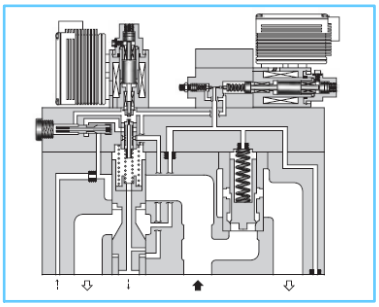
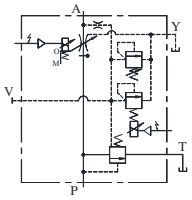
Proportional Electro-Hydraulic Flow Control and Relief Valves

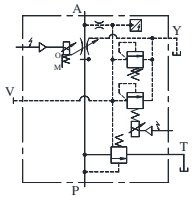
These are proportional electro-hydraulic flow control valves having functions for controlling the direct electric current of metre-in type and for pressure control.
They are energy-saving valves for supplying the minimum pressure and flow required to operate actuators.



Graphic Symbols

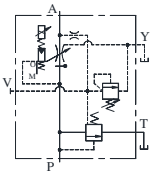


Models With Proportional Pilot Relief Valve



Models With Proportional Pilot Relief Valve and Sensor

External Pilot Pr. Connection



Models With Proportional Pilot Relief Valve

Specification

Description \ Model Number			EHFBG-03-※	EHFBG-06-250	EHFBG-10-500
Max. Operating Pres.			250 Kgf/cm²		
Max. Metred Flow			60 L/min. 125 L/min.	250 L/min.	500 L/min.
Metred Flow Capacity			60: 1~60 L/min. 125:1~125 L/min.	2.5~250 L/min.	5~500 L/min.
Min. Pilot Pressure			15 Kgf/cm²		
Pilot Flow	At Normal		1 L/min.		
	At Transition		3 L/min.	4 L/min.	6 L/min.
Differential Pressure			6 Kgf/cm²	7 Kgf/cm²	9 Kgf/cm²
Flow Controls	Hysteresis		Less than 3%		
	Repeatability		Less than 1%*1		
	Input Signal Voltage		Max. Flow / 5 V DC		
	Coil Resistance		10Ω		
	Supply Electric Power		24V DC (21 to 28V DC included Ripple)		
	Input Impedance		10 kΩ		
	Power Input (Max.)		28 W		
Pressure Controls*2	Pressure*3 Adj. Range	Adj. Range: C	12~160 Kgf/cm²	14~160 Kgf/cm²	15~160 Kgf/cm²
		Adj. Range: H	14~250 Kgf/cm²	14~250 Kgf/cm²	15~250 Kgf/cm²
	Hysteresis		Less than 2%		
	Repeatability		Less than 1%*1		
	Coil Resistance		10Ω		
	Input Signal Voltage		Max. Flow / 5 V DC		
	Supply Electric Power		24V DC (21 to 28V DC included Ripple)		
	Input Impedance		10 kΩ		
	Power Input (Max.)		28 W		
Output Signal (Sensor Monitor)			C: 5 V DC / 160 Kgf/cm² H: 5 V DC / 250 Kgf/cm²		
Ambient Temperature			0 – 50°C (With Circulated Air)		
Mass			Refer to page 669 ~ 671		

*1 The repeatability of the valve is obtained by having it tested independently on the conditions similar to its original testing.
*2 The specifications for pressure controls is applied to models with pilot relief valve.
*3 The pressure adjustment range of the valves without pilot relief valves (Ex. EHFBG-03-125-※-50) is from a minimum adjustable pressure to 250 Kgf/cm²

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.	Pilot Relief valve Pr. Adj. Range Kgf/cm²	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 **125:** 125	**None:** Without Proportional Pilot Relief Valve **C, H :** See Specifications	**None:** Internal Pilot **E :** External Pilot	**None:** Open-Loop **E :** Open-Loop with Sensor	**50**
			06	**250:** 250				
			10	**500:** 500				

Mounting Bolts

Model Number	Socket head cap Screw	Qty	Bolt Kit Model Number
EHFBG-03-60/125	M10 x 65 Lg.	4	BKEHFBG-03-50
EHFBG-06-250	M16 x 100 Lg.		BKEHFBG-06-50
EHFBG-10-500	M20 x 130 Lg.		BKEHFBG-10-50

Sub-Plate

Sl. No.	Model Number	Sub-Plate Model Numbers	Thread size	Mass Kg.
1	EHFBG-03	EFBGM-03Y-3080	3/4 BSP.F	6
		EFBGM-03Z-3080	1 BSP.F	
2	EHFBG-06	EFBGM-06X-3080	1 BSP.F	12.5
		EFBGM-06Y-3080	1 1/4 BSP.F	16
3	EHFBG-10	EFBGM-10Y-3080	1 1/2, 2 BSP.F (Pipe Flange Mtg.)	37

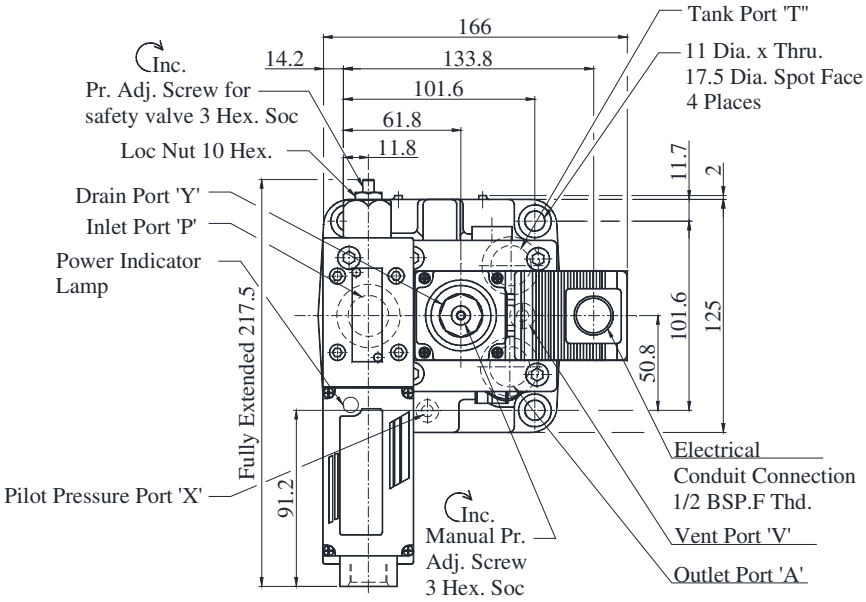
- Sub-plates are available. Specify sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- EFBGM-10Y is special type sub-plate to be used with flange. When ordering Efbgm-10y specify pipe flange in addition to EFBGM-10y. Refer engineering catalogue.
- For Sub-plates details please refer page no. 599.

