



VÁLVULAS DE CONTROL ELECTRO-HIDRÁULICAS

H2

SERIE E CONTROLES
PROPORCIONALES
ELECTRO-HIDRÁULICOS



油研工業株式会社



FINCSA[®]
GROUP

E Series Proportional Electro-Hydraulic Controls

Types	Graphic Symbols	Max. Operating Pressure MPa (PSI)	Maximum Flow		Page
			U.S.GPM	L/min	
			.5 1 5 10 50 100 200	50 100 200	
Pilot Relief Valves		24.5 (3550)	EDG 01		670
Relief Valves		24.5 (3550)	EBG 03	06 10	676
Relieving and Reducing Valves		24.5 (3550)	ERBG 06	10	685
40 Ω Series Flow Control (and Check) Valves		20.6 (3000)	EFG EFCG 02	03 06 10	695
10 Ω Series Flow Control (and Check) Valves		03: 20.6 (3000) 06: 24.5 (3550)	EFG EFCG 03	06	705
40 Ω - 10 Ω Series Flow Control and Relief Valves		24.5 (3550)	EFBG 03	06 10	712
10 Ω - 10 Ω Series Flow Control and Relief Valves		24.5 (3550)	EFBG 03	06 10	722
High Flow Series Flow Control and Relief Valves		24.5 (3550)	EFBG 03	06 10	733
Shockless Type Directional and Flow Control Valves		25 (3630)	EDFG 01		743
Directional and Flow Control Valves		25 (3630)	EDFHG 03	04 06	746
High Responses Type Directional and Flow Control Valves		01/03: 31.5 (4570) 04/06: 35 (5080)	ELDFG 01 03	ELDFHG 04 06	753

Power Amplifiers Page 766

Setting Adjusters Page 789

Hydraulic Fluids

● Fluid Types

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

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

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

● Recommended Fluid Viscosity and Temperature

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

Name	Viscosity	Temperature
Pilot Relief Valves Relief Valves Reducing and Relieving Valves	15 - 400 mm ² /s (77 - 1800 SSU)	-15 - +70°C (5 - 160°F)
Flow Control Valves Flow Control and Check Valves Flow Control and Relief Valves	20 - 200 mm ² /s (98 - 900 SSU)	
Directional and Flow Control Valves	20 - 400 mm ² /s (98 - 1800 SSU)	0 - +60°C (32 - 140°F)
Shockless Type Directional and Flow Control Valves High Responses Type Directional and Flow Control Valves (Direct Type)	20 - 200 mm ² /s (98 - 900 SSU)	0 - +60°C (32 - 140°F)
High Responses Type Directional and Flow Control Valves (Two Stage Type)	15 - 400 mm ² /s (77 - 1800 SSU)	-15 - +60°C (5 - 140°F)

● Control of Contamination

Due caution must be paid to maintaining control over contamination of the hydraulic fluids which may otherwise lead to breakdowns and shorten the life of the valve. Please maintain the degree of contamination within NAS 1638-Grade 11. Use 20 μm or finer line filter.

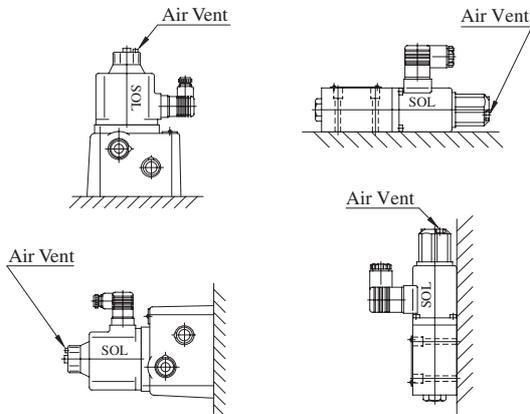
Instructions

Mounting

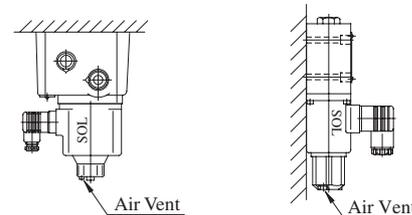
Be sure that the air vent faces up.

In addition, if the valve is mounted vertically, the minimum adjustment pressure is 0.2 MPa (29 PSI) or higher.

[Good example]



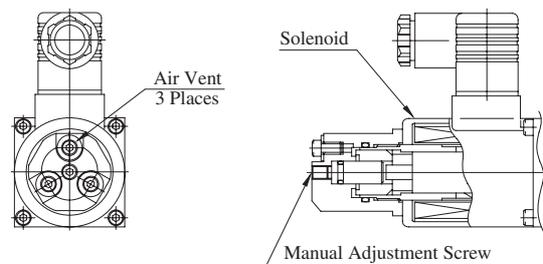
[Bad example]



Air Bleeding

To ensure stable control, bleed the air from solenoid completely and fill its core with oil.

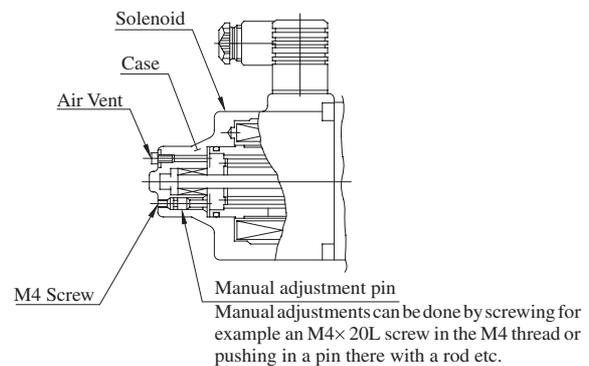
Bleeding can be done by slowly loosening one of the air vents at the end of the solenoid. Choose one of the three air vents which is expected to work most effectively (see the figure to the right).



10 Ω Series Solenoid

Manual Adjustment Screw

When initial adjustments are to be made or when no current is supplied to the valve due to electrical failure or other problem, turn the manual adjustment screw to temporarily set the valve pressure / flow rate. In that case, when turn the manual adjustment screw clockwise, the valve pressure / flow rate increases. Under normal condition, however, this screw must be kept in its original position (see the figure to the right).



40 Ω Series Solenoid

Tank and Drain Piping

The tank-line back pressure and drain back pressure directly affect the minimum adjustment pressure. Therefore, do not connect the tank or drain pipes to other lines, but connect them directly to the reservoir maintaining the back pressure as low as possible. Be sure that the tank and drain pipe ends are immersed in fluid.

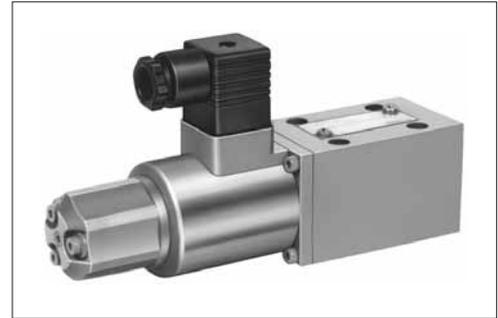
Hysteresis and Repeatability Value Indications

The hysteresis and repeatability values indicated in the specifications for each control valve are determined under the following conditions:

- Hysteresis Value: Obtained when Yuken's applicable power amplifier is used.
- Repeatability Value: Obtained when Yuken's applicable power amplifier is used under the same conditions.

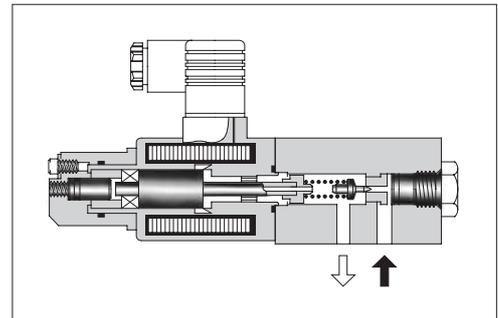
■ Proportional Electro-Hydraulic Pilot Relief Valves

This valve consists of a small DC solenoid and a direct-acting relief valve. It serves as a pilot valve for a low flow rate hydraulic system or a proportional electro-hydraulic control valve and controls the pressure in proportion to the input current. Note that this valve is used in conjunction with the applicable power amplifier.

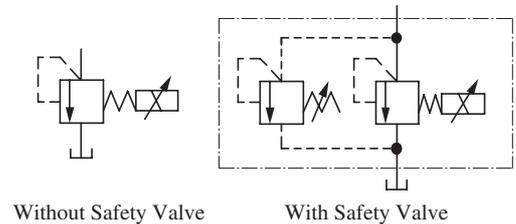


■ Specifications

Model Numbers	EDG-01
Description	EDG-01
Max. Operating Pres.	24.5 MPa (3550 PSI)
Max. Flow	2 L/min (.53 U.S.GPM)
Min. Flow	0.3 L/min (.08 U.S.GPM)
Pressure Adj. Range MPa (PSI)	Refer to Model Number Designation
Rated Current	EDG-01 *-B: 800 mA EDG-01 *-C: 900 mA EDG-01 *-H: 950 mA
Coil Resistance	10 Ω
Hysteresis	3% or less
Repeatability	1% or less
Approx. Mass	2 kg (4.4 lbs.)



Graphic Symbols



■ Model Number Designation

F-	ED	G	-01	V	-C	-1	-PN	T13	-51	*
Special Seals	Series Number	Type of Mounting	Valve Size	Applicable Control ^{★1}	Pressure Adj. Range MPa (PSI)	Safety Valve	P-Line Orifice	T-Line ^{★2} Orifice	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	ED: Proportional Electro-Hydraulic Pilot Relief Valve	G: Sub-plate Mounting	01	None: General use	B: 0.5 - 6.9 (70 - 1000)	None: Without Safety Valve 1: With Safety Valve	PN: Without Orifice (Standard)	T15	51	Refer to ^{★3}
				V: Vent Control of Relief Valve (Omit if not required)	C: 1.0 - 15.7 (145 - 2275)			T13		
					H: 1.2 - 24.5 (175 - 3550)			T11		

★1. When the valve is to be used for vent control purpose, orifice adjustment is required due to piping capacity limitations. Therefore, consult your Yuken representative in advance.

★2. The orifice used as the pilot valve may differ from the standard orifice.

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

Attachment

Mounting Bolts

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

Descriptions	Soc. Hd. Cap Screw
Japanese Standard "JIS" European Design Standard	M5 × 45 Lg.
N. American Design Standard	No. 10 - 24 UNC × 1-3/4 Lg.

Sub-plate

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

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- Sub-plates are those for 1/8 solenoid operated directional valves. For dimensions, see [page 356](#).

Instructions

Tank-Line Back Pressure

Check that the tank line back pressure does not exceed 0.2 MPa (29 PSI).

Vent Control

When the valve is used for vent control of relief valves or others, use the pipes of 6 mm (.24 in.) ID. 300 mm (11.8 in.) or less length for connection.

If the pressure is instable, provide a 1.0 to 1.5 mm (.04 to .06 in.) diameter orifice to the vent port of the relief valves or others.

Circuit Pressure Control

When the pressure in a circuit is directly controlled with this valve, set the trapped oil volume being more than 40 cm³ (2.44 cu. in.).

Applicable Power Amplifier

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see [page 767, 771, 780](#)).

Model Numbers : AME-D-10-*-20

AME-D2-1010-11

SK1022-**-*-11

SK1015-11 (For DC power supply)

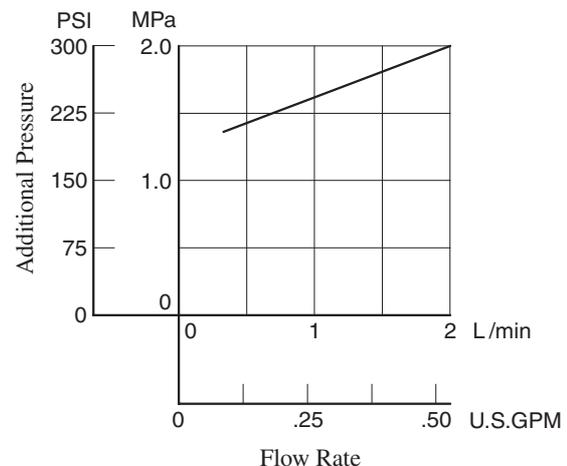
AMN-D-10 (For DC power supply)

Safety Valve Pressure Setting

The pressure of the safety valve at the maximum flow is preset at the value equal to the upper limit of the pressure adjustment range plus 2 MPa (290 PSI).

In case where the upper limit of operating pressure is low or the upper limit of flow rate to be used is different from the specified maximum flow, please adjust and determine the setting pressure of the safety valve at the value calculated from the following formula.

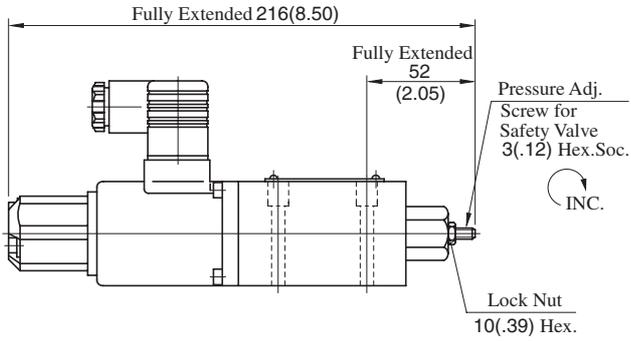
Setting pressure = (Operating pressure upper limit) + (Additional pressure indicated below)



To lower the setting pressure, turn the safety valve pressure adjustment screw anti-clockwise. After adjustment, be sure to tighten the lock nut.

EDG-01*-*-1-PNT*-51/5190

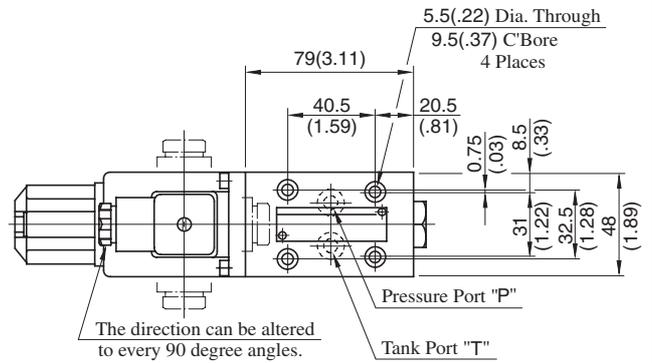
With Safety Valve



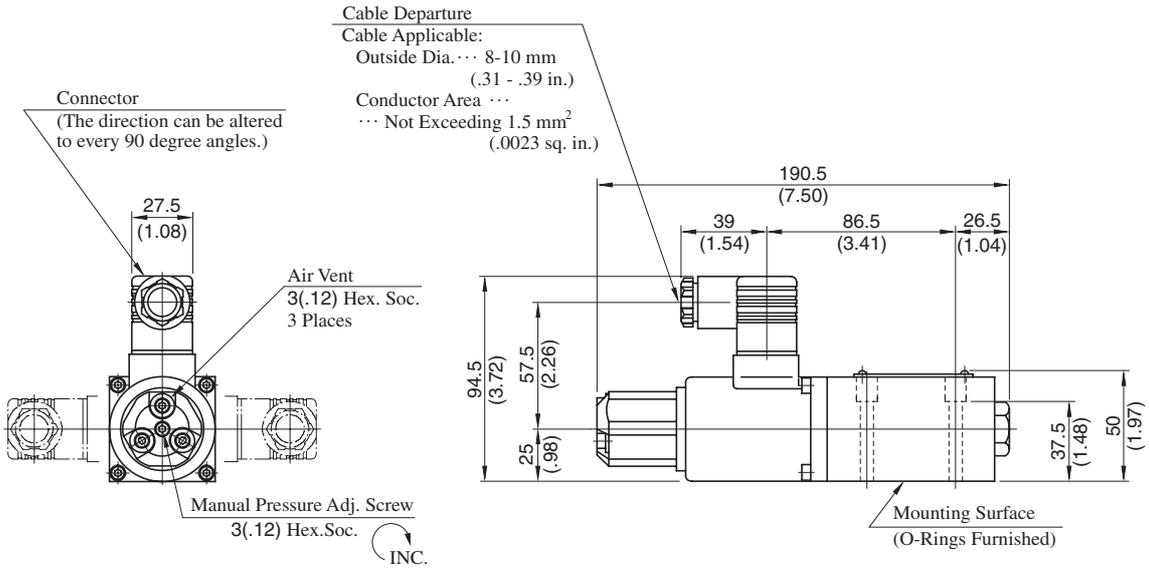
• For other dimensions, refer to the without safety valve.

EDG-01*-*-PNT*-51/5190

Without Safety Valve



DIMENSIONS IN MILLIMETRES (INCHES)

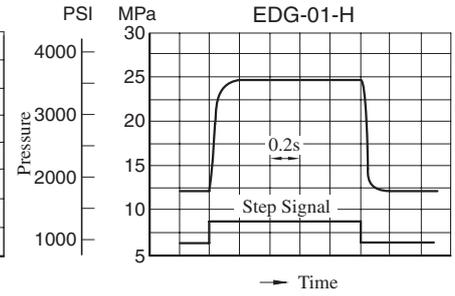
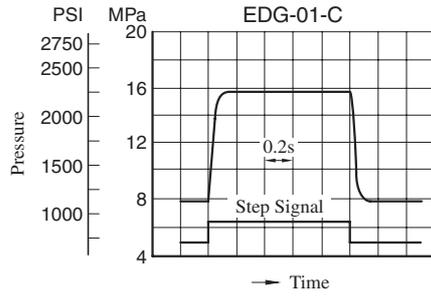
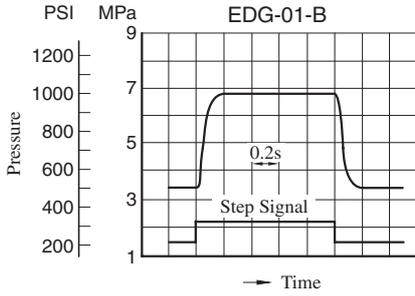


Note: For valve mounting surface dimensions, see the dimensional drawings of sub-plates (P.356) in common use.

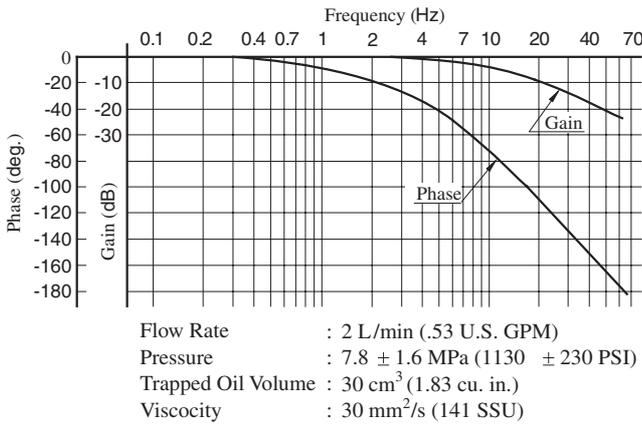
Step Response (Example)

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

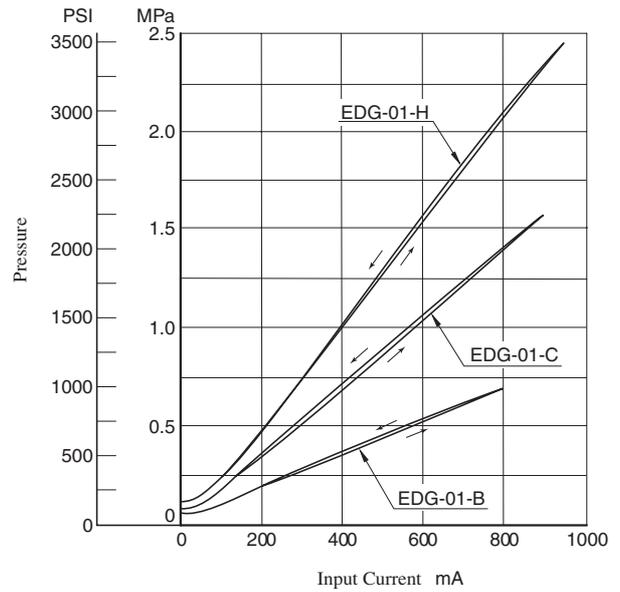
Flow Rate : 2 L/min (.53 U.S. GPM)
 Trapped Oil Volume : 40 cm³ (2.44 cu. in.)
 Viscosity : 30 mm²/s (141 SSU)



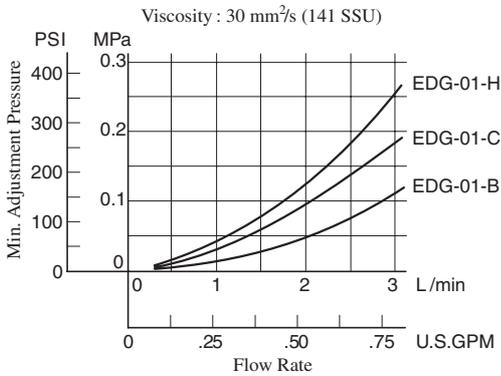
Frequency Response



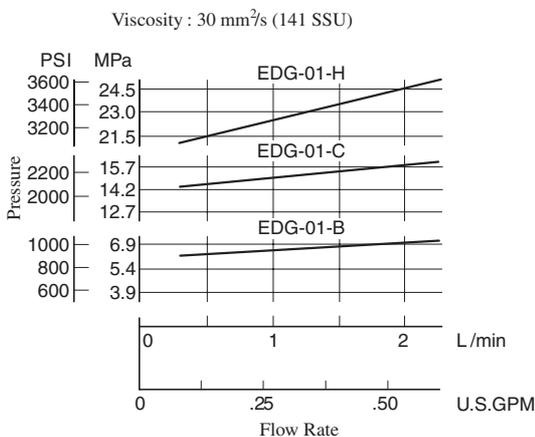
Control Pressure vs. Input Current



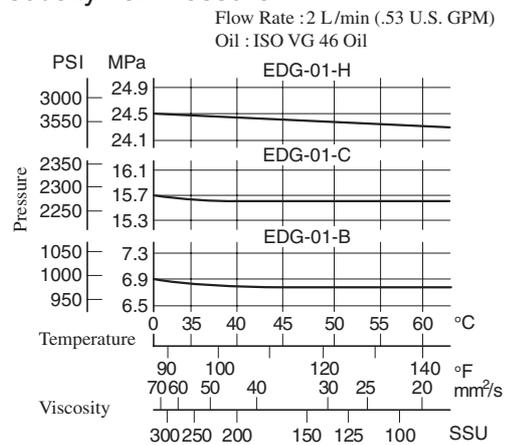
Min. Adjustment Pressure



Flow Rate vs. Pressure



Viscosity vs. Pressure



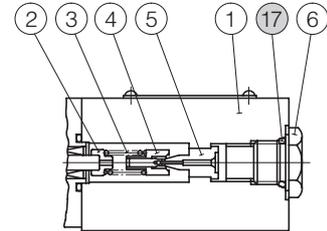
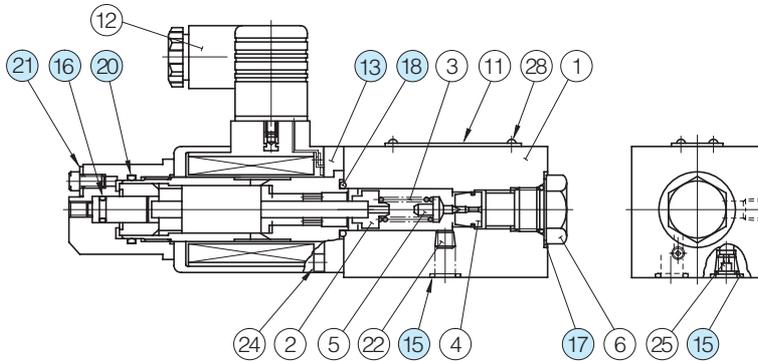
■ List of Seals and Solenoid Ass'y

● Without Safety Valve

EDG-01*-*-PNT*-51/5190

EDG-01V- *-PNT*-5103

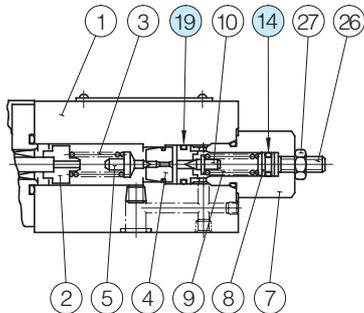
EDG-01- *-PNT*-5101



● With Safety Valve

EDG-01*-*-1-PNT*-51/5190

EDG-01V- *-1-P*T*-5103/5197



● List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
14	O-Ring	SO-NA-P6	1	Included in Seal Kit Kit No.: KS-EDG-01-51
15	O-Ring	SO-NB-P9	2	
16	O-Ring	SO-NB-P7	1	
17	O-Ring	SO-NB-P14	1	
18	O-Ring	SO-NB-P18	1	
19	O-Ring	SO-NB-A013	1	
20	O-Ring	SO-NB-P22	1	
21	Fastener Seal	SG-FCF-4	1	

Note) O-ring (Item 16, 18, 20) and the fastener seal (Item 21) are included in the solenoid assembly.

● Solenoid Ass'y

Valve Model Numbers	⑬ Solenoid Ass'y
EDG-01- *- *-P*T*-51/5190 EDG-01- *- *-P*T*-5101	E318-Y06M1-28-61
EDG-01V- *- *-P*T*-51/5190	E318-Y06M1-05-61
EDG-01V- *- *-PNT*-5103	E318-Y06M1-04-61
EDG-01V- *-1-PNT20-5197	E318-Y06M1-28-61

Note) The connector assembly GDM-211-B-11 (Item 12) is not included in the solenoid assembly.

Interchangeability between Current and New Design

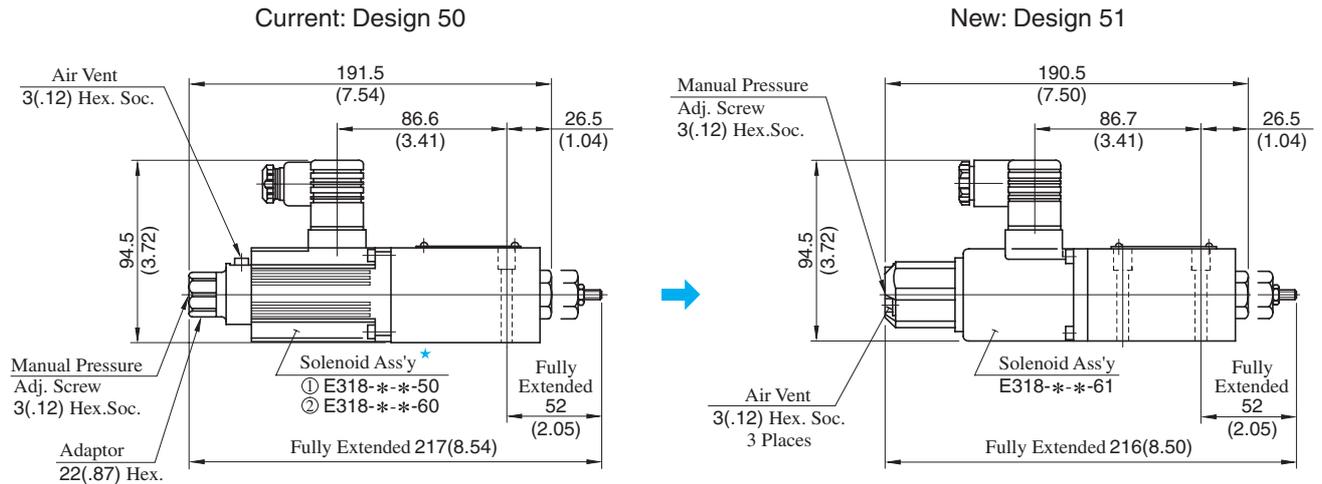
EDG-01 series valve has changed model from 50 to 51 design in line with the solenoid improvement.

Specifications and Characteristics

No change in specifications and characteristics between current and new design.

Mounting Interchangeability

There is an interchangeability in the mounting dimensions, however, the outside shape and dimensions are changed as shown below due to solenoid improvement and other modifications.



★ The solenoid assembly current design comes in two types: ① E318-50 design and ② 60 design. See the figure on the left for an external view of type ①. See the figure on the right for type ②.

DIMENSIONS IN
MILLIMETRES (INCHES)

■ Proportional Electro-Hydraulic Relief Valves

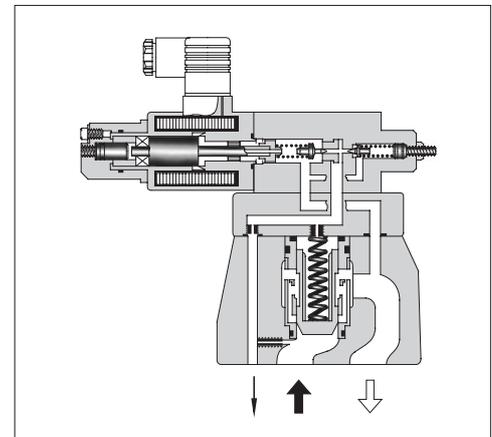
This valve is derived by combining a small, high-performance 1/8 proportional electro-hydraulic pilot relief valve with a specially developed low-noise relief valve.

With this valve, it is possible to regulate the system pressure in proportion to the input current. Note that this valve is used in conjunction with the applicable power amplifier.

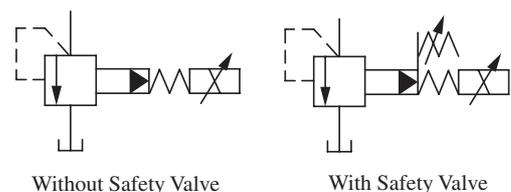


■ Specifications

Model Numbers	EBG-03	EBG-06	EBG-10
Description			
Max. Operating Pres. MPa (PSI)	24.5 (3550)	24.5 (3550)	24.5 (3550)
Max. Flow L/min(U.S.GPM)	100 (26.4)	200 (52.8)	400 (106)
Min. Flow L/min(U.S.GPM)	3 (.79)	3 (.79)	3 (.79)
Pressure Adjustment Range MPa (PSI)	Refer to Model Number Designation		
Rated Current	C: 770 mA H: 820 mA	C: 750 mA H: 800 mA	C: 730 mA H: 780 mA
Coil Resistance	10 Ω	10 Ω	10 Ω
Hysteresis	3% or less	3% or less	3% or less
Repeatability	1% or less	1% or less	1% or less
Approx. Mass kg (lbs.)	5.6 (12.3)	6.3 (13.9)	10 (22)



Graphic Symbols



■ Model Number Designation

F-	EB	G	-03	-C	-T	-51	*
Special Seals	Series Number	Type of Mounting	Valve Size	Pres. Adj. Range MPa (PSI)	Safety Valve	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	EB: Proportional Electro-Hydraulic Relief Valve	G: Sub-plate Mounting	03	C: * - 15.7 (* - 2275) H: * - 24.5 (* - 3550)	None: With Safety Valve T: Without Safety Valve	51	Refer to ^{★2}
06							
10							

★1. Min. adjustment pressure shall be referred to the curves on page 680.

★2. 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		
	Japanese Standard "JIS" & European Design Standard	N. American Design Standard	Qty.
EBG-03	M12 × 40 Lg.	1/2 - 13 UNC × 1-1/2 Lg.	4
EBG-06	M16 × 50 Lg.	5/8 - 11 UNC × 2 Lg.	4
EBG-10	M20 × 60 Lg.	3/4 - 10 UNC × 2-1/4 Lg.	4

■ Applicable Power Amplifiers

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see [page 767, 771, 780](#)).

Model Numbers : AME-D-10-*-20 SK1015-11 (For DC power supply)
 AME-D2-1010-11 AMN-D-10 (For DC power supply)
 SK1022-**-*-11

■ Sub-plate

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

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

■ Instructions

● Safety Valve

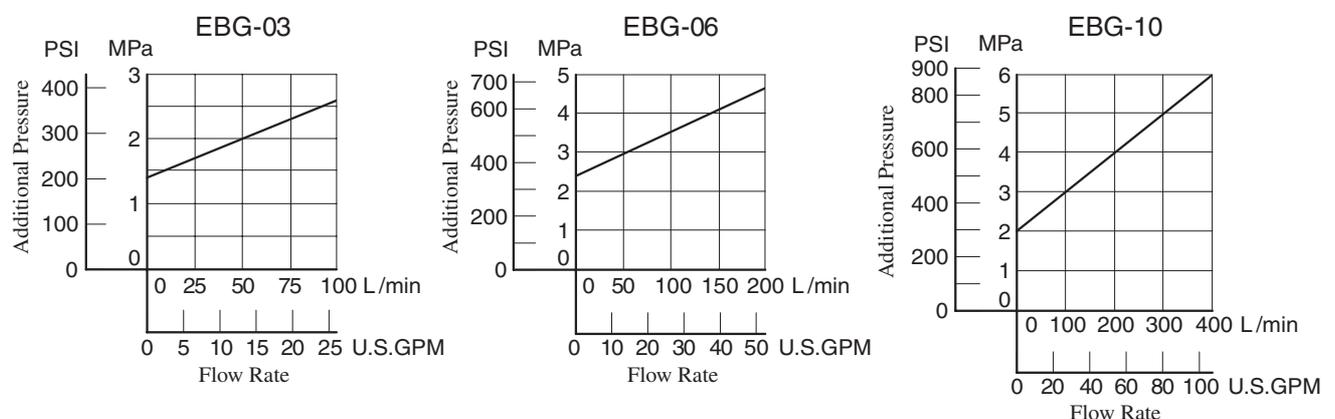
The pressure of the safety valve for EBG-03 is preset at the value equal to the upper limit of the pressure adjustment range plus 2 MPa (290 PSI) subject to a flow rate of 50 L/min (13.2 U.S.GPM).

The same for EBG-06 is preset at the value equal to the upper limit of the pressure adjustment range plus 3.5 MPa (510 PSI) subject to a flow rate of 100 L/min (26.4 U.S.GPM).

The same for EBG-10 is preset at the value equal to the upper limit of the pressure adjustment range plus 4 MPa (580 PSI) subject to a flow rate of 200 L/min (52.8 U.S.GPM).

In case where the upper limit of operating pressure is low or the upper limit of flow rate to be used is different from the specified maximum flow, please adjust and determine the setting pressure of the safety valve at the value calculated from the following formula.

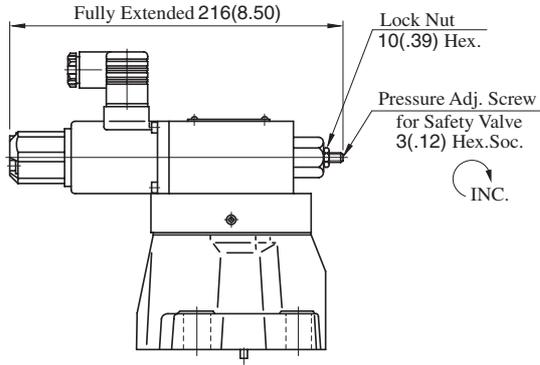
$$\text{Setting pressure} = (\text{Operating pressure upper limit}) + (\text{Additional pressure indicated blow})$$



To lower the setting pressure, turn the safety valve pressure adjustment screw anti-clockwise. After adjustment, be sure to tighten the lock nut.

EBG-03-06-*-51/5190

With Safety Valve



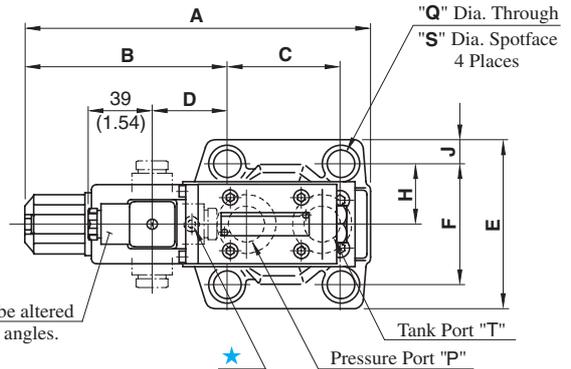
• For other dimensions, refer to the without safety valve.

Mounting Surface
EBG-03 : ISO 6264-AR-06-2-A
EBG-06 : ISO 6264-AS-08-2-A

DIMENSIONS IN MILLIMETRES (INCHES)

EBG-03-06-*-T-51/5190

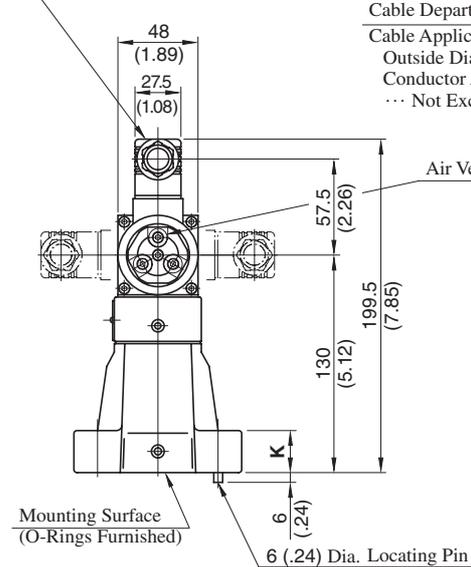
Without Safety Valve



The direction can be altered to every 90 degree angles.

★ This port is not used. It is provided because of the common use of the body with the low-noise type pilot operated relief valve. On the sub-plate, plug the port which corresponds to this port.

Connector
(The direction can be altered to every 90 degree angles.)

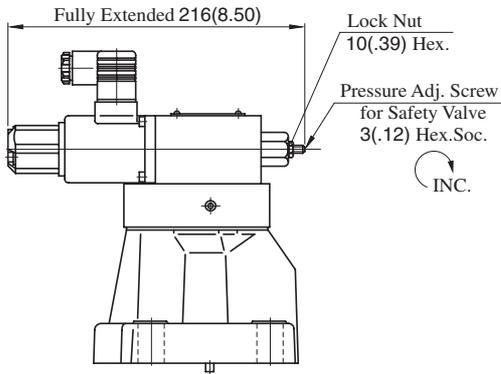


Model Numbers	Dimensions mm (Inches)												
	A	B	C	D	E	F	H	J	K	L	N	Q	S
EBG-03	197.5 (7.78)	117.6 (4.63)	53.8 (2.12)	40.3 (1.59)	76 (2.99)	53.8 (2.12)	26.9 (1.06)	11.1 (.44)	21.5 (.85)	106 (4.17)	26.1 (1.03)	13.5 (.53)	21 (.83)
EBG-06	205.5 (8.09)	119.5 (4.70)	66.7 (2.63)	42.1 (1.66)	98 (3.86)	70 (2.76)	35 (1.38)	14 (.55)	26 (1.02)	122 (4.80)	36 (1.42)	17.5 (.69)	26 (1.02)

Note: For valve mounting surface dimensions, see the dimensional drawings of sub-plates (p.213) in common use.

EBG-10-*-51/5190

With Safety Valve



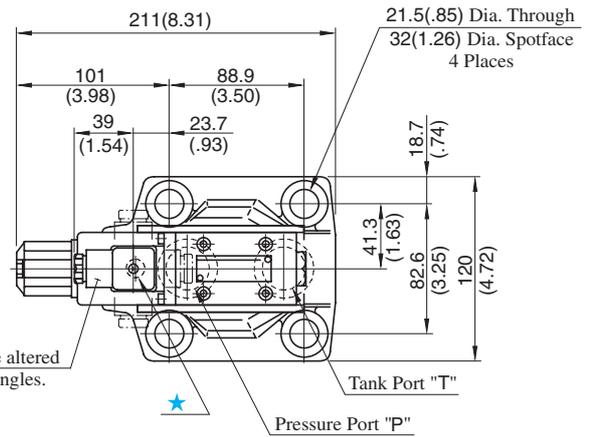
• For other dimensions, refer to the without safety valve.

Mounting surface:
ISO 6264-AT-10-2-A

**DIMENSIONS IN
MILLIMETRES (INCHES)**

EBG-10-*-T-51/5190

Without Safety Valve

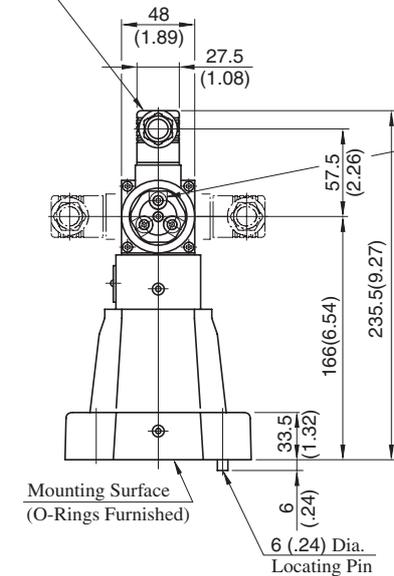


The direction can be altered to every 90 degree angles.

★ This port is not used. It is provided because of the common use of the body with the low-noise type pilot operated relief valve.

On the sub-plate, plug the port which corresponds to this port.

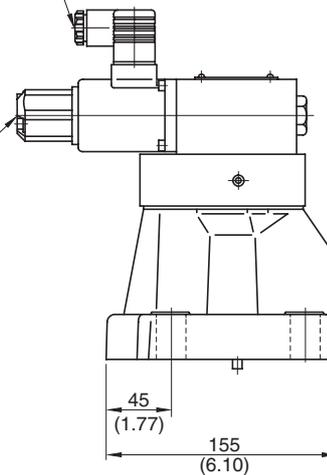
Connector
(The direction can be altered to every 90 degree angles.)



Cable Departure
Cable Applicable:
Outside Dia. ... 8-10 mm (.31 - .39 in.)
Conductor Area
... Not Exceeding 1.5 mm²
(.0023 sq. in.)

Air Vent
3(.12) Hex.Soc.
3 Places

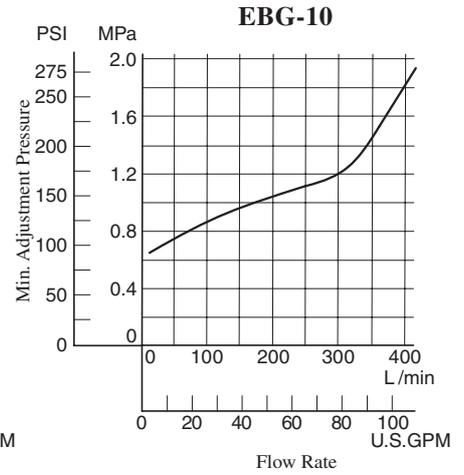
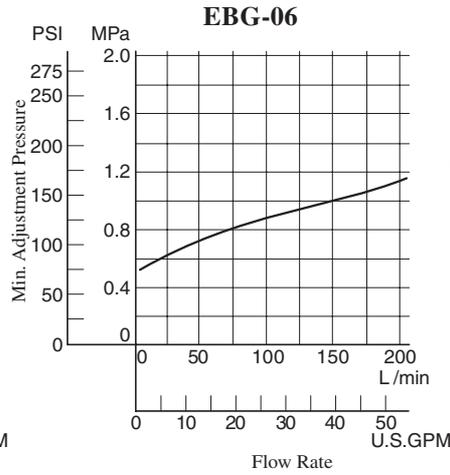
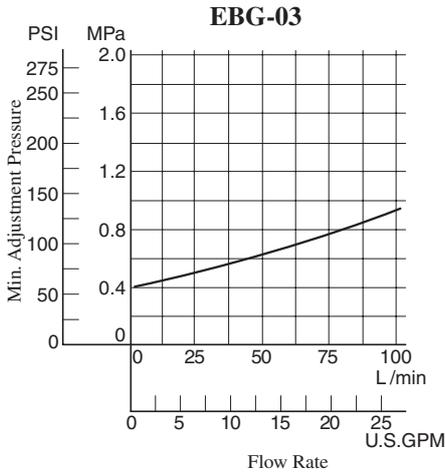
Manual Pressure
Adj. Screw
3(.12) Hex.Soc.
INC.



Note: For valve mounting surface dimensions, see the dimensional drawings of sub-plates (p.213) in common use.

Min. Adjustment Pressure

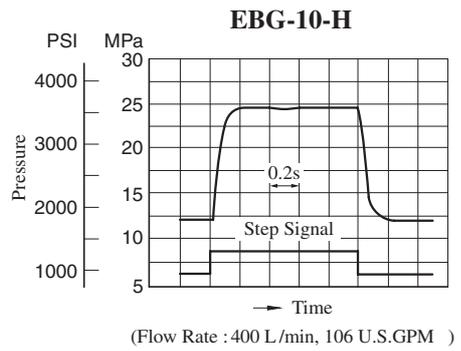
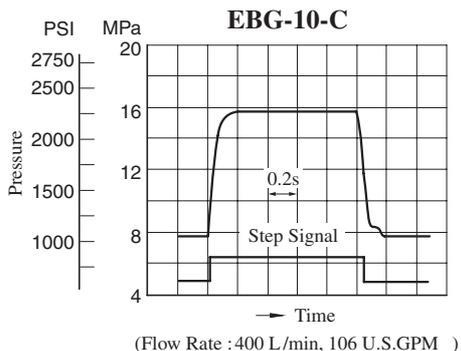
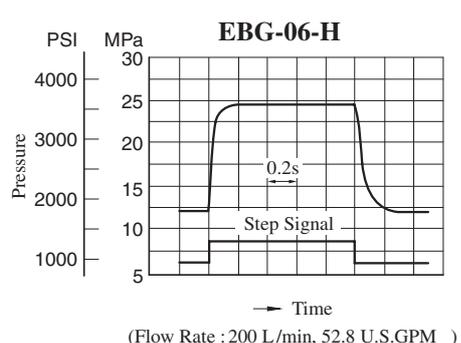
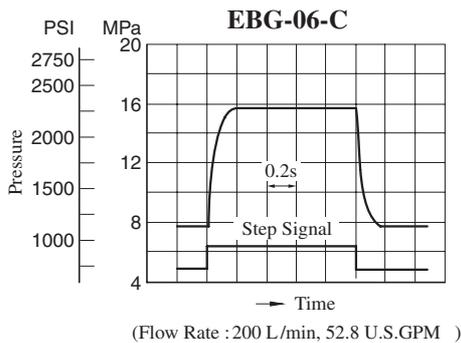
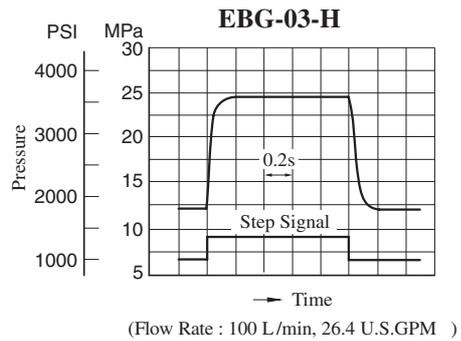
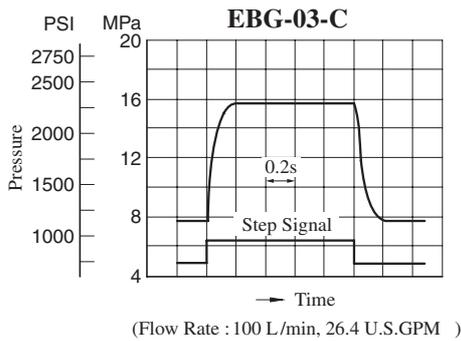
Viscosity : 30 mm²/s (141 SSU)



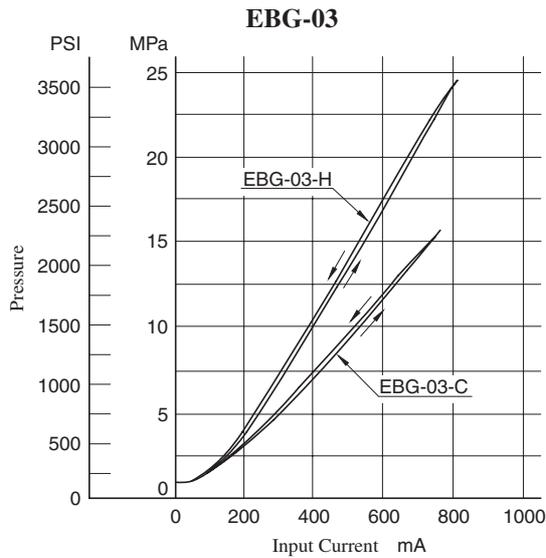
Step Response (Example)

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

Trapped Oil Volume : 1 L (.264 U.S. Gallons)
Viscosity : 30 mm²/s (141 SSU)

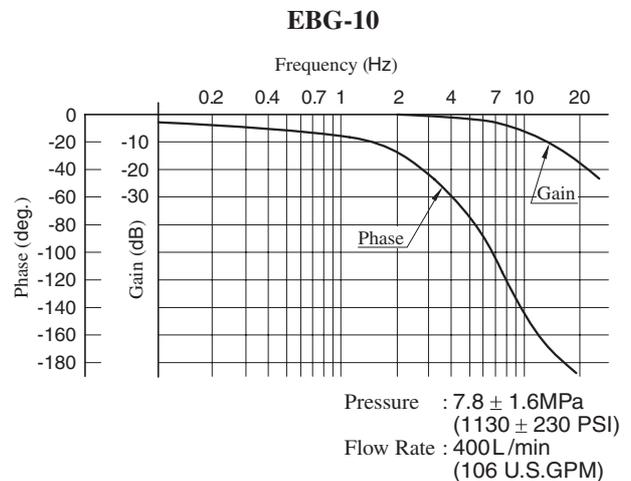
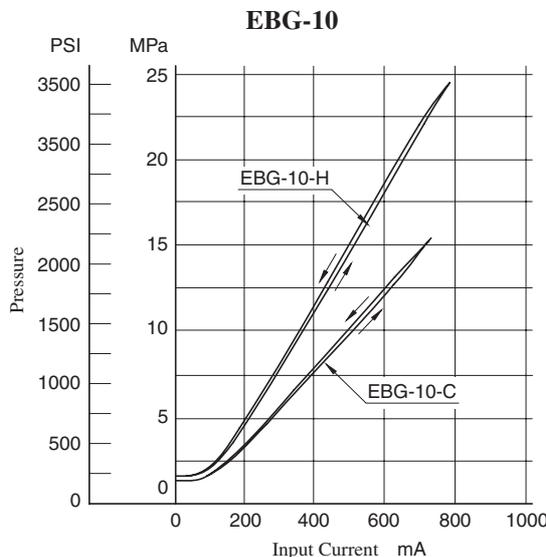
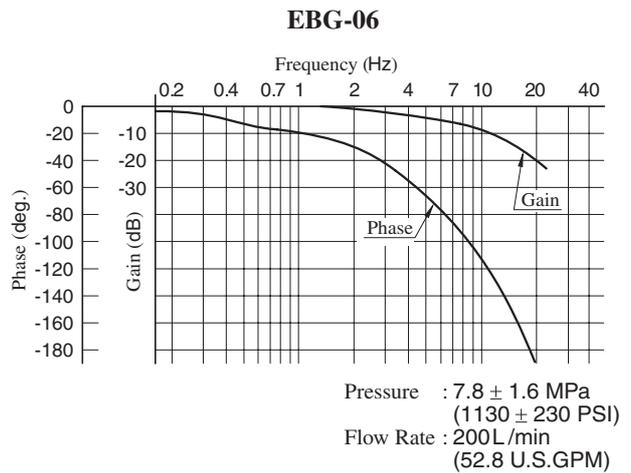
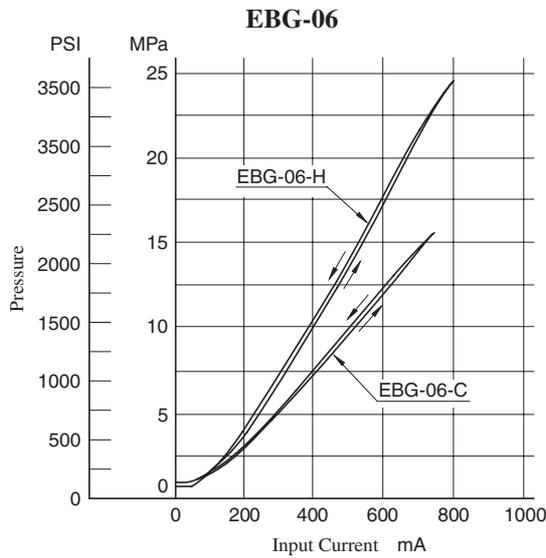
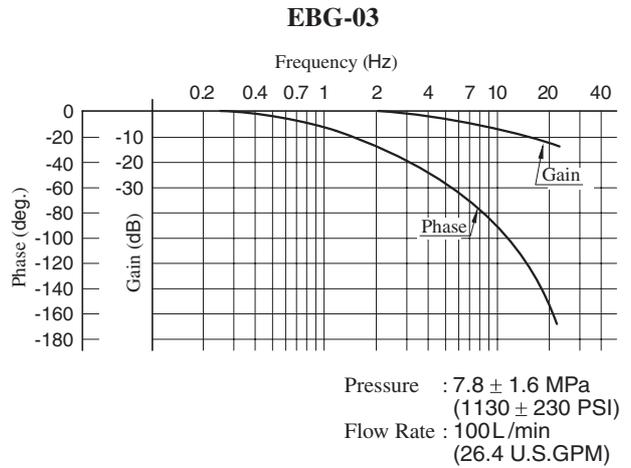


Input Current vs. Pressure



Frequency Response

Trapped Oil Volume : 1 L (.264 U.S. Gallons)
 Viscosity : 30 mm²/s (141 SSU)



Viscosity vs. Pressure

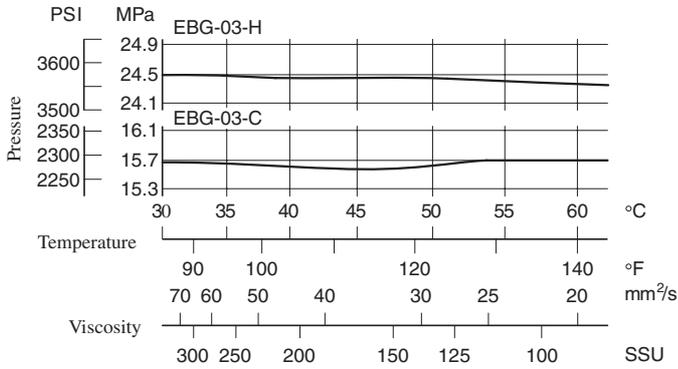
Oil : ISO VG 46 Oil

Flow Rate vs. Pressure

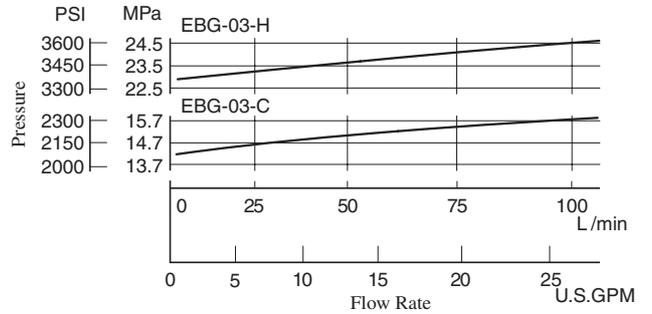
Viscosity : 30 mm²/s (141 SSU)

EBG-03

Flow Rate : 100L/min
(26.4 U.S.GPM)

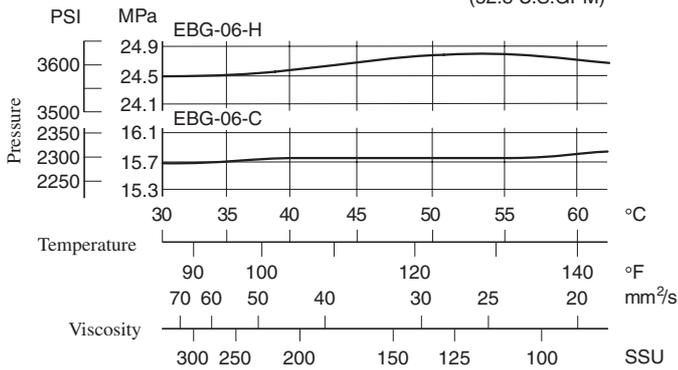


EBG-03

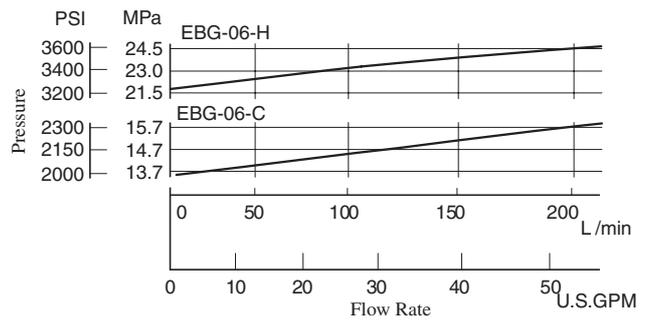


EBG-06

Flow Rate : 200L/min
(52.8 U.S.GPM)

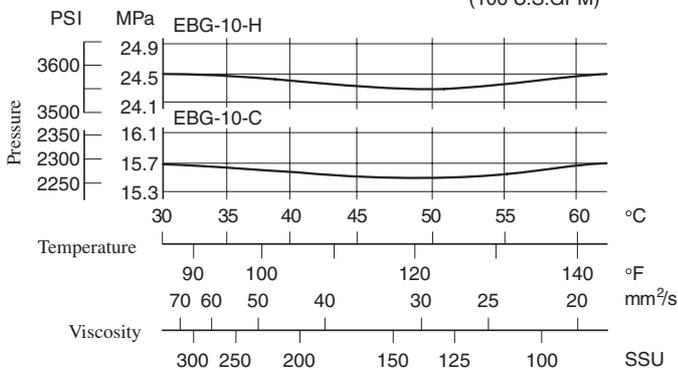


EBG-06

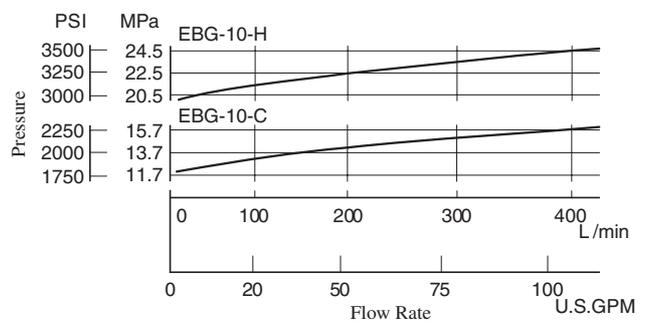


EBG-10

Flow Rate : 400L/min
(106 U.S.GPM)

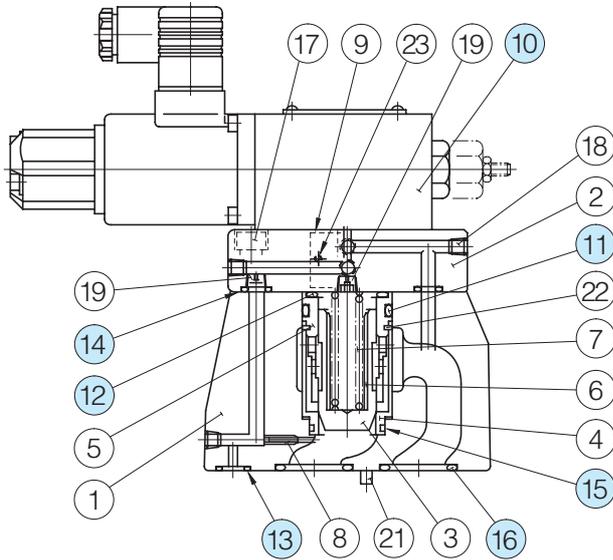


EBG-10



List of Seals and Pilot Valves

03
EBG-06-**-**-51/5190
10



Pilot Valve

Valve Model Numbers	⑩ Pilot Valve Model Numbers
EBG-03-C-51/5190	EDG-01V-C-1-PNT09-51
EBG-03-H-51/5190	EDG-01V-H-1-PNT09-51
EBG-03-C-T-51/5190	EDG-01V-C-PNT09-51
EBG-03-H-T-51/5190	EDG-01V-H-PNT09-51
EBG-06-C-51/5190	EDG-01V-C-1-PNT10-51
EBG-06-H-51/5190	EDG-01V-H-1-PNT10-51
EBG-06-C-T-51/5190	EDG-01V-C-PNT10-51
EBG-06-H-T-51/5190	EDG-01V-H-PNT10-51
EBG-10-C-51/5190	EDG-01V-C-1-PNT11-5103
EBG-10-H-51/5190	EDG-01V-H-1-PNT11-5103
EBG-10-C-T-51/5190	EDG-01V-C-PNT11-5103
EBG-10-H-T-51/5190	EDG-01V-H-PNT11-5103

Note: For the details of pilot valves, refer to "Pilot Relief Valves" on [page 674](#).

