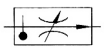
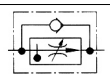
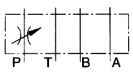
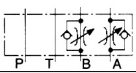
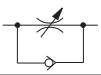
D

FLOW CONTROLS

Valve Type	KS Graphic Symbols	Maximum Operating Pressure MPa {kgf/cm²}	Maximum Flow L/min (1 2 3 5 10 20 30 50 100 200 300 500 1000 2000 3000 5000)	Page
Flow Control Valves		21{214}	01 02 03	D-3
Flow Control and Check Valves		21{214}	01 02 03	D-3
Restrictors		25{255}	03 06 (Rated flow)★	D-10
One Way Restrictors		25{255}	03 06 (Rated flow)★	D-14
Throttle Modules		25{255}	01 03	D-18
Throttle & Check Modules		25{255}	01 03	D-18
Needle Valves		35{357}	02	D-22
Flow Control and Check Valves		21{214}	400 600 800 1200 1600 2000	D-24

★Rated flow stands for approximate flow rate when the pressure drop between inlet and outlet ports of the valve in fully opened condition becomes 0.3MPa{kgf/cm²} maximum at fluid's specific gravity of 0.85 and kinematic viscosity of 20㎟/s(98SSU).

Hydraulic Fluid

1.Fluid Types

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

Types of fluids	Specifications
Petroleum base oils	Use fluids equivalent to ISO VG32 or VG46.
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 hydtaulic fluids other than those listed above, please consult your SEWON representatives in advande.
Water in oil emulsion type fluids can be used for restrictors and one way restrictors.

2.Recommended Viscosity and Oil Temperatures

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

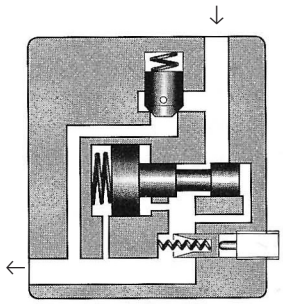
Name	Viscosity	Temperature
Flow Control Valves Flow Control and Check Valves	20~200mm²/s{cSt}	-15℃~+70℃
Restrictors One Way Restrictors Throttle Modules Throttle and Check Modules Needle Valves	15~400mm²/s{cSt}	

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 shorten the life of the valves. Please maintain the degree of contamination within NAS 1638-Grade12. Use 25μm 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.



Ratings

Model Numbers	Max.Metred Flow Capacity L/min	Min. Metred Flow Capacity L/min	Max. Operating Pressure MPa{kgf/cm²}	Approx. Madss kg
FG FCG-01-$\frac{4}{8}$-※-11	8	0.02 (0.04) ★	14{143}	1.3
FG FCG-02-30-※-30	30	0.05	21{214}	3.8
FG FCG-03-125-※-30	125	0.2		7.9

★ The figures in the brace are for pressures above 7MPa{71.4kgfcm}.

Model Number Designation

FC	G	- 01	- 8	- N	- 11
Series Number	Type of Mounting	Valve Size	Max.Metred Flow Capacity L/min	Pres. Compensator ★ Stroke Adjustment	Design Number
F: Flow Control Valves **FC**: Flow Control and Check Valves	**G**: Sub-plate Mounting	**01**	**4 · 8**	**N**: Applicable only for Pres.Compesator Stroke Adjustment (Option-Omit if not required)	**11**
		02	**30**		**30**
		03	**125**		**30**

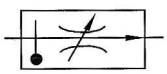
★ **Pres.compensator stroke adjustment Can reduce jumping at the start of the actuator.**

Attachment

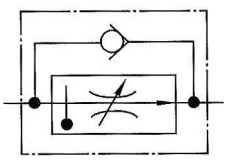
Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw
FG FCG-01	M5 × 55L · · · · 4pcs
FG FCG-02	M8 × 50L · · · · 4pcs
FG FCG-03	M10 × 75L · · · · 4pcs

KS Graphic Symbols



FG



FCG

Sub-plate

Valve Model Numbers	Sub-plate Model Numbers	Thread Size	Approx Mass kg
FG FCG -01	FGM-01X-10	Rc ¼	0.8
FG FCG -02	FGM-02-20	Rc ¼	2.3
	FGM-02X-20	Rc ⅜	2.3
	FGM-02Y-20	Rc ½	3.1
FG FCG -03	FGM-03X-20	Rc ½	3.9
	FGM-03Y-20	Rc ¾	5.7
	FGM-03Z-20	Rc 1	5.7

- 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

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.