Instructions

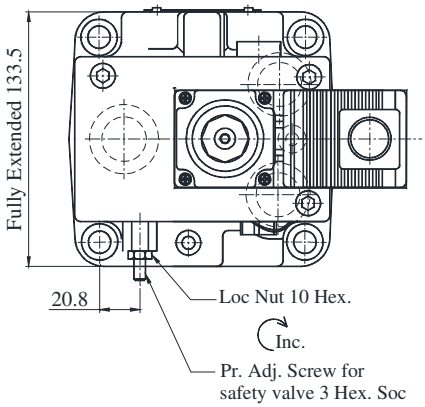
- **Drain Back Pressure**
  Check that the drain back pressure does not exceed 2 Kgf/cm².
- **When Relief valve passing flow rate is low in pressure control state.**
  To avoid preselected pressure instability, use a passing flow of 15 L/min. or higher.
  Further, check that the tank-side back pressure does not exceed 5 Kgf/cm²
- **Safety Valve Pressure Setting.**
  The safety valve is preset to a pressure that is 20 Kgf/cm² higher than the maximum adjustment pressure.
  Therefore, adjust this pressure setting as needed to suit the pressure used.
  To lower the pressure setting, turn the safety valve pressure adjustment screw anti-clock wise.
  After adjustment, be sure to tighten the lock nut.

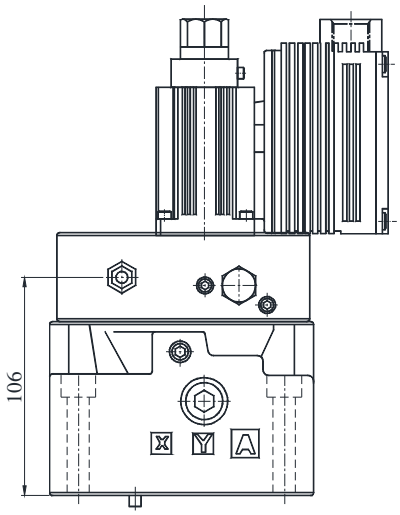
● EHFBG-03 $\frac{60}{125}$ -$\frac{C}{H}$(-E)-※-50

DIMENSIONS IN MILLIMETRES



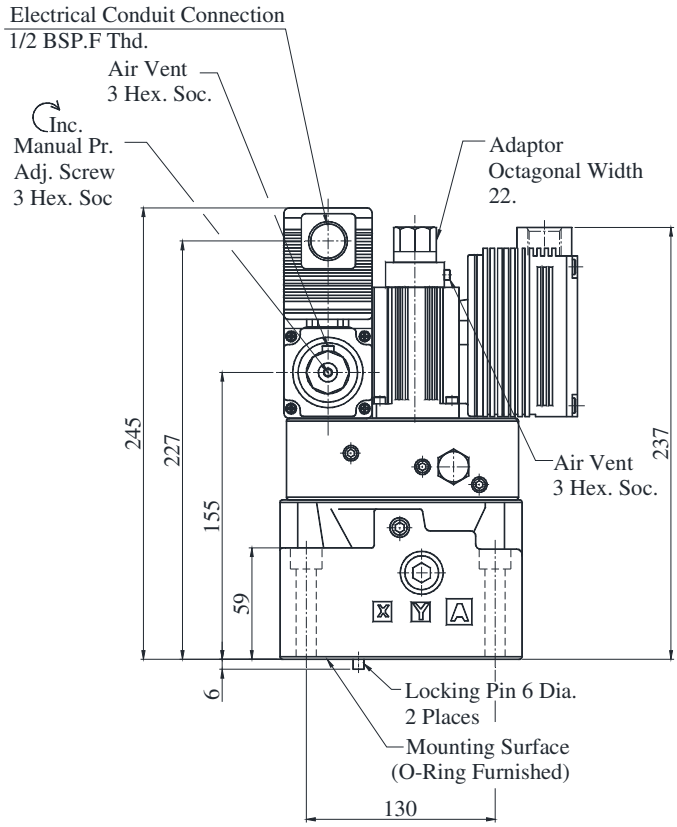
● EHFBG-03 $\frac{60}{125}$ -(-E)-50





For other dimensions, refer right sight drawing

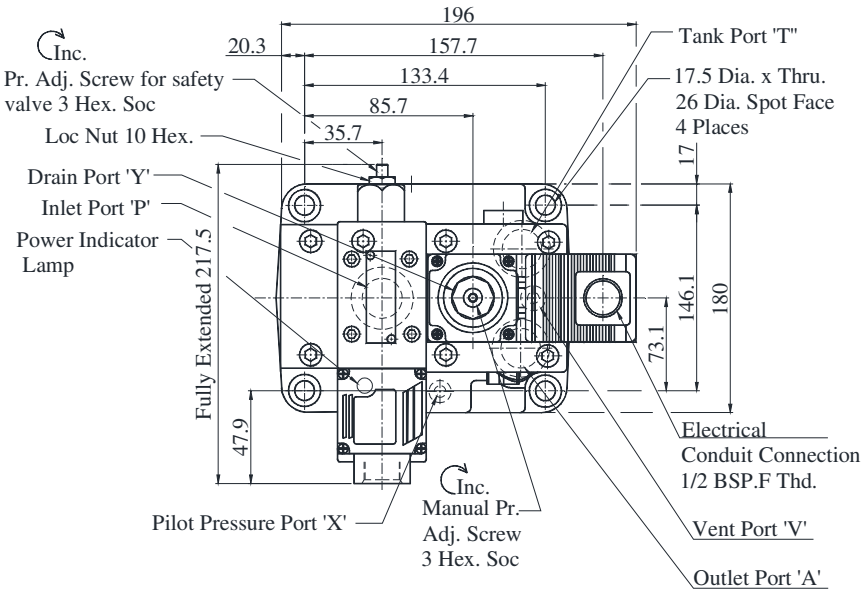
Mass ….14.8 Kg.



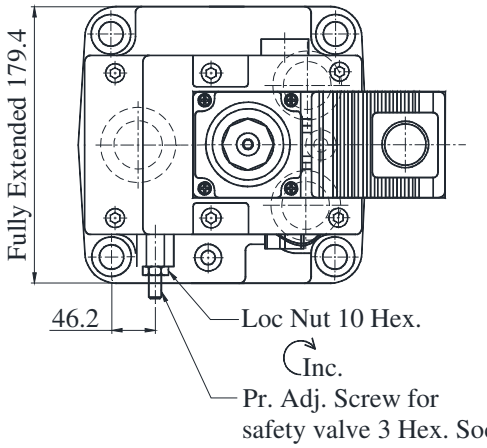
Mass ….17 Kg.
(Models with Sensor ….17.7 Kg.)

