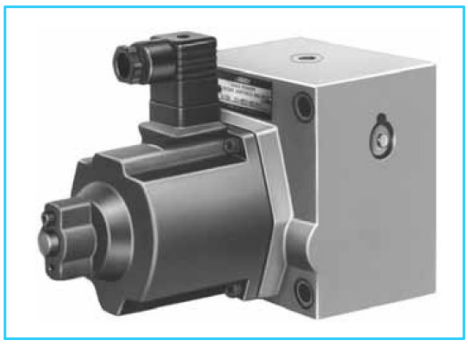
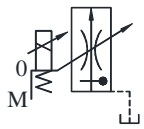
40 Ω Series

Proportional Electro-Hydraulic Flow Control (and Check) Valves

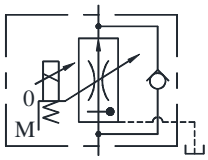
Since the preselected flow rate continuously varies in proportion to the current input to the valve, the system flow rate can be remote-controlled as desired by regulating the amplifier current output.
Further, since pressure and temperature compensation functions are provided, the preselected flow rate is not affected by pressure (load) or temperature (fluid viscosity).
This valve is ideal for use where actuator startup, stop and speed changes are to be implemented without producing a shock. Note that this valve is used in conjuction with the applicable power amplifier.



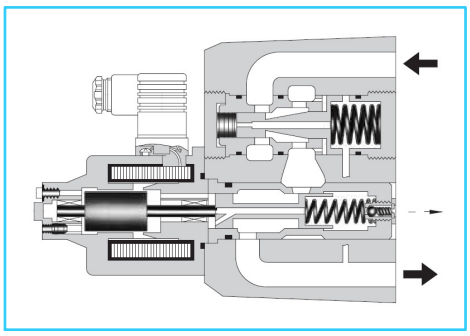
Graphic Symbol



EFG-※



EFCG-※



Specification

Description \ Model Number	EF※G02- 10 30	EF※G-03- 60 125	EF※G-06-250	EF※G-10-500
Max. Operating Pres. Kgf/cm^2	210			
Metered Flow Adjustment Range L/min.	**10 :** 0.3-10 **30 :** 0.3-30	**60 :** 2-60 **125 :** 2-125	3-250	5-500
Min. Differential Pres. Kgf/cm^2 *1	6	10	13	20
Free Flow (EFCG Models) L/min.	40	130	280	550
Rated Current mA	600			700
Coil Resistance Ω	45			
Hysteresis	Less than 5%	Less than 7%		
Repeatability	Less than 1%			
Mass Kg.	8.2	12.5	25	51

*1 Min. Pressure difference required between inlet and outlet ports to maintain function as pressure compensator.

Model Number Designation

F	EF	G	-02	-10	-31
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metered Flow L/min.	Design Number
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	**EF:** Proportional electro-Hydraulic Flow Control Valve	**G:** Sub-Plate Mounting	**02**	**10** : 10 **30** : 30	**31**
			03	**60** : 60 **125** : 125	**26**
	EFC: Proportional electro-Hydraulic Flow Control and Check Valve		**06**	**250** : 250	**22**
			10	**500** : 500	**11**

Note: If the model with pressure compensator stroke adjustment screw to be used, consult YUKEN representative in advance.

Attachment

- **Mounting Bolts**

Valve Model Numbers	Socket head Cap Screw	Qty.	Bolt Kit Model Number
EF※G-02	M8 x 75Lg.	4	BKEFG-02-31
EF※G-03	M10 x 100Lg.	4	BKEFG-03-26
EF※G-06	M16 x 130Lg.	4	BKEFG-06-22
EF※G-10	M20 x 160Lg.	4	BKEFG-10-11

Applicable Power Amplifier

For stable performance, it is recommended that YUKEN's applicable Power Amplifiers be used.

Model Numbers:
- AME-D-※-40
- AME-DF-S-※-22
- AME-T-S-※-22

Sub-Plate

Valve Model Numbers		Sub-Plate Model Number	Piping Size	Mass Kg.
EFG EFCG	-02	EFGM-02X-2080	3/8 BSP.F	2.3
		EFGM-02Y-2080	1/2 BSP.F	3.1
EFG EFCG	-03	EFGM-03Y-2080	3/4 BSP.F	5.7
		EFGM-03Z-2080	1 BSP.F	5.6
EFG EFCG	-06	EFGM-06X-2080	1 BSP.F	12.5
		EFGM-06Y-2080	1-1/4 BSP.F	16
EFG EFCG	-10	EFGM-10Y-2080	1-1/2, 2 Flange Mounting	37

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

Model with Pressure Compensator Stroke Adjustment Screw

Models with pressure compensator stroke adjustment screw is optionally available to minimize the actuator protrusion (jumping) at startup. Contact your local dealers for details.

Instructions

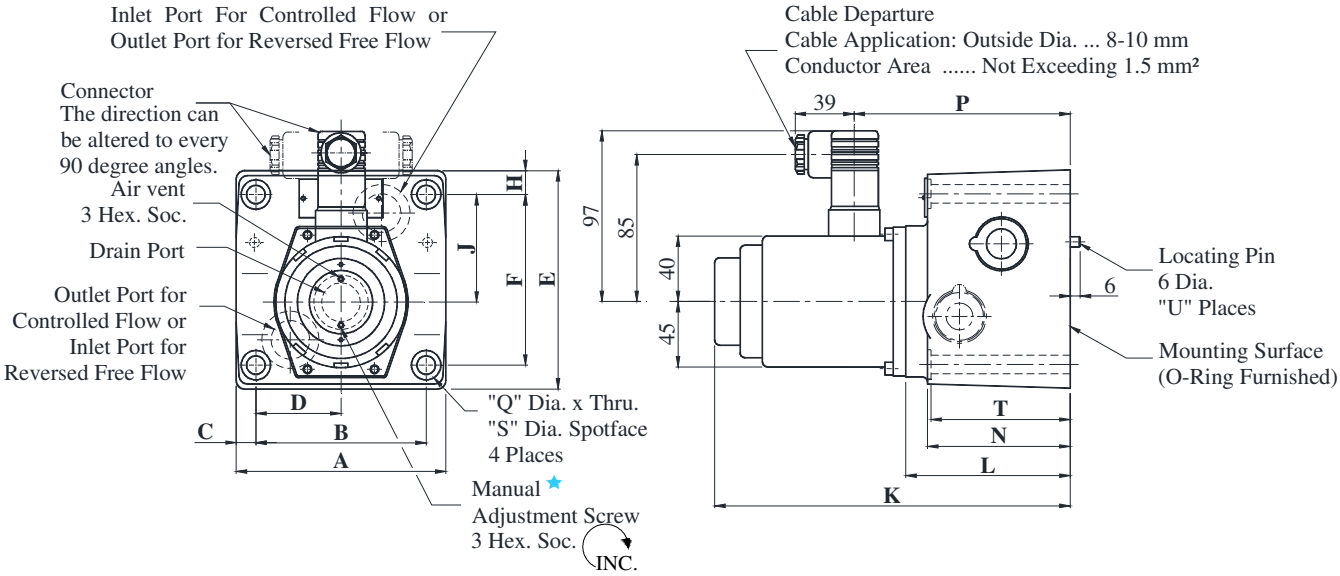
- **Drain Back Pressure**

  Check that the drain back pressure does not exceed 2 Kgf/cm^2

- **Models with Check Valve**

  A models with check valve makes it possible to obtain a free flow in the direction opposite to that of the controlled flow irrespective of the input current.

