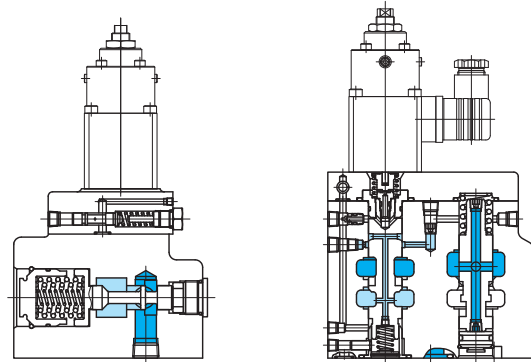


Proportional solenoid flow control valves EPF(R)G

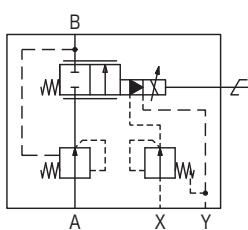


This valve is a flow control valve which utilizes a proportional solenoid actuator. A proprietary flow adjustment design is incorporated to allow very precise positioning of the main spool. This flow control valve is pilot operated, and the main spool is impervious to effects of flow forces and other disturbances.

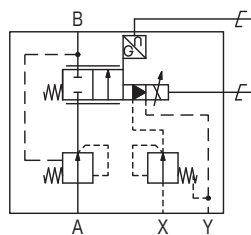
The EPFRG valve utilizes a bypass type pressure compensator with load sensing function which contributes to energy saving of hydraulic circuits.

Functional Symbols

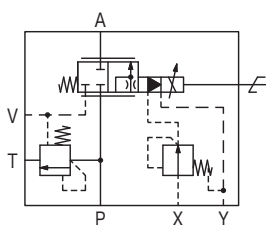
EPFG-**-**



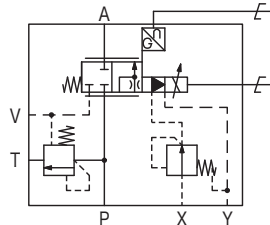
EPFG-**-F



EPFRG-**-S1



EPFRG-**-F-S1



Note: EPFRG-06/10 has no V ports (vent).

Model Code

EPF(R)G-03-130-(F)-(EX)-10-(S1)

1

2

3

4

5

6

7

1 Proportional solenoid flow control valve (gasket mounting)

EPFG: with series type pressure compensator

EPFRG: with bypass type pressure compensator

2 Size

Refer to "Specifications".

3 Max. control flow

Refer to "Specifications".

4 Position sensor

Omit: no position sensor

F: with position sensor

5 Pilot

Omit: internal pilot with reducing valve

EX: external pilot with reducing valve

6 Design no.

10: all except EPFRG-06

11: EPFRG-06

7 Control code

Omitted for EPFG

S1: for EPFRG

Specifications

Model Code		EPFG						EPFRG											
Size		03		06		10		02		03		06		10					
Max. working pressure	MPa	21						17.5						21					
Max. control flow code		30	65	130	170	250	375	500	30	65	130	150	250	290	375	500	1000		
Min. control flow	L/min	0.7	1.0	1.3	1.7	2.5	4	5	1	1.5	2	2	3	4	5	6	10		
Max. control flow	L/min	30	65	130	170	250	375	500	30	65	130	150	250	290	375	500	1000		
Pilot Pressure	MPa	1.5~21																	
Pilot flow	L/min	1.5		1.5		2.5		1.5		2.0		2.5		3					
Rated current	A	1																	
Coil resistance	Ω	14												15					
Dither frequency	Hz	100~110																	
Dither current	mA rms	42												90					
Current control solenoid	Hysteresis	3% or Less*1																	
	Repeatability	1% or Less*3																	
Position control solenoid	Hysteresis	0.2% or Less*2												—					
	Repeatability	0.1% or Less*3												—					
Pressure compensator		Series type*5						Bypass type*4											
Weight	kg	10		24		50		10		18		33		68					

Note:

*1: Value when using controller P-X-20 or equivalent.

*2: Value when using controller PB-Z-20 or equivalent.

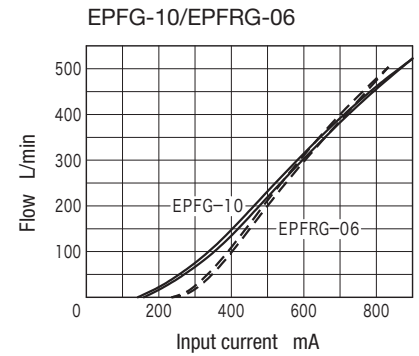
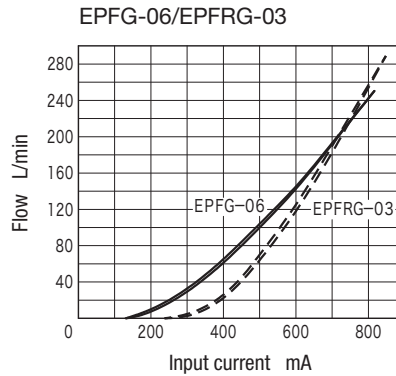
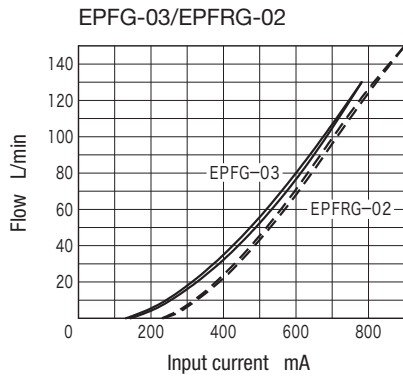
*3: Valve unit value using special controller and with same working conditions.

*4: Capacity of EPFRG-10 pressure compensator is 600 L/min. For flow control above 600 L/min, pressure compensator function will deteriorate if load pressure is below 2 MPa.

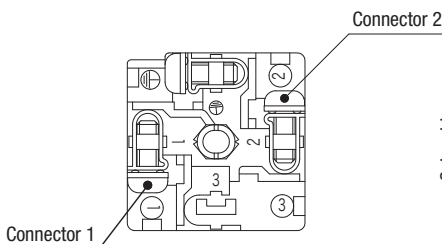
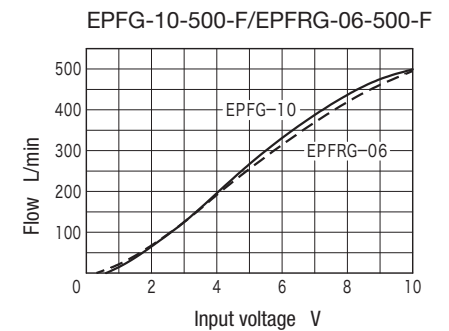
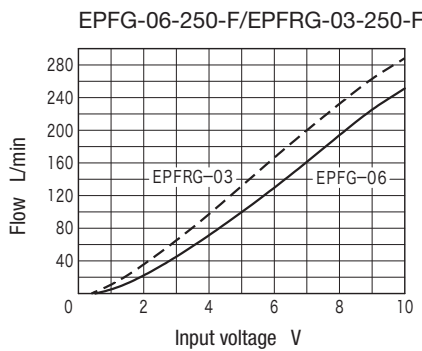
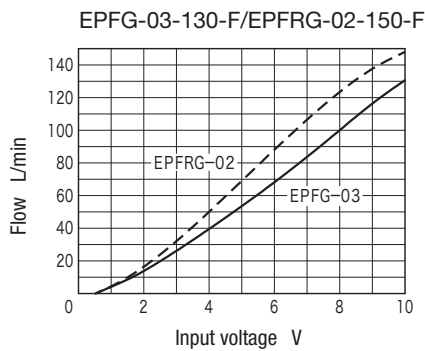
*5: For optimum flow control, maintain valve pressure differential over 1 MPa for size 03, over 1.5 MPa for size 06, and over 2 MPa for size 10.