List of Seals

Item	Name of Parts	Part Numbers			Qty.
		EBG-03	EBG-06	EBG-10	
11	O-Ring	SO-NB-P32	SO-NB-P32	SO-NB-P42	1
12	O-Ring	SO-NB-P28	SO-NB-P28	SO-NB-P28	1
13	O-Ring	SO-NB-P9	SO-NB-P11	SO-NB-P9	1
14	O-Ring	SO-NB-P9	SO-NB-P9	SO-NB-P9	2
15	O-Ring	SO-NB-A024	SO-NB-A024	SO-NB-A128	1
16	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	2

Note) When ordering seals, please specify the seal kit number from the table below.
In addition to the above O-rings, seals for pilot valve are included in the seal kit.
For the details of the pilot valve seals, see [page 674](#).

List of Seal Kit

Model Numbers	Seal Kit Numbers
EBG-03	KS-EBG-03-51
EBG-06	KS-EBG-06-51
EBG-10	KS-EBG-10-51

Interchangeability between Current and New Design

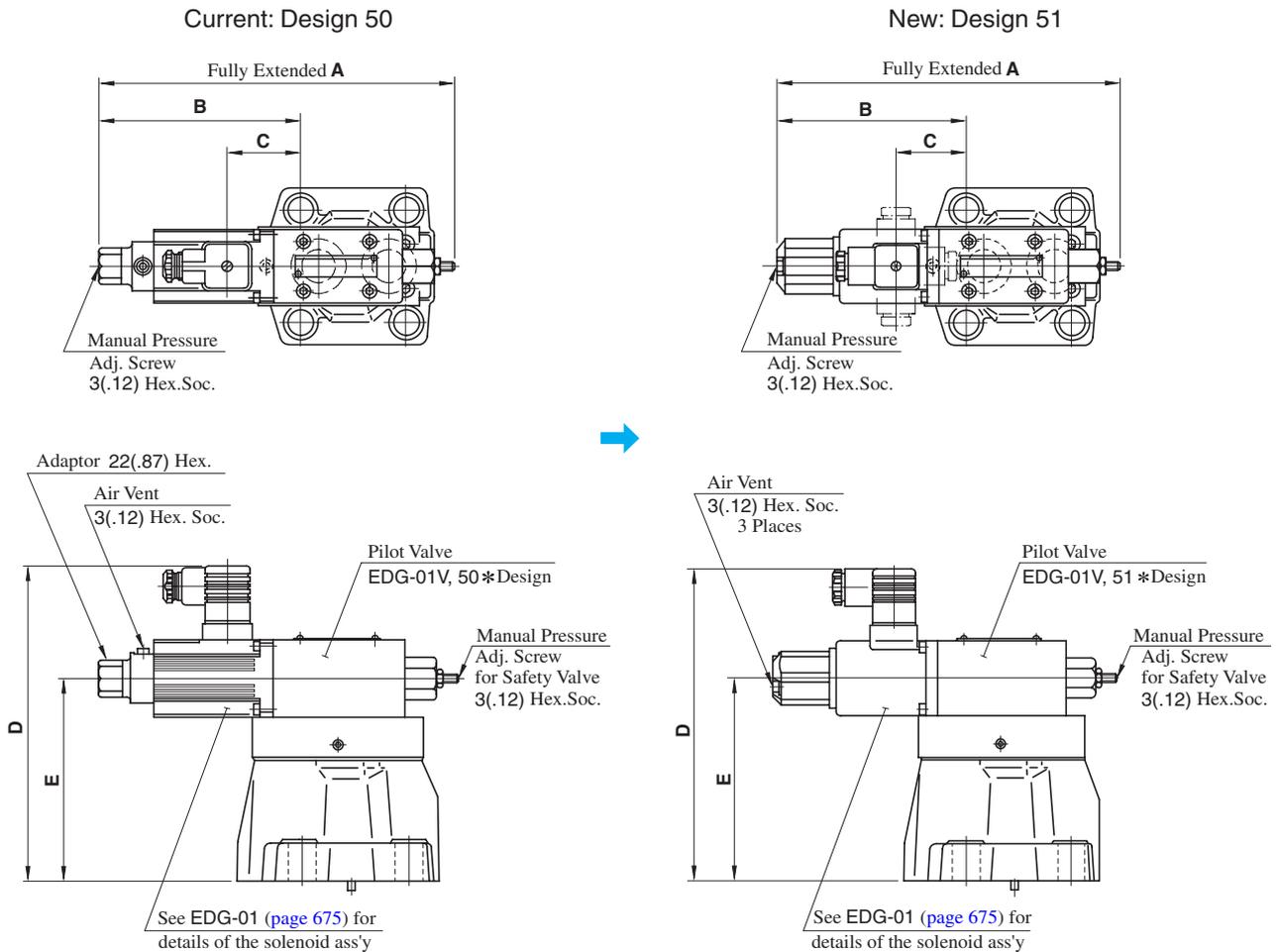
EBG-03/06/10 series valves have changed model from 50 to 51 design in line with the model change of pilot valve (EDG-01).

Specifications and Characteristics

No change in specifications and characteristics between current and new design.

Mounting Interchangeability

There is an interchangeability in the mounting dimensions, however, the outside shape and dimensions are changed as shown below due to pilot valve improvement and other modifications.



Model Numbers		A	B	C	D	E
Current	EBG-03-*-*50/5090	217 (8.54)	118.6 (4.67)	40.2 (1.58)	199.5 (7.85)	130 (5.12)
New	EBG-03-*-*51/5190	216 (8.50)	117.6 (4.63)	40.2 (1.59)		
Current	EBG-06-*-*50/5090	217 (8.54)	120.5 (4.74)	42.1 (1.66)	199.5 (7.85)	130 (5.12)
New	EBG-06-*-*51/5190	216 (8.50)	119.5 (4.70)	42.1 (1.66)		
Current	EBG-10-*-*50/5090	217 (8.54)	102 (4.02)	23.6 (.93)	235.5 (9.27)	166 (6.54)
New	EBG-10-*-*51/5190	216 (8.50)	101 (3.98)	23.6 (.93)		

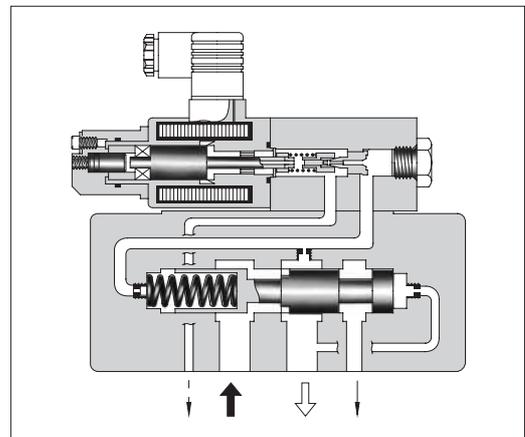
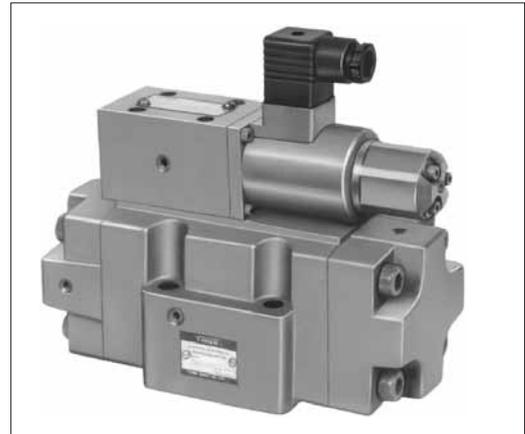
**DIMENSIONS IN
MILLIMETRES (INCHES)**

■ Proportional Electro-Hydraulic Relieving and Reducing Valves

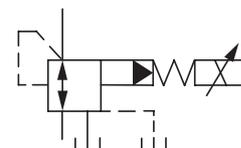
This valve is derived by combining a small, high-performance 1/8 proportional electro-hydraulic pilot relief valve with a relieving and reducing valve.

With this valve, it is possible to regulate the system pressure in proportion to the input current.

Incorporating a relief mechanism, this valve provides a good response speed and the pressure decreases even if the load is large. Note that this valve is used in conjunction with the applicable power amplifier.



Graphic Symbol



■ Specifications

Model Numbers	ERBG-06	ERBG-10
Description		
Max. Operating Pres. MPa (PSI)	24.5 (3550)	24.5 (3550)
Max. Flow L/min(U.S.GPM)	100 (26.4)	250 (66)
Max. Relieving Flow L/min(U.S.GPM)	35 (9.24) *	15 (3.96) *
Secondary Pres. Adj. Range MPa (PSI)	Refer to Model Number Designation	
Rated Current	B : 800 mA C : 800 mA H : 950 mA	B : 800 mA C : 800 mA H : 950 mA
Coil Resistance	10 Ω	10 Ω
Hysteresis	3% or less	3% or less
Repeatability	1% or less	1% or less
Approx. Mass kg (lbs.)	12 (26.5)	13.5 (29.8)

★ The values shown are those obtained where the differential pressure between the secondary pressure port and tank port is 13.7 MPa (2000 PSI).

■ Model Number Designation

F-	ERB	G	-06	-C	-51	*
Special Seals	Series Number	Type of Mounting	Valve Size	Secondary Pres. Adj. Range MPa (PSI)	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	ERB: Proportional Electro-Hydraulic Relieving and Reducing Valve	G: Sub-plate Mounting	06	B: 0.8 - 6.9 (115 - 1000) C: 1.2 - 13.7 (175 - 2000) H: 1.5 - 20.6 (220 - 3000)	51	Refer to ★
			10	B: 0.9 - 6.9 (130 - 1000) C: 1.2 - 13.7 (175 - 2000) H: 1.5 - 20.6 (220 - 3000)		

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

H
E Series
Relieving and Reducing Valves

■ Attachment

● Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw		
	Japanese Standard "JIS" & European Design Standard	N. American Design Standard	Qty.
ERBG-06	M10 × 70 Lg.	3/8 - 16 UNC × 2-3/4 Lg.	4
ERBG-10	M10 × 70 Lg.	3/8 - 16 UNC × 2-3/4 Lg.	6

■ Applicable Power Amplifier

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see [page 767, 771, 780](#)).

Model Numbers : AME-D-10-*-20
 AME-D2-1010-11
 SK1022- *- *-11
 SK1015-11 (For DC power supply)
 AMN-D-10 (For DC power supply)

■ Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
ERBG-06	ERBGM-06-20	Rc 3/4	ERBGM-06-2080	3/4 BSP.F	ERBGM-06-2090	3/4 NPT	3.0 (6.6)
ERBG-10	ERBGM-10-10	Rc 1-1/4	ERBGM-10-1080	1-1/4 BSP.F	ERBGM-10-1090	1-1/4 NPT	6.5 (14.3)

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

■ Instructions

● Primary Pressure Required for Preselected Pressure

The primary pressure must be 1 MPa (145 PSI) higher than the preselected pressure.

● Drain Back Pressure

Check that the drain back pressure does not exceed 0.2 MPa (29 PSI).

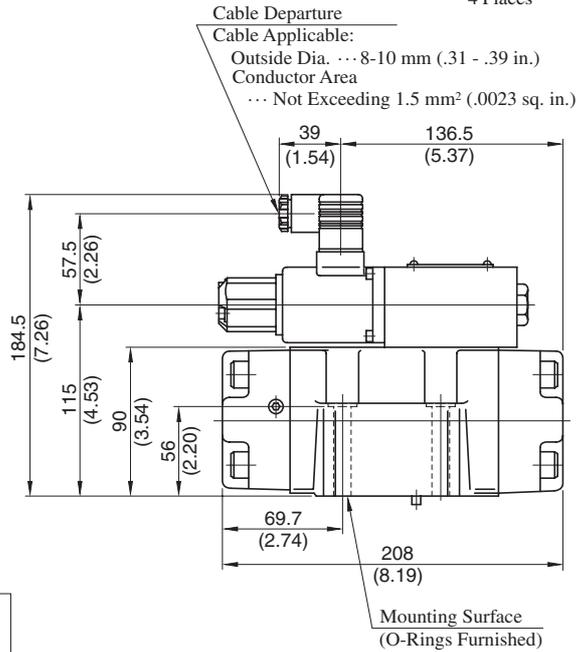
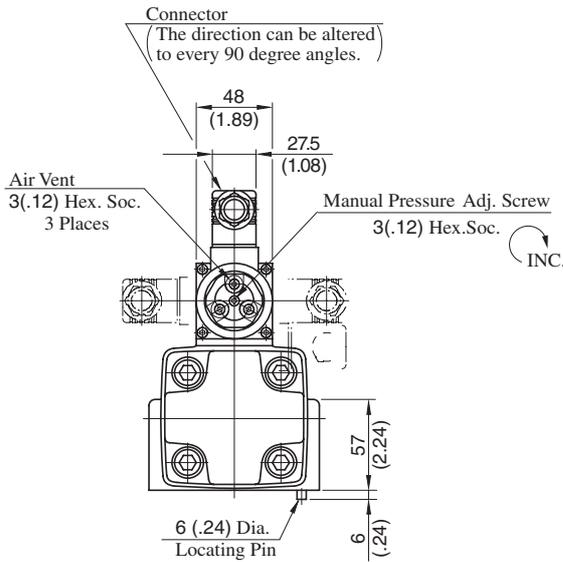
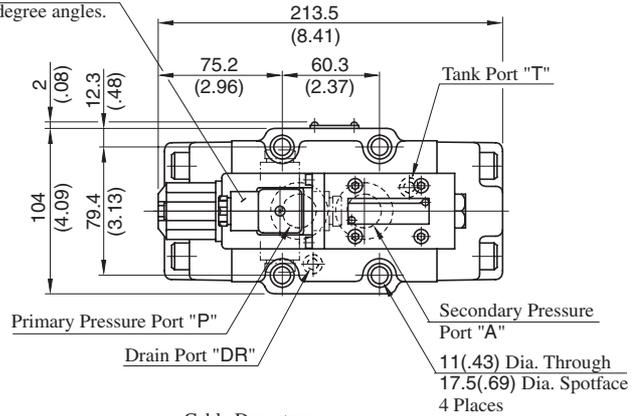
● Trapped Oil Volume

The recommended secondary side trapped oil volume is about 20 liters (5.28 U.S.Gallons). Note that the trapped oil volume must not be lower than 1.4 liters (.37 U.S.Gallons).

ERBG-06-*-51/5190

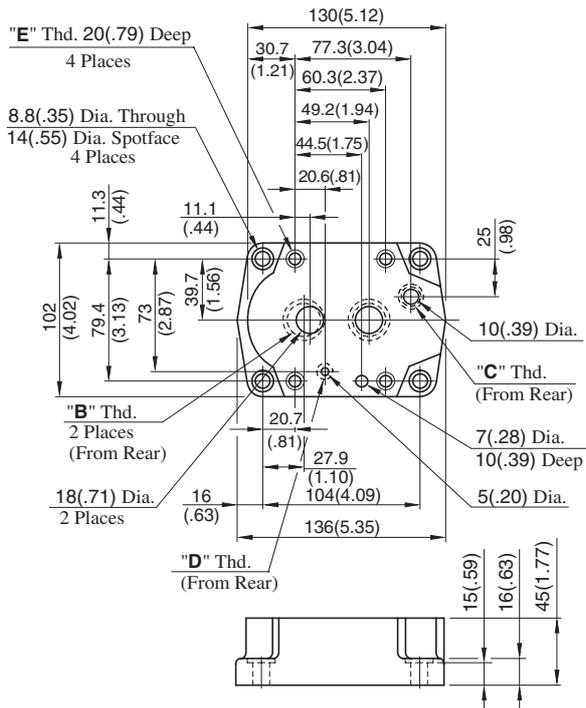
DIMENSIONS IN
MILLIMETRES (INCHES)

The direction can be altered
to every 90 degree angles.



Sub-plate:

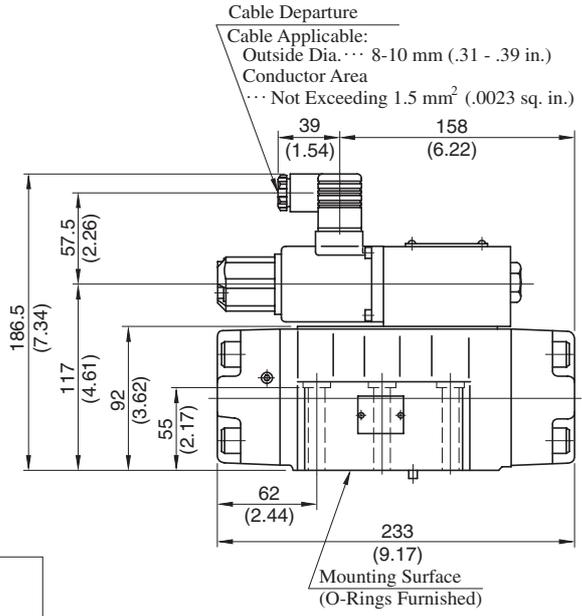
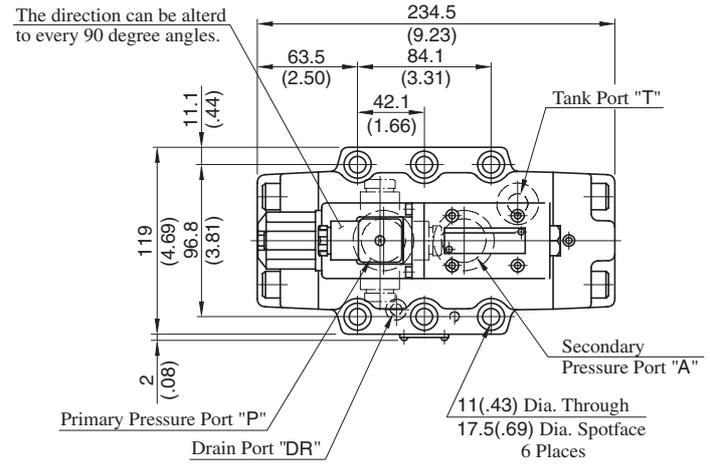
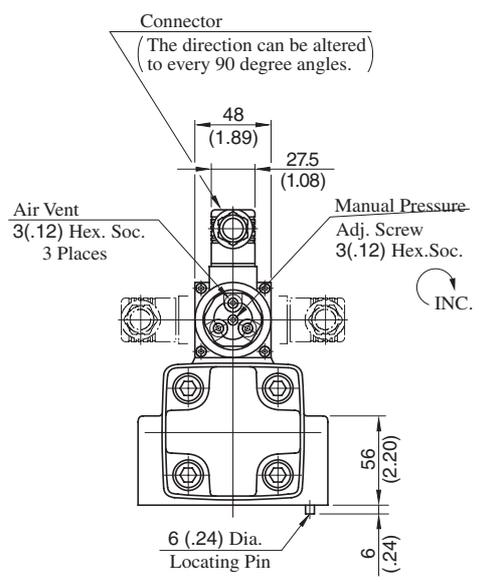
ERBGM-06-20/2080/2090



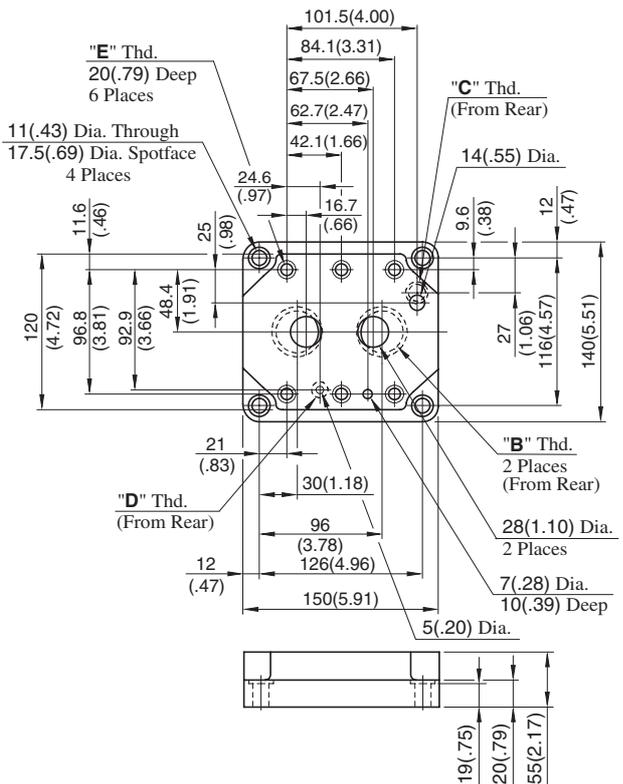
Sub-plate Model Numbers	Thread Size			
	"B" Thd.	"C" Thd.	"D" Thd.	"E" Thd.
ERBGM-06-20	Rc 3/4	Rc 3/8	Rc 1/4	M10
ERBGM-06-2080	3/4 BSP.F	3/8 BSP.F	1/4 BSP.F	
ERBGM-06-2090	3/4 NPT	3/8 NPT	1/4 NPT	

ERBG-10-*-51/5190

**DIMENSIONS IN
MILLIMETRES (INCHES)**



**Sub-plate
ERBGM-10-10/1080/1090**



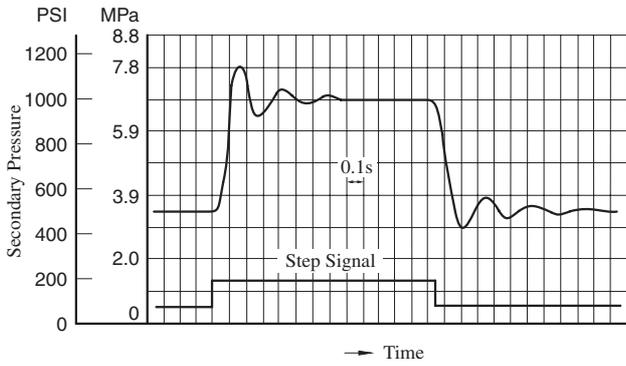
Sub-plate Model Numbers	Thread Size			
	"B" Thd.	"C" Thd.	"D" Thd.	"E" Thd.
ERBGM-10-10	Rc 1-1/4	Rc 3/8	Rc 1/4	M10
ERBGM-10-1080	1-1/4 BSPF	3/8 BSPF	1/4 BSPF	
ERBGM-10-1090	1-1/4 NPT	3/8 NPT	1/4 NPT	3/8-16 UNC

Step Response (Example)

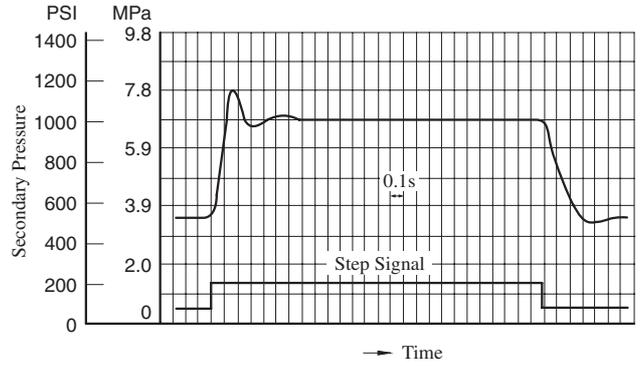
The following step response characteristics are taken when the trapped oil volume is 20 liters (5.28 U.S.Gallons). The step response varies by trapped oil volume.

Primary Pressure : 24.5 MPa (3550 PSI)
 Trapped Oil Volume : 20 L (5.28 U.S.Gallons)
 Viscosity : 30 mm²/s (141 SSU)

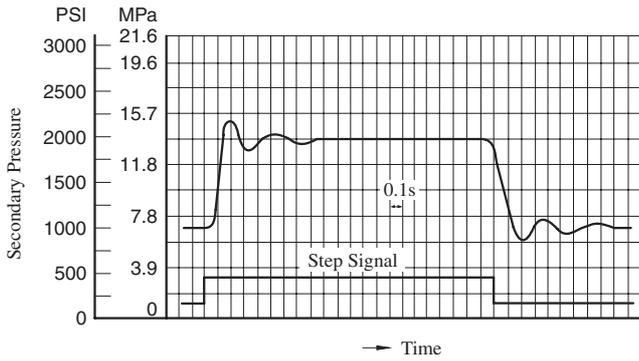
ERBG-06-B



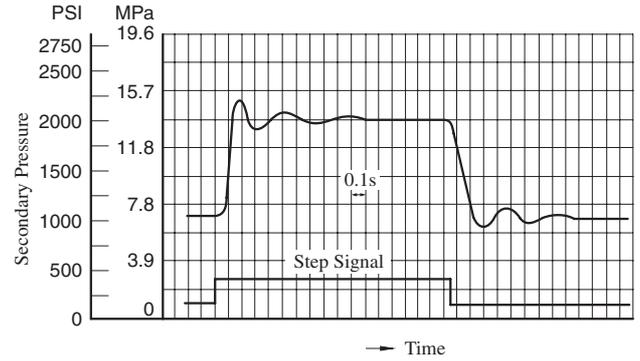
ERBG-10-B



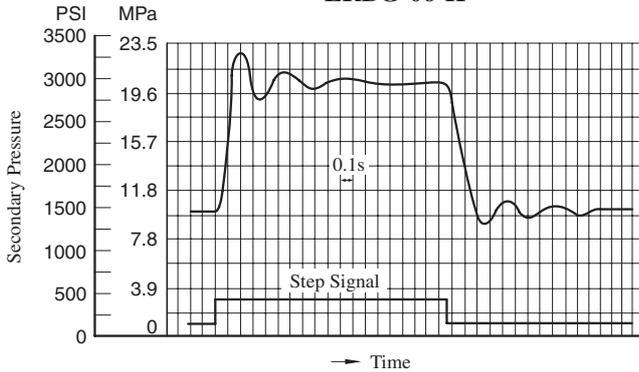
ERBG-06-C



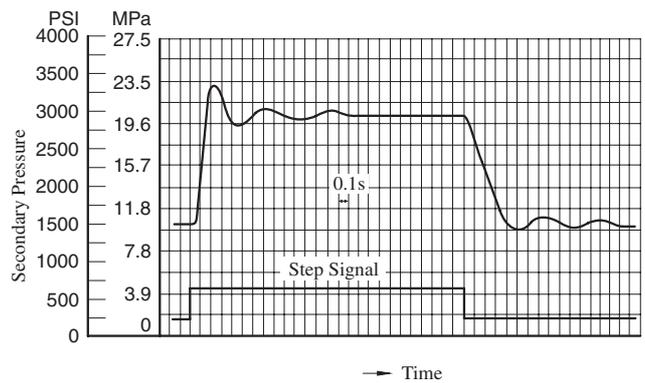
ERBG-10-C



ERBG-06-H

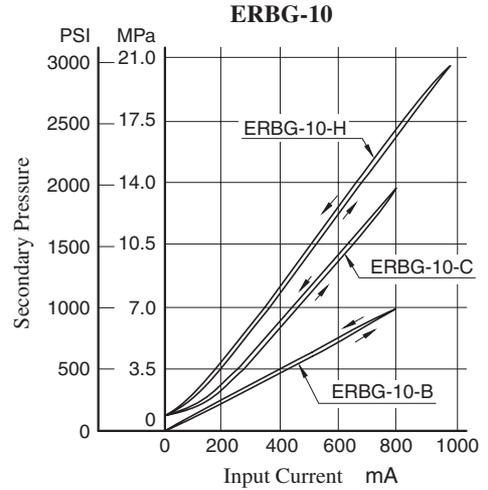
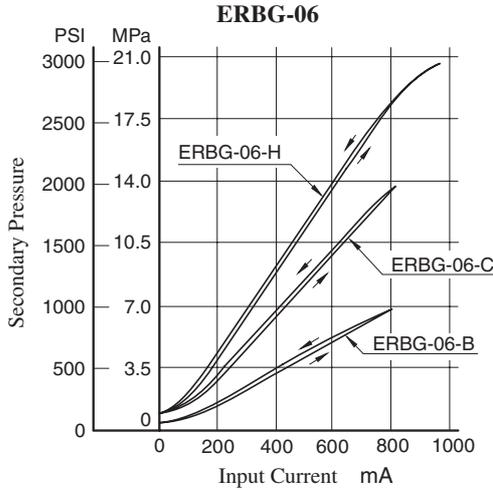


ERBG-10-H



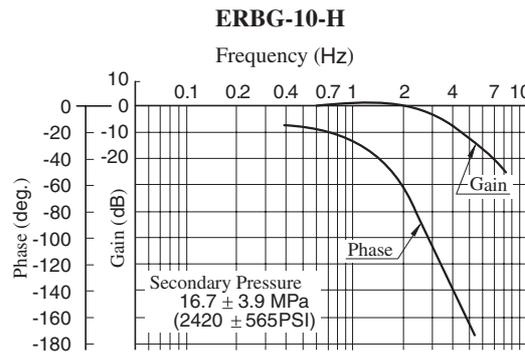
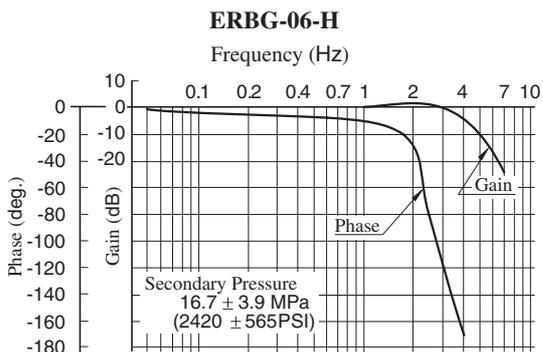
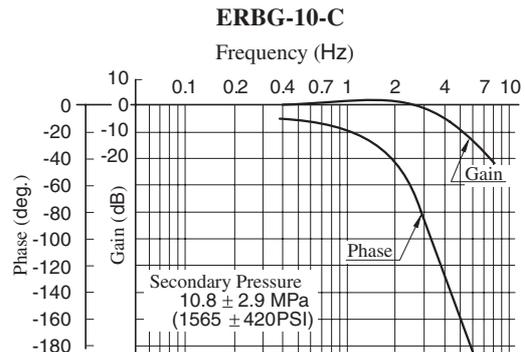
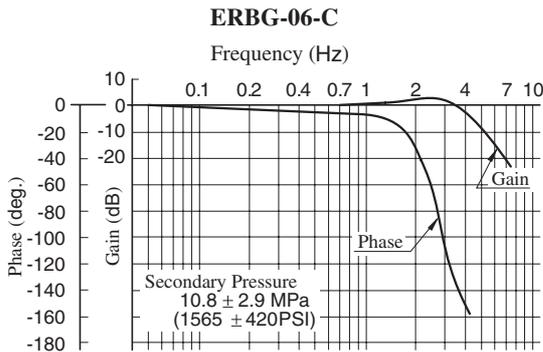
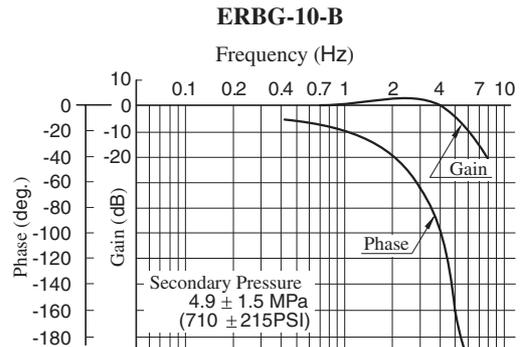
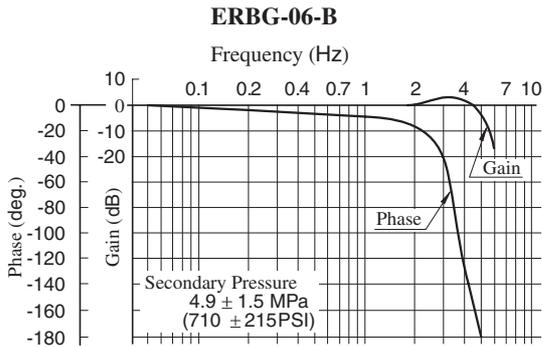
Input Current vs. Secondary Pressure

Primary Pressure : 24.5 MPa (3550 PSI)
 Viscosity : 30 mm²/s (141 SSU)



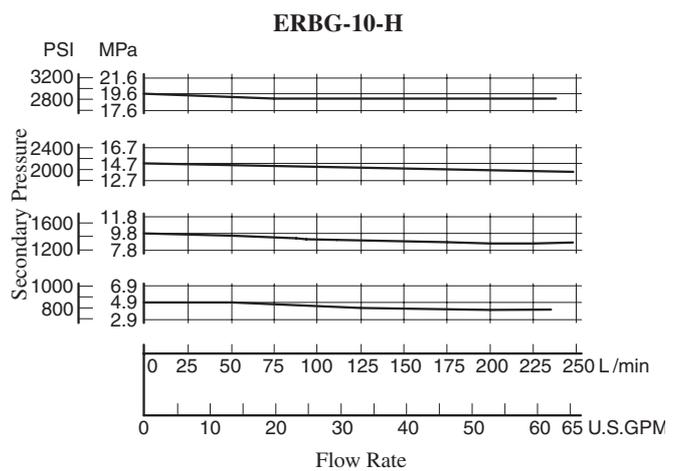
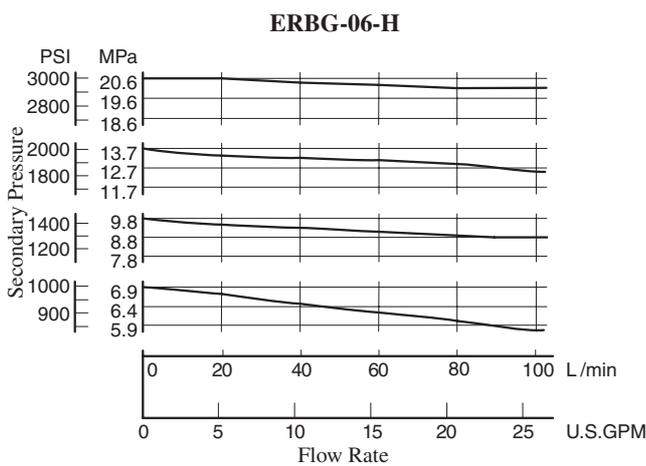
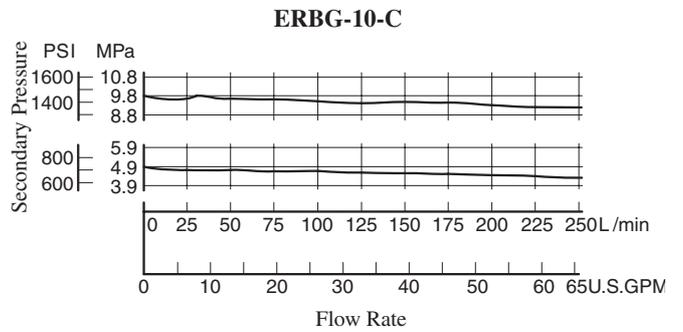
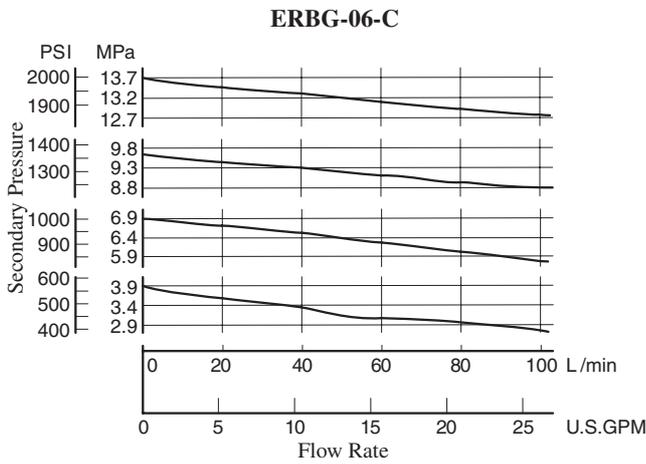
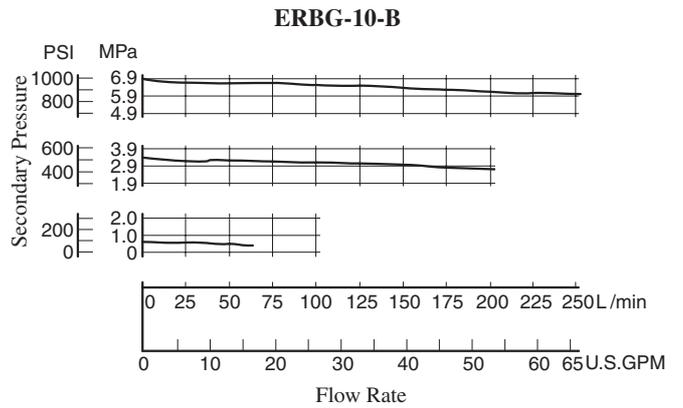
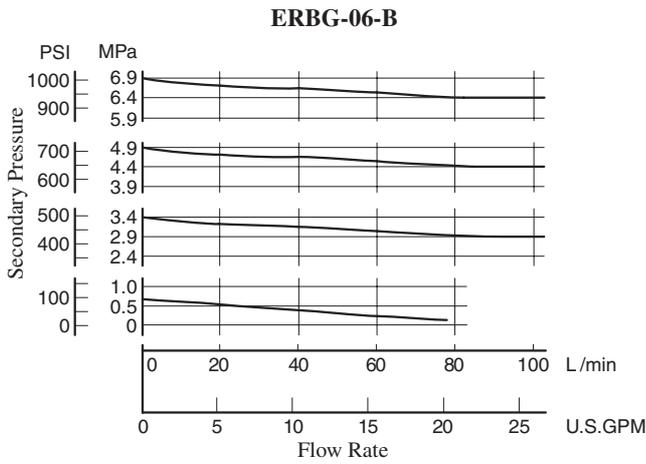
Frequency Response

Primary Pressure : 24.5 MPa (3550 PSI)
 Trapped Oil Volume : 20 L (5.28 U.S.Gallons)
 Viscosity : 30 mm²/s (141 SSU)



Flow Rate vs. Secondary Pressure

Viscosity : 30 mm²/s (141 SSU)

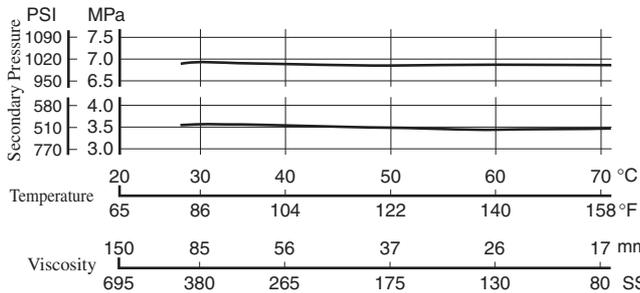


E Series
Relieving and Reducing Valves

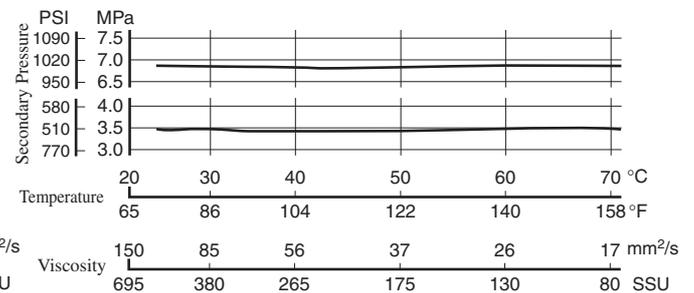
■ Viscosity vs. Secondary Pressure

Oil: ISO VG32

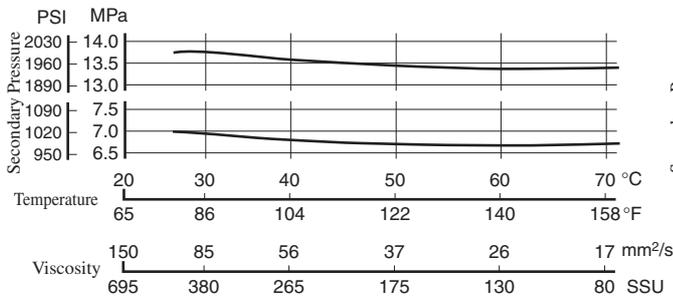
ERBG-06-B



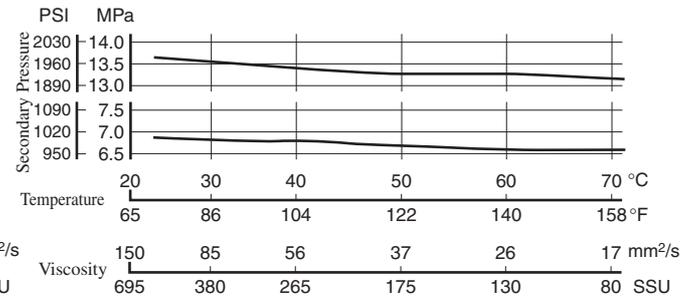
ERBG-10-B



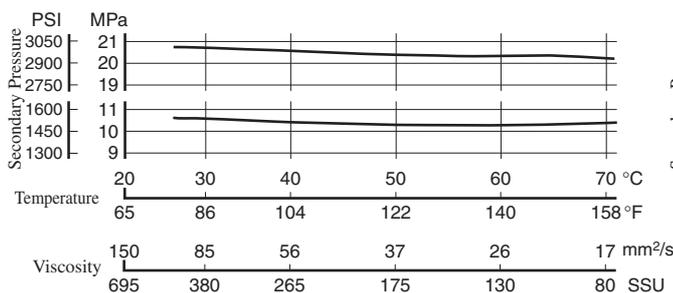
ERBG-06-C



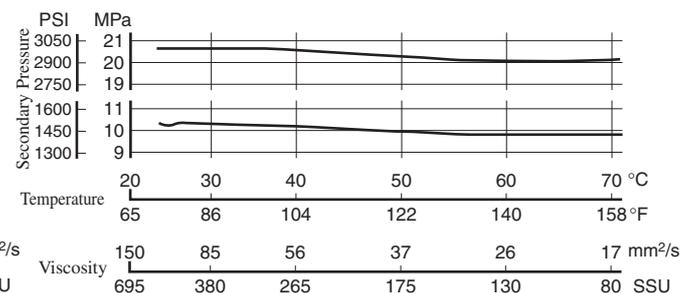
ERBG-10-C



ERBG-06-H

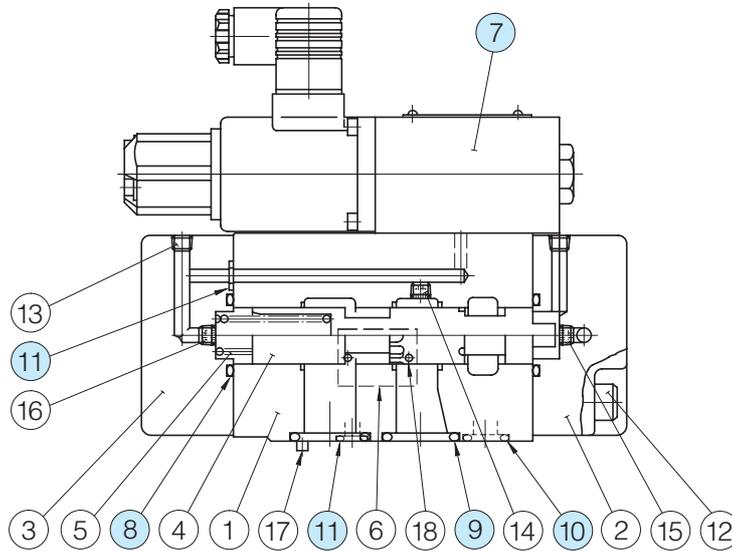


ERBG-10-H



List of Seals and Pilot Valves

ERBG- $\frac{06}{10}$ -*-51/5190



List of Seals

Item	Name of Parts	Part Numbers		Qty.
		ERBG-06	ERBG-10	
8	O-Ring	SO-NB-G30	SO-NB-P36	2
9	O-Ring	SO-NB-P28	SO-NB-P32	2
10	O-Ring	SO-NB-P14	SO-NB-P18	1
11	O-Ring	SO-NB-P9	SO-NB-P9	3

Note) When ordering seals, please specify the seal kit number from the table below. In addition to the above O-rings, seals for pilot valve are included in the seal kit.
For the details of the pilot valve seals, see [page 674](#).

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
ERBG-06	KS-ERBG-06-51
ERBG-10	KS-ERBG-10-51

Pilot Valve

Valve Model No.	⑦ Pilot Valve Model Numbers
ERBG-06-B-51/5190	EDG-01-B-PNTN-5101
ERBG-06-C-51/5190	EDG-01-C-PNTN-5101
ERBG-06-H-51/5190	EDG-01-H-PNT15-5101
ERBG-10-B-51/5190	EDG-01-B-PNTN-5101
ERBG-10-C-51/5190	EDG-01-C-PNTN-5101
ERBG-10-H-51/5190	EDG-01-H-PNT15-5101

Note: For the details of pilot valves, refer to "Pilot Relief Valves" on [page 674](#).

Interchangeability between Current and New Design

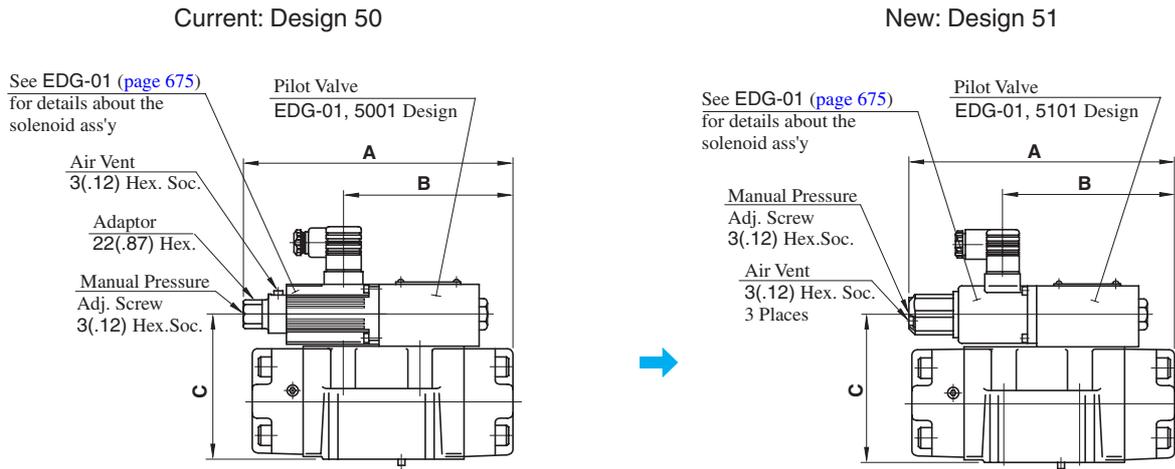
ERBG-06/10 series valves have changed model from 50 to 51 design in line with the model change of pilot valve (EDG-01).

Specifications and Characteristics

No change in specifications and characteristics between current and new design.

Mounting Interchangeability

There is an interchangeability in the mounting dimensions, however, the outside shape and dimensions are changed as shown below due to pilot valve improvement and other modifications.



Model Numbers		A	B	C
Current	ERBG-06-*-50/5090	214.5 (8.44)	136.5 (5.37)	115 (4.53)
New	ERBG-06-*-51/5190	213.5 (8.41)	136.5 (5.37)	115 (4.53)
Current	ERBG-10-*-50/5090	235.5 (9.27)	158 (6.22)	117 (4.61)
New	ERBG-10-*-51/5190	234.5 (9.23)	158 (6.22)	117 (4.61)

**DIMENSIONS IN
MILLIMETRES (INCHES)**

40Ω 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).

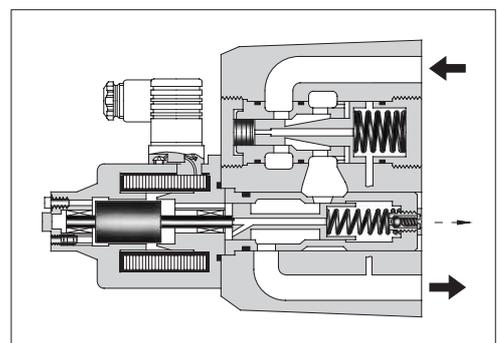
This valve is ideal for use where actuator startup, stop, and speed changes are to be implemented without producing a shock. Note that this valve is used in conjunction with the applicable power amplifier.



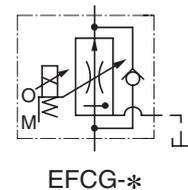
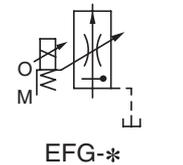
Specifications

Model No.	EFG EFCG -02-10 EFCG -02-30	EFG EFCG -03-60 EFCG -03-125	EFG EFCG -06-250	EFG EFCG -10-500
Max. Operating Pres. MPa (PSI)	20.6 (3000)	20.6 (3000)	20.6 (3000)	20.6 (3000)
Metred Flow Adjustment Range L/min (U.S.GPM)	10: 0.3-10 (.08-2.6) 30: 0.3-30 (.08-7.9)	60: 2-60 (.53-15.9) 125: 2-125 (.53-33)	3-250 (.79-66)	5-500 (1.32-132)
Min. Differential Pres. MPa (PSI)	0.6 (90)	1.0 (145)	1.3 (190)	2.0 (290)
Free Flow (EFCG Models Only.) L/min (U.S.GPM)	40 (10.6)	130 (34.3)	280 (74.0)	550 (145)
Rated Current	600 mA	600 mA	600 mA	700 mA
Coil Resistance	45 Ω	45 Ω	45 Ω	45 Ω
Hysteresis	5% or less	7% or less	7% or less	7% or less
Repeatability	1% or less	1% or less	1% or less	1% or less
Approx. Mass kg (lbs.)	8.2 (18.1)	12.5 (27.6)	25 (55.1)	51 (113)

★ Min. pressure difference required between inlet and outlet ports to maintain function as pressure compensator.



Graphic Symbols



Model Number Designation

F-	EFC	G	-02	-10	-31	*
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min (U.S.GPM)	Design Number	Design Standards
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	02	10: 10 (2.6) 30: 30 (7.9)	31	Refer to ★
			03	60: 60 (15.9) 125: 125 (33)	26	
			06	250: 250 (66)	22	
			10	500: 500 (132)	11	

Note: If you are going to use the model with pressure compensator stroke adjustment screw, consult your Yuken representative in advance.