- **EFG/EFCG-02-※-31**
- **EFG/EFCG-03-※-26**

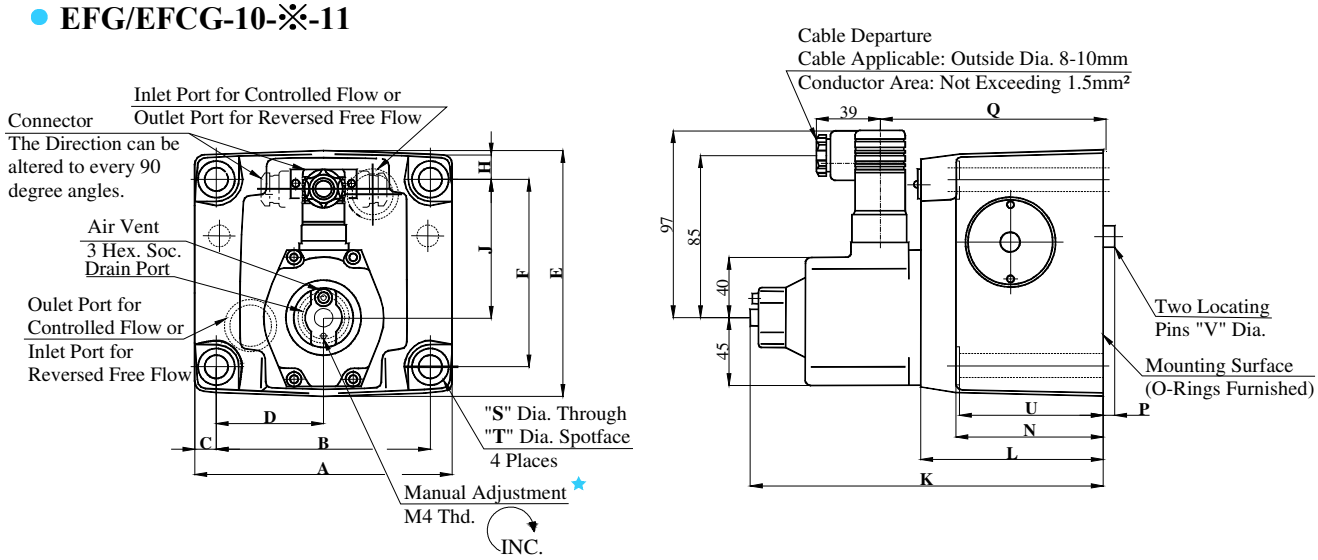


★ Manual adjustment can be done by screwing for example an M4x20L screw in the M4 thread or pushing in a rod etc. there.

Model Numbers	Dimensions mm															
	A	B	C	D	E	F	H	J	K	L	N	P	Q	S	T	U
EF※G-02	96	76.2	9.9	38.1	106	82.6	11.7	46.3	195	81	66	108	8.8	14	65	1
EF※G-03	125	101.6	11.7	50.8	130	101.6	14.2	61.8	212	98	85	125	11	17.5	84	2

DIMENSIONS IN MILLIMETRES

- **EFG/EFCG-06-※-22**
- **EFG/EFCG-10-※-11**



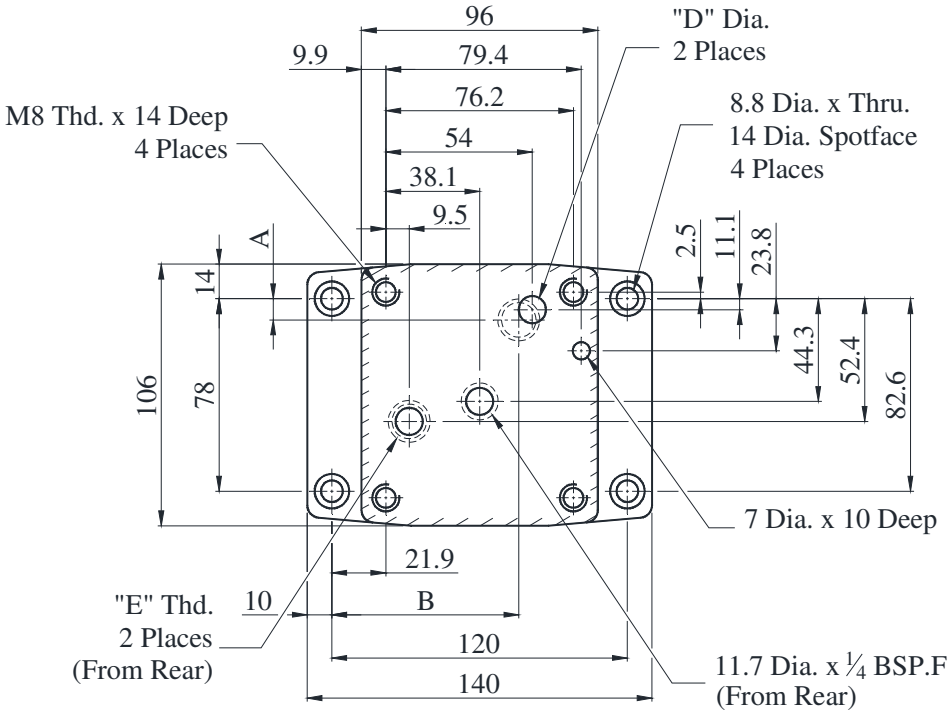
★ Manual adjustment can be done by screwing for example an M4x20L screw in the M4 thread or pushing in a rod etc. there.

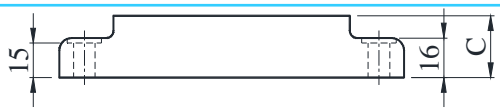
Model Numbers	Dimensions mm																
	A	B	C	D	E	F	H	J	K	L	N	P	Q	S	T	U	V
EF※G-06	180	146.1	17	73.1	174	133.4	20.3	99	244	130	105	7	157	17.5	26	103.5	16
EF※G-10	244	196.9	23.5	98.5	228	177.8	25	144.5	274	160	137	10	187	21.5	32	135	18

Sub Plate

Model Number	A	B	C	D	"E" Thd.
EFGM-2X-2080	8.6	75.9	25	15.2	3/8 BSP.F
EFGM-2Y-2080	11.5	72.9	35	15	1/2 BSP.F

