

C

PRESSURE CONTROLS

Valve Type	Graphic Symbols	Maximum Operating Pressure MPa (PSI)	Maximum Flow												Page
Remote Cont. Relief Valves		25 (3630)	DT DG 01												203
Direct Type Relief Valves		21 (3050)	DT/DG 02												206
Pilot Operated Relief Valves		25 (3630)	BT/BG 03 06												209
Low Noise Type Pilot Operated Relief Valves		25 (3630)	S-BG 03 06 10												216
Sol. Cont. Relief Valves		25 (3630)	BST/BSG 03 06 10												220
Low Noise Type Sol. Cont. Relief Valves		25 (3630)	S-BSG 03 06 10												230
H Type Press. Cont. Valves / HC Type Press. Cont. Valves		21 (3050)	HT/HG HCT/HCG 03 06 10 HF HCF 16												237
Press. Reducing Valves / Press. Reducing & Check Valves		21 (3050)	RT/RG RCT/RCG 03 06 10 RF RCF 16												251
Pres. Reducing & Relieving Valves		03 : 14(2030) 06 : 25(3630)	RBG 03 06												260
Unloading Relief Valves		21 (3050)	BUCC 06 10												265
Brake Valves		25 (3630)	UBGR 03 06 10												271
Semiconductor Type Pressure Switches		35 (5080)	JT-02												272
Pressure Monitoring System		20(2900) 35(5080)													274

Hydraulic Fluids

Fluid Types

Any type of hydraulic fluids listed in the table below can be used.

Petroleum base oils	Use fluids equivalent to ISO VG 32 or VG 46.
Synthetic fluids	Use phosphate ester or polyol ester fluid. When phosphate ester fluid is used, prefix "F-" to the model number because the special seals (fluororubber) are required to be used.
Water containing fluids	Use water-glycol fluid.

Note: For use with hydraulic fluids other than those listed above, please consult your Yuken representatives in advance.

Recommended Fluid Viscosity and Temperature

Use under conditions where the viscosity and temperature of the hydraulic fluid remain in the ranges indicated in the following table.

Name	Viscosity	Temperature
Remote Control Relief Valves Direct Type Relief Valves Pilot Operated Relief Valves Low Noise Type Pilot Operated Relief Valves Solenoid Controlled Relief Valves * Low Noise Type Solenoid Controlled Relief Valves * H Type Pressure Control Valves HC Type Pressure Control Valves Pressure Reducing Valves Pressure Reducing and Check Valves Pressure Reducing and Relieving Valves Unloading Relief Valves Brake Valves	15 - 400 mm ² /s (88 - 1800 SSU)	-15 - +70°C (5 - 158°F)
Semiconductor Type Pressure Switches	15 - 400 mm ² /s (88 - 1800 SSU)	-20 - +70°C (- 4 - 158°F)

* If the valve is provided with a vent restrictor (ex. : A-BSG-03), the viscosity range should be 15 - 200 mm²/s (80 - 900 SSU).

Control of Contamination

Due caution must be paid to maintaining control over contamination of the hydraulic fluids which may otherwise lead to breakdowns and shorten the life of the valves. Please maintain the degree of contamination within NAS 1638-Grade 12. Use 25 μm or finer line filter.

Interchangeability in Installation between Current and New Design

Model change has been made on the following products.

The difference between current and new design has been described on the paragraph of "Interchangeability in Installation between Current and New Design". Refer to relevant pages on each series.

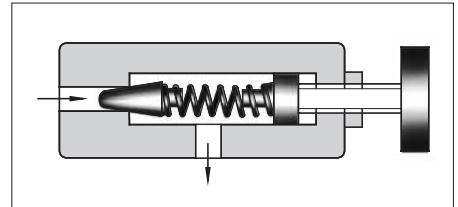
Name	Model Numbers		Mounting Interchangeability	Main Changes	Page
	Current	New			
Solenoid Controlled Relief Valve	BS*-03, -47*	BS*-03, -48*	Yes	Pilot valves (DSG-01) have been changed in the design numbers 70.	222
	BS*-06, -47*	BS*-06, -48*			
	BS*-10, -47*	BS*-10, -48*			
Low Noise Type Solenoid Controlled Relief Valve	S-BSG-03, -52*	S-BSG-03, -53*	Yes		231
	S-BSG-06, -52*	S-BSG-06, -53*			
	S-BSG-10, -52*	S-BSG-10, -53*			

Remote Control Relief Valves

This valve is used as a remote control valve for pilot operated type pressure control valves.

Specifications

Model Numbers		Max. Operating Pres. MPa (PSI)	Approx. Mass kg (lbs.)	
Threaded Connection	Sub-plate Mounting		DT type	DG type
DT-01-22*	DG-01-22*	25 (3630)	1.6 (3.5)	1.4 (3.1)



Remote Control Relief Valves

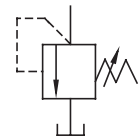
Model Number Designation

F-	D	T	-01	-22	*
Special Seals	Series Number	Type of Mounting	Valve Size	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	D: Remote Control Relief Valves	T: Threaded Connection	01	22	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std.
		G: Sub-plate Mounting		22	None: Japanese Std. "JIS" and European Design Std. 90: N. American Design Std.

Instructions

- To adjust the pressure, loosen the lock nut and turn the handle slowly clockwise for higher pressures or anti-clockwise for lower pressures. After adjustments, do not forget to tighten the lock nut.
- Piping of the tank line should not be connected to any tank line of the other valves, but connected directly to the reservoir.
- Pressure is limited by collars fitted. If a working pressure cannot be attained, remove some collars. One collar is equivalent to 10 MPa (1450 PSI).
- If the internal volume of the vent line is too large, chattering is likely to occur.

Graphic Symbol



Attachment

Mounting bolts

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Std. "JIS" and European Design Std.	N. American Design Std.	
DG-01	M5 × 45 Lg.	No.10-24 UNC × 1-3/4 Lg.	4

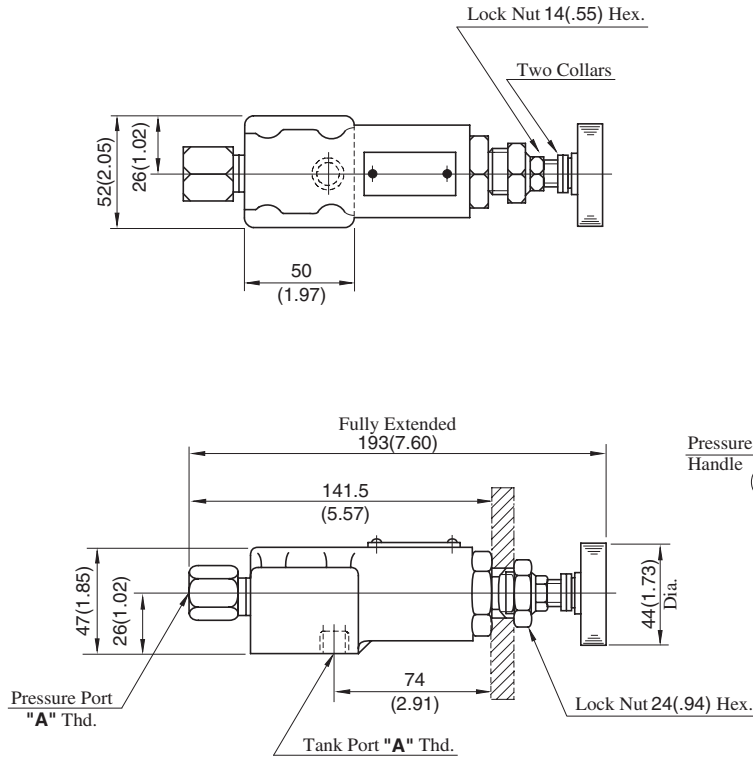
Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
DG-01	DGM-02-20	Rc 1/4	DGM-02-2080	1/4 BSP.F	DGM-02-2090	1/4 NPT	0.7 (1.5)

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

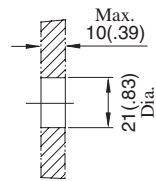
DT-01-22/2280/2290

DIMENSIONS IN MILLIMETRES (INCHES)

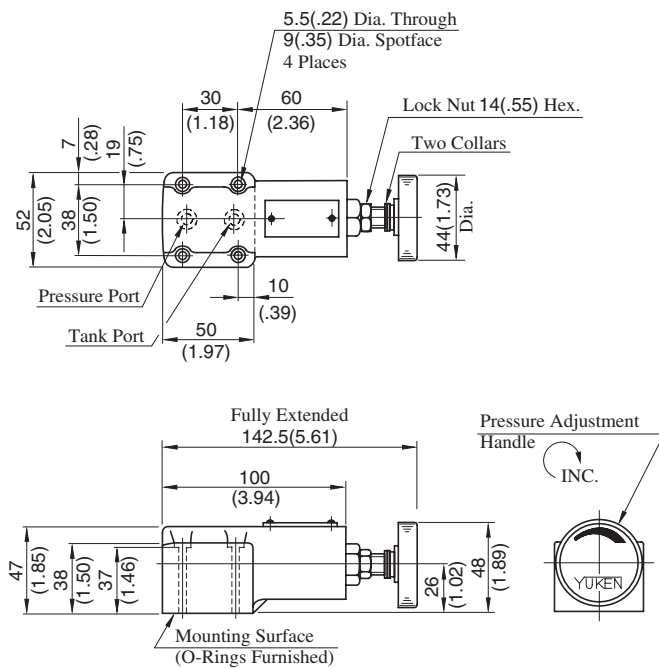


Model Numbers	"A" Thd.
DT-01-22	Rc 1/4
DT-01-2280	1/4 BSP.F
DT-01-2290	1/4 NPT

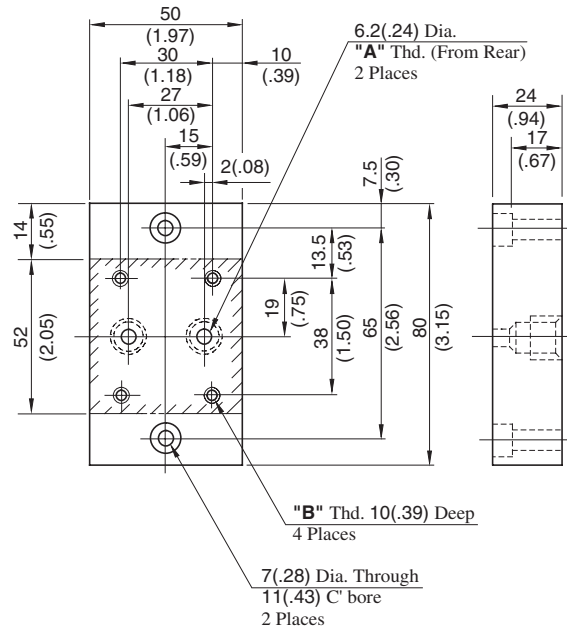
Dimensions of The Panel Mounting Hole



DG-01-22/2290



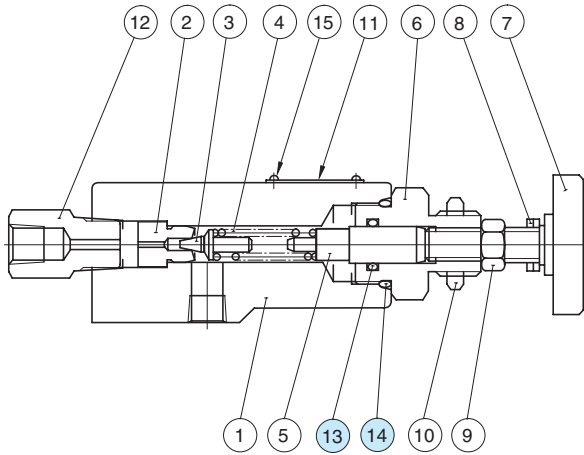
Sub-plate: DGM-02-20/2080/2090



Model Numbers	"A" Thd.	"B" Thd.
DGM-02-20	Rc 1/4	M5
DGM-02-2080	1/4 BSP.F	
DGM-02-2090	1/4 NPT	No. 10-24 UNC

Spare Parts List

DT-01-22/2280/2290



List of Seals

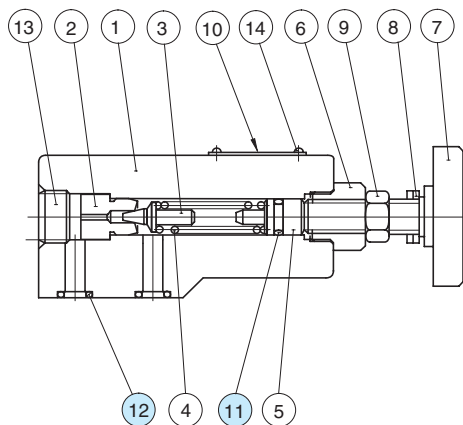
Item	Name of Parts	Part Numbers	Qty.
13	O-Ring	SO-NA-P12	1
14	O-Ring	SO-NB-P22.4	1

Note: When ordering the seals, please specify the seal kit number from the table below.

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
DT-01	KS-DT-01-22
DG-01	KS-DG-01-22

DG-01-22/2290



List of Seals

Item	Name of Parts	Part Numbers	Qty.
11	O-Ring	SO-NA-P9	1
12	O-Ring	SO-NB-P9	2

Note: When ordering the seals, please specify the seal kit number from the table above.

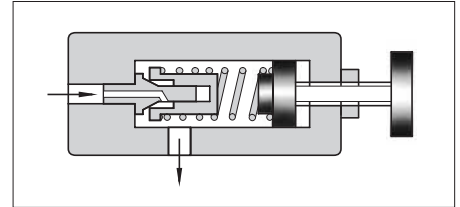
Direct Type Relief Valves

This valve is used in a hydraulic circuit to prevent damage due to over pressure and to adjust the maximum circuit pressure of small capacity.

Specifications

Model Numbers		Max. Operating Pressure MPa (PSI)	Pres. Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg (lbs.)	
Threaded Connection	Sub-plate Mounting				DT type	DG type
DT-02-*-22*	DG-02-*-22*	21 (3050)	Note)	16 (4.23)	1.5 (3.3)	1.5 (3.3)

Note: Refer to the Model Number Designation.



Model Number Designation

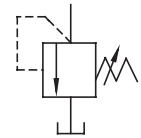
F-	D	T	-02	-B	-22	*
Special Seals	Series Number	Type of Mounting	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	D: Direct Type Relief Valves	T: Threaded Connection	02	B: ★-7 (★-1020)	22	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std.
		G: Sub-plate Mounting		C: 3.5-14 (510-2030)		
				H: 7-21 (1020-3050)	22	None: Japanese Std. "JIS" and European Design Std. 90: N. American Design Std.

★ Refer to the Minimum Adjustment Pressure Characteristics.

Instructions

- To adjust the pressure, loosen the lock nut and turn the handle slowly clockwise for higher pressures or anti-clockwise for lower pressures. After adjustments, do not forget to tighten the lock nut.
- Piping of the tank line should not be connected to any tank line of the other valves, but connected directly to the reservoir.

Graphic Symbol



Attachment

Mounting bolts

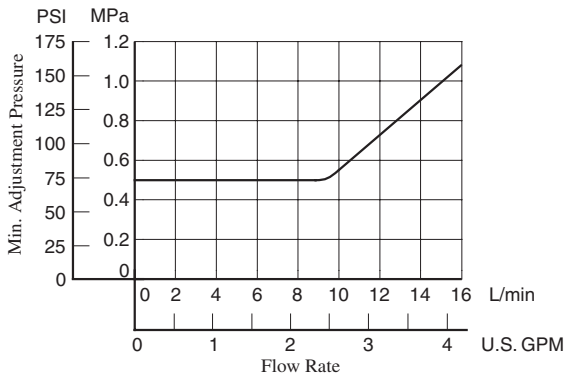
Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Std. "JIS" and European Design Std.	N. American Design Std.	
DG-02	M5 × 45 Lg.	No.10-24 UNC × 1-3/4 Lg.	4

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
DG-02	DGM-02-20	Rc 1/4	DGM-02-2080	1/4 BSP.F	DGM-02-2090	1/4 NPT	0.7 (1.5)

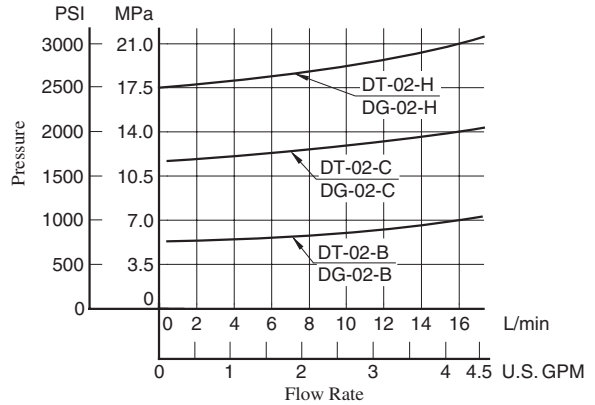
- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- The sub-plates are those for remote control relief valves. For dimensions, see [page 204](#).

Min. Adjustment Pressure

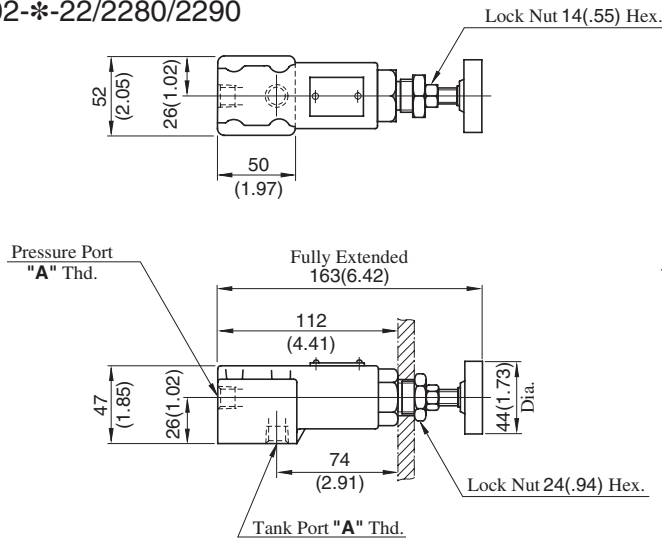


Nominal Override Characteristics

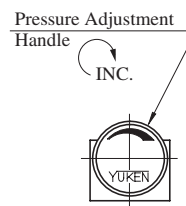
Hydraulic fluid
Viscosity : 35 mm²/s (164 SSU)
Specific Gravity : 0.850



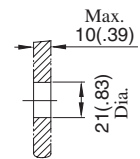
DT-02-*-22/2280/2290



Model Numbers	"A" Thd.
DT-02-*-22	Rc 1/4
DT-02-*-2280	1/4 BSP.F
DT-02-*-2290	1/4 NPT

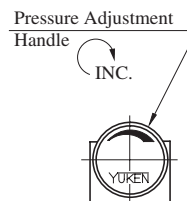
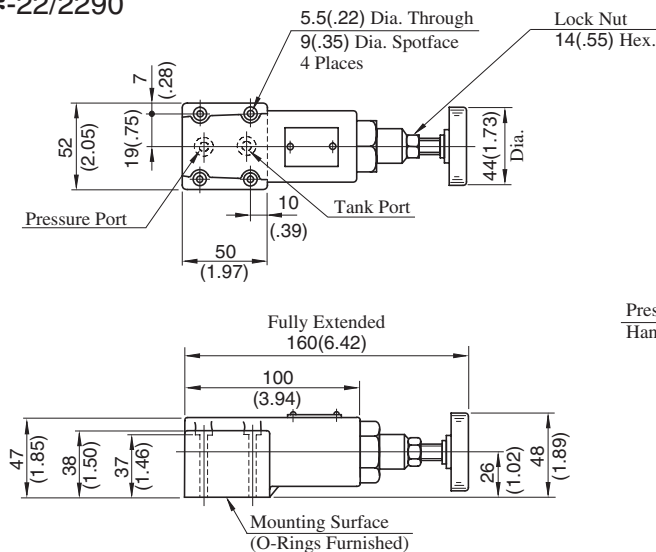


Dimensions of The Panel Mounting Hole



DIMENSIONS IN MILLIMETRES (INCHES)

DG-02-*-22/2290

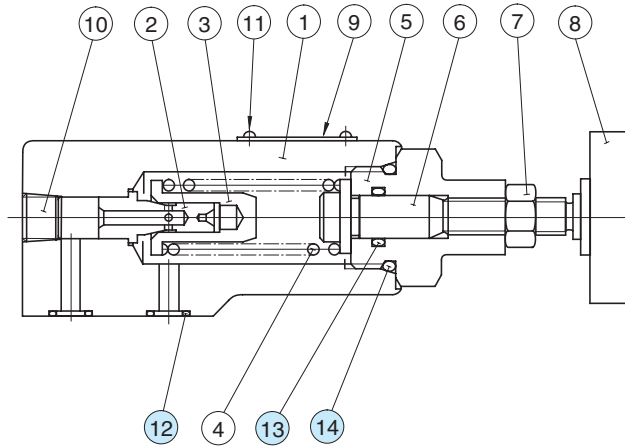


Note: For dimensions of the valve mounting surface, see the dimensional drawing (page 204) of the sub-plate used together.

■ Spare Parts List

DT-02-*-22/2280/2290

DG-02-*-22/2290



● List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
12	O-Ring	SO-NB-P9	2	Use only for DG-02
13	O-Ring	SO-NA-P12	1	———
14	O-Ring	SO-NB-P22.4	1	———

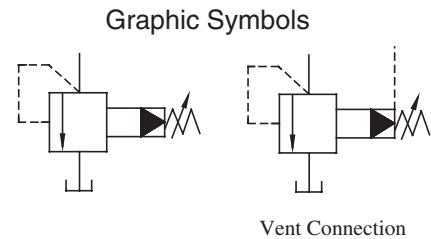
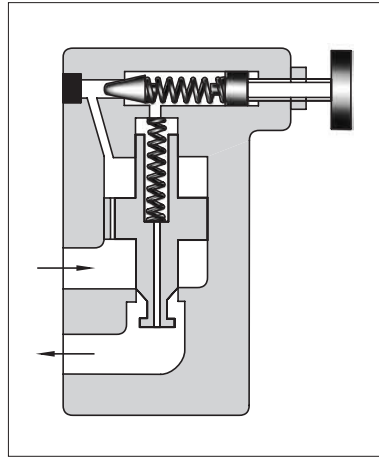
Note: When ordering the seals, please specify the seal kit number from the table below.

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
DT-02	KS-DT-01-22
DG-02	KS-DG-02-22

Pilot Operated Relief Valves

These valves protect the hydraulic system from excessive pressure, and can be used to maintain constant pressure in a hydraulic system. Remote control and unloading are permitted by using vent circuits.



Specifications

Model Numbers		Max. Operating Pressure MPa (PSI)	Pres. Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg (lbs.)	
Threaded Connection	Sub-plate Mounting				BT type	BG type
BT-03-*-32*	BG-03-*-32*	25 (3630)	Note) ★-25 (★-3630)	100 (26.4)	5.0 (11.0)	4.7 (10.4)
BT-06-*-32*	BG-06-*-32*			200 (52.8)	5.0 (11.0)	5.6 (12.3)
BT-10-*-32*	BG-10-*-32*			400 (106)	8.5 (18.7)	8.7 (19.2)

Note: Refer to the Minimum adjustment Pressure characteristics on [page 214](#).

Model Number Designation

F-	B	T	-03	-V	-32	*
Special Seals	Series Number	Type of Mounting	Valve Size	High Venting* Pres. Feature	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	B: Pilot Operated Relief Valves	T: Threaded Connection	03	V: For High Venting Pressure Feature (Omit if not required)	32	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std.
			06		32	
			10		32	
		G: Sub-plate Mounting	03		32	None: Japanese Std. "JIS" and European Design Std. 90: N. American Design Std.
			06		32	
			10		32	

★ Use high venting pressure type to reduce the response time from unload to onload.

■ Attachment

● Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw	
	Japanese Std. "JIS" and European Design Std.	N. American Design Std.
BG-03	M12 × 70 Lg. (2 pcs.), M12 × 95 Lg. (2 pcs.)	1/2-13UNC × 2-3/4 Lg. (2 pcs.), 1/2-13UNC × 3-3/4 Lg. (2 pcs.)
BG-06	M16 × 60 Lg. (2 pcs.), M16 × 80 Lg. (2 pcs.)	5/8-11UNC × 2-1/4 Lg. (2 pcs.), 5/8-11UNC × 3-1/4 Lg. (2 pcs.)
BG-10	M20 × 70 Lg. (2 pcs.), M20 × 90 Lg. (2 pcs.)	3/4-10UNC × 2-3/4 Lg. (2 pcs.), 3/4-10UNC × 3-1/2 Lg. (2 pcs.)

■ Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
BG-03	BGM-03-20	Rc 3/8	BGM-03-3080	3/8 BSP.F	BGM-03-2090	3/8 NPT	2.4(5.3)
	BGM-03X-20	Rc 1/2	BGM-03X-3080	1/2 BSP.F	BGM-03X-2090	1/2 NPT	3.1(6.8)
BG-06	BGM-06-20	Rc 3/4	BGM-06-3080	3/4 BSP.F	BGM-06-2090	3/4 NPT	4.7(10.4)
	BGM-06X-20	Rc 1	BGM-06X-3080	1 BSP.F	BGM-06X-2090	1 NPT	5.7(12.6)
BG-10	BGM-10-20	Rc 1-1/4	BGM-10-3080	1-1/4 BSP.F	BGM-10-2090	1-1/4 NPT	8.4(18.5)
	BGM-10X-20	Rc 1-1/2	BGM-10X-3080	1-1/2 BSP.F	BGM-10X-2090	1-1/2 NPT	10.3(22.7)

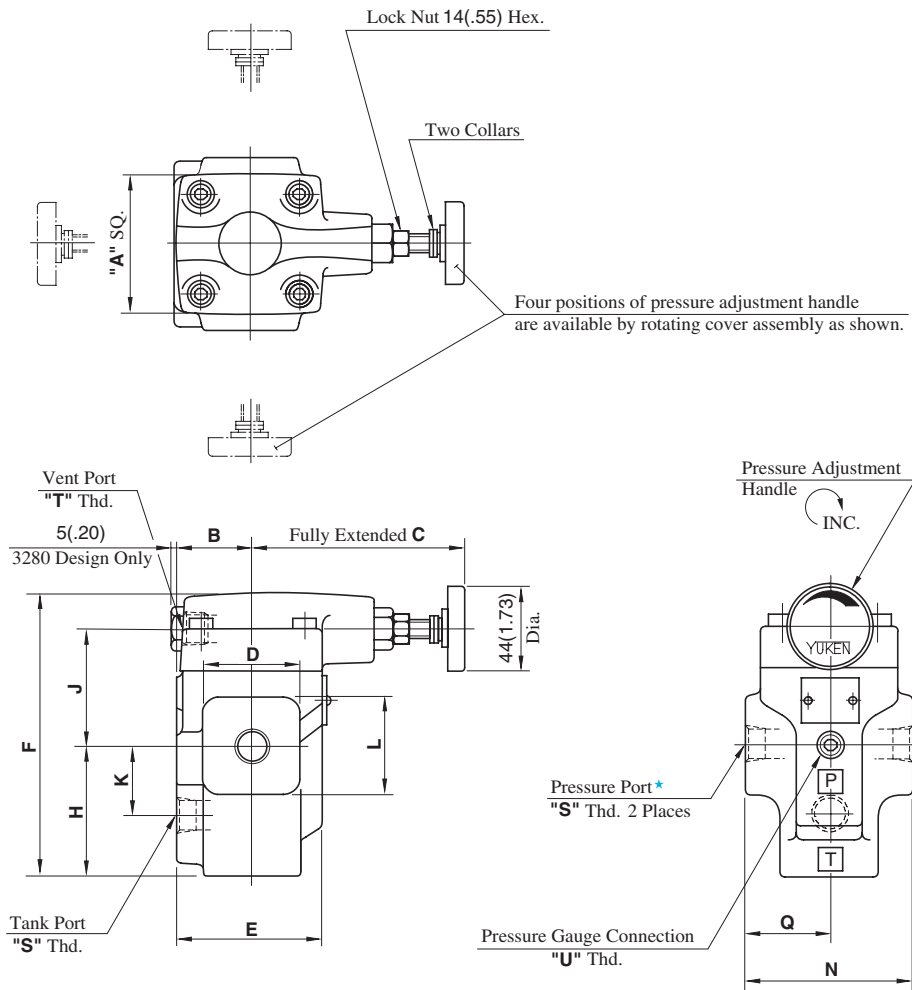
- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

■ Instructions

- If a remote control relief valve is used in the vent circuit, see [page 203](#). In addition, if the internal volume of the vent line is too large, chattering is likely to occur. Thus, as far as possible reduce the inside diameter and the length of the pipe.
- To adjust the pressure, loosen the lock nut and turn the handle slowly clockwise for higher pressures or anti-clockwise for lower pressures. After adjustments, do not forget to tighten the lock nut.
- Piping of the tank line should not be connected to any tank line of the other valves, but connected directly to the reservoir.
- Pressure is limited by collars fitted. If a working pressure cannot be attained, remove some collars. One collar is equivalent to 10 MPa (1450 PSI).
- With a small flow, the setting pressure may be unstable. Use models numbered 03 and 06 with a flow rate above 8 L/min (2.1 U.S. GPM) and model 10 with 15 L/min (4.0 U.S. GPM).

BT-03-*-32/3280/3290
 BT-06-*-32/3280/3290
 BT-10-*-32/3280/3290

DIMENSIONS IN
MILLIMETRES (INCHES)



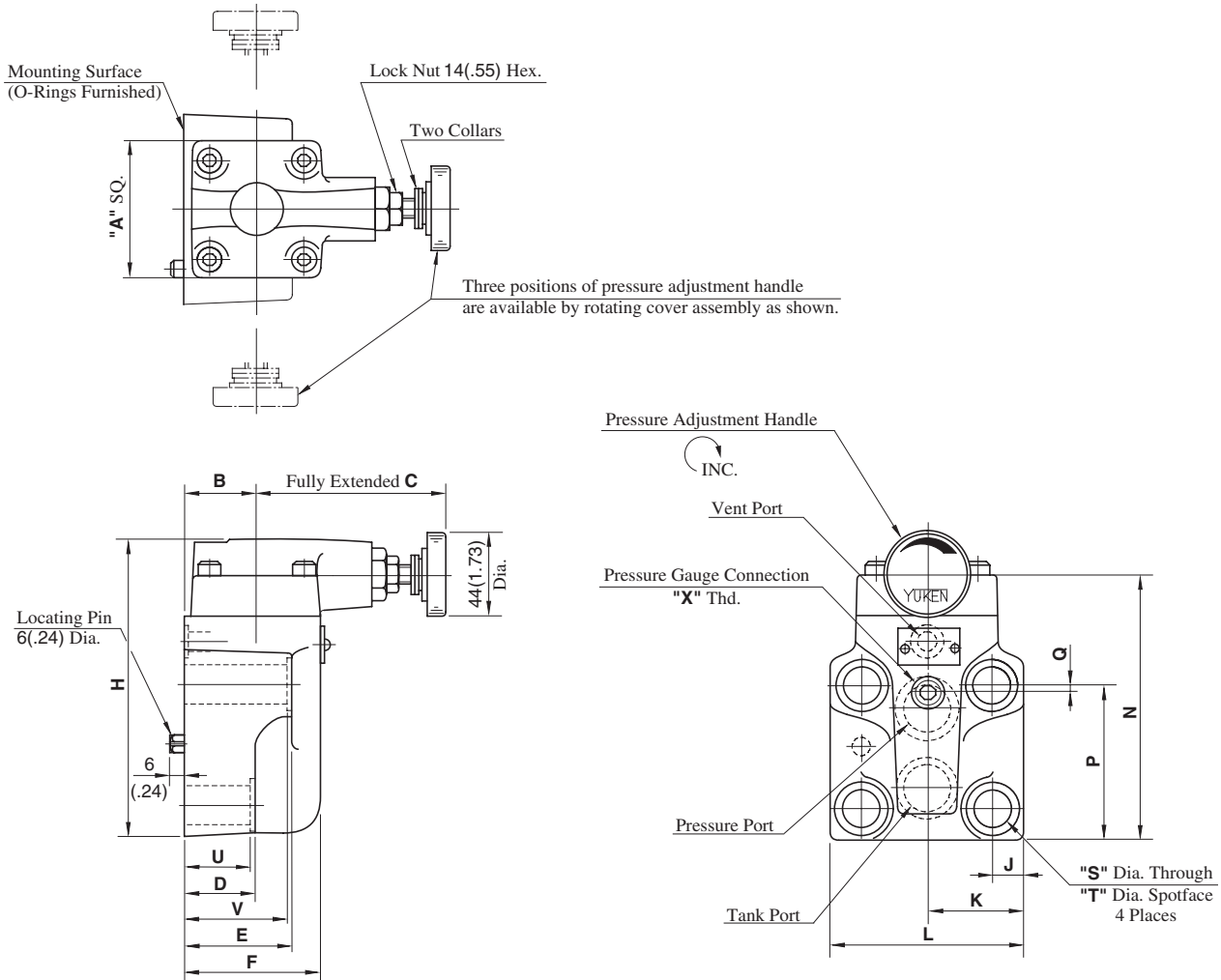
★ There are two threaded connection pressure ports. They can be connected each other in-line; one as inlet and the other as an outlet or the valve can be used by plugging one of the pressure ports.

Model Numbers	Dimensions mm (Inches)											
	A	B	C	D	E	F	H	J	K	L	N	Q
BT-03-*-32/3280/3290	75 (2.95)	40 (1.57)	105 (4.13)	52 (2.05)	78 (3.07)	150.5 (5.93)	68.5 (2.70)	62 (2.44)	36 (1.42)	52 (2.05)	90 (3.54)	45 (1.77)
BT-06-*-32/3280/3290												
BT-10-*-32/3280/3290	85 (3.35)	50 (1.97)	101 (3.98)	80 (3.15)	96 (3.78)	183 (7.20)	89 (3.50)	74 (2.91)	49 (1.93)	80 (3.15)	120 (4.72)	60 (2.36)

Model Numbers	Thread Size		
	"S" Thd.	"T" Thd.	"U" Thd.
BT-03-*-32	Rc 3/8	Rc 3/8	Rc 1/4
BT-03-*-3280	3/8 BSP.F	3/8 BSP.F	1/4 BSP.Tr
BT-03-*-3290	3/8 NPT	3/8 NPT	1/4 NPT
BT-06-*-32	Rc 3/4	Rc 3/8	Rc 1/4
BT-06-*-3280	3/4 BSP.F	3/8 BSP.F	1/4 BSP.Tr
BT-06-*-3290	3/4 NPT	3/8 NPT	1/4 NPT
BT-10-*-32	Rc 1-1/4	Rc 3/8	Rc 1/4
BT-10-*-3280	1-1/4 BSP.F	3/8 BSP.F	1/4 BSP.Tr
BT-10-*-3290	1-1/4 NPT	3/8 NPT	1/4 NPT

BG-03-*-32/3290
 BG-06-*-32/3290
 BG-10-*-32/3290

**DIMENSIONS IN
 MILLIMETRES (INCHES)**

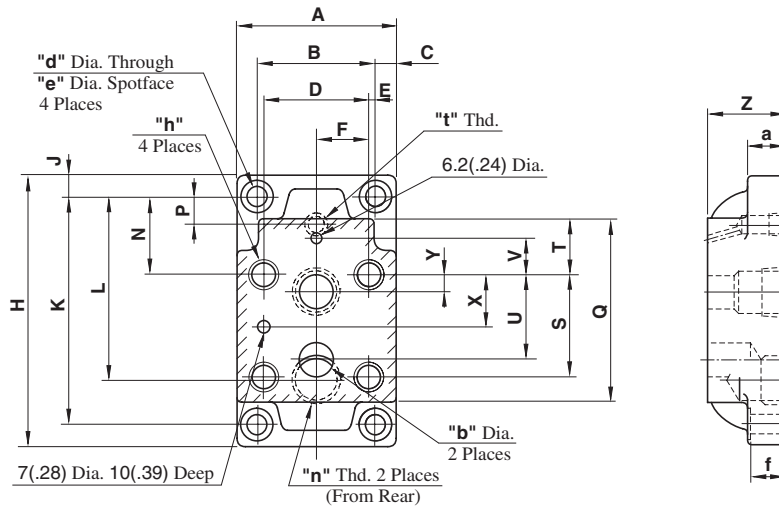


Model Numbers	Dimensions mm (Inches)																
	A	B	C	D	E	F	H	J	K	L	N	P	Q	S	T	U	V
BG-03-*-32/3290	75 (2.95)	40 (1.57)	105 (4.13)	57 (2.24)	78 (3.07)	78 (3.07)	137 (5.39)	14.1 (.56)	41 (1.61)	82 (3.23)	117 (4.61)	77 (3.03)	22 (.87)	13.5 (.53)	21 (.83)	55 (2.17)	77 (3.03)
BG-06-*-32/3290	75 (2.95)	40 (1.57)	105 (4.13)	40 (1.57)	60 (2.36)	78 (3.07)	161 (6.34)	17 (.67)	52 (2.05)	104 (4.09)	141 (5.55)	83.5 (3.29)	4.5 (.18)	17.5 (.69)	26 (1.02)	38 (1.50)	58 (2.28)
BG-10-*-32/3290	85 (3.35)	45 (1.77)	101 (3.98)	47 (1.85)	67 (2.64)	87.5 (3.44)	195 (7.68)	20.7 (.81)	62 (2.44)	124 (4.88)	175 (6.89)	110 (4.33)	6 (.24)	21.5 (.85)	32 (1.26)	45 (1.77)	65 (2.56)

Model Numbers	Thread Size	Mounting Surface
	"X" Thd	
BG-03-*-32	Rc 1/4 = 1/4 BSP.Tr	ISO 6264-AR-06-2-A
BG-03-*-3290	1/4 NPT	
BG-06-*-32	Rc 1/4 = 1/4 BSP.Tr	ISO 6264-AS-08-2-A
BG-06-*-3290	1/4 NPT	
BG-10-*-32	Rc 1/4 = 1/4 BSP.Tr	ISO 6264-AT-10-2-A
BG-10-*-3290	1/4 NPT	

BGM-03,03X-20 / 3080 / 2090
 BGM-06,06X-20 / 3080 / 2090
 BGM-10,10X-20 / 3080 / 2090

DIMENSIONS IN
 MILLIMETRES (INCHES)



Model Numbers	Dimensions mm (Inches)													
	A	B	C	D	E	F	H	J	K	L	N	P	Q	S
BGM-03	86	60	13	53.8	3.1	26.9	149	13	123	86	32	26	97	53.8
BGM-03X	(3.39)	(2.36)	(.51)	(2.12)	(.12)	(1.06)	(5.87)	(.51)	(4.84)	(3.39)	(1.26)	(1.02)	(3.82)	(2.12)
BGM-06	108	78	15	70	4	35	180	15	150	106.5	51	27.2	121	66.7
BGM-06X	(4.25)	(3.07)	(.59)	(2.76)	(.16)	(1.38)	(7.09)	(.59)	(5.91)	(4.19)	(2.01)	(1.07)	(4.76)	(2.63)
BGM-10	126	94	16	82.6	5.7	41.3	227	16	195	138.2	62	30.2	154	88.9
BGM-10X	(4.96)	(3.70)	(.63)	(3.25)	(.22)	(1.63)	(8.94)	(.63)	(7.68)	(5.44)	(2.44)	(1.19)	(6.06)	(3.50)

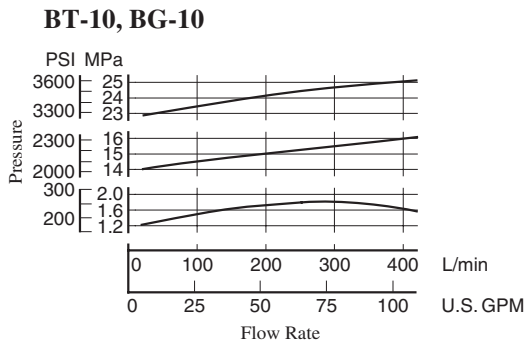
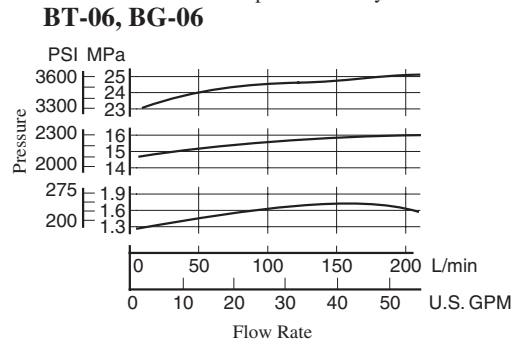
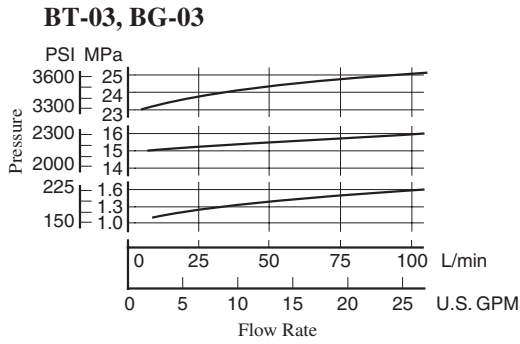
Model Numbers	Dimensions mm (Inches)										
	T	U	V	X	Y	Z	a	b	d	e	f
BGM-03	19	47.4	0	22	22	32	20	14.5	11	17.5	19
BGM-03X	(.75)	(1.87)	(0)	(.87)	(.87)	(1.26)	(.79)	(.57)	(.43)	(.69)	(.75)
BGM-06	37	55.5	23.8	33.4	11	40	25	23	13.5	21	24
BGM-06X	(1.46)	(2.19)	(.94)	(1.31)	(.43)	(1.57)	(.98)	(.91)	(.53)	(.83)	(.94)
BGM-10	42	76.2	31.8	44.5	12.7	50	32	28	17.5	26	31
BGM-10X	(1.65)	(3.00)	(1.25)	(1.75)	(.50)	(1.97)	(1.26)	(1.10)	(.69)	(1.02)	(1.22)

Model Numbers	Japanese Standard "JIS" Design "20"			European Design Standard Design "3080"			N. American Design Standard Design "2090"		
	"h"	"n" Thd.	"t" Thd.	"h"	"n" Thd.	"t" Thd.	"h"	"n" Thd.	"t" Thd.
BGM-03	M12 Thd.	Rc 3/8	Rc 1/4	M12 Thd.	3/8 BSP.F	1/4 BSP.F	1/2-13UNC Thd.	3/8 NPT	1/4 NPT
BGM-03X	20(.79) Deep	Rc 1/2		20(.79) Deep	1/2 BSP.F		22(.87) Deep	1/2 NPT	
BGM-06	M16 Thd.	Rc 3/4		M16 Thd.	3/4 BSP.F		5/8-11UNC Thd.	3/4 NPT	
BGM-06X	25(.98) Deep	Rc 1		25(.98) Deep	1 BSP.F		27(1.06) Deep	1 NPT	
BGM-10	M20 Thd.	Rc1-1/4	M20 Thd.	1-1/4 BSP.F	3/4-10UNC Thd.	1-1/4 NPT			
BGM-10X	28(1.10) Deep	Rc 1-1/2	28(1.10) Deep	1-1/2 BSP.F	28(1.10) Deep	1-1/2 NPT			



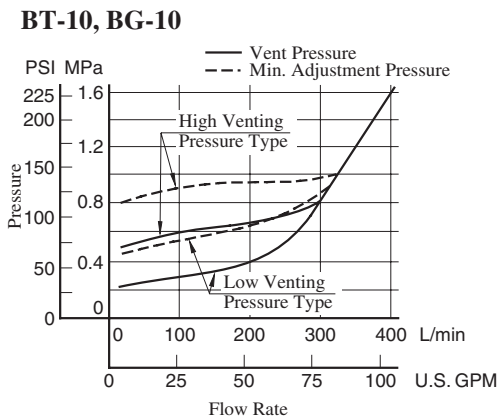
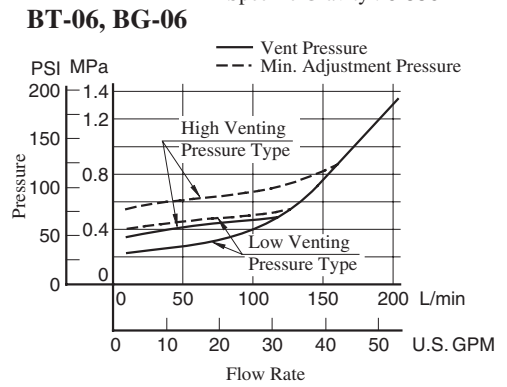
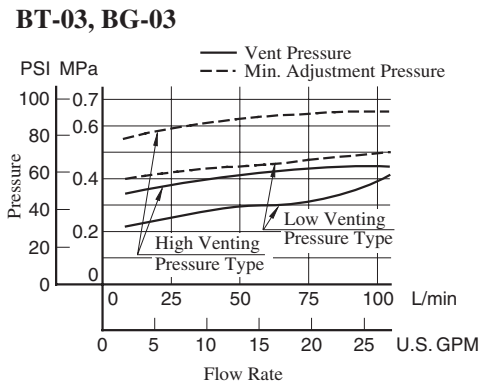
Nominal Override Characteristics

Hydraulic fluid: Viscosity : 35 mm²/s (164 SSU)
Specific Gravity : 0.850



Min. Adj. Pressure & Vent Pressure vs. Flow

Hydraulic fluid: Viscosity : 35 mm²/s (164 SSU)
Specific Gravity : 0.850

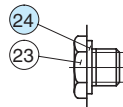
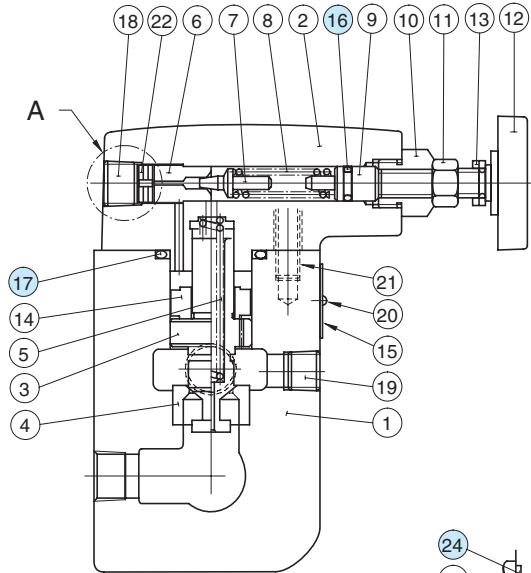


Spare Parts List

BT-03-* -32/3280/3290

BT-06-* -32/3280/3290

BT-10-* -32/3280/3290



Section "A"
for Design 3280

List of Seals

Item	Name of Parts	Part Numbers			Qty.
		BT-03	BT-06	BT-10	
16	O-Ring	SO-NA-P9	SO-NA-P9	SO-NA-P9	1
17	O-Ring	SO-NB-P32	SO-NB-P42	SO-NB-P42	1
24	Bonded Seal	SG-FB-3/8	SG-FB-3/8	SG-FB-3/8	1

Note: When ordering the seals, please specify the seal kit number from the table below.

List of Seal Kits

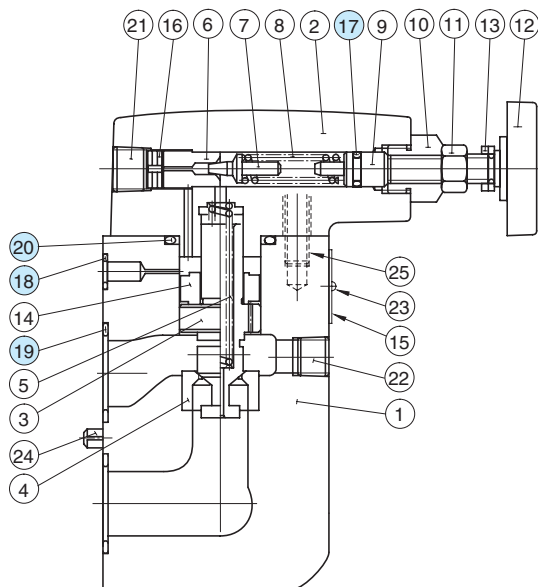
Valve Model Numbers	Seal Kit Numbers
BT-03	KS-BT-03-32
BT-06	
BT-10	KS-BT-10-32

Note: No bonded seals are included in the seal kits.

BG-03-* -32/3290

BG-06-* -32/3290

BG-10-* -32/3290



List of Seals

Item	Name of Parts	Part Numbers			Qty.
		BG-03	BG-06	BG-10	
17	O-Ring	SO-NA-P9	SO-NA-P9	SO-NA-P9	1
18	O-Ring	SO-NB-P9	SO-NB-P11	SO-NB-P9	1
19	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	2
20	O-Ring	SO-NB-P32	SO-NB-P32	SO-NB-P42	1

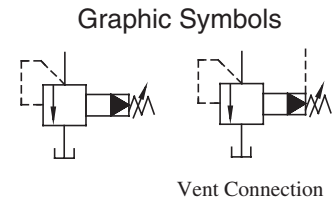
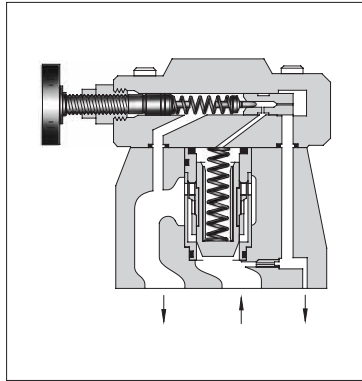
Note: When ordering the seals, please specify the seal kit number from the table below.

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
BG-03	KS-BG-03-32
BG-06	KS-BG-06-32
BG-10	KS-BG-10-32

Low Noise Type Pilot Operated Relief Valves

Pilot operated relief valves here have been particularly developed as low-noise types. Able to protect pumps and control valves against excessive pressures, they are used to control the pressure in the hydraulic system to a constant level. Remote control and unloading are permitted by using vent circuits.



Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Pres. Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg (lbs.)
S-BG-03-*-40*	25 (3630)	Note	100 (26.4)	4.1 (9.0)
S-BG-06-*-40*		★-25	200 (52.8)	5.0 (11.0)
S-BG-10-*-40*		(★-3630)	400 (106)	10.5 (23.2)

Note: See minimum adjustment pressure characteristics on [page 218](#).

Model Number Designation

F-	S-	B	G	-03	-V	-L	-40	*
Special Seals	Low Noise Type	Series Number	Type of Mounting	Valve Size	High Venting*1	Direction of Handle	Design Number	Design Std.
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	S: Low Noise Type	B: Pilot Operated Relief Valves	G: Sub-plate Mounting	03	V: For High Venting Pressure Feature (Omit if not required)	(Viewed from pressure gauge connection) L: Left (Normal) R: Right	40	Refer to ★2
				06			40	
				10			40	

★1. Use the high venting pressure type where it is necessary to reduce the response time from unloading to onloading.

★2. Design Standards: None Japanese Standard "JIS" and European Design Standard 90 N. American Design Standard

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
S-BG-03	BGM-03-20	Rc 3/8	BGM-03-3080	3/8 BSP.F	BGM-03-2090	3/8 NPT	2.4 (5.3)
	BGM-03X-20	Rc 1/2	BGM-03X-3080	1/2 BSP.F	BGM-03X-2090	1/2 NPT	3.1 (6.8)
S-BG-06	BGM-06-20	Rc 3/4	BGM-06-3080	3/4 BSP.F	BGM-06-2090	3/4 NPT	4.7 (10.4)
	BGM-06X-20	Rc 1	BGM-06X-3080	1 BSP.F	BGM-06X-2090	1 NPT	5.7 (12.6)
S-BG-10	BGM-10-20	Rc 1-1/4	BGM-10-3080	1-1/4 BSP.F	BGM-10-2090	1-1/4 NPT	8.4 (18.5)
	BGM-10X-20	Rc 1-1/2	BGM-10X-3080	1-1/2 BSP.F	BGM-10X-2090	1-1/2 NPT	10.3 (22.7)

• Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

• The sub-plates are those for pilot operated relief valves. For dimensions, see [page 213](#).

- Attachment
- Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Std. "JIS" and European Design Std.	N. American Design Std.	
S-BG-03	M12 × 40 Lg.	1/2-13 UNC × 1-1/2 Lg.	4
S-BG-06	M16 × 50 Lg.	5/8-11 UNC × 2 Lg.	4
S-BG-10	M20 × 60 Lg.	3/4-10 UNC × 2-1/4 Lg.	4

Instructions

- If a remote control relief valve is used in the vent circuit, see [page 203](#). In addition, if the internal volume of the vent line is too large, chattering is likely to occur. Thus, as far as possible reduce the inside Dia. and the length of the pipe.
- To adjust the pressure, loosen the lock nut and turn the handle slowly clockwise for higher pressures or anti-clockwise for lower pressures. After adjustments, do not forget to tighten the lock nut.
- Piping of the tank line should not be connected to any tank line of the other valves, but connected directly to the reservoir.
- Pressure is limited by collars. If a working pressure cannot be attained, remove some collars. One collar is equivalent to 10 MPa (1450 PSI).
- With a small flow, the setting pressure may be unstable. Use models numbered 03 and 06 with a flow rate above 5 L/min (1.3 U.S. GPM) and model 10 with 8 L/min (2.1 U.S. GPM).

S-BG-03-**-L-40/4090
S-BG-06-**-L-40/4090
S-BG-10-**-L-40/4090

**DIMENSIONS IN
MILLIMETRES (INCHES)**

Mounting surface
S-BG-03: ISO 6264-AR-06-2-A
S-BG-06: ISO 6264-AS-08-2-A
S-BG-10: ISO 6264-AT-10-2-A

Opposite Handle Position

S-BG-03--R**

Note: For other dimensions, see the figures shown left.

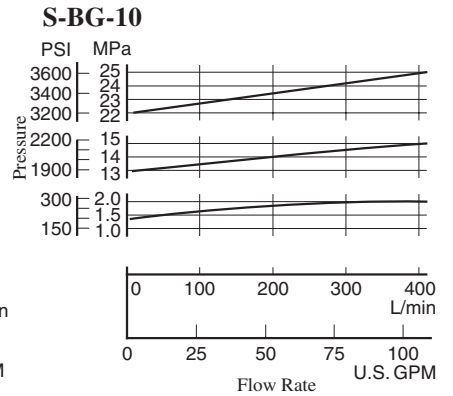
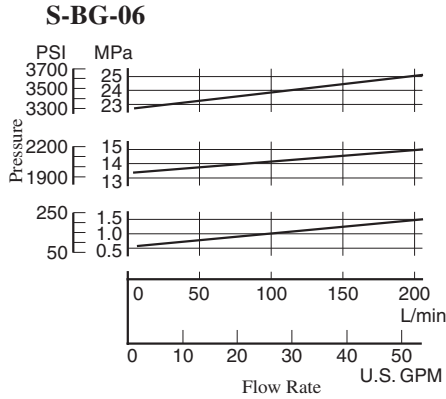
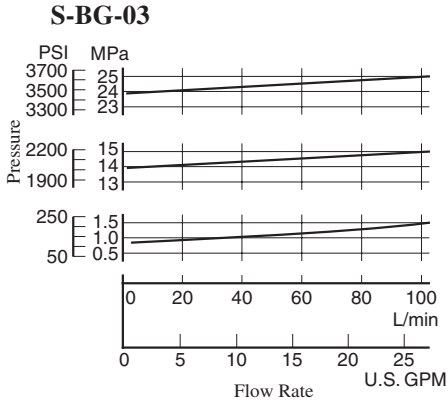
Note: For dimensions of the valve mounting surface, see the dimensional drawing (P. 213) of the sub-plate used together.

Model Numbers	"Y" Thd.
S-BG-03-**-*-40	Rc 1/4 = 1/4 BSP.Tr
S-BG-03-**-*-4090	1/4 NPT
S-BG-06-**-*-40	Rc 1/4 = 1/4 BSP.Tr
S-BG-06-**-*-4090	1/4 NPT
S-BG-10-**-40	Rc 1/4 = 1/4 BSP.Tr
S-BG-10-**-4090	1/4 NPT

Model Numbers	Dimensions mm (Inches)																	
	A	B	C	D	E	F	H	J	K	N	P	Q	S	T	U	V	X	Z
S-BG-03	76 (2.99)	53.8 (2.12)	11.1 (.44)	26.9 (1.06)	53.8 (2.12)	73.6 (2.90)	26.9 (1.06)	163.5 (6.44)	13.5 (.53)	21 (.83)	50 (1.97)	130 (5.12)	103 (4.06)	21.5 (.85)	106 (4.17)	26.1 (1.03)	13 (.51)	36.1 (1.42)
S-BG-06	98 (3.86)	70 (2.76)	14 (.55)	35 (1.38)	66.7 (2.63)	58.8 (2.31)	33.7 (1.33)	163.5 (6.44)	17.5 (.69)	26 (1.02)	50 (1.97)	130 (5.12)	103 (4.06)	26 (1.02)	122 (4.80)	19.3 (.76)	13 (.51)	21.3 (.84)
S-BG-10	120 (4.72)	82.6 (3.25)	18.7 (.74)	41.3 (1.63)	88.9 (3.50)	46.1 (1.81)	44.9 (1.77)	180 (7.09)	21.5 (.85)	32 (1.26)	65 (2.56)	167 (6.57)	135 (5.31)	33.5 (1.32)	155 (6.10)	21.1 (.83)	18 (.71)	—

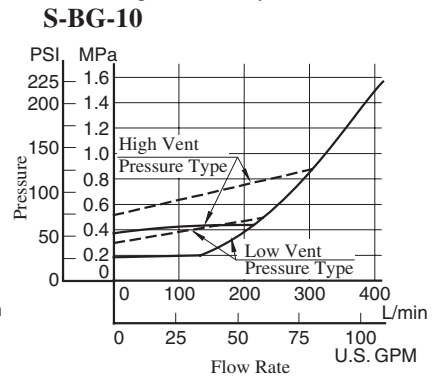
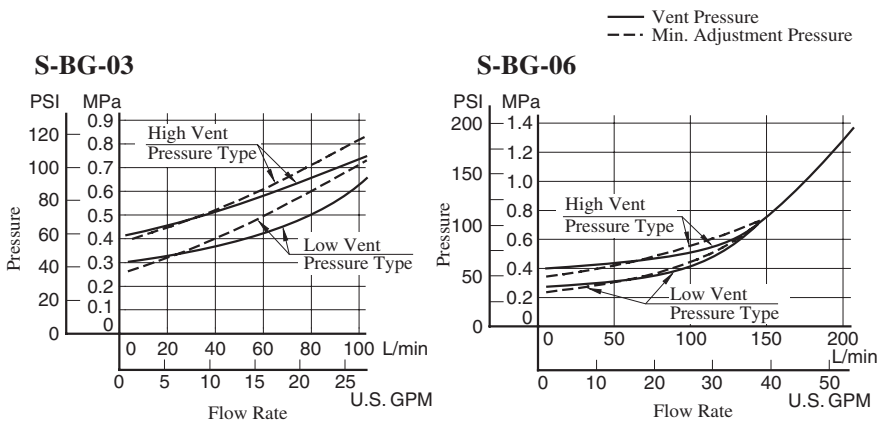
Nominal Override Characteristics

Hydraulic fluid:
 Viscosity : 35 mm²/s (164 SSU)
 Specific Gravity : 0.850



Min. Adj. Pressure and Vent Pressure vs. Flow

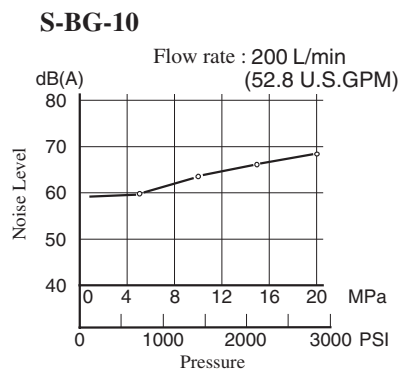
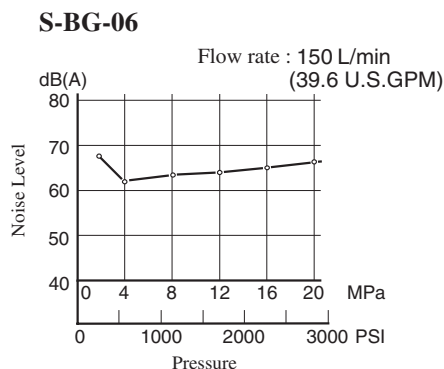
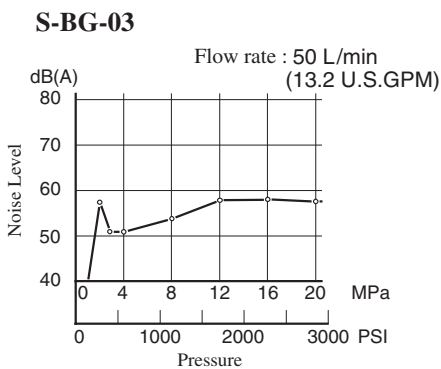
Hydraulic fluid:
 Viscosity : 35 mm²/s (164 SSU)
 Specific Gravity : 0.850



Noise Level

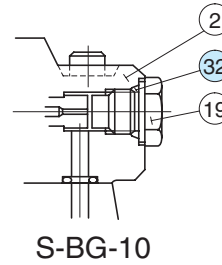
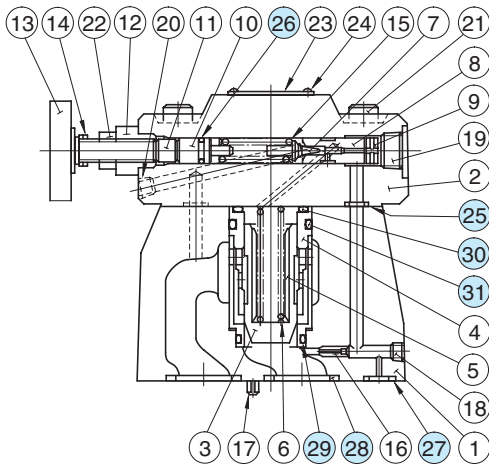
Measuring condition

Measuring position: At 1m (3.3 ft.) back from the valve front.
 Viscosity : 35 mm²/s (164 SSU)
 Back pressure : 0.1 MPa (14.5 PSI)



Spare Parts List

S-BG-03,06,10-*-40/4090



List of Seals

Item	Name of Parts	Part Numbers			Qty.
		S-BG-03	S-BG-06	S-BG-10	
25	O-Ring	SO-NB-P9	SO-NB-P9	SO-NB-P9	2
26	O-Ring	SO-NA-P9	SO-NA-P9	SO-NA-P9	1
27	O-Ring	SO-NB-P9	SO-NB-P11	SO-NB-P9	1
28	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	2
29	O-Ring	SO-NB-A024	SO-NB-A024	SO-NB-A128	1
30	O-Ring	SO-NB-P28	SO-NB-P28	SO-NB-P36	1
31	O-Ring	SO-NB-P32	SO-NB-P32	SO-NB-P42	1
32	O-Ring	—	—	SO-NB-P14	1

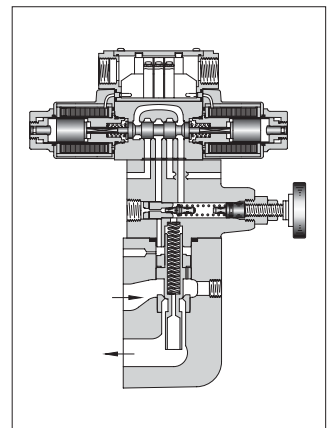
Note: When ordering the seals, please specify the seal kit number from the table below.

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
S-BG-03	KS-S-BG-03-40
S-BG-06	KS-S-BG-06-40
S-BG-10	KS-S-BG-10-40

Solenoid Controlled Relief Valves

These valves are a combination of a pilot operated relief valve and a solenoid operated directional valve. Piping between the two is eliminated as the solenoid valve is directly mounted on the relief valve and connected with the relief valve vent. Pump pressure may be unloaded remotely by an electrical signal to the solenoid, or by connecting pilot relief valves to the solenoid valve ports.



Specifications

Model Numbers		Max. Operating Pressure MPa (PSI)	Pressure Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg (lbs.)		
					Double Sol.	Single Sol.	With Vent Restrictor
Threaded Connection	BST-03-*-**-*-48*	25 (3630)	Note)	100 (26.4)	7.1 (15.7)	6.6 (14.6)	7.6 (16.8)
	BST-06-*-**-*-48*		★-25	200 (52.8)	7.1 (15.7)	6.6 (14.6)	7.6 (16.8)
	BST-10-*-**-*-48*		(★-3630)	400 (106)	10.8 (23.8)	10.3 (22.7)	11.3 (24.9)
Sub-plate Mounting	BSG-03-*-**-*-48*	25 (3630)	Note)	100 (26.4)	6.8 (15.0)	6.3 (13.9)	7.3 (16.1)
	BSG-06-*-**-*-48*		★-25	200 (52.8)	7.7 (17.0)	7.2 (15.9)	8.2 (18.1)
	BSG-10-*-**-*-48*		(★-3630)	400 (106)	11.0 (24.3)	10.5 (23.2)	11.5 (25.4)

Note: For relief valves, standard pilot operated relief valves are used.
For minimum adjustment pressures and other characteristics, see [page 214](#).

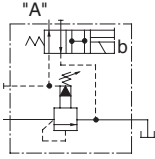
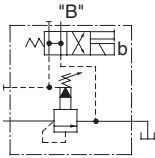
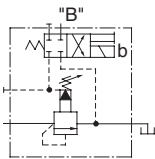
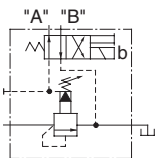
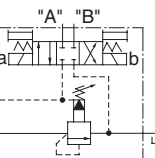
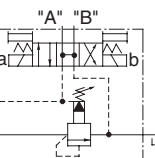
Model Number Designation

F-	A-	BS	T	-03	-V	-2B3A	-A100	-N	-48	*
Special Seals	With Vent Restrictor	Series Number	Type of Mounting	Valve Size	High Venting Pres. Feature	Vent Type	Coil Type ^{*4}	Type of Electrical Con.	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	A: With Vent Restrictor (Option-Omit if not required) ^{*1}	BS: Solenoid Controlled Relief Valves	T: Threaded Connection G: Sub-plate Mounting	03 06 10	V: For High Venting Pressure Feature (Omit if not required) ^{*2}	2B3A ^{*3} 2B3B 2B2B 2B2 3C2 3C3	AC: A100, A120 A200, A240 DC: D12, D24 D48 AC→DC: R100, R200	None: Terminal Box Type N: With Plug-in Connector (DIN) N: With Plug-in Connector (DIN)	48	None: Japanese Std. "JIS" 90: N. American Design Std. 80: European Design Std.

- ★1. Models with vent restrictor are applicable only for the vent type 2B3A and 2B3B. For details, see [page 222](#).
- ★2. Use high venting pressure types to reduce response time from unloading to onloading.
- ★3. For the details of the vent types, see the [following page](#).
- ★4. The coil codes are the same as for solenoid operated directional valve DSG-01. See the Solenoid Ratings on [page 345](#).

The coil type numbers in the shaded column are handled as optional extras. In case these coils are required to be chosen, please confirm the time of delivery with us before ordering.

Vent Types

Vent Type	Graphic Symbols	Solenoid Operated Directional Valve Model Number	Operation		
			SOL "a"	SOL "b"	Vent Connecting
2B3A		DSG-01-2B3A	—	OFF	Connected to port "A".
				ON	Connected to tank (no-load)
2B3B		DSG-01-2B3B	—	OFF	Connected to tank (no-load)
				ON	Connected to port "B".
2B2B		DSG-01-2B2B	—	OFF	Closed state (relief valve setting pressure)
				ON	Connected to port "B".
2B2		DSG-01-2B2	—	OFF	Connected to port "A".
				ON	Connected to port "B".
3C2		DSG-01-3C2	OFF	OFF	Closed state (relief valve setting pressure)
			ON	OFF	Connected to port "A".
			OFF	ON	Connected to port "B".
3C3		DSG-01-3C3	OFF	OFF	Connected to tank (no-load)
			ON	OFF	Connected to port "A".
			OFF	ON	Connected to port "B".

Attachment

Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw	
	Japanese Std. "JIS" and European Design Std.	N. American Design Std.
BSG-03	M12 × 70 Lg. (2 pcs.), M12 × 95 Lg. (2 pcs.)	1/2-13UNC × 2-3/4 Lg. (2 pcs.), 1/2-13UNC × 3-3/4 Lg. (2 pcs.)
BSG-06	M16 × 60 Lg. (2 pcs.), M16 × 80 Lg. (2 pcs.)	5/8-11UNC × 2-1/4 Lg. (2 pcs.), 5/8-11UNC × 3-1/4 Lg. (2 pcs.)
BSG-10	M20 × 70 Lg. (2 pcs.), M20 × 90 Lg. (2 pcs.)	3/4-10UNC × 2-3/4 Lg. (2 pcs.), 3/4-10UNC × 3-1/2 Lg. (2 pcs.)

C
Solenoid Controlled Relief Valves

Sub-plate

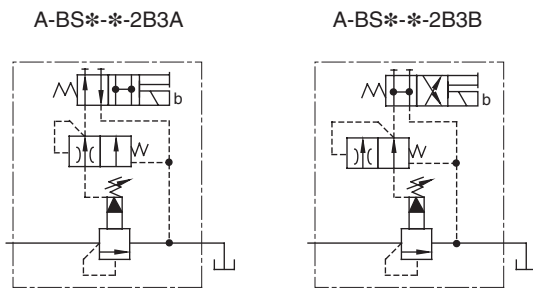
Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
BSG-03	BGM-03-20	Rc 3/8	BGM-03-3080	3/8 BSP.F	BGM-03-2090	3/8 NPT	2.4(5.3)
	BGM-03X-20	Rc 1/2	BGM-03X-3080	1/2 BSP.F	BGM-03X-2090	1/2 NPT	3.1(6.8)
BSG-06	BGM-06-20	Rc 3/4	BGM-06-3080	3/4 BSP.F	BGM-06-2090	3/4 NPT	4.7(10.4)
	BGM-06X-20	Rc 1	BGM-06X-3080	1 BSP.F	BGM-06X-2090	1 NPT	5.7(12.6)
BSG-10	BGM-10-20	Rc 1-1/4	BGM-10-3080	1-1/4 BSP.F	BGM-10-2090	1-1/4 NPT	8.4(18.5)
	BGM-10X-20	Rc 1-1/2	BGM-10X-3080	1-1/2 BSP.F	BGM-10X-2090	1-1/2 NPT	10.3(22.7)

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- The sub-plates are those for pilot operated relief valves. For dimensions, see [page 213](#).

Option

Models with vent restrictor

The type with a vent restrictor has a vent restrictor in vent types 2B3A and 2B3B added between a relief valve and a solenoid operated directional valve. It prevents shock to the main circuit by gradually lowering the venting pressure in the shift from the set pressure to unloading. Unloading pressure are the same as without a vent restrictor.



Instructions

- If a remote control relief valve is used in the vent circuit, see [page 203](#). In addition, if the internal volume of the vent line is too large, chattering is likely to occur. Thus, as far as possible reduce the inside diameter and the length of the pipe.
- To adjust the pressure, loosen the lock nut and turn the handle slowly clockwise for higher pressures or anti-clockwise for lower pressures. After adjustments, do not forget to tighten the lock nut.
- Piping of the tank line should not be connected to any tank line of the other valves, but connected directly to the reservoir.
- Pressure is limited by collars fitted. If a working pressure cannot be attained, remove some collars. One collar is equivalent to 10 MPa (1450 PSI).
- With a small flow, the setting pressure may be unstable. Use models numbered 03 and 06 with a flow rate above 8 L/min (2.1 U.S. GPM) and model 10 with 15 L/min (4.0 U.S. GPM).

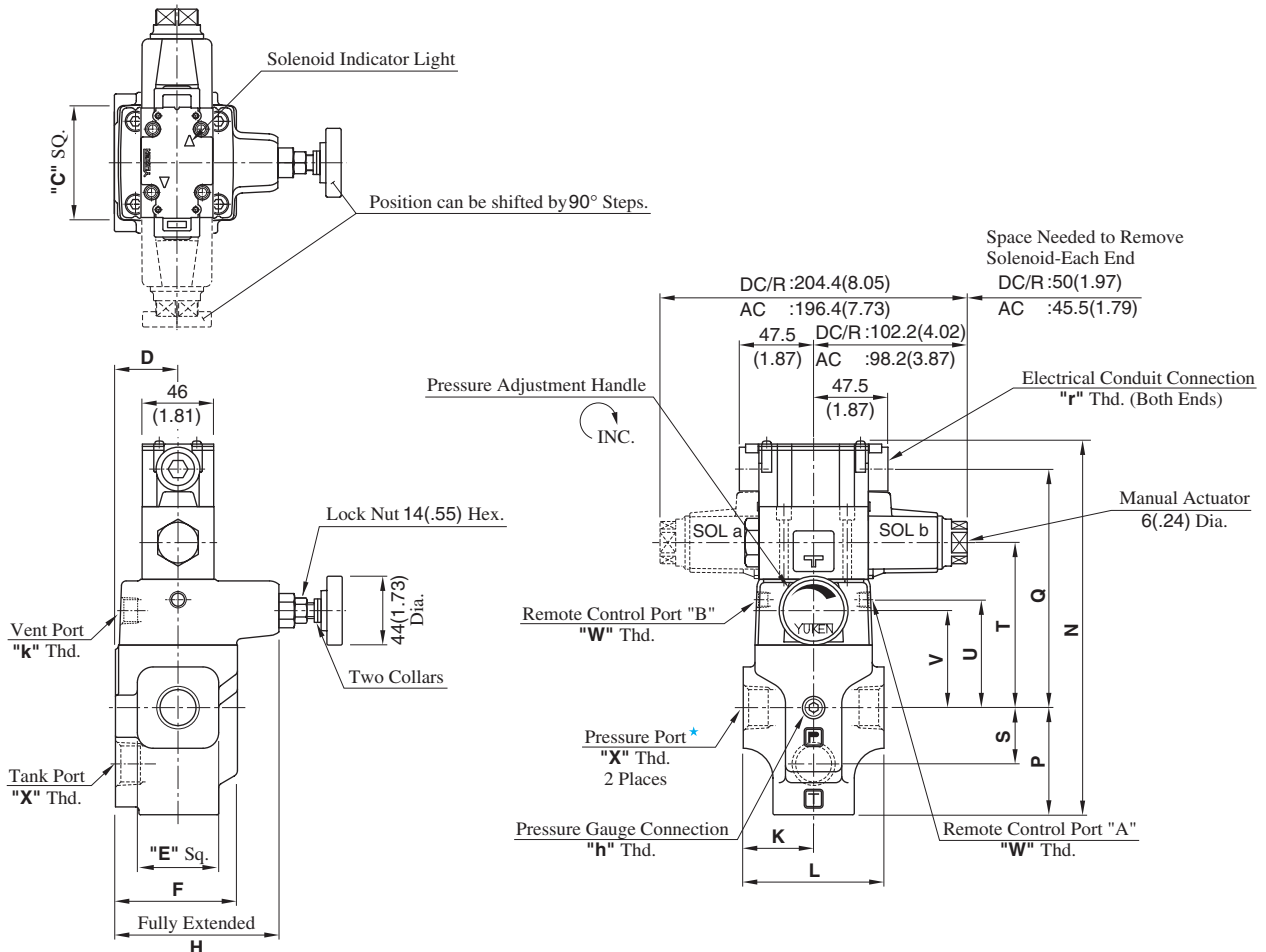
Interchangeability in Installation between Old and New Design.

Design 48 valve is one on which DSG-01, design 70 is mounted as a pilot valve. It is interchangeable with old design (design 47) with respect to specifications, exterior shape and mounting dimensions.

BST-03-**-**-48/4890
 BST-06-**-**-48/4890
 BST-10-**-**-48/4890

DIMENSIONS IN
MILLIMETRES (INCHES)

● Terminal Box Type



★ There are two threaded connection pressure ports. They can be connected each other in-line; one as inlet and the other as an outlet or the valve can be used by plugging one of the pressure ports.

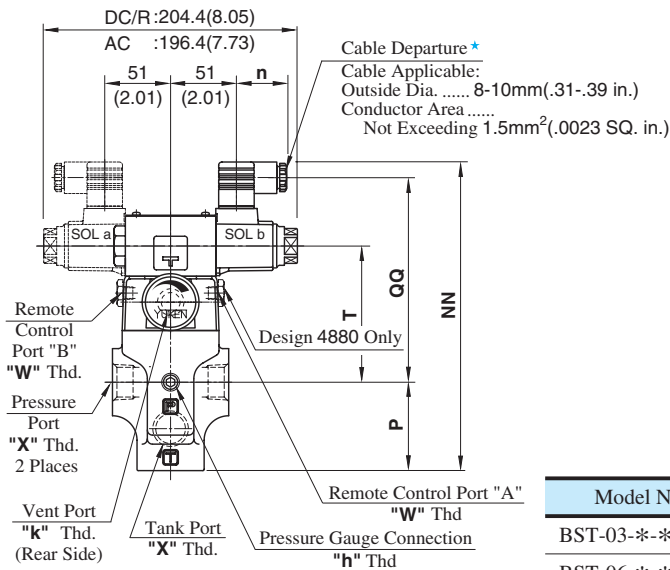
Model Numbers	Dimensions mm (Inches)													
	C	D	E	F	H	K	L	N	P	Q	S	T	U	V
BST-03-**-48/4890	75 (2.95)	40 (1.57)	52 (2.05)	78 (3.07)	145 (5.71)	45 (1.77)	90 (3.54)	239.3 (9.42)	68.5 (2.70)	152.5 (6.00)	36 (1.42)	105.5 (4.15)	69 (2.72)	62 (2.44)
BST-06-**-48/4890														
BST-10-**-48/4890	85 (3.35)	50 (1.97)	80 (3.15)	96 (3.78)	151 (5.94)	60 (2.36)	120 (4.72)	271.8 (10.70)	89 (3.50)	164.5 (6.48)	49 (1.93)	117.5 (4.63)	81 (3.19)	74 (2.91)

Model Numbers	Japanese Standard "JIS" Design 48					N. American Design Standard Design 4890				
	"W" Thd.	"X" Thd.	"h" Thd.	"k" Thd.	"r" Thd.	"W" Thd.	"X" Thd.	"h" Thd.	"k" Thd.	"r" Thd.
BST-03		Rc 3/8					3/8 NPT			
BST-06	Rc 1/8	Rc 3/4	Rc 1/4	Rc 3/8	G 1/2	1/8 NPT	3/4 NPT	1/4 NPT	3/8 NPT	1/2 NPT
BST-10		Rc 1-1/4					1-1/4 NPT			

● **Models with Plug-in Connector**

03
BST-06-**-**-N-48/4880/4890
10

**DIMENSIONS IN
MILLIMETRES (INCHES)**



Model Numbers	Dimensions mm(Inches)				
	P	T	NN	QQ	n
BST-03-**-A*-N	68.5 (2.70)	105.5 (4.15)	239 (9.41)	158.5 (6.24)	39 (1.54)
BST-06-**-A*-N					
BST-10-**-A*-N	89 (3.50)	117.5 (4.63)	271.5 (10.69)	170.5 (6.71)	39 (1.54)
BST-03-**-D*-N	68.5 (2.70)	105.5 (4.15)	250 (9.84)	169.5 (6.67)	
BST-06-**-D*-N					39 (1.54)
BST-10-**-D*-N	89 (3.50)	117.5 (4.63)	282.5 (11.12)	181.5 (7.15)	
BST-03-**-R*-N	68.5 (2.70)	105.5 (4.15)	253 (9.96)	162.7 (6.41)	53 (2.09)
BST-06-**-R*-N					
BST-10-**-R*-N	89 (3.50)	117.5 (4.63)	285.5 (11.24)	174.7 (6.88)	

★ Position of cable departure can be changed. For details, refer to DSG-01 valve on [page 357](#).

Model Numbers	"W" Thd.	"X" Thd.	"h" Thd.	"k" Thd.
BST-03-**-**-N-4880		3/8 BSP.F		
BST-06-**-**-N-4880	1/8 BSP.F	3/4 BSP.F	1/4 BSP.Tr	3/8 BSP.Tr
BST-10-**-**-N-4880		1-1/4 BSP.F		

See the installation drawing of terminal box type on [page 223](#) for design 48 and 4890 port thread and other dimensions.

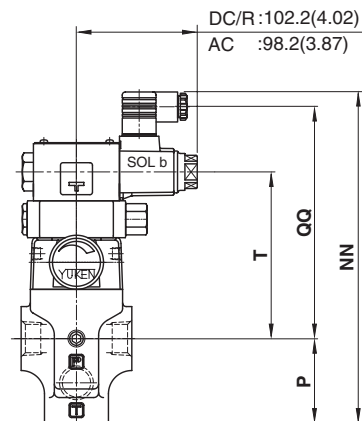
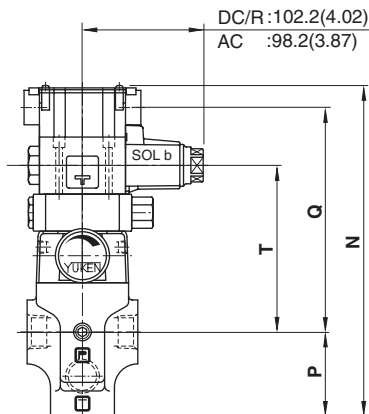
■ **Options - Models with Vent Restrictor**

● **Terminal Box Type**

03
A-BST-06-**-2B3A
10 2B3B-**-48/4880

● **Plug-in Connector Type**

03
A-BST-06-**-2B3A
10 2B3B-**-N-48/4880/4890



Model Numbers	Dimensions mm (Inches)		Terminal Box Type		Plug-in Connector Type					
	P	T			AC Solenoid		DC Solenoid		R (AC→DC) Solenoid	
			N	Q	NN	QQ	NN	QQ	NN	QQ
A-BST-03	68.5 (2.70)	135.5 (5.33)	269.3 (10.60)	182.5 (7.19)	269 (10.59)	188.5 (7.42)	280 (11.02)	199.5 (7.85)	283 (11.14)	192.7 (7.59)
A-BST-06										
A-BST-10	89 (3.50)	147.5 (5.81)	301.8 (11.88)	194.5 (7.66)	301.5 (11.87)	200.5 (7.89)	312.5 (12.30)	211.5 (8.33)	315.5 (12.42)	204.7 (8.06)

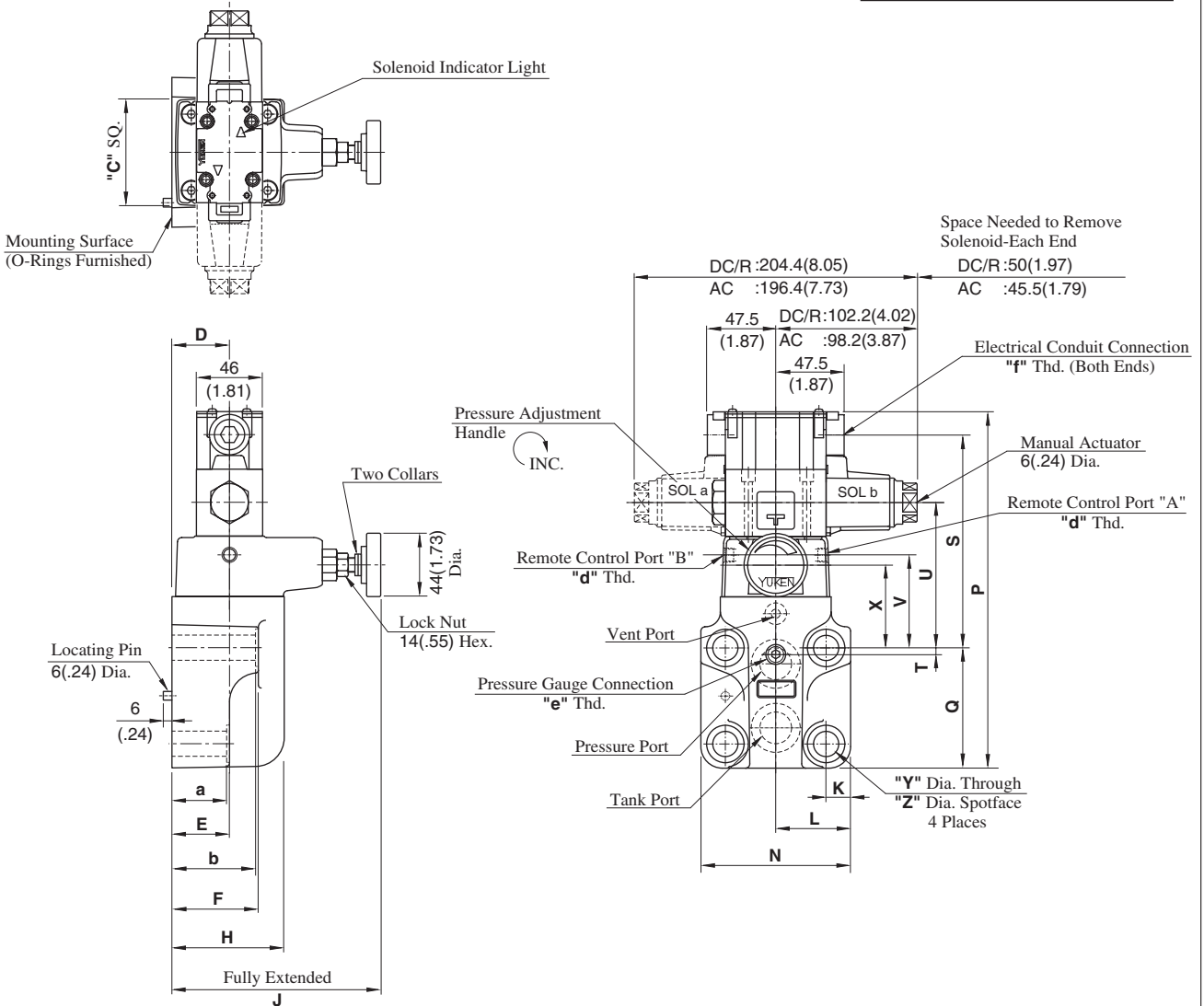
For other dimensions, see the models without vent restrictor type on [page 223](#) and [224](#).

BSG-03-***-48/4890
 BSG-06-***-48/4890
 BSG-10-***-48/4890

Mounting surface
 BSG-03: ISO 6264-AR-06-2-A
 BSG-06: ISO 6264-AS-08-2-A
 BSG-10: ISO 6264-AT-10-2-A

● Terminal Box Type

DIMENSIONS IN MILLIMETRES (INCHES)



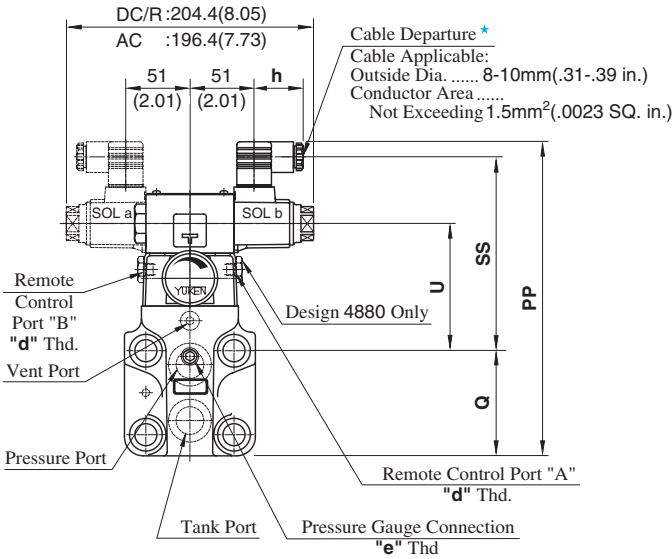
Model Numbers	Dimensions mm (Inches)																			
	C	D	E	F	H	J	K	L	N	P	Q	S	T	U	V	X	Y	Z	a	b
BSG-03	75 (2.95)	40 (1.57)	57 (2.24)	78 (3.07)	78 (3.07)	145 (5.71)	14.1 (.56)	41 (1.61)	82 (3.23)	225.8 (8.89)	77 (3.03)	130.5 (5.14)	22 (.87)	83.5 (3.29)	47 (1.85)	40 (1.57)	13.5 (.53)	21 (.83)	55 (2.17)	77 (3.03)
BSG-06	75 (2.95)	40 (1.57)	40 (1.57)	60 (2.36)	78 (3.07)	145 (5.71)	17 (.67)	52 (2.05)	104 (4.09)	249.8 (9.83)	83.5 (3.29)	148 (5.83)	4.5 (.18)	101 (3.98)	64.5 (2.54)	57.5 (2.26)	17.5 (.69)	26 (1.02)	38 (1.50)	58 (2.28)
BSG-10	85 (3.35)	45 (1.77)	47 (1.85)	67 (2.64)	84 (3.31)	146 (5.75)	20.7 (.81)	62 (2.44)	124 (4.88)	283.8 (11.17)	110 (4.33)	155.5 (6.12)	6 (.24)	108.5 (4.27)	72 (2.83)	65 (2.56)	21.5 (.85)	32 (1.26)	45 (1.77)	65 (2.56)

Model Numbers	Japanese Standard "JIS" Design 48			N. American Design Standard Design 4890		
	"d" Thd.	"e" Thd.	"f" Thd.	"d" Thd.	"e" Thd.	"f" Thd.
BSG-03						
BSG-06	Rc 1/8	Rc 1/4	G 1/2	1/8 NPT	1/4 NPT	1/2 NPT
BSG-10						

Note: For dimensions of the valve mounting surface, see the installation drawing (P. 213) of the sub-plate used together.

● **Models with Plug-in Connector**

03
BSG-06-*-N-48/4880/4890
10



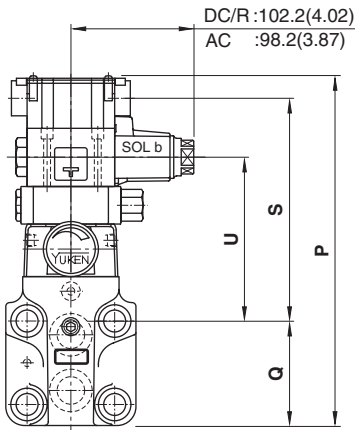
★ Position of cable departure can be changed. For details, refer to DSG-01 valve on page 357.

DIMENSIONS IN MILLIMETRES (INCHES)

■ **Options - Models with Vent Restrictor**

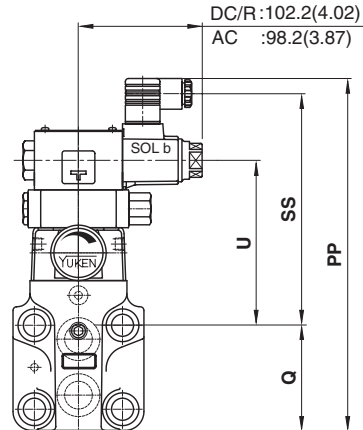
● **Terminal Box Type**

03
A-BSG-06-*-2B3A
10 2B3B *-N-48/4890



● **Plug-in Connector Type**

03
A-BSG-06-*-2B3A
10 2B3B *-N-48/4880/4890



Model Numbers	Dimensions mm(Inches)				
	Q	U	PP	SS	h
BSG-03-*-A*-N	77 (3.03)	83.5 (3.29)	225.5 (8.88)	136.5 (5.37)	39 (1.54)
BSG-06-*-A*-N	83.5 (3.29)	101 (3.98)	249.5 (9.82)	154 (6.06)	
BSG-10-*-A*-N	110 (4.33)	108.5 (4.27)	283.5 (11.16)	161.5 (6.36)	
BSG-03-*-D*-N	77 (3.03)	83.5 (3.29)	236.5 (9.31)	147.5 (5.81)	39 (1.54)
BSG-06-*-D*-N	83.5 (3.29)	101 (3.98)	260.5 (10.26)	165 (6.50)	
BSG-10-*-D*-N	110 (4.33)	108.5 (4.27)	294.5 (11.59)	172.5 (6.79)	
BSG-03-*-R*-N	77 (3.03)	83.5 (3.29)	239.5 (9.43)	140.7 (5.54)	53 (2.09)
BSG-06-*-R*-N	83.5 (3.29)	101 (3.98)	263.5 (10.37)	158.2 (6.23)	
BSG-10-*-R*-N	110 (4.33)	108.5 (4.27)	297.5 (11.71)	165.7 (6.52)	

Model Numbers	"d" Thd.	"e" Thd.
BSG-03-*-N-4880	1/8 BSP.F	1/4 BSP.Tr
BSG-06-*-N-4880		
BSG-10-*-N-4880		

See the installation drawing of terminal box type on page 225 for design 48 and 4890 port threads and other dimensions.

Model Numbers	Dimensions mm (Inches)		Terminal Box Type		Plug-in Connector Type					
	Q	U	P	S	AC Solenoid		DC Solenoid		R (AC→DC) Solenoid	
					PP	SS	PP	SS	PP	SS
A-BSG-03	77 (3.03)	113.5 (4.47)	255.8 (10.07)	160.5 (6.32)	255.5 (10.06)	166.5 (6.56)	266.5 (10.49)	177.5 (6.99)	269.5 (10.61)	170.7 (6.72)
A-BSG-06	83.5 (3.29)	131 (5.16)	279.8 (11.02)	178 (7.01)	279.5 (11.00)	184 (7.24)	290.5 (11.44)	195 (7.68)	293.5 (11.56)	188.2 (7.41)
A-BSG-10	110 (4.33)	138.5 (5.45)	313.8 (12.35)	185.5 (7.30)	313.5 (12.34)	191.5 (7.54)	324.5 (12.78)	202.5 (7.97)	327.5 (12.89)	195.7 (7.70)

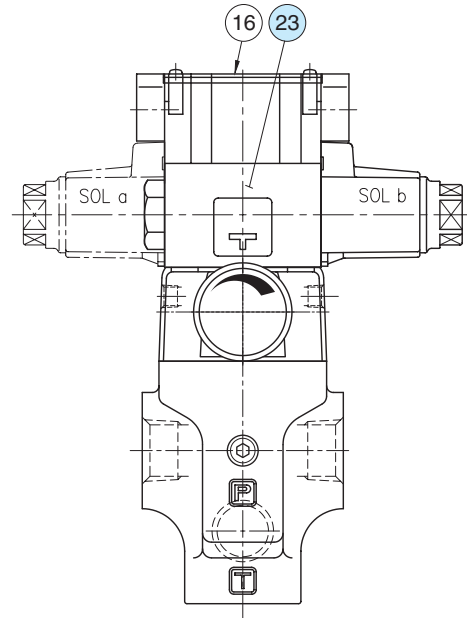
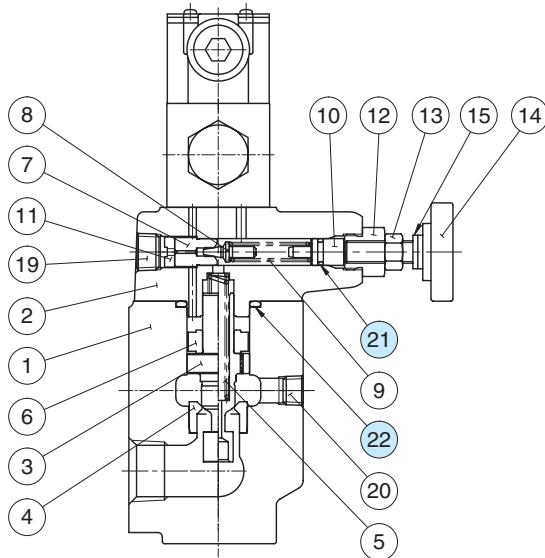
For other dimensions, see the models without vent restrictor type on page 225 and 226.

Spare Parts List

Threaded Connections

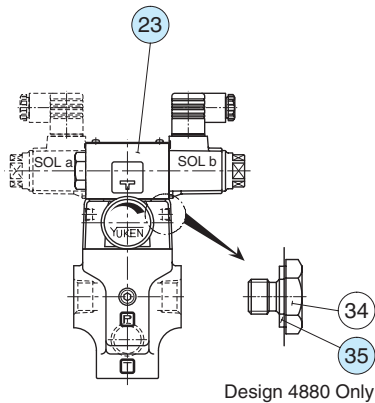
Terminal Box Type

03
BST-06 -*-*-48/4890
10



Models with Plug-in Connector

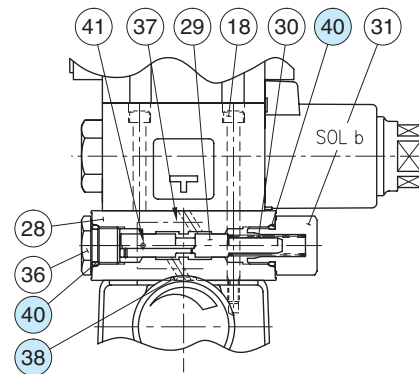
03
BST-06 -*-*-N-48/4880/4890
10



Option

Models with Vent Restrictor

03
A-BST-06 -*-*-48/4890
10
N-48/4880/4890



List of Seals

Item	Name of Parts	Part Numbers			Qty.
		BST-03	BST-06	BST-10	
21	O-Ring	SO-NA-P9	SO-NA-P9		1
22	O-Ring	SO-NB-P32	SO-NB-P42		1
35	Bonded Seal	SG-FB-1/8	SG-FB-1/8		2
38*	O-Ring		SO-NB-P8		2
40*	O-Ring		SO-NB-P14		2

★ The O-Rings for Item 38,40 are used only for the models with the vent restrictor.

Note: When ordering the seals, please specify the seal kit number from the table right. In addition to the above seals, seals for the pilot valves are included in the seal kit.

For the detail of the pilot valve seals, see the [page 359](#).

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
BST-03	KS-BST-03-48
BST-06	
BST-10	
A-BST-03	KS-A-BST-03-48
A-BST-06	
A-BST-10	

Note: No bonded seals are included in the seal kits.

Pilot Valves

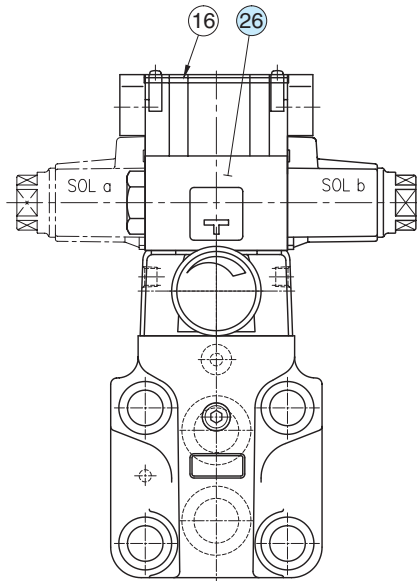
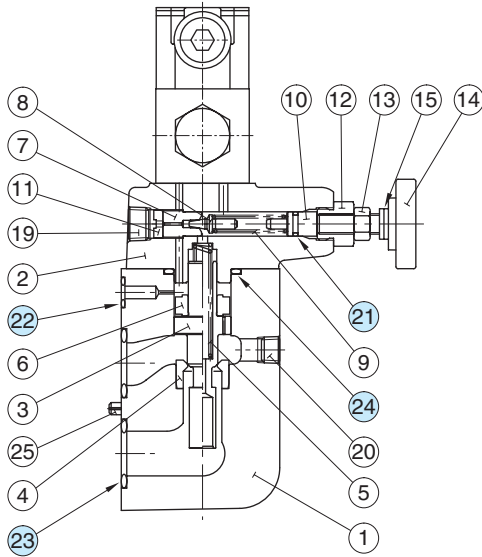
See [page 229](#) for the pilot valve model numbers to be used.

Spare Parts List

Sub-plate Mounting

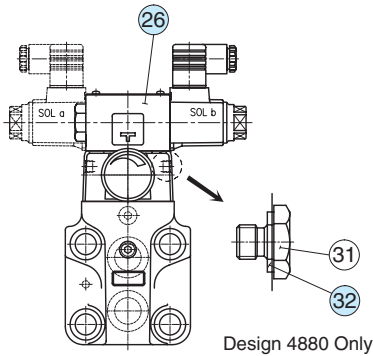
Terminal Box Type

03
BSG-06-**-**-48/4890
10



Models with Plug-in Connector

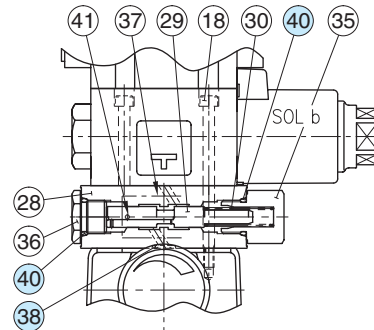
03
BSG-06-**-**-N-48/4880/4890
10



Option

Models with Vent Restrictor

03
A-BSG-06-**-**-48/4890
10
N-48/4880/4890



List of Seals

Item	Name of Parts	Part Numbers			Qty.
		BSG-03	BSG-06	BSG-10	
21	O-Ring	SO-NA-P9	SO-NA-P9	SO-NA-P9	1
22	O-Ring	SO-NB-P9	SO-NB-P11	SO-NB-P9	1
23	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	2
24	O-Ring	SO-NB-P32	SO-NB-P32	SO-NB-P42	1
32	Bonded Seal	SG-FB-1/8	SG-FB-1/8	SG-FB-1/8	2
38*	O-Ring		SO-NB-P8		2
40*	O-Ring		SO-NB-P14		2

★ The O-Rings for item 38, 40 are used only for the models with the vent restrictor.

Note: When ordering the seals, please specify the seal kit number from the table right. In addition to the above seals, seals for the pilot valves are included in the seal kit.

For the detail of the pilot valve seals, see [page 359](#).

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
BSG-03	KS-BSG-03-48
BSG-06	KS-BSG-06-48
BSG-10	KS-BSG-10-48
A-BSG-03	KS-A-BSG-03-48
A-BSG-06	KS-A-BSG-06-48
A-BSG-10	KS-A-BSG-10-48

Note: No bonded seals are included in the seal kits.

Pilot Valves

See [page 229](#) for the pilot valve model numbers to be used.

■ Spare Parts List

● List of Pilot Valves

Type of Electrical Conduit Connection	Valve Model Numbers	Pilot Valve Model Numbers	Remarks	
Terminal Box Type	*-BST/BSG-03/06/10*-2B3A-★-48	DSG-01-2B3A-★-70	Japanese Standard "JIS"	
	-BST/BSG-03/06/10-2B3B-★-48	DSG-01-2B3B-★-70		
	-BST/BSG-03/06/10-2B2B-★-48	DSG-01-2B2B-★-70		
	-BST/BSG-03/06/10-2B2-★-48	DSG-01-2B2-★-70		
	-BST/BSG-03/06/10-3C2-★-48	DSG-01-3C2-★-70		
	-BST/BSG-03/06/10-3C3-★-48	DSG-01-3C3-★-70		
	Terminal Box Type	*-BST/BSG-03/06/10*-2B3A-★-4890	DSG-01-2B3A-★-7090	N. American Design Std.
		-BST/BSG-03/06/10-2B3B-★-4890	DSG-01-2B3B-★-7090	
		-BST/BSG-03/06/10-2B2B-★-4890	DSG-01-2B2B-★-7090	
		-BST/BSG-03/06/10-2B2-★-4890	DSG-01-2B2-★-7090	
		-BST/BSG-03/06/10-3C2-★-4890	DSG-01-3C2-★-7090	
		-BST/BSG-03/06/10-3C3-★-4890	DSG-01-3C3-★-7090	
Plug-in Connector Type	*-BST/BSG-03/06/10*-2B3A-★-N-48	DSG-01-2B3A-★-N-70	Japanese Standard "JIS"	
	-BST/BSG-03/06/10-2B3B-★-N-48	DSG-01-2B3B-★-N-70		
	-BST/BSG-03/06/10-2B2B-★-N-48	DSG-01-2B2B-★-N-70		
	-BST/BSG-03/06/10-2B2-★-N-48	DSG-01-2B2-★-N-70		
	-BST/BSG-03/06/10-3C2-★-N-48	DSG-01-3C2-★-N-70		
	-BST/BSG-03/06/10-3C3-★-N-48	DSG-01-3C3-★-N-70		
	Plug-in Connector Type	*-BST/BSG-03/06/10*-2B3A-★-N-4880	DSG-01-2B3A-★-N-70	European Design Std.
		-BST/BSG-03/06/10-2B3B-★-N-4880	DSG-01-2B3B-★-N-70	
		-BST/BSG-03/06/10-2B2B-★-N-4880	DSG-01-2B2B-★-N-70	
		-BST/BSG-03/06/10-2B2-★-N-4880	DSG-01-2B2-★-N-70	
		-BST/BSG-03/06/10-3C2-★-N-4880	DSG-01-3C2-★-N-70	
		-BST/BSG-03/06/10-3C3-★-N-4880	DSG-01-3C3-★-N-70	
	Plug-in Connector Type	*-BST/BSG-03/06/10*-2B3A-★-N-4890	DSG-01-2B3A-★-N-7090	N. American Design Std.
		-BST/BSG-03/06/10-2B3B-★-N-4890	DSG-01-2B3B-★-N-7090	
		-BST/BSG-03/06/10-2B2B-★-N-4890	DSG-01-2B2B-★-N-7090	
		-BST/BSG-03/06/10-2B2-★-N-4890	DSG-01-2B2-★-N-7090	
		-BST/BSG-03/06/10-3C2-★-N-4890	DSG-01-3C2-★-N-7090	
		-BST/BSG-03/06/10-3C3-★-N-4890	DSG-01-3C3-★-N-7090	

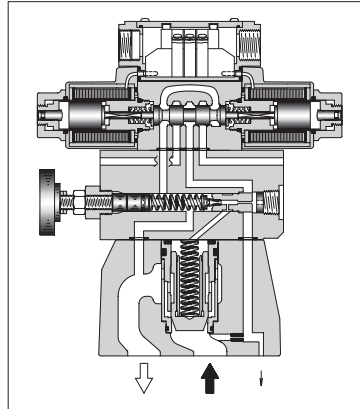
Note: 1. Fill a coil type (a symbol representing current/voltage) in section marked ★.

2. For the details of the pilot valves, see [page 359](#).



Low Noise Type Solenoid Controlled Relief Valves

The low-noise solenoid controlled relief valve is a combination of a low-noise type pilot operated relief valve and a solenoid operated directional valve. It is used for no-load pump operation by using electric signals or, together with a remote control relief valve, for two or three pressure control of the hydraulic system.



Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Pressure Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg (lbs.)		
				Double Sol.	Single Sol.	With Vent Restrictor
S-BSG-03-*-53*	25 (3630)	★ - 25 (★ - 3630)	100 (26.4)	6.0 (13.2)	5.5 (12.1)	6.5 (14.3)
S-BSG-06-*-53*			200 (52.8)	6.9 (15.2)	6.4 (14.1)	7.4 (16.3)
S-BSG-10-*-53*			400 (106)	12.6 (27.8)	12.1 (26.7)	12.9 (28.4)

★ For relief valves, low-noise type pilot operated relief valves are used.
For minimum adjustment pressures and other characteristics, see [page 218](#).

Model Number Designation

F-	A-	S-	BS	G	-03	-V	-2B3A	-A100	-N	-L	53	*
Special Seals	With Vent Restrictor	Low Noise Type	Series Number	Type of Mtg.	Valve size	High Venting Pres. Feature	Vent Type	Coil Type	Type of Electrical Connections	Direction of Handle	Design Number	Design Standards
F: Special Seals for Phosphate Ester Fluids (Omit if not required)	A: ★1 With Vent Restrictor (Option-Omit if not required)	S: Low Noise Type	BS: Solenoid Controlled Relief Valves	G: Sub-plate Mtg.	03 06 10	V: ★2 For High Venting Pressure Feature (Omit if not required)	2B3A ★3 2B3B 2B2B 2B2 3C2 3C3	AC: ★4 A100 A120 A200 A240 DC: D12 D24 D48 AC → DC: R100 R200	None: Terminal Box Type N: With Plug-in Connector (DIN) N: With Plug-in Connector (DIN)	L: Left (Normal) R: Right	53	None: Japanese Std. "JIS" 90: N. American Design Std. 80: European Design Std.

- ★1. Models with vent restrictor are applicable only for the vent type 2B3A and 2B3B. For details, see [page 231](#).
- ★2. Use high venting pressure types to reduce response time from unloading to onloading.
- ★3. The vent types are the same as for the conventional type solenoid controlled relief valves. For the details of the vent types, see [page 221](#).
- ★4. The coil codes are the same as for solenoid operated directional valve DSG-01 valve. See the solenoid ratings on [page 345](#).

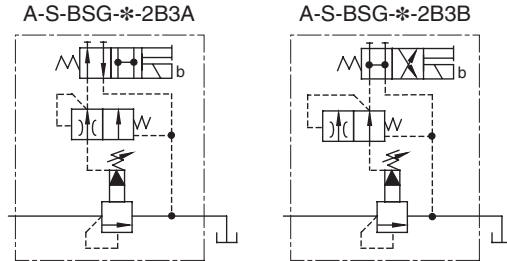
The coil type numbers in the shaded column are handled as optional extras. In case these coils are required to be chosen, please confirm the time of delivery with us before ordering.

Option

Models with vent restrictor

The type with a vent restrictor has a vent restrictor in vent types 2B3A and 2B3B added between a relief valve and a solenoid operated directional valve. It prevents shock to the main circuit by gradually lowering the venting pressure in the shift from the setting pressure to unloading.

Unloading pressures are the same as without a vent restrictor.



Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
S-BSG-03	BGM-03-20	Rc 3/8	BGM-03-3080	3/8 BSP.F	BGM-03-2090	3/8 NPT	2.4(5.3)
	BGM-03X-20	Rc 1/2	BGM-03X-3080	1/2 BSP.F	BGM-03X-2090	1/2 NPT	3.1(6.8)
S-BSG-06	BGM-06-20	Rc 3/4	BGM-06-3080	3/4 BSP.F	BGM-06-2090	3/4 NPT	4.7(10.4)
	BGM-06X-20	Rc 1	BGM-06X-3080	1 BSP.F	BGM-06X-2090	1 NPT	5.7(12.6)
S-BSG-10	BGM-10-20	Rc 1-1/4	BGM-10-3080	1-1/4 BSP.F	BGM-10-2090	1-1/4 NPT	8.4(18.5)
	BGM-10X-20	Rc 1-1/2	BGM-10X-3080	1-1/2 BSP.F	BGM-10X-2090	1-1/2 NPT	10.3(22.7)

• Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

• The sub-plates are those for pilot operated relief valves. For dimensions, see [page 213](#).

Attachment

Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Std. "JIS" and European Design Std.	N. American Design Std.	
S-BSG-03	M12 × 40 Lg.	1/2-13 UNC × 1-1/2 Lg.	4
S-BSG-06	M16 × 50 Lg.	5/8-11 UNC × 2 Lg.	4
S-BSG-10	M20 × 60 Lg.	3/4-10 UNC × 2-1/4 Lg.	4

Instructions

- If a remote control relief valve is used in the vent circuit, see [page 203](#). In addition, if the internal volume of the vent line is too large, chattering is likely to occur. Thus, as far as possible reduce the inside diameter and the length of the pipe.
- To adjust the pressure, loosen the lock nut and turn the handle slowly clockwise for higher pressures or anti-clockwise for lower pressures. After adjustments, do not forget to tighten the lock nut.
- Piping of the tank line should not be connected to any tank line of the other valves, but connected directly to the reservoir.
- Pressure is limited by collars fitted. If a working pressure cannot be attained, remove some collars. One collar is equivalent to 10 MPa (1450 PSI).
- With a small flow, the setting pressure may be unstable. Use models numbered 03 and 06 with a flow rate above 5 L/min (1.3 U.S. GPM) and model 10 with 8 L/min (2.1 U.S. GPM).

Interchangeability in Installation between Old and New Design.

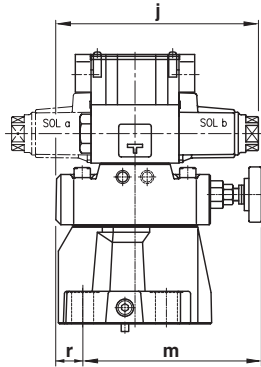
Design 53 valve is one on which DSG-01, design 70 is mounted as a pilot valve. It is interchangeable with old design (design 52) with respect to specifications, exterior shape and mounting dimensions.

Terminal Box Type

Opposite Handle Position

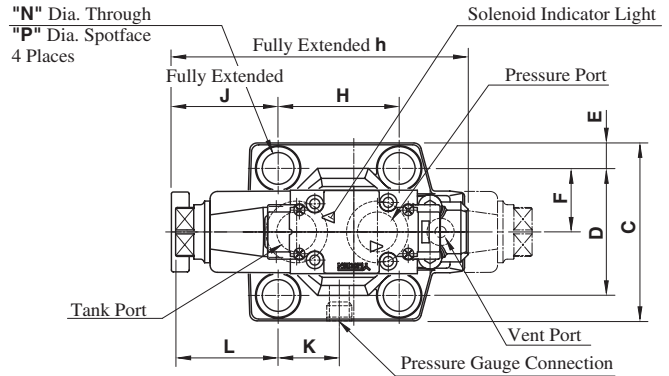
Mounting surface
 S-BSG-03: ISO 6264-AR-06-2-A
 S-BSG-06: ISO 6264-AS-08-2-A
 S-BSG-10: ISO 6264-AT-10-2-A

S-BSG-03
 06 -*-R-53/5390

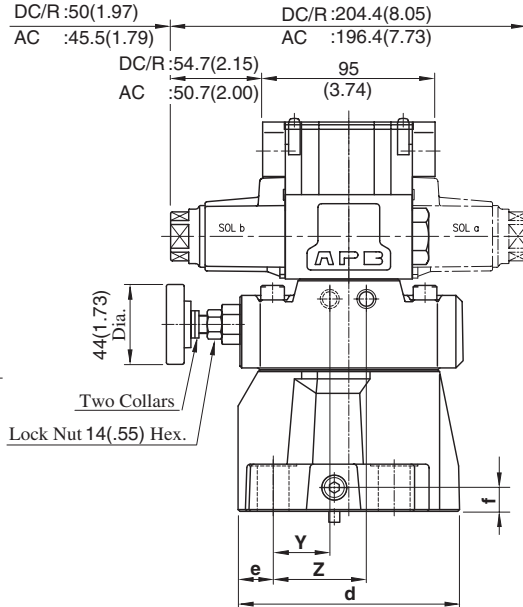


Note: For other dimensions, see the figures shown below.

S-BSG-03
 06 -*-L-53/5390
 S-BSG-10 -*-53/5390



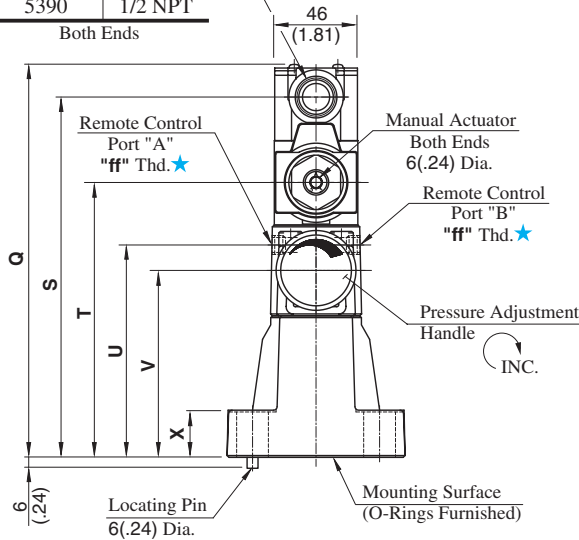
Space Needed to Remove Solenoid-Each End
 DC/R :50(1.97)
 AC :45.5(1.79)



Electrical Conduit Connection

Design Std.	Thd. Size
53	G 1/2
5390	1/2 NPT

Both Ends



Model Numbers	Dimensions mm (Inches)																						
	C	D	E	F	H	J	K	N	P	Q	S	T	U	V	X	Y	Z	d	e	f	h	m	r
S-BSG-03	76 (2.99)	53.8 (2.12)	11.1 (.44)	26.9 (1.06)	53.8 (2.12)	73.6 (2.90)	26.9 (1.06)	13.5 (.53)	21 (.83)	216.8 (8.54)	198.5 (7.81)	151.5 (5.96)	117 (4.61)	103 (4.06)	21.5 (.85)	17.1 (.67)	36.6 (1.44)	106 (4.17)	26.1 (1.03)	13 (.51)	163.5 (6.44)	127.4 (5.02)	36.1 (1.42)
S-BSG-06	98 (3.86)	70 (2.76)	14 (.55)	35 (1.38)	66.7 (2.63)	58.8 (2.31)	33.7 (1.33)	17.5 (.69)	26 (1.02)	216.8 (8.54)	198.5 (7.81)	151.5 (5.96)	117 (4.61)	103 (4.06)	26 (1.02)	31.9 (1.26)	51.4 (2.02)	122 (4.80)	19.3 (.76)	13 (.51)	163.5 (6.44)	142.2 (5.60)	21.3 (.84)
S-BSG-10	120 (4.72)	82.6 (3.25)	18.7 (.74)	41.3 (1.63)	88.9 (3.50)	46.1 (1.81)	44.9 (1.77)	21.5 (.85)	32 (1.26)	251.8 (9.91)	233.5 (9.19)	186.5 (7.34)	149 (5.87)	135 (5.31)	33.5 (1.32)	43.2 (1.70)	62.7 (2.47)	155 (6.10)	21.1 (.83)	18 (.71)	180 (7.09)	—	—

Model Numbers	AC Solenoid		DC/R Solenoid	
	L	j	L	j
S-BSG-03	71.3 (2.81)	161.2 (6.35)	75.3 (2.96)	165.2 (6.50)
S-BSG-06	56.5 (2.22)	161.2 (6.35)	60.5 (2.38)	165.2 (6.50)
S-BSG-10	44.3 (1.74)	—	48.3 (1.90)	—

DIMENSIONS IN MILLIMETRES (INCHES)

★ For the port screws, see the Plug-in Connector type on page 233.

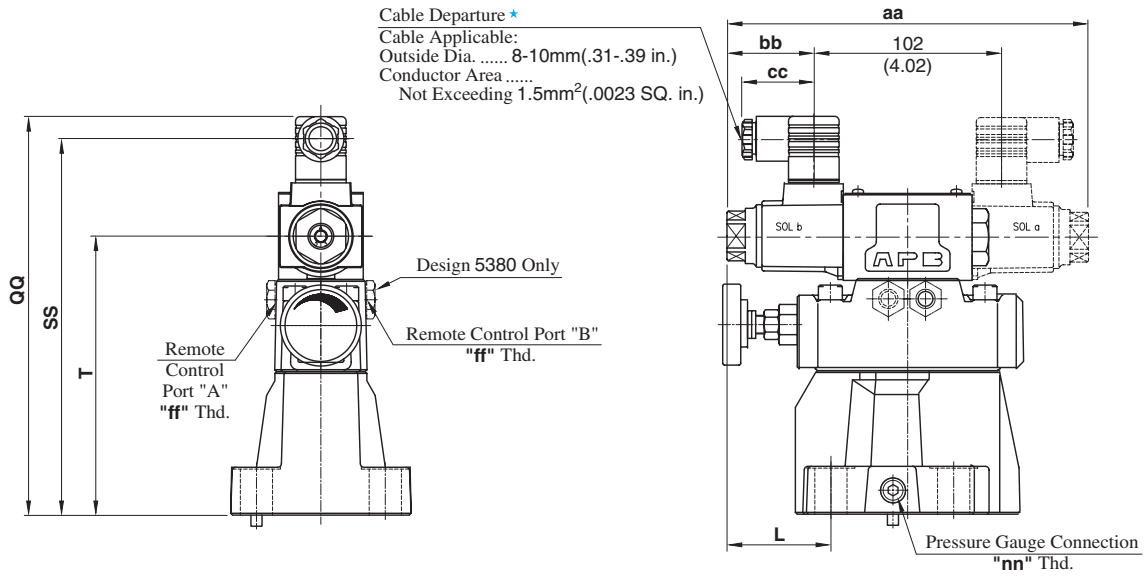
Note: For dimensions of the valve mounting surface, see the installation drawing (P. 213) of the sub-plate used together.

■ Plug-in Connector Type

S-BSG-03-**-**-N-L-53/5380/5390

S-BSG-10-**-**-N-L-53/5380/5390

DIMENSIONS IN
MILLIMETRES (INCHES)



★ Position of cable departure can be changed. For details, refer to DSG-01 valve on [page 357](#).

Model Numbers	Dimensions mm (Inches)							Remarks
	L	QQ	SS	T	aa	bb	cc	
S-BSG-03-**-**-A*-N	71.3 (2.81)	216.5 (8.52)	204.5 (8.05)	151.5 (5.96)	196.4 (7.73)	47.2 (1.86)	39 (1.54)	With AC Solenoid
S-BSG-06-**-**-A*-N	56.5 (2.22)	216.5 (8.52)	204.5 (8.05)	151.5 (5.96)				
S-BSG-10-**-**-A*-N	44.3 (1.74)	251.5 (9.90)	239.5 (9.43)	186.5 (7.34)				
S-BSG-03-**-**-D*-N	75.3 (2.96)	227.5 (8.96)	215.5 (8.48)	151.5 (5.96)	204.4 (8.05)	51.2 (2.02)	39 (1.54)	With DC Solenoid
S-BSG-06-**-**-D*-N	60.5 (2.38)	227.5 (8.96)	215.5 (8.48)	151.5 (5.96)				
S-BSG-10-**-**-D*-N	48.3 (1.90)	262.5 (10.33)	250.5 (9.86)	186.5 (7.34)				
S-BSG-03-**-**-R*-N	75.3 (2.96)	230.5 (9.07)	208.7 (8.22)	151.5 (5.96)	204.4 (8.05)	51.2 (2.02)	53 (2.09)	With AC → DC Solenoid
S-BSG-06-**-**-R*-N	60.5 (2.38)	230.5 (9.07)	208.7 (8.22)	151.5 (5.96)				
S-BSG-10-**-**-R*-N	48.3 (1.90)	265.5 (10.45)	243.7 (9.59)	186.5 (7.34)				

Model Numbers	Thread Size					
	Japanese Standard "JIS" Design 53		European Design Standard Design 5380		N. American Design Standard Design 5390	
	"ff" Thd.	"nn" Thd.	"ff" Thd.	"nn" Thd.	"ff" Thd.	"nn" Thd.
S-BSG-03-**-**-N	Rc 1/8	Rc 1/4	1/8 BSP.F	1/4 BSP.F	1/8 NPT	1/4 NPT
S-BSG-06-**-**-N						
S-BSG-10-**-**-N						

Low Noise Type Solenoid Controlled Relief Valves

Options-Models with Vent Restrictor

**DIMENSIONS IN
MILLIMETRES (INCHES)**

● Terminal Box Type

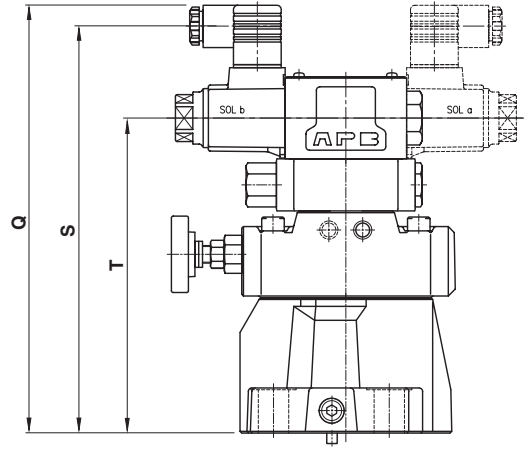
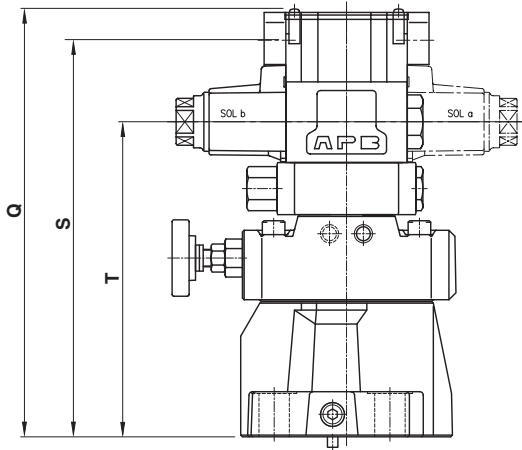
A-S-BSG-⁰³/₀₆ -*- *-L-53/5390

A-S-BSG-10-*- *-53/5390

● Plug-in Connector Type

A-S-BSG-⁰³/₀₆ -*- *-N-L-53/5380/5390

A-S-BSG-10-*- *-N-53/5380/5390

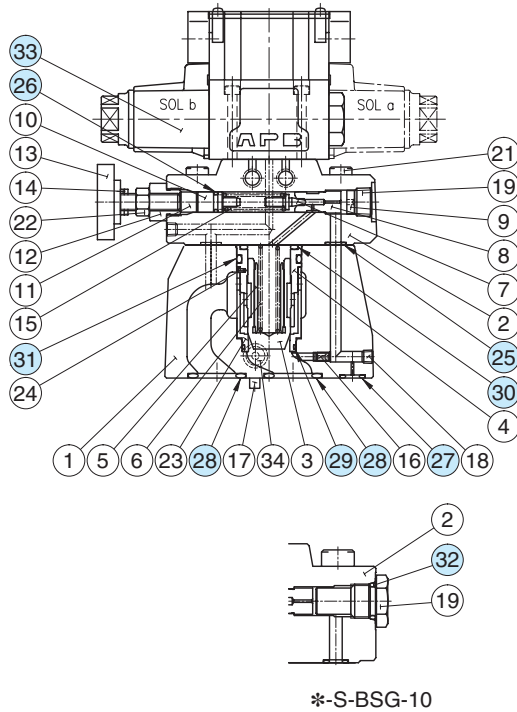


Model Numbers	Dimensions mm (Inches)			Remarks
	Q	S	T	
A-S-BSG-03-*- *-A*/D*/R*-L	246.8(9.72)	228.5(9.00)	181.5(7.15)	Terminal Box Type
A-S-BSG-06-*- *-A*/D*/R*-L				
A-S-BSG-10-*- *-A*/D*/R* *				
A-S-BSG-03-*- *-A*-N-L	246.5(9.70)	234.5(9.23)	181.5(7.15)	Plug-in Connector with AC Solenoid
A-S-BSG-06-*- *-A*-N-L				
A-S-BSG-10-*- *-A*-N				
A-S-BSG-03-*- *-D*-N-L	257.5(10.14)	245.5(9.67)	181.5(7.15)	Plug-in Connector with DC Solenoid
A-S-BSG-06-*- *-D*-N-L				
A-S-BSG-10-*- *-D*-N				
A-S-BSG-03-*- *-R*-N-L	260.5(10.26)	238.7(9.40)	181.5(7.15)	Plug-in Connector with R Type Solenoid
A-S-BSG-06-*- *-R*-N-L				
A-S-BSG-10-*- *-R*-N				

Spare Parts List

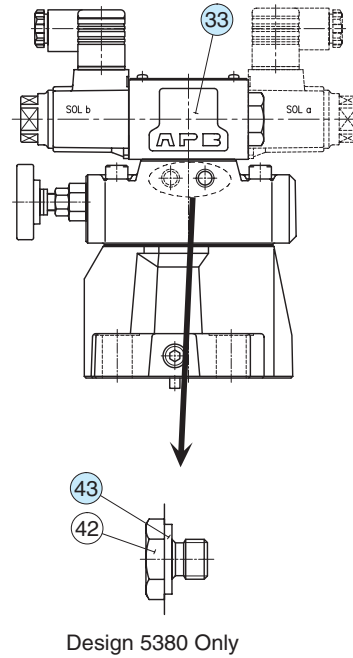
Terminal Box Type

S-BSG-03,06,10-**-**-53/5390



Plug-in Connector Type

S-BSG-03,06,10-**-**-N-53/5380/5390



List of Seals

Item	Name of Parts	Part Numbers			Qty.
		S-BSG-03	S-BSG-06	S-BSG-10	
25	O-Ring	SO-NB-P9	SO-NB-P9	SO-NB-P9	2
26	O-Ring	SO-NA-P9	SO-NA-P9	SO-NA-P9	1
27	O-Ring	SO-NB-P9	SO-NB-P11	SO-NB-P9	1
28	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	2
29	O-Ring	SO-NB-A024	SO-NB-A024	SO-NB-A128	1
30	O-Ring	SO-NB-P28	SO-NB-P28	SO-NB-P36	1
31	O-Ring	SO-NB-P32	SO-NB-P32	SO-NB-P42	1
32	O-Ring	—	—	SO-NB-P14	1
38*	O-Ring	SO-NB-P8			2
40*	O-Ring	SO-NB-P14			2
43	Bonded Seal	SG-FB-1/8	SG-FB-1/8	SG-FB-1/8	2

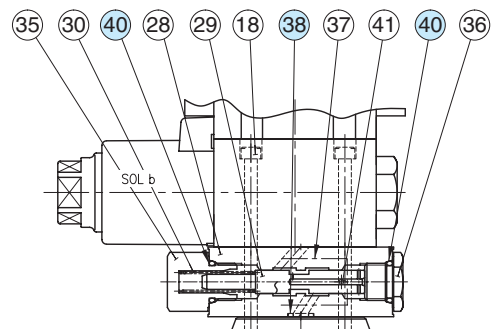
★ The O-Rings for item 38, 40 are used only for the models with the vent restrictor.

Note: When ordering the seals, please specify the seal kit number from the table right. In addition to the above seals, seals for the pilot valves are included in the seal kit.

For the detail of the pilot valve seals, see [page 359](#).

Option-Models with Vent Restrictor

A-S-BSG-03,06,10-**-**-53/5390
N-53/5380/5390



List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
S-BSG-03	KS-S-BSG-03-53
S-BSG-06	KS-S-BSG-06-53
S-BSG-10	KS-S-BSG-10-53
A-S-BSG-03	KS-A-S-BSG-03-53
A-S-BSG-06	KS-A-S-BSG-06-53
A-S-BSG-10	KS-A-S-BSG-10-53

Note: No bonded seals are included in the seal kits.

Pilot Valves

See [page 236](#) for the pilot valve model numbers to be used.

Spare Parts List

List of Pilot Valves

Type of Electrical Conduit Connection	Valve Model Numbers	Pilot Valve Model Numbers	Remarks
Terminal Box Type	*-S-BSG-03/06/10-*-2B3A-★-53	DSG-01-2B3A-★-70	Japanese Standard "JIS"
	-S-BSG-03/06/10--2B3B-★-53	DSG-01-2B3B-★-70	
	-S-BSG-03/06/10--2B2B-★-53	DSG-01-2B2B-★-70	
	-S-BSG-03/06/10--2B2-★-53	DSG-01-2B2-★-70	
	-S-BSG-03/06/10--3C2-★-53	DSG-01-3C2-★-70	
	-S-BSG-03/06/10--3C3-★-53	DSG-01-3C3-★-70	
	-S-BSG-03/06/10--2B3A-★-5390	DSG-01-2B3A-★-7090	N. American Design Std.
	-S-BSG-03/06/10--2B3B-★-5390	DSG-01-2B3B-★-7090	
	-S-BSG-03/06/10--2B2B-★-5390	DSG-01-2B2B-★-7090	
	-S-BSG-03/06/10--2B2-★-5390	DSG-01-2B2-★-7090	
-S-BSG-03/06/10--3C2-★-5390	DSG-01-3C2-★-7090		
-S-BSG-03/06/10--3C3-★-5390	DSG-01-3C3-★-7090		
Plug-in Connector Type	*-S-BSG-03/06/10-*-2B3A-★-N-53	DSG-01-2B3A-★-N-70	Japanese Standard "JIS"
	-S-BSG-03/06/10--2B3B-★-N-53	DSG-01-2B3B-★-N-70	
	-S-BSG-03/06/10--2B2B-★-N-53	DSG-01-2B2B-★-N-70	
	-S-BSG-03/06/10--2B2-★-N-53	DSG-01-2B2-★-N-70	
	-S-BSG-03/06/10--3C2-★-N-53	DSG-01-3C2-★-N-70	
	-S-BSG-03/06/10--3C3-★-N-53	DSG-01-3C3-★-N-70	
	-S-BSG-03/06/10--2B3A-★-N-5380	DSG-01-2B3A-★-N-70	European Design Std.
	-S-BSG-03/06/10--2B3B-★-N-5380	DSG-01-2B3B-★-N-70	
	-S-BSG-03/06/10--2B2B-★-N-5380	DSG-01-2B2B-★-N-70	
	-S-BSG-03/06/10--2B2-★-N-5380	DSG-01-2B2-★-N-70	
	-S-BSG-03/06/10--3C2-★-N-5380	DSG-01-3C2-★-N-70	
	-S-BSG-03/06/10--3C3-★-N-5380	DSG-01-3C3-★-N-70	
	-S-BSG-03/06/10--2B3A-★-N-5390	DSG-01-2B3A-★-N-7090	N. American Design Std.
	-S-BSG-03/06/10--2B3B-★-N-5390	DSG-01-2B3B-★-N-7090	
	-S-BSG-03/06/10--2B2B-★-N-5390	DSG-01-2B2B-★-N-7090	
	-S-BSG-03/06/10--2B2-★-N-5390	DSG-01-2B2-★-N-7090	
-S-BSG-03/06/10--3C2-★-N-5390	DSG-01-3C2-★-N-7090		
-S-BSG-03/06/10--3C3-★-N-5390	DSG-01-3C3-★-N-7090		

Note: 1. Fill a coil type (a symbol representing current/voltage) in section marked ★.

2. For the details of the pilot valves, see [page 359](#).

H/HC Type Pressure Control Valves

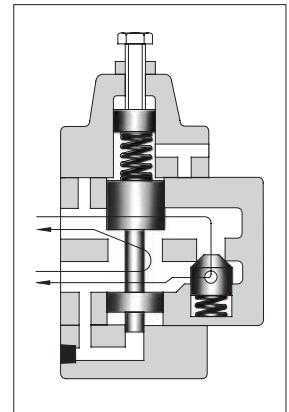
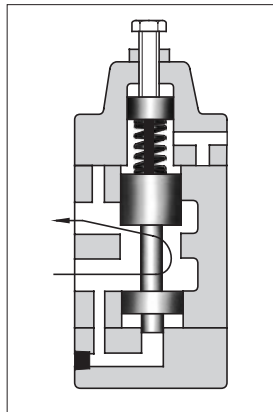
These valves are hydraulically damped, direct operated, pressure control valves which can be actuated by internal or external pilot pressure.

H Type Pressure Control Valves

There are various types of valve including sequence, unloading and low pressure relief valves, all of which are operated by a pressure rise in the circuit, sensed either internally or remotely.

HC Type Pressure Control Valves

They are available with integral check valves for use when free reverse flow from secondary port to the primary port is desired. There are various types of valve including sequence and counterbalance valves, all of which are operated by a pressure rise in the circuit, sensed either internally or remotely.



Specifications

Series	Model Numbers		Max. Operating Pres. MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg (lbs.)	
	Threaded Connection	Sub-plate Mounting			Threaded Connection	Sub-plate Mounting
H Type Pressure Control Valves	HT-03-***-22/2280/2290	HG-03-***-22/2290	21(3050)	50 (13.2)	3.7 (8.2)	4.0 (8.8)
	HT-06-***-22/2280/2290	HG-06-***-22/2290		125 (33)	6.2 (13.7)	6.1 (13.5)
	HT-10-***-22/2280/2290	HG-10-***-22/2290		250 (66)	12.0 (26.5)	11.0 (24.3)
HC Type Pressure Control Valves	HCT-03-***-22/2280/2290	HCG-03-***-22/2290	21(3050)	50 (13.2)	4.1 (9.0)	4.8 (10.6)
	HCT-06-***-22/2280/2290	HCG-06-***-22/2290		125 (33)	7.1 (15.7)	7.4 (16.3)
	HCT-10-***-22/2280/2290	HCG-10-***-22/2290		250 (66)	13.8 (30.4)	13.8 (30.4)

● For check valve pressure drops of HC type, see free flow pressure drop characteristics described on [page 247](#).

Yuken can offer flanged connection valves described below.
For details, contact us.

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. flow L/min (U.S.GPM)
HF/HCF-10-***-22/2290	21 (3050)	250(66)
HF/HCF-16-***-20/2090		500(132)

Model Number Designation

F-	H	T	-03	-C	3	-P	-22	*	
Special Seals	Series Number	Type of Mounting	Valve Size	Pres. Adj. Range MPa (PSI)	Valve Type ^{★1}	With Auxiliary Pilot Pressure	Design Number	Design Standards	
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	H: H Type Pressure Control Valves	T: Threaded Connection	03	L: 0.25 - 0.45 (36 - 65) M: 0.45 - 0.9 (65 - 130) N: 0.9 - 1.8 (130 - 260) A: 1.8 - 3.5 (260 - 510) B: 3.5 - 7.0 (510 - 1020) C: 7.0 - 14 (1020 - 2030)	1 ^{★2} 2 3 4	P: With Auxiliary Pilot Pressure ^{★3}	22	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std.	
			06				22		
			10				22		
		G: Sub-plate Mounting	03				22		None: Japanese Std. "JIS" & European Design Std. 90: N. American Design Std.
			06				22		
			10				22		
	HC: HC Type Pressure Control Valves	T: Threaded Connection	03		1 2 3 4		22	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std.	
			06				22		
			10				22		
		G: Sub-plate Mounting	03				22		None: Japanese Std. "JIS" & European Design Std. 90: N. American Design Std.
			06				22		
			10				22		

★1. For the details of valve types, see the following page.

★2. Type 1 is only possible for pressure adjustment ranges L and M.

★3. Models with auxiliary pilots are used where valves must be operated under a lower external pilot pressure than the adjusted pressure (types N, A, and B: about 1/8 of adjusted pressure; type C: about 1/16). This does not apply to pressure adjustment ranges L and M and valve type 1.

Instructions

- To adjust the pressure, loosen the lock nut and turn the pressure adjustment screw slowly clockwise to increase pressures or anti-clockwise to decrease pressures. After adjustments, do not forget to tighten the lock nut.
- Connect the secondary side pressure ports of types 1 and 4 (internal drain) and the drain ports of types 2 and 3 (external drain) directly to the reservoir with a back pressure close to the atmospheric pressure.
- There are two threaded connection primary pressure ports. They can be connected each other in-line; one as inlet and the other as an outlet or the valve can be used by plugging one of the pressure ports.

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N.American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
HG HCG ^{-03-*}	HGM-03-20	Rc 3/8	HGM-03-2080	3/8 BSP.F	HGM-03-2090	3/8 NPT	1.6 (3.5)
	HGM-03X-20	Rc 1/2	HGM-03X-2080	1/2 BSP.F	HGM-03X-2090	1/2 NPT	1.6 (3.5)
HG HCG ^{-03-**-P}	HGM-03-P-20	Rc 3/8	HGM-03-P-2080	3/8 BSP.F	HGM-03-P-2090	3/8 NPT	2.0 (4.4)
	HGM-03X-P-20	Rc 1/2	HGM-03X-P-2080	1/2 BSP.F	HGM-03X-P-2090	1/2 NPT	2.0 (4.4)
HG HCG ^{-06-*}	HGM-06-20	Rc 3/4	HGM-06-2080	3/4 BSP.F	HGM-06-2090	3/4 NPT	2.4 (5.3)
	HGM-06X-20	Rc 1	HGM-06X-2080	1 BSP.F	HGM-06X-2090	1 NPT	3.0 (6.6)
HG HCG ^{-06-**-P}	HGM-06-P-20	Rc 3/4	HGM-06-P-2080	3/4 BSP.F	HGM-06-P-2090	3/4 NPT	2.4 (5.3)
	HGM-06X-P-20	Rc 1	HGM-06X-P-2080	1 BSP.F	HGM-06X-P-2090	1 NPT	3.0 (6.6)
HG HCG ^{-10-*}	HGM-10-20	Rc 1-1/4	HGM-10-2080	1-1/4 BSP.F	HGM-10-2090	1-1/4 NPT	4.8 (10.6)
	HGM-10X-20	Rc 1-1/2	HGM-10X-2080	1-1/2 BSP.F	HGM-10X-2090	1-1/2 NPT	5.7 (12.6)
HG HCG ^{-10-**-P}	HGM-10-P-20	Rc 1-1/4	HGM-10-P-2080	1-1/4 BSP.F	HGM-10-P-2090	1-1/4 NPT	4.8 (10.6)
	HGM-10X-P-20	Rc 1-1/2	HGM-10X-P-2080	1-1/2 BSP.F	HGM-10X-P-2090	1-1/2 NPT	5.7 (12.6)

● Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

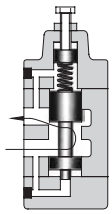
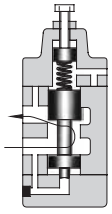
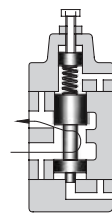
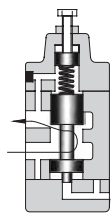
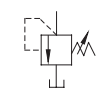
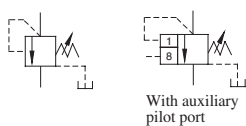
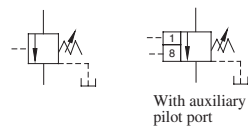
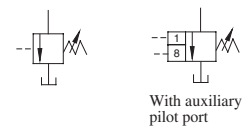
■ Attachment

● Mounting Bolts

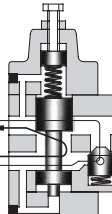
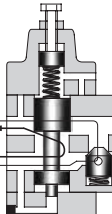
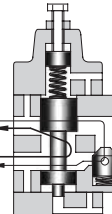
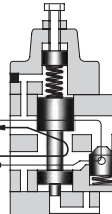
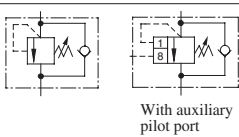
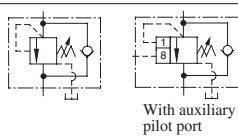
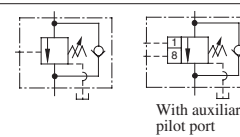
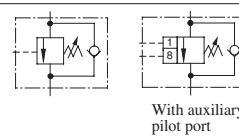
Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Std. "JIS" and European Design Std.	N. American Design Std.	
HG-03	M10×50 Lg.	3/8 -16 UNC×2 Lg.	4
HG-06	M10×50 Lg.	3/8 -16 UNC×2 Lg.	4
HG-10	M10×50 Lg.	3/8 -16 UNC×2 Lg.	6
HCG-03	M10×70 Lg.	3/8 -16 UNC×2-3/4 Lg.	4
HCG-06	M10×80 Lg.	3/8 -16 UNC×3-1/4 Lg.	4
HCG-10	M10×90 Lg.	3/8 -16 UNC×3-1/2 Lg.	6

■ Valve Types

● H Type

Valve Type	Type 1: Low Pres. Relief Valve	Type 2: Sequence Valve	Type 3: Sequence Valve	Type 4: Unloading Valve
Pilot-Drain Type	Internal Pilot-Internal Drain	Internal Pilot-External Drain	External Pilot-External Drain	External Pilot-Internal Drain
Operations				
Graphic Symbols				
Description	Can be used as low-pressure relief valve, but be careful to occurrence of surge pressure.	Used to control the operational sequence of two or more actuators. If primary pressure exceeds the pressure setting, effective fluid is delivered to the secondary side.	Used for the same purpose as for the type 2. Operated by external pilot pressure irrespective of primary pressure.	Used as unloading valve. If external pilot pressure exceeds the pressure setting, the pump is turned no-load by releasing all fluid to the tank.

● HC Type

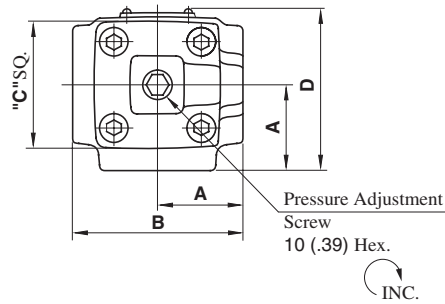
Valve Type	Type 1: Counterbalance Valve	Type 2: Sequence and Check Valve	Type 3: Sequence and Check Valve	Type 4: Counterbalance Valve
Pilot-Drain Type	Internal Pilot-Internal Drain	Internal Pilot-External Drain	External Pilot-External Drain	External Pilot-Internal Drain
Operations				
Graphic Symbols				
Descriptions	Used to prevent gravitational falls by generating a pressure on the actuator return side. If primary pressure exceeds the pressure setting, fluid is released to keep the pressure constant.	Used to control the operating sequence of two or more actuators. If primary pressure exceeds the pressure setting, effective fluid is delivered to the secondary side. Reversed flow is free by a check valve.	Used for the same purpose as for type 2. Operated by external pilot pressure irrespective of primary pressure. Reversed flow is free by a check valve.	Used for the same purpose as for type 1. Operated by external pilot pressure irrespective of primary pressure. Reversed flow is free by a check valve.



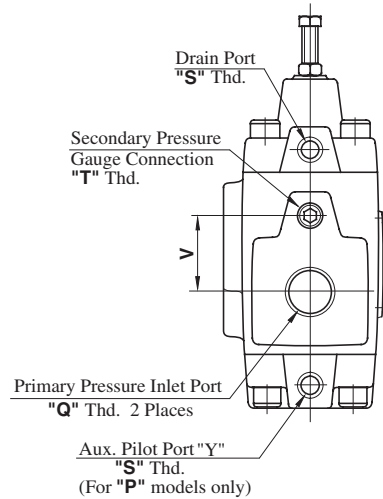
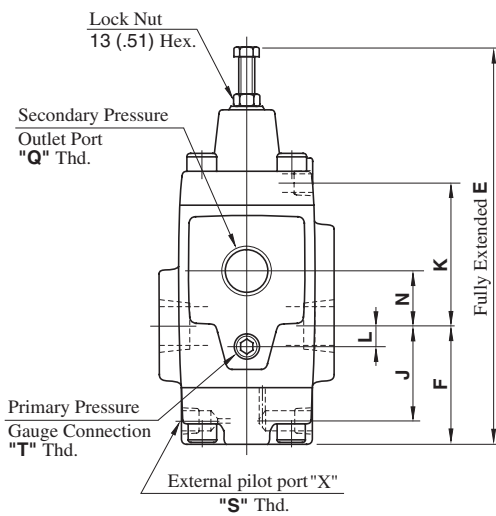
HT-03, 06, 10-**-22/2280/2290

Type 3: Sequence Valve
(External Pilot, External Drain)

DIMENSIONS IN MILLIMETRES (INCHES)

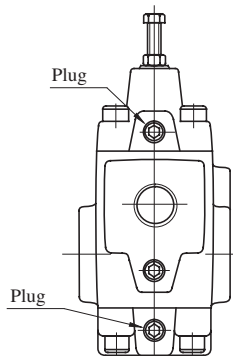


Model Numbers	Thread Size		
	"Q" Thd.	"S" Thd.	"T" Thd.
HT-03, 22	Rc 3/8	Rc 1/4	Rc 1/4
HT-06, 22	Rc 3/4		
HT-10, 22	Rc 1-1/4		
HT-03, 2280	3/8 BSP.F	1/4 BSP.F	1/4 BSP.Tr
HT-06, 2280	3/4 BSP.F		
HT-10, 2280	1-1/4 BSP.F		
HT-03, 2290	3/8 NPT	1/4 NPT	1/4 NPT
HT-06, 2290	3/4 NPT		
HT-10, 2290	1-1/4 NPT		

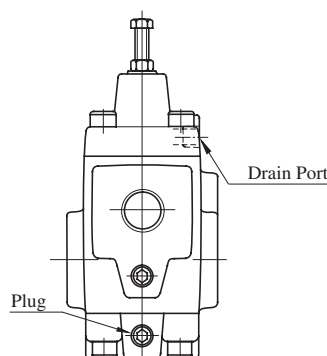


Model Numbers	Dimensions mm (Inches)										
	A	B	C	D	E	F	J	K	L	N	V
HT-03	41 (1.61)	82 (3.23)	60 (2.36)	74 (2.91)	191 (7.52)	57 (2.24)	43 (1.69)	70 (2.76)	0 (0)	28 (1.10)	28 (1.10)
HT-06	48 (1.89)	96 (3.78)	73 (2.87)	87 (3.43)	221 (8.70)	64.5 (2.54)	50.5 (1.99)	80.5 (3.17)	9 (.35)	33 (1.30)	42 (1.65)
HT-10	66 (2.60)	132 (5.20)	86 (3.39)	112 (4.41)	272 (10.71)	84 (3.31)	66 (2.60)	98 (3.86)	12 (.47)	40 (1.57)	52 (2.05)

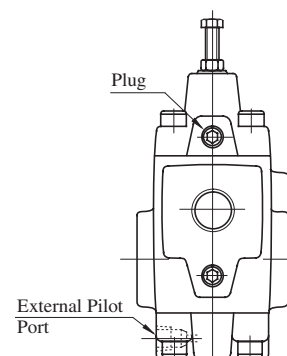
Type 1: Low Pressure Relief Valve
(Internal Pilot, Internal Drain)



Type 2: Sequence Valve
(Internal Pilot, External Drain)



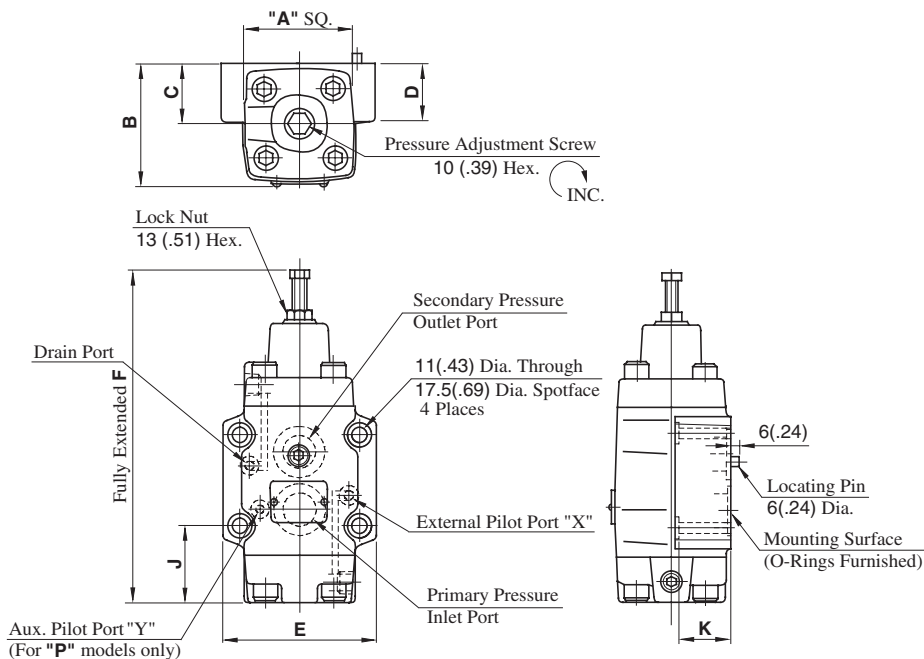
Type 4: Unloading Valve
(External Pilot, Internal Drain)



HG-03, 06-**-**-22/2290

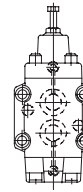
Type 3: Sequence Valve
(External Pilot, External Drain)

Mounting Surface
HG-03: ISO 5781-AG-06-2-A
HG-06: ISO 5781-AH-08-2-A

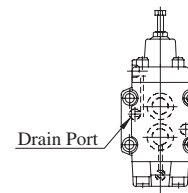


Model Numbers	Dimensions mm (Inches)							
	A	B	C	D	E	F	J	K
HG-03	60 (2.36)	67 (2.64)	35 (1.38)	39 (1.54)	89 (3.50)	191 (7.52)	49.6 (1.95)	38 (1.50)
HG-06	73 (2.87)	79 (3.11)	40 (1.57)	39 (1.54)	102 (4.02)	221 (8.70)	51 (2.01)	38 (1.50)

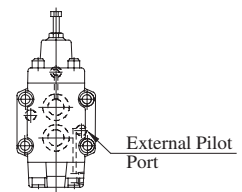
Type 1: Low Pressure Relief Valve
(Internal Pilot, Internal Drain)



Type 2: Sequence Valve
(Internal Pilot, External Drain)



Type 4: Unloading Valve
(External Pilot, Internal Drain)

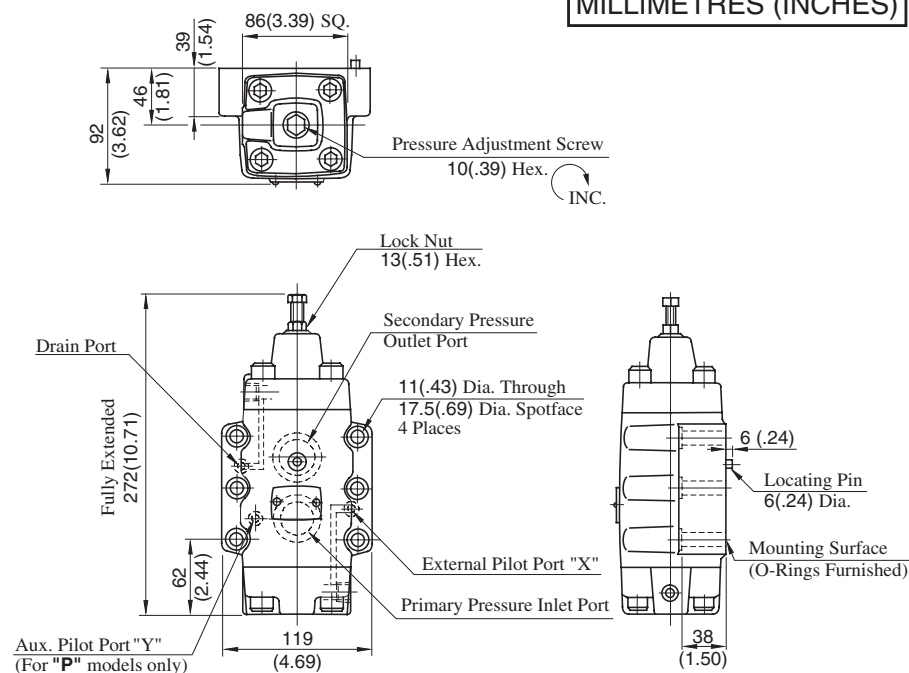


HG-10-**-**-22/2290

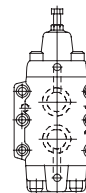
Type 3: Sequence Valve
(External Pilot, External Drain)

Mounting Surface
ISO 5781-AJ-10-2-A

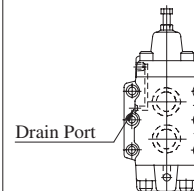
DIMENSIONS IN
MILLIMETRES (INCHES)



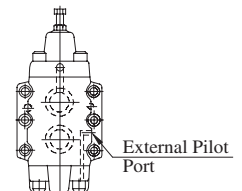
Type 1: Low Pressure Relief Valve
(Internal Pilot, Internal Drain)



Type 2: Sequence Valve
(Internal Pilot, External Drain)



Type 4: Unloading Valve
(External Pilot, Internal Drain)

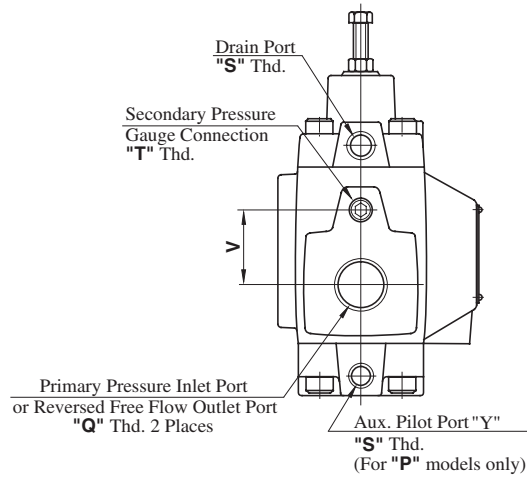
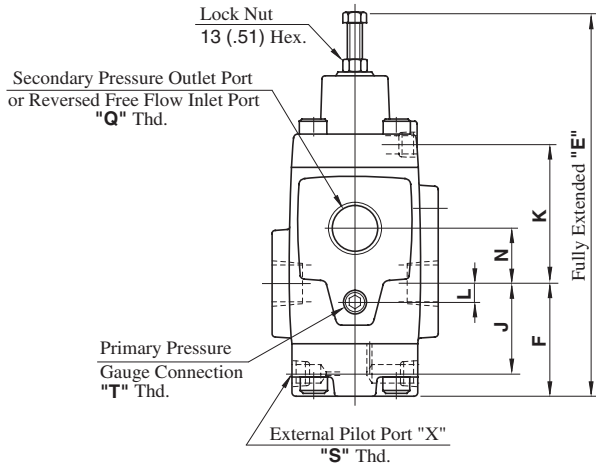
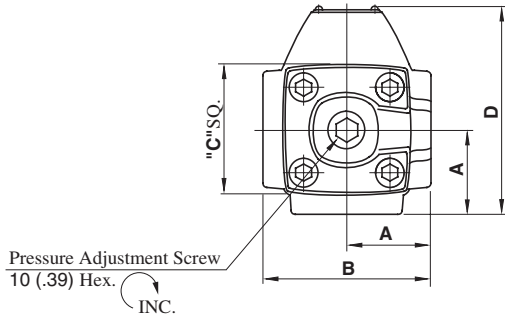


HCT-03, 06, 10-**-**-22/2280/2209

Type 3: Sequence and Check Valve
(External Pilot, External Drain)

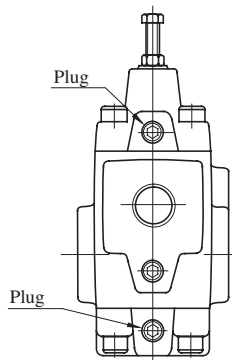
DIMENSIONS IN MILLIMETRES (INCHES)

Model Numbers	Thread Size		
	"Q" Thd.	"S" Thd.	"T" Thd.
HCT-03, 22	Rc 3/8	Rc 1/4	Rc 1/4
HCT-06, 22	Rc 3/4		
HCT-10, 22	Rc 1-1/4		
HCT-03, 2280	3/8 BSP.F	1/4 BSP.F	1/4 BSP.Tr
HCT-06, 2280	3/4 BSP.F		
HCT-10, 2280	1-1/4 BSP.F		
HCT-03, 2290	3/8 NPT	1/4 NPT	1/4 NPT
HCT-06, 2290	3/4 NPT		
HCT-10, 2290	1-1/4 NPT		

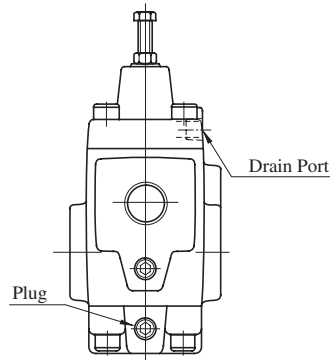


Model Numbers	Dimensions mm (Inches)										
	A	B	C	D	E	F	J	K	L	N	V
HCT-03	41 (1.61)	82 (3.23)	60 (2.36)	96 (3.78)	191 (7.52)	57 (2.24)	43 (1.69)	70 (2.76)	0 (0)	28 (1.10)	28 (1.10)
HCT-06	48 (1.89)	96 (3.78)	73 (2.87)	116 (4.57)	221 (8.70)	64.5 (2.54)	50.5 (1.99)	80.5 (3.17)	9 (.35)	33 (1.30)	42 (1.65)
HCT-10	66 (2.60)	132 (5.20)	86 (3.39)	152 (5.98)	272 (10.71)	84 (3.31)	66 (2.60)	98 (3.86)	12 (.47)	40 (1.57)	52 (2.05)

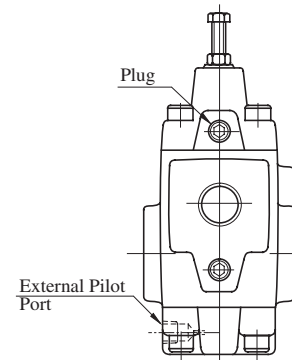
Type 1: Counterbalance Valve
(Internal Pilot, Internal Drain)



Type 2: Sequence and Check Valve
(Internal Pilot, External Drain)



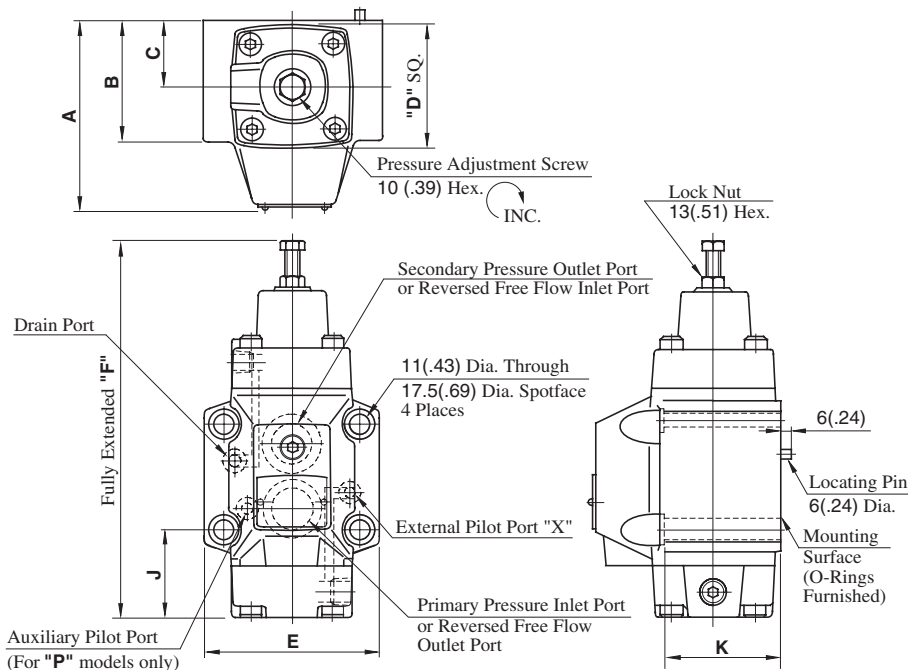
Type 4: Counterbalance Valve
(External Pilot, Internal Drain)



HCG-03, 06-**-**-22/2290

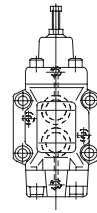
Type 3: Sequence and Check Valve
(External Pilot, External Drain)

Mounting Surface
HCG-03: ISO 5781-AG-06-2-A
HCG-06: ISO 5781-AH-08-2-A

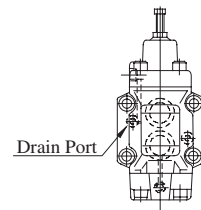


Model Numbers	Dimensions mm (Inches)							
	A	B	C	D	E	F	J	K
HCG-03	90 (3.54)	59 (2.32)	35 (1.38)	60 (2.36)	89 (3.50)	191 (7.52)	49.6 (1.95)	58 (2.28)
HCG-06	108 (4.25)	69 (2.72)	40 (1.57)	73 (2.87)	102 (4.02)	221 (8.70)	51 (2.01)	68 (2.68)

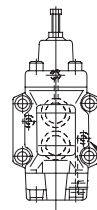
Type 1: Counterbalance Valve
(Internal Pilot, Internal Drain)



Type 2: Sequence and Check Valve
(Internal Pilot, External Drain)



Type 4: Counterbalance Valve
(External Pilot, Internal Drain)

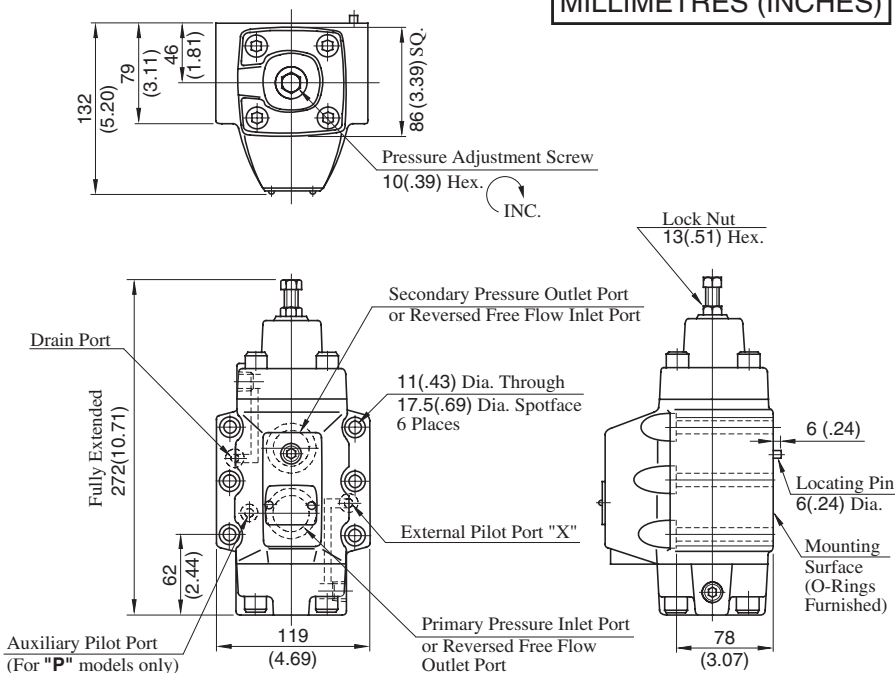


HCG-10-**-**-22/2290

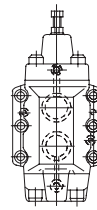
Type 3: Sequence and Check Valve
(External Pilot, External Drain)

Mounting Surface
ISO 5781-AJ-10-2-A

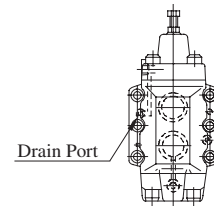
**DIMENSIONS IN
MILLIMETRES (INCHES)**



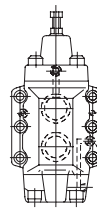
Type 1: Counterbalance Valve
(Internal Pilot, Internal Drain)



Type 2: Sequence and Check Valve
(Internal Pilot, External Drain)

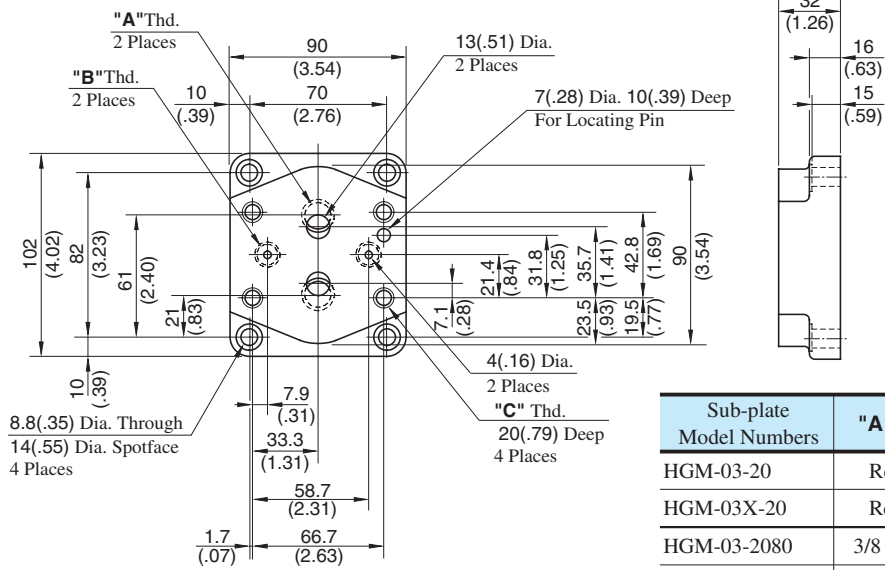


Type 4: Counterbalance Valve
(External Pilot, Internal Drain)



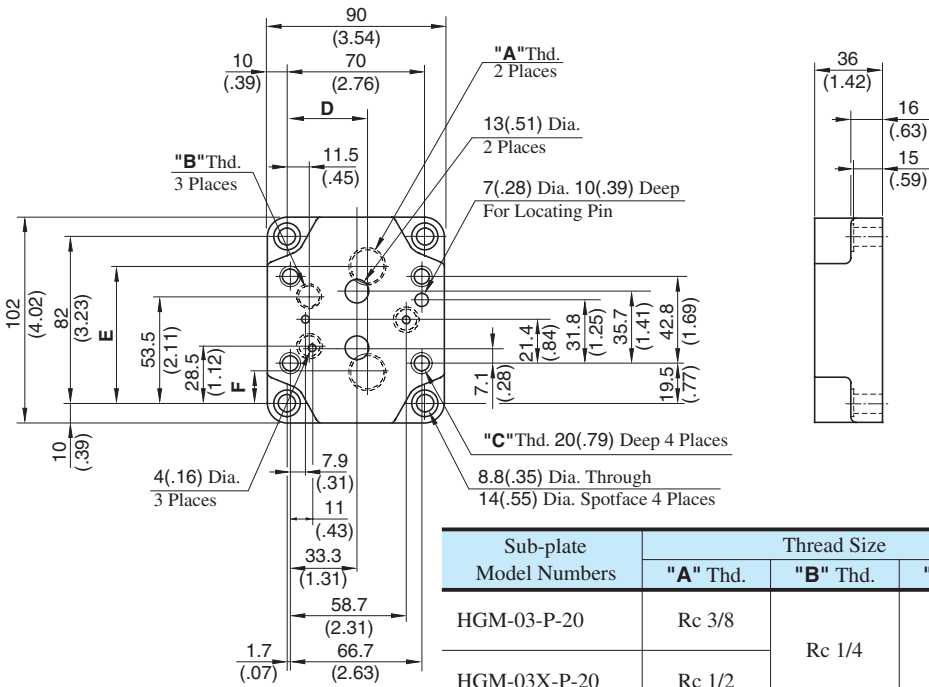
● HGM-03-20/2080/2090
HGM-03X-20/2080/2090

DIMENSIONS IN MILLIMETRES (INCHES)



Sub-plate Model Numbers	"A" Thd.	"B" Thd.	"C" Thd.
HGM-03-20	Rc 3/8	Rc 1/4	M10
HGM-03X-20	Rc 1/2		
HGM-03-2080	3/8 BSP.F	1/4 BSP.F	
HGM-03X-2080	1/2 BSP.F		
HGM-03-2090	3/8 NPT	1/4 NPT	3/8-16 UNC
HGM-03X-2090	1/2 NPT		

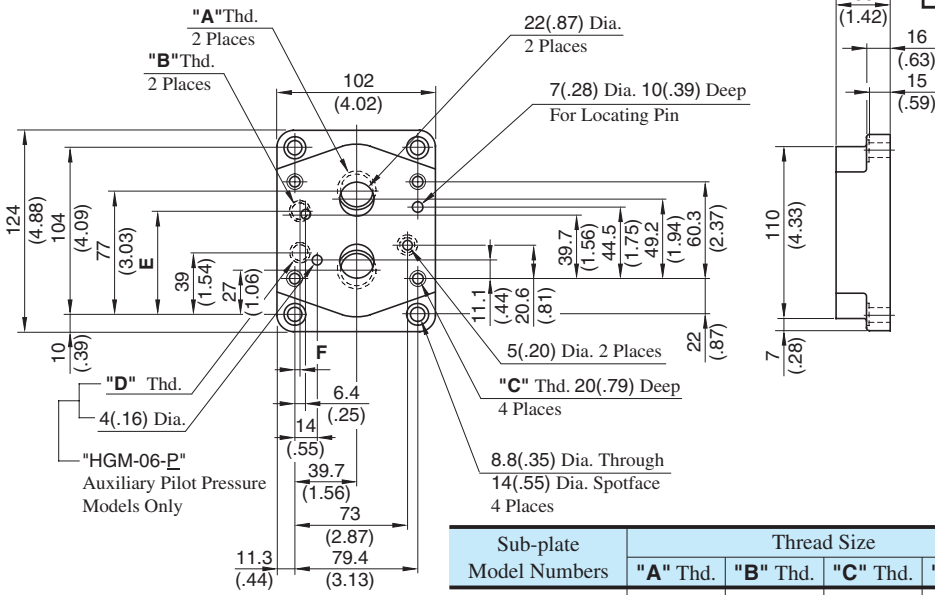
● With Auxiliary Pilot Pressure Port
HGM-03-P-20/2080/2090
HGM-03X-P-20/2080/2090



Sub-plate Model Numbers	Thread Size			Dimensions mm(Inches)		
	"A" Thd.	"B" Thd.	"C" Thd.	D	E	F
HGM-03-P-20	Rc 3/8	Rc 1/4	M 10	35 (1.38)	69.5 (2.74)	12.5 (.49)
HGM-03X-P-20	Rc 1/2			41 (1.61)	67.5 (2.66)	14.5 (.57)
HGM-03-P-2080	3/8 BSP.F	1/4 BSP.F		35 (1.38)	69.5 (2.74)	12.5 (.49)
HGM-03X-P-2080	1/2 BSP.F			41 (1.61)	67.5 (2.66)	14.5 (.57)
HGM-03-P-2090	3/8 NPT	1/4 NPT	3/8-16 UNC	35 (1.38)	69.5 (2.74)	12.5 (.49)
HGM-03X-P-2090	1/2 NPT			41 (1.61)	67.5 (2.66)	14.5 (.57)

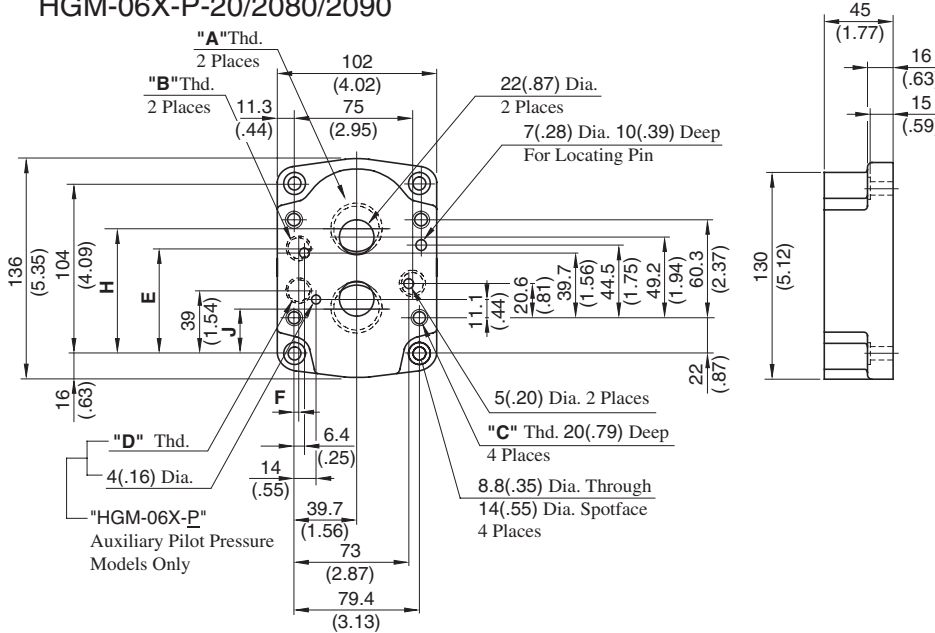
● HGM-06-20/2080/2090
HGM-06-P-20/2080/2090

DIMENSIONS IN MILLIMETRES (INCHES)



Sub-plate Model Numbers	Thread Size				Dimensions mm(Inches)	
	"A" Thd.	"B" Thd.	"C" Thd.	"D" Thd.	E	F
HGM-06-20	Rc 3/4	Rc 1/4	M10	Rc 1/4	61.7 (2.43)	6.4 (.25)
HGM-06-P-20					64 (2.52)	3 (.12)
HGM-06-2080	3/4	1/4	M10	1/4	61.7 (2.43)	6.4 (.25)
HGM-06-P-2080	BSP.F	BSP.F			64 (2.52)	3 (.12)
HGM-06-2090	3/4 NPT	1/4 NPT	3/8-16 UNC	1/4 NPT	61.7 (2.43)	6.4 (.25)
HGM-06-P-2090					64 (2.52)	3 (.12)

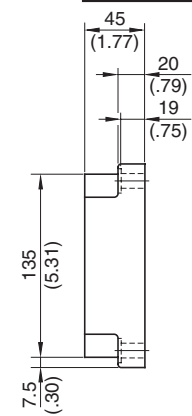
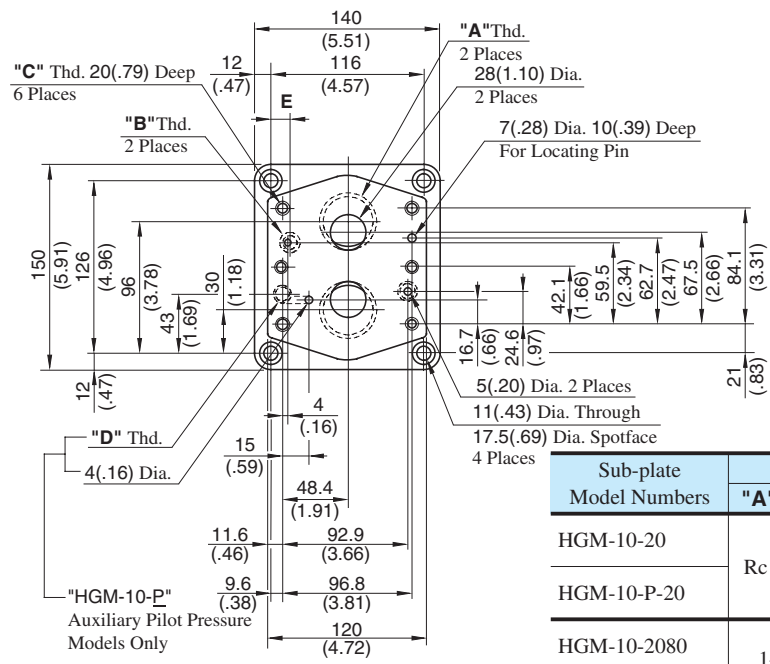
● HGM-06X-20/2080/2090
HGM-06X-P-20/2080/2090



Sub-plate Model Numbers	Thread Size				Dimensions mm(Inches)			
	"A" Thd.	"B" Thd.	"C" Thd.	"D" Thd.	E	F	H	J
HGM-06X-20	Rc 1	Rc 1/4	M10	Rc 1/4	61.7 (2.43)	6.4 (.25)	82.3 (3.24)	22 (.87)
HGM-06X-P-20					64 (2.52)	3 (.12)		
HGM-06X-2080	1 BSP.F	1/4 BSP.F	M10	1/4 BSP.F	61.7 (2.43)	6.4 (.25)	80 (3.15)	24 (.94)
HGM-06X-P-2080					64 (2.52)	3 (.12)	82.3 (3.24)	22 (.87)
HGM-06X-2090	1 NPT	1/4 NPT	3/8-16 UNC	1/4 NPT	61.7 (2.43)	6.4 (.25)	80 (3.15)	24 (.94)
HGM-06X-P-2090					64 (2.52)	3 (.12)	82.3 (3.24)	22 (.87)

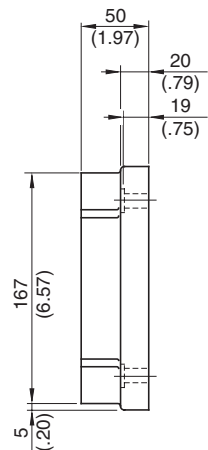
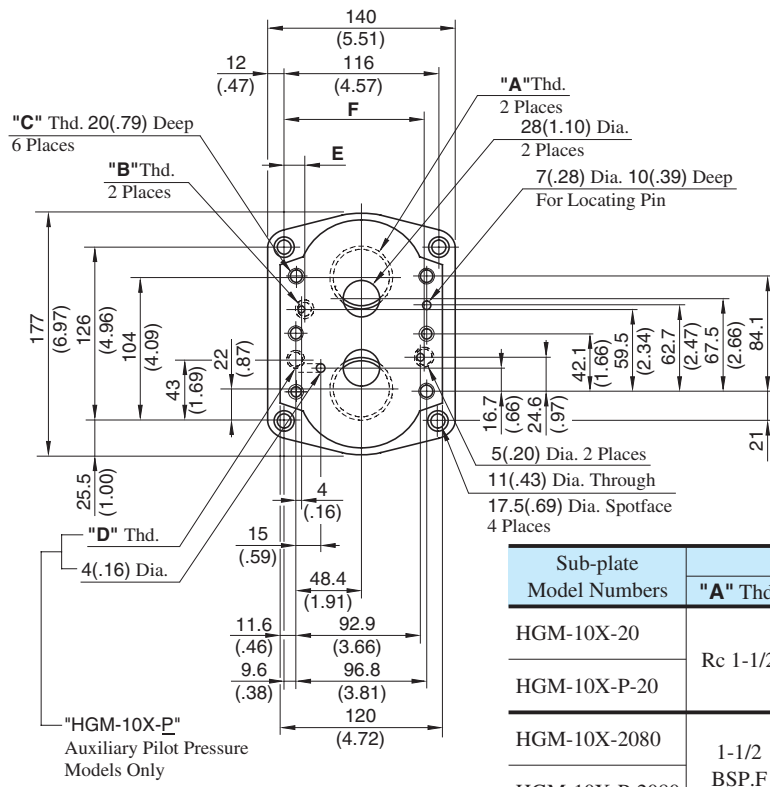
● HGM-10-20/2080/2090
HGM-10-P-20/2080/2090

**DIMENSIONS IN
MILLIMETRES (INCHES)**



Sub-plate Model Numbers	Thread Size				mm(Inches)	
	"A" Thd.	"B" Thd.	"C" Thd.	"D" Thd.	E	
HGM-10-20	Rc 1-1/4	Rc 1/4	M10	Rc 1/4	13.6	
HGM-10-P-20					9.6	
HGM-10-2080	1-1/4 BSP.F	1/4 BSP.F		1/4 BSP.F	13.6	
HGM-10-P-2080					9.6	
HGM-10-2090	1-1/4 NPT	1/4 NPT	3/8-16 UNC	1/4 NPT	13.6	
HGM-10-P-2090					9.6	

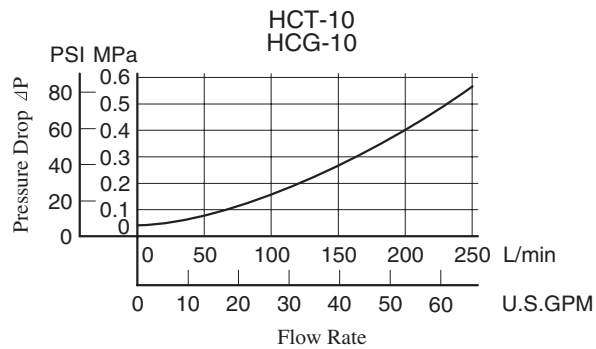
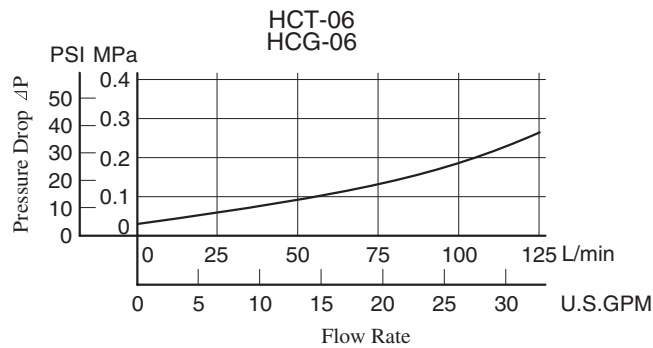
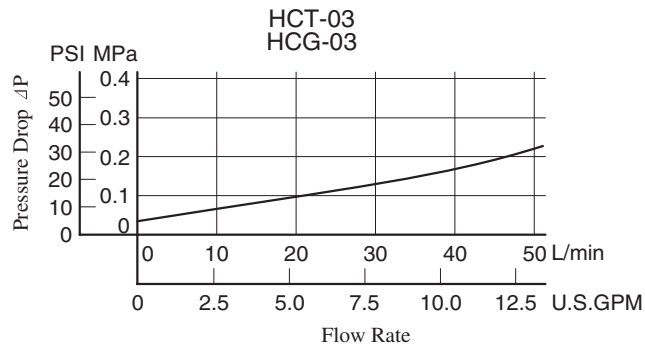
● HGM-10X-20/2080/2090
HGM-10X-P-20/2080/2090



Sub-plate Model Numbers	Thread Size				mm(Inches)	
	"A" Thd.	"B" Thd.	"C" Thd.	"D" Thd.	E	F
HGM-10X-20	Rc 1-1/2	Rc 1/4	M10	Rc 1/4	13.6	102.5
HGM-10X-P-20					9.6	106
HGM-10X-2080	1-1/2 BSP.F	1/4 BSP.F		1/4 BSP.F	13.6	102.5
HGM-10X-P-2080					9.6	106
HGM-10X-2090	1-1/2 NPT	1/4 NPT	3/8-16 UNC	1/4 NPT	13.6	102.5
HGM-10X-P-2090					9.6	106

Pressure Drop for Reversed Free Flow

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



- For any other viscosity, multiply the factors in the table below.

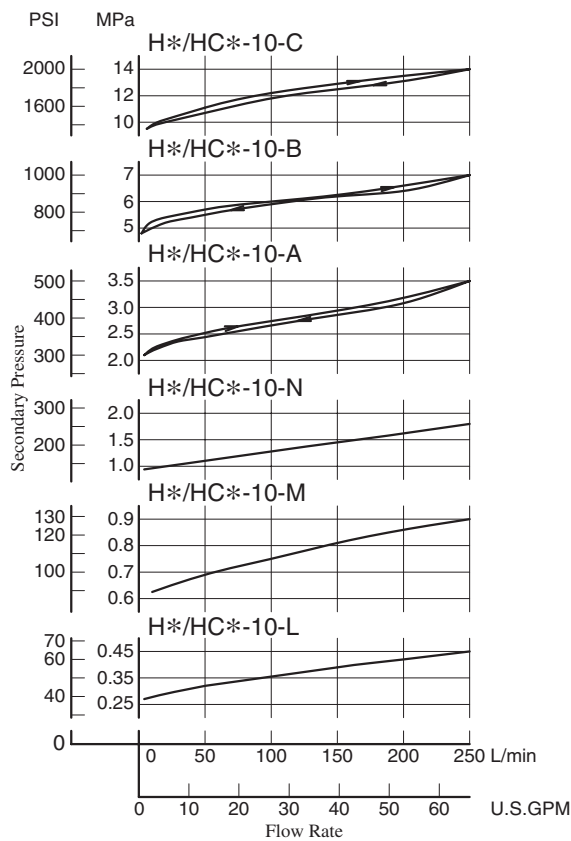
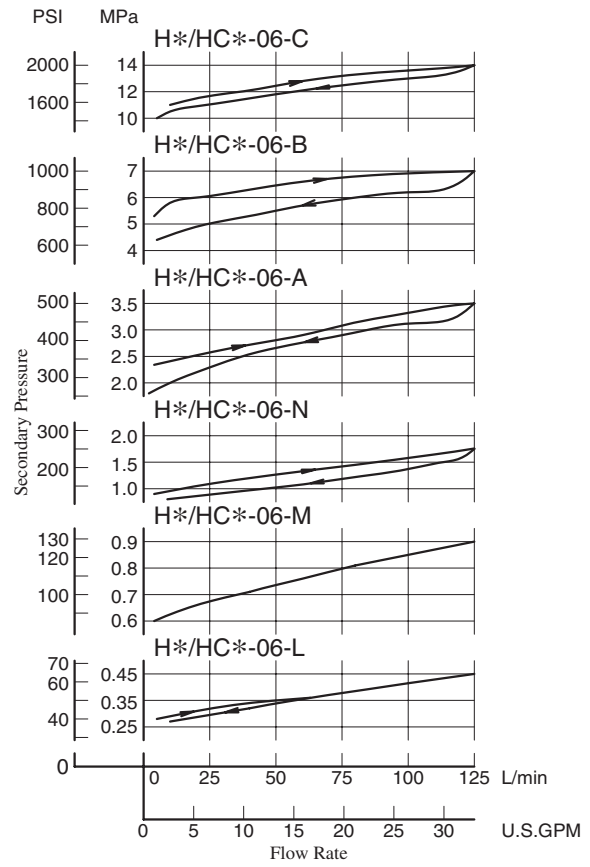
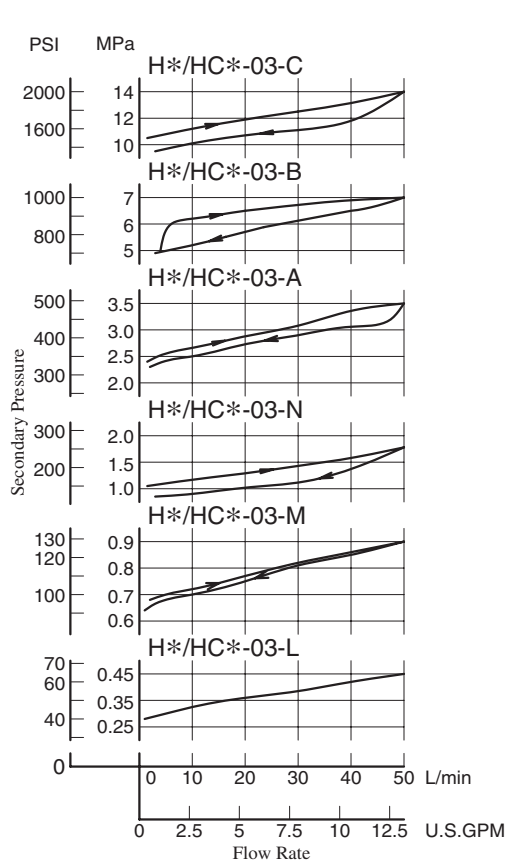
Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
	SSU		77	98	141	186	232	278	324	371	417
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

- For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

$$\Delta P' = \Delta P (G'/0.850)$$

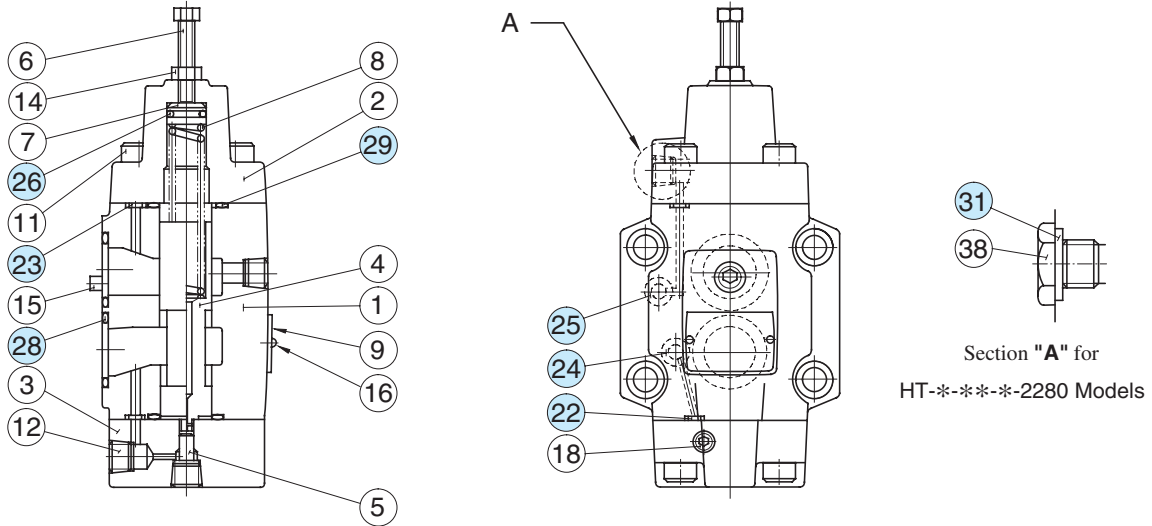
Nominal Override Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



■ Spare Parts List

HT-03, 06, 10-**-**-22/2280/2290
 HG-03, 06, 10-**-**-22/2290



● List of Seals

Item	Name of Parts	Part Numbers			Quantity	
		HT HG -03	HT HG -06	HT HG -10	HT-*	HG-*
22	O-Ring	SO-NB-P4	SO-NB-P4	SO-NB-P4	—	3*
23	O-Ring	SO-NB-P6	SO-NB-P6	SO-NB-P6	4	4
24	O-Ring	SO-NB-P9	SO-NB-P9	SO-NB-P9	—	1*
25	O-Ring	SO-NB-P9	SO-NB-P9	SO-NB-P9	—	2
26	O-Ring	SO-NA-P11	SO-NA-P15	SO-NA-P20	1	1
28	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	—	2
29	O-Ring	SO-NB-P22	SO-NB-P28	SO-NB-P36	2	2
31	Bonded Seal	SG-FB-1/4	SG-FB-1/4	SG-FB-1/4	2	—

★ Used only for HG type with auxiliary pilot pressure (P).
 Note: When ordering the seals, please specify the seal kit number from the table below.

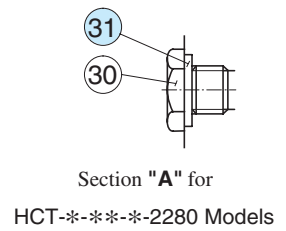
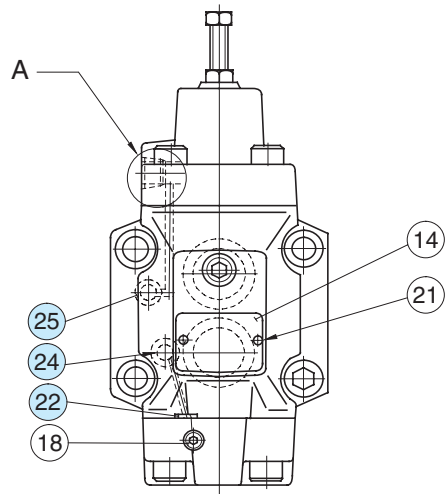
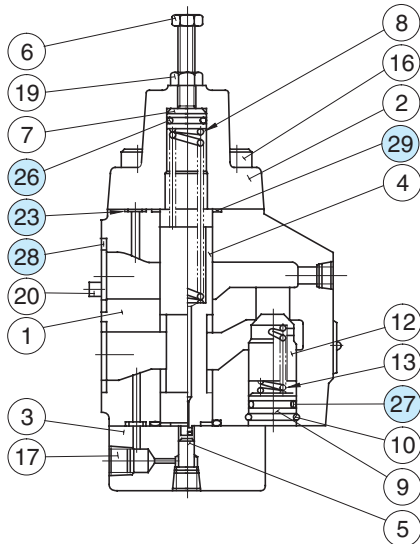
● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
HT-03-**-**-22/2280/2290	KS-HT-03-22
HT-06-**-**-22/2280/2290	KS-HT-06-22
HT-10-**-**-22/2280/2290	KS-HT-10-22
HG-03-**-22/2290	KS-HG-03-22
HG-03-**-P-22/2290	KS-HG-03-P-22
HG-06-**-22/2290	KS-HG-06-22
HG-06-**-P-22/2290	KS-HG-06-P-22
HG-10-**-22/2290	KS-HG-10-22
HG-10-**-P-22/2290	KS-HG-10-P-22

Note: No bonded seals are included in the seal kits.

Spare Parts List

HCT-03, 06, 10-***-22/2280/2290
 HCG-03, 06, 10-***-22/2290



● List of Seals

Item	Name of Parts	Part Numbers			Quantity	
		HCT HCG -03	HCT HCG -06	HCT HCG -10	HCT-*	HCG-*
22	O-Ring	SO-NB-P4	SO-NB-P4	SO-NB-P4	—	3 *
23	O-Ring	SO-NB-P6	SO-NB-P6	SO-NB-P6	4	4
24	O-Ring	SO-NB-P9	SO-NB-P9	SO-NB-P9	—	1 *
25	O-Ring	SO-NB-P9	SO-NB-P9	SO-NB-P9	—	2
26	O-Ring	SO-NA-P11	SO-NA-P15	SO-NA-P20	1	1
27	O-Ring	SO-NB-P12	SO-NB-P18	SO-NB-P22A	1	1
28	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	—	2
29	O-Ring	SO-NB-P22	SO-NB-P28	SO-NB-P36	2	2
31	Bonded Seal	SG-FB-1/4	SG-FB-1/4	SG-FB-1/4	2	—

★ Used only for HCG type with auxiliary pilot pressure (P).
 Note: When ordering the seals, please specify the seal kit number from the table below.

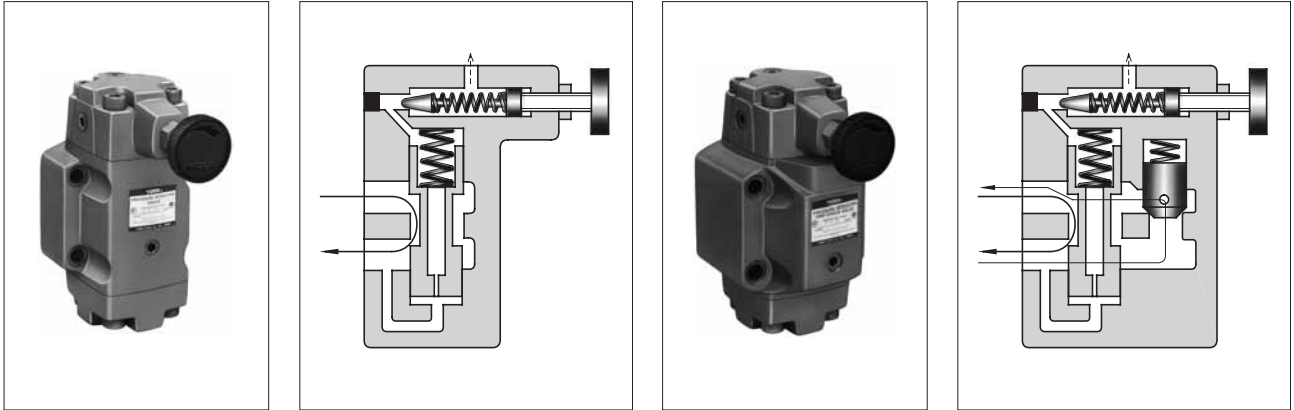
● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
HCT-03-***-22/2280/2290	KS-HCT-03-22
HCT-06-***-22/2280/2290	KS-HCT-06-22
HCT-10-***-22/2280/2290	KS-HCT-10-22
HCG-03-***-22/2290	KS-HCG-03-22
HCG-03-***-P-22/2290	KS-HCG-03-P-22
HCG-06-***-22/2290	KS-HCG-06-22
HCG-06-***-P-22/2290	KS-HCG-06-P-22
HCG-10-***-22/2290	KS-HCG-10-22
HCG-10-***-P-22/2290	KS-HCG-10-P-22

Note: No bonded seals are included in the seal kits.

Pressure Reducing Valves / Pressure Reducing and Check Valves

Pressure reducing valves are used to set the pressure of a hydraulic circuit below that of the main circuit. In addition, operation under remote control is possible by using the remote control port. Pressure reducing and check valves have check valves, which allow a free flow from the secondary side to the primary.



Specifications

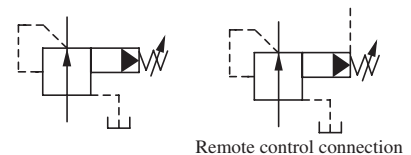
Valve Name	Model Numbers		Max. Operating Pressure MPa (PSI)	Max. Flow ^{★1}		Drain Flow ^{★2} L/min (U.S.GPM)	Approx. Mass kg (lbs.)	
	Threaded Connection	Sub-plate Mounting		Setting Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)		Threaded Connection	Sub-plate Mounting
Pressure Reducing Valve	RT-03-*-22*	RG-03-*-22*	21 (3050)	0.7 - 1.0 (102 - 145)	40 (10.6)	0.8 - 1.0 (.21 - .26)	4.3 (9.5)	4.5 (9.9)
				1.0 - 20.5 (145 - 2970)	50 (13.2)			
	RT-06-*-22*	RG-06-*-22*	21 (3050)	0.7 - 1.0 (102 - 145)	50 (13.2)	0.8 - 1.1 (.21 - .29)	6.9 (15.2)	6.8 (15.0)
				1.0 - 1.5 (145 - 220)	100 (26.4)			
				1.5 - 20.5 (220 - 2970)	125 (33.0)			
	RT-10-*-22*	RG-10-*-22*	21 (3050)	0.7 - 1.0 (102 - 145)	130 (34.3)	1.2 - 1.5 (.32 - .40)	12.0 (26.5)	11.0 (24.3)
				1.0 - 1.5 (145 - 220)	180 (47.6)			
				1.5 - 10.5 (220 - 1520)	220 (58.1)			
				10.5 - 20.5 (1520 - 2970)	250 (66.0)			
Pressure Reducing and Check Valve	RCT-03-*-22*	RCG-03-*-22*	21 (3050)	0.7 - 1.0 (102 - 145)	40 (10.6)	0.8 - 1.0 (.21 - .26)	4.8 (10.6)	5.4 (11.9)
				1.0 - 20.5 (145 - 2970)	50 (13.2)			
	RCT-06-*-22*	RCG-06-*-22*	21 (3050)	0.7 - 1.0 (102 - 145)	50 (13.2)	0.8 - 1.1 (.21 - .29)	7.8 (17.2)	8.1 (17.9)
				1.0 - 1.5 (145 - 220)	100 (26.4)			
				1.5 - 20.5 (220 - 2970)	125 (33.0)			
	RCT-10-*-22*	RCG-10-*-22*	21 (3050)	0.7 - 1.0 (102 - 145)	130 (34.3)	1.2 - 1.5 (.32 - .40)	13.8 (30.4)	13.8 (30.4)
				1.0 - 1.5 (145 - 220)	180 (47.6)			
				1.5 - 10.5 (220 - 1520)	220 (58.1)			
				10.5 - 20.5 (1520 - 2970)	250 (66.0)			

★1. The max. flow rates are those shown at the primary pressure at 21 MPa (3050 PSI).

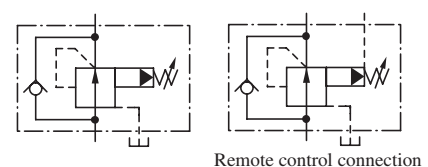
★2. The drain flow rates are equal to pilot flow rates when differential pressure between primary and secondary pressure is at 20.5 MPa (2970 PSI).

Graphic Symbols

● RT / RG



● RCT / RCG



Yuken can offer flanged connection valves described below.

For details, contact us.

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
RF/RCF-10-*-22*	21 (3050)	250 (66)
RF/RCF-16-*-20*		500 (132)

Model Number Designation

F-	R	T	-03	-B	-22	*
Special Seals	Series Number	Type of Mounting	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	R: Pressure Reducing Valves	T: Threaded Connection	03	B: 0.7-7 (102-1020) C: 3.5-14 (510-2030) H: 7-20.5 (1020-2970)	22	None: Japanese Std. "JIS" 80: European Design Std. 90: N.American Design Std.
			06		22	
			10		22	
		G: Sub-plate Mounting	03		22	
			06		22	
			10		22	
	RC: Pressure Reducing and Check Valves	T: Threaded Connection	03	B: 0.7-7 (102-1020) C: 3.5-14 (510-2030) H: 7-20.5 (1020-2970)	22	None: Japanese Std. "JIS" 80: European Design Std. 90: N.American Design Std.
			06		22	
			10		22	
		G: Sub-plate Mounting	03		22	
			06		22	
			10		22	

Attachment

Mounting bolts

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Std. "JIS" and European Design Std.	N. American Design Std.	
RG-03	M10 × 50 Lg.	3/8-16 UNC × 2 Lg.	4
RG-06	M10 × 50 Lg.	3/8-16 UNC × 2 Lg.	4
RG-10	M10 × 50 Lg.	3/8-16 UNC × 2 Lg.	6
RCG-03	M10 × 70 Lg.	3/8-16 UNC × 2-3/4 Lg.	4
RCG-06	M10 × 80 Lg.	3/8-16 UNC × 3-1/4 Lg.	4
RCG-10	M10 × 90 Lg.	3/8-16 UNC × 3-1/2 Lg.	6

Sub-plate

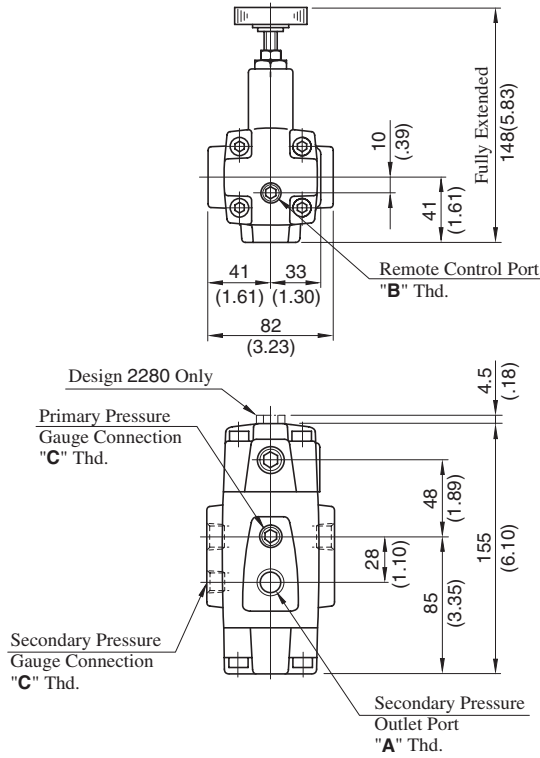
Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
RG RCG ⁻⁰³	HGM-03-20	Rc 3/8	HGM-03-2080	3/8 BSP.F	HGM-03-2090	3/8 NPT	1.6 (3.5)
	HGM-03X-20	Rc 1/2	HGM-03X-2080	1/2 BSP.F	HGM-03X-2090	1/2 NPT	
RG RCG ⁻⁰⁶	HGM-06-20	Rc 3/4	HGM-06-2080	3/4 BSP.F	HGM-06-2090	3/4 NPT	2.4 (5.3)
	HGM-06X-20	Rc 1	HGM-06X-2080	1 BSP.F	HGM-06X-2090	1 NPT	3.0 (6.6)
RG RCG ⁻¹⁰	HGM-10-20	Rc 1-1/4	HGM-10-2080	1-1/4 BSP.F	HGM-10-2090	1-1/4 NPT	4.8 (10.6)
	HGM-10X-20	Rc 1-1/2	HGM-10X-2080	1-1/2 BSP.F	HGM-10X-2090	1-1/2 NPT	5.7 (12.6)

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- The sub-plates are the same as those for H type pressure control valves. With the reducing and check valve, the sub-plate is used in a position 180° turned (upside down) from the normal position. When mounting the sub-plate, be sure to bring the valve locating pin to the sub-plate pin hole. For dimensions, see [page 244 to 246](#).

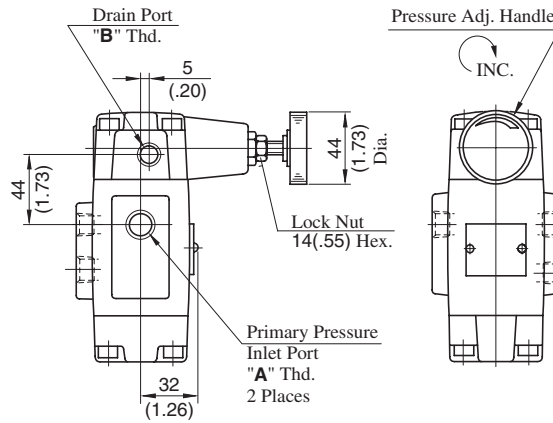
Instructions

- To adjust the pressure, loosen the lock nut and turn the pressure adjustment handle slowly clockwise for higher pressures and anti-clockwise for lower pressures. After adjustments, do not forget to tighten the lock nut.
- Connect the drain port directly to the reservoir in which case the pressure at the drain port should be kept at a low back pressure close to the atmospheric pressure.
- In case of "Threaded Connections", there are two threaded connection type primary pressure ports. They can be connected each other in-line; one as an inlet and the other as an outlet or the valve can be used by plugging one of the pressure ports.

RT-03-*-22/2280/2290

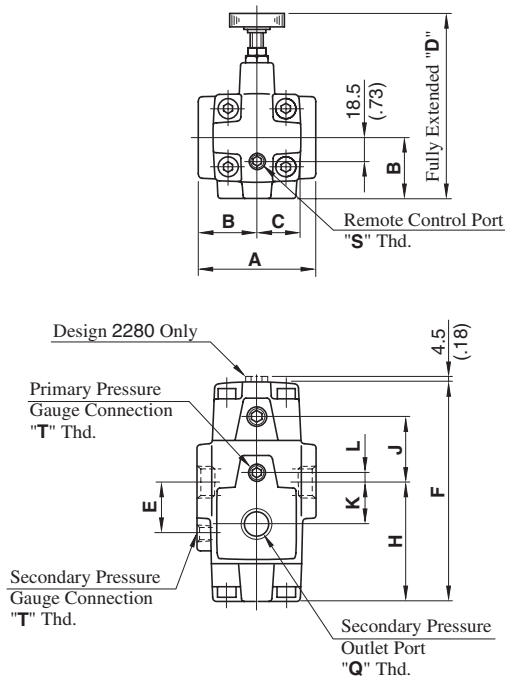


Model Numbers	Thread Size		
	"A" Thd.	"B" Thd.	"C" Thd.
RT-03-*-22	Rc 3/8	Rc 1/4	Rc 1/4
RT-03-*-2280	3/8 BSP.F	1/4 BSP.F	1/4 BSP.Tr
RT-03-*-2290	3/8 NPT	1/4 NPT	1/4 NPT

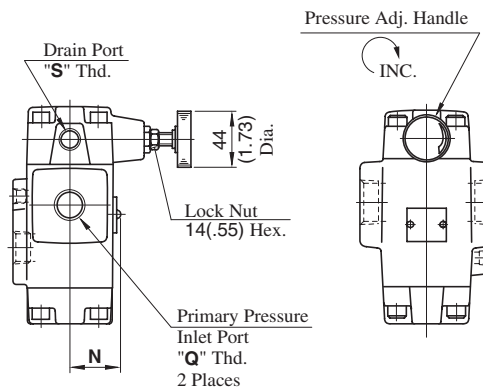


DIMENSIONS IN MILLIMETRES (INCHES)

RT-10⁰⁶-*-22/2280/2290



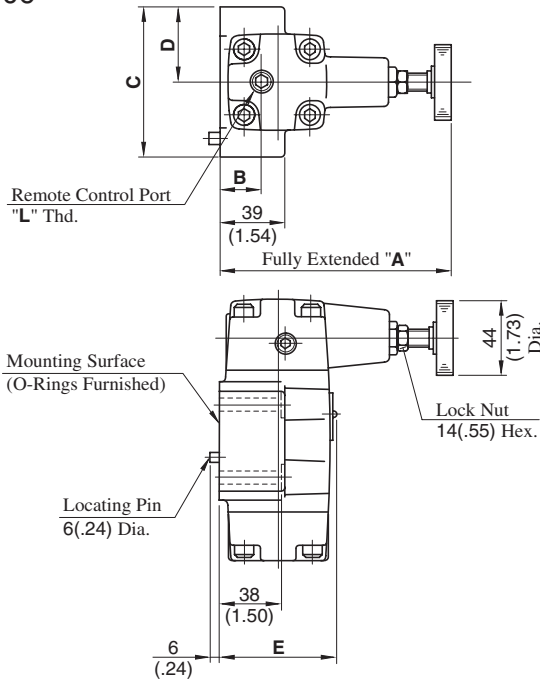
Model Numbers	Thread Size		
	"Q" Thd.	"S" Thd.	"T" Thd.
RT-06-*-22	Rc 3/4	Rc 1/4	Rc 1/4
RT-06-*-2280	3/4 BSP.F	1/4 BSP.F	1/4 BSP.Tr
RT-06-*-2290	3/4 NPT	1/4 NPT	1/4 NPT
RT-10-*-22	Rc 1-1/4	Rc 1/4	Rc 1/4
RT-10-*-2280	1-1/4 BSP.F	1/4 BSP.F	1/4 BSP.Tr
RT-10-*-2290	1-1/4 NPT	1/4 NPT	1/4 NPT



Model Numbers	Dimensions - mm (Inches)										
	A	B	C	D	E	F	H	J	K	L	N
RT-06	96 (3.78)	48 (1.89)	36.5 (1.44)	149 (5.87)	42 (1.65)	179 (7.05)	97.5 (3.84)	53.5 (2.11)	33 (1.30)	9 (.35)	39 (1.54)
RT-10	132 (5.20)	66 (2.60)	43 (1.69)	167 (6.57)	52 (2.05)	216 (8.50)	124 (4.88)	64 (2.52)	40 (1.57)	12 (.47)	46 (1.81)

Pressure Reducing Valves / Pressure Reducing and Check Valves

RG-03/06-*-22/2280/2290



Model Numbers	Thread Size	
	"L" Thd.	"N" Thd.
RG-03/06-*-22	Rc 1/4	Rc 1/4
RG-03/06-*-2280	1/4 BSP.F	1/4 BSP.Tr
RG-03/06-*-2290	1/4 NPT	1/4 NPT

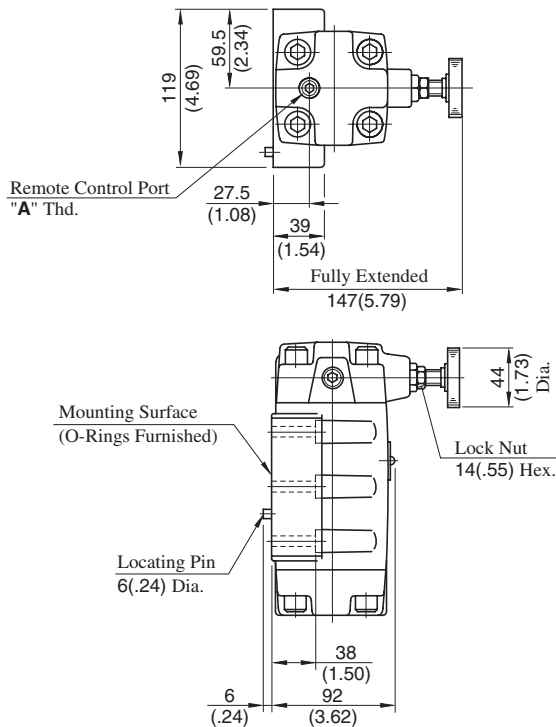
★ Port connection is not required for RG models but an O-ring should be furnished.

