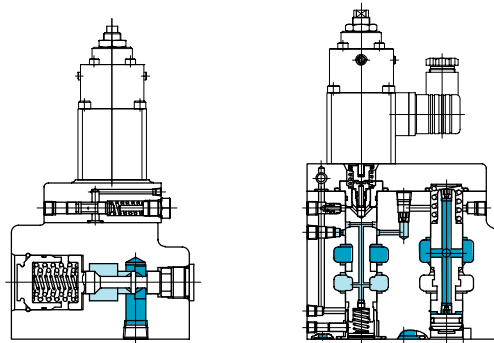


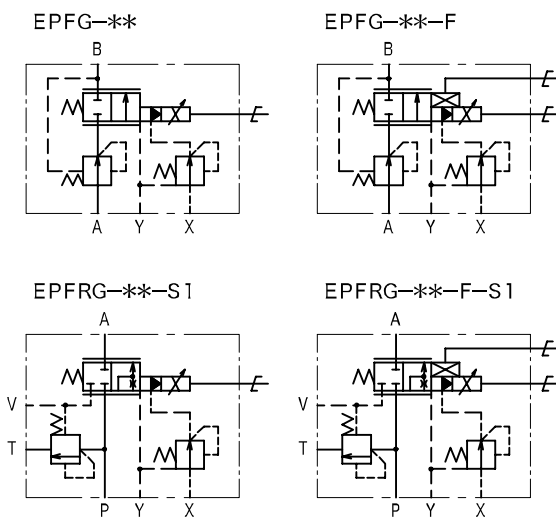
Proportional flow control valves EPF(R)G



- This flow control valve utilizes a proportional solenoids. 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 affects of flow forces and other disturbances. The EPFRG valve utilizes a bypass type pressure compensator load sensing function which contributes to energy saving hydraulic circuits.

Functional Symbols



Note: EPFRG-06/10 do not have V (vent) ports.

Model Code

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

1 2 3 4 5 6 7

- | | |
|---|---|
| <ul style="list-style-type: none"> 1 Proportional solenoid flow control valve (gasket mounted)
EPFG: with series type pressure compensator
EPFRG: with bypass type pressure compensator 2 Size
See 'Specifications' 3 Max. controllable flow
See 'Specifications' 4 Position sensor
Omit for no position sensor
F: with position sensor | <ul style="list-style-type: none"> 5 Pilot
Omit for 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
Omit for EPFG
S1: for EPFRG |
|---|---|

Specifications

Model	EPFG							EPFRG									
Size	03			06			10	02			03			06		10	
Max. operating 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 voltage A	1																
Coil resistance Ω															14		15
Dither frequency Hz	100~110																
Dither voltage mA rms															42		90
Current control solenoid	Hysteresis						Less than (Note 1)										
	Repeatability						Less than (Note 3)										
Position control solenoid	Hysteresis						Less than (Note 2)										
	Repeatability						Less than (Note 3)										
Pressure compensator	Series type (Note 5)							Bypass type (Note 4)									
Weight kg	10			24			50	10			18			33		68	

Note 1: Values when using P-X-14 controller or similar.

Note 2: Values when using P-Z-14 controller or similar.

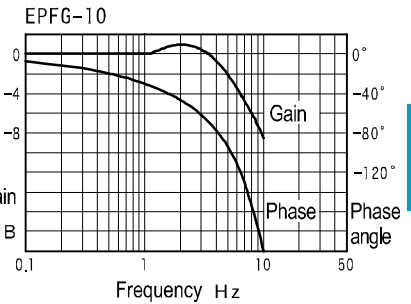
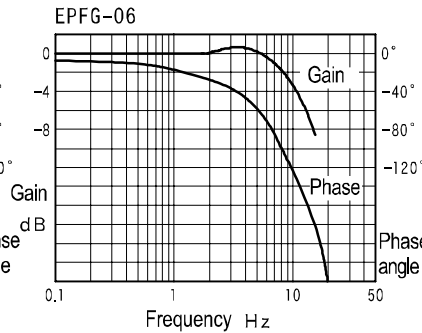
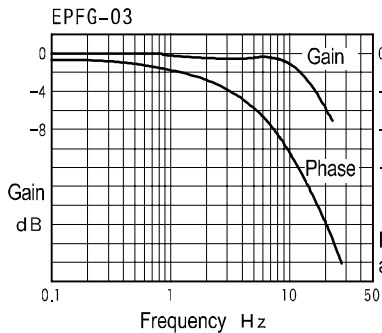
Note 3: Value of valve operating under same working conditions as special controller used.

Note 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.

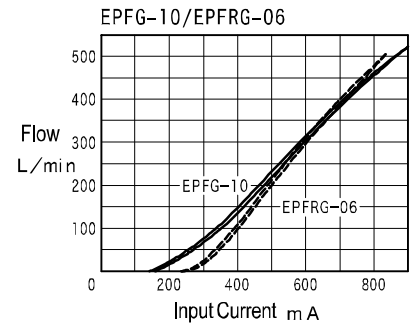
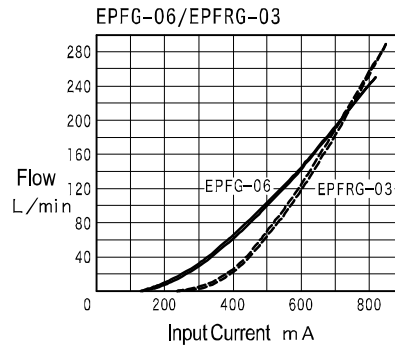
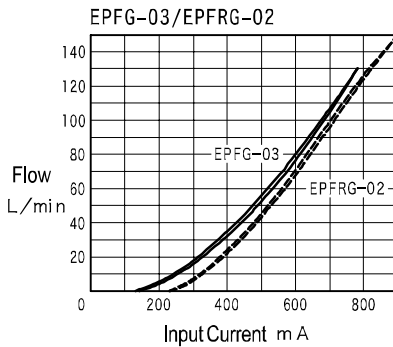
Note 5: For good flow control, maintain valve pressure differential over 1 MPa for 03, over 1.5 MPa for 06, and over 2 MPa for 10 size.

