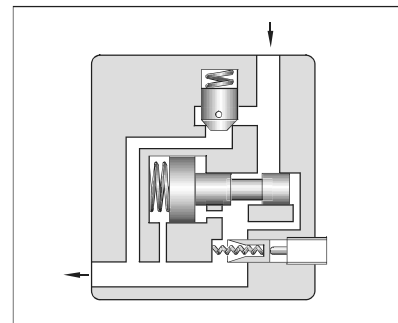


Flow Control Valves / Flow Control and Check Valves

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 -01- $\frac{4}{8}$ -*-11*	4(1.06) 8(2.1)	0.02(.005) {0.04 (.011)} *	14 (2030)	1.3 (2.9)
FG -02-30-*-30*	30(7.9)	0.05 (.013)	21 (3050)	3.8 (8.4)
FG -03-125-*-30*	125(33)	0.2 (.053)		7.9 (17.4)
FG -06-250-*-30*	250(66)	2 (.53)		23 (50.7)
FG -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

Option

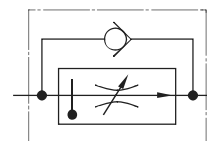
Pres. compensator stroke adjustment

Can reduce jumping at the start of the actuator.

Graphic Symbols



FG



FCG

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]

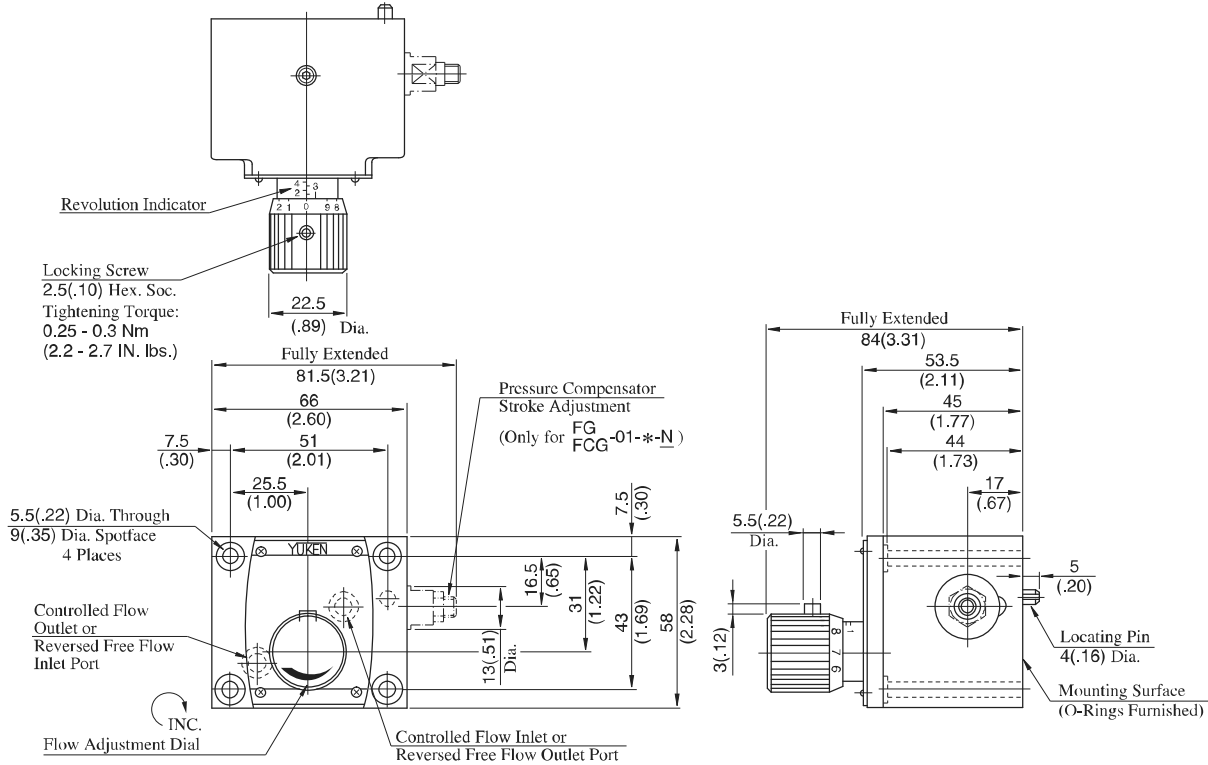
Loosen the locking screw and turn the flow adjustment handle clockwise for increase, and anti-clockwise for decrease. Open condition is indicated in digital-scale in built-in revolution indicator (Refer to the characteristics of "Metred Flow vs. Dial Position").

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.