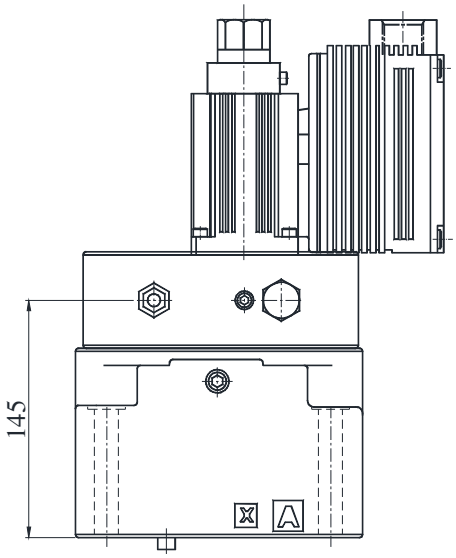
● EHFBG-06-250-$\frac{C}{H}$(-E)-※-50

DIMENSIONS IN MILLIMETRES



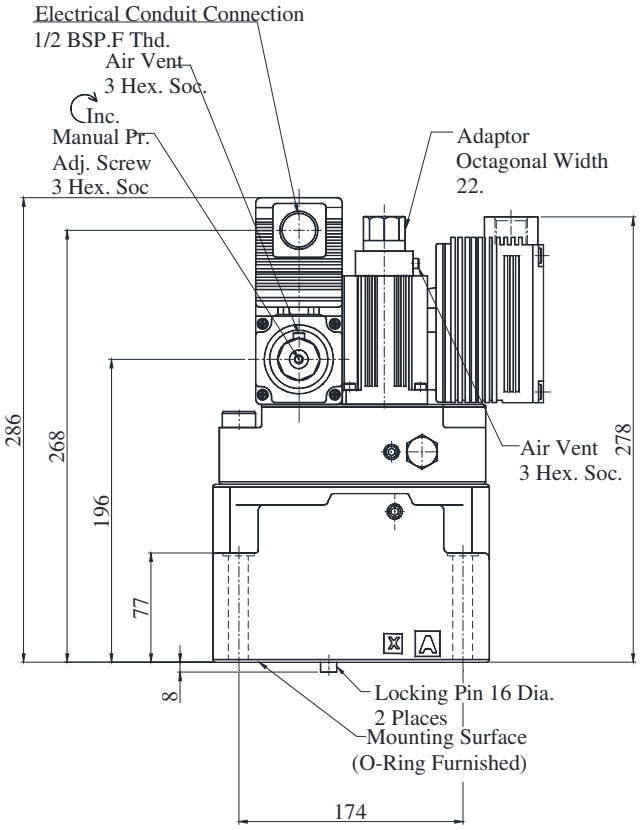
● EHFBG-06-250(-E)-50





For other dimensions, refer right sight drawing

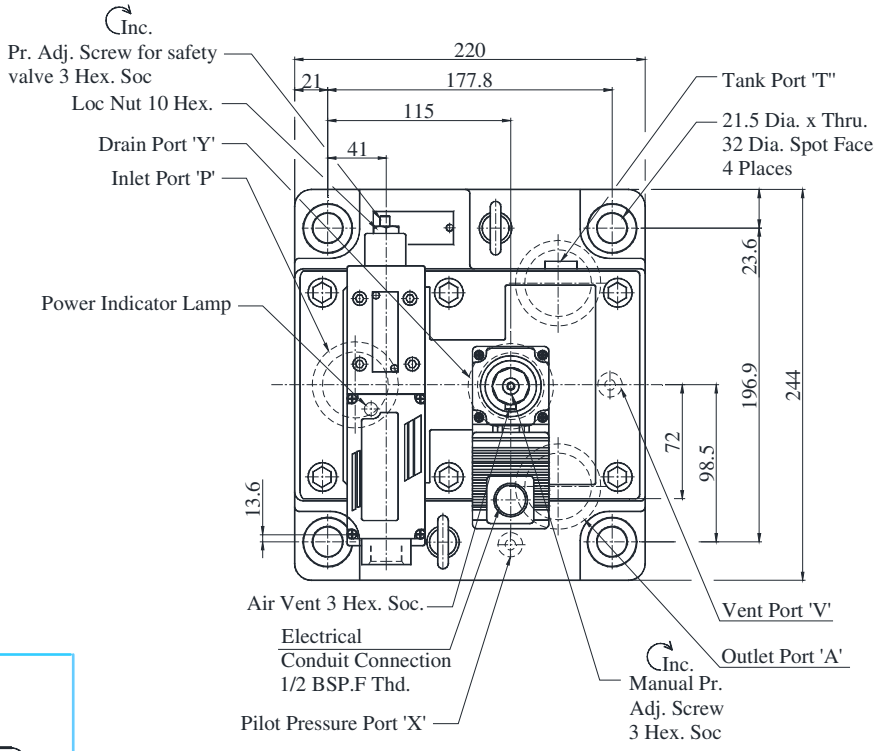
Mass ….21.8 Kg.



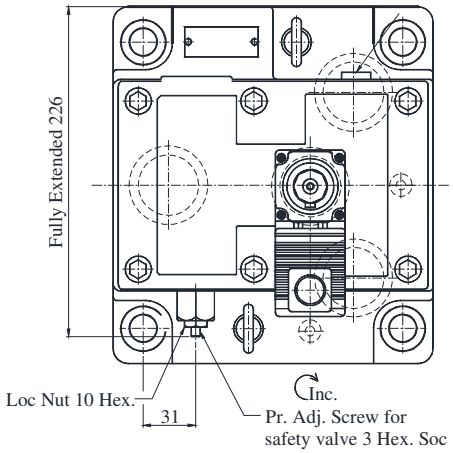
Mass ….24 Kg.
(Models with Sensor ….24.7 Kg.)