Performance Curve (at 20mm²/s)

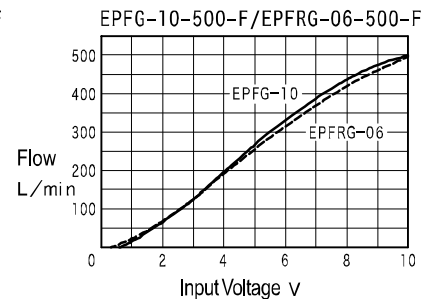
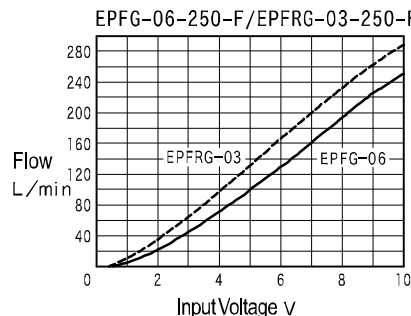
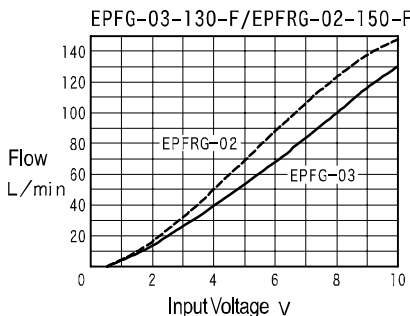
Frequency Response Characteristics



Input Current - Flow Characteristics (Example)

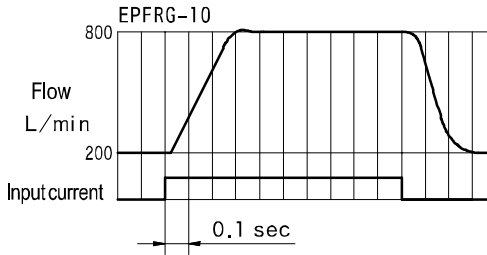
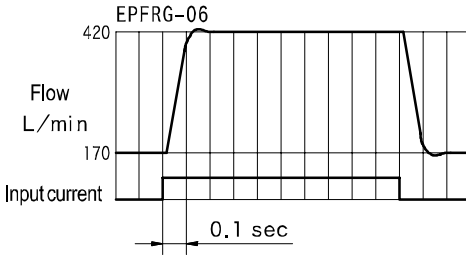
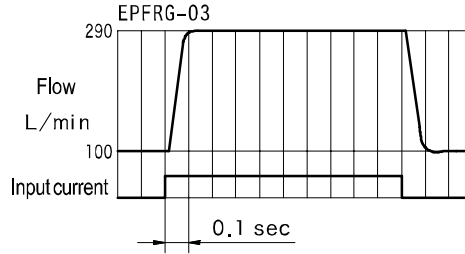
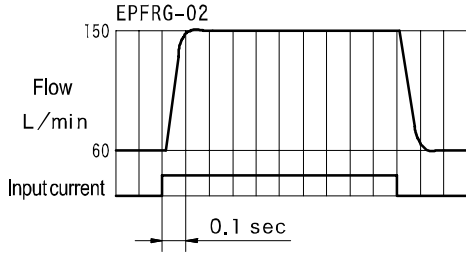


Input Voltage - Flow Characteristics (Example)



Performance Curve

Step Response Characteristics (Example)



Notes on Use

- **Mounting direction**
Valve can be mounting in any direction. However if valve is mounted on manifold block, if 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 (1.5%) according to the mounting direction.
- **Air bleed**
For stable pressure control, during the initial adjustment, loosening the air bleed plug and bleed air completely out of the valve prior to use.
- **Manual adjustment**
In case of initial adjustment or during electrical failures, etc., when there is no input electrical current, the manual operation pin can be pushed for inching, etc., flow control.
- **Zero adjustment**
This is adjusted at factory before shipment. Readjustment is not necessary.
- **Drain piping**
Allowable back pressure is 0.2 MPa. T port piping should be returned directly to tank, and the end of the pipe should be below the lowest 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(resonation). Piping should be as short as possible.
- For optimum flow control, differential pressure should be below the values shown in the below table.