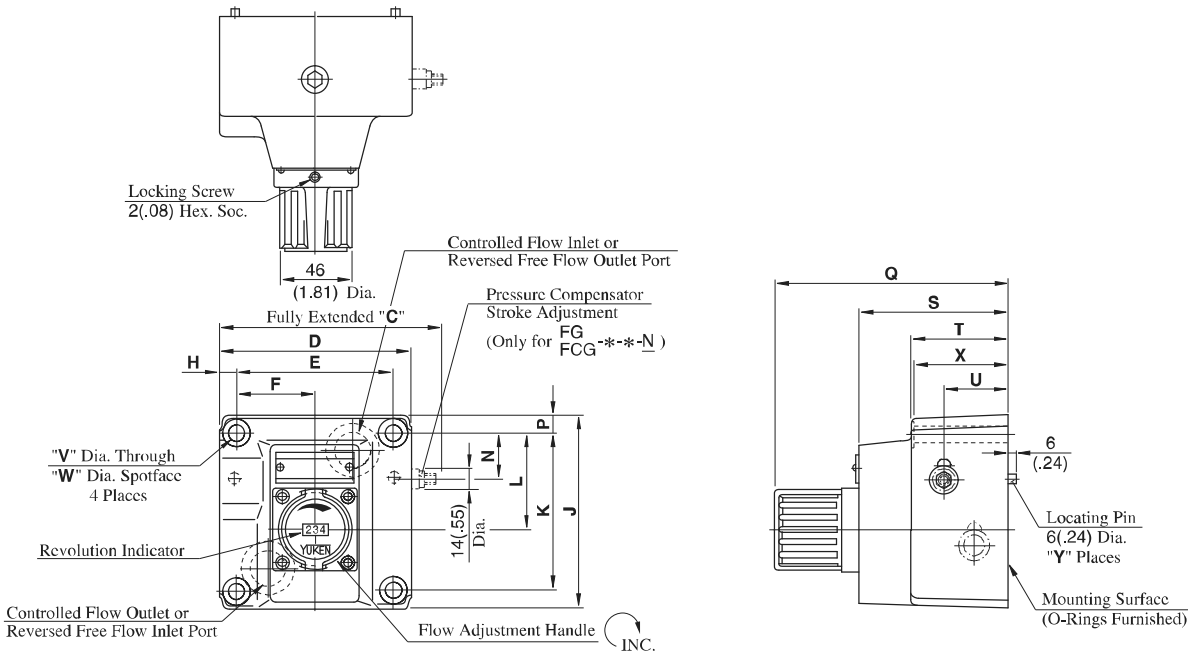
FG/FCG-01-**-**11/1190



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

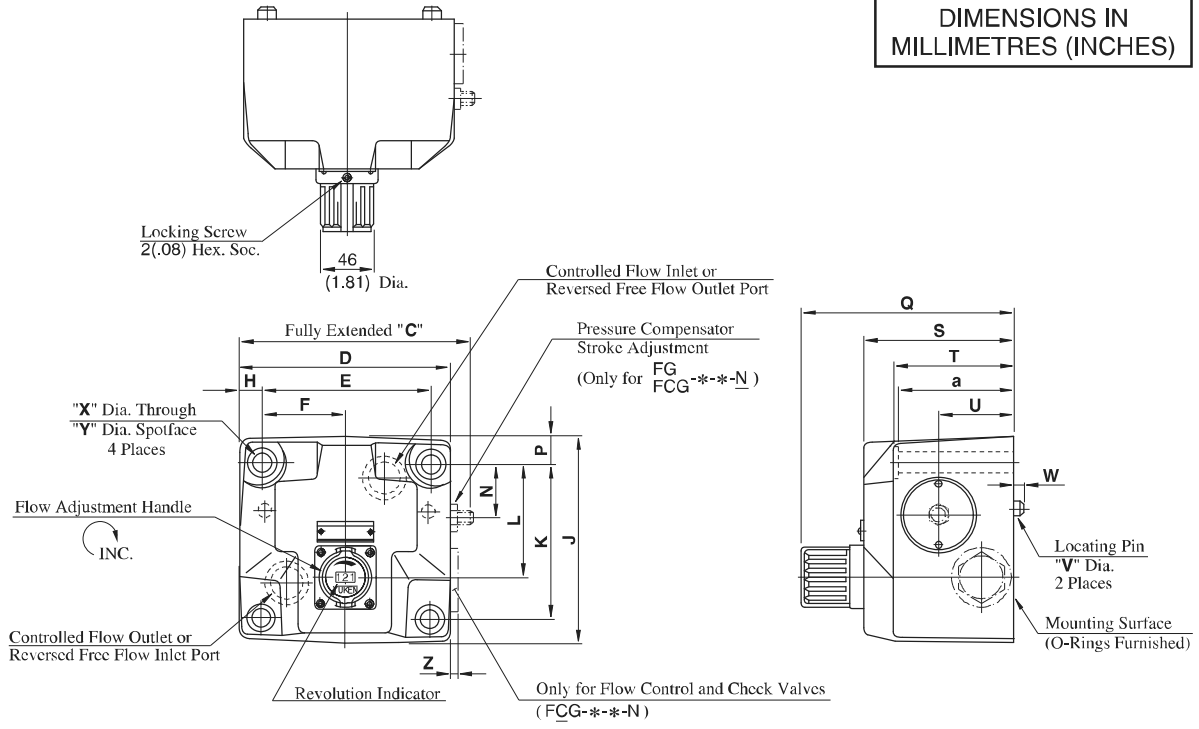
D

Flow Control Valves
Flow Control and Check Valves

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

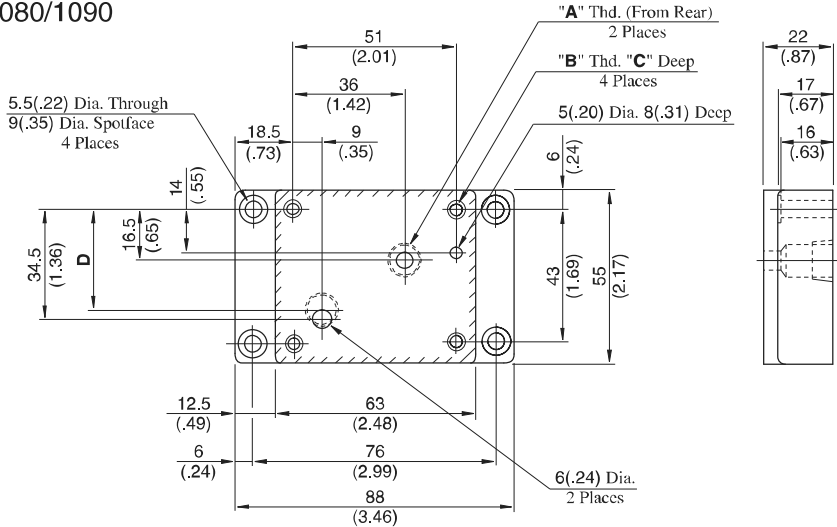
Mounting surface:
 F*G-06: ISO 6263-AP-08-2-A

**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)

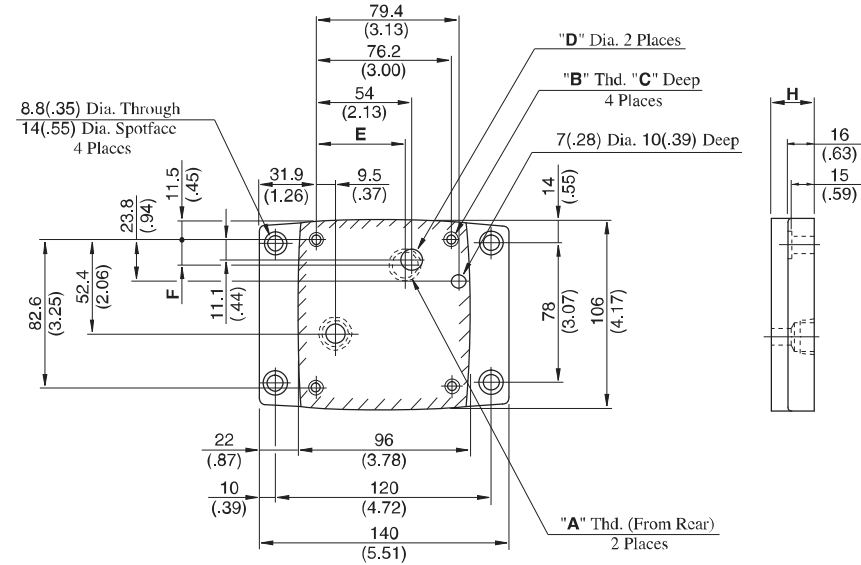
FGM-01X-10/1080/1090



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)

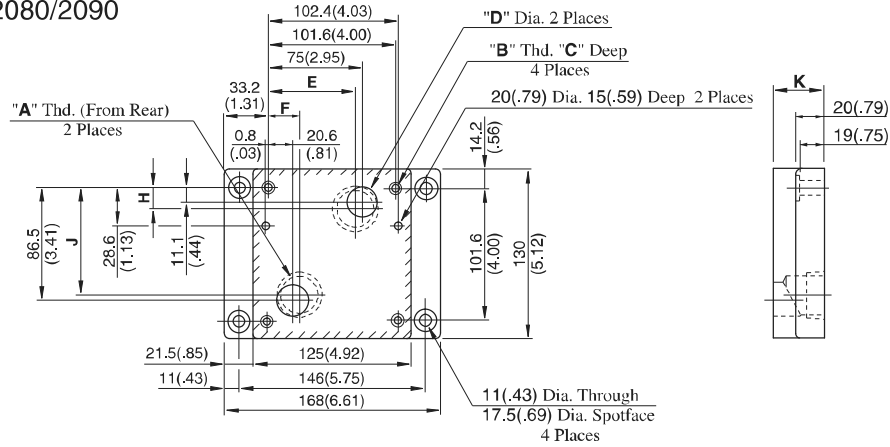
FGM-02*-20/2080/2090



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	18 (.71)	14.0 (.55)			