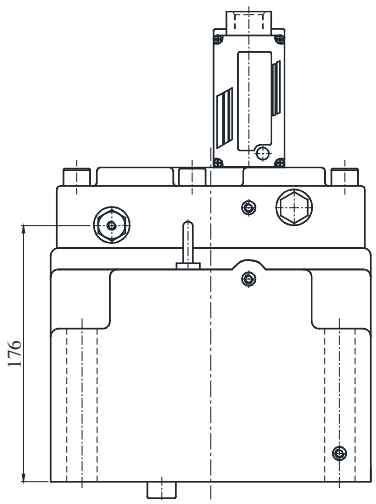
● EHFBG-10-500-$\frac{C}{H}$(-E)-※-50

DIMENSIONS IN MILLIMETRES



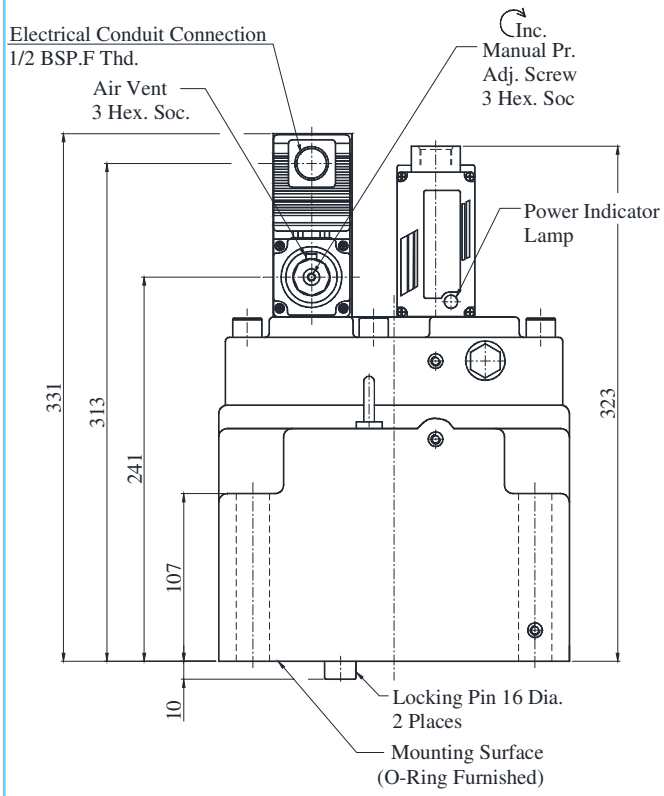
● EHFBG-10-500(-E)-50





For other dimensions, refer right sight drawing

Mass ….21.8 Kg.

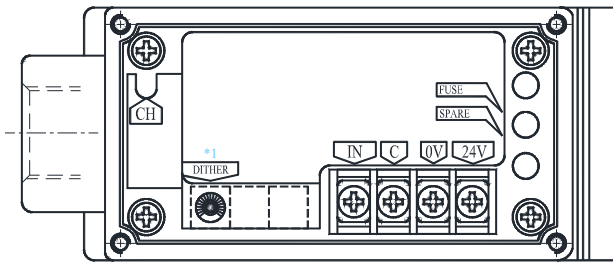


Mass ….64 Kg.
(Models with Sensor ….64.7 Kg.)

Detail of Amplifier

Connecting Terminal

- Flow Control
- Pressure controls …. Open Loop Type

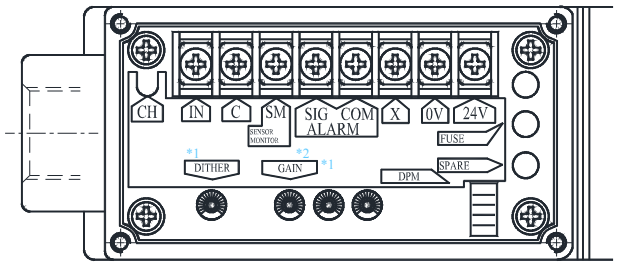


Terminal	Name
IN	Input Signal (+)
C	Input Signal (COM)
0 V	} Power Supply
24 V	
CH	Output Current Check (to C)

*1 **DITHER**
Use as they are since they are factory-preset to the optimum position. (Do not touch them in normal condition)

*2 **GAIN**
GAIN adjusting volume is not available

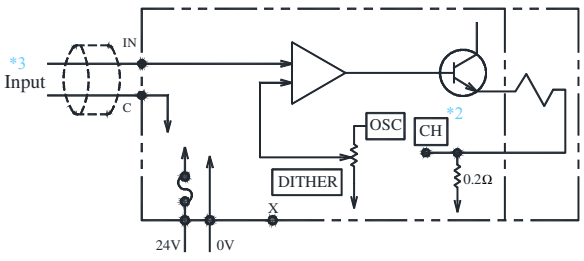
- Pressure controls ….
  Open Loop Type with Sensor



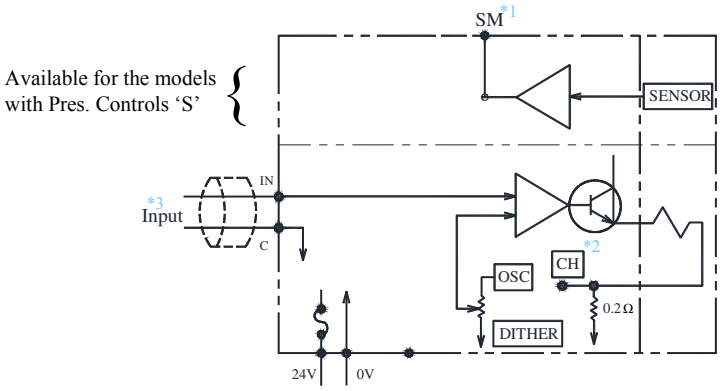
Terminal		Name
IN		Input Signal (+)
C		Input Signal (COM)
SM		Sensor Monitor (to C)
ALARM	SIG	(Open)
	COM	
X		(Open)
0 V		} Power Supply
24 V		
CH		Output Current Check (to C)

Circuit Schematic

Flow Controls



Pressure Controls

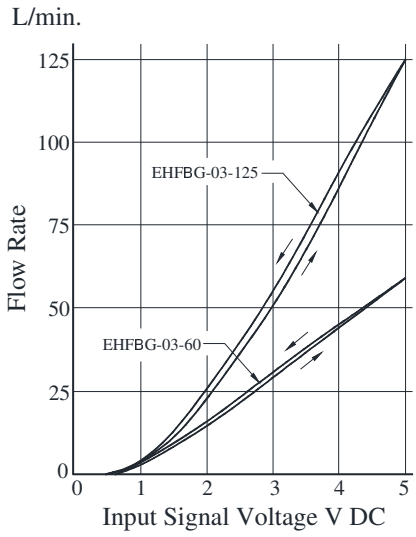


*1 For "SM" terminal, external instruments should have input impedance of more than 10 kΩ.
*2 For "CH" terminal, external instruments should have input impedance of more than 10 kΩ.
*3 Use shielded cable for "Input" connection. The ground of the shielded cable must be connected to input signal side.

