

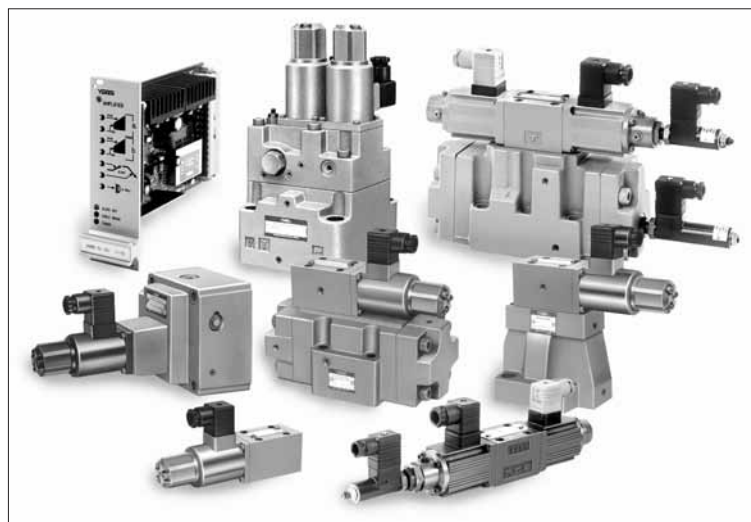
# HH

# PROPORTIONAL ELECTRO-HYDRAULIC CONTROLS

■ **HH Series-Hybrid Components** .....Page 656  
Proportional Electro-Hydraulic Control Valves



■ **HH Series** .....Page 667  
Proportional Electro-Hydraulic Controls

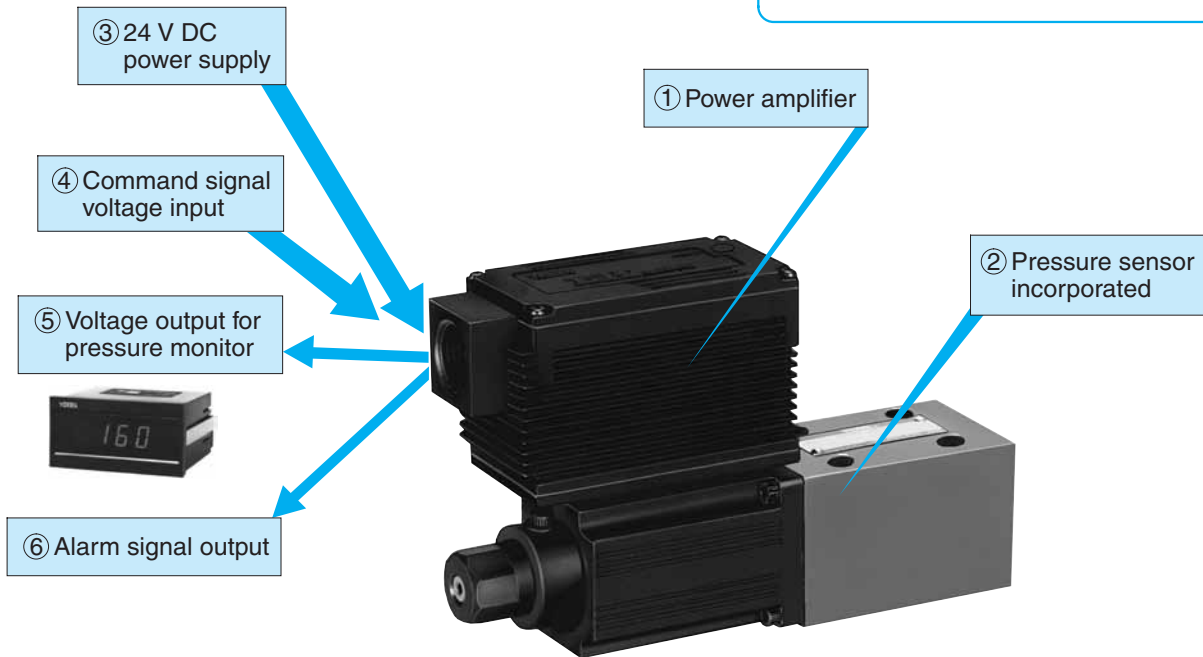


High-accuracy, simple, convenient

**EH** Series realizes your dreams.

### Why simple ?

Highly accurate hydraulic control can be obtained only by supplying 24 V DC power ③<sup>★3</sup> and inputting a command signal voltage of 0 to 5 V ④.<sup>★4</sup>



Details of Proportional Electro-hydraulic Relief Valve

### Why high-accuracy ?

The power amplifier ① and pressure sensor ②<sup>★1</sup> are integrated in the control valve. Furthermore, the closed-loop control <sup>★2</sup> design greatly improves the linearity, hysteresis and stability in control pressure.

- ★1. The sensor in directional control valves is to monitor the spool position. Valves without sensor are also available in both pressure control valves and directional control valves.
- ★2. Open-loop types are also available.
- ★3. EHDFG-04 and 06: ±24V DC power supply is needed.
- ★4. EHDFG-01, 03, 04 and 06: 0 to ±5V DC command signal is needed.
- ★5. EHDFG-04 and 06: The spool displacement is shown as a percentage.

### Why convenient ?

Analog voltages can be output by using the incorporated sensor for monitoring pressure, etc. ⑤<sup>★5</sup>. Pressure can be displayed remotely with the indicators obtainable in the market and also can be transmitted into a computer.

If any trouble arises in the system and the command signal does not match to the output, the alarm signal ⑥ is dispatched. The trouble, if arises, can be easily detected by monitoring the dispatch of the alarm signal with sequence controller or computer.

# EH Series-Hybrid Components

## Proportional Electro-Hydraulic Controls

Types	Graphic Symbols	Max. Operating Pressure MPa (PSI)	Maximum Flow												Page									
			L/min						U.S.GPM															
			.5	1	2	3	5	10	20	30	50	100	200	1	2	3	5	10	20	30	50	100	200	
Pilot Relief Valves		24.5 (3550)	EHDG 01												658									
Pressure Control Valves		SB1110: 24.5(3550) SB1190: 7(1020)	SB1110 SB1190												659									
Relief Valves		24.5 (3550)	EHBG 03 06 10												660									
Relieving and Reducing Valves		24.5 (3550)	EHRBG 06 10												661									
Flow Control (and Check) Valves		03: 20.6 (2990) 06: 24.5 (3550)	EHFG EHFCC 03 06												662									
Flow Control and Relief Valves		24.5 (3550)	EHFBG 03 06 10												663									
High Flow Series Flow Control and Relief Valves		24.5 (3550)	EHFBG 03 06												664									
Directional and Flow Control Valves		24.5 (3550)	EHDFG 01 03												665									
High Responses Type Directional and Flow Control Valves		15.7 (2280)	EHDFG 04 06												666									

Consult Yuken when detailed material such as dimensions figures is required.

## ■ Proportional Electro-Hydraulic Pilot Relief Valves

The valve can be used as a pilot valve of the Proportional Electro-Hydraulic Control Valves.

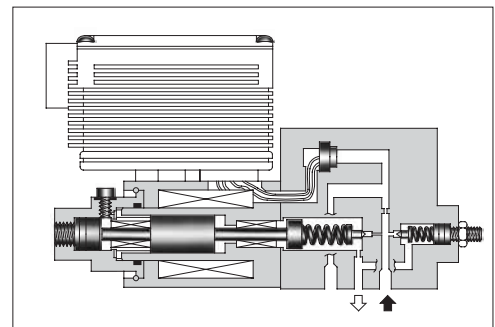
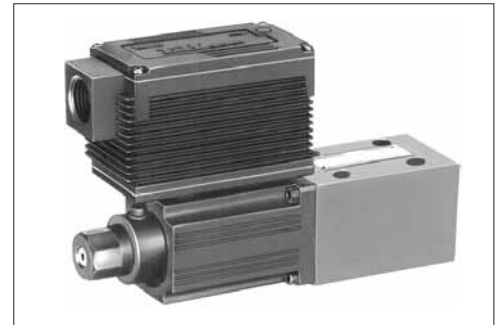
The valve can also be used as a relief valve for the hydraulic system where a small flow rate and continuous pressure control are required.

### ■ Specifications

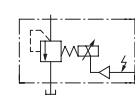
Model Numbers	EHDG-01*
Description	EHDG-01*
Max. Operating Pres.	24.5 MPa (3550 PSI)
Max. Flow	2 L/min (.53 U.S.GPM)
Min. Flow	0.3 L/min (.08 U.S.GPM)
Pressure Adjustment Range	Refer to Model Number Designation
Coil Resistance	10 Ω
Hysteresis	3% (1%)* <sup>1</sup> or less
Repeatability	1%* <sup>2</sup> or less
Frequency Response	B: 10 (27) Hz * <sup>1</sup> C: 10 (27) Hz * <sup>1</sup> (-90 degree) H: 12 (27) Hz * <sup>1</sup>
Supply Electric Power	24 V DC (21 to 28 V DC Included Ripple)
Power Input (Max.)	28 W
Input Signal	B: 6.9 MPa (1000 PSI) / 5 V DC C: 15.7 MPa (2275 PSI) / 5 V DC H: 24.5 MPa (3550 PSI) / 5 V DC
Input Impedance	10 kΩ
Alarm Signal Output (Open Collector)	Voltage: Max. 30 V DC Current: Max. 40 mA
Pressure Signal Output	B: 5 V DC / 6.9 MPa (1000 PSI) C: 5 V DC / 15.7 MPa (2275 PSI) H: 5 V DC / 24.5 MPa (3550 PSI)
Ambient Temperature	0 - 50°C (32 - 122°F) (With Circulated Air)

★1. The value in ( ) is for the closed-loop type.

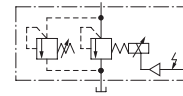
★2. The repeatability of the valve is obtained by having it tested independently on the conditions similar to its original testing.



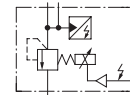
### Graphic Symbols



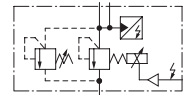
Open-Loop Type



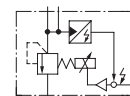
Open-Loop Type with Safety Valve



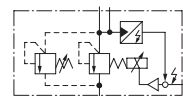
Open-Loop Type with Sensor



Open-Loop Type with Safety Valve & Sensor



Closed-Loop Type



Closed-Loop Type with Safety Valve

### ■ Model Number Designation

F-	EHD	G	-01	V	-B	-S	-1	-PN	T15	M10	-50
Special Seals	Series Number	Type of Mounting	Valve Size	Applicable Control	Pres. Adj. Range MPa (PSI)	Control Type	Safety Valve	P-Line Orifice	T-Line Orifice	P-B Line Orifice	Design Number
<b>F:</b> Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>EHD:</b> Proportional Electro-Hydraulic Pilot Relief Valve	<b>G:</b> Sub-plate Mounting	<b>01</b>	<b>None:</b> For general use <b>V:</b> Vent Control of Relief Valve (Omit if not required)	<b>B:</b> 0.5 - 6.9 (70 - 1000) <b>C:</b> 1 - 15.7 (145 - 2275) <b>H:</b> 1.2 - 24.5 (175 - 3550)	<b>None:</b> Open-Loop <b>S:</b> Open-Loop with Sensor <b>L:</b> Closed-Loop* <sup>1</sup>	<b>None:</b> Without Safety Valve <b>1:</b> With Safety Valve	<b>PN:</b> Without Orifice (Standard)	<b>T15</b> <b>T13</b> <b>T11</b> * <sup>2</sup>	<b>M10:</b> Standard Orifice	<b>50</b>

★1. For closed-loop models, specify applicable control code "V" even though the valve may not be used as vent control of relief valve.

★2. Standard of T-line Orifice.  
Pres. Adj. Range B:T15, C:T13, H:T11.

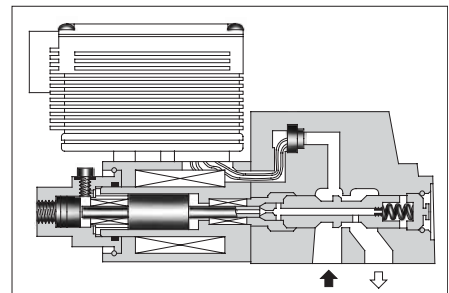
## ■ Proportional Electro-Hydraulic Pressure Control Valves

These are closed-loop type pressure control valves controlling the system pressure from low to high in proportion to the input voltage. The stable pressure control is possible even in a small flow rate.

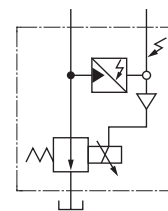


### ■ Specifications

Model Numbers	SB1110	SB1190
Description		
Max. Operating Pres.	B: 6.9 MPa (1000 PSI) H: 24.5MPa (3550 PSI)	7.0MPa (1020 PSI)
Max. Flow	30 L/min (7.93 U.S.GPM)	70 L/min (18.49 U.S.GPM)
Min. Flow	B: 0.5 L/min (.13 U.S.GPM) H: 0.5 L/min (.13 U.S.GPM) at 0.2 - 6.9 MPa (29 - 1000 PSI) 1.5 L/min (.40 U.S.GPM) at 6.9 - 15.7 MPa (1000 - 2275 PSI) 3.0 L/min (.79 U.S.GPM) at 15.7 - 24.5 MPa (2275 - 3550 PSI)	1 L/min (.26 U.S.GPM)
Pressure Adjustment Range	Refer to Model Number Designation	
Coil Resistance	10 Ω	
Hysteresis	1 % or less	1.5 % or less
Repeatability	1 % <sup>★1</sup> or less	
Supply Electric Power	24 V DC (21 to 28 V DC Included Ripple)	
Power Input (Max.)	28 W	
Input Signal	B: 6.9 MPa (1000 PSI) / 5 V DC H: 24.5 MPa (3550 PSI) / 5 V DC	7.0 MPa (1020 PSI) / 5 V DC
Input Impedance	10 kΩ	
Alarm Signal Output (Open Collector)	Voltage: Max. 30 V DC Current: Max. 40 mA	
Pressure Signal Output	B: 5 V DC / 6.9 MPa (1000 PSI) H: 5 V DC / 24.5 MPa (3550 PSI)	5 V DC / 7.0 MPa (1020 PSI)
Ambient Temperature	0 - 50°C (32 - 122°F) (With Circulated Air)	



Graphic Symbol



★ 1. The repeatability of the valve is obtained by having it tested independently on the conditions similar to its original testing.

### ■ Model Number Designation

F-	SB1110	-B	-20
Special Seals	Series Number	Pres. Adj. Range MPa (PSI)	Design Number
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>SB1110:</b> Proportional Electro-Hydraulic Pressure Control Valve (3/8, Sub-plate mounting)	<b>B:</b> 0.2 <sup>★</sup> - 6.9 (29 - 1000) <b>H:</b> 0.2 <sup>★</sup> - 24.5 (29 - 3550)	<b>20</b>
	<b>SB1190:</b> Proportional Electro-Hydraulic Pressure Control Valve (3/4, Sub-plate mounting)	<b>B:</b> 0.2 <sup>★</sup> - 7.0 (29 - 1020)	<b>10</b>

★ The minimum adjustable pressure is the value obtained at maximum flow rate.

## ■ Proportional Electro-Hydraulic Relief Valves

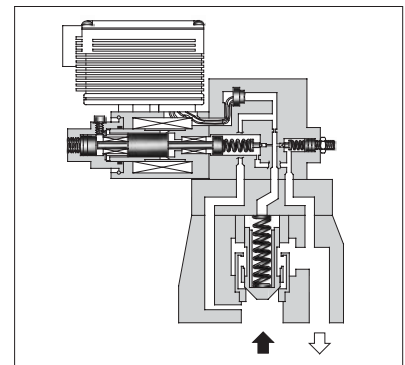
These valves, consist of a small size but high performance EH series electro-hydraulic proportional pilot relief valve and a low noise type relief valve. The valves control the system pressure proportionally through a controlled input voltage.

### ■ Specifications

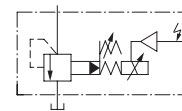
Model Numbers	EHBG-03	EHBG-06	EHBG-10
Description			
Max. Operating Pres.	24.5 MPa (3550 PSI)		
Max. Flow	100 L/min (26.4 U.S.GPM)	200 L/min (52.8 U.S.GPM)	400 L/min (106 U.S.GPM)
Min. Flow	3 L/min (.79 U.S.GPM)	3 L/min (.79 U.S.GPM)	3 L/min (.79 U.S.GPM)
Pressure Adjustment Range	Refer to Model Number Designation		
Coil Resistance	10 Ω		
Hysteresis	2% (1%) <sup>*1</sup> or less		
Repeatability	1% <sup>*2</sup> or less		
Frequency Response	C: 10 (22) Hz <sup>*1</sup> H: 10 (25) Hz <sup>*1</sup> (-90 degree)	C: 11 (22) Hz <sup>*1</sup> H: 13 (24.5) Hz <sup>*1</sup> (-90 degree)	C: 7 (10.5) Hz <sup>*1</sup> H: 6 (14) Hz <sup>*1</sup> (-90 degree)
Supply Electric Power	24 V DC (21 to 28 V DC Included Ripple)		
Power Input (Max.)	28 W		
Input Signal	C: 15.7 MPa (2275 PSI) / 5 V DC H: 24.5 MPa (3550 PSI) / 5 V DC (At Max. Flow)		
Input Impedance	10 kΩ		
Alarm Signal Output (Open Collector)	Voltage: Max. 30 V DC Current: Max. 40 mA		
Pressure Signal Output	C: 5 V DC / 15.7 MPa (2275 PSI) H: 5 V DC / 24.5 MPa (3550 PSI)		
Ambient Temperature	0 - 50°C (32 - 122°F) (With Circulated Air)		

★1. The value in ( ) is for the closed-loop type.

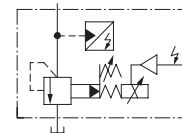
★2. The repeatability of the valve is obtained by having it tested independently on the conditions similar to its original testing.



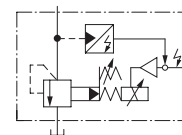
Graphic Symbols



Open-Loop Type



Open-Loop Type with Sensor



Closed-Loop Type

### ■ Model Number Designation

F-	EHB	G	-03	-C	-S	-50
Special Seals	Series Number	Type of Mounting	Valve Size	Pres. Adj. Range MPa (PSI)	Control Type	Design Number
<b>F:</b> Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>EHB:</b> Proportional Electro-Hydraulic Relief Valve	<b>G:</b> Sub-plate Mounting	<b>03</b>	<b>C:</b> 0.6 [0.8] <sup>*1</sup> - 15.7 (85 [115] <sup>*1</sup> - 2275) <b>H:</b> 0.6 [0.8] <sup>*1</sup> - 24.5 (85 [115] <sup>*1</sup> - 3550)	<b>None:</b> Open-Loop	<b>50</b>
			<b>06</b>	<b>C:</b> 0.9 [1.0] <sup>*1</sup> - 15.7 (130 [145] <sup>*1</sup> - 2275) <b>H:</b> 0.9 [1.0] <sup>*1</sup> - 24.5 (130 [145] <sup>*1</sup> - 3550)		<b>S:</b> Open-Loop with Sensor
			<b>10</b>	<b>C:</b> 1.1 [1.4] <sup>*1</sup> - 15.7 (160 [205] <sup>*1</sup> - 2275) <b>H:</b> 1.1 [1.4] <sup>*1</sup> - 24.5 (160 [205] <sup>*1</sup> - 3550)	<b>L:</b> Closed-Loop	<b>50</b>

★ Each value of minimum adjustment pressure is of at 50% flow rate of the Max. Flow shown on the Specifications. The value in [ ] is for the closed-loop type.

## ■ Proportional Electro-Hydraulic Relieving and Reducing Valves

These valves consist of a small size but high performance electro-hydraulic proportional pilot relief valve and reducing valve with relief function. The valves control the system pressure proportionally through a controlled input voltage.

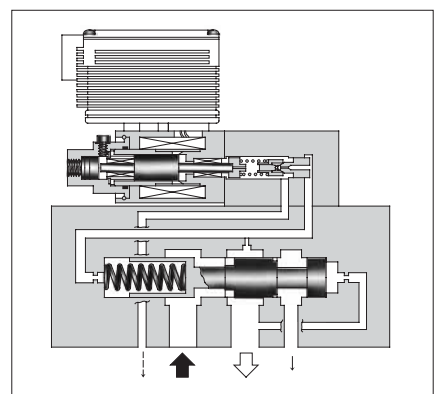
Moreover, a good response speed in reducing the pressure even at a large load capacity can be obtained with the relief function of the valves.



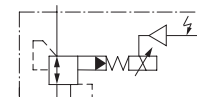
### ■ Specifications

Model Numbers	EHRBG-06	EHRBG-10
Description		
Max. Operating Pres.	24.5 MPa (3550 PSI)	
Max. Flow	100 L/min (26.4 U.S.GPM)	250 L/min (66 U.S.GPM)
Max. Relieving Flow	35 L/min <sup>★1</sup> (9.24 U.S.GPM)	15 L/min <sup>★1</sup> (3.96 U.S.GPM)
Pressure Adjustment Range	Refer to Model Number Designation	
Coil Resistance	10 Ω	
Hysteresis	3% or less	
Repeatability	1% <sup>★2</sup> or less	
Frequency Response	B: 4 Hz C: 3 Hz (-90 degree) H: 3 Hz	
Supply Electric Power	24 V DC (21 to 28 V DC Included Ripple)	
Power Input (Max.)	28 W	
Input Signal	B: 6.9 MPa (1000 PSI) / 5 V DC C: 13.7 MPa (2000 PSI) / 5 V DC H: 20.6 MPa (3000 PSI) / 5 V DC (at Flow Rate Zero)	
Input Impedance	10 k Ω	
Pressure Signal Output	B: 5 V DC / 6.9 MPa (1000 PSI) C: 5 V DC / 13.7 MPa (2000 PSI) H: 5 V DC / 20.6 MPa (3000 PSI)	
Ambient Temperature	0 - 50°C (32 - 122°F) (With Circulated Air)	

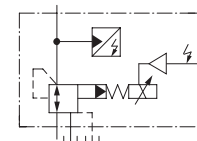
- ★1. The figures shown are those obtained where the differential pressure between the secondary pressure port and tank port is 14 MPa (2030 PSI).
- ★2. The repeatability of the valve is obtained by having it tested independently on the conditions similar to its original testing.



Graphic Symbols



Open-Loop Type



Open-Loop Type with Sensor

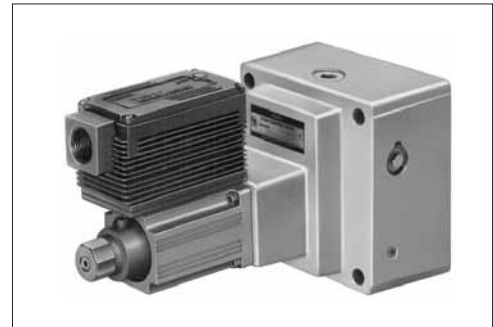
### ■ Model Number Designation

F-	EHRB	G	-06	-C	-S	-50
Special Seals	Series Number	Type of Mounting	Valve Size	Pres. Adj. Range MPa (PSI)	Control Type	Design Number
<b>F:</b> Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>EHRB:</b> Proportional Electro-Hydraulic Relieving & Reducing Valve	<b>G:</b> Sub-plate Mounting	06	<b>B:</b> 0.8 - 6.9 (115 - 1000) <b>C:</b> 1.2 - 13.7 (175 - 2000) <b>H:</b> 1.5 - 20.6 (220 - 3000)	None: Open-Loop	50
			10	<b>B:</b> 0.9 - 6.9 (130 - 1000) <b>C:</b> 1.2 - 13.7 (175 - 2000) <b>H:</b> 1.5 - 20.6 (220 - 3000)	S: Open-Loop with Sensor	50



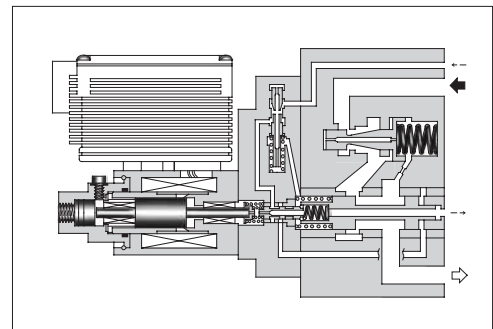
## ■ Proportional Electro-Hydraulic Flow Control (and Check) Valves

The system flow rate can be controlled remotely as desired by regulating input voltage. Further, since pressure and temperature compensation functions are provided, the preselected flow rate is not affected by pressure (load) or temperature (fluid viscosity).



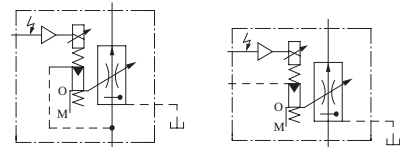
### ■ Specifications

Model Numbers		EHF*G-03- 60 125	EHF*G-06-250
Description			
Max. Operating Pres. MPa (PSI)		20.6 (3000)	24.5 (3550)
Max. Metred Flow L/min (U.S.GPM)		60: 60 (15.8) 125: 125 (33)	250 (66)
Min. Metred Flow L/min (U.S.GPM)		1 (.26)	2.5 (.66)
Min. Differential Pressure *1 MPa (PSI)		1.0 (145)	1.0 (145)
Free Flow L/min (U.S.GPM) (Only with Check Valve)		130 (34.3)	280 (73.9)
Pilot Flow L/min (U.S.GPM)	at Normal	0.5 (.13)	1 (.26)
	at Transition	2.6 (.69)	4 (1.06)
Min. Pilot Pressure MPa (PSI)		1.0 (145)	1.5 (215)
Frequency Response		12 Hz (-90 degree)	
Hysteresis		3% or less	
Repeatability		1% *2 or less	
Coil Resistance		10 Ω	
Supply Electric Power		24 V DC (21 to 28 V DC Included Ripple)	
Power Input (Max.)		28 W	
Input signal		Max. Metred Flow / 5V DC	
Input Impedance		10 kΩ	
Ambient Temperature		0 - 50°C (32 - 122°F) (With Circulated Air)	



### Graphic Symbols

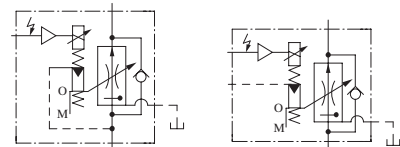
#### ● EHF



Internal Pilot

External Pilot

#### ● EHF



Internal Pilot

External Pilot

- ★1. Minimum differential pressure means fine pressure compensation at inlet and outlet port.
- ★2. The repeatability of the valve is obtained by having it tested independently on the conditions similar to its original testing.

### ■ Model Number Designation

F-	EHF	G	-03	-60	-E	-50
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min (U.S.GPM)	Pilot Connection	Design Number
<b>F:</b> Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>EHF:</b> Proportional Electro-Hydraulic Flow Control Valve  <b>EHFC:</b> Proportional Electro-Hydraulic Flow Control and Check Valve	<b>G:</b> Sub-plate Mounting	<b>03</b>	<b>60:</b> 60 (15.8) <b>125:</b> 125 (33)	<b>None:</b> Internal Pilot	<b>50</b>
			<b>06</b>	<b>250:</b> 250 (66)	<b>E:</b> External Pilot	<b>50</b>



## ■ Proportional Electro-Hydraulic Flow Control and Relief Valves

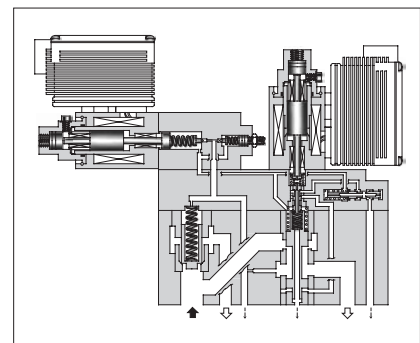
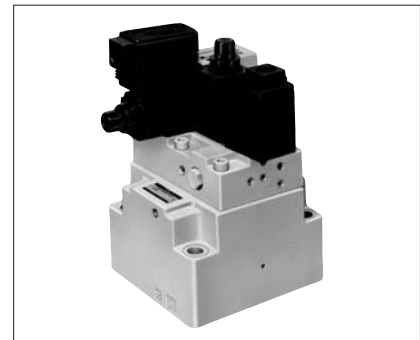
These are proportional electro-hydraulic flow control valves having functions for controlling the direct electric current of metre-in type and for pressure control.

They are energy-saving valves for supplying the minimum pressure and flow required to operate actuators.

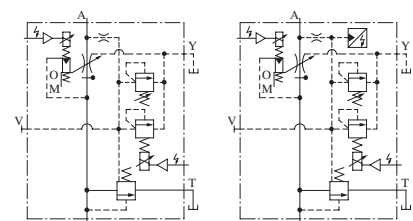
### ■ Specifications

Model Numbers		EHFBG-03- <sub>60</sub> / <sub>125</sub>	EHFBG-06-250	EHFBG-10-500
Description				
Max. Operating Pressure MPa (PSI)		24.5 (3550)	24.5 (3550)	24.5 (3550)
Max. Flow		60: 60 (15.8) 125: 125 (33)	250 (66)	500 (132)
Metred Flow Capacity		60: 1-60(.26-15.8) 125: 1-125(.26-33)	2.5-250 (.66-66)	5-500 (1.32-132)
Min. Pilot Pressure MPa (PSI)		1.5 (215)	1.5 (215)	1.5 (215)
Pilot Flow	at Normal	1 (.26)	1 (.26)	1 (.26)
	at Transition	3 (.79)	4 (1.06)	6 (1.59)
Differential Pressure MPa (PSI)		0.6 (85)	0.7 (100)	0.9 (130)
Flow Controls	Hysteresis	3% or less		
	Repeatability	1%* or less		
	Input Signal	Max. Flow / 5 V DC		
	Coil Resistance	10 Ω		
	Supply Electric Power	24 V DC (21 to 28 V DC Included Ripple)		
	Input Impedance	10 kΩ		
	Power Input (Max.)	28 W		
Pressure Controls	Pres. Adj. Range	Adj. Range: C 1.2-15.7 (175-2275) Adj. Range: H 1.4-24.5 (200-3550)	1.4-15.7 (200-2275)	1.5-15.7 (215-2275)
	Hysteresis	2% or less		
	Repeatability	1%* or less		
	Coil Resistance	10 Ω		
	Input Signal	Max. Operating Pres. / 5 V DC		
	Supply Electric Power	24 V DC (21 to 28 V DC Included Ripple)		
	Power Input (Max.)	28 W		
Output Signal	C : 5 V DC / 15.7 MPa (2275 PSI) H : 5 V DC / 24.5 MPa (3550 PSI)			
Ambient Temperature	0 - 50°C (32 - 122°F) (With Circulated Air)			

\*The repeatability of the valves is obtained by having it tested independently on the conditions similar to its original testing.

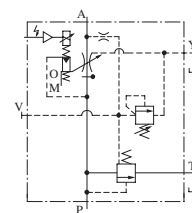


Graphic Symbols



Models with Proportional Pilot Relief Valve

Models with Proportional Pilot Relief Valve and Sensor



Models without Proportional Pilot Relief Valve



External Pilot Pres. Connection

### ■ Model Number Designation

F-	EHFB	G	-03	-60	-C	-E	-S	-50
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min (U.S.GPM)	Pilot Relief Valve Pres. Adj. Range	Pilot Connection of Flow Control	Pressure Controls	Design Number
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	EHFB: Proportional Electro-Hydraulic Flow Control and Relief Valve	G: Sub-plate Mounting	03	60: 60 (15.8) 125: 125 (33)	None: Without Proportional Pilot Relief Valve	None: Internal Pilot E: External Pilot	None: Open-Loop S: Open-Loop with Sensor	50
			06	250: 250 (66)				50
			10	500: 500 (132)	C, H: See Specifications			50

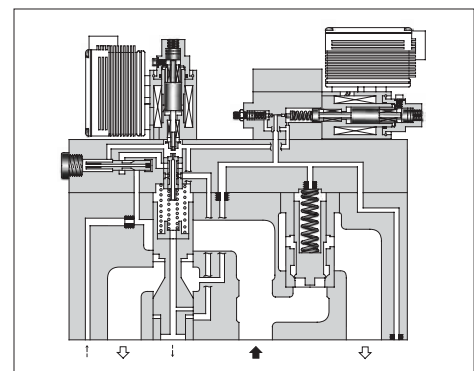
# High Flow Series Proportional Electro-Hydraulic Flow Control and Relief Valves

This flow control and relief valve is a 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 → 66 U.S.GPM), 06 size: 250 → 500 L/min (66 → 132 U.S.GPM)] enables a smaller valve size than conventional products; compact-sized devices can be provided.

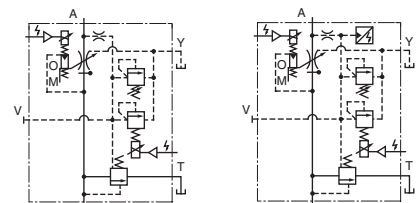
## Specifications

Model Numbers		EHFBG-03-250	EHFBG-06-500
Description			
Max. Operating Pressure	MPa (PSI)	24.5 (3550)	24.5 (3550)
Max. Flow	L/min (U.S.GPM)	250 (66)	500 (132)
Metred Flow Capacity	L/min (U.S.GPM)	2.5-250 (.66-66)	5-500 (1.32-132)
Min. Pilot Pressure	MPa (PSI)	1.5 (215)	1.5 (215)
Pilot Flow	at Normal	1 (.26)	1 (.26)
	at Transition	4 (1.06)	6 (1.59)
Differential Pressure	MPa (PSI)	0.8 (115)	0.9 (130)
Flow Controls	Hysteresis	3% or less	
	Repeatability	1%* or less	
	Input Signal	Max. Flow / 5 V DC	
	Coil Resistance	10 Ω	
	Supply Electric Power	24 V DC (21 to 28 V DC Included Ripple)	
	Input Impedance	10 kΩ	
	Power Input (Max.)	28 W	
Pressure Controls	Pres. Adj. Range	Adj. Range: C	1.6-15.7 (230-2275)
	MPa (PSI)	Adj. Range: H	1.5-15.7 (215-2275)
			1.8-24.5 (260-3550)
	Hysteresis	3% or less	
	Repeatability	1%* or less	
	Coil Resistance	10 Ω	
	Input Signal	Max. Operating Pres. / 5 V DC	
Supply Electric Power	24 V DC (21 to 28 V DC Included Ripple)		
Input Impedance	10 kΩ		
Power Input (Max.)	28 W		
Output Signal	C : 5 V DC / 15.7 MPa (2275 PSI) H : 5 V DC / 24.5 MPa (3550 PSI)		
Ambient Temperature	0 - 50°C (32 - 122°F) (With Circulated Air)		

\* The repeatability of the valves is obtained by having it tested independently on the conditions similar to its original testing.

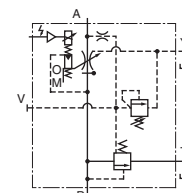


### Graphic Symbols



Models with Proportional Pilot Relief Valve

Models with Proportional Pilot Relief Valve and Sensor



Models without Proportional Pilot Relief Valve



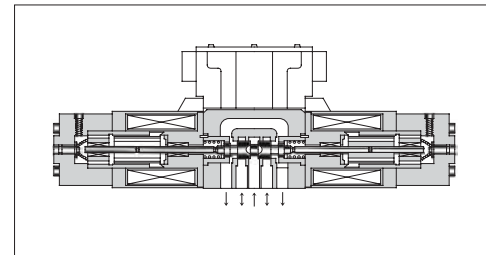
External Pilot Pres. Connection

## Model Number Designation

F-	EHFB	G	-03	-250	-C	-E	-S	-50
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min (U.S.GPM)	Pilot Relief Valve Pres. Adj. Range	Pilot Connection of Flow Control	Pressure Controls	Design Number
<b>F:</b> Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>EHFB:</b> Proportional Electro-Hydraulic Flow Control and Relief Valve	<b>G:</b> Sub-plate Mounting	<b>03</b>	<b>250:</b> 125 (66)	<b>None:</b> Without Proportional Pilot Relief Valve <b>C, H:</b> See Specifications	<b>None:</b> Internal Pilot <b>E:</b> External Pilot	<b>None:</b> Open-Loop <b>S:</b> Open-Loop with Sensor	<b>50</b>
			<b>06</b>	<b>500:</b> 500 (132)				<b>50</b>

## Proportional Electro-Hydraulic Directional and Flow Control Valves

These valves incorporate two control functions - flow and direction - which simplify the hydraulic circuit composition and therefore the cost of the system is reduced.



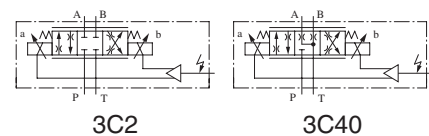
### Specifications

		Model Numbers	EHDFG-01	EHDFG-03
Description				
Max. Operating Pressure	MPa (PSI)		24.5 (3550)	24.5 (3550)
Max. Tank Line Back Pres.	MPa (PSI)		7 (1020)	7 (1020)
Rated Flow	L/min (U.S.GPM)		30 (7.92)	60 (15.9)
[Valve ΔP 6.9 MPa (1000 PSI)]				
Hysteresis			5% or less	
Repeatability			1%* or less	
Frequency Response			20 Hz (-90 deg.)	17 Hz (-90 deg.)
Coil Resistance			10.5 Ω	8.0 Ω
Supply Electric Power			24 V DC (21 to 28 V DC Included Ripple)	
Input Voltage	By Controlling Variable Resistance (Using of Power from Amp.)		1 - 2 kΩ Volume Range	
	By Controlling Voltage (Using of Power outside Amp.)		0 - -5 V for SOL a	0 - +5 V for SOL b
Input Impedance			10 kΩ	10 kΩ
Power Input (Max.)			40 W	45 W
Ambient Temperature			0 - 50°C (32 - 122°F) (With Circulated Air)	

\* The repeatability of the valves is obtained by having it tested independently on the conditions similar to its original testing.

### Graphic Symbols

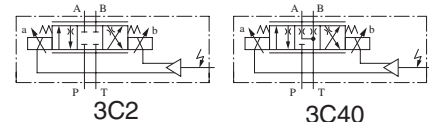
#### ● Metre-in • Metre-out Control



3C2

3C40

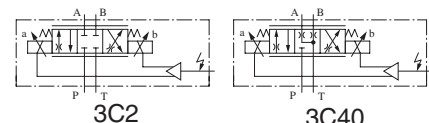
#### ● Metre-out Control



3C2

3C40

#### ● Metre-in Control



3C2

3C40

### Model Number Designation

F-	EHDF	G	-01	-30	-3C2	-E	-30
Special Seals	Series Number	Type of Mounting	Valve Size	Rated Flow L/min (U.S.GPM)	Spool Type*	Direction of Flow	Design Number
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	EHDF: Proportional Electro-Hydraulic Directional and Flow Control Valve	G: Sub-plate Mounting	01	30: 30 (7.92)	3C2	XY : Metre-in • Metre-out X : Metre-in Y : Metre-out	30
			03	60: 60 (15.9)	3C40		30

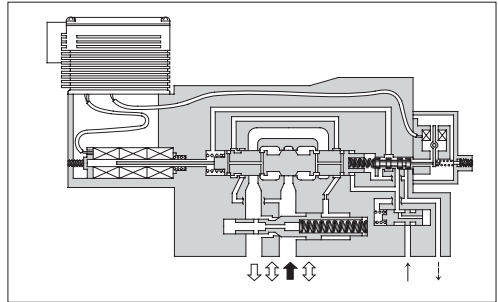
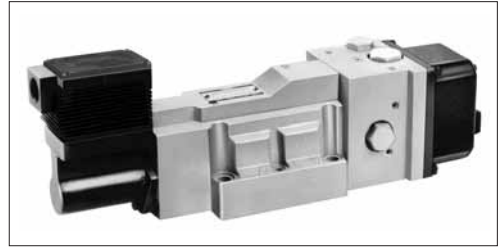
\* Spool type shown in the column is for the centre position.

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

These valves pursue the ultimate performance of proportional electro-hydraulic directional & flow control valves and make themselves to have high response features.

The closed-loop is composed in the valve inside by combination of a differential transformer (LVDT) and a power amplifier. Thus, high accuracy and reliability are provided.

In addition to control in the open-loop, these can be used for the closed-loop system as simplified servo valves.



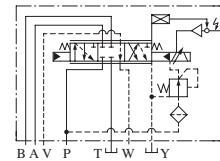
## Specifications

Model Numbers		EHDFG-04	EHDFG-06
Description			
Max. Operating Pres.	MPa (PSI)	15.7 (2280)	15.7 (2280)
Rated Flow	L/min (U.S.GPM)	130 (34.3)	280 (73.9)
Valve Pres. Difference:	1.5 MPa (215 PSI)		
Min. Required Pilot Pres.	MPa (PSI)	1.5 (215)	1.5 (215)
Min. Required Pilot Flow	at Normal	2 (.53)	2 (.53)
	L/min (U.S.GPM)	at Transition	10 (2.64)
Max. Drain Line Back Pres.	MPa (PSI)	0.1 (15)	0.1 (15)
Hysteresis		1% or less	
Repeatability		1%* or less	
Frequency Response		55 Hz (-90 deg.)	45 Hz (-90 deg.)
Coil Resistance		30 Ω	30 Ω
Supply Electric Power		±24 V DC (±21 to ±28 V DC Included Ripple)	
Input Signal		Rated Flow / ±5 V DC	
Input Impedance		10 k Ω	10 k Ω
Power Input (Max.)		20 W	20 W
Alarm Signal Output (Open Collector)		Voltage: Max. 30 V DC Current: Max. 30 mA	
LVDT Output (Sensor Monitor)		±5 V DC / Rated Travel of Spool	
Ambient Temperature		0 - 50°C (32 - 122°F) (With Circulated Air)	

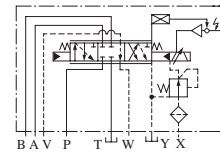
\*The repeatability of the valves is obtained by having it tested independently on the conditions similar to its original testing.

### Graphic Symbols

- Models without Pressure Compensator Valve

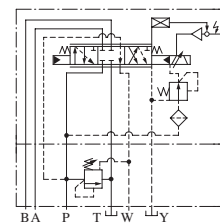


Internal Pilot



External Pilot

- Models with Pressure Compensator Valve



Internal Pilot

## Model Number Designation

F-	EHDF	G	-04	-130	-2	-E	-CB	-10
Special Seals	Series Number	Type of Mounting	Valve Size	Rated Flow L/min (U.S.GPM)	Spool Type*	Pilot Connection	Relief Type Pres. Compensator	Design Number
<b>F:</b> Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>EHDF:</b> Proportional Electro-Hydraulic Directional and Flow Control Valve	<b>G:</b> Sub-plate Mounting	<b>04</b>	<b>130:</b> 130 (34.3)	<b>2</b>	<b>None:</b> Internal Pilot	<b>None:</b> Not Provided	<b>10</b>
			<b>06</b>	<b>280:</b> 280 (73.9)	<b>40</b>	<b>E:</b> External Pilot	<b>CB:</b> Provided	<b>10</b>

\* Spool type shown in the column is for the centre position.

# 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 <sup>2</sup> /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 <sup>2</sup> /s (98 - 900 SSU)	
Directional and Flow Control Valves	20 - 400 mm <sup>2</sup> /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 <sup>2</sup> /s (98 - 900 SSU)	0 - +60°C (32 - 140°F)
High Responses Type Directional and Flow Control Valves (Two Stage Type)	15 - 400 mm <sup>2</sup> /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.

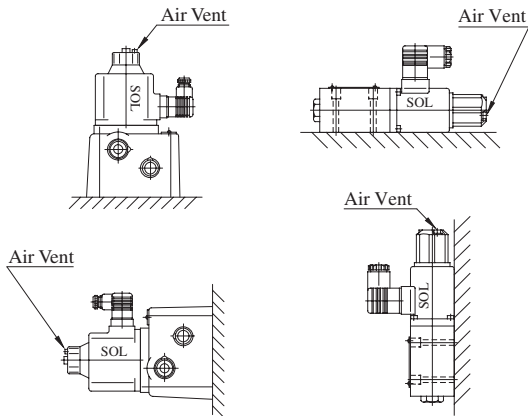
**Instructions**

**Mounting**

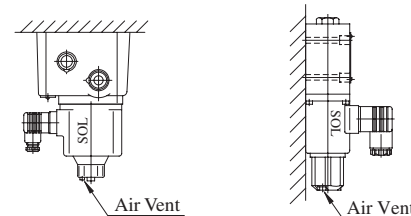
Be sure that the air vent faces up.

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

**[Good example]**



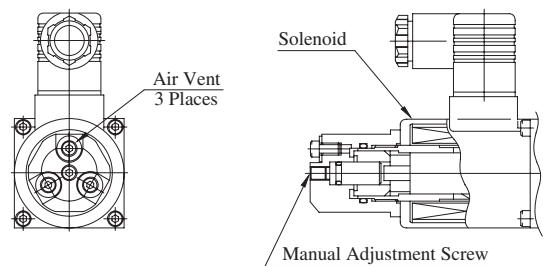
**[Bad example]**



**Air Bleeding**

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

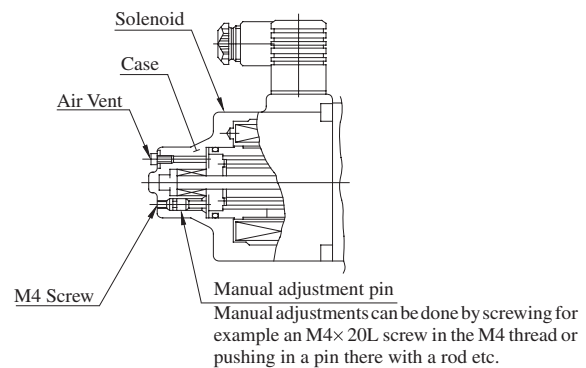
Bleeding can be done by slowly loosening one of the air vents at the end of the solenoid. Choose one of the three air vents which is expected to work most effectively (see the figure to the right).



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**

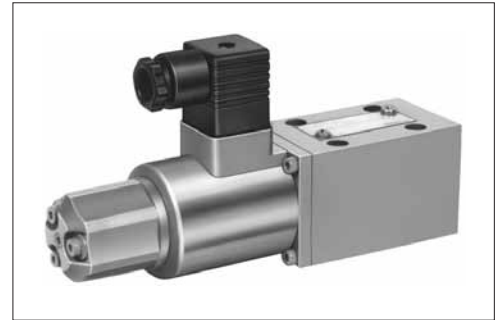
The hysteresis and repeatability values indicated in the specifications for each control valve are determined under the following conditions:

- 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.



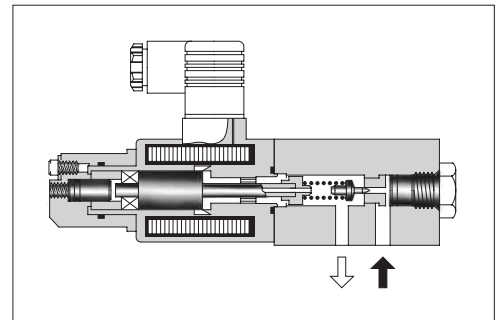
## ■ Proportional Electro-Hydraulic Pilot Relief Valves

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.

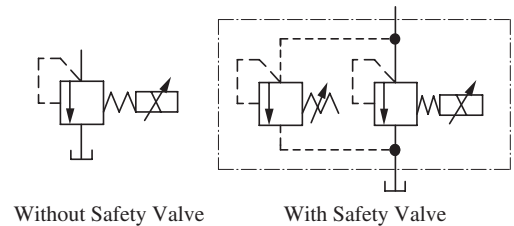


### ■ Specifications

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

★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 cm<sup>3</sup> (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](#)).

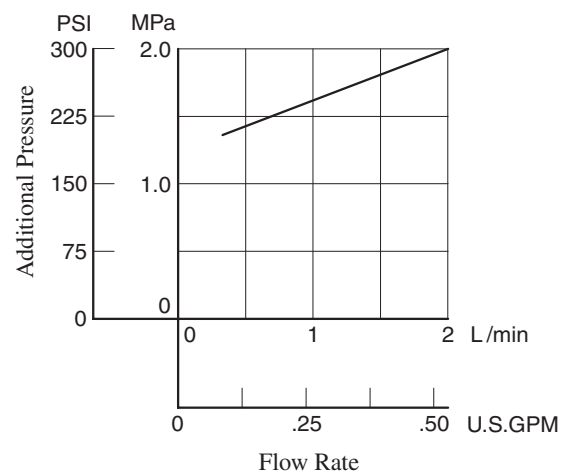
Model Numbers : AME-D-10-\*-20  
 AME-D2-1010-11  
 SK1022-\*\*-\*-11  
 SK1015-11 (For DC power supply)  
 AMN-D-10 (For DC power supply)

### 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.

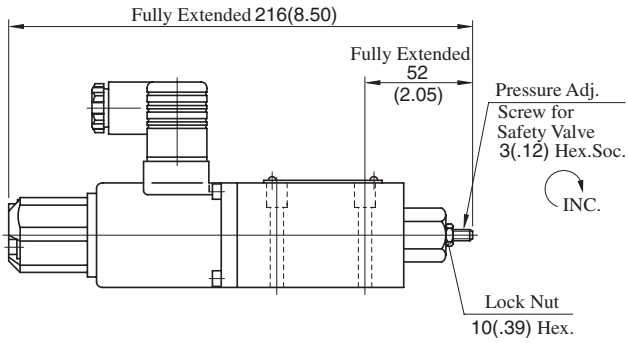
Setting pressure = (Operating pressure upper limit) + (Additional pressure indicated below)



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

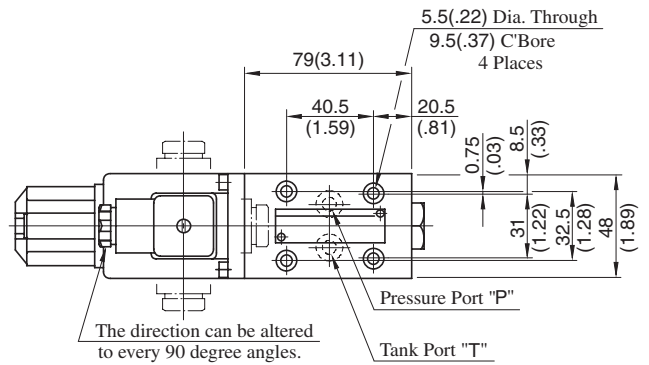
With Safety Valve



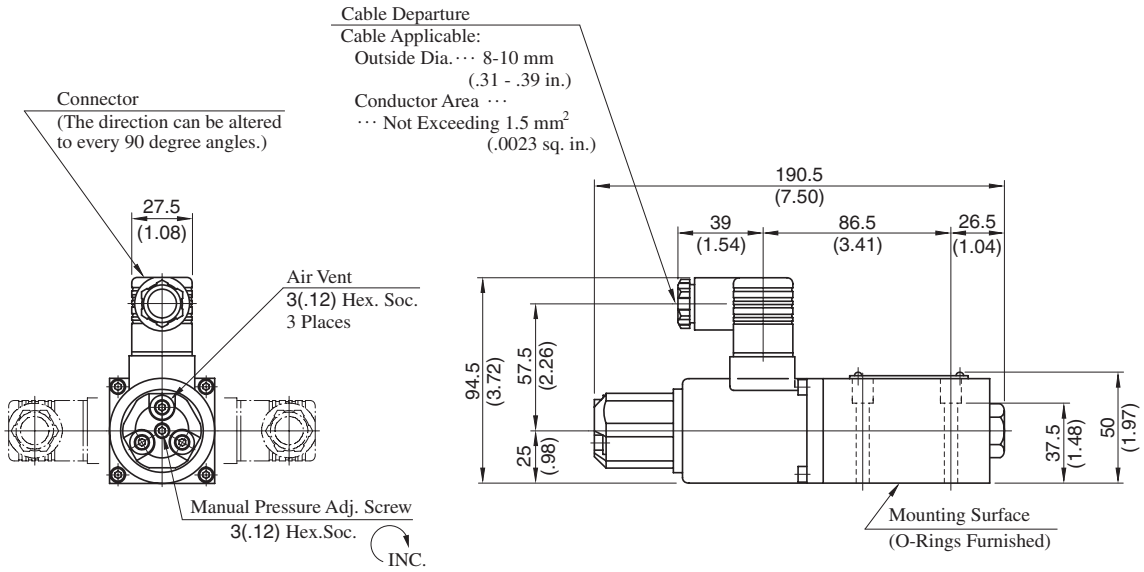
• For other dimensions, refer to the without safety valve.

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

Without Safety Valve



**DIMENSIONS IN MILLIMETRES (INCHES)**

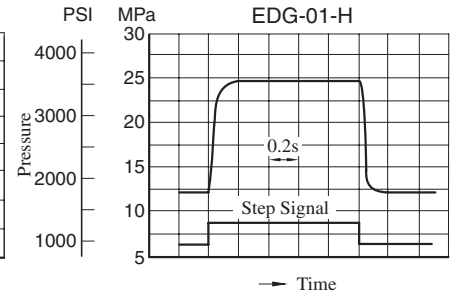
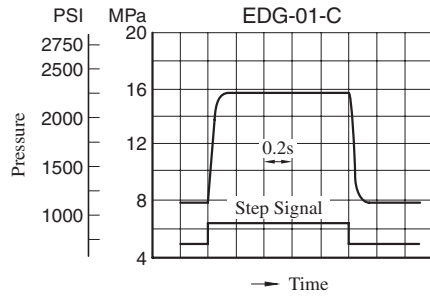
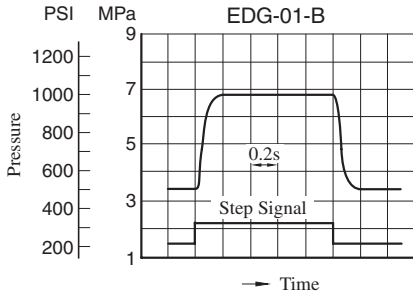


Note: For valve mounting surface dimensions, see the dimensional drawings of sub-plates (P.356) in common use.

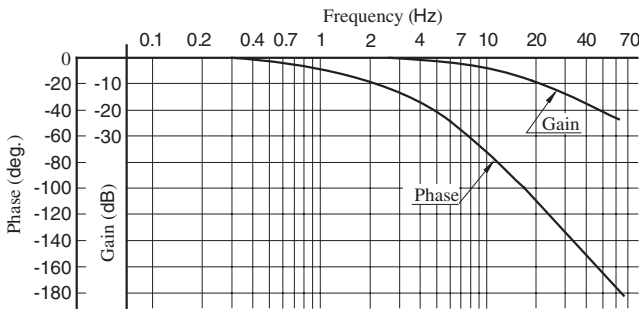
**Step Response (Example)**

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 cm<sup>3</sup> (2.44 cu. in.)  
 Viscosity : 30 mm<sup>2</sup>/s (141 SSU)

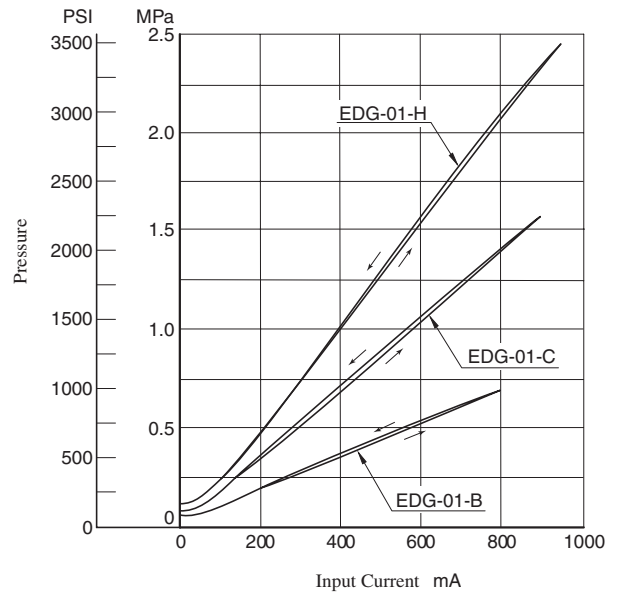


**Frequency Response**



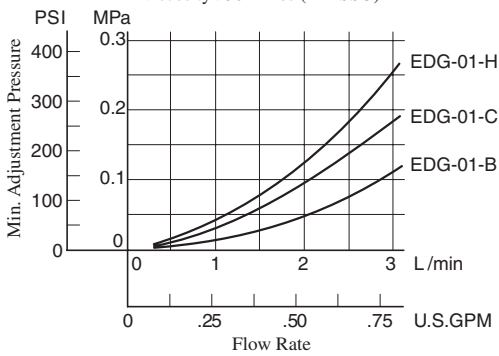
Flow Rate : 2 L/min (.53 U.S. GPM)  
 Pressure : 7.8 ± 1.6 MPa (1130 ± 230 PSI)  
 Trapped Oil Volume : 30 cm<sup>3</sup> (1.83 cu. in.)  
 Viscosity : 30 mm<sup>2</sup>/s (141 SSU)

**Control Pressure vs. Input Current**



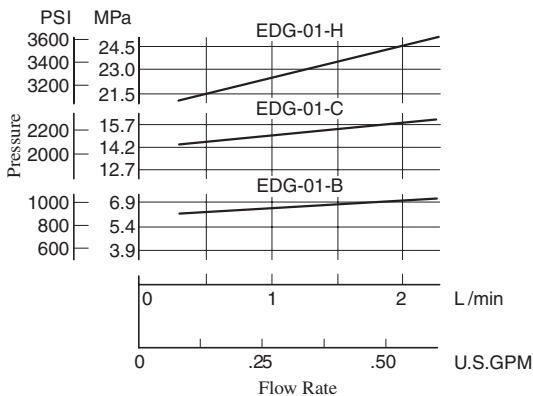
**Min. Adjustment Pressure**

Viscosity : 30 mm<sup>2</sup>/s (141 SSU)



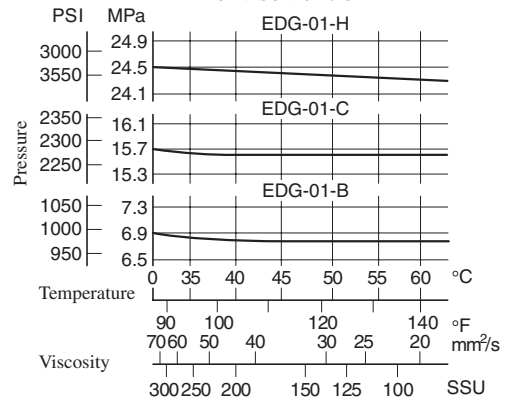
**Flow Rate vs. Pressure**

Viscosity : 30 mm<sup>2</sup>/s (141 SSU)



**Viscosity vs. Pressure**

Flow Rate : 2 L/min (.53 U.S. GPM)  
 Oil : ISO VG 46 Oil



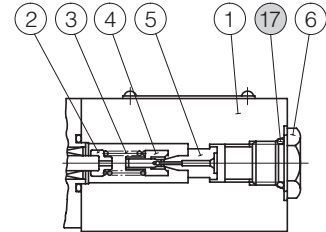
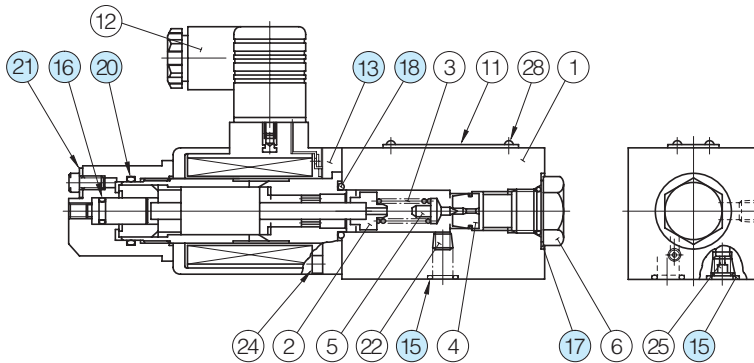
■ List of Seals and Solenoid Ass'y

● Without Safety Valve

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

EDG-01V- \*-PNT\*-5103

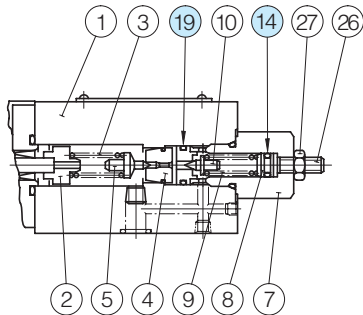
EDG-01- \*-PNT\*-5101



● 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

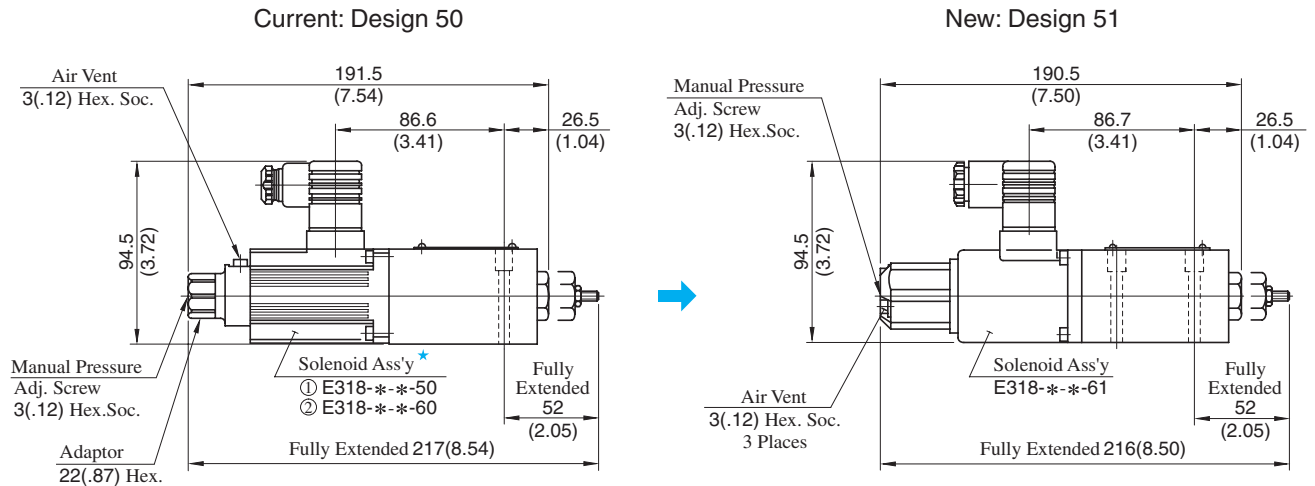
EDG-01 series valve has changed model from 50 to 51 design in line with the solenoid improvement.

### 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

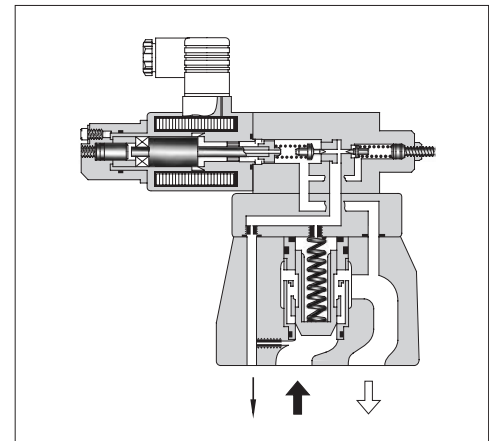
This valve is derived by combining a small, high-performance 1/8 proportional electro-hydraulic pilot relief valve with a specially developed low-noise relief valve.