Model Numbers	Dimensions mm (Inches)								
	A	B	C	D	E	F	H	J	K
RG-03	142 (5.59)	25 (.98)	89 (3.50)	44.5 (1.75)	67 (2.64)	155.5 (6.12)	92.4 (3.64)	40.6 (1.60)	34.9 (1.37)
RG-06	141 (5.55)	21.5 (.85)	102 (4.02)	51 (2.01)	79 (3.11)	179 (7.05)	111 (4.37)	40 (1.57)	48 (1.89)

Note: For dimensions of the valve mounting surface see the dimensional drawing (page 244 & 245) of the sub-plate used together.

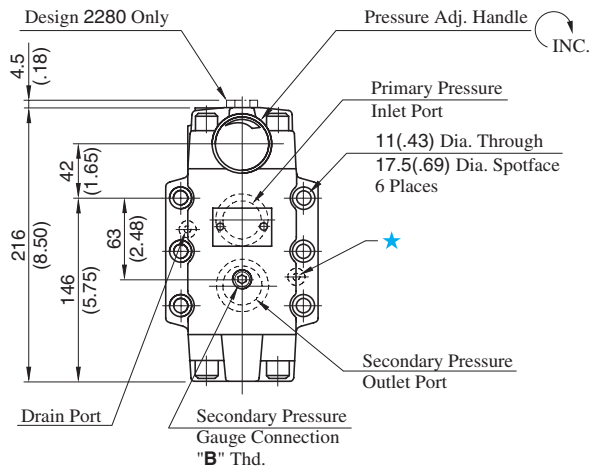
DIMENSIONS IN MILLIMETRES (INCHES)

RG-10-*-22/2280/2290



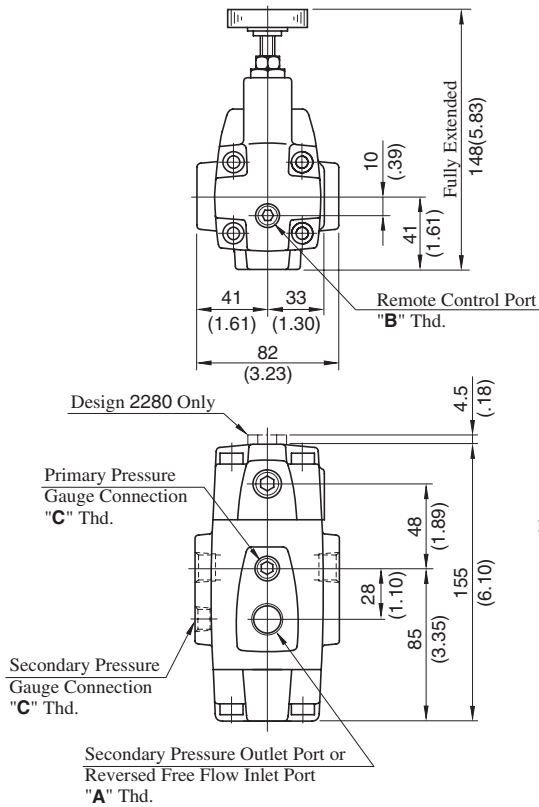
Model Numbers	Thread Size	
	"A" Thd.	"B" Thd.
RG-10-*-22	Rc 1/4	Rc 1/4
RG-10-*-2280	1/4 BSP.F	1/4 BSP.Tr
RG-10-*-2290	1/4 NPT	1/4 NPT

★ Port connection is not required for RG models but an O-ring should be furnished.

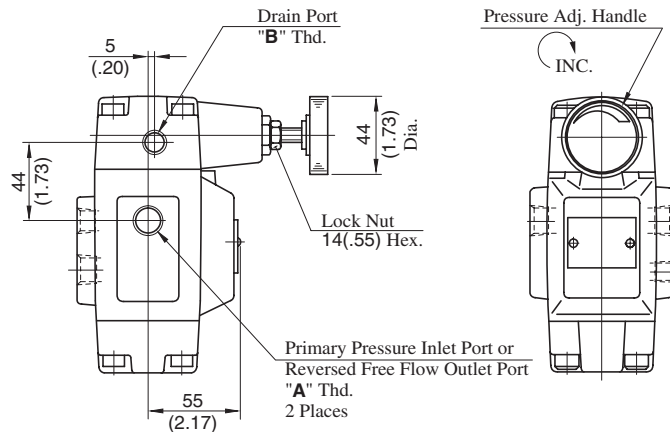


Note: For dimensions of the valve mounting surface see the dimensional drawing (page 246) of the sub-plate used together.

RCT-03-*-22/2280/2290

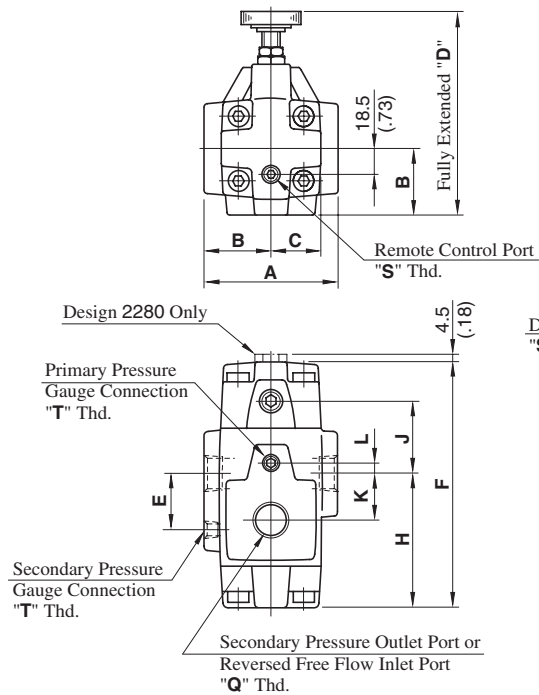


Model Numbers	Thread Size		
	"A" Thd.	"B" Thd.	"C" Thd.
RCT-03-*-22	Rc 3/8	Rc 1/4	Rc 1/4
RCT-03-*-2280	3/8 BSP.F	1/4 BSP.F	1/4 BSP.Tr
RCT-03-*-2290	3/8 NPT	1/4 NPT	1/4 NPT

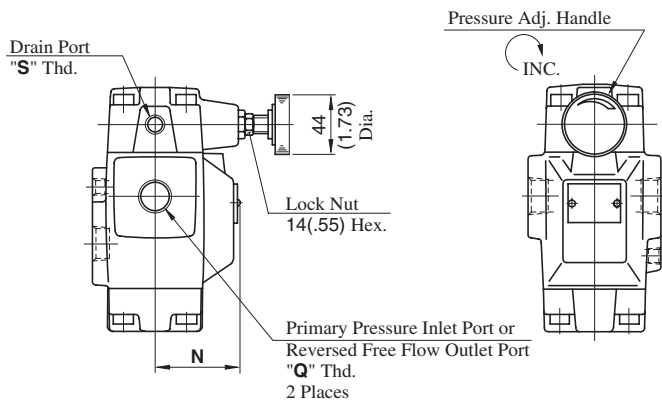


DIMENSIONS IN MILLIMETRES (INCHES)

RCT-06₁₀-*-22/2280/2290



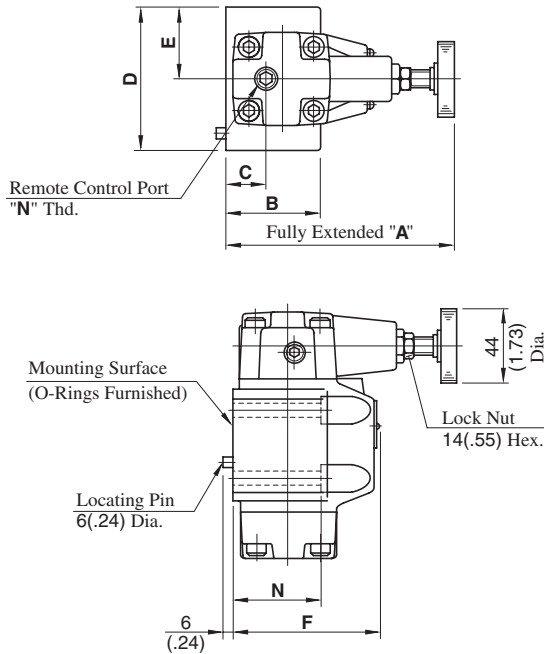
Model Numbers	Thread Size		
	"Q" Thd.	"S" Thd.	"T" Thd.
RCT-06-*-22	Rc 3/4	Rc 1/4	Rc 1/4
RCT-06-*-2280	3/4 BSP.F	1/4 BSP.F	1/4 BSP.Tr
RCT-06-*-2290	3/4 NPT	1/4 NPT	1/4 NPT
RCT-10-*-22	Rc 1-1/4	Rc 1/4	Rc 1/4
RCT-10-*-2280	1-1/4 BSP.F	1/4 BSP.F	1/4 BSP.Tr
RCT-10-*-2290	1-1/4 NPT	1/4 NPT	1/4 NPT



Model Numbers	Dimensions mm (Inches)										
	A	B	C	D	E	F	H	J	K	L	N
RCT-06	96 (3.78)	48 (1.89)	36.5 (1.44)	149 (5.87)	42 (1.65)	179 (7.05)	97.5 (3.84)	53.5 (2.11)	33 (1.30)	9 (.35)	68 (2.68)
RCT-10	132 (5.20)	66 (2.60)	43 (1.69)	167 (6.57)	52 (2.05)	216 (8.50)	124 (4.88)	64 (2.52)	40 (1.57)	12 (.47)	86 (3.39)

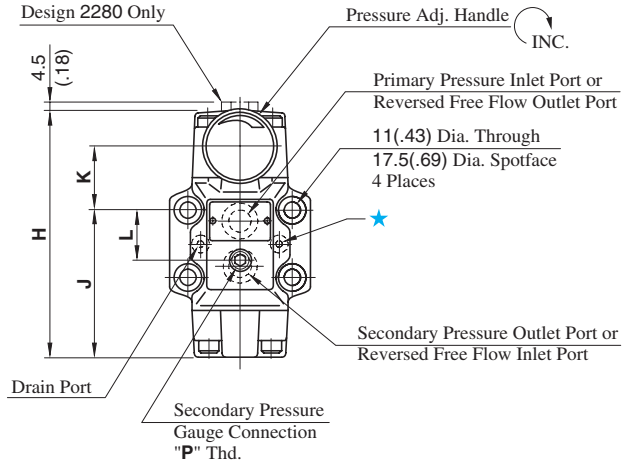
Pressure Reducing Valves / Pressure Reducing and Check Valves

RCG-03-06-22/2280/2290



Model Numbers	Thread Size	
	"N" Thd.	"P" Thd.
RCG-03/06-22	Rc 1/4	Rc 1/4
RCG-03/06-2280	1/4 BSP.F	1/4 BSP.Tr
RCG-03/06-2290	1/4 NPT	1/4 NPT

★ Port connection is not required for RCG models but an O-ring should be furnished.

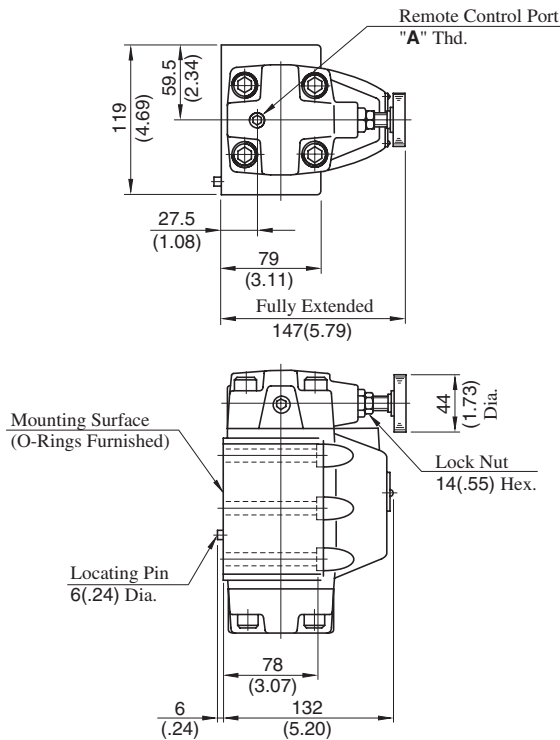


Model Numbers	Dimensions mm (Inches)										
	A	B	C	D	E	F	H	J	K	L	N
RCG-03	142 (5.59)	59 (2.32)	25 (.98)	89 (3.50)	44.5 (1.75)	90 (3.54)	155 (6.10)	92.4 (3.64)	40.6 (1.60)	34.9 (1.37)	58 (2.28)
RCG-06	141 (5.55)	69 (2.72)	21.5 (.85)	102 (4.02)	51 (2.01)	108 (4.25)	179 (7.05)	111 (4.37)	40 (1.57)	48 (1.89)	68 (2.68)

Note: For dimensions of the valve mounting surface see the dimensional drawing (page 244 & 245) of the sub-plate used together.

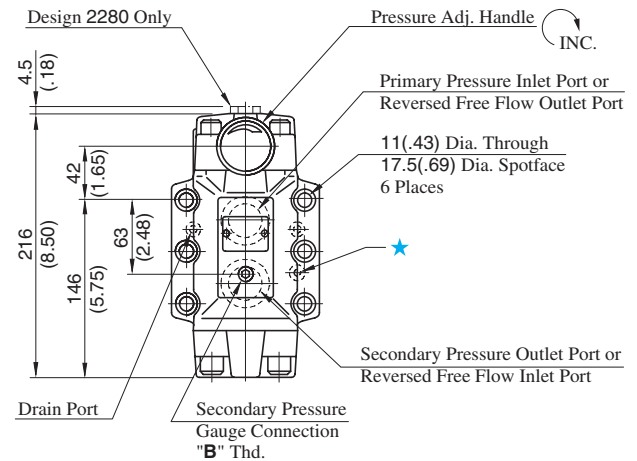
DIMENSIONS IN MILLIMETRES (INCHES)

RCG-10-22/2280/2290



Model Numbers	Thread Size	
	"A" Thd.	"B" Thd.
RCG-10-22	Rc 1/4	Rc 1/4
RCG-10-2280	1/4 BSP.F	1/4 BSP.Tr
RCG-10-2290	1/4 NPT	1/4 NPT

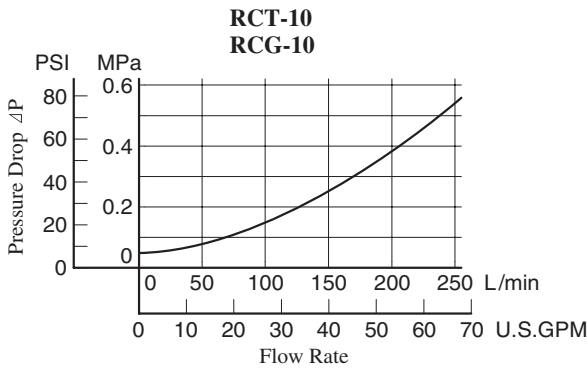
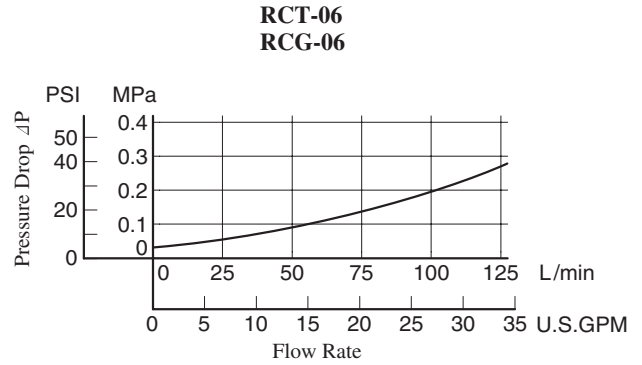
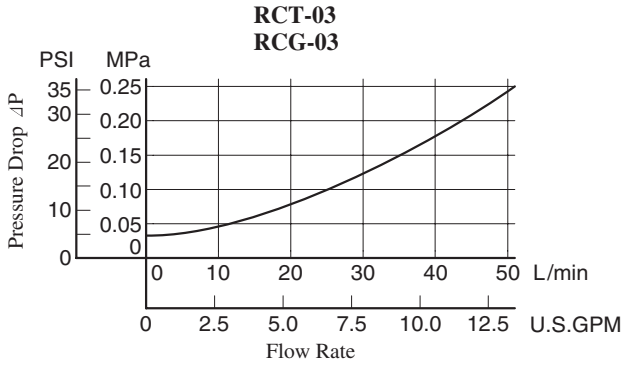
★ Port connection is not required for RCG models but an O-ring should be furnished.



Note: For dimensions of the valve mounting surface see the dimensional drawing (page 246) of the sub-plate used together.

Pressure Drop for Reversed Free Flow

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



• For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
	SSU	77	98	141	186	232	278	324	371	417	464
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

• For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

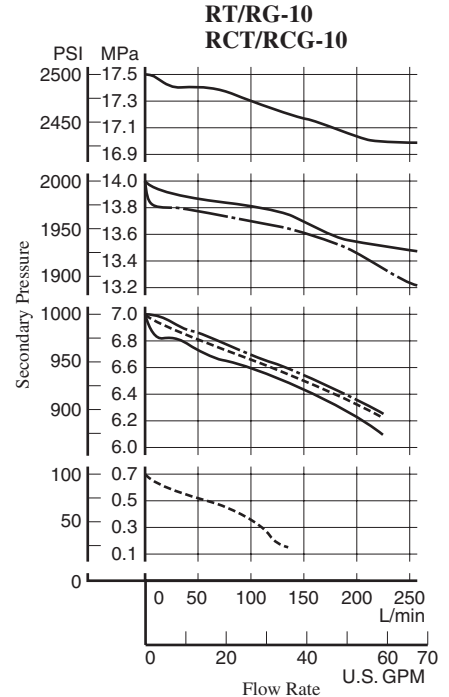
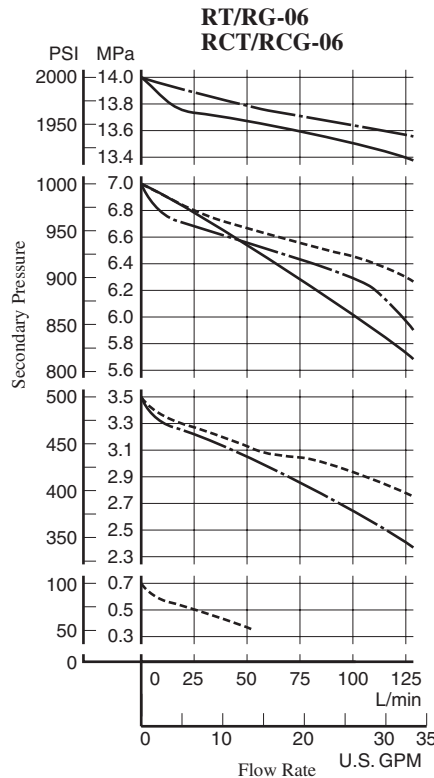
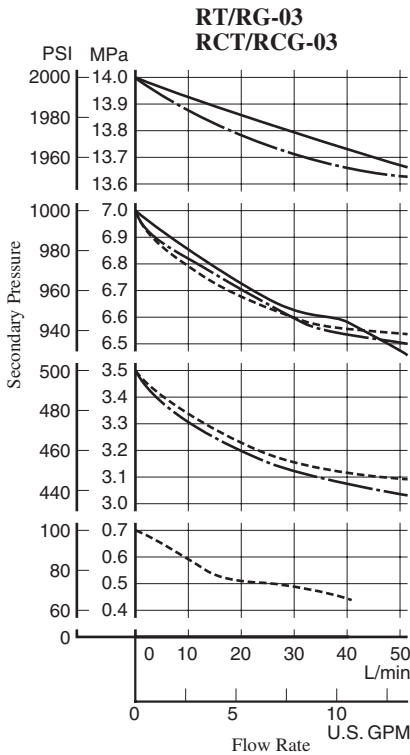
$$\Delta P' = \Delta P (G'/0.850)$$

Flow Rate vs. Secondary Pressure

Primary Pressure : 21 MPa (3050 PSI)
Hydraulic Fluid : Viscosity 35 mm²/s (164 SSU)

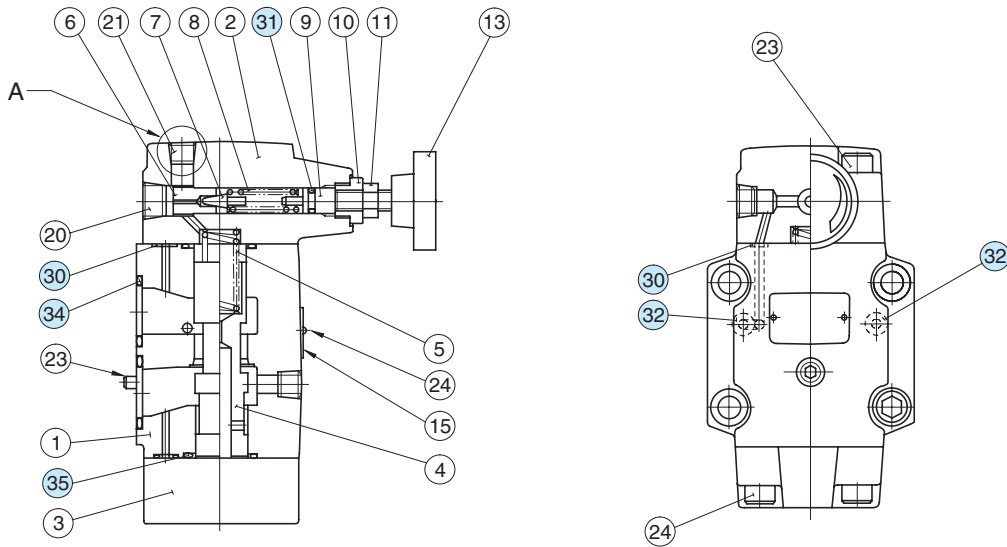
Pressure Adj. Range

----- : "B"
- - - - - : "C"
————— : "H"



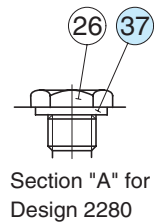
■ Spare Parts List

RT/RG-03-*-22/2280/2290
 RT/RG-06-*-22/2280/2290
 RT/RG-10-*-22/2280/2290



● List of Seals

Item	Name of Parts	Part Numbers			Quantity	
		RT RG -03	RT RG -06	RT RG -10	RT-*	RG-*
30	O-Ring	SO-NB-P6	SO-NB-P6	SO-NB-P6	4	4
31	O-Ring	SO-NA-P9	SO-NA-P9	SO-NA-P9	1	1
32	O-Ring	SO-NB-P9	SO-NB-P9	SO-NB-P9	—	2
34	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	—	2
35	O-Ring	SO-NB-P22	SO-NB-P28	SO-NB-P36	2	2
37	Bonded Seal	SG-FB-1/4	SG-FB-1/4	SG-FB-1/4	1	1



Note: When ordering the seals, please specify the seal kit number from the table below.

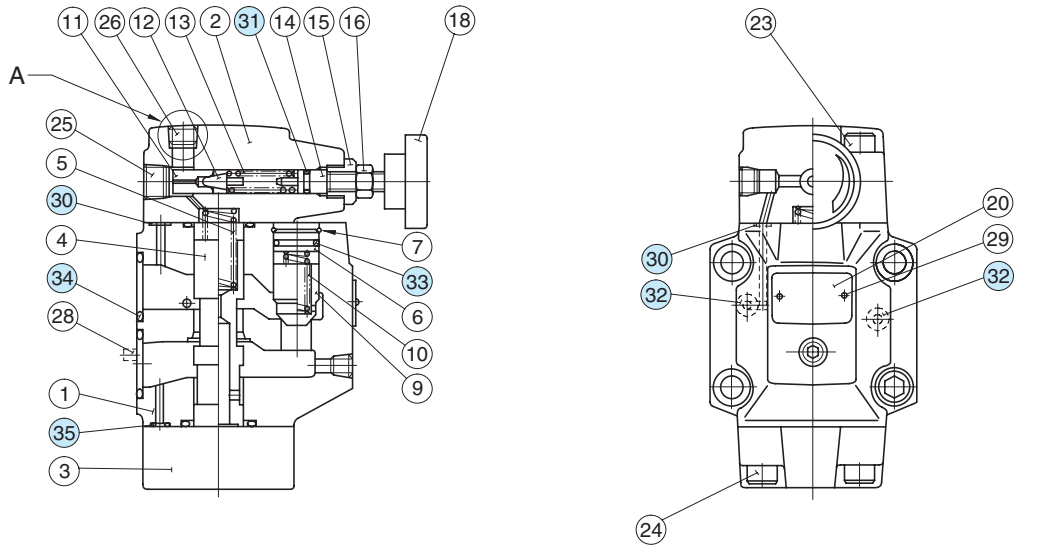
● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
RT-03-*-22/2280/2290	KS-RT-03-22
RT-06-*-22/2280/2290	KS-RT-06-22
RT-10-*-22/2280/2290	KS-RT-10-22
RG-03-*-22/2280/2290	KS-RG-03-22
RG-06-*-22/2280/2290	KS-RG-06-22
RG-10-*-22/2280/2290	KS-RG-10-22

Note: No bonded seals are included in the seal kits.

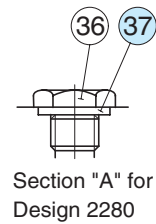
Spare Parts List

RCT/RCG-03-*22/2280/2290
 RCT/RCG-06-*22/2280/2290
 RCT/RCG-10-*22/2280/2290



List of Seals

Item	Name of Parts	Part Numbers			Quantity	
		RCT RCG-03	RCT RCG-06	RCT RCG-10	RCT-* RCG-*	RCG-*
30	O-Ring	SO-NB-P6	SO-NB-P6	SO-NB-P6	4	4
31	O-Ring	SO-NA-P9	SO-NA-P9	SO-NA-P9	1	1
32	O-Ring	SO-NB-P9	SO-NB-P9	SO-NB-P9	—	2
33	O-Ring	SO-NB-P12	SO-NB-P18	SO-NB-P22A	1	1
34	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	—	2
35	O-Ring	SO-NB-P22	SO-NB-P28	SO-NB-P36	2	2
37	Bonded Seal	SG-FB-1/4	SG-FB-1/4	SG-FB-1/4	1	1



Note: When ordering the seals, please specify the seal kit number from the table below.

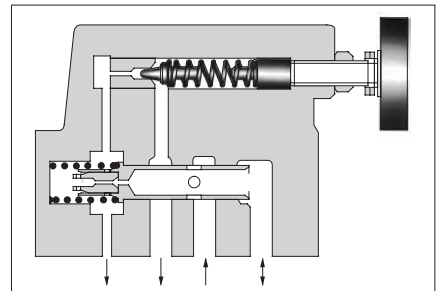
List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
RCT-03-*22/2280/2290	KS-RCT-03-22
RCT-06-*22/2280/2290	KS-RCT-06-22
RCT-10-*22/2280/2290	KS-RCT-10-22
RCG-03-*22/2280/2290	KS-RCG-03-22
RCG-06-*22/2280/2290	KS-RCG-06-22
RCG-10-*22/2280/2290	KS-RCG-10-22

Note: No bonded seals are included in the seal kits.

Pressure Reducing and Relieving Valves

Pressure reducing and relieving valves are composite pressure control valves having pressure reducing and counterbalancing functions developed for hydraulic balancing circuits.



Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Pres. Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)	Relieving Flow L/min (U.S.GPM)	Drain Flow L/min (U.S.GPM)	Approx. Mass kg (lbs.)
RBG-03-*-10*	14 (2030)	0.6-13.5 (90-1960)	50 (13.2)	50 (13.2)	0.6-1 (.16-.26)	4.2 (9.3)
RBG-06-*-10*	25 (3630)	0.8-24.5 (120-3550)	125 (33)	125 (33)	1.5-2 (.40-.53)	11 (24.3)

Model Number Designation

F-	RB	G	-03	-R	-10	*
Special Seals	Series Number	Type of Mounting	Valve Size	Drain Type	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	RB: Pressure Reducing and Relieving Valves	G: Sub-plate Mounting	03	None: Internal Drain R: External Drain	10	Refer to ★
			06		10	

- ★ Design Standards: None Japanese Standard "JIS"
- 80 European Design Standard
- 90 N. American Design Standard

Attachment

Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw (4 pcs.)	
	Japanese Standard "JIS" European Design Standard	N. American Design Standard
RBG-03	M10 × 65 Lg.	3/8-16 UNC × 2-1/2 Lg.
RBG-06	M10 × 70 Lg.	3/8-16 UNC × 2-3/4 Lg.

Sub-plate

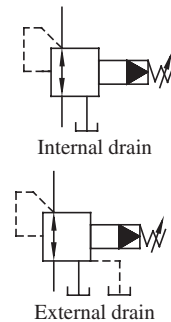
Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
RBG-03	RBGM-03-10	Rc 3/8	RBGM-03-1080	3/8 BSP.F	RBGM-03-1090	3/8 NPT	1.6 (3.5)
	RBGM-03X-10	Rc 1/2	RBGM-03X-1080	1/2 BSP.F	RBGM-03X-1090	1/2 NPT	
RBG-06	RBGM-06-10	Rc 3/4	RBGM-06-1080	3/4 BSP.F	RBGM-06-1090	3/4 NPT	4.8 (10.6)
	RBGM-06X-10	Rc 1	RBGM-06X-1080	1 BSP.F	RBGM-06X-1090	1 NPT	

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

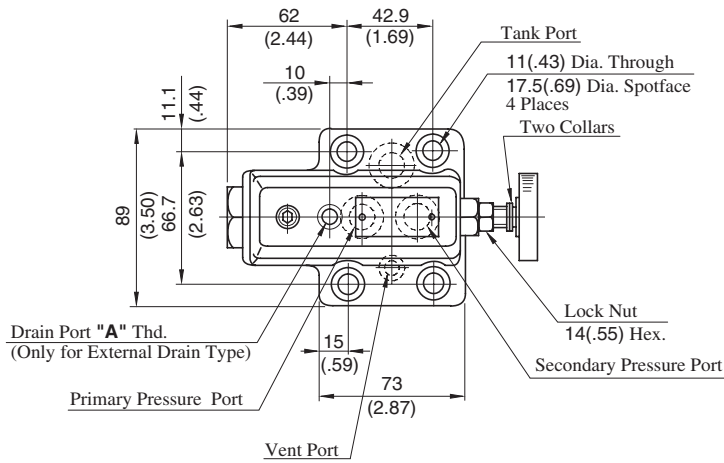
Instructions

- To use remote control relief valve in the venting circuit, see page 203. If the internal volume of the vent line is too large, chattering is likely to occur. Thus, as far as possible reduce the inside diameter and the length of the pipe.
- To adjust the pressure, loosen the lock nut and turn the pressure adjustment handle slowly clockwise for higher pressures and anti-clockwise for lower pressures. After adjustments, do not forget to tighten the lock nut.
- Pressure is limited by collars fitted. If a working pressure cannot be attained, remove some collars. One collar is equivalent to 10 MPa (1450 PSI).
- Connect the tank pipe not to any other line but directly to the reservoir.

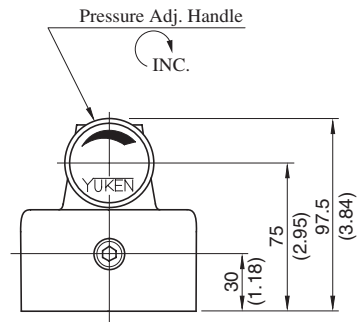
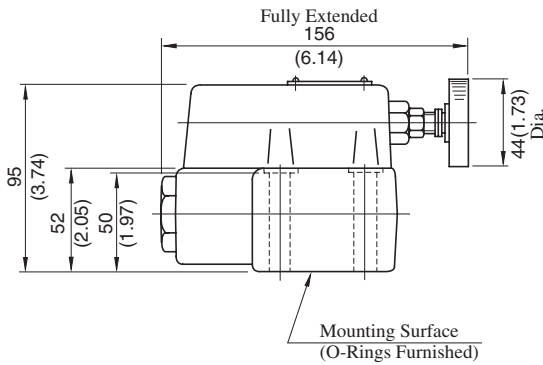
Graphic Symbols



RBG-03-*-10/1080/1090

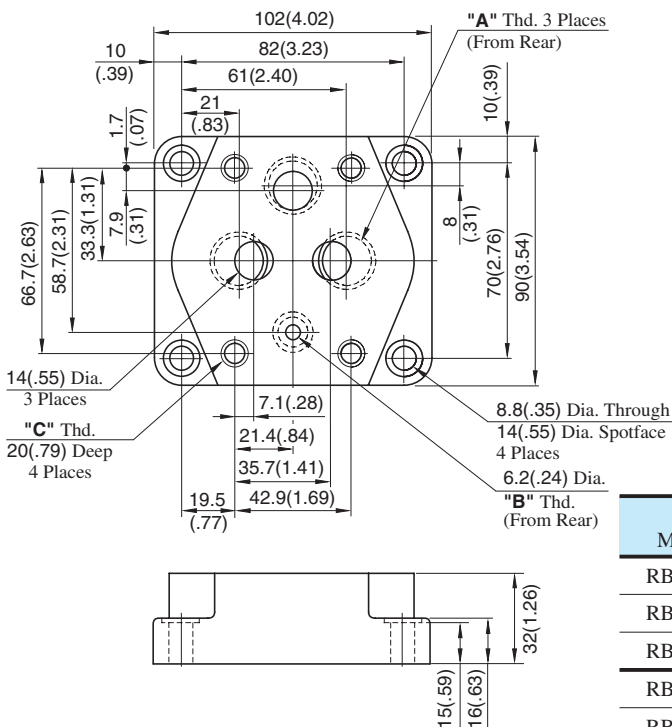


Model Numbers	"A" Thd.
RBG-03-*-10	Rc 1/4
RBG-03-*-1080	1/4 BSP.F
RBG-03-*-1090	1/4 NPT



DIMENSIONS IN MILLIMETRES (INCHES)

Sub-plate : RBGM-03-10/1080/1090



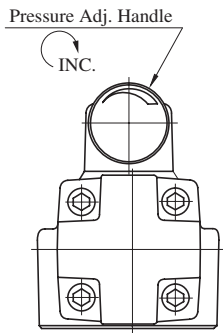
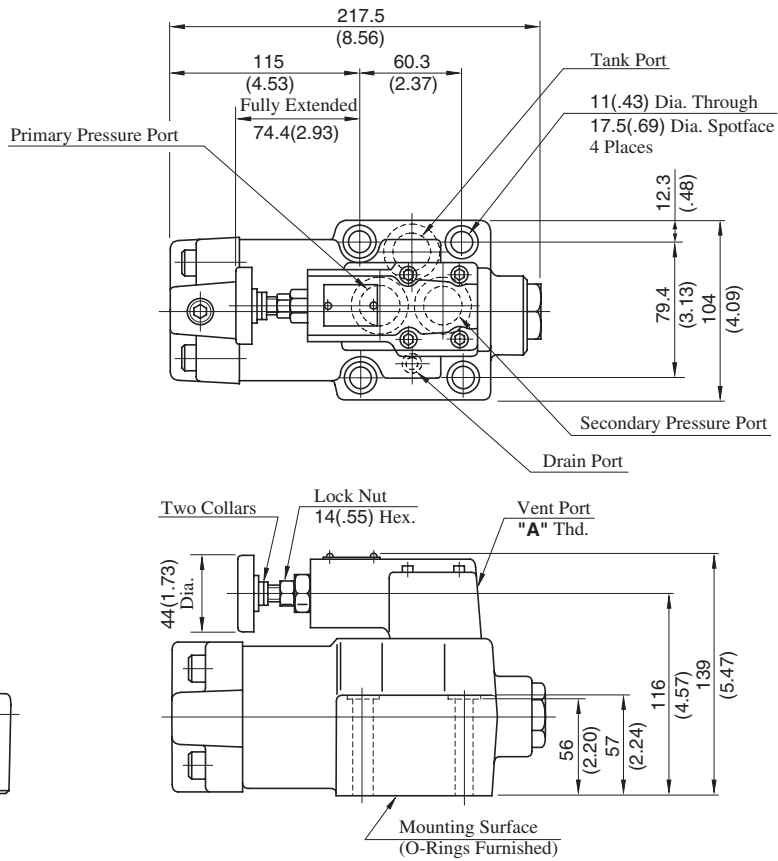
Sub-plate Model Numbers	"A" Thd.	"B" Thd.	"C" Thd.
RBGM-03-10	Rc 3/8	Rc 1/4	M10
RBGM-03-1080	3/8 BSP.F	1/4 BSP.F	
RBGM-03-1090	3/8 NPT	1/4 NPT	3/8-16 UNC
RBGM-03X-10	Rc 1/2	Rc 1/4	M10
RBGM-03X-1080	1/2 BSP.F	1/4 BSP.F	
RBGM-03X-1090	1/2 NPT	1/4 NPT	3/8-16 UNC



Pressure Reducing and Relieving Valves

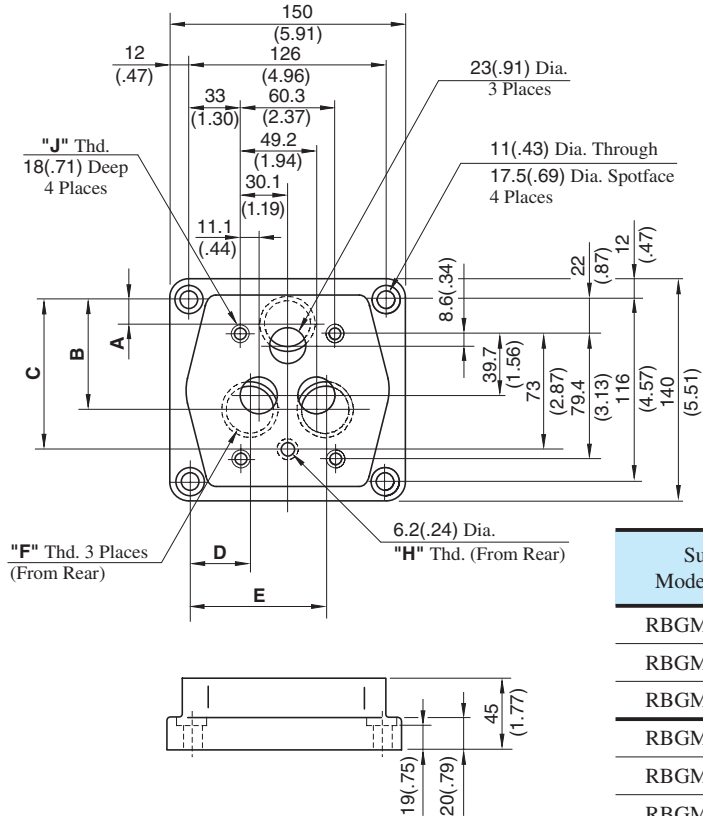
RBG-06-*-10/1080/1090

Model Numbers	"A" Thd.
RBG-06-*-10	Rc 3/8
RBG-06-*-1080	3/8 BSP.F
RBG-06-*-1090	3/8 NPT



DIMENSIONS IN MILLIMETRES (INCHES)

Sub-plate : RBGM-0606X-10/1080/1090

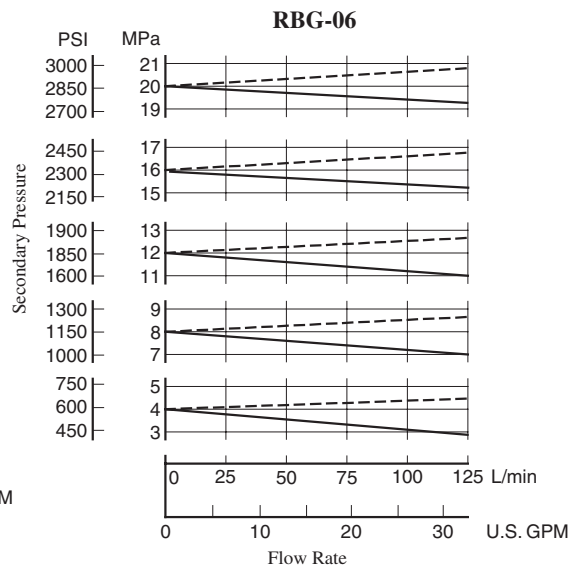
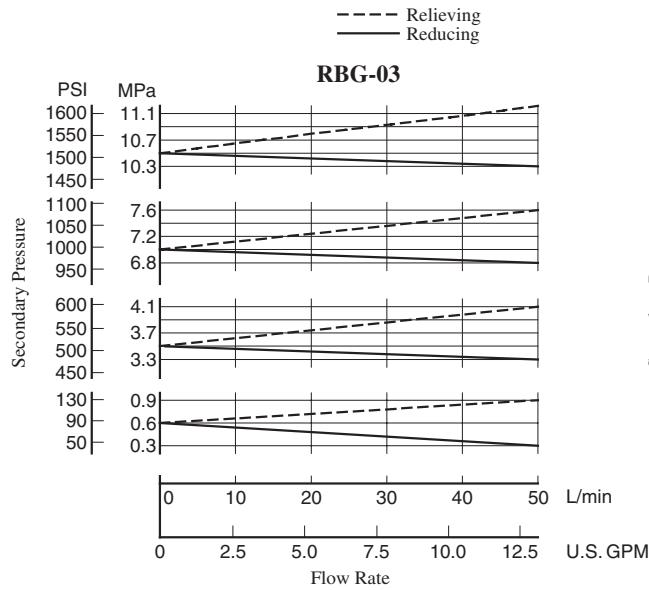


Model Numbers	Dimensions mm (Inches)				
	A	B	C	D	E
RBGM-06	20.7 (.81)	65.7 (2.59)	95 (3.74)	37.1 (1.46)	89.1 (3.51)
RBGM-06X	20.4 (0.80)	69.7 (2.74)	98.4 (3.87)	32.5 (1.28)	93.8 (3.69)

Sub-plate Model Numbers	Thread Size		
	"F" Thd.	"H" Thd.	"J" Thd.
RBGM-06-10	Rc 3/4	Rc 1/4	M10
RBGM-06-1080	3/4 BSP.F	1/4 BSP.F	
RBGM-06-1090	3/4 NPT	1/4 NPT	3/8-16 UNC
RBGM-06X-10	Rc 1	Rc 1/4	M10
RBGM-06X-1080	1 BSP.F	1/4 BSP.F	
RBGM-06X-1090	1 NPT	1/4 NPT	3/8-16 UNC

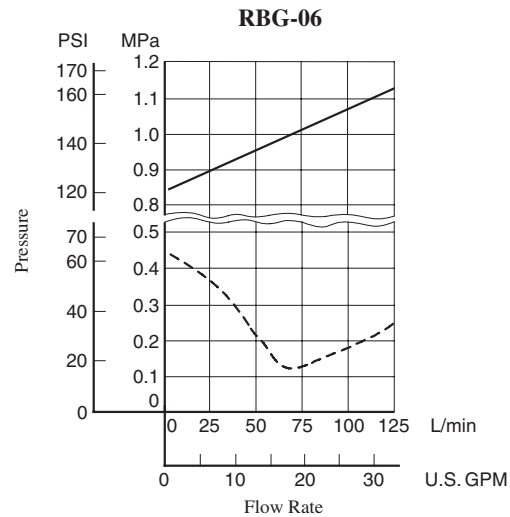
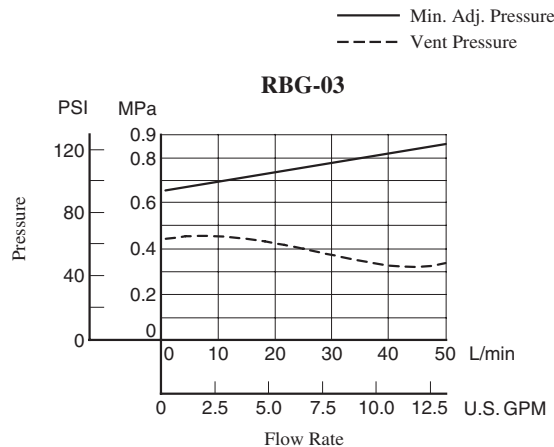
Nominal Override Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



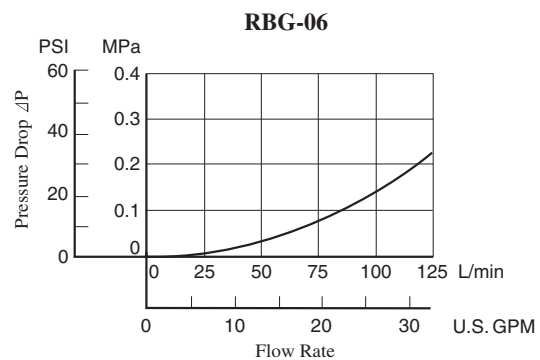
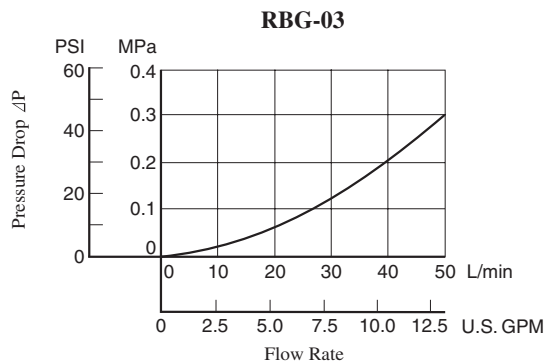
Min. Adj. Pressure & Vent Pressure

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



Pressure Drop

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



● For any other viscosity, multiply the factors in the table below.

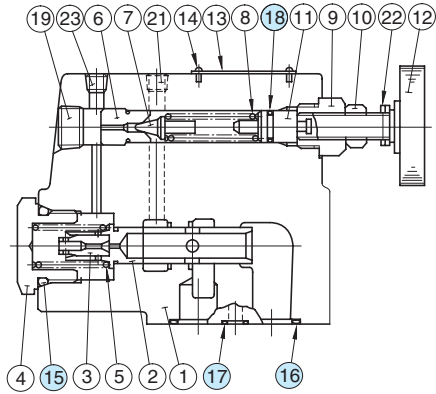
Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
		SSU	77	98	141	186	232	278	324	371	417
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

● For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

$$\Delta P' = \Delta P (G'/0.850)$$

Spare Parts List

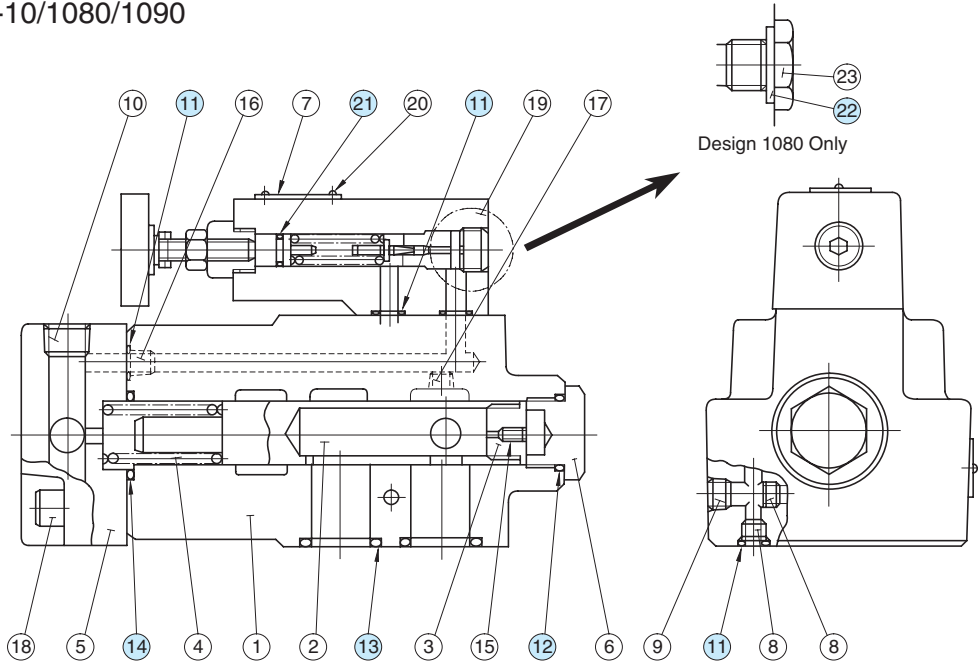
RBG-03-*-10/1080/1090



List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
15	O-Ring	SO-NB-P24	1	Included in Seal Kit Kit No. : KS-RBG-03-10
16	O-Ring	SO-NB-P18	3	
17	O-Ring	SO-NB-P9	1	
18	O-Ring	SO-NA-P9	1	

RBG-06-*-10/1080/1090



List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
11	O-Ring	SO-NB-P9	2	Included in Seal Kit Kit No. : KS-RBG-06-10
12	O-Ring	SO-NB-P24	1	
13	O-Ring	SO-NB-P28	3	
14	O-Ring	SO-NB-P30	1	
21	O-Ring	SO-NA-P9	1	
22	Bonded Seal	SG-FB-3/8	1	

Note: No bonded seals are included in the seal kits.

Unloading Relief Valves

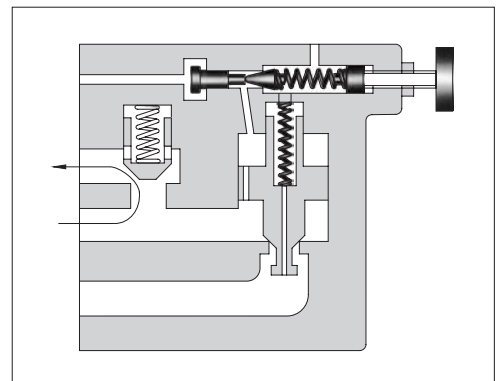
These valves are used to operate the pumps with minimum load in accumulator circuits or in high-low pump circuits.

In accumulator circuits, when the system pressure reaches to a cut out pressure (adjusted maximum), the valve acts to divert the pump delivery to the reservoir at low pressure, thus the pump is unloaded automatically.

When the accumulator pressure drops to the cut in pressure (refer to characteristic chart on page 269), the valve directs the pump delivery to the accumulator and hydraulic system.

An integral check valve prevents reverse flow through the valve from the accumulator.

In high-low pump circuits, the valve acts to unload the large volume pump with the same manner as described above during load operation of the small volume pump.



Unloading Relief Valves

Specifications

Model Numbers	Max. Operating Pres. MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg (lbs.)
BUCG-06-**-30/3080/3090	21 (3050)	125 (33)	12 (26.5)
BUCG-10-**-25/2580/2590		250 (66)	21.5 (47.4)

Model Number Designation

F-	BUC	G	-06	-B	V	-30	*
Special Seals	Series Number	Type of Mounting	Valve Size	Cut-out Pres. Adj. Range MPa (PSI)	High Venting* Pres. Feature	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	BUC: Unloading Relief Valve	G: Sub-plate Mounting	06 10	B: 2.5-7.0 (360-1020) C: 3.5-14 (510-2030) H: 7.0-21 (1020-3050)	V: For High Venting Pressure Feature (Omit if not required)	30 25	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std.

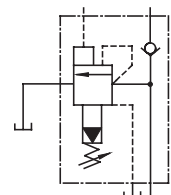
★ Use the high-venting-pressure type to reduce the shift time from unloading to onloading.

Pilot-drain system

A pilot-drain system is typically configured with an external pilot and an external drain, as indicated by the right graphic symbol. However, customized pilot-drain systems with an internal pilot are also available.

For the internal pilot type, the design standard number at the end of the model number is uniquely assigned. Refer to the table below for the internal pilot type. Please contact us for details.

Graphic Symbol



Pilot & Drain Conn.	Graphic Symbols	European Design Standard	N. American Design Standard	Japanese Std. "JIS"
Int. Pilot- Int. Drain		BUCG-06-**-30801 BUCG-10-**-25801	BUCG-06-**-30901 BUCG-10-**-25901	BUCG-06-**-3001 BUCG-10-**-2501
Int. Pilot- Ext. Drain		BUCG-06-**-30802	BUCG-06-**-30902	BUCG-06-**-2502

■ Instructions

- To adjust the pressure, loosen the lock nut and turn the pressure adjustment handle slowly clockwise for higher pressures or anti-clockwise for lower pressures. After adjustments, do not forget to tighten the lock nut.
- Take care not to neglect connecting the drain pipe to the reservoir; otherwise not only will the valve fail to operate properly but also the line pressure will rise infinitely. Extend the end of the drain pipe into fluid.
- Limit the pressure drop between the valve and the accumulator in an accumulator circuit below 10% of the cut-out pressure.
- Limit the drain port back pressure below 2% of the cut-out pressure.

■ Attachment

● Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw	
	Japanese Std. "JIS" and European Design Std.	N. American Design Std.
BUCG-06	M16 × 55Lg. (2 pcs.)	5/8-11 UNC × 2-1/4 Lg. (2 pcs.)
	M16 × 110Lg. (2 pcs.)	5/8-11 UNC × 4-1/2 Lg. (2 pcs.)
	M16 × 130Lg. (2 pcs.)	5/8-11 UNC × 5 Lg. (2 pcs.)
BUCG-10	M20 × 70Lg. (2 pcs.)	3/4-10 UNC × 2-3/4 Lg. (2 pcs.)
	M20 × 160Lg. (4 pcs.)	3/4-10 UNC × 6-1/2 Lg. (4 pcs.)

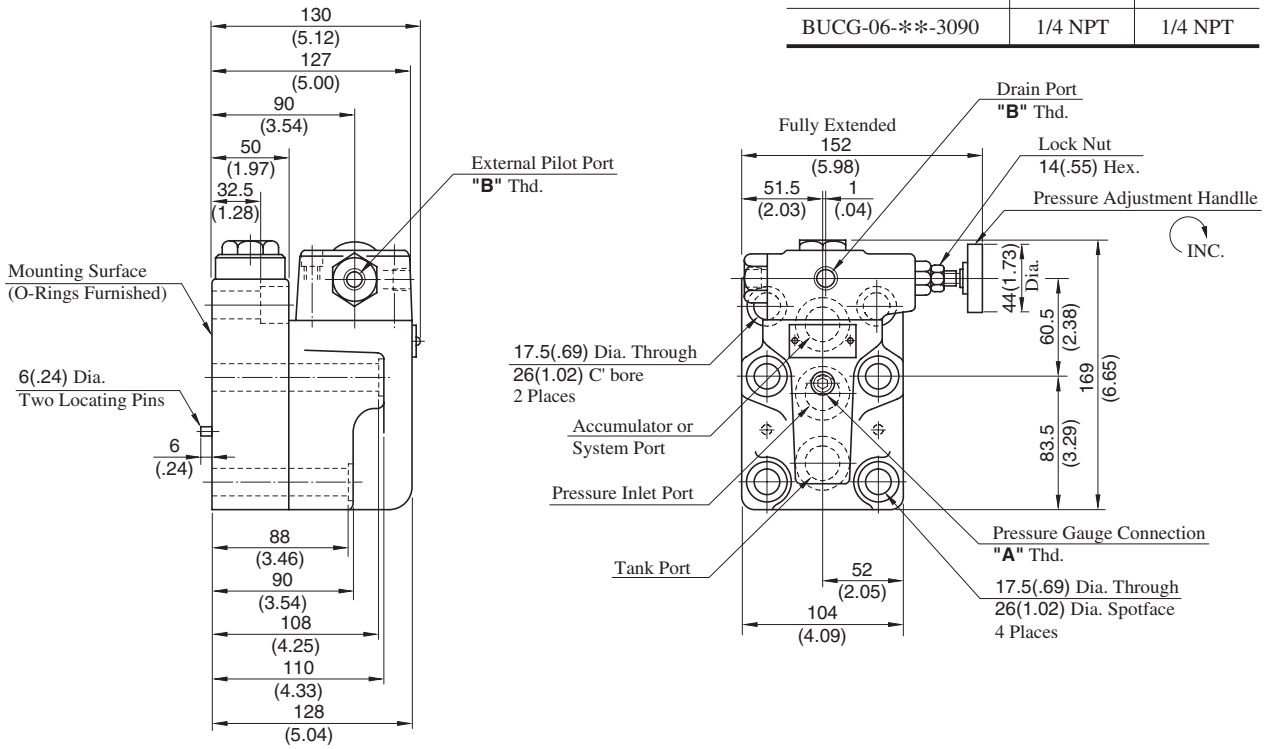
■ Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
BUCG-06	BUCGM-06-20	Rc 3/4	BUCGM-06-2080	3/4 BSP.F	BUCGM-06-2090	3/4 NPT	4.4 (9.7)
BUCG-10	BUCGM-10-20	Rc 1-1/4	BUCGM-10-2080	1-1/4 BSP.F	BUCGM-10-2090	1-1/4 NPT	7.2 (15.9)

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

BUCG-06-**-30/3080/3090

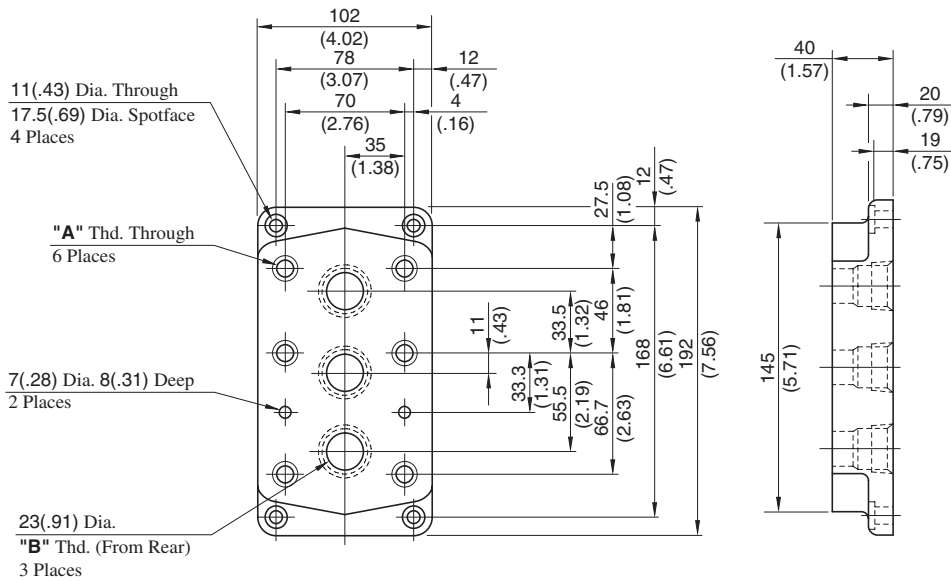
Model Numbers	"A" Thd.	"B" Thd.
BUCG-06-**-30	Rc 1/4	Rc 1/4
BUCG-06-**-3080	1/4 BSP.Tr	1/4 BSP.F
BUCG-06-**-3090	1/4 NPT	1/4 NPT



DIMENSIONS IN MILLIMETRES (INCHES)

■ Sub-plate

BUCGM-06-20/2080/2090

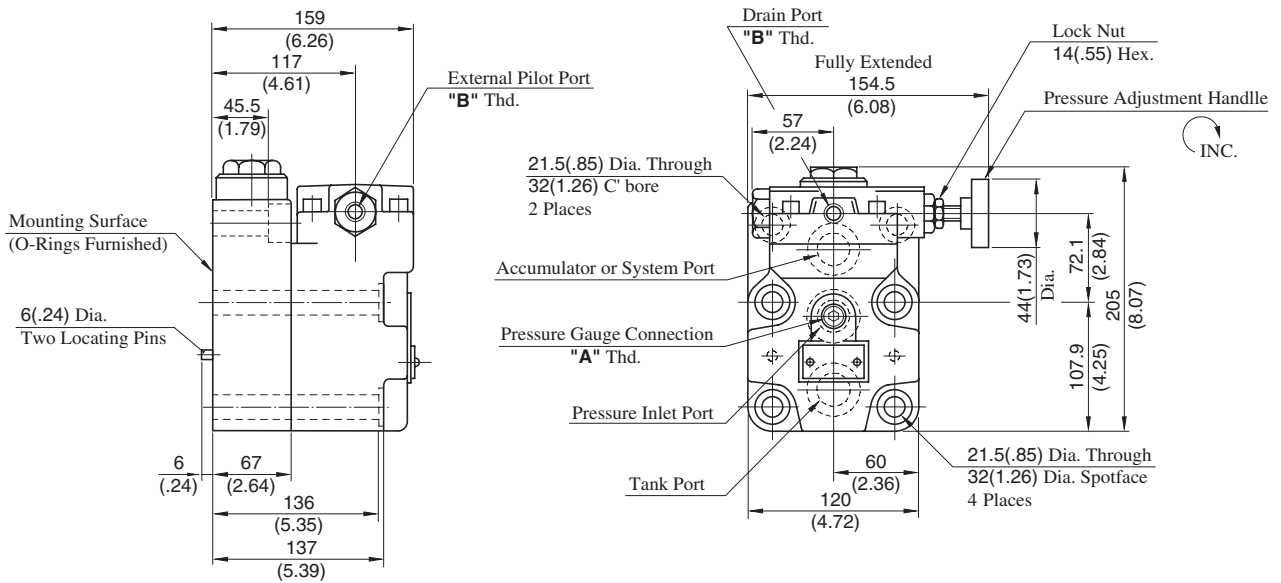


Sub-plate Model No.	"A" Thd.	"B" Thd.
BUCGM-06-20	M16	Rc 3/4
BUCGM-06-2080	M16	3/4 BSP.F
BUCGM-06-2090	5/8-11 UNC	3/4 NPT



BUCG-10--25/2580/2590**

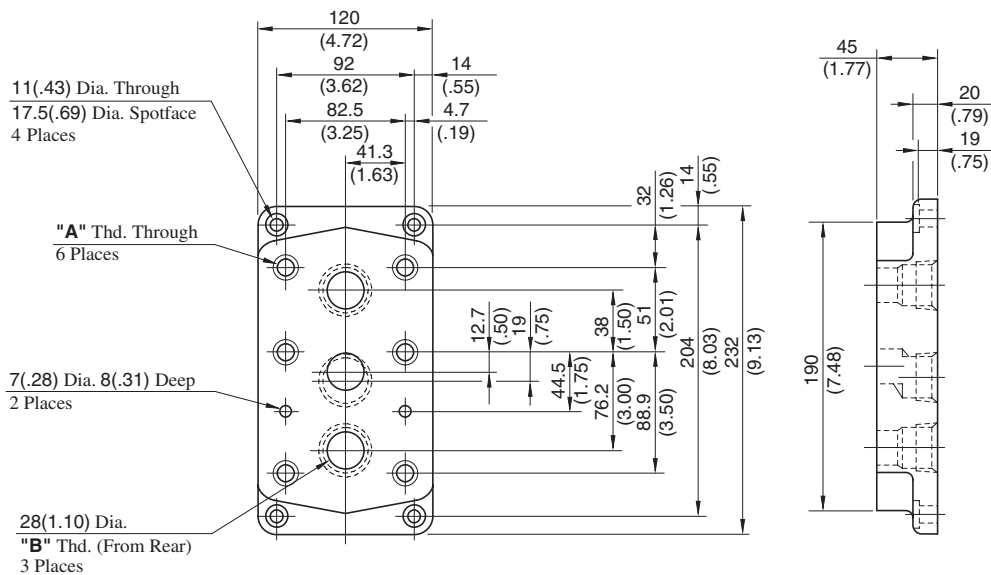
Model Numbers	"A" Thd.	"B" Thd.
BUCG-10-**-25	Rc 1/4	Rc 1/4
BUCG-10-**-2580	1/4 BSP.Tr	1/4 BSP.F
BUCG-10-**-2590	1/4 NPT	1/4 NPT



DIMENSIONS IN MILLIMETRES (INCHES)

■ Sub-plate

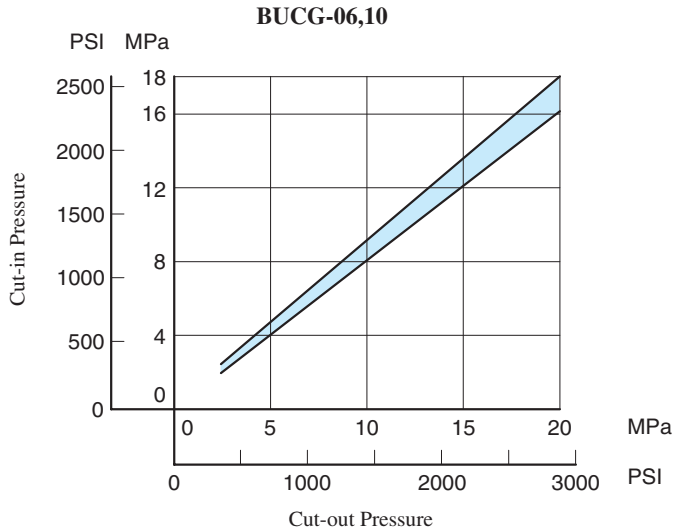
BUCGM-10-20/2080/2090



Sub-plate Model No.	"A" Thd.	"B" Thd.
BUCGM-10-20	M20	Rc 1-1/4
BUCGM-10-2080	M20	1-1/4 BSP.F
BUCGM-10-2090	3/4-10 UNC	1-1/4 NPT

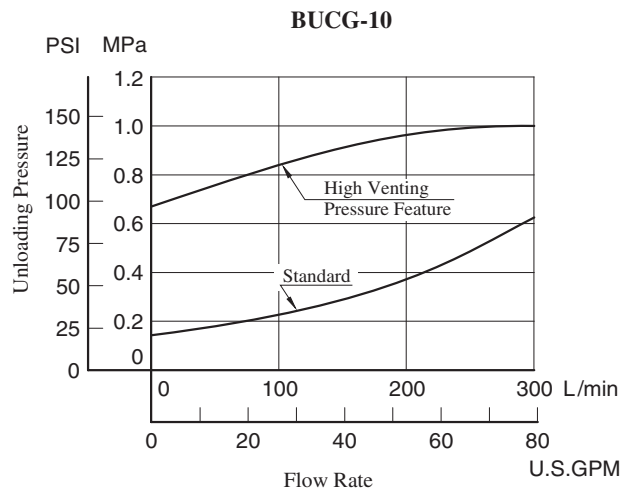
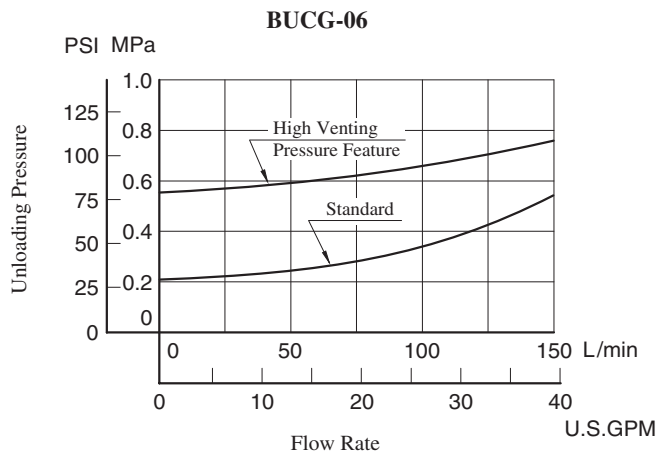
Cut-in Pressure vs. Cut-out Pressure

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



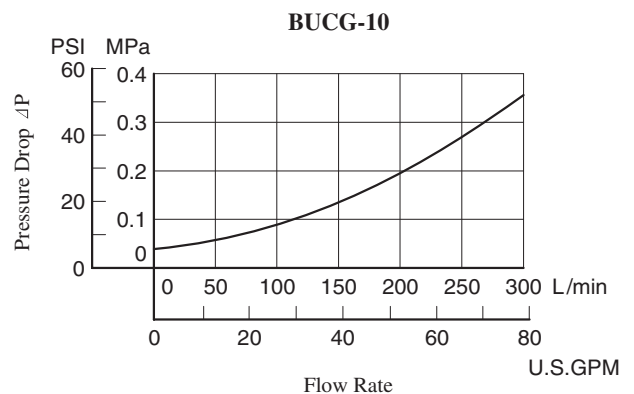
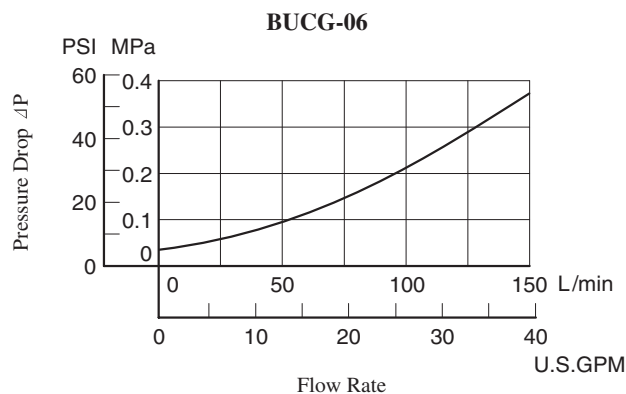
Unloading Pressure vs. Flow

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



Pressure Drop for Check Valve

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



• For any other viscosity, multiply the factors in the table below.

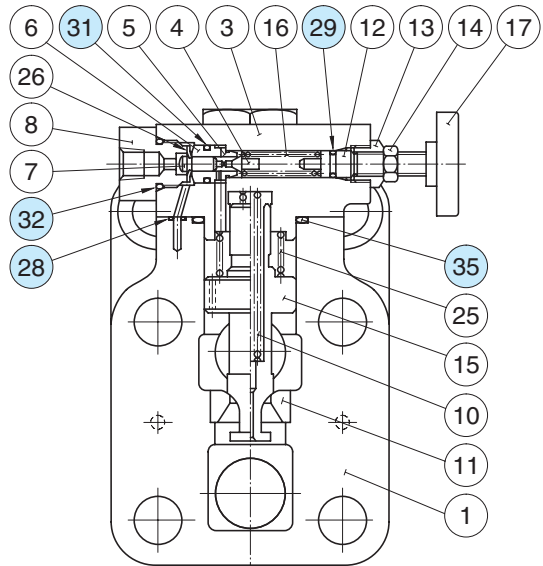
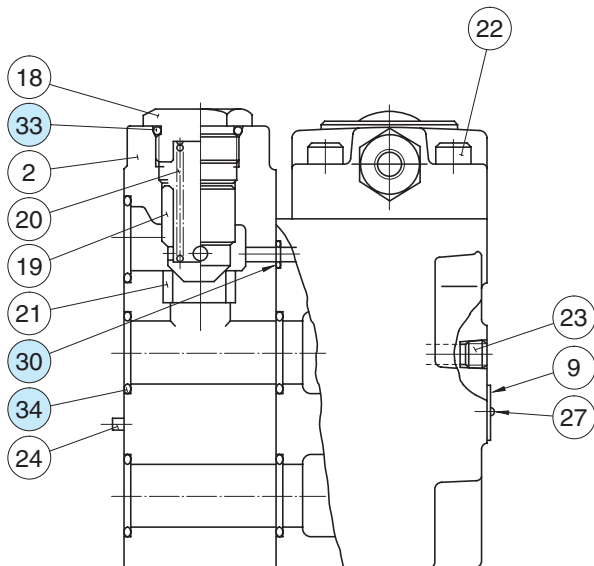
Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
		SSU	77	98	141	186	232	278	324	371	417
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

• For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

$$\Delta P' = \Delta P (G'/0.850)$$

Spare Parts List

BUCG-06-**-30/3080/3090
 BUCG-10-**-25/2580/2590



● List of Seals

Item	Name of Parts	Part Numbers		Quantity
		BUCG-06	BUCG-10	
28	O-Ring	SO-NB-P6	SO-NB-P6	3
29	O-Ring	SO-NA-P9	SO-NA-P9	1
30	O-Ring	SO-NB-P11	SO-NB-P9	1
31	O-Ring	SO-NB-P12	SO-NB-P12	1
32	O-Ring	SO-NB-P18	SO-NB-P18	1
33	O-Ring	SO-NB-P24	SO-NB-P32	1
34	O-Ring	SO-NB-P28	SO-NB-P32	5
35	O-Ring	SO-NB-P32	SO-NB-P45	1

Note: When ordering the seals, please specify the seal kit number from the table below.

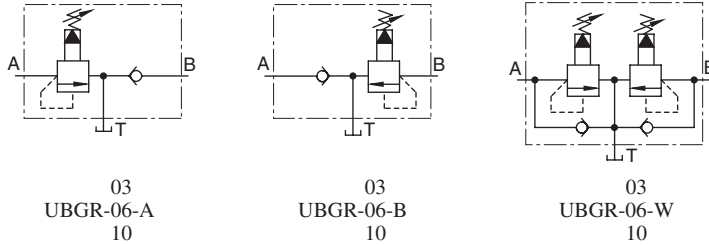
● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
BUCG-06	KS-BUCG-06-30
BUCG-10	KS-BUCG-10-25

Brake Valves

Brake valves are used on hydraulic cylinders and in brake circuits of hydraulic motors. They can brake with any pressure, permitting smooth stopping.

Graphic Symbols



Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Pres. Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)
UBGR - 03 - * - B - 20 *	25 (3630)	0.7 - 7.0 (100 - 1020)	50 (13.2)
UBGR - 03 - * - H - 20 *		3.5 - 25 (510 - 3630)	
UBGR - 06 - * - 20 *		0.7 - 25 (100 - 3630)	125 (33.0)
UBGR - 10 - * - 20 *		0.7 - 25 (100 - 3630)	200 (52.8)

Model Number Designation

F-	UBGR	-03	-A	-B	-20	*
Special Seals	Series Number	Valve Size	Type	Pres. Adj. Range MPa (PSI)	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	UBGR: Brake Valves, Sub-plate Mounting	03	A: For A-Line B: For B-Line W: For A•B-Lines	B: 0.7-7.0 (100-1020) H: 3.5-25 (510-3630)	20	Refer to ★
		06		None: 0.7-25 (100-3630)	20	
		10			20	

★ Design Standards: None Japanese Standard "JIS" and European Design Standard 90 N. American Design Standard

- Consult Yuken when detailed material such as dimensions figures is required.

Semiconductor Type Pressure Switches

These pressure switches have built-in electronic circuit on a semiconductor pressure sensor and an open collector insulated by a photocoupler has been used as output. As the use of semiconductor has put movable parts away from the sensor section, high reliability and durability can be obtained.

These pressure switches are suitable for the applications not only compact, light weight and vibration-proof are required but also better substitute to conventional pressure switches.

Model Number Designation

J	T	-02	-100	-11
Series Number	Type of Mounting	Valve Size	Max. Setting Pressure MPa (PSI)	Design Number
J: Semiconductor Type Pressure Switch	T: Threaded Connection	02	35: 3.5 (510) 100: 10 (1450) 200: 20 (2900) 350: 35 (5080)	11

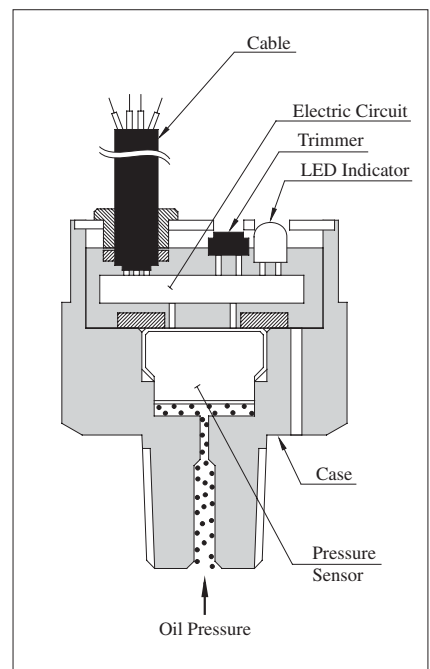
Specifications

Model Numbers		JT-02 -35-11	JT-02 -100-11	JT-02 -200-11	JT-02 -350-11
Description					
Max. Operating Pressure	MPa (PSI)	10 (1450)	10 (1450)	20 (2900)	35 (5080)
Proof Pressure	MPa (PSI)	20 (2900)	20 (2900)	40 (5800)	50 (7250)
Pressure Setting Range	MPa (PSI)	0.1 – 3.5 (15 – 510)	1 – 10 (145 – 1450)	2 – 20 (290 – 2900)	3.5 – 35 (510 – 5080)
Pressure Setting (ON pressure Setting)		Single adjustment: ON trimmer setting (variable resistor)*			
Differential Pressure Setting (OFF Pressure Setting)		Single adjustment: DIFF trimmer setting (-1 to -10% of the ON pressure setting)			
Sign on act		When the ON pressure, the LED indicator lights.			
Output System		Open collector (photocoupler insulated) Maximum operating voltage : 35 VDC; maximum current: 100 mA			
Power Source		10 to 28 VDC (ripple included). A constant-voltage power supply must be used. Current consumption: 10 mA.			
Insulation Resistance		100 MΩ or more			
Response Time		1.5 ms	20 ms (damper contained)		
Repeatability		Approx. 0.5 %			
Operating Temperature Range		-20 to +70 °C (-4 to 158 °F)			
Setting Fluctuation with Temperature Drift		1% or less of the maximum operating pressure relative to 10 °C change.			
Storage Temperature Range		-40 to +105 °C (-40 to 221 °F)			
Dust-proofness /Water-Proofness		IEC Pub. 529 IP54			
Vibration-resistance		98 m/s ² (322 ft./s ²) (10 – 55 Hz)			
Shock-resistance		98 m/s ² (322 ft./s ²)			
Mass		17g (.39 lbs.)			

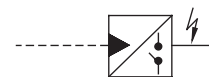
★ Trimmer Rotation Angle: 0 to 260°

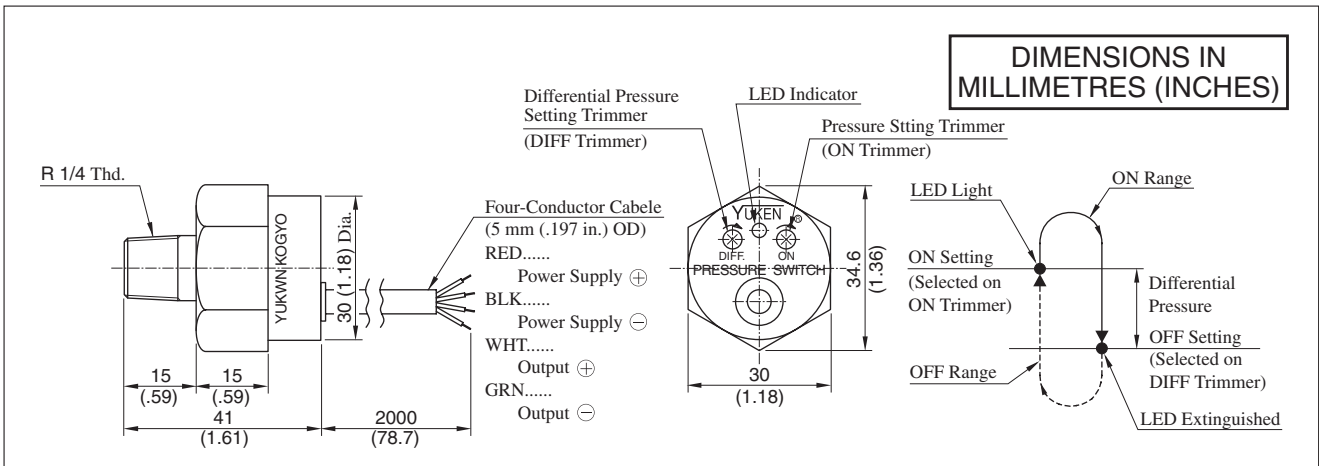
Instructions

Voltage-proof test should not be carried out as semiconductor has been used.



Graphic Symbol



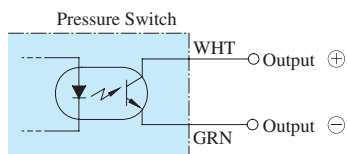


Adjustment

- Before starting, turn the ON and DIFF trimmers fully clockwise. (Trimmer Rotation Angle: 0 – 260°)
- Turn on the power.
- < ON pressure setting >
Apply required pressure to the switch. Turn ON trimmer slowly anti-clockwise and stop it when LED indicator lights, ON setting obtained.
- < Differential pressure setting >
Gradually reduce pressure to obtain the required OFF pressure. Then, turn DIFF trimmer anti-clockwise slowly and stop it when LED indicator goes off. The OFF setting is now obtained.
- Make sure if "ON" or "OFF" setting is correct by working of LED indicator when applying or reducing pressure repeatedly several times.

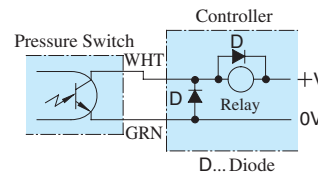
Application Examples of Electrical Circuit

Output Circuit of Semiconductor Type Pressure Switch (Internal Circuit)



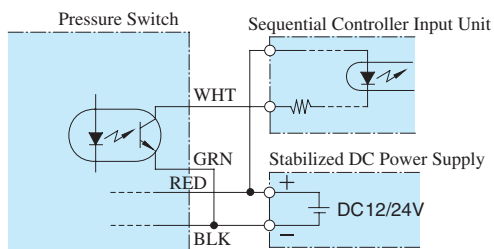
Direct Relay Drive

- Use relay operable at 100 mA or lower.
- Connect surge voltage absorption diode (D) in parallel with the relay coil.
- Connect protective diode (D) between the white and green wires.

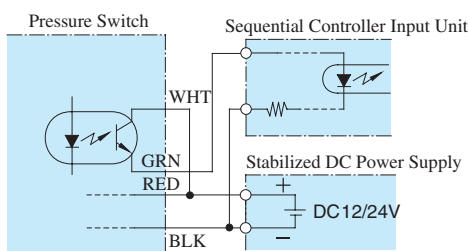


Connection to Sequential Controller

1. Sink System



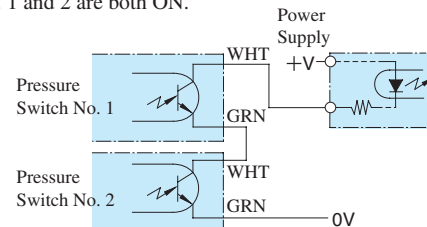
2. Source System



The usage below is possible because output circuit is insulated by a photocoupler.

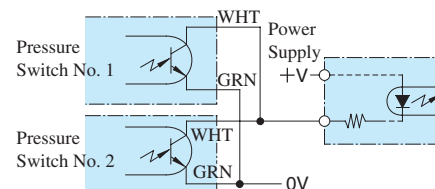
1. When AND circuit Two Pressures

The sequential controller is signaled only when pressure switches No. 1 and 2 are both ON.



2. When OR circuit two pressures

The sequential controller is signaled when either of pressure switches No. 1 and 2 is ON.



Pressure Monitoring System

The pressure monitoring system is for watching hydraulic system pressure and is composed of highly reliable pressure sensor (SJT*-02-10) and easy-to-use digital pressure monitor (DP*-*-10). There is no specific model number code for the pressure monitoring system itself, therefore, when ordering, specify the digital pressure monitor and pressure sensor with respective model number code.

- **Remote pressure indication**

Even if the monitor is located away from the unit, remote pressure indication can be obtained by combination with special sensors.

- **Remote-setting pressure sensors**

The pressure sensor can be used as a pressure switch with two contacts: top and bottom. Pressure can be set and checked without using any other pressure gauge, moreover, such pressure setting and pressure check can be made when no pressure is applied in the hydraulic system.



Digital Pressure Monitors

The digital pressure monitor indicates the system pressure and also despatches signals when the system pressure reaches to the preset pressure. The monitor can be separated from the sensor and installed away from the sensor. The monitor and the sensor so separately installed can be connected by wire, therefore, a long hydraulic piping is not required. The digital pressure monitor provides high accuracy when it is used with a special pressure sensor (SJT*-02-10).



- **Specifications**

Model Numbers	Input Voltage	Output System	Pressure setting
DP20*-*-10	0 - 4.5V / 0 - 19.6 MPa (0 - 4.5V / 0 - 2842 PSI)	Open-collection output × 2, 40 V - 100 mA (max.)	Total 4 points: high (HI) and low (LO) limits for 2 channels (each set independently)
DP35*-*-10	0 - 4.5V / 0 - 34.3 MPa (0 - 4.5V / 0 - 4974 PSI)		

Pressure Sensor

The pressure sensor uses semiconductors and has no moving parts for high reliability and durability. It provides high accuracy when combined with the special monitor (DP*-*-10).

- **Specifications**

Model Numbers	Rated Pres. Range	Output Range *	Power Supply
SJT20-02-10	0 - 20 MPa (0 - 2900 PSI)	0.5 - 4.5 V	DC 5.0 ± 0.5 V
SJT35-02-10	0 - 35 MPa (0 - 5080 PSI)		

★ Proportional to supply voltage if this voltage is 5.00 V






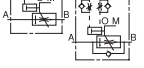

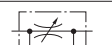

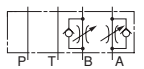


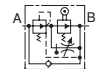
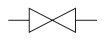
Graphic Symbol



- Consult Yuken when detailed material such as dimensions figures is required.

D

FLOW CONTROLS

Valve Type	Graphic Symbols	Maximum Operating Pressure MPa (PSI)	Maximum Flow												Page				
			1	5	10	50	100	U.S.GPM		L/min									
			1	2	3	5	10	20	30	50	100	200	300	500	1000	2000	3000	5000	
Flow Control Valves		21 (3050)	FG	01	02	03	06	10											277
Flow Control and Check Valves		21 (3050)	FCG	01	02	03	06	10											277
Pilot Operated Flow Control Valves		21 (3050)	FHG		02	03	06	10											289
Pilot Operated Flow Control and Check Valves		21 (3050)	FHCG		02	03	06	10											289
Restrictors		25 (3630)	SRT/SRG		03	06	10	SRF-16										(Rated Flow)★	299
One Way Restrictors		25 (3630)	SRCT/SRCG		03	06	10	SRCF-16										(Rated Flow)★	299
Throttle Modules		25 (3630)	TC1G		01	03													305
Throttle & Check Modules		25 (3630)	TC2G		01	03													305
Deceleration Valves		21 (3050)	ZT/ZG		03	06	10												310
Deceleration & Check Valves		21 (3050)	ZCT/ZCG		03	06	10												310
Feed Control Valves		14 (2030)	UCF1G/UCF2G	01	03	04													318
Needle Valves		35 (5080)	GCT/ GCTR	02															325

★ Rated flow stands for approximate flow rate when the pressure drop between inlet and outlet ports of the valve in fully opened condition becomes 0.3 MPa (44 PSI) maximum at fluid's specific gravity of 0.85 and kinematic viscosity of 20 mm²/s (98 SSU).

Hydraulic Fluids

Fluid Types

Any type of hydraulic fluids listed in the table below can be used.

Petroleum base oils	Use fluids equivalent to ISO VG 32 or VG 46.
Synthetic fluids	Use phosphate ester or polyol ester fluid. When phosphate ester fluid is used, prefix "F-" to the model number because the special seals (fluororubber) are required to be used.
Water containing fluids	Use water-glycol fluid.

Note: For use with hydraulic fluids other than those listed above, please consult your Yuken representatives in advance.

Recommended Viscosity and Oil Temperatures

Use hydraulic fluids which satisfy the recommended viscosity and oil temperatures given below.

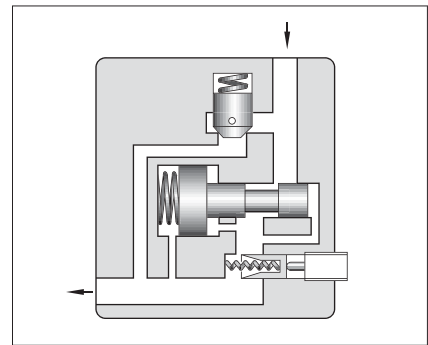
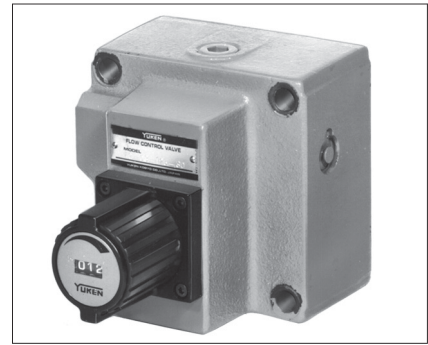
Name	Viscosity	Temperature
Flow Control Valves Flow Control and Check Valves Pilot Operated Flow Control Valves Pilot Operated Flow Control and Check Valves Feed Control Valves	20 - 200 mm ² /s (98 - 900 SSU)	-15 - +70°C (5 - 158°F)
Restrictors One Way Restrictors Throttle Modules Throttle and Check Modules Deceleration Valves Deceleration and Check Valves Needle Valves	15 - 400 mm ² /s (77 - 1800 SSU)	

Control of Contamination

Due caution must be paid to maintaining control over contamination of the hydraulic fluids which may otherwise lead to breakdowns and shorten the life of the valves. Please maintain the degree of contamination within NAS 1638-Grade 12. Use 25 μm or finer line filter.

Flow Control Valves / Flow Control and Check Valves

These valves are pressure and temperature compensating type valves and maintain a constant flow rate independent of change in system pressure (load) and temperature (viscosity of the fluid). They control flow rate of the hydraulic circuit and eventually control speed of the actuator precisely. Valves with an integral check valve allow a controlled flow and reverse free flow. Repeated resetting can be made easily with a digital readout.



Specifications

Model Numbers	Max. Metred Flow Capacity L/min (U.S.GPM)	Min. Metred Flow Capacity L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Approx. Mass kg (lbs.)
FG FCG -01- $\frac{4}{8}$ -*-11*	4(1.06) 8(2.1)	0.02(.005) {0.04 (.011)} ★	14 (2030)	1.3 (2.9)
FG FCG -02-30-*-30*	30(7.9)	0.05 (.013)	21 (3050)	3.8 (8.4)
FG FCG -03-125-*-30*	125(33)	0.2 (.053)		7.9 (17.4)
FG FCG -06-250-*-30*	250(66)	2 (.53)		23 (50.7)
FG FCG -10-500-*-30*	500(132)	4 (1.06)		52 (115)

★ The figures in the brace are for pressures above 7 MPa (1020 PSI).

Model Number Designation

F-	FC	G	-01	-8	-N	-11	*
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow Capacity L/min (U.S.GPM)	Pres. Compensator Stroke Adjustment	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	F: Flow Control Valves FC: Flow Control and Check Valves	G: Sub-plate Mounting	01	4 : 4 (1.06) 8 : 8 (2.1)	N: Applicable only for Pres. Compensator Stroke Adjustment (Option - Omit if not required)	11	Refer to ★
			02	30 : 30 (7.9)		30	
			03	125 : 125 (33)		30	
			06	250 : 250 (66)		30	
			10	500 : 500 (132)		30	

★ Design Standards: None.....Japanese Standard "JIS" and European Design Standard
90.....N. American Design Standard

Attachment

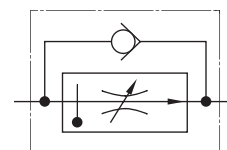
Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Std. "JIS" & European Design Std.	N. American Design Std.	
FG/FCG-01	M5 × 55 Lg.	No.10-24 UNC × 2-1/4 Lg.	4
FG/FCG-02	M8 × 50 Lg.	5/16-18 UNC × 2 Lg.	4
FG/FCG-03	M10 × 75 Lg.	3/8-16 UNC × 3 Lg.	4
FG/FCG-06	M16 × 130 Lg.	5/8-11 UNC × 5 Lg.	4
FG/FCG-10	M20 × 160 Lg.	3/4-10 UNC × 6-1/2 Lg.	4

Graphic Symbols



FG



FCG

Option

Pres. compensator stroke adjustment

Can reduce jumping at the start of the actuator.

D
Flow Control Valves / Flow Control and Check Valves

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Std.		N. American Design Std.		Approx. Mass kg (lbs.)
	Sub-plate Model No.	Thread Size	Sub-plate Model No.	Thread Size	Sub-plate Model No.	Thread Size	
FG FCG -01	FGM-01X-10	Rc 1/4	FGM-01X-1080	1/4 BSP.F	FGM-01X-1090	1/4 NPT	0.8 (1.8)
FG FCG -02	FGM-02-20	Rc 1/4	FGM-02-2080	1/4 BSP.F	FGM-02-2090	1/4 NPT	2.3 (5.1)
	FGM-02X-20	Rc 3/8	FGM-02X-2080	3/8 BSP.F	FGM-02X-2090	3/8 NPT	2.3 (5.1)
	FGM-02Y-20	Rc 1/2	FGM-02Y-2080	1/2 BSP.F	FGM-02Y-2090	1/2 NPT	3.1 (6.8)
FG FCG -03	FGM-03-20	Rc 3/8	FGM-03-2080	3/8 BSP.F	FGM-03-2090	3/8 NPT	3.9 (8.6)
	FGM-03X-20	Rc 1/2	FGM-03X-2080	1/2 BSP.F	FGM-03X-2090	1/2 NPT	3.9 (8.6)
	FGM-03Y-20	Rc 3/4	FGM-03Y-2080	3/4 BSP.F	FGM-03Y-2090	3/4 NPT	5.7 (12.6)
	FGM-03Z-20	Rc 1	FGM-03Z-2080	1 BSP.F	FGM-03Z-2090	1 NPT	5.7 (12.6)
FG FCG -06	FGM-06X-20	Rc 1	FGM-06X-2080	1 BSP.F	FGM-06X-2090	1 NPT	12.5 (27.6)
	FGM-06Y-20	Rc 1-1/4	FGM-06Y-2080	1-1/4 BSP.F	FGM-06Y-2090	1-1/4 NPT	16 (35.3)
	FGM-06Z-20	Rc 1-1/2	FGM-06Z-2080	1-1/2 BSP.F	FGM-06Z-2090	1-1/2 NPT	16 (35.3)
FG FCG -10	FGM-10Y-20★	1-1/2, 2	FGM-10Y-20★	1-1/2, 2	FGM-10Y-2090★	1-1/2, 2	37 (81.6)

● Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

★ FGM-10Y is special type sub-plate to be used with pipe flange. When ordering FGM-10Y, specify pipe flange kit in addition to FGM-10Y referring to F3 pipe flanges show on [page 821](#).

Instructions

● Min. required pressure difference

The minimum differential pressure between inlet and outlet port is required to obtain the optimum pressure compensation. It varies according to the flow rate to be set. For details, please refer to the performance curves.

● Free flow

Check valve pressure drops vary with flow rates. If models with check valves are used, see free flow pressure drop characteristics.

● Flow adjustment

[F*G-01]

Loosen the locking screw and turn the flow adjustment dial clockwise for increase, and anti-clockwise for decrease. The dial makes about 4 revolutions from zero to full flow and the valve opening is indicated on the revolution indicator. (Refer to characteristics of "Metred Flow vs. Dial Position").

After flow adjustments, tighten the locking screw.

[F*G-02, 03, 06, 10]

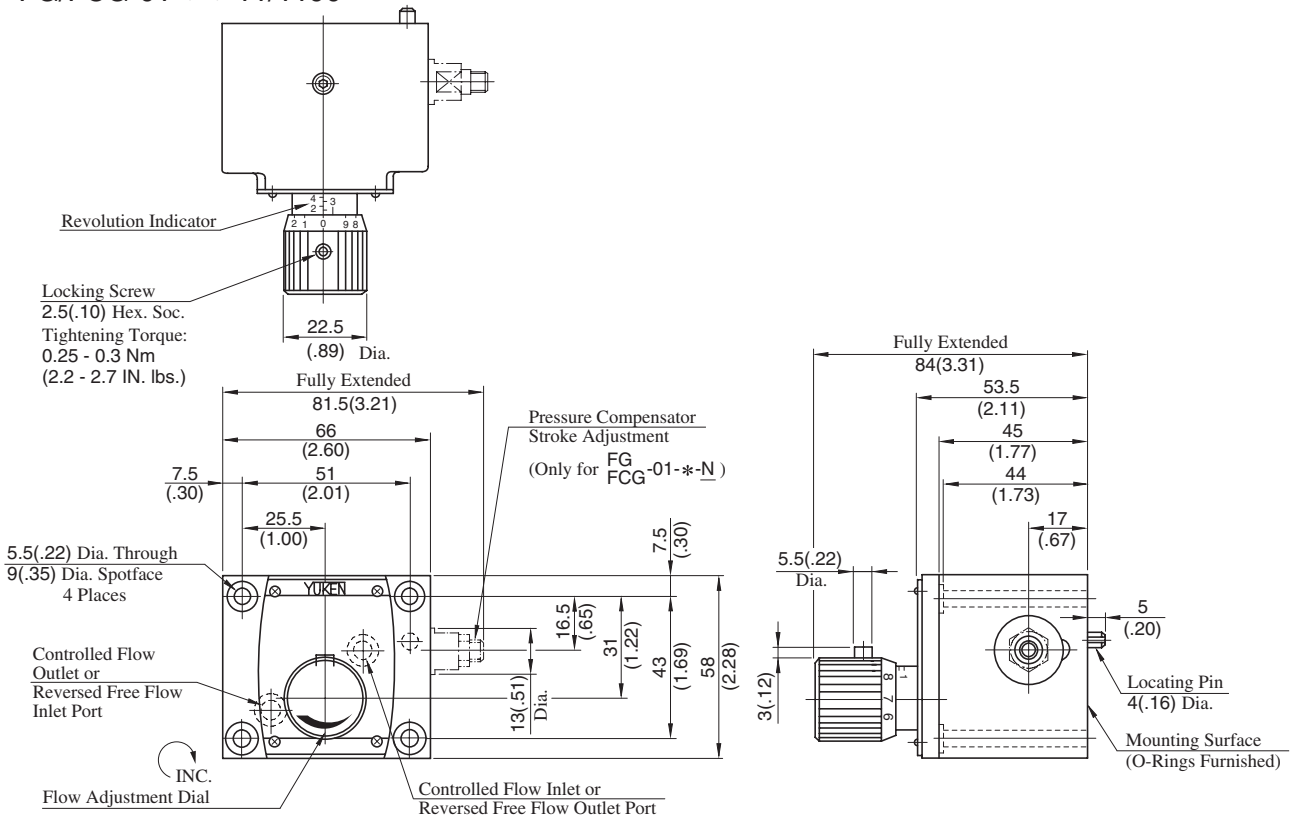
Loosen the locking screw and turn the flow adjustment handle clockwise for increase, and anti-clockwise for decrease. Open condition is indicated in digital-scale in built-in revolution indicator (Refer to the characteristics of "Metred Flow vs. Dial Position").

After flow adjustments, tighten the locking screw.

● Line filter

To carry out flow adjustments by as small degree as 2 L/min (.53 U.S.GPM) or less, be sure to use a line filter of 10 μm or finer and install it near the valve inlet.

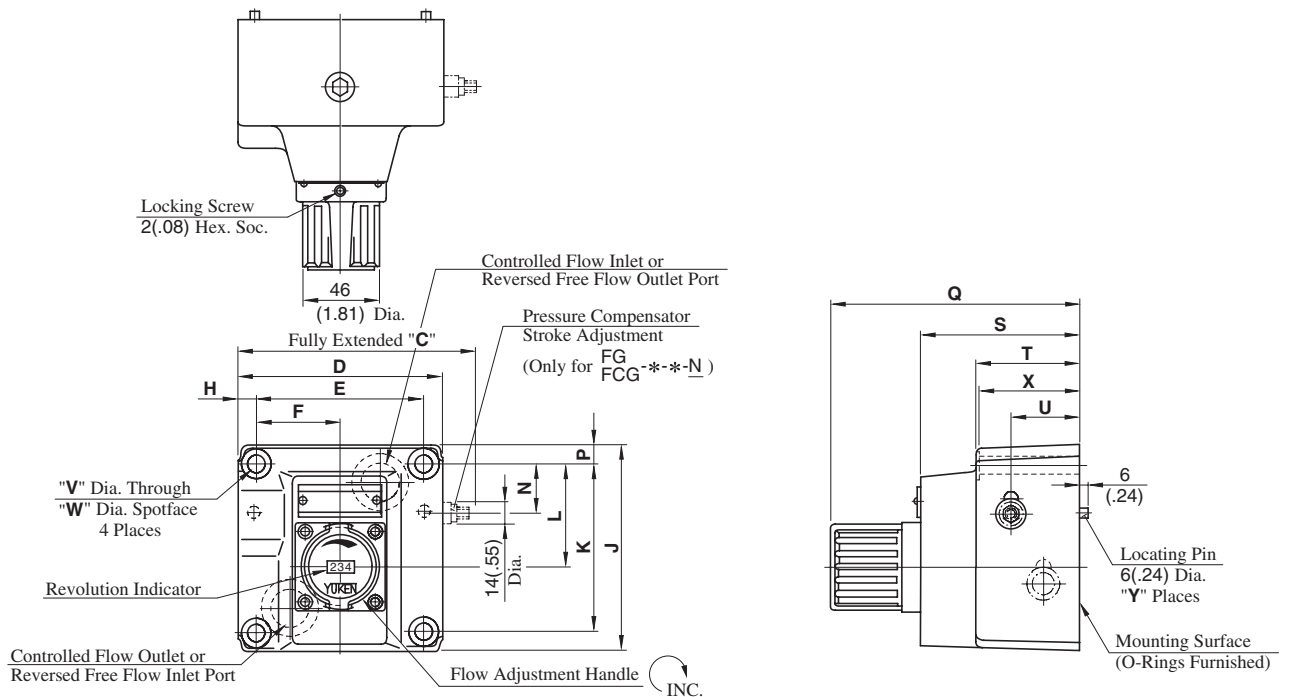
FG/FCG-01-**-11/1190



DIMENSIONS IN
MILLIMETRES (INCHES)

Mounting surface:
F*G-02: ISO 6263-AB-06-4-B
F*G-03: ISO 6263-AK-07-2-A

FG/FCG-02-30-**-30/3090
FG/FCG-03-125-**-30/3090



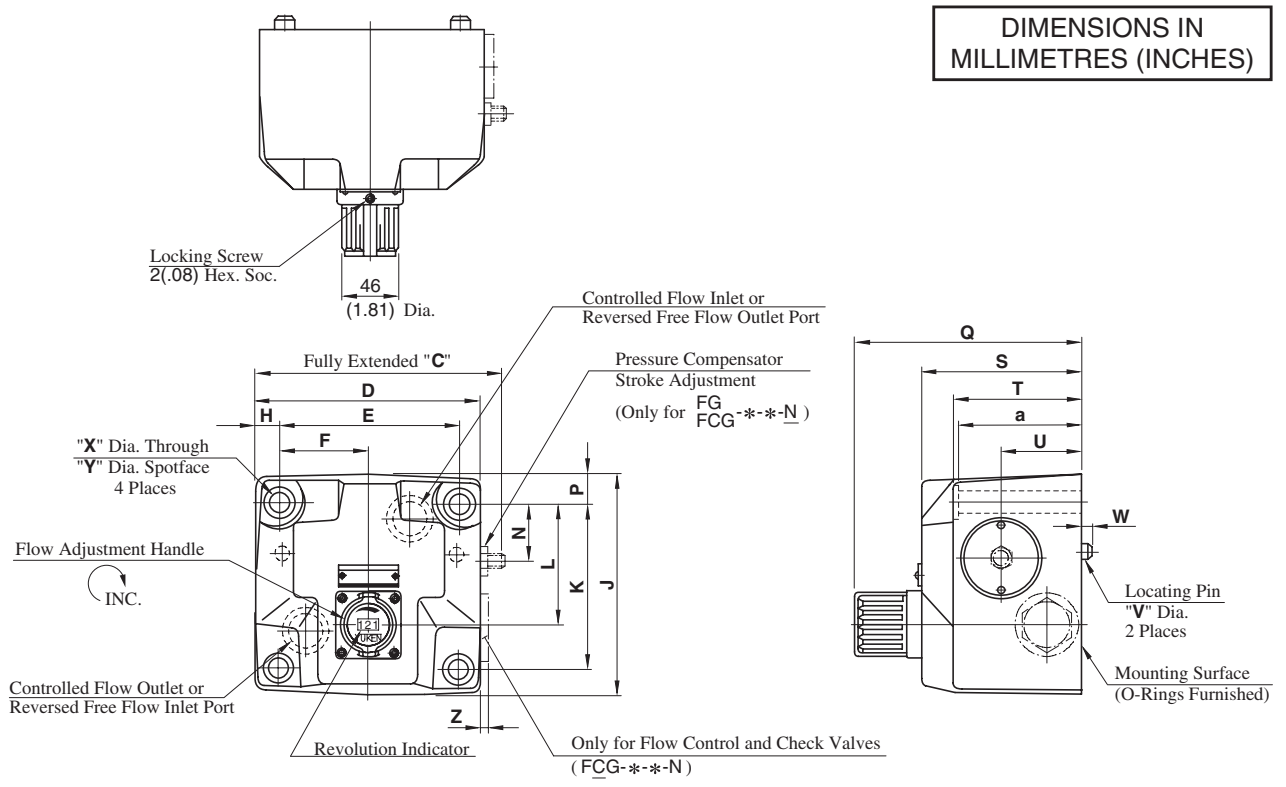
Model No.	Dimensions mm (Inches)																	Y
	C	D	E	F	H	J	K	L	N	P	Q	S	T	U	V	W	X	
FG FCG-02	116 (4.57)	96 (3.78)	76.2 (3.00)	38.1 (1.50)	9.9 (.39)	104.5 (4.11)	82.6 (3.25)	44.3 (1.74)	24 (.94)	9.9 (.39)	123 (4.84)	69 (2.72)	40 (1.57)	23 (.91)	8.8 (.35)	14 (.55)	39 (1.54)	1
FG FCG-03	145 (5.71)	125 (4.92)	101.6 (4.00)	50.8 (2.00)	11.7 (.46)	125 (4.92)	101.6 (4.00)	61.8 (2.43)	29.8 (1.17)	11.7 (.46)	152 (5.98)	98 (3.86)	64 (2.52)	41 (1.61)	11 (.43)	17.5 (.69)	63 (2.48)	2

D
Flow Control Valves
Flow Control and Check Valves

FG/FCG-06-250-*-30/3090
 FG/FCG-10-500-*-30/3090

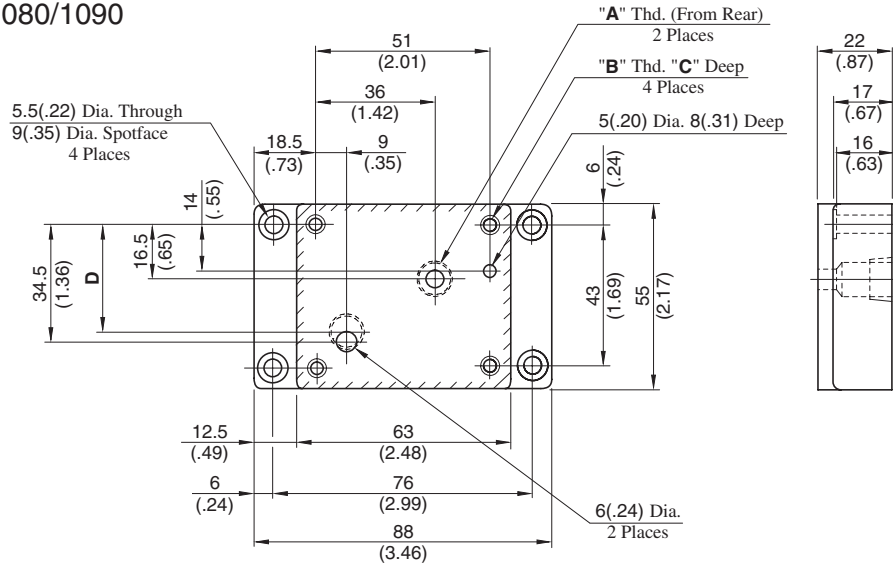
Mounting surface:
 F*G-06: ISO 6263-AP-08-2-A

**DIMENSIONS IN
 MILLIMETRES (INCHES)**



Model No.	Dimensions mm (Inches)																			
	C	D	E	F	H	J	K	L	N	P	Q	S	T	U	V	W	X	Y	Z	a
FG FCG ⁻⁰⁶	198 (7.80)	180 (7.09)	146.1 (5.75)	73 (2.87)	17 (.67)	174 (6.85)	133.4 (5.25)	99 (3.90)	44 (1.73)	20.3 (.80)	184 (7.24)	130 (5.12)	105 (4.13)	65 (2.56)	16 (.63)	7 (.28)	17.5 (.69)	26 (1.02)	10 (.39)	103 (4.06)
FG FCG ⁻¹⁰	267 (10.51)	244 (9.61)	196.9 (7.75)	98.5 (3.88)	23.5 (.93)	228 (8.98)	177.8 (7.00)	144.5 (5.69)	61 (2.40)	25 (.98)	214 (8.43)	160 (6.30)	137 (5.39)	85 (3.35)	18 (.71)	10 (.39)	21.5 (.85)	32 (1.26)	7.5 (.30)	135 (5.31)

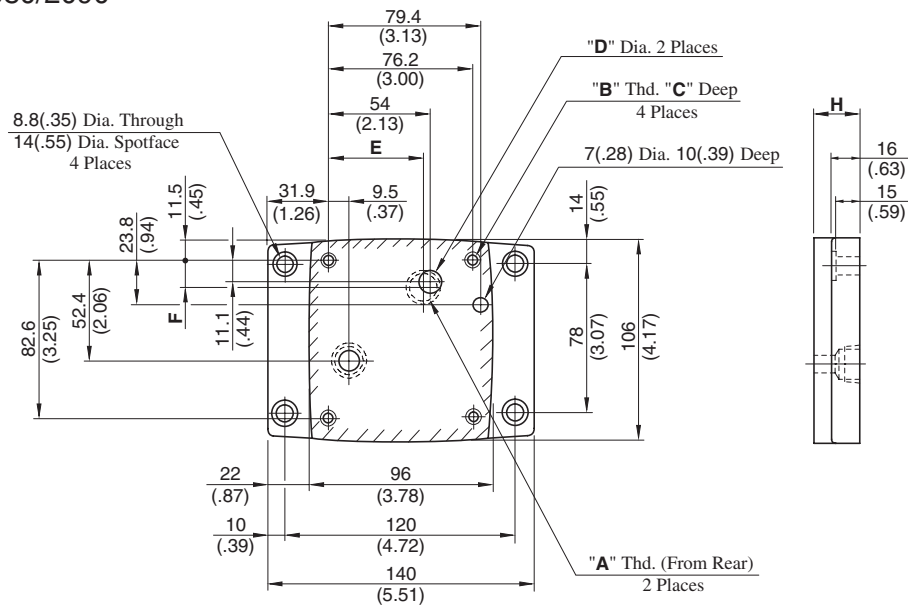
FGM-01X-10/1080/1090



Sub-plate Model Numbers	"A" Thd.	"B" Thd.	C	D
FGM-01X-10	Rc 1/4	M5	14 (.55)	34.5 (1.36)
FGM-01X-1080	1/4 BSP.F	M5	14 (.55)	30.0 (1.18)
FGM-01X-1090	1/4 NPT	No.10-24 UNC	15 (.59)	34.5 (1.36)

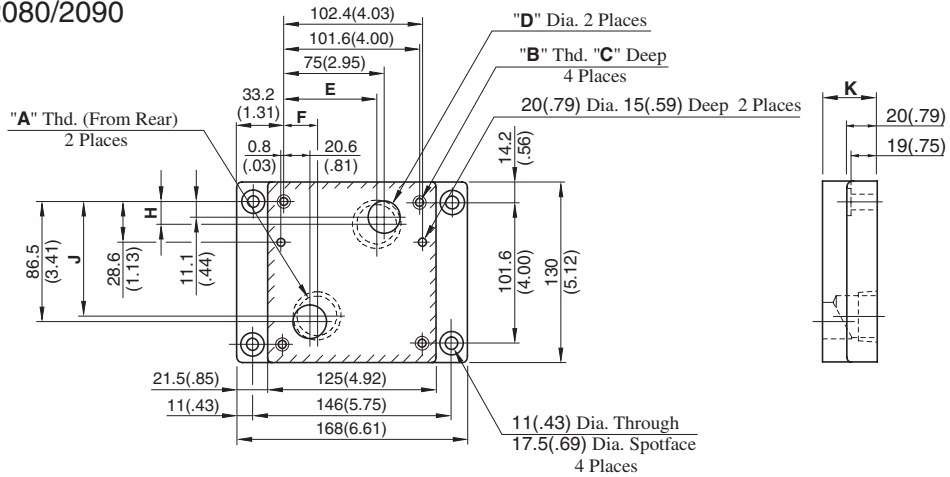
DIMENSIONS IN MILLIMETRES (INCHES)

FGM-02*-20/2080/2090



Sub-plate Model Numbers	"A" Thd.	"B" Thd.	C	D	E	F	H
FGM-02-20	Rc 1/4	M8	14 (.55)	11.0 (.43)	54 (2.13)	11.1 (.44)	25 (.98)
FGM-02-2080	1/4 BSP.F			11.7 (.46)			
FGM-02-2090	1/4 NPT	5/16-18 UNC	18 (.71)	11.0 (.43)			
FGM-02X-20	Rc 3/8	M8	14 (.55)	14.0 (.55)			
FGM-02X-2080	3/8 BSP.F			15.2 (.60)			
FGM-02X-2090	3/8 NPT	5/16-18 UNC	18 (.71)	14.0 (.55)			
FGM-02Y-20	Rc 1/2	M8	14 (.55)	14.0 (.55)	51 (2.01)	14 (.55)	35 (1.38)
FGM-02Y-2080	1/2 BSP.F			15.0 (.59)			
FGM-02Y-2090	1/2 NPT			5/16-18 UNC			

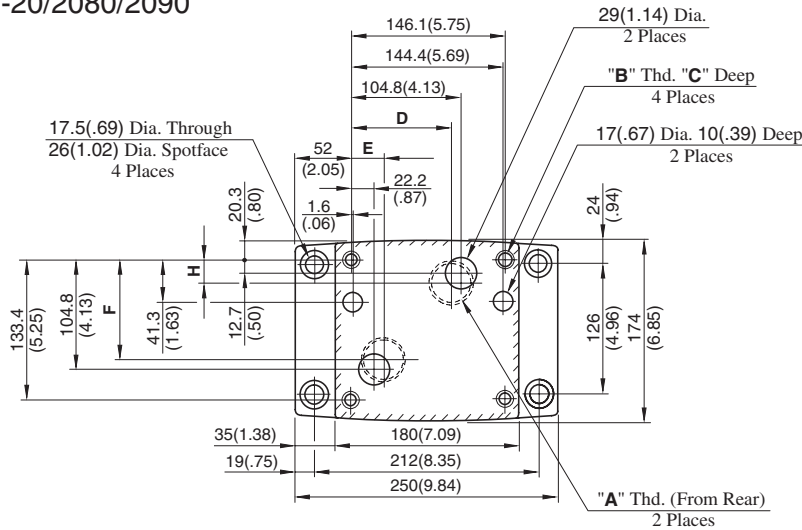
FGM-03*-20/2080/2090



Sub-plate Model Numbers	"A" Thd.	"B" Thd.	C	D	E	F	H	J	K
FGM-03-20	Rc 3/8	M10	18 (.71)	14.0 (.55)	75 (2.95)	20.6 (.81)	11.1 (.44)	86.5 (3.41)	25 (.98)
FGM-03-2080	3/8 BSP.F								
FGM-03-2090	3/8 NPT	3/8-16 UNC	21 (.83)	14.0 (.55)	75 (2.95)	20.6 (.81)	11.1 (.44)	86.5 (3.41)	25 (.98)
FGM-03X-20	Rc 1/2	M10	18 (.71)	17.5 (.69)					
FGM-03X-2080	1/2 BSP.F								
FGM-03X-2090	1/2 NPT	3/8-16 UNC	21 (.83)	17.5 (.69)	70 (2.76)	25.6 (1.01)	16.1 (.63)	81.5 (3.21)	40 (1.57)
FGM-03Y-20	Rc 3/4	M10	18 (.71)	23.0 (.91)					
FGM-03Y-2080	3/4 BSP.F								
FGM-03Y-2090	3/4 NPT	3/8-16 UNC	21 (.83)	23.0 (.91)	70 (2.76)	25.6 (1.01)	16.1 (.63)	81.5 (3.21)	40 (1.57)
FGM-03Z-20	Rc 1	M10	18 (.71)						
FGM-03Z-2080	1 BSP.F								
FGM-03Z-2090	1 NPT	3/8-16 UNC	21 (.83)	23.0 (.91)	70 (2.76)	25.6 (1.01)	16.1 (.63)	81.5 (3.21)	40 (1.57)

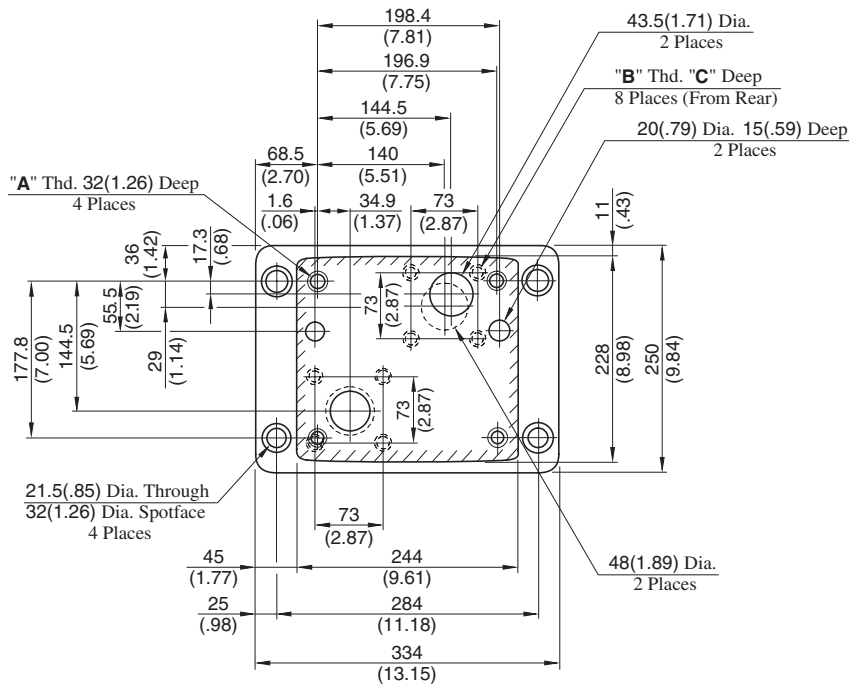
DIMENSIONS IN MILLIMETRES (INCHES)

FGM-06*-20/2080/2090

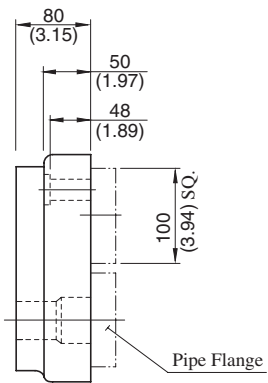


Sub-plate Model Numbers	"A" Thd.	"B" Thd.	C	D	E	F	H	J	K	L
FGM-06X-20	Rc 1	M16	30 (1.18)	104.8 (4.13)	22.2 (.87)	104.8 (4.13)	18 (.71)	45 (1.77)	35 (1.38)	34 (1.34)
FGM-06X-2080	1 BSP.F									
FGM-06X-2090	1 NPT	5/8-11 UNC	35 (1.38)	99 (3.90)	34 (1.34)	99 (3.90)	23 (.91)	60 (2.36)	40 (1.57)	39 (1.54)
FGM-06Y-20	Rc 1-1/4	M16	30 (1.18)							
FGM-06Y-2080	1-1/4 BSP.F									
FGM-06Y-2090	1-1/4 NPT	5/8-11 UNC	35 (1.38)	99 (3.90)	34 (1.34)	99 (3.90)	23 (.91)	60 (2.36)	40 (1.57)	39 (1.54)
FGM-06Z-20	Rc 1-1/2	M16	30 (1.18)							
FGM-06Z-2080	1-1/2 BSP.F									
FGM-06Z-2090	1-1/2 NPT	5/8-11 UNC	35 (1.38)	99 (3.90)	34 (1.34)	99 (3.90)	23 (.91)	60 (2.36)	40 (1.57)	39 (1.54)

FGM-10Y-20/2090



DIMENSIONS IN MILLIMETRES (INCHES)

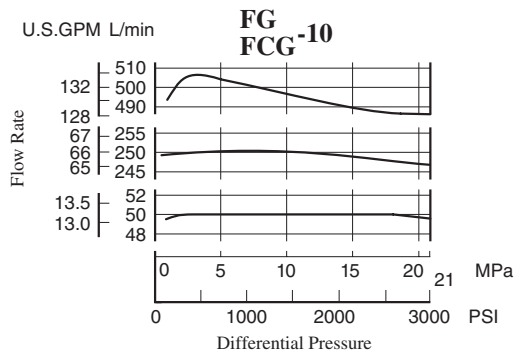
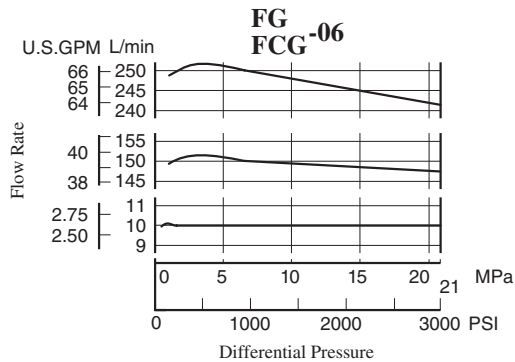
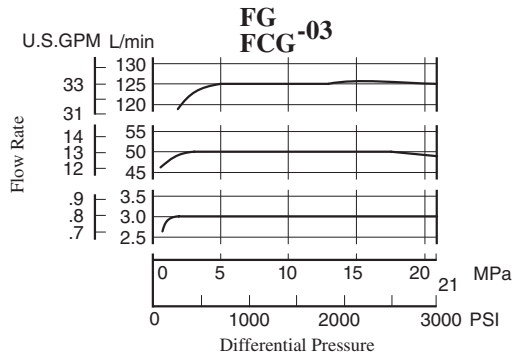
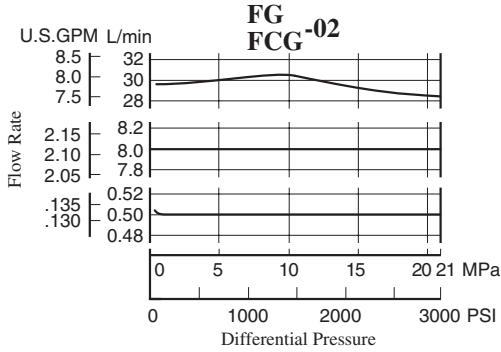
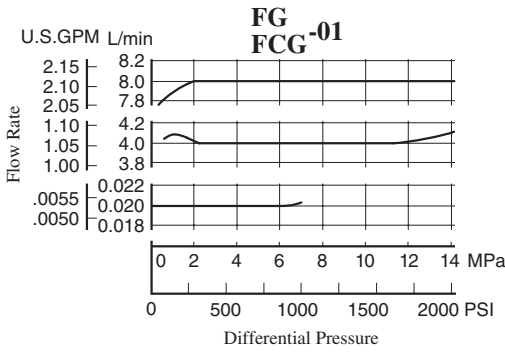


Sub-plate Model Numbers	"A" Thd.	"B" Thd.	C
FGM-10Y-20	M20	M16	32 (1.26)
FGM-10Y-2090	3/4-10 UNC	5/8-11 UNC	34 (1.34)

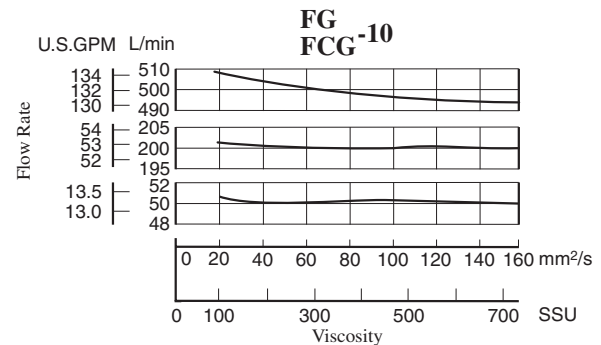
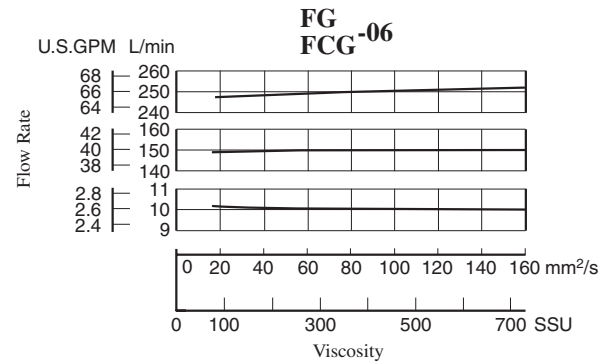
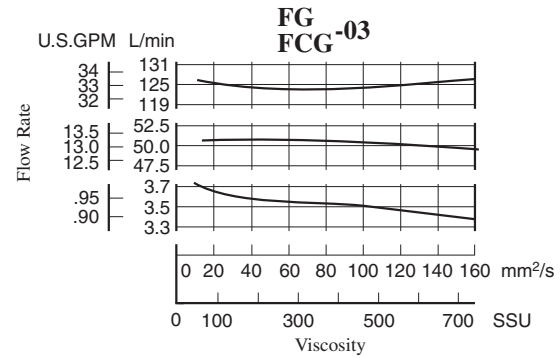
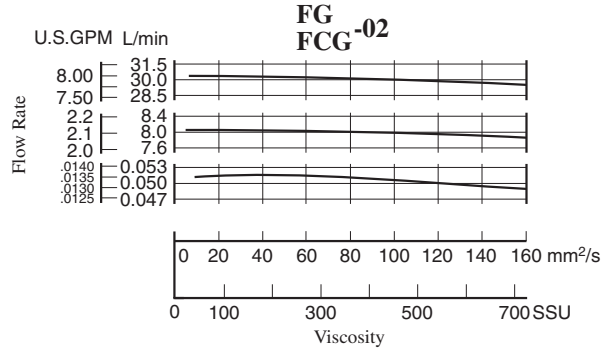
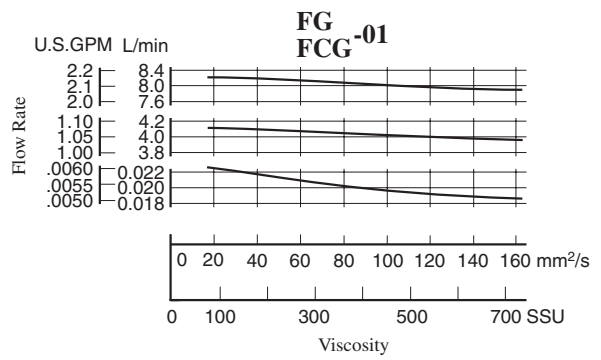
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Flow Control Valves
Flow Control and Check Valves

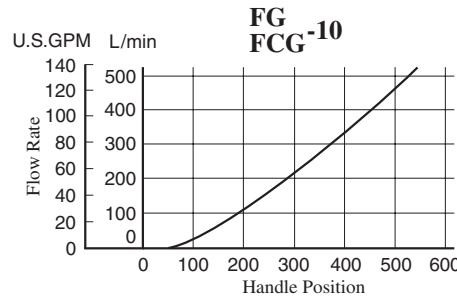
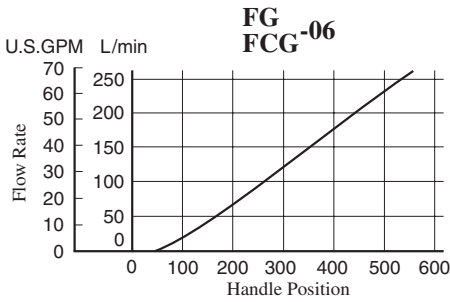
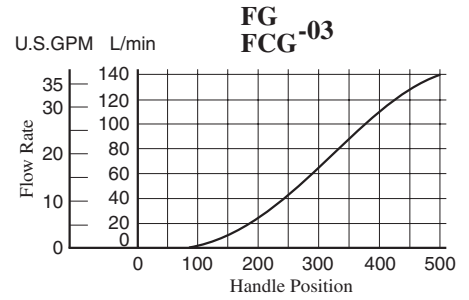
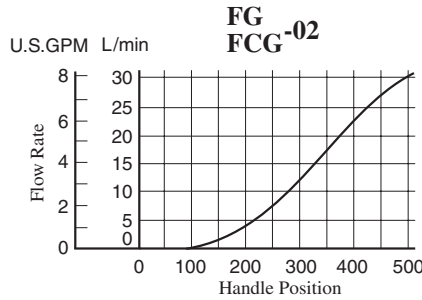
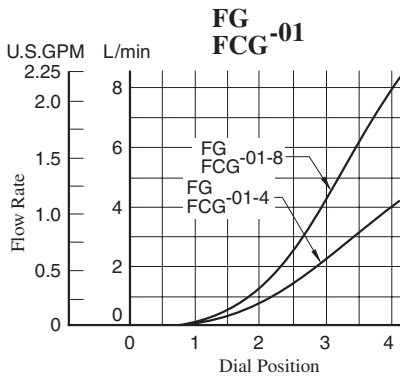
Metred Flow vs. Differential Pressure



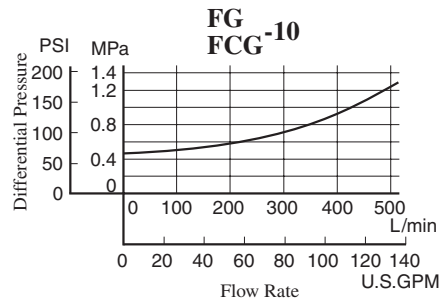
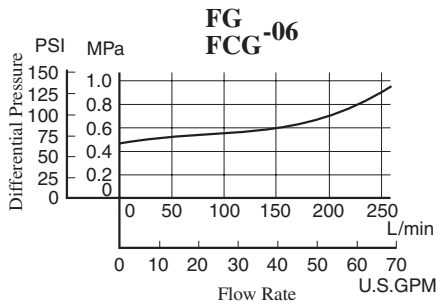
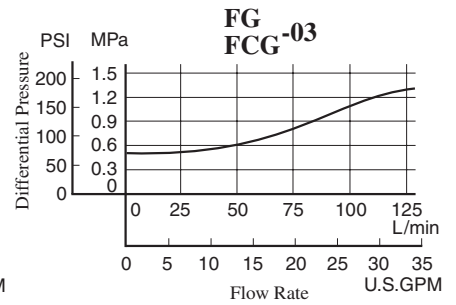
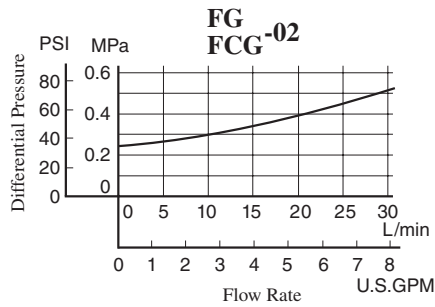
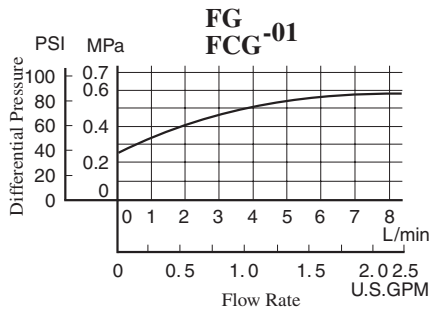
Metred Flow vs. Viscosity



Metred Flow vs. Dial Position



Min. Required Pressure Difference

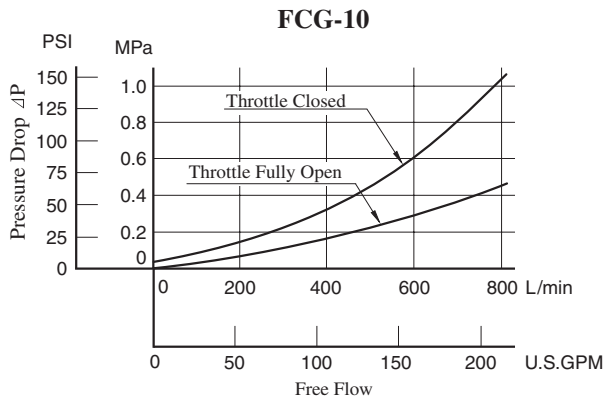
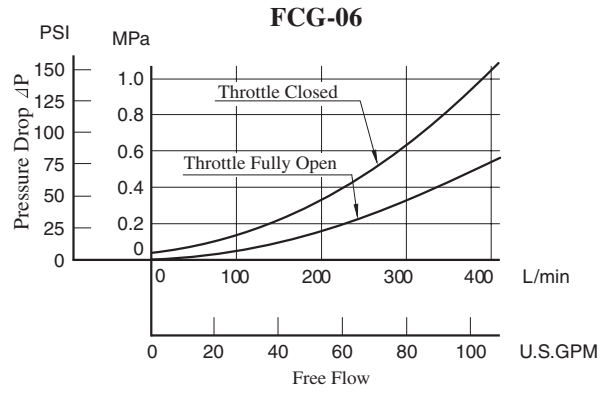
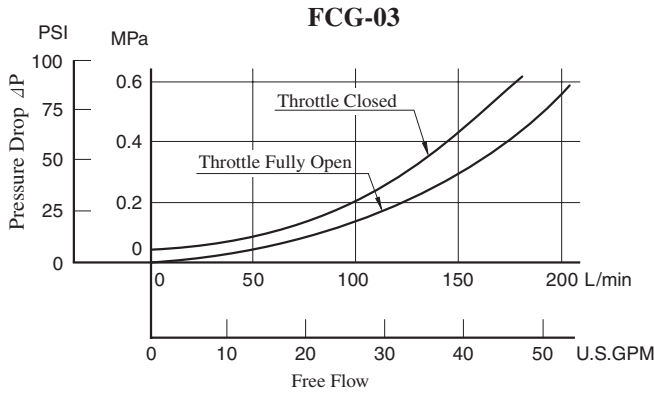
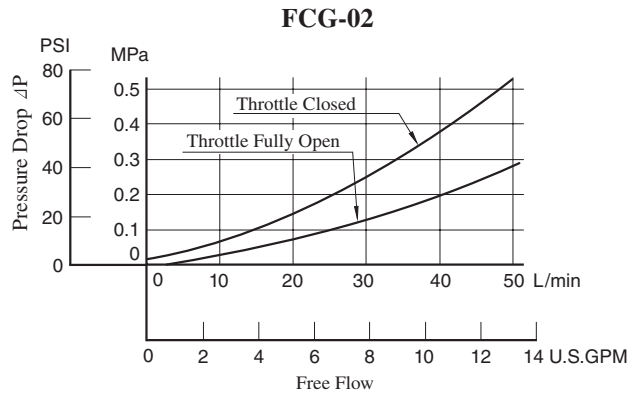
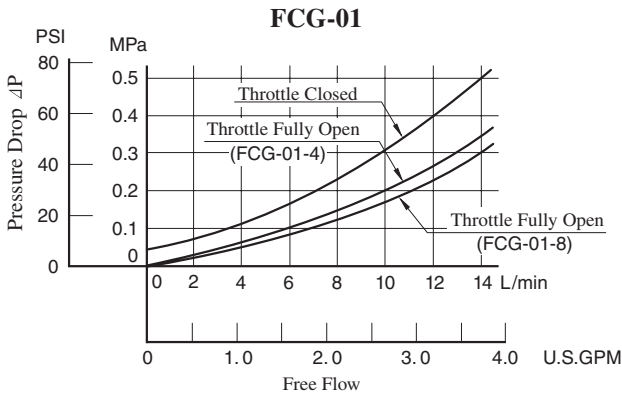


D

Flow Control Valves
Flow Control and Check Valves

Pressure Drop for Reversed Free Flow

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



- For any other viscosity, multiply the factors in the table below.

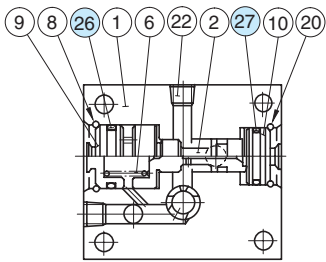
Viscosity	mm ² /s	20	40	60	80	100
	SSU	98	186	278	371	464
Factor		0.87	1.03	1.14	1.23	1.30

- For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

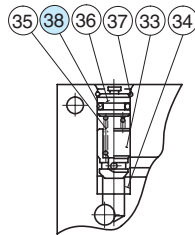
$$\Delta P' = \Delta P (G'/0.850)$$

List of seals

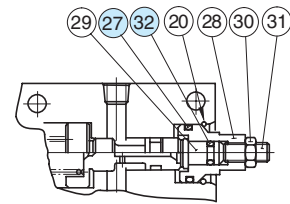
FG
FCG -01-*-*-11/1190



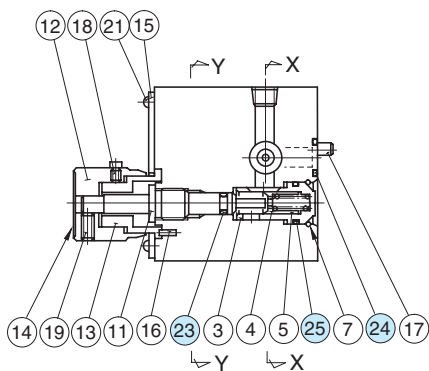
Section X-X
(FG-01 Type)



Section Y-Y
(FCG-01 Type)



Section X-X
(FG/FCG-01-*-N Type)



List of Seals

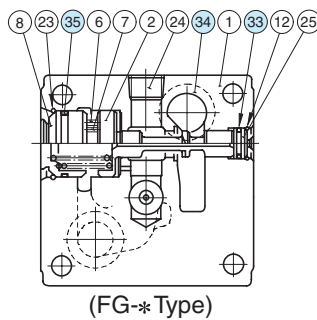
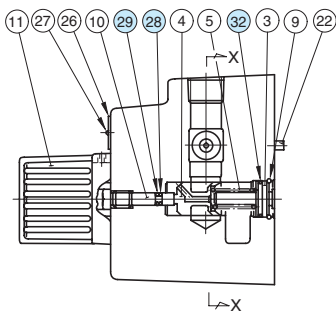
Item	Name of Parts	Part Numbers	Qty.
23	O-Ring	SO-NA-P4	1
24	O-Ring	SO-NB-P9	2
25	O-Ring	SO-NB-P10	1
26	O-Ring	SO-NB-P16	1
27	O-Ring	SO-NB-P14	1
32	O-Ring	SO-NA-P5	1
38	O-Ring	SO-NB-P7	1

Note: When ordering the seals, please specify the seal kit number from the table below.

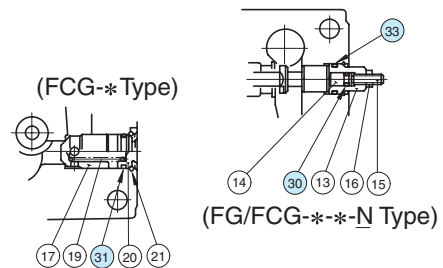
List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
FG-01	KS-FG-01-11
FCG-01	KS-FCG-01-11

FG/FCG-02-30-*-30/3090
FG/FCG-03-125-*-30/3090



(FG-* Type)



Section X-X

List of Seals

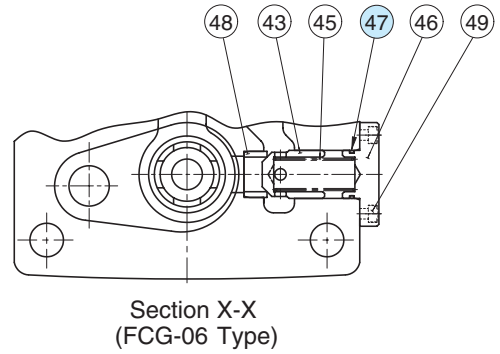
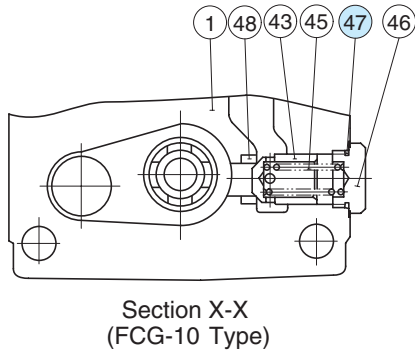
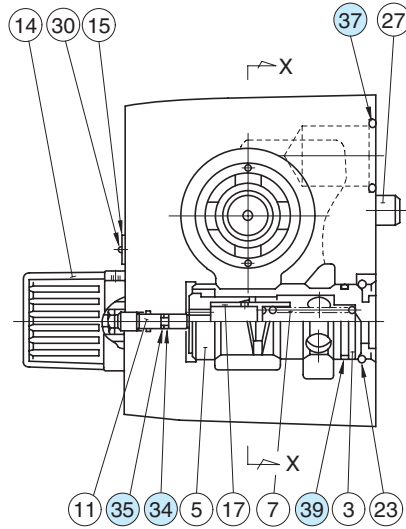
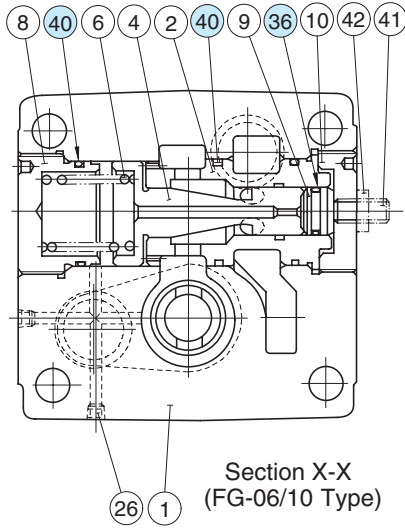
Item	Name of Parts	Part Numbers		Qty.
		FG FCG-02	FG FCG-03	
28	O-Ring	SO-NA-P4	SO-NA-P4	1
29	Back Up Ring	SO-BB-P4	SO-BB-P4	1
30	O-Ring	SO-NB-P5	SO-NB-P5	1
31	O-Ring	SO-NB-P10A	SO-NB-P16	1
32	O-Ring	SO-NB-P12	SO-NB-P18	1
33	O-Ring	SO-NB-P14	SO-NB-P14	1
34	O-Ring	SO-NB-P18	SO-NB-P28	2
35	O-Ring	SO-NB-G25	SO-NB-G35	1

Note: When ordering the seals, please specify the seal kit number from the table right.

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
FG-02	KS-FG-02-30
FCG-02	KS-FCG-02-30
FG-03	KS-FG-03-30
FCG-03	KS-FCG-03-30

FG/FCG-06-250-*-30/3090
 FG/FCG-10-500-*-30/3090



● List of Seals

Item	Name of Parts	Part Numbers		Qty.
		FG FCG-06	FG FCG-10	
34	O-Ring	SO-NA-P4	SO-NA-P4	1
35	Back Up Ring	SO-BB-P4	SO-BB-P4	1
36	O-Ring	SO-NB-P21	SO-NB-P34	1
37	O-Ring	SO-NB-P32	SO-NB-P48	2
39	O-Ring	SO-NB-P34	SO-NB-P50	1
40	O-Ring	SO-NB-P50	SO-NB-G75	3
47	O-Ring	SO-NB-A020	SO-NB-P32	1

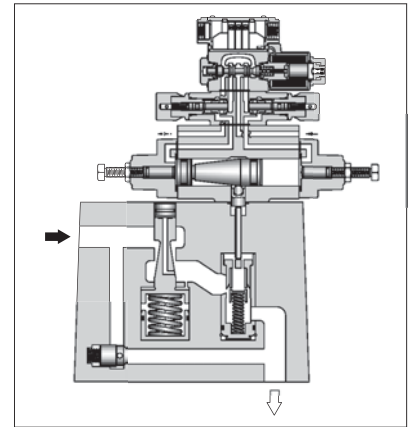
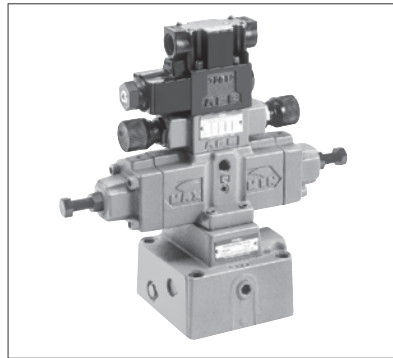
Note: When ordering the seals, please specify the seal kit number from the table right.

● List of Seal Kits

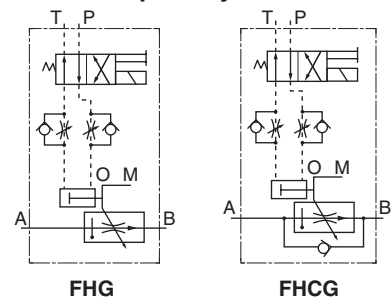
Valve Model Numbers	Seal Kit Numbers
FG-06	KS-FG-06-30
FCG-06	KS-FCG-06-30
FG-10	KS-FG-10-30
FCG-10	KS-FCG-10-30

Pilot Operated Flow Control Valves / Pilot Operated Flow Control and Check Valves

Flow control of these valves is continuously made by a hydraulically operated pilot piston mechanism which controls opening area of the orifice of the valve. With the use of these valves, shockless operation either in acceleration or deceleration can be obtained. With the compensator for the pressure and temperature, stable flow control can be obtained regardless of the changes in the pressure (load) and temperature (oil viscosity).



Graphic Symbols



Specifications

Model Numbers	Max. Metred Flow Capacity L/min (U.S.GPM)	Min. Metred Flow Capacity L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Min. Pilot Pressure MPa (PSI)	Approx. Mass kg (lbs.)
FHG/FHCG-02-30-*-13*	30 (7.9)	0.05 (.013)	21 (3050)	1.5 (220)	13 (28.7)
FHG/FHCG-03-125-*-13*	125 (33)	0.2 (.053)			17 (37.5)
FHG/FHCG-06-250-*-13*	250 (66)	2 (.53)			32 (70.6)
FHG/FHCG-10-500-*-13*	500 (132)	4 (1.06)			61 (135)

Model Number Designation

F-	FHC	G	-02	-30	-N	-O	-A100	-N	-13	*
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min (U.S.GPM)	Pressure ^{*3} Compensator Stroke Adj.	With No Pilot Valve ^{*1}	Coil ^{*2} Type	Type of Electrical Connections	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	FH: Pilot Operated Flow Control Valves FHC: Pilot Operated Flow Cont. & Check Valves	G: Sub-plate Mounting	02	30: 30 (7.9)	N: Applicable only for Pres. Compensator Stroke Adjustment (Option - Omit if not required)	O: Applicable only for Without Pilot Valve	AC: A100 A120 A200 A240 DC: D12 D24 D48 AC → DC: R100 R200	None: Terminal Box Type N: With Plug-in Connector (Din) N: With Plug-in Connector (Din)	13	None: Japanese Std. "JIS" 90: N.American Design Std. 80: European Design Std.
			03	125: 125 (33)					13	
			06	250: 250 (66)					13	
			10	500: 500 (132)					13	

- ★1. Both solenoid operated directional valve (DSG-01) and modular valve (MSW-01) can be used as a pilot valve. If no pilot valve is required, there is no need to specify the coil type and the electrical connection type of solenoid operated directional valve.
- ★2. The coil types are same as those for DSG-01 Series solenoid operated directional valves. See solenoid ratings on page 345.
- ★3. **Pres. compensator stroke adjustment:** Can reduce jumping at the start of the actuator.

In the table above, the symbols or numbers highlighted with shade represent the optional extras. The valves with model number having such optional extras are handles as options, therefore, please confirm the time of delivery with us before ordering.

Attachment
Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Std. "JIS" & European Design Std.	N. American Design Std.	
FHG/FHCG-02	M8×50 Lg.	5/16-18 UNC × 2 Lg.	4
FHG/FHCG-03	M10×75 Lg.	3/8-16 UNC × 3 Lg.	4
FHG/FHCG-06	M16×130 Lg.	5/8-11 UNC × 5 Lg.	4
FHG/FHCG-10	M20×160 Lg.	3/4-10 UNC × 6-1/2 Lg.	4

D Pilot Operated Flow Control Valves Pilot Operated Flow Control and Check Valves

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Std.		N. American Design Std.		Approx. Mass kg (lbs.)
	Sub-plate Model No.	Thread Size	Sub-plate Model No.	Thread Size	Sub-plate Model No.	Thread Size	
FHG FHCG -02	FGM-02-20	Rc 1/4	FGM-02-2080	1/4 BSP.F	FGM-02-2090	1/4 NPT	2.3 (5.1)
	FGM-02X-20	Rc 3/8	FGM-02X-2080	3/8 BSP.F	FGM-02X-2090	3/8 NPT	2.3 (5.1)
	FGM-02Y-20	Rc 1/2	FGM-02Y-2080	1/2 BSP.F	FGM-02Y-2090	1/2 NPT	3.1 (6.8)
FHG FHCG -03	FGM-03-20	Rc 3/8	FGM-03-2080	3/8 BSP.F	FGM-03-2090	3/8 NPT	3.9 (8.6)
	FGM-03X-20	Rc 1/2	FGM-03X-2080	1/2 BSP.F	FGM-03X-2090	1/2 NPT	3.9 (8.6)
	FGM-03Y-20	Rc 3/4	FGM-03Y-2080	3/4 BSP.F	FGM-03Y-2090	3/4 NPT	5.7 (12.6)
FHG FHCG -06	FGM-03Z-20	Rc 1	FGM-03Z-2080	1 BSP.F	FGM-03Z-2090	1 NPT	5.7 (12.6)
	FGM-06X-20	Rc 1	FGM-06X-2080	1 BSP.F	FGM-06X-2090	1 NPT	12.5 (27.6)
	FGM-06Y-20	Rc 1-1/4	FGM-06Y-2080	1-1/4 BSP.F	FGM-06Y-2090	1-1/4 NPT	16 (35.3)
FHG FHCG -10	FGM-06Z-20	Rc 1-1/2	FGM-06Z-2080	1-1/2 BSP.F	FGM-06Z-2090	1-1/2 NPT	16 (35.3)
	FGM-10Y-20★	1-1/2, 2	FGM-10Y-20★	1-1/2, 2	FGM-10Y-2090★	1-1/2, 2	37 (81.6)

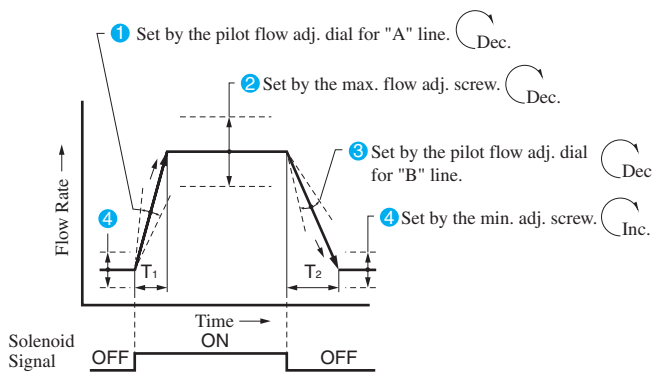
• Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

★ FGM-10Y is special type sub-plates to be used with pipe flange. When ordering FGM-10Y, specify the pipe flange kit in addition to FGM-10Y referring to F3 pipe flanges shown on page 821.

• Sub-plates are common with flow control valves. For dimensions, see pages 281 to 283.

Instructions

Control patterns and flow rate adjustment



- While the solenoid operated directional valve off (4 shown left)
The flow rate is set by the minimum flow adjustment screw and the actuator operates at the minimum speed setting.
- When the solenoid operated directional valve is turned on (1 shown left)
The flow rate is shifted from minimum to maximum and the actuator speed is also shifted likewise. The switching time can be set by the pilot flow adjustment dial 1.
- When the solenoid operated directional valve is turned off (3 shown left)
The flow rate is shifted from maximum to minimum and the actuator speed is also shifted likewise. The switching time can be set by the pilot flow adjustment dial 3.

Tightening of flow adjustment screws and dials

To adjust flow rates, slacken the lock nut or the dial setting screw. After adjustments, tighten the lock nut or the dial.

Min. required pressure difference

The minimum differential pressure between inlet and outlet port is required to obtain the optimum pressure compensation. It varies according to the flow rate to be set. For details, please refer to the performance curves.

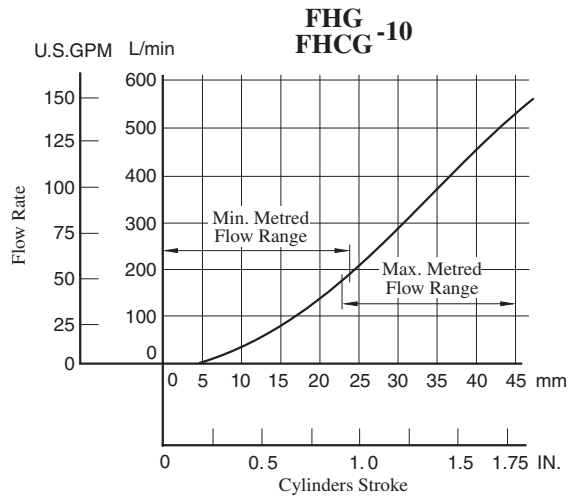
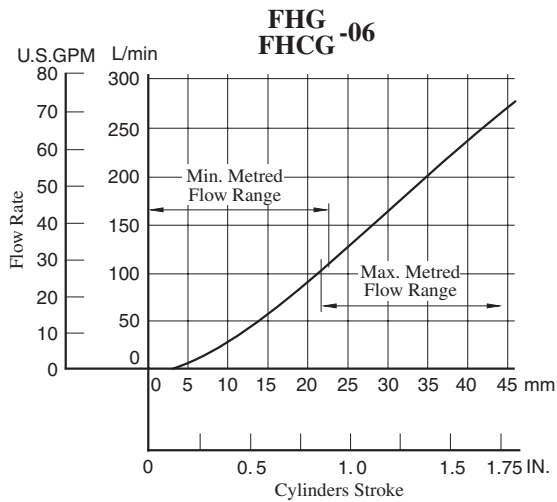
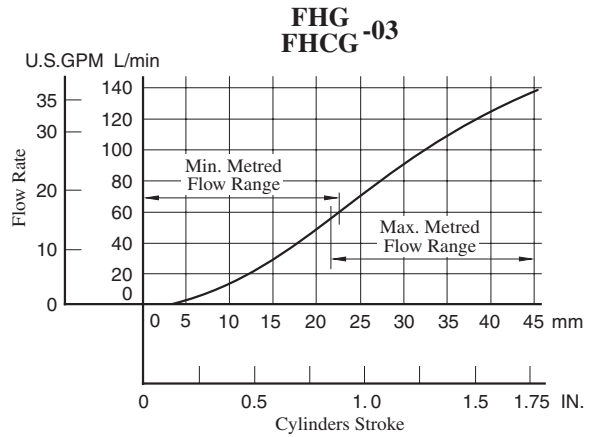
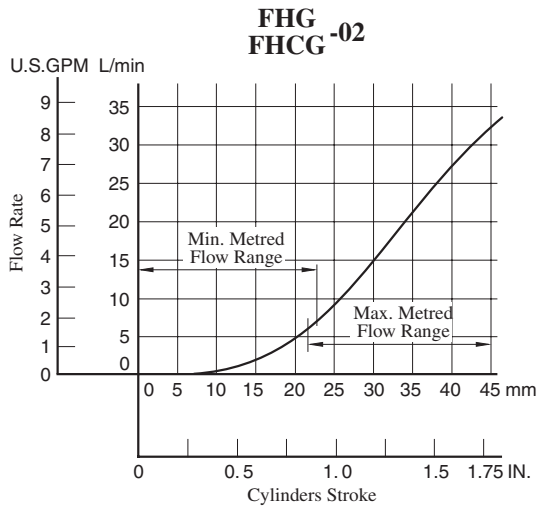
Free flow

Check valve pressure drops vary with flow rates. If models with check valves are used, see free flow pressure drop characteristics.

Line filter

To carry out flow adjustments by as small degree as 2 L/min (.53 U.S.GPM) or less, be sure to use a line filter of 10 μm or finer and install it near the valve inlet.

Metred Flow vs. Cylinders Stroke



Other Characteristics

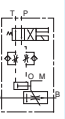
The following characteristics are the same as for flow control valves;

- Metred Flow vs. Differential Pressure
- Metred Flow vs. Viscosity
- Min. Required Pressure Difference
- Pressure Drop for Reversed Free Flow (only for models with check valves)

See [pages 284 to 286](#). For reference, the corresponding model No. of the flow control valves are shown below.

Valve Model No.	Model No.
FHG -02 FHCG	FG -02 FCG
FHG -03 FHCG	FG -03 FCG
FHG -06 FHCG	FG -06 FCG
FHG -10 FHCG	FG -10 FCG

D



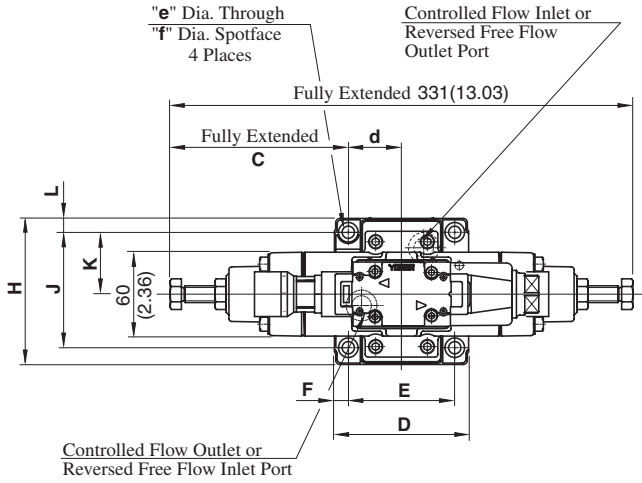
Pilot Operated Flow Control Valves
Pilot Operated Flow Control and Check Valves

● Terminal Box Type

FHG/FHCG-02-30-**-**-13/1390
 FHG/FHCG-03-125-**-**-13/1390

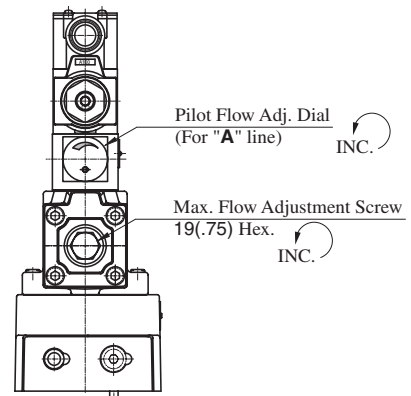
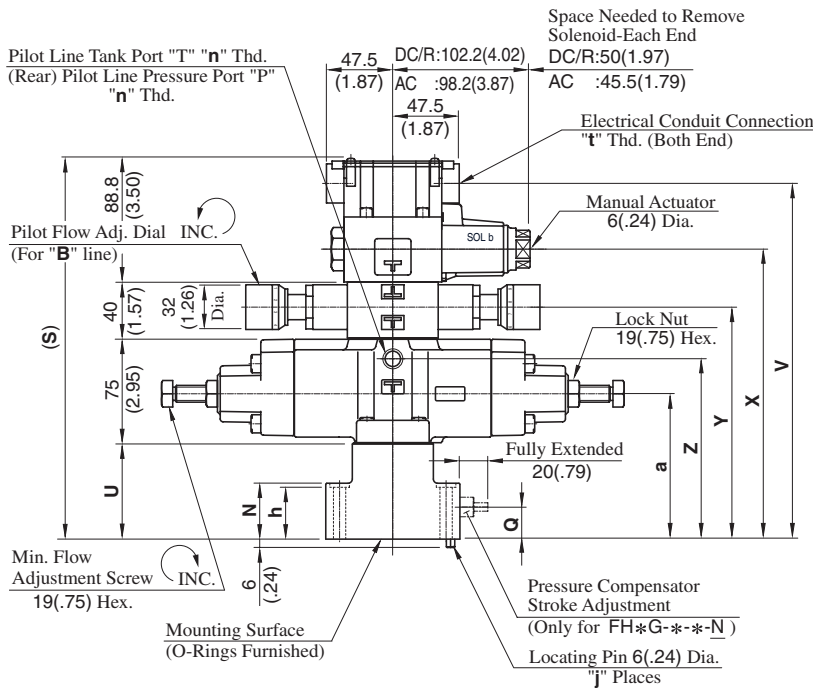
Mounting surface:
 FH*G-02: ISO 6263-AK-06-2-A
 FH*G-03: ISO 6263-AM-07-2-A

DIMENSIONS IN MILLIMETRES (INCHES)



Model Numbers	n	t
FHG/FHCG-02-30-**-**-13	Rc 1/4	G 1/2
FHG/FHCG-02-30-**-**-1390	1/4 NPT	1/2 NPT
FHG/FHCG-03-125-**-**-13	Rc 1/4	G 1/2
FHG/FHCG-03-125-**-**-1390	1/4 NPT	1/2 NPT

Note: For dimensions of the valve mounting surface, see the installation drawing (P.281 and 282) of the sub-plate used together.



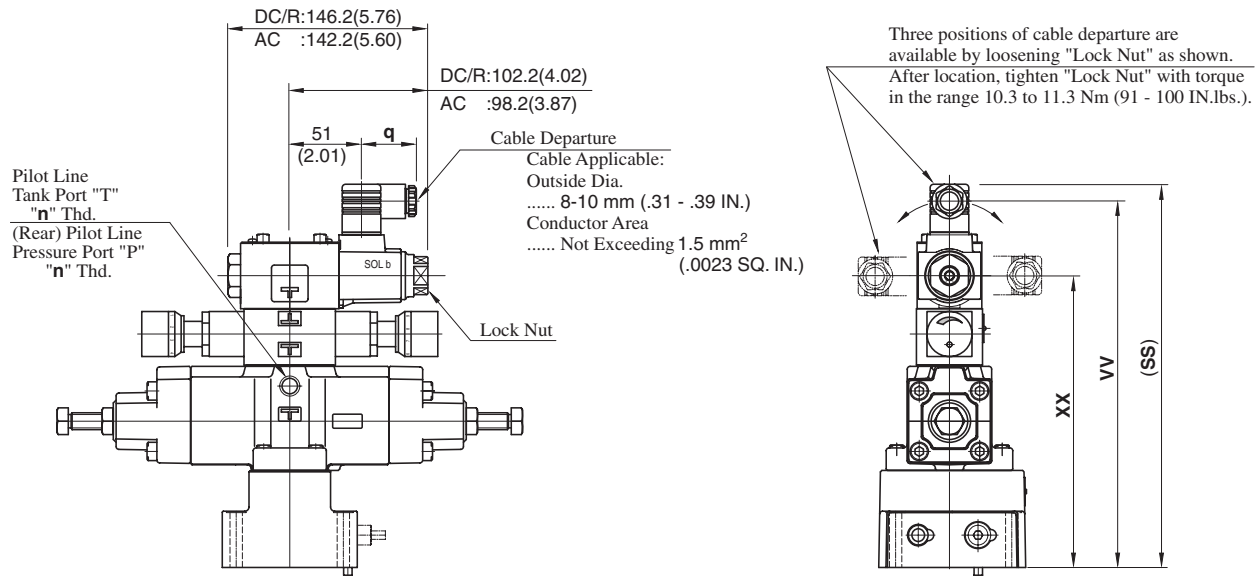
Model Numbers	Dimensions mm (Inches)															
	C	D	E	F	H	J	K	L	N	Q	S	U	V	X	Y	Z
FHG FHCG-02	127.4 (5.02)	96 (3.78)	76.2 (3.00)	9.9 (.39)	100.6 (3.96)	82.6 (3.25)	44.3 (1.74)	9 (.35)	40 (1.57)	23 (.91)	272.8 (10.74)	69 (2.72)	254.5 (10.02)	207.5 (8.17)	166 (6.54)	129 (5.08)
FHG FHCG-03	114.7 (4.52)	125 (4.92)	101.6 (4.00)	11.7 (.46)	125 (4.92)	101.6 (4.00)	61.8 (2.43)	11.7 (.46)	64 (2.52)	41 (1.61)	301.8 (11.88)	98 (3.86)	283.5 (11.16)	236.5 (9.31)	195 (7.68)	158 (6.22)

Model Numbers	Dimensions mm (Inches)					j
	a	d	e	f	h	
FHG FHCG-02	104 (4.09)	38.1 (1.50)	8.8 (.35)	14 (.55)	39 (1.54)	1
FHG FHCG-03	133 (5.24)	50.8 (2.00)	11 (.43)	17.5 (.69)	63 (2.48)	2

● **Models with Plug-in Connector**

FHG/FHCG-02-30-*-N-13/1380/1390
 FHG/FHCG-03-125-*-N-13/1380/1390

**DIMENSIONS IN
 MILLIMETRES (INCHES)**



Model Numbers	Dimensions mm (Inches)				Remarks
	SS	VV	XX	q	
FHG/FHCG-02-30-*-A*-N	272.5 (10.73)	260.5 (10.26)	207.5 (8.17)	39 (1.54)	with AC Solenoid
FHG/FHCG-03-125-*-A*-N	301.5 (11.87)	289.5 (11.40)	236.5 (9.31)		
FHG/FHCG-02-30-*-D*-N	283.5 (11.16)	271.5 (10.69)	207.5 (8.17)	39 (1.54)	with DC Solenoid
FHG/FHCG-03-125-*-D*-N	312.5 (12.30)	300.5 (11.83)	236.5 (9.31)		
FHG/FHCG-02-30-*-R*-N	286.5 (11.28)	264.7 (10.42)	207.5 (8.17)	53 (2.09)	with AC → DC Solenoid
FHG/FHCG-03-125-*-R*-N	315.5 (12.42)	293.7 (11.56)	236.5 (9.31)		

Model Numbers	Thread Size		
	Japanese Std. "JIS" Design 13	European Design Std. Design 1380	N.American Design Std. Design 1390
	"n" Thd.	"n" Thd.	"n" Thd.
FHG/FHCG-02-30-*-N	Rc 1/4	1/4 BSP.F	1/4 NPT
FHG/FHCG-03-125-*-N			

● For other dimensions, refer to "Terminal Box Type".

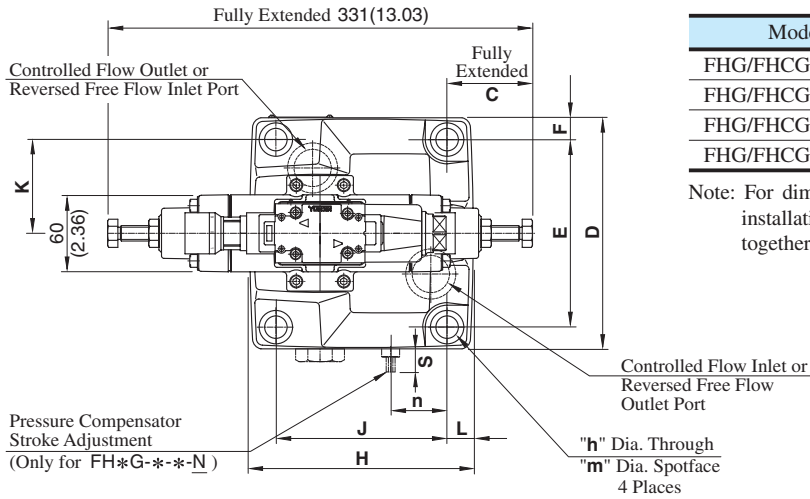
D
 Pilot Operated Flow Control Valves
 Pilot Operated Flow Control and Check Valves

● Terminal Box Type

FHG/FHCG-06-250-*-13/1390
 FHG/FHCG-10-500-*-13/1390

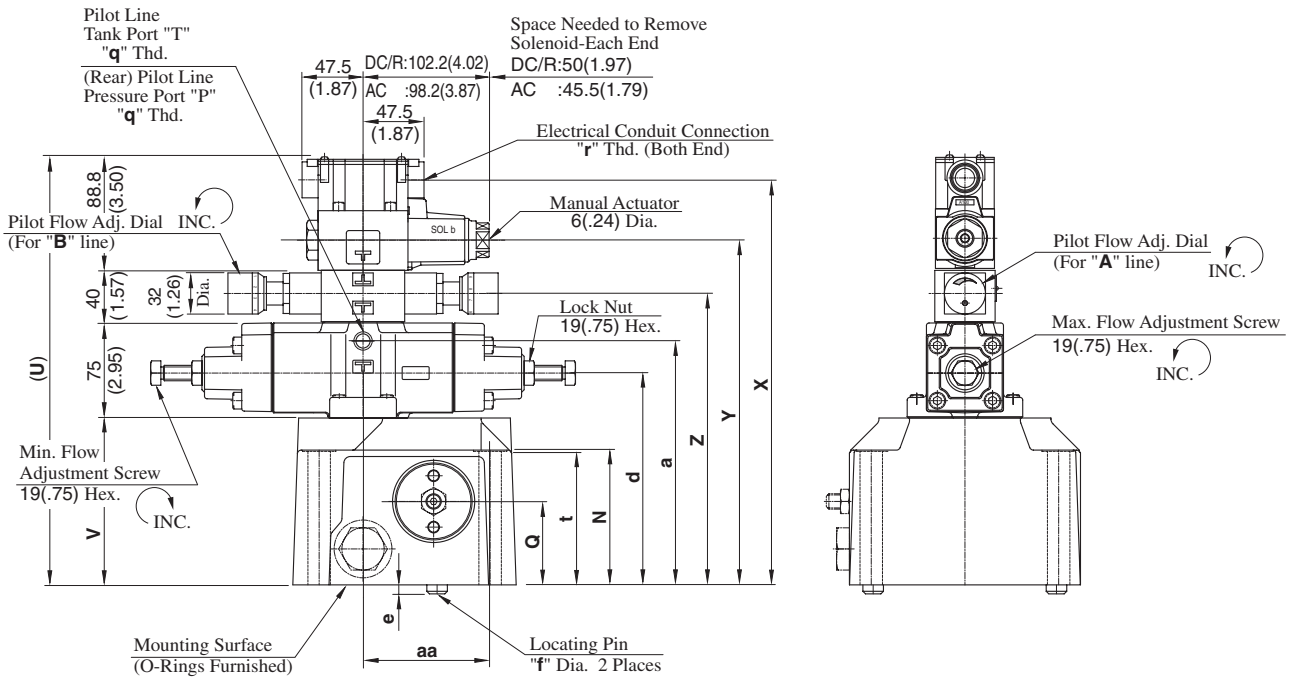
Mounting surface:
 FH*G-06: ISO 6263-AP-08-2-A

**DIMENSIONS IN
 MILLIMETRES (INCHES)**



Model Numbers	q	r
FHG/FHCG-06-250-*-13	Rc 1/4	G 1/2
FHG/FHCG-06-250-*-1390	1/4 NPT	1/2 NPT
FHG/FHCG-10-500-*-13	Rc 1/4	G 1/2
FHG/FHCG-10-500-*-1390	1/4 NPT	1/2 NPT

Note: For dimensions of the valve mounting surface, see the installation drawing (P.282 and 283) of the sub-plate used together.



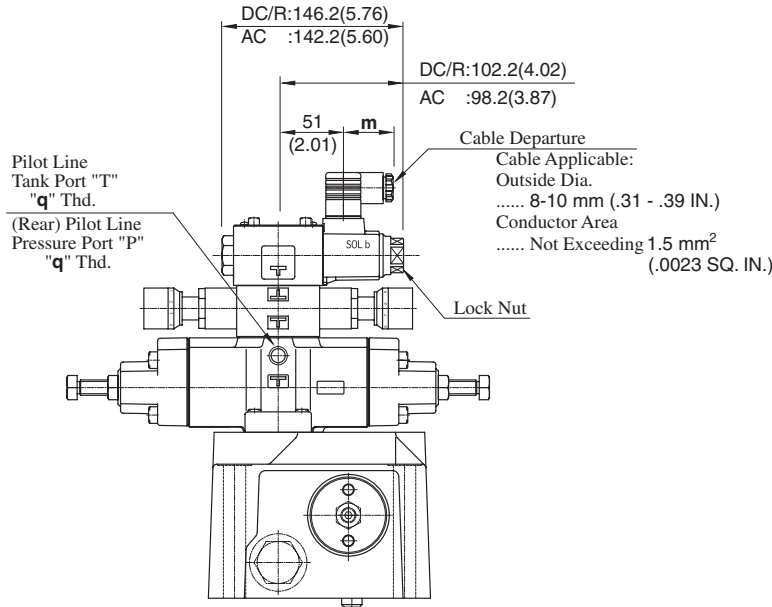
Model Numbers	Dimensions mm (Inches)															
	C	D	E	F	H	J	K	L	N	Q	S	U	V	X	Y	Z
FHG-06 FHCG-06	66.5 (2.62)	180 (7.09)	146.1 (5.75)	17 (.67)	174 (6.85)	133.4 (5.25)	73.1 (2.88)	20.3 (.80)	105 (4.13)	65 (2.56)	18 (.71)	333.8 (13.14)	130 (5.12)	315.5 (12.42)	268.5 (10.57)	227 (8.94)
FHG-10 FHCG-10	21 (.83)	244 (9.61)	196.9 (7.75)	23.5 (.93)	228 (8.98)	177.8 (7.00)	98.5 (3.88)	25.1 (.99)	137 (5.39)	85 (3.35)	23 (.91)	363.8 (14.32)	160 (6.30)	345.5 (13.60)	298.5 (11.75)	257 (10.12)

Model Numbers	Dimensions mm (Inches)								
	a	d	e	f	h	m	n	t	aa
FHG-06 FHCG-06	190 (7.48)	165 (6.50)	7 (.28)	16 (.63)	17.5 (.69)	26 (1.02)	44 (1.73)	103 (4.06)	99 (3.90)
FHG-10 FHCG-10	220 (8.66)	195 (7.68)	10 (.39)	18 (.71)	21.5 (.85)	32 (1.26)	61 (2.40)	135 (5.31)	144.5 (5.69)

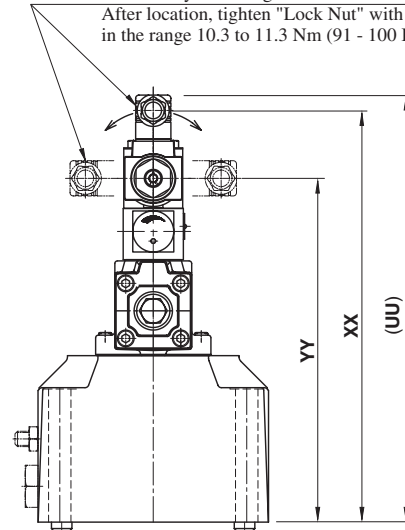
● **Models with Plug-in Connector**

FHG/FHCG-06-250-*-N-13/1380/1390
 FHG/FHCG-10-500-*-N-13/1380/1390

**DIMENSIONS IN
 MILLIMETRES (INCHES)**



Three positions of cable departure are available by loosening "Lock Nut" as shown. After location, tighten "Lock Nut" with torque in the range 10.3 to 11.3 Nm (91 - 100 IN.lbs.).



Model Numbers	Dimensions mm (Inches)				Remarks
	UU	XX	YY	m	
FHG/FHCG-06-250-*-A*-N	333.5 (13.13)	321.5 (12.66)	268.5 (10.57)	39 (1.54)	with AC Solenoid
FHG/FHCG-10-500-*-A*-N	363.5 (14.31)	351.5 (13.84)	298.5 (11.75)		
FHG/FHCG-06-250-*-D*-N	344.5 (13.56)	332.5 (13.09)	268.5 (10.57)	39 (1.54)	with DC Solenoid
FHG/FHCG-10-500-*-D*-N	374.5 (14.74)	362.5 (14.27)	298.5 (11.75)		
FHG/FHCG-06-250-*-R*-N	347.5 (13.68)	325.7 (12.82)	268.5 (10.57)	53 (2.09)	with AC → DC Solenoid
FHG/FHCG-10-500-*-R*-N	377.5 (14.86)	355.7 (14.00)	298.5 (11.75)		

Model Numbers	Thread Size		
	Japanese Std. "JIS" Design 13	European Design Std. Design 1380	N.American Design Std. Design 1390
	"q" Thd.	"q" Thd.	"q" Thd.
FHG/FHCG-06-250-*-N	Rc 1/4	1/4 BSPF	1/4 NPT
FHG/FHCG-10-500-*-N			

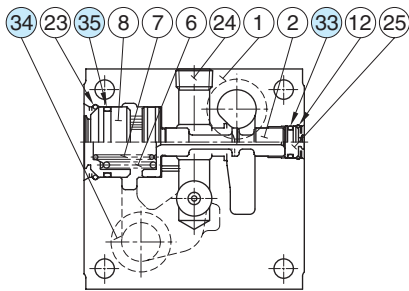
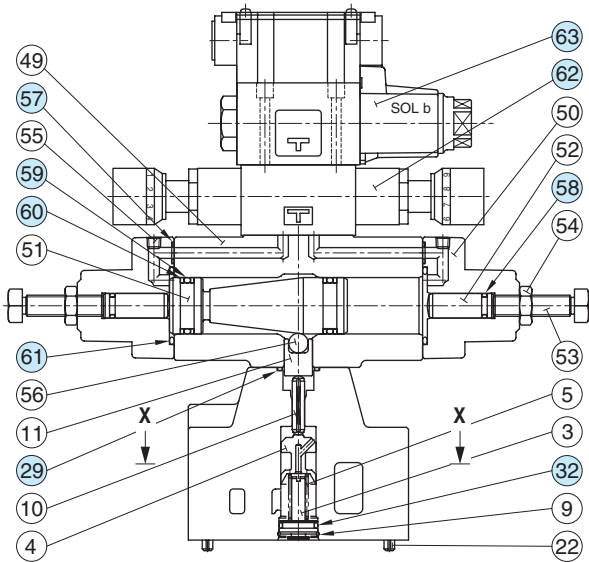
● For other dimensions, refer to "Terminal Box Type".

D
 Pilot Operated Flow Control Valves
 Pilot Operated Flow Control and Check Valves

■ List of seals

● Terminal Box Type

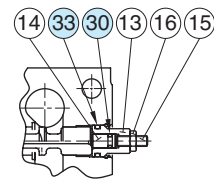
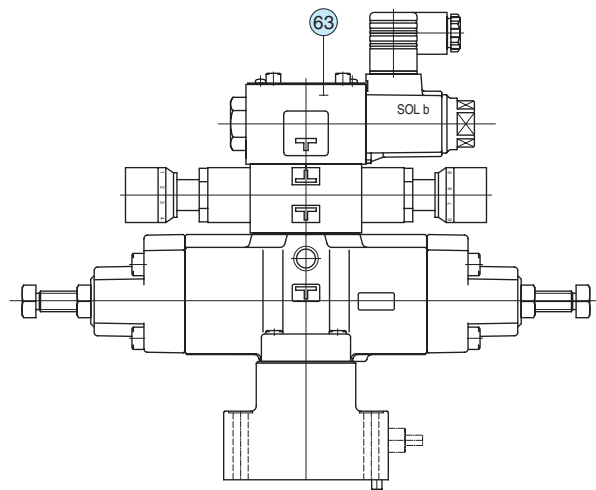
FHG/FHCG-02-30-*-N-13/1390
 FHG/FHCG-03-125-*-N-13/1390



(FHG-* Type)

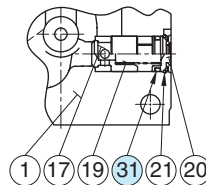
● Models with Plug-in Connector

FHG/FHCG-02-30-*-N-13/1380/1390
 FHG/FHCG-03-125-*-N-13/1380/1390



(FHG
 FHCG -*-N Type)

(FHCG-* Type)



Section X-X

● List of Seals

Item	Name of Parts	Part Numbers		Qty.
		FHG -02 FHCG	FHG -03 FHCG	
29	O-Ring	SO-NB-P20	SO-NB-P20	1
30	O-Ring	SO-NB-P5	SO-NB-P5	1
31	O-Ring	SO-NB-P10A	SO-NB-P16	1
32	O-Ring	SO-NB-P12	SO-NB-P18	1
33	O-Ring	SO-NB-P14	SO-NB-P14	1
34	O-Ring	SO-NB-P18	SO-NB-P28	2
35	O-Ring	SO-NB-G25	SO-NB-G35	1
57	O-Ring	SO-NB-P9	SO-NB-P9	2
58	O-Ring	SO-NB-P10A	SO-NB-P10A	2
59	O-Ring	SO-NA-P26	SO-NA-P26	2
60	Back Up Ring	SO-BB-P26	SO-BB-P26	4
61	O-Ring	SO-NB-P38	SO-NB-P38	2

Note: When ordering the seals, please specify the seal kit number from the table right. In addition to the above seals, seals for pilot valves are included in the seal kit.

● Pilot Valves

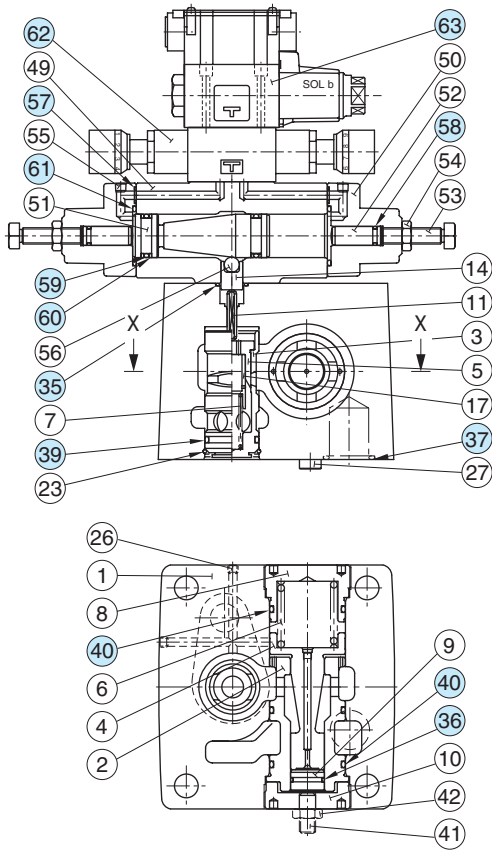
See page 298 for the pilot valve model numbers to be used.

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
FHG-02	KS-FHG-02-13
FHCG-02	KS-FHCG-02-13
FHG-03	KS-FHG-03-13
FHCG-03	KS-FHCG-03-13

● Terminal Box Type

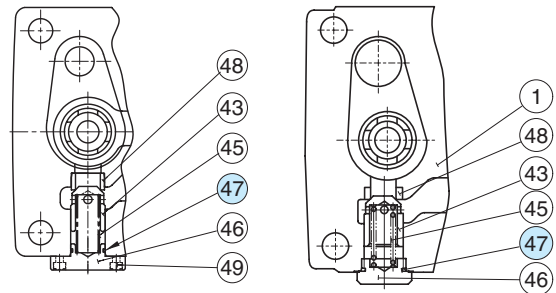
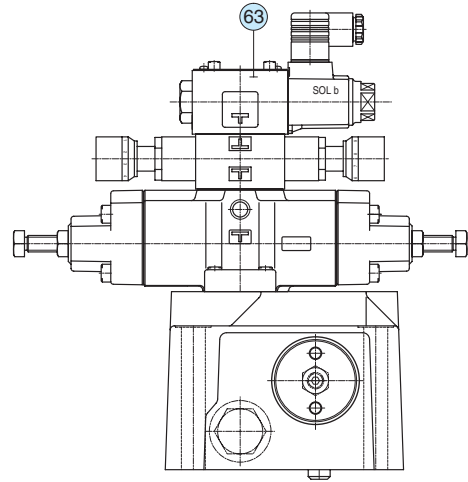
FHG/FHCG-06-250-*-*/-13/1390
 FHG/FHCG-10-500-*-*/-13/1390



(FHG-* Type)
 Section X-X

● Models with Plug-in Connector

FHG/FHCG-06-250-*-*/-N-13/1380/1390
 FHG/FHCG-10-500-*-*/-N-13/1380/1390



(FHCG-06 Type)

(FHCG-10 Type)

Section X-X

● List of Seals

Item	Name of Parts	Part Numbers		Qty.
		FHG FHCG-06	FHG FHCG-10	
35	O-Ring	SO-NB-P20	SO-NB-P20	1
36	O-Ring	SO-NB-P21	SO-NB-P34	1
37	O-Ring	SO-NB-P32	SO-NB-P48	2
39	O-Ring	SO-NB-P34	SO-NB-P50	1
40	O-Ring	SO-NB-P50	SO-NB-G75	3
47	O-Ring	SO-NB-A020	SO-NB-P32	1
57	O-Ring	SO-NB-P9	SO-NB-P9	2
58	O-Ring	SO-NB-P10A	SO-NB-P10A	2
59	O-Ring	SO-NA-P26	SO-NA-P26	2
60	Back Up Ring	SO-BB-P26	SO-BB-P26	4
61	O-Ring	SO-NB-P38	SO-NB-P38	2

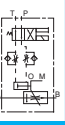
Note: When ordering the seals, please specify the seal kit number from the table right. In addition to the above seals, seals for pilot valves are included in the seal kit.

● Pilot Valves

See page 298 for the pilot valve model numbers to be used.

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
FHG-06	KS-FHG-06-13
FHCG-06	KS-FHCG-06-13
FHG-10	KS-FHG-10-13
FHCG-10	KS-FHCG-10-13



List of Pilot Valves

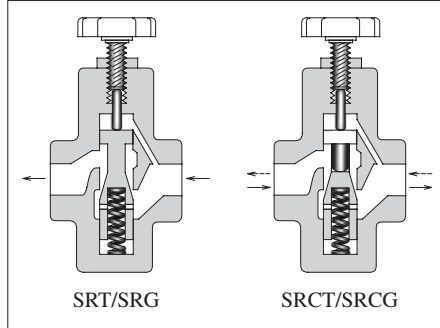
List of Pilot Valves

Type of Electrical Conduit Connections	Valve Model Numbers	Pilot Valve Model Numbers		Remarks
		Item No.62 Throttle and Check Modular Valves	Item No.63 Solenoid Operated Directional Valves	
Terminal Box Type	FHG/FHCG-02- 30-* -★ -13 FHG/FHCG-03-125-* -★ -13 FHG/FHCG-06-250-* -★ -13 FHG/FHCG-10-500-* -★ -13	MSW-01-X-50	DSG-01-2B2-★ -70	Japanese Std. "JIS"
	FHG/FHCG-02- 30-* -★ -1390 FHG/FHCG-03-125-* -★ -1390 FHG/FHCG-06-250-* -★ -1390 FHG/FHCG-10-500-* -★ -1390	MSW-01-X-50	DSG-01-2B2-★ -7090	N. American Design Std.
Plug-in Connector Type	FHG/FHCG-02- 30-* -★ -N-13 FHG/FHCG-03-125-* -★ -N-13 FHG/FHCG-06-250-* -★ -N-13 FHG/FHCG-10-500-* -★ -N-13	MSW-01-X-50	DSG-01-2B2-★ -N-70	Japanese Std. "JIS"
	FHG/FHCG-02- 30-* -★ -N-1380 FHG/FHCG-03-125-* -★ -N-1380 FHG/FHCG-06-250-* -★ -N-1380 FHG/FHCG-10-500-* -★ -N-1380	MSW-01-X-50	DSG-01-2B2-★ -N-70	European Design Std.
	FHG/FHCG-02- 30-* -★ -N-1390 FHG/FHCG-03-125-* -★ -N-1390 FHG/FHCG-06-250-* -★ -N-1390 FHG/FHCG-10-500-* -★ -N-1390	MSW-01-X-50	DSG-01-2B2-★ -N-7090	N. American Design Std.

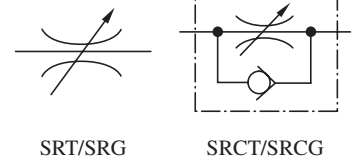
Note: 1. Fill a coil type (a symbol representing current/voltage) in section marked ★ .
 2. For the detail of the MSW-01 valve O-rings, see [Page 566](#).
 3. For the detail of the DSG-01 valve O-rings, see [Page 359](#).

Restrictors / One Way Restrictors

This valve is used to regulate an actuator speed in a circuit where line pressure is almost steady and small fluctuation of oil flow due to pressure changes is permitted. Integrated check valve allows reversed free flow from outlet to inlet port. Pressure balanced construction provides less effort in adjustment at high pressure.



Graphic Symbols



Specifications

Valve Name	Model Numbers		Rated Flow* L/min (U.S.GPM)	Max. Operating Pres. MPa (PSI)	Approx. Mass kg (lbs.)	
	Threaded Connection	Sub-plate Mounting			Threaded Connection	Sub-plate Mounting
Restrictor	SRT-03-50/5080/5090	SRG-03-50/5090	30 (7.9)	25 (3630)	1.5 (3.3)	2.5 (5.5)
	SRT-06-50/5080/5090	SRG-06-50/5090	85 (22.4)		3.8 (8.4)	3.9 (8.6)
	SRT-10-50/5080/5090	SRG-10-50/5090	230 (60.7)		9.1 (20.1)	7.5 (16.5)
One Way Restrictor	SRCT-03-50/5080/5090	SRCG-03-50/5090	30 (7.9)	25 (3630)	1.5 (3.3)	2.5 (5.5)
	SRCT-06-50/5080/5090	SRCG-06-50/5090	85 (22.4)		3.8 (8.4)	3.9 (8.6)
	SRCT-10-50/5080/5090	SRCG-10-50/5090	230 (60.7)		9.1 (20.1)	7.5 (16.5)

*Rated flow stands for approximate flow rate when the pressure drop between inlet and outlet ports of the valve in fully opened condition becomes 0.3 MPa (44 PSI) maximum at fluid's specific gravity of 0.85 and kinematic viscosity of 20 mm²/s (98 SSU).

Yuken can offer flanged connection valves described below.

For details, contact us.

Model Numbers	Rated Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)
SRF/SRCF-10-50 SRF/SRCF-10-5090	230 (60.7)	25 (3630)
SRF/SRCF-16-50 SRF/SRCF-16-5090	500 (132)	

Model Number Designation

F-	SR	T	-03	-50	*
Special Seals	Series Number	Type of Mounting	Valve Size	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	SR: Restrictor	T: Threaded Connection	03	50	None: Japanese Std. "JIS" 80: European Design Std. 90: N.American Design Std.
			06	50	
			10	50	
		G: Sub-plate Mounting	03	50	
			06	50	
			10	50	
	SRC: One Way Restrictor	T: Threaded Connection	03	50	None: Japanese Std. "JIS" 80: European Design Std. 90: N.American Design Std.
			06	50	
			10	50	
		G: Sub-plate Mounting	03	50	
			06	50	
			10	50	

Attachment

● Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Std. "JIS" and European Design Std.	N. American Design Std.	
SRG/SRCG-03	M10 × 45 Lg.	3/8-16 UNC × 1-3/4 Lg.	4
SRG/SRCG-06	M10 × 50 Lg.	3/8-16 UNC × 2 Lg.	4
SRG/SRCG-10	M10 × 55 Lg.	3/8-16 UNC × 2-1/4 Lg.	6

Instructions

● Flow Adjustment

Slacken the lock nut and turn the flow adjustment handle anti-clockwise to throttle flow. After achieving satisfactory performance tighten the lock nut.

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
SRG SRCG-03	CRGM-03-50	Rc 3/8	CRGM-03-5080	3/8 BSP.F	CRGM-03-5090	3/8 NPT	1.6 (3.5)
	CRGM-03X-50	Rc 1/2	CRGM-03X-5080	1/2 BSP.F	CRGM-03X-5090	1/2 NPT	1.6 (3.5)
SRG SRCG-06	CRGM-06-50	Rc 3/4	CRGM-06-5080	3/4 BSP.F	CRGM-06-5090	3/4 NPT	2.4 (5.3)
	CRGM-06X-50	Rc 1	CRGM-06X-5080	1 BSP.F	CRGM-06X-5090	1 NPT	3.0 (6.6)
SRG SRCG-10	CRGM-10-50	Rc 1-1/4	CRGM-10-5080	1-1/4 BSP.F	CRGM-10-5090	1-1/4 NPT	4.8 (10.6)
	CRGM-10X-50	Rc 1-1/2	CRGM-10X-5080	1-1/2 BSP.F	CRGM-10X-5090	1-1/2 NPT	5.7 (12.6)

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- Sub-plates are common with right angle check valves. For dimensions, see [page 502](#).

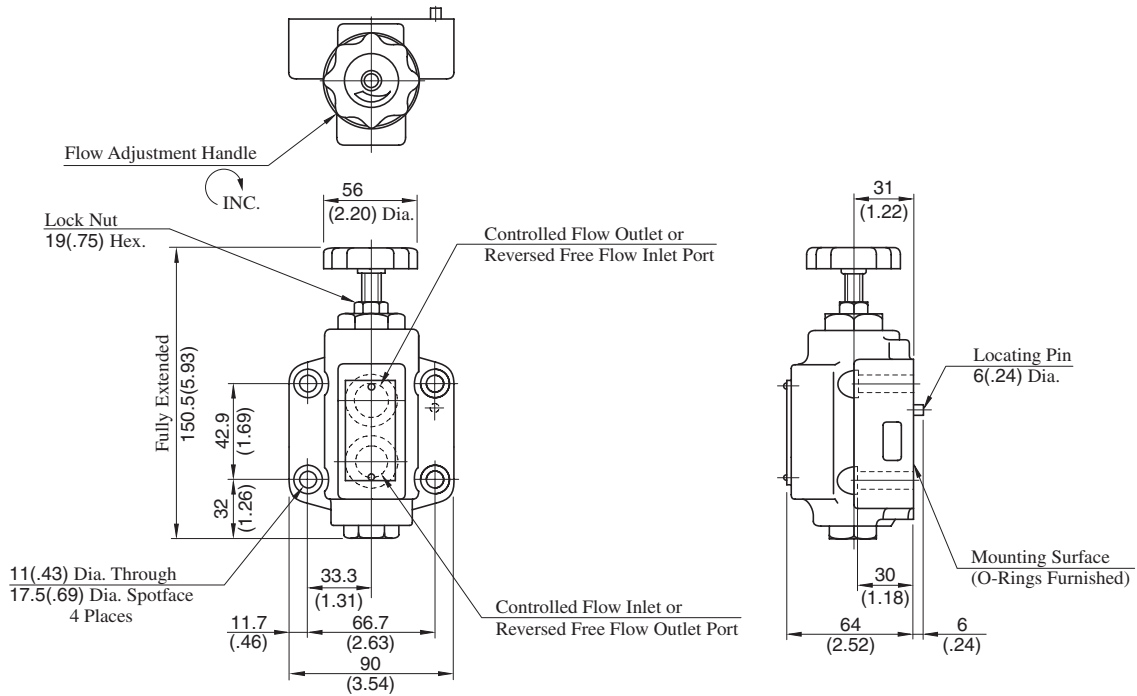
SRT/SRCT-03-50/5080/5090
SRT/SRCT-06-50/5080/5090
SRT/SRCT-10-50/5080/5090

DIMENSIONS IN MILLIMETRES (INCHES)

Model Numbers	Dimensions mm (Inches)								Thd. Size
	C	D	E	F	H	J	K	L	"N" Thd.
SRT/SRCT-03-50	72 (2.83)	36 (1.42)	44 (1.73)	150.5 (5.93)	53.5 (2.11)	38 (1.50) Dia.	46 (1.81)	22 (.87)	Rc 3/8
SRT/SRCT-03-5080									3/8 BSP.F
SRT/SRCT-03-5090									3/8 NPT
SRT/SRCT-06-50	100 (3.94)	50 (1.97)	58 (2.28)	180 (7.09)	66.5 (2.62)	62 (2.44) Sq.	64 (2.52)	31 (1.22)	Rc 3/4
SRT/SRCT-06-5080									3/4 BSP.F
SRT/SRCT-06-5090									3/4 NPT
SRT/SRCT-10-50	138 (5.43)	69 (2.72)	80 (3.15)	227 (8.94)	86 (3.39)	80 (3.15) Sq.	82 (3.23)	40 (1.57)	Rc 1-1/4
SRT/SRCT-10-5080									1-1/4 BSP.F
SRT/SRCT-10-5090									1-1/4 NPT

SRG/SRCG-03-50/5090

Mounting surface: ISO5781-AG-06-2-A

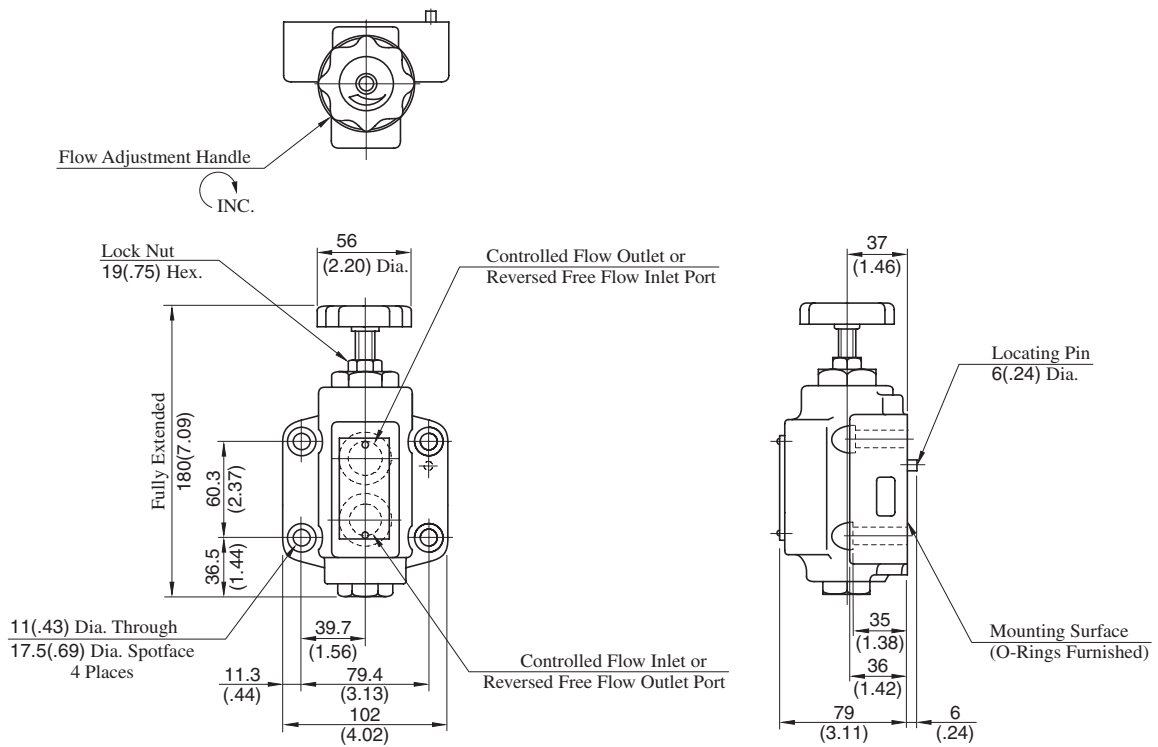


Note: For dimensions of the valve mounting surface, see the dimensional drawing (P.502) of the sub-plate used together.

DIMENSIONS IN
MILLIMETRES (INCHES)

SRG/SRCG-06-50/5090

Mounting surface: ISO5781-AH-08-2-A



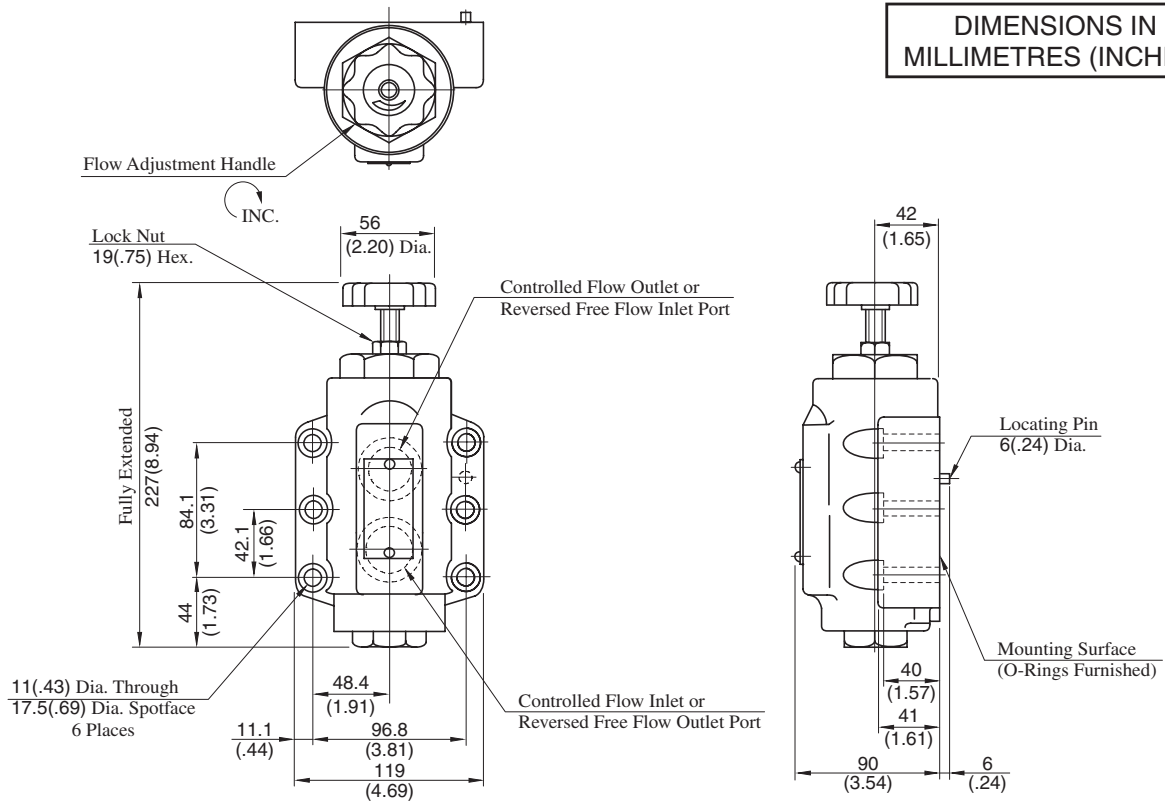
Note: For dimensions of the valve mounting surface, see the dimensional drawing (P.502) of the sub-plate used together.

D
Restrictors
One Way Restrictors

SRG/SRCG-10-50/5090

Mounting surface: ISO 5781-AJ-10-2-A

**DIMENSIONS IN
MILLIMETRES (INCHES)**



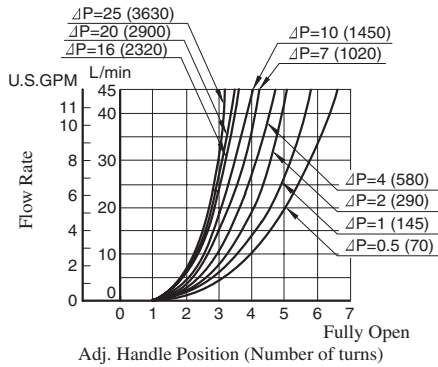
Note: For dimensions of the valve mounting surface, see the dimensional drawing (P.502) of the sub-plate used together.

Metred Flow vs Adjustment Handle Revolutions

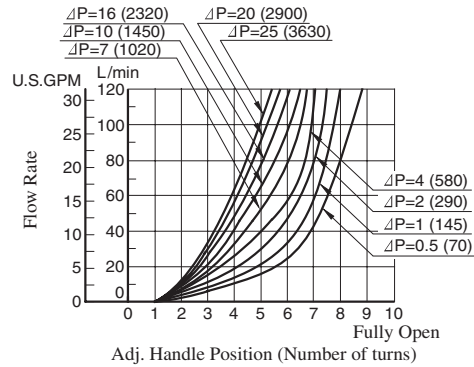
Hydraulic Fluid: Viscosity 30 mm²/s (141 SSU), Specific Gravity 0.850

ΔP : Differential Pressure MPa (PSI)

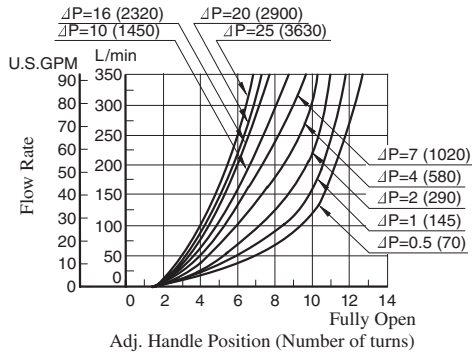
SRT SRG-03, SRCT SRCG-03



SRT SRG-06, SRCT SRCG-06



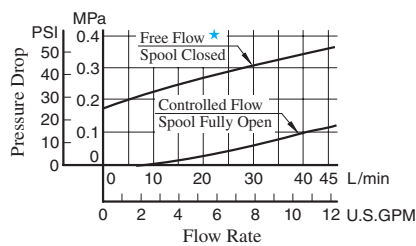
SRT SRG-10, SRCT SRCG-10



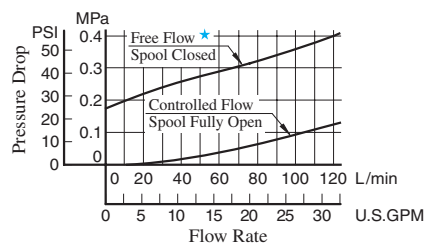
Pressure Drop

Hydraulic Fluid: Viscosity 30 mm²/s (141 SSU), Specific Gravity 0.850

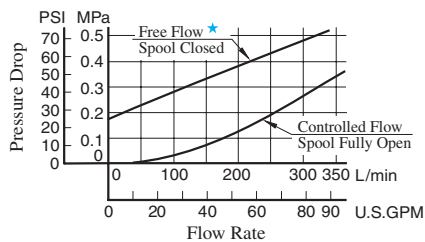
SRT SRG-03, SRCT SRCG-03



SRT SRG-06, SRCT SRCG-06



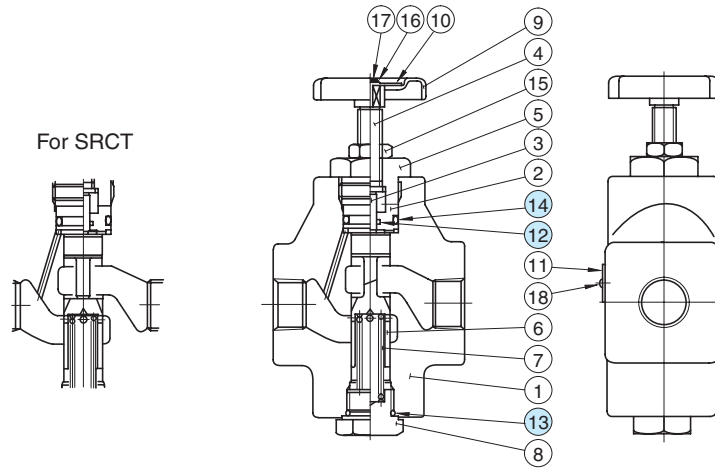
SRT SRG-10, SRCT SRCG-10



★ Applicable only for one way restrictor (Model No. SRC*)

■ List of seals

SRT/SRCT-03-50/5080/5090
 SRT/SRCT-06-50/5080/5090
 SRT/SRCT-10-50/5080/5090



● List of Seals

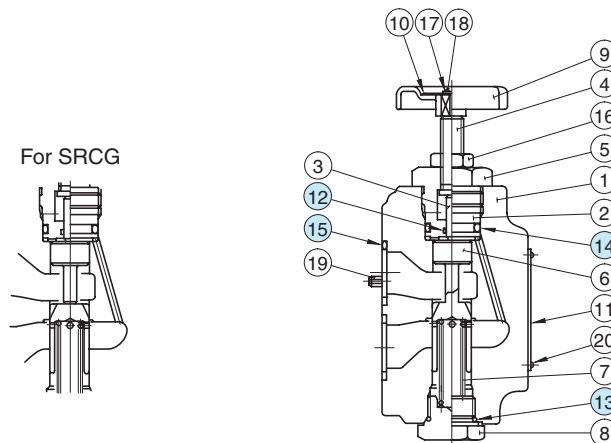
Item	Name of Parts	Part Numbers			Qty.
		SRT SRCT-03	SRT SRCT-06	SRT SRCT-10	
12	O-Ring	SO-NB-P7	SO-NB-P7	SO-NB-P7	1
13	O-Ring	SO-NB-P15	SO-NB-P21	SO-NB-P29	1
14	O-Ring	SO-NB-P20	SO-NB-P22.4	SO-NB-P36	1

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
SRT/SRCT-03	KS-SRT-03-50
SRT/SRCT-06	KS-SRT-06-50
SRT/SRCT-10	KS-SRT-10-50

Note: When ordering the seals, please specify the seal kit number from the table right.

SRG/SRCG-03-50/5090
 SRG/SRCG-06-50/5090
 SRG/SRCG-10-50/5090



● List of Seals

Item	Name of Parts	Part Numbers			Qty.
		SRG SRCG-03	SRG SRCG-06	SRG SRCG-10	
12	O-Ring	SO-NB-P7	SO-NB-P7	SO-NB-P7	1
13	O-Ring	SO-NB-P15	SO-NB-P21	SO-NB-P29	1
14	O-Ring	SO-NB-P20	SO-NB-P22.4	SO-NB-P36	1
15	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	2

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
SRG/SRCG-03	KS-SRG-03-50
SRG/SRCG-06	KS-SRG-06-50
SRG/SRCG-10	KS-SRG-10-50

Note: When ordering the seals, please specify the seal kit number from the table right.

Throttle Modules / Throttle and Check Modules

Used as pilot choke valves for solenoid controlled pilot operated directional valves and pilot operated directional valves.



Graphic Symbols

Valve Size	Throttle Modules		Throttle and Check Modules	
	Standard Type	With Check	Standard (Metre-out) Type	Metre-in Type
01	<p>Solenoid Operated Directional Valve</p> <p>P A B T</p> <p>TC1G-01</p>	<p>P A B T</p>	<p>Solenoid Operated Directional Valve</p> <p>P A B T</p> <p>TC2G-01</p>	<p>P A B T</p>
03	<p>Solenoid Operated Directional Valve</p> <p>P A B T</p> <p>TC1G-03</p>	<p>Solenoid Operated Directional Valve</p> <p>P A B T</p> <p>TC1G-03-C</p>	<p>Solenoid Operated Directional Valve</p> <p>P A B T</p> <p>TC2G-03</p>	<p>Solenoid Operated Directional Valve</p> <p>P A B T</p> <p>TC2G-03-A</p>

Specifications

Model Numbers	Nominal Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Approx. Mass kg (lbs.)
TC1G-01-40/4090	30 (7.9)	25 (3630)	0.6 (1.3)
TC2G-01-40/4090			0.65 (1.4)
TC1G-03-*-40/4090	80 (21.1)		1.6 (3.5)
TC2G-03-*-40/4090			1.8 (4.0)

Model Number Designation

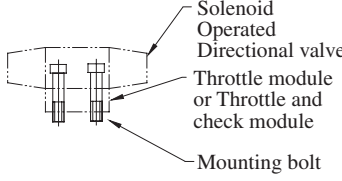
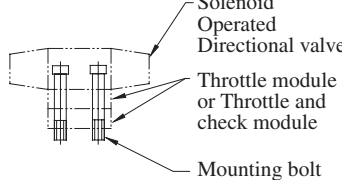
F-	TC1	G	-03	-C	-40	*
Special Seals	Series Number	Type of Mounting	Valve Size	Valve Type	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	TC1: Throttle Module	G: Gasket Mounting	01	None: Std. Type	40	None: Japanese Std. "JIS" and European Design Std. 90: N. American Design Std.
	TC2: Throttle and Check Module			None: Std. (Metre-Out) Type		
	TC1: Throttle Module	G: Gasket Mounting	03	None: Std. Type C: With Check Valve	40	
	TC2: Throttle and Check Module			None: Std. (Metre-Out) Type A: Metre-in Type		

D
Throttle Modules
Throttle and Check Modules

Attachment

Mounting Bolts

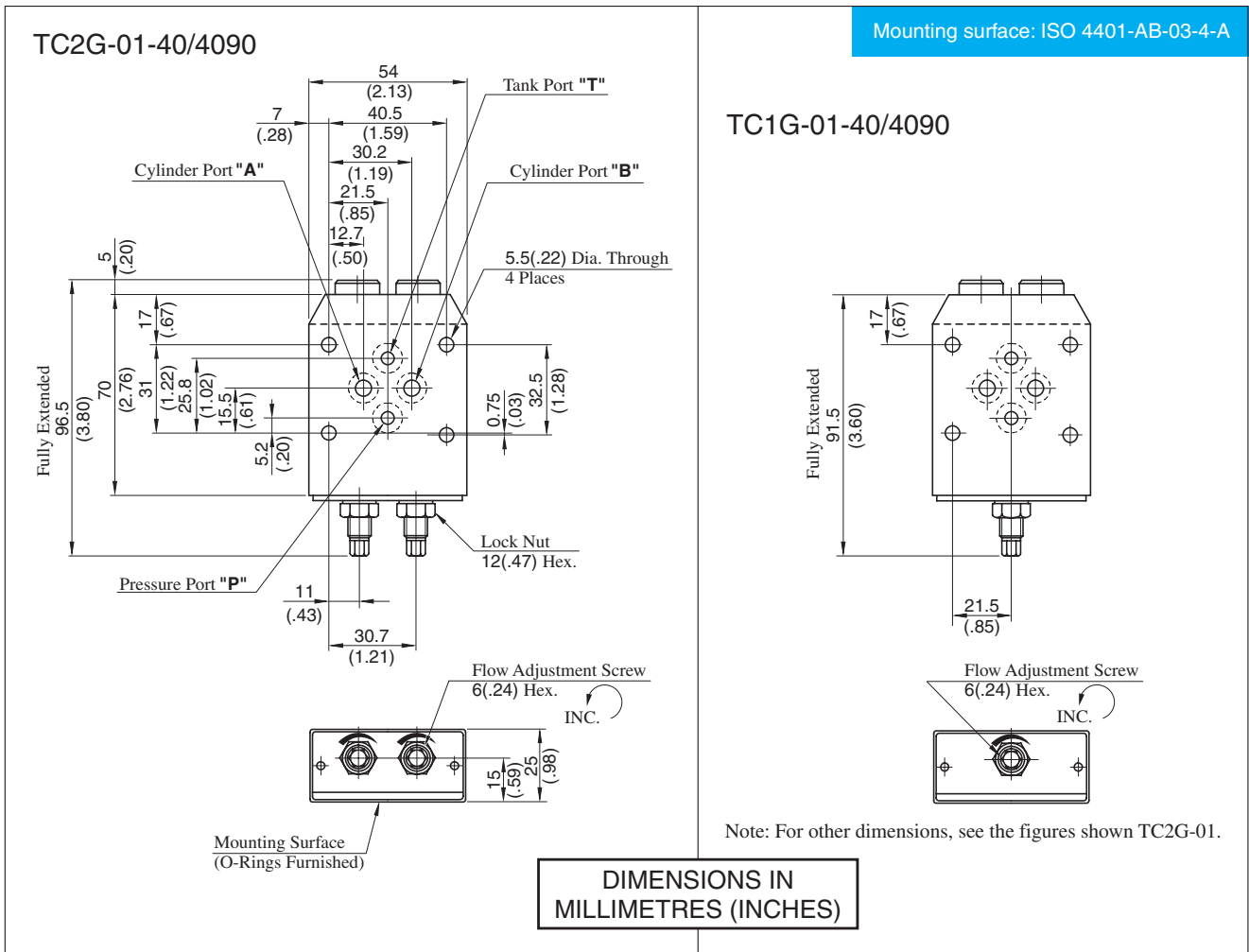
If mounting bolts are necessary, order suitable ones selected from the table below. If mounting bolts from other companies are used, their strength must be 8.8 or up ISO standards.

