

# 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.

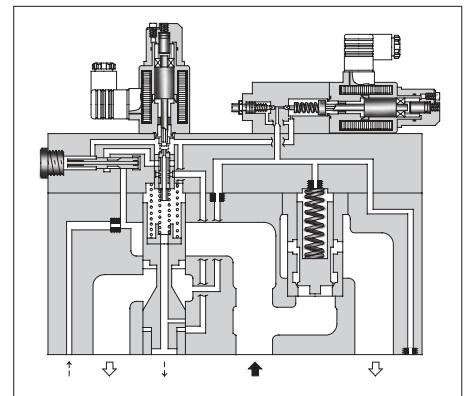
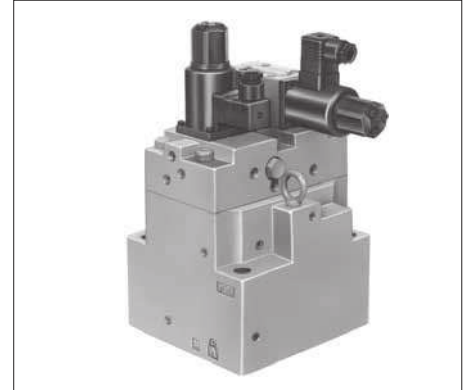
For the High Flow Series, double maximum flow rate [03 size: 125→250 L/min (33.03→66.05 U.S.GPM), 06 size: 250→500 L/min (66.05→132.1 U.S.GPM), 10 size: 500→1000 L/min (132.1→264.2 U.S.GPM)] enables a smaller valve size than conventional products; compact-sized devices can be provided.

## 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
★1 Pressure Controls	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)	C: 1.1-15.7 (160-2275) H: 1.1-24.5 (160-3550)
	Rated Current	C: 850 mA H: 870 mA	C: 800 mA H: 900 mA	C: 900 mA H: 950 mA
	Coil Resistance	10 Ω	10 Ω	10 Ω
	Hysteresis	3% or less	3% or less	3% or less
	Repeatability	1% or less	1% or less	1% or less
Approx. Mass kg (lbs.)		Refer to page 735 to 737		

★1. The specifications for pressure controls are applied to models with proportional pilot relief valve. (Ex. EFBG-03-250-C-\*-51)

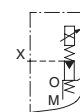
★2. The maximum pressure adjustment range of the valves without proportional pilot relief valves is 24.5 MPa (3550 PSI).



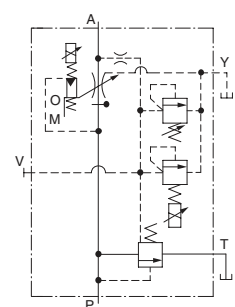
## Graphic Symbols

With Proportional Pilot Relief Valve

External Pilot

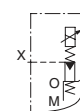


Internal Pilot

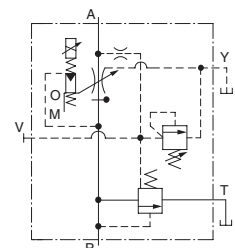


Without Proportional Pilot Relief Valve

External Pilot



Internal Pilot



H



E Series  
High Flow Series Flow Control and Relief Valves

## Model Number Designation

F-	EFB	G	-03	-250	-C	-E	-51	*
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min (U.S.GPM)	Proportional Pilot Relief Valve Pressure Adj. Range	Pilot Connection	Design Number	Design Standards
<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 ★
			<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)