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

E Series
40Ω Series Flow Control (and Check) Valves

Attachment

Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Std. "JIS" and European Design Std.	N. American Design Std.	
EF*G-02	M8 × 75 Lg.	5/16-18 UNC × 3 Lg.	4
EF*G-03	M10 × 100 Lg.	3/8-16 UNC × 4 Lg.	4
EF*G-06	M16 × 130 Lg.	5/8-11 UNC × 5 Lg.	4
EF*G-10	M20 × 160 Lg.	3/4-10 UNC × 6-1/2 Lg.	4

Applicable Power Amplifiers

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see [page 772](#)).

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

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
EFG EFCG -02	EFGM-02X-20	Rc 3/8	EFGM-02X-2080	3/8 BSP.F	EFGM-02X-2090	3/8 NPT	2.3 (5.1)
	EFGM-02Y-20	Rc 1/2	EFGM-02Y-2080	1/2 BSP.F	EFGM-02Y-2090	1/2 NPT	3.1 (6.8)
EFG EFCG -03	EFGM-03Y-20	Rc 3/4	EFGM-03Y-2080	3/4 BSP.F	EFGM-03Y-2090	3/4 NPT	5.7 (12.6)
	EFGM-03Z-20	Rc 1	EFGM-03Z-2080	1 BSP.F	EFGM-03Z-2090	1 NPT	5.6 (12.3)
EFG EFCG -06	EFGM-06X-20	Rc 1	EFGM-06X-2080	1 BSP.F	EFGM-06X-2090	1 NPT	12.5 (27.6)
	EFGM-06Y-20	Rc 1-1/4	EFGM-06Y-2080	1-1/4 BSP.F	EFGM-06Y-2090	1-1/4 NPT	16 (35.3)
EFG EFCG -10	EFGM-10Y-10 [★]	1-1/2, 2 Flange Mounting	EFGM-10Y-1080 [★]	1-1/2, 2 Flange Mounting	EFGM-10Y-1090 [★]	1-1/2, 2 Flange Mounting	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.

★ When ordering the EFGM-10Y, see Type F3 Pipe Flange Kits on [page 821](#) and order an appropriate pipe flange kit also.

Models with Pressure Compensator Stroke Adjustment Screw

A models with pressure compensator stroke adjustment screw is optionally available to minimize the actuator protrusion (jumping) at startup. For the details, please consult us or your Yuken distributors.

Instructions

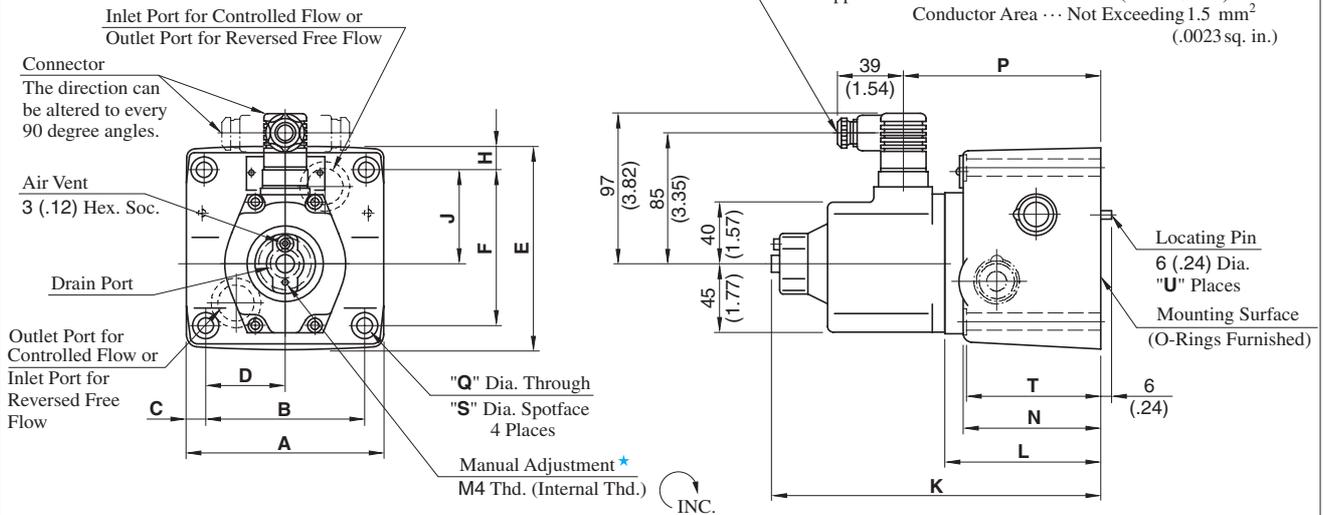
Drain Back Pressure

Check that the drain back pressure does not exceed 0.2 MPa (29 PSI).

Models with Check Valve

A models with check valve makes it possible to obtain a free flow in the direction opposite that of the controlled flow without respect to the input current.

EFG/EF CG-02- *-31/3190
EFG/EF CG-03- *-26/2690

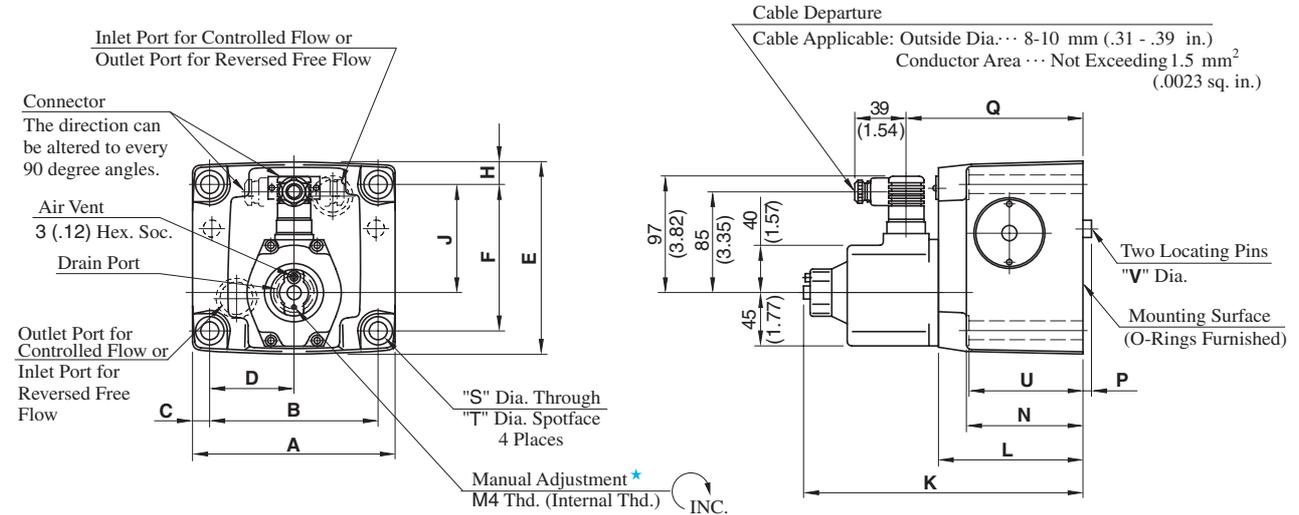


★ Manual adjustment can be done by screwing for example an M4×20 L screw in the M4 thread or pushing in a rod etc. there.

Model Numbers	Dimensions mm (Inches)															U
	A	B	C	D	E	F	H	J	K	L	N	P	Q	S	T	
EF*G-02	96 (3.78)	76.2 (3.00)	9.9 (.39)	38.1 (1.50)	106 (4.17)	82.6 (3.25)	11.7 (.46)	46.3 (1.82)	195 (7.68)	81 (3.19)	66 (2.60)	108 (4.25)	8.8 (.35)	14 (.55)	65 (2.56)	1
EF*G-03	125 (4.92)	101.6 (4.00)	11.7 (.46)	50.8 (2.00)	130 (5.12)	101.6 (4.00)	14.2 (.56)	61.8 (2.43)	212 (8.35)	98 (3.86)	85 (3.35)	125 (4.92)	11 (.43)	17.5 (.69)	84 (3.31)	2

EFG/EF CG-06-250-22/2290
EFG/EF CG-10-500-11/1190

DIMENSIONS IN MILLIMETRES (INCHES)

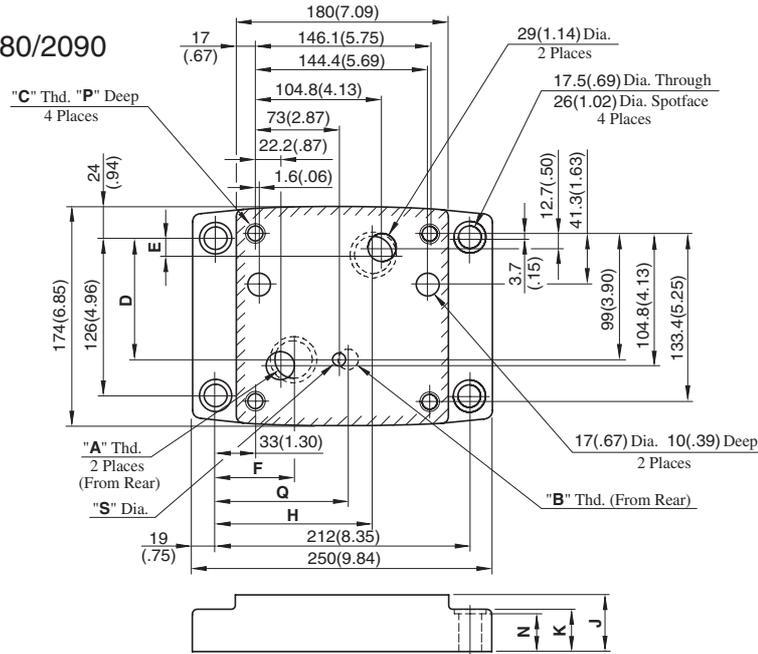


★ Manual adjustment can be done by screwing for example an M4×20 L screw in the M4 thread or pushing in a rod etc. there.

Model Numbers	Dimensions mm (Inches)																
	A	B	C	D	E	F	H	J	K	L	N	P	Q	S	T	U	V
EF*G-06	180 (7.09)	146.1 (5.75)	17 (.67)	73.1 (2.88)	174 (6.85)	133.4 (5.25)	20.3 (.80)	99 (3.90)	244 (9.61)	130 (5.12)	105 (4.13)	7 (.28)	157 (6.18)	17.5 (.69)	26 (1.02)	103.5 (4.07)	16 (.63)
EF*G-10	244 (9.61)	196.9 (7.75)	23.5 (.93)	98.5 (3.88)	228 (8.98)	177.8 (7.00)	25 (.98)	144.5 (5.69)	274 (10.79)	160 (6.30)	137 (5.93)	10 (.39)	187 (7.36)	21.5 (.85)	32 (1.26)	135 (5.31)	18 (.71)

H
E Series
40Ω Series Flow Control (and Check) Valves

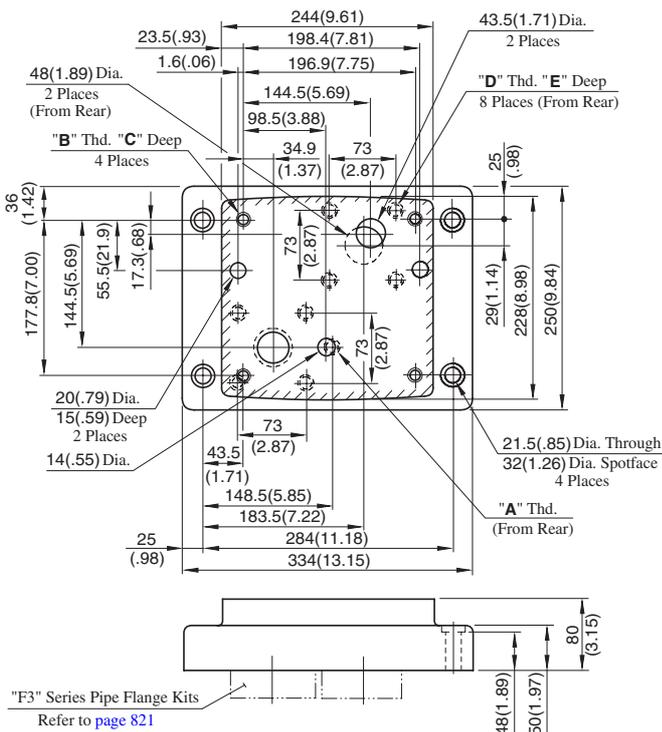
■ Sub-plate
EFGM-06X/06Y-20/2080/2090



Sub-plate Model Numbers	Thread Size			Dimensions mm (Inches)										
	"A" Thd.	"B" Thd.	"C" Thd.	D	E	F	H	J	K	N	P	Q	S	
EFGM-06X-20	Rc 1	Rc 3/8	M16	101.1 (3.98)	14.3 (.56)	55.2 (2.17)	137.8 (5.43)	45 (1.77)	35 (1.38)	34 (1.34)	30 (1.18)	106 (4.17)	14 (.55)	
EFGM-06Y-20	Rc 1-1/4			95.3 (3.75)	19.3 (.76)	67 (2.64)	132 (5.20)	60 (2.36)	40 (1.57)	39 (1.54)				
EFGM-06X-2080	1 BSP.F	3/8 BSP.F		101.1 (3.98)	14.3 (.56)	55.2 (2.17)	137.8 (5.43)	45 (1.77)	35 (1.38)	34 (1.34)				
EFGM-06Y-2080	1-1/4 BSP.F			95.3 (3.75)	19.3 (.76)	67 (2.64)	132 (5.20)	60 (2.36)	40 (1.57)	39 (1.54)				
EFGM-06X-2090	1 NPT	3/8 NPT		5/8-11 UNC	101.1 (3.98)	14.3 (.56)	55.2 (2.17)	137.8 (5.43)	45 (1.77)	35 (1.38)	34 (1.34)	35 (1.38)	106 (4.17)	14 (.55)
EFGM-06Y-2090	1-1/4 NPT				95.3 (3.75)	19.3 (.76)	67 (2.64)	132 (5.20)	60 (2.36)	40 (1.57)	39 (1.54)			

DIMENSIONS IN MILLIMETRES (INCHES)

EFGM-10Y-10/1080/1090



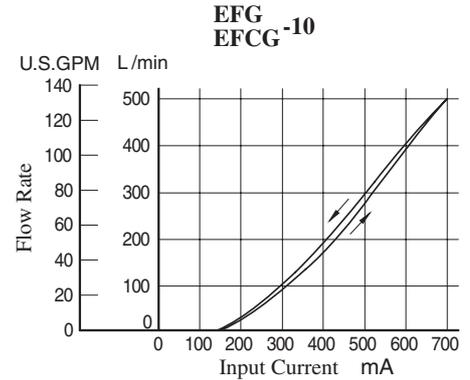
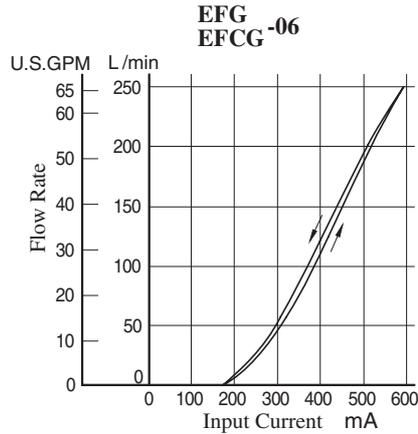
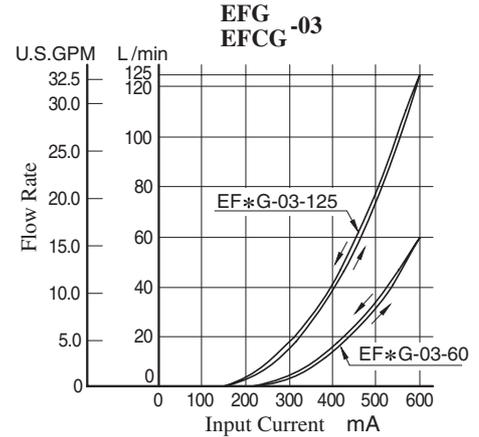
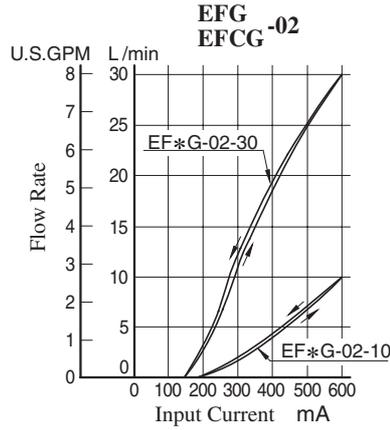
Sub-plate Model Numbers	Thread Size		
	"A" Thd.	"B" Thd.	"D" Thd.
EFGM-10Y-10	Rc 3/8	M20	M16
EFGM-10Y-1080	3/8 BSP.F		
EFGM-10Y-1090	3/8 NPT	3/4-10 UNC	5/8-11 UNC

Sub-plate Model Numbers	mm (Inches)	
	C	E
EFGM-10Y-10	30 (1.18)	30 (1.18)
EFGM-10Y-1080	30 (1.18)	30 (1.18)
EFGM-10Y-1090	34 (1.34)	35 (1.38)

E Series
40Ω Series Flow Control (and Check) Valves

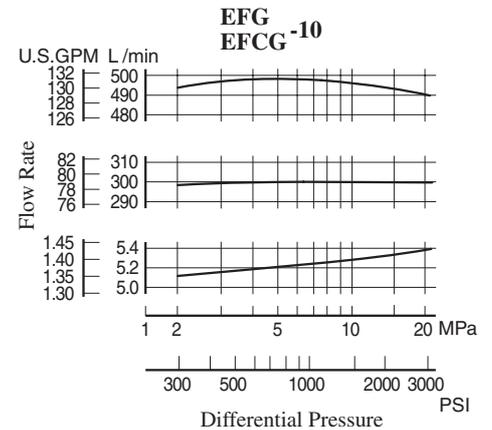
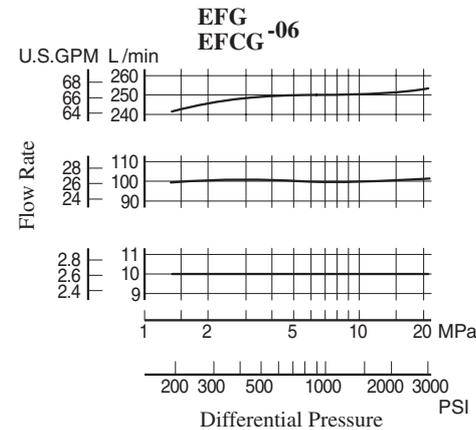
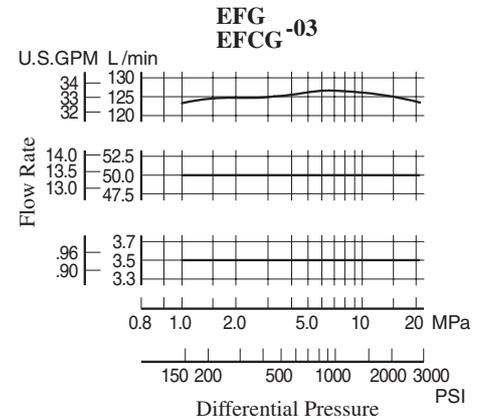
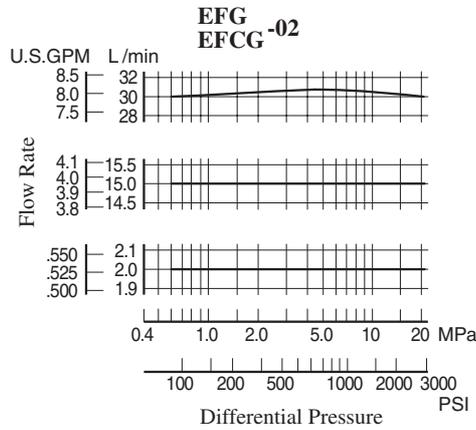
Input Current vs. Flow

Viscosity: 30 mm²/s
(141 SSU)



Differential Pressure vs. Metred Flow

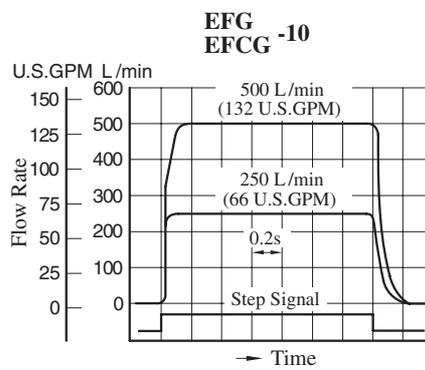
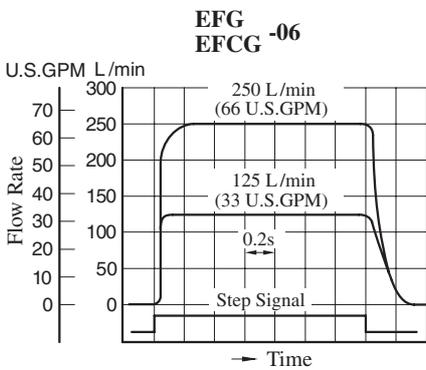
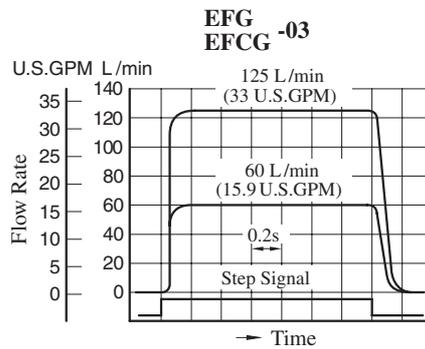
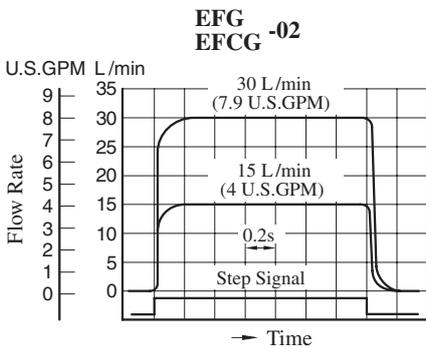
Viscosity: 30 mm²/s
(141 SSU)



Step Response

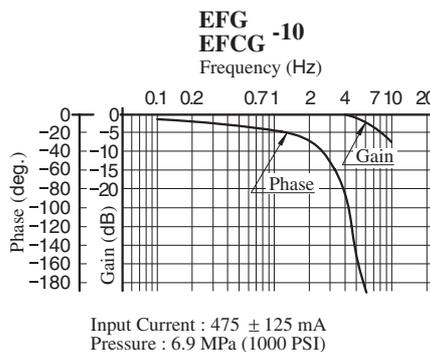
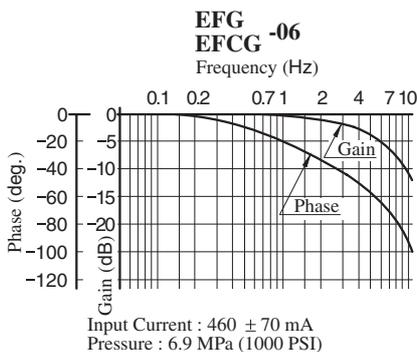
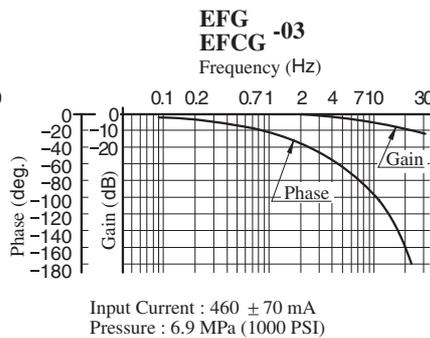
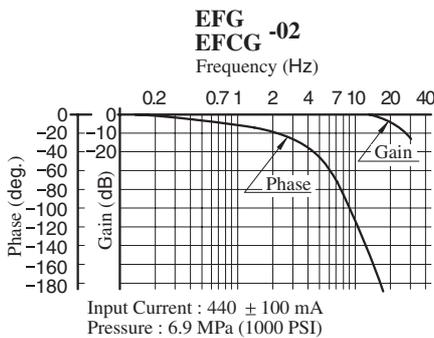
Viscosity: 30 mm²/s (141 SSU)

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

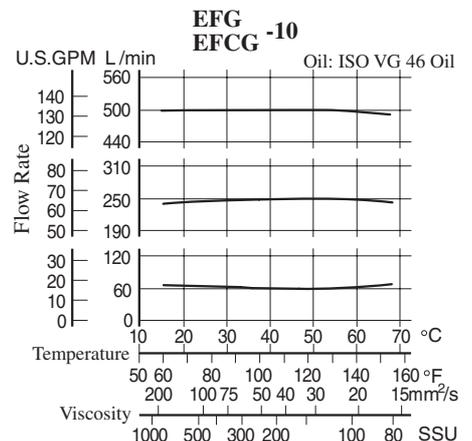
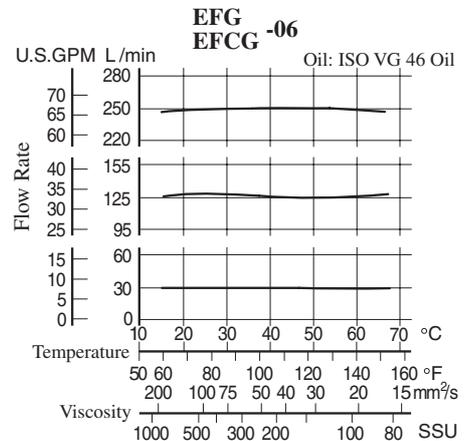
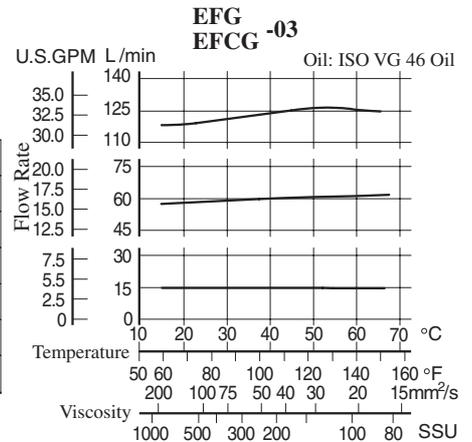
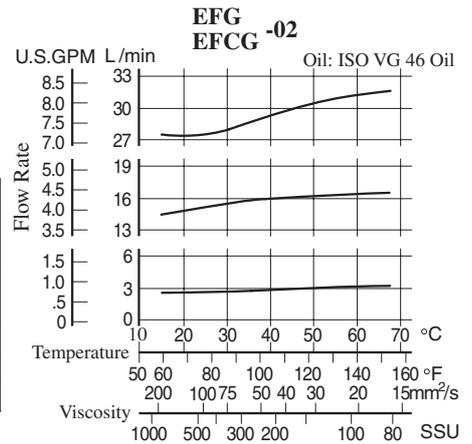


Frequency Response

Viscosity: 30 mm²/s (141 SSU)



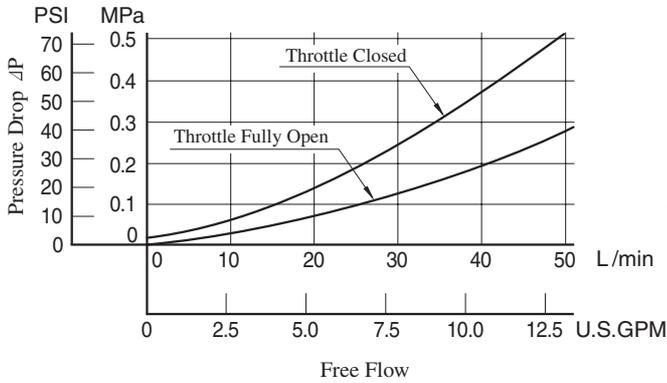
Viscosity vs. Flow



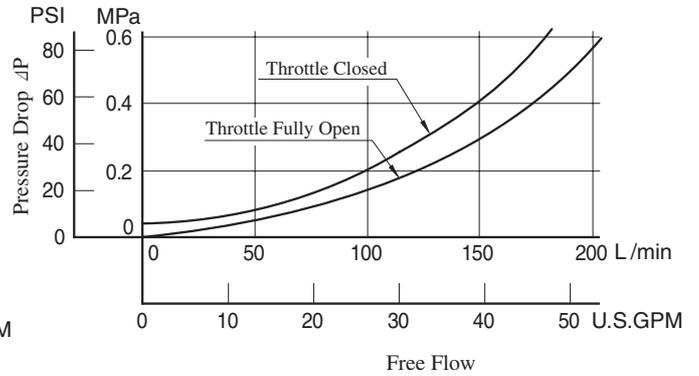
■ Pressure Drop for Reversed Free Flow (Only for "EFCG" Models)

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

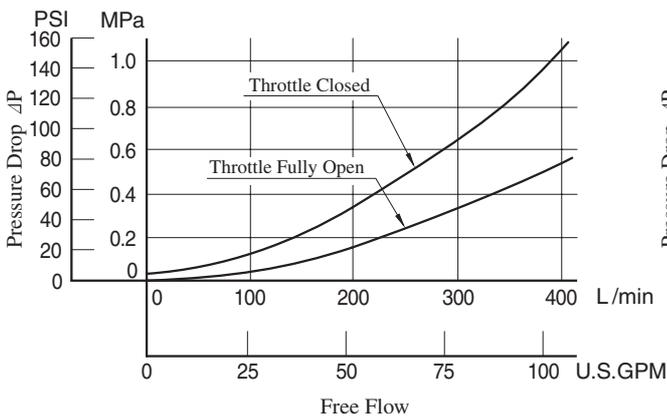
EFCG-02



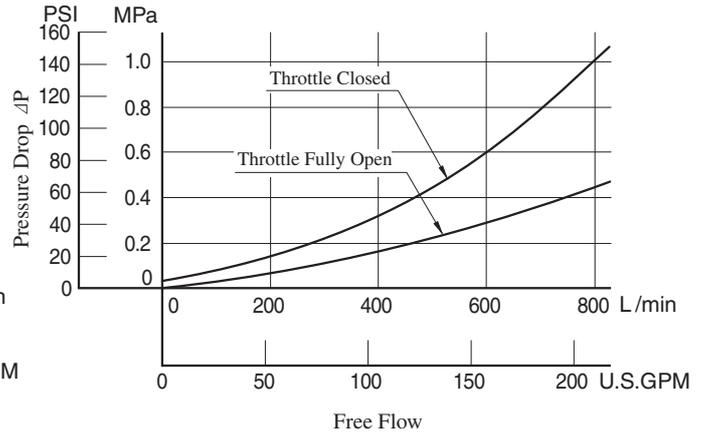
EFCG-03



EFCG-06



EFCG-10



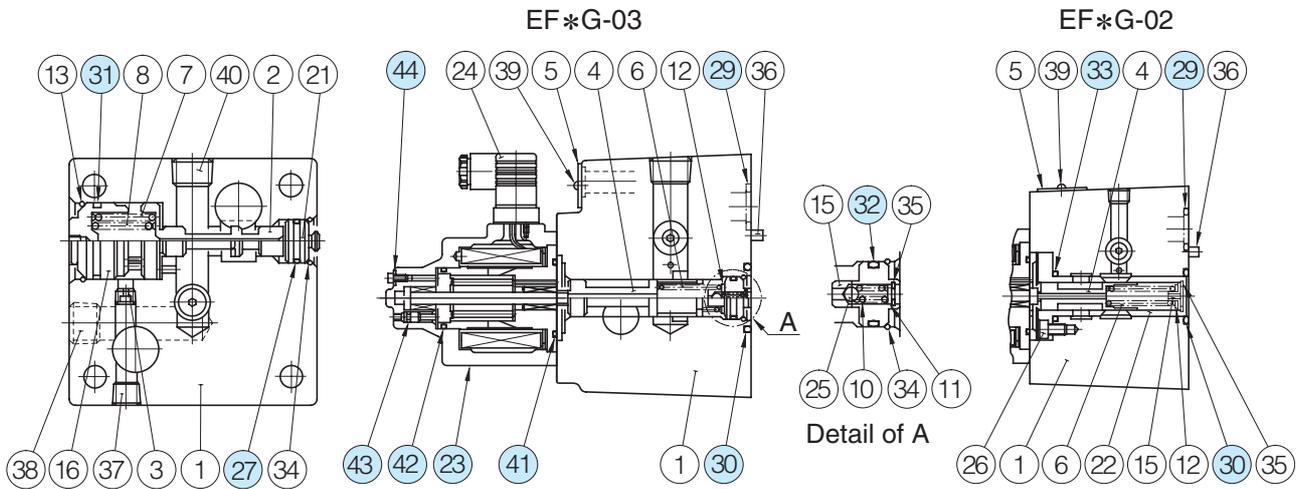
● For any other viscosity, multiply the factors in the table below.

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

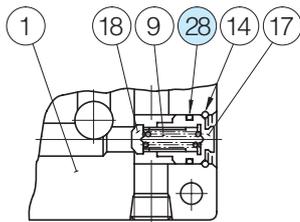
● For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.
 $\Delta P' = \Delta P (G'/0.850)$

List of Seals and Solenoid Ass'y

EFG/EFCG-02- *-31/3190
EFG/EFCG-03- *-26/2690



With Check Valve (EFCG-02, 03)



List of Seals and Solenoid Ass'y

Item	Name of Parts	Part Numbers		Qty.
		EF*G-02	EF*G-03	
23	Solenoid Ass'y	E321-45-20	E321-45-20	1
27	O-Ring	SO-NB-P18	SO-NB-P18	1
28	O-Ring	SO-NB-P10A	SO-NB-P21	1
29	O-Ring	SO-NB-P18	SO-NB-P28	2
30	O-Ring	SO-NB-P22	SO-NB-P31	1
31	O-Ring	SO-NB-G25	SO-NB-G35	1
32	O-Ring	—	SO-NB-P18	1
33	O-Ring	SO-NB-P22	—	1
41	O-Ring	SO-NB-G45	SO-NB-G45	1
42	O-Ring	SO-NB-G35	SO-NB-G35	1
43	O-Ring	SO-NA-P4	SO-NA-P4	1
44	Fastener Seal	SG-FCF-4	SG-FCF-4	1

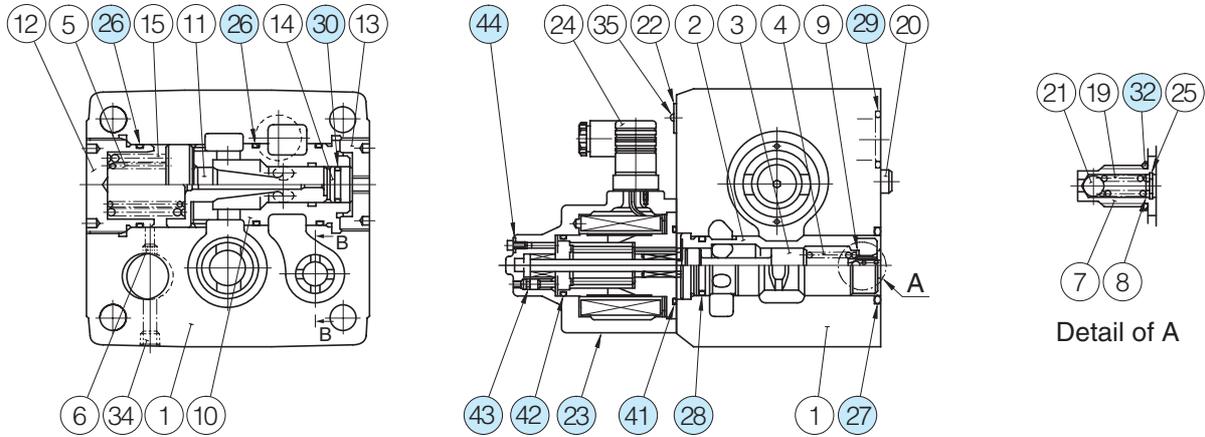
- Note 1: O-rings (Item 41, 42, 43) and the fastener seal (Item 44) are included in the solenoid assembly.
 2: The connector assembly GDM-211-B-11 (Item 24) is not included in the solenoid assembly.
 3: When ordering seals, please specify the seal kit number from the table right.

List of Seal Kits

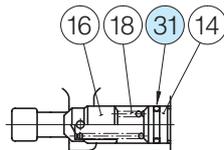
Valve Model Numbers	Seal Kit Numbers
EFG-02- *-31 *	KS-EFG-02-31
EFCG-02- *-31 *	KS-EFCG-02-31
EFG-03- *-26 *	KS-EFG-03-26
EFCG-03- *-26 *	KS-EFCG-03-26

■ List of Seals and Solenoid Ass'y

EFG/EFCG-06-250-22/2290
EFG/EFCG-10-500-11/1190



With Check Valve (EFCG-06, 10)



Section B-B

● List of Seals and Solenoid Ass'y

Item	Name of Parts	Part Numbers		Qty.
		EF*G-06	EF*G-10	
23	Solenoid Ass'y	E321-45-20	E321-45-20	1
26	O-Ring	SO-NB-P50	SO-NB-G75	3
27	O-Ring	SO-NB-P44	SO-NB-G60	1
28	O-Ring	SO-NB-P34	SO-NB-P50	1
29	O-Ring	SO-NB-P32	SO-NB-P48	2
30	O-Ring	SO-NB-P21	SO-NB-P34	1
31	O-Ring	SO-NB-P21	SO-NB-P26	1
32	O-Ring	SO-NA-P10	SO-NA-P10	1
41	O-Ring	SO-NB-G45	SO-NB-G45	1
42	O-Ring	SO-NB-G35	SO-NB-G35	1
43	O-Ring	SO-NA-P4	SO-NA-P4	1
44	Fastener Seal	SG-FCF-4	SG-FCF-4	1

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
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

Note1: O-rings (Item 41, 42, 43) and the fastener seal (Item 44) are included in the solenoid assembly.

2: The connector assembly GDM-211-B-11 (Item 24) is not included in the solenoid assembly.

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

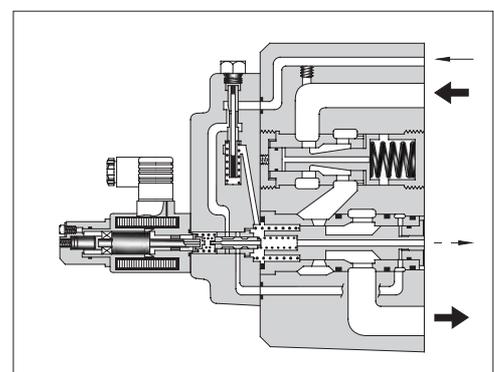
10Ω Series Proportional Electro-Hydraulic Flow Control (and Check) Valves

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 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.



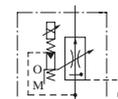
Specifications

Description		Model No. EFG EFCG	60 -03-125	EFG EFCG	-06-250
Max. Operating Pressure MPa (PSI)			20.6 (3000)		24.5 (3550)
Metred Flow Adj. Range L/min (U.S.GPM)			60: 1-60 (.26-15.9) 125: 1-125 (.26-33)		2.5-250 (.66-66)
Min. Differential Pressure ^{★1} MPa (PSI)			1.0 (145)		1.0 (145)
Free Flow (EFCG Models Only) L/min (U.S.GPM)			130 (34.3)		280 (74.0)
Min. Pilot Pressure ^{★2} MPa (PSI)			1.0 (145)		1.5 (220)
Pilot Flow L/min (U.S.GPM)	at Normal		0.5 (.13)		1 (.26)
	at Transition		2.6 (.69)		4 (1.06)
Rated Current			780 mA		820 mA
Coil Resistance			10 Ω		10 Ω
Hysteresis			3% or less		3% or less
Repeatability			1% or less		1% or less
Approx. Mass	kg (lbs.)		10 (22.1)		25 (55.1)



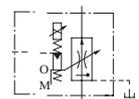
Graphic Symbols

Internal Pilot

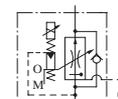


EFG- *

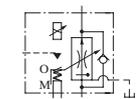
External Pilot



EFG- *



EFCG- *



EFCG- *

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

Model Number Designation

F-	EFC	G	-03	-125	-E	-51	*
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min (U.S.GPM)	Pilot Connection	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	EF: Proportional Electro-Hydraulic Flow Control Valve	G: Sub-plate Mounting	03	60: 60 (15.9) 125: 125 (33)	None: Internal Pilot E: External Pilot	51	Refer to ★
	EFC: Proportional Electro-Hydraulic Flow Control and Check Valve		06	250: 250 (66)		51	

★ 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" and European Design Std.	N. American Design Std.	
EF*G-03	M10 × 80 Lg.	3/8-16 UNC × 3-1/4 Lg.	4
EF*G-06	M16 × 130 Lg.	5/8-11 UNC × 5 Lg.	4

Applicable Power Amplifiers

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see [page 767, 771, 780](#)).

- Model Numbers: AME-D-10-* -20
- AME-D2-1010-11
- SK1022-* -*-11
- SK1015-11 (For DC power supply)
- AMN-D-10 (For DC power supply)

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
EFG EFCG ⁻⁰³	EFGM-03Y-30	Rc 3/4	EFGM-03Y-3080	3/4 BSP.F	EFGM-03Y-3090	3/4 NPT	5.7 (12.6)
	EFGM-03Z-30	Rc 1	EFGM-03Z-3080	1 BSP.F	EFGM-03Z-3090	1 NPT	5.6 (12.3)
EFG EFCG ⁻⁰⁶	EFGM-06X-30	Rc 1	EFGM-06X-3080	1 BSP.F	EFGM-06X-3090	1 NPT	12.5 (27.6)
	EFGM-06Y-30	Rc 1-1/4	EFGM-06Y-3080	1-1/4 BSP.F	EFGM-06Y-3090	1-1/4 NPT	16 (35.3)

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

Instructions

Drain Back Pressure

Check that the drain back pressure dose not exceed 0.2 MPa (29 PSI).

Pilot Type Selection

This valve is constructed so as to operate at a pre-determined pilot pressure. For the 03, a pilot pressure of 1 MPa (145 PSI) or higher is required. For the 06, the reqiued pilot pressure is 1.5 MPa (220 PSI) or higher. To obtain such a required pilot pressure, select the pilot type according to the circuit examples on the right.

① / ②

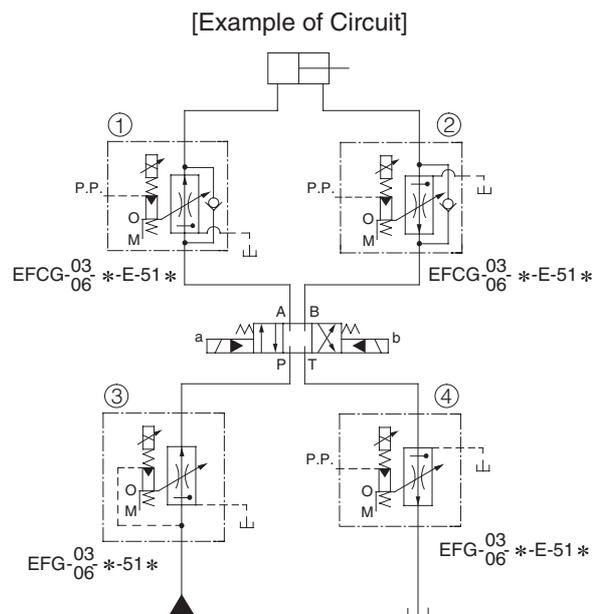
Use the external pilot type (pilot connection code: E) whether a metre-in or metre-out circuit is employed.

③

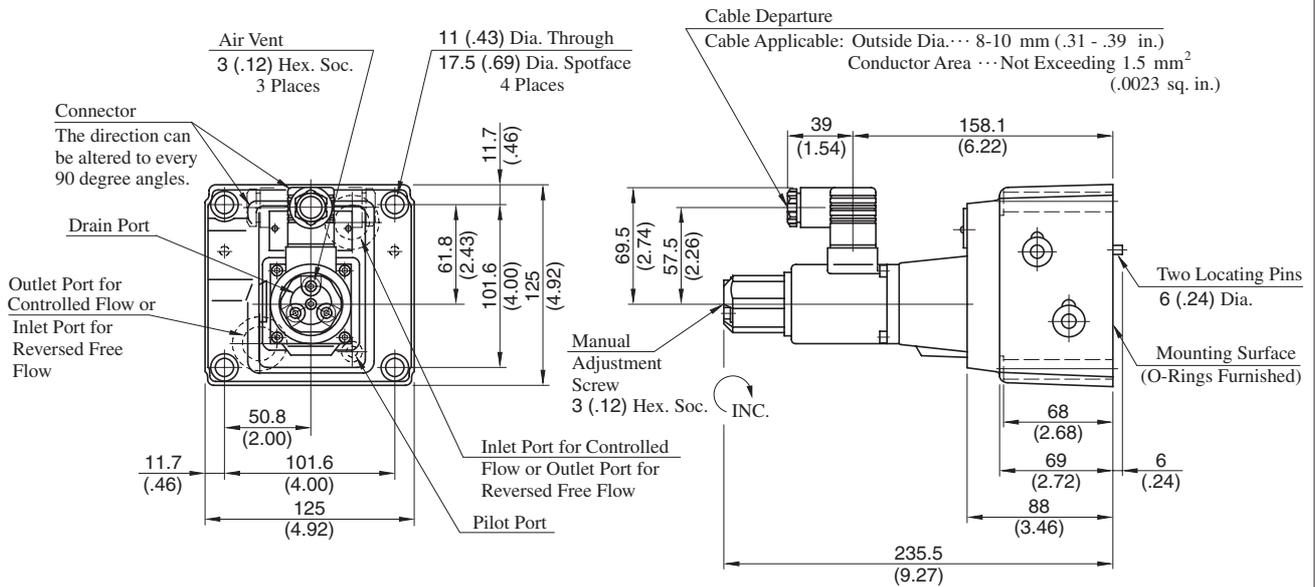
Use the internal pilot type (pilot connection code: None)

④

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

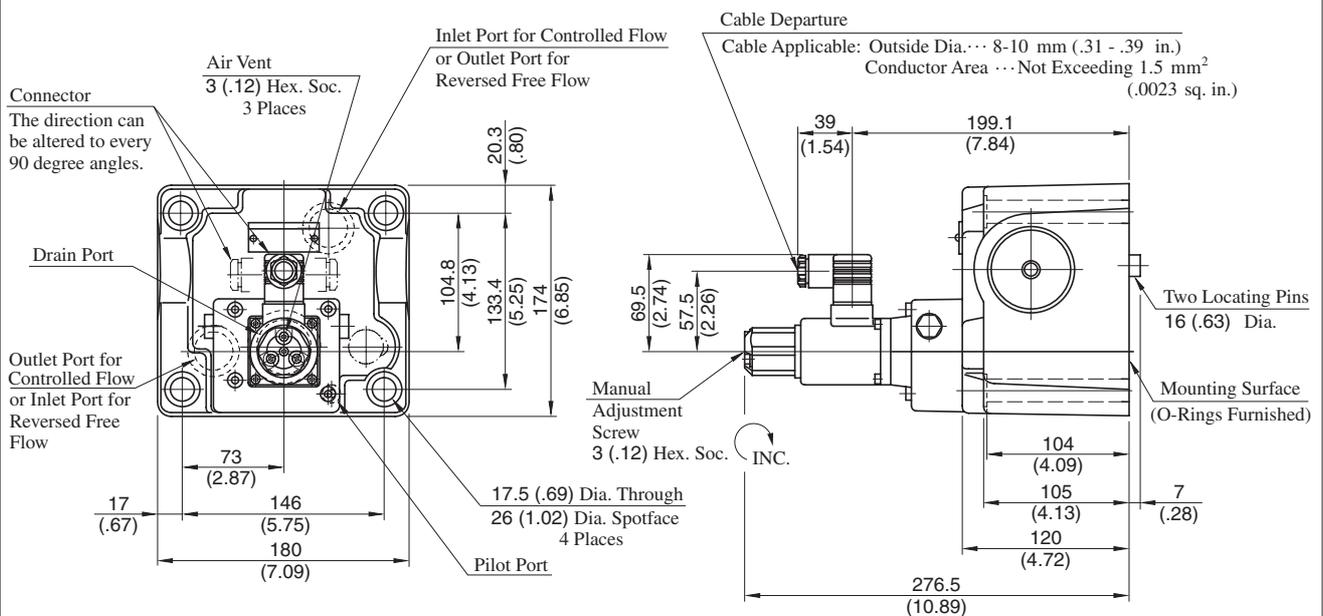


EFG -03- 60
EFCG -03- 125 - *-51/5190



DIMENSIONS IN MILLIMETRES (INCHES)

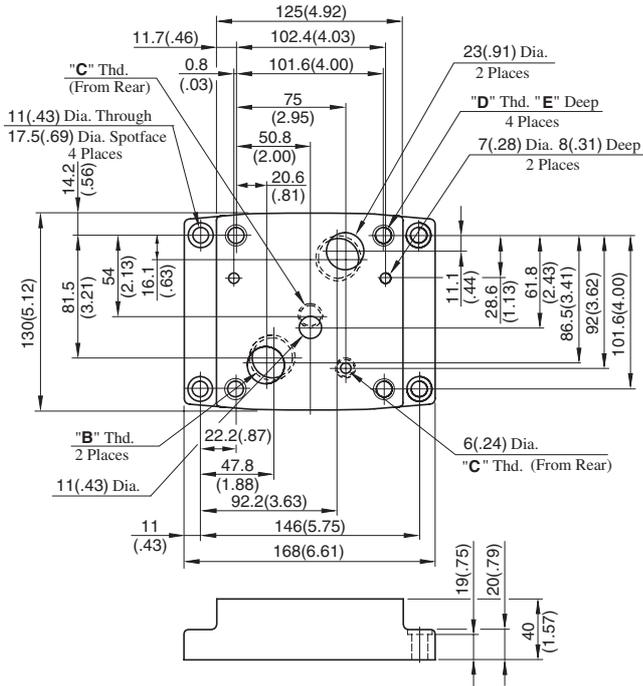
EFG -06-250- *-51/5190
EFCG -06-250- *-51/5190



H
E Series
10Ω Series Flow Control (and Check) Valves

Sub-plate

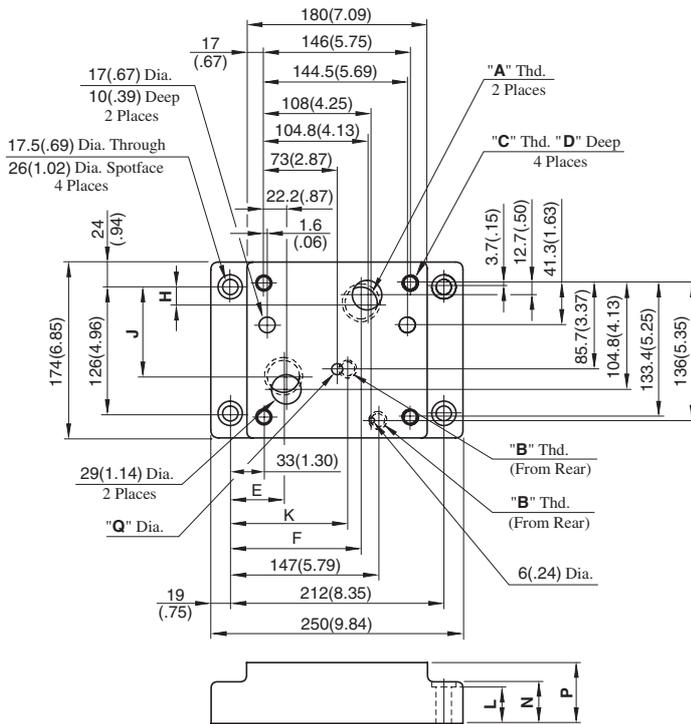
EFGM-03Y, 03Z-30/3080/3090



Sub-plate Model Numbers	Thread Size			E mm(in.)
	"B" Thd.	"C" Thd.	"D" Thd.	
EFGM-03Y-30	Rc 3/4	Rc 1/4	M10	18 (.71)
EFGM-03Z-30	Rc 1			
EFGM-03Y-3080	3/4 BSP.F			
EFGM-03Z-3080	1 BSP.F			
EFGM-03Y-3090	3/4 NPT	1/4 NPT	3/8-16 UNC	21 (.83)
EFGM-03Z-3090	1 NPT			

DIMENSIONS IN MILLIMETRES (INCHES)

EFGM-06X, 06Y-30/3080/3090

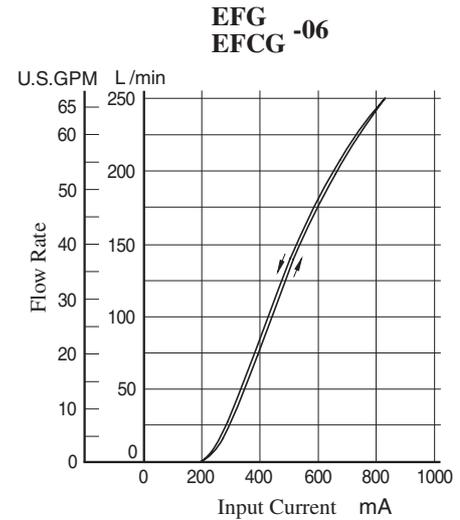
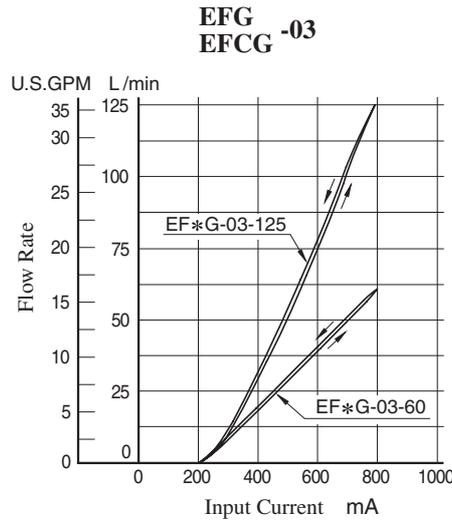


Sub-plate Model Numbers	Thread Size		
	"A" Thd.	"B" Thd.	"C" Thd.
EFGM-06X-30	Rc 1	Rc 3/8	M16
EFGM-06Y-30	Rc 1-1/4		
EFGM-06X-3080	1 BSP.F		
EFGM-06Y-3080	1-1/4 BSP.F		
EFGM-06X-3090	1 NPT	3/8 NPT	5/8-11 UNC
EFGM-06Y-3090	1-1/4 NPT		

Sub-plate Model Numbers	Dimensions mm (Inches)									
	D	E	F	H	J	K	L	N	P	Q
EFGM-06X-30	30 (1.18)	55.2 (2.17)	137.8 (5.43)	14.3 (.56)	101.1 (3.98)	106 (4.17)	34 (1.34)	35 (1.38)	45 (1.77)	11 (.43)
EFGM-06Y-30		52 (2.05)	132 (5.20)	19.3 (.76)	91.3 (3.59)		39 (1.54)	40 (1.57)	60 (2.36)	
EFGM-06X-3080		55.2 (2.17)	137.8 (5.43)	14.3 (.56)	101.1 (3.98)	116 (4.57)	34 (1.34)	35 (1.38)	45 (1.77)	15.2 (.60)
EFGM-06Y-3080		52 (2.05)	132 (5.20)	19.3 (.76)	91.3 (3.59)		39 (1.54)	40 (1.57)	60 (2.36)	
EFGM-06X-3090	35 (1.38)	55.2 (2.17)	137.8 (5.43)	14.3 (.56)	101.1 (3.98)	106 (4.17)	34 (1.34)	35 (1.38)	45 (1.77)	11 (.43)
EFGM-06Y-3090		52 (2.05)	132 (5.20)	19.3 (.76)	91.3 (3.59)		39 (1.54)	40 (1.57)	60 (2.36)	

Input Current vs. Flow

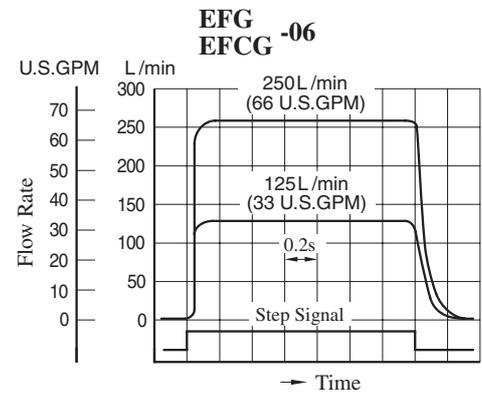
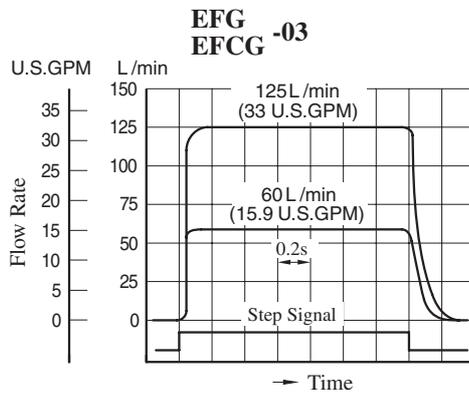
Viscosity: 30 mm²/s
(141 SSU)



Step Response

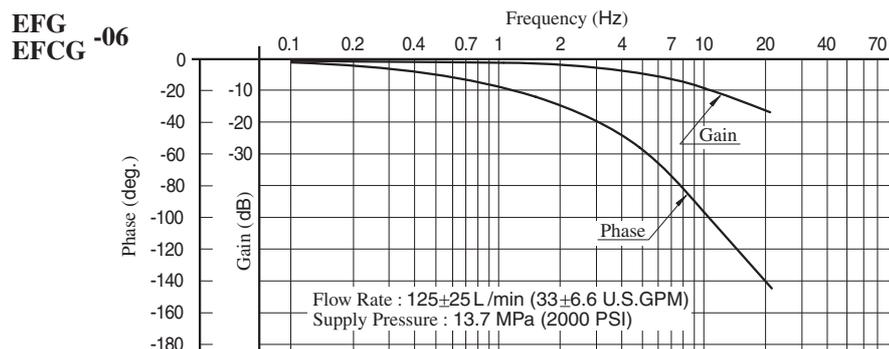
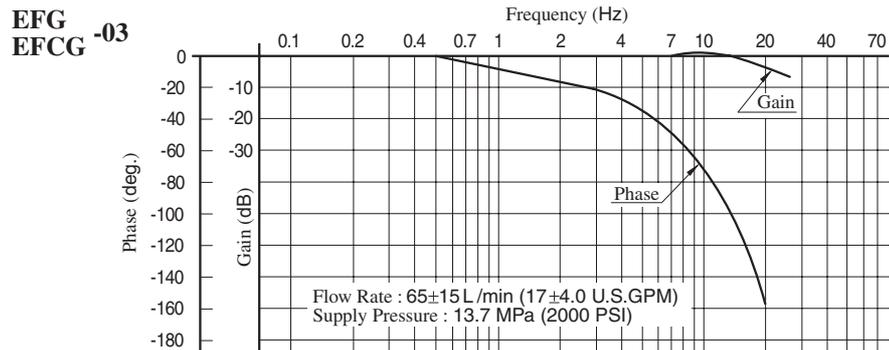
These characteristics have been obtained by measuring on each valve. Therefore, they may vary according to a hydraulic circuit to be used.