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.

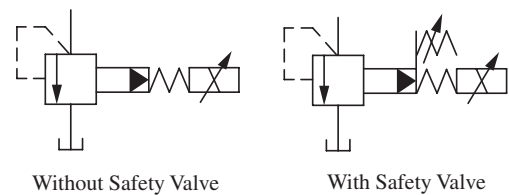


### ■ Specifications

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
<b>F:</b> Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>EB:</b> Proportional Electro-Hydraulic Relief Valve	<b>G:</b> Sub-plate Mounting	03	<b>C:</b> * - 15.7 (* - 2275) <b>H:</b> * - 24.5 (* - 3550)	<b>None:</b> With Safety Valve <b>T:</b> Without Safety Valve	51	Refer to <sup>★2</sup>
			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

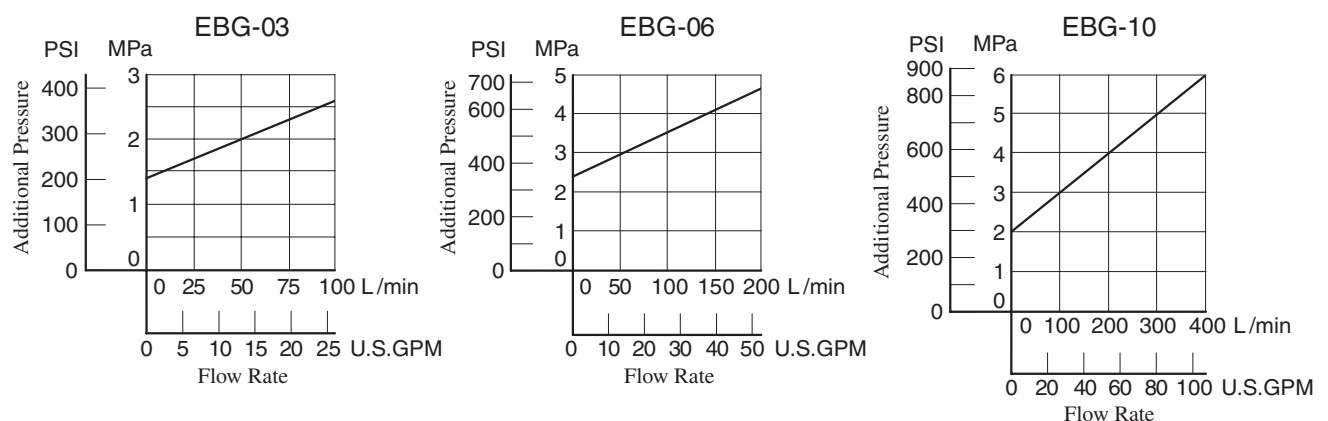
The pressure of the safety valve for EBG-03 is preset at the value equal to the upper limit of the pressure adjustment range plus 2 MPa (290 PSI) subject to a flow rate of 50 L/min (13.2 U.S.GPM).

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.

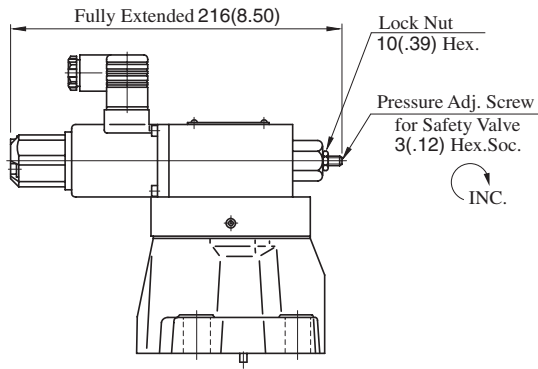
$$\text{Setting pressure} = (\text{Operating pressure upper limit}) + (\text{Additional pressure indicated blow})$$



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



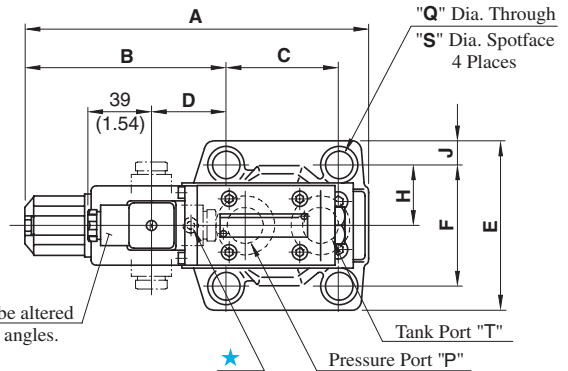
• For other dimensions, refer to the without safety valve.

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

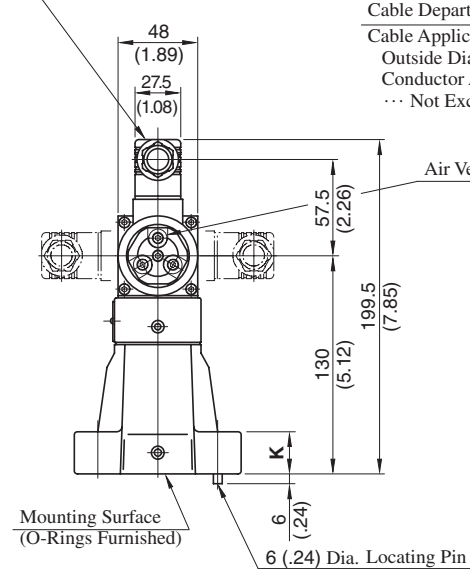


The direction can be altered to every 90 degree angles.

★ 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.)

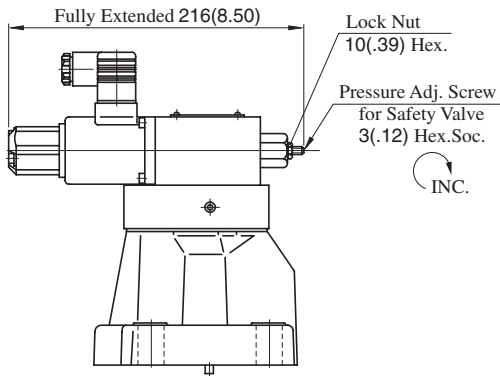


Model Numbers	Dimensions mm (Inches)												
	A	B	C	D	E	F	H	J	K	L	N	Q	S
EBG-03	197.5 (7.78)	117.6 (4.63)	53.8 (2.12)	40.3 (1.59)	76 (2.99)	53.8 (2.12)	26.9 (1.06)	11.1 (.44)	21.5 (.85)	106 (4.17)	26.1 (1.03)	13.5 (.53)	21 (.83)
EBG-06	205.5 (8.09)	119.5 (4.70)	66.7 (2.63)	42.1 (1.66)	98 (3.86)	70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



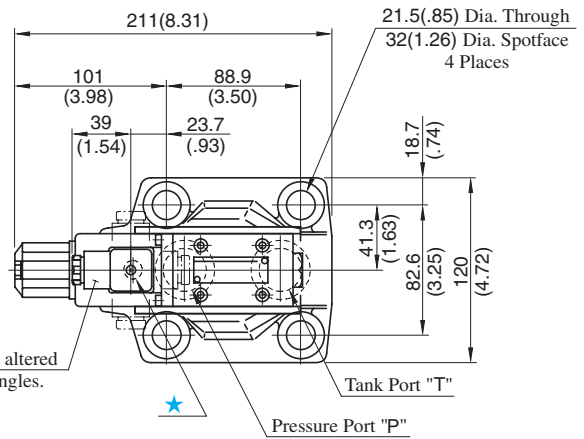
• For other dimensions, refer to the without safety valve.

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

**DIMENSIONS IN  
MILLIMETRES (INCHES)**

**EBG-10-\*-T-51/5190**

Without Safety Valve

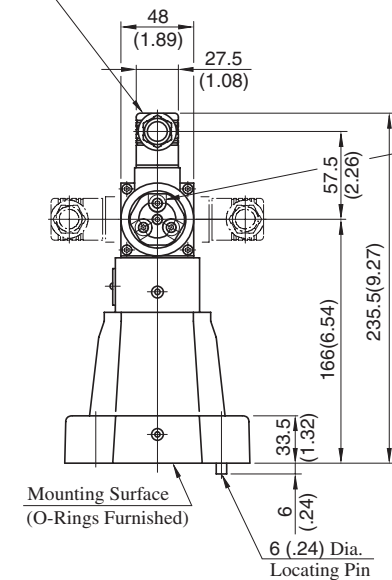


The direction can be altered to every 90 degree angles.

★ 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.)

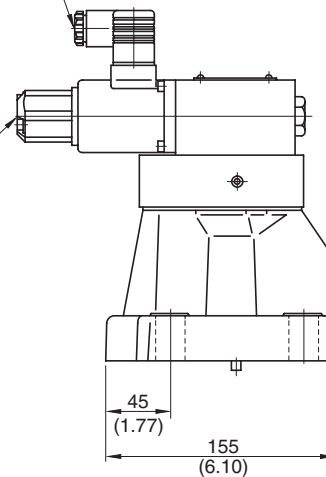


Cable Departure  
Cable Applicable:  
Outside Dia. ... 8-10 mm (.31 - .39 in.)  
Conductor Area  
... Not Exceeding 1.5 mm<sup>2</sup>  
(.0023 sq. in.)

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

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

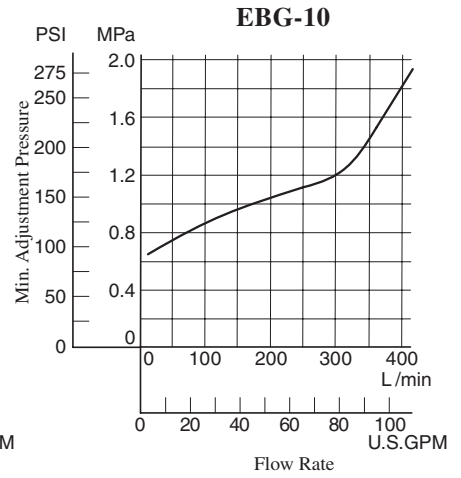
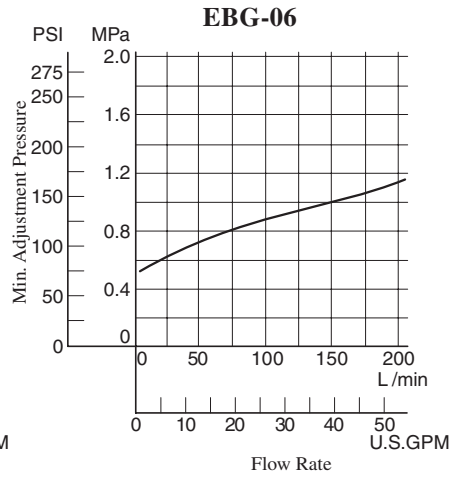
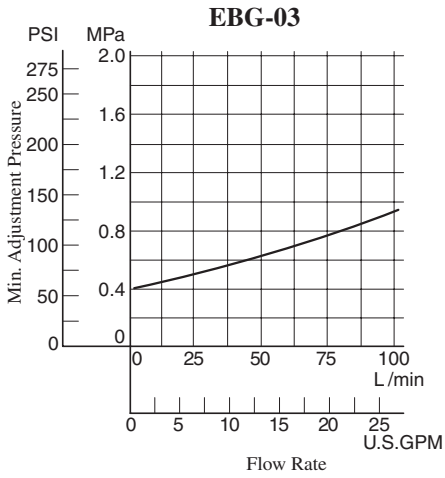
INC.



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

**Min. Adjustment Pressure**

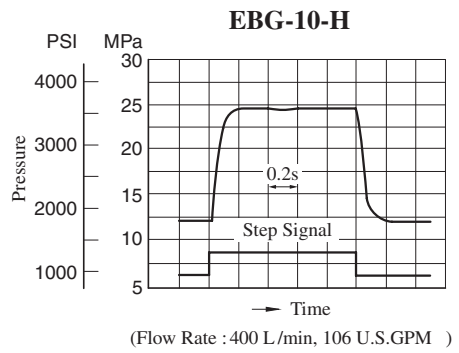
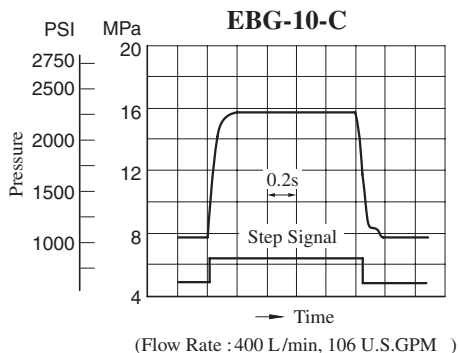
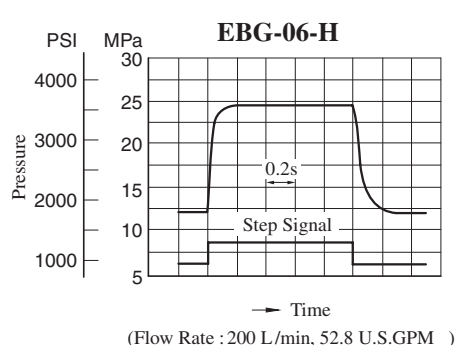
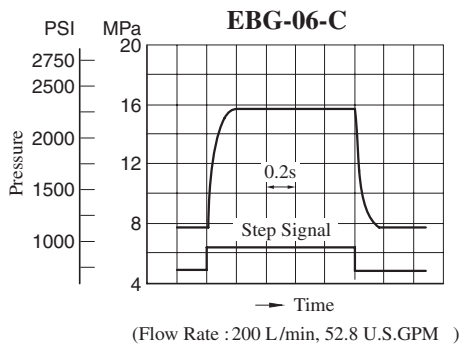
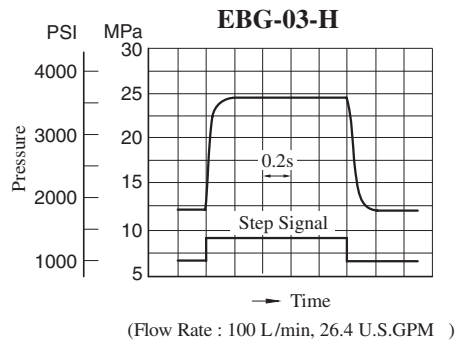
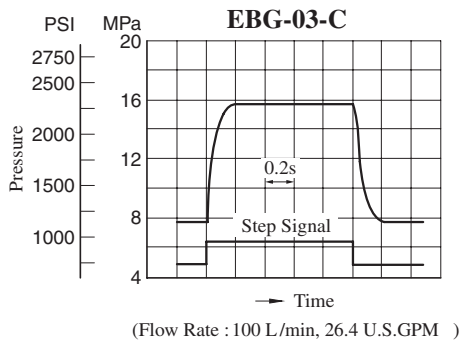
Viscosity : 30 mm<sup>2</sup>/s (141 SSU)



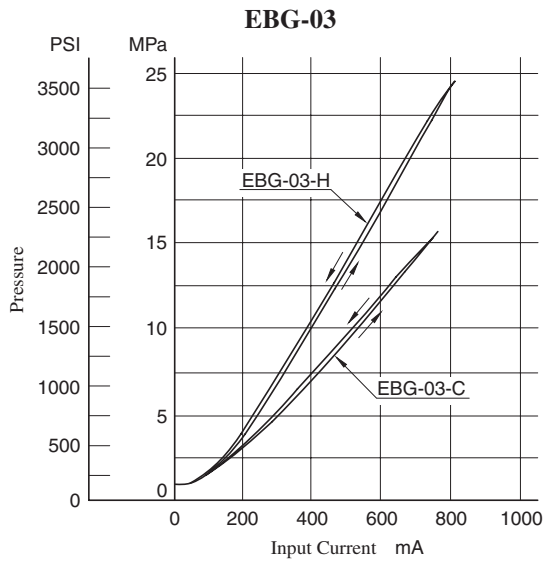
**Step Response (Example)**

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 mm<sup>2</sup>/s (141 SSU)

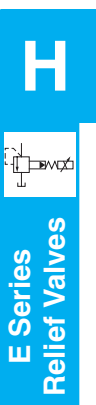
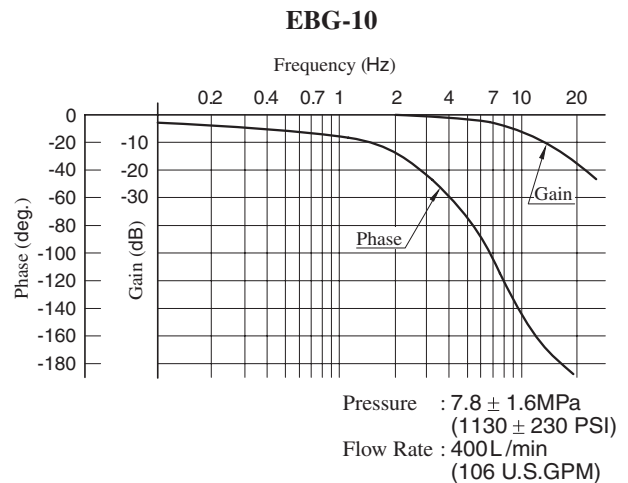
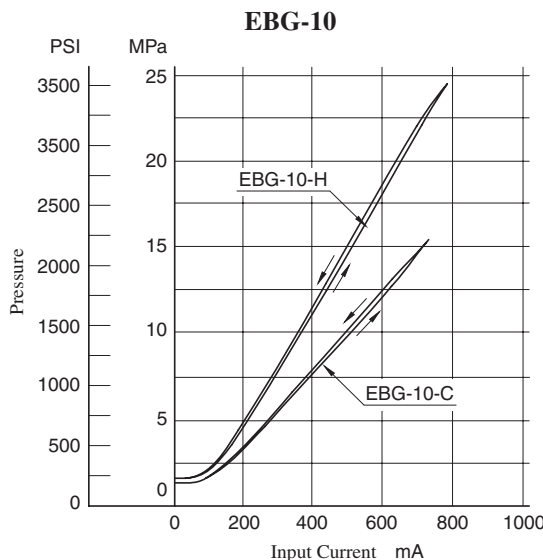
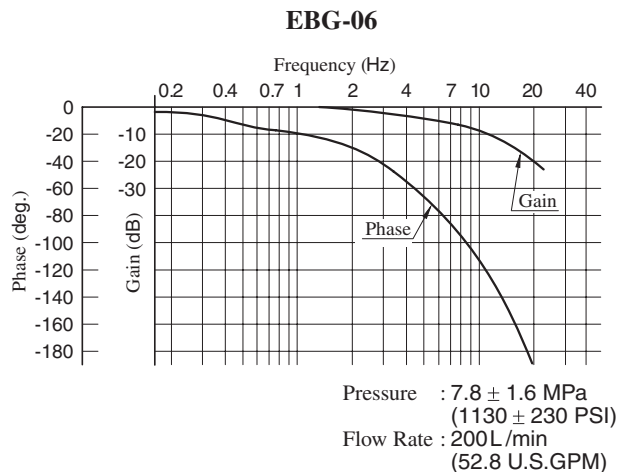
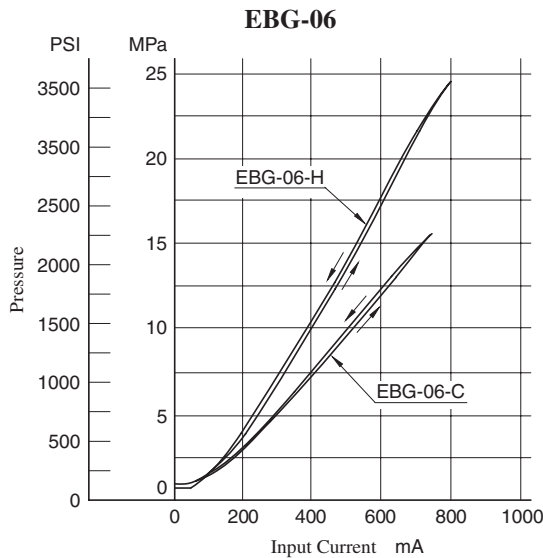
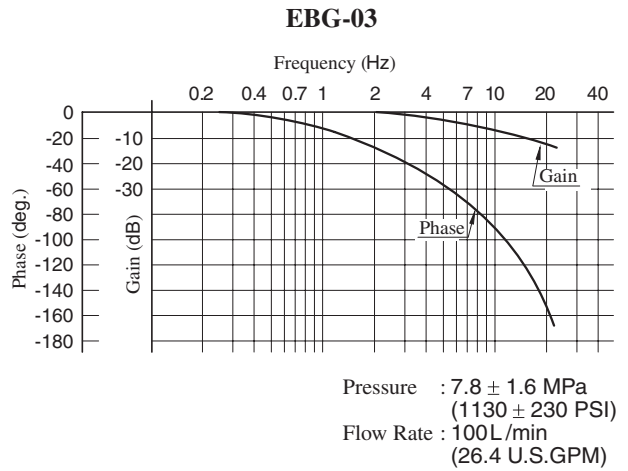


**Input Current vs. Pressure**



**Frequency Response**

Trapped Oil Volume : 1 L (.264 U.S. Gallons)  
 Viscosity : 30 mm<sup>2</sup>/s (141 SSU)



**Viscosity vs. Pressure**

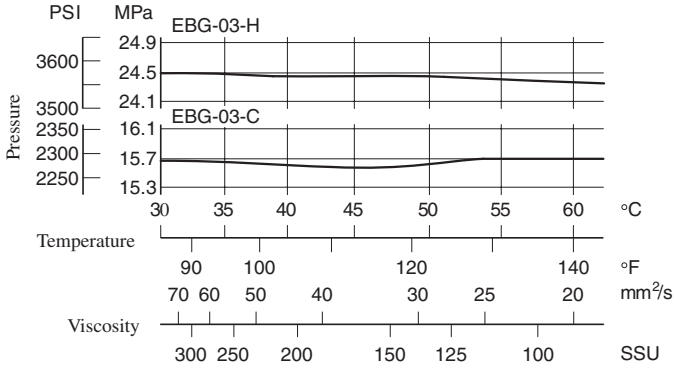
Oil : ISO VG 46 Oil

**Flow Rate vs. Pressure**

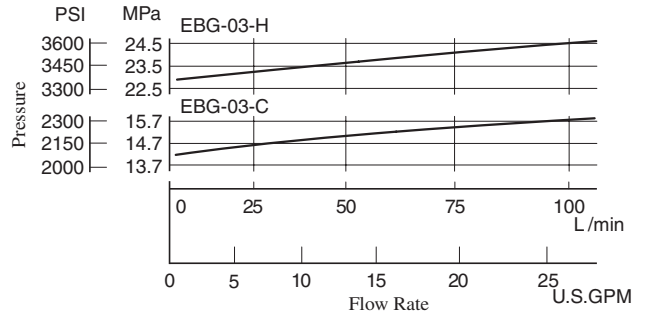
Viscosity : 30 mm<sup>2</sup>/s (141 SSU)

**EBG-03**

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

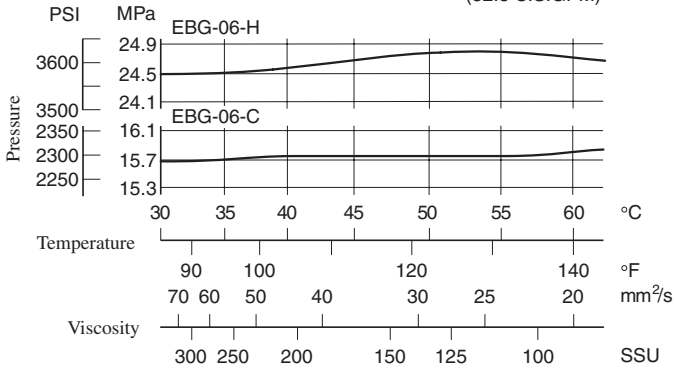


**EBG-03**

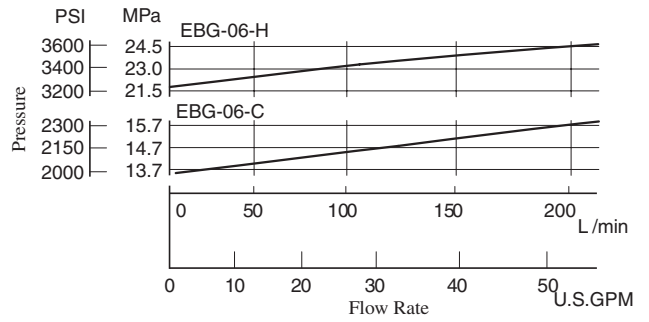


**EBG-06**

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

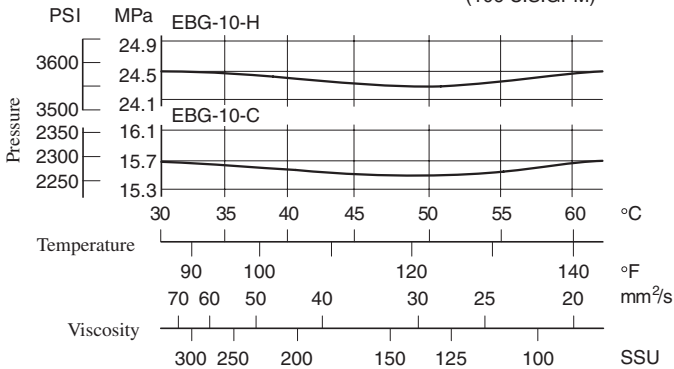


**EBG-06**

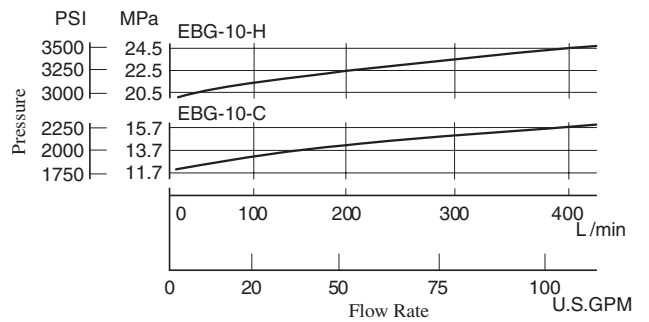


**EBG-10**

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

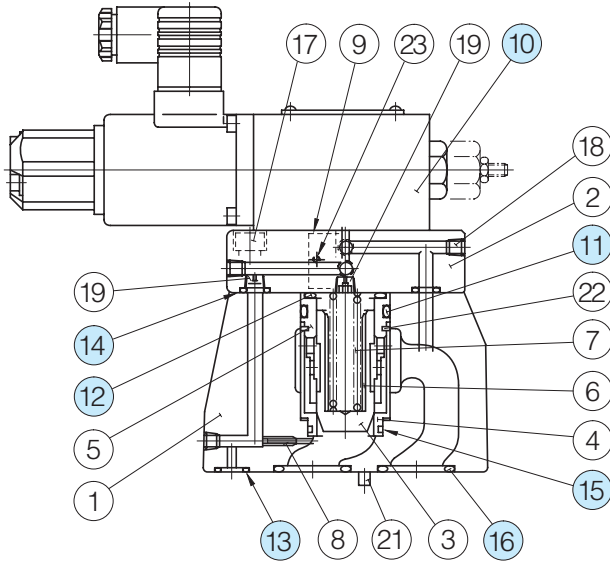


**EBG-10**



## 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**

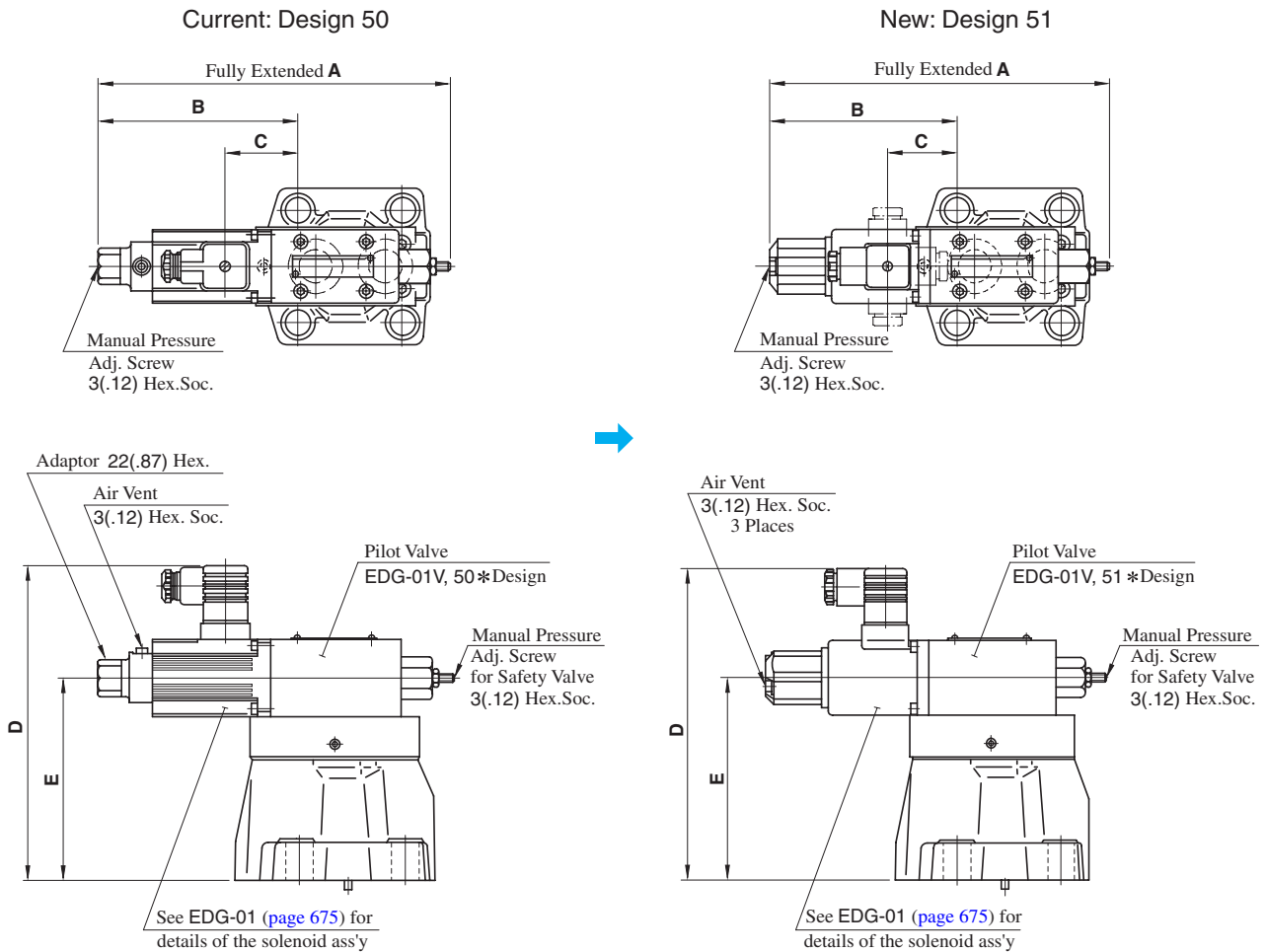
EBG-03/06/10 series valves have changed model from 50 to 51 design in line with the model change of pilot valve (EDG-01).

● **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)		

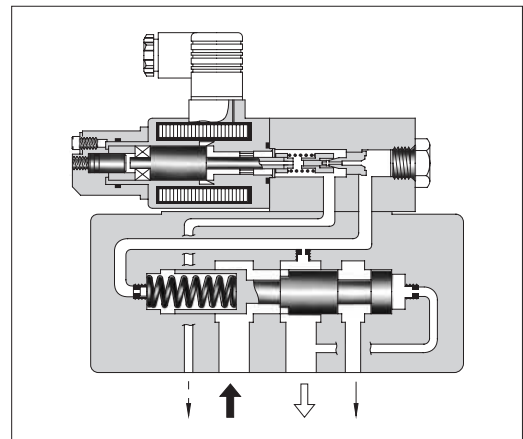
**DIMENSIONS IN  
MILLIMETRES (INCHES)**

## ■ Proportional Electro-Hydraulic Relieving and Reducing Valves

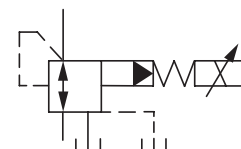
This valve is derived by combining a small, high-performance 1/8 proportional electro-hydraulic pilot relief valve with a relieving and reducing valve.

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
<b>F:</b> Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>ERB:</b> Proportional Electro-Hydraulic Relieving and Reducing Valve	<b>G:</b> Sub-plate Mounting	<b>06</b>	<b>B:</b> 0.8 - 6.9 (115 - 1000) <b>C:</b> 1.2 - 13.7 (175 - 2000) <b>H:</b> 1.5 - 20.6 (220 - 3000)	<b>51</b>	Refer to ★
			<b>10</b>	<b>B:</b> 0.9 - 6.9 (130 - 1000) <b>C:</b> 1.2 - 13.7 (175 - 2000) <b>H:</b> 1.5 - 20.6 (220 - 3000)		

★ 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.
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).

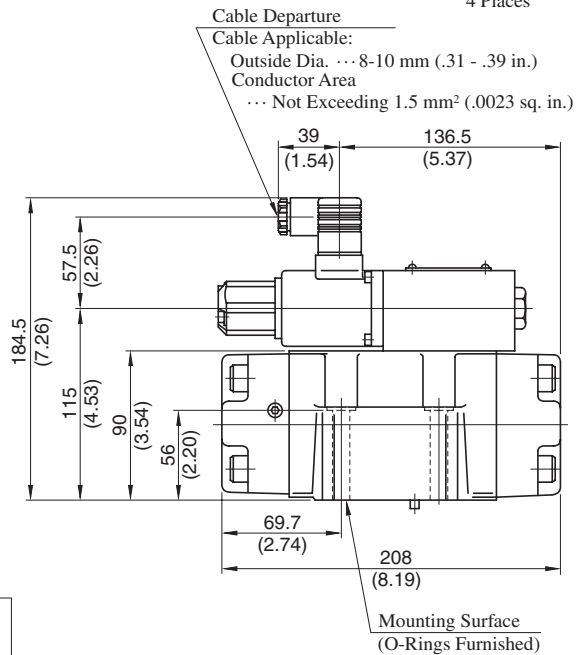
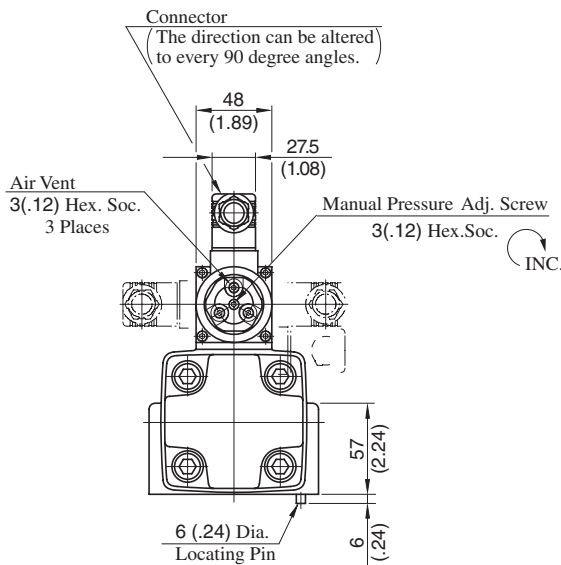
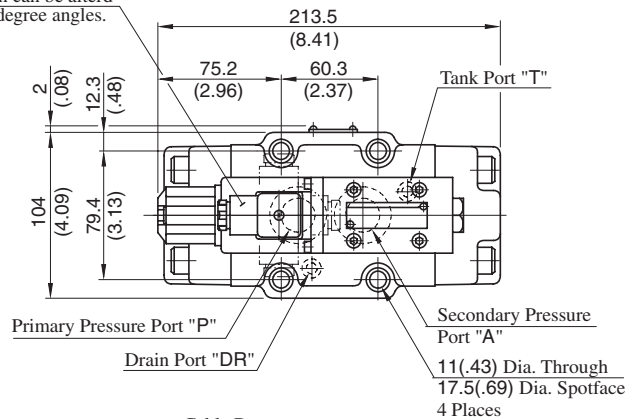
### ● Trapped Oil Volume

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).

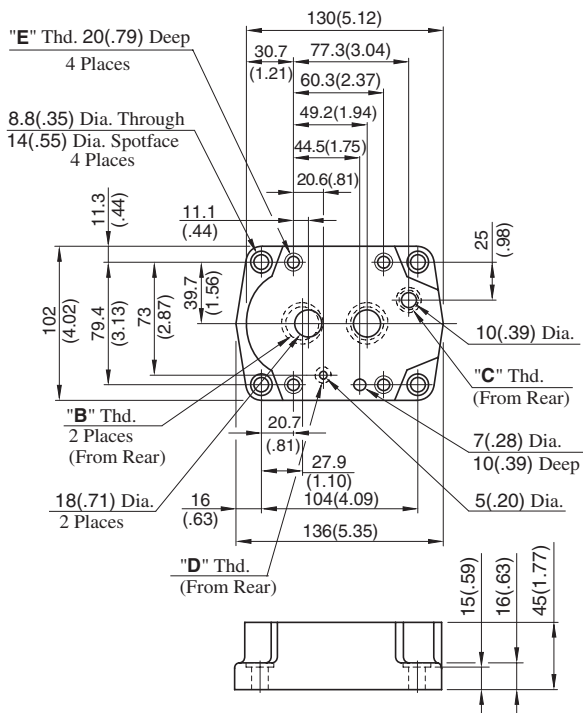
ERBG-06-\*/-51/5190

DIMENSIONS IN MILLIMETRES (INCHES)

The direction can be altered to every 90 degree angles.



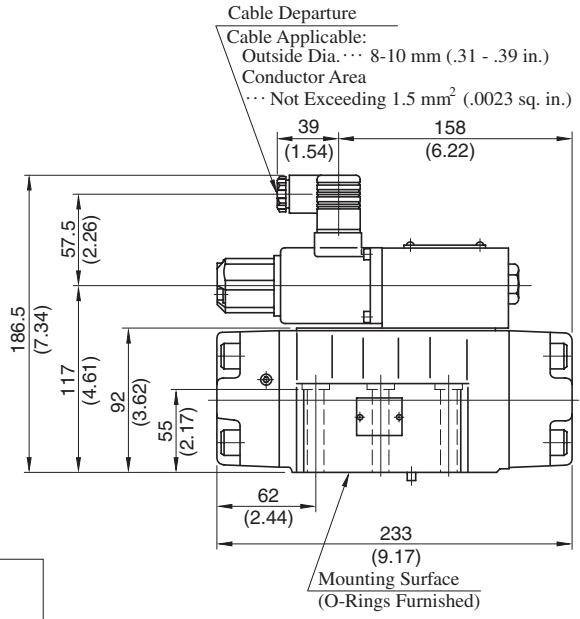
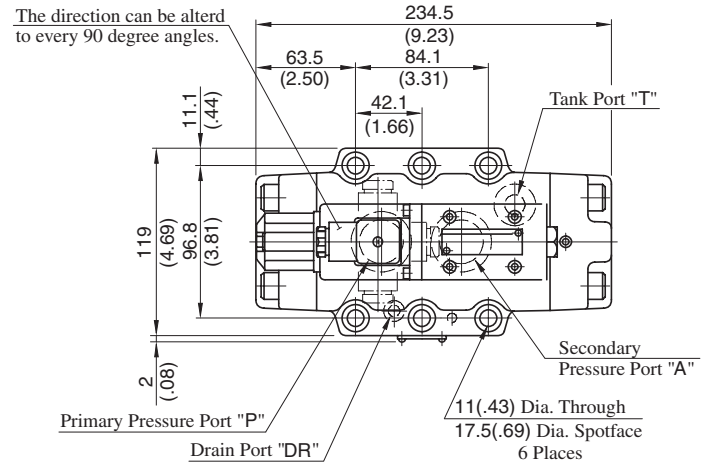
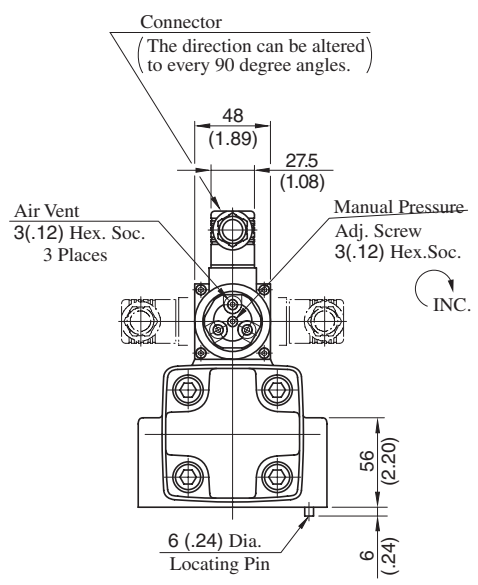
Sub-plate:  
ERBGM-06-20/2080/2090



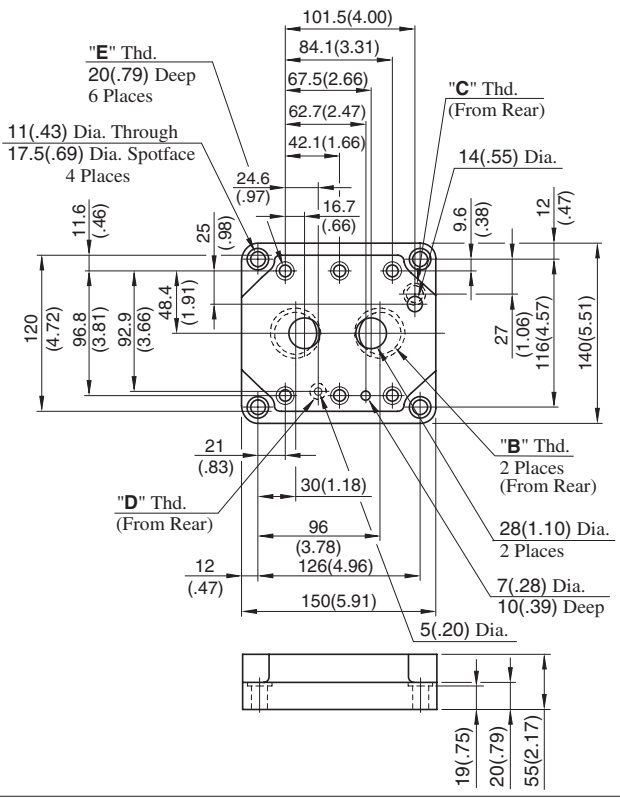
Sub-plate Model Numbers	Thread Size			
	"B" Thd.	"C" Thd.	"D" Thd.	"E" Thd.
ERBGM-06-20	Rc 3/4	Rc 3/8	Rc 1/4	M10
ERBGM-06-2080	3/4 BSP.F	3/8 BSP.F	1/4 BSP.F	
ERBGM-06-2090	3/4 NPT	3/8 NPT	1/4 NPT	

**ERBG-10-\*-51/5190**

**DIMENSIONS IN  
MILLIMETRES (INCHES)**



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



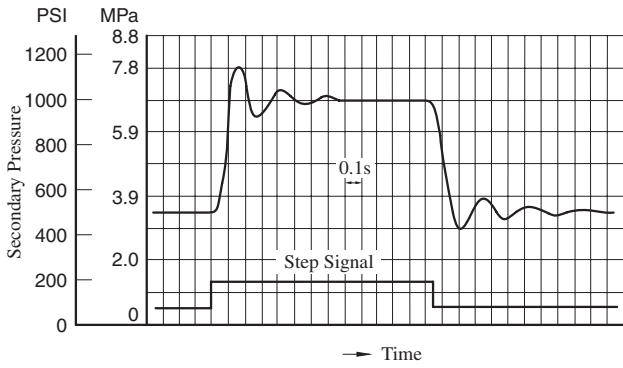
Sub-plate Model Numbers	Thread Size			
	"B" Thd.	"C" Thd.	"D" Thd.	"E" Thd.
ERBGM-10-10	Rc 1-1/4	Rc 3/8	Rc 1/4	M10
ERBGM-10-1080	1-1/4 BSPF	3/8 BSPF	1/4 BSPF	
ERBGM-10-1090	1-1/4 NPT	3/8 NPT	1/4 NPT	3/8-16 UNC

**Step Response (Example)**

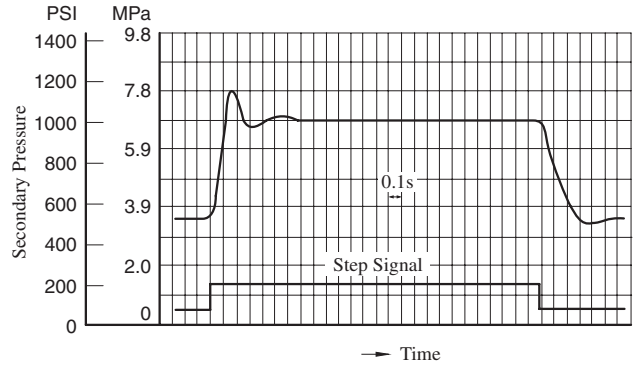
The following step response characteristics are taken when the trapped oil volume is 20 liters (5.28 U.S.Gallons). The step response varies by trapped oil volume.

Primary Pressure : 24.5 MPa (3550 PSI)  
 Trapped Oil Volume : 20 L (5.28 U.S.Gallons)  
 Viscosity : 30 mm<sup>2</sup>/s (141 SSU)

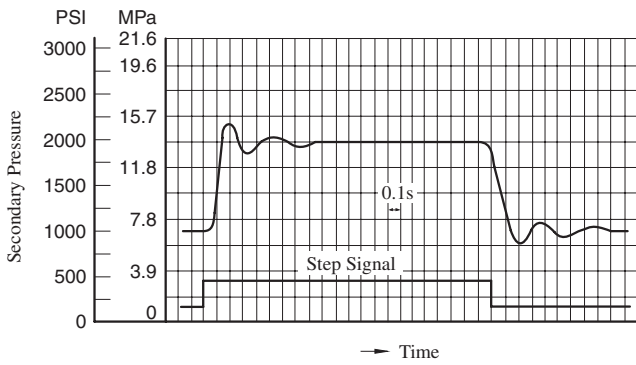
**ERBG-06-B**



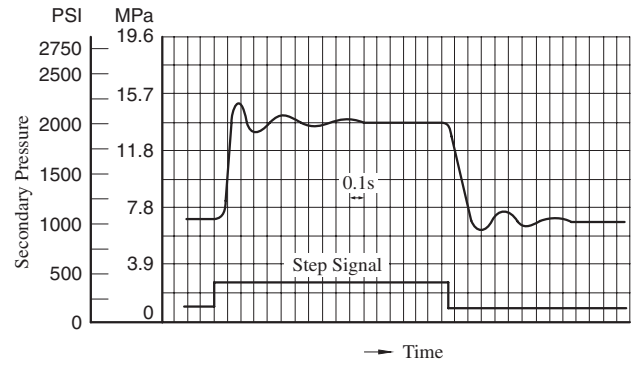
**ERBG-10-B**



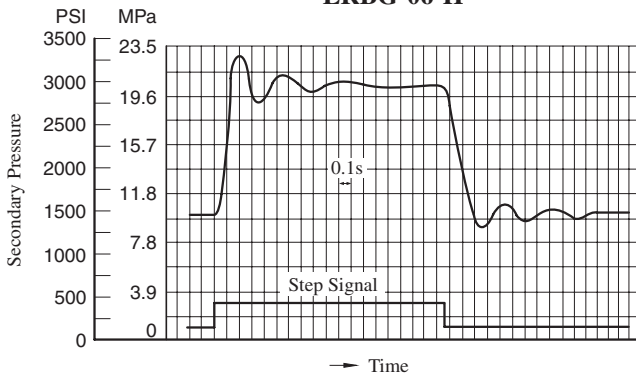
**ERBG-06-C**



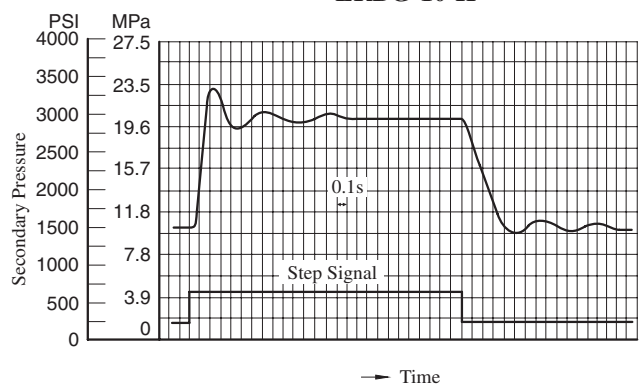
**ERBG-10-C**



**ERBG-06-H**

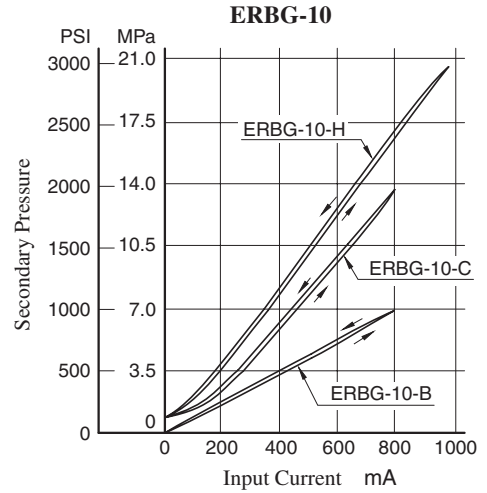
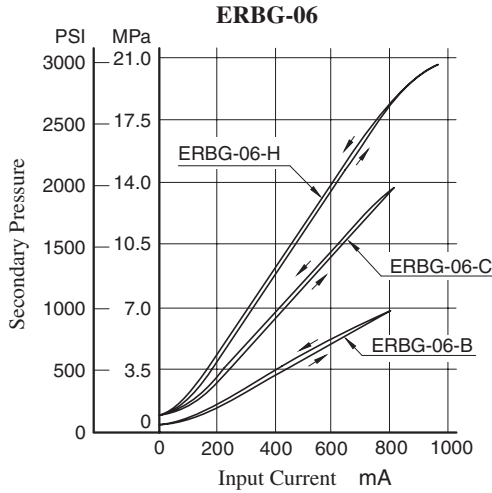


**ERBG-10-H**



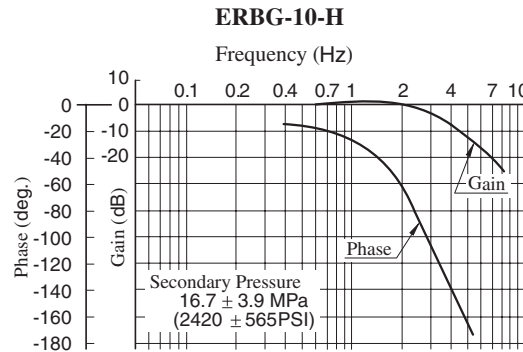
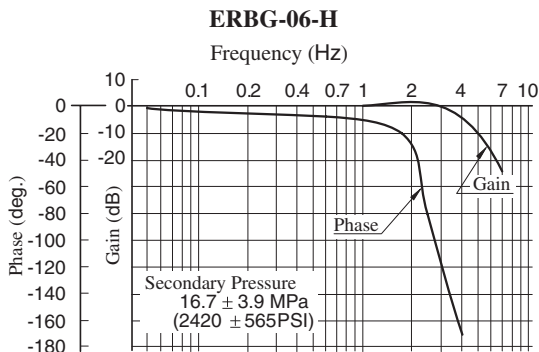
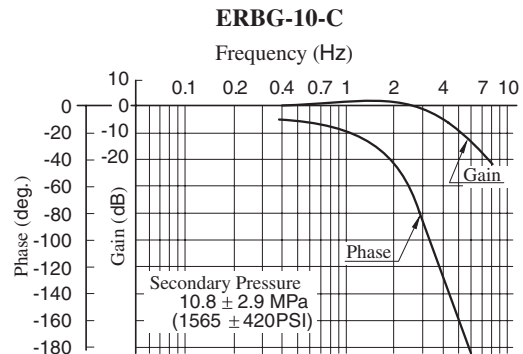
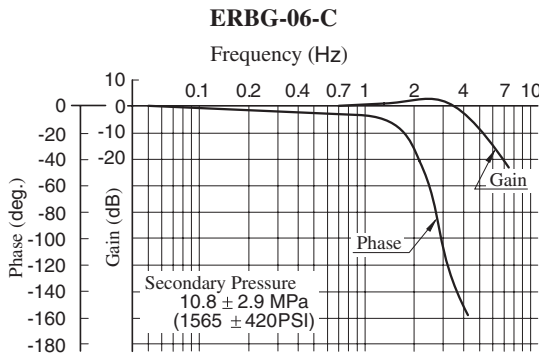
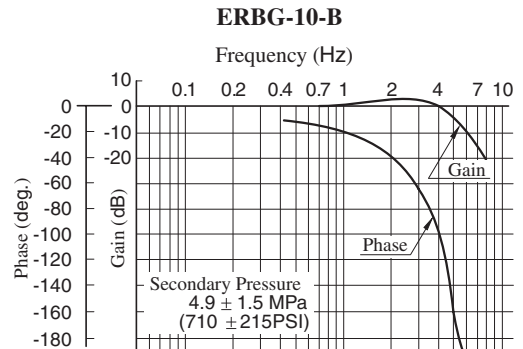
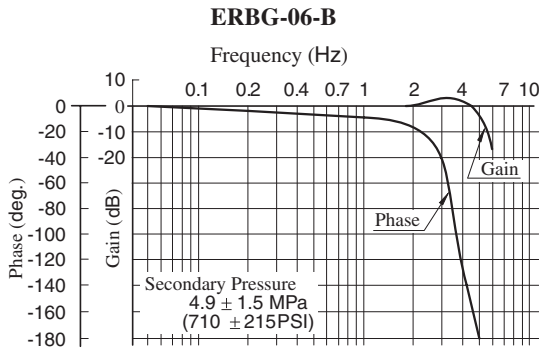
**Input Current vs. Secondary Pressure**

Primary Pressure : 24.5 MPa (3550 PSI)  
 Viscosity : 30 mm<sup>2</sup>/s (141 SSU)



**Frequency Response**

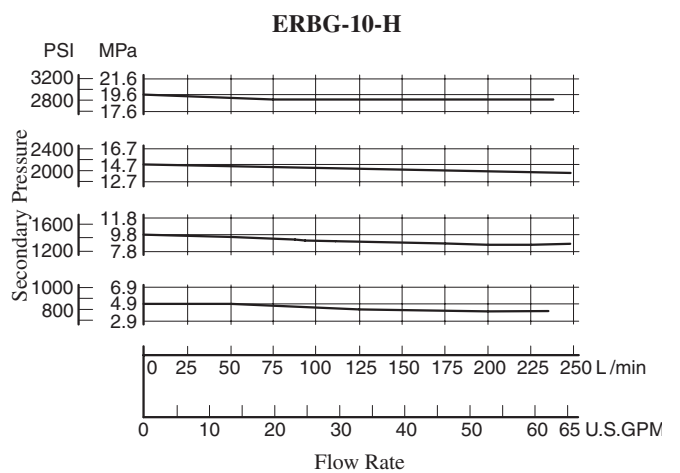
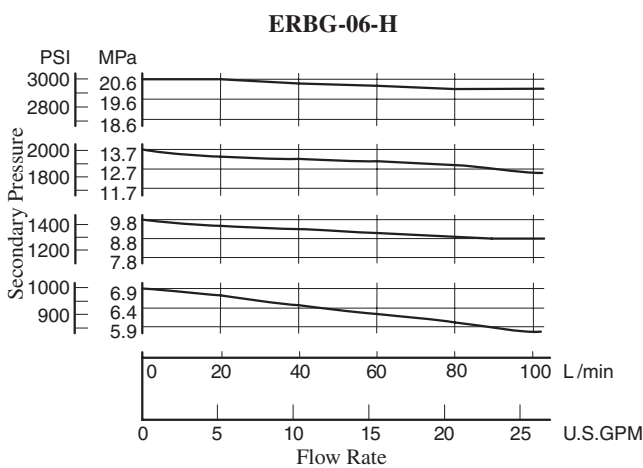
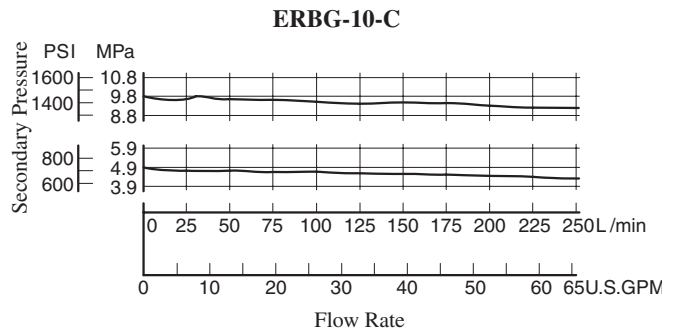
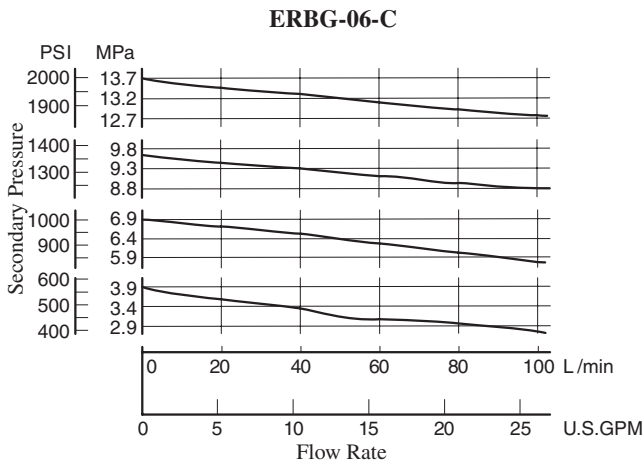
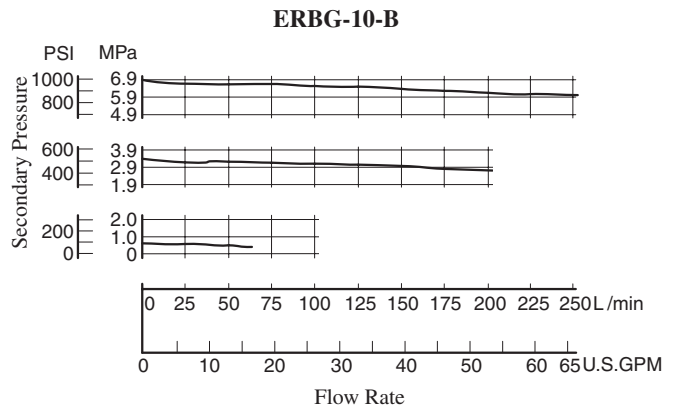
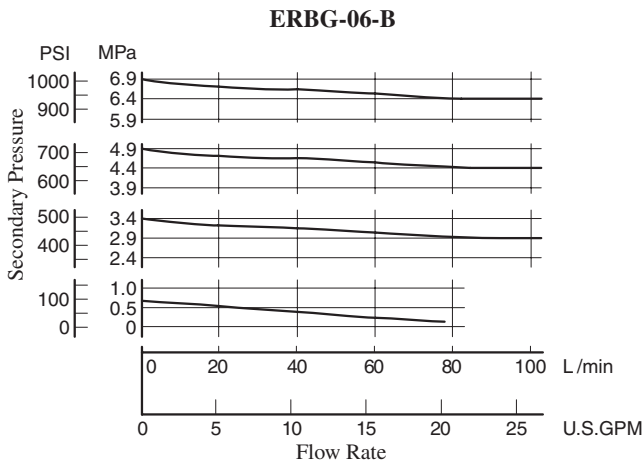
Primary Pressure : 24.5 MPa (3550 PSI)  
 Trapped Oil Volume : 20 L (5.28 U.S.Gallons)  
 Viscosity : 30 mm<sup>2</sup>/s (141 SSU)





**Flow Rate vs. Secondary Pressure**

Viscosity : 30 mm<sup>2</sup>/s (141 SSU)

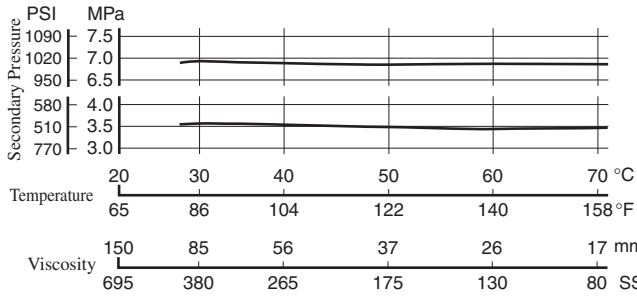


**H**  
E Series  
Relieving and Reducing Valves

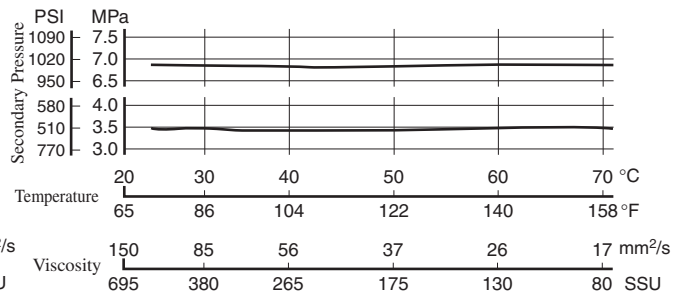
■ Viscosity vs. Secondary Pressure

Oil: ISO VG32

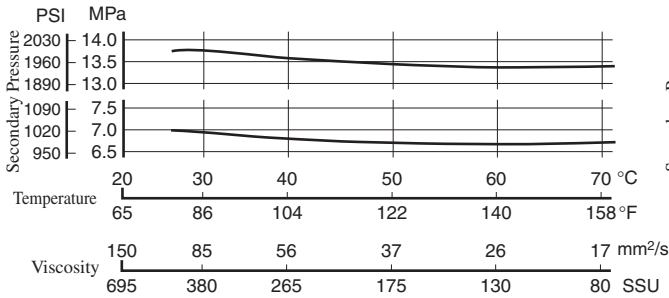
**ERBG-06-B**



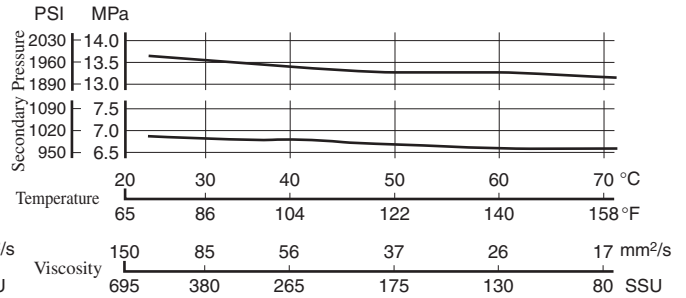
**ERBG-10-B**



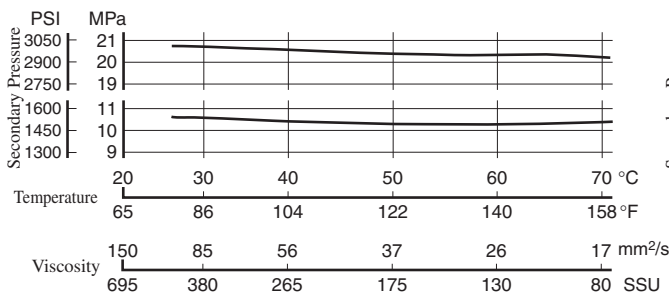
**ERBG-06-C**



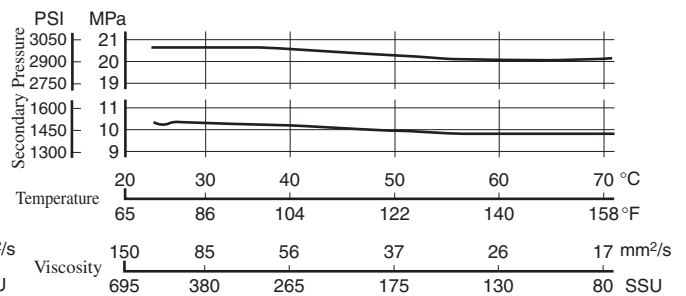
**ERBG-10-C**



**ERBG-06-H**

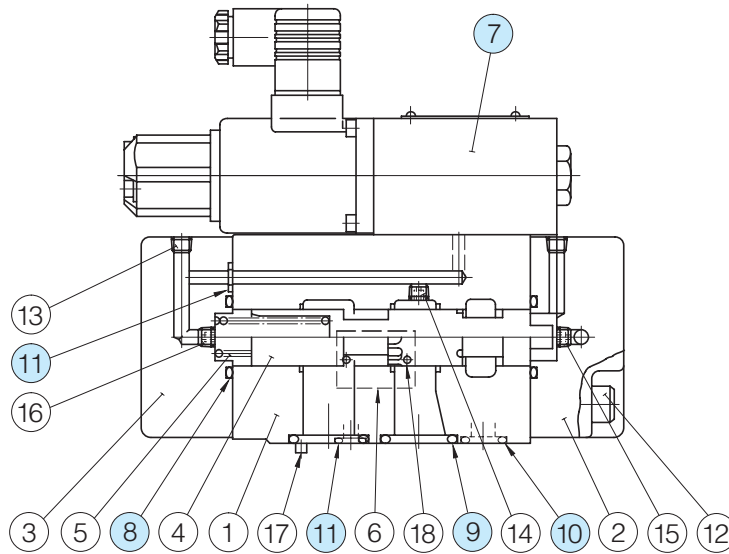


**ERBG-10-H**



**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**

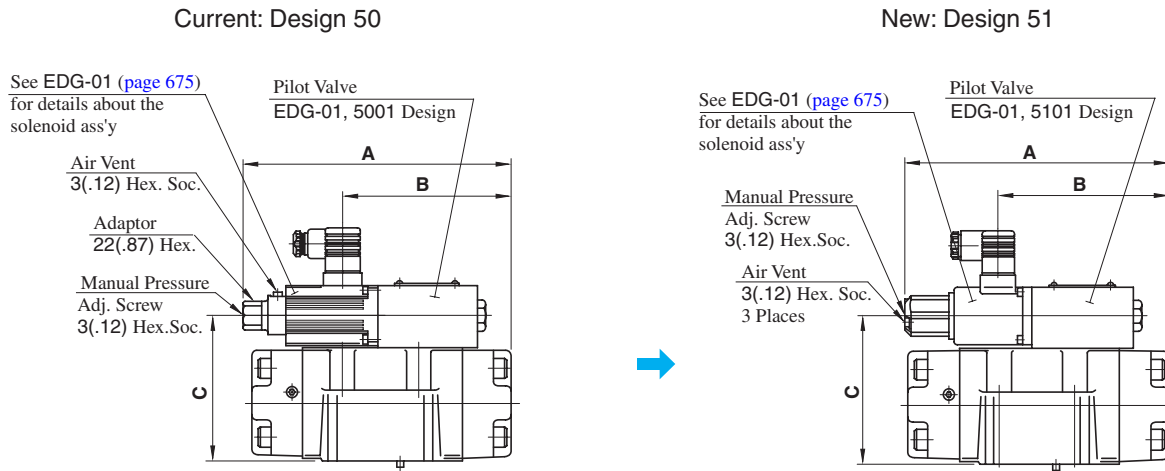
ERBG-06/10 series valves have changed model from 50 to 51 design in line with the model change of pilot valve (EDG-01).

