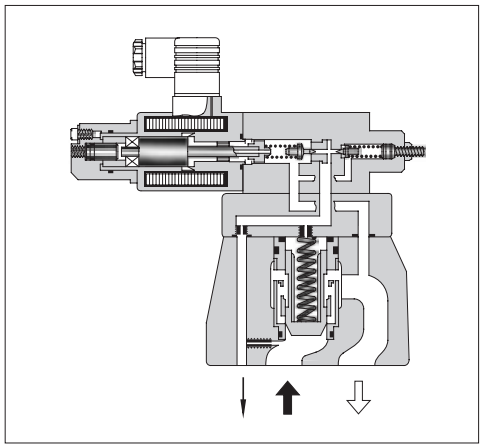
Proportional Electro-Hydraulic Relief Valves

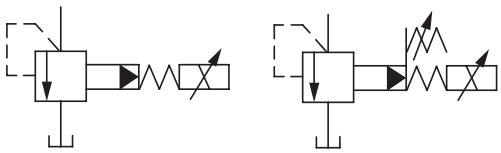
This valve is derived by combining a small, high-performance 1/8 proportional electro-hydraulic pilot relief valve with a specially developed low-noise relief valve.
With this valve, it is possible to regulate the system pressure in proportion to the input current. Note that this valve is used in conjunction with the applicable power amplifier.



Specifications

Description \ Model Numbers	EBG-03	EBG-06	EBG-10
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



Without Safety Valve | With Safety Valve

Model Number Designation

F-	EB	G	-03	-C	-T	-51	✻
Special Seals	Series Number	Type of Mounting	Valve Size	Pres. Adj. Range MPa (PSI)	Safety Valve	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	**EB**: Proportional Electro-Hydraulic Relief Valve	**G**: Sub-plate Mounting	**03** **06** **10**	**C**: ✻ - 15.7 (✻ - 2275) ★1 **H**: ✻ - 24.5 (✻ - 3550) ★1	**None**: With Safety Valve **T**: Without Safety Valve	**51**	Refer to ★2

★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 rrecommended 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 BSP.F	BGM-03-2090	3/8 NPT	2.4 (5.3)
	BGM-03X-20	Rc 1/2	BGM-03X-3080	1/2 BSP.F	BGM-03X-2090	1/2 NPT	3.1 (6.8)
EBG-06	BGM-06-20	Rc 3/4	BGM-06-3080	3/4 BSP.F	BGM-06-2090	3/4 NPT	4.7 (10.4)
	BGM-06X-20	Rc 1	BGM-06X-3080	1 BSP.F	BGM-06X-2090	1 NPT	5.7 (12.6)
EBG-10	BGM-10-20	Rc 1-1/4	BGM-10-3080	1-1/4 BSP.F	BGM-10-2090	1-1/4 NPT	8.4 (18.5)
	BGM-10X-20	Rc 1-1/2	BGM-10X-3080	1-1/2 BSP.F	BGM-10X-2090	1-1/2 NPT	10.3 (22.7)

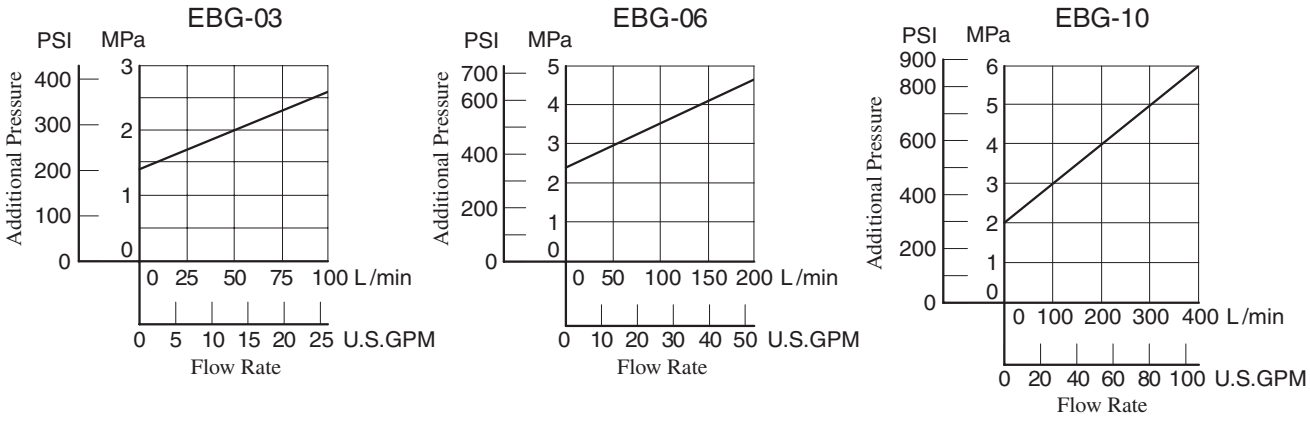
- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- Sub-plates are those for pilot operated relief valves. For dimensions, see page 213.