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 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〕

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

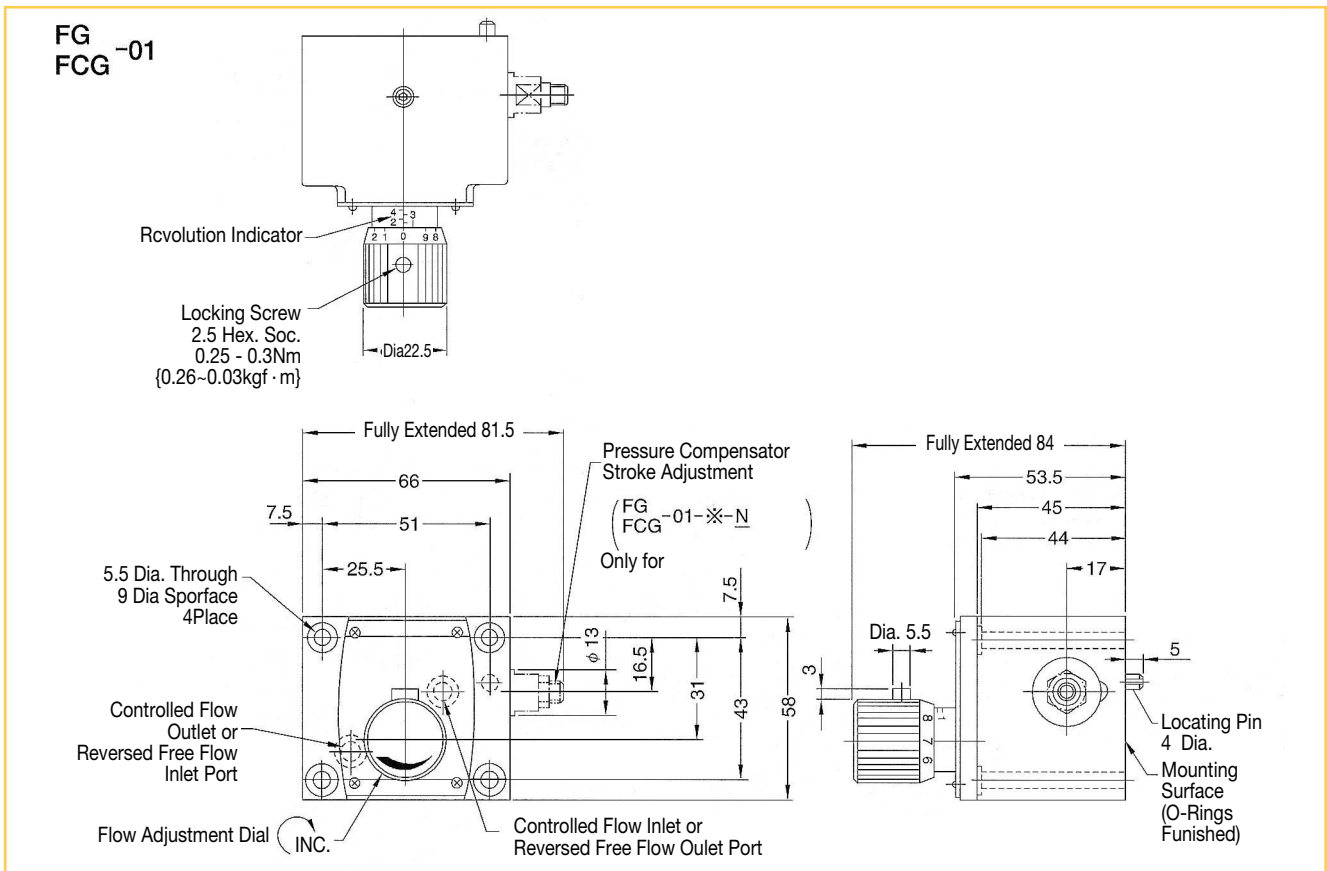
Open condition is indicated In digital scale in built-in revolution indicator.

(Refer to characteristics of "Metred Flow vs. Dial Position")

After flow adjustments, tighten the locking screw.