**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

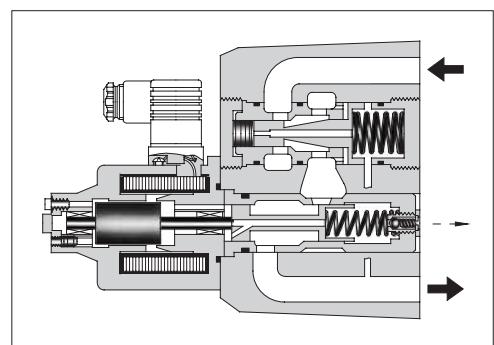
Since the preselected flow rate continuously varies in proportion to the current input to the valve, the system flow rate can be remote-controlled as desired by regulating the amplifier current output. Further, since pressure and temperature compensation functions are provided, the preselected flow rate 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.

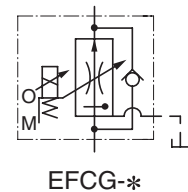
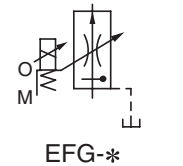


### Specifications

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)



Graphic Symbols



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

### 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
<b>F:</b> Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>EF:</b> Proportional Electro-Hydraulic Flow Control Valve <b>EFC:</b> Proportional Electro-Hydraulic Flow Control and Check Valve	<b>G:</b> Sub-plate Mounting	<b>02</b>	<b>10:</b> 10 (2.6) <b>30:</b> 30 (7.9)	<b>31</b>	Refer to ★
			<b>03</b>	<b>60:</b> 60 (15.9) <b>125:</b> 125 (33)	<b>26</b>	
			<b>06</b>	<b>250:</b> 250 (66)	<b>22</b>	
			<b>10</b>	<b>500:</b> 500 (132)	<b>11</b>	

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

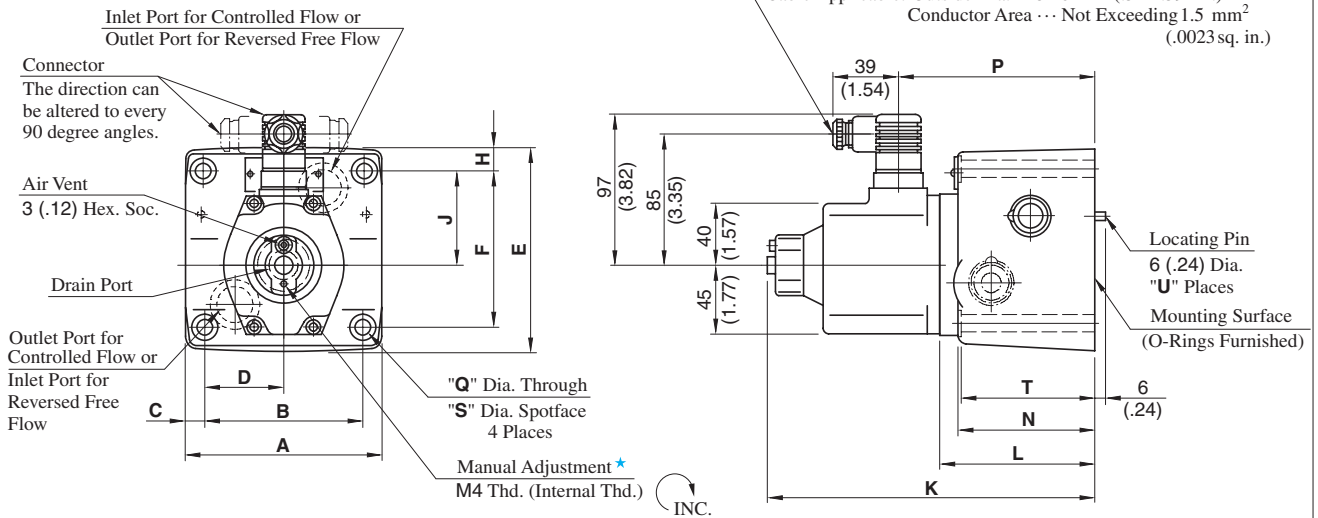
● Drain Back Pressure

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**

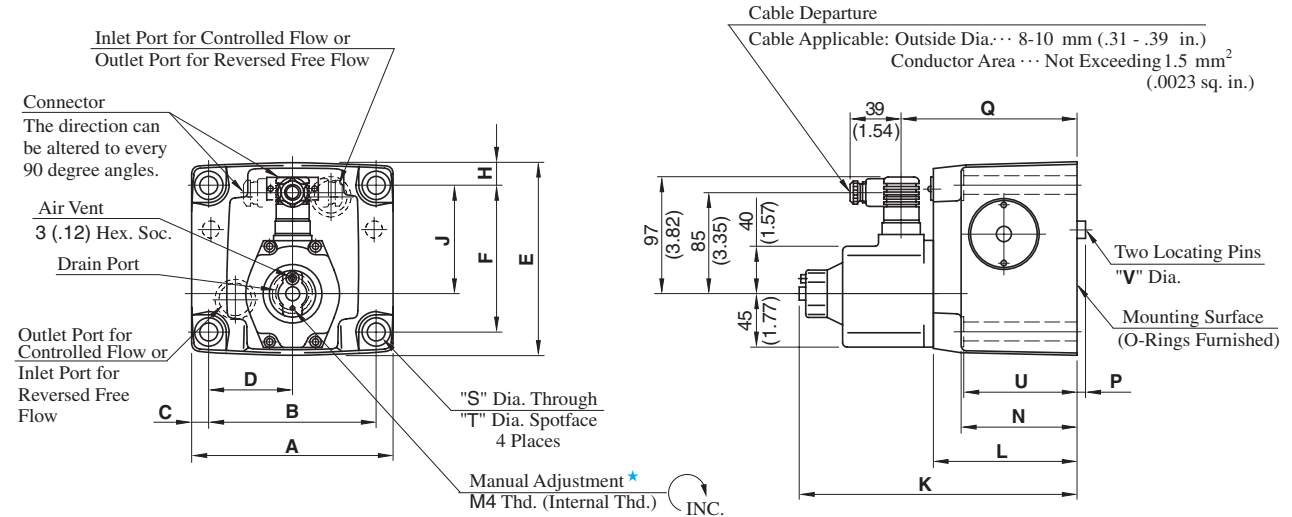


★ Manual adjustment can be done by screwing for example an M4×20 L screw in the M4 thread or pushing in a rod etc. there.

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)**



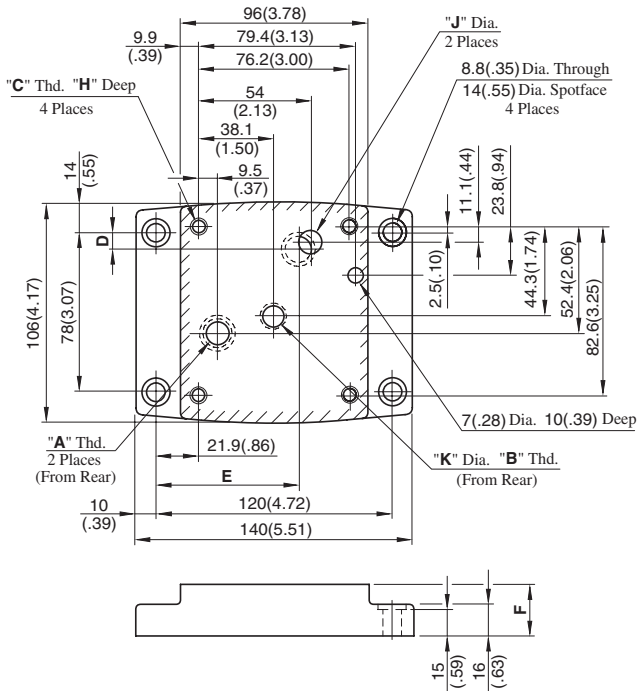
★ Manual adjustment can be done by screwing for example an M4×20 L screw in the M4 thread or pushing in a rod etc. there.

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-02X/02Y-20/2080/2090**

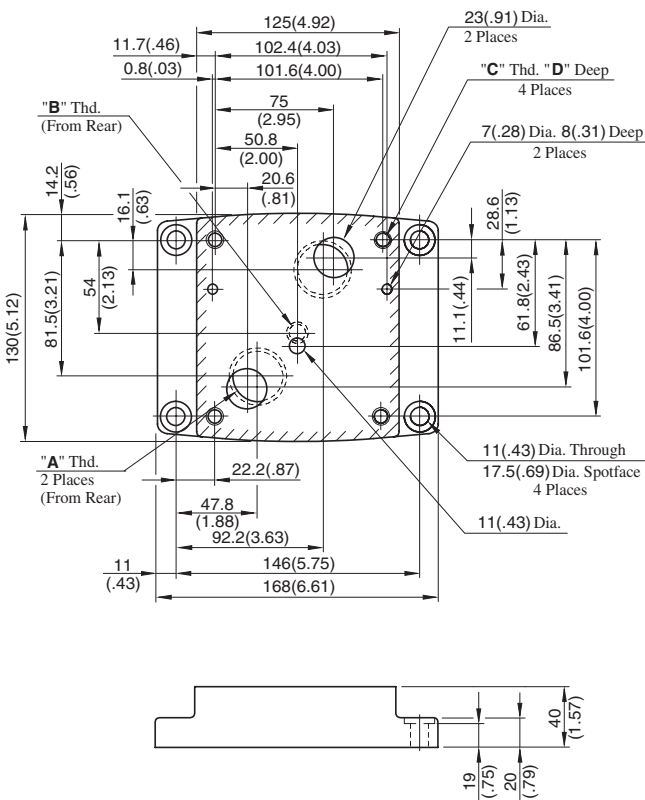


Sub-plate Model Numbers	Thread Size		
	"A" Thd.	"B" Thd.	"C" Thd.
EFGM-02X-20	Rc 3/8	Rc 1/4	M8
EFGM-02Y-20	Rc 1/2		
EFGM-02X-2080	3/8 BSPF	1/4 BSPF	
EFGM-02Y-2080	1/2 BSPF		
EFGM-02X-2090	3/8 NPT	1/4 NPT	5/16-18 UNC
EFGM-02Y-2090	1/2 NPT		

Sub-plate Model Numbers	Dimensions mm (Inches)					
	D	E	F	H	J	K
EFGM-02X-20	8.6 (.34)	75.9 (2.99)	25 (.98)	14 (.55)	14 (.55)	11 (.43)
EFGM-02Y-20	11.5 (.45)	72.9 (2.87)	35 (1.38)		15.2 (.60)	11.7 (.46)
EFGM-02X-2080	8.6 (.34)	75.9 (2.99)	25 (.98)		15 (.59)	
EFGM-02Y-2080	11.5 (.45)	72.9 (2.87)	35 (1.38)			
EFGM-02X-2090	8.6 (.34)	75.9 (2.99)	25 (.98)	18 (.17)	14 (.55)	11 (.43)
EFGM-02Y-2090	11.5 (.45)	72.9 (2.87)	35 (1.38)			

DIMENSIONS IN MILLIMETRES (INCHES)

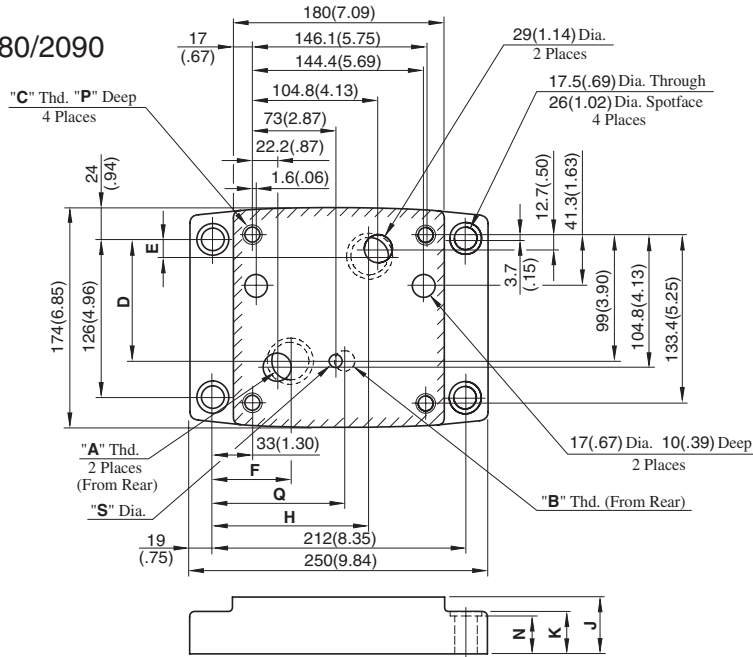
**EFGM-03Y/03Z-20/2080/2090**



Sub-plate Model Numbers	Thread Size			D mm(in.)
	"A" Thd.	"B" Thd.	"C" Thd.	
EFGM-03Y-20	Rc 3/4	Rc 1/4	M10	18 (.71)
EFGM-03Z-20	Rc 1			
EFGM-03Y-2080	3/4 BSPF	1/4 BSPF		
EFGM-03Z-2080	1 BSPF			
EFGM-03Y-2090	3/4 NPT	1/4 NPT	3/8-16 UNC	21 (.83)
EFGM-03Z-2090	1 NPT			



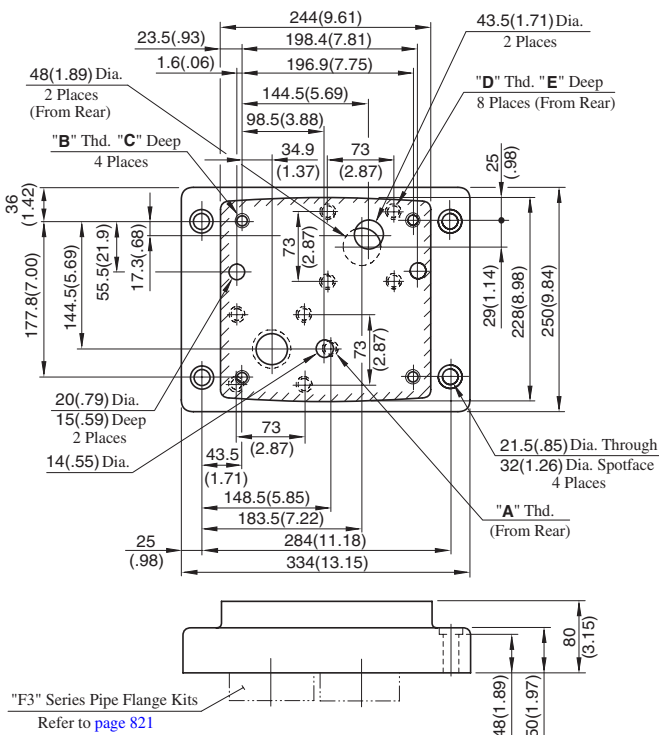
■ Sub-plate  
EFGM-06X/06Y-20/2080/2090



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)		116 (4.57)	15 (.59)	
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



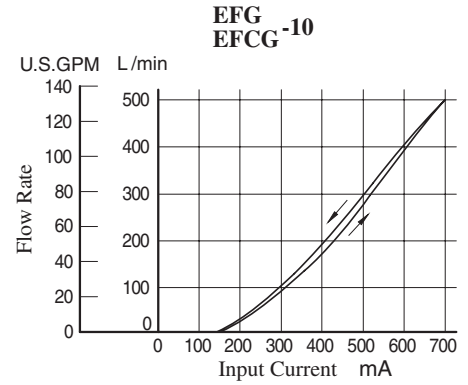
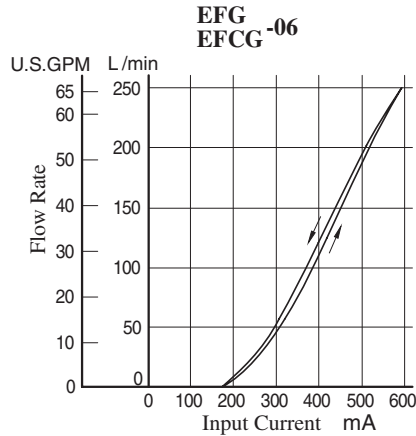
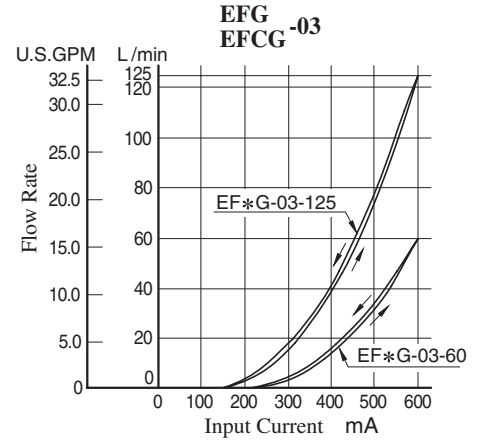
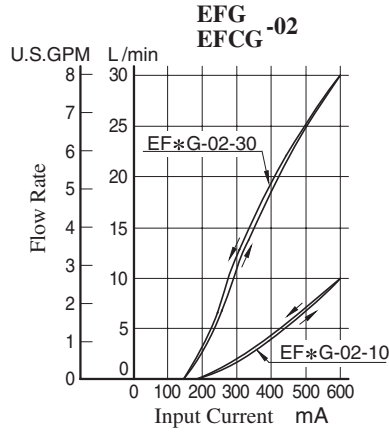
Sub-plate Model Numbers	Thread Size		
	"A" Thd.	"B" Thd.	"D" Thd.
EFGM-10Y-10	Rc 3/8	M20	M16
EFGM-10Y-1080	3/8 BSP.F		
EFGM-10Y-1090	3/8 NPT	3/4-10 UNC	5/8-11 UNC

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)

"F3" Series Pipe Flange Kits  
Refer to page 821

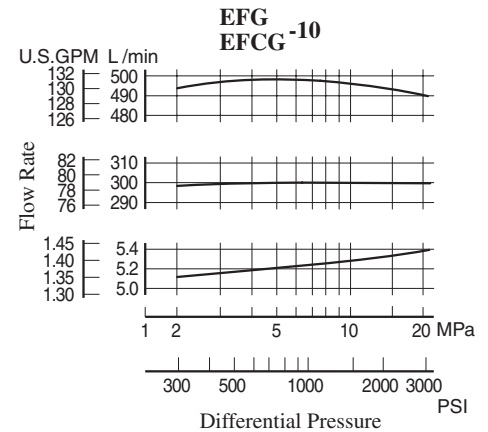
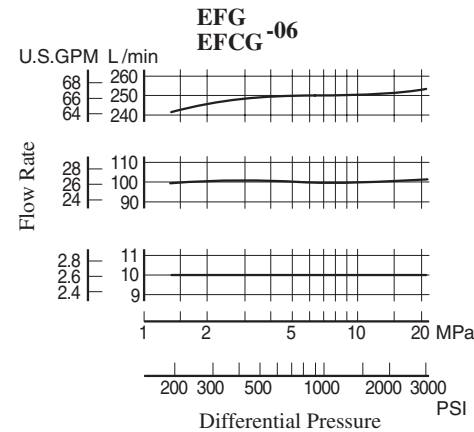
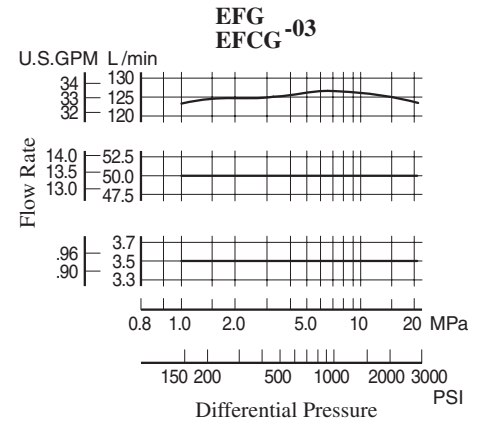
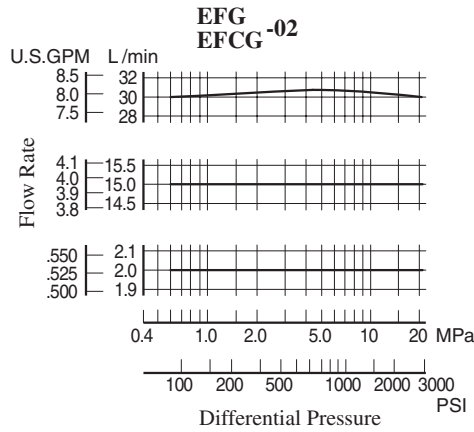
**Input Current vs. Flow**

Viscosity: 30 mm<sup>2</sup>/s  
(141 SSU)



**Differential Pressure vs. Metred Flow**

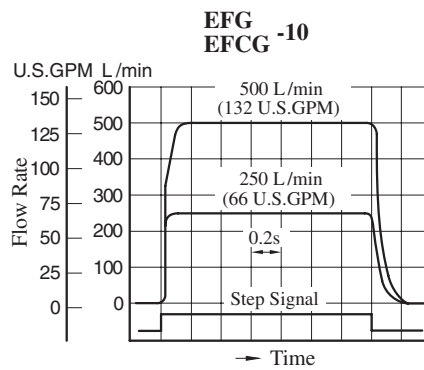
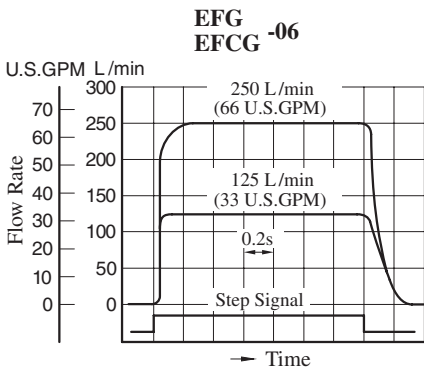
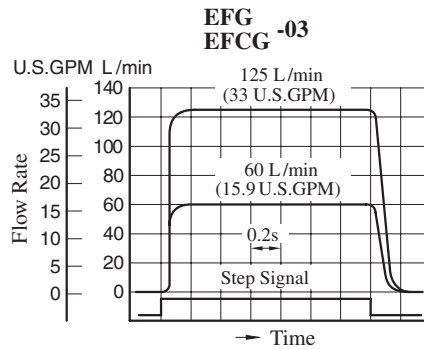
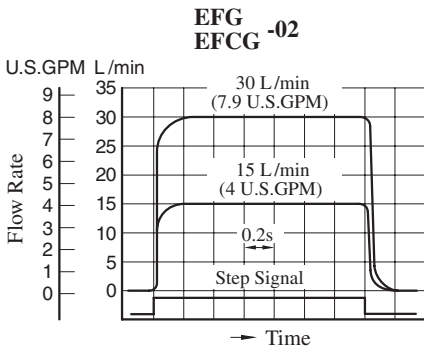
Viscosity: 30 mm<sup>2</sup>/s  
(141 SSU)



**Step Response**

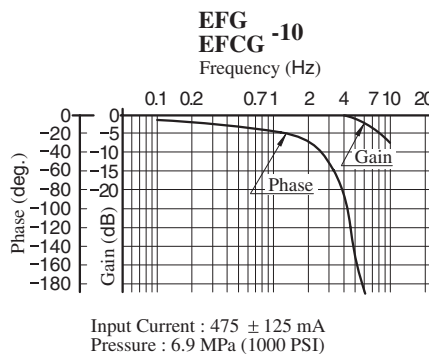
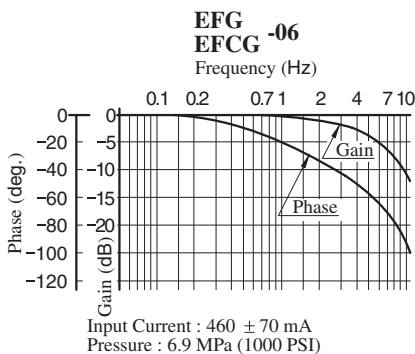
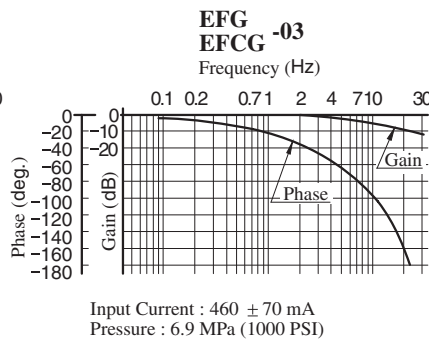
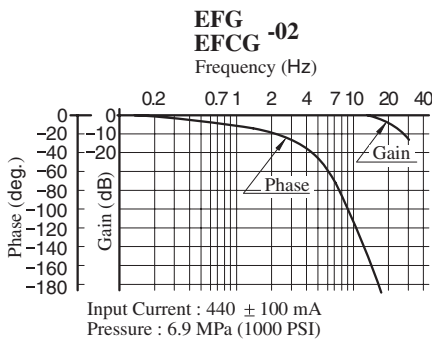
Viscosity: 30 mm<sup>2</sup>/s (141 SSU)

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

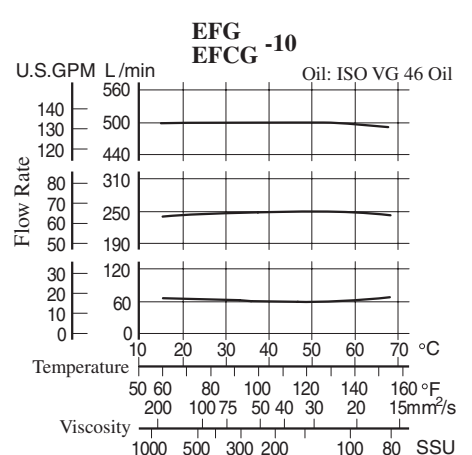
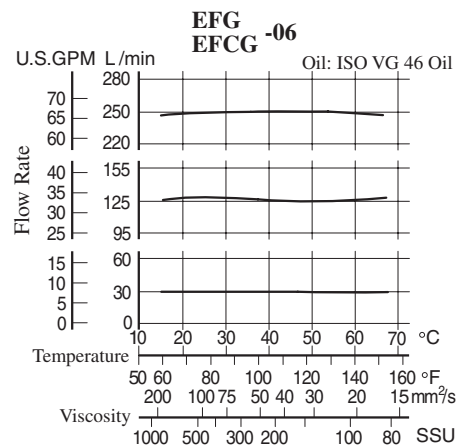
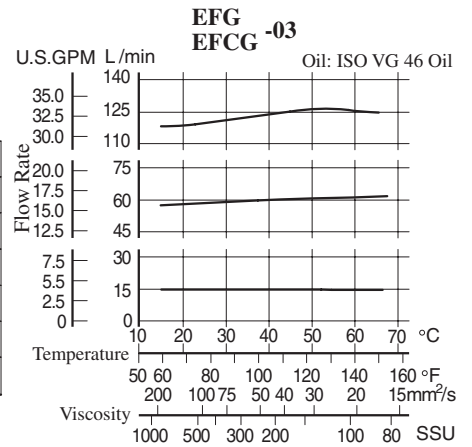
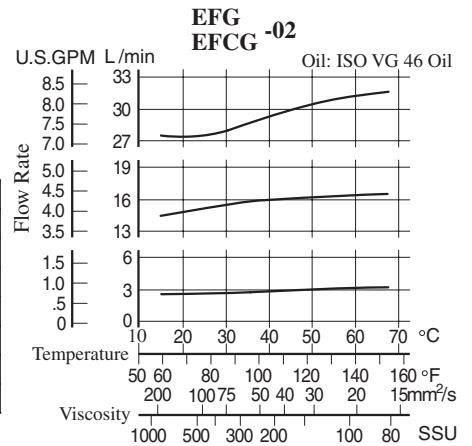


**Frequency Response**

Viscosity: 30 mm<sup>2</sup>/s (141 SSU)



**Viscosity vs. Flow**

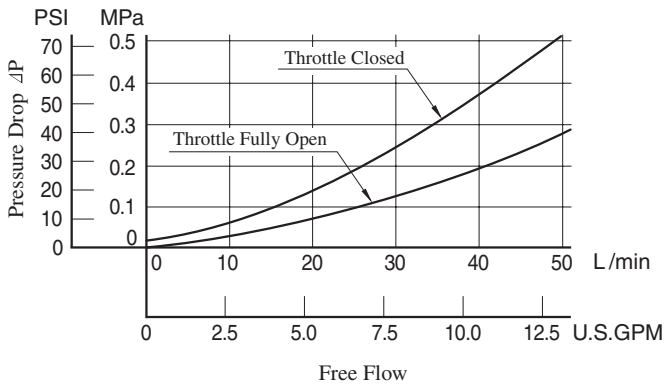


**E Series**  
40Ω Series Flow Control (and Check) Valves

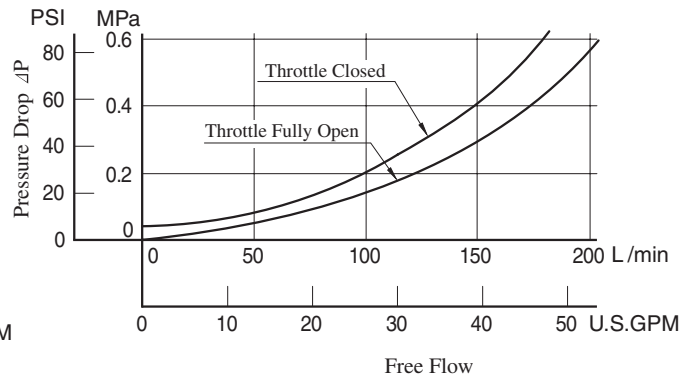
■ Pressure Drop for Reversed Free Flow (Only for "EFCG" Models)

Oil Viscosity: 35 mm<sup>2</sup>/s (164 SSU)  
 Specific Gravity: 0.850

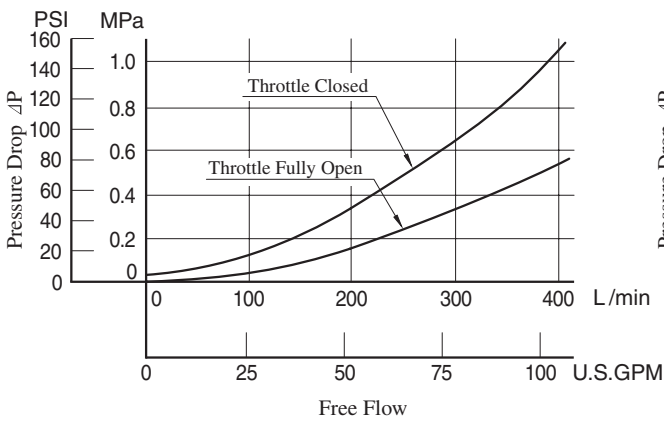
**EFCG-02**



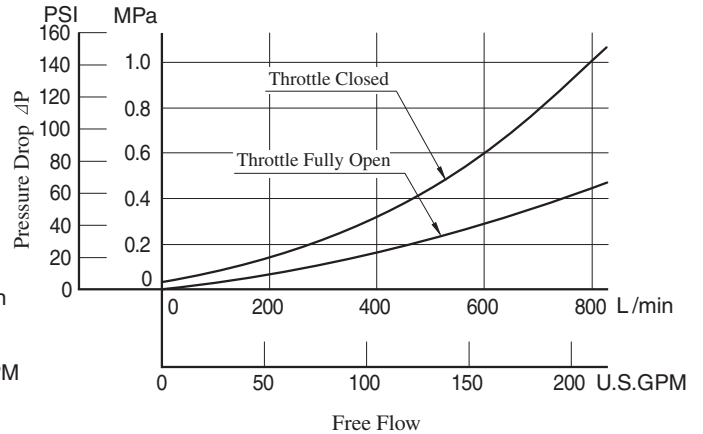
**EFCG-03**



**EFCG-06**



**EFCG-10**



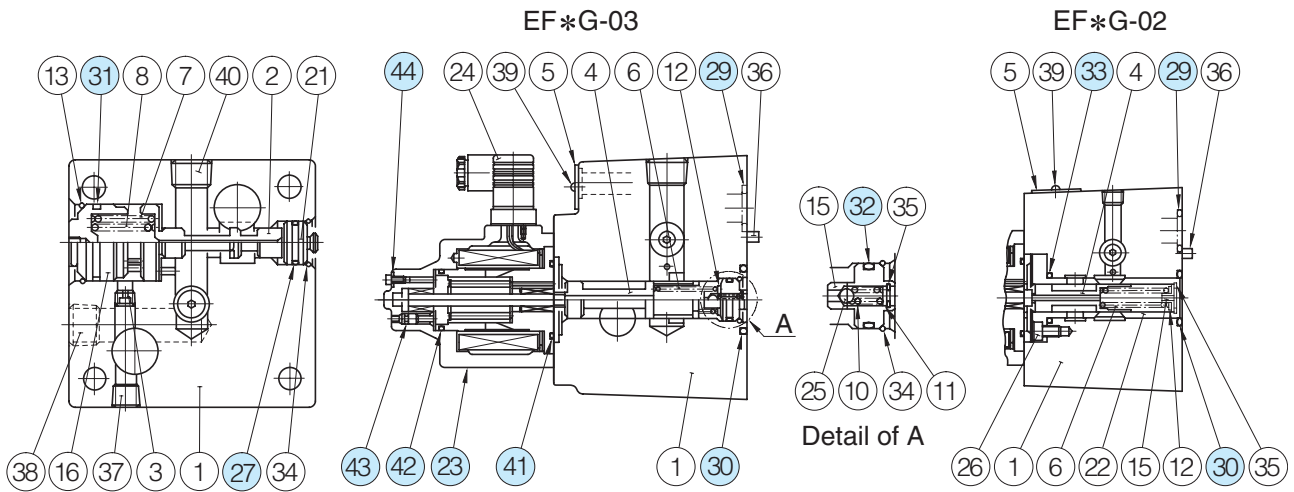
● For any other viscosity, multiply the factors in the table below.

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

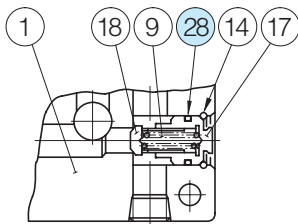
● For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.  
 $\Delta P' = \Delta P (G'/0.850)$

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

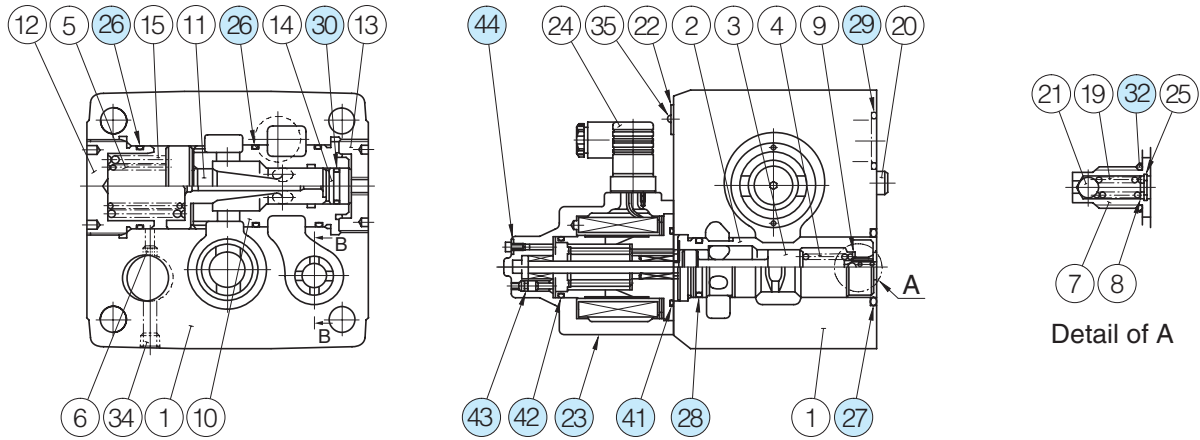
Note 1: O-rings (Item 41, 42, 43) and the fastener seal (Item 44) are included in the solenoid assembly.  
 2: The connector assembly GDM-211-B-11 (Item 24) is not included in the solenoid assembly.  
 3: When ordering seals, please specify the seal kit number from the table right.

List of Seal Kits

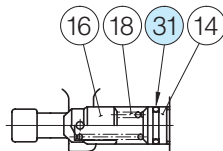
Valve Model Numbers	Seal Kit Numbers
EFG-02- *-31 *	KS-EFG-02-31
EFCG-02- *-31 *	KS-EFCG-02-31
EFG-03- *-26 *	KS-EFG-03-26
EFCG-03- *-26 *	KS-EFCG-03-26

■ 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.

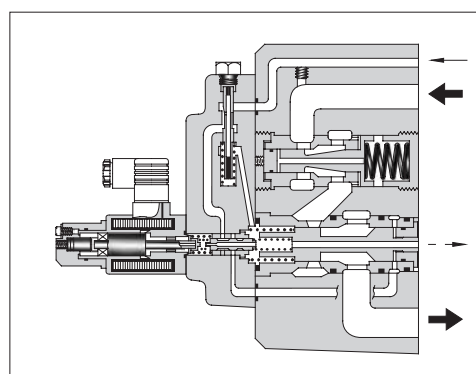
## 10Ω Series Proportional Electro-Hydraulic Flow Control (and Check) Valves

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.



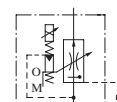
### Specifications

Model No.		EFG EFCG -03- 60 EFCG -03-125	EFG EFCG -06-250
Description			
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 <sup>★1</sup> 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 <sup>★2</sup> 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)



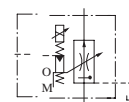
### Graphic Symbols

Internal Pilot

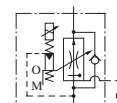


EFG- \*

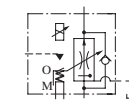
External Pilot



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
<b>F:</b> Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>EF:</b> Proportional Electro-Hydraulic Flow Control Valve  <b>EFC:</b> Proportional Electro-Hydraulic Flow Control and Check Valve	<b>G:</b> Sub-plate Mounting	<b>03</b>	<b>60:</b> 60 (15.9) <b>125:</b> 125 (33)	<b>None:</b> Internal Pilot  <b>E:</b> External Pilot	<b>51</b>	Refer to ★
			<b>06</b>	<b>250:</b> 250 (66)		<b>51</b>	

★ 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 requied 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

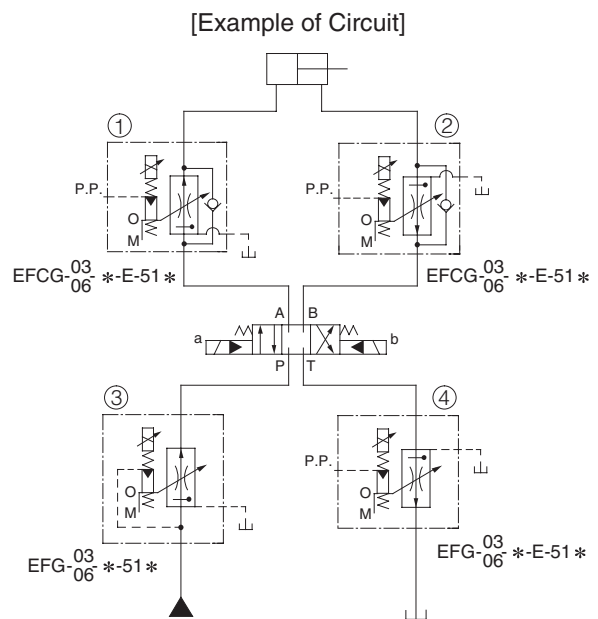
Use the external pilot type (pilot connection code: E) whether a metre-in or metre-out circuit is employed.

③

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

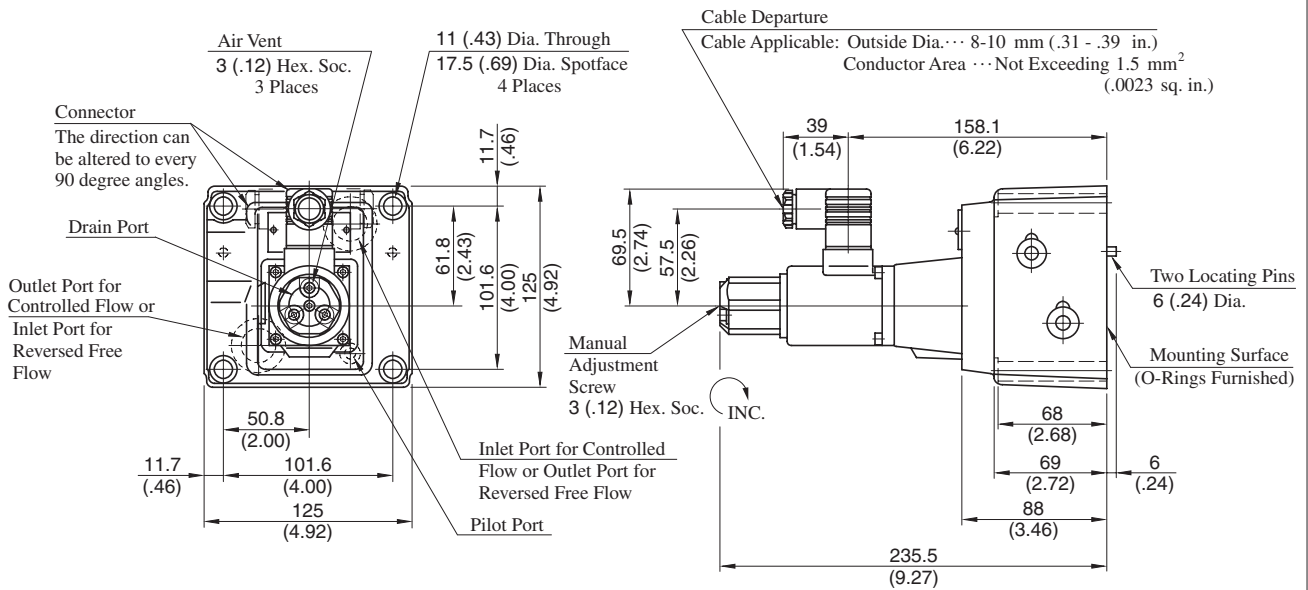
④

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



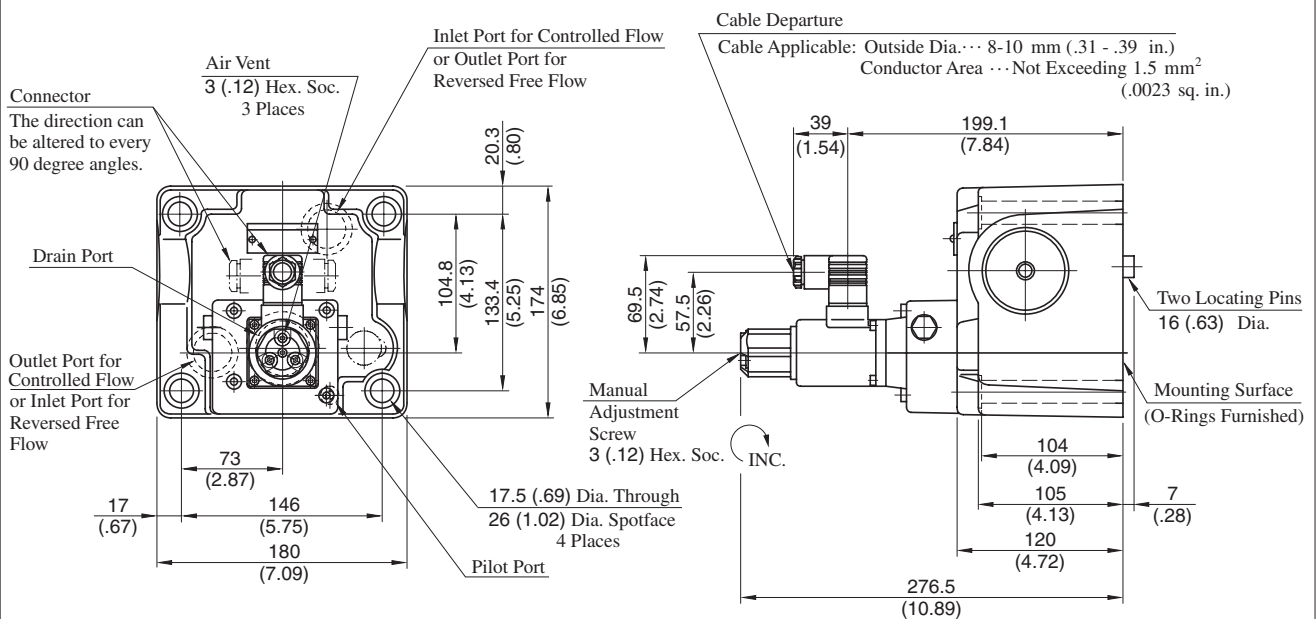


EFG -03- 60  
EFCG -03- 125 - \*-51/5190



**DIMENSIONS IN MILLIMETRES (INCHES)**

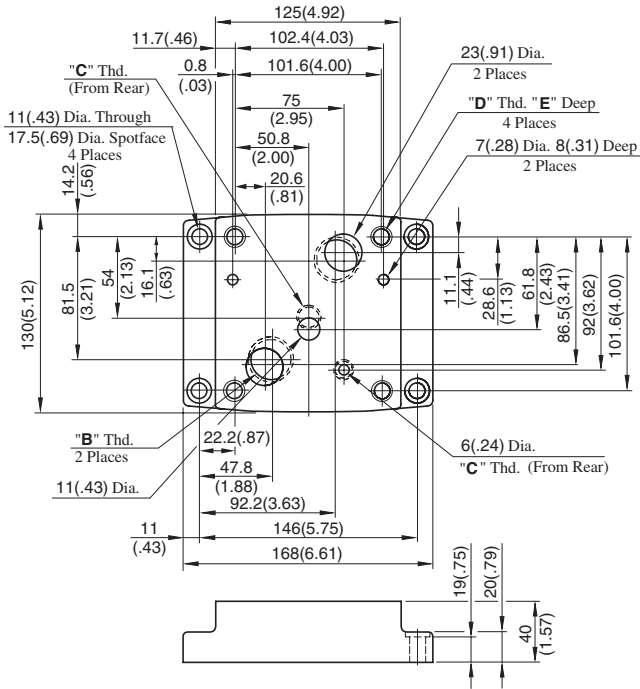
EFG -06-250- \*-51/5190  
EFCG



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

**Sub-plate**

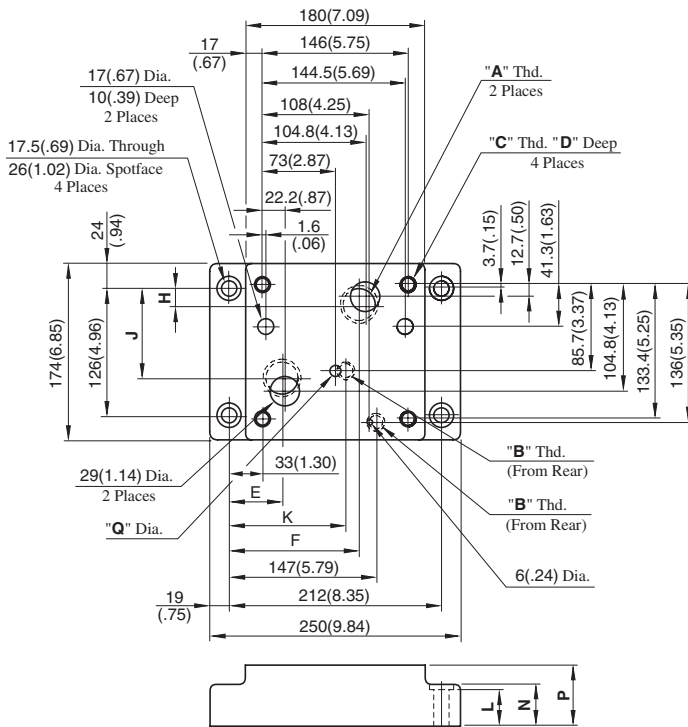
**EFGM-03Y, 03Z-30/3080/3090**



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**

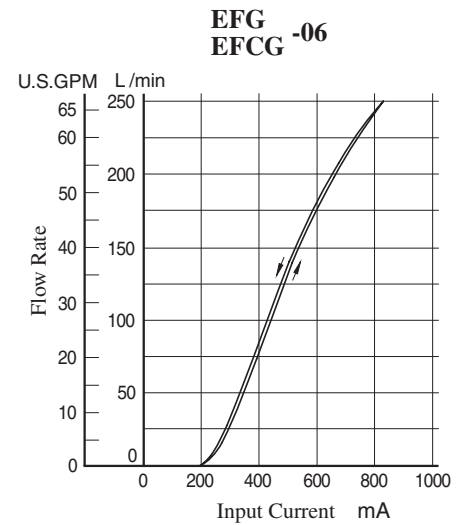
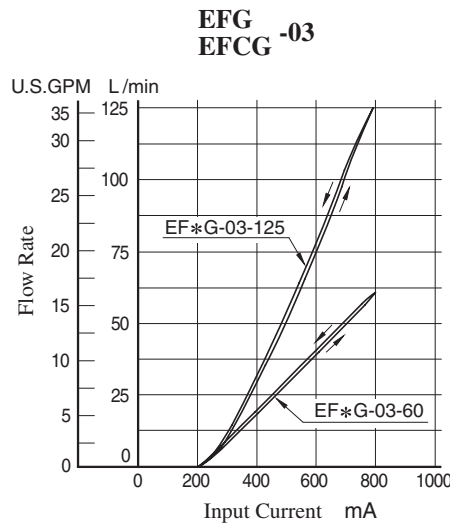


Sub-plate Model Numbers	Thread Size		
	"A" Thd.	"B" Thd.	"C" Thd.
EFGM-06X-30	Rc 1	Rc 3/8	M16
EFGM-06Y-30	Rc 1-1/4		
EFGM-06X-3080	1 BSP.F		
EFGM-06Y-3080	1-1/4 BSP.F		
EFGM-06X-3090	1 NPT	3/8 NPT	5/8-11 UNC
EFGM-06Y-3090	1-1/4 NPT		

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**

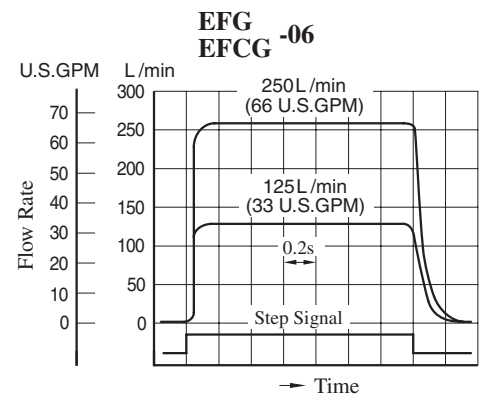
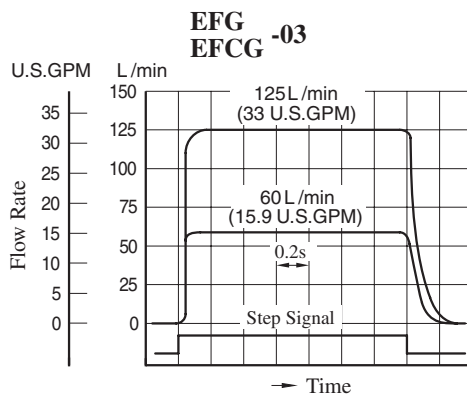
Viscosity: 30 mm<sup>2</sup>/s  
(141 SSU)



**Step Response**

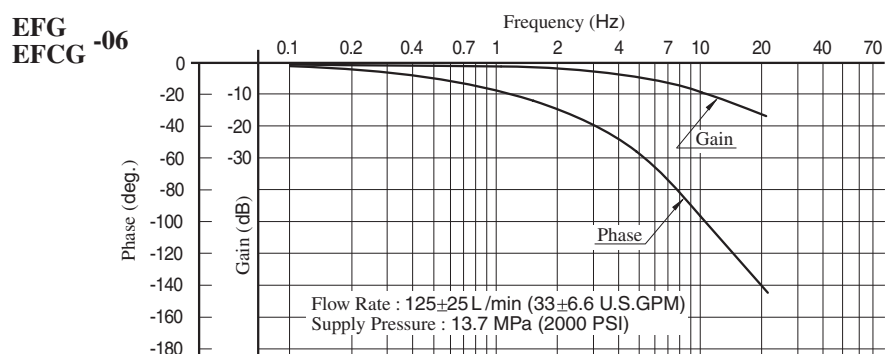
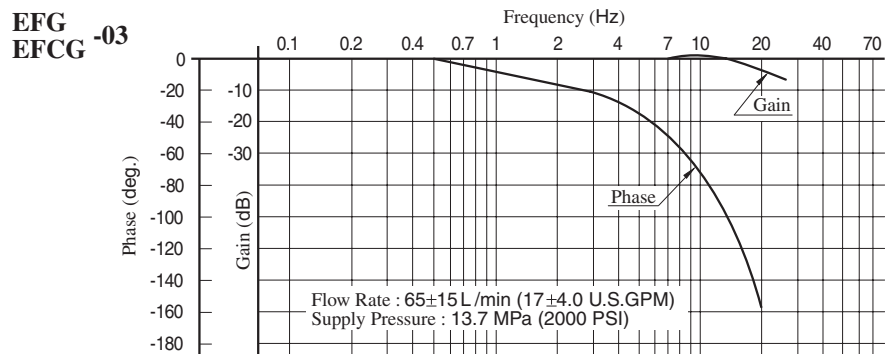
These characteristics have been obtained by measuring on each valve. Therefore, they may vary according to a hydraulic circuit to be used.

Viscosity: 30 mm<sup>2</sup>/s  
(141 SSU)

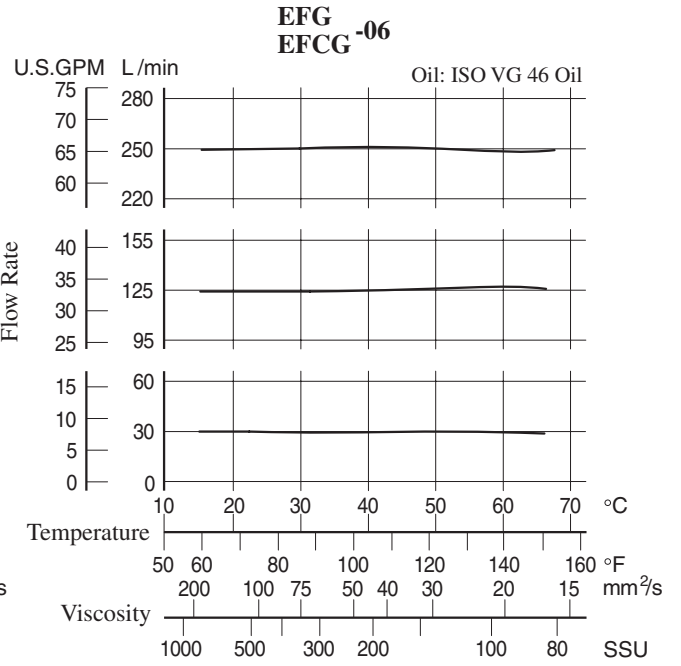
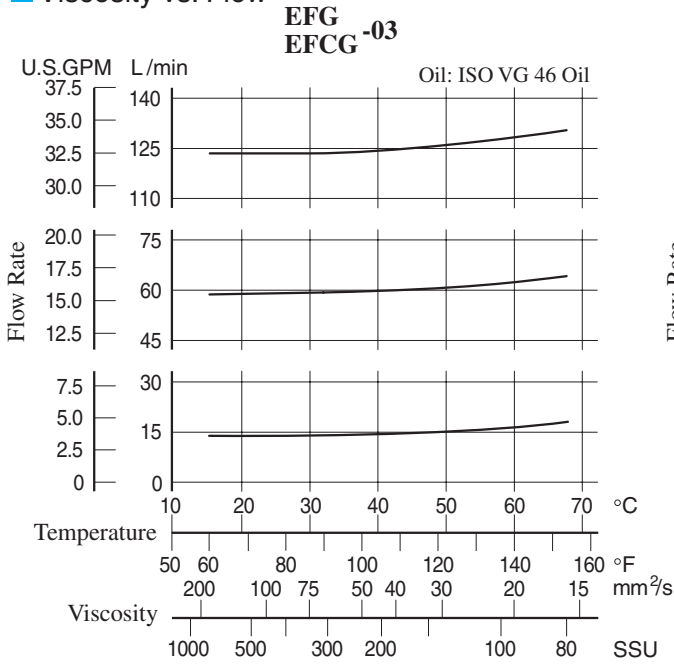


**Frequency Response**

Viscosity: 30 mm<sup>2</sup>/s  
(141 SSU)

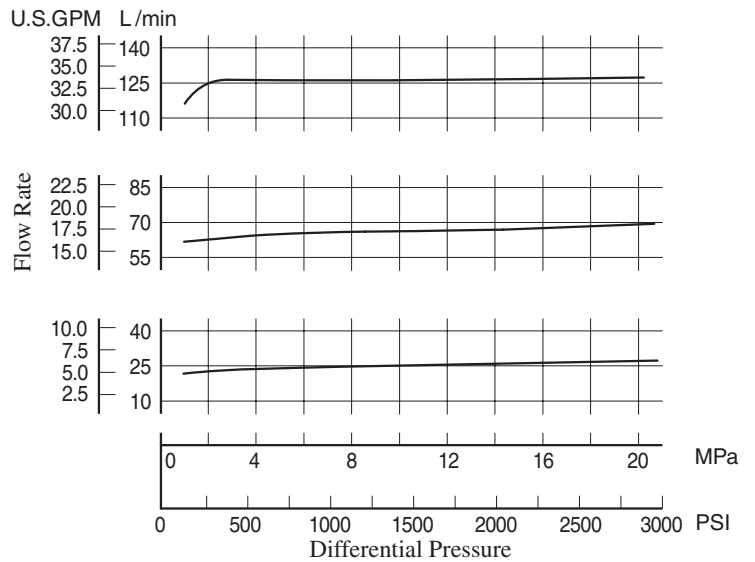


**■ Viscosity vs. Flow**

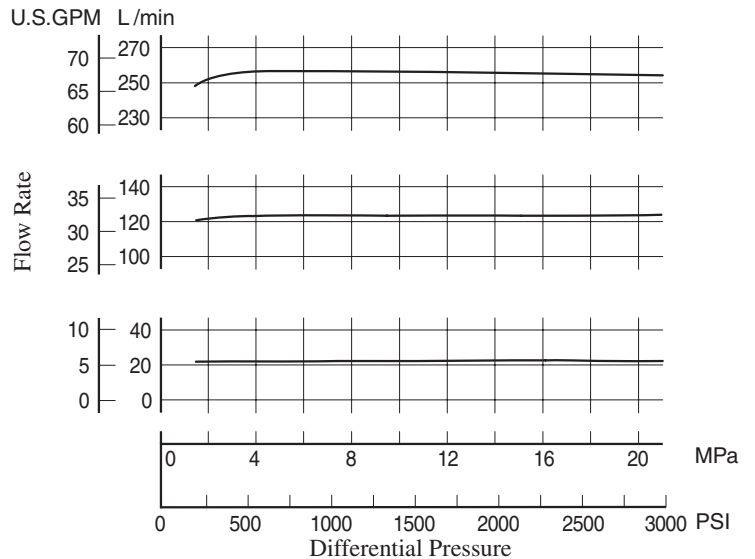


**■ Differential Pressure vs. Metred Flow**

**EFG  
EFCG -03**

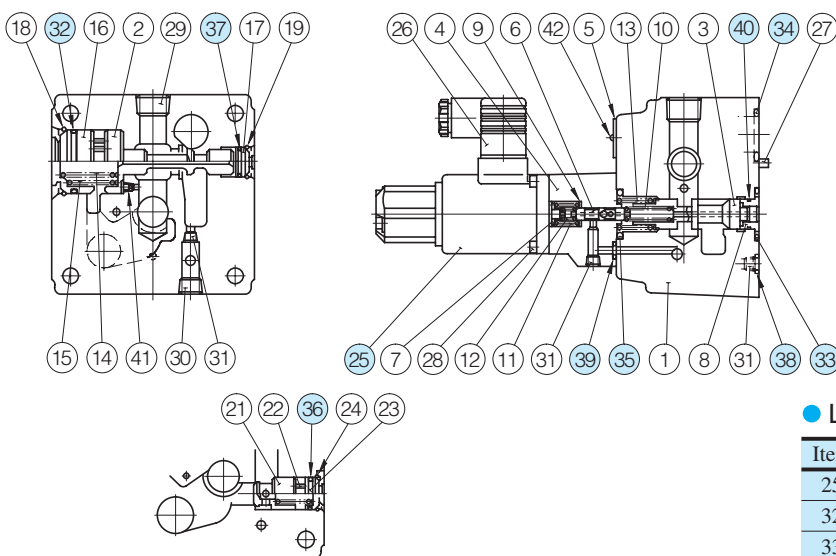


**EFG  
EFCG -06**



**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](#).

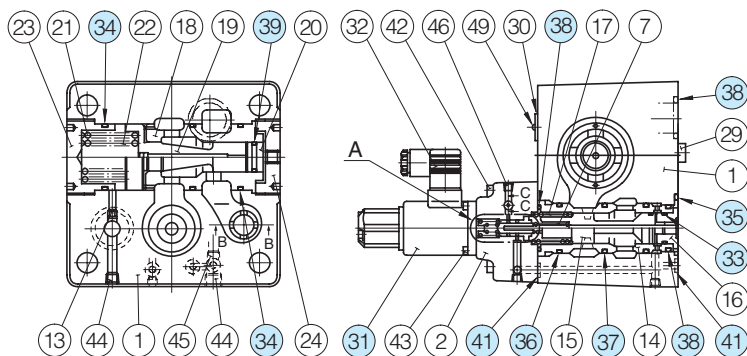
● List of Seal Kits

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

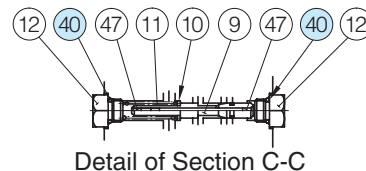
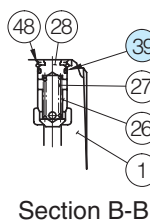
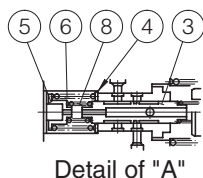
● List of Seals and Solenoid Ass'y

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)



● 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](#).