Solenoid Operated Directional Valve	Valve Model Numbers	Socket Head Cap Screw		Qty.
		Japanese Std. "JIS" & European Design Std.	N. American Design Std.	
 <p>Solenoid Operated Directional valve Throttle module or Throttle and check module Mounting bolt</p>	TC*G-01	M5 × 70 Lg.	No. 10-24 UNC × 2-3/4 Lg.	4
	TC*G-03	M6 × 70 Lg.	1/4-20 UNC × 2-3/4 Lg.	4
 <p>Solenoid Operated Directional valve Throttle module or Throttle and check module Mounting bolt</p>	TC*G-01	M5 × 95 Lg.	No. 10-24 UNC × 3-3/4 Lg.	4
	TC*G-03	M6 × 100 Lg.	1/4-20 UNC × 4 Lg.	4

Instructions

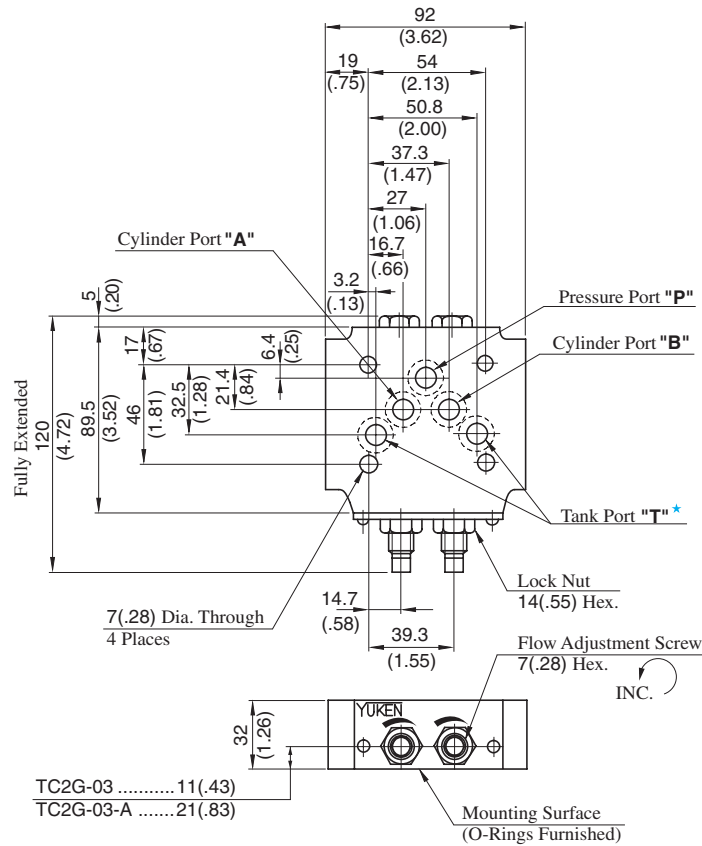
Flow adjustment

Slacken the lock nut and turn the flow adjustment screw clockwise caused the flow rate to decrease
After adjustment, be sure to tighten the lock nut.



TC2G-03-40/4090
TC2G-03-A-40/4090

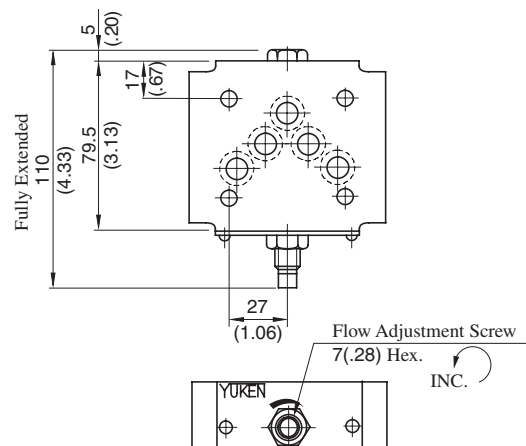
Mounting surface: ISO 4401-AC-05-4-A



★ With standard sub-plates, the left one of the two tank ports "T" is used but either one may be used.

DIMENSIONS IN
MILLIMETRES (INCHES)

TC1G-03-40/4090
TC1G-03-C-40/4090

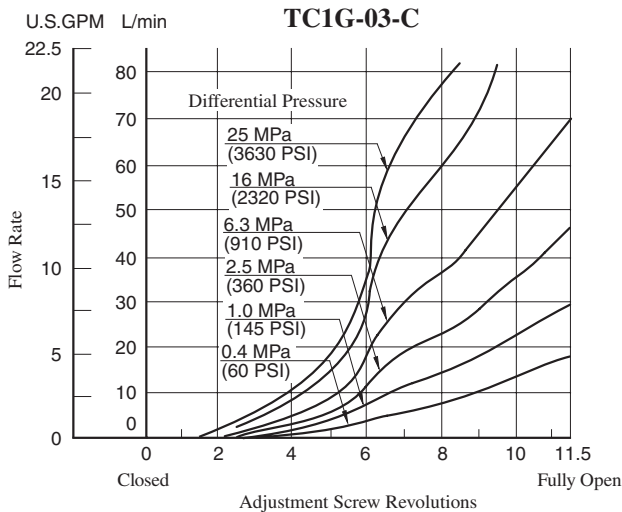
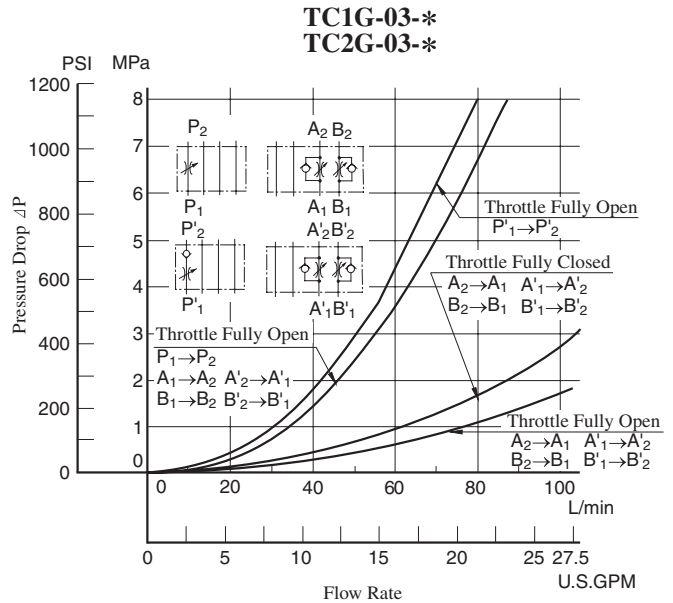
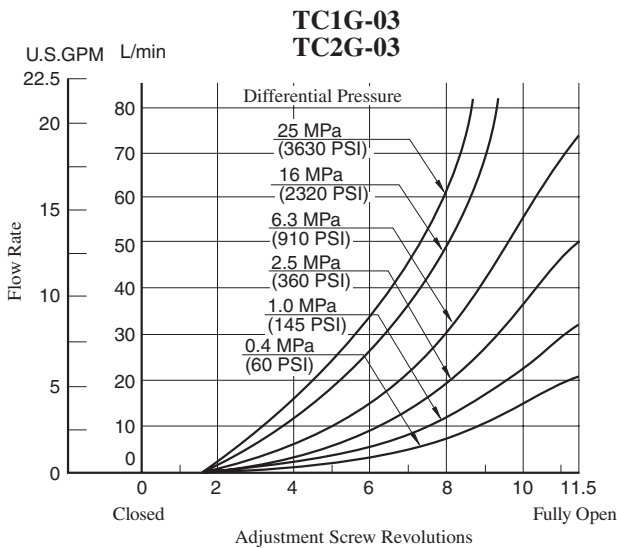
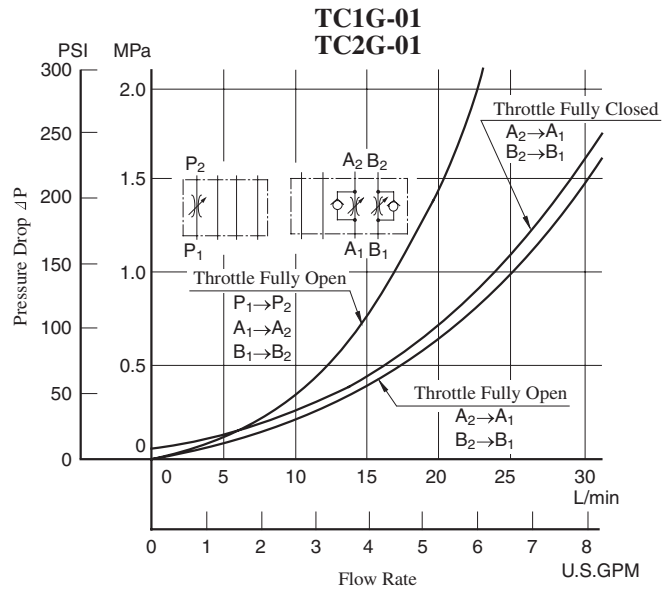
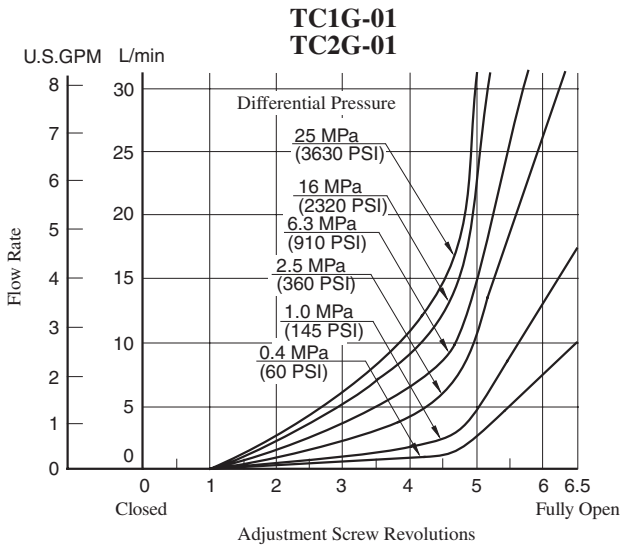


Note: For other dimensions, see the figures shown TC2G-03.

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU) , Specific Gravity 0.850

Metred Flow vs. Adjustment Revolutions

Pressure Drop



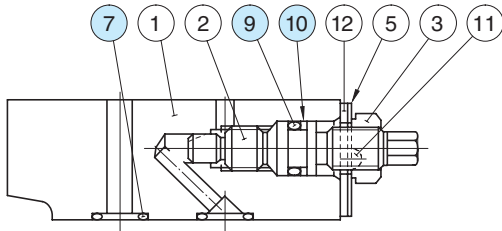
- For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
	SSU		77	98	141	186	232	278	324	371	417
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

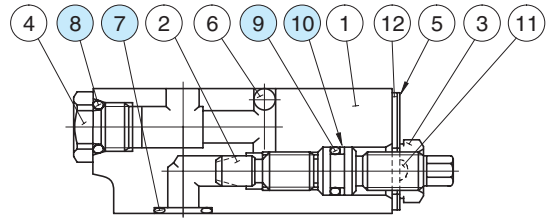
- For any other specific gravity (G'), the pressure drop ($\Delta P'$) may be obtained from the formula below.
 $\Delta P' = \Delta P (G'/0.850)$

List of Seals

TC1G-01-40/4090
TC1G-03-*-40/4090



TC1G-01



TC1G-03

List of Seals

Item	Name of Parts	Part Numbers		Qty.
		TC1G-01	TC1G-03	
7	O-Ring	SO-NB-P9	SO-NB-A014	5★
8	O-Ring	————	SO-NB-P10	1
9	O-Ring	SO-NA-P7	SO-NA-P9	1
10	Back Up Ring	SO-BB-P7	SO-BB-P9	1

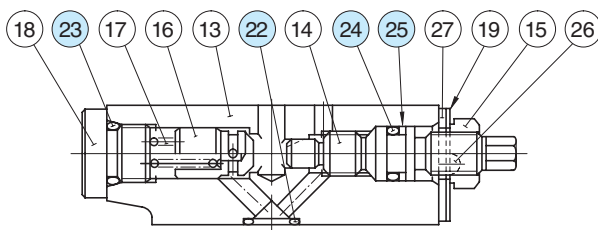
★ With TC1G-01, four O-Rings, Item ⑦, are used.

Note: When ordering the seals, please specify the seal kit number from the table right

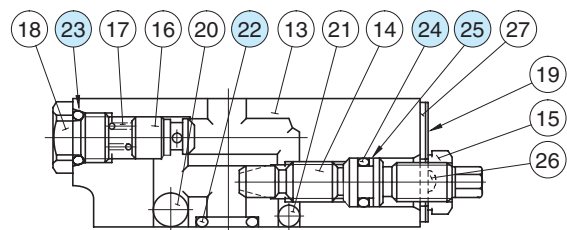
List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
TC1G-01	KS-TC1G-01-40
TC1G-03	KS-TC1G-03-40
TC1G-03-C	

TC2G-01-40/4090
TC2G-03-*-40/4090



TC2G-01



TC2G-03

List of Seals

Item	Name of Parts	Part Numbers		Qty.
		TC2G-01	TC2G-03	
22	O-Ring	SO-NB-P9	SO-NB-A014	5★
23	O-Ring	SO-NB-P10	SO-NB-P10	2
24	O-Ring	SO-NA-P7	SO-NA-P9	2
25	Back Up Ring	SO-BB-P7	SO-BB-P9	2

★ With TC2G-01, four O-Rings, Item ②, are used.

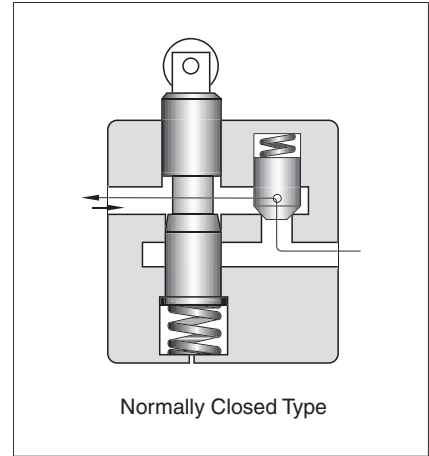
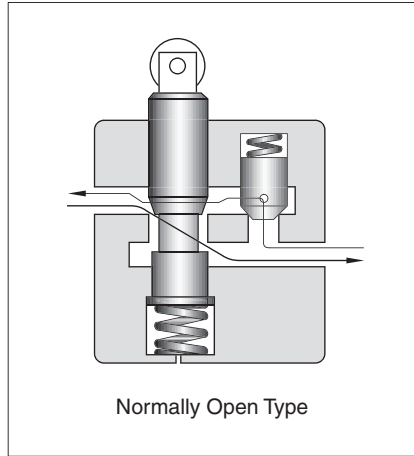
Note: When ordering the seals, please specify the seal kit number from the table right

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
TC2G-01	KS-TC2G-01-40
TC2G-03	KS-TC2G-03-40
TC2G-03-A	

Deceleration Valves / Deceleration and Check Valves

These valves are available either with or without an integral check valve which allows free reverse flow. Flow rate through the valve is regulated by the movement of the spool, which is operated by a cam. When the spool is depressed, the flow is decreased in Normally Open type valves and increased in Normally Closed type valves. Their principal use is to control the speed of actuators in machine tools and similar applications.



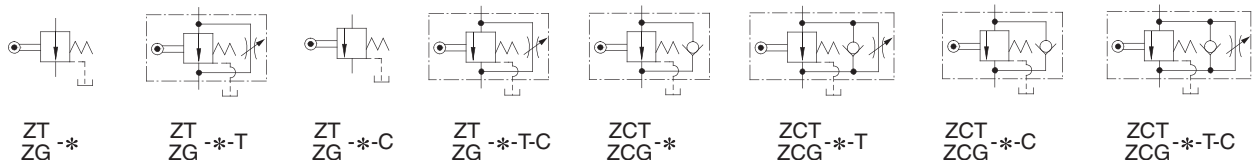
Specifications

Model Numbers		Max. Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Approx. Mass kg (lbs.)	
Threaded Connection	Sub-plate Mounting			Z*T	Z*G
ZT/ZCT-03-**-22/2280/2290	ZG/ZCG-03-**-22/2290	30 (7.9)	21 (3050)	4.3 (9.5)	4.3 (9.5)
ZT/ZCT-06-**-22/2280/2290	ZG/ZCG-06-**-22/2290	80 (21.1)		8.7 (19.2)	8.7 (19.2)
ZT/ZCT-10-**-22/2280/2290	ZG/ZCG-10-**-22/2290	200 (52.8)		17 (37.5)	17 (37.5)

Model Number Designation

F-	ZC	T	-03	-T	-C	-22	*		
Special Seals	Series Number	Type of Mounting	Valve Size	With Adjustable Needle Valve for By-Pass Line	Spool Type	Design Number	Design Standards		
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	Z: Deceleration Valve	T: Threaded Connection	03	T: With Adjustable Needle Valve (Omit if not required)	None: Normally Open Type	22	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std.		
			06			22			
			10			22			
		G: Sub-plate Mounting	03			C: Normally Closed Type	22	None: Japanese Std. "JIS" & European Design Std. 90: N. American Design Std.	
			06				22		
			10				22		
	ZC: Deceleration and Check Valve	T: Threaded Connection	T: With Adjustable Needle Valve (Omit if not required)	03	None: Normally Open Type	C: Normally Closed Type	22	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std.	
				06			22		
				10			22		
		G: Sub-plate Mounting		03			C: Normally Closed Type	22	None: Japanese Std. "JIS" & European Design Std. 90: N. American Design Std.
				06				22	
				10				22	

Graphic Symbols



Instructions

Force to Depress Spool

Model Numbers	Force N (lbs.)
ZT/ZG ZCT/ZCG-03	150 (337)
ZT/ZG ZCT/ZCG-06	270 (607)
ZT/ZG ZCT/ZCG-10	400 (899)

Total Leakage at Spool Fully Closed [Viscosity:20 mm²/s (98 SSU)]

Model Numbers	Total Leakage cm ³ /min (cu.in./min)				
	Pressure MPa (PSI)				
	1 (145)	2 (290)	5 (730)	10 (1450)	21 (3050)
ZT/ZG ZCT/ZCG-03	9 (.55)	18 (1.10)	44 (2.7)	88 (5.4)	185 (11.3)
ZT/ZG ZCT/ZCG-06	9 (.55)	17 (1.04)	43 (2.6)	86 (5.2)	180 (11.0)
ZT/ZG ZCT/ZCG-10	10 (.61)	20 (1.22)	49 (3.0)	98 (6.0)	205 (12.5)

Drain Port Back Pressure

Limit the drain port back pressure to 0.1 MPa (15 PSI).

In addition, connect the drain pipe independently and directly to the tank.

Attachment

Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Std. "JIS" and European Design Std.	N. American Design Std.	
ZG/ZCG-03	M8 × 75 Lg.	5/16-18 UNC × 3 Lg.	4
ZG/ZCG-06	M10 × 100 Lg.	3/8-16 UNC × 4 Lg.	4
ZG/ZCG-10	M12 × 120 Lg.	1/2-13 UNC × 4-3/4 Lg.	4

Option

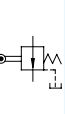
Bypass throttle valves

To allow a metered flow between ports even when the flow is stopped by the spool.

Sub-plate

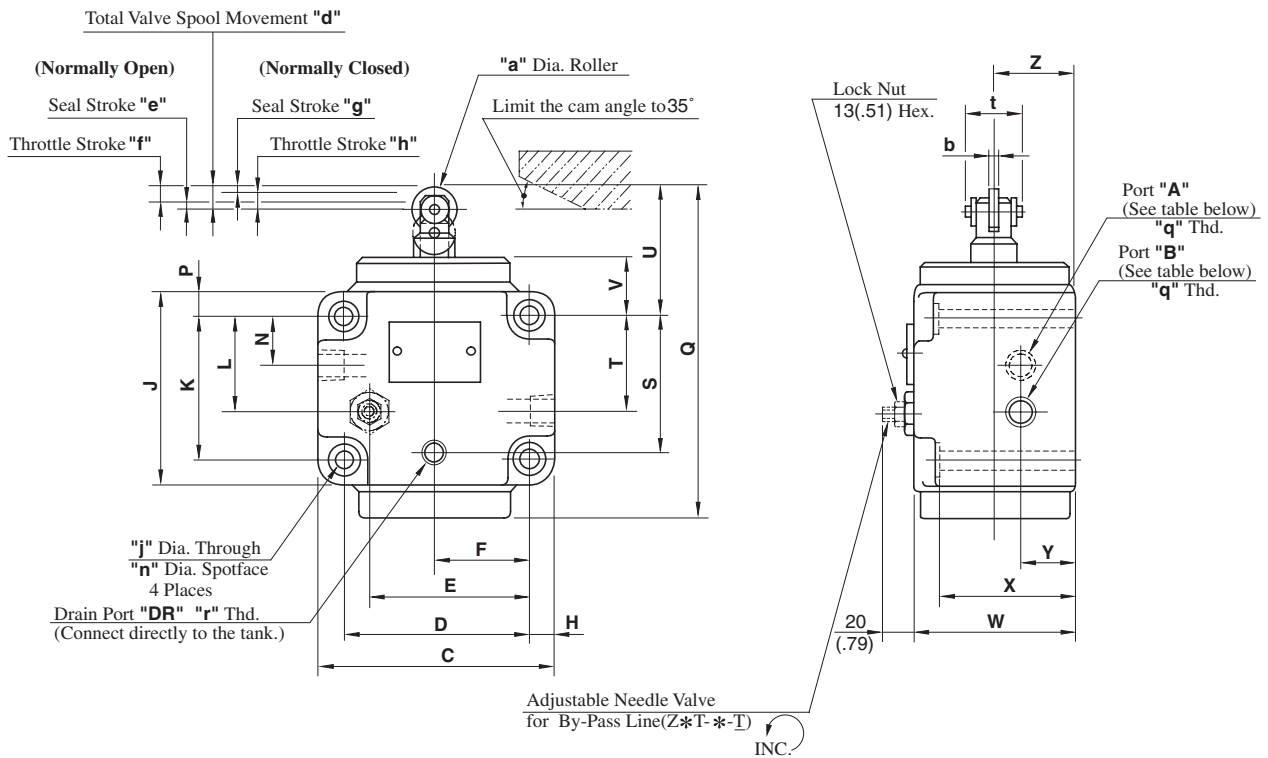
Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N.American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model No.	Thread Size	Sub-plate Model No.	Thread Size	Sub-plate Model No.	Thread Size	
ZG/ZCG-03	ZGM-03-21	Rc 3/8	ZGM-03-2180	3/8 BSP.F	ZGM-03-2190	3/8 NPT	2 (4.4)
ZG/ZCG-06	ZGM-06-21	Rc 3/4	ZGM-06-2180	3/4 BSP.F	ZGM-06-2190	3/4 NPT	3.8 (8.4)
ZG/ZCG-10	ZGM-10-21	Rc 1-1/4	ZGM-10-2180	1-1/4 BSP.F	ZGM-10-2190	1-1/4 NPT	9 (19.8)

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.



ZT/ZCT-03-*-22/2280/2290
 ZT/ZCT-06-*-22/2280/2290
 ZT/ZCT-10-*-22/2280/2290

**DIMENSIONS IN
 MILLIMETRES (INCHES)**



Model Numbers	Port "A"	Port "B"
ZT-*	Controlled flow inlet	Controlled flow outlet
ZCT-*	Controlled flow inlet or Reversed free flow outlet	Controlled flow outlet or Reversed free flow inlet

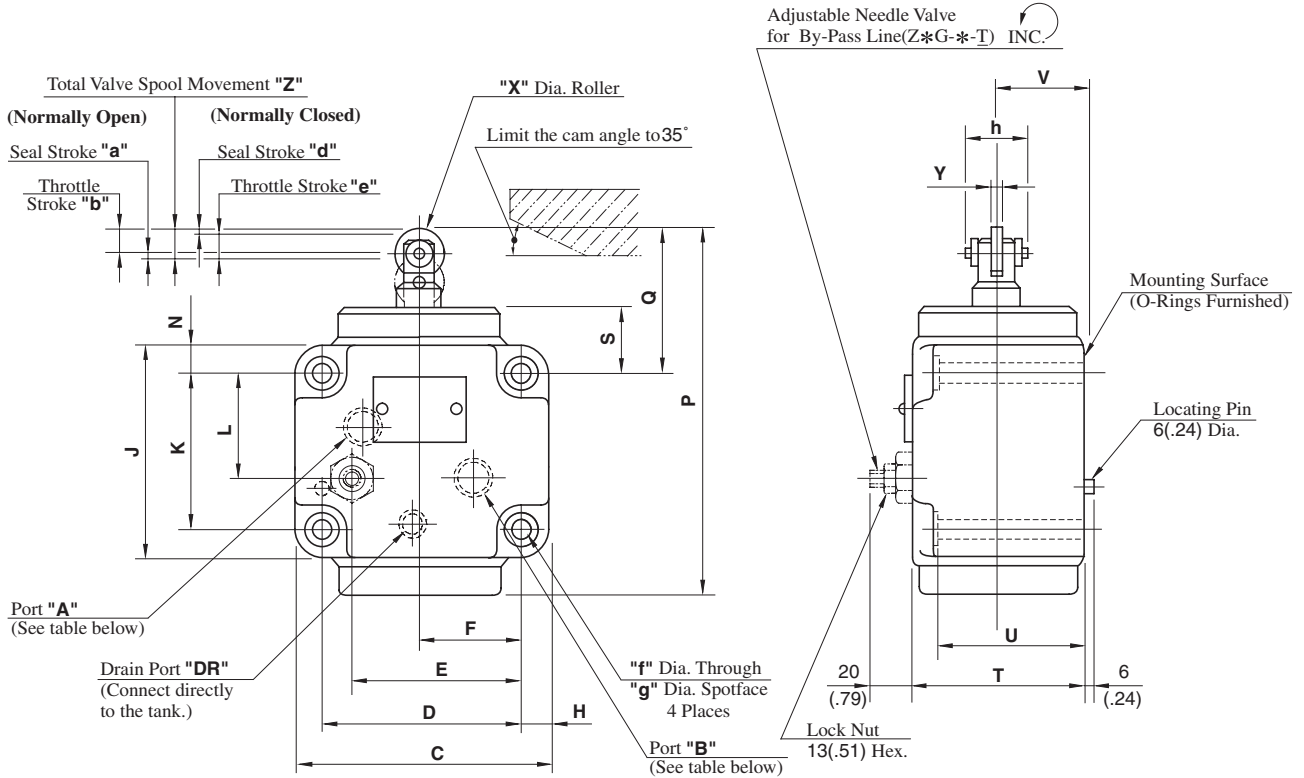
Model Numbers	"q" Thd.	"r" Thd.
ZT/ZCT-03-*-22	Rc 3/8	Rc 1/4
ZT/ZCT-03-*-2280	3/8 BSP.F	1/4 BSP.F
ZT/ZCT-03-*-2290	3/8 NPT	1/4 NPT
ZT/ZCT-06-*-22	Rc 3/4	Rc 1/4
ZT/ZCT-06-*-2280	3/4 BSP.F	1/4 BSP.F
ZT/ZCT-06-*-2290	3/4 NPT	1/4 NPT
ZT/ZCT-10-*-22	Rc 1-1/4	Rc 1/4
ZT/ZCT-10-*-2280	1-1/4 BSP.F	1/4 BSP.F
ZT/ZCT-10-*-2290	1-1/4 NPT	1/4 NPT

Model Numbers	Dimensions mm (Inches)															
	C	D	E	F	H	J	K	L	N	P	Q	S	T	U	V	W
ZT/ZCT-03	102 (4.02)	80 (3.15)	66 (2.60)	40 (1.57)	11 (.43)	82 (3.23)	60 (2.36)	41 (1.61)	20 (.79)	11 (.43)	141 (5.55)	58 (2.28)	40 (1.57)	56 (2.20)	25 (.98)	70 (2.76)
ZT/ZCT-06	120 (4.72)	98 (3.86)	82 (3.23)	49 (1.93)	11 (.43)	106 (4.17)	84 (3.31)	57 (2.24)	32 (1.26)	11 (.43)	176 (6.93)	81 (3.19)	57 (2.24)	65 (2.56)	27 (1.06)	95 (3.74)
ZT/ZCT-10	160 (6.30)	132 (5.20)	103 (4.06)	66 (2.60)	14 (.55)	140 (5.51)	112 (4.41)	75 (2.95)	40 (1.57)	14 (.55)	224 (8.82)	106 (4.17)	75 (2.95)	80 (3.15)	32 (1.26)	110 (4.33)

Model Numbers	Dimensions mm (Inches)												
	X	Y	Z	a	b	d	e	f	g	h	j	n	t
ZT/ZCT-03	60 (2.36)	25 (.98)	35 (1.38)	18 (.71)	6 (.24)	10 (.39)	2 (.08)	8 (.31)	2 (.08)	8 (.31)	8.8 (.35)	14 (.55)	24.5 (.96)
ZT/ZCT-06	85 (3.35)	32 (1.26)	50 (1.97)	22 (.87)	8 (.31)	13 (.51)	3 (.12)	10 (.39)	3 (.12)	10 (.39)	11 (.43)	17.5 (.69)	29 (1.14)
ZT/ZCT-10	96 (3.78)	40 (1.57)	55 (2.17)	28 (1.10)	10 (.39)	18 (.71)	3 (.12)	15 (.59)	3 (.12)	15 (.59)	13.5 (.53)	21 (.83)	34 (1.34)

ZG/ZCG-03-*-22/2290
 ZG/ZCG-06-*-22/2290
 ZG/ZCG-10-*-22/2290

DIMENSIONS IN
 MILLIMETRES (INCHES)



Model Numbers	Port "A"	Port "B"
ZG-*	Controlled flow inlet	Controlled flow outlet
ZCG-*	Controlled flow inlet or Reversed free flow outlet	Controlled flow outlet or Reversed free flow inlet

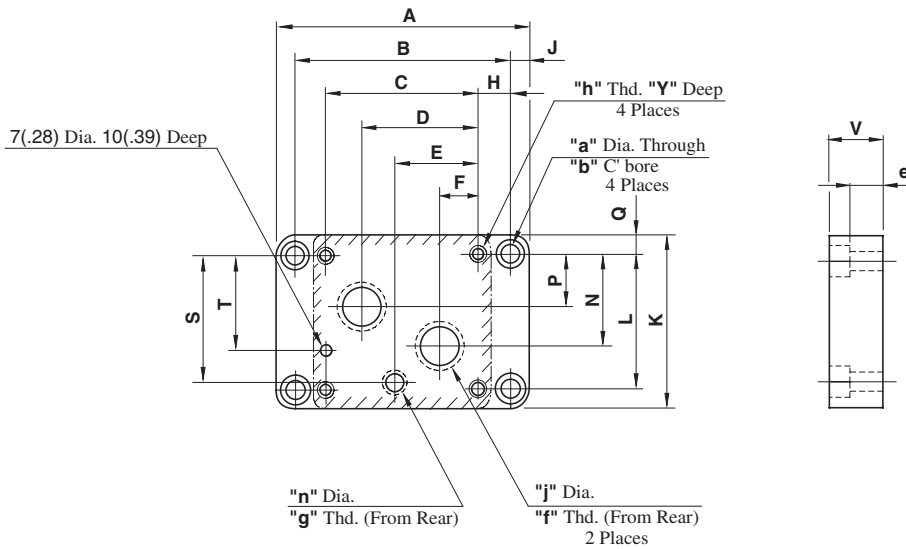
Model Numbers	Dimensions mm (Inches)												
	C	D	E	F	H	J	K	L	N	P	Q	S	T
ZG/ZCG-03	102 (4.02)	80 (3.15)	66 (2.60)	40 (1.57)	11 (.43)	82 (3.23)	60 (2.36)	41 (1.61)	11 (.43)	141 (5.55)	56 (2.20)	25 (.98)	70 (2.76)
ZG/ZCG-06	120 (4.72)	98 (3.86)	82 (3.23)	49 (1.93)	11 (.43)	106 (4.17)	84 (3.31)	57 (2.24)	11 (.43)	176 (6.93)	65 (2.56)	27 (1.06)	95 (3.74)
ZG/ZCG-10	160 (6.30)	132 (5.20)	103 (4.06)	66 (2.60)	14 (.55)	140 (5.51)	112 (4.41)	75 (2.95)	14 (.55)	224 (8.82)	80 (3.15)	32 (1.26)	110 (4.33)

Model Numbers	Dimensions mm (Inches)											
	U	V	X	Y	Z	a	b	d	e	f	g	h
ZG/ZCG-03	60 (2.36)	35 (1.38)	18 (.71)	6 (.24)	10 (.39)	2 (.08)	8 (.31)	2 (.08)	8 (.31)	8.8 (.35)	14 (.55)	24.5 (.96)
ZG/ZCG-06	85 (3.35)	50 (1.97)	22 (.87)	8 (.31)	13 (.51)	3 (.12)	10 (.39)	3 (.12)	10 (.39)	11 (.43)	17.5 (.69)	29 (1.14)
ZG/ZCG-10	96 (3.78)	55 (2.17)	28 (1.10)	10 (.39)	18 (.71)	3 (.12)	15 (.59)	3 (.12)	15 (.59)	13.5 (.53)	21 (.83)	34 (1.34)

D
 Deceleration Valves
 Deceleration and Check Valves

ZGM-03-21/2180/2190
 ZGM-06-21/2180/2190
 ZGM-10-21/2180/2190

**DIMENSIONS IN
 MILLIMETRES (INCHES)**



Model Numbers	Thd. Size			mm (Inches)	
	"f" Thd.	"g" Thd.	"h" Thd.	j	n
ZGM-03-21	Rc 3/8	Rc 1/4	M8	14 (.55)	6.2 (.24)
ZGM-03-2180	3/8 BSPF	1/4 BSPF		15 (.59)	
ZGM-03-2190	3/8 NPT	1/4 NPT		14 (.55)	
ZGM-06-21	Rc 3/4	Rc 1/4	M10	23 (.91)	11 (.43)
ZGM-06-2180	3/4 BSPF	1/4 BSPF		24.5 (.96)	
ZGM-06-2190	3/4 NPT	1/4 NPT		23 (.91)	
ZGM-10-21	Rc 1-1/4	Rc 1/4	M12	29 (1.14)	11 (.43)
ZGM-10-2180	1-1/4 BSPF	1/4 BSPF			11.7 (.46)
ZGM-10-2190	1-1/4 NPT	1/4 NPT			11 (.43)

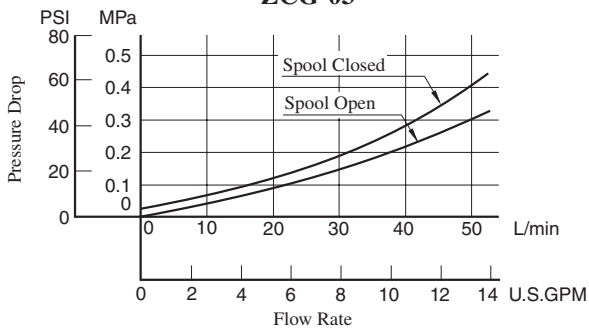
Model Numbers	Dimensions mm (Inches)													
	A	B	C	D	E	F	H	J	K	L	N	P	Q	S
ZGM-03	146 (5.75)	124 (4.88)	80 (3.15)	60 (2.36)	42 (1.65)	20 (.79)	22 (.87)	11 (.43)	85 (3.35)	60 (2.36)	40 (1.57)	20 (.79)	12.5 (.49)	58 (2.28)
ZGM-06	160 (6.30)	138 (5.43)	98 (3.86)	74 (2.91)	53 (2.09)	24 (.94)	20 (.79)	11 (.43)	108 (4.25)	84 (3.31)	57 (2.24)	32 (1.26)	12 (.47)	81 (3.19)
ZGM-10	218 (8.58)	190 (7.48)	132 (5.20)	98 (3.86)	70 (2.76)	34 (1.34)	29 (1.14)	14 (.55)	140 (5.51)	112 (4.41)	75 (2.95)	40 (1.57)	14 (.55)	106 (4.17)

Model Numbers	Dimensions mm (Inches)					
	T	V	Y	a	b	e
ZGM-03	44 (1.73)	26 (1.02)	18 (.71)	11 (.43)	17.5 (.69)	15.2 (.60)
ZGM-06	60 (2.36)	35 (1.38)	18 (.71)	11 (.43)	17.5 (.69)	24.2 (.95)
ZGM-10	87 (3.43)	45 (1.77)	25 (.98)	14 (.55)	21 (.83)	31.5 (1.24)

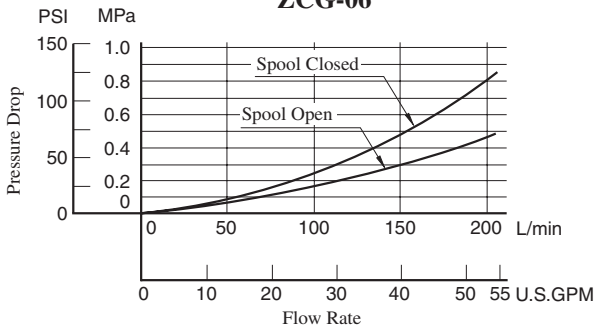
Hydraulic Fluid: Viscosity 20 mm²/s (98 SSU), Specific Gravity 0.850

■ Pressure Drop for Reversed Free Flow

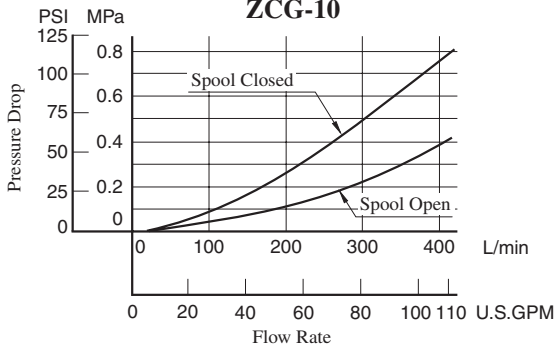
ZCT-03
ZCG-03



ZCT-06
ZCG-06

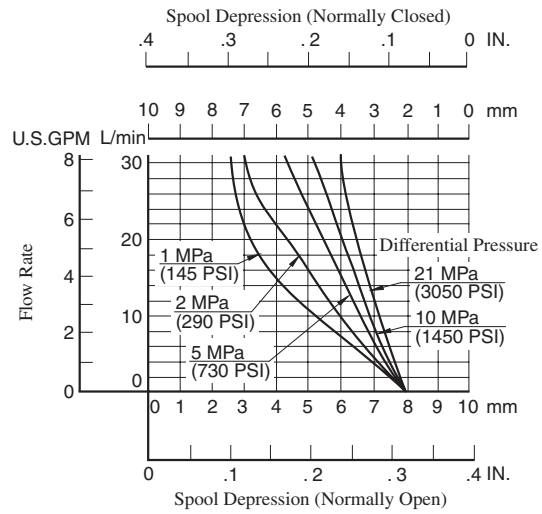


ZCT-10
ZCG-10

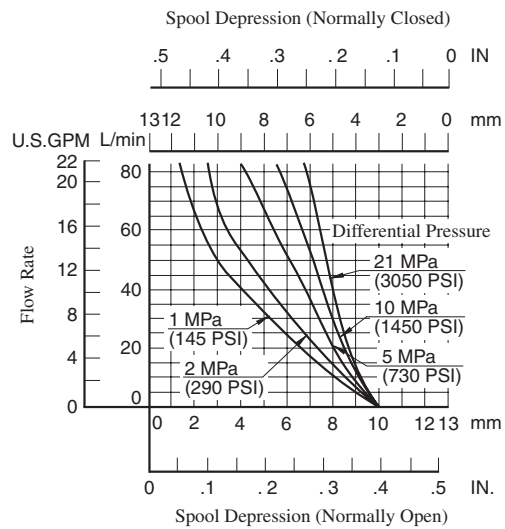


■ Metred Flow vs. Spool Depression

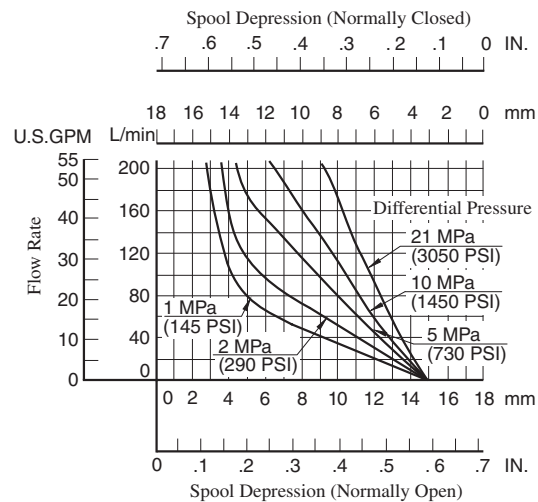
Z*T-03
Z*G-03



Z*T-06
Z*G-06

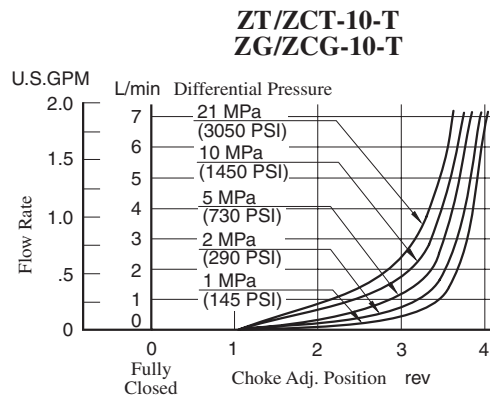
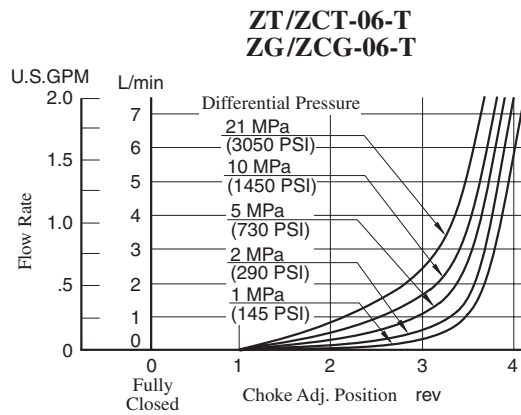
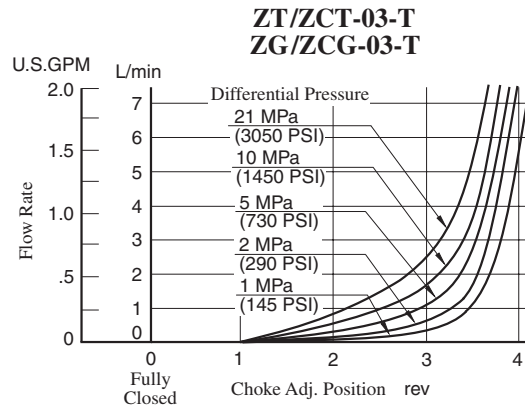


Z*T-10
Z*G-10



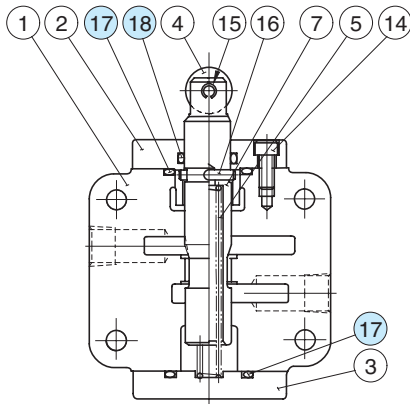
Hydraulic Fluid: Viscosity 20 mm²/s (98 SSU) , Specific Gravity 0.850

■ Metred Flow for Needle Valve

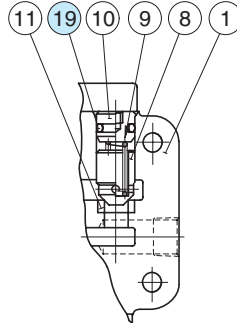


List of Seals

ZT/ZCT-03-*-22/2280/2290
 ZT/ZCT-06-*-22/2280/2290
 ZT/ZCT-10-*-22/2280/2290

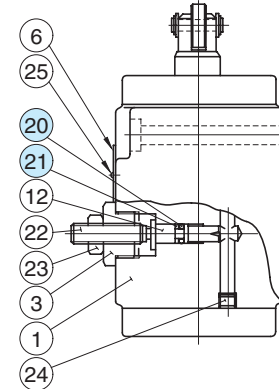


With Check Valve
(ZCT-*)



With Adjustable Needle Valve
for By-Pass Line

(ZT
ZCT-*-T)



List of Seals

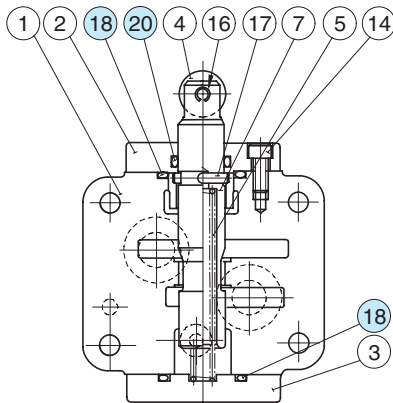
Item	Name of Parts	Part Numbers			Qty.
		ZT ZCT-03	ZT ZCT-06	ZT ZCT-10	
17	O-Ring	SO-NB-P32	SO-NB-P36	SO-NB-P49	2
18	O-Ring	SO-NA-P20	SO-NA-P25	SO-NA-P32	1
19	O-Ring	SO-NB-P12	SO-NB-P18	SO-NB-P22A	1
20	O-Ring	SO-NA-P5	SO-NA-P5	SO-NA-P5	1
21	Back Up Ring	SO-BB-P5	SO-BB-P5	SO-BB-P5	1

Note: When ordering the seals, please specify the seal kit number from the table right.

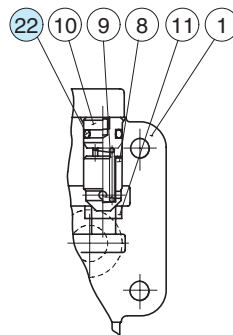
List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
ZT-03	KS-ZT-03-22
ZT-06	KS-ZT-06-22
ZT-10	KS-ZT-10-22
ZCT-03	KS-ZCT-03-22
ZCT-06	KS-ZCT-06-22
ZCT-10	KS-ZCT-10-22

ZG/ZCG-03-*-22/2290
 ZG/ZCG-06-*-22/2290
 ZG/ZCG-10-*-22/2290

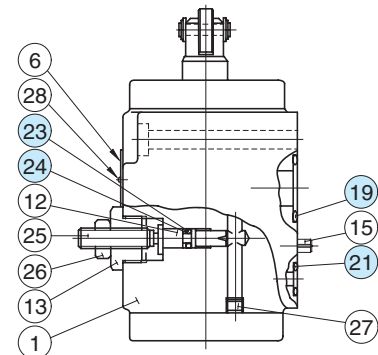


With Check Valve
(ZCG-*)



With Adjustable Needle Valve
for By-Pass Line

(ZG
ZCG-*-T)



List of Seals

Item	Name of Parts	Part Numbers			Qty.
		ZG ZCG-03	ZG ZCG-06	ZG ZCG-10	
18	O-Ring	SO-NB-P32	SO-NB-P36	SO-NB-P49	2
19	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	2
20	O-Ring	SO-NA-P20	SO-NA-P25	SO-NA-P32	1
21	O-Ring	SO-NB-P9	SO-NB-P14	SO-NB-P14	1
22	O-Ring	SO-NB-P12	SO-NB-P18	SO-NB-P22A	1
23	O-Ring	SO-NA-P5	SO-NA-P5	SO-NA-P5	1
24	Back Up Ring	SO-BB-P5	SO-BB-P5	SO-BB-P5	1

Note: When ordering the seals, please specify the seal kit number from the table right.

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
ZG-03	KS-ZG-03-22
ZG-06	KS-ZG-06-22
ZG-10	KS-ZG-10-22
ZCG-03	KS-ZCG-03-22
ZCG-06	KS-ZCG-06-22
ZCG-10	KS-ZCG-10-22

Feed Control Valves

These valves are the combination of flow control valve, a deceleration valve and a check valve and used mainly for controlling rapid traverse and feed cycles machine tools. Switching from rapid traverse to feed is made by a cam operation, and fine feed control is accomplished by dial rotation regardless of pressure and oil temperature variation. Rapid return is free of cam actuation.

Specifications

Model Numbers	Max. Flow ^{★1} L/min (U.S.GPM)	Metred Flow Range L/min (U.S.GPM)		Max. Reversed Free Flow L/min (U.S.GPM)	Max. Operat- ing Pressure MPa (PSI)	Approx. Mass kg (lbs.)
		Feed	Fine Feed			
UCF1G-01-4-A-*-11*	16 [12] (4.2 [3.2])	0.03-4 (.008-1.06)	—	20 (5.3)	14 (2030)	1.6 (3.5)
UCF1G-01-4-B-*-11*	12 [8] (3.2 [2.1])					
UCF1G-01-4-C-*-11*	8 [4] (2.1 [1.06])					
UCF1G-01-8-A-*-11*	20 [12] (5.3 [3.2])	0.03-8 (.008-2.1)	—	40 (10.6)	14 (2030)	2.6 (5.7)
UCF1G-01-8-B-*-11*	16 [8] (4.2 [2.1])					
UCF1G-01-8-C-*-11*	12 [4] (3.2 [1.06])					
UCF1G-03-4-*-10*	40 [40] (10.6 [10.6])	0.05-4 (.013-1.06)	—	40 (10.6)	14 (2030)	2.7 (6.0)
UCF1G-03-8-*-10*		0.05-8 (.013-2.1)	—			
UCF2G-03-4-*-10*	40 [40] (10.6 [10.6])	0.1-4 (.026-1.06)	0.05-4 (.013-1.06)	40 (10.6)	14 (2030)	6.5 (14.3)
UCF2G-03-8-*-10*		0.1-8 (.026-2.1)	0.05-4 (.013-1.06)			
UCF1G-04-30-30*	80 [40] (21.1 [10.6])	0.1-22 (.026-5.8)	—	80 (21.1)	14 (2030)	9.2 (20.3)
UCF2G-04-30-30*		0.1-22 (.026-5.8)	0.1-17 (.026-4.5)			

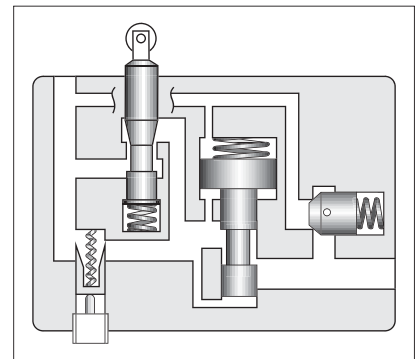
★1. The maximum flow rates are values with the deceleration valve and the flow control valve fully open. The values in [] are maximum flow rates with the deceleration valve fully open and the flow control valve fully closed.

★2. The values in { } are for pressures above 7 MPa (1020 PSI).

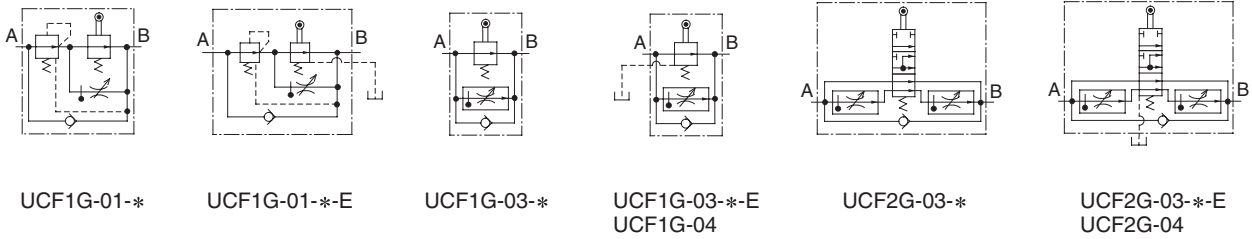
Model Number Designation

F-	UCF1	G	-01	-4	-A	-E	-11	*
Special Seals	Series Number	Type of Mounting	Valve Size	Nominal Metred Flow L/min (U.S.GPM)	Deceleration Valve Max. Flow L/min (U.S.GPM)	Drain Connection	Design Number	Design Standards
F-: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	UCF1: Single Feed Control	G: Gasket Mounting	01	4: 4 (1.06) 8: 8 (2.1)	A: 12 (3.2) B: 8 (2.1) C: 4 (1.06)	None: Internal Drain E: External Drain	11	Refer to ★
			03	4: 4 (1.06) 8: 8 (2.1)	—	10		
			04	30:30 (7.9)	—	30		
	UCF2: Double Feed Control	G: Gasket Mounting	03	4: 4 (1.06) 8: 8 (2.1)	—	None: Internal Drain E: External Drain	10	
04			30:30 (7.9)	—	None: External Drain	30		

★ Design Standards: None. Japanese Standard "JIS" and European Design Standard 90. N. American Design Standard



Graphic Symbols



Attachment

Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Std. "JIS" & European Design Std.	N. American Design Std.	
UCF1G-01	M6 × 55 Lg.	1/4-20 UNC × 2-1/4 Lg.	4
UCF1G-03	M6 × 55 Lg.	1/4-20 UNC × 2-1/4 Lg.	4
UCF2G-03	M6 × 55 Lg.	1/4-20 UNC × 2-1/4 Lg.	4
UCF1G-04	M10 × 70 Lg.	3/8-16 UNC × 2-3/4 Lg.	4
UCF2G-04	M10 × 70 Lg.	3/8-16 UNC × 2-3/4 Lg.	4

Instructions

Allowable pressures at controlled flow outlet

If internal drain types of UCF1G-01 or 03 or UCF2G-03 are used, use them in metre-out circuits in order to limit the valve outlet pressure to the valves shown below. In addition, external drain types can also be used in metre-in circuits.

Model Numbers		Allowable Outlet Port Back Pres. MPa (PSI)
Internal Drain Type	UCF1G-01-*	0.3 (44)
	UCF1G-03-*	
	UCF2G-03-*	
External Drain Type	UCF1G-01-*-E	14 (2030)
	UCF1G-03-*-E	
	UCF1G-04	
	UCF2G-03-*-E UCF2G-04	

Minimum required pressure difference

The minimum pressure differential between inlet and outlet port is required to obtain the optimum pressure compensation. It varies accordingly to the flow rate to be set. For details, refer to the performance curve.

Spool push down level

Limit the spool push down level within the allowable maximum stroke range shown in the installation drawings.

Allowable drain port back pressure

Limit to 0.1 MPa (15 PSI).

In addition, connect the drain pipe independently and directly to the tank. (This applies only to external drain types.)

Required Force for Spool Push Down

Model Numbers	Drain Type	Force N (lbs.)
UCF1G-01	Internal drain type	100 (22.5)
	External drain type	80 (18.0)
UCF1G-03	Internal drain type	170 (38.2)
	External drain type	90 (20.2)
UCF2G-03	Internal drain type	170 (38.2)
	External drain type	130 (29.2)
UCF1G-04	External drain type	170 (38.2)
UCF2G-04	External drain type	170 (38.2)

Note: The push down forces are with the maximum allowable pressure at the port concerned, which is controlled flow outlet "B" for internal drain types or the drain port for internal drain types.

Line filter

To carry out flow adjustments by as small degree as 2 L/min (.53 U. S. GPM) or less, be sure to use a line filter, 10 µm or less, near the valve inlet.

Flow adjustment

[UCF1G-01, UCF*G-03]

Loosen the locking screw and turn the flow adjustment dial clockwise for increase, and anti-clockwise for decrease.

The dial makes about four revolutions from zero to full flow and the valve opening is indicated on the revolution indicator.

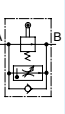
After flow adjustment, tighten the locking screw.

[UCF*G-04]

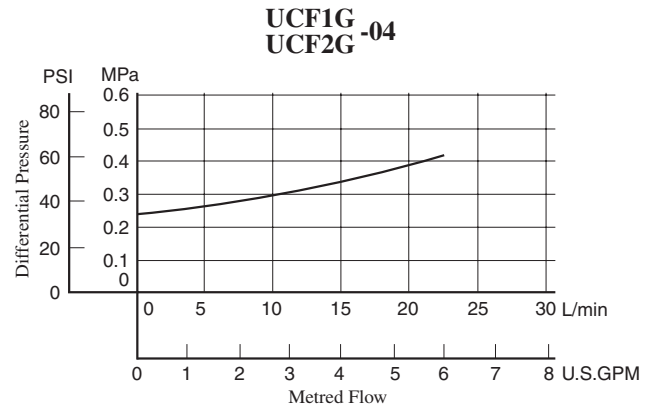
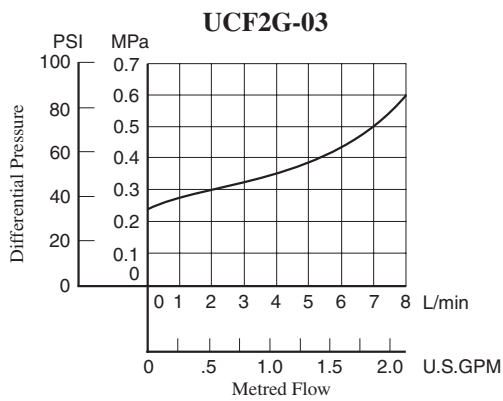
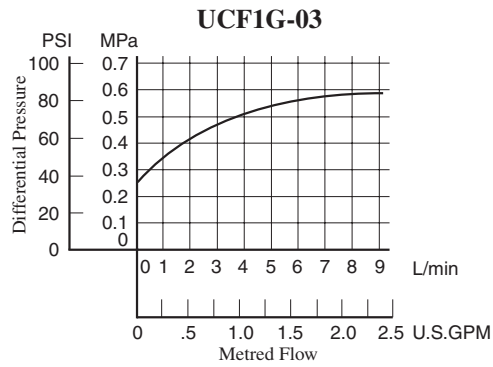
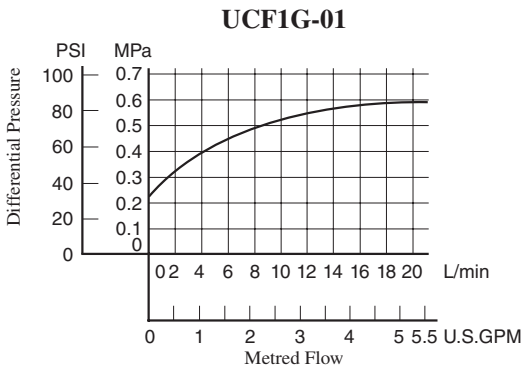
Loosen the locking screw and turn the flow adjustment handle clockwise to increase, and anti-clockwise to decrease.

Open condition is indicated in digital-scale in built-in revolution indicator.

After flow adjustment, tighten the locking screw.

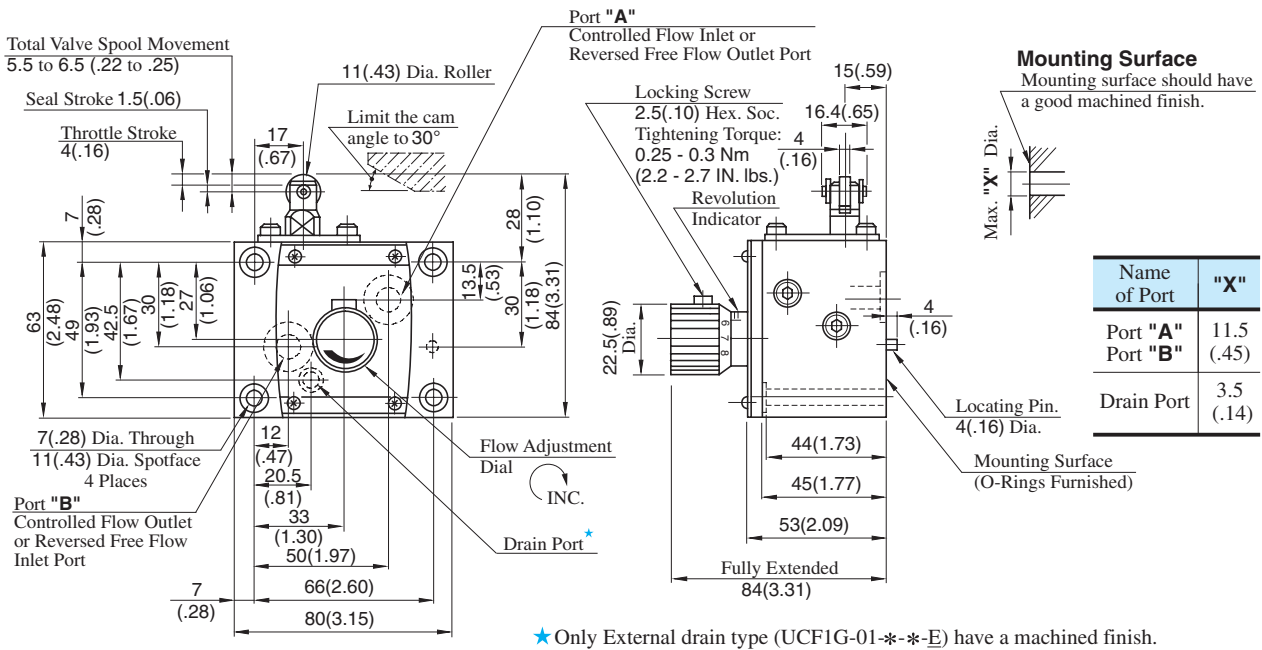


■ Min. Required Pressure Difference

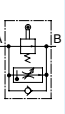


UCF1G-01-***-11/1190

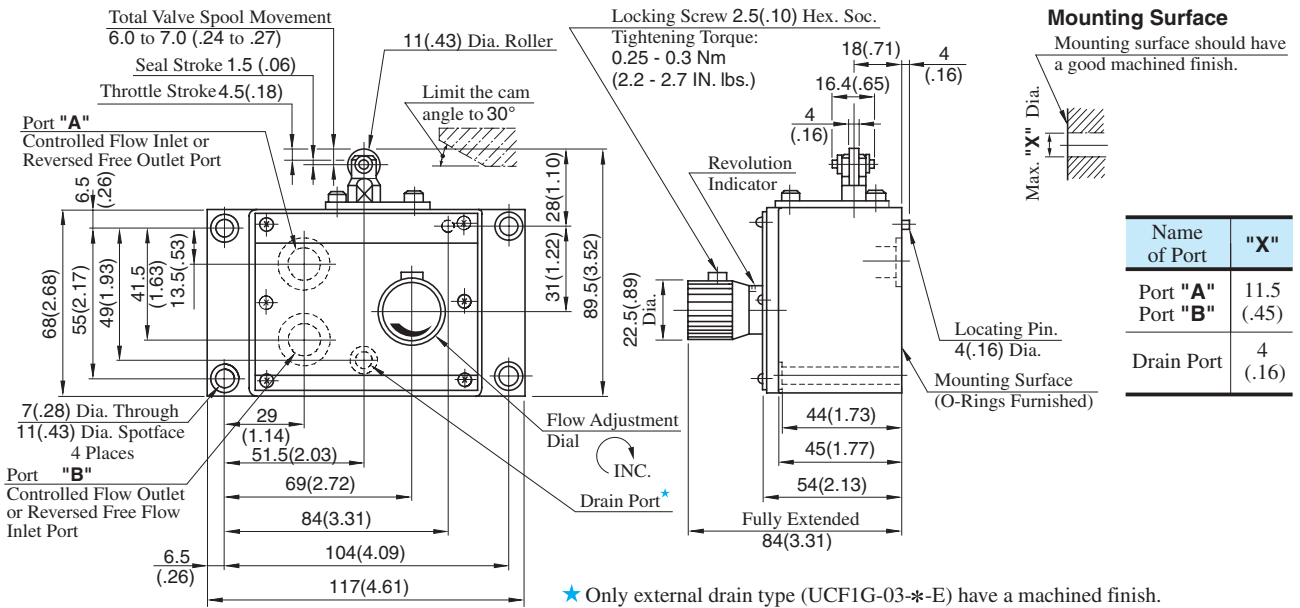
DIMENSIONS IN MILLIMETRES (INCHES)



Name of Port	"X"
Port "A"	11.5
Port "B"	(.45)
Drain Port	3.5 (.14)

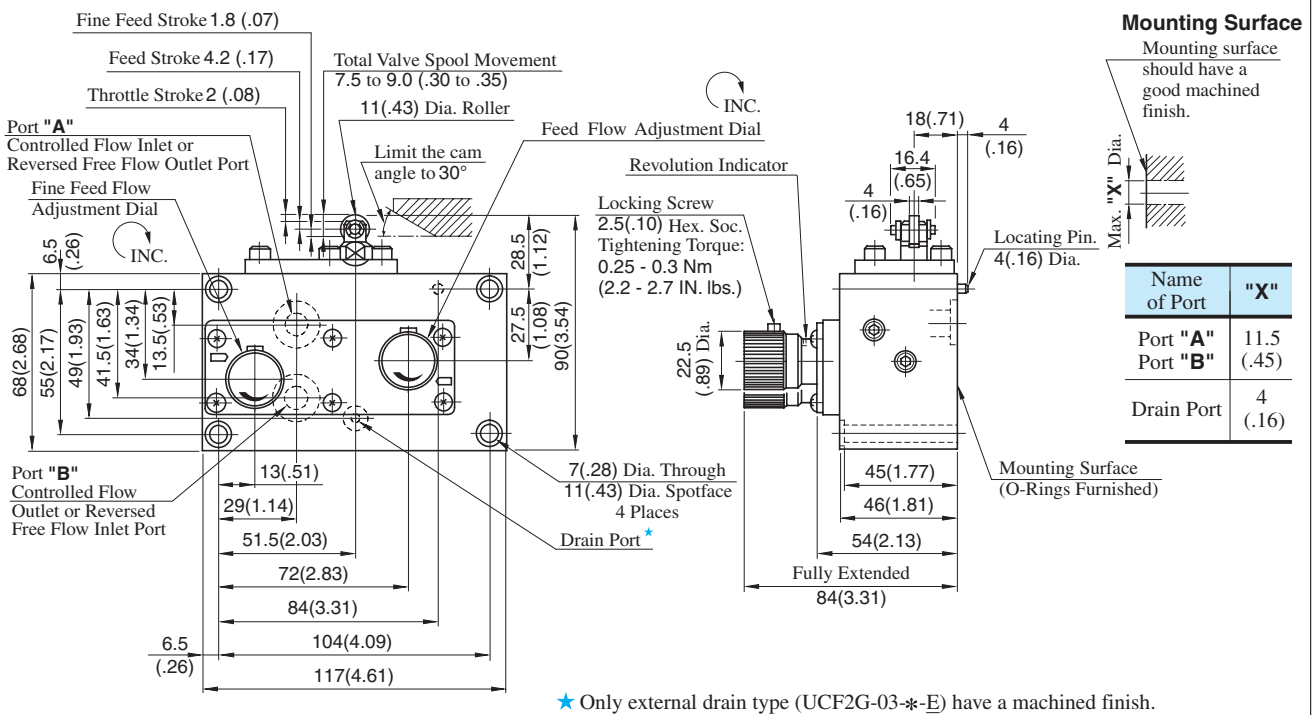


UCF1G-03-*-10/1090

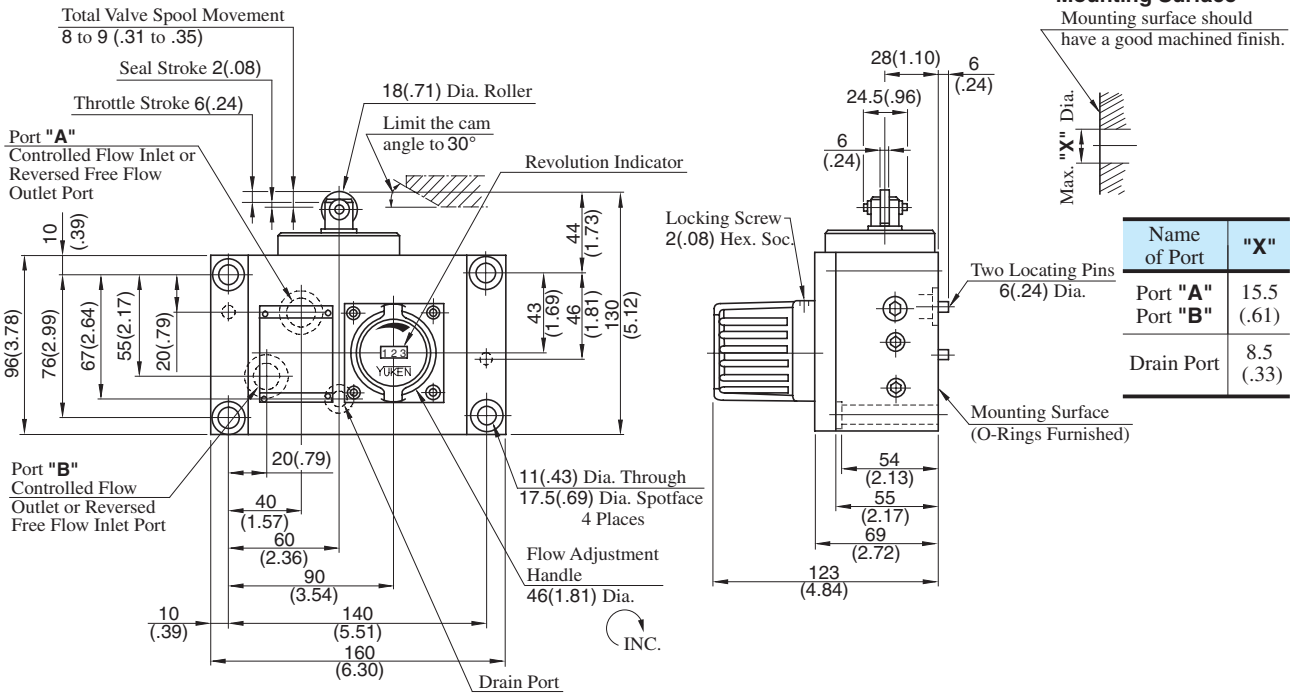


DIMENSIONS IN MILLIMETRES (INCHES)

UCF2G-03-*-10/1090

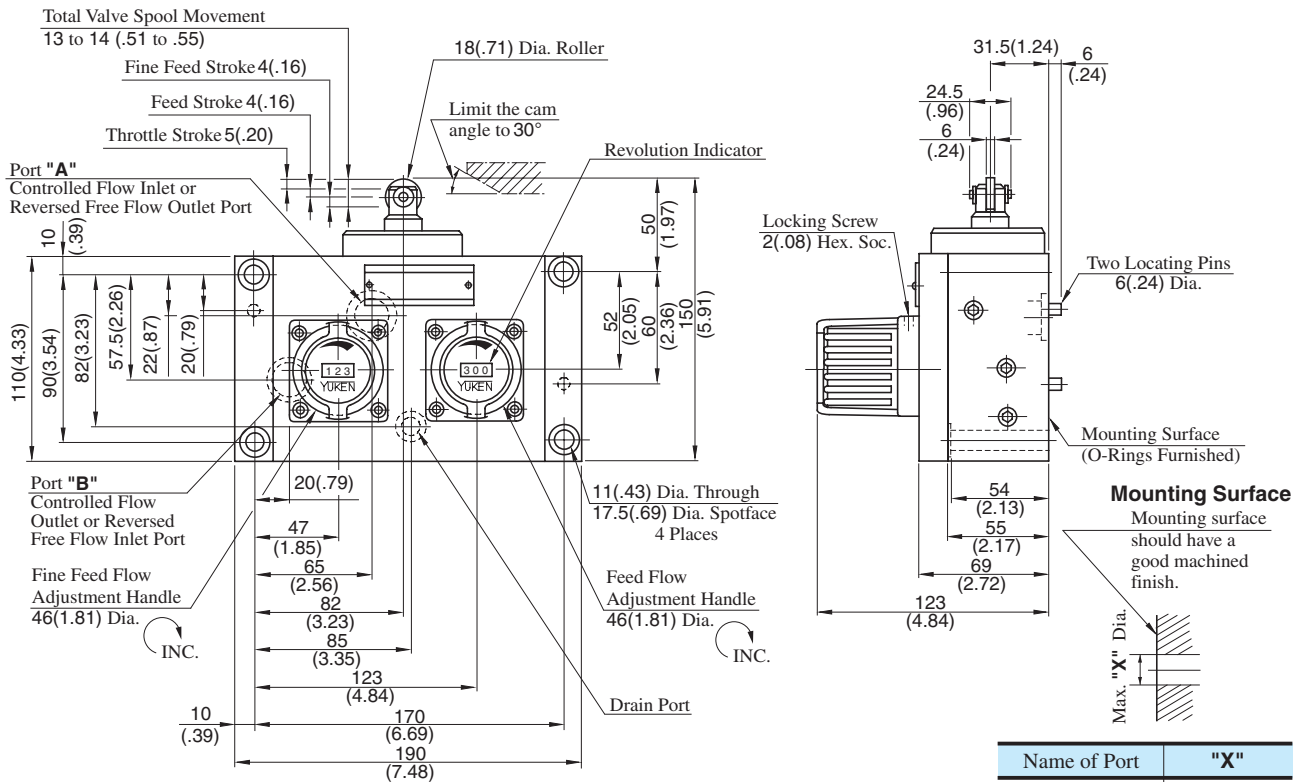


UCF1G-04-30-30/3090



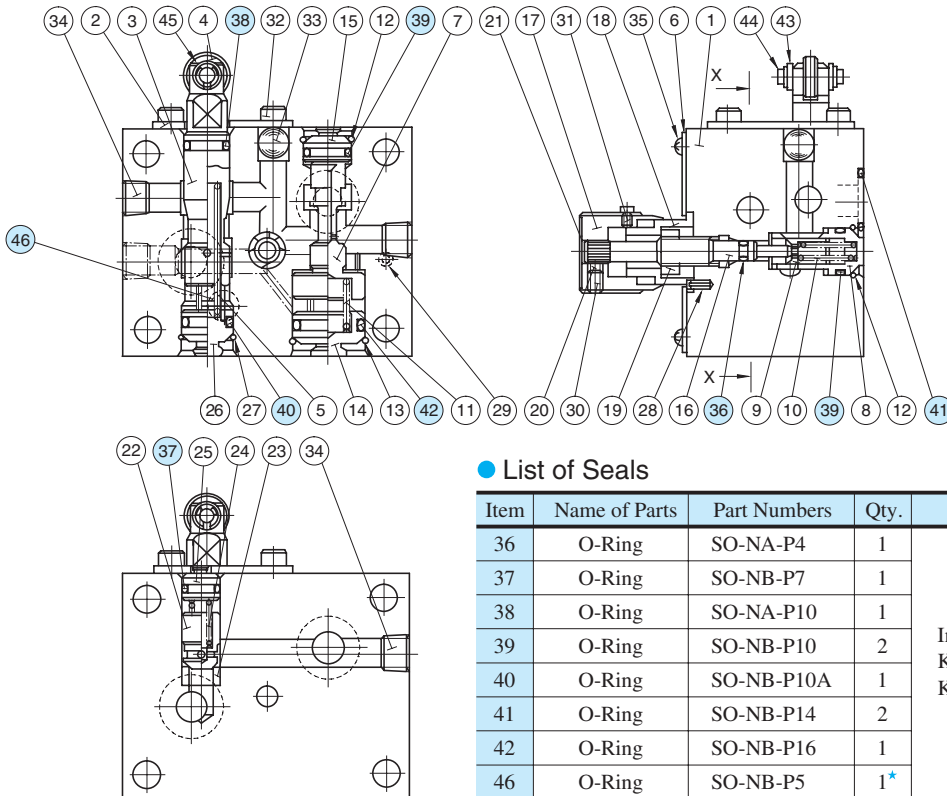
DIMENSIONS IN MILLIMETRES (INCHES)

UCF2G-04-30-30/3090



List of Seals

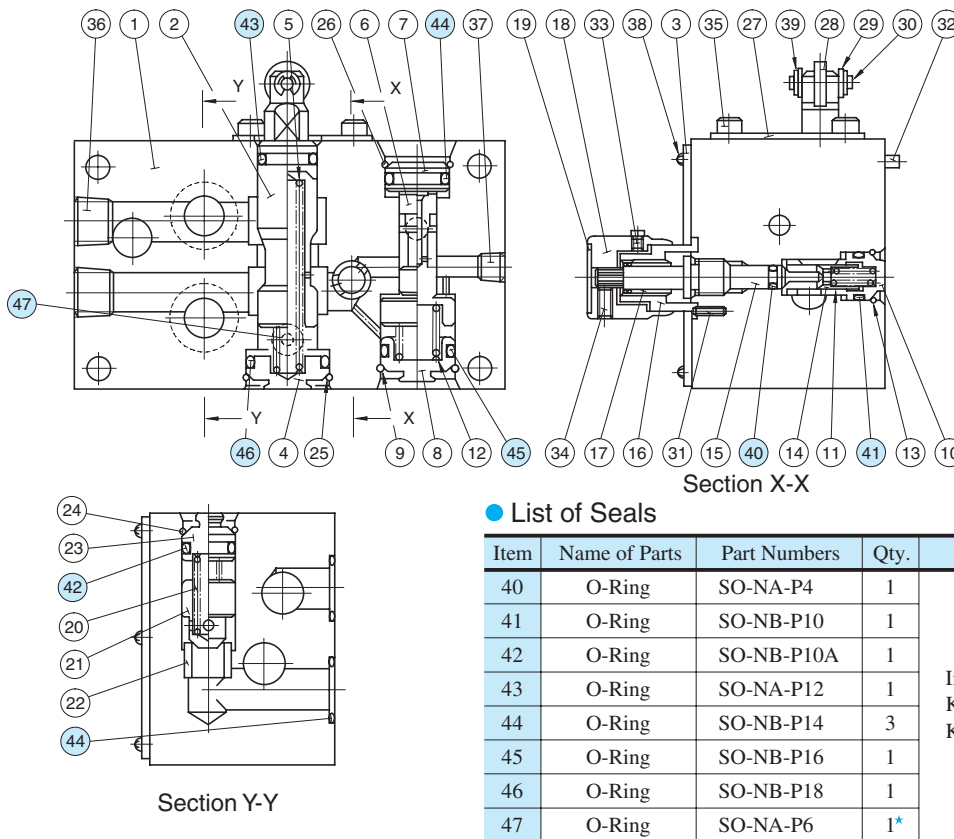
UCF1G-01-**-**-11/1190



List of Seals

★ Used only for external drain types (UCF1G-01-**-**-E-11*).

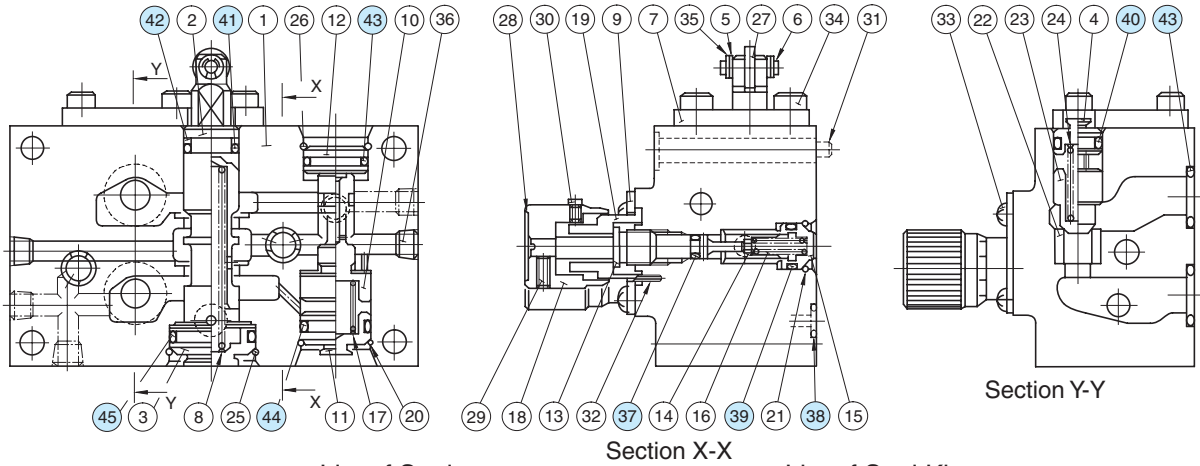
UCF1G-03-**-**-10/1090



List of Seals

★ Used only for external drain types (UCF1G-03-**-E-10*).

UCF2G-03-*-10/1090



● List of Seals

Item	Name of Parts	Part Numbers	Qty.
37	O-Ring	SO-NA-P4	2
38	O-Ring	SO-NB-P6	1 ^{*1}
39	O-Ring	SO-NB-P10	2
40	O-Ring	SO-NB-P10A	1
41	O-Ring	SO-NA-P12	1
42	Back Up Ring	SO-BB-P12	1 ^{*2}
43	O-Ring	SO-NB-P14	3
44	O-Ring	SO-NB-P16	1
45	O-Ring	SO-NB-P21	1

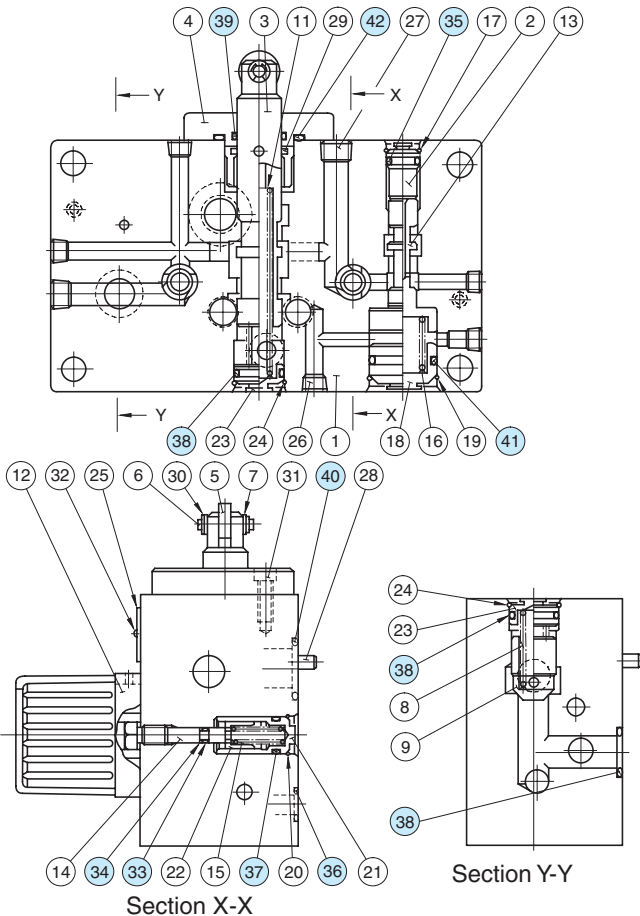
● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
UCF2G-03-*-10*	KS-UCF2G-03-10
UCF2G-03-*-E-10*	KS-UCF2G-03-E-10

- ★ 1. Used only for external drain types (UCF2G-03-*-E-10*).
- ★ 2. Used only for internal drain types (UCF2G-03-*-10*).

Note: When ordering the seals, please specify the seal kit number from the table above.

UCF1G-04-30-30/3090
UCF2G-04-30-30/3090



● List of Seals

Item	Name of Parts	Part Numbers	Quantity	
			UCF1G	UCF2G
33	O-Ring	SO-NA-P4	1	2
34	Back Up Ring	SO-BB-P4	1	2
35	O-Ring	SO-NB-P14	1	—
		SO-NB-P10A	—	1
36	O-Ring	SO-NB-P11	1	1
37	O-Ring	SO-NB-P12	1	2
38	O-Ring	SO-NB-P18	3	3
39	O-Ring	SO-NA-P20	1	1
40	O-Ring	SO-NB-P18	1	—
		SO-NB-P22A	—	1
41	O-Ring	SO-NB-G25	1	1
42	O-Ring	SO-NB-P34	1	1

Note: When ordering the seals, please specify the seal kit number from the table below.

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
UCF1G-04	KS-UCF1G-04-30
UCF2G-04	KS-UCF2G-04-30

Needle Valves

Used as stop valves for pressure gauge lines and small-capacity line. Also can be used as restrictors for regulating flow rates in pilot lines.

Specifications

Model Numbers		Max. Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Approx. Mass kg (lbs.)
In-Line Type	Angle Type			
GCT-02-32*	GCTR-02-32*	★	35 (5080)	0.34 (.75)

★ Depends on allowable pressure drops. See Flow vs. Adjustment Revolutions characteristics and Pressure Drop at Full Open characteristics.



Model Number Designation

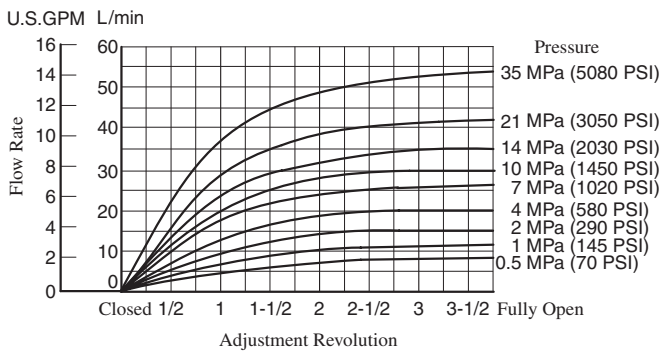
F-	GCT	-02	-32	*
Special Seals	Series Number	Valve Size	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	GCT : In-line Type Needle Valve, Threaded Connection GCTR : Angle Type Needle Valve, Threaded Connection	02	32	Refer to ★

★ Design Standards: None.....Japanese Standard "JIS"
80.....European Design Standard
90.....N. American Design Standard

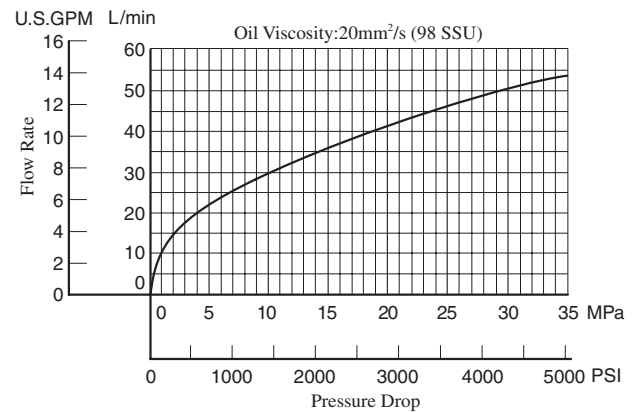
Graphic Symbol



Flow vs. Adjustment Revolutions



Pressure Drop at Full Open

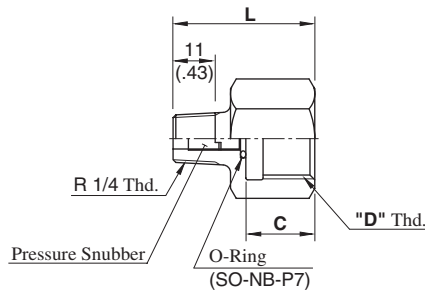


Adaptor

Used where pressure gauges are attached directly to needle valves. Equipped with pressure snubber for reducing harmful surges to protect pressure gauges.

Adaptors are not accessories to needle valves. Order them referring to the table below. For the models shown here, only Japanese standard specifications are available.

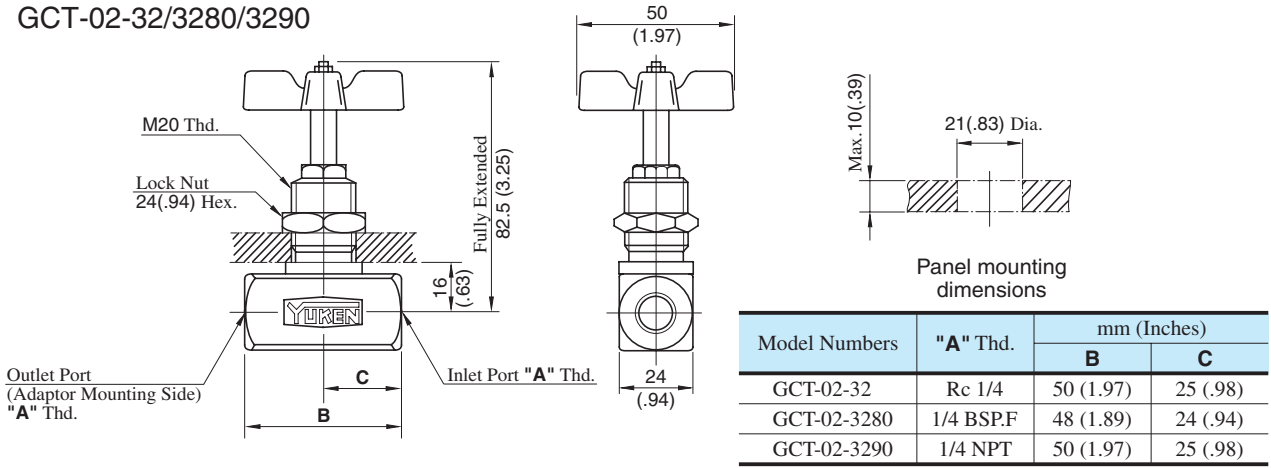
AG-02S
AG-03S
AG-04S



DIMENSIONS IN MILLIMETRES (INCHES)

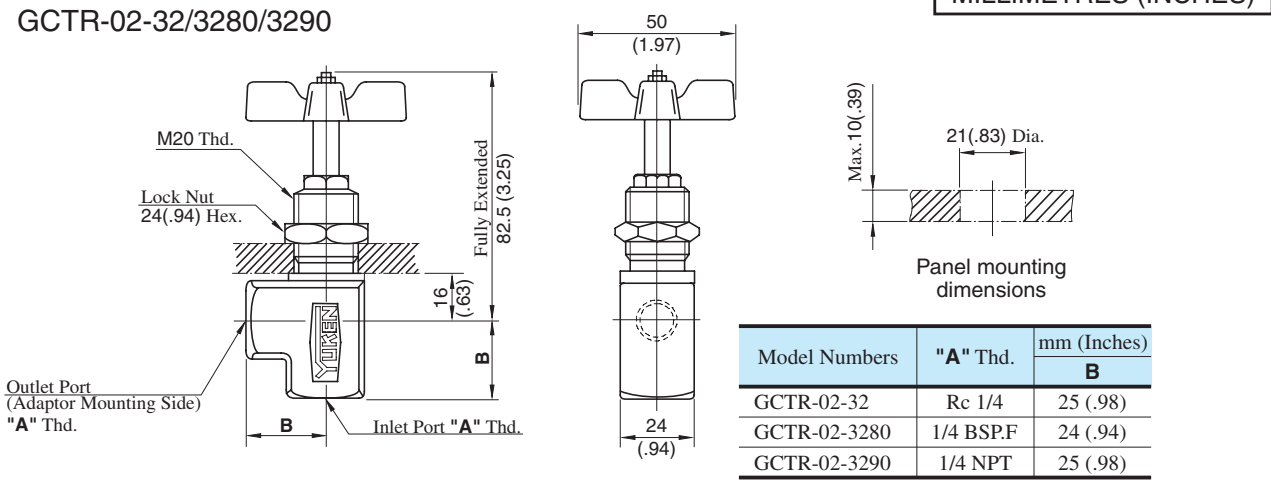
Adaptor Type	Thread Size "D" Thd.	Dimensions mm (Inches)			Approx. Mass kg (lbs.)
		B	C	L	
AG-02S	G 1/4	24 (.94)	14 (.55)	32 (1.26)	0.075 (.165)
AG-03S	G 3/8	24 (.94)	16 (.63)	35 (1.38)	0.075 (.165)
AG-04S	G 1/2	27 (1.06)	18 (.71)	37 (1.46)	0.08 (.176)

GCT-02-32/3280/3290



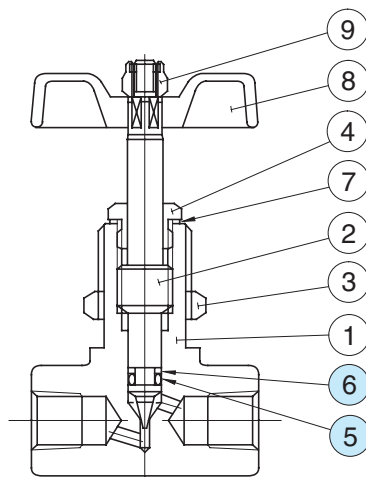
DIMENSIONS IN MILLIMETRES (INCHES)

GCTR-02-32/3280/3290



List of Seals

**GCT-02-32/3280/3290
GCTR-02-32/3280/3290**



List of Seals

Item	Name of Parts	Part Numbers	Qty.
5	O-Ring	SO-NA-P5	1
6	Back Up Ring	SO-BB-P5	1

Note : When ordering the seals, please specify the seal kit number from the table below.

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
GCT-02	KS-GCT-02-32
GCTR-02	

Installation

Refer to the following procedures to fit the valve with a panel. Figure in a circle below is shown on the above drawing.

1. Remove the nut ⑨ then take off the handle ⑧.
2. Take off the nut ③.
3. Insert the needle valve to a panel hole.
4. Screw the nut ③ onto the valve and fix the valve with the panel.
5. Fit the handle ⑧ and fix it with the nut ⑨.

E

DIRECTIONAL CONTROLS

Solenoid Operated Directional Valves	Page 331
Solenoid Controlled Pilot Operated Directional Valves.....	Page 331
“G” Series Shockless Type Directional Valves	Page 331
Pilot/Manually/Mechanically Operated Directional Valves	Page 331
Poppet Type Directional Valves	Page 451
Check/Pilot Controlled Check Valves	Page 497

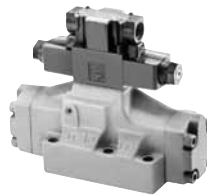
Directional Valves

These valve are used for shifting oil flow direction of hydraulic circuit and for actuator starting/stopping as well as the operating direction shifting of actuator.

● Solenoid Operated Directional Valves



● Solenoid Controlled Pilot Operated Directional Valves



● "G" Series Shockless Type Directional Valves



● Pilot/Manually/Mechanically Operated Directional Valves



● Poppet Type Directional Valves



● Check/Pilot Controlled Check Valves



Hydraulic Fluids

1. Type of Fluids

Any type of hydraulic fluid, listed in the table below can be used.

Type of Fluids	Remarks
Petroleum Base Oils	Use fluids equivalent to ISO VG32 or VG46.
Synthetic Fluids ¹⁾	Use phosphate ester or polyol ester type. When phosphate ester type fluid is to be used, prefix "F-" to the model number because a special seal (fluororubber) will be used.
Water Containing Fluids	Use water-glycol fluids or W/O emulsion type fluids.

- Notes
- 1: Not applicable with G-DSG and G-DSHG series valves.
 - 2: For two types of manually operated directional valves, DMT-⁰⁶/_{06X} and DMT-¹⁰/_{10X}, only petroleum base oils and polyol ester type fluids are available.
 - 3: Water-glycol fluids cannot be used for two types of solenoid operated poppet type two-way valves; CDST-03* and CDSG-03 types.
 - 4: For use with hydraulic fluids other than those listed above, please consult your Yuken representatives in advance.

2. Recommended Viscosity and Oil Temperatures

Use hydraulic fluids which satisfy the both recommended viscosity and oil temperatures given in the table below.

Name	Viscosity	Oil Temperature
DSG-005 series Solenoid Operated Directional Valves	20 – 200 mm ² /s (100 – 900 SSU)	–15 – +60°C (5 – 140°F)
Solenoid Operated Directional Valves Solenoid Controlled Pilot Operated Directional Valves Poppet Type Solenoid Operated Directional Valves Multi Purpose Control Valves Solenoid Operated Poppet Type Two-Way Valves Pilot Controlled Directional Valves Manually Operated Directional Valves Mechanically Operated Directional Valves Check Valves Pilot Controlled Check Valves	15 – 400 mm ² /s (80 – 1800 SSU)	–15 – +70°C (5 – 160°F)
G Series Shockless Type Solenoid Operated Directional Valves (Shifting Time Adjustable)	15 – 200 mm ² /s (80 – 900 SSU)	–15 – +60°C (5 – 140°F)

3. Control of Contamination

Due caution must be paid to maintaining control over contamination of the hydraulic fluids which may otherwise lead to breakdowns and shorter the life of the valve. Please maintain the degree of contamination within NAS 1638-Grade 12. Use 25 µm or finer line filter (In case of DSG-005 series Solenoid Operated Directional Valves, NAS1638-Grade 11. Use 20 µm or finer line filter).



Water-proof, dust-proof and vibration-resistance

These properties are in compliance with the following standards.
(The marking of ○ indicates compliance)

Item	Standard	Type	Description	Compliance							
				DSG-005	(S-/T-/L-)DSG-01 DSHG-01 DSHG-03 (S-)DSHG-04 (S-)DSHG-06 (S-)DSHG-10	(S-/E-/T-/L-)DSG-03	G-DSG-01 G-DSG-03 G-DSHG-04 G-DSHG-06	DSLHG DSLHG DSP*	CDS*		
★2 Water-proof	JIS F8001 Water-proof test for marine electric appliance	Class 1 water spray	Drip-proof construction	○	○	○	○	○	○		
		Class 2 water spray	Froth-roof construction	×	○	○	○	○	○		
	JIS D0203 Damp-proof and Water-proof test for automobile parts	Damp-proof test M1	Test to examine damp-resistance of parts	×	○	○	○	○	○		
		Damp-proof test M2	Test to examine functions of part under high temperature and high humidity	×	○	○	○	○	○		
		Splash-proof test R1	Test to examine functions of parts which are likely to be exposed to water splash.	○	○	○	○	○	○		
		Splash-proof test R2	Test to examine functions of parts which are indirectly exposed to stormy weather or water splash.	×	○	○	○	○	○		
	JIS C0920 Water-proof test for electro-mechanical parts and wiring materials	Drip-proof type	Not affected by water dropping at vertical angle of 15 degrees or less.	○	○	○	○	○	○		
		Rain-proof type	Not affected by rain fall at vertical angle of 60 degrees or less.	×	○	○	○	○	○		
		Froth-proof type	Not affected by water drip from any direction.	×	○	○	○	○	○		
		Jet-flow proof type	Not affected by jet flow from any direction.	×	○	×	×	×	×		
	(I.E.C) PUBL. 529	Protection Class 2: Drip-proof type (2)	Not affected by water drip falling at vertical angle of 15 degrees or less.	○	○	○	○	○	○		
		Protection Class 3: Rain-proof type	Not affected by rain falling at vertical angle of 60 degrees or less.	×	○	○	○	○	○		
		Protection Class 4: Froth-proof type	Not affected by water drip from any direction.	×	○	○	○	○	○		
		Protection Class 5: Jet-flow proof type	Not affected by jet flow from any direction.	×	○	×	×	×	×		
	Dust-proof	(I.E.C) PUBL. 529	Protection Class 6	Fully protected from entry of dust.	○	○	○	○	○	○	
	Vibration-resistance	JIS C0911 Vibration test for small electric appliances	Resonance test (IC)	Vibration range: 7-59.5 Hz Duplex amplitude: 0.1 mm	×	○	○	○	○	○	
Fixed frequency resistance test (IIC)				Frequency: 20 Hz	Grade 1: duplex amplitude-0.5 mm	×	○	○	○	○	○
				Grade 2: duplex amplitude-1.2 mm	×	○(2D*)★1	○(2D*)★1	○★1	○	○	
				Grade 3: duplex amplitude-1.8 mm	×	○(2D*)★1	○(2D*)★1	○★1	○	○	
Grade 4: duplex amplitude-2.4 mm			×	○(2D*)★1	○(2D*)★1	○★1	○	○			
Variable frequency resistance test (IIIC)			Frequency range: 7-59.5 Hz	Grade 1: duplex amplitude-0.3 mm	×	○(2D*)★1	○(2D*)★1	○★1	○	○	
				Grade 2: duplex amplitude-0.5 mm	×	○(2D*)★1	○(2D*)★1	○★1	○	×	
		Grade 3: duplex amplitude-0.75 mm		×	○(2D*)★1	○(2D*)★1	○★1	○	×		
JIS D1601 Vibration test for automobile parts		Class 1: mainly for parts of passenger car	Grade A: Parts mounted on spring of body or chassis having relatively low vibration.	×	○(2D*)★1	○(2D*)★1	○	○	×		
	Grade B: Parts mounted on spring of body or chassis having relatively low vibration.		×	○(2D*)★1	○(2D*)★1	○	○	×			
	Grade C: Parts mounted in engine having relatively low vibration		×	○(2D*)★1	○(2D*)★1	×	○	×			

★1 : No-spring detented type (2D*) and No-spring type (2N*) can be used when energised continuous for position holding.
★2 : For outdoor use, protect equipment with a cover, etc., to prevent direct exposure to water.

Solenoid Operated Directional Valves

Solenoid Controlled Pilot Operated Directional Valves

“G” Series Shockless Type Directional Valves

Pilot / Manually / Mechanically Operated Directional Valves

Valve Type	Graphic Symbols	Max. Operating Pressure MPa (PSI)	Maximum Flow		Page
			L/min	U.S.GPM	
Solenoid Operated Directional Valves		25 (3600)	DSG-005		336
		16 (2320)	L-DSG-01		344
		25 (3600)	S-DSG-01		
		35 (5080)	DSG-01		361
		16 (2320)	L-DSG-03		
		25 (3600)	S-DSG-03		
Low Wattage (5W) Type Solenoid Operated Directional Valves		31.5 (4580)	DSG-03		378
		16 (2320)	E-DSG-01		
Electronic Relay Incorporated Solenoid Operated Directional Valves		16 (2320)	E-DSG-03		379
		25 (3600)	T-S-DSG-01		
		35 (5080)	T-DSG-01		
		25 (3600)	T-S-DSG-03		
Solenoid Controlled Pilot Operated Directional Valve		31.5 (4580)	T-DSG-03		381
		21 (3050)	DSHG-01		
		25 (3600)	DSHG-03		
		31.5 (4580)	DSHG-04/S-DSHG-04		
			DSHG-06/S-DSHG-06		
“G” Series Shockless Type Solenoid Operated Directional Valves		25 (3600)	DSHG-10/S-DSHG-10		412
			G-DSG-01		
“G” Series Shockless Type Solenoid Controlled Pilot Operated Directional Valves		25 (3600)	G-DSG-03		418
			G-DSHG-04		
Pilot Operated Directional Valves		31.5 (4580)	G-DSHG-06		423
			DHG-04 06 10		
Manually Operated Directional Valves		21 (3050)	Threaded Connection (DMT)	03 06 10	429
		31.5 (4580)	Sub-plate connection (DMG)	01 03 04 06 10	
Mechanically Operated Directional Valves		7 (1020)	Rotary (DR ^T _G)	02	441
		25 (3600)	Cam Operated (DC ^T _G)	01 03	

Spool Types

Spool types are classified to the condition of flow at the neutral position.

Spool Type	Graphic Symbols	Schematic Drawing (Centre Position)	Functions and Applications
2 (Closed Centre All Ports)			Holds pump pressure and cylinder position at neutral. Care should be paid if used as a 2-position type because shock occurs when each port is blocked in transit.
3 (Open Centre All Ports)			Pump can be unloaded and actuator is floating at neutral. If a 2-position type is used, shock is reduced as each ports is released to tank in transit.
4 (Open Centre A, B&T)			Pump pressure is held and actuator is floated at neutral. 2-position type is used when system pressure is required to be held in transit. Shock during transit is less compared to spool type "2".
40 (Open Centre A, B&T Restricted Flow)			In a variation of spool type "4", a restrictor is provided in A-T and B-T ports. Making it faster at stopping the actuator.
5 (Open Centre P, A&T)			It can be used when a pump is unloading at neutral and actuator is halted at one way flow.
6 (Open Centre P&T Closed Crossover)			Pump is unloading and actuator position held at neutral. Suitable for series operation.
60 (Open Centre P&T Open Crossover)			It is a variation of spool type "6". Shock is reduced as each port is released to tank on transit.
7 (Open Centre All Ports Restricted Flow)			Mainly used as a 2-position type. Shock is reduced on transit.
8 (2-Way)			Pump pressure and cylinder position is held at neutral in the same way as spool type "2". It is used as 2 way type.
9 (Open Centre P, A&B)			Regenerative circuit is provided at neutral.
10 (Open Centre B&T)			Prevent actuator from one direction drift by leakage of P port at neutral.
11 (Open Centre P&A)			Halt actuator movement positively at B, T ports blocked P, A ports connected at neutral.
12 (Open Centre A&T)			Prevent actuator from one direction drift by leakage of P port at neutral.

■ Mounting Surface

Mounting surface dimensions conform to ISO 4401, Hydraulic fluid power-Four-Port directional control valves-Mounting surfaces.

Model Numbers	ISO Code of Mounting Surface
$\begin{pmatrix} S- \\ L- \\ E- \\ T- \\ G- \end{pmatrix}$ DSG-01 DSHG-01 DMG-01 DCG-01	ISO 4401-AB-03-4-A
$\begin{pmatrix} S- \\ L- \\ E- \\ T- \\ G- \end{pmatrix}$ DSG-03 DMG-03 DCG-03	ISO 4401-AC-05-4-A
DSHG-03	ISO 4401-AC-05-4-A*
$\begin{pmatrix} S- \\ G- \end{pmatrix}$ DSHG-04 DHG-04 DMG-04	ISO 4401-AD-07-4-A
$\begin{pmatrix} S- \\ G- \end{pmatrix}$ DSHG-06 DHG-06 DMG-06	ISO 4401-AE-08-4-A
(S-) DSHG-10 DHG-10 DMG-10	ISO 4401-AF-10-4-A

* The main port conform to the ISO 4401-AC-05-4-A.
 The pilot and drain ports is sccondance with the ISO original draft.

Interchangeability in Installation between Current and New Design

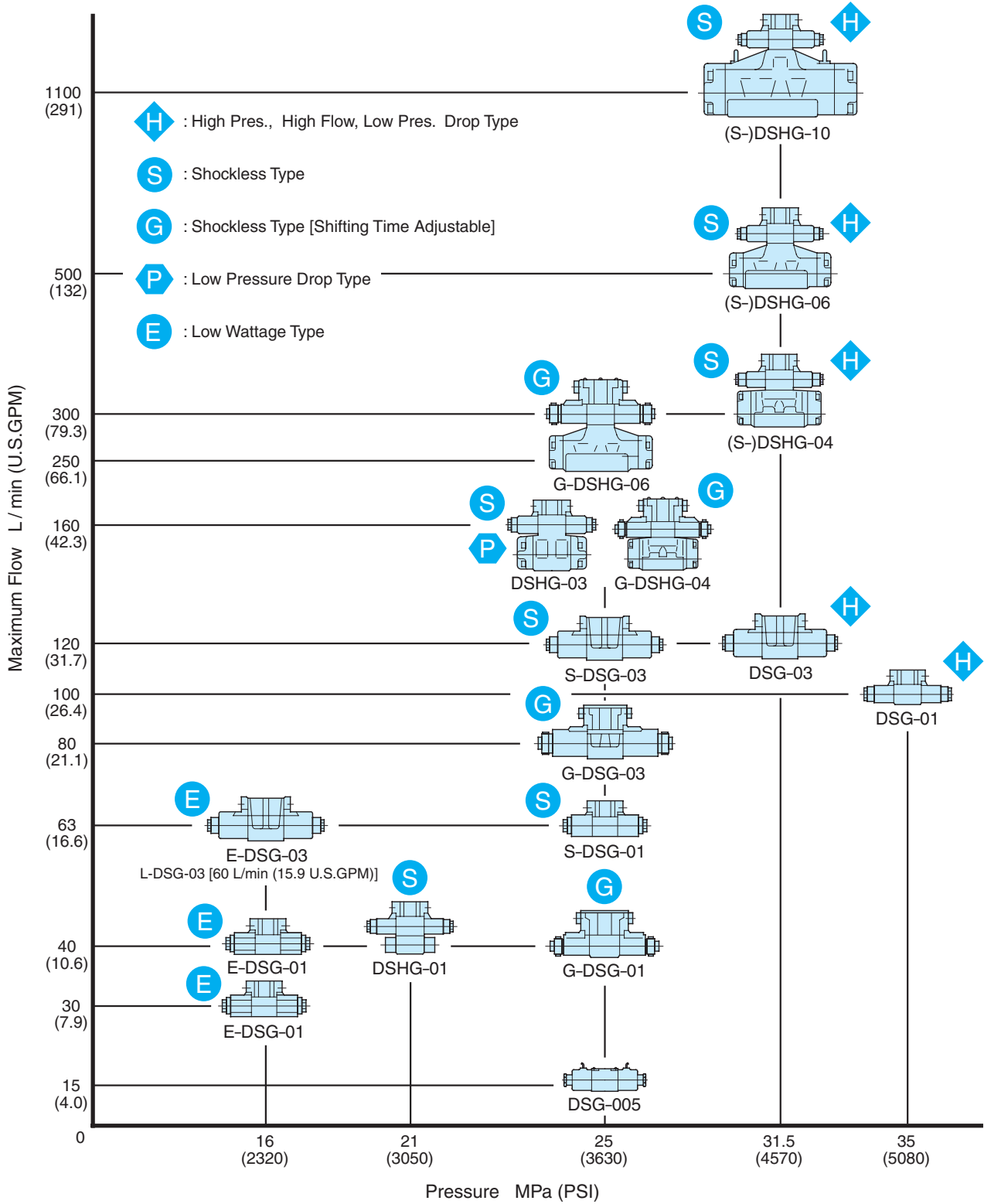
Model change has been made on the following product.

The difference between current and new design has been described on the paragraph of “Interchangeability in Installation between Current and New Design.” Refer to relevant pages on each series.

Name	Model Numbers		Interchangeability in Installation	Related Page	Major Changes
	Current	New			
DSG-005 Series Solenoid Operated Directional Valves	DSG-005-***-*-30/3090	DSG-005-***-*-40/4090 DSG-005-***-*- $\frac{N}{NI}$ -40/4090	Yes	—	<ul style="list-style-type: none"> ● High Flow ● Low Pressure Drop ● Din-connector type solenoid in addition
DSG-01 Series Solenoid Operated Directional Valves	$\begin{pmatrix} S- \\ L- \\ T- \end{pmatrix}$ DSG-01-***-*-60/6090	$\begin{pmatrix} S- \\ L- \\ T- \end{pmatrix}$ DSG-01-***-*-70/7090	Yes	357	<ul style="list-style-type: none"> ● High Pressure and High Flow ● Low Pressure Drop
1/8,3/8 Solenoid Controlled Pilot Operated Directional Valves	DSHG-01-***-*-13/1390 DSHG-03-***-*-13/1390	DSHG-01-***-*-14/1490 DSHG-03-***-*-14/1490	Yes	—	<ul style="list-style-type: none"> ● Pilot valve has been changed from DSG-01, 60 design to 70 design.
1/2 Solenoid Controlled Pilot Operated Directional Valves	(S-) DSHG-04-***-*-51/5190	(S-) DSHG-04-***-*-52/5290	Yes	—	<ul style="list-style-type: none"> ● Pilot valve has been changed from DSG-01, 60 design to 70 design.
3/4,1-1/4 Solenoid Controlled Pilot Operated Directional Valves	(S-) DSHG-06-***-*-52/5290 (S-) DSHG-10-***-*-42/4290	(S-) DSHG-06-***-*-53/5390 (S-) DSHG-10-***-*-43/4390	Yes	—	<ul style="list-style-type: none"> ● Pilot valve has been changed from DSG-01, 60 design to 70 design.

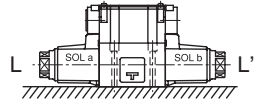
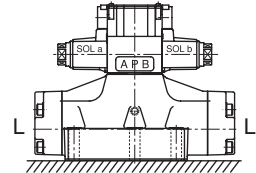
■ Solenoid Operated / Solenoid Controlled Operated Directional Valves

WIDE RANGE OF MODELS – Choose the optimum valve to meet your needs from a largeselection available.



Instructions

Mounting

DSG-005	No mounting restrictions for any model.	
*-DSG-01 *-DSG-03	No-spring detented models not energised continuously must be installed so that the spool axis L-L' is horizontal. Otherwise there is no mounting restrictions.	
DSHG-01 DSHG-03 (S-) DSHG-04 (S-) DSHG-06 (S-) DSHG-10	No-spring models not energised continuously must be installed so that the spool axis L-L' is horizontal. Otherwise there is no mounting restrictions.	

Energisation

1. No-Spring Type

One of two solenoids should be energised continuously to avoid malfunction.

2. On double solenoid valves do not energise both at the same time as it will result in coils burning out.

Valve Tank Port

Avoid connecting the valve tank port to a line with possible surge pressure.

Piping end of tank line should be submerged in oil.

Pilot Drain Port for Solenoid Controlled Pilot Operated Valve

Avoid connecting the valve pilot drain port to a line with possible surge pressure.

Piping end of drain should be submerged in oil.

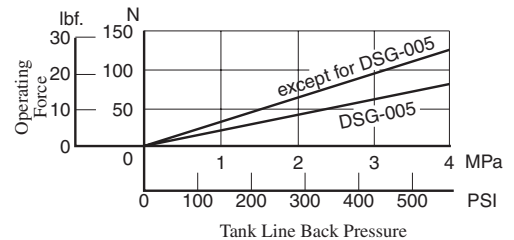
Shockless Type

In order to benefit from a shockless operation, it is necessary to fill the tank line with operating oil.

Only after the tank line has been filled with operating oil should the valve be used on a regular basis.

Operating Force by Manual Actuator

Take care as the operating force by the manual actuator increases in proportion to the tank line back pressure. (See the graph right.)



Solenoid

Solenoid connector (DIN connector)

The solenoid connector is in accordance with the international standard ISO 4400 (Fluid power systems and components-Three-pin electrical plug connectors-Characteristics and requirements).

AC Solenoid

50-60 Hz common service solenoids do not require re-wiring when the applied frequency is changed.

DC Solenoid (K-series Solenoid Operated Directional Valve)

These valves differ from conventional DC solenoid operated directional valves and have the following characteristics:

1. The spark between the relay contacts has been eliminated and therefore the valve can be operated by miniature relays.
2. The surge voltage is approximately 10 % of that normally experienced.
3. Time lag on de-energisation is reduced by approximately 50 %.

R type Models with Current Rectifier and DC Solenoid

Specially designed DC solenoid and receptacle (or connector) containing AC-DC rectifier and transient peak suppressor are provided. Connection to be made to AC power source as with conventional AC solenoid. Remarkably high reliability and long life and other advantages including quiet valve operation. No over-heating of coil due to the spool sticking and protection against transient voltage peaks are assured.

RQ type Models with Current rectifier and Quick Return Solenoid

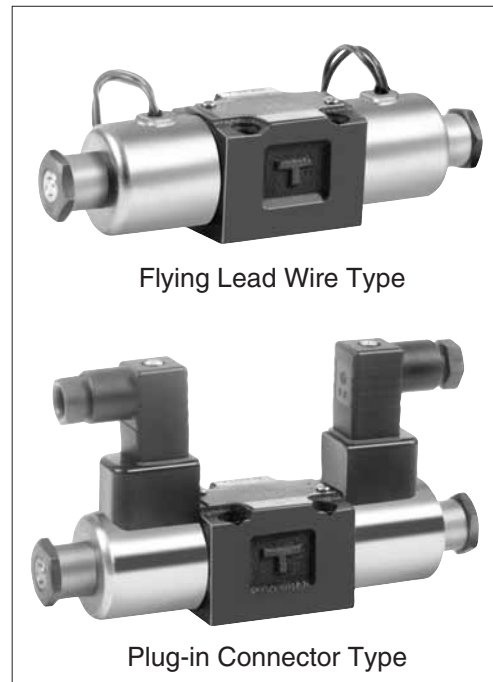
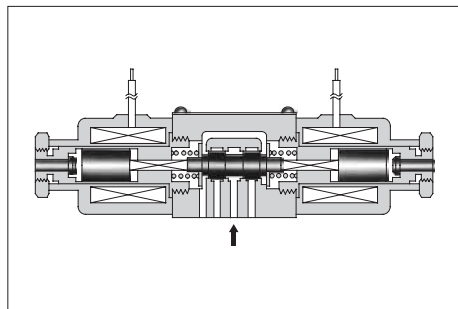
Valve characteristics are identical to R type except for the fast return time of the spool after deenergisation.

Insulation Class of Solenoid

Model numbers	Insulation Class
DSG-005, DSG-01, S-DSG01 L-DSG-01, E-DSG-01, T-DSG-01 DSG-03, S-DSG-03, L-DSG-03 E-DSG-03, T-DSG-03 DSHG-01/03/04/06/10, S-DSHG-04/-06/10	Class H
G-DSG-01, G-DSG-03	Class F

Solenoid Operated Directional Valves, DSG-005 Series

These DSG-005 series solenoid directional valves are the products newly developed as a “Mini-series”. Compared with DSG-01 series, the valve are much more compactly manufactured but enjoy a maximum operating pressure of 25 MPa (3630 PSI) and a maximum flow rate of 15 L/min (3.96 U.S.GPM), while contributing further to a space saving requirement. Moreover, using wet armature solenoids, the valves ensure the long life.



Specifications

Model Numbers	Max. Flow★ L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Max. Tank-Line Back Pressure MPa (PSI)	Max. Changeover Frequency min ⁻¹ (Cycles/min)	Approx. Mass kg (lbs.)
DSG-005-3C*- *-40/4090	15 (3.96)	25 (3630)	7 (1020)	120	0.5 (1.1)
DSG-005-2B*- *-40/4090					0.4 (.9)

★ The maximum flow means the limited flow without inducing any abnormality to the operation (changeover) of the valve. The maximum flow differs according to the type and operating conditions. For details, please refer to the “List of Standard Models and Maximum Flow” on pages 338 to 339.

Solenoid Rating

Electric Source	Coil Type	Frequency (Hz)	Voltage (V)		Current & Power at Rated Voltage		
			Source Rating	Serviceable	Inrush★ ¹ (A)	Holding (A)	Power (W)
AC	A100	50	100	80 – 110	0.36	0.16	—
		60		90 – 120	0.34	0.11	
	A200	50	200	160 – 220	0.18	0.08	
		60		180 – 240	0.17	0.05	
DC★ ²	D12	—	12	10.8 – 13.2	—	1.2	15
	D24	—	24	21.6 – 26.4	—	0.6	

- ★¹ Inrush current in the above table shows rms values at maximum stroke.
- ★² The Plug-in Connector Type DC solenoid has a built-in surge absorber. The Flying Lead Wire Type has no surge absorber equipped. Install a surge absorber separately.

Model Number Designation

F-	DSG	-005	-3	C	2	-D24	-N	-40	*
Special Seals	Series Number	Valve Size	Number of Valve Position	Spool-Spring Arrangement	Spool Type	Coil Type	Electrical Conduit Connection	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	DSG: Solenoid Operated Directional Valve	005	3	C: Spring Centred	2, 3 40	AC A100, A200 DC D12, D24	None: Flying Lead Wire Type N: Plug-in Connector Type N1: Plug-in Connector with Indicator Light	40	Refer to [★]
			2	B: Spring Offset	2, 3				

★ Design Standards: None Japanese Standard "JIS" and European Design Standard 90 N. American Design Standard

Sub-plates

Piping Size	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
1/8	DSGM-005X-20	Rc 1/8	DSGM-005X-2080	1/8 BSP.F	DSGM-005X-2090	1/8 NPT	0.8 (1.8)
1/4	DSGM-005Y-20	Rc 1/4	DSGM-005Y-2080	1/4 BSP.F	DSGM-005Y-2090	1/4 NPT	0.8 (1.8)

● Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

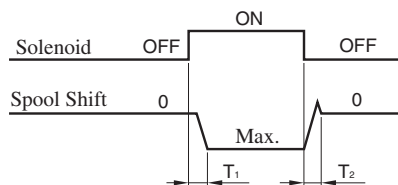
Mounting Bolts

Four socket head cap screws in the table below are included.

Descriptions	Soc. Hd. Cap Screw (4 Pcs.)	Tightening Torque
Japanese Standard "JIS" European Design Standard	M4 × 35 Lg.	2.5 - 3.5 Nm (22.1 - 31.0 in. lbs.)
N. American Design Standard	No. 8-32 UNC × 1-3/8 Lg.	

Typical Changeover Time (Example)

Changeover time varies according to oil viscosity, spool type and hydraulic circuit.



[Test Conditions]

Pressure: 16 MPa (2320 PSI)

Flow Rate: 7.5 L/min (1.98 U.S.GPM)

Viscosity: 30 mm²/s (141 SSU)

Voltage: Rated Voltage (After coil temperature rises and saturated)

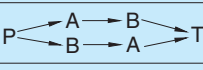
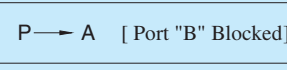





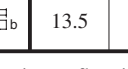
Direction of Flow: P → A → B → T
P → B → A → T

[Result of Measurement]

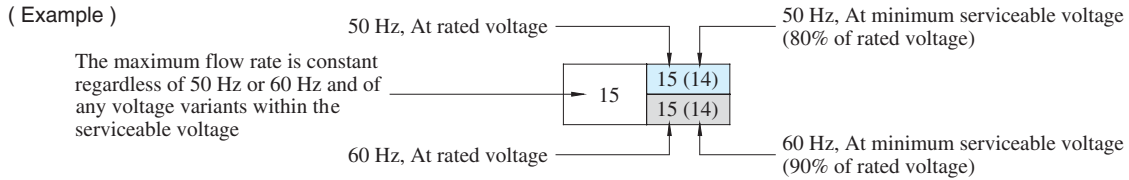
Model Numbers	Time ms	
	T ₁	T ₂
DSG-005-3C2-A*	16	60
DSG-005-3C2-D*	23	40
DSG-005-2B2-A*	14	45
DSG-005-2B2-D*	15	33

■ List of Standard Models and The Maximum Flow


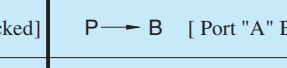

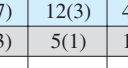

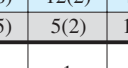
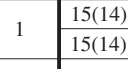
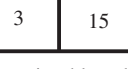
● Models with AC Solenoids : DSG-005-*** -A* -40/4090

No. of Valve Position	Spool-Spring Arrangement	Model Numbers	Graphic Symbols	Max. Flow L/min											
															
				Working Pressure MPa				Working Pressure MPa				Working Pressure MPa			
				5	10	16	25	5	10	16	25	5	10	16	25
Three Positions	Spring Centred	DSG-005-3C2		15	15	15	15	15(14)	15(7)	12(3)	4(0.5)	15(14)	15(7)	12(3)	4(0.5)
								15(12)	12(3)	5(1)	1(0.5)	15(12)	12(3)	5(1)	1(0.5)
		DSG-005-3C3		12	12	12	12	15	15	15	15	15	15	15	15
Three Positions	Spring Centred	DSG-005-3C40		15	15	15	15	15(14)	15(6)	12(2)	4(0.5)	15(14)	15(6)	12(2)	4(0.5)
						15(10)	12(5)	5(2)	1(0.5)	15(10)	12(5)	5(2)	1(0.5)		
Two Positions	Spring Offset	DSG-005-2B2		14	14	14	14	2	1	1	1	15(14)	15(10)	13(5)	6(0.5)
										15(14)	14(9)	8(4)	4(0.5)		
Two Positions	Spring Offset	DSG-005-2B3		13.5	13.5	13.5	13.5	3	3	3	3	15	15(14)	15(11)	15(9)

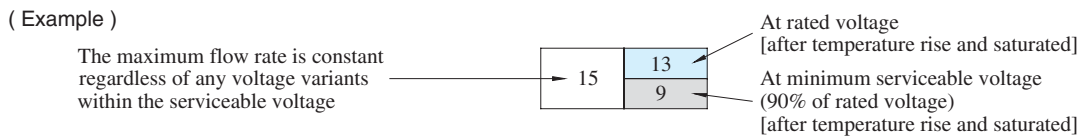
Notes: 1. The relation between the maximum flow in the table above and the frequency/voltage (within the serviceable voltage) is as shown below.



● Models with DC Solenoids : DSG-005-*** -D* -40/4090

No. of Valve Position	Spool-Spring Arrangement	Model Numbers	Graphic Symbols	Max. Flow L/min											
															
				Working Pressure MPa				Working Pressure MPa				Working Pressure MPa			
				5	10	16	25	5	10	16	25	5	10	16	25
Three Positions	Spring Centred	DSG-005-3C2		15	15	15	15	15	8	5	3	15	8	5	3
								12	5	3	2	12	5	3	2
		DSG-005-3C3		15	15	15	15	15	15	15	15	15	15	15	15
Three Positions	Spring Centred	DSG-005-3C40		15	15	15	15	15	13	8	5	15	13	8	5
							9	5.5	3.5		9	5.5	3.5		
Two Positions	Spring Offset	DSG-005-2B2		14	14	14	14	8.5	4.5	6.5	6.5	15	15	11	9
												11	7.5	5.5	
Two Positions	Spring Offset	DSG-005-2B3		13.5	13.5	13.5	13.5	8	7	8	9	15	15	15	13.5

Notes: 1. The relation between the maximum flow in the table above and the voltage (within the serviceable voltage) is as shown below.

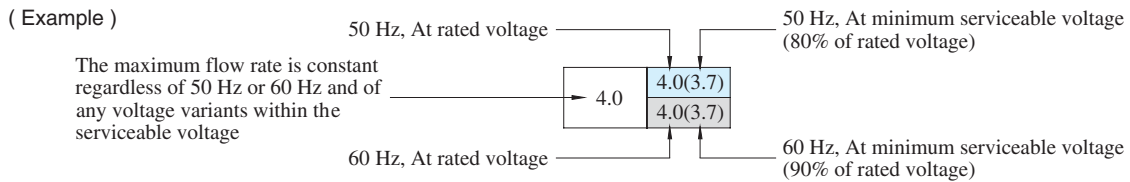


■ List of Standard Models and The Maximum Flow

● Models with AC Solenoids : DSG-005-***-A*-40/4090

No. of Valve Position	Spool-Spring Arrangement	Model Numbers	Graphic Symbols	Max. Flow U.S.GPM											
				Working Pressure PSI				Working Pressure PSI				Working Pressure PSI			
				730	1450	2320	3630	730	1450	2320	3630	730	1450	2320	3630
Three Positions	Spring Centred	DSG-005-3C2		4.0	4.0	4.0	4.0	4.0(3.7)	4.0(1.9)	3.2(.8)	1.1(.1)	4.0(3.7)	4.0(1.9)	3.2(.8)	1.1(.1)
				4.0	4.0	4.0	4.0	4.0(3.2)	4.0(.8)	1.3(.3)	.3(.1)	4.0(3.2)	3.2(.8)	1.3(.3)	.3(.1)
		DSG-005-3C40		4.0	4.0	4.0	4.0	4.0(3.7)	4.0(1.6)	3.2(.5)	1.1(.1)	4.0(3.7)	4.0(1.6)	3.2(.5)	1.1(.1)
Two Positions	Spring Offset	DSG-005-2B2		3.7	3.7	3.7	3.7	.5	.3	.3	.3	4.0(3.7)	4.0(2.6)	3.4(1.3)	1.6(.1)
				3.6	3.6	3.6	3.6	.8	.8	.8	.8	4.0	4.0(3.7)	4.0(2.9)	4.0(2.4)

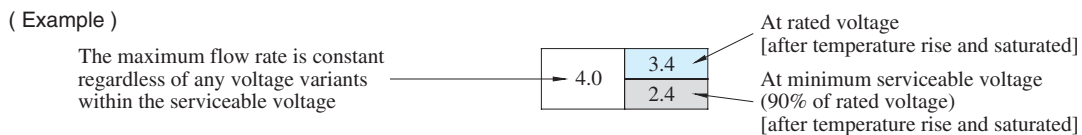
Notes: 1. The relation between the maximum flow in the table above and the frequency/voltage (within the serviceable voltage) is as shown below.



● Models with DC Solenoids : DSG-005-***-D*-40/4090

No. of Valve Position	Spool-Spring Arrangement	Model Numbers	Graphic Symbols	Max. Flow U.S.GPM											
				Working Pressure PSI				Working Pressure PSI				Working Pressure PSI			
				730	1450	2320	3630	730	1450	2320	3630	730	1450	2320	3630
Three Positions	Spring Centred	DSG-005-3C2		4.0	4.0	4.0	4.0	4.0	2.1	1.3	.8	4.0	2.1	1.3	.8
				4.0	4.0	4.0	4.0	3.2	1.3	.8	.5	3.2	1.3	.8	.5
		DSG-005-3C40		4.0	4.0	4.0	4.0	4.0	3.4	2.1	1.3	4.0	3.4	2.1	1.3
Two Positions	Spring Offset	DSG-005-2B2		3.7	3.7	3.7	3.7	2.3	1.2	1.7	1.7	4.0	4.0	2.9	2.4
				3.6	3.6	3.6	3.6	2.1	1.9	2.1	2.4	4.0	4.0	4.0	3.6

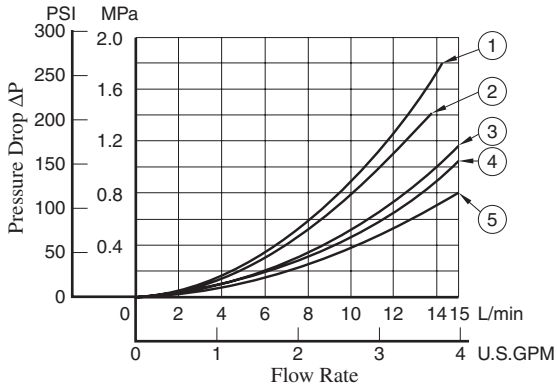
Notes: 1. The relation between the maximum flow in the table above and the voltage (within the serviceable voltage) is as shown below.



E
 DSG-005 Series Solenoid Operated Directional Valves

Pressure Drop

Pressure drop curves based on viscosity of 30 mm²/s (141 SSU) and specific gravity of 0.850.



Model Numbers	Pressure Drop Curve Numbers				
	P → A	B → T	P → B	A → T	P → T
DSG-005-3C2	④	④	④	④	—
DSG-005-3C3	⑤	⑤	⑤	⑤	③
DSG-005-3C40	④	④	④	④	—
DSG-005-2B2	①	①	④	④	—
DSG-005-2B3	②	②	④	④	—

● For any other viscosity, multiply the factors in the table below.

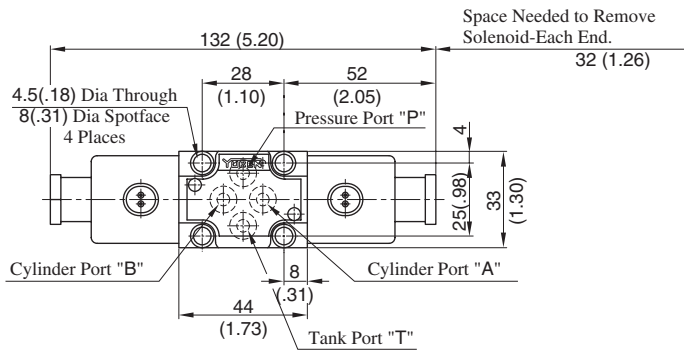
Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
	SSU	77	98	141	186	232	278	324	371	417	464
Factor		0.84	0.91	1.00	1.07	1.14	1.19	1.24	1.28	1.32	1.35

● For any other specific gravity (G'), the pressure drop (ΔP) may be obtained from the formula below.

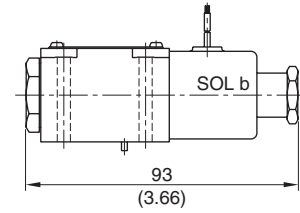
$$\Delta P' = \Delta P (G'/0.850)$$

Flying Lead Wire Type

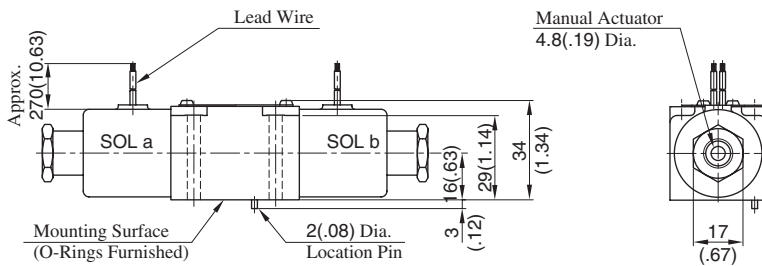
- Spring Centred: DSG-005-3C* - A*_{D*}-40/4090



- Spring Offset: DSG-005-2B* - A*_{D*}-40/4090



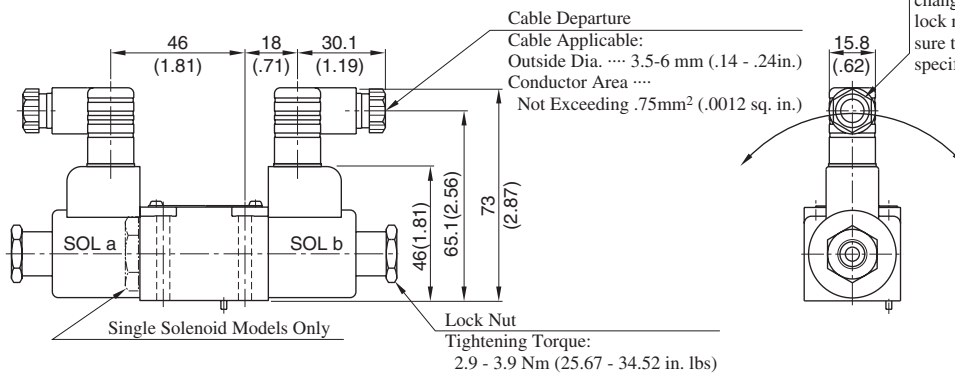
- For other dimensions, refer to "Spring Centred" type.



DIMENSIONS IN
MILLIMETRES (INCHES)

DIN Connector Type / DIN Connector with Indicator Light

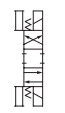
- Spring Centred: DSG-005-3C* - A*_{D*}-N/N1-40/4090
- Spring Offset: DSG-005-2B* - A*_{D*}-N/N1-40/4090



The position of the Plug-in connector can be changed as illustrated below by loosening the lock nut. After completion of the change, be sure to tighten the lock nut with the torque as specified below.

- For other dimensions, refer to "Flying Lead Wire Type".

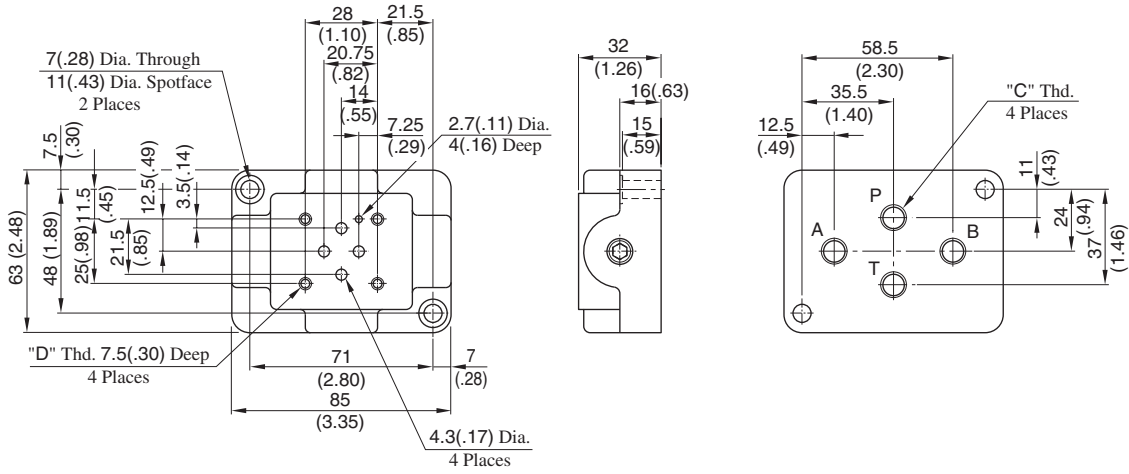
E



DSG-005 Series Solenoid
Operated Directional Valves

■ Sub-plates: DSGM-005* -20/2080/2090

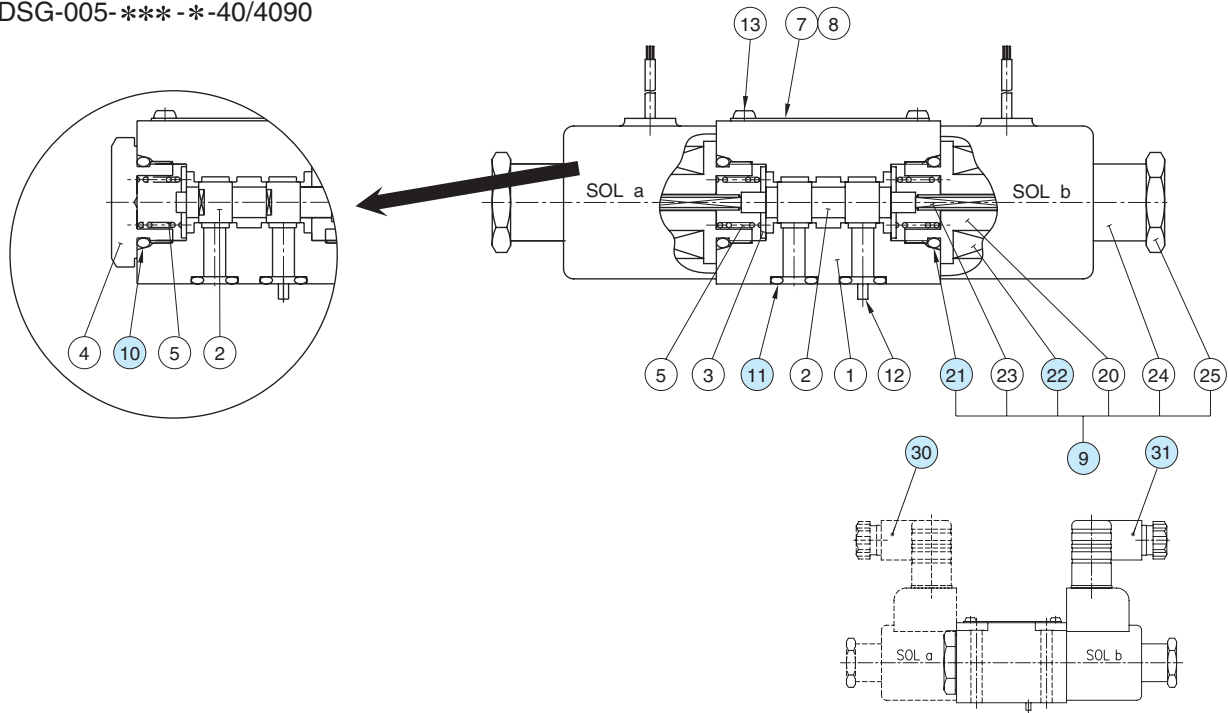
**DIMENSIONS IN
MILLIMETRES (INCHES)**



Sub-plate Model Numbers	Piping Size "C" Thd.	"D" Thd.
DSGM-005X-20	Rc 1/8	M4
DSGM-005X-2080	1/8 BSP. F	
DSGM-005X-2090	1/8 NPT	No. 8-32 UNC
DSGM-005Y-20	Rc 1/4	M4
DSGM-005Y-2080	1/4 BSP. F	
DSGM-005Y-2090	1/4 NPT	No. 8-32 UNC

List of Seals, Solenoid Ass'y, Coil and Connector Ass'y

DSG-005-***-*-40/4090



List of Seals

Item	Name of Parts	Part Numbers	Qty.		Remarks
			3C*	2B*	
10	O-Ring	SO-NB-P14	—	1	
11	O-Ring	SO-NB-P6	4	4	
21	O-Ring	SO-NB-P14	2	1	Included in Solenoid Ass'y

Note: When ordering seals, please specify the seal kit number "KS-DSG-005-40".

Solenoid Ass'y, Coil and Connector Ass'y No.

Valve Model Number	⑨ Solenoid Ass'y No.	⑫ Coil No.	⑳ Connector Ass'y Part No.	㉑ Connector Ass'y Part No.	Remarks
DSG-005-***-A100	SA05-100-40	C-SA05-100-40	—	—	Flying Lead Wire Type
DSG-005-***-A200	SA05-200-40	C-SA05-200-40			
DSG-005-***-D12	SD05-12-40	C-SD05-12-40			
DSG-005-***-D24	SD-05-24-40	C-SD-05-24-40			
DSG-005-***-A100-N	SA05-100-N-40	C-SA05-100-N-40	TK290058-7	TK290058-7	Plug-in Connector Type
DSG-005-***-A200-N	SA05-200-N-40	C-SA05-200-N-40			
DSG-005-***-D12-N	SD05-12-N-40	C-SD05-12-N-40			
DSG-005-***-D24-N	SD-05-24-N-40	C-SD-05-24-N-40			
DSG-005-***-A100-N1	SA05-100-N-40	C-SA05-100-N-40	TK290378-9	TK290378-9	Plug-in Connector with Indicator Light
DSG-005-***-A200-N1	SA05-200-N-40	C-SA05-200-N-40	TK290379-7	TK290379-7	
DSG-005-***-D12-N1	SD05-12-N-40	C-SD05-12-N-40	TK290089-2	TK290089-2	
DSG-005-***-D24-N1	SD-05-24-N-40	C-SD-05-24-N-40	TK290090-0	TK290090-0	

■ 1/8 Solenoid Operated Directional Valves, DSG-01 Series

These are Solenoid Operated Directional Valves of high pressure, high flow and low pressure drop, the features of which can be materialized by employing a powerful wet type solenoid and the rational flow channel design.

● High Pressure & High Flow Rate

In comparison to our existing lines, both the pressure and flow of these valves are much increased.

- Max. Operating Pressure: approx. 10 % increased [31.5→35 MPa (4570 →5080 PSI)]
- Max. T-Line Back Pressure: approx. 30 % increased [16→21 MPa (2320 →3050 PSI)]
- Max. Flow Rate: approx. 60 % increased [63→100 L/min (16.64 →26.42 U.S.GPM)]

● Low Pressure Drop

The pressure drop of these valves is reduced by 10 % from 1.0 to 0.9 MPa (145 to 131 PSI), in comparison to our existing lines*; the valves effectively reduce the energy consumption of the unit.

{* At Flow Rate: 60 L/min (15.9 U.S.GPM), Spool Type: 3C2 (P→A)}

● Compact & Small Mass

Despite of high pressure, high flow and low pressure drop, these valve bodies are compact and lightweight with DC double solenoids; the overall length and mass are reduced from 210 to 205 mm (8.26 to 8.07 inch) and from 2.2 to 1.85 kg (4.85 to 4.08 lbs), respectively.

● Shockless type available

In addition to the standard valves for high pressure and high flow, a shockless type capable of minimizing noise and vibration in piping during spool changeover is also available.

● Stable Operation

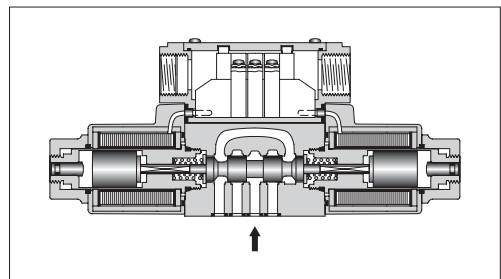
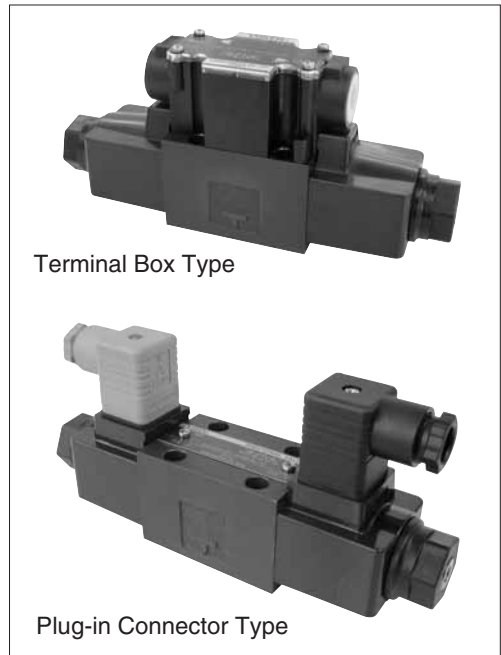
Due to the powerful magnetic and spring force of the solenoids, these valves exhibit a high tolerance to contaminants and especially stable operation.

● IP65-equivalent high dust- and water-proof

These valves demonstrate excellent dust- and water-proof characteristics, in compliance with I. E. C. Pub. 529. IP65 and JIS C 0920 IP65 (dust- and jet-proof type).

● Usable in products of various standards

These standard valves are CE certified for installation in equipment overseas. UL/CSA certified products are also available.



■ Specifications

Valve Type	Model Numbers	Max. Flow ^{★2} L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Max. T-Line Back Pressure MPa (PSI)	Max. Changeover Frequency Cycle/min {min ⁻¹ }	Mass kg (lbs.)
Standard Type	DSG-01-3C*-70/7090	100 (26.4)	35 (5080)	21 (3050)	300 (R Type Sol. Only) 120	1.85 (4.08)
	DSG-01-2D2*-70/7090					1.4(3.09)
	DSG-01-2B*-70/7090					1.4(3.09)
Shockless Type	S-DSG-01-3C*-70/7090	63 (16.6)	25 (3630)	21 (3050)	120	1.85(4.08)
	S-DSG-01-2B2*-70/7090					1.4(3.09)
Low Wattage(14W) Type ^{★1}	L-DSG-01-3C*-70/7090	40 (10.6)	16 (2320)	16 (2320)	300 (R Type Sol. Only) 120	1.85 (4.08)
	L-DSG-01-2D2*-70/7090					1.4(3.09)
	L-DSG-01-2N*-70/7090					
	L-DSG-01-2B***-70/7090					

★ 1. For details of L-DSG-01, please contact us.

★ 2. Maximum flow indicates a ceiling flow depends on the type of spool and operating condition, refer to the List of Spool Functions on pages 347 to 351 for details.

Sub-plate

Piping Size	Japanese Standard "JIS "		European Design Standard		N.American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
1/8	DSGM-01-31	Rc 1/8	DSGM-01-3180	1/8 BSP.F	DSGM-01-3190	1/8 NPT	0.8 (1.8)
1/4	DSGM-01X-31	Rc 1/4	DSGM-01X-3180	1/4 BSP.F	DSGM-01X-3190	1/4 NPT	0.8 (1.8)
3/8	DSGM-01Y-31	Rc 3/8	—	—	DSGM-01Y-3190	3/8 NPT	0.8 (1.8)

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

Mounting Bolt

For socket head cap screws in the table below are included.

Descriptions	Soc. Hd. Cap Screw (4 pcs.)	Tightening Torque
Japanese Standard "JIS" European Design Standard	M5 × 45 Lg.	5 - 7 Nm (43 - 60 in. lbs.) Applicable to working pressure more than 25 MPa (3630 PSI): 6 - 7 Nm (52 - 60 in. lbs.)
N. American Design Standard	No. 10-24 UNC × 1-3/4 Lg.	

Solenoid Ratings

Valve Type	Electric source	Coil Type	Frequency (Hz)	Voltage (V)		Current & Power at Rated Voltage		
				Source Rating	Serviceable Range	Inrush (A) ^{*2}	Holding (A)	Power (W)
Standard Type	AC ^{*1}	A100	50	100	80 - 110	2.42	0.51	—
			60	100	90 - 120	2.14	0.37	
		A120	50	120	96 - 132	2.02	0.42	
			60		108 - 144	1.78	0.31	
		A200	50	200	160 - 220	1.21	0.25	
			60		180 - 240	1.07	0.19	
		A240	50	240	192 - 264	1.01	0.21	
			60		216 - 288	0.89	0.15	
Shockless Type	DC (K Series)	D12	—	12	10.8 - 13.2	—	2.45	29
		D24		24	21.6 - 26.4		1.23	
		D48		48	43.2 - 52.8		0.61	
	AC → DC Rectified (R)	R100	50/60	100	90 - 110	—	0.33	29
		R200		200	180 - 220		0.16	

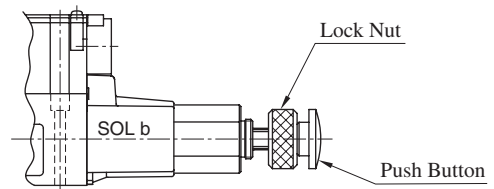
- ^{*1} AC solenoid is not available in shockless type. R type models with built-in current rectifier is recommended for shockless operation with AC power.
- ^{*2} Inrush current in the above table show rms values at maximum stroke.
- ^{*3} There are more coil types other than the above. For details, please make inquiries.

The coil type numbers in the shaded column are handled as optional extras. In case these coils are required to be chosen, please confirm the time of delivery with us before ordering.

Options

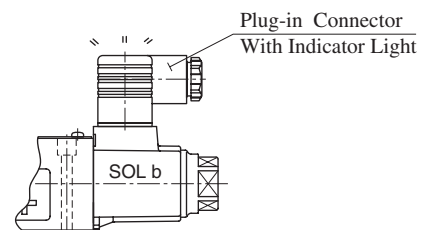
Push Button with Lock Nut

Can be used for manual changeover of spool. The push button can be locked in the pressed condition.



Plug-in Connector with Solenoid Indicator Light

These are the indicator light incorporated plug-in connector type solenoids. Energisation or de-energisation of the solenoid can be easily identified with the incorporated indicator light.



Model Number Designation

F-	S-	DSG	-01	-2	B	2	A	-D24	-C	-N	-70	*	-L			
Special Seals	Shockless Type	Series Number	Valve Size	Number of Valve Positions	Spool-Spring Arrangement	Spool Type	Special Two Position Valve (Omit if not required)	Coil Type	Manual Override	Electrical Conduit Connection	Design Number	Design Standard	Models with Reverse Mtg. of Solenoid (Omit if not required)			
F: For Phosphate Ester Type Fluids (Omit if not required)	None: Standard Type	DSG: Solenoid Operated Directional Valve	01	3: Three Positions	C: Spring Centred	2, 3 4, 40 60, 9 10, 11 12	—	AC: A100 A120 A200 A240	None: Manual Override Pin	None: Terminal Box Type	70	None: Japanese Std. "JIS" 90: N.American Design Std.	—			
						2								D: No-Spring Detented	2	—
	2: Two Positions			B: Spring Offset	2 3 8	A ^{*1} B ^{*1}	R: (AC→DC) R100 R200	C: Push Button and Lock Nut (Option)								
					3: Three Positions									C: Spring Centred	2 4	—
S: Shockless Type	2: Two Positions	B: Spring Offset	2	R: (AC→DC) R100 R200	L											

★1. In case of the special two position valve, please refer to page 352 for details.
 ★2. N1 is not available for R type solenoids.

In the table above, the symbols or numbers highlighted with shade represent the optional extras. The valves with model number having such optional extras are handles as options, therefore, please confirm the time of delivery with us before ordering.

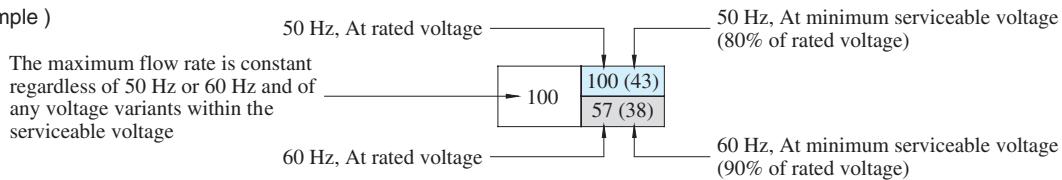
■ List of Standard Models and The Maximum Flow

● Models with AC Solenoids: DSG-01-***-A*

No. of Valve Positions	Spool-Spring Arrangement	Model Numbers	Graphic Symbols	Max. Flow L/min														
				Working Pressure MPa					Working Pressure MPa					Working Pressure MPa				
				10	16	25	31.5	35	10	16	25	31.5	35	10	16	25	31.5	35
Three Positions	Spring Centred	DSG-01-3C2		100	100	100	100	100	100(43) 57(38)	100(41) 53(31)	80(21) 29(17)	60(17) 19(10)	38(15) 13(9)	100(43) 57(38)	100(41) 53(31)	80(21) 29(17)	60(17) 19(10)	38(15) 13(9)
		DSG-01-3C3		100(80) 90(63)	100(80) 90(63)	100(80) 90(63)	100(77) 90(63)	100(77) 90(63)	70(46) 45(30)	70(46) 45(30)	70(46) 45(30)	70(46) 45(30)	70(46) 45(30)	70(46) 45(30)	70(46) 45(30)	70(46) 45(30)	70(46) 45(30)	70(46) 45(30)
		DSG-01-3C4		90	90	90	90(22)	35(18)	100(38) 50(31)	76(28) 38(20)	67(15) 20(10)	57(10) 16(7)	35(7) 12(5)	100(38) 50(31)	76(28) 38(20)	67(15) 20(10)	57(10) 16(7)	35(7) 12(5)
		DSG-01-3C40		85	85	85	80(40)	80(22)	85(40) 80	85(35) 80	85(24) 80	60(16) 50(24)	55(12) 32(16)	85(40) 80	85(35) 80	85(24) 80	60(16) 50(24)	55(12) 32(16)
		DSG-01-3C60★		43(23) 40(23)	43(23) 40(23)	42(23) 38(23)	42(23) 36(23)	42(23) 35(23)	54(32) 48(30)	54(32) 47(30)	52(32) 47(30)	52(32) 47(30)	52(32) 47(30)	54(32) 48(30)	54(32) 47(30)	52(32) 47(30)	52(32) 47(30)	52(32) 47(30)
		DSG-01-3C9		100	100	100	100	100	20	15	10	10	8	20	15	10	10	8
		DSG-01-3C10◆		100	100	100(63)	100(33)	100(27)	100(50) 100(37)	100(37) 55(25)	100(20) 29(14)	78(16) 20(11)	62(13) 15(10)	100(50) 100(37)	100(37) 55(25)	100(20) 29(14)	78(16) 20(11)	62(13) 15(10)
		DSG-01-3C11◆		100	100	100	100	100	23	20	13	10	5	100(65) 70(50)	85(52) 57(40)	72(45) 50(25)	65(34) 43(19)	60(27) 35(18)
		DSG-01-3C12◆		100	100	100(63)	100(33)	100(27)	100(50) 100(37)	100(37) 55(25)	100(20) 29(14)	78(16) 20(11)	62(13) 15(10)	100(50) 100(37)	100(37) 55(25)	100(20) 29(14)	78(16) 20(11)	62(13) 15(10)
		Two Positions	No-Spring Detented	DSG-01-2D2		80	80	80	80	80	45	45	45(21) 36(18)	45(16) 28(13)	38(13) 22(12)	50	50(45) 50(45)	50(42) 50(42)
DSG-01-2B2				85	85	85	85	85	20	16	16	15	13	85(63) 85(30)	80(50) 60(33)	63(40) 50(28)	44(32) 40(28)	44(32) 40(28)
Spring Offset	DSG-01-2B3			70	70	70	70	70	50	50	50	50	50	80(70) 70(48)	80(70) 70(48)	80(70) 70(48)	80(70) 70(48)	80(70) 70(48)
	DSG-01-2B8			—	—	—	—	—	26	17	13	11	10	80(50) 35(20)	70(40) 23(15)	60(20) 15(8)	45(10) 10(5)	30(10) 7(5)

Notes: 1. The relation between the maximum flow in the table above and the frequency/voltage (within the serviceable voltage) is as shown below.

(Example)



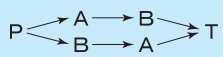
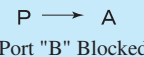
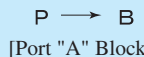
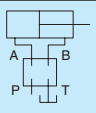
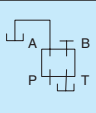
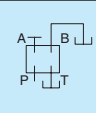







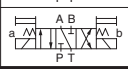

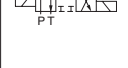



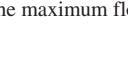
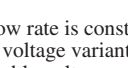
2. For the maximum flow rate in P → T of the valves with a ★ mark, please see page 351.

The valve models with a ◆ mark are handled as Options. If you choose such valves, check the time of delivery beforehand.

DSG-01 Series Solenoid Operated Directional Valves

List of Standard Models and The Maximum Flow

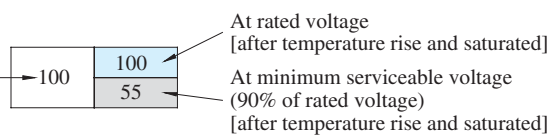
Models with DC or R Type Solenoids: DSG-01-***-D*/R*

No. of Valve Positions	Spool-Spring Arrangement	Model Numbers	Graphic Symbols	Max. Flow L/mi														
									 [Port "B" Blocked]					 [Port "A" Blocked]				
																		
				Working Pressure MPa					Working Pressure MPa					Working Pressure MPa				
				10	16	25	31.5	35	10	16	25	31.5	35	10	16	25	31.5	35
Three Positions	Spring Centred	DSG-01-3C2		100	100	100	100	100	100	45	28	25	22	100	45	28	25	22
		DSG-01-3C3		100	100	100	100	100	78	78	78	78	75	78	78	78	78	75
		DSG-01-3C4		90	90	90	50	38	100	58	38	31	29	100	58	38	31	29
		DSG-01-3C40		85	85	65	40	33	85	52	30	26	24	85	52	30	26	24
		DSG-01-3C60		50	50	50	50	50	66	66	66	66	66	66	66	66	66	66
		DSG-01-3C9		100	100	100	100	100	20	15	10	10	8	20	15	10	10	8
		DSG-01-3C10		85	85	85	80	40	100	56	36	28	24	100	56	36	28	24
		DSG-01-3C11		100	100	100	100	100	23	20	13	10	5	100	60	40	36	32
		DSG-01-3C12		85	85	85	80	40	100	56	36	28	24	100	56	36	28	24
Two Positions	No-Spring Detented	DSG-01-2D2		75	75	75	75	75	45	45	40	30	27	50	50	50	45	45
		DSG-01-2B2		80	80	80	80	80	20	16	16	15	13	46	31	24	22	22
	Spring Offset	DSG-01-2B3		70	70	70	70	70	50	50	50	50	50	75	75	75	75	75
		DSG-01-2B8		—	—	—	—	—	26	17	13	11	10	53	35	23	19	17
		DSG-01-2B8		—	—	—	—	—	26	17	13	11	10	35	30	17	13	12
		DSG-01-2B8		—	—	—	—	—	26	17	13	11	10	35	30	17	13	12

Notes: 1. The relation between the maximum flow in the table above and the voltage (within the serviceable voltage) is as shown below.

(Example)

The maximum flow rate is constant regardless of any voltage variants within the serviceable voltage

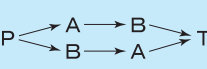
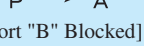

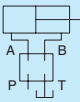







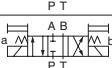
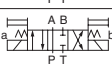



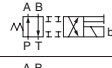


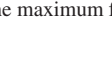
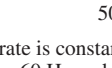


2. For the maximum flow rate in P → T of the valves with a ★ mark, please see [page 351](#).

The valve models with a ◆ mark are handled as Options. If you choose suce valves, check the time of delivery beforehand.

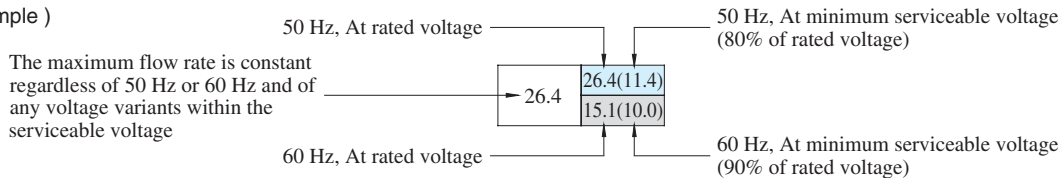
■ List of Standard Models and The Maximum Flow

● Models with AC Solenoids: DSG-01-***-A*

No. of Valve Positions	Spool-Spring Arrangement	Model Numbers	Graphic Symbols	Max. Flow U.S.GPM														
																		
																		
				Working Pressure PSI					Working Pressure PSI					Working Pressure PSI				
				1450	2320	3630	4570	5080	1450	2320	3630	4570	5080	1450	2320	3630	4570	5080
Three Positions	Spring Centred	DSG-01-3C2		26.4	26.4	26.4	26.4	26.4	26.4(11.4)	26.4(10.8)	21.1(5.6)	15.9(4.5)	10.0(4.0)	26.4(11.4)	26.4(10.8)	21.1(5.6)	15.9(4.5)	10.0(4.0)
		DSG-01-3C3		26.4(21.1)	26.4(21.1)	26.4(21.1)	26.4(21.1)	26.4(21.1)	18.5(12.2)	18.5(12.2)	18.5(12.2)	18.5(12.2)	18.5(12.2)	18.5(12.2)	18.5(12.2)	18.5(12.2)	18.5(12.2)	18.5(12.2)
		DSG-01-3C4		23.8	23.8	23.8	23.8	23.8	26.4(10.0)	20.1(17.4)	17.7(4.0)	15.1(2.6)	9.2(1.8)	26.4(10.0)	20.1(17.4)	17.7(4.0)	15.1(2.6)	9.2(1.8)
		DSG-01-3C40		22.5	22.5	22.5	21.1(10.6)	21.1(5.8)	22.5(10.6)	22.5(9.3)	22.5(6.3)	15.9(4.2)	14.5(3.2)	22.5(10.6)	22.5(9.3)	22.5(6.3)	15.9(4.2)	14.5(3.2)
		DSG-01-3C60		11.4(6.1)	11.4(6.1)	11.1(6.1)	11.1(6.1)	11.1(6.1)	14.2(8.4)	14.2(8.4)	13.7(8.4)	13.7(8.4)	13.7(8.4)	14.2(8.4)	14.2(8.4)	13.7(8.4)	13.7(8.4)	13.7(8.4)
		DSG-01-3C9		26.4	26.4	26.4	26.4	26.4	5.3	4.0	2.6	2.6	2.1	5.3	4.0	2.6	2.6	2.1
		DSG-01-3C10		26.4	26.4	26.4	26.4	26.4	26.4(13.2)	26.4(9.8)	26.4(5.3)	20.6(4.2)	16.4(3.4)	26.4(13.2)	26.4(9.8)	26.4(5.3)	20.6(4.2)	16.4(3.4)
		DSG-01-3C11		26.4	26.4	26.4	26.4	26.4	6.1	5.3	3.4	2.6	1.3	26.4(17.2)	22.5(13.7)	19.0(13.7)	17.2(9.0)	15.9(7.1)
		DSG-01-3C12		26.4	26.4	26.4	26.4	26.4	26.4(13.2)	26.4(9.8)	26.4(5.3)	20.6(4.2)	16.4(3.4)	26.4(13.2)	26.4(9.8)	26.4(5.3)	20.6(4.2)	16.4(3.4)
Two Positions	No-Spring Detented	DSG-01-2D2		21.1	21.1	21.1	21.1	21.1	11.9	11.9	11.9(5.6)	11.9(4.2)	10.0(3.4)	13.2	13.2(11.9)	13.2(11.1)	11.9(10.6)	11.9(10.6)
		DSG-01-2B2		22.5	22.5	22.5	22.5	22.5	5.3	4.2	4.2	4.0	3.4	22.5(16.6)	21.1(13.2)	16.6(10.6)	11.6(8.5)	11.6(8.5)
	Spring Offset	DSG-01-2B3		18.5	18.5	18.5	18.5	18.5	13.2	13.2	13.2	13.2	13.2	21.1(18.5)	21.1(18.5)	21.1(18.5)	21.1(18.5)	21.1(18.5)
		DSG-01-2B8		—	—	—	—	—	6.9	4.5	3.4	2.9	2.6	21.1(13.2)	18.5(10.6)	15.9(5.3)	11.9(2.6)	7.9(2.6)
		DSG-01-2B8		—	—	—	—	—	6.9	4.5	3.4	2.9	2.6	9.2(5.3)	6.1(4.0)	4.0(2.1)	2.6(1.3)	1.9(1.3)
		DSG-01-2B8		—	—	—	—	—	6.9	4.5	3.4	2.9	2.6	21.1(13.2)	18.5(10.6)	15.9(5.3)	11.9(2.6)	7.9(2.6)

Notes: 1. The relation between the maximum flow in the table above and the frequency/voltage (within the serviceable voltage) is as shown below.

(Example)



2. For the maximum flow rate in P → T of the valves with a ★ mark, please see [page 351](#).

The valve models with a ◆ mark are handled as Options. If you choose such valves, check the time of delivery beforehand.

DSG-01 Series Solenoid Operated Directional Valves

■ List of Standard Models and The Maximum Flow

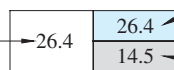
● Models with DC or R Type Solenoids: DSG-01-***-D*/R*

No. of Valve Positions	Spool-Spring Arrangement	Model Numbers	Graphic Symbols	Max. Flow U.S.GPM														
									 [Port "B" Blocked]					 [Port "A" Blocked]				
				Working Pressure PSI					Working Pressure PSI					Working Pressure PSI				
				1450	2320	3630	4570	5080	1450	2320	3630	4570	5080	1450	2320	3630	4570	5080
Three Positions	Spring Centred	DSG-01-3C2		26.4	26.4	26.4	26.4	26.4	26.4	11.9	7.4	6.6	5.8	26.4	11.9	7.4	6.6	5.8
		DSG-01-3C3		26.4	26.4	26.4	26.4	26.4	20.6	20.6	20.6	20.6	19.8	20.6	20.6	20.6	20.6	19.8
		DSG-01-3C4		23.8	23.8	23.8	13.2	10.0	26.4	15.3	10.0	8.2	7.7	26.4	15.3	10.0	8.2	7.7
		DSG-01-3C40		22.5	22.5	17.2	10.6	8.7	22.5	13.7	7.9	6.9	6.3	22.5	13.7	7.9	6.9	6.3
		DSG-01-3C60		13.3	13.3	13.3	13.3	13.3	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4
		DSG-01-3C9		26.4	26.4	26.4	26.4	26.4	5.3	4.0	2.6	2.6	2.1	5.3	4.0	2.6	2.6	2.1
		DSG-01-3C10		22.5	22.5	22.5	21.1	10.6	26.4	14.8	9.5	7.4	6.3	26.4	14.8	9.5	7.4	6.3
		DSG-01-3C11		26.4	26.4	26.4	26.4	26.4	6.1	5.3	3.4	2.6	1.3	26.4	15.9	10.6	9.5	8.5
		DSG-01-3C12		22.5	22.5	22.5	21.1	10.6	26.4	14.8	9.5	7.4	6.3	26.4	14.8	9.5	7.4	6.3
Two Positions	No-Spring Detented	DSG-01-2D2		19.8	19.8	19.8	19.8	19.8	11.9	11.9	10.6	7.9	7.1	13.2	13.2	11.9	11.9	
		DSG-01-2D2		18.5	18.5	18.5	18.5	18.5	7.9	6.6	5.8	13.2	11.1	10.6	10.6			
	Spring Offset	DSG-01-2B2		21.1	21.1	21.1	21.1	21.1	5.3	4.2	4.2	4.0	3.4	12.2	8.2	6.3	5.8	5.8
		DSG-01-2B3		18.5	18.5	18.5	18.5	18.5	13.2	13.2	13.2	13.2	13.2	19.8	19.8	19.8	19.8	19.8
		DSG-01-2B3		18.5	18.5	18.5	18.5	18.5	13.2	13.2	13.2	13.2	13.2	17.2	17.2	17.2	17.2	17.2
		DSG-01-2B8		—	—	—	—	—	6.9	4.5	3.4	2.9	2.6	14.0	9.2	6.1	5.0	4.5
DSG-01-2B8		—	—	—	—	—	6.9	4.5	3.4	2.9	2.6	9.3	7.9	4.5	3.4	3.2		

Notes: 1. The relation between the maximum flow in the table above and the voltage (within the serviceable voltage) is as shown below.

(Example)

The maximum flow rate is constant regardless of any voltage variants within the serviceable voltage



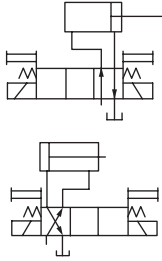
At rated voltage [after temperature rise and saturated]
26.4
At minimum serviceable voltage (90% of rated voltage) [after temperature rise and saturated]
14.5

2. For the maximum flow rate in P → T of the valves with a ★ mark, please see page 351.

The valve models with a ◆ mark are handled as Options. If you choose suce valves, check the time of delivery beforehand.

Maximum Flow of Centre By-Pass

In valve type 3C60, in case where the actuator is put on in between the cylinder ports A and B as illustrated below and where the actuator moves and suspended at its stroke end and where the valve is then shifted to the neutral position in the suspended state of the actuator, the maximum flow rates available are those as shown as the table below regardless of any voltage in the range of serviceable voltage.



Mode Numbers	Graphic Symbol	Max. Flow L/min (U.S.GPM)				
		10 MPa (1450 PSI)	16 MPa (2320 PSI)	25 MPa (3630 PSI)	31.5 MPa (4570 PSI)	35 MPa (5080 PSI)
DSG-01-3C60-A*/D*/R*		55 (14.5)	44 (11.6)	30 (7.9)	26 (6.9)	22 (5.8)

List of Shockless Models and The Maximum Flow

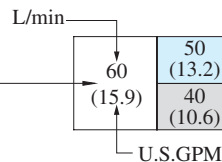
- Models with DC or R Type Solenoids: S-DSG-01-***-D*/R*

No. of Valve Positions	Spool-Spring Arrangement	Model Numbers	Graphic Symbol	Max. Flow L/min (U.S.GPM)								
							P → A [Port "B" Blocked]			P → B [Port "A" Blocked]		
				Working Pressure MPa (PSI)			Working Pressure MPa (PSI)			Working Pressure MPa (PSI)		
				10 (1450)	16 (2320)	25 (3630)	10 (1450)	16 (2320)	25 (3630)	10 (1450)	16 (2320)	25 (3630)
Three Positions	Spring Centred	S-DSG-01-3C2		63 (16.6)	63 (16.6)	40 (10.6)	40 (10.6)	32 (8.5)	25 (6.6)	40 (10.6)	32 (8.5)	25 (6.6)
		S-DSG-01-3C4		60 (15.9)	50 (13.2)	40 (10.6)	40 (10.6)	32 (8.5)	16 (4.2)	40 (10.6)	32 (8.5)	16 (4.2)
Two Positions	Spring Offset	S-DSG-01-3B2		50 (13.2)	45 (11.9)	45 (11.9)	30 (7.9)	30 (7.9)	30 (7.9)	60 (15.9)	40 (10.6)	40 (10.6)
				45 (11.9)	40 (10.6)	40 (10.6)						

Notes: 1. The relation between the maximum flow in the table above and the voltage (within the serviceable voltage) is as shown below.

(Example)

The maximum flow rate is constant regardless of any voltage variants within the serviceable voltage



At rated voltage [after temperature rise and saturated]
At minimum serviceable voltage (90% of rated voltage) [after temperature rise and saturated]

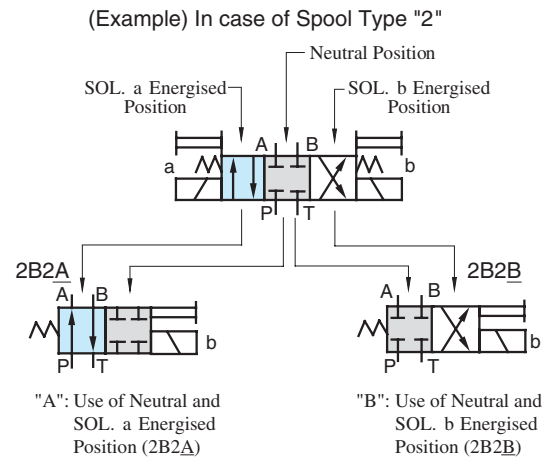
■ Reverse Mounting of Solenoid.

In spring offset type, it is a standard configuration that the solenoid is mounted onto the valve in the SOL b position (side). However, in this particular spool-spring arrangement, the mounting of the solenoid onto the valve in the reverse position -SOL a side- is also available. The graphic symbol for this reverse mounting is as shown below. As for the valve type 2B*A and 2B*B, please refer to the explanation under the heading of "Valves Using Neutral Position and Side Position" given below.



■ Valves Using Neutral Position and Side Position. (Special Two position Valve)

Besides the use of the standard 2-position valves aforementioned in the "List of Standard Models and Maximum Flow", the 3-position valves also can be used as the 2-position valves using the two of their three positions. In this case, there are two kinds of the valve available. One is the valve using the neutral position and SOL a position (2B*A) and another is the valve using the neutral position and SOL b position (2B*B).



Model Numbers	Graphic SymbolsG	
	Standard Mtg. Type	Reverse Mtg. Type
DSG-01-2B*A		
DSG-01-2B2A		—

Model Numbers	raphic Symbols	
	Standard Mtg. Type	Reverse Mtg. Type
DSG-01-2B*B		
DSG-01-2B2B		—
DSG-01-2B3B		—
DSG-01-2B4B		
DSG-01-2B60B		—
DSG-01-2B10B		—

In the above table, the graphic symbols in mounting type highlighted with shade are optional extra, therefore, please confirm the time of delivery with us before ordering.

■ Typical Changeover Time

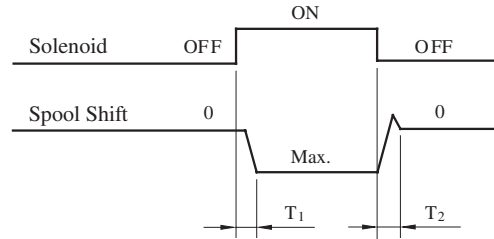
Changeover time varies according to oil viscosity, spool type and hydraulic circuit.

● Standard Type (Without Shockless Function)

[Test Conditions]

Pressure: 16 MPa (2320 PSI)
 Flow Rate: 31.5 L/min (8.3 U.S.GPM)
 Viscosity: 35 mm²/s (164 SSU)
 Voltage: 100 %V
 (After coil temprature rises and saturated)

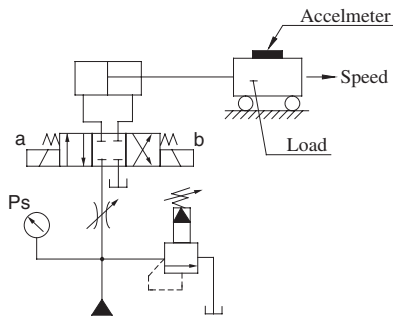
[Result of Measurement]



Type	Model Numbers	Time ms	
		T ₁	T ₂
Standard Type	DSG-01-3C2- A*	15	23
	DSG-01-3C2- D*	48	19
	DSG-01-3C2- R*	50	100

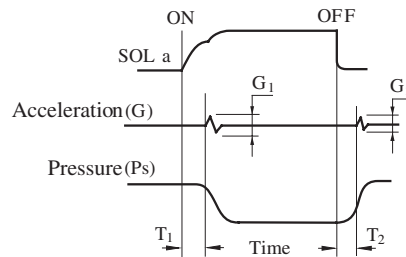
● Shockless Type

[Test Circuit and Conditions]



Setting Pressure (Ps): 7 MPa (1020 PSI)
 Load (W): 1000 kg (2205 lbs.)
 Speed: 8 m/min (26.2 ft./min)
 Viscosity: 35 mm²/s (164 SSU)

[Results of Measurement]

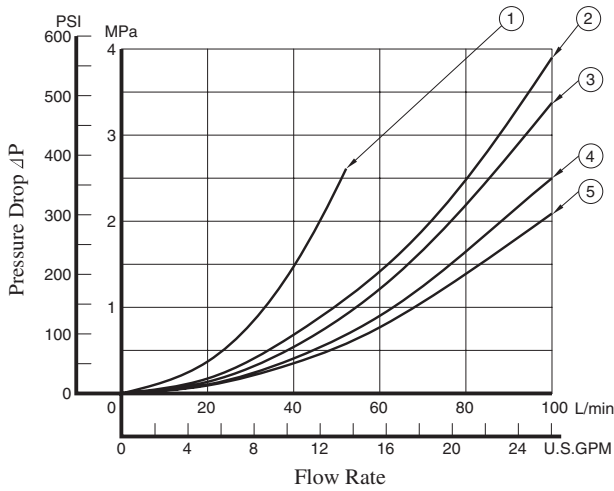


Type	Model Numbers	Time ms		Acceleration m/s ² (G)	
		T ₁	T ₂	G ₁	G ₂
Shockless Type	S-DSG-01-3C2- D*	70	30	12 (1.2)	7 (0.7)
Standard Type	DSG-01-3C2- D*	35	25	18 (1.8)	15 (1.5)

Pressure Drop

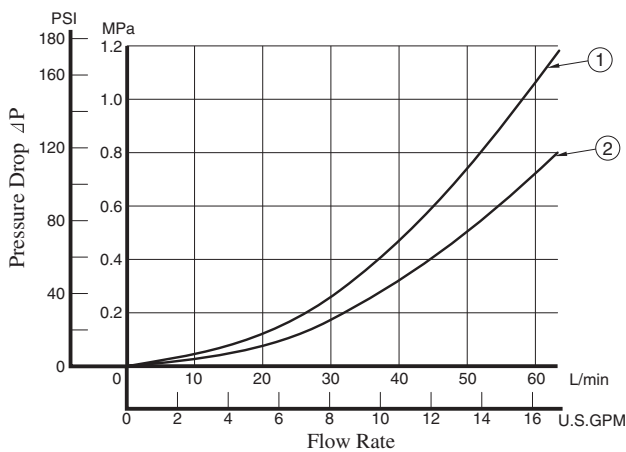
Pressure drop curves based on viscosity of 35 mm²/s (164 SSU) and specific gravity of 0.850.

Standard Type: DSG-01



Model Numbers	Pressure Drop Curve Number				
	P→A	B→T	P→B	A→T	P→T
DSG-01-3C2	④	④	④	④	—
DSG-01-3C3	⑤	⑤	⑤	⑤	②
DSG-01-3C4	④	④	④	④	—
DSG-01-3C40	④	④	④	④	—
DSG-01-3C60	①	①	①	①	②
DSG-01-3C9	⑤	③	⑤	③	—
DSG-01-3C10	④	⑤	④	④	—
DSG-01-3C11	④	④	④	④	—
DSG-01-3C12	④	④	④	⑤	—
DSG-01-2D2	⑤	④	⑤	④	—
DSG-01-2B2	⑤	④	⑤	④	—
DSG-01-2B3	⑤	⑤	⑤	⑤	—
DSG-01-2B8	⑤	—	④	—	—

Shockless Type: S-DSG-01



Model Numbers	Pressure Drop Curve Number			
	P→A	B→T	P→B	A→T
S-DSG-01-3C2	①	①	①	①
S-DSG-01-3C4	①	②	①	②
S-DSG-01-2B2	①	①	①	①

For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
		SSU	77	98	141	186	232	278	324	371	417
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

$$\Delta P' = \Delta P (G'/0.850)$$

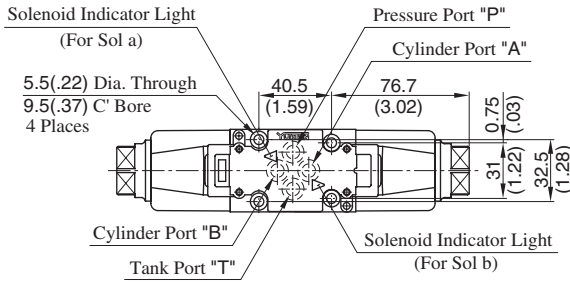
Mounting surface: ISO 4401-AB-03-4-A

TERMINAL BOX TYPE

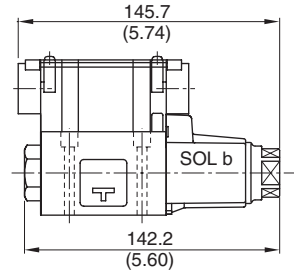
Models with AC Solenoids

- Double Solenoid: Spring Centred & No-Spring Detented

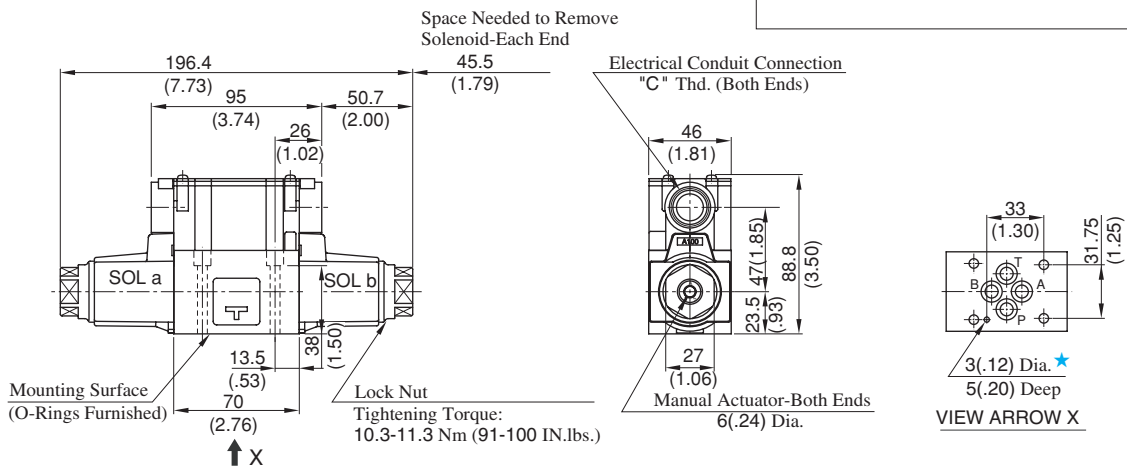
DSG-01-3C*-A*-70/7090



- Single Solenoid: Spring Offset
DSG-01-2B*-A*-70/7090



- For other dimensions, refer to "spring Centred and No-Spring Detented" models.
- Solenoid being mounted in the reverse position SOL a side is also available.



Model Numbers	"C" Thd.
DSG-01-***-A*-70	G 1/2
DSG-01-***-A*-7090	1/2 NPT

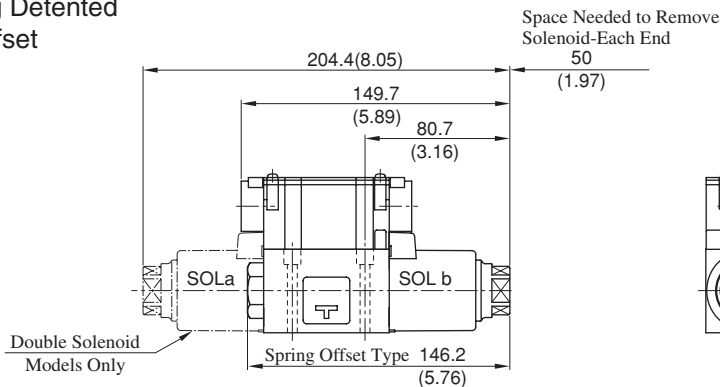
- ★ Locating pin can be fitted to this hole to conform with ISO4401-03-02-94. However, locating pin is not provided to standard design valve. When ordering valve with a locating pin, please consult Yuken.

DIMENSIONS IN MILLIMETRES (INCHES)

Models with DC Solenoids: (S-)DSG-01-***-D*-70/7090

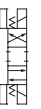
Models with R Type Solenoids: (S-)DSG-01-***-R*-70/7090

- Spring Centred
- No-Spring Detented
- Spring Offset



- For other dimensions, refer to models with AC solenoids.

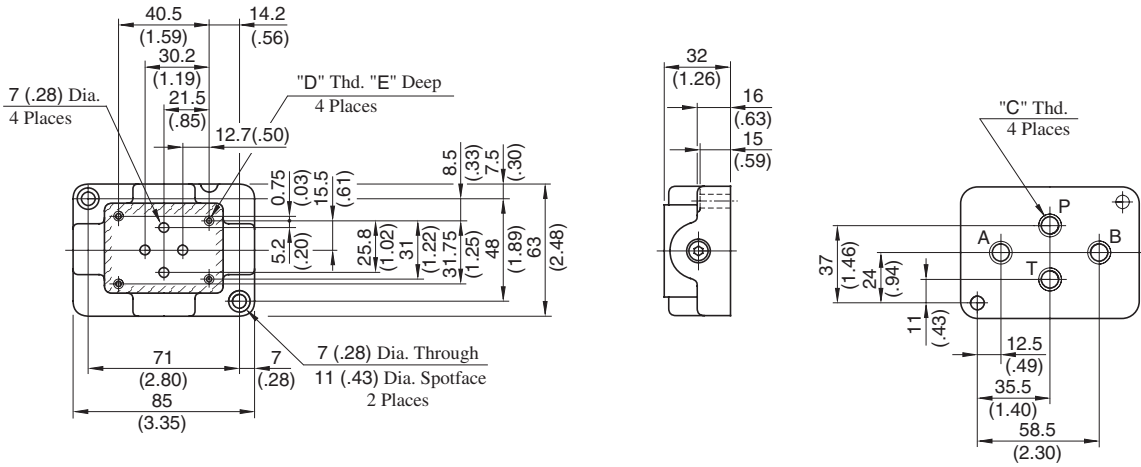
E



DSG-01 Series Solenoid Operated Directional Valves

■ Sub-plate : DSGM-01/01X/01Y-31/3180/3190

**DIMENSIONS IN
MILLIMETRES (INCHES)**



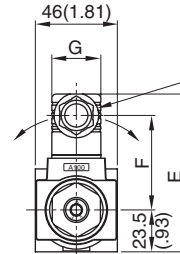
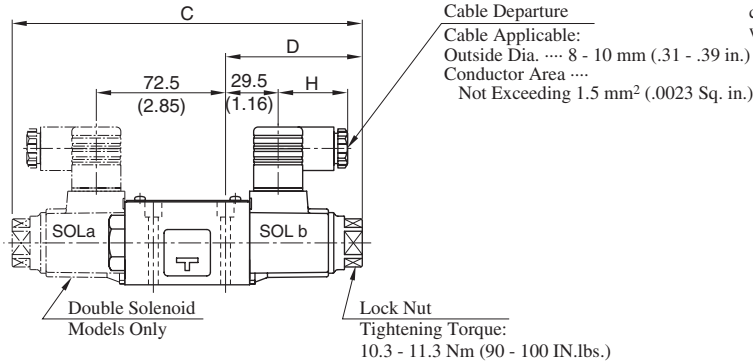
Sub-plate Model Numbers	Piping Size "C" Thd.	"D" Thd.	"E" mm(IN.)
DSGM-01-31	Rc 1/8	M5	10 (.39)
DSGM-01-3180	1/8 BSP.F		
DSGM-01-3190	1/8 NPT	No.10-24 UNC	12 (.47)
DSGM-01X-31	Rc 1/4	M5	10 (.39)
DSGM-01X-3180	1/4 BSP.F		
DSGM-01X-3190	1/4 NPT	No.10-24 UNC	12 (.47)
DSGM-01Y-31	Rc 3/8	M5	10 (.39)
DSGM-01Y-3190	3/8 NPT	No. 10-24 UNC	12 (.47)

PLUG-IN CONNECTOR TYPE (N) PLUG-IN CONNECTOR WITH INDICATOR LIGHT (N1)

- Models with AC Solenoids: DSG-01-***-A*-N₁-70/7090
- Models with DC Solenoids: (S-)DSG-01-***-D*-N₁-70/7090
- Models with R Solenoids: (S-)DSG-01-***-R*-N-70/7090

DIMENSIONS IN
MILLIMETRES (INCHES)

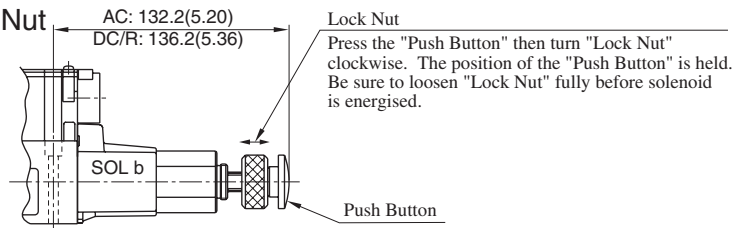
The position of the Plug-in connector can be changed as illustrated below by loosening the lock nut. After completion of the change, be sure to tighten the lock nut with the torque as specified below.



Model Numbers	C	D	E	F	G	H
DSG-01-***-A*-N*	196.4 (7.73)	76.7 (3.02)	88.5 (3.48)	53 (2.09)	27.5 (1.08)	39 (1.54)
(S-)DSG-01-***-D*-N*	204.4 (8.05)	80.7 (3.18)	99.5 (3.92)	64 (2.52)	27.5 (1.08)	39 (1.54)
(S-)DSG-01-***-R*-N	204.4 (8.05)	80.7 (3.18)	102.5 (4.04)	57.2 (2.25)	34 (1.34)	53 (2.09)

● For other dimensions, refer to "Terminal Box type" (Page 356).

Models with Push Button & Lock Nut (S-)DSG-01-***-*-C



Interchangeability in Installation Current and New Design

In order to achieve higher pressure, higher flow, lower pressure drop DSG-01 valves has been upgraded from the 60 design series to the 70 design series.

The figures in the table below are the comparison between the current and the new design valves.

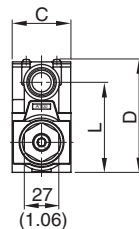
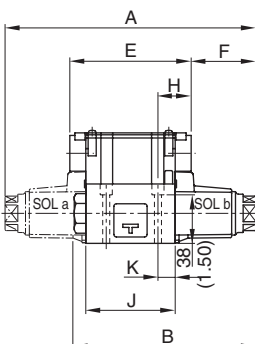
Specifications

Design Number	Max. Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Max. T-Line Back Pres. MPa (PSI)	Max. Changeover Frequency Cycle/min (min ⁻¹)	Pressure Drop* MPa (PSI) {P→A}	Mass kg (lbs.)	
						3C*/2D*	2B*
New Design: 70	100(26.4)	35(5080)	21(3050)	300 (R Type sol. Only 120)	0.9(130) 1.0(145)	1.85(4.08)	1.4(3.09)
Current Design: 60	63(16.6)	31.5(4570)	16(2320)			2.2(4.85)	1.6(3.53)

* Flow Rate: 60 L/min (15.9 U.S.GPM), Viscosity: 30 mm²/s (141 SSU), Spool type "2" (Closed centre)

Interchangeability in Installation

Interchangeability in installation is maintained though there are minor differences in dimension as in the following table.



Coil Type	Design Number	A	B	C	D	E	F	H	J	K	L
AC	New Design : 70	196.4 (7.73)	142.2 (5.60)	46 (1.81)	88.8 (3.50)	95 (3.74)	50.7 (2.00)	26 (1.02)	70 (2.76)	13.5 (.53)	70.5 (2.78)
	Current Design : 60	191.4 (7.54)	142.7 (5.62)	48 (1.89)	90.3 (3.56)	90 (3.54)	50.7 (2.00)	23.5 (.93)	65 (2.56)	11 (.43)	72 (2.83)
DC R	New Design : 70	204.4 (8.05)	146.2 (5.76)	46 (1.81)	88.8 (3.50)	95 (3.74)	54.7 (2.15)	26 (1.02)	70 (2.76)	13.5 (.53)	70.5 (2.78)
	Current Design : 60	210 (8.27)	152 (5.98)	48 (1.89)	90.3 (3.56)	90 (3.54)	60 (2.36)	23.5 (.93)	65 (2.56)	11 (.43)	72 (2.83)

■ Details of Receptacle

Type of Electrical Conduit Connection	Double Solenoid Type	Single Solenoid Type
Terminal Box Type		
Plug-in Connector Type		

- ★1. There are two grounding terminals. You can use either one.
- ★2. If you do not need the common plate, remove it.
- ★3. With DC solenoids, polarity is no question.

⚠ DANGER

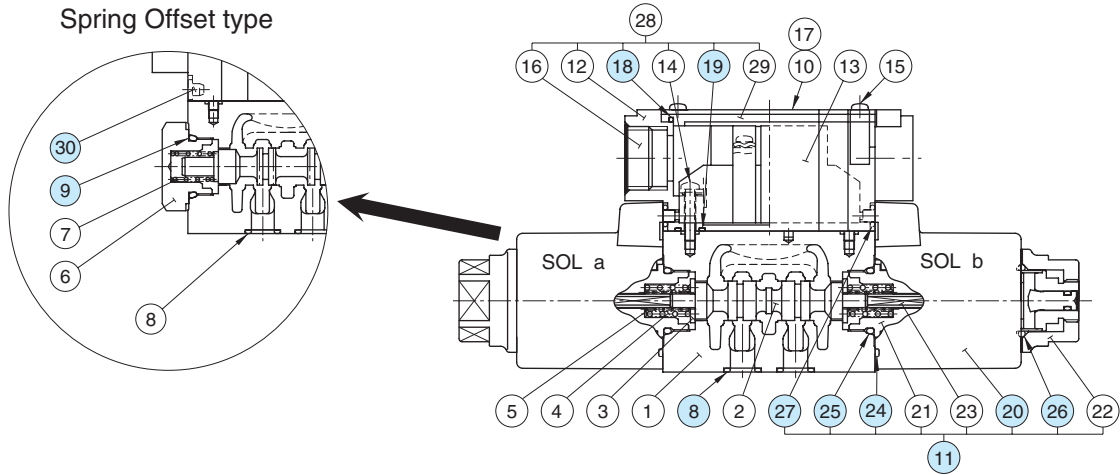
- Do not perform wiring while the power is on. Doing so may result in electric shock, burns or death.
- Make the wiring properly. Improper wiring will cause an irregular movement of the machine, resulting in a grave accident.

■ Electrical Circuit

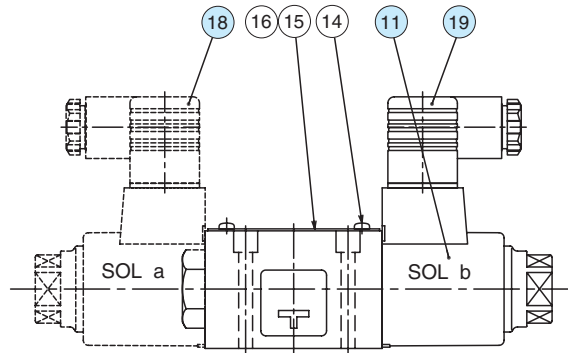
Type of Electrical Conduit Connection	Electric Source		
	AC	DC	AC→DC Rectified
Terminal Box Type			
Plug-in Connector Type			

List of Seals

*-DSG-01-***-*-70/7090



*-DSG-01-***-*-N/N1-70/7090



List of Seals

Item	Name of Parts	Part Numbers	Qty.			Remarks
			3C*	2D*	2B*	
8	O-Ring	SO-NB-A-012 (NBR, Hs90)	4	4	4	
9	O-Ring	SO-NB-P18	—	—	1	
18	Packing	1790S-VK421290-8	1	1	1	
19	O-Ring	S6	2	2	2	
24	O-Ring	AS 568-026 (NBR, Hs70)	2	2	1	} Included in Solenoid Ass'y (Item 11)
25	O-Ring	SO-NB-P18	2	2	1	
26	O-Ring	SO-NA-P20	2	2	1	
27	O-Ring	SO-NA-P4	4	4	2	
30	Plug	1790S-VK418329-9	—	—	2	

★ When ordering the O-Rings, please specify the seal kit number from the table below.

Valve Model Numbers	Seal Kit No.	O-Ring Details for Seal Kit
*-DSG-01-***-*-70/7090	KS-DSG-01-70	(8)(4 Pcs.), (9) & (25) (2 Pcs., see above), (27) (4 Pcs.)
*-DSG-01-***-*-N-70/7090	KS-DSG-01-N-70	(8)(4 Pcs.), (9) & (25) (2 Pcs., see above)

● Solenoid Ass'y, Coil, Receptacle and Connector Refer to [page 360](#) for the details of these parts.

■ Solenoid Ass'y, Coil, Receptacle and Connector Ass'y No.

Valve Model Numbers	⑪ Solenoid Ass'y No.	⑫ Coil No.	⑬ Receptacle Part No.	⑱ Connector Ass'y Part No.	⑲ Connector Ass'y Part No.	Remarks		
DSG-01-***-A100-70*	SA1-100-70	C-SA1-100-70	R1-70	—	—	Terminal Box Type		
DSG-01-***-A120-70*	SA1-120-70	C-SA1-120-70						
DSG-01-***-A200-70*	SA1-200-70	C-SA1-200-70						
DSG-01-***-A240-70*	SA1-240-70	C-SA1-240-70						
DSG-01-***-D12-70*	SD1-12-70	C-SD1-12-70	KR1-A-70					
DSG-01-***-D24-70*	SD1-24-70	C-SD1-24-70	KR1-B-70					
DSG-01-***-D48-70*	SD1-48-70	C-SD1-48-70	RR1-70					
DSG-01-***-R100-70*	SR1-100-70	C-SR1-100-70	KR1-A-70					
DSG-01-***-R200-70*	SR1-200-70	C-SR1-200-70						
S-DSG-01-***-D12-70*	SD1-12-S-70	C-SD1-12-70	KR1-B-70					
S-DSG-01-***-D24-70*	SD1-24-S-70	C-SD1-24-70	RR1-70					
S-DSG-01-***-D48-70*	SD1-48-S-70	C-SD1-48-70						
S-DSG-01-***-R100-70*	SR1-100-S-70	C-SR1-100-70	RR1-70					
S-DSG-01-***-R200-70*	SR1-200-S-70	C-SR1-200-70						
DSG-01-***-A100-N-70*	SA1-100-N-70	C-SA1-100-N-70	—				GDM-211-A-11	GDM-211-B-11
DSG-01-***-A120-N-70*	SA1-120-N-70	C-SA1-120-N-70						
DSG-01-***-A200-N-70*	SA1-200-N-70	C-SA1-200-N-70						
DSG-01-***-A240-N-70*	SA1-240-N-70	C-SA1-240-N-70						
DSG-01-***-D12-N-70*	SD1-12-N-70	C-SD1-12-N-70						
DSG-01-***-D24-N-70*	SD1-24-N-70	C-SD1-24-N-70						
DSG-01-***-D48-N-70*	SD1-48-N-70	C-SD1-48-N-70		GDME-211-R-A-10	GDME-211-R-B-10			
DSG-01-***-R100-N-70*	SR1-100-N-70	C-SR1-100-N-70						
DSG-01-***-R200-N-70*	SR1-200-N-70	C-SR1-200-N-70		GDM-211-A-11	GDM-211-B-11			
S-DSG-01-***-D12-N-70*	SD1-12-S-N-70	C-SD1-12-N-70						
S-DSG-01-***-D24-N-70*	SD1-24-S-N-70	C-SD1-24-N-70		GDME-211-R-A-10	GDME-211-R-B-10			
S-DSG-01-***-D48-N-70*	SD1-48-S-N-70	C-SD1-48-N-70						
S-DSG-01-***-R100-N-70*	SR1-100-S-N-70	C-SR1-100-N-70		GDML-211-1-11	GDML-211-1-11			
S-DSG-01-***-R200-N-70*	SR1-200-S-N-70	C-SR1-200-N-70						
DSG-01-***-A100-N1-70*	SA1-100-N-70	C-SA1-100-N-70		—	GDML-211-2-11	GDML-211-2-11	Plug-in Connector with Indicator Light	
DSG-01-***-A120-N1-70*	SA1-120-N-70	C-SA1-120-N-70						
DSG-01-***-A200-N1-70*	SA1-200-N-70	C-SA1-200-N-70			GDML-211-3-11	GDML-211-3-11		
DSG-01-***-A240-N1-70*	SA1-240-N-70	C-SA1-240-N-70						
DSG-01-***-D12-N1-70*	SD1-12-N-70	C-SD1-12-N-70	GDML-211-1-11		GDML-211-1-11			
DSG-01-***-D24-N1-70*	SD1-24-N-70	C-SD1-24-N-70						
DSG-01-***-D48-N1-70*	SD1-48-N-70	C-SD1-48-N-70	GDML-211-2-11		GDML-211-2-11			
S-DSG-01-***-D12-N1-70*	SD1-12-S-N-70	C-SD1-12-N-70						
S-DSG-01-***-D24-N1-70*	SD1-24-S-N-70	C-SD1-24-N-70	GDML-211-3-11		GDML-211-3-11			
S-DSG-01-***-D48-N1-70*	SD1-48-S-N-70	C-SD1-48-N-70						

Note: The connector assembly is not included in the solenoid assembly.

3/8 Solenoid Operated Directional Valves, DSG-03 Series

These are epoch-making solenoid operated valves of high pressure, high flow which have been developed incorporating a unique design concept into every part of the valve including the solenoid. With wet type solenoids, these valves ensure the low noise and the long life, moreover, ensure no leakage of oil outside of the valves.

Wide Range of Models

Choose the optimum valve to meet your need from a large selection available. The DSG-03 50 design series solenoid operated directional valves are classified into the two basic models.

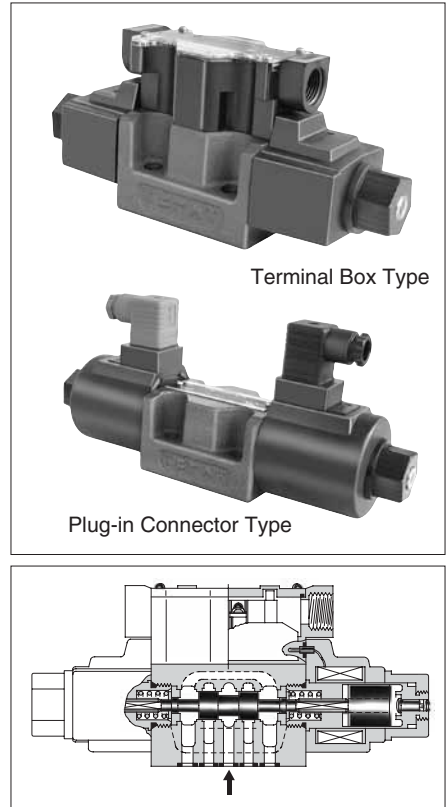
- Standard type Useable at high pressure: 31.5 MPa (4570 PSI) and high flow: 120 L/min (31.7 U.S.GPM)
- Shockless type A noise at spool changeover and a vibration in piping can be reduced to a minimum.

Stable Operation

With a strong magnet and spring force, the valves are tough against contamination and thus ensure a stable operation.

Usable in products of various standards

CE/UL/CSA certified products are available.



Specifications

Valve Type	Model Numbers	Max. Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Max. T-Line Back Pres. MPa (PSI)	Max. Changeover Frequency min ⁻¹ (Cycles/Min)	Approx. Mass kg(1bs.)	
						Type of Solenoid	
						AC	DC, R, RQ
Standard Type	DSG-03-3C*-*/-50/5090	120 (31.7)	31.5 (4570) [Spool Type 60 Only] 25 (3630)]	16 (2320)	240 (R Type Sol. Only) 120	3.6 (7.9)	5 (11)
	DSG-03-2D2*-*/-50/5090					2.9 (6.4)	3.6 (7.9)
	DSG-03-2B*-*/-50/5090					—	3.6 (7.9)
Shockless Type	S-DSG-03-3C*-*/-50/5090	120 (31.7)	25 (3630)	16 (2320)	120	—	5 (11)
	S-DSG-03-2B2*-*/-50/5090					—	3.6 (7.9)
Low Wattage (14W)Type	L-DSG-03-3C*-*/-50/5090	60 (15.9)	16 (2320)	16 (2320)	240 (R Type Sol. Only) 120	3.6 (7.9)	5 (11)
	L-DSG-03-2D2*-*/-50/5090					—	3.6 (7.9)
	L-DSG-03-2B*-*/-50/5090					2.9 (6.4)	3.6 (7.9)

★1 For details of L-DSG-03, please contact us.

★2 The maximum flow means the limited flow without inducing any abnormality to the operation (changeover) of the valve. The maximum flow differs according to the spool type and operating conditions. For details, please refer to the "List of Standard Models and Maximum Flow" on pages 364 to 368.

Sub-plate

Piping Size	Japanese Standard "JIS"		European Design Standard		N.American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
3/8	DSGM-03-40	Rc 3/8	DSGM-03-2180	3/8 BSP.F	DSGM-03-2190	3/8 NPT	3.0 (6.6)
1/2	DSGM-03X-40	Rc 1/2	DSGM-03X-2180	1/2 BSP.F	DSGM-03X-2190	1/2 NPT	3.0 (6.6)
3/4	DSGM-03Y-40	Rc 3/4	DSGM-03Y-2180	3/4 BSP.F	DSGM-03Y-2190	3/4 NPT	4.7 (10.4)

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

Mounting Bolts

For socket head cap screws in the table below are included.

Descriptions	Soc. Hd. Cap Screw (4 pcs.)	Tightening Torque
Japanese Standard "JIS" European Design Standard	M6 × 35 Lg.	12 - 15 Nm (106 - 133 in. lbs.)
N. American Design Standard	1/4-20 UNC × 1-1/2 Lg.	

E
DSG-03 Series Solenoid Operated Directional Valves

Solenoid Ratings

Valve Type	Electric source	Coil Type	Frequency (Hz)	Voltage (V)		Current & Power at Rated Voltage		
				Source Rating	Serviceable Range	Inrush (A) ^{★2}	Holding (A)	Power (W)
Standard Type	AC ^{★1}	A100	50	100	80 - 110	5.37	0.90	—
			60	100	90 - 120	4.57	0.63	
				110		5.03	0.77	
		A120	50	120	96 - 132	4.48	0.75	
			60		108 - 144	3.81	0.52	
		A200	50	200	160 - 220	2.69	0.45	
					180 - 240	2.29	0.31	
			60	220		2.52	0.38	
					A240	50	240	
		60	216 - 288	1.91		0.26		
Shockless Type	DC (K Series)	D12	—	12	10.8 - 13.2	—	3.16	38
		D24		24	21.6 - 26.4		1.57	
		D100		100	90 - 110		0.38	
	AC→DC Rectified (R)	R100	50/60	100	90 - 110	—	0.43	38
		R200		200	180 - 220		0.21	
	AC→DC Rectified (RQ) (Quick Return)	RQ100	50/60	100	90 - 110	—	0.43	38

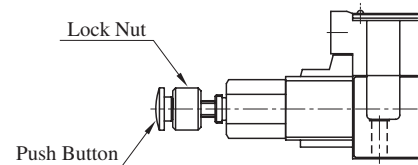
- ★1. AC solenoid is not available in shockless type.
R or RQ type models with built-in current rectifier is recommended for shockless operation with AC power.
- ★2. Inrush current in the above table show rms values at maximum stroke.
- ★3. There are more coil types other than the above. For details, please make inquiries .

The coil type numbers in the shaded column are handled as optional extras. In case these coils are required to be chosen, please confirm the time of delivery with us before ordering .

Options

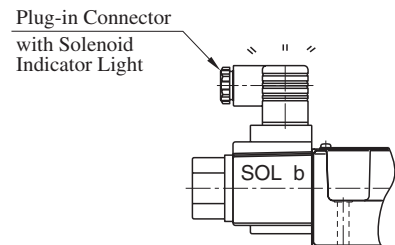
● Push Button with Lock Nut

Can be used for manual changeover of spool. The push button can be locked in the pressed condition.



● Plug-in Connector with Solenoid Indicator Light

These are the indicator light incorporated plug-in connector type solenoids. Energisation or de-energisation of the solenoid can be easily identified with the incorporated indicator light.



● M8 Mounting Bolts.

As the mounting bolts, M6 socket head cap screws are used for the standard valves, however, M8 socket head cap screws are also available for supply as optional extras. In case the M8 screws are required, suffix "02" to the design number of both valve and sub-plate model number like below.

(Example)

Valve: DSG-03-3C2-A100-5002
Sub-plate: DSGM-03-4002

The valve is supplied with 4 pcs. hexagon socket head cap screws M8 × 38 Lg.

Model Number Designation

F-	S-	DSG	-03	-2	B	2	A	-D24	-C	-N	-50	*	-L									
Special Seals	Shockles Type	Series Number	Valve Size	Number of Valve Positions	Spool-Spring Arrangement	Spool Type	Special Two Position Valve (Omit if not required)	Coil Type	Manual Override	Electrical Conduit Connection	Design Number	Design Standard	Models with Reverse Mtg. of Solenoid (Omit if not required)									
F: For Phosphate Ester Type Fluids (Omit if not required)	None: Standard Type	DSG: Solenoid Operated Directional Valve	03	3: Three Positions	C: Spring Centred	2, 3	—	AC: A100 A120 A200 A240	None: Manual Override Pin	None: Terminal Box Type	50	None: Japanese Std. "JIS" 90: N.American Design Std.	—									
						4,40 5 ,60 9, 10 11 , 12		DC: D12 D24 D100														
						2: Two Positions		D: No-Spring Detented						2	—	R: (AC→DC) R100 R200						
	3: Three Positions			C: Spring Centred	2 4	—	DC: D12 D24 D100	C: Push Button and Lock Nut (Option)						R: (AC DC) R100 R200	N: ^{*2} Plug-in Connector Type	N1: ^{*3} Plug-in Connector Type with Indicator Light (Option)	None: Japanese Std. "JIS" and European Design Std. 90: N.American Design Std.	—				
																			B: Spring Offset	2 3 8	A ^{*1} B ^{*1}	RQ: (AC→DC) RQ100
																			2: Two Positions	B: Spring Offset	2	A ^{*1} B ^{*1}

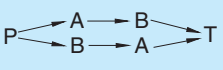
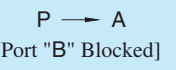
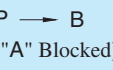
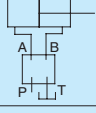
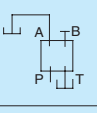
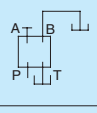






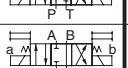

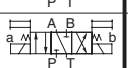
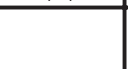
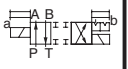


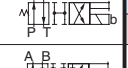
- ★ 1. In case of the special two position valve, please refer to [page 369](#) for details.
- ★ 2. N is not available for RQ-type solenoids .
- ★ 3. N1 is not available for R and RQ-type solenoids .

In the table above, the symbols or numbers highlighted with shade represent the optional extras. The valves with model number having such optional extras are handles as options, therefore, please confirm the time of delivery with us before ordering.

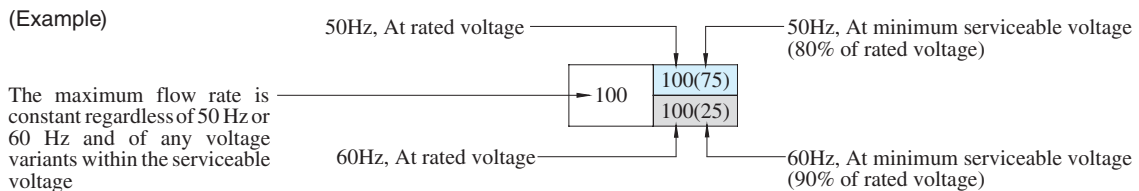


■ List of Standard Models and The Maximum Flow

● Models with AC Solenoids: DSG-03-***-A*

No. of Valve Positions	Spool-Spring Arrangement	Model Numbers	Graphic Symbols	Max. Flow L/min												
																
																
				Working Pressure MPa				Working Pressure MPa				Working Pressure MPa				
		10	16	25	31.5	10	16	25	31.5	10	16	25	31.5			
Three Positions	Spring Centred	DSG-03-3C2		100	100	100	100	100(70)	100(48)	96(28)	65(24)	100(70)	100(48)	96(28)	65(24)	
		DSG-03-3C3		90	90	90	90	100(81)	100(81)	100(81)	100(81)	100(81)	100(81)	100(81)	100(81)	100(81)
		DSG-03-3C4		80	80	80(65)	80(25)	100(58)	100(33)	76(22)	46(19)	100(58)	100(33)	76(22)	46(19)	
		DSG-03-3C40		100	100	100	100	100(75)	100(62)	100(39)	84(21)	48(18)	100(62)	100(39)	84(21)	48(18)
		DSG-03-3C5		30	30	30	30	26	21	18	16	30	28	28	28	
		DSG-03-3C60		70	70	70	—	100	100	100	—	100	100	100	—	
		DSG-03-3C9		100	100	100	100	60	60	60	60	60	60	60	60	
		DSG-03-3C10		80	80	80(30)	80(20)	100(55)	100(36)	60(21)	34(16)	100(55)	100(36)	60(21)	34(16)	
		DSG-03-3C11		100	100	100	100	100(80)	100(65)	85(35)	62(28)	100(80)	100(65)	85(35)	62(28)	
		DSG-03-3C12		90	90	90(30)	90(20)	100(55)	100(36)	60(21)	34(16)	100(55)	100(36)	60(21)	34(16)	
Two Positions	No-Spring Detented	DSG-03-2D2		100	100	100	100	40	40	30	28	60	60	40	35	
		Spring Offset	DSG-03-2B2		100	100	100	100	100(90)	100(90)	100(90)	100(90)	34	24	20	19
			DSG-03-2B3		100	100	100	100	100(75)	100(75)	100(75)	100(75)	57	57	57	57
			DSG-03-2B8		—	—	—	—	26	19	18	16	100(35)	87(15)	61(9)	49(7)

Notes : 1. The relation between the maximum flow in the table above and the frequency/voltage (within the serviceable voltage) is as shown below.