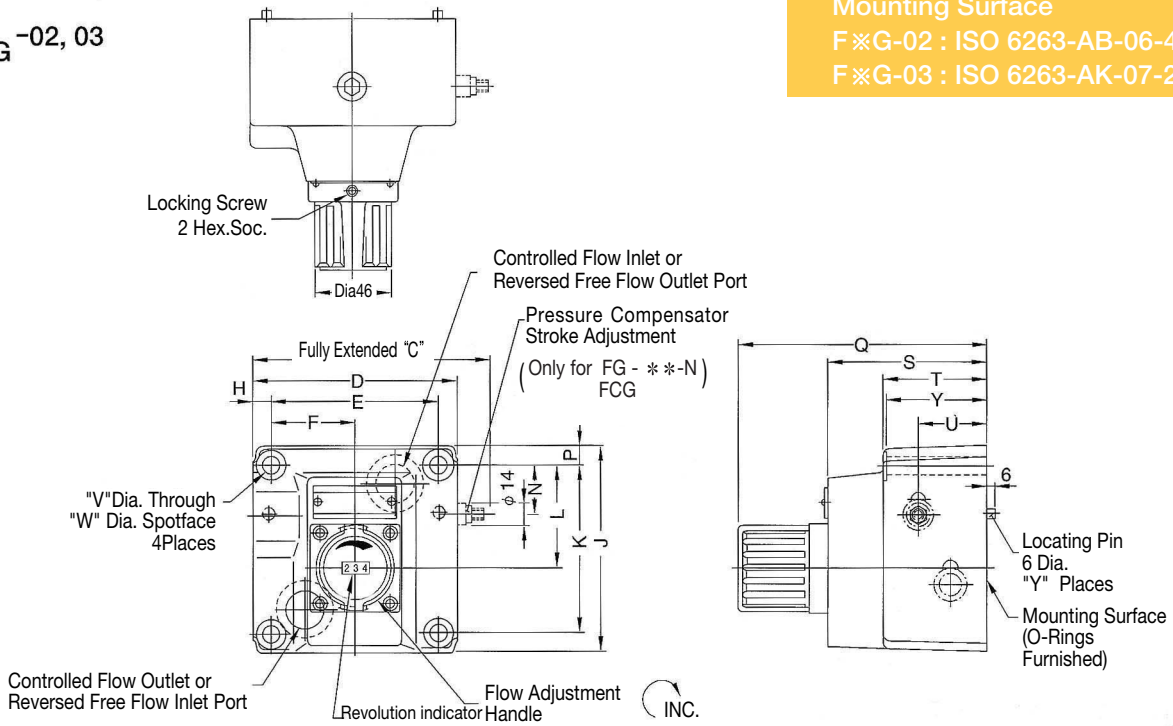
Line filter

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



FG
FCG -02, 03

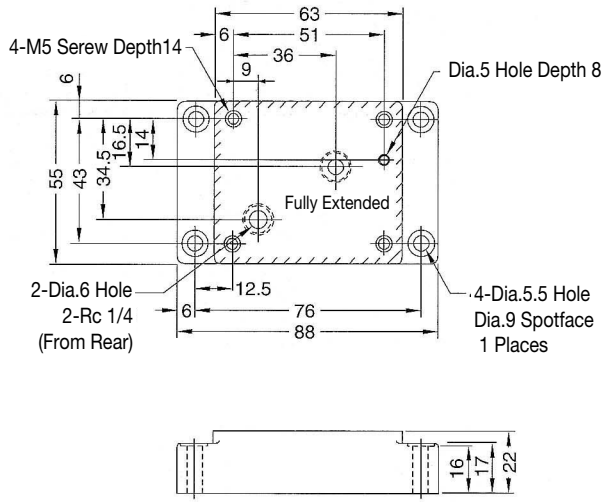
Mounting Surface
F※G-02 : ISO 6263-AB-06-4-B
F※G-03 : ISO 6263-AK-07-2-A