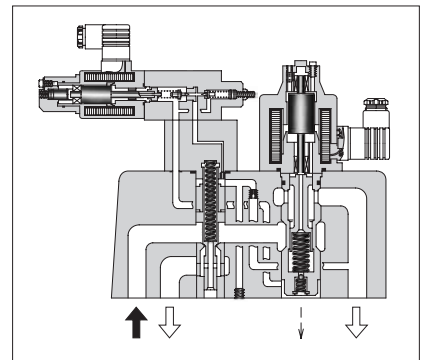
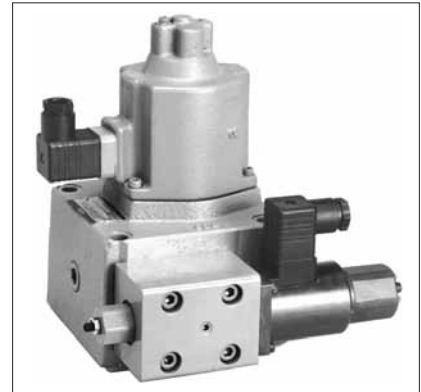
## 40Ω–10Ω Series Proportional Electro-Hydraulic Flow Control and Relief Valves

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.

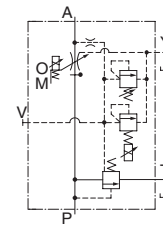
### Specifications

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 <sup>★1</sup>	Pres. Adj. Range MPa (PSI) <sup>★2</sup>	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 <a href="#">page 714 to 716</a>	

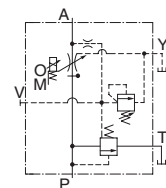
- ★1. The specifications for pressure controls are applied to models with proportional pilot relief valve. (Ex. EFBG-03-125-C-17)
- ★2. The maximum pressure adjustment range of the models without proportional pilot relief valves is 24.5 MPa (3550 PSI).



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
<b>F:</b> Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>EFB:</b> Proportional Electro-Hydraulic Flow Control and Relief Valve	<b>G:</b> Sub-plate Mounting	<b>03</b>	<b>125:</b> 125 (33)	<b>C, H:</b> See Specifications  <b>None:</b> Without Proportional Pilot Relief Valve	<b>17</b>	Refer to ★
			<b>06</b>	<b>250:</b> 250 (66)		<b>17</b>	
			<b>10</b>	<b>500:</b> 500 (132)		<b>17</b>	

- ★ 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-* <sup>C</sup> <sub>H</sub> -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 <sup>★</sup>	1-1/2, 2 Flange Mounting	EFBGM-10Y-1080 <sup>★</sup>	1-1/2, 2 Flange Mounting	EFBGM-10Y-1090 <sup>★</sup>	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.

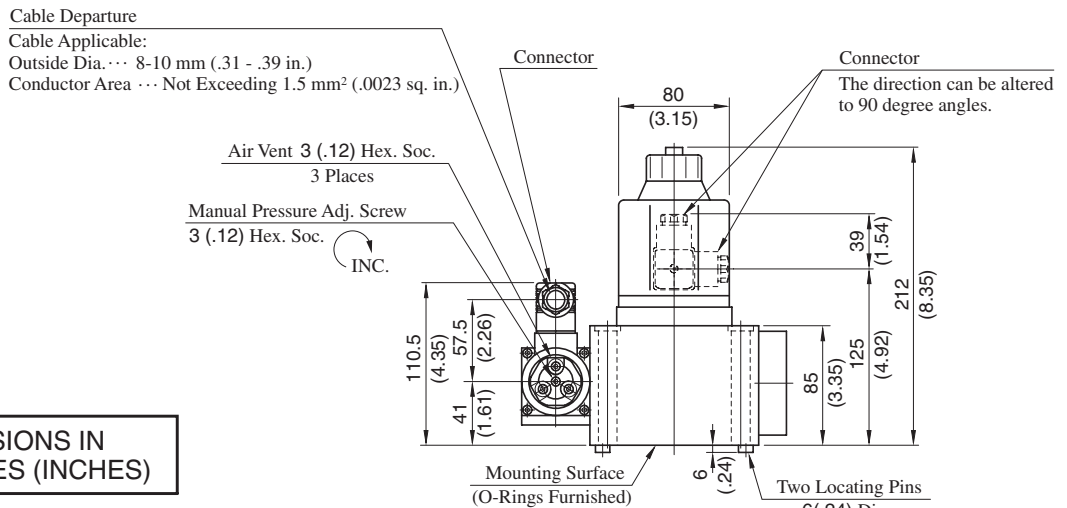
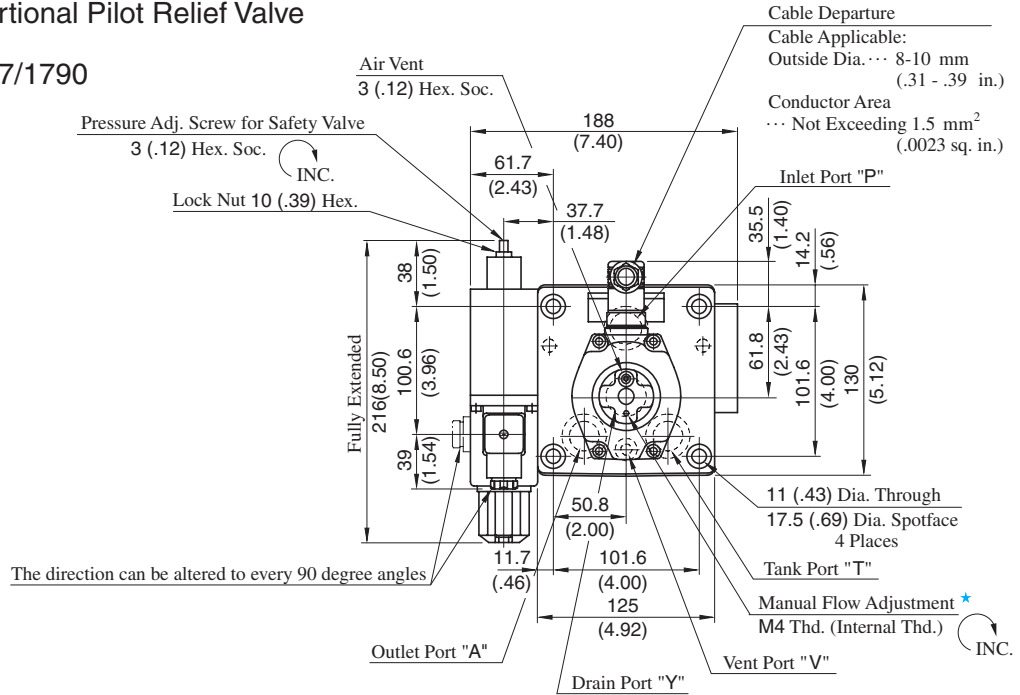
To lower the pressure setting, turn the safety valve pressure adjustment screw anti-clockwise. After adjustment, be sure to tighten the lock nut.





**Models with Proportional Pilot Relief Valve**

EFBG-03-125-<sup>C</sup><sub>H</sub>-17/1790



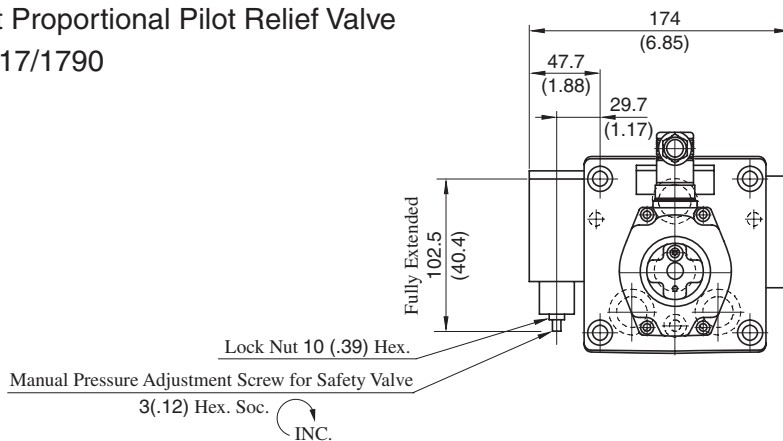
**DIMENSIONS IN MILLIMETRES (INCHES)**

★ 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



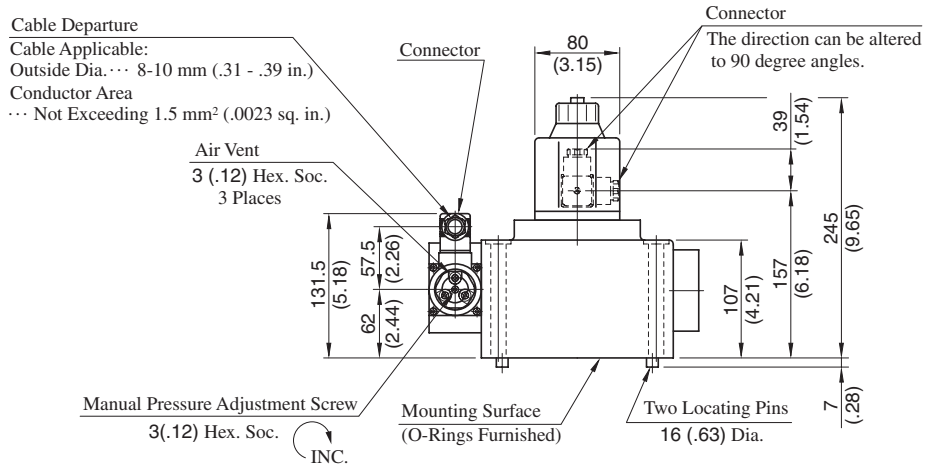
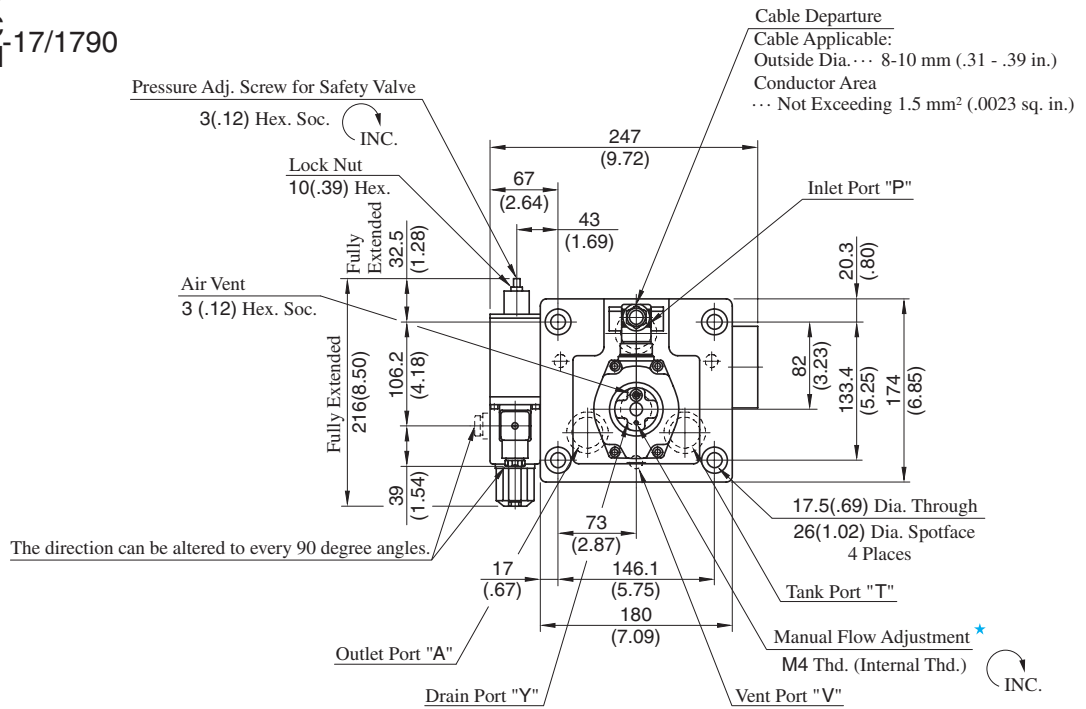
Approx. Mass ..... 14 kg (30.9 lbs.)

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



Models with Proportional Pilot Relief Valve

EFBG-06-250-<sup>C</sup><sub>H</sub>-17/1790

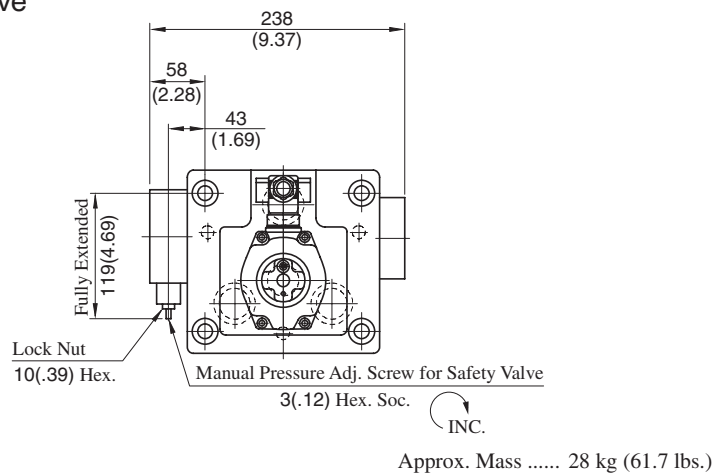


**DIMENSIONS IN MILLIMETRES (INCHES)**

★ 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.

Models without Proportional Pilot Relief Valve

EFBG-06-250-17/1790



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

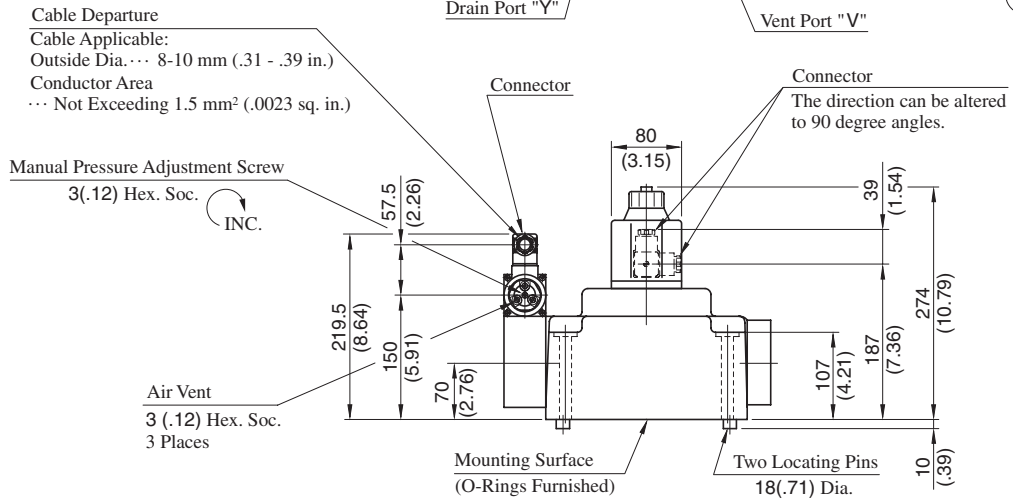
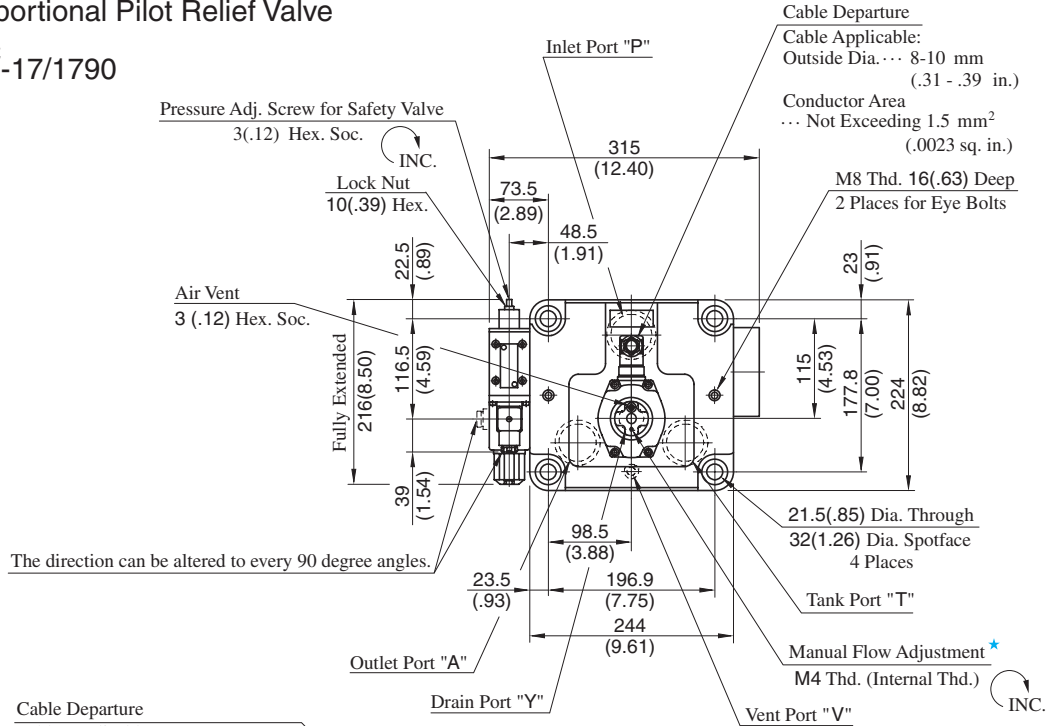
**H**



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

**Models with Proportional Pilot Relief Valve**

**EFBG-10-500-<sup>C</sup><sub>H</sub>-17/1790**

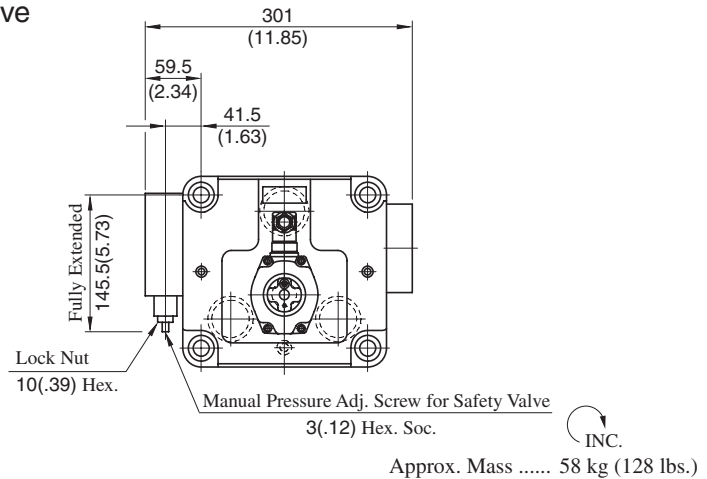


**DIMENSIONS IN MILLIMETRES (INCHES)**

★ 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.

**Models without Proportional Pilot Relief Valve**

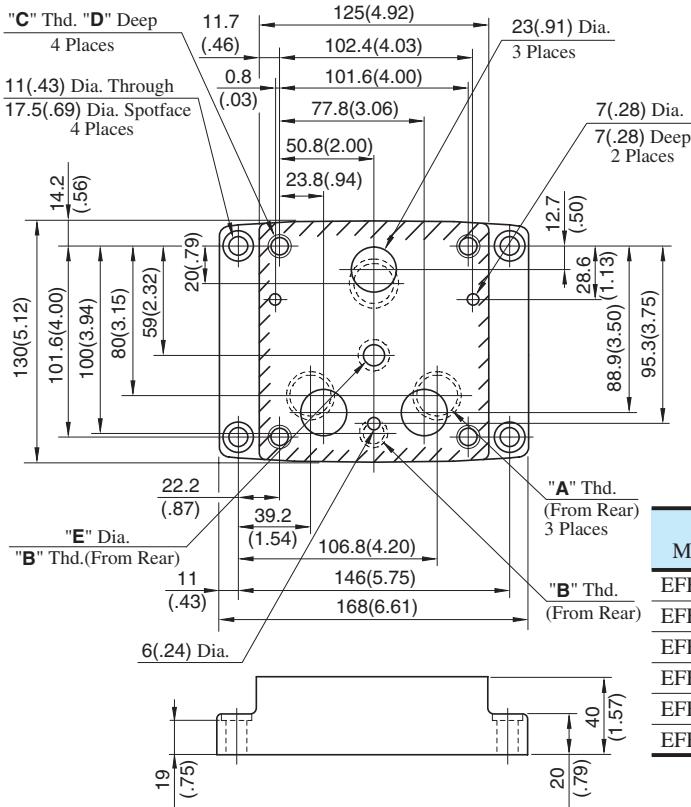
**EFBG-10-500-17/1790**



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

**Sub-plate**

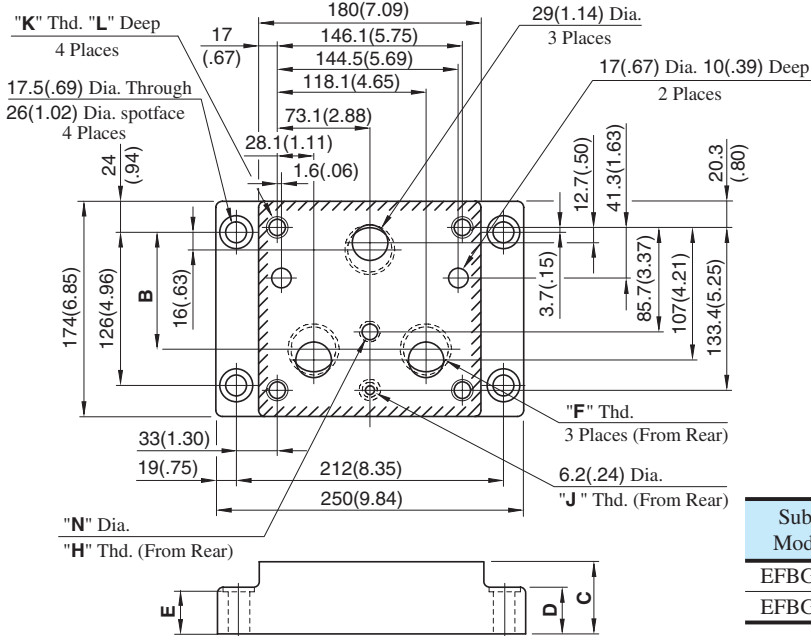
**EFBGM-03Y/03Z-10/1080/1090**



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 BSP.F	1/4 BSP.F			11 (.43)
EFBGM-03Z-1080	1 BSP.F				11.7 (.46)
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)

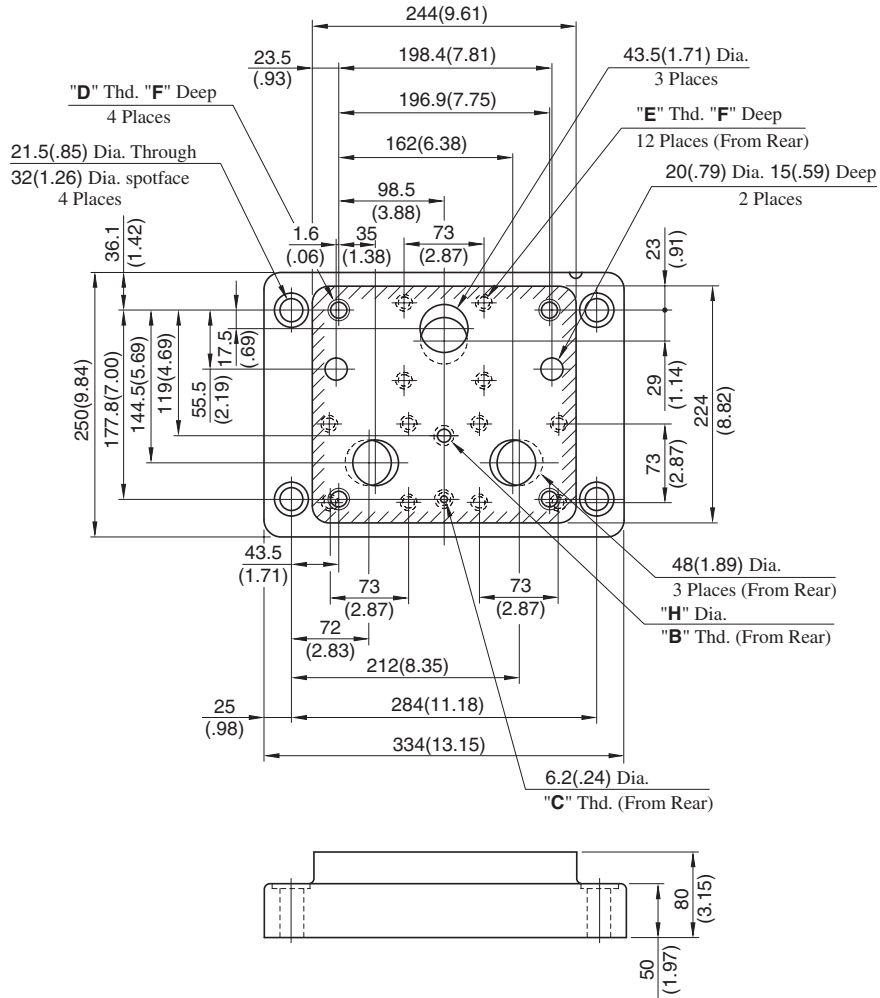
Sub-plate Model No.	Thread Size				mm (in.)	
	"F" Thd.	"H" Thd.	"J" Thd.	"K" Thd.	L	N
EFBGM-06X-10	Rc 1	Rc 3/8	Rc 1/4	M 16	30 (1.18)	14 (.55)
EFBGM-06Y-10	Rc 1-1/4				30 (1.18)	15.2 (.60)
EFBGM-06X-1080	1 BSP.F	3/8 BSP.F	1/4 BSP.F	M 16	30 (1.18)	14 (.55)
EFBGM-06Y-1080	1-1/4 BSP.F				30 (1.18)	14 (.55)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

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

**Sub-plate**

EFBGM-10Y-10/1080/1090

**DIMENSIONS IN MILLIMETRES (INCHES)**



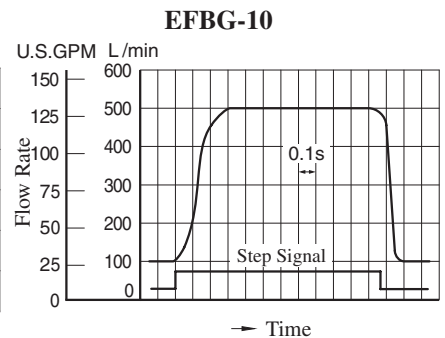
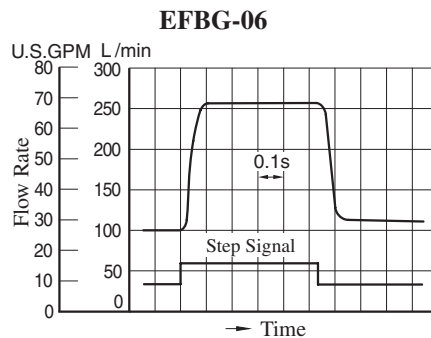
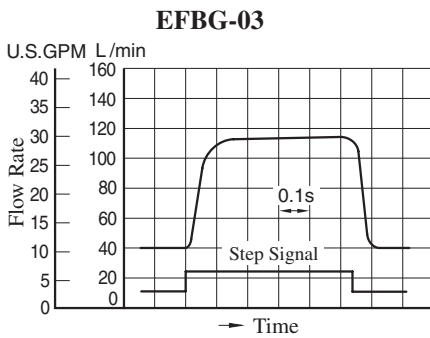
Sub-plate Model Numbers	Thread Size				mm (in.)	
	"B" Thd.	"C" Thd.	"D" Thd.	"E" Thd.	F	H
EFBGM-10Y-10	Rc 3/8	Rc 1/4	M20	M16	32 (1.26)	14 (.55)
EFBGM-10Y-1080	3/8 BSPF	1/4 BSPF				15.2 (.60)
EFBGM-10Y-1090	3/8 NPT	1/4 NPT	3/4-10 UNC	5/8-11 UNC	34 (1.34)	14 (.55)

**Step Response**

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

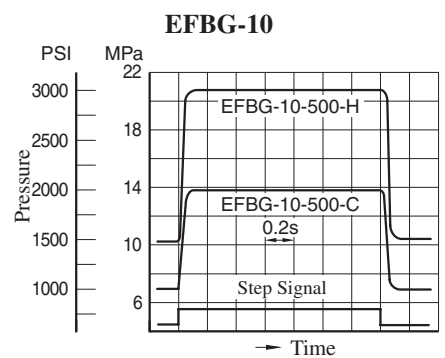
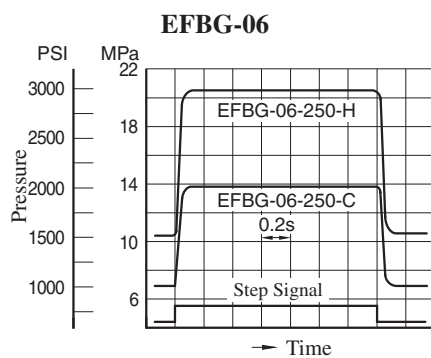
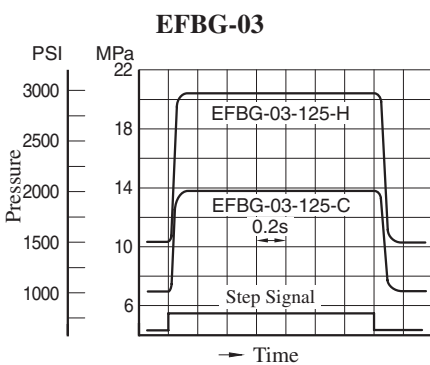
Viscosity: 30 mm<sup>2</sup>/s (141 SSU)

**Flow Controls**



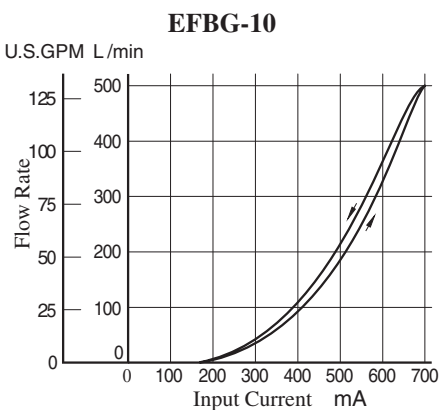
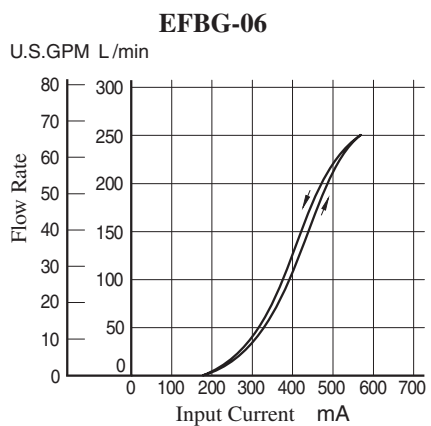
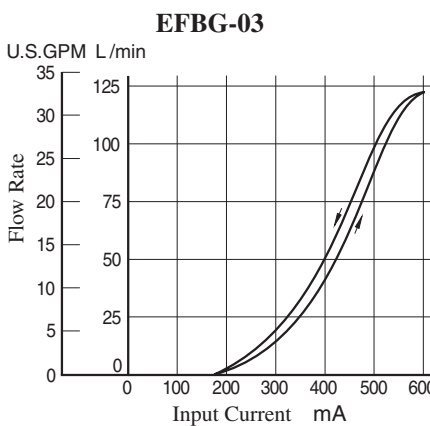
**Pressure Controls**

Viscosity: 30 mm<sup>2</sup>/s (141 SSU)



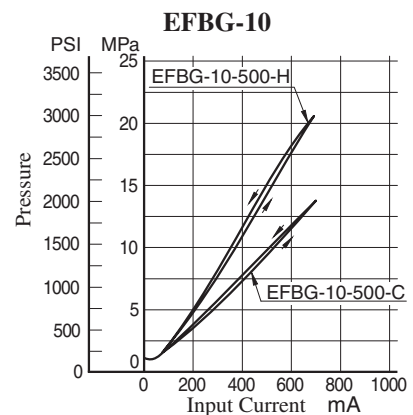
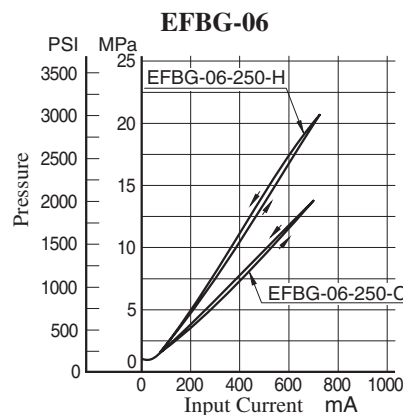
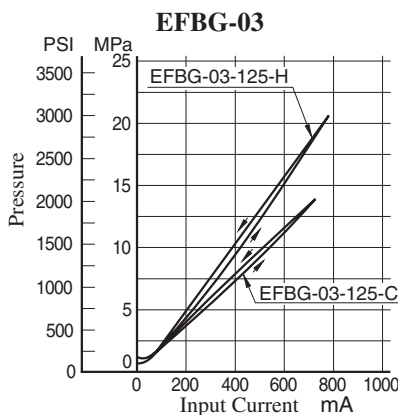
**Input Current vs. Flow**

Viscosity: 30 mm<sup>2</sup>/s (141 SSU)



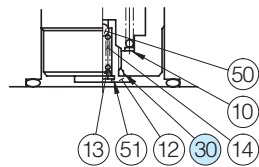
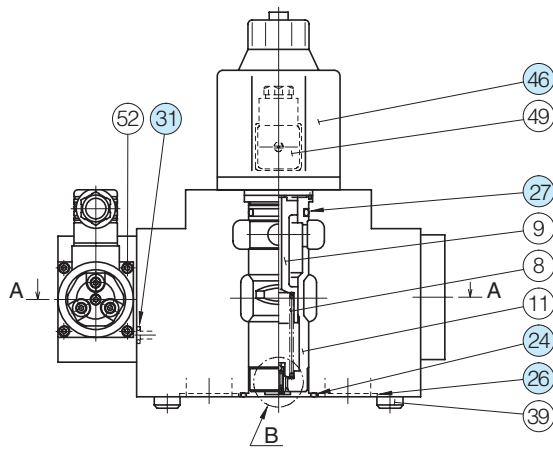
**Input Current vs. Pressure**

Viscosity: 30 mm<sup>2</sup>/s (141 SSU)

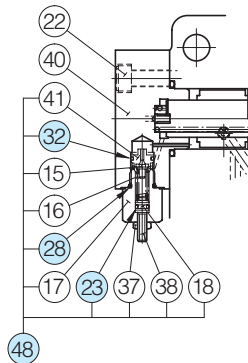
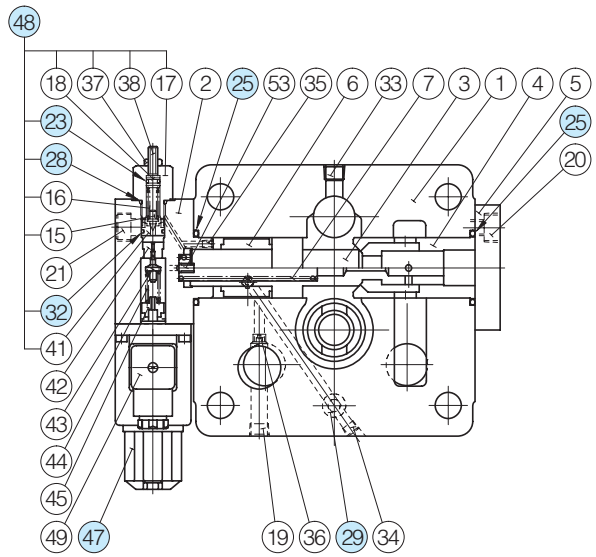


■ List of Seals, Solenoid Ass'y and Safety Valve

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.

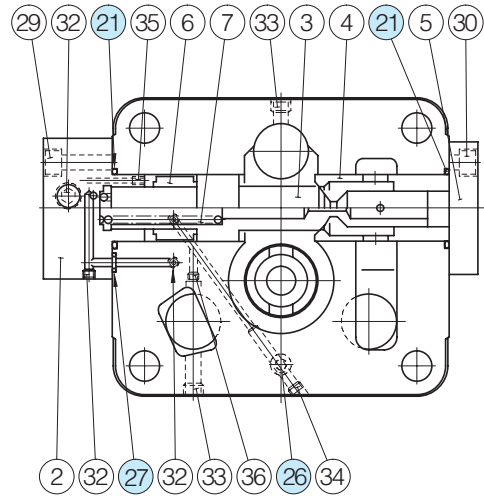
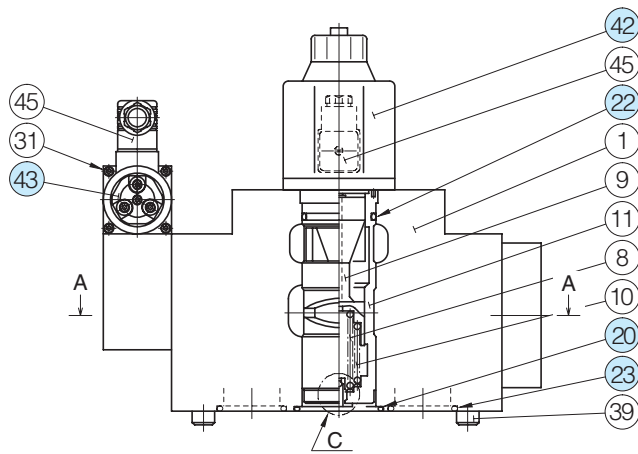
When ordering seals, please specify the seal kit number from the table above.

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.

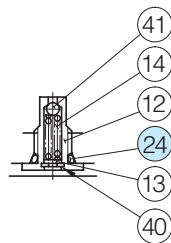
List of Seals, Solenoid Ass'y, Pilot Relief Valves and Safety Valve

EFBG-10-500- \*-17/1790

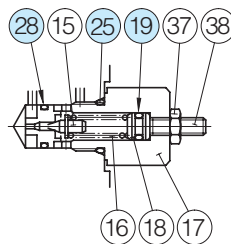


Section A-A

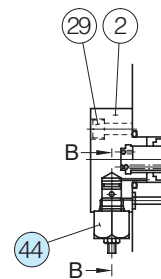
Detail of Safety Valve (Item 44)



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.

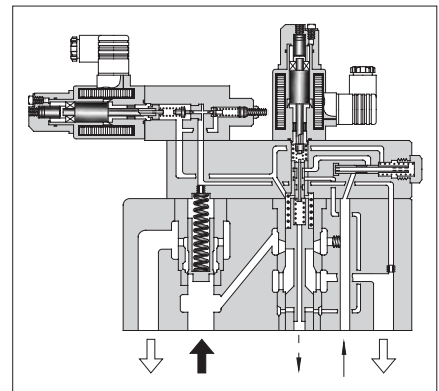
Further, since a temperature compensation function is incorporated, this valve provides consistent flow control without respect to the fluid temperature.

### 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 <sup>*1</sup>	Pres. Adj. Range MPa (PSI) <sup>*2</sup>	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 <a href="#">page 724 to 726</a>		

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

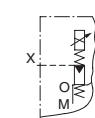
★2. The maximum pressure adjustment range of the models without proportional pilot relief valves is 24.5 MPa (3550 PSI).



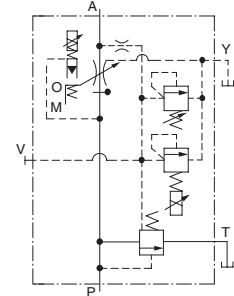
### Graphic Symbols

#### With Proportional Pilot Relief Valve

##### External Pilot

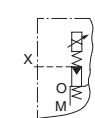


##### Internal Pilot

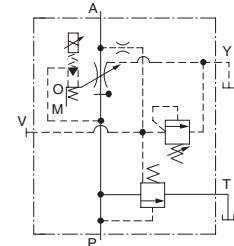


#### Without Proportional Pilot Relief Valve

##### External Pilot



##### Internal Pilot





**Model Number Designation**

<b>F-</b>	<b>EFB</b>	<b>G</b>	<b>-03</b>	<b>-125</b>	<b>-C</b>	<b>-E</b>	<b>-61</b>	<b>*</b>
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
<b>F:</b> Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>EFB:</b> Proportional Electro-Hydraulic Flow Control and Relief Valve	<b>G:</b> Sub-plate Mounting	<b>03</b>	<b>125:</b> 125 (33)	<b>C, H:</b> See Specifications <b>None:</b> Without Proportional Pilot Relief Valve	<b>None:</b> Internal Pilot <b>E:</b> External Pilot	<b>61</b>	Refer to *
			<b>06</b>	<b>250:</b> 250 (66)			<b>61</b>	
			<b>10</b>	<b>500:</b> 500 (132)			<b>51</b>	

★ 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).

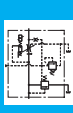
**When Relief Valve Passing Flow Rate is Low in Pressure Control State**

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**

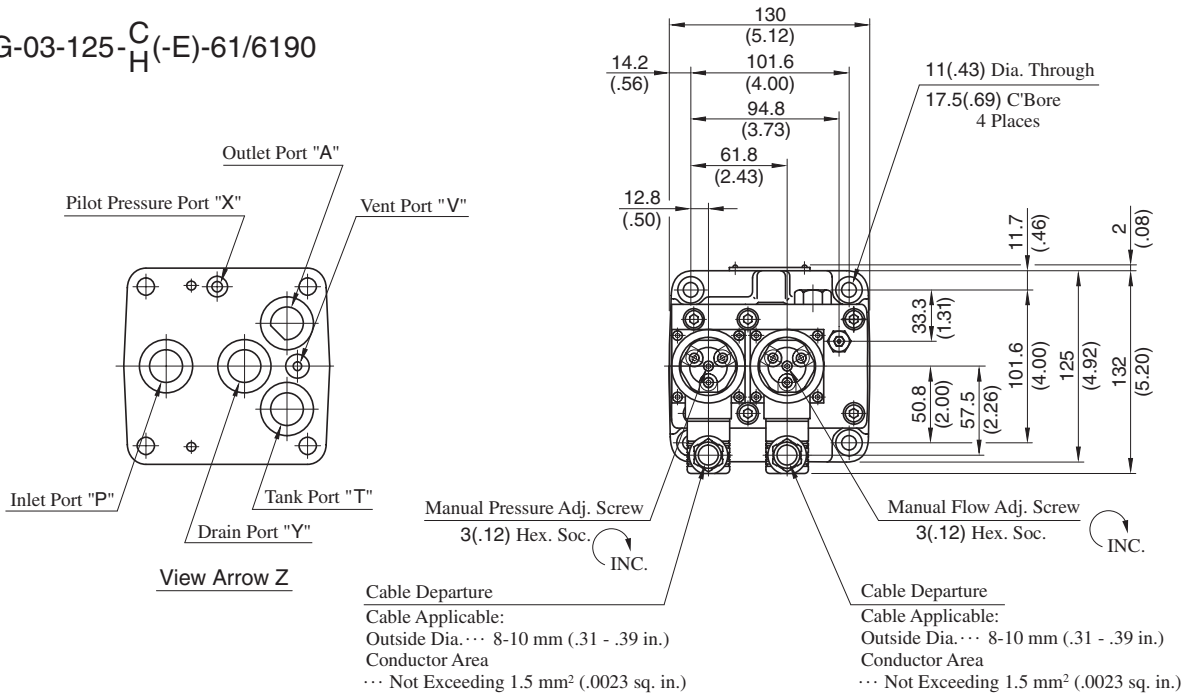
The pressure of the saffety valve is preset at the value equal to the upper limit of the pressure adjustment rengo plus 2 MPa (290 PSI). Please adjust the pressure of the valve so preset to meet the pressure to be used actually.

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



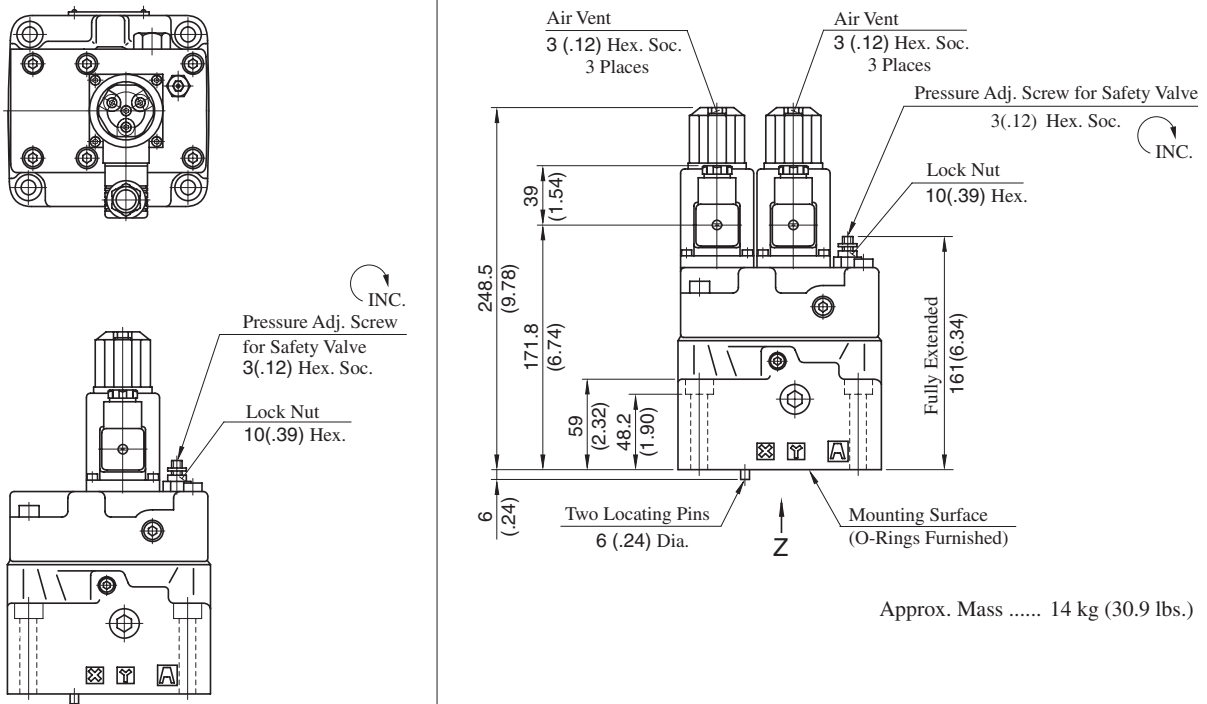
**Models with Proportional Pilot Relief Valve**

**EFBG-03-125-<sup>C</sup><sub>H</sub>(-E)-61/6190**



**Models without Proportional Pilot Relief Valve**

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



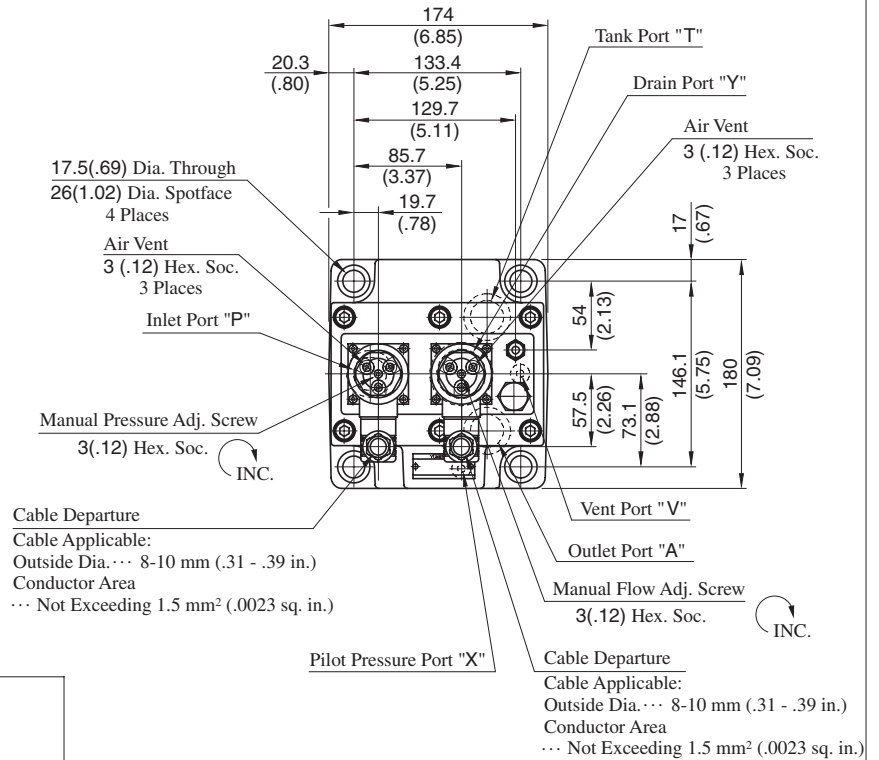
• For other dimensions, please refer to the models with Proportional Pilot Relief Valve.

Approx. Mass ..... 13.3 kg (29.3 lbs.)

**DIMENSIONS IN MILLIMETRES (INCHES)**

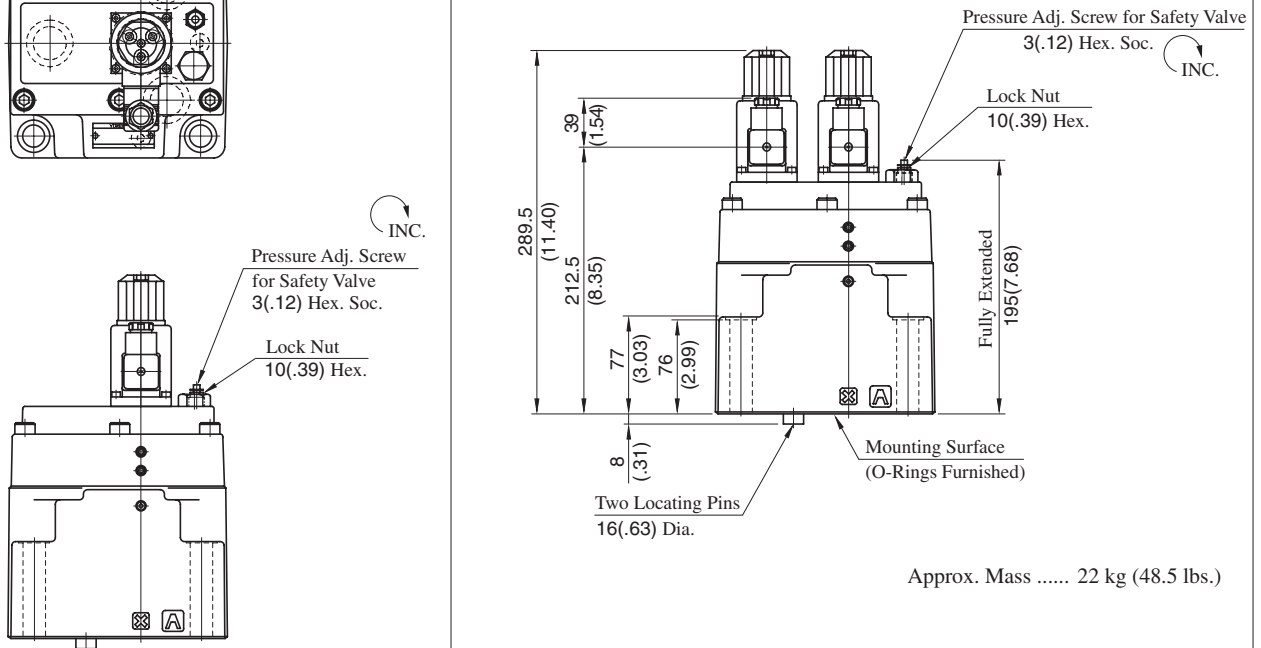
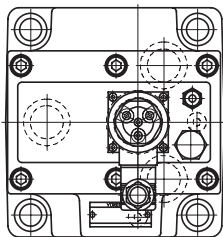
Models with Proportional Pilot Relief Valve

EFBG-06-250-<sup>C</sup><sub>H</sub>(-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.)

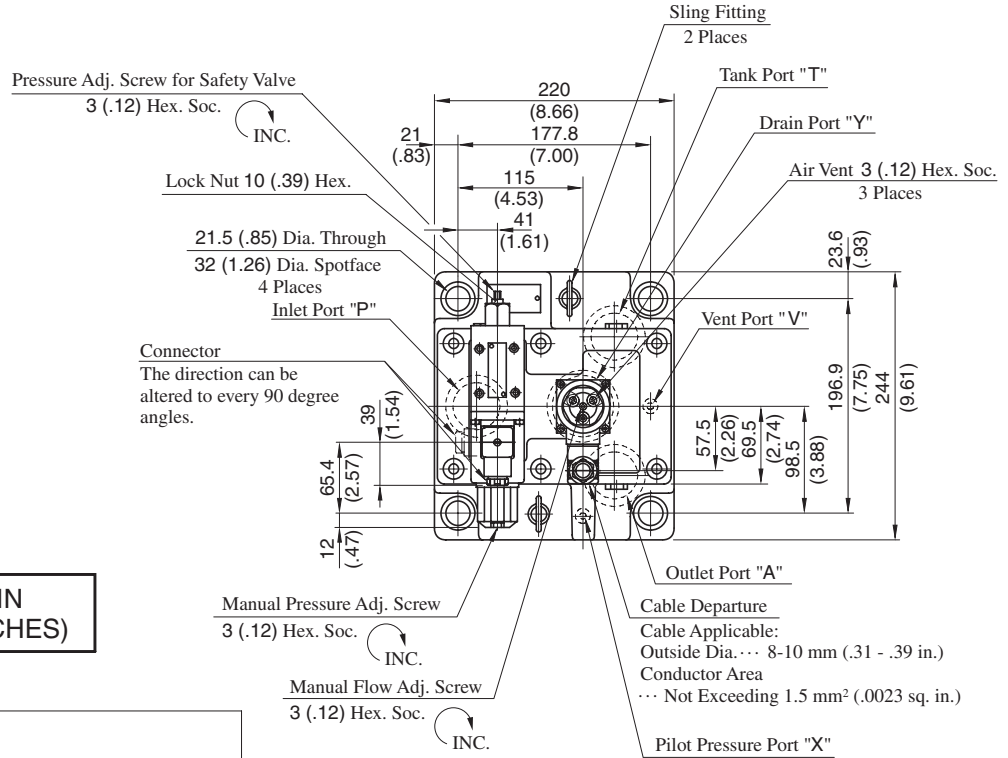
**DIMENSIONS IN MILLIMETRES (INCHES)**



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

Models with Proportional Pilot Relief Valve

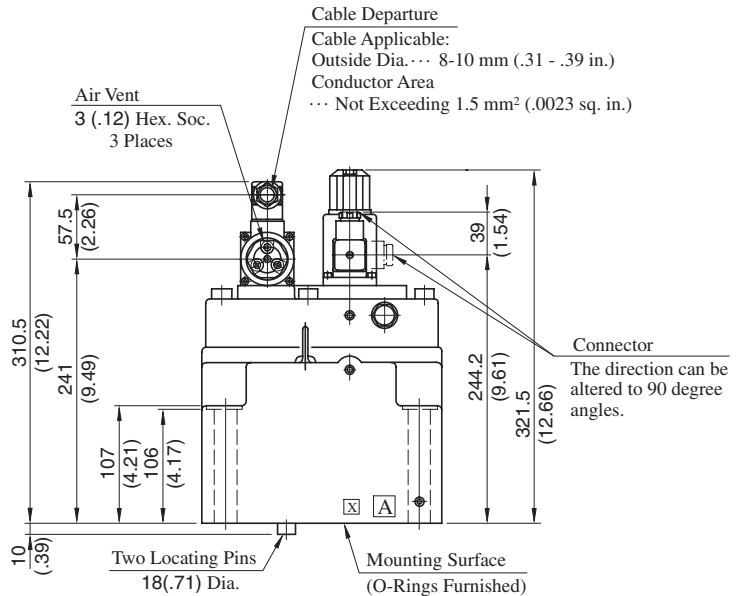
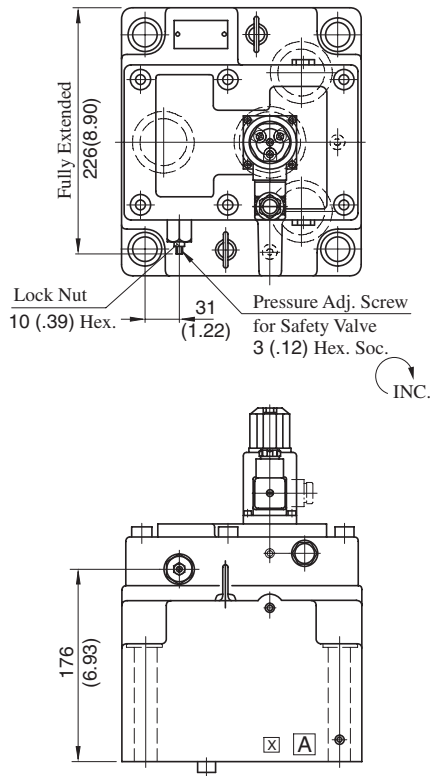
EFBG-10-500-<sup>C</sup><sub>H</sub>(-E)-51/5190



**DIMENSIONS IN MILLIMETRES (INCHES)**

Models without Proportional Pilot Relief Valve

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



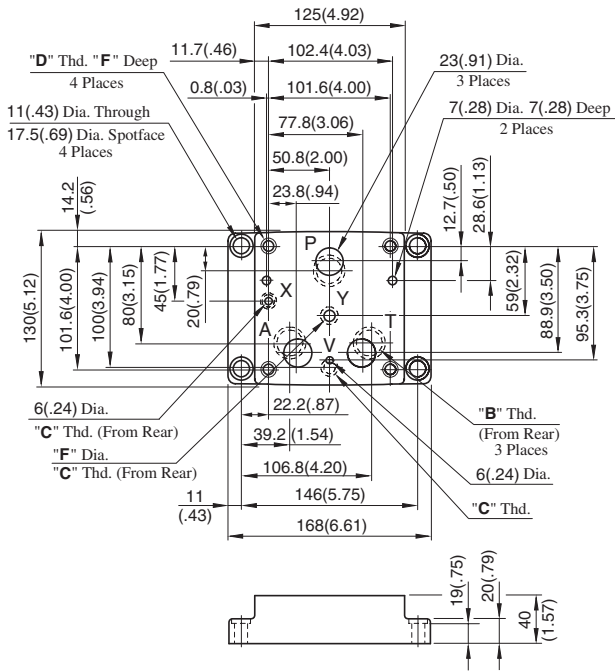
Approx. Mass ..... 64 kg (141 lbs.)

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

Approx. Mass ..... 62 kg (137 lbs.)