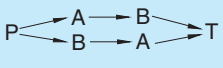
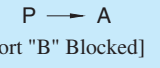
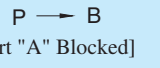


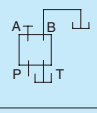
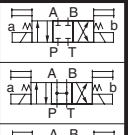
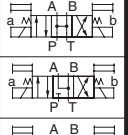

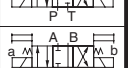
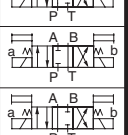

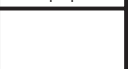
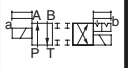

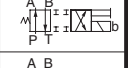
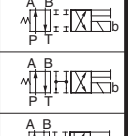
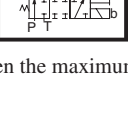
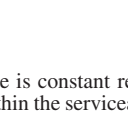
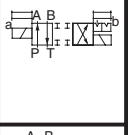


2. For the maximum flow rate in P→T of the valves with a ★ mark, please see page 368.

The valve models with a ◆ mark are handled as Options. If you choose such valves, check the time of delivery beforehand.

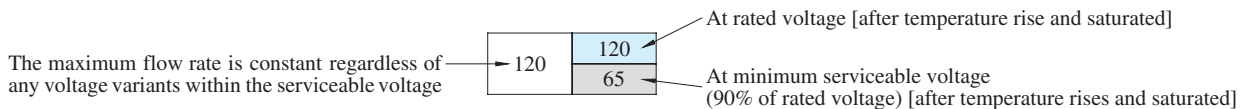
■ List of Standard Models and The Maximum Flow

- Models with DC Solenoids: DSG-03-***-D*
- Models with R Type Solenoids: DSG-03-***-R*
- Models with RQ Type Solenoids: DSG-03-***-RQ100*

No. of Valve Positions	Spool-Spring Arrangement	Model Numbers	Graphic Symbols	Max. Flow L/min											
								 [Port "B" Blocked]				 [Port "A" Blocked]			
															
				Working Pressure MPa				Working Pressure MPa				Working Pressure MPa			
10				16				25				31.5			
Three Positions	Spring Centred	DSG-03-3C2		120	120	120	120	120	120	80	55	120	120	80	55
		DSG-03-3C3		120	120	120	120	120	120	120	120	120	120	120	120
		DSG-03-3C4		120	120	120	120	120	120	84	64	120	120	84	64
		DSG-03-3C40		120	120	120	120	120	120	65	53	120	120	65	53
		DSG-03-3C5		50	50	50	50	35	24	21	20	45	45	45	45
		DSG-03-3C60		120	120	120	—	120	120	120	—	120	120	120	—
		DSG-03-3C9		120	120	120	120	100	100	100	100	100	100	100	100
		DSG-03-3C10		120	120	120	65	120	112	60	51	120	112	60	51
		DSG-03-3C11		120	120	120	120	100	100	80	65	100	100	80	65
		DSG-03-3C12		120	120	120	65	120	120	62	51	120	120	62	51
Two Positions	Spring Offset	DSG-03-2B2		110	110	110	110	68	47	38	38	120	114	75	63
		DSG-03-2B3		120	120	120	120	77	77	77	77	120	120	120	103
		DSG-03-2B8		—	—	—	—	53	33	24	23	120	120	62	47
		DSG-03-2D2		120	120	120	120	45	37	30	28	60	60	40	35

Notes) 1. The relation between the maximum flow in the table above and the voltage (within the serviceable voltage) is as shown below.

(Example)



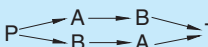
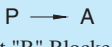
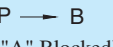
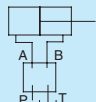
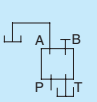
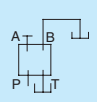
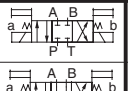


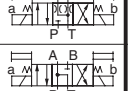
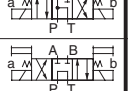


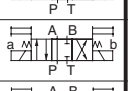
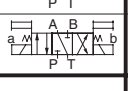
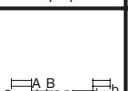
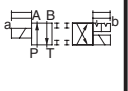
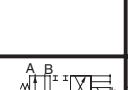
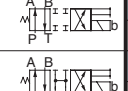
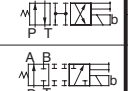
2. For the maximum flow rate in P → T of the valves with a ★ mark, please see [page 368](#).

The valve models with a ◆ mark are handled as Options. If you choose such valves, check the time of delivery beforehand.

DSG-03 Series Solenoid Operated Directional Valves

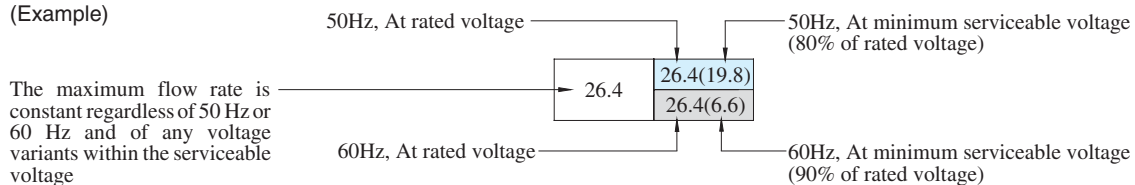
■ List of Standard Models and The Maximum Flow

● Models with AC Solenoids: DSG-03-***-A*

No. of Valve Positions	Spool-Spring Arrangement	Model Numbers	Graphic Symbole	Max. Flow U.S.GPM														
								 [Port "B" Blocked]				 [Port "A" Blocked]						
																		
				Working Pressure PSI				Working Pressure PSI				Working Pressure PSI						
		1450	2320	3630	4570	1450	2320	3630	4570	1450	2320	3630	4570					
Three Positions	Spring Centred	DSG-03-3C2		26.4	26.4	26.4	26.4	26.4 (18.5)	26.4 (12.7)	25.4 (7.4)	17.2 (6.3)	26.4 (18.5)	26.4 (12.7)	25.4 (7.4)	17.2 (6.3)			
		DSG-03-3C3		23.8	23.8	23.8	23.8	26.4 (21.4)	26.4 (21.4)	26.4 (21.4)	26.4 (21.4)	26.4 (21.4)	26.4 (21.4)	26.4 (21.4)	26.4 (21.4)	26.4 (21.4)		
		DSG-03-3C4		21.1	21.1	21.1 (17.2)	21.1 (6.6)	26.4 (15.3)	26.4 (8.7)	20.1 (5.8)	12.2 (5.0)	26.4 (15.3)	26.4 (8.7)	20.1 (5.8)	12.2 (5.0)	19.8 (5.3)	7.9 (4.0)	
		DSG-03-3C40		26.4	26.4	26.4	26.4	26.4 (19.8)	26.4 (16.4)	26.4 (10.3)	22.2 (5.5)	12.7 (4.8)	26.4 (16.4)	26.4 (10.3)	22.2 (5.5)	12.7 (4.8)	26.4 (6.6)	16.4 (10.6)
		DSG-03-3C5		7.9	7.9	7.9	7.9	6.9	5.5	4.8	4.2	7.9	7.4	7.4	7.4	7.4	7.4	
		DSG-03-3C60		18.5	18.5	18.5	—	26.4	26.4	26.4	—	26.4	26.4	26.4	—	26.4	26.4	
		DSG-03-3C9		26.4	26.4	26.4	26.4	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	
		DSG-03-3C10		21.1	21.1	21.1 (7.9)	21.1 (5.3)	26.4 (14.5)	26.4 (9.5)	15.9 (5.5)	9.0 (4.2)	26.4 (14.5)	26.4 (9.5)	15.9 (5.5)	9.0 (4.2)	7.9 (6.6)	5.3 (4.0)	
		DSG-03-3C11		26.4	26.4	26.4	26.4	26.4 (21.1)	26.4 (17.2)	22.5 (9.2)	16.4 (7.4)	26.4 (21.1)	26.4 (17.2)	22.5 (9.2)	16.4 (7.4)	21.1 (15.9)	18.5 (12.2)	
		DSG-03-3C12		23.8	23.8	23.8 (7.9)	23.8 (5.3)	26.4 (14.5)	26.4 (9.5)	15.9 (5.5)	9.0 (4.2)	26.4 (14.5)	26.4 (9.5)	15.9 (5.5)	9.0 (4.2)	10.6 (5.3)	5.3 (4.0)	
Two Positions	No-Spring Detented	DSG-03-2D2		26.4	26.4	26.4	26.4	10.6	10.6	7.9	7.4	15.9	15.9	10.6	9.2			
	Spring Offset	DSG-03-2B2		26.4	26.4	26.4	26.4	9.0	6.3	5.3	5.0	26.4 (16.4)	26.4 (16.4)	26.4 (11.6)	24.8 (9.8)	21.1 (11.1)	19.3 (9.5)	
		DSG-03-2B3		26.4	26.4	26.4	26.4	15.1	15.1	15.1	15.1	26.4 (20.9)	26.4 (19)	26.4 (16.9)	26.4 (15.6)	24.3 (14.5)	23.5 (12.2)	
		DSG-03-2B8		—	—	—	—	6.9	5.0	4.8	4.2	26.4 (9.2)	23 (4.0)	16.1 (2.4)	12.9 (1.8)	11.9 (5.5)	9.0 (3.2)	

Notes: 1. The relation between the maximum flow in the table above and the voltage (within the serviceable voltage) is as shown below.

(Example)


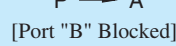

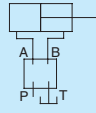
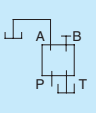
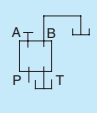
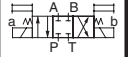

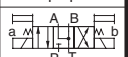
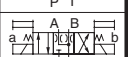

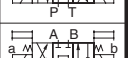
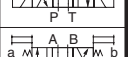
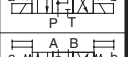
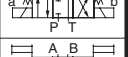
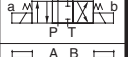

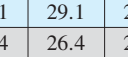
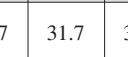



2. For the maximum flow rate in P → T of the valves with a ★ mark, please see page 368.

The valve models with a ◆ mark are handled as Options. If you choose such valves, check the time of delivery beforehand.

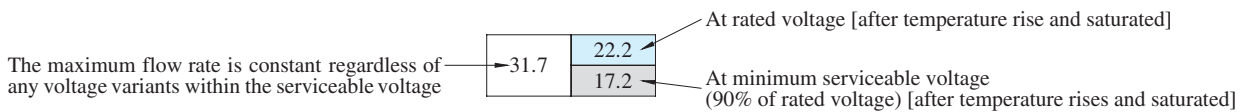
■ List of Standard Models and The Maximum Flow

- Models with DC Solenoids: DSG-03-***-D*
- Models with R Type Solenoids: DSG-03-***-R*
- Models with RQ Type Solenoids: DSG-03-***-RQ100*

No. of Valve Positions	Spool-Spring Arrangement	Model Numbers	Graphic Symbols	Max. Flow U.S. GPM											
															
															
				Working Pressure PSI				Working Pressure PSI				Working Pressure PSI			
				1450	2320	3630	4570	1450	2320	3630	4570	1450	2320	3630	4570
Three Positions	Spring Centred	DSG-03-3C2		31.7	31.7	31.7	31.7	31.7	31.7	21.1	14.5	31.7	31.7	21.1	14.5
		DSG-03-3C3		31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7
		DSG-03-3C4		31.7	31.7	31.7	31.7	31.7	31.7	22.2	16.9	31.7	31.7	22.2	16.9
		DSG-03-3C40		31.7	31.7	31.7	31.7	31.7	31.7	16.4	12.9	31.7	31.7	16.4	12.9
		DSG-03-3C5		13.2	13.2	13.2	13.2	9.2	6.3	5.5	5.3	11.9	11.9	11.9	11.9
		DSG-03-3C60		31.7	31.7	31.7	—	31.7	31.7	31.7	—	31.7	31.7	31.7	—
		DSG-03-3C9		31.7	31.7	31.7	31.7	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4
		DSG-03-3C10		31.7	31.7	31.7	17.2	31.7	29.6	15.9	13.5	31.7	29.6	15.9	13.5
		DSG-03-3C11		31.7	31.7	31.7	31.7	26.4	26.4	21.1	17.2	26.4	26.4	21.1	17.2
		DSG-03-3C12		31.7	31.7	31.7	17.2	31.7	31.7	16.4	13.5	31.7	31.7	16.4	13.5
Two Positions	No-Spring Detented	DSG-03-2D2		31.7	31.7	31.7	31.7	11.9	9.8	7.9	7.4	15.9	15.9	10.6	9.2
	Spring Offset	DSG-03-2B2		29.1	29.1	29.1	29.1	18	12.4	10	10	31.7	30.1	19.8	16.6
		DSG-03-2B3		31.7	31.7	31.7	31.7	20.3	20.3	20.3	20.3	31.7	31.7	31.7	27.2
		DSG-03-2B8		—	—	—	—	14	8.7	6.3	6.1	31.7	31.7	16.4	12.4

Notes) 1. The relation between the maximum flow in the table above and the voltage (within the serviceable voltage) is as shown below.

(Example)



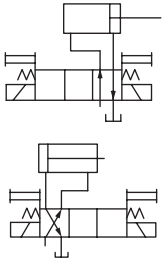
2. For the maximum flow rate in P → T of the valves with a ★ mark, please see [page 368](#).

The valve models with a ◆ mark are handled as Options. If you choose such valves, check the time of delivery beforehand.

DSG-03 Series Solenoid Operated Directional Valves

Maximum Flow of Centre By-Pass

In valve type 3C3, 3C5 and 3C60, in case where the actuator is put on in between the cylinder ports A and B as illustrated below and where the actuator moves and suspended at its stroke end and where the valve is then shifted to the neutral position in the suspended state of the actuator, the maximum flow rates available are those as shown as the table below regardless of any voltage in the range of serviceable voltage.



Model Numbers	Graphic Symbols	Max. Flow L/min (U.S.GPM)			
		10 MPa (1450 PSI)	16 MPa (2320 PSI)	25 MPa (3630 PSI)	31.5 MPa (4570 PSI)
DSG-03-3C3-A*		100 (26.4)	100 (26.4)	100 (26.4)	100 (26.4)
DSG-03-3C3-D*/R*/RQ100		120 (31.7)	120 (31.7)	120 (31.7)	120 (31.7)
DSG-03-3C5-A*		26 (6.9)	21 (5.5)	18 (4.8)	16 (4.2)
DSG-03-3C5-D*/R*/RQ100		35 (9.2)	24 (6.3)	21 (5.5)	20 (5.3)
DSG-03-3C60-A*		84 (22.2)	52 (13.7)	52 (13.7)	—
DSG-03-3C60-D*/R*/RQ100		68 (18.0)	65 (17.2)	61 (16.1)	—

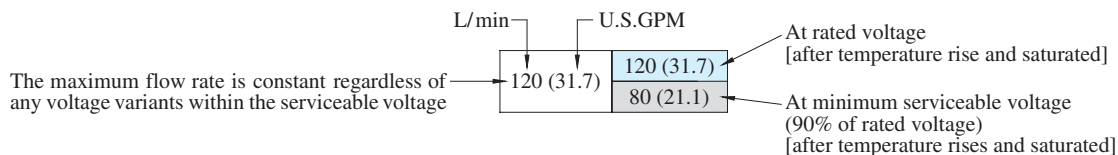
List of Shockless Models and The Maximum Flow

- Models with DC Solenoids: S-DSG-03-*** -D*
- Models with R Type Solenoids: S-DSG-03-*** -R*
- Models with RQ Type Solenoids: S-DSG-03-*** -RQ100

No. of Valve Positions	Spool-Spring Arrangement	Model Numbers	Graphic Symbols	Max. Flow L/min (U.S.GPM)											
								P → A [Port "B" Blocked]				P → B [Port "A" Blocked]			
				Working Pressure MPa (PSI)				Working Pressure MPa (PSI)				Working Pressure MPa (PSI)			
				5 (730)	10 (1450)	16 (2320)	25 (3630)	5 (730)	10 (1450)	16 (2320)	25 (3630)	5 (730)	10 (1450)	16 (2320)	25 (3630)
Three Positions	Spring Centred	S-DSG-03-3C2		120 (31.7)	120 (31.7)	120 (31.7)	120 (31.7)	120 (31.7)	120 (31.7)	75 (19.8)	50 (13.2)	120 (31.7)	120 (31.7)	75 (19.8)	50 (13.2)
		S-DSG-03-3C4		120 (31.7)	120 (31.7)	85 (22.5)	65 (17.2)	120 (31.7)	120 (31.7)	75 (19.8)	40 (10.6)	120 (31.7)	120 (31.7)	75 (19.8)	40 (10.6)
Two Positions	Spring Offset	S-DSG-03-2B2		120 (31.7)	100 (26.4)	75 (19.8)	40 (10.6)	39 (10.3)	39 (10.3)	39 (10.3)	39 (10.3)	120 (31.7)	120 (31.7)	105 (27.7)	60 (15.9)
														80 (21.1)	50 (13.2)

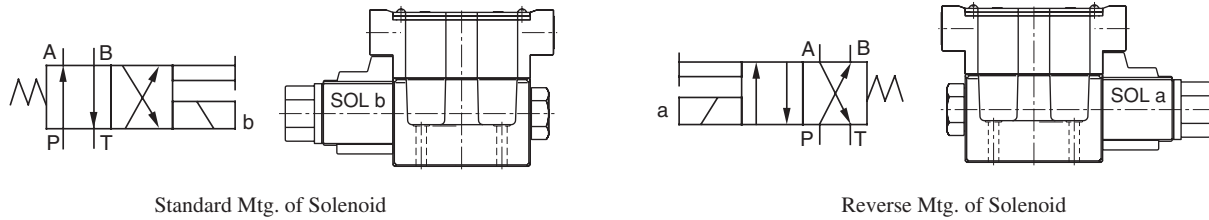
Note: The relation between the maximum flow in the table above and the voltage (within the serviceable voltage) is as shown below.

(Example)



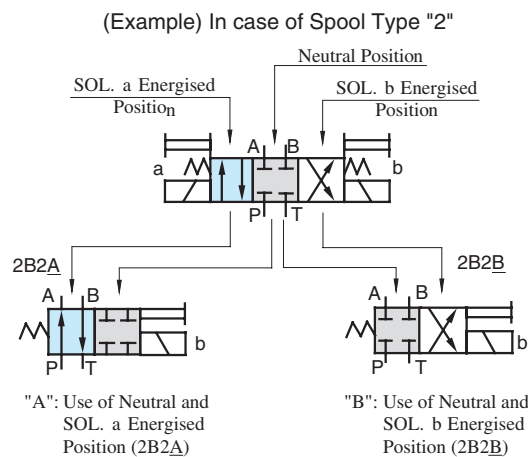
Reverse Mounting of Solenoid

In spring offset type, it is a standard configuration that the solenoid is mounted onto the valve in the SOL b position (side). However, in this particular spool-spring arrangement, the mounting of the solenoid onto the valve in the reverse position -SOL a side- is also available. The graphic symbol for this reverse mounting is as shown below. As for the valve type 2B*A and 2B*B, please refer to the explanation under the heading of "Valves Using Neutral Position and Side Position" given below.



Valves Using Neutral Position and Side Position (Special Two Position Valve)

Besides the use of the standard 2-position valves aforementioned in the "List of Standard Models and Maximum Flow", the 3-position valves also can be used as the 2-position valves using the two of their three positions. In this case, there are two kinds of the valve available. One is the valve using the neutral position and SOL a position (2B*A) and another is the valve using the neutral position and SOL b position (2B*B).



Model Numbers	Graphic SymbolsG	
	Standard Mtg. Type	Reverse Mtg. Type
(S-) DSG-03-2B*A		
(S-) DSG-03-2B2A		—

Model Numbers	raphic Symbols	
	Standard Mtg. Type	Reverse Mtg. Type
DSG-03-2B*B		
(S-) DSG-03-2B2B		
DSG-03-2B3B		—
(S-) DSG-03-2B4B		—
DSG-03-2B60B		—
DSG-03-2B10B		—

In the above table, the graphic symbols in mounting type highlighted with shade are optional extra, therefore, please confirm the time of delivery with us before ordering.

■ **Typical Changeover Time**

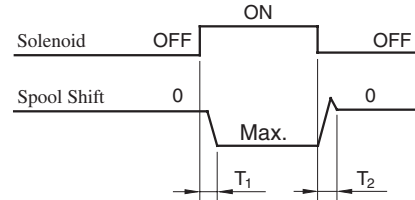
Changeover time varies according to oil viscosity, spool type and hydraulic circuit.

● **Standard Type (Without Shockless Function)**

[Test Conditions]

Pressure: 16 MPa (2320 PSI)
 Flow Rate: 70 L/min (18.5 U.S.GPM)
 Viscosity: 30 mm²/s (140 SSU)
 Voltage: 100 %V (After coil temperature rises and saturated)

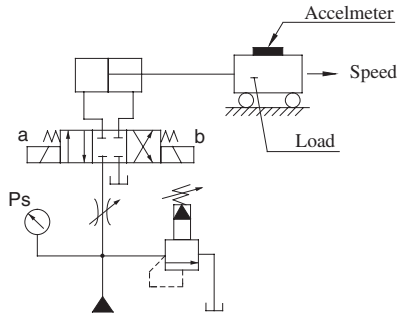
[Result of Measurement]



Type	Model Numbers	Changeover Time ms	
		T ₁	T ₂
Standard Type	DSG-03-3C2-A*	27	22
	DSG-03-3C2-D*	97	30
	DSG-03-3C2-R*	97	204
	DSG-03-3C2-RQ100	97	41

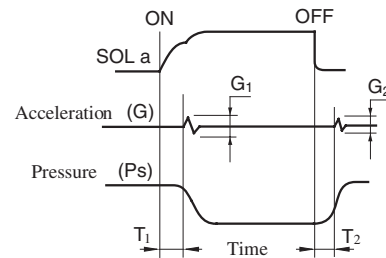
● **Shockless Type**

[Test Circuit and Conditions]



Setting Pressure (Ps): 7 MPa (1020 PSI)
 Load (W): 1000 kg (2205 lbs.)
 Speed: 8.8 m/min (28.9 ft./min)
 Viscosity: 30 mm²/s (140 SSU)

[Result of Measurement]

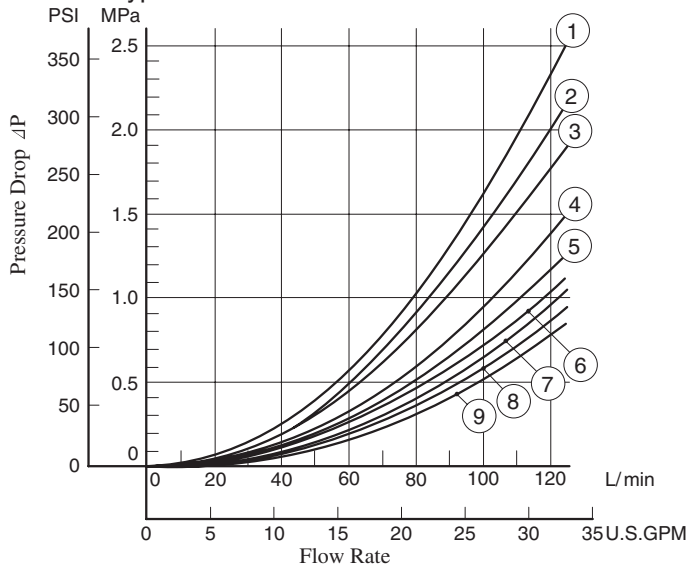


Type	Model Numbers	Time ms		Acceleration m/s ² (G)	
		T ₁	T ₂	G ₁	G ₂
Shockless Type	S-DSG-03-3C2-D*	110	120	6.4 (.65)	6.4 (.65)
	S-DSG-03-3C2-R*	110	220		
	S-DSG-03-3C2-RQ100	110	120		

Pressure Drop

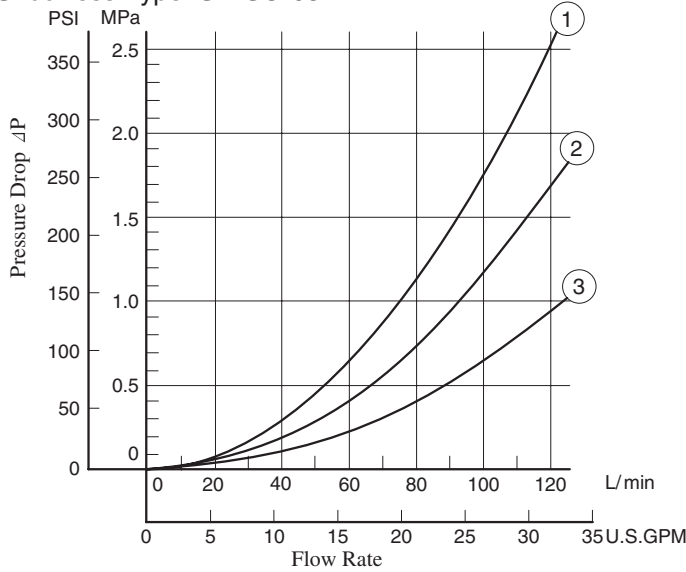
Pressure drop curves based on viscosity of 35 mm²/s (164 SSU) and specific gravity of 0.850.

Standard Type: DSG-03



Model Numbers	Pressure Drop Curve Number				
	P→A	B→T	P→B	A→T	P→T
DSG-03-3C2	⑦	⑦	⑦	⑦	—
DSG-03-3C3	⑨	⑨	⑨	⑨	⑤
DSG-03-3C4	⑦	⑧	⑦	⑧	—
DSG-03-3C40	⑦	⑦	⑦	⑦	—
DSG-03-3C5	⑨	⑦	⑦	⑨	①
DSG-03-3C60	⑥	⑤	⑥	⑤	①
DSG-03-3C9	⑨	⑦	⑨	⑦	—
DSG-03-3C10	⑦	⑧	⑦	⑦	—
DSG-03-3C11	⑨	⑦	⑦	⑦	—
DSG-03-3C12	⑦	⑦	⑦	⑧	—
DSG-03-2D2	④	③	⑥	⑥	—
DSG-03-2B2	②	①	⑦	⑦	—
DSG-03-2B3	③	②	⑨	⑨	—
DSG-03-2B8	⑥	—	⑤	—	—

Shockless Type: S-DSG-03



Model Numbers	Pressure Drop Curve Number			
	P→A	B→T	P→B	A→T
S-DSG-03-3C2	②	②	②	②
S-DSG-03-3C4	②	②	③	③
S-DSG-03-2B2	①	②	②	②

● For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
	SSU		77	98	141	186	232	278	324	371	417
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

● For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

$$\Delta P' = \Delta P (G'/0.850)$$

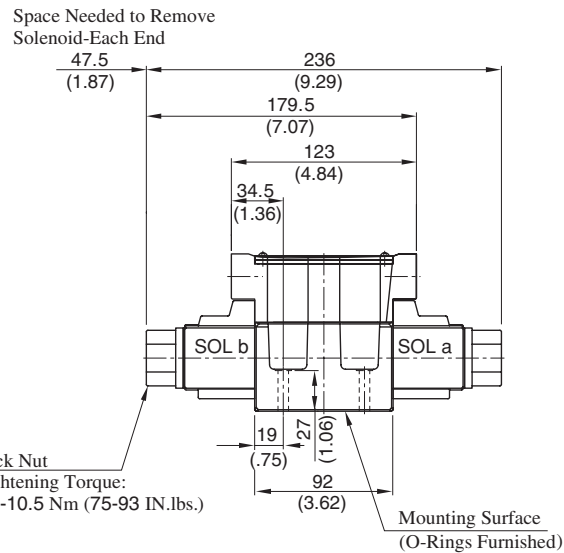
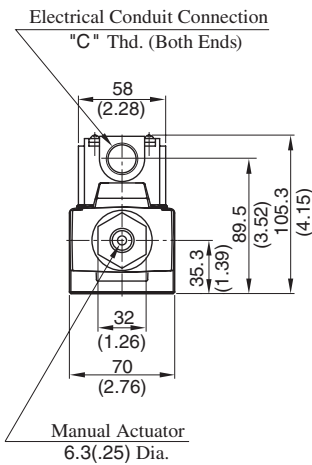
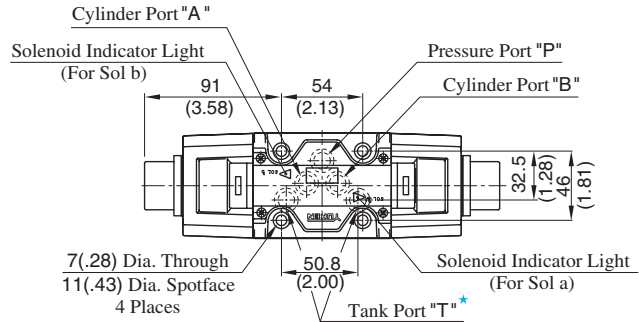


DSG-03 Series Solenoid Operated Directional Valves

TERMINAL BOX TYPE

- Models with AC Solenoids: DSG-03- ***-A* -50/5090
- Double Solenoid: Spring Centred & No-Spring Detended

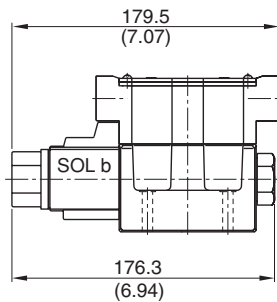
Model Numbers	"C" Thd.
DSG-03- ***-A* -50	G 1/2
DSG-03- ***-A* -5090	1/2 NPT



★. Of the two of tank port "T", the tank port in the left side is normally used in our standard sub-plate, though, either side of the tank port "T" can be used without problem.

DIMENSIONS IN MILLIMETRES (INCHES)

- Single Solenoid: Spring Offset

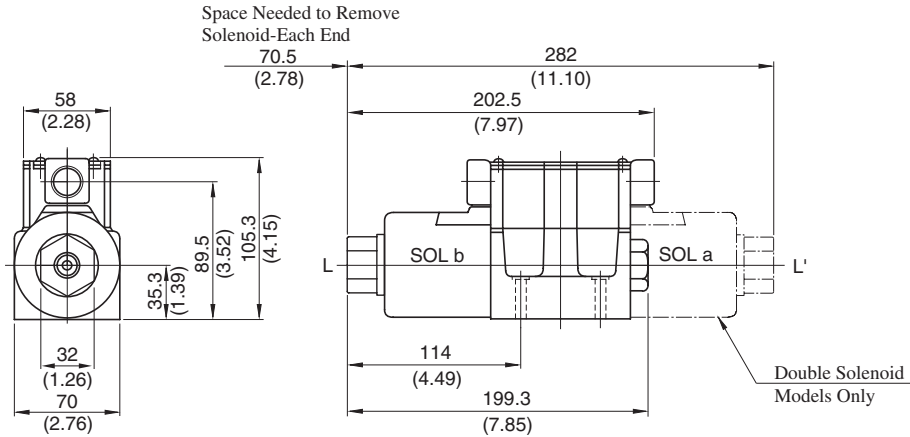


- For other dimensions, refer to "Spring Centred and No-Spring Detended" models.
- Solenoid being mounted in the reverse position -SOL a side- is also available.

Mounting surface: ISO 4401-AC-05-4-A

TERMINAL BOX TYPE

- Models with DC Solenoids : (S-)DSG-03- *** -D* -50/5090
- Models with R Type Solenoids : (S-)DSG-03- *** -R* -50/5090
- Models with RQ Type Solenoids : (S-)DSG-03- *** -RQ100-50/5090
- Double Solenoid: Spring Centred & No-Spring Detented
- Single Solenoid: Spring Offset

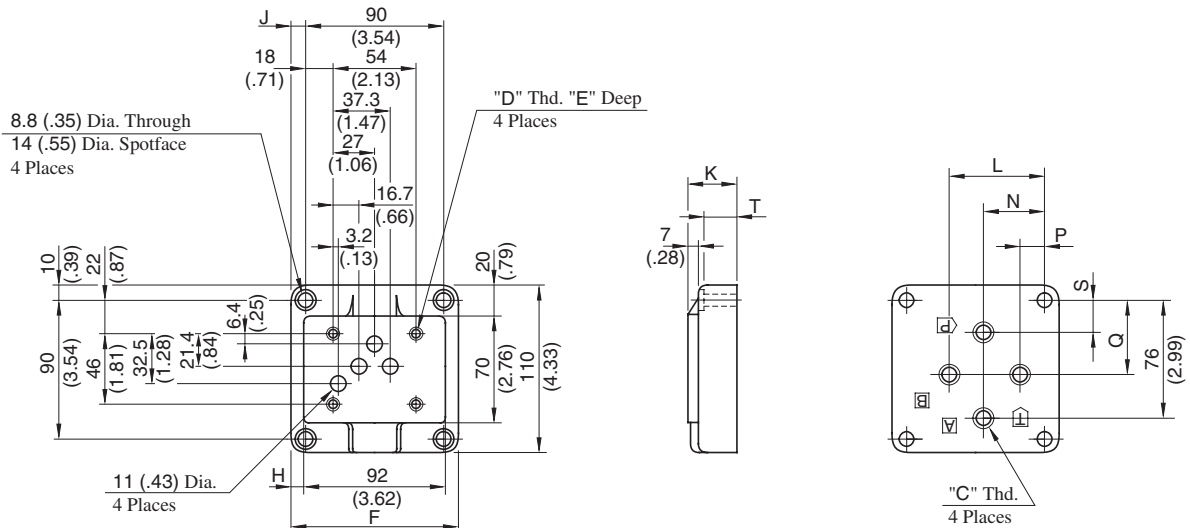


● For other dimensions, refer to Models with AC solenoids (Page 372).

DIMENSIONS IN
MILLIMETRES (INCHES)

Sub- plates

DSGM-03*-40/2180/2190

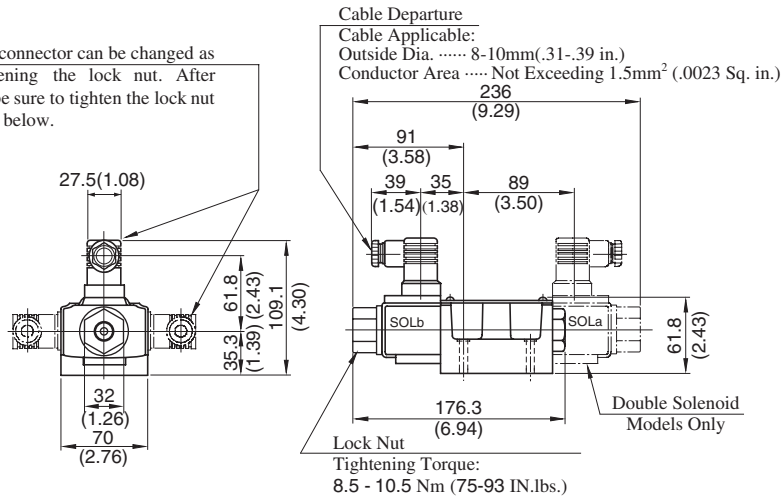


Sub-plate Model Numbers	Piping Size "C" Thd.	"D" Thd.	Dimensions mm (Inches)										
			E	F	H	J	K	L	N	P	Q	S	T
DSGM-03-40	Rc 3/8	M6	13 (.51)	110	9	10	32	62	40	16	48	21	24
DSGM-03-2180	3/8 BSP.F		(4.33)	(.35)	(.39)	(1.26)	(2.44)	(1.57)	(.63)	(1.89)	(.83)	(.94)	
DSGM-03-2190	3/8 NPT		1/4-20 UNC	15 (.59)									
DSGM-03X-40	Rc 1/2	M6	13 (.51)	110	9	10	32	62	40	16	48	21	24
DSGM-03X-2180	1/2 BSP.F		(4.33)	(.35)	(.39)	(1.26)	(2.44)	(1.57)	(.63)	(1.89)	(.83)	(.94)	
DSGM-03X-2190	1/2 NPT		1/4-20 UNC	15 (.59)									
DSGM-03Y-40	Rc 3/4	M6	13 (.51)	120	14	15	50	80	45	10	47	16	42
DSGM-03Y-2180	3/4 BSP.F		(4.72)	(.55)	(.59)	(1.97)	(3.15)	(1.77)	(.39)	(1.85)	(.63)	(1.65)	
DSGM-03Y-2190	3/4 NPT		1/4-20 UNC	15 (.59)									

■ **PLUG-IN CONNECTOR TYPE (N)**
PLUG-IN CONNECTOR WITH INDICATOR LIGHT (N1)

● **Models with AC Solenoids: DSG-03- *** -A* - $\frac{N}{N1}$ -50/5090**

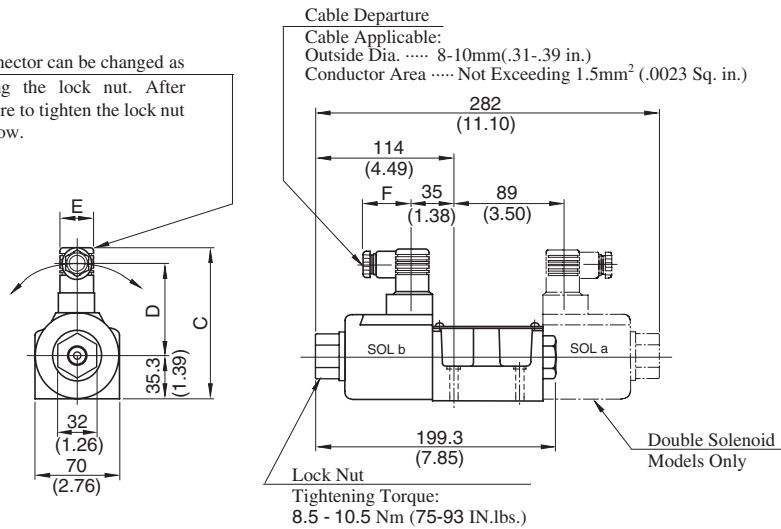
The position of the Plug-in connector can be changed as illustrated below by loosening the lock nut. After completion of the change, be sure to tighten the lock nut with the torque as specified below.



● **Models with DC Solenoids: (S-)DSG-03- *** -D* - $\frac{N}{N1}$ -50/5090**

● **Models with R Type Solenoids: (S-)DSG-03- *** -R* -N-50/5090**

The position of the Plug-in connector can be changed as illustrated below by loosening the lock nut. After completion of the change, be sure to tighten the lock nut with the torque as specified below.



Model Numbers	Dimensions mm (Inches)			
	C	D	E	F
DSG-03- *** -D* - $\frac{N}{N1}$ -50/5090	121.1 (4.77)	73.8 (2.91)	27.5 (1.08)	39 (1.54)
DSG-03- *** -R* -N-50/5090	124.9 (4.92)	62.6 (2.46)	34 (1.34)	53 (2.09)

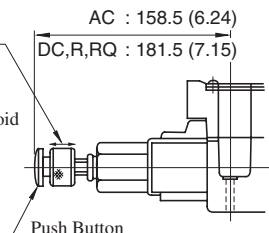
● For other dimensions, refer to "Terminal Box Type" (Page 372 – 373).

DIMENSIONS IN MILLIMETRES (INCHES)

■ **Options**

Models with Push Button & Lock Nut: (S-)DSG-03- * -*C(- $\frac{N}{N1}$)-50/5090**

Lock Nut
 Press the "Push Button" then turn "Lock Nut" clockwise. The position of the "Push Button" is held.
 Be sure to loosen "LockNut" fully before solenoid is energised



Details of Receptacle

Type of Electrical Conduit Connection	Double Solenoid Type	Single Solenoid Type
Terminal Box Type	<p>Diagram showing a double solenoid valve with two solenoids, SOL. a and SOL. b. It includes two power supplies (one for each solenoid), two indicator lights, two earth terminals, and a common plate. Labels include: Power Supply (For SOL.b), Earth, Indicator Light, SOL. b, Common Plate, Common, SOL. a, Indicator Light, Earth, and Power Supply (For SOL.a).</p>	<p>Diagram showing a single solenoid valve with one solenoid, SOL. b, and one indicator light. It includes one power supply and one earth terminal. Labels include: Earth, Indicator Light, SOL. b, and Power Supply.</p>
Plug-in Connector Type	<p>Diagram showing a plug-in connector with two power supply terminals, one ground terminal, and two indicator light terminals. Labels include: 1-Power Supply, Ground, 2-Power Supply, and Indicator Light.</p>	

- ★1. There are two grounding terminals. You can use either one.
- ★2. If you do not need the common plate, remove it.
- ★3. With DC solenoids, polarity is no question.

⚠ DANGER

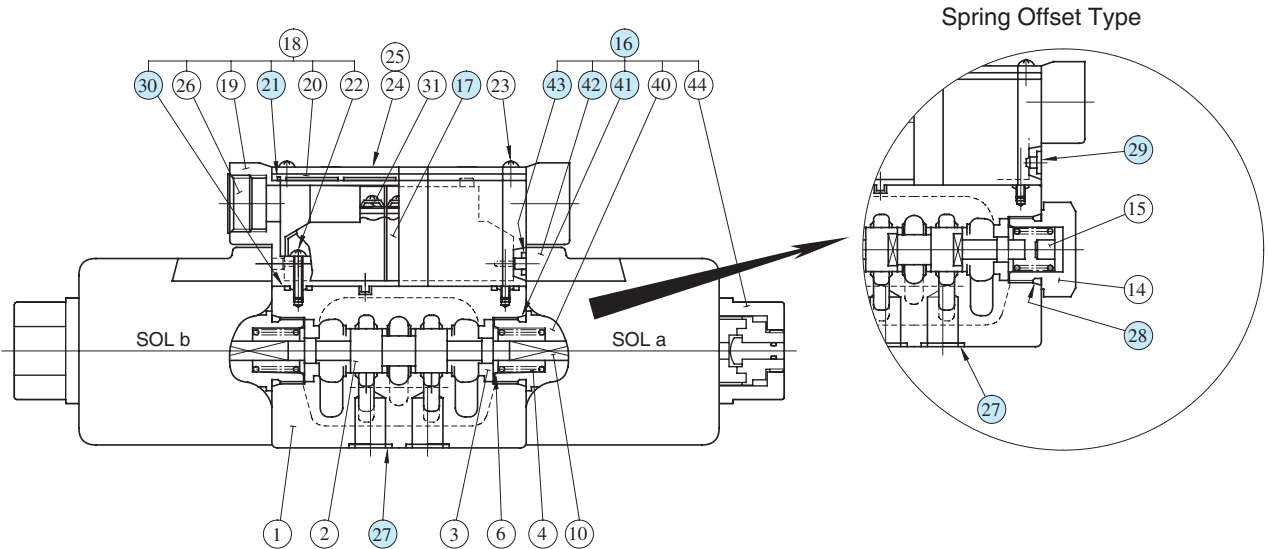
- Do not perform wiring while the power is on. Doing so may result in electric shock, burns or death.
- Make the wiring properly. Improper wiring will cause an irregular movement of the machine, resulting in a grave accident.

Electrical Circuit

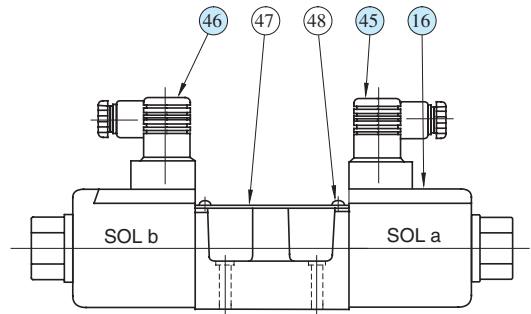
Type of Electrical Conduit Connection	Electric Source		
	AC	DC	AC→DC Rectified
Terminal Box Type	<p>AC circuit diagram showing a power supply connected to an indicator light and a solenoid (SOL.). The common terminal is connected to ground.</p>	<p>DC circuit diagram showing a power supply connected to an indicator light and a solenoid (SOL.). A voltage-surge suppressor is connected between the power supply and the common terminal. The common terminal is connected to ground.</p>	<p>AC→DC Rectified circuit diagram showing a power supply connected to an indicator light, a voltage-surge suppressor, and a rectifier circuit. The common terminal is connected to ground. The solenoid (SOL.) is connected to the rectifier circuit.</p>
Plug-in Connector Type	<p>AC circuit diagram showing a 1-Power Supply connected to an indicator light and a solenoid (SOL.). A 2-Power Supply is connected to the common terminal, which is also connected to ground. The indicator light is integrated in the "N1" model only.</p>	<p>DC circuit diagram showing a 1-Power Supply connected to an indicator light and a solenoid (SOL.). A 2-Power Supply is connected to the common terminal, which is also connected to ground. A voltage-surge suppressor is connected between the 1-Power Supply and the common terminal. The indicator light is integrated in the "N1" model only.</p>	<p>AC→DC Rectified circuit diagram showing a 1-Power Supply connected to an indicator light, a voltage-surge suppressor, and a rectifier circuit. A 2-Power Supply is connected to the common terminal, which is also connected to ground. The solenoid (SOL.) is connected to the rectifier circuit.</p>

■ List of Seals

*-DSG-03-***-*-50/5090



*-DSG-03-***-N/N1-50/5090



● List of Seals

Item	Name of Parts	Part Numbers	Qty.			Remarks
			3C	2D2	2B	
21	Gasket	1751S-VK418689-6	1	1	1	
27	O-Ring	SO-NB-A014(NBR, Hs90)	5	5	5	
28	O-Ring	SO-NB-P21	—	—	1	
29	Plug	1790S-VK418329-9	—	—	2	
30	O-Ring	S6	2	2	2	
41	O-Ring	SO-NB-P21	2	2	1	} Included in Solenoid Ass'y (Item 16)
43	O-Ring	SO-NA-P4	4	4	2	

★ When ordering the O-Rings, please specify the seal kit number from the table below.

Valve Model Numbers	Seal Kit No.	O-Ring Details for Seal Kit
DSG-03-***-*-50/5090	KS-DSG-03-50	27(5 Pcs.), 28 & 41(2 Pcs., see above), 43(4 Pcs.)
DSG-03-***-*-N-50/5090	KS-DSG-03-N-50	27(5 Pcs.), 28 & 41(2 Pcs., see above)

● Solenoid Ass'y, Coil, Receptacle and Connector

Refer to [Page 377](#) for the details of these parts.

Solenoid Ass'y, Coil, Receptacle and Connector Ass'y No.

Valve Model Numbers	⑩ Solenoid Ass'y No.	④② Coil No.	⑰ Receptacle Part No.	④⑤ Connector Ass'y Part No.	④⑥ Connector Ass'y Part No.	Remarks
DSG-03-***-A100-50*	SA3-100-51	C-SA3-100-51	R3-60	—	—	Terminal Box Type
DSG-03-***-A120-50*	SA3-120-51	C-SA3-120-51				
DSG-03-***-A200-50*	SA3-200-51	C-SA3-200-51				
DSG-03-***-A240-50*	SA3-240-51	C-SA3-240-51				
DSG-03-***-D12-50*	SD3-12-51	C-SD3-12-51	KR3-A-60			
DSG-03-***-D24-50*	SD3-24-51	C-SD3-24-51	KR3-C-60			
DSG-03-***-D100-50*	SD3-100-51	C-SD3-100-51				
DSG-03-***-R100-50*	SR3-100-51	C-SR3-100-51	RR3-60			
DSG-03-***-R200-50*	SR3-200-51	C-SR3-200-51	QR3-C-60			
DSG-03-***-RQ100-50*	SR3-100-51	C-SR3-100-51				
S-DSG-03-***-D12-50*	SD3-12-S-51	C-SD3-12-51	KR3-A-60			
S-DSG-03-***-D24-50*	SD3-24-S-51	C-SD3-24-51	KR3-C-60			
S-DSG-03-***-D100-50*	SD3-100-S-51	C-SD3-100-51				
S-DSG-03-***-R100-50*	SR3-100-S-51	C-SR3-100-51	RR3-60			
S-DSG-03-***-R200-50*	SR3-200-S-51	C-SR3-200-51	QR3-C-60			
S-DSG-03-***-RQ100-50*	SR3-100-51	C-SR3-100-51				
DSG-03-***-A100-N-50*	SA3-100-N-51	C-SA3-100-N-51	—	GDM-211-A-11	GDM-211-B-11	Plug-in Connector Type
DSG-03-***-A120-N-50*	SA3-120-N-51	C-SA3-120-N-51				
DSG-03-***-A200-N-50*	SA3-200-N-51	C-SA3-200-N-51				
DSG-03-***-A240-N-50*	SA3-240-N-51	C-SA3-240-N-51				
DSG-03-***-D12-N-50*	SD3-12-N-51	C-SD3-12-N-51				
DSG-03-***-D24-N-50*	SD3-24-N-51	C-SD3-24-N-51				
DSG-03-***-D100-N-50*	SD3-100-N-51	C-SD3-100-N-51				
DSG-03-***-R100-N-50*	SR3-100-N-51	C-SR3-100-N-51				
DSG-03-***-R200-N-50*	SR3-200-N-51	C-SR3-200-N-51		GDME-211-R-A-10	GDME-211-R-B-10	
S-DSG-03-***-D12-N-50*	SD3-12-S-N-51	C-SD3-12-N-51		GDM-211-A-11	GDM-211-B-11	
S-DSG-03-***-D24-N-50*	SD3-24-S-N-51	C-SD3-24-N-51				
S-DSG-03-***-D100-N-50*	SD3-100-S-N-51	C-SD3-100-N-51		GDME-211-R-A-10	GDME-211-R-B-10	
S-DSG-03-***-R100-N-50*	SR3-100-S-N-51	C-SR3-100-N-51				
S-DSG-03-***-R200-N-50*	SR3-200-S-N-51	C-SR3-200-N-51		GDM-211-A-11	GDM-211-B-11	Plug-in Connector with Indicator Light
DSG-03-***-A100-N1-50*	SA3-100-N-51	C-SA3-100-N-51				
DSG-03-***-A120-N1-50*	SA3-120-N-51	C-SA3-120-N-51				
DSG-03-***-A200-N1-50*	SA3-200-N-51	C-SA3-200-N-51				
DSG-03-***-A240-N1-50*	SA3-240-N-51	C-SA3-240-N-51				
DSG-03-***-D12-N1-50*	SD3-12-N-51	C-SD3-12-N-51				
DSG-03-***-D24-N1-50*	SD3-24-N-51	C-SD3-24-N-51				
DSG-03-***-D100-N1-50*	SD3-100-N-51	C-SD3-100-N-51				
S-DSG-03-***-D12-N1-50*	SD3-12-S-N-51	C-SD3-12-N-51				
S-DSG-03-***-D24-N1-50*	SD3-24-S-N-51	C-SD3-24-N-51				
S-DSG-03-***-D100-N1-50*	SD3-48-S-N-51	C-SD3-100-N-51				
S-DSG-03-***-D100-N1-50*	SD3-48-S-N-51	C-SD3-100-N-51				

Note : The connector assembly is not included in the solenoid assembly.

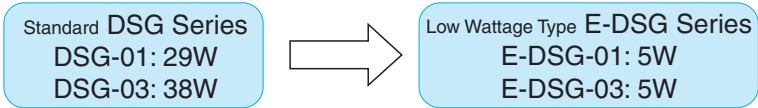
E

DSG-03 Series Solenoid Operated Directional Valves

Low Wattage (5W) Type Solenoid Operated Directional Valves

2 type of Direct Acting type Solenoid Operated Directional Valves, E-DSG-01/03, with suppressed consumption power 5W were launched in series.

- Because these valves only 5W of power which enables remarkable reduction of operating cost.



- Since these valves operate on only 5W, they can be driven through the output circuit of a programmed or sequence controller. This feature simplifies the electric circuitry and enables savings in initial cost.
- These low wattage valves minimize coil surface temperature.
- CE certified products are available.



Specifications

Model Numbers	Max. Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Max. T-Line Back Pressure MPa (PSI)	Max. Changeover Frequency Cycle/min {min ⁻¹ }	Mass kg (lbs.)
E-DSG-01-3C*-D*-60	30 (7.9)	16 (2320)	16 (2320)	240	2.2 (4.85)
E-DSG-01-2N2-D*-60					2.2 (4.85)
E-DSG-01-2D2-D*-60					2.2 (4.85)
E-DSG-01-2B*-D*-60					1.6 (3.53)
E-DSG-03-3C*-D*-50	63 (16.6)	16 (2320)	16 (2320)	240	5 (11.03)
E-DSG-01-2D2-D*-50					5 (11.03)
E-DSG-01-2B2-D*-50					3.6 (7.94)

★ Maximum flow indicates a ceiling flow depends on the type of spool and operating condition.

Solenoid Ratings

Model Numbers	Electric source	Coil Type	Voltage (V)		Current & Power at Rated Voltage	
			Source Rating	Serviceable Range	Inrush (A)	Power (W)
E-DSG-01	DC (K Series)	D12	12	10.8 – 13.2	0.43	5
		D24	24	21.6 – 26.4	0.23	
E-DSG-03		D12	12	10.8 – 13.2	0.44	5
		D24	24	21.6 – 26.4	0.22	

The coil type numbers in the shaded column are handled as optional extras. In case these coils are required to be chosen, please confirm the time of delivery with us before ordering .

For details, please contact us.

Electronic Relay Incorporated Solenoid Operated Directional Valves

Drive power source and signal are separate.

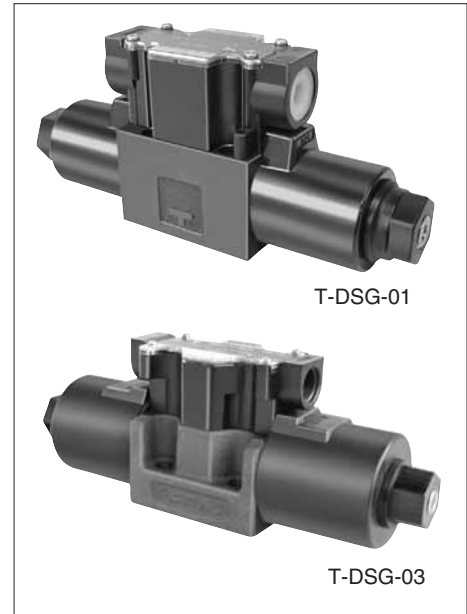
The valve is actuated by operating a built-in switch using a very small current signal (about 10 mA) when the solenoid is energised.

- **A Direct Drive by a programmable controller is now possible.**

As the valve can be actuated by a very small current, as we have mentioned, a Direct Drive is possible on the output circuit of the programmable controller or sequence controller.

- **Simple construction and stable operation.**

Since the valve is a direct type, the construction is quite simple. Also the solenoid is the well proven wet armature type, which can withstand contamination. Therefore a stable operation can be obtained.



Specifications

Valve Type	Model Numbers	Max. Flow ★ L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Max. T-Line Back Pressure MPa (PSI)	Max. Changeover Frequency Cycle/min {min ⁻¹ }	Mass kg (lbs.)
Standard Type	T-DSG-01-3C*-D24*-70/7090	100 (26.4)	35 (5080)	21 (3050)	300	1.85 (4.08)
	T-DSG-01-2D2-D24*-70/7090					
	T-DSG-01-2B*-D24*-70/7090					
Shockless Type	T-S-DSG-01-3C*-D24*-70/7090	63 (16.6)	25 (3630)	21 (3050)	120	1.85 (4.08)
	T-S-DSG-01-2B2-D24*-70/7090					
Standard Type	T-DSG-03-3C*-D24*-50/5090	120 (31.7)	31.5 (4570) { Spool Type 60 Only } 25 (3630)	16 (2320)	240	5 (11.03)
	T-DSG-03-2D2-D24*-50/5090					
	T-DSG-03-2B*-D24*-50/5090					
Shockless Type	T-S-DSG-03-3C*-D24*-50/5090	120 (31.7)	25 (3630)	16 (2320)	120	5 (11.03)
	T-S-DSG-03-2B2-D24*-50/5090					

★ Maximum flow indicates a ceiling flow. As the ceiling flow depends on the type of spool and operating condition the same as those for standard DSG-01/03, refer to the List of Spool Functions on [pages 347 - 351](#) (DSG-01) and [364 - 368](#) (DSG-03) for details.

Model Number Designation

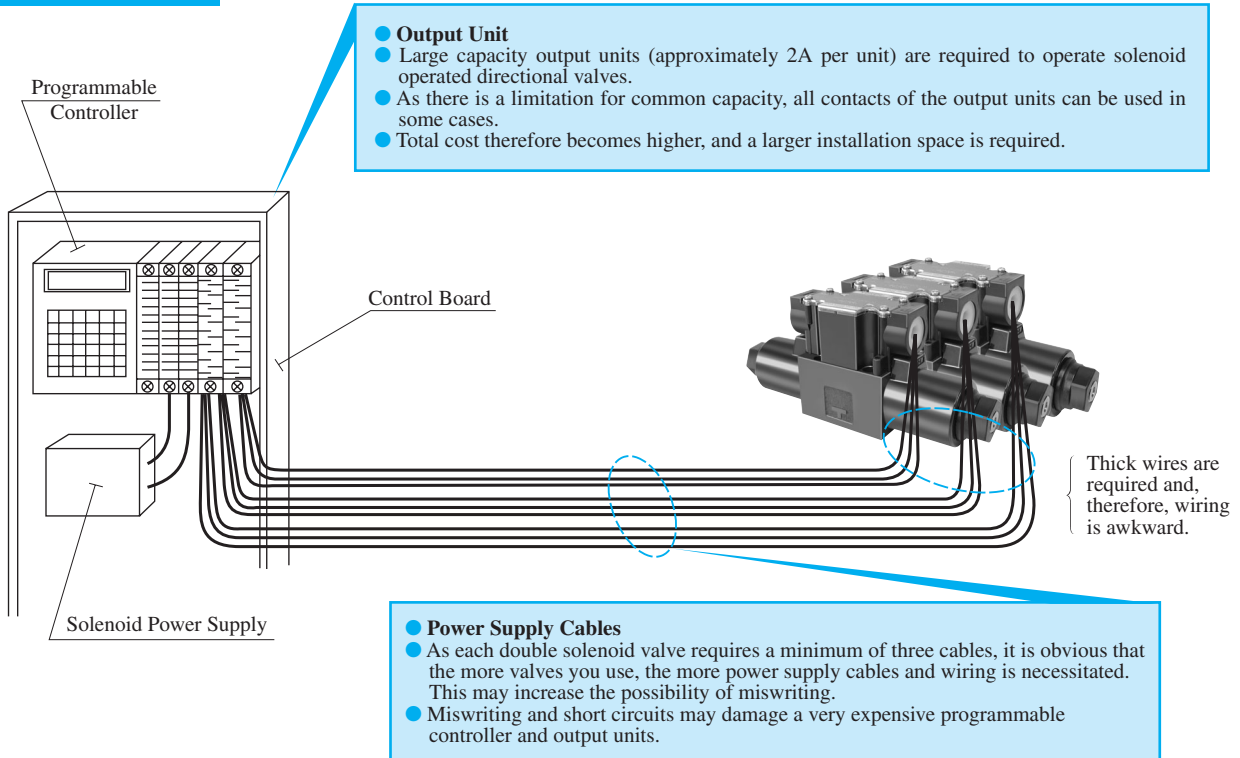
F-	T-	S-	DSG	-03	-2	B	2	A	-D24	M	-70	*	-L
Special Seals	Control Type	Type	Series Number	Valve Size	Number of Valve Position	Spool-Spring Arrangement	Spool Type	Special Two Position Valve	Coil Type	Supply Type of Signal Power	Design Number	Design Standard	Models with Alternate Offset Solenoid
	T: Electronic Relay Incorporated Type			01					DC D24	None: Internal Signal Power	70		
				03						M: External Signal Power	50		

★ Please refer to the valve type DSG-01 and DSG-03 shown on [page 346](#) and [363](#) for the area shaded.

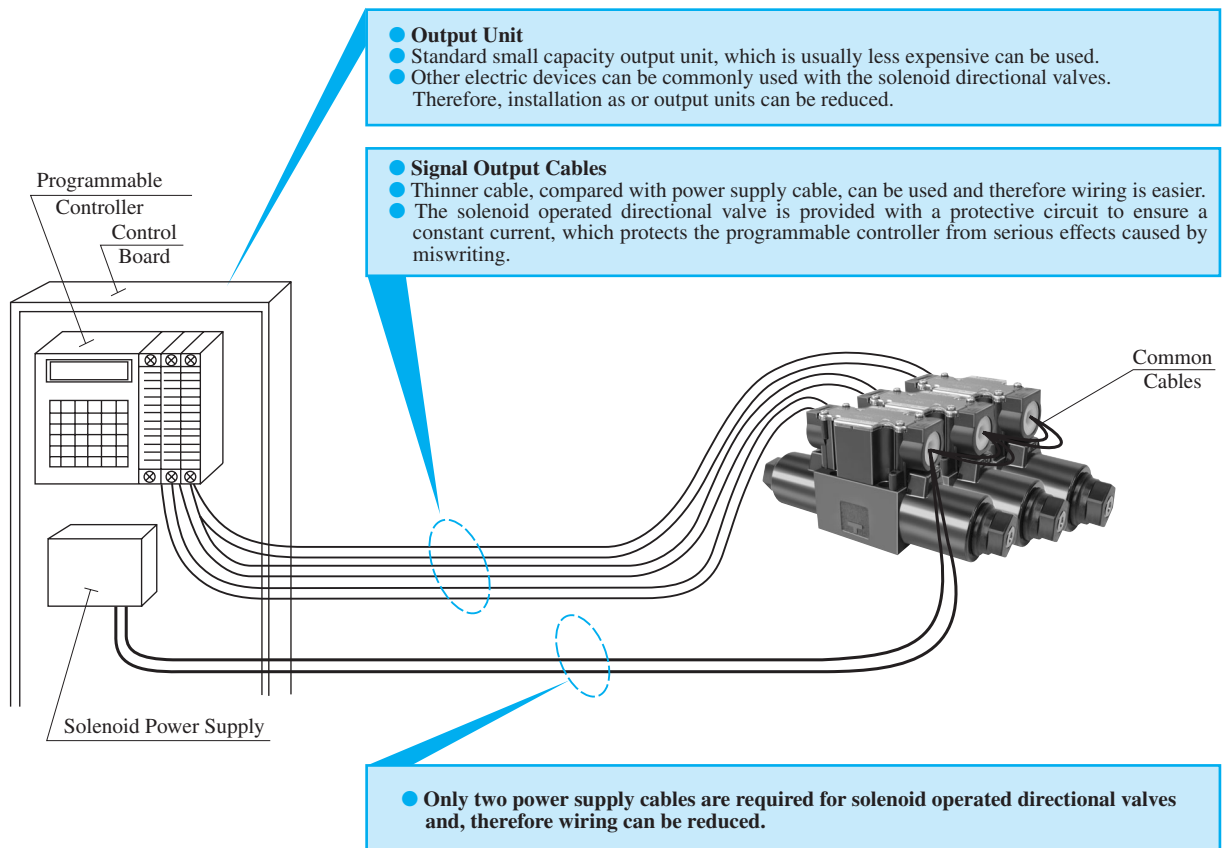
For details, please contact us.

Comparison of The Conventional Type and The Electronic Relay Incorporated Type

Conventional Type



Electronic Relay Incorporated Type



Solenoid Controlled Pilot Operated Directional Valves

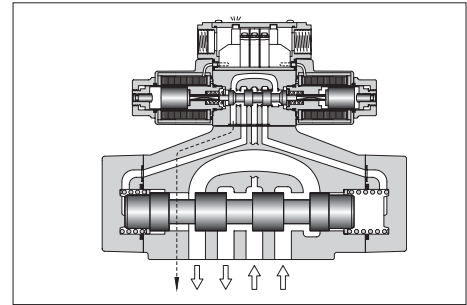
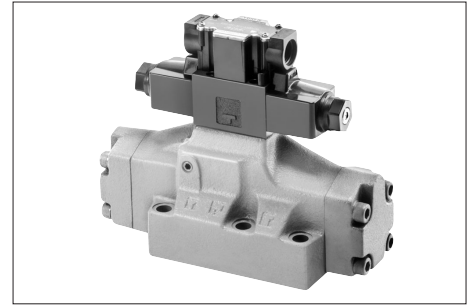
These valves are composed of a solenoid operated pilot valve and a pilot operated slave valve. When a solenoid is energised the pilot valve directs the flow to move the spool of the slave valve, thus changing the direction of flow in the hydraulic circuit.

High Pressure High Flow

High pressure [31.5 MPa (4570 PSI)] along with high flow means compact system design.

Lower Pressure Drop

System energy saving increased as pressure drop of each valve has been greatly reduced.



Specifications

Valve Type	Model Numbers	Max. Flow L/min (U.S.GPM) ^{★1}	Max. Operating Pressure MPa (PSI)	Max. Pilot Pressure MPa (PSI)	Min. ^{★2} Required Pilot Pres. MPa (PSI)	Max. T-Line Back Pressure MPa (PSI)		Max. Change-over Frequency Cycles/Min {min ⁻¹ }			Mass kg (lbs.)
						Ext. Drain	Int. Drain	AC	DC	R	
Standard Type	DSHG-01-3C*-*-14/1480/1490	40 (10.6)	21 (3050)	21 (3050)	1.0 (145)	16 (2320)	16 (2320)	120	120	120	3.2 (7.1)
	DSHG-01-2B*-*-14/1480/1490										
	DSHG-03-3C*-*-14/1490	160 (42.3)	25 (3630)	25 (3630)	0.7 (100)	16 (2320)	16 (2320)	120	120	120	6.9 (15.2)
	DSHG-03-2N*-*-14/1490										6.9 (15.2)
	DSHG-03-2B*-*-14/1490										6.4 (14.1)
	Shockless Type	(S-)DSHG-04-3C*-*-52/5290	300 (79.3)	31.5 (4570)	25 (3630)	0.8 (120)	21 (3050)	16 (2320)	120	120	120
(S-)DSHG-04-2N*-*-52/5290		8.5 (18.7)									
(S-)DSHG-04-2B*-*-52/5290		8.0 (17.6)									
(S-)DSHG-06-3C*-*-53/5390		500 (132)	31.5 (4570)	25 (3630)	0.8 (120)	21 (3050)	16 (2320)	120	120	120	12.4 (27.3)
(S-)DSHG-06-2N*-*-53/5390											12.4 (27.3)
(S-)DSHG-06-2B*-*-53/5390				11.9 (26.2)							
(S-)DSHG-06-3H*-*-53/5390				21 (3050)	1.0 (145)		110	110	110	13.2 (29.1)	
(S-)DSHG-10-3C*-*-43/4390		1100 (291)	31.5 (4570)	25 (3630)	1.0 (145)	21 (3050)	16 (2320)	120	120	100	45.0 (99.2)
(S-)DSHG-10-2N*-*-43/4390								100	100	100	45.0 (99.2)
(S-)DSHG-10-2B*-*-43/4390				21 (3050)		60	60	50	44.5 (98.1)		
(S-)DSHG-10-3H*-*-43/4390								52.9 (116.6)			

- ★1. Maximum flow indicates a ceiling flow. As the ceiling flow depends on the type of spool and operating condition, refer to the List of Spool Functions on pages 386 to 390 for details.
- ★2. Pilot pressure of internal pilot drain models must always exceed tank line back pressure by a minimum required pilot pressure.
- ★3. Min. pilot pressure of with pilot piston in 1.8 MPa (260 PSI).

Solenoid Ratings

Solenoid ratings of pilot valve are identical with those of standard solenoid valve. Refer to relevant solenoid ratings described on the page below.

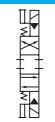
Model Numbers	Pilot Valve Model Numbers	Solenoid Ratings described on the page below
DSHG-01	DSG-01-***-70*	345
DSHG-03		
(S-)DSHG-04		
(S-)DSHG-06		
(S-)DSHG-10		

Yuken can offer flanged connection valves described below. Consult us for the details.

Model Numbers	Rated Flow l/min (U.S.GPM)	Max. Pressure MPa (PSI)
DSHF-10-***-27*	315 (83)	21 (3050)
DSHF-16-***-37*	500 (132)	21 (3050)
DSHF-24-***-28*	1200 (317)	21 (3050)
DSHF-32-***-27*	2400 (634)	21 (3050)

CSA Approved Solenoid Valve

Available to supply DSHG-06 series valve approved by the CSA (Canadian Standards Association). Consult us for details.



■ Model Number Designation

F-	S-	DSHG	-06	-2	B	2	A	-C2	-E	T	
Special Seals	Type	Series Number	Valve Size	No. of Valve Position	Spool-Spring Arrangement	Spool Type	Special Two Position Valve	Models with Pilot Choke Valve	Pilot Connection	Drain Connection	
F: For Phosphate Ester Type Fluids (Omit if not required)	None: Standard Type	DSHG: Solenoid Controlled Pilot Operated Directional Valve, Sub-plate Mounting	01	3	C: Spring Centred	2, 3, 4 40, 5, 60 7, 9, 10 11, 12	—	—	C1: With C1 Choke C2: With C2 Choke C1C2: With C1 & C2 Choke (Omit if not required)	None: Internal Pilot E: External Pilot	None: External Drain E: Internal Drain
				2	B: Spring Offset	2, 3, 4 40, 7					
			03	3	C: Spring Centred	2, 3, 4 40, 5, 60 7, 9, 10 11, 12	—				
				2	N: No-Spring B: Spring Offset	2 3 4 40 7					
			04	3	C: Spring Centred	2, 4, 40 60, 10, 12 (3, 5, 6) ^{*1} (7, 9, 11)	—	A ^{*2} (Omit if not required)			
				2	N: No-Spring B: Spring Offset	2, 4, 40 (3, 7) ^{*1} 2, 4, 40 (3, 7) ^{*1}	A ^{*2} B ^{*2} (Omit if not required)				
	06		3	H: Pressure Centred	2, 4, 40 60, 10, 12 (3, 5, 6) ^{*1} (7, 9, 11)	—	A ^{*2} (Omit if not required)				
				C: Spring Centred							
	10		2	N: No-Spring	2, 4, 40 (3, 7) ^{*1}	A ^{*2} (Omit if not required)					
				B: Spring Offset	2, 4, 40 (3, 7) ^{*1}	A ^{*2} B ^{*2} (Omit if not required)					

Note: In spool type “3”, “5”, “6”, “60”, and “7”, the combination applicable between pilot system and drain system is as described in the table below.

Pilot Connection	Drain Connection	Care in Application
Internal Pilot	External Drain	Hold back pressure in the tank line so that the difference between pilot pressure and drain pressure is always more than minimum required pilot pressure.
	Internal Drain (T)	Combination is not applicable
External Pilot (E)	External Drain Internal Drain (T)	No restrictions in the combination on us

-R2	-A100	-C	-H	-N	-53	-*	-L
Spool Control ^{★3} (Omit if not required)	Coil Type	Manual Override of Pilot Valve	Bult-in Orifice for Pilot Line	Type of Electrical Conduit Connection	Design Number	Design Standard	Models with Reverse Mtg. of Solenoid
—	AC: A100 , A200 A120 , A240		—		14	None: Japanese Standard "JIS"	— L (Omit if not required)
R2 : With Stroke Adjustment, Both Ends	DC: D12 , D24 D48	None : Manual Override Pin	—	None: Terminal Box Type	14	90: N. American Design Standard	— L (Omit if not required)
RA : With Stroke Adjustment, Port "A" End	AC → DC R100 , R200		—		52	None: Japanese Standard "JIS" & European Design Standard	— L (Omit if not required)
RB : With Stroke Adjustment, Port "B" End	AC: A100 , A200 A120 , A240	C : Push Button & Lock Nut	—	N: Push-in Connector Type	53	80: European Design Standard (Applicable only for DSHG-01)	— L (Omit if not required)
R2 : With Stroke Adj., Both Ends	DC: D12 , D24 D48		—	N1 : Push-in Connector with Indicator Light ^{★4}	43	90: N. American Design Standard	— L (Omit if not required)
RA : With Stroke Adj., Port "A" End	AC → DC R100 , R200		H : Refer to ^{★5}				
RB : With Stroke Adj., Port "B" End			—				
P2 : With Pilot Piston, Both Ends			—				
PA : With Pilot Piston, Port "A" End			—				
PB : With Pilot Piston, Port "B" End			—				

- ★1. Shekless type (S-DSHG) are not available for spool type marked ().
- ★2. As for the details of the valve using the neutral position and the side position (either SOL a or SOL b side), please refer to page 391. Furthermore, the spool types other than "2", "4", "40" (3, 7) are also available.
- ★3. In spool-spring arrangement "H" (Pressure centred models), the valves with stroke adjustment (R*) and pilot-piston (P*) are not available.
- ★4. NI stands for Plug-in connector with solenoid indicator light. NI is not available for R-type solenoids.
- ★5. In spool-spring arrangement "H" (pressure centred models), in case the pilot pressure is more than 10 MPa (1450 PSI), please specify that the valve should have the built-in orifice to the pilot line.

In the table above, the symbols and numbers highlighted with shade represent the optional extras. The valves with model number having such optional extras are handles as options, therefore please confirm the time of delivery with us before ordering.

Sub-plates

Valve Model Numbers	Japanese Standard "JIS"			European Design Standard			N. American Design Standard		
	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)
DSHG-01	DSGM-01-31	Rc 1/8	0.8 (1.8)	DSGM-01-3080	1/8 BSP.F	0.8 (1.8)	DSGM-01-3090	1/8 NPT	0.8 (1.8)
	DSGM-01X-31	Rc 1/4	0.8 (1.8)	DSGM-01X-3080	1/4 BSP.F	0.8 (1.8)	DSGM-01X-3090	1/4 NPT	0.8 (1.8)
	DSGM-01Y-31	Rc 3/8	0.8 (1.8)	—	—	—	DSGM-01Y-3090	3/8 NPT	0.8 (1.8)
DSHG-03	DSGM-03-40*	Rc 3/8	3.0 (6.6)	DSGM-03-2180*	3/8 BSP.F	3.0 (6.6)	DSGM-03-2190*	3/8 NPT	3.0 (6.6)
	DSGM-03X-40*	Rc 1/2	3.0 (6.6)	DSGM-03X-2180*	1/2 BSP.F	3.0 (6.6)	DSGM-03X-2190*	1/2 NPT	3.0 (6.6)
	DSGM-03Y-40*	Rc 3/4	4.7 (10.4)	DSGM-03Y-2180*	3/4 BSP.F	4.7 (10.4)	DSGM-03Y-2190*	3/4 NPT	4.7 (10.4)
	DHGM-03Y-10	Rc 3/4	4.7 (10.4)	DHGM-03Y-1080	3/4 BSP.F	4.7 (10.4)	DHGM-03Y-1090	3/4 NPT	4.7 (10.4)
DSHG-04	DHGM-04-20	Rc 1/2	4.4 (9.7)	DHGM-04-2080	1/2 BSP.F	4.4 (9.7)	DHGM-04-2090	1/2 NPT	4.4 (9.7)
	DHGM-04X-20	Rc 3/4	4.1 (9.0)	DHGM-04X-2080	3/4 BSP.F	4.1 (9.0)	DHGM-04X-2090	3/4 NPT	4.1 (9.0)
DSHG-06	DHGM-06-50	Rc 3/4	7.4 (16.3)	DHGM-06-5080	3/4 BSP.F	8.5 (18.7)	DHGM-06-5090	3/4 NPT	7.4 (16.3)
	DHGM-06X-50	Rc 1	7.4 (16.3)	DHGM-06X-5080	1 BSP.F	8.5 (18.7)	DHGM-06X-5090	1 NPT	7.4 (16.3)
DSHG-10	DHGM-10-40	Rc 1-1/4	21.5 (47.4)	DHGM-10-4080	1-1/4 BSP.F	21.5 (47.4)	DHGM-10-4090	1-1/4 NPT	21.5 (47.4)
	DHGM-10X-40	Rc 1-1/2	21.5 (47.4)	DHGM-10X-4080	1-1/2 BSP.F	21.5 (47.4)	DHGM-10X-4090	1-1/2 NPT	21.5 (47.4)

★ DSGM-03* is available only for Internal pilot-Internal drain type (Use DHGM-03Y for other valves).

● Sub-plates are available. Specify the sub-plate model number from the table above.

When sub-plates are not used, the mounting surface should have a good machined finish.

Mounting Bolt

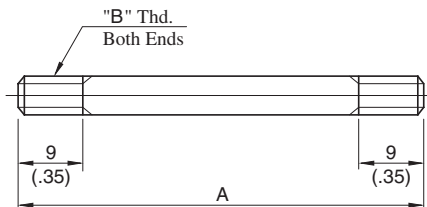
Model Numbers	Mounting Bolt				
	Name	Japanese Standard "JIS" European Design Standard	N. American Design Standard	Qty.	Tightening Torque Nm (in. lbs.)
DSHG-01	Mtg. Bolt Kit ★ ³	MBK-01-01-30 ★ ¹ MBK-01-02-30 ★ ²	MBK-01-01-3090 ★ ¹ MBK-01-02-3090 ★ ²	1 set	5 - 6 (43 - 52)
DSHG-03	Soc. Hd. Cap Screw	M6 × 35 Lg.	1/4-20 UNC × 1-3/4 Lg.	4	12 - 15 (104 - 130)
(S-)DSHG-04	Soc. Hd. Cap Screw	M6 × 45 Lg.	1/4-20 UNC × 1-3/4 Lg.	2	12 - 15 (104 - 130)
		M10 × 50 Lg.	3/8-16 UNC × 2 Lg.	4	58 - 72 (504 - 625)
(S-)DSHG-06	Soc. Hd. Cap Screw	M12 × 60 Lg.	1/2-13 UNC × 2-1/2 Lg.	6	100 - 123 (868 - 1068)
(S-)DSHG-10	Soc. Hd. Cap Screw	M20 × 75 Lg.	3/4-10 UNC × 3 Lg.	6	473 - 585 (4106 - 5078)

★ 1. For Internal Pilot-Internal Drain.

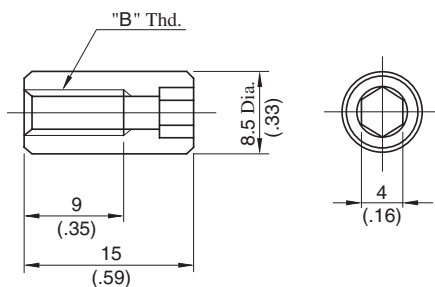
★ 2. For External Pilot or External Drain.

★ 3. Mounting bolt kit is common to that of 01 series modular valves. Refer to figure below for the dimensions of bolt kit.

Stud Bolt



Nut



DIMENSIONS IN MILLIMETRES (INCHES)

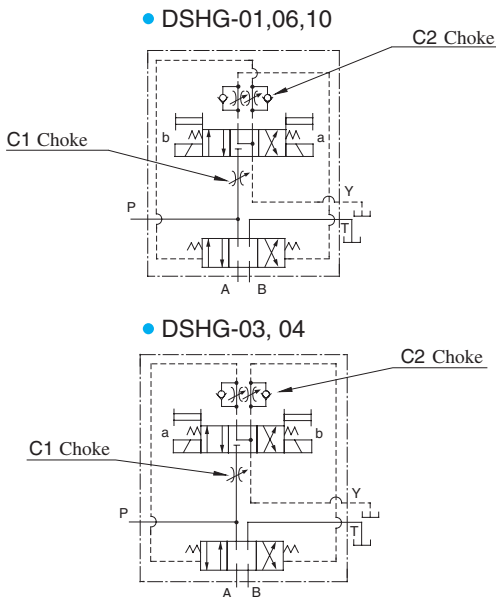
Model Numbers	A mm (In.)	"B" Thd.
MBK-01-01-30	94 (3.70)	M5
MBK-01-02-30	134 (5.28)	
MBK-01-01-3090	94 (3.70)	No.10-24 UNC
MBK-01-02-3090	134 (5.28)	

Options

Models with Pilot Choke Adjustment

When the adjustment screw is turned clockwise, changeover speed of the main spool becomes slow. In case of the spring centred valves in particular, making slow of the returning speed of the main spool to the neutral position is possible with a C2 choke valve. These choke valves can be used in combination with the valves of spring centred, no-spring, offset, pressure centred and the valves with stroke adjustment.

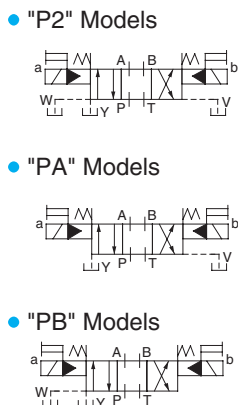
Graphic Symbols (Ex.: Spring Centred)



Models with Pilot Piston (P2, PA, PB)

The valves with a pilot piston can be used when the high speed changeover of the main spool is required. However, please note that in case of spring centered valves, there is no change in the returning speed of the main spool to the neutral position even with the pilot piston.

Graphic Symbols (Ex.: Spring Centred)

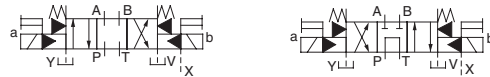


Pressure Centred Models (3H*)

The pressure centered type can be used when the returning of the main spool to the neutral position is required to be firmly.

Graphic Symbols (Ex.: External Pilot-External Drain)

(Only for 3H6, 3H60)

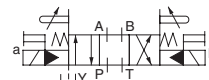


Models with Stroke Adjustment (R2, RA, RB)

When the adjustment screw is screwed in, the main spool stroke becomes short and flow rate reduces.

Graphic Symbols (Ex.: Spring Centred)

"R2" Models



"RA" Models



"RB" Models



Additional Mass of Options

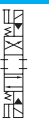
Add the mass described below to the mass of standard models on [page 381](#), if options are required.

kg (lbs.)

Model Numbers	Model with Pilot Choke Adj.		Models with Pilot Piston		Models with Stroke Adj.	
	C1, C2	C1C2	P2	PA PB	P2	PA PB
DSHG-03	0.65(1.4)	1.3(2.9)	—	—	0.6(1.3)	0.3 (.7)
(S-)DSHG-04	0.65(1.4)	1.3(2.9)	—	—	1.0(2.2)	0.5(1.1)
(S-)DSHG-06	0.65(1.4)	1.3(2.9)	1.0(2.2)	0.5(1.1)	1.2(2.6)	0.6(1.3)
(S-)DSHG-10	0.65(1.4)	1.3(2.9)	3.6(7.9)	1.8(4.0)	3.7(8.2)	1.85(4.1)

Options on Pilot Valve

The same options to DSG-01 series valves are available. Please refer to [page 345](#) for the details.



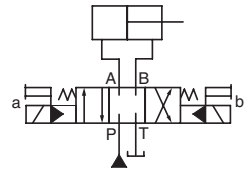
List of Spool Functions and Maximum Flow (DSHG-01)

Spool Type	Three Positions				Two Positions			
	Spring Centred				Spring Centred			
	Graphic Symbol 	Maximum Flow L/min (U.S.GPM)			Graphic Symbol 	Maximum Flow L/min (U.S.GPM)		
Model Numbers	7 MPa (1020 PSI)	14 MPa (2030 PSI)	21 MPa (3050 PSI)	Model Numbers	7 MPa (1020 PSI)	14 MPa (2030 PSI)	21 MPa (3050 PSI)	
"2"	DSHG-01-3C2	40 (10.6)	40 (10.6)	40 (10.6)	DSHG-01-2B2	40 (10.6)	40 (10.6)	40 (10.6)
"3"	DSHG-01-3C3	40 (10.6)	40 (10.6)	40 (10.6)	DSHG-01-2B3	40 (10.6)	40 (10.6)	40 (10.6)
"4"	DSHG-01-3C4	40 (10.6)	40 (10.6)	40 (10.6)	DSHG-01-2B4	40 (10.6)	40 (10.6)	40 (10.6)
"40"	DSHG-01-3C40	40 (10.6)	40 (10.6)	40 (10.6)	DSHG-01-2B40	40 (10.6)	40 (10.6)	40 (10.6)
"5"	DSHG-01-3C5	40 (10.6)	40 (10.6)	40 (10.6)				
"60"	DSHG-01-3C60	40 (10.6)	40 (10.6)	40 (10.6)				
"7"	DSHG-01-3C7	40 (10.6)	40 (10.6)	40 (10.6)	DSHG-01-2B7	40 (10.6)	40 (10.6)	40 (10.6)
"9"	DSHG-01-3C9	40 (10.6)	40 (10.6)	40 (10.6)				
"10"	DSHG-01-3C10	40 (10.6)	40 (10.6)	40 (10.6)				
"11"	DSHG-01-3C11	40 (10.6)	40 (10.6)	40 (10.6)				
"12"	DSHG-01-3C12	40 (10.6)	40 (10.6)	40 (10.6)				

Notes) 1. Max. flow shows value at pilot pressure more than 1 MPa (150 PSI)

2. Max. flow in the table above represents the value in the flow condition of P → A → B → T (or P → B → A → T) as shown in the circuit diagram right.

In case the valve is used in the condition that either A or B port is blocked, the maximum flow differs according to a hydraulic circuit, therefore, please consult us for details.



List of Spool Functions and Maximum Flow (DSHG-03)

Three Positions

Spool Type	Spring Centred			
	Graphic Symbol 	Maximum Flow L/min (U.S.GPM)		
	Model Numbers	7 MPa (1020 PSI)	14 MPa (2030 PSI)	25 MPa (3630 PSI)
"2"	DSHG-03-3C2	160 (42.3)	85 (22.5) 160 (42.3)	60 (15.9) 95 (25.1)
"3"	DSHG-03-3C3	160 (42.3)	160 (42.3)	160 (42.3)
"4"	DSHG-03-3C4	160 (42.3)	85 (22.5) 160 (42.3)	60 (15.9) 95 (25.1)
"40"	DSHG-03-3C40	160 (42.3)	85 (22.5) 160 (42.3)	60 (15.9) 95 (25.1)
"5"	DSHG-03-3C5	160 (42.3)	85 (22.5) 160 (42.3)	60 (15.9) 95 (25.1)
"60"	DSHG-03-3C60	160 (42.3)	160 (42.3)	125 (33.0) 160 (42.3)
"7"	DSHG-03-3C7	160 (42.3)	85 (22.5) 160 (42.3)	60 (15.9) 95 (25.1)
"9"	DSHG-03-3C9	160 (42.3)	85 (22.5) 160 (42.3)	60 (15.9) 95 (25.1)
"10"	DSHG-03-3C10	160 (42.3)	85 (22.5) 160 (42.3)	60 (15.9) 95 (25.1)
"11"	DSHG-03-3C11	160 (42.3)	85 (22.5) 160 (42.3)	60 (15.9) 95 (25.1)
"12"	DSHG-03-3C12	160 (42.3)	85 (22.5) 160 (42.3)	60 (15.9) 95 (25.1)

Two Positions

Spool Type	No-Spring			Spring Offset				
	Graphic Symbol 	Maximum Flow L/min (U.S.GPM)			Graphic Symbol 	Maximum Flow L/min (U.S.GPM)		
	Model Numbers	7 MPa (1020 PSI)	14 MPa (2030 PSI)	25 MPa (3630 PSI)	Model Numbers	7 MPa (1020 PSI)	14 MPa (2030 PSI)	25 MPa (3630 PSI)
"2"	DSHG-03-2N2	160 (42.3)	160 (42.3)	85 (22.5) 160 (42.3)	DSHG-03-2B2	160 (42.3)	160 (42.3)	85 (22.5) 160 (42.3)
"3"	DSHG-03-2N3	160 (42.3)	160 (42.3)	85 (22.5) 160 (42.3)	DSHG-03-2B3	160 (42.3)	160 (42.3)	85 (22.5) 160 (42.3)
"4"	DSHG-03-2N4	160 (42.3)	160 (42.3)	85 (22.5) 160 (42.3)	DSHG-03-2B4	160 (42.3)	160 (42.3)	85 (22.5) 160 (42.3)
"40"	DSHG-03-2N40	160 (42.3)	160 (42.3)	85 (22.5) 160 (42.3)	DSHG-03-2B40	160 (42.3)	160 (42.3)	85 (22.5) 160 (42.3)
"7"	DSHG-03-2N7	160 (42.3)	160 (42.3)	85 (22.5) 160 (42.3)	DSHG-03-2B7	160 (42.3)	160 (42.3)	85 (22.5) 160 (42.3)

Notes: 1. The relation between max. flow and pilot pressure in the table above is as shown below.

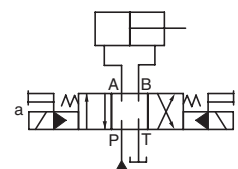
(Example)

Maximum flow rate is constant regardless of pilot pressure.
Pilot Pressure more than 0.7 MPa (100 PSI).

160 (42.3)	85 (22.5)	Pilot Pressure at 0.7 MPa (100 PSI).
160 (42.3)	160 (42.3)	Pilot Pressure at 1 MPa (150 PSI).

2. Max. flow in the table above represents the value in the flow condition of P → A → B → T (or P → B → A → T) as shown in the circuit diagram right.

In case the valve is used in the condition that either A or B port is blocked, the maximum flow differs according to a hydraulic circuit, therefore, please consult us for details.



■ List of Spool Functions and Maximum Flow (DSHG-04/S-DSHG-04)

● Three Positions

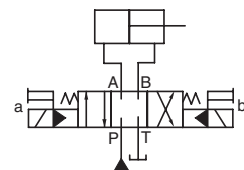
Spool Type	Spring Centred				
	Graphic Symbol	Maximum Flow			
	Model Numbers	10 MPa (1450 PSI)	16 MPa (2320 PSI)	25 MPa (3630 PSI)	31.5 MPa (4570 PSI)
"2"	DSHG-04-3C2 (S-)DSHG-04-3C2	300 (79.3)	300 (79.3)	200 (52.8)	145 (38.3)
"3"	DSHG-04-3C3	300 (79.3)	300 (79.3)	300 (79.3)	300 (79.3)
"4"	DSHG-04-3C4 (S-)DSHG-04-3C4	300 (79.3)	300 (79.3)	250 (66.1)	165 (43.6)
"40"	DSHG-04-3C40 (S-)DSHG-04-3C40	300 (79.3)	300 (79.3)	200 (52.8)	145 (38.3)
"5"	DSHG-04-3C5	250 (66.1)	250 (66.1)	245 (64.7)	245 (64.7)
"6"	DSHG-04-3C6	300 (79.3)	260 (68.7)	245 (64.7)	235 (62.1)
"60"	DSHG-04-3C60 (S-)DSHG-04-3C60	300 (79.3)	300 (79.3)	300 (79.3)	300 (79.3)
"7"	DSHG-04-3C7	300 (79.3)	300 (79.3)	200 (52.8)	145 (38.3)
"9"	DSHG-04-3C9	300 (79.3)	300 (79.3)	280 (74.0)	250 (66.1)
"10"	DSHG-04-3C10 (S-)DSHG-04-3C10	300 (79.3)	300 (79.3)	200 (52.8)	150 (39.6)
"11"	DSHG-04-3C11	300 (79.3)	260 (68.7)	160 (42.3)	140 (37.0)
"12"	DSHG-04-3C12 (S-)DSHG-04-3C12	300 (79.3)	280 (74.0)	170 (44.9)	135 (35.7)

● Two Positions

Spool Type	No-Spring					Spring Offset				
	Graphic Symbol	Maximum Flow				Graphic Symbol	Maximum Flow			
	Model Numbers	10 MPa (1450 PSI)	16 MPa (2320 PSI)	25 MPa (3630 PSI)	31.5 MPa (4570 PSI)	Model Numbers	10 MPa (1450 PSI)	16 MPa (2320 PSI)	25 MPa (3630 PSI)	31.5 MPa (4570 PSI)
"2"	(S-)DSHG-04-2N2	300 (79.3)	300 (79.3)	300 (79.3)	300 (79.3)	(S-)DSHG-04-2B2	300 (79.3)	300 (79.3)	300 (79.3)	300 (79.3)
"3"	DSHG-04-2N3	300 (79.3)	300 (79.3)	300 (79.3)	300 (79.3)	DSHG-04-2B3	300 (79.3)	300 (79.3)	300 (79.3)	300 (79.3)
"4"	(S-)DSHG-04-2N4	300 (79.3)	300 (79.3)	300 (79.3)	300 (79.3)	(S-)DSHG-04-2B4	300 (79.3)	300 (79.3)	300 (79.3)	300 (79.3)
"40"	(S-)DSHG-04-2N40	300 (79.3)	300 (79.3)	300 (79.3)	300 (79.3)	(S-)DSHG-04-2B40	300 (79.3)	300 (79.3)	300 (79.3)	300 (79.3)
"7"	DSHG-04-2N7	300 (79.3)	300 (79.3)	300 (79.3)	300 (79.3)	DSHG-04-2B7	300 (79.3)	300 (79.3)	300 (79.3)	300 (79.3)

Notes: 1. Max flow described above shown value at pilot pressure more than 0.8 MPa (120 PSI).

2. Max. flow in the table above represents the value in the flow condition of P → A → B → T (or P → B → A → T) as shown in the circuit diagram right.
In case the valve is used in the condition that either A or B port is blocked, the maximum flow differs according to a hydraulic circuit, therefore, please consult us for details.



List of Spool Functions and Maximum Flow (DSHG-06/S-DSHG-06)

Three Positions

Spool Type	Spring Centred					Pressure Centred				
	Graphic Symbol	Maximum Flow				Graphic Symbol	Maximum Flow			
	Model Numbers	10 MPa (1450 PSI)	16 MPa (2320 PSI)	25 MPa (3630 PSI)	31.5 MPa (4570 PSI)	Model Numbers	10 MPa (1450 PSI)	16 MPa (2320 PSI)	25 MPa (3630 PSI)	31.5 MPa (4570 PSI)
"2"	(S-)DSHG-06-3C2	500 (132)	500 (132)	410 (108) 500 (132)	310 (81.9) 500 (132)	(S-)DSHG-06-3H2	500 (132)	500 (132)	500 (132)	420 (111) 500 (132)
"3"	DSHG-06-3C3	500 (132)	500 (132)	460 (122)	370 (97.8)	DSHG-06-3H3	500 (132)	500 (132)	500 (132)	500 (132)
"4"	(S-)DSHG-06-3C4	500 (132)	500 (132)	410 (108) 500 (132)	310 (81.9) 500 (132)	(S-)DSHG-06-3H4	500 (132)	500 (132)	500 (132)	420 (111) 500 (132)
"40"	(S-)DSHG-06-3C40	500 (132)	500 (132)	410 (108) 500 (132)	310 (81.9) 500 (132)	(S-)DSHG-06-3H40	500 (132)	500 (132)	500 (132)	420 (111) 500 (132)
"5"	DSHG-06-3C5	500 (132)	500 (132)	425 (112)	350 (92.5)	DSHG-06-3H5	500 (132)	500 (132)	500 (132)	470 (124) 500 (132)
"6"	DSHG-06-3C6	475 (125)	390 (103)	300 (79.3)	230 (60.8)	DSHG-06-3H6	500 (132)	500 (132)	500 (132)	420 (111) 500 (132)
"60"	(S-)DSHG-06-3C60	475 (125)	420 (111)	340 (89.8)	280 (74.0)	(S-)DSHG-06-3H60	500 (132)	500 (132)	500 (132)	420 (111) 500 (132)
"7"	DSHG-06-3C7	500 (132)	500 (132)	450 (119)	360 (95.1)	DSHG-06-3H7	500 (132)	500 (132)	500 (132)	500 (132)
"9"	DSHG-06-3C9	500 (132)	500 (132)	450 (119) 500 (132)	360 (95.1) 500 (132)	DSHG-06-3H9	500 (132)	500 (132)	500 (132)	500 (132)
"10"	(S-)DSHG-06-3C10	500 (132)	500 (132)	410 (108) 500 (132)	310 (81.9) 500 (132)	(S-)DSHG-06-3H10	500 (132)	500 (132)	500 (132)	460 (122) 500 (132)
"11"	DSHG-06-3C11	500 (132)	500 (132)	410 (108) 500 (132)	310 (81.9) 500 (132)	DSHG-06-3H11	500 (132)	500 (132)	500 (132)	460 (122) 500 (132)
"12"	(S-)DSHG-06-3C12	500 (132)	500 (132)	410 (108) 500 (132)	310 (81.9) 500 (132)	(S-)DSHG-06-3H12	500 (132)	500 (132)	500 (132)	460 (122) 500 (132)

Two Positions

Spool Type	No-Spring					Spring Offset				
	Graphic Symbol	Maximum Flow				Graphic Symbol	Maximum Flow			
	Model Numbers	10 MPa (1450 PSI)	16 MPa (2320 PSI)	25 MPa (3630 PSI)	31.5 MPa (4570 PSI)	Model Numbers	10 MPa (1450 PSI)	16 MPa (2320 PSI)	25 MPa (3630 PSI)	31.5 MPa (4570 PSI)
"2"	(S-)DSHG-06-2N2	500 (132)	500 (132)	500 (132)	500 (132)	(S-)DSHG-06-2B2	500 (132)	500 (132)	500 (132)	500 (132)
"3"	DSHG-06-2N3	500 (132)	500 (132)	500 (132)	500 (132)	DSHG-06-2B3	500 (132)	500 (132)	500 (132)	500 (132)
"4"	(S-)DSHG-06-2N4	500 (132)	500 (132)	500 (132)	500 (132)	(S-)DSHG-06-2B4	500 (132)	500 (132)	500 (132)	500 (132)
"40"	(S-)DSHG-06-2N40	500 (132)	500 (132)	500 (132)	500 (132)	(S-)DSHG-06-2B40	500 (132)	500 (132)	500 (132)	500 (132)
"7"	DSHG-06-2N7	500 (132)	500 (132)	500 (132)	500 (132)	DSHG-06-2B7	500 (132)	500 (132)	500 (132)	500 (132)

Notes: 1. The relation between max. flow and pilot pressure in the table above is as shown below.

(Example)

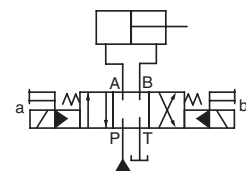
Maximum flow rate is constant regardless of pilot pressure. → 500 (132)
 Pilot Pressure more than 0.8 MPa (120 PSI).
 In case pressure centred models, pilot pressure is more than 1 MPa (150 PSI).

500 (132)	410 (108)
500 (132)	500 (132)

Pilot Pressure at 0.8 MPa (120 PSI).
 In case pressure centred models, pilot pressure is more than 1 MPa (150 PSI)

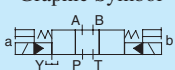













Pilot Pressure at 1.5 MPa (220 PSI).

2. Max. flow in the table above represents the value in the flow condition of P → A → B → T (or P → B → A → T) as shown in the circuit diagram right.
 In case the valve is used in the condition that either A or B port is blocked, the maximum flow differs according to a hydraulic circuit, therefore, please consult us for details.

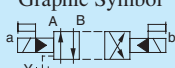
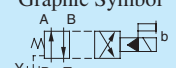







■ List of Spool Functions and Maximum Flow (DSHG-010/S-DSHG-10)

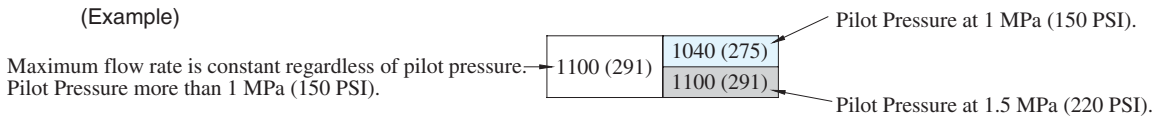
● Three Positions

Spool Type	Spring Centred					Pressure Centred				
	Graphic Symbol 	Maximum Flow L/min (U.S.GPM)				Graphic Symbol 	Maximum Flow L/min (U.S.GPM)			
	Model Numbers	10 MPa (1450 PSI)	16 MPa (2320 PSI)	25 MPa (3630 PSI)	31.5 MPa (4570 PSI)	Model Numbers	10 MPa (1450 PSI)	16 MPa (2320 PSI)	25 MPa (3630 PSI)	31.5 MPa (4570 PSI)
"2" 	(S-)DSHG-10-3C2	1100(291)	1100(291)	950(251) 1100(291)	750(198) 1100(291)	(S-)DSHG-10-3H2	1100(291)	1100(291)	1100(291)	970(256) 1100(291)
"3" 	DSHG-10-3C3	1100(291)	1100(291)	1060(280)	895(236)	DSHG-10-3H3	1100(291)	1100(291)	1100(291)	1050(277) 1100(291)
"4" 	(S-)DSHG-10-3C4	1100(291)	1100(291)	950(251) 1100(291)	750(198) 1100(291)	(S-)DSHG-10-3H4	1100(291)	1100(291)	1100(291)	970(256) 1100(291)
"40" 	(S-)DSHG-10-3C40	1100(291)	1100(291)	950(251) 1100(291)	750(198) 1100(291)	(S-)DSHG-10-3H40	1100(291)	1100(291)	1100(291)	970(256) 1100(291)
"5" 	DSHG-10-3C5	1100(291)	1100(291)	980(259)	850(225)	DSHG-10-3H5	1100(291)	1100(291)	1100(291)	1000(264) 1100(291)
"6" 	DSHG-10-3C6	1050(277)	880(232)	700(185)	570(151)	DSHG-10-3H6	1100(291)	1100(291)	1100(291)	970(256) 1100(291)
"60" 	(S-)DSHG-10-3C60	1050(277)	940(248)	785(207)	680(180)	(S-)DSHG-10-3H60	1100(291)	1100(291)	1100(291)	970(256) 1100(291)
"7" 	DSHG-10-3C7	1100(291)	1100(291)	1040(275) 1100(291)	870(230) 1100(291)	DSHG-10-3H7	1100(291)	1100(291)	1100(291)	1100(291)
"9" 	DSHG-10-3C9	1100(291)	1100(291)	1040(275)	870(230)	DSHG-10-3H9	1100(291)	1100(291)	1100(291)	1100(291)
"10" 	(S-)DSHG-10-3C10	1100(291)	1100(291)	950(251) 1100(291)	750(198) 1100(291)	(S-)DSHG-10-3H10	1100(291)	1100(291)	1100(291)	1060(280) 1100(291)
"11" 	DSHG-10-3C11	1100(291)	1100(291)	950(251) 1100(291)	750(198) 1100(291)	DSHG-10-3H11	1100(291)	1100(291)	1100(291)	1060(280) 1100(291)
"12" 	(S-)DSHG-10-3C12	1100(291)	1100(291)	950(251) 1100(291)	750(198) 1100(291)	(S-)DSHG-10-3H12	1100(291)	1100(291)	1100(291)	1060(280) 1100(291)

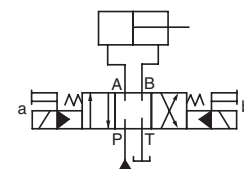
● Two Positions

Spool Type	No-Spring					Spring Offset				
	Graphic Symbol 	Maximum Flow L/min (U.S.GPM)				Graphic Symbol 	Maximum Flow L/min (U.S.GPM)			
	Model Numbers	10 MPa (1450 PSI)	16 MPa (2320 PSI)	25 MPa (3630 PSI)	31.5 MPa (4570 PSI)	Model Numbers	10 MPa (1450 PSI)	16 MPa (2320 PSI)	25 MPa (3630 PSI)	31.5 MPa (4570 PSI)
"2" 	(S-)DSHG-10-2N2	1100(291)	1100(291)	1100(291)	1100(291)	(S-)DSHG-10-2B2	1100(291)	1100(291)	1100(291)	1100(291)
"3" 	DSHG-10-2N3	1100(291)	1100(291)	1100(291)	1100(291)	DSHG-10-2B3	1100(291)	1100(291)	1100(291)	1100(291)
"4" 	(S-)DSHG-10-2N4	1100(291)	1100(291)	1100(291)	1100(291)	(S-)DSHG-10-2B4	1100(291)	1100(291)	1100(291)	1100(291)
"40" 	(S-)DSHG-10-2N40	1100(291)	1100(291)	1100(291)	1100(291)	(S-)DSHG-10-2B40	1100(291)	1100(291)	1100(291)	1100(291)
"7" 	DSHG-10-2N7	1100(291)	1100(291)	1100(291)	1100(291)	DSHG-10-2B7	1100(291)	1100(291)	1100(291)	1100(291)

Notes) 1. The relation between max. flow and pilot pressure in the table above is as shown below.
(Example)

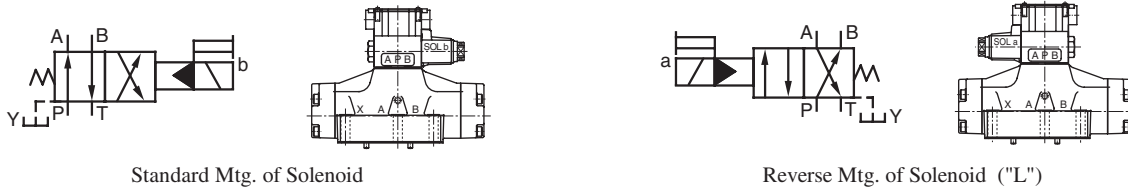


2. Max. flow in the table above represents the value in the flow condition of P → A → B → T (or P → B → A → T) as shown in the circuit diagram right.
In case the valve is used in the condition that either A or B port is blocked, the maximum flow differs according to a hydraulic circuit, therefore, please consult us for details.



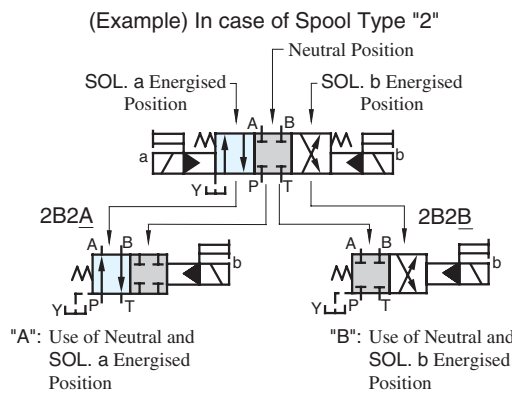
Reverse Mounting of Solenoid.

In spring offset type, it is a standard configuration that the solenoid is mounted onto the valve in the SOL b position (side). However, in this particular spool-spring arrangement, the mounting of the solenoid onto the valve in the reverse position - SOL a side - is also available. The graphic symbol for this reverse mounting is as shown below. As for the valve type 2B*A and 2B*B, please refer to the explanation under the heading of "Valves Using Neutral Position and Side Position" given below.



Valves Using Neutral Position and Side Position. (Special Two position Valve)

Besides the use of the standard 2-position valves aforementioned in the "List of Standard Models and Maximum Flow", the 3-position valves also can be used as the 2-position valves using the two of their three positions. In this case, there are two kinds of the valve available. One is the valve using the neutral position and SOL a position (2B*A) and another is the valve using the neutral position and SOL b position (2B*B).



Model Numbers	Graphic Symbols	
	Standard Mtg.	Reverse Mtg. Type
04 DSHG-06-2B*A 10		
(S-)DSHG-*-2B2A		
DSHG-*-2B3A		
(S-)DSHG-*-2B4A		
(S-)DSHG-*-2B40A		
DSHG-*-2B5A		
DSHG-*-2B6A		
(S-)DSHG-*-2B60A		
DSHG-*-2B7A		
DSHG-*-2B9A		
(S-)DSHG-*-2B10A		
DSHG-*-2B11A		
(S-)DSHG-*-2B12A		

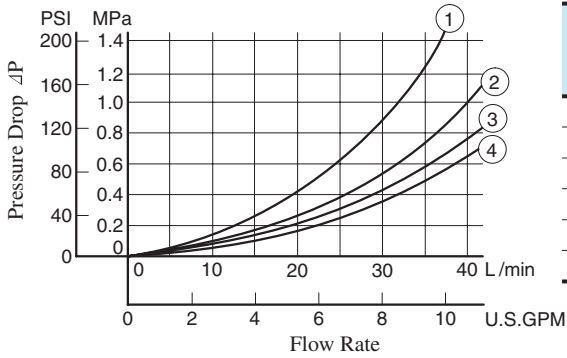
Model Numbers	Graphic Symbols	
	Standard Mtg.	Reverse Mtg. Type
04 DSHG-06-2B*B 10		
(S-)DSHG-*-2B2B		
DSHG-*-2B3B		
(S-)DSHG-*-2B4B		
(S-)DSHG-*-2B40B		
DSHG-*-2B5B		
DSHG-*-2B6B		
(S-)DSHG-*-2B60B		
DSHG-*-2B7B		
DSHG-*-2B9B		
(S-)DSHG-*-2B10B		
DSHG-*-2B11B		
(S-)DSHG-*-2B12B		

Model Numbers	Graphic Symbols
	Standard Mtg.
04 DSHG-06-2N*A 10	
(S-)DSHG-*-2N2A	
DSHG-*-2N3A	
(S-)DSHG-*-2N4A	
(S-)DSHG-*-2N40A	
DSHG-*-2N5A	
DSHG-*-2N6A	
(S-)DSHG-*-2N60A	
DSHG-*-2N7A	
DSHG-*-2N9A	
(S-)DSHG-*-2N10A	
DSHG-*-2N11A	
(S-)DSHG-*-2N12A	

Pressure Drop

Pressure drop curves based on viscosity of 35 mm²/s (164 SSU) and specific gravity of 0.850.

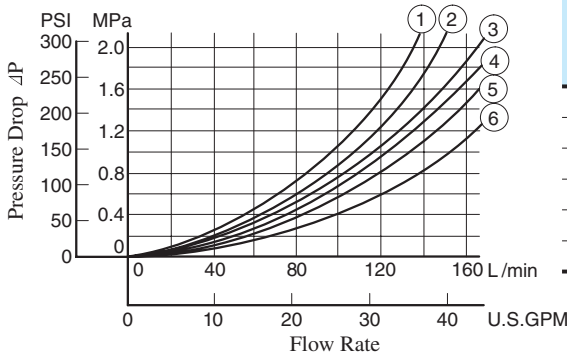
● **DSHG-01**



● **DSHG-01**

Spool Type	Pressure Drop Curve Numbers					Spool Type	Pressure Drop Curve Numbers				
	P→A	B→T	P→B	A→T	P→T		P→A	B→T	P→B	A→T	P→T
2	③	②	③	②	—	7	③	②	③	②	—
3	④	②	④	②	②	9	④	②	④	②	—
4	③	②	③	②	—	10	③	②	③	②	—
40	③	②	③	②	—	11	③	②	③	②	—
5	③	②	③	②	①	12	③	②	③	②	—
60	③	②	③	②	①						

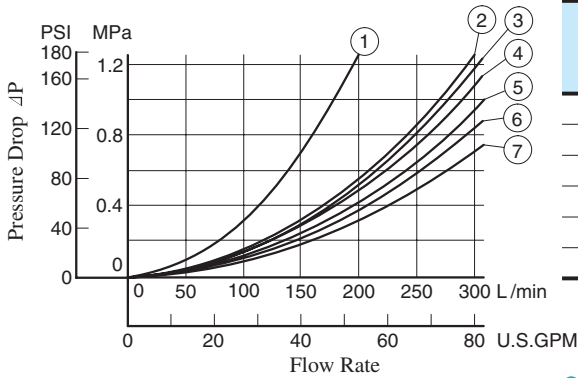
● **DSHG-03**



● **DSHG-03**

Spool Type	Pressure Drop Curve Numbers					Spool Type	Pressure Drop Curve Numbers				
	P→A	B→T	P→B	A→T	P→T		P→A	B→T	P→B	A→T	P→T
2	③	③	④	④	—	7	③	③	④	④	—
3	⑤	⑤	⑤	⑥	④	9	⑥	③	⑥	④	—
4	③	⑤	④	⑥	—	10	③	⑤	④	④	—
40	③	③	④	④	—	11	⑥	③	④	④	—
5	⑥	③	④	⑥	②	12	③	③	④	⑥	—
60	③	③	④	④	①						

● **DSHG-04, S-DSHG-04**



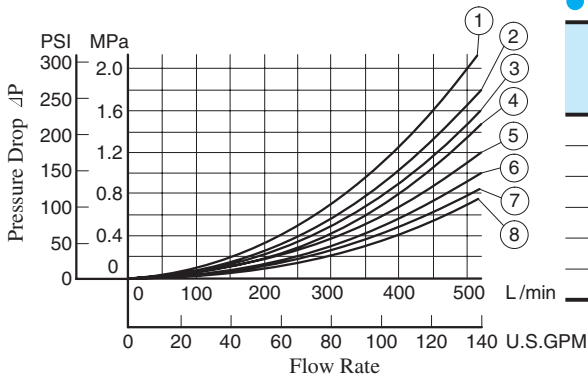
● **DSHG-04**

Spool Type	Pressure Drop Curve Numbers					Spool Type	Pressure Drop Curve Numbers				
	P→A	B→T	P→B	A→T	P→T		P→A	B→T	P→B	A→T	P→T
2	⑤	④	⑤	⑥	—	60	⑦	⑤	⑦	⑦	②
3	⑤	③	⑤	⑤	⑦	7	⑤	④	⑤	⑥	—
4	⑤	③	⑤	⑤	—	9	⑤	④	⑤	⑥	—
40	⑤	④	⑤	⑥	—	10	⑤	②	⑤	⑥	—
5	⑦	④	⑤	⑤	⑤	11	⑥	④	⑤	⑥	—
6	⑤	③	⑤	⑥	①	12	⑤	④	⑤	⑤	—

● **S-DSHG-04**

Spool Type	Pressure Drop Curve Numbers					Spool Type	Pressure Drop Curve Numbers				
	P→A	B→T	P→B	A→T	P→T		P→A	B→T	P→B	A→T	P→T
2	②	②	②	④	—	60	⑥	④	⑥	⑦	②
4	②	③	②	⑤	—	10	②	②	②	④	—
40	②	④	②	⑥	—	12	②	②	②	⑤	—

● DSHG-06, S-DSHG-06



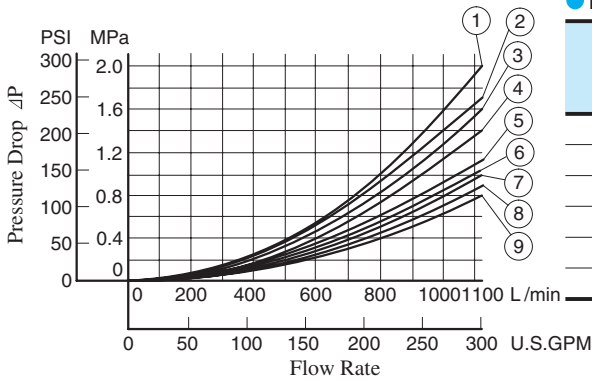
● DSHG-06

Spool Type	Pressure Drop Curve Numbers					Spool Type	Pressure Drop Curve Numbers				
	P→A	B→T	P→B	A→T	P→T		P→A	B→T	P→B	A→T	P→T
2	(8)	(5)	(8)	(7)	—	60	(6)	(5)	(6)	(7)	(1)
3	(6)	(4)	(6)	(7)	(4)	7	(6)	(4)	(6)	(7)	—
4	(8)	(5)	(8)	(7)	—	9	(6)	(5)	(6)	(7)	—
40	(8)	(5)	(8)	(7)	—	10	(8)	(5)	(8)	(7)	—
5	(8)	(4)	(5)	(7)	(1)	11	(8)	(4)	(5)	(7)	—
6	(5)	(3)	(5)	(4)	(1)	12	(8)	(5)	(8)	(7)	—

● S-DSHG-06

Spool Type	Pressure Drop Curve Numbers					Spool Type	Pressure Drop Curve Numbers				
	P→A	B→T	P→B	A→T	P→T		P→A	B→T	P→B	A→T	P→T
2	(6)	(1)	(6)	(2)	—	60	(6)	(2)	(6)	(3)	(1)
4	(6)	(2)	(6)	(2)	—	10	(8)	(5)	(8)	(7)	—
40	(8)	(5)	(8)	(7)	—	12	(8)	(5)	(8)	(7)	—

● DSHG-10, S-DSHG-10



● DSHG-10

Spool Type	Pressure Drop Curve Numbers					Spool Type	Pressure Drop Curve Numbers				
	P→A	B→T	P→B	A→T	P→T		P→A	B→T	P→B	A→T	P→T
2	(9)	(6)	(9)	(8)	—	60	(8)	(5)	(8)	(5)	(3)
3	(7)	(6)	(7)	(7)	(5)	7	(7)	(6)	(7)	(7)	—
4	(9)	(6)	(9)	(6)	—	9	(7)	(6)	(7)	(8)	—
40	(9)	(6)	(9)	(8)	—	10	(9)	(5)	(9)	(8)	—
5	(9)	(6)	(8)	(6)	(1)	11	(9)	(6)	(8)	(7)	—
6	(5)	(3)	(5)	(2)	(2)	12	(9)	(7)	(9)	(6)	—

● S-DSHG-10

Spool Type	Pressure Drop Curve Numbers					Spool Type	Pressure Drop Curve Numbers				
	P→A	B→T	P→B	A→T	P→T		P→A	B→T	P→B	A→T	P→T
2	(8)	(3)	(8)	(4)	—	60	(8)	(4)	(8)	(4)	(2)
4	(8)	(5)	(8)	(6)	—	10	(9)	(5)	(9)	(8)	—
40	(9)	(6)	(9)	(8)	—	12	(9)	(7)	(9)	(6)	—

● For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
	SSU		77	98	141	186	232	278	324	371	417
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

● For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula right.

$$\Delta P' = \Delta P(G'/0.850)$$

Typical Changeover Time

Changeover time varies according to oil viscosity, spool type and hydraulic circuit.

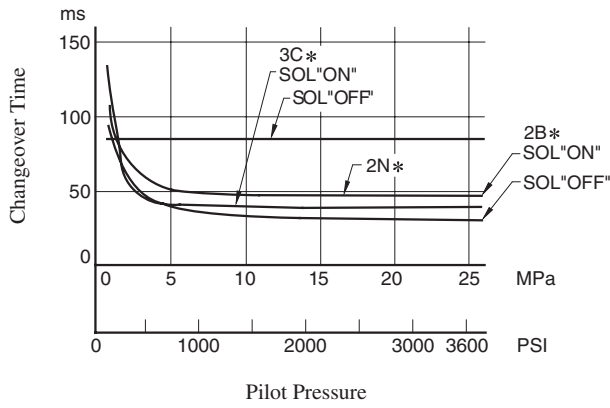
● Test Conditions

Coil Type : D*(Models with DC solenoids)

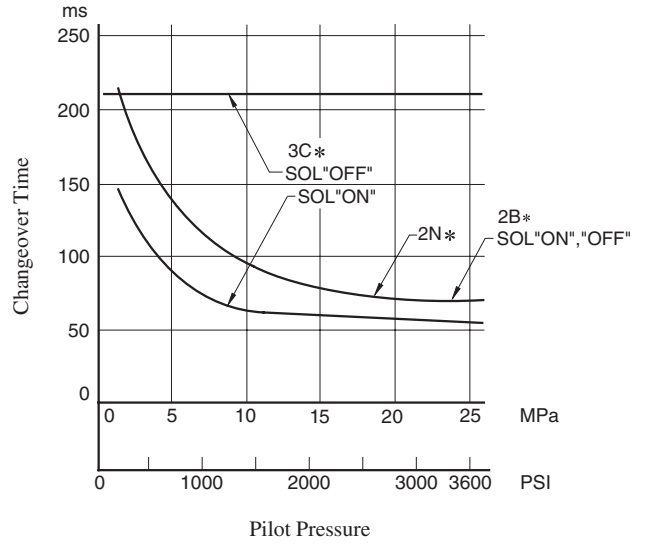
Voltage : Rated Voltage

Oil Viscosity : 35 mm²/s (164 SSU)

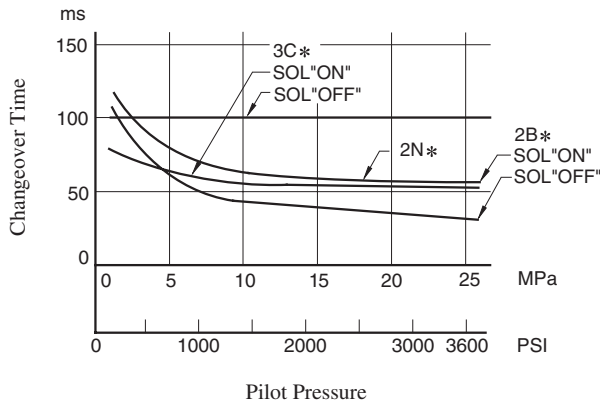
● DSHG-04



● DSHG-10



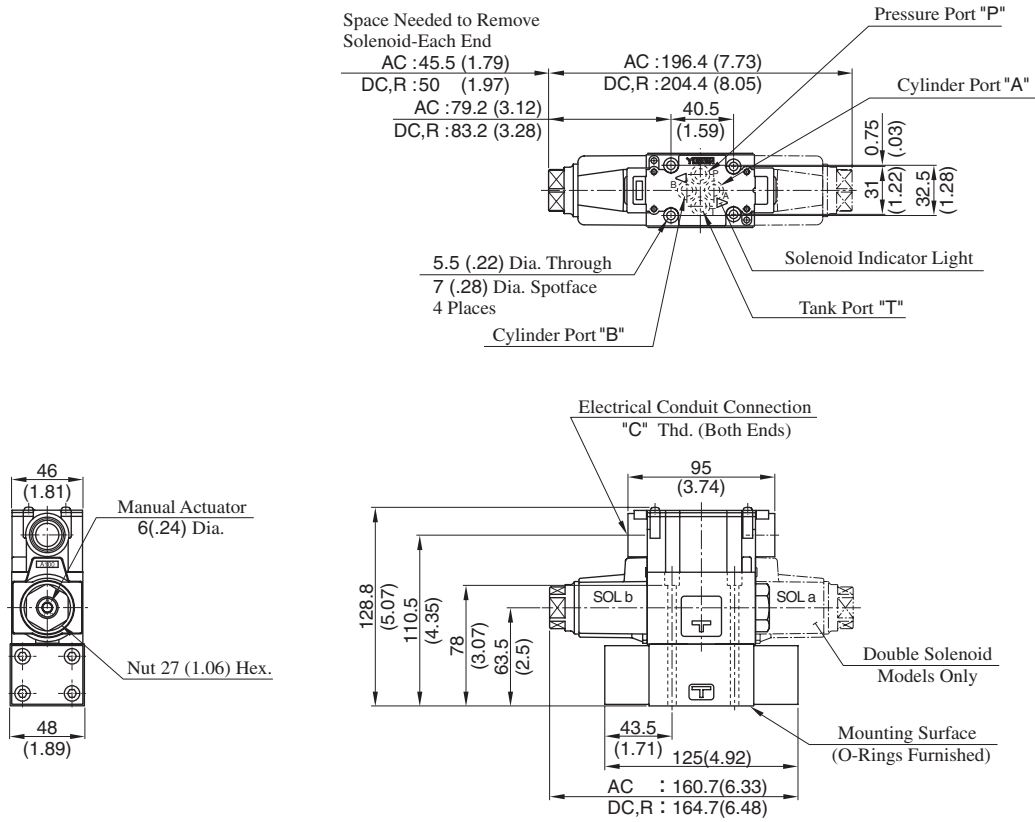
● DSHG-06



Terminal Box type: DSHG-01-***-*-14/1490

Mounting surface: ISO 4401-AB-03-4-A

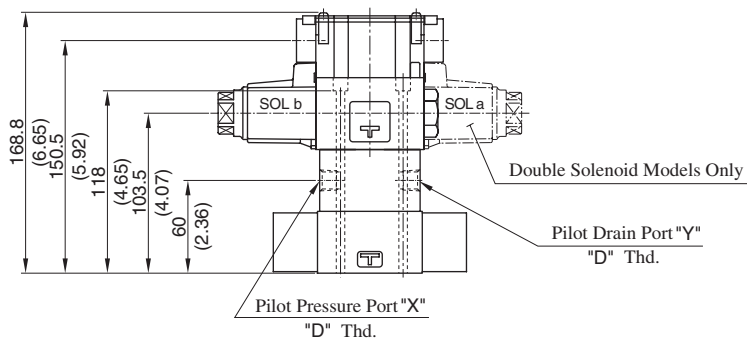
● Internal Pilot - Internal Drain



Model Numbers	"C" Thd.	"D" Thd.
DSHG-01-***-*-14	G 1/2	Rc 1/4
DSHG-01-***-*-1490	1/2 NPT	1/4 NPT

DIMENSIONS IN MILLIMETRES (INCHES)

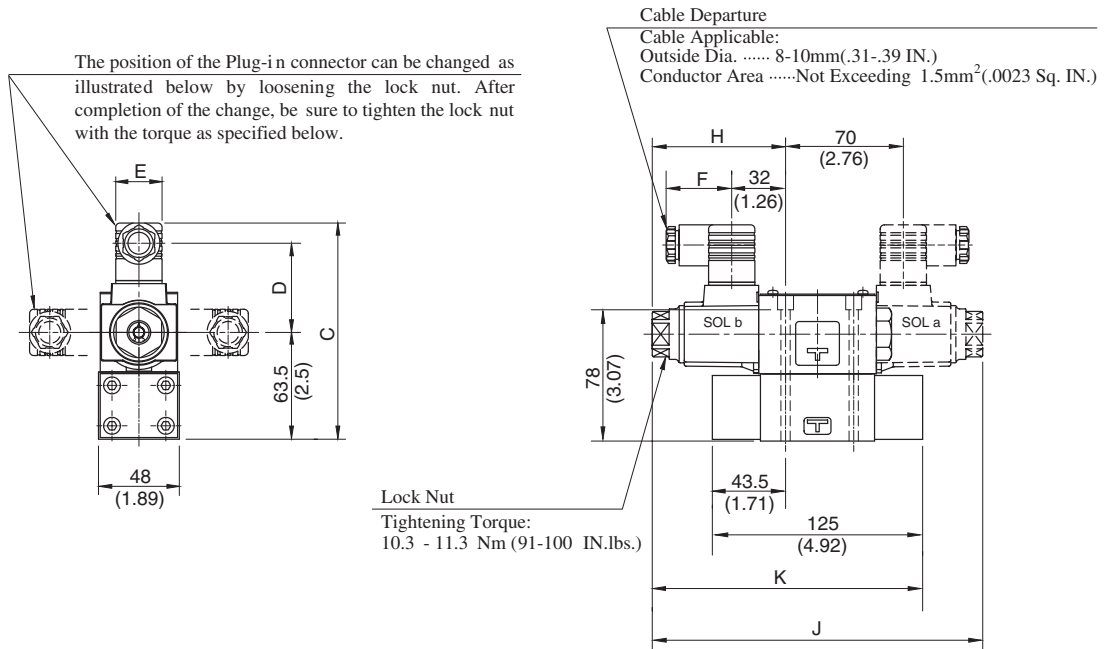
- External Pilot - External Drain
- External Pilot - Internal Drain
- Internal Pilot - External Drain



● For other dimensions, refer to "Internal Pilot Internal Drain".

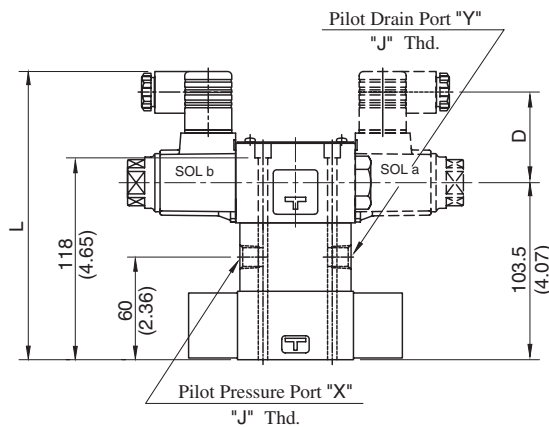
■ Plug-in Connector Type: DSHG-01-***-*-N₁-14/1480/1490

● Internal Pilot-Internal Drain



DIMENSIONS IN MILLIMETRES (INCHES)

- External Pilot-External Drain
- External Pilot-Internal Drain
- Internal Pilot-External Drain



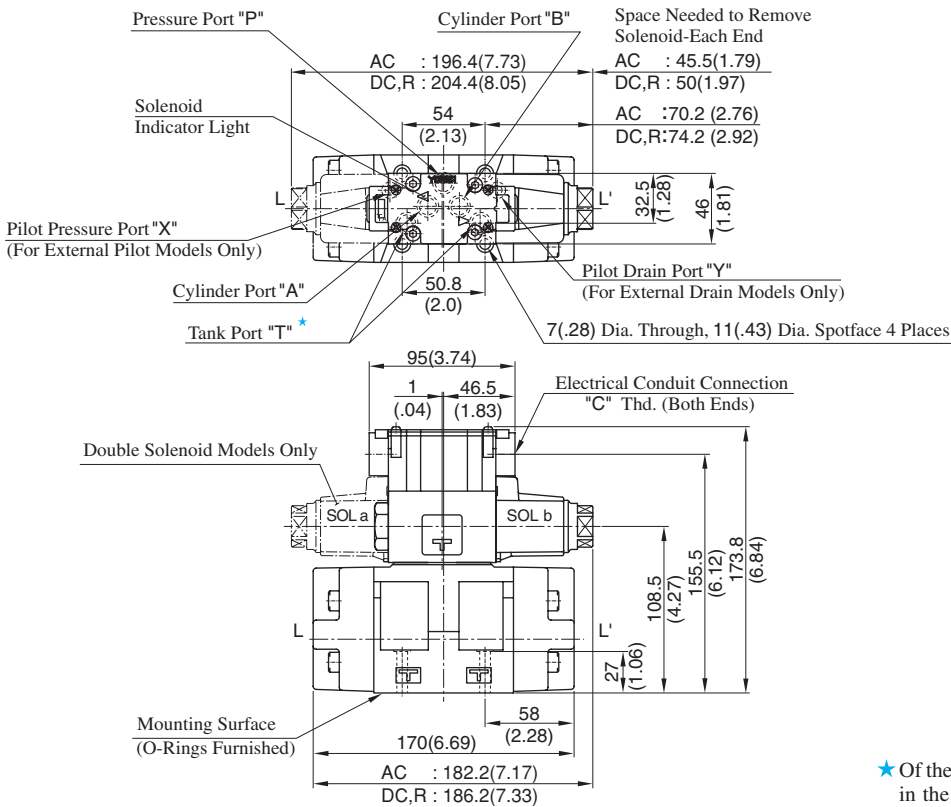
Model Numbers	"J" Thd.
DSHG-01-***-*-N*-14	Rc 1/4
DSHG-01-***-*-N*-1480	1/4 BSP.F
DSHG-01-***-*-N*-1490	1/4 NPT

Model Numbers	Dimensions mm (Inches)							
	C	D	E	F	H	J	K	L
DSHG-01-***-*-A*-N/N1	128.5 (5.06)	53 (2.09)	27.5 (1.08)	39 (1.54)	79.2 (3.12)	196.4 (7.73)	160.7 (6.33)	168.5 (6.63)
DSHG-01-***-*-D*-N/N1	139.5 (5.49)	64 (2.52)	27.5 (1.08)	39 (1.54)	83.2 (3.28)	204.4 (8.05)	164.7 (6.48)	179.5 (7.07)
DSHG-01-***-*-R*-N	142.5 (5.61)	57.2 (2.25)	34 (1.34)	53 (2.09)				182.5 (7.19)

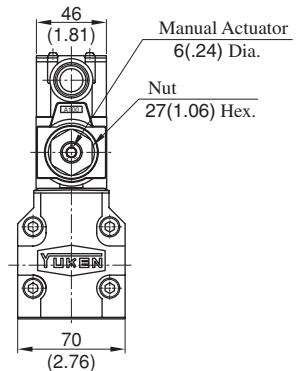
● For other dimensions, refer to "Terminal Box Type".

Terminal Box Type: DSHG-03-***-*-14/1490

Mounting surface: ISO 4401-AC-05-4-A
(The pilot and drain ports in accordance with the ISO original draft)



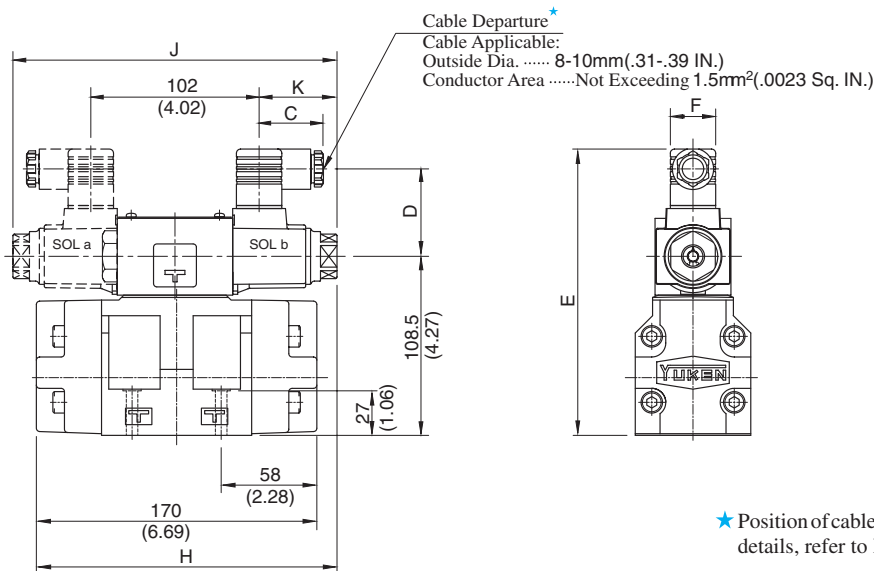
Model Numbers	"C" Thd.
DSHG-03-***-*-14	G 1/2
DSHG-03-***-*-1490	1/2 NPT



★ Of the two of tank port "T", the tank port in the left side is normally used in our standard sub-plate, though, either side of the tank port "T" can be used without problem.

DIMENSIONS IN MILLIMETRES (INCHES)

Plug-in Connector Type: DSHG-03-***-*-N_{N1}-14/1490



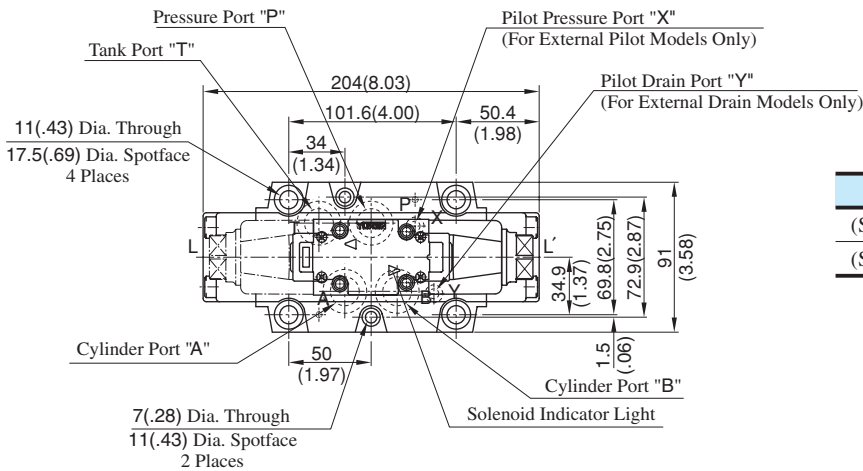
★ Position of cable departure can be changed. For details, refer to DSHG-01 valve on [page 396](#).

Model Numbers	Dimensions mm (Inches)						
	C	D	E	F	H	J	K
DSHG-03-***-*-A*-N/N1	39 (1.54)	53 (2.09)	173.5 (6.83)	27.5 (1.08)	182.2 (7.17)	196.4 (7.73)	47.2 (1.86)
DSHG-03-***-*-D*-N/N1	39 (1.54)	64 (2.52)	184.5 (7.26)	27.5 (1.08)	186.2 (7.33)	204.4 (8.05)	51.2 (2.02)
DSHG-03-***-*-R*-N	53 (2.09)	57.2 (2.25)	187.5 (7.38)	34 (1.34)			

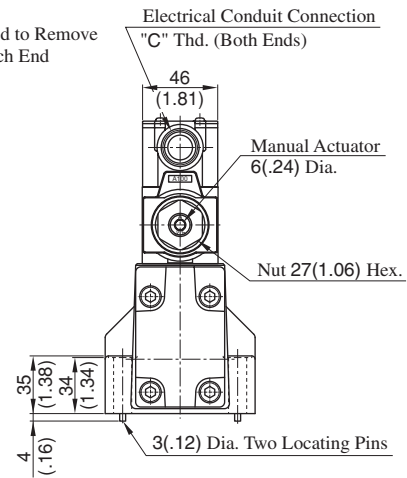
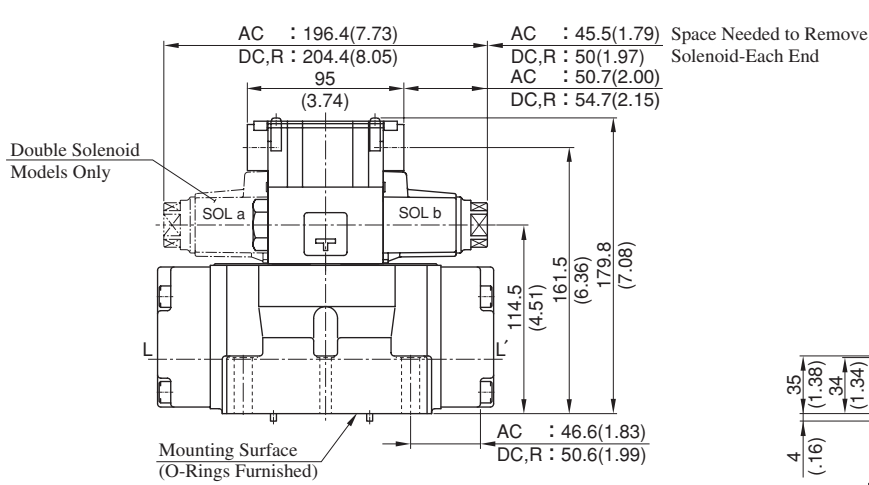
• For other dimensions, refer to "Terminal Box Type".

■ Terminal Box Type: (S-)DSHG-04-***-*-52/5290

Mounting surface:
ISO 4401-AD-07-4-A

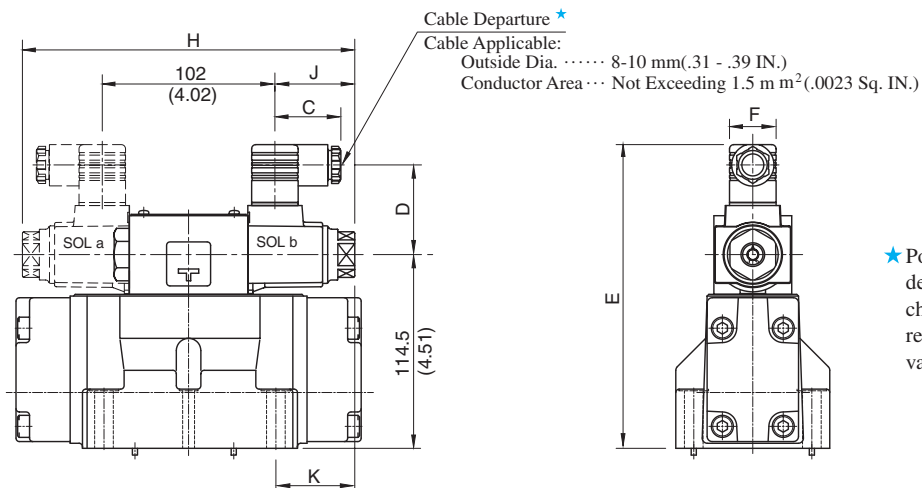


Model Numbers	"C" Thd.
(S-)DSHG-04-***-*-52	G 1/2
(S-)DSHG-04-***-*-5290	1/2 NPT



DIMENSIONS IN MILLIMETRES (INCHES)

■ Plug-in Connector Type: (S-)DSHG-04-***-*-N₁-52/5290



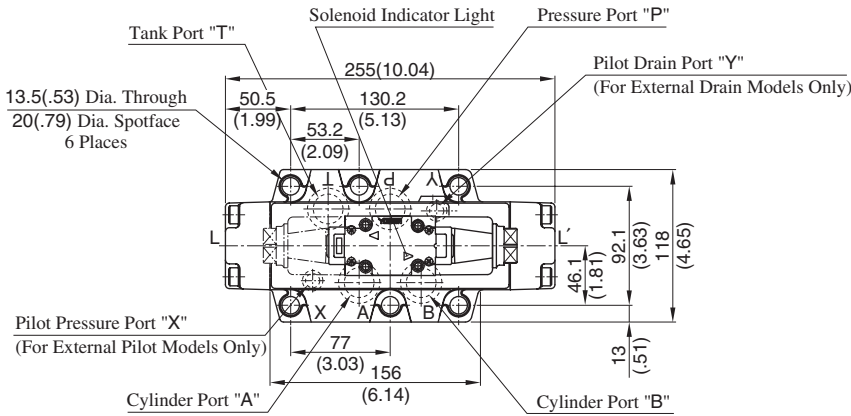
★ Position of cable departure can be changed. For details, refer to DSHG-01 valve on [page 396](#).

Model Numbers	Dimensions mm (Inches)						
	C	D	E	F	H	J	K
(S-)DSHG-04-***-A*-N/N1	39 (1.54)	53 (2.09)	173.5 (6.83)	27.5 (1.08)	196.4 (7.73)	47.2 (1.86)	45.6 (1.80)
(S-)DSHG-04-***-D*-N/N1	39 (1.54)	64 (2.52)	184.5 (7.26)	27.5 (1.08)	204.4 (8.05)	51.2 (2.02)	49.6 (1.95)
(S-)DSHG-04-***-R*-N	53 (2.09)	57.2 (2.25)	187.6 (7.39)	34 (1.34)			

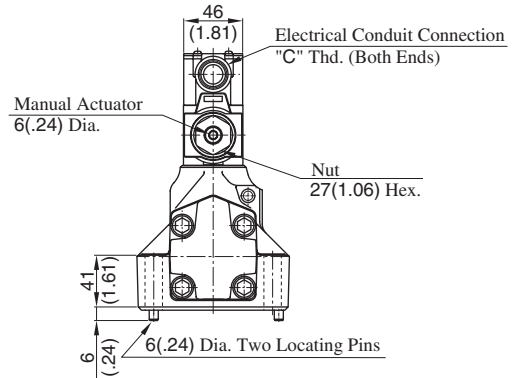
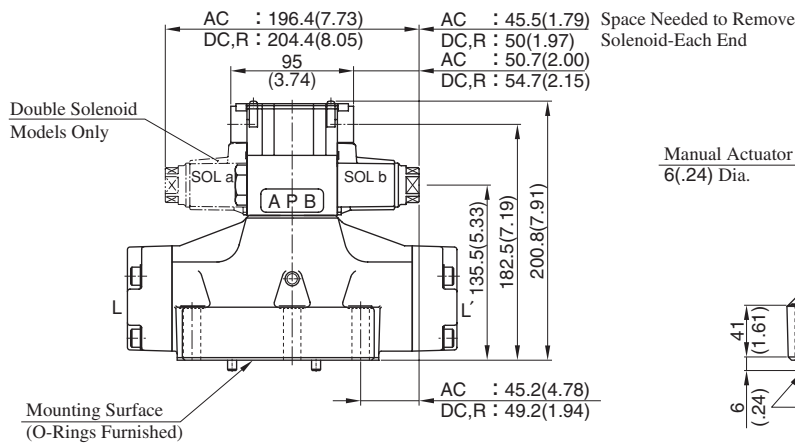
● For other dimensions, refer to "Terminal Box Type".

Terminal Box Type: (S-)DSHG-06-***-*-53/5390

Mounting surface:
ISO 4401-AE-08-4-A

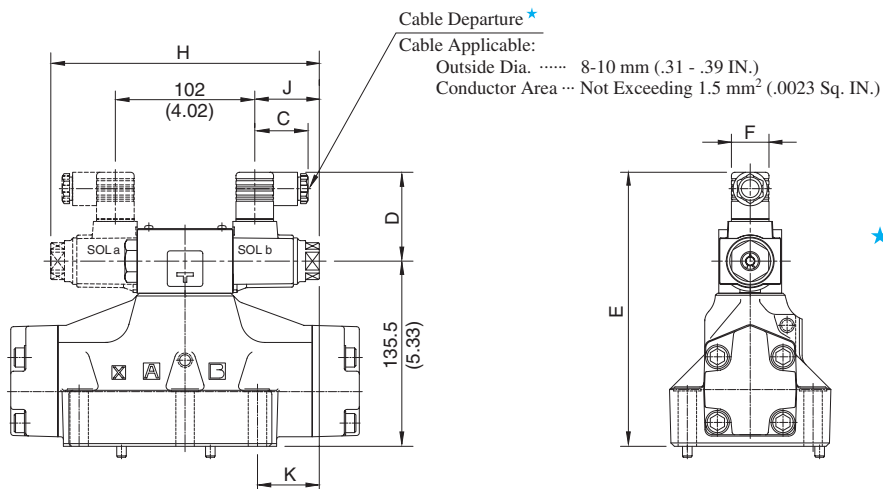


Model Numbers	"C" Thd.
(S-)DSHG-06-***-*-53	G 1/2
(S-)DSHG-06-***-*-5390	1/2 NPT



DIMENSIONS IN MILLIMETRES (INCHES)

Plug-in Connector Type: (S-)DSHG-06-***-*-N_{N1}-53/5390



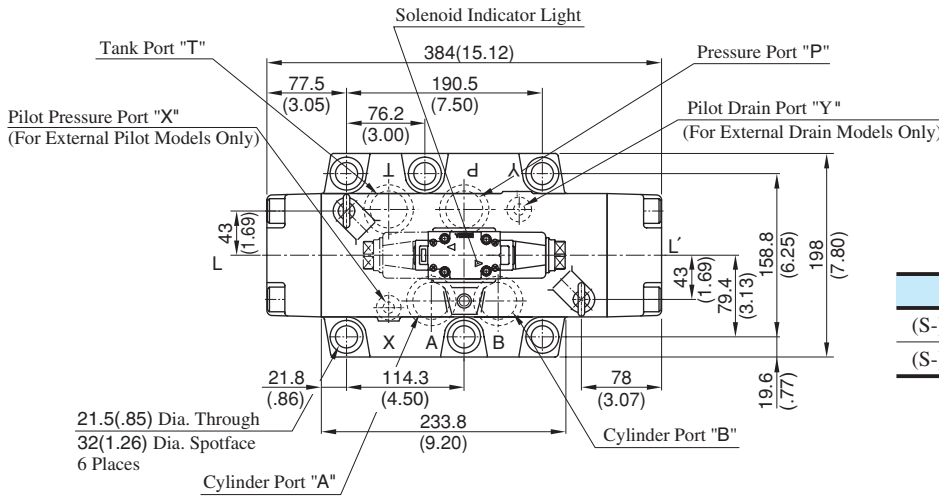
★ Position of cable departure can be changed. For details, refer to DSHG-01 valve on page 396.

Model Numbers	Dimensions mm (Inches)						
	C	D	E	F	H	J	K
(S-)DSHG-06-***-A*-N/N1	39 (1.54)	53 (2.09)	200.5 (7.95)	27.5 (1.08)	196.4 (7.73)	47.2 (1.86)	45.2 (1.78)
(S-)DSHG-06-***-D*-N/N1	39 (1.54)	64 (2.52)	211.5 (8.33)	27.5 (1.08)	204.4 (8.05)	51.2 (2.02)	49.2 (1.94)
(S-)DSHG-06-***-R*-N	53 (2.09)	57.2 (2.25)	214.5 (8.44)	34 (1.34)			

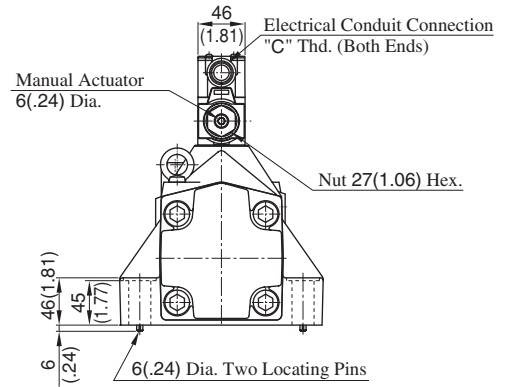
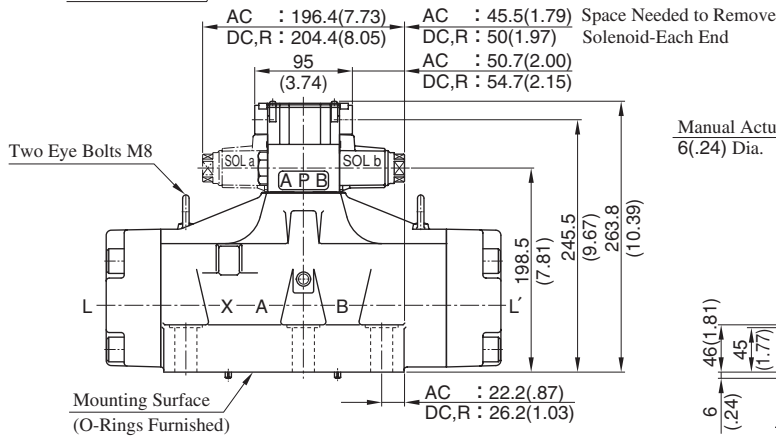
• For other dimensions, refer to "Terminal Box Type".

■ Terminal Box Type: (S-)DSHG-10-***-*-43/4390

Mounting surface:
ISO 4401-AF-10-4-A

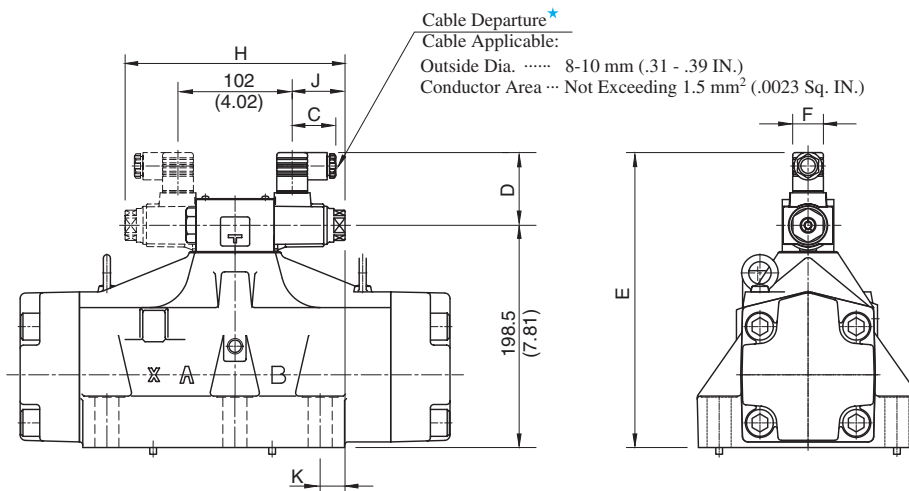


Model Numbers	"C" Thd.
(S-)DSHG-10-***-*-43	G 1/2
(S-)DSHG-10-***-*-4390	1/2 NPT



DIMENSIONS IN MILLIMETRES (INCHES)

■ Plug-in Connector Type: (S-)DSHG-10-***-*-N₁-43/4390



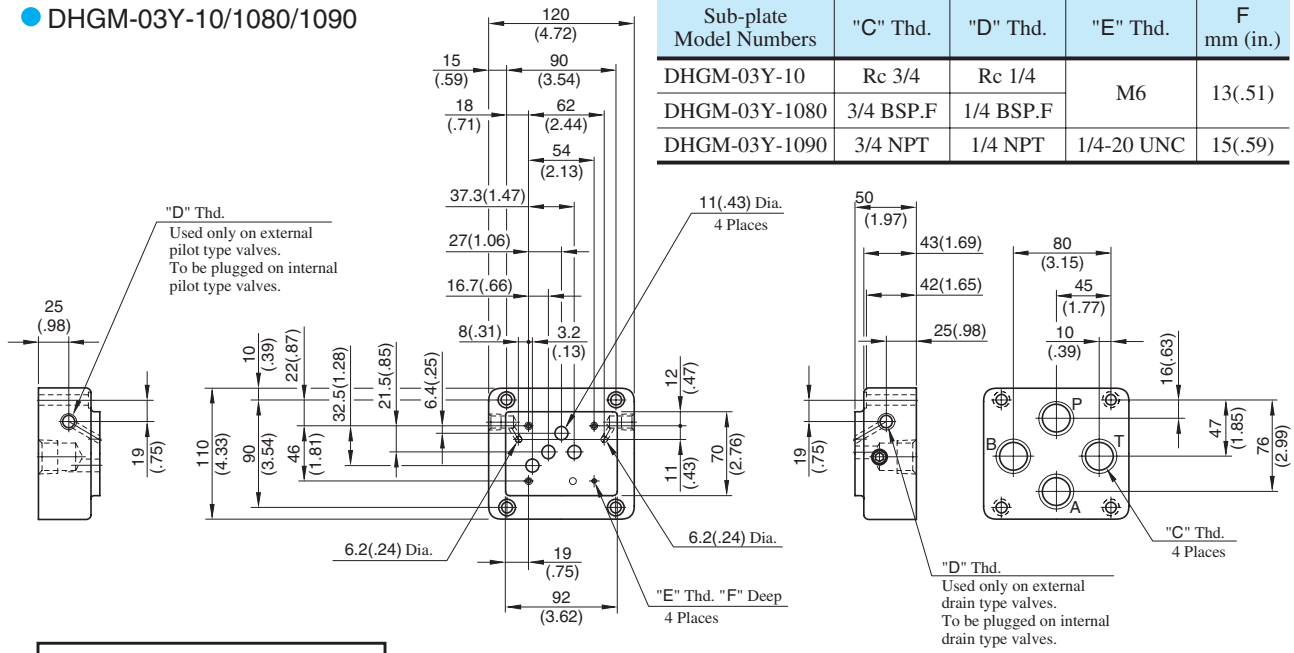
★ Position of cable departure can be changed. For details, refer to DSHG-01 valve on page 396.

Model Numbers	Dimensions mm (Inches)						
	C	D	E	F	H	J	K
(S-)DSHG-10-***-A*-N/N ₁	39 (1.54)	53 (2.09)	263.5 (10.37)	27.5 (1.08)	196.4 (7.73)	47.2 (1.86)	22.2 (.87)
(S-)DSHG-10-***-D*-N/N ₁	39 (1.54)	64 (2.52)	274.5 (10.81)	27.5 (1.08)	204.4 (8.05)	51.2 (2.02)	26.2 (1.03)
(S-)DSHG-10-***-R*-N	53 (2.09)	57.2 (2.25)	277.5 (10.93)	34 (1.34)			

● For other dimensions, refer to "Terminal Box Type".

Sub-plate

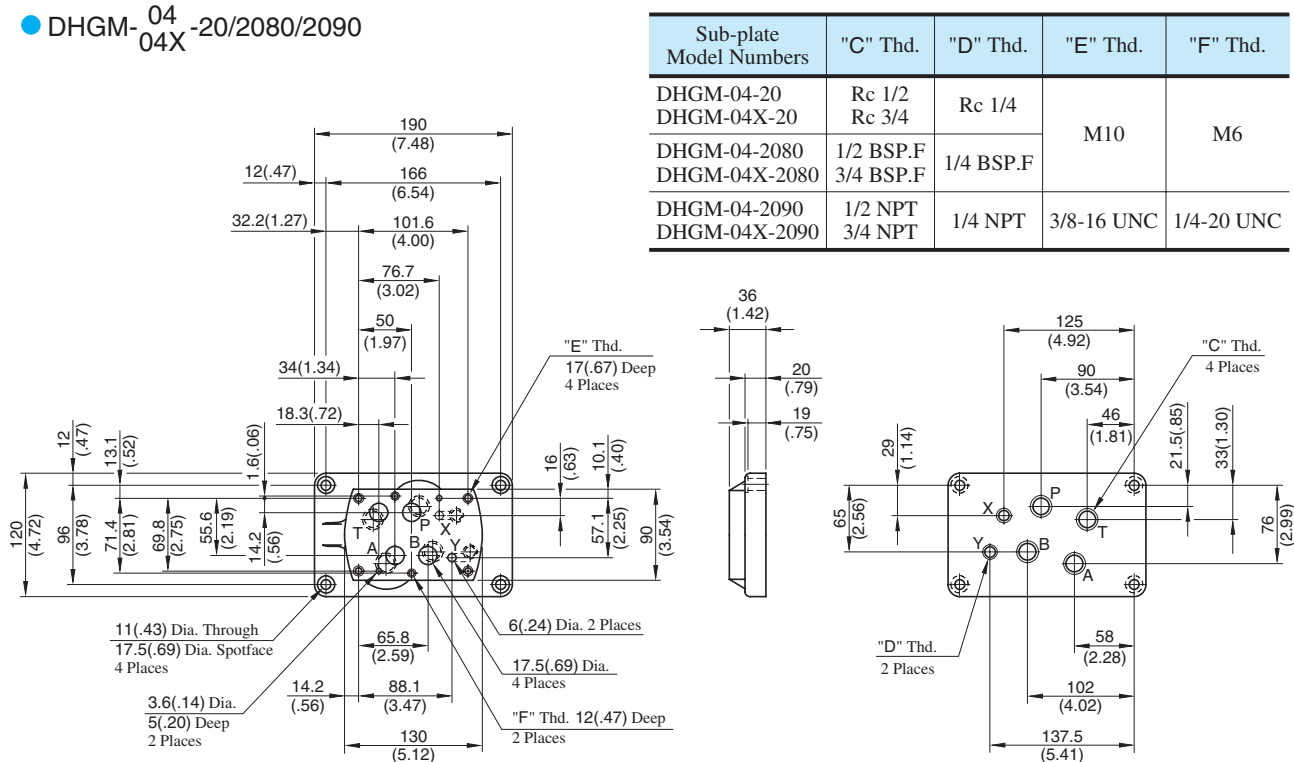
DHGM-03Y-10/1080/1090



Sub-plate Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	F mm (in.)
DHGM-03Y-10	Rc 3/4	Rc 1/4	M6	13(.51)
DHGM-03Y-1080	3/4 BSP.F	1/4 BSP.F		
DHGM-03Y-1090	3/4 NPT	1/4 NPT	1/4-20 UNC	15(.59)

DIMENSIONS IN MILLIMETRES (INCHES)

DHGM-04-20/2080/2090

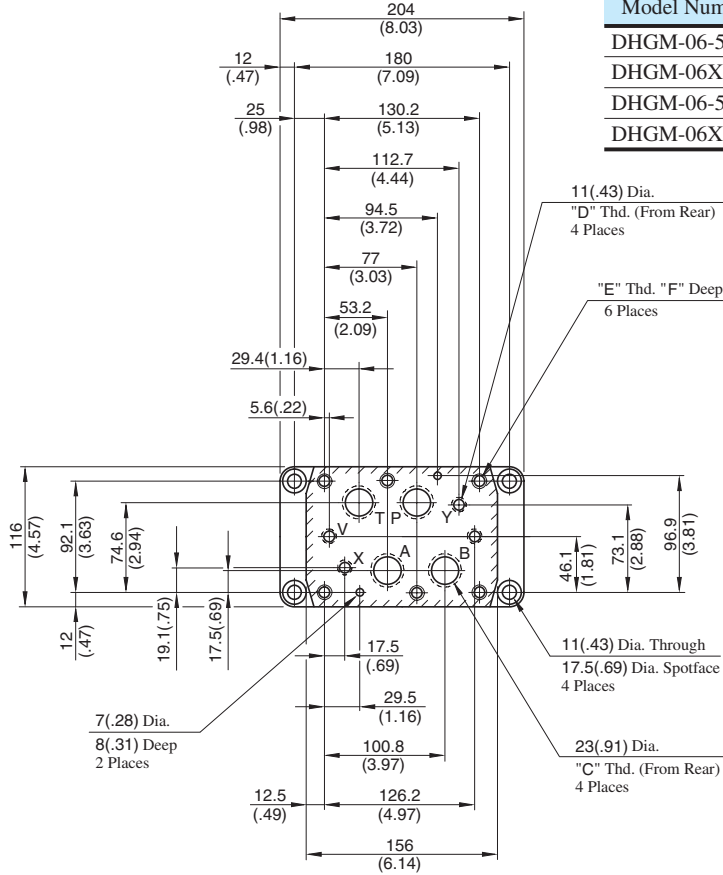


Sub-plate Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.
DHGM-04-20	Rc 1/2	Rc 1/4	M10	M6
DHGM-04X-20	Rc 3/4			
DHGM-04-2080	1/2 BSP.F	1/4 BSP.F	3/8-16 UNC	1/4-20 UNC
DHGM-04X-2080	3/4 BSP.F			
DHGM-04-2090	1/2 NPT	1/4 NPT	3/8-16 UNC	1/4-20 UNC
DHGM-04X-2090	3/4 NPT			

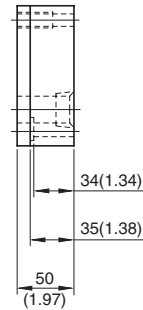
Valve Types		Pilot Pressure Port "X"	Port "Y"
Solenoid Controlled Pilot Operated Directional Valves		Used only on external pilot type valves. To be plugged on internal pilot type valves.	Used as drain port only on external drain type valves. To be plugged on internal drain type valves.
Pilot Operated Directional Valves	Spring Centred No-spring	Used	Used as pilot pressure port
	Spring Offset		Used as pilot drain port
Manually Operated Directional Valves		Not used (plug is not required)	Used as drain port

■ Sub-plate

● DHGM-06
06X -50/5090

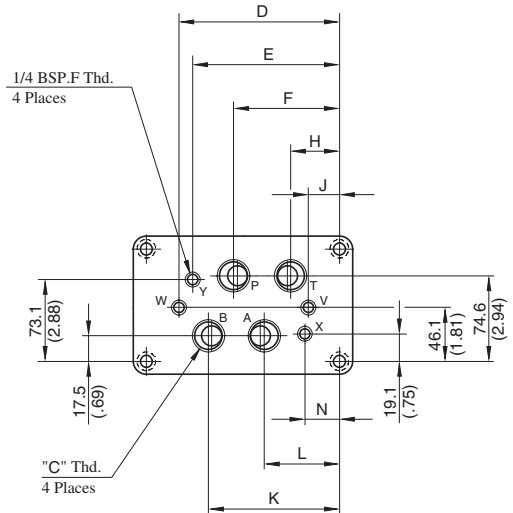
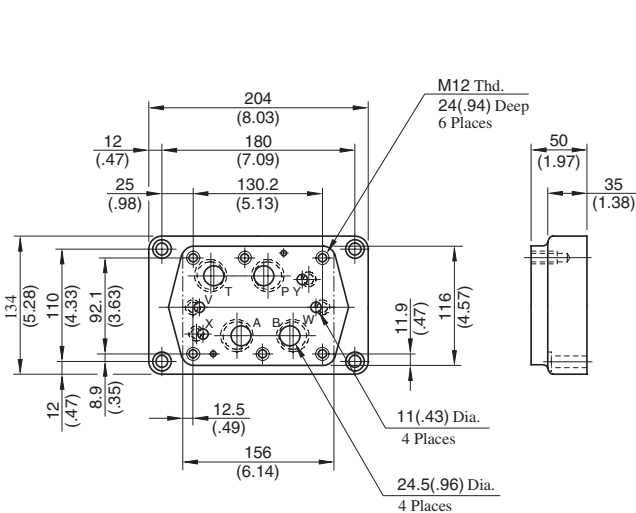


Sub-plate Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	F mm (in.)
DHGM-06-50	Rc 3/4	Rc 1/4	M12	24 (.94)
DHGM-06X-50	Rc 1			
DHGM-06-5090	3/4 NPT	1/4 NPT	1/2-13 UNC	26 (1.02)
DHGM-06X-5090	1 NPT			



DIMENSIONS IN MILLIMETRES (INCHES)

● DHGM-06
06X -5080



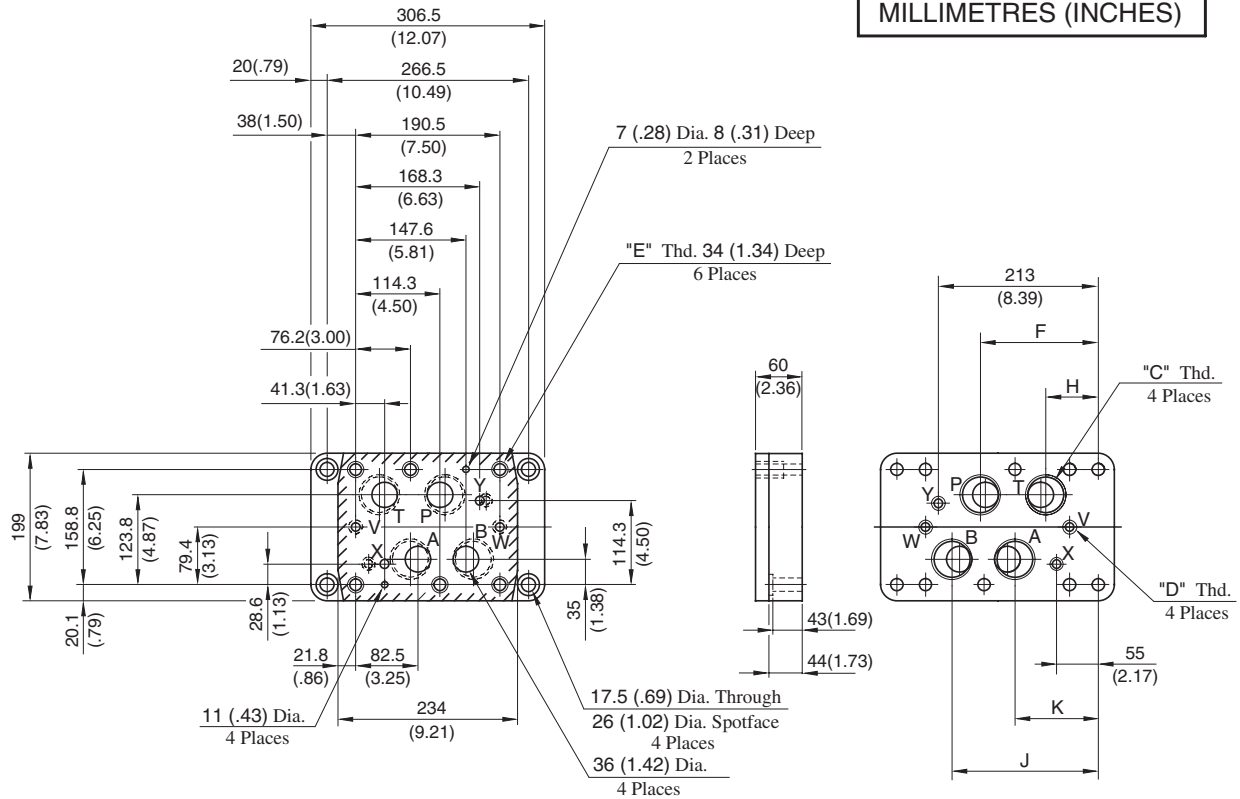
Sub-plate Model Numbers	"C" Thd.	Dimensions mm (Inches)							
		D	E	F	H	J	K	L	N
DHGM-06-5080	3/4 BSP.F	151.2 (5.95)	137.7 (5.42)	102 (4.02)	54.4 (2.14)	30.6 (1.20)	125.8 (4.95)	78.2 (3.08)	42.5 (1.67)
DHGM-06X-5080	1 BSP.F	155.2 (6.11)	148 (5.83)	106 (4.17)	50 (1.97)	25 (.98)	130 (5.12)	74 (2.91)	32 (1.26)

For other dimensions, refer to "DHGM-06*-50/5090" above.

* For Uses of Port "X", "Y", "V", "W", refer to DHGM-10* on the following page.

Sub-plate

● DHGM-10
10X -40/4080/4090



Sub-plate Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	Dimensions mm (Inches)			
				F	H	J	K
DHGM-10-40	Rc 1-1/4	Rc 3/8	M20	152 (5.98)	79 (3.11)	185.5 (7.30)	120.5 (4.74)
DHGM-10-4080	1-1/4 BSP.F	3/8 BSP.F	M20				
DHGM-10-4090	1-1/4 NPT	3/8 NPT	3/4-10 UNC				
DHGM-10X-40	Rc 1-1/2	Rc 3/8	M20	156 (6.14)	74 (2.91)	194.5 (7.66)	112.5 (4.43)
DHGM-10X-4080	1-1/2 BSP.F	3/8 BSP.F	M20				
DHGM-10X-4090	1-1/2 NPT	3/8 NPT	3/4-10 UNC				

Note: Uses of port "X", "Y", "V", and "W"

Valve Types		Pilot Pres. Port "X"	Port "Y"	Drain Port "V"	Drain Port "W"
Solenoid Controlled Pilot Operated Directional Valves	Spring Centred, No-spring, Spring Offset	Used only on external pilot type valves.	Used as drain port only on external drain type valves.	Not used (plug is not required)	
	Pressure Centred			Used	Not used
	With Pilot Piston, Both Ends	To be plugged on internal pilot type valves.	To be plugged on [★] internal drain type valves.	Used	Used
	With Pilot Piston, Port "A" End			Used	Not used (plug is required)
	With Pilot Piston, Port "B" End			Not used (plug is required)	Used
Pilot Operated Directional Valves	Spring Centred, No-spring	Used	Used as pilot pres. port	Not used (plug is not required)	
	Spring Offset		Used as pilot drain port		
	Pressure Centred		Used as pilot pres. port	Used	Not used
	With Pilot Piston, Both Ends			Used	Used
	With Pilot Piston, Port "B" End			Not used (plug is required)	Used
	With Pilot Piston Port "A" End		Spring Centred No-spring	Used as pilot pres. port	Used
Spring Offset		Used as pilot drain port			
Manually Operated Directional Valves		Not used (plug is not required)	Not used (plug is not required)	Used	Not used (plug is not required)

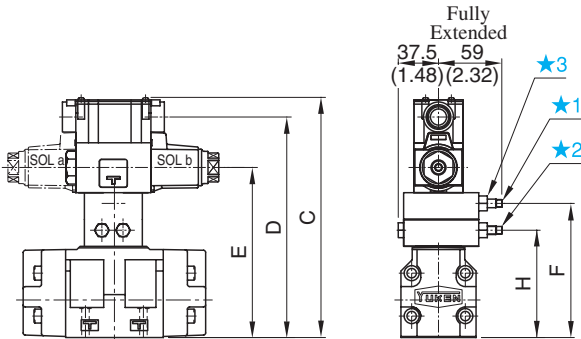
★ As the thread is provided on the body, plug either port on the sub-plate or port on the body.

Options

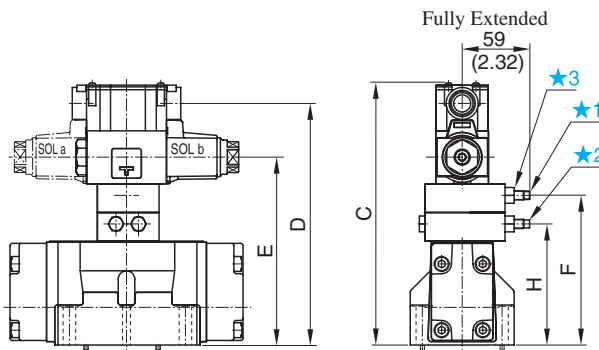
Models with Pilot Choke Valve

■ Terminal Box Type

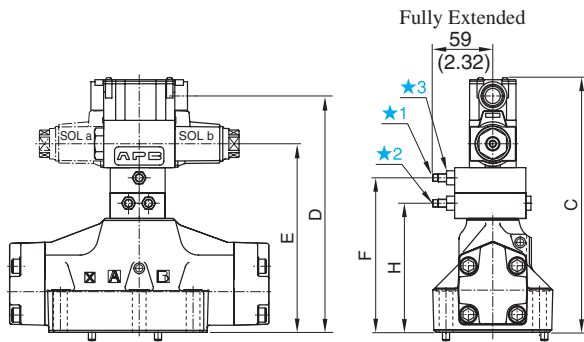
- DSHG-03-***-C1/C2/C1C2



- (S-)DSHG-04-***-C1/C2/C1C2

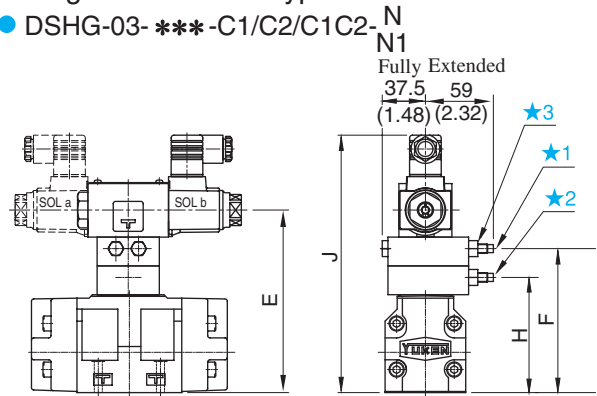


- (S-)DSHG-06⁰⁶/₁₀-***-C1/C2/C1C2

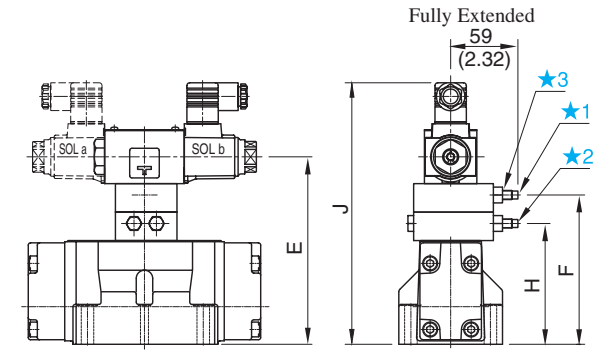


■ Plug-in Connector Type

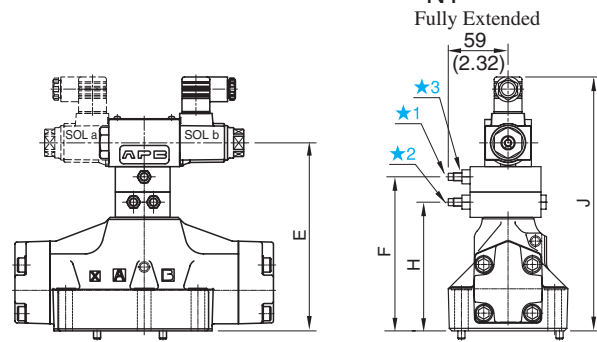
- DSHG-03-***-C1/C2/C1C2-N_{N1}



- (S-)DSHG-04-***-C1/C2/C1C2-N_{N1}



- (S-)DSHG-06⁰⁶/₁₀-***-C1/C2/C1C2-N_{N1}



- ★1. "C1" Choke Adj. Screw 6 (.24) Hex.
- ★2. "C2" Choke Adj. Screw 6 (.24) Hex.
- ★3. Lock Nut 12 (.47) Hex.

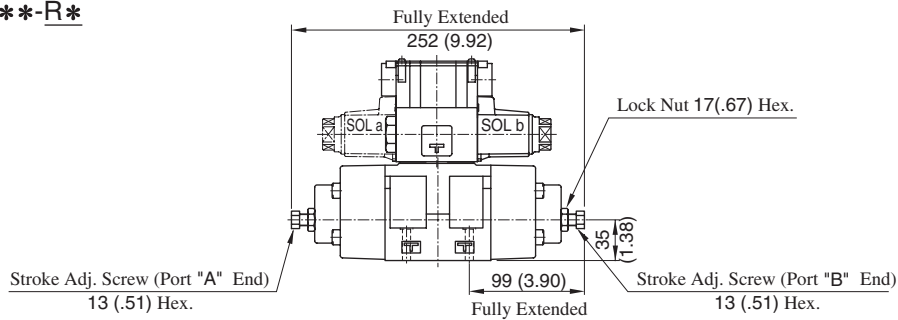
DIMENSIONS IN MILLIMETRES (INCHES)

Model Numbers	Dimensions mm (Inches)								
	C	D	E	F	H	J			
						AC SO L	DC SO L	R SOL	
DSHG-03-***-C1	198.8 (7.83)	180.5 (7.11)	133.5 (5.26)	100 (3.94)	—	198.5 (7.81)	209.5 (8.25)	212.5 (8.37)	
DSHG-03-***-C2				—	100 (3.94)				
DSHG-03-***-C1C2	223.8 (8.81)	205.5 (8.09)	158.5 (6.24)	125 (4.92)	100 (3.94)	223.5 (8.80)	234.5 (9.23)	237.5 (9.35)	
(S-) DSHG-04-***-C1	204.8 (8.06)	186.5 (7.34)	139.5 (5.49)	106 (4.17)	—	204.5 (8.05)	215.5 (8.48)	218.5 (8.60)	
(S-) DSHG-04-***-C2				—	106 (4.17)				
(S-) DSHG-04-***-C1C2	229.8 (9.05)	211.5 (8.33)	164.5 (6.48)	131 (5.16)	106 (4.17)	229.5 (9.04)	240.5 (9.47)	243.5 (9.59)	
(S-) DSHG-06-***-C1	225.8 (8.89)	207.5 (8.17)	160.5 (6.32)	127 (5.00)	—	225.5 (8.88)	236.5 (9.31)	239.5 (9.43)	
(S-) DSHG-06-***-C2				—	127 (5.00)				
(S-) DSHG-06-***-C1C2	250.8 (9.87)	232.5 (9.15)	185.5 (7.30)	152 (5.98)	127 (5.00)	250.5 (9.86)	261.5 (10.30)	264.5 (10.41)	
(S-) DSHG-10-***-C1	288.8 (11.37)	270.5 (10.65)	223.5 (8.80)	190 (7.48)	—	288.5 (11.36)	299.5 (11.79)	302.5 (11.91)	
(S-) DSHG-10-***-C2				—	190 (7.48)				
(S-) DSHG-10-***-C1C2	313.8 (12.35)	295.5 (11.63)	248.5 (9.78)	215 (8.46)	190 (7.48)	313.5 (12.34)	324.5 (12.78)	327.5 (12.89)	

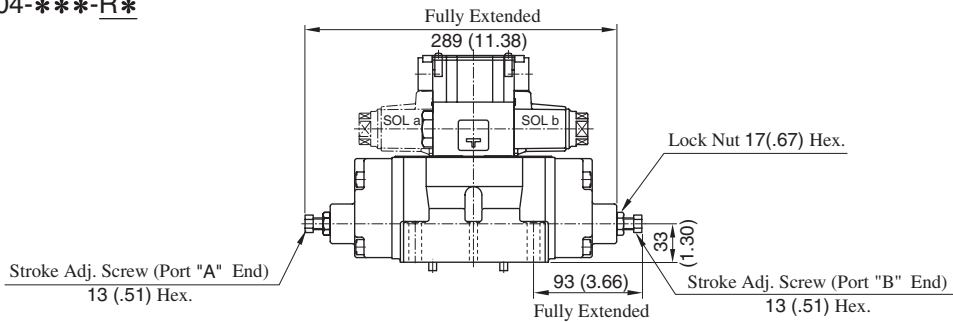
Options

Models with Stroke Adjustment

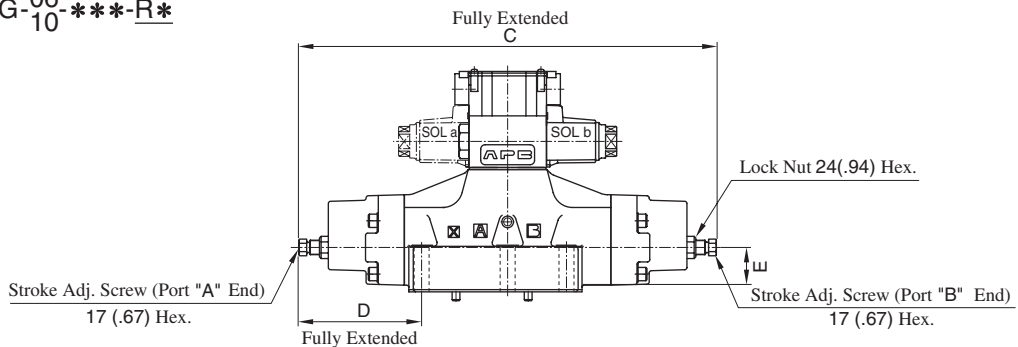
- DSHG-03-***-R*



- (S-)DSHG-04-***-R*



- (S-)DSHG-⁰⁶/₁₀-***-R*

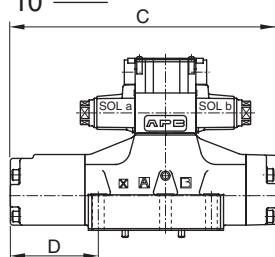


Model Numbers	C	D	E
(S-)DSHG-06-***-R2	376 (14.80)	111 (4.37)	40 (1.57)
(S-)DSHG-10-***-R2	558 (21.97)	164.5 (6.48)	65 (2.56)

DIMENSIONS IN MILLIMETRES (INCHES)

Pressure Centred Models

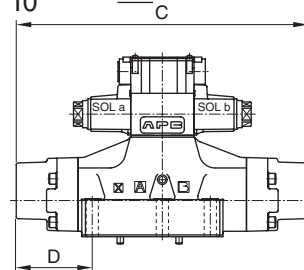
- (S-)DSHG-⁰⁶/₁₀-3H*



Model Numbers	C	D
(S-)DSHG-06-3H*	306.5 (12.07)	102 (4.02)
(S-)DSHG-10-3H*	456 (17.95)	149.5 (5.89)

Models with Pilot Piston

- (S-)DSHG-⁰⁶/₁₀-***-P*

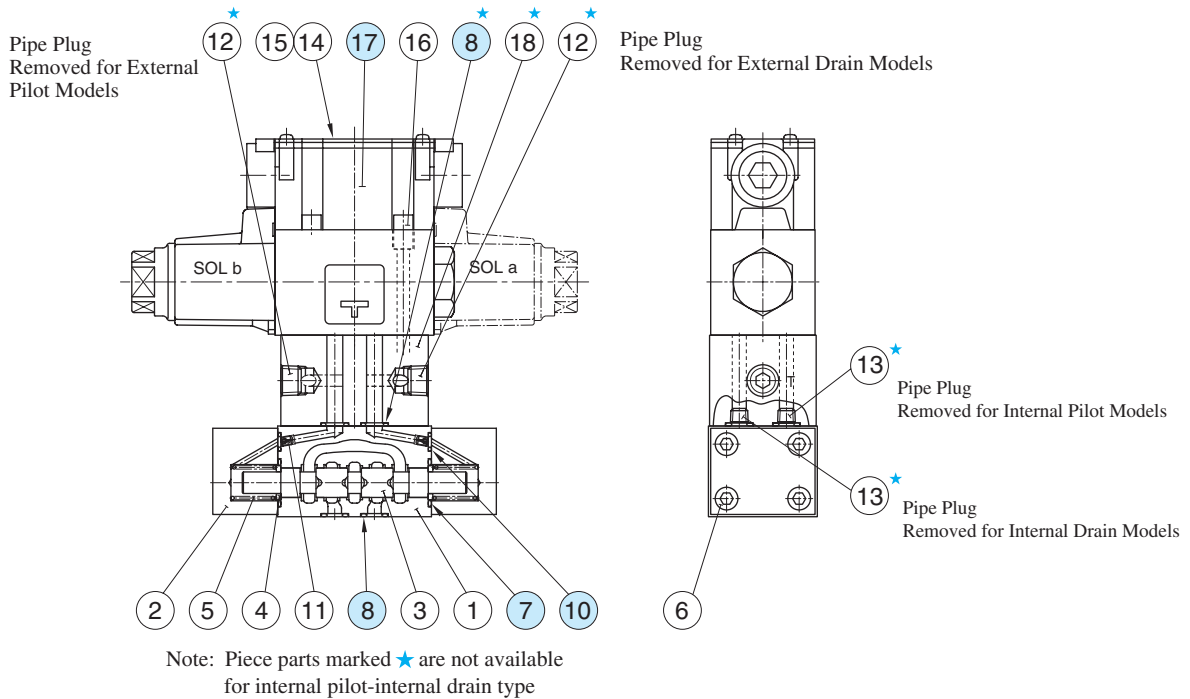


Model Numbers	C	D
(S-)DSHG-06-***-P2	323 (12.72)	84 (3.31)
(S-)DSHG-10-***-P2	479 (18.86)	125 (4.92)

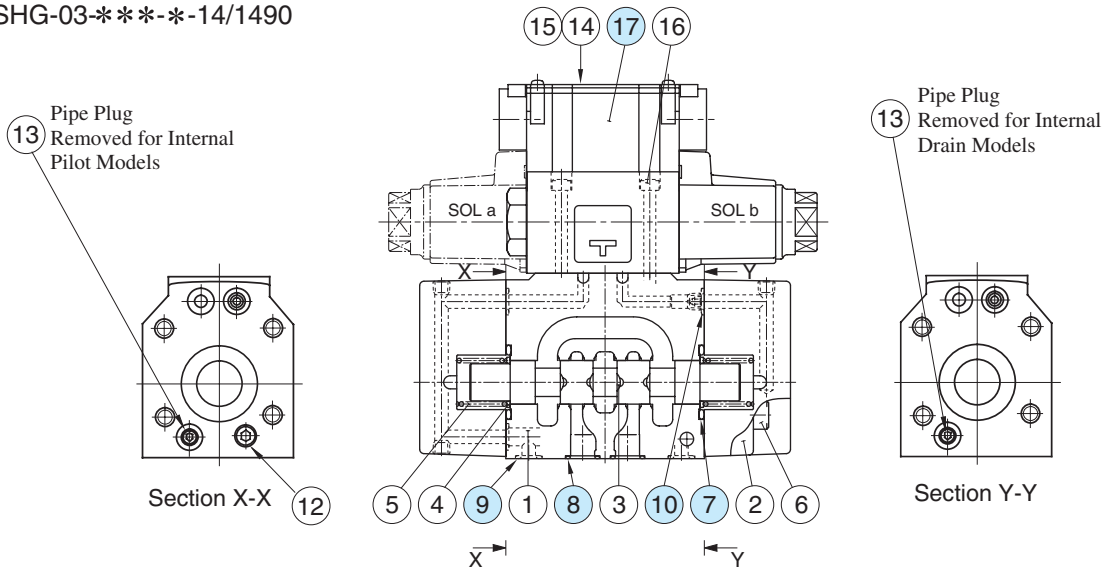
E
Solenoid Controlled Pilot Operated Directional Valves

List of Seals and Pilot Valves

DSHG-01-***-14/1480/1490



DSHG-03-***-14/1490



List of Seals

Item	Name	DSHG-01		DSHG-03	
		Part Numbers	Qty.	Part Numbers	Qty.
7	O-Ring	JASO-1018-1A	2	SO-NB-P28	2
8	O-Ring	SO-NB-P9	8(4)★	SO-NB-A104	5
9	O-Ring	—	—	SO-NB-P9	2
10	O-Ring	SO-NB-P5	2	SO-NB-P9	6

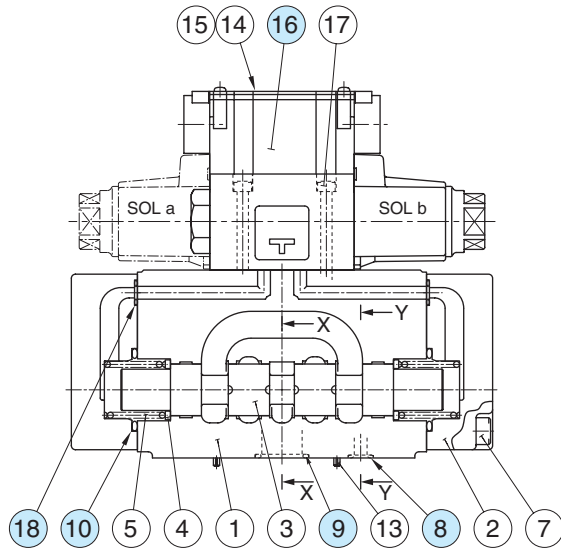
★ Quantities in the () are applicable to internal pilot-internal drain.
 Note: When ordering the o-rings, please specify the seal kit number listed in [page 408](#). In addition to the above o-rings, o-rings for pilot valve is included in the seal kit.
 For the detail of the pilot valve o-rings, see [page 359](#).

Pilot Valves

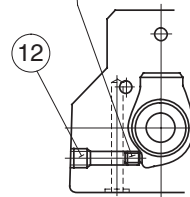
See [page 408](#) for the pilot valve model numbers to be used.

List of Seals and Pilot Valves

(S-)DSHG-04-***-52/5290

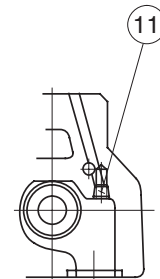


11 Pipe Plug Removed for Internal Drain Models



Section Y-Y

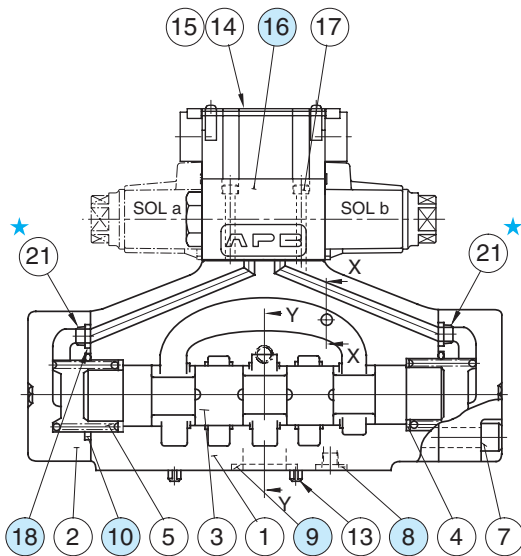
Pipe Plug Removed for Internal Pilot Models



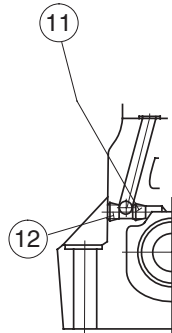
Section X-X

(S-)DSHG-06-***-53/5390

(S-)DSHG-10-***-43/4390

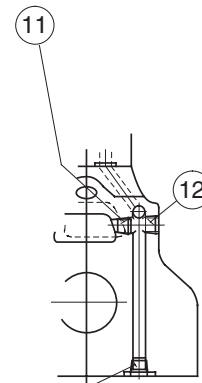


Pipe Plug Removed for Internal Pilot Models



Section Y-Y

Pipe Plug Removed for Internal Drain Models



Section X-X

11 Pipe Plug Removed for External Drain Models

Note: Item ② orifice marked ★ is applicable to pressure centred models (3H*) with pilot pressure more than 10 MPa (1450 PSI).

List of Seals

Item	Name	Part Numbers			Qty.
		(S-)DSHG-04	(S-)DSHG-06	(S-)DSHG-10	
8	O-Ring	SO-NB-P9	SO-NB-P14	SO-NB-P20	2
9		SO-NB-P22	SO-NB-P30	SO-NB-P42	4
10		SO-NB-P34	SO-NB-P40	SO-NB-P65	2
18		SO-NB-P9	SO-NB-P10	SO-NB-P14	2

Note: When ordering the o-rings, please specify the seal kit number listed in [page 408](#). In addition to the above o-rings, o-rings for pilot valve is included in the seal kit.

For the detail of the pilot valve o-rings, see [page 359](#).

Pilot Valves

See [page 408](#) for the pilot valve model numbers to be used.

List of Seal Kits and Pilot Valves

Valve Model Numbers	Pilot Valve Model Numbers	Seal Kit Numbers
DSHG-01-3C*-★-▲-14 DSHG-01-3C*-★-N-1480 DSHG-01-3C*-★-▲-1490	DSG-01-3C4-★-▲-70 DSG-01-3C4-★-N-70 DSG-01-3C4-★-▲-7090	KS-DSHG-01-▲-14 (For Internal Pilot-Internal Drain)
DSHG-01-2B*-★-▲-14 DSHG-01-2B*-★-N-1480 DSHG-01-2B*-★-▲-1490	DSG-01-2B2-★-▲-70-L DSG-01-2B2-★-N-70-L DSG-01-2B2-★-▲-7090-L	KS-DSHG-01-ET-▲-14 (Except for Internal Pilot-Internal Drain)
DSHG-03-3C*-★-▲-14 DSHG-03-3C*-★-▲-1490	DSG-01-3C4-★-▲-70 DSG-01-3C4-★-▲-7090	KS-DSHG-03-▲-14
DSHG-03-2B*-★-▲-14 DSHG-03-2B*-★-▲-1490	DSG-01-2B2-★-▲-70 DSG-01-2B2-★-▲-7090	
DSHG-03-2N*-★-▲-14 DSHG-03-2N*-★-▲-1490	DSG-01-2D2-★-▲-70 DSG-01-2D2-★-▲-7090	
(S-)DSHG-04-3C*-★-▲-52 (S-)DSHG-04-3C*-★-▲-5290	DSG-01-3C4-★-▲-70 DSG-01-3C4-★-▲-7090	KS-DSHG-04-▲-52
(S-)DSHG-04-2B*-★-▲-52 (S-)DSHG-04-2B*-★-▲-5290	DSG-01-2B2-★-▲-70 DSG-01-2B2-★-▲-7090	
(S-)DSHG-04-2N*-★-▲-52 (S-)DSHG-04-2N*-★-▲-5290	DSG-01-2D2-★-▲-70 DSG-01-2D2-★-▲-7090	
(S-)DSHG-06-3C*-★-▲-53 (S-)DSHG-06-3C*-★-▲-5390	DSG-01-3C4-★-▲-70 DSG-01-3C4-★-▲-7090	KS-DSHG-06-▲-53
(S-)DSHG-06-2B*-★-▲-53 (S-)DSHG-06-2B*-★-▲-5390	DSG-01-2B2-★-▲-70-L DSG-01-2B2-★-▲-7090-L	
(S-)DSHG-06-2N*-★-▲-53 (S-)DSHG-06-2N*-★-▲-5390	DSG-01-2D2-★-▲-70 DSG-01-2D2-★-▲-7090	
(S-)DSHG-10-3C*-★-▲-43 (S-)DSHG-10-3C*-★-▲-4390	DSG-01-3C4-★-▲-70 DSG-01-3C4-★-▲-7090	KS-DSHG-10-▲-43
(S-)DSHG-10-2B*-★-▲-43 (S-)DSHG-10-2B*-★-▲-4390	DSG-01-2B2-★-▲-70-L DSG-01-2B2-★-▲-7090-L	
(S-)DSHG-10-2N*-★-▲-43 (S-)DSHG-10-2N*-★-▲-4390	DSG-01-2D2-★-▲-70 DSG-01-2D2-★-▲-7090	

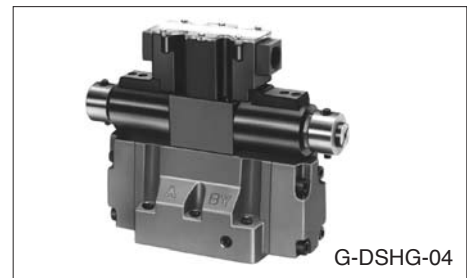
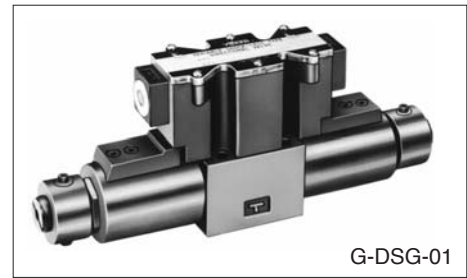
Notes) 1: Fill coil type (a symbol representing current/voltage) in section marked ★. Likewise, in section marked ▲, fill a symbol representing the type of electrical conduit connection (None: Terminal Box Type, N: Plug-in Connector Type).
2: For the details of the pilot valves, see [page 359 to 360](#).

“G” Series Shockless Type Solenoid Operated / Solenoid Controlled Pilot Operated Directional Valves

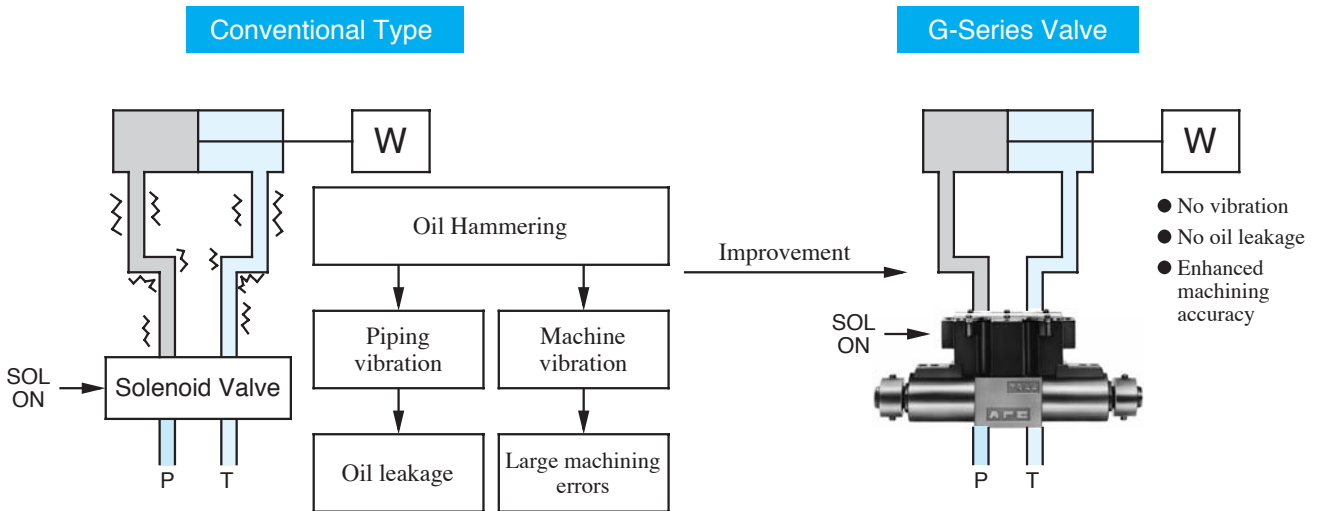
The G-Series Solenoid Operated Directional Valves incorporate electronic circuits to enable adjustment of the spool shifting time.

A special spool shape that minimises shock is used, shocks caused by the actuator starting and stopping, as well as vibration due to oil hammering. The shifting time of conventional Solenoid Operated, Shockless, and Directional Valves is constant and cannot be adjusted.

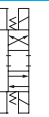
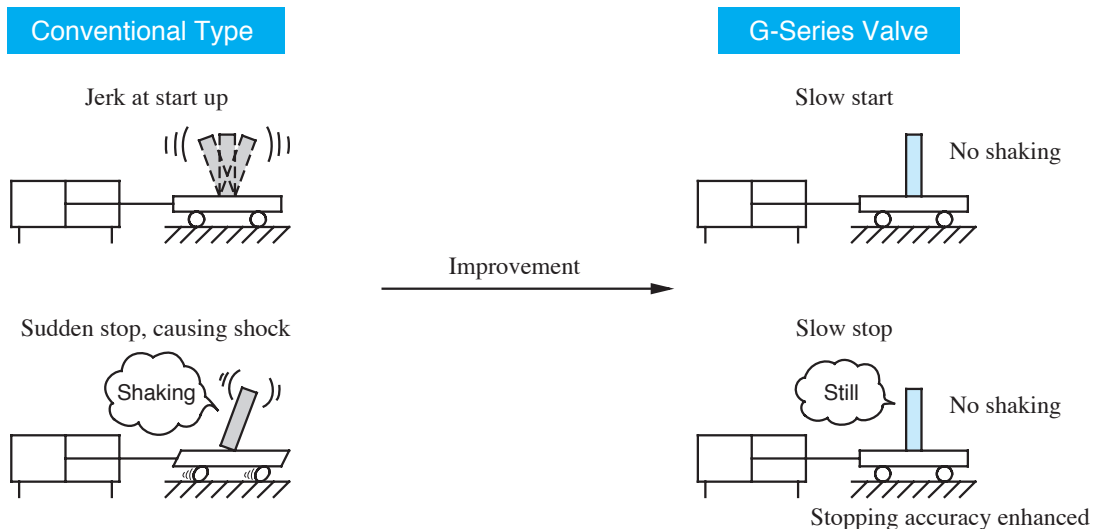
As the shifting time of the G-Series valves can be adjusted, it can be set at an optimal level to minimise shocks to the machine.



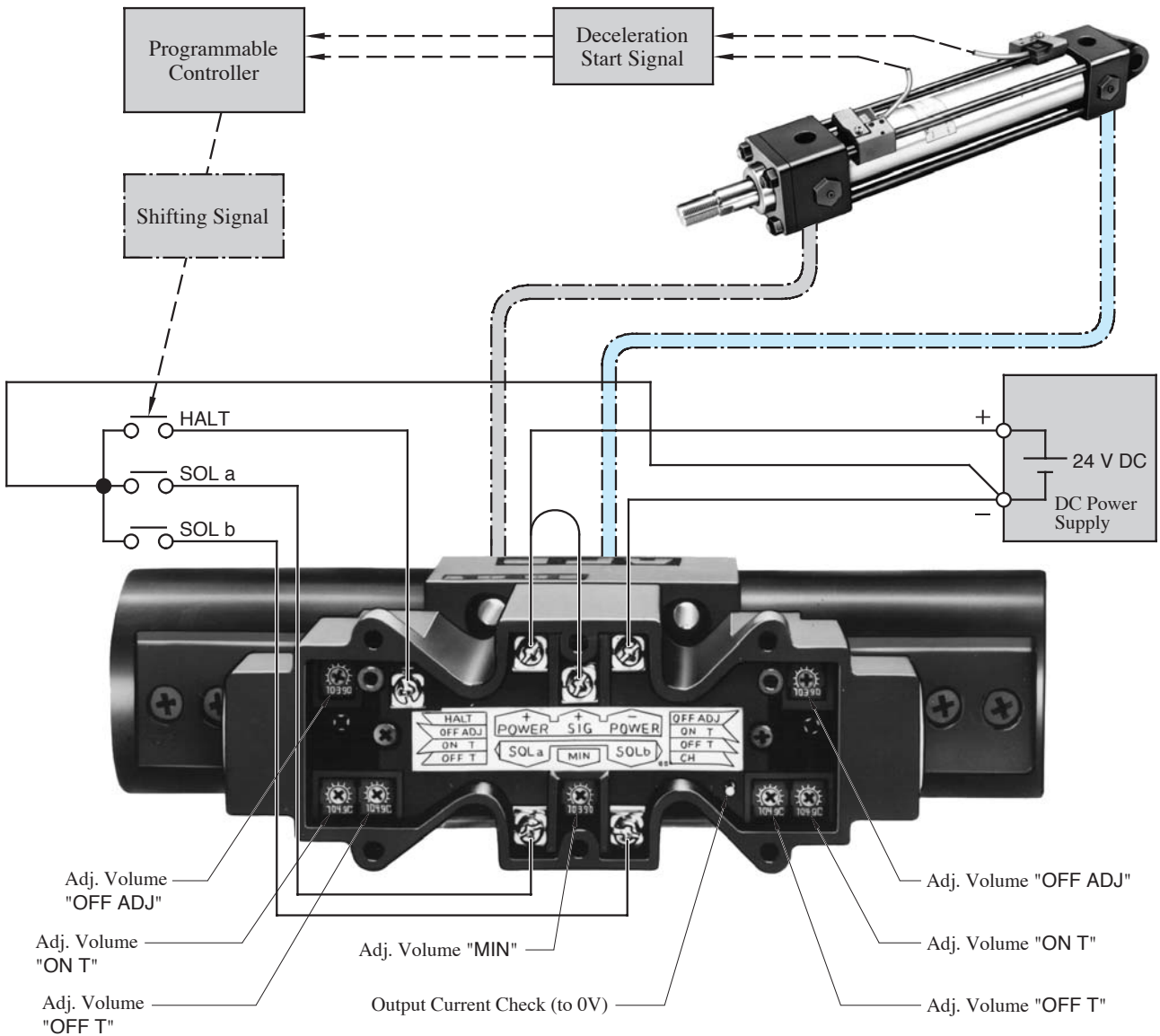
1 Reduces oil hammering during spool changeover.



2 Reduces shock caused by acceleration and deceleration

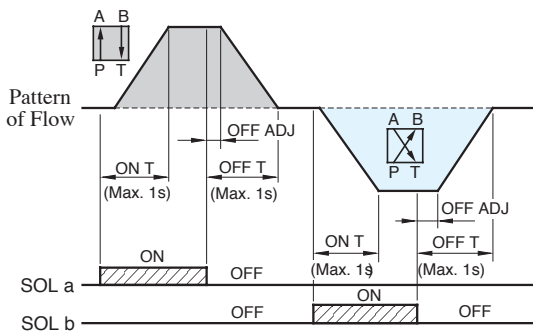


■ System Diagram (Example of sink type wiring)

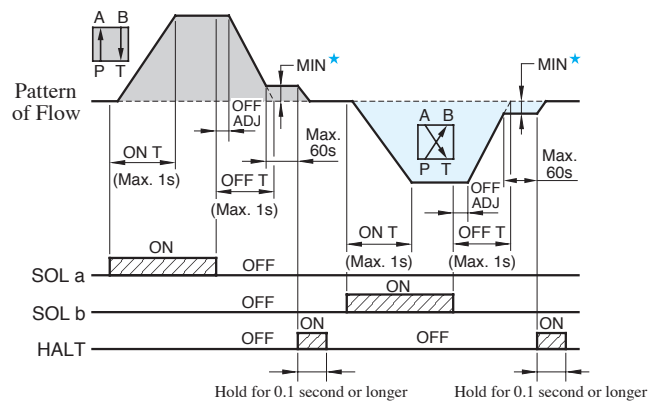


■ Relationships between SOL signals and flow patterns

● Without HALT functions



● With HALT functions



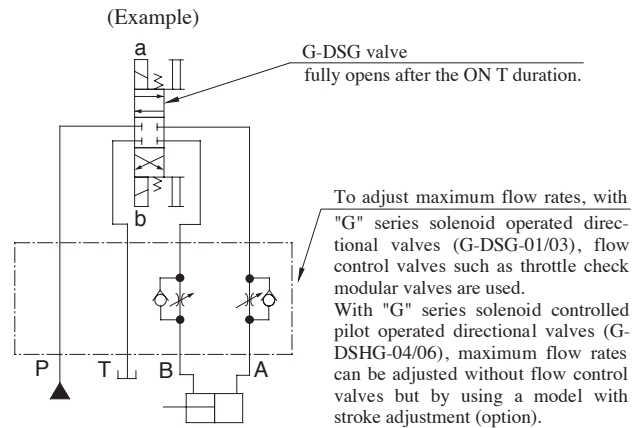
★ The minimum adjustment volume is common for SOL a and b, and it is not possible to set a different volume for each SOL a and b individually. If the HALT functions are not used, set the minimum adjustment volume to zero.

Instructions

Adjustment of maximum flow rate

The G-Series Solenoid Operated Directional Valves cannot be adjusted for maximum flow rates.

To adjust maximum flow rates, use flow control valves. In G-series solenoid controlled pilot operated directional valves (G-DSHG-04/06), the maximum flow rate can be adjusted by use of the valve with stroke adjustment screw of optional extra.

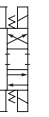
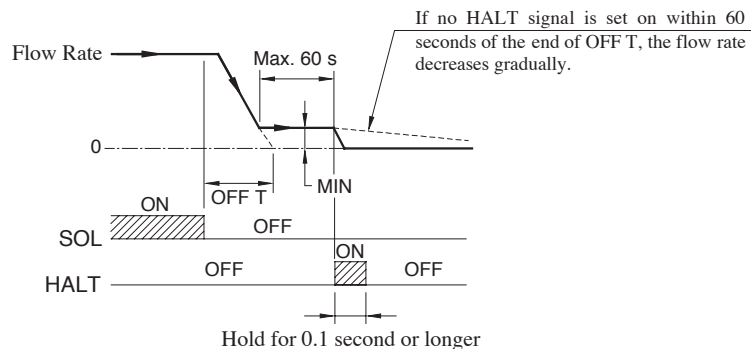


How to use HALT functions

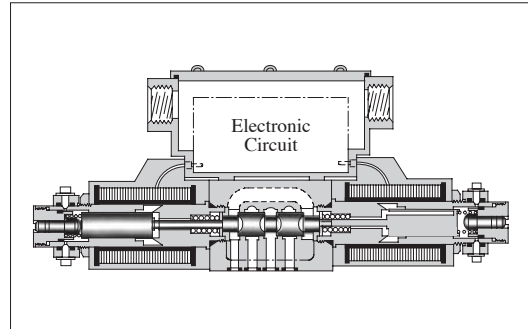
The HALT functions are used to drive the actuator at a low speed to the stop position while keeping a slight flow after OFF T.

A flow rate (min. flow rate) during a low-speed operation can be set with the minimum adjusting volume (The minimum adjusting volume is common for SOL a and b. Individual setting is not possible for SOL a and b.) When HALT signal is on, the min. flow rate becomes zero and the actuator stops. Here, take care to keep the HALT signal on for longer than 0.1 second. The min. flow rate gets to "0" after about 60 seconds following the OFF T. If the HALT functions are not used, set the minimum adjusting volume to zero.

The HALT functions are not applicable to the spool function "2B7".



■ “G” Series Shockless Type Solenoid Operated Directional Valves



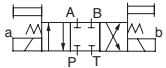
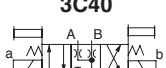

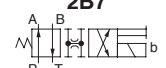
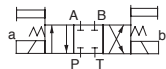
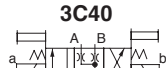
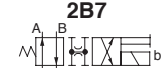
■ Specifications

Descriptions		Model Numbers	G-DSG-01-***-*-50/5090	G-DSG-03-***-*-50/5090
Max. Flow ^{★1}	L/min (U.S.GPM)		10 (2.6), 20 (5.3), 30 (7.9), 40 (10.6)	40 (10.6), 60 (15.9), 80 (21.1)
Max. Operating Pres. ^{★2}	MPa (PSI)		25 (3630)	25 (3630)
Max. T-Line Back Pres.	MPa (PSI)		16 (2320)	16 (2320)
Electric Power Supply	Voltage	24 V DC (21 - 28 V DC Included Ripple): Use a stable power supply		
	Input Power at 24V		36 W	36 W
Shifting signal, low speed operation halt signal (can be used in common with electric power supply).	Voltage	5 - 48 V DC (Use a stable power supply)		
	Current	Constant at 10 mA (A constant-current circuit is used)		
	Input interface	Sink Type, Source Type		
Shifting time range (for ON and OFF)			0.1 - 1 s	0.3 - 1 s
Low speed operation flow rate (min. flow rate) range (for SOL a and b) L/min (U.S.GPM)			0.5 - 5 (.13 - 1.3)	1 - 10 (.26 - 2.6)
Low speed operation flow rate (min. flow rate) hold time		Max. 60 s (After 60 seconds, the flow rate decreases gradually.)		
Ambient Temperature		0 - 50 °C (32 - 122 °F) with circulated air		
Approx. Mass	Single Solenoid		2.1 kg (4.6 lbs.)	5.3 kg (11.7 lbs.)
	Double Solenoid		3.0 kg (6.6 lbs.)	7.5 kg (16.5 lbs.)

★1. The maximum flow rates may vary according to the operating pressure. Refer to Maximum Flow Rates Characteristics on pages 414 and 415 for details.

★2. At pressures more than 21 MPa (3050 PSI), the "shockless effect" is slightly less if compared it with that at 16 MPa (2320 PSI).

Model Number Designation

G-DSG	-01	-10	-2B7	-S	-50	*	-L
Series Number	Valve Size	Metred Flow Capacity	Spool Type	Input Interface	Design Number	Design Standards	Models with Alternate Offset Solenoid
G-DSG : G Series Shockless Type Solenoid Operated Directional Valve, Sub-plate Mounting	01	None: 40 L/min 10 : 10 L/min 20 : 20 L/min	3C2  3C40 	None: Sink Type (Standard) S: Source Type	50	Refer to ★	L Applicable only for 2B7 (Omit if not required) 
		None: 30 L/min 10 : 10 L/min 20 : 20 L/min	2B7 				
	03	None: 80 L/min 40 : 40 L/min 60 : 60 L/min	3C2  3C40 		50		
		None: 60 L/min 40 : 40 L/min	2B7 				

★ Design Standards: None Japanese Standard "JIS" and European Design Standard 90 N. American Design Standard

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
G-DSG-01	DSGM-01-31	Rc 1/8	DSGM-01-3180	1/8 BSPF	DSGM-01-3190	1/8 NPT	0.8 (1.8)
	DSGM-01X-31	Rc 1/4	DSGM-01X-3180	1/4 BSPF	DSGM-01X-3190	1/4 NPT	0.8 (1.8)
	DSGM-01Y-31	Rc 3/8	—	—	DSGM-01Y-3190	3/8 NPT	0.8 (1.8)
G-DSG-03	DSGM-03-40	Rc 3/8	DSGM-03-2180	3/8 BSPF	DSGM-03-2190	3/8 NPT	3.0 (6.6)
	DSGM-03X-40	Rc 1/2	DSGM-03X-2180	1/2 BSPF	DSGM-03X-2190	1/2 NPT	3.0 (6.6)
	DSGM-03Y-40	Rc 3/4	DSGM-03Y-2180	3/4 BSPF	DSGM-03Y-2190	3/4 NPT	4.7 (10.4)

● Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

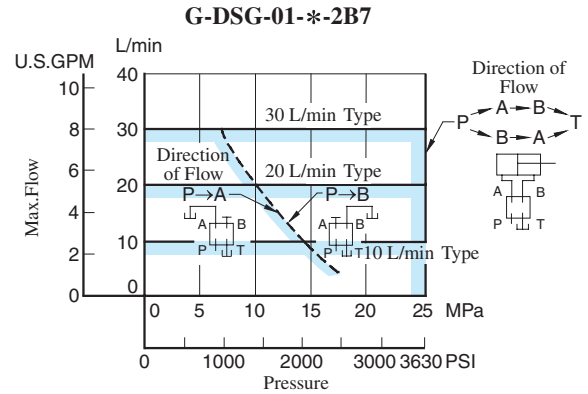
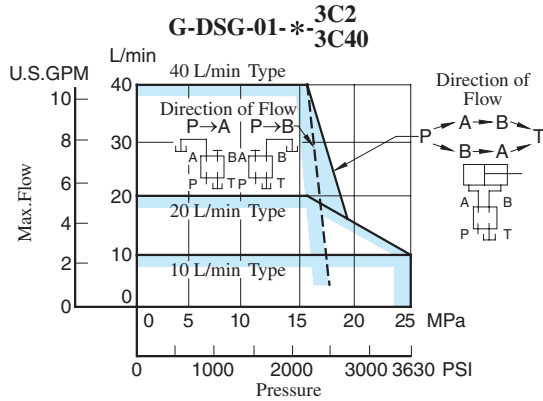
Attachment (Mtg. Bolt)

Four socket head cap screws in the table below are included.