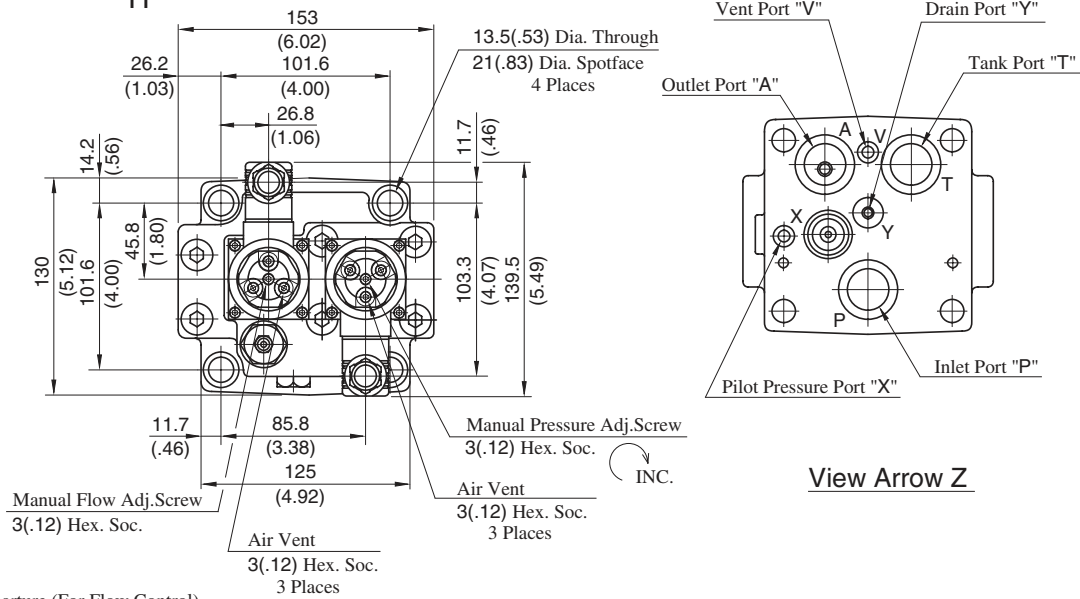
#### EFBG-03

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



### 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.)

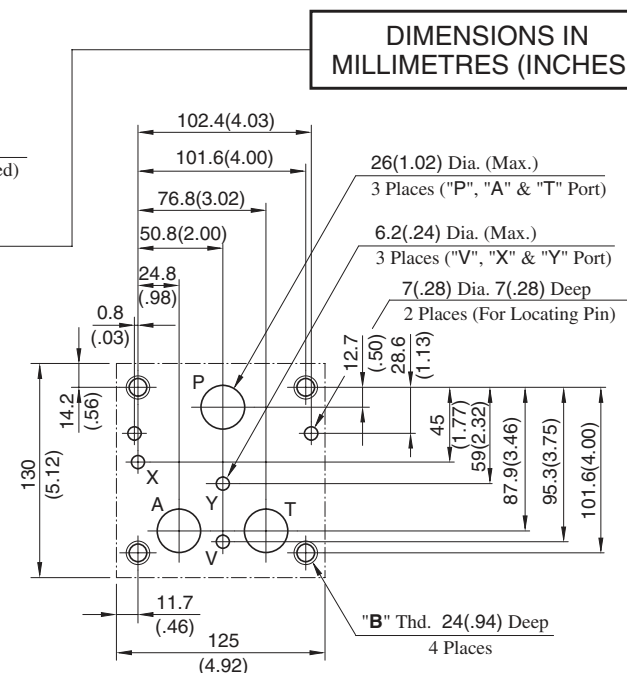
Models with proportional pilot  
relief valve (EFBG-03-250-C/H )  
only.