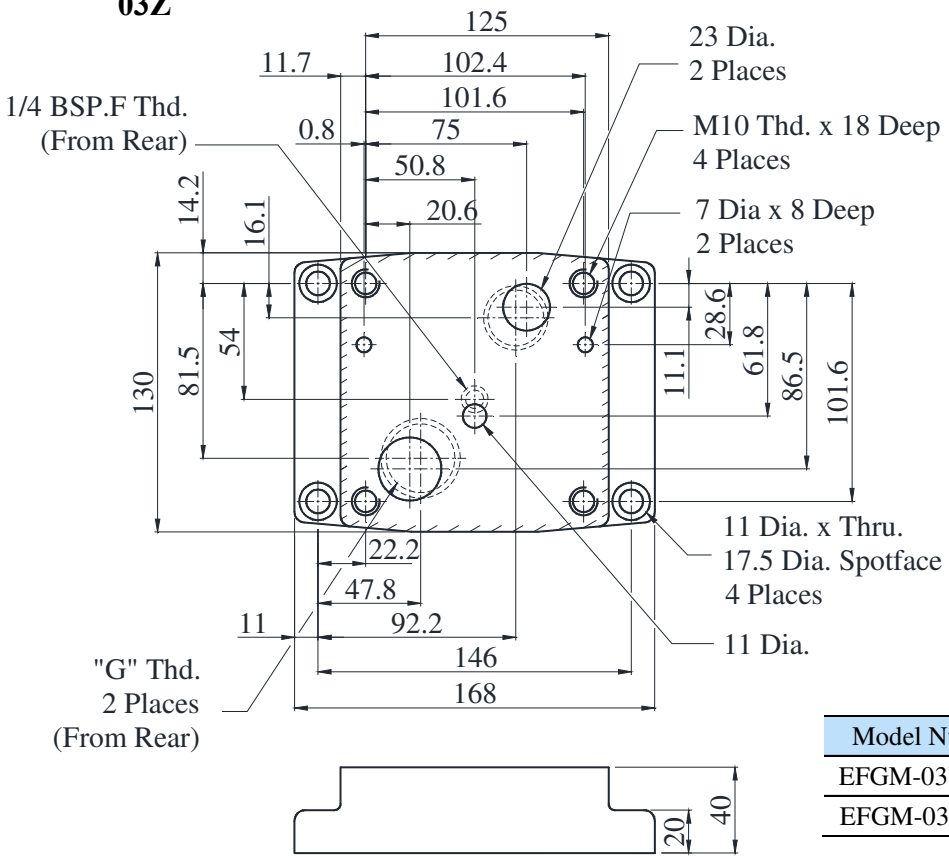
- **EFGM-02X/02Y-2080**





DIMENSIONS IN MILLIMETRES

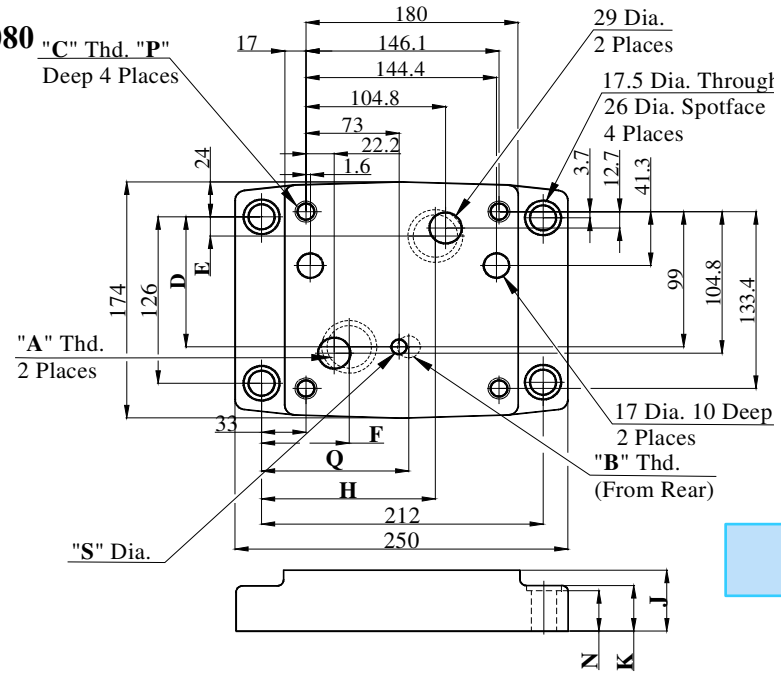
- **EFGM-03Y/03Z-2080**



Model Number	"G" Thd.
EFGM-03Y-2080	3/4 BSP.F
EFGM-03Z-2080	1 BSP.F

Sub Plate

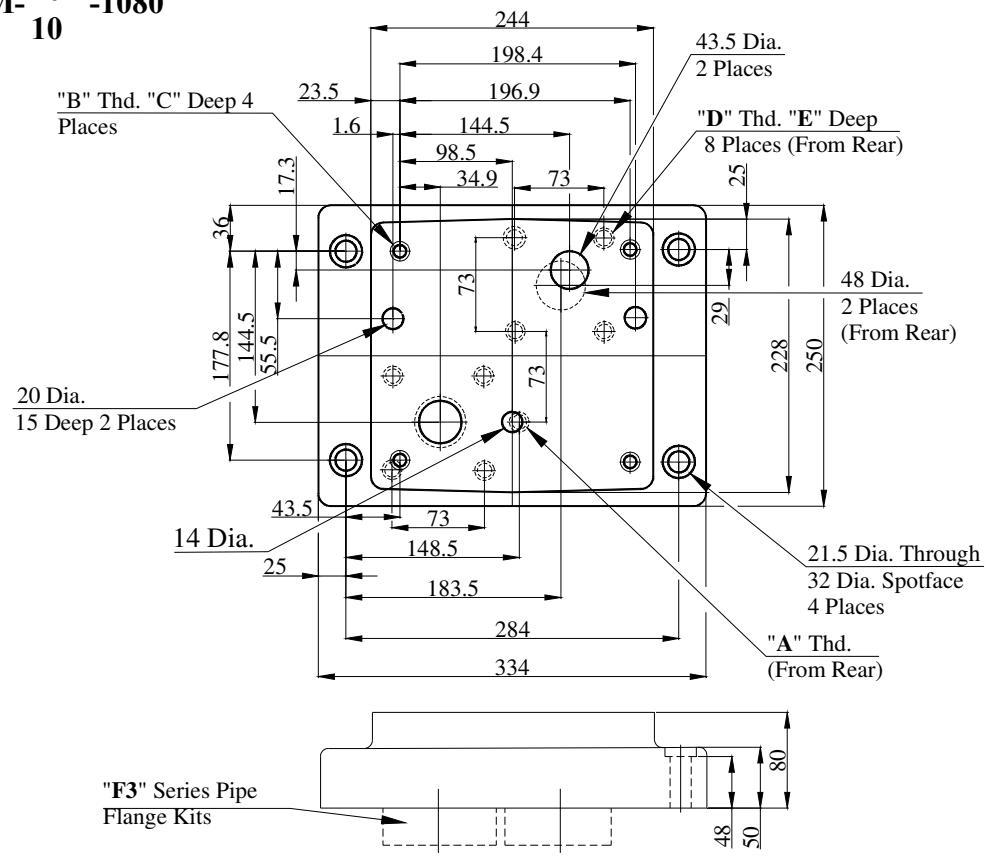
- **EFGM-06X/06Y-2080**



DIMENSIONS IN MILLIMETRES

Sub-plate Model Number	Thread Size			Dimensions mm									
	"A" Thd.	"B" Thd.	"C" Thd.	D	E	F	H	J	K	N	P	Q	S
EFGM-6X-2080	1 BSP.F	3/8 BSP.F	M16	101.1	14.3	55.2	137.8	45	35	34	30	116	15.2
EFGM-6Y-2080	1-1/4 BSP.F			95.3	19.3	67	132	60	40	39			15

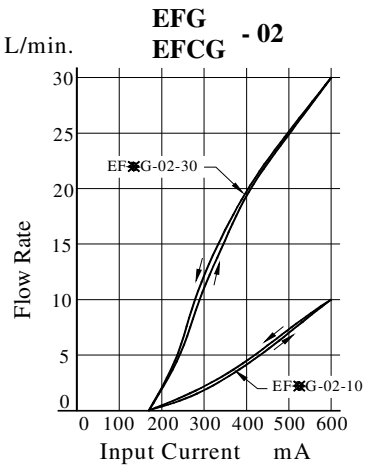
- **EFGM-10Y/10-1080**

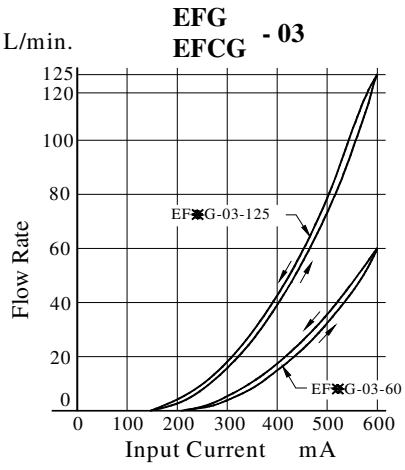


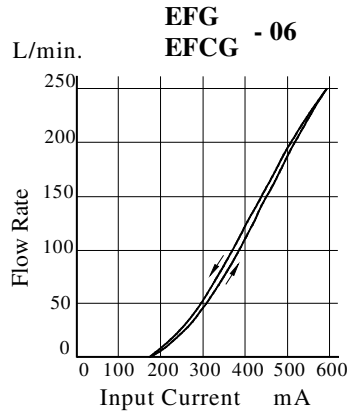
Sub-Plate Model Number	Thread Size			mm	
	"A" Thd.	"B" Thd.	"D" Thd.	"C" Thd.	"E" Thd.
EFGM-10Y-1080	3/8 BSP.F	M20	M16	30	30