D
 Flow Control Valves
 Flow Control and Check Valves

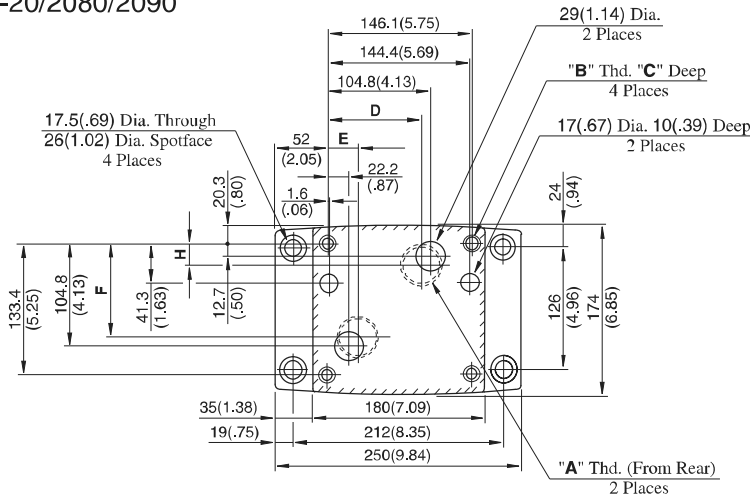
FGM-03*-20/2080/2090



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			15.0 (.59)					
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			19.0 (.75)					
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)						

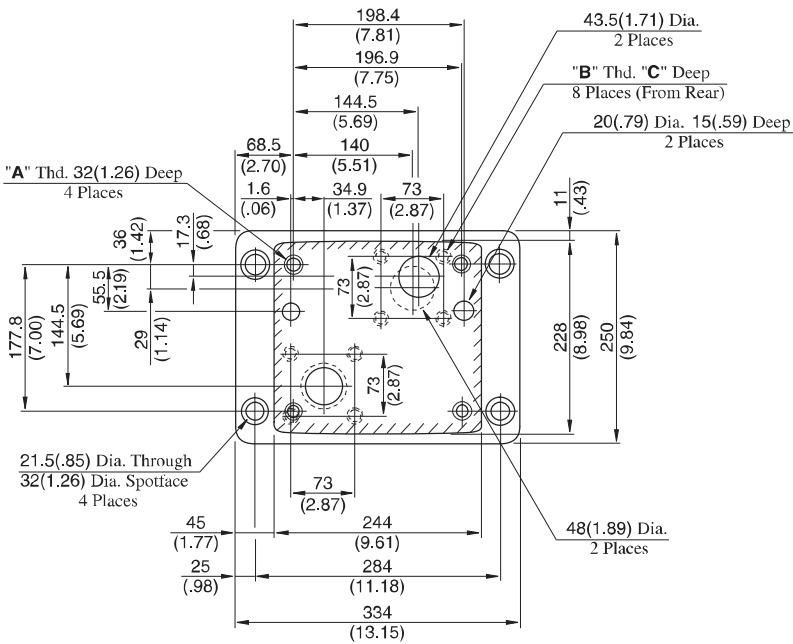
DIMENSIONS IN MILLIMETRES (INCHES)

FGM-06*-20/2080/2090

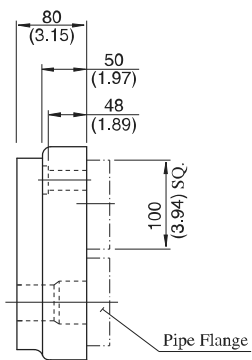


Sub-plate Model Numbers	"A" Thd.	"B" Thd.	C	D	E	F	H	J	K	L
FGM-06X-20	Rc 1	M16	30 (1.18)	104.8 (4.13)	22.2 (.87)	104.8 (4.13)	18 (.71)	45 (1.77)	35 (1.38)	34 (1.34)
FGM-06X-2080	1 BSP.F									
FGM-06X-2090	1 NPT	5/8-11 UNC	35 (1.38)	99 (3.90)	34 (1.34)	99 (3.90)	23 (.91)	60 (2.36)	40 (1.57)	39 (1.54)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