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.

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



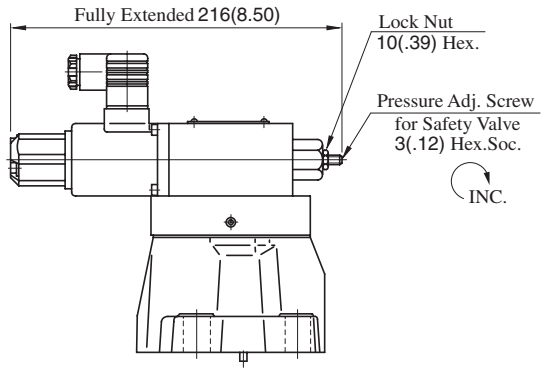
To lower the setting pressure, turn the safety valve pressure adjustment screw anti-clockwise. After adjustment, be sure to tighten the lock nut.

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

DIMENSIONS IN MILLIMETRES (INCHES)

EBG-$\begin{matrix}03\\06\end{matrix}$-∗-51/5190

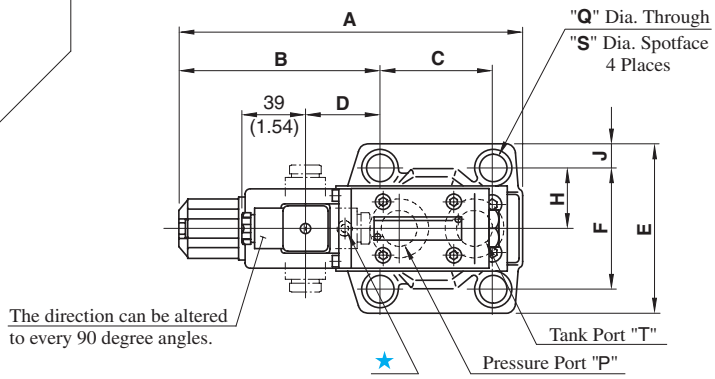
With Safety Valve

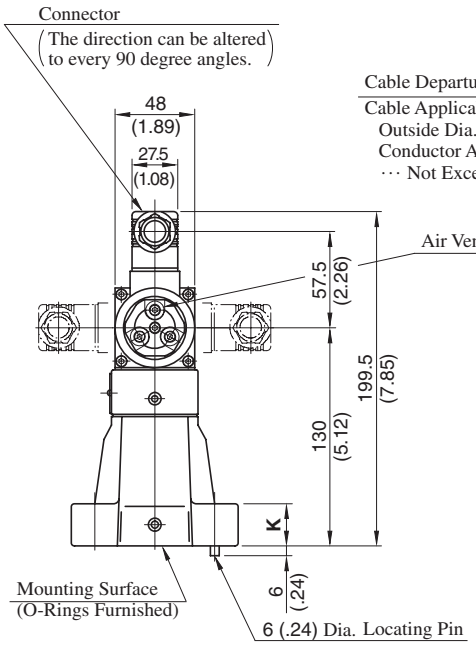


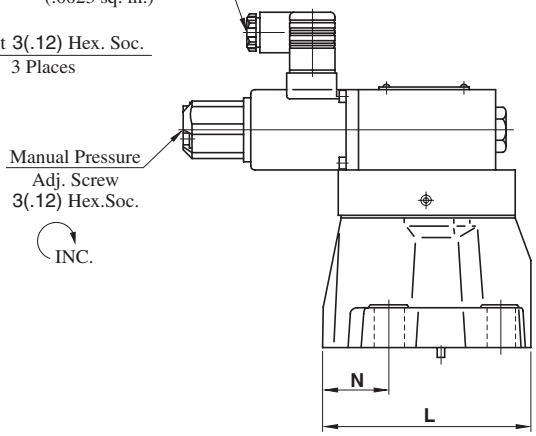
• For other dimensions, refer to the without safety valve.