Sub-plate

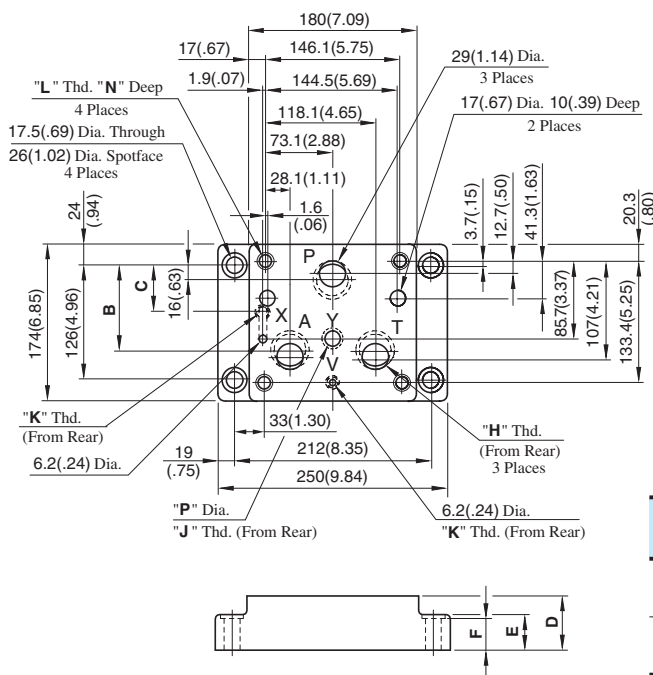
EFBGM-03Y-20/2080/2090  
03Z



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	M10	18 (.71)	11.7 (.46)
EFBGM-03Z-2080	1 BSP.F				11 (.43)
EFBGM-03Y-2090	3/4 NPT	1/4 NPT	3/8-16 UNC	21 (.83)	11 (.43)
EFBGM-03Z-2090	1 NPT				11 (.43)

DIMENSIONS IN MILLIMETRES (INCHES)

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



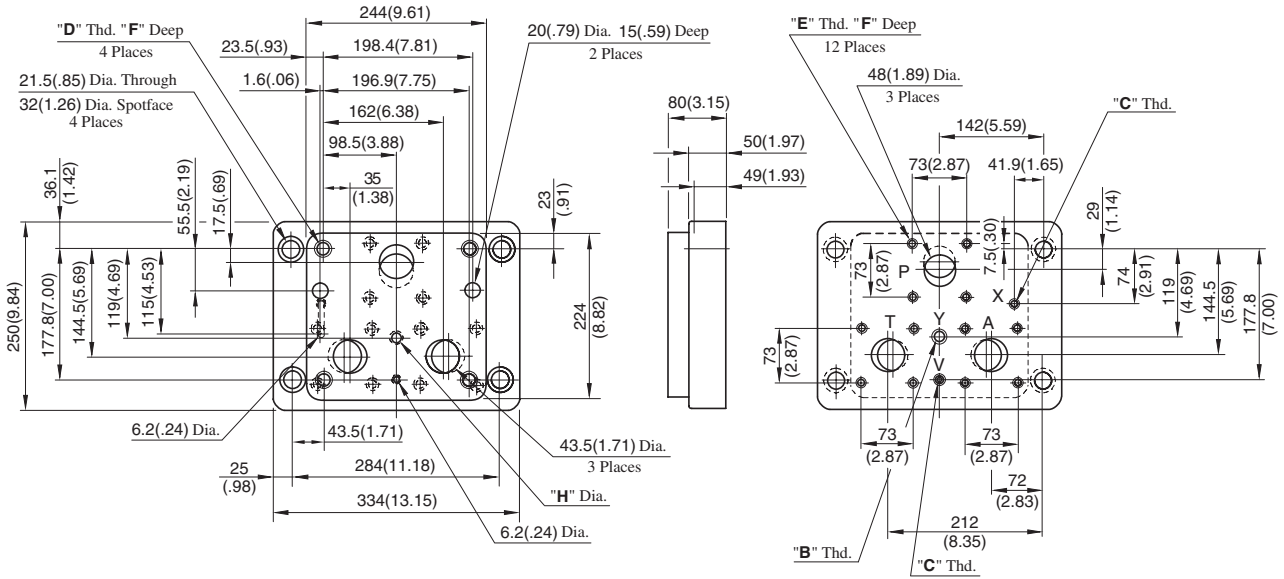
Sub-plate Model Numbers	Dimensions mm (in.)				
	B	C	D	E	F
EFBGM-06X	103.3 (4.07)	63.3 (2.49)	45 (1.77)	35 (1.38)	34 (1.34)
EFBGM-06Y	95 (3.74)	53.3 (2.10)	60 (2.36)	40 (1.57)	39 (1.54)

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					15.2 (.60)
EFBGM-06X-2080	1 BSP.F	3/8 BSP.F	1/4 BSP.F	M16	30 (1.18)	14 (.55)
EFBGM-06Y-2080	1-1/4 BSP.F					15.2 (.60)
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					14 (.55)

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

**EFBGM-10Y-20/2080/2090**

**DIMENSIONS IN  
MILLIMETRES (INCHES)**



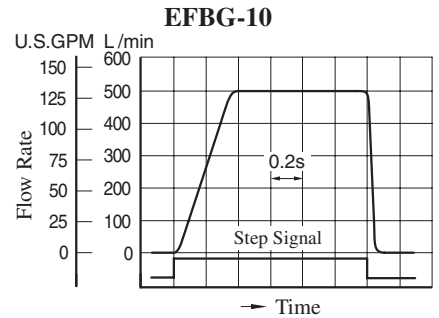
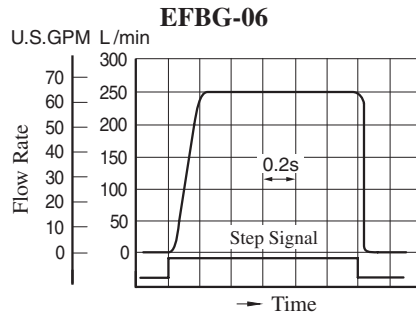
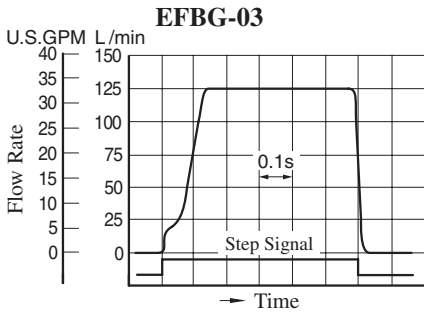
Sub-plate Model Numbers	Thread Size				mm (in.)	
	"B" Thd.	"C" Thd.	"D" Thd.	"E" Thd.	F	H
EFBGM-10Y-20	Rc 3/8	Rc 1/4	M20	M16	32(1.26)	14(.55)
EFBGM-10Y-2080	3/8 BSPF	1/4 BSPF				15.2(.60)
EFBGM-10Y-2090	3/8 NPT	1/4 NPT	3/4-10 UNC	5/8-11 UNC	34(1.34)	14(.55)

**Step Response**

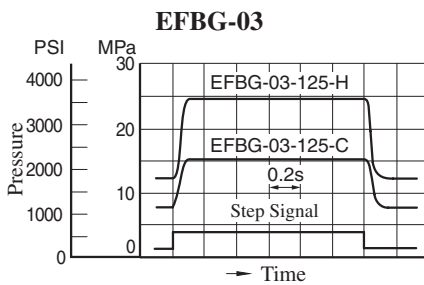
These characteristics have been obtained by measuring on each valve. Therefore, they may vary according to a hydraulic circuit to be used.

Viscosity: 30 mm<sup>2</sup>/s (141 SSU)

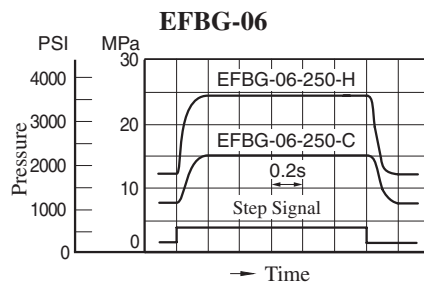
**Flow Controls**



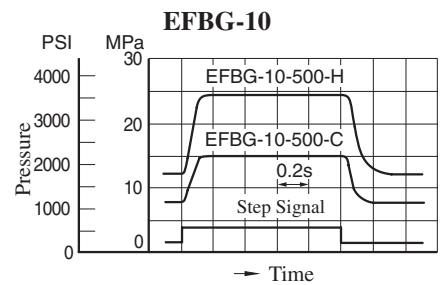
**Pressure Controls**



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



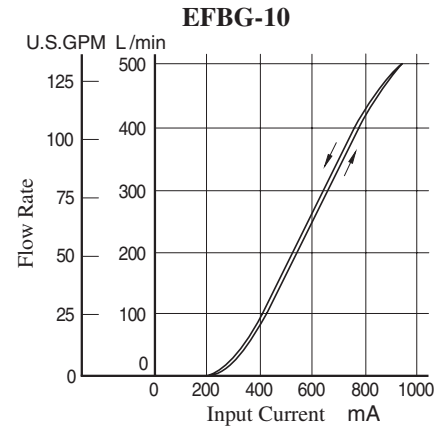
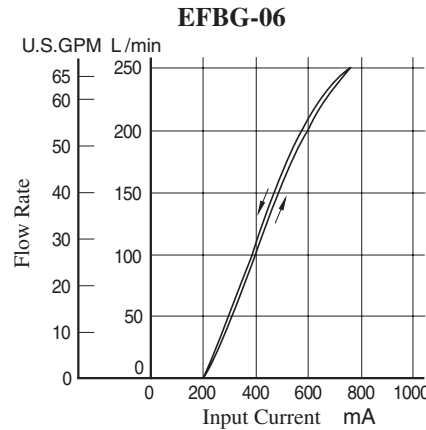
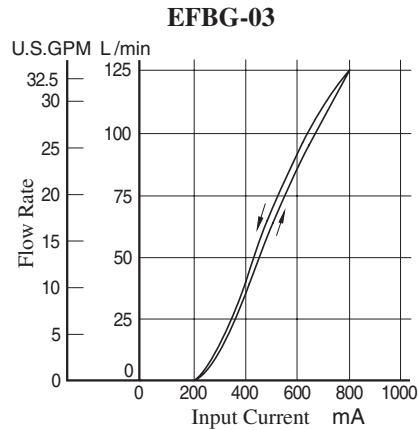
Flow Rate : 250 L/min (66 U.S.GPM)  
Trapped Oil Volume : < 1 L (.264 U.S.Gallons)



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

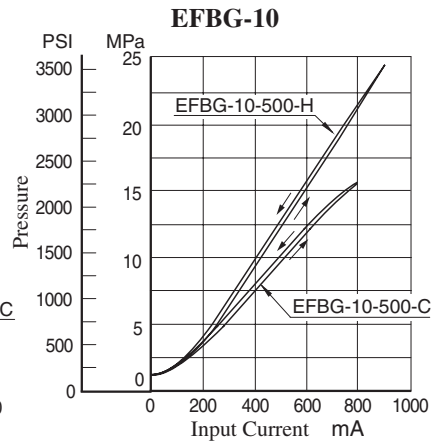
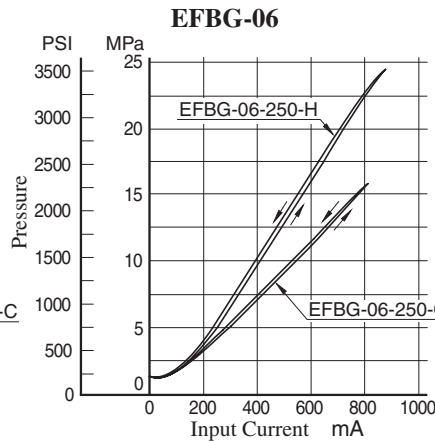
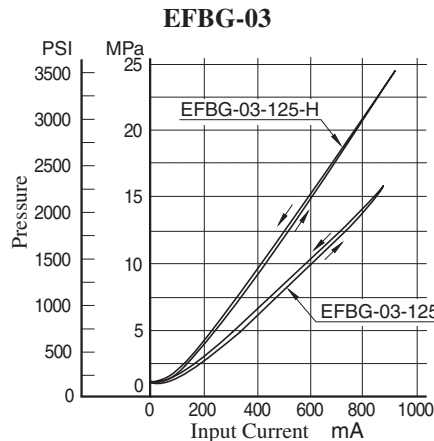
**Input Current vs. Flow**

Viscosity: 30 mm<sup>2</sup>/s (141 SSU)



**Input Current vs. Pressure**

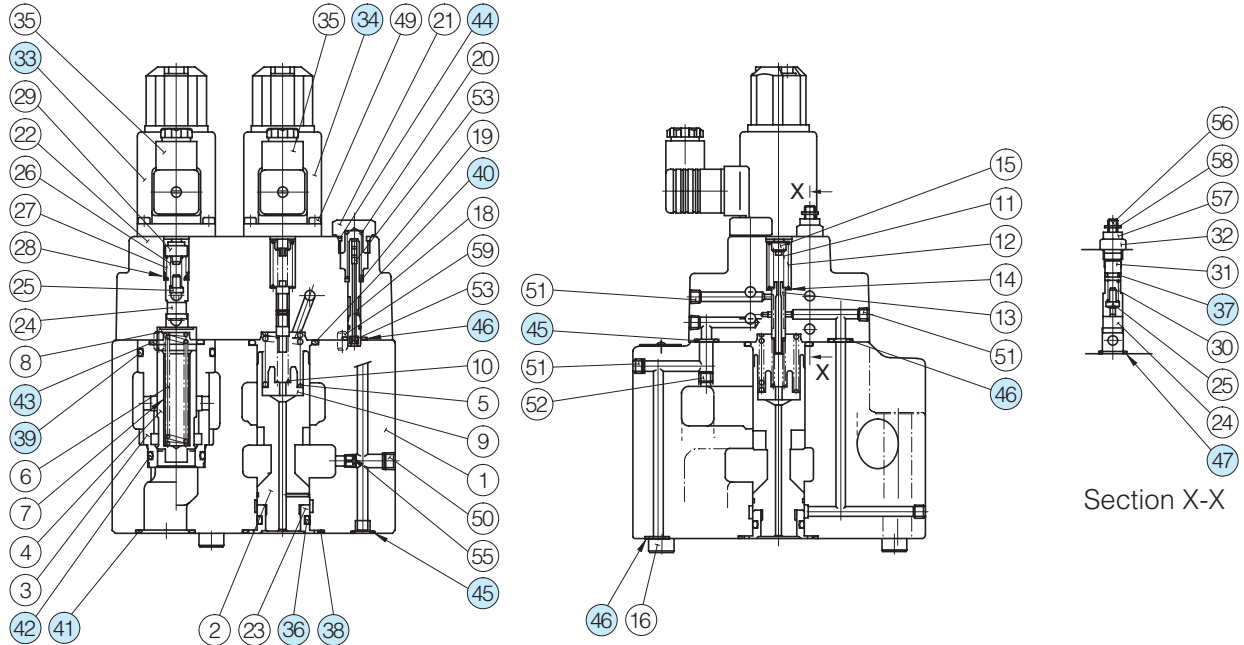
Viscosity: 30 mm<sup>2</sup>/s (141 SSU)





■ 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

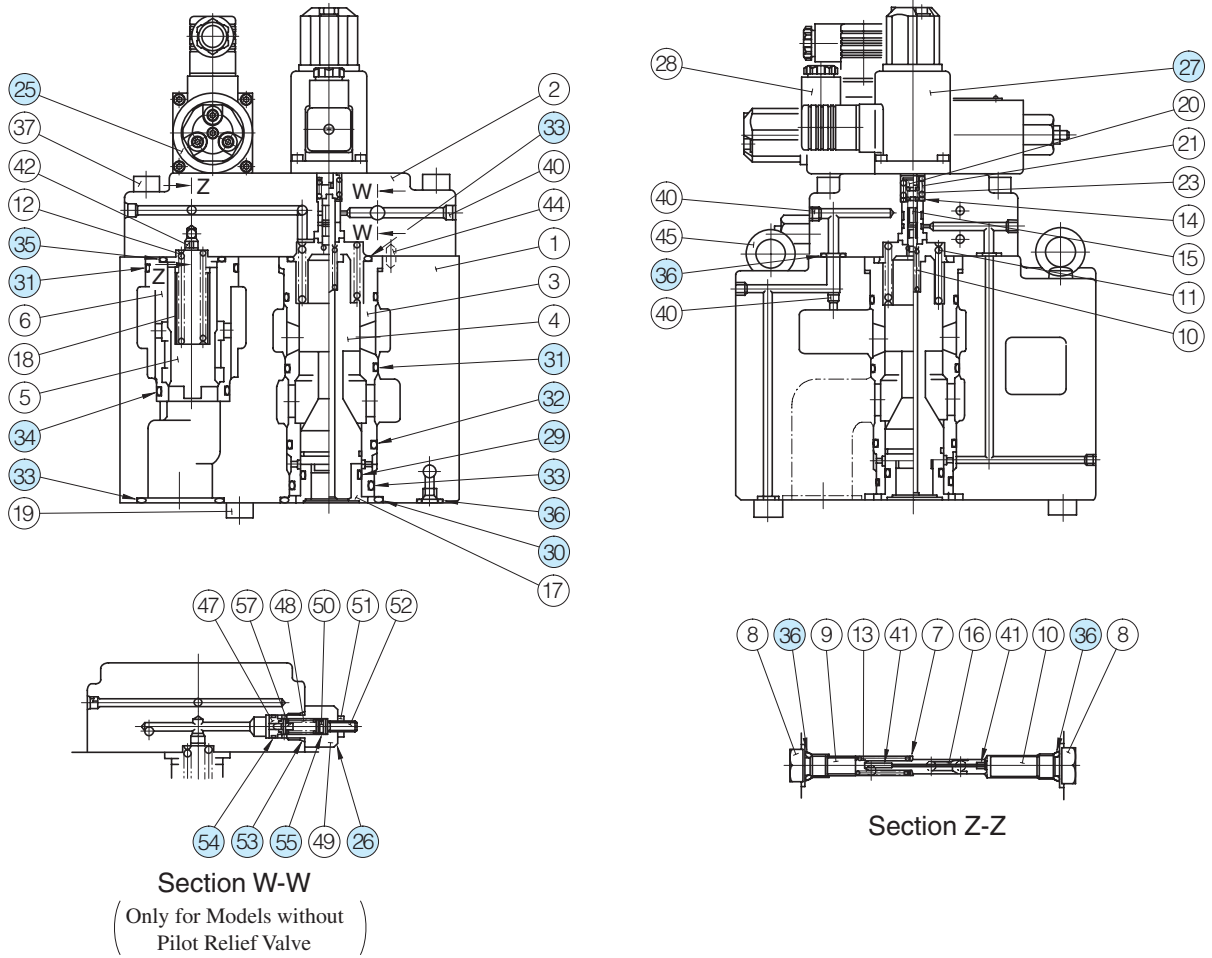
Valve Model Numbers	(33) Solenoid Ass'y Model Numbers	(34) Solenoid Ass'y Model Numbers
EFBG-03-125-C/H(-E)-61/6190	E318-Y06M1-04-61	E318-Y06M1-28-61
EFBG-06-250-C/H(-E)-61/6190		
EFBG-03-125(-E)-61/6190 EFBG-06-250(-E)-61/6190	—	

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**

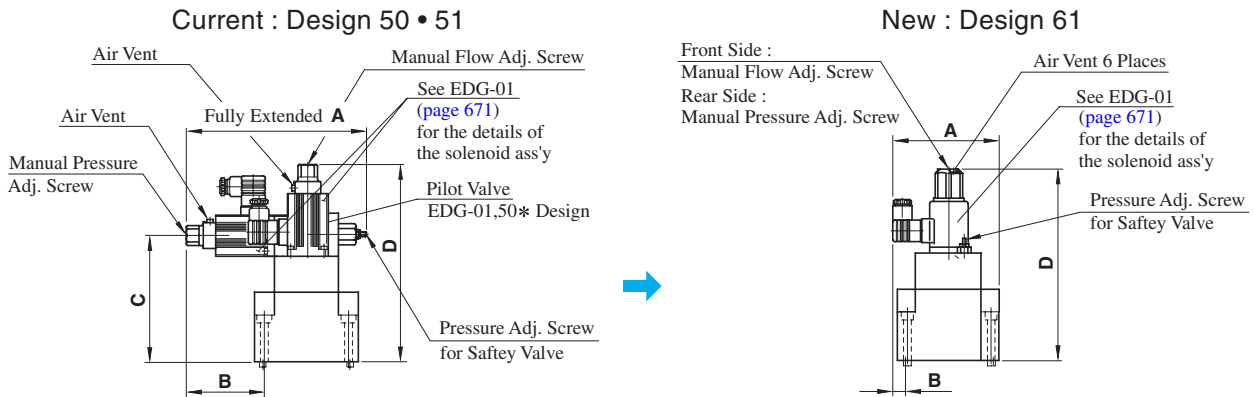
No changes in specifications and characteristics between current and new design

**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)

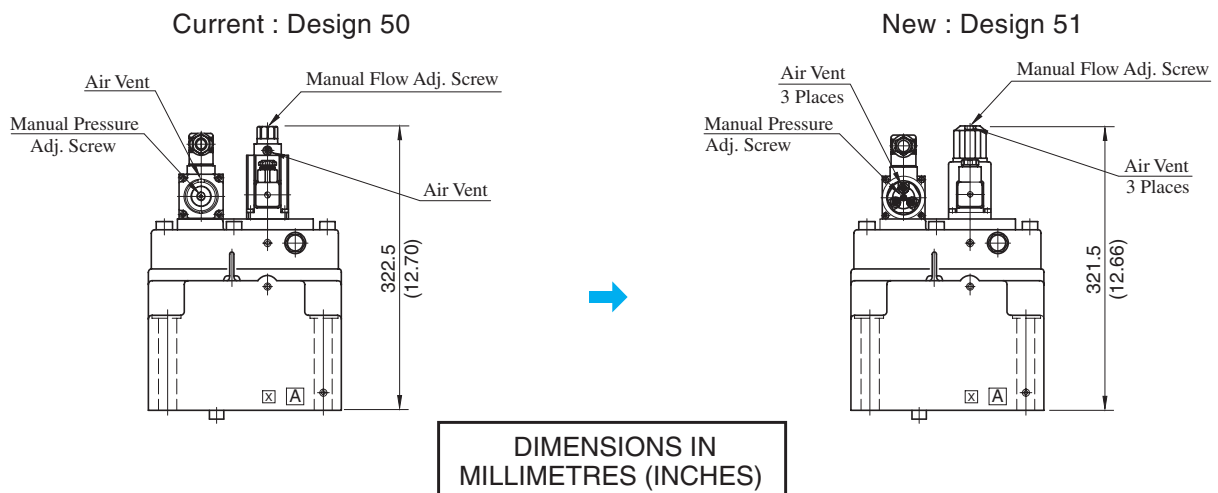
60\* Design → 61\* Design

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

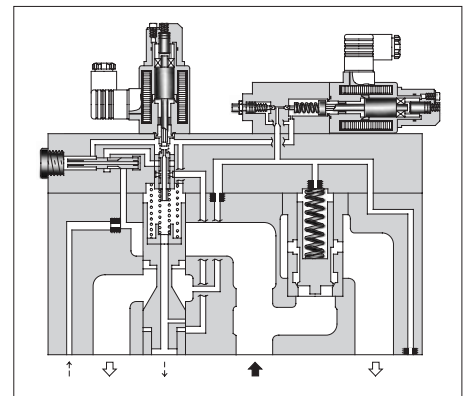
This flow control and relief valve is an energy-saving valve that supplies the minimum pressure and flow necessary for actuator drive.

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 <sup>★1</sup>	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 <a href="#">page 735 to 737</a>	

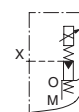
- ★1. The specifications for pressure controls are applied to models with proportional pilot relief valve. (Ex. EFBG-03-250-C-\*-51)
- ★2. The maximum pressure adjustment range of the valves without proportional pilot relief valves is 24.5 MPa (3550 PSI).



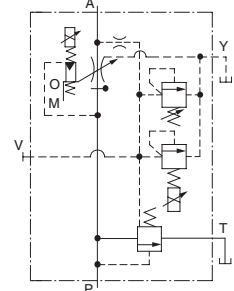
### Graphic Symbols

With Proportional Pilot Relief Valve

External Pilot

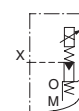


Internal Pilot

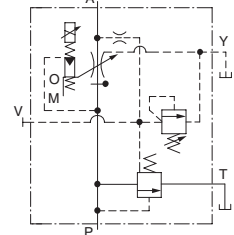


Without Proportional Pilot Relief Valve

External Pilot



Internal Pilot



**Model Number Designation**

<b>F-</b>	<b>EFB</b>	<b>G</b>	<b>-03</b>	<b>-250</b>	<b>-C</b>	<b>-E</b>	<b>-51</b>	<b>*</b>
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
<b>F:</b> Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>EFB:</b> Proportional Electro-Hydraulic Flow Control and Relief Valve	<b>G:</b> Sub-plate Mounting	<b>03</b>	<b>250:</b> 250 (66)	<b>C, H:</b> See Specifications <b>None:</b> Without Proportional Pilot Relief Valve	<b>None:</b> Internal Pilot <b>E:</b> External Pilot	<b>51</b>	Refer to <span style="color: blue;">★</span>
			<b>06</b>	<b>500:</b> 500 (132)			<b>51</b>	
			<b>10</b>	<b>1000:</b> 1000 (264)			<b>51</b>	

★ 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)**

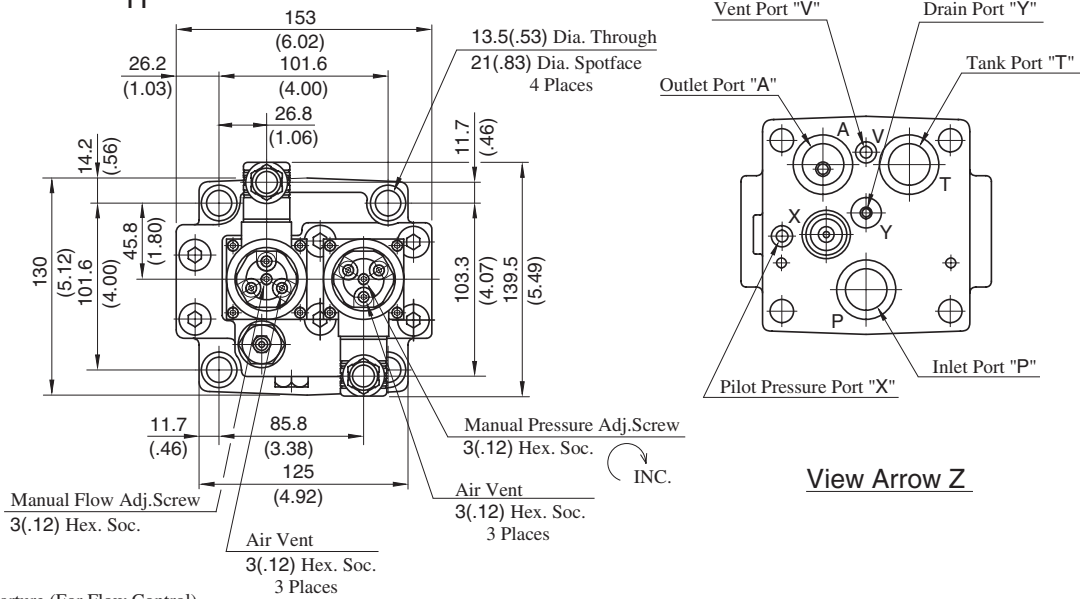
**EFBG-03**

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<sub>H</sub>(-E)-51/5190, EFBG-03-250 (-E)-51/5190



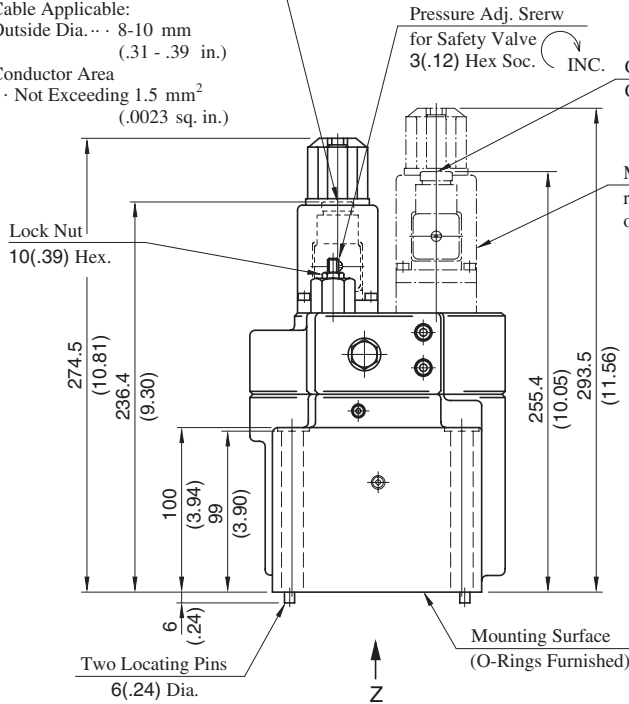
View Arrow Z

Cable Departure (For Flow Control)

Cable Applicable:  
 Outside Dia. ... 8-10 mm (.31 - .39 in.)  
 Conductor Area ... Not Exceeding 1.5 mm<sup>2</sup> (.0023 sq. in.)

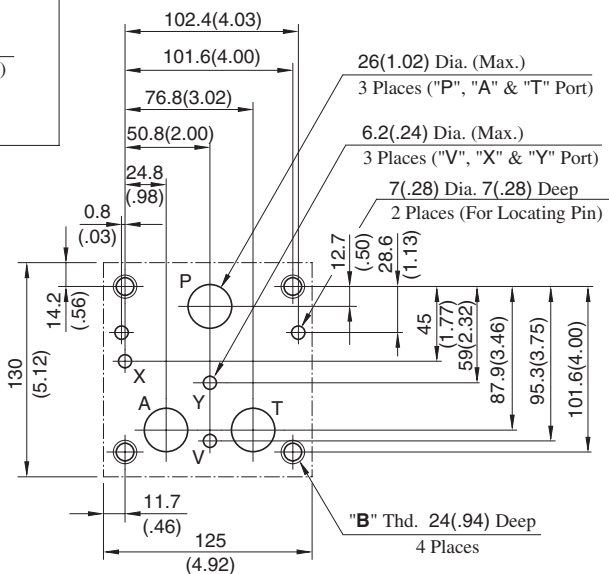
Cable Departure (For Pressure Control)

Cable Applicable:  
 Outside Dia. ... 8-10 mm (.31 - .39 in.)  
 Conductor Area ... Not Exceeding 1.5 mm<sup>2</sup> (.0023 sq. in.)



Approx. Mass ..... 19 kg (41.9 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

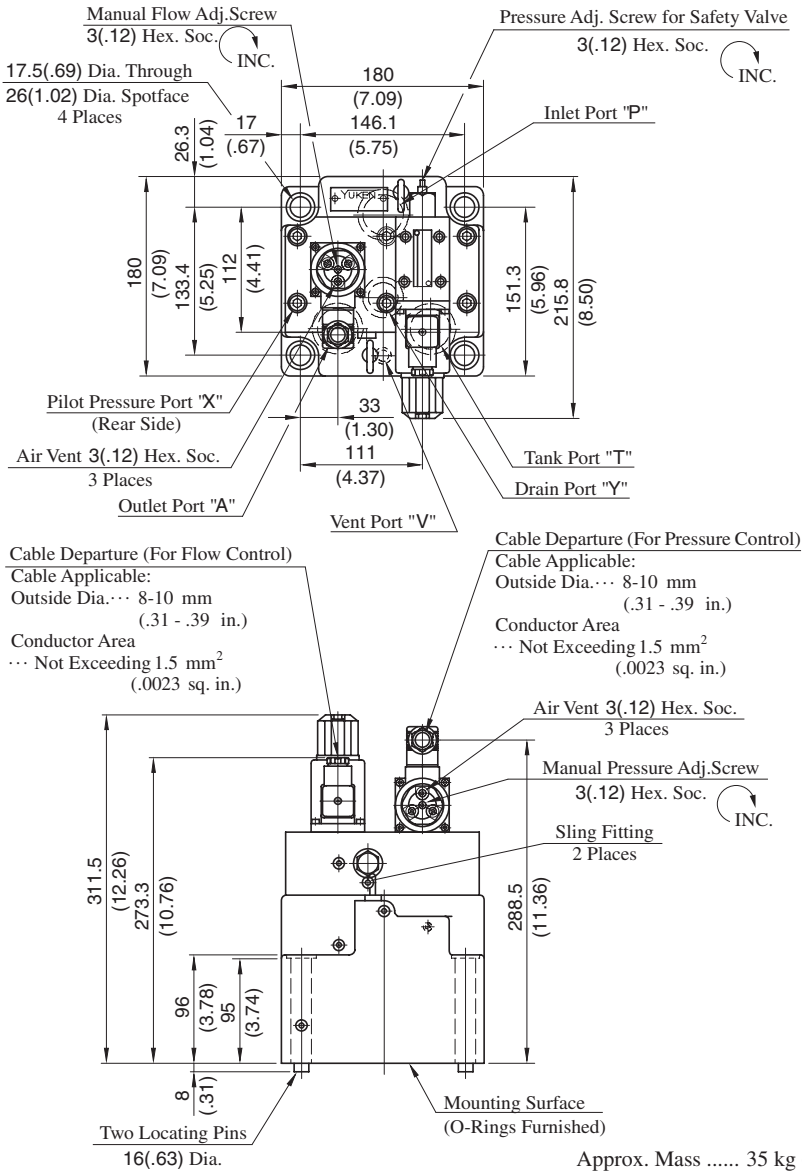


Dimensions of valve mounting surface

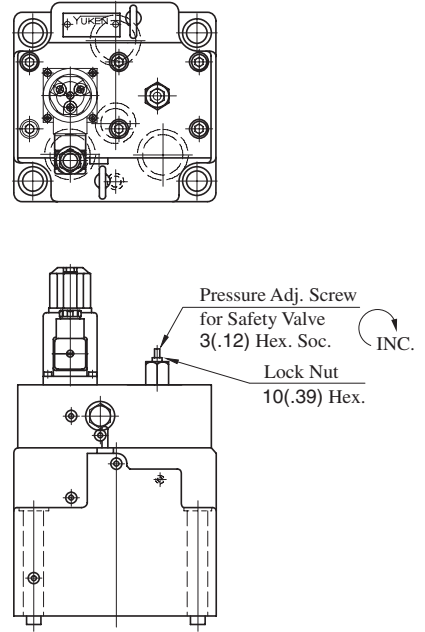
Prepare a mounting surface as shown to the right.  
 Also finish it finely.

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<sub>H</sub>(-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.

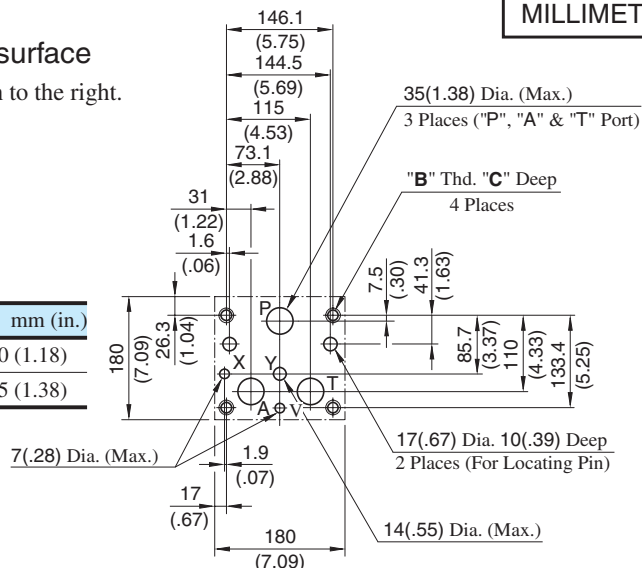
Approx. Mass ..... 33 kg (72.8 lbs.)

**DIMENSIONS IN MILLIMETRES (INCHES)**

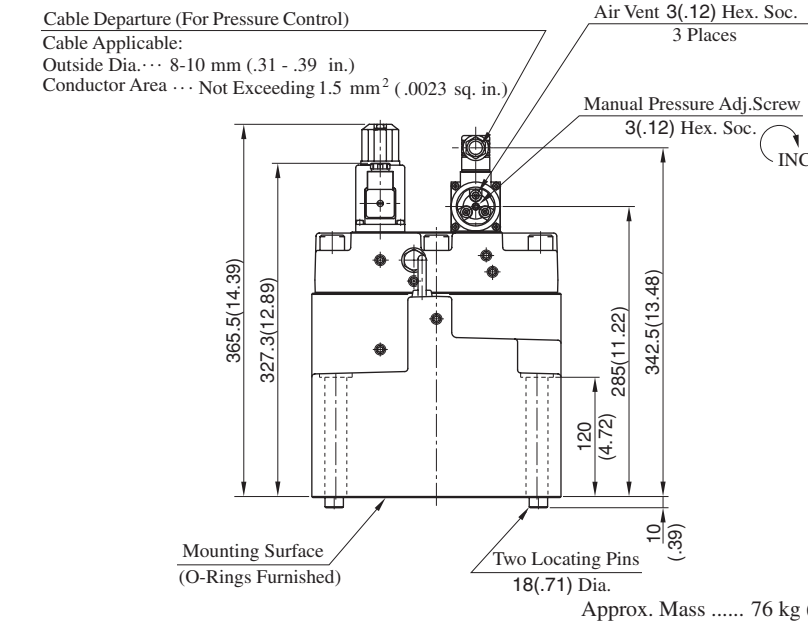
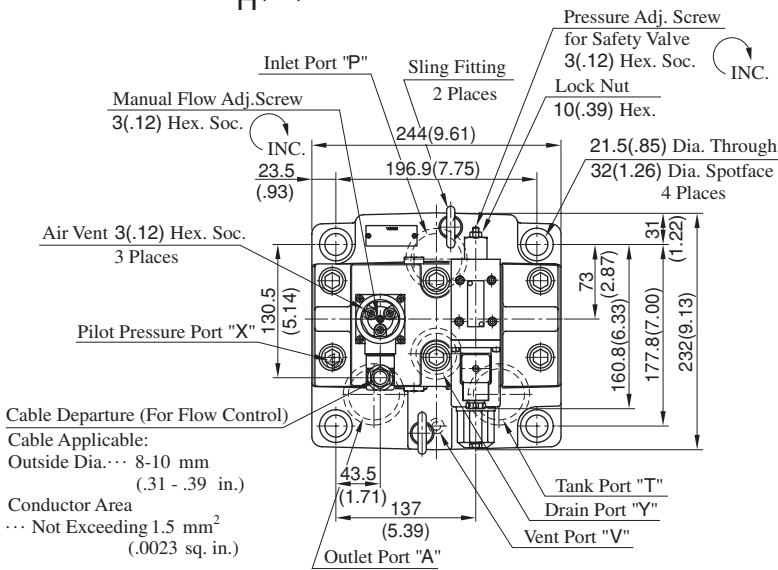
**Dimensions of valve mounting surface**

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

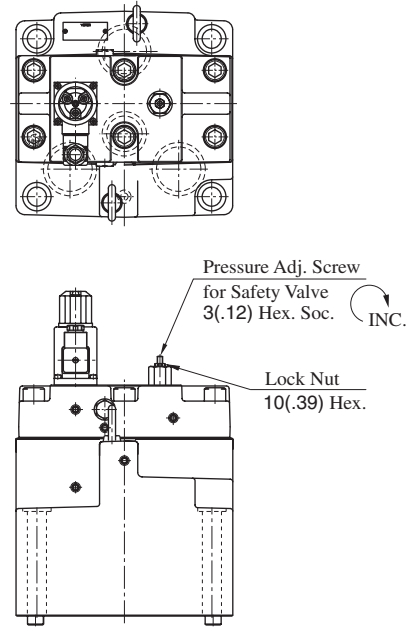
Model Numbers	"B" Thd.	C mm (in.)
EFBG-06-500-*-51	M16	30 (1.18)
EFBG-06-500-*-5190	5/8-11 UNC	35 (1.38)



Models with Proportional Pilot Relief Valve  
 EFBG-10-1000-C<sub>H</sub>(-E)-51/5190



Models without Proportional Pilot Relief Valve  
 EFBG-10-1000(-E)-51/5190



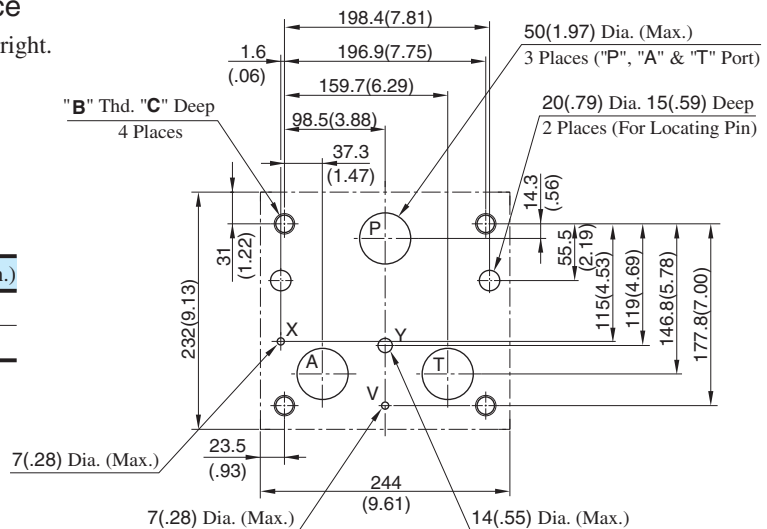
• For other dimensions, please refer to the models with Proportional Pilot Relief Valve.  
 Approx. Mass ..... 74 kg (163.1 lbs.)

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)



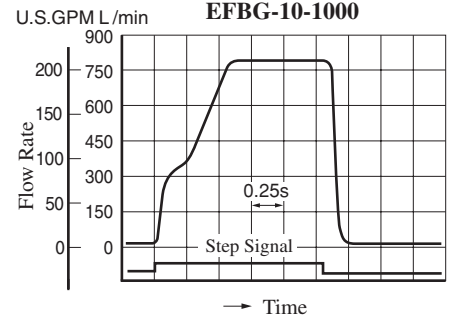
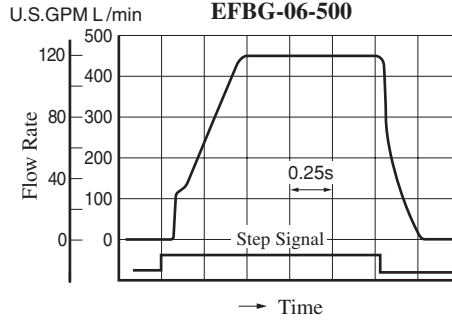
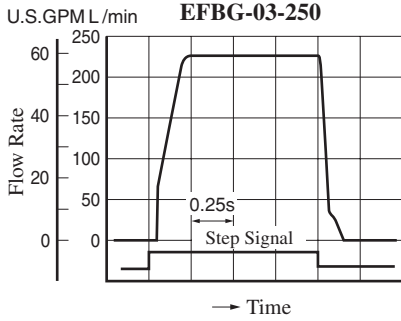


**Step Response**

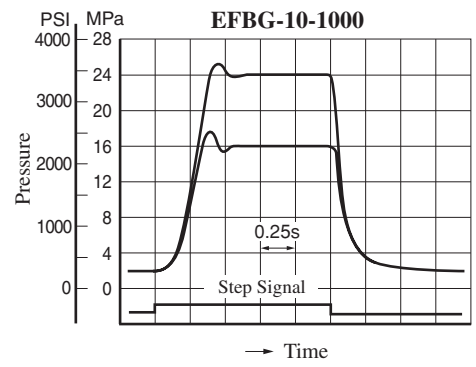
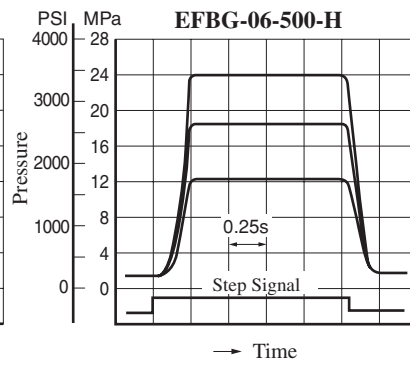
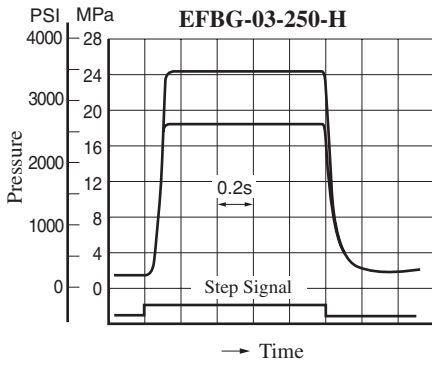
These characteristics have been obtained by measuring on each valve. Therefore, they may vary according to a hydraulic circuit to be used.

Viscosity: 30mm<sup>2</sup>/s (141 SSU)

**Flow Controls**

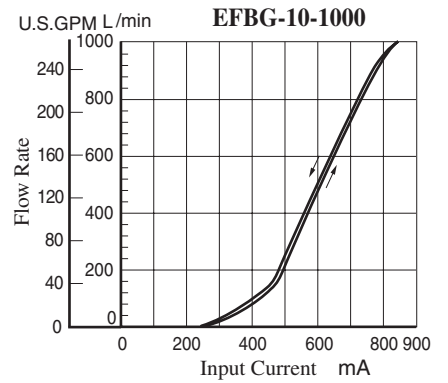
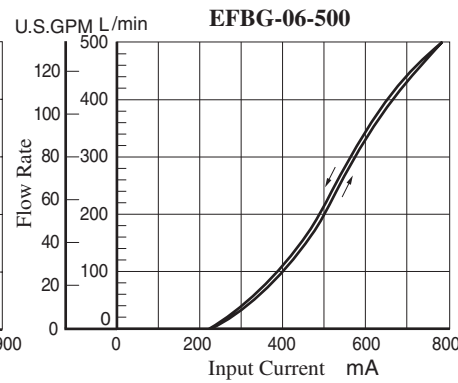
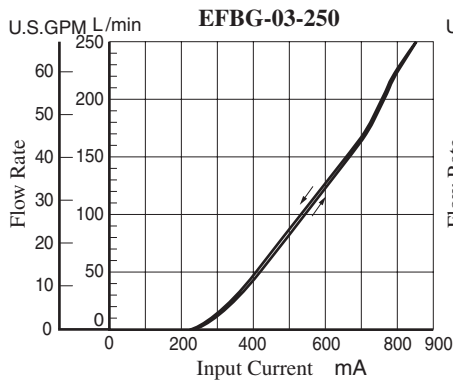


**Pressure Controls**



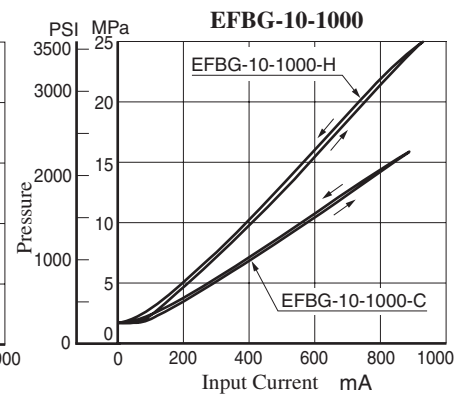
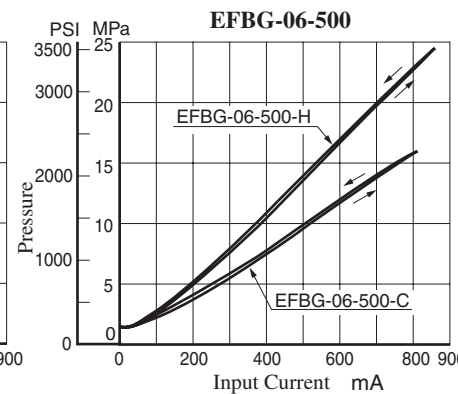
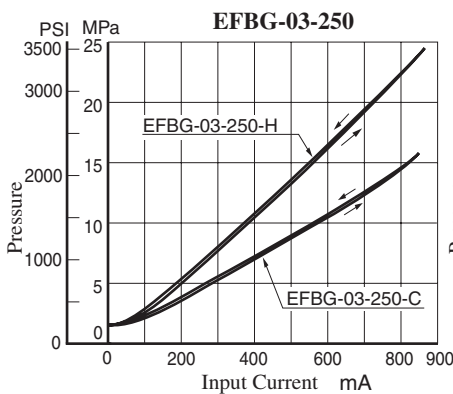
**Input Current vs. Flow**

Viscosity: 30mm<sup>2</sup>/s (141 SSU)



**Input Current vs. Pressure**

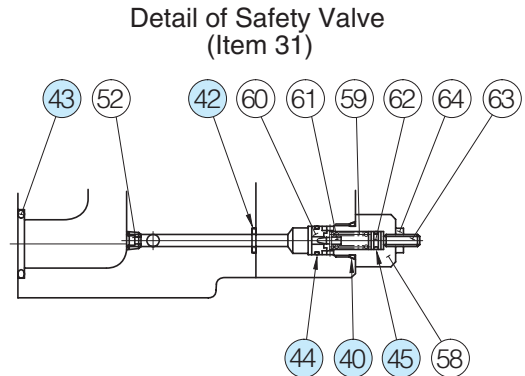
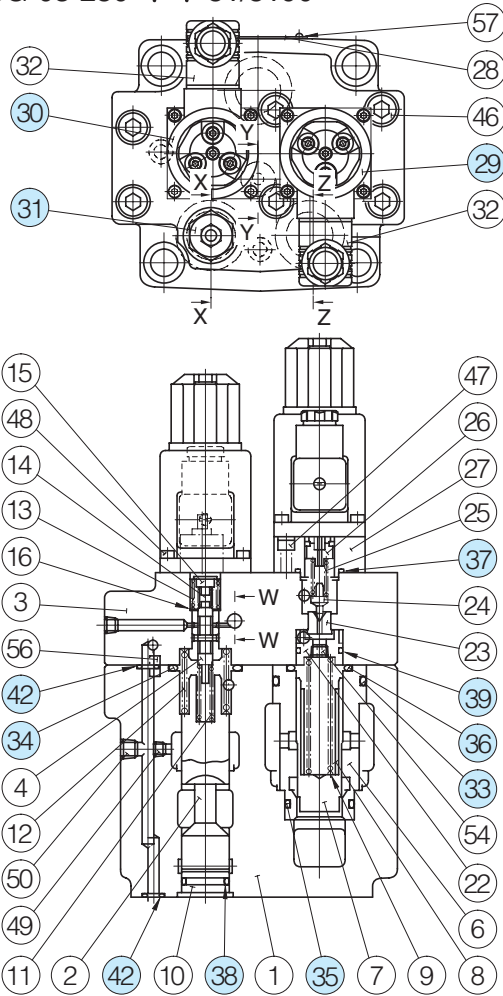
Viscosity: 30mm<sup>2</sup>/s (141 SSU)



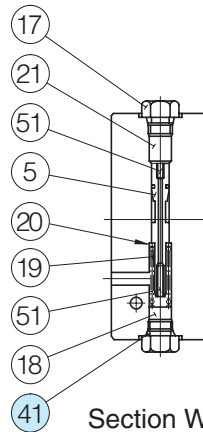


List of Seals, Solenoid Ass'y and Safety Valve

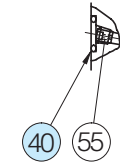
EFBG-03-250-\*\*-51/5190



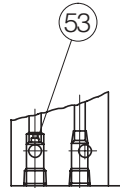
Section X-X



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.	③① 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.

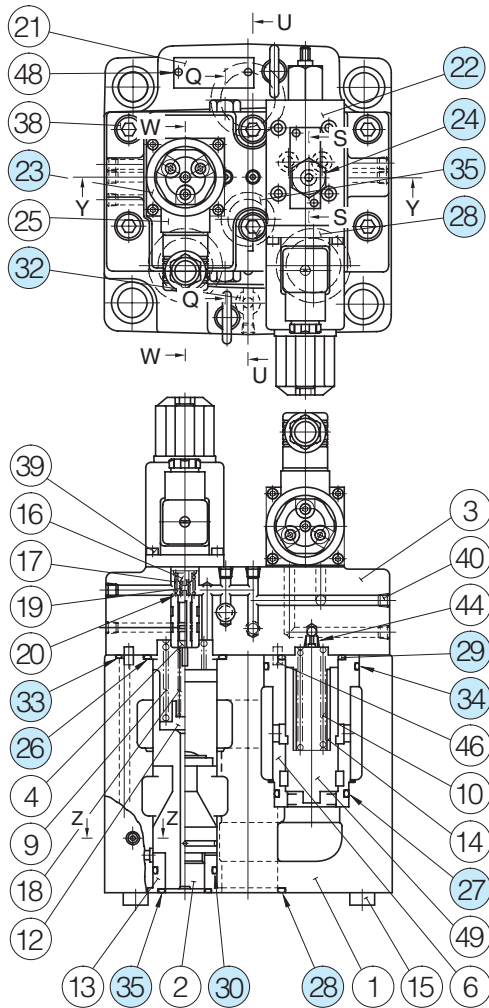
List of Seal Kits

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

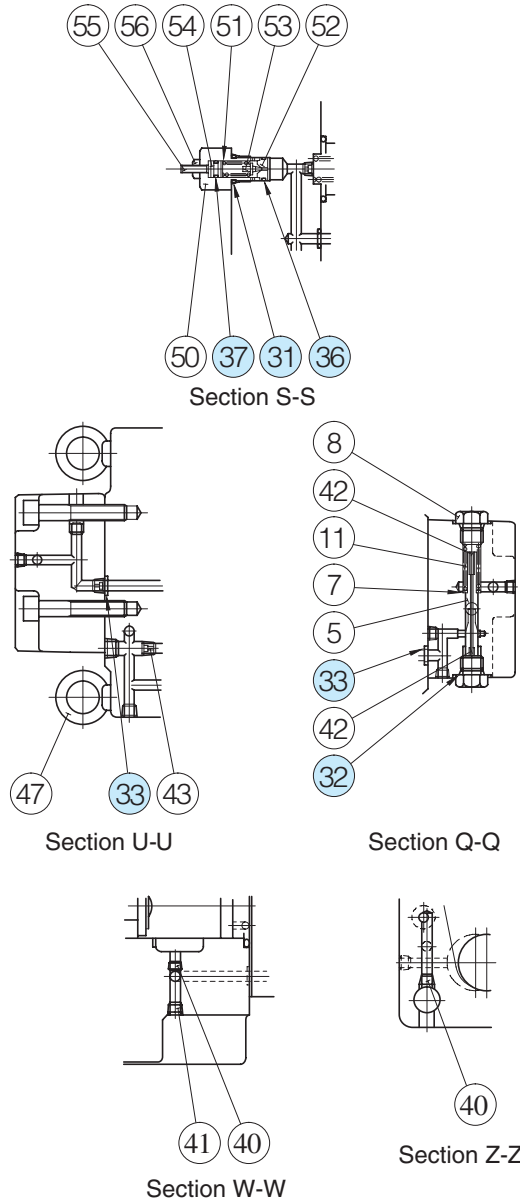


■ List of Seals, Pilot Valves, Solenoid Ass'y and Safety Valve

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



Detail of Safety Valve (Item 24)  
 [ Models Without Pilot Relief Valve : EFBG-06-500(-E) ]



● 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 list 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

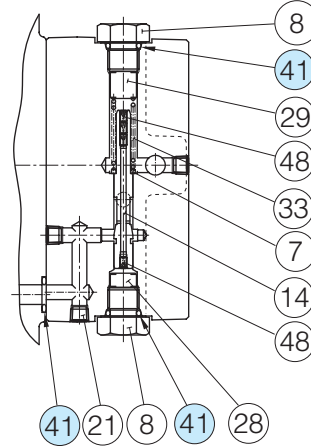
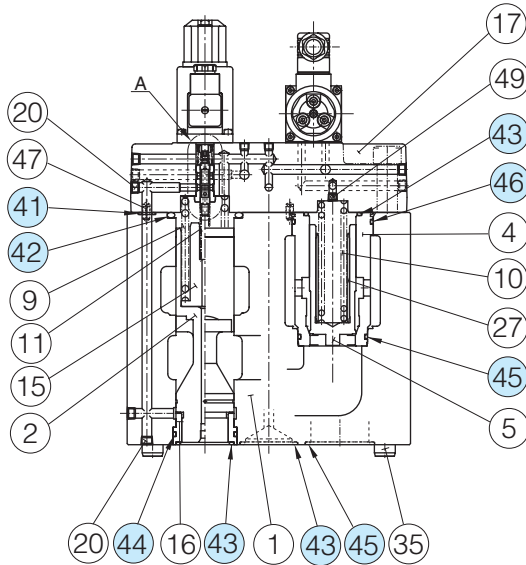
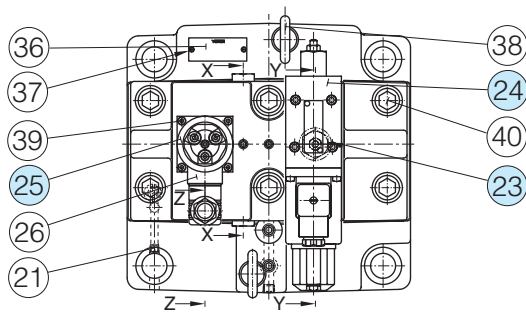
Note: The connector assembly GDM-211-B-11 (Item 25) is not included in the solenoid assembly.

● List of Seal Kits

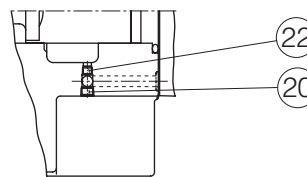
Valve Model Numbers	Seal Kit Numbers
EFBG-06-500-51*	KS-EFBG-06-500-51
EFBG-06-500-C/H-51*	KS-EFBG-06-500-C-51

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

EFBG-10-1000-\*\*-51/5190



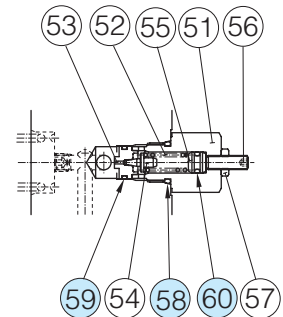
Section X-X



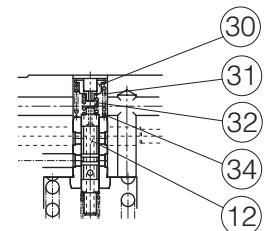
Section Z-Z

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.

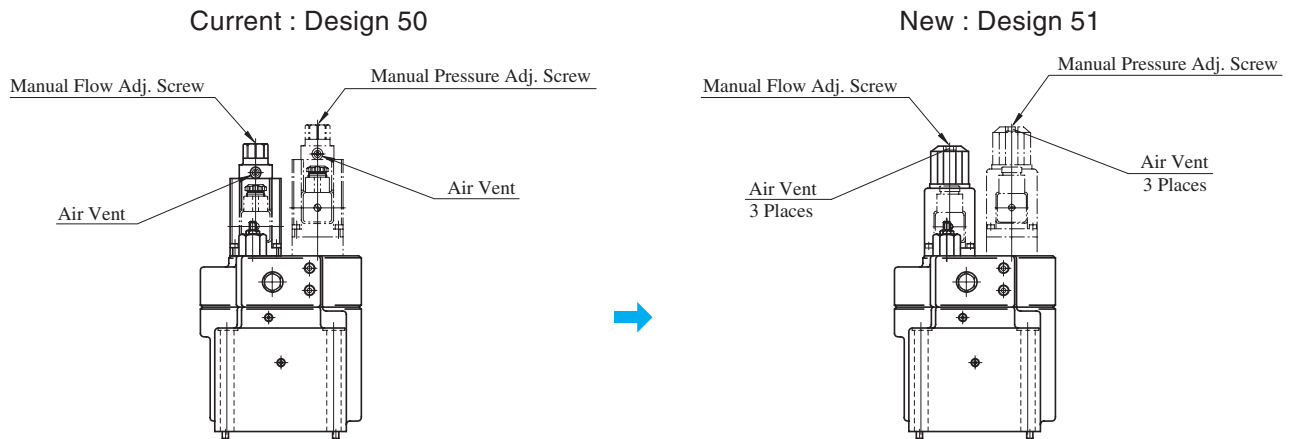
● **Specifications and Characteristics**

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

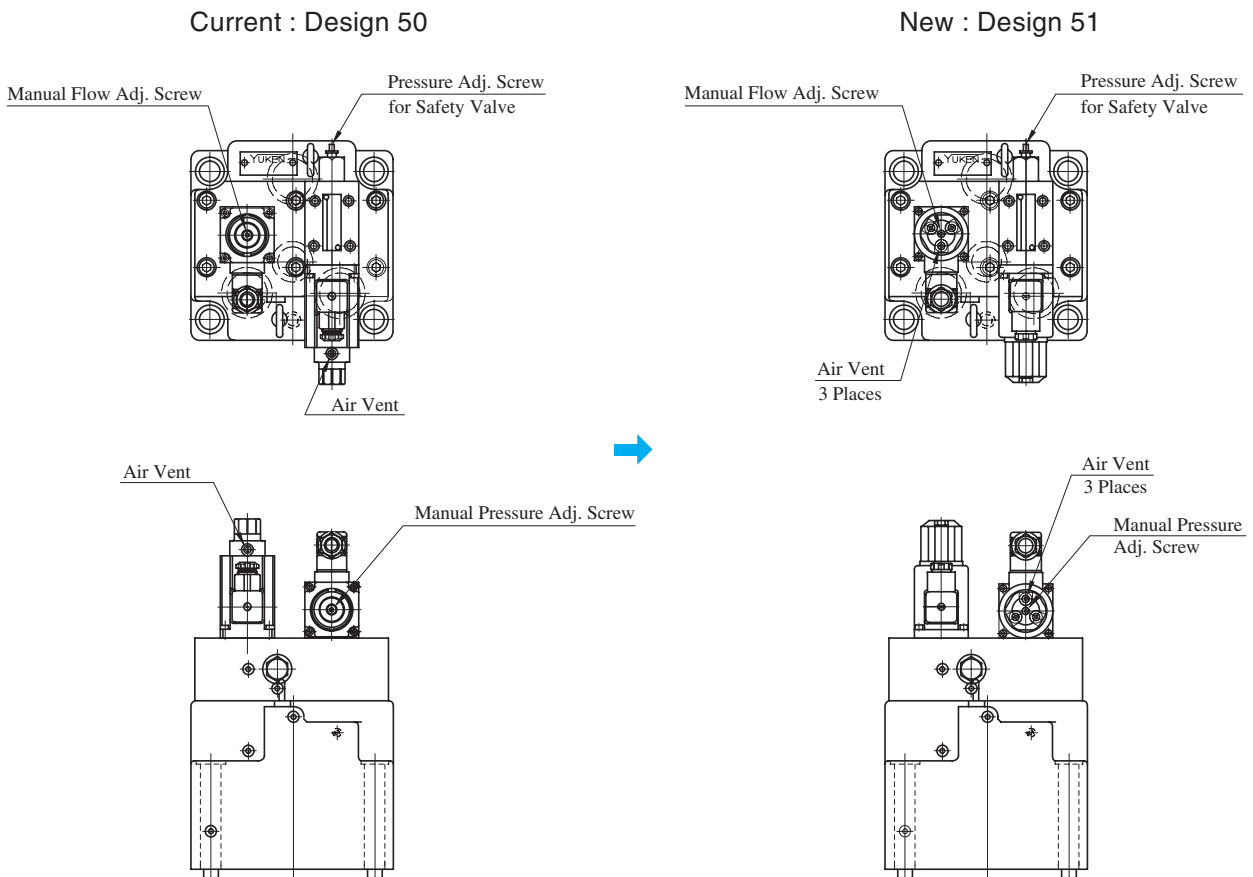
● **Mounting Interchangeability**

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**



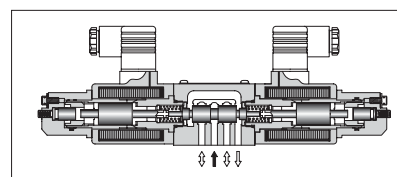
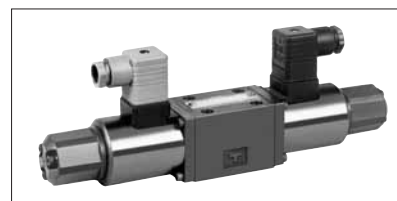
## Shockless Type Proportional Electro-Hydraulic Directional and Flow Control Valves

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.