FGM-10Y-20/2090



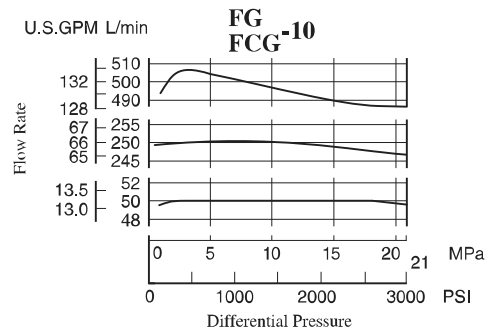
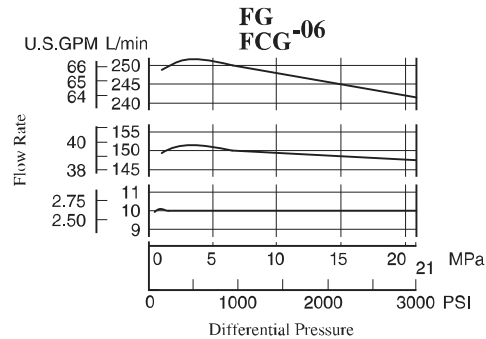
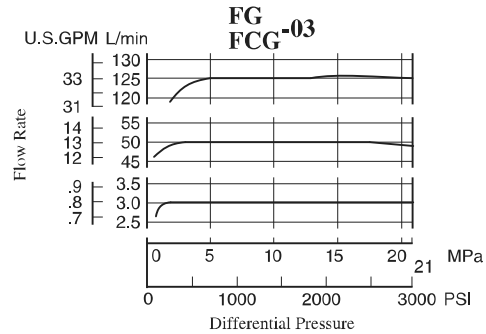
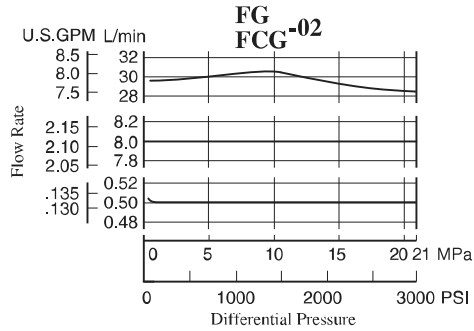
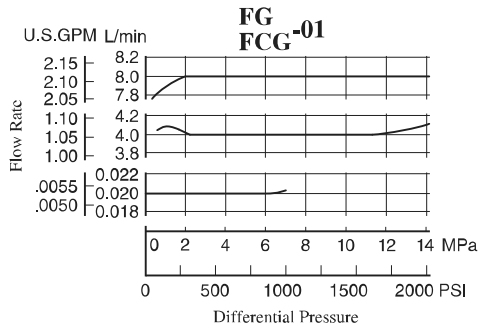
DIMENSIONS IN MILLIMETRES (INCHES)



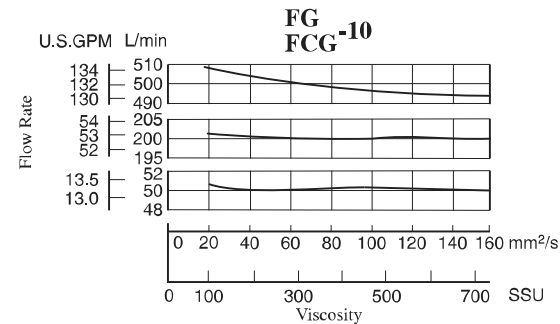
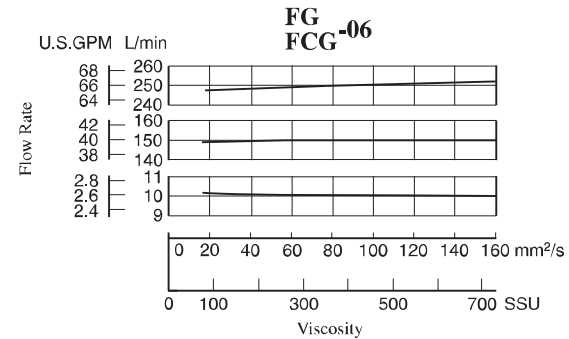
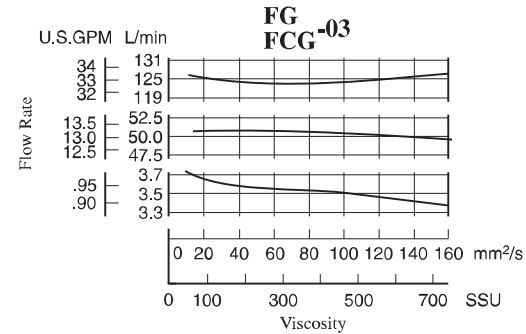
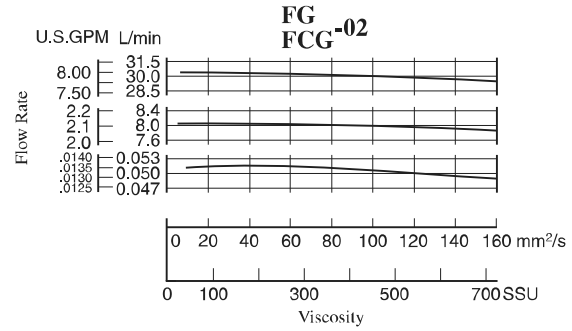
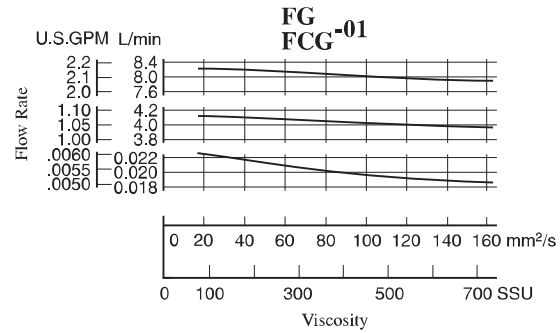
Sub-plate Model Numbers	"A" Thd.	"B" Thd.	C
FGM-10Y-20	M20	M16	32 (1.26)
FGM-10Y-2090	3/4-10 UNC	5/8-11 UNC	34 (1.34)