Characteristics Curve (at 20 mm²/s) (typical examples)

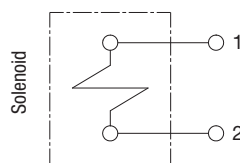
Input Current–Flow Characteristics



Input Voltage–Flow Characteristics



DIN connector pin layout

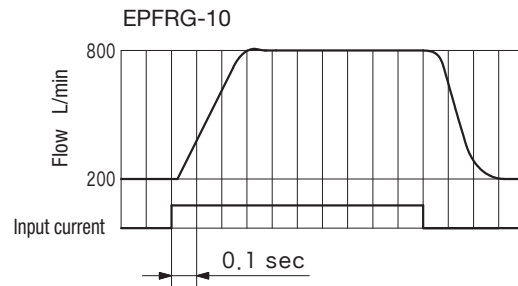
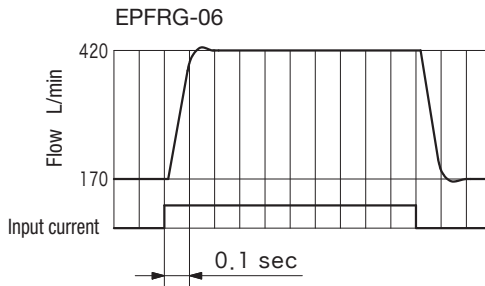
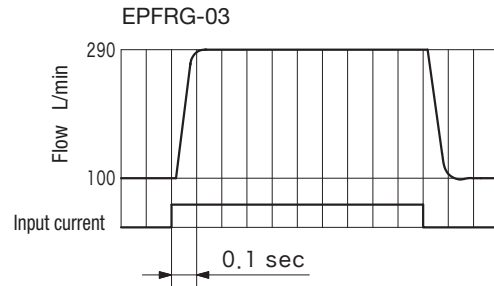
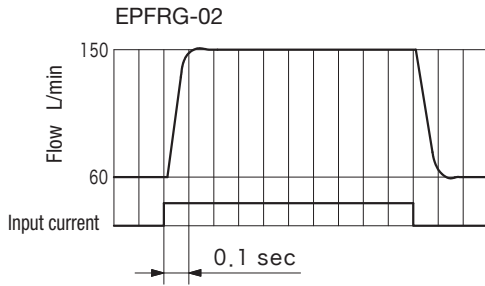


* No polarity for terminal 1, 2

Proportional solenoid electrical wiring diagram

Characteristics Curve (at 20 mm²/s) (typical examples)

Step Response Characteristics



Notes on Operation

- **Mounting orientation**
Valve can be mounted in any direction. However if valve is mounted on the lateral side of the manifold block, and none of the 3 air bleed plugs do not face the ceiling, rotate the proportional solenoid 90° to orient an air bleed plug to the ceiling. Current-flow characteristics may vary slightly (approx. 1.5%) according to the mounting direction.
- **Air bleed**
For stable flow control, loosen the air bleed plug and bleed air completely out of the valve prior to use.
- **Manual operation**
In case there is no input current to the solenoid during initial adjustment or electric malfunction, press the manual pin for flow control such as Inching.

- **Zero adjustment**
This is adjusted at factory before shipment. Readjustment is not necessary.
- **Drain piping**
Y port (drain) allowable back pressure is 0.2 MPa. Piping should be directly returned to tank. Ensure that end of the piping is always below the fluid level.
- **Valve and actuator piping**
Care should be paid when the vent line piping is long as the large volume of fluid in the pipes may cause instability (resonance). Piping should be as short as possible.
- **For optimum flow control, differential pressure should be more than or equal to the values shown in the below table.**

Size	Valve Differential Pressure MPa
03	1
06	1.5
10	2

Mounting Bolts (JIS B 1176, Strength Class 12.9)

Valve Model	Hex Socket Bolts		Qty
	Metric Thread	Unified Thread	
EPFG-03	M10 × 60	3/8-16UNC × 63.5	4
EPFG-06	M16 × 105	5/8-11UNC × 101.6	4
EPFG-10	M20 × 145	3/4-10UNC × 146.1	4
EPFRG-02	M10 × 70	3/8-16UNC × 69.8	4
EPFRG-03	M12 × 110	1/2-13UNC × 114.3	2
	M12 × 90	1/2-13UNC × 95.2	2
EPFRG-06	M20 × 150	—	2
	M20 × 110	—	2
EPFRG-10	M20 × 190	—	2
	M20 × 130	—	2

- Mounting bolts must be ordered separately.
- Mounting bolt tightening torque
EPFG-03, EPFRG-02: 50 to 60 N·m
EPFRG-03: 75 to 81 N·m
EPFG-06: 90 to 110 N·m
EPFRG-06, EPF(R)G-10: 230 to 290 N·m

