

Proportional Electro-Hydraulic Relief Valves

The electro hydraulic relief valve is designed for compactness and high efficiency. The valve provides fast proportional response to the input current. For linear pressure control a special venting feature is incorporated with good stability & low hysteresis.

Specification

| Item | Model Number | EBG-03 | EBG-06 |
|---------------------------|---------------------|--|--|
| Max. Operating Pres. | Kgf/cm ² | 210 | |
| Rated Flow | L/min. | 80 | 170 |
| Pressure Adjustment Range | Kgf/cm ² | Refer Model No. Designation | |
| Rated Current | mA | EBG-03-C : 750 EBG-03-H : 850 | EBG-06-C : 700 EBG-06-H : 800 |
| Coil Resistance | Ω | 10 | 10 |
| Hysteresis *1 | | Less than 3% | Less than 3% (Note1) |
| Repeatability *2 | | Less than 1% | |
| Frequency Response | Hz | Refer Page 517 | |
| Mass (Approx.) | Kg. | 5.6 | 6.3 |

Note :1. Under the condition of using with YUKEN amplifier.
2. The figure is only valve under the same condition.

Model Number Designation

| EB | G | -03 | -C | -11 |
|---|------------------------------|------------|---|------------|
| Series No. | Type of Mounting | Valve Size | Pr. Adjustment Range Kgf/cm ² *1 | Design No. |
| EB: Prop. Electro Hydraulic Relief Valve | G: Sub Plate Mounting | 03 | Note C: ※ ~ 140 H: ※ ~ 210 | 11 |
| | | 06 | | 11 |

*1. For Min. Adj. Pressure, Please refer Page No. 517

Attachment

● Mounting Bolts

| Model No. | Socket Head Cap Screw | Qty. | Bolt Kit Ordering Code |
|-----------|-----------------------|------|------------------------|
| EBG-03 | M12 x 70Lg. | 02 | BKBG-03-10 |
| | M12 x 95Lg. | 02 | |
| EBG-06 | M16 x 60Lg. | 02 | BKBG-06-10 |
| | M16 x 80Lg. | 02 | |

Applicable Power Amplifier

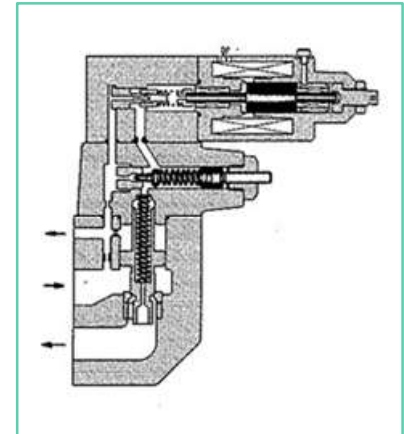
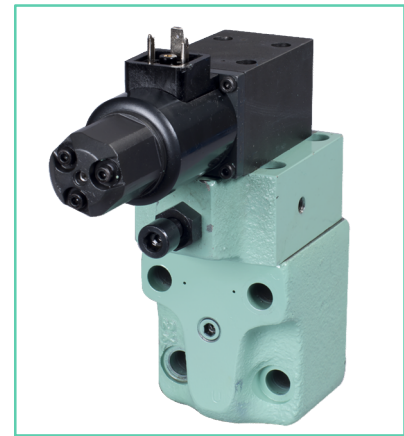
For stable performance, it is recommended that Yuken's applicable power amplifiers be used.
(For details see Page No. 647,651,660,668,719)

Model Numbers:

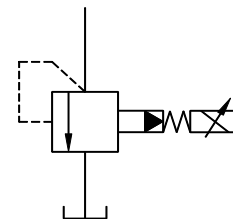
- PW100-※-H11 Refer EIC-H-1008
- PW200
- AME-D-10-※-20
- AME-D2-1010-11
- SK1022-※-※-11
- SK1015-11 (For DC power supply)
- AMN-D-10 (For DC power supply)

E Series

Proportional Electro-Hydraulic Relief Valve



Graphic Symbol



● Sub-Plate

| Valve Model Number | Sub-Plate Model number. | Piping BSP.F | Mass Kg. |
|--------------------|-------------------------|--------------|----------|
| EBG-03 | BGM-03-30 | 3/8 | 2.4 |
| | BGM-03x-30 | 1/2 | 3.1 |
| EBG-06 | BGM-06-30 | 3/4 | 4.7 |
| | BGM-06x-30 | 1 | 5.7 |

- When ordering , please specify model number according to the above table.
When not using sub-plate, please make suitable mounting surface.
- Sub-Plates are same as applicable to pilot operated relief valve. Ref. EIC-C-1002.

● **Note**

● **Mounting**

Air vent should be in the top position
(Bleed position of air vent can be changed.
Refer below drawing).

● **Air Vent**

The valve solenoid is of oil immersed design. To give better flow rate stability, fill the oil cavity in the solenoid body by loosening the air vent. Bleed all air from the inside of the solenoid.

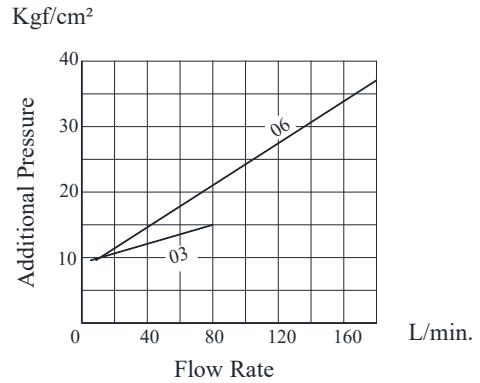
● **Tank Piping**

Do not connect to the other tank line. Connect directly to the tank and end of piping should be immersed in the oil.