D
 Flow Control Valves
 Flow Control and Check Valves

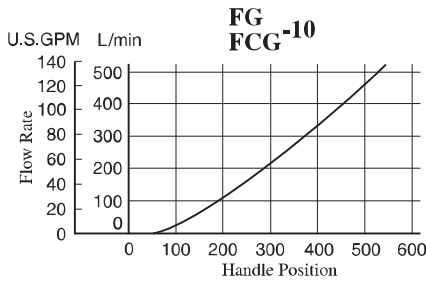
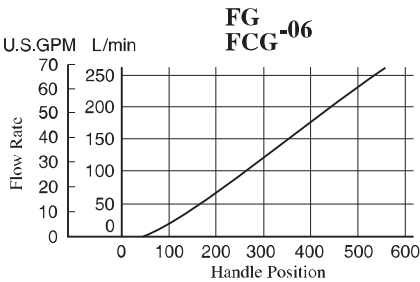
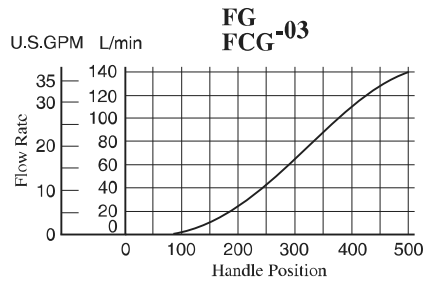
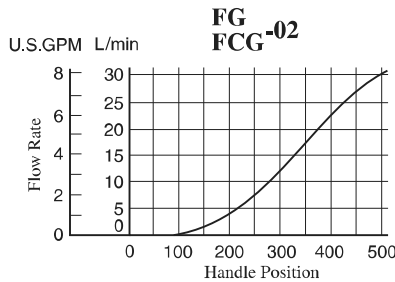
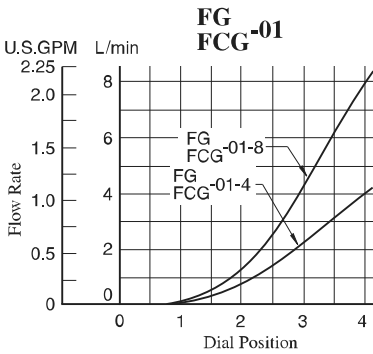
■ Metred Flow vs. Differential Pressure



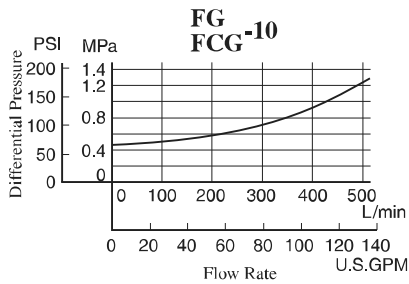
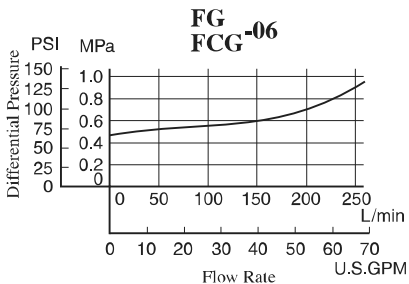
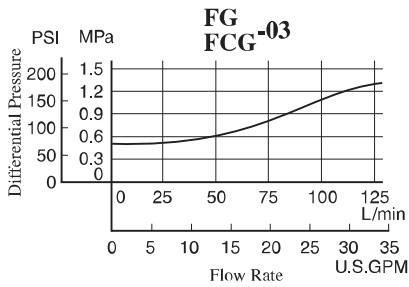
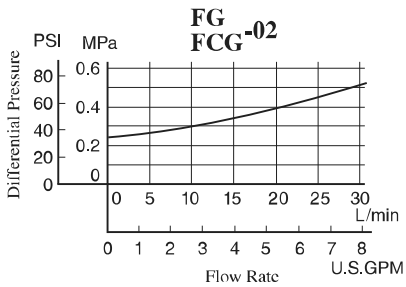
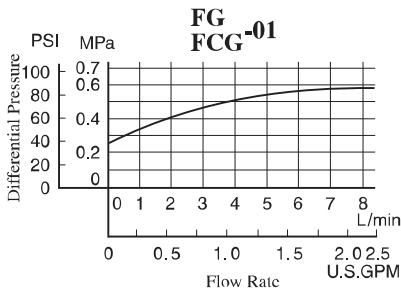
■ Metred Flow vs. Viscosity