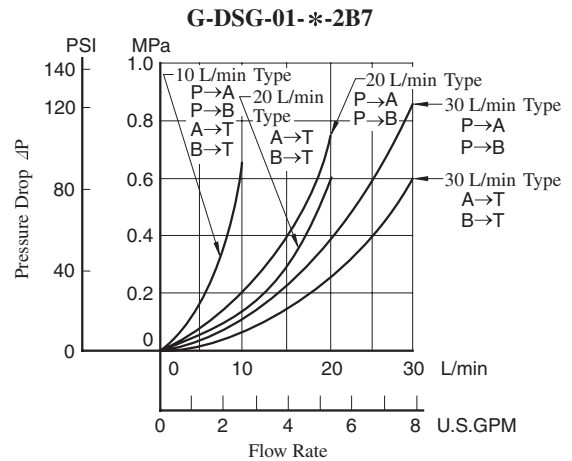
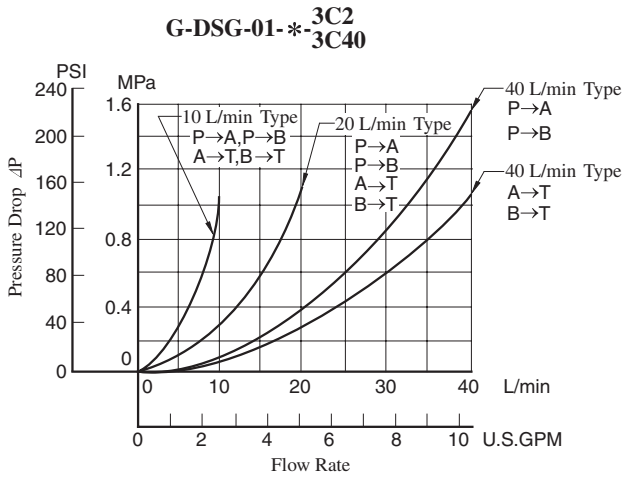
Model Numbers	Socket Head Cap Screw (4 pcs.)		
	Japanese Standard "JIS" & European Design Standard	N. American Design Standard	Tightening Torque
G-DSG-01	M5 × 45 Lg.	No.10-24 UNC × 1-3/4 Lg.	5-7 Nm (44-62 in. lbs.)
G-DSG-03	M6 × 35 Lg.	1/4-20 UNC × 1-1/2 Lg.	12-15 Nm (106-133 in. lbs.)

Typical Performance Characteristics of "G-DSG-01" at Viscosity 30 mm²/s (141 SSU), Specific Gravity 0.850

Maximum Flow Rate



Pressure Drop



- For any other viscosity, multiply the factors in the table right.
- For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

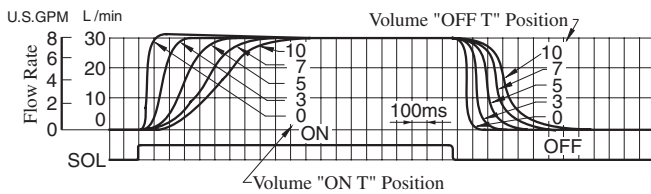
$$\Delta P' = \Delta P (G'/0.850)$$

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
		SSU	77	98	141	186	232	278	324	371	417
Factor		0.84	0.91	1.00	1.07	1.14	1.19	1.24	1.28	1.32	1.35

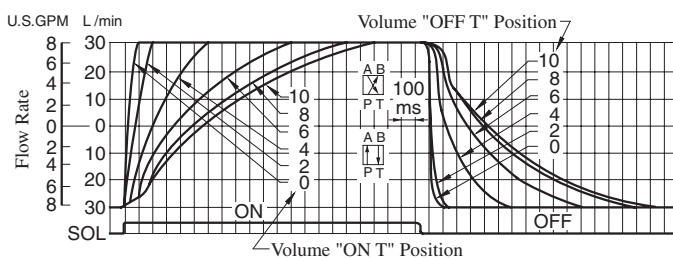
Shifting Characteristics

Supply Pressure : 16 MPa (2320 PSI)
Flow Rate : 30 L/min (7.9 U.S.GPM)

3C2, 3C40

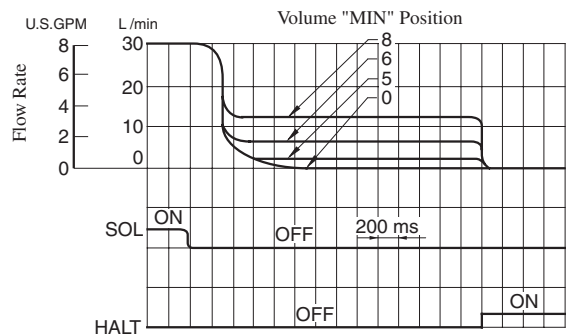


2B7



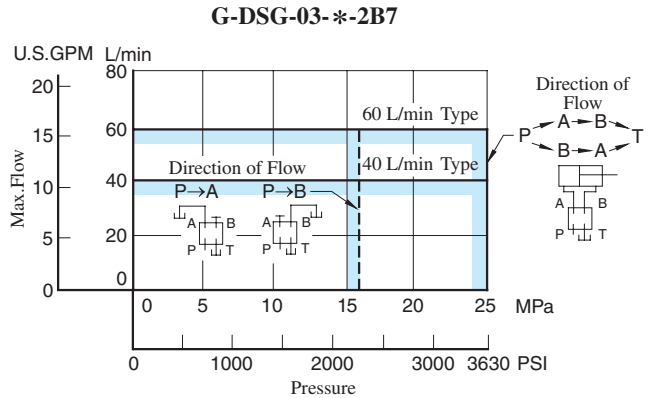
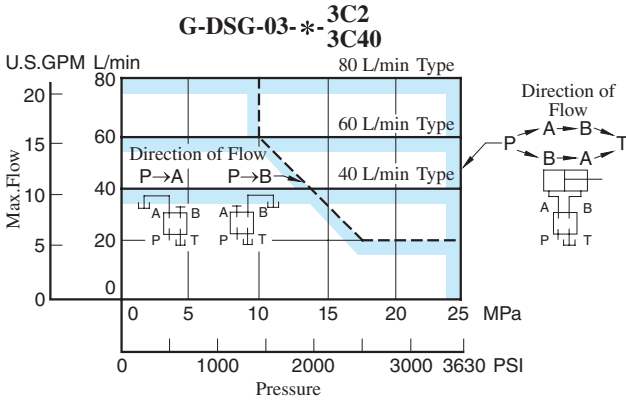
Low Speed Operating Flow Characteristics

Supply Pressure : 16 MPa (2320 PSI)
Flow Rate : 30 L/min (7.9 U.S.GPM)

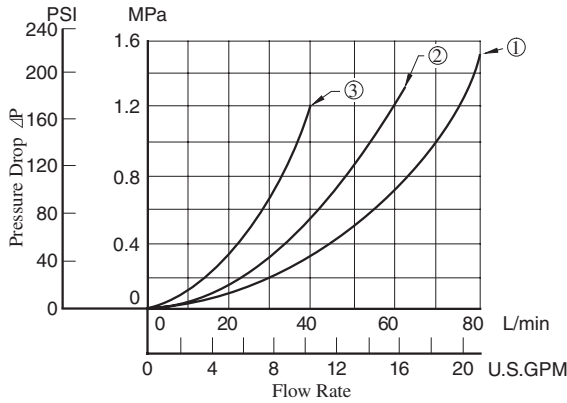


Typical Performance Characteristics of "G-DSG-03" at Viscosity 30 mm²/s (141 SSU), Specific Gravity 0.850

Maximum Flow Rate



Pressure Drop



Model Numbers	Pressure Drop Curve Numbers*
G-DSG-03- ^{3C2} _{3C40}	①
G-DSG-03-40- ^{3C2} _{3C40}	③
G-DSG-03-60- ^{3C2} _{3C40}	②
G-DSG-03-2B7	①
G-DSG-03-40-2B7	③

* The numbers of the pressure drop curves are the same for P→A, P→B, A→T and B→T.

- For any other viscosity, multiply the factors in the table right.
- For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

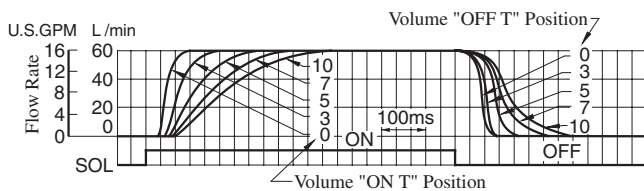
$$\Delta P' = \Delta P (G'/0.850)$$

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
	SSU	77	98	141	186	232	278	324	371	417	464
Factor		0.84	0.91	1.00	1.07	1.14	1.19	1.24	1.28	1.32	1.35

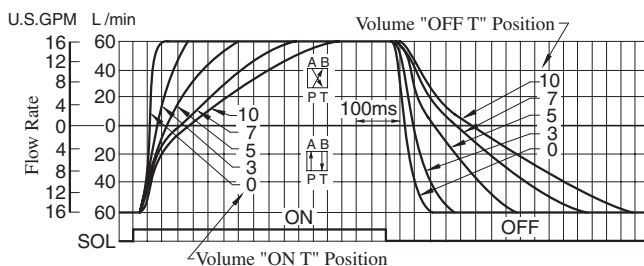
Shifting Characteristics

Supply Pressure : 16 MPa (2320 PSI)
Flow Rate : 60 L/min (15.9 U.S.GPM)

● 3C2, 3C40

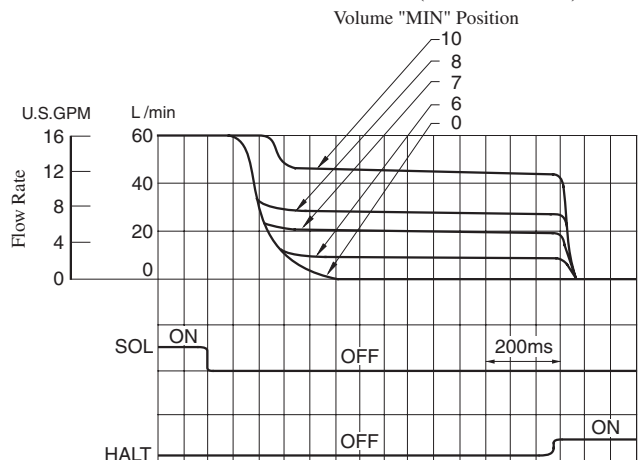


● 2B7



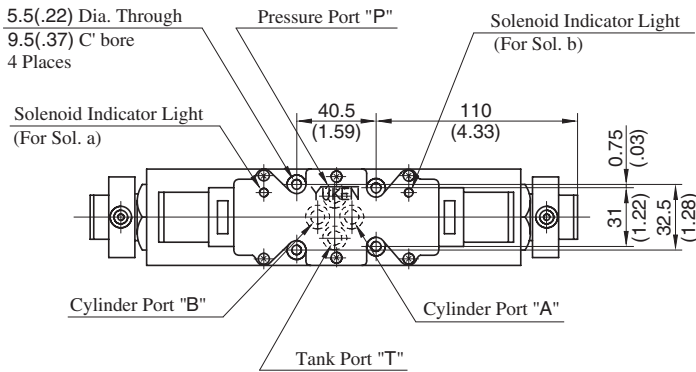
Low Speed Operating Flow Characteristics

Supply Pressure : 16 MPa (2320 PSI)
Flow Rate : 60 L/min (15.9 U.S.GPM)

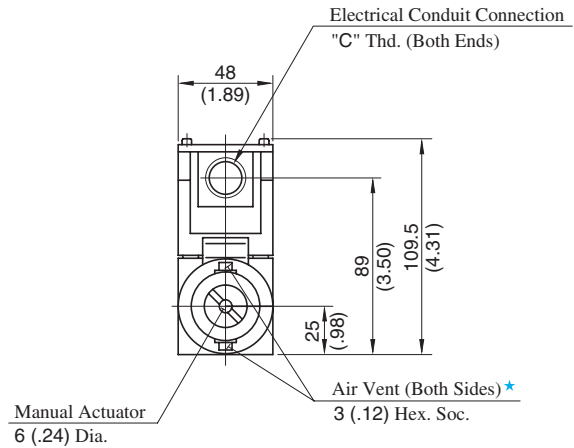
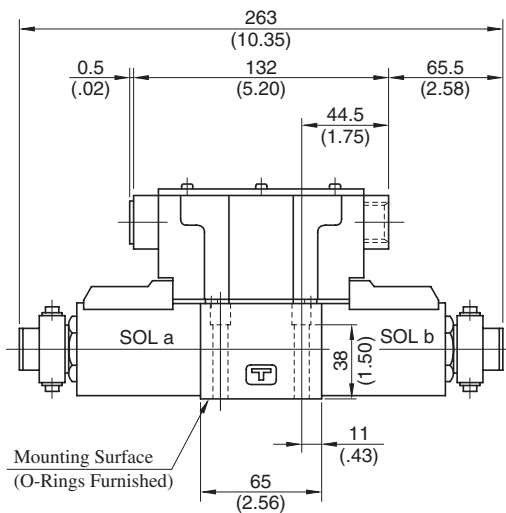


G-DSG-01-**-3C2/3C40-**-50/5090

Mounting Surface:
ISO4401-AB-03-4-A



Model Numbers	"C" Thd.
G-DSG-01-***-**-50	G 1/2
G-DSG-01-***-**-5090	1/2 NPT

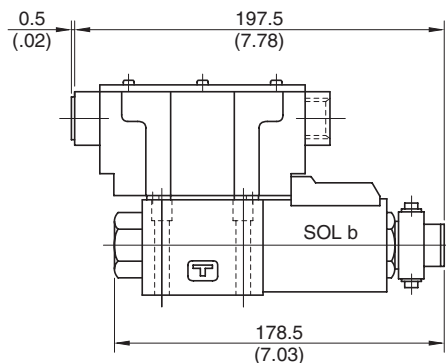


★ Air vent position around valve longitudinal axis can be optionally selected.

Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 356](#).

**DIMENSIONS IN
MILLIMETRES (INCHES)**

G-DSG-01-**-2B7-**-50/5090

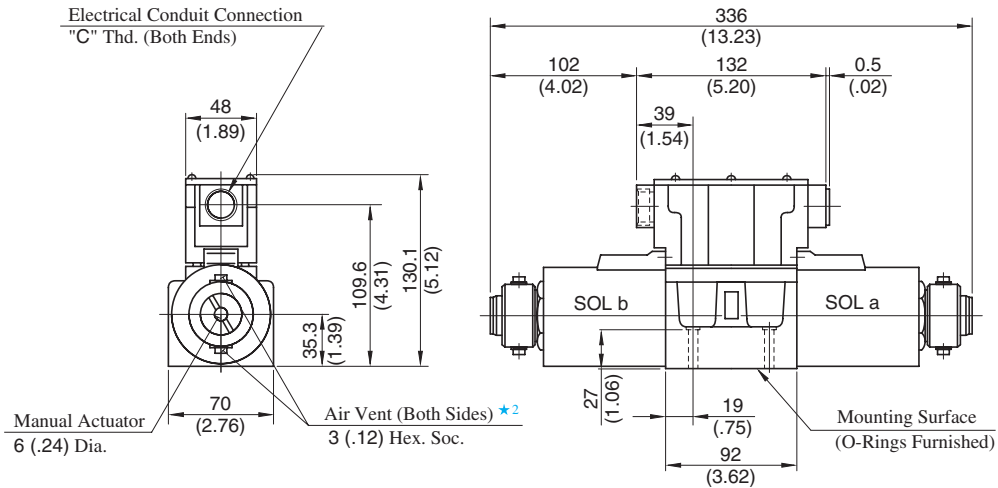
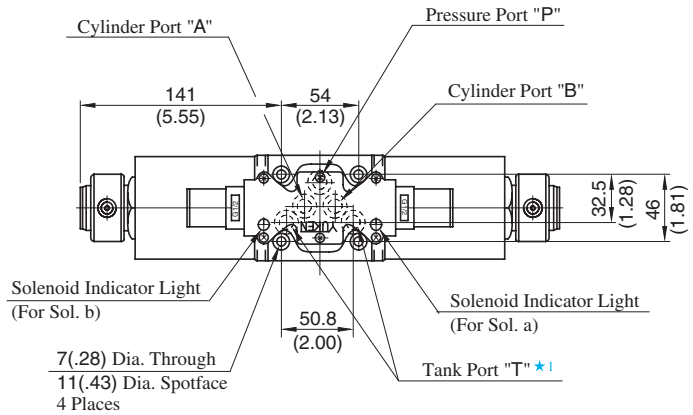


• For other dimensions, refer to the drawing above.

G-DSG-03-**-3C2/3C40-**-50/5090

Mounting Surface:
ISO 4401-AC-05-4-A

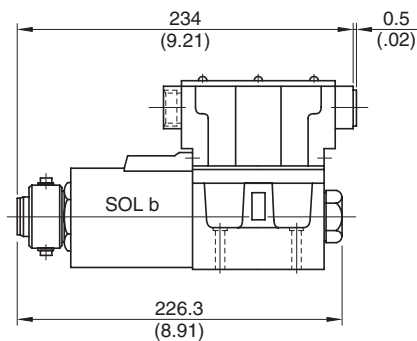
Model Numbers	"C" Thd.
G-DSG-03-**-50	G 1/2
G-DSG-03-**-5090	1/2 NPT



- ★ 1. Although the tank port is shown on the left in our sub-plate, either may be used.
 - ★ 2. Air vent position around valve longitudinal axis can be optionally selected.
- Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 373](#).

DIMENSIONS IN
MILLIMETRES (INCHES)

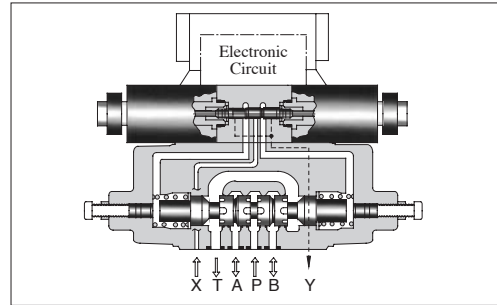
G-DSG-03-**-2B7-**-50/5090



- For other dimensions, refer to the drawing above.

E
 "G" Series Shockless Type
 Solenoid Operated Directional Valves

“G” Series Shockless Type Solenoid Controlled Pilot Operated Directional Valves



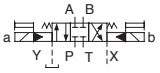

Specifications

Descriptions		Model Numbers	G-DSHG-04-3C*-**-50/5090	G-DSHG-06-3C*-**-50/5090
Max. Flow	L/min (U.S.GPM)		160 (42.3) ★ ¹	250 (66.1) ★ ¹
Max. Operating Pres.	MPa (PSI)		25 (3630)	25 (3630)
Max. T-Line Back Pres.	MPa (PSI)		16 (2320)	16 (2320)
Max. Drain Line Back Pressure	MPa (PSI)		3 (440)	3 (440)
Max. Pilot Pressure	MPa (PSI)		16 (2320)	16 (2320)
Min. Required Pilot Pres.	MPa (PSI)		1.5 (220) ★ ²	
Pilot Flow L/min (U.S.GPM)	at Normal		1 (0.3)	1 (0.3)
	at Transition		4 (1.1)	6 (1.6)
Electric Power Supply	Voltage		24 V DC (21 - 28 V DC Included Ripple): Use a stable power supply	
	Input Power at 24V		36 W	36 W
Shifting signal, low speed operation halt signal (can be used in common with electric power supply)	Voltage		5 - 48 V DC (Use a stable power supply)	
	Current		Constant at 10 mA (A constant-current circuit is used)	
	Input interface		Sink Type, Source Type	
Shifting time range (for ON and OFF)			ON: 0.06 - 1.5 s, OFF: 0.1 - 2 s	ON: 0.1 - 1 s, OFF: 0.2 - 2 s
Low speed operation flow rate (min. flow rate) range (for SOL a and b)	L/min (U.S.GPM)		5 - 20 (1.3 - 5.3)	10 - 30 (2.6 - 7.9)
Low speed operation flow rate (min. flow rate) hold time			Max. 60 s (After 60 seconds, the flow rate decreases gradually.)	
Ambient Temperature			0 - 50 °C (32 - 122 °F) with circulated air	
Approx. Mass			12 kg (26.5 lbs.)	15 kg (33.1 lbs.)

★1. The maximum flow rate is constant irrespective of the working pressure.

★2. Be sure that the difference between pilot pressure and drain port back pressure is larger than the minimum pilot pressure.

Model Number Designation

G-DSHG	-04	-3C2	-E	-R2	-S	-50	*
Series Number	Valve Size	Spool Type	Pilot Connection	Spool Control Modification (Omit if not required)	Input Interface	Design Number	Design Standards
G-DSHG : G Series Shockless Type Solenoid Controlled Pilot Operated Directional Valve, Sub-plate Mounting	04	3C2 	None: Internal Pilot	R2: With Stroke Adjustment, Both Ends RA: With Stroke Adjustment, Port "A" End RB: With Stroke Adjustment, Port "B" End	None: Sink Type (Standard) S: Source Type	50	Refer to ★
	06	3C40 	E: External Pilot			50	

★ Design Standards: None Japanese Standard "JIS" and European Design Standard 90 N. American Design Standard

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"			European Design Standard			N. American Design Standard		
	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)
G-DSHG-04	DHGM-04-20	Rc 1/2	4.4 (9.7)	DHGM-04-2080	1/2 BSP.F	4.4 (9.7)	DHGM-04-2090	1/2 NPT	4.4 (9.7)
	DHGM-04X-20	Rc 3/4	4.1 (9.0)	DHGM-04X-2080	3/4 BSP.F	4.1 (9.0)	DHGM-04X-2090	3/4 NPT	4.1 (9.0)
G-DSHG-06	DHGM-06-50	Rc 3/4	7.4 (16.3)	DHGM-06-5080	3/4 BSP.F	8.5 (18.7)	DHGM-06-5090	3/4 NPT	7.4 (16.3)
	DHGM-06X-50	Rc 1	7.4 (16.3)	DHGM-06X-5080	1 BSP.F	8.5 (18.7)	DHGM-06X-5090	1 NPT	7.4 (16.3)

● Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

Attachment (Mtg. Bolts)

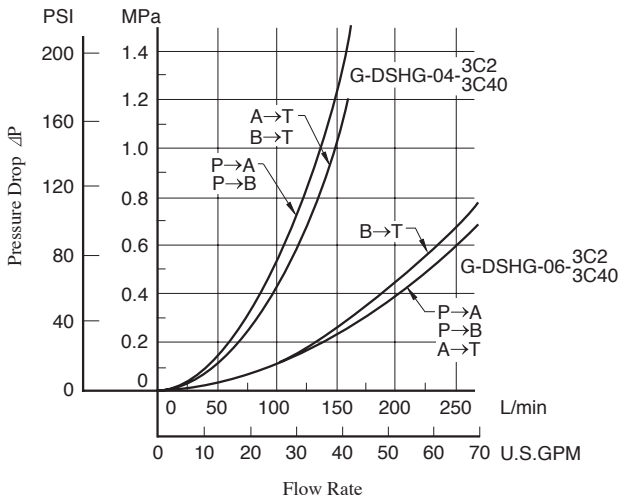
Socket head cap screws in the table below are included.

Model Numbers	Socket Head Cap Screw			
	Japanese Standard "JIS" & European Design Standard	N. American Design Standard	Qty.	Tightening Torque Nm (in. lbs.)
G-DSHG-04	M6 × 45 Lg.	1/4-20 UNC × 1-3/4 Lg.	2	12-15 (106-133)
	M10 × 50 Lg.	3/8-16 UNC × 2 Lg.	4	58-72 (513-637)
G-DSHG-06	M12 × 60 Lg.	1/2-13 UNC × 2-1/2 Lg.	6	100-123 (885-1089)

Hydraulic Fluid: Viscosity 30 mm²/s (141 SSU), Specific Gravity 0.850

Pressure Drop

G-DSHG-04/06-3C2/3C40



● For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
	SSU	77	98	141	186	232	278	324	371	417	464
Factor		0.84	0.91	1.00	1.07	1.14	1.19	1.24	1.28	1.32	1.35

● For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

$$\Delta P' = \Delta P (G'/0.850)$$

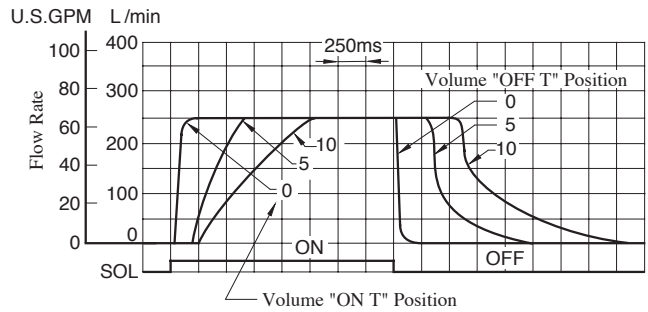
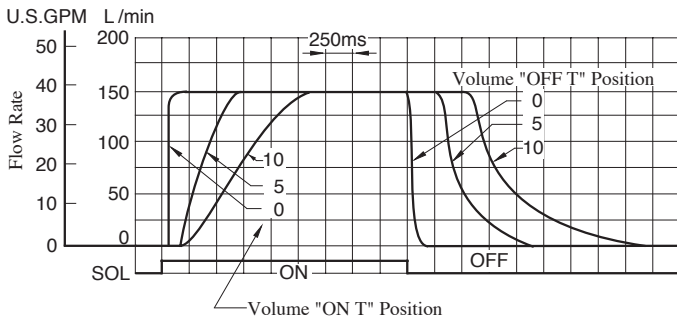
Shifting Characteristics

G-DSHG-04-3C2/3C40

Supply Pressure : 16 MPa (2320 PSI)
 Flow Rate : 150 L/min (39.6 U.S.GPM)
 Pilot Pressure : 16 MPa (2320 PSI)

G-DSHG-06-3C2/3C40

Supply Pressure : 16 MPa (2320 PSI)
 Flow Rate : 250 L/min (66.1 U.S.GPM)
 Pilot Pressure : 16 MPa (2320 PSI)



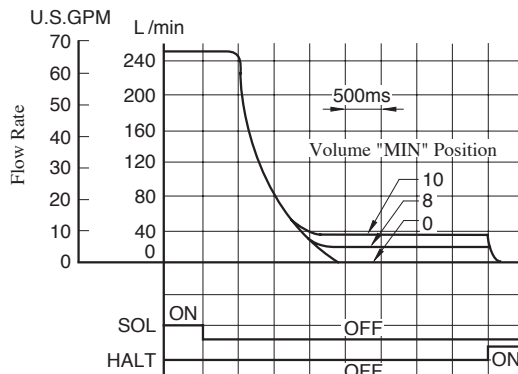
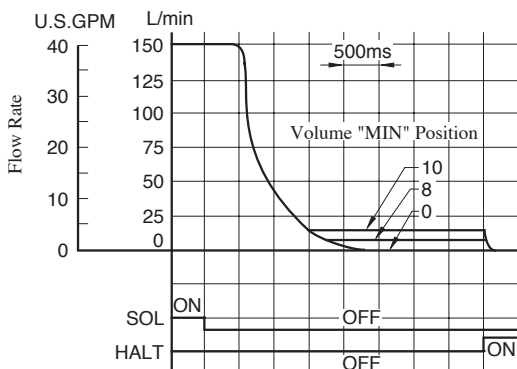
Low Speed Operating Flow Characteristics

G-DSHG-04-3C2/3C40

Supply Pressure : 16 MPa (2320 PSI)
 Flow Rate : 150 L/min (39.6 U.S.GPM)
 Pilot Pressure : 16 MPa (2320 PSI)

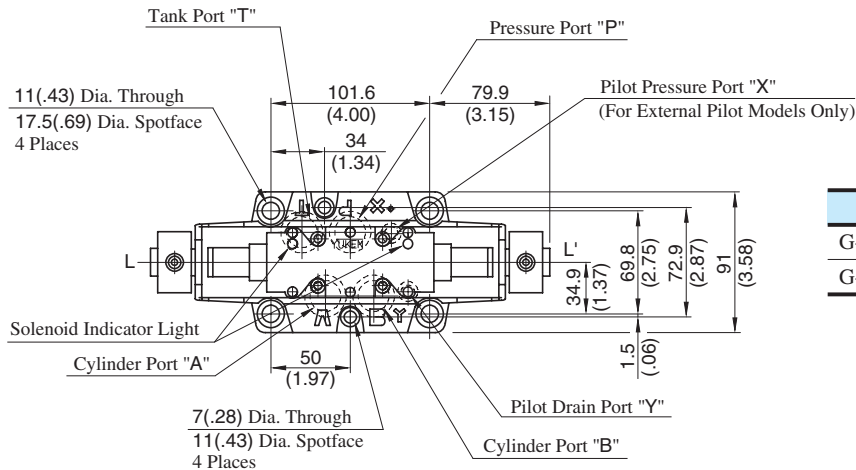
G-DSHG-06-3C2/3C40

Supply Pressure : 16 MPa (2320 PSI)
 Flow Rate : 250 L/min (66.1 U.S.GPM)
 Pilot Pressure : 16 MPa (2320 PSI)

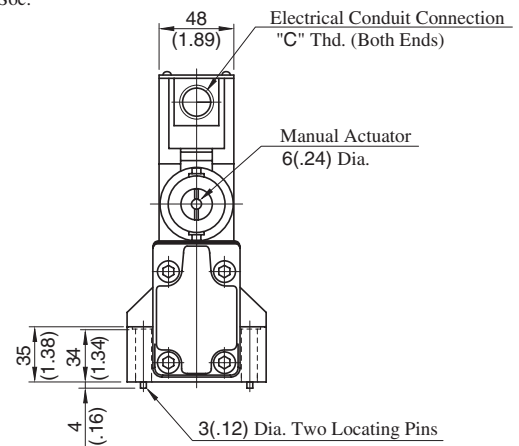
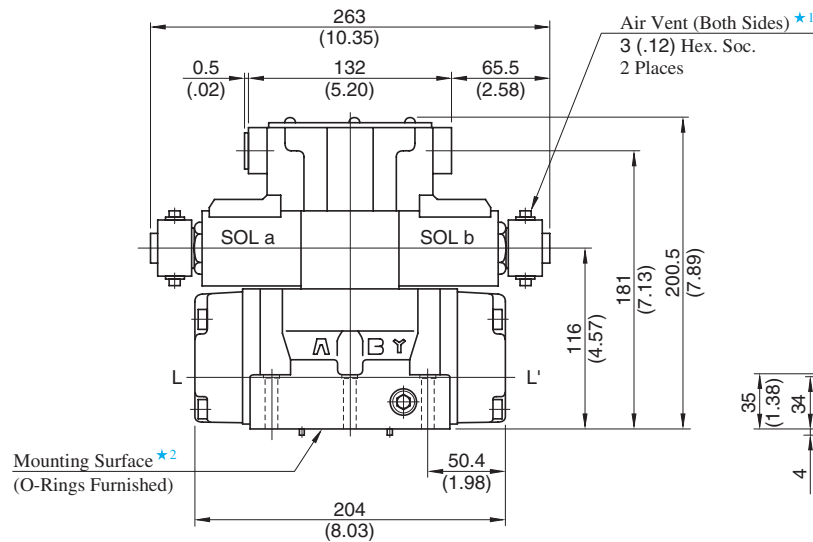


G-DSHG-04-3C*-*-50/5090

Mounting Surface:
ISO 4401-AD-07-4-A



Model Numbers	"C" Thd.
G-DSHG-04-3C*-*-50	G 1/2
G-DSHG-04-3C*-*-5090	1/2 NPT



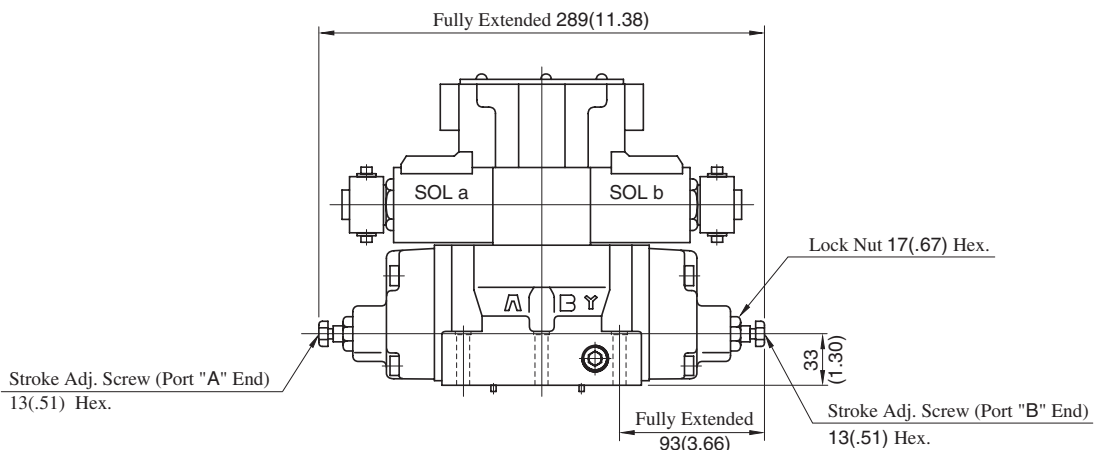
- ★ 1. Air vent position around valve longitudinal axis can be optionally selected.
- ★ 2. O-rings for ports: SO-NB-P22 for P/A/B/T ports
SO-NB-P9 for X/Y ports

Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate on [page 401](#).

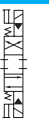
DIMENSIONS IN
MILLIMETRES (INCHES)

● Models with Stroke Adjustment (Option)

G-DSHG-04-3C*-*-R*-*-50/5090



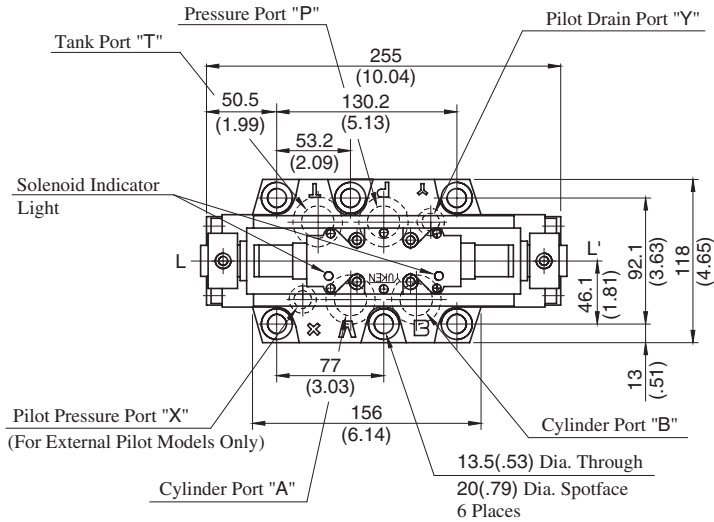
E



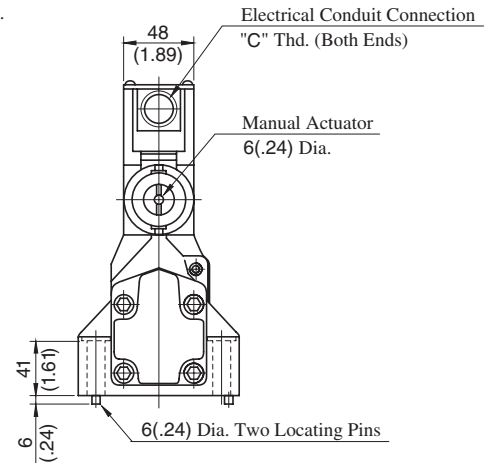
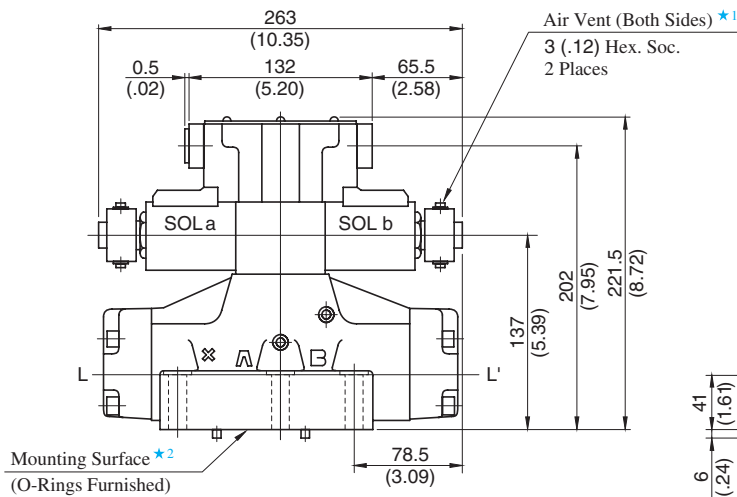
"G" Series Shockless Type
Solenoid Controlled Pilot Directional Valves

G-DSHG-06-3C*-*-50/5090

Mounting Surface:
ISO4401-AE-08-4-A



Model Numbers	"C" Thd.
G-DSHG-06-3C*-*-50	G 1/2
G-DSHG-06-3C*-*-5090	1/2 NPT

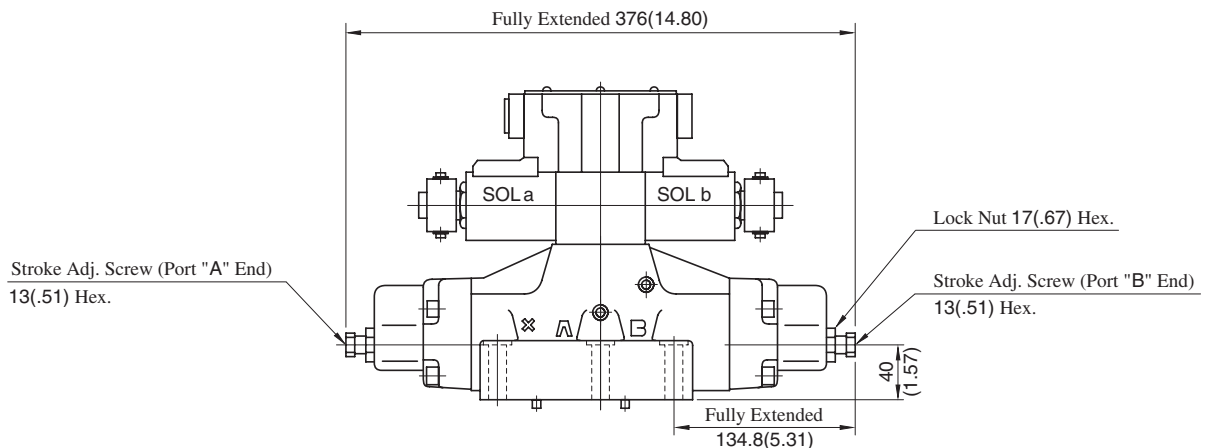


- ★ 1. Air vent position around valve longitudinal axis can be optionally selected.
 - ★ 2. O-rings for ports: SO-NB-P30 for P/A/B/T ports
SO-NB-P14 for X/Y ports
- Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 403](#).

DIMENSIONS IN
MILLIMETRES (INCHES)

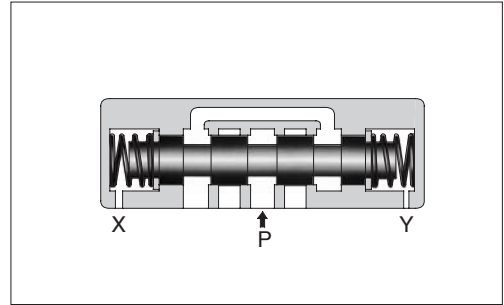
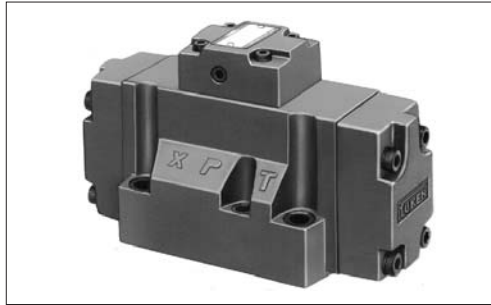
● **Models with Stroke Adjustment (Option)**

G-DSHG-06-3C*-*-R*-*-50/5090



Pilot Operated Directional Valves

These valves perform a change over of spool by hydraulic pilot and shift the direction of oil flow.

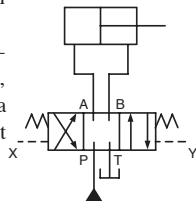


Specifications

Model Numbers	Maximum Flow L/min (U.S.GPM)				Max. Operating Pressure MPa (PSI)	Max. Pilot Pressure MPa (PSI)	Min. Required Pilot Pressure MPa (PSI)	Max. T-Line Back Pressure MPa (PSI)	Approx. Mass kg (lbs.)
	10 MPa (1450 PSI)	16 MPa (2320 PSI)	25 MPa (3630 PSI)	31.5 MPa (4570 PSI)					
DHG-04-3C*-50*	300 (79.3) ^{*1}	300 (79.3) ^{*1}	300 (79.3) ^{*1}	300 (79.3) ^{*1}	31.5 (4570)	25 (3630)	0.8 (120)	21 (3050)	7.4 (16.3)
DHG-04-2N*-50*	300 (79.3)	300 (79.3)	300 (79.3)	300 (79.3)					7.4 (16.3)
DHG-04-2B*-50*	130 (34.3)	70 (18.5)	70 (18.5)	60 (15.9)					7.8 (17.2)
DHG-06-3C*-50*	500 (132) ^{*2}	500 (132) ^{*2}	500 (132) ^{*2}	500 (132) ^{*2}	31.5 (4570)	25 (3630)	0.8 (120) ^{*4}	21 (3050)	11.2 (24.7)
DHG-06-2N*-50*	500 (132)	500 (132)	500 (132)	500 (132)					11.2 (24.7)
DHG-06-2B*-50*	140 (37)	100 (26.4)	90 (23.8)	80 (21.1)					11.7 (25.8)
DHG-06-3H*-50*	500 (132)	500 (132)	500 (132)	500 (132) ^{*3}					12.0 (26.5)
DHG-10-3C*-40*	1100 (291) ^{*4}	1100 (291) ^{*4}	1100 (291) ^{*4}	1100 (291) ^{*4}	31.5 (4570)	25 (3630)	1 (150) ^{*4}	21 (3050)	43.8 (96.6)
DHG-10-2N*-40*	1100 (291)	1100 (291)	1100 (291)	1100 (291)					43.8 (96.6)
DHG-10-2B*-40*	460 (122)	300 (79.3)	220 (58.1)	200 (52.8)					45.6 (101)
DHG-10-3H*-40*	1100 (291)	1100 (291)	1100 (291) ^{*3}	1100 (291) ^{*3}					51.6 (114)

Note: Max. flow in the table above represents the value in the flow condition of P→A →B→T (or P→B→A→T) as shown in the circuit diagram right.

In case the valves is used in the condition that either A or B port is blocked, the maximum flow differs according to a hydraulic circuit, therefore, please consult us for details.



- ★ 1. Varies depending on the spool type. For more information, see [page 388](#) for the List of “Standard Model and Maximum Flow” (DSHG-04) for Solenoid Controlled Pilot Operated Directional Valves.
- ★ 2. Varies depending on the spool type and pilot pressure. For more information, see [page 389](#) for the List of “Standard Model and Maximum Flow” (DSHG-06) related to the Solenoid Controlled Pilot Operated Directional Valves.
- ★ 3. Varies depending on the spool type and pilot pressure. For more information, see [page 390](#) for the List of “Standard Model and Maximum Flow” (DSHG-10) related to the Solenoid Controlled Pilot Operated Directional Valves.
- ★ 4. Minimum Pilot Pressure for the models with pilot piston is 1.8 MPa (260 PSI).

Yuken can offer flanged connection valves described below.
Consult us for the details.

Model Numbers	Rated Flow L/min (U.S.GPM)	Max. Operating Pres. MPa (PSI)
DHF-16-***-30*	500 (132)	21 (3050)
DHF-24-***-26*	1200 (317)	
DHF-32-***-21*	2400 (634)	

Pressure Drop

Same as those for Solenoid Controlled Pilot Operated Directional Valves. See [pages 392 and 393](#) for the related information.

Instruction

- In case of Spring Offset Models, directly connect the pilot pressure port "Y" to the reservoir as a drain port.



Model Number Designation

F-	DH	G	-04	-2	B	2	A	-C2	-RA	-H	-50	*	
Special Seals	Series Number	Type of Connection	Valve Size	Number of Valve Positions	Spool-Spring Arrangement	Spool Type	Special Two Position Valve	Model with Pilot Choke Valve (Options) ^{*2}	Spool Control Modification (Options) ^{*2}	Built-in Orifice for Pilot Line	Design Number	Design Standard	
F: Special Seals for Phosphate ester type fluids (Omit if not required)	DH: Pilot Operated Directional Valve	G: Sub-plate Mounting	04	3	C: Spring Centred	2, 3 4, 40 5, 6 60, 7 9, 10 11, 12	A ^{*3} , B ^{*3} (Omit if not required)	C2: With C2 Choke	R2: With Stroke Adjustment, Both Ends RA: With Stroke Adjustment, Port A End RB: With Stroke Adjustment, Port B End P2: With Pilot Piston, Both Ends PA: With Pilot Piston, Port A End PB: With Pilot Piston, Port B End	—	50	Refer to ^{*5}	
			06		H: Pressure Centred (Option) ^{*2}								H: Refer to ^{*4}
			10		N: No-Spring B: Spring Offset								
Refer to ^{*1}													

- ★ 1. For various combination, see the List of Valve Types below.
- ★ 2. For the option combinations of the Type (Valve Size) and Options, see the List of Options below.
- ★ 3. Refer to the column "valves using neutral position and side position" (Special 2-position valve) on page 426.
- ★ 4. In spool-spring arrangement "H" (pressure centred models), in case the pilot pressure is more than 10 MPa (150PSI), please specify that the valve should have the built-in orifice to the pilot line.
- ★ 5. Design Standards: None..... Japanese Standard "JIS" and European Design Standard 90..... N. American Design Standard

List of Valve Type

Spool Type	Valve Types				
	Three Positions		Two Positions		
	Spring Centred	Pressure Centred [*]	No-Spring	Spring Offset	
	Graphic Symbols				
2		3C2	3H2	2N2	2B2
3		3C3	3H3	2N3	2B3
4		3C4	3H4	2N4	2B4
40		3C40	3H40	2N40	2B40
5		3C5	3H5		
6		3C6	3H6		
60		3C60	3H60		
7		3C7	3H7	2N7	2B7
9		3C9	3H9		
10		3C10	3H10		
11		3C11	3H11		
12		3C12	3H12		

★: Pressure Centered Models are not available for the Valve Size of "04".

List of Options

Model Numbers	Option Code							
	3H*	C2	R2	RA	RB	P2	PA	PB
DHG-04-3C*	×	○	○	○	○	×	×	×
DHG-04-2N*	×	○	○	○	○	×	×	×
DHG-04-2B*	×	○	×	○	×	×	×	×
DHG-06-3C*	×	○	○	○	○	○	○	○
DHG-06-2N*	×	○	○	○	○	○	○	○
DHG-06-2B*	×	○	×	○	×	×	○	×
DHG-06-3H*	○	○	×	×	×	×	×	×
DHG-10-3C*	×	○	○	○	○	○	○	○
DHG-10-2N*	×	○	○	○	○	○	○	○
DHG-10-2B*	×	○	×	○	×	×	○	×
DHG-10-3H*	○	○	×	×	×	×	○	×

Note. ○ Mark: Available
× Mark: Not Available

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"			European Design Standard			N. American Design Standard		
	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)
DHG-04	DHGM-04-20	Rc 1/2	4.4 (9.7)	DHGM-04-2080	1/2 BSP.F	4.4 (9.7)	DHGM-04-2090	1/2 NPT	4.4 (9.7)
	DHGM-04X-20	Rc 3/4	4.1 (9.0)	DHGM-04X-2080	3/4 BSP.F	4.1 (9.0)	DHGM-04X-2090	3/4 NPT	4.1 (9.0)
DHG-06	DHGM-06-50	Rc 3/4	7.4 (16.3)	DHGM-06-5080	3/4 BSP.F	8.5 (18.7)	DHGM-06-5090	3/4 NPT	7.4 (16.3)
	DHGM-06X-50	Rc 1	7.4 (16.3)	DHGM-06X-5080	1 BSP.F	8.5 (18.7)	DHGM-06X-5090	1 NPT	7.4 (16.3)
DHG-10	DHGM-10-40	Rc 1-1/4	21.5 (47.4)	DHGM-10-4080	1-1/4 BSP.F	21.5 (47.4)	DHGM-10-4090	1-1/4 NPT	21.5 (47.4)
	DHGM-10X-40	Rc 1-1/2	21.5 (47.4)	DHGM-10X-4080	1-1/2 BSP.F	21.5 (47.4)	DHGM-10X-4090	1-1/2 NPT	21.5 (47.4)

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- Sub-plates are shared with those for Solenoid Controlled Pilot Operated Directional Valves. Refer to [pages 401 to 403](#) for dimensions.

Mounting Bolts

Model Numbers	Socket Head Cap Screw			
	Japanese Standard "JIS" European Design Standard	N. American Design Standard	Qty.	Tightening Torque Nm (in. lbs)
DHG-04	M6 × 45 Lg.	1/4-20 UNC × 1-3/4 Lg.	2	12-15 (106-133)
	M10 × 50 Lg.	3/8-16 UNC × 2 Lg.	4	58-72 (513-637)
DHG-06	M12 × 60 Lg.	1/2-13 UNC × 2-1/2 Lg.	6	100-123 (885-1089)
DHG-10	M20 × 75 Lg.	3/8-16 UNC × 2 Lg.	6	473-585 (4186-5177)

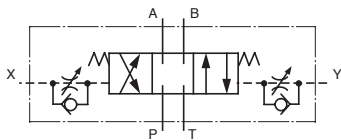
Options

Models with Pilot Choke Adjustment (C2)

When the adjustment screw is turned clockwise, changeover speed of the spool becomes slow. In case of the spring centred valves in particular, making slow of the returning speed of the spool to the neutral position is possible with a C2 choke valve. These choke valves can be used in combination with valves of spring centred, no spring, spring offset, pressure centred and the valves with stroke adjustment.

Graphic Symbols

Spring Centred Models

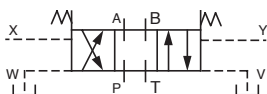


Models with Pilot Piston (P*)

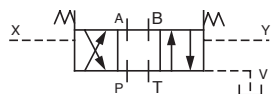
The valves with a pilot piston can be used when the high speed changeover of the spool is required. However, please note that in case of spring centred valves, there is no change in the returning speed of the spool to the neutral position even with the pilot piston.

Graphic Symbols

Spring Centred Models with Pilot Piston on Both Ends (P2)



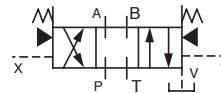
Spring Centred Models with Pilot Piston on Port "A" End (PA)



Pressure Centred Models (3H*)

The pressure centred type can be used when the returning of the spool to the neutral position is required to be done firmly.

Graphic Symbol

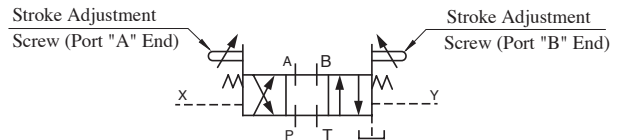


Models with Stroke Adjustment (R*)

When the adjustment screw is screwed in, the spool stroke becomes short and flow rate reduces

Graphic Symbol

Spring Centred Models with Stroke Adjustment on Both Ends (R2)



Additional Mass of Options

Add the mass described below to the mass of standard models on [page 423](#) if options are required.

kg (lbs.)

Model Numbers	With Pilot Choke Valve	With Pilot Piston		With Stroke Adjustment	
		P2	PA PB	R2	RA RB
DHG-04	0.65 (1.4)	—	—	1.0 (2.2)	0.5 (1.1)
DHG-06	0.65 (1.4)	1.0 (2.2)	0.5 (1.1)	1.2 (2.6)	0.6 (1.3)
DHG-10	0.65 (1.4)	3.6(7.9)	1.8 (4.0)	3.7 (8.2)	1.85 (4.1)

Valves Using Neutral Position and Side Position (Special Two Position Valve)

In addition to the standard two positions valves (2B*), the following two types of two positions valves are available: valves with neutral position and pilot Y pressure position (2B*A), valves with neutral position and pilot X pressure position (2B*B).

Model Numbers	Graphic Symbols
04 DHG-06-2B* <u>A</u> 10	
DHG-* <u>-2B2A</u>	
DHG-* <u>-2B3A</u>	
DHG-* <u>-2B4A</u>	
DHG-* <u>-2B40A</u>	
DHG-* <u>-2B5A</u>	
DHG-* <u>-2B6A</u>	
DHG-* <u>-2B60A</u>	
DHG-* <u>-2B7A</u>	
DHG-* <u>-2B9A</u>	
DHG-* <u>-2B10A</u>	
DHG-* <u>-2B11A</u>	
DHG-* <u>-2B12A</u>	

Model Numbers	Graphic Symbols
04 DHG-06-2B* <u>B</u> 10	
DHG-* <u>-2B2B</u>	
DHG-* <u>-2B3B</u>	
DHG-* <u>-2B4B</u>	
DHG-* <u>-2B40B</u>	
DHG-* <u>-2B5B</u>	
DHG-* <u>-2B6B</u>	
DHG-* <u>-2B60B</u>	
DHG-* <u>-2B7B</u>	
DHG-* <u>-2B9B</u>	
DHG-* <u>-2B10B</u>	
DHG-* <u>-2B11B</u>	
DHG-* <u>-2B12B</u>	

DHG-04-***-50/5090

DIMENSIONS IN MILLIMETRES (INCHES)

Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate on [page 401](#).

Mounting Surface: ISO 4401-AD-07-4-A

Options

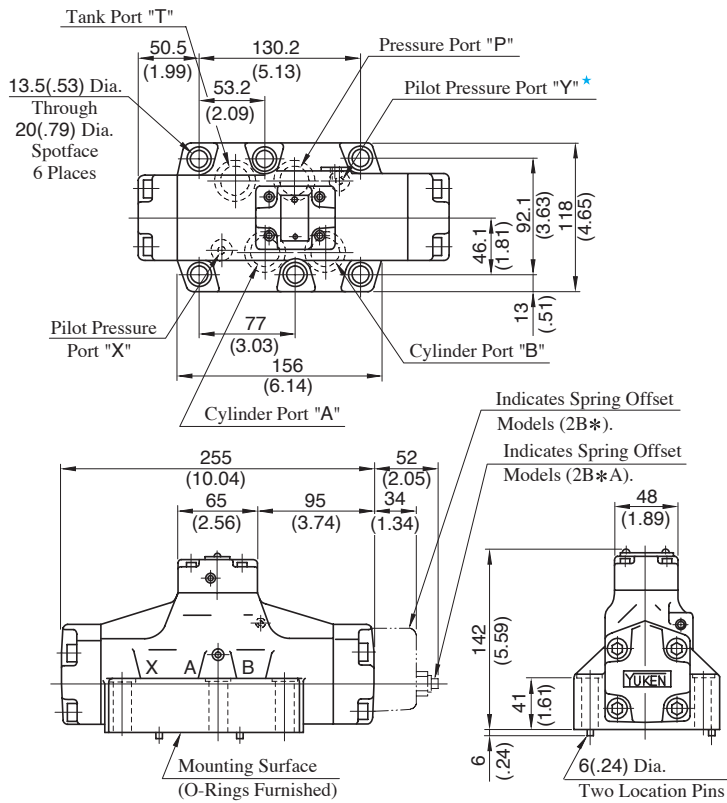
- Models with Pilot Choke Valve**
DHG-04-***-C2
- Models with Stroke Adj. (R*)**

Outside dimensions are the same as those of the main valve of Solenoid Controlled Pilot Operated Directional Valves (DSHG-04). See [page 405](#).

★ For Spring Offset Models (2B*, 2B*A), it functions as drain port. When that model is used, directly connect it to the reservoir.

DHG-06-***-50/5090

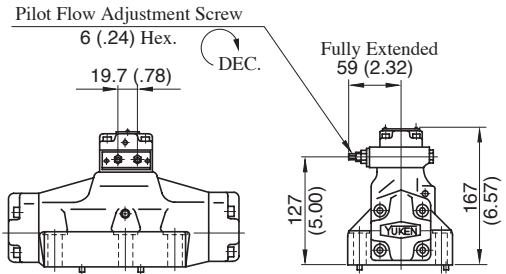
Mounting surface: ISO 4401-AE-08-4-A



Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 402](#).

Options

- **Models with Pilot Choke Valve**
DHG-06-***-C2



- **Pressure Centred Models (3H*)**
- **Models with Stroke Adjustment (R*)**
- **Models with Pilot Piston (P*)**

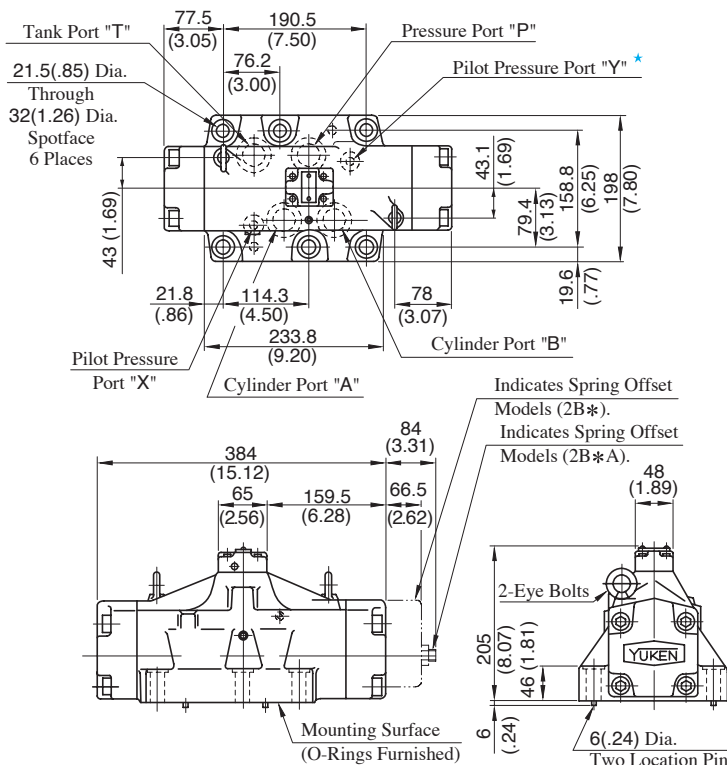
The outside dimensions of the above options are the same as those of the main valve of Solenoid Controlled Pilot Operated Directional Valve (DSHG-06). See [page 405](#).

★ In case of Spring Offset Model (2B*, 2B*^A/_B), it functions as a drain port. When that model is used, directly connect it to the reservoir.

DIMENSIONS IN
MILLIMETRES (INCHES)

DHG-10-***-40/4090

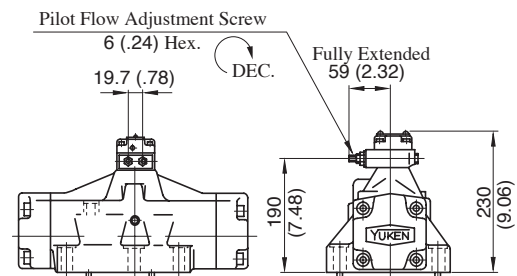
Mounting surface: ISO 4401-AF-10-4-A



Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 403](#).

Options

- **Models with Pilot Choke Valve**
DHG-10-***-C2



- **Pressure Centred Models (3H*)**
- **Models with Stroke Adjustment (R*)**
- **Models with Pilot Piston (P*)**

The outside dimensions of the above options are the same as those of the main valve of Solenoid Controlled Pilot Operated Directional Valves (DSHG-10). See [page 405](#).

★ In case of Spring Offset Model (2B*, 2B*^A/_B), in functions as a drain port. When that model is used, directly connect it to the reservoir.

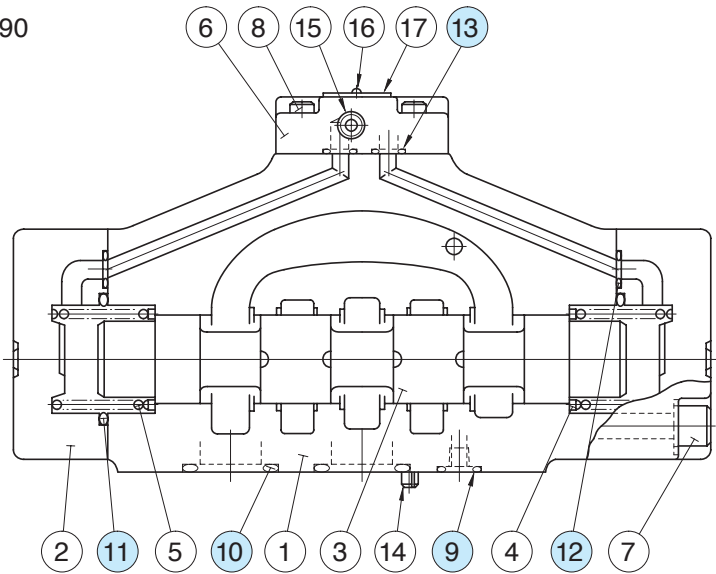


■ List of Seals

DHG-04-***-50/5090

DHG-06-***-50/5090

DHG-10-***-40/4090



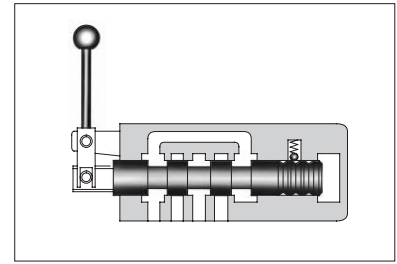
Item	Name of Parts	Part Numbers			Qty
		DHG-04	DHG-06	DHG-10	
9	O-Ring	SO-NB-P9	SO-NB-P14	SO-NB-P20	2
10	O-Ring	SO-NB-P22	SO-NB-P30	SO-NB-P42	4
11	O-Ring	SO-NB-P34	SO-NB-P40	SO-NB-G65	2
12	O-Ring	SO-NB-P9	SO-NB-P10	SO-NB-P14	2
13	O-Ring	SO-NB-P9	SO-NB-P9	SO-NB-P9	4

Note: When ordering the o-rings, please specify the seal kit number from the table below.

Valve Model Numbers	Seal Kit Numbers
DHG-04-***-50/5090	KS-DHG-04-50
DHG-06-***-50/5090	KS-DHG-06-50
DHG-10-***-40/4090	KS-DHG-10-40

Manually Operated Directional Valves

These valves may be used to manually shift the spool position and change the direction of oil flow.



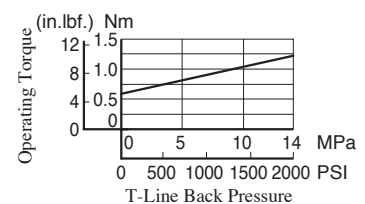
Specifications

Model Numbers	Maximum Flow L/min (U.S.GPM)				Max. Operating Pressure MPa (PSI)	Max. T-Line Back Pressure MPa (PSI)	Approx. Mass kg (lbs.)
	7 MPa (1020 PSI)	14 MPa (2030 PSI)	21 MPa (3050 PSI)	31.5 MPa (4570 PSI)			
Threaded Connections	DMT-03-3C*-50*	100 (26.4) ^{*1}	100 (26.4) ^{*1}	100 (26.4) ^{*1}	25 (3630)	16 (2320)	5.0 (11.0)
	DMT-03-3D*-50*	100 (26.4)	100 (26.4)	100 (26.4)			
	DMT-03-2D*-50*	100 (26.4)	100 (26.4)	100 (26.4)			
	DMT-03-2B*-50*	100 (26.4) ^{*1}	100 (26.4) ^{*1}	100 (26.4) ^{*1}			
	DMT-06*-3C*-30*	300 {200} ^{*2} (79.3 {52.8})	300 {120} ^{*2} (79.3 {31.7})	300 {100} ^{*2} (79.3 {26.4})	21 (3050)	At time spool shift is required: 7 (1020) At time spool shift is not required: 21 (3050)	12.9 (28.5)
	DMT-06*-3D*-30*	300 (79.3)	300 (79.3)	300 (79.3)			
	DMT-06*-2D*-30*	300 (79.3)	300 (79.3)	300 (79.3)			
	DMT-06*-2B*-30*	200 (52.8)	120 (31.7)	100 (26.4)			
Sub-Plate Mounting	DMT-10*-3C*-30*	500 {315} ^{*2} (132 {83.2})	500 {315} ^{*2} (132 {83.2})	500 {315} ^{*2} (132 {83.2})	21 (3050)	At time spool shift is required: 7 (1020) At time spool shift is not required: 21 (3050)	22 (48.5)
	DMT-10*-3D*-30*	500 (132)	500 (132)	500 (132)			
	DMT-10*-2D*-30*	500 (132)	500 (132)	500 (132)			
	DMT-10*-2B*-30*	315 (83.2)	315 (83.2)	315 (83.2)			
	DMG-01-3C*-10*	35 (9.2)	35 (9.2)	35 (9.2)	25 (3630)	14 (2030) ^{*5}	1.8 (4.0)
	DMG-01-3D*-10*						
	DMG-01-2D*-10*						
	DMG-01-2B*-10*						
DMG-03-3C*-50*	100 (26.4) ^{*1}	100 (26.4) ^{*1}	100 (26.4) ^{*1}	25 (3630)	16 (2320)	4.0 (8.8)	
DMG-03-3D*-50*	100 (26.4)	100 (26.4)	100 (26.4)				
DMG-03-2D*-50*	100 (26.4)	100 (26.4)	100 (26.4)				
DMG-03-2B*-50*	100 (26.4) ^{*1}	100 (26.4) ^{*1}	100 (26.4) ^{*1}				
DMG-04-3C*-21*	200 (52.8) ^{*3}	200 (52.8) ^{*3}	105 (27.7) ^{*3}	21 (3050)	21 (3050) ^{*6}	7.4 (16.3)	
DMG-04-3D*-21*	200 (52.8)	200 (52.8)	200 (52.8)				
DMG-04-2D*-21*	200 (52.8)	200 (52.8)	200 (52.8)				
DMG-04-2B*-21*	90 (23.8)	60 (15.9)	50 (13.2)				
DMG-06-3C*-50*	500 (132)	500 (132)	500 (132)	31.5 (4570)	21 (3050) ^{*6}	11.5 (25.4)	
DMG-06-3D*-50*	500 (132)	500 (132)	500 (132)				
DMG-06-2D*-50*	500 (132)	500 (132)	500 (132)				
DMG-06-2B*-50*	420 (111)	300 (79.3)	250 (66.1)				
DMG-10-3C*-40*	1100 (291) ^{*4}	1100 (291) ^{*4}	1100 (291) ^{*4}	31.5 (4570)	21 (3050) ^{*6}	48.2 (106)	
DMG-10-3D*-40*	1100 (291)	1100 (291)	1100 (291)				
DMG-10-2D*-40*	1100 (291)	1100 (291)	1100 (291)				
DMG-10-2B*-40*	670 (177)	350 (92.5)	260 (68.7)				

Note: The maximum flow means the limited flow without inducing any abnormality to the operation (changeover) of the valve. For details, please refer to the "List of Standard Models and Maximum Flow" on pages 386 to 390.

- ★ 1. Varies depending on the spool type. For details, see the "List of Standard Model and Maximum Flows" for DSG-03 Series Solenoid Operated Directional Valves (page 364 and 366 at 50 Hz rated voltage).
- ★ 2. The figures in parentheses indicate Max. flow for 3C3,3C5, 3C6 and 3C60.
- ★ 3. Varies depending on the spool type. For the details, see the table in the following page.
- ★ 4. Varies depending on the spool type. Same as DSHG-10 (at pilot pressure of 1.5 MPa (220 PSI). See page 390.
- ★ 5. Lever operating torque varies depends on the T-line back pressure. See the right-hand figure.
- ★ 6. If the T-Line back pressure exceeds 7 MPa (1020 PSI), directly connect the drain port to the reservoir.

DMG-01 Lever Operating Torque



Model Number Designation

F-	DM	T	-03	-2	B	2	A	-50	*								
Special Seals	Series Number	Type of Connection	Valve Size	No. of Valve Position	Spool-Spring Arrangement	Spool Type	Special Two Position Valve	Design Number	Design Standard								
F: Special Seals for Phosphate ester fluids (Omit if not required)	DM: Manually Operated Directional Valves	T: Threaded Connection	03	3	C: Spring Centred	2, 3 4, 40 5, 6 60, 7	A*, B* (Omit if not required)	50	None: Japanese Std. "JIS"								
			06 (Piping size 3/4) 06X (Piping size 1)					30		80: European Design Std. 90: N. American Design Std.							
			10 (Piping size 1-1/4) 10X (Piping size 1-1/2)					30									
		G: Sub-plate Mounting	01	2	D: No-Spring Detented B: Spring Offset	10		8, 9 10, 11 12	10	None: Japanese Std. "JIS" and European Design Std. 90: N. American Design Std.							
			03			50											
			04			21											
			06			50											
			10			40											
			See the table below for combinations.														

* Refer to column "valves using neutral position and side position" (special 2-position valve) on page 431.

Yuken can offer flanged connection valves described below. Consult us for the details.

Model Numbers	Rated Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)
DMF-10-***-30*	315 (83.2)	21 (3050)
DMF-16-***-31*	400 (106)	

List of Spool Type

Spool Type	DMG-01			DMT-03 DMG-03			DMT-06* DMT-10*		DMG-04 DMG-06 DMG-10	
	3C 3D	2D	2B	3C 3D	2D	2B	3C 3D	2D 2B	3C 3D	2D 2B
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	—	○	○	○	○	○
4	○	—	—	○	—	—	○	○	○	○
40	○	—	—	○	—	—	○	○	○	○
5	○	—	—	—	—	—	—	—	—	—
6	—	—	—	—	—	—	—	—	○	—
60	○	—	—	○	—	—	—	—	○	—
7	○	○	—	—	—	—	○	○	○	○
8	○	○	○	—	—	—	○	○	○	—
9	○	—	—	○	—	—	○	—	○	—
10	○	—	—	○	—	—	○	—	○	—
11	○	—	—	—	—	—	○	—	○	—
12	○	—	—	○	—	—	○	—	○	—

Maximum Flow of DMG-04-3C*

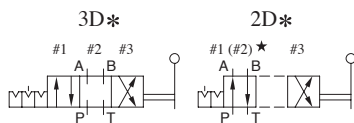
Model Numbers	Max. Flow L/min (U.S.GPM)		
	7 MPa(1020 PSI)	14 MPa(2030 PSI)	21 MPa(3050 PSI)
DMG-04-3C2	200 (52.8)	130 (34.3)	85 (22.5)
DMG-04-3C3	180 (47.6)	90 (23.8)	70 (18.5)
DMG-04-3C4	200 (52.8)	200 (52.8)	90 (23.8)
DMG-04-3C40	200 (52.8)	200 (52.8)	105 (27.7)
DMG-04-3C5	80 (21.1)	50 (13.2)	40 (10.6)
DMG-04-3C6	90 (23.8)	60 (15.9)	55 (14.5)
DMG-04-3C60	140 (37.0)	70 (18.5)	55 (14.5)
DMG-04-3C7	200 (52.8)	75 (19.8)	55 (14.5)
DMG-04-3C9	200 (52.8)	125 (33.0)	100 (26.4)
DMG-04-3C10	200 (52.8)	130 (34.3)	85 (22.5)
DMG-04-3C11	200 (52.8)	150 (39.6)	85 (22.5)
DMG-04-3C12	200 (52.8)	200 (52.8)	95 (25.1)

Graphic Symbols

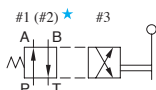
Spring Centred Models (3C*)



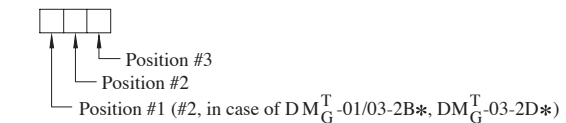
No-Spring Detented Models



Spring Offset Models (2B*)



* Position #2 is applied for models DMG-01-2B* and DM_G^T-03-2B*/2D*.



Note: The ○ mark indicate the spool type available for each type.

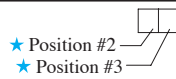
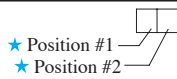
Valves Using Neutral Position and Side Position (Special Two Position Valve)

In addition to the standard two positions valves (2D*, 2B*), the following two types of two positions valves are available: Valves with neutral position (#2) and position #1 (2B*A, 2D*A), valves with neutral position (#2) and position #3 (2B*B, 2D*B).

The ○ mark in the table below indicates the spool type available for each models.

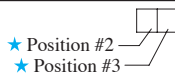
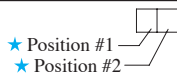
Spring Offset Models

Valve Type	Graphic Symbols	Model			Valve Type	Graphic Symbols	Model			
		DMT-03 DMG-03	DMT-06* DMT-10*	DMG-04 DMG-06 DMG-10			DMG-01	DMT-03 DMG-03	DMT-06* DMT-10*	DMG-04 DMG-06 DMG-10
2B2A		○	○	○	2B2B		○	○	○	○
2B3A		○	○	○	2B3B		○	○	○	○
2B4A		—	○	○	2B4B		○	○	○	○
2B40A		—	○	○	2B40B		○	—	○	○
—	—	—	—	—	2B5B		○	—	—	—
2B5A		—	○	○			—	—	○	○
2B6A		—	—	○	2B6B		—	—	—	○
		—	○	—			—	—	○	—
2B60A		—	—	○	2B60B		○	○	—	○
		—	○	—			—	—	○	—
2B7A		—	○	○	2B7B		○	—	○	○
2B8A		—	○	—	2B8B		○	—	○	—
2B9A		—	○	○	2B9B		○	—	○	○
2B10A		—	○	○	2B10B		○	○	○	○
2B11A		—	○	○	2B11B		○	—	○	○
2B12A		—	○	○	2B12B		○	○	○	○

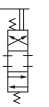


No-spring Detented Models

Valve Type	Graphic Symbols	Model		Valve Type	Graphic Symbols	Model		
		DMT-06* DMT-10*	DMG-04 DMG-06 DMG-10			DMG-01	DMT-06* DMT-10*	DMG-04 DMG-06 DMG-10
2D2A		○	○	2D2B		○	○	○
2D3A		○	○	2D3B		○	○	○
2D4A		○	○	2D4B		○	○	○
2D40A		○	○	2D40B		○	○	○
—	—	—	—	2D5B		○	—	—
2D5A		○	○			—	○	○
2D6A		—	○	2D6B		—	—	○
		○	—			—	○	—
2D60A		—	○	2D60B		○	—	○
		○	—			—	○	—
2D7A		○	○	2D7B		○	○	○
2D8A		○	—	2D8B		○	○	—
2D9A		○	○	2D9B		○	○	○
2D10A		○	○	2D10B		○	○	○
2D11A		○	○	2D11B		○	○	○
2D12A		○	○	2D12B		○	○	○



★. Position number is determined with three position type (3C* and 3D*) as the standard.



Sub-plates

Valve Model Numbers	Japanese Standard "JIS"			European Design Standard			N. American Design Standard		
	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)
DMG-01	DSGM-01-31	Rc 1/8	0.8 (1.8)	DSGM-01-3080	1/8 BSPF	0.8 (1.8)	DSGM-01-3190	1/8 NPT	0.8 (1.8)
	DSGM-01X-31	Rc 1/4	0.8 (1.8)	DSGM-01X-3080	1/4 BSPF	0.8 (1.8)	DSGM-01X-3190	1/4 NPT	0.8 (1.8)
	DSGM-01Y-31	Rc 3/8	0.8 (1.8)	—	—	—	DSGM-01Y-3190	3/8 NPT	0.8 (1.8)
DMG-03	DSGM-03-40	Rc 3/8	3.0 (6.6)	DSGM-03-2180	3/8 BSPF	3.0 (6.6)	DSGM-03-2190	3/8 NPT	3.0 (6.6)
	DSGM-03X-40	Rc 1/2	3.0 (6.6)	DSGM-03X-2180	1/2 BSPF	3.0 (6.6)	DSGM-03X-2190	1/2 NPT	3.0 (6.6)
	DSGM-03Y-40	Rc 3/4	4.7 (10.4)	DSGM-03Y-2180	3/4 BSPF	4.7 (10.4)	DSGM-03Y-2190	3/4 NPT	4.7 (10.4)
DMG-04	DHGM-04-20	Rc 1/2	4.4 (9.7)	DHGM-04-2080	1/2 BSPF	4.4 (9.7)	DHGM-04-2090	1/2 NPT	4.4 (9.7)
	DHGM-04X-20	Rc 3/4	4.1 (9.0)	DHGM-04X-2080	3/4 BSPF	4.1 (9.0)	DHGM-04X-2090	3/4 NPT	4.1 (9.0)
DMG-06	DHGM-06-50	Rc 3/4	7.4 (16.3)	DHGM-06-5080	3/4 BSPF	8.5 (18.7)	DHGM-06-5090	3/4 NPT	7.4 (16.3)
	DHGM-06X-50	Rc 1	7.4 (16.3)	DHGM-06X-5080	1 BSPF	8.5 (18.7)	DHGM-06X-5090	1 NPT	7.4 (16.3)
DMG-10	DHGM-10-40	Rc 1-1/4	21.5 (47.4)	DHGM-10-4080	1-1/4 BSPF	21.5 (47.4)	DHGM-10-4090	1-1/4 NPT	21.5 (47.4)
	DHGM-10X-40	Rc 1-1/2	21.5 (47.4)	DHGM-10X-4080	1-1/2 BSPF	21.5 (47.4)	DHGM-10X-4090	1-1/2 NPT	21.5 (47.4)

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- Sharable with Solenoid Operated Directional Valves and Solenoid Controlled Pilot Operated Directional Valves. For dimensions, refer to the right table then see the corresponding pages.

- Sub-plate dimensions appearing page

Subplate Model Numbers	Page
DSGM-01*	356
DSGM-03*	373
DHGM-04*	401
DHGM-06*	402
DHGM-10*	403

Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw			
	Japanese Standard "JIS" European Design Standard	N. American Design Standard	Qty.	Tightening Torque Nm (in. lbs.)
DMG-01	M5 × 45 Lg.	No. 10-24 UNC × 1-3/4 Lg.	4	5-7 (44-62)
DMG-03	M6 × 35 Lg.	1/4-20 UNC × 1-3/4 Lg.	4	12-15 (106-133)
DMG-04	M6 × 40 Lg.	1/4-20 UNC × 1-1/2 Lg.	2	12-15 (106-133)
	M10 × 45 Lg.	3/8-16 UNC × 1-3/4 Lg.	4	58-72 (513-637)
DMG-06	M12 × 60 Lg.	1/2-13 UNC × 2-1/2 Lg.	6	100-123 (885-1089)
DMG-10	M20 × 75 Lg.	3/4-10 UNC × 3 Lg.	8	473-585 (4195-5177)

Instructions

- Avoid connecting the Tank Port "T" to a line with possible surge pressure.

Pressure Drop

The following characteristics are based on the following conditions: viscosity of the fluid: 35 mm²/s (164 SSU) and Specific Gravity: 0.850

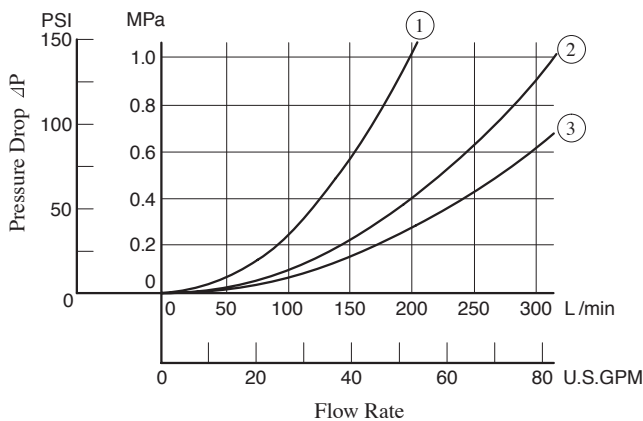
- For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
	SSU	77	98	141	186	232	278	324	371	417	464
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

- For any other specific gravity (G'), the pressure drop ($\Delta P'$) may be obtained from the formula below.

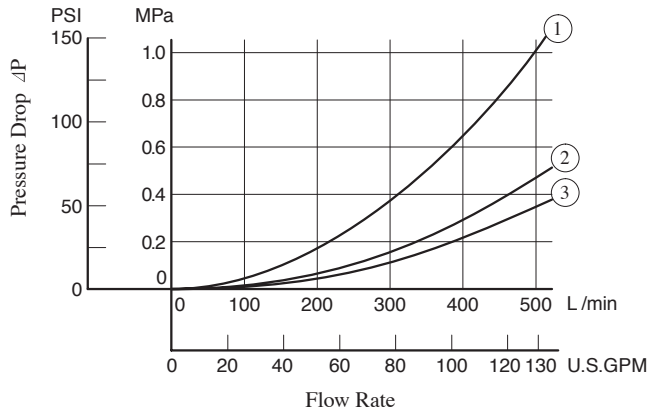
$$\Delta P' = \Delta P (G'/G) \text{ where } \Delta P \text{ is a value on the following chart and } G \text{ is } 0.850.$$

- DMT-06, 06X



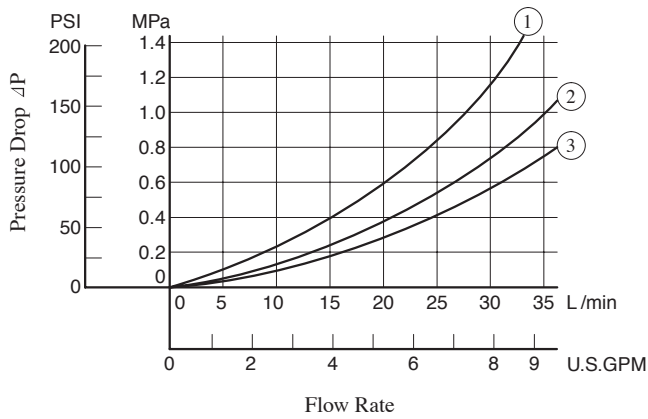
Spool Type	Pressure Drop Curve Number				
	P→A	B→T	P→B	A→T	P→T
2	②	②	②	②	
3	③	②	③	②	②
4	②	③	②	②	—
40	②	②	②	②	—
5	③	②	②	②	—
6	③	②	③	②	①
60	③	②	③	②	①
7	②	②	②	②	—
8	②	—	②	—	—
9	③	②	③	②	—
10	②	②	②	②	—
11	③	②	②	②	—
12	②	②	②	②	—

● DMT-10, 10X



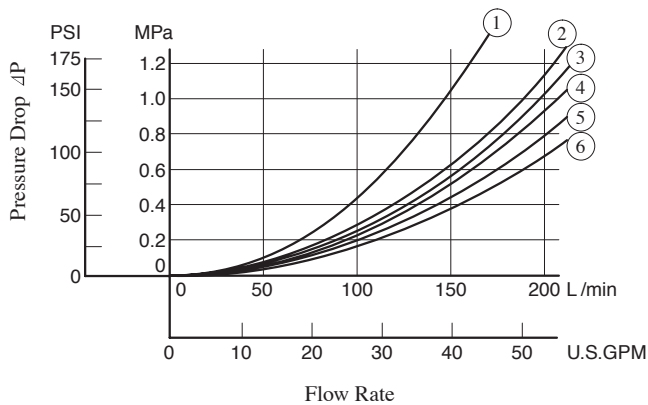
Spool Type	Pressure Drop Curve Number				
	P→A	B→T	P→B	A→T	P→T
2	③	②	③	②	—
3	③	②	③	②	②
4	③	②	③	②	—
40	③	②	③	②	—
5	③	②	③	②	—
6	③	③	③	③	①
60	③	③	③	③	①
7	③	②	③	②	—
8	③	—	③	—	—
9	③	②	③	②	—
10	③	②	③	②	—
11	③	②	③	②	—
12	③	②	③	②	—

● DMG-01



Valve type				Pressure Drop Curve Number				
3C*	3D*	2D*	2B*	P→A	B→T	P→B	A→T	P→T
3C2	3D2	2D2		③	③	③	③	—
3C3	3D3	2D3		③	③	③	③	②
3C4	3D4			③	③	③	③	—
3C40	3D40			③	③	③	③	—
3C5	3D5			②	①	①	①	③
3C60	3D60			①	①	①	①	③
3C7	3D7	2D7		③	③	③	③	—
3C8	3D8	2D8		③	—	③	—	—
3C9	3D9			③	③	③	③	—
3C10	3D10			③	③	③	③	—
3C11	3D11			③	③	③	③	—
3C12	3D12			③	③	③	③	—
			2B2	②	②	③	③	—
			2B3	②	②	③	③	—
			2B8	③	—	③	—	—

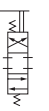
● DMG-04



Spool Type	Pressure Drop Curve Number				
	P→A	B→T	P→B	A→T	P→T
2	⑤	②	⑤	④	—
3	⑥	③	⑥	⑤	③
4	⑤	④	⑤	⑤	—
40	⑤	④	⑤	⑤	—
5	⑤	②	④	⑤	①
6	②	③	④	②	①
60	②	③	④	②	①
7	⑤	②	⑤	⑤	—
9	⑥	②	⑥	⑤	—
10	⑤	④	⑤	⑤	—
11	⑤	④	⑤	⑤	—
12	⑤	③	⑤	⑤	—

● For DMT-03, DMG-03, DMG-06, and DMG-10, refer to the table below then see the related page.

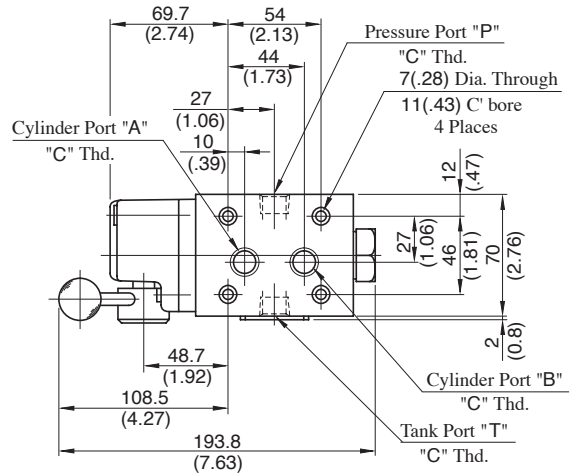
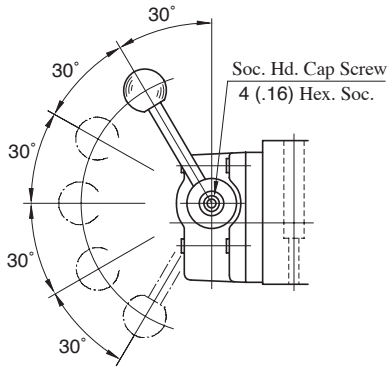
Model Number	Pressure Drop Characteristics	Page	Remarks
DMT-03 DMG-03	Same as DSG-03 Series Solenoid Operated Directional Valves (Standard Type)	371	3D* is same as 3C*
DMG-06	Same as Solenoid Controlled Pilot Operated Directional Valves (DSHG-06)	393	
DMG-10	Same as Solenoid Controlled Pilot Operated Directional Valves (DSHG-10)	393	



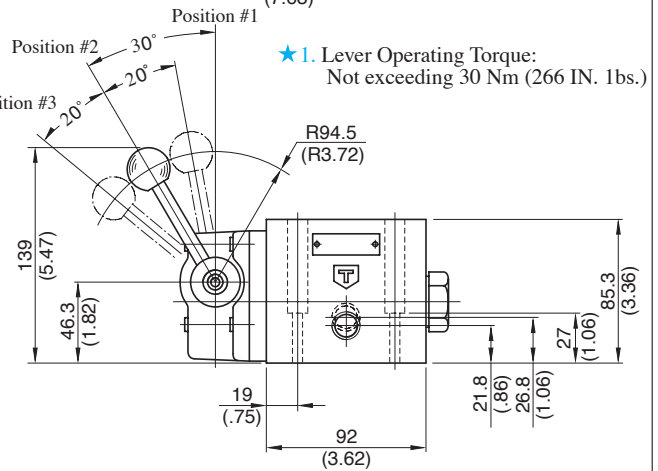
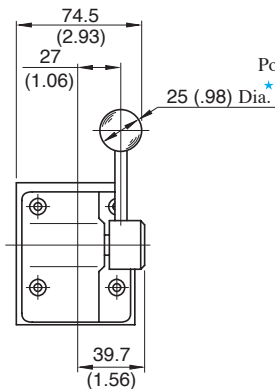
DMT-03-*-50/5080/5090**

How to Change Lever Position:

The lever position can be changed to any position in five different positions shown on the sketch in the right. For the lever position change, remove the Soc. Hd. Cap Screw and lever once, set the lever at the required position and tighten it with the Soc. Hd. Cap Screw firmly.



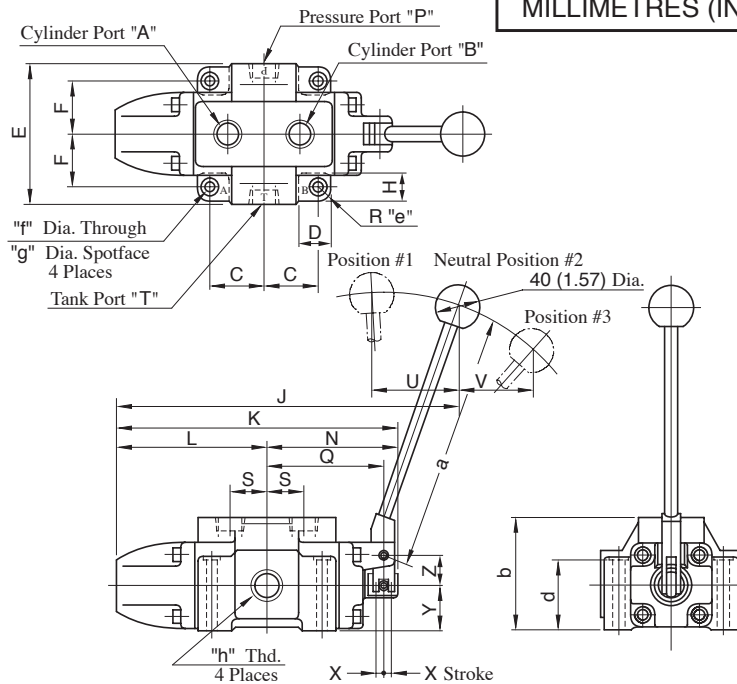
Model Numbers	"C" Thd.
DMT-03-***-50	Rc 3/8
DMT-03-***-5080	3/8 BSPF
DMT-03-***-5090	3/8 NPT



DIMENSIONS IN MILLIMETRES (INCHES)

DMT-06, 06X-*-30/3080/3090**
DMT-10, 10X-*-30/3080/3090**

Model Numbers	"h" Thd.
DMT-06-***-30	Rc 3/4
DMT-06X-***-30	Rc 1
DMT-06-***-3080	3/4 BSPF
DMT-06X-***-3080	1 BSPF
DMT-06-***-3090	3/4 NPT
DMT-06X-***-3090	1 NPT
DMT-10-***-30	Rc 1-1/4
DMT-10X-***-30	Rc 1-1/2
DMT-10-***-3080	1-1/4 BSPF
DMT-10X-***-3080	1-1/2 BSPF
DMT-10-***-3090	1-1/4 NPT
DMT-10X-***-3090	1-1/2 NPT

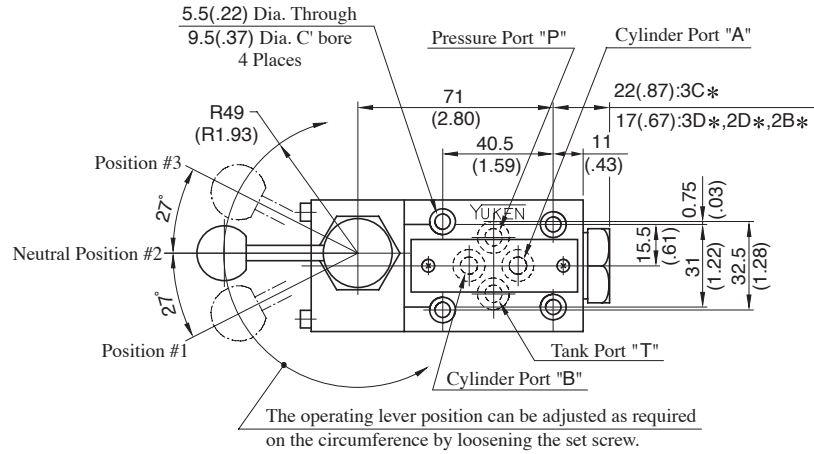


Model No.	Dimension mm (Inches)																					
	C	D	E	F	H	J	K	L	N	Q	S	U	V	X	Y	Z	a	b	d	e	f	g
DMT-06	50	30	126	47.5	24	320	255	137	118	107	33.5	86	76	9	40	25	250	100	63.5	12	11	17.5
DMT-06X	(1.97)	(1.18)	(4.96)	(1.87)	(.94)	(12.60)	(10.04)	(5.39)	(4.65)	(4.21)	(1.32)	(3.39)	(2.99)	(.35)	(1.57)	(.98)	(9.84)	(3.94)	(2.50)	(.47)	(.43)	(.69)
DMT-10	66	40	160	62.5	33	402	320	173	147	135	40	102	90	12.5	50	35	300	120	78.5	15	13.5	21
DMT-10X	(2.60)	(1.57)	(6.30)	(2.46)	(1.30)	(15.83)	(12.60)	(6.81)	(5.79)	(5.31)	(1.57)	(4.02)	(3.54)	(.49)	(1.97)	(1.38)	(11.81)	(4.72)	(3.09)	(.59)	(.53)	(.83)

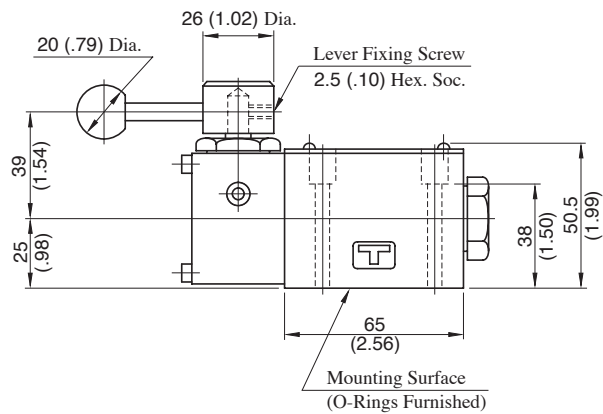
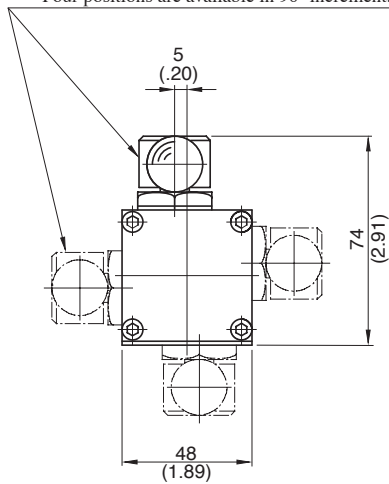
DMG-01-***-10/1090

Mounting surface: ISO 4401-AB-03-4-A

DIMENSIONS IN
MILLIMETRES (INCHES)



Four positions are available in 90° increment.

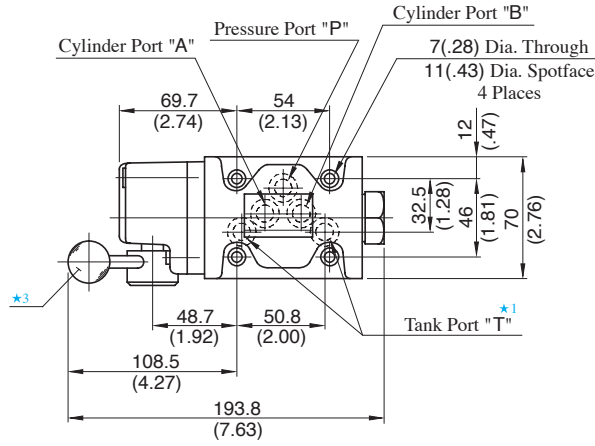


Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 356](#).

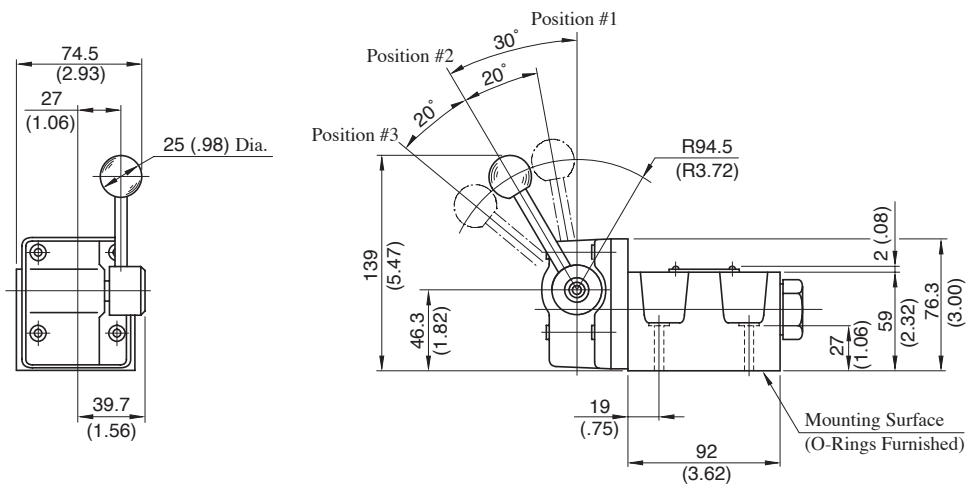
DMG-03-***-50/5090

Mounting surface: ISO 4401-AC-05-4-A

DIMENSIONS IN MILLIMETRES (INCHES)



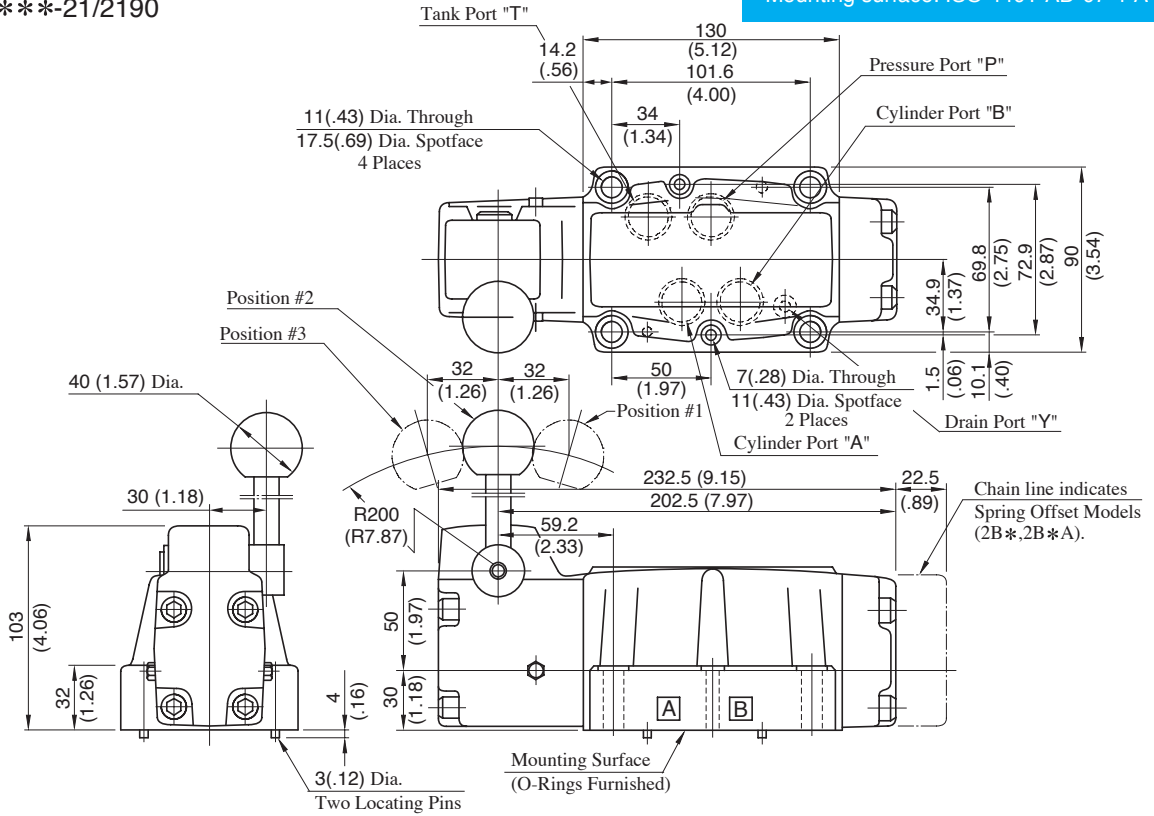
- ★ 1. Although the tank port is shown on the left in our sub-plate either may be used.
- ★ 2. The position of operating lever can be changed as required. For the detail, see the DMT-03 in the [previous page](#).
- ★ 3. Lever Operating Torque:
Not exceeding 30 Nm (266 IN. lbs.)



Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 373](#).

DMG-04-***-21/2190

Mounting surface: ISO 4401-AD-07-4-A

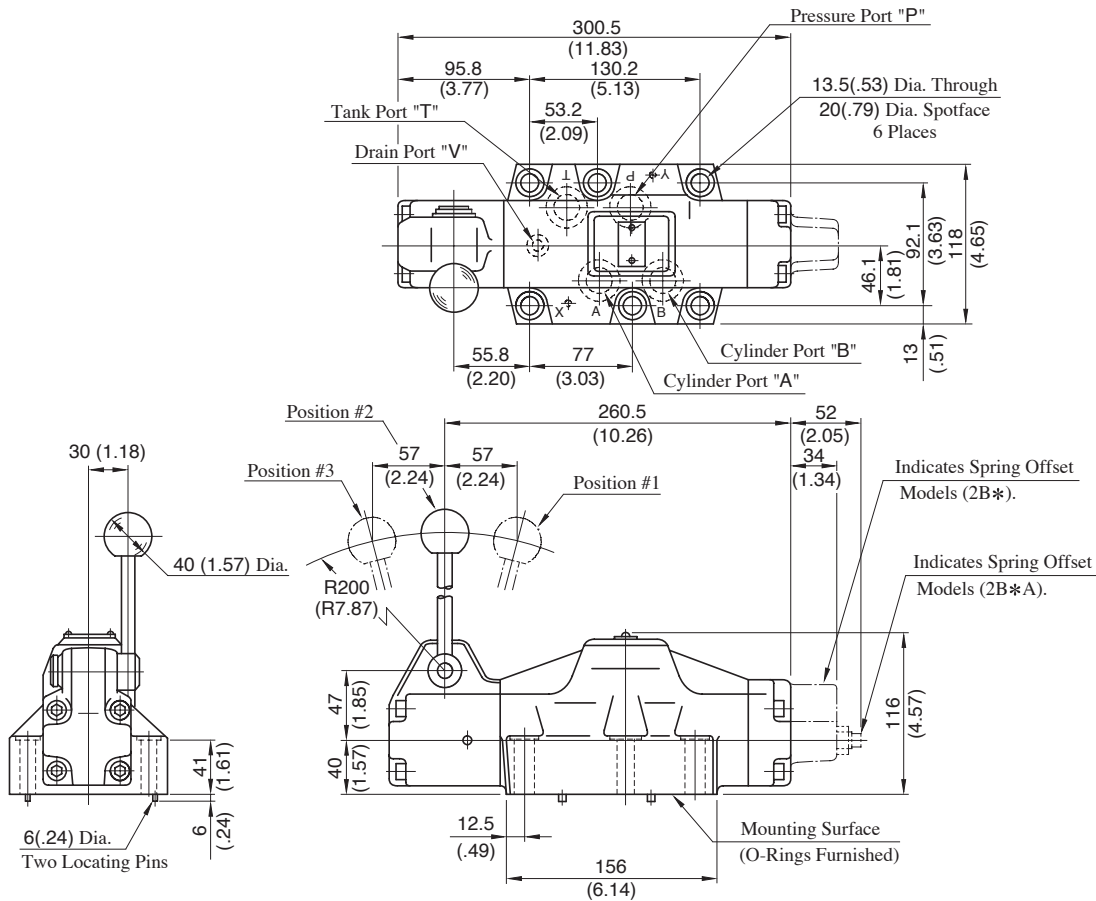


Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 401](#).

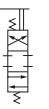
DIMENSIONS IN MILLIMETRES (INCHES)

DMG-06-***-50/5090

Mounting surface: ISO 4401-AE-08-4-A



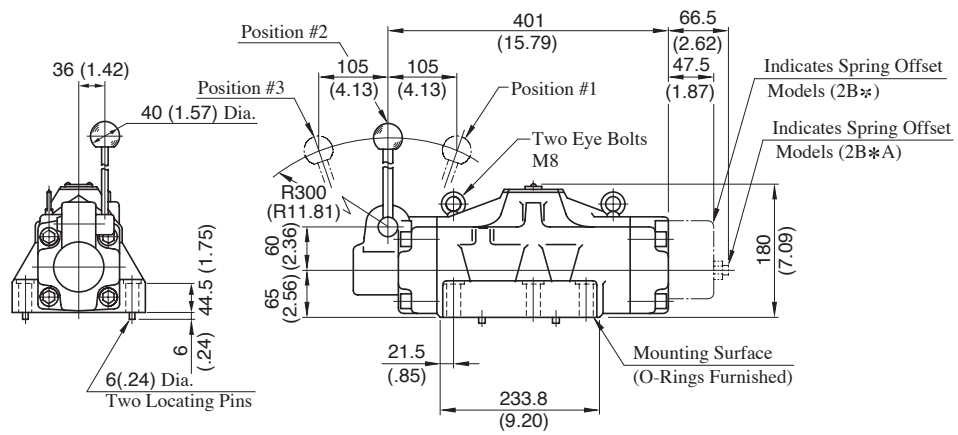
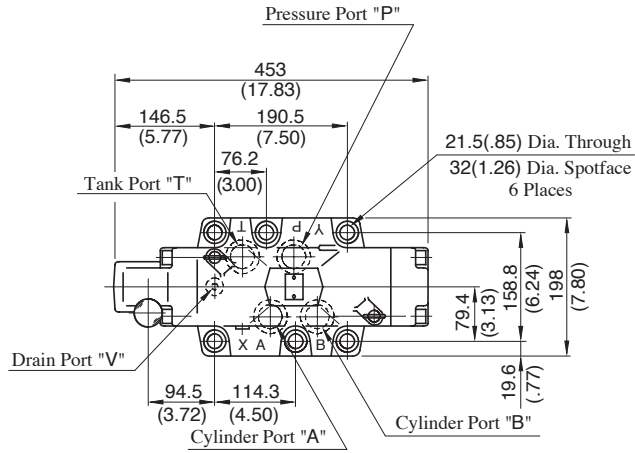
Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 402](#).



DMG-10-***-50/5090

Mounting surface: ISO 4401-AF-10-4-A

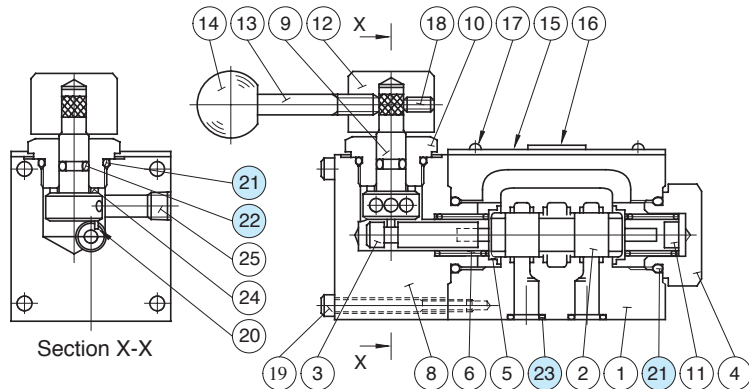
**DIMENSIONS IN
MILLIMETRES (INCHES)**



Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 403](#).

List of Seals

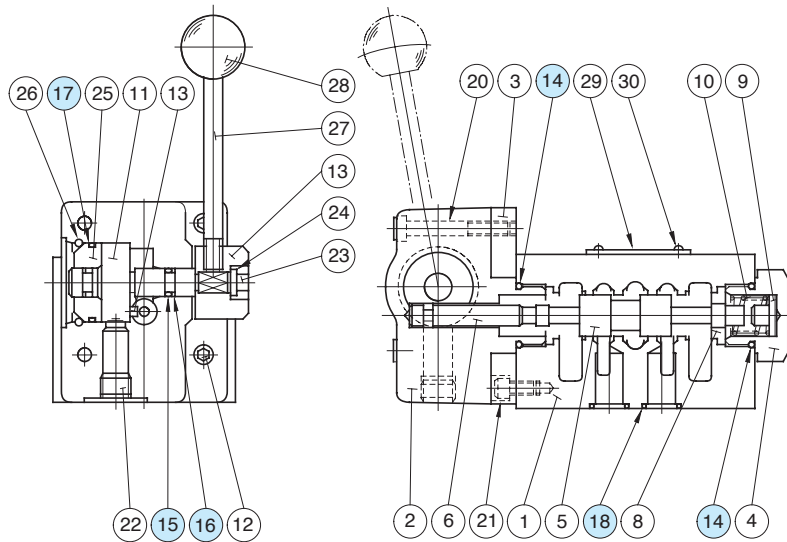
DMG-01-***-10/1090



Item	Name of Parts	Part Numbers	Qty.
21	O-Ring	SO-NB-P18	3
22	O-Ring	SO-NA-P6	1
23	O-Ring	SO-NB-P9	4

Note: When ordering the o-ring, please specify the seal kit number (KS-DMG-01-10).

DMT-03-***-50/5080/5090
DMG-03-***-50/5090



Item	Name of Parts	Part Numbers	Qty.
14	O-Ring	SO-NB-P21	2
15	O-Ring	SO-NA-P8	2
16	Back Up Ring	SO-BB-P8	2
17	O-Ring	SO-NB-A023	1
18	O-Ring	SO-NB-A014	5

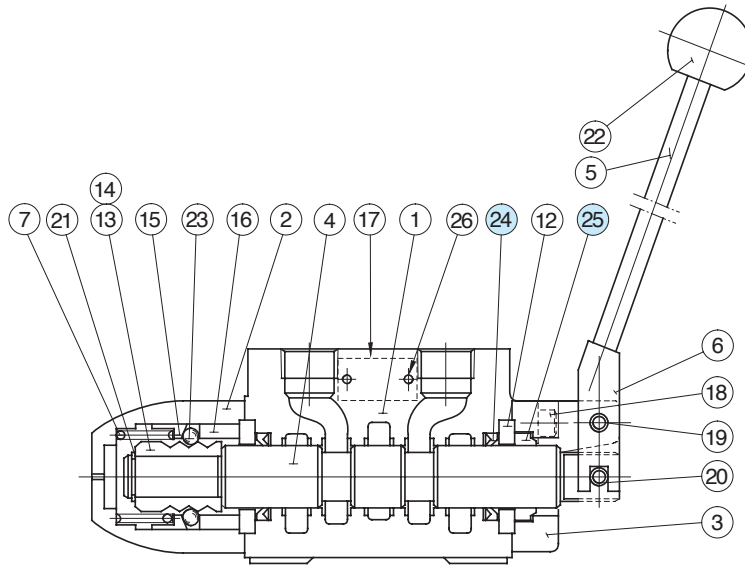
Valve Model Numbers	Seal Kit Numbers
DMT-03-***-50/5080/5090	KS-DMT-03-50
DMG-03-***-50/5090	KS-DMG-03-50

Note: 1. O-rings of Item (18) are not used for DMT-03.
2. When ordering the seals, please specify the seal kit number from the table right.



List of Seals

DMT-06, 06X-***-30/3080/3090
 DMT-10, 10X-***-30/3080/3090



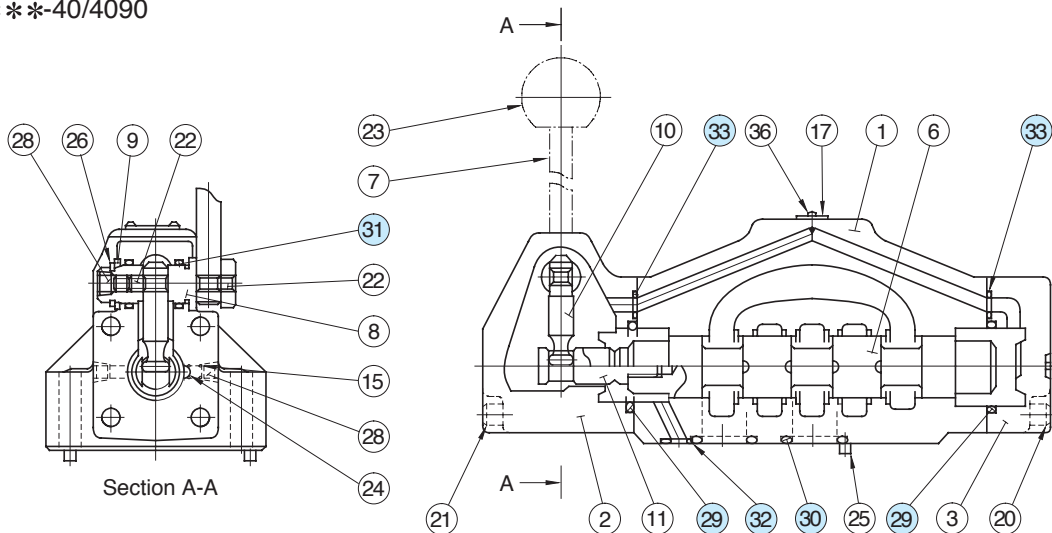
● List of Seal Kits

Item	Name of Parts	Part Numbers		Qty.
		DMT-06*	DMT-10*	
24	Packing	UPI 32 • 40 • 6Y	UPI 40 • 55 • 10Y	2
25	Dust Seal	DKI 32 • 44 • 7 • 10	DKI 40 • 52 • 7 • 10	1

Valve Model Numbers	Seal Kit Numbers
DMT-06*-***-30/3080/3090	KS-DMT-06-30
DMT-10*-***-30/3080/3090	KS-DMT-10-30

Note: When ordering the seals, please specify the seal kit number from the table right.

DMG-04-***-21/2190
 DMG-06-***-50/5090
 DMG-10-***-40/4090



● List of Seal Kits

Item	Name of Parts	Part Numbers			Qty.
		DMG-04	DMG-06	DMG-10	
29	O-Ring	SO-NB-P34	SO-NB-P40	SO-NB-G65	2
30	O-Ring	SO-NB-P22A	SO-NB-P30	SO-NB-P42	4
31	O-Ring	SO-NA-P20	SO-NA-P20	SO-NA-P25	2
32	O-Ring	SO-NB-P9	SO-NB-P14	SO-NB-P20	1
33	O-Ring	SO-NB-P9	SO-NB-P10	SO-NB-P14	2

Valve Model Numbers	Seal Kit Numbers
DMG-04*-***-21/2190	KS-DMG-04-21
DMG-06*-***-50/5090	KS-DMG-06-50
DMG-10-***-40/4090	KS-DMG-10-40

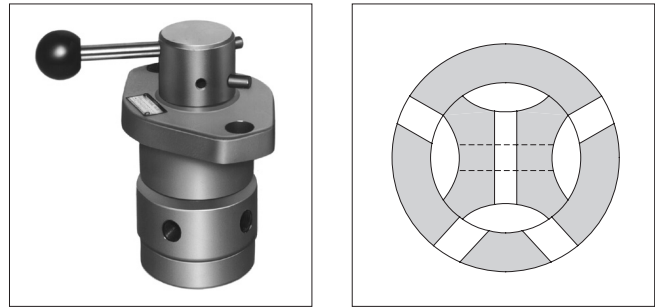
Note: When ordering the seals, please specify the seal kit number from the table right.

Mechanically Operated Directional Valves

These valves are chiefly used to shift the pilot circuit. Rotary Type Directional Valves and Cam Operated Type Directional Valves are available.

Rotary Type Directional Valves

These valves are used to rotate the spool either manually or by way of cam and shift the direction of oil flow. The detented mechanism incorporated in these valves prevents the valve from being changed over by itself due to vibrations or any other shocks.



Specifications

Model Numbers		Rated Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Max. T-Line Pressure MPa (PSI)	Approx. Mass kg (lbs.)	
Threaded Connection	Sub-plate Mounting				DRT Type	DRG Type
DRT-02-*D*-20*	DRG-02-*D*-20*	16 (4.2)	7 (1020)	7 (1020)*	4.7 (10.4)	3.4 (7.5)

★ When a back pressure of more than 3 MPa (435 PSI) is generated in the tank port, be sure to use External Drain Type.

Model Number Designation

F-	DR	G	-02	-2	D	2	-A	-R	-20	*
Special Seals	Series Connection	Type of Mounting	Valve Size	No. of Valve Position	Spool-Spring Arrangement	Spool Type	Operation Type	Drain Connection	Design Number	Design Standards
F: Special seals for phosphate ester type fluids (Omit if not required)	DR: Rotary Type Directional Valve	T: Threaded Connection	02	2	D: No-spring Detented	2	A: Reversing Dog B: Reversing Dog & Manual C: Manual	None: Internal Drain R: External Drain	20	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std. None: Japanese Std. "JIS" & European Design Std. 90: N. American Design Std.
		G: Sub-plate Mounting	02	3		4			20	

Note: When selecting the Model type, be sure to give the model number from the following Graphic Symbols. No combinations other than those in the table below are allowed.

Graphic Symbols

No. of Position	2-Position Type			3-Position Type
	Reversing Dog Operation	Reversing Dog & Manual Operation	Manual Operation	Manual Operation
Graphic Symbols				
Model No.	DR*-02-2D2-A	DR*-02-2D2-B	DR*-02-2D2-C	DR*-02-3D4-C

Instructions

Changeover Torque

When the pressure of pressure port "P" and cylinder port "A" (or "B") is set to 7 MPa (1020 PSI), the valve changeover torque will be as right side table:

Changeover Torque

Tank Port Back Pres. MPa (PSI)	Torque Nm (in. lbs.)
0	1.0 (8.9)
3 (435)	4.8 (42.5)

2-Way directional valves

Be sure to use the External Drain Type Valve of spool type "2" and plug the tank port.



Sub-plates

Drain Connection	Japanese Standard "JIS"		European Design Standard		N.American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
For Internal Drain	DRGM-02-20	Rc 1/4	DRGM-02-2080	1/4 BSPF	DRGM-02-2090	1/4 NPT	1.9 (4.2)
	DRGM-02X-20	Rc 3/8	DRGM-02X-2080	3/8 BSPF	DRGM-02X-2090	3/8 NPT	
For External Drain	DRGM-02-R-20	Rc 1/4	DRGM-02-R-2080	1/4 BSPF	DRGM-02-R-2090	1/4 NPT	
	DRGM-02X-R-20	Rc 3/8	DRGM-02X-R-2080	3/8 BSPF	DRGM-02X-R-2090	3/8 NPT	

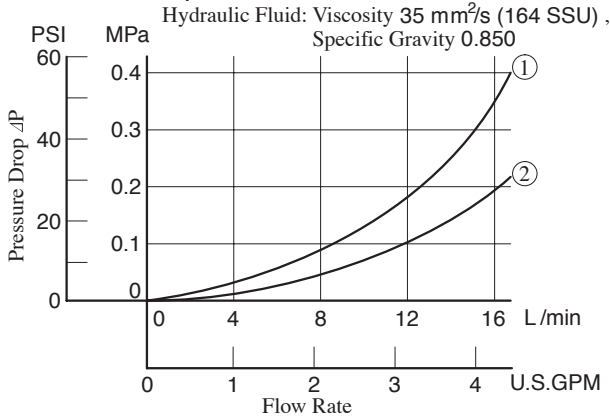
- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

Mounting Bolts

The Sub-plate Mounting Type Valves (DRG-02) only are furnished with the following mounting bolts.

Model Numbers	Socket Head Cap Screw (5 Pcs.)	
	Japanese Standard "JIS" European Design Standard	N. American Design Standard
DRG-02	M8 × 45 Lg.	5/16-18 UNC × 1-3/4 Lg.

Pressure Drop



Valve Type	Pressure Drop Curve No.			
	P→A	B→T	P→B	A→T
2D2	②	②	②	②
3D4	②	②	①	②

1. For any other viscosity, multiply by the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
	SSU	77	98	141	186	232	278	324	371	417	464
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

2. For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

$$\Delta P' = \Delta P (G'/0.850)$$

DRT-02- *D* - *-20/2080/2090

● Type "A" : Reversing Dog Operation

● Type "B": Reversing Dog and Manual Operation

● Type "C": Manual Operation

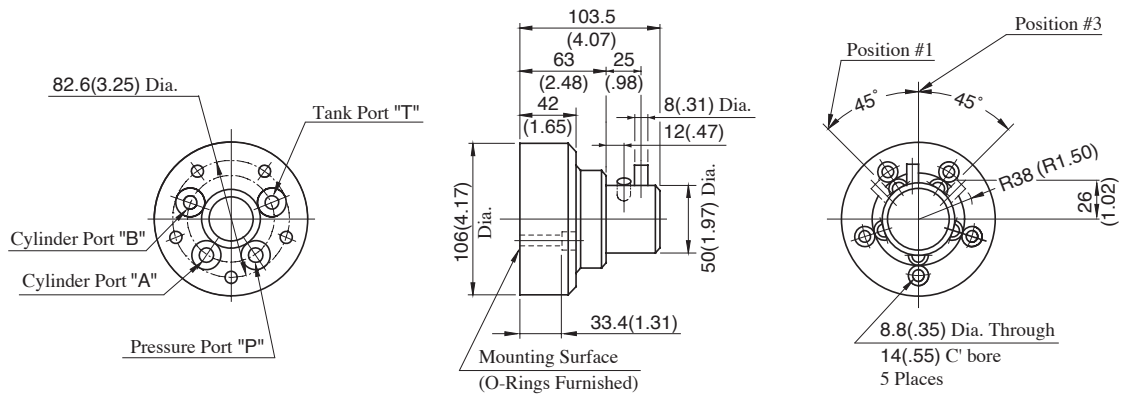
Model Numbers	"C" Thd.
DRT-02- *D* - *-20	Rc 1/4
DRT-02- *D* - *-2080	1/4 BSPF
DRT-02- *D* - *-2090	1/4 NPT

DIMENSIONS IN MILLIMETRES (INCHES)

For other dimensions, refer to "Reversing Dog Operation".

DRG-02-*D*-*20/2090

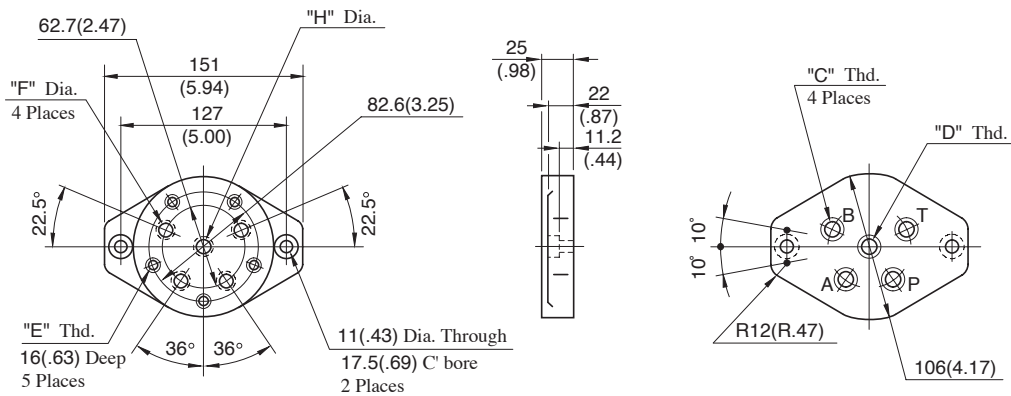
● Type "A": Reversing Dog Operation



For information on Type "B": reversing Dog and Manual Operation and Type "C": Manual Operation, see DRT-02 on the [previous page](#).

**DIMENSIONS IN
MILLIMETRES (INCHES)**

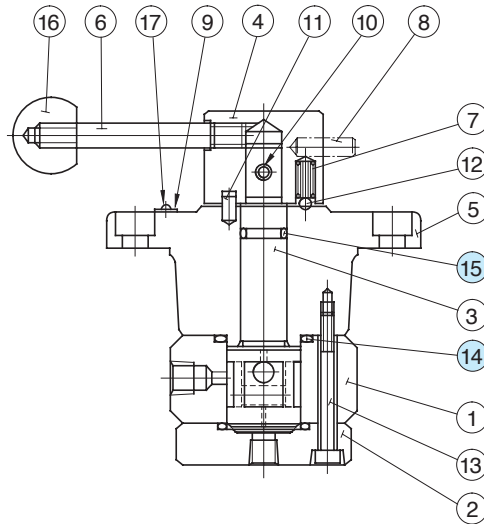
Sub-plates : DRGM-⁰²_{02X}-*20/2080/2090



Sub-plate Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	mm (Inches)		Remarks
				F	H	
DRGM-02-20 DRGM-02X-20	Rc 1/4 Rc 3/8	—	M8	11 (.43)	—	For Internal Drain
DRGM-02-2080 DRGM-02X-2080	1/4 BSP.F 3/8 BSP.F	—	M8	11.7 (.46)	—	
DRGM-02-2090 DRGM-02X-2090	1/4 NPT 3/8 NPT	—	5/16-18 UNC	11 (.43)	—	
DRGM-02-R-20 DRGM-02X-R-20	Rc 1/4 Rc 3/8	Rc 1/4	M8	11 (.43)	11 (.43)	For External Drain
DRGM-02-R-2080 DRGM-02X-R-2080	1/4 BSP.F 3/8 BSP.F	1/4 BSP.F	M8	11.7 (.46)	11.7 (.46)	
DRGM-02-R-2090 DRGM-02X-R-2090	1/4 NPT 3/8 NPT	1/4 NPT	5/16-18 UNC	11 (.43)	11 (.43)	

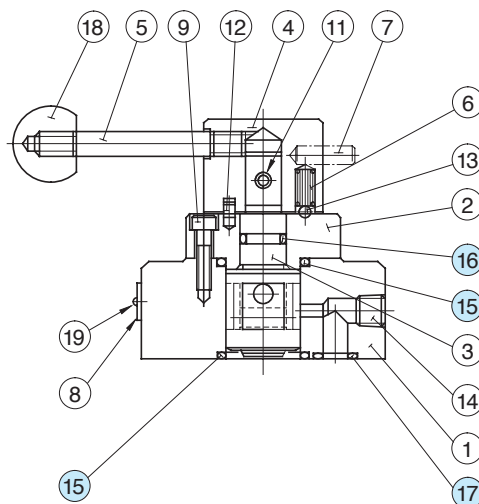
■ List of Seals

DRT-02- *D* - *-20/2080/2090



Item	Name of Parts	Part Numbers	Qty.	Remarks
14	O-Ring	SO-NB-G35	2	Included in Seal Kit
15	O-Ring	SO-NA-P16	1	(Kit No.: KS-DRT-02-20)

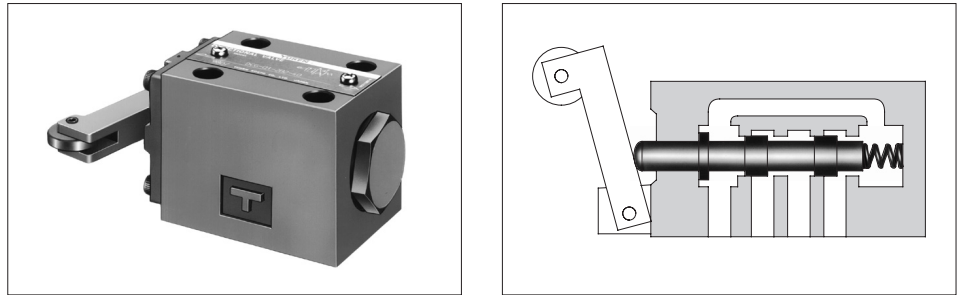
DRG-02- *D* - *-20/2090



Item	Name of Parts	Part Numbers	Qty.	Remarks
15	O-Ring	SO-NB-G35	2	Included in Seal Kit (Kit No.: KS-DRG-02-20)
16	O-Ring	SO-NA-P16	1	
17	O-Ring	SO-NB-P16	4	

Cam Operated Directional Valves

These valves may be used to shift the direction of oil flow by depressing the spool by way of a cam.



Specifications

Model Numbers		Max. Flow * L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Max. T-Line Pressure MPa (PSI)	Approx. Mass kg (lbs.)	
Threaded Connection	Sub-plate Mounting				DCT Type	DCG Type
DCT-01-2B*-40*	DCG-01-2B*-40*	30 (7.9)	21 (3050)	7 (1020)	1.1 (2.4)	1.1 (2.4)
DCT-03-2B*-50*	DCG-03-2B*-50*	100 (26.4)	25 (3630)	10 (1450)	4.5 (9.9)	3.8 (8.4)

★ Max. flow indicates the ceiling flow which does not affect the normal function (changeover) of valves.

Model Number Designation

F-	DC	T	-01	-2	B	2	-R	-40	*	
Special Seals	Series Number	Type of Connection	Valve Size	No. of Valve Position	Spool-Spring Arrangement	Spool Type	Roller Position	Design Number	Design Standards	
F: Special seals for phosphate ester type fluids (Omit if not required)	DC: Cam Operated Directional Valve	T: Threaded Connection	01	2	B: Spring Offset	2	None (Normal Position)	40	None: Japanese Standard "JIS" 80: European Design Standard 90: N. American Design Standard	
			03					50		
		G: Sub-plate Mounting	01					40		None: Japanese Standard "JIS" & European Design Standard 90: N. American Design Standard
			03					50		

Sub-plates

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
DCG-01	DSGM-01-31	Rc 1/8	DSGM-01-3180	1/8 BSP.F	DSGM-01-3190	1/8 NPT	0.8 (1.8)
	DSGM-01X-31	Rc 1/4	DSGM-01X-3180	1/4 BSP.F	DSGM-01X-3190	1/4 NPT	0.8 (1.8)
	DSGM-01Y-31	Rc 3/8	—	—	DSGM-01Y-3190	3/8 NPT	0.8 (1.8)
DCG-03	DSGM-03-41	Rc 3/8	DSGM-03-2180	3/8 BSP.F	DSGM-03-2190	3/8 NPT	3.0 (6.6)
	DSGM-03X-41	Rc 1/2	DSGM-03X-2180	1/2 BSP.F	DSGM-03X-2190	1/2 NPT	3.0 (6.6)
	DSGM-03Y-41	Rc 3/4	DSGM-03Y-2180	3/4 BSP.F	DSGM-03Y-2190	3/4 NPT	4.7 (10.4)

● Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.



Mounting Bolts

Socket head cap screws in the table below are included.

Model Numbers	Socket Head Cap Screw			
	Japanese Standard "JIS" European Design Standard	N. American Design Standard	Qty.	Tightening Torque Nm (in. lbs)
DCT-01	M5 × 45 Lg.	No. 10-24 UNC × 1-3/4 Lg.	2	5-7 (43-60)
DCG-01	M5 × 45 Lg.	No. 10-24 UNC × 1-3/4 Lg.	4	5-7 (43-60)
DCG-03	M6 × 35 Lg.	1/4-20 UNC × 1-1/2 Lg.	4	12-15 (105-130)

Direction of Oil Flow for Roller Position

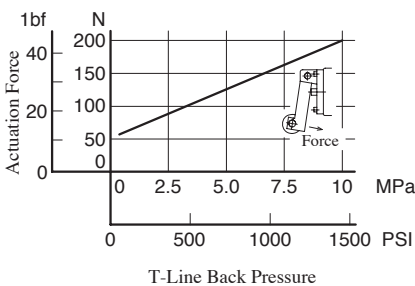
Model Numbers	Graphic Symbols	Roller Position and Direction of Oil Flow	
		Roller Stroke from Offset Position mm(Inches)	
		Extended(Offset)	Depressed
DCT-01-2B2 DCG-01-2B2		P → B A → T 0 ——— 3.8 (All ports blocked) ——— 4.6 ——— 9.5 (.150) (.181) (.374)	P → A B → T 0 ——— 3.8 (All ports blocked) ——— 4.6 ——— 9.5 (.150) (.181) (.374)
DCT-01-2B3 DCG-01-2B3		P → B A → T 0 ——— 3.8 (All ports open) ——— 4.6 ——— 9.5 (.150) (.181) (.374)	P → A B → T 0 ——— 3.8 (All ports open) ——— 4.6 ——— 9.5 (.150) (.181) (.374)
DCT-01-2B8 DCG-01-2B8		P → B A&T ports blocked 0 ——— 3.8 (A&T ports blocked) ——— 9.5 (.150) (.374)	P → A B&T ports blocked 0 ——— 3.8 (B&T ports blocked) ——— 9.5 (.150) (.374)
DCT-03-2B2 DCG-03-2B2		P → A B → T 0 ——— 3.4 (All ports blocked) ——— 3.8 ——— 7 (.134) (.150) (.276)	P → B A → T 0 ——— 3.4 (All ports blocked) ——— 3.8 ——— 7 (.134) (.150) (.276)
DCT-03-2B3 DCG-03-2B3		P → A B → T 0 ——— 3.0 (All ports open) ——— 4.0 ——— 7 (.118) (.157) (.276)	P → B A → T 0 ——— 3.0 (All ports open) ——— 4.0 ——— 7 (.118) (.157) (.276)
DCT-03-2B8 DCG-03-2B8		P → A B&T ports blocked 0 ——— 3.6 (B&T ports blocked) ——— 4.7 (All ports blocked) ——— 7 (.142) (.185) (.276)	P → B A&T ports blocked 0 ——— 3.6 (A&T ports blocked) ——— 4.7 (All ports blocked) ——— 7 (.142) (.185) (.276)

Instructions

Valve Type "2B8"

Tank port "T" functions as a drain port. Directly connect it to the reservoir. [Max. allowable back pressure 0.35 MPa (50 PSI)].

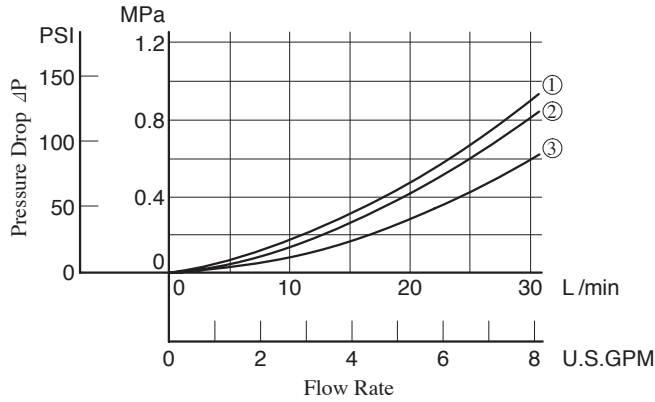
Actuation Force



Pressure Drop

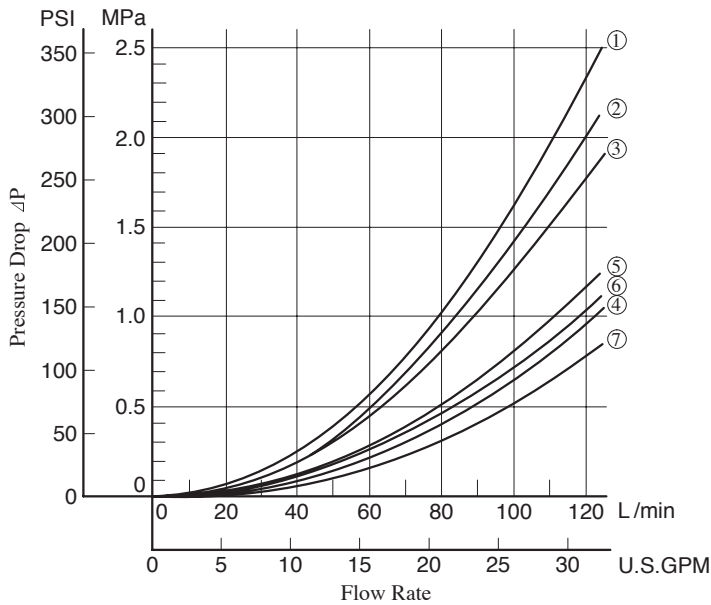
Pressure drop curves based on viscosity of 35 mm²/s (164 SSU) and specific gravity of 0.850.

DCT DCG -01



Model Numbers	Pressure Drop Curve No.			
	P→A	B→T	P→B	A→T
DCT-01-2B2	①	①	②	①
DCT-01-2B3	②	—	②	—
DCG-01-2B2	②	②	③	③
DCG-01-2B3	③	—	③	—

DCT DCG -03



Model Numbers	Pressure Drop Curve No.			
	P→A	B→T	P→B	A→T
DCG-03-2B2	②	①	④	④
DCG-03-2B3	③	②	⑦	⑦
DCG-03-2B8	⑥	—	⑤	—

● For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
		SSU	77	98	141	186	232	278	324	371	417
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

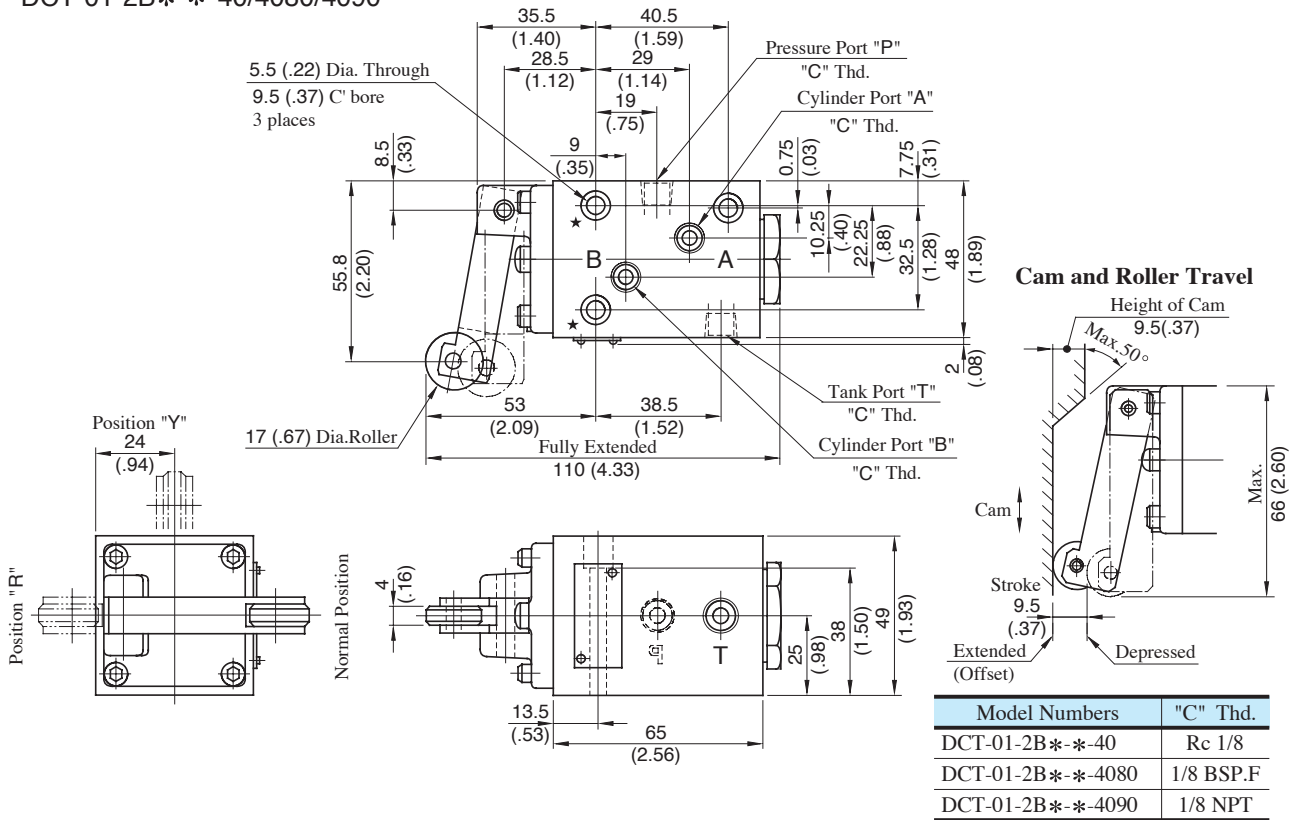
● For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

$$\Delta P' = \Delta P (G'/G)$$

where, ΔP is a value on the above chart and G is 0.850.



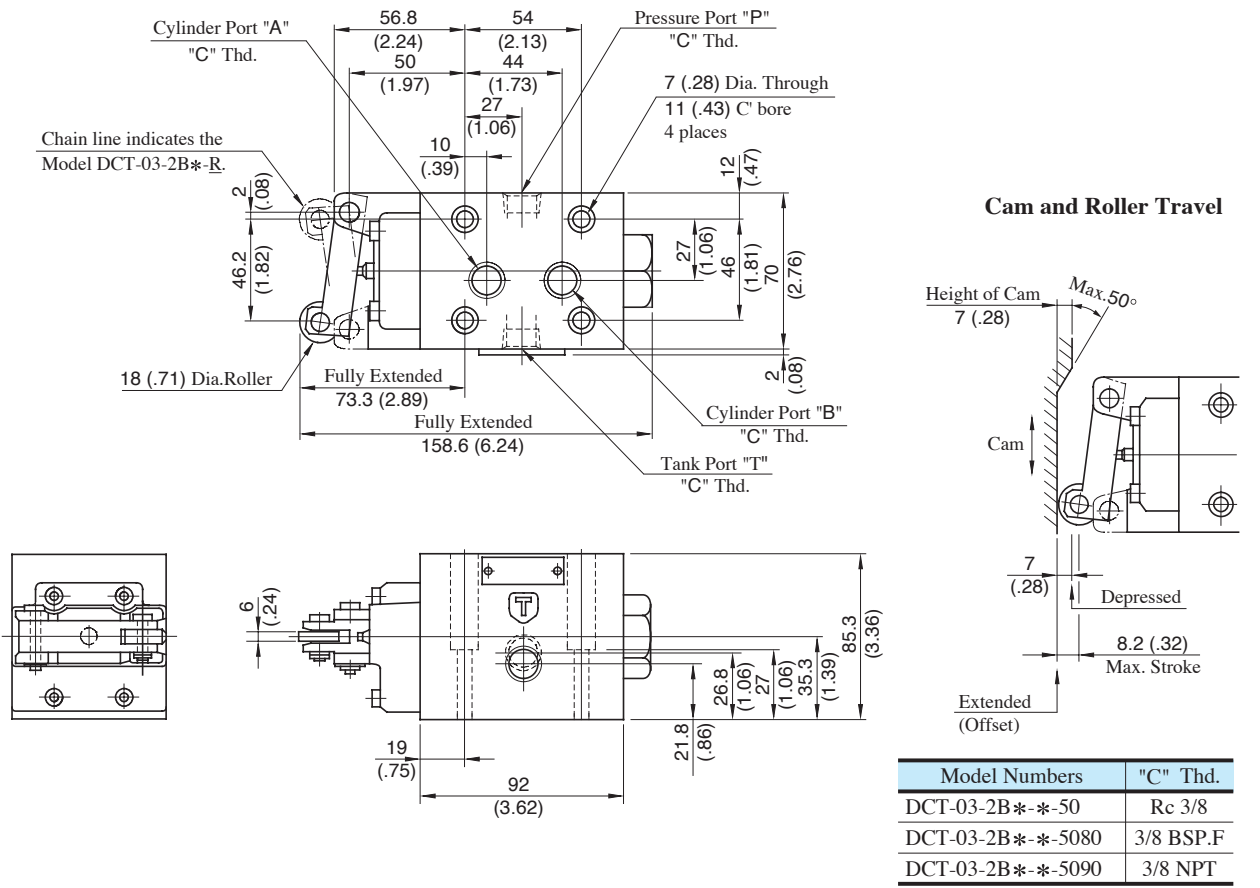
DCT-01-2B*-*-40/4080/4090



Note: When mounting the valve, be sure to use two mounting holes marked with ★.

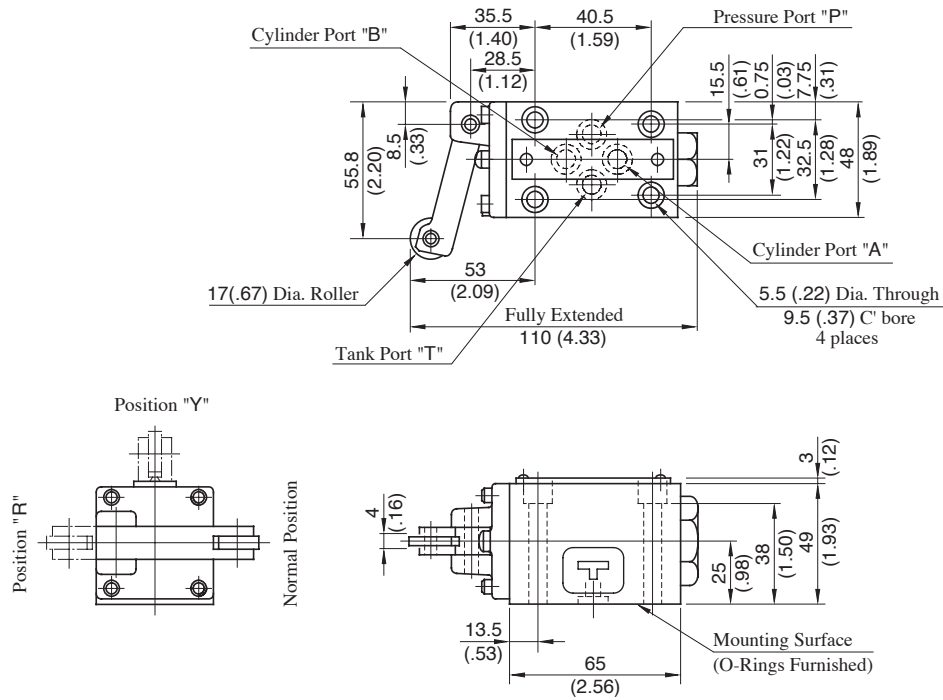
DIMENSIONS IN MILLIMETRES (INCHES)

DCT-03-2B*-*-50/5080/5090



DCG-01-2B*-**-40/4090

Mounting Surface: ISO 4401-AB-03-4-A



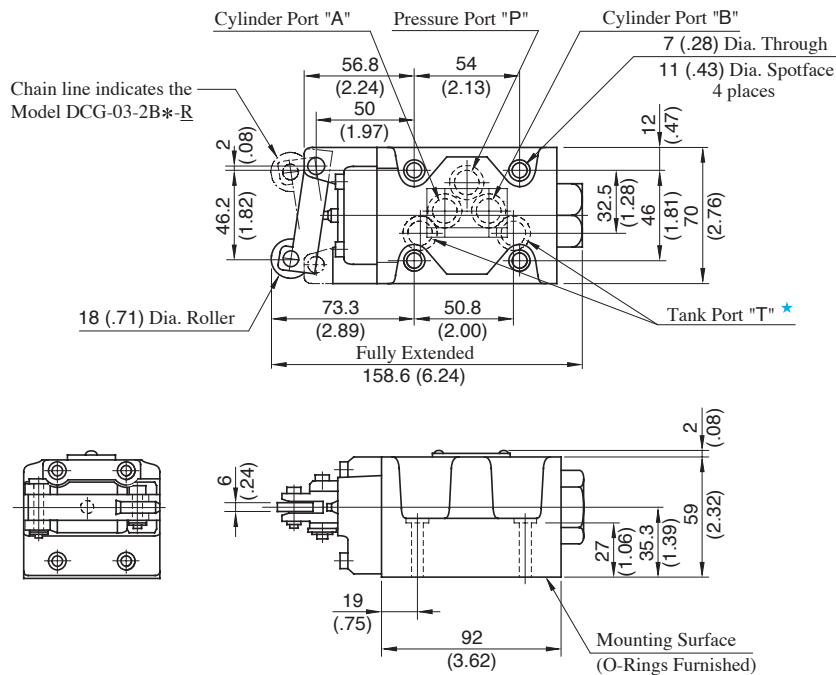
Note1: For the cam and roller travel, see DCT-01 in the [previous page](#).

Note2: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 356](#).

DIMENSIONS IN MILLIMETRES (INCHES)

Mounting Surface: ISO 4401-AC-05-4-A

DCG-03-2B*-**-50/5090



★. Although the tank port is shown on the left in our sub-plate, either may be used.

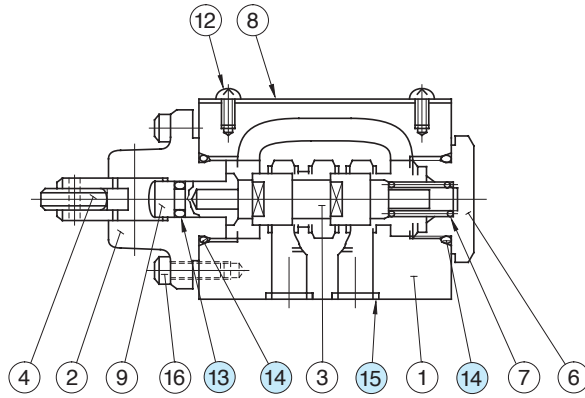
Note1: For the cam and roller travel, see DCT-03 in the [previous page](#).

Note2: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 373](#).



■ List of Seals

DCT-01-2B*- *-40/4080/4090
 DCG-01-2B*- *-40/4090



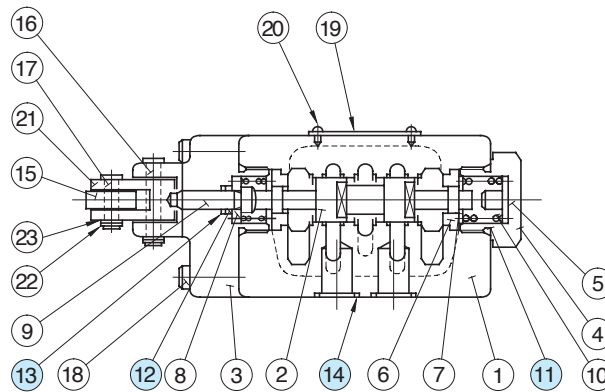
● List of Seal Kit No.

Item	Name of Parts	Part Numbers	Quantity	
			DCT-01	DCG-01
13	O-Ring	SO-NA-P5	1	1
14	O-Ring	SO-NB-P18	2	2
15	O-Ring	SO-NB-P9	0	4

Valve Mdel Numbers	Seal Kit Numbers
DCT-01-2B*- *-40/4080/4090	KS-DCT-01-40
DCG-01-2B*- *-40/4090	KS-DCG-01-40

Note: When ordering the o-rings, please specify the seal kit number from the table right.

DCT-03-2B*- *-50/5080/5090
 DCG-03-2B*- *-50/5090




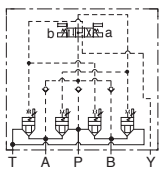
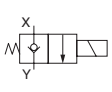
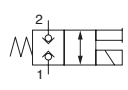
● List of Seal Kit No.

Item	Name of Parts	Part Numbers	Quantity	
			DCT-03	DCG-03
11	O-Ring	SO-NB-P21	2	2
12	O-Ring	SO-NA-P6	1	1
13	Back Up Ring	SO-BE-P6	1	1
14	O-Ring	SO-NB-A014	0	5

Valve Mdel Numbers	Seal Kit Numbers
DCT-03-2B*- *-50/5080/5090	KS-DCT-03-50
DCG-03-2B*- *-50/5090	KS-DCG-03-50

Note: When ordering the seals, please specify the seal kit number from the table right.

Poppet Type Directional Valves

Valve Type	Graphic Symbols	Max. Operating Pressure MPa (PSI)	Maximum Flow		Page
			L/min	U. S. GPM	
Poppet Type Solenoid Operated Directional Valves		31.5 (4570)	DSLG-01		453
Multi Purpose Control Valves		25 (3630)	DSLHG-04 DSLHG-06 DSLHG-10		459
Solenoid Operated Poppet Type Two-Way Valves		21 (3050)	CDSC-01		480
		14 (2030)	CDSC-03		
			CDST-03※ CDSG-03		
Shut-off Type Solenoid Operated Directional Valves		25 (3630)	DSPC-01		489
			DSPG-01		
			DSPC-03		
			DSPG-03		

■ Mounting Surface

Mounting surfacedimensions conform to ISO standard described in below table.

Name	Model Number	ISO Code of Mounting Surface
Shut-off Type Solenoid Operated Directional Valves	DSPG-01	ISO 4401-AB-03-4-A
	DSPG-03	ISO 4401-AC-05-4-A
	DSPC-01	ISO 7789 20-01-0-93
	DSPC-03	ISO 7789 27-01-0-93
Multi Purpose Control Cavles	DSLHG-04	ISO 4401-AD-07-4-A
	DSLHG-06	ISO 4401-AE-08-4-A
	DSLHG-10	ISO 4401-AF-10-4-A

Interchangeability in Installation between Current and New Design

Model change has been made on the following products.

The difference between current and new design has been described on the paragraph of “Interchangeability in Installation between Current and New Design”. Refer to relevant pages on each series.

Name	Model Numbers		Mtg. Interchangeability	Page	Main changes
	Current	New			
Multi Purpose Control Valves	DSLHG-04-*-*-12* DSLHG-06-*-*-12* DSLHG-10-*-*-12*	DSLHG-04-*-*-13* DSLHG-06-*-*-13* DSLHG-10-*-*-13*	Yes	—	Pilot valve (DSG-01) changed to design.
Solenoid Operated Poppet Type Two-Way Valves	CDS*-03*-C-*-20*	CDS*-03*-C-*-21*	Yes	488	The change of solenoid ratings.
Shut-off Type Solenoid Operated Directional Valves	DSP*-01-C-*-10*	DSP*-01-C-*-20*	Yes	—	The change of solenoid.

Solenoid

■ Solenoid connector (DIN connector)

The solenoid connector is in accordance with the international standard ISO 4400 (Fluidpower System and components-Three-Pin electrical plug connectors-Characteristics and requirements.).

■ AC Solenoid

50-60 Hz common service solenoids do not require re-wiring when the applied frequency is changed.

■ DC Solenoid (K-series Solenoid)

K-series DC Solenoid which has a reputation for excellent DC control is employed.

1. The spark between the relay contacts has been eliminated and therefore the valve can be operated by miniature relays.
2. The surge voltage is approximately 10 % of that normally experienced.
3. Time lag on de-exercitation is reduced by approximately 50 %.

■ R Type Models with Current Rectifier and DC Solenoid

Specially designed DC solenoids and receptacle (or connector) containing AC-DC rectifier and transient peak suppressor are provided. Connection to be made to AC power source as with conventional AC solenoid. Remarkably high reliability and long life and other advantages including quiet valve operation. No overheating of coil due to the spool sticking and protection against transient voltage peaks are assured.

■ Insulation Class of Solenoid

Model Numbers	Insulation Class
DSLHG-01	Class H
DSLHG-04/06/10	
CDSC-01	
CDS*-03* DSP*-01/03	

■ Poppet Type Directional Valves

These are Solenoid Operated Directional Valves of No Leak Type developed with the aim of responding the demand of the age including energy saving. Because these valves are of no leak type they allow the low viscosity hydraulic fluids to be used as well as the circuit construction which cannot be used by the conventional spool type directional valves because of too much internal leak of pressure oil. The use of the low viscosity hydraulic fluids reduces the pressure loss which can arise from the passage resistance of the hydraulic fluids, leading to the system energy saving.

■ Poppet Type Solenoid Operated Directional Valves

● High Response High Reliability

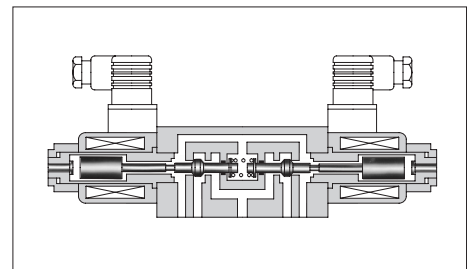
Because these valves are of poppet type, there is no overlap, high response can be achieved. At the same time, hydraulic lock is eliminated.

● No Leak

Sheet type seal has been adopted and internal leak is greatly reduced.

● ISO Comformant Mounting Surface

Because the mounting surface conforms to ISO 4401-AB-03-4-A, there is an interchangeability with the conventional valves. This makes it possible to use these valves in combination with 01 Series Modular Valves.



■ Specifications

Model Numbers	Max. Flow	Max. Operating Pressure	Max. T-Line Back Pressure	Max. Changeover Frequency	Internal leakage	Approx. Mass	Graphic Symbols
	L/min (U.S.GPM)	MPa (PSI)	MPa (PSI)	min ⁻¹ {Cycles/Min}			
DSL-G-01-3-C-*N-11	16 (4.2)	31.5 (4570)	16 (2320)	240	Or Less 0.5 ^{★1} (.03)	1.9 (4.2)	
DSL-G-01-3-O-*N-11							
DSL-G-01-4-O-*N-11					Or Less 1 ^{★2} (.06)	3.7 (8.2)	

★1. This is the leakage towards "T" port in A port block at "P" port pressure 14 MPa (2030 PSI).

★2. This is the leakage towards "T" port in A•B port block at "P" port pressure 14 MPa (2030 PSI).

■ Solenoid Ratings

Electric Source	Coil Type	Frequency (Hz)	Voltage (V)		Current & Power at Rated Voltage	
			Source Rating	Serviceable Range	Holding (A)	Power (W)
DC (K Series)	D12	—	12	10.8 - 13.2	2.45	29
	D24	—	24	21.6 - 26.4	1.23	
AC→DC Rectified	R100	50/60	100	90 - 110	0.33	29
	R200	50/60	200	180 - 220	0.16	

Model Number Designation

F-	DSLGL	-01	-4	-O	-D24	-N	-11	*
Special Seals	Series Number	Valve Size	Number of Port	Function	Coil Type	Type of Electrical Conduit Connection	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	DSLGL: Poppet Type Solenoid Operated Directional Valve (Sub-plate Mtg.)	01	3: 3 Port	O: Normally Open C: Normally Closed	DC D12, D24 AC→DC R100 R200	N: Plug-in Connector	11	Refer to ★
			4: 4 Port	O: Normally Open				

★ Design Standards: None Japanese Standard "JIS" and European Design Standard 90 N. American Design Standard

Sub-plate

Piping Size	Japanese Standard "JIS"		European Design Std.		N. American Design Std.		Approx. Mass kg (lbs.)
	Sub-plate Model No.	Thread Size	Sub-plate Model No.	Thread Size	Sub-plate Model No.	Thread Size	
1/8	DSGM-01-31	Rc 1/8	DSGM-01-3180	1/8 BSP.F	DSGM-01-3190	1/8 NPT	0.8 (1.8)
1/4	DSGM-01X-31	Rc 1/4	DSGM-01X-3180	1/4 BSP.F	DSGM-01X-3190	1/4 NPT	0.8 (1.8)
3/8	DSGM-01Y-31	Rc 3/8	—	—	DSGM-01Y-3190	3/8 NPT	0.8 (1.8)

● Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

Mounting Bolts

Four socket head cap screws in the table below are included.

Descriptions	Socket Head Cap Screw (4 pcs.)	Tightening Torque
Japanese Standard "JIS" European Design Standard	M5 × 45 Lg.	5-7 Nm (44-62 in. lbs.) [Applicable to working pressure more than 25 MPa (3630 PSI) : 6-7 Nm (53-62 in. lbs.)]
N. American Design Standard	No. 10-24 UNC × 1-3/4 Lg.	

Instructions

● **Mounting**

No mounting restrictions for any models.

● **Solenoid Shifting**

On double solenoid valves do not energise both at the same time.

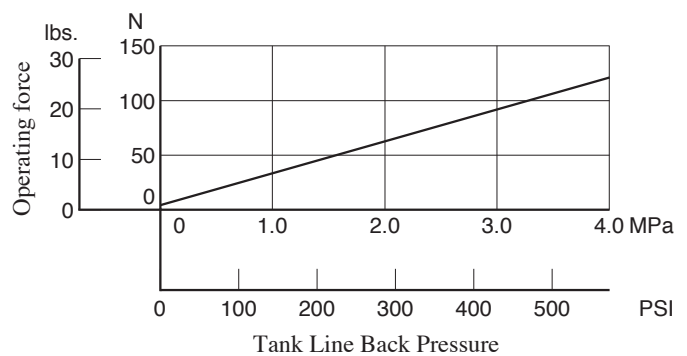
● **Valve Tank Port**

Avoid connecting the valve tank port to a line with possible surge pressure.

● **Operating Force by Manual Actuator**

Take care as the operating force by the manual actuator increases in proportion to the tank line back pressure. (See the graph right.)

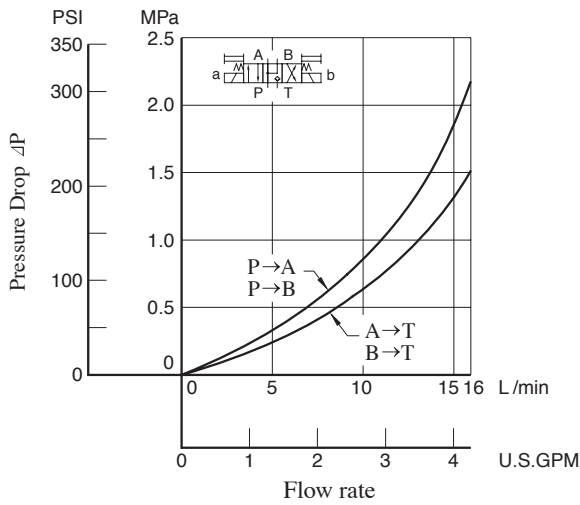
Operating Force by Manual Actuator



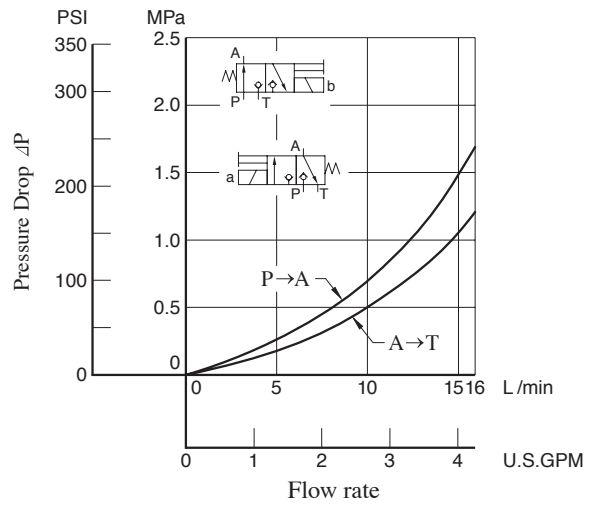
Pressure Drop

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850

4 Port Valve



3 Port Valve



- For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
	SSU		77	98	141	186	232	278	324	371	417
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

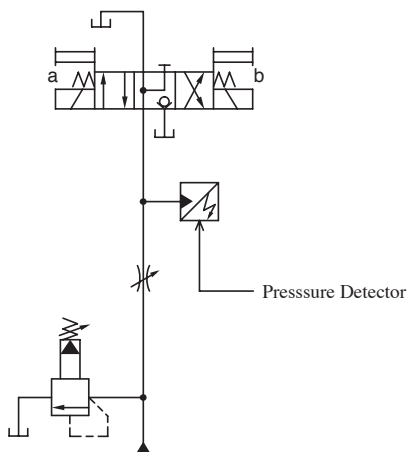
- For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

$$\Delta P' = \Delta P (G'/0.850)$$

Changeover Time

Changeover time varies according to hydraulic circuit of the model actually used and conditions. An example of measurement is given in the figure below.

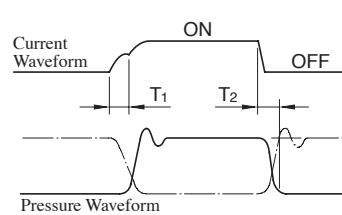
Test Circuit and Conditions



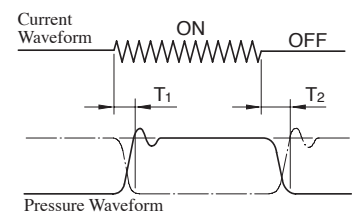
Pressure: 21 MPa (3050 PSI)
Flow Rate: 16 L/min (4.2 U.S.GPM)
Voltage: Rated voltage

Result of Measurement

(DC Solenoid)



(AC→DC Rectified)



Note: Alternate long and short dash lines in the pressure waveform figures indicate the waveforms for Normally Closed Type 3 Port Valves.

Solenoid Type	Model Numbers	Time (ms)		Remarks
		T ₁	T ₂	
DC	DSL-G-01-4-O-D*	55	30	4 port valve, normally open
	DSL-G-01-3-O-D*	55	30	3 port valve, normally open
	DSL-G-01-3-C-D*	70	25	3 port valve, normally closed
AC→DC Rectified	DSL-G-01-4-O-R*	55	150	4 port valve, normally open
	DSL-G-01-3-O-R*	55	150	3 port valve, normally open
	DSL-G-01-3-C-R*	70	150	3 port valve, normally closed

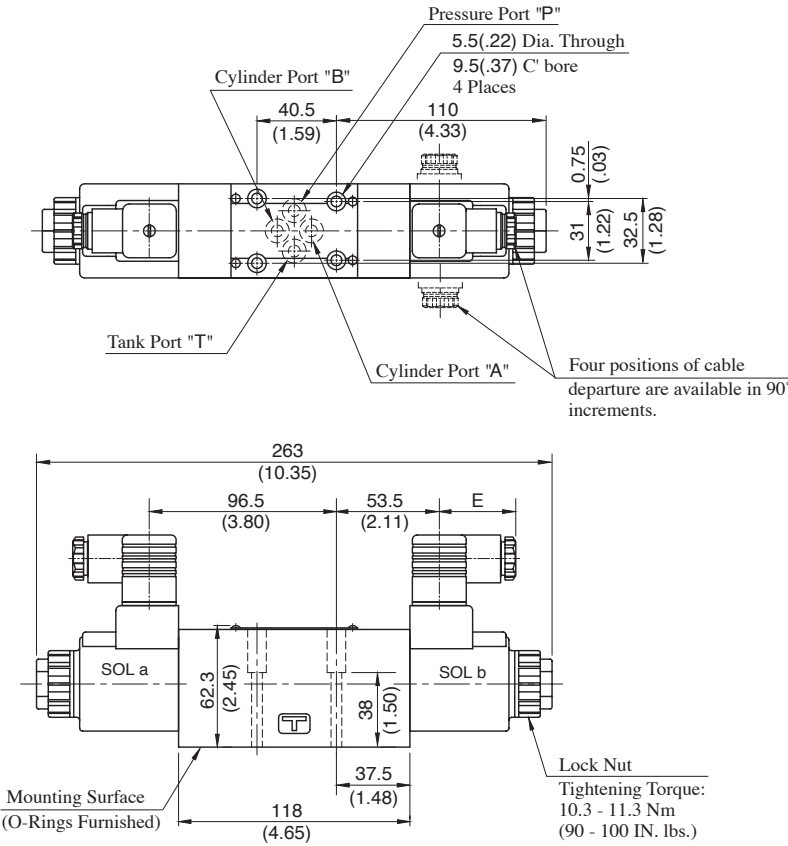


■ 4 Port Valve

Mounting Surface:
ISO4401-AB-03-4-A

● Normally Open: DSLG-01-4-O-*-N-11/1190

**DIMENSIONS IN
MILLIMETRES (INCHES)**

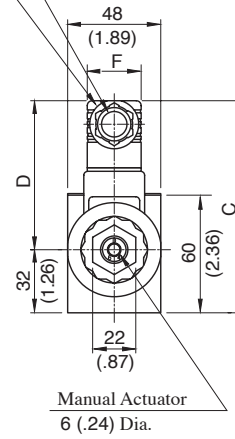


The connector can be moved to various positions by loosening the "Lock Nut". After location tighten "Lock Nut".

Cable Departure

Cable Applicable:

Outside Dia. 8-10 mm (.31 - .39 in.)
Conductor Area ... Not Exceeding 1.5 mm²
(.0023 Sq. in.)



Model Numbers	Dimensions mm (Inches)			
	C	D	E	F
DSL-01-4-O-D*-N	108 (4.25)	64 (2.52)	39 (1.54)	27.5 (1.08)
DSL-01-4-O-R*-N	111 (4.37)	57.2 (2.25)	51 (2.01)	34 (1.34)

● The information on 3 Port Valves is provided in the [following page](#).

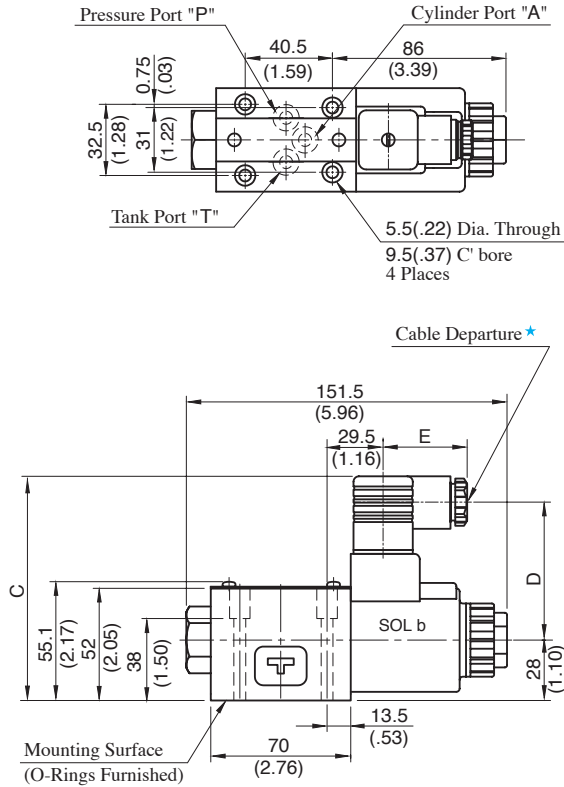
Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 356](#).

Mounting Surface:
ISO4401-AB-03-4-A

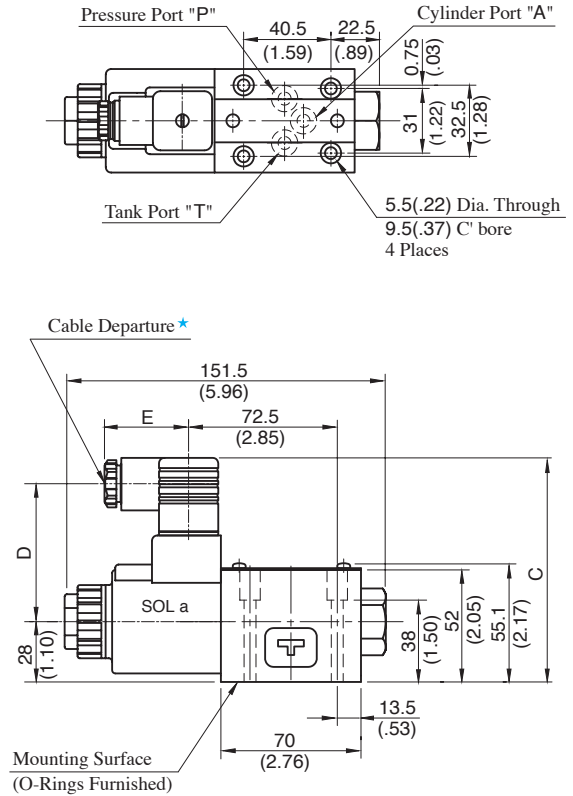
3 Port Valves

DIMENSIONS IN
MILLIMETRES (INCHES)

● Normally Open Type: DSL_G-01-3-O-***-N-11/1190



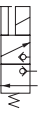
● Normally Closed Type: DSL_G-01-3-C-***-N-11/1190



Model Numbers	Dimensions mm (Inches)		
	C	D	E
DSL _G -01-3- <i>*</i> -D- <i>*</i> -N	104 (4.09)	64 (2.52)	39 (1.54)
DSL _G -01-3- <i>*</i> -R- <i>*</i> -N	107 (4.21)	57.2 (2.25)	51 (2.01)

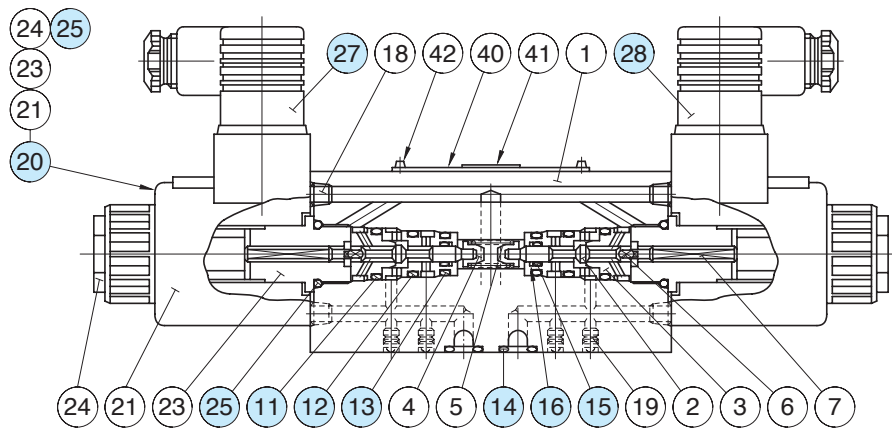
★ Cable departure position can be changed. See "4 Port Valves" in the previous page for the details.

Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 356](#).

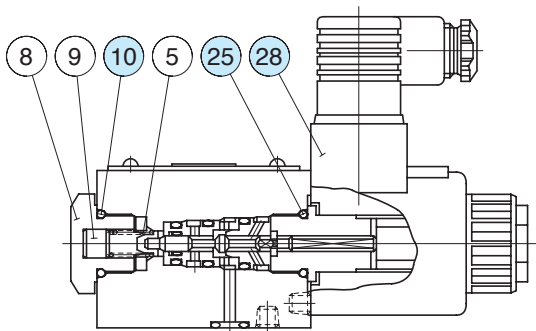


■ List of Seals, Solenoid Ass'y and Connectors

4 Port Valve



3 Port Valve



● List of Seals

Item	Name of Parts	Part Numbers	Quantity	
			4 Port Valve	3 Port Valve
10	O-Ring	SO-NB-P18	—	1
11	O-Ring	SO-NB-P14	2	1
12	O-Ring	SO-NB-P12	2	1
13	O-Ring	SO-NB-P11	2	1
14	O-Ring	SO-NB-P9	4	3
15	O-Ring	SO-NA-P5	2	1
16	Back Up Ring	2705-VK414322-8	2	1
25	O-Ring	SO-NB-P18	2	1

Note 1: O-Ring of item (25) are included in solenoid assembly.
 2: When ordering the seals, specify the seal kit number from the table right.

● Change of supply voltage

The supply voltage can be changed by replacing the coil (21) only.

● List of Seal Kits

Valve Model Number s	Seal Kit Numbers
DSL G-01-3-O-* -N-11*	KS-DSL G-01-3-N-11
DSL G-01-3-C-* -N-11*	
DSL G-01-4-O-* -N-11*	KS-DSL G-01-4-N-11

● List of Solenoid Ass'y and Connectors

Valve Model No.	(20) Solenoid Ass'y No.	(21) Coil No.	(27) Connector No.	(28) Connector No.
DSL G-01-* -D12-N-11*	SD1L-12-N-20	C-SD1-12-N-60	GDM-211-A-11	GDM-211-B-11
DSL G-01-* -D24-N-11*	SD1L-24-N-20	C-SD1-24-N-60		
DSL G-01-* -R100-N-11*	SD1L-100-N-20	C-SR1-100-N-60	GDME-211-R-A-10	GDME-211-R-B-10
DSL G-01-* -R200-N-11*	SD1L-200-N-20	C-SR1-200-N-60		

Multi Purpose Control Valves

The Yuken Multi-Purpose Control Valves Comply with The Needs of Reducing Cost and Size of Your Machine

YUKEN's Multi Purpose Control Valves are compound valves composed of the main valve having four poppets, 1/8 Solenoid Operated Directional Valves for pilot and Pilot Selector Valves. This valve is multifunctionalized by having individual poppet had functions such as directional control, flow control or pressure control according to the combination of the main valve and pilot selector valve.

Features

Multi-purpose control valves

The valves combine three functions of directional control, flow control and of pilot operated check valve (or counterbalance valve). The valves contribute for reducing a number of valves in applications and space for installation and then eventually leads to reduction in size and cost of your machines.

Quick response, High reliability

Changeover response time is very quick as the valves are poppet type, there is no over-lap. No hydraulic lock occurs as there is no leakage of pressurised oil from the seat parts.

Easy to reduce shock in your hydraulic system

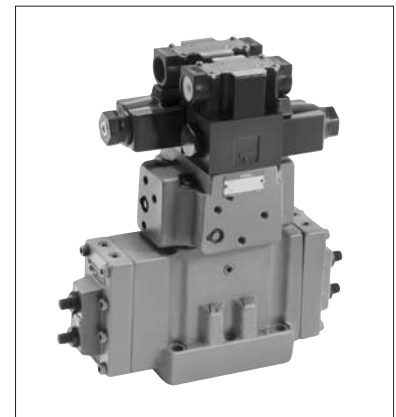
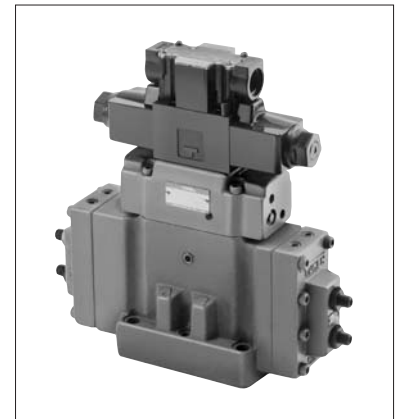
By selecting proper diameter of orifice for pilot, the open/close timing of the flow passage can be set freely. Therefore, smooth starting and stopping of actuator can be done combined with using shockless type poppet. Noise of ON/OFF and vibration of piping in hydraulic system can be also reduced.

For regenerative circuit

4 position-4 way type, which is to compose regenerative circuit, is available. By adopting regenerative circuit, gaining fast feed speed by using smaller volume pump is possible. Therefore saving electric power of system is possible.

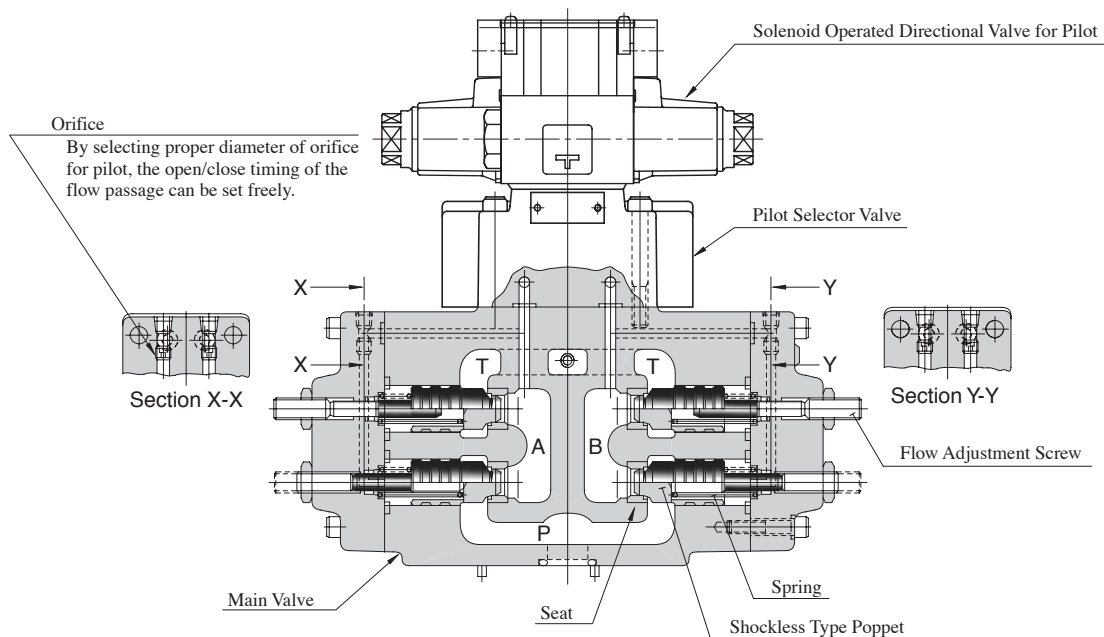
The mounting dimensions are conformed with ISO standard

The valves are interchangeable with our conventional valves in mounting.



E

Multi Purpose Control Valves



Specifications

Model Numbers	Max. Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Max. Pilot Pressure MPa (PSI)	Max. T-Line Back Pres. MPa (PSI)	Pressure Adj. Range of Counterbalance MPa (PSI)	Ratio of Poppet Area (Seat Area: Annular Area)		Approx. Mass kg (lbs.)
						Direction & Flow Control	Pressure Control	
DSLHG-04-1-* -13*	150 (39.6)	25 (3630)	25 (3630)	16 (2320)	—	1:1	—	15 (33)
DSLHG-04-2-* -13*								15 (33)
DSLHG-04-3-* -13*								19 (42)
DSLHG-04-4-* -13*	150 {100}* (39.6 {26.4})	25 (3630)	25 (3630)	16 (2320)	Refer to Model No. Designation	1:1	24:1	20 (44)
DSLHG-04-5-* -13*								22.5 (50)
DSLHG-06-1-* -13*	300 (79.3)	25 (3630)	25 (3630)	16 (2320)	—	1:1	—	26.5 (59)
DSLHG-06-2-* -13*								26.5 (59)
DSLHG-06-3-* -13*								28 (62)
DSLHG-06-4-* -13*	300 {200}* (79.3 {52.8})	25 (3630)	25 (3630)	16 (2320)	Refer to Model No. Designation	1:1	24:1	31 (68)
DSLHG-06-5-* -13*								34.5 (76)
DSLHG-10-1-* -13*	500 (132)	25 (3630)	25 (3630)	16 (2320)	—	1:1	—	59 (130)
DSLHG-10-2-* -13*								59 (130)
DSLHG-10-3-* -13*								62 (137)
DSLHG-10-4-* -13*	500 {300}* (132 {79.3})	25 (3630)	25 (3630)	16 (2320)	Refer to Model No. Designation	1:1	24:1	63.5 (140)
DSLHG-10-5-* -13*								67 (148)

★ In case of counterbalance function line, maximum flow is limited to the values in brackets.

Solenoid Ratings

Refer to Pilot Valve (DSG-01 Series Solenoid Operated Directional Valve) Solenoid Ratings on [page 345](#).

Model Number Designation

F-	DSLH	G	-04	-4	A	-B		
Special Seals	Series Number	Type of Mounting	Valve Size	Type of Pilot Control	Counterbalance Function	Pressure Adj. Range of Counterbalance MPa (PSI)		
F: For phosphate ester type fluids (Omit if not required)	DSLH: Multi-Purpose Control Valve	G: Sub-plate Mounting	04	1	—	—		
				2				
				3				
				4			A : AT Line W : AT & BT Lines	B : * ^{★1} - 7 (* ^{★1} - 1020) H : 6 - 25 (870 - 3630)
				5				
			06	1	—	A : AT Line W : AT & BT Lines	None: * ^{★1} - 25 (* ^{★1} - 3630)	
				2				
				3				
				4				
				5				
10	1	—	A : AT Line W : AT & BT Lines	None: * ^{★1} - 25 (* ^{★1} - 3630)				
	2							
	3							
	4							
	5							

See [page 462](#) for functions and purpose of use.

★1. See "Min. Adjustment Pressure", [page 464](#), for information on minimum adjustment pressure.

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"			European Design Standard			N. American Design Standard		
	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)
DSLHG-04	DHGM-04-20	Rc 1/2	4.4 (9.7)	DHGM-04-2080	1/2 BSP.F	4.4 (9.7)	DHGM-04-2090	1/2 NPT	4.4 (9.7)
	DHGM-04X-20	Rc 3/4	4.1 (9.0)	DHGM-04X-2080	3/4 BSP.F	4.1 (9.0)	DHGM-04X-2090	3/4 NPT	4.1 (9.0)
DSLHG-06	DHGM-06-50	Rc 3/4	7.4 (16.3)	DHGM-06-5080	3/4 BSP.F	8.5 (18.7)	DHGM-06-5090	3/4 NPT	7.4 (16.3)
	DHGM-06X-50	Rc 1	7.4 (16.3)	DHGM-06X-5080	1 BSP.F	8.5 (18.7)	DHGM-06X-5090	1 NPT	7.4 (16.3)
DSLHG-10	DHGM-10-40	Rc 1-1/4	21.5 (47.4)	DHGM-10-4080	1-1/4 BSP.F	21.5 (47.4)	DHGM-10-4090	1-1/4 NPT	21.5 (47.4)
	DHGM-10X-40	Rc 1-1/2	21.5 (47.4)	DHGM-10X-4080	1-1/2 BSP.F	21.5 (47.4)	DHGM-10X-4090	1-1/2 NPT	21.5 (47.4)

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- These sub-plates are sharable with those for DSHG Series Solenoid Controlled Pilot Operated Directional Valve. For dimensions, see [pages 401 to 403](#).

Mounting Bolts

Socket head cap screws in the table below are included.

Model Numbers	Socket Head Cap Screw			
	Japanese Standard "JIS" and European Design Standard	N. American Design Standard	Qty.	Tightening Torque Nm (In. lbs.)
DSLHG-04	M6 × 40 Lg.	1/4-20 UNC × 1-1/2 Lg.	2	12-15 (106-133)
	M10 × 45 Lg.	3/8-16 UNC × 1-3/4 Lg.	4	58-72 (513-637)
DSLHG-06	M12 × 60 Lg.	1/2-13 UNC × 2-1/2 Lg.	6	100-123 (885-1089)
DSLHG-10	M20 × 75 Lg.	3/4-10 UNC × 3 Lg.	6	473-585 (4186-5177)

-E	T	-A100	-C	-N	-13	*
Pilot Connection	Drain Connection ^{★2}	Coil Type	Manual Override	Electrical Conduit Connection	Design Number	Design Standards
None: Internal Pilot	None: External Drain	AC: A100 A120 A200 A240	None: Manual Override Pin	None: Terminal Box Type	13	None: Japanese Std. "JIS" 90: N.American Design Std.
		DC: D12 D24 D48				
E: External Pilot	T: Internal Drain	R: (AC→DC) R100 R200	C: Push Button & Lock Nut (Options)	N: Plug-in Connector Type	13	None: Japanese Std. "JIS" & European Design Std. 90: N.American Design Std.

★2. In case of lines with counterbalance function ($-4 \frac{A}{W}$, $-5 \frac{A}{W}$), External Drain must be selected for Drain Connection.

The coil type numbers in the shaded column are handled as optional extras. In case these coils are required to be chosen, please confirm the time of delivery with us before ordering.

Function and Purpose of Use

Type of Pilot Control	Model No.	Graphic Symbols	Function			Purpose of Use													
			Directional Control	Flow Control	Pilot Operated Check Valve / Pressure Control														
Type "1"	DSLHG-**-1		 <table border="1"> <tr> <td>Position</td> <td>#1</td> <td>#2</td> <td>#3</td> </tr> <tr> <td>SOL a</td> <td>ON</td> <td>OFF</td> <td>OFF</td> </tr> <tr> <td>SOL b</td> <td>OFF</td> <td>OFF</td> <td>ON</td> </tr> </table>	Position	#1	#2	#3	SOL a	ON	OFF	OFF	SOL b	OFF	OFF	ON	 Both Metre-in and Metre-out are possible	 To get a function of pilot operated check valve, the following conditions should be fulfilled. <ul style="list-style-type: none"> Internal pilot type ("P" port pressure) \geq ("A""B" ports pressure) External pilot type (Pilot pressure) \geq ("A""B" ports pressure) 	<ul style="list-style-type: none"> Functions as Three Position Four-Way Valve (Spring Centred Model). 	
	Position	#1	#2	#3															
SOL a	ON	OFF	OFF																
SOL b	OFF	OFF	ON																
DSLHG-**-2		 <table border="1"> <tr> <td>Position</td> <td>#1</td> <td>#2</td> <td>#3</td> </tr> <tr> <td>SOL a</td> <td>ON</td> <td>OFF</td> <td>OFF</td> </tr> <tr> <td>SOL b</td> <td>OFF</td> <td>OFF</td> <td>ON</td> </tr> </table>	Position	#1	#2	#3	SOL a	ON	OFF	OFF	SOL b	OFF	OFF	ON	<ul style="list-style-type: none"> Functions as Three Position Four-Way Valve (Spring Centred Model) as well as Two Position Valve which uses positions #1 and #3. Effective especially when the actuator has inertia force. 				
Position	#1	#2	#3																
SOL a	ON	OFF	OFF																
SOL b	OFF	OFF	ON																
Type "3"	DSLHG-**-3		 <table border="1"> <tr> <td>Position</td> <td>#1</td> <td>#2</td> <td>#3</td> <td>#4</td> </tr> <tr> <td>SOL a</td> <td>ON</td> <td>OFF</td> <td>ON</td> <td>OFF</td> </tr> <tr> <td>SOL b</td> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>ON</td> </tr> </table>	Position	#1	#2	#3	#4	SOL a	ON	OFF	ON	OFF	SOL b	OFF	OFF	ON	ON	<ul style="list-style-type: none"> Functions as Four Position Four-Way Valve. Regenerative circuit can be constructed at the Position #3.
	Position	#1	#2	#3	#4														
SOL a	ON	OFF	ON	OFF															
SOL b	OFF	OFF	ON	ON															
DSLHG-**-4A		 <table border="1"> <tr> <td>Position</td> <td>#1</td> <td>#2</td> <td>#3</td> </tr> <tr> <td>SOL a</td> <td>ON</td> <td>OFF</td> <td>OFF</td> </tr> <tr> <td>SOL b</td> <td>OFF</td> <td>OFF</td> <td>ON</td> </tr> </table>	Position	#1	#2	#3	SOL a	ON	OFF	OFF	SOL b	OFF	OFF	ON	<ul style="list-style-type: none"> Pressure control function (counterbalance valve) has been added to Type "2" to make this type. 				
Position	#1	#2	#3																
SOL a	ON	OFF	OFF																
SOL b	OFF	OFF	ON																
Type "4"	DSLHG-**-4W		 <table border="1"> <tr> <td>Position</td> <td>#1</td> <td>#2</td> <td>#3</td> </tr> <tr> <td>SOL a</td> <td>ON</td> <td>OFF</td> <td>OFF</td> </tr> <tr> <td>SOL b</td> <td>OFF</td> <td>OFF</td> <td>ON</td> </tr> </table>	Position	#1	#2	#3	SOL a	ON	OFF	OFF	SOL b	OFF	OFF	ON	<ul style="list-style-type: none"> Used to control the back pressure of the actuator. 			
	Position	#1	#2	#3															
SOL a	ON	OFF	OFF																
SOL b	OFF	OFF	ON																
Type "5"	DSLHG-**-5A		 <table border="1"> <tr> <td>Position</td> <td>#1</td> <td>#2</td> <td>#3</td> <td>#4</td> </tr> <tr> <td>SOL a</td> <td>ON</td> <td>OFF</td> <td>ON</td> <td>OFF</td> </tr> <tr> <td>SOL b</td> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>ON</td> </tr> </table>	Position	#1	#2	#3	#4	SOL a	ON	OFF	ON	OFF	SOL b	OFF	OFF	ON	ON	<ul style="list-style-type: none"> Pressure control function (counterbalance valve) has been added to Type "3" to make this type.
	Position	#1	#2	#3	#4														
SOL a	ON	OFF	ON	OFF															
SOL b	OFF	OFF	ON	ON															
DSLHG-**-5W		 <table border="1"> <tr> <td>Position</td> <td>#1</td> <td>#2</td> <td>#3</td> <td>#4</td> </tr> <tr> <td>SOL a</td> <td>ON</td> <td>OFF</td> <td>ON</td> <td>OFF</td> </tr> <tr> <td>SOL b</td> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>ON</td> </tr> </table>	Position	#1	#2	#3	#4	SOL a	ON	OFF	ON	OFF	SOL b	OFF	OFF	ON	ON	<ul style="list-style-type: none"> Used to control the back pressure of the actuator. 	
Position	#1	#2	#3	#4															
SOL a	ON	OFF	ON	OFF															
SOL b	OFF	OFF	ON	ON															

■ Instructions

● Pilot Pressure

Pilot pressure of external pilot drain models must always exceed the pressure of the main pressure port "P".

● Pilot Drain Port

Avoid connecting the pilot drain port to a line with possible surge pressure.

● Drain Connection when with Counterbalance Function

When a valve having counterbalance function is used with internal drain type, the counterbalance pilot valve is subjected to pressure fluctuation and the pressure setting becomes unstable. For this reason, be sure to use external drain type valve.

● Flow Adjustment

To perform the flow adjustment, loosen the lock nut, then turn the flow adjustment screw clockwise to decrease the flow. Be sure to re-tighten the lock nut after the adjustment.

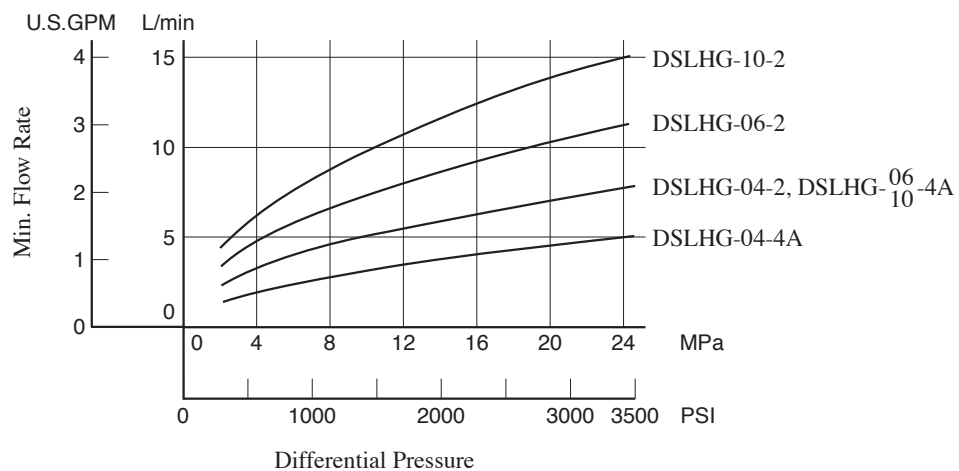
● Pressure Adjustment

To perform the pressure adjustment, loosen the lock nut, then turn the pressure adjustment screw clockwise to increase the pressure. Be sure to re-tighten the lock nut after the adjustment.

● Min. Controlled Flow for Types "2" and "4A" at The Time of Metre-out Control

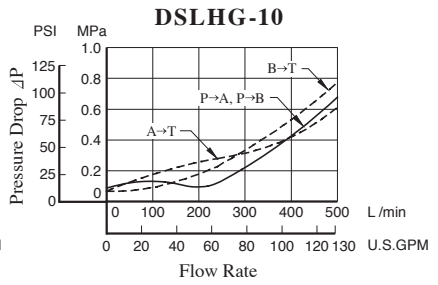
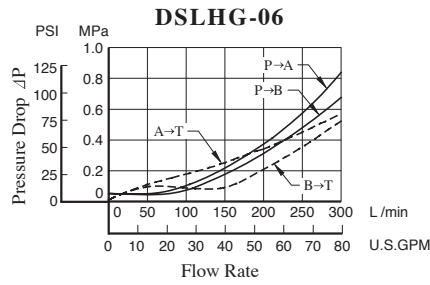
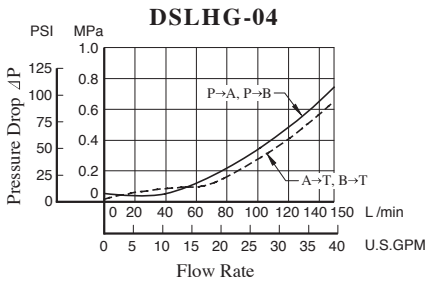
Minimum controlled flow at the time of metre-out control is limited (this does not happen during metre-in control) as shown in the figure below only in the case of pilot control types "2" (DSLHG- *-2) and "4A" (DSLHG- *-4A).

Min. Controlled Flow for Types "2" and "4A" at The Time of Metre-out Control



Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850

Pressure Drop



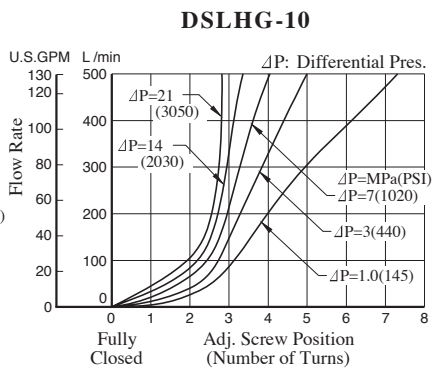
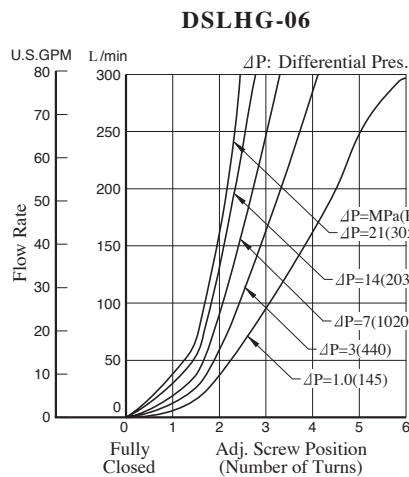
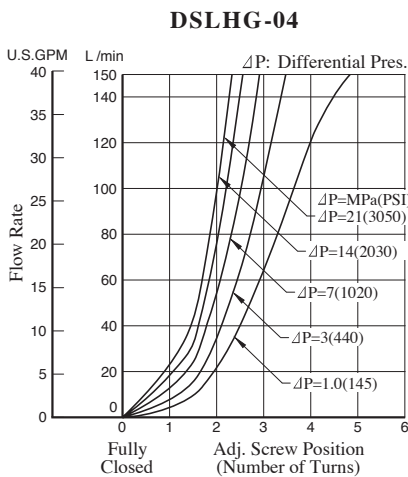
- For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
		SSU	77	98	141	186	232	278	324	371	417
	Factor	0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

- For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

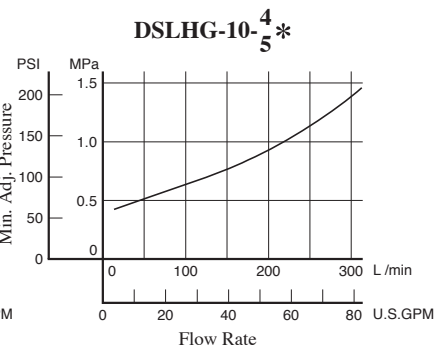
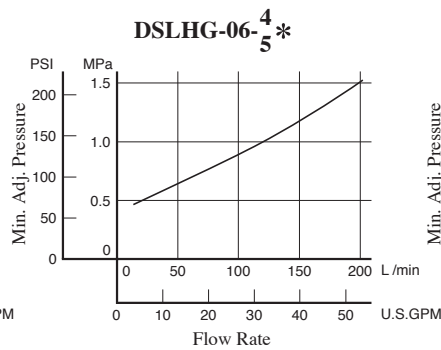
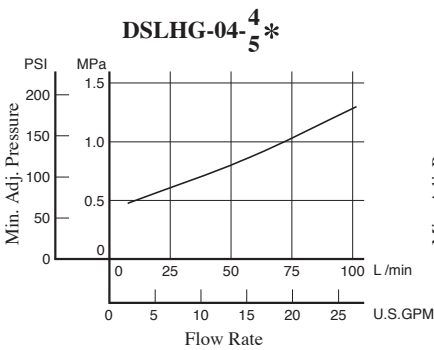
$$\Delta P' = \Delta P (G'/0.850)$$

Flow vs. Adjustment Revolutions



Minimum Adjustment Pressure

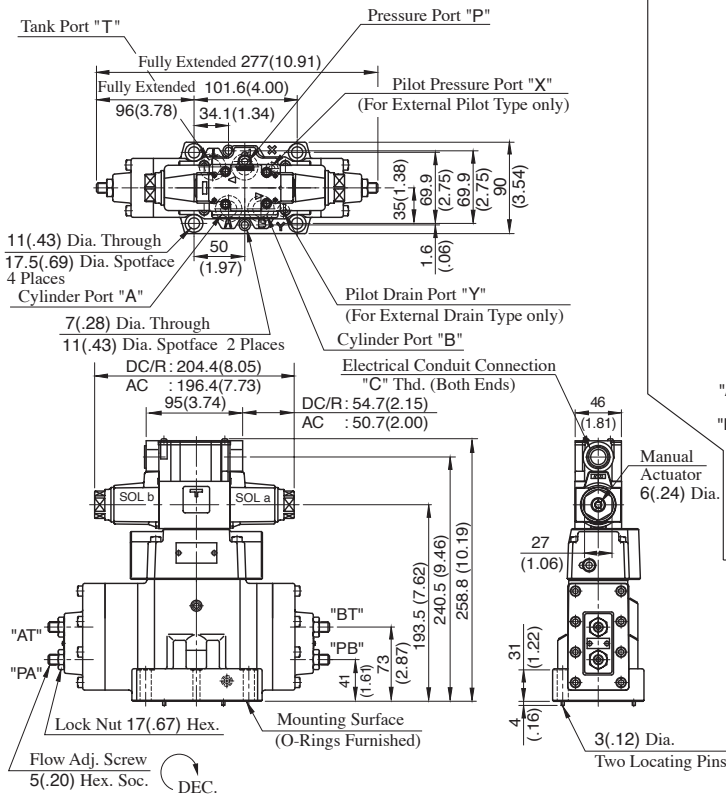
Because the minimum adjustment pressure varies with the tank line back pressure, add the tank line back pressure to the value on the following lines.



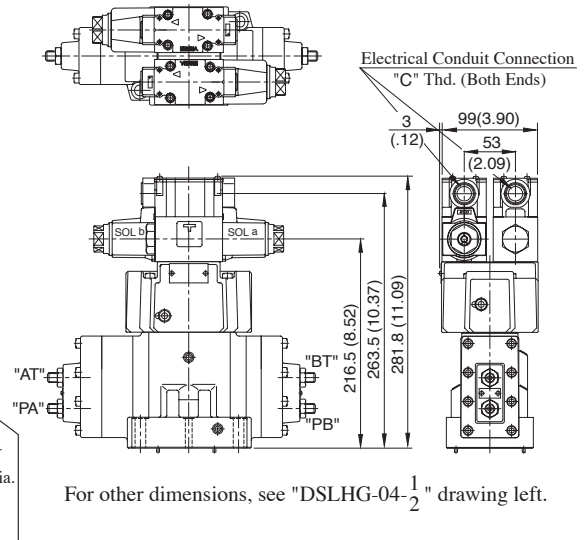
DSLHG-04- $\frac{1}{2}$ -*-13/1390

Terminal Box Type

Mounting Surface:
ISO4401-AD-07-4-A



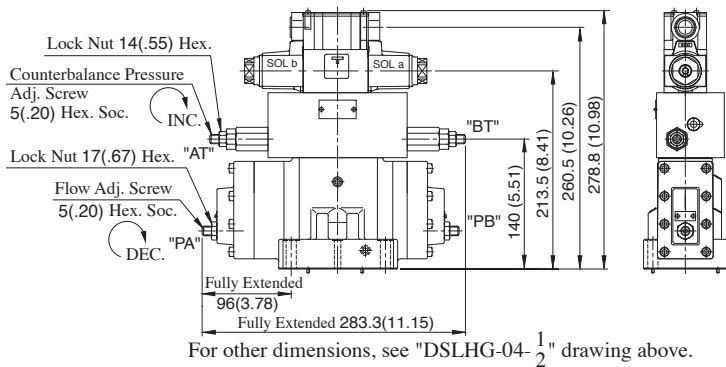
DSLHG-04-3-*-13/1390



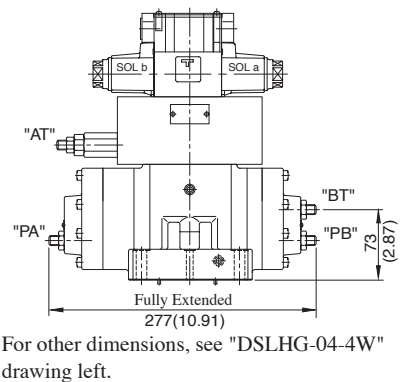
Model Numbers	"C" Thd.
DSLHG-04-*-*-13	G 1/2
DSLHG-04-*-*-1390	1/2 NPT

DIMENSIONS IN
MILLIMETRES (INCHES)

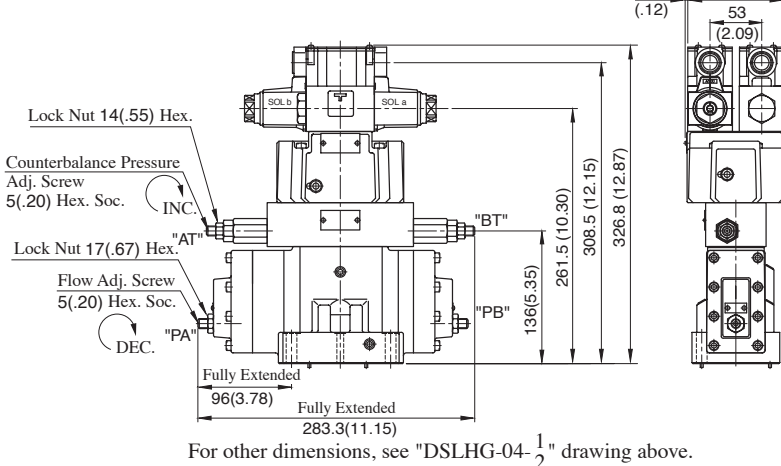
DSLHG-04-4W-*-*-13/1390



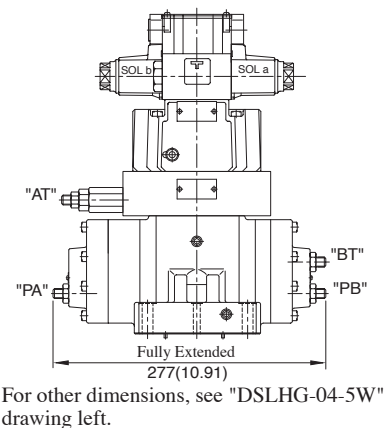
DSLHG-04-4A-*-*-13/1390



DSLHG-04-5W-*-*-13/1390



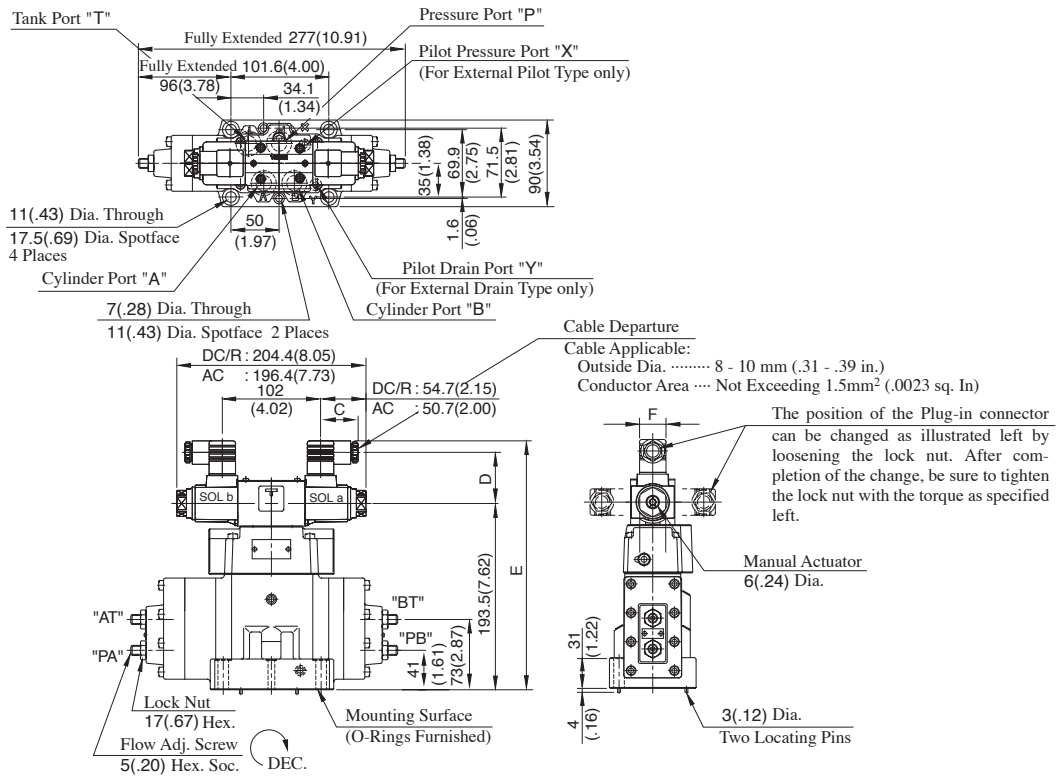
DSLHG-04-5A-*-*-13/1390



DSLHG-04- $\frac{1}{2}$ -*-N-13/1390

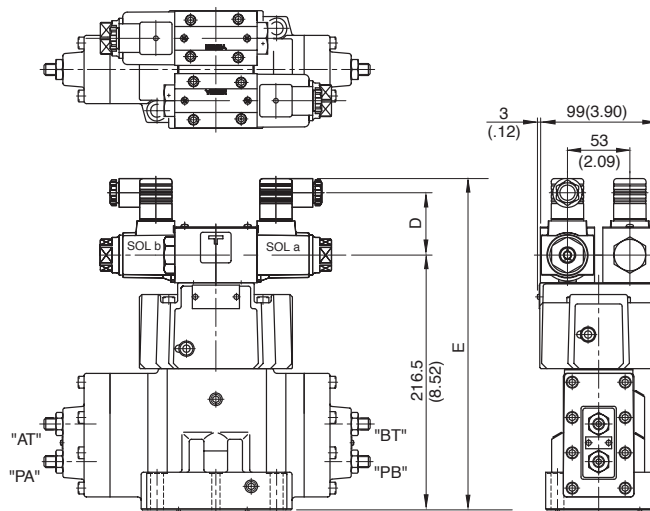
Plug-in Connector Type

Mounting Surface:
ISO 4401-AD-07-4-A



Model Numbers	Dimensions mm (Inches)			
	C	D	E	F
DSLHG-04-*-A*-N	39 (1.54)	53 (2.09)	258.5(10.18)	27.5 (1.08)
DSLHG-04-*-D*-N	39 (1.54)	64 (2.52)	269.5(10.61)	27.5 (1.08)
DSLHG-04-*-R*-N	53 (2.09)	57.2(2.25)	272.5(10.73)	34 (1.34)

DSLHG-04-3-*-N-13/1390



Model Numbers	Dimensions mm (Inches)	
	D	E
DSLHG-04-3-A*-N	53 (2.09)	281.5 (11.08)
DSLHG-04-3-D*-N	64 (2.52)	292.5 (11.52)
DSLHG-04-3-R*-N	57.2 (2.25)	299.5 (11.63)

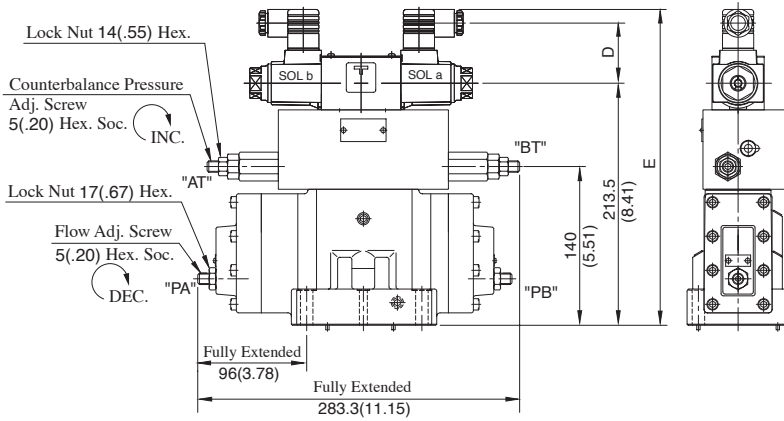
DIMENSIONS IN MILLIMETRES (INCHES)

For other dimensions, see "DSLHG-04- $\frac{1}{2}$ -*-N" drawing above.