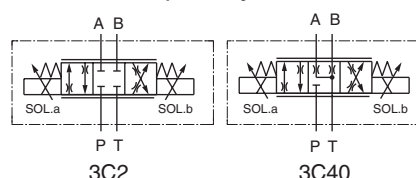
In combination with the newly developed digital amplifiers, the further enhancement of maneuverability and repeatability of the valves can be realized.

### 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
<b>F:</b> Special Seals for Phosphate Ester Type Fluid (Omit if not required)	<b>EDF:</b> Shockless Type Proportional Directional and Flow Control Valve	<b>G:</b> Sub-plate Mounting	<b>01</b>	<b>30</b> (7.9)	<b>3C2</b> <b>3C40</b>	<b>XY:</b> Metre - In • Metre - Out	<b>50</b>	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

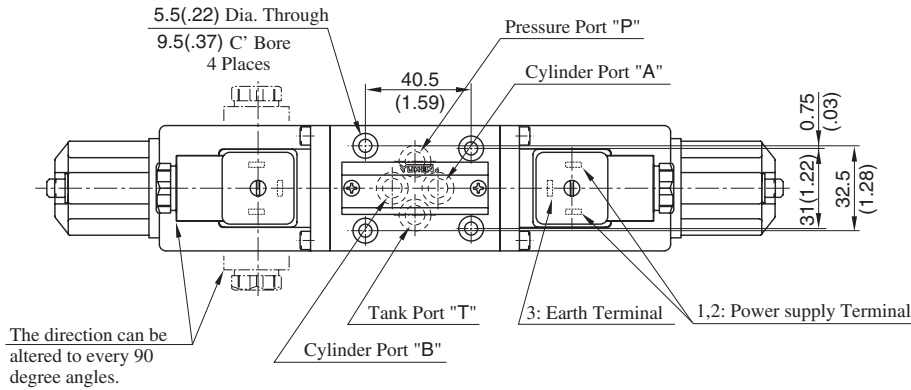
Piping Size	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
1/8	DSGM-01-31	Rc 1/8	DSGM-01-3180	1/8 BSP.F	DSGM-01-3190	1/8 NPT	0.8 (1.8)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

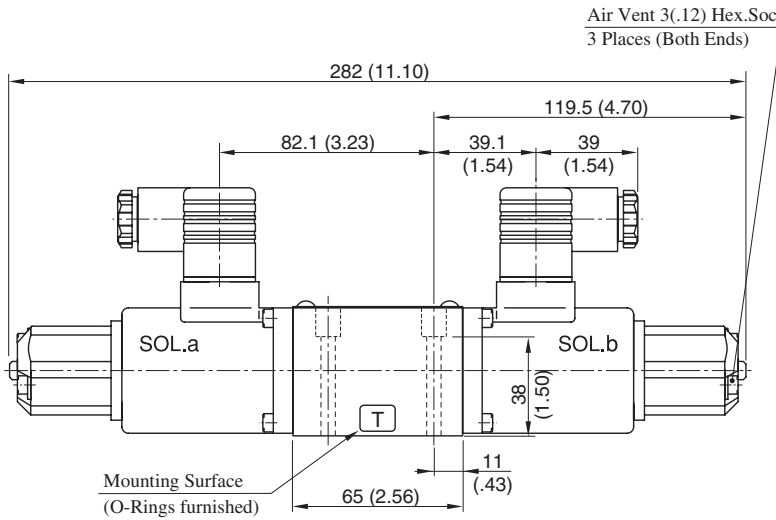
● Sub-plates are those for 1/8 solenoid operated directional valves. For dimensions, see page 356.

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

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

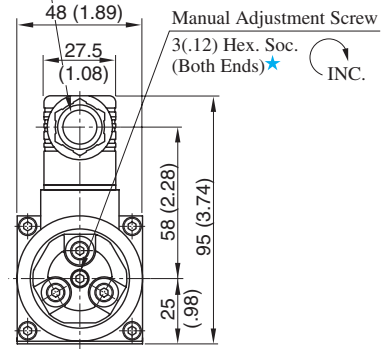


**DIMENSIONS IN MILLIMETRES (INCHES)**



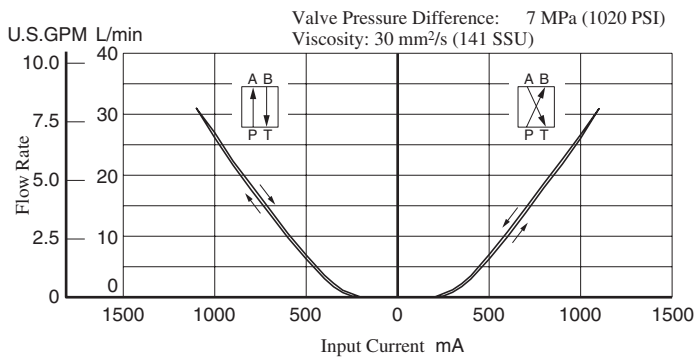
Cable Departure

Cable Applicable:  
Outside Dia ... 8-10mm(.31-.39in.)  
Conductor Area ...  
Not Exceeding 1.5mm<sup>2</sup>(.0023 sq.in.)

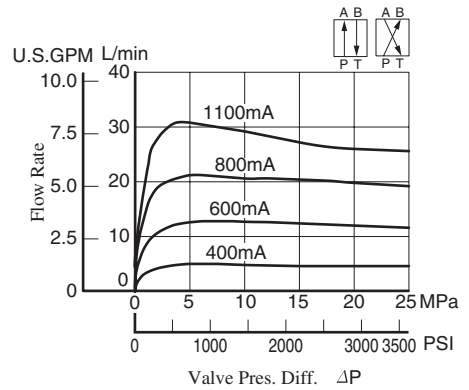


★ Under normal conditions, however, this screw must be kept in its original position.

■ Input Current vs. Flow

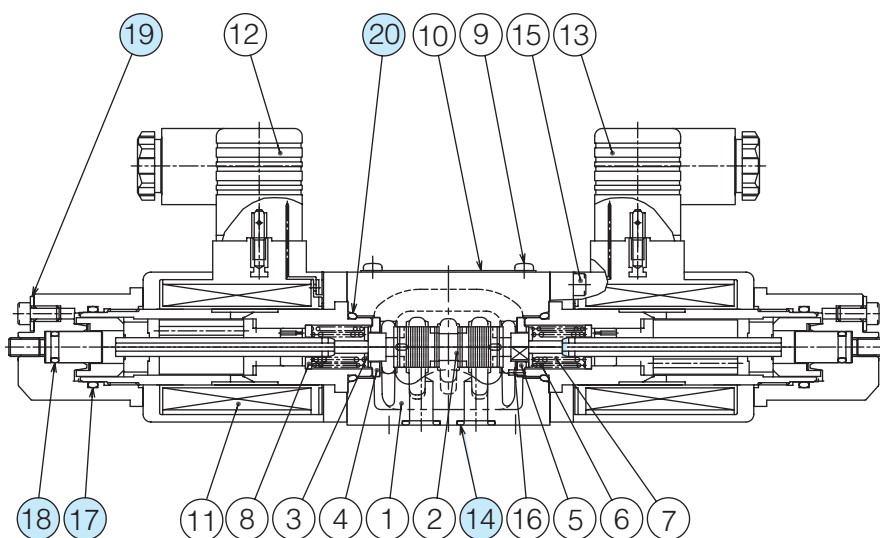


■ Valve pressure Difference vs. Flow



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 Kit No.: KS-EDFG-01-50
17	O-Ring	SO-NB-P22	2	
18	O-Ring	SO-NB-P7	2	
19	Fastner Seal	SG-FCF-4	6	
20	O-Ring	SO-NB-P18	2	

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

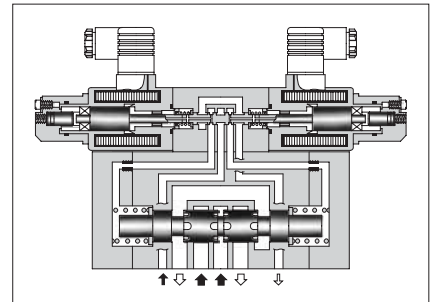
Model No.		EDFHG-03	EDFHG-04	EDFHG-06
Description				
Max. Operating Pressure	MPa (PSI)	25 (3630)		
Rated Flow	L/min (U.S.GPM) at Valve Pressure Difference: 1.0 MPa (145 PSI)	100 (26.4)	140 (37.0)	280 (74.0)
Pilot Pressure <sup>★1</sup>	MPa (PSI)	1.5 - 16 (220 - 2320) <sup>★1</sup>		
Pilot Flow	at Normal	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) <sup>★2</sup>		
Rated Current		800 mA	980 mA	900 mA
Coil Resistance		10 Ω		
Hysteresis		5% or less <sup>★3</sup>		
Repeatability		1% or less <sup>★3</sup>		
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).

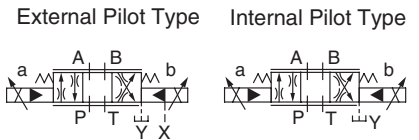
★2. To obtain stable performance, keep the drain port back pressure low and minimize its fluctuations.

★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 <sup>★1</sup>	Direction of Flow	Pilot Connection	Design Number	Design Standards
<b>F:</b> Special Seals for Phosphate Ester Type Fluids (Omit if not required)	<b>EDFH:</b> Proportional Electro-Hydraulic Directional and Flow Control Valves	<b>G:</b> Sub-Plate Mounting	<b>03</b> <b>04</b> <b>06</b>	<b>100:</b> 100 (26.4) <b>140:</b> 140 (37.0) <b>280:</b> 280 (74.0)	<b>3C2</b> <b>3C40</b>	<b>XY:</b> Metre-in • Metre-out	<b>E:</b> External Pilot <b>None:</b> Internal Pilot	<b>31</b> <b>31</b> <b>31</b>	Refer to <sup>★2</sup>

★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

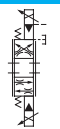
## Instructions

### 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.

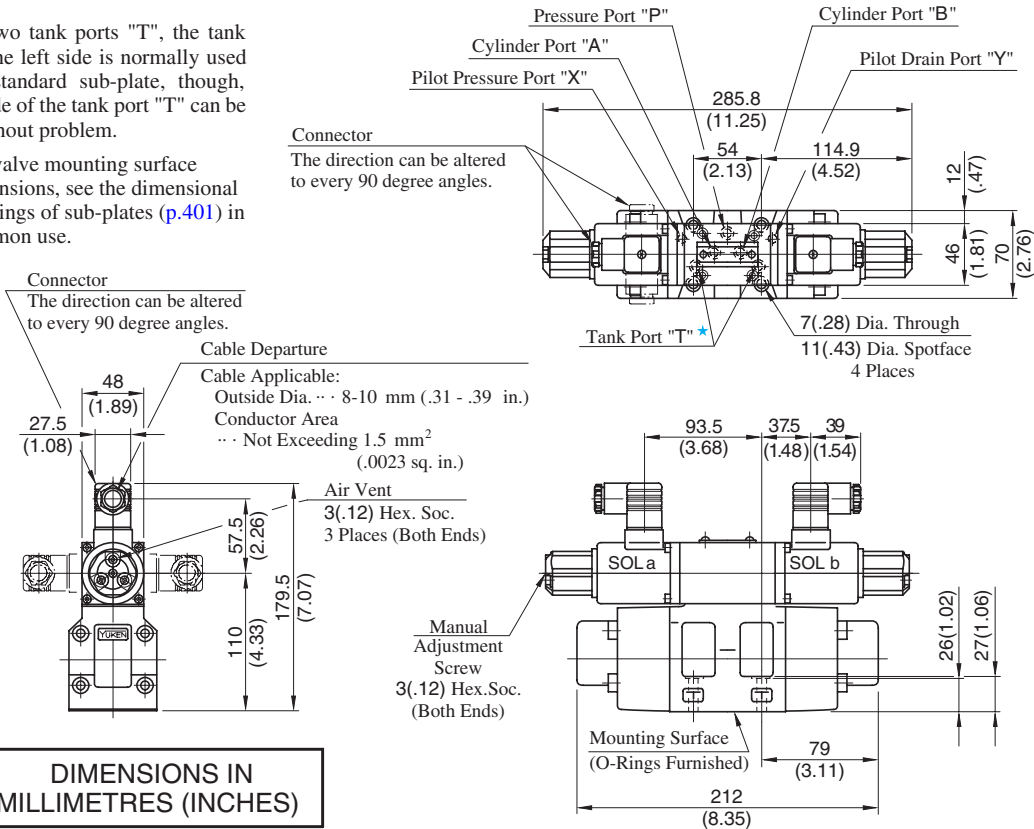


**EDFHG-03-100-3C\*-XY-\*-31/3190**

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.

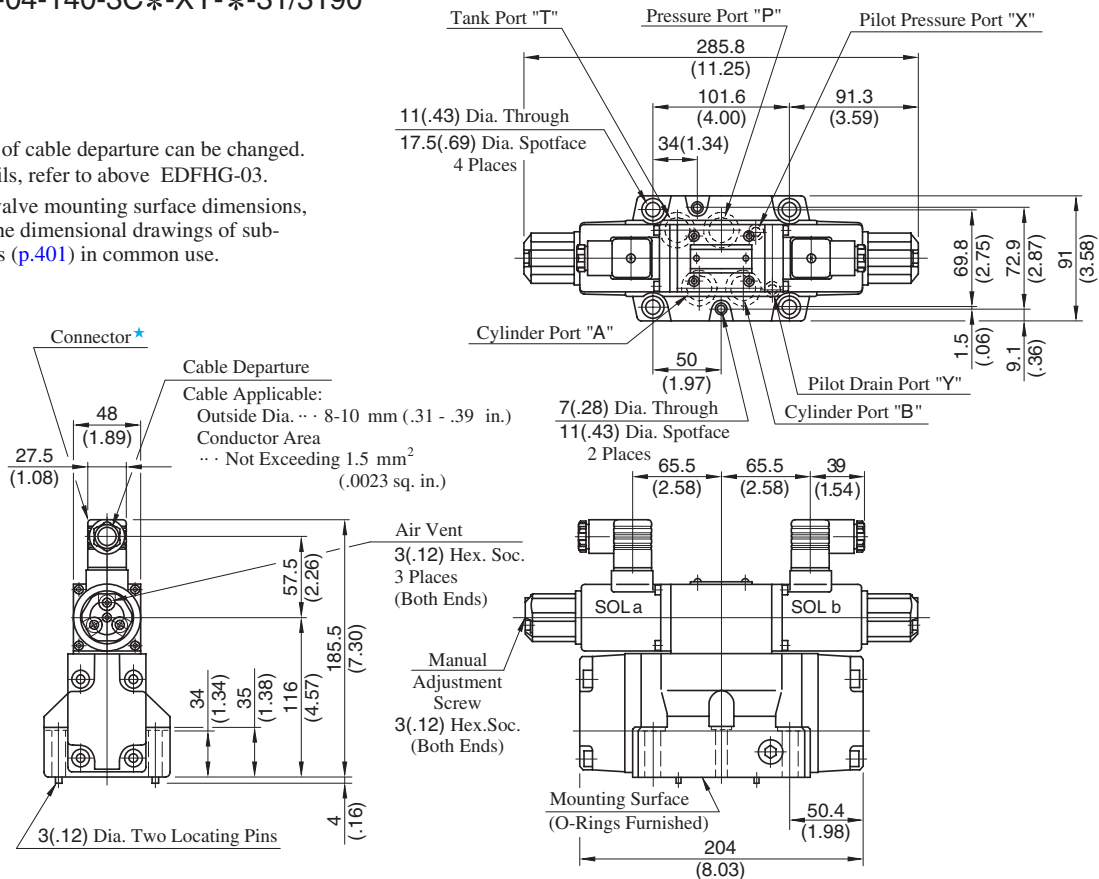


**EDFHG-04-140-3C\*-XY-\*-31/3190**

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.

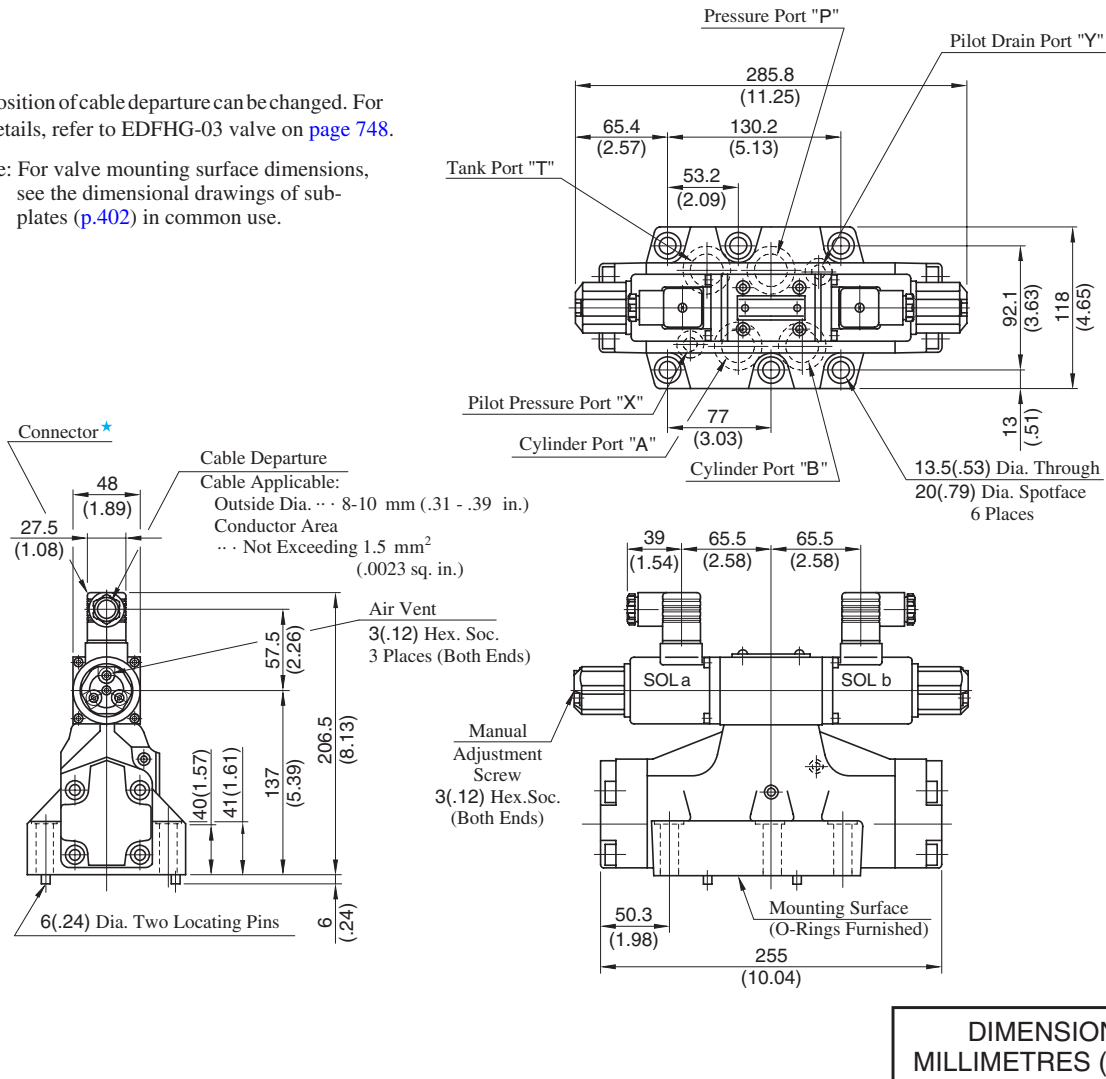


EDFHG-06-280-3C\*-XY-\*-31/3190

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**

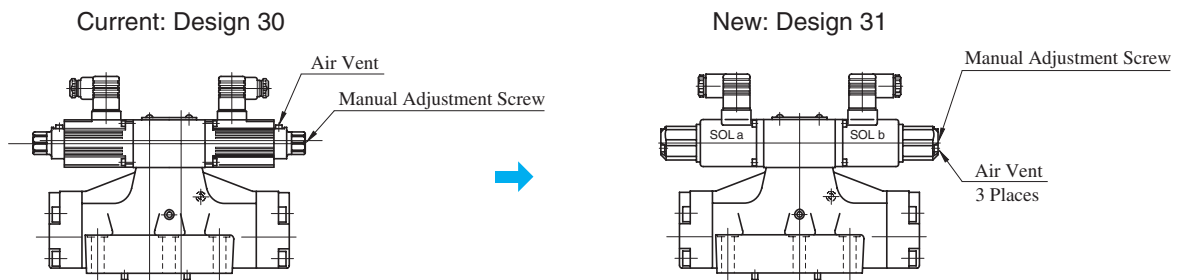
**● Specifications and Characteristics**

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

**● Mounting Interchangeability**

The mounting surface are interchangeable.

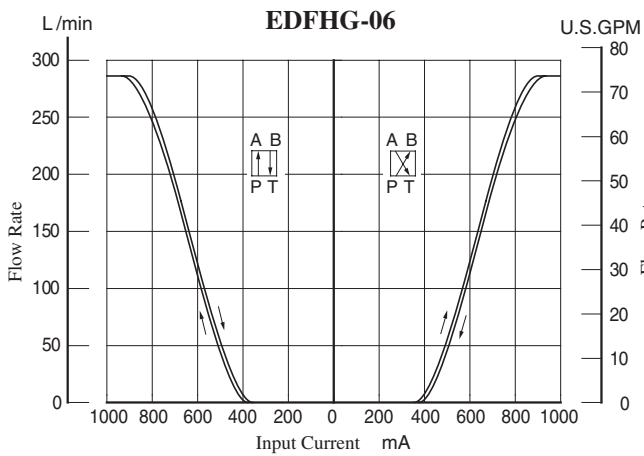
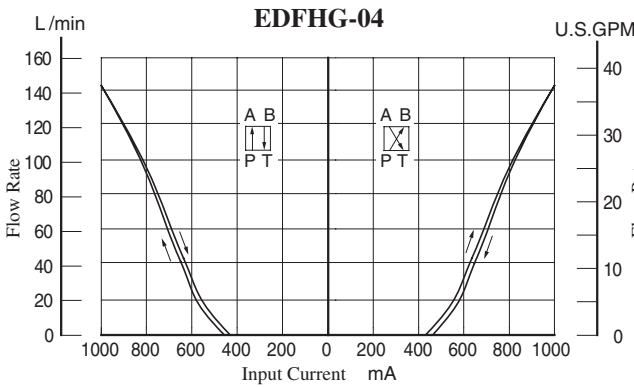
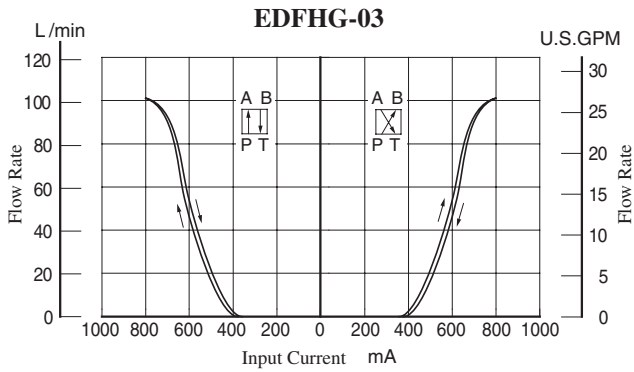
Note that because of improvements made on the solenoids, the overall shapes have been changed as shown below.



**Input Current vs. Flow**

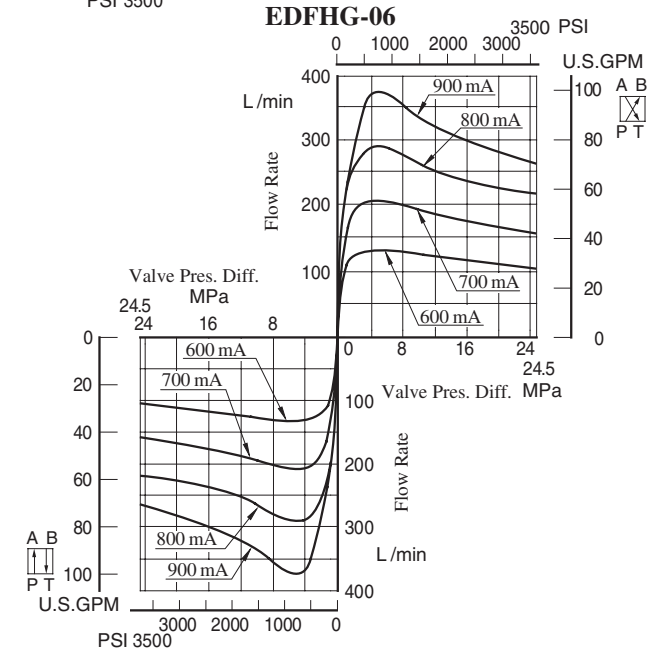
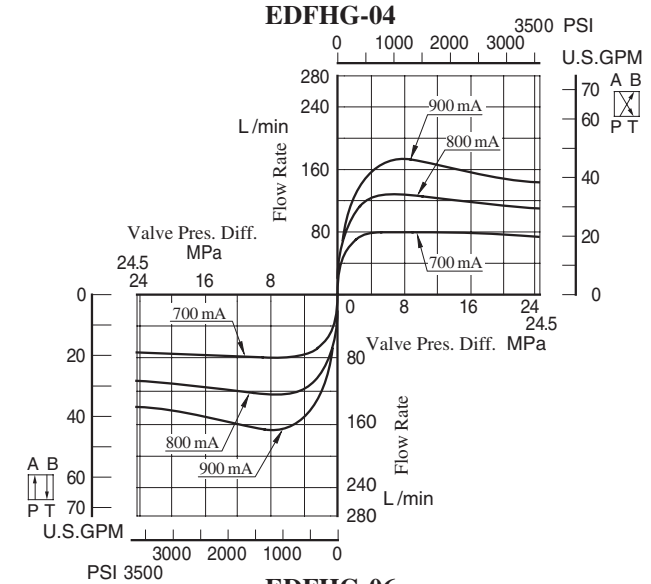
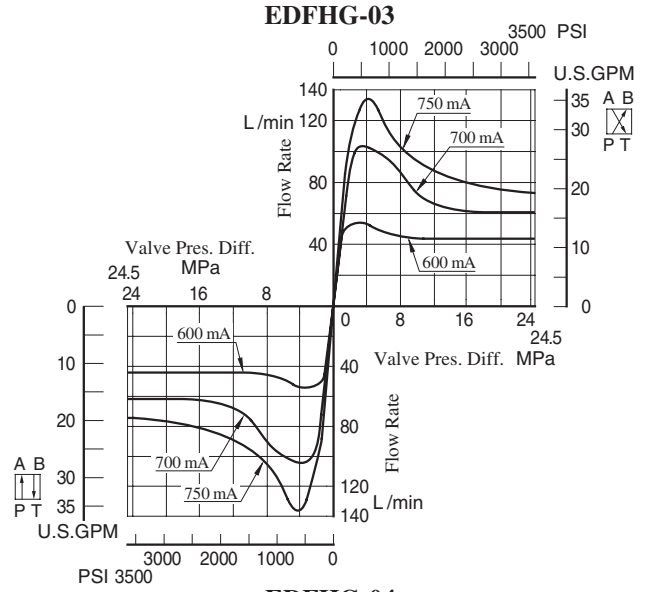
Viscosity : 30 mm<sup>2</sup>/s (141 SSU)

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

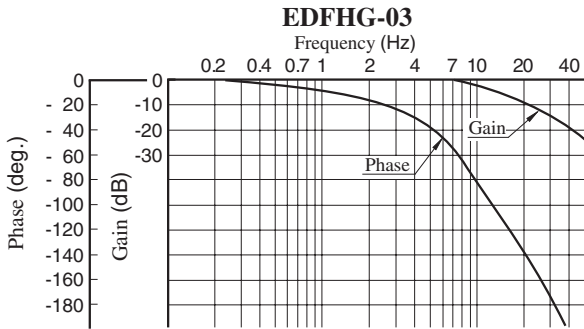


**Valve Pressure Difference vs. Flow**

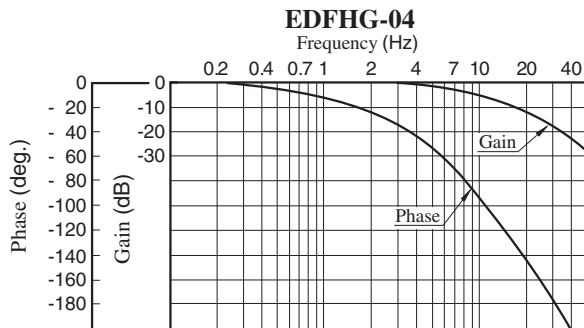
Viscosity : 30 mm<sup>2</sup>/s (141 SSU)



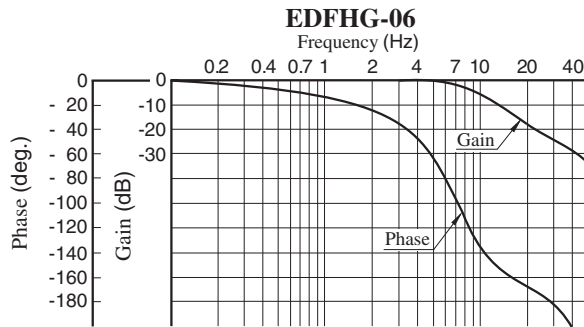
**Frequency Response**



Model Number : EDFHG-03-100-3C2-E-31  
 Viscosity : 30 mm<sup>2</sup>/s(141 SSU)  
 Pilot Pressure : 15.7 MPa(2280 PSI)  
 Travel of Spool : ±10% of Maximum Stroke



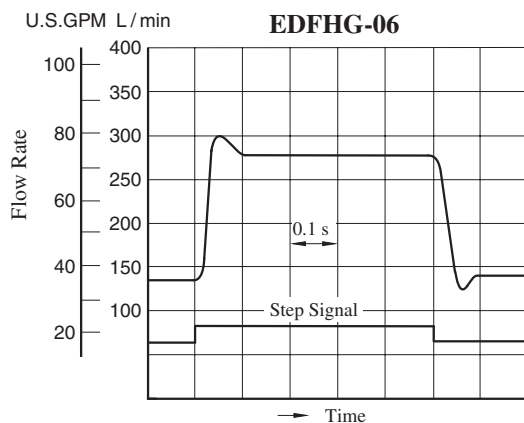
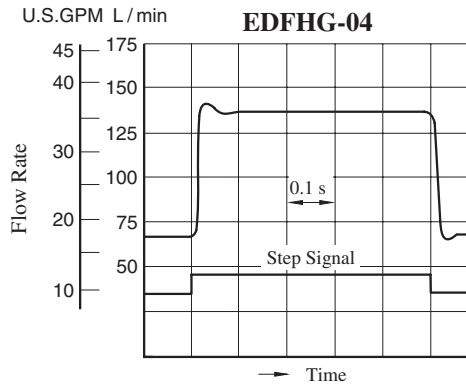
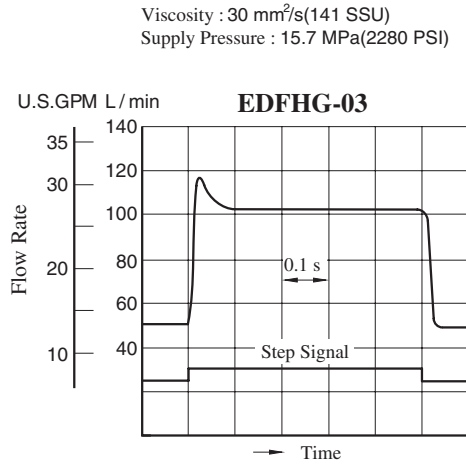
Model Number : EDFHG-04-140-3C2-E-31  
 Viscosity : 30 mm<sup>2</sup>/s(141 SSU)  
 Pilot Pressure : 15.7 MPa(2280 PSI)  
 Travel of Spool : ±10% of Maximum Stroke



Model Number : EDFHG-06-280-3C2-E-31  
 Viscosity : 30 mm<sup>2</sup>/s(141 SSU)  
 Pilot Pressure : 15.7 MPa(2280 PSI)  
 Travel of Spool : ±10% of Maximum Stroke

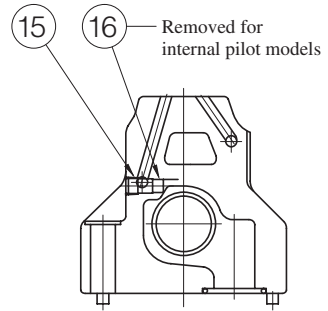
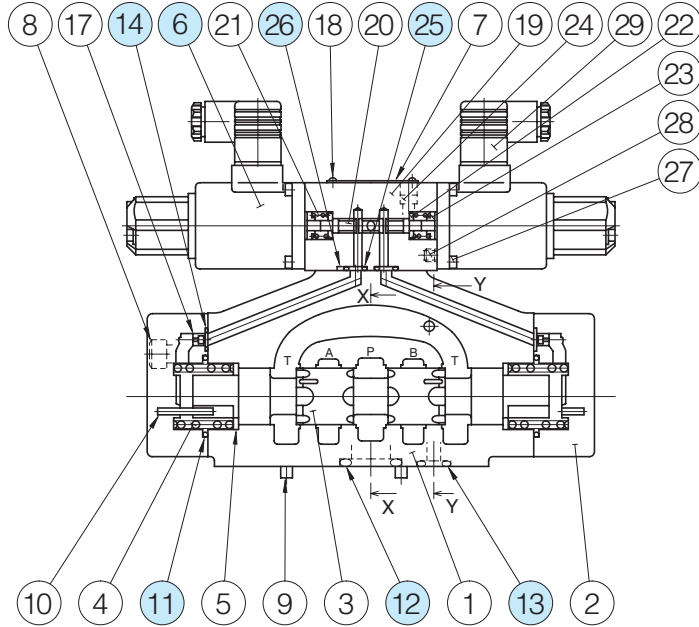
**Step Response**

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

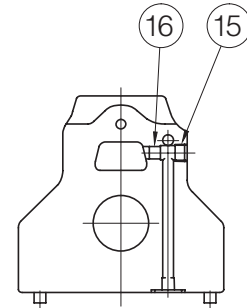


● List of Seals and Solenoid Ass'y

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.

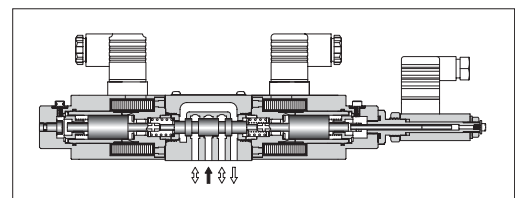
## Direct Operated Type Directional and Flow Control Valves

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

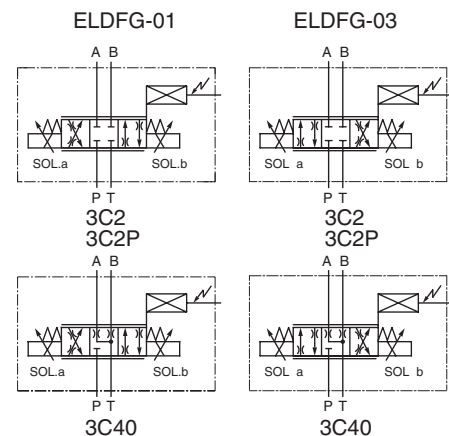
Compared to nozzle flapper type servo valve, this product has excellent contamination-related problems.

### 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)



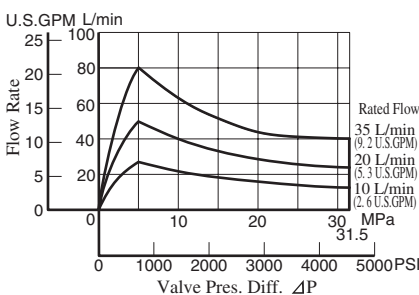
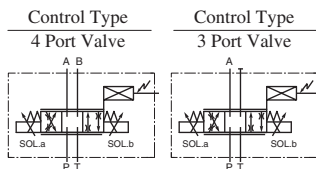
Graphic Symbols



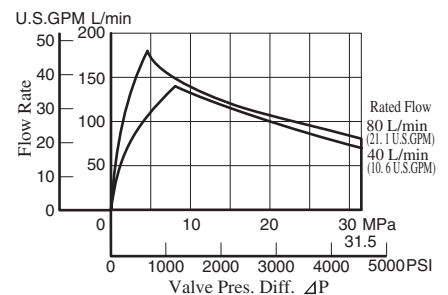
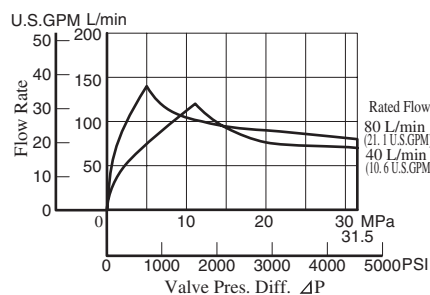
### Range of Flow Control

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

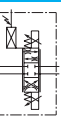
**ELDFG-01**



**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**

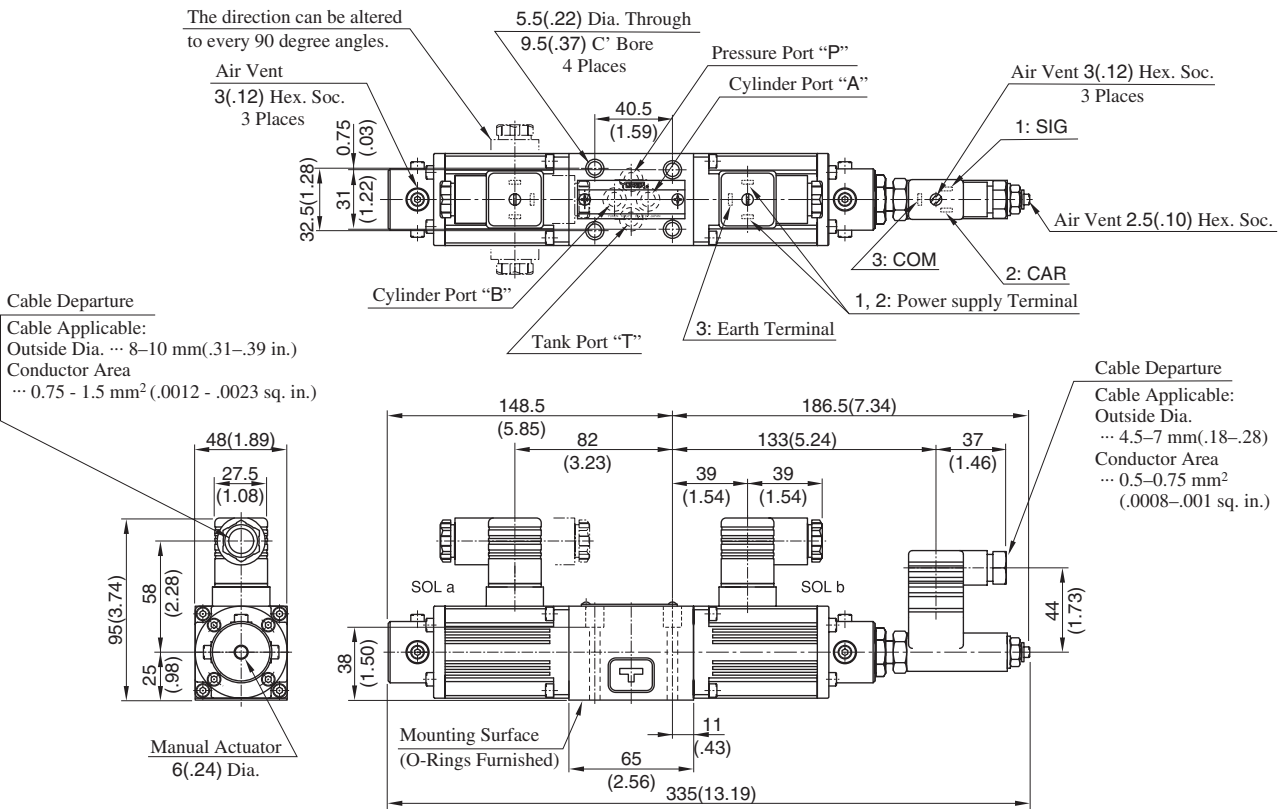
For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see page 786).

Valve Model Numbers	Power Amplifier Model Numbers
ELDFG-01-* - <sup>3C2</sup> / <sub>3C40</sub>	AMN-L-01-1-10
ELDFG-01-* -3C2P	AMN-L-01-3-2P-10
ELDFG-03-* - <sup>3C2</sup> / <sub>3C40</sub>	AMB-EL-03-1-10
ELDFG-03-* -3C2P	AMB-EL-03-2P-1-10



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

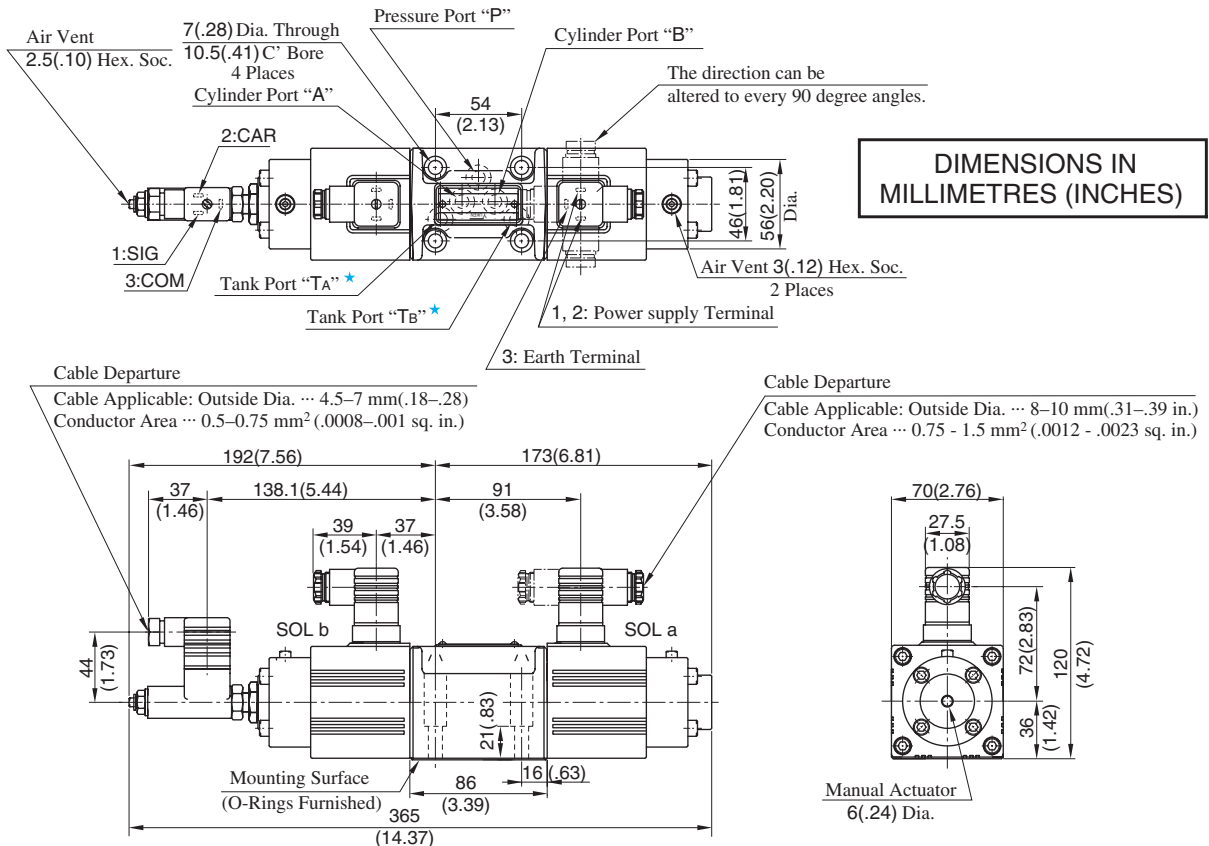
Mounting surface: Conform to ISO4401-AB-03-4-A.



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.



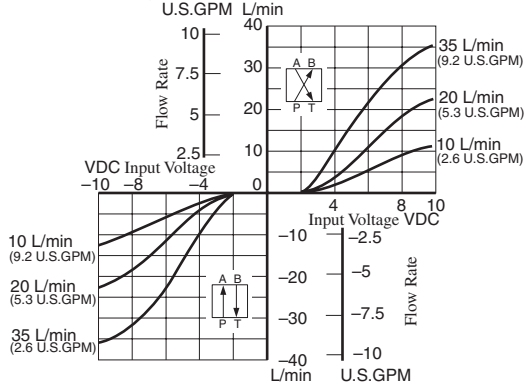
Note: For valve mounting surface dimensions, see the dimensional drawings of sub-plates (p.373) in common use.

**H**  
E Series  
Direct Operated Type Directional and Flow Control Valves

**Input Voltage vs. Flow Rate**

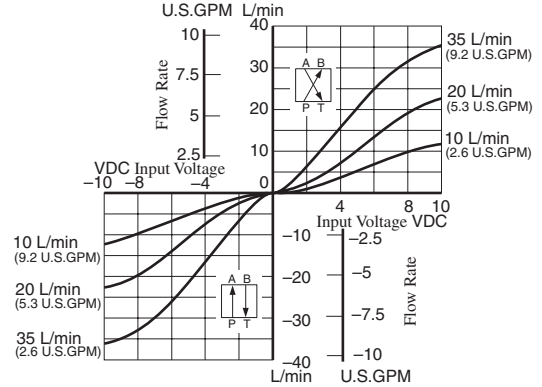
**ELDFG-01-\* -3C2/3C40**

Valve Pres. Diff. : 1.2 MPa (174 PSI)  
 Viscosity : 30 mm<sup>2</sup>/s (141 SSU)



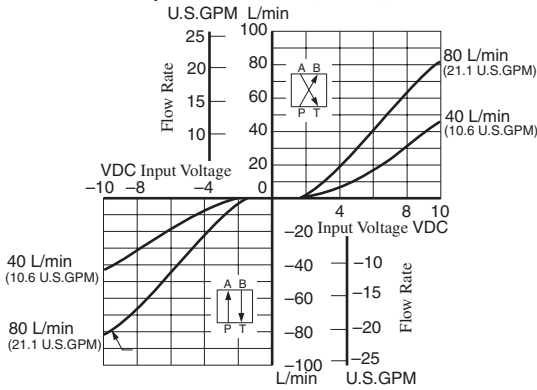
**ELDFG-01-\* -3C2P**

Valve Pres. Diff. : 1.2 MPa (174 PSI)  
 Viscosity : 30 mm<sup>2</sup>/s (141 SSU)



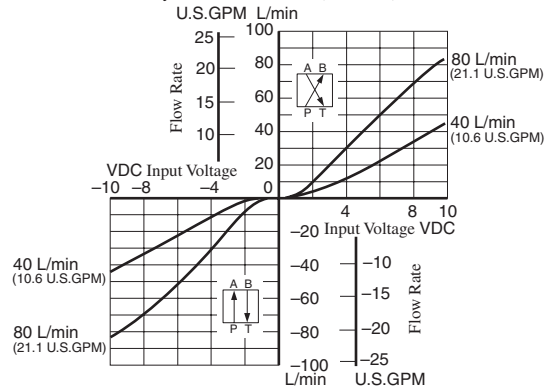
**ELDFG-03-\* -3C2/3C40**

Valve Pres. Diff. : 1.5 MPa (218 PSI)  
 Viscosity : 30 mm<sup>2</sup>/s (141 SSU)



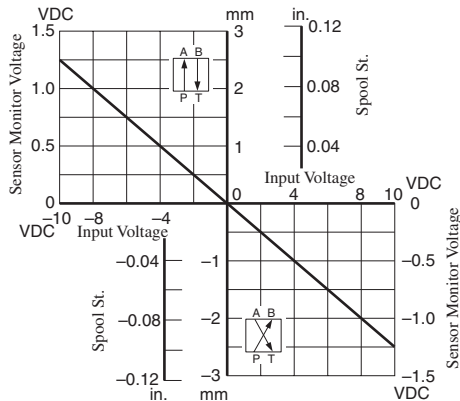
**ELDFG-03-\* -3C2P**

Valve Pres. Diff. : 1.5 MPa (218 PSI)  
 Viscosity : 30 mm<sup>2</sup>/s (141 SSU)

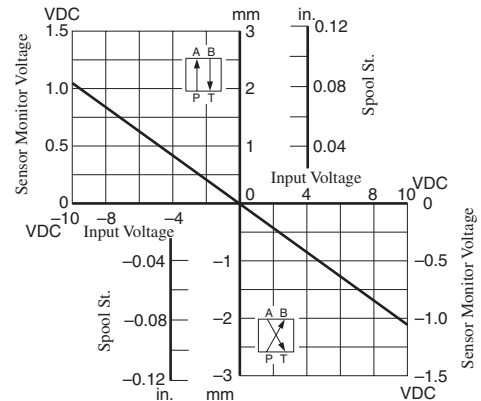


**Input Voltage vs. Spool St.**

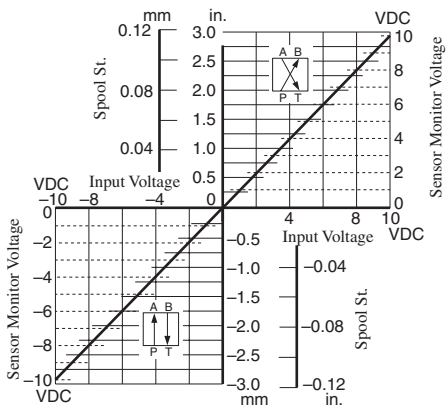
**ELDFG-01-\* -3C2/3C40**



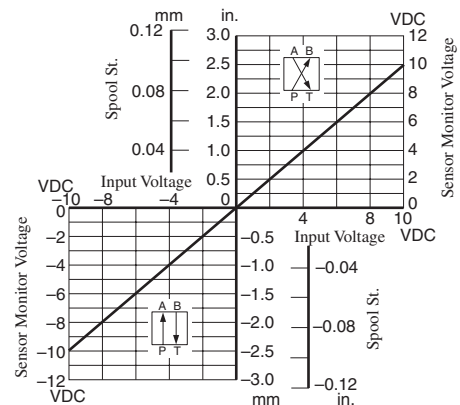
**ELDFG-01-\* -3C2P**



**ELDFG-03-\* -3C2/3C40**



**ELDFG-03-\* -3C2P**



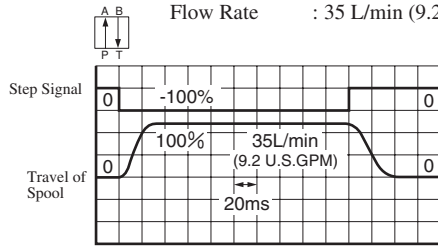
**Step Response (Example)**

Viscosity : 30 mm<sup>2</sup>/s (140 SSU)

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

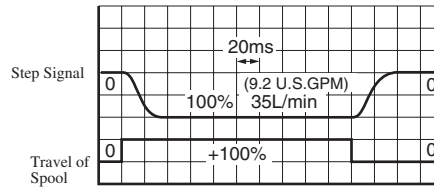
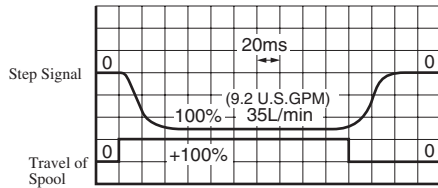
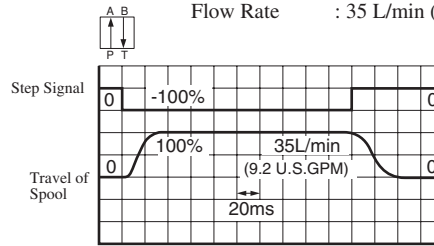
**ELDFG-01-35-3C2/3C40**

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



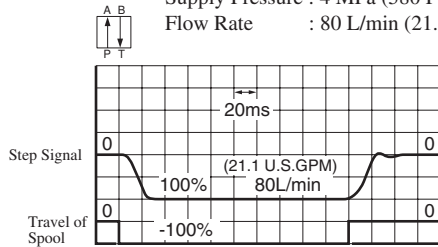
**ELDFG-01-35-3C2P**

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



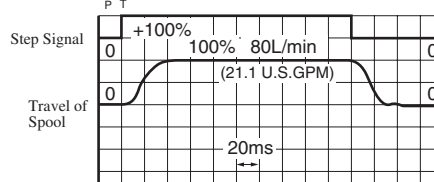
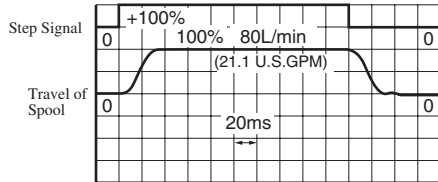
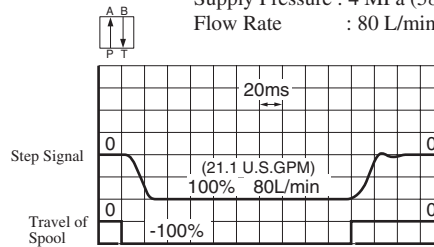
**ELDFG-03-80-3C2/3C40**

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



**ELDFG-03-80-3C2P**

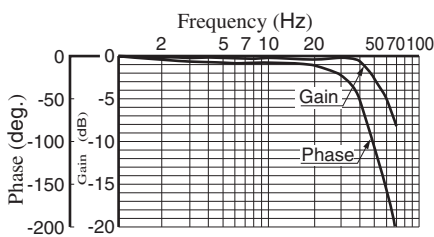
Supply Pressure : 4 MPa (580 PSI)  
Flow Rate : 80 L/min (21.1 U.S.GPM)



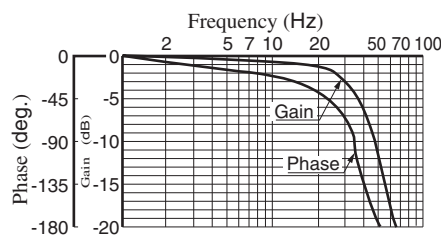
**Frequency Response**

Input Signal : 0 ±25 %V  
Primary Pressure : 14 PMa (2030 PSI)  
Viscosity : 30 mm<sup>2</sup>/s (140 SSU)

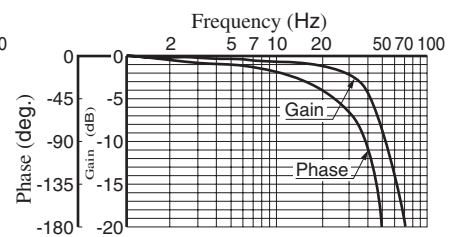
**ELDFG-01-35-3C2/3C40/3C2P**



**ELDFG-03-80-3C2/3C40**

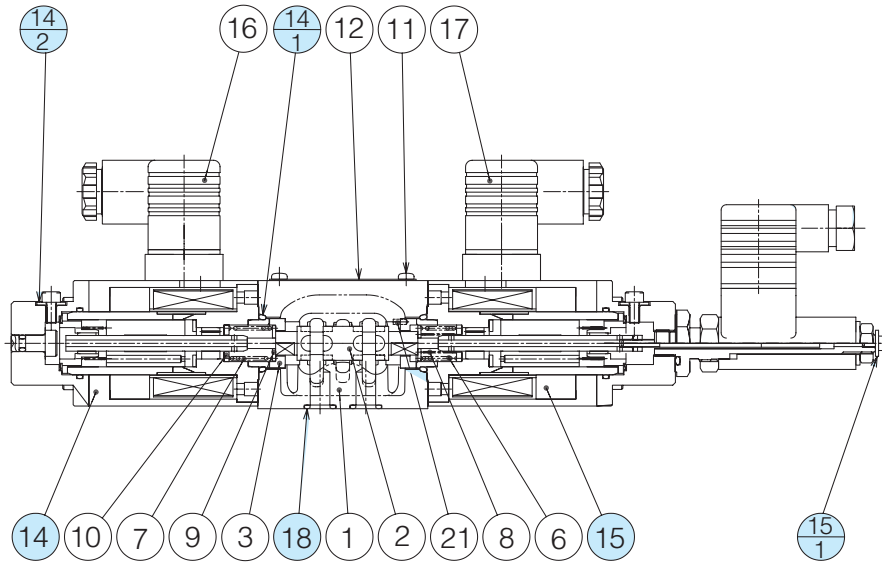


**ELDFG-03-80-3C2P**



■ 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.

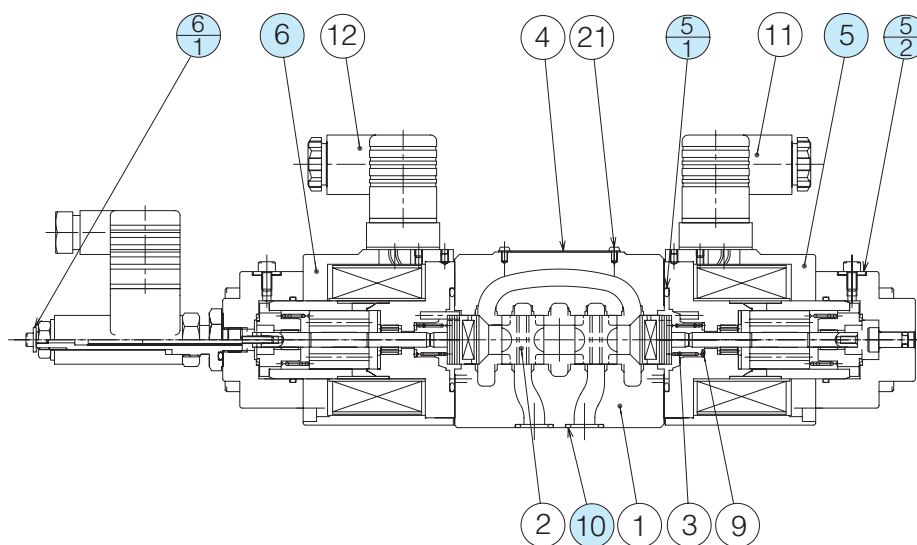
● Solenoid Ass'y

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

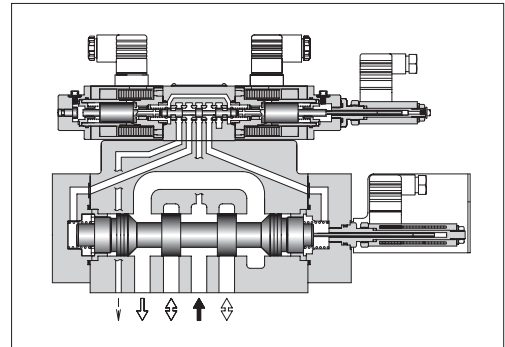
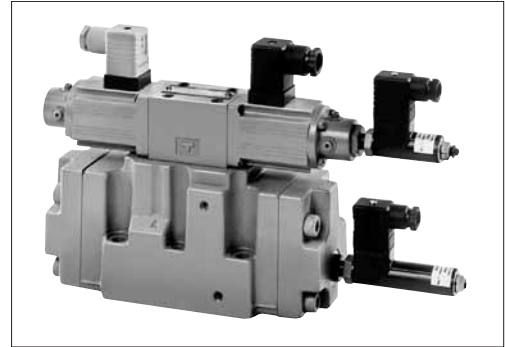
Note) The connector assembly GDM-211-\*\*-11 (Item 11, 12) is not included in the solenoid assembly.