Size	Diff. Pressure MPa
03	1
06	1.5
10	2

Mounting Bolts (JIS B1176, Strength Class 12.9)

Model	Hex Socket Bolts		Qty
	Metric	Unified	
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 : 50~60 N·m
 EPFRG-03 : 75~81 N·m
 EPFG-06 : 90~110 N·m
 EPFRG-06, EPFRG-10 : 230~290 N·m

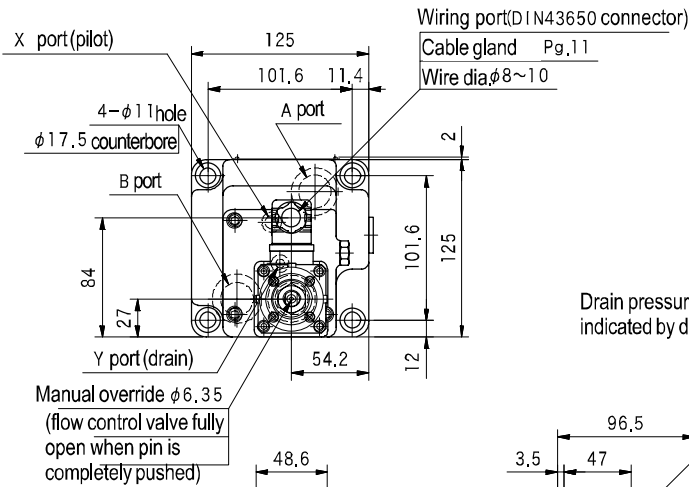
Subplate

Model	Subplate Model	Port Dia. Rc	Thread
EPFG-03	EPFGM-03Y-20	3/4	Unified
	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
EPFRG-03	D-FRGM-03-10	1-1/4	
EPFRG-06	D-FRGM-06-10	1-1/2	

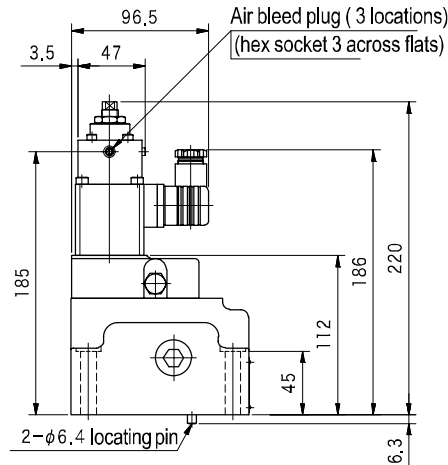
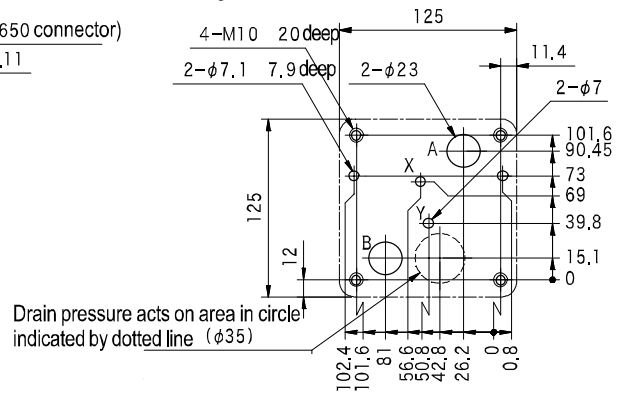
- Subplates must be ordered separately.
- Hex socket bolts for valve mounting are provided (see above table for thread types)
- See page Q9, Q10 for dimensions.

Dimensions

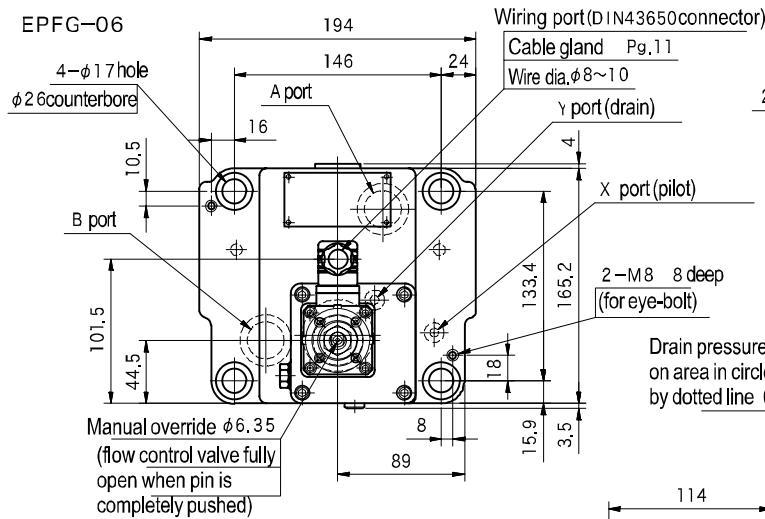
EPFG-03



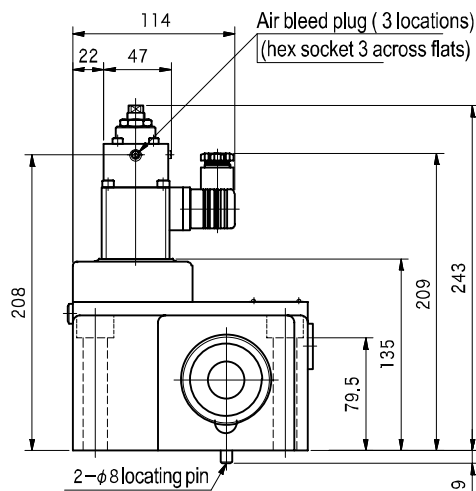
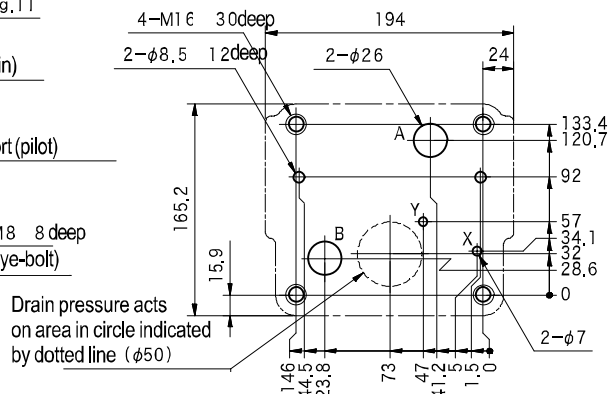
Mounting Dimensions



