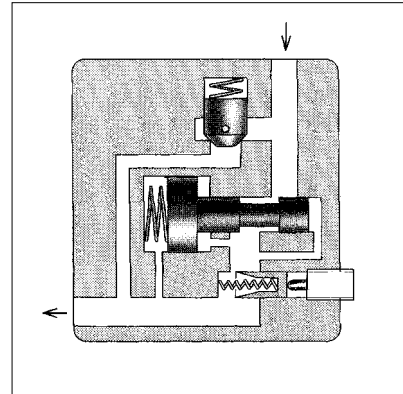
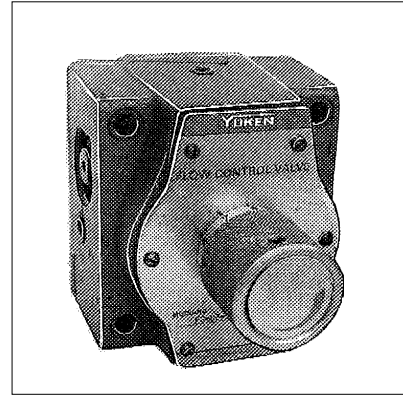


■ Flow Control Valves

■ 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.



■ Ratings

Model Numbers	Max. Metered Flow Capacity l/min	Min. Metered Flow Capacity l/min	Max. Operating Pressure kgf/cm ²	Mass kg
FG - 01-4- ⁴ *-11 FCG - 8	4 8	0.02 (0.04)*	140	1.3
FG - 02-30-* ³⁰ -22801 FCG	30	0.05	210	3.8
FG - 03-125-* ¹²⁵ -22801 FCG	125	0.2		7.9

* The figures in the bracket are for pressures above 70 kgf/cm²

■ Model Number Designation

F-	FC	G	-01	-8	-N	-11
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metered Flow Capacity l/min	Pres. Compensator Stroke Adjustment	Design Number
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	F: Flow Control Valves FC: Flow Control and Check Valves	G: Sub-Plating Mounting	01	4:4 8:8	N: Applicable only for Pres. Compensator Stroke Adjustment (option) (Omit if not required)	11
			02	30:30		22801
			03	125:125		22801

Also available with locking feature with key & model no. Please refer drawing FG - ⁰² - * - * - 22801HO1
03

■ Attachment

● Mounting Bolts

Valve Model Number	Socket Head Cap Screw	Qty.	Bolt Kit Model Number
F*G-01	M5 x 55 Lg.	4	BKFG - 01-10
F*G-02	M8 x 60 Lg.	4	BKFG - 02-22
F*G-03	M10 x 80 Lg.	4	BKFG - 03-22

■ Option

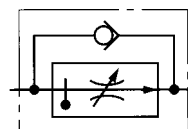
● Pres. compensator stroke adjustment

Can reduce jumping at the start of the actuator

Graphic Symbols



FG



FCG

■ Sub-Plates

Valve Model Number	Sub-Plate Model No.	Piping Size	Mass kg.
FG -01 FCG	FGM-01 X-1080	1/4 BSP.F	0.8
FG -02 FCG	FGM-02-2080	1/4 BSP.F	2.3
	FGM-02X-2080	3/8 BSP.F	2.3
	FGM-02Y-2080	1/2 BSP.F	3.1
FG -03 FCG	FGM-03-2080	3/8 BSP.F	3.9
	FGM-03X-2080	1/2 BSP.F	3.9
	FGM-03Y-2080	3/4 BSP.F	5.7

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

■ Instructions

● Min. required pressure difference

Min required 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, please refer to the performance curve.

● 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]

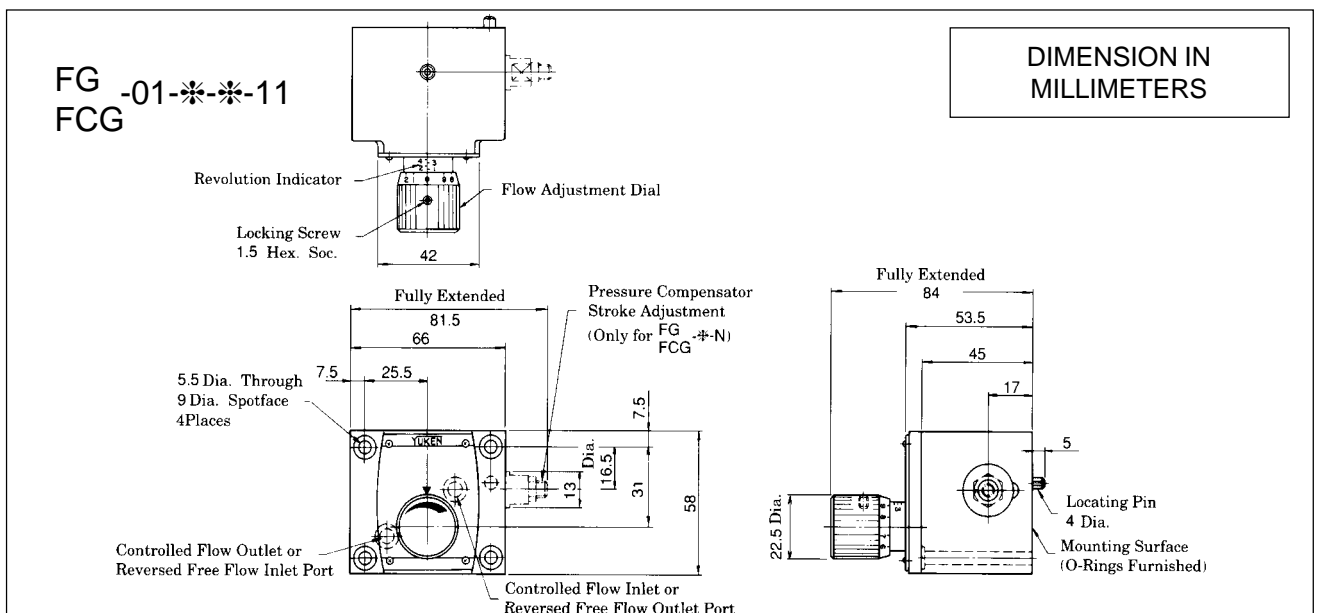
Loosen locking screw and turn flow adjustment dial clockwise for increase, and anti-clockwise for decrease. The dial makes about 4 revolutions from zero to full flow and the valve opening is indicated on the revolution indicator. (Refer to characteristic of "Metered Flow vs. Dial Position")

Also Flow adjustment, tighten locking screw.

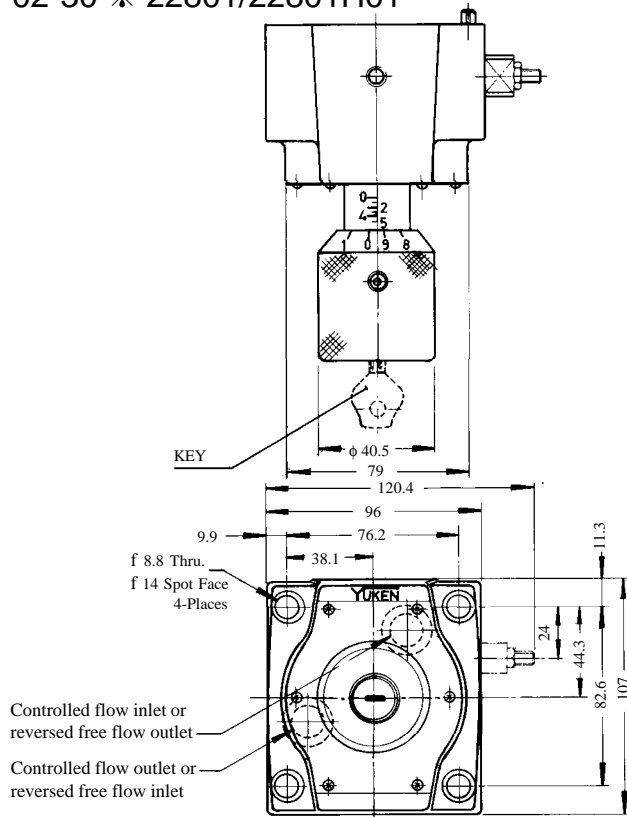
[F*G - 02/03] ---- Anticlockwise for increase and clockwise for decrease.

● Line filter

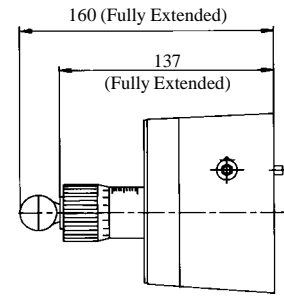
To carry out flow adjustments by as small degree as 2 l/min of less, be sure to use a line filter, 10 m or less, near the valve inlet.