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

### 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



# H

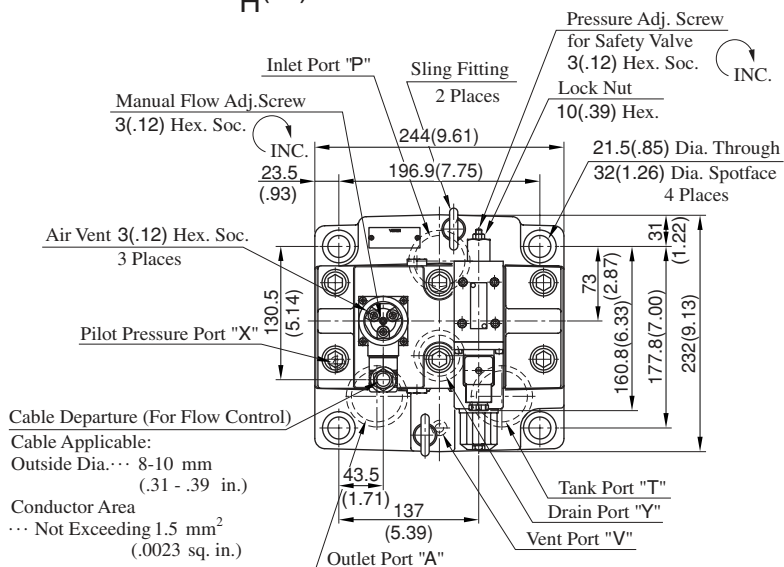


**E Series**  
High Flow Series Flow Control and Relief Valves



## Models with Proportional Pilot Relief Valve

EFBG-10-1000-<sup>C</sup><sub>H</sub>(-E)-51/5190

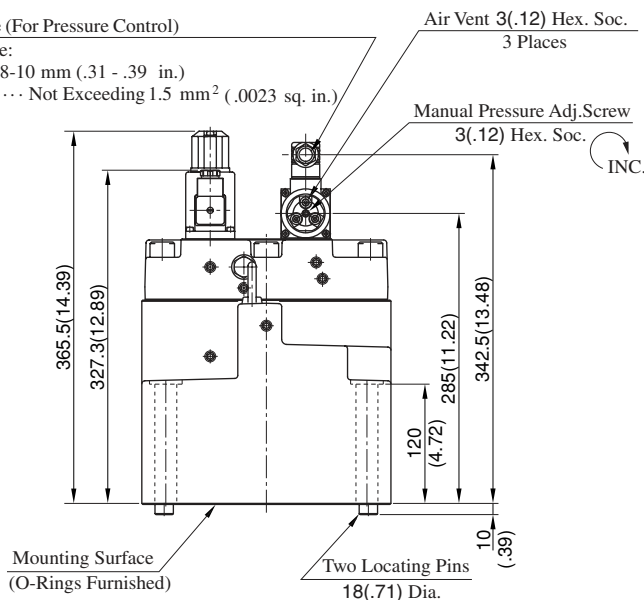


### Cable Departure (For Pressure Control)

Cable Applicable:

Outside Dia. ... 8-10 mm (.31 - .39 in.)

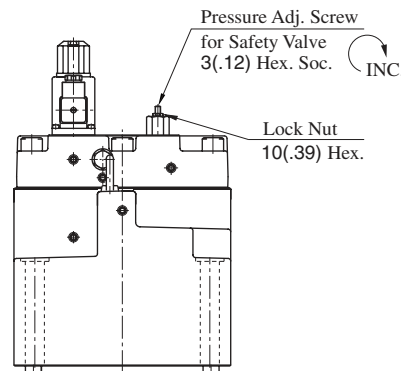
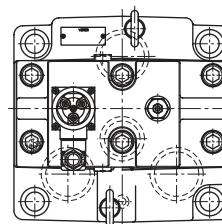
Conductor Area ... Not Exceeding 1.5 mm² (.0023 sq. in.)



Approx. Mass ..... 76 kg (167.6 lbs.)

## Models without Proportional Pilot Relief Valve

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



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

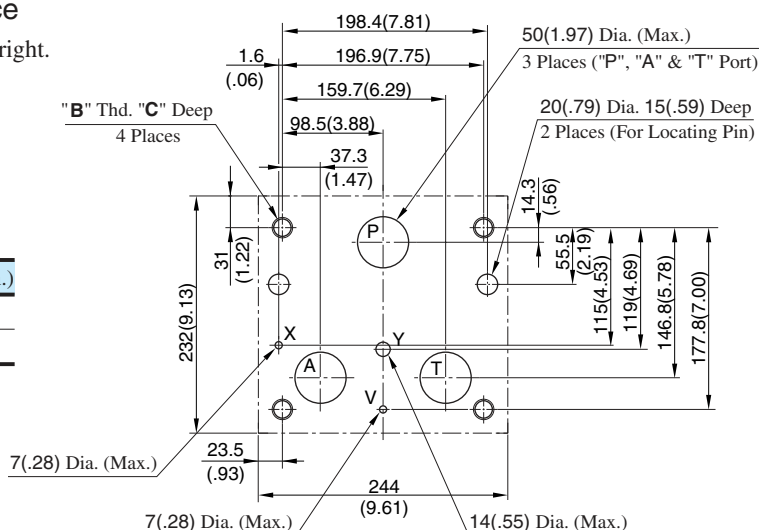
Approx. Mass ..... 74 kg (163.1 lbs.)