EBG-$\begin{matrix}03\\06\end{matrix}$-∗-T-51/5190

Without Safety Valve







★ 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.

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)

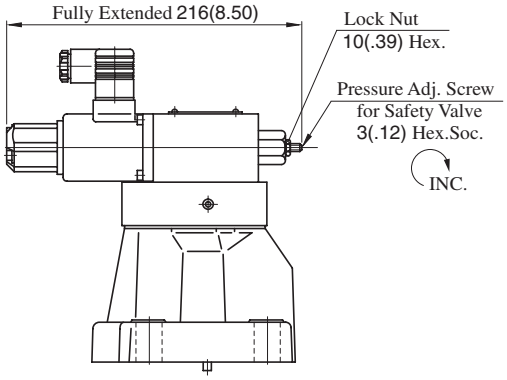
Note: For valve mounting surface dimensions, see the dimensional drawings of sub-plates (p.213) in common use.

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

DIMENSIONS IN MILLIMETRES (INCHES)

EBG-10-∗-51/5190

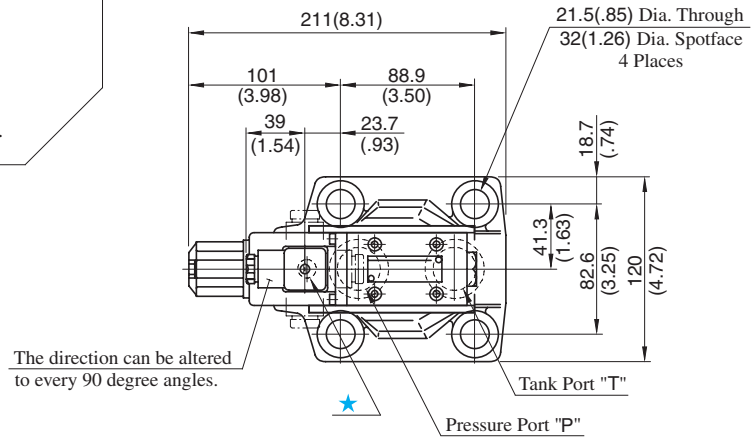
With Safety Valve



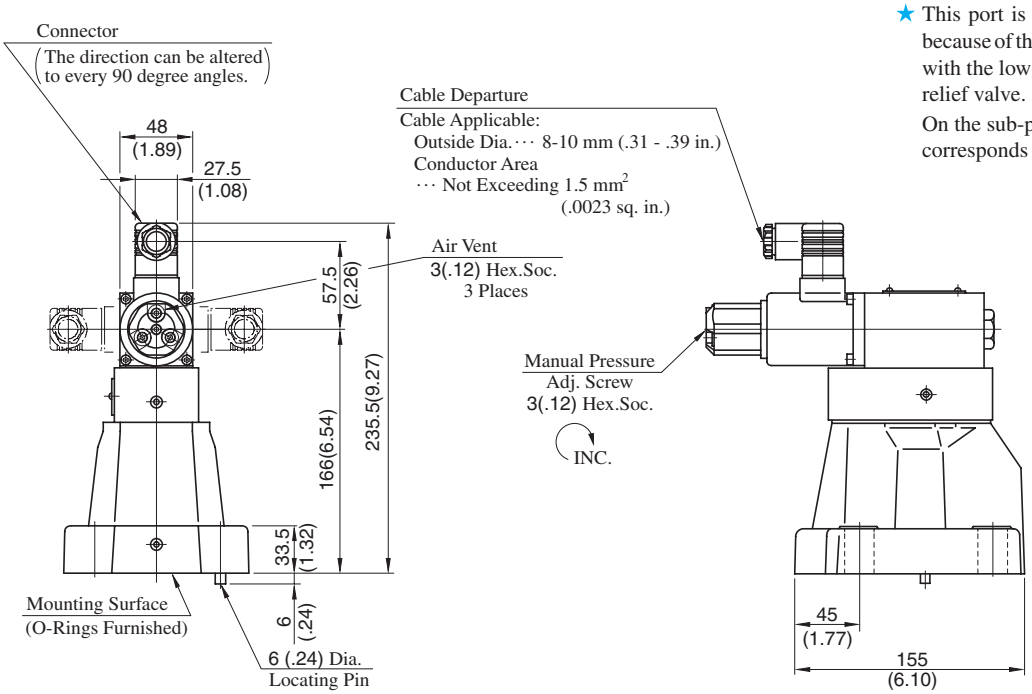
• For other dimensions, refer to the without safety valve.