Viscosity: 30 mm²/s
(141 SSU)

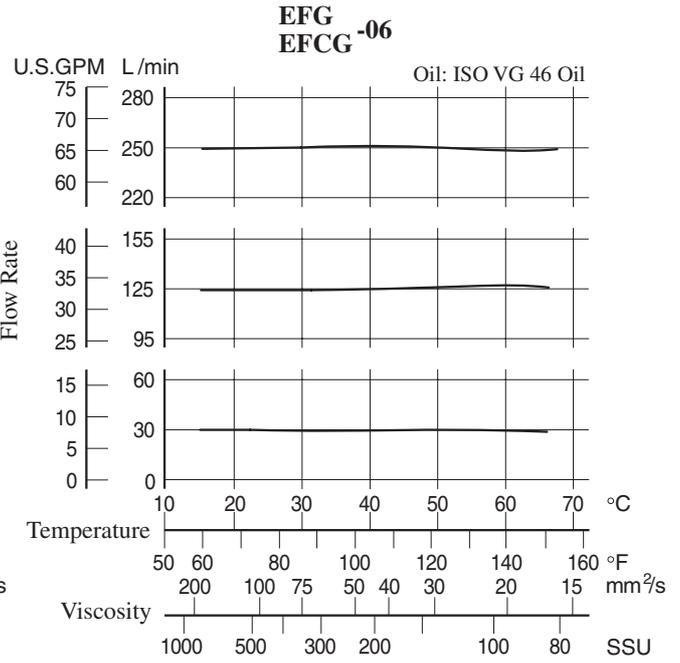
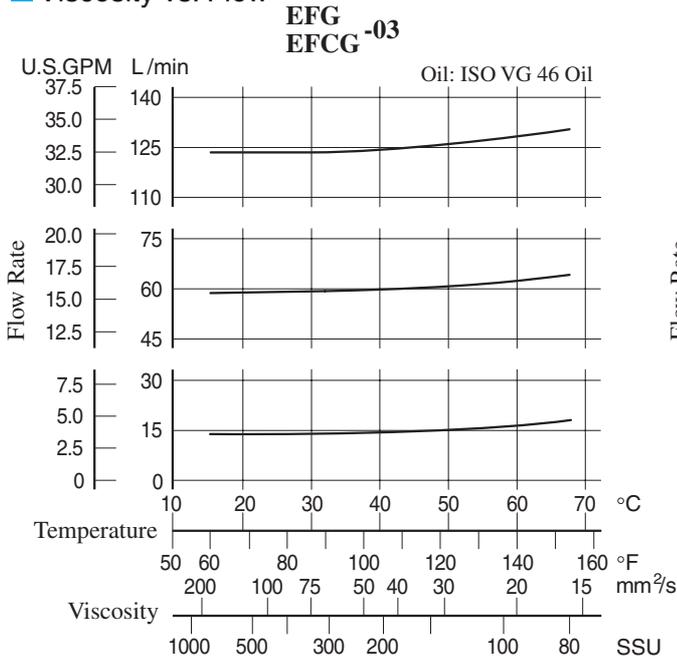


Frequency Response

Viscosity: 30 mm²/s
(141 SSU)

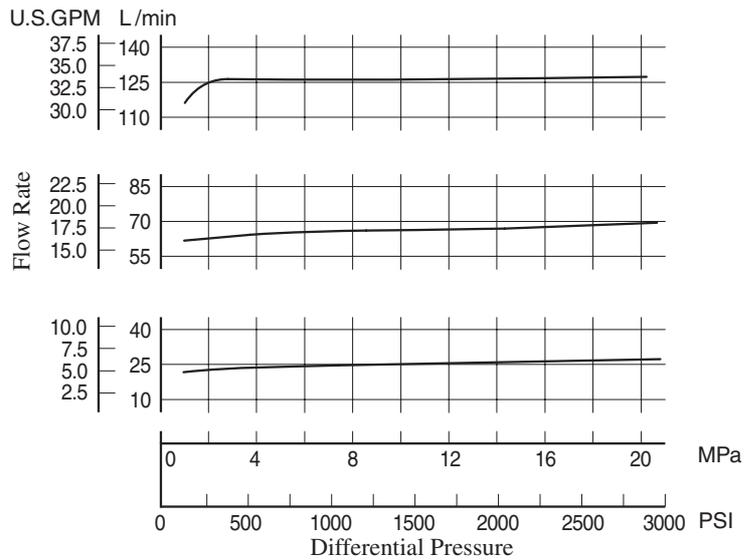


■ Viscosity vs. Flow

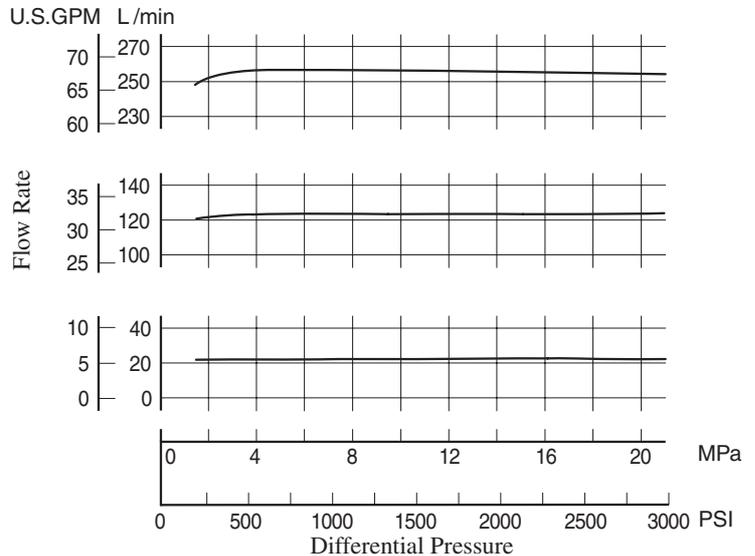


■ Differential Pressure vs. Metred Flow

**EFG
EFCG -03**

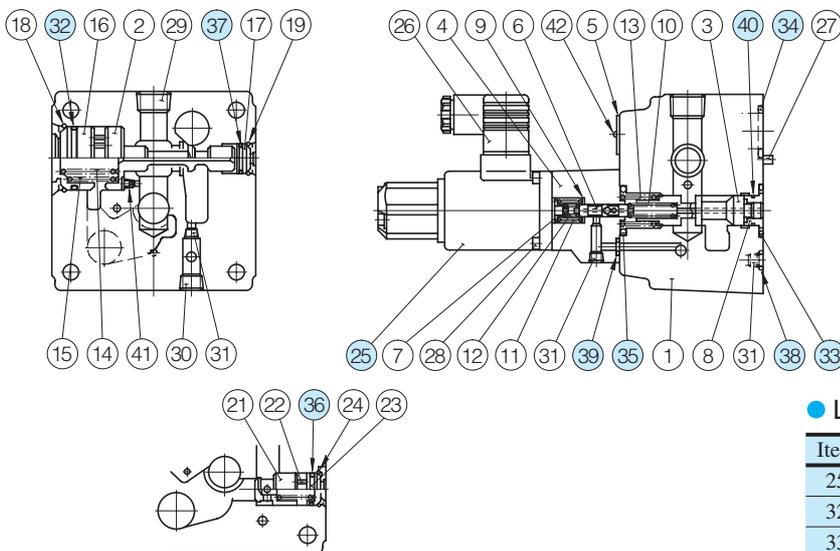


**EFG
EFCG -06**



List of Seals and Solenoid Ass'y

EFG
EFCG -03-*-*-51/5190



With Check Valve (EFCG-03)

Note: The connector assembly GDM-211-B-11 (Item 26) is not included in the solenoid assembly.

Note: When ordering seals, please specify the seal kit number from the table right. In addition to the right o-rings, seals for solenoid ass'y is included in the seal kit. For the detail of the solenoid ass'y seals, see [page 674](#).

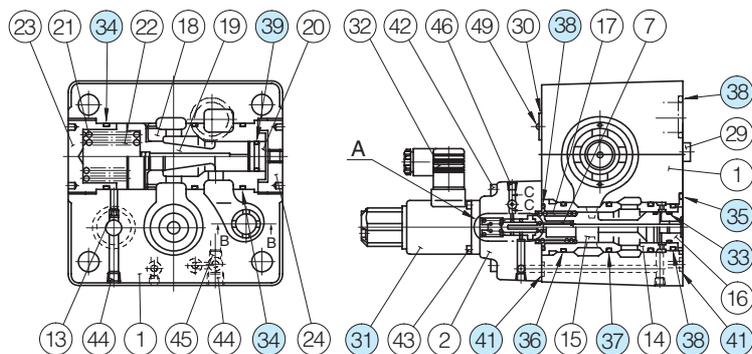
● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
EFG-03-*-*-51*	KS-EFG-03-51
EFCG-03-*-*-51*	KS-EFCG-03-51

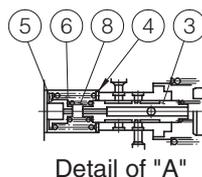
● List of Seals and Solenoid Ass'y

Item	Name of Parts	Part Numbers	Qty.
25	Solenoid Ass'y	E318-Y06M1-28-61	1
32	O-Ring	SO-NB-G35	1
33	O-Ring	SO-NB-P28	1
34	O-Ring	SO-NB-P28	2
35	O-Ring	SO-NB-P26	1
36	O-Ring	SO-NB-P16	1
37	O-Ring	SO-NB-P14	1
38	O-Ring	SO-NB-P9	1
39	O-Ring	SO-NB-P6	2
40	O-Ring	SO-NA-A016	1

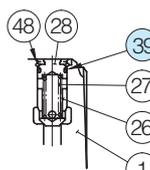
EFG
EFCG -06-250-*-*-51/5190



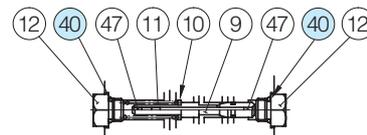
With Check Valve (EFCG-06)



Detail of "A"



Section B-B



Detail of Section C-C

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
EFG-06-250-*-*-51*	KS-EFG-06-51
EFCG-06-250-*-*-51*	KS-EFCG-06-51

● List of Seals and Solenoid Ass'y

Item	Name of Parts	Part Numbers	Qty.
31	Solenoid Ass'y	E318-Y06M1-28-61	1
33	O-Ring	SO-NA-P21	1
34	O-Ring	SO-NB-P50	3
35	O-Ring	SO-NB-P46	1
36	O-Ring	SO-NB-P36	1
37	O-Ring	SO-NB-P34	2
38	O-Ring	SO-NB-P32	4
39	O-Ring	SO-NA-P21	1*
40	O-Ring	SO-NB-P10	2
41	O-Ring	SO-NB-P9	3

★ Two O-rings are required for the EFCG.

Note: The connector assembly GDM-211-B-11 (Item 32) is not included in the solenoid assembly.

Note: When ordering seals, please specify the seal kit number from the table right. In addition to the right o-rings, seals for solenoid ass'y is included in the seal kit. For the detail of the solenoid ass'y seals, see [page 674](#).

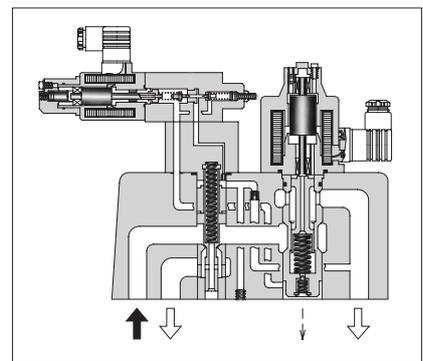
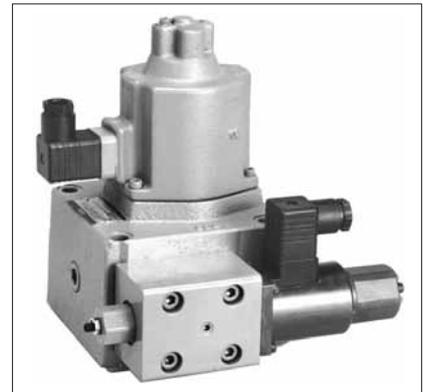
40Ω–10Ω Series Proportional Electro-Hydraulic Flow Control and Relief Valves

This flow control and relief valve is an energy-saving valve that supplies the minimum pressure and flow necessary for actuator drive. Since this valve controls the pump pressure by following the load pressure while keeping the differential pressure minimized, it serves as a low power-consumption energy - saving, metre-in, controlled flow control valve. Further, since a temperature compensation function is incorporated, this valve provides consistent flow control without respect to the fluid temperature.

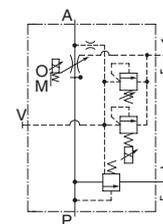
Specifications

Model No.		EFBG-03 -125-* -17*	EFBG-06 -250-* -17*	EFBG-10 -500-* -17*
Description				
Max. Operating Pressure MPa (PSI)		24.5 (3550)	24.5 (3550)	24.5 (3550)
Max. Flow L/min (U.S.GPM)		125 (33)	250 (66)	500 (132)
Metred Flow Adjustment Range L/min (U.S.GPM)		1-125 (.26-33)	2.5-250 (.66-66)	5-500 (1.32-132)
Flow Controls	Rated Current	600 mA	580 mA	700 mA
	Coil Resistance	45 Ω	45 Ω	45 Ω
	Differential Pressure MPa (PSI)	0.6 (85)	0.7 (100)	0.9 (130)
	Hysteresis	7% or less	7% or less	7% or less
	Repeatability	1% or less	1% or less	1% or less
Pressure Controls ^{★1}	Pres. Adj. Range MPa (PSI) ^{★2}	C: 1.4-13.7 (205-2000) H: 1.4-20.6 (205-3000)	C: 1.5-13.7 (220-2000) H: 1.5-20.6 (220-3000)	C: 1.6-13.7 (230-2000) H: 1.6-20.6 (230-3000)
	Rated Current	C: 750 mA H: 750 mA	C: 690 mA H: 730 mA	C: 690 mA H: 690 mA
	Coil Resistance	10 Ω	10 Ω	10 Ω
	Hysteresis	3% or less	3% or less	3% or less
	Repeatability	1% or less	1% or less	1% or less
	Approx. Mass	kg (lbs.)	Refer to page 714 to 716	

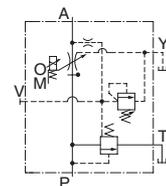
- ★1. The specifications for pressure controls are applied to models with proportional pilot relief valve. (Ex. EFBG-03-125-C-17)
- ★2. The maximum pressure adjustment range of the models without proportional pilot relief valves is 24.5 MPa (3550 PSI).



Graphic Symbols



With Proportional Pilot Relief Valve



Without Proportional Pilot Relief Valve

Model Number Designation

F-	EFB	G	-03	-125	-C	-17	*
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min (U.S.GPM)	Proportional Pilot Relief Valve Pressure Adjustment Range	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	EFB: Proportional Electro-Hydraulic Flow Control and Relief Valve	G: Sub-plate Mounting	03	125: 125 (33)	C, H: See Specifications None: Without Proportional Pilot Relief Valve	17	Refer to ★
			06	250: 250 (66)		17	
			10	500: 500 (132)		17	

- ★ 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" and European Design Std.	N. American Design Std.	
EFBG-03	M10 × 100 Lg.	3/8-16 UNC × 4 Lg.	4
EFBG-06	M16 × 130 Lg.	5/8-11 UNC × 5 Lg.	4
EFBG-10	M20 × 130 Lg.	3/4-10 UNC × 5 Lg.	4

Applicable Power Amplifiers

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see [page 772, 778](#)).

Valve Model Numbers	Power Amplifier Model Numbers	
	For Flow Control	For Pres. Control
EFBG-03-125-17/1790 EFBG-06-250-17/1790 EFBG-10-500-17/1790	AME-D-S-*-40 AME-DF-S-*-22 AME-T-S-*-22	—
03 EFBG-06-* ^C _H -17/1790 10	AME-D2-H1-*-12	

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
EFBG-03	EFBGM-03Y-10	Rc 3/4	EFBGM-03Y-1080	3/4 BSP.F	EFBGM-03Y-1090	3/4 NPT	6 (13.2)
	EFBGM-03Z-10	Rc 1	EFBGM-03Z-1080	1 BSP.F	EFBGM-03Z-1090	1 NPT	
EFBG-06	EFBGM-06X-10	Rc 1	EFBGM-06X-1080	1 BSP.F	EFBGM-06X-1090	1 NPT	12.5 (27.6)
	EFBGM-06Y-10	Rc 1-1/4	EFBGM-06Y-1080	1-1/4 BSP.F	EFBGM-06Y-1090	1-1/4 NPT	16 (35.3)
EFBG-10	EFBGM-10Y-10 [*]	1-1/2, 2 Flange Mounting	EFBGM-10Y-1080 [*]	1-1/2, 2 Flange Mounting	EFBGM-10Y-1090 [*]	1-1/2, 2 Flange Mounting	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.

★ When ordering the EFBGM-10Y, see Type F3 Pipe Flange Kits on [page 821](#) and order an appropriate pipe flange kit also.

Instructions

Drain Back Pressure

Check that the drain back pressure does not exceed 0.2 MPa (29 PSI).

When Relief Valve Passing Flow Rate is Low in Pressure Control State

To avoid preselected pressure instability, use a passing flow rate of 10 L/min (2.6 U.S.GPM) or higher for nominal sizes 03 and 06 or 15 L/min (4.0 U.S.GPM) or higher for nominal size 10.

Further, check that the tank-line back pressure does not exceed 0.5 MPa (70 PSI).

Safety Valve Pressure Setting

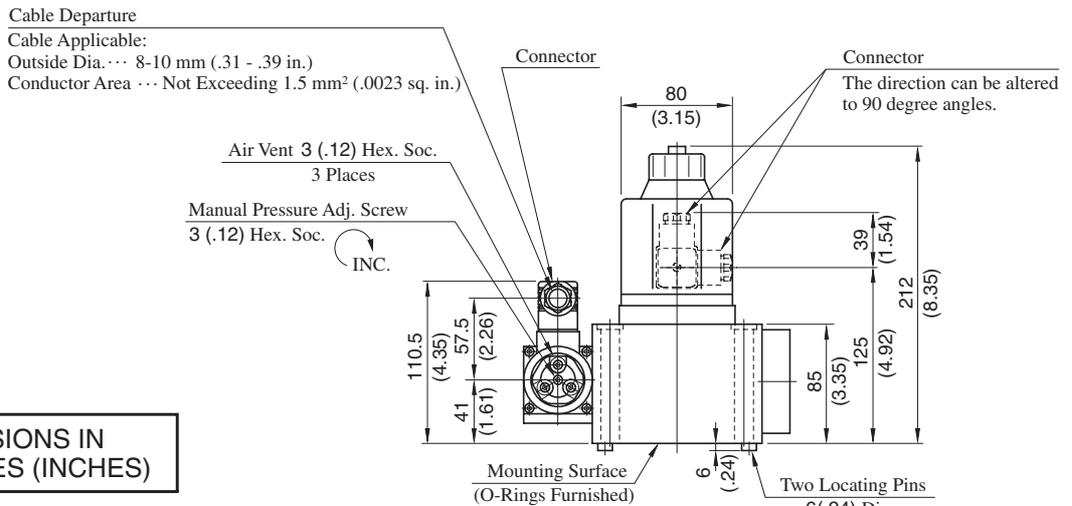
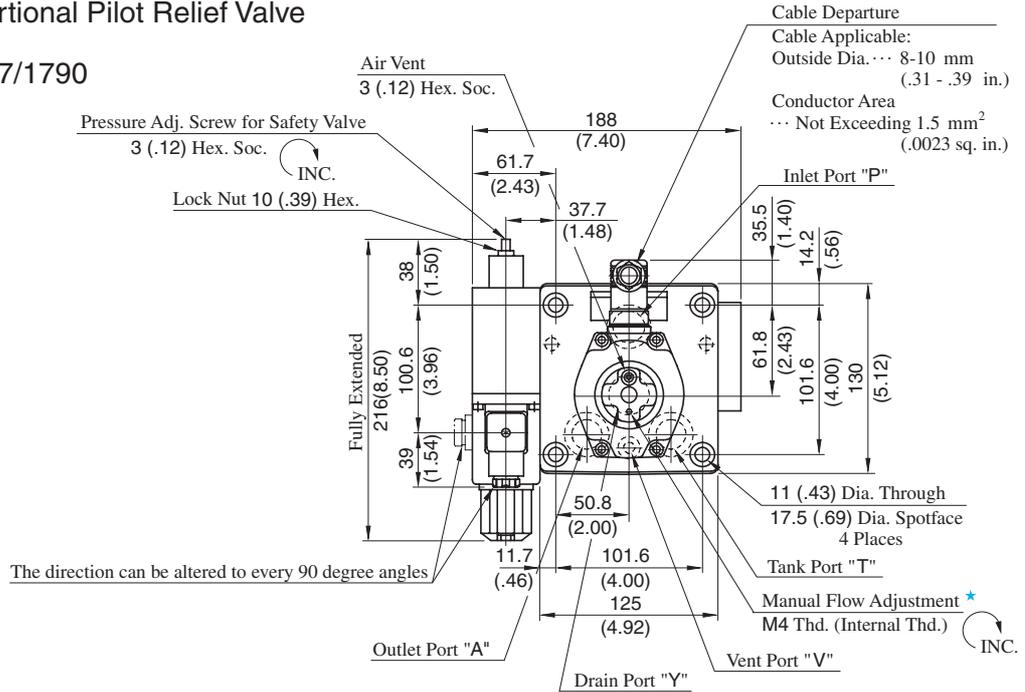
The pressure of the safety valve is preset at the value equal to the upper limit of the pressure adjustment range plus 2 MPa (290 PSI). Please adjust the pressure of the valve so preset to meet the pressure to be used actually.

To lower the pressure setting, turn the safety valve pressure adjustment screw anti-clockwise. After adjustment, be sure to tighten the lock nut.



Models with Proportional Pilot Relief Valve

EFBG-03-125-^C_H-17/1790



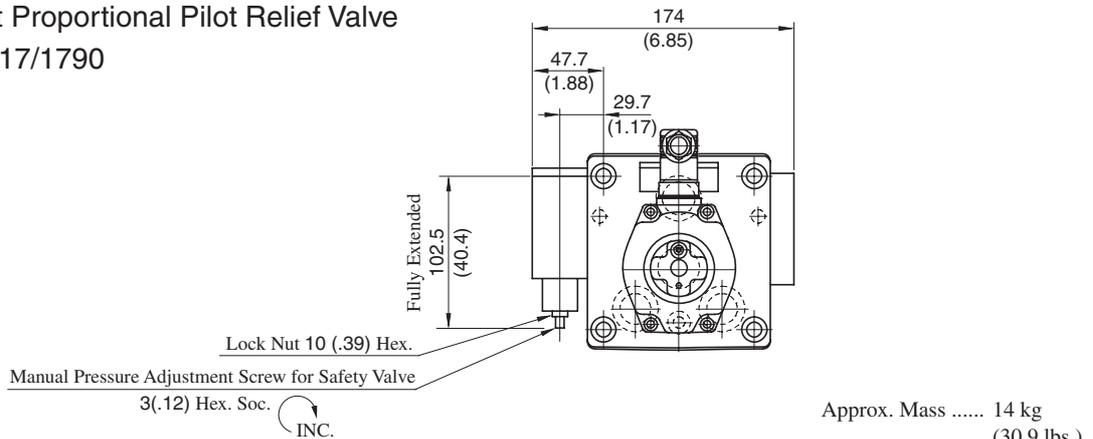
DIMENSIONS IN MILLIMETRES (INCHES)

★ Manual flow adjustment can be done by screwing for example an M4×20L screw in the M4 thread or pushing in a rod etc. there.

Approx. Mass 16 kg (35.3 lbs.)

Models without Proportional Pilot Relief Valve

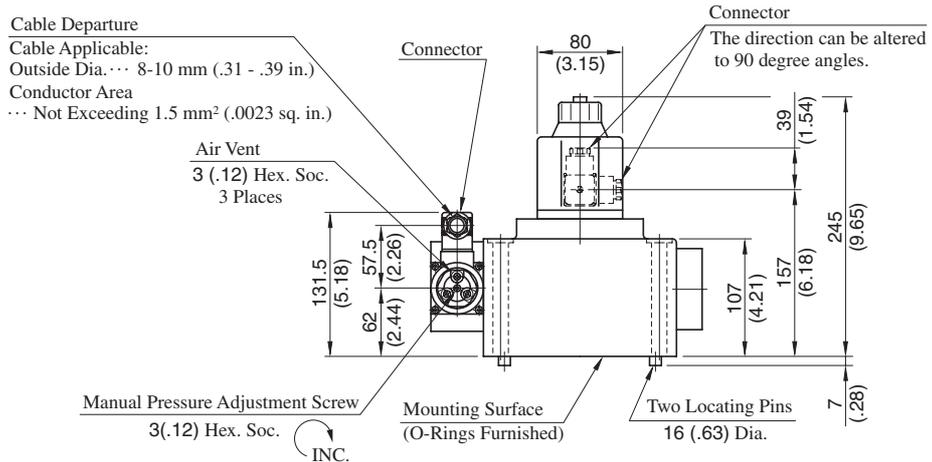
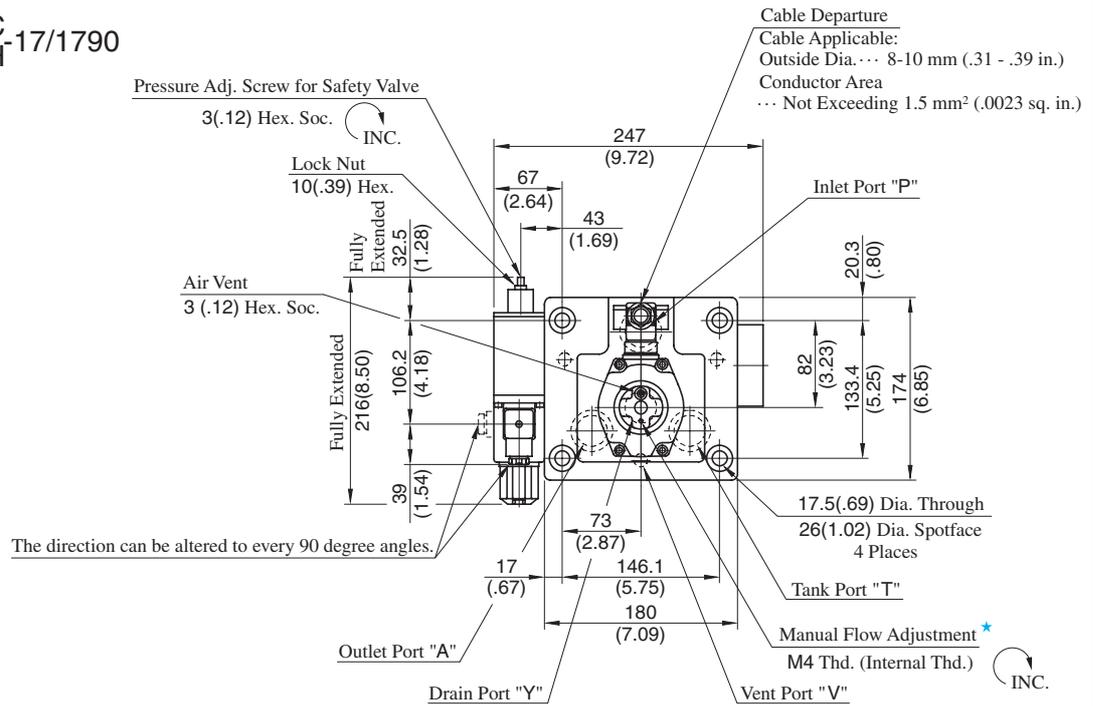
EFBG-03-125-17/1790



● For other dimensions, please refer to the models with proportional pilot relief valve.

Models with Proportional Pilot Relief Valve

EFBG-06-250-^C_H-17/1790



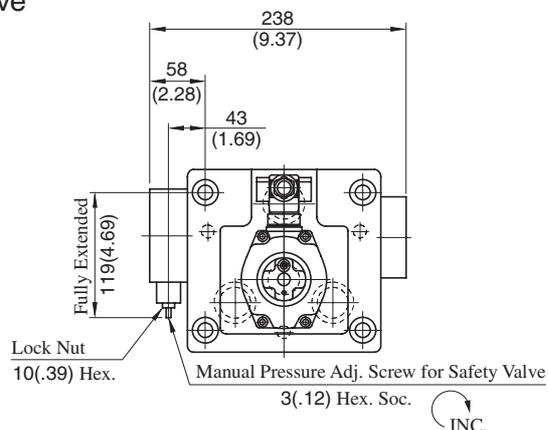
Approx. Mass 30 kg (66.2 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

★ Manual flow adjustment can be done by screwing for example an M4×20L screw in the M4 thread or pushing in a rod etc. there.

Models without Proportional Pilot Relief Valve

EFBG-06-250-17/1790



Approx. Mass 28 kg (61.7 lbs.)

• For other dimensions, please refer to the models with Proportional Pilot Relief Valve.

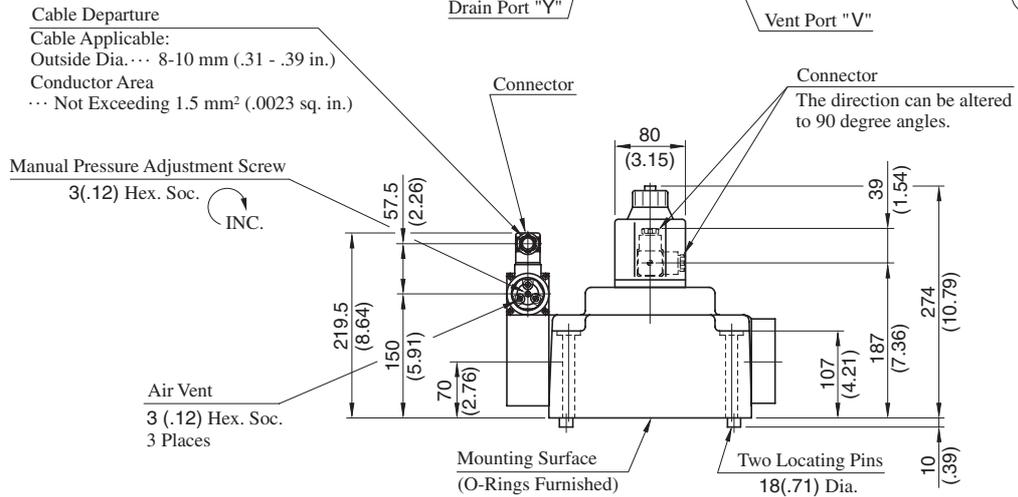
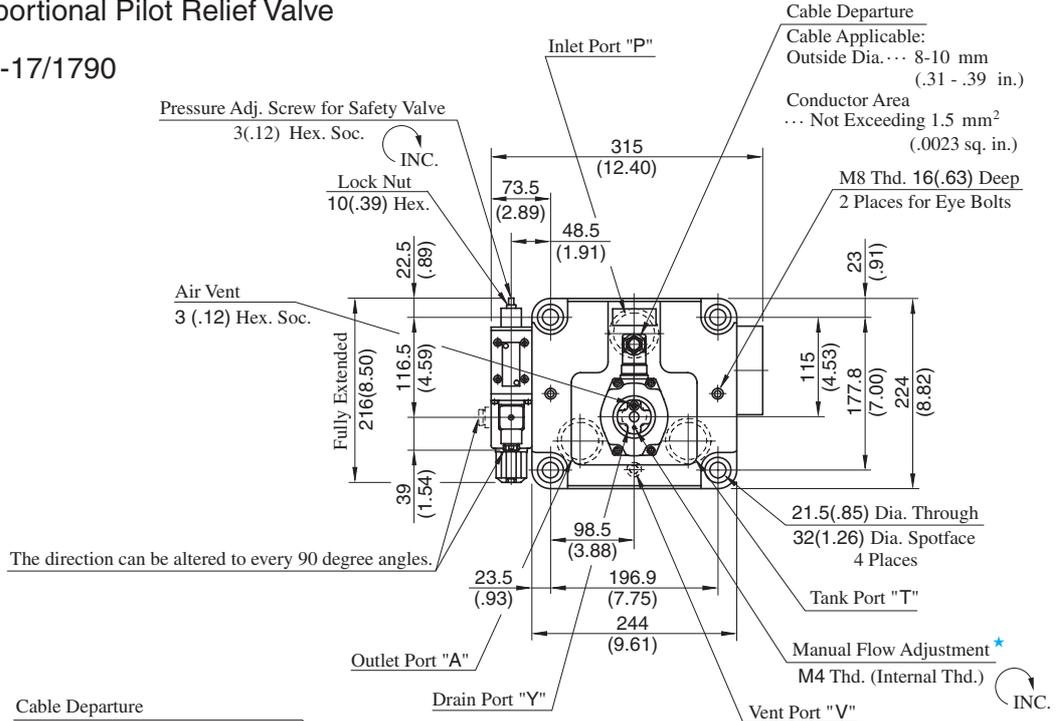
H



E Series
40Ω-10Ω Series Flow Control and Relief Valves

Models with Proportional Pilot Relief Valve

EFBG-10-500-^C_H-17/1790



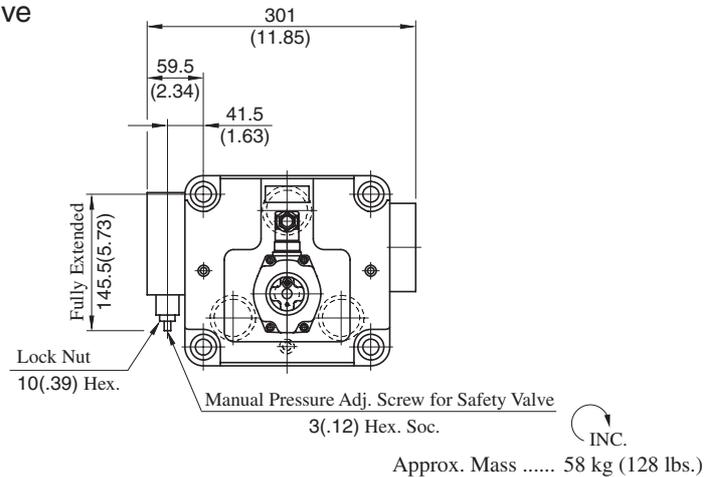
DIMENSIONS IN MILLIMETRES (INCHES)

Approx. Mass 60 kg (132 lbs.)

★ Manual adjustment can be done by screwing for example an M4×20 L screw in the M4 thread or pushing in a rod etc. there.

Models without Proportional Pilot Relief Valve

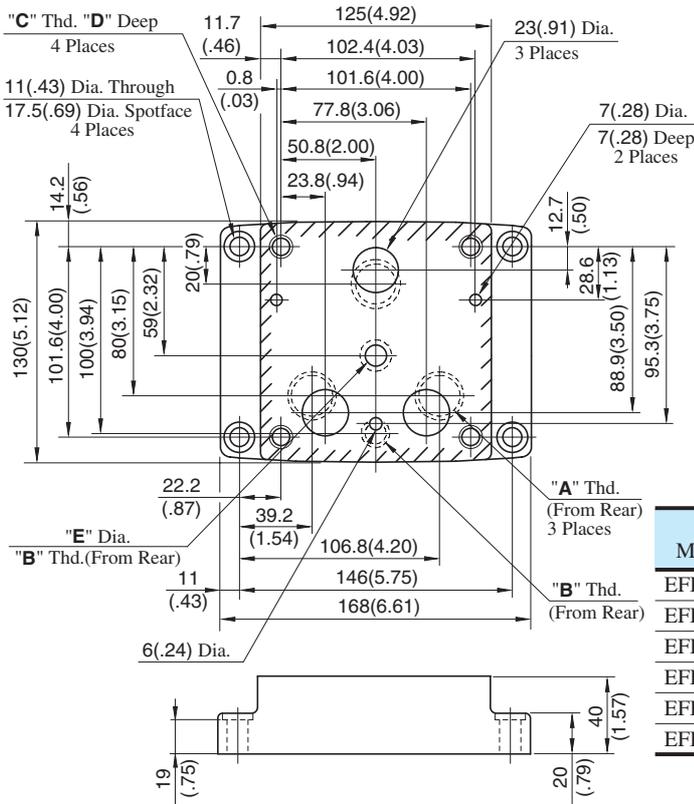
EFBG-10-500-17/1790



• For other dimensions, please refer to the models with Proportional Pilot Relief Valve.

Sub-plate

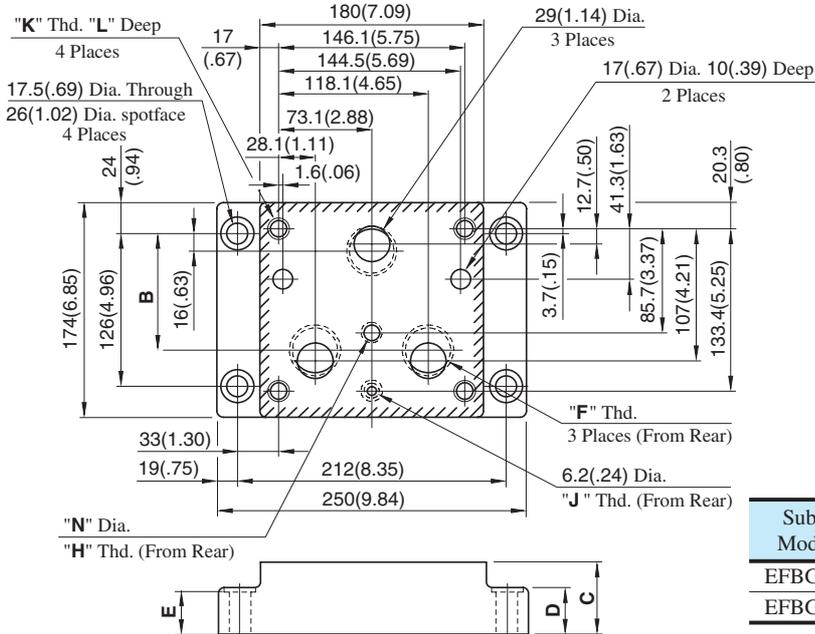
EFBGM-03Y/03Z-10/1080/1090



Sub-plate Model Numbers	Thread Size			mm (in.)	
	"A" Thd.	"B" Thd.	"C" Thd.	D	E
EFBGM-03Y-10	Rc 3/4	Rc 1/4	M10	18 (.71)	11 (.43)
EFBGM-03Z-10	Rc 1				11.7 (.46)
EFBGM-03Y-1080	3/4 BSPF	1/4 BSPF	M10	18 (.71)	11.7 (.46)
EFBGM-03Z-1080	1 BSPF				11 (.43)
EFBGM-03Y-1090	3/4 NPT	1/4 NPT	3/8-16 UNC	21 (.83)	11 (.43)
EFBGM-03Z-1090	1 NPT				11 (.43)

DIMENSIONS IN MILLIMETRES (INCHES)

EFBGM-06X/06Y-10/1080/1090



Sub-plate Model No.	Dimensions mm (in.)			
	B	C	D	E
EFBGM-06X	103.3 (4.07)	45 (1.77)	35 (1.38)	34 (1.34)
EFBGM-06Y	95 (3.74)	60 (2.36)	40 (1.54)	39 (1.54)

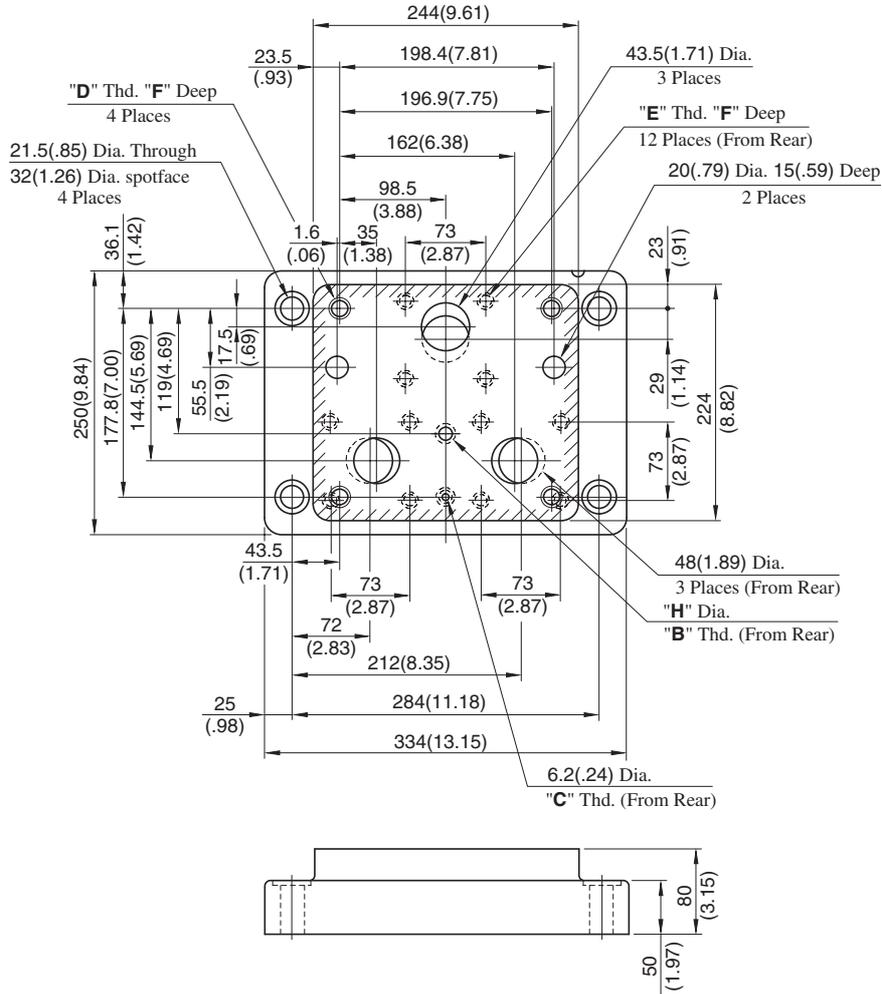
Sub-plate Model No.	Thread Size				mm (in.)	
	"F" Thd.	"H" Thd.	"J" Thd.	"K" Thd.	L	N
EFBGM-06X-10	Rc 1	Rc 3/8	Rc 1/4	M 16	30 (1.18)	14 (.55)
EFBGM-06Y-10	Rc 1-1/4				15.2 (.60)	
EFBGM-06X-1080	1 BSPF	3/8 BSPF	1/4 BSPF	M 16	30 (1.18)	14 (.55)
EFBGM-06Y-1080	1-1/4 BSPF				15.2 (.60)	
EFBGM-06X-1090	1 NPT	3/8 NPT	1/4 NPT	5/8-11 UNC	35 (1.38)	14 (.55)
EFBGM-06Y-1090	1-1/4 NPT				14 (.55)	

H
E Series
40Ω-10Ω Series Flow Control and Relief Valves

Sub-plate

EFBGM-10Y-10/1080/1090

DIMENSIONS IN MILLIMETRES (INCHES)



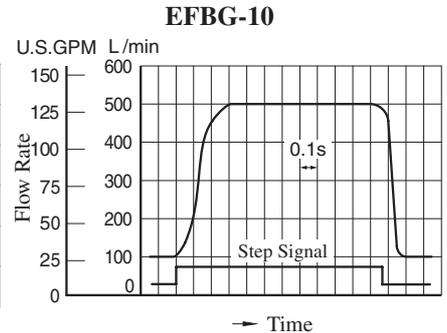
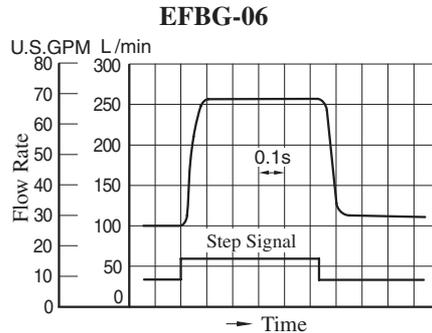
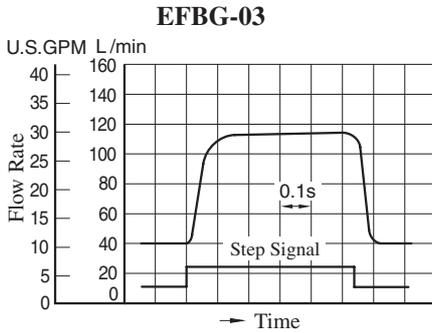
Sub-plate Model Numbers	Thread Size				mm (in.)	
	"B" Thd.	"C" Thd.	"D" Thd.	"E" Thd.	F	H
EFBGM-10Y-10	Rc 3/8	Rc 1/4	M20	M16	32 (1.26)	14 (.55)
EFBGM-10Y-1080	3/8 BSPF	1/4 BSPF				15.2 (.60)
EFBGM-10Y-1090	3/8 NPT	1/4 NPT	3/4-10 UNC	5/8-11 UNC	34 (1.34)	14 (.55)

Step Response

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

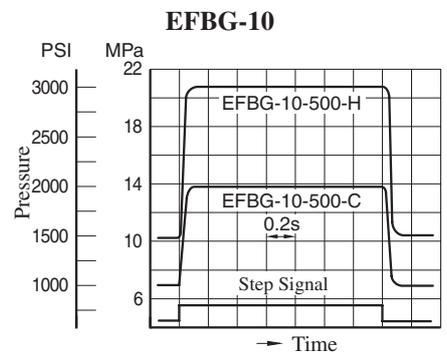
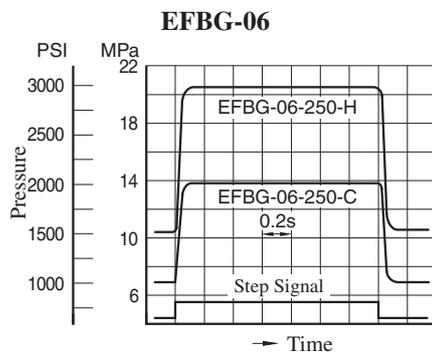
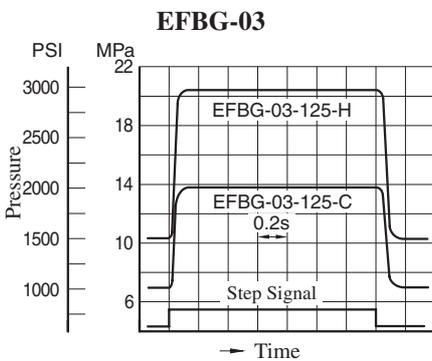
Viscosity: 30 mm²/s (141 SSU)

Flow Controls



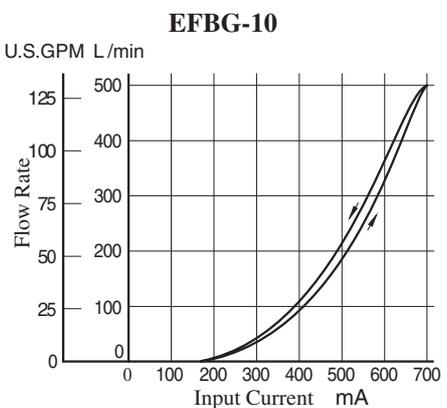
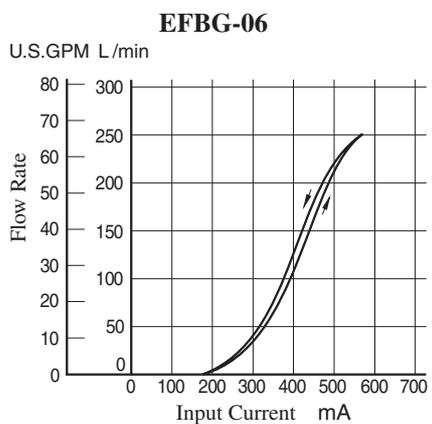
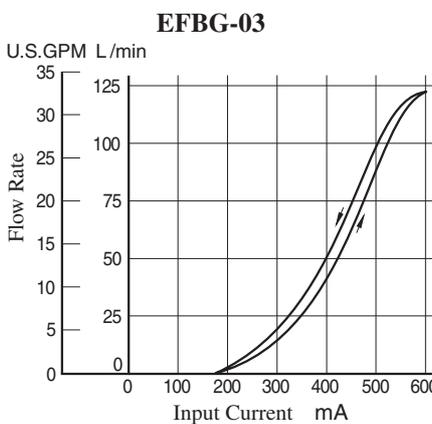
Pressure Controls

Viscosity: 30 mm²/s (141 SSU)



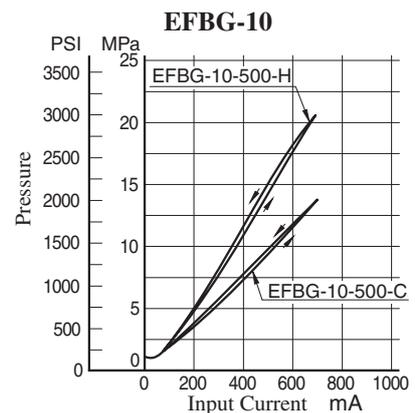
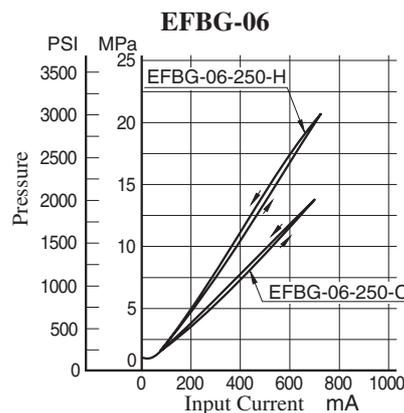
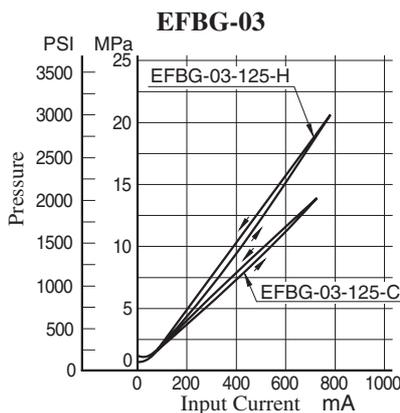
Input Current vs. Flow

Viscosity: 30 mm²/s (141 SSU)



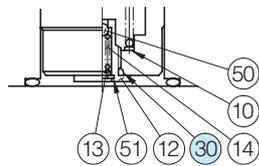
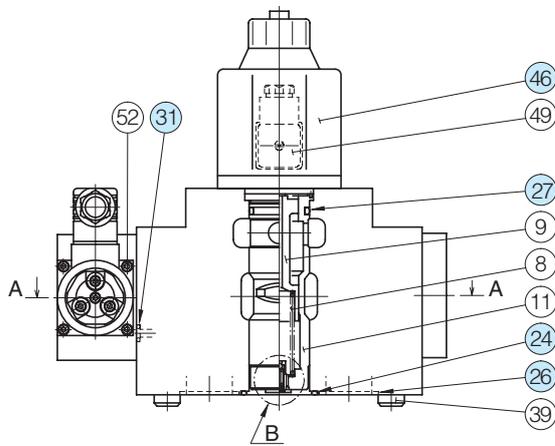
Input Current vs. Pressure

Viscosity: 30 mm²/s (141 SSU)

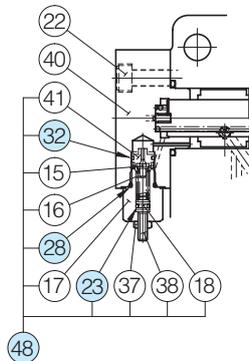
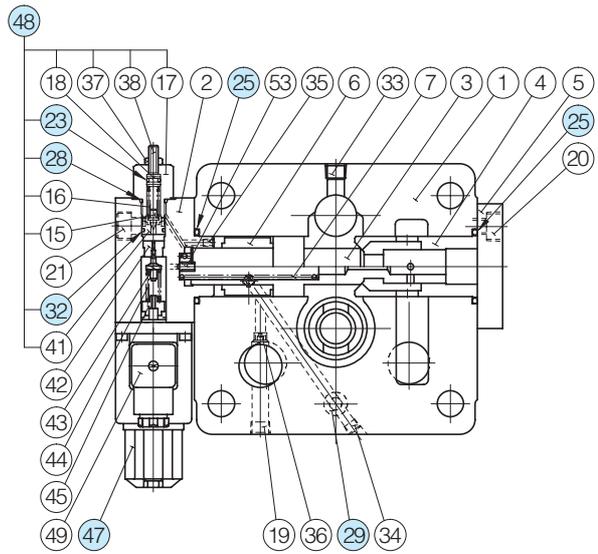


■ List of Seals, Solenoid Ass'y and Safety Valve

EFBG-03-125- *-17/1790
EFBG-06-250- *-17/1790



Detail of "B"



Without Proportional Pilot Relief Valve

Section A-A

● List of Seals

Item	Name of Parts	Part Numbers		Qty.
		EFBG-03	EFBG-06	
23	O-Ring	SO-NA-P6	SO-NA-P6	1
24	O-Ring	SO-NB-G30	SO-NB-P44	1
25	O-Ring	SO-NB-P32	SO-NB-P42	2
26	O-Ring	SO-NB-P28	SO-NB-P32	3
27	O-Ring	—	SO-NB-P34	1
28	O-Ring	SO-NB-P14	SO-NB-P14	1
29	O-Ring	SO-NB-P11	SO-NB-P11	1
30	O-Ring	—	SO-NA-P10	1
31	O-Ring	SO-NB-P9	SO-NB-P9	1
32	O-Ring	SO-NB-A013	SO-NB-A013	1

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
EFBG-03-125-17*	KS-EFBG-03-17
EFBG-03-125-C/H-17*	KS-EFBG-03-C-17
EFBG-06-250-17*	KS-EFBG-06-17
EFBG-06-250-C/H-17*	KS-EFBG-06-C-17

● Solenoid Ass'y and Safety valve

Valve Model Numbers	④⑦ Solenoid Ass'y Model No.	④⑥ Solenoid Ass'y Model No.	④⑧ Safety Valve Model No.
EFBG-03-125-C/H-17/1790	E318-Y06M2-05-61	E321-45-20	SB1094-2002
EFBG-06-250-C/H-17/1790			
EFBG-03-125-17/1790 EFBG-06-250-17/1790	—		

Note: The connector assembly GDM-211-B-11 (Item 49) is not included in the solenoid assembly.