## DIMENSIONS IN MILLIMETRES (INCHES)

### Dimensions of valve mounting surface

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

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

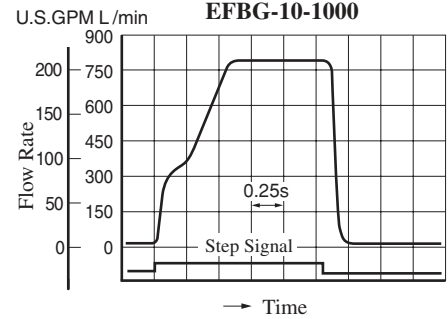
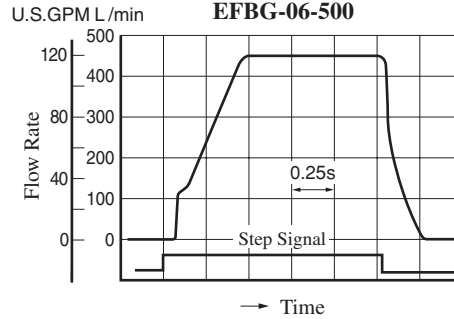
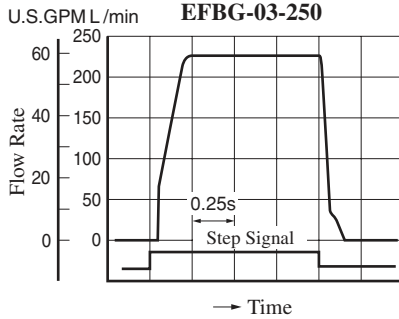


## Step Response

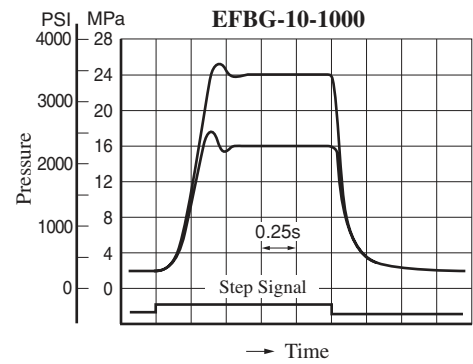
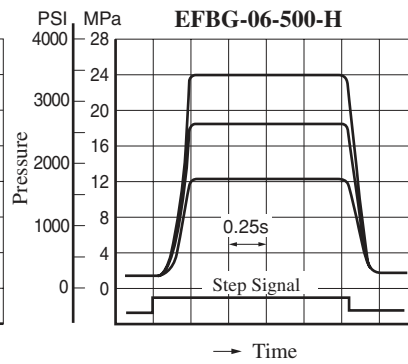
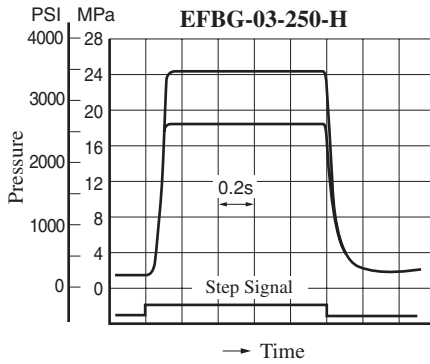
These characteristics have been obtained by measuring on each valve.  
Therefore, they may vary according to a hydraulic circuit to be used.