Plug-in Connector Type

Mounting Surface:
ISO 4401-AD-07-4-A

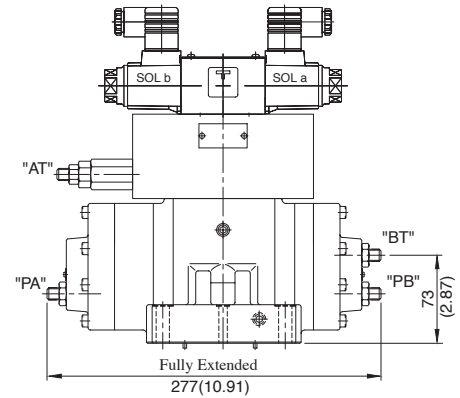
DSLHG-04-4W-*-N-13/1390



Model Numbers	Dimensions mm (Inches)	
	D	E
DSLHG-04-4W-*-A*-N	53 (2.09)	278.5 (10.96)
DSLHG-04-4W-*-D*-N	64 (2.52)	289.5 (11.40)
DSLHG-04-4W-*-R*-N	57.2 (2.25)	292.5 (11.52)

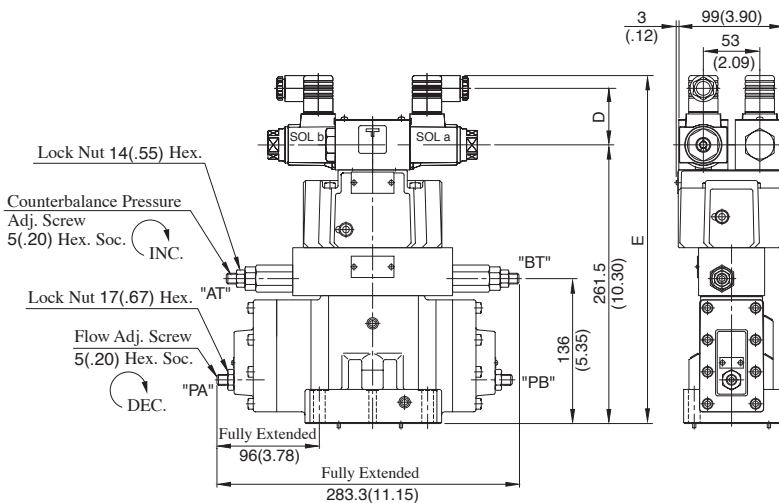
For other dimensions, see DSLHG-04- $\frac{1}{2}$ -*-N on the [previous page](#).

DSLHG-04-4A-*-N-13/1390



For other dimensions, see
"DSLHG-04-4W-*-N" drawing left.

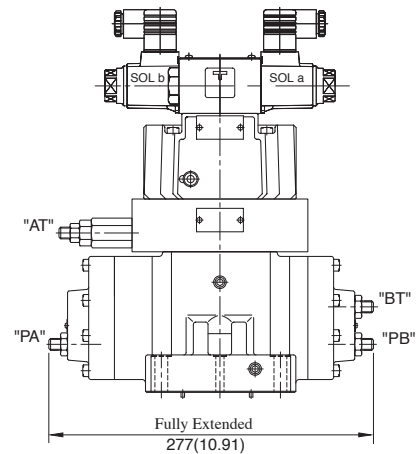
DSLHG-04-5W-*-N-13/1390



Model Numbers	Dimensions mm (Inches)	
	D	E
DSLHG-04-5W-*-A*-N	53 (2.09)	326.5 (12.85)
DSLHG-04-5W-*-D*-N	64 (2.52)	337.5 (13.28)
DSLHG-04-5W-*-R*-N	57.2 (2.25)	340.5 (13.41)

For other dimensions, see DSLHG-04- $\frac{1}{2}$ -*-N on the [previous page](#).

DSLHG-04-5A-*-N-13/1390



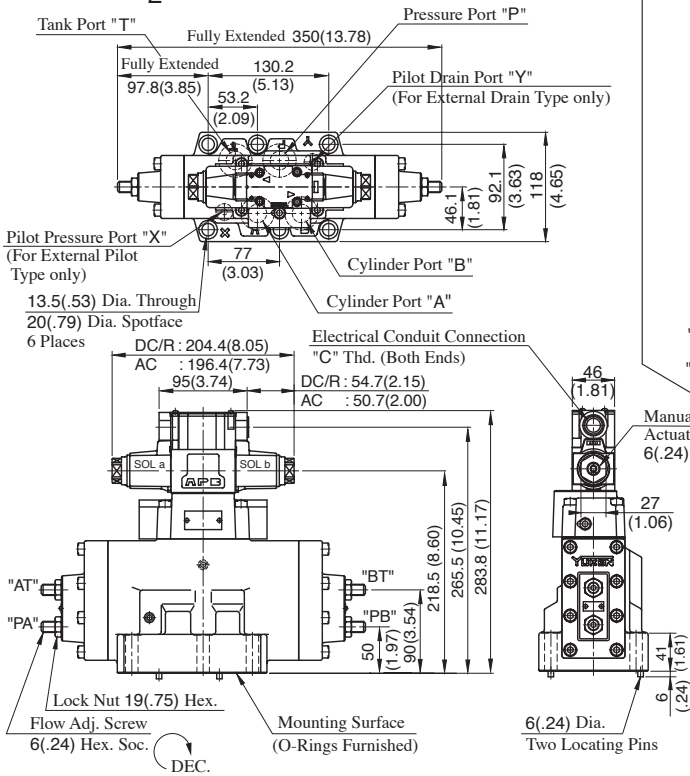
For other dimensions, see
"DSLHG-04-5W-*-N" drawing left.

**DIMENSIONS IN
MILLIMETRES (INCHES)**

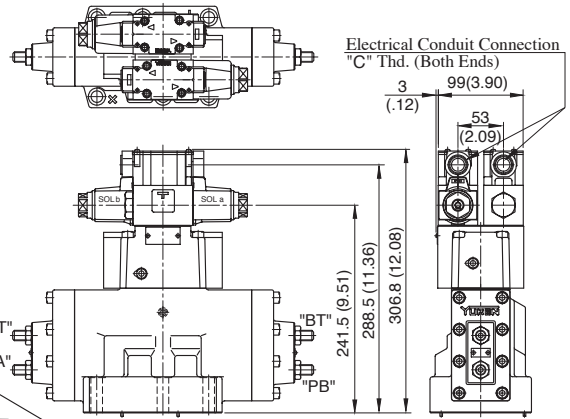
Terminal Box Type

Mounting Surface:
ISO4401-AE-08-4-A

DSLHG-06- $\frac{1}{2}$ -*-13/1390



DSLHG-06-3-*-13/1390

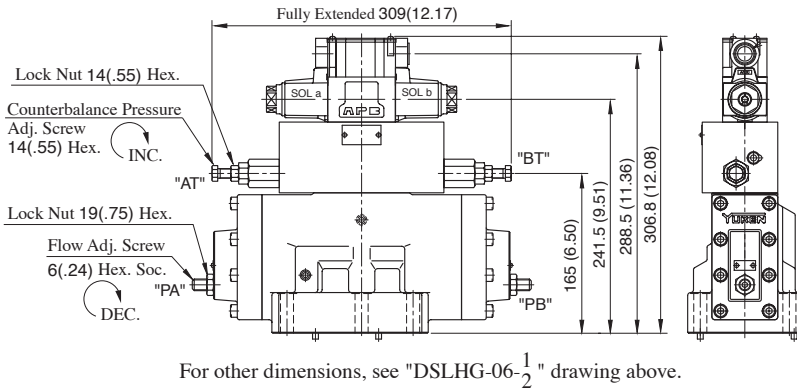


For other dimensions, see "DSLHG-06- $\frac{1}{2}$ " drawing left.

Model Numbers	"C" Thd.
DSLHG-06-*-13	G 1/2
DSLHG-06-*-1390	1/2 NPT

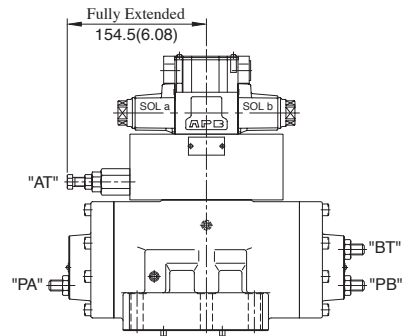
DIMENSIONS IN MILLIMETRES (INCHES)

DSLHG-06-4W-*-13/1390



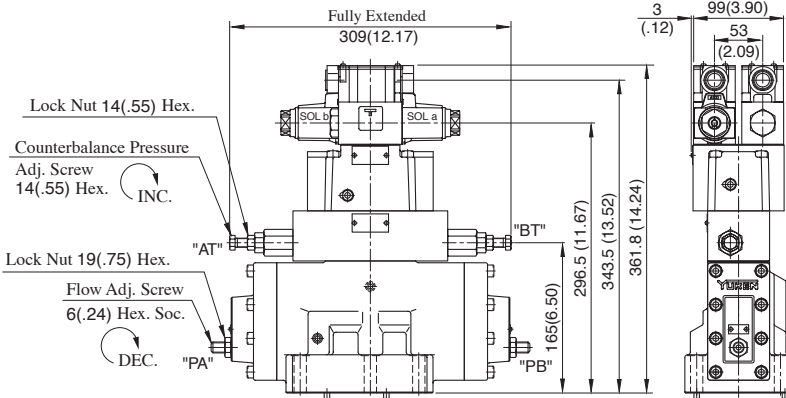
For other dimensions, see "DSLHG-06- $\frac{1}{2}$ " drawing above.

DSLHG-06-4A-*-13/1390



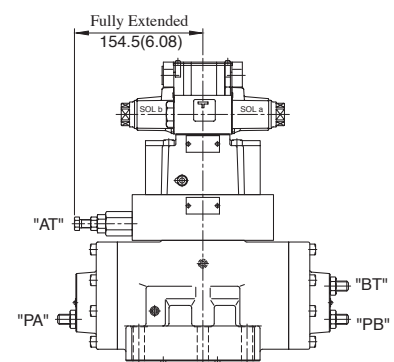
For other dimensions, see "DSLHG-06-4W" drawing left.

DSLHG-06-5W-*-13/1390



For other dimensions, see "DSLHG-06- $\frac{1}{2}$ " drawing above.

DSLHG-06-5A-*-13/1390

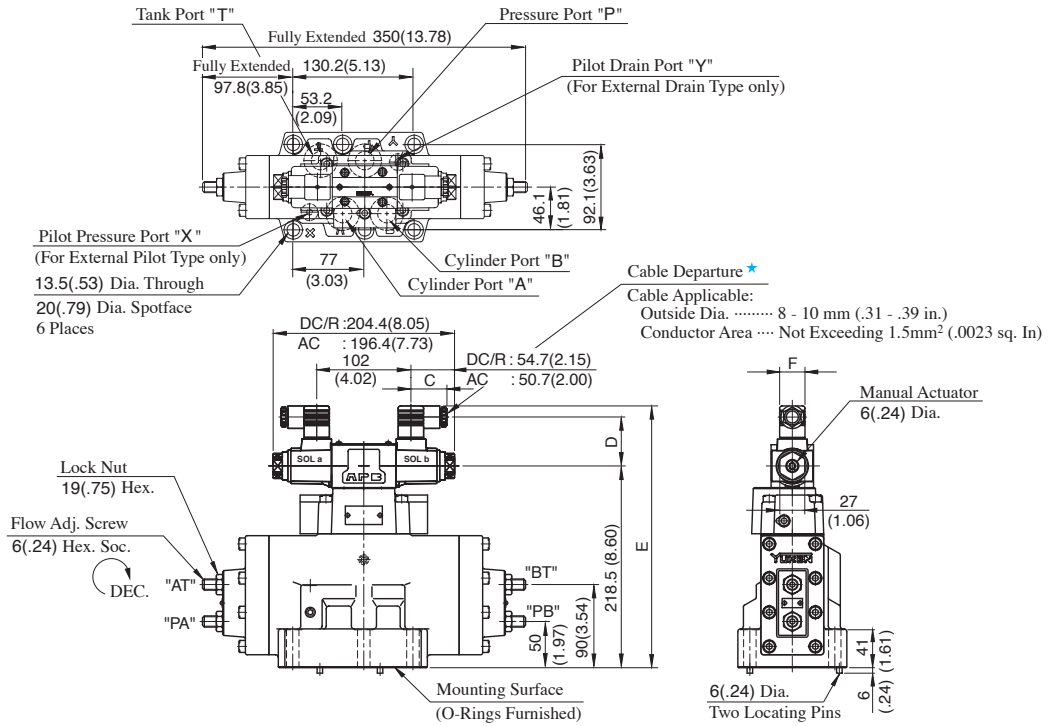


For other dimensions, see "DSLHG-06-5W" drawing left.

DSLHG-06- $\frac{1}{2}$ -*-N-13/1390

Plug-in Connector Type

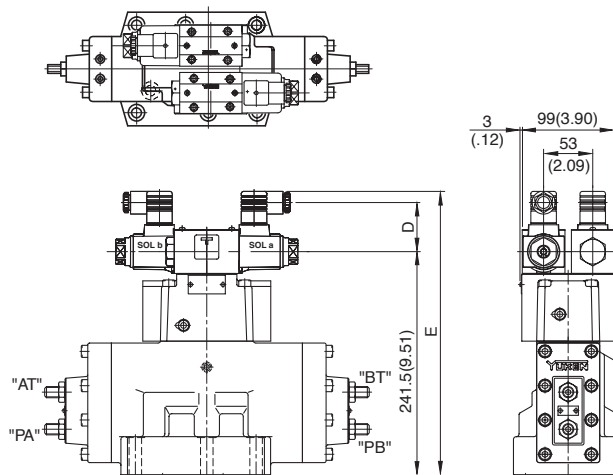
Mounting Surface:
ISO4401-AE-08-4-A



Model Numbers	Dimensions mm (Inches)			
	C	D	E	F
DSLHG-06-*-A*-N	39 (1.54)	53 (2.09)	283.5 (11.16)	27.5 (1.08)
DSLHG-06-*-D*-N	39 (1.54)	64 (2.52)	294.5 (11.59)	27.5 (1.08)
DSLHG-06-*-R*-N	53 (2.09)	57.2(2.25)	297.5 (11.71)	34 (1.34)

\star Position of cable departure can be changed. For the details, refer to DSLHG-04 valve on page 466.

DSLHG-06-3-*-N-13/1390



Model Numbers	Dimensions mm (Inches)	
	D	E
DSLHG-06-3-A*-N	53 (2.09)	306.5 (12.07)
DSLHG-06-3-D*-N	64 (2.52)	317.5 (12.50)
DSLHG-06-3-R*-N	57.2 (2.25)	320.5 (12.62)

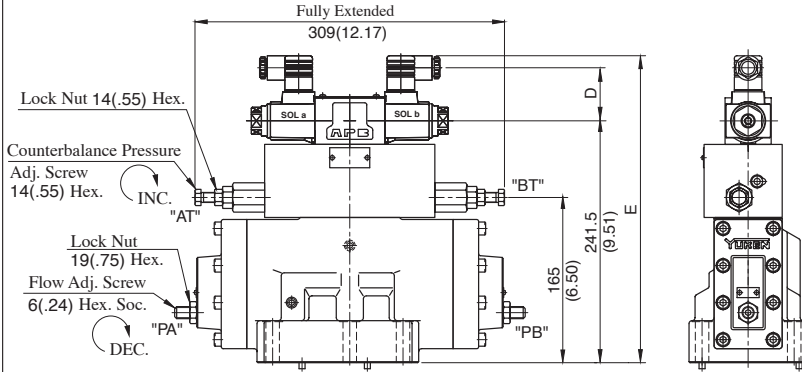
DIMENSIONS IN
MILLIMETRES (INCHES)

For other dimensions, see "DSLHG-06- $\frac{1}{2}$ -*-N" drawing above.

Plug-in Connector Type

Mounting Surface:
ISO4401-AE-08-4-A

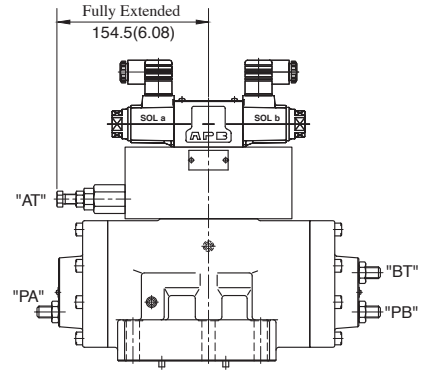
DSLHG-06-4W-*-N-13/1390



Model Numbers	Dimensions mm (Inches)	
	D	E
DSLHG-06-4W-A*-N	53 (2.09)	306.5 (12.07)
DSLHG-06-4W-D*-N	64 (2.52)	317.5 (12.50)
DSLHG-06-4W-R*-N	57.2 (2.25)	320.5 (12.62)

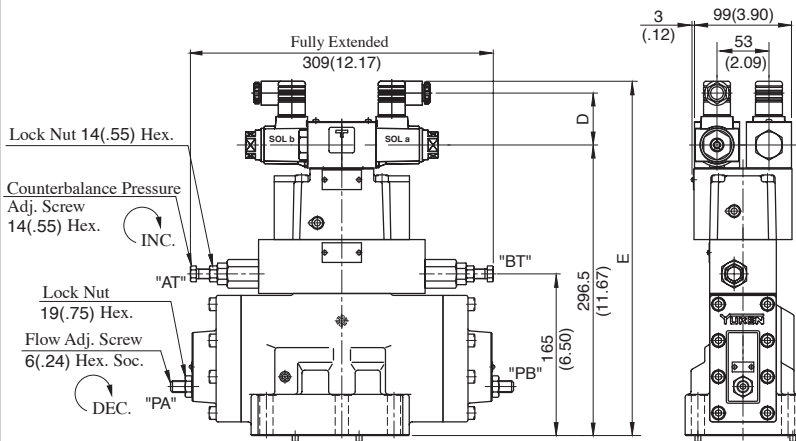
For other dimensions, see DSLHG-06- $\frac{1}{2}$ -*-N on the [previous page](#).

DSLHG-06-4A-*-N-13/1390



For other dimensions, see "DSLHG-06-4W-*-N" drawing left.

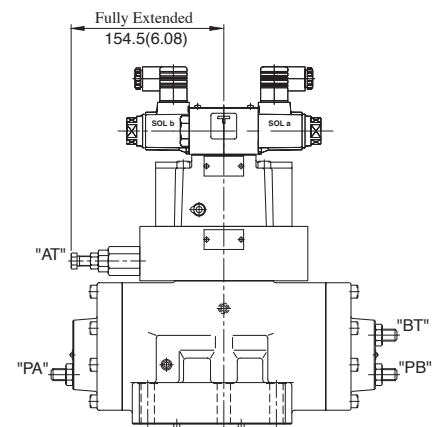
DSLHG-06-5W-*-N-13/1390



Model Numbers	Dimensions mm (Inches)	
	D	E
DSLHG-06-5W-A*-N	53 (2.09)	361.5 (14.23)
DSLHG-06-5W-D*-N	64 (2.52)	372.5 (14.67)
DSLHG-06-5W-R*-N	57.2 (2.25)	375.5 (14.78)

For other dimensions, see DSLHG-06- $\frac{1}{2}$ -*-N on the [previous page](#).

DSLHG-06-5A-*-N-13/1390



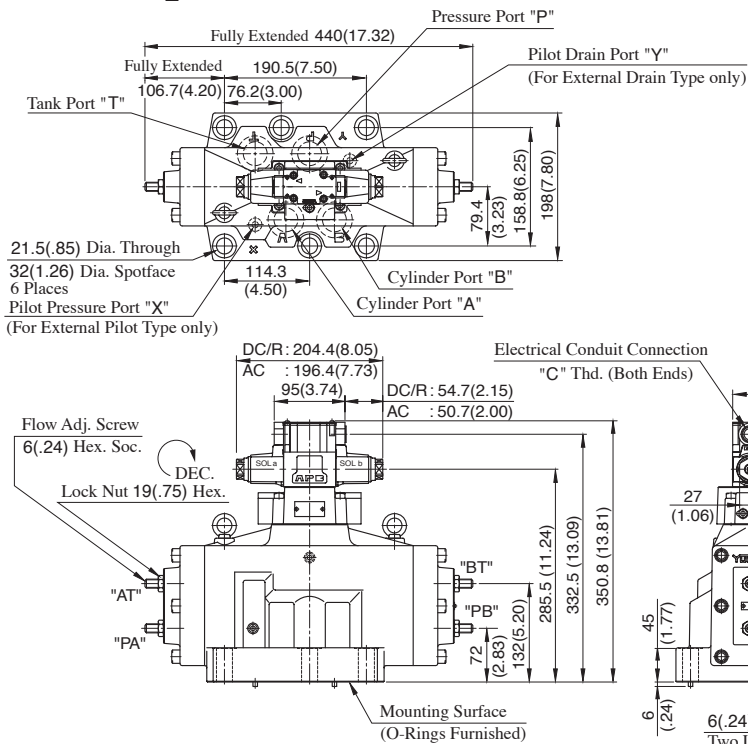
For other dimensions, see "DSLHG-06-5W-*-N" drawing left.

**DIMENSIONS IN
MILLIMETRES (INCHES)**

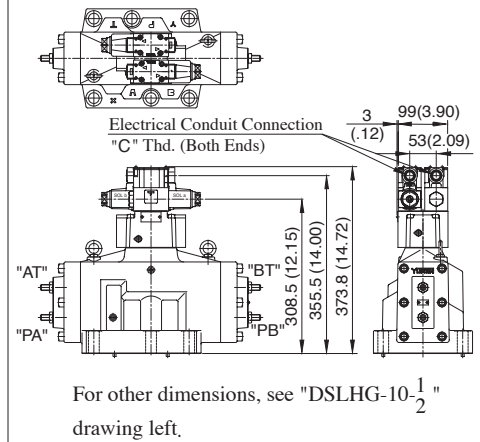
Terminal Box Type

Mounting Surface:
ISO 4401-AF-10-4-A

DSLHG-10- $\frac{1}{2}$ -*-13/1390



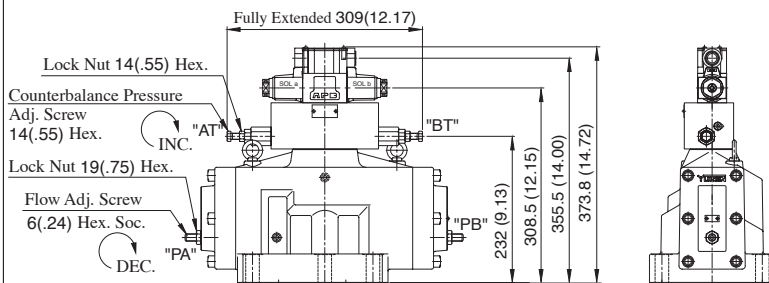
DSLHG-10-3-*-13/1390



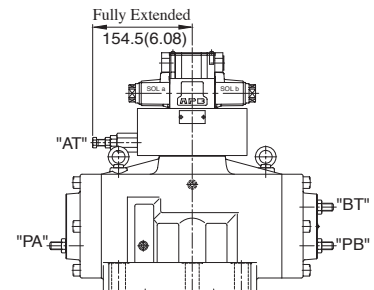
Model Numbers	"C" Thd.
DSLHG-10-*-13	G 1/2
DSLHG-10-*-1390	1/2 NPT

**DIMENSIONS IN
MILLIMETRES (INCHES)**

DSLHG-10-4W-*-13/1390

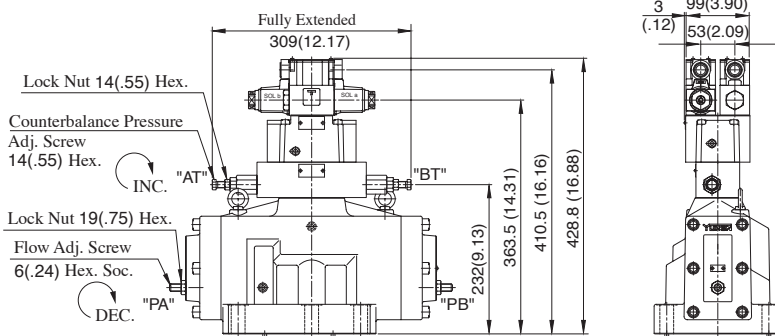


DSLHG-10-4A-*-13/1390



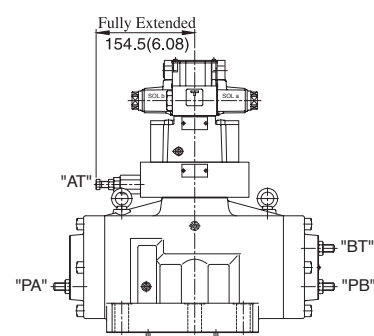
For other dimensions, see "DSLHG-10-4W"
drawing left.

DSLHG-10-5W-*-13/1390



For other dimensions, see "DSLHG-10- $\frac{1}{2}$ "
drawing above.

DSLHG-10-5A-*-13/1390



For other dimensions, see "DSLHG-10-5W"
drawing left.

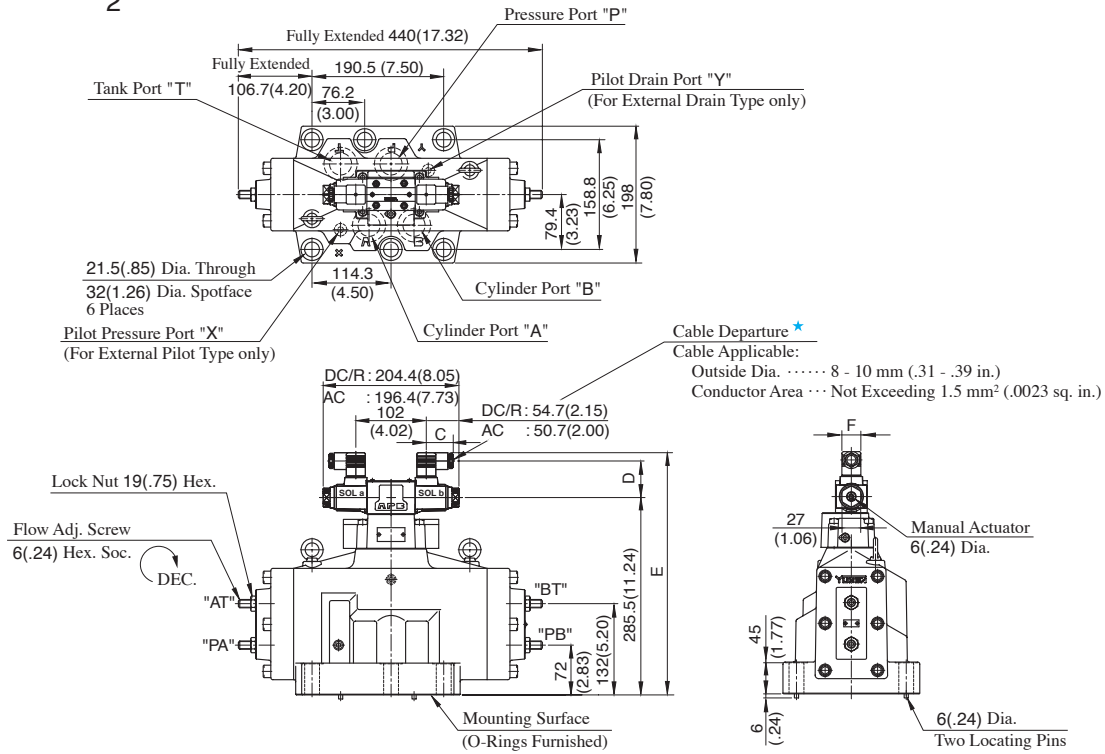
E

Multi Purpose Control Valves

Plug-in Connector Type

Mounting Surface:
ISO 4401-AF-10-4-A

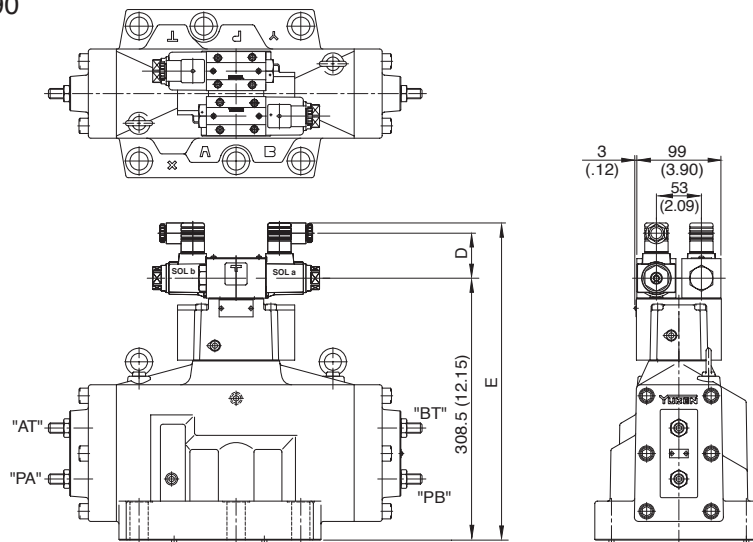
DSLHG-10- $\frac{1}{2}$ -*-N-13/1390



Model Numbers	Dimensions mm (Inches)			
	C	D	E	F
DSLHG-10-*-A*-N	39 (1.54)	53 (2.09)	350.5 (13.80)	27.5 (1.08)
DSLHG-10-*-D*-N	39 (1.54)	64 (2.52)	361.5 (14.23)	27.5 (1.08)
DSLHG-10-*-R*-N	53 (2.09)	57.2(2.25)	364.5 (14.35)	34 (1.34)

★ Position of cable departure can be changed. For the details, refer to DSLHG-04 valve on page 466.

DSLHG-10-3-*-N-13/1390



Model Numbers	Dimensions mm (Inches)	
	D	E
DSLHG-10-3-A*-N	53 (2.09)	373.5 (14.70)
DSLHG-10-3-D*-N	64 (2.52)	384.5 (15.14)
DSLHG-10-3-R*-N	57.2 (2.25)	387.5 (15.26)

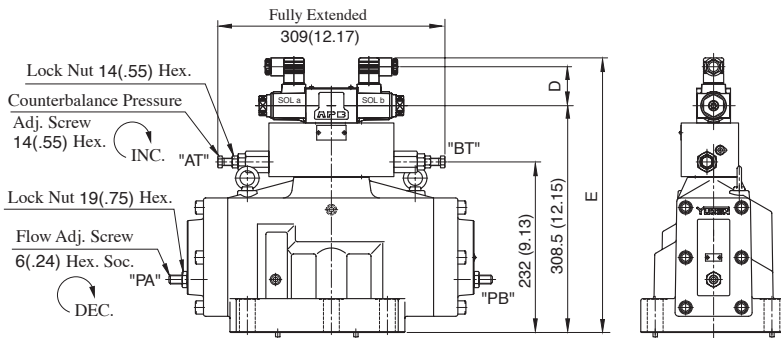
**DIMENSIONS IN
MILLIMETRES (INCHES)**

For other dimensions, see "DSLHG-10- $\frac{1}{2}$ -*-N" drawing above.

Plug-in Connector Type

Mounting Surface:
ISO 4401-AF-10-4-A

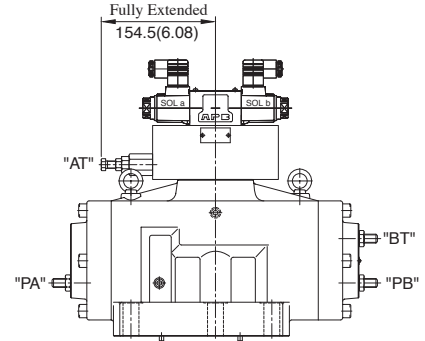
DSLHG-10-4W-*-N-13/1390



Model Numbers	Dimensions mm (Inches)	
	D	E
DSLHG-10-4W-A*-N	53 (2.09)	373.5 (14.70)
DSLHG-10-4W-D*-N	64 (2.52)	384.5 (15.14)
DSLHG-10-4W-R*-N	57.2 (2.25)	387.5 (15.26)

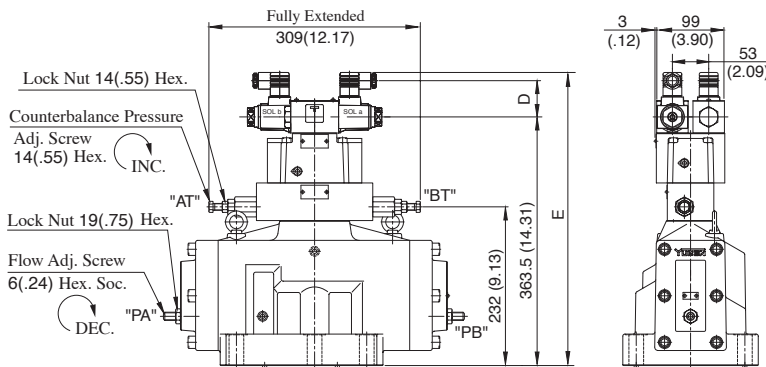
For other dimensions, see DSLHG-10- $\frac{1}{2}$ -*-N on the [previous page](#).

DSLHG-10-4A-*-N-13/1390



For other dimensions, see
"DSLHG-10-4W-*-N" drawing left.

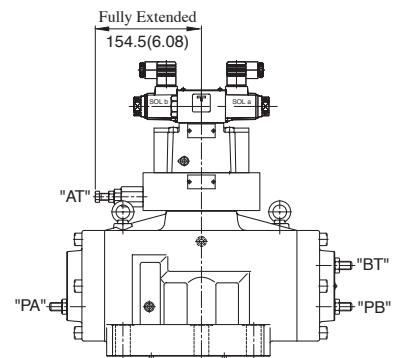
DSLHG-10-5W-*-N-13/1390



Model Numbers	Dimensions mm (Inches)	
	D	E
DSLHG-10-5W-A*-N	53 (2.09)	428.5 (16.87)
DSLHG-10-5W-D*-N	64 (2.52)	439.5 (17.30)
DSLHG-10-5W-R*-N	57.2 (2.25)	442.5 (17.42)

For other dimensions, see DSLHG-10- $\frac{1}{2}$ -*-N on the [previous page](#).

DSLHG-10-5A- *-N-13/1390



For other dimensions, see
"DSLHG-10-5W-*-N" drawing left.

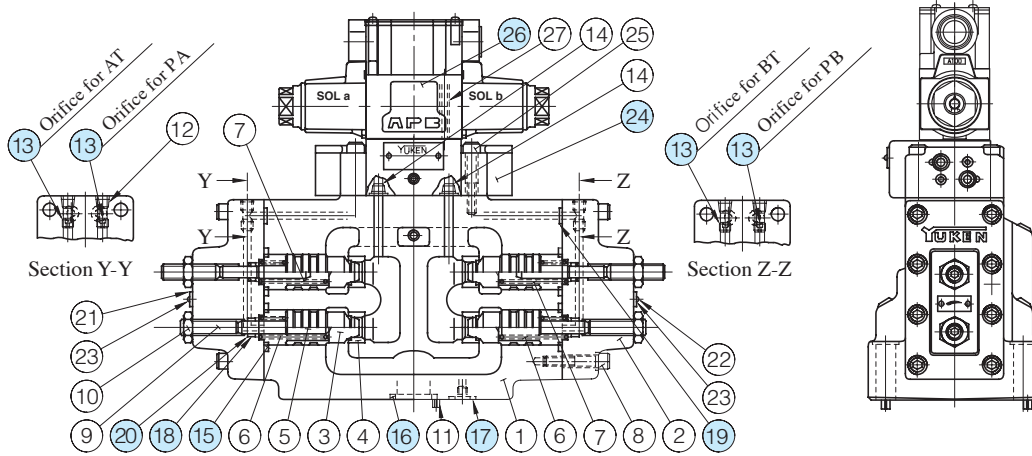
**DIMENSIONS IN
MILLIMETRES (INCHES)**

E

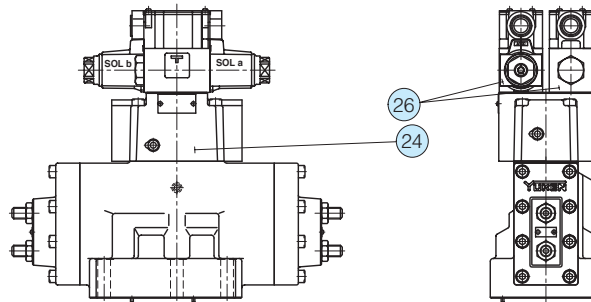
Multi Purpose Control Valves

■ List of Seals for Main Valve, Pilot Selector Valve and Orifice

DSLHG-04/06/10- $\frac{1}{2}$ -*-13/1390



DSLHG-04/06/10-3-*-13/1390



Note) Main valve is same as above drawings.

● List of Seals for Main Valves

Item	Name of Parts	Part Numbers			Qty.
		DSLHG-04	DSLHG-06	DSLHG-10	
15	O-Ring	SO-NB-P22	SO-NB-G30	SO-NB-G40	4
16	O-Ring	SO-NB-P22	SO-NB-P30	SO-NB-P42	4
17	O-Ring	SO-NB-P9	SO-NB-P14	SO-NB-P14	2
18	O-Ring	SO-NA-P8	SO-NA-P10	SO-NA-P16	4
19	O-Ring	SO-NB-P8	SO-NB-P9	SO-NB-P11	4
20	Back Up Ring	SO-BB-P8	SO-BB-P10	SO-BB-P16	4

Note: When ordering the seals, please specify the seal kit number listed on page 478.

● Item 13 Orifice

The timing of flow path opening/closing can be adjusted as required by selecting the appropriate pilot orifice diameter. When the diameter of the orifice is to be changed, another orifice should be ordered. Standard built-in orifice diameters and selectable orifice diameters are listed in the table below.

Orifice Type	TP-OPT-1/16 x d			Max. Dia. at Pressure over 20 MPa(2900 PSI)
	Orifice Diameter "d" mm			
	Standard Built-in	Selectable		
DSLHG-04	1.0	0.5, 0.6, 0.8, 1.0		1.2
DSLHG-06	1.2	1.2, 1.4, 1.6, 1.8		
DSLHG-10	1.4	2.0, 2.5		1.4

● Item 24 Pilot Selector Valve List

Multi-Purpose Control Valve Model Numbers	24 Pilot Selector Valve Model Numbers
DSLHG-04-1	CG-04-1-10
DSLHG-04-2	CG-04-2-10
DSLHG-04-3	CG-04-3-10
DSLHG-06-1	CG-06-1-10
DSLHG-06-2	CG-06-2-10
DSLHG-06-3	CG-06-3-10
DSLHG-10-1	CG-06-1-10
DSLHG-10-2	CG-06-2-10
DSLHG-10-3	CG-06-3-10

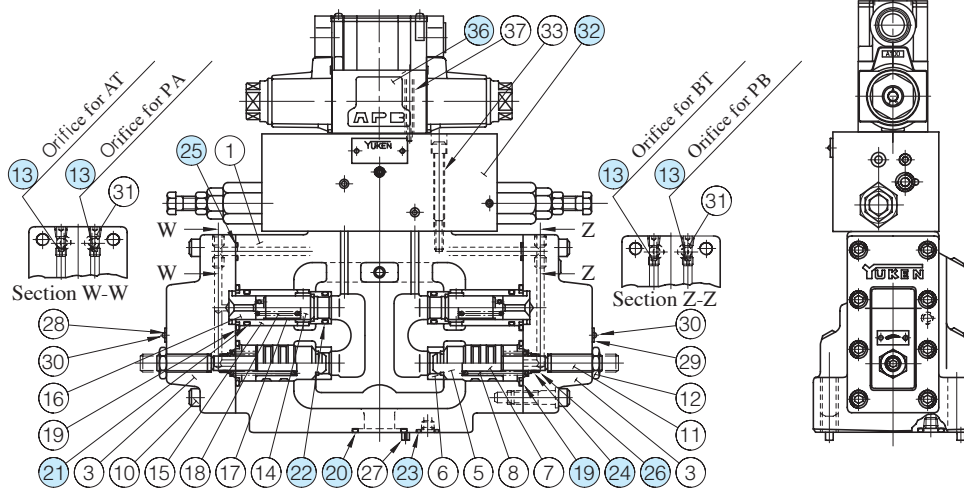
Note: For details of Pilot Selector Valve, see page 476.

● Pilot Valve

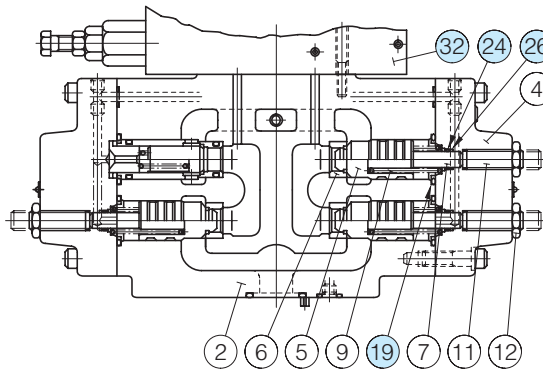
Refer to page 478 for Pilot Valve Model Numbers.

List of Seals for Main Valves and Pilot Selector Valve

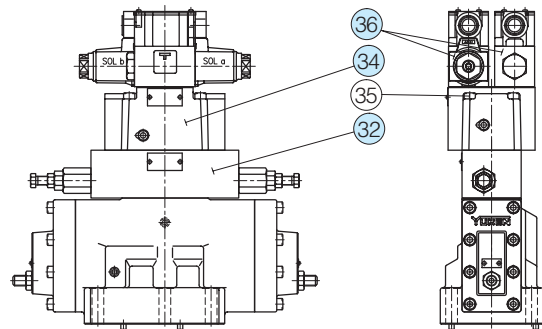
DSLHG-04/06/10-4W-*-12/1290



DSLHG-04/06/10-4A
5A-*-12/1290



DSLHG-04/06/10-5W-*-12/1290



Note) Main valve is the same as above drawings.

List of Seals for Main Valves

Item	Name of Parts	Part Numbers			Qty.
		DSLHG-04	DSLHG-06	DSLHG-10	
19	O-Ring	SO-NB-P22	SO-NB-G30	SO-NB-G40	4
20	O-Ring	SO-NB-P22	SO-NB-P30	SO-NB-P42	4
21	O-Ring	SO-NB-P16	SO-NB-P22	SO-NB-P30	2(1)
22	O-Ring	SO-NB-P14	SO-NB-P20	SO-NB-A122	2(1)
23	O-Ring	SO-NB-P9	SO-NB-P14	SO-NB-P14	2
24	O-Ring	SO-NA-P8	SO-NA-P10	SO-NA-P16	2(3)
25	O-Ring	SO-NB-P8	SO-NB-P9	SO-NB-P11	4
26	Back Up Ring	SO-BB-P8	SO-BB-P10	SO-BB-P16	2(3)

Note 1: The figures in () indicate the quantity of seals used for 4A and 5A.

Note 2: When ordering the seals, please specify the seal kit number listed on [page 478](#).

Pilot Valve

Refer to [page 478](#) for Pilot Valve Model Numbers.

Pilot Selector Valve List

Multi-Purpose Control Valve Model Numbers	Pilot Selector Valve Model Numbers	
	Item (32)	Item (34)
DSLHG-04-4A-■	CG-04-4A-■-10	—
DSLHG-04-4W-■	CG-04-4W-■-10	—
DSLHG-04-5A-■	CG-04-5A-■-10	CG-04-3-10
DSLHG-04-5W-■	CG-04-5W-■-10	
DSLHG-06-4A	CG-06-4A-10	—
DSLHG-06-4W	CG-06-4W-10	—
DSLHG-06-5A	CG-06-5A-10	CG-06-3-10
DSLHG-06-5W	CG-06-5W-10	
DSLHG-10-4A	CG-06-4A-10	—
DSLHG-10-4W	CG-06-4W-10	—
DSLHG-10-5A	CG-06-5A-10	CG-06-3-10
DSLHG-10-5W	CG-06-5W-10	

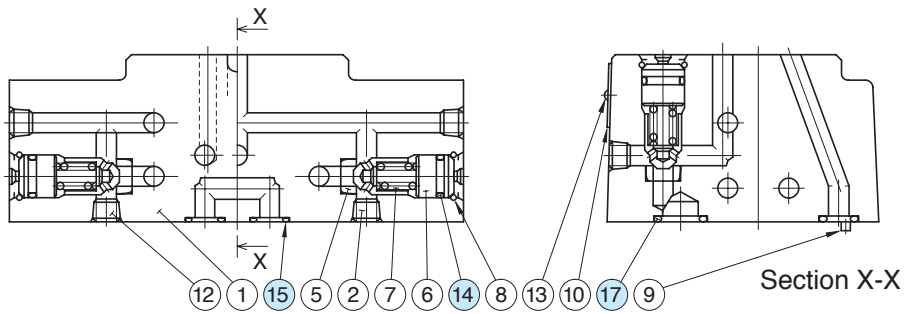
Note: Fill "B" or "H" representing the pressure adjustment range in section marked with ■.

See [page 477](#) for the details of the pilot selector valves.

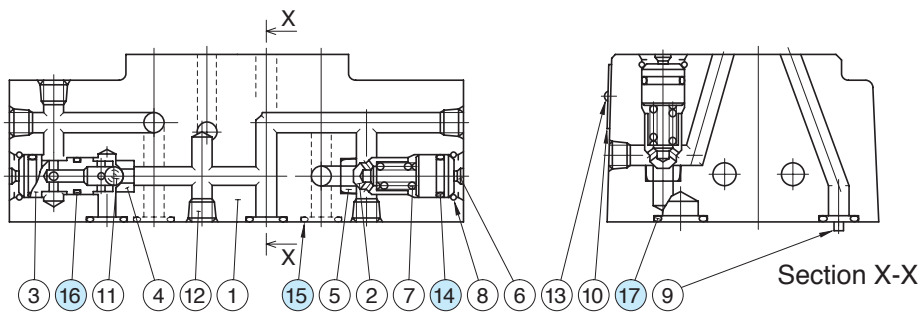
● See the [previous page](#) for Item (13) Orifice.

■ List of Seals (Pilot Selector Valves)

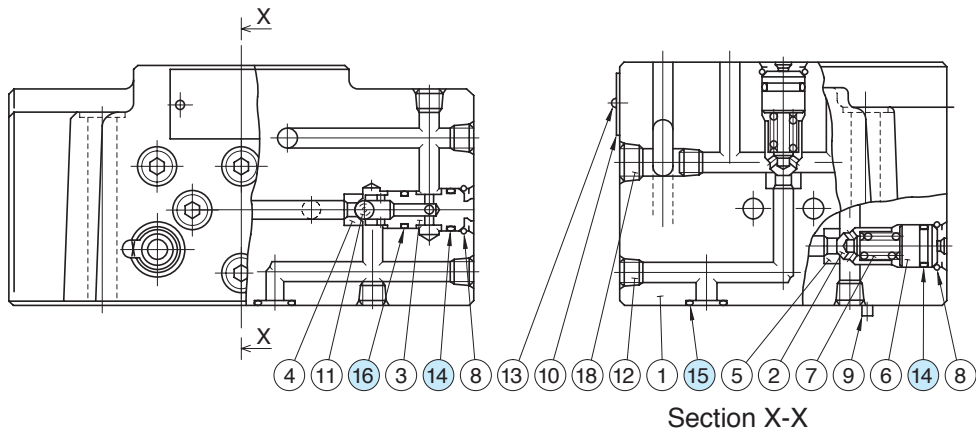
CG-04/06-1-10



CG-04/06-2-10



CG-04/06-3-10



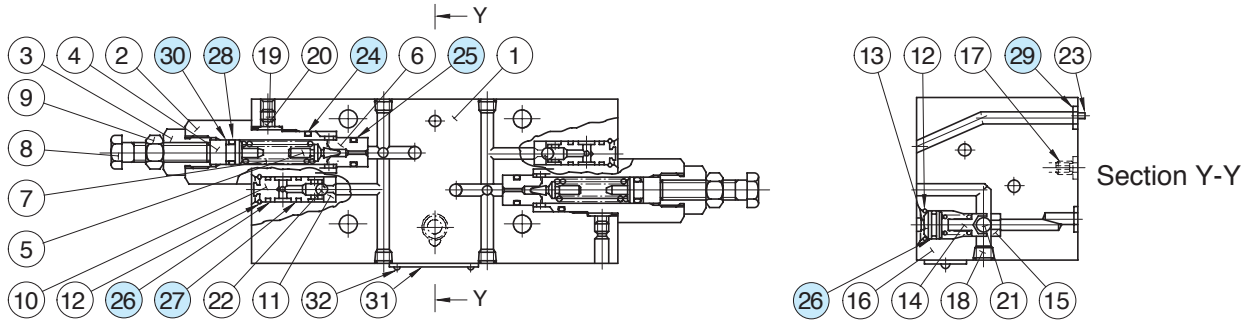
● List of Seals

Item	Name of Parts	CG-04					CG-06			
		Part Numbers	Quantity			Part Numbers	Quantity			
			CG-04-1	CG-04-2	CG-04-3		CG-06-1	CG-06-2	CG-06-3	
14	O-Ring	SO-NB-P10	3	5	5	SO-NB-P10	3	5	5	
15	O-Ring	SO-NB-P8	7	7	8	SO-NB-P9	7	7	8	
16	O-Ring	SO-NB-P8	—	2	2	SO-NB-P8	—	2	2	
17	O-Ring	SO-NB-P8	1	1	—	SO-NB-A014	1	1	—	

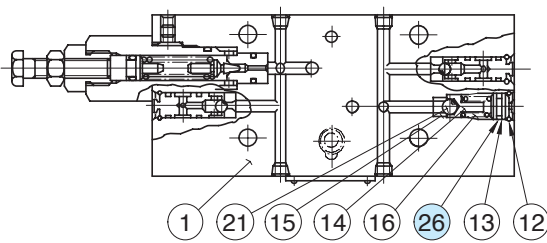
Note: When ordering the o-rings, please specify the seal kit number listed in [page 478](#).

List of Seals (Pilot Selector Valves)

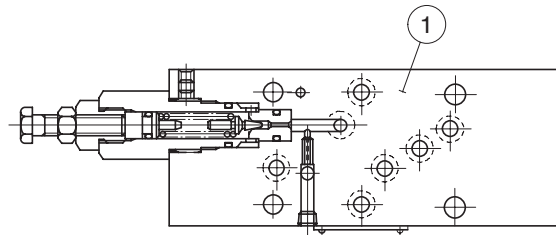
CG-04/06-4W-10



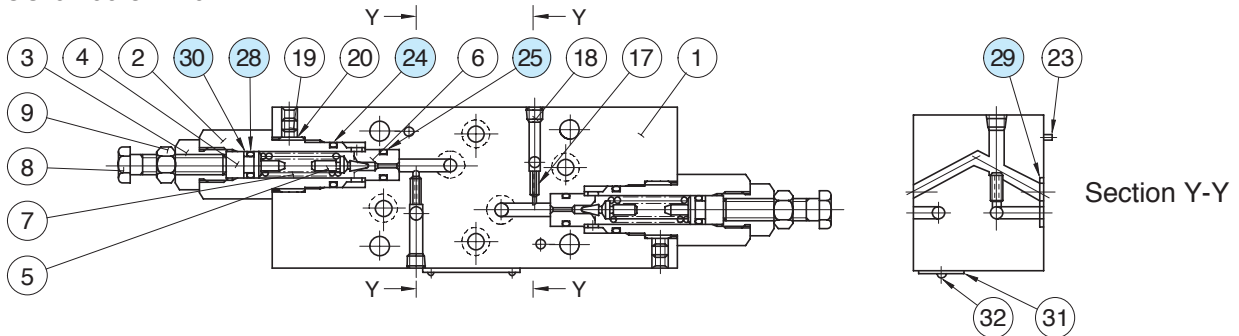
CG-04/06-4A-10



CG-04/06-5A-10



CG-04/06-5W-10



List of Seals

Item	Name of Parts	CG-04				CG-06					
		Part Numbers	Quantity				Part Numbers	Quantity			
			-4W-	-4A-	-5W-	-5A-		-4W-	-4A-	-5W-	-5A-
24	O-Ring	SO-NB-P12	2	1	2	1	SO-NB-P16	2	1	2	1
25	O-Ring	SO-NB-P9	2	1	2	1	SO-NB-P11	2	1	2	1
26	O-Ring	SO-NB-P10	3	4	—	—	SO-NB-P10	3	4	—	—
27	O-Ring	SO-NB-P8	2	2	—	—	SO-NB-P8	2	2	—	—
28	O-Ring	SO-NA-P6	2	1	2	1	SO-NA-P9	2	1	2	1
29	O-Ring	SO-NB-P8	8	8	8	8	SO-NB-P9	8	8	8	8
30	Back Up Ring	SO-BB-P6	2	1	2	1	SO-BB-P9	2	1	2	1

Note: When ordering the seals, please specify the seal kit number listed in [page 478](#).

List of Seal Kits and Pilot Valves

Model Numbers	Pilot Valve Model Numbers	Seal Kit Numbers		
		Complete Kit	For Pilot Selector Valves	For Pilot Valves
DSLHG-04-1-★-▲-13 DSLHG-04-1-★-▲-1390	DSG-01-3C9-★-▲-70 DSG-01-3C9-★-▲-7090	KS-DSLHG-04-1-▲-13	KS-CG-04-1-10	KS-DSG-01-▲-70 (1 Set Req'd)
DSLHG-04-2-★-▲-13 DSLHG-04-2-★-▲-1390	DSG-01-3C9-★-▲-70 DSG-01-3C9-★-▲-7090	KS-DSLHG-04-2-▲-13	KS-CG-04-2-10	
DSLHG-04-3-★-▲-13 DSLHG-04-3-★-▲-1390	DSG-01-2B2-★-▲-70 DSG-01-2B2-★-▲-7090	KS-DSLHG-04-3-▲-13		KS-DSG-01-▲-70 (2 Set Req'd)
DSLHG-04-4A-★-▲-13 DSLHG-04-4A-★-▲-1390	DSG-01-3C9-★-▲-70 DSG-01-3C9-★-▲-7090	KS-DSLHG-04-4A-▲-13	KS-CG-04-4A-10	KS-DSG-01-▲-70 (1 Set Req'd)
DSLHG-04-4W-★-▲-13 DSLHG-04-4W-★-▲-1390	DSG-01-3C9-★-▲-70 DSG-01-3C9-★-▲-7090	KS-DSLHG-04-4W-▲-13	KS-CG-04-4W-10	
DSLHG-04-5A-★-▲-13 DSLHG-04-5A-★-▲-1390	DSG-01-2B2-★-▲-70 DSG-01-2B2-★-▲-7090	KS-DSLHG-04-5A-▲-13	KS-CG-04-5A-10	KS-DSG-01-▲-70 (2 Set Req'd)
DSLHG-04-5W-★-▲-13 DSLHG-04-5W-★-▲-1390	DSG-01-2B2-★-▲-70 DSG-01-2B2-★-▲-7090	KS-DSLHG-04-5W-▲-13	KS-CG-04-5W-10	
DSLHG-06-1-★-▲-13 DSLHG-06-1-★-▲-1390	DSG-01-3C9-★-▲-70 DSG-01-3C9-★-▲-7090	KS-DSLHG-06-1-▲-13	KS-CG-06-1-10	KS-DSG-01-▲-70 (1 Set Req'd)
DSLHG-06-2-★-▲-13 DSLHG-06-2-★-▲-1390	DSG-01-3C9-★-▲-70 DSG-01-3C9-★-▲-7090	KS-DSLHG-06-2-▲-13	KS-CG-06-2-10	
DSLHG-06-3-★-▲-13 DSLHG-06-3-★-▲-1390	DSG-01-2B2-★-▲-70 DSG-01-2B2-★-▲-7090	KS-DSLHG-06-3-▲-13	KS-CG-06-3-10	KS-DSG-01-▲-70 (2 Set Req'd)
DSLHG-06-4A-★-▲-13 DSLHG-06-4A-★-▲-1390	DSG-01-3C9-★-▲-70 DSG-01-3C9-★-▲-7090	KS-DSLHG-06-4A-▲-13	KS-CG-06-4A-10	KS-DSG-01-▲-70 (1 Set Req'd)
DSLHG-06-4W-★-▲-13 DSLHG-06-4W-★-▲-1390	DSG-01-3C9-★-▲-70 DSG-01-3C9-★-▲-7090	KS-DSLHG-06-4W-▲-13	KS-CG-06-4W-10	
DSLHG-06-5A-★-▲-13 DSLHG-06-5A-★-▲-1390	DSG-01-2B2-★-▲-70 DSG-01-2B2-★-▲-7090	KS-DSLHG-06-5A-▲-13	KS-CG-06-5A-10	KS-DSG-01-▲-70 (2 Set Req'd)
DSLHG-06-5W-★-▲-13 DSLHG-06-5W-★-▲-1390	DSG-01-2B2-★-▲-70 DSG-01-2B2-★-▲-7090	KS-DSLHG-06-5W-▲-13	KS-CG-06-5W-10	
DSLHG-10-1-★-▲-13 DSLHG-10-1-★-▲-1390	DSG-01-3C9-★-▲-70 DSG-01-3C9-★-▲-7090	KS-DSLHG-10-1-▲-13	KS-CG-06-1-10	KS-DSG-01-▲-70 (1 Set Req'd)
DSLHG-10-2-★-▲-13 DSLHG-10-2-★-▲-1390	DSG-01-3C9-★-▲-70 DSG-01-3C9-★-▲-7090	KS-DSLHG-10-2-▲-13	KS-CG-06-2-10	
DSLHG-10-3-★-▲-13 DSLHG-10-3-★-▲-1390	DSG-01-2B2-★-▲-70 DSG-01-2B2-★-▲-7090	KS-DSLHG-10-3-▲-13	KS-CG-06-3-10	KS-DSG-01-▲-70 (2 Set Req'd)
DSLHG-10-4A-★-▲-13 DSLHG-10-4A-★-▲-1390	DSG-01-3C9-★-▲-70 DSG-01-3C9-★-▲-7090	KS-DSLHG-10-4A-▲-13	KS-CG-06-4A-10	KS-DSG-01-▲-70 (1 Set Req'd)
DSLHG-10-4W-★-▲-13 DSLHG-10-4W-★-▲-1390	DSG-01-3C9-★-▲-70 DSG-01-3C9-★-▲-7090	KS-DSLHG-10-4W-▲-13	KS-CG-06-4W-10	
DSLHG-10-5A-★-▲-13 DSLHG-10-5A-★-▲-1390	DSG-01-2B2-★-▲-70 DSG-01-2B2-★-▲-7090	KS-DSLHG-10-5A-▲-13	KS-CG-06-5A-10	KS-DSG-01-▲-70 (2 Set Req'd)
DSLHG-10-5W-★-▲-13 DSLHG-10-5W-★-▲-1390	DSG-01-2B2-★-▲-70 DSG-01-2B2-★-▲-7090	KS-DSLHG-10-5W-▲-13	KS-CG-06-5W-10	

Note 1: Fill coil type (a symbol representing current/voltage) in section marked ★. Likewise, in section marked ▲, fill a symbol representing the type of electrical conduit connection (None: Terminal Box Type, N: Plug-in Connector Type).

2: A complete seal kit is composed of seal kit for pilot selector valve, seal kit for pilot valve and seal for main valve.

See pages 474 and 475 for information on the seals for main valve.

3: See page 344 for the detailed information on the pilot valves.

How to Change Pilot & Drain Connection

Pilot Connection and Drain Connection can be changed easily with a disconnection/connection of pilot plug. The following drawings give illustrations of External Pilot-External Drain Type, When changing to Internal Pilot-Internal Drain Type, the following procedure may be followed.

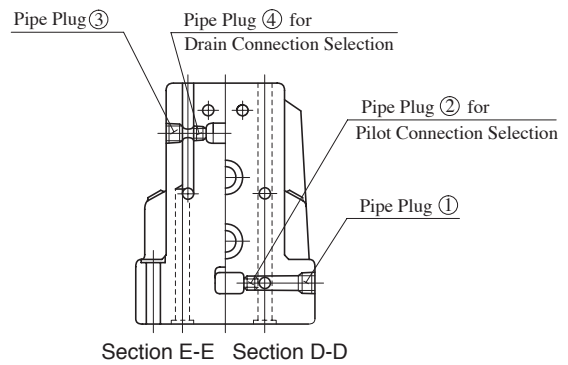
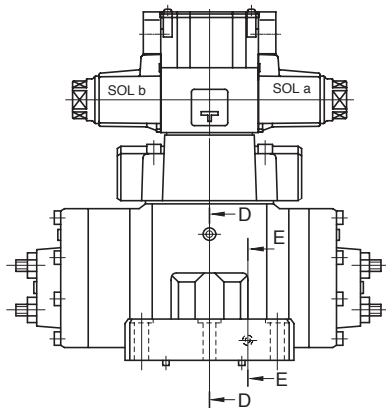
External Pilot → Internal Pilot (See Section E-E)

- 1) Remove pipe plug ①.
- 2) Remove pipe plug ②.
- 3) Wind a sealing tape around the pipe plug ①, then fit the plug into the port.

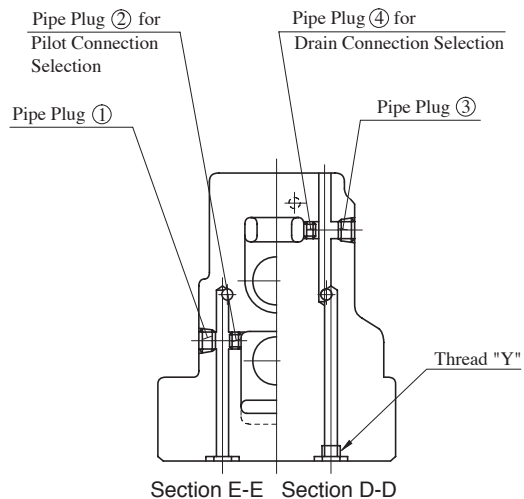
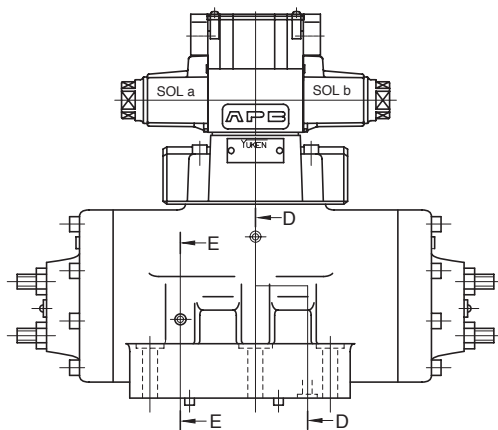
External Drain → Internal Drain (See Section D-D)

- 1) Remove pipe plug ③.
- 2) Remove pipe plug ④.
- 3) Wind a sealing tape around the pipe plug ③, then fit the plug into the port.
- 4) In case of DSLHG-04, fit the plug into the port "Y" on the sub-plate. In case of DSLHG-06/10, wind a sealing tape around the plug ④ and then thread it into the port "Y".

DSLHG-04



DSLHG-06/10



Solenoid Operated Poppet Type Two-Way Valves

These valves are used for opening/closing the oil path by having the poppet valve operated with an electric signal via solenoid. Because these are of poppet type, the internal leakage is quite small and there is no worry about hydraulic lock.

Specifications

Model Numbers	Max. Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Internal leakage cm ³ /min (cu.in./min)	Max. Changeover Frequency min ⁻¹ (Cycles/Min)	Approx. Mass kg(1bs.)
CDSC-01-C-D24-10*	15 (4.0)	21 (3050)*2	or less 0.25 (.015)	240	0.35 (.8)
CDSC-03-C-*-21*	50 (13.2)	14 (2030)	or less 0.25 (.015)	AC: 300 DC: 240 R: 120	0.5 (1.1)
CDST-03W-03-C-*-21*					0.85 (1.9)
CDSG-03-C-*-21*					0.85 (1.9)

- ★ 1. The maximum flow means the limited flow without inducing any abnormality to the operation (changeover) of the valve.
- ★ 2. When the valve is operated at 18.5 Mpa (2680 PSI) or higher pressure, continuous energies time is restricted with Max. 30 min., and also the energies ratio less than 90 %.

Solenoid Ratings

Electric Source	Coil Type	Frequency (Hz)	Voltage (V)		Current & Power at Rated Voltage				
			Source Rating	Serviceable Range	Inrush (A)	Holding (A)	Power (W)		
AC	A100	50	100	80 - 100	1.12	0.55	—		
		60	100	90 - 120	0.95	0.40			
	A120	50	120	96 - 132	0.93	0.46			
		60		108 - 144	0.79	0.33			
	A200	50	200	160 - 220	0.56	0.28			
		60		180 - 240	0.48	0.20			
	A240	50	240	192 - 264	0.47	0.23			
		60		216 - 288	0.40	0.17			
	DC (K Series)	D12	—	12	10.8 - 13.2	—		2.20	26
		D24★		24	21.6 - 26.4			1.10	
D48		48		43.2 - 52.8	0.55				
AC→DC Rectified	R100	50/60	100	90 - 110	—	0.30	26		
	R200		200	180 - 220		0.15			

- ★ CDSC-01 is available with coil type "D24" only.
- Because both AC and DC solenoids employ the plug-in type electrical wiring, the valve can be removed without removing the wiring. (Coil type of CDSC-01 is flying lead wire only.)
- Being 50-60 Hz common service AC solenoids, do not require rewiring when the applied frequency is changed.
- K-Series DC Solenoid which has a reputation for excellent DC control is employed. (Coil type of CDSC-01 is with Surge Suppressor.)

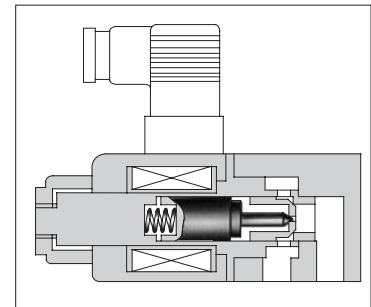
Model Number Designation

F-	CDS	T	-03	-C	-D12	-21	*
Special Seals	Series Number	Type of Connection	Valve Size	Valve Type	Coil Type	Design Number	Design Standard
F: Special seals for phosphate ester type fluids (Omit if not required)	CDS: Solenoid Operated Poppet Type Two-Way Valves	C: Cartridge Type	01	C: Normally Closed	DC D24	10	None: Japanese Std. "JIS" & European Design Std. 90: N. American Design Std.
		T: Threaded Connection	03W (Piping Size 1/4) 03 (Piping Size 3/8)		AC A100, A120 A200, A240 DC D12, D24, D100 AC→DC Rectified R100, R200	21	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std.
		G: Gasket Mounting	03			21	None: Japanese Std. "JIS" & European Design Std. 90: N. American Design Std.

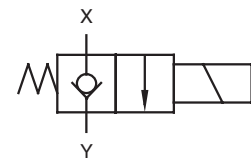
Mounting Bolts

Mounting bolt in the table below is attached only for Gasket mounting type valve (CDSG-03).

Valve Model Numbers	Socket Head Cap Screws (2pcs.)	
	Japanese Standard "JIS" European Design Standard	N. American Design Standard
CDSG-03	M6 × 60 Lg.	1/4-20 UNC × 2-1/4Lg.



Graphic Symbol

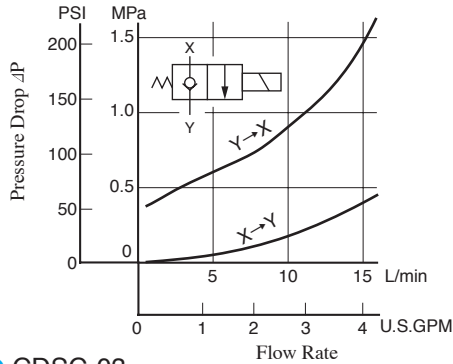


Instructions

- **Direction of flow when the solenoid is energised**
These valves do not allow flow from Y to X when the solenoid is energised.
- **At the time of test run**
At the time of test run, there is a possibility that the oil may not flow even after the solenoid is energised because of the residual air in the valve.
- **Mounting**
There are no mounting restrictions for any models.

Pressure Drop

- **CDSC-01** Hydraulic Fluid: Viscosity 30 mm² (141 SSU), Specific Gravity 0.850



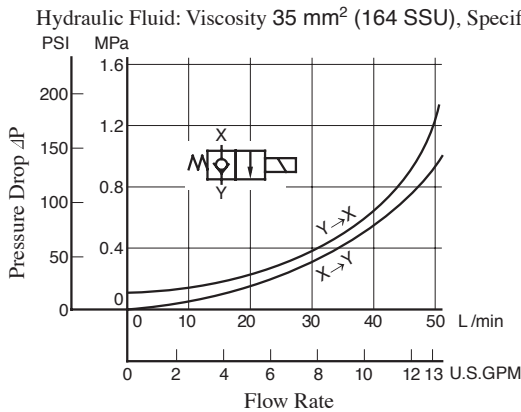
- For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
	SSU		77	98	141	186	232	278	324	371	417
Factor		0.84	0.91	1.00	1.07	1.14	1.19	1.24	1.28	1.32	1.35

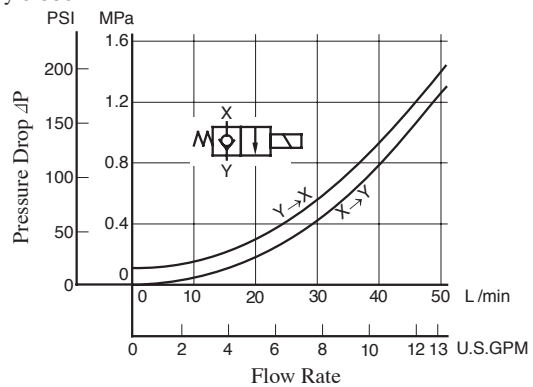
- For any other specific gravity (G'), the pressure drop ($\Delta P'$) may be obtained from the formula below.

$$\Delta P' = \Delta P (G'/0.850)$$

- **CDSC-03**
- **CDST-03**
- **CDSG-03**



- **CDST-03W**



Note: Measuring has been made for the CDSC-03 (Cartridge type) when it is equipped with the same body as the threaded connections and the gasket mounting type.

- For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
	SSU		77	98	141	186	232	278	324	371	417
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

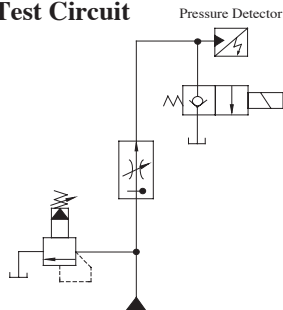
- For any other specific gravity (G'), the pressure drop ($\Delta P'$) may be obtained from the formula below.

$$\Delta P' = \Delta P (G'/0.850)$$

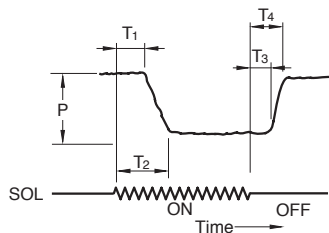
Changeover Time

Changeover time, T₂ and T₄, in particular, varies according to the hydraulic circuit and operating conditions. As an example, the following figures show how the measurement is made.

- **Test Circuit**

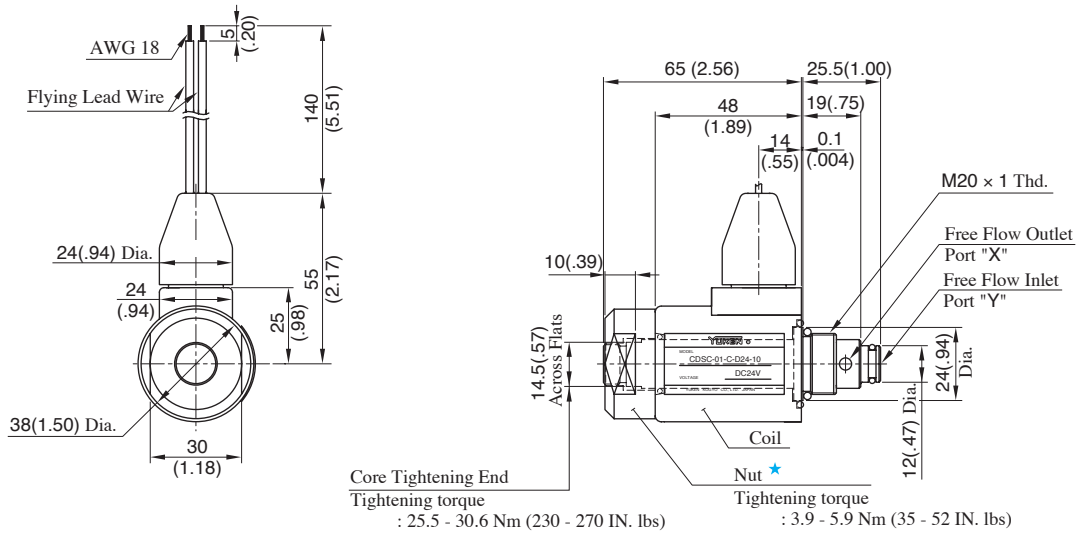


- **Result of measurement**



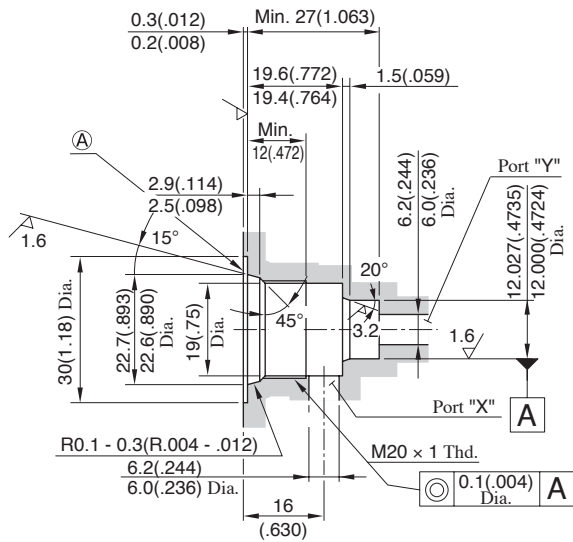
Model Number	Solenoid Types	Condition		Shifting time (ms)			
		Pressure "P" MPa (PSI)	Flow Rate L/min (U.S.GPM)	SOL "ON"(Open→Close)		SOL "OFF"(Open→Close)	
				T ₁	T ₂ (ex.)	T ₃	T ₄ (ex.)
CDSC-01	DC	10 (1450)	15 (4.0)	21.4	44.0	29.0	38.4
		21 (3050)	15 (4.0)	30.6	47.0	27.0	44.0
CDS*-03	AC	7 (1020)	50 (13.2)	10.0	86.0	20.0	44.0
		14 (2030)	50 (13.2)	11.0	43.0	12.0	54.0
	DC	7 (1020)	50 (13.2)	22.0	104.0	44.0	66.0
		14 (2030)	50 (13.2)	24.0	60.0	41.0	73.0
AC→DC Rectified	7 (1020)	50 (13.2)	27.0	100.0	114.0	146.0	
	14 (2030)	50 (13.2)	32.0	66.0	108.0	142.0	

CDSC-01-C-D24-10/1090



DIMENSIONS IN MILLIMETRES (INCHES)

Details of Mounting Holes



Note: The fitting portion of o-rings should have a good machined finish.

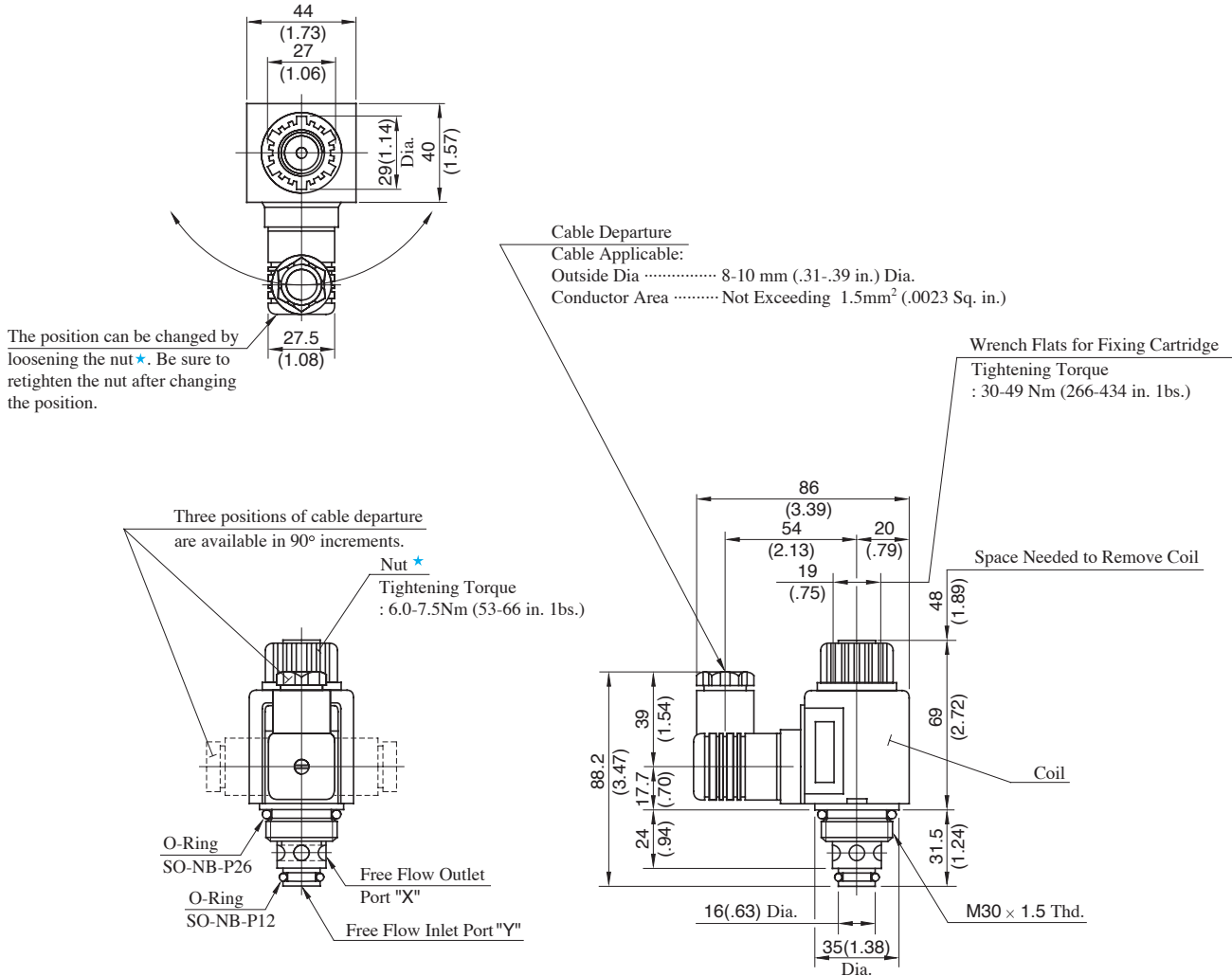
How to Mount

When mounting, the following steps must be followed:

1. Loosen the nut★, then remove the coil.
2. Thread the cartridge, making sure that the collar 24 (.94) Dia. of the cartridge is well fitted to the component surface (A) surface in the left drawing).
3. Attach the coil and secure it with a nut.

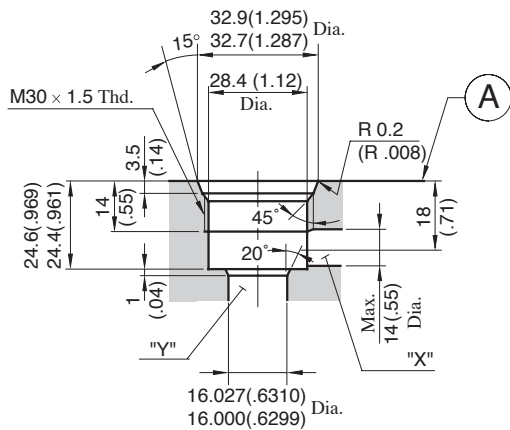
CDSC-03-C-A*-21/2190

Models with AC Solenoids



DIMENSIONS IN MILLIMETRES (INCHES)

Details of Mounting Holes



How to Mount

When mounting, the following steps must be followed:

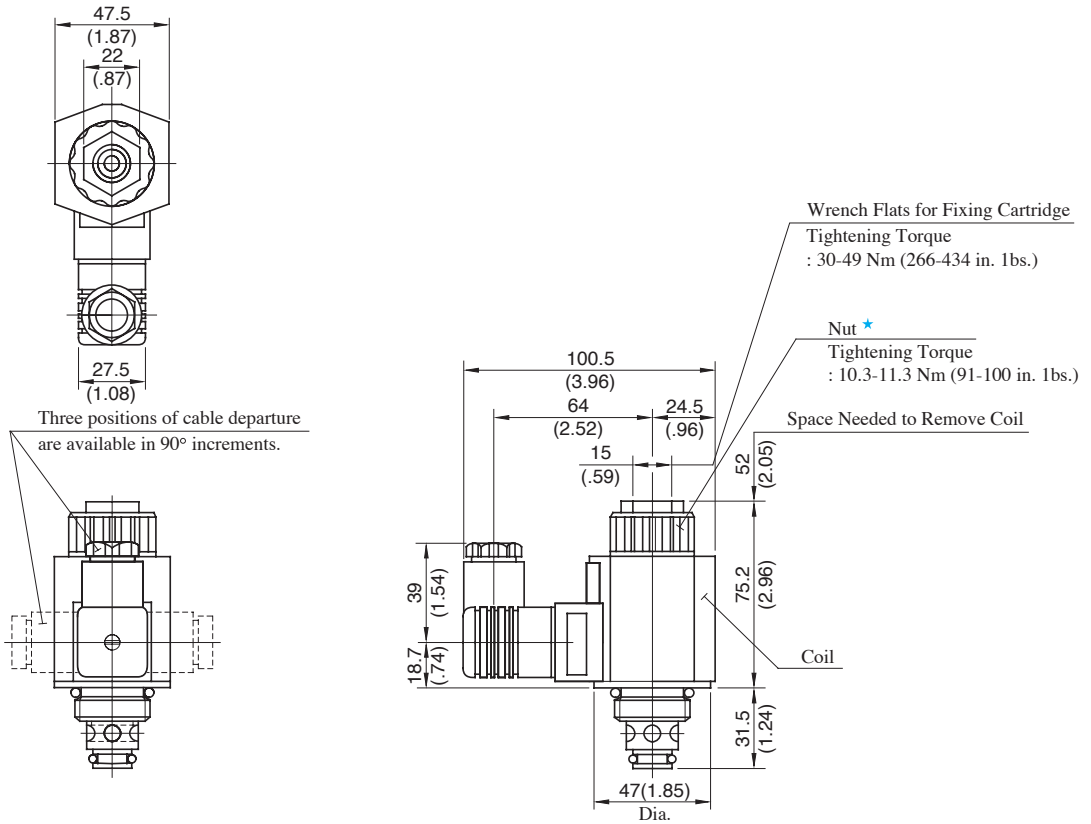
1. Loosen the nut \star , then remove the coil.
2. Thread the cartridge, making sure that the collar 35 (1.38) Dia. of the cartridge is well fitted to the component surface (A surface in the left drawing).
3. Attach the coil and secure it with a nut.

Note: The fitting portion of O-rings should have a good machined finish.



CDSC-03-C-D*-21/2190

Models with DC Solenoids

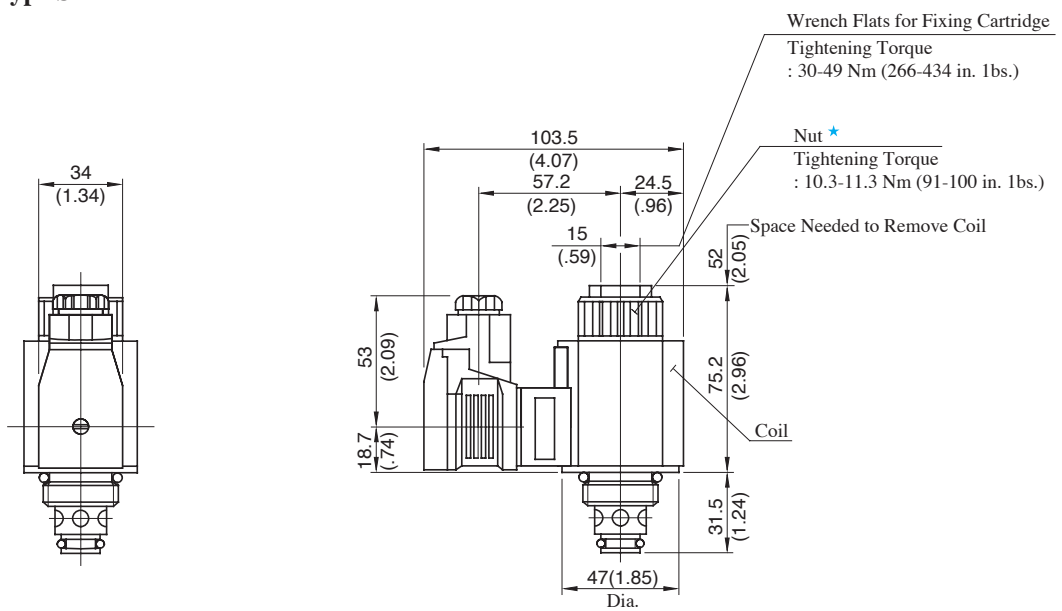


For other dimensions, refer to the "Models with AC Solenoids".

**DIMENSIONS IN
MILLIMETRES (INCHES)**

CDSC-03-C-R*-21/2190

Models with R Type Solenoids

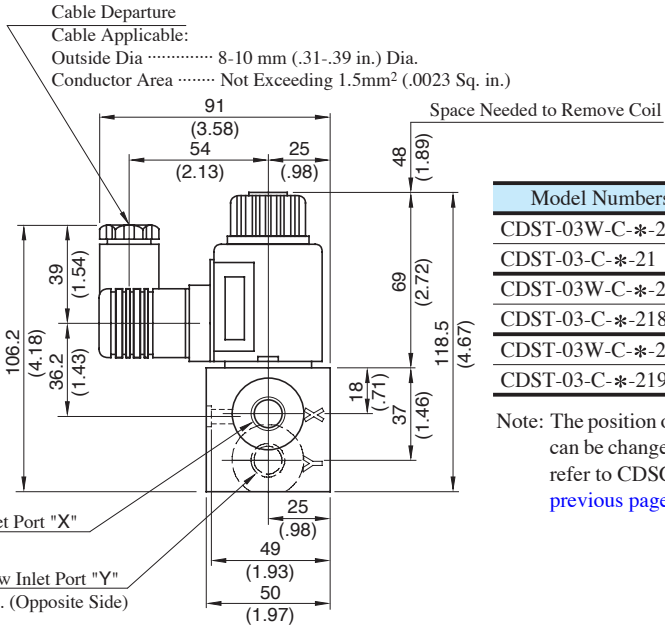
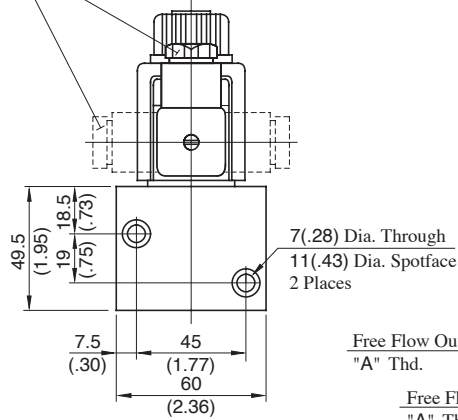


For other dimensions, refer to the "Models with AC Solenoids".

CDST-03, 03W-C-* -21/2180/2190

Models with AC Solenoids

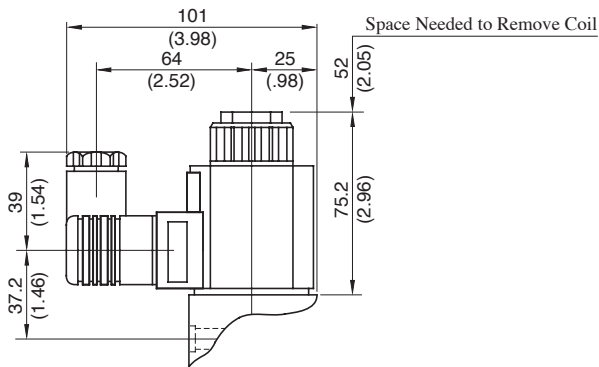
Three positions of cable departure are available in 90° increments.



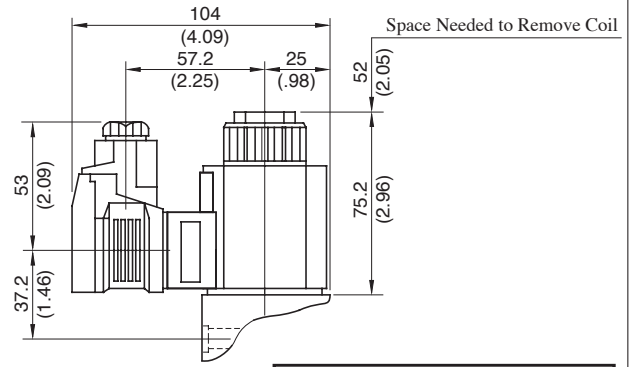
Model Numbers	"A" Thd.
CDST-03W-C-* -21	Rc 1/4
CDST-03-C-* -21	Rc 3/8
CDST-03W-C-* -2180	1/4 BSP.F
CDST-03-C-* -2180	3/8 BSP.F
CDST-03W-C-* -2190	1/4 NPT
CDST-03-C-* -2190	3/8 NPT

Note: The position of cable departure can be changed. For the detail, refer to CDSC-03 on the previous page.

Models with DC Solenoids



Models with R Type Solenoids



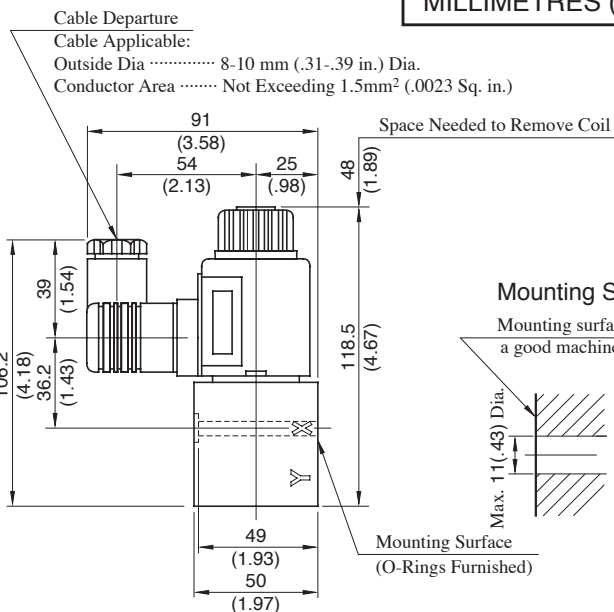
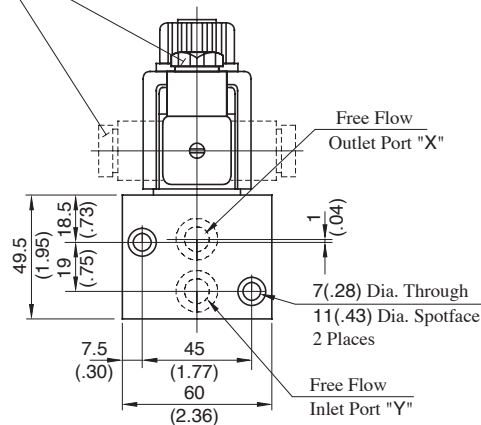
For other dimensions, refer to the "Models with AC Solenoids".

DIMENSIONS IN MILLIMETRES (INCHES)

CDSG-03-C-* -21/2190

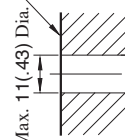
Models with AC Solenoids

Three positions of cable departure are available in 90° increments.



Mounting Surface

Mounting surface should have a good machined finish.



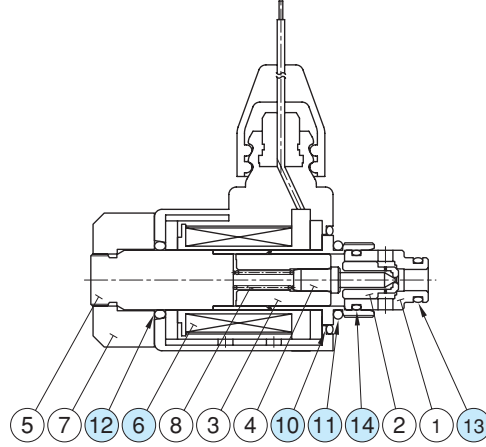
Note 1: For models with DC solenoids and models with R type solenoids, refer to CDST-03, 03W.

2: The position of cable departure can be changed. For the detail, refer to CDSC-03 on the previous page.



■ List of Seals and Coil Ass'y

CDSC-01-C-D24-10/1090

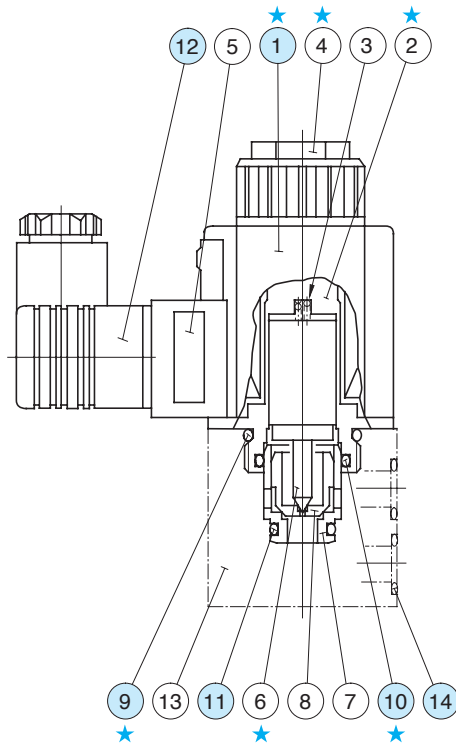


Item	Name of Parts	Part Numbers	Qty.	Seal Kit Numbers
6	Coil Ass'y	2697-VK317470-3	1	—————
10	O-Ring	TK280163-7	1	KS-CDSC-01-10
11	O-Ring	SO-NB-P18	1	
12	O-Ring	SO-NB-P16	1	
13	O-Ring	SO-NB-P9	1	
14	O-Ring	SO-NB-A014	1	

Note: When ordering the seals, please specify the seal kit number.

List of Seals, Solenoid Ass'y, Coil Ass'y and Connector Ass'y

CDST-03*-C- *-21/2180/2190
 CDSC-03-C- *-21/2190
 CDSG-03-C- *-21/2190



Solenoid assembly is composed of the parts marked with ★.

List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
9	O-Ring	SO-NB-P26	1	_____
10	O-Ring	SO-NB-P20	1	_____
11	O-Ring	SO-NB-P12	1	_____
14	O-Ring	SO-NB-A014	2	only for CDSG

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
CDSC-03-C- *-21*	KS-CDSC-03-20
CDST-03*-C- *-21*	
CDSG-03-C- *-21*	KS-CDSG-03-20

Note: When ordering the seals, please specify the seal kit number from the table right.

Solenoid Ass'y, Coil Ass'y and Connector Ass'y No.

Valve Model No.	Solenoid Ass'y No.	① Coil No.	② Connector Ass'y No.
CDS*-03*-C-A100	CSA1-100-20	C-CSA1-100-20	GDM-211-B-11
CDS*-03*-C-A120	CSA1-120-20	C-CSA1-120-20	
CDS*-03*-C-A200	CSA1-200-20	C-CSA1-200-20	
CDS*-03*-C-A240	CSA1-240-20	C-CSA1-240-20	
CDS*-03*-C-D12	CSD1-12-20	C-SD1-12-50	GDM-211-B-11
CDS*-03*-C-D24	CSD1-24-20	C-SD1-24-50	
CDS*-03*-C-D48	CSD1-48-20	C-SD1-48-50	
CDS*-03*-C-R100	CSR1-100-20	C-SR1-100-50	GDME-211-R-B-10
CDS*-03*-C-R200	CSR1-200-20	C-SR1-200-50	

Change of supply voltage

The supply voltage can be changed by replacing the coil.



■ **Interchangeability between Current and New Design**

Because of solenoid assembly improvements, CDS*-03* has been model-changed (design 20 to design 21).

● **Specifications and Characteristics**

There are no changes in the specifications and characteristics of the valves themselves.

● **Solenoid Ratings**

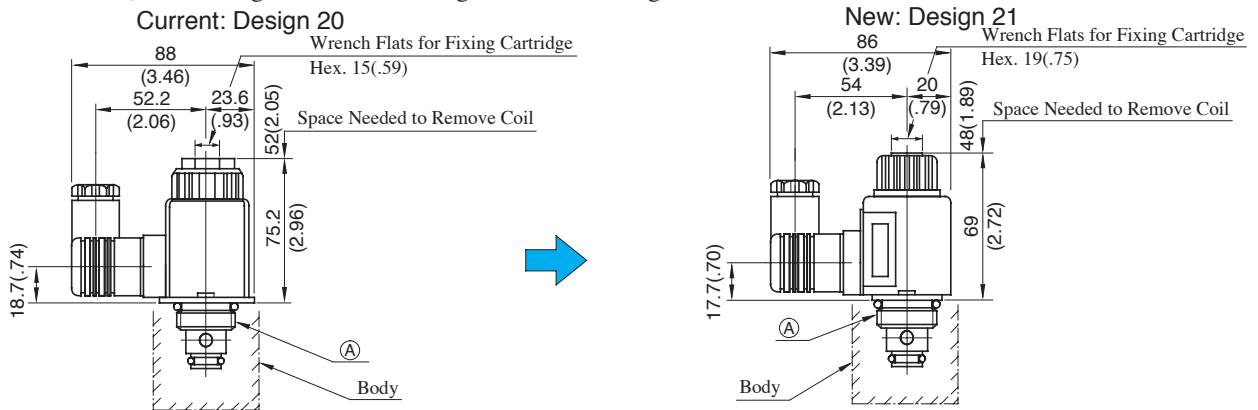
There are changes in the inrush current, holding current and power as shown below. No other changes.

Electric Source	Coil Type	Frequency (Hz)	Voltage (V)		Current & Power at Rated Voltage					
			Source Rating	Serviceable Range	Inrush (A)		Holding (A)		Power (W)	
					New	Current	New	Current	New	Current
AC	A100	50	100	80 - 110	1.12	1.30	0.55	0.52	—	—
		60	100	90 - 120	0.95	1.08	0.40	0.39		
			110		0.86	1.19	0.36	0.47		
	A120	50	120	96 - 132	0.93	1.08	0.46	0.45		
		60		108 - 144	0.79	0.98	0.33	0.33		
	A200	50	200	160 - 220	0.56	0.65	0.28	0.27		
			200	180 - 240	0.48	0.54	0.20	0.20		
		220	0.43		0.59	0.18	0.24			
A240	50	240	192 - 264	0.47	0.55	0.23	0.23			
	60		216 - 288	0.40	0.45	0.17	0.17			
DC (K Series)	D12	—	12	10.8 - 13.2	—	—	2.20	2.40	26	29
	D24		24	21.6 - 26.4			1.10	1.20		
	D48		48	43.2 - 52.8			0.55	0.60		
AC→DC Rectified	R100	50/60	100	90 - 110	—	—	0.30	0.32	26	29
	R200		200	180 - 220			0.15	0.17		

● **Interchangeability in Installation**

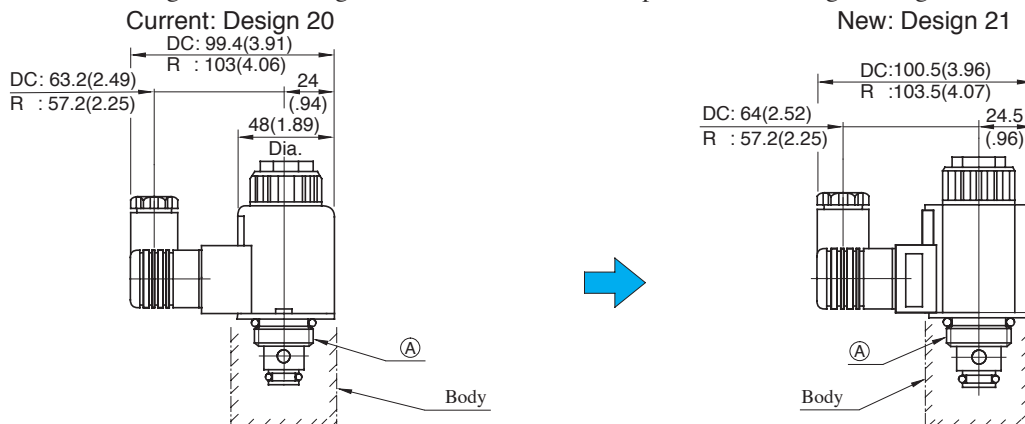
● **AC Solenoids**

Most items of mounting are interchangeable except the dimensions as shown below. In addition, the size of the spanner (core end faces) for locking the CDSC cartridges has been changed to 15-19 mm across flats.



● **DC/R Type Solenoids**

Most items of mounting are interchangeable except the dimensions as shown below. The solenoid shape changed from circular to hexagonal. No change in the size 15 mm of the spanner for locking cartridges.

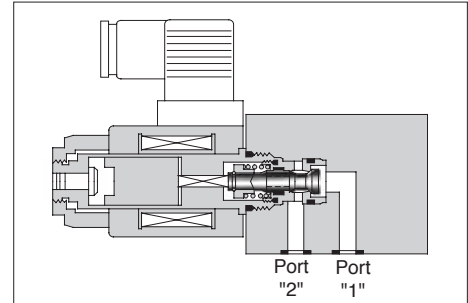


Note: The above drawings give illustrations for the cartridge type. The dimension (A) at the mounting section remains unchanged. In case of the Thread Connection Type and Gasket Mounting Type, a body is mounted to the hatched section. The dimensions of the body remain unchanged.

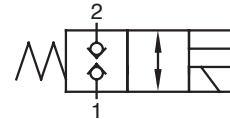
Shut-off Type Solenoid Operated Directional Valves

The shut-off type solenoid operated directional valves are poppet type solenoid operated two-way directional valves developed to meet the needs of this age such as energy and resources saving.

- **High-response**
High response is provided by the poppet design.
- **Smallest internal leakage**
Internal leakage are very small, less than 5 drips per min., which is achieved by the poppet design.
- **Two mounting types: cartridge and sub-plate**
Mounting dimensions for both types conform to ISO standard.
- **Water-proof type (conforming to JIS D 0203 Water Spray Test 32) is also available.**



Graphic Symbol



Specifications

Model Numbers	Max. Flow ^{★1} L/min (U.S.GPM)	Max. Operating Pressure			Max. Changeover Frequency min ⁻¹ (Cycles/Min)	Internal leakage cm ³ /min (cu.in./min)	Approx. Mass kg(1bs.)	
		Port "1" ^{★2}		Port "2"			AC	DC
		"1" to "2" Flow	"2" to "1" Flow					
DSPC-01-C-*-20* ^{★3} ^{★4}	40 (10.6)	10 (1450)	16 (2320)	25 (3630)	300	or Less 0.25 (.015)	0.45 (1.0)	0.6 (1.3)
DSPG-01-C-*-20* ^{★3}							1.45 (3.2)	1.6 (3.5)
DSPC-03-C-*-10* ^{★3}	80 (21.1)	10 (1450)	16 (2320)	25 (3630)	240	or Less 0.25 (.015)	0.9 (2.0)	1.0 (2.2)
DSPG-03-C-*-10* ^{★3}							3.8 (8.4)	3.9 (8.6)

★1. Maximum flow rates depend on operating conditions. For details, see page 491.

★2. Do not connect port "1" to a line subjected to surge pressures. In addition, if you use port "1" for tank line, be sure to keep the end of the line in the oil.

★3. Protections against dust and water conform to the international electric standard (IEC) PUBL 529 IP64.

★4. In the case of "DSPC-01-C-D*", use iron material for installation body (cavity).

E
Shut-off Type Solenoid Operated Directional Valves

Model Number Designation

F-	DSP	G	-01	-C	-D24	-20	*
Special Seals	Series Number	Type of Connection	Valve Size	Valve Type	Coil Type	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	DSP: Shut-Off Type Solenoid Operated Directional Valves	C: Cartridge Type G: Sub-plate Mounting	01	C: Normally Closed	AC A 100 A 200	20	None: Japanese Std. "JIS" & European Design Std. 90: N. American Design Std.
			03		DC D12 D24	10	

Solenoid Ratings

Electric Source	Coil Type	Frequency (Hz)	Voltage (V)		Current & Power at Rated Voltage					
			Source Rating	Serviceable Range	Inrush (A) ^{★1}		Holding (A)		Power (W)	
					01	03	01	03	01	03
AC	A100	50	100	80 - 110	2.42	5.37	0.51	0.90	—	—
			100	90 - 120	2.14	4.57	0.37	0.63		
		110	2.35		5.03	0.44	0.77			
	A200	50	200	160 - 220	1.21	2.69	0.25	0.45		
			200	180 - 240	1.07	2.29	0.19	0.31		
		220	1.18		2.52	0.22	0.38			
DC ^{★2} (K Series)	D12	—	12	10.8 - 13.2	—	—	2.45	3.16	29	38
	D24	—	24	21.6 - 26.4	—	—	1.23	1.57		

★1. Inrush current in the above table show rms values at maximum stroke.

★2. K-Series DC Solenoid which has a reputation for excellent DC control is employed.

Sub-plate

Model Numbers	Japanese Standard "JIS"		European Design Standard		N.American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
DSPG-01	DSGM-01-31	Rc 1/8	DSGM-01-3180	1/8 BSP.F	DSGM-01-3190	1/8 NPT	0.8 (1.8)
	DSGM-01X-31	Rc 1/4	DSGM-01X-3180	1/4 BSP.F	DSGM-01X-3190	1/4 NPT	0.8 (1.8)
	DSGM-01Y-31	Rc 3/8	—	—	DSGM-01Y-3190	3/8 NPT	0.8 (1.8)
DSPG-03	DSGM-03-40	Rc 3/8	DSGM-03-2180	3/8 BSP.F	DSGM-03-2190	3/8 NPT	3.0 (6.6)
	DSGM-03X-40	Rc 1/2	DSGM-03X-2180	1/2 BSP.F	DSGM-03X-2190	1/2 NPT	3.0 (6.6)
	DSGM-03Y-40	Rc 3/4	DSGM-03Y-2180	3/4 BSP.F	DSGM-03Y-2190	3/4 NPT	4.7 (10.4)

● Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

Mounting Bolts

Four socket head cap screws in the table below are included.

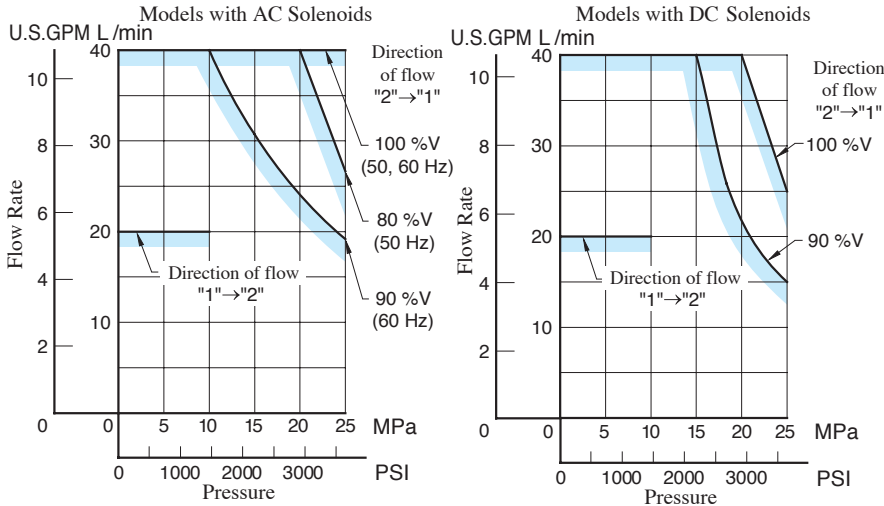
Valve Model Numbers	Descriptions	Soc. Hd. Cap Screw (4 pcs.)	Tightening Torque
DSPG-01	Japanese Standard "JIS" and European Design Standard	M5 × 50 Lg.	5-7 Nm (44 -62 in. lbs.)
	N. American Design Standard	No. 10-24 UNC × 2 Lg.	
DSPG-03	Japanese Standard "JIS" and European Design Standard	M6 × 80 Lg.	12-15 Nm (106 -133 in. lbs.)
	N. American Design Standard	1/4-20 UNC × 3-1/4 Lg.	

Typical Performance Characteristics at Viscosity 30 mm²/s (141 SSU) [ISO VG 46 oils, 50°C(122°F)]

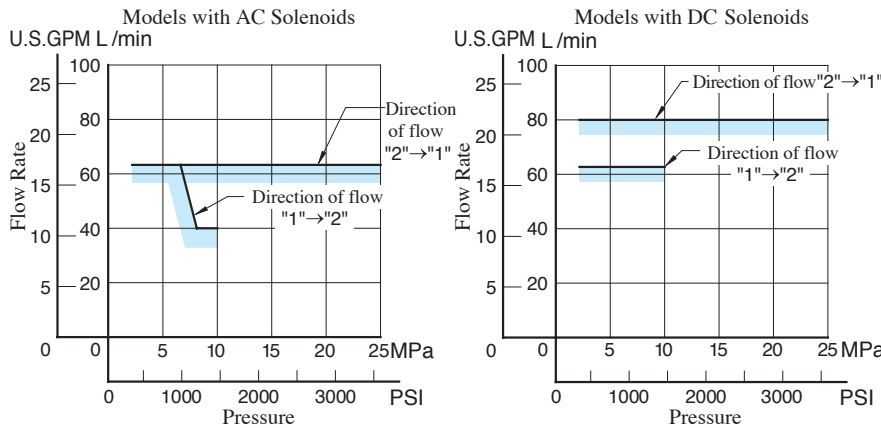
Maximum Flow Rate

The zone under each shaded line denotes the flow rate ranges being free of trouble in changeover.

DSPC/DSPG-01



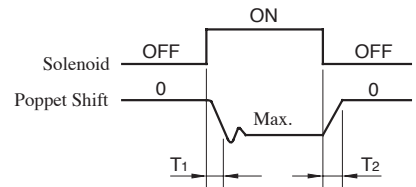
DSPC/DSPG-03



Typical Changeover Time

[Test Conditions]

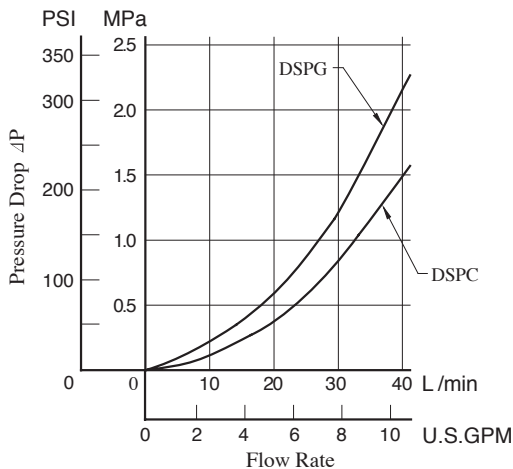
- Pressure: 15 MPa (2180 PSI)
- Flow Rate: (01) 30 L/min (7.9 U.S.GPM)
(03) 63 L/min (16.6 U.S.GPM)
- Viscosity: 30 mm²/s (141 SSU)
- Voltage: 100 % V
(After coil temperature rise and saturates)
- Direction of Flow: "2" → "1"



Model Numbers	Shifting Time (ms)	
	T ₁	T ₂
DSPC/DSPG-01-C-A*	22	30
DSPC/DSPG-01-C-D*	69	14
DSPC/DSPG-03-C-A*	22	20
DSPC/DSPG-03-C-D*	60	80

Pressure Drop

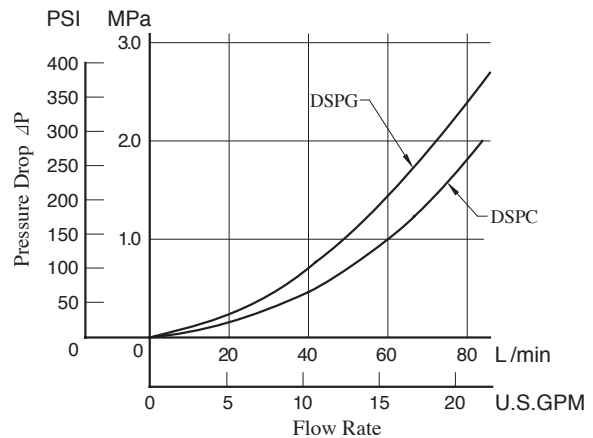
DSPC/DSPG-01



● For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
	SSU		77	98	141	186	232	278	324	371	417
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

DSPC/DSPG-03



● For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

$$\Delta P' = \Delta P(G'/0.850)$$

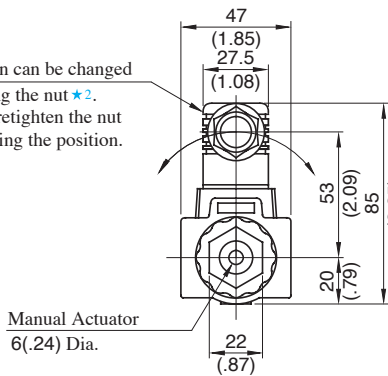


DSPC-01-C-*/20/2090

Mounting Surface: ISO 7789 20-01-0-93

● Models with AC Solenoids

The position can be changed by loosening the nut ★2. Be sure to retighten the nut after changing the position.

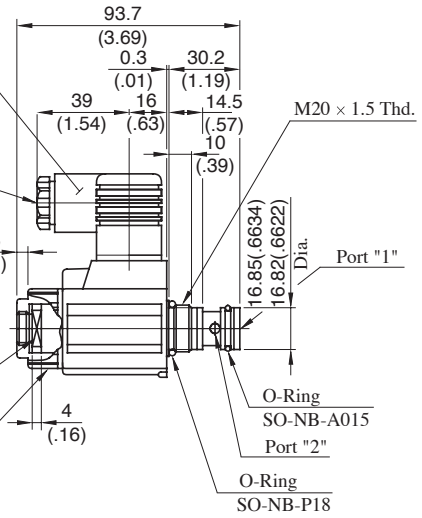


Three positions of cable departure are available in 90° increments.

Cable Departure
Cable Applicable:
Outside Dia.
.....8-10 mm (.31-.39 in.) Dia.
Conductor Area
.....Not Exceeding
1.5m² (.0023 Sq. in.)

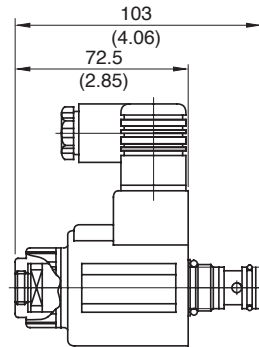
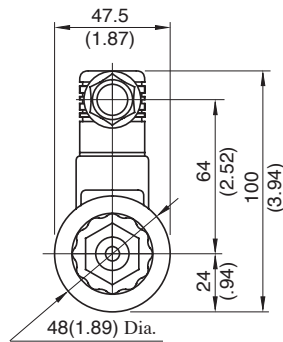
Core Tightening End
15(.59) Across Flats★1

Nut ★2



- ★1. Tightening torque for iron core assembly: 30 - 50 Nm (266-443 IN. lbs.)
- ★2. Tightening torque for nuts: 10.3 - 11.3 Nm (91-100 IN. lbs.)

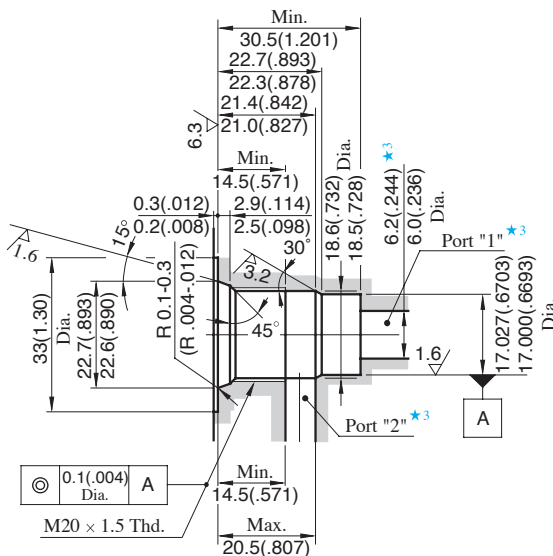
● Models with DC Solenoids



● For other dimensions, refer to the "Models with AC Solenoids".

■ Details of Mounting Holes

DIMENSIONS IN MILLIMETRES (INCHES)



How to Mount

When mounting, the following steps must be followed.

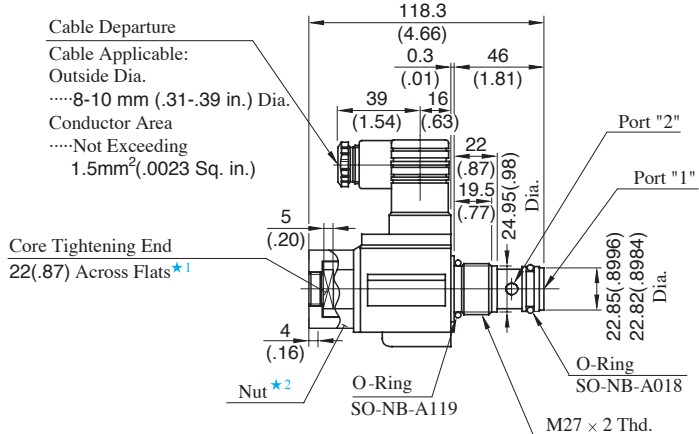
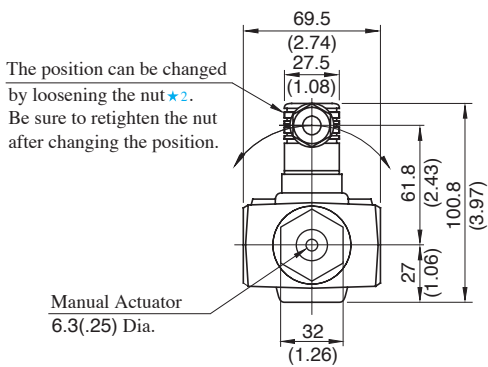
1. Loosen the coil fastening the nut and remove the coil.
2. Making use of the core tightening end, screw the cartridge in.
3. Attach the coil and fix it with the nut.

- ★3. Port diameter of 6.2 (.244) Dia. recommended.
- ★4. Use iron materials for the mounting section.

DSPC-03-C-*-10/1090

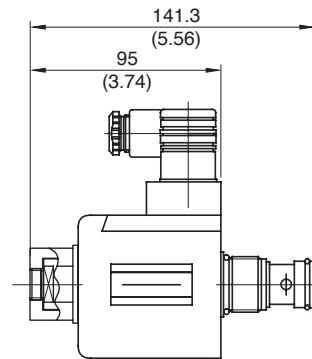
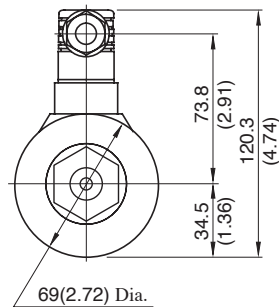
Mounting Surface: ISO 7789 27-01-0-93

Models with AC Solenoids



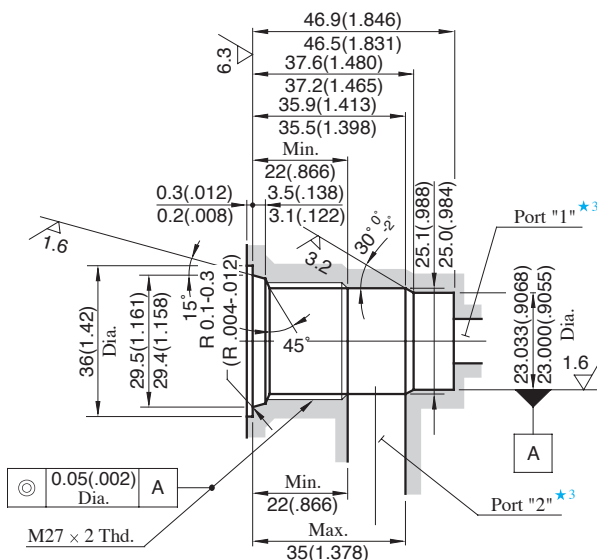
- ★1. Tightening torque for iron core assembly: 110-140 Nm (970-1240 IN. lbs.)
- ★2. Tightening torque for nuts: 8.5-10.5 Nm (75-93 IN. lbs.)

Models with DC Solenoids



● For other dimensions, refer to the "Models with AC Solenoids".

Details of Mounting Holes

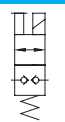


DIMENSIONS IN
MILLIMETRES (INCHES)

How to Mount

- When mounting, the following steps must be followed.
1. Loosen the coil fastening the nut and remove the coil.
 2. Making use of the core tightening end, screw the cartridge in.
 3. Attach the coil and fix it with the nut.

- ★3. A recommendable port dia. is 11 (.433) mm.
- ★4. Use iron materials for the mounting section.

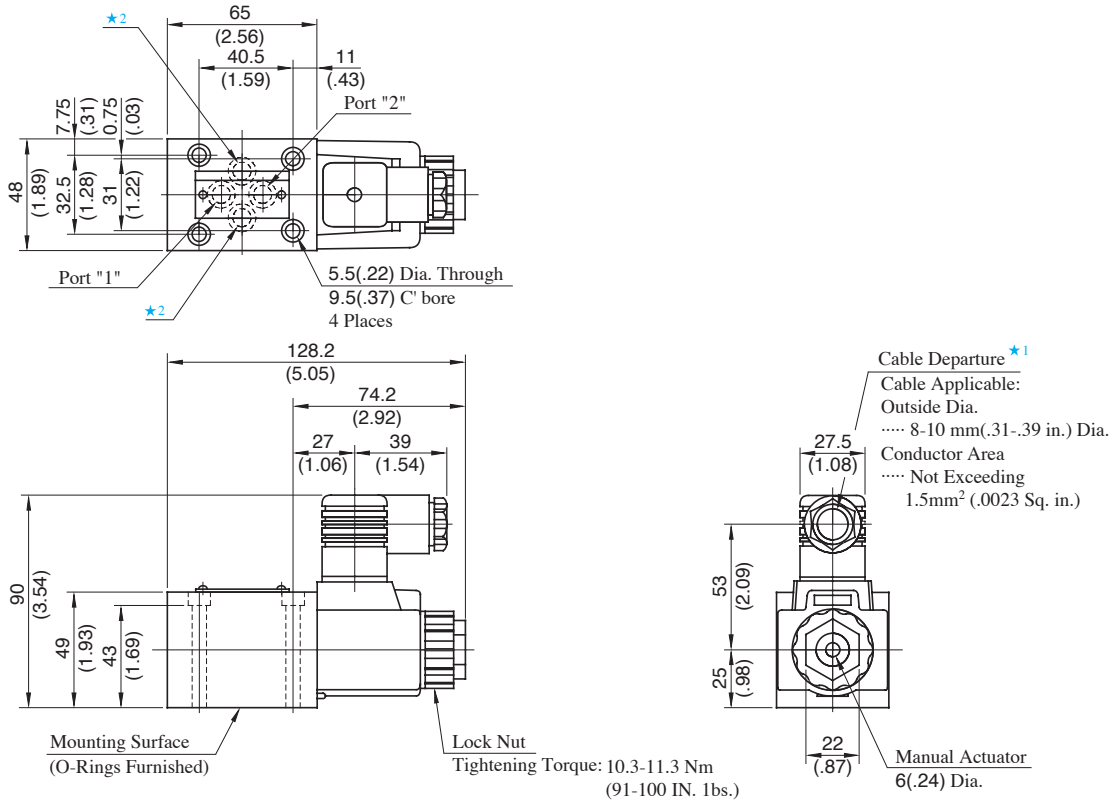


Shut-off Type Solenoid Operated Directional Valves

DSPG-01-C-* -20/2090

Mounting Surface: ISO 4401-AB-03-4-A

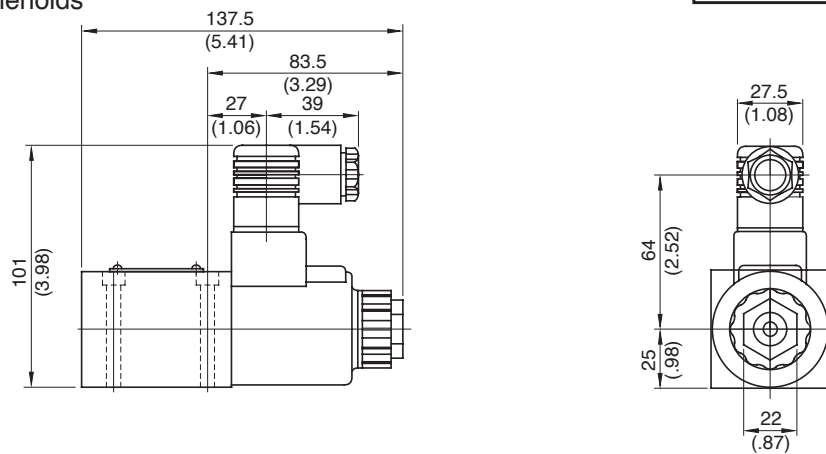
Models with AC Solenoids



- ★1. The location and the position of the cable departure can be changed. For details, see [the cartridge type](#).
- ★2. These ports (2) are not used. In addition, the body has the O-ring grooves and O-rings are included in the body.
- ★3. The mounting dimensions conform to ISO 4401-AB-03-4-A. Ports A and B are used as ports "2" and "1" respectively.
- ★4. O-rings for ports: SO-NB-P9

DIMENSIONS IN
MILLIMETRES (INCHES)

Models with DC Solenoids



● For other dimensions, refer to the "Models with AC Solenoids".

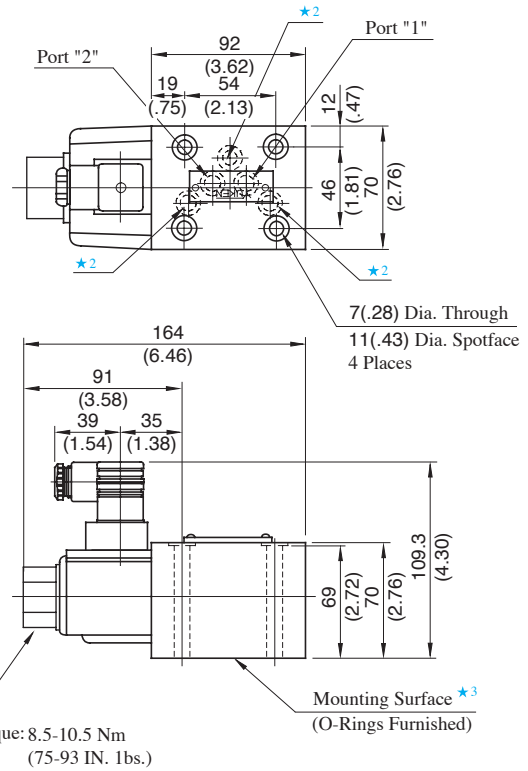
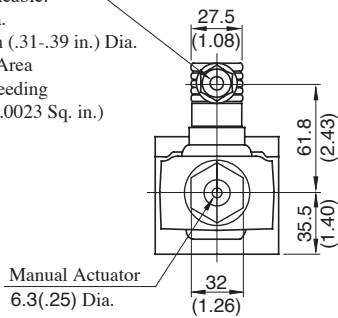
DSPG-03-C-*/-10/1090

Mounting Surface: ISO 4401-AC-05-4-A

Models with AC Solenoids

Cable Departure ^{★1}

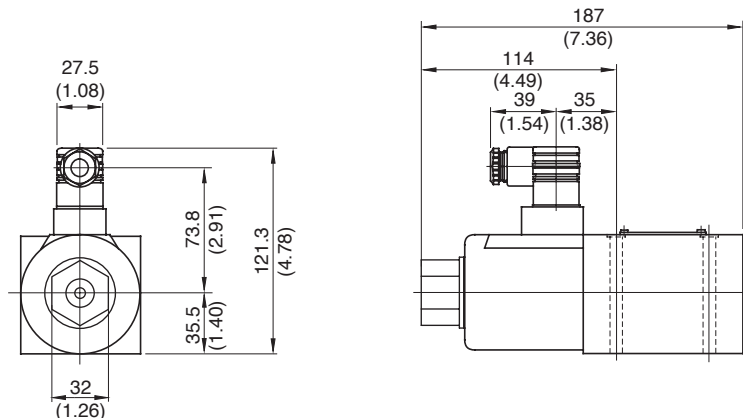
Cable Applicable:
Outside Dia.
.....8-10 mm (.31-.39 in.) Dia.
Conductor Area
.....Not Exceeding
1.5mm² (.0023 Sq. in.)



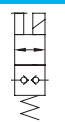
- ★1. The location and the position of the cable departure can be changed. For details, see [the cartridge type](#).
- ★2. These ports (3) are not used. In addition, the body has the O-ring grooves and O-rings are included in the body.
- ★3. The dimensions of mounting surface conform to ISO 4401-AC-05-4-A. Ports A and B are used as port 2 and port 1 respectively.
- ★4. O-rings for each port: SO-NB-A014

DIMENSIONS IN
MILLIMETRES (INCHES)

Models with DC Solenoids

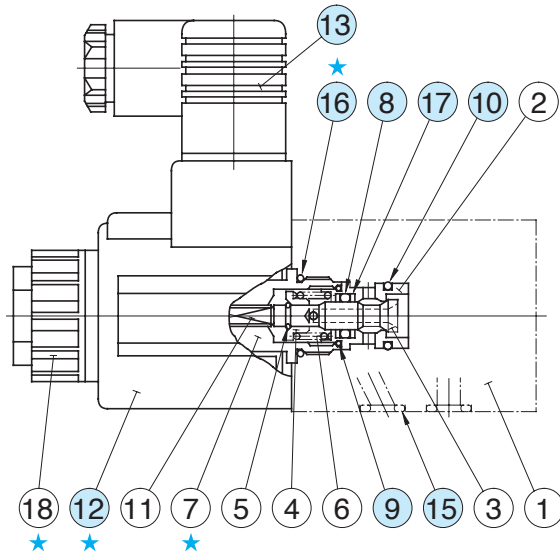


● For other dimensions, refer to the "Models with AC Solenoids".



Shut-off Type Solenoid Operated Directional Valves

■ List of Seals, Solenoid Ass'y, Coil Ass'y and Connector Ass'y



Solenoid assembly is composed of the parts marked with ★.

● List of Seals

Item	Name of Parts	DSP*-01		DSP*-03		Remarks
		Part Numbers	Qty.	Part Numbers	Qty.	
8	O-Ring	SO-NA-P8	1	SO-NA-P12	1	————
9	O-Ring	SO-NB-A014	1	SO-NB-A017	1	————
10	O-Ring	SO-NB-A015	1	SO-NB-A018	1	————
15	O-Ring	SO-NB-P9	4	SO-NB-A014	5	————
16	O-Ring	SO-NB-P18	1	SO-NB-A119	1	only for "DSPG"
17	Back Up Ring	5701-VK413831-9	2	2691-VK418550-0	2	————

Note: When ordering the seals, specify the seal kit number from the table below.


● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
DSPC-01-C-*-20*	KS-DSPC-01-C-10
DSPC-03-C-*-10*	KS-DSPC-03-C-10
DSPG-01-C-*-20*	KS-DSPG-01-C-10
DSPG-03-C-*-10*	KS-DSPG-03-C-10

● Solenoid Ass'y, Coil Ass'y and Connector Ass'y No.

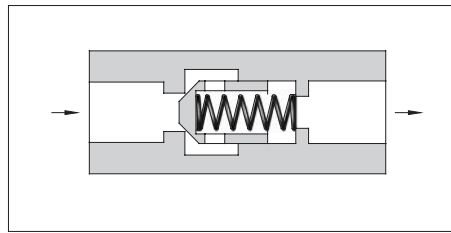
Valve Model No.	Solenoid Ass'y No.	⑫ Coil No.	⑬ Connector No.
DSPC/DSPG-01-C-A100-20/2090	SA1-100-N-6055	C-SA1-100-N-60	GDM-211-B-11
DSPC/DSPG-01-C-A200-20/2090	SA1-200-N-6055	C-SA1-200-N-60	
DSPC/DSPG-01-C-D12-20/2090	SD1-12-N-6055	C-SD1-12-N-60	
DSPC/DSPG-01-C-D24-20/2090	SD1-24-N-6055	C-SD1-24-N-60	
DSPC/DSPG-03-C-A100-10/1090	SA3-100-N-5130	C-SA3-100-N-50	
DSPC/DSPG-03-C-A200-10/1090	SA3-200-N-5130	C-SA3-200-N-50	
DSPC/DSPG-03-C-D12-10/1090	SD3-12-N-5130	C-SD3-12-N-50	
DSPC/DSPG-03-C-D24-10/1090	SD3-24-N-5130	C-SD3-24-N-50	

Check/Pilot Controlled Check Valves

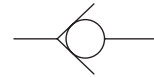
Valve Type	Graphic Symbols	Max. Operating Pressure MPa (PSI)	U.S.GPM										Page	
			1	2	5	10	20	50	100	200	500	1000		
			L/min											
Check Valves		25 (3630)	In-Line (CIT) 02 03 06 10				Right Angle (CRT/CRG) 03 06 10		Right Angle, Flanged Connection (CRF) 10 16 24				498	
			Threaded Connection(CP*T) Sub-plate Mounting(CP*G) 03 06 10				Flanged Connection(CP*F) 10 16							504

In-Line Check Valves

These valves allow free flow in one direction and prevent flow in the reverse direction. Cracking pressure specified is the pressure required to open the valve and allow free flow.



Graphic Symbol



Specifications

Model Numbers	Rated Flow* L/min (U.S.GPM)	Max. Operating Pres. MPa (PSI)	Cracking Pres. MPa (PSI)	Approx. Mass kg (lbs.)
CIT-02-* -50/5080/5090	16 (4.23)	25 (3630)	0.04 (6) 0.35 (50) 0.5 (70)	0.1 (.22)
CIT-03-* -50/5080/5090	30 (7.93)			0.3 (.66)
CIT-06-* -50/5080/5090	85 (22.5)			0.8 (1.8)
CIT-10-* -50/5080/5090	230 (60.8)			2.3 (5.1)

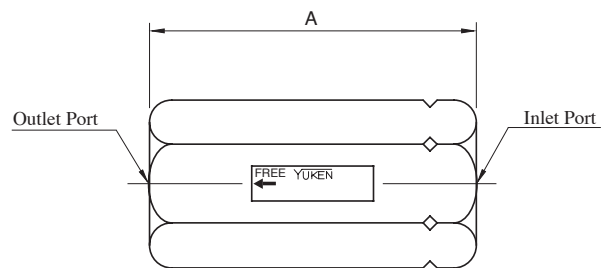
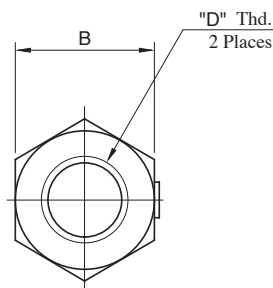
★ Rated flow is the approximate flow rate, when there is a free flow pressure drop of maximum 0.3 MPa (44 PSI), the fluid has a specific gravity of 0.85 and a kinematic viscosity of 20 mm²/s (98 SSU), and the cracking pressure is 0.04 MPa (6 PSI).

Model Number Designation

CI	T	-03	-04	-50	*
Series Number	Type of Connection	Valve Size	Cracking Pressure MPa (PSI)	Design Number	Design Standards
CI: In-Line Check Valve	T: Threaded Connection	02	04: 0.04 (6) 35: 0.35 (50) 50: 0.5 (70)	50	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std.
		03		50	
		06		50	
		10		50	

Note: For In-Line Check Valves, standard type (for petroleum base oils) can be used phosphate ester type fluid.

CIT-02-* -50/5080/5090
CIT-03-* -50/5080/5090
CIT-06-* -50/5080/5090
CIT-10-* -50/5080/5090



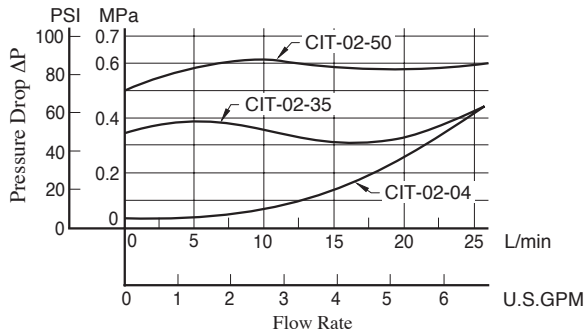
Model Numbers	mm (Inches)		"D" Thd.
	A	B	
CIT-02-* -50	58 (2.28)	19 (.75)	Rc 1/4
CIT-02-* -5080	65 (2.56)	22 (.87)	1/4 BSP.F
CIT-02-* -5090	58 (2.28)	19 (.75)	1/4 NPT
CIT-03-* -50	76 (2.99)	27 (1.06)	Rc 3/8
CIT-03-* -5080	83 (3.27)		3/8 BSP.F
CIT-03-* -5090	76 (2.99)		3/8 NPT
CIT-06-* -50	95 (3.74)	41 (1.61)	Rc 3/4
CIT-06-* -5080	102(4.02)		3/4 BSP.F
CIT-06-* -5090	95 (3.74)		3/4 NPT
CIT-10-* -50	133(5.24)	60 (2.36)	Rc 1-1/4
CIT-10-* -5080			1-1/4 BSP.F
CIT-10-* -5090			1-1/4 NPT

DIMENSIONS IN MILLIMETRES (INCHES)

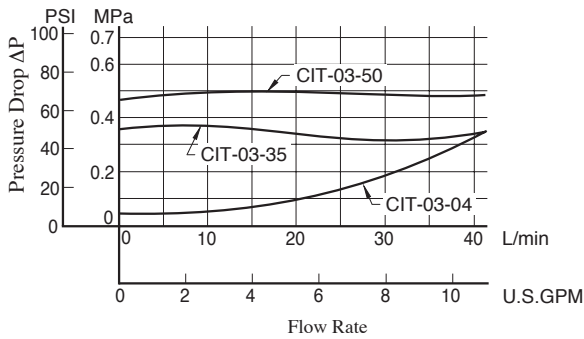
Pressure Drop

Hydraulic Fluid: Viscosity 30 mm²/s (141 SSU), Specific Gravity 0.850

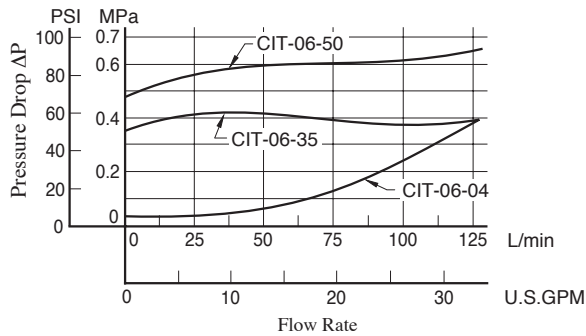
CIT-02



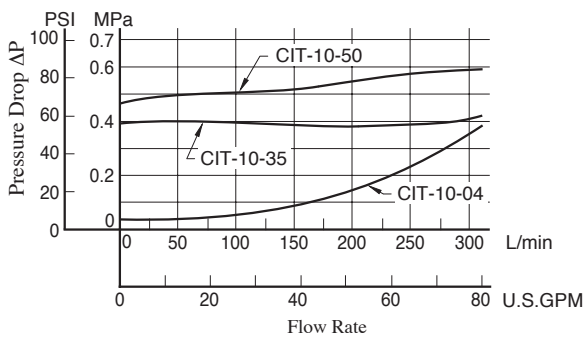
CIT-03



CIT-06

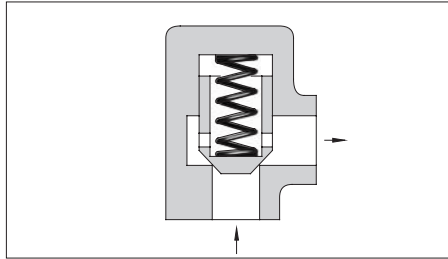


CIT-10

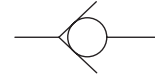


Right Angle Check Valves

These valves allow free flow in one direction and prevent flow in the reverse direction. Cracking pressure specified is the pressure required to open the valve and allow free flow.



Graphic Symbol



Specifications

Type of Connection	Model Numbers	Rated Flow* L/min (U.S.GPM)	Max. Operating Pres. MPa (PSI)	Cracking Pres. MPa (PSI)	Approx. Mass kg (lbs.)
Threaded Connection	CRT-03-*50/5080/5090	40 (10.6)	25 (3630)	0.04 (6)	0.9 (2.0)
	CRT-06-*50/5080/5090	125 (33)		0.35 (50)	1.7 (3.7)
	CRT-10-*50/5080/5090	250 (66)		0.5 (70)	5.6 (12.3)
Sub-plate Mounting	CRG-03-*50/5090	40 (10.6)	25 (3630)	0.04 (6)	1.7 (3.7)
	CRG-06-*50/5090	125 (33)		0.35 (50)	2.9 (6.4)
	CRG-10-*50/5090	250 (66)		0.5 (70)	5.5 (12.1)

* Rated flow is the approximate flow rate, when there is a free flow pressure drop of maximum 0.3 MPa (44 PSI), the fluid has a specific gravity of 0.85 and a kinematic viscosity of 20 mm²/s (98 SSU), and the cracking pressure is 0.04 MPa (6 PSI).

Model Number Designation

F-	CR	T	-03	-04	-50	*
Special Seals	Series Number	Type of Connection	Valve Size	Cracking Pressure MPa (PSI)	Design Number	Design Standards
F: Special seals for phosphate ester type fluids (Omit if not required)	CR: Right Angle Check Valve	T: Threaded Connection	03	04: 0.04 (6)	50	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std.
			06	35: 0.35 (50)	50	
			10	50: 0.5 (70)	50	
		G: Sub-plate Mounting	03	04: 0.04 (6)	50	None: Japanese Std. "JIS" & European Design Std. 90: N. American Design Std.
			06	35: 0.35 (50)	50	
			10	50: 0.5 (70)	50	

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N.American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
CRG-03	CRGM-03-50	Rc 3/8	CRGM-03-5080	3/8 BSP.F	CRGM-03-5090	3/8 NPT	1.6 (3.5)
	CRGM-03X-50	Rc 1/2	CRGM-03X-5080	1/2 BSP.F	CRGM-03X-5090	1/2 NPT	1.6 (3.5)
CRG-06	CRGM-06-50	Rc 3/4	CRGM-06-5080	3/4 BSP.F	CRGM-06-5090	3/4 NPT	2.4 (5.3)
	CRGM-06X-50	Rc 1	CRGM-06X-5080	1 BSP.F	CRGM-06X-5090	1 NPT	3.0 (6.6)
CRG-10	CRGM-10-50	Rc 1-1/4	CRGM-10-5080	1-1/4 BSP.F	CRGM-10-5090	1-1/4 NPT	4.8 (10.6)
	CRGM-10X-50	Rc 1-1/2	CRGM-10X-5080	1-1/2 BSP.F	CRGM-10X-5090	1-1/2 NPT	5.7 (12.6)

● Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

Yuken can offer flanged connection valves described below.

For details, contact us.

Model No.	Rated Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)
CRF-10-*50*	300 (79.3)	25 (3630)
CRF-16-*50*	600 (159)	
CRF-24-*50*	1300 (343)	

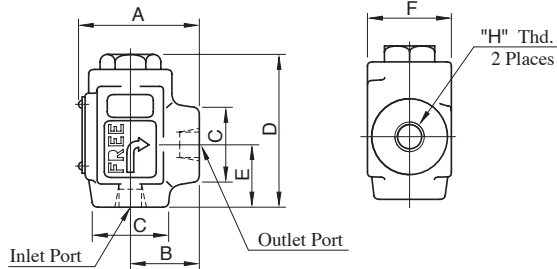
Mounting Bolts

Socket head cap screws in the table below are included.

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Standard "JIS" European Design Standard	N.American Design Standard	
CRG-03	M10 × 45 Lg.	3/8-16 UNC × 1-3/4 Lg.	4
CRG-06	M10 × 50 Lg.	3/8-16 UNC × 2 Lg.	4
CRG-10	M10 × 55 Lg.	3/8-16 UNC × 2-1/4 Lg.	6

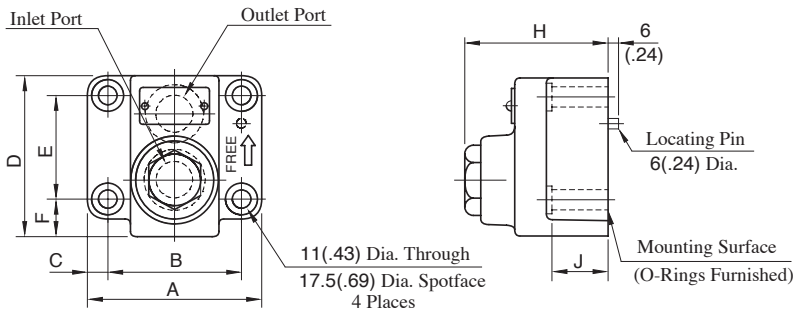
CRT-03-*50/5080/5090
 CRT-06-*50/5080/5090
 CRT-10-*50/5080/5090

**DIMENSIONS IN
 MILLIMETRES (INCHES)**



Model Numbers	Dimensions mm (Inches)						"H" Thd.
	A	B	C	D	E	F	
CRT-03-*50	62	36	38	80.5	33	44	Rc 3/8
CRT-03-*5080	(2.44)	(1.42)	(1.50) Dia	(3.17)	(1.30)	(1.73)	3/8 BSP.F
CRT-03-*5090							3/8 NPT
CRT-06-*50	74	45	54	104.5	49	54	Rc 3/4
CRT-06-*5080	(2.91)	(1.77)	(2.13) Dia	(4.11)	(1.93)	(2.13)	3/4 BSP.F
CRT-06-*5090							3/4 NPT
CRT-10-*50	107	65	80	130	65	80	Rc 1-1/4
CRT-10-*5080	(4.21)	(2.56)	(3.15) SQ.	(5.12)	(2.56)	(3.15)	1-1/4 BSP.F
CRT-10-*5090							1-1/4 NPT

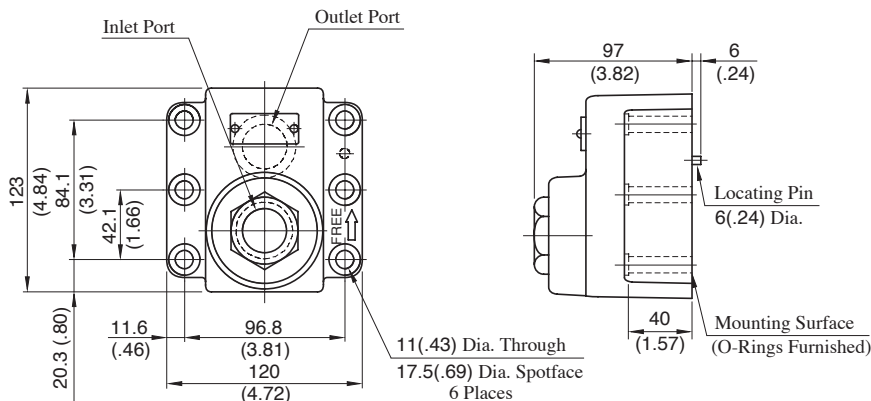
CRG-03-*50/5090
 CRG-06-*50/5090



Model Numbers	Dimensions mm (Inches)								Mounting Surface
	A	B	C	D	E	F	H	J	
CRG-03	90	66.7	11.7	72	42.9	17.5	72.5	30	ISO 5781-AG-06-2-A
	(3.54)	(2.63)	(.46)	(2.83)	(1.69)	(.69)	(2.85)	(1.18)	
CRG-06	102	79.4	11.3	93	60.3	21.4	84.5	35	ISO 5781-AH-08-2-A
	(4.02)	(3.13)	(.44)	(3.66)	(2.37)	(.84)	(3.33)	(1.38)	

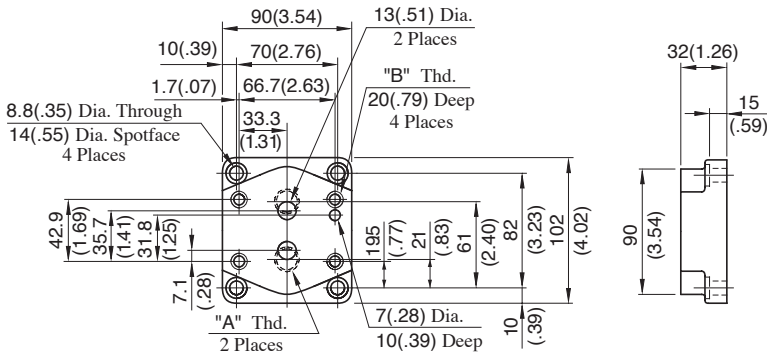
CRG-10-*50/5090

Mounting surface: ISO 5781-AJ-10-2-A



Sub-plate

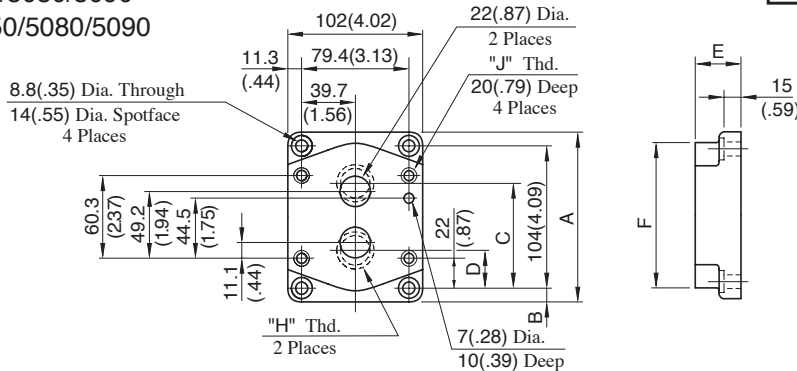
CRGM-03-50/5080/5090
CRGM-03X-50/5080/5090



Sub-plate Model Numbers	Thread Size	
	"A" Thd.	"B" Thd.
CRGM-03-50	Rc 3/8	M10
CRGM-03-5080	3/8 BSP.F	
CRGM-03-5090	3/8 NPT	3/8-16 UNC
CRGM-03X-50	Rc 1/2	M10
CRGM-03X-5080	1/2 BSP.F	
CRGM-03X-5090	1/2 NPT	3/8-16 UNC

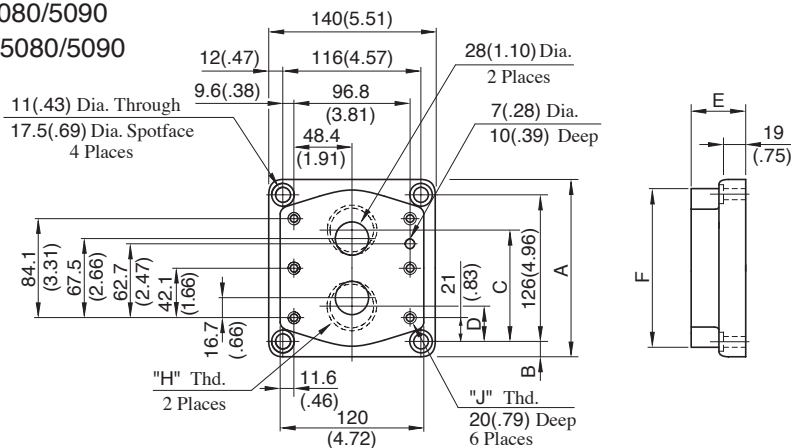
DIMENSIONS IN MILLIMETRES (INCHES)

CRGM-06-50/5080/5090
CRGM-06X-50/5080/5090



Sub-plate Model Numbers	Dimensions mm (Inches)						Thread Size	
	A	B	C	D	E	F	"H" Thd.	"J" Thd.
CRGM-06-50							Rc 3/4	M10
CRGM-06-5080	124 (4.88)	10 (.39)	77 (3.03)	27 (1.06)	36 (1.42)	110 (4.33)	3/4 BSP.F	
CRGM-06-5090							3/4 NPT	3/8-16 UNC
CRGM-06X-50			82.3 (3.24)	22 (.87)			Rc 1	M10
CRGM-06X-5080	136 (5.35)	16 (.63)	80 (3.15)	24 (.94)	45 (1.77)	130 (5.12)	1 BSP.F	
CRGM-06X-5090			82.3 (3.24)	22 (.87)			1 NPT	3/8-16 UNC

CRGM-10-50/5080/5090
CRGM-10X-50/5080/5090

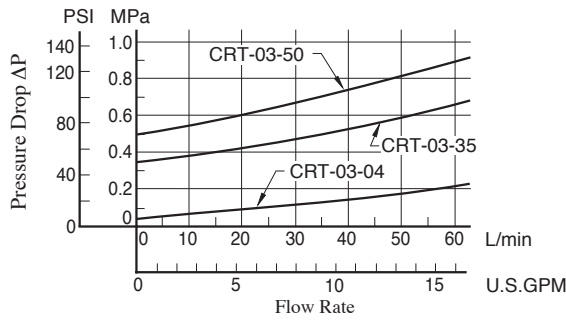


Sub-plate Model Numbers	Dimensions mm (Inches)						Thread Size	
	A	B	C	D	E	F	"H" Thd.	"J" Thd.
CRGM-10-50							Rc 1-1/4	M10
CRGM-10-5080	150 (5.91)	12 (.47)	96 (3.78)	30 (1.18)	45 (1.77)	135 (5.31)	1-1/4 BSP.F	
CRGM-10-5090							1-1/4 NPT	3/8-16 UNC
CRGM-10X-50							Rc 1-1/2	M10
CRGM-10X-5080	177 (6.97)	25.5 (1.00)	104 (4.09)	22 (.87)	50 (1.97)	167 (6.57)	1-1/2 BSP.F	
CRGM-10X-5090							1-1/2 NPT	3/8-16 UNC

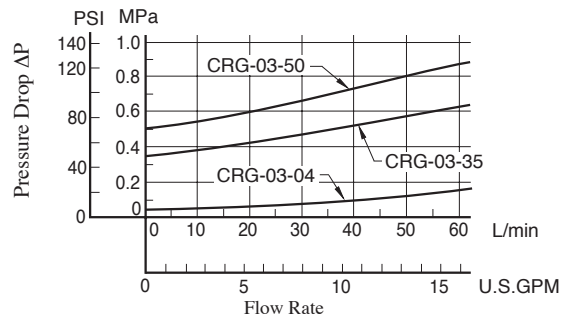
Pressure Drop

Hydraulic Fluid: Viscosity 30mm²/s (141 SSU), Specific Gravity 0.850

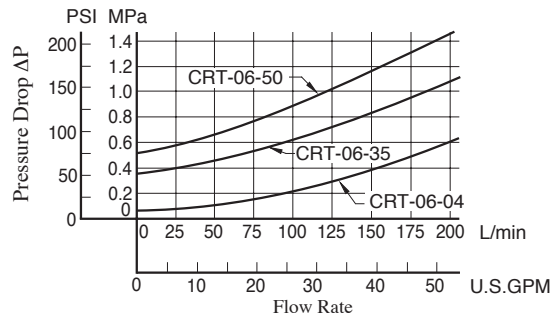
● CRT-03



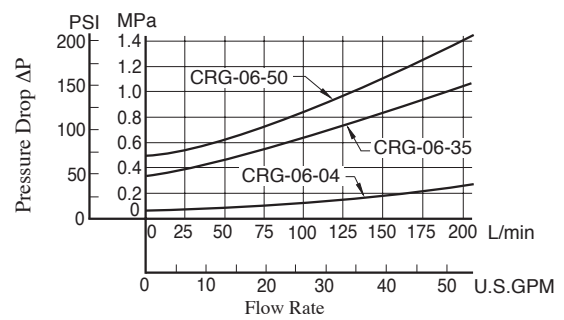
● CRG-03



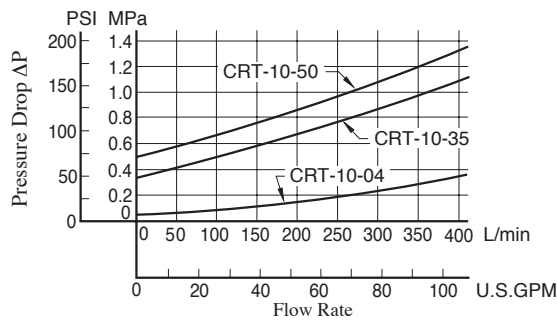
● CRT-06



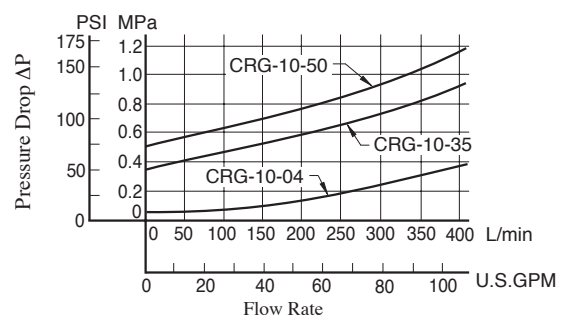
● CRG-06



● CRT-10

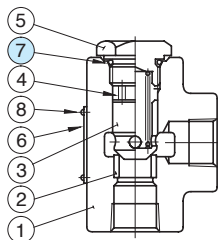


● CRG-10

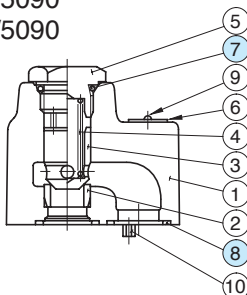


List of Seals

CRT-03-50/5080/5090
 CRT-06-50/5080/5090
 CRT-10-50/5080/5090



CRG-03-50/5090
 CRG-06-50/5090
 CRG-10-50/5090



● List of Seals & Seal Kits

Item	Name of Parts	Part Numbers			Qty.
		CRT-03	CRT-06	CRT-10	
7	O-Ring	SO-NB-P21	SO-NB-P24	SO-NB-P32	1
★	Seal Kit	KS-CRT-03-50	KS-CRT-06-50	KS-CRT-10-50	—

★ When ordering the O-Rings, please specify the seal kit number from the table above.

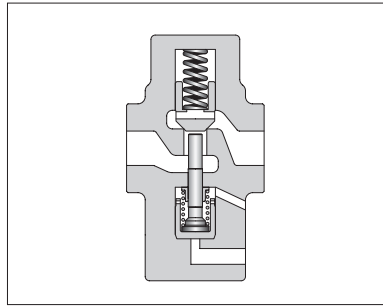
● List of Seals & Seal Kits

Item	Name of Parts	Part Numbers			Qty.
		CRG-03	CRG-06	CRG-10	
7	O-Ring	SO-NB-P21	SO-NB-P24	SO-NB-P32	1
8	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	2
★	Seal Kit	KS-CRG-03-50	KS-CRG-06-50	KS-CRG-10-50	—

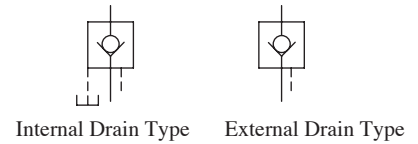
★ When ordering the O-Rings, please specify the seal kit number from the table above.

Pilot Operated Check Valves

These check valves allow flow in one direction and prevent flow in the reverse direction, until operated by pilot pressure to allow free reverse flow. The specified cracking pressure is required to open the valve to allow free flow direction.



Graphic Symbols



Specifications

Type of Connection	Model Numbers	Rated Flow* L/min (U.S.GPM)	Max. Operating Pres. MPa (PSI)	Cracking Pres. MPa (PSI)	Approx. Mass kg (lbs.)
Threaded Connection	CPT/CPDT-03-*-50*	40 (10.6)	25 (3630)	0.04 (6)	3.0 (6.6)
	CPT/CPDT-06-*-50*	125 (33)		0.2 (29)	5.5 (12.1)
	CPT/CPDT-10-*-50*	250 (66)		0.35 (50)	9.6 (21.2)
Sub-plate Mounting	CPG/CPDG-03-*-50*	40 (10.6)	25 (3630)	0.04 (6)	3.3 (7.3)
	CPG/CPDG-06-*-50*	125 (33)		0.2 (29)	5.4 (11.9)
	CPG/CPDG-10-*-50*	250 (66)		0.35 (50)	8.5 (18.7)

* Rated flow is the approximate flow rate, when there is a free flow pressure drop of maximum 0.3 MPa (44 PSI), the fluid has a specific gravity of 0.85 and a kinematic viscosity of 20 mm²/s (98 SSU), and the cracking pressure is 0.04 MPa (6 PSI).

Model Number Designation

F-	CP	T	03	-E	-04	-50	*
Special Seals	Series Number	Type of Connection	Valve Size	Drain Connection	Cracking Pres. MPa (PSI)	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	CP: Pilot Operated Check Valve	T: Threaded Connection	03	None: Internal Drain	04: 0.04 (6)	50	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std.
			06			50	
			10			50	
	CPD: Decompression Type Pilot Operated Check Valve	G: Sub-plate Mounting	03	E: External Drain	35: 0.35 (50) 50: 0.5 (70)	50	None: Japanese Std. "JIS" & European Design Std. 90: N. American Design Std.
			06			50	
			10			50	

Mounting Bolts

Socket head cap screws in the table below are included.

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Standard "JIS" & European Design Standard	N.American Design Standard	
CP*G-03	M10 × 45 Lg.	3/8-16 UNC × 1-3/4 Lg.	4
CP*G-06	M10 × 50 Lg.	3/8-16 UNC × 2 Lg.	4
CP*G-10	M10 × 55 Lg.	3/8-16 UNC × 2-1/4 Lg.	6

Yuken can offer flanged connection valves described below.
For details, contact us.

Model Numbers	Rated Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)
CP*F-10-*-50*	250 (66)	25 (3630)
CP*F-16-*-50*	600 (159)	25 (3630)

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
CP*G-03	HGM-03-20	Rc 3/8	HGM-03-2080	3/8 BSP.F	HGM-03-2090	3/8 NPT	1.6 (3.5)
	HGM-03X-20	Rc 1/2	HGM-03X-2080	1/2 BSP.F	HGM-03X-2090	1/2 NPT	1.6 (3.5)
CP*G-06	HGM-06-20	Rc 3/4	HGM-06-2080	3/4 BSP.F	HGM-06-2090	3/4 NPT	2.4 (5.3)
	HGM-06X-20	Rc 1	HGM-06X-2080	1 BSP.F	HGM-06X-2090	1 NPT	3.0 (6.6)
CP*G-10	HGM-10-20	Rc 1-1/4	HGM-10-2080	1-1/4 BSP.F	HGM-10-2090	1-1/4 NPT	4.8 (10.6)
	HGM-10X-20	Rc 1-1/2	HGM-10X-2080	1-1/2 BSP.F	HGM-10X-2090	1-1/2 NPT	5.7 (12.6)

- Sub-plates are available, specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- Sub-plates are shared with those for H Type Pressure Control Valves. Refer to [pages 244 to 246](#) for dimensions.

Instructions

Operation of internal and external drain types

When the outlet side P1 is directly connected to the tank in reversed free flow (Fig. a), the internal drain type is normally used. When the back pressure is applied to the outlet side P1 (Fig. b), be sure to use the external drain type.

Minimum pilot pressure characteristics

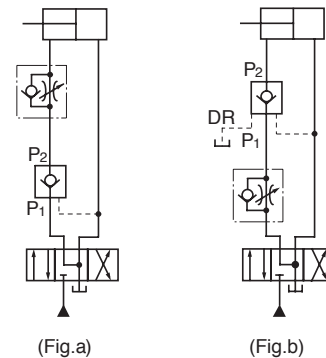
That depends on the pressure of the inlet side P2 in the reversed free flow.

This value can be determined from the characteristics chart.

Caution on replacement of 20 design low cracking pressure type valves with 50 design valves.

In 20 design valve with cracking pressure of 0.035 MPa (5 PSI) (Code "5"), for closing the valve completely and certainly, it was necessary to introduce the pressurized oil into the drain port to push down the piston compulsory.

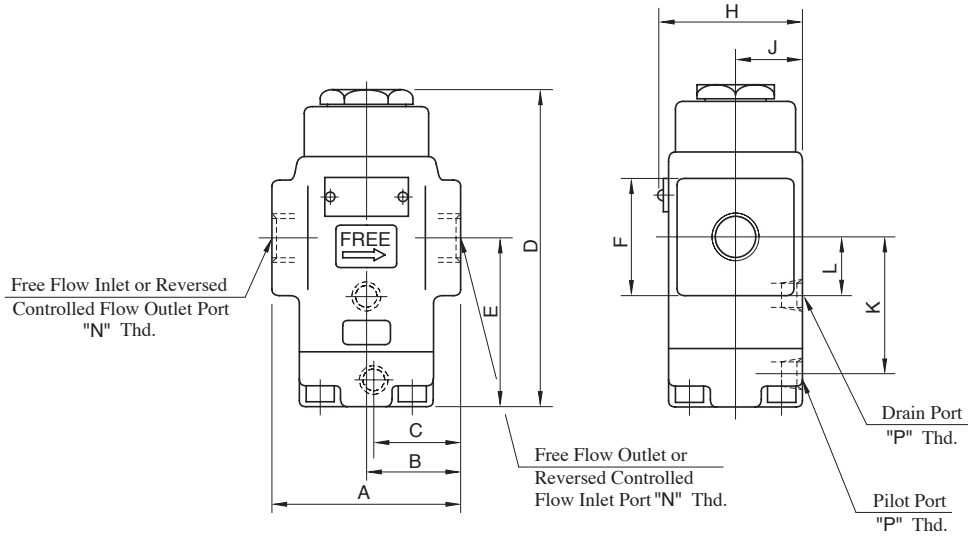
While in 50 design valve with cracking pressure of 0.04 MPa (6 PSI) (Code "6"), it has such structure that the valve can be closed completely and certainly without introducing the pressurized oil into the drain port. On the contrary, what is worse is that if the pressurized oil is introduced into the drain port, the oil acts towards the direction of opening the valve, which is very dangerous and has to be absolutely avoided. Therefore, please do not supply any pressurized oil into the drain port in case of using 50 design valve.



WARNING

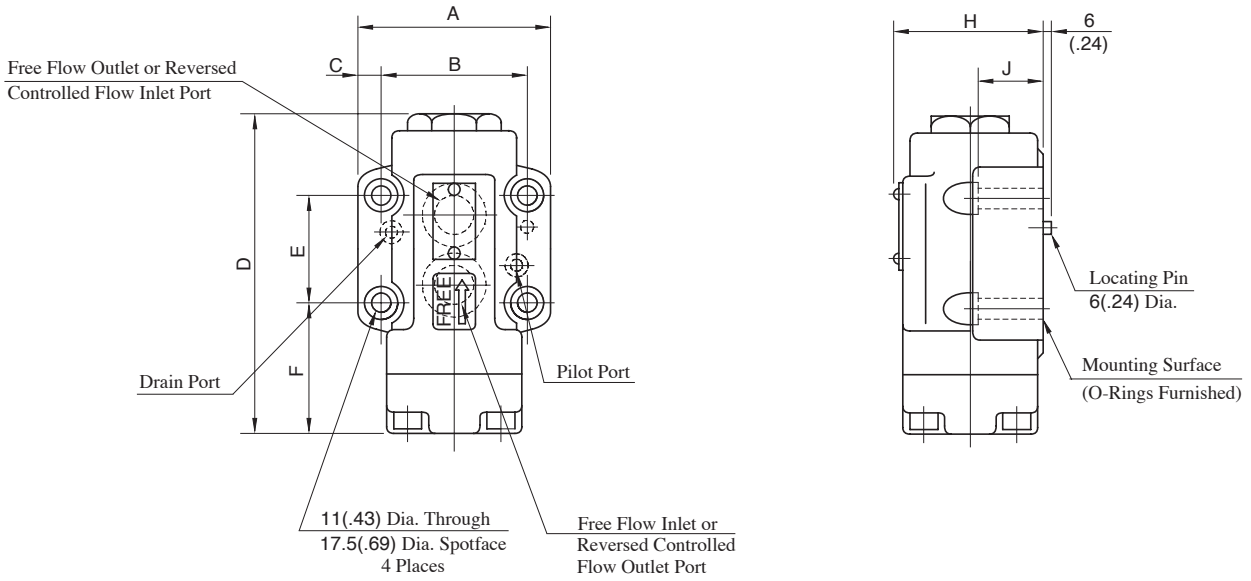
The machinery, if misused due to failure to observe the "Cautions" on the left, may perform unforeseeable movements, resulting in a disastrous accident.

CPT/CPDT-03-**-**-50/5080/5090
 CPT/CPDT-06-**-**-50/5080/5090
 CPT/CPDT-10-**-**-50/5080/5090



Model Numbers	Dimensions mm (Inches)										Thread Size	
	A	B	C	D	E	F	H	J	K	L	"N" Thd.	"P" Thd.
CPT/CPDT-03-**-**-50											Rc 3/8	Rc 1/4
CPT/CPDT-03-**-**-5080	80 (3.15)	40 (1.57)	39 (1.54)	150.5 (5.93)	84.5 (3.33)	38 (1.50) Dia.	60 (2.36)	29 (1.14)	67.5 (2.66)	26.5 (1.04)	3/8 BSP.F	1/4 BSP.F
CPT/CPDT-03-**-**-5090											3/8 NPT	1/4 NPT
CPT/CPDT-06-**-**-50											Rc 3/4	Rc 1/4
CPT/CPDT-06-**-**-5080	96 (3.78)	48 (1.89)	47 (1.85)	171.5 (6.75)	92.5 (3.64)	62 (2.44) SQ.	72 (2.83)	35 (1.38)	75.5 (2.97)	31 (1.22)	3/4 BSP.F	1/4 BSP.F
CPT/CPDT-06-**-**-5090											3/4 NPT	1/4 NPT
CPT/CPDT-10-**-**-50											Rc 1-1/4	Rc 1/4
CPT/CPDT-10-**-**-5080	140 (5.51)	70 (2.76)	64 (2.52)	203.5 (8.01)	113 (4.45)	80 (3.15) SQ.	82 (3.23)	40 (1.57)	96 (3.78)	43 (1.69)	1-1/4 BSP.F	1/4 BSP.F
CPT/CPDT-10-**-**-5090											1-1/4 NPT	1/4NPT

CPG/CPDG-03-**-50/5090
 CPG/CPDG-06-**-50/5090

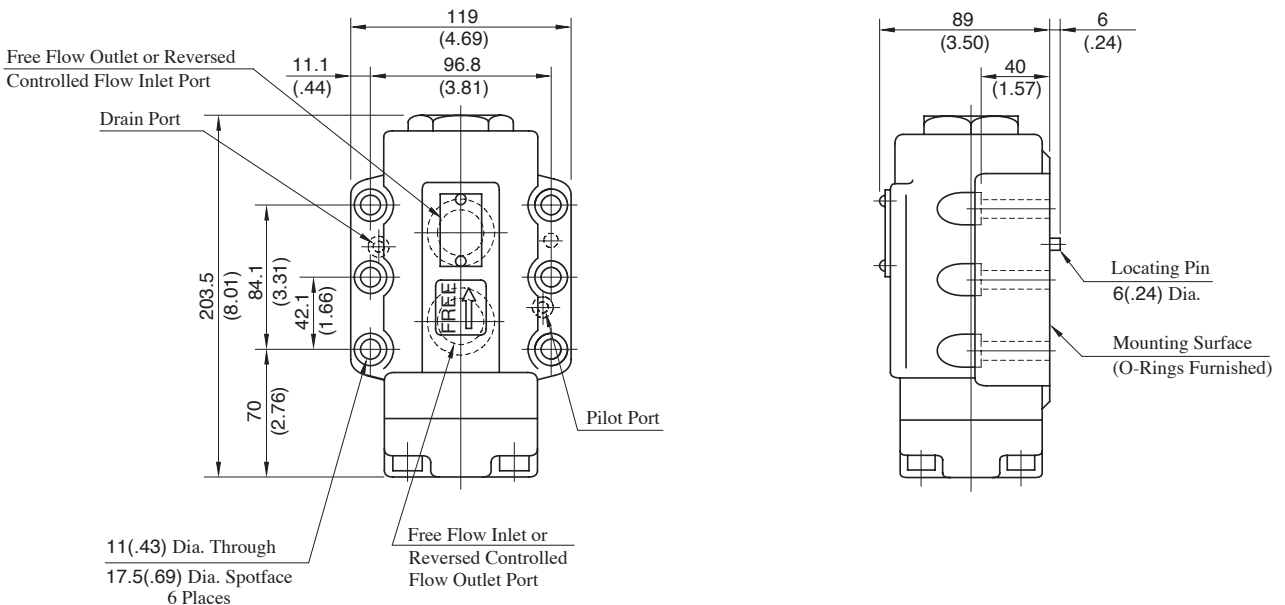


Model Numbers	Dimensions mm (Inches)								Mounting Surface
	A	B	C	D	E	F	H	J	
CPG/CPDG-03-**-50/5090	90 (3.54)	66.7 (2.63)	11.7 (.46)	150.5 (5.93)	42.9 (1.69)	66 (2.60)	62 (2.44)	30 (1.18)	ISO 5781-AG-06-2-A
CPG/CPDG-06-**-50/5090	102 (4.02)	79.4 (3.13)	11.3 (.44)	171.5 (6.75)	60.3 (2.37)	67.5 (2.66)	74 (2.91)	35 (1.38)	ISO 5781-AH-08-2-A

CPG/CPDG-10-**-50/5090

Mounting surface: ISO 5781-AJ-10-2-A

DIMENSIONS IN MILLIMETRES (INCHES)



E

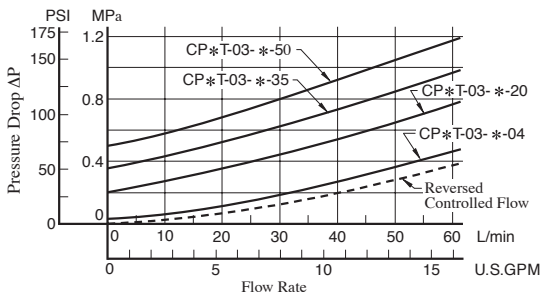


Pilot Operated Check Valves

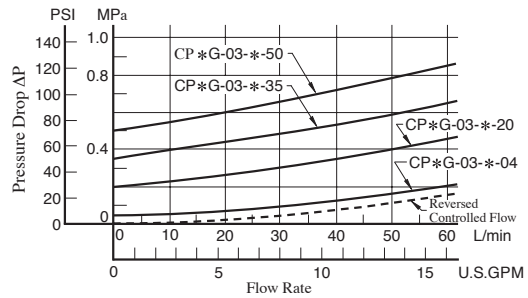
Hydraulic Fluid: Viscosity 30 mm²/s (141 SSU), Specific Gravity 0.850

Pressure Drop

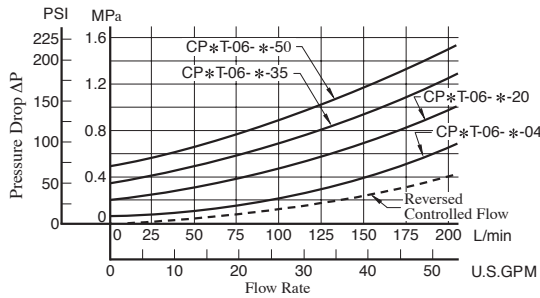
● CPT-03, CPDT-03



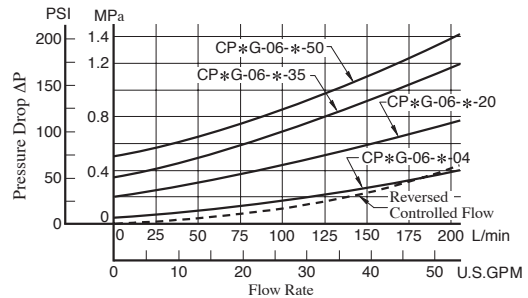
● CPG-03, CPDG-03



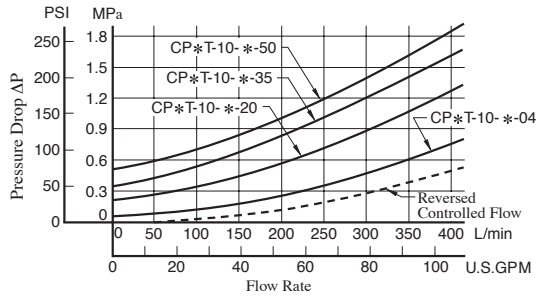
● CPT-06, CPDT-06



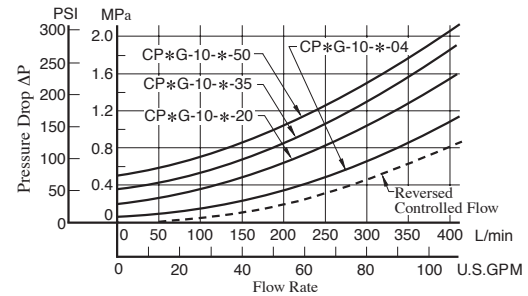
● CPG-06, CPDG-06



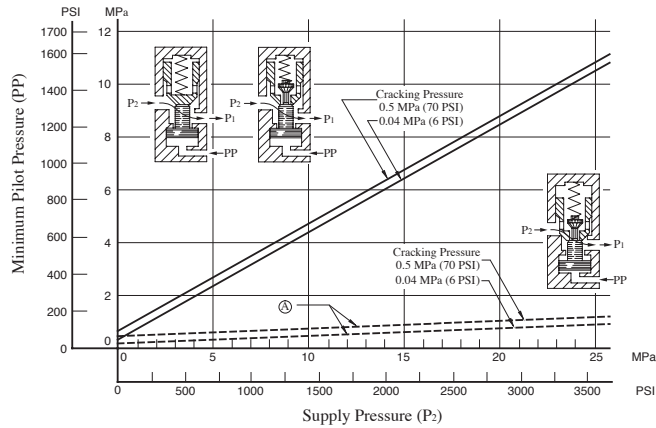
● CPT-10, CPDT-10



● CPG-10, CPDG-10



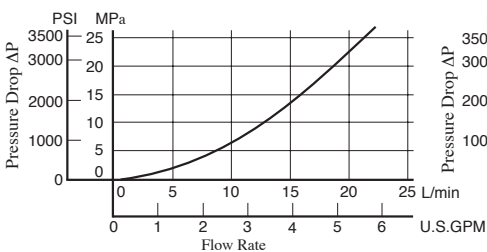
Min. Pilot Pressure Chart



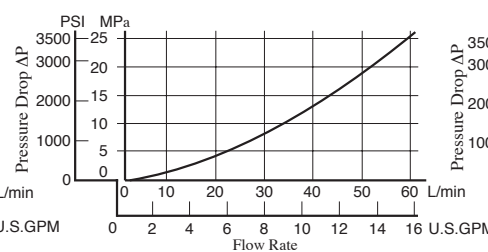
Ⓐ : Min. Pilot Pressure to open the Decompression Valve

Pressure Drop for Reversed Controlled Flow Only when Decompression Valve is Opened

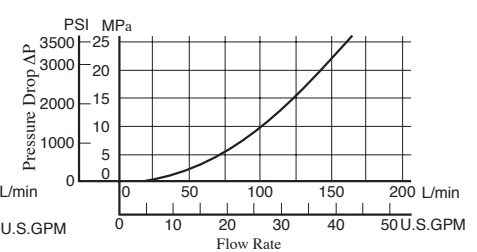
● CPDT-03, CPDG-03



● CPDT-06, CPDG-06

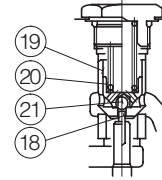
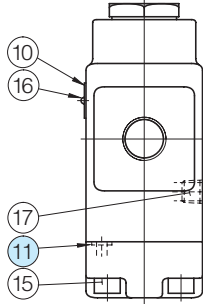
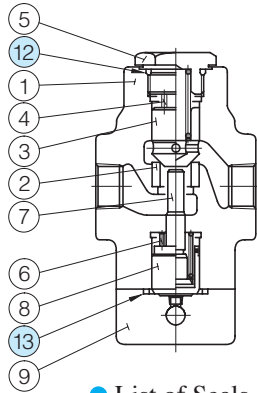


● CPDT-10, CPDG-10



List of Seals

CPT/CPDT-03-**-50/5080/5090
 CPT/CPDT-06-**-50/5080/5090
 CPT/CPDT-10-**-50/5080/5090



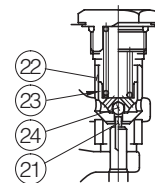
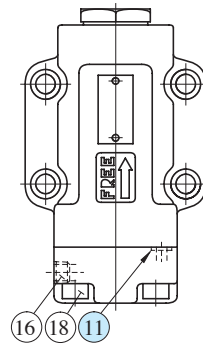
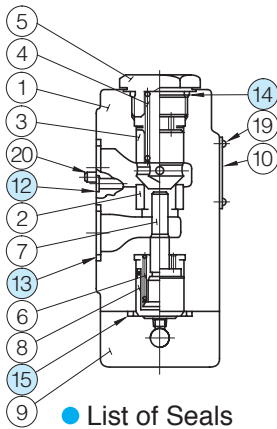
CPDT-03/06/10

List of Seals

Item	Name of Parts	Part Numbers			Qty.
		CPT/CPDT-03	CPT/CPDT-06	CPT/CPDT-10	
11	O-Ring	SO-NB-P7	SO-NB-P9	SO-NB-P9	1
12	O-Ring	SO-NB-P21	SO-NB-P29	SO-NB-P36	1
13	O-Ring	SO-NB-G25	SO-NB-P32	SO-NB-P42	1

Note: When ordering the seals, please specify the seal kit number from the table below.

CPG/CPDG-03-**-50/5090
 CPG/CPDG-06-**-50/5090
 CPG/CPDG-10-**-50/5090



CPDG-03/06/10

List of Seals

Item	Name of Parts	Part Numbers			Qty.
		CPG/CPDG-03	CPG/CPDG-06	CPG/CPDG-10	
11	O-Ring	SO-NB-P7	SO-NB-P9	SO-NB-P9	1
12	O-Ring	SO-NB-P9	SO-NB-P9	SO-NB-P9	2
13	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	2
14	O-Ring	SO-NB-P21	SO-NB-P29	SO-NB-P36	1
15	O-Ring	SO-NB-G25	SO-NB-P32	SO-NB-P42	1

Note: When ordering the O-Rings, please specify the seal kit number from the table below.

List of Seal Kits

Model Numbers	Seal Kit Numbers
CPT/CPDT-03-**-50/5080/5090	KS-CPT-03-50
CPT/CPDT-06-**-50/5080/5090	KS-CPT-06-50
CPT/CPDT-10-**-50/5080/5090	KS-CPT-10-50
CPG/CPDG-03-**-50/5090	KS-CPG-03-50
CPG/CPDG-06-**-50/5090	KS-CPG-06-50
CPG/CPDG-10-**-50/5090	KS-CPG-10-50



F

MODULES

YUKEN's Modular Valves are stack type valves, and require no piping. They not only rationalise system build, but they also meet the technical requirements for a variety of hydraulic systems. Stacking systems is a new era in hydraulics.

The valves have standardized mounting surface conforming to ISO 4401 and optimum thickness for each size. Any hydraulic circuits can be easily composed by stacking the valves with mounting bolts. The valves can be used widely for hydraulic systems for various industries such as machine tools, special purpose machines, ships and steel mill equipment.

Valve Type	Max. Operating Pressure MPa (PSI)	Maximum Flow		Page
		L/min	U.S.GPM	
005 Series Modular Valves	25 (3630)	005		517
01 Series Modular Valves	31.5 (4570)	01	01 *	535
03 Series Modular Valves	25 (3630)	03	03 *	577
06 Series Modular Valves	25 (3630)	06		619
10 Series Modular Valves	25 (3630)	10		633

★ Maximum Flow for Throttle and Check Modular Valves.

Hydraulic Fluids

Fluid Types

Any type of hydraulic fluid listed in the table below can be used.

Petroleum Base Oils	Use fluids equivalent to ISO VG 32 or VG 46.
Synthetic Fluids	Use phosphate ester or polyol ester fluids. When phosphate ester fluid is used, prefix "F-" to the model number because the special seals (fluororubber) are required to be used.
Water-containing Fluids	Use water-glycol fluid.

Note: For use with hydraulic fluids other than those listed above, please consult your Yuken representatives in advance.

Recommended Fluid Viscosity and Temperature

Use hydraulic fluids which satisfy the both recommended viscosity and oil temperatures given in the table below.

Name	Viscosity	Temperature
005 Series Modular Valves	15 - 200 mm ² /s (77 - 900 SSU)	-15 - +60°C (5 - 140°F)
01 Series Modular Valves 03 Series Modular Valves 06 Series Modular Valves 10 Series Modular Valves	15 - 400 mm ² /s (77 - 1800 SSU)	-15 - +70°C (5 - 160°F)

Control of Contamination

Due caution must be paid to maintaining control over contamination of the hydraulic fluids which may otherwise lead to breakdowns and shorten the life of the valve.

Name	Contamination	Nominal Filtration
005 Series Modular Valves	Within NAS1638 - Grade 11	20 μm or less
01 Series Modular Valves 03 Series Modular Valves 06 Series Modular Valves 10 Series Modular Valves	Within NAS1638 - Grade 12	20 μm or less

High Pressure, High Flow Rate Modular Valves

Features

1. Installation and mounting space can be minimized.
2. No special skill is required for assembly and any addition or alteration of the hydraulic circuit can be made quickly and easily.
3. Problems such as oil-leaks, vibration and noise which may be caused by piping are minimized, increasing the reliability of the hydraulic system.
4. Maintenance and system check-ups can be easily carried out as they are normally installed in stackable units.

Specifications

Series	Valve Size	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)	Number of Stack ^{*2}
005 Series	—	25 (3630)	15 (3.96)	1 to 4 stacks
01 Series	1/8	31.5 (4570)	35 [60] ^{*1} (9.24 [15.9]) ^{*1}	1 to 5 stacks ^{*3}
03 Series	3/8	25 [31.5] ^{*4} (3630 [4570]) ^{*4}	70 [120] ^{*1} (18.5 [31.7]) ^{*1}	1 to 5 stacks
06 Series	3/4	25 (3630)	500 (132)	
10 Series	1-1/4	25 (3630)	800 (211)	

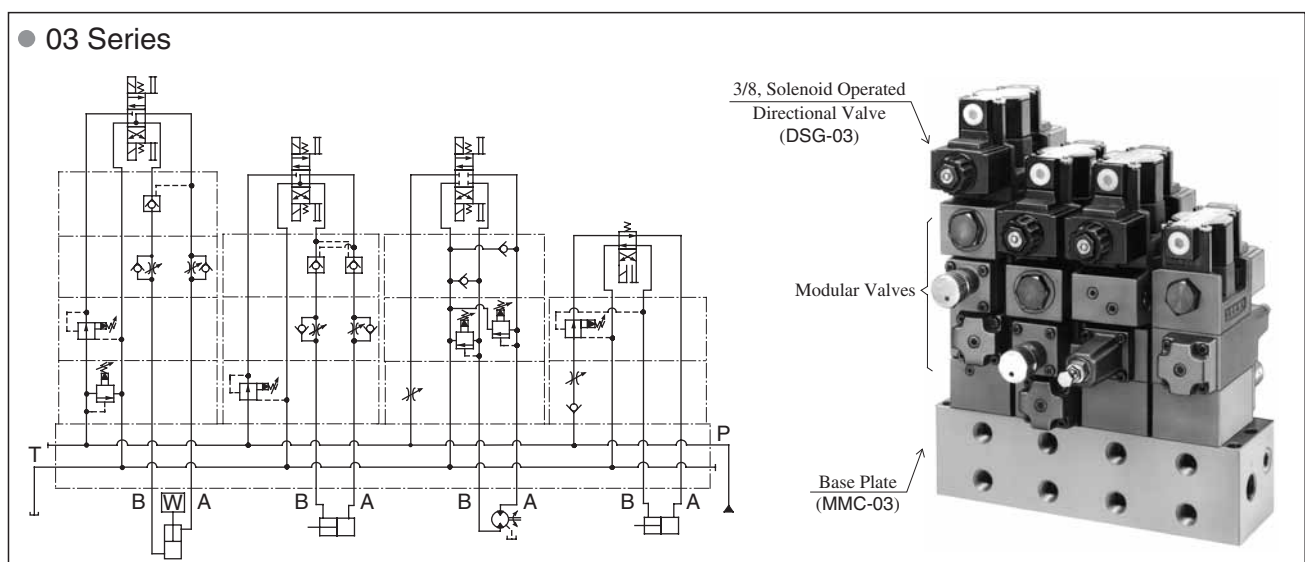
- ★ 1. The values in parentheses represent the max. flow rates for throttle modular valves (MSP) and throttle check modular valves (MSA/MSB/MSW).
- ★ 2. Solenoid operated directional valve is included in the number of stack.
- ★ 3. Solenoid operated directional valve is included in the number of stack. If the working pressure is above 25 MPa (3630 PSI), the maximum number of layers in a stack is 4 including the solenoid operated directional valve.
- ★ 4. The value range in parentheses represents the tightening torque requirements if the operating pressure is above 25 MPa (3630 PSI).

Mounting Surface

Mounting surface dimensions conform to ISO 4401 (Hydraulic fluid power four port directional control valves mounting surface) as listed in the table below.

Name of Valve	ISO Mtg. Surface Code No.
01 Series Modular Valve	ISO 4401-AB-03-4-A
03 Series Modular Valve	ISO 4401-AC-05-4-A
06 Series Modular Valve	ISO 4401-AE-08-4-A
10 Series Modular Valve	ISO 4401-AF-10-4-A

Stacking Example



Instructions

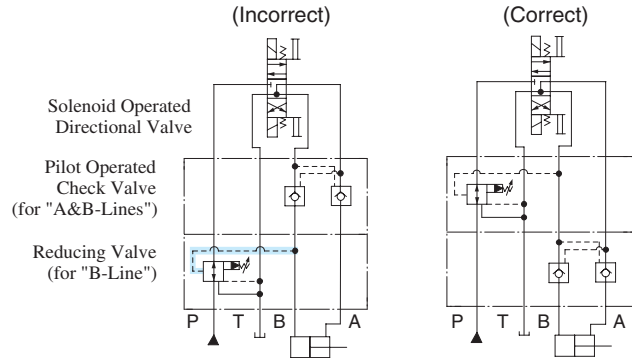
Caution in the selection of valves and circuit designing

The selection of modular valves, to suit a particular function or hydraulic circuit, are made in exactly the same way as conventional valves, taking into account of the flow and pressure of each valve to be used. In some cases, the stacking system may be restricted, so please refer to the following instructions for stacking sequence. Please note, that when designing a system using modular stacking valves, due consideration should be given to working space for future maintenance.

Stacking sequence when using reducing valves (for "A" or "B" line) and pilot operated check valves.

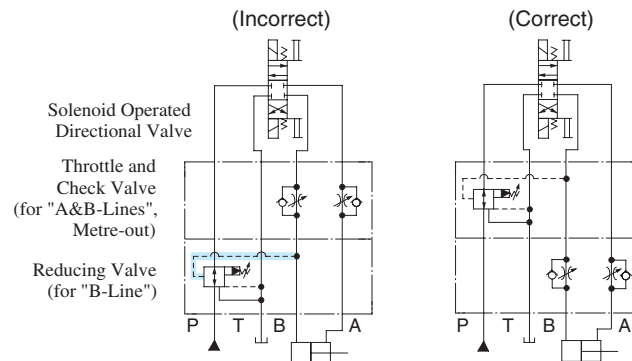
Because reducing valves are spool type, there is an internal leakage. In the stacking sequence shown in the drawing left (incorrect), the cylinder moves due to leakage through the pilot pressure line.

Consequently, retaining the position of the cylinder using a pilot operated check valve becomes impossible. The stacking sequence shown in the drawing right (correct) is required in order to retain the cylinder position.



Stacking sequence when using reducing valves (for "A" or "B" line) and throttle and check valves (for metre-out).

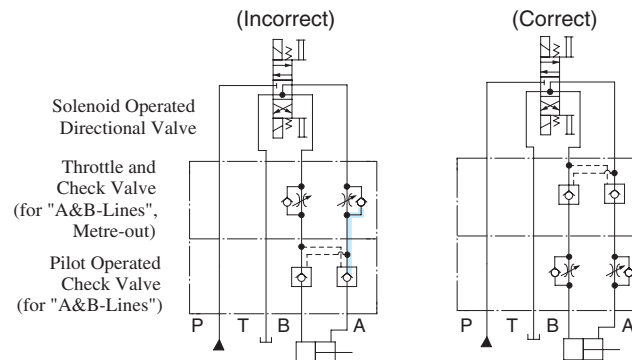
In B to T flow in the drawing left (incorrect), pressure is generated at part with a throttle effect of the throttle and check valve. Depending upon the pressure so generated, the reducing valve may perform a pressure reducing function which causes a shortage of output power of the cylinder and spoils the smooth operation of the cylinder. Therefore, stacking sequence in the drawing right (correct) is required in this combination.



Stacking sequence when using pilot operated check valves and throttle and check valves (metre-out).

In A to T flow in the drawing left (incorrect), pressure is generated at part with a throttle effect of the throttle and check valve.

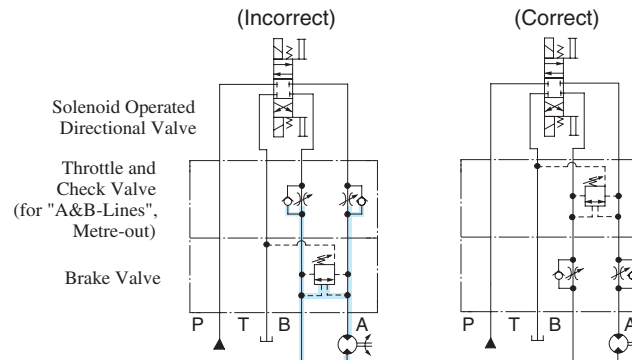
The pressure so generated acts to shut the pilot operated check valve and eventually creates an open and shut operation of the valve repeatedly which may cause the cylinder to have a knocking effect (the same effect will occur in the case of B to T flow). Therefore, the stacking sequence in the drawing right (correct) is required in this combination.



Stacking sequence when using brake valves and throttle and check valves.

In the drawing left (incorrect), pressure is generated at part (a load pressure and a back pressure from throttle effect). For structural reasons of the brake valve, the load pressure and back pressure act to open the valve, therefore, the setting pressure should be more than the pressure equal to the load pressure plus back pressure ($P_a + P_b$). If the setting pressure is less than $P_a + P_b$, the brake valve acts and brakes the movement of the actuator in operation, this eventually reduces the speed of the actuator.

On the contrary, if the setting pressure is more than $P_a + P_b$, shock may occur when braking the actuator since the setting pressure is too high against the load pressure. Therefore, the stacking sequence in the drawing right (correct) is required in this combination.



■ Base Plates and Sub-Plates

When mounting the modular valves, use base plates and sub-plates specified below. If these base plates and the sub-plates are not used, ensure that the mounting surface has a good machined finish.

Series	Base Plates		Sub-Plates	
	Model Numbers	Page	Model Numbers	Page
005 Series	MMC-005-* -20	531	DSGM-005* -20	342
01 Series	MMC-01-* -40	573	DSGM-01* -31	356
03 Series	MMC-03-T-* -21	615	DSGM-03* -40	373
06 Series	Consult your Yuken representative in advance.	—	DHGM-06* -50	402
10 Series	Consult your Yuken representative in advance.	—	DHGM-10* -40	403

■ Assembly

Assembly should be carried out in clean conditions and in accordance with the following procedure. Cautious attention should be paid to ensure that the interface of the valves are clean and free from dirt or other foreign materials.

● Assembly Procedure:

- 005 Series
 - 1) To stack modular valves and solenoid operated directional valves according to circuit requirements, match the O-ring surfaces to the mounting surface and check the alignment of the locating pins.
 - 2) Align the right and left sides of the stacked valves.
 - 3) Tighten the four mounting bolts to the specified tightening torque.
 - 4) Perform an operational test and re-check mounting bolt torque, re-tightening if required.
- 01-10 Series
 - 1) Screw-in the four stud bolts(06 and 10 series: six stud bolts), fully into the tapped holes on the mounting surface of the specified base plate, sub-plate or manifold.
 - 2) Stack the modular valves and solenoid operated directional valves in accordance with the hydraulic circuit, place the O-ring inserted surface face onto the base plate and make sure that the port arrangement of the modular valves are in the correct position before stacking the valves onto the stud bolts.
 - 3) Align both the end of the valves stacked.
 - 4) Screw-in the four nuts(06 and 10 series: six nuts) onto the stud bolts and tighten with the specified torque. After the test run, be sure to re-tighten the nuts firmly within the specified torque.

■ Pressure Drop

Pressure drop curves of the modular valves are those based on viscosity of 35 mm²/s (164 SSU) and specific gravity of 0.850.

When using the modular valves in conditions other than the above mentioned, find the appropriate values referring to the following table and formula.

- For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s	15	20	30	40	50	60	70	80	90	100
		SSU	77	98	141	186	232	278	324	371	417
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

- For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the following formula.

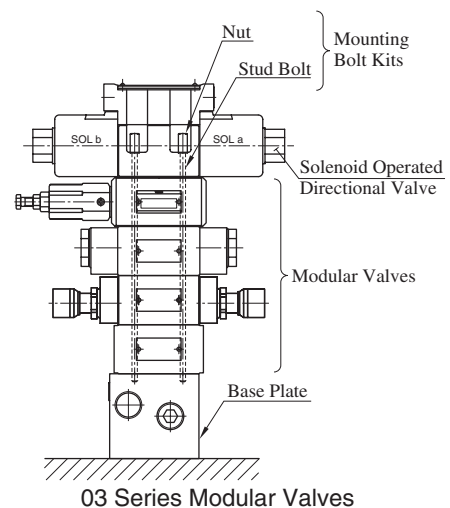
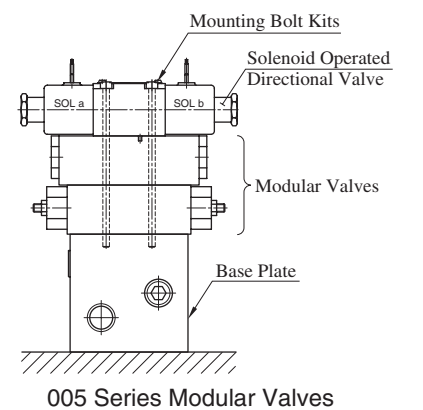
$$\Delta P' = \Delta P (G'/0.850)$$

■ Mounting Bolts

Modular valves are mounted using stud bolts which are supplied in a kit form. When mounting, see the following table for tightening torque. After the test run, be sure to tighten again firmly within the specified torque.

Series	Bolt Kit Model Numbers	Tightening Torque Nm (in. lbs.)
005 Series	MBK-005-* -20	2.5-3.5 (22-31)
01 Series	MBK-01-* -30	5-6[6-7] (44-53[53-62])★
03 Series	MBK-03-* -10	12-15 (106-133)
06 Series	MBK-06-* -30	50-60 (443-531)
10 Series	MBK-10-* -10	150-170 (1330-1505)

★ The value range in parentheses represents the tightening torque requirements if the operating pressure is above 25 MPa (3630 PSI).

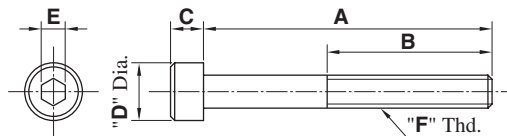


Interchangeability in Installation between Current and New Design

The model changed for the following models have been made.

Models	Model Numbers		Mtg. Interchangeability	Main changes
	Current	New		
005 Series	Throttle and Check Modular Valves	MSW-005-*-10	A MSB-005-*-20 W	Yes ● Modification for large flow use. ● Addition of the valve for A & B lines.
	Pilot Operated Check Modular Valves	MP ^B _W -005-2-10	A MPB-005-2-20 W	Yes ● Modification for large flow use. ● Addition of the valve for A lines.
	Base Plates	MMC-005-*-10	MMC-005-*-20	Yes Change of the port hole dia. for large flow use (3.4 Dia. → 4.3 Dia.).
	Bolt Kits	MBK-005-*-10	MBK-005-*-20	Yes ● Addition of bolt kit for 4-stage stacking. ● Change the bolt kit model numbers to conform to the required bolt length for the 01 to 10 series (See the table below for details.)
01 Series	Throttle Modular Valves	MSP-01-30	MSP-01-50	Yes Modification for large flow use.
	Throttle and Check Modular Valves	A MSB-01-**-*-40 W	A MSB-01-**-*-50 W	Yes Improved Controllability and Operatability.
03 Series	Relief Modular Valves	MB*-03-*-20	MB*-03-*-30	Yes Higher Operating Pressure.
	Reducing Modular Valves	P MRA-03-*-20 B	P MRA-03-*-30 B	Yes Modification for large flow use.

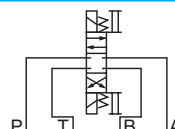















Comparison of MBK-005 bolt kit model numbers



Bolt Kit Model Numbers		Dimensions mm (Inches)					"F" Thd.	The number of the laminating steps quantity of valves to be stacked including solenoid operated directional Valve
(New) 20 Design	(Old) 10 Design	A	B	C	D	E		
MBK-005-01-20	MBK-005-02-10	65(2.56)	20 (0.79)	4 (0.16)	7 (0.28)	3 (0.12)	M4	2
MBK-005-02-20	MBK-005-03-10	95(3.74)						3
MBK-005-03-20	—————	125(4.92)						4
MBK-005-05-20	MBK-005-05-10	35(1.38)						1
MBK-005-01-2090	MBK-005-02-1090	65.1(2-9/16)	22.4 (0.88)	4.17 (0.164)	6.86 (0.27)	3.6 (9/64)	No.8-32 UNC	2
MBK-005-02-2090	MBK-005-03-1090	95.2(3-3/4)						3
MBK-005-03-2090	—————	125.4(4-15/16)						4
MBK-005-05-2090	MBK-005-05-1090	34.9(1-3/8)						1

005 Series Modular Valves

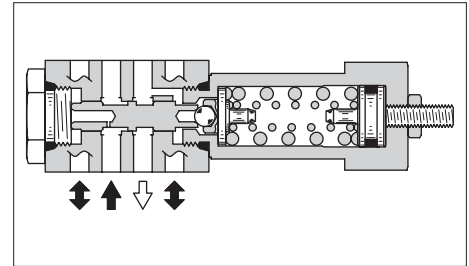
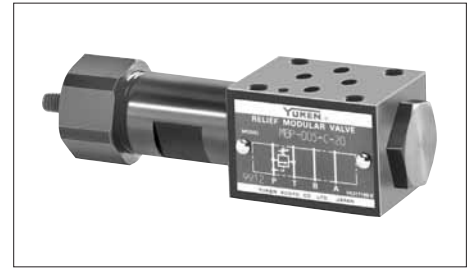
Type of Modular Valve

Class	Model Numbers	Graphic Symbols	Page
	Solenoid Operated Directional Valve DSG-005-***-*-40		336
Pressure Control Valves	Relief Valves (for "P-Line") MBP-005-*-20		518
	Reducing Valves (for "P-Line") MRP-005-*-20/2090		521
Flow Control Valves	Throttle and Check Valves (for "A-Line", Metre-out) MSA-005-X-20		524
	Throttle and Check Valves (for "A-Line", Metre-in) MSA-005-Y-20		
	Throttle and Check Valves (for "B-Line", Metre-out) MSB-005-X-20		
	Throttle and Check Valves (for "B-Line", Metre-in) MSB-005-Y-20		
	Throttle and Check Valves (for "A&B-Lines", Metre-out) MSW-005-X-20		
	Throttle and Check Valves (for "A&B-Lines", Metre-in) MSW-005-Y-20		
Directional Control Valves	Pilot Operated Check Valves (for "A-Line") MPA-005-2-20		527
	Pilot Operated Check Valves (for "B-Line") MPB-005-2-20		
	Pilot Operated Check Valves (for "A&B-Lines") MPW-005-2-20		
	Check Valves (for "P-Line") MCP-005-0-20		529
Modular Plates and Mounting Bolts	End Plates (Blocking plates) MDC-005-A-20		530
	Base Plates MMC-005-*-20/2080/2090		531
	Bolts Kits MBK-005-*-20/2090		534

Relief Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MBP-005-*-20	25 (3630)	15 (3.96)




Model Number Designation

F-	MBP	-005	-C	-20	*
Special Seals	Series Number	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MBP: Relief Valve for P-Line	005	C: *-16 ^{★1} (*-2320) H: 7-25 (1020-3630)	20	Refer to ^{★2}

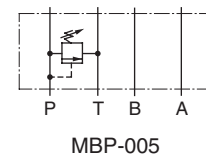
★1. See the "Minimum Adjustment Pressure" of the next page for the item marked *.

★2. Design Standards: None..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

Instructions

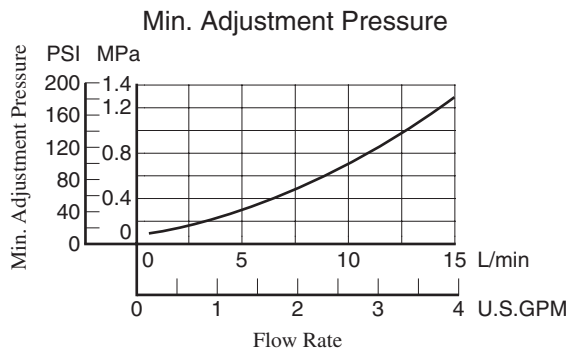
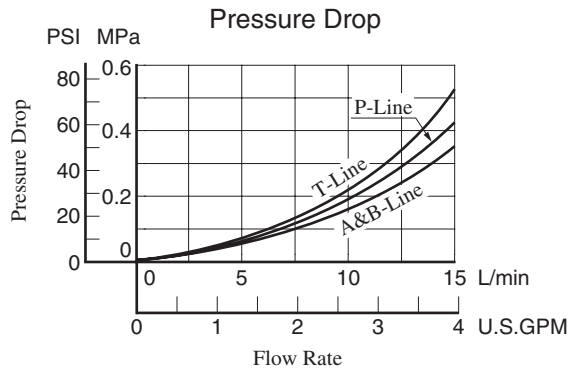
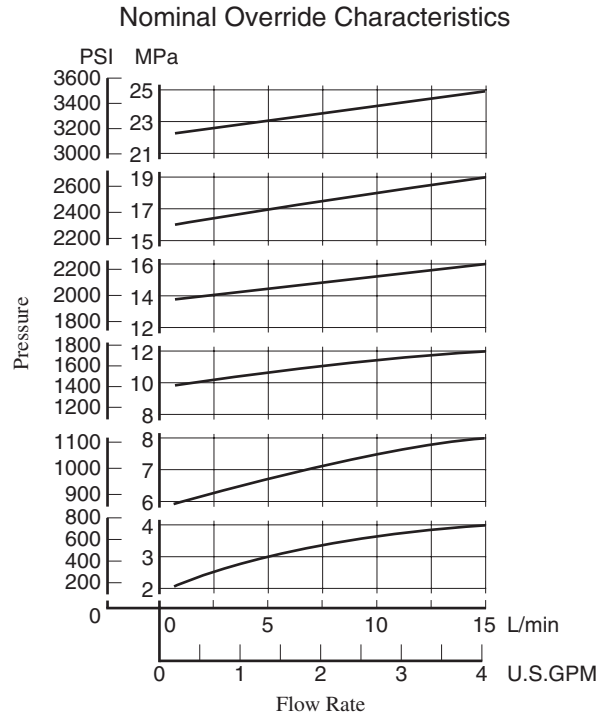
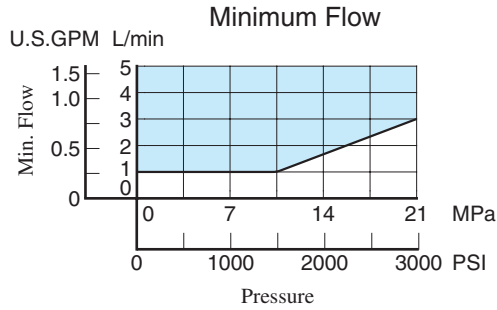
- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the next page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.
- In case of a small flow, the setting pressure may become unstable. To avoid this, refer to the minimum flow characteristic curve of the [next page](#) and use the valve within a range as shown with .

Graphic Symbol



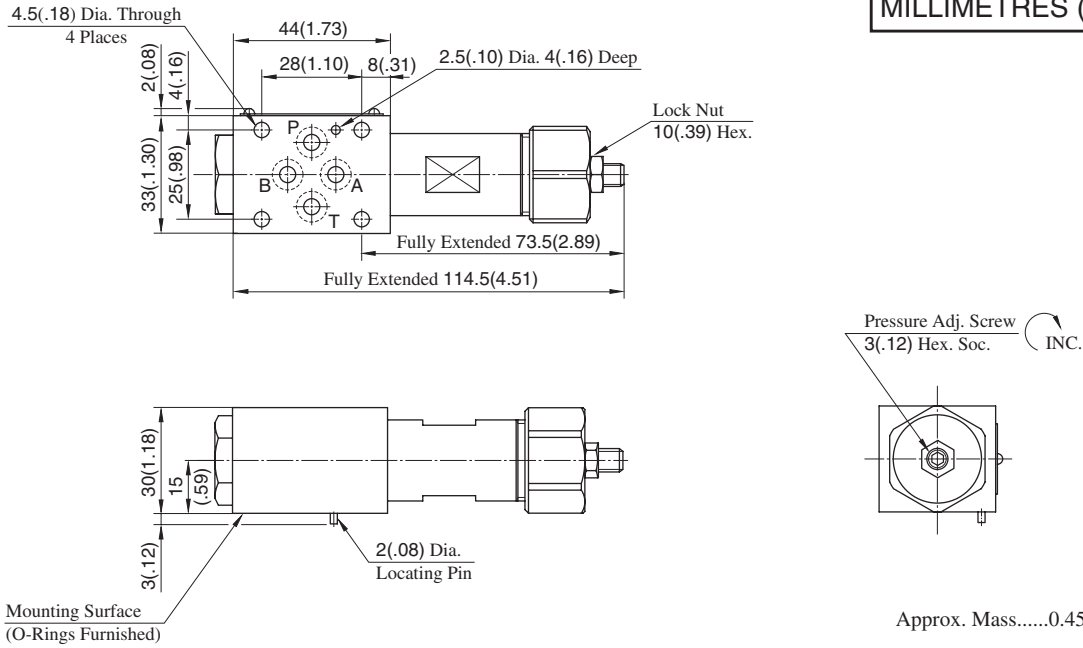
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



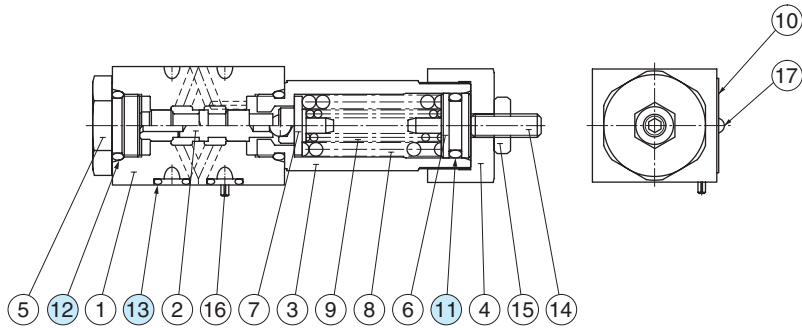
MBP-005-*-20

DIMENSIONS IN MILLIMETRES (INCHES)



Spare Parts List

MBP-005-*-20



List of Seals

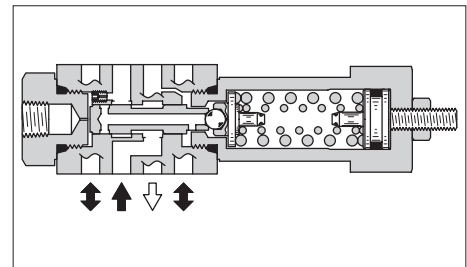
Item	Name of Parts	Part Numbers	Qty.	Remarks
11	O-Ring	SO-NA-P12.5	1	Included in Seal Kit Kit No. : KS-MBP-005-20
12	O-Ring	SO-NB-P14	2	
13	O-Ring	SO-NB-P6	4	

Reducing Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MRP-005-*-20/2090	25 (3630)	15 (3.96) *

★ If the pressure is set below 1.6 MPa (232 PSI), the maximum flow is limited. See the minimum adjustment pressure vs. maximum flow characteristics and during use, stay within the shaded zone on the graph.



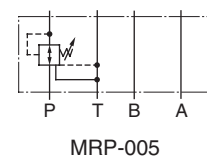
Model Number Designation

F-	MRP	-005	-B	-20	*
Special Seals	Series Number	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MRP: Reducing Valve for P-Line	005	B: *-7 (*-1020) ★ C: 3.5-16 (510-2320) H: 7-24.5 (1020-3550)	20	Refer to ★2

★ 1. See the "Minimum Adjustment Pressure vs. Maximum Flow" of the next page for the item marked *.

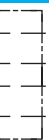
★ 2. Design Standards: None Japanese Standard "JIS" and European Design Standard 90 N. American Design Standard

Graphic Symbol



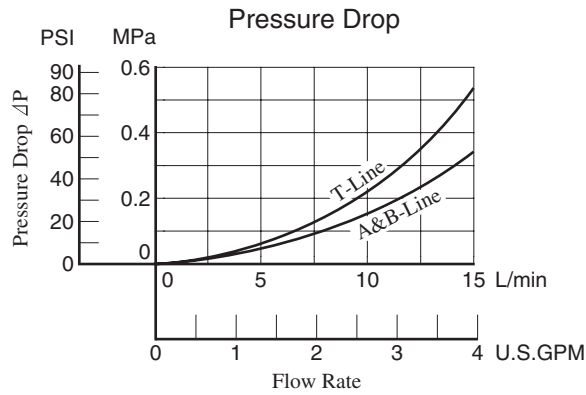
Instructions

- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the next page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.