Metred Flow vs. Dial Position



Min. Required Pressure Difference

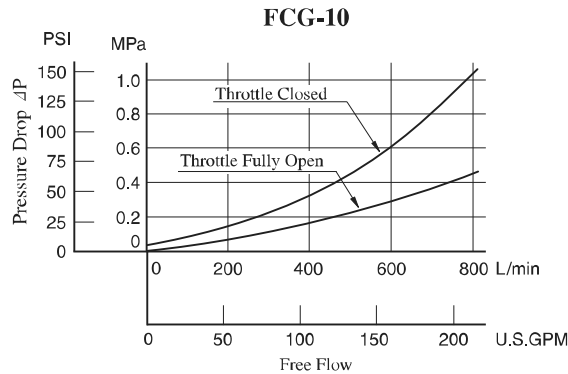
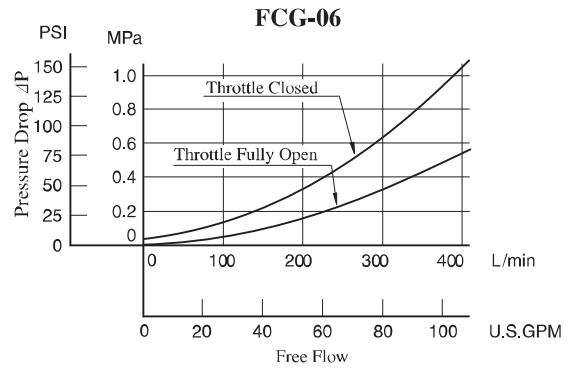
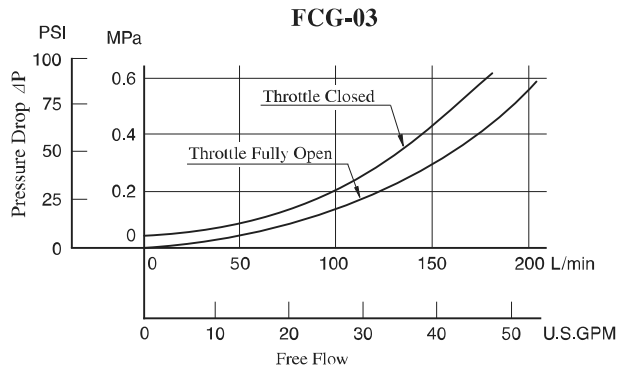
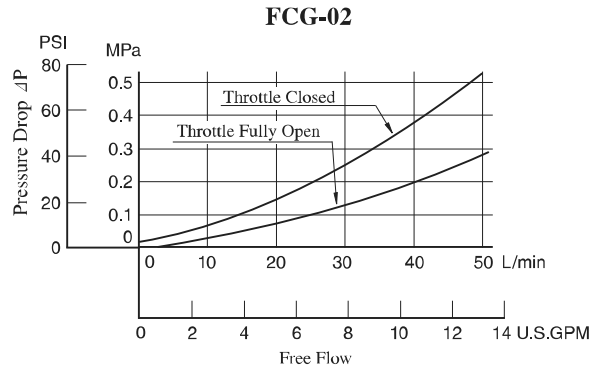
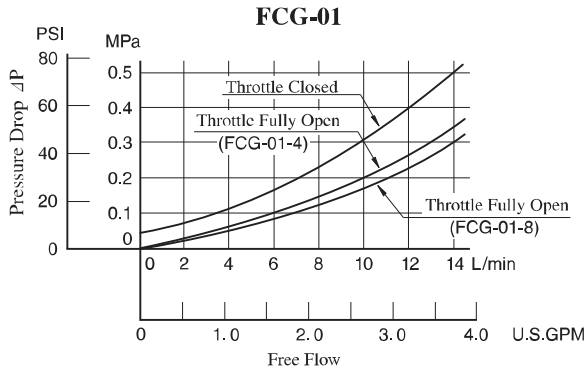


D

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.

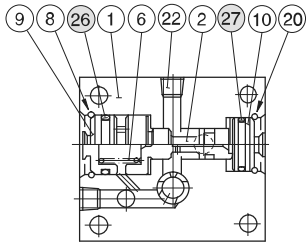
Viscosity	mm ² /s	20	40	60	80	100
	SSU	98	186	278	371	464
Factor		0.87	1.03	1.14	1.23	1.30