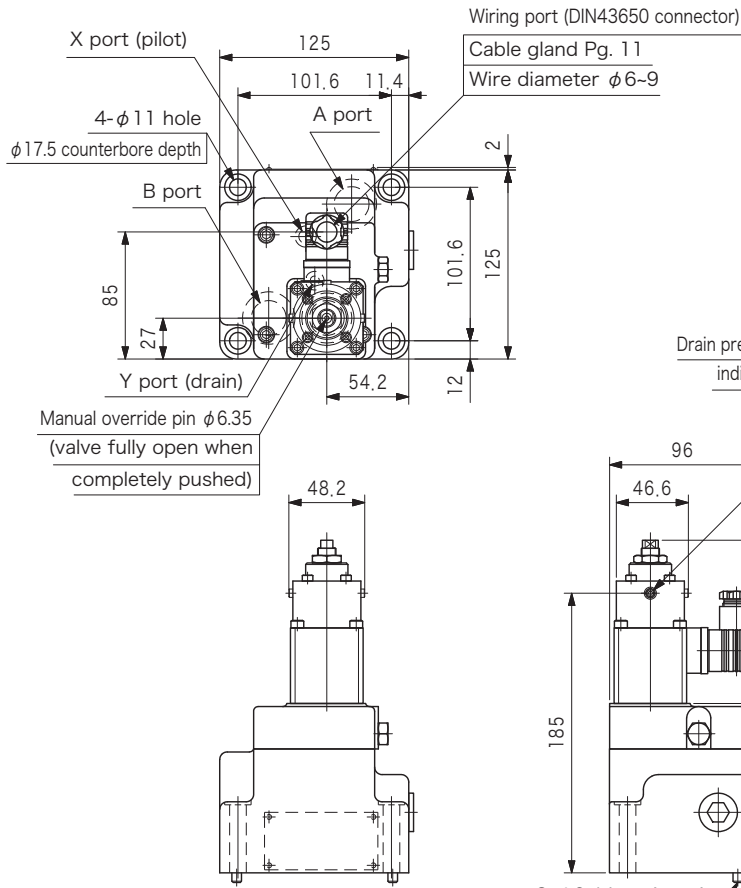
Subplate

Valve Model	Subplate	Connection Port Dia. Rc	Valve Mounting Thread
EPFG-03	EPFGM-03Y-20	3/4	Unified thread
	EPFGM-03Z-20	1	
EPFG-06	EPFGM-06X-20	1	
	EPFGM-06Y-20	1-1/4	
EPFG-10	EPFGM-06Z-20	1-1/2	
	TFGTM-10X-10	1-1/2	
	TFGTM-10Y-10	2	
EPFRG-02	D-FRGM-02-10	3/4	Metric thread
EPFRG-03	D-FRGM-03-10	1-1/4	
EPFRG-06	D-FRGM-06-10	1-1/2	

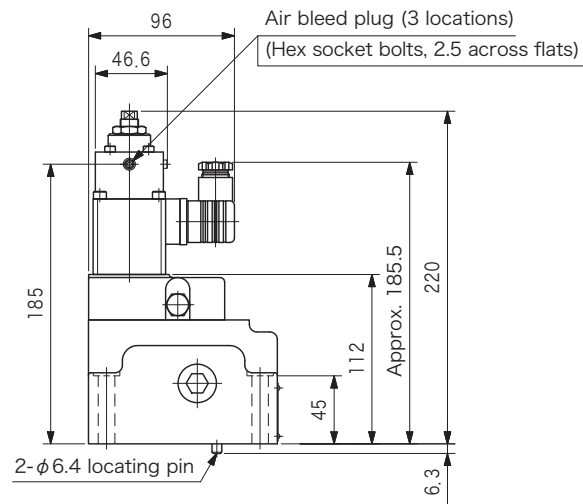
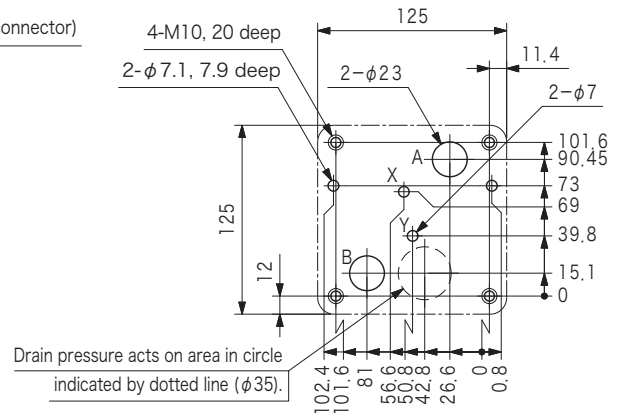
- Subplate must be ordered separately.
- Hex socket bolts for mounting valve included (See above table for thread types.)
- See page R6-8 and R6-9 for dimensions.

Dimensions

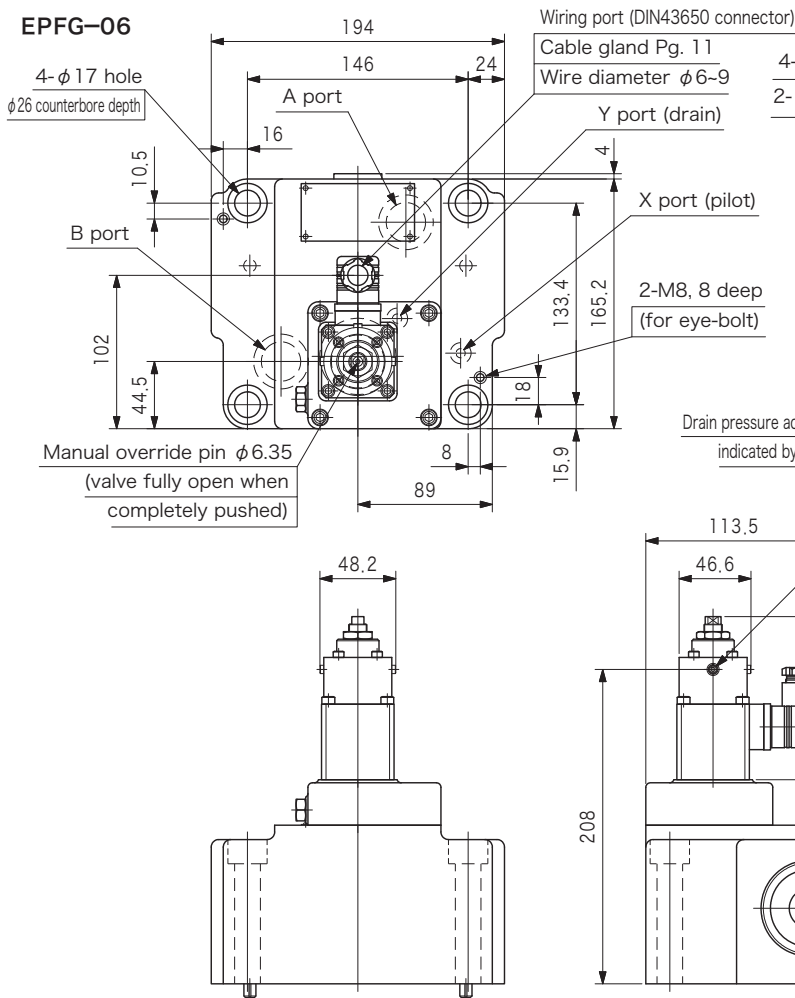
EPFG-03



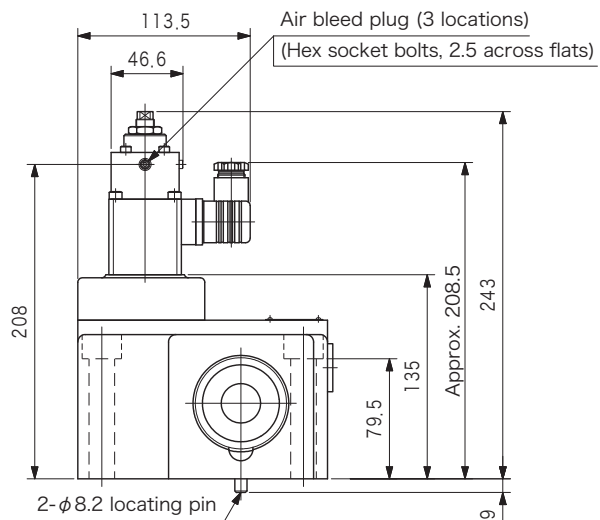
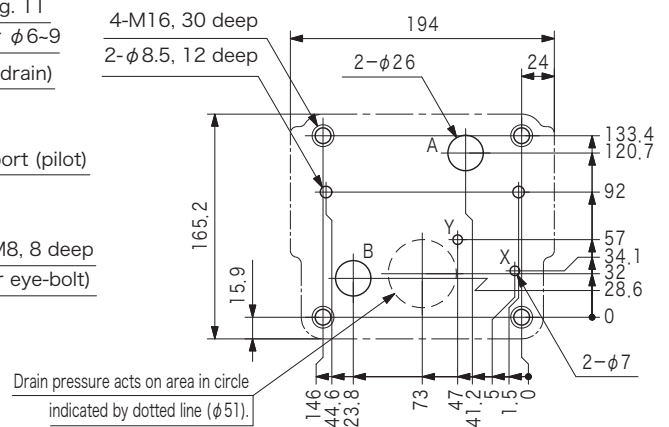
● Mounting dimensions