EPFG-06

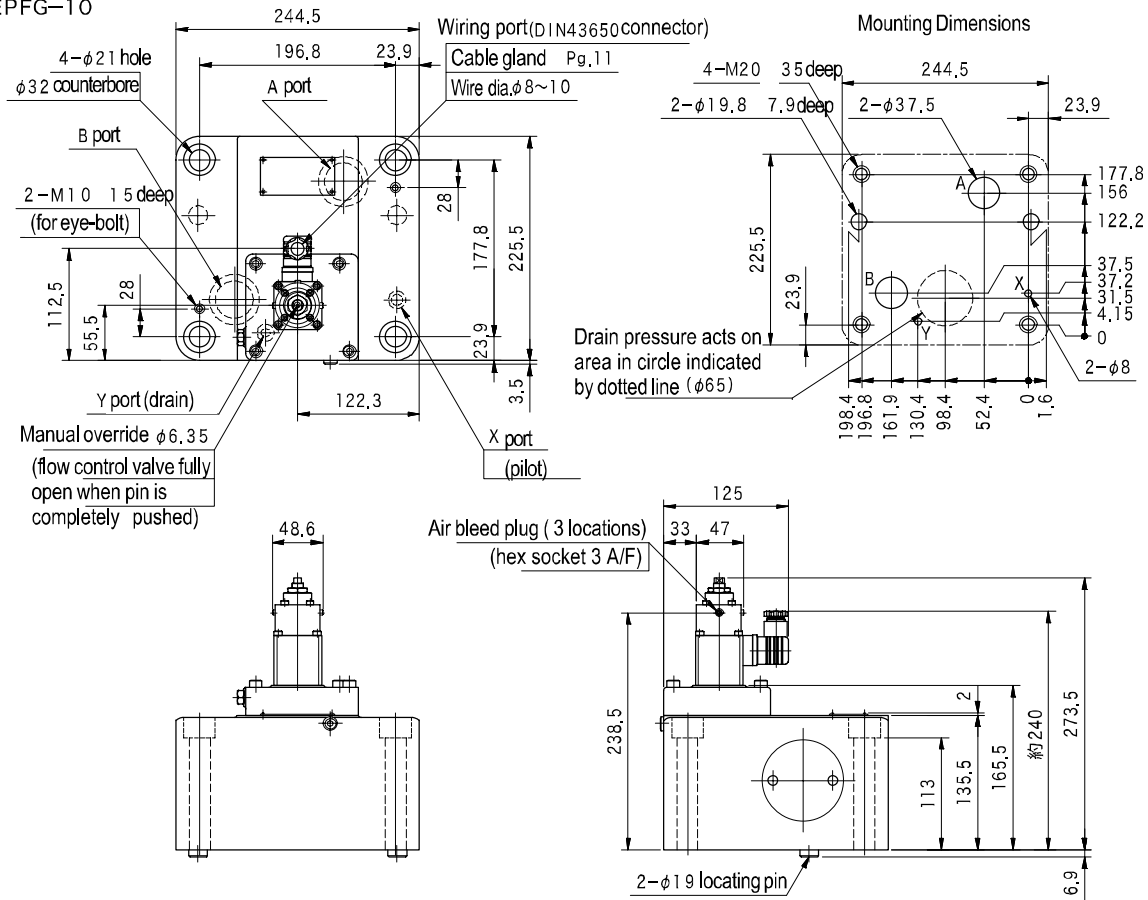


Mounting Dimensions

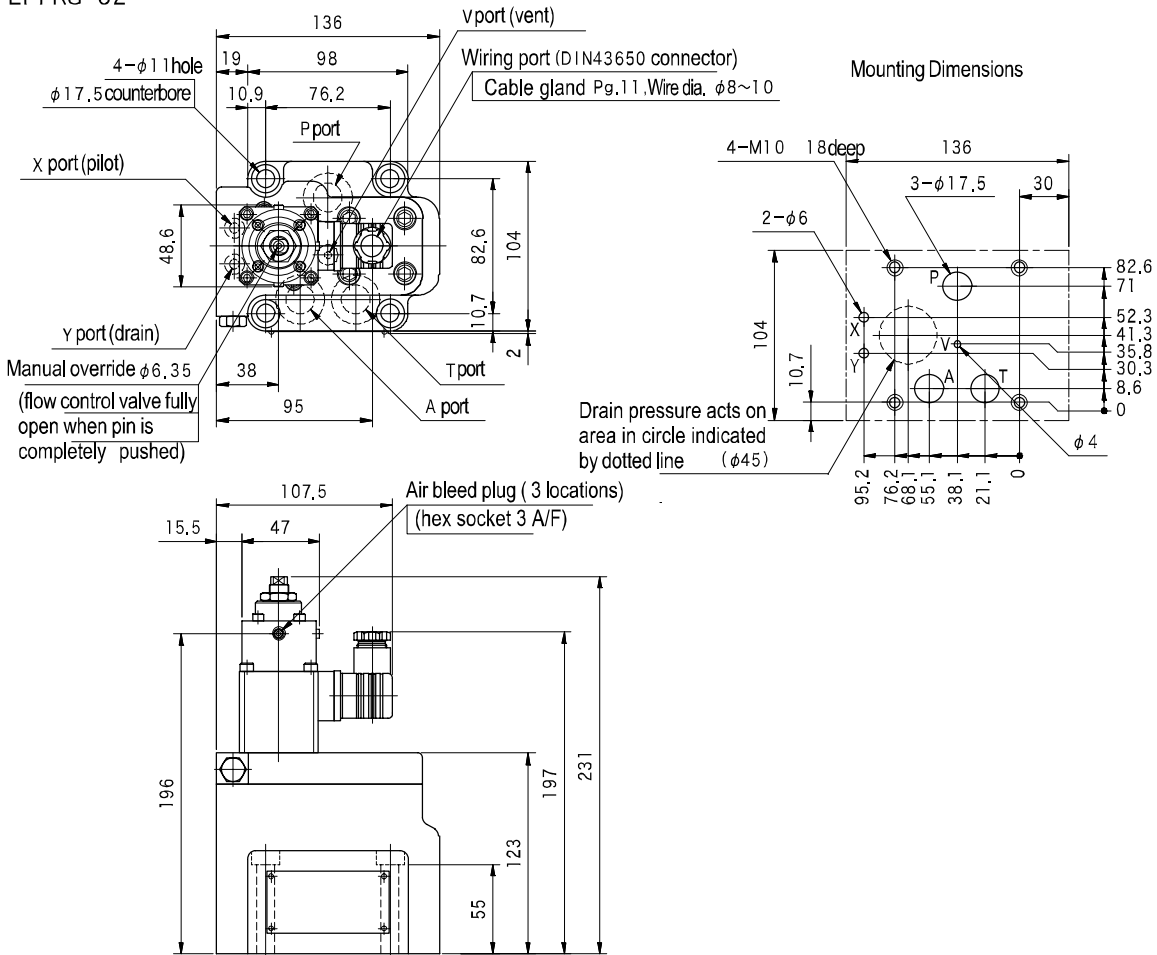


Dimensions

EPFG-10

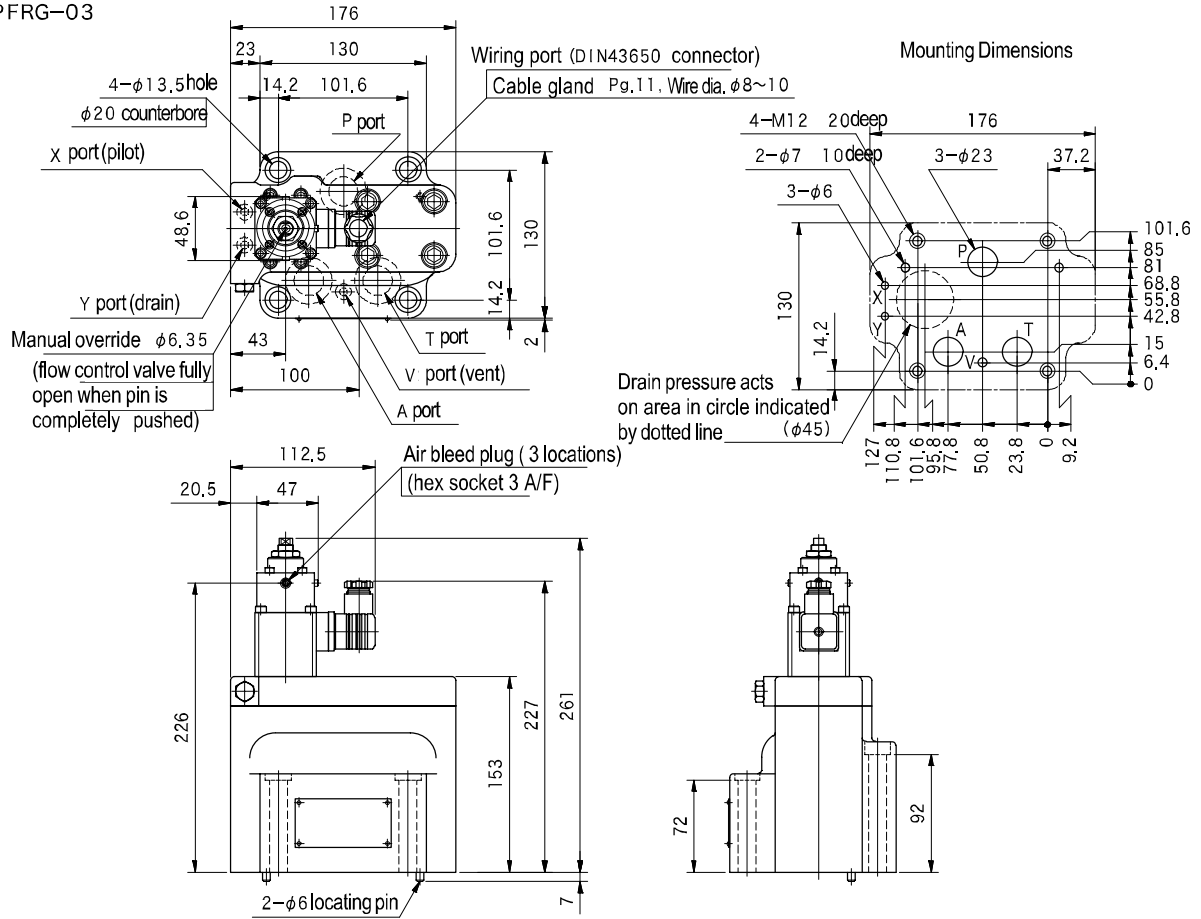


EPFRG-02

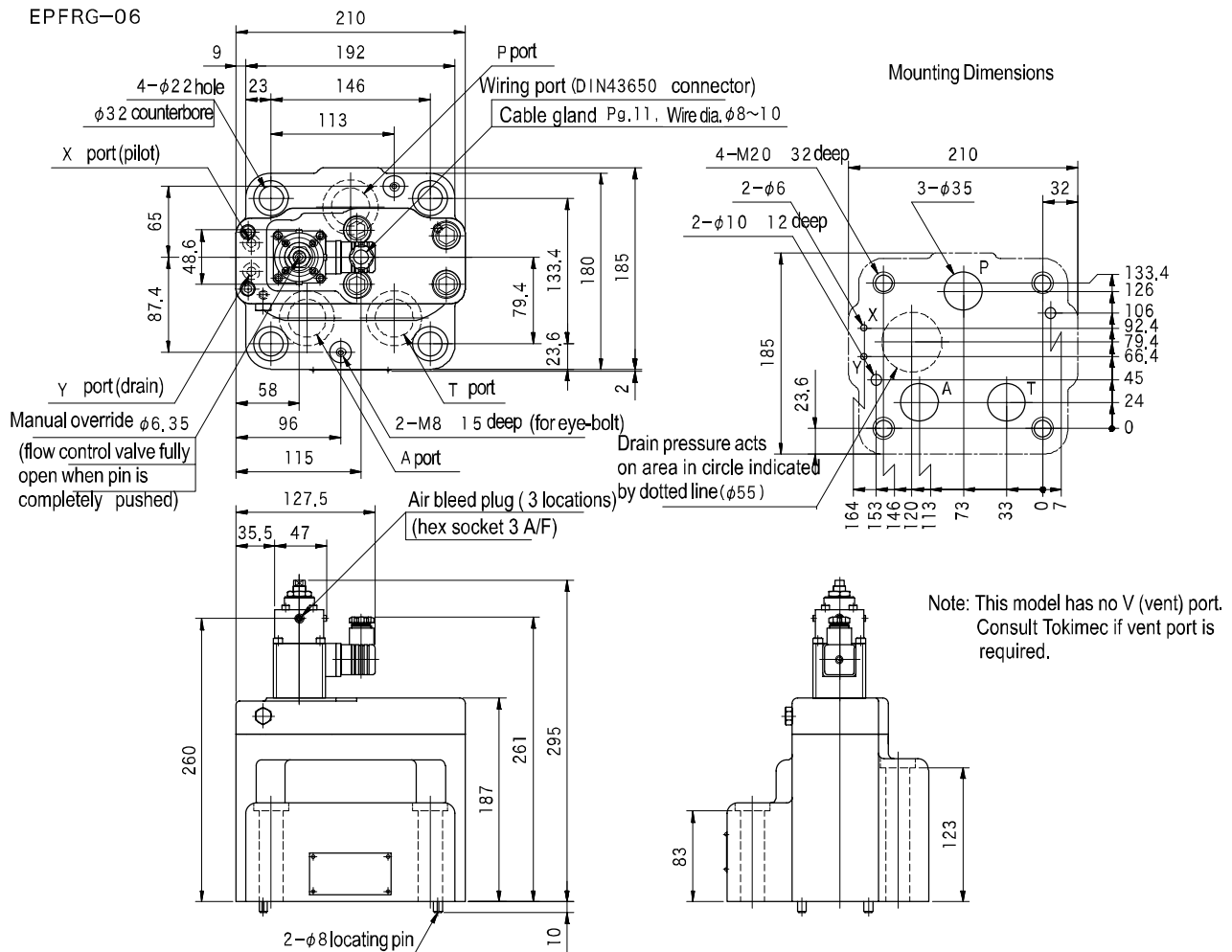


Dimensions

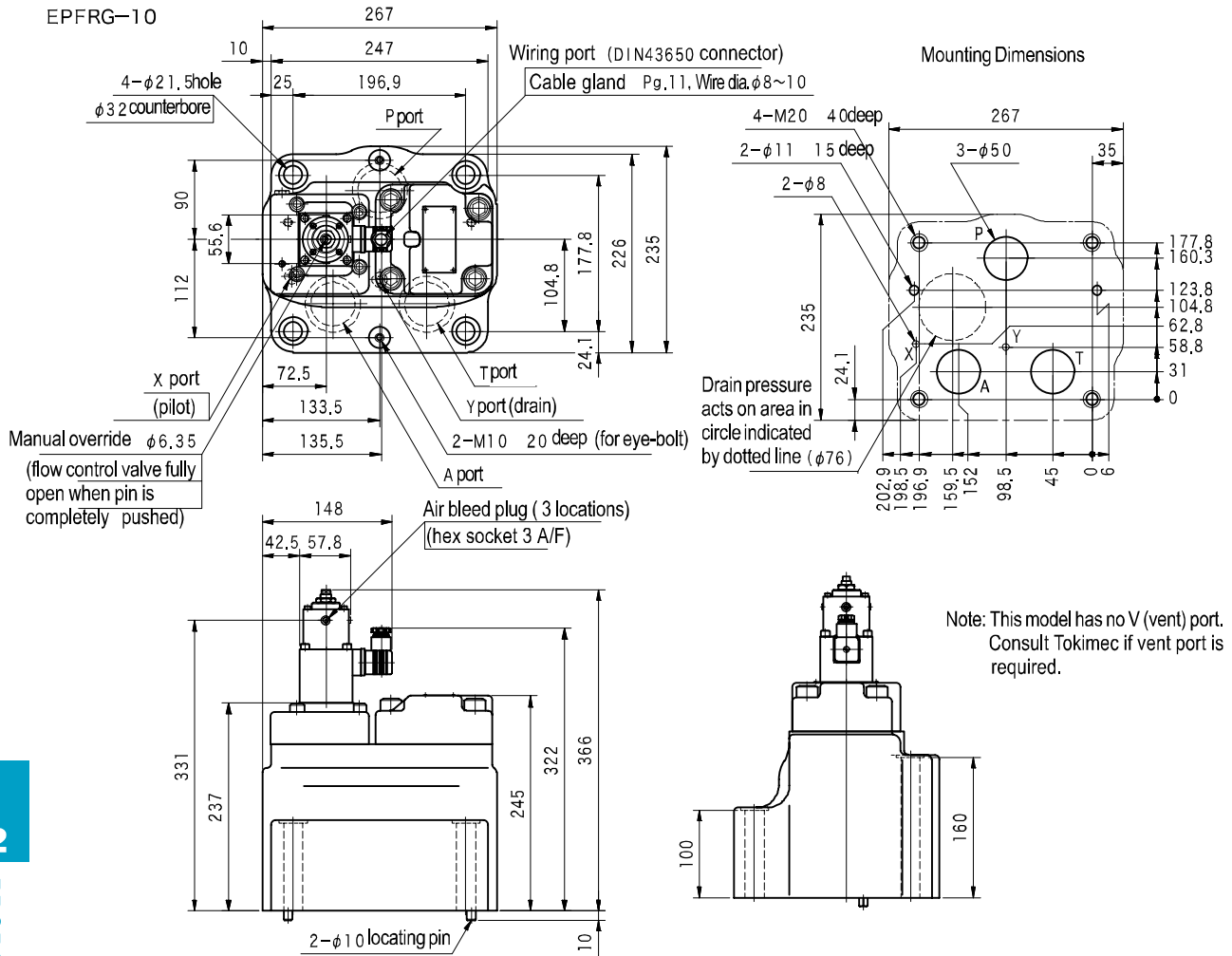
EPFRG-03



EPFRG-06



Dimensions