F*G-02-30-*22801/22801H01



Locking Feature with key



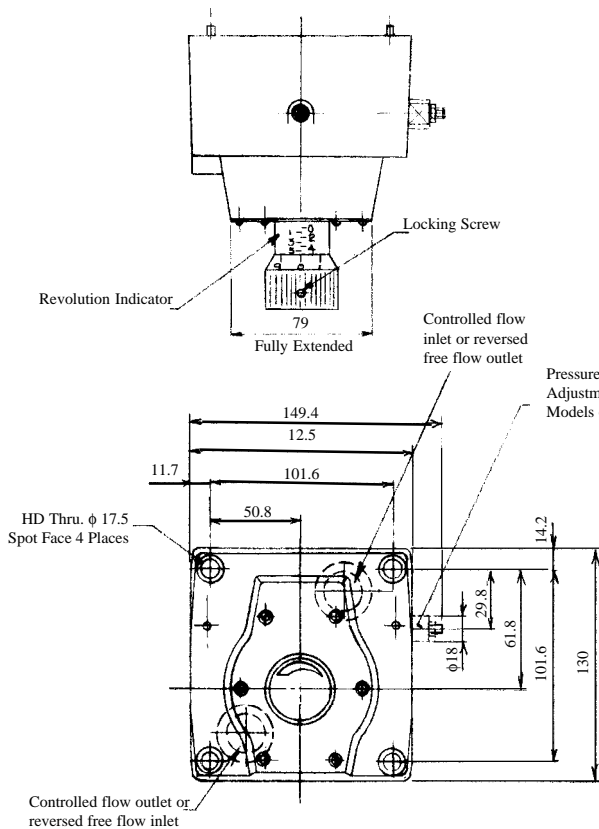
(Fully Extended) 140

71
50
23 6

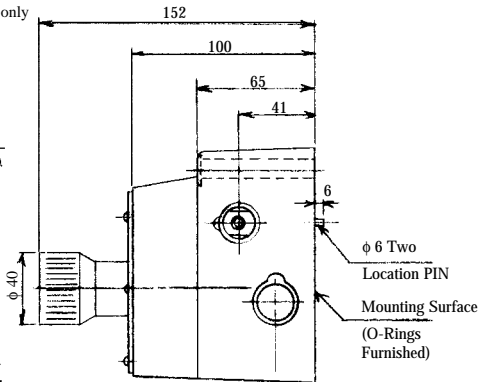
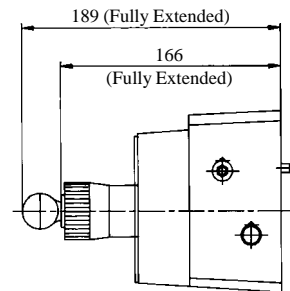
Mounting Surface
(O-Rings furnished)

DIMENSION IN MILLIMETERS

F*G-03-125-*22801/22801H01

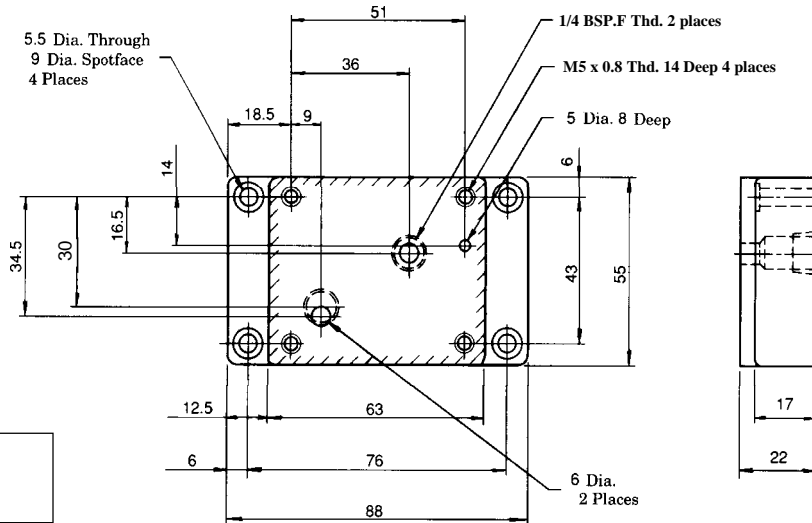


Locking Feature with key



Sub-plates

FGM-01X-1080

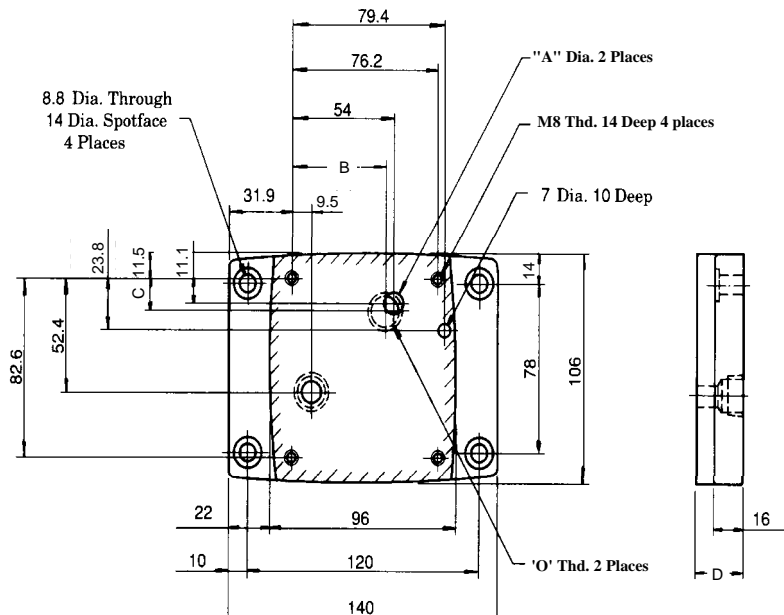


DIMENSION IN
MILLIMETERS

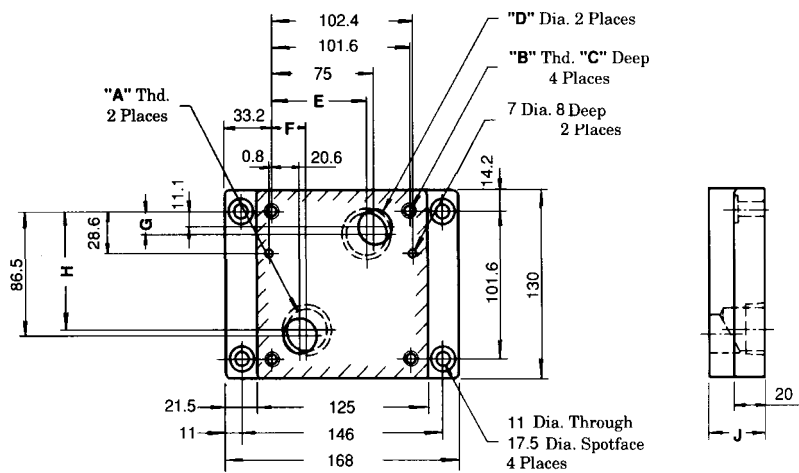
02 FGM-02X-2080 02Y

Sub-Plate Model Number	O' Thd. BSP.F	A	B	C
FGM-02-2080	1/4	11.7	54	11.1
FGM-02X-2080	3/8	15.2	54	11.1
FGM-02Y-2080	1/2	15	51	14

Sub-Plate Model Number	D	Weight Approx. kgf.
FGM-02-2080	25	2.3
FGM-02X-2080	25	2.3
FGM-02Y-2080	35	3.1



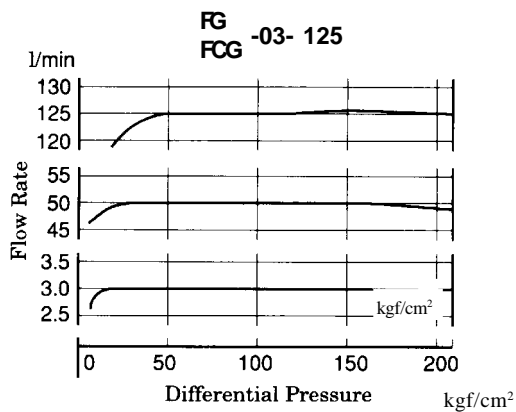
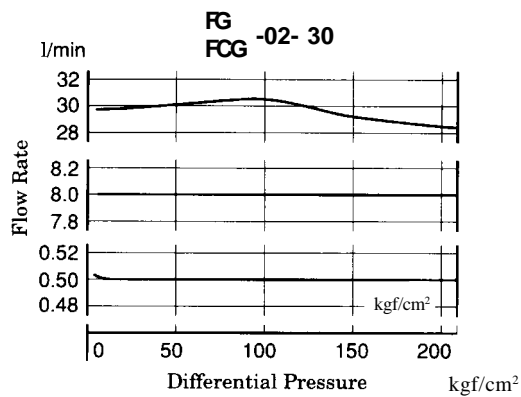
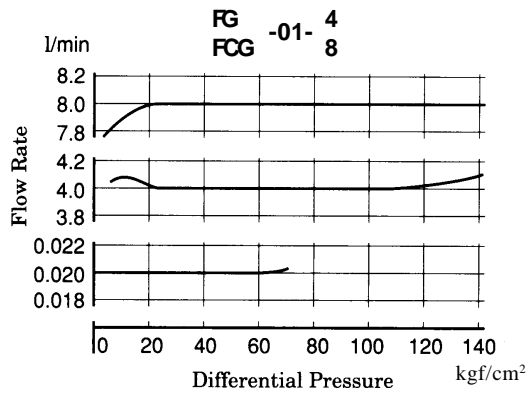
03 FGM-03X-2080 03Y