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

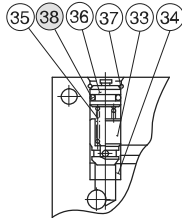
$$\Delta P' = \Delta P (G'/0.850)$$

■ List of seals

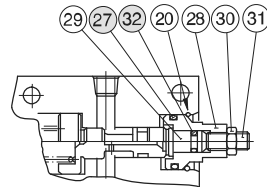
FG -01-*-*-11/1190
FCG



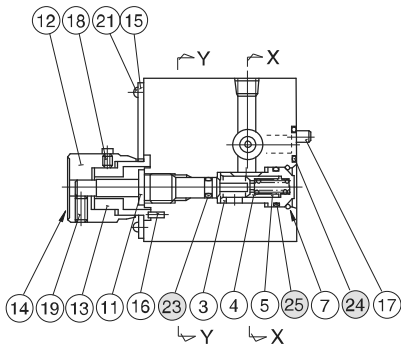
Section X-X
(FG-01 Type)



Section Y-Y
(FCG-01 Type)



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



● List of Seals

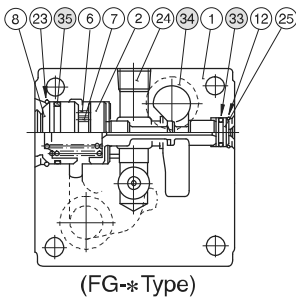
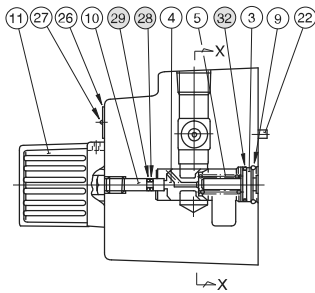
Item	Name of Parts	Part Numbers	Qty.
23	O-Ring	SO-NA-P4	1
24	O-Ring	SO-NB-P9	2
25	O-Ring	SO-NB-P10	1
26	O-Ring	SO-NB-P16	1
27	O-Ring	SO-NB-P14	1
32	O-Ring	SO-NA-P5	1
38	O-Ring	SO-NB-P7	1

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

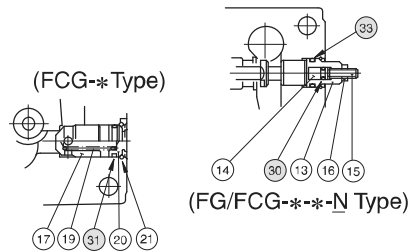
● List of Seal Kits

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

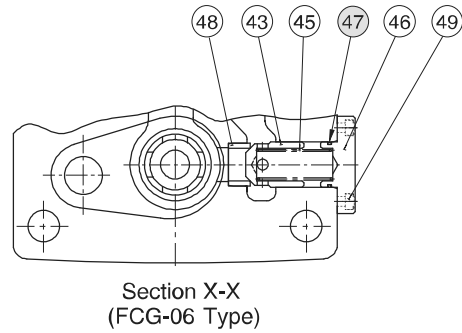
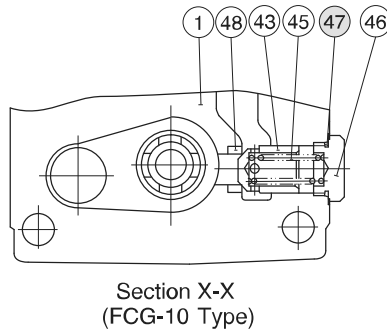
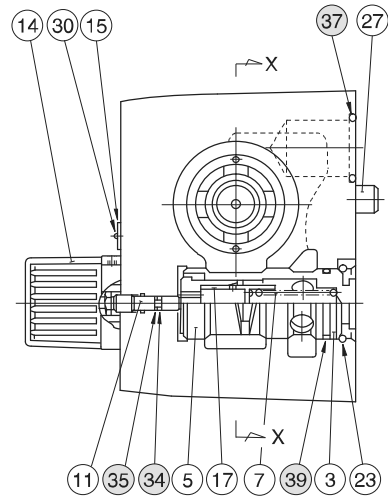
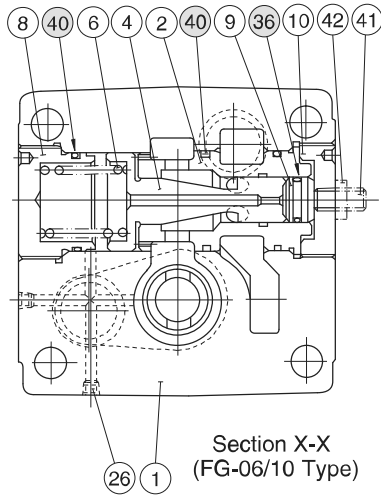
Item	Name of Parts	Part Numbers		Qty.
		FG FCG-02	FG FCG-03	
28	O-Ring	SO-NA-P4	SO-NA-P4	1
29	Back Up Ring	SO-BB-P4	SO-BB-P4	1
30	O-Ring	SO-NB-P5	SO-NB-P5	1
31	O-Ring	SO-NB-P10A	SO-NB-P16	1
32	O-Ring	SO-NB-P12	SO-NB-P18	1
33	O-Ring	SO-NB-P14	SO-NB-P14	1
34	O-Ring	SO-NB-P18	SO-NB-P28	2
35	O-Ring	SO-NB-G25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