● **Low Flow Rates**

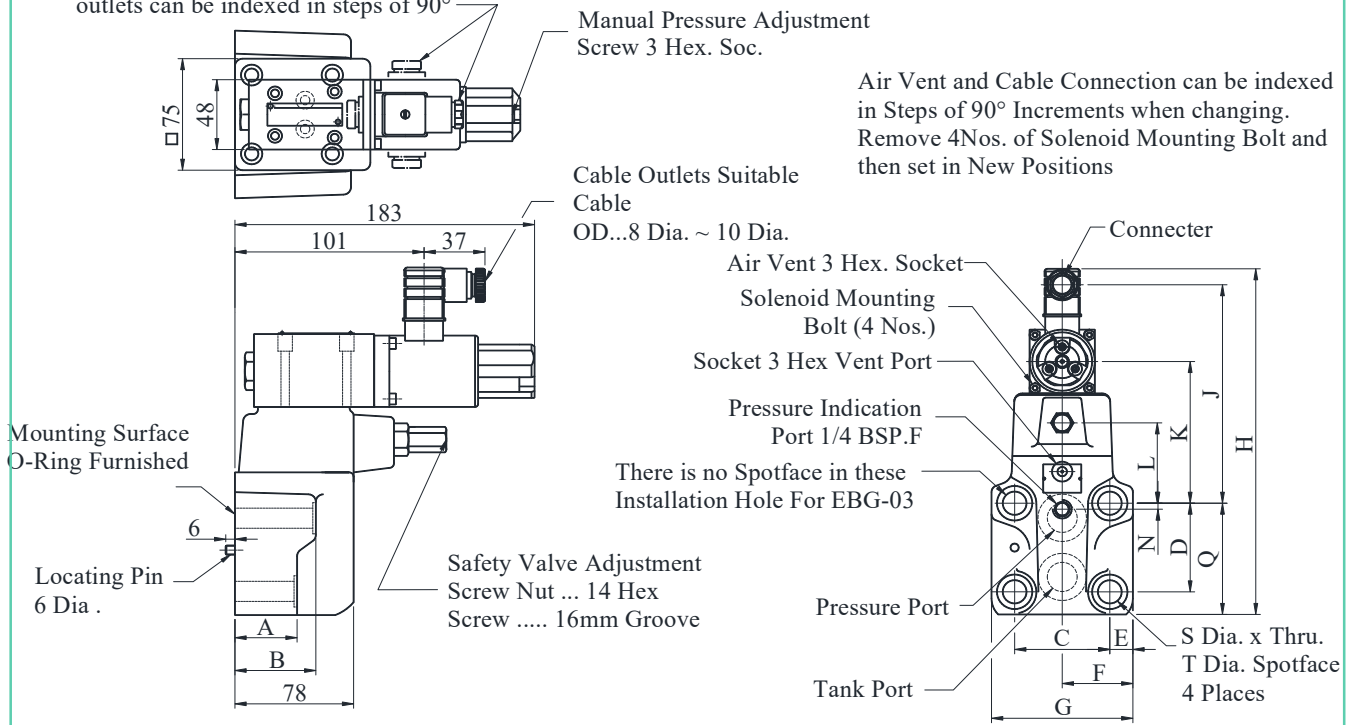
A flow rate of 6 L/min or higher should be used to avoid preselected pressure instability.

- Safety valve setting pressure is given additional pressure 15 Kgf/cm² (03 size) or 39 Kgf/cm². (06 size) Max. at rated flow when maximum operation pressure. Further safety valve setting pressure is determined by max. operation pressure plus additional pressure in the graph.



● **EBG-03**
EBG-06

Positions of Cable outlets can be indexed in steps of 90°



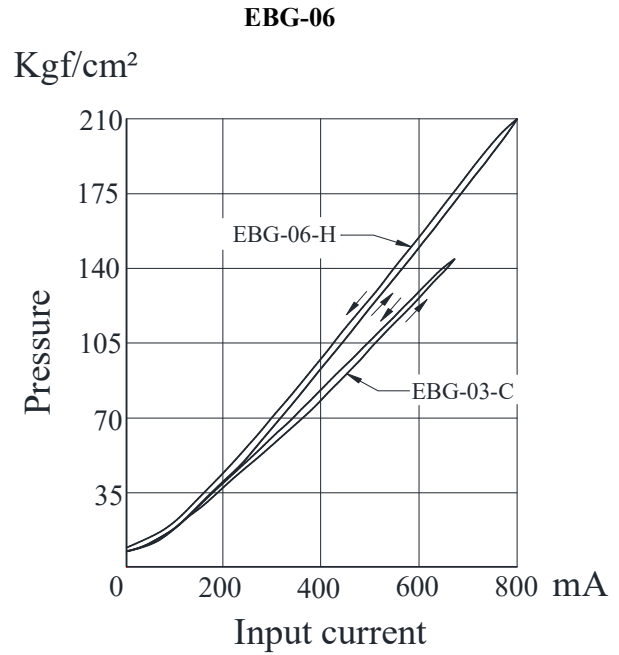
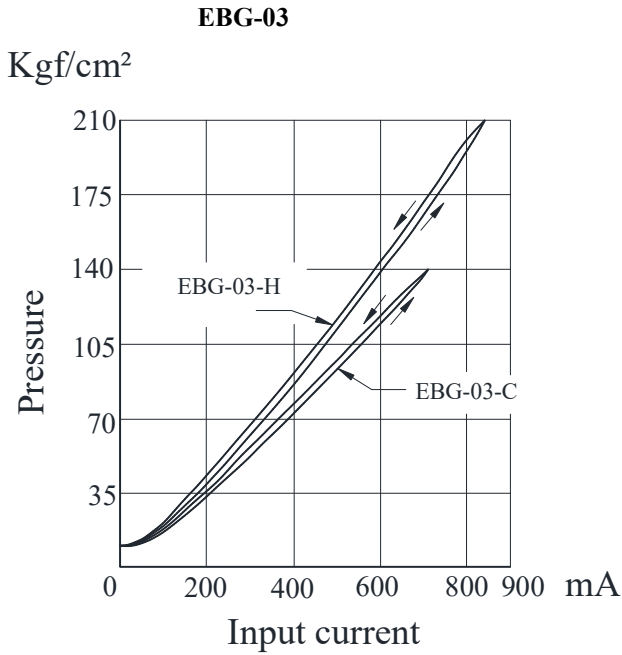
Air Vent and Cable Connection can be indexed in Steps of 90° Increments when changing. Remove 4Nos. of Solenoid Mounting Bolt and then set in New Positions

There is no Spotface in these Installation Hole For EBG-03

| Model No. | A | B | C | D | E | F | G | H | J | K | L | N | Q | S | T |
|-----------|----|----|------|------|------|----|-----|-------|-------|-------|------|-----|------|------|----|
| EBG - 03 | 57 | 78 | 53.8 | 53.8 | 14.1 | 41 | 82 | 231.5 | 142 | 85 | 40 | 22 | 77 | 13.5 | 21 |
| EBG - 06 | 40 | 60 | 70 | 66.7 | 17 | 52 | 104 | 225.5 | 159.5 | 102.5 | 57.5 | 4.5 | 88.5 | 17.5 | 26 |

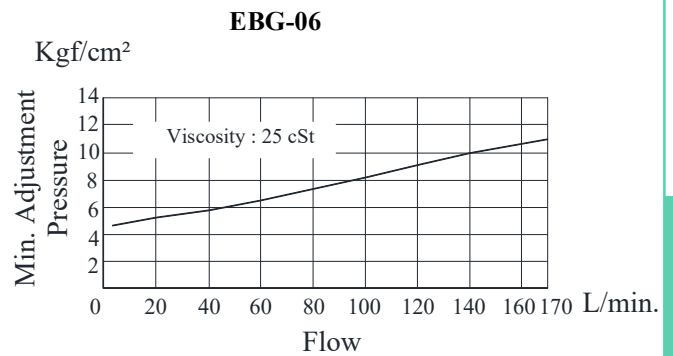
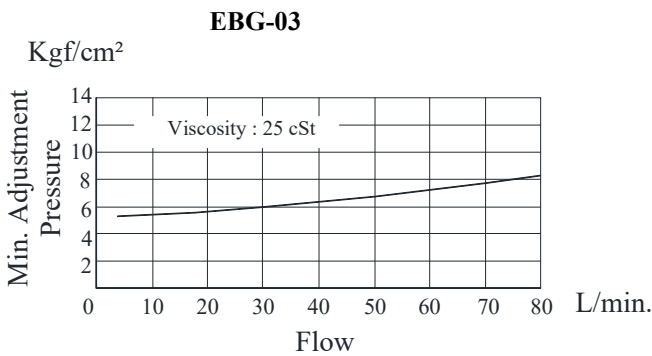
Note : Valve Mounting Surface Dimension is the same as BG-03, BG-06
Sub Plate for EBG-03 ----- BGM-03 or 03X
EBG-06 ----- BGM-06 or 06X