EBG-10-∗-T-51/5190

Without Safety Valve



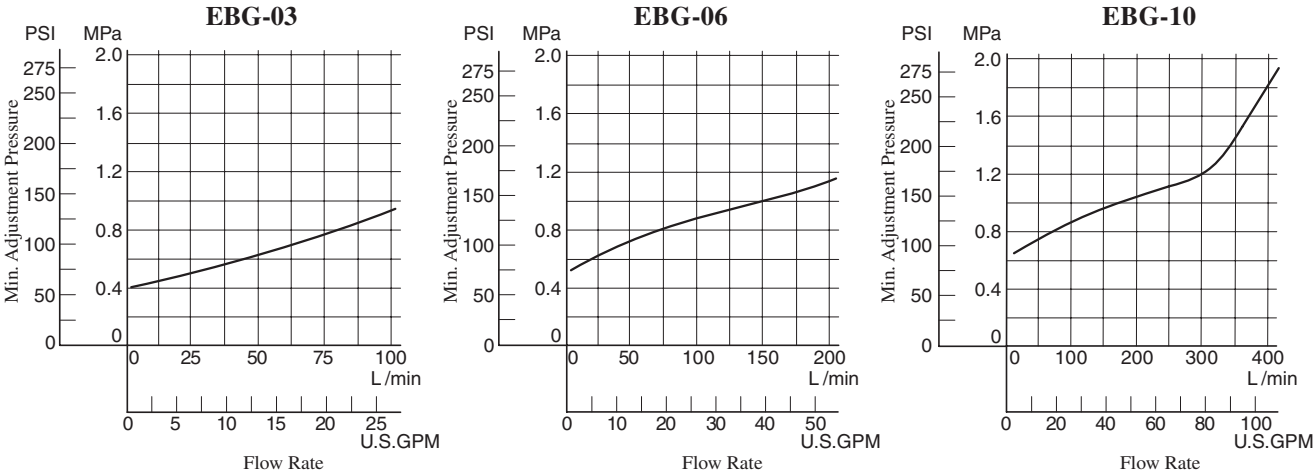
★ This port is not used. It is provided because of the common use of the body with the low-noise type pilot operated relief valve.
On the sub-plate, plug the port which corresponds to this port.



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

Min. Adjustment Pressure

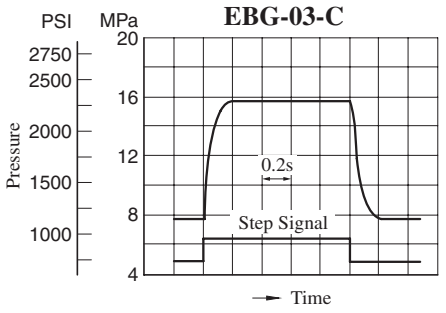
Viscosity : 30 mm²/s (141 SSU)



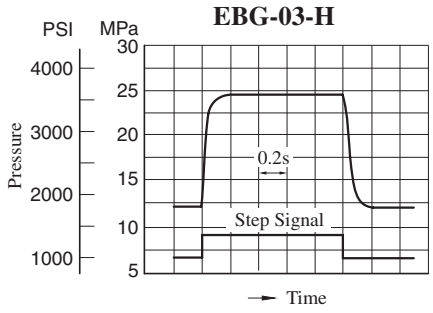
Step Response (Example)

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

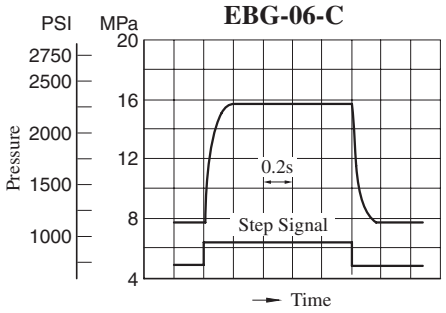
Trapped Oil Volume : 1 L (.264 U.S. Gallons)
Viscosity : 30 mm²/s (141 SSU)



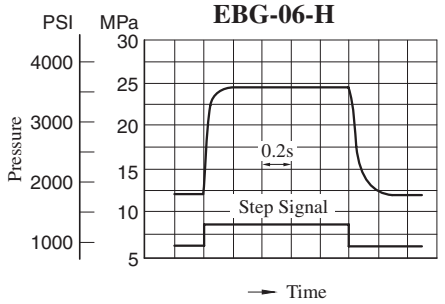
(Flow Rate : 100 L/min, 26.4 U.S.GPM)