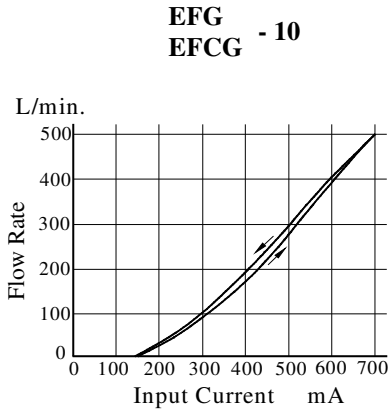
Input Current vs. Flow

Viscosity : 30mm²/s



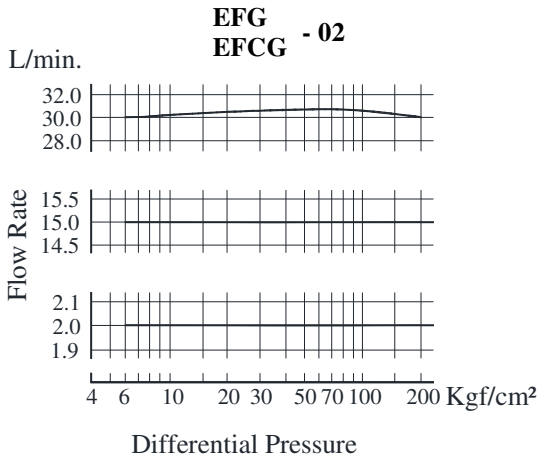


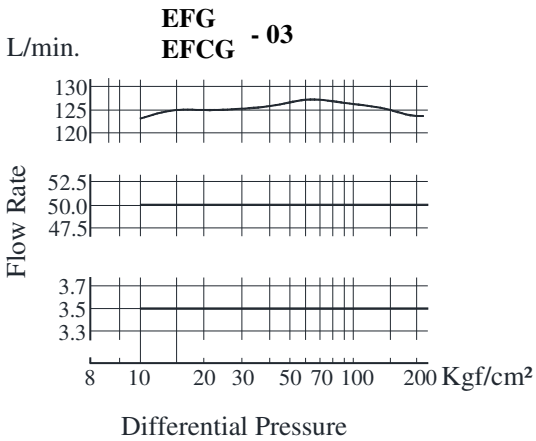


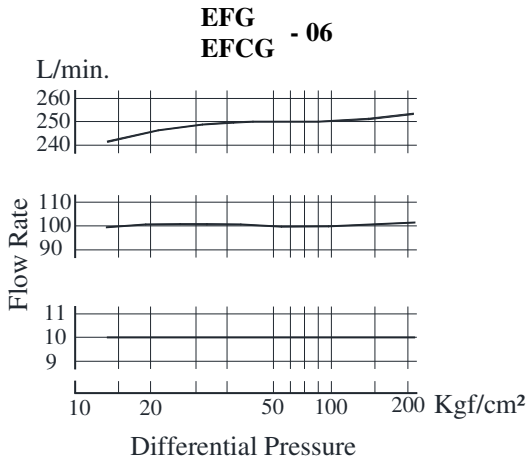


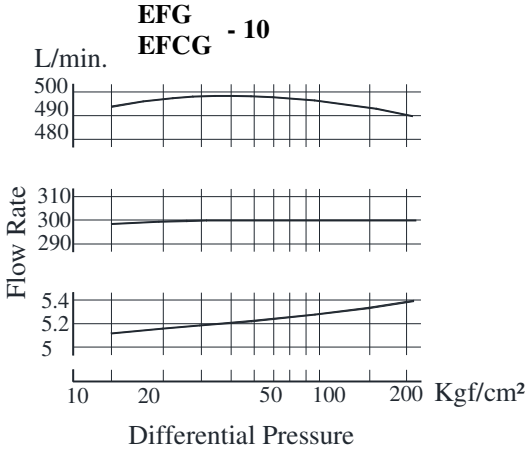
Differential Pressure vs. Metered Flow

Viscosity : 30mm²/s







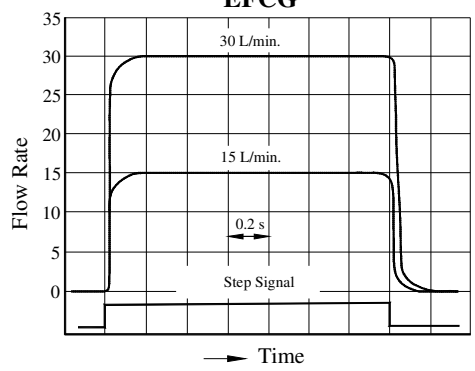


Step Response

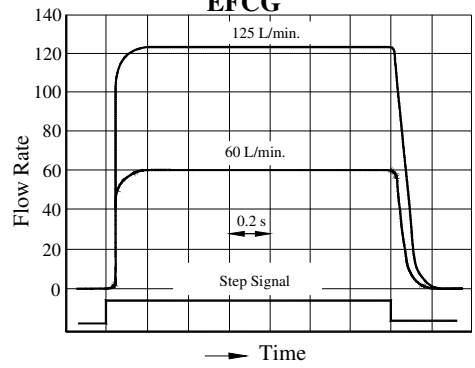
Viscosity : 30mm²/s

These characteristics have been obtained by measuring on each valve. Therefore, they may vary according to a hydraulic circuit to be used.

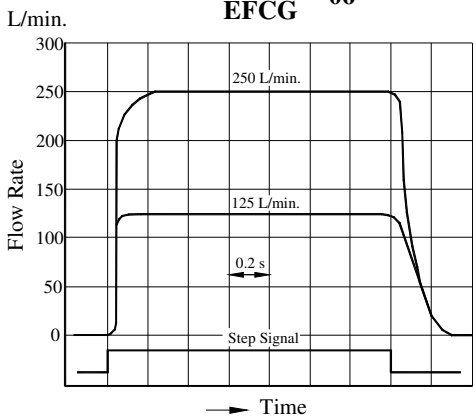
EFG EFCG - 02



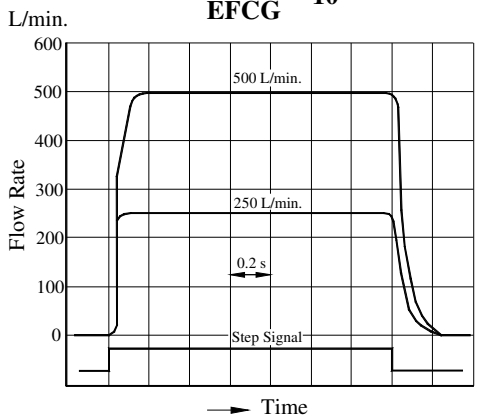
EFG EFCG - 03



EFG EFCG - 06



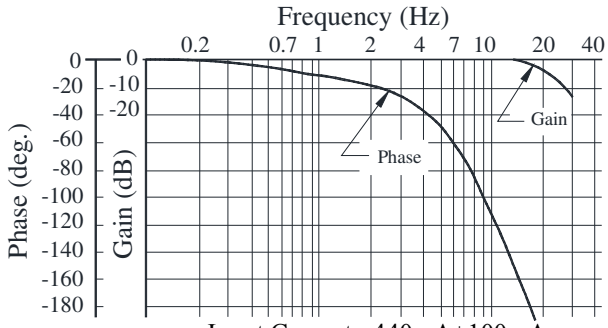
EFG EFCG - 10



Frequency Response

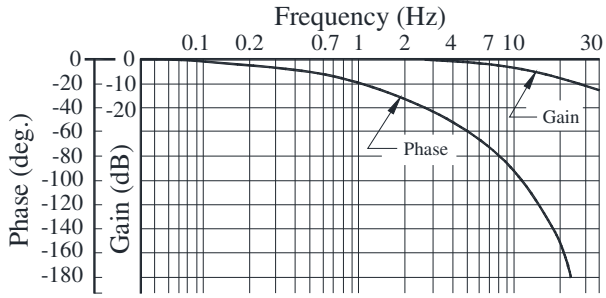
Viscosity : 30mm²/s

EFG EFCG - 02



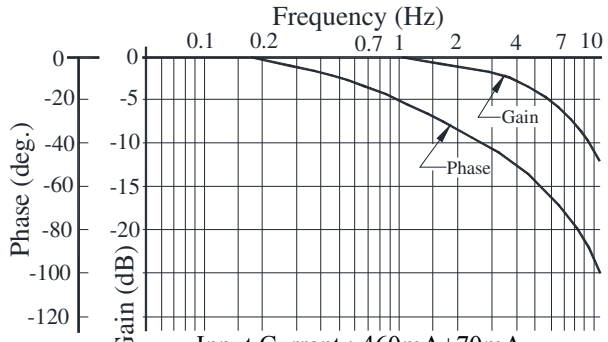
Input Current : 440mA±100mA
Pressure : 70 Kgf/cm²