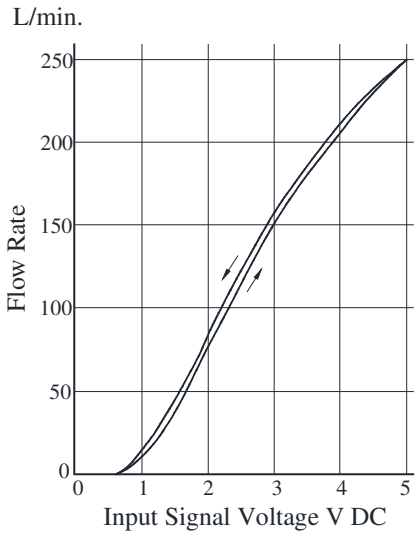
Input Signal Voltage Vs. Flow Rate

Viscosity : 30 cSt

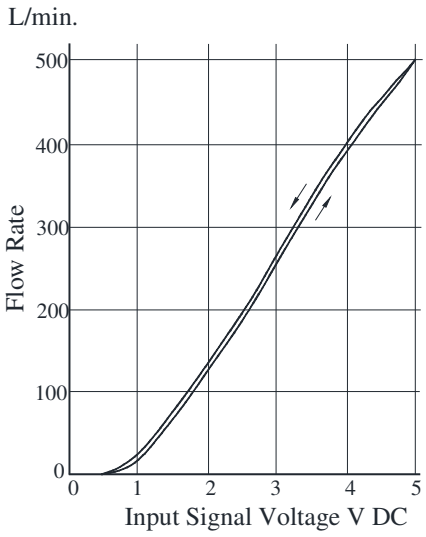
EHFBG-03



EHFBG-06



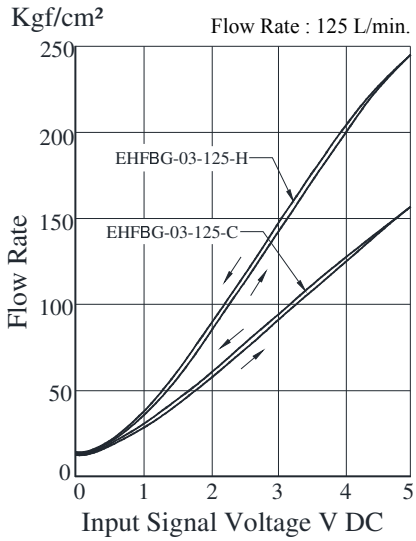
EHFBG-10



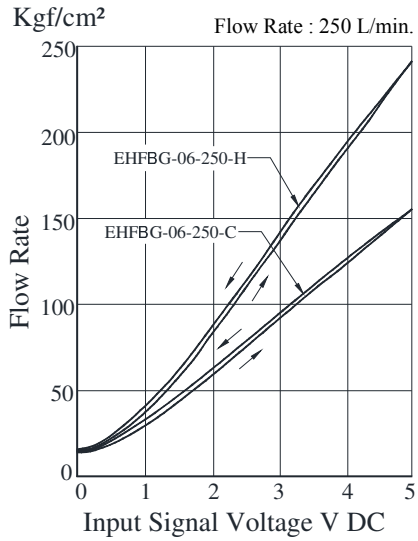
Input Signal Voltage Vs. Pressure

Viscosity : 30 cSt

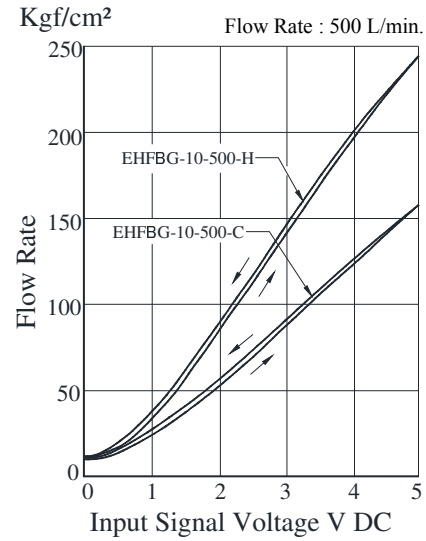
EHFBG-03



EHFBG-06



EHFBG-10

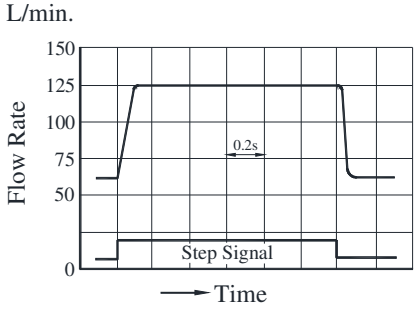


Step Response (Flow Controls)

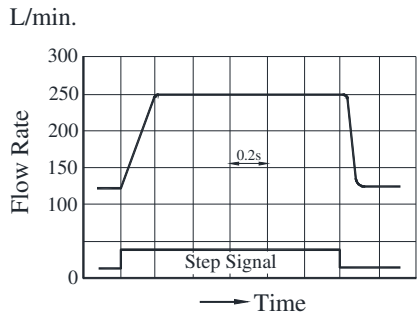
Viscosity : 30 cSt

The step response right are those obtained when the valve itself is tested independently.
The step responses may differ from them when the valve is used in combination with other control valves.

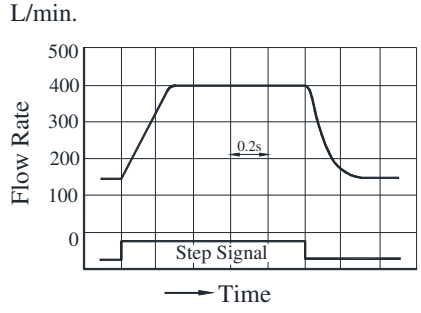
● **EHFBG-03**



● **EHFBG-06**



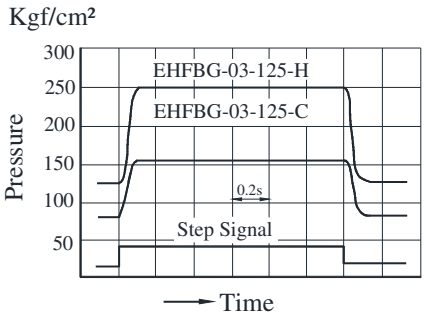
● **EHFBG-10**



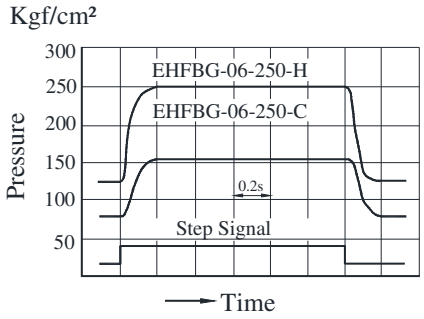
Step Response (Pressure Controls)