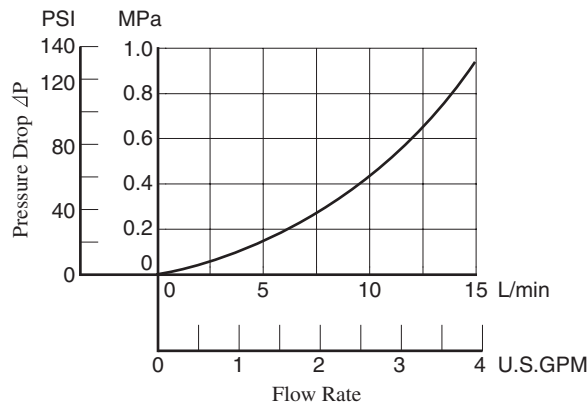


■ Typical Performance Characteristics

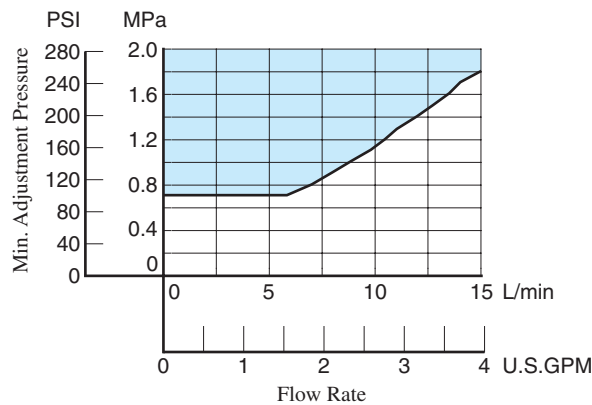
Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



Pres. Drop at Spool Fully Open (P-Line)

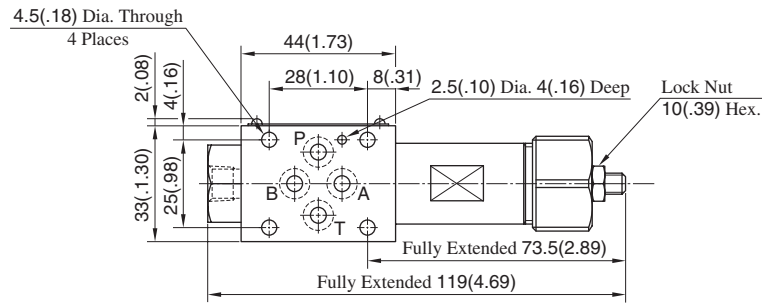


Min. Adjustment Pressure vs. Max. Flow



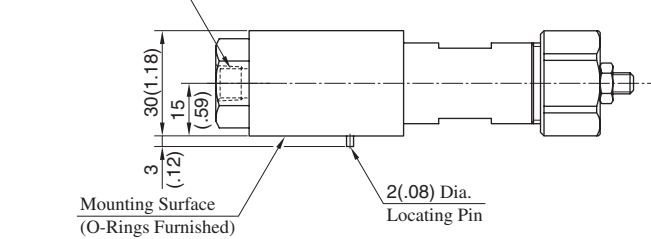
MRP-005-*-20/2090

DIMENSIONS IN MILLIMETRES (INCHES)

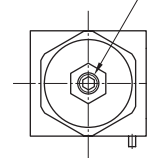


Model Numbers	Thread Size "C" Thd.
MR*-005-*-20	Rc 1/8 = 1/8 BSP.Tr
MR*-005-*-2090	1/8 NPT

Pressure Gauge Connection "C" Thd.



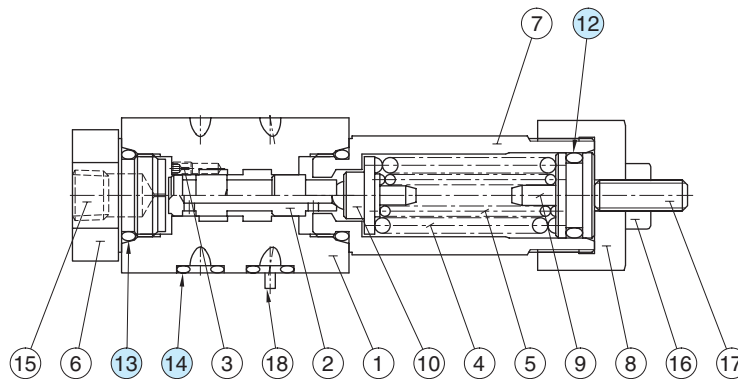
Pressure Adj. Screw 3(.12) Hex. Soc. INC.



Approx. Mass.....0.45 kg(.99 lbs.)

Spare Parts List

MRP-005-*-20/2090



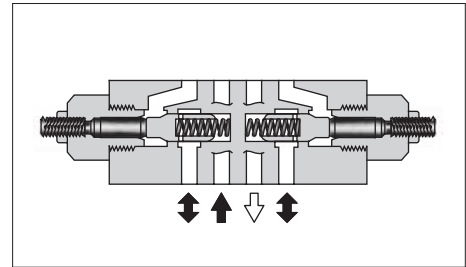
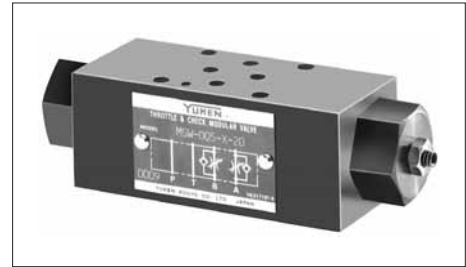
List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
12	O-Ring	SO-NA-P12.5	1	Included in Seal Kit Kit No. : KS-MRP-005-20
13	O-Ring	SO-NB-P14	2	
14	O-Ring	SO-NB-P6	4	

Throttle and Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MSW-005-*-20 MSA-005-*-20 MSB-005-*-20	25 (3630)	15 (3.96)



Model Number Designation

F-	MSW	-005	-X	-20	*
Special Seals	Series Number	Valve Size	Direction of Flow	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSA: Throttle and Check Valve for A-Line	005	X: Metre-out Y: Metre-in	20	Refer to ★
	MSB: Throttle and Check Valve for B-Line				
	MSW: Throttle and Check Valve for A&B-Lines				

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

Flow Adjustment

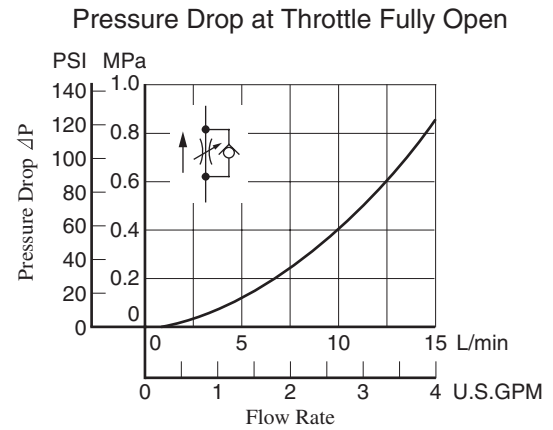
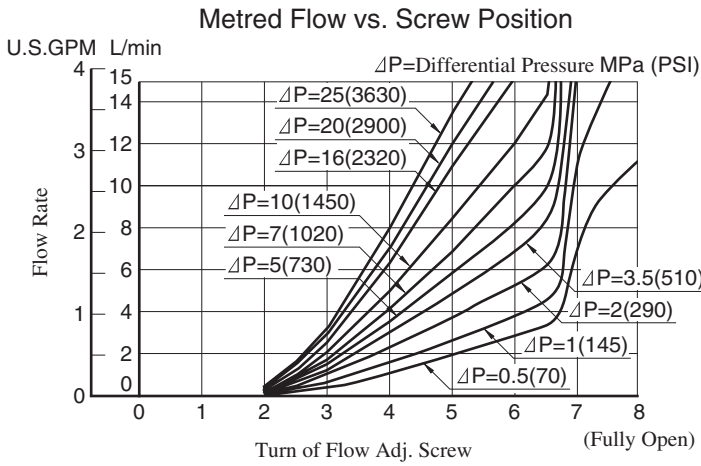
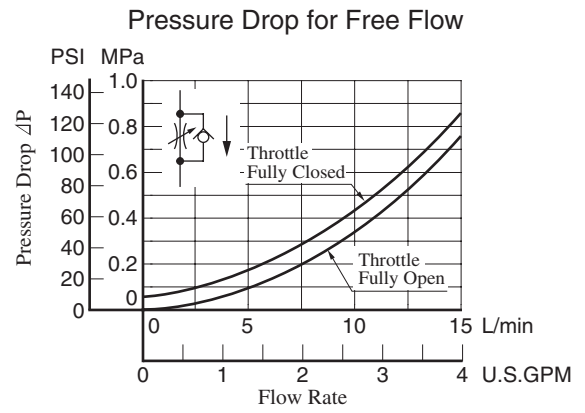
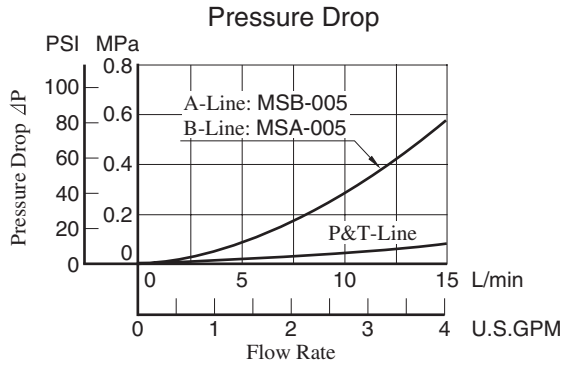
To make flow rate adjustment, loosen the lock nut and turn the flow adjustment screw clockwise or anti-clockwise. To throttle the flow, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after the adjustment of the flow rate is completed.

Graphic Symbols

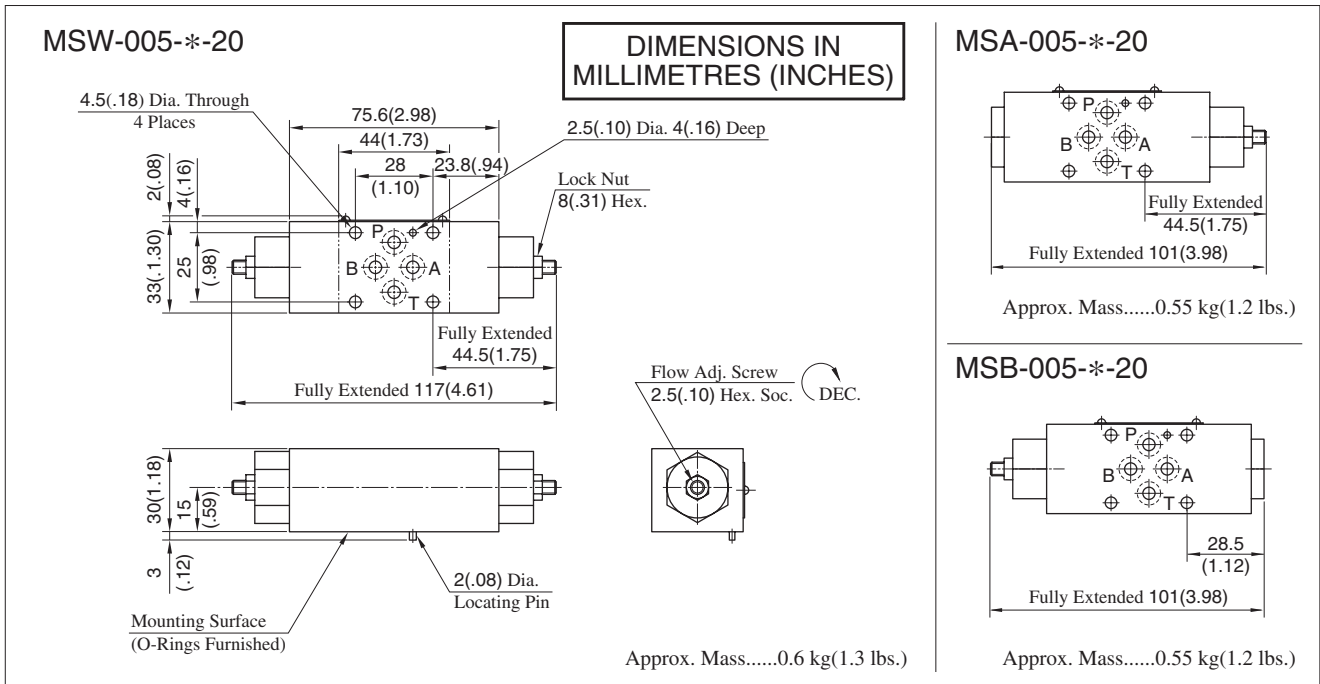
Metre-out	Metre-in
<p>MSA-005-X</p>	<p>MSA-005-Y</p>
<p>MSB-005-X</p>	<p>MSB-005-Y</p>
<p>MSW-005-X</p>	<p>MSW-005-Y</p>

Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



F
 005 Series Modular Valves



■ Spare Parts List

MSA-005-X_Y-20

MSB-005-X_Y-20

MSW-005-X_Y-20

- List of Seals

Item	Name of Parts	Part Numbers	Qty.	
			MSA MSB	MSW
7	O-Ring	SO-NA-P3	1	2
8	O-Ring	SO-NB-P6	4	4
9	O-Ring	SO-NB-P14	2	2
10	Back Up Ring	SO-BB-P3	1	2

- List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
MSA-005	KS-MSA-005-20
MSB-005	
MSW-005	KS-MSW-005-20

Pilot Operated Check Modular Valves

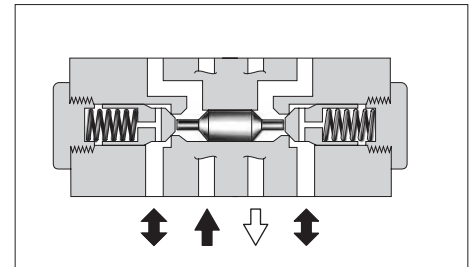
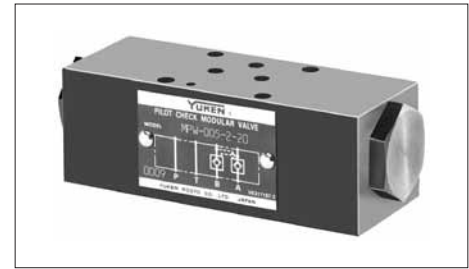
Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MPA-005-2-20 MPB-005-2-20 MPW-005-2-20	25 (3630)	15 (3.96)

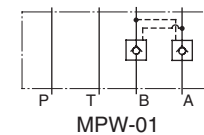
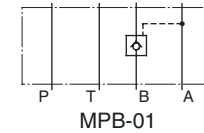
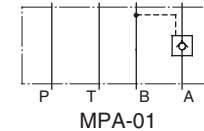
Model Number Designation

F-	MPW	-005	-2	-20	*
Special Seals	Series Number	Valve Size	Cracking Pressure MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MPA: Pilot Operated Check Valve for A-Line MPB: Pilot Operated Check Valve for B-Line MPW: Pilot Operated Check Valve for A&B-Lines	005	2: 0.2 (29)	20	Refer to ★

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

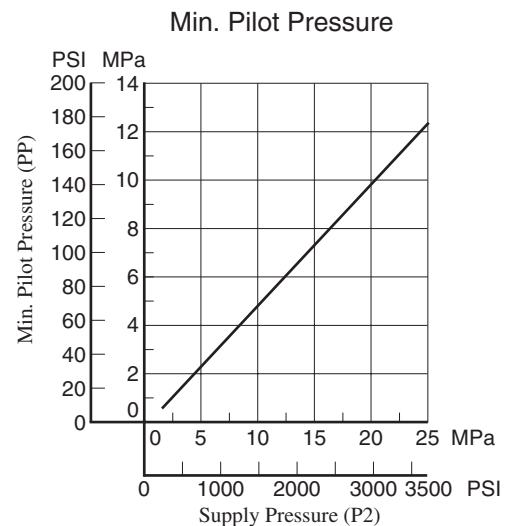
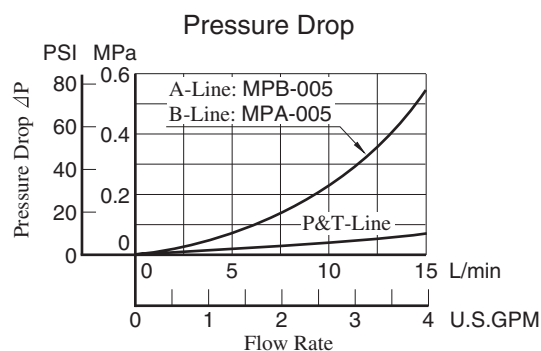
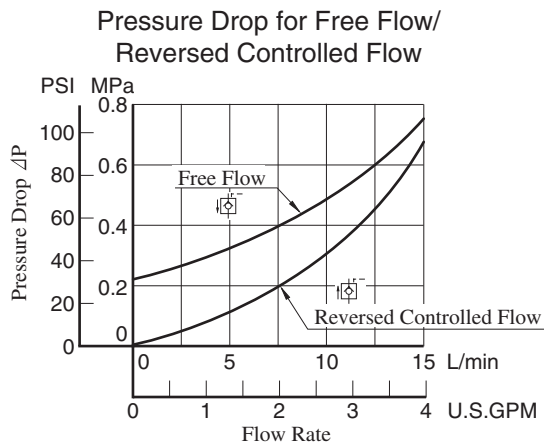


Graphic Symbols



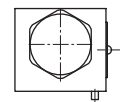
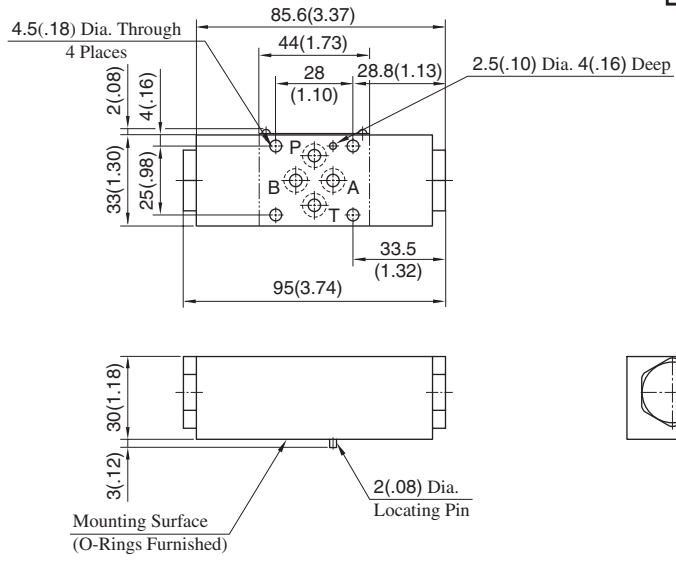
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



MPA-005-2-20
 MPB-005-2-20
 MPW-005-2-20

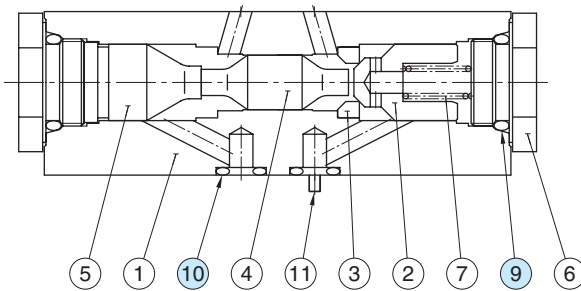
**DIMENSIONS IN
 MILLIMETRES (INCHES)**



Approx. Mass.....0.55 kg(1.2 lbs.)

Spare Parts List

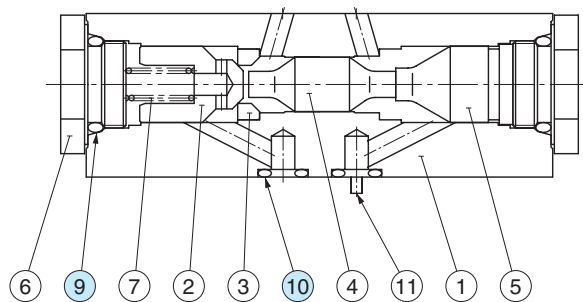
MPA-005-2-20



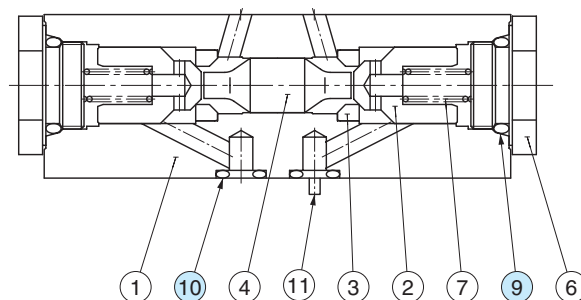
List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
9	O-Ring	SO-NB-P14	2	Included in Seal Kit
10	O-Ring	SO-NB-P6	4	Kit No. : KS-MPA-005-20

MPB-005-2-20



MPW-005-2-20



Check Modular Valves

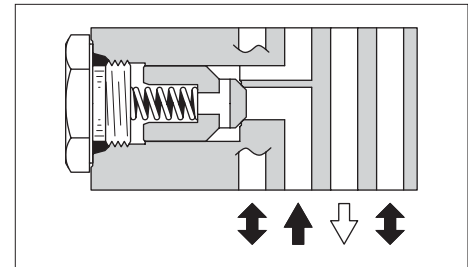
Specifications

Model Number	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MCP-005-0-20	25 (3630)	15 (3.96)

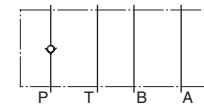
Model Number Designation

F-	MCP	-005	-0	-20	*
Special Seals	Series Number	Valve Size	Cracking Pressure MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MCP: Check Valve for P-Line	005	0: 0.035(5)	20	Refer to ★

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard



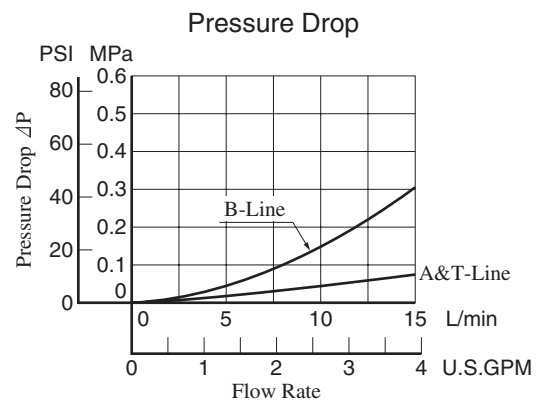
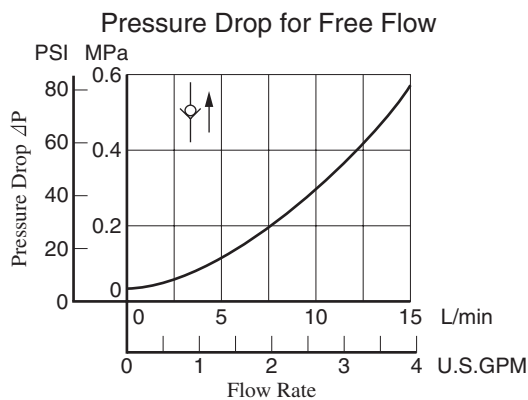
Graphic Symbol



MCP-005

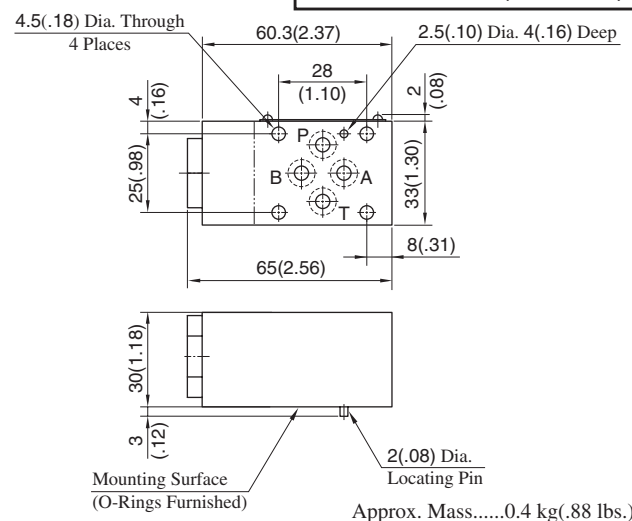
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



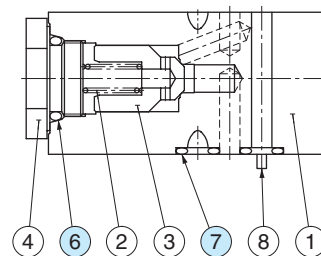
MCP-005-0-20

DIMENSIONS IN MILLIMETRES (INCHES)



Spare Parts List

MCP-005-0-20



List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
6	O-Ring	SO-NB-P14	2	Included in Seal Kit
7	O-Ring	SO-NB-P6	4	Kit No. : KS-MPA-005-20



End Plates

Blocking plates are used for auxiliary mounting surface or for closing unnecessary circuits.

Specifications

Max. Operating Pressure ----- 25 MPa (3630 PSI)

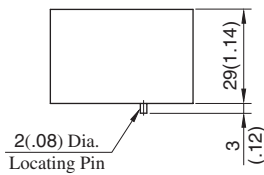
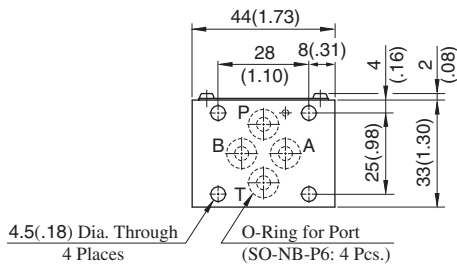


Model Number Designation

F-	MDC	-005	-A	-20	*
Special Seals	Series Number	Plate Size	Type of Plate	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MDC: End Plate	005	A: Blocking Plate	20	Refer to ★

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

MDC-005-A-20



DIMENSIONS IN MILLIMETRES (INCHES)

Approx. Mass.....0.3 kg(.66 lbs.)

Graphic Symbol

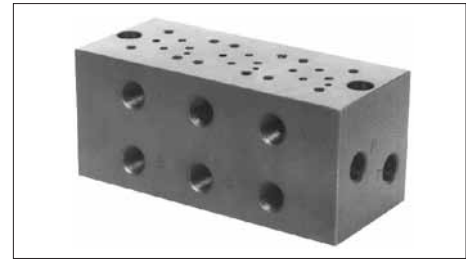


MDC-005-A

Base Plates For Modular Valves

Specifications

Max. Operating Pressure ----- 25 MPa (3630 PSI)



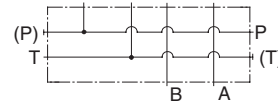
Model Number Designation

MMC	-005	-5	-20	*
Series Number	Plate Size	Number of Stations	Design Number	Design Standard
MMC: Base Plate	005	1 : 1 Station 2 : 2 Stations 3 : 3 Stations 4 : 4 Stations 5 : 5 Stations	20	None : Japanese Standard "JIS" 80 : European Design Standard 90 : N.American Design Standard

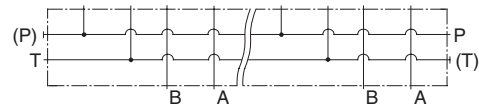
Instructions

- Port Used: Base plate has more than one pressure port "P" and tank port "T". Any one of these ports or two or more ports may be used. However, please note that the ports marked with (P) or (T) in the drawing are normally plugged. Remove the plugs when using such ports. Make sure that ports that are not currently used are properly plugged.

Graphic Symbols

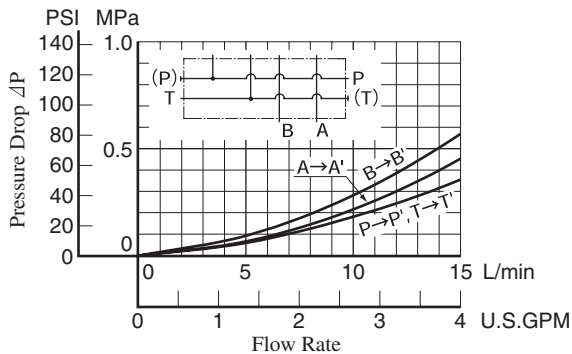


MMC-005-1



MMC-005-2-5

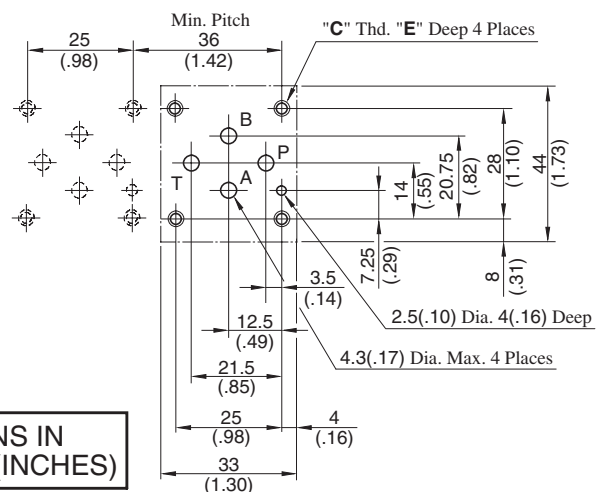
Pressure Drop



Mounting Surface Dimensions for 005 Series Modular Valve

When standard base plates (MMC-005) are not used, the mounting surface described on the right must be prepared. The mounting surface should have a good machined finish.

Design Std.	"C" Thd.	"E"
Japanese Std. "JIS" and European Design Std.	M4	7.5 (.30)
N. American Design Std.	No.8 - 32 UNC	10 (.39)

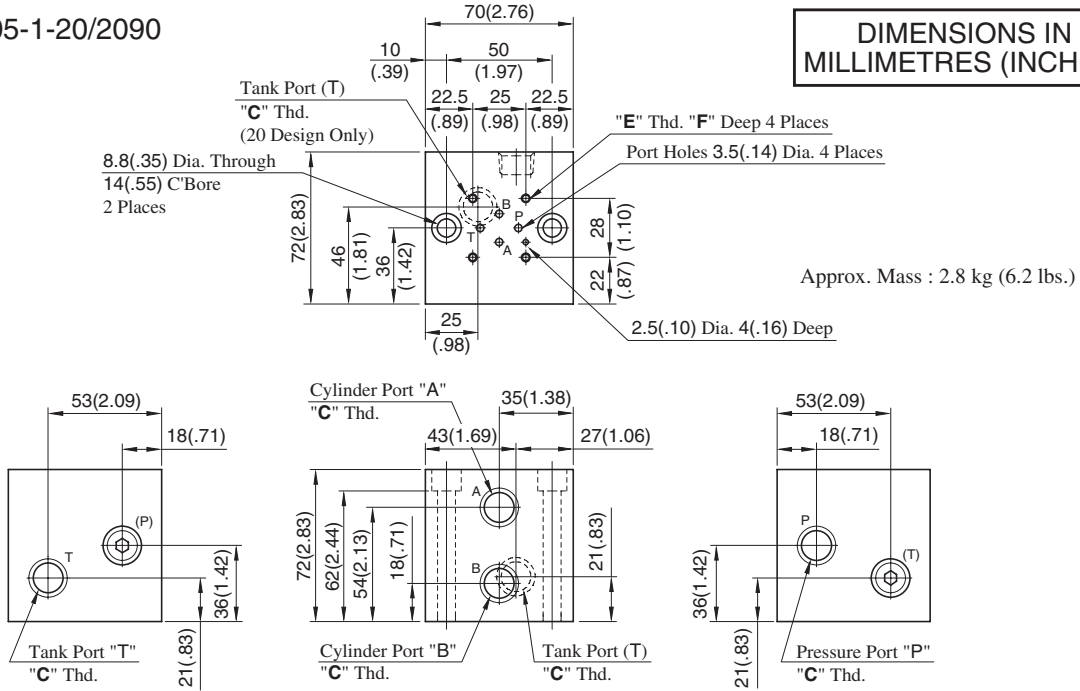


DIMENSIONS IN MILLIMETRES (INCHES)

005 Series Modular Valves

MMC-005-1-20/2090

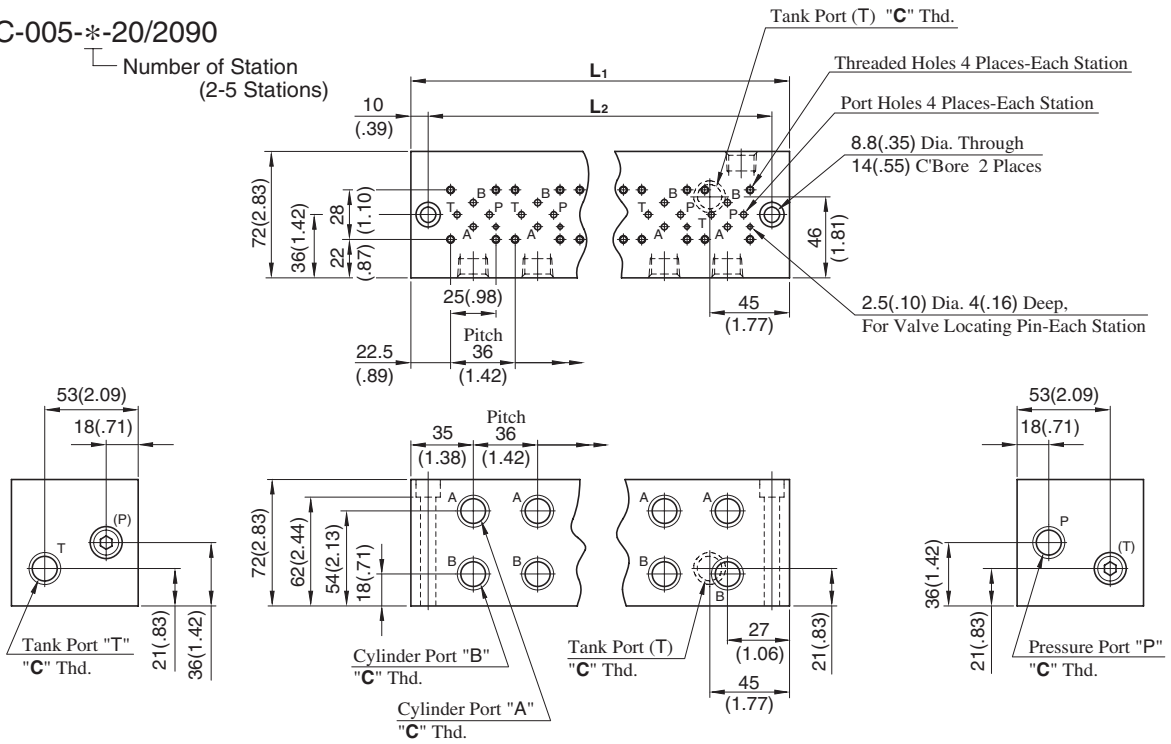
DIMENSIONS IN MILLIMETRES (INCHES)



Approx. Mass : 2.8 kg (6.2 lbs.)

MMC-005-*-20/2090

Number of Station
(2-5 Stations)



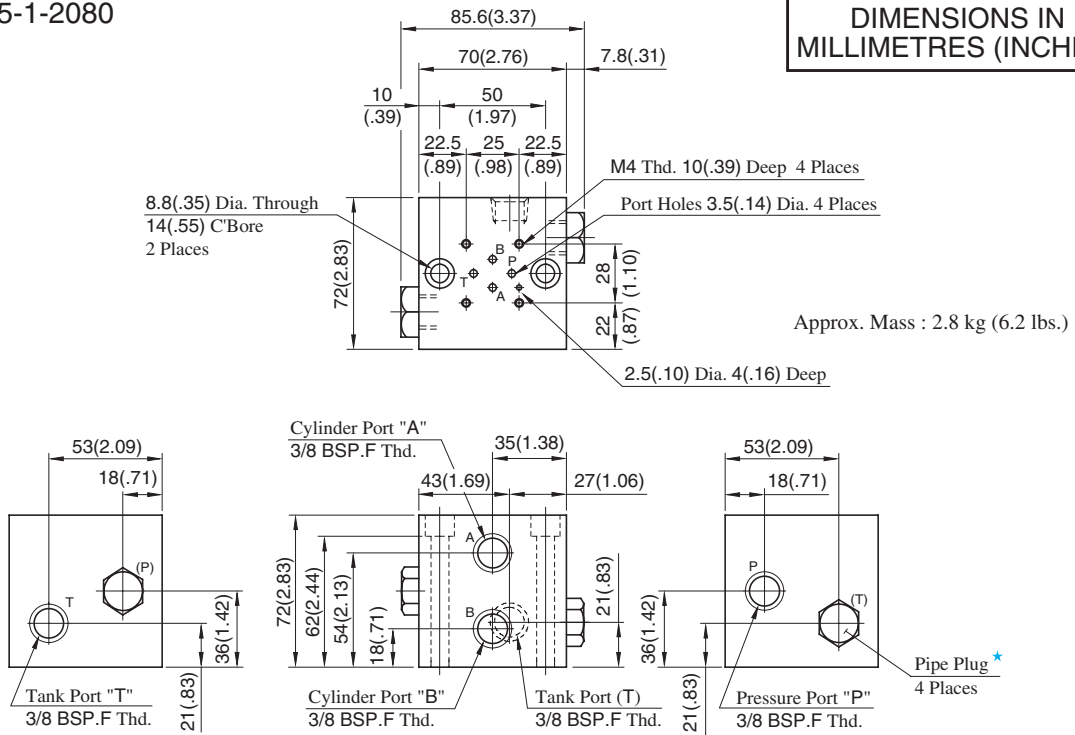
• For other dimensions, refer to the above Model MMC-005-1.

Model Numbers	Thread Size		Dimensions mm (Inches)
	"C" Thd.	"E" Thd.	F
MMC-005-*-20	Rc 3/8	M4	8 (.31)
MMC-005-*-2090	3/8 NPT	No. 8-32 UNC	10 (.39)

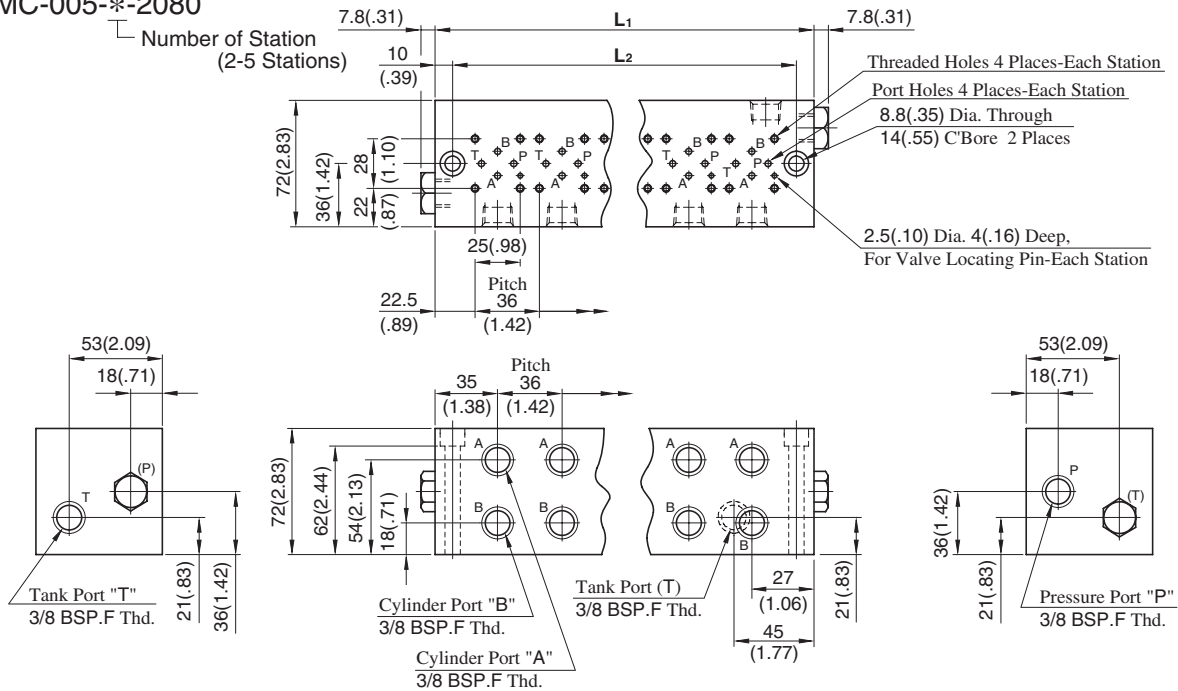
Model Numbers	Dimensions mm (Inches)		Approx. Mass kg (lbs.)
	L1	L2	
MMC-005-2	106 (4.17)	86 (3.39)	4.3 (9.5)
MMC-005-3	142 (5.59)	122 (4.80)	5.8 (12.8)
MMC-005-4	178 (7.01)	158 (6.22)	7.2 (15.9)
MMC-005-5	214 (8.43)	194 (7.64)	8.7 (19.2)

MMC-005-1-2080

DIMENSIONS IN MILLIMETRES (INCHES)



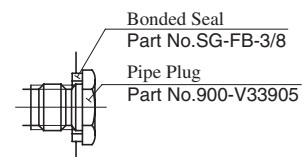
MMC-005-*-2080



• For other dimensions, refer to the above Model MMC-005-1.

Model Numbers	Dimensions mm (Inches)		Approx. Mass kg (lbs.)
	L ₁	L ₂	
MMC-005-2	106 (4.17)	86 (3.39)	4.3 (9.5)
MMC-005-3	142 (5.59)	122 (4.80)	5.8 (12.8)
MMC-005-4	178 (7.01)	158 (6.22)	7.2 (15.9)
MMC-005-5	214 (8.43)	194 (7.64)	8.7 (19.2)

★ Detail of Pipe Plug



Mounting Bolt Kits

To mount the valves, four M4 bolts are used. The combination of valves varies with circuits. So, we have several mounting bolt kits suitable for different valve combinations. From the selection chart, choose a necessary bolt kit and specify it with model number when ordering.



Model Number Designation

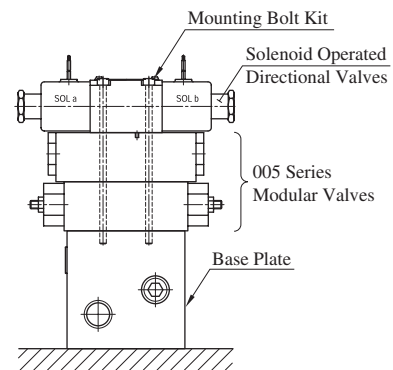
MBK	-005	-02	-20	*
Series Number	Size of Modular Valve	Bolt Number	Design Number	Design Standard
MBK: Bolt Kits for Modular Valves	005	01,02,03,05 (Refer to the following chart)	20	None: Japanese Standard "JIS" and European Design Standard 90: N.American Design Standard

Bolt Kits Selection Chart

Model Numbers	Quantity of valves to be stacked			Approx. Mass g (lbs.)
	Solenoid Operated Directional Valve (DSG-005)	Modular Valve (MDC-005)	Modular Valve (M**-005)	
MBK-005-01-20*	1	0	1	30(.07)
	0	1		
MBK-005-02-20*	1	0	2	40(.09)
	0	1		
MBK-005-03-20*	1	0	3	50(.11)
	0	1		
MBK-005-05-20*	1*	0	0	18(.04)
	0	1		

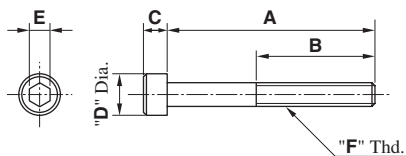
★ The solenoid operated directional valve comes with mounting bolts.

- **Bolts Kit Composition:**
Soc. Hd. Cap Screw.....4 Pcs.
- **Tightening Torque:**
2.5 - 3.5 Nm (22-31 in. lbs.)



Stacking Example

MBK-005-*-20/2090



Model Numbers	Dimensions mm (Inches)					"F" Thd.
	A	B	C	D	E	
MBK-005-01-20	65 (2.56)					M4
MBK-005-02-20	95 (3.74)	20 (.79)	4 (.16)	7 (.28)	3 (.12)	
MBK-005-03-20	125 (4.92)					
MBK-005-05-20	35 (1.38)					
MBK-005-01-2090	65.1 (2-9/16)					
MBK-005-02-2090	95.2 (3-3/4)	22.4 (.88)	4.17 (.164)	6.86 (.27)	3.6 (9/64)	
MBK-005-03-2090	125.4 (4-15/16)					
MBK-005-05-2090	34.9 (1-3/8)					

1/8 Modular Valves

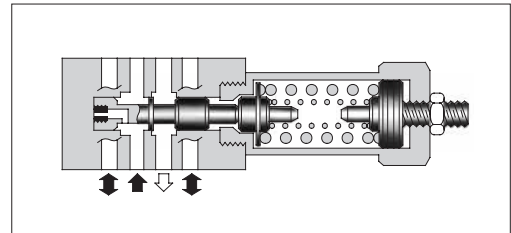
Type of Modular Valve

Class	Model Numbers	Graphic Symbols	Page	Class	Model Numbers	Graphic Symbols	Page				
Pressure Control Valves	Solenoid Operated Directional Valve (S-)DSG-01-***-70/7090 E-DSG-01-***-D*60/6090 T-DSG-01-***-D24*70/7090 G-DSG-01-***-50/5090		344 378 379 412	Flow Control Valves	P T B A						
	Relief Valves (for "P-Line") MBP-01-*30		536					Throttle Valves (for "P-Line") MSP-01-50		559	
	Relief Valves (for "A-Line") MBA-01-*30		536					Check and Throttle Valves (for "P-Line") MSCP-01-30		561	
	Relief Valves (for "B-Line") MBB-01-*30		536					Throttle and Check Valves (for "A-Line", Metre-out) MSA-01-X-50		563	
	Reducing Valves (for "P-Line") MRP-01-*30/3090		539					Throttle and Check Valves (for "A-Line", Metre-in) MSA-01-Y-50		563	
	Reducing Valves (for "A-Line") MRA-01-*30/3090		539					Throttle and Check Valves (for "B-Line", Metre-out) MSB-01-X-50		563	
	Reducing Valves (for "B-Line") MRB-01-*30/3090		539					Throttle and Check Valves (for "B-Line", Metre-in) MSB-01-Y-50		563	
	Brake Valves MBR-01-*30		542					Throttle and Check Valves (for "A&B-Lines", Metre-out) MSW-01-X-50		563	
	Sequence Valves (for "P-Line") MHP-01-*30		544					Throttle and Check Valves (for "A&B-Lines", Metre-in) MSW-01-Y-50		563	
	Counterbalance Valves (for "A-Line") MHA-01-*30		544					Throttle and Check Valves (for "A&B-Lines", Metre-in, Metre-out) MSW-01-YX-50		563	
	Pressure Switch Valves (for "P-Line") MJP-01-*30		547					Directional Control Valves	Check Valves (for "P-Line") MCP-01-*30		567
	Pressure Switch Valves (for "A-Line") MJA-01-*30		547						Check Valves (for "T-Line") MCT-01-*30		567
	Pressure Switch Valves (for "B-Line") MJB-01-*30		547						Anti-Cavitation Valves MAC-01-30		568
Flow Control Valves (for "P-Line") MFP-01-10		551	Pilot Operated Check Valves (for "A-Line") MPA-01-*40/4001		569						
Flow Control and Check Valves (for "A-Line", Metre-out) MFA-01-X-10		551	Pilot Operated Check Valves (for "B-Line") MPB-01-*40/4001		569						
Flow Control and Check Valves (for "A-Line", Metre-in) MFA-01-Y-10		551	Pilot Operated Check Valves (for "A&B-Lines") MPW-01-*40/4001		569						
Flow Control Valves	Flow Control and Check Valves (for "B-Line", Metre-out) MFB-01-X-10		551	Modular Plates and Mounting Bolts	End Plates (Blocking plates) MDC-01-A-30		571				
	Flow Control and Check Valves (for "B-Line", Metre-in) MFB-01-Y-10		551		End Plates (Bypass plates) MDC-01-B-30		571				
	Flow Control and Check Valves (for "A&B-Lines", Metre-out) MFW-01-X-10		551		Connecting Plates (for "P&A-Lines") MDS-01-PA-30/3090		572				
	Flow Control and Check Valves (for "A&B-Lines", Metre-in) MFW-01-Y-10		551		Connecting Plates (for "P&B-Lines") MDS-01-PB-30/3090		572				
	Temperature Compensated Throttle and Check Valves (for "A-Line", Metre-out) MSTA-01-X-10		555		Connecting Plates (for "A&T-Lines") MDS-01-AT-30/3090		572				
	Temperature Compensated Throttle and Check Valves (for "B-Line", Metre-out) MSTB-01-X-10		555		Base Plates MMC-01-*40/4080/4090		573				
	Temperature Compensated Throttle and Check Valves (for "B-Line", Metre-in) MSTB-01-Y-10		555		Bolt Kits MBK-01-*30/3090		576				
	Temperature Compensated Throttle and Check Valves (for "A&B-Lines", Metre-out) MSTW-01-X-10		555								

Relief Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MBP-01-* -30 MBA-01-* -30 MBB-01-* -30	21 (3050)	35 (9.25)



Model Number Designation

F-	MBP	-01	-C	-30	*
Special Seals	Series Number	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MBP: Relief Valve for P-Line MBA: Relief Valve for A-Line MBB: Relief Valve for B-Line	01	C: *-14 ^{★1} (*-2030) H: 7-21 (1020-3050)	30	Refer to ^{★2}

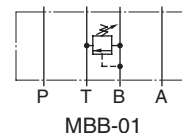
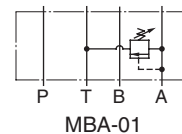
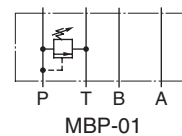
★1. See the "Minimum Adjustment Pressure" of the next page for the item marked *.

★2. Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

Instructions

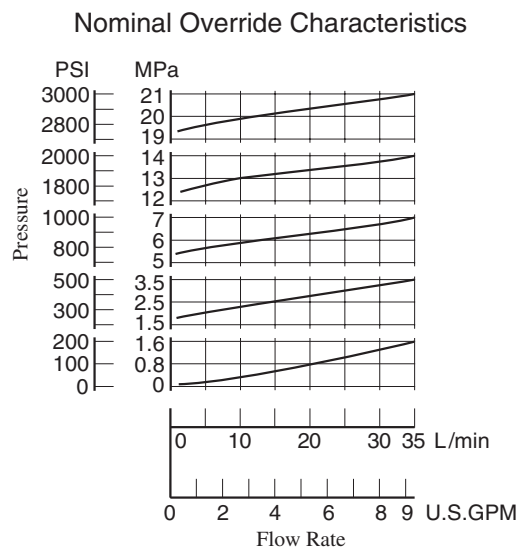
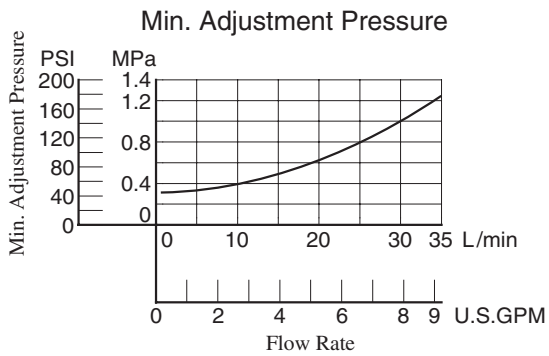
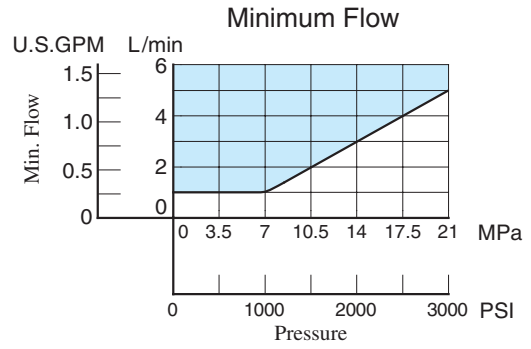
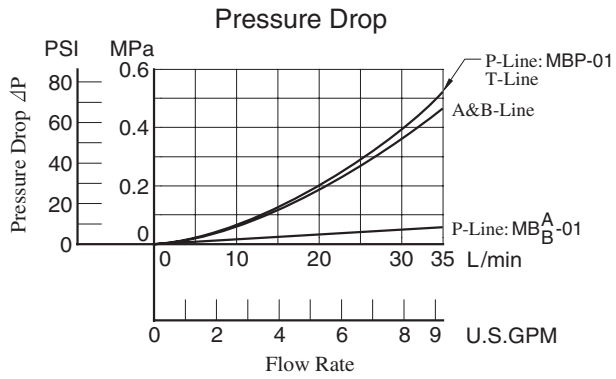
- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the [next page](#). This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.
- In case of a small flow, the setting pressure may become unstable. To avoid this, refer to the minimum flow characteristic curve of the next page and use the valve within a range as shown with .

Graphic Symbols

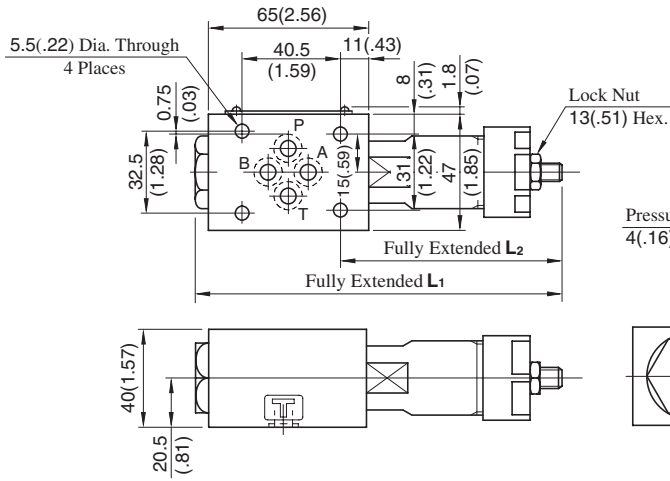


Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



MBP-01-*-30
MBB-01-*-30

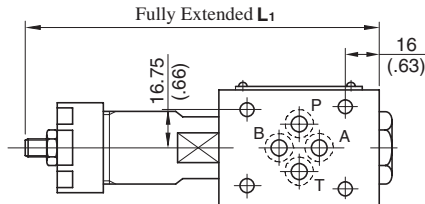


Model No.	L ₁	L ₂
MB*-01-C	151 (5.94)	92 (3.62)
MB*-01-H	166.5 (6.56)	107.5 (4.23)

Approx. Mass.....1.1 kg (2.4 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

MBA-01-*-30

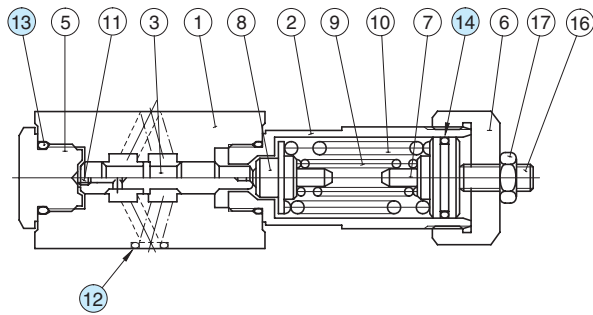


Approx. Mass.....1.1 kg (2.4 lbs.)

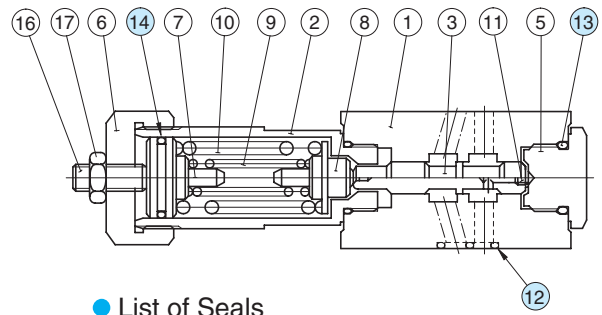
• For other dimensions, refer to above (MBP-01) drawing.

■ Spare Parts List

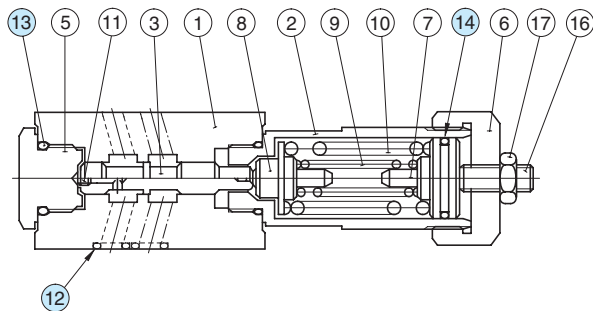
MBP-01-*-30



MBA-01-*-30



MBB-01-*-30



• **List of Seals**

Item	Name of Parts	Part Numbers	Qty.
12	O-Ring	SO-NB-P9	4
13	O-Ring	SO-NB-P18	2
14	O-Ring	SO-NA-P20	1

Note: When ordering seals, please specify the seal kit number from the table below.

• **List of Seal Kit**

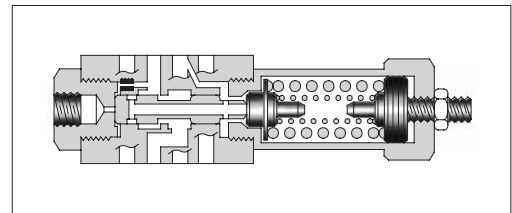
Valve Model No.	Seal kit No.
MBP-01	KS-MBP-01-30
MBA-01	
MBB-01	

Reducing Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa(PSI)	Max. Flow L/min (U.S.GPM)
MRP-01-*-30/3090 MRA-01-*-30/3090 MRB-01-*-30/3090	31.5 (4570)	35 (9.25) *

★ If the pressure is set below 1.9 MPa (280 PSI), the maximum flow is limited. See the minimum adjustment pressure vs. maximum flow characteristics and during use, stay within the shaded zone on the graph.



Model Number Designation

F-	MRP	-01	-B	-30	*
Special Seals	Series Number	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MRP: Reducing Valve for P-Line MRA: Reducing Valve for A-Line MRB: Reducing Valve for B-Line	01	B: *-7 (*-1020) *1 C: 3.5-14 (510-2030) H: 7-21 (1020-3050)	30	Refer to ★2

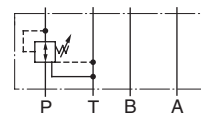
★1. See the "Minimum Adjustment Pressure vs. Maximum Flow" of the next page for the item marked *.

★2. Design Standards: None Japanese Standard "JIS" and European Design Standard
90 N. American Design Standard

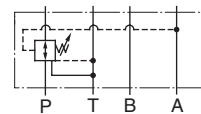
Instructions

- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the next page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.

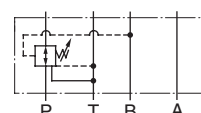
Graphic Symbols



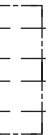
MRP-01



MRA-01

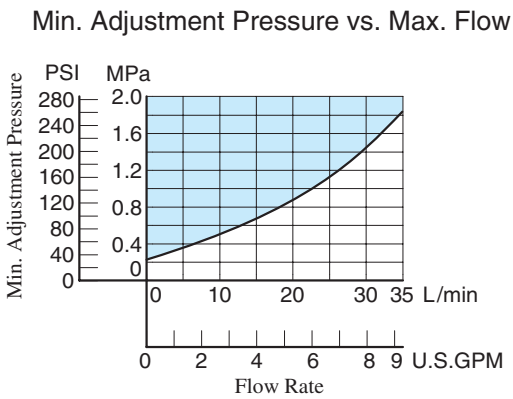
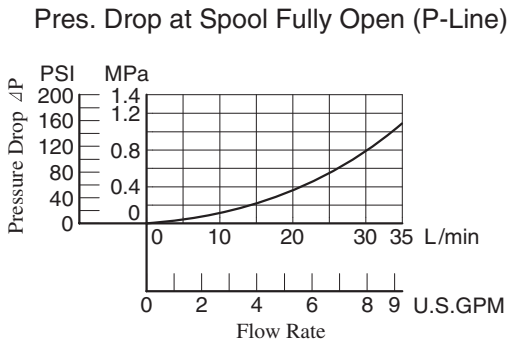
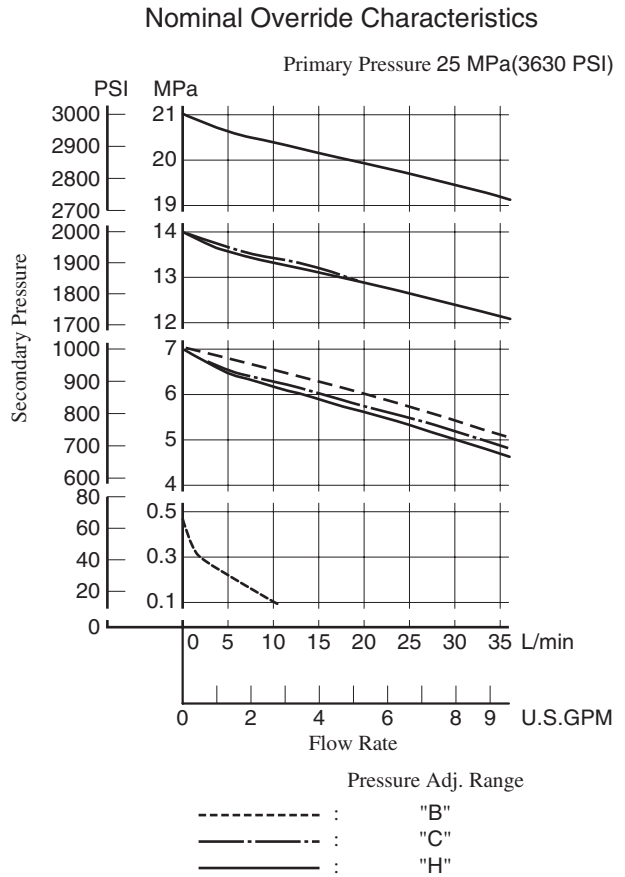
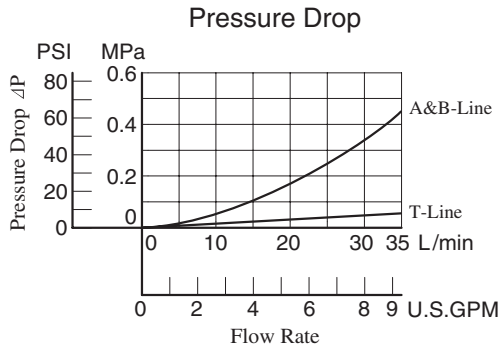


MRB-01



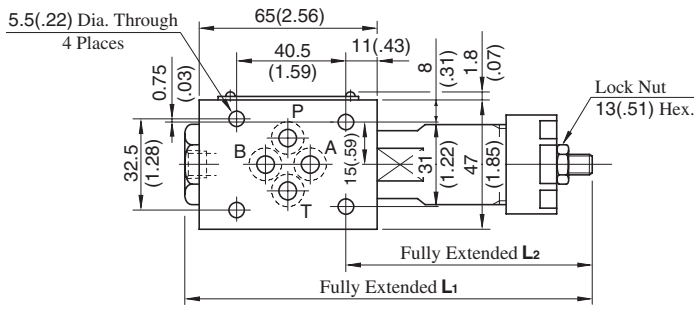
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



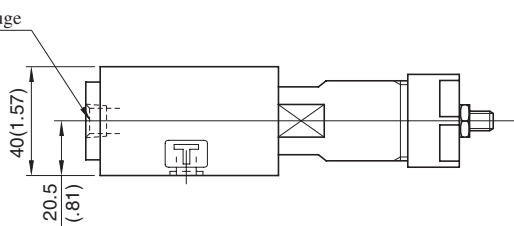
MRP-01-*-30/3090
MRA-01-*-30/3090
MRB-01-*-30/3090

DIMENSIONS IN
MILLIMETRES (INCHES)

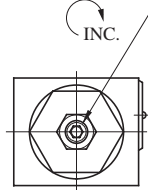


Model No.	L ₁	L ₂
MR*-01- ^B / _C	158 (6.22)	92 (3.62)
MR*-01-H	173.5 (6.83)	107.5 (4.23)

Pressure Gauge
Connection
"C" Thd.



Pressure Adj. Screw
4(.16) Hex. Soc.

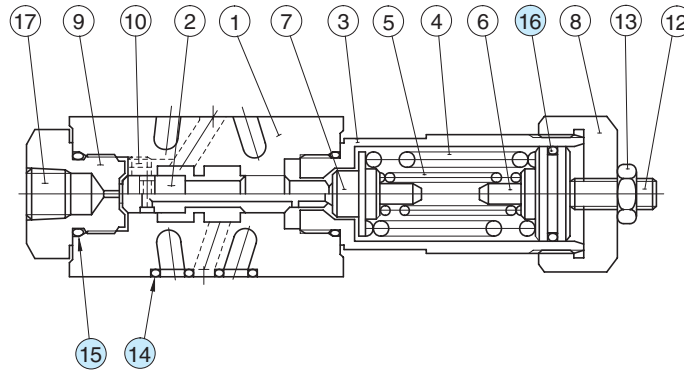


Model Numbers	Thread Size "C" Thd.
MR*-01-*-30	Rc 1/4 = 1/4 BSP.Tr
MR*-01-*-3090	1/4 NPT

Approx. Mass.....1.1 kg (2.4 lbs.)

Spare Parts List

MRP-01-*-30/3090
MRA-01-*-30/3090
MRB-01-*-30/3090



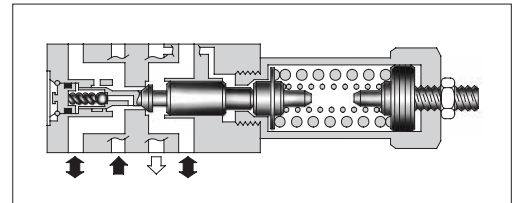
List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
14	O-Ring	SO-NB-P9	4	Included in Seal Kit Kit No.: KS-MBP-01-30
15	O-Ring	SO-NB-P18	2	
16	O-Ring	SO-NA-P20	1	

Brake Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MBR-01-* -30	25 (3630)	35 (9.25)



Model Number Designation

F-	MBR	-01	-C	-30	*
Special Seals	Series Number	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MBR: Brake Valve	01	C: *-14 * ¹ (* -2030) H: 7-21 (1020-3050)	30	Refer to * ²

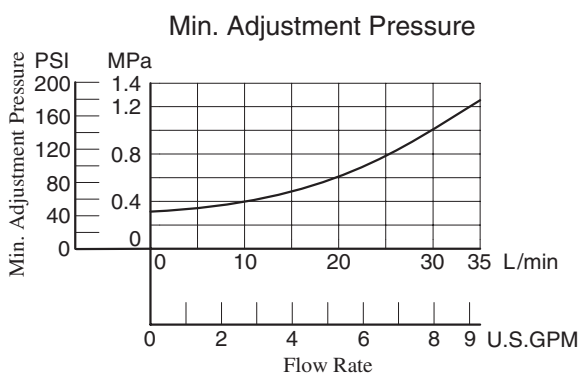
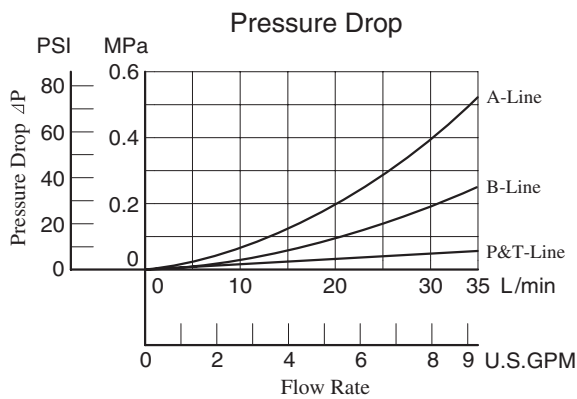
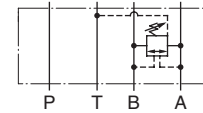
*¹. See the "Minimum Adjustment Pressure" for the item marked *.

*². Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850

Graphic Symbol

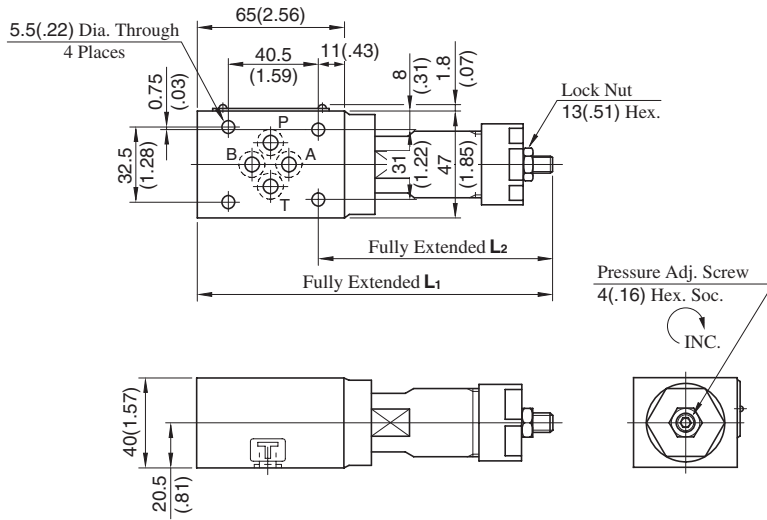


Instructions

- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the left. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.

MBR-01-*-30

DIMENSIONS IN
MILLIMETRES (INCHES)

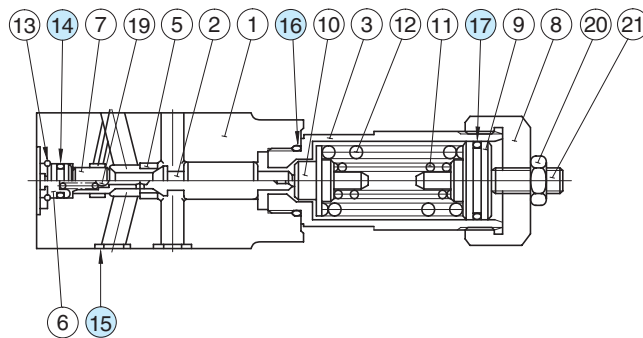


Model No.	L ₁	L ₂
MBR-01-C	161 (6.34)	107 (4.21)
MBR-01-H	176.5 (6.95)	122.5 (4.82)

Approx. Mass.....1.3 kg (2.9 lbs.)

Spare Parts List

MBR-01-*-30



List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
14	O-Ring	SO-NB-P7	1	Included in Seal Kit Kit No.: KS-MBR-01-30
15	O-Ring	SO-NB-P9	4	
16	O-Ring	SO-NB-P18	1	
17	O-Ring	SO-NA-P20	1	

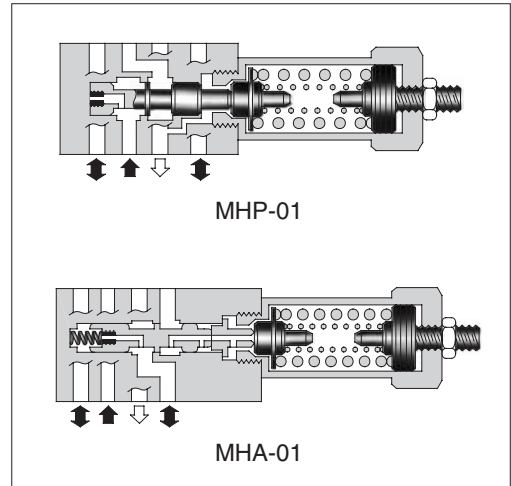
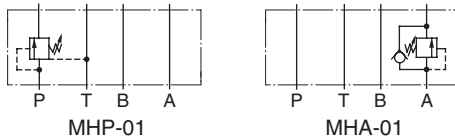
Sequence Modular Valves/Counterbalance Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)	Free Flow L/min (U.S.GPM)
MHP-01-* -30	25 (3630)	35 (9.25)	—
MHA-01-* -30			35 (9.25)



Graphic Symbols



Model Number Designation

F-	MHP	-01	-C	-30	*
Special Seals	Series Number	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MHP: Sequence Valve for P-Line MHB: Counterbalance Valve for A-Line	01	C: *-14 * ¹ (*-2030) H: 7-21 (1020-3050)	30	Refer to * ²

*¹ 1. See the "Minimum Adjustment Pressure" of the next page for the item marked *.

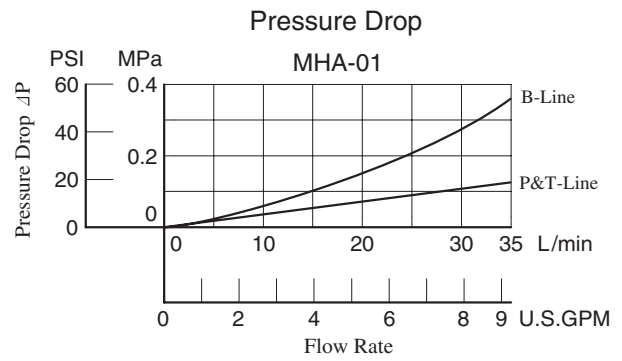
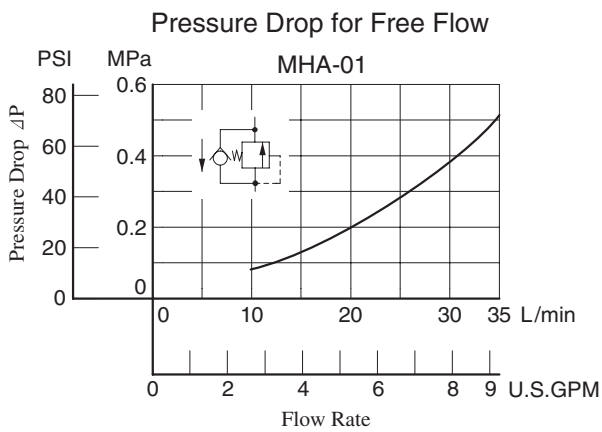
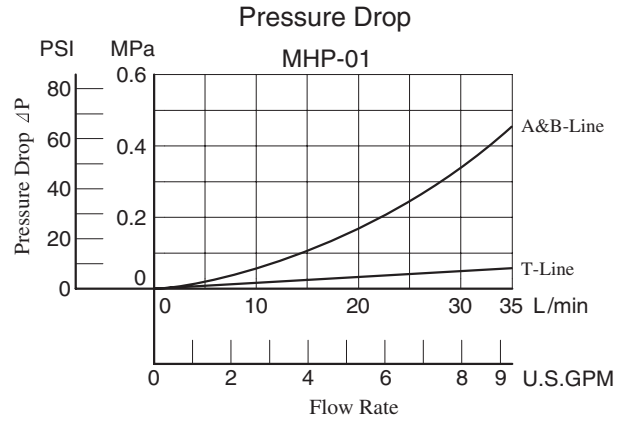
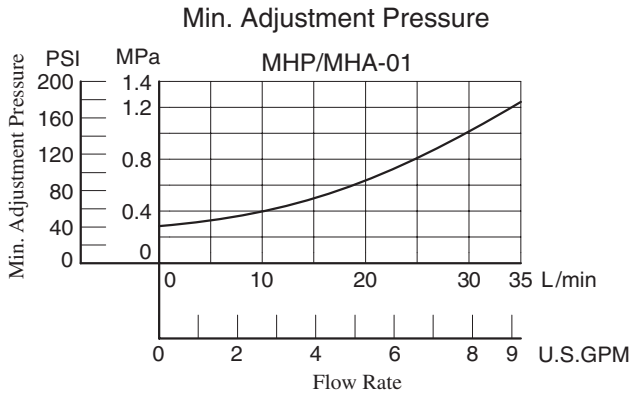
*² 2. Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

Instructions

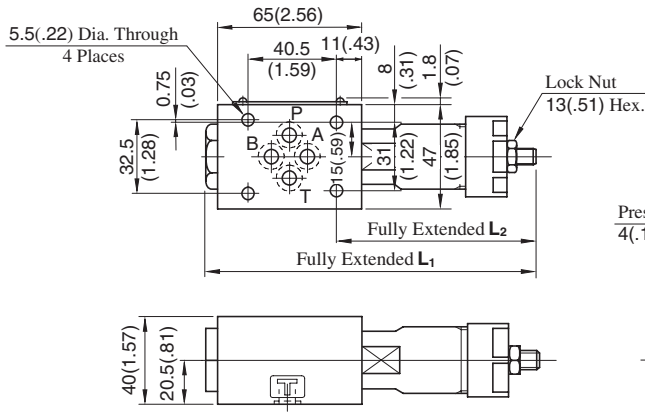
- The minimum adjustment pressure (MHP-01) equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the next page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.
- The minimum adjustment pressure (MHA-01) equals the value obtained from the minimum adjustment pressure characteristics plus the outlet-side back pressure of the valve on the next page. The outlet-side back pressure should include the values of the A-line and T-line pressure drop characteristics of the valves to be stacked due to the valve with internal drain.

Typical Performance Characteristics

Hydraulic Fluid: Viscosity $35 \text{ mm}^2/\text{s}$ (164 SSU), Specific Gravity 0.850



MHP-01-*-30

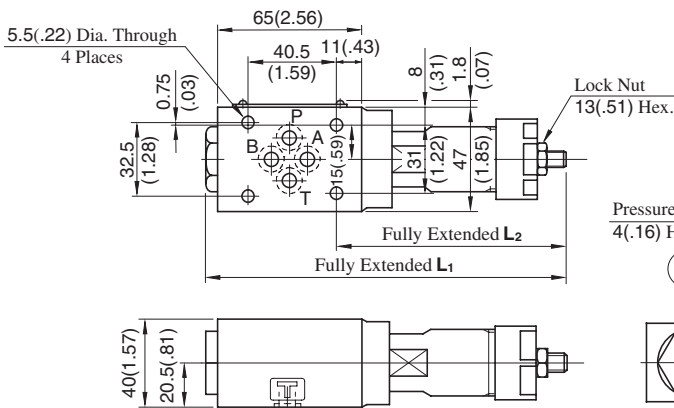


Model Numbers	L ₁	L ₂
MHP-01-C	151 (5.94)	92 (3.62)
MHP-01-H	166.5 (6.56)	107.5 (4.23)

Approx. Mass.....1.1 kg (2.4 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

MHA-01-*-30

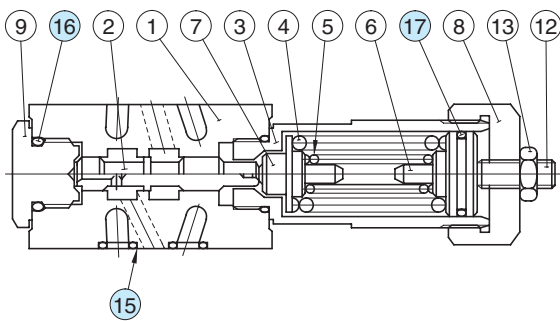


Model Numbers	L ₁	L ₂
MHA-01-C	171 (6.73)	112 (4.41)
MHA-01-H	186.5 (7.34)	127.5 (5.02)

Approx. Mass.....1.3 kg (2.9 lbs.)

Spare Parts List

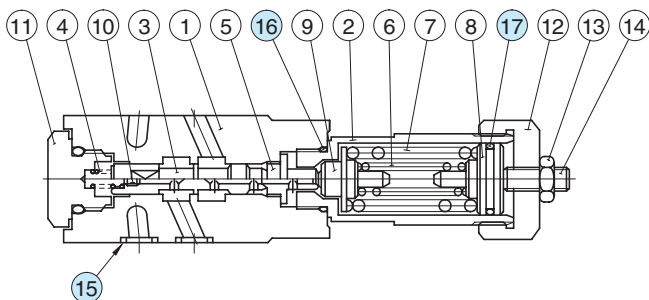
MHP-01-*-30



List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
15	O-Ring	SO-NB-P9	4	Included in Seal Kit Kit No.: KS-MBP-01-30
16	O-Ring	SO-NB-P18	2	
17	O-Ring	SO-NA-P20	1	

MHA-01-*-30



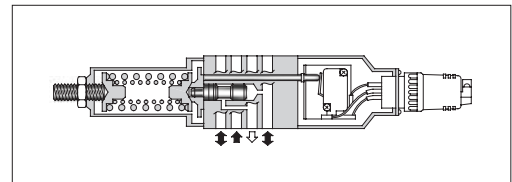
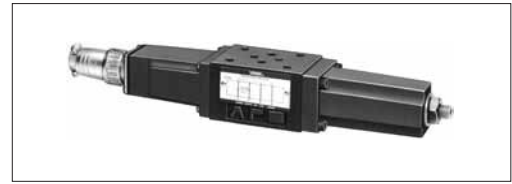
List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
15	O-Ring	SO-NB-P9	4	Included in Seal Kit Kit No.: KS-MHA-01-30
16	O-Ring	SO-NB-P18	2	
17	O-Ring	SO-NB-P20	1	

Pressure Switch Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa(PSI)	Max. Flow L/min (U.S.GPM)
MJ*-01-M-*-*-10	31.5 (4570)	35 (9.25)
MJ*-01-J-35-10	10 (1450)	
MJ*-01-J-100-10	10 (1450)	
MJ*-01-J-200-10	20 (2900)	
MJ*-01-J-350-10	35 (5080)	



Sensitive Switch Ratings

Electric Source		AC	DC	
Voltage	V	125 • 250	125	250
Current	A	11A-1/3HP	0.5	0.25

Specifications of semiconductor type pressure switch

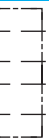
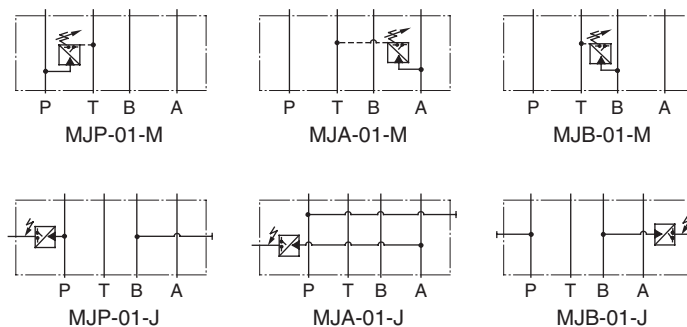
JT-02 series is installed for semiconductor type pressure switch, refer to [page 272](#) for details.

Model Number Designation

F-	MJP	-01	-M	-B	-N	-10	*
Special Seals	Series Number	Valve Size	Type of Switch	Pres. Adj. Range MPa (PSI)	Type of Electrical Connection	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MJP : Pressure Switch for P-Line	01	M: Sensitive Switch	B: 1-7 (145-1020) C: 3.5-14 (510-2030) H: 7-21 (1020-3050)	None: Cable Connector Type N: With Plug-in Connector (DIN)	10	Refer to ★
	MJA : Pressure Switch for A-Line		J: Semi-conductor Type Pressure Switch	35: 0.1-3.5 (14.5-510) 100: 1-10 (145-1450) 200: 2-20 (290-2900) 350: 3.5-35 (510-5080)	None: Lead Wire Type		
	MJB : Pressure Switch for B-Line						

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

Graphic Symbols



Instructions

- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.
- Wiring of a sensitive switch should be made correctly referring to the table below. Numbers in the switch status column indicate wiring numbers in receptacles or contact numbers of connectors.

(Pressure with Sensitive Switch)
and The Switch Status

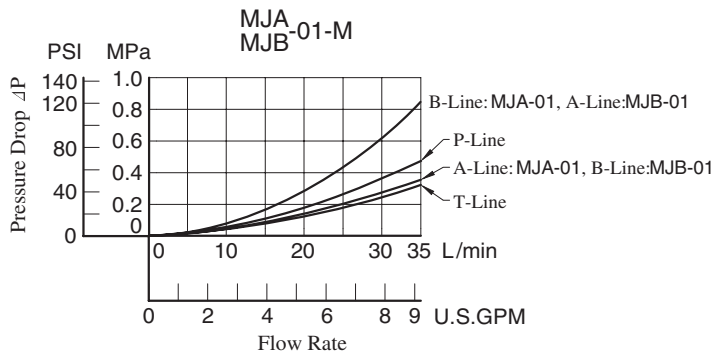
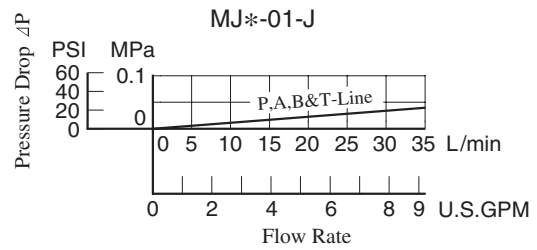
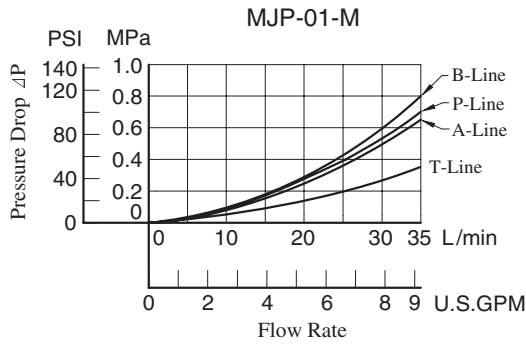
Operating Pressure	Switch Status
Less than Pressure setting	1 ○ 2 ○ 3
More than Pressure setting	1 ○ 2 ○ 3

Attachment

Valve Model No.	Attachment
MJ*-01-M-*-10	Cable connector: NJC-203-PR 1 Pc.
MJ*-01-M-*-N-10	DIN connector: GDM311-B-11... 1 Pc.

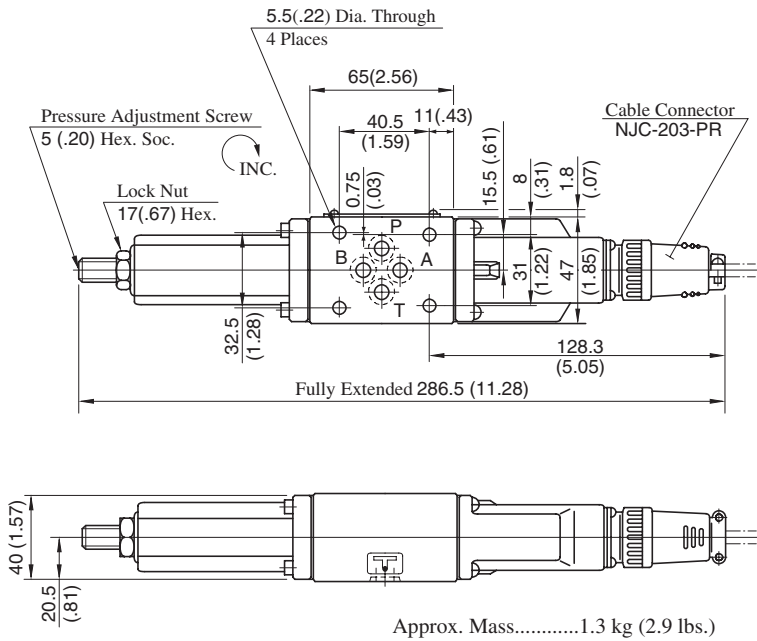
Pressure Drop

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850

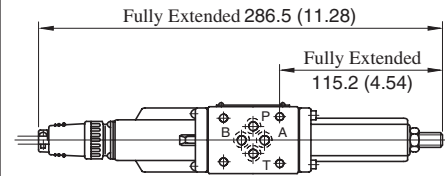


● Cable Connector Type

MJP-01-M-*-10
MJA-01-M-*-10



MJB-01-M-*-10

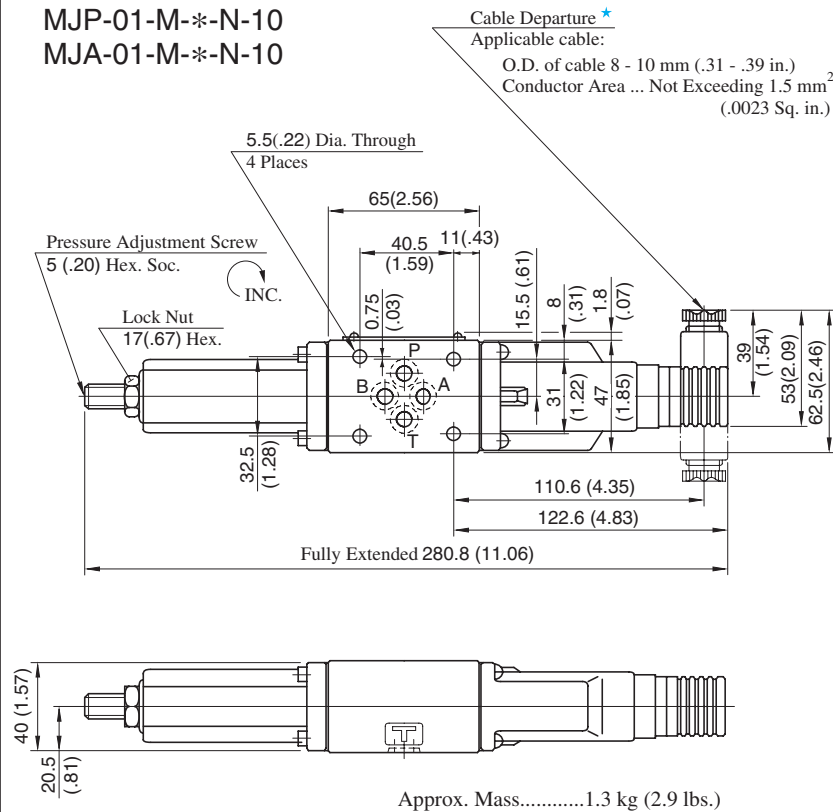


Approx. Mass.....1.3 kg (2.9 lbs.)

- For other dimensions, refer to "MJ_A^P-01" drawing left.

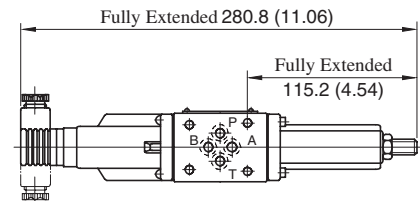
● Plug-in Connector Type

MJP-01-M-*-N-10
MJA-01-M-*-N-10



DIMENSIONS IN
MILLIMETRES (INCHES)

MJB-01-M-*-N-10



Approx. Mass.....1.3 kg (2.9 lbs.)

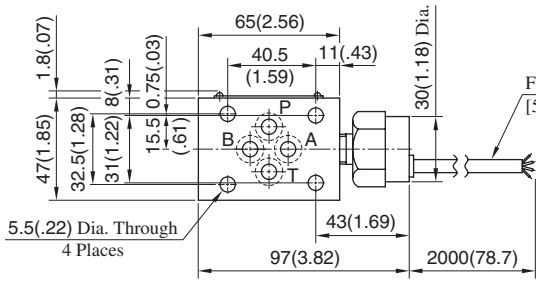
- For other dimensions, refer to "MJ_A^P-01" drawing left.

★ As shown by the dot-and-dash line, the cable departure can also be faced opposite.

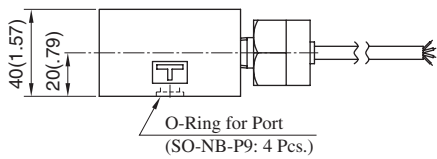
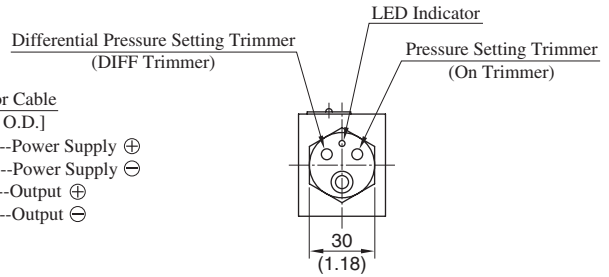
01 Series Modular Valves

● **Semiconductor Type Pressure Switch**

MJP-01-J-*-10
MJA-01-J-*-10

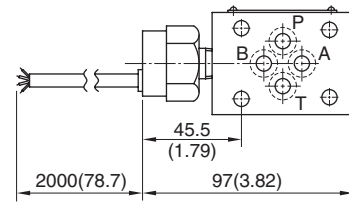


Four Conductor Cable
[5 mm(.20 in.) O.D.]
RED-----Power Supply ⊕
BLACK---Power Supply ⊖
WHITE---Output ⊕
GREEN---Output ⊖



Approx. Mass.....1 kg (2.2 lbs.)

MJB-01-J-*-10



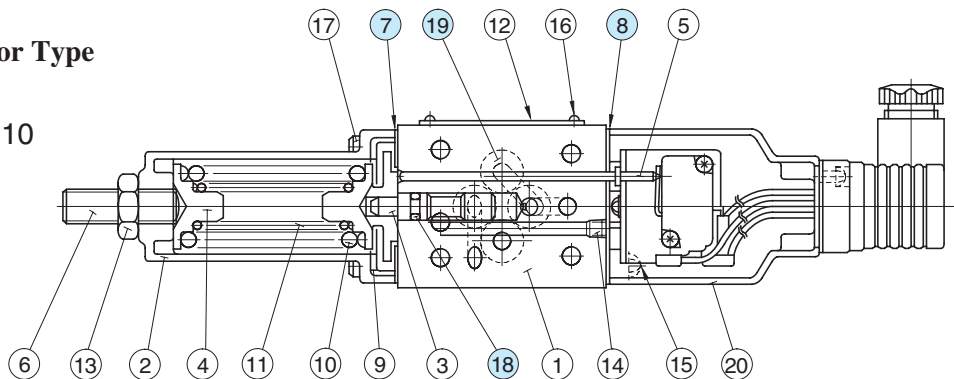
Approx. Mass.....1 kg (2.2 lbs.)

● For other dimensions, refer to "MJ_A^P-01" drawing left.

■ **Spare Parts List**

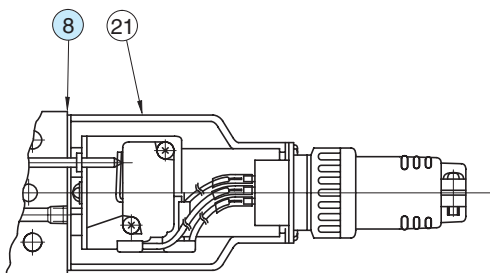
● **Plug-in Connector Type**

MJP
MJA-01-M-*-N-10
MJB



● **Cable Connector Type**

MJP
MJA-01-M-*-10
MJB



● **List of Seals**

Item	Name of Parts	Part Numbers	Qty.
7	Packing	3116-VK414239-4	1
8	Packing	3116-VK414240-2	1
18	O-Ring	SO-NA-P5	1
19	O-Ring	SO-NB-P9	4

Note: When ordering seals, please specify the seal kit number from the table below.

● **List of Seal Kits**

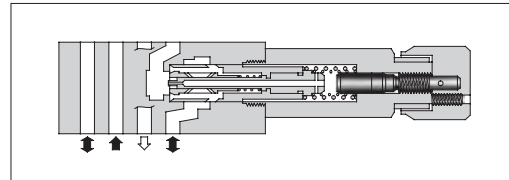
Valve Model No.	Seal Kit Numbers
MJP-01	Included in seal kit Kit No.: KS-MJP-01-10
MJA-01	
MJB-01	

● Since MJ*-01-J-*-10 (Semiconductor type pressure switch) does not have any seals inside, only four(4) O-rings for the ports are required. Please refer to the above drawing.

Pressure and Temperature Compensated Flow Control (and Check) Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Metred Flow L/min (U.S.GPM)	Max. Free Flow L/min (U.S.GPM)
MFP-01-10	16 (2320)	35 (9.25)	—
MFA-01-*-10			35 (9.25)
MFB-01-*-10 MFW-01-*-10			



Model Number Designation

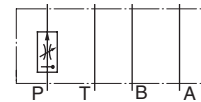
F-	MFA	-01	-X	-10	
Special Seals	Series Number	Valve Size	Direction of Flow	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MFP : Flow Control Valve for P-Line	01	—	10	Refer to ★
	MFA : Flow Control and Check Valve for A-Line MFB : Flow Control and Check Valve for B-Line MFW : Flow Control and Check Valve for A&B-Lines		X : Metre-out Y : Metre-in	10	

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

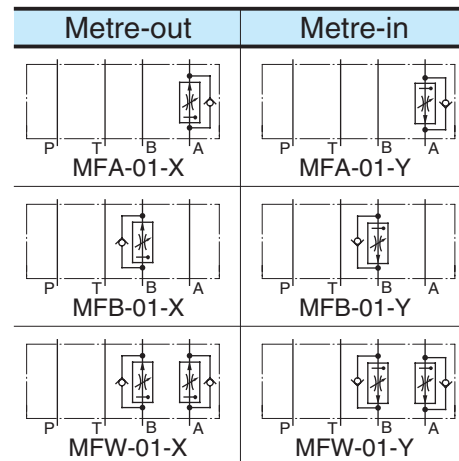
Instructions

- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

Graphic Symbols



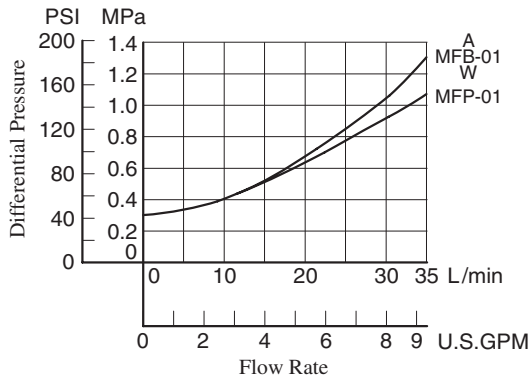
MFP-01



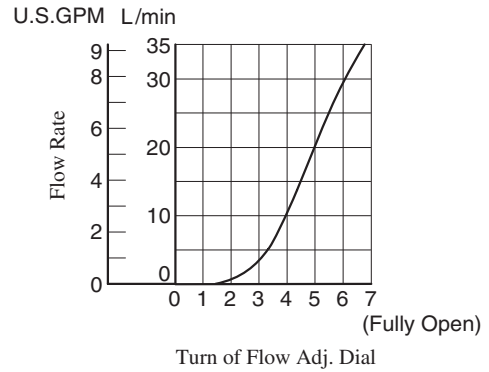
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850

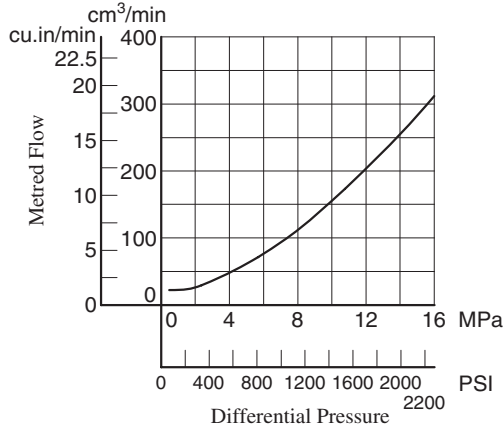
Min. Required Pressure Difference



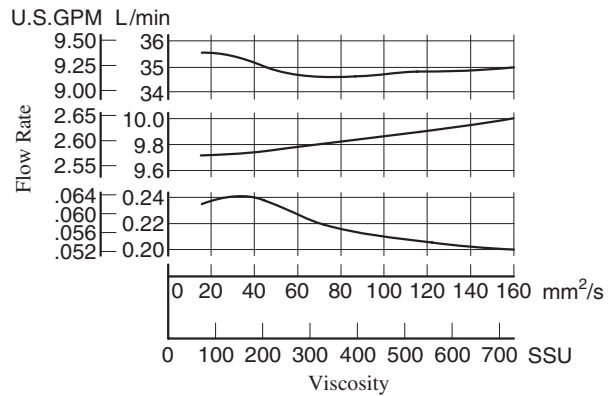
Metred Flows vs. Dial Position



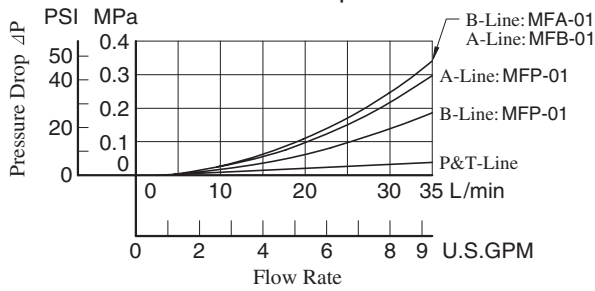
Min. Metred Flow



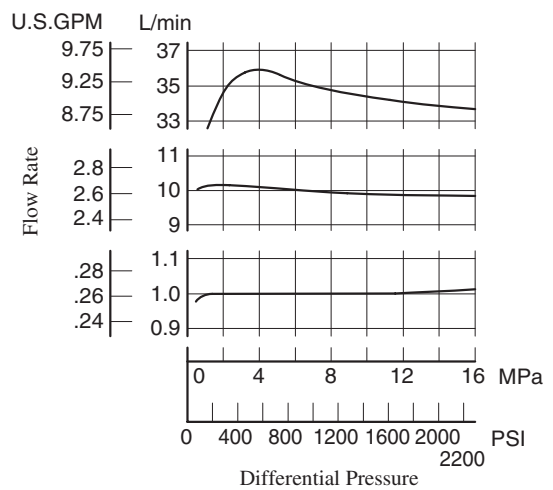
Metred Flow vs. Viscosity



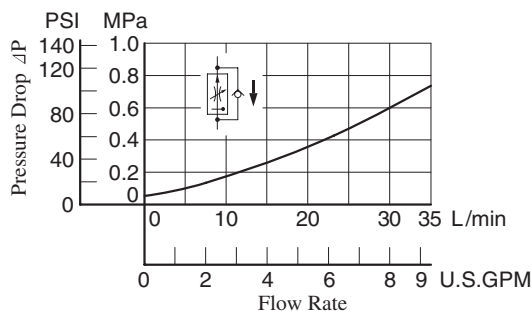
Pressure Drop



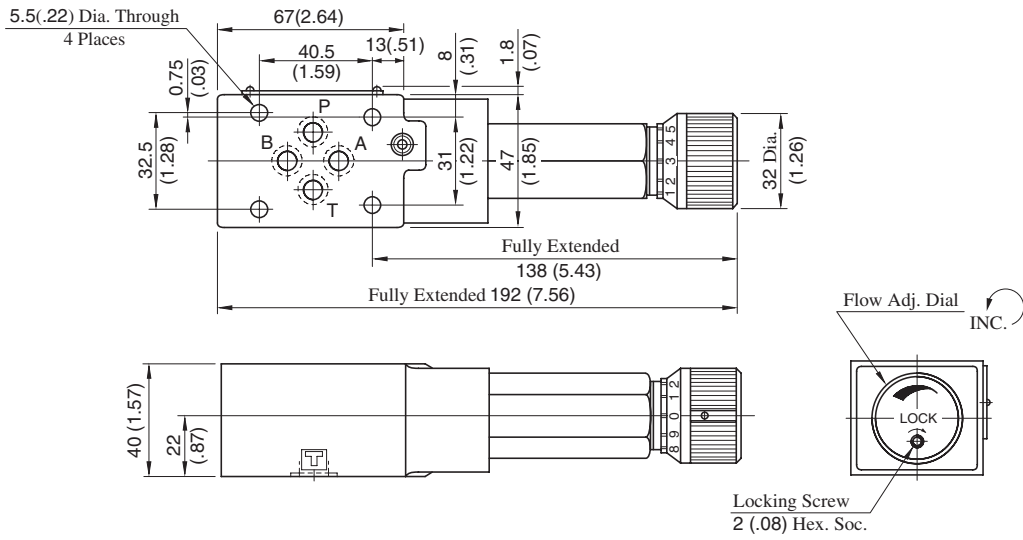
Metred Flow vs. Differential Pres.



Pressure Drop for Free Flow

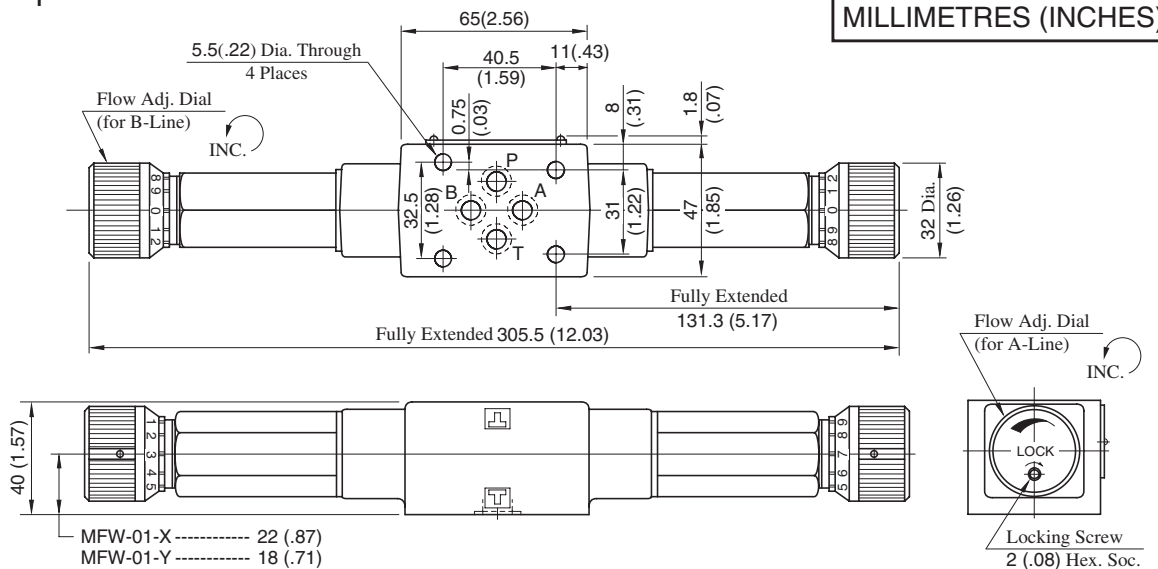


MFP-01-10



Approx. Mass..... 1.7 kg (3.8 lbs.)

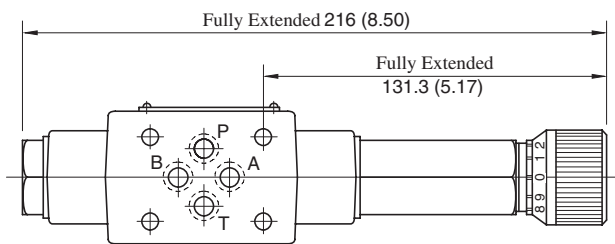
MFW-01-X-10



DIMENSIONS IN
MILLIMETRES (INCHES)

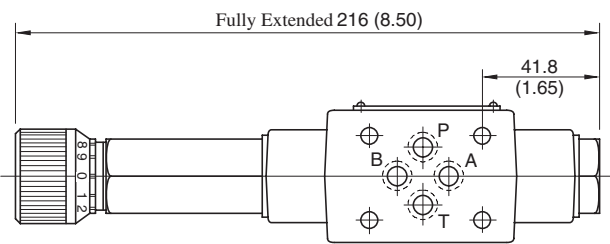
Approx. Mass..... 2.1 kg (4.6 lbs.)

MFA-01-X-10



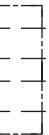
Approx. Mass..... 1.6 kg (3.5 lbs.)

MFB-01-X-10



Approx. Mass..... 1.6 kg (3.5 lbs.)

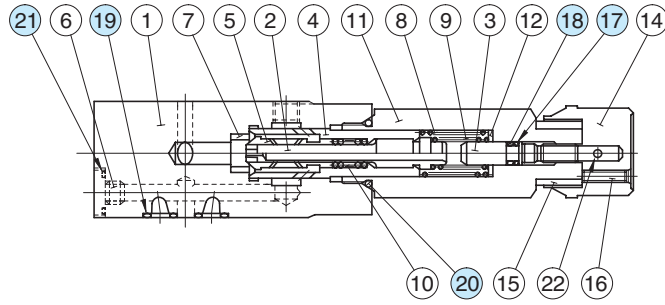
• For other dimensions, refer to "MFW-01" drawing above.



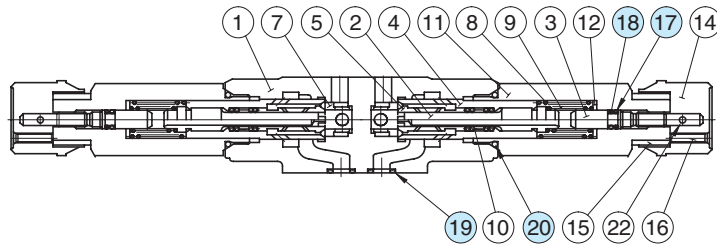
01 Series Modular Valves

■ Spare Parts List

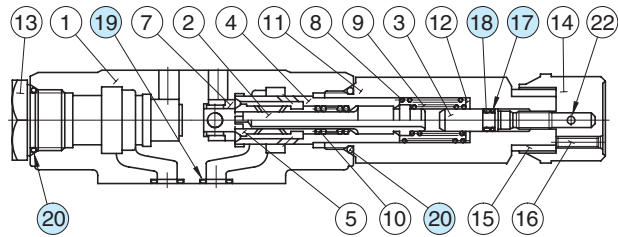
MFP-01-10



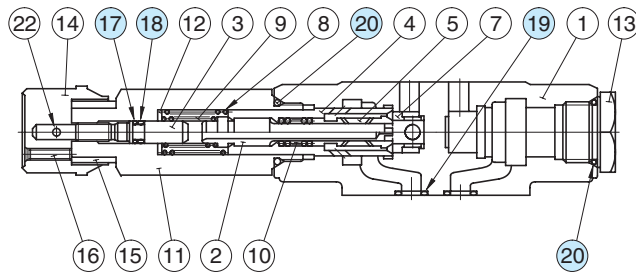
MFW-01-X_Y-10



MFA-01-X_Y-10



MFB-01-X_Y-10



● List of Seals

Item	Name of Parts	Part Numbers	Quantity			
			MFP-01	MFA-01	MFB-01	MFW-01
17	Back Up Ring	SO-BB-P6	1	1	1	2
18	O-Ring	SO-NA-P6	1	1	1	2
19	O-Ring	SO-NB-P9	4	4	4	4
20	O-Ring	SO-NB-P18	1	2	2	2
21	O-Ring	SO-NB-P10	1	—	—	—

● List of Seal Kits

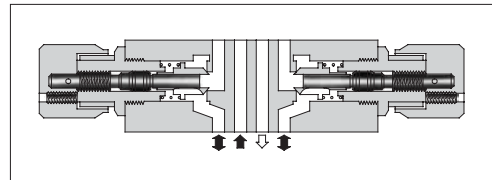
Valve Model Numbers	Seal Kit Numbers
MFP-01	KS-MFP-01-10
MFA-01	KS-MFA-01-10
MFB-01	
MFW-01	KS-MFW-01-10

Note: When ordering seals, please specify the seal kit number from the table right.

Temperature Compensated Throttle and Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure	Max. Differential Pressure	Max. Metred Flow	Min. Metred Flow	Max. Free Flow
	MPa (PSI)	MPa (PSI)	L/min (U.S.GPM)	L/min (U.S.GPM)	L/min (U.S.GPM)
MSTA-01-X-10 MSTB-01-X-10 MSTW-01-X-10	31.5 (4570)	14 (2030)	35 (9.25)	0.5 (.13)	35 (9.25)



Model Number Designation

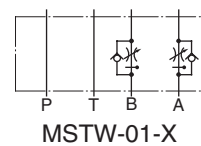
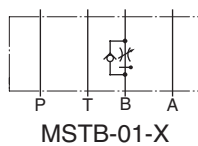
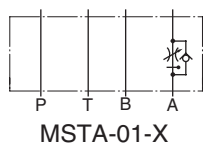
F-	MSTA	-01	-X	-10	*
Special Seals	Series Number	Valve Size	Direction of Flow	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSTA : Temperature Compensated Throttle and Check Valve for A-Line MSTB : Temperature Compensated Throttle and Check Valve for B-Line MSTW : Temperature Compensated Throttle and Check Valve for A&B-Lines	01	X: Metre-out	10	Refer to ★

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

Instructions

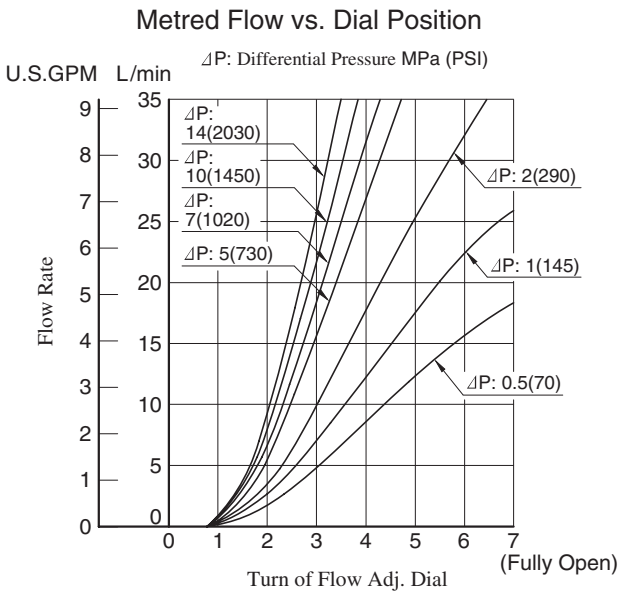
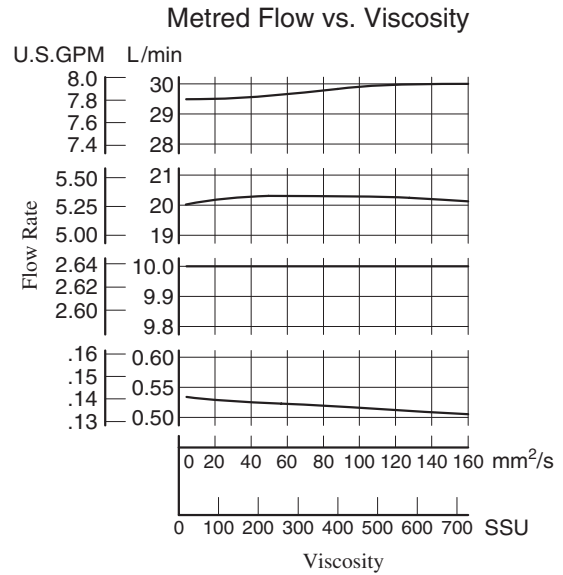
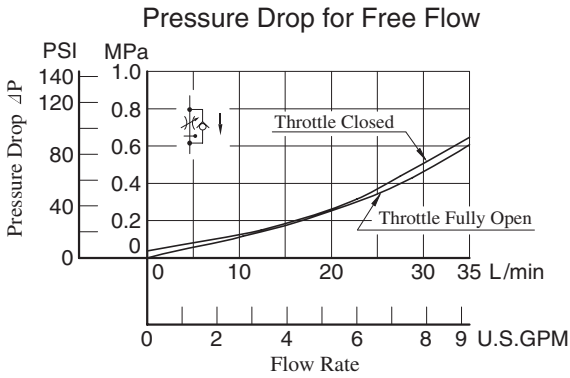
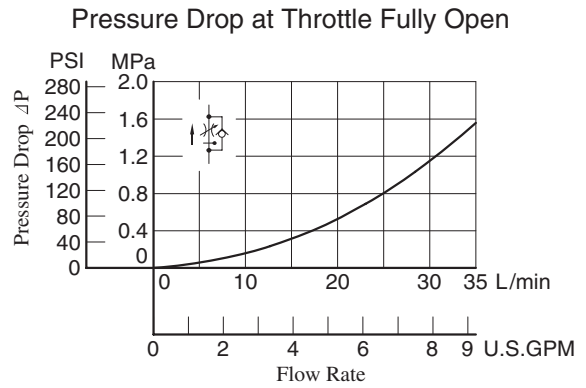
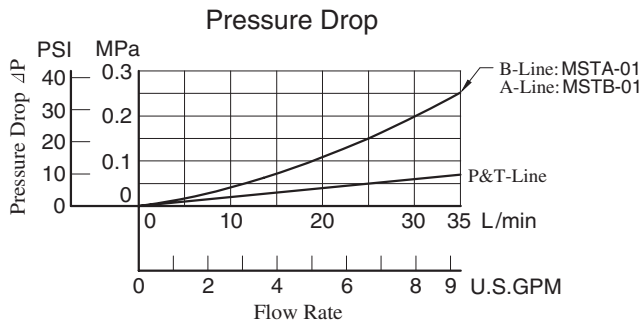
- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

Graphic Symbols



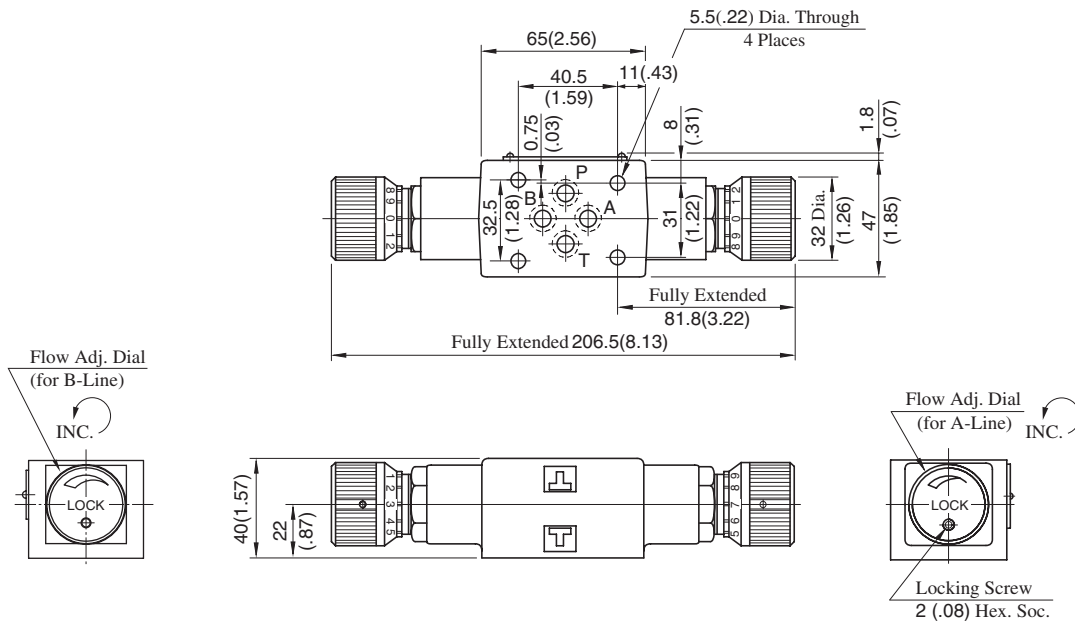
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



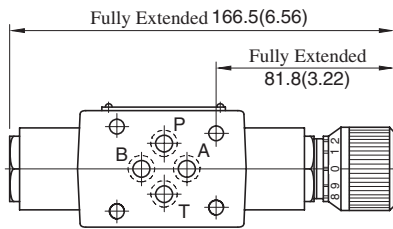
MSTW-01-X-10

DIMENSIONS IN MILLIMETRES (INCHES)



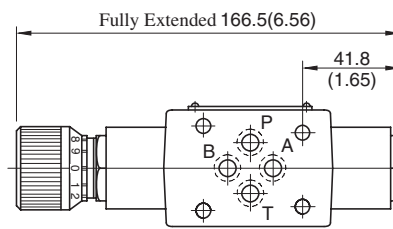
Approx. Mass..... 1.5 kg (3.3 lbs.)

MSTA-01-X-10



Approx. Mass..... 1.3 kg (2.9 lbs.)

MSTB-01-X-10



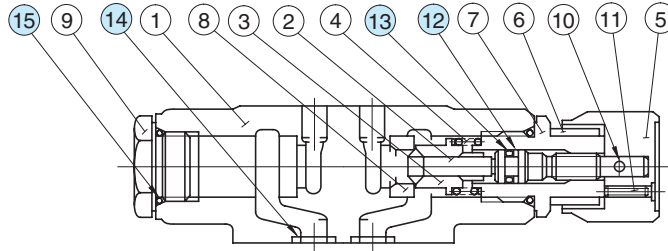
Approx. Mass..... 1.3 kg (2.9 lbs.)

• For other dimensions, refer to "MSTW-01" drawing above.

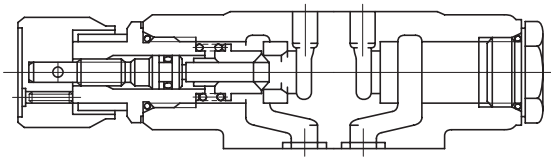


■ Spare Parts List

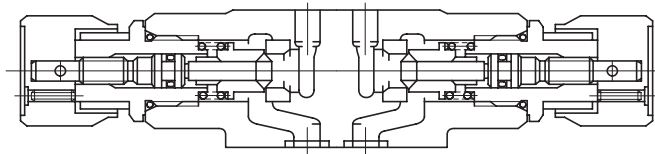
MSTA-01-X-10



MSTB-01-X-10



MSTW-01-X-10



● List of Seals

Item	Name of Parts	Part Numbers	Quantity		
			MSTA	MSTB	MSTW
12	Back Up Ring	SO-BB-P6	1	1	2
13	O-Ring	SO-NA-P6	1	1	2
14	O-Ring	SO-NB-P9	4	4	4
15	O-Ring	SO-NB-P18	2	2	2

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
MSTA-01	KS-MFA-01-10
MSTB-01	
MSTW-01	KS-MFW-01-10

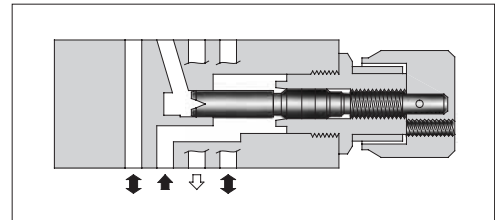
Note: When ordering seals, please specify the seal kit number from the table right.

Throttle Modular Valves

Specifications

Model Number	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MSP-01-50	31.5 (4570)	60 (15.9)★

★ At the low differential pressure, maximum flow is limited. See "Pressure Drop at Throttle Fully Open".



Model Number Designation

F-	MSP	-01	-50	*
Special Seals	Series Number	Valve Size	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSP : Throttle Valve for P-Line	01	50	Refer to ★

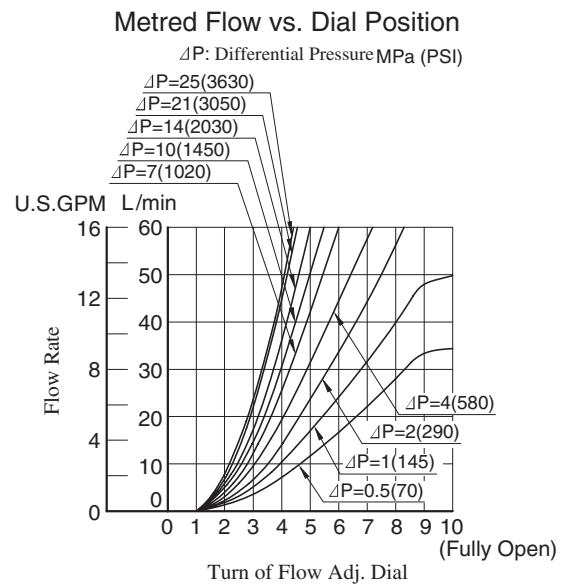
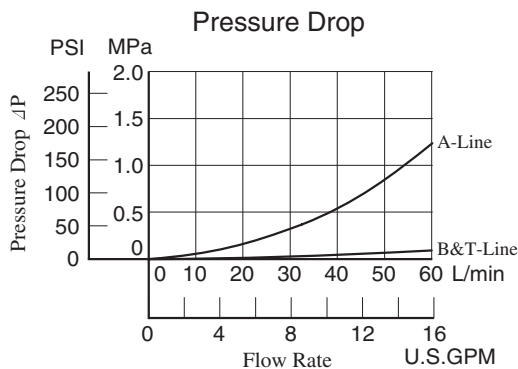
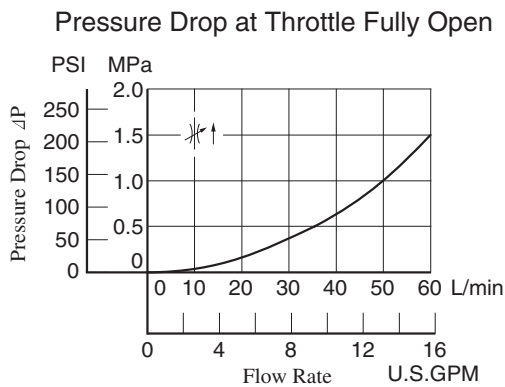
★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

Graphic Symbol



Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850

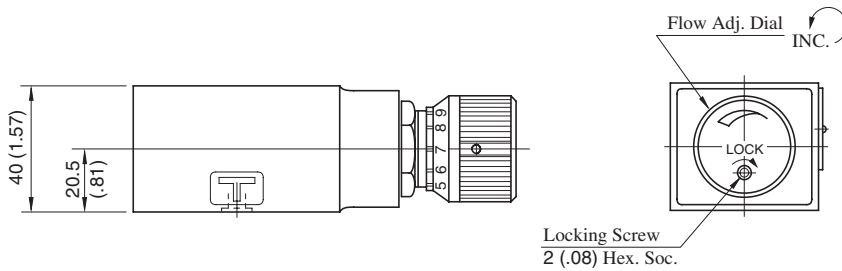
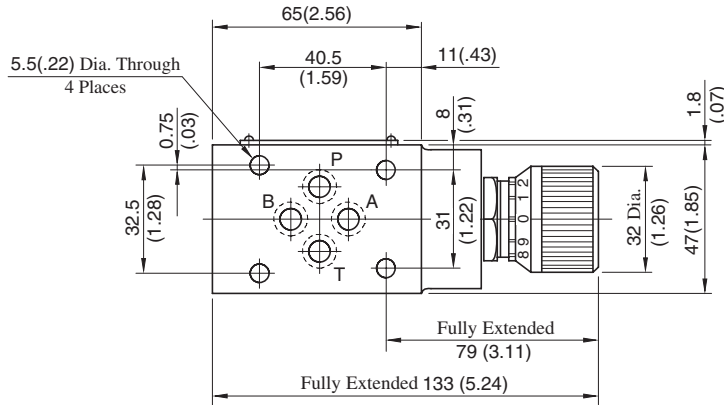


Instructions

- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

MSP-01-50

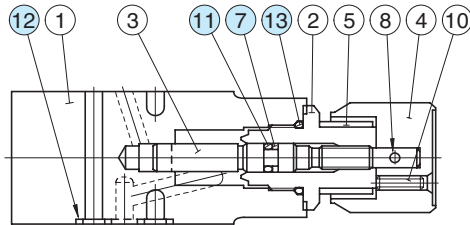
**DIMENSIONS IN
MILLIMETRES (INCHES)**



Approx. Mass..... 1.2 kg (2.6 lbs.)

■ Spare Parts List

MSP-01-50



● List of Seals

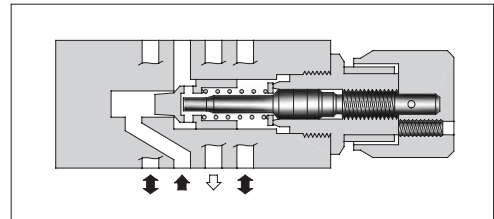
Item	Name of Parts	Part Numbers	Qty.	Remarks
7	Back Up Ring	SO-BB-P6	1	Included in Seal Kit Kit No.: KS-MSP-01-50
11	O-Ring	SO-NA-P6	1	
12	O-Ring	SO-NB-P9	4	
13	O-Ring	SO-NB-P18	1	

Check and Throttle Modular Valves

Specifications

Model Number	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MSCP-01-30	31.5 (4570)	35 (9.25)★

★ At the low differential pressure, maximum flow is limited. See "Pressure Drop at Throttle Fully Open".

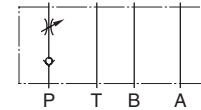


Model Number Designation

F-	MSCP	-01	-30	*
Special Seals	Series Number	Valve Size	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSCP : Check and Throttle Valve for P-Line	01	30	Refer to ★

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

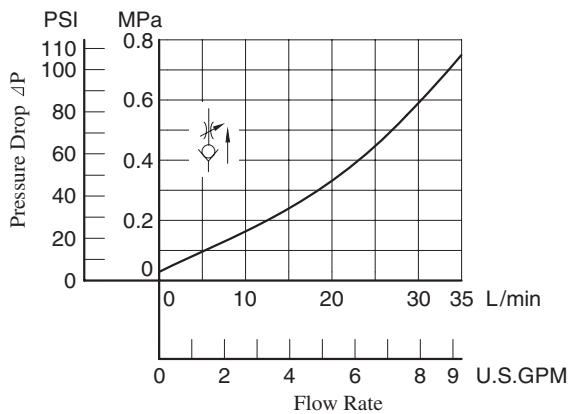
Graphic Symbol



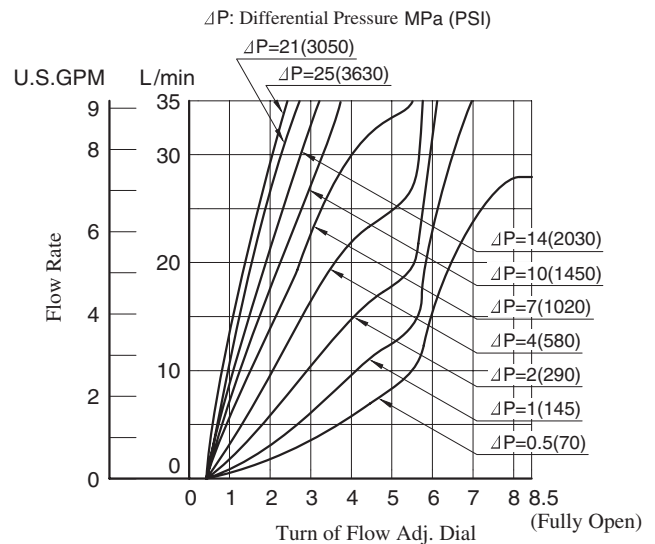
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850

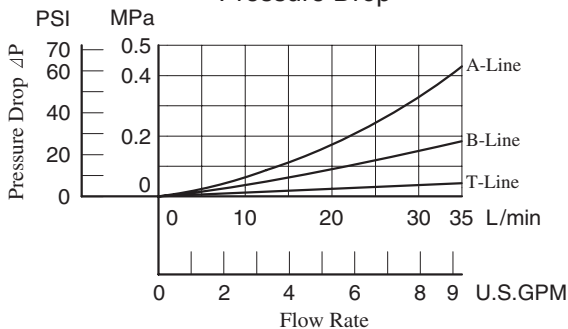
Pressure Drop at Throttle Fully Open



Metred Flow vs. Dial Position



Pressure Drop

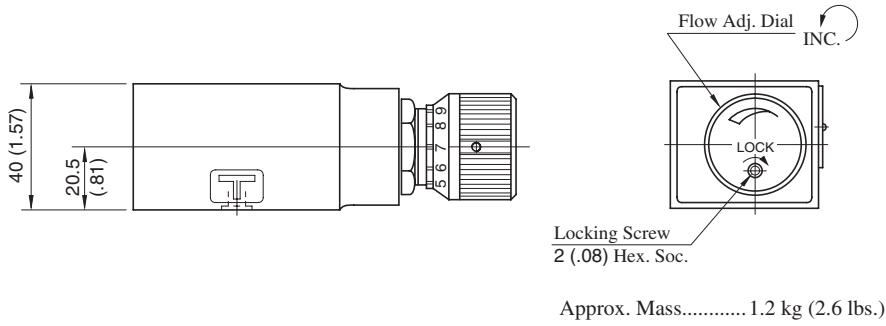
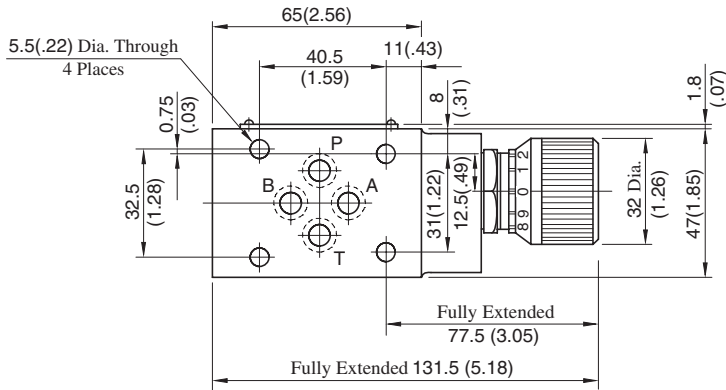


Instructions

- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

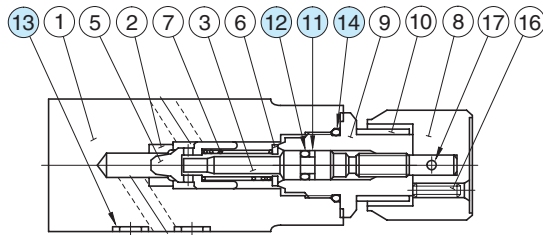
MSCP-01-30

DIMENSIONS IN MILLIMETRES (INCHES)



■ Spare Parts List

MSCP-01-30



● List of Seals

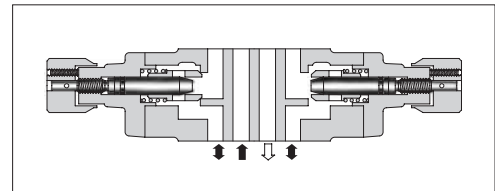
Item	Name of Parts	Part Numbers	Qty.	Remarks
11	Back Up Ring	SO-BB-P6	1	Included in Seal Kit Kit No.: KS-MSP-01-30
12	O-Ring	SO-NA-P6	1	
13	O-Ring	SO-NB-P9	4	
14	O-Ring	SO-NB-P18	1	

Throttle and Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MSA-01-**-50 MSB-01-**-50 MSW-01-**-50	31.5 (4570)	60 (15.9) *

* At the low differential pressure, maximum flow is limited. See "Pressure Drop at Throttle Fully Open" of the next page.



Model Number Designation

F-	MSW	-01	-X	Y	-50	*
Special Seals	Series Number	Valve Size	Direction of Flow ("A" Line)	Direction of Flow ("B" Line)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSA : Throttle and Check Valve for A-Line	01	X : Metre-out Y : Metre-in	—	50	Refer to *
	MSB : Throttle and Check Valve for B-Line		—	X : Metre-out Y : Metre-in		
	MSW : Throttle and Check Valve for A&B-Lines		X : Metre-out Y : Metre-in	Y : Metre-in X : Metre-out		
			X : Metre-out Y : Metre-in	Y : Metre-in X : Metre-out		

* Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

Instructions

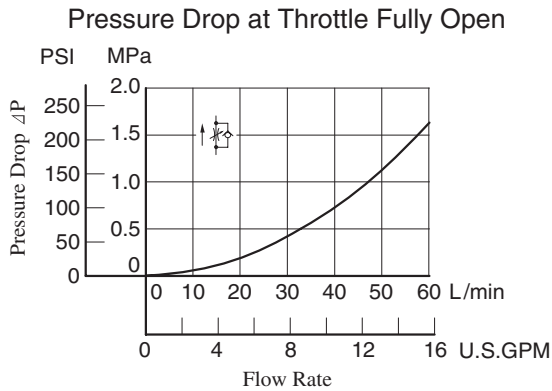
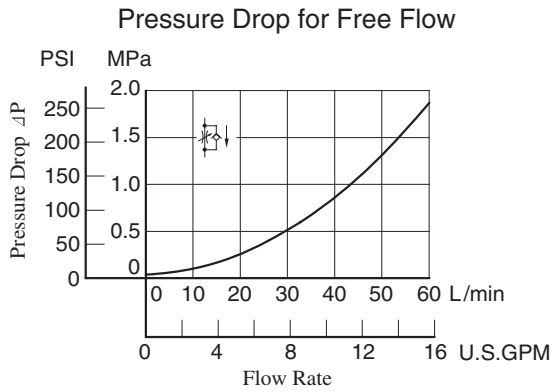
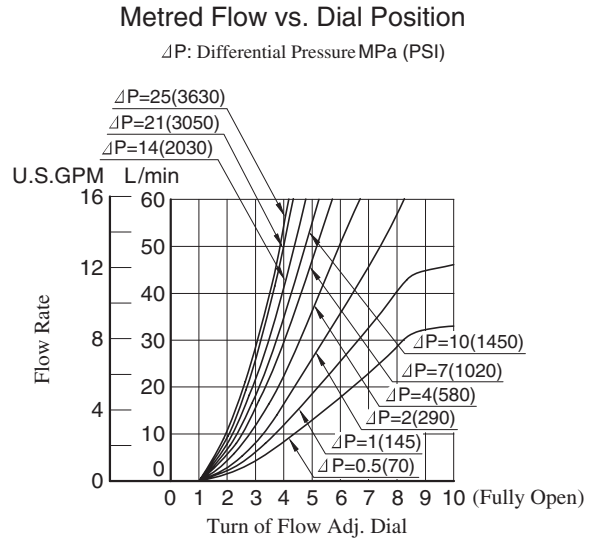
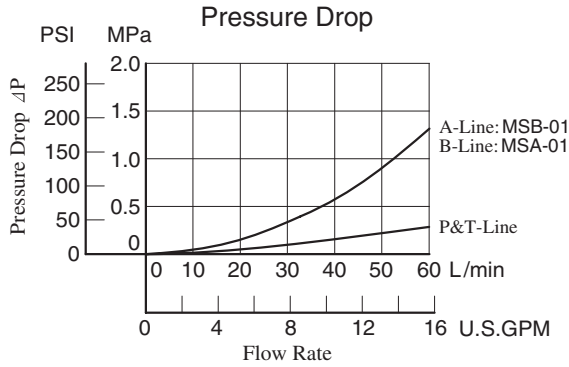
- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

Graphic Symbols

Metre-out	Metre-in
 MSA-01-X	 MSA-01-Y
 MSB-01-X	 MSB-01-Y
 MSW-01-X	 MSW-01-Y
Metre-out · Metre-in	Metre-in · Metre-out
 MSW-01-XY	 MSW-01-YX

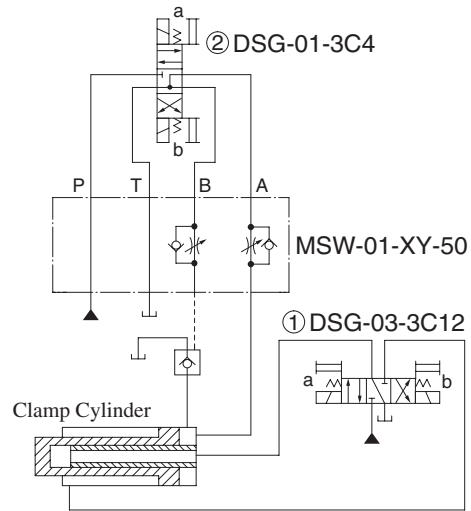
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



Application

Circuit of Clamp Cylinder for Injection Molding Machine

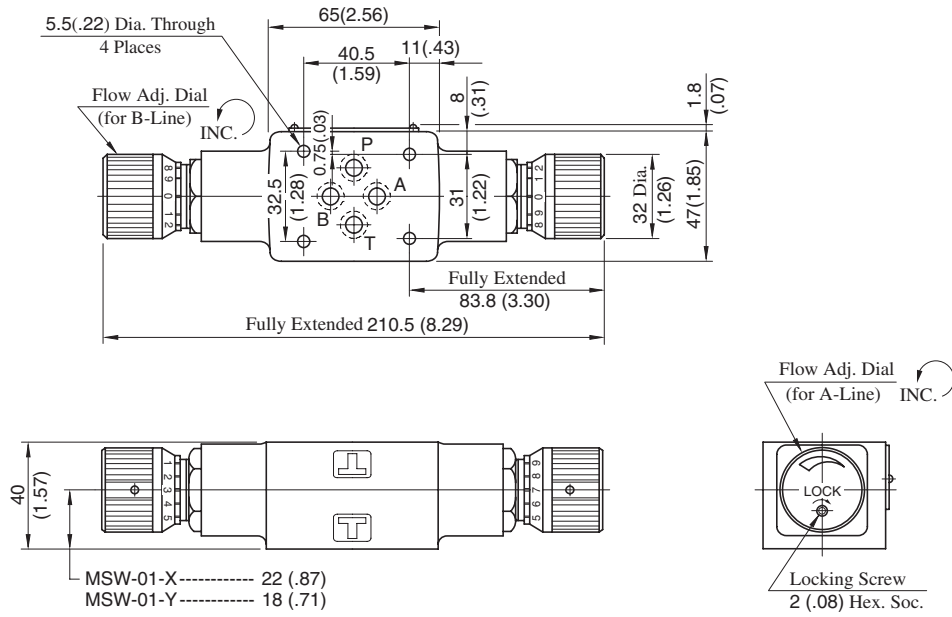


Operation Sequence

Clamp Cylinder	Advance	End Point Pressurisation	Decompression	Retreat
Solenoid Operated Directional Valve ①	Sol.a ON	→	Centre Position	Sol.b ON
Solenoid Operated Directional Valve ②	Sol.b ON	Sol.a ON	Sol.b ON	→

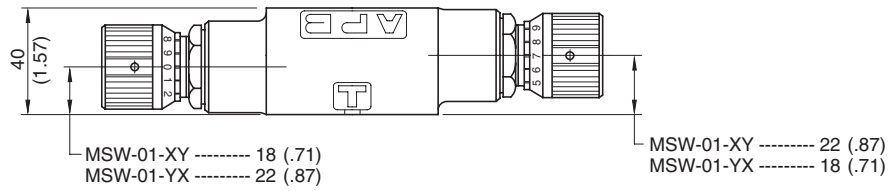
MSW-01-X_Y-50

DIMENSIONS IN MILLIMETRES (INCHES)



Approx. Mass..... 1.5 kg (3.3 lbs.)

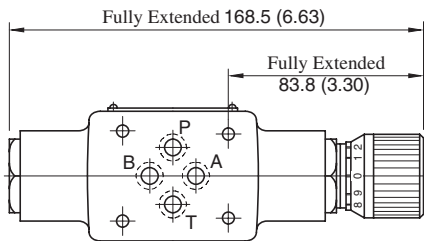
MSW-01-XY_{YX}-50



Approx. Mass..... 1.5 kg (3.3 lbs.)

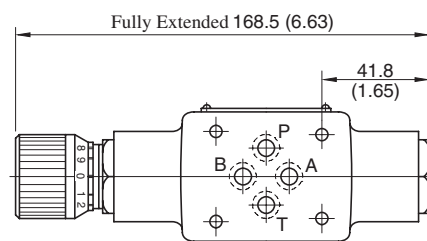
• For other dimensions, refer to "MSW-01-X_Y" drawing above.

MSA-01-X_Y-50



Approx. Mass..... 1.3 kg (2.9 lbs.)

MSB-01-X_Y-50



Approx. Mass..... 1.3 kg (2.9 lbs.)

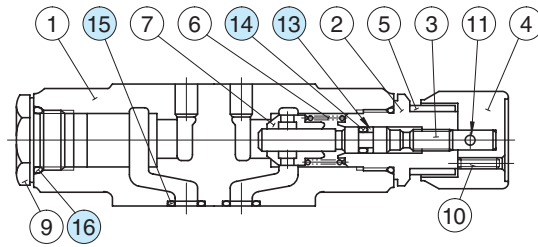
• For other dimensions, refer to "MSW-01" drawing above.



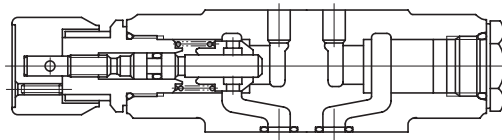
01 Series Modular Valves

■ Spare Parts List

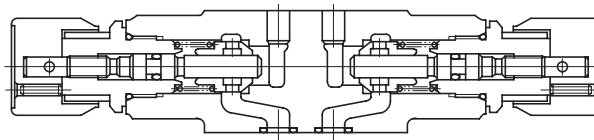
MSA-01-X-Y-50



MSB-01-X-Y-50



MSW-01-**-50



● List of Seals

Item	Name of Parts	Part Numbers	Quantity	
			MSA,MSB	MSW
13	Back Up Ring	SO-BB-P6	1	2
14	O-Ring	SO-NA-P6	1	2
15	O-Ring	SO-NB-P9	4	4
16	O-Ring	SO-NB-P18	2	2

Note: When ordering seals, please specify the seal kit number from the table right.

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
MSA-01	KS-MSA-01-30
MSB-01	
MSW-01	KS-MSW-01-30

Check Modular Valves

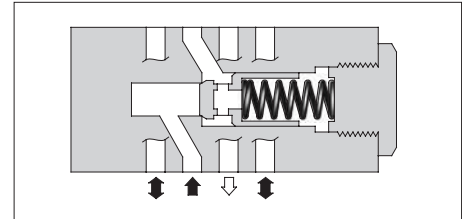
Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MCP-01-*-30 MCT-01-*-30	31.5 (4570)	35 (9.25)

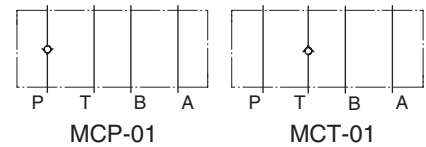
Model Number Designation

F-	MCP	-01	-0	-30	*
Special Seals	Series Number	Valve Size	Cracking Pressure MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MCP: Check Valve for P-Line MCT: Check Valve for T-Line	01	0: 0.035 (5) 2: 0.2 (29) 4: 0.4 (58)	30	Refer to ★

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard



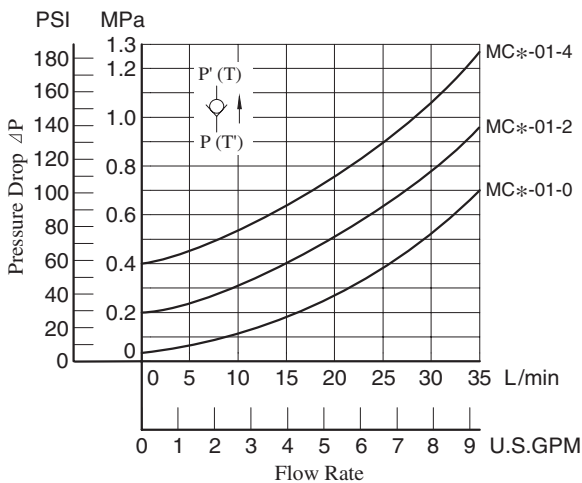
Graphic Symbols



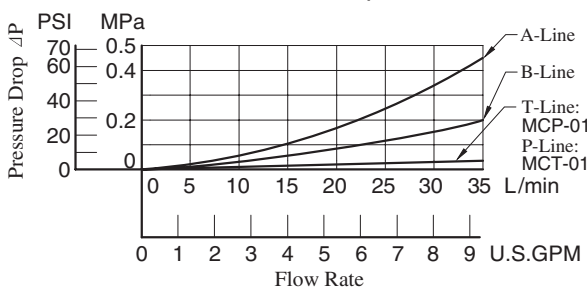
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU),
Specific Gravity 0.850

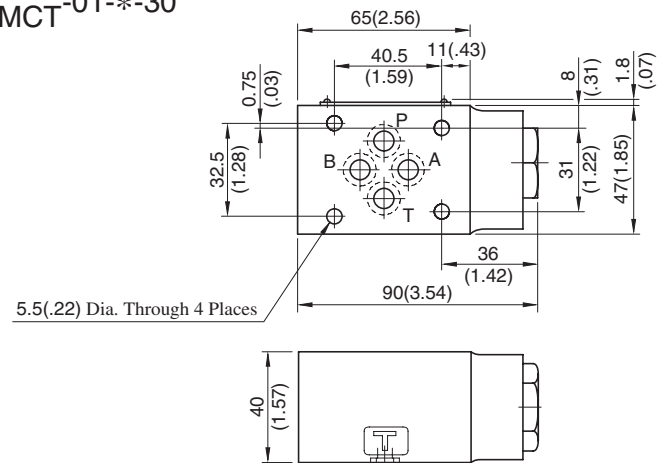
Pressure Drop for Free Flow



Pressure Drop

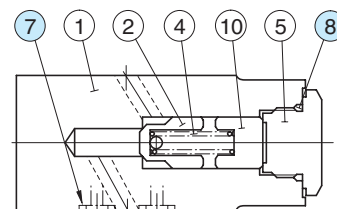


MCP
MCT-01-*-30



DIMENSIONS IN MILLIMETRES (INCHES)

MCP
MCT-01-*-30



List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
7	O-Ring	SO-NB-P9	4	Included in Seal Kit
8	O-Ring	SO-NB-P18	1	Kit No.: KS-MCP-01-30

Anti-Cavitation Modular Valves

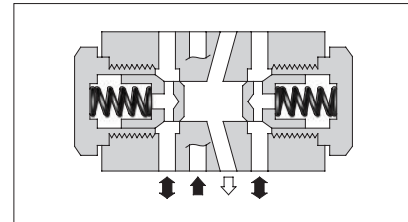
Specifications

Model Number	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MAC-01-30	31.5 (4570)	35 (9.25)

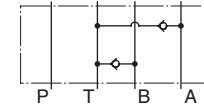
Model Number Designation

F-	MAC	-01	-30	*
Special Seals	Series Number	Valve Size	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MAC: Anti-Cavitation Valve	01	30	Refer to ★

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

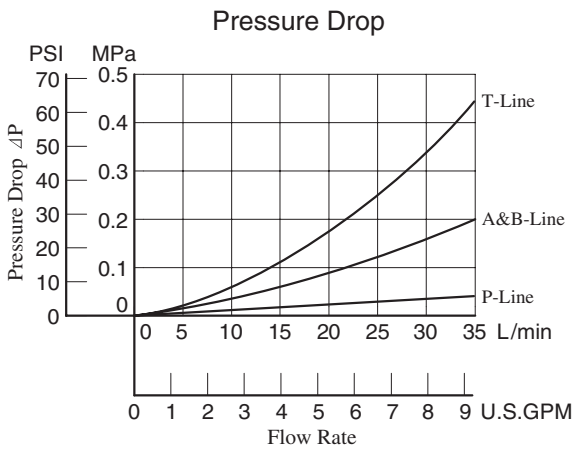


Graphic Symbol

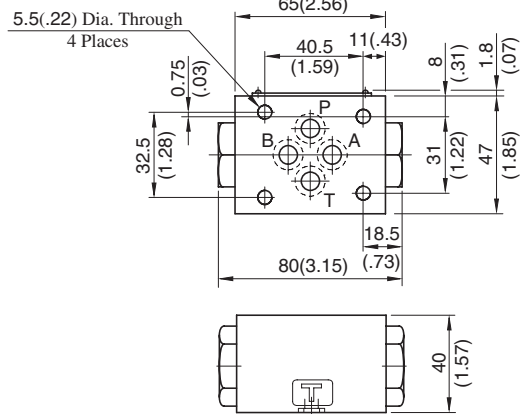


Pressure Drop

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



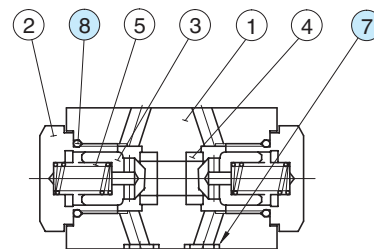
MAC-01-30



DIMENSIONS IN MILLIMETRES (INCHES)

Approx. Mass.....0.8 kg (1.8 lbs.)

MAC-01-30



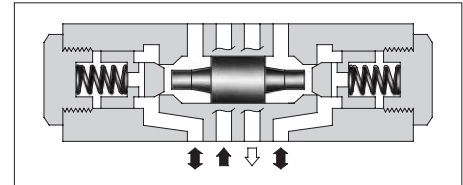
List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
7	O-Ring	SO-NB-P9	4	Included in Seal Kit
8	O-Ring	SO-NB-P18	2	Kit No.: KS-MAC-01-30

Pilot Operated Check Modular Valves

Specifications

Model Numbers		Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
Standard	MP*-01-*-40	31.5 (4570)	35 (9.25)
Low Pilot Pressure Control Type	MP*-01-*-4001		

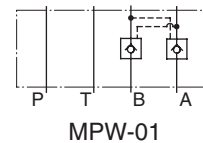
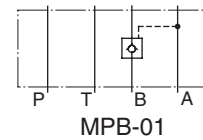
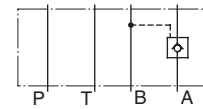


Model Number Designation

F-	MPA	-01	-2	-40	*
Special Seals	Series Number	Valve Size	Cracking Pressure MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MPA : Pilot Operated Check Valve for A-Line MPB : Pilot Operated Check Valve for B-Line MPW : Pilot Operated Check Valve for A&B-Lines	01	2 : 0.2 (29) 4 : 0.4 (58)	40 (Standard) 4001 (Low Pilot Pressure Control Type)	Refer to ★

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

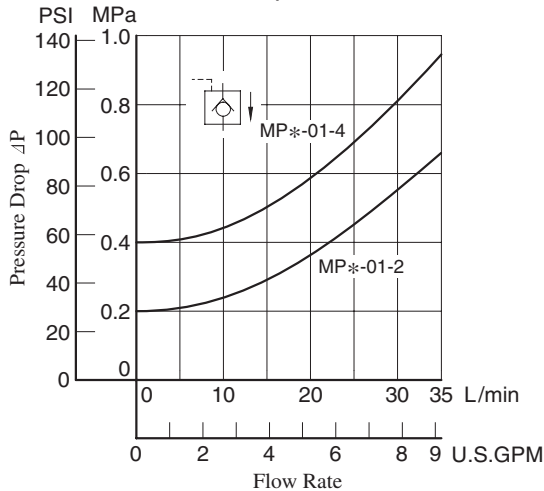
Graphic Symbols



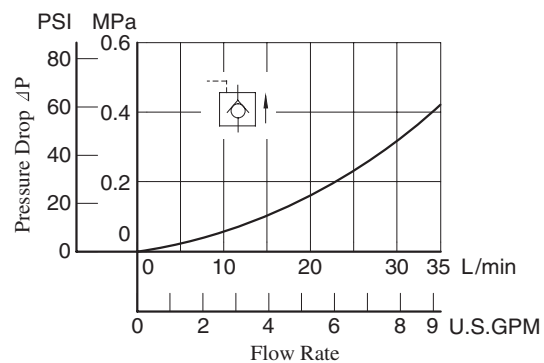
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU),
Specific Gravity 0.850

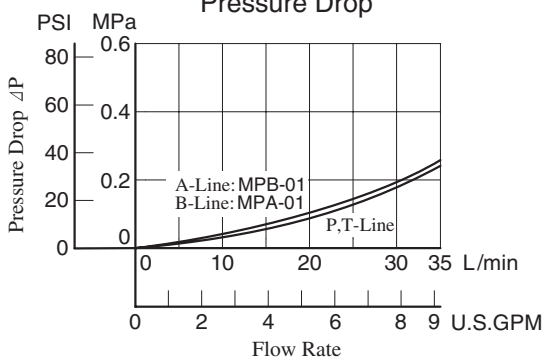
Pressure Drop for Free Flow



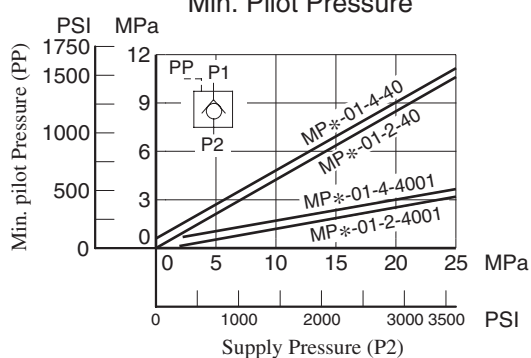
Pressure Drop for Reversed Controlled Flow



Pressure Drop

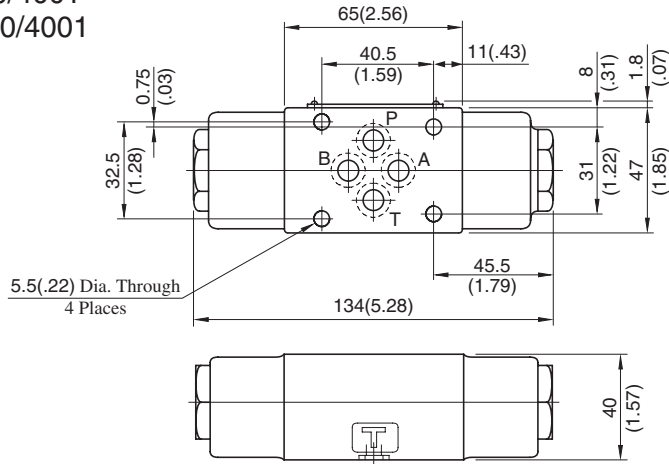


Min. Pilot Pressure



MPA-01-*-40/4001
 MPB-01-*-40/4001
 MPW-01-*-40/4001

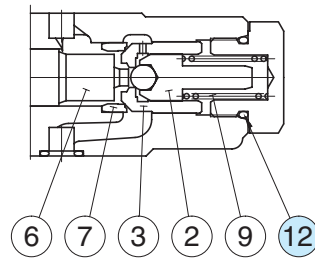
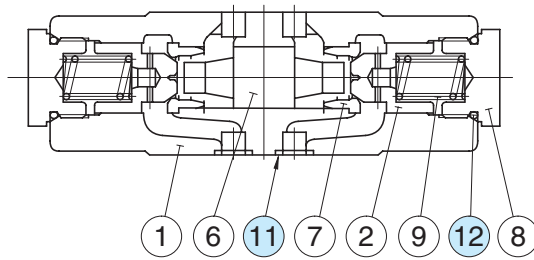
**DIMENSIONS IN
 MILLIMETRES (INCHES)**



Approx. Mass..... 1.2 kg (2.6 lbs.)

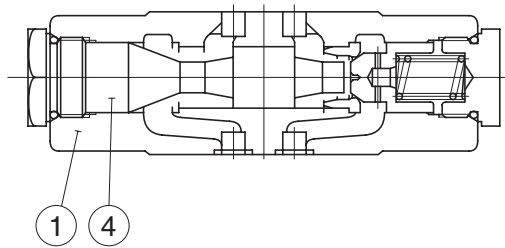
■ Spare Parts List

MPW-01-*-40

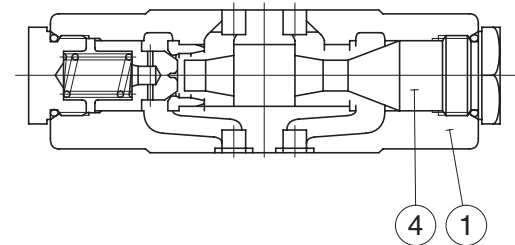


Low Pilot Pressure Control Type
 (MPW-01-*-4001)

MPA-01-*-40



MPB-01-*-40



● List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
11	O-Ring	SO-NB-P9	4	Included in Seal Kit Kit No.: KS-MAC-01-30
12	O-Ring	SO-NB-P18	2	

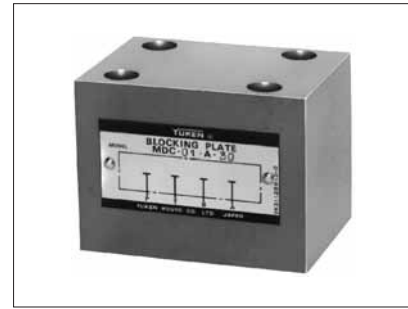
End Plates

Blocking plates are used for auxiliary mounting surface or for closing unnecessary circuits.

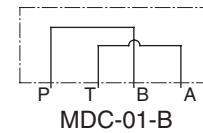
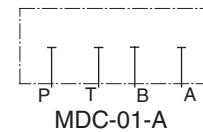
Bypass plates are used for unidirectional circuits that require no solenoid operated directional valves.

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MDC-01-*-30	31.5 (4570)	35 (9.25)



Graphic Symbols



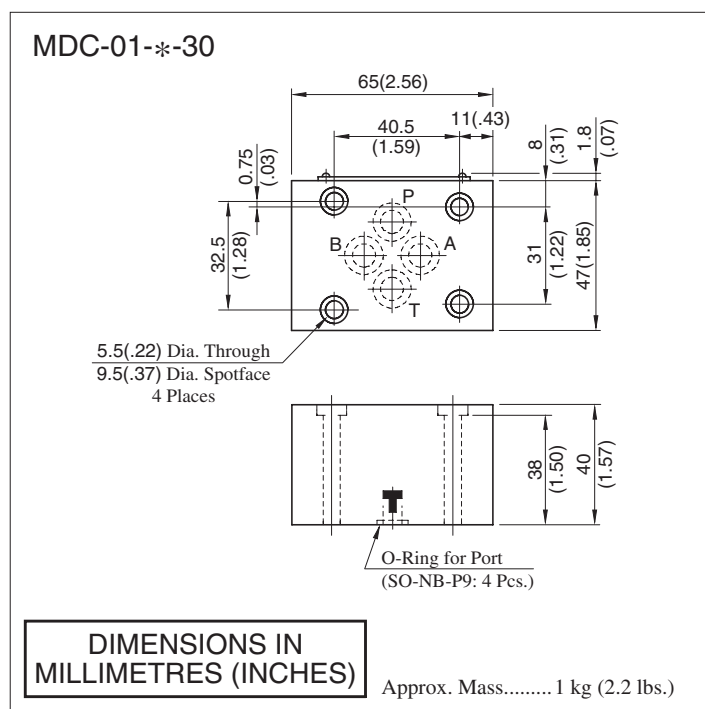
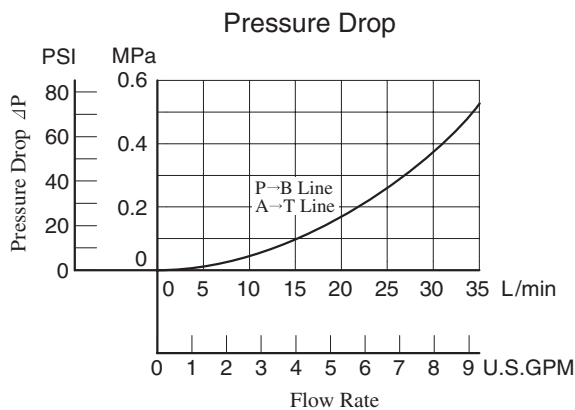
Model Number Designation

F-	MDC	-01	-A	-30	*
Special Seals	Series Number	Plate Size	Type of Plate	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MDC: End Plate	01	A: Blocking Plate B: Bypass Plate	30	Refer to ★

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU),
Specific Gravity 0.850



Connecting Plate

These plates are used for detecting pressure of each line.

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MDS-01-*-30/3090	31.5 (4570)	35 (9.25)



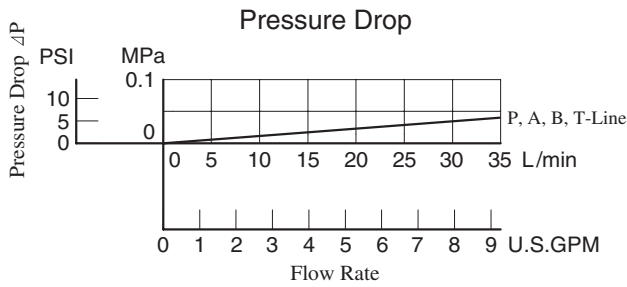
Model Number Designation

F-	MDS	-01	-PA	-30	*
Special Seals	Series Number	Plate Size	Type of Detecting Line	Design Number	Design Standard
F : Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MDS : Connecting Plate	01	PA : P&A-Lines PB : P&B-Lines AT : A&T-Lines	30	Refer to ★

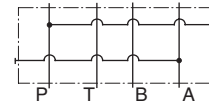
★ Design Standards: None Japanese Standard "JIS" and European Design Standard
90 N. American Design Standard

Pressure Drop

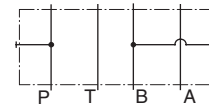
Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU),
Specific Gravity 0.850



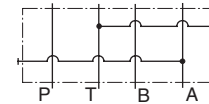
Graphic Symbols



MDS-01-PA

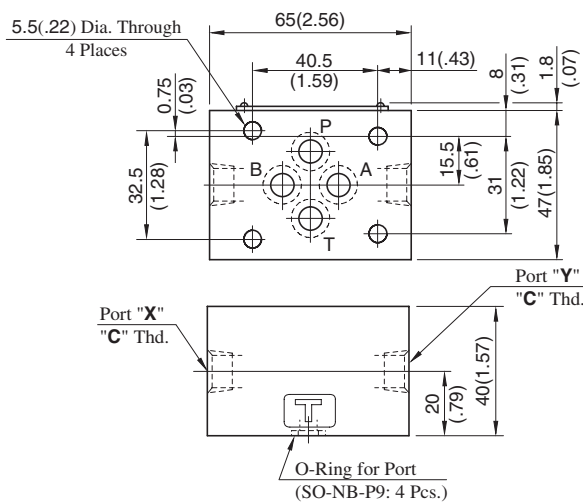


MDS-01-PB



MDS-01-AT

MDS-01-*-30/3090



Approx. Mass.....0.8 kg (1.8 lbs.)

Model Numbers	Pressure Detecting Line	
	Port "X"	Port "Y"
MDS-01-PA	P-Line	A-Line
MDS-01-PB	B-Line	P-Line
MDS-01-AT	T-Line	A-Line

Model Numbers	Thread Size "C" Thd.
MDS-01-*-30	Rc 1/4 = 1/4 BSP.Tr
MDS-01-*-3090	1/4 NPT

**DIMENSIONS IN
MILLIMETRES (INCHES)**

Base Plates For Modular Valves

Specifications

Max. Operating Pressure ----- 25 MPa (3630 PSI)

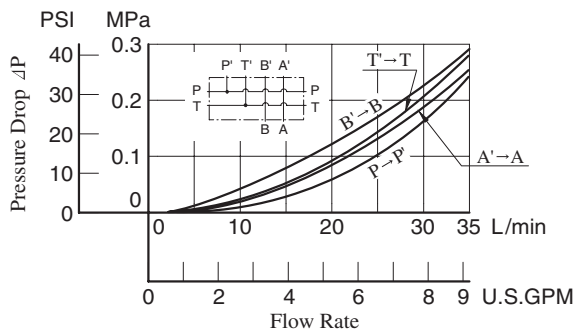


Model Number Designation

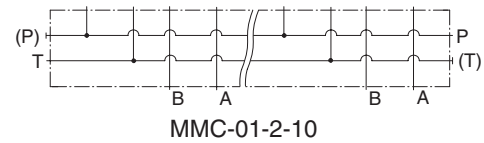
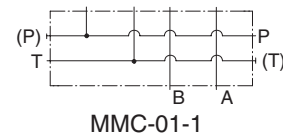
MMC	-01	-6	-40	*
Series Number	Plate Size	Number of Stations	Design Number	Design Standard
MMC : Base Plate	01	1: 1 Station	40	None: Japanese Standard "JIS"
		2: 2 Stations		6: 6 Stations
		3: 3 Stations		90: N.American Design Standard
		4: 4 Stations		
		5: 5 Stations		
		7: 7 Stations		
		8: 8 Stations		
		9: 9 Stations		
		10: 10 Stations		

Pressure Drop

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



Graphic Symbols

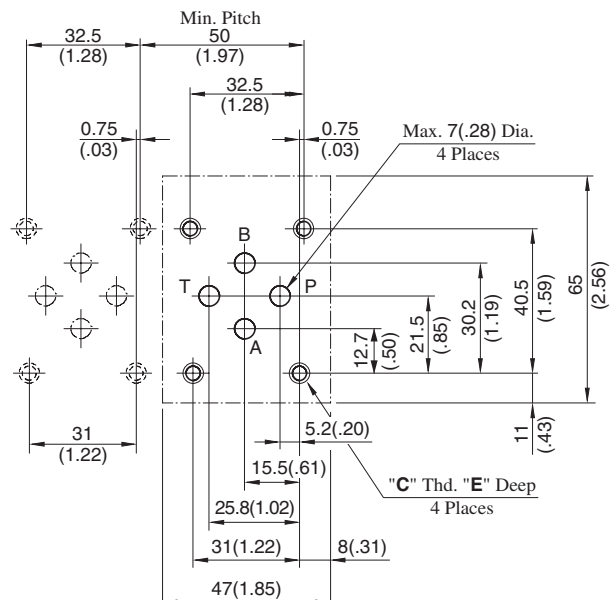


Instructions

- **Port Used:** Base plate has three (two, in case of 1 station type) **pressure port "P"**s and four **tank port "T"**s. Any one of these ports or two or more ports may be used. However, please note that the ports marked with (P) or (T) in the drawing are normally plugged. Remove the plugs when using such ports. Make sure that ports that are not currently used are properly plugged.

Interface Mounting Surface Dimensions for 1/8 Modular Valve

When standard base plates (MMC-01) are not used, the mounting surface described on right must be prepared. The mounting surface should have a good machined finish.

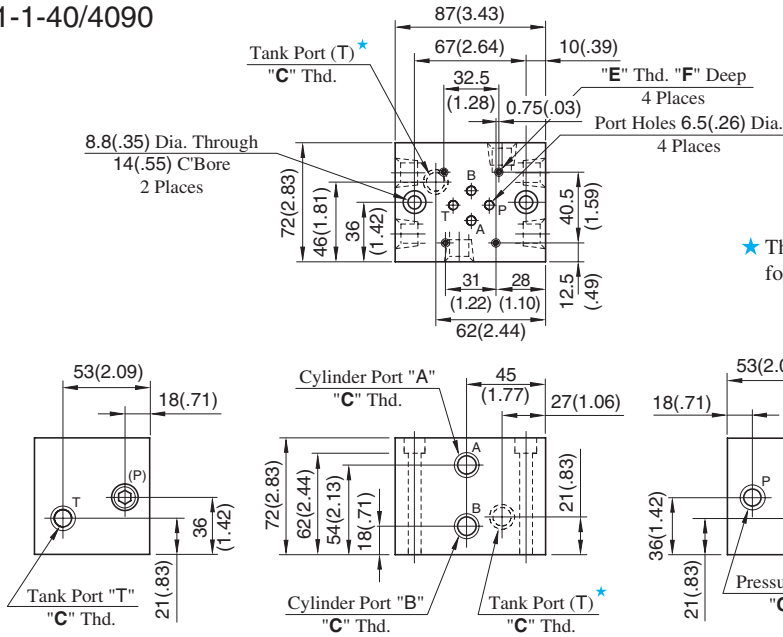


DIMENSIONS IN MILLIMETRES (INCHES)

Design Std.	"C" Thd.	E
Japanese Standard "JIS" and European Design Standard	M5	10 (.39)
N.American Design Standard	No. 10-24 UNC	12 (.47)

MMC-01-1-40/4090

DIMENSIONS IN MILLIMETRES (INCHES)

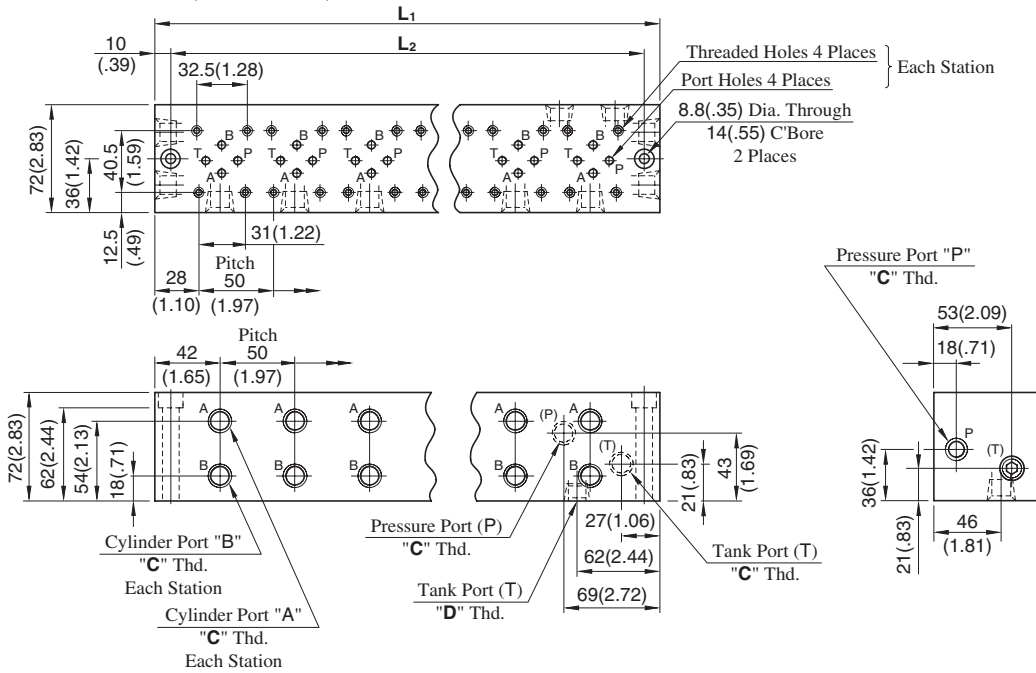


★ The two tank ports (T) are not machined for 4090 design.

Approx. Mass : 3.5 kg (7.7 lbs.)

MMC-01-*-40/4090

Number of Station (2-10 Stations)

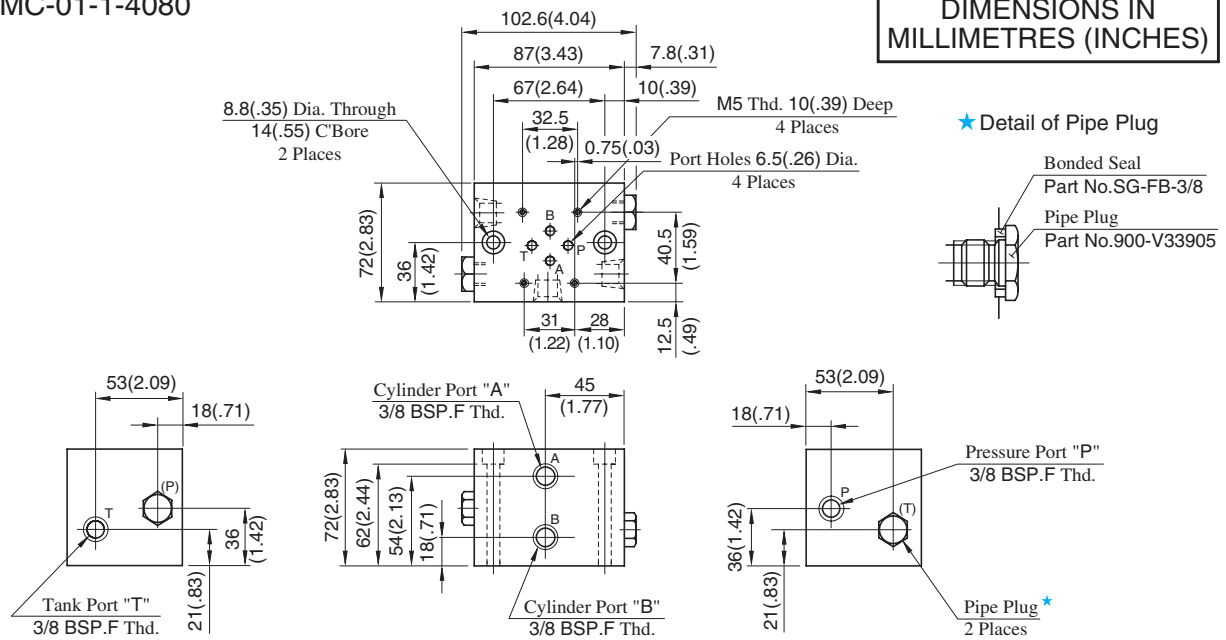


• For other dimensions, refer to above Model MMC-01-1.

Model Numbers	Thread Size			Dimensions mm (Inches)
	"C" Thd.	"D" Thd.	"E" Thd.	F
MMC-01-*-40	Rc 3/8	Rc 1/2	M5	10 (.39)
MMC-01-*-4090	3/8 NPT	1/2 NPT	No.10-24 UNC	12 (.47)

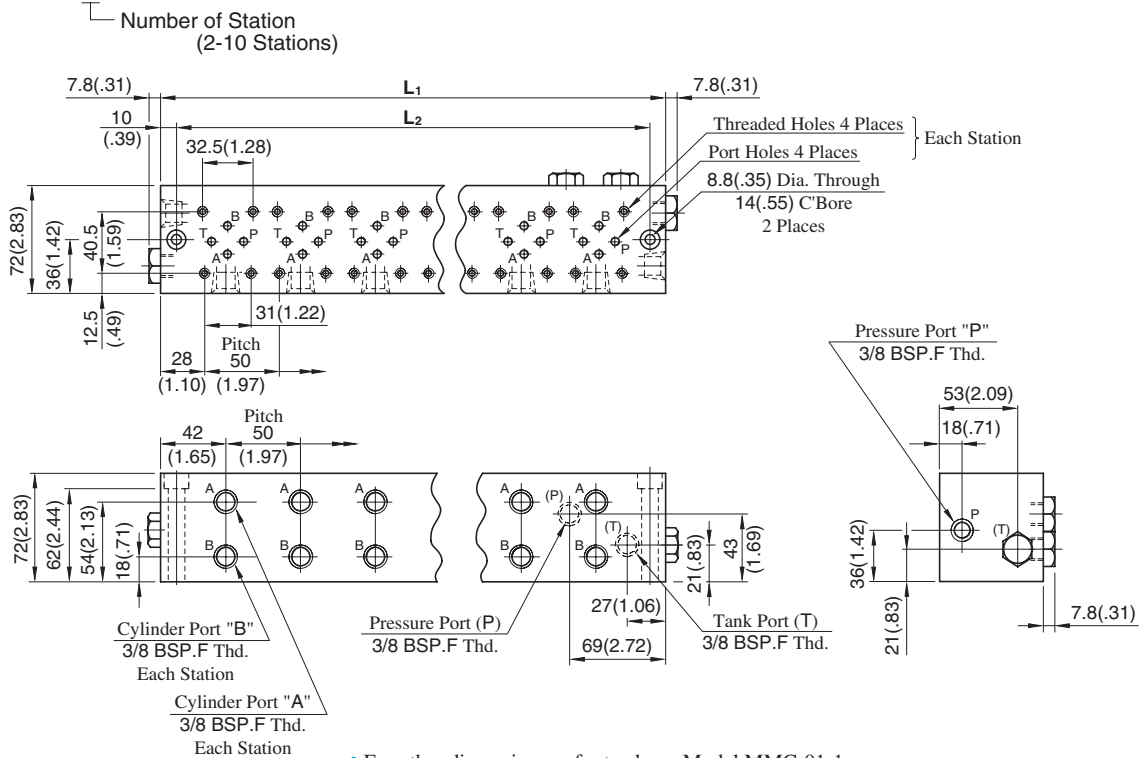
Model Numbers	Dimensions mm (Inches)		Approx. Mass kg (lbs.)	Model Numbers	Dimensions mm (Inches)		Approx. Mass kg (lbs.)
	L ₁	L ₂			L ₁	L ₂	
MMC-01-2	137 (5.39)	117 (4.61)	5.5 (12.1)	MMC-01-7	387 (15.24)	367 (14.45)	13.0 (28.7)
MMC-01-3	187 (7.36)	167 (6.57)	7.0 (15.4)	MMC-01-8	437 (17.20)	417 (16.42)	14.5 (32.0)
MMC-01-4	237 (9.33)	217 (8.54)	8.5 (18.7)	MMC-01-9	487 (19.17)	467 (18.39)	16.0 (35.3)
MMC-01-5	287 (11.30)	267 (10.51)	10.0 (22.1)	MMC-01-10	537 (21.14)	517 (20.35)	17.5 (38.6)
MMC-01-6	337 (13.27)	317 (12.48)	11.5 (25.4)				

MMC-01-1-4080



Approx. Mass : 3.5 kg (7.7 lbs.)

MMC-01-*4080



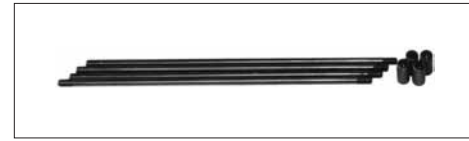
Model Numbers	Dimensions mm (Inches)		Approx. Mass kg (lbs.)	Model Numbers	Dimensions mm (Inches)		Approx. Mass kg (lbs.)
	L ₁	L ₂			L ₁	L ₂	
MMC-01-2	137 (5.39)	117 (4.61)	5.5 (12.1)	MMC-01-7	387 (15.24)	367 (14.45)	13.0 (28.7)
MMC-01-3	187 (7.36)	167 (6.57)	7.0 (15.4)	MMC-01-8	437 (17.20)	417 (16.42)	14.5 (32.0)
MMC-01-4	237 (9.33)	217 (8.54)	8.5 (18.7)	MMC-01-9	487 (19.17)	467 (18.39)	16.0 (35.3)
MMC-01-5	287 (11.30)	267 (10.51)	10.0 (22.1)	MMC-01-10	537 (21.14)	517 (20.35)	17.5 (38.6)
MMC-01-6	337 (13.27)	317 (12.48)	11.5 (25.4)				

01 Series Modular Valves

Mounting Bolt Kits

Valves are mounted with four stud bolts. Valve combination varies according to the circuit type. Hence, the mounting bolt kits are available on a combination type basis.

When ordering the bolt kit, be sure to give the bolt kit model number from the table below.



Model Number Designation

MBK	-01	-02	-30	*
Series Number	Size of Modular Valve	Bolt Number	Design Number	Design Standard
MBK: Bolt Kits for Modular Valves	01	01, 02, 03, 04, 05 (Refer to the following chart)	30	Refer to ★

★ Design Standards: None Japanese Standard "JIS" and European Design Standard 90 N. American Design Standard

Bolt Kit Composition

Stud Bolt ----- 4 Pcs. } 1 Set
Nut ----- 4 Pcs. }

Note: In case of bolt kit model number having "05", four hexagon socket head cap screws only.

Tightening Torque:

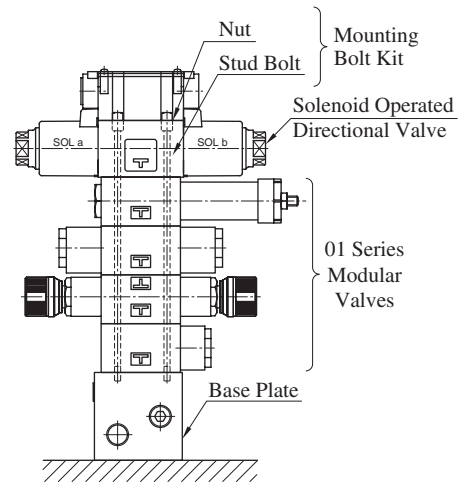
Operating Pressure MPa (PSI)	Tightening Torque Nm (in. lbs.)
25(3630) or less	5 - 6 (44 - 53)
More Than 25(3630)	6 - 7 (53 - 62)

Bolt Kits Selection Chart

Model Numbers	Quantity of valves to be stacked			Approx. Mass g (lbs.)
	Solenoid Operated Directional Valve (*-DSG-01)	End Plate (MDC-01)	Modular Valve & Connecting Plate	
MBK-01-01-30*	1	0	1	60(.13)
	0	1		
MBK-01-02-30*	1	0	2	100(.22)
	0	1		
MBK-01-03-30*	1	0	3	130(.29)
	0	1		
MBK-01-04-30* ^{★1}	1	0	4	160(.35)
	0	1		
MBK-01-05-30* ^{★2}	1	0	0	40(.09)
	0	1		

★ 1. In case of MBK-01-04-30*, operating pressure is restricted at 25 MPa (3630 PSI) or less.

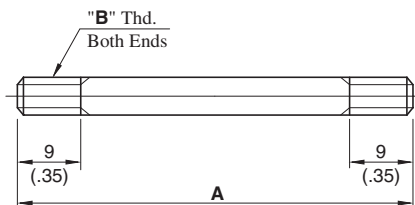
★ 2. The solenoid operated directional valve comes with mounting bolts.



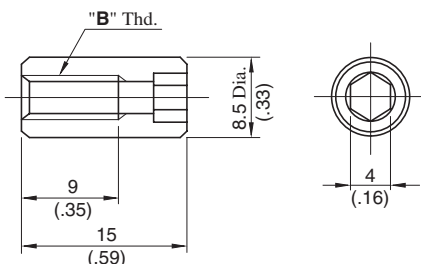
Stacking Example

MBK-01-01/02/03/04-30/3090

Stud Bolt

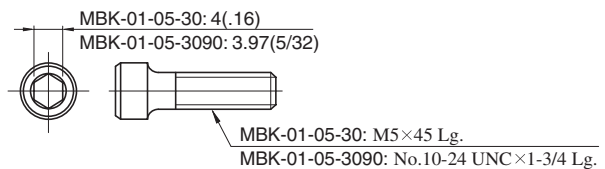


Nut



MBK-01-05-30/3090

Socket Head Cap Screw



DIMENSIONS IN MILLIMETRES (INCHES)

Model Numbers	A mm (In.)	"B" Thd.
MBK-01-01-30	94 (3.70)	M5
MBK-01-02-30	134 (5.28)	
MBK-01-03-30	174 (6.85)	
MBK-01-04-30	214 (8.43)	
MBK-01-01-3090	94 (3.70)	No.10-24 UNC
MBK-01-02-3090	134 (5.28)	
MBK-01-03-3090	174 (6.85)	
MBK-01-04-3090	214 (8.43)	

3/8 Modular Valves

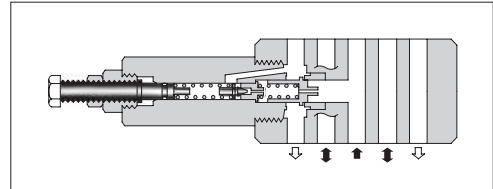
Type of Modular Valve

Class	Model Numbers	Graphic Symbols	Page	Class	Model Numbers	Graphic Symbols	Page	
Pressure Control Valves	Solenoid Operated Directional Valve (S-)DSG-03-***-50/5090 E-DSG-03-***-D*50/5090 T-DSG-03-***-D24*50/5090 G-DSG-03-***-50/5090		361 378 379 412	Flow Control Valves	Temperature Compensated Throttle and Check Valves (for "A&B-Lines", Metre-out) MSTW-03-X-20		595	
	Relief Valves (for "P-Line") MBP-03-*30		578		Throttle Valves (for "P-Line") MSP-03-30		598	
	Relief Valves (for "A-Line") MBA-03-*30		578		Check and Throttle Valves (for "P-Line") MSCP-03-20		600	
	Relief Valves (for "B-Line") MBB-03-*30		578		Throttle and Check Valves (for "A-Line", Metre-out) MSA-03-X-40		602	
	Relief Valves (for "A&B-Lines") MBW-03-*30		578		Throttle and Check Valves (for "A-Line", Metre-in) MSA-03-Y-40		602	
	Reducing Valves (for "P-Line") MRP-03-*30/3090		581		Throttle and Check Valves (for "B-Line", Metre-out) MSB-03-X-40		602	
	Reducing Valves (for "A-Line") MRA-03-*30/3090		581		Throttle and Check Valves (for "B-Line", Metre-in) MSB-03-Y-40		602	
	Reducing Valves (for "B-Line") MRB-03-*30/3090		581		Throttle and Check Valves (for "A&B-Lines", Metre-out) MSW-03-X-40		602	
	Reducing Valves for Low Pressure Setting (for "P-Line") MRLP-03-10/1090		584		Throttle and Check Valves (for "A&B-Lines", Metre-in) MSW-03-Y-40		602	
	Reducing Valves for Low Pressure Setting (for "A-Line") MRLA-03-10/1090		584		Directional Control Valves	Check Valves (for "P-Line") MCP-03-*10		605
	Reducing Valves for Low Pressure Setting (for "B-Line") MRLB-03-10/1090		584			Check Valves (for "A-Line") MCA-03-*20		605
	Sequence Valves (for "P-Line") MHP-03-*20		588			Check Valves (for "B-Line") MCB-03-*20		605
	Counterbalance Valves (for "A-Line") MHA-03-*20		588			Check Valves (for "T-Line") MCT-03-*10		605
	Counterbalance Valves (for "B-Line") MHB-03-*20		588			Check Valves (for "P&T-Lines") MCPT-03-P*-T*-10		607
Flow Control Valves	Flow Control Valves (for "P-Line") MFP-03-11		591	Anti-Cavitation Valves MAC-03-10			609	
	Flow Control and Check Valves (for "A-Line", Metre-out) MFA-03-X-11		591	Pilot Operated Check Valves (for "A-Line") MPA-03-*20/2001			610	
	Flow Control and Check Valves (for "A-Line", Metre-in) MFA-03-Y-11		591	Pilot Operated Check Valves (for "B-Line") MPB-03-*20/2001			610	
	Flow Control and Check Valves (for "B-Line", Metre-out) MFB-03-X-11		591	Pilot Operated Check Valves (for "A&B-Lines") MPW-03-*20/2001			610	
	Flow Control and Check Valves (for "B-Line", Metre-in) MFB-03-Y-11		591	Modular Plates and Mounting Bolts		End Plates (Blocking Plates) MDC-03-A-10		613
	Flow Control and Check Valves (for "A&B-Lines", Metre-out) MFW-03-X-11		591			End Plates (Bypass Plates) MDC-03-B-10		613
	Flow Control and Check Valves (for "A&B-Lines", Metre-in) MFW-03-Y-11		591			Connecting Plates MDS-03-10/1090		614
	Temperature Compensated Throttle and Check Valves (for "A-Line", Metre-out) MSTA-03-X-20		595			Base Plates MMC-03-T*-21/2180/2190		615
	Temperature Compensated Throttle and Check Valves (for "B-Line", Metre-out) MSTB-03-X-20		595			Bolt Kits MBK-03-*10/1090		618

Relief Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MBP-03-* -30 MBA-03-* -30 MBB-03-* -30 MBW-03-* -30	31.5 (4570)	70 (18.5)



Model Number Designation

F-	MBA	-03	-B	-30	*
Special Seals	Series Number	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MBP : Relief Valve for P-Line MBA : Relief Valve for A-Line MBB : Relief Valve for B-Line MBW : Relief Valve for A&B-Lines	03	B : *-7 ^{★1} (* -1020) H : 3.5-31.5 (510-4570)	30	Refer to ^{★2}

★1. See the "Minimum Adjustment Pressure" of the next page for the item marked *.

★2. Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

Instructions

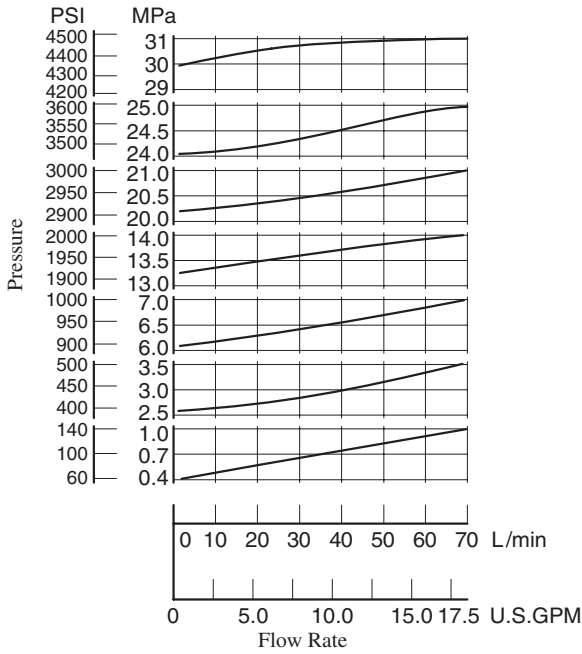
- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the next page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.
- In case of a small flow, the setting pressure may become unstable. To avoid this, refer to the minimum flow characteristic curve of the next page and use the valve within a range as shown with .

Model Numbers	Graphic Symbols	Detailed Graphic Symbols
MBP-03		
MBA-03		
MBB-03		
MBW-03		

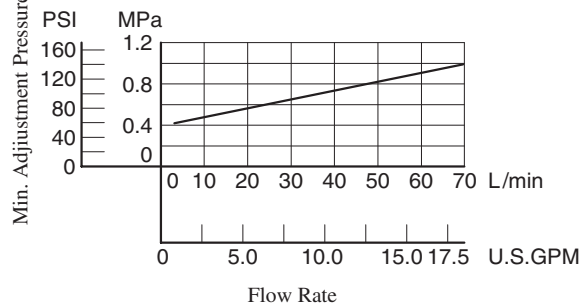
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850

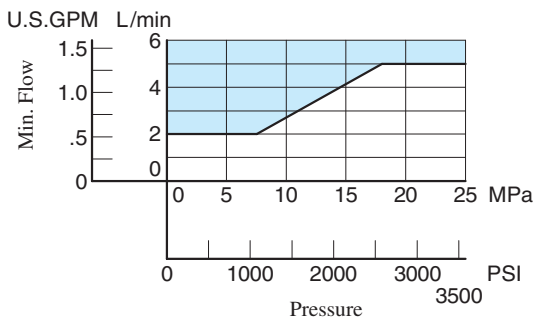
Nominal Override Characteristics



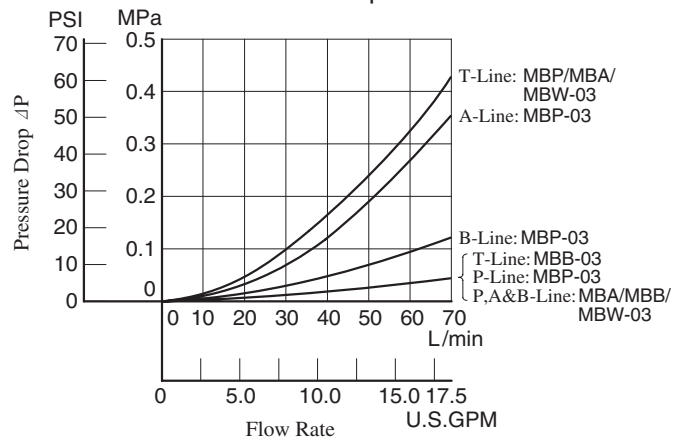
Min. Adjustment Pressure



Min. Flow vs. Adjustment Pressure



Pressure Drop



MBW-03-*-30

DIMENSIONS IN MILLIMETRES (INCHES)

Approx. Mass..... 3.8 kg (8.4 lbs.)

MBP-03-*-30 MBA-03-*-30

Approx. Mass..... 3.1 kg (6.8 lbs.)

• For other dimensions, refer to "MBW-03" drawing left.

MBB-03-*-30

Approx. Mass..... 3.1 kg (6.8 lbs.)

• For other dimensions, refer to "MBW-03" drawing left.

■ Spare Parts List

MBP-03-*-30 MBA-03-*-30

MBB-03-*-30

MBW-03-*-30

● List of Seals

Item	Name of Parts	Part Numbers	Quantity			
			MBP-03	MBA-03	MBB-03	MBW-03
15	O-Ring	SO-NB-A014	5	5	5	5
16	O-Ring	SO-NA-P6	1	1	1	2
17	O-Ring	SO-NB-P16	1	1	1	2
18	O-Ring	SO-NB-P26	1	1	1	2

Note: When ordering seals, please specify the seal kit number from the table right.

● List of Seal Kits

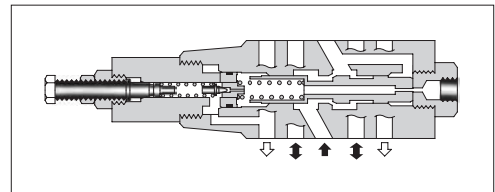
Valve Model Numbers	Seal kit Numbers
MBP-03	KS-MBP-03-30
MBA-03	
MBB-03	
MBW-03	KS-MBW-03-30

Reducing Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa(PSI)	Max. Flow L/min (U.S.GPM)
MRP-03-*-30/3090 MRA-03-*-30/3090 MRB-03-*-30/3090	25 (3630)	70 (18.5) *

★ In pressure adjustment range "H", if the pressure in the primary side is set above 20 MPa (2900 PSI) and the pressure in the secondary side is set below 10 MPa (1450 PSI), the maximum flow is limited to 50 L/min (13.2 U.S.GPM).



Model Number Designation

F-	MRP	-03	-B	-30	*
Special Seals	Series Number	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MRP: Reducing Valve for P-Line MRA: Reducing Valve for A-Line MRB: Reducing Valve for B-Line	03	B: 1-7 (145-1020) H: 3.5-24.5 (510-3550)	30	Refer to ★

★ Design Standards: None Japanese Standard "JIS" and European Design Standard
90 N. American Design Standard

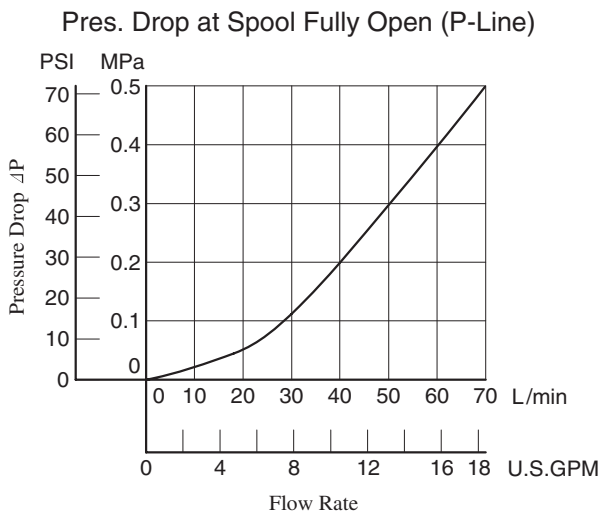
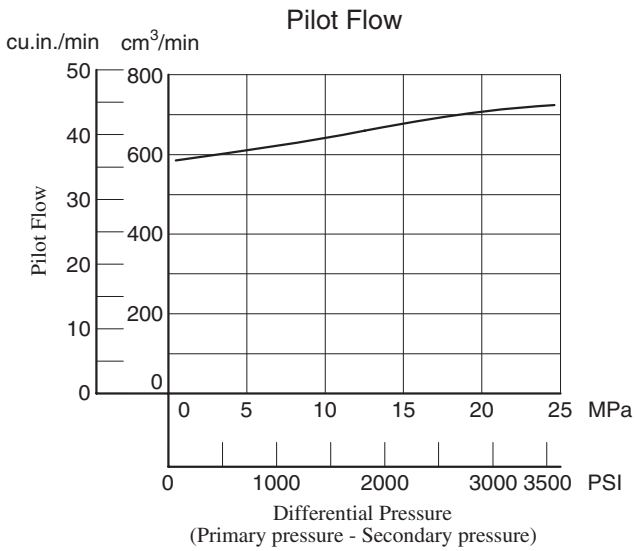
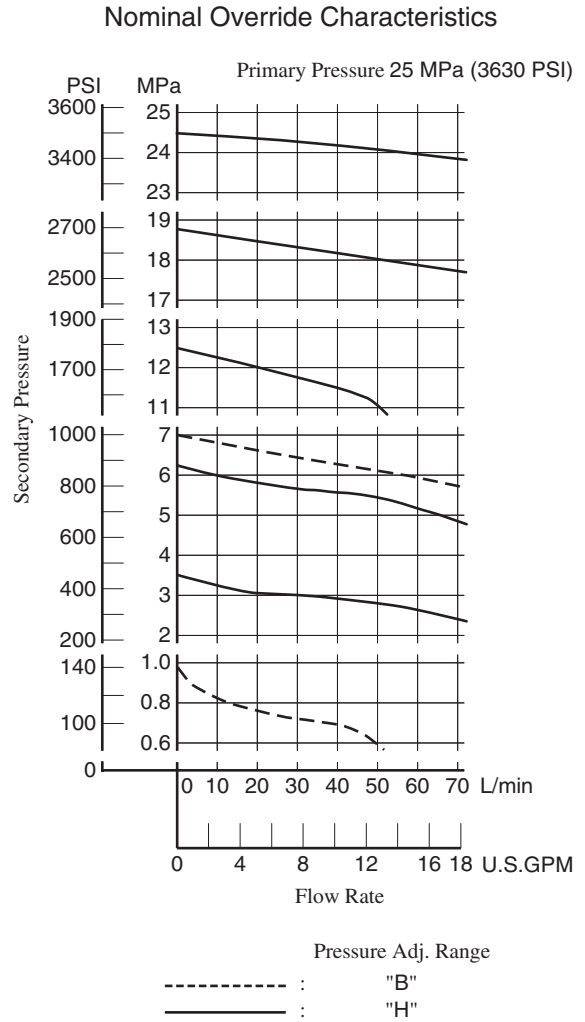
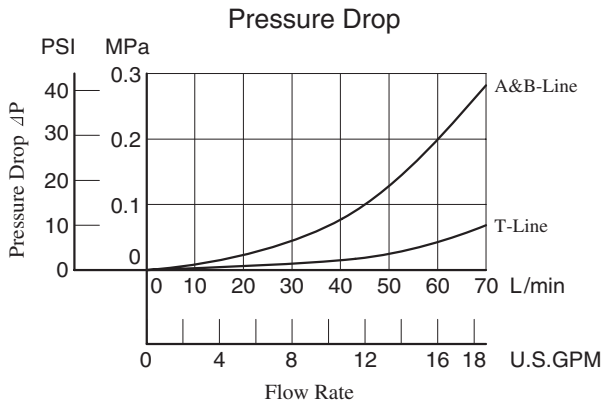
Instructions

- The minimum adjustment pressure equals the lower limit of either pressure adjustment range (B, H) plus the tank line back pressure of the [next page](#). This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.

Model Numbers	Graphic Symbols	Detailed Graphic Symbols
MRP-03		
MRA-03		
MRB-03		

Typical Performance Characteristics

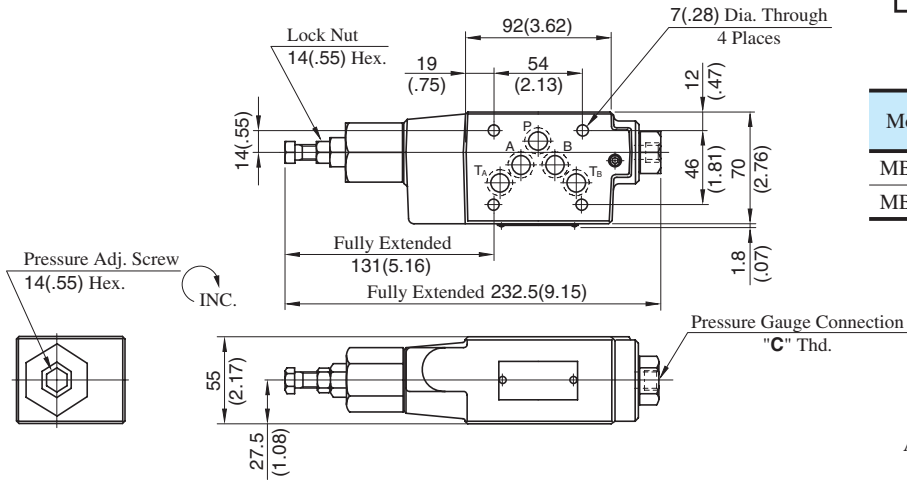
Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



MRP-03-*-30/3090

MRB-03-*-30/3090

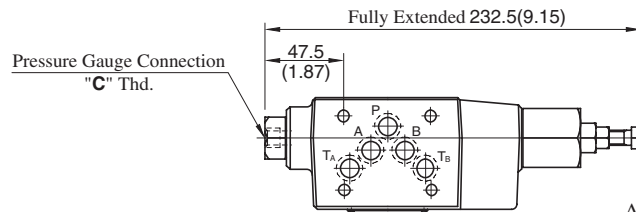
DIMENSIONS IN MILLIMETRES (INCHES)



Model Numbers	Thread Size "C" Thd.
MB*-01-*-30	Rc 1/4 = 1/4 BSP.Tr
MB*-01-*-3090	1/4 NPT

Approx. Mass.....3.3 kg (7.5 lbs.)

MRA-03-*-30/3090

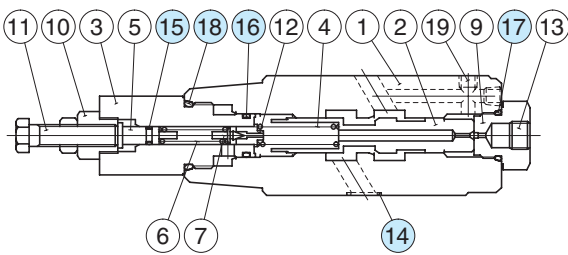


Approx. Mass.....3.3 kg (7.5 lbs.)

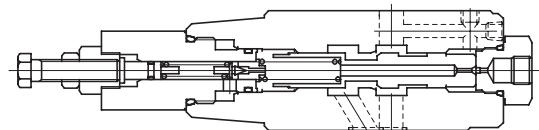
• For other dimensions, refer to "MRP-03" drawing above.

Spare Parts List

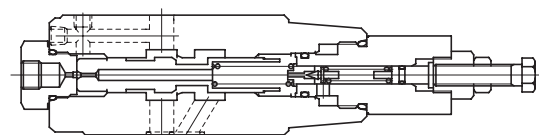
MRP-03-*-30/3090



MRB-03-*-30/3090



MRA-03-*-30/3090



List of Seals

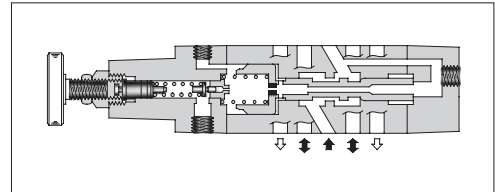
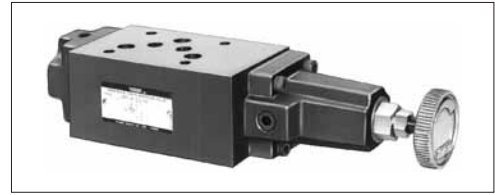
Item	Name of Parts	Part Numbers	Qty.	Remarks
14	O-Ring	SO-NB-A014	5	Included in Seal Kit Kit No.: KS-MRP-03-30
15	O-Ring	SO-NA-P6	1	
16	O-Ring	SO-NB-P16	1	
17	O-Ring	SO-NB-P18	1	
18	O-Ring	SO-NB-P26	1	

Reducing Modular Valves For Low Pressure Setting

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Pres. Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)
MRLP-03-10/1080/1090 MRLA-03-10/1080/1090 MRLB-03-10/1080/1090	7 (1020)	0.2-6.5 (29-940)	50 (13.2) *

★ When pressure setting is less than 0.8 MPa (116 PSI), maximum flow decreases. See "Min. Adjustment Pressure vs. Max. Flow" on the [next page](#) for the appropriate range.



Model Number Designation

F-	MRLP	-03	-10	*
Special Seals	Series Number	Valve Size	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MRLP : Low Pressure Setting Type Reducing Valve for P-Line MRLA : Low Pressure Setting Type Reducing Valve for A-Line MRLB : Low Pressure Setting Type Reducing Valve for B-Line	03	10	Refer to ★

★ Design Standards: None Japanese Standard "JIS"
80 European Design Standard
90 N. American Design Standard

Instructions

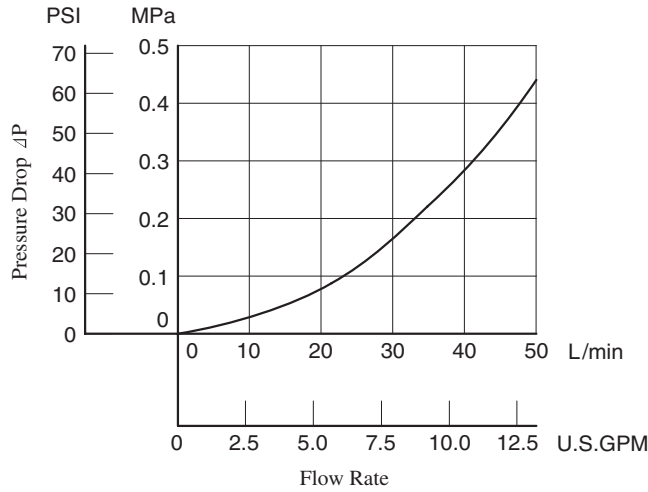
- If there is a pressure in drain line, it is added to the secondary setting pressure. Hence, drain line must be connected to tank directly with a low back pressure close to atmospheric pressure.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment handle clockwise or anti-clockwise. For an increase of pressure, turn the handle clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.

Model Numbers	Graphic Symbols	Detailed Graphic Symbols
MRLP-03		
MRLA-03		
MRLB-03		

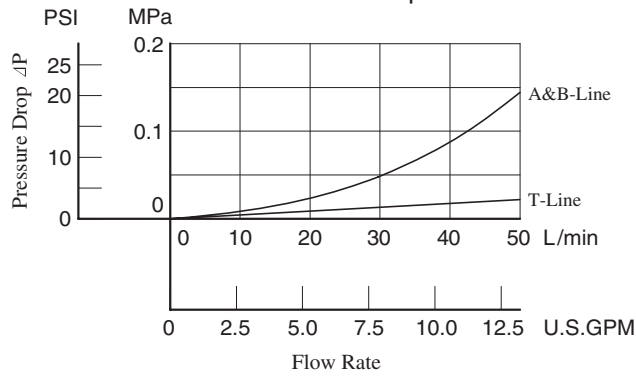
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850

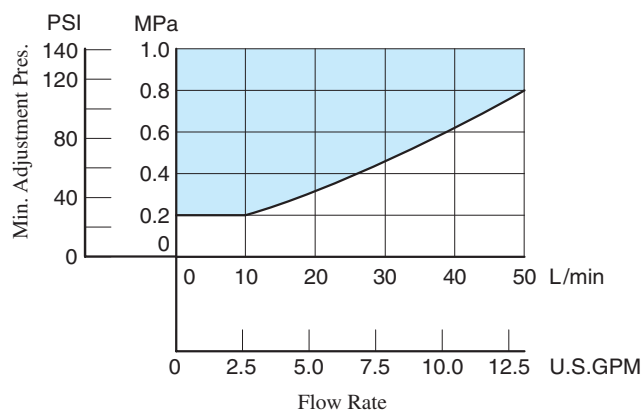
Pres. Drop at Spool Fully Open (P-Line)



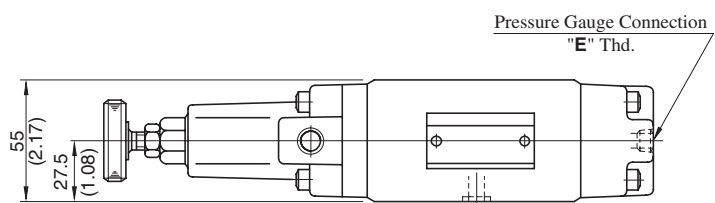
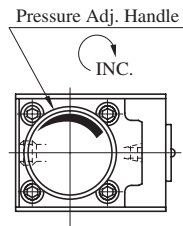
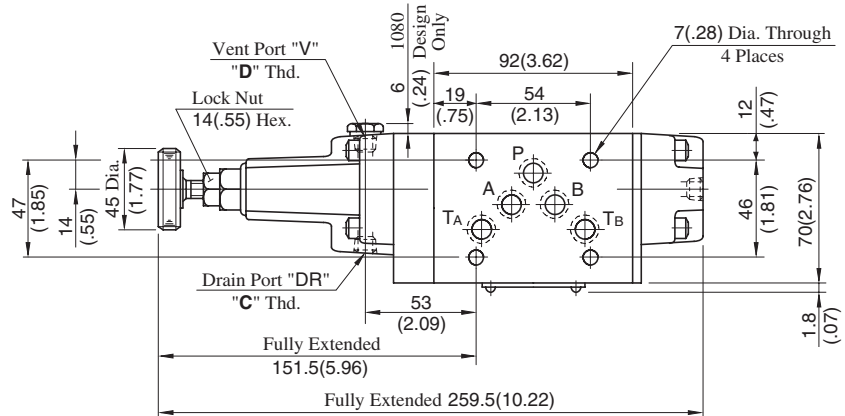
Pressure Drop



Min. Adjustment Pressure vs. Max. Flow



MRLP-03-10/1080/1090
MRLB-03-10/1080/1090

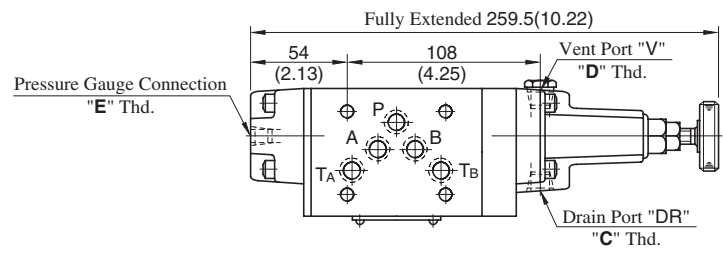


Approx. Mass.....4.5 kg (9.9 lbs.)

Model Numbers	Thread Size		
	"C" Thd.	"D" Thd.	"E" Thd.
MRL*-03-10	Rc 1/4	Rc 1/8	Rc 1/4
MRL*-03-1080	1/4 BSP.F	1/8 BSP.F	1/4 BSP.Tr
MRL*-03-1090	1/4 NPT	1/8 NPT	1/4 NPT

DIMENSIONS IN MILLIMETRES (INCHES)

MRLA-03-10/1080/1090

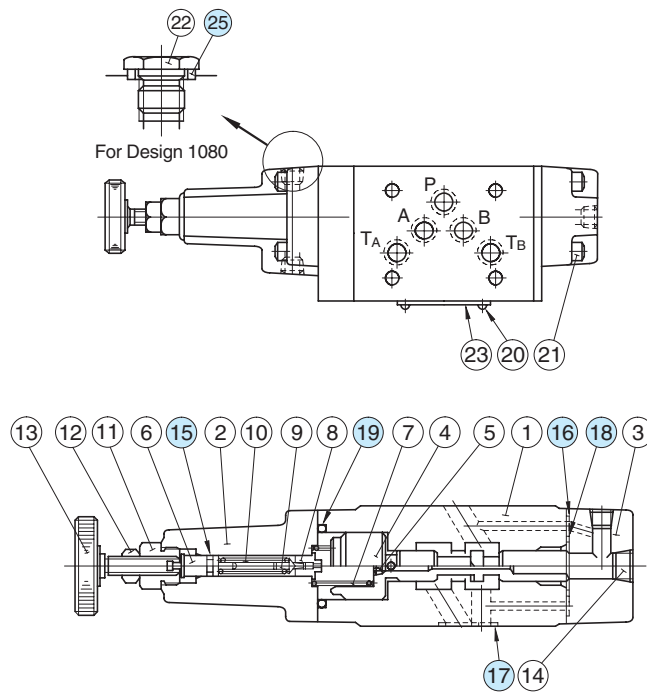


Approx. Mass.....4.5 kg (9.9 lbs.)