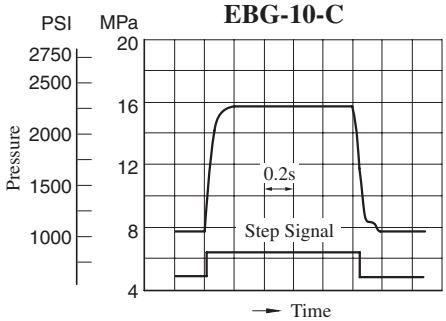
(Flow Rate : 100 L/min, 26.4 U.S.GPM)



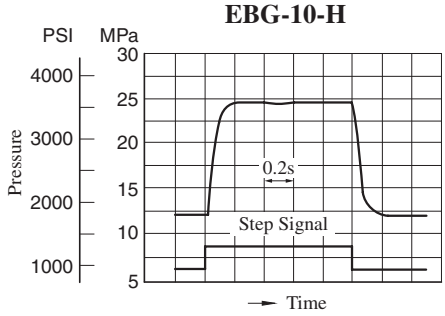
(Flow Rate : 200 L/min, 52.8 U.S.GPM)



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



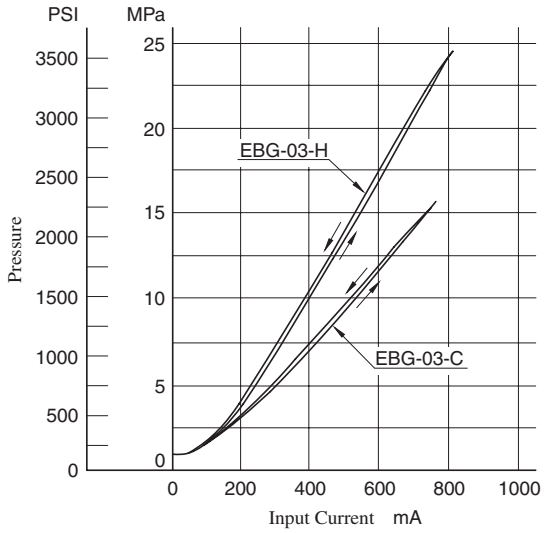
(Flow Rate : 400 L/min, 106 U.S.GPM)



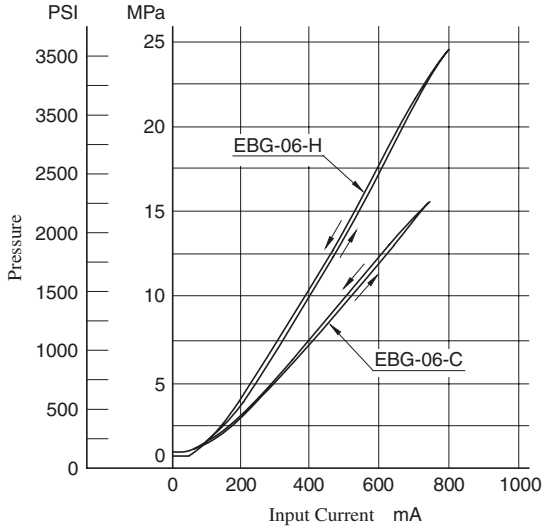
(Flow Rate : 400 L/min, 106 U.S.GPM)