Input Current vs Pressure

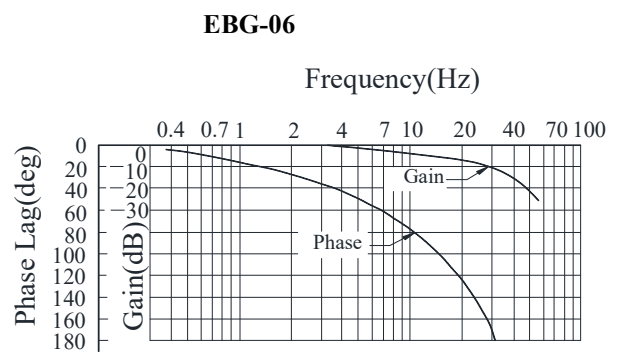
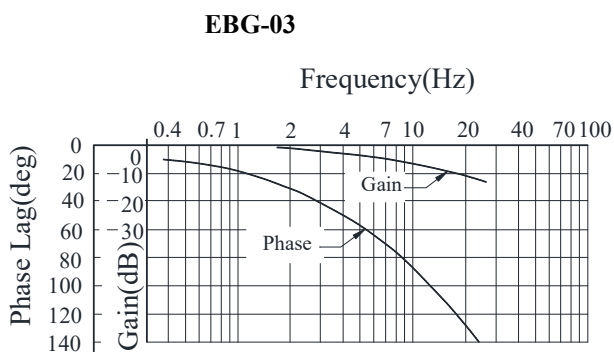


Note : Input current Error : Rating Input Current
50 mA at Rated Flow

Min. Adjustment Pressure



Frequency Response

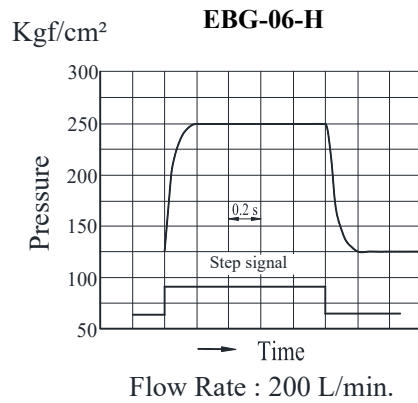
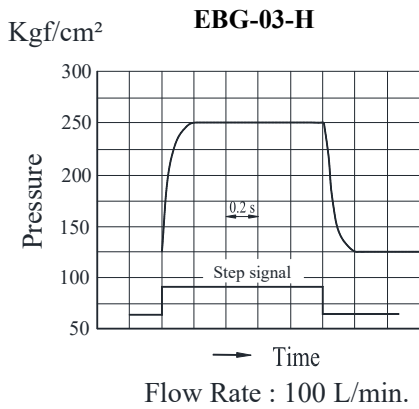
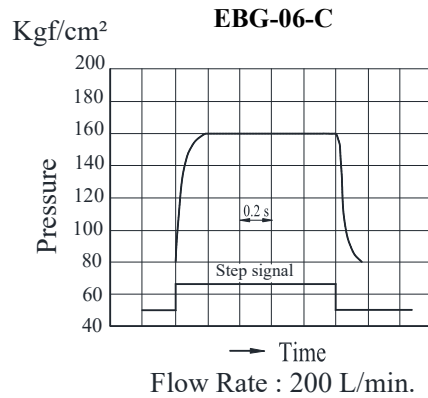
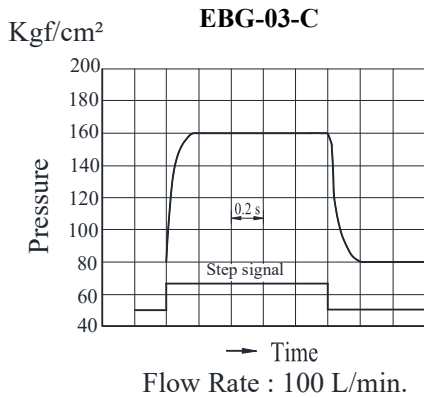


Input Current : 430 mA ± 80 mA
Loading Flow : 80 L/min.
Loading Volume : 3/4" Rubber Hose 1.5 m

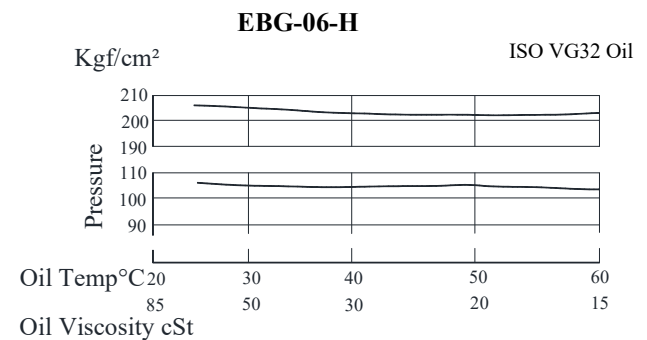
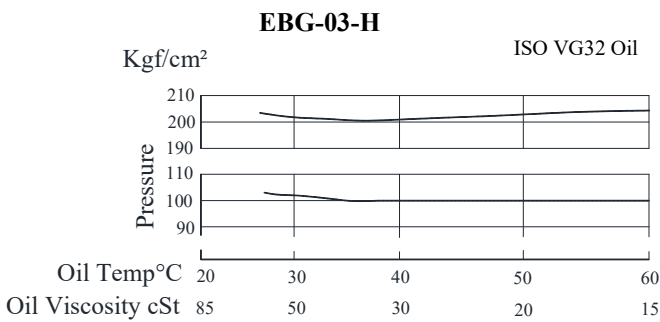
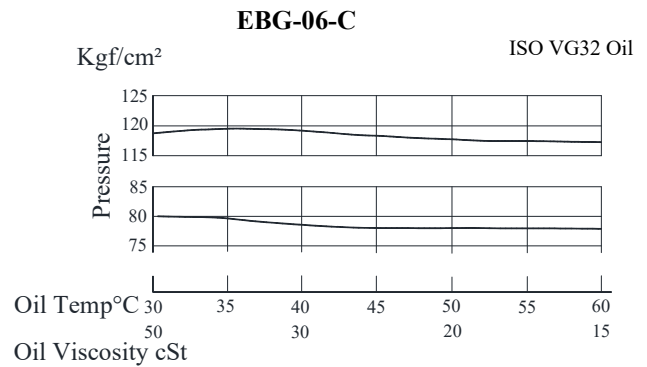
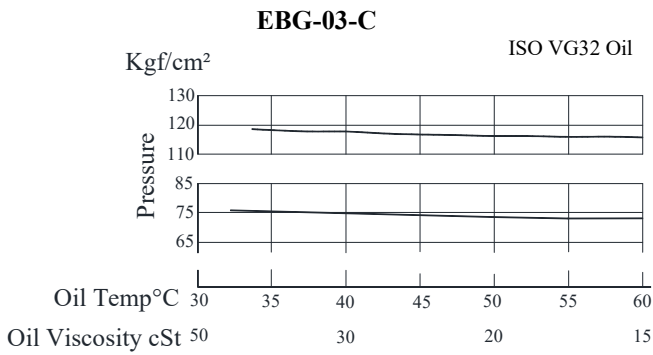
Input Current : 430 mA ± 80 mA
Loading Flow : 80 L/min.
Loading Volume : 3/4" Rubber Hose 1.5 m