EPFG-06

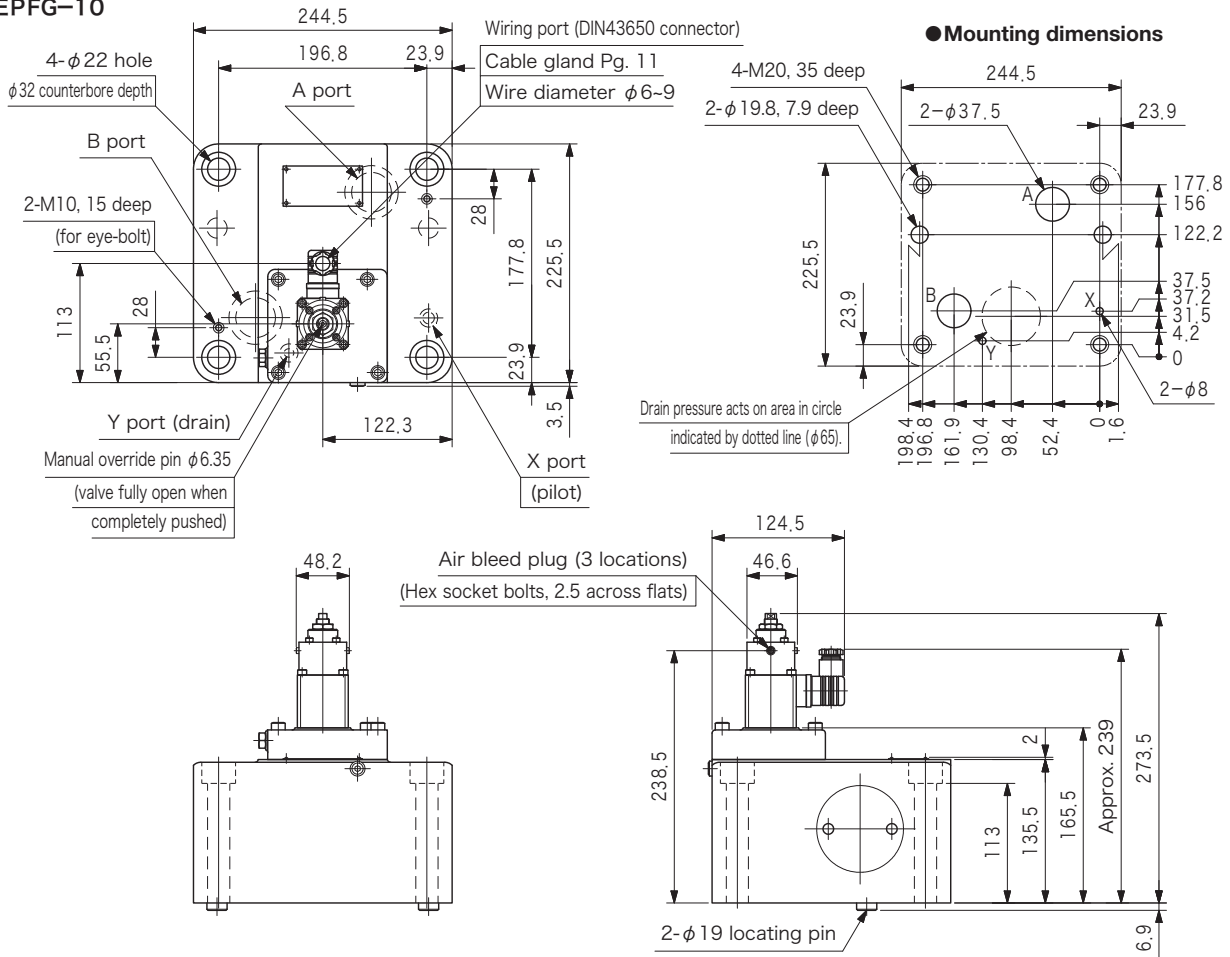


● Mounting dimensions

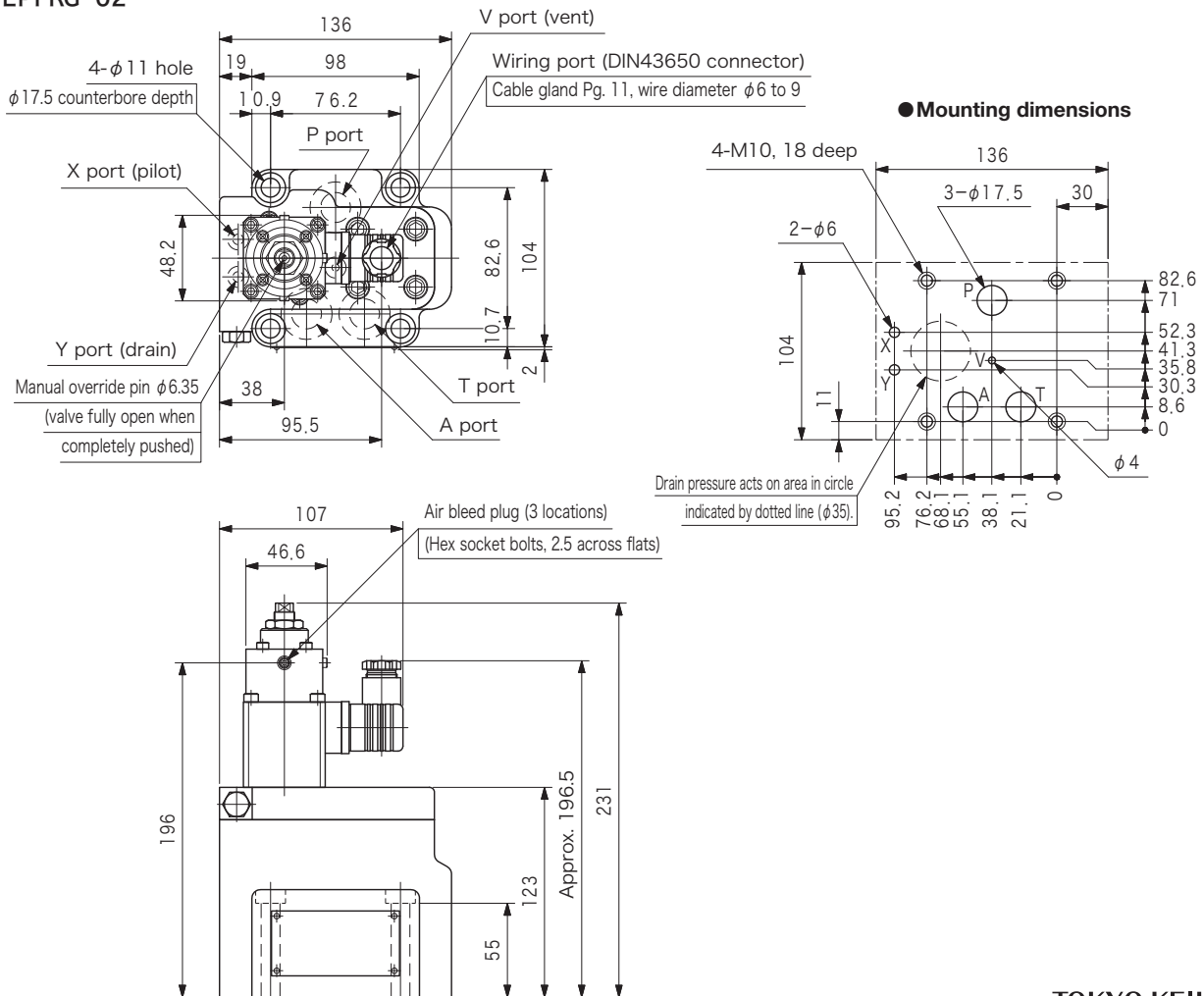


Dimensions

EPFG-10

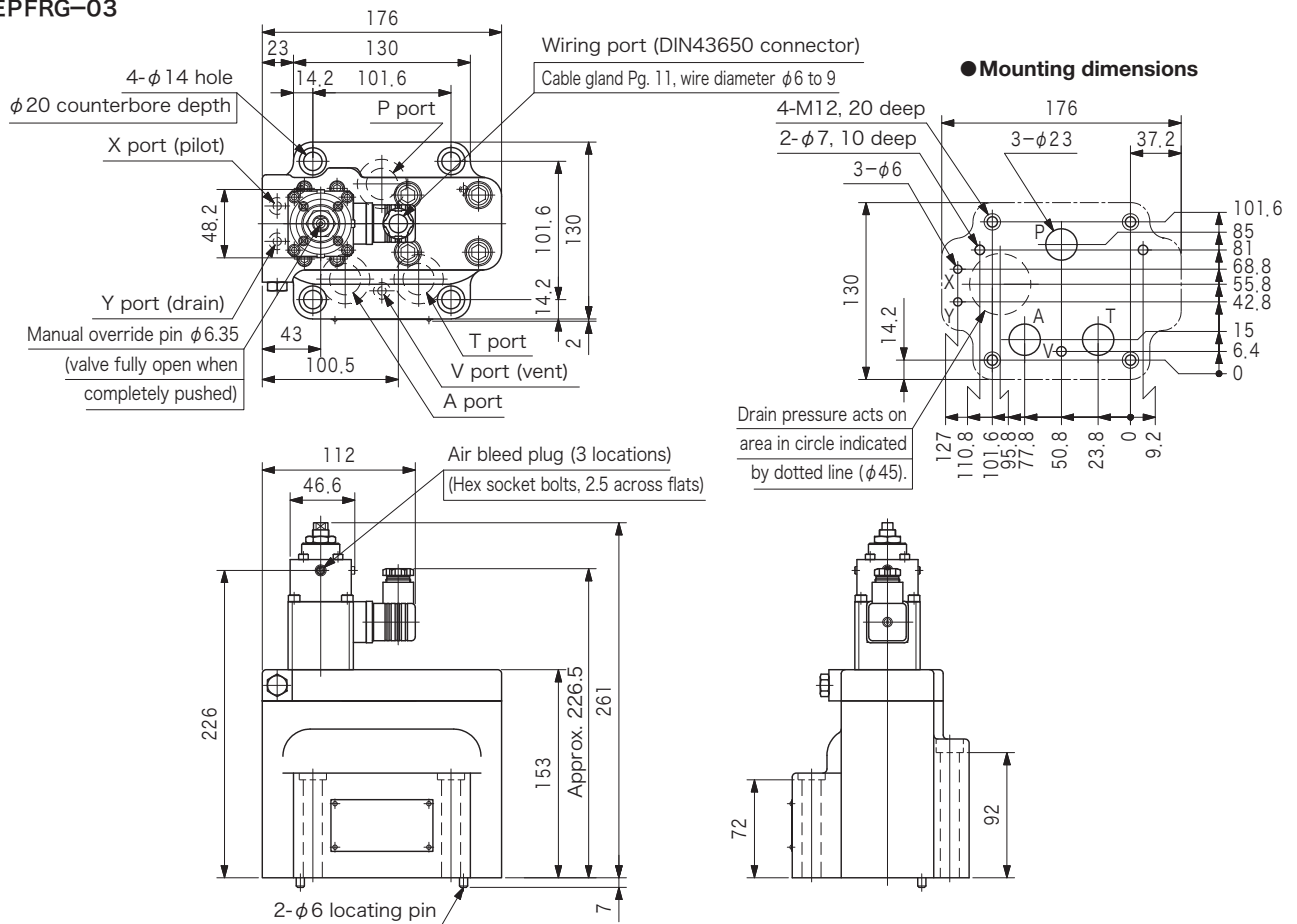


EPFRG-02

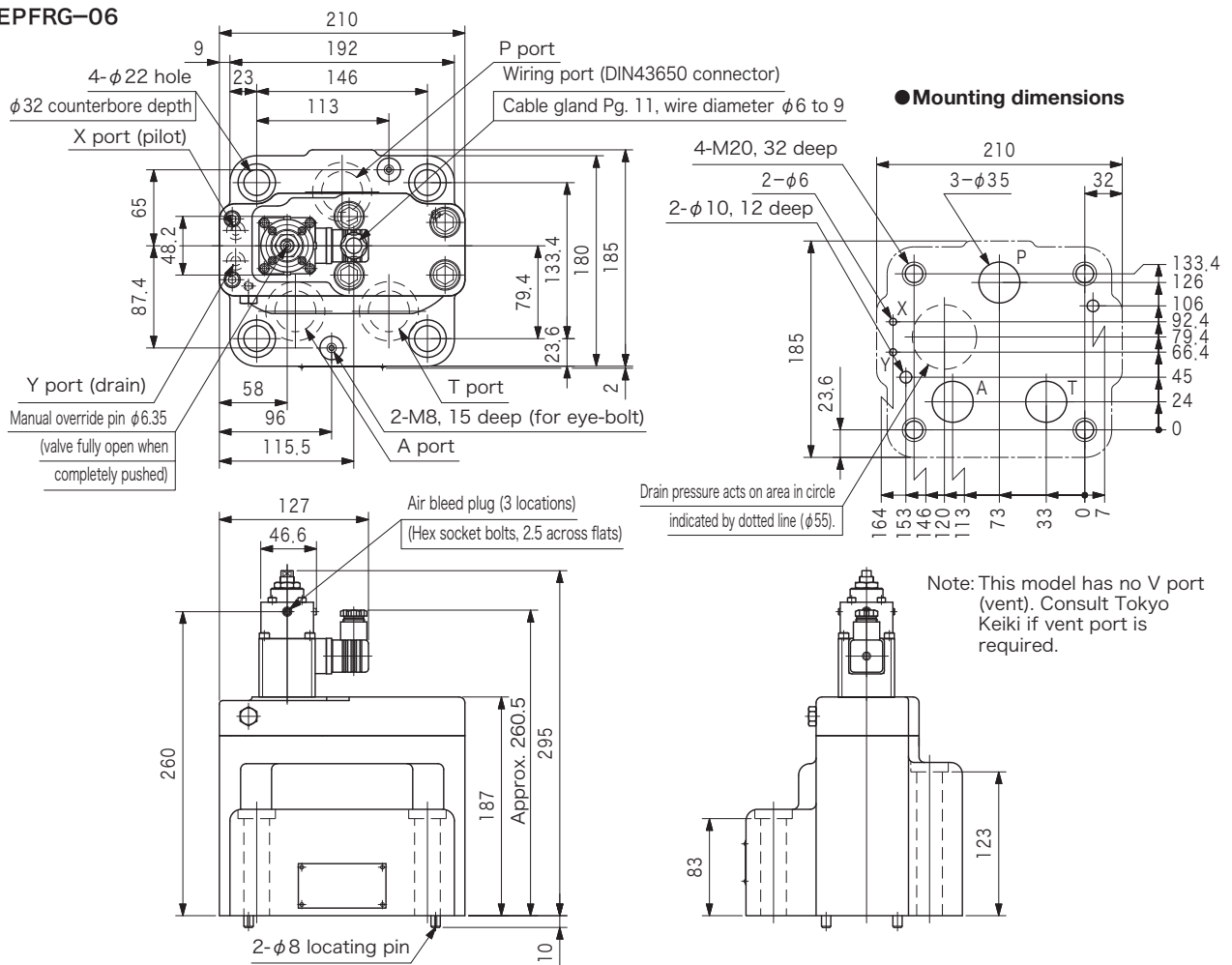


Dimensions

EPFRG-03

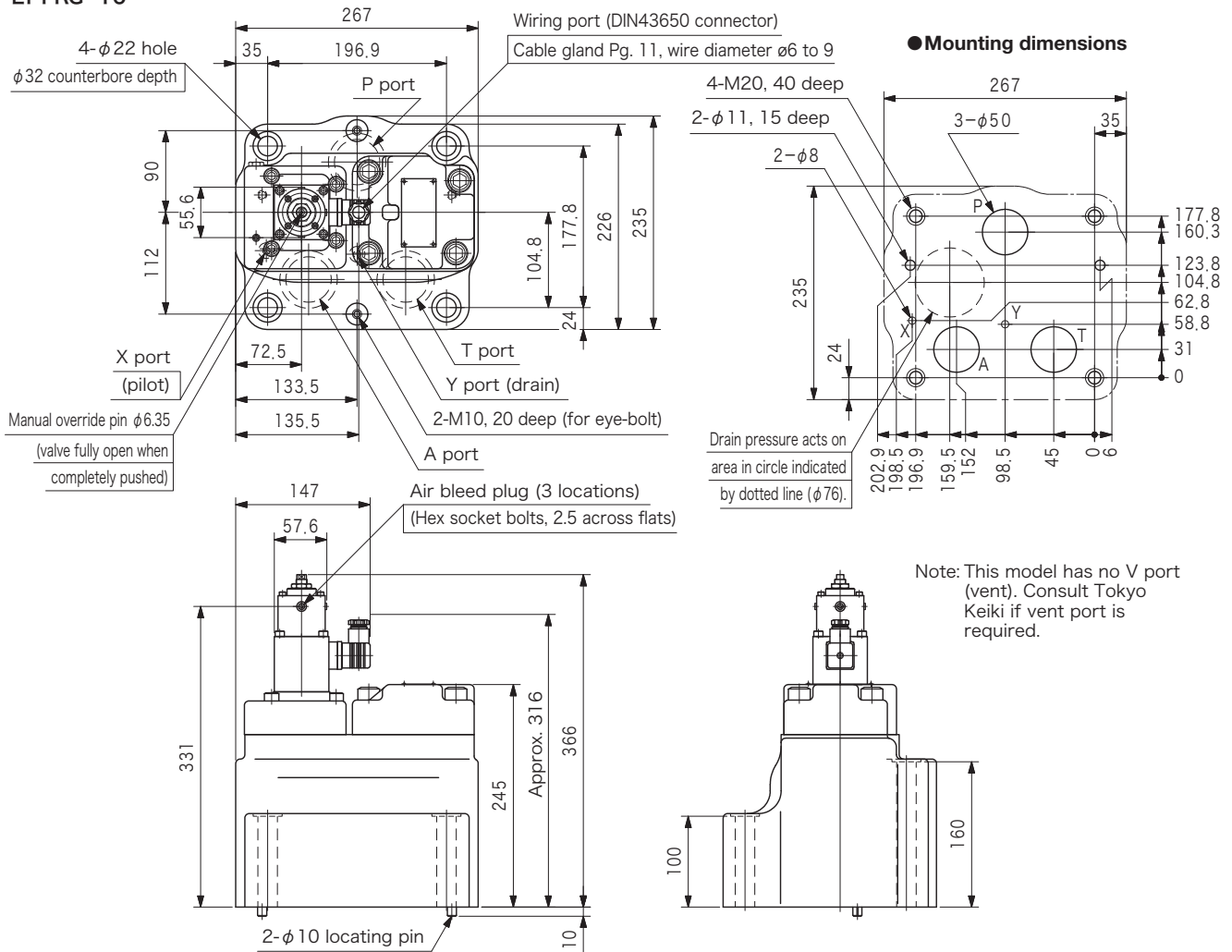


EPFRG-06



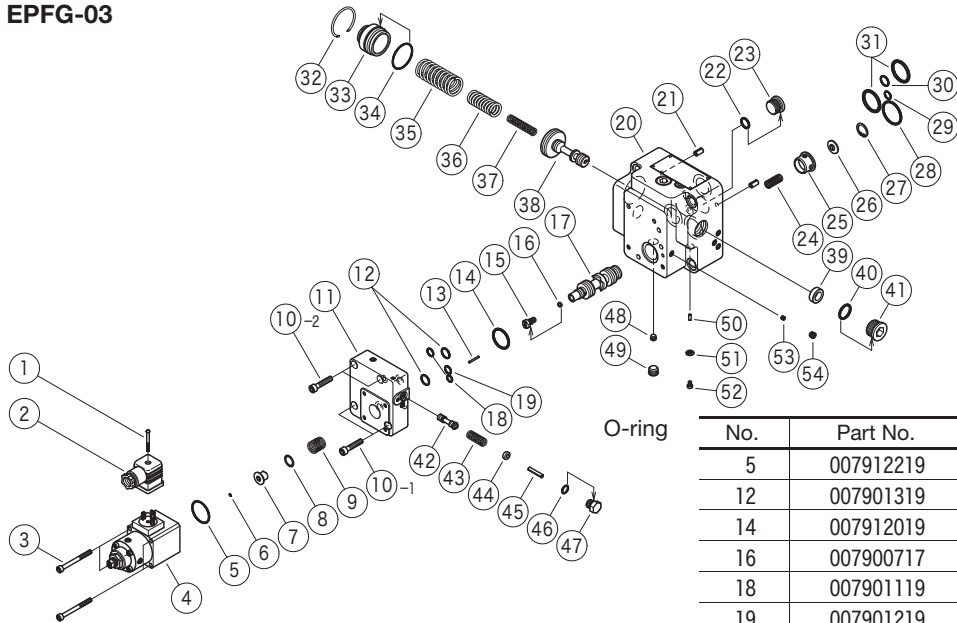
Dimensions

EPFRG-10