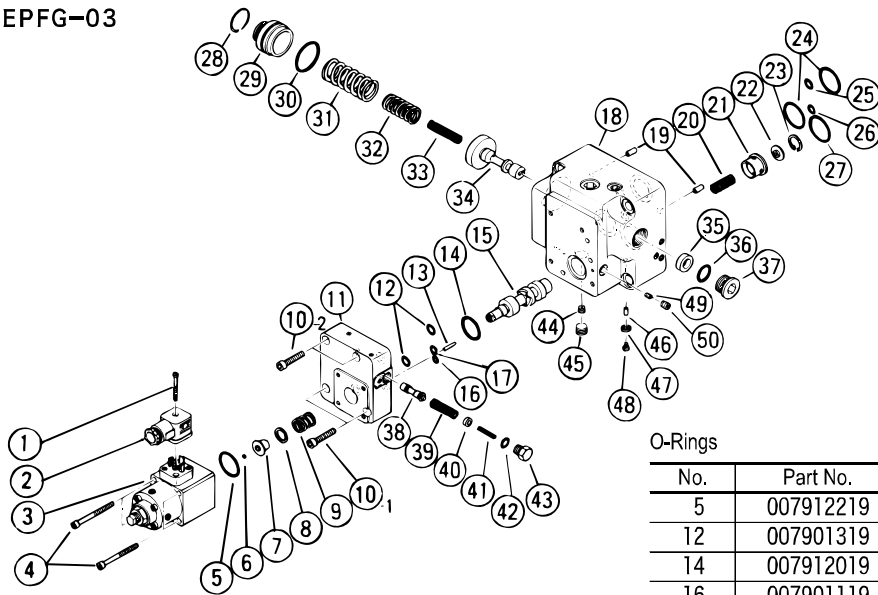


22

PROPORTIONAL CONTROL & SERVO VALVES

Construction

EPFG-03

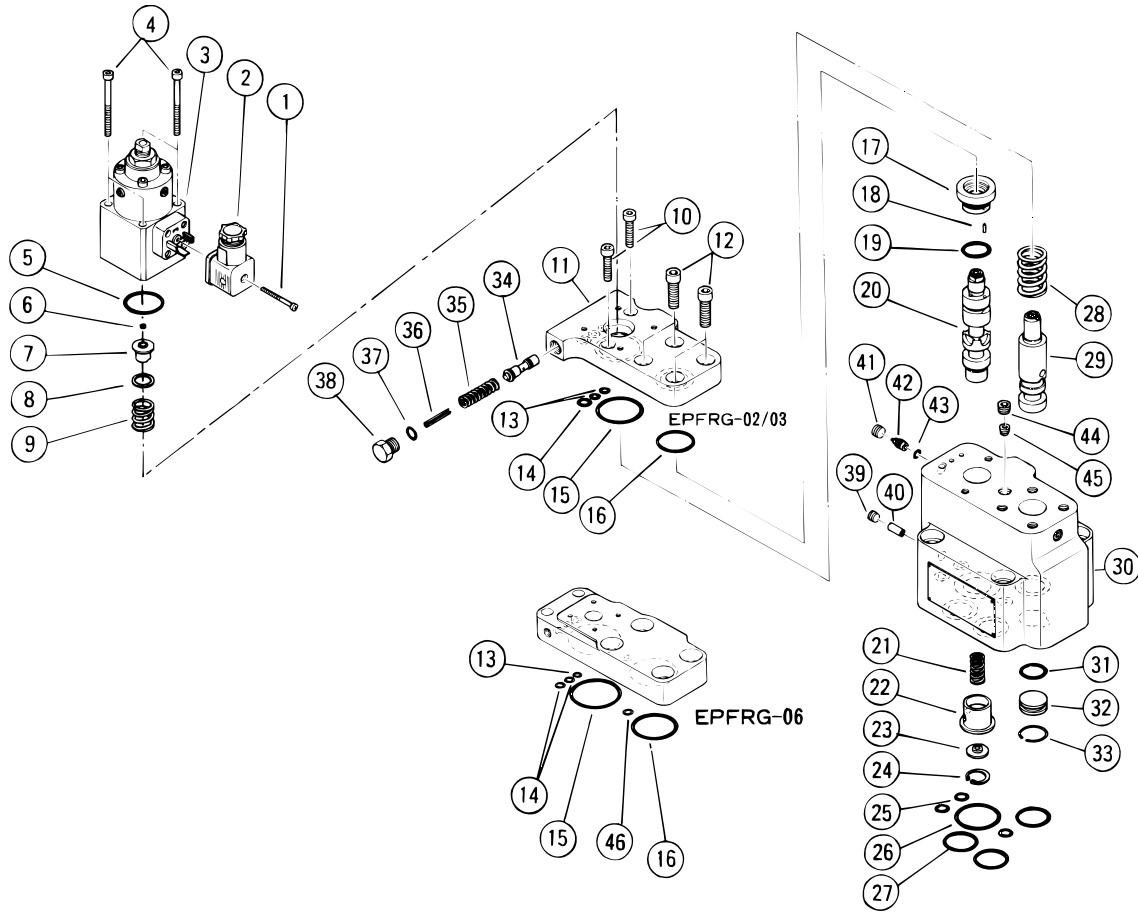


O-Rings

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	007901119	AS568-011 (NBR, Hs90)	2
17	007901219	AS568-012 (NBR, Hs90)	1
24	007921519	AS568-215 (NBR, Hs90)	2