## Two Stage Type Directional and Flow Control Valves

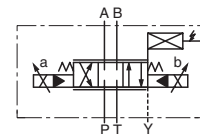
### Specifications

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 <sup>★1</sup> (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 <sup>★2</sup> MPa (PSI)		1.5–31.5 (218–4570)	
Pilot Flow <sup>★3</sup>		16 L/min or more	350: 16 L/min or more 500: 19 L/min or more
Null Leakage <sup>★4</sup> 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 <sup>2</sup> (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)

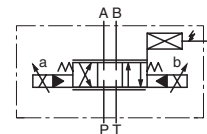
- ★1. Return pressure should be less than the actual supply pressure.
- ★2. Pilot pressure should be between 1.5 MPa (218 PSI) and 3.5 MPa (508 PSI), and should exceed 60% of the actual supply pressure to main valve.
- ★3. Pilot flow is calculated with the above step response time at pilot pressure 14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



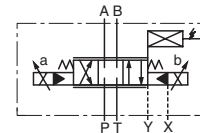
### Graphic Symbols



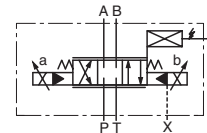
Internal Pilot / External Drain Type



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
<b>F:</b> Special Seals for Phosphate Ester Type Fluids (Omit if not required)	<b>ELDFH:</b> High Response (Two Stage) Type Proportional Electro-Hydraulic Directional and Flow Control Valves	<b>G:</b> Sub-Plate Mounting	<b>04</b>	<b>280:</b> 280(74.0)	<b>3C2</b>  <b>3C40</b> 	<b>XY:</b> Metre-in • Metre-out	<b>None:</b> Internal Pilot	<b>None:</b> External Drain	<b>10</b>	Refer to <sup>★1</sup>
			<b>06</b>	<b>350:</b> 350(92.5) <b>500:</b> 500(132.1)	<b>3C2P</b>  (Zero Lap)		<b>E:</b> External Pilot	<b>T:</b> External Drain	<b>10</b>	

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

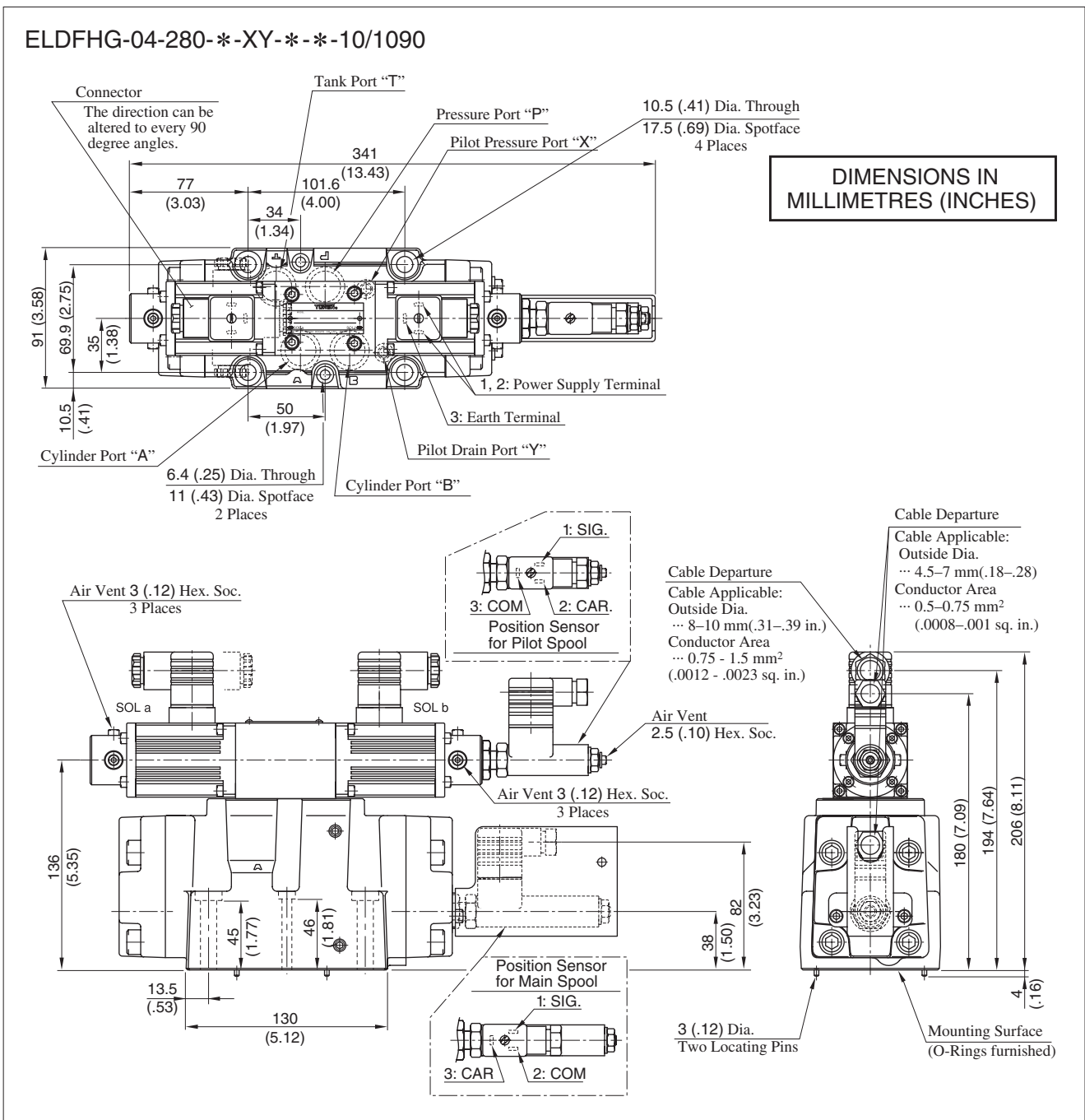
**Applicable Power Amplifiers**

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**

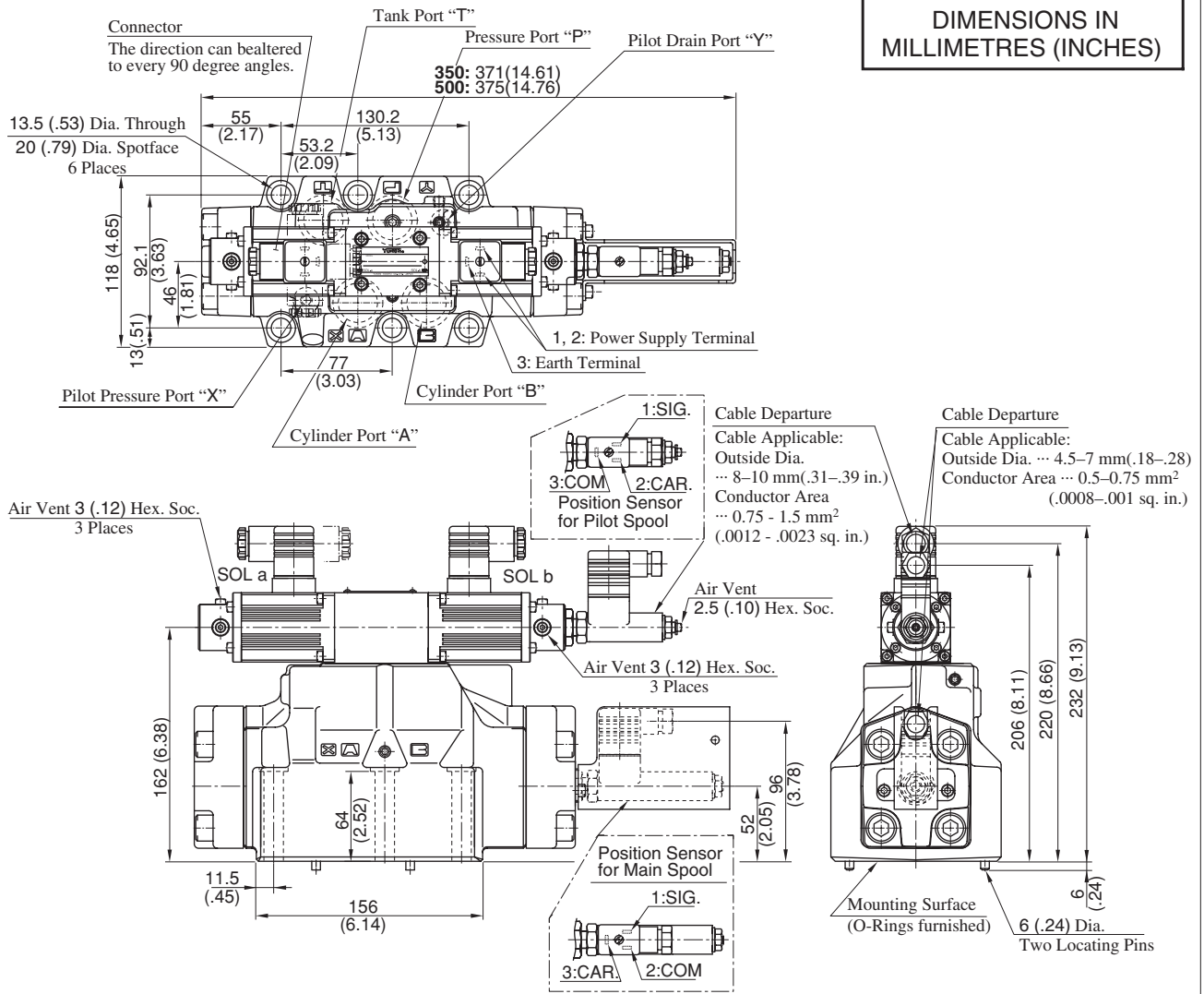
Model Numbers	Socket Head Cap Screw			Tightening Torque Nm (in. lbs.)
	Japanese Standard "JIS" European Design Standard	N. American Design Standard	Qty.	
ELDFHG-04	M6 × 55 Lg.	1/4-20 UNC × 2-1/4 Lg.	2	12 - 15 (106 - 133)
	M10 × 60 Lg.	3/8-16 UNC × 2-1/2 Lg.	4	58 - 72 (513 - 637)
ELDFHG-06	M12 × 85 Lg.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





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

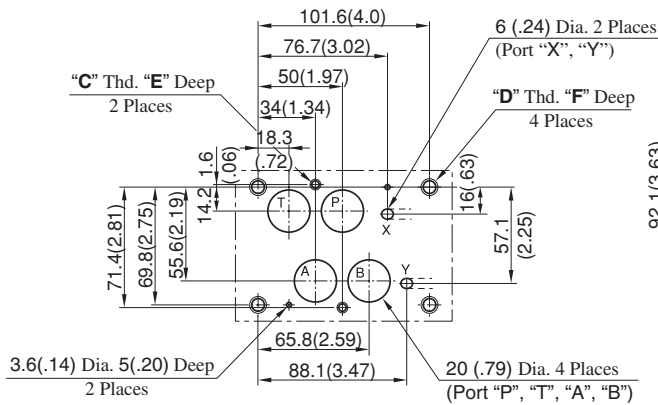
**DIMENSIONS IN MILLIMETRES (INCHES)**



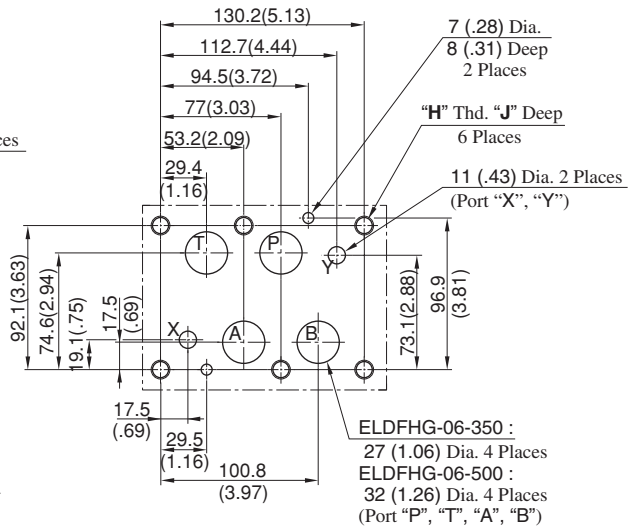
**Dimensions of valve mounting surface**

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

● **ELDFHG-04**



● **ELDFHG-06**



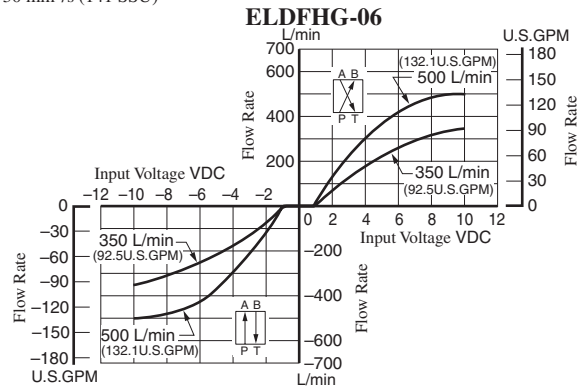
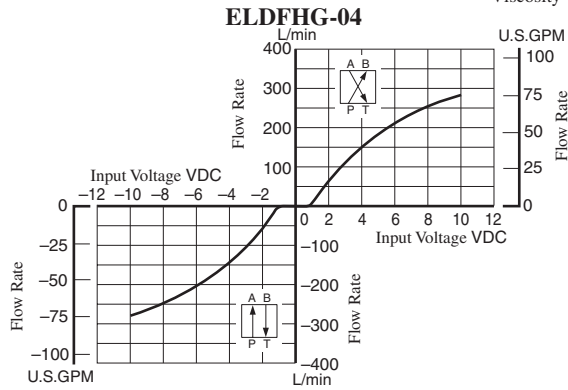
Model Numbers	"C" Thd.	"D" Thd.	"E" mm (in.)	F mm (in.)
ELDFHG-04-*-10	M6	M10	12 (.47)	17 (.67)
ELDFHG-04-*-1090	1/4-20 UNC	3/8-16 UNC	14 (.55)	20 (.79)

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



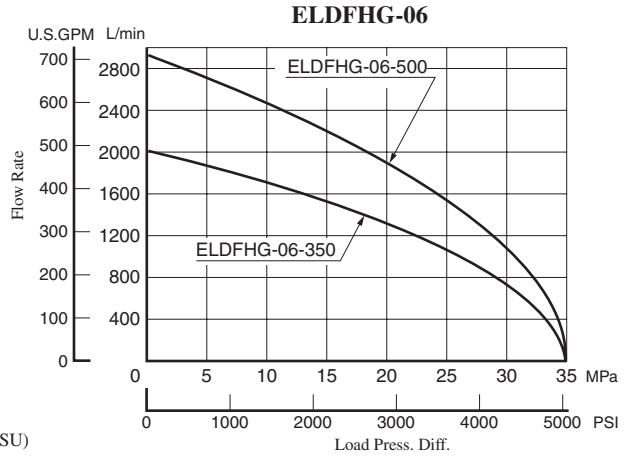
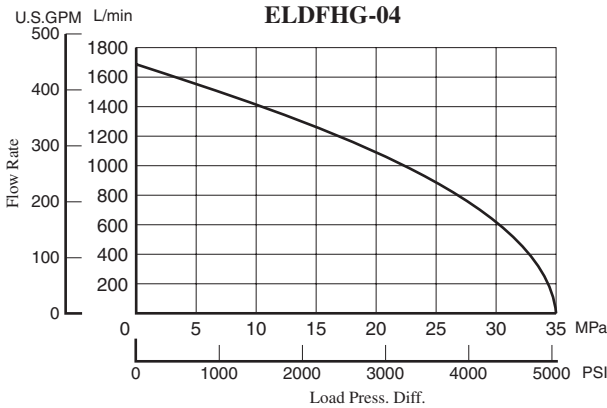
Input Voltage vs. Flow Rate

Valve Pres. Diff. : 1 MPa (145 PSI)  
 Viscosity : 30 mm<sup>2</sup>/s (141 SSU)



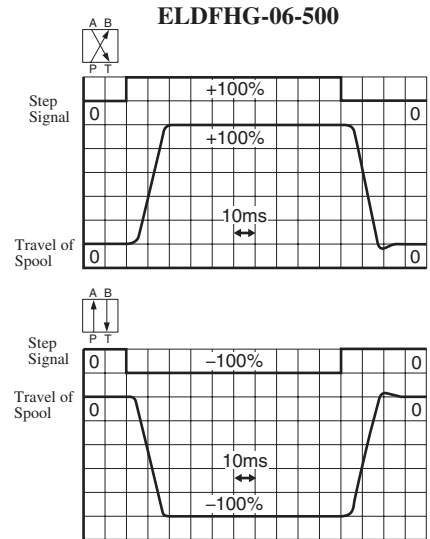
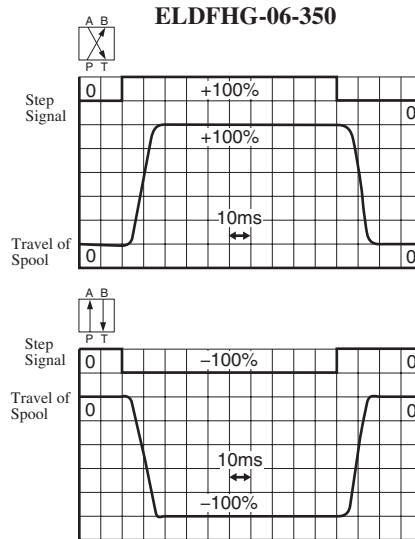
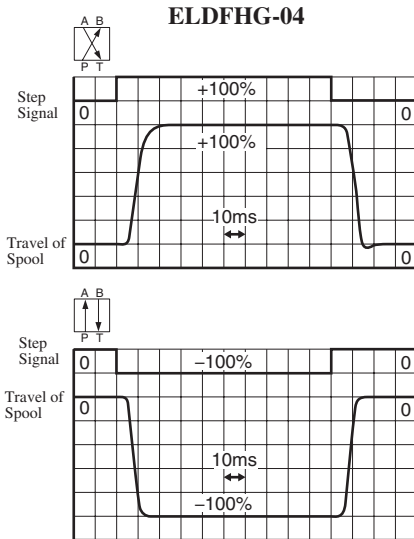
Load Flow Characteristics

Viscosity : 30 mm<sup>2</sup>/s (141 SSU)



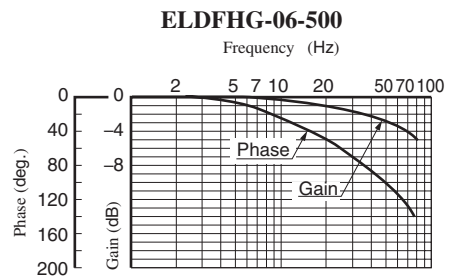
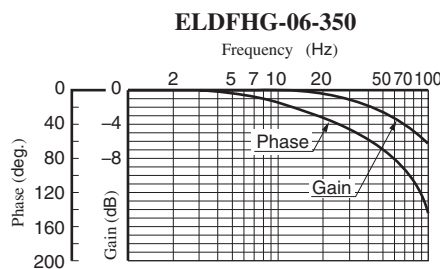
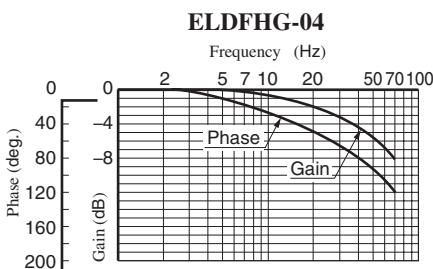
Step Response (Example)

Viscosity : 30 mm<sup>2</sup>/s (141 SSU)



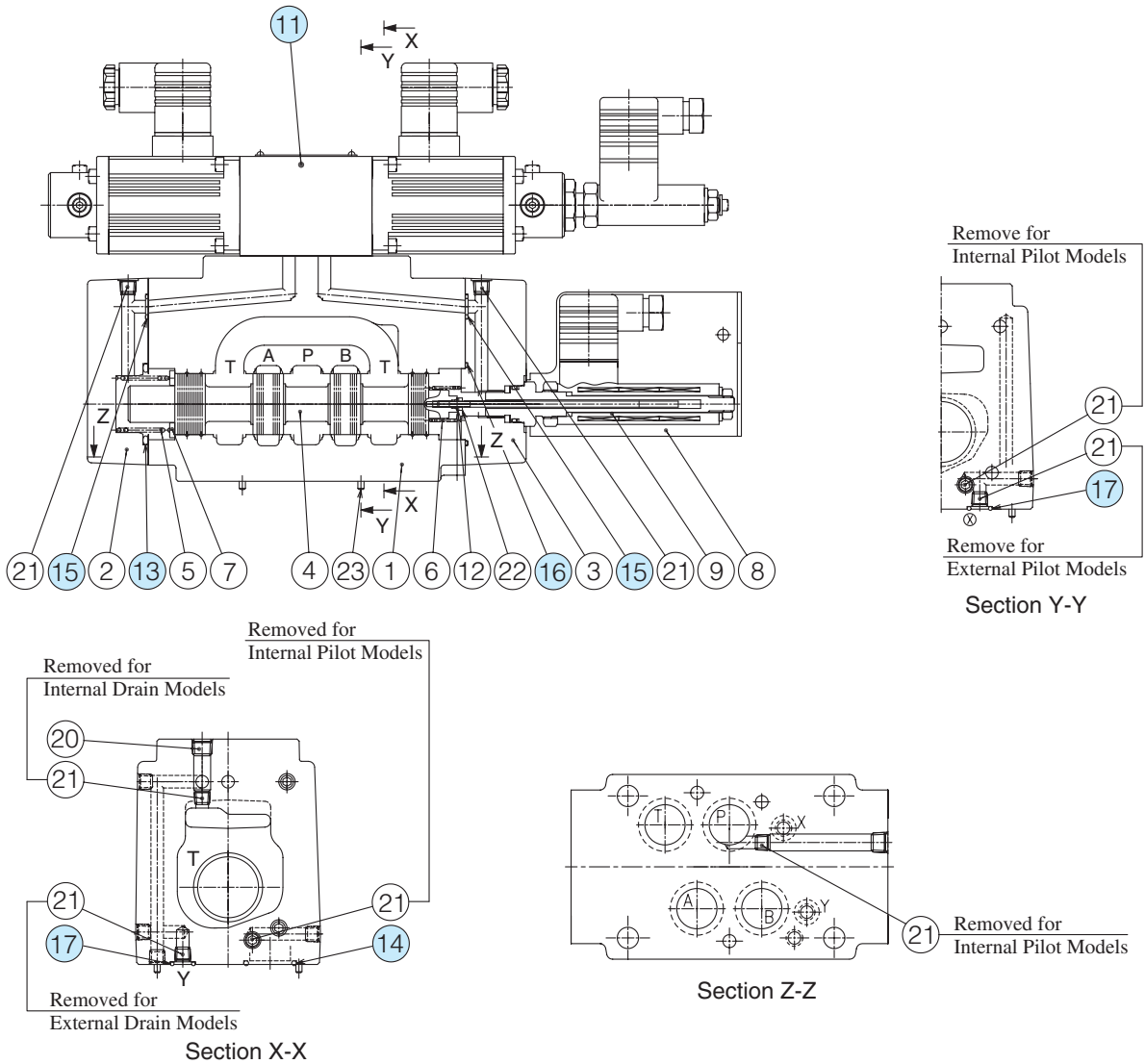
Frequency Response

Input Signal : 0 ± 25 %  
 Hydraulic Circuit : Port A/B Closed  
 Supply and Pilot Pressure : 14 PMa (2030 PSI)  
 Viscosity : 30 mm<sup>2</sup>/s (140 SSU)



■ 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

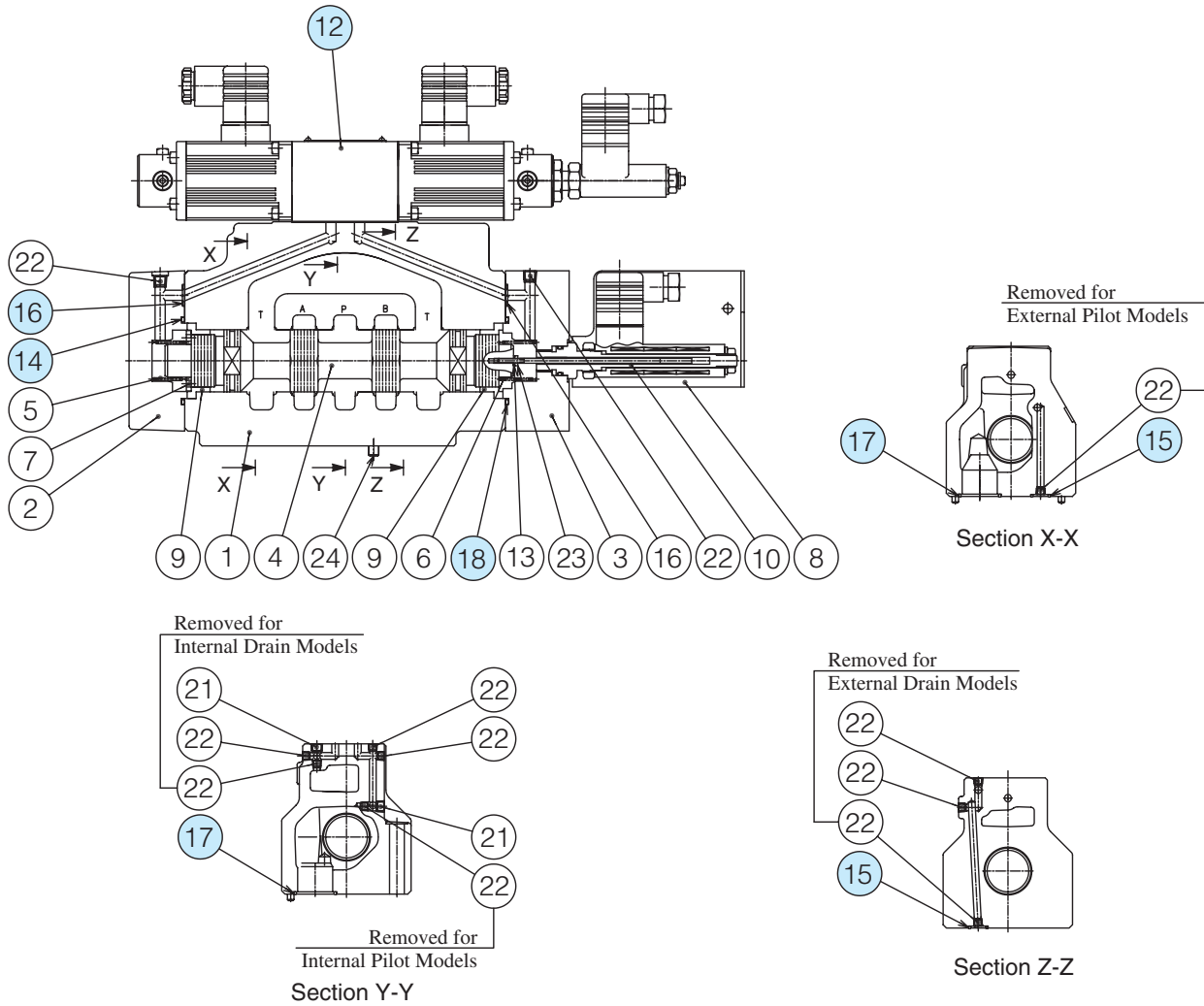
Valve Model No.	⑪ Pilot Valve Model No.
ELDFHG-04	ELDFG-01-30-3C2P-XY-1004

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

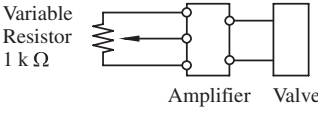
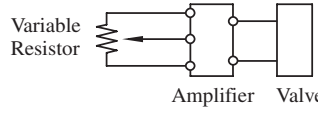
Note) See ELDFG-01-\*\*-\*\*-XY-10/1090 on page 758 for the corresponding seal and solenoid assembly for the pilot valve.

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.

## Power Amplifiers For 10Ω Series Control Valves

These power amplifiers are used to drive the 10Ω series proportional electro-hydraulic pressure or flow control valves.

### Model Number Designation

AME	-D	-10	-100	-20
Series Number	Type of Function	Coil Resistance of Valve	Power Supply	Design Number
AME	D: DC Input Type	10: 10 Ω	100: 100 V AC 200: 200 V AC	20

SK1022	-A	-100	-11
Series Number	Type of Function	Power Supply	Design Number
SK1022: DC Input-Feedback Type	A: Polarity of Feedback Voltage...(-) B: Polarity of Feedback Voltage...(+)	100: 100 V AC 200: 200/220 V AC	11
SK1015: DC Input Type for DC Power Supply	—	— <sup>*</sup>	11

<sup>\*</sup> Use with 24 V DC since this is for a battery power supply.

### Specifications

Model No.	AME-D-10-*-20	SK1022-A-*-11	SK1022-B-*-11	SK1015-11
Description				
Type of Function	DC Input Type	DC Input Feedback Type	DC Input Feedback Type	DC Input Type
Max. Output Current	1 A (10 Ω Solenoid)	1 A (10 Ω Solenoid)	1 A (10 Ω Solenoid)	0.9 A (10 Ω Solenoid)
Max. Input Voltage	+ 10 V DC	+ 10 V DC	+ 10 V DC	+ 10 V DC
Feedback Voltage	—	0 to -10V	0 to +10V	—
Input Impedance	10 kΩ	50 kΩ	50 kΩ	50 kΩ
Max. Gain	1 A / 5 V	1 A / 0.5 V	1 A / 0.5 V	0.9 A / 5 V
Dither	Variable	Fix	Fix	Fix
Temperature Drift (Max.)	0.2 mA /°C	0.2 mA /°C	0.2 mA /°C	1 mA /°C
Power Supply	100 V AC, 200 V AC (50/60 Hz) <sup>*</sup>	100 V AC, 200/220 V AC ±10% (50/60 Hz)		22-30 V DC
Power Input (Max.)	55 VA	45 VA	45 VA	25 VA
Ambient Temperature	0-50°C (32-122°F)	0-50°C (32-122°F)	0-50°C (32-122°F)	0-50°C (32-122°F)
External Setting Resistance	1 kΩ	1 kΩ	1 kΩ	10 kΩ
Mass	2.1 kg (4.6 lbs.)	4.5 kg (9.9 lbs.)	4.5 kg (9.9 lbs.)	0.4 kg (.88 lbs.)

<sup>\*</sup> Serviceable Range; 100 VAC can be used from 90 to 132 VAC, 200 VAC can be used from 180 to 264 VAC.

### Instructions

Power supply for the setting adjuster can be provided from this power amplifier, but for only one.

However, please use the variable resistor or potentiometre of which impedance is 1 kΩ (in case of madel SK1015, use 10 kΩ) for the setting adjuster.

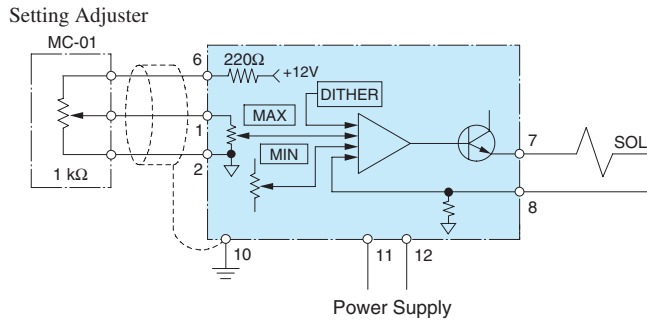


### Applicable to Valve

Name of Valve	Model Numbers
Pilot Relief Valves	EDG-01*
Relief Valves	EBG-03
	EBG-06
	EBG-10
Relieving and Reducing Valves	ERBG-06
	ERBG-10
10 Ω Series Flow Control Valves	EFG-03/06 EFCG-03/06 (51 Design)
Flow Control and Relief Valves	EFBG-03
	EFBG-06
	EFBG-10

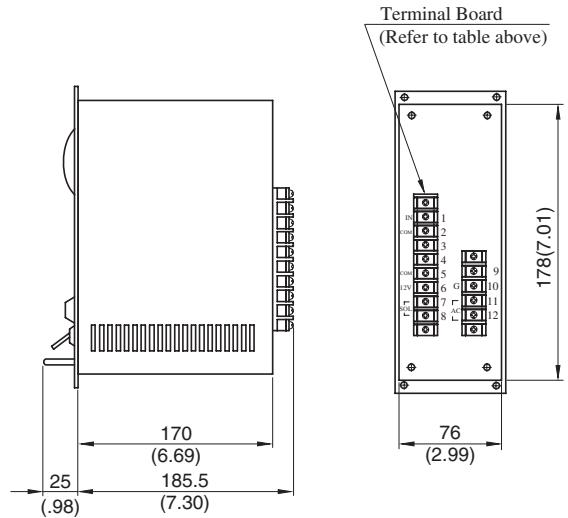
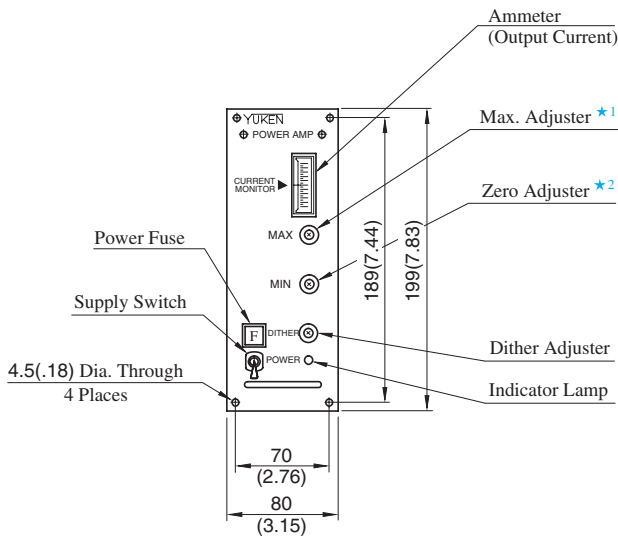
AME-D-10-\* -20

[Example Diagram]



● Detail of Terminal Board

Terminal Number	Name	
1	Input Signal	IN
2	Input Signal	COM
3	—	
4	—	
5	Input Signal	COM
6	Internal Power Supply	+12 V
7	Output to Valve Solenoid	SOL
8	—	
9	—	
10	Ground	G
11	Power Supply	
12	100/200 VAC	

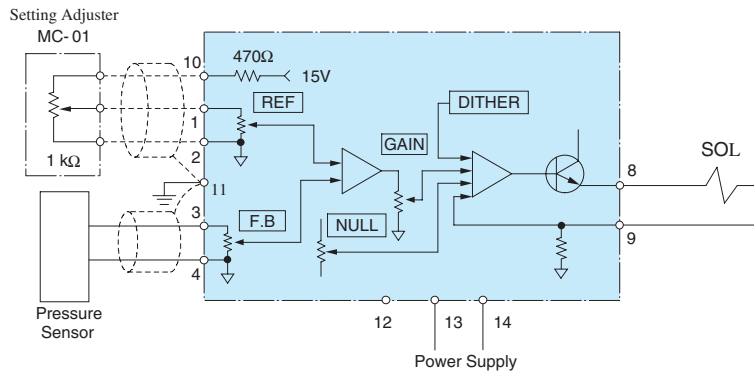


- ★1. Adjustment of upper limit of usable range
- ★2. Adjustment of lower limit of usable range

DIMENSIONS IN  
MILLIMETRES (INCHES)

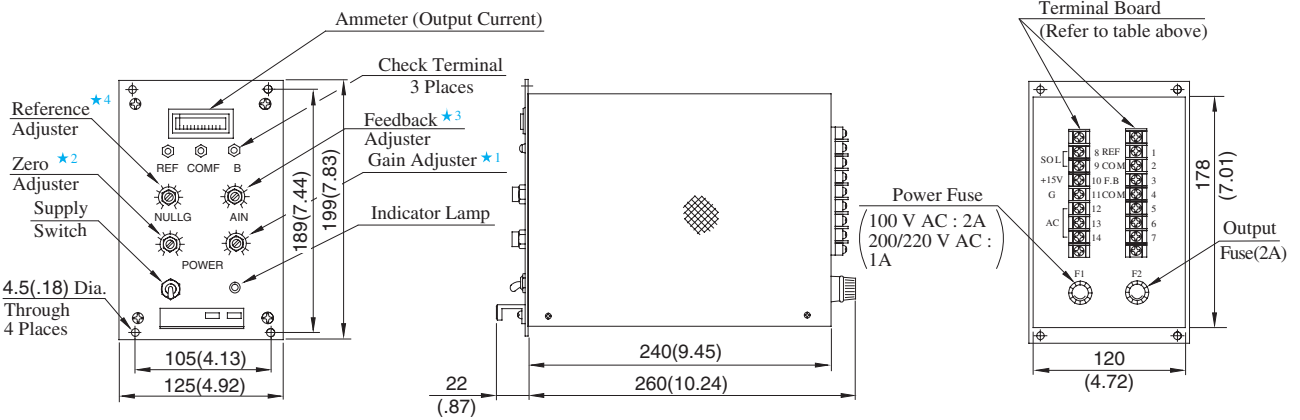
SK1022-A/B-\*-11

[ Example Diagram ]



● Detail of Terminal Board

Terminal Number	Name	
1	Input Signal	REF
2	Input Signal	COM
3	Feedback Signal	F.B
4	Feedback Signal	COM
5		—
6		—
7		—
8	Output to Valve Solenoid	SOL
9		SOL
10	Power Supply for Setting Adjuster	+15V (10 V at 1 kΩ)
11	Ground	G
12	Power Supply	100 V AC, 200V AC : 13, 14 220 V AC : 12, 14
13		
14		

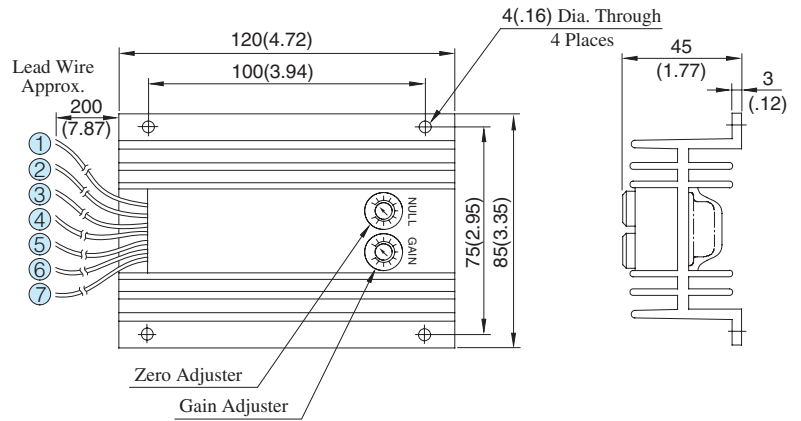
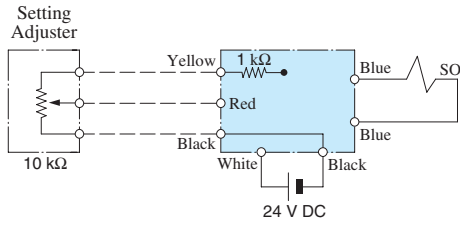


- ★ 1. Adjustment of upper limit of usable range
- ★ 2. Adjustment of lower limit of usable range
- ★ 3. Adjustment of feedback voltage ratio
- ★ 4. Adjustment of input voltage ratio

DIMENSIONS IN MILLIMETRES (INCHES)

**SK1015-11**

[ Example Diagram ]



● **Lead Wire Detail**

- ① White.....Plus of 24 V DC
- ② Black.....Zero of 24 V DC
- ③ Blue.....
- ④ Blue..... } Output to Valve Solenoid
- ⑤ Yellow.....15 V Power Supply for Setting Adjuster (10 V at 10 kΩ)
- ⑥ Red.....Input Signal
- ⑦ Black.....Zero of Input Signal

**DIMENSIONS IN  
MILLIMETRES (INCHES)**

■ **Instructions**

● **Supply Switch**

The power amplifier has no power supply switch.

As soon as it is connected to a power supply, it comes to be alive. Provide a power switch externally.



## Compact Power Amplifiers For 10Ω Series Control Valves

Compact power amplifiers for 10Ω proportional solenoids. The power supply is 24 V DC. It uses a new circuitry to be slow to heat.

### Model Number Designation

AMN	-D	-10
Series Number	Type of Function	Design Number
AMN	D: DC Input Type	10



### Specifications

Model No.	AMN-D-10
Description	AMN-D-10
Type of Function	DC Input Type
Max. Output Current	1 A (10Ω Solenoid)
Power Input (Max.)	+ 10 V DC
Input Impedance	10 kΩ
Max. Gain	1 A / 5 V
Dither	Variable
Temperature Drift (Max.)	0.2 mA / °C
Power Supply	24 V DC (20 - 30 V DC)
Max. Input Power	25 W
Ambient Temperature	0 - 50°C (32 - 122°F)
External Setting Resistance	1 kΩ
Approx. Mass	0.2 kg (.44 lbs.)

### Applicable to Valve

Name of Valve	Model Numbers
Pilot Relief Valves	EDG-01*
Relief Valves	EBG-03 EBG-06 EBG-10
Relieving and Reducing Valves	ERBG-06 ERBG-10
10Ω Series Flow Control Valves	EFG-03/06 EFCG-03/06 (51 Design)
10Ω-10Ω Series High Flow Series Flow Control and Relief Valves	EFBG-03 EFBG-06 EFBG-10

### AMN-D-10

[Example Diagram]

Setting Adjuster  
MC-01  
+12V  
MIN  
SPAN  
1 kΩ  
DITHER  
Power Supply  
Z SOL

**DIMENSIONS IN MILLIMETRES (INCHES)**

3.5(.14) Dia. Through 2 Places  
YUKEN  
MIN  
SPAN  
POWER  
Indicator Lamp  
Zero Adjuster  
Span Adjuster  
Terminal Board (Refer to table on the left.)

90(3.54)  
100(3.94)  
50 (1.97)  
60 (2.36)  
2.5 (.10)  
30 (1.18)

#### ● Detail of Terminal Board

Terminal Number	Name	
1	Power Supply	+24 V
2	Power Supply	0 V
3	Ground	G
4	Internal Power Supply	+12 V
5	Input Signal	IN
6	Input Signal	COM
7	Output to Valve	SOL
8	Solenoid	SOL

## Power Amplifiers For 40Ω Series Flow Control Valves

These power amplifiers are used to drive the 40Ω series proportional electro-hydraulic flow control valves.

### Model Number Designation

AME	-D	-40	-100	-40
Series Number	Type of Function	Coil Resistance of Valve	Power Supply	Design Number
AME	D: DC Input Type	40: 40 Ω	100: 100 V AC 200: 200 V AC	40

AME	-DF	-S	-100	-22
Series Number	Type of Function	Type of Mounting	Power Supply	Design Number
AME	DF: DC Input Feedback Type	S: Panel Mounting Type	100: 100 V AC	22
	T: Slow Up Down Type		200: 200/220 V AC	22



### Applicable to Valve

Name of Valve	Model Numbers
40 Ω Series Flow Control Valves	EFG -02 (31 Design) EFCG
	EFG -03 (26 Design) EFCG
	EFG -06 (22 Design) EFCG
	EFG -10 (11 Design) EFCG

### Specifications

Description	Model No.		
	AME-D-40-*-40	AME-DF-S-*-22	AME-T-S-*-22
Type of Function	DC Input Type	DC Input Feedback Type	Slow Up Down Type
Max. Output Current	0.8 A (40 Ω Solenoid)	0.8 A (40 Ω Solenoid)	0.8 A (40 Ω Solenoid)
Max. Input Voltage	+ 10 V DC	+ 10 V DC	—
Feedback Voltage	—	0 to -10 V	—
Input Impedance	10 kΩ	50 kΩ	—
Slow Up Down Range	—	—	0.05 – 1 s/100 mA
Max. Gain	0.8 A / 5 V	0.8 A / 5 V	—
Dither	Fix	Fix	Fix
Temperature Drift (Max.)	0.2 mA /°C	0.2 mA /°C	0.2 mA /°C
Power Supply	100 V AC, 200/220 V AC ±10% (50/60 Hz)		
Power Input (Max.)	70 VA	90 VA	90 VA
Ambient Temperature	0–50°C (32–122°F)	0 – 50°C (32 – 122°F)	0 – 50°C (32 – 122°F)
External Setting Resistance	1 kΩ	1 kΩ	—
Approx. Mass	2.8 kg (6.2 lbs.)	4.5 kg (9.9 lbs.)	4.5 kg (9.9 lbs.)

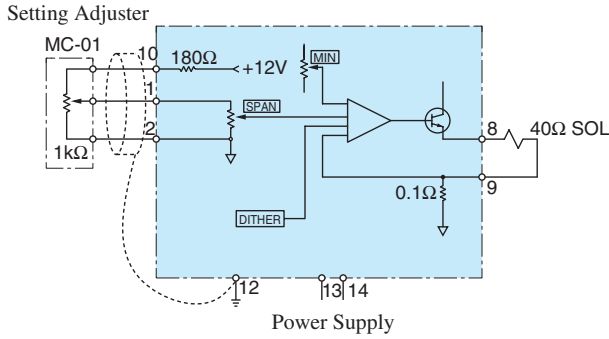
### Instructions

#### Power supply of the outside setting adjuster

When DC input type (AME-D-40) or DC input-feedback type (AME-DF-S) power amplifier is used, power supply for the setting adjuster can be provided from this power amplifier, but for only one. However, please use the variable resistor or potentiometre of which impedance is 1 kΩ for the setting adjuster.

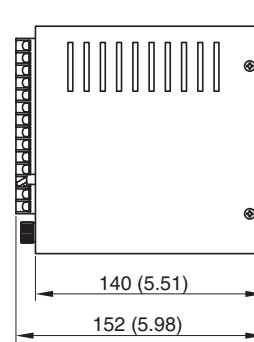
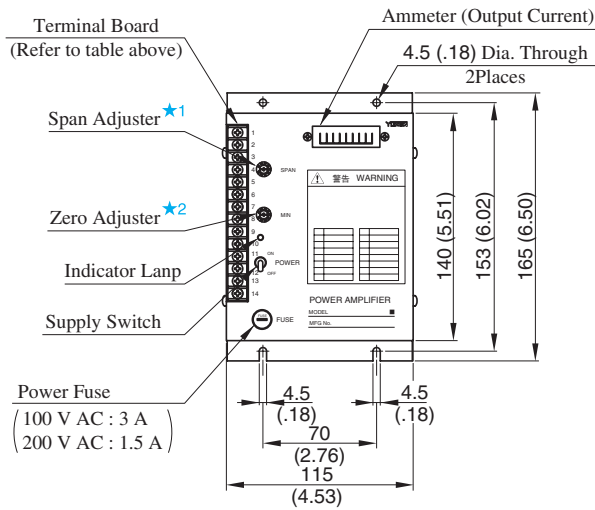
AME-D-40- \*-40

[Example Diagram]



● Detail of Terminal Board

Terminal Number	Name
1	Input Signal IN
2	Input Signal COM
3	—
4	—
5	Internal Power Supply -5V
6	Feedback Signal MFB
7	Feedback Signal COM
8	Output to Valve SOL
9	Solenoid
10	Internal Power Supply +12V
11	—
12	Frame Ground FG
13	Power Supply VAC
14	Power Supply VAC

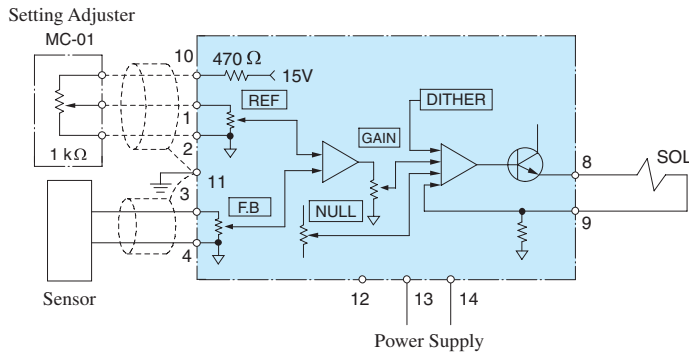


- ★1. Adjustment of upper limit of usable range
- ★2. Adjustment of lower limit of usable range

DIMENSIONS IN  
MILLIMETRES (INCHES)

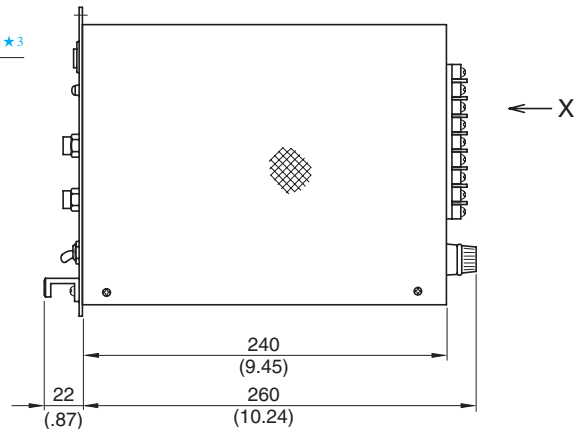
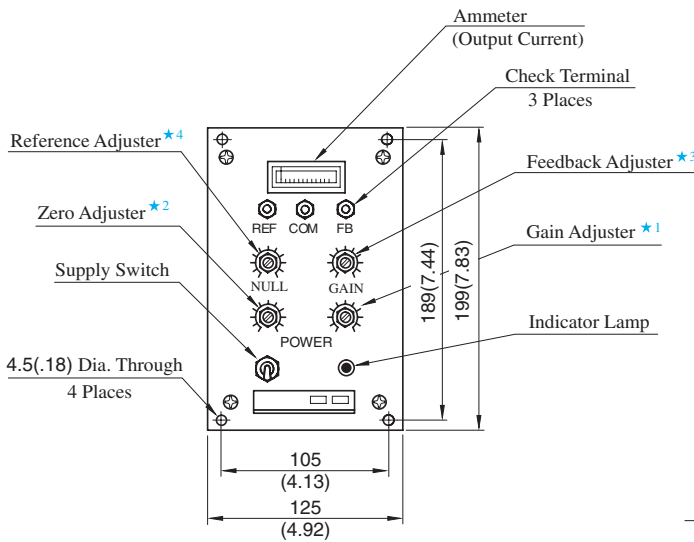
AME-DF-S-\*\*-22

[Example Diagram]



● Detail of Terminal Board

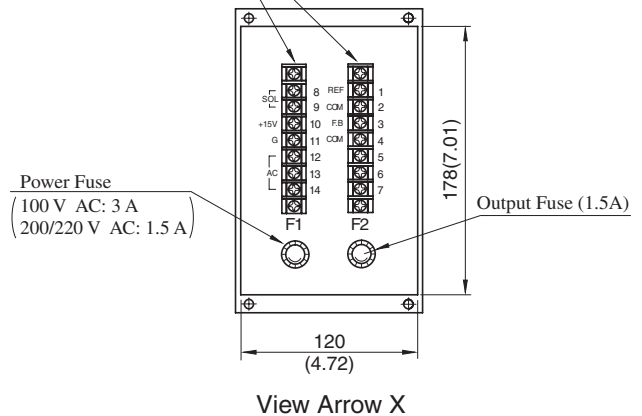
Terminal Number	Name	
1	Input Signal REF	
2	Input Signal COM	
3	Feedback Signal F.B	
4	Feedback Signal COM	
5	—	
6	—	
7	—	
8	Output to Valve Solenoid SOL	
9		
10	Power Supply for Setting Adjuster (10 V at 1 kΩ) +15 V	
11	Ground G	
12	Power Supply	
13		100 V AC, 200 V AC: 13, 14
14		220 V AC: 12, 14



- ★ 1. Adjustment of upper limit of usable range
- ★ 2. Adjustment of lower limit of usable range
- ★ 3. Adjustment of feedback voltage ratio
- ★ 4. Adjustment of input voltage ratio

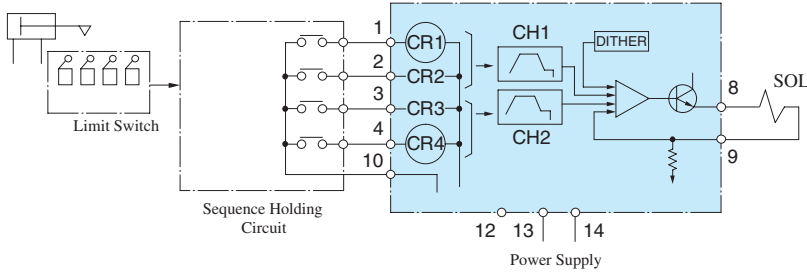
**DIMENSIONS IN MILLIMETRES (INCHES)**

Terminal Board (Refer to table above)



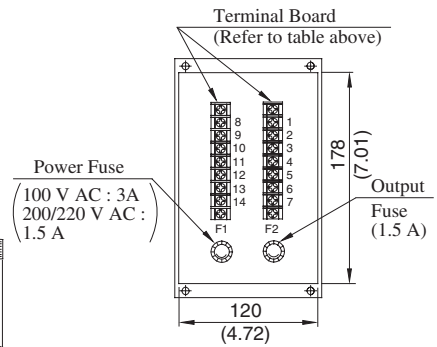
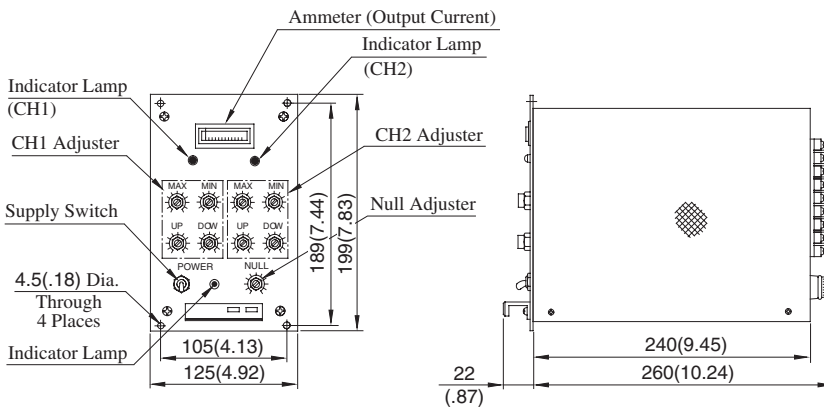
**AME-T-S-\*-22**

[Example Diagram]

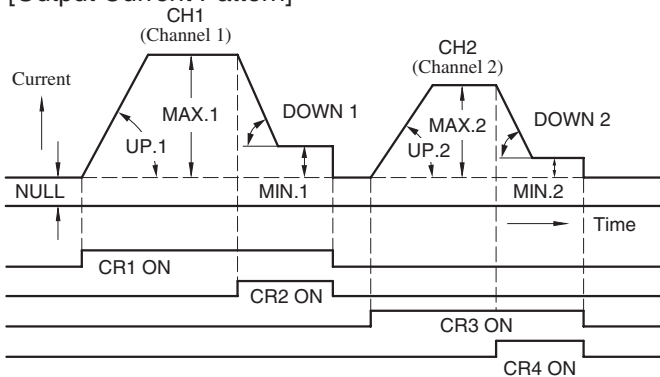


● Detail of Terminal Board

Terminal Number	Name	
1	Input Command	CR1
2	Input Command	CR2
3	Input Command	CR3
4	Input Command	CR4
5	—	
6	—	
7	—	
8	Output to Valve Solenoid	SOL
9	—	
10	Input Command	CR.COM
11	Ground	G
12	Power Supply	
13		100 V AC, 200 V AC: 13, 14
14		220 V AC: 12, 14



[Output Current Pattern]



**DIMENSIONS IN MILLIMETRES (INCHES)**

Terminal  
 1 & 10 in Short-Circuit  
 2 & 10 in Short-Circuit  
 3 & 10 in Short-Circuit  
 4 & 10 in Short-Circuit

Note: 1. CR1 to CR4: Relays in the power amplifier.  
 The output patterns CH1 and CH2 can not be obtained simultaneously nor can they be transmitted halfway to another pattern.  
 2. The words such as MAX, MIN, UP and DOWN show the volume adjustment of the power amplifier.

**How to Calculate Accelerating and Decelerating Time (Example)**

**Question:** Wish to accelerate and decelerate the actuator in between 5 L/min (1.32 U.S. GPM) and 25 L/min (6.6 U.S. GPM) in the use of proportional flow control valve model EFG-02-30-31\*.  
In such case, what are the manimum and minimum time adjustable for the acceleration and deceleration?

**Answer:** The input current for EFG-02-30-31\* at the flow rate of 5 L/min (1.32 U.S. GPM) and 25 L/min (6.6 U.S. GPM) can be obtained respectively from the chart below. The chart shows:

Input current at 5 L/min (1.32 U.S. GPM) 300 mA  
Input current at 25 L/min (6.6 U.S. GPM) 520 mA

Then, the difference between the above two can be obtained with the following formula:

$$520 \text{ mA} - 300 \text{ mA} = 220 \text{ mA}$$

While, the specification for the model AME-T-S shows the amplifier's gradient for acceleration or deceleration as being between 0.05 s/100 mA and 1.0 s/100 mA (which means that the minimum time is 0.05 second and the maximum time is 1.0 second for every 100 mA variation).

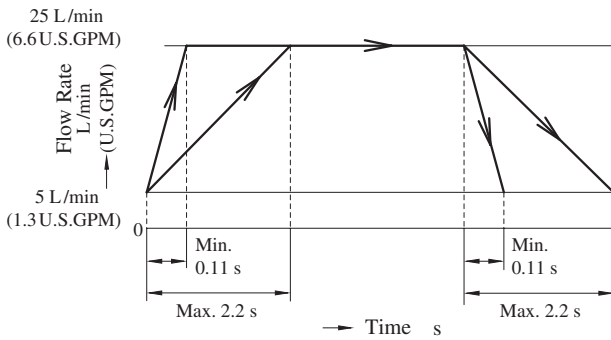
Therefore, the minimum and maximum adjustable time can be obtained as follows:

$$\frac{220 \text{ mA}}{100 \text{ mA}} \times 0.05 \text{ second} = 0.11 \text{ second (Minimum)}$$

$$\frac{220 \text{ mA}}{100 \text{ mA}} \times 1.0 \text{ second} = 2.2 \text{ second (Maximum)}$$

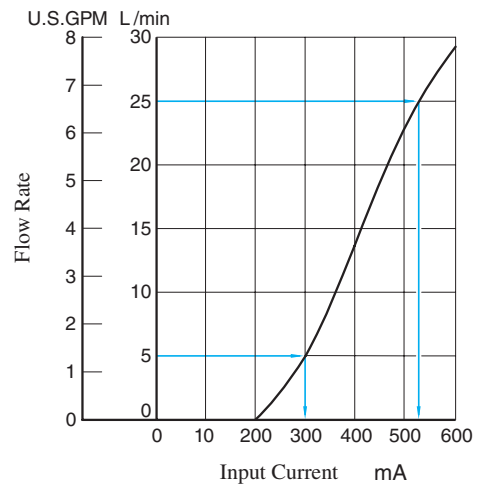
The result above are as illustrated on the below.

[Flow Pattern]



[Input Current vs. Flow]

EFG-02



**Interchangeability in Installation Current and New Design**

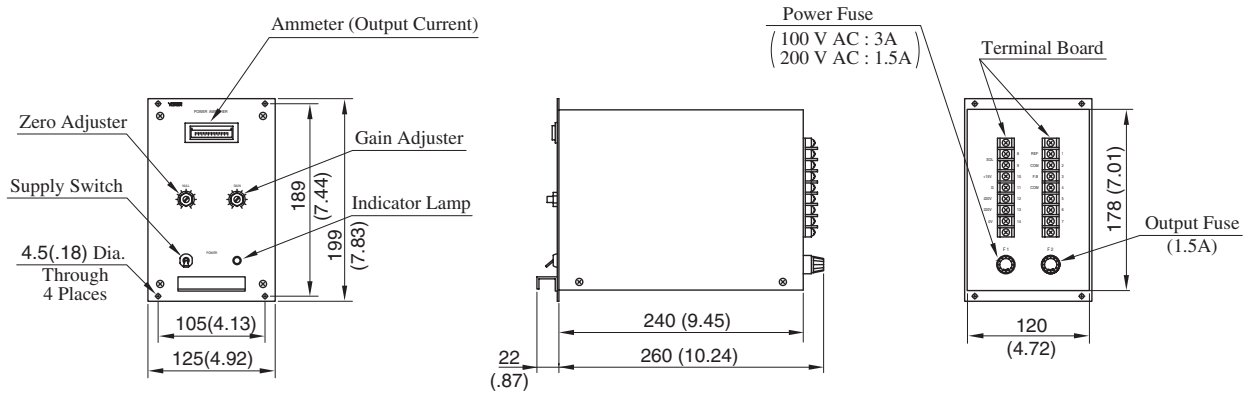
**Specification**

Electricity consumption is different by Current and New Design.  
The other specifications remain unchanged.

Electricity Consumption	
Current : 32 Design	New : 40 Design
90 VA	70 VA

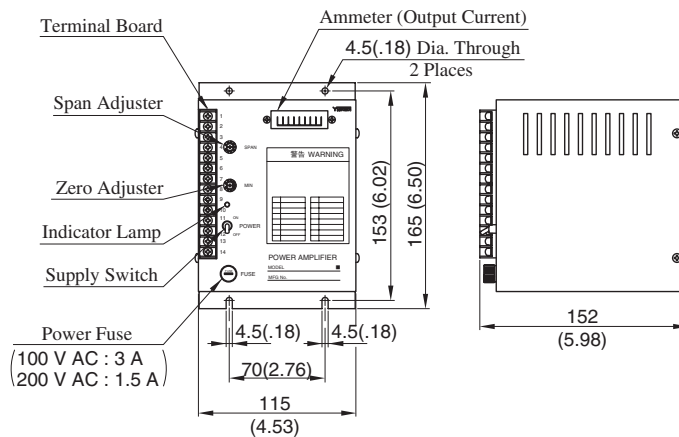
**Installation Interchangeability : None**

**AME-D-S-\* -32**



**DIMENSIONS IN MILLIMETRES (INCHES)**

**AME-D-40-\* -40**



## ■ Power Amplifiers For 40Ω - 10Ω Series Control Valves

These power amplifiers are specially designed to combine and incorporate the functions of pressure control (10Ω solenoid) and flow control (40Ω solenoid) into one and can be used for the proportional electro-hydraulic flow control and relief valves of which model numbers are as shown below.



### ■ Model Number Designation

AME	-D2	-H1	-100	-12
Series Number	Type of Function	Type of Mounting	Power Supply	Design Number
AME	D2: DC Input Type	H1: Wall Tapestry Type	100: 100 V AC 200: 200/220 V AC	12

### ■ Applicable to Valve

Name of Valve	Model Numbers
40Ω - 10Ω Series Flow Control and Relief Valve	EFBG-03-125-C/H-17* EFBG-06-250-C/H-17* EFBG-10-500-C/H-17*

### ■ Specifications

Description	Model No. AME-D2-H1-*-12	
	Flow Controls (40Ω Solenoid)	Pressure Controls (10Ω Solenoid)
Type of Function	DC Input Type	DC Input Type
Max. Output Current	0.8 A (40Ω Solenoid)	1 A (10Ω Solenoid)
Max. Input Voltage	+10 V DC	+10 V DC
Input Impedance	10 kΩ	10 kΩ
Max. Gain	0.8 A / 5 V	1 A / 5 V
Dither	Fix	Fix
Temperature Drift (Max.)	0.2 mA /°C	0.2 mA /°C
Power Supply	100 V AC, 200/220 V AC ± 10% (50/60 Hz)	
Power Input (Max.)	130 VA	
Ambient Temperature	0-50°C (32-122°F)	
External Setting Resistance	1 kΩ	1 kΩ
Approx. Mass	5.6 kg (12.3 lbs.)	

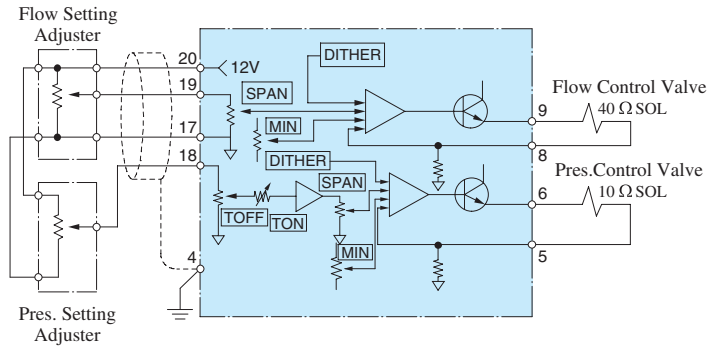
### ■ Instructions

Power supply for the setting adjuster up to two set can be provided from this power amplifier. However, please use the variable resistor or potentiometre of which impedance is 1 kΩ for the setting adjuster.