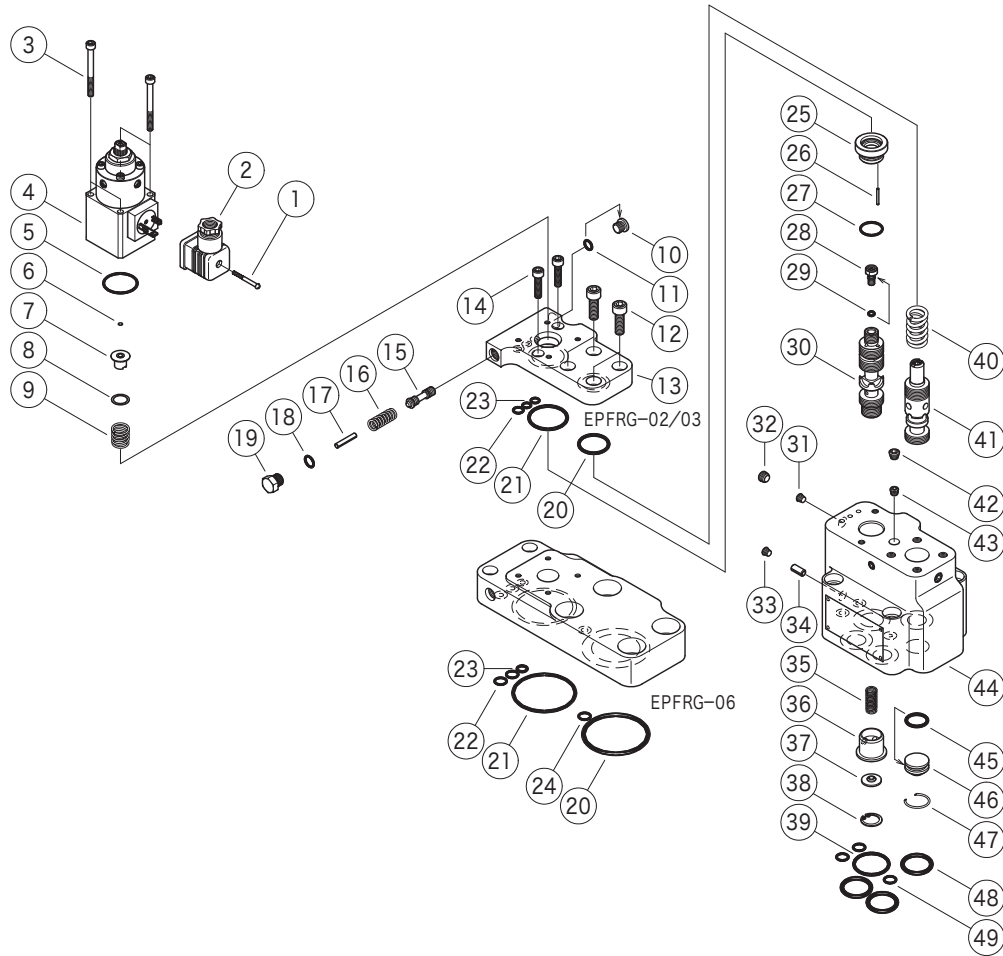
Construction

EPFG-03



No.	Part No.	Standard	Qty
5	007912219	AS568-122 (NBR, Hs90)	1
12	007901319	AS568-013 (NBR, Hs90)	2
14	007912019	AS568-120 (NBR, Hs90)	1
16	007900717	AS568-007 (NBR, Hs70)	1
18	007901119	AS568-011 (NBR, Hs90)	2
19	007901219	AS568-012 (NBR, Hs90)	1
22	007990819	AS568-908 (NBR, Hs90)	1
28	007912319	AS568-123 (NBR, Hs90)	1