Step Response Characteristic (Example)

(These characteristics are measured for valve itself so it is not much different in different circuit)



Viscosity vs Pressure Characteristic



■ Spare Parts List

● List of Seals

| Sl. No. | Name of Parts | Part Number | Quantity | |
|---------|---------------|-------------|----------|--------|
| | | | EBG-03 | EBG-06 |
| 1 | O-Ring | SO-NA-P9 | 1 | 1 |
| 2 | O-Ring | SO-NB-P9 | 3 | 2 |
| 3 | O-Ring | SO-NB-P11 | - | 1 |
| 4 | O-Ring | SO-NB-P18 | 2 | - |
| 5 | O-Ring | SO-NB-P28 | - | 2 |
| 6 | O-Ring | SO-NB-P32 | 1 | 1 |

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

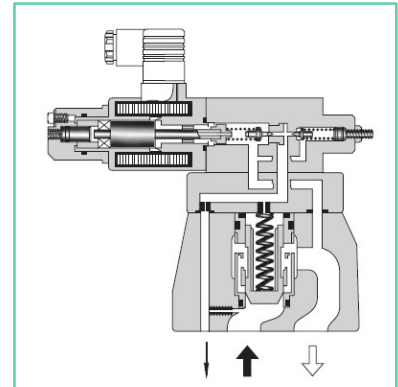
● List of Seal Kit

| Model Numbers | Seal Kit Numbers |
|---------------|------------------|
| EBG-03 | KS-EBG-03-11 |
| EBG-06 | KS-EBG-06-11 |

Proportional Electro-Hydraulic Relief Valves

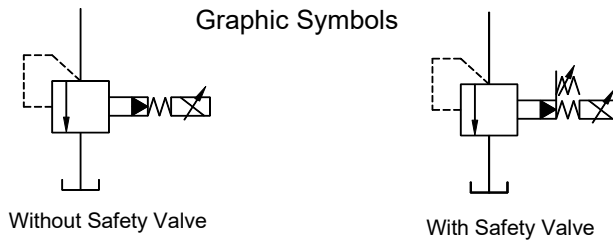
This valve is derived by combining a small, high-performance 1/8 proportional electro-hydraulic pilot relief valve with a specially developed low-noise relief valve.

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.



Specification

| Model Numbers | | EBG-03 | EBG-06 | EBG-10 |
|----------------------|---------------------|-----------------------------------|--------------------|--------------------|
| Description | | | | |
| Max. Operating Pres. | Kgf/cm ² | 250 | | |
| Max. Flow | L/min. | 100 | 200 | 400 |
| Min. Flow | L/min. | 3 | | |
| Pressure Adj. Range | Kgf/cm ² | Refer to Model Number Designation | | |
| Rated Current | mA | C : 770 H : 820 | C : 750 H : 800 | C : 730 H : 780 |
| Coil Resistance | Ω | 10 | | |
| Hysteresis | | 3% or less | | |
| Repeatability | | 1% or less | | |
| Approx. Mass | Kg. | 5.6 | 6.3 | 10 |



Model Number Designation

| F- | EB | G | -03 | -C | -T | -51 |
|--|---|---------------------------------|-------------------------------------|--|--|---------------|
| Special Seals** | Series Number | Type of Mounting | Valve Size | Pressure Adj. Range Kgf/cm ² | Safety Valve | Design Number |
| 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: ※ ^{*1} - 160 H: ※ ^{*1} - 250 | None: With Safety Valve T: Without Safety Valve | 51 |

*1. Min. adjustment pressure shall be referred to the curves on page no.524.

** Before ordering the Special seals, consult YUKEN INDIA LTD.

Attachment

Mounting Bolts

| Valve Model Numbers | Socket Head Cap Screw | Bolt Kit Model Number | Qty. |
|---------------------|-----------------------|-----------------------|------|
| EBG-03 | M12 x 40Lg. | BKEBG-03-51 | 4 |
| EBG-06 | M16 x 50Lg. | BKEBG-06-51 | 4 |
| EBG-10 | M20 x 60Lg. | BKEBG-10-51 | 4 |

E Series

Proportional Electro-Hydraulic Relief Valves

Applicable Power Amplifiers

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see page no. 647, 651, 660)

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 | Sub-Plate Model Numbers | Thread Size | Approx. Mass Kg |
|---------------------|-------------------------|-------------|-----------------|
| EBG-03 | BGM-03-3080 | 3/8 BSP.F | 2.4 |
| | BGM-03X-3080 | 1/2 BSP.F | 3.1 |
| EBG-06 | BGM-06-3080 | 3/4 BSP.F | 4.7 |
| | BGM-06X-3080 | 1 BSP.F | 5.7 |
| EBG-10 | BGM-10-3080 | 1-1/4 BSP.F | 8.4 |
| | BGM-10X-3080 | 1-1/2 BSP.F | 10.3 |

- Sub-plates are available. Specify the sub-plate model numbers from 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. Dimensions, see page 259.

Instructions

Safety valve

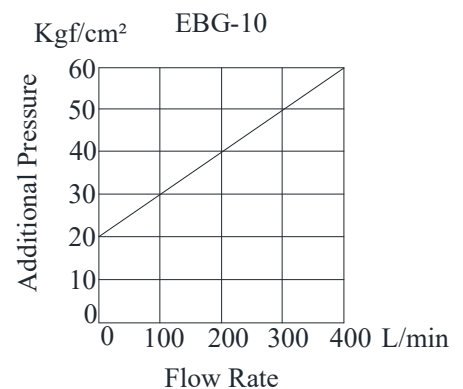
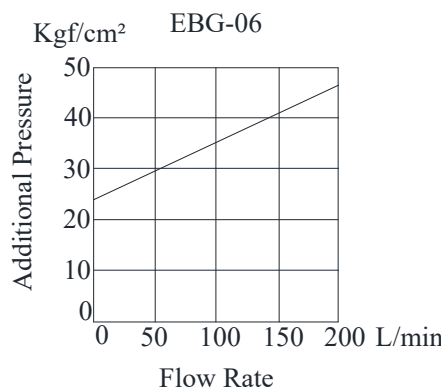
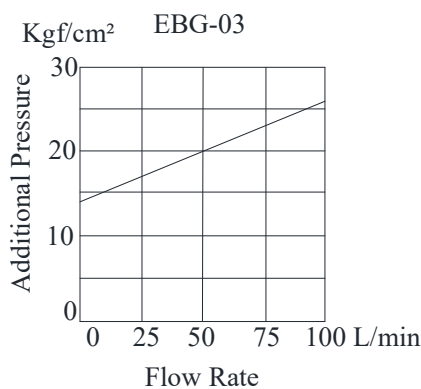
The pressure of the safety valve for EBG-03 is preset at the value equal to the upper limit of the pressure adjustment range plus 20 Kgf/cm² subject to a flow rate of 50 L/min.