EFG EFCG - 03



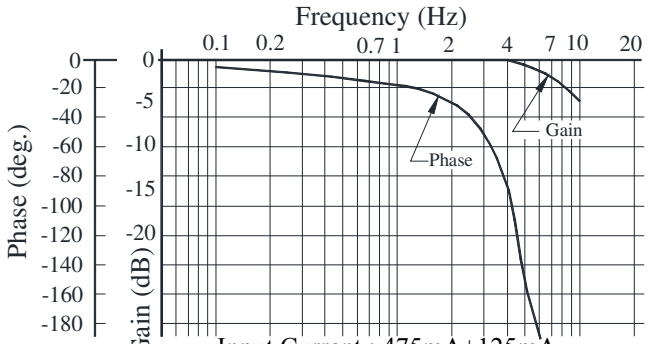
Input Current : 460mA±70mA
Pressure : 70 Kgf/cm²

EFG EFCG -06



Input Current : 460mA±70mA
Pressure : 70 Kgf/cm²

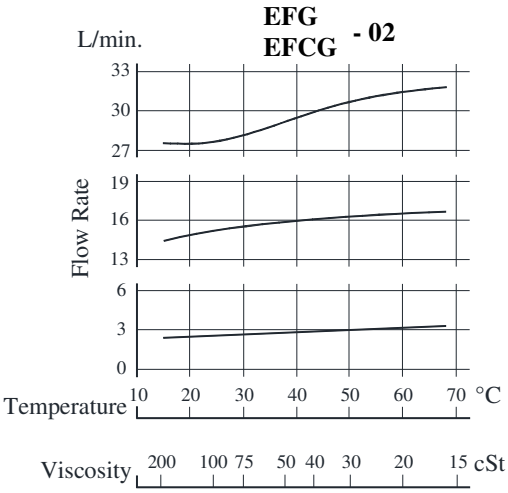
EFG EFCG - 10

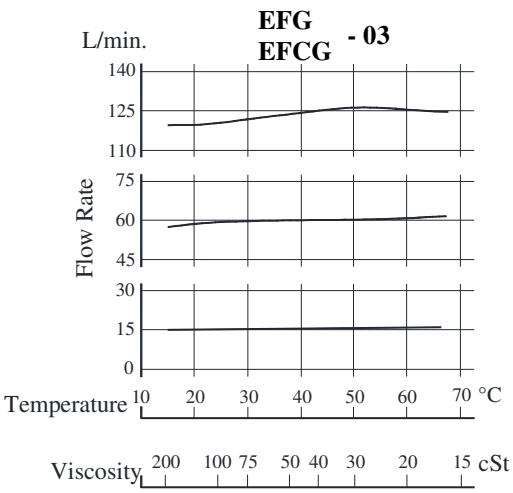


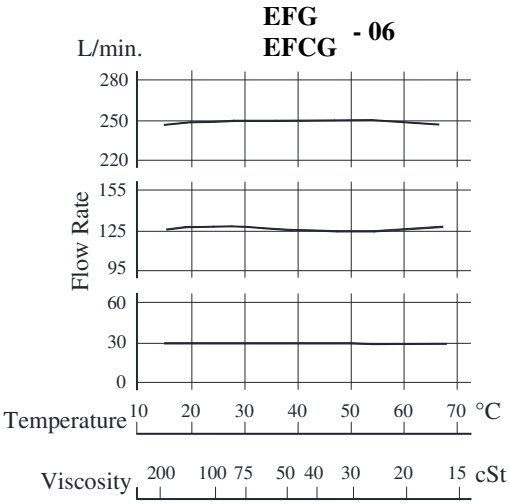
Input Current : 475mA±125mA
Pressure : 70 Kgf/cm²

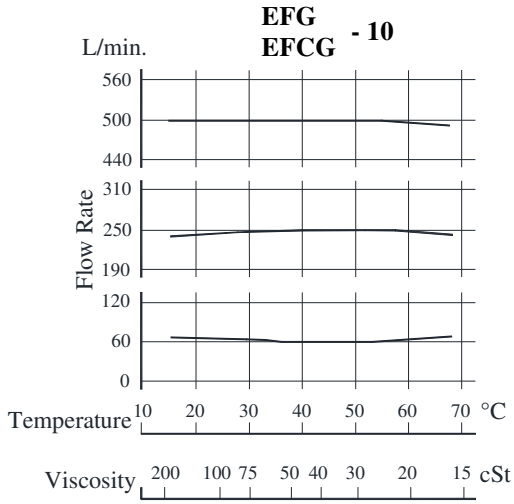
Viscosity vs. Flow

Oil : ISO VG 46



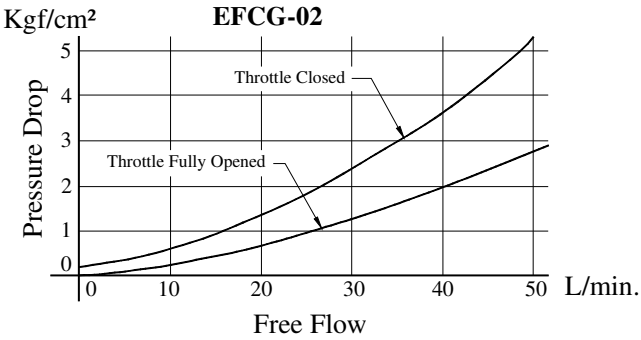


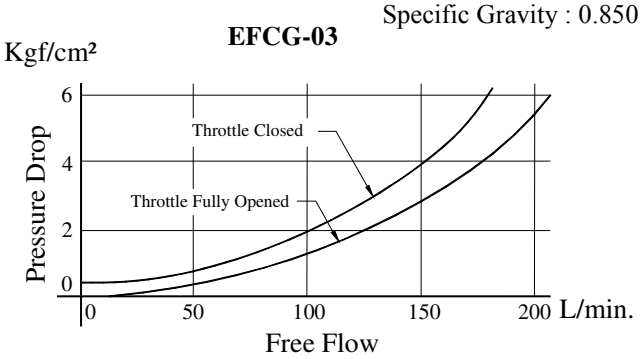


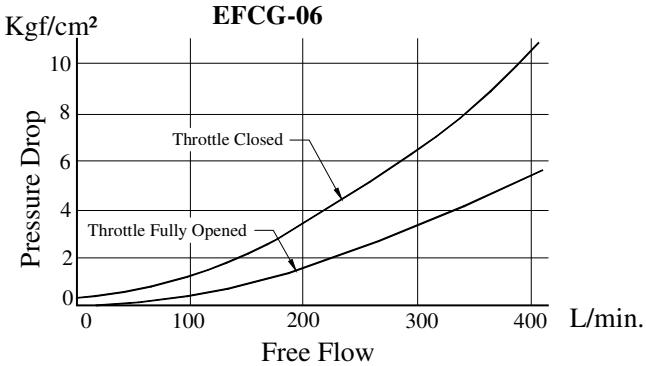


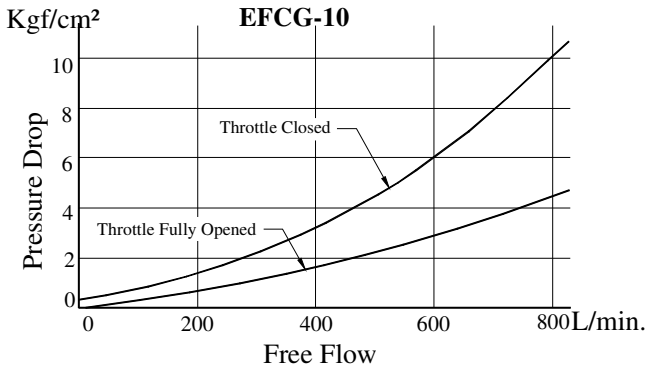
Pressure Drop Reversed Free Flow (Only for Models With Check Valves)

Oil Viscosity: 35mm²/
Specific Gravity : 0.850









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

Viscosity	cSt	20	40	60	80	100
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.
  P'=ΔP (G'/0.85)