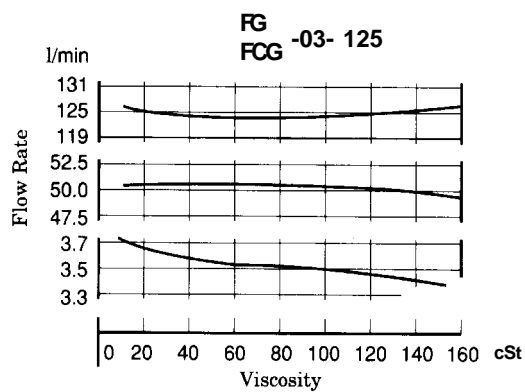
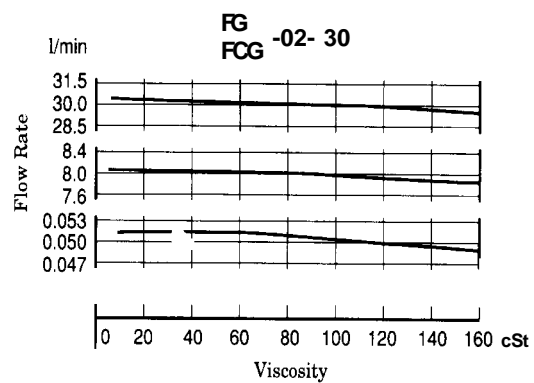
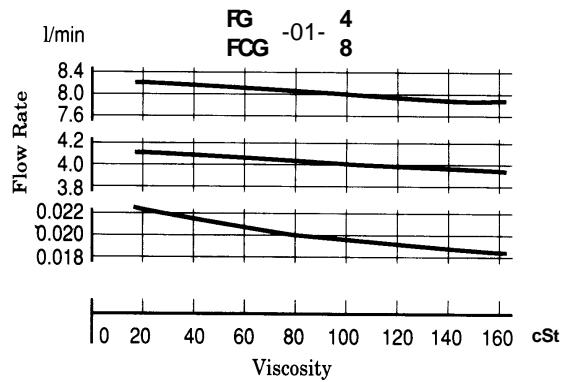
Sub-plate Model Numbers	"A" thd	"B" thd	C	D	E	F	G	H	J
FGM-03-2080	3/8 BSP.F	M10	18	15.0	75	20.6	11.1	86.5	25
FGM-03X-2080	1/2 BSP.F	M10	18	19.0					
FGM-03Y-2080	3/4 BSP.F	M10	18	23.0	70	25.6	16.1	81.5	40

FLOW CONTROLS

■ Metered Flow Vs. Differential Pressure



■ Metered Flow Vs. Viscosity



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

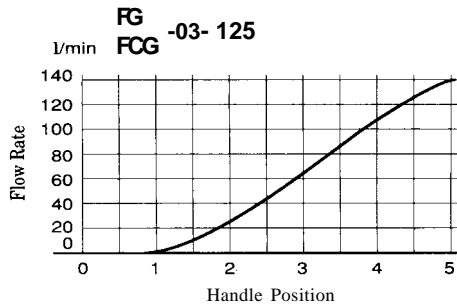
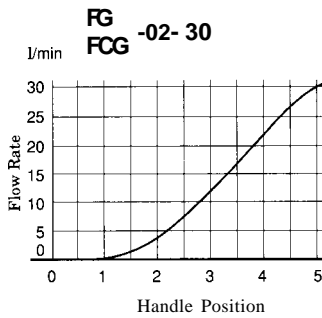
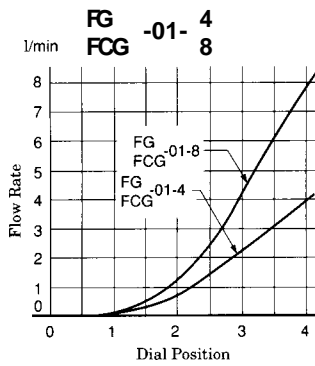
Viscosity	cSt	20	40	60	80	100
		SSU	98	186	278	371
Factor		0.87	1.03	1.14	1.23	1.30

2. For any other specific gravity, use the formula :

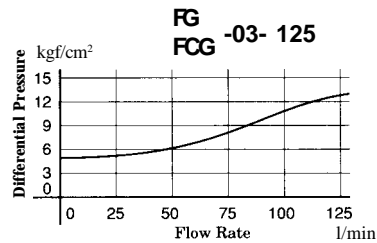
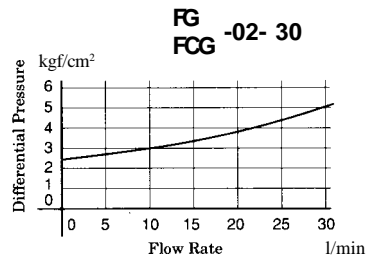
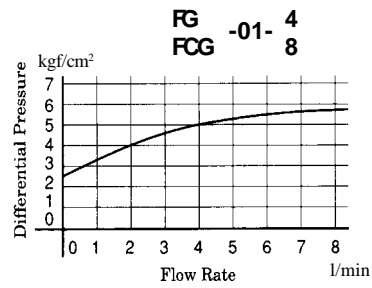
$$\Delta P' = \Delta P \frac{G'}{G}$$

Where P is each value in the chart above, and G is 0.850 specific gravity.

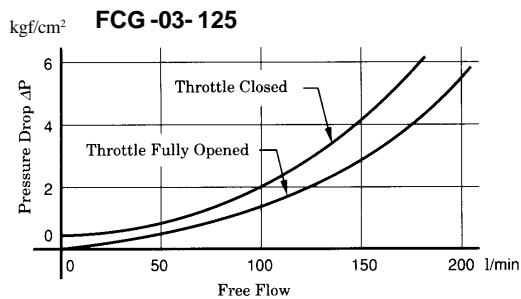
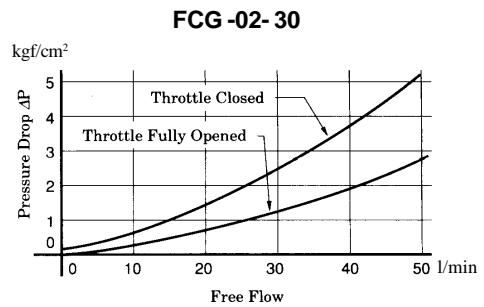
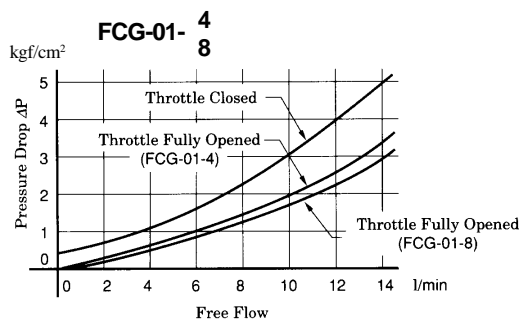
■ Metered Flow Vs. Dial Position



■ Minimum Pressure Difference Required Between Inlet And Outlet Port



■ Pressure Drop For Reversed Free Flow



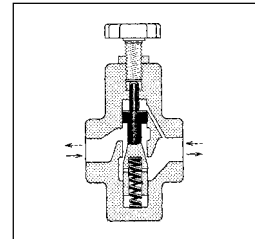
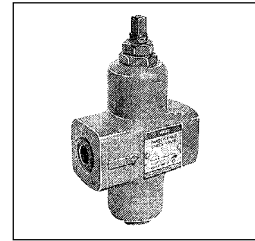
■ Throttle and Check Valve

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.

■ Ratings

Models Numbers		Rated Flow l/min	Max. Operating Pres. kgf/cm ²	Mass kg
Threaded Connection	SRCT-03-4180	30	210	1.2
	SRCT-06-4180	85	210	3.2
Sub-Plate Mounting	SRCG-06-41	85	210	4.0

Rated flow stands for approximate flow rate when the pressure drop between inlet and outlet ports of the valve is fully opened condition becomes 3 kgf/cm² maximum at fluid's specific gravity of 0.95 and kinematic viscosity of 20 cSt (100SSU)



■ Model Number Designation

F	SRC	T	-03	-H	-41	*
Special Seas	Serial Number	Type of Mounting	Valve Size	Pr. Differential kgf/cm ²	Design Number	Design Standard
F: For Phosphate Ester Type Fluids (Omit if not required)	SRC: Throttle and Check Valve	T: Threaded Connection	03	H: High Pr. differen- tial 50 ~ 210 L: Low Pr. differential 5 ~ 50	41	80
			06			None
		G: Sub-Plate Mounting	06			

Also available with Hand Knob type on request.