29	007901219	AS568-012 (NBR, Hs90)	1
30	007901319	AS568-013 (NBR, Hs90)	1
31	007921519	AS568-215 (NBR, Hs90)	2
34	007902819	AS568-028 (NBR, Hs90)	1
40	007991019	AS568-910 (NBR, Hs90)	1
46	007901219	AS568-012 (NBR, Hs90)	1

EPFRG-02/03/06



O-ring

EPFRG-02

No.	Part No.	Standard	Qty
5	007912219	AS568-122 (NBR, Hs90)	1
11	007901119	AS568-011 (NBR, Hs90)	1
18	007901219	AS568-012 (NBR, Hs90)	1
20	007912019	AS568-120 (NBR, Hs90)	1
21	007912519	AS568-125 (NBR, Hs90)	1
22	007901119	AS568-011 (NBR, Hs90)	1
23	007901019	AS568-010 (NBR, Hs90)	2
27	007901819	AS568-018 (NBR, Hs90)	1
29	007900717	AS568-007 (NBR, Hs70)	1
39	007912319	AS568-123 (NBR, Hs90)	1
45	007911519	AS568-115 (NBR, Hs90)	1
48	007921319	AS568-213 (NBR, Hs90)	3
49	007901219	AS568-012 (NBR, Hs90)	3