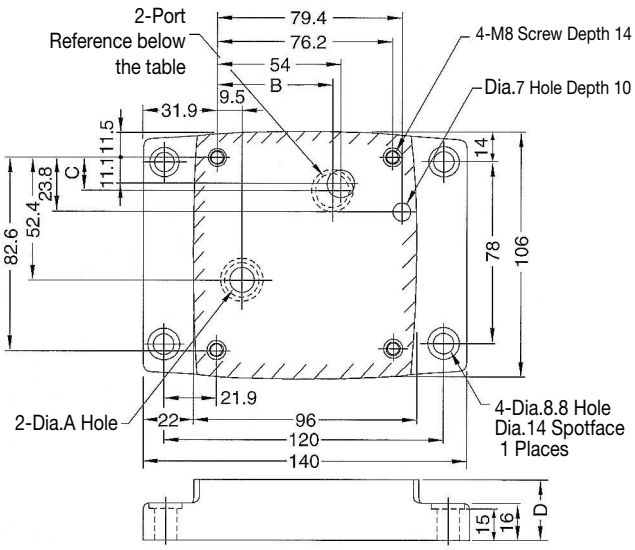
Model No.	C	D	E	F	H	J	K	L	N	P	Q	S	T	U	V	W	X	Y
FG FCG-02	116	96	76.2	38.1	9.9	104.5	82.6	44.3	24	9.9	123	69	40	23	1	8.8	14	39
FG FCG-03	145	125	101.6	50.8	11.7	125	101.6	61.8	29.8	11.7	152	98	64	41	2	11	17.5	63

Sub Plate

FGM-01X

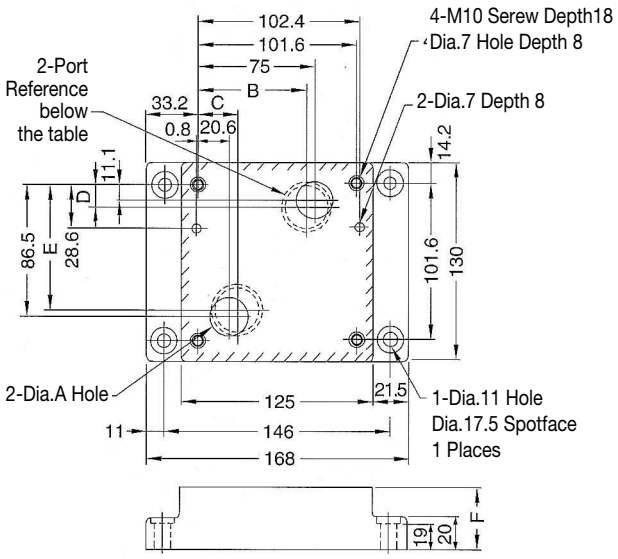


FGM-02, 02X, 02Y



Sub-plate Model Number	Thread Size Rc	A	B	C	D
FGM-02-20	1/4	11	54	11.1	25
FGM-02X-20	3/8	14	54	11.1	25
FGM-02Y-20	1/2	14	51	14	35

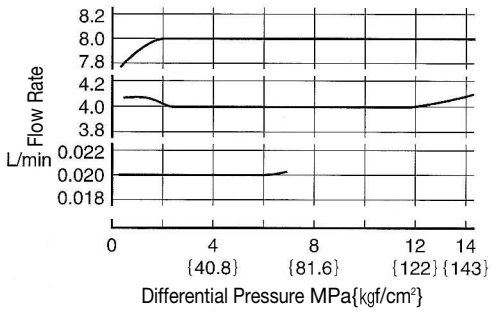
FGM-03X, 03Y, 03Z



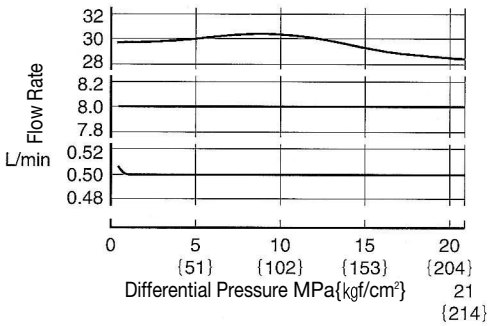
Sub-plate Model Number	Thread Size Rc	A	B	C	D	E	F
FGM-03X-20	1/2	17.5	75	20.6	11.1	86.5	25
FGM-03Y-20	3/4	23	70	25.6	16.1	81.5	40
FGM-03Z-20	1	23	70	25.6	16.1	81.5	40