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

## Flow Controls

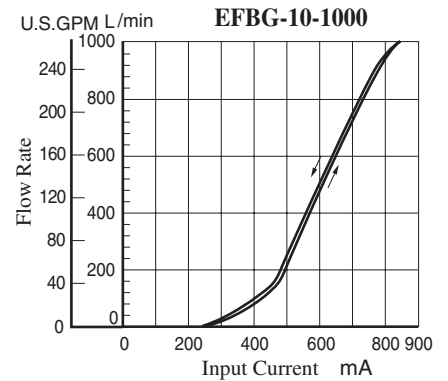
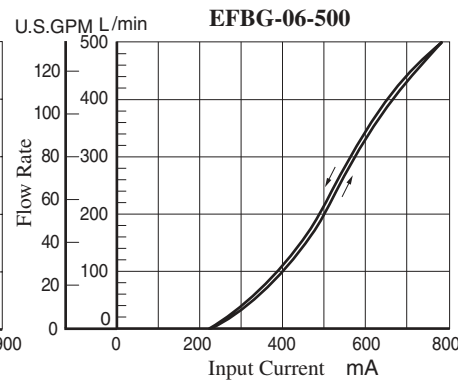
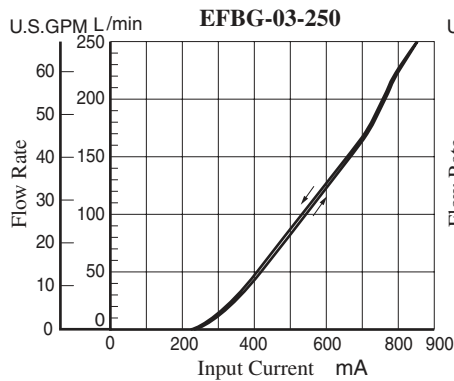


## Pressure Controls



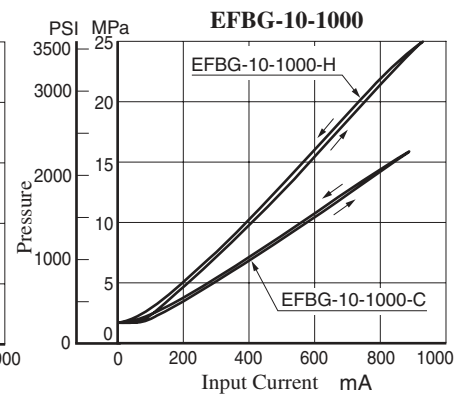
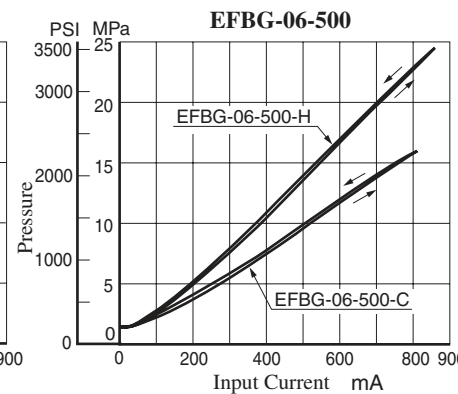
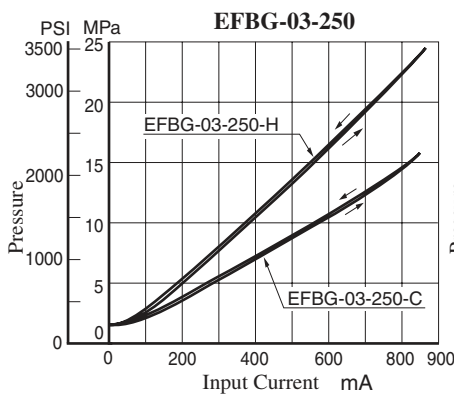
## Input Current vs. Flow