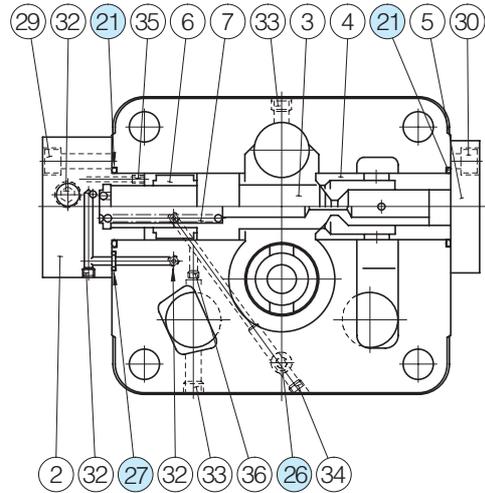
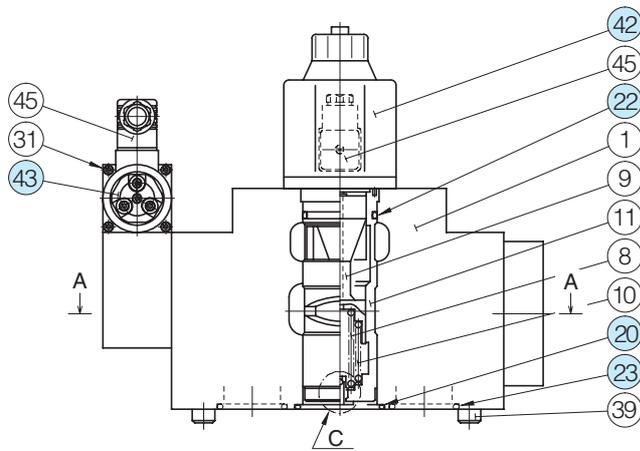
When ordering seals, please specify the seal kit number from the table above.

In addition to the above o-rings, seals for solenoid ass'y ④⑥ and ④⑦ are included in the seal kit.

For the details of seals for solenoid ass'y ④⑥, see page 704 and for solenoid ass'y ④⑦ see page 674.

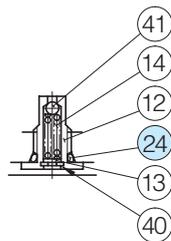
● List of Seals, Solenoid Ass'y, Pilot Relief Valves and Safety Valve

EFBG-10-500- *-17/1790

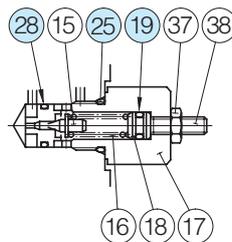


Section A-A

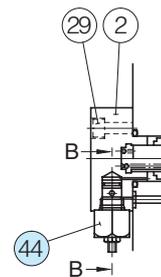
● Detail of Safety Valve (Item 44)



Detail of "C"



Section B-B



Without Proportional Pilot Relief Valve

● List of Seals and Solenoid Ass'y

Item	Name of Parts	Part Numbers	Qty.
19	O-Ring	SO-NA-P6	1
20	O-Ring	SO-NB-G60	1
21	O-Ring	SO-NB-G55	2
22	O-Ring	SO-NB-P50	1
23	O-Ring	SO-NB-P48	3
24	O-Ring	SO-NA-P10	1
25	O-Ring	SO-NB-P14	1
26	O-Ring	SO-NB-P11	1
27	O-Ring	PO-NB-P11	1
28	O-Ring	SO-NB-A013	1
42	Solenoid Ass'y	E321-45-20	1

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
EFBG-10-500-17*	KS-EFBG-10-17
EFBG-10-500-C/H-17*	KS-EFBG-10-C-17

Note: The connector assembly GDM-211-B-11 (Item 45) is not included in the solenoid assembly.

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

In addition to the above o-rings, seals for Pilot Valve and solenoid ass'y are included in the seal kit.

● Pilot Valves and Safety Valve

Valve Model Numbers	④③ Proportional Pilot Relief Valve Model Numbers	④④ Safety Valve Model Numbers
EFBG-10-500-17/1790	—	SB1094-2002
EFBG-10-500-C-17/1790	EDG-01V-C-1-P18T17-5103	—
EFBG-10-500-H-17/1790	EDG-01V-H-1-PNT13-5103	—

Note: For the details of seals for solenoid ass'y ④②, see page 704 and for pilot relief valve ④③ see page 674.



10Ω-10Ω Series Proportional Electro-Hydraulic Flow Control and Relief Valves

This flow control and relief valve is an energy-saving valve that supplies the minimum pressure and flow necessary for actuator drive.

Since this valve controls the pump pressure by following the load pressure while keeping the differential pressure minimized, it serves as a low power-consumption energy-saving, metre-in, controlled flow control valve.

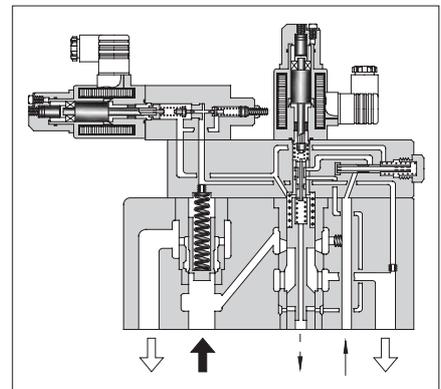
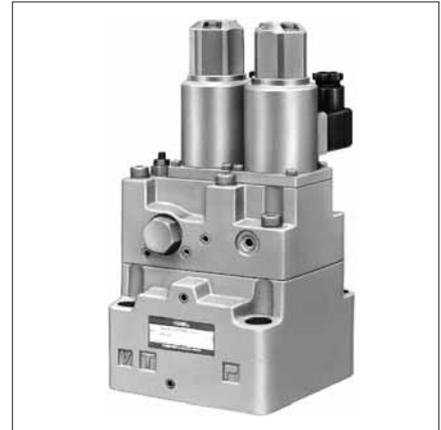
Further, since a temperature compensation function is incorporated, this valve provides consistent flow control without respect to the fluid temperature.

Specifications

Model Numbers		EFBG-03 -125-*-*-61*	EFBG-06 -250-*-*-61*	EFBG-10 -500-*-*-51*
Description				
Max. Operating Pressure MPa (PSI)		24.5 (3550)	24.5 (3550)	24.5 (3550)
Max. Flow L/min (U.S.GPM)		125 (33)	250 (66)	500 (132)
Metred Flow Adjustment Range L/min (U.S.GPM)		1-125 (.26-33)	2.5-250 (.66-66)	5-500 (1.32-132)
Min. Pilot Pressure MPa (PSI)		1.5 (220)	1.5 (220)	1.5 (220)
Pilot Flow L/min (U.S.GPM)		at Normal	1 (.26)	1 (.26)
		at Transition	3 (.79)	4 (1.06)
Flow Controls	Rated Current	800 mA	750 mA	900 mA
	Coil Resistance	10 Ω	10 Ω	10 Ω
	Differential Pressure MPa (PSI)	0.7 (100)	0.7 (100)	0.9 (130)
	Hysteresis	3% or less	3% or less	3% or less
	Repeatability	1% or less	1% or less	1% or less
Pressure Controls ^{*1}	Pres. Adj. Range MPa (PSI) ^{*2}	C: 1.4-15.7 (200-2275) H: 1.4-24.5 (200-3550)	C: 1.4-15.7 (200-2275) H: 1.4-24.5 (200-3550)	C: 1.5-15.7 (220-2275) H: 1.5-24.5 (220-3550)
		Rated Current	C: 890 mA H: 930 mA	C: 820 mA H: 880 mA
	Coil Resistance	10 Ω	10 Ω	10 Ω
	Hysteresis	3% or less	3% or less	3% or less
	Repeatability	1% or less	1% or less	1% or less
Approx. Mass kg (lbs.)		Refer to page 724 to 726		

★1. The specifications for pressure controls are applied to models with proportional pilot relief valve. (Ex. EFBG-03-125-C-*-61)

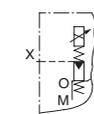
★2. The maximum pressure adjustment range of the models without proportional pilot relief valves is 24.5 MPa (3550 PSI).



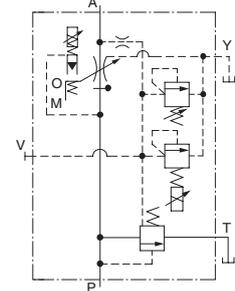
Graphic Symbols

With Proportional Pilot Relief Valve

External Pilot

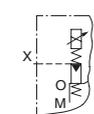


Internal Pilot

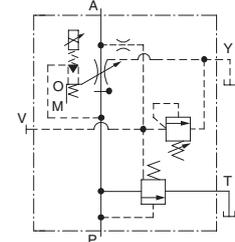


Without Proportional Pilot Relief Valve

External Pilot



Internal Pilot



Model Number Designation

F-	EFB	G	-03	-125	-C	-E	-61	*
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min (U.S.GPM)	Proportional Pilot Relief Valve Pressure Adj. Range	Pilot Connection	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	EFB: Proportional Electro-Hydraulic Flow Control and Relief Valve	G: Sub-plate Mounting	03	125: 125 (33)	C, H: See Specifications None: Without Proportional Pilot Relief Valve	None: Internal Pilot E: External Pilot	61	Refer to *
			06	250: 250 (66)			61	
			10	500: 500 (132)			51	

★ 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" and European Design Std.	N. American Design Std.	
EFBG-03	M10 × 65 Lg.	3/8-16 UNC × 2-1/2 Lg.	4
EFBG-06	M16 × 100 Lg.	5/8-11 UNC × 4 Lg.	4
EFBG-10	M20 × 130 Lg.	3/4-10 UNC × 5 Lg.	4

Applicable Power Amplifiers

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see [page 767, 780](#)).

Valve Model Numbers	Power Amplifier Model Numbers	
	For Flow Control	For Pres. Control
EFBG-03-125(-E)-61/6190 EFBG-06-250(-E)-61/6190 EFBG-10-500(-E)-51/5190	AME-D-10-*20 AMN-D-10 (For DC Power Supply)	—
EFBG-03-125-C/H(-E)-61/6190 EFBG-06-250-C/H(-E)-61/6190 EFBG-10-500-C/H(-E)-51/5190	AME-D2-1010-11	

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
EFBG-03	EFBGM-03Y-20	Rc 3/4	EFBGM-03Y-2080	3/4 BSPF	EFBGM-03Y-2090	3/4 NPT	6 (13.2)
	EFBGM-03Z-20	Rc 1	EFBGM-03Z-2080	1 BSPF	EFBGM-03Z-2090	1 NPT	
EFBG-06	EFBGM-06X-20	Rc 1	EFBGM-06X-2080	1 BSPF	EFBGM-06X-2090	1 NPT	12.5 (27.6)
	EFBGM-06Y-20	Rc 1-1/4	EFBGM-06Y-2080	1-1/4 BSP,F	EFBGM-06Y-2090	1-1/4 NPT	16 (35.3)
EFBG-10	EFBGM-10Y-20★	1-1/2, 2 Flange Mounting	EFBGM-10Y-2080★	1-1/2, 2 Flange Mounting	EFBGM-10Y-2090★	1-1/2, 2 Flange Mounting	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.

★ When ordering the EFBGM-10Y, see Type F3 Pipe Flange Kits on [page 821](#) and order an appropriate pipe flange kit also.

Instructions

Drain Back Pressure

Check that the drain back pressure dose not exceed 0.2 MPa (29 PSI).

When Relief Valve Passing Flow Rate is Low in Pressure Control State

To avoid preselected pressure instability, use a passing flow rate of 15 L/min (4.0 U.S.GPM) or higher. Further, check that the tank-line back pressure dose not exceed 0.5 MPa (70 PSI).

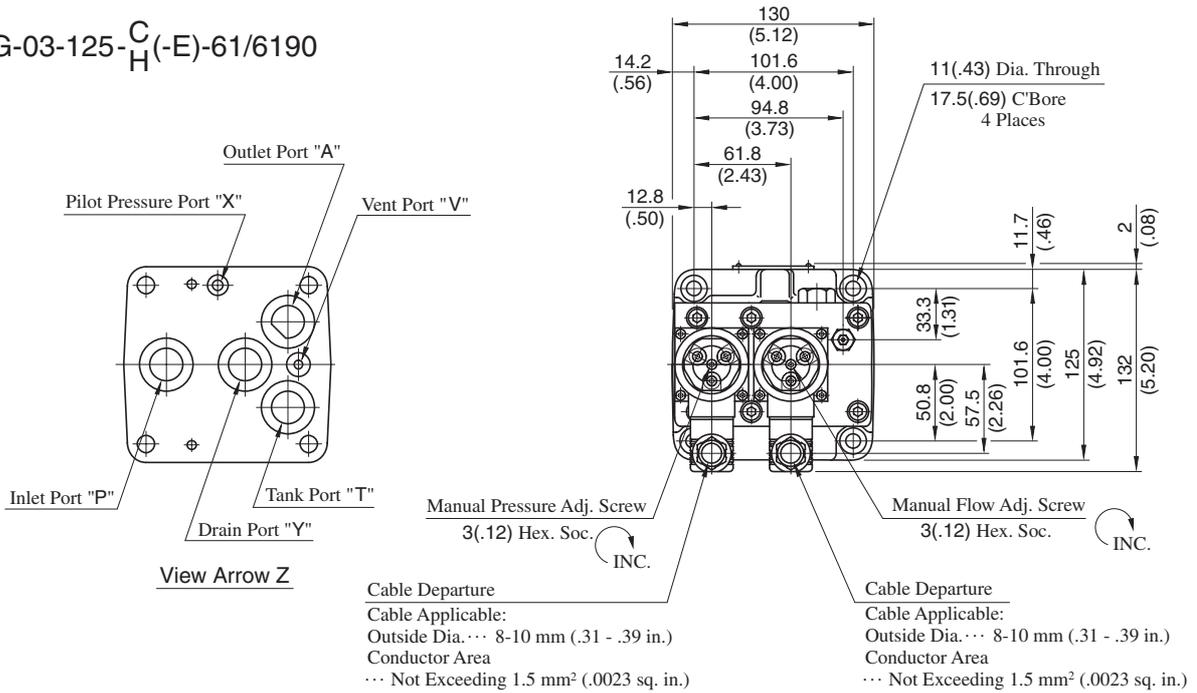
Safety Valve Pressure Setting

The pressure of the saffety valve is preset at the value equal to the upper limit of the pressure adjustment rengo plus 2 MPa (290 PSI). Please adjust the pressure of the valve so preset to meet the pressure to be used actually. To lower the pressure setting, turn the safety valve pressure adjustment screw anti-clockwise. After adjustment, be sure to tighten the lock nut.



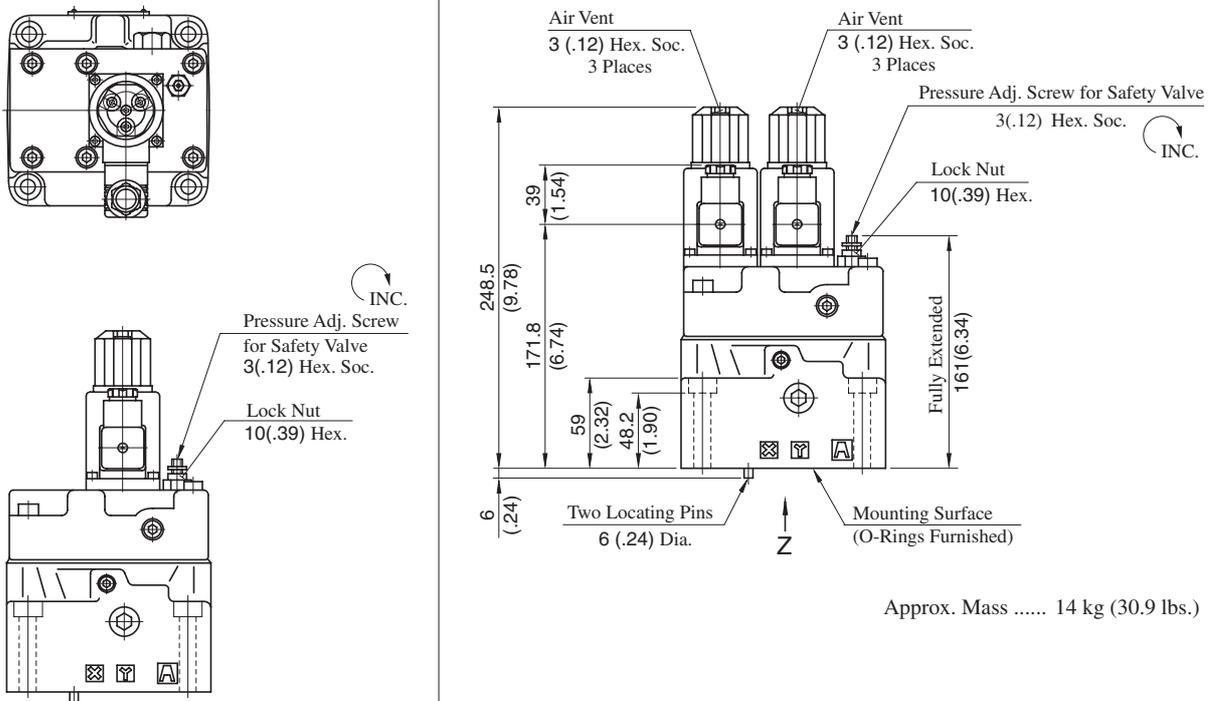
Models with Proportional Pilot Relief Valve

EFBG-03-125-C_H(-E)-61/6190



Models without Proportional Pilot Relief Valve

EFBG-03-125(-E)-61/6190



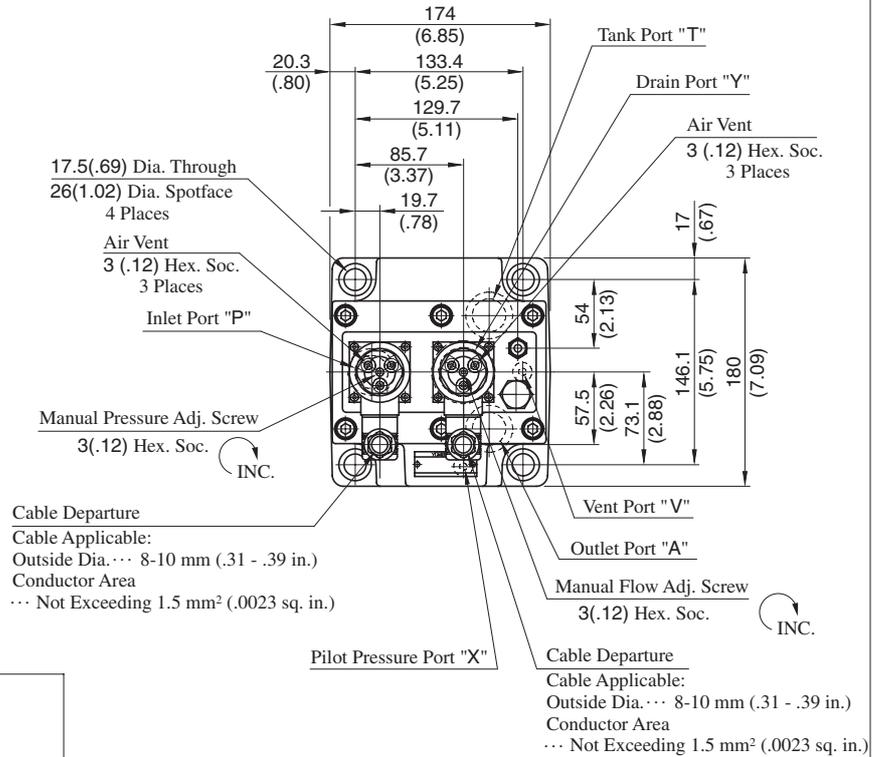
• For other dimensions, please refer to the models with Proportional Pilot Relief Valve.

Approx. Mass 13.3 kg (29.3 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

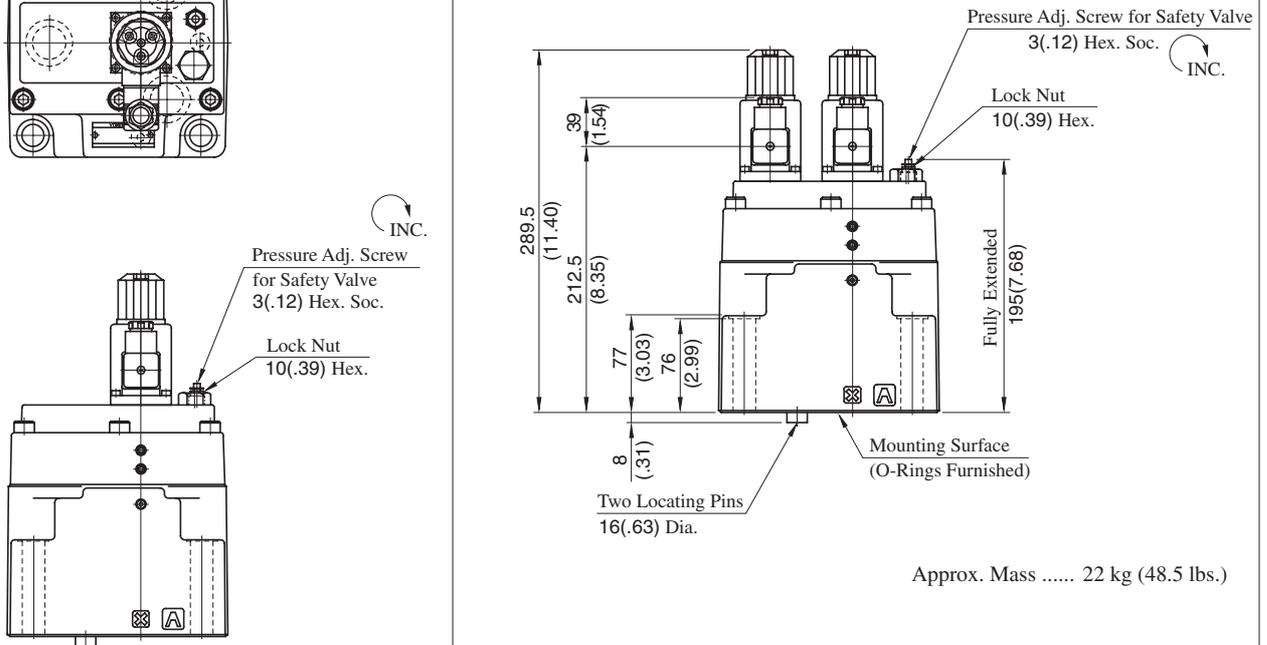
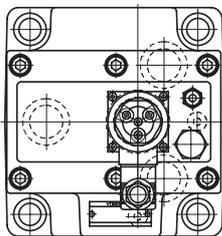
Models with Proportional Pilot Relief Valve

EFBG-06-250-^C_H(-E)-61/6190



Models without Proportional Pilot Relief Valve

EFBG-06-250(-E)-61/6190



• For other dimensions, please refer to the models with Proportional Pilot Relief Valve.

Approx. Mass 21.3 kg (47.0 lbs.)

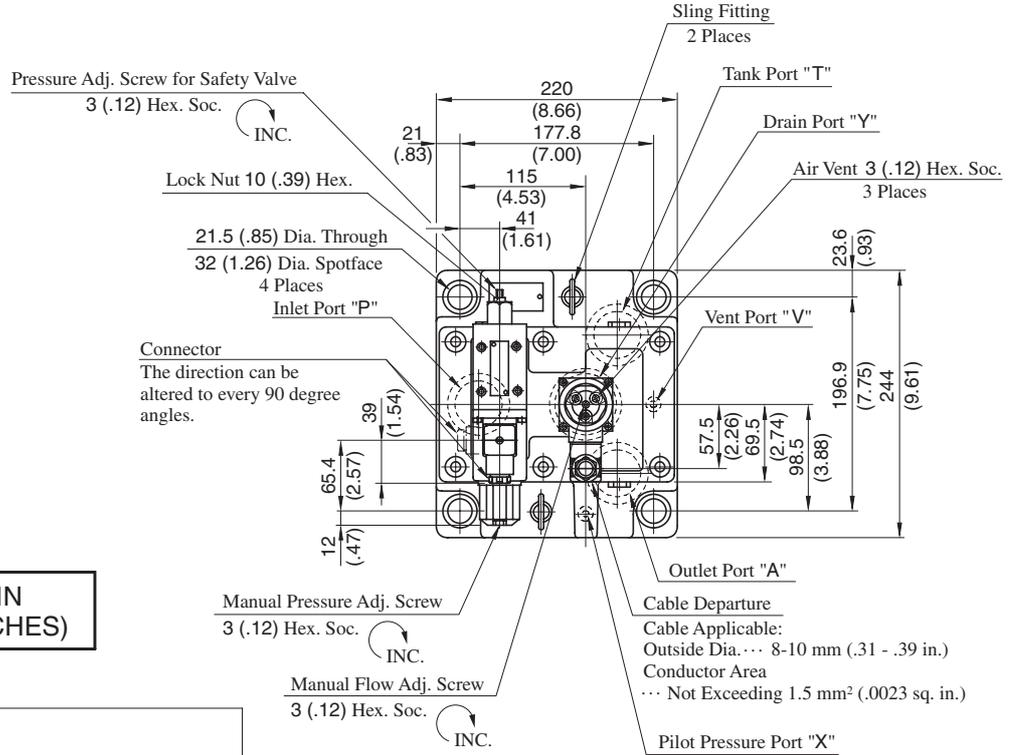
DIMENSIONS IN MILLIMETRES (INCHES)



E Series
10Ω-10Ω Series Flow Control and Relief Valves

Models with Proportional Pilot Relief Valve

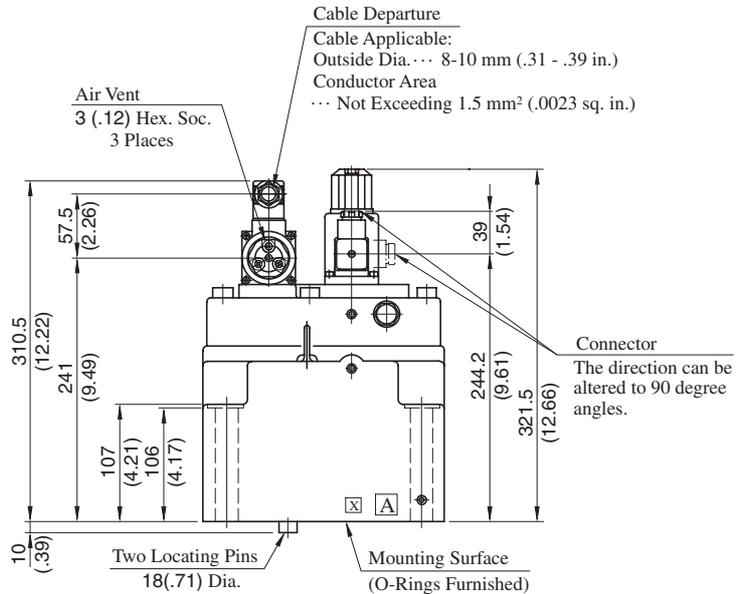
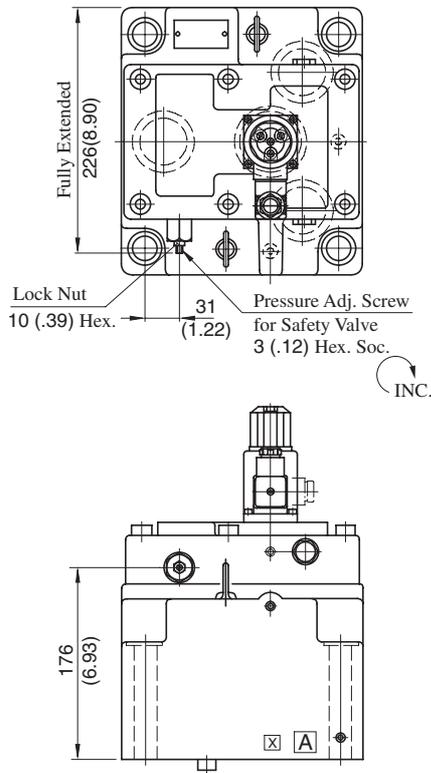
EFBG-10-500-^C_H(-E)-51/5190



DIMENSIONS IN MILLIMETRES (INCHES)

Models without Proportional Pilot Relief Valve

EFBG-10-500(-E)-51/5190



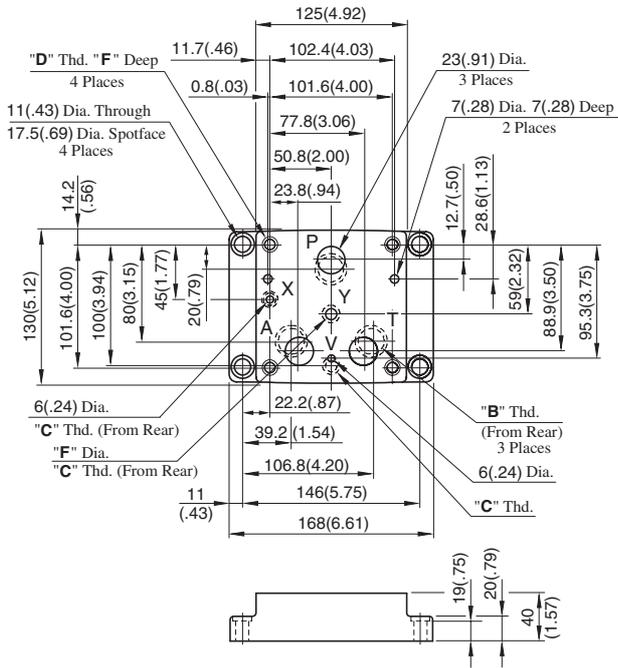
Approx. Mass 64 kg (141 lbs.)

• For other dimensions, please refer to the models with Proportional Pilot Relief Valve.

Approx. Mass 62 kg (137 lbs.)

Sub-plate

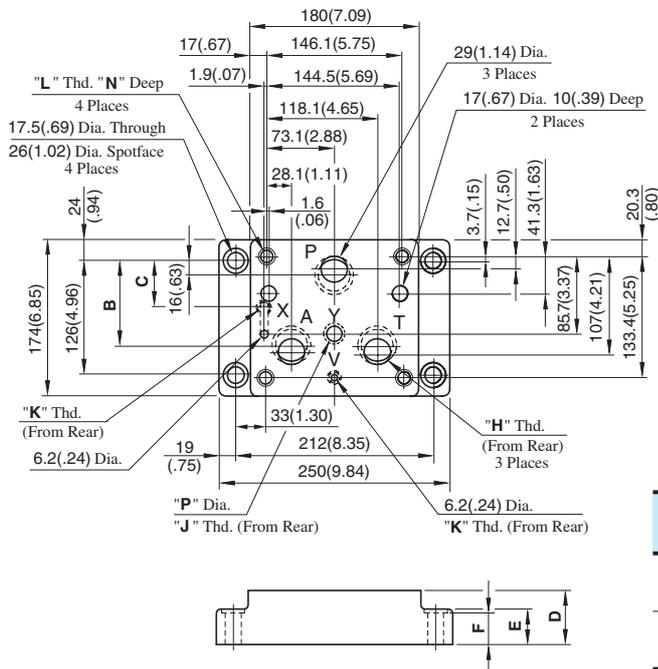
EFBGM-03Y-20/2080/2090
03Z



Sub-plate Model Numbers	Thread Size			mm (in.)	
	"B" Thd.	"C" Thd.	"D" Thd.	E	F
EFBGM-03Y-20	Rc 3/4	Rc 1/4	M10	18 (.71)	11 (.43)
EFBGM-03Z-20	Rc 1				11.7 (.46)
EFBGM-03Y-2080	3/4 BSP.F	1/4 BSP.F		21 (.83)	11 (.43)
EFBGM-03Z-2080	1 BSP.F				
EFBGM-03Y-2090	3/4 NPT	1/4 NPT	3/8-16 UNC	11 (.43)	
EFBGM-03Z-2090	1 NPT				

DIMENSIONS IN MILLIMETRES (INCHES)

EFBGM-06X-20/2080/2090
06Y



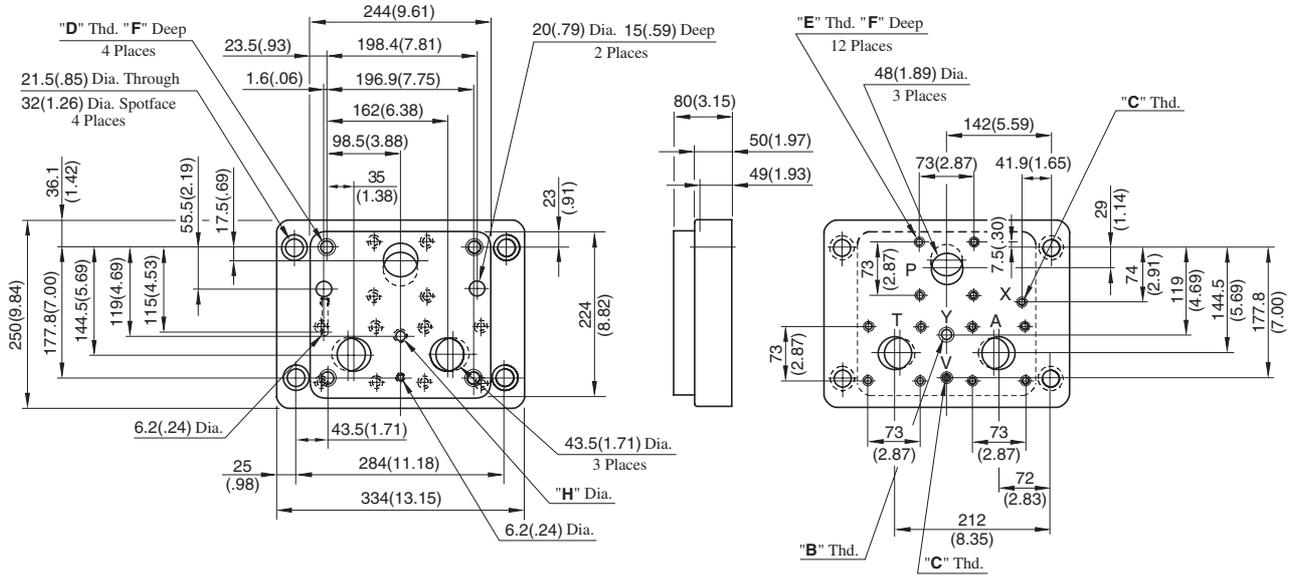
Sub-plate Model Numbers	Dimensions mm (in.)				
	B	C	D	E	F
EFBGM-06X	103.3 (4.07)	63.3 (2.49)	45 (1.77)	35 (1.38)	34 (1.34)
EFBGM-06Y	95 (3.74)	53.3 (2.10)	60 (2.36)	40 (1.57)	39 (1.54)

Sub-plate Model Numbers	Thread Size				mm (in.)	
	"H" Thd.	"J" Thd.	"K" Thd.	"L" Thd.	N	P
EFBGM-06X-20	Rc 1	Rc 3/8	Rc 1/4	M16	30 (1.18)	14 (.55)
EFBGM-06Y-20	Rc 1-1/4					
EFBGM-06X-2080	1 BSP.F	3/8 BSP.F	1/4 BSP.F	M16	30 (1.18)	15.2 (.60)
EFBGM-06Y-2080	1-1/4 BSP.F					
EFBGM-06X-2090	1 NPT	3/8 NPT	1/4 NPT	5/8-11 UNC	35 (1.38)	14 (.55)
EFBGM-06Y-2090	1-1/4 NPT					

H
 E Series
 10Q-10Q Series Flow Control and Relief Valves

EFBGM-10Y-20/2080/2090

**DIMENSIONS IN
MILLIMETRES (INCHES)**



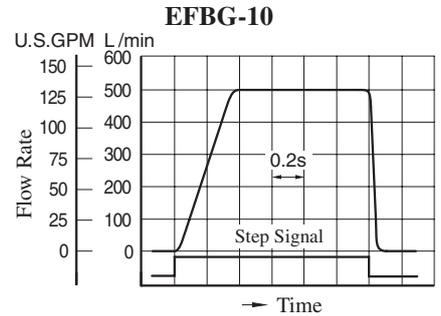
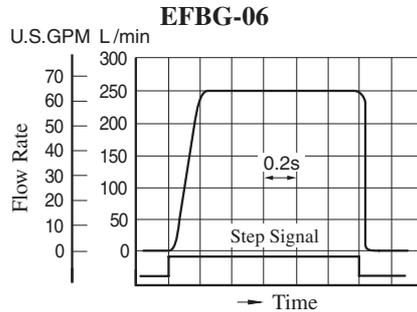
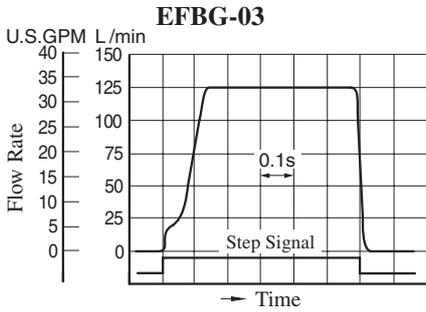
Sub-plate Model Numbers	Thread Size				mm (in.)	
	"B" Thd.	"C" Thd.	"D" Thd.	"E" Thd.	F	H
EFBGM-10Y-20	Rc 3/8	Rc 1/4	M20	M16	32(1.26)	14(.55)
EFBGM-10Y-2080	3/8 BSPF	1/4 BSPF				15.2(.60)
EFBGM-10Y-2090	3/8 NPT	1/4 NPT	3/4-10 UNC	5/8-11 UNC	34(1.34)	14(.55)

Step Response

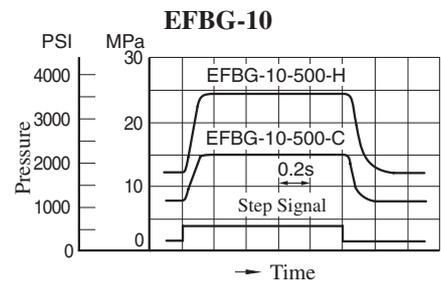
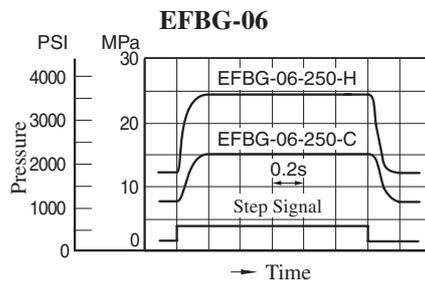
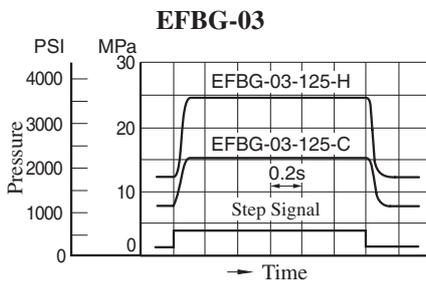
These characteristics have been obtained by measuring on each valve. Therefore, they may vary according to a hydraulic circuit to be used.

Viscosity: 30 mm²/s (141 SSU)

Flow Controls



Pressure Controls



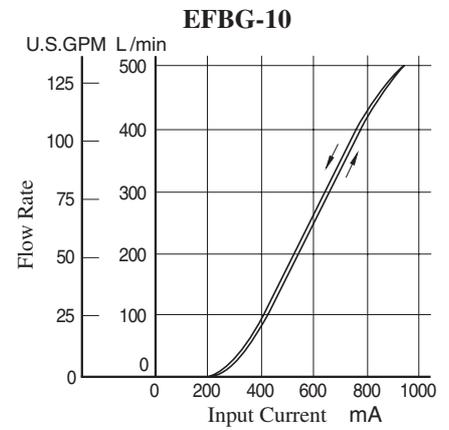
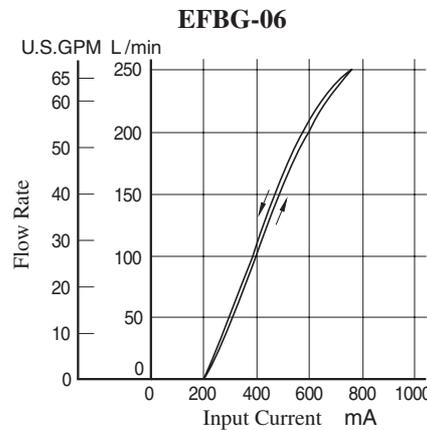
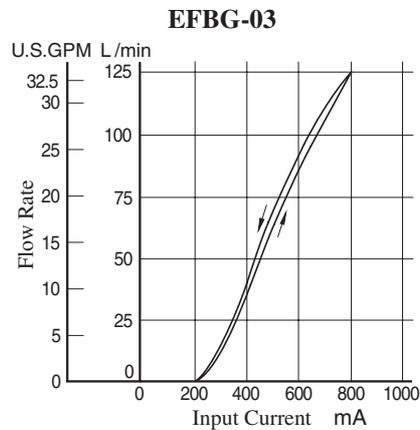
Flow Rate : 125 L/min (33 U.S.GPM)
Trapped Oil Volume : < 1 L (.264 U.S.Gallons)

Flow Rate : 250 L/min (66 U.S.GPM)
Trapped Oil Volume : < 1 L (.264 U.S.Gallons)

Flow Rate : 500 L/min (132 U.S.GPM)
Trapped Oil Volume : < 1 L (.264 U.S.Gallons)

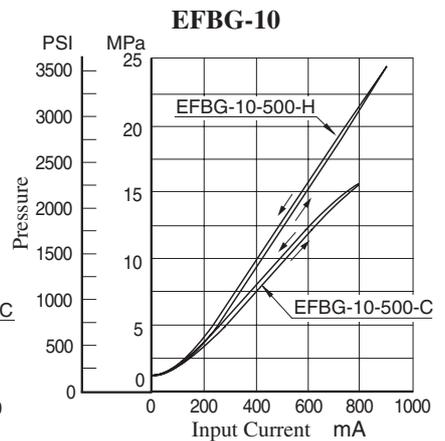
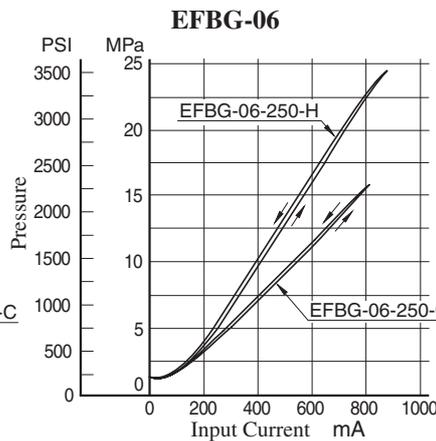
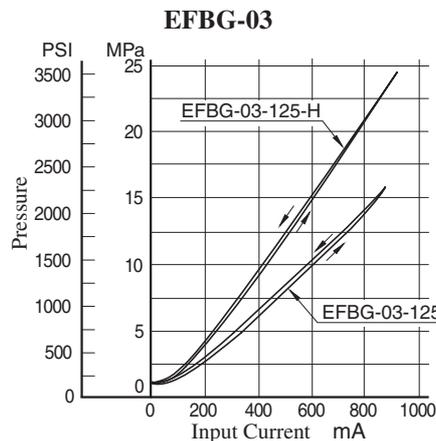
Input Current vs. Flow

Viscosity: 30 mm²/s (141 SSU)



Input Current vs. Pressure

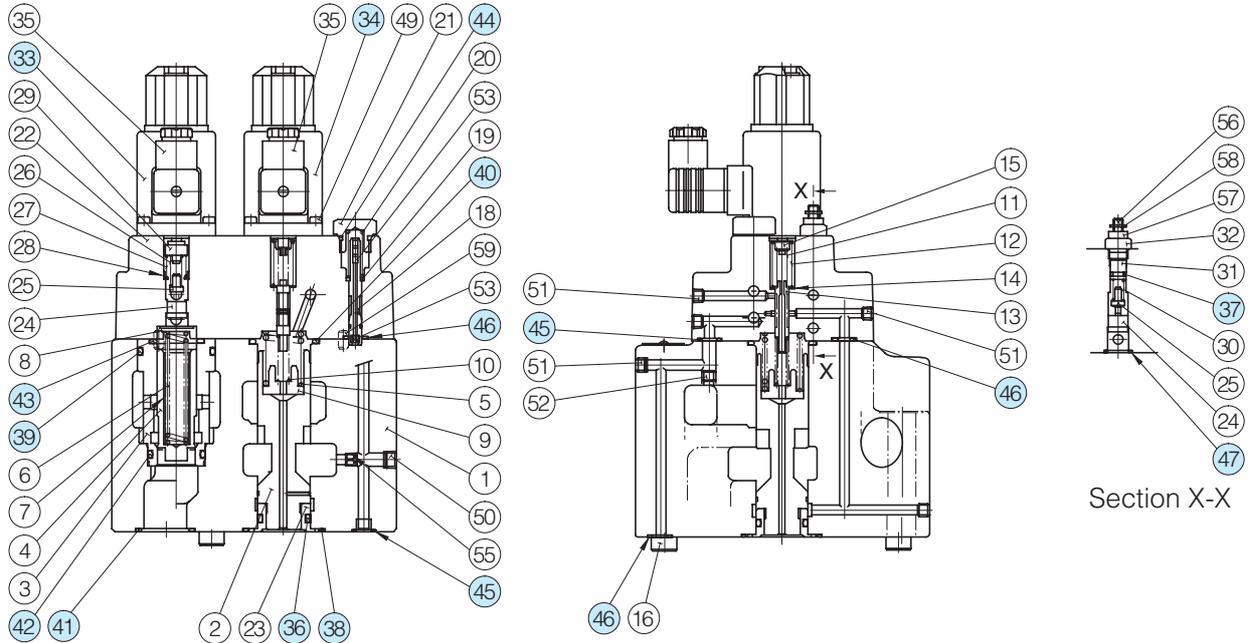
Viscosity: 30 mm²/s (141 SSU)



E Series
10Ω-10Ω Series Flow Control and Relief Valves

■ List of Seals and Solenoid Ass'y

EFBG-03-125-**-61/6190
 EFBG-06-250-**-61/6190



● List of Seals

Item	Name of Parts	EFBG-03		EFBG-06	
		Part Numbers	Qty.	Part Numbers	Qty.
36	O-Ring	SO-NA-A016	1	SO-NA-P26	1
37	O-Ring	SO-NA-P6	1	SO-NA-P6	1
38	O-Ring	SO-NB-P28	1	SO-NB-P44	1
39	O-Ring	SO-NB-P32	1	SO-NB-P42	1
40	O-Ring	SO-NB-P28	1	SO-NB-P36	1
41	O-Ring	SO-NB-P28	3	SO-NB-P32	3
42	O-Ring	SO-NB-G30	1	SO-NB-P30	1
43	O-Ring	SO-NB-P28	1	SO-NB-P28	1
44	O-Ring	SO-NB-P15	1	SO-NB-P15	1
45	O-Ring	SO-NB-P11	2	SO-NB-P11	2
46	O-Ring	SO-NB-P9	5	SO-NB-P11	4
47	O-Ring	SO-NB-A016	1	SO-NB-A016	1

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
EFBG-03-125-61*	KS-EFBG-03-61
EFBG-03-125-C/H-61*	KS-EFBG-03-C-61
EFBG-06-250-61*	KS-EFBG-06-61
EFBG-06-250-C/H-61*	KS-EFBG-06-C-61

Note: When ordering seals, please specify the seal kit number from the table right.
 In addition to the above o-rings, seals for solenoid ass'y are included in the seal kit.
 For the details of seals for solenoid ass'y (33) and (34) see page 674.

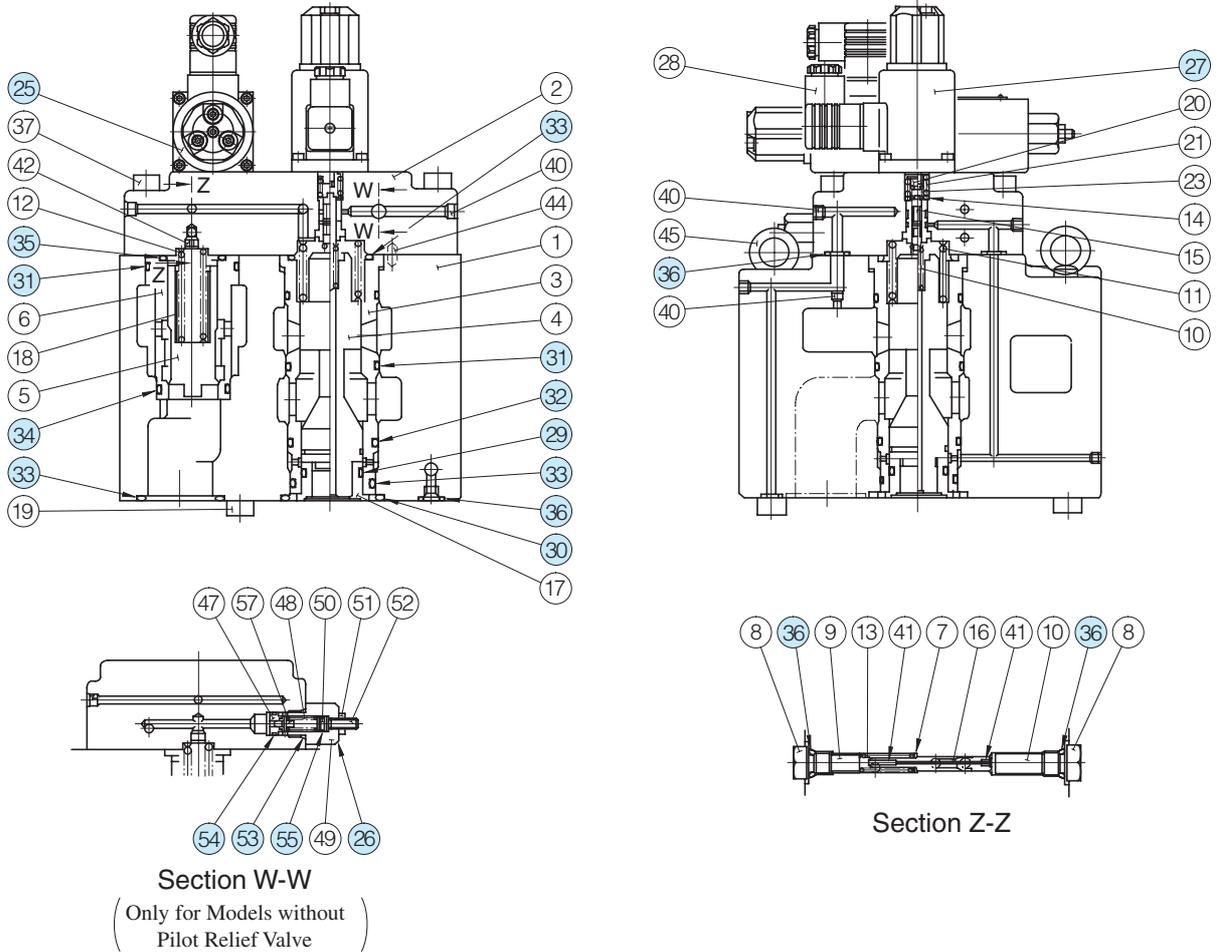
● Solenoid Ass'y

Valve Model Numbers	(33) Solenoid Ass'y Model Numbers	(34) Solenoid Ass'y Model Numbers
EFBG-03-125-C/H(-E)-61/6190	E318-Y06M1-04-61	E318-Y06M1-28-61
EFBG-06-250-C/H(-E)-61/6190		
EFBG-03-125(-E)-61/6190 EFBG-06-250(-E)-61/6190	—	

Note: The connector assembly GDM-211-B-11 (Item 35) is not included in the solenoid assembly.

List of Seals, Pilot Valves, Solenoid Ass'y and Safety Valve

EFBG-10-500-**-51/5190



List of Seals

Item	Name of Parts	Part Numbers	Qty.	
			Models with Pilot Relief Valve	Models without Pilot Relief Valve
29	O-Ring	SO-NA-P34	1	1
30	O-Ring	SO-NB-G60	1	1
31	O-Ring	SO-NB-G55	3	3
32	O-Ring	SO-NB-P50	1	1
33	O-Ring	SO-NB-P48	5	5
34	O-Ring	SO-NB-P42	1	1
35	O-Ring	SO-NB-P36	1	1
36	O-Ring	SO-NB-P11	8	8
53	O-Ring	SO-NB-P14	—	1
54	O-Ring	SO-NB-A013	—	1
55	O-Ring	SO-NA-P6	—	1

Note: When ordering seals, please specify the seal kit number from the table right. In addition to the above o-rings, seals for pilot valve and solenoid ass'y are included in the seal kit. For the detail of the pilot valve and solenoid ass'y seals, see page 674.