EPFRG-06

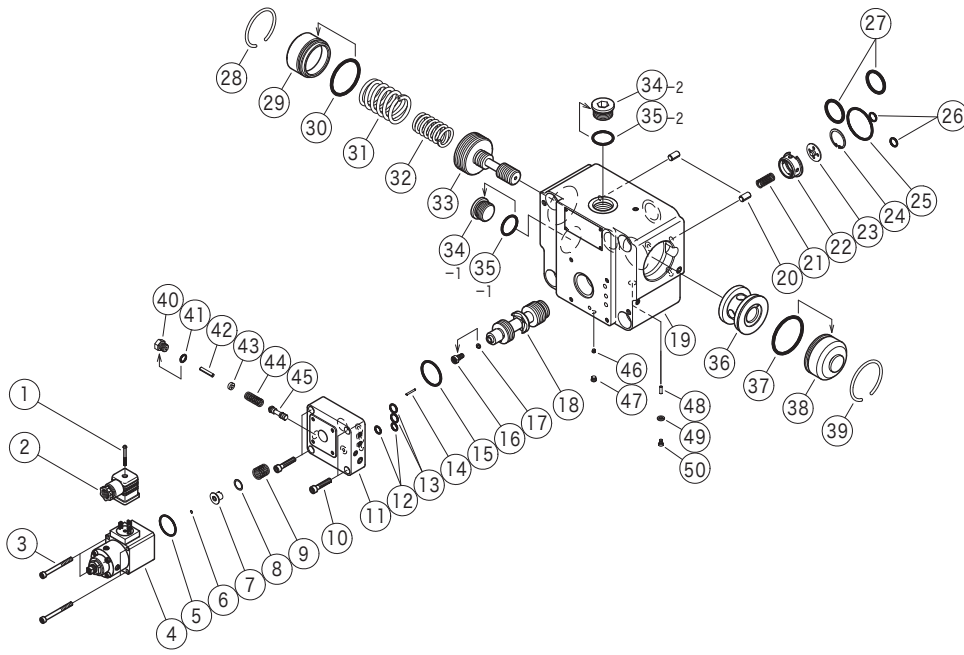
No.	Part No.	Standard	Qty
5	007912219	AS568-122 (NBR, Hs90)	1
18	007901219	AS568-012 (NBR, Hs90)	1
20	007922819	AS568-228 (NBR, Hs90)	1
21	007913919	AS568-139 (NBR, Hs90)	1
22	007901219	AS568-012 (NBR, Hs90)	2
23	007901119	AS568-011 (NBR, Hs90)	1
24	007901219	AS568-012 (NBR, Hs90)	1
27	007912919	AS568-129 (NBR, Hs90)	1
29	007900717	AS568-007 (NBR, Hs70)	1
39	008050619	JIS B 2401 1B-G50	1
45	007912919	AS568-129 (NBR, Hs90)	1
48	007922419	AS568-224 (NBR, Hs90)	3
49	007911119	AS568-111 (NBR, Hs90)	2

EPFRG-03

No.	Part No.	Standard	Qty
5	007912219	AS568-122 (NBR, Hs90)	1
18	007901219	AS568-012 (NBR, Hs90)	1
20	007912719	AS568-127 (NBR, Hs90)	1
21	007913119	AS568-131 (NBR, Hs90)	1
22	007901119	AS568-011 (NBR, Hs90)	1
23	007901019	AS568-010 (NBR, Hs90)	2
27	007912119	AS568-121 (NBR, Hs90)	1
29	007900717	AS568-007 (NBR, Hs70)	1
39	007912919	AS568-129 (NBR, Hs90)	1
45	007912119	AS568-121 (NBR, Hs90)	1
48	007921719	AS568-217 (NBR, Hs90)	3
49	007901219	AS568-012 (NBR, Hs90)	3

Construction

EPFG-06/10

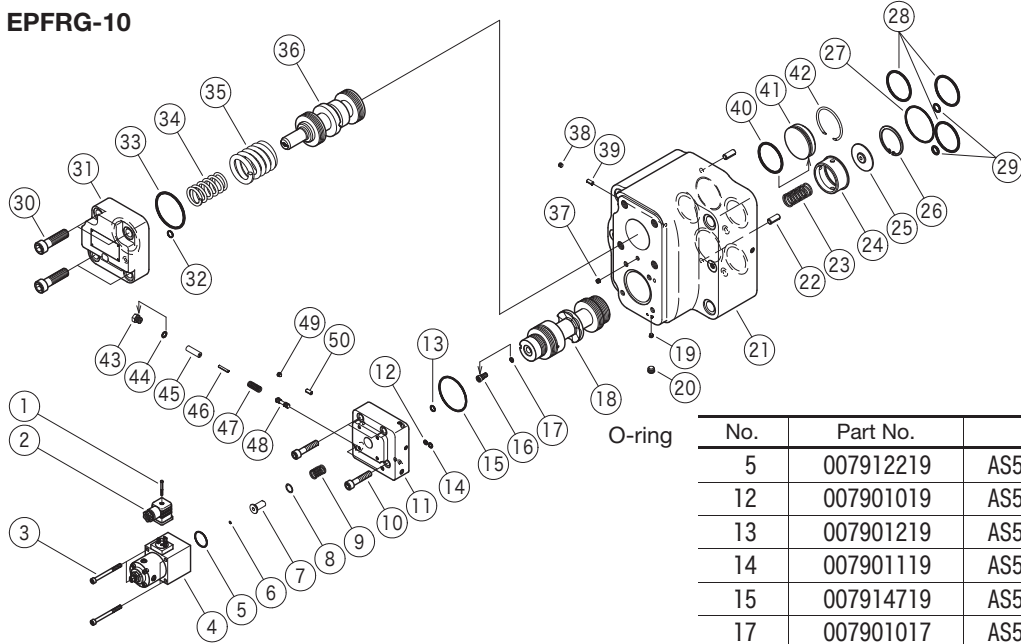


O-ring
EPFG-06

No.	Part No.	Standard	Qty
5	007912219	AS568-122 (NBR, Hs90)	1
12	007901219	AS568-012 (NBR, Hs90)	2
13	007901319	AS568-013 (NBR, Hs90)	2
15	007912619	AS568-126 (NBR, Hs90)	1
17	007900717	AS568-007 (NBR, Hs70)	1
25	007913319	AS568-133 (NBR, Hs90)	1
26	007901319	AS568-013 (NBR, Hs90)	2
27	007921719	AS568-217 (NBR, Hs90)	2
30	007922619	AS568-226 (NBR, Hs90)	1
35	007991219	AS568-912 (NBR, Hs90)	2
37	007922719	AS568-227 (NBR, Hs90)	1
41	007901219	AS568-012 (NBR, Hs90)	1

No.	Part No.	Standard	Qty
5	007912219	AS568-122 (NBR, Hs90)	1
12	007901219	AS568-012 (NBR, Hs90)	2
13	007901319	AS568-013 (NBR, Hs90)	2
15	007913719	AS568-137 (NBR, Hs90)	1
17	007900717	AS568-007 (NBR, Hs70)	1
25	007914119	AS568-141 (NBR, Hs90)	1
26	007911219	AS568-112 (NBR, Hs90)	2
27	007922419	AS568-224 (NBR, Hs90)	2
30	007923219	AS568-232 (NBR, Hs90)	1
35	007921819	AS568-218 (NBR, Hs90)	2
37	007923419	AS568-234 (NBR, Hs90)	1
41	007901219	AS568-012 (NBR, Hs90)	1

EPFRG-10



O-ring

No.	Part No.	Standard	Qty
5	007912219	AS568-122 (NBR, Hs90)	1
12	007901019	AS568-010 (NBR, Hs90)	1
13	007901219	AS568-012 (NBR, Hs90)	1
14	007901119	AS568-011 (NBR, Hs90)	1
15	007914719	AS568-147 (NBR, Hs90)	1
17	007901017	AS568-010 (NBR, Hs70)	1
27	007914919	AS568-149 (NBR, Hs90)	1
28	007922819	AS568-228 (NBR, Hs90)	3
29	007911219	AS568-112 (NBR, Hs90)	2
32	007901319	AS568-013 (NBR, Hs90)	1
33	007923219	AS568-232 (NBR, Hs90)	1
40	007922819	AS568-228 (NBR, Hs90)	1
44	007901219	AS568-012 (NBR, Hs90)	1