The same for EBG-06 is preset at the value equal to the upper limit of the pressure adjustment range plus 35 Kgf/cm² subject to a flow rate of 100 L/min.

The same for EBG-10 is preset at the value equal to the upper limit of the pressure adjustment range plus 40 Kgf/cm² subject to a flow rate of 200 L/min.

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.

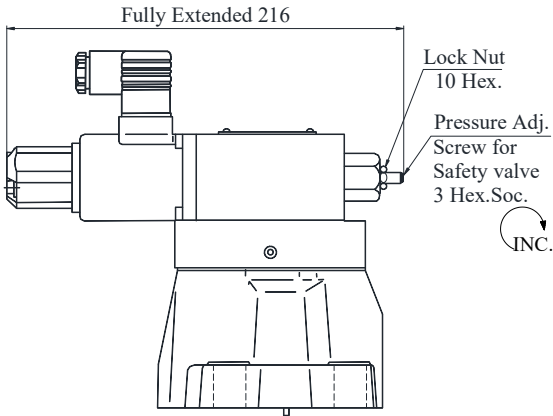
$$\text{Setting pressure} = (\text{Operating pressure upper limit}) + (\text{Additional pressure indicated below})$$



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

With Safety Valve



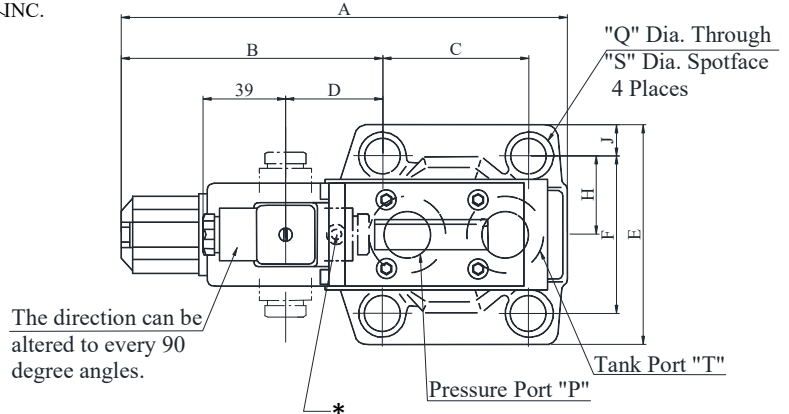
*For other dimensions, refer to the without safety valve

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

DIMENSIONS IN MILLIMETRES

● **EBG-03-06** -*-T-51

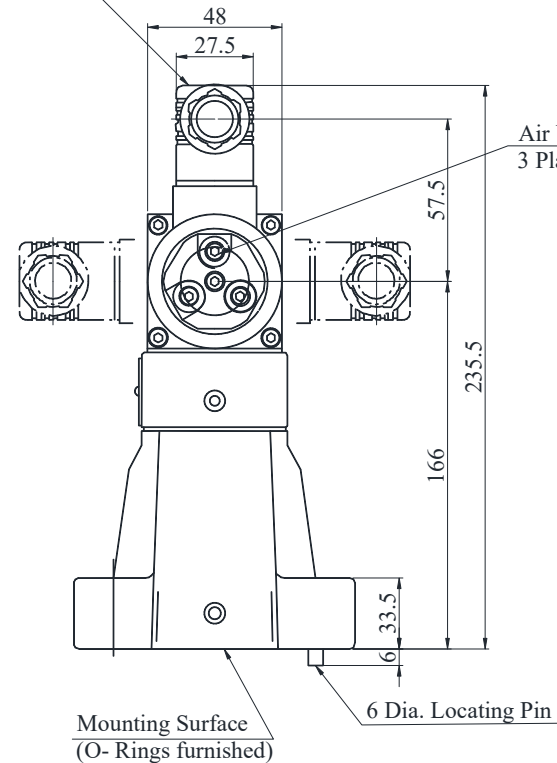
Without Safety Valve



* 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.

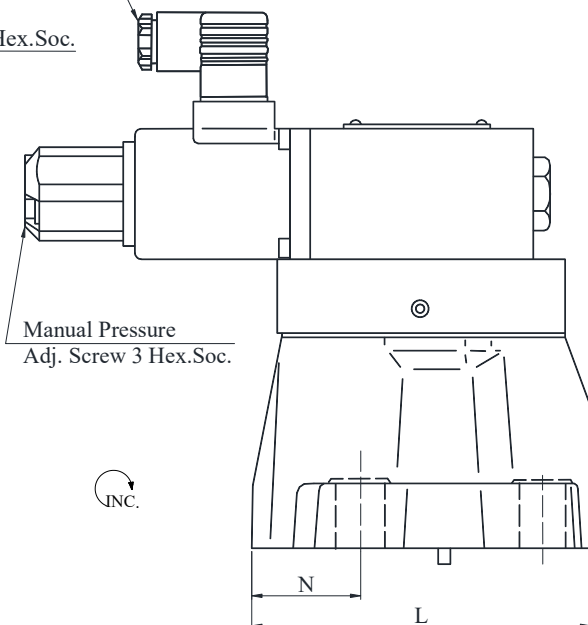
Connector

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



Cable Departure

Cable Applicable : Outside Dia. 8-10mm
 Conductor Area : Not Exceeding 1.5mm²



| Model No. | Dimensions mm | | | | | | | | | | | | |
|-----------|---------------|-------|------|------|----|------|------|------|------|-----|------|------|----|
| | A | B | C | D | E | F | H | J | K | L | N | Q | S |
| EBG - 03 | 197.5 | 117.6 | 53.8 | 40.3 | 76 | 53.8 | 26.9 | 11.1 | 21.5 | 106 | 26.1 | 13.5 | 21 |
| EBG - 06 | 205.5 | 119.5 | 66.7 | 42.1 | 98 | 70 | 35 | 14 | 26 | 122 | 36 | 17.5 | 26 |

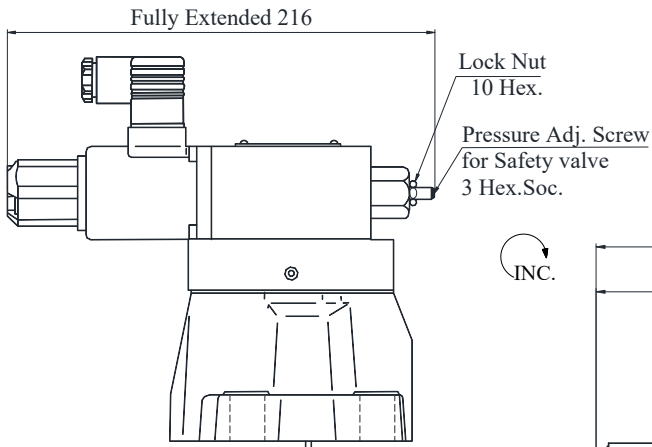
Note: For valve mounting surface dimensions, see the dimensional drawings of sub-plates (Page No. 259) in common use.