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
EFBG-10-500-51*	KS-EFBG-10-51
EFBG-10-500-C/H-51*	KS-EFBG-10-C-51

Pilot Valve, Solenoid Ass'y and Safety Valve

Valve Model Numbers	25 Pilot Valve Model Numbers	27 Solenoid Ass'y Model No.	26 Safety Valve Model No.
EFBG-10-500-C(-E)-51/5190	EDG-01V-C-1-PNT12-5103	E318-Y06M1-28-61	—
EFBG-10-500-H(-E)-51/5190	EDG-01V-H-1-PNT12-5103		—
EFBG-10-500(-E)-51/5190	—		SB1094-2002

Note: The connector assembly GDM-211-B-11 (Item 28) is not included in the solenoid assembly.

Interchangeability between Current and New Design

Model changes have been made from 50, 51 to 61 design in the EFBG-03/06 because of changes in the pilot valve building-in method and model changes have been made from 50 to 51 design in the EFBG-10 because of improvement in Solenoid Ass'y.

Specification and Characteristics

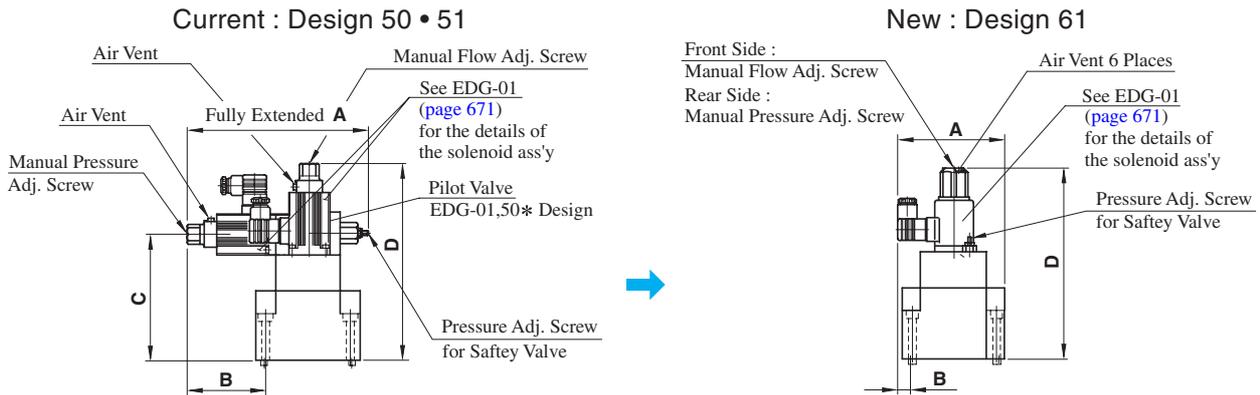
No changes in specifications and characteristics between current and new design

Interchangeability in Installation

EFBG-03/06

50* • 51* Design → 61* Design

The mounting surface are interchangeable. However, the method of building in the pilot valve has been changed, bringing about changes in the appearance shapes and dimensions as shown below.



Model Numbers	A	B	C	D
(Current) EFBG-03-125-*-* 50/5090 51/5190	217 (8.54)	93.2 (3.67)	155 (6.10)	236.5 (9.31)
(New) EFBG-03-125-*-* 61/6190	132 (5.20)	18.7 (.74)	—	248.5 (9.78)
(Current) EFBG-06-250-*-* 50/5090 51/5190	217 (8.54)	53.3 (2.10)	196 (7.72)	277.5 (10.93)
(New) EFBG-06-250-*-* 61/6190	180 (7.09)	—	—	289.5 (11.40)

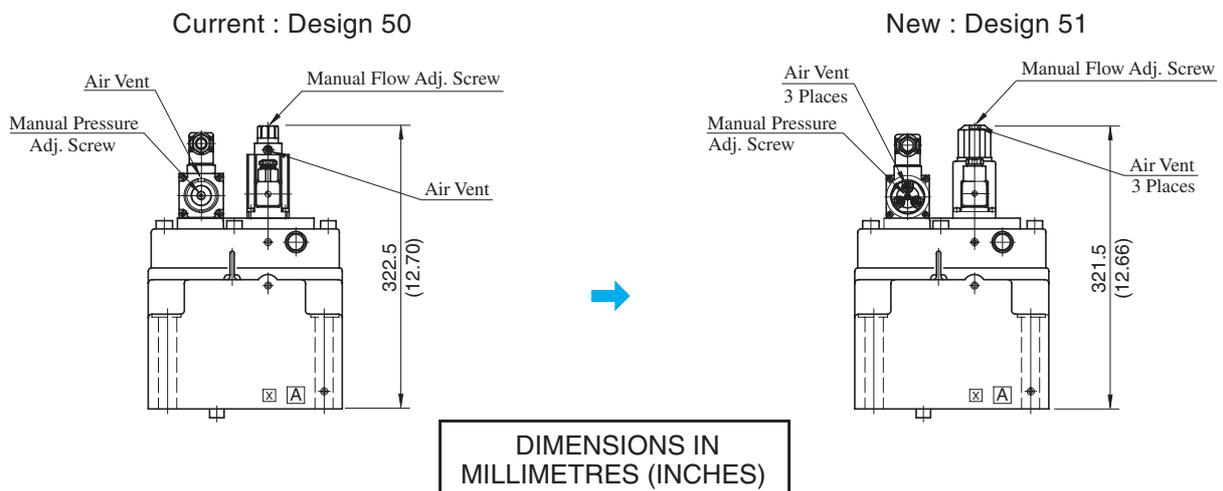
60* Design → 61* Design

The mounting surface are interchangeable. There are no changes in the appearance shapes and dimensions.

EFBG-10

Mounting compatibility is provided.

Note that because of improvements made on the solenoids, the overall shapes have been changed as shown below.



High Flow Series Proportional Electro-Hydraulic Flow Control and Relief Valves

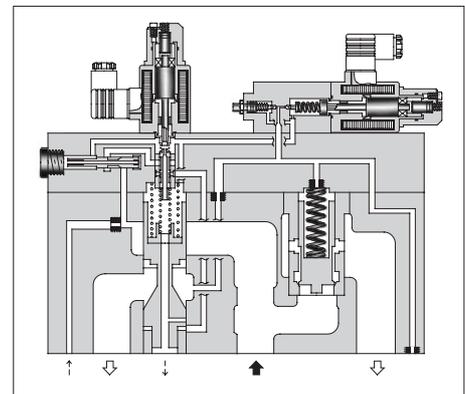
This flow control and relief valve is an energy-saving valve that supplies the minimum pressure and flow necessary for actuator drive.

For the High Flow Series, double maximum flow rate [03 size: 125→250 L/min (33.03→66.05 U.S.GPM), 06 size: 250→500 L/min (66.05→132.1 U.S.GPM), 10 size: 500→1000 L/min (132.1→264.2 U.S.GPM)] enables a smaller valve size than conventional products; compact-sized devices can be provided.

Specifications

Model No.		EFBG-03 -250-*-*-51*	EFBG-06 -500-*-*-51*	EFBG-10 -1000-*-*-51*
Description				
Max. Operating Pressure MPa (PSI)		24.5 (3550)	24.5 (3550)	24.5 (3550)
Max. Flow	L/min (U.S.GPM)	250 (66)	500 (132)	1000 (264)
Metred Flow Adjustment Range L/min (U.S.GPM)		2.5-250 (.66-66)	5-500 (1.32-132)	10-1000 (2.64-264)
Min. Pilot Pressure MPa (PSI)		1.5 (220)	1.5 (220)	1.5 (220)
Pilot Flow L/min (U.S.GPM)	at Normal	1 (.26)	1 (.26)	4.5 (1.19)
	at Transition	4 (1.06)	6 (1.59)	10.0 (2.64)
Flow Controls	Rated Currnt	830 mA	780 mA	830 mA
	Coil Resistance	10 Ω	10 Ω	10 Ω
	Differential Pressure MPa (PSI)	0.8 (115)	0.9 (130)	1.2 (174)
	Hysteresis	3% or less	3% or less	3% or less
	Repeatability	1% or less	1% or less	1% or less
	Pressure Controls ^{★1}	Pres. Adj. Range MPa (PSI)	C: 1.6-15.7 (230-2275) H: 1.8-24.5 (260-3550)	C: 1.5-15.7 (220-2275) H: 1.5-24.5 (220-3550)
Rated Current		C: 850 mA H: 870 mA	C: 800 mA H: 900 mA	C: 900 mA H: 950 mA
Coil Resistance		10 Ω	10 Ω	10 Ω
Hysteresis		3% or less	3% or less	3% or less
Repeatability		1% or less	1% or less	1% or less
Approx. Mass		kg (lbs.)	Refer to page 735 to 737	

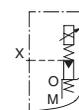
- ★1. The specifications for pressure controls are applied to models with proportional pilot relief valve. (Ex. EFBG-03-250-C-*-51)
- ★2. The maximum pressure adjustment range of the valves without proportional pilot relief valves is 24.5 MPa (3550 PSI).



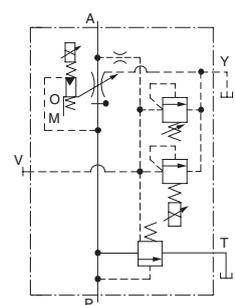
Graphic Symbols

With Proportional Pilot Relief Valve

External Pilot

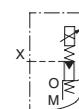


Internal Pilot

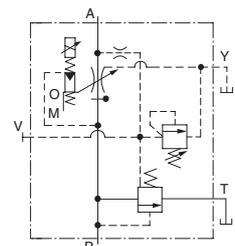


Without Proportional Pilot Relief Valve

External Pilot



Internal Pilot



■ **Model Number Designation**

F-	EFB	G	-03	-250	-C	-E	-51	*
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min (U.S.GPM)	Proportional Pilot Relief Valve Pressure Adj. Range	Pilot Connection	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	EFB: Proportional Electro-Hydraulic Flow Control and Relief Valve	G: Sub-plate Mounting	03	250: 250 (66)	C, H: See Specifications None: Without Proportional Pilot Relief Valve	None: Internal Pilot E: External Pilot	51	Refer to ★
			06	500: 500 (132)			51	
			10	1000: 1000 (264)	51			

★ 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" and European Design Std.	N. American Design Std.	
EFBG-03	M12 × 120 Lg.	1/2-13 UNC × 4-3/4 Lg.	4
EFBG-06	M16 × 120 Lg.	5/8-11 UNC × 4-3/4 Lg.	4
EFBG-10	M20 × 150 Lg.	3/4-10 UNC × 6 Lg.	4

■ **Applicable Power Amplifiers**

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see [page 767, 771](#)).

Model Numbers	Power Amplifier Model Numbers	
	For Flow Control	For Pres. Control
EFBG-03-250(-E)-51/5190 EFBG-06-500(-E)-51/5190 EFBG-10-1000(-E)-51/5190	AME-D-10-*-20 AMN-D-10 (For DC power supply)	—
EFBG-03-250-C/H(-E)-51/5190 EFBG-06-500-C/H(-E)-51/5190 EFBG-10-1000-C/H(-E)-51/5190	AME-D2-1010-11	

■ **Instructions**

● **Drain Back Pressure**

Check that the drain back pressure dose not exceed 0.2 MPa (29 PSI).

● **When Relief Valve Passing Flow Rate is Low in Pressure Control State**

To avoid preselected pressure instability, use a passing flow rate of 15 L/min (4.0 U.S.GPM) or higher. Further, check that the tank-line back pressure dose not exceed 0.5 MPa (70 PSI).

● **Safety Valve Pressure Setting**

The pressure of the safety valve is preset at the value equal to the upper limit of the pressure adjustment range plus 2 MPa (290 PSI). Please adjust the pressure of the valve so preset to meet the pressure to be used actually.

To lower the pressure setting, turn the safety valve pressure adjustment screw anti-clockwise. After adjustment, be sure to tighten the lock nut.

● **Interchangeability in installation with conventional valves (10 Ω-10 Ω Series)**

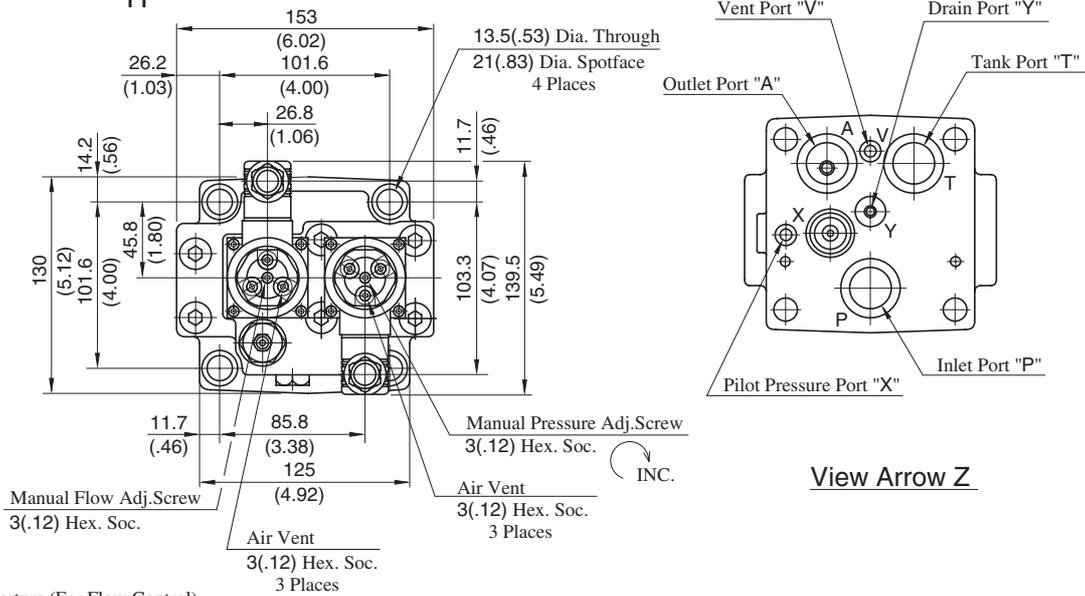
● **EFBG-03**

There is no interchangeability in installation.

● **EFBG-06/10**

A product in the high-flow series can be mounted on the conventional mounting surface but no conventional product can be mounted on the mounting surface of the high-flow series.

EFBG-03-250-C_H(-E)-51/5190, EFBG-03-250 (-E)-51/5190



View Arrow Z

Cable Departure (For Flow Control)

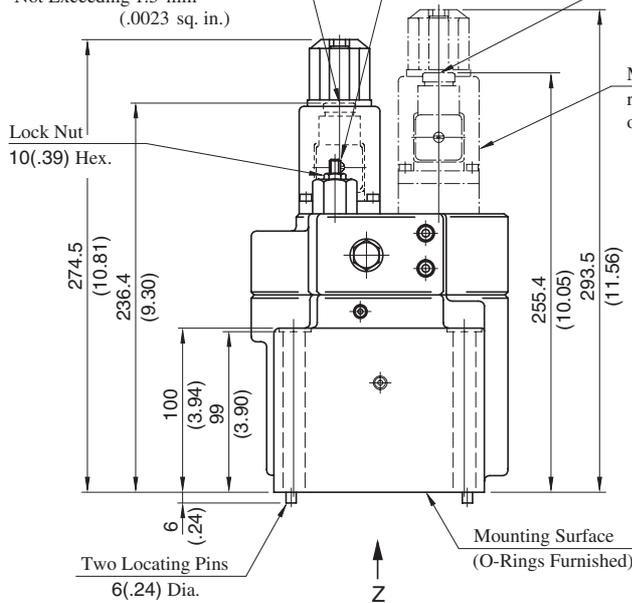
Cable Applicable:
 Outside Dia. ... 8-10 mm (.31 - .39 in.)
 Conductor Area ... Not Exceeding 1.5 mm² (.0023 sq. in.)

Pressure Adj. Screw for Safety Valve 3(.12) Hex Soc. INC.

Cable Departure (For Pressure Control)

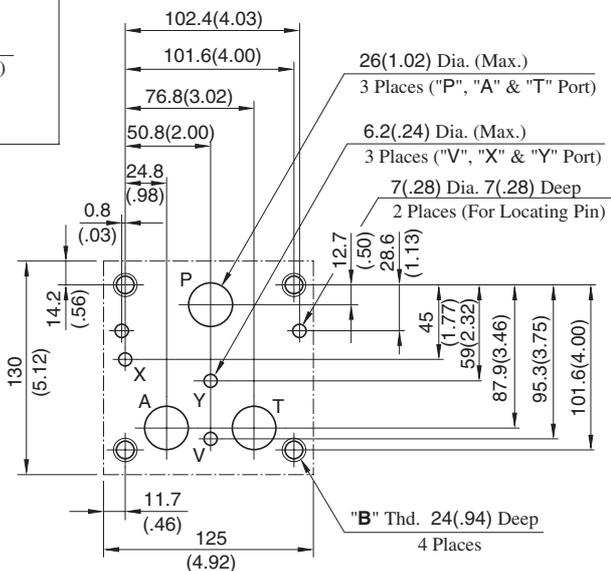
Cable Applicable:
 Outside Dia. ... 8-10 mm (.31 - .39 in.)
 Conductor Area ... Not Exceeding 1.5 mm² (.0023 sq. in.)

Models with proportional pilot relief valve (EFBG-03-250-C/H) only.



Approx. Mass 19 kg (41.9 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

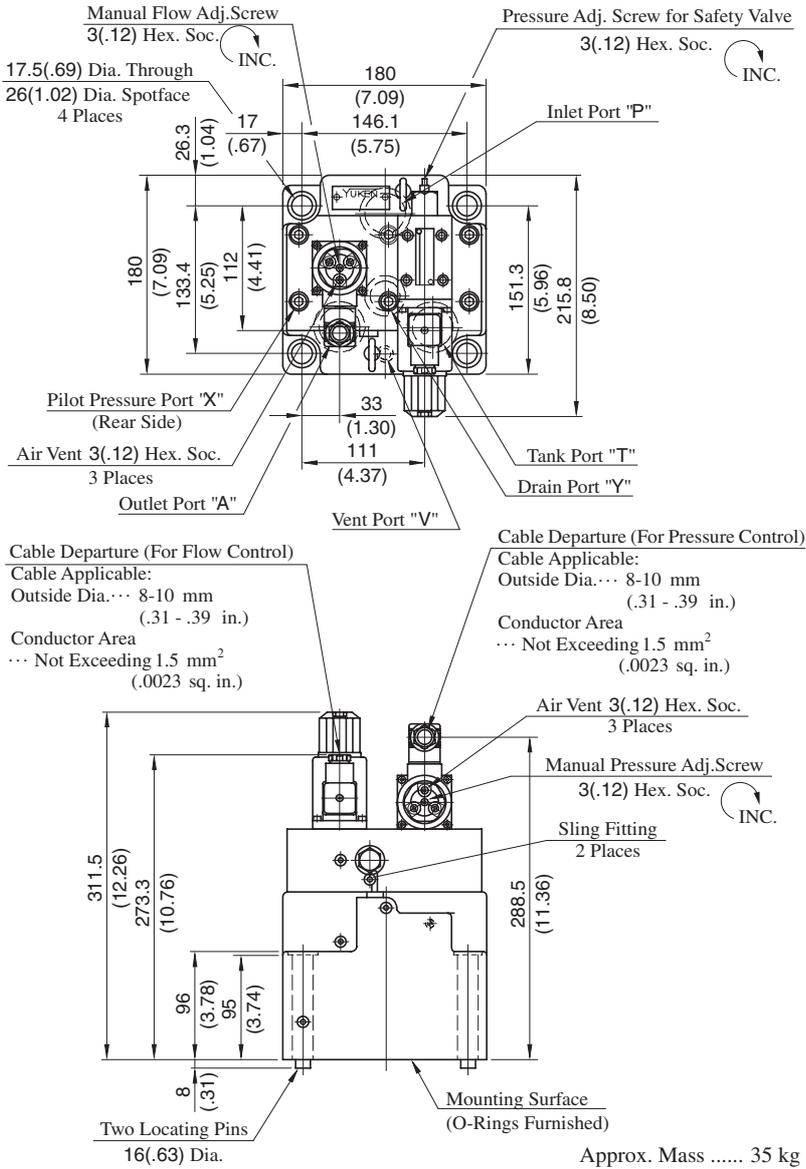


Dimensions of valve mounting surface

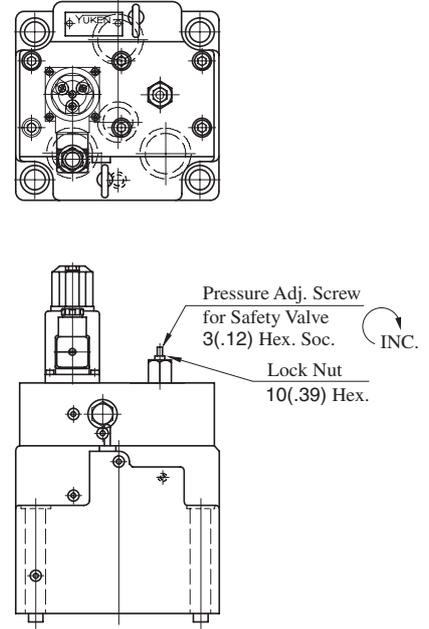
Prepare a mounting surface as shown to the right. Also finish it finely.

Model Numbers	"B" Thd.
EFBG-03-250-*-51	M12
EFBG-03-250-*-5190	1/2-13 UNC

Models with Proportional Pilot Relief Valve
EFBG-06-500-C(-E)-51/5190



Models without Proportional Pilot Relief Valve
EFBG-06-500(-E)-51/5190



• For other dimensions, please refer to the models with Proportional Pilot Relief Valve.

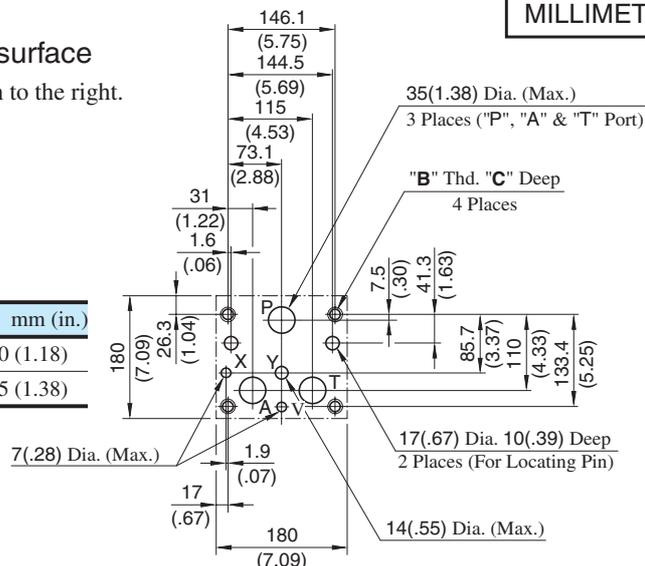
Approx. Mass 33 kg (72.8 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

Dimensions of valve mounting surface

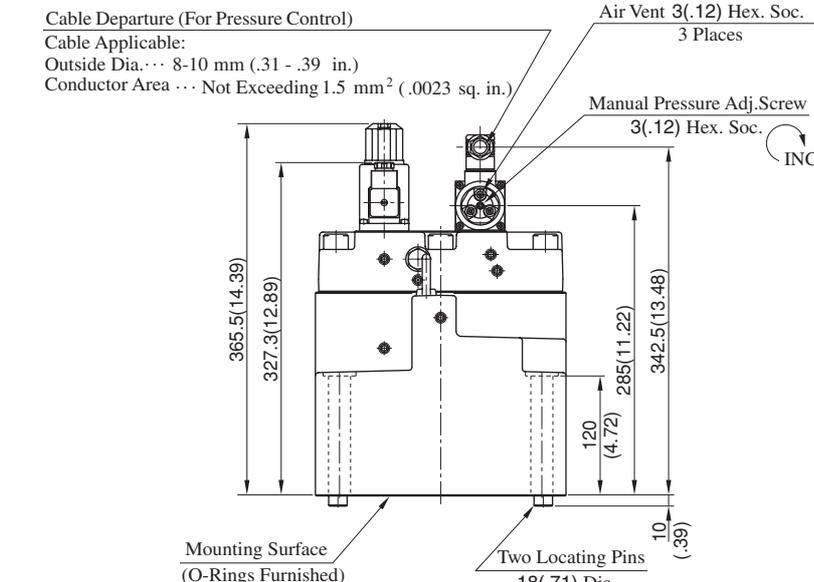
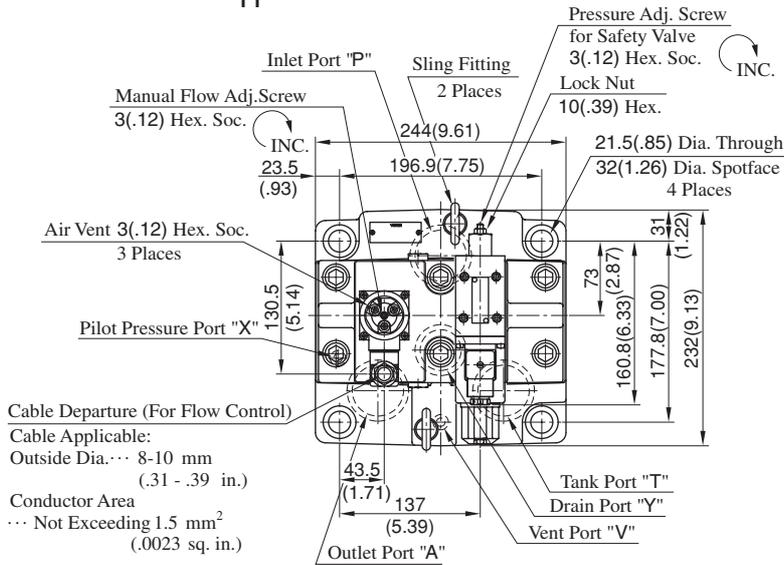
Prepare a mounting surface as shown to the right.
 Also finish it finely.

Model Numbers	"B" Thd.	C mm (in.)
EFBG-06-500-*-51	M16	30 (1.18)
EFBG-06-500-*-5190	5/8-11 UNC	35 (1.38)



Models with Proportional Pilot Relief Valve

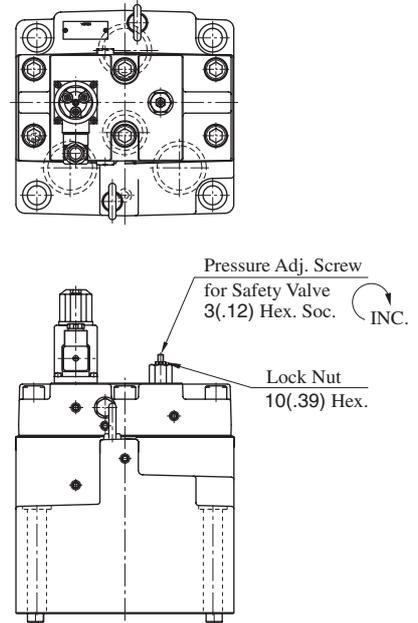
EFBG-10-1000-C_H(-E)-51/5190



Approx. Mass 76 kg (167.6 lbs.)

Models without Proportional Pilot Relief Valve

EFBG-10-1000(-E)-51/5190



• For other dimensions, please refer to the models with Proportional Pilot Relief Valve.

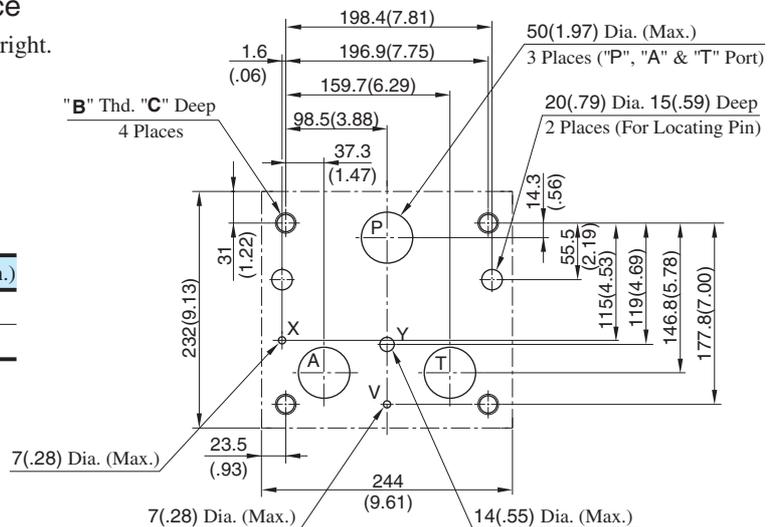
Approx. Mass 74 kg (163.1 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

Dimensions of valve mounting surface

Prepare a mounting surface as shown to the right. Also finish it finely.

Model Numbers	"B" Thd.	C mm (in.)
EFBG-10-1000*-51	M20	32 (1.26)
EFBG-10-1000*-5190	3/4-10 UNC	35 (1.38)

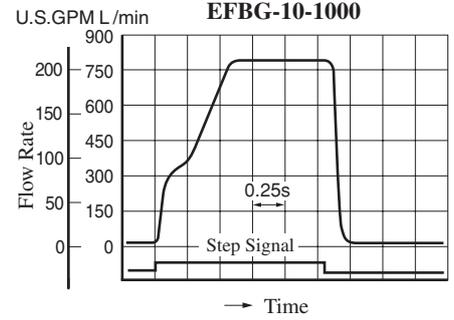
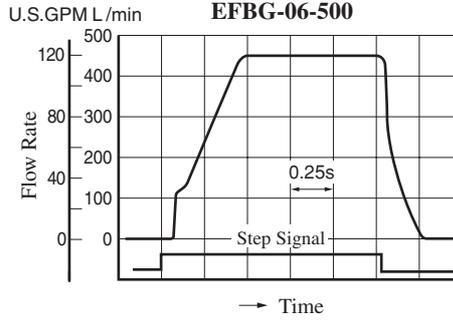
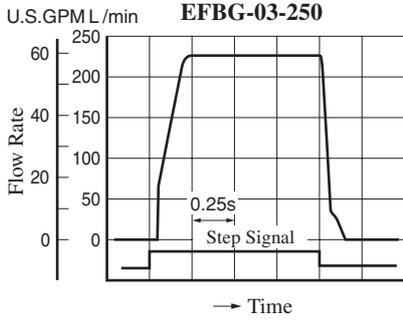


Step Response

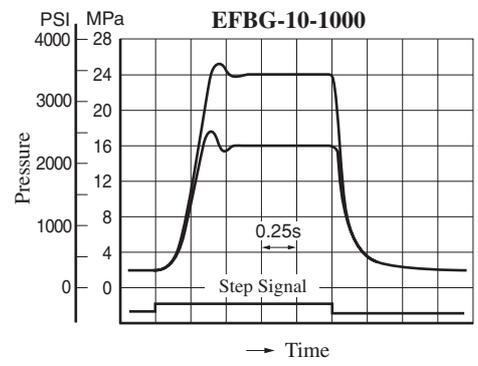
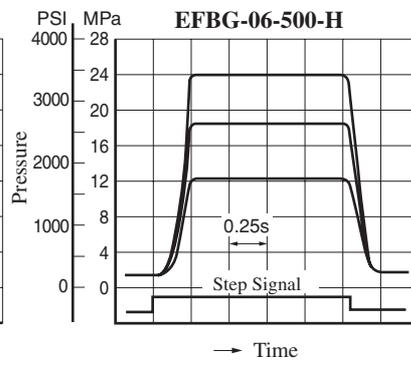
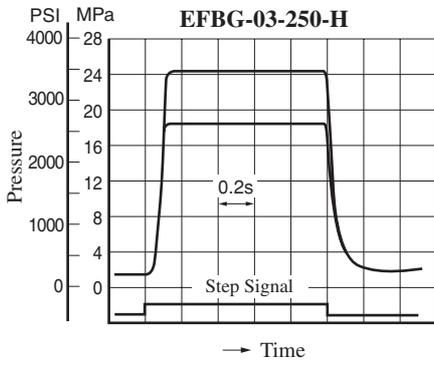
These characteristics have been obtained by measuring on each valve. Therefore, they may vary according to a hydraulic circuit to be used.

Viscosity: 30mm²/s (141 SSU)

Flow Controls

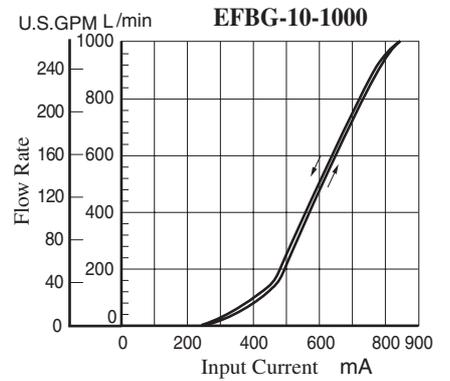
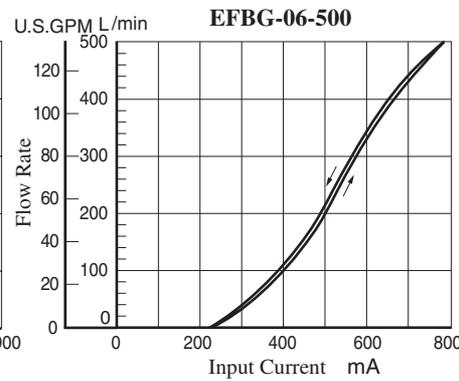
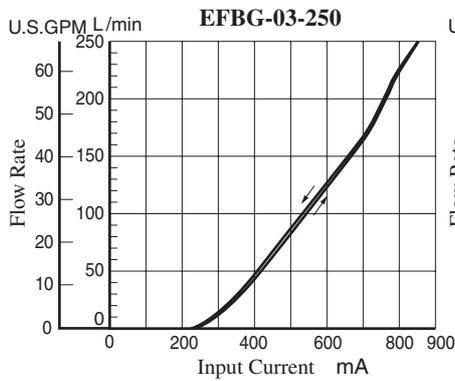


Pressure Controls



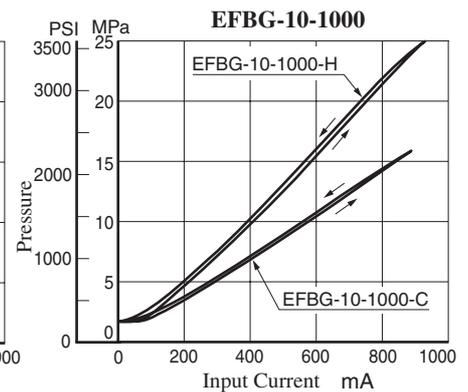
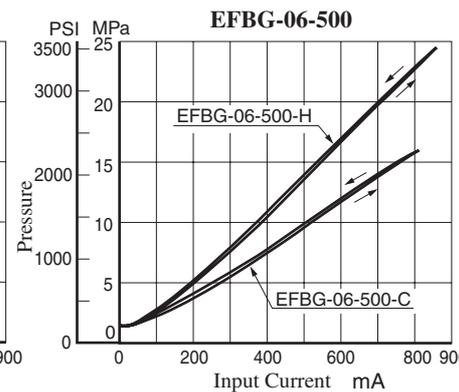
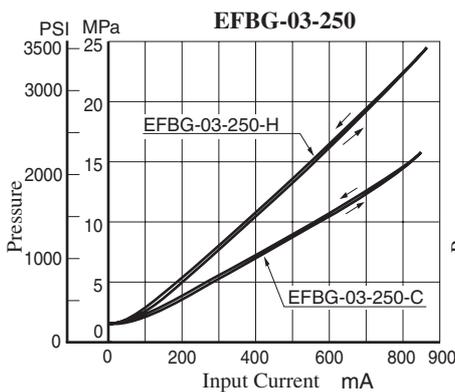
Input Current vs. Flow

Viscosity: 30mm²/s (141 SSU)



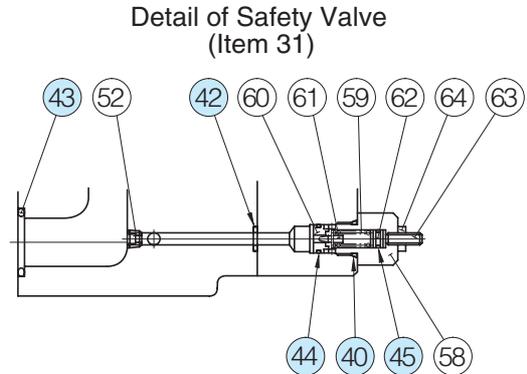
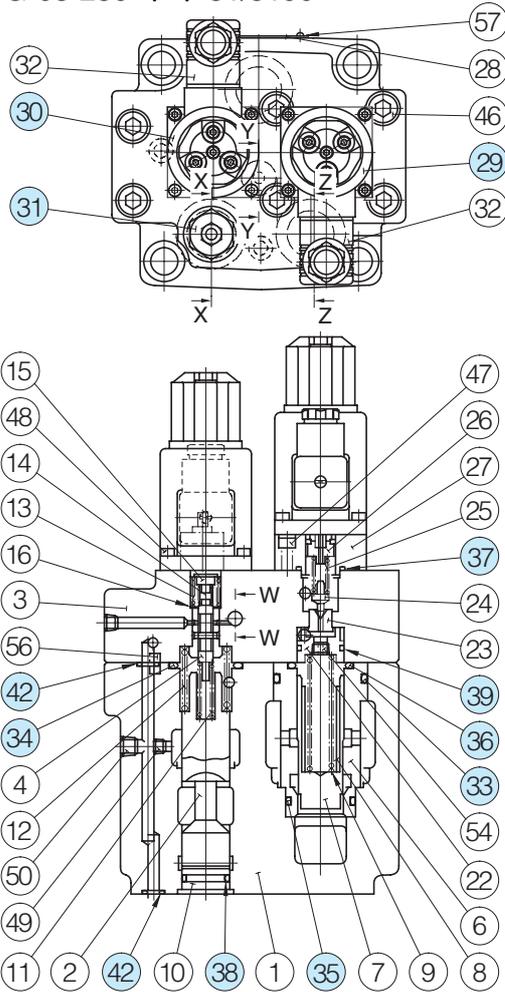
Input Current vs. Pressure

Viscosity: 30mm²/s (141 SSU)

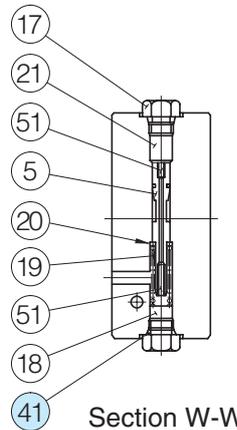


List of Seals, Solenoid Ass'y and Safety Valve

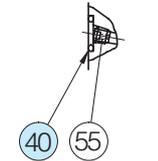
EFBG-03-250-**-51/5190



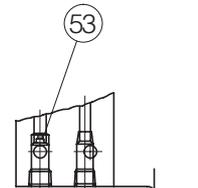
Section X-X



Section W-W



Section Y-Y



Section Z-Z

List of Seals

Item	Name of Parts	Part Numbers	Qty.
33	O-Ring	SO-NB-P42	1
34	O-Ring	SO-NB-P32	1
35	O-Ring	SO-NB-P30	1
36	O-Ring	SO-NB-P28	1
37	O-Ring	SO-NB-P22	1*
38	O-Ring	SO-NB-P21	1
39	O-Ring	SO-NB-P20	1*
40	O-Ring	SO-NB-P14	2
41	O-Ring	SO-NB-P11	2
42	O-Ring	SO-NB-P9	6
43	O-Ring	SO-NB-G30	3
44	O-Ring	SO-NB-A013	1
45	O-Ring	SO-NA-P6	1

* O-rings, item 37 and 39, are used only with the proportional pilot relief valve (EFBG-03-250-C/H).

Note: When ordering seals, please specify the seal kit number from the table right. In addition to the above o-rings, seals for solenoid ass'y are included in the seal kit.

For the detail of seals for solenoid ass'y seals, see page 674.

Solenoid Ass'y and Safety Valve

Valve Model Numbers	②⑨ Solenoid Ass'y Model No.	③⑩ Solenoid Ass'y Model No.	③⑪ Safety Valve Model No.
EFBG-03-250-C/H(-E)-51/5190	E318-Y06M1-04-61	E318-Y06M1-28-61	SB1094-2002
EFBG-03-250(-E)-51/5190	—		

Note: The connector assembly GDM-211-B-11 (Item 32) is not included in the solenoid assembly.

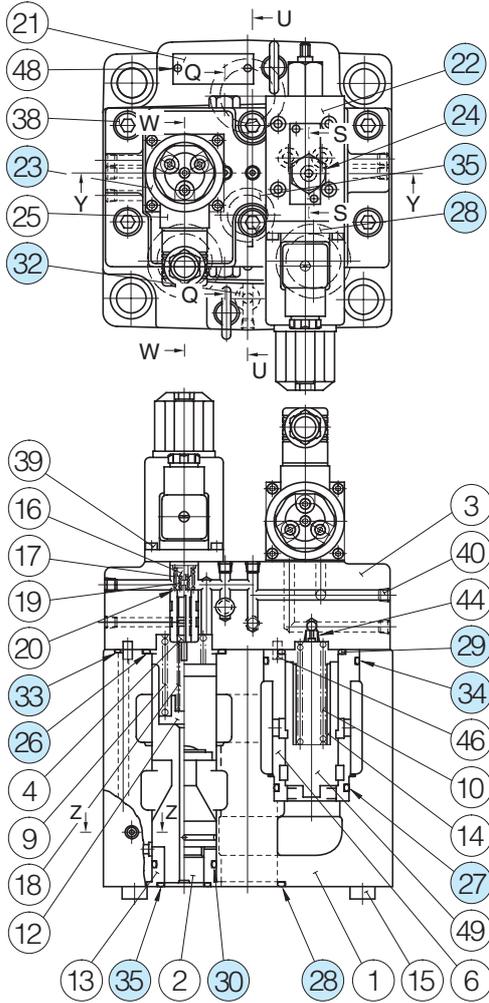
List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
EFBG-03-250-51*	KS-EFBG-03-250-51
EFBG-03-250-C/H-51*	KS-EFBG-03-250-C-51



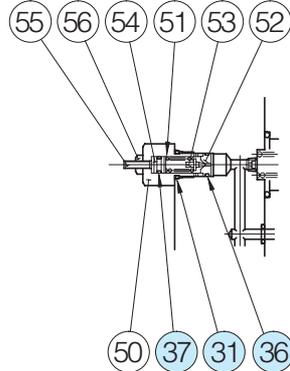
■ List of Seals, Pilot Valves, Solenoid Ass'y and Safety Valve

EFBG-06-500- *- *-51/5190

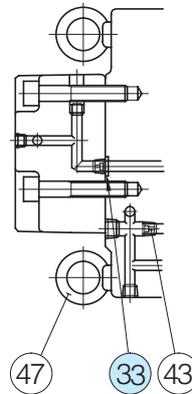


Detail of Safety Valve (Item 24)

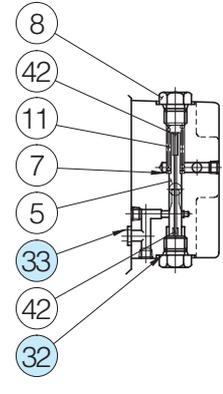
{ Models Without Pilot Relief Valve : EFBG-06-500(-E) }



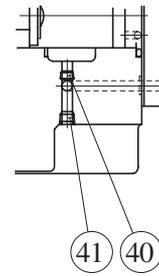
Section S-S



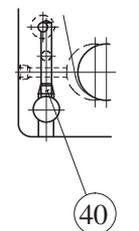
Section U-U



Section Q-Q



Section W-W



Section Z-Z

● List of Seals

Item	Name of Parts	Part Numbers	Qty.
26	O-Ring	SO-NB-P46	1
27	O-Ring	SO-NB-P42	1
28	O-Ring	SO-NB-P40	3
29	O-Ring	SO-NB-P36	1
30	O-Ring	SO-NB-P34	1
31	O-Ring	SO-NB-P14	1★
32	O-Ring	SO-NB-P11	4
33	O-Ring	SO-NB-P9	4
34	O-Ring	SO-NB-G55	1
35	O-Ring	SO-NB-G30	2
36	O-Ring	SO-NB-AO13	1★
37	O-Ring	SO-NA-P6	1★

★ O-rings, item 31, 36 and 37, are used only without the proportional pilot relief valve [(EFBG-06-500(-E)].

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

In addition to the above o-rings, seals for pilot valve and solenoid ass'y are included in the seal kit.

For the detail of the pilot valve and solenoid ass'y seals, see [page 674](#).

● Pilot Valve, Solenoid Ass'y and Safety Valve

Valve Model Numbers	②② Pilot Valve Model Numbers	②③ Solenoid Ass'y Model No.	②④ Safety Valve Model No.
EFBG-06-500-C(-E)-51/5190	EDG-01V-C-1-PNT11-5103	E318-Y06M1-28-61	—
EFBG-06-500-H(-E)-51/5190	EDG-01V-H-1-PNT11-5103		—
EFBG-06-500(-E)-51/5190	—		SB1094-2002

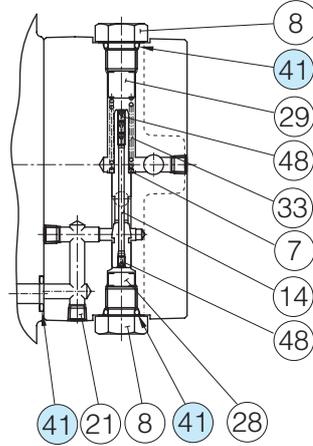
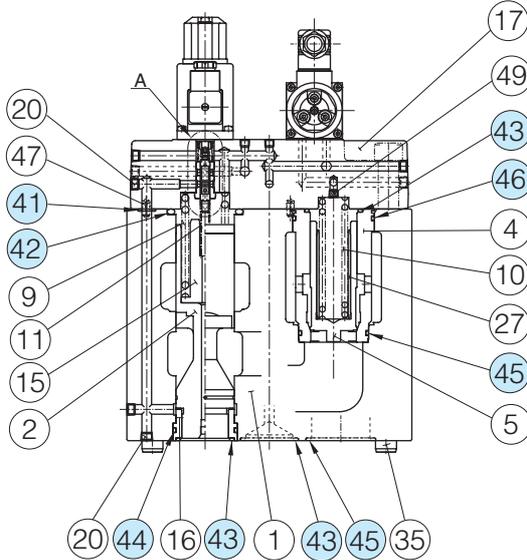
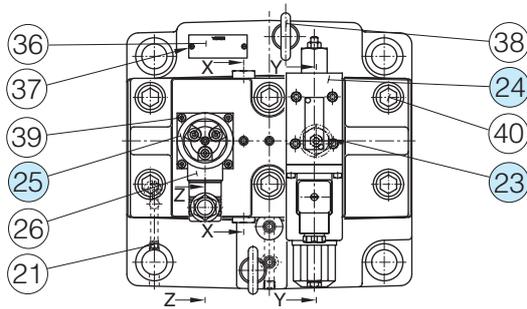
Note: The connector assembly GDM-211-B-11 (Item 25) is not included in the solenoid assembly.

● List of Seal Kits

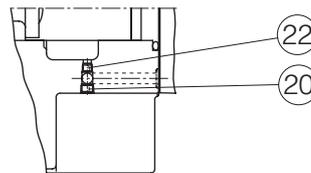
Valve Model Numbers	Seal Kit Numbers
EFBG-06-500-51*	KS-EFBG-06-500-51
EFBG-06-500-C/H-51*	KS-EFBG-06-500-C-51

List of Seals, Pilot Valves, Solenoid Ass'y and Safety Valve

EFBG-10-1000-*-51/5190



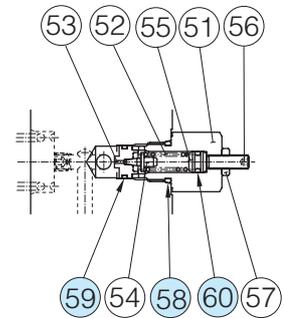
Section X-X



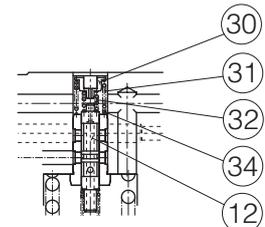
Section Z-Z

Detail of Safety Valve (Item 23)

(Models Without Pilot Relief Valve : EFBG-10-1000(-E))



Section Y-Y



Detail A

List of Seals

Item	Name of Parts	Part Numbers	Qty.
41	O-Ring	JIS-B 2401-1B-P11	8
42	O-Ring	JIS-B 2401-1B-P55	1
43	O-Ring	JIS-B 2401-1B-G45	3
44	O-Ring	JIS-B 2401-1B-G50	1
45	O-Ring	JIS-B 2401-1B-G55	4
46	O-Ring	JIS-B 2401-1B-G65	1
58	O-Ring	JIS-B 2401-1B-P14	1★
59	O-Ring	AS568-013(NBR, Hs90)	1★
60	O-Ring	JIS-B 2401-1A-P6	1★

★ O-rings, item 58, 59 and 60, are used only without the proportional pilot relief valve [EFBG-10-1000(-E)].

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

In addition to the above o-rings, seals for pilot valve and solenoid ass'y are included in the seal kit.

For the detail of the pilot valve and solenoid ass'y seals, see page 674.

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
EFBG-10-1000-51*	KS-EFBG-10-1000-51
EFBG-10-1000-C/H-51*	KS-EFBG-10-1000-C-51

Pilot Valve, Solenoid Ass'y and Safety Valve

Valve Model Numbers	②④ Pilot Valve Model Numbers	②⑤ Solenoid Ass'y Model No.	②③ Safety Valve Model No.
EFBG-10-1000-C(-E)-51/5190	EDG-01V-C-1-PNT20-5197	E318-Y06M1-28-61	—
EFBG-10-1000-H(-E)-51/5190	EDG-01V-H-1-PNT20-5197		—
EFBG-10-1000(-E)-51/5190	—		SB1094-2002

Note: The connector assembly GDM-211-B-11 (Item 25) is not included in the solenoid assembly.



■ **Interchangeability between Current and New Design**

EFBG-03/06/10 series valves have changed model from 50 to 51 design in line with the model change of solenoid ass'y.

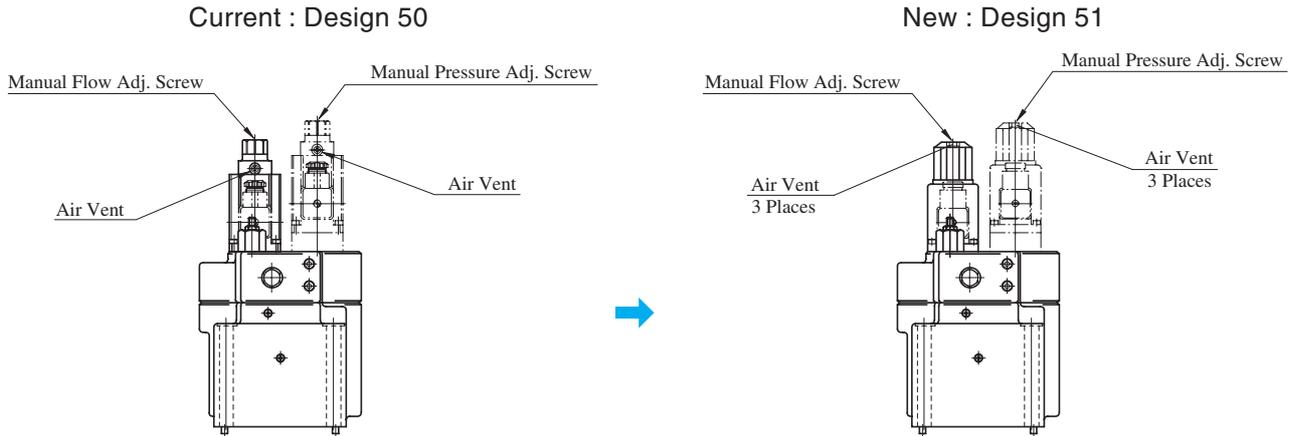
● **Specifications and Characteristics**

No changes in specifications and characteristics between current and new design.

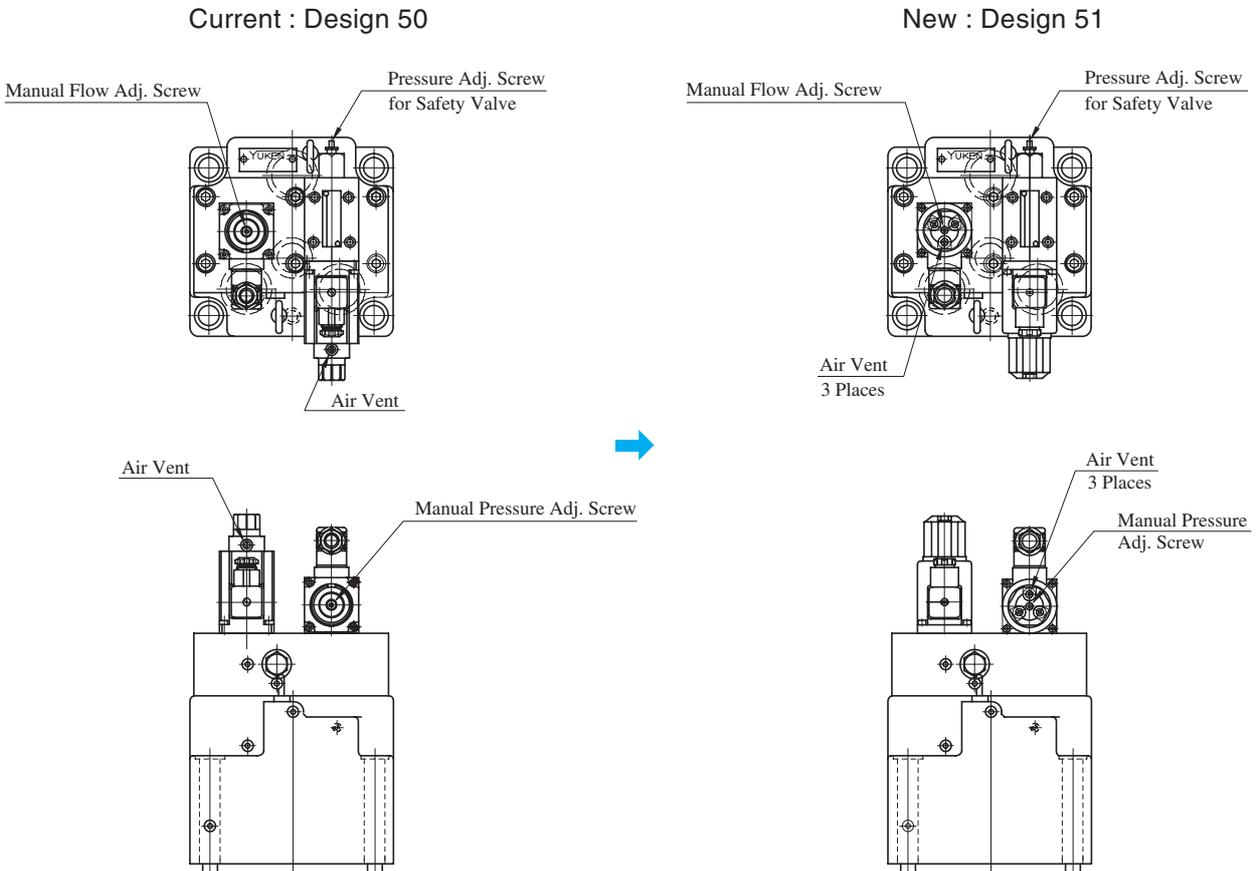
● **Mounting Interchangeability**

There is an interchangeability in the mounting dimensions between current and new design, however, note that because of improvements made on the solenoids, the overall shapes have been changed as shown below.