Metred Flow vs. Differential Pressure

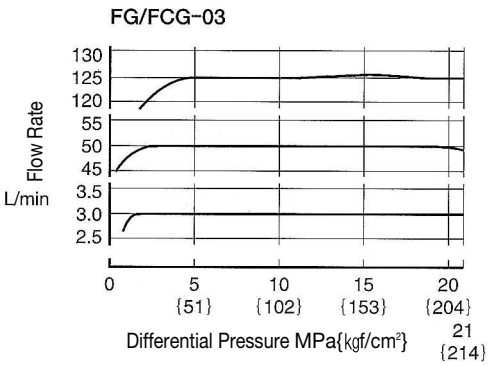
FG/FCG-01



FG/FCG-02

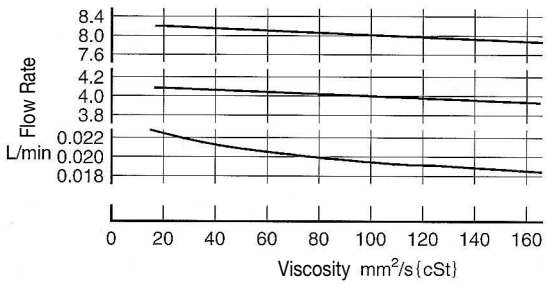


FG/FCG-03

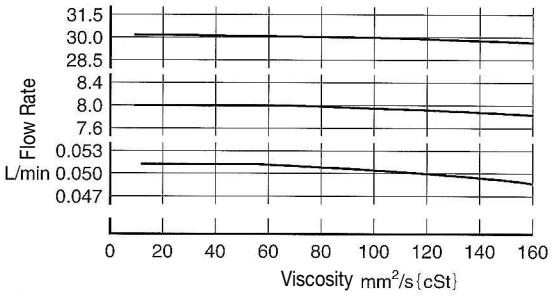


Metred Flow vs. Viscosity

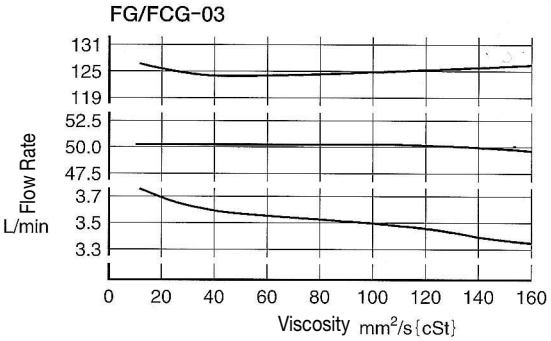
FG/FCG-01



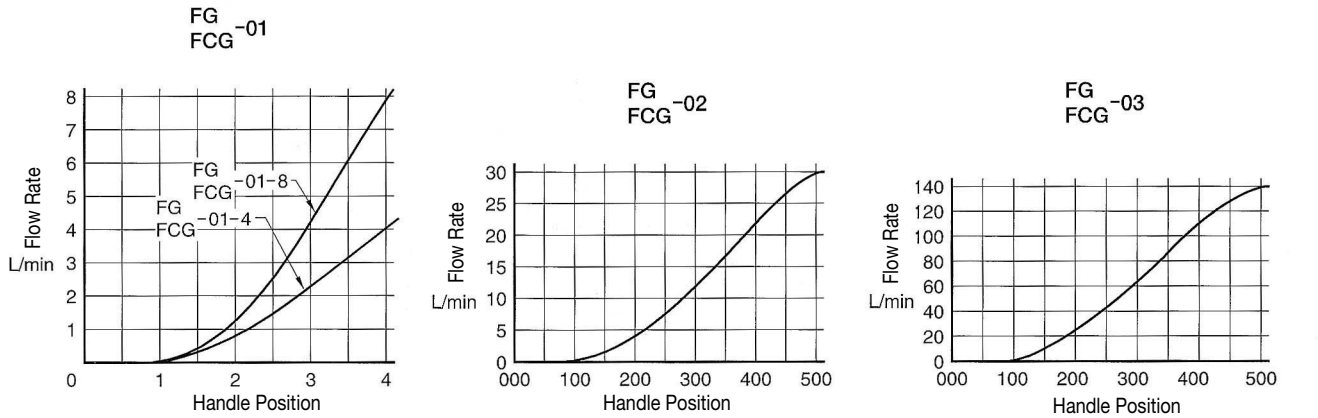
FG/FCG-02



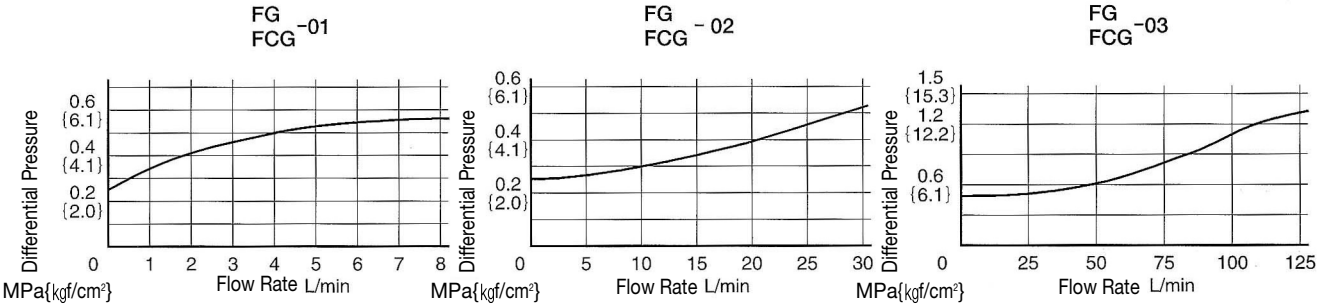
FG/FCG-03



Metred Flow vs. Dial Position

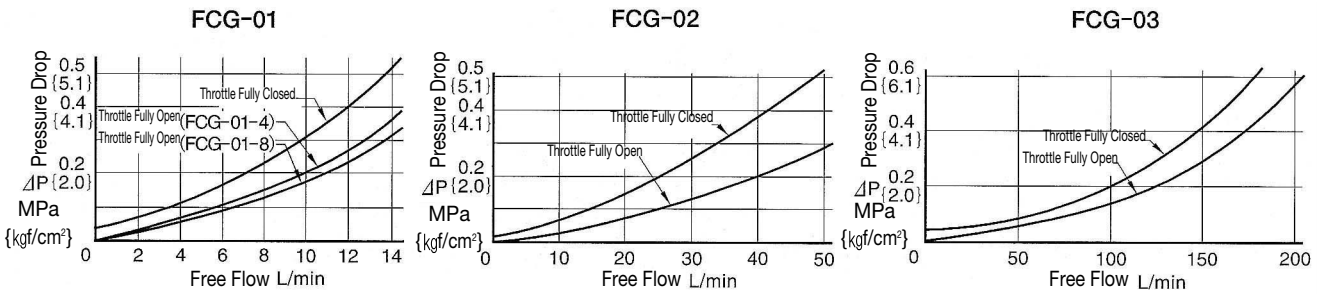


Min.Requied Pressure Difference