Viscosity : 30 cSt

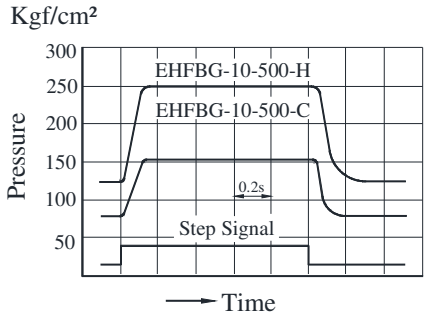
● EHFBG-03



● EHFBG-06



● EHFBG-10

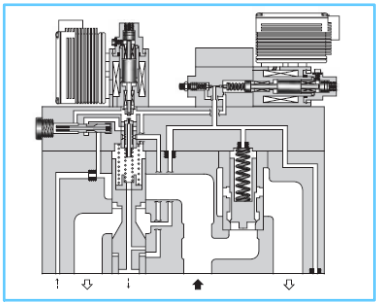


The step response right are those obtained when the valve itself is tested independently.
The step responses may differ from them when the valve is used in combination with other control valves.

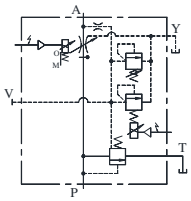
High Flow Series

Proportional Electro-Hydraulic Flow Control and Relief Valves

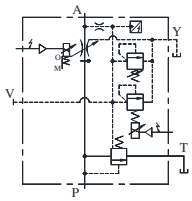
The power saving valves are energy-saving valves designed to supply the minimum pressure and flow nessesary to drive the actuators. The high-flow series has a flow rate two times as much as the conventional maximum flow rates (03:250 against 125 L/min. ; 06:500 against 250 L/min.) the permits use of smaller valves which eventually makes the machine size compact.



Graphic Symbols

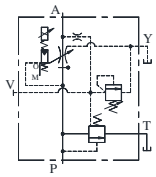


Models With Proportional Pilot Relief Valve



Models With Proportional Pilot Relief Valve and Sensor

External Pilot Pr. Connection



Models With Proportional Pilot Relief Valve

Specification

Description \ Model Number			EHFBG-03-250	EHFBG-06-500
Max. Operating Pres. Kgf/cm²			250	
Max. Metred Flow L/min.			250	500
Metred Flow Capacity L/min.			2.5~250	5~500
Min. Pilot Pressure Kgf/cm²			15	
Pilot Flow	At Normal		1 L/min.	
	At Transition		4 L/min.	6 L/min.
Differential Pressure Kgf/cm²			8	9
Flow Controls	Hysteresis		3% or Less	
	Repeatability		1% or Less *1	
	Input Signal Voltage		Max. Flow / 5 V DC	
	Coil Resistance Ω		10	
	Supply Electric Power		24V DC (21 to 28V DC included Ripple)	
	Input Impedance kΩ		10	
	Power Input (Max.) W		28	
Pressure Controls *2	Pressure Adj. Range *3	Adj. Range: C	16~160 Kgf/cm²	15~160 Kgf/cm²
		Adj. Range: H	18~250 Kgf/cm²	15~250 Kgf/cm²
	Hysteresis		Less than 3%	
	Repeatability		Less than 1% *1	
	Coil Resistance Ω		10	
	Input Signal Voltage		Max. Adj. Pressure / 5V DC	
	Supply Electric Power		24V DC (21 to 28V DC included Ripple)	
	Input Impedance k Ω		10	
	Power Input (Max.) W		28	
Output Signal (Sensor Monitor)			C: 5 V DC / 160 Kgf/cm² H: 5 V DC / 250 Kgf/cm²	
Ambient Temperature			0 – 50°C (With Circulated Air)	
Mass			Refer to page no 677 ~ 678	

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

*2 The specifications for pressure controls is applied to models with pilot relief valve. (Ex. EHFBG-03-125-C-50)

*3 The pressure adjustment range of the valves without pilot relief valves (Ex. EHFBG-03-125-※-50) is from a minimum adjustable pressure to 250 Kgf/cm²

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.	Pilot Relief valve Pr. Adj. Range Kgf/cm²	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**	**250**	**None:** Without Proportional Pilot Relief Valve **C, H :** See Specifications	**None:** Internal Pilot **E :** External Pilot	**None:** Open-Loop **S :** Open-Loop with Sensor	**50**
			06	**500**				

Mounting Bolts

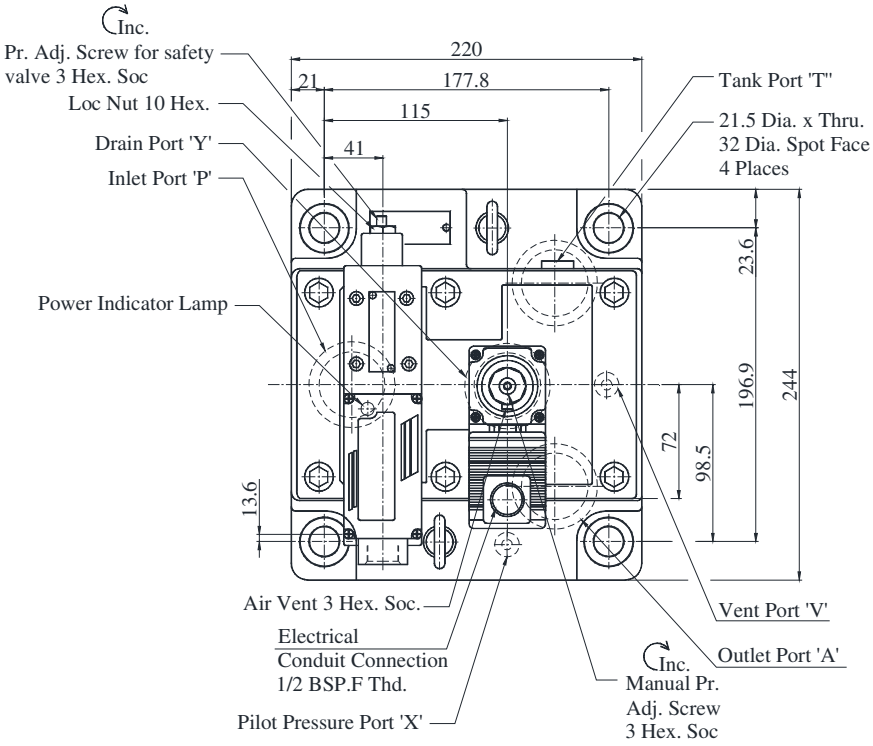
Model Number	Socket head cap Screw	Qty	Bolt Kit Model Number
EHFBG-03-250	M12 x 120 Lg.	4	BKEHFBG-03-250-50
EHFBG-06-500	M16 x 120 Lg.		BKEHFBG-06-500-50