● **EFBG-03**



● **EFBG-06/10**



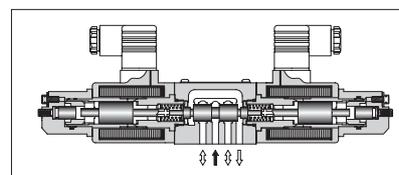
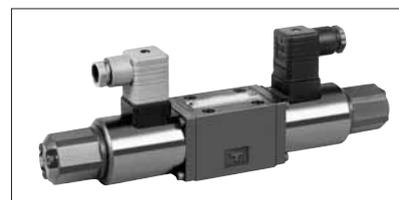
Shockless Type Proportional Electro-Hydraulic Directional and Flow Control Valves

These valves are well accepted by industrial users as shifting time adjustable type shockless valves. By employing the basic design concept of the “G series solenoid operated directional valves”, we have been successful developing the shifting time adjustable shockless valves with high performance which makes the speed setting possible at any high speed operation.

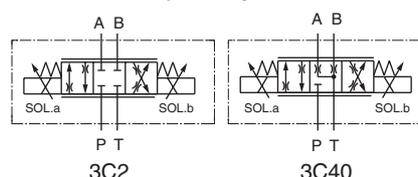
In combination with the newly developed digital amplifiers, the further enhancement of maneuverability and repeatability of the valves can be realized.

Specifications

Model No.		EDFG-01
Description		
Max. Operating Pressure	MPa (PSI)	25 (3630)
Max. Flow	L/min (U.S.GPM)	30 (7.9)
Max. Tank Line Back Pressure	MPa (PSI)	14 (2030)
Rated Current		1100 mA
Coil Resistance		10.8 Ω
Hysteresis		5% or less
Repeatability		1% or less
Step Response (Typical Rating) (0 ↔ 100%)		100 ms or less
Frequency Response (50% ±25%)	Phase	20 Hz (-90 degree)
	Gain	25 Hz (-3 dB)
Approx. Mass	kg (lbs.)	2.4 (5.3)



Graphic Symbols



Model Number Designation

F-	EDF	G	-01	-30	-3C2	-XY	-50	*
Special Seals	Series Number	Type of Mounting	Valve Size	Rated Flow L/min (U.S.GPM)	Spool Type	Direction of Flow	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	EDF: Shockless Type Proportional Directional and Flow Control Valve	G: Sub-plate Mounting	01	30 (7.9)	3C2 3C40	XY: Metre - In • Metre - Out	50	Refer to ★1

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

Attachment

Mounting Bolts

Descriptions	Soc. Hd. Cap Screw	Qty.
Japanese Standard "JIS"	M5 × 45 Lg.	4
European Design Standard		
N. American Design Standard	No.10 - 24 UNC × 1-3/4 Lg.	4

Applicable Power Amplifier

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see page 782).

Model Numbers: AMN-G/W-10

Sub-plate

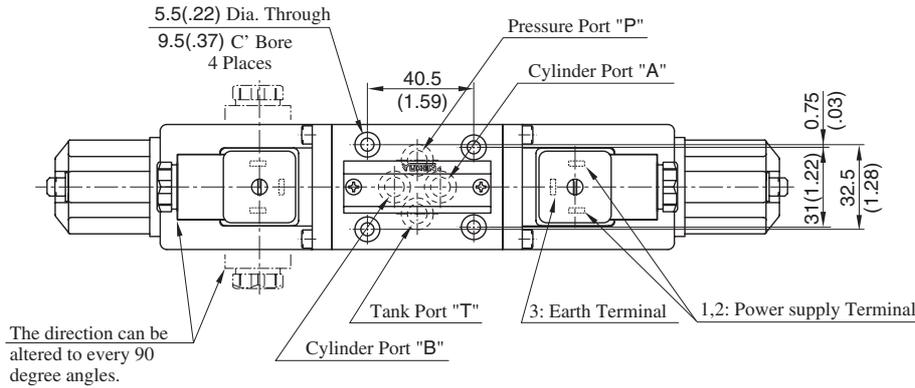
Piping Size	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
1/8	DSGM-01-31	Rc 1/8	DSGM-01-3180	1/8 BSP.F	DSGM-01-3190	1/8 NPT	0.8 (1.8)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

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

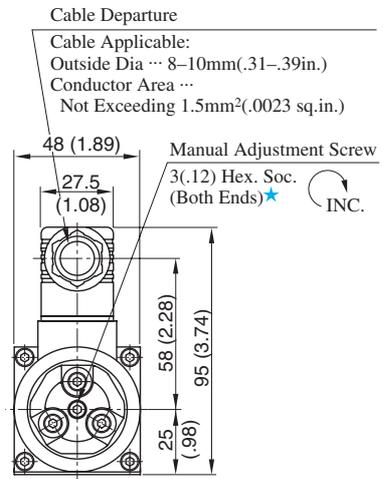
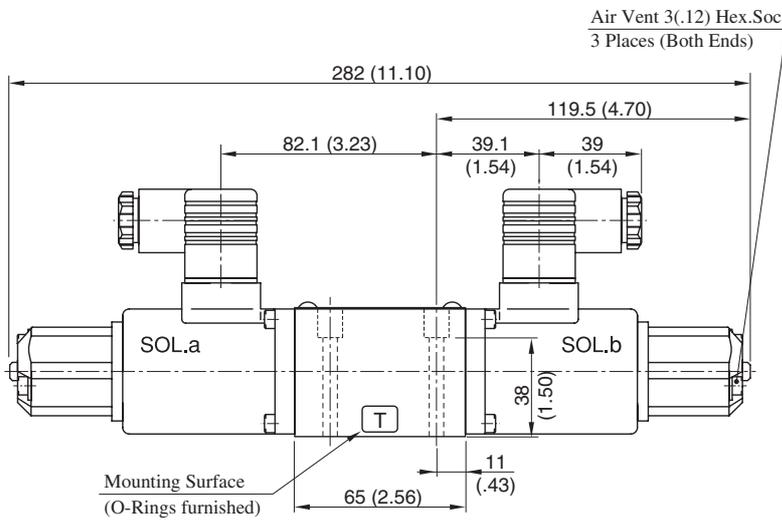
● Sub-plates are those for 1/8 solenoid operated directional valves. For dimensions, see page 356.

EDFG-01-30-3C*-XY-50/5090

Mounting Surface
ISO 4401-AB-03-4-A

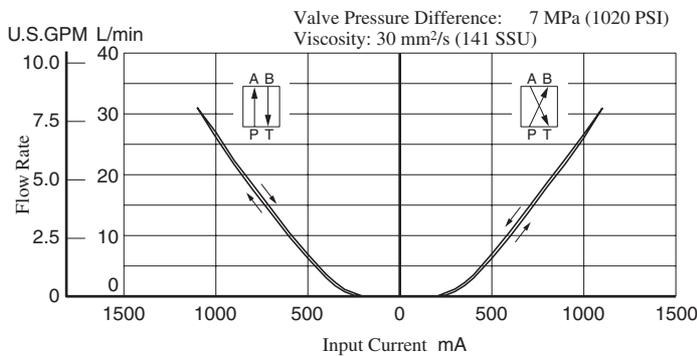


DIMENSIONS IN MILLIMETRES (INCHES)

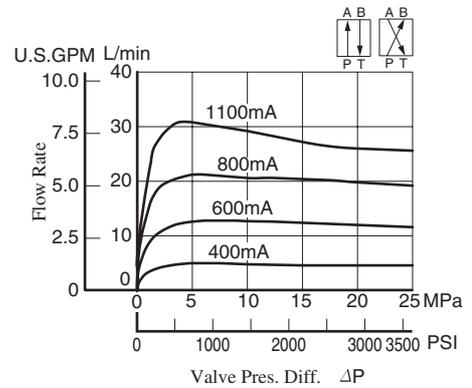


★ Under normal conditions, however, this screw must be kept in its original position.

■ Input Current vs. Flow

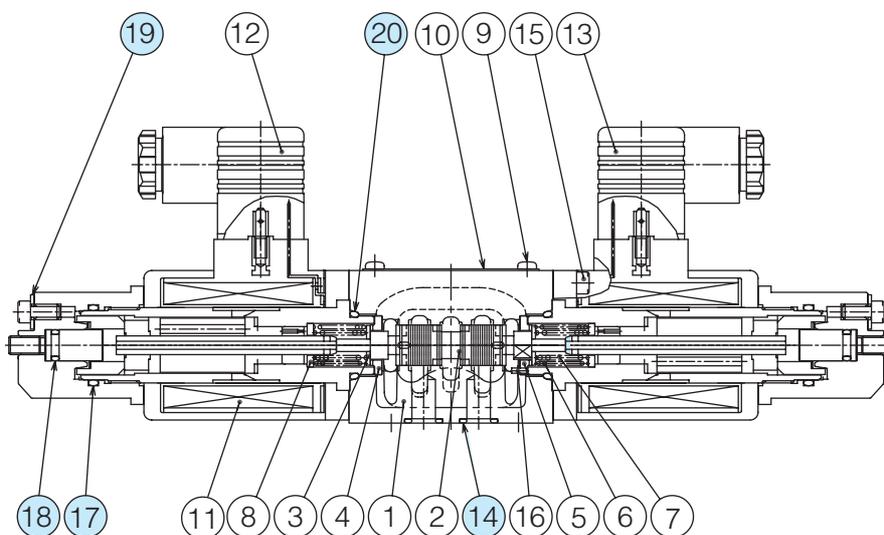


■ Valve pressure Difference vs. Flow



List of Seals and Solenoid Ass'y

EDFG-01-30-*-XY-50/5090



List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
14	O-Ring	SO-NB-P9	4	Included in Seal Kit
17	O-Ring	SO-NB-P22	2	
18	O-Ring	SO-NB-P7	2	
19	Fastner Seal	SG-FCF-4	6	Kit No.:
20	O-Ring	SO-NB-P18	2	KS-EDFG-01-50

Note) O-ring (Item 17, 18, 20) and the fastner sael (Item 19) are included in the solenoid assembly.

Solenoid Ass'y

Valve Model Numbers	⑪ Solenoid Ass'y	Qty.
EDFG-01-30-*-XY-50/5090	E318-Y05M2-28-6103	2

Note) The connector assembly GDM-211-*-11 (Item 12, 13) is not included in the solenoid assembly.

■ Proportional Electro-Hydraulic Directional and Flow Control Valves

These valves are double-deck directional and flow control valves employing as their pilot the electro-hydraulic proportional pressure reducing valves with two proportional solenoids. The flow rate can be controlled by changing an input current to the solenoids and the direction of the flow can be controlled by providing the current to either solenoid of the two.

By combining the valves with the power amplifiers specially designed for the valves, the speed control, acceleration, deceleration and directional control can be done with a single valve, which eventually makes the hydraulic circuits simple and contributes the cost of the hydraulic systems.

■ Specifications

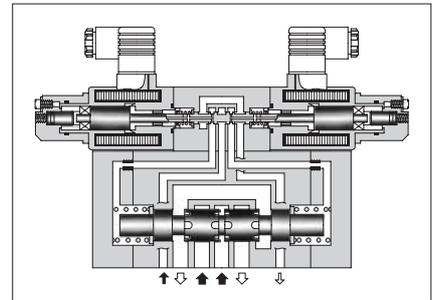
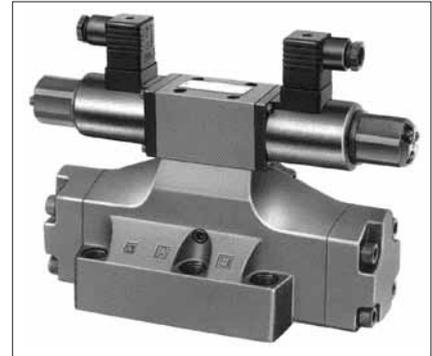
Model No.		EDFHG-03	EDFHG-04	EDFHG-06
Description				
Max. Operating Pressure	MPa (PSI)	25 (3630)		
Rated Flow	L/min (U.S.GPM) at Valve Pressure Difference: 1.0 MPa (145 PSI)	100 (26.4)	140 (37.0)	280 (74.0)
Pilot Pressure ^{★1}	MPa (PSI)	1.5 - 16 (220 - 2320) ^{★1}		
Pilot Flow	at Normal	1 (.26)	1 (.26)	1 (.26)
	L/min (U.S.GPM) at Transition	3 (.79)	4 (1.06)	6 (1.59)
Max. Tank Line Back Pressure	MPa (PSI)	16 (2320)	21 (3050)	21 (3050)
Max. Drain Line Back Pressure	MPa (PSI)	3.0 (435) ^{★2}		
Rated Current		800 mA	980 mA	900 mA
Coil Resistance		10 Ω		
Hysteresis		5% or less ^{★3}		
Repeatability		1% or less ^{★3}		
Approx. Mass	kg (lbs.)	11 (24.3)	12 (26.5)	15 (33.1)

★1. Take care to keep the difference between the pilot pressure and drain port back pressure consistently greater than 1.5 MPa (220 PSI).

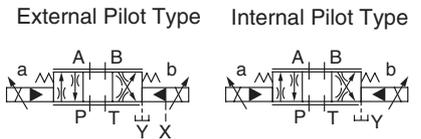
★2. To obtain stable performance, keep the drain port back pressure low and minimize its fluctuations.

★3. The hysteresis and repeatability values indicated in the specifications for each control valve are determined under the following conditions:

- Hysteresis Value: Obtained when Yuken's applicable power amplifier is used.
- Repeatability Value: Obtained when Yuken's applicable power amplifier is used under the same conditions.



Graphic Symbols



■ Model Number Designation

F-	EDFH	G	-03	-100	-3C2	-XY	-E	-31	*
Special Seals	Series Number	Type of Mounting	Valve Size	Rated Flow L/min (U.S.GPM)	Spool Type ^{★1}	Direction of Flow	Pilot Connection	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	EDFH: Proportional Electro-Hydraulic Directional and Flow Control Valves	G: Sub-Plate Mounting	03 04 06	100: 100 (26.4) 140: 140 (37.0) 280: 280 (74.0)	3C2 3C40	XY: Metre-in • Metre-out	E: External Pilot None: Internal Pilot	31 31 31	Refer to ^{★2}

★1. Spool type shown in the column is for the centre position.

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

■ Attachment

● Mounting Bolts

Model Numbers	Socket Head Cap Screw			
	Japanese Standard "JIS" European Design Standard	N. American Design Standard	Qty.	Tightening Torque Nm (in. lbs.)
EDFHG-03	M6 × 35 Lg.	1/4-20 UNC × 1-1/2 Lg.	4	12 - 15 (106 - 133)
EDFHG-04	M6 × 45 Lg.	1/4-20 UNC × 1-3/4 Lg.	2	12 - 15 (106 - 133)
	M10 × 50 Lg.	3/8-16 UNC × 2 Lg.	4	58 - 72 (513 - 637)
EDFHG-06	M12 × 60 Lg.	1/2-13 UNC × 2-1/2 Lg.	6	100 - 123 (885 - 1089)

Sub-plates

Valve Model Numbers	Japanese Standard "JIS"			European Design Standard			N. American Design Standard		
	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)	Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)
EDFHG-03	DHGM-03Y-10	Rc 3/4	4.7 (10.4)	DHGM-03Y-1080	3/4 BSPF	4.7 (10.4)	DHGM-03Y-1090	3/4 NPT	4.7 (10.4)
EDFHG-04	DHGM-04-20	Rc 1/2	4.4 (9.7)	DHGM-04-2080	1/2 BSPF	4.4 (9.7)	DHGM-04-2090	1/2 NPT	4.4 (9.7)
	DHGM-04X-20	Rc 3/4	4.1 (9.0)		3/4 BSPF	4.1 (9.0)		3/4 NPT	4.1 (9.0)
EDFHG-06	DHGM-06-50	Rc 3/4	7.4 (16.3)	DHGM-06-5080	3/4 BSPF	8.5 (18.7)	DHGM-06-5090	3/4 NPT	7.4 (16.3)
	DHGM-06X-50	Rc 1	7.4 (16.3)		1 BSPF	8.5 (18.7)		1 NPT	7.4 (16.3)

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- Sub-plates are those for solenoid controlled pilot operated directional valves. For dimensions, see [page 401 and 402](#).

Applicable Power Amplifiers

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see [page 784](#)).

Model Numbers: SK1091-D24-10

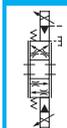
Instructions

Manual Adjustment

In the event of an electric fault or emergency, a manual shift can be made by screwing in the manual adjustment screw. Take care, however, that this manual shift has no flows adjusting function.

For this operation, set the pilot pressure (or P-port pressure on an internal-pilot model) below 7 MPa (1020 PSI).

After operation, be sure to return the manual adjustment screw completely to the original position.

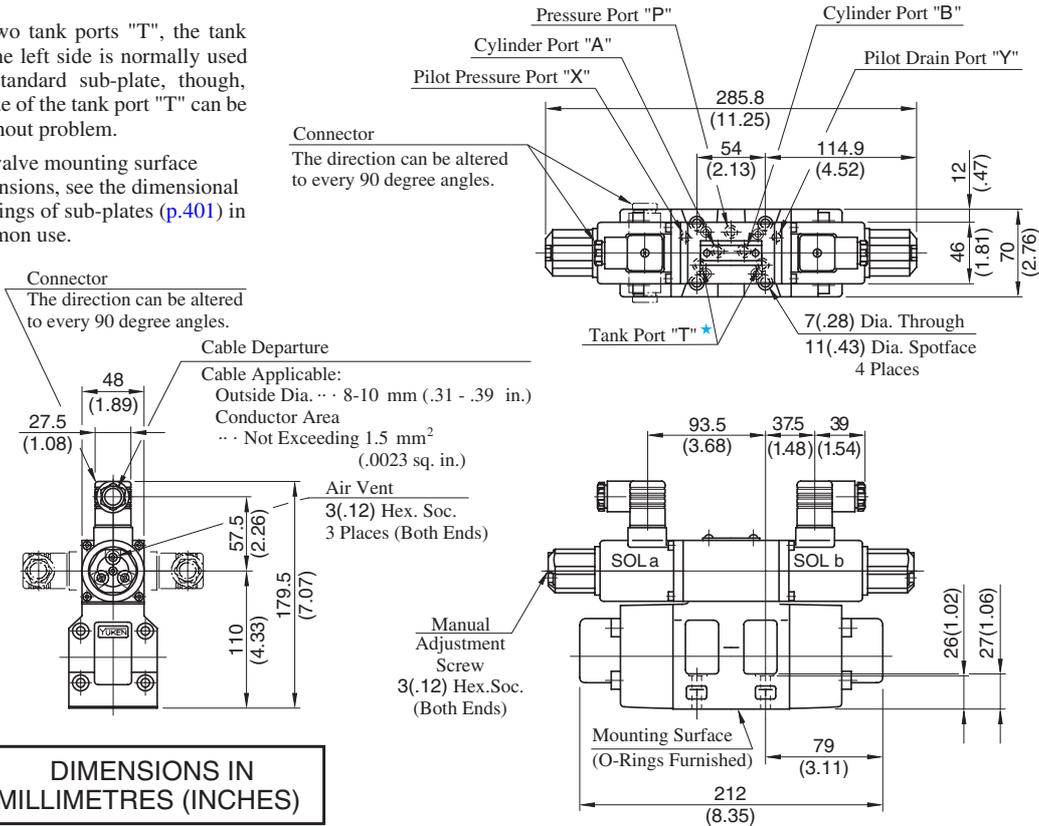


EDFHG-03-100-3C*-XY-*-31/3190

Mounting Surface: Main port ... Conform to ISO 4401-AC-05-4-A.
Pilot/drain ports ... Conform to ISO.

★ Of the two tank ports "T", the tank port in the left side is normally used in our standard sub-plate, though, either side of the tank port "T" can be used without problem.

Note: For valve mounting surface dimensions, see the dimensional drawings of sub-plates (p.401) in common use.



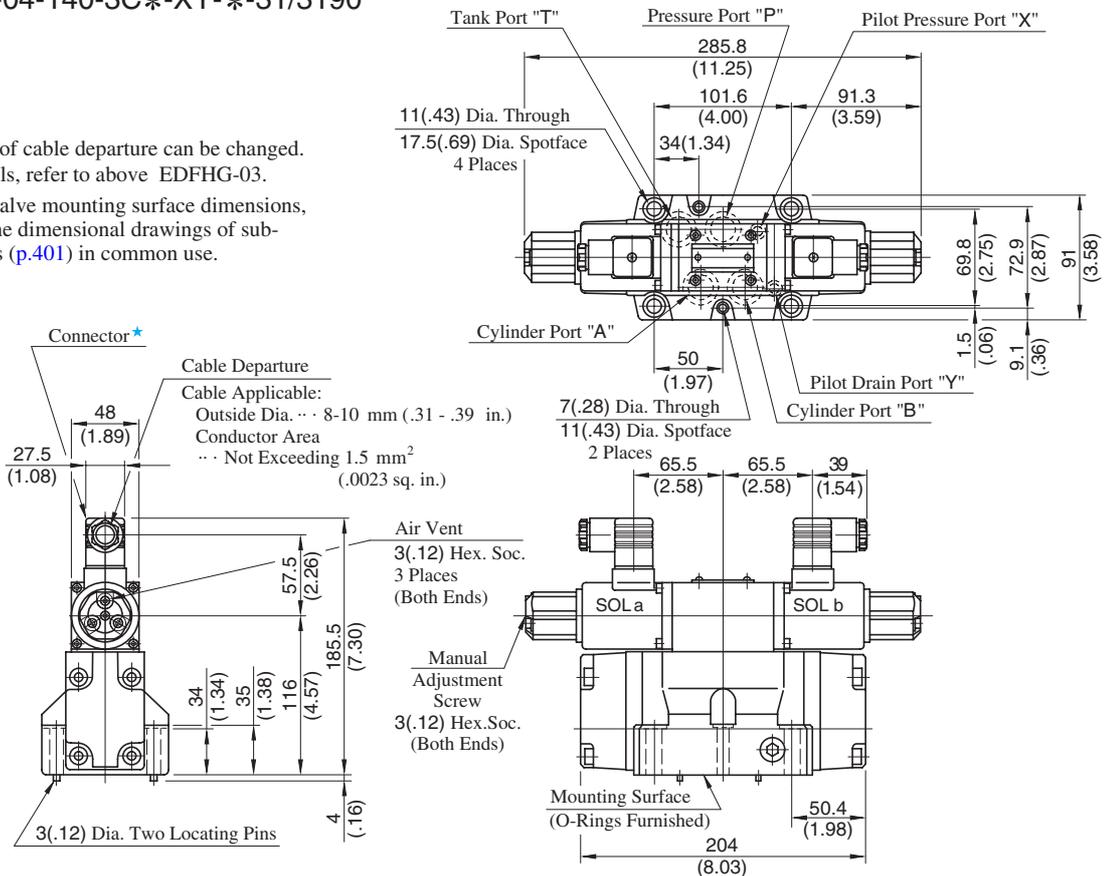
DIMENSIONS IN MILLIMETRES (INCHES)

EDFHG-04-140-3C*-XY-*-31/3190

Mounting surface: Conform to ISO4401-AD-07-4-A.

★ Position of cable departure can be changed. For details, refer to above ED FHG-03.

Note: For valve mounting surface dimensions, see the dimensional drawings of sub-plates (p.401) in common use.

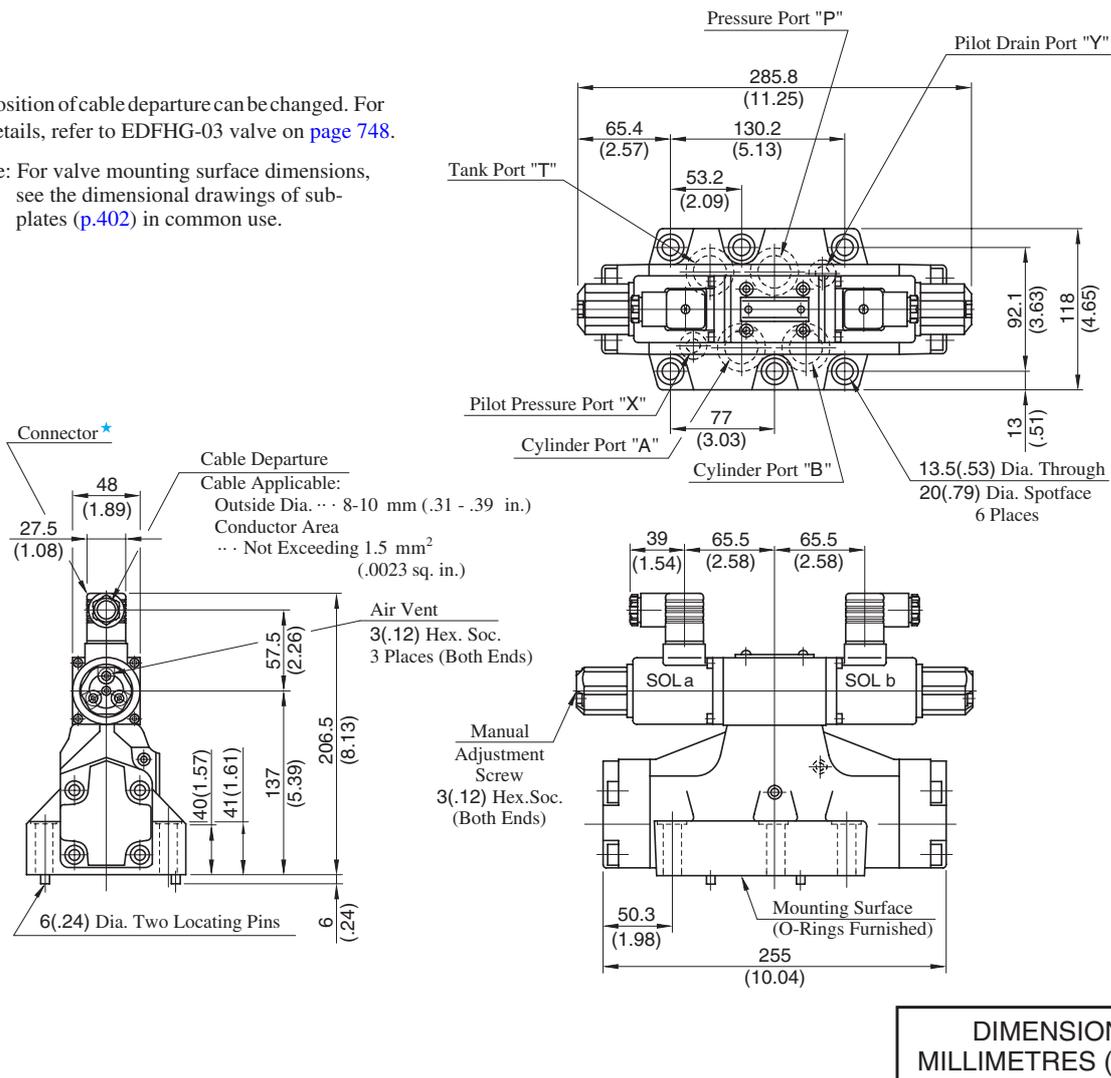


EDFHG-06-280-3C*-XY-*-31/3190

Mounting surface: Conform to ISO4401-AE-08-4-A.

★ Position of cable departure can be changed. For details, refer to EDFHG-03 valve on page 748.

Note: For valve mounting surface dimensions, see the dimensional drawings of sub-plates (p.402) in common use.



■ Interchangeability between Current and New Design

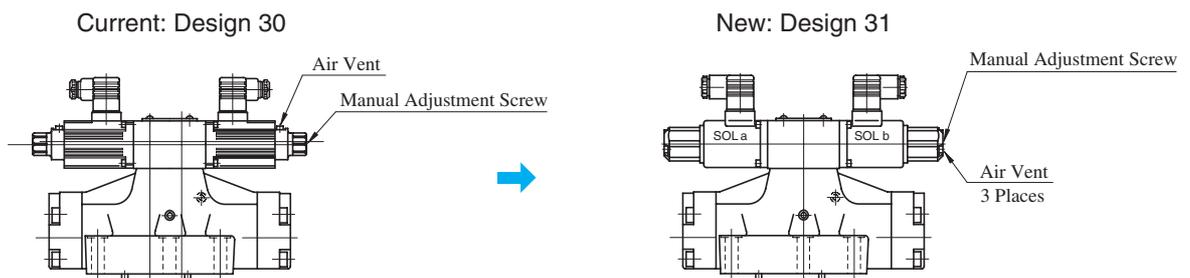
● Specifications and Characteristics

No changes in specifications and characteristics between current and new design.

● Mounting Interchangeability

The mounting surface are interchangeable.

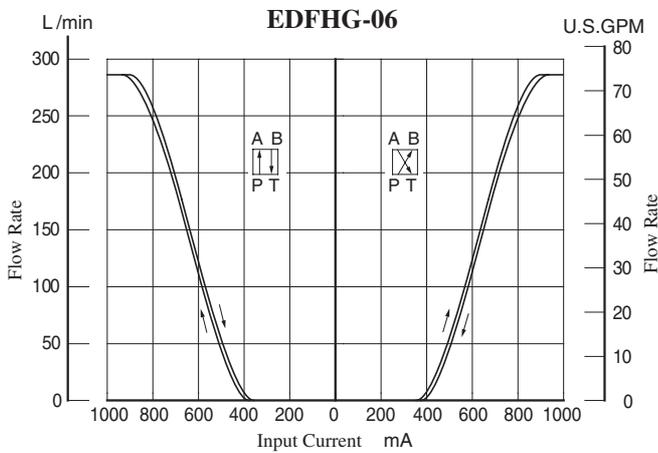
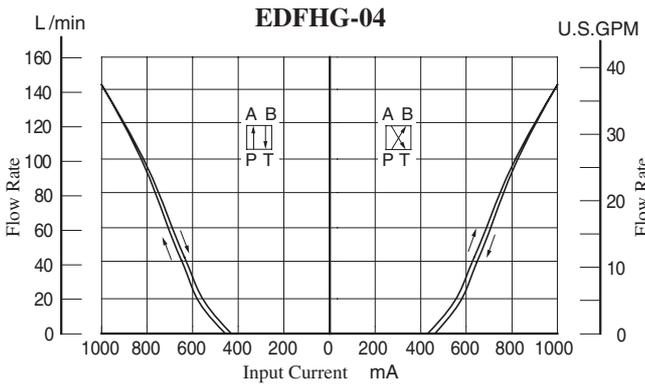
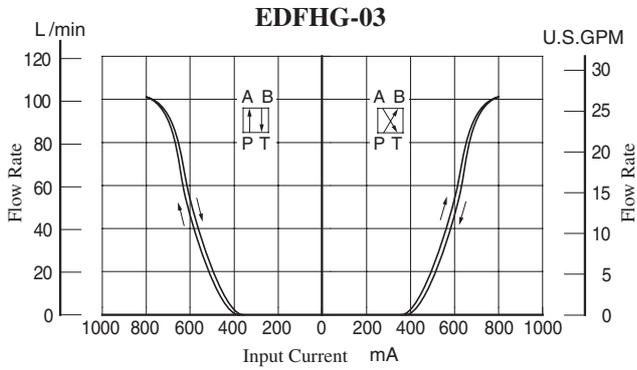
Note that because of improvements made on the solenoids, the overall shapes have been changed as shown below.



Input Current vs. Flow

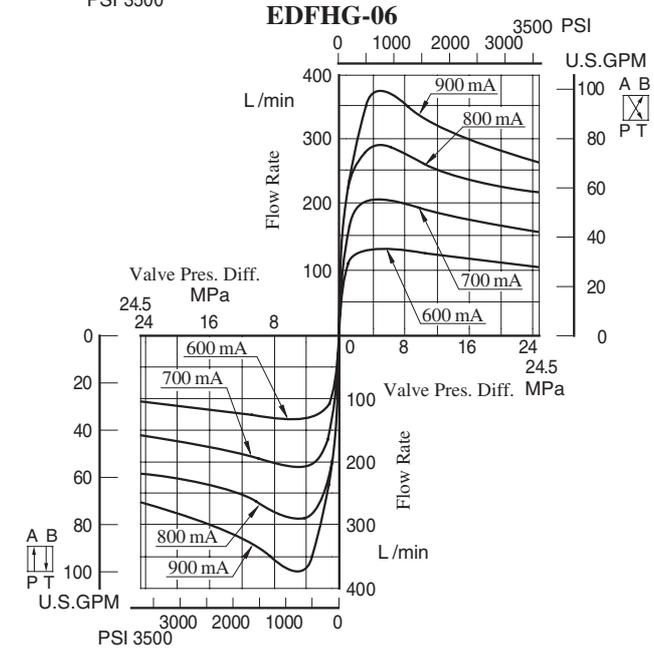
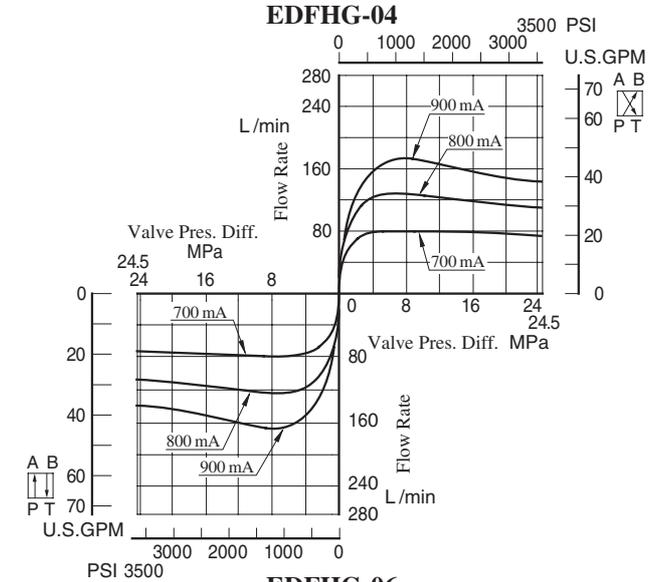
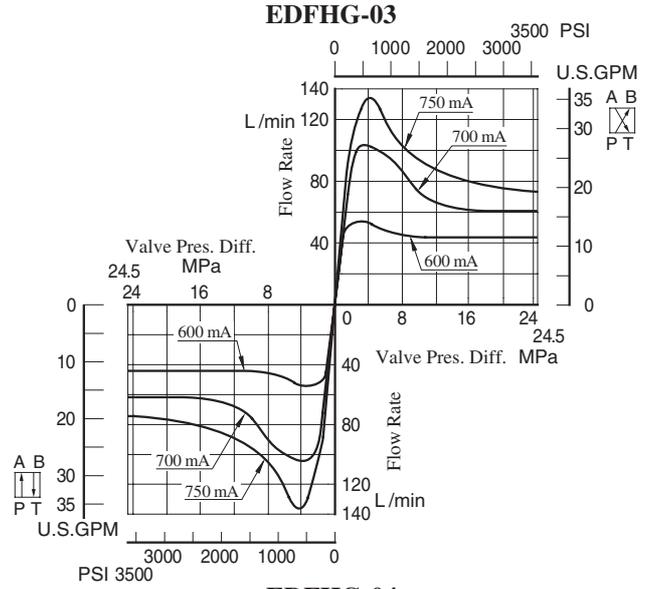
Viscosity : 30 mm²/s (141 SSU)

Valve Pres. Difference : P→A (B), B (A) →T 1 MPa (145 PSI)

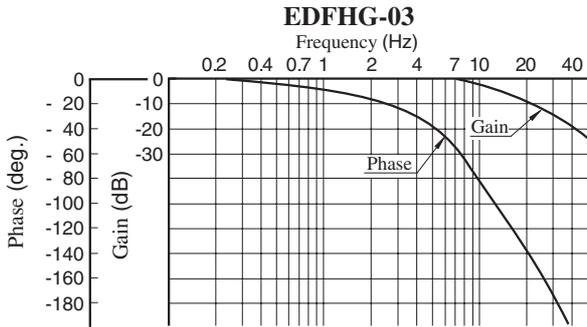


Valve Pressure Difference vs. Flow

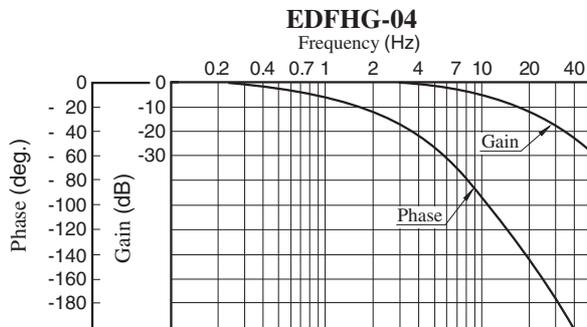
Viscosity : 30 mm²/s (141 SSU)



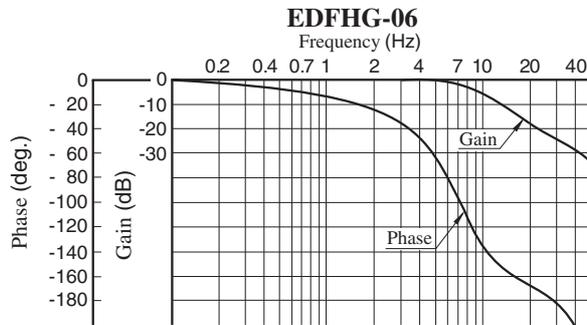
Frequency Response



Model Number : EDFHG-03-100-3C2-E-31
 Viscosity : 30 mm²/s(141 SSU)
 Pilot Pressure : 15.7 MPa(2280 PSI)
 Travel of Spool : ±10% of Maximum Stroke



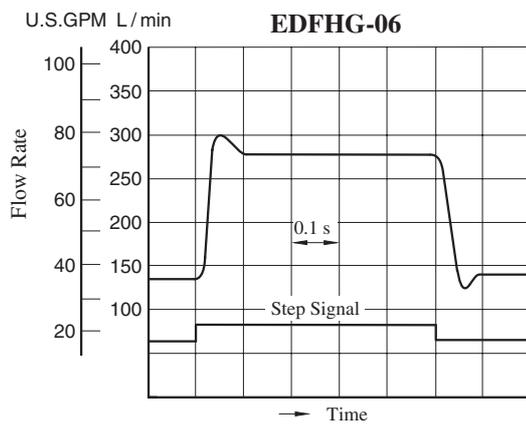
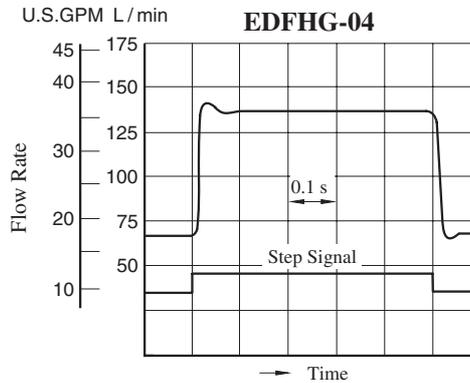
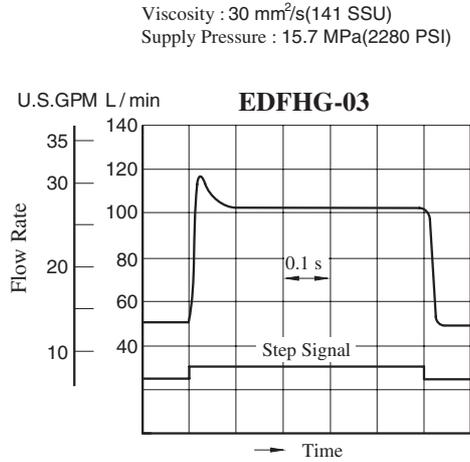
Model Number : EDFHG-04-140-3C2-E-31
 Viscosity : 30 mm²/s(141 SSU)
 Pilot Pressure : 15.7 MPa(2280 PSI)
 Travel of Spool : ±10% of Maximum Stroke



Model Number : EDFHG-06-280-3C2-E-31
 Viscosity : 30 mm²/s(141 SSU)
 Pilot Pressure : 15.7 MPa(2280 PSI)
 Travel of Spool : ±10% of Maximum Stroke

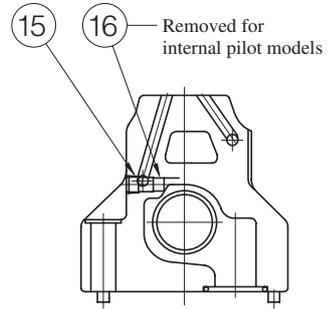
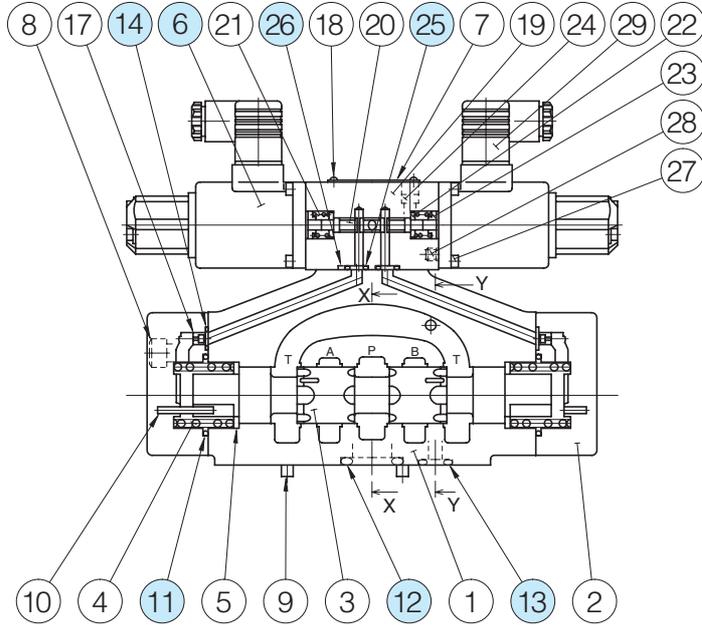
Step Response

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

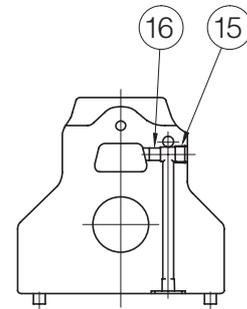


● List of Seals and Solenoid Ass'y

EDFHG-03-100-3C *-XY- *-31/3190
 EDFHG-04-140-3C *-XY- *-31/3190
 EDFHG-06-280-3C *-XY- *-31/3190



Section X-X



Section Y-Y

● List of Seals and Solenoid Ass'y

Item	Name of Parts	EDFHG-03		EDFHG-04		EDFHG-06	
		Part Numbers	Qty.	Part Numbers	Qty.	Part Numbers	Qty.
6	Solenoid Ass'y	E318-Y06M1-28-61	2	E318-Y06M1-28-61	2	E318-Y06M1-28-61	2
11	O-Ring	SO-NB-P28	2	SO-NB-P34	2	SO-NB-P40	2
12	O-Ring	SO-NB-A014	5	SO-NB-P22	4	SO-NB-P30	4
13	O-Ring	SO-NB-P9	2	SO-NB-P9	2	SO-NB-P14	2
14	O-Ring	SO-NB-P9	6	SO-NB-P9	2	SO-NB-P10	2
25	O-Ring	SO-NB-P9	4	SO-NB-P9	4	SO-NB-P9	4
26	O-Ring	SO-NB-P4	2	SO-NB-P4	2	SO-NB-P4	2

Note: The GDM-211-B-11 connector assembly (Item 29) is not included in the solenoid assembly.

When ordering seals, please specify the seal kit number from the table below. In addition to the above o-rings, seals for solenoid ass'y are included in the seal kit.

For the detail of the solenoid ass'y o-rings, see [page 674](#).

● List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
EDFHG-03	KS-EDFHG-03-31
EDFHG-04	KS-EDFHG-04-31
EDFHG-06	KS-EDFHG-06-31

High Response Type Proportional Electro-Hydraulic Directional and Flow Control Valves

High response, high precision and high reliability are achieved by a combination of a compact and powerful solenoid and a spool-position-detection LVDT.

Direct type ELDFG-01/03 and two stage type ELDFG-04/06 (which use the ELDFG-01 as a pilot) are available.

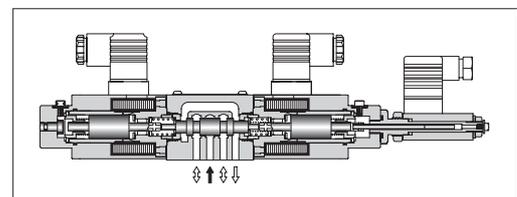
Direct Operated Type Directional and Flow Control Valves

This product can be interchanged with the simplified servo valve to perform position control and pressure control.

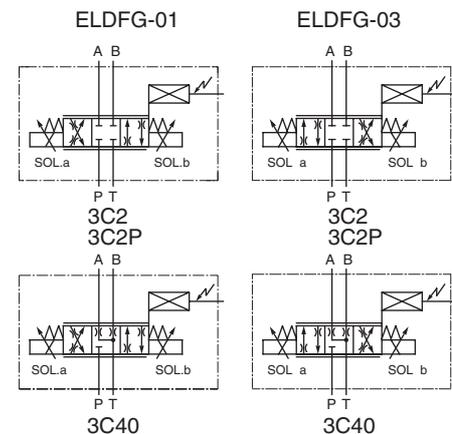
Compared to nozzle flapper type servo valve, this product has excellent contamination-related problems.

Specifications

Description		Model No.	ELDFG-01	ELDFG-03
Max. Operating Pressure		MPa (PSI)	31.5 (4570)	
Max. Tank Line Back Pressure		MPa (PSI)	21 (3050)	
Rated Flow	L/min (U.S.GPM)		10: 10 (2.6) 20: 20 (5.3) 35: 35 (9.2)	40: 40 (10.6) 80: 80 (21.1)
Valve Pres. Diff. : 1.5 MPa (220 PSI)				
Hysteresis			0.5% or less	
Repeatability			0.5% or less	
Step Response (Typical Rating)	0 → 100%		30 ms	3C2, 3C40: 29 ms 3C2P: 25 ms
	100 → 0%		38 ms	3C2, 3C40: 26 ms 3C2P: 23 ms
Frequency Response (0 ±25 %V)	Phase -90 degree		48 Hz	3C2, 3C40: 36 Hz 3C2P: 41 Hz
	Gain -3 dB		52 Hz	3C2, 3C40: 35 Hz 3C2P: 38 Hz
Rated Current			Max. 2.5 A	Max. 3 A
Coil Resistance [20°C (68°F)]			3.9 Ω	3 Ω
Power Input			Max. 25 W	Max. 27 W
Approx. Mass		kg (lbs.)	3.2 (7.1)	7.5 (16.5)



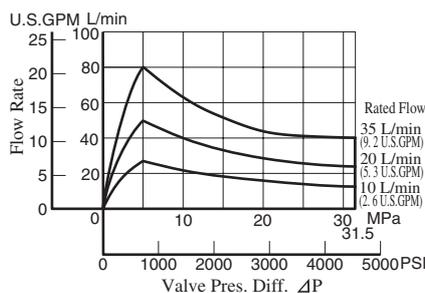
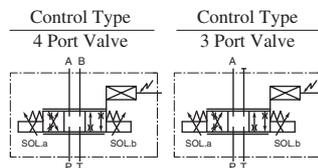
Graphic Symbols



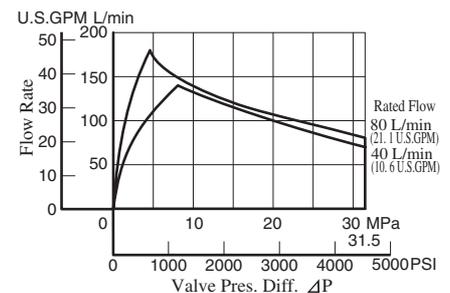
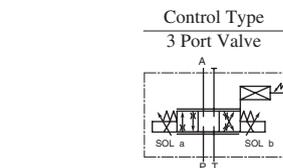
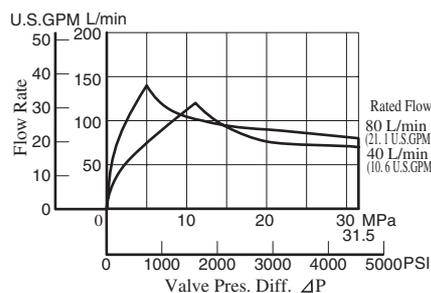
Range of Flow Control

See “Valve Pres. Difference vs. Flow Rate” below characteristics for the appropriate range.

ELDFG-01



ELDFG-03



★ Valve pressure difference “ΔP” is reference by follows. In addition, “P”, “A”, “B”, “T”, are pressure of each port.
 4 Port Valve: ΔP = [(P-A) + (B-T)] or [(P-B) + (A-T)]
 3 Port Valve: ΔP = (P-A) or (A-T)

Model Number Designation

F-	ELDF	G	-01	-35	-3C2	-XY	-10	*
Special Seals	Series Number	Type of Mounting	Valve Size	Rated Flow L/min (U.S.GPM)	Spool Type	Direction of Flow	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	ELDF: High Response (Direct) Type Proportional Electro-Hydraulic Directional and Flow Control Valves	G: Sub-plate Mounting	01	10: 10 (2.6) 20: 20 (5.3) 35: 35 (9.2)		XY: Metre-In · Metre-Out	10	Refer to ★
			03	40: 40 (10.6) 80: 80 (21.1)			10	

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

Attachment

Mounting Bolts

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

Model No.	Descriptions	Soc. Hd. Cap Screw (4 pcs.)	Tightening Torque
ELDFG-01	Japanese Standard "JIS" European Design Standard	M5 × 45 Lg.	5 - 7 Nm (43 - 60 in. lbs.) [Applicable to working pressure more than 25 MPa (3630 PSI): 6 - 7 Nm (52 - 60 in. lbs.)]
	N. American Design Standard	No. 10-24 UNC × 1-3/4 Lg.	
ELDFG-03	Japanese Standard "JIS" European Design Standard	M6 × 35 Lg.	12 - 15 Nm (106 - 133 in. lbs.)
	N. American Design Standard	1/4-20 UNC × 1-1/2 Lg.	

Sub-plate

Valve Model Numbers	Piping Size	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
		Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
ELDFG-01	1/8	DSGM-01-31	Rc 1/8	DSGM-01-3180	1/8 BSPF	DSGM-01-3190	1/8 NPT	0.8 (1.8)
	1/4	DSGM-01X-31	Rc 1/4	DSGM-01X-3180	1/4 BSPF	DSGM-01X-3190	1/4 NPT	0.8 (1.8)
	3/8	DSGM-01Y-31	Rc 3/8	—	—	DSGM-01Y-3190	3/8 NPT	0.8 (1.8)
ELDFG-03	3/8	DSGM-03-40	Rc 3/8	DSGM-03-2180	3/8 BSPF	DSGM-03-2190	3/8 NPT	3.0 (6.6)
	1/2	DSGM-03X-40	Rc 1/2	DSGM-03X-2180	1/2 BSPF	DSGM-03X-2190	1/2 NPT	3.0 (6.6)
	3/4	DSGM-03Y-40	Rc 3/4	DSGM-03Y-2180	3/4 BSPF	DSGM-03Y-2190	3/4 NPT	4.7 (10.4)

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- The Sub-plates are those for 1/8 and 3/8 solenoid operated directional valves. For dimensions, see page 356 and 373.

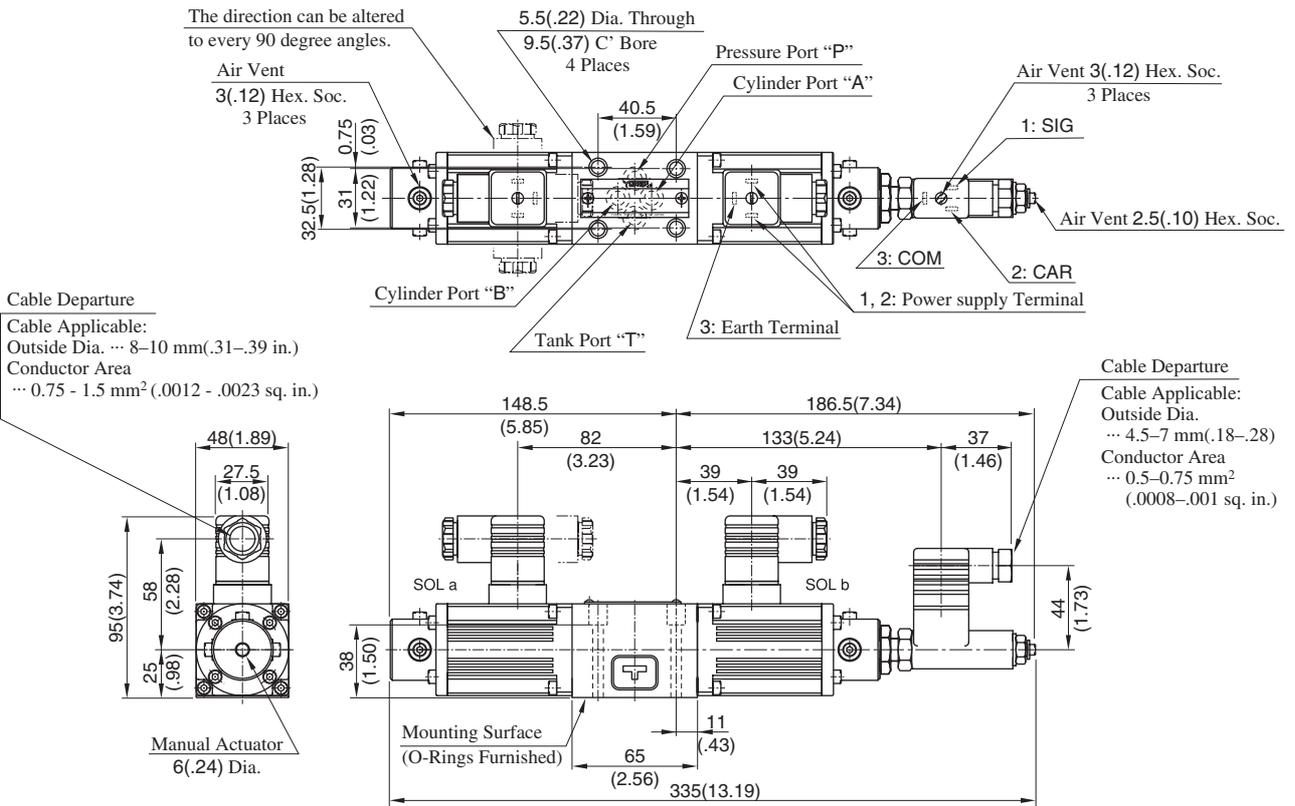
Applicable Power Amplifiers

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see page 786).