E Series
Proportional Electro-Hydraulic Relief Valves

● **EBG-10-*51**
With Safety Valve

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

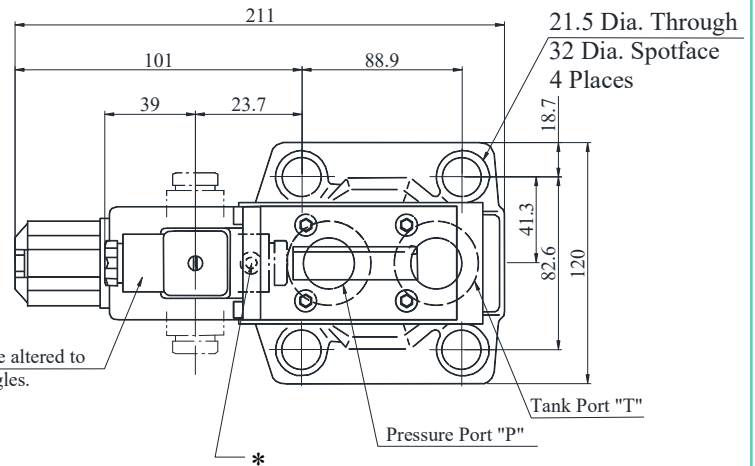
**DIMENSIONS IN
MILLIMETRES**



*For other dimensions, refer to the without safety valve

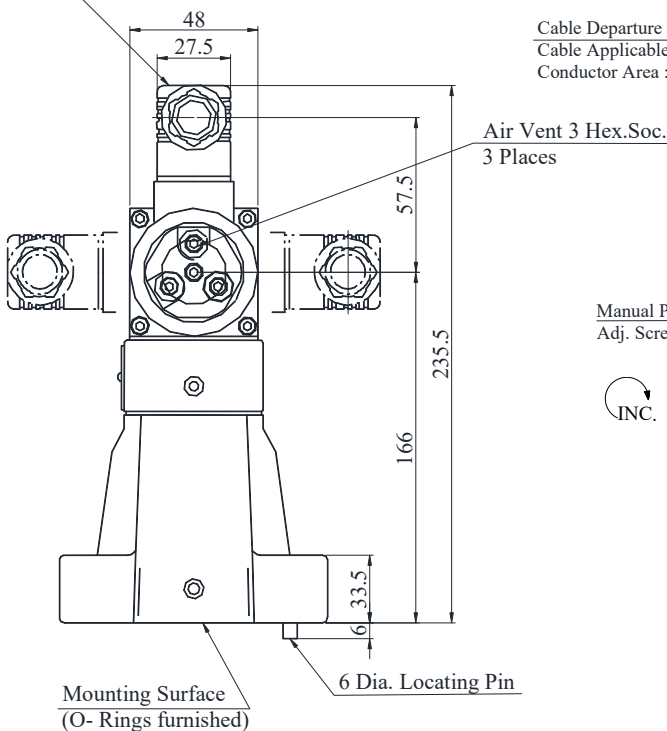
The direction can be altered to every 90 degree angles.

● **EBG-10-*T-51**
Without Safety Valve



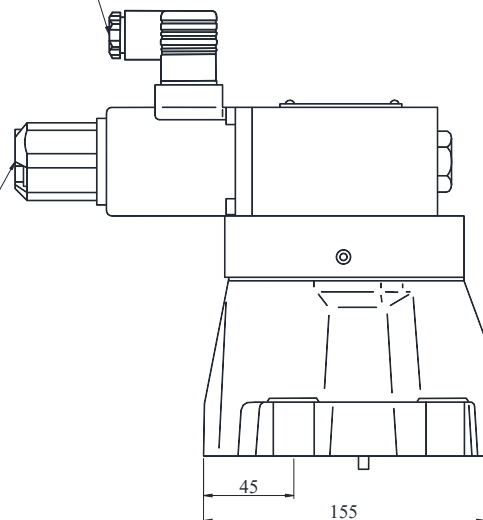
* This port is not used. It is provided because of the common use of the body with the low-noise type pilot operated relief valve. On the sub-plate, plug the port which corresponds to this port.

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



Cable Departure
Cable Applicable : Outside Dia. 8-10mm
Conductor Area : Not Exceeding 1.5mm²

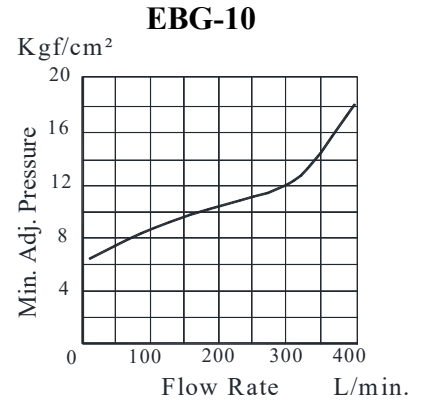
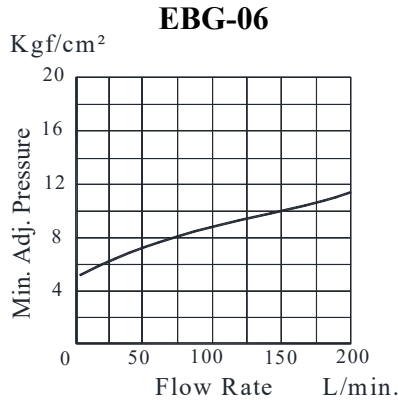
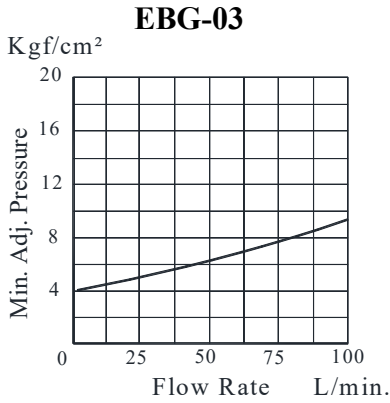
Manual Pressure
Adj. Screw 3 Hex.Soc.



Note: For valve mounting surface dimensions, see the dimensional drawings of sub-plates (Page No. 259) in common use.