■ Sub-Plate

Valve Model Numbers	Sub-Plate Model Numbers	Piping Size	Mass kg
SRCG-06	SRGM-06-4080	3/4 BSP.F	2.4
	SRGM-06X-4080	1 BSP.F	3.0

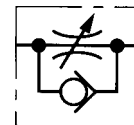
- Sub-plates are available, Specify sub-plate model from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

■ Attachment

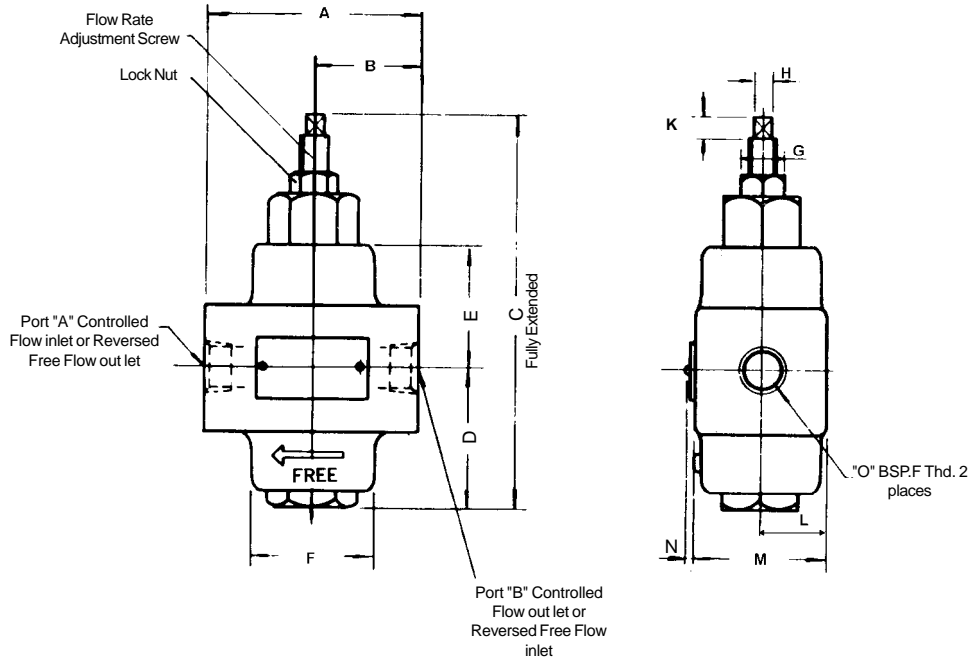
● Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw	Qty.	Bolt Kit Model Number
SRCG-06	M10 x 70 Lg.	4	BKSRG-06-40

Graphic Symbol



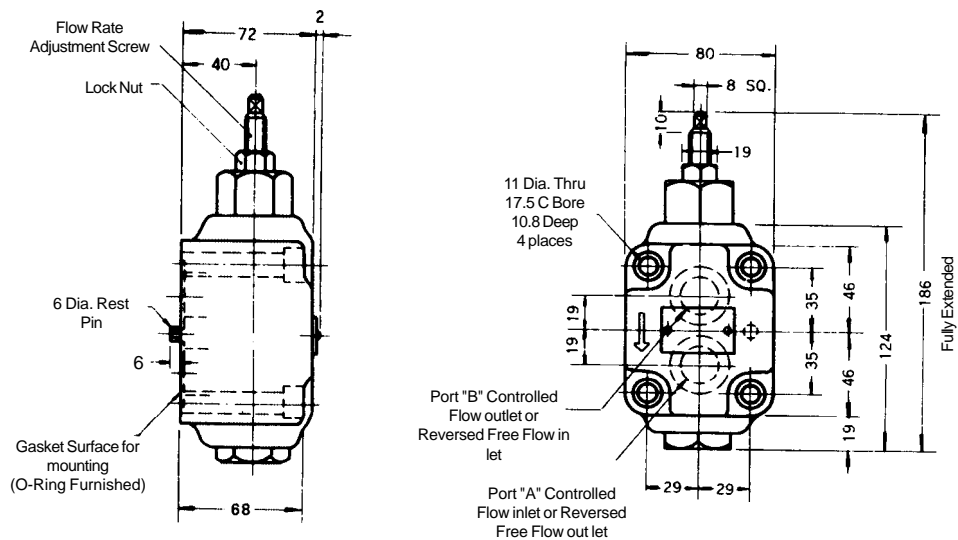
SRCT-03/06-✱-4180



Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	O
SRCT-03-✱-4180	82	41	151	58	54	φ 40	19	Sq.8	40	10	20	40	2	3/8 BSP.F
SRCT-06-✱-4180	112	56	186	66	83	φ 56	19	Sq. 8	—	10	36	60	2	3/4 BSP.F

DIMENSION IN MILLIMETRES

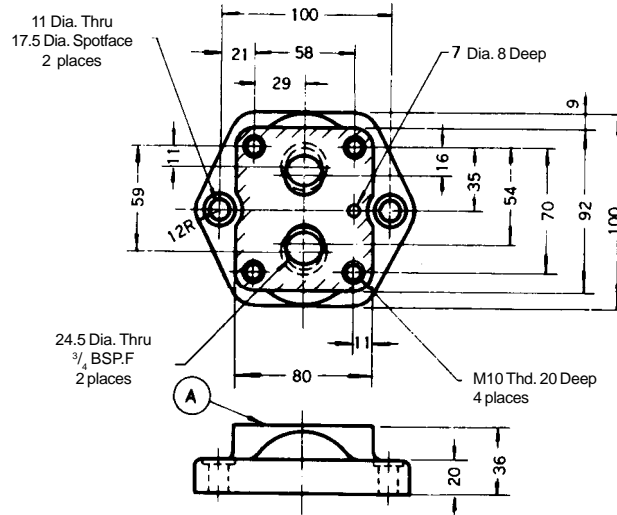
SRCG-06-✱-41



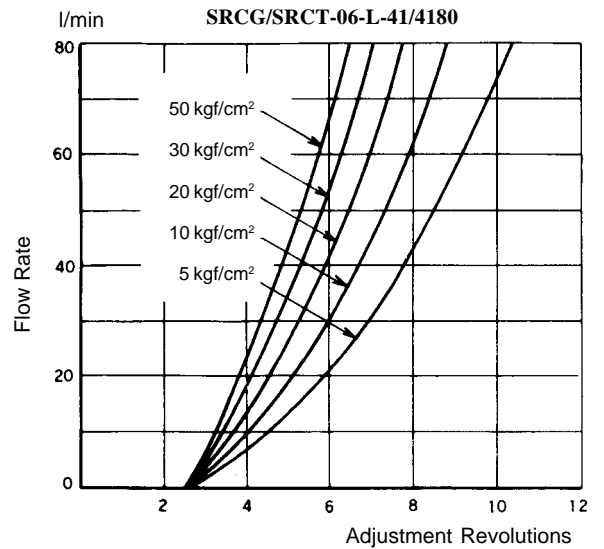
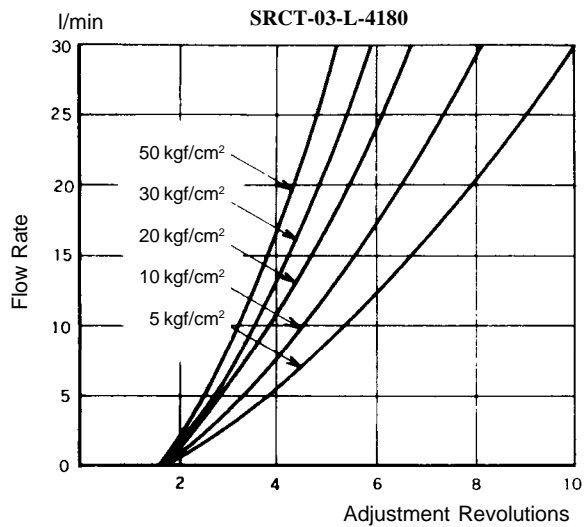
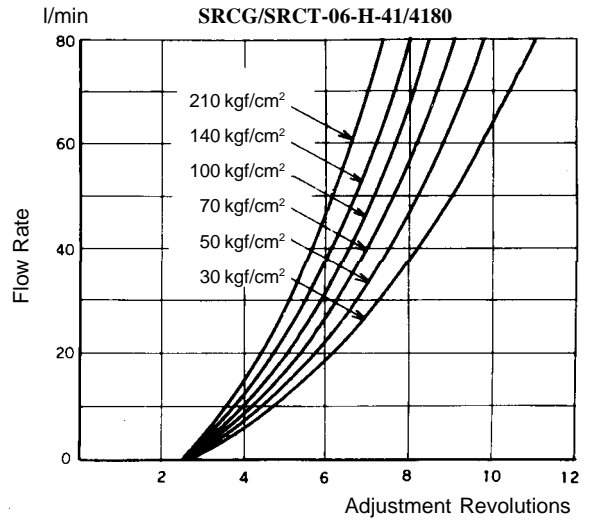
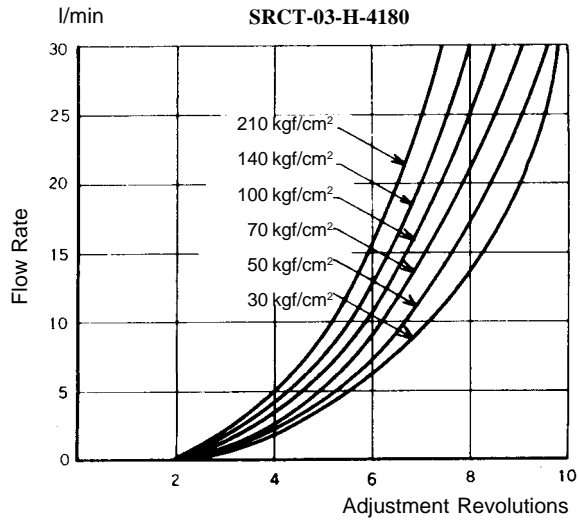
Mounting Sub-Plate