Input Current vs. Pressure

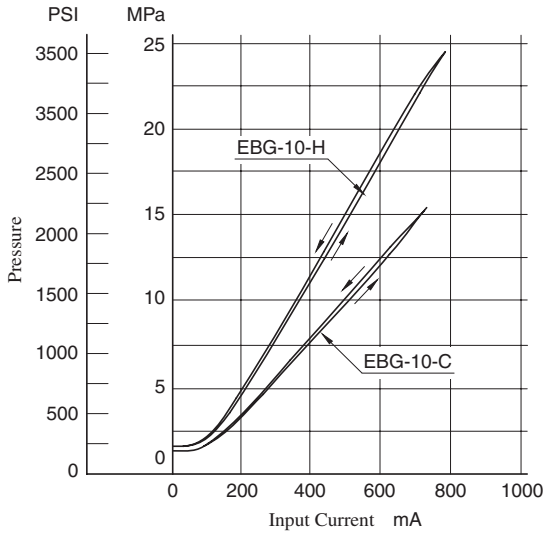
EBG-03



EBG-06



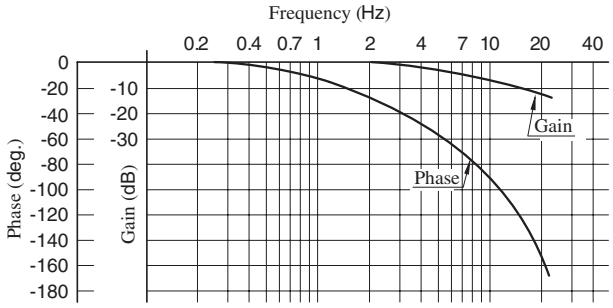
EBG-10



Frequency Response

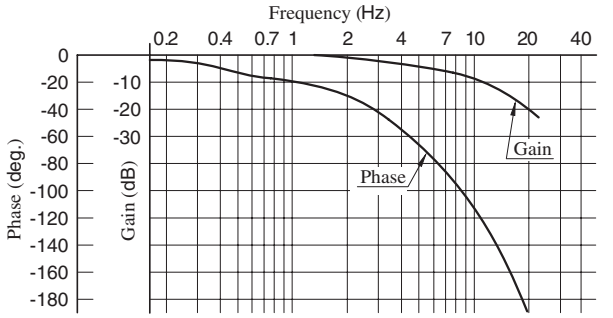
Trapped Oil Volume : 1 L (.264 U.S. Gallons)
Viscocity : 30 mm^2/s (141 SSU)

EBG-03



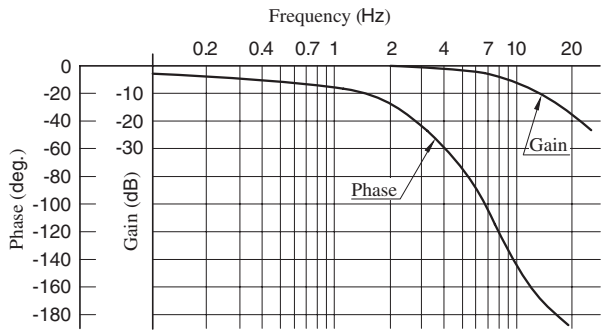
Pressure : 7.8 ± 1.6 MPa
(1130 ± 230 PSI)
Flow Rate : 100 L/min
(26.4 U.S.GPM)

EBG-06



Pressure : 7.8 ± 1.6 MPa
(1130 ± 230 PSI)
Flow Rate : 200 L/min
(52.8 U.S.GPM)

EBG-10

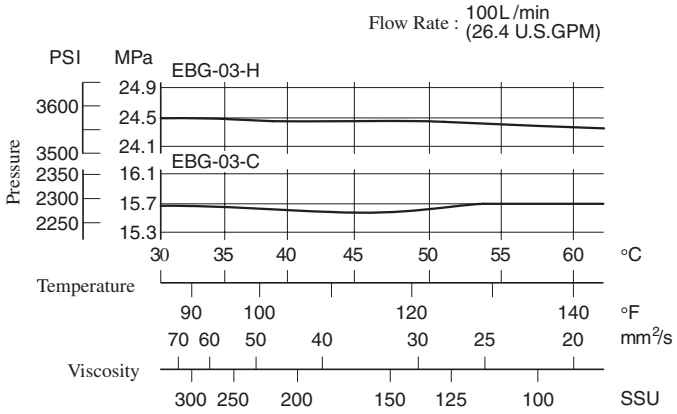


Pressure : 7.8 ± 1.6MPa
(1130 ± 230 PSI)
Flow Rate : 400 L/min
(106 U.S.GPM)