Min. Adjustment Pressure

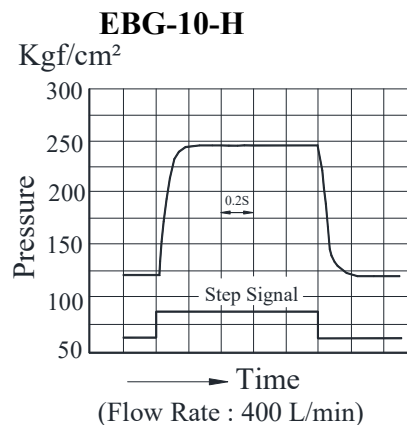
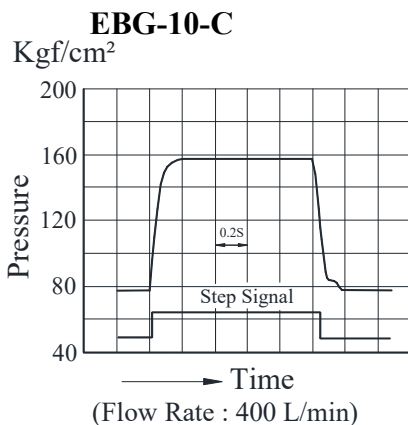
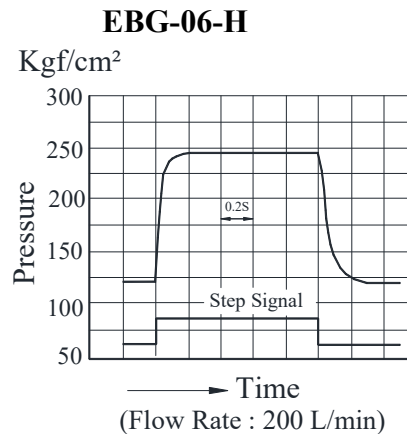
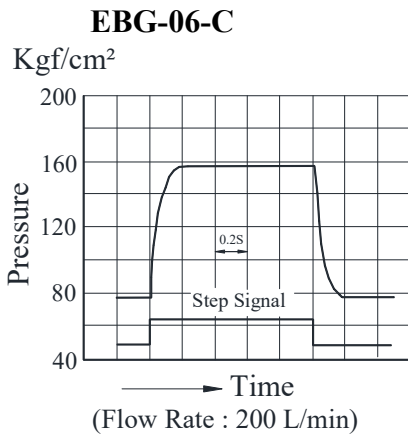
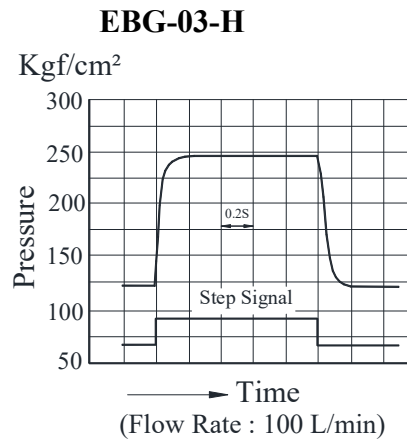
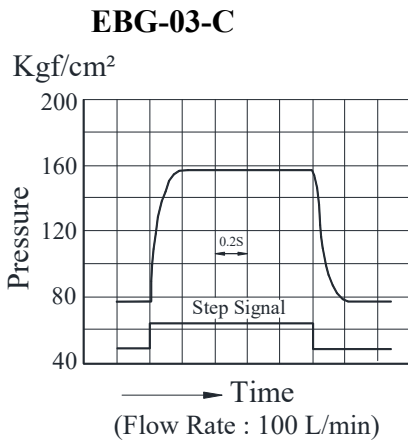
Viscosity : 30mm²/s



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 : 1L
Viscosity : 30mm²/s

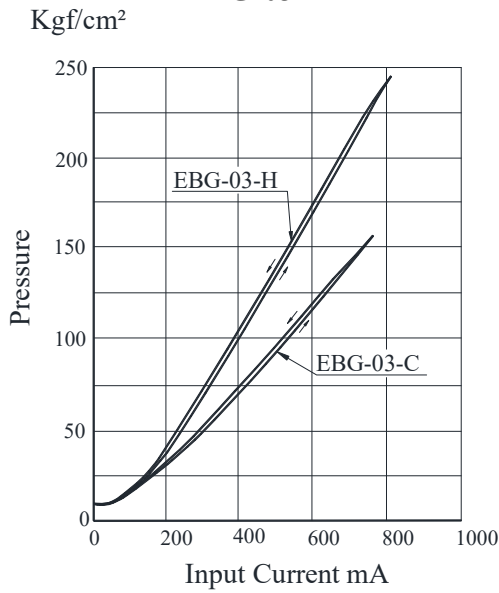


E Series

Proportional Electro-Hydraulic Relief Valves

Input Current vs. Pressure

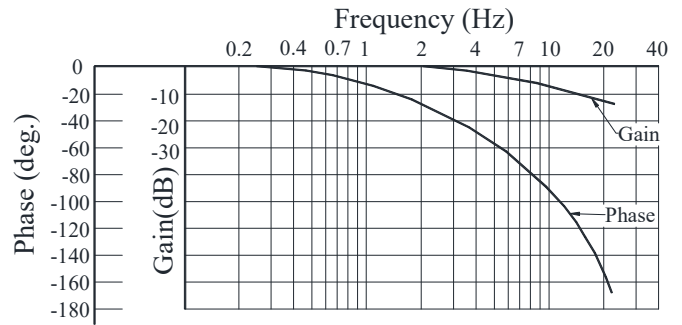
EBG-03



Frequency Response

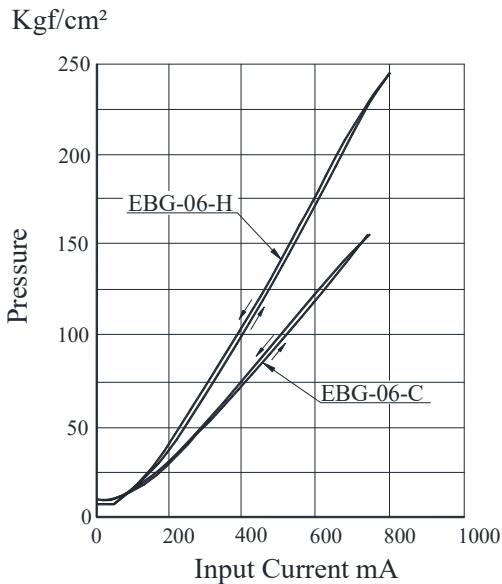
Trapped Oil Volume : 1L
Viscosity : 30 mm²/s