Spare Parts List

List of Seals

Sl. No.	Name of Parts	Part Numbers		Qty.	Part Numbers		Qty.
		EF※G-02	EF※G-03		EF※G-06	EF※G-10	
1	Solenoid Ass'y	E321-45-20	E321-45-20	1	E321-45-20	E321-45-20	1
2	O-Ring	SO-NB-P18	SO-NB-P18	1	SO-NB-P50	SO-NB-G75	3
3	O-Ring	SO-NB-P10A	SO-NB-P21	1	SO-NB-P44	SO-NB-G60	1
4	O-Ring	SO-NB-P18	SO-NB-P28	2	SO-NB-P34	SO-NB-P50	1
5	O-Ring	SO-NB-P22	SO-NB-P31	1	SO-NB-P32	SO-NB-P48	2
6	O-Ring	SO-NB-G25	SO-NB-G35	1	SO-NB-P21	SO-NB-P34	1
7	O-Ring	-	SO-NB-P18	1	SO-NB-P21	SO-NB-P26	1
8	O-Ring	SO-NB-P22	-	1	SO-NB-P10	SO-NB-P10	1
9	O-Ring	SO-NB-G45	SO-NB-G45	1	SO-NB-G45	SO-NB-G45	1
10	O-Ring	SO-NB-G35	SO-NB-G35	1	SO-NB-G35	SO-NB-G35	1
11	O-Ring	SO-NA-P4	SO-NA-P4	1	SO-NA-P4	SO-NA-P4	1
12	Fastener Seal	SG-FCF-4	SG-FCF-4	1	SG-FCF-4	SG-FCF-4	1

Note: When Ordering the seals, please specify the seal kit numbers from the table below.

List of Seal Kits

Model Numbers	Seal Kit Numbers
EFG-02-※-31※	KS-EFG-02-31
EFCG-02-※-31※	KS-EFCG-02-31
EFG-03-※-26※	KS-EFG-03-26
EFCG-03-※-26※	KS-EFCG-03-26
EFG-06-250-22※	KS-EFG-06-22
EFCG-06-250-22※	KS-EFCG-06-22
EFG-10-500-11※	KS-EFG-10-11
EFCG-10-500-11※	KS-EFCG-10-11

10Ω Series

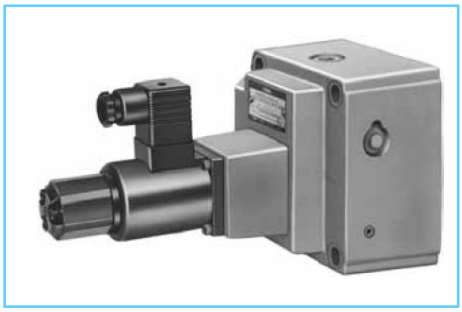
Proportional Electro-Hydraulic Flow Control (and Check) Valves

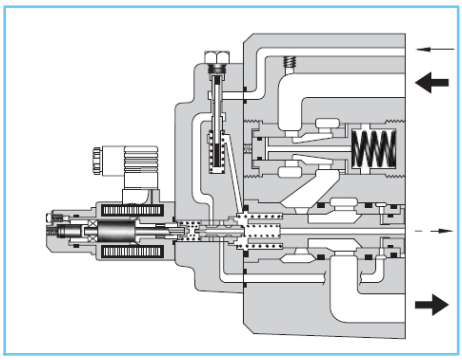
Since the preselected flow rate continuously varies in proportion to the current input to the valve, the system flow rate can be remote controlled as desired by regulating the current output from the amplifier. Further, since the pressure and temperature compensation functions are provided, the preselected flow rate is not be affected by pressure (load) or temperature (fluid viscosity).
This valve is ideal for use where actuator startup, stop, and speed changes are to be implemented without producing a shock. Note that this valve is used in conjunction with the applicable power amplifier.

Specifications

Description \ Model No.		EF※G-03- 60 125	EF※G-06-250
Max. Operating Pres.	Kgf/cm²	210	250
Metered Flow adj. Range	L/min.	60: 1 ~ 60 125: 1 ~ 125	2.5 ~ 250
Min. Differential Pressure*1	Kgf/cm²	10	
Free Flow (EFCG Models only)	L/min.	130	280
Min. Pilot Pressure*2	Kgf/cm²	10	15
Pilot Flow L/min.	At Normal	0.5	1
	At Transition	2.6	4
Rated Current	mA	780	820
Coil Resistance	Ω	10	
Hysteresis		Less than 3%	
Repeatability		Less than 1%	
Approx. Mass	Kg.	10	25

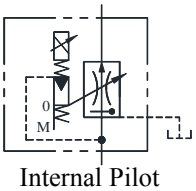
*1 Minimum pressure difference required between inlet and outlet ports to maintain function as pressure compensator.
*2 The minimum required value for the external pilot type.



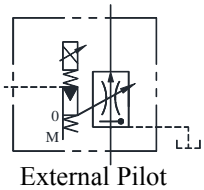


Graphic Symbols

● EFG-※

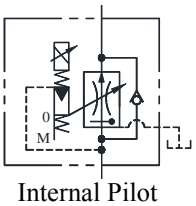


Internal Pilot

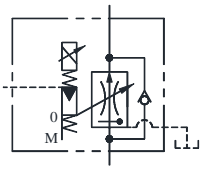


External Pilot

● EFCG-※



Internal Pilot



External Pilot

Model Number Designation

F-	EF	-G	-03	-60	-E	-51
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min.	Pilot Connection	Design Number
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required	**EF:** Proportional Electro-Hydraulic Flow Control Valve **EFC:** Proportional Electro-Hydraulic Flow Control and Check Valve	**G:** Sub-Plate Mounting	**03**	**60:** 60 **125:** 125	**None:** Internal Pilot **E :** External Pilot	**51**
			06	**250:** 250		

Mounting Bolts

Model Number	Socket head cap Screw	Qty	Bolt Kit Model Number
EFG-03 EFCG-03	M10 x 80Lg.	4	BKEFG-03-51
EFG-06 EFCG-06	M16 x 130Lg.		BKEFG-06-51

Sub-Plate

Sl. No.	Model Number	Sub-Plate Model Numbers	Thread size	Mass Kg.
1	EFG-03 EFCG-03	EFGM-03Y-2080	3/8 BSP.F	5.7
		EFGM-03Z-2080	1 BSP.F	5.6
2	EFG-06 EFCG-06	EFGM-06Y-2080	1 BSP.F	12.5
		EFGM-06Z-2080	1 1/4 BSP.F	16

- 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.
- For Sub-plates details please refer page No. 583.

Applicable Power Amplifier

Model No.

For suitable performance, it is recommended that YUKEN's applicable power amplifiers be used (for details see page 691)

- **AME-D-10-※-20**
- **AME-D2-1010-11**
- **SK1022-※-※-11**
- **SK1015-11 (For DC Power supply)**
- **AMN-D-10 (For DC Power supply)**

Instructions

- **Drain Back Pressure**

  Check that the drain back pressure does not exceed 2 Kgf/cm².

- **Pilot Type Selection**

  This valve is constructed so as to operate at a predetermined pilot pressure, for the 03, a pilot pressure of 10 Kgf/cm² or higher is required. For the 06, the required pilot pressure is 15 Kgf/cm² or higher.
  To obtain such a required pilot pressure, select the pilot type according to the circuit examples on the right.

①②

Use the external pilot type (Pilot connection code : E) whether a meter-in or meter-out circuit is employed.