Valve Model Numbers	Power Amplifier Model Numbers
ELDFG-01-* - ^{3C2} / _{3C40}	AMN-L-01-1-10
ELDFG-01-* -3C2P	AMN-L-01-3-2P-10
ELDFG-03-* - ^{3C2} / _{3C40}	AMB-EL-03-1-10
ELDFG-03-* -3C2P	AMB-EL-03-2P-1-10

ELDFG-01--*-XY-10/1090**

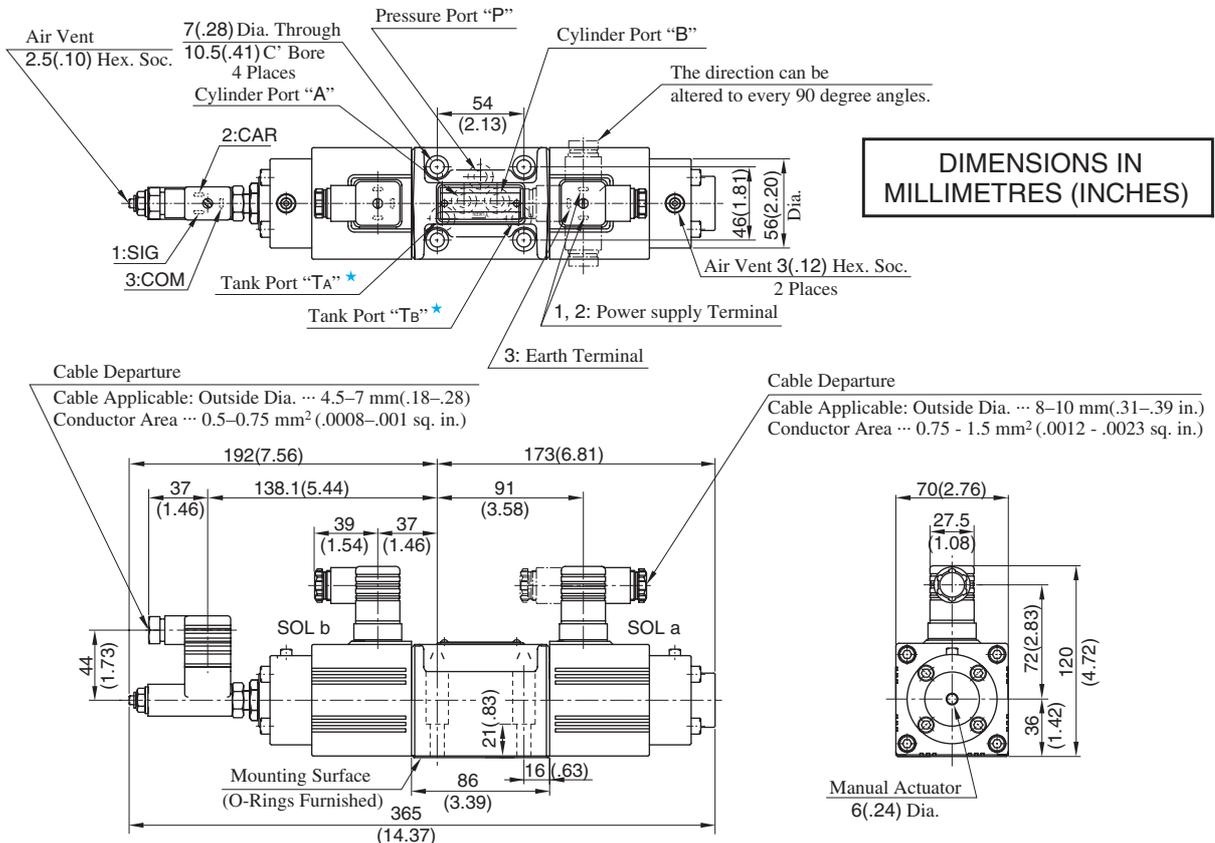
Mounting surface: Conform to ISO4401-AB-03-4-A.



Note: For valve mounting surface dimensions, see the dimensional drawings of sub-plates (p.356) in common use.

ELDFG-03--*-XY-10/1090**

Mounting surface: Conform to ISO4401-AC-05-4-A.



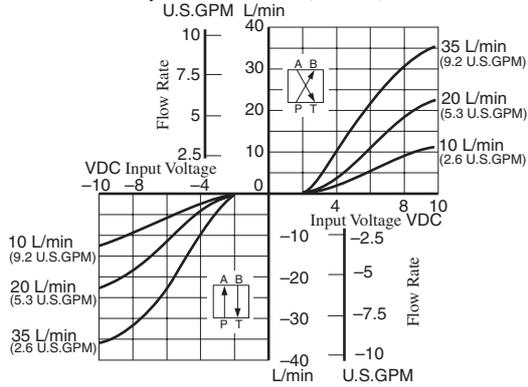
Note: For valve mounting surface dimensions, see the dimensional drawings of sub-plates (p.373) in common use.

H
E Series
 Direct Operated Type Directional and Flow Control Valves

Input Voltage vs. Flow Rate

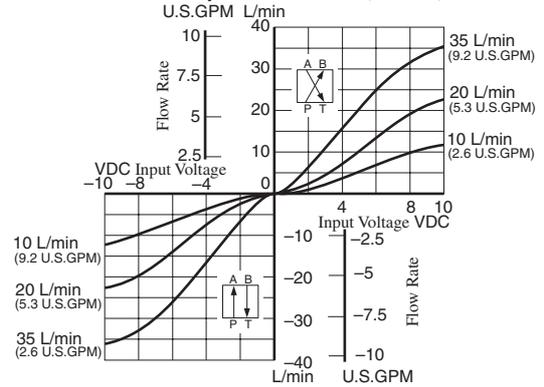
ELDFG-01-* -3C2/3C40

Valve Pres. Diff. : 1.2 MPa (174 PSI)
 Viscosity : 30 mm²/s (141 SSU)



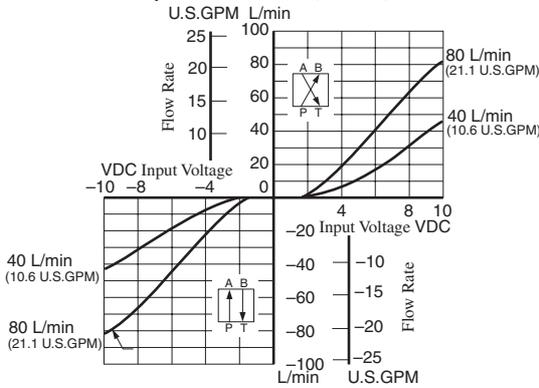
ELDFG-01-* -3C2P

Valve Pres. Diff. : 1.2 MPa (174 PSI)
 Viscosity : 30 mm²/s (141 SSU)



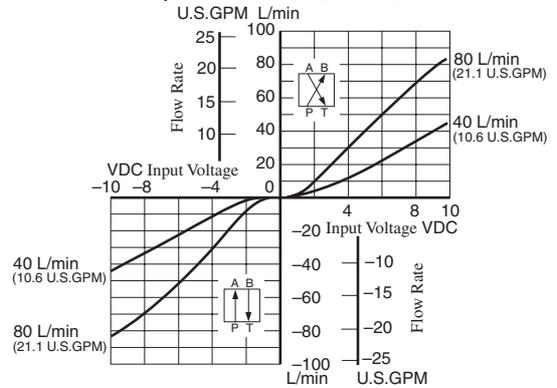
ELDFG-03-* -3C2/3C40

Valve Pres. Diff. : 1.5 MPa (218 PSI)
 Viscosity : 30 mm²/s (141 SSU)



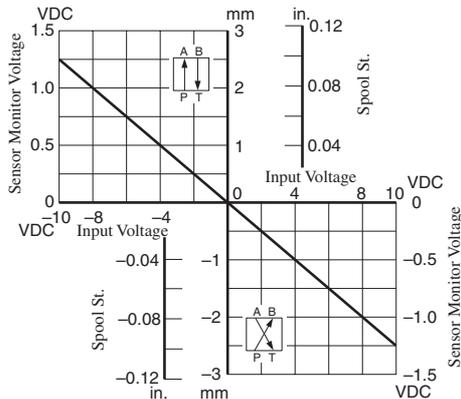
ELDFG-03-* -3C2P

Valve Pres. Diff. : 1.5 MPa (218 PSI)
 Viscosity : 30 mm²/s (141 SSU)

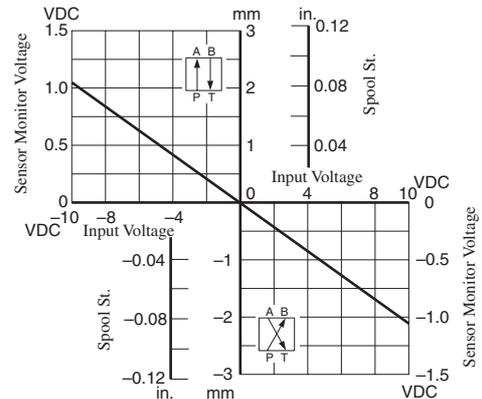


Input Voltage vs. Spool St.

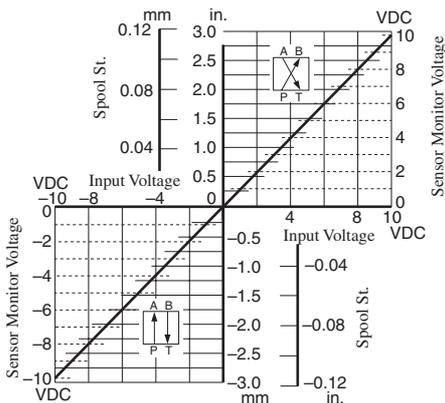
ELDFG-01-* -3C2/3C40



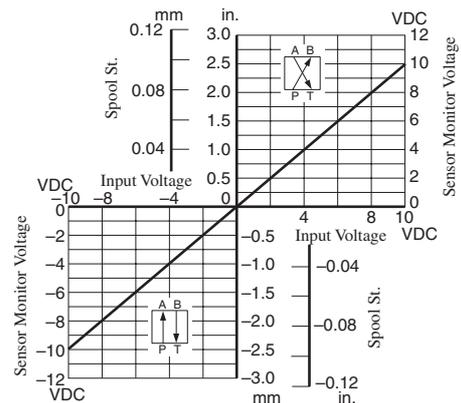
ELDFG-01-* -3C2P



ELDFG-03-* -3C2/3C40



ELDFG-03-* -3C2P



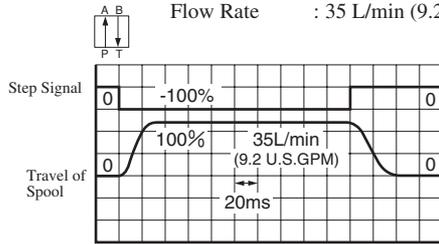
Step Response (Example)

Viscosity : 30 mm²/s (140 SSU)

The values were measured on independent valves. They vary by circuit.

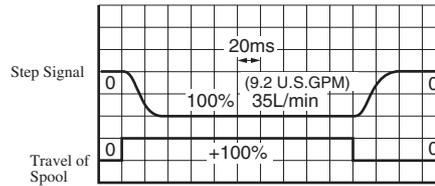
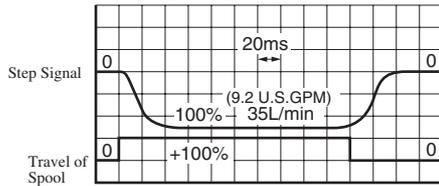
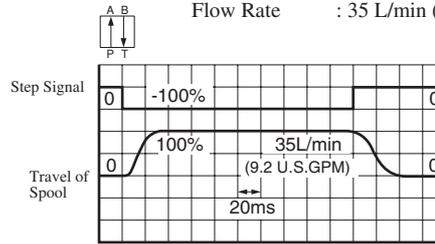
ELDFG-01-35-3C2/3C40

Supply Pressure : 2 MPa (290 PSI)
Flow Rate : 35 L/min (9.2 U.S.GPM)



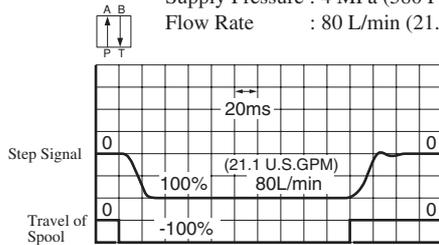
ELDFG-01-35-3C2P

Supply Pressure : 2 MPa (290 PSI)
Flow Rate : 35 L/min (9.2 U.S.GPM)



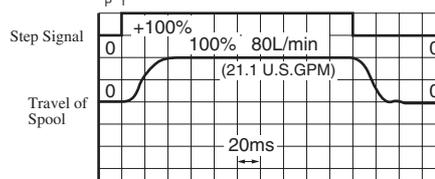
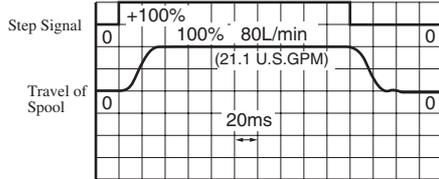
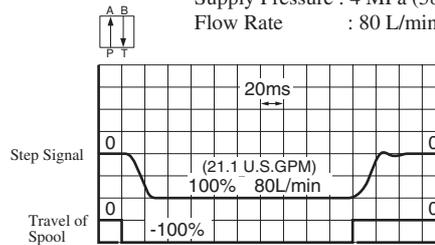
ELDFG-03-80-3C2/3C40

Supply Pressure : 4 MPa (580 PSI)
Flow Rate : 80 L/min (21.1 U.S.GPM)



ELDFG-03-80-3C2P

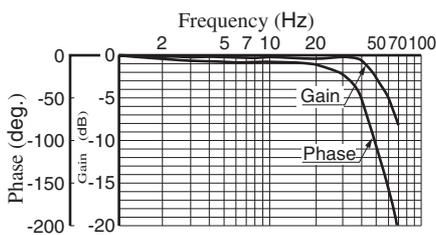
Supply Pressure : 4 MPa (580 PSI)
Flow Rate : 80 L/min (21.1 U.S.GPM)



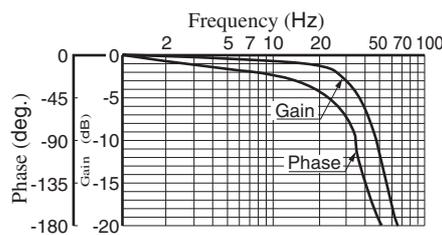
Frequency Response

Input Signal : 0 ±25 %V
Primary Pressure : 14 PMa (2030 PSI)
Viscosity : 30 mm²/s (140 SSU)

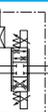
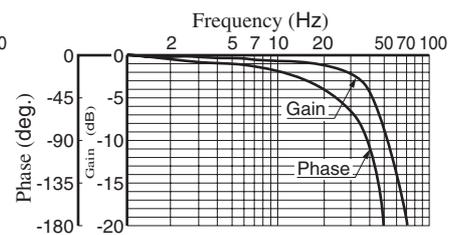
ELDFG-01-35-3C2/3C40/3C2P



ELDFG-03-80-3C2/3C40

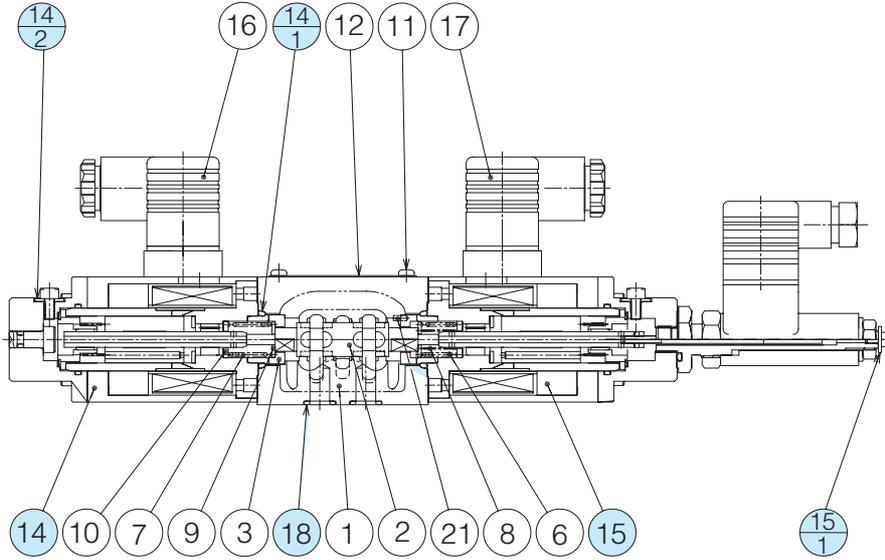


ELDFG-03-80-3C2P



■ List of Seals and Solenoid Ass'y

ELDFG-01-*-*-XY-10/1090



● List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
14-1	O-Ring	SO-NB-P18	2	Included in Seal Kit Kit No.: KS-ELDFG-01-10
14-2	Fastner Seal	SG-FCF-4	2	
15-1	Fastner Seal	TK280152-0	1	
18	O-Ring	SO-NB-P9	4	

Note) O-ring (Item 14-1) and the fastner sael (Item 14-2, 15-1) are included in the solenoid assembly.

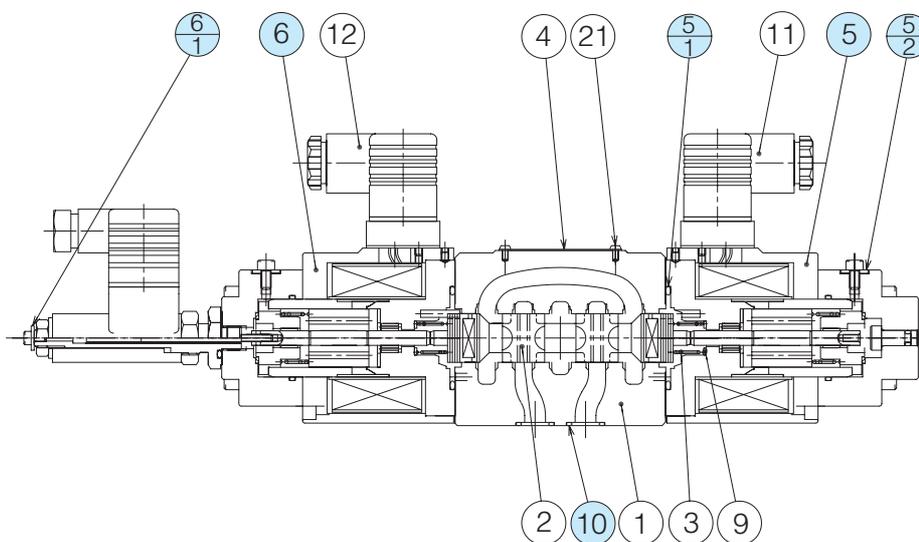
● Solenoid Ass'y

Valve Model Numbers	Item	Solenoid Ass'y	Qty.
ELDFG-01-*-*-XY-10/1090	14	E318-Y06M2-14-5007	1
	15	E318-Y06M2-14-L-5007	1

Note) The connector assembly GDM-211-*-11 (Item 16, 17) is not included in the solenoid assembly.

■ List of Seals and Solenoid Ass'y

ELDFG-03-**-**-XY-10/1090



● List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
5-1	O-Ring	SO-NB-A128	2	Included in Seal Kit Kit No.: KS-ELDFG-03-10
5-2	Fastner Seal	SG-FCF-4	2	
6-1	Fastner Seal	TK280152-0	1	
10	O-Ring	SO-NB-A014	4	

Note) O-ring (Item 5-1) and the fastener seal (Item 5-2, 6-1) are included in the solenoid assembly.

● Solenoid Ass'y

Valve Model Numbers	Item	Solenoid Ass'y	Qty.
ELDFG-03-**-**-XY-10/1090	5	E324-Y12M2-28-10	1
	6	E324-Y12M2-28-L-10	1

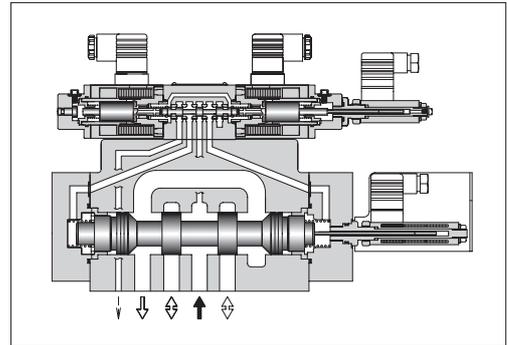
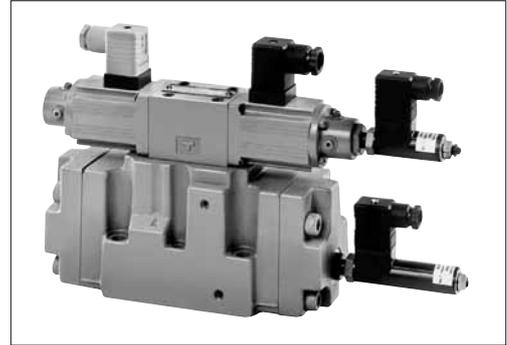
Note) The connector assembly GDM-211-**-11 (Item 11, 12) is not included in the solenoid assembly.

Two Stage Type Directional and Flow Control Valves

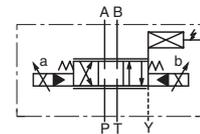
Specifications

Description	Model No.	ELDFHG-04	ELDFHG-06
Rated Flow L/min (U.S.GPM) Valve Pres. Diff. : 1 MPa (145 PSI)		280 (74.0)	350: 350 (92.5) 500: 500 (132.1)
Max. Operating Pressure MPa (PSI)		35 (5080)	350: 35 (5080) 500: 31.5 (4570)
Proof Pressure at Return Port ^{★1} (External Drain) MPa (PSI)		"T" Port : 31.5 (4570) "Y" Port : 21 (3050)	350 "T" Port : 35 (5080) "Y" Port : 21 (3050) 500 "T" Port : 25 (3630) "Y" Port : 21 (3050)
Proof Pressure at Return Port (Internal Drain) MPa (PSI)		21 (3050)	
Pilot Pressure ^{★2} MPa (PSI)		1.5–31.5 (218–4570)	
Pilot Flow ^{★3}		16 L/min or more	350: 16 L/min or more 500: 19 L/min or more
Null Leakage ^{★4} Ps=14 MPa (2030 PSI), Pp=14 MPa (2030 PSI)		3C2: 3 L/min or less 3C2P: 10 L/min or less	3C40: 4 L/min or less
Step Response (Typical Rating) (0↔100%) Pp=14 MPa (2030 PSI)		13 ms	350: 15 ms 500: 18 ms
Frequency Response (0±25%V, Phase) Pp=14 MPa (2030 PSI)		46 Hz (–90 degree)	350: 66 Hz (–90 degree) 500: 39 Hz (–90 degree)
Water - Proofness		IP64	
Operating Temperature Range		–15 – +60 °C (5–140°F)	
Spool Type		3C2:  3C2P:  (Zero Rap) 3C40: 	
Approximate Spool Stroke to Stops		±5 mm (±.20 in.)	350: ±5 mm (±.20 in.) 500: ±7 mm (±.28 in.)
Main Spool End Area cm ² (sq. in.)		7.1 (1.10)	8 (1.24)
Rated Current		Max. 2.5 A	
Coil Resistance [20 °C (68 °F)]		3.9 Ω	
Approx. Mass kg (lbs.)		10 (22.0)	350: 18 (39.7) 500: 19 (41.9)

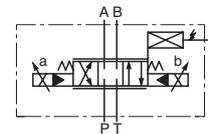
- ★1. Return pressure should be less than the actual supply pressure.
- ★2. Pilot pressure should be between 1.5 MPa (218 PSI) and 3.5 MPa (508 PSI), and should exceed 60% of the actual supply pressure to main valve.
- ★3. Pilot flow is calculated with the above step response time at pilot pressure 14 MPa (2030 PSI).
- ★4. Added up leakage of main and pilot spools are stated.



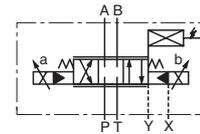
Graphic Symbols



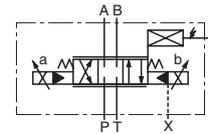
Internal Pilot / External Drain Type



Internal Pilot / Internal Drain Type



External Pilot / External Drain Type



External Pilot / Internal Drain Type

Model Number Designation

F-	ELDFH	G	-04	-280	-3C2P	-XY	-E	T	-10	*
Special Seals	Series Number	Type of Mounting	Valve Size	Rated Flow L/min (U.S.GPM)	Spool Type	Direction of Flow	Pilot Connection	Drain Connection	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	ELDFH: High Response (Two Stage) Type Proportional Electro-Hydraulic Directional and Flow Control Valves	G: Sub-Plate Mounting	04	280: 280(74.0)	3C2  3C40 	XY : Metre-in • Metre-out	None: Internal Pilot	None: External Drain	10	Refer to ^{★1}
		06	350: 350(92.5) 500: 500(132.1)	3C2P  (Zero Lap)	E: External Pilot		T: External Drain	10		

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

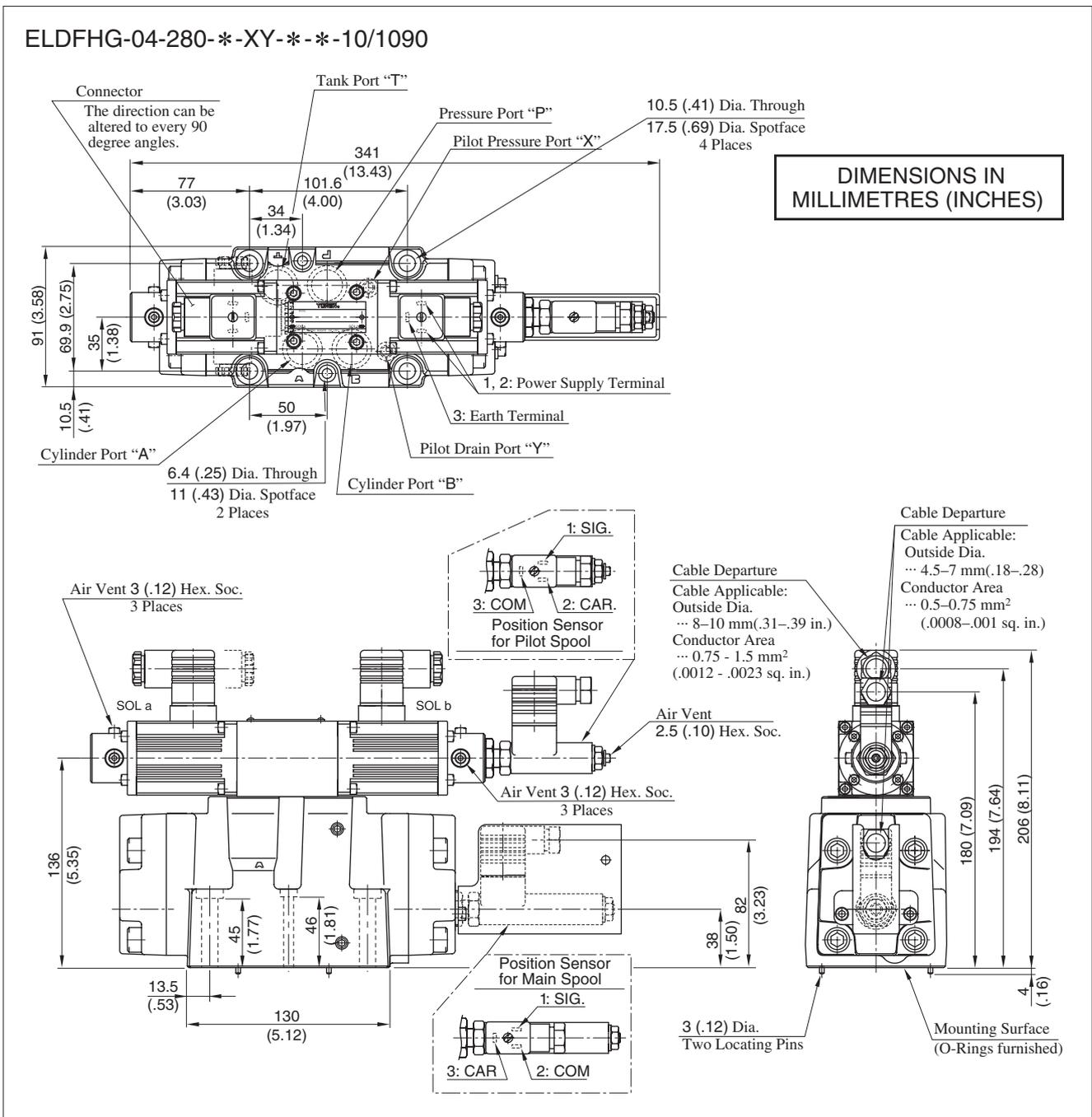
Applicable Power Amplifiers

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see [page 786](#)).
 Model Numbers: AMB-EL-**-**-10

Attachment

Mounting Bolts

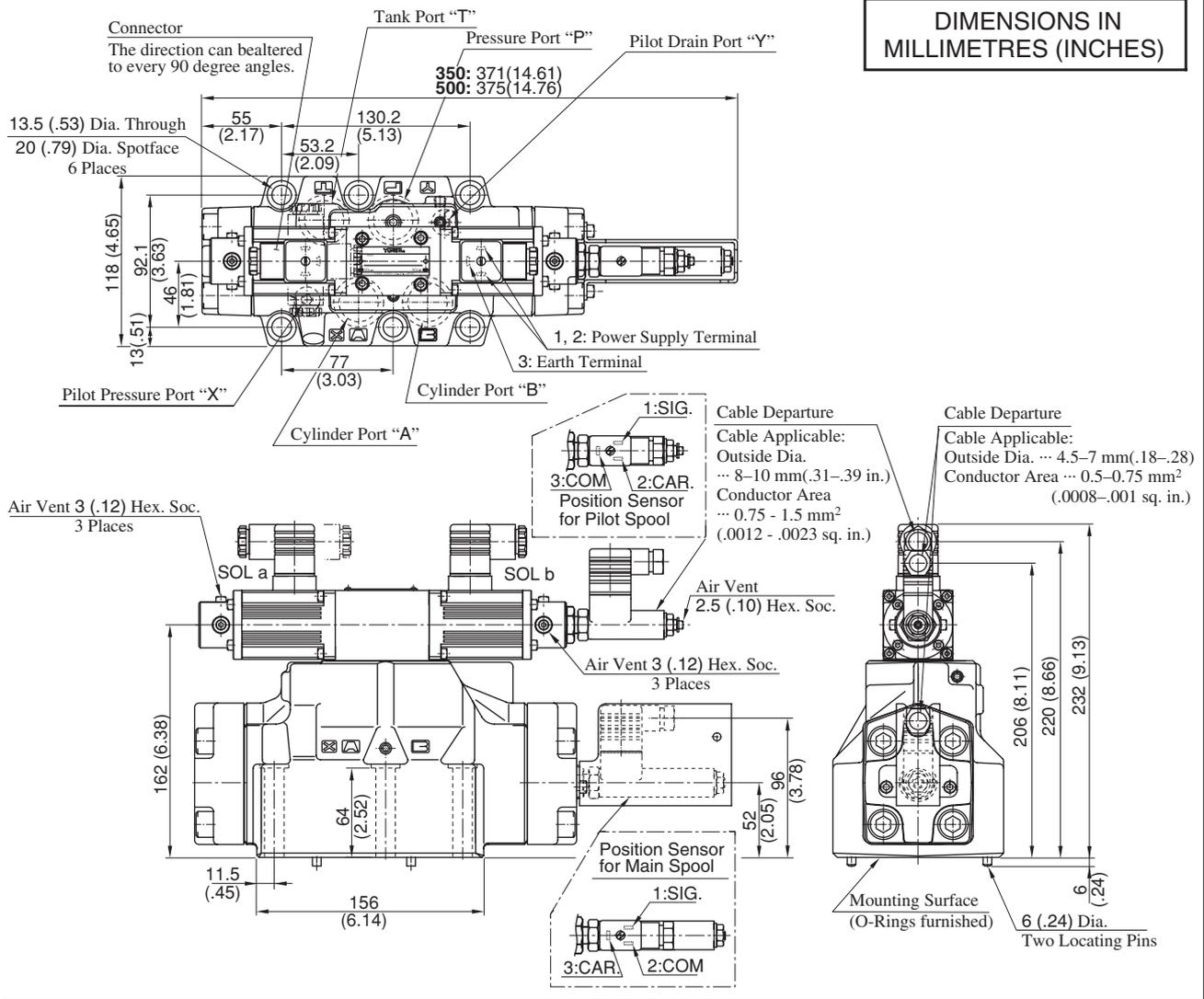
Model Numbers	Socket Head Cap Screw			Tightening Torque Nm (in. lbs.)
	Japanese Standard "JIS" European Design Standard	N. American Design Standard	Qty.	
ELDFHG-04	M6 × 55 Lg.	1/4-20 UNC × 2-1/4 Lg.	2	12 - 15 (106 - 133)
	M10 × 60 Lg.	3/8-16 UNC × 2-1/2 Lg.	4	58 - 72 (513 - 637)
ELDFHG-06	M12 × 85 Lg.	1/2-13 UNC × 3-1/2 Lg.	6	100 - 123 (885 - 1089)



E Series
Two Stage Type Directional and Flow Control Valves

ELDFHG-06-*-*-XY-*-*-10/1090

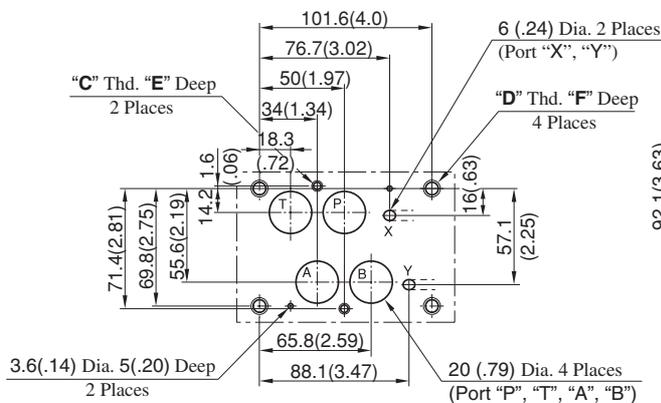
DIMENSIONS IN MILLIMETRES (INCHES)



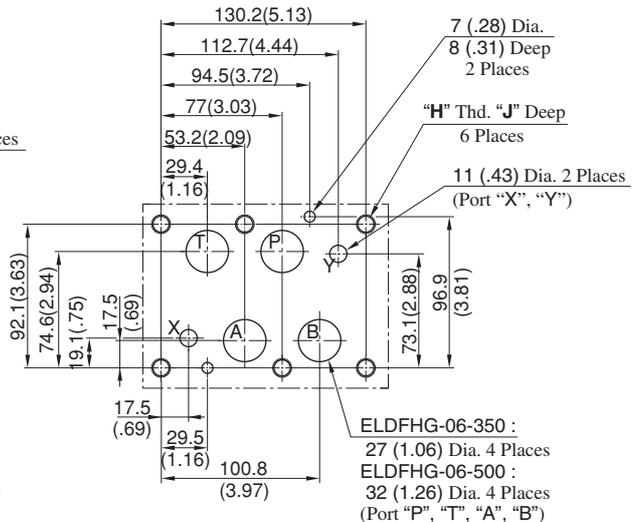
Dimensions of valve mounting surface

Prepare a mounting surface as shown to the below.
Also finish it finely.

● **ELDFHG-04**



● **ELDFHG-06**

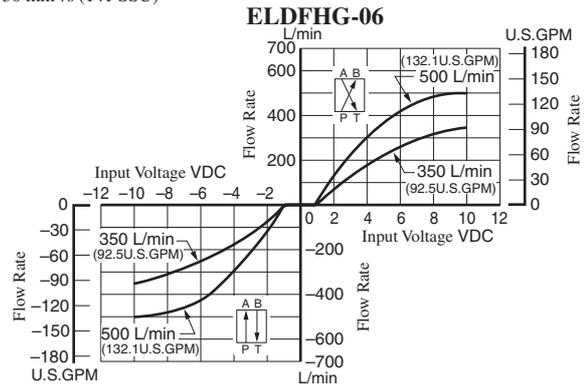
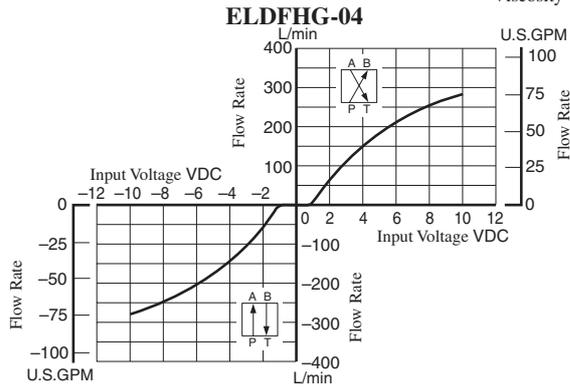


Model Numbers	"C" Thd.	"D" Thd.	"E" mm (in.)	F mm (in.)
ELDFHG-04-*-*-10	M6	M10	12 (.47)	17 (.67)
ELDFHG-04-*-*-1090	1/4-20 UNC	3/8-16 UNC	14 (.55)	20 (.79)

Model Numbers	"H" Thd.	J mm (in.)
ELDFHG-06-*-*-10	M12	24 (.94)
ELDFHG-06-*-*-1090	1/2-13 UNC	28 (1.10)

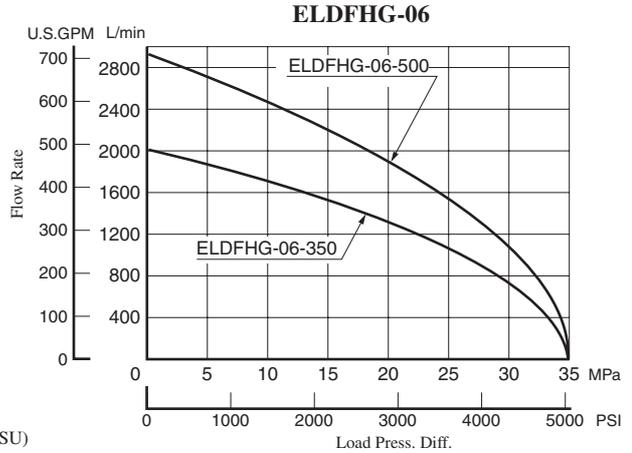
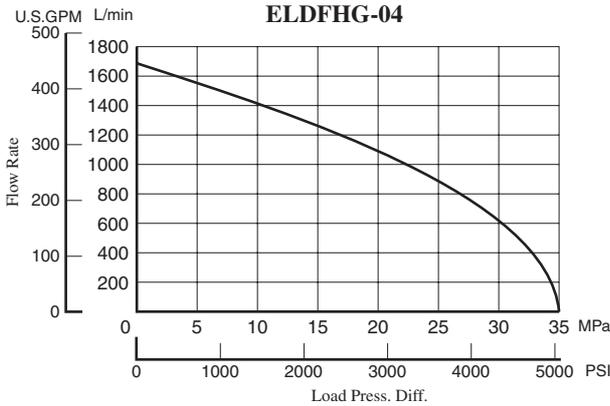
Input Voltage vs. Flow Rate

Valve Pres. Diff. : 1 MPa (145 PSI)
 Viscosity : 30 mm²/s (141 SSU)



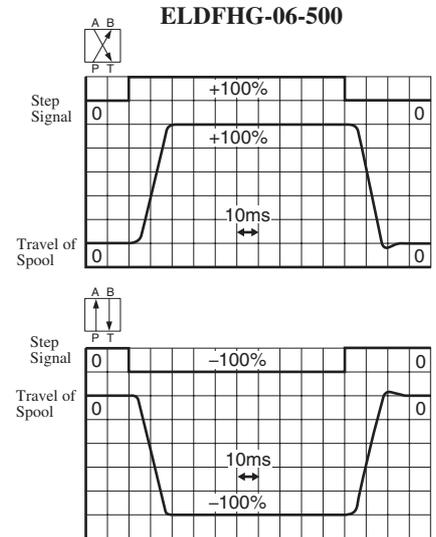
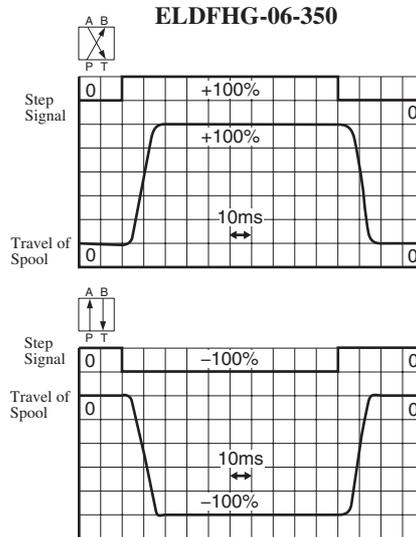
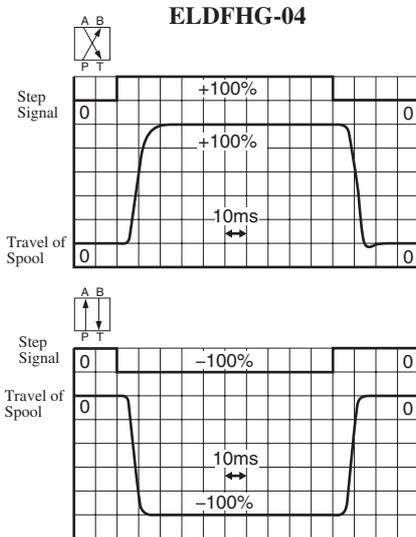
Load Flow Characteristics

Viscosity : 30 mm²/s (141 SSU)



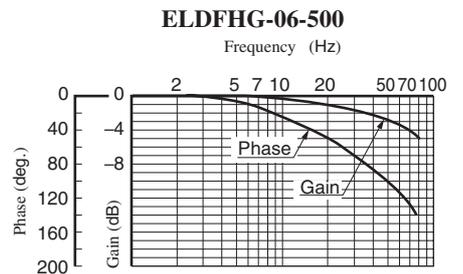
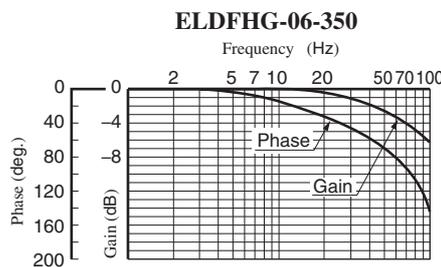
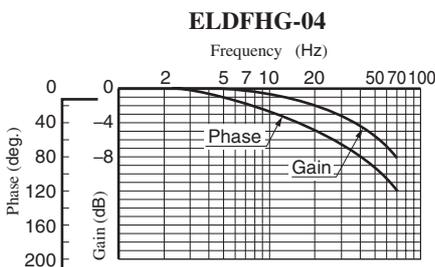
Step Response (Example)

Viscosity : 30 mm²/s (141 SSU)



Frequency Response

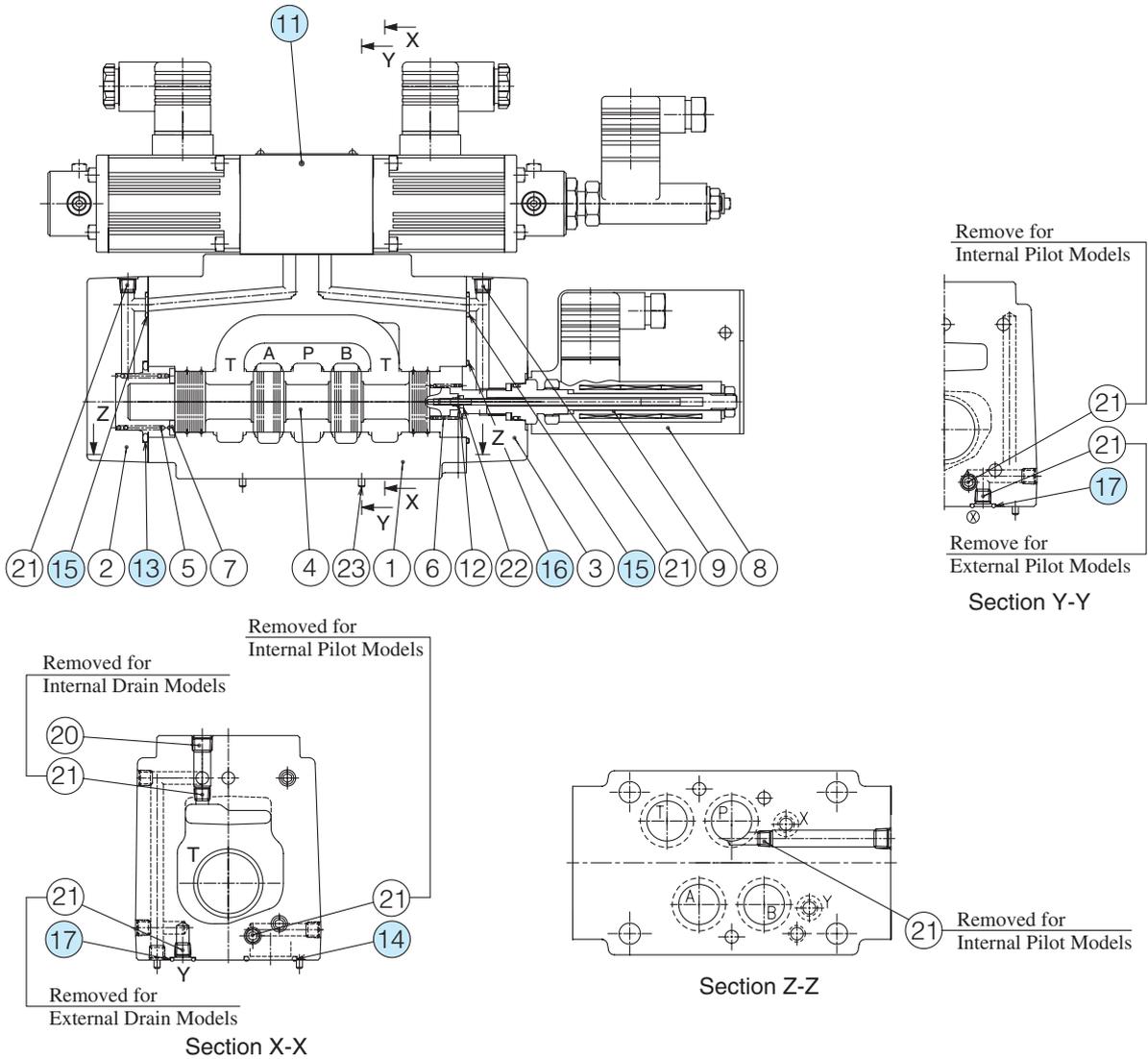
Input Signal : 0 ± 25 %
 Hydraulic Circuit : Port A/B Closed
 Supply and Pilot Pressure : 14 PMa (2030 PSI)
 Viscosity : 30 mm²/s (140 SSU)



E Series Two Stage Type Directional and Flow Control Valves

■ List of Seals and Pilot Valve

ELDFHG-04-280-*-XY-**-10/1090



● List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
13	O-Ring	SO-NB-P39	1	Included in Seal Kit Kit No.: KS-ELDFHG-01-10
14	O-Ring	SO-NB-P22	4	
15	O-Ring	SO-NB-P9	2	
16	O-Ring	SO-NB-A029	1	
17	O-Ring	SO-NB-A012	2	

● Pilot Valve

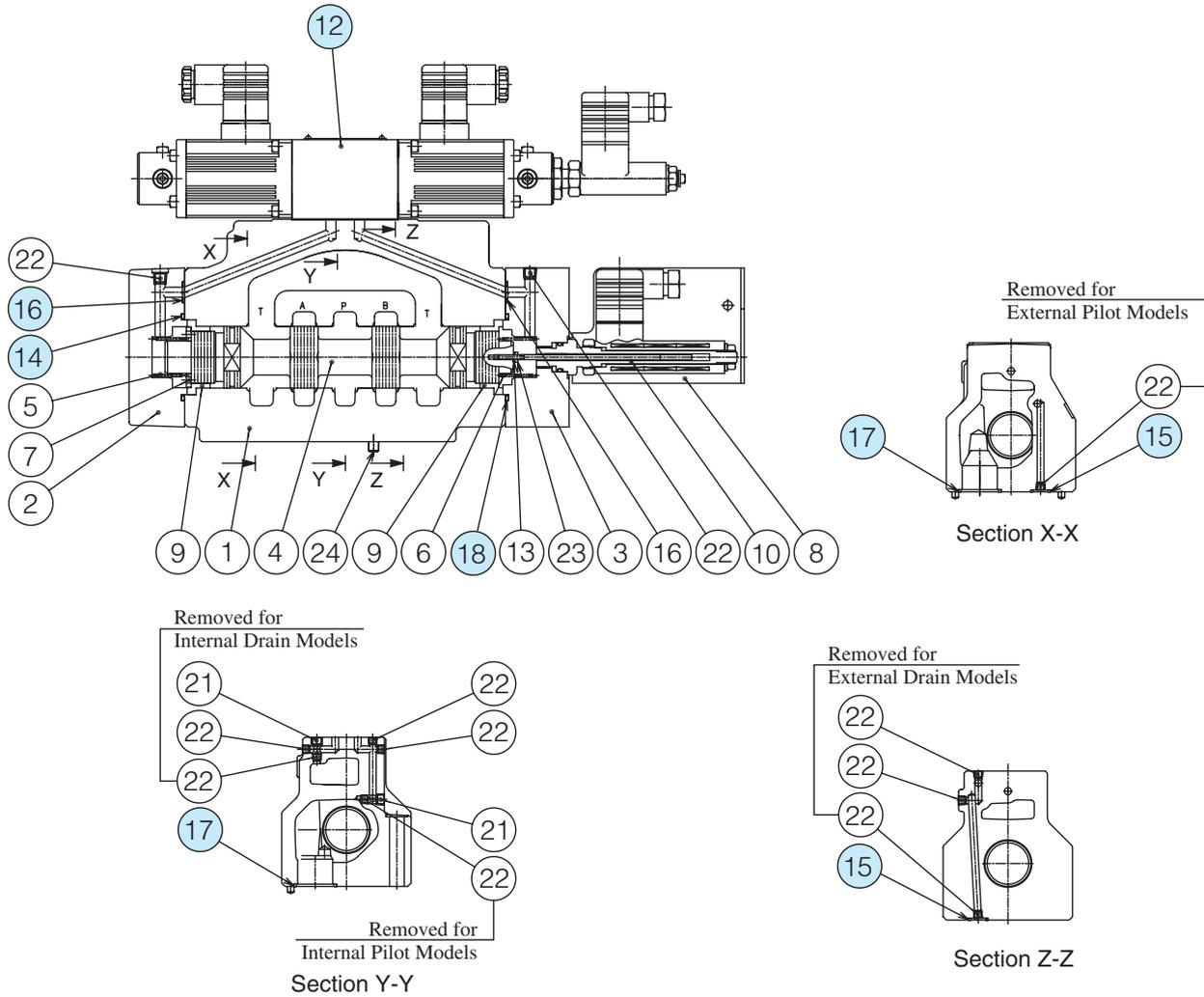
Valve Model No.	⑪ Pilot Valve Model No.
ELDFHG-04	ELDFG-01-30-3C2P-XY-1004

Note) See ELDFG-01-*-XY-10/1090 on [page 758](#) for the corresponding seal and solenoid assembly for the pilot valve.

Note: When ordering seals, please specify the seal kit number from the table above. In addition to the above o-rings, seals for pilot valve are included in the seal kit. For the detail of the pilot valve seals, see [page 758](#).

List of Seals and Pilot Valve

ELDFHG-06-**-**-XY-**-10/1090



List of Seals

Item	Name of Parts	Part Numbers		Qty.
		ELDFHG-06-350	ELDFHG-06-500	
14	O-Ring	SO-NB-P40	SO-NB-A135	1
15	O-Ring	SO-NB-P14		2
16	O-Ring	SO-NB-P10		2
17	O-Ring	SO-NB-A123	SO-NB-A126	4
18	O-Ring	SO-NB-A030	SO-NB-A135	1

Note: When ordering seals, please specify the seal kit number from the table above. In addition to the above o-rings, seals for pilot valve are included in the seal kit. For the detail of the pilot valve seals, see page 758.

Pilot Valve

Valve Model No.	⑫ Pilot Valve Model No.
ELDFHG-06	ELDFG-01-30-3C2P-XY-1006

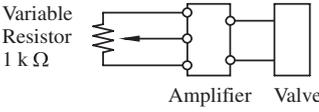
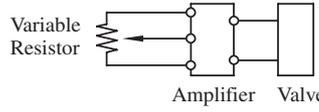
Note) See ELDFG-01-**-**-XY-10/1090 on page 758 for the corresponding seal and solenoid assembly for the pilot valve.

Seal Kit Numbers

Valve Model Numbers	Seal Kit Numbers
ELDFHG-06-350-**-**-XY-**-10/1090	KS-ELDFHG-06-350-10
ELDFHG-06-500-**-**-XY-**-10/1090	KS-ELDFHG-06-500-10

■ Power Amplifiers / Setting Adjusters For Proportional Electro-Hydraulic Control Valves

These are power amplifiers to be used exclusively to operate the electro-hydraulic proportional valves. Various type and models are available for a variety of applications.

Type	Model Numbers	Applicable to Control Valve	Function
DC Input	AME-D-10-*-20	Pressure or Flow Control (For 10 Ω Sol.)	<p>By giving the command of DC voltage (0–10 V) to the amplifier, current in proportion to that voltage will flow into the solenoid of the control valve in order to control pressure or flow rate.</p> <p>An external setting unit which makes the command voltage of 0–10 V and a DC power supply (or a function generator) are necessary, but if a variable resistor for external setting is only one, the internal power supply for amplifier can be used.</p> 
	AME-D-40-*-40	Flow Control (For 40 Ω Sol.)	
	AME-D2-H1-*-12	Flow Control and Relief (For 40Ω -10Ω Sol.)	
	AME-D2-1010-*-11	Flow Control and Relief (For 10Ω-10Ω Sol.)	
DC Input-Feedback	SK1022-*-*-11	Pressure or Flow Control (For 10 Ω Sol.)	<p>Basically, this is a DC input type with a feedback operating unit. This is for high-accuracy control and used to feedback the pressure or flow rate converted to electric signals.</p>
	AME-DF-S-*-22	Flow Control (For 40 Ω Sol.)	
Slow Up-Down	AME-T-S-*-22	Flow Control (For 40 Ω Sol.)	<p>A slow up-down signal generator and the functions of a DC input type are incorporated. This is used to control the pressure or flow rate by slow up-down pattern and the command signals are given by relay contacts, limit switches, timer contacts, etc.</p>
DC Input For DC Power 24 V DC	SK1015-11 AMN-D-10 AMN-W-10	Pressure or Flow Control (For 10 Ω Sol.)	<p>An amplifier which is operated by a battery power supply (24 V). By giving the command of DC voltage to the amplifier, current in proportion to that voltage will flow in the solenoid of the control valve in order to control pressure or flow rate.</p> <p>An external setting unit which makes the command voltage and a DC power supply (or a function generator) are necessary, but if a variable resistor for external setting is only one, the internal power supply for amplifier can be used.</p>  <p>SK1015 amplifier can be used in automobile construction machine.</p>
	SK1091-D24-10	Directional and Flow Control	
DC Input with Minor Feedback	AMN-L-01-*-*-10	High Response Type Directional and Flow Control	<p>An amplifier which is operated by a battery power supply (24V).</p>
	AMB-EL-*-*-*-10		<p>This is for high-response, high-accuracy control and used to feedback the pressure or flow rate converted to electric signals.</p>
Shockless	AMN-G-10	Shockless Directional and Flow Control	<p>Outputs shockless patterns, low speed (Level 1) high-speed (Level 2) low speed (Level 3).</p> <p>Shockless speed control is enabled just by providing SOL a and SOL b only contact signals in the same control mode as the mode for the “G” series of shifting time adjustable type shockless valves.</p>

■ Instructions

- The power amplifiers should be kept away from hot and humid conditions which may deteriorate some components of the power amplifiers. They also should be installed in the clean and dry place where the vibration is minimal. Please avoid to install the power amplifiers in the complete enclosure or get them enclosed totally as they need to radiate the heat from semiconductors or ICs inside.
- Please use shielded wires for input signal transmission to prevent the amplifiers from any interference such as noise from outside.



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