SRGM-06-✱-4080

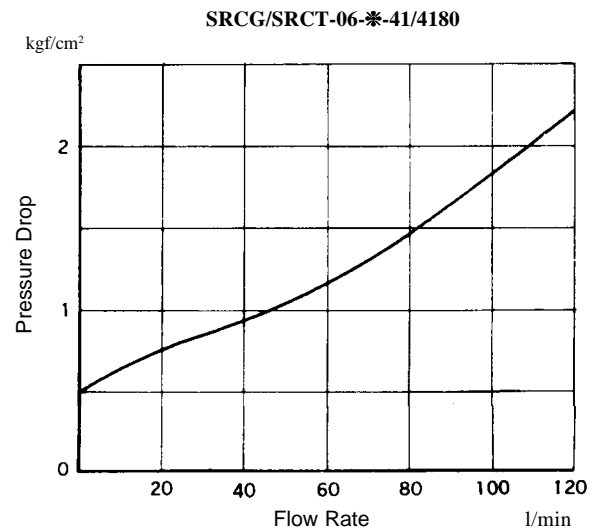
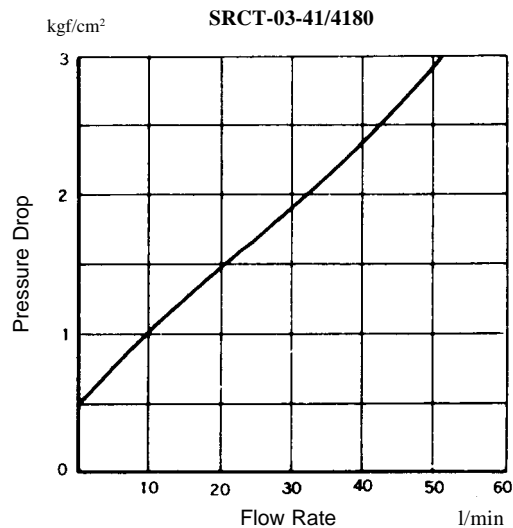
DIMENSION IN
MILLIMETRES



Metered Flow Vs. Adjustment Revolutions



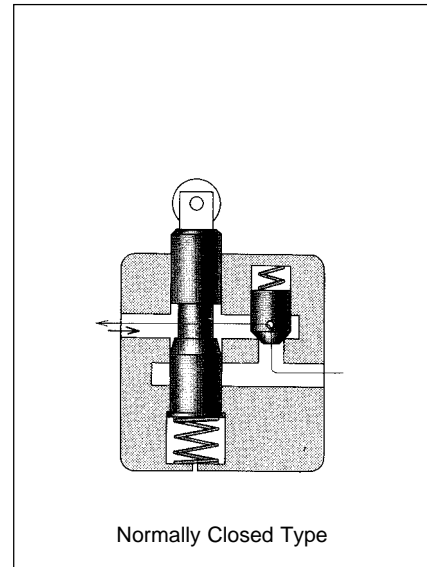
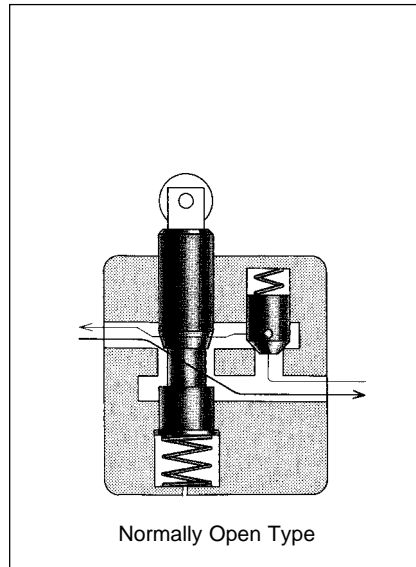
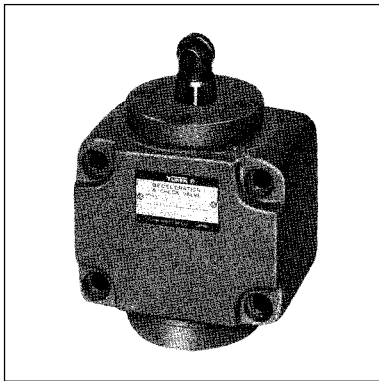
Pressure Drop for Reserve Free Flow



■ 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 application.

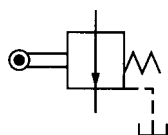


■ Ratings

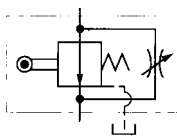
Model Numbers	Max. Flow l/min	Max. Operating Pressure kgf/cm ²	Mass kg
Z*G-03-**-22	30	210	4.3
Z*G-06-**-22	60		8.7

■ Model Number Designation

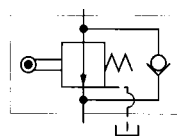
F -	ZC	G	- 03	- T	- C	- 22
Special Seals	Series Number	Type of Mounting	Valve Size	Width Adjustable Needle Valve for By-Pass Line	Spool Type	Design Number
F: Special Seals For Phosphate Ester Type Fluids (Omit if not required)	Z: Deceleration Valve ZC: Deceleration and Check Valve	G: Sub-Plate Mounting	03 06	T: With Adjustable Needle Valve (Omit if not required)	None: Normally Open Type C: Normally Closed Type	22



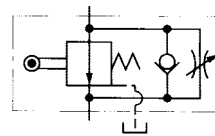
ZG-*



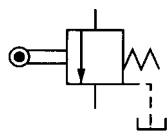
ZG-*-T



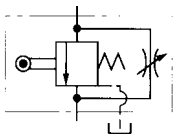
ZCG-*



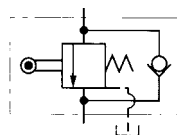
ZCG-*-T



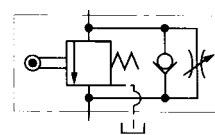
ZG-*-C



ZG-*-T-C



ZCG-*-C



ZCG-*-T-C

■ Instruction

● Force to Depress Spool

Model No.	Force kgf
Z*-G-03	15
Z*-G-06	27

● Drain Port Back Pressure

Limit the drain port back pressure to 1kgf/cm². In addition, connect the drain pipe independently and directly to the tank.

● Total Leakage cm³/min [Viscosity: 20 cSt]

Model No.	Pressure kgf/cm ²				
	10	20	50	100	210
Z*-G-03	9	18	44	88	185
Z*-G-06	9	17	43	86	180

■ Attachment

● Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw	Qty.	Bolt Kit Model No.
Z*-G-03	M8 x 75 Lg.	4	BKZG-03-20
Z*-G-06	M10 x 100 Lg.	4	BKZG-06-20