Pressure Drop for Reversed Free Flow

Hydraulic Fluid: Viscosity 35mm²/s, Specific Gravity 0.850



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

Viscosity	mm²/s {cSt}	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.

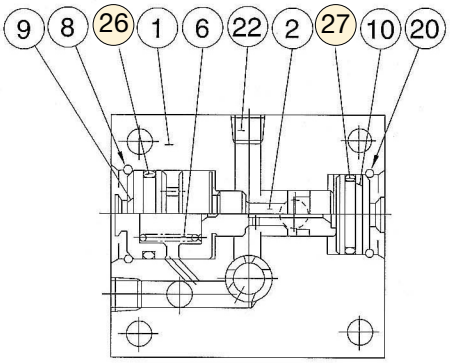
$\Delta P' = \Delta P(G' / 0.850)$

List of Seals

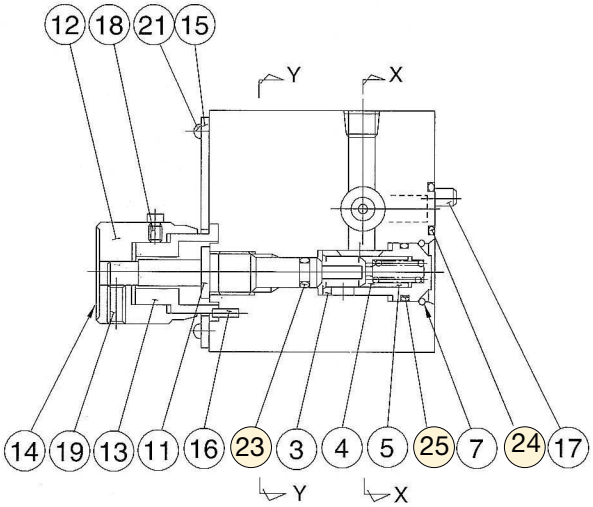
CAUTION

When making replacement of seals or solenoid assemblies, please do it carefully after reading through the relevant instructions in the Operator's Manual.