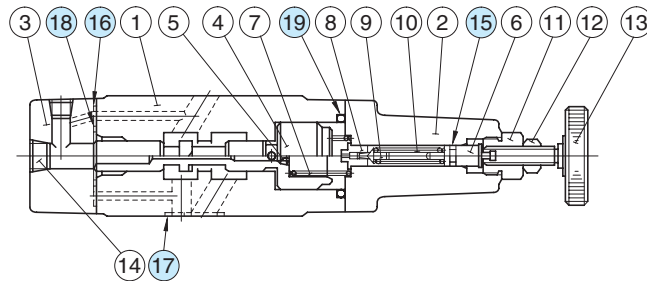
- For other dimensions, refer to "MRLP-03" drawing above.

Spare Parts List

MRLP-03-10/1080/1090
MRLB-03-10/1080/1090



MRLA-03-10/1080/1090



List of Seals

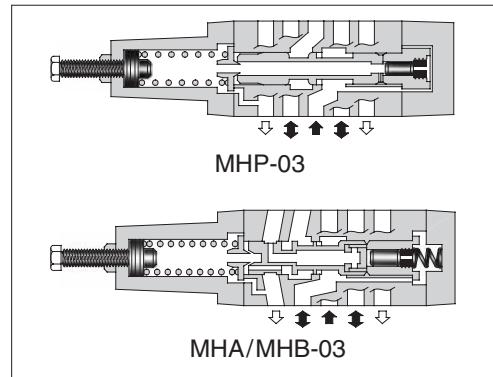
Item	Name of Parts	Part Numbers	Qty.	Remarks
15	O-Ring	SO-NA-P6	1	Included in Seal Kit Kit No.:KS-MRLP-03-10
16	O-Ring	SO-NB-P6	2	
17	O-Ring	SO-NB-A014	5	
18	O-Ring	SO-NB-P22	1	
19	O-Ring	SO-NB-P32	1	
25	Bonded Seal	SG-FB-1/8	1	

Note: No bonded seal are included in seal kits.

Sequence Modular Valves/Counterbalance Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)	Max. Free Flow L/min (U.S.GPM)
MHP-03-* -20	25 (3630)	50 (13.2)	—
MHA-03-* -20 MHB-03-* -20			70 (18.5)



Model Number Designation

F-	MHA	-03	-C	-20	*
Special Seals	Series Number	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MHP: Sequence Valve for P-Line	03	N: *-1.8 (*-260) ★ ¹ A: 1.8-3.5 (260-510) B: 3.5-7 (510-1020) C: 7-14 (1020-2030)	20	Refer to ★ ²
	MHA: Counterbalance Valve for A-Line MHB: Counterbalance Valve for B-Line			20	

★¹. See the "Minimum Adjustment Pressure" of the next page for the item marked *.

★². Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

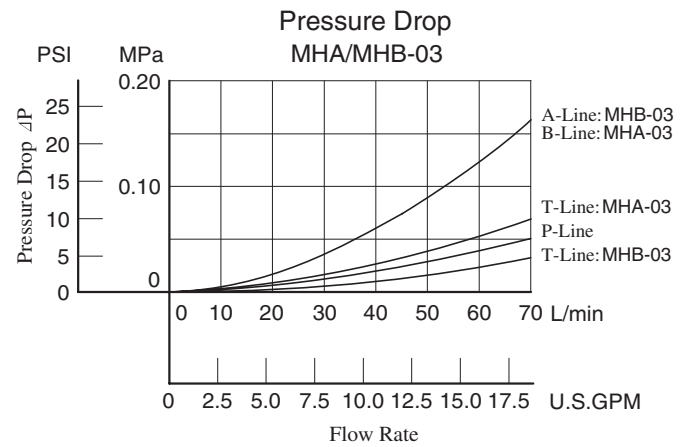
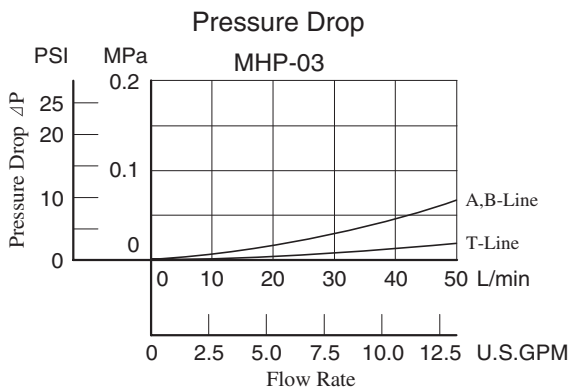
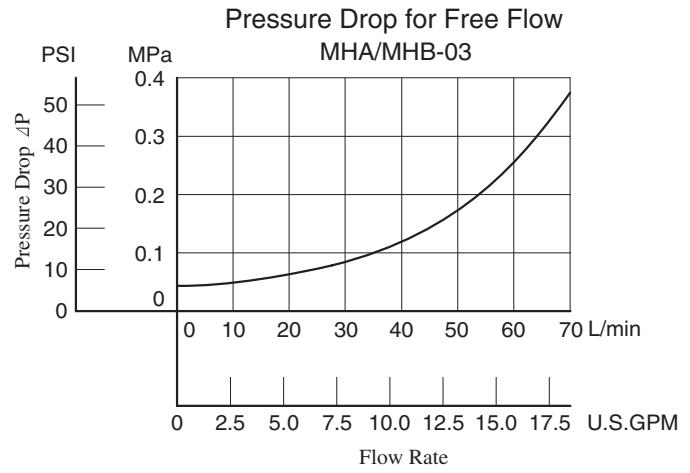
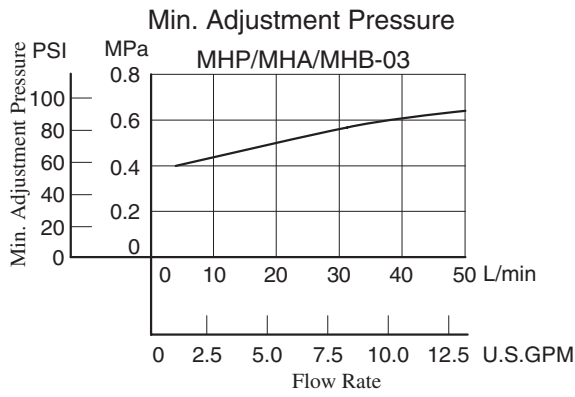
Instructions

- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the next page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.

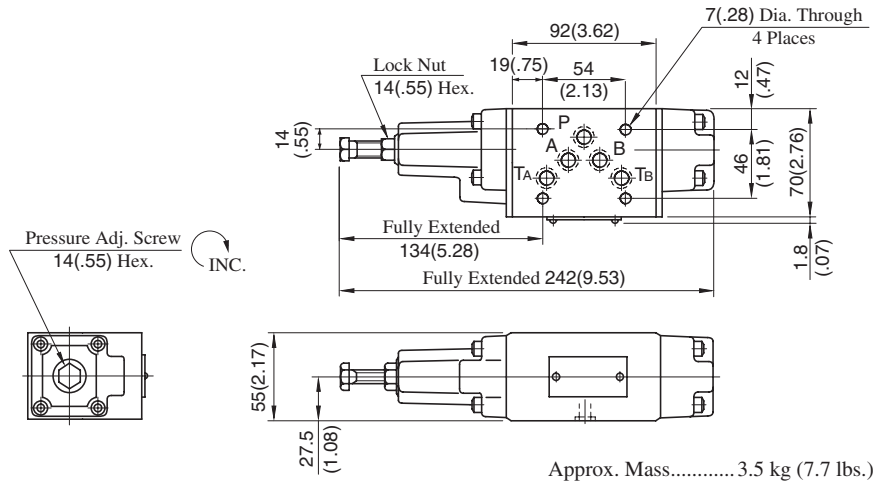
Model Numbers	Graphic Symbols	Detailed Graphic Symbols
MHP-03		
MHA-03		
MHB-03		

Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



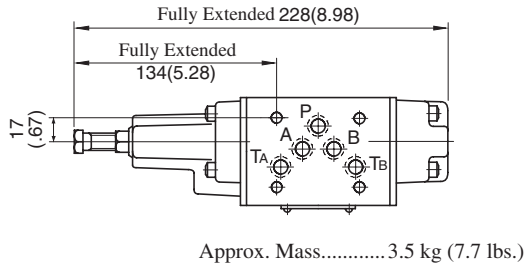
MHP-03-*-20



Approx. Mass.....3.5 kg (7.7 lbs.)

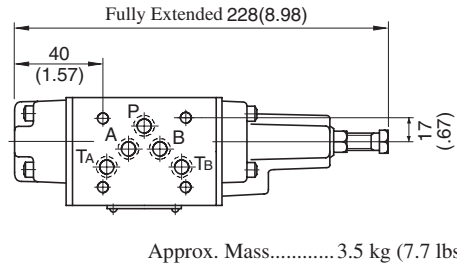
DIMENSIONS IN MILLIMETRES (INCHES)

MHA-03-*-20



Approx. Mass.....3.5 kg (7.7 lbs.)

MHA-03-*-20

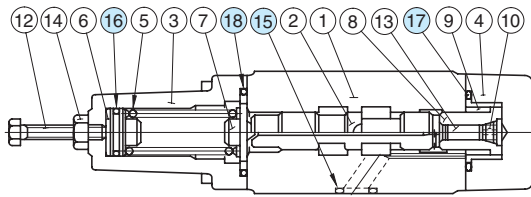


Approx. Mass.....3.5 kg (7.7 lbs.)

• For other dimensions, refer to "MHP-03" drawing above.

■ Spare Parts List

MHP-03-*-20

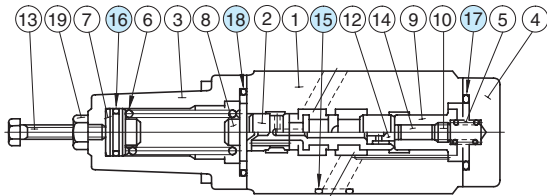


• List of Seals

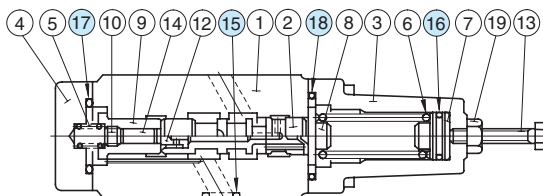
MHP-03, MHA-03

Item	Name of Parts	Part Numbers	Qty.	Remarks
15	O-Ring	SO-NB-A014	5	Included in Seal Kit Kit No.:KS-MHP-03-20
16	O-Ring	SO-NB-P16	1	
17	O-Ring	SO-NB-P29	1	
18	O-Ring	SO-NB-P32	1	

MHA-03-*-20



MHB-03-*-20



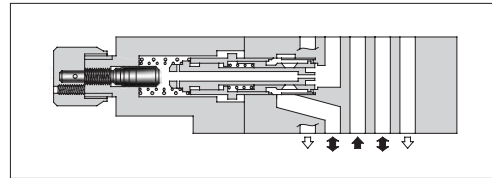
MHB-03

Item	Name of Parts	Part Numbers	Qty.	Remarks
15	O-Ring	SO-NB-A014	5	Included in Seal Kit Kit No.:KS-MHB-03-20
16	O-Ring	SO-NA-P16	1	
17	O-Ring	SO-NB-P29	1	
18	O-Ring	SO-NB-P32	1	

Pressure and Temperature Compensated Flow Control (and Check) Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Metred Flow L/min (U.S.GPM)	Max. Free Flow L/min (U.S.GPM)
MFP-03-11	16 (2320)	50 (13.2)	—
MFA-03-*-11 MFB-03-*-11 MFW-03-*-11			70 (18.5)



Model Number Designation

F-	MFA	-03	-X	-11	*
Special Seals	Series Number	Valve Size	Direction of Flow	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MFP : Flow Control Valve for P-Line	03	—	11	Refer to ★
	MFA : Flow Control and Check Valve for A-Line MFB : Flow Control and Check Valve for B-Line MFW : Flow Control and Check Valve for A&B-Lines		X : Metre-out Y : Metre-in	11	

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

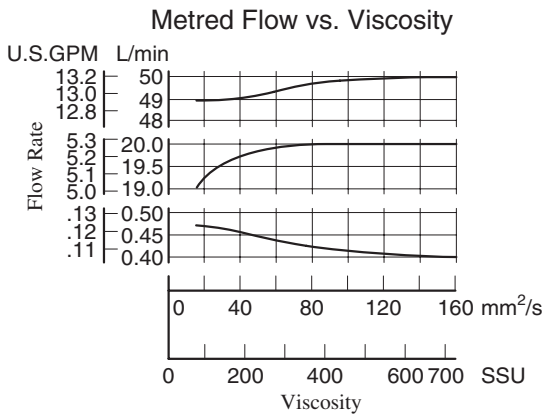
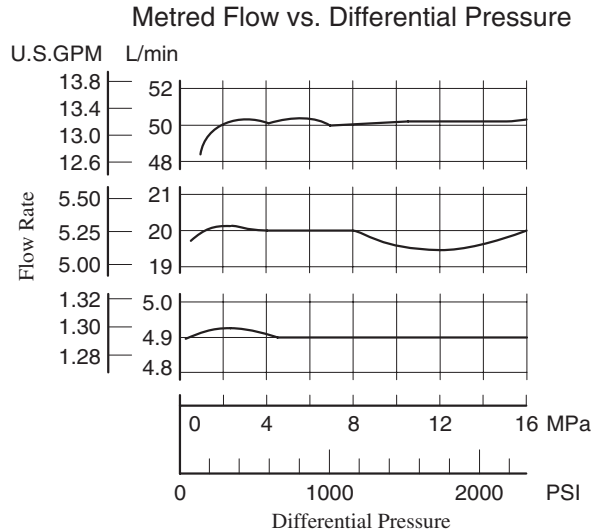
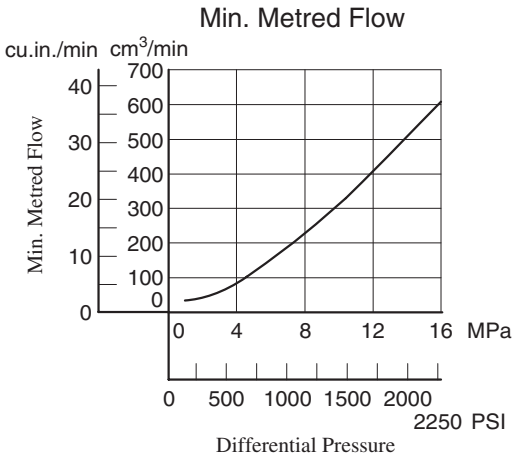
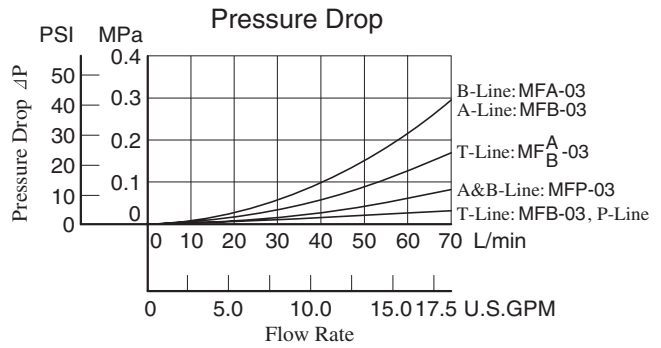
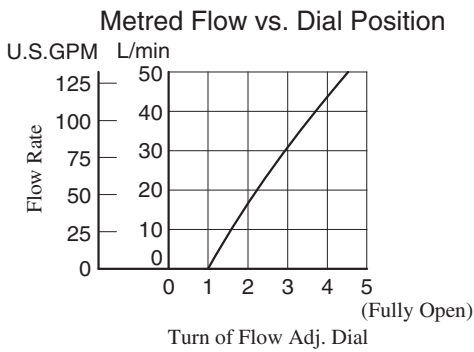
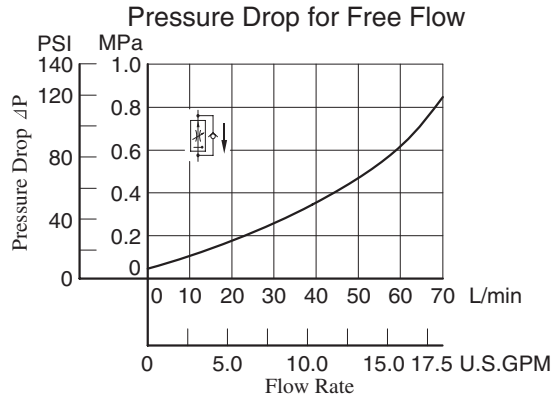
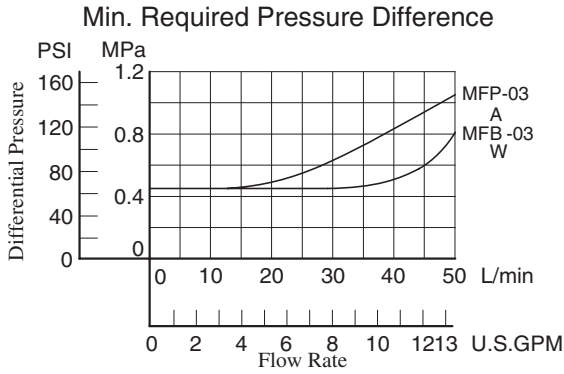
Instructions

- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

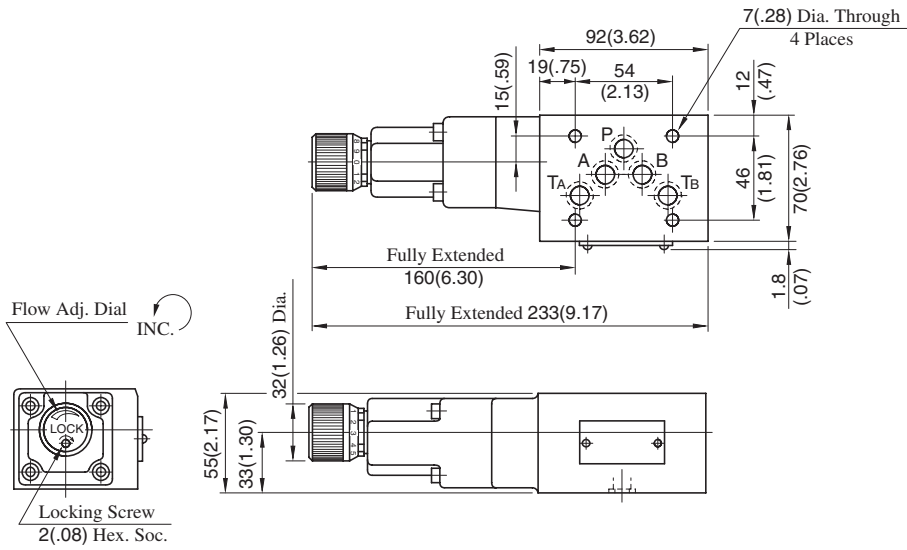
Model No.	Graphic Symbols	Detailed Graphic Symbols	Model No.	Graphic Symbols	Detailed Graphic Symbols
MFP-03					
Model No.	Metre-out		Metre-in		
MFA-03-X			MFA-03-Y		
MFB-03-X			MFB-03-Y		
MFW-03-X			MFW-03-Y		

Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



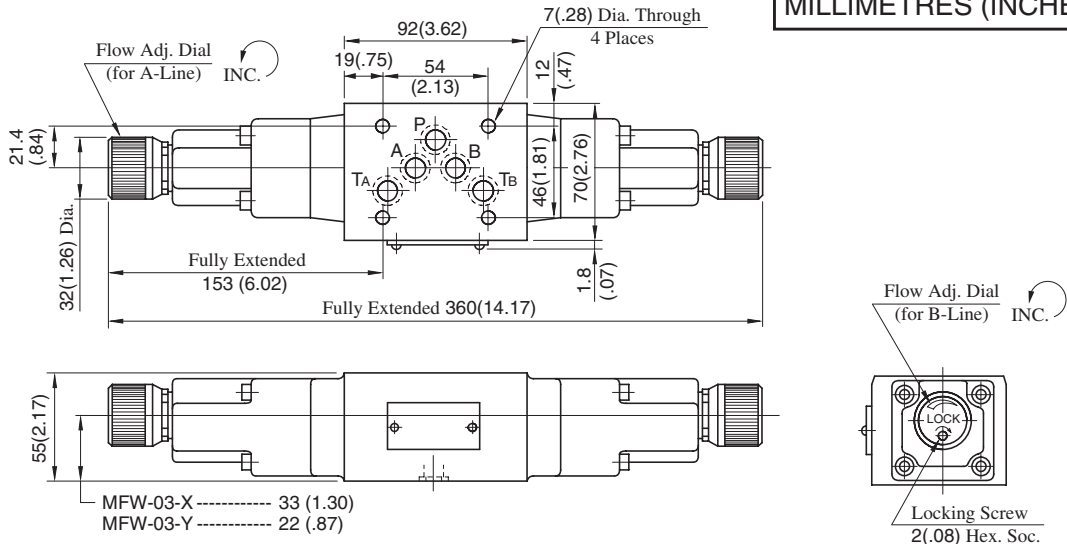
MFP-03-11



Approx. Mass.....4.2 kg (9.3 lbs.)

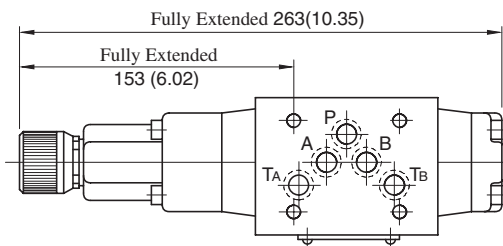
MFW-03-X-11

DIMENSIONS IN MILLIMETRES (INCHES)



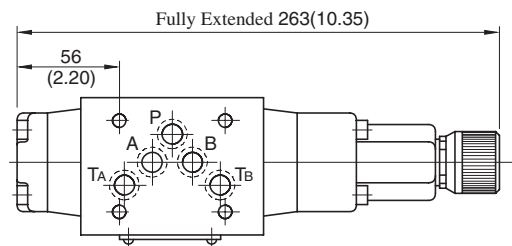
Approx. Mass.....5.2 kg (11.5 lbs.)

MFA-03-X-11



Approx. Mass.....4.1 kg (9.0 lbs.)

MFB-03-X-11

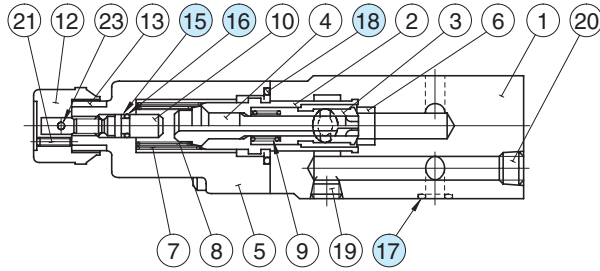


Approx. Mass.....4.1 kg (9.0 lbs.)

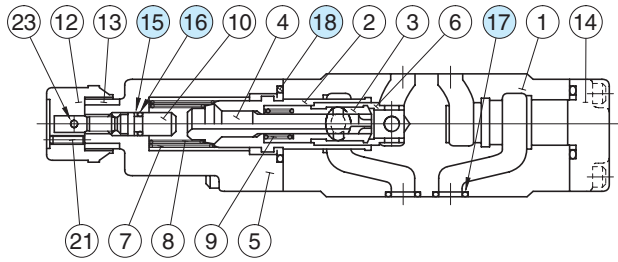
• For other dimensions, refer to "MFW-03" drawing above.

■ Spare Parts List

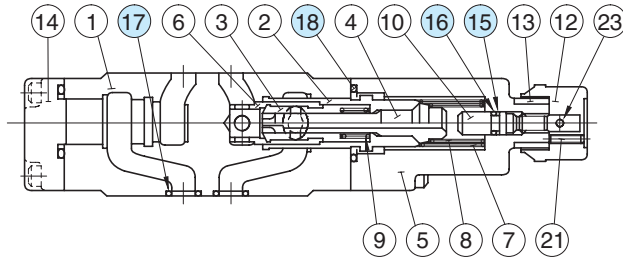
MFP-03-11



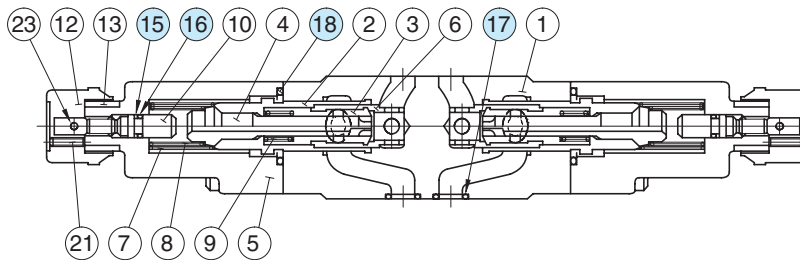
MFA-03-X_Y-11



MFB-03-X_Y-11



MFW-03-X_Y-11



● List of Seals

Item	Name of Parts	Part Numbers	Quantity			
			MFP-03	MFA-03	MFB-03	MFW-03
15	Back Up Ring	SO-BB-P6	1	1	1	2
16	O-Ring	SO-NA-P6	1	1	1	2
17	O-Ring	SO-NB-A014	5	5	5	5
18	O-Ring	SO-NB-P28	1	2	2	2

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
MFP-03	KS-MFP-03-10
MFA-03	KS-MFA-03-10
MFB-03	
MFW-03	KS-MFW-03-10

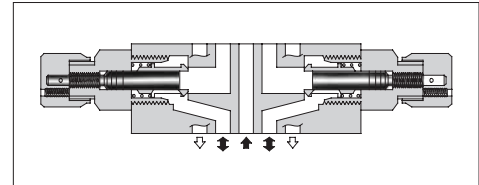
Note: When ordering seals, please specify the seal kit number from the table right.

Temperature Compensated Throttle and Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Differential Pressure MPa (PSI)	Max. Metred Flow L/min (U.S.GPM)	Min. Metred Flow L/min (U.S.GPM)	Max. Free Flow L/min (U.S.GPM)
MSTA-03-X-20 MSTB-03-X-20 MSTW-03-X-20	25 (3630)	25 (3630)	70 (18.5)	2 (.53) {1 (.26)}*	70 (18.5)

*The figures in parentheses are the values when the differential pressure is less than 3.5 MPa (510 PSI).



Model Number Designation

F-	MSTA	-03	-X	-20	*
Special Seals	Series Number	Valve Size	Direction of Flow	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSTA : Temperature Compensated Throttle and Check Valve for A-Line MSTB : Temperature Compensated Throttle and Check Valve for B-Line MSTW : Temperature Compensated Throttle and Check Valve for A&B-Lines	03	X : Metre-out	20	Refer to ★

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

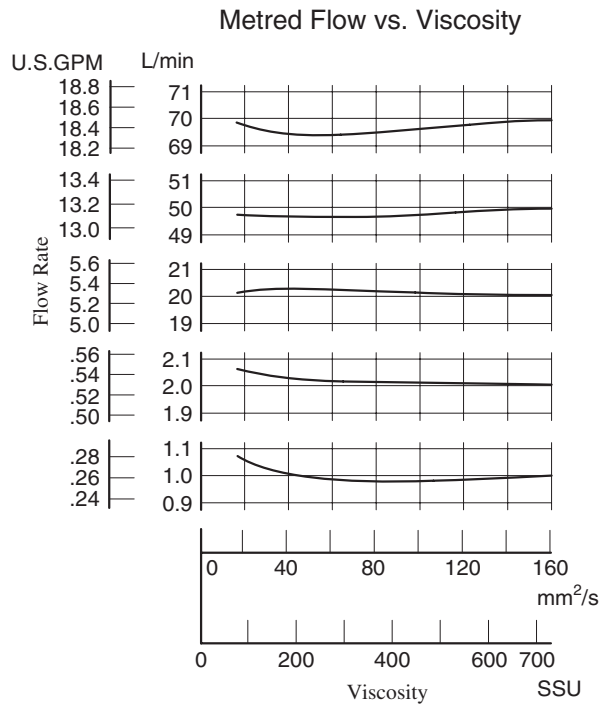
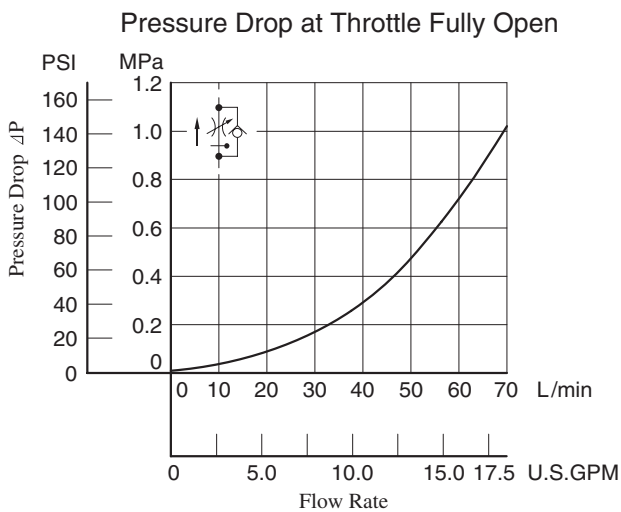
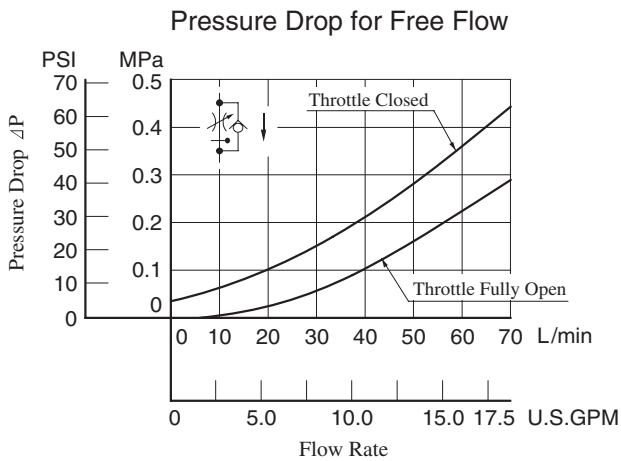
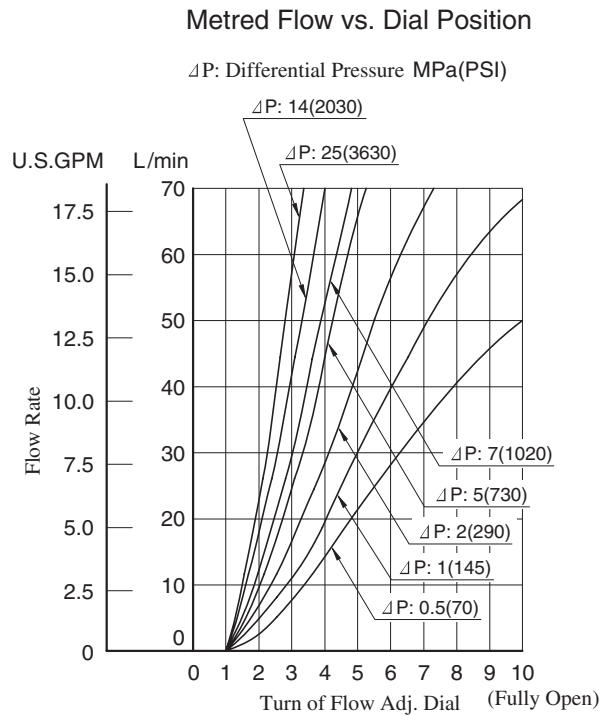
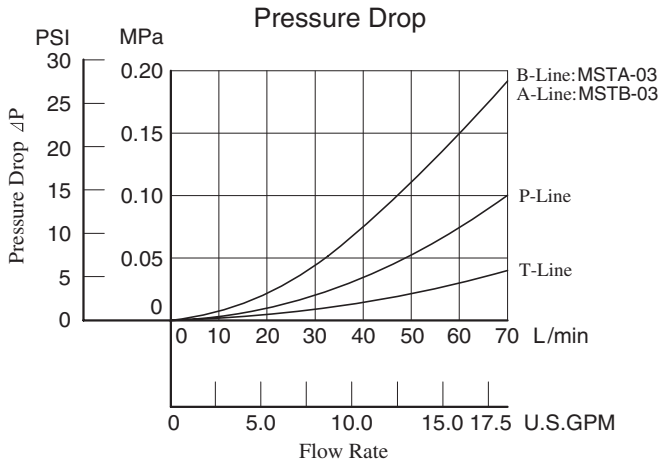
Instructions

- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

Model No.	Graphic Symbols	Detailed Graphic Symbols
	Metre-out	
MSTA-03-X		
MSTB-03-X		
MSTW-03-X		

Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



MSTW-03-X-20

**DIMENSIONS IN
MILLIMETRES (INCHES)**

Approx. Mass..... 3.7 kg (8.2 lbs.)

MSTA-03-X-20

Approx. Mass..... 3.5 kg (7.7 lbs.)

- For other dimensions, refer to "MSTW-03" drawing left.

MSTB-03-X-20

Approx. Mass..... 3.5 kg (7.7 lbs.)

- For other dimensions, refer to "MSTW-03" drawing left.

■ Spare Parts List

MSTA-03-X-20

MSTB-03-X-20

MSTW-03-X-20

- List of Seals

Item	Name of Parts	Part Numbers	Quantity		
			MSTA-03	MSTB-03	MSTW-03
12	Back Up Ring	900-VK411915-2	1	1	2
13	O-Ring	SO-NA-P7	1	1	2
14	O-Ring	SO-NB-A014	5	5	5
15	O-Ring	SO-NB-P24	2	2	2

Note: When ordering seals, please specify the seal kit number from the table right.

- List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
MSTA-03	KS-MSTA-03-20
MSTB-03	
MSTW-03	KS-MSTW-03-20

Throttle Modular Valves

Specifications

Model Number	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MSP-03-30	25 (3630)	70 (18.5) *

★ Maximum flow decreases when the differential pressure is less than 1 MPa (145 PSI).
See "Pressure Drop at Throttle Fully Open".

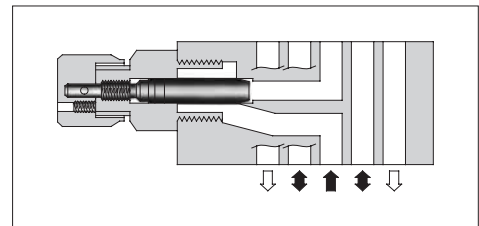
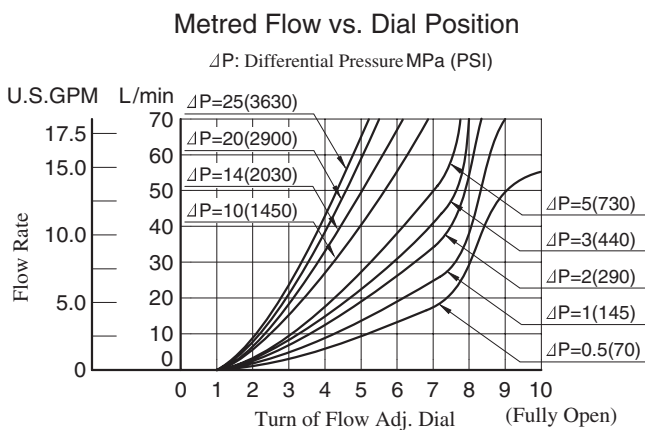
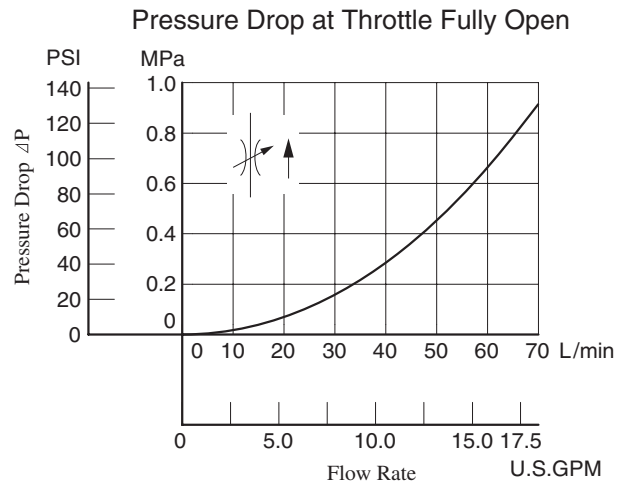
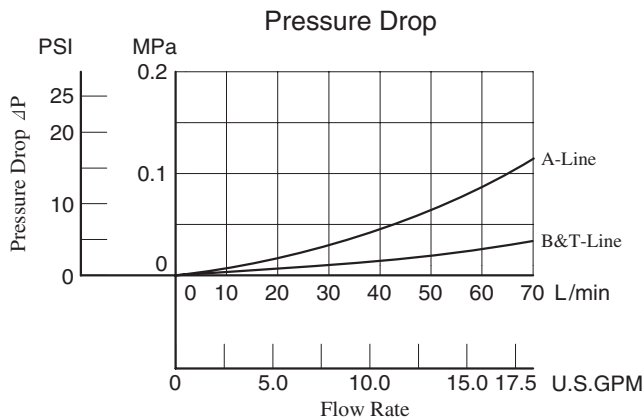
Model Number Designation

F-	MSP	-03	-30	*
Special Seals	Series Number	Valve Size	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSP : Throttle Valve for P-Line	03	30	Refer to ★

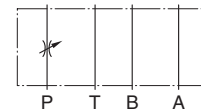
★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

Typical Performance Characteristics

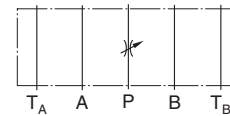
Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



Graphic Symbol



Detailed Graphic Symbol

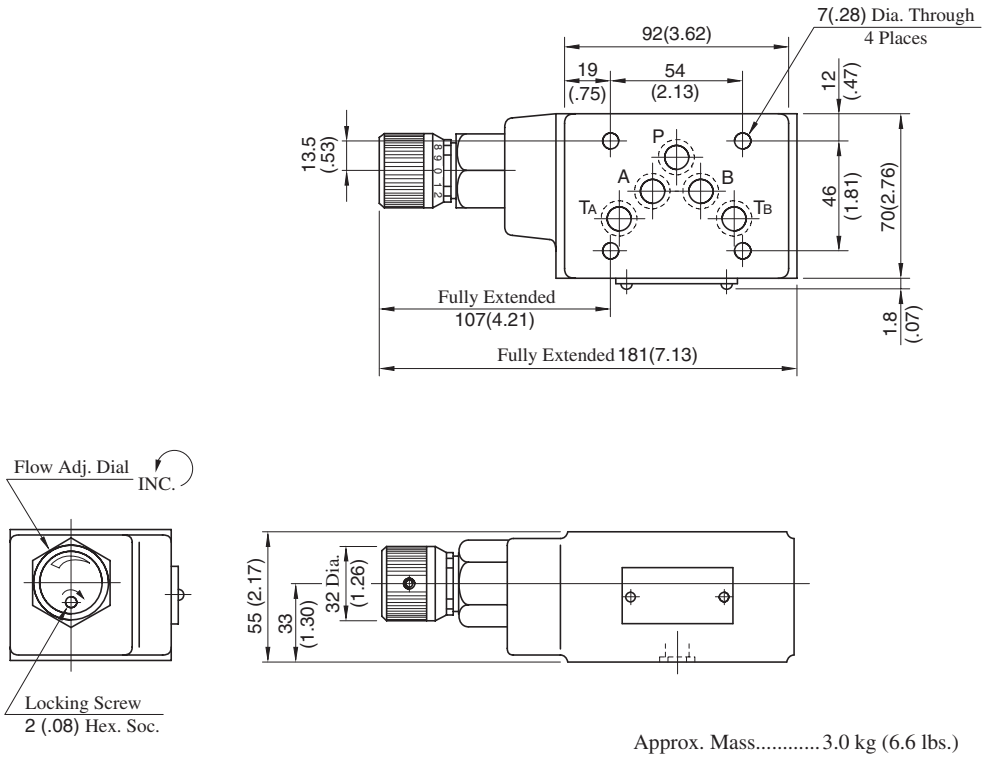


Instructions

- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

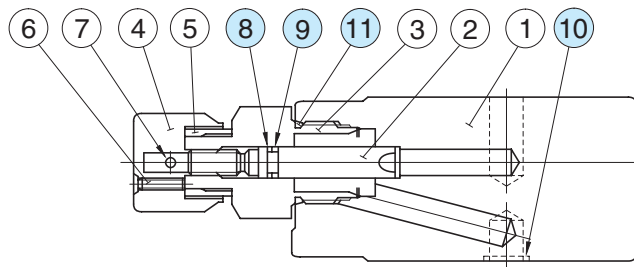
MSP-03-30

**DIMENSIONS IN
MILLIMETRES (INCHES)**



■ Spare Parts List

MSP-03-30



● List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
8	Back Up Ring	900-VK411915-2	1	Included in Seal Kit Kit No.: KS-MSP-03-30
9	O-Ring	SO-NA-P7	1	
10	O-Ring	SO-NB-A014	5	
11	O-Ring	SO-NB-P24	1	

Check and Throttle Modular Valves

Specifications

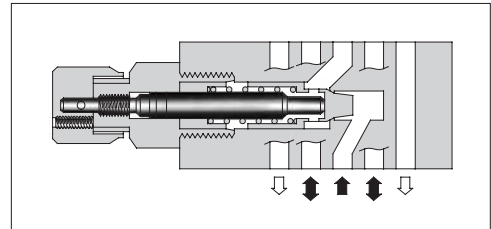
Model Number	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MSCP-03-20	25 (3630)	70 (18.5) *

★ Maximum flow decreases when the differential pressure is less than 1 MPa (145 PSI).
See "Pressure Drop at Throttle Fully Open".

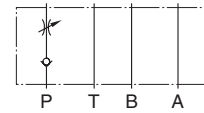
Model Number Designation

F-	MSCP	-03	-20	*
Special Seals	Series Number	Valve Size	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSCP : Check and Throttle Valve for P-Line	03	20	Refer to ★

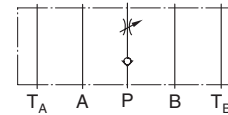
★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard



Graphic Symbol

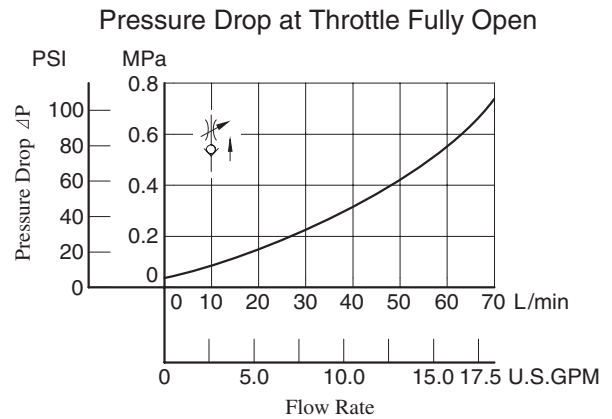
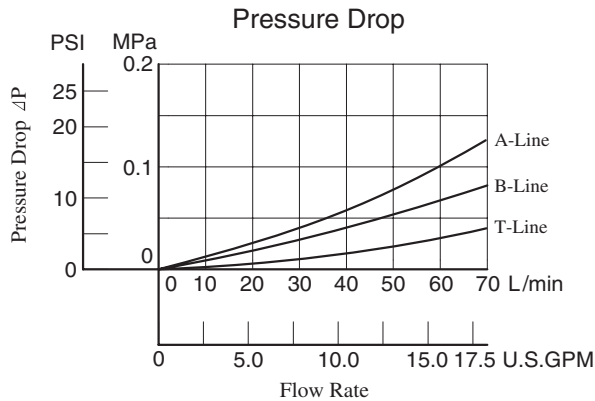


Detailed Graphic Symbol



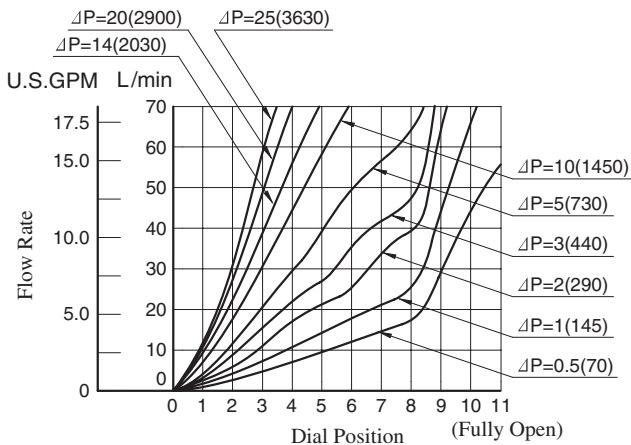
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



Metred Flow vs. Dial Position

ΔP: Differential Pressure MPa (PSI)

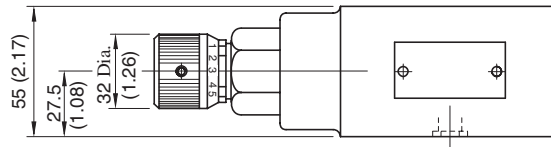
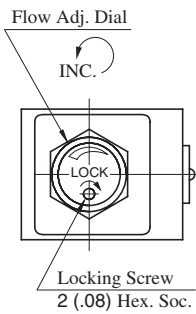
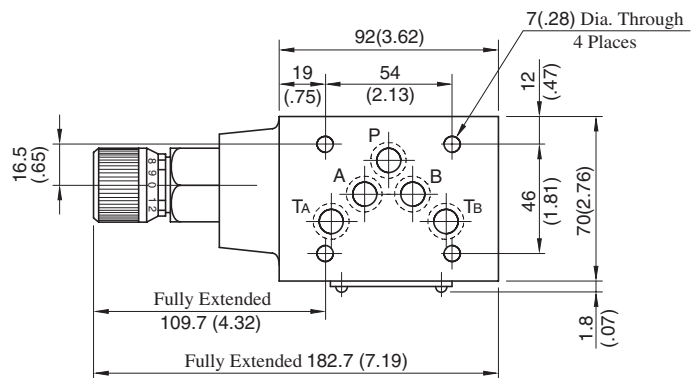


Instructions

- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

MSCP-03-20

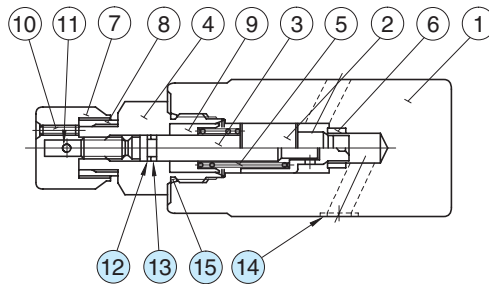
**DIMENSIONS IN
MILLIMETRES (INCHES)**



Approx. Mass..... 3.0 kg (6.6 lbs.)

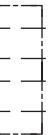
■ Spare Parts List

MSCP-03-20



● List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
12	Back Up Ring	900-VK411915-2	1	Included in Seal Kit Kit No.: KS-MSP-03-30
13	O-Ring	SO-NA-P7	1	
14	O-Ring	SO-NB-A014	5	
15	O-Ring	SO-NB-P24	1	

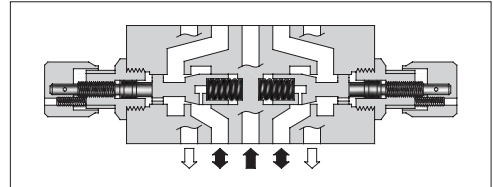


03 Series Modular Valves

Throttle and Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MSA-03-*-40 MSB-03-*-40 MSW-03-*-40	25 (3630)	120 (31.7)



Model Number Designation

F-	MSW	-03	-X	-40	*
Special Seals	Series Number	Valve Size	Direction of Flow	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSA : Throttle and Check Valve for A-Line MSB : Throttle and Check Valve for B-Line MSW : Throttle and Check Valve for A&B-Lines	03	X : Metre-out Y : Metre-in	40	Refer to ★

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

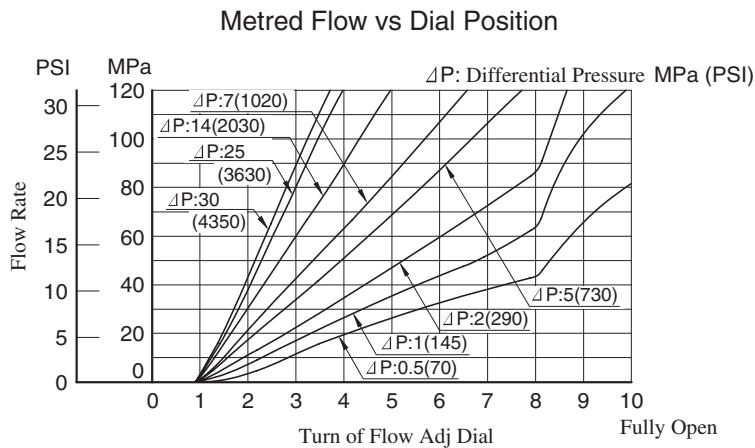
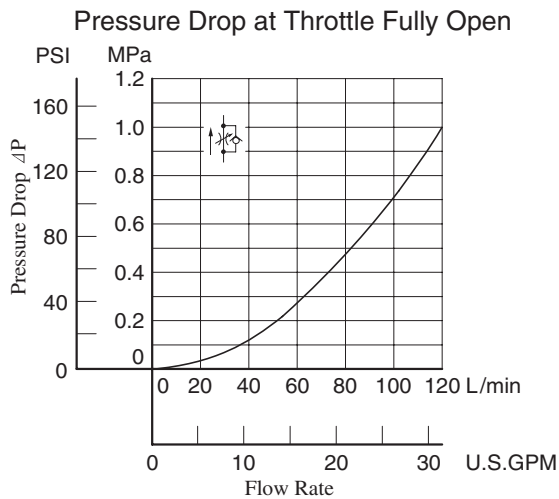
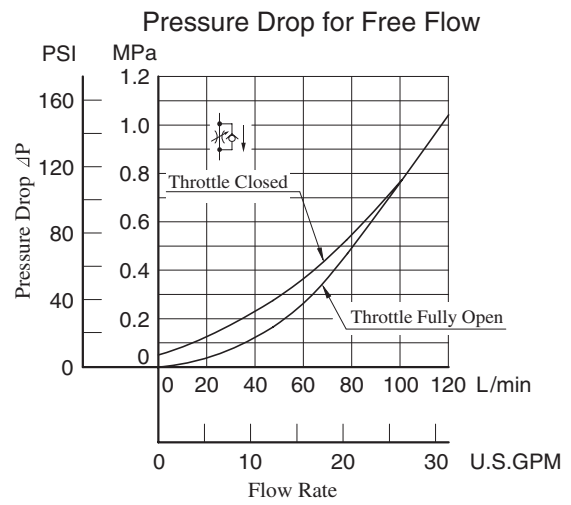
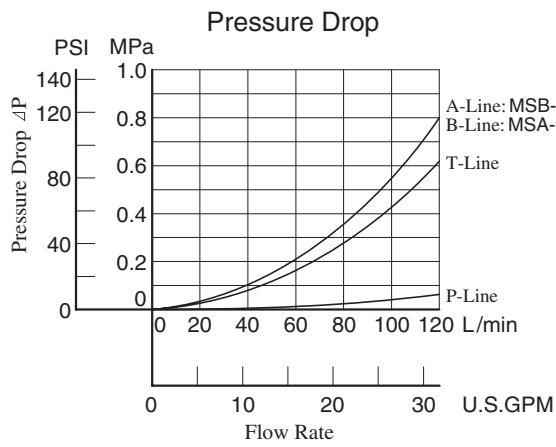
Instructions

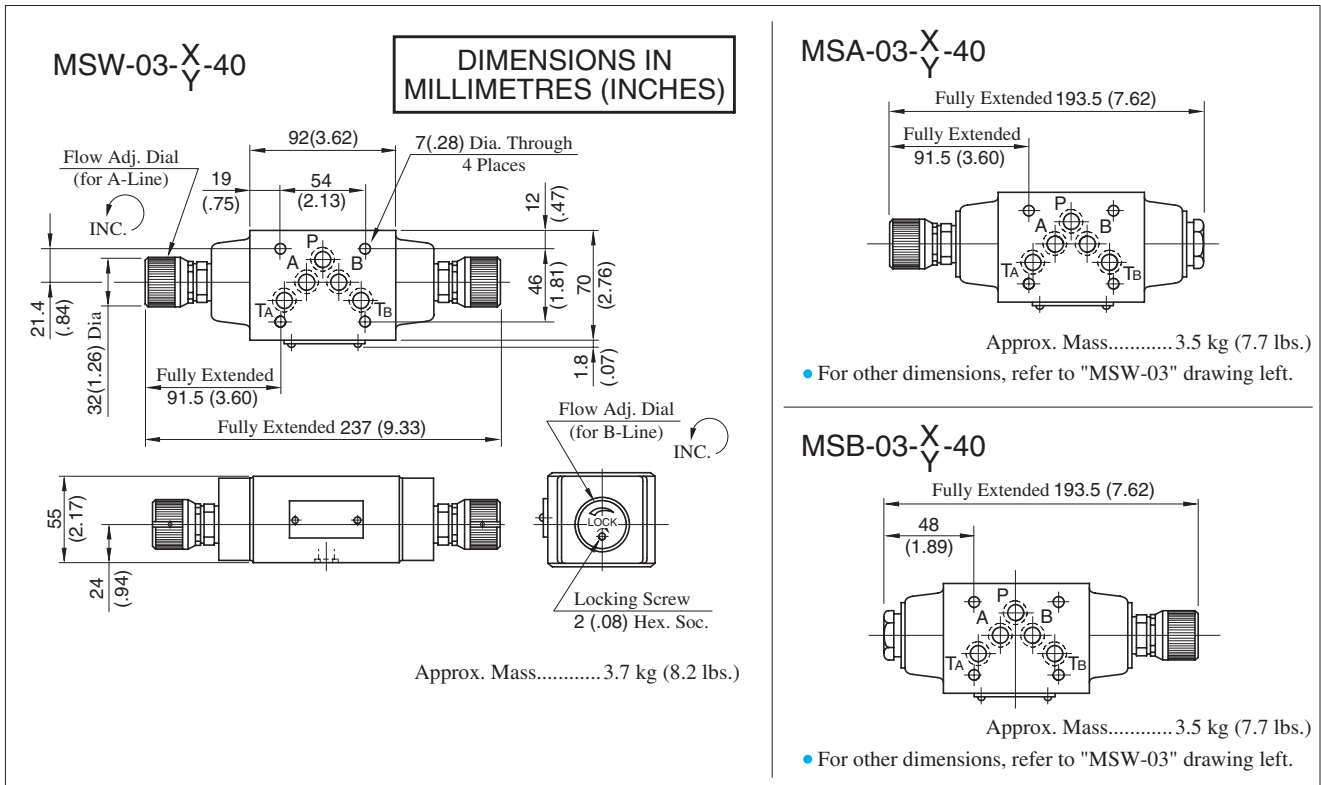
- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

Model No.	Graphic Symbols	Detailed Graphic Symbols	Model No.	Graphic Symbols	Detailed Graphic Symbols
	Metre-out			Metre-in	
MSA-03-X			MSA-03-Y		
MSB-03-X			MSB-03-Y		
MSW-03-X			MSW-03-Y		

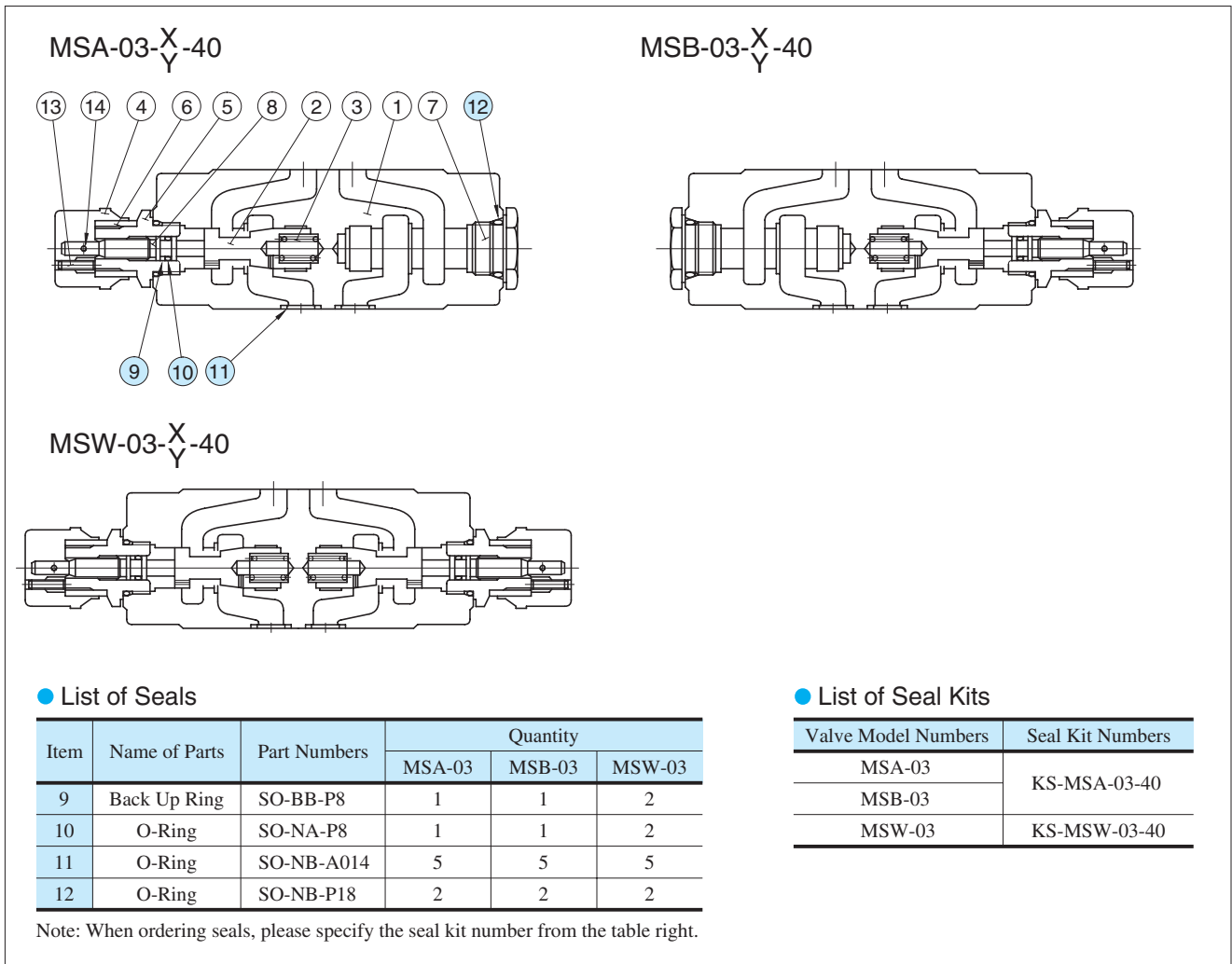
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850





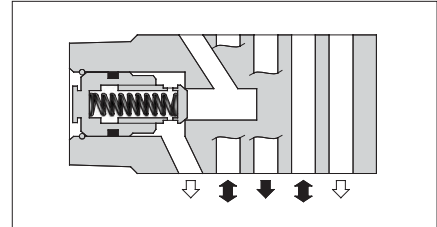
■ Spare Parts List



Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MCP-03-*-10 MCA-03-*-20 MCB-03-*-20 MCT-03-*-10	25 (3630)	70 (18.5)



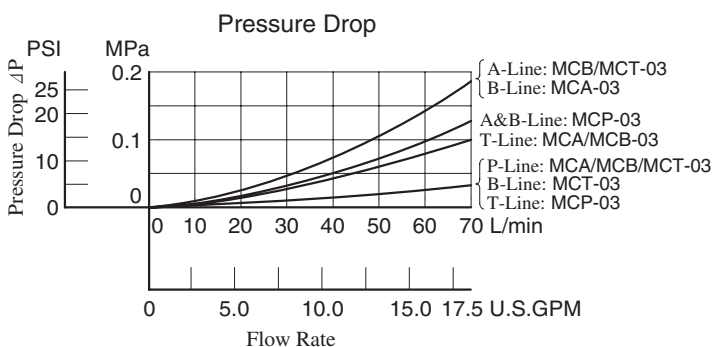
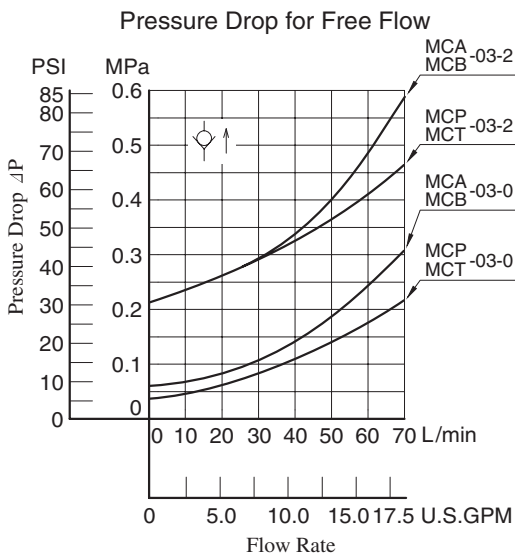
Model Number Designation

F-	MCP	-03	-0	-10	*
Special Seals	Series Number	Valve Size	Cracking Pressure MPa(PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MCP: Check Valve for P-Line	03	0: 0.035(5) 2: 0.2(29)	10	Refer to ★
	MCA: Check Valve for A-Line			20	
	MCB: Check Valve for B-Line			10	
	MCT: Check Valve for T-Line				

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



Model No.	Graphic Symbols	Detailed Graphic Symbols
MCP-03		
MCA-03		
MCB-03		
MCT-03		

Instructions

● Tank Line Used

Check valve function of MCT-03 is included in TA-Line. Therefore, the tank line for a circuit that uses this valve must be TA-line.

03 Series Modular Valves

MCP-03-*-10

Approx. Mass.....2.5 kg (5.5 lbs.)

MCA-03-*-20 MCB-03-*-20

Approx. Mass.....3.5 kg (7.7 lbs.)

MCT-03-*-10

(Check valve is included)

Approx. Mass.....2.8 kg (6.2 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

■ Spare Parts List

MCP-03-*-10

● List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
8	O-Ring	SO-NB-A014	5	Included in Seal Kit Kit No.: KS-MCP-03-10
9	O-Ring	SO-NB-P21	1	

MCT-03-*-10

● List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
7	O-Ring	SO-NB-A014	5	Included in Seal Kit Kit No.: KS-MCP-03-10
8	O-Ring	SO-NB-P21	1	

MCA-03-*-20

● List of Seals

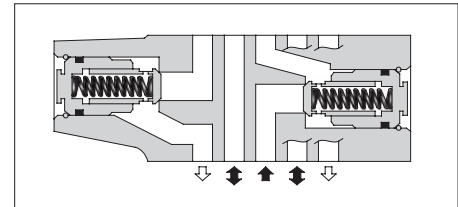
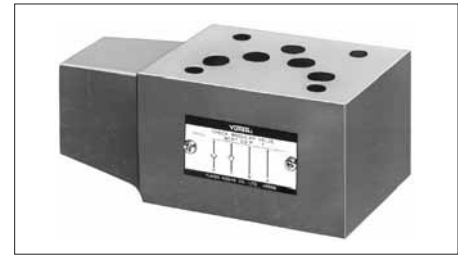
Item	Name of Parts	Part Numbers	Qty.	Remarks
6	O-Ring	SO-NB-A014	5	Included in Seal Kit Kit No.: KS-MCA-03-20
7	O-Ring	SO-NB-P24	2	

MCB-03-*-20

Check Modular Valves For "P&T" Lines

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MCPT-03-P*-T*-10	25 (3630)	70 (18.5)



Model Number Designation

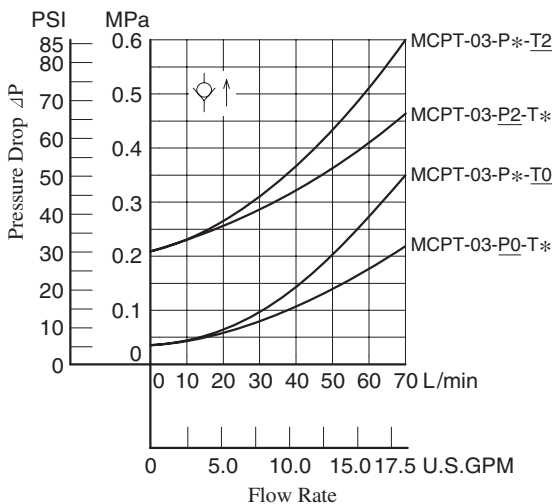
F-	MCPT	-03	-P0	-T0	-10	*
Special Seals	Series Number	Valve Size	Cracking Pres. of P-Line MPa(PSI)	Cracking Pres. of T-Line MPa(PSI)	Design Number	Design Standard
F : Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MCPT : Check Valve for P&T-Lines	03	P0 : 0.035(5) P2 : 0.2(29)	T0 : 0.035(5) T2 : 0.2(29)	10	Refer to ★

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

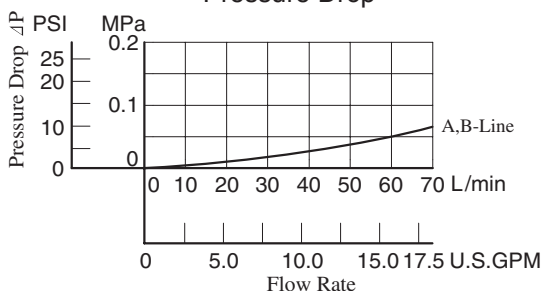
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850

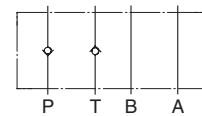
Pressure Drop for Free Flow



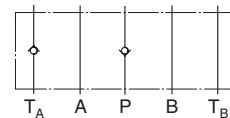
Pressure Drop



Graphic Symbol



Detailed Graphic Symbol

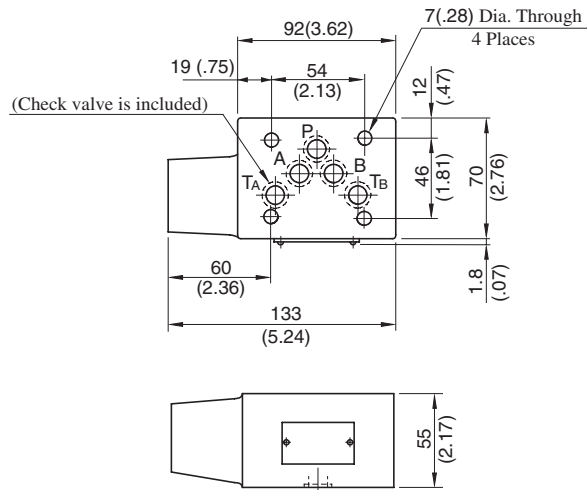


Instructions

● Tank Line Used

Check valve function of Tank Line is included in TA-Line. Therefore, the tank line for a circuit that uses this valve must be TA-line.

MCPT-03-P*-T*-10

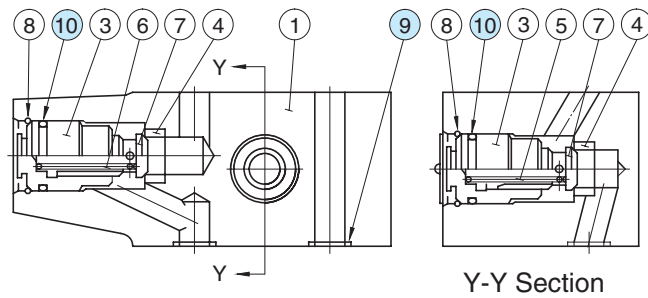


Approx. Mass.....2.7 kg (6.0 lbs.)

**DIMENSIONS IN
MILLIMETRES (INCHES)**

■ Spare Parts List

MCPT-03-P*-T*-10



● List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
9	O-Ring	SO-NB-A014	5	Included in Seal Kit
10	O-Ring	SO-NB-P21	2	Kit No.: KS-MCPT-03-10

Anti-Cavitation Modular Valves

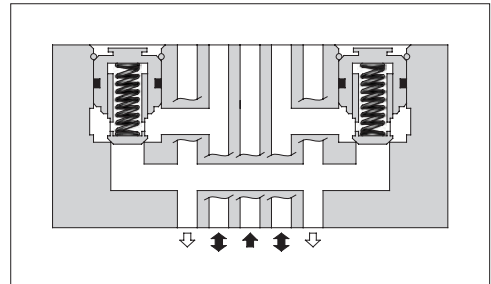
Specifications

Model Number	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MAC-03-10	25 (3630)	70 (18.5)

Model Number Designation

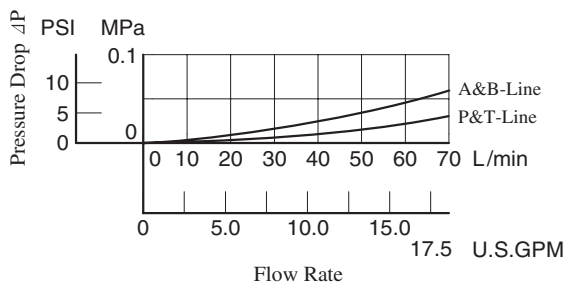
F-	MAC	-03	-10	*
Special Seals	Series Number	Valve Size	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MAC: Anti-Cavitation Valve	03	10	Refer to ★

★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

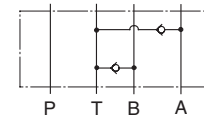


Pressure Drop

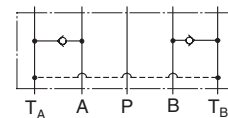
Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



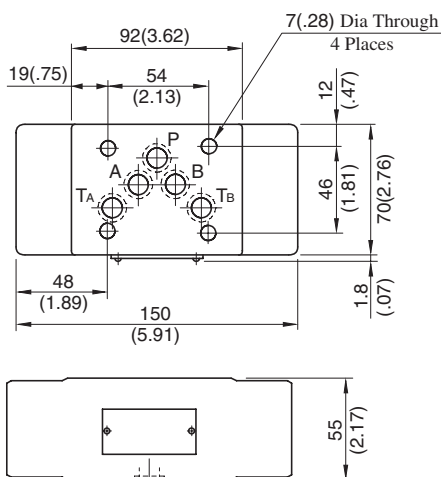
Graphic Symbol



Detailed Graphic Symbol



MAC-03-10

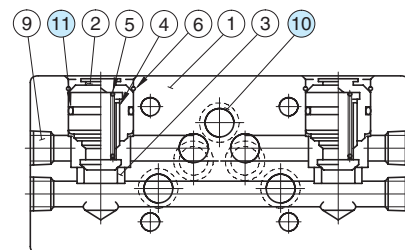


Approx. Mass.....3.8 kg (8.4 lbs.)

**DIMENSIONS IN
MILLIMETRES (INCHES)**

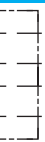
Spare Parts List

MAC-03-10



List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
10	O-Ring	SO-NB-A014	5	Included in Seal Kit
11	O-Ring	SO-NB-P21	2	Kit No.: KS-MAC-03-10



Pilot Operated Check Modular Valves

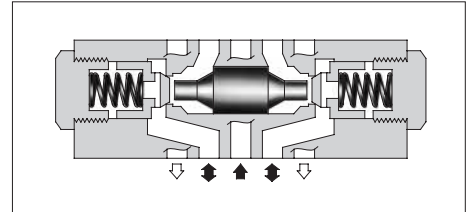
Specifications

Model Numbers		Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
Standard	MP*-03-*-20	25 (3630)	70 (18.5)
Low Pilot Pressure Control Type	MP*-03-*-2001		



Model Number Designation

F-	MPA	-03	-2	-20	*
Special Seals	Series Number	Valve Size	Cracking Pressure MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MPA : Pilot Operated Check Valve for A-Line MPB : Pilot Operated Check Valve for B-Line MPW : Pilot Operated Check Valve for A&B-Lines	03	2 : 0.2 (29) 4 : 0.4 (58)	20 (Standard) 2001 (Low Pilot Pressure Control Type)	Refer to ★

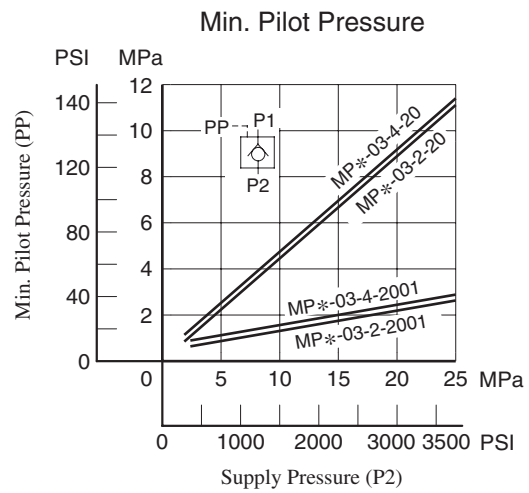
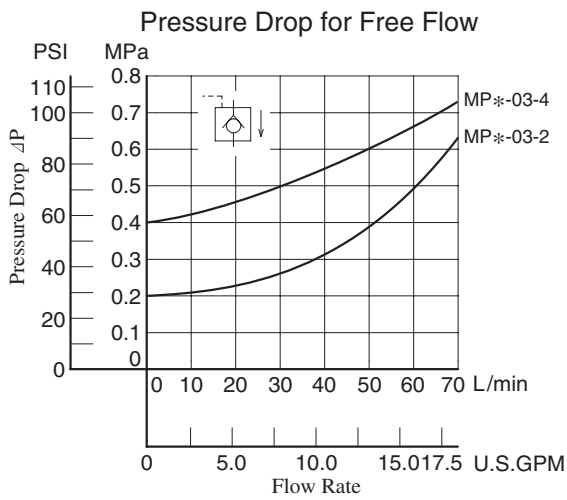
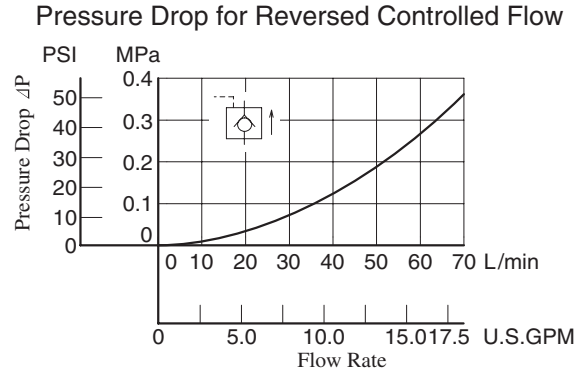
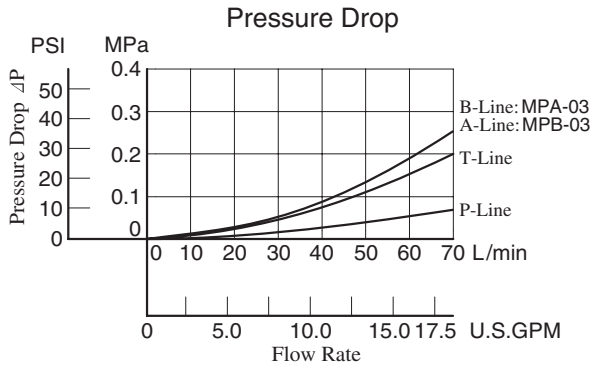


★ Design Standards: None Japanese Standard "JIS", European Design Standard and N. American Design Standard

Model No.	Graphic Symbols	Detailed Graphic Symbols
MPA-03		
MPB-03		
MPW-03		

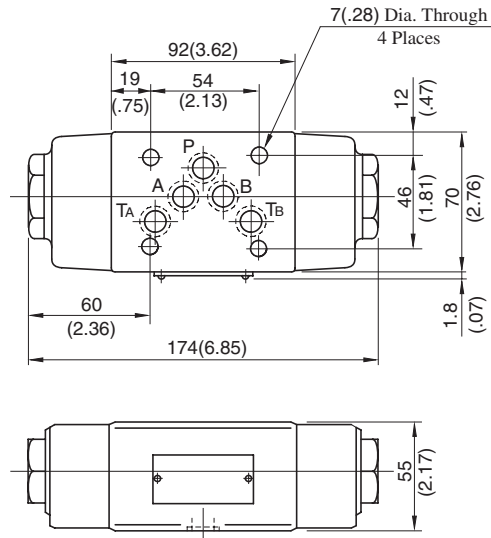
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



MPA-03-*-20/2001
 MPB-03-*-20/2001
 MPW-03-*-20/2001

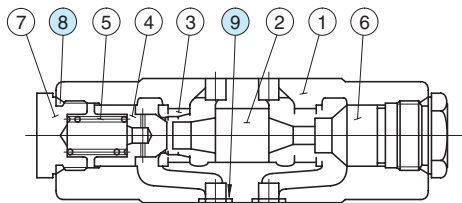
**DIMENSIONS IN
 MILLIMETRES (INCHES)**



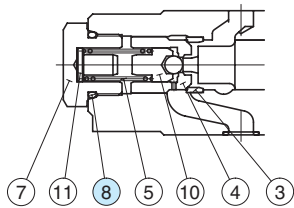
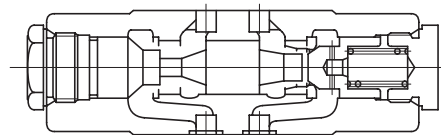
Approx. Mass..... 3.5 kg (7.7 lbs.)

■ Spare Parts List

MPA-03-*-20



MPB-03-*-20

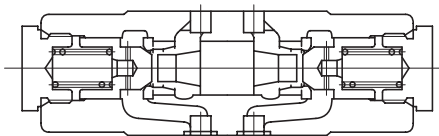


**Low Pilot Pressure Control Type
 (MPA-03-*-2001)**

● List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
8	O-Ring	SO-NB-P24	2	Included in Seal Kit
9	O-Ring	SO-NB-A014	5	Kit No.: KS-MPA-03-20

MPW-03-*-20



End Plates

Blocking plates are used for auxiliary mounting surfaces or for closing unnecessary circuit.

Bypass plates are used for one-way flow circuit that requires no solenoid operated directional valves.



Specifications

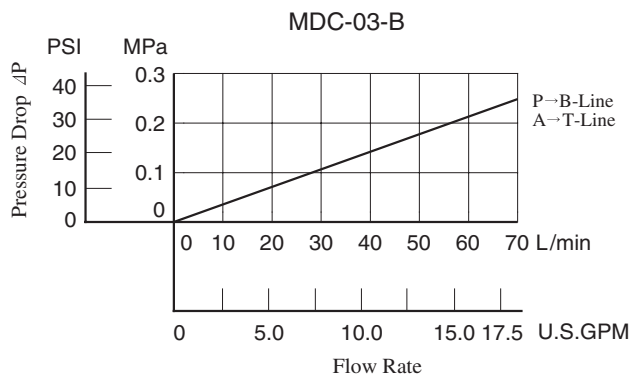
Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MDC-03-*-10	25 (3630)	70 (18.5)

Model Number Designation

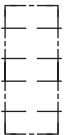
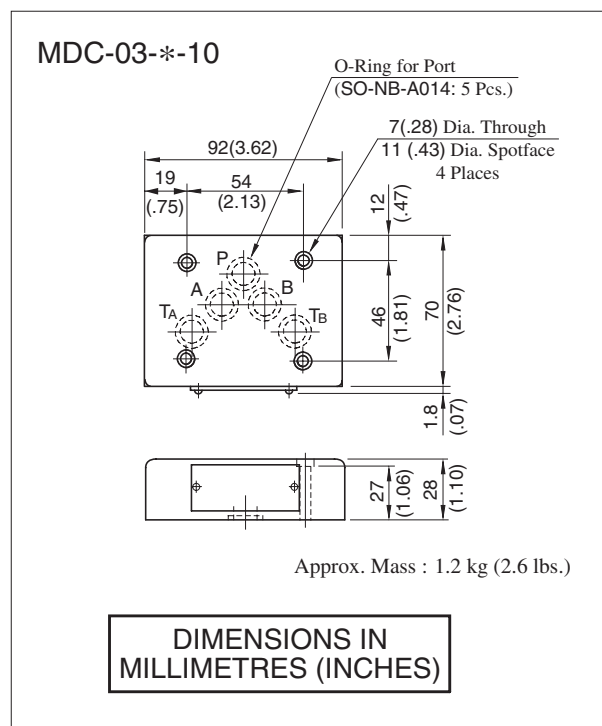
F-	MDC	-03	-A	-10	*
Special Seals	Series Number	Valve Size	Type of Plate	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MDC: End Plate	03	A: Blocking Plate B: Bypass Plate	10	None: Japanese Standard "JIS", European Design Standard and N. American Design Standard

Pressure Drop

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



Model No.	Graphic Symbols	Detailed Graphic Symbols
MDC-03-A		
MDC-03-B		



Connecting Plates

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MDS-03-10/1090	25 (3630)	70 (18.5)

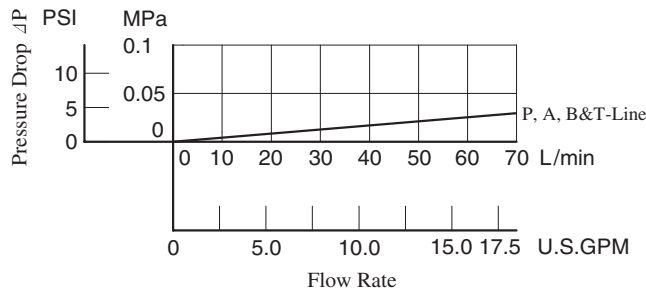


Model Number Designation

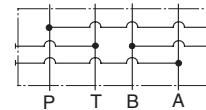
F-	MDS	-03	-10	*
Special Seals	Series Number	Valve Size	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MDS: Connecting Plate	03	10	None: Japanese Standard "JIS" and European design Standard 90: N.American Design Standard

Pressure Drop

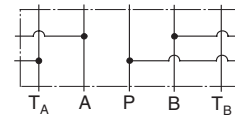
Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



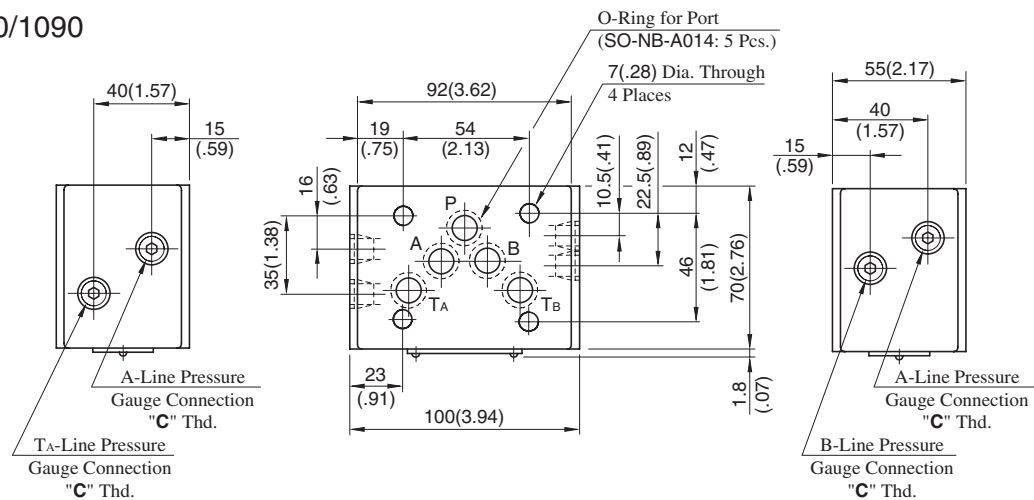
Graphic Symbol



Detailed Graphic Symbol



MDS-03-10/1090



Approx. Mass.....2.5 kg (5.5 lbs.)

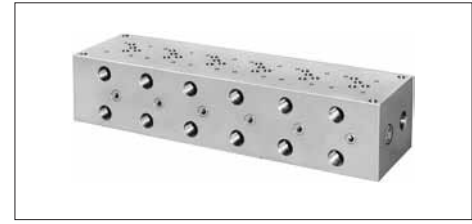
Model Numbers	Thread Size "C" Thd.
MDS-03-10	Rc 1/4 = 1/4 BSP.Tr
MDS-03-1090	1/4 NPT

**DIMENSIONS IN
MILLIMETRES (INCHES)**

Base Plates For Modular Valves

Specifications

Max. Operating Pressure ----- 25 MPa (3630 PSI)

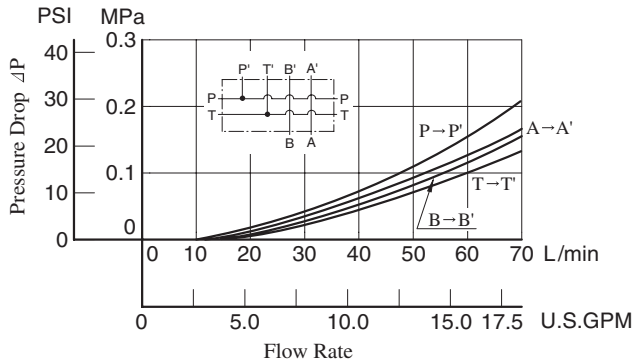


Model Number Designation

MMC	-03	-T	-6	-21	*	
Series Number	Plate Size	Type of Connection	Number of Stations	Design Number	Design Standard	
MMC : Base Plate	03	T : Threaded Connection	1: 1 Station 2: 2 Stations 3: 3 Stations 4: 4 Stations	5: 5 Stations 6: 6 Stations 7: 7 Stations	21	None: Japanese Standard "JIS" 80: European Design Standard 90: N.American Design Standard

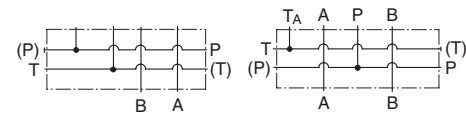
Pressure Drop

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



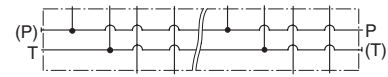
Graphic Symbol

Detailed Graphic Symbol



MMC-03-T-1

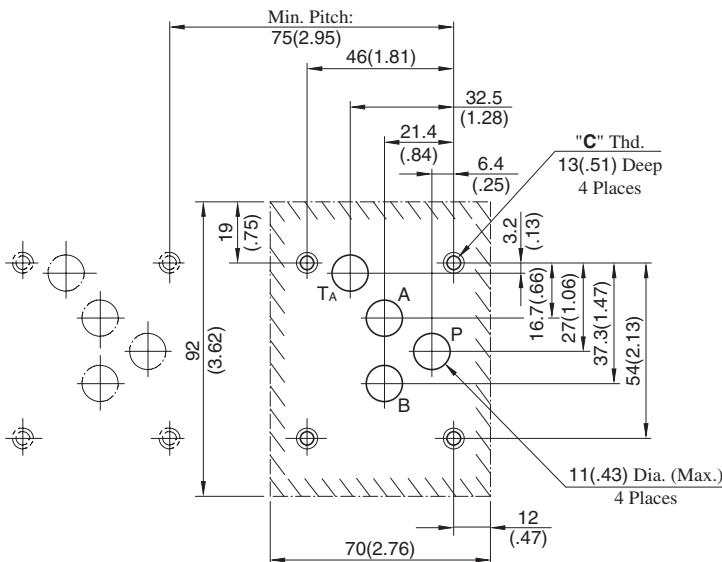
Graphic Symbol



MMC-03-T-2-7

Mounting Surface Dimensions for 3/8 Modular Valve

When the standard base plate (MMC-03) is not used, the following mounting surface must be prepared. Also, the mounting surface must have a good machined finish.



Instructions

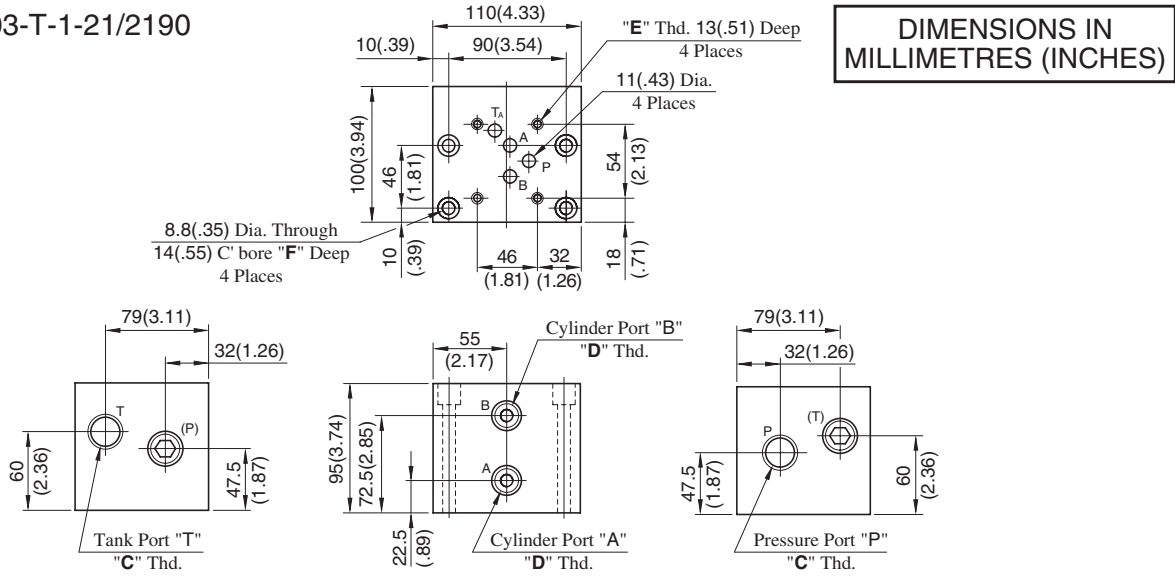
- Although two ports are provided for both **pressure port "P"** and **tank port "T"**, either may be used.

However, the ports having (P) or (T) in the drawing are normally plugged. Remove the plugs of the ports when they are used. Make sure that the ports that are not currently used are properly plugged.

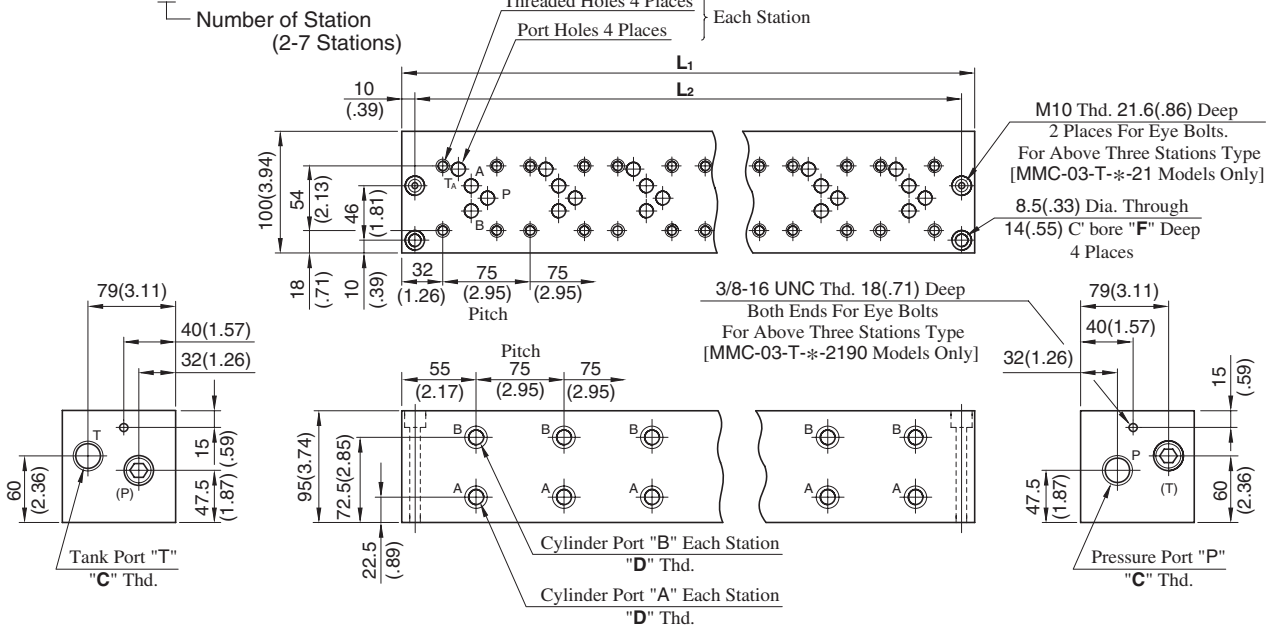
DIMENSIONS IN MILLIMETRES (INCHES)

Design Std.	"C" Thd.
Japanese Standard "JIS" and European Design Standard	M6
N.American Design Standard	1/4-20 UNC

MMC-03-T-1-21/2190



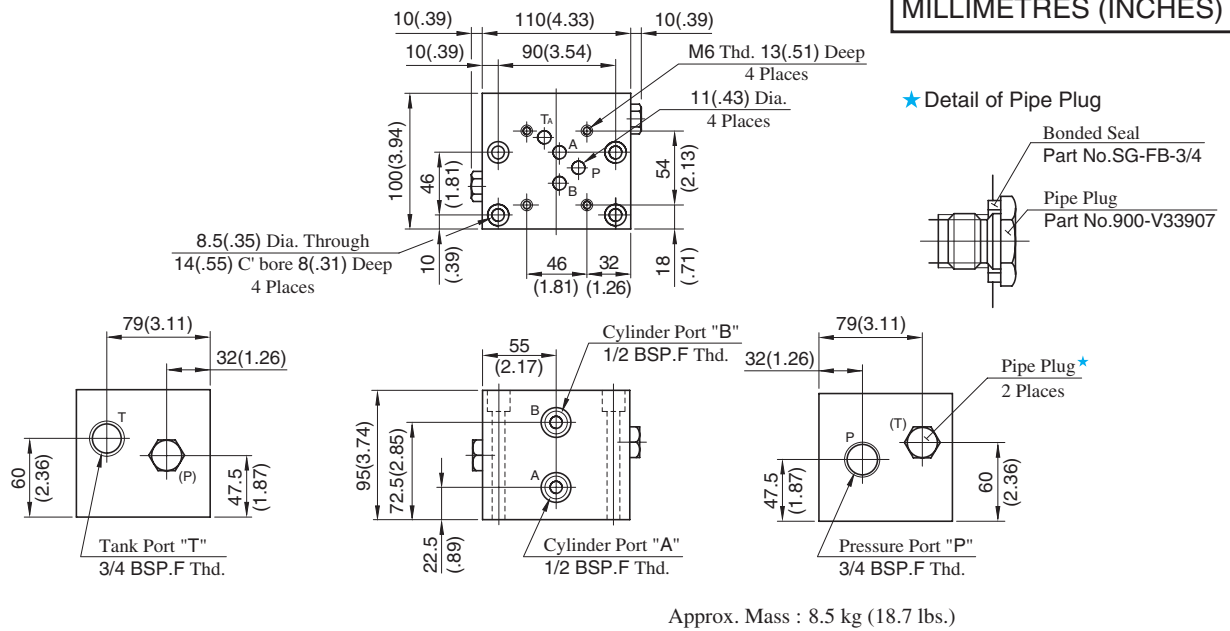
MMC-03-T-*21/2190



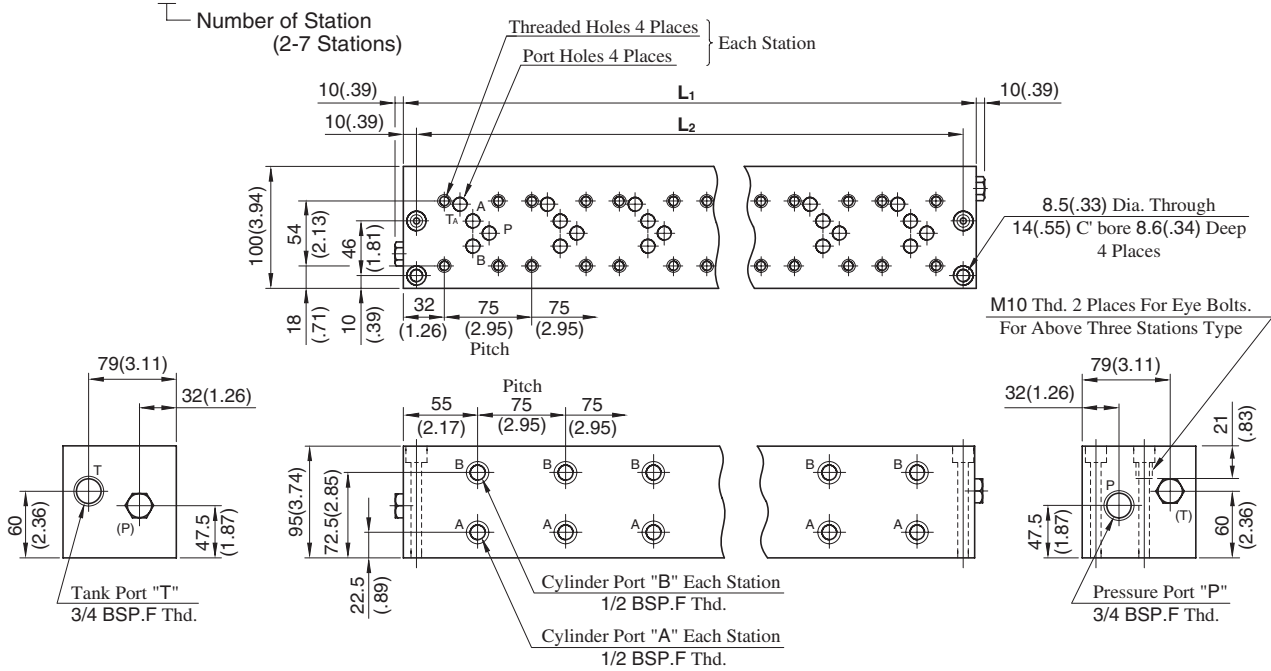
• For other dimensions, refer to above Model MMC-03-T-1.

Model Numbers	Thread Size			Dimensions mm (Inches)			Approx. Mass kg (lbs.)
	"C" Thd.	"D" Thd.	"E" Thd.	F	L ₁	L ₂	
MMC-03-T-1-21	Rc 3/4	Rc 1/2	M6	8.6 (.34)	—	—	8.5 (18.7)
MMC-03-T-1-2190	3/4 NPT	1/2 NPT	1/4-20 UNC	22 (.87)	—	—	
MMC-03-T-2-21	Rc 3/4	Rc 1/2	M6	8.6 (.34)	185	165	14 (30.9)
MMC-03-T-2-2190	3/4 NPT	1/2 NPT	1/4-20 UNC	22 (.87)	(7.28)	(6.50)	
MMC-03-T-3-21	Rc 3/4	Rc 1/2	M6	8.6 (.34)	260	240	19.5 (43.0)
MMC-03-T-3-2190	3/4 NPT	1/2 NPT	1/4-20 UNC	22 (.87)	(10.24)	(9.45)	
MMC-03-T-4-21	Rc 3/4	Rc 1/2	M6	8.6 (.34)	335	315	25 (55.1)
MMC-03-T-4-2190	3/4 NPT	1/2 NPT	1/4-20 UNC	22 (.87)	(13.19)	(12.40)	
MMC-03-T-5-21	Rc 3/4	Rc 1/2	M6	8.6 (.34)	410	390	30.5 (67.3)
MMC-03-T-5-2190	3/4 NPT	1/2 NPT	1/4-20 UNC	22 (.87)	(16.14)	(15.35)	
MMC-03-T-6-21	Rc 3/4	Rc 1/2	M6	8.6 (.34)	485	465	36 (79.4)
MMC-03-T-6-2190	3/4 NPT	1/2 NPT	1/4-20 UNC	22 (.87)	(19.09)	(18.31)	
MMC-03-T-7-21	Rc 3/4	Rc 1/2	M6	8.6 (.34)	560	540	41 (90.4)
MMC-03-T-7-2190	3/4 NPT	1/2 NPT	1/4-20 UNC	22 (.87)	(22.05)	(21.26)	

MMC-03-T-1-2180



MMC-03-T-*2180



• For other dimensions, refer to above Model MMC-03-T-1.

Model Numbers	Dimensions mm (Inches)		Approx. Mass kg (lbs.)
	L ₁	L ₂	
MMC-03-T-2-2180	185 (7.28)	165 (6.50)	14 (30.9)
MMC-03-T-3-2180	260 (10.24)	240 (9.45)	19.5 (43.0)
MMC-03-T-4-2180	335 (13.19)	315 (12.40)	25 (55.1)
MMC-03-T-5-2180	410 (16.14)	390 (15.35)	30.5 (67.3)
MMC-03-T-6-2180	485 (19.09)	465 (18.31)	36 (79.4)
MMC-03-T-7-2180	560 (22.05)	540 (21.26)	41 (90.4)

Mounting Bolt Kits For Modular Valves

Valves are mounted with four stud bolts. Valve combination varies according to the circuit type. Hence, the mounting bolt kits are available on a combination type basis. When ordering the mounting bolt kit, be sure to give the bolt kit model number from the table below.



Model Number Designation

MBK	-03	-04	-10	*
Series Number	Size of Modular Valve	Bolt Number	Design Number	Design Standard
MBK: Mounting Bolt Kits for Modular Valve	03	01, 02, 03, 04, 05 (Refer to the following chart)	10	Refer to ★

★ Design Standards: None Japanese Standard "JIS" and European Design Standard 90 N. American Design Standard

Bolt Kit Composition

Stud Bolt ----- 4 Pcs. } 1 Set
Nut ----- 4 Pcs. }

Note: In case of bolt kit model number having "05", four hexagon socket head cap screws only.

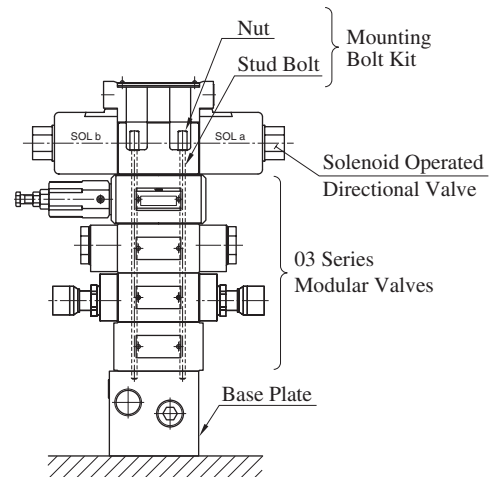
Tightening Torque:

12-15 Nm (106-133 IN. lbs.)

Bolt Kits Selection Chart

Model Numbers	Quantity of valves to be stacked			Approx. Mass g (lbs.)
	Solenoid Operated Directional Valve (*-DSG-03)	End Plate (MDC-03)	Modular Valve & Connecting Plate	
MBK-03-01-10*	1	0	1	120(.26)
	0	1		
MBK-03-02-10*	1	0	2	160(.35)
	0	1		
MBK-03-03-10*	1	0	3	200(.44)
	0	1		
MBK-03-04-10*	1	0	4	240(.53)
	0	1		
MBK-03-05-10*	1★	0	0	40(.09)
	0	1		

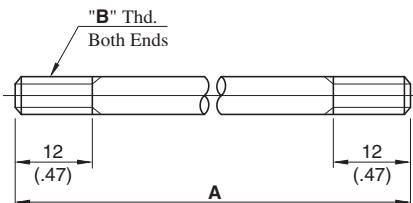
★ The solenoid operated directional valve comes with mounting bolts.



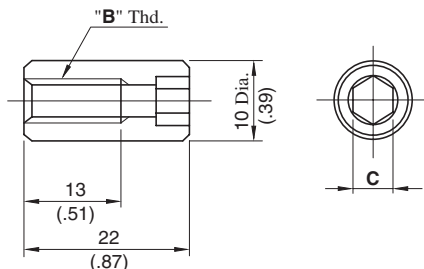
Stacking Example

MBK-03-*-10/1090

Stud Bolt

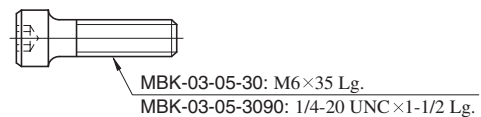


Nut



MBK-03-05-10/1090

Socket Head Cap Screw



DIMENSIONS IN MILLIMETRES (INCHES)

Model Numbers	A mm (In.)	"B" Thd.	C
MBK-03-01-10	103 (4.06)	M6	5 (.20)
MBK-03-02-10	158 (6.22)		
MBK-03-03-10	213 (8.39)		
MBK-03-04-10	268 (10.55)		
MBK-03-01-1090	103 (4.06)	1/4-20 UNC	4.76 (3/16)
MBK-03-02-1090	158 (6.22)		
MBK-03-03-1090	213 (8.39)		
MBK-03-04-1090	268 (10.55)		

3/4 Modular Valves

Type of Modular Valve


Class	Model Numbers	Graphic Symbols	Page	Class	Model Numbers	Graphic Symbols	Page
Pressure Control Valves	Solenoid Controlled Pilot Operated Directional Valve (S-)DSHG-06-***-*-53/5390		381	Directional Control Valves	Pilot Operated Check Valves (for "A-Line", Internal Pilot-) Internal Drain Type MPA-06-**-30/3090		626
	Reducing Valves (for "P-Line") MRP-06-**-30/3090		620		Pilot Operated Check Valves (for "A-Line", External Pilot-) External Drain Type MPA-06-**-X-30/3090		626
	Reducing Valves (for "A-Line") MRA-06-**-30/3090		620		Pilot Operated Check Valves (for "A-Line", External Pilot-) Internal Drain Type MPA-06-**-Y-30/3090		626
Reducing Valves (for "B-Line") MRB-06-**-30/3090		620	Pilot Operated Check Valves (for "B-Line", Internal Pilot-) Internal Drain Type MPB-06-**-30/3090			626	
Flow Control Valves	Throttle and Check Valves (for "A-Line", Metre-out) MSA-06-X-30/3090		623		Pilot Operated Check Valves (for "B-Line", External Pilot-) External Drain Type MPB-06-**-X-30/3090		626
	Throttle and Check Valves (for "A-Line", Metre-in) MSA-06-Y-30/3090		623		Pilot Operated Check Valves (for "B-Line", External Pilot-) Internal Drain Type MPB-06-**-Y-30/3090		626
	Throttle and Check Valves (for "B-Line", Metre-out) MSB-06-X-30/3090		623		Pilot Operated Check Valves (for "A&B-Lines", Internal Pilot-) Internal Drain Type MPW-06-**-30/3090		626
	Throttle and Check Valves (for "B-Line", Metre-in) MSB-06-Y-30/3090		623		Mounting Bolts Bolt Kits MBK-06-**-30/3090		630
	Throttle and Check Valves (for "A&B-Lines", Metre-out) MSW-06-X-30/3090		623			<p>★ Because drain ports "V" and "W" are not provided for solenoid controlled pilot operated directional valves of Pressure Centred Type (3H*) and models with Pilot Piston (P*), those valves cannot be used in combination with modular valves.</p>	
	Throttle and Check Valves (for "A&B-Lines", Metre-in) MSW-06-Y-30/3090		623				

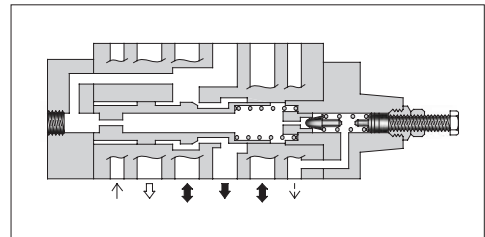
Reducing Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa(PSI)	Max. Flow* L/min (U.S.GPM)
MR*-06-A-30/3090	25 (3630)	125 (33)
MR*-06-C-30/3090 B H		500 (132)

★ In the pressure adjustment ranges "A" and "B", maximum flow rates are limited by the pressure setting on the secondary side.

Referring to the secondary pressure vs. maximum flow characteristics on the following page, use the valve at the maximum flow rate within a zone highlighted with .



Model Number Designation

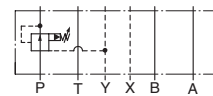
F-	MRP	-06	-B	-30	*
Special Seals	Series Number	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MRP: Reducing Valve for P-Line MRA: Reducing Valve for A-Line MRB: Reducing Valve for B-Line	06	A: 0.7-7 (100-1020) B: 1.5-7 (220-1020) C: 3.5-14 (510-2030) H: 7-21 (1020-3050)	30	Refer to ★

★ Design Standards: None Japanese Standard "JIS" and European Design Standard
90 N. American Design Standard

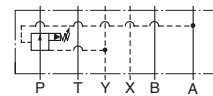
Instructions

- Connect **Drain Line (Y port)** to oil tank independently so as to obtain stable pressure setting. At the same time, the solenoid controlled pilot operated directional valve to be used in combination with this valve must be of internal drain type (with T).
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.

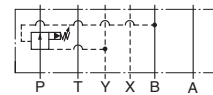
Graphic Symbols



MRP-06



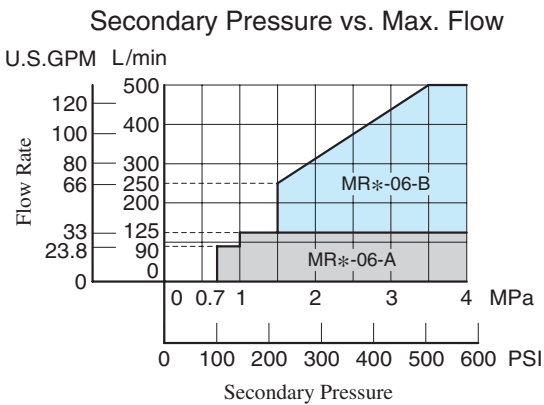
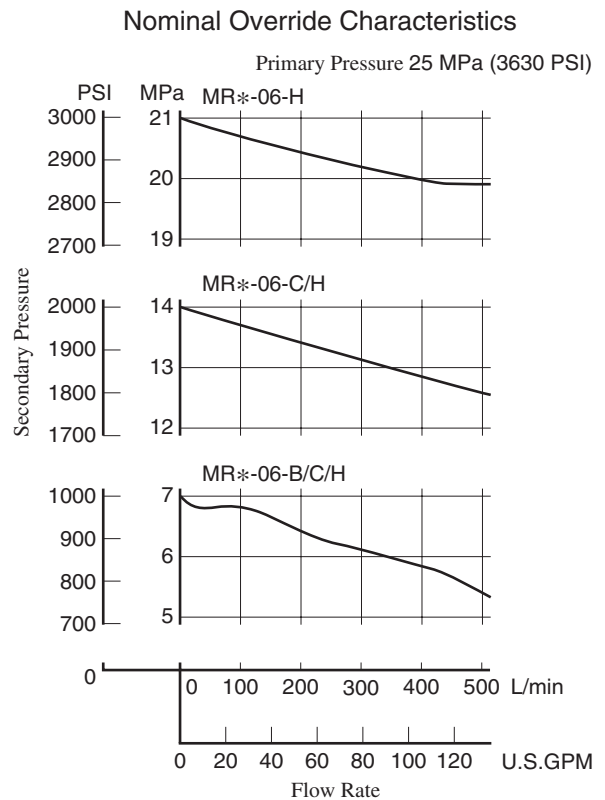
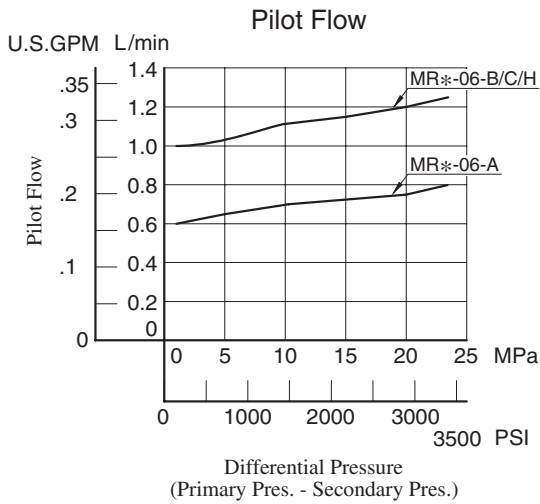
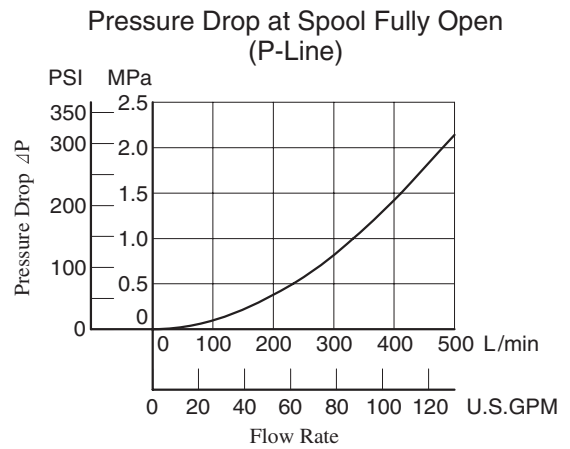
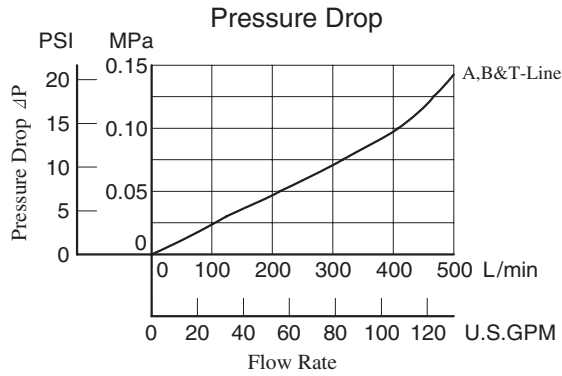
MRA-06



MRB-06

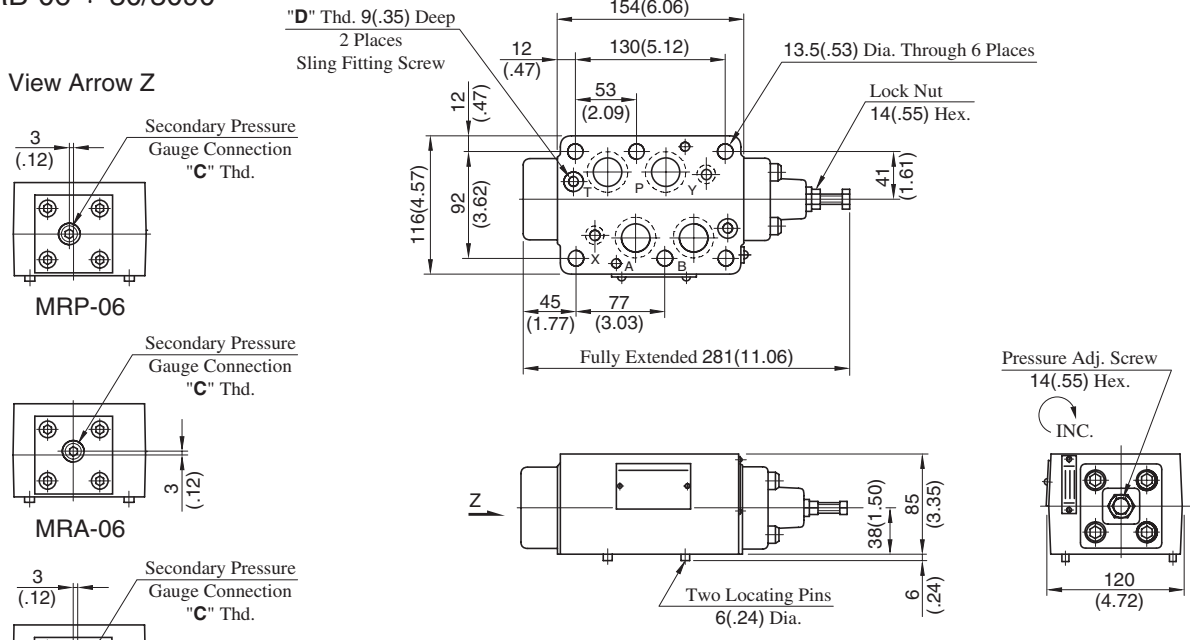
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



MRP-06-*-30/3090
 MRA-06-*-30/3090
 MRB-06-*-30/3090

**DIMENSIONS IN
 MILLIMETRES (INCHES)**

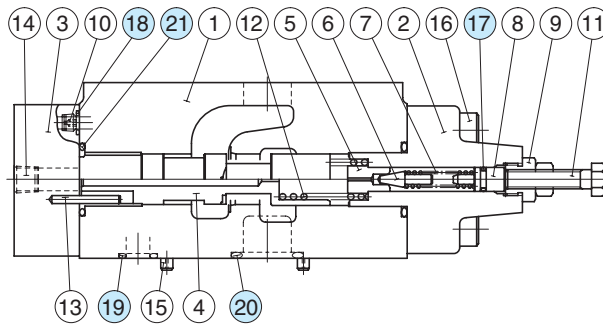


Approx. Mass..... 11.1 kg (24.5 lbs.)

Model Numbers	Thread Size	
	"C" Thd.	"D" Thd.
MR*-06-*-30	Rc 1/4 = 1/4 BSP.Tr	M8
MR*-06-*-3090	1/4 NPT	5/16-18 UNC

■ Spare Parts List

MRP-06-*-30/3090
 MRA-06-*-30/3090
 MRB-06-*-30/3090



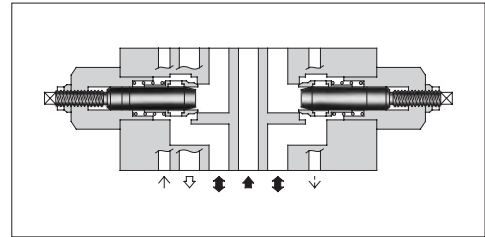
● List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
17	O-Ring	SO-NA-P9	1	Included in Seal Kit Kit No.: KS-MRP-06-10
18	O-Ring	SO-NB-P9	5	
19	O-Ring	SO-NB-P14	2	
20	O-Ring	SO-NB-P28	4	
21	O-Ring	SO-NB-P30	2	

Throttle and Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MSA-06-*-30/3090 MSB-06-*-30/3090 MSW-06-*-30/3090	25 (3630)	500 (132)



Model Number Designation

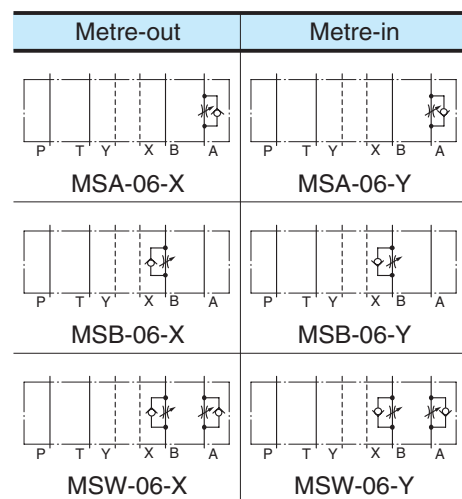
F-	MSW	-06	-X	-30	*
Special Seals	Series Number	Valve Size	Direction of Flow	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSA : Throttle and Check Valve for A-Line MSB : Throttle and Check Valve for B-Line MSW : Throttle and Check Valve for A&B-Lines	06	X : Metre-out Y : Metre-in	30	Refer to ★

★ Design Standards: None Japanese Standard "JIS" and European Design Standard 90 N. American Design Standard

Instructions

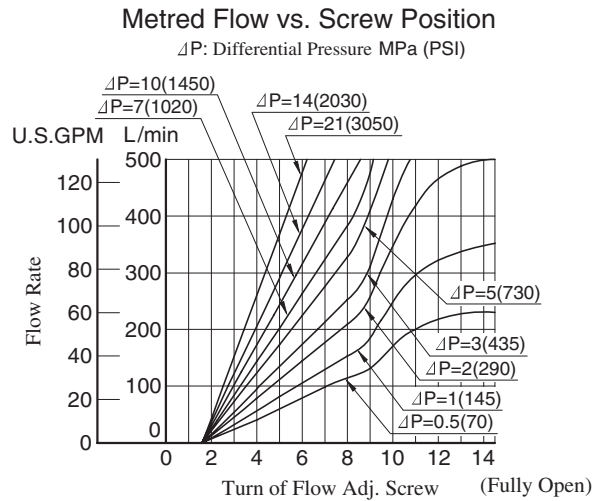
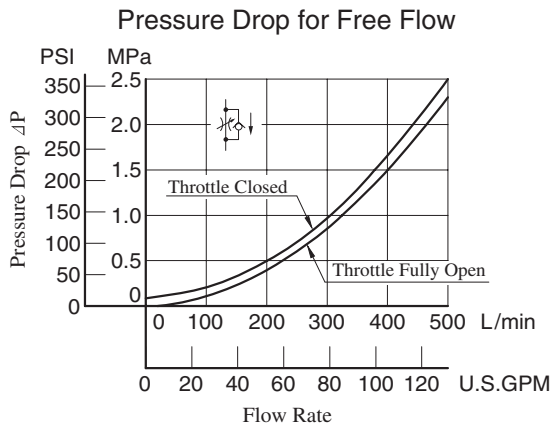
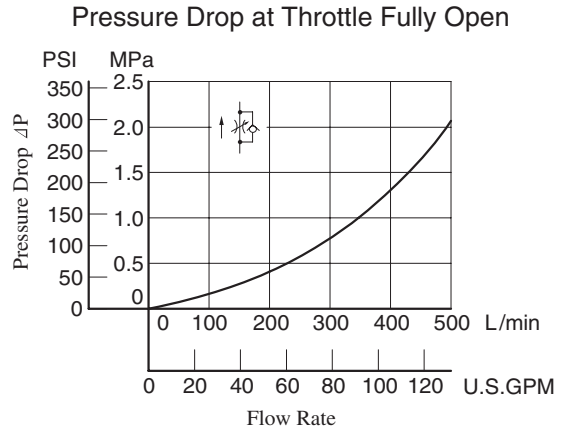
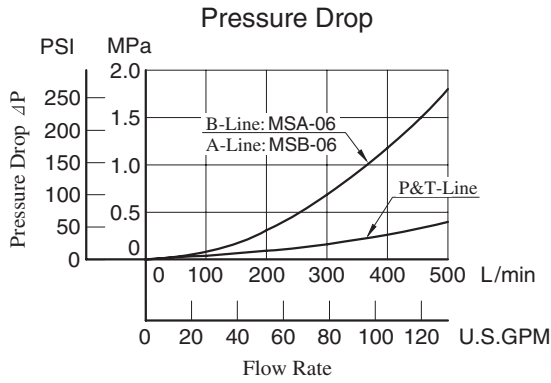
- To make flow rate adjustment, loosen lock nut and turn the flow adjustment screw clockwise or anti-clockwise. To throttle the flow, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after the adjustment of the flow rate is completed.

Graphic Symbols

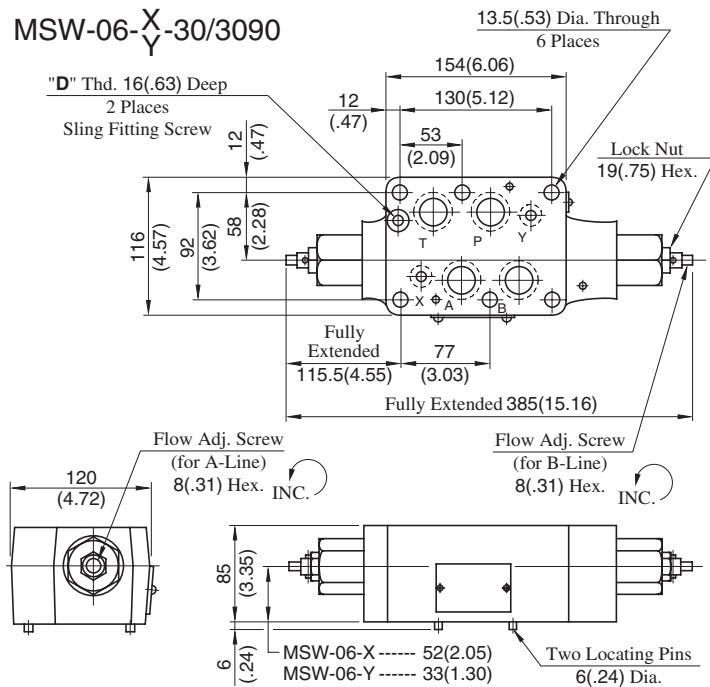


Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



MSW-06-X-30/3090

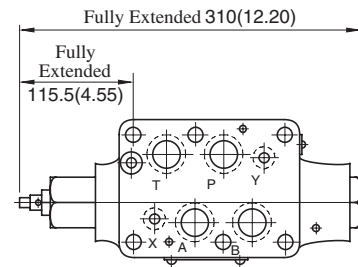


DIMENSIONS IN MILLIMETRES (INCHES)

Model Numbers	"D" Thd.
MS*-06-*-30	M8
MS*-06-*-3090	5/16-18 UNC

Approx. Mass..... 12.2 kg (26.9 lbs.)

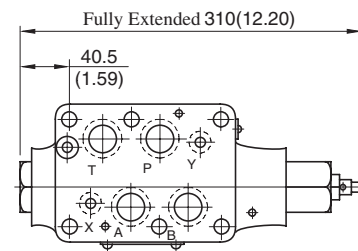
MSA-06-X-30/3090



Approx. Mass..... 12 kg (26.5 lbs.)

• For other dimensions, refer to "MSW-06" drawing left.

MSB-06-Y-30/3090

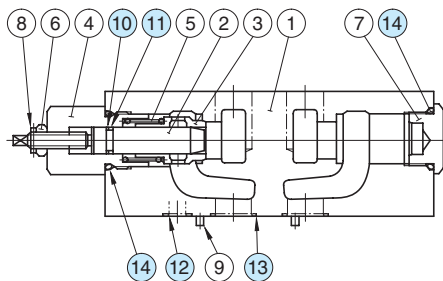


Approx. Mass..... 12 kg (26.5 lbs.)

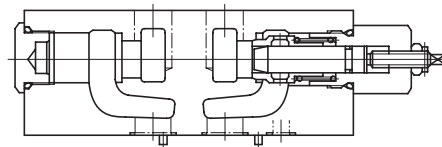
• For other dimensions, refer to "MSW-06" drawing left.

Spare Parts List

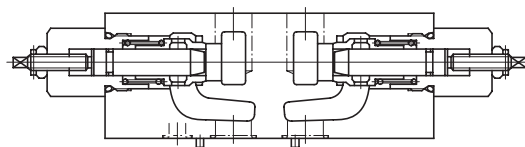
MSA-06-*-30/3090



MSB-06-*-30/3090



MSW-06-*-30/3090



List of Seals

Item	Name of Parts	Part Numbers	Quantity		
			MSA-06	MSB-06	MSW-06
10	Back Up Ring	SO-BB-P14	1	1	2
11	O-Ring	SO-NA-P14	1	1	2
12	O-Ring	SO-NB-P14	2	2	2
13	O-Ring	SO-NB-P28	4	4	4
14	O-Ring	SO-NB-P32	2	2	2

Note: When ordering seals, please specify the seal kit number from the table right.

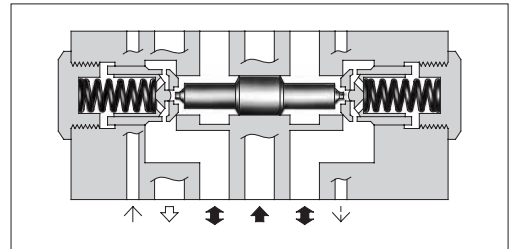
List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
MSA-06	KS-MSA-06-10
MSB-06	
MSW-06	KS-MSW-06-10

Pilot Operated Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MPA-06*-**-30/3090 MPB-06*-**-30/3090 MPW-06*-30/3090	25 (3630)	500 (132)



Model Number Designation

F-	MPA	-06	S	-2	-X	-30	*
Special Seals	Series Number	Valve Size	Port Tapping Feature of Pilot-Drain Port ^{★1}	Cracking Pressure MPa (PSI)	Pilot-Drain ^{★2} Connection	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MPA : Pilot Operated Check Valve for A-Line MPB : Pilot Operated Check Valve for B-Line MPW : Pilot Operated Check Valve for A&B-Lines	06	None : Taper Thread S : Straight Thread (Applicable only for Japanese Std. "JIS")	2 : 0.2 (29) 4 : 0.4 (58)	None: Internal Pilot-Internal Drain X : External Pilot-External Drain Y : External Pilot-Internal Drain	30	Refer to ^{★3}

★1. This item applies only to External Pilot or External Drain Type.

★2. Only "None: Internal Pilot-Internal Drain Type" is available for MPW (for "A&B-Lines").

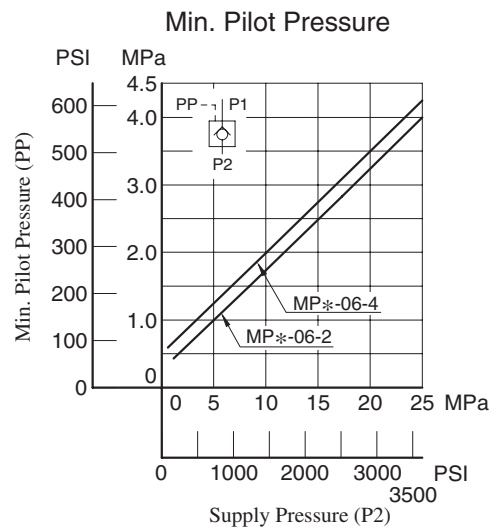
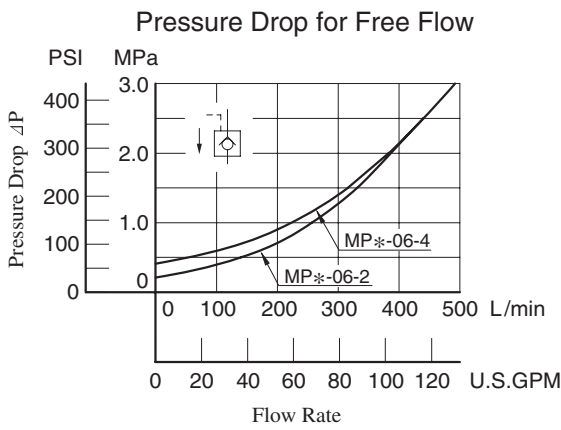
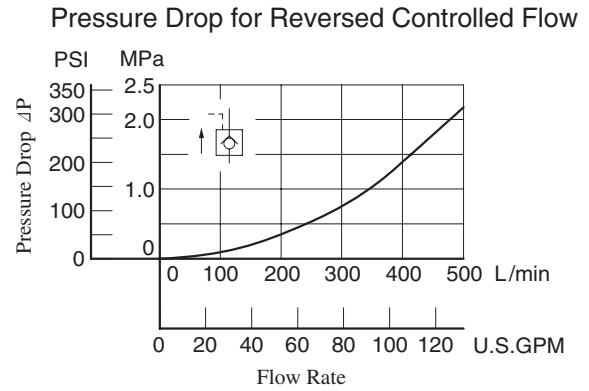
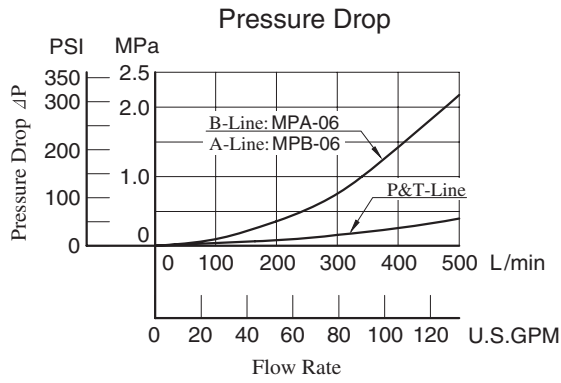
★3. Design Standards: None Japanese Standard "JIS" and European Design Standard
90 N. American Design Standard

Graphic Symbols

Pilot-Drain type Model No.	Internal pilot- Internal drain type	External pilot- External drain type	External pilot- Internal drain type
MPA-06	 MPA-06-*	 MPA-06*-*-X	 MPA-06*-*-Y
MPB-06	 MPB-06-*	 MPB-06*-*-X	 MPB-06*-*-Y
MPW-06	 MPW-06-*	—	—

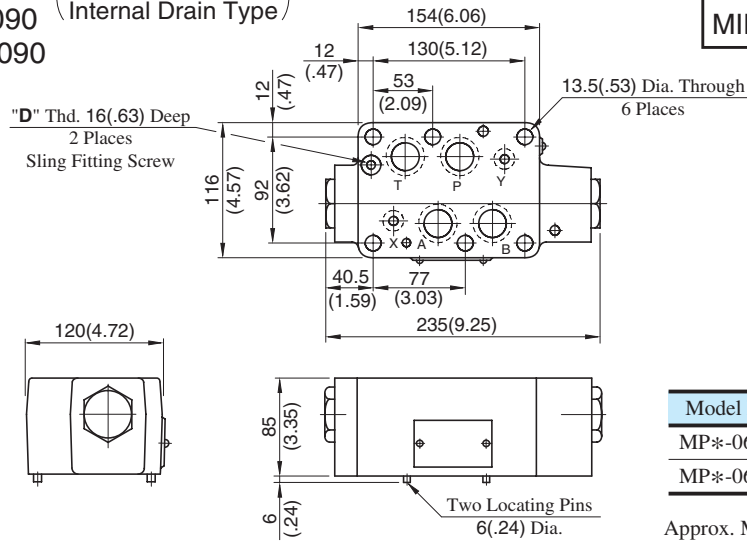
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



MPA-06-*-30/3090 (Internal Pilot-Internal Drain Type)
 MPB-06-*-30/3090 (Internal Drain Type)
 MPW-06-*-30/3090

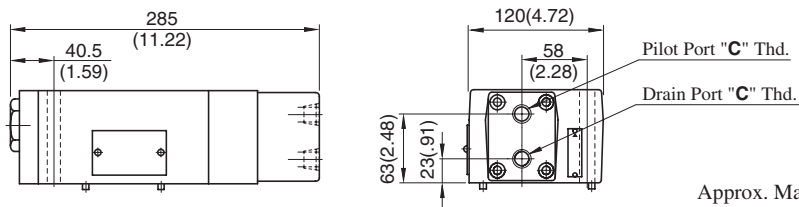
DIMENSIONS IN MILLIMETRES (INCHES)



Model Numbers	"D" Thd.
MP*-06-*-30	M8
MP*-06-*-3090	5/16-18 UNC

Approx. Mass..... 11.6 kg (25.6 lbs.)

MPA-06*-*-X-30/3090 (External Pilot-External Drain Type)



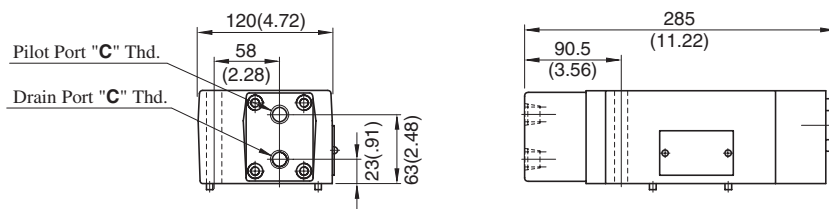
Approx. Mass..... 13 kg (28.7 lbs.)

Model Numbers	Thread Size "C" Thd.
MPA-06*-*-30	Rc 3/8 = 3/8 BSP. Tr
MPA-06*-*-3090	3/8 NPT
MPA-06S*-*-30	G 3/8

Approx. Mass..... 11.6 kg (25.6 lbs.)

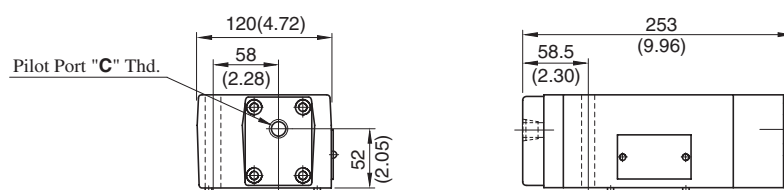
• For other dimensions, refer to "Internal pilot-Internal drain type" drawing above.

MPB-06*-*-X-30/3090 (External Pilot-External Drain Type)



Approx. Mass..... 13 kg (28.7 lbs.)

MPB-06*-*-Y-30/3090 (External Pilot-Internal Drain Type)



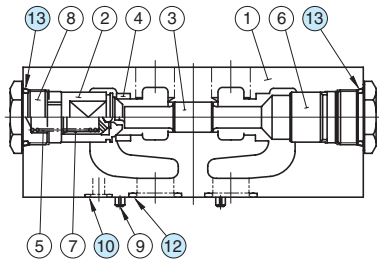
Approx. Mass..... 11.6 kg (25.6 lbs.)

Model Numbers	Thread Size "C" Thd.
MPB-06*-*-30	Rc 3/8 = 3/8 BSP. Tr
MPB-06*-*-3090	3/8 NPT
MPB-06S*-*-30	G 3/8

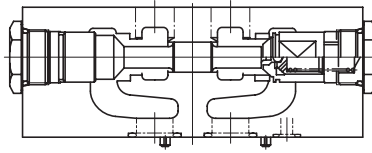
• For other dimensions, refer to "Internal pilot-Internal drain type" drawing above.

Spare Parts List

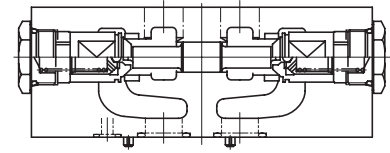
Internal Pilot- Internal Drain Type



MPA-06-*-30/3090

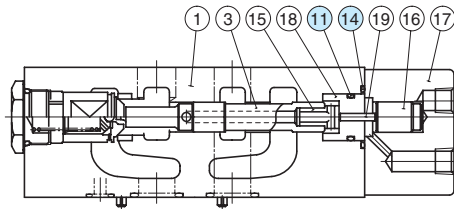


MPB-06-*-30/3090

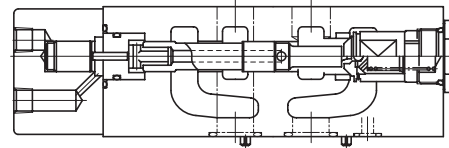


MPW-06-*-30/3090

External Pilot- External Drain Type

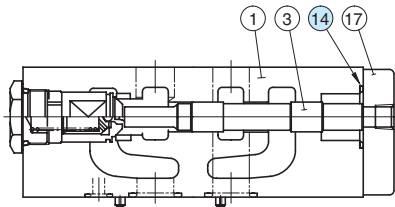


MPA-06*-*-X-30/3090

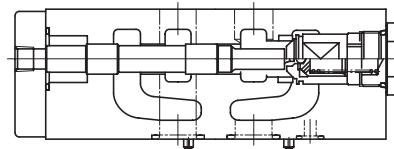


MPB-06*-*-X-30/3090

External Pilot- Internal Drain Type



MPA-06*-*-Y-30/3090



MPB-06*-*-Y-30/3090

List of Seals

Item	Name of Parts	Part Numbers	Quantity		
			Internal Pilot- Internal Drain	External Pilot- External Drain	External Pilot- Internal Drain
10	O-Ring	SO-NB-P14	2	2	2
11	O-Ring	SO-NA-P26	—	1	—
12	O-Ring	SO-NB-P28	4	4	4
13	O-Ring	SO-NB-P32	2	1	1
14	O-Ring	SO-NB-P36	—	1	1

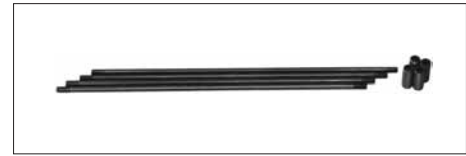
Note: When ordering seals, please specify the seal kit number from the table right.

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
MPA-06-*	KS-MPA-06-10
MPB-06-*	
MPW-06-*	
MPA-06*-*-X	KS-MPA-06-X-10
MPB-06*-*-X	
MPA-06*-*-Y	KS-MPA-06-Y-10
MPB-06*-*-Y	

Mounting Bolt Kits For Modular Valves

Valves are mounted with six stud bolts. Valve combination varies according to the circuit type. Hence, the mounting bolt kits are available on a combination type basis. When ordering the mounting bolt kit, be sure to give the bolt kit model number from the table below.



Model Number Designation

MBK	-06	-04	-30	*
Series Number	Size of Modular Valve	Bolt Number	Design Number	Design Standard
MBK: Mounting Bolt Kits for Modular Valves	06	01, 02, 03, 04	30	None: Japanese Standard "JIS" and European Design Standard 90: N.American Design Standard

Bolt Kits Selection Chart

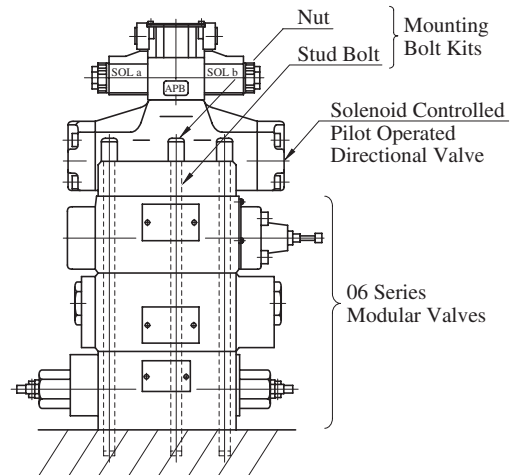
Bolt Kit Model Numbers	Quantity of Valves to be Stacked		Approx. Mass kg (lbs.)
	Sol. Cont. Pilot Operated Directional Valves (*-DSHG-06)	Modular Valve	
MBK-06-01-30*	1	1	1.1(2.4)
MBK-06-02-30*	1	2	1.5(3.3)
MBK-06-03-30*	1	3	2.0(4.4)
MBK-06-04-30*	1	4	2.4(5.3)

Bolt Kit Composition

Stud Bolt ----- 6 Pcs. } 1 Set
 Nut ----- 6 Pcs. }

Tightening Torque:

50-60 Nm (443-531 in. lbs.)

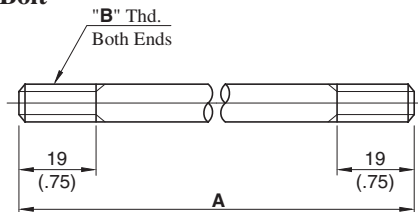


Stacking Example

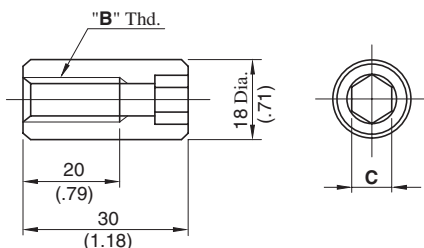
MBK-06-*-30/3090

DIMENSIONS IN MILLIMETRES (INCHES)

Stud Bolt



Nut



Model Numbers	A mm (in.)
MBK-06-01	161 (6.34)
MBK-06-02	246 (9.69)
MBK-06-03	331 (13.03)
MBK-06-04	416 (16.38)

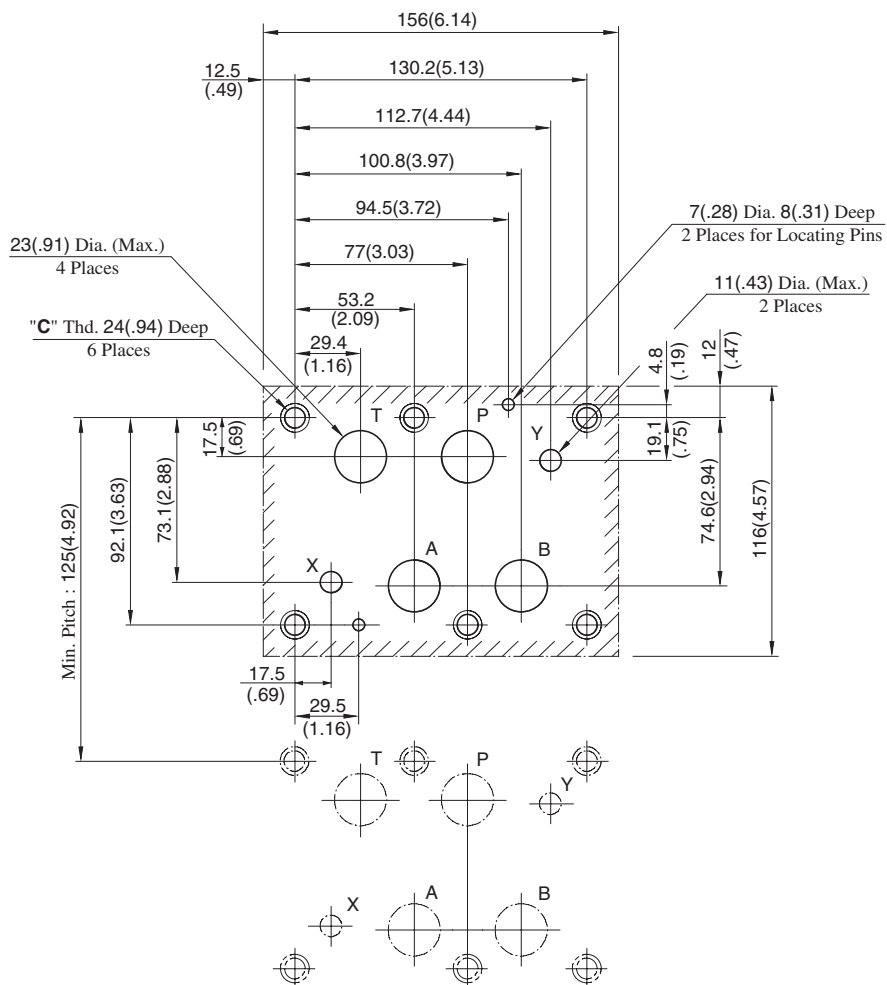
Model Numbers	"B" Thd.	C
MBK-06-*-30	M12	10 (.39)
MBK-06-*-3090	1/2-13 UNC	9.5 (3/8)

■ Mounting Surface Dimensions for 3/4 Modular Valve

When mounting 06 series modular valve, be sure to use a sub-plate for 3/4 solenoid controlled pilot operated directional valves.

Name	Sub-plate Model Number	Page
Sub-plate for 3/4 Solenoid Controlled Pilot Operated Directional Valves	DHGM-06*-50/5080/5090	402

Also, when no sub-plates are used, be sure to use the following mounting surface.



Design Std.	"C" Thd.
Japanese std. "JIS" and European Design Std.	M12
N. American Design Std.	1/2-13 UNC

Type of Modular Valve

Class	Model Numbers	Graphic Symbols	Page	Class	Model Numbers	Graphic Symbols	Page	
	Solenoid Controlled Pilot Operated Directional Valve (S-)DSHG-10-***-**-43/4390		381		Pilot Operated Check Valves (for "A-Line", Internal Pilot-) Internal Drain Type MPA-10-*-30/3090		640	
Pressure Control Valves	Reducing Valves (for "P-Line") MRP-10-*-30/3090		634		Pilot Operated Check Valves (for "A-Line", External Pilot-) External Drain Type MPA-10-*-X-30/3090		640	
	Reducing Valves (for "A-Line") MRA-10-*-30/3090		634		Pilot Operated Check Valves (for "A-Line", External Pilot-) Internal Drain Type MPA-10-*-Y-30/3090		640	
	Reducing Valves (for "B-Line") MRB-10-*-30/3090		634		Pilot Operated Check Valves (for "B-Line", Internal Pilot-) Internal Drain Type MPB-10-*-30/3090		640	
Flow Control Valves	Throttle and Check Valves (for "A-Line", Metre-out) MSA-10-X-30/3090		637	Directional Control Valves	Pilot Operated Check Valves (for "B-Line", External Pilot-) External Drain Type MPB-10-*-X-30/3090		640	
	Throttle and Check Valves (for "A-Line", Metre-in) MSA-10-Y-30/3090		637			Pilot Operated Check Valves (for "B-Line", External Pilot-) Internal Drain Type MPB-10-*-Y-30/3090		640
	Throttle and Check Valves (for "B-Line", Metre-out) MSB-10-X-30/3090		637			Pilot Operated Check Valves (for "A&B-Lines", Internal Pilot-) Internal Drain Type MPW-10-*-30/3090		640
	Throttle and Check Valves (for "B-Line", Metre-in) MSB-10-Y-30/3090		637	Mounting Bolts	Bolt Kits MBK-10-*-10/1090		644	
	Throttle and Check Valves (for "A&B-Lines", Metre-out) MSW-10-X-30/3090		637					
	Throttle and Check Valves (for "A&B-Lines", Metre-in) MSW-10-Y-30/3090		637					

★ Because drain ports "V" and "W" are not provided for solenoid controlled pilot operated directional valves of Pressure Centred Type (3H*) and models with Pilot Piston (P*), those valves cannot be used in combination with modular valves.

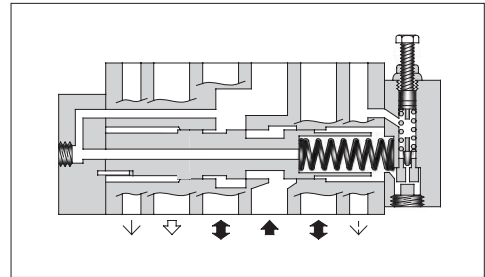
Reducing Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa(PSI)	Max. Flow* L/min (U.S.GPM)
MR*-10-A-30/3090	25 (3630)	250 (66)
MR*-10-B-30/3090		800 (211)
MR*-10-C-30/3090 H		

★ In the pressure adjustment ranges "A" and "B", maximum flow rates are limited by the pressure setting on the secondary side.

Referring to the secondary pressure vs. maximum flow characteristics on the following page, use the valve at the maximum flow rate within a zone highlighted with .



Model Number Designation

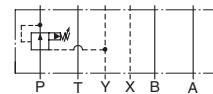
F-	MRP	-10	-B	-30	*
Special Seals	Series Number	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MRP: Reducing Valve for P-Line MRA: Reducing Valve for A-Line MRB: Reducing Valve for B-Line	10	A: 0.7-7 (100-1020) B: 1.5-7 (220-1020) C: 3.5-14 (510-2030) H: 7-21 (1020-3050)	30	Refer to ★

★ Design Standards: None Japanese Standard "JIS" and European Design Standard
90 N. American Design Standard

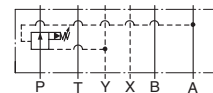
Instructions

- Connect **Drain Line (Y port)** to oil tank independently so as to obtain stable pressure setting. At the same time, the solenoid controlled pilot operated directional valve to be used in combination with this valve must be of internal drain type (with T).
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.

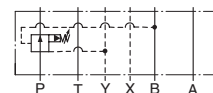
Graphic Symbols



MRP-10



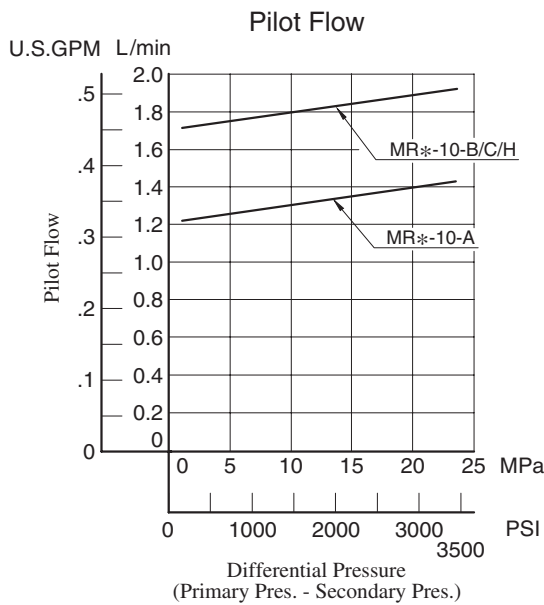
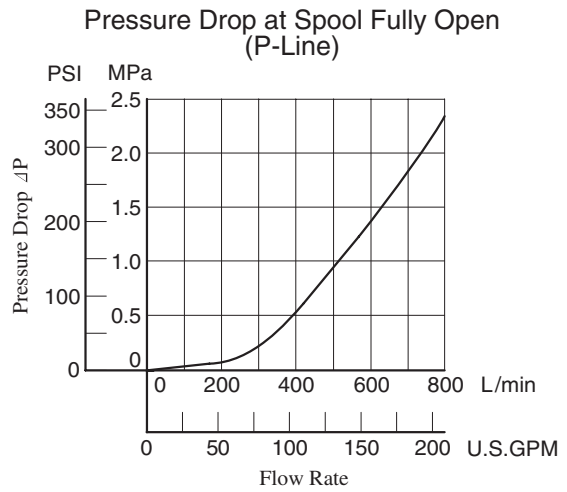
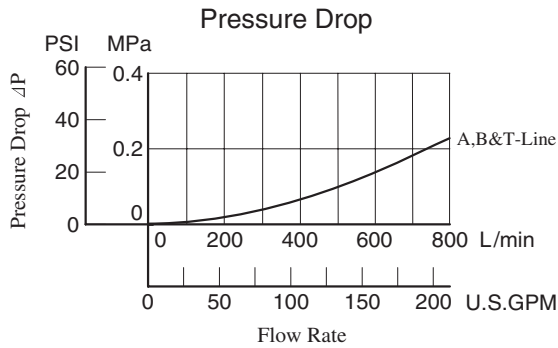
MRA-10



MRB-10

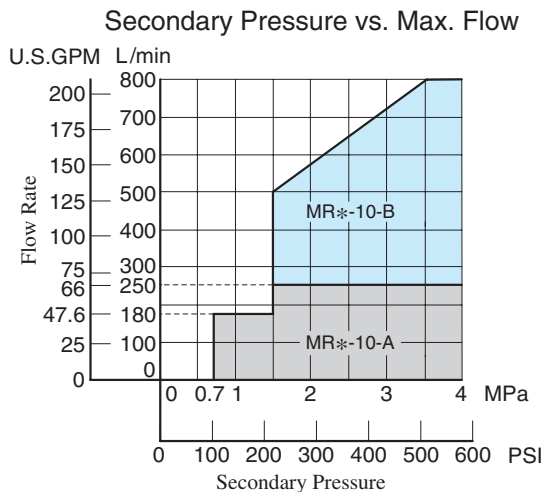
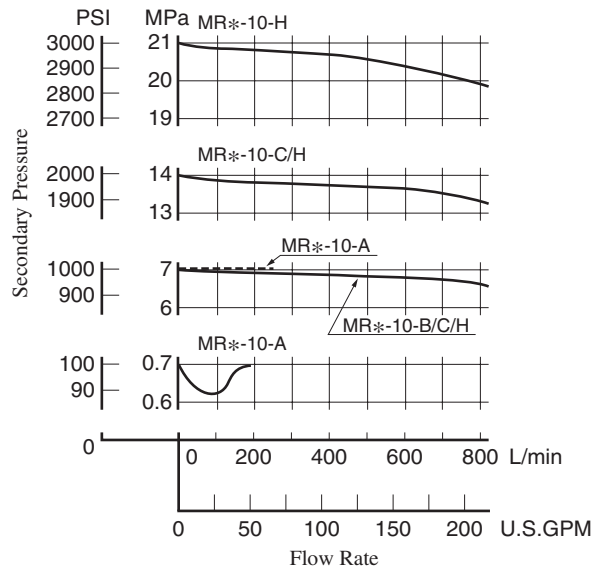
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



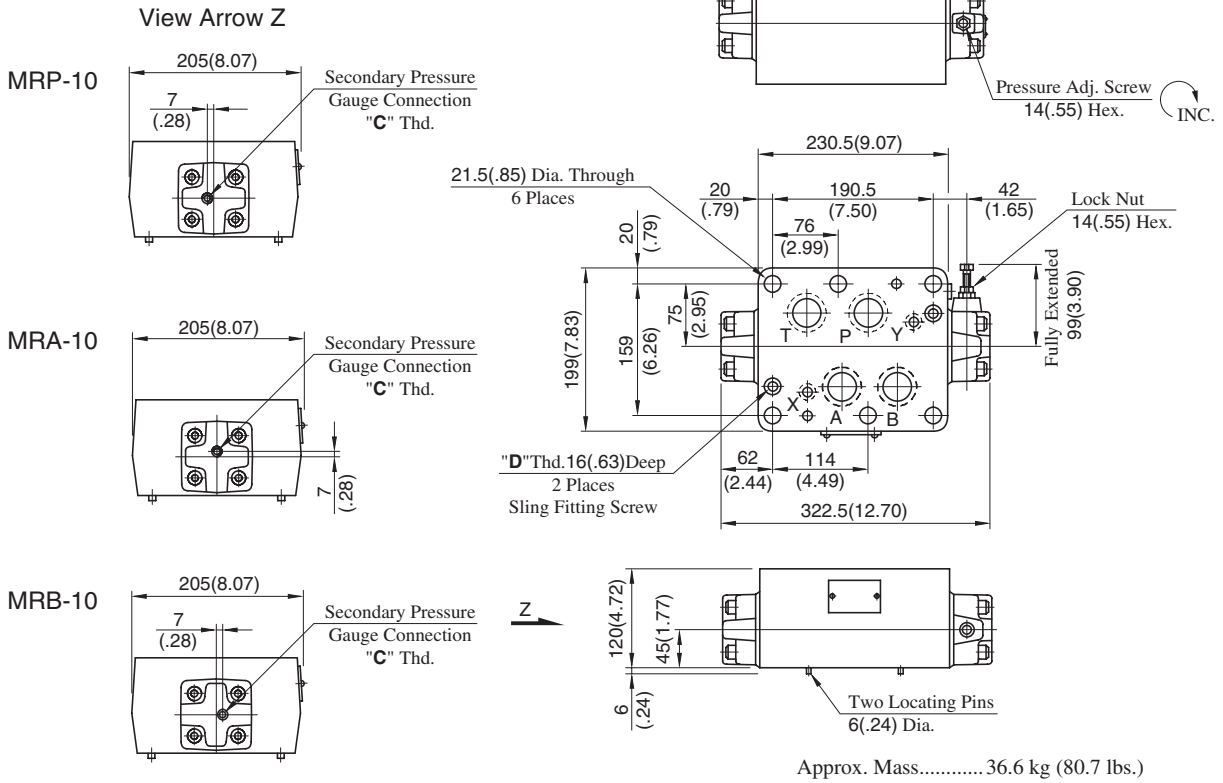
Nominal Override Characteristics

Primary Pressure 25 MPa (3630 PSI)



MRP-10-*-30/3090
 MRA-10-*-30/3090
 MRB-10-*-30/3090

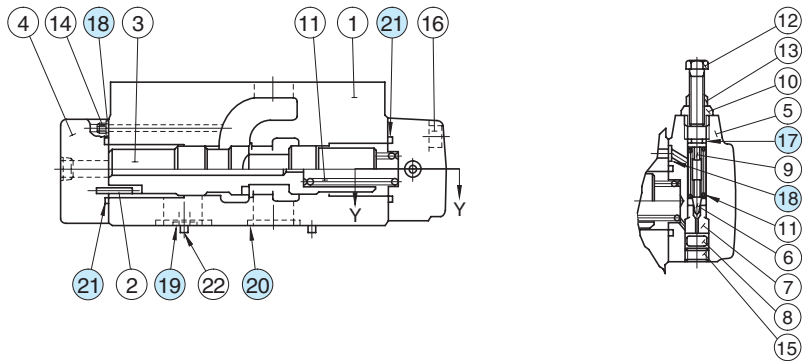
**DIMENSIONS IN
 MILLIMETRES (INCHES)**



Model Numbers	Thread Size	
	"C" Thd.	"D" Thd.
MR*-10-*-30	Rc 1/4 = 1/4 BSP.Tr	M8
MR*-10-*-3090	1/4 NPT	5/16-18 UNC

■ Spare Parts List

MRP-10-*-30/3090
 MRA-10-*-30/3090
 MRB-10-*-30/3090



● List of Seals

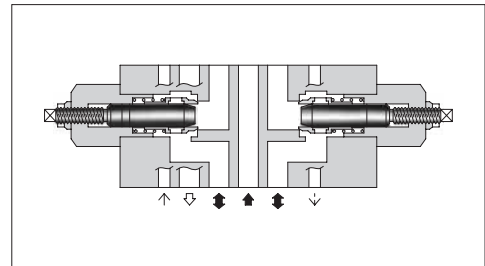
Item	Name of Parts	Part Numbers	Qty.	Remarks
17	O-Ring	SO-NA-P9	1	Included in Seal Kit Kit No.: KS-MRP-10-10
18	O-Ring	SO-NB-P9	4	
19	O-Ring	SO-NB-P16	2	
20	O-Ring	SO-NB-P40	4	
21	O-Ring	SO-NB-P44	2	

Section Y-Y

Throttle and Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MSA-10-*-30/3090 MSB-10-*-30/3090 MSW-10-*-30/3090	25 (3630)	800 (211)



Model Number Designation

F-	MSW	-10	-X	-30	*
Special Seals	Series Number	Valve Size	Direction of Flow	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSA : Throttle and Check Valves for A-Line MSB : Throttle and Check Valves for B-Line MSW : Throttle and Check Valves for A&B-Lines	10	X : Metre-out Y : Metre-in	30	Refer to ★

★ Design Standards: None Japanese Standard "JIS" and European Design Standard 90 N. American Design Standard

Instructions

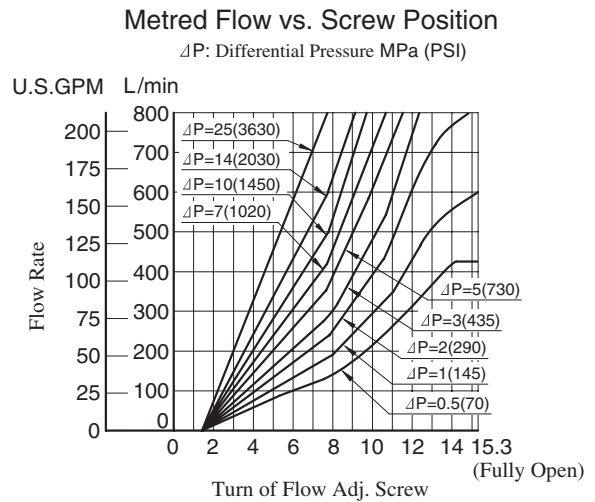
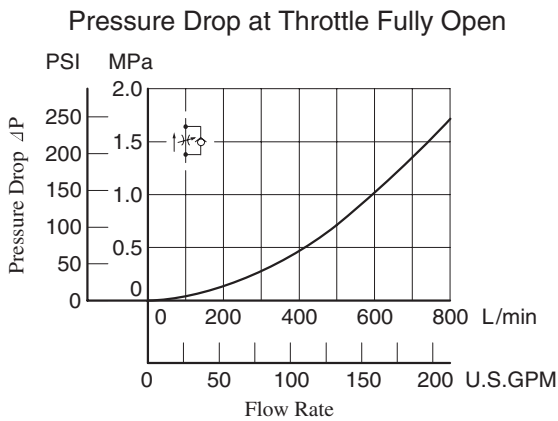
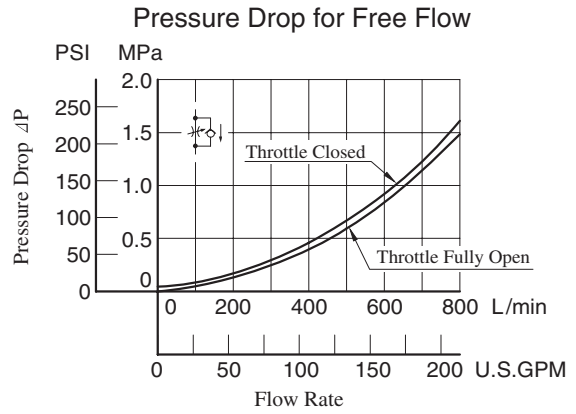
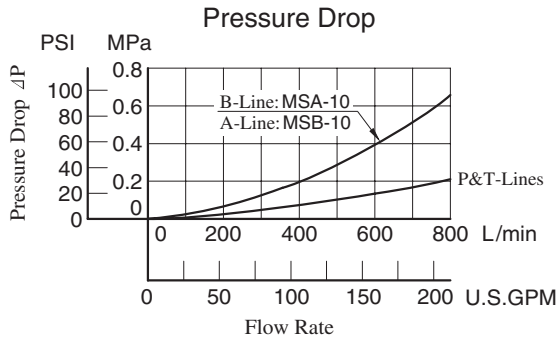
- To make flow rate adjustment, loosen the lock nut and turn the flow adjustment screw clockwise or anti-clockwise. To throttle the flow, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after the adjustment of the flow rate is completed.

Graphic Symbols

Metre-out	Metre-in
<p>MSA-10-X</p>	<p>MSA-10-Y</p>
<p>MSB-10-X</p>	<p>MSB-10-Y</p>
<p>MSW-10-X</p>	<p>MSW-10-Y</p>

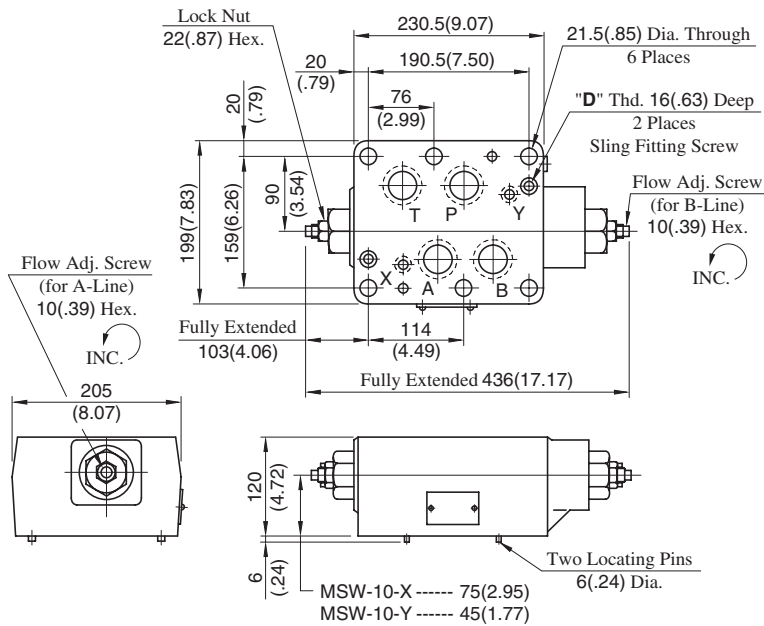
■ Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



MSW-10-X-Y-30/3090

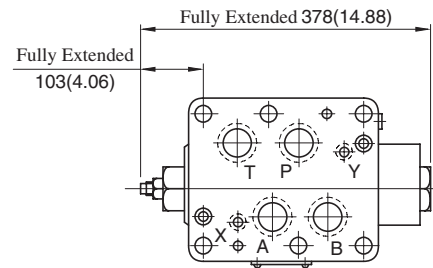
DIMENSIONS IN MILLIMETRES (INCHES)



Model Numbers	"D" Thd.
MS*-10-*-30	M8
MS*-10-*-3090	5/16-18 UNC

Approx. Mass..... 35.7 kg (78.7 lbs.)

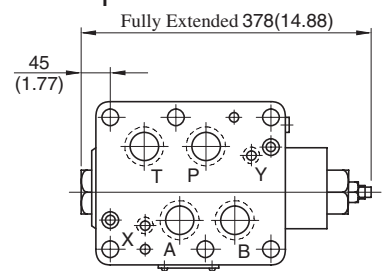
MSA-10-X-Y-30/3090



Approx. Mass..... 35 kg (77.2 lbs.)

• For other dimensions, refer to "MSW-10" drawing left.

MSB-10-X-Y-30/3090

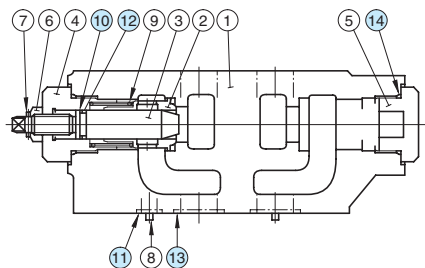


Approx. Mass..... 35 kg (77.2 lbs.)

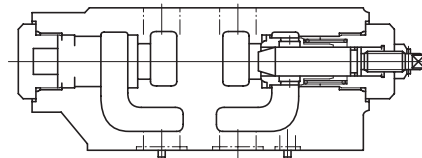
• For other dimensions, refer to "MSW-10" drawing left.

Spare Parts List

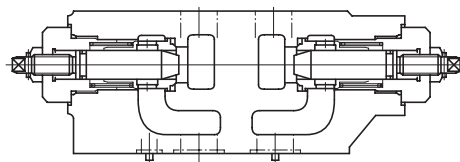
MSA-10-*-30/3090



MSB-10-*-30/3090



MSW-10-*-30/3090



List of Seals

Item	Name of Parts	Part Numbers	Quantity		
			MSA-10	MSB-10	MSW-10
10	Back Up Ring	SO-BB-P20	1	1	2
11	O-Ring	SO-NB-P16	2	2	2
12	O-Ring	SO-NA-P20	1	1	2
13	O-Ring	SO-NB-P40	4	4	4
14	O-Ring	SO-NB-P44	2	2	2

Note: When ordering seals, please specify the seal kit number from the table right.

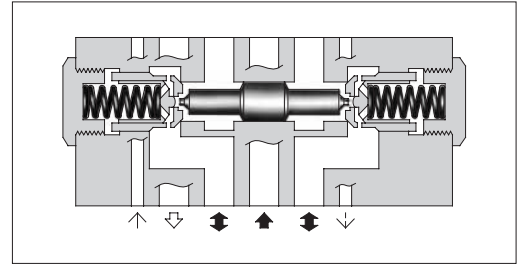
List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
MSA-10	KS-MSA-10-10
MSB-10	
MSW-10	KS-MSW-10-10

Pilot Operated Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MPA-10*-**-30/3090 MPB-10*-**-30/3090 MPW-10*-**-30/3090	25 (3630)	800 (211)



Model Number Designation

F-	MPA	-10	S	-2	-X	-30	*
Special Seals	Series Number	Valve Size	Port Tapping Feature of Pilot-Drain Port ^{★1}	Cracking Pressure MPa (PSI)	Pilot-Drain ^{★2} Connection	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MPA : Pilot Operated Check Valve for A-Line MPB : Pilot Operated Check Valve for B-Line MPW : Pilot Operated Check Valve for A&B-Lines	10	None : Taper Thread S : Straight Thread (Applicable only for Japanese Std. "JIS")	2 : 0.2 (29) 4 : 0.4 (58)	None: Internal Pilot-Internal Drain X : External Pilot-External Drain Y : External Pilot-Internal Drain	30	Refer to ^{★3}

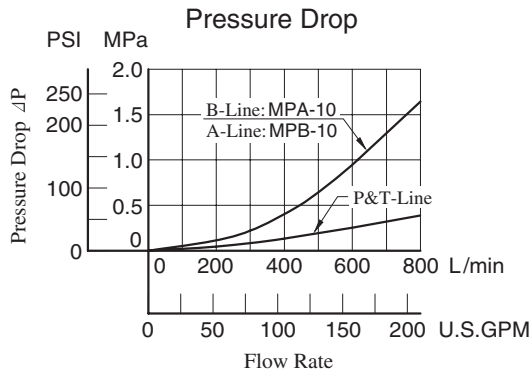
- ★1. This item applies only to External Pilot or External Drain Type.
- ★2. Only "None: Internal Pilot-Internal Drain Type" is available for MPW (for "A&B-Lines").
- ★3. Design Standards: None Japanese Standard "JIS" and European Design Standard 90 N. American Design Standard

Graphic Symbols

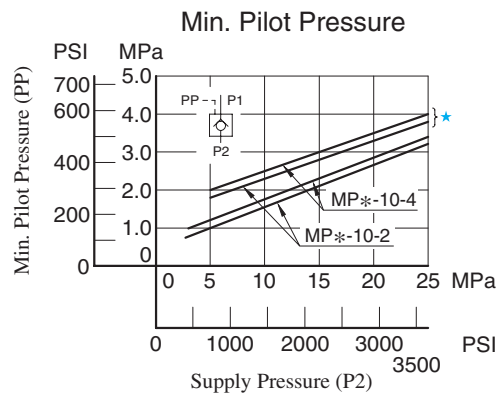
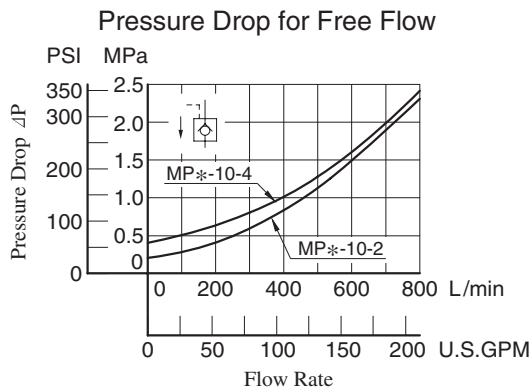
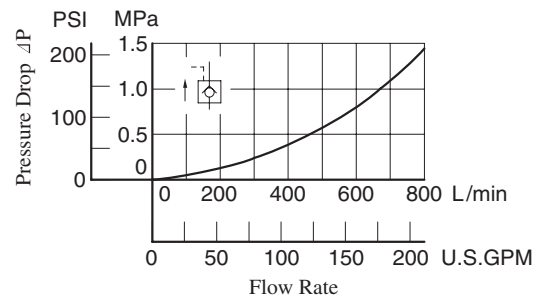
Pilot-Drain type Model No.	Internal Pilot-Internal Drain Type	External Pilot-External Drain Type	External Pilot-Internal Drain Type
MPA-10	 MPA-10*	 MPA-10*-*-X	 MPA-10*-*-Y
MPB-10	 MPB-10*	 MPB-10*-*-X	 MPB-10*-*-Y
MPW-10	 MPW-10*	—	—

Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



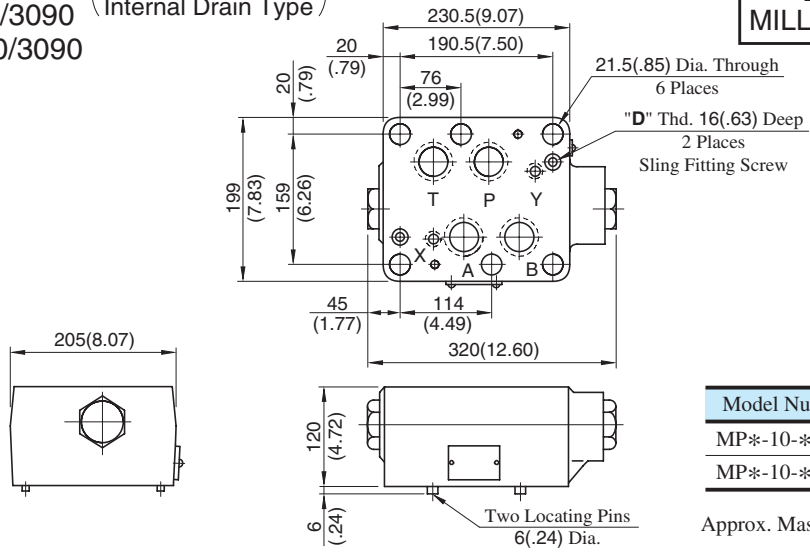
Pressure Drop for Reversed Controlled Flow



★ In case of 500 L/min (132 U.S.GPM) or more.

MPA-10-*-30/3090 (Internal Pilot-
MPB-10-*-30/3090 Internal Drain Type)
MPW-10-*-30/3090

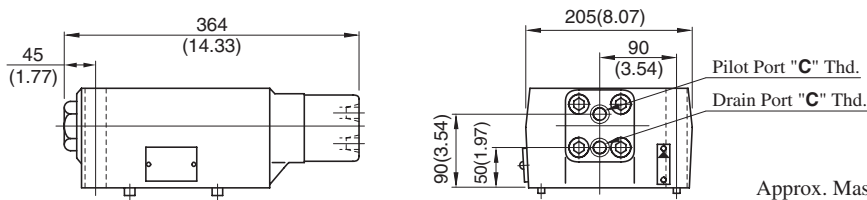
**DIMENSIONS IN
MILLIMETRES (INCHES)**



Model Numbers	"D" Thd.
MP*-10-*-30	M8
MP*-10-*-3090	5/16-18 UNC

Approx. Mass.....36.5 kg (80.5 lbs.)

MPA-10-*-X-30/3090 (External Pilot-
External Drain Type)

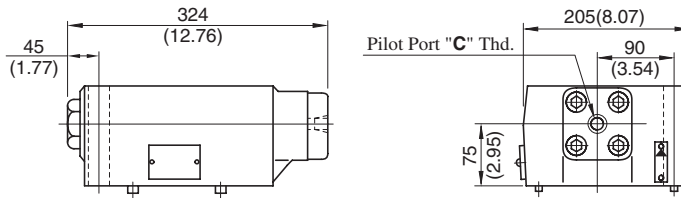


Approx. Mass.....38 kg (83.8 lbs.)

Model Numbers	Thread Size "C" Thd.
MPA-10-*-X-30	Rc 3/8 = 3/8 BSP. Tr
MPA-10-*-X-3090	3/8 NPT
MPA-10S-*-X-30	G 3/8

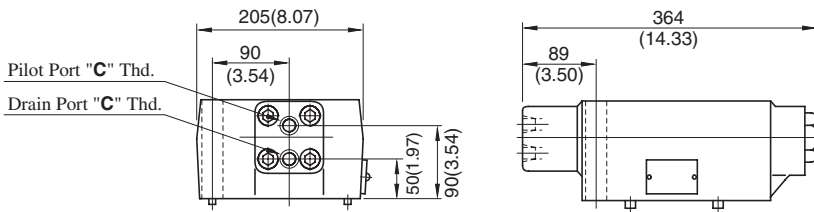
Approx. Mass.....36.5 kg (80.5 lbs.)

MPA-10-*-Y-30/3090 (External Pilot-
Internal Drain Type)



• For other dimensions, refer to "Internal pilot-Internal drain type" drawing above.

MPB-10-*-X-30/3090 (External Pilot-
External Drain Type)

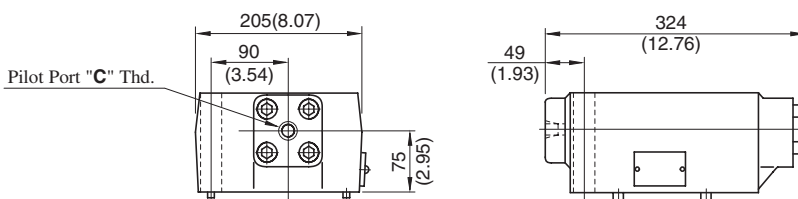


Approx. Mass.....38 kg (83.8 lbs.)

Model Numbers	Thread Size "C" Thd.
MPB-10-*-X-30	Rc 3/8 = 3/8 BSP. Tr
MPB-10-*-X-3090	3/8 NPT
MPB-10S-*-X-30	G 3/8

Approx. Mass.....36.5 kg (80.5 lbs.)

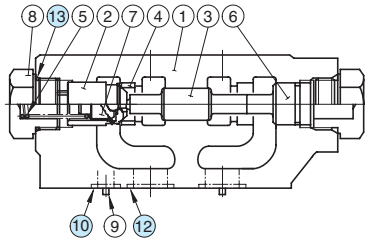
MPB-10-*-Y-30/3090 (External Pilot-
Internal Drain Type)



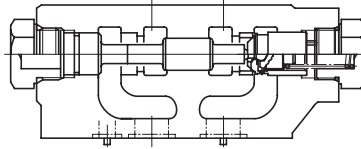
• For other dimensions, refer to "Internal pilot-Internal drain type" drawing above.

Spare Parts List

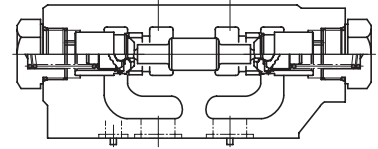
Internal Pilot- Internal Drain Type



MPA-10*-30/3090

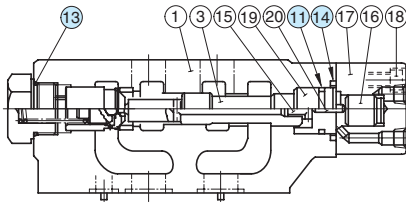


MPB-10*-30/3090

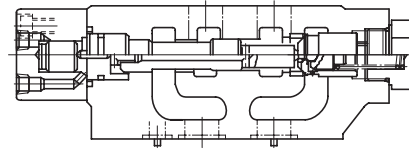


MPW-10*-30/3090

External Pilot- External Drain Type

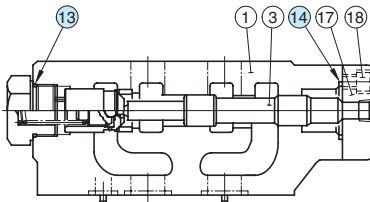


MPA-10*-X-30/3090

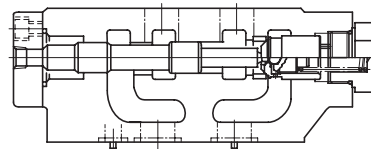


MPB-10*-X-30/3090

External Pilot- Internal Drain Type



MPA-10*-Y-30/3090



MPB-10*-Y-30/3090

List of Seals

Item	Name of Parts	Part Numbers	Quantity		
			Internal Pilot- Internal Drain	External Pilot- External Drain	External Pilot- Internal Drain
10	O-Ring	SO-NB-P16	2	2	2
11	O-Ring	SO-NB-P34	—	1	—
12	O-Ring	SO-NB-P40	4	4	4
13	O-Ring	SO-NB-P44	2	1	1
14	O-Ring	SO-NB-P46	—	1	1

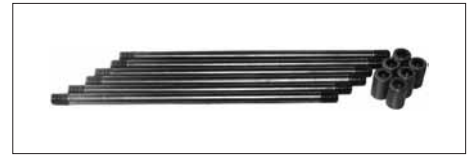
Note: When ordering seals, please specify the seal kit number from the table right.

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers	
MPA-10*- MPB-10*- MPW-10*-	KS-MPA-10-10	
MPA-10*-X- MPB-10*-X-		KS-MPA-10-X-10
MPA-10*-Y- MPB-10*-Y-		KS-MPA-10-Y-10

Mounting Bolt Kits For Modular Valves

Valves are mounted with six stud bolts. Valve combination varies according to the circuit type. Hence, the mounting bolt kits are available on a combination type basis. When ordering the mounting bolt kit, be sure to give the bolt kit model number from the table below.



Model Number Designation

MBK	-10	-04	-10	*
Series Number	Size of Modular Valve	Bolt Number	Design Number	Design Standard
MBK: Mounting Bolt Kits for Modular Valves	10	01, 02, 03, 04	10	None: Japanese Standard "JIS" and European Design Standard 90: N.American Design Standard

Bolt Kits Selection Chart

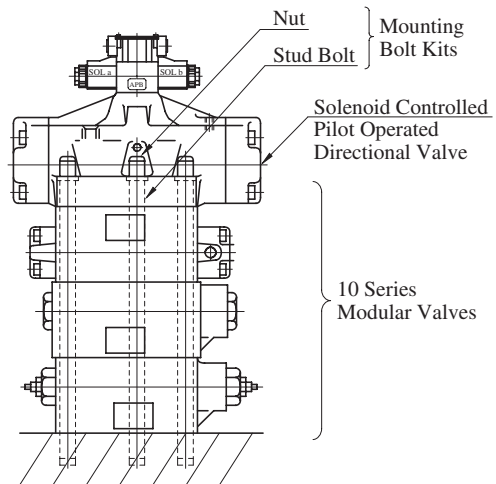
Model Numbers	Quantity of Valves to be Stacked		Approx. Mass kg (lbs.)
	Sol. Cont. Pilot Operated Directional Valves (*-DSHG-10)	Modular Valve	
MBK-10-01-10*	1	1	3.9 (8.6)
MBK-10-02-10*	1	2	5.7 (12.6)
MBK-10-03-10*	1	3	7.4 (16.3)
MBK-10-04-10*	1	4	9.2 (20.3)

Bolt Kit Composition

Stud Bolt ----- 6 Pcs. } 1 set
 Nut ----- 6 Pcs. }

Tightening Torque:

150-170 Nm (1330-1505 in. lbs.)

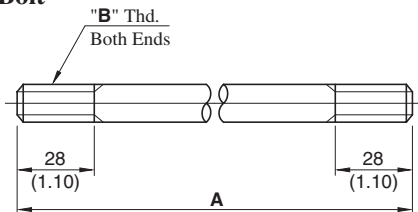


Stacking Example

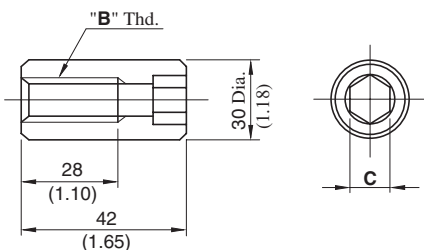
MBK-10-*-10/1090

DIMENSIONS IN MILLIMETRES (INCHES)

Stud Bolt



Nut



Bolt Numbers	A mm (in.)
MBK-10-01	217 (8.54)
MBK-10-02	337 (13.27)
MBK-10-03	457 (17.99)
MBK-10-04	577 (22.72)

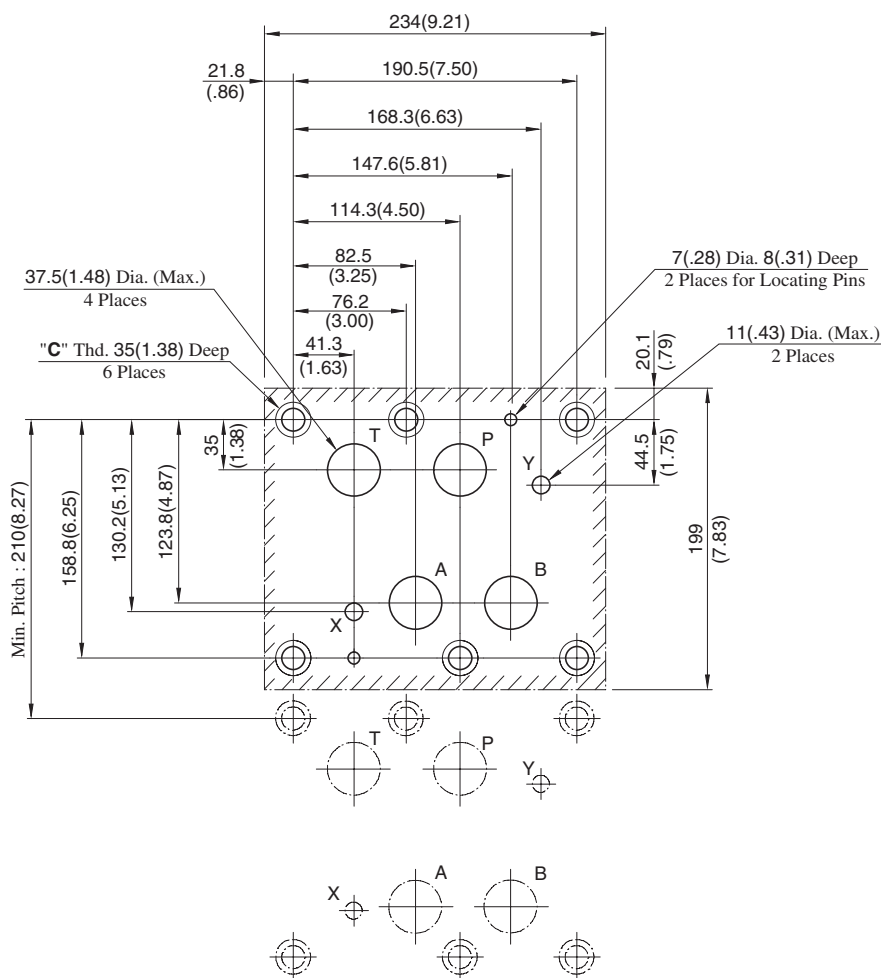
Model Numbers	"B" Thd.	C
MBK-10-*-10	M20	17 (.67)
MBK-10-*-1090	3/4-10 UNC	15.9 (5/8)

■ Mounting Surface Dimensions for 1-1/4 Modular Valve

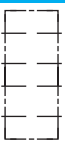
When mounting 10 series modular valve, be sure to use a sub-plate for 1-1/4 solenoid controlled pilot operated directional valves.

Name	Sub-plate Model Number	Page
Sub-plate for 1-1/4 Solenoid Controlled Pilot Operated Directional Valves	DHGM-10*-40/4080/4090	403

When no sub-plates are used, be sure to use the following mounting surface.



Design Std.	"C" Thd.
Japanese Std. "JIS" and European Design Std.	M20
N. American Design Std.	3/4-10 UNC



G

LOGIC VALVES

Valve Type	Graphic Symbols	Maximum Operating Pressure MPa (PSI)	Rated Flow		Page
			U.S.GPM	L/min	
Directional Control Logic Valves Directional and Flow Control Logic Valves		31.5 (4570)	LD	16 25 32 40 50 63 80 100	650
Solenoid Operated Directional Control Logic Valves		31.5 (4570)	LDS	25 32 40 50 63	651
Relief Logic Valves		31.5 (4570)	LB	16 25 32 50	652
Solenoid Controlled Relief Logic Valves		31.5 (4570)	LBS	16 25 32 50	653

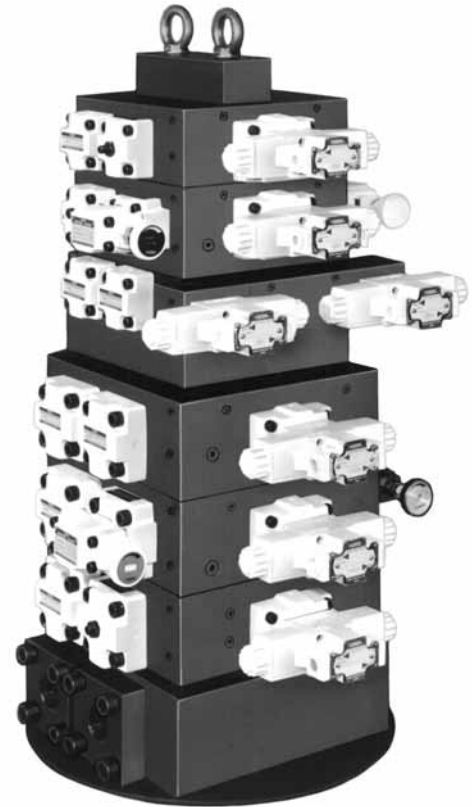
Consult Yuken when detailed material such as dimensions figures is required.

Logic Valves

Yuken Logic Valves comprise cartridge typed elements and covers with pilot passages. Various types may be combined for direction, flow rate and pressure control.

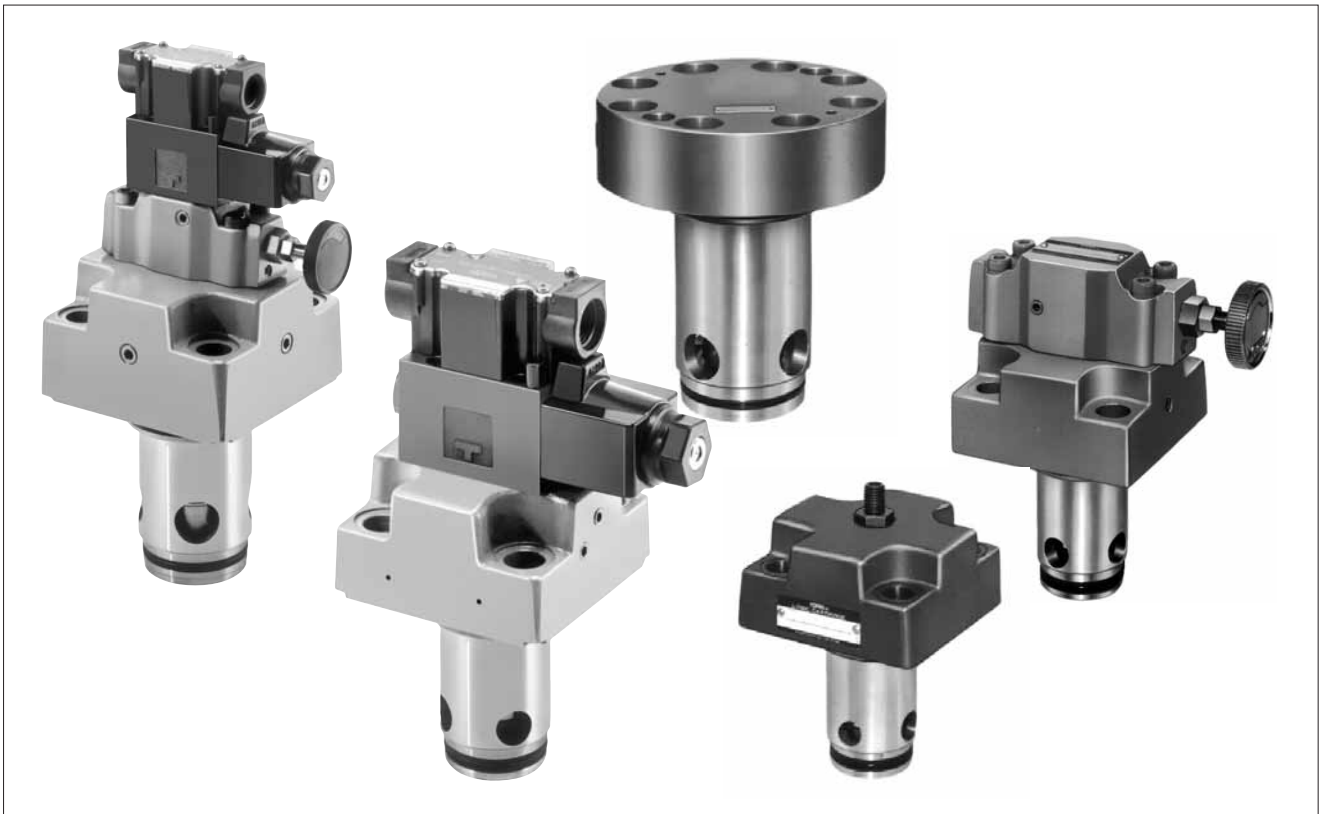
Yuken Logic Valves can be incorporated in manifold blocks to form optimum integrated hydraulic circuits and compact hydraulic power units. Being a poppet type, the elements permit high-pressure, high flow rates, high speed and shockless shifting with low pressure drop.

Typical applications include steel mill machines, injection moulding machines, machine tools and so on. In addition, Yuken Logic Valves cavity specifications conform to ISO standards.



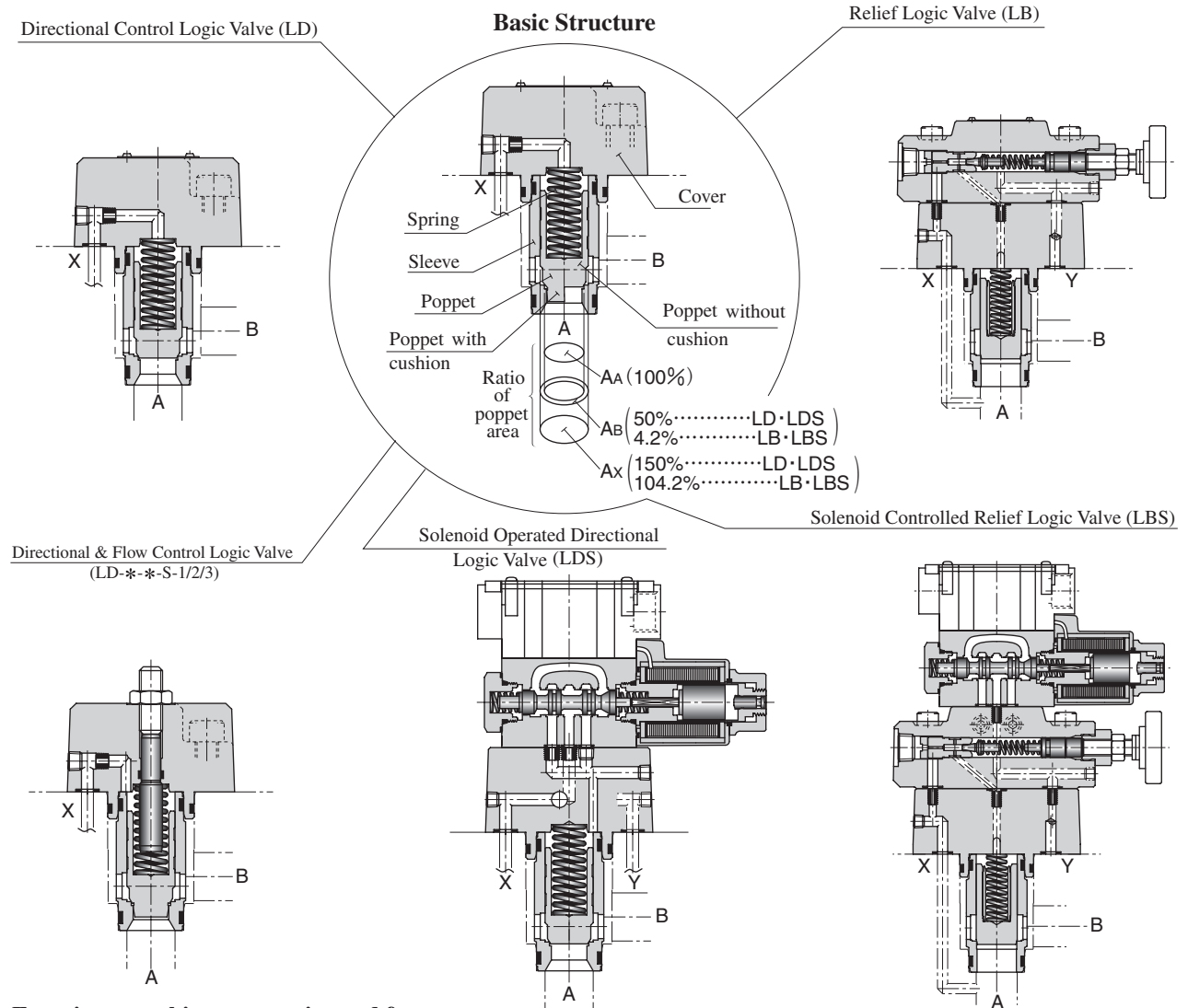
Features

- Multifunction performance in terms of direction, flow and pressure can be obtained by combining elements and covers.
- Poppet-type elements virtually eliminate internal leakage and hydraulic locking. Because there are no overlaps, response times are very high, permitting high-speed shifting.
- For high pressure, large capacity systems, optimum performance is achieved with low pressure losses.
- Since the logic valves are directly incorporated in cavities provided in blocks, the system is free from problems related to piping such as oil leakage, vibration and noise, and higher reliability is achieved.
- Multi-function logic valves permit compact integrated hydraulic systems which reduce manifold dimensions and mass and achieve lower cost conventional types.



Structure and Functions

- As shown below, a logic valve consists of a cover, a sleeve, a poppet and a spring incorporated in a block. Although it is a simple two-port valve designed to open and close the poppet in accordance with the pressure signals from the pilot line, it serves as a multifunctional valve for controlling the direction, flow and pressure by controlling the pressure signals. Standard covers have several pressure signal ports (pilot ports) and control valves for control purposes are available. The covers are spigot mounted. There is no risk of oil leakage.



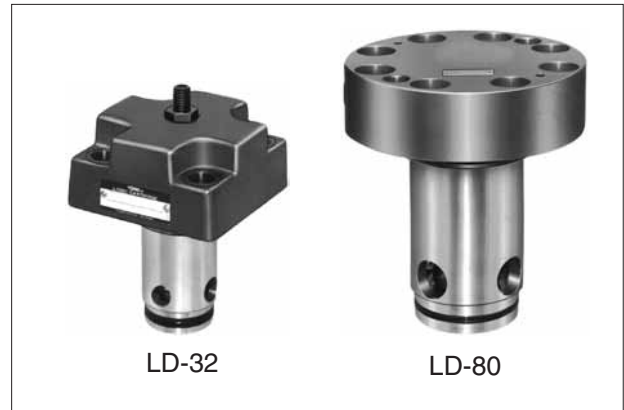
Functions, working area ratios and features

Function	Graphic Symbols	Working area ratio (AA : AB)	Features
Direction		2 : 1	<ul style="list-style-type: none"> Poppet shape Without cushion (LD/LDS-*-*) : high-speed shift With cushion (LD/LDS-*-S) : Shockless shift No leakage between port A and B Flow A to B and B to A are possible Response time and shock can be adjusted by orifice selection.
Direction and Flow			<ul style="list-style-type: none"> Poppet shape With cushion (LD-*-S-1/2/3) : flow control. No leakage between port A and B Flow A to B only is possible. Response time and shock can be adjusted by orifice selection.
Relief		24 : 1	<ul style="list-style-type: none"> Remote and unloading control is possible with vent circuit (LB-*-*) . Two or three pressure controls are possible in combination of solenoid operated directional valve and pilot relief valve (LBS-*-*) .

Directional Control / Directional & Flow Control Logic Valves

These valves are 2-way directional valves designed to open and close the circuits in accordance with pressure signals from the pilot lines. They are used as multifunctional valves for controlling flow directions or flow directions and rates.

Standard covers provided with a choice of several control valves are available so that optimum valves can be selected for control purposes.

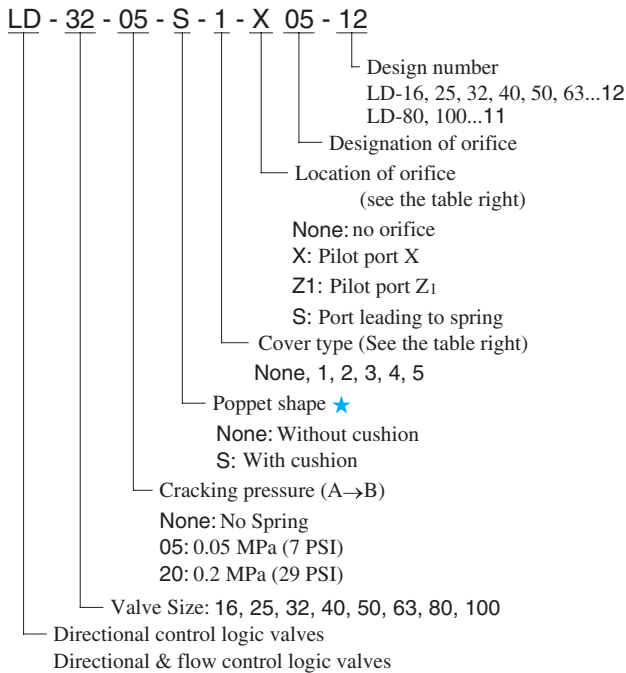


Specifications

Model No.	Rated Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Cracking Pressure MPa (PSI)	Ratio of Poppet Area	Approx. Mass kg (lbs.)
LD-16	130 (34.3)	31.5 (4570)	Refer to Model No. Designation	2 : 1 (Annular area 50%)	1.6 (3.5)
LD-25	350 (92.5)				3.0 (6.6)
LD-32	500 (132)				5.3 (11.7)
LD-40	850 (225)				9.1 (20.1)
LD-50	1400 (370)				14.8 (32.6)
LD-63	2100 (555)				29.8 (65.7)
LD-80	3400 (898)				48 (106)
LD-100	5500 (1453)				86 (190)

Note: The rated flow is values with a pressure drop of 0.3 MPa (44 PSI) [fluid viscosity 35 mm²/s (164 SSU)].

Model Number Designation



★ Poppet shapes

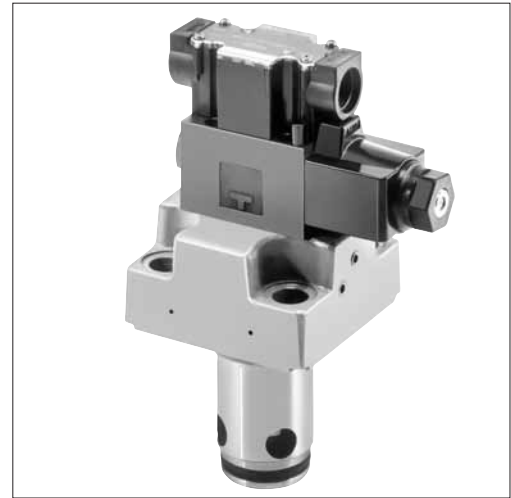
The type without a cushion and the type with a cushion are both suitable for high-speed shifting and shockless shifting respectively. For directional and flow control logic valves, be sure to specify "poppet with cushions".

List of Cover Types

Cover Type Designation	Graphic Symbols	Valve Size								
		16	25	32	40	50	63	80	100	
Directional Control	Standard (None)		○	○	○	○	○	○	○	○
	With Check Valve (4)		○	○	○	○	○	○	—	—
	With Shuttle Valve (5)		○	○	○	○	○	○	—	—
Directional & Flow Control	With Stroke Adjuster (1)		○	○	○	○	○	○	○	○
	With Check Valve & Stroke Adjuster (2)		○	○	○	○	○	○	—	—
	With Shuttle Valve & Stroke Adjuster (3)		○	○	○	○	○	○	—	—

Solenoid Operated Directional Control Logic Valves

These solenoid operated directional control logic valves are composed of directional control valves and solenoid operated directional valves combined together. The solenoid operated directional valves serve to switch pilot lines and the directional control valves are used to control the direction of the main circuits. Covers provided with various control valves are available to provide optimum control.

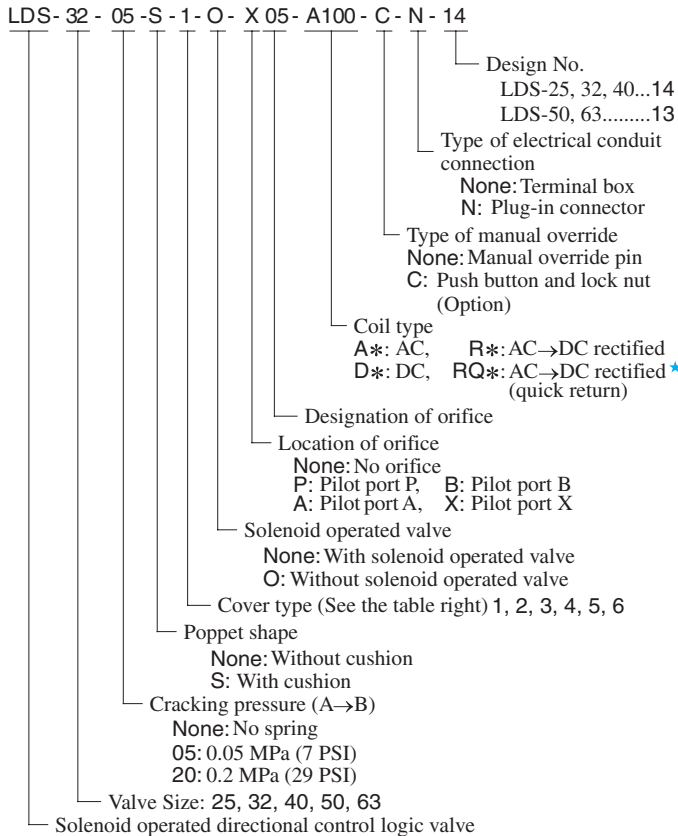


Specifications

Model No.	Rated Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Cracking Pressure MPa (PSI)	Ratio of Poppet Area	Approx. Mass kg(lbs.)
LDS-25	350 (92.5)	31.5 (4570)	Refer to Model No. Designation	2 : 1 (Annular area 50%)	4.2 (9.3)
LDS-32	500 (132)				6.5 (14.3)
LDS-40	850 (225)				10.3 (22.7)
LDS-50	1400 (370)				18.6 (41.0)
LDS-63	2100 (555)				33.6 (74.1)

Note: The rated flow is values with a pressure drop of 0.3 MPa (44 PSI) [fluid viscosity 35mm²/s (164 SSU)].

Model Number Designation



* Applicable only for LDS-50, 63.

List of Cover Types

Cover Type Designation	Graphic Symbols	Valve Size				
		25	32	40	50	63
Normally Closed (1)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Normally Open (2)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Normally Closed with Shuttle Valve (3)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Normally Open with Shuttle Valve (4)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Normally Closed with Shuttle Valve (5)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Normally Open with Shuttle Valve (6)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Note: In case of LDS-*-*-*-*-*O (without solenoid operated valve), the graphic symbol for the solenoid operated valve is excluded.

Relief Logic Valves

These relief logic valves are used to protect pumps and control valves from excessive pressure and control the pressures of their hydraulic lines at constant levels.

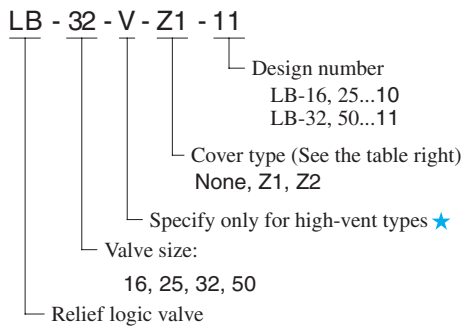
With the help of vent lines, they are also capable of remote and unload control.

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Pres. Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg(lbs.)
LB-16-*-*-10	31.5 (4570)	0.4 - 31.5 (60 - 4570)	125 (33)	3.6 (7.9)
LB-25-*-*-10			250 (66)	4.5 (9.9)
LB-32-*-*-11			500 (132)	6.7 (14.8)
LB-50-*-*-11			1200 (317)	16.1 (35.5)



Model Number Designation



★ Use high-vent pressure types if the shifting time from unloading to on-loading is reduced.

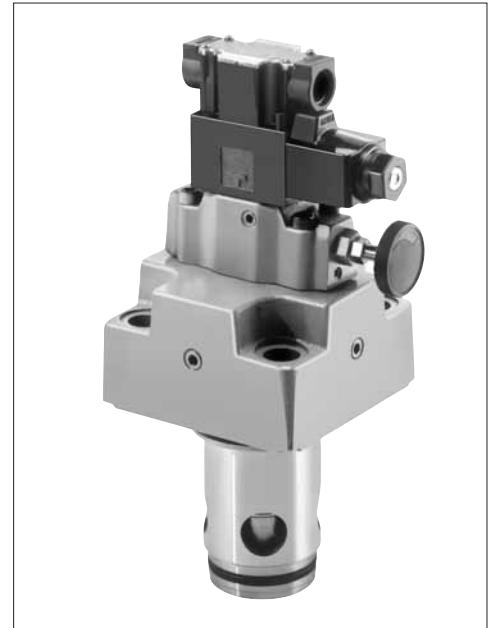
List of Cover Types

Cover Type Designation	Graphic Symbols	Valve Size			
		16	25	32	50
Standard (None)		○	○	○	○
Vent controlled (Z1)		○	○	○	○
Vent controlled (Z2)		○	○	○	○

Solenoid Controlled Relief Logic Valves

These solenoid controlled relief logic valves are composite control valves having solenoid controlled directional and pilot relief valves and vent restrictors combined together.

This configuration eliminates pipes from the vent circuits of relief logic valves. They are used to put pumps into unloading operation, with the solenoid controlled directional valves serving to select pilot lines, or to place hydraulic system two or three pressure controls, with the pilot relief valves in action.

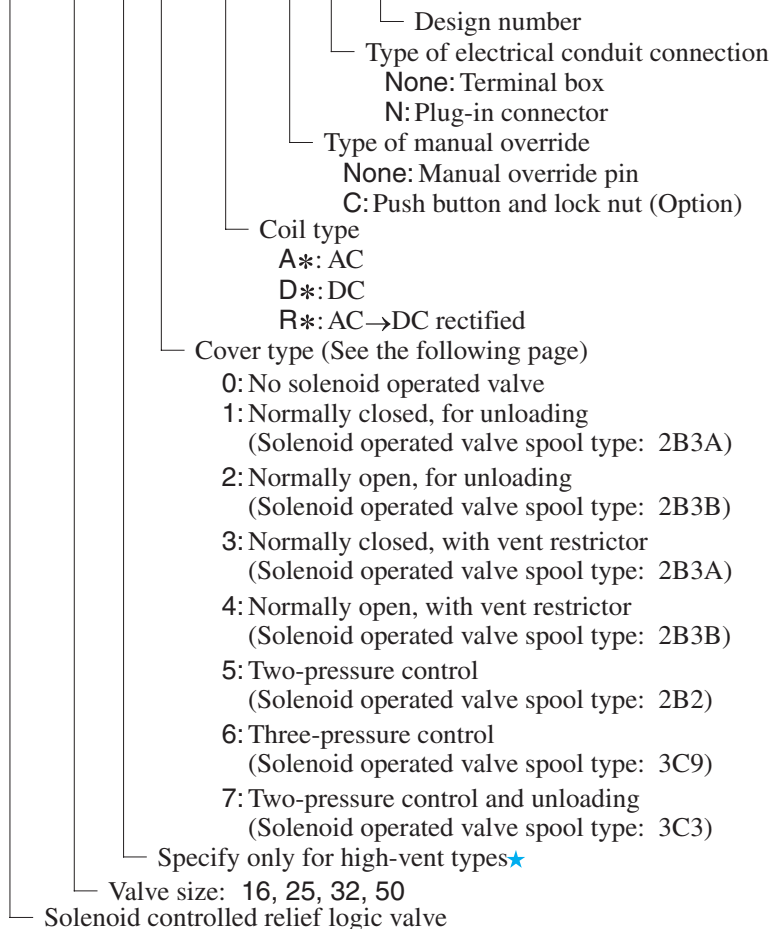


Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Pres. Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg(lbs.)	
				LBS-*0	LBS-*-1/2
LBS-16-*-**-14	31.5 (4570)	0.4 - 31.5 (60 - 4570)	125 (33)	7.2 (15.9)	8.6 (19.0)
LBS-25-*-**-14			250 (66)	8.1 (17.9)	9.5 (20.9)
LBS-32-*-**-14			500 (132)	10.3 (22.7)	11.7 (25.8)
LBS-50-*-**-14			1200 (317)	19.7 (43.4)	21.1 (46.5)

Model Number Designation

LBS- 32 - V - 1 - A100 - C - N - 14



★ Use high-vent pressure types if the shifting time from unloading to on-loading is reduced.



List of Cover Type

Cover Type Designation	Graphic Symbols	Valve Size			
		16	25	32	50
Without Solenoid Valve (0)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Normally Closed for Unloading (1)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Normally Open for Unloading (2)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Normally Closed with Vent Restrictor (3)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Normally Open with Vent Restrictor (4)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Cover Type Designation	Graphic Symbols	Valve Size			
		16	25	32	50
Two Pressure Control (5)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Three Pressure Control (6)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Two Pressure Control and Unloading (7)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>