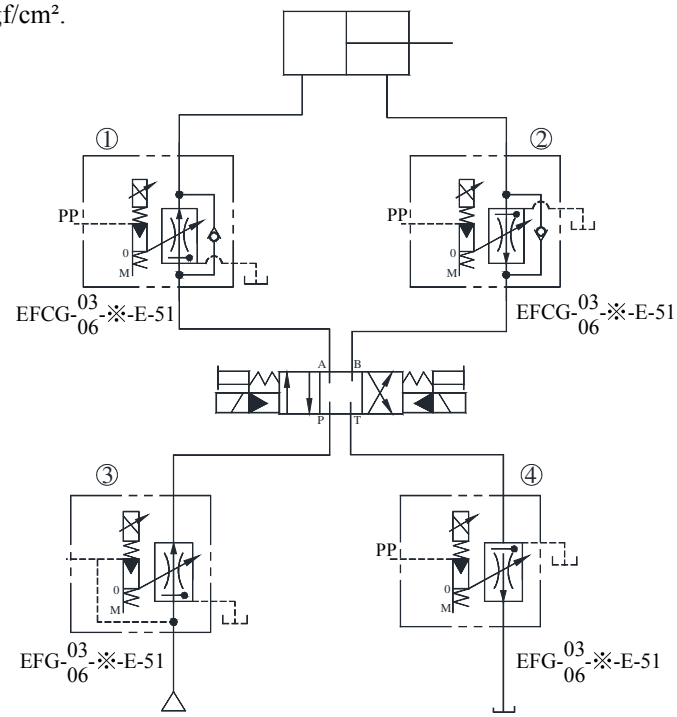
③

Use the internal pilot type (Pilot connection code : None)

④

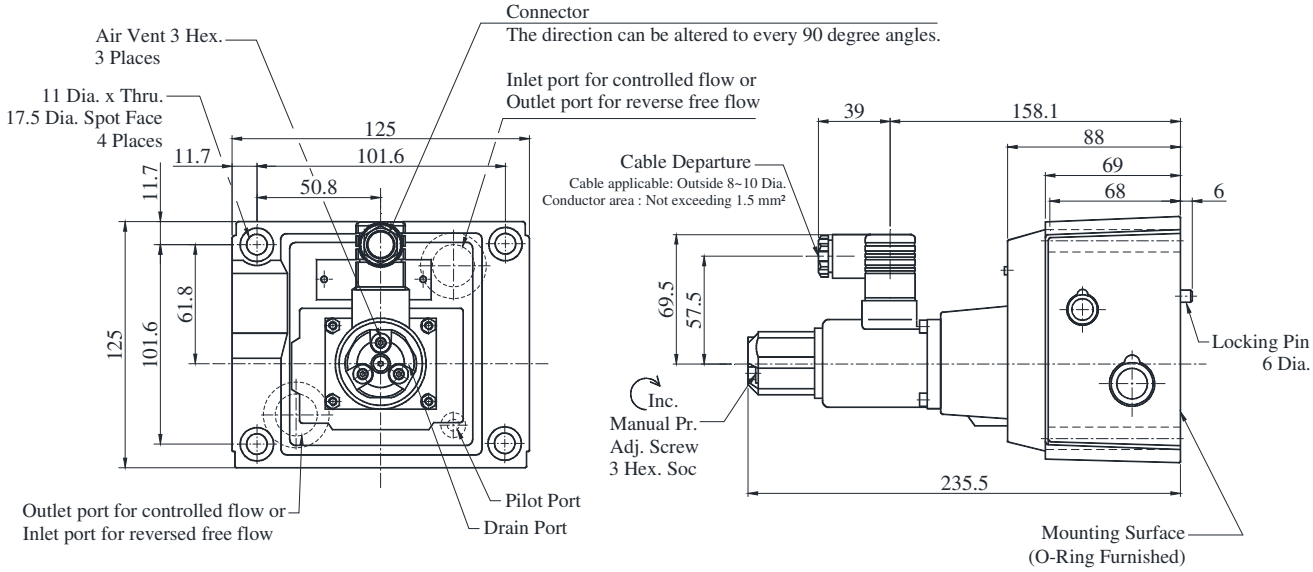
Use the external pilot type (Pilot connection code : E)

- **Example of Circuit**



- EFG
- EFCG

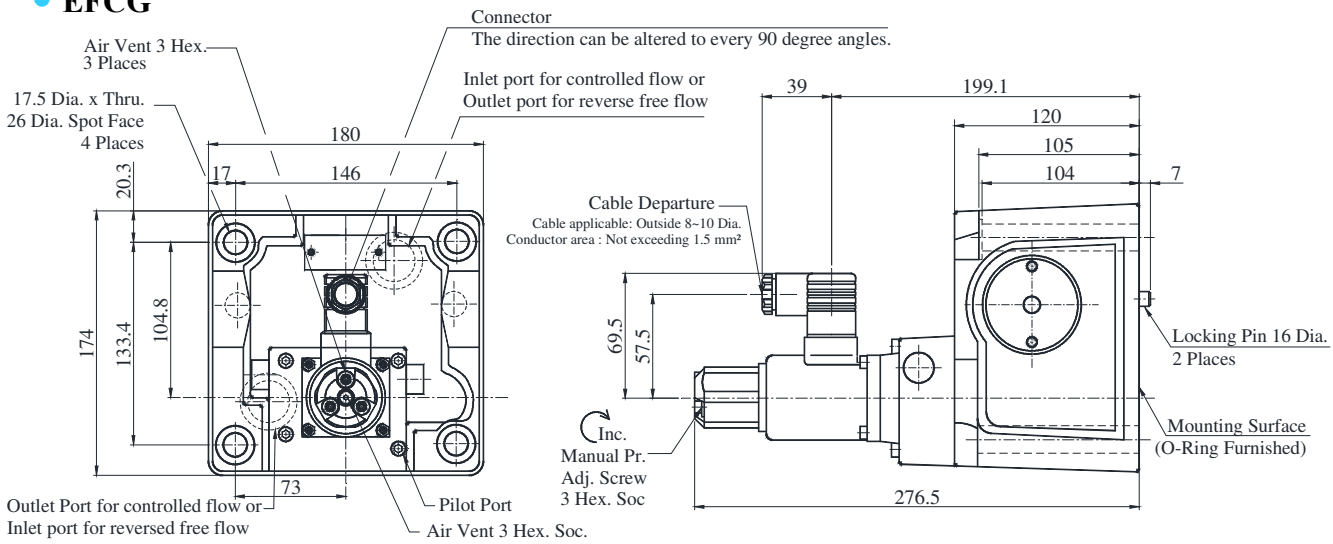
03- 60/125 -※-51



DIMENSIONS IN MILLIMETRES

- EFG
- EFCG

06-250-※-51

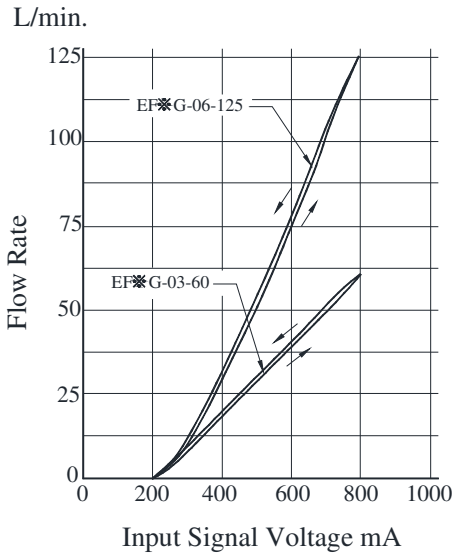


Input Current Vs. Flow

Viscosity : 30 cSt

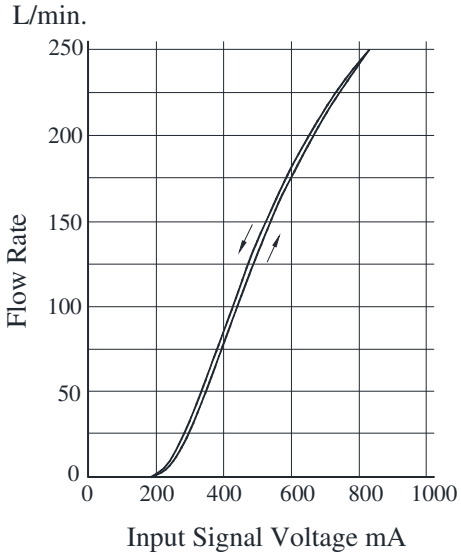
- EFG
- EFCG

03



- EFG
- EFCG

06



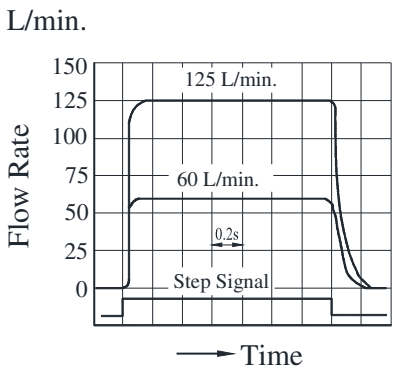
E Series
10Ω Series Flow Control (and Check) Valves
591
H
Proportional Electro-Hydraulic Pilot Relief Valve

Step Response (Example)

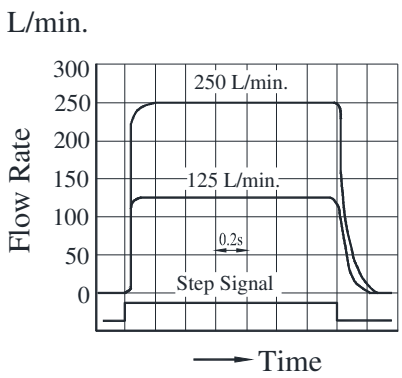
Viscosity : 30 cSt

These characteristics have been obtained by measuring on each valve. therefore, they may vary according to a hydraulic circuit to be used.