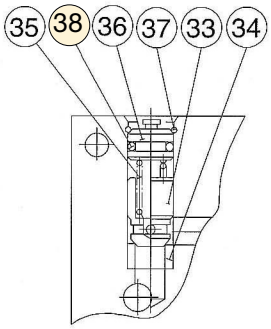
FG FCG-01



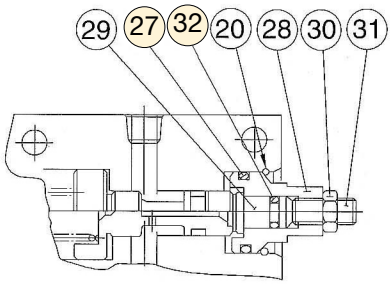
Section X-X
(FG-01 Type)



Item	Name of Parts	Part Numbers	Qty.
23	O-Ring	JIS B 2401-1A-P4	1
24	O-Ring	JIS B 2401-1B-P9	2
25	O-Ring	JIS B 2401-1B-P10	1
26	O-Ring	JIS B 2401-1B-P16	1
27	O-Ring	JIS B 2401-1B-P14	1
32	O-Ring	JIS B 2401-1A-P4	1
38	O-Ring	JIS B 2401-1B-P7	1

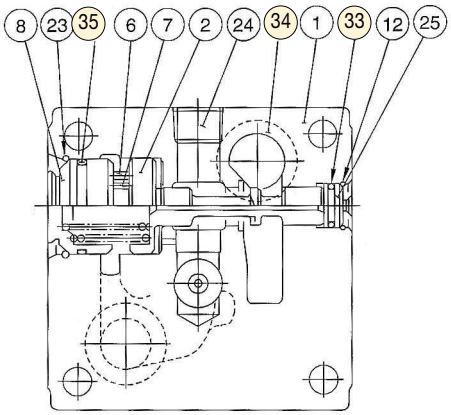


Section X-Y
(FCG-01 Type)

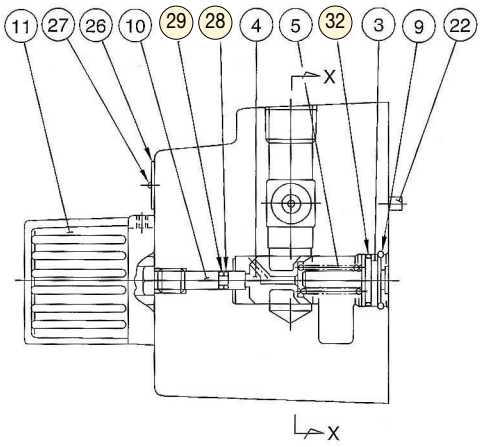


Section X-X
(FG/FCG-01-∗-N Type)

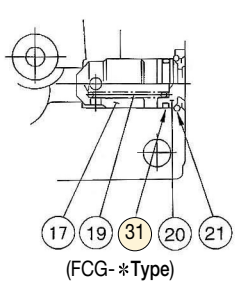
FG FCG-02, 03



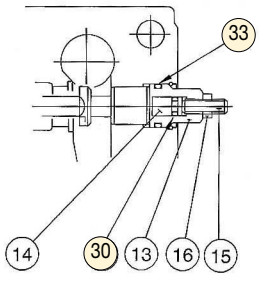
Section X-X
(FG-∗Type)



Item	Name of Parts	Part Numbers		Qty.
		FG FCG-02	FG FCG-03	
28	O-Ring	JIS B 2401-1A-P4	JIS B 2401-1A-P4	1
29	Back Up Ring	JIS B 2407-T2-P4	JIS B 2407-T2-P4	1
30	O-Ring	JIS B 2401-1B-P5	JIS B 2401-1B-P5	1
31	O-Ring	JIS B 2401-1B-P10A	JIS B 2401-1B-P16	1
32	O-Ring	JIS B 2401-1B-P12	JIS B 2401-1B-P18	1
33	O-Ring	JIS B 2401-1B-P14	JIS B 2401-1B-P14	1
34	O-Ring	JIS B 2401-1B-P18	JIS B 2401-1B-P28	2
35	O-Ring	JIS B 2401-1B-G25	JIS B 2401-1B-G35	1



(FCG-∗Type)



Section X-X
(FC FCG∗-∗-N Type)