■ Options

● Bypass throttle valves

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

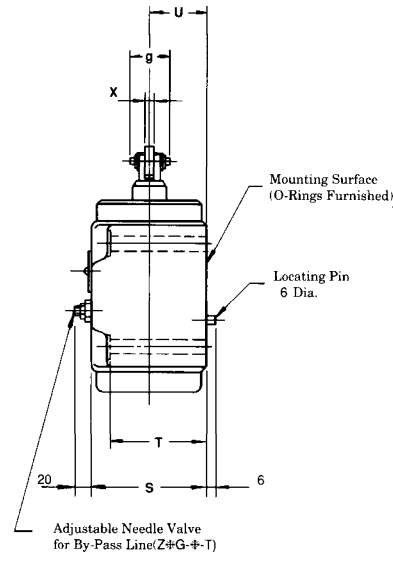
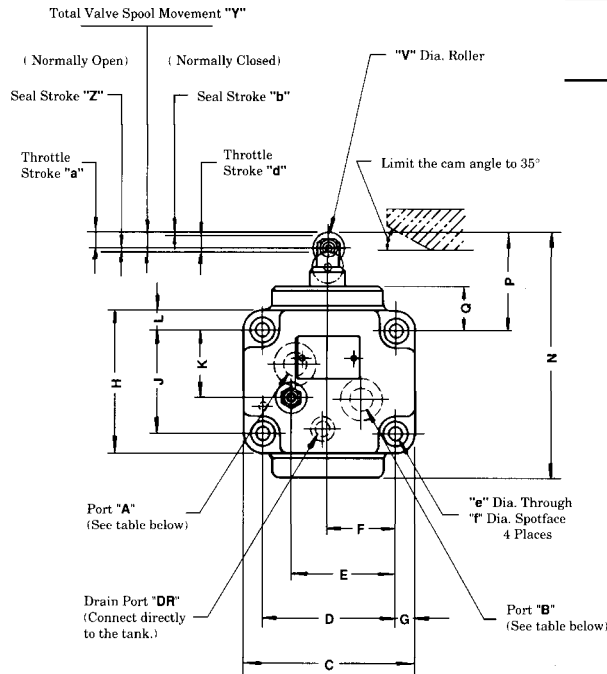
■ Sub-Plate

Valve Model Numbers	Sub-Plate Model No.	Piping Size	Mass kg.
Z*-G-03	ZGM-03-2180	3/8 BSP.F	2
Z*-G-06	ZGM-06-2180	3/4 BSP.F	3.8

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

ZG 03
ZCG 06 -*-22

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

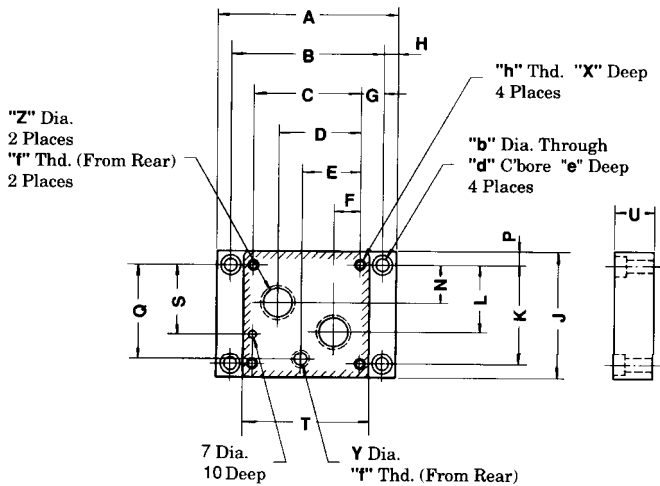


Model Number	C	D	E	F	G	H	J	K	L	N	P	Q	S
Z*G-03	102	80	66	40	11	82	60	41	11	141	56	25	70
Z*G-06	120	98	82	49	11	106	84	57	11	176	65	27	95

Model Number	T	U	V	X	Y	Z	a	b	d	e	f	g
Z*G-03	60	35	18	6	10	2	8	2	8	8.8	14	24.5
Z*G-06	85	50	22	8	13	3	10	3	10	11	17.5	29

Sub-Plate: ZGM-03, 06

DIMENSION IN MILLIMETERS



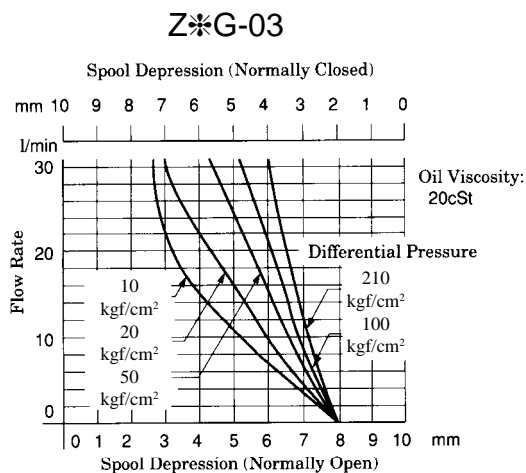
Model Number	"f" Thd.	"g" Thd.	"h" Thd.
ZGM-03-2180	3/8 BSP.F	1/4 BSP.F	M8
ZGM-06-2180	3/4 BSP.F	1/4 BSP.F	M10

Model Number	A	B	C	D	E	F	G	H	J	K
Z*G-03	146	124	80	60	42	20	22	11	85	60
Z*G-06	160	138	98	74	53	24	20	11	108	84

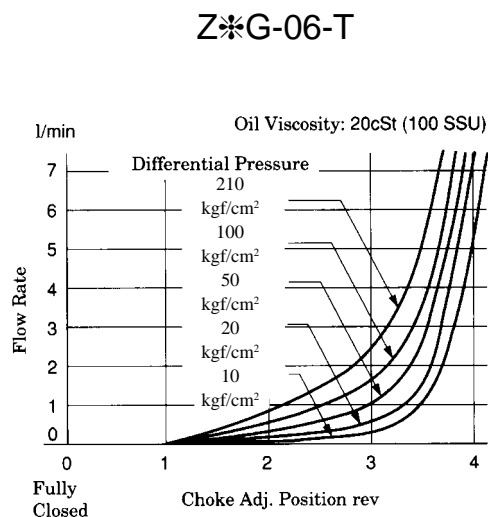
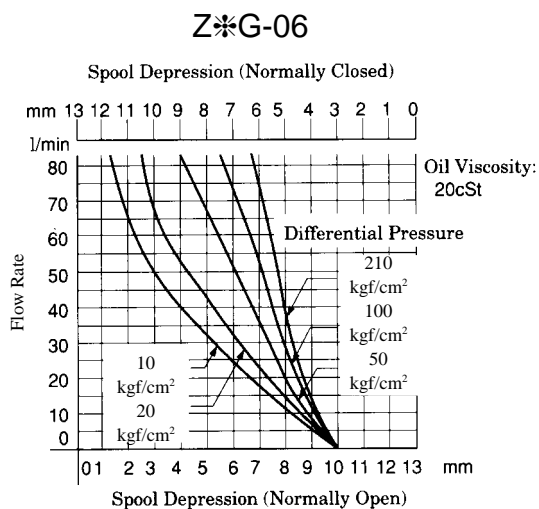
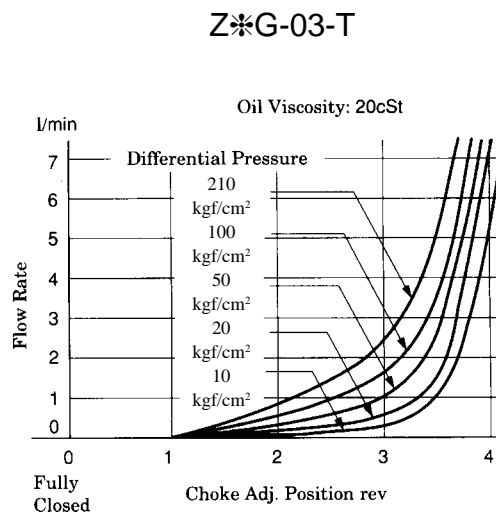
Model Number	L	N	P	Q	S	T	U	X	Y	Z	b	d	e
Z*G-03	40	20	12.5	58	44	102	26	18	6.2	14	11	17.5	10.8
Z*G-06	57	32	12	81	60	120	35	18	11	23	11	17.5	10.8

FLOW CONTROLS

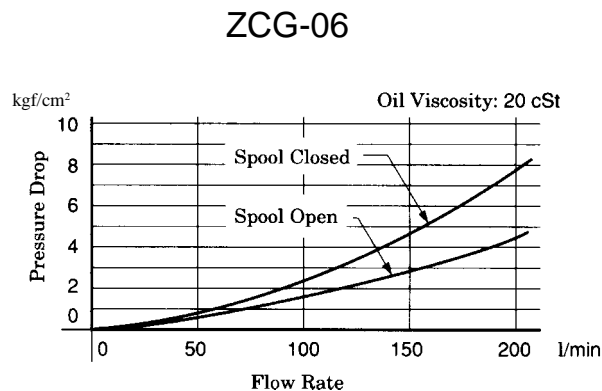
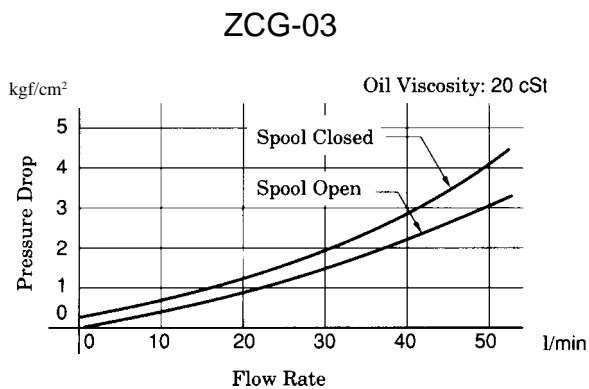
■ Metered Flow vs. Spool Depression