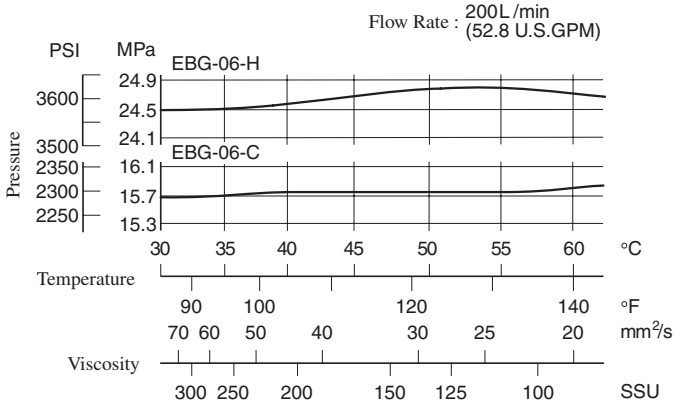
Viscosity vs. Pressure

Oil : ISO VG 46 Oil

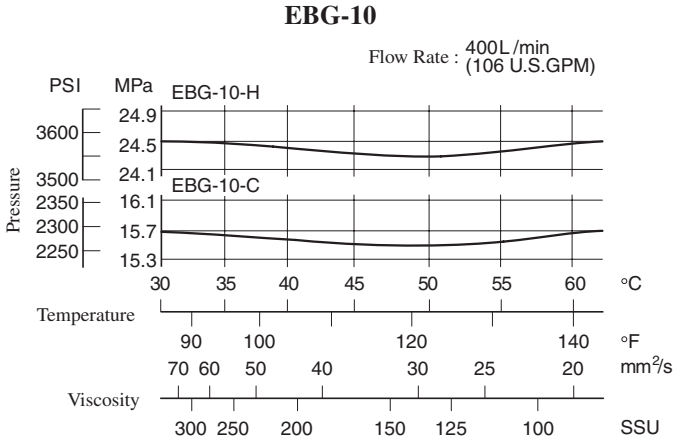
EBG-03



EBG-06



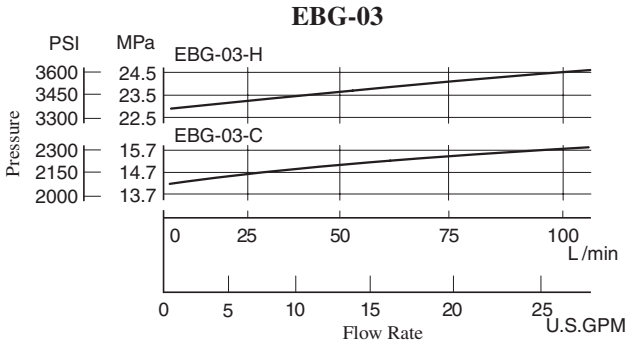
EBG-10



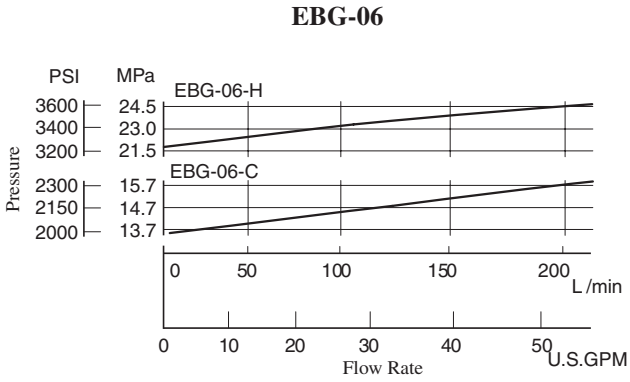
Flow Rate vs. Pressure

Viscosity : 30 mm²/s (141 SSU)

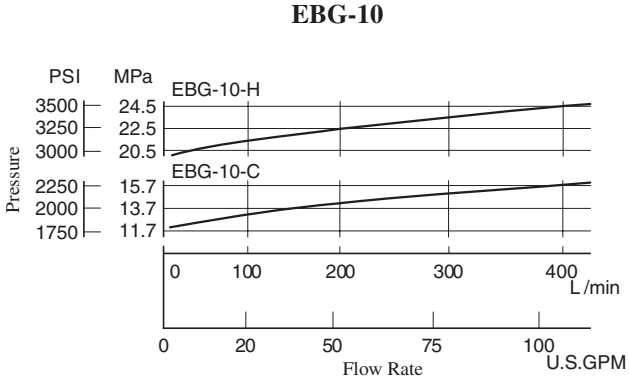
EBG-03



EBG-06

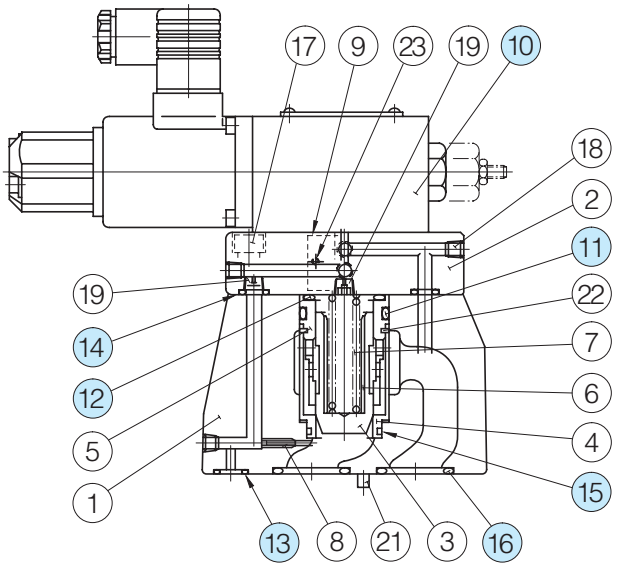


EBG-10



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).