EBG-03

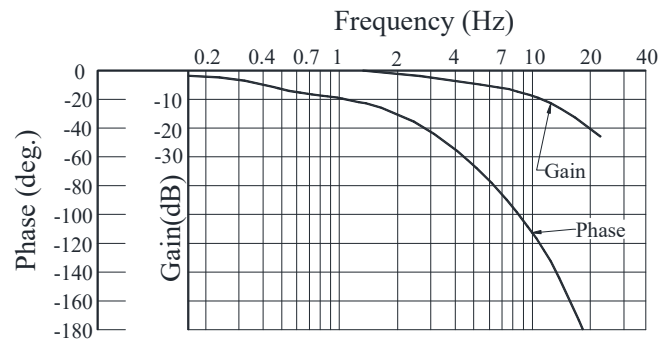


Pressure : 7.8 ± 16 Kgf/cm²
Flow Rate : 100 L/min

EBG-06

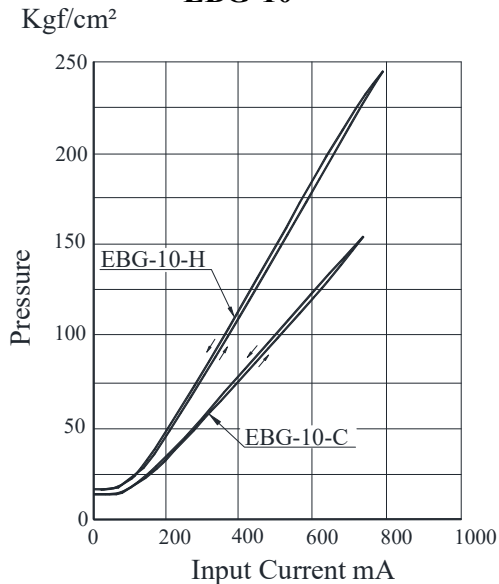


EBG-06

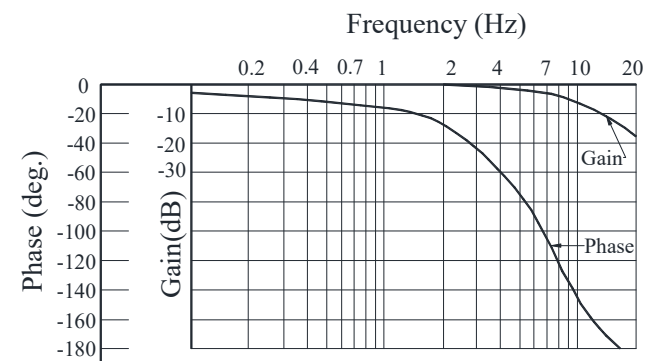


Pressure : 7.8 ± 16 Kgf/cm²
Flow Rate : 200 L/min

EBG-10



EBG-10



Pressure : 7.8 ± 16 Kgf/cm²
Flow Rate : 400 L/min

E Series

Proportional Electro-Hydraulic Relief Valves

H
Proportional Electro-Hydraulic Relief Valve

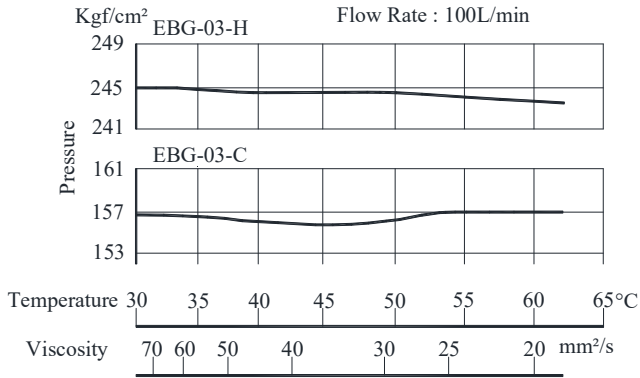
Viscosity vs. Pressure

Oil : ISO VG 46 Oil

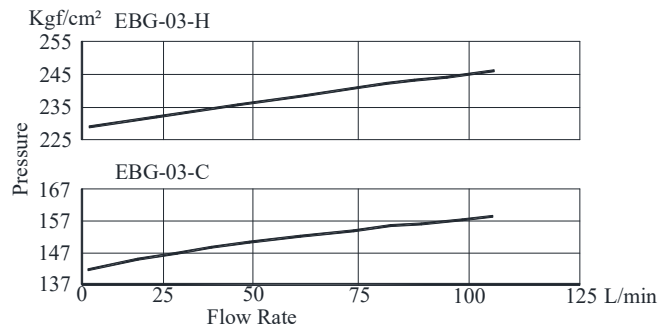
Flow Rate vs. Pressure

Viscosity : 30 mm²/s

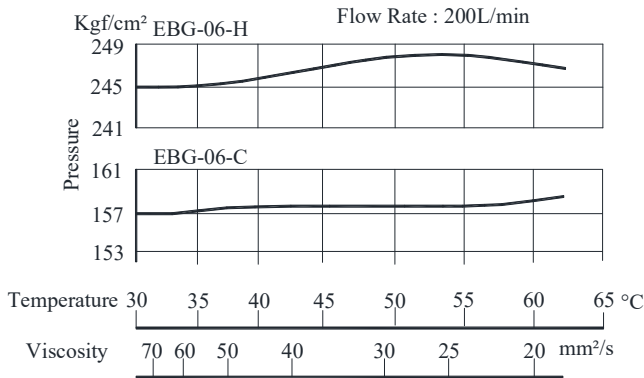
EBG-03



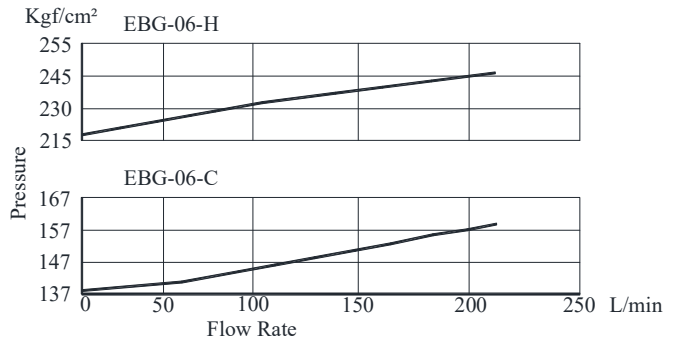
EBG-03



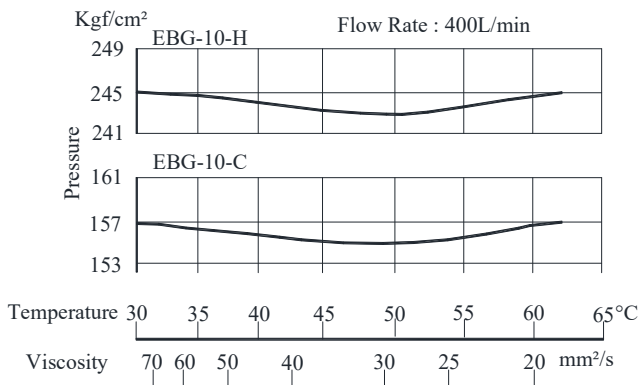
EBG-06



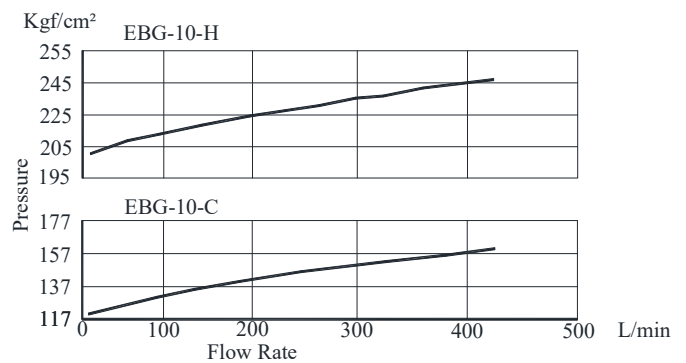
EBG-06



EBG-10



EBG-10



List of Seals and Pilot Valves

● **List of Seals**

| Sl. No. | Name of Parts | Part Numbers | | | Quantity |
|---------|---------------|--------------|------------|------------|----------|
| | | EBG-03 | EBG-06 | EBG-10 | |
| 1 | O-Ring | SO-NB-P32 | SO-NB-P32 | SO-NB-P42 | 1 |
| 2 | O-Ring | SO-NB-P28 | | | 1 |
| 3 | O-Ring | SO-NB-P9 | SO-NB-P11 | SO-NB-P9 | 1 |
| 4 | O-Ring | SO-NB-P9 | | | 2 |
| 5 | O-Ring | SO-NB-A024 | SO-NB-A024 | SO-NB-A128 | 1 |
| 6 | 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 511.

● **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 |

● **Pilot Valve**

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

Note:

For the details of pilot valves, refer to “Pilot Relief Valves” on page 511.