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



## Input Current vs. Pressure

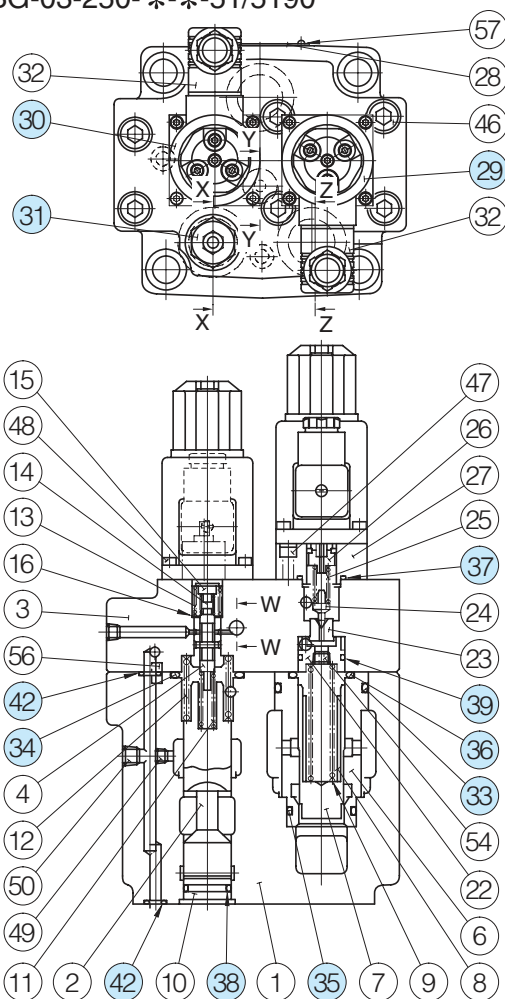
Viscosity: 30mm<sup>2</sup>/s (141 SSU)



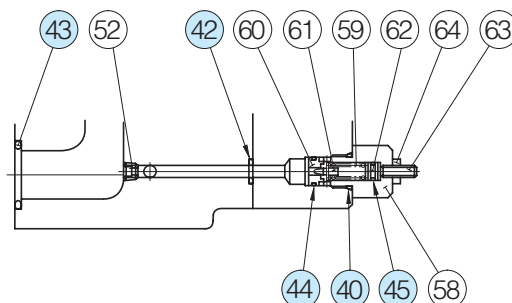


## List of Seals, Solenoid Ass'y and Safety Valve

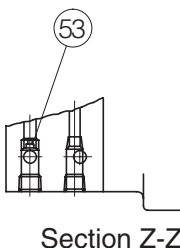
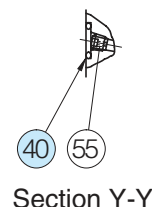
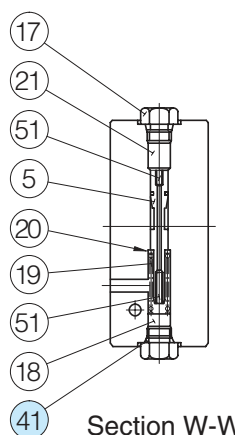
EFBG-03-250-\*\*-51/5190



Detail of Safety Valve  
(Item 31)



Section X-X



### 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.	③① 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	—		

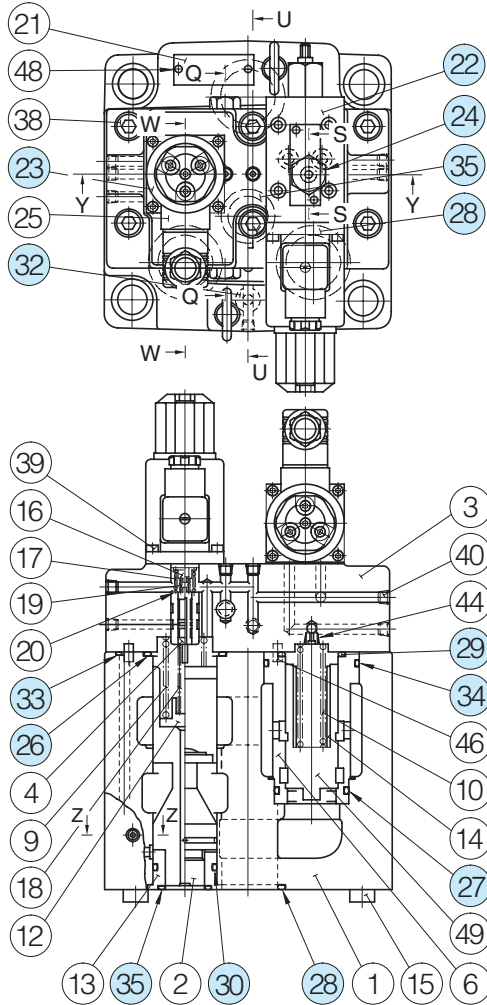
Note: The connector assembly GDM-211-B-11 (Item 32) is not included in the solenoid assembly.