AME-D2-H1-\*-12

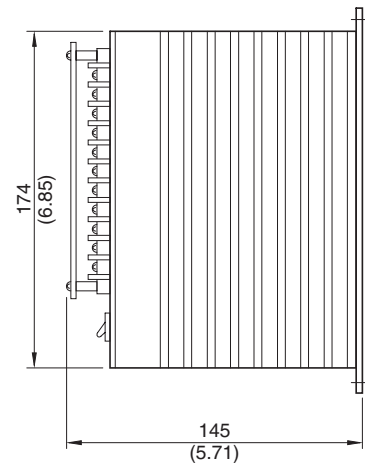
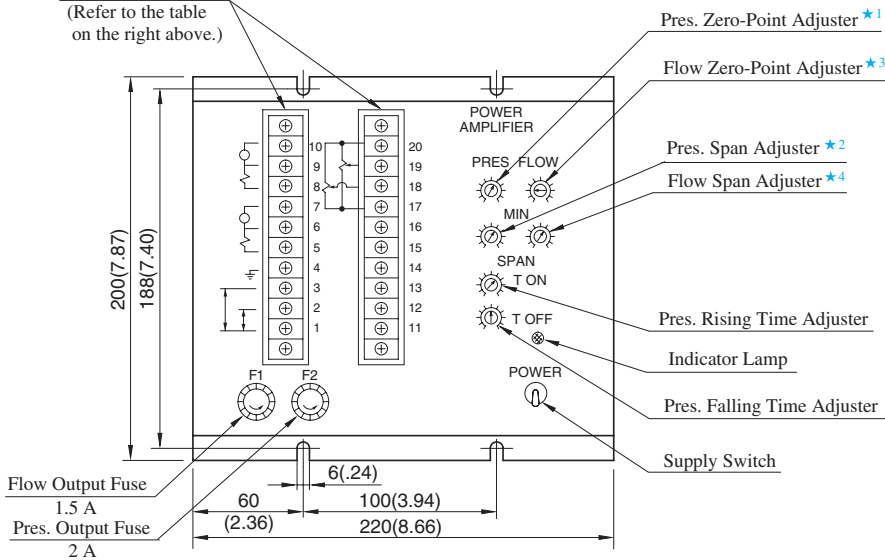
[Example Diagram]



● Detail of Terminal Board

Terminal Number	Name
1	Power Supply 100 V AC, 200 V AC: 1, 2 220 V AC: 1, 3
2	
3	
4	Ground G
5	Output to Pressure Control
6	Valve (10Ω) Solenoid PR. SOL
7	Ammeter
8	Output to Flow Control
9	Valve (40Ω) Solenoid FL. SOL
10	Ammeter
11	Common COM
12	—
13	—
14	-12 V OUT -12 V
15	Common COM
16	+12 V OUT +12 V
17	Common COM
18	Input Signal for PRES. PR.IN
19	Input Signal for FLOW FL.IN
20	+12 V OUT +12 V

Terminal Board  
(Refer to the table on the right above.)



- ★ 1. Minimum Pressure Setting
- ★ 2. Variable Pressure Range Setting
- ★ 3. Minimum Flow Setting
- ★ 4. Variable Flow Range Setting

DIMENSIONS IN MILLIMETRES (INCHES)

## Power Amplifiers For 10Ω - 10Ω Series Control Valves

These power amplifiers can drive two solenoid of 10Ω load simultaneously or separately, and the control can be done in the same way even though the object is separated by pressure system and flow rate system. Although the display of control unit on the front panel is **PRESS** and **FLOW**, they are exactly the same circuit, so there is no distinction between the two system when used.



### Model Number Designation

AME	-D2	-1010	-11
Series Number	Type of Function	Coil Resistance of Valve	Design Number
AME	D2: DC Input Type	1010: 10 Ω × 2	11

### Specifications

Description	Model No.	AME-D2-1010-11
Type of Function		DC Input Type
Max. Output Current		1 A (10Ω Solenoid)
Max. Input Voltage		+ 10 V DC
Input Impedance		10 kΩ
Max. Gain		1 A / 5 V
Dither		Variable 100-300 mA
Temperature Drift (Max.)		0.2 mA / °C
Power Supply		85 - 264 VAC
Power Input (Max.)		120 VA
Ambient Temperature		0-50°C (32-122°F)
External Setting Resistance		1 kΩ
Approx. Mass		4.3 kg (9.5 lbs.)

### Applicable to Valve

Name of Valve	Model Numbers
Pilot Relief Valves	EDG-01 *
Relief Valves	EBG-03 EBG-06 EBG-10
Relieving and Reducing Valves	ERBG-06 ERBG-10
10 Ω Series Flow Control Valves	EFG-03/06 EFCG-03/06
10 Ω-10 Ω Series High Flow Series Flow Control and Relief Valves	EFBG-03 EFBG-06 EFBG-10

### Applicable to Piston Pump

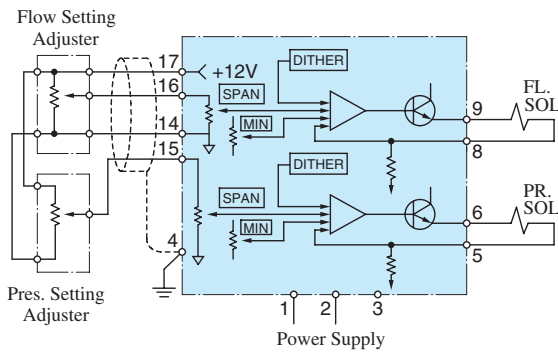
Name of Pump	Model Numbers
"A" Series Variable Displacement Piston Pump	A16- *-R-04 A22- *-R-04 A37- *-R-04 A56- *-R-04 A70- *R04 A90- *R04 A145- *R04
( Proportional Electro-Hydraulic Load Sensing Type )	Also, double pumps combined with the models listed above and fixed displacement vane pumps.

### Instructions

Power supply for the setting adjuster up to two set can be provided from this power amplifier. However, please use the variable resistor or potentiometre of which impedance is 1 kΩ for the setting adjuster.

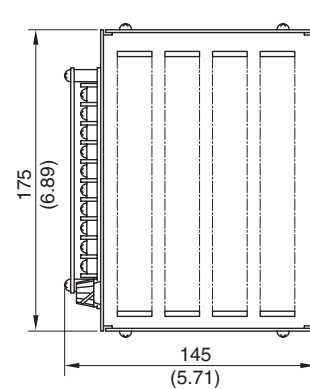
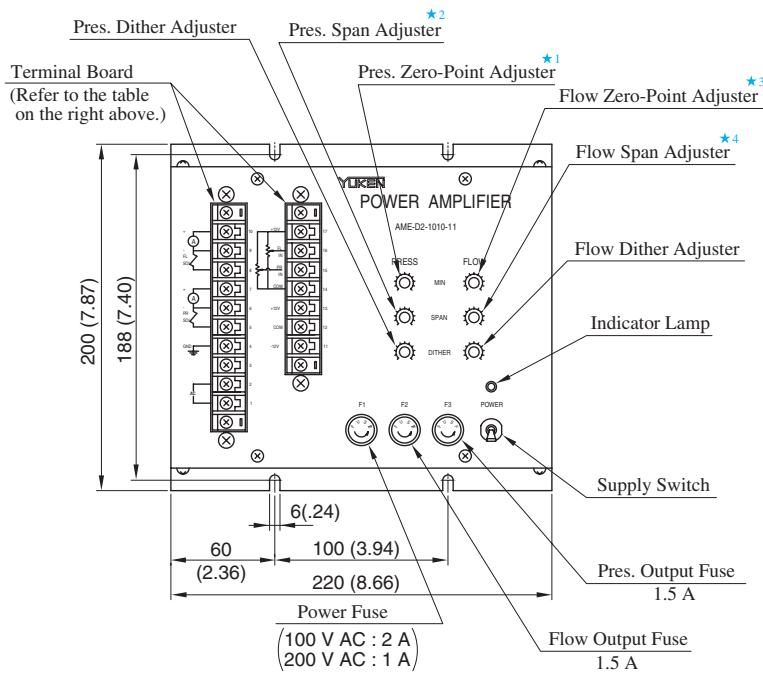
AME-D2-1010-11

[Example Diagram]



● Detail of Terminal Board

Terminal Number	Name
1	Power Supply 85 - 264 VAC
2	
3	
4	Ground G
5	Output to Pressure Control
6	Valve Solenoid PR. SOL
7	Ammeter
8	Output to Flow Control
9	Valve Solenoid FL. SOL
10	Ammeter
11	-12 V OUT -12 V
12	Common COM
13	+12 V OUT +12 V
14	Common COM
15	Input Signal for PRES. PR.IN
16	Input Signal for FLOW FL.IN
17	+12 V OUT +12 V



- ★ 1. Minimum Pressure Setting
- ★ 2. Variable Pressure Range Setting
- ★ 3. Minimum Flow Setting
- ★ 4. Variable Flow Range Setting

DIMENSIONS IN  
MILLIMETRES (INCHES)

## Power Amplifiers For Shockless Type Directional and Flow Control Valves

These power amplifiers are used to drive the shockless type proportional and flow control valves.

### Model Number Designation

AMN	-G	-10
Series Number	Type of Function	Design Number
AMN	G: Shockless Directional and Flow Control Type	10
	W: DC Input Type	10



### Applicable to Valve

Name of Valve	Model Numbers
Shockless Type Proportional Directional and flow Control Valves	EDFG-01

### Specifications

Model Numbers		AMN-G-10	AMN-W-10
Description			
Max. Output Current		1.3 A (10 Ω Solenoid)	
Setting Resolution		0 – 99 % (1 % Units)	—
Number of Preselection Pattern		SOLa : 3 Patterns SOLb : 3 Patterns	—
Sequence Input	Input Current	10 mA/24 V	—
	Voltage Range	10 – 28 V	—
Maximum Input Voltage		—	-10 V DC : SOLa +10 V DC : SOLb
Input Impedance		—	10 kΩ
Maximum Gain		—	1.3 A/-5 V : SOLa 1.3 A/+5 V : SOLb
Dither		Variable (Internal)	
Slope Adjustment Range		0 – 99 %/Max. slope time	—
Maximum Slope Time		1 – 99 s	—
Delay Time Adjustment Range		—	0.1 – 3 s
Temperature Drift		0.2 mA /°C	
Power Supply		24 V DC (Power Supply Range : 20 – 30 V)	
Power Input		25 W	
Ambient Temperature		0 – 50°C (32 – 122°F)	
Ambient Humidity		90 % RH or less	
Approx. Mass		0.2 kg (.4 lbs.)	

### Instructions

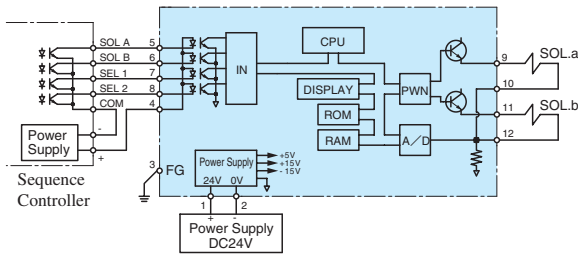
#### Power supply of the outside setting adjuster

When DC input type (AMN-W) power amplifier is used, power supply for the setting adjuster can be provided from this power amplifier, but for only one. However, please use the variable resistor or potentiometre of which impedance is 1 kΩ for the setting adjuster.

#### Supply Switch

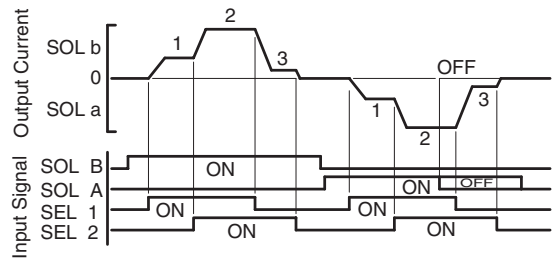
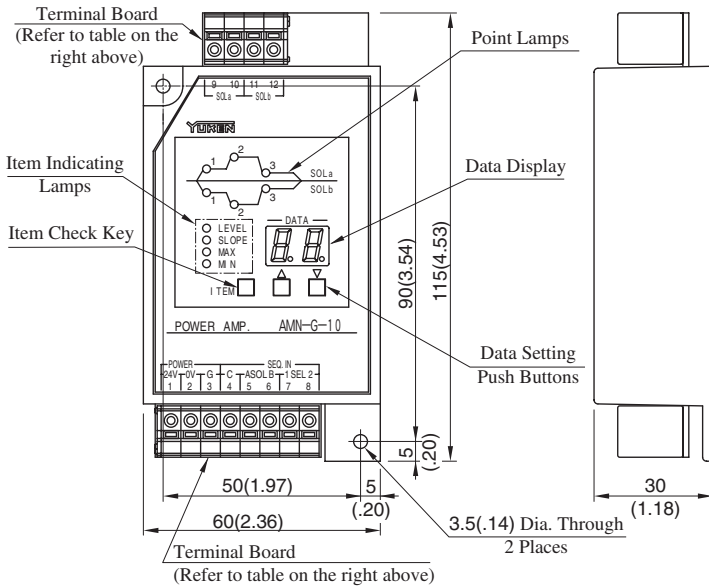
The power amplifier has no power supply switch. As soon as it is connected to a power supply, it comes to be alive. Provide a power switch externally.

AMN-G-10 [Example Diagram]



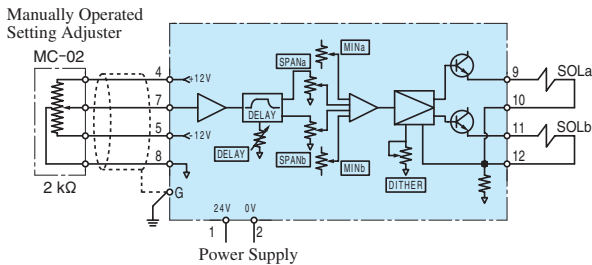
● Detail of Terminal Board

Terminal Number	Name	Terminal Number	Name
1	Power Supply +24V	7	Sequence Input SEL 1
2	Power Supply 0V	8	Sequence Input SEL 2
3	Ground G	9	Output to Valve Solenoid SOL a
4	Sequence Input IN COM	10	Output to Valve Solenoid SOL b
5	Sequence Input SOL A	11	
6	Sequence Input SOL B	12	



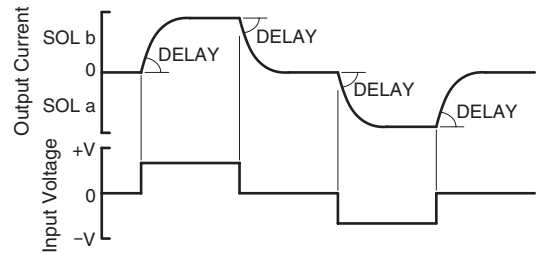
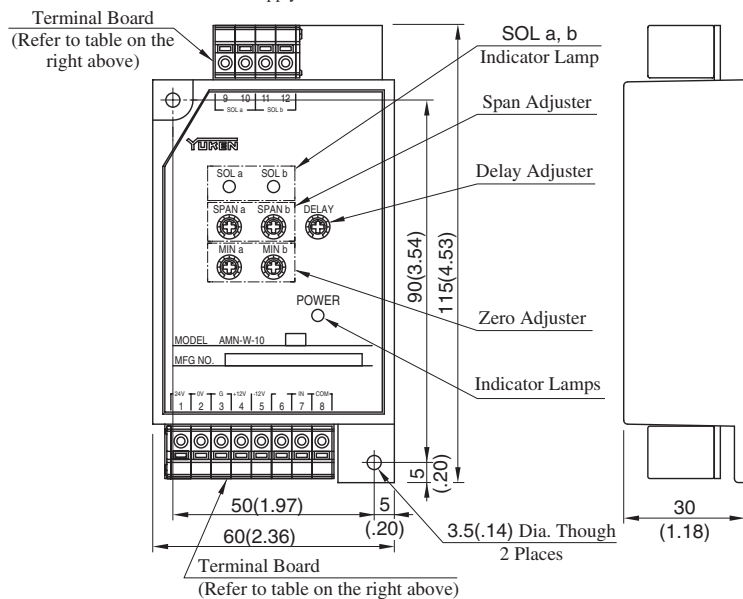
DIMENSIONS IN MILLIMETRES (INCHES)

AMN-W-10 [Example Diagram]



● Detail of Terminal Board

Terminal Number	Name	Terminal Number	Name
1	Power Supply +24V	7	Input Signal IN
2	Power Supply 0V	8	Input Signal COM
3	Ground G	9	Output to Valve Solenoid SOL a
4	Internal Power Supply +12V	10	Output to Valve Solenoid SOL b
5	Internal Power Supply -12V	11	
6		12	



DIMENSIONS IN MILLIMETRES (INCHES)

## ■ Power Amplifiers For Directional and Flow Control Valves

These power amplifiers are used to drive the proportional electro-hydraulic directional and flow control valves.

### ■ Model Number Designation

<b>SK1091</b>	<b>-D24</b>	<b>-10</b>
Series Number	Power Supply	Design Number
<b>SK1091</b>	<b>D24: 24 V DC</b>	<b>10</b>

### ■ Applicable to Valve

Name of Valve	Model Numbers
Directional and Flow Control Valve	03 EDFHG-04 06



### ■ Specifications

Model No.	SK1091-D24-10
Description	
Max. Output Current	1 A (10Ω Solenoid)
Max. Input Voltage	-10 V DC for SOL a +10 V DC for SOL b
Input Impedance	10 kΩ
Max. Gain	1 A / ±5 V
Dither	Variable
Delay Time Adjustment Range	0.15-3 s
Temperature Drift (Max.)	0.2 mA / °C
Power Supply	24 V DC (21-28 V Included Ripple)
Required Current	1.5 A or more
Power Input (Max.)	25 W
Ambient Temperature	0-50°C (32-122°F)
Ambient Humidity	90%RH or less
External Setting Resistance	2 kΩ
Approx. Mass	1.0 kg (2.2 lbs.)

### ■ Instructions

#### ● Power Supply for the Setting Adjuster

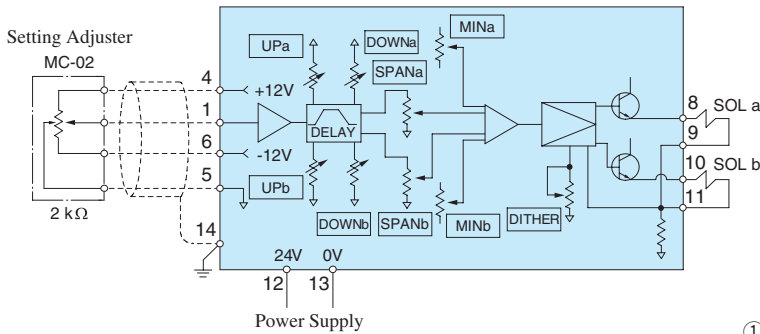
Power supply for the setting adjuster can be provided from this power amplifier, but for only one. However, please use the variable resistor or potentiometre of which impedance is 2 kΩ for the setting adjuster.

#### ● Power Switch

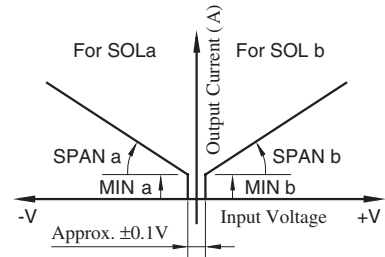
The power amplifier has no power supply switch. As soon as it is connected to a power supply, it comes to be alive. Provide a power switch externally.

SK1091-D24-10

[Example Diagram]



[Input-Output Characteristics]



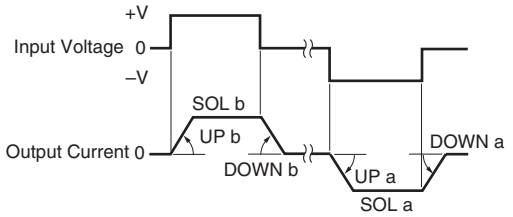
[Delay Function]

● Detail of Terminal Board

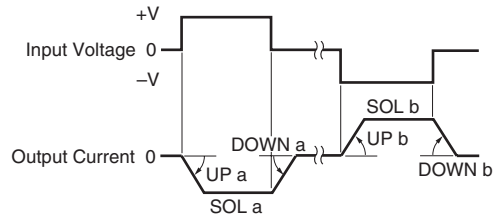
Terminal Number	Name
1	Input Signal IN *
2	Input Signal COM
3	Input Signal IN *
4	Power Supply for Setting Adjuster +12V
5	Power Supply for Setting Adjuster COM
6	Power Supply for Setting Adjuster -12V
7	—
8	Output to Valve Solenoid SOL a
9	Output to Valve Solenoid SOL a
10	Output to Valve Solenoid SOL b
11	Output to Valve Solenoid SOL b
12	Power Supply 24 V
13	Power Supply 0 V
14	Frame Ground FG

★ Three (3) usages are available as shown ① to ③ of “Delay Function” at right hand side for Input signal terminal (IN).

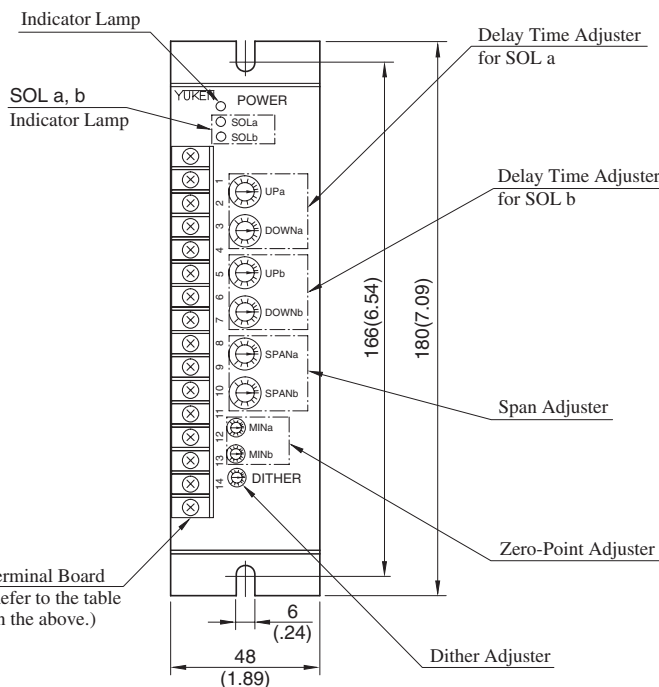
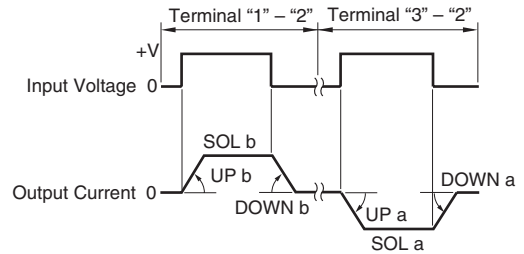
① In case “1” and “2” Input signal terminals are used.



② In case “3” and “2” Input signal terminals are used.



③ In case “1”, “2” and “3” Input signal terminals are used.

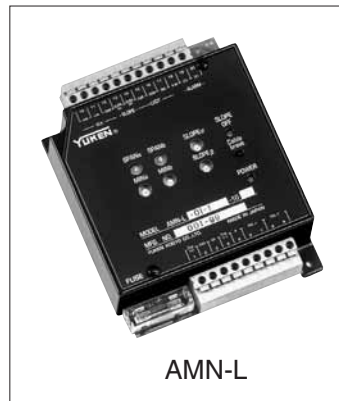


## Power Amplifiers For High Response Type Directional and Flow Control Valves

These power amplifiers are used to drive the high response type proportional electro-hydraulic directional and flow control valves.

A compact AMN-L model and a euro card type AMB-EL model are available.

The single height [3U: 100 × 160 mm (3.94 × 6.30 in.)] is employed for the euro card size of the AMB-EL model.



AMN-L



AMB-EL

### Model Number Designation

#### ● AMN-L

AMN	-L	-01	-3	-2P	-10
Series Number	Type of Function	Size of Applicable Valve	Compensation	Applicable Spool Type	Design Number
AMN	L: DC Input Type Directional and Flow Control with Miner feedback	01: 01 Size	1: Type 1 3: Type 3	None: 3C2, 3C40 2P: 3C2P	10

#### ● AMB-EL

AMB	-EL	-03	-2P	-1	-10
Series Number	Type of Function	Size of Applicable Valve	Applicable Spool Type	Compensation	Design Number
AMB	EL: DC Input Type Directional and Flow Control with Miner feedback	01: 01 Size 03: 03 Size 04: 04 Size 06: 06 Size	None: 3C2, 3C40 2P: 3C2P	★1 1: For flow rate 40/80 L/min (10.6/21.1 U.S.GPM) 2: For flow rate 280 L/min (74.0 U.S.GPM) 3: For flow rate 350 L/min(92.5 U.S.GPM) 4: For flow rate 500 L/min(132 U.S.GPM)	10

Please refer to us for ★1.

### Specifications

Description	Model Numbers					
	AMN-L-01-1	AMN-L-01-3-2P	AMB-EL-01	AMB-EL-03	AMB-EL-04	AMB-EL-06
Max. Output Current	2.5 A (3.9 Ω Solenoid)		2.5 A (3.9 Ω Solenoid)	3.0 A (3 Ω Solenoid)	2.5 A (3.9 Ω Solenoid)	
Max. Input Voltage	+10 V DC: P→B→A→T -10 V DC: P→A→B→T		±10 V / ±5 V			
Input Impedance	10 kΩ or more		100 kΩ (50 kΩ in single-end mode)			
Slope-off input	Terminal Number 13-14 Short	—	4 – 28 V			
Slope Adjust Time	0.03 – 5 s	—	0.05 – 5 s (Slope Adjustment function is not available with “AMB-EL-*2P”)			
Monitor Voltage	±1.5 V / ±3 mm st.		±10 V / rated st.			
Alarm	Open Collector (30 V DC, 10 mA Max.)		Open Collector (30 V DC, 10 mA Max.)			
Supply Voltage Range	24 V DC (20 – 30 V DC)		24 V DC (21 – 28 V DC)			
Power Input	75 W		30 W	40 W	30 W	
Ambient Temperature	0 – 50 °C (32 – 122 °F)		0 – 50 °C (32 – 122 °F)			
Ambient Humidity	90 % RH or less		85 % RH or less			
Connector	—		DIN 41612 – F32			
Approx. Mass	0.3 kg (.66 lbs.)		0.28 kg (.62 lbs.)		0.34 kg (.75 lbs.)	

### Applicable to Valve

Power Amplifiers Model Numbers	Valve Model Numbers
AMN-L	ELDFG-01
AMB-EL	ELDFG-01/03 ELDFHG-04/06

### Instructions

#### ● Power Switch

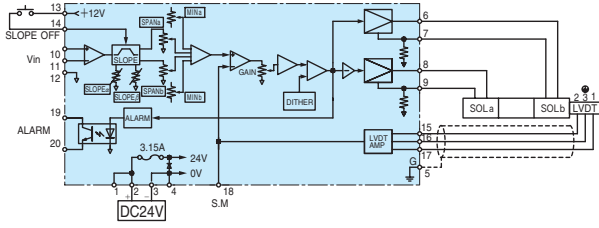
The power amplifier has no power supply switch. As soon as it is connected to a power supply, it comes to be alive.

Provide a power switch externally.



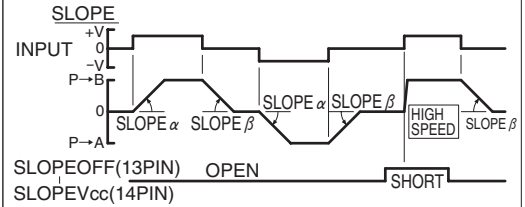
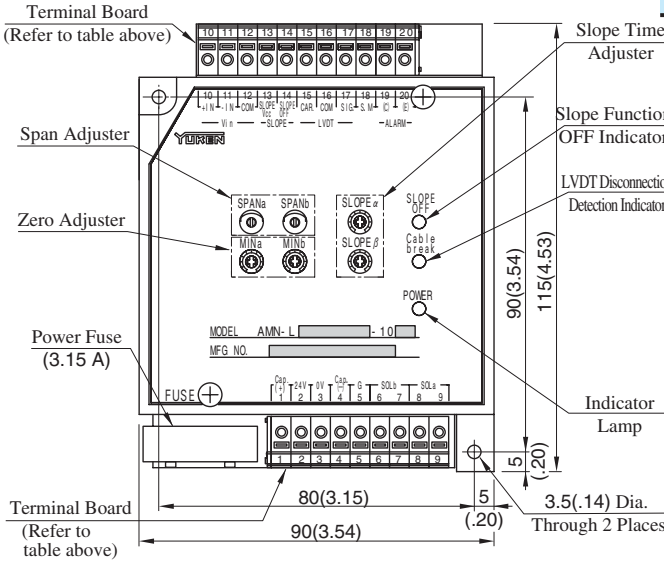
AMN-L-01-1-10

[Example Diagram]



● Detail of Terminal Board

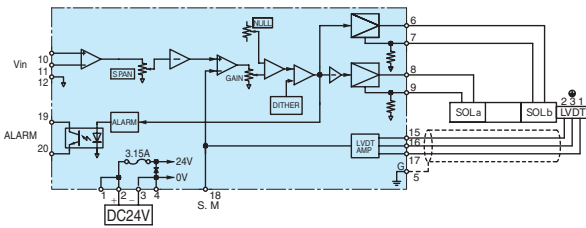
Terminal Number	Name	Terminal Number	Name
1	Power Supply CAPACITOR(+)	11	Input Signal -IN
2	Power Supply +24V	12	Input Signal COM
3	Power Supply 0V	13	Slope Control ON/OFF Terminal SLOPE Vcc
4	Power Supply CAPACITOR(-)	14	Slope Control ON/OFF Terminal SLOPE OFF
5	Frame Ground G	15	LVDT Terminal CAR.
6	Output to Valve Solenoid SOL b	16	LVDT Terminal COM
7	Output to Valve Solenoid SOL a	17	LVDT Terminal SIG.
8	Output to Valve Solenoid SOL a	18	Sensor Monitor Output S.M
9	Output to Valve Solenoid SOL a	19	Alarm Output ALM(C)
10	Input Signal +IN	20	Alarm Output ALM(E)



DIMENSIONS IN MILLIMETRES (INCHES)

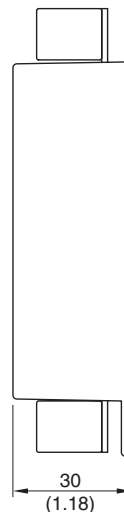
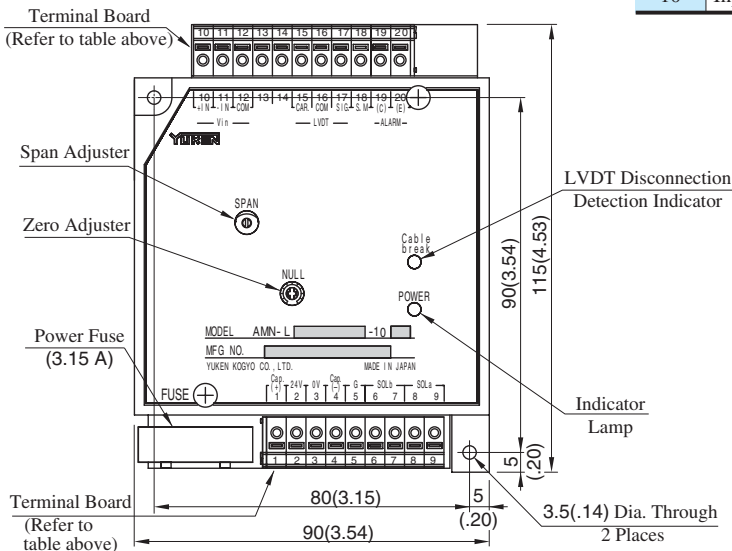
AMN-L-01-3-2P-10

[Example Diagram]



● Detail of Terminal Board

Terminal Number	Name	Terminal Number	Name
1	Power Supply CAPACITOR(+)	11	Input Signal -IN
2	Power Supply +24V	12	Input Signal COM
3	Power Supply 0V	13	
4	Power Supply CAPACITOR(-)	14	
5	Frame Ground G	15	LVDT Terminal CAR.
6	Output to Valve Solenoid SOL b	16	LVDT Terminal COM
7	Output to Valve Solenoid SOL b	17	LVDT Terminal SIG.
8	Output to Valve Solenoid SOL a	18	Sensor Monitor Output S.M
9	Output to Valve Solenoid SOL a	19	Alarm Output ALM(C)
10	Input Signal +IN	20	Alarm Output ALM(E)



DIMENSIONS IN MILLIMETRES (INCHES)

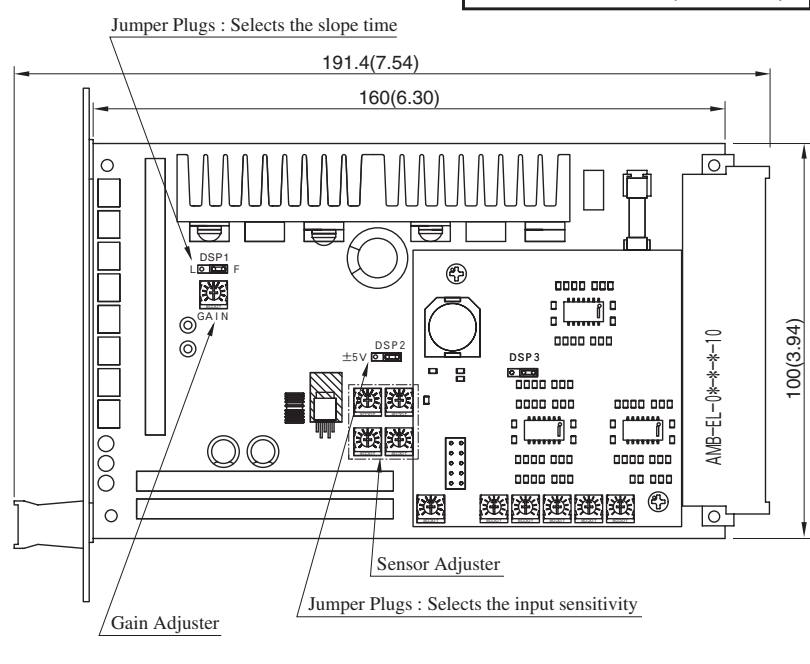
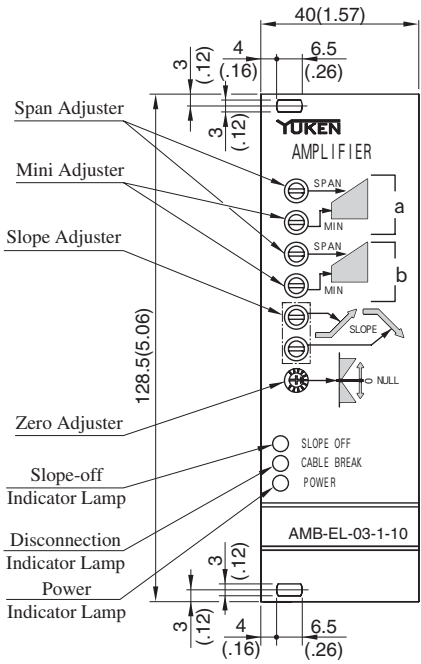
**AMB-EL-\*\*\*-10**

**● Pin Connections and Functions**

Pin Number	Name	Pin Number	Name	
b02	Power Supply	0V	z02	sol a(+)
b04	Power Supply	0V	z04	sol a(-)
b06			z06	
b08			z08	
b10			z10	Command Input (+)
b12			z12	Command Input (-)
b14			z14	
b16	Power Supply	+24V	z16	COM (No.2)
b18	Power Supply	+24V	z18	Carrier (No.3)
b20	Slope Off		z20	Signal (No.1)
b22	COM (No.3)	Connected to pilot valve sensor.	z22	
b24	Signal (No.1)	See "Snsor Connecton"	z24	Alarm Output (-)
b26	Carrier (No.2)		z26	Alarm Output (+)
b28	Output	24V	z28	Stroke Monitor Signal (P)
b30	Output	24V	z30	Stroke Monitor Signal (S)
b32		FG	z32	

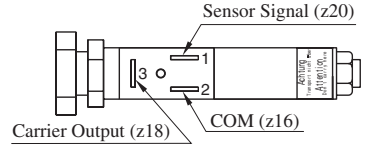
This power amplifier requires connector cards for connection. A connector card attached model is also available. Please ask for details if interested.

**DIMENSIONS IN MILLIMETRES (INCHES)**

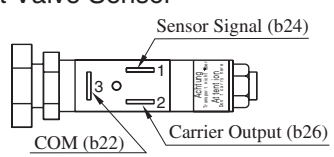


**■ Sensor Connection**

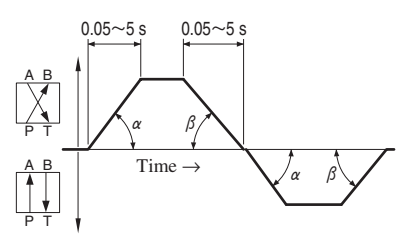
**● Main Valve Sensor**



**● Pilot Valve Sensor**

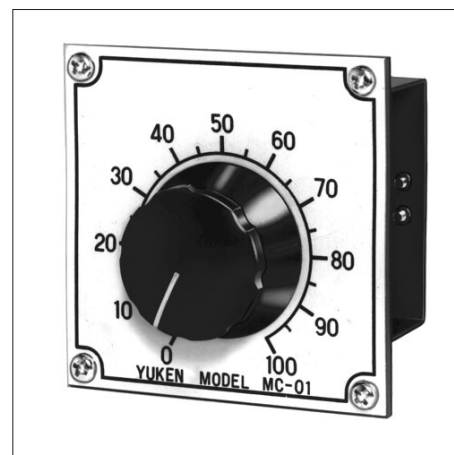


**■ Lamp Pattern**



## Setting Adjusters

The setting adjuster supplies the command signal voltage to the power amplifier. Since the setting adjuster is closely related to actual machine operating procedure, the user generally provides this device. Yuken makes the following standard setting adjusters for general use and designs and manufactures special setting adjusters to order.



Type	Model Number	Function
Manually Operated Setting Adjuster	MC-01	This is the simplest setting adjuster, consisting of a trimmer (1 k $\Omega$ ) and a dial.
	MC-02	Consisting of a centre-tapped trimmer (1 k $\Omega$ - 1 k $\Omega$ ) and a dial, this setting adjuster is ideal for a servo system.
6-point Setting Adjuster	AMC-V6-S-* -10	Six trimmers are incorporated, so it is possible to set six points.
Multifunction Slope Controller	AMC-T-20	This multifunction slope controller generates any desired two-channel analog voltage pattern outputs. It can also be used with slope-proportional and time-proportional systems.
Slope Controller	AMN-T-10	Slope and output can be set optionally 4-bit signal.

**Manually Operated Setting Adjuster**

**MC-01**  
[Electric Circuit]

[Example Diagram]

[Mounting Panel]

**DIMENSIONS IN MILLIMETRES (INCHES)**

**MC-02**  
[How to Use]

This setting adjuster is for using positive and negative voltages to the right and left of the zero point. Most suitable for servo systems. Please contact us for usage details.

[Electric Circuit]

[Example Diagram]

[Mounting Panel]

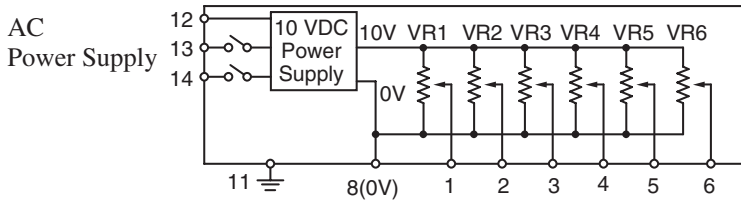
**DIMENSIONS IN MILLIMETRES (INCHES)**

6-Point Setting Adjuster

AMC-V6-S-\*-10

Power Supply  
 100 ..... 100 VAC  
 200 ..... 200 VAC  
 220 ..... 220 VAC

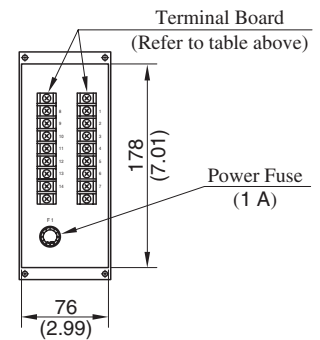
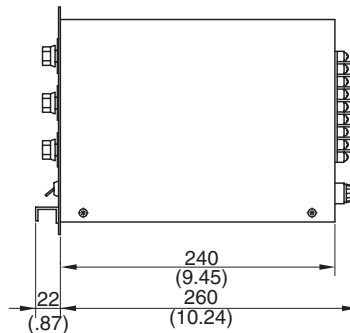
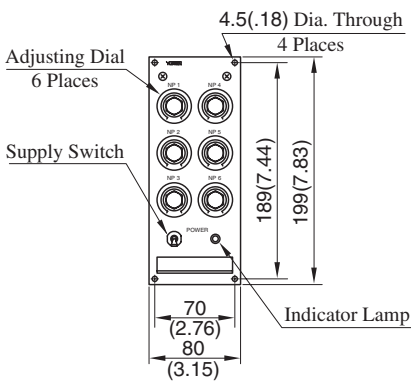
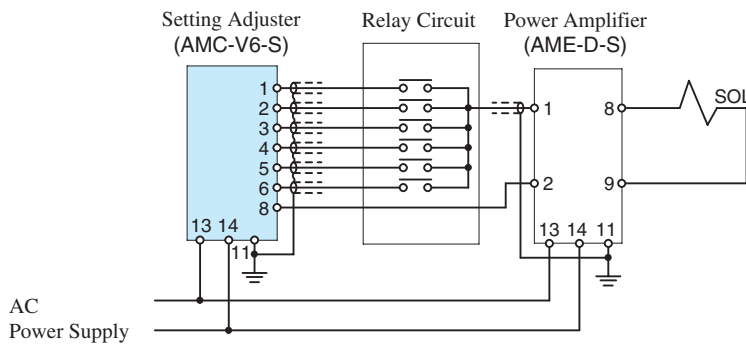
[Electric Circuit]



● Detail of Terminal Board

Terminal Number	Name
1	1 OUT (VR1)
2	2 OUT (VR2)
3	3 OUT (VR3)
4	4 OUT (VR4)
5	5 OUT (VR5)
6	6 OUT (VR6)
7	---
8	0V COM
9	---
10	---
11	Ground G
12	Power Supply 85 - 265 VAC
13	
14	

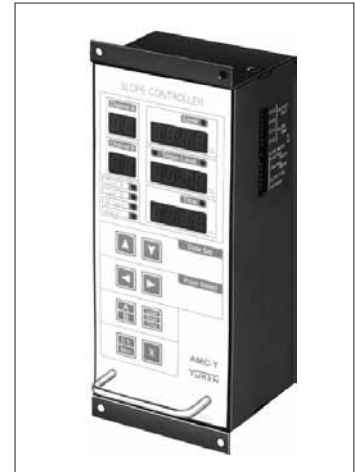
[Example Diagram]



DIMENSIONS IN MILLIMETRES (INCHES)

## Multifunction Slope Controllers

This controller can generate any desired two-channel analog voltage pattern outputs and can be used with slope-constant and time-constant systems. Although two-channel outputs can be used independently, this controller can also be used as a setting adjuster for the EH Series variable piston pumps.



### Model Number Designation

AMC	-T	-20
Series Number	Type of Function	Design Number
AMC: Setting Adjuster	T : Acceleration/deceleration signal type (Slope Controller)	20

### Specifications

Model No.	AMC-T-20						
Description							
Number of Output Channels	2 channels (A, B)						
Maximum Output Range	0 - +5 V *, 0 - ±5 V, 0 - +10 V, 0 - ±10 V (The settings are DIP switch selectable)						
Two Categories of Slopes	<table style="border: none;"> <tr> <td style="border: none;">Slope-constant *</td> <td rowspan="2" style="border: none;">} (to be selected by DIP switch)</td> </tr> <tr> <td style="border: none;">With a level change, the slope will not change (but arrival time changes.)</td> </tr> <tr> <td style="border: none;">Time-constant</td> <td rowspan="2" style="border: none;">}</td> </tr> <tr> <td style="border: none;">With a level change, the time will not change (but the slope changes.)</td> </tr> </table>	Slope-constant *	} (to be selected by DIP switch)	With a level change, the slope will not change (but arrival time changes.)	Time-constant	}	With a level change, the time will not change (but the slope changes.)
Slope-constant *	} (to be selected by DIP switch)						
With a level change, the slope will not change (but arrival time changes.)							
Time-constant	}						
With a level change, the time will not change (but the slope changes.)							
Acceleration/Deceleration Signal Type	4 Types Polygonal Line Signal* : 1 Type (to be selected by DIP switch) Curve Compensation Signal : 3 Types						
Max. Slope Time	5 s *, 20 s, 50 s, 100 s (The settings are DIP switch selectable)						
Setting Resolution	The level and slope settings are variable in 0.1% units from 0 to ±99.9%						
Control Mode Number of Preselected Patterns	Mode 1, 4-bit binary code input, 15 patterns Mode 2, 6-bit binary code input, 63 patterns Mode 3, Timer control, 9 patterns (4 variations)						
Stop Mode (Applicable Only for Control Mode 1)	ON : The stop mode is to retain the state of controller output at the instant an external input signal is interrupted. When the external signal is input again, the operation is resumed from the retained state. OFF * : When external input signal is interrupted, function goes back to the initial setting (Pattern No.0).						
Control Input Signal	Current input type, 10 mA /bit max. Usable as a voltage input type (voltage range: 8 to 48V DC) Photocoupler insulation input						
Control Output Signal	Output from transistor open collector Max. 30V, 50 mA						
Data Save	EEP-ROM (Battery not needed)						
Power Supply	100/200 V AC, 50/60 Hz (85-260 V AC)						
Power Input	10 VA or less						
Ambient Temperature	0-50°C (32-122°F)						
Ambient Humidity	85%RH or less (Bedewing must be avoided)						
Approx. Mass	1 kg (2.2 lbs.)						

Note: ★ Indicates preset conditions.

### Instructions

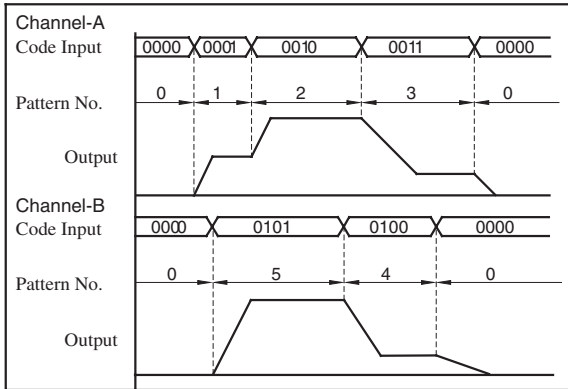
- Since this controller incorporates a micro computer, do subject it to undue electrical noise.

**Control Modes**

One among the following three types of control modes can be chosen by changing DIP switch.

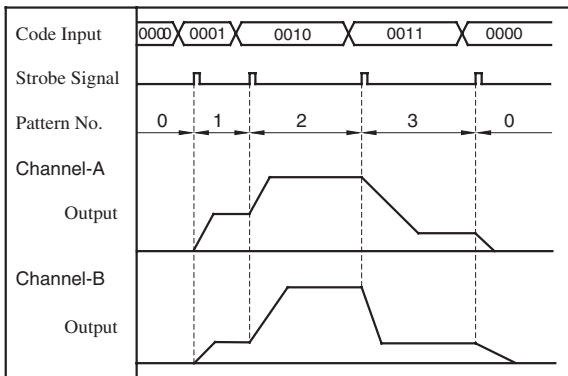
**Control Mode 1**

Channels A and B generate optional slopes independently each other.



**Control Mode 2**

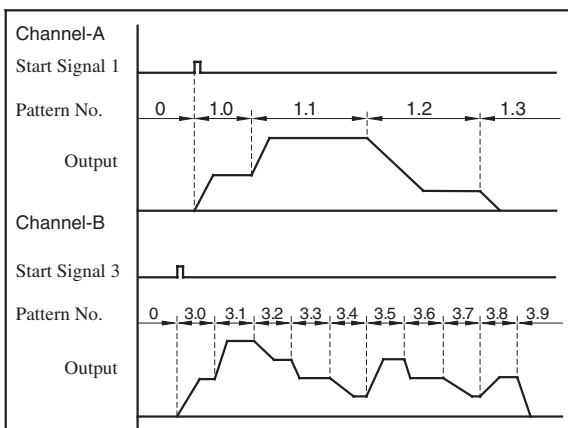
A slope is generated by a strobe signal (signal for change to next signal). Channels A and B operate synchronously.



**Control Mode 3**

The internal timer is activated by a start signal, causing the slopes to be generated successively in memory.

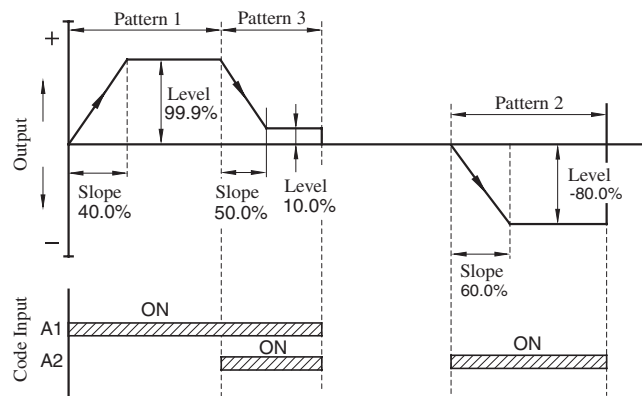
Channels A and B operate independently.



**Setting Example**

**Control Mode 1 Channel - A**

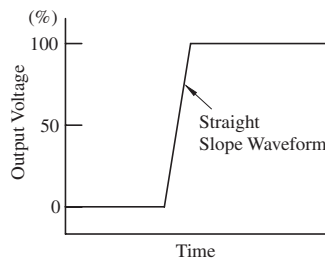
Code Input				Pattern No.	Setting %		Remarks
A8	A4	A2	A1		Level	Slope	
OFF	OFF	OFF	OFF	0	0	0	Stop
OFF	OFF	OFF	ON	1	99.9	40.0	Cylinder forward acceleration
OFF	OFF	ON	OFF	2	-80.0	60.0	Cylinder backward acceleration
OFF	OFF	ON	ON	3	10.0	50.0	Cylinder forward deceleration
~~~~~							
ON	ON	ON	ON	15	10.0	10.0	



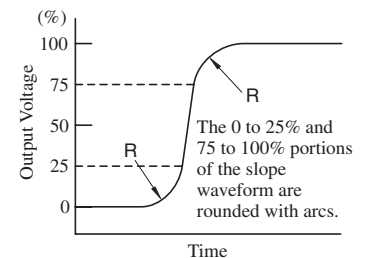
**Slope Type**

One among the following four types can be chosen by changing DIP switch.

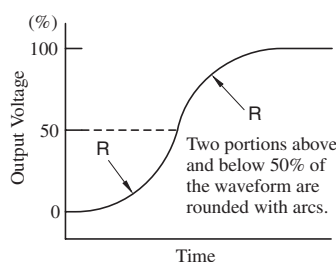
**Type 1**



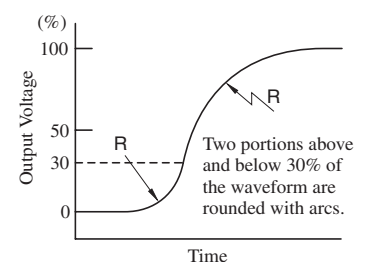
**Type 2**



**Type 3**

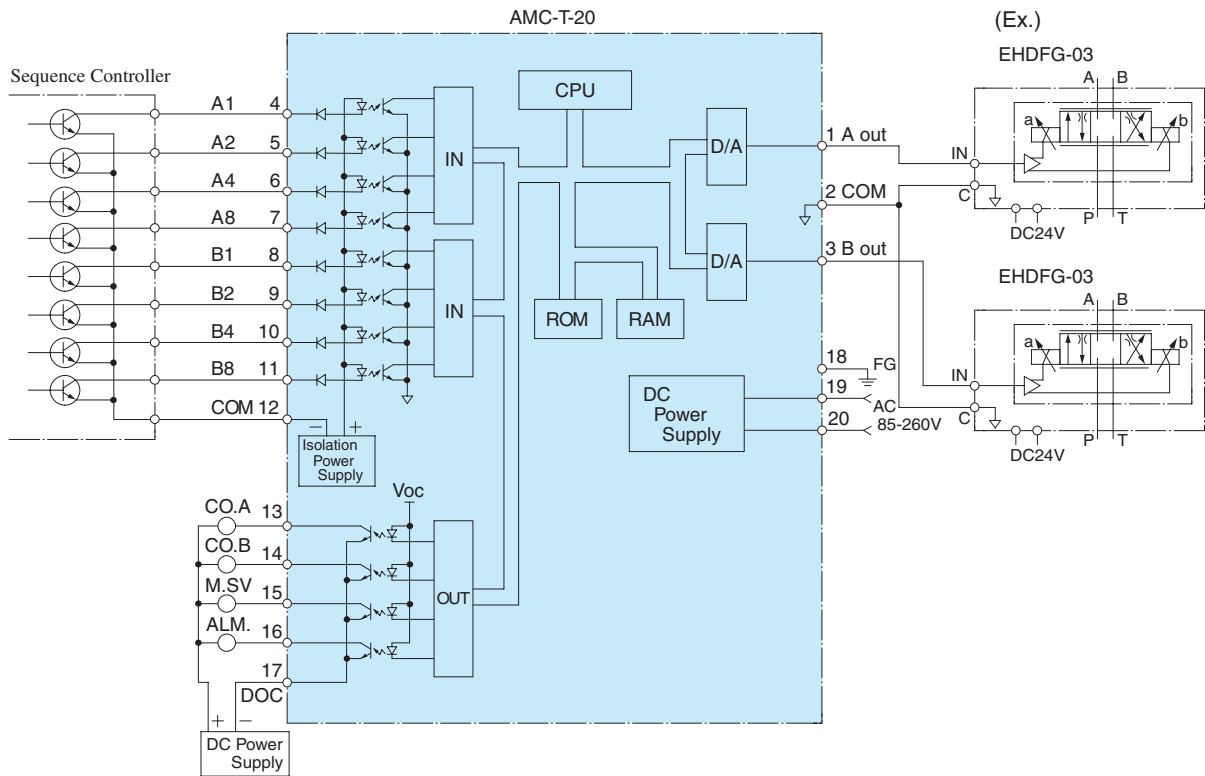


**Type 4**



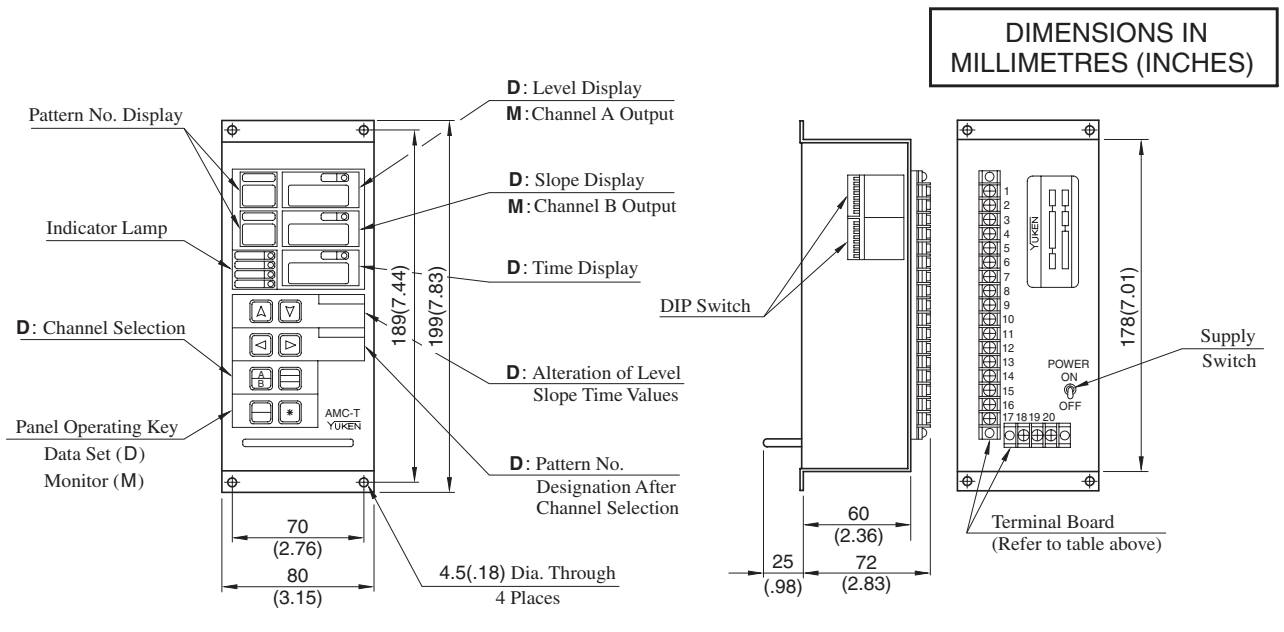
**AMC-T-20**

[Example Diagram]



● Detail of Terminal Board

Terminal Number	Name	Terminal Number	Name		
1	Channel A Output	A out	11	Code Input	B8
2	Common	COM	12	Code Input Common	DCOM
3	Channel B Output	B out	13	Coincidental Output Signal with "A"	CO.A
4	Code Input	A1	14	Coincidental Output Signal with "B"	CO.B
5	Code Input	A2	15	Data Save Signal	M.SV
6	Code Input	A4	16	Alarm Signal Output	ALM.
7	Code Input	A8	17	Output Common	DOC
8	Code Input	B1	18	Frame Ground	FG
9	Code Input	B2	19	Power Supply	AC
10	Code Input	B4	20		





## Interchangeability between Current and New Design

### Specifications

Specifications unchanged unless specified below.

Description	Model No.	New : AMC-T-20	Current : AMC-T-10
Control Output Signal		Output from transistor open collector Max. 30 V, 50 mA	Output from transistor open collector Max. 30 V, 10 mA
Slope Types	4 Types	Polygonal Line Signal : 1 Type Curve Compensation Signal : 3 Types (to be selected by DIP switch)	1 Type : Polygonal Line Signal
Stop Mode (Applicable only for Control Mode 1)		ON, OFF	—
Data Save		EEP-ROM Battery not needed	Battery Required
Approx. Mass		1 kg (2.2 lbs.)	1.8 kg (4.0 lbs.)

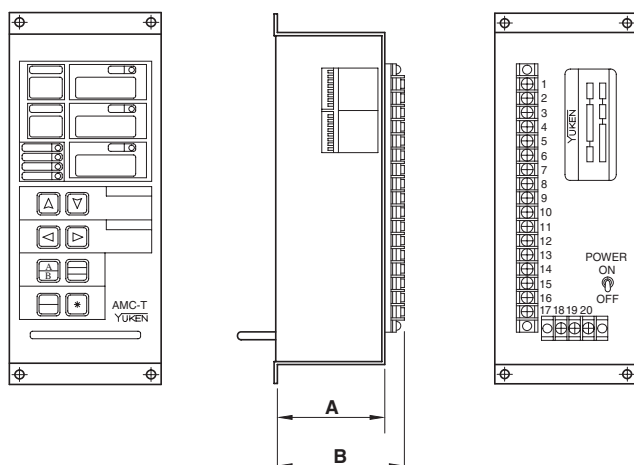
### Terminal

The following are differences between current and new.

Terminal Number	Name		Remarks
	New : Design 20	Current : Design 10	
13	Coincidental Output Signal with "A" "CO.A"	Coincidental Output Signal with "A" "DO1"	Abbreviation of the terminals are changed, though functionally the same.
14	Coincidental Output Signal with "B" "CO.B"	Coincidental Output Signal with "B" "DO2"	
15	Data Save Signal "M.SV"	—	Added new functions.
16	Alarm Signal Output "ALM."	—	

### Interchangeability in Installation

There is an interchangeability in installation, although depths (dimensions "A" and "B") are different.



Model Numbers		mm (Inches)	
		A	B
Current	AMC-T-10	185 (7.28)	200 (7.87)
New	AMC-T-20	60 (2.36)	72 (2.83)

## Slope Controllers

This slope controller is considerably smaller and lighter compared to conventional slope controllers.

4-bit switching signals allow the pattern output of given levels and acceleration/deceleration times. One-touch disconnection is supported. The mass and the volume have been reduced to one-fifth and one-fourth, respectively.



### Model Number Designation

AMN	-T	-10
Series Number	Type of Function	Design Number
AMN	T : Slope Controller	10

### Specifications

Model Numbers	AMN-T-10
Description	AMN-T-10
Number of Output Channels	1 channel
Maximum Output Range	0 – +5 V (Factory Preset) 0 – +10 V ±5 V ±10 V
Maximum Slope Time	<ul style="list-style-type: none"> <li>Slope-constant type: ★1 1-9999 s/Max. Output signal (Factory Setting, 5 s)</li> <li>Time-constant type: ★2 1-9999 s (Can be set in 1 second increments)</li> </ul>
Acceleration/Deceleration Signal Type	<ul style="list-style-type: none"> <li>Polygonal Line Signal: 1 Type (Factory Setting)</li> <li>Curve Compensation Signal: 3 Type</li> </ul>
Setting Resolution	The level and slope setting are variable in 0.1 % units from 0 to ±99.9%
Number of Preselected Patterns	4-bit binary code input 15 patterns
Sequence Input	Input Current: 10 mA/24 V Voltage Range: 10 – 28 V
Sequence Output	Load Current: Max. 50 mA Supply Voltage: Max. 32 V
Power Supply Voltage	24 VDC (20 – 30 VDC)
Power Input	3 W
Ambient Temperature	0 – 50 °C (32 – 122 °F)
Ambient Humidity	90 % RH or less
Approx. Mass	0.2 kg (.44 lbs)

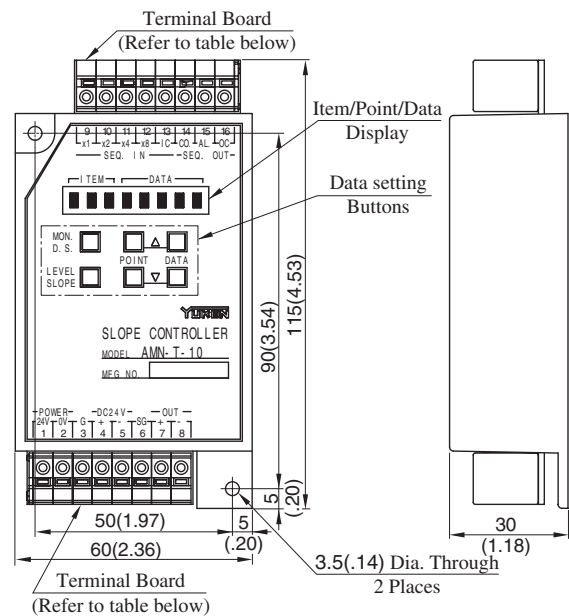
- ★1. A fixed slope means that the slope endpoint time changes while the slope gradient remains unchanged when the level is changed.
- ★2. A fixed time means that the slope endpoint time remains unchanged when the level is changed.
- ★3. The same slope types as those for the multifunction slope controller are supported. See page 789 for details.

### Instructions

- Since this controller incorporates a micro computer, do subject it to undue electrical noise.

### AMN-T-10

DIMENSIONS IN MILLIMETRES (INCHES)



### Detail of Terminal Board

Terminal Number	Name	Terminal Number	Name
1	Power Supply +24V	9	Sequence Input ×1
2	Power Supply 0V	10	Sequence Input ×2
3	Frame Ground G	11	Sequence Input ×4
4	Internal Power Supply +24V	12	Sequence Input ×8
5	Internal Power Supply 0V	13	Sequence Input IN COM
6	Signal Ground SG	14	Sequence Output COL N.
7	Output Signal +	15	Sequence Output ALARM
8	Output Signal -	16	Sequence Output OUT COM

### [Example Diagram]