■ Metered Flow for Needle Valve Oil

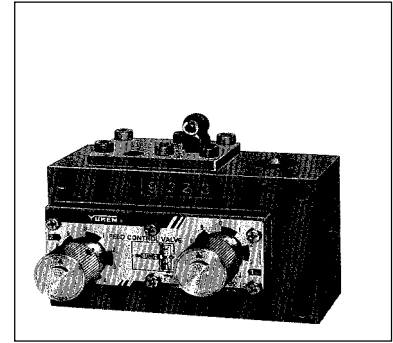


■ Pressure Drop for Reversed Free Flow

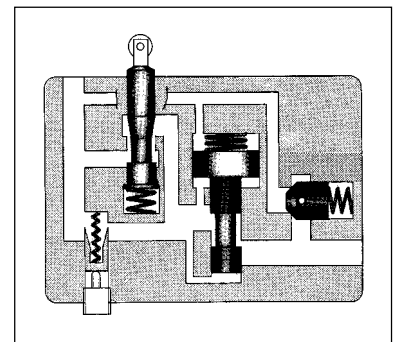
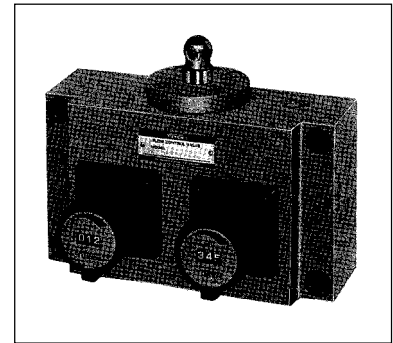


■ Feed Control Valves

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 cycle in 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.



■ Ratings



Model Numbers	1* Max. Flow l/min	Metered Flow Range l/min		Max. Reversed Free Flow l/min	Max. Operat- ing Pressure kgf/cm ²	Mass kg	
		Feed	Fine Feed				
UCF1G-01-4-A-11	16 [12]	0.03-4	—	20	140	1.6	
UCF1G-01-4-B-11	12 [8]						*2
UCF1G-01-4-C-11	8 [4]	[0.05-4]					
UCF1G-01-8-A-11	20 [12]	0.03-8					
UCF1G-01-8-B-11	16 [8]	*2	—				
UCF1G-01-8-C-11	12 [4]	[0.05-8]					
UCF1G-03-4-10	40 [40]	0.05-4	—			40	2.6
UCF1G-03-8-10		0.05-8	—				
UCF2G-03-4-10	40 [40]	0.1-4	0.05-4	40	2.7		
UCF2G-03-8-10		0.1-8	0.05-4				

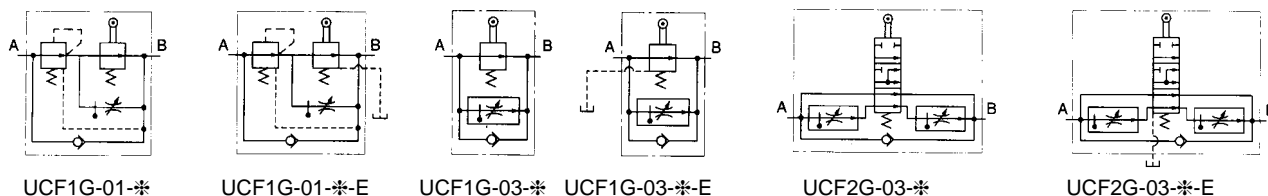
*1. The maximum flow rates are values with the deceleration valve and the flow control valve fully open. The values in [] are maximum flow rates with the deceleration valve fully open and the flow control valve fully closed.

*2. The values in [] are for pressures above 70 kgf/cm²

■ Model Number Designation

F -	UCF1	G	- 01	- 4	- A	- E	- 11
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metered Flow l/min	Deceleration Valve Max. Flow l/min	Drain Connection	Design Number
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	UCF1: Single Feed Control	G: Gasket Mounting	01	4 : 4 8 : 8	A:12, B:8, C:4	None: Internal Drain E: External Drain	11
			03	4 : 4 8 : 8	—		10
	UCF2: Double Feed Control		03	4 : 4 8 : 8	—		10

Graphic Symbols



■ 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 Number	Allowable Outlet Back Pressure kgf/cm ²
UCF1G-01- UCF1G-03- UCF2G-03-	3
UCF1G-01-E UCF1G-03-E UCF2G-03-E	140

● Minimum required pressure difference

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

● Spool push down level

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

● Sub-Plate

Valve Model Number	Sub-plate Model Number	Mass kg
UCF1G-01- - - 11	UCF1GM-01-1080	1.5
UCF1G-03- - - 10	UCF1GM-03-1080	2.3
UCF2G-03- - - 10	UCF2GM-03-1080	1.9

Sub-Plates are available. Specify sub-plate model from the table.

When Sub-Plates, are not used, the mounting surface should have a good machined finish.

● Required Force for Spool Push Down

Model Number	Drain Type	Force kgf
UCF1G-01	Internal drain type	10
	External drain type	8
UCF1G-03	Internal drain type	17
	External drain type	9
UCF2G-03	Internal drain type	17
	External drain type	13

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.

● Allowable drain port back pressure

Limit to 1 kgf/cm²

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

(This applies only to external drain types.)

● Line filter

To carry out flow adjustments by as small degree as 2 l/min or less, be sure to use a line filter, 10 or less, near the valve inlet.

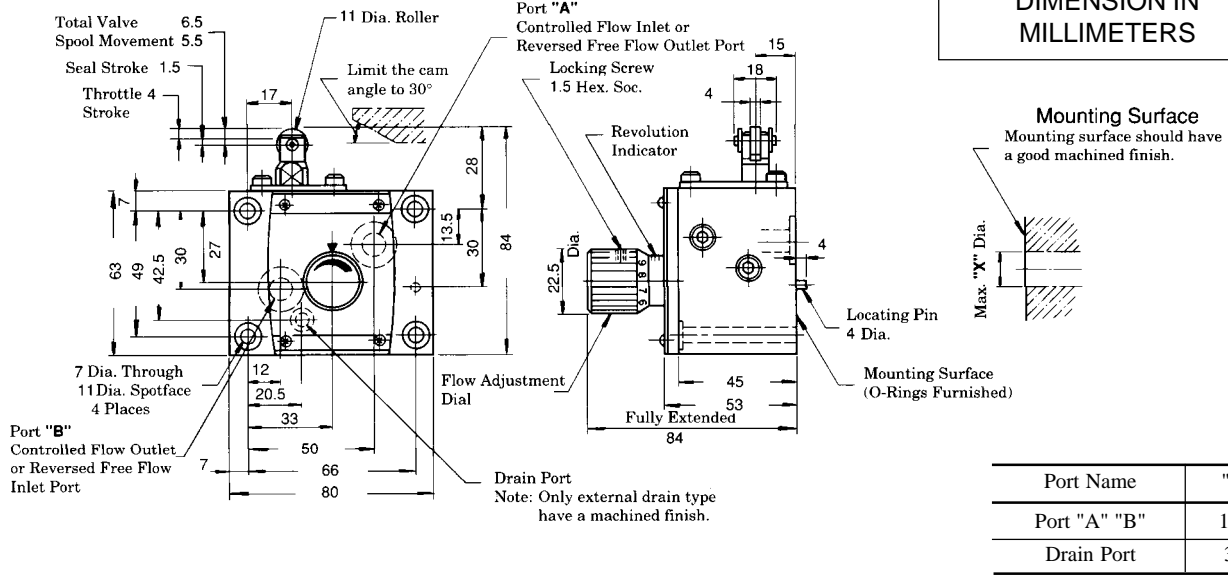
● Flow adjustment

[UCF1G-01, UCF*G-03]

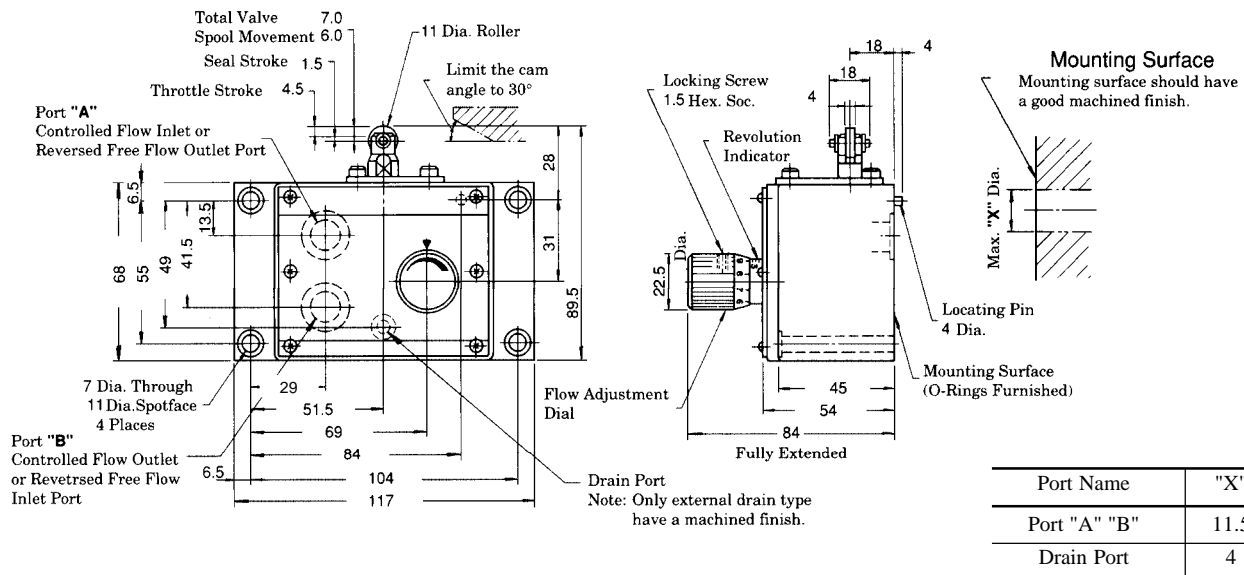
Loosen locking screw and turn flow adjustment dial clock for increase, and anti-clockwise for decrease.