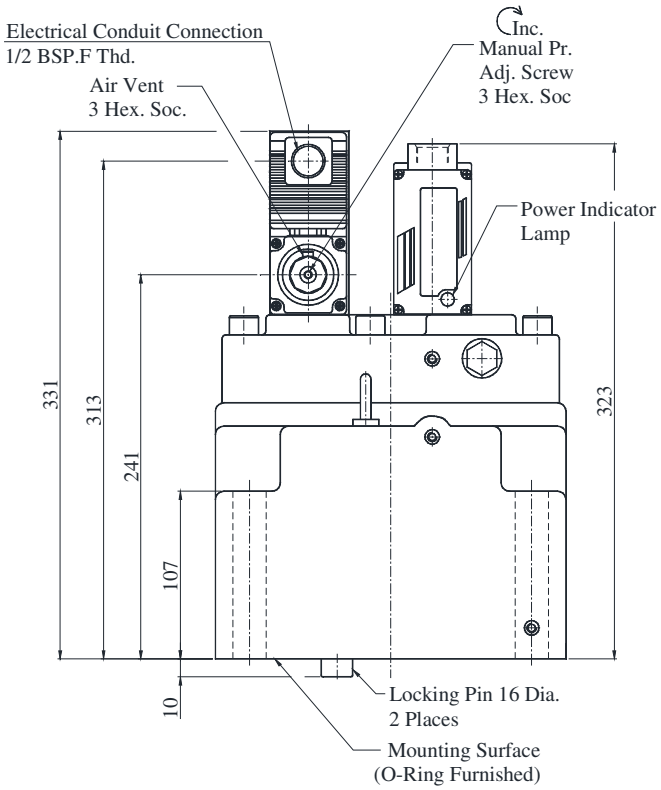
Instructions

- **Drain Back Pressure**
  Check that the drain back pressure does not exceed 2 Kgf/cm².
- **When Relief valve passing flow rate is low in pressure control state.**
  To avoid preselected pressure instability, use a passing flow of 15 L/min. or higher.
  Further, check that the tank-side back pressure does not exceed 5 Kgf/cm²
- **Safety Valve Pressure Setting.**
  The safety valve is preset to a pressure that is 20 Kgf/cm² higher than the maximum adjustment pressure.
  Therefore, adjust this pressure setting as needed to suit the pressure used.
  To lower the pressure setting, turn the safety valve pressure adjustment screw anti-clock wise.
  After adjustment, be sure to tighten the lock nut.