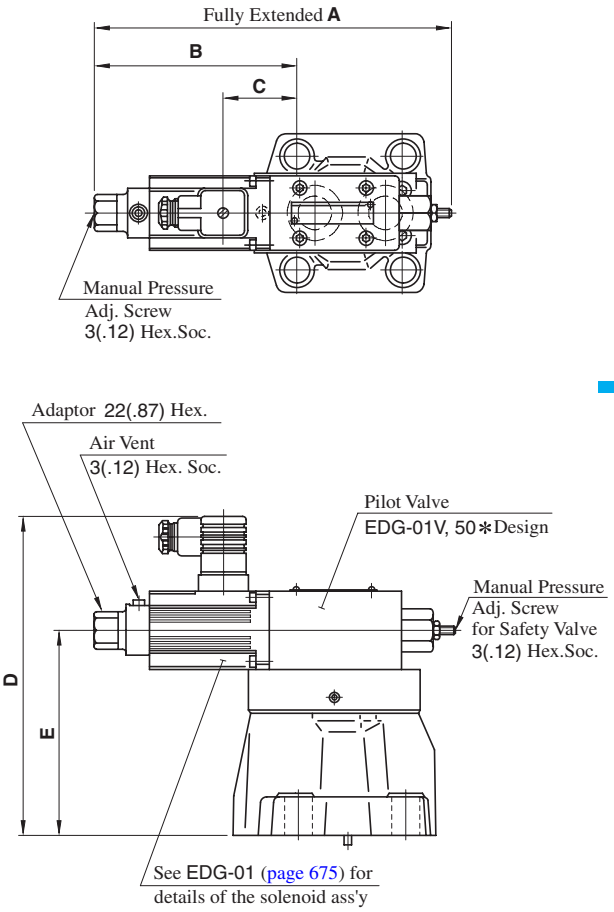
● Specifications and Characteristics

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

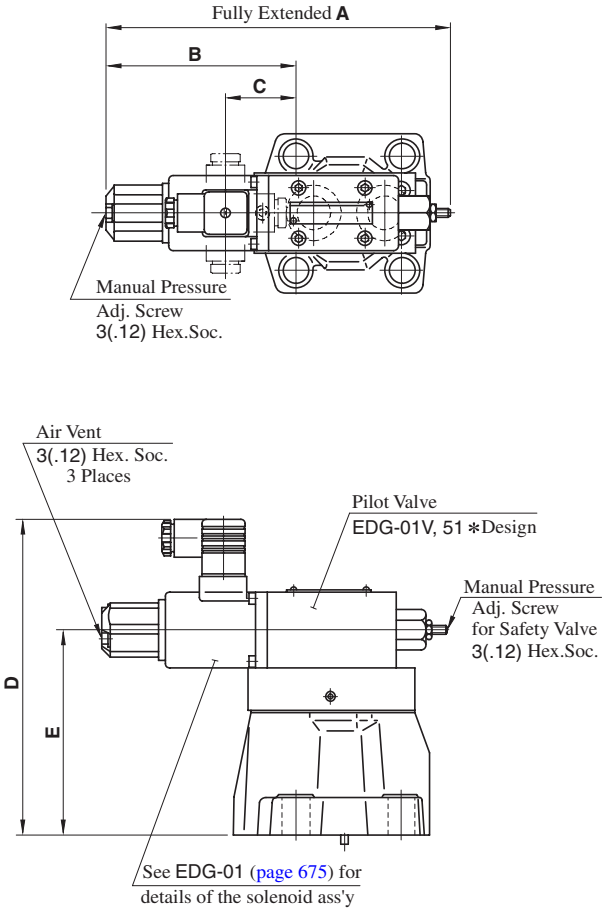
● Mounting Interchangeability

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.

Current: Design 50



New: Design 51



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)