The dial makes about 4 revolutions from zero to full flow and the valve opening indicated on the revolution indicator. (Refer to characteristic of "Mitered Flow vs. Dial Position") After flow adjustment, tighten locking screw.

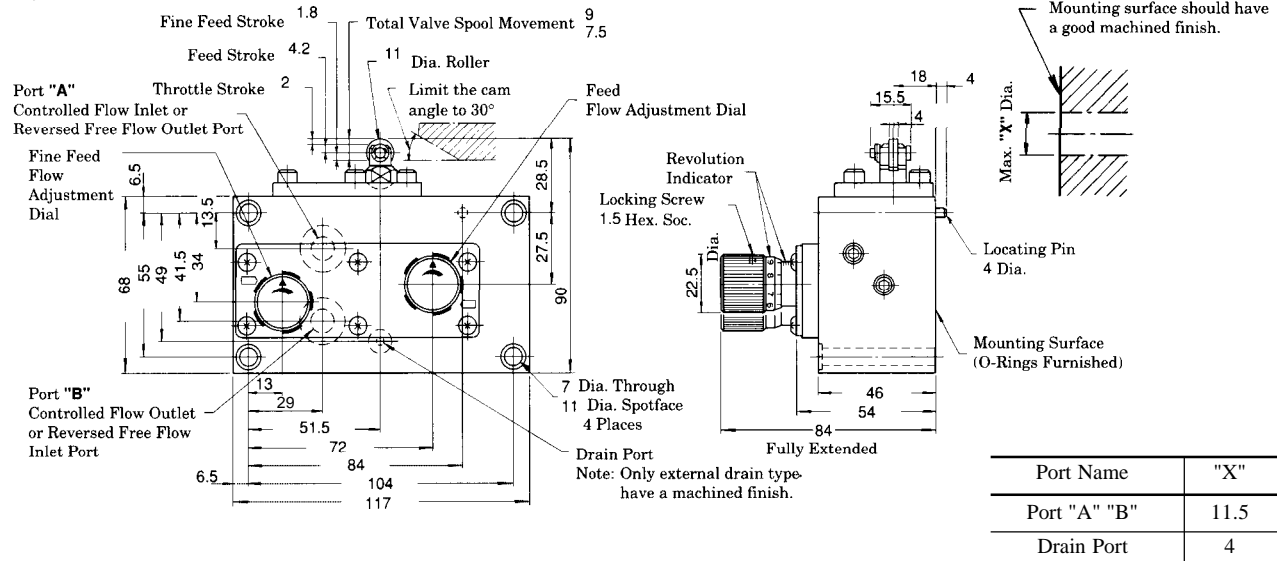
UCF1G-01-***-11



UCF1G-03-***-10



UCF2G-03-***-10



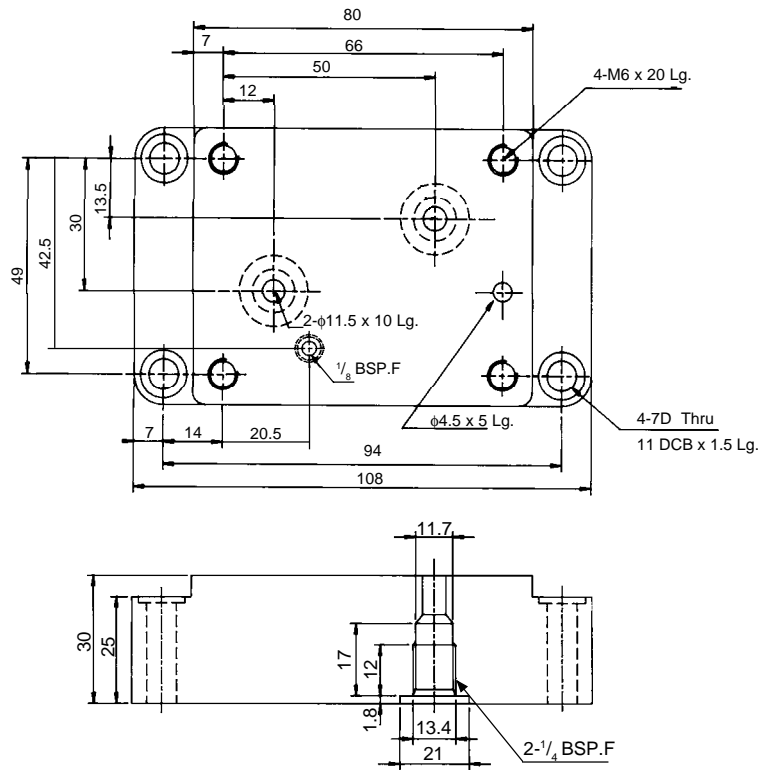
■ Attachment

● Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw.	Qty.	Bolt Kit Model No.
UCF1G-01	M6 x 55 Lg.	4	BKUCF1G-01-11
UCF1G-03	M6 x 55 Lg.	4	BKUCF1G-03-10
UCF2G-03	M6 x 55 Lg.	4	BKUCF2G-03-10

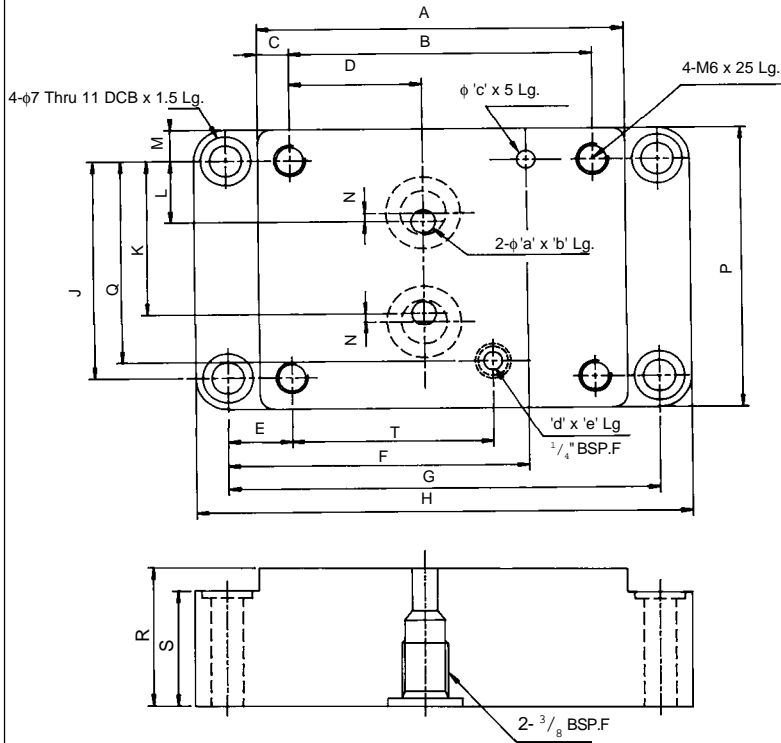
Sub Plate : **UCF1GM-01-1080**

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Sub Plate: UCF*GM-03-1080

DIMENSION IN
MILLIMETERS



Model Number	A	B	C	D	E	F	G	H	J
UCF1GM-03-1080	117	104	6.5	29	13.5	84	130	144	55
UCF2GM-03-1080	117	104	6.5	29	16.5	84	124	144	55

Model Number	K	L	M	N	P	Q	R	S	T
UCF1GM-03-1080	41.5	13.5	6.5	4	68	49	35	28	51.5
UCF2GM-03-1080	41.5	13.5	6.5	5	68	49	30	22	51.5

Model Number	'a'	'b'	'c'	'd'	'e'
UCF1GM-03-1080	11.5	7	4.5	4	12
UCF2GM-03-1080	11	10	4	4	12

■ Min. Recommended Pressure Drop