● EFG 03
● EFCG



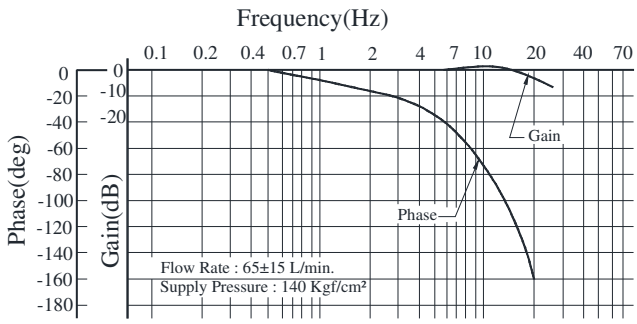
● EFG 06
● EFCG



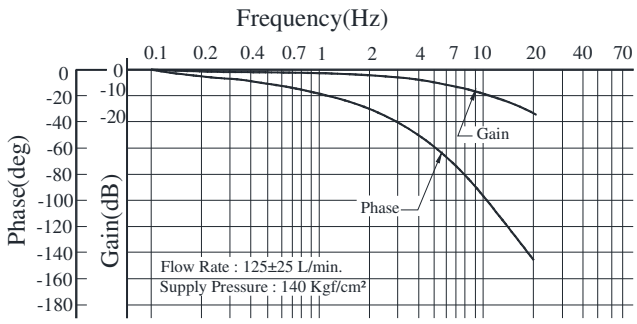
Frequency Response

Viscosity : 30 cSt

● EFG 03
● EFCG



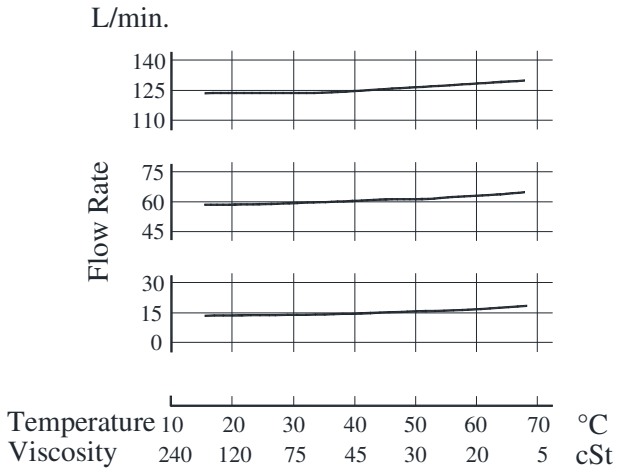
● EFG 06
● EFCG



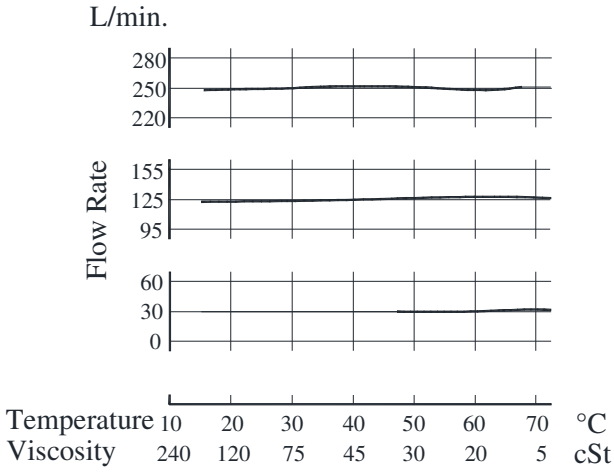
Viscosity Vs. Flow Rate

Oil : ISO VG 46 Oil.

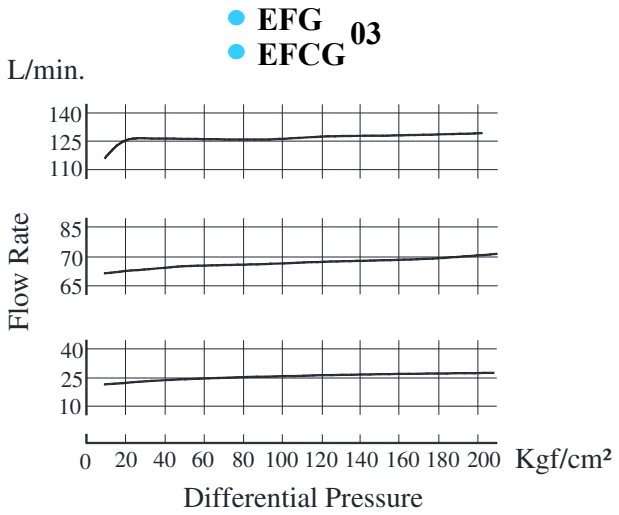
● EFG 03
● EFCG

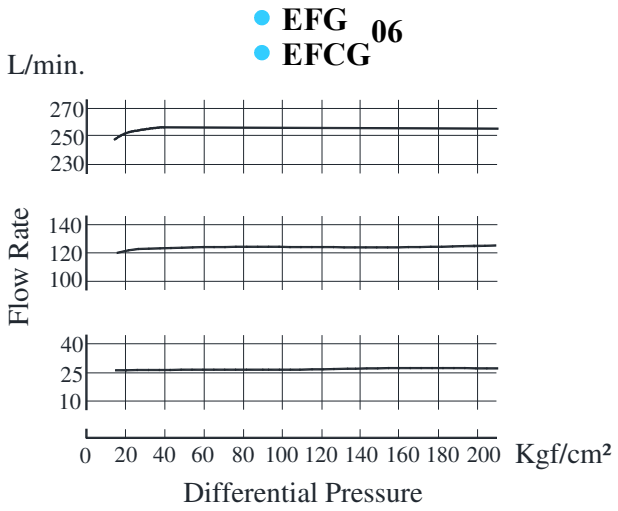


● EFG 06
● EFCG



Differential Pressure Vs. Flow





Spare Parts List

EF※ G-03

List of Seals

Sl. No.	Name of Parts	Part No.	Qty.
1	O-Ring	SO-NB-G35	1
2	O-Ring	SO-NB-P28	3
3	O-Ring	SO-NB-P26	1
4	O-Ring	SO-NB-P16	1
5	O-Ring	SO-NB-P14	1
6	O-Ring	SO-NB-P9	1
7	O-Ring	SO-NB-P6	2
8	O-Ring	SO-NA-A016	1

List of Seal Kits

Model Numbers	Seal Kit Numbers
EFG-03-※-※-51	KS-EFG-03-51
EFCG-03-※-※-51	KS-EFCG-03-51

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

EF※ G-06

List of Seals

Sl. No.	Name of Parts	Part No.	Qty.
1	O-Ring	SO-NA-P21	1
2	O-Ring	SO-NB-P50	3
3	O-Ring	SO-NB-P46	1
4	O-Ring	SO-NB-P36	1
5	O-Ring	SO-NB-P34	2
6	O-Ring	SO-NB-P32	4*1
7	O-Ring	SO-NA-P21	1
8	O-Ring	SO-NB-P10	2
9	O-Ring	SO-NB-P9	3

*1. Two O-Rings are required for the EFCG.

List of Seal Kits

Model Numbers	Seal Kit Numbers
EFG-06-250-※-51	KS-EFG-03-51
EFCG-06-250-※-51	KS-EFCG-03-51

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

Solenoid Assy.

Valve Model Numbers	Solenoid Assy.	Qty.
EF※G-03-※-※-51	E318-Y06M1-28-61	1
EF※G-06-125-※-51		