- **EHFBG-03-250-$\frac{C}{H}$(-E)-※-50**
- **EHFBG-03-250(-E)-※-50**

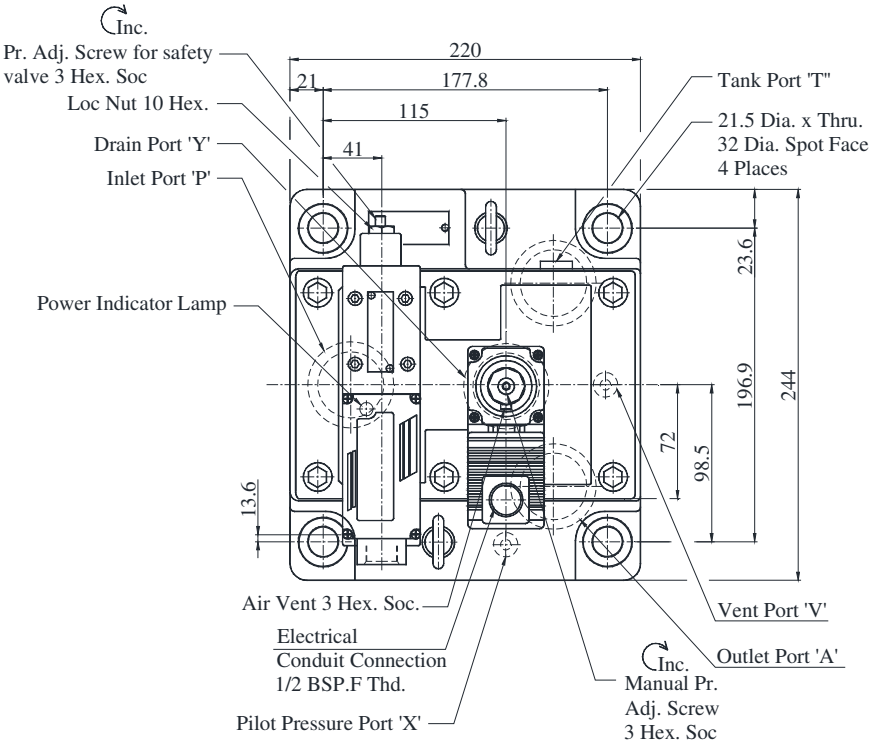
DIMENSIONS IN MILLIMETRES

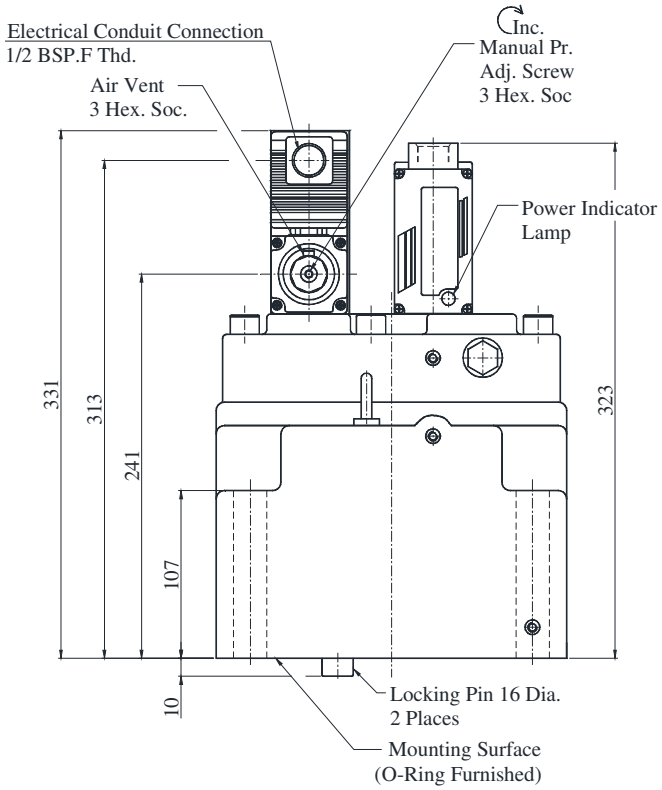




- **EHFBG-06-500-$\frac{C}{H}$(-E)-※-50**
- **EHFBG-06-500(-E)-※-50**

DIMENSIONS IN MILLIMETRES

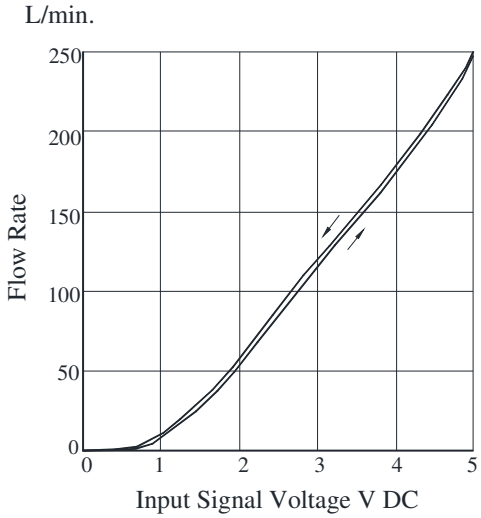




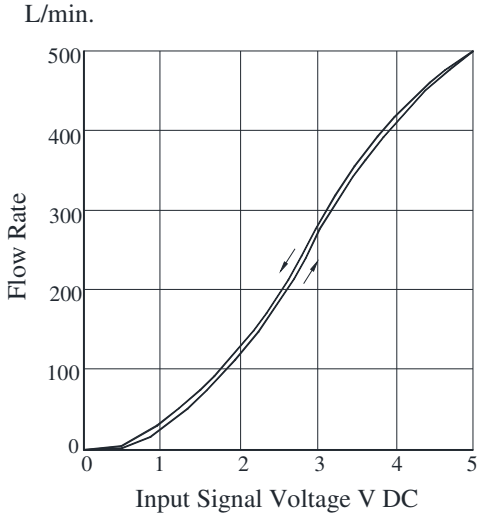
Input Signal Voltage Vs. Flow Rate

Viscosity : 30 cSt

EHFBG-03-250



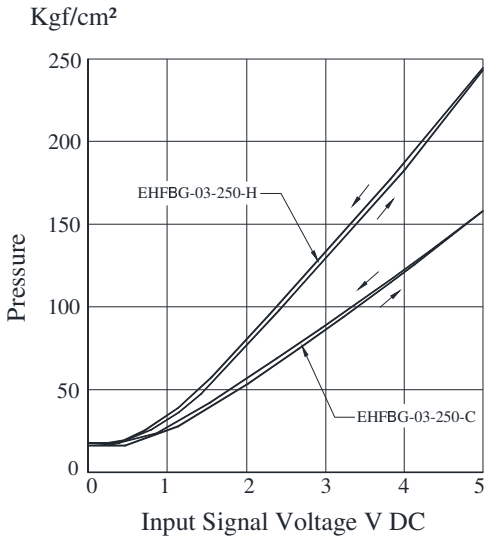
EHFBG-06-500



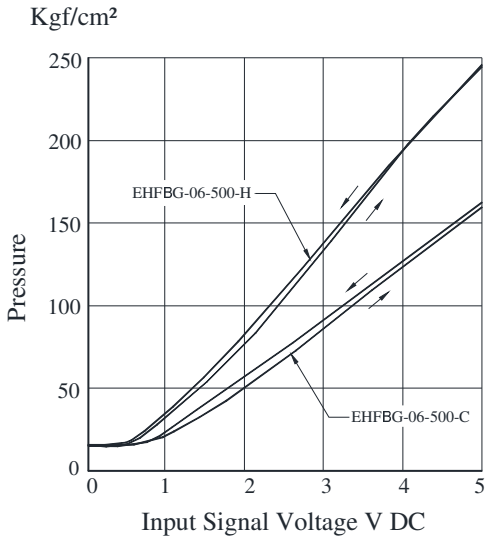
Input Signal Voltage Vs. Pressure

Viscosity : 30 cSt

EHFBG-03



EHFBG-06

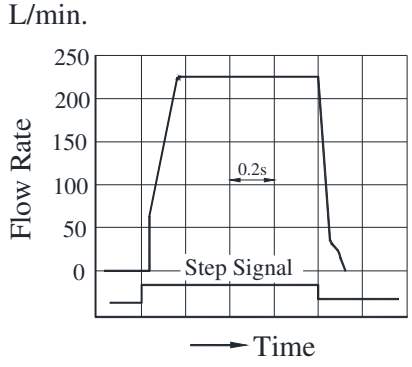


Step Response (Flow Controls)

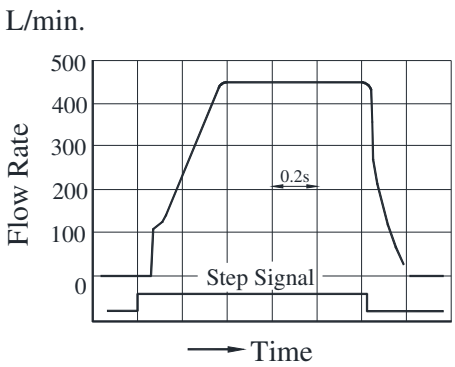
Viscosity : 30 cSt

The step response below are those obtained when the valve itself is tested independently.
The step responses may differ from them when the valve is used in combination with other control valves.

EHFBG-03



EHFBG-06

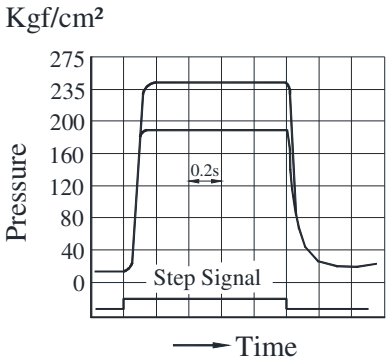


Step Response (Pressure Controls)

Viscosity : 30 cSt

The step responses below are those obtained when the valve itself is tested independently.
The step responses may differ from them when the valve is used in combination with other control valves.

EHFBG-03



EHFBG-06