### List of Seal Kits

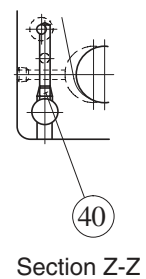
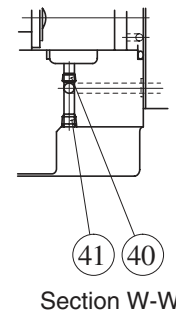
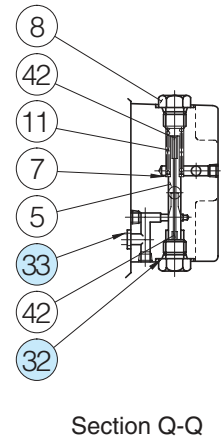
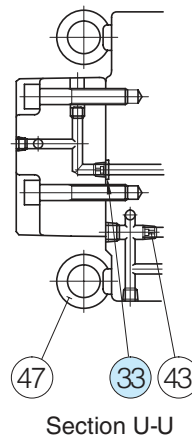
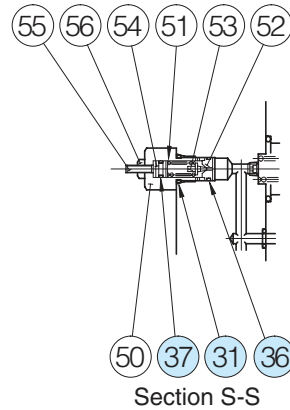
Valve Model Numbers	Seal Kit Numbers
EFBG-03-250-51*	KS-EFBG-03-250-51
EFBG-03-250-C/H-51*	KS-EFBG-03-250-C-51

■ 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 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](#).

● 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.

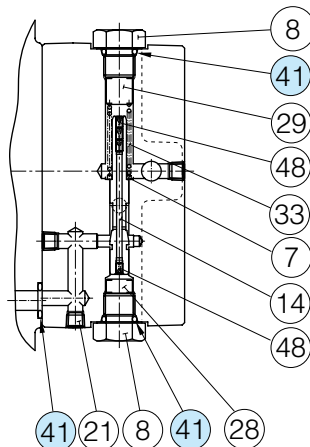
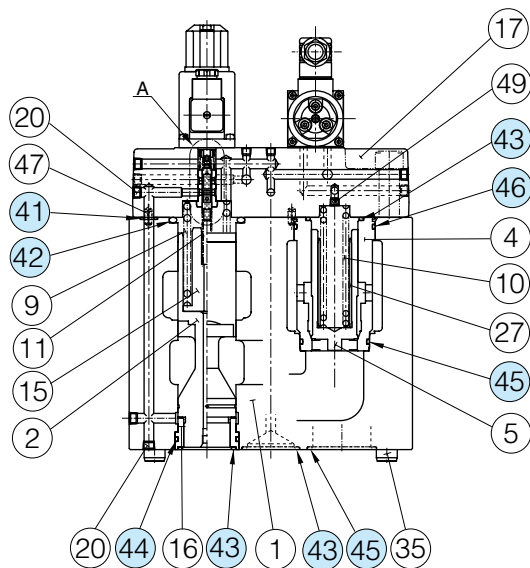
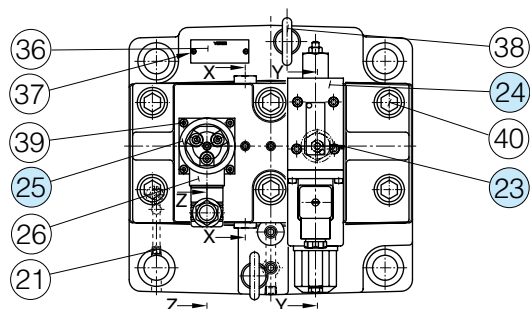
● List of Seal Kits

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

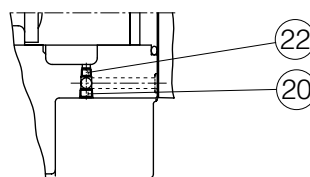


## List of Seals, Pilot Valves, Solenoid Ass'y and Safety Valve

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



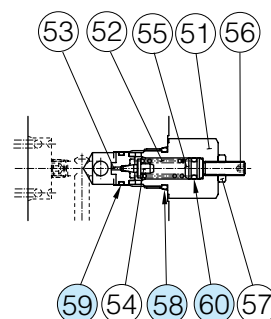
Section X-X



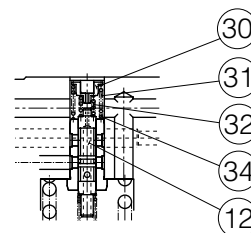
Section Z-Z

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

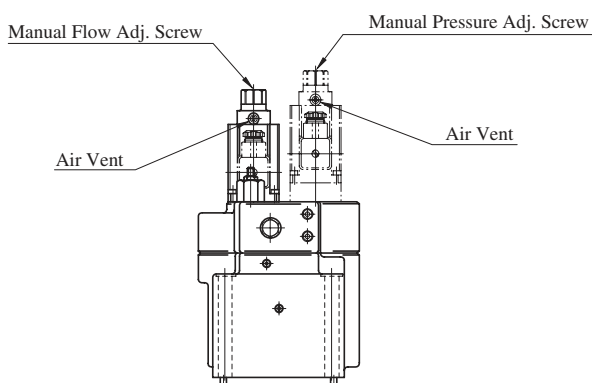
No changes in specifications and characteristics between current and new design.

## Mounting Interchangeability

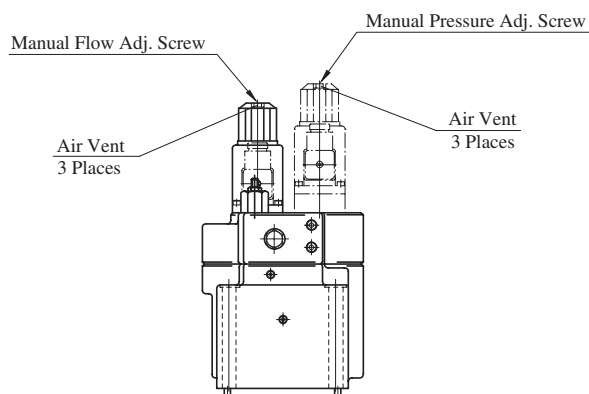
There is an interchangeability in the mounting dimensions between current and new design, however, note that because of improvements made on the solenoids, the overall shapes have been changed as shown below.

### EFBG-03

Current : Design 50

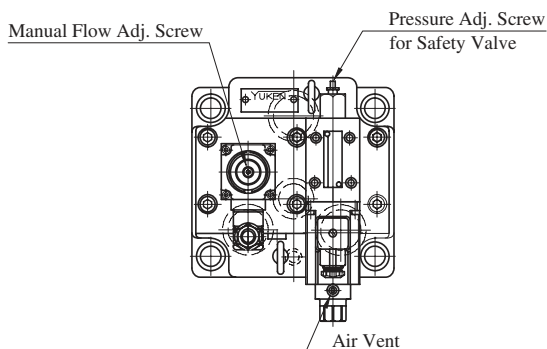


New : Design 51



### EFBG-06/10

Current : Design 50



New : Design 51