25	007901319	AS568-013 (NBR, Hs90)	1
26	007901219	AS568-012 (NBR, Hs90)	1
27	007912319	AS568-123 (NBR, Hs90)	1
30	007902819	AS568-028 (NBR, Hs90)	1
36	007991019	AS568-910 (NBR, Hs90)	1
42	007901219	AS568-012 (NBR, Hs90)	1

Construction

EPFRG-02/03/06



O-Rings

EPFRG-02

No.	Part No.	Standard	Qty
5	007912219	AS568-122 (NBR, Hs90)	1
13	007901019	AS568-010 (NBR, Hs90)	2
14	007901119	AS568-011 (NBR, Hs90)	1
15	007912519	AS568-125 (NBR, Hs90)	1
16	007912019	AS568-120 (NBR, Hs90)	1
19	007901819	AS568-018 (NBR, Hs90)	1
25	007901219	AS568-012 (NBR, Hs90)	3
26	007912319	AS568-123 (NBR, Hs90)	1
27	007921319	AS568-213 (NBR, Hs90)	3
31	007911519	AS568-115 (NBR, Hs90)	1
37	007901219	AS568-012 (NBR, Hs90)	1
43	007900719	AS568-007 (NBR, Hs90)	1

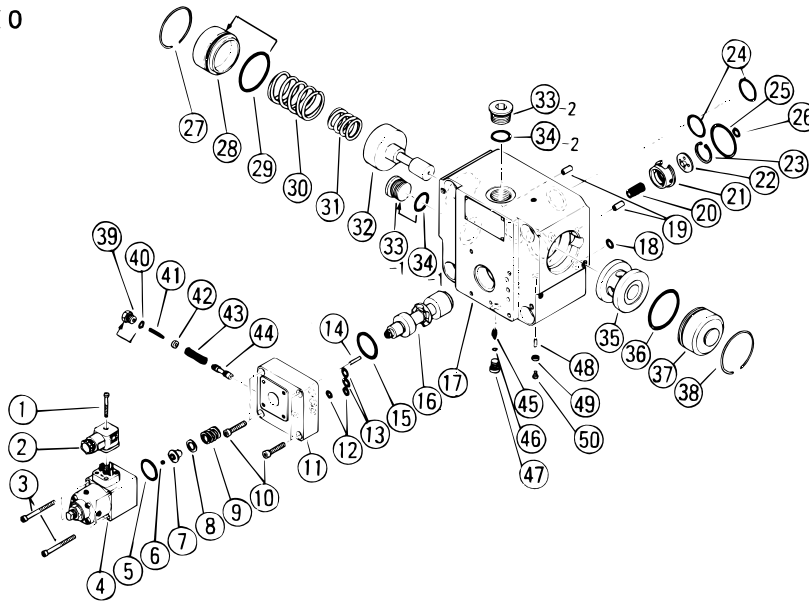
EPFRG-06

No.	Part No.	Standard	Qty
5	007912219	AS568-122 (NBR, Hs90)	1
13	007901119	AS568-011 (NBR, Hs90)	1
14	007901219	AS568-012 (NBR, Hs90)	2
15	007913919	AS568-139 (NBR, Hs90)	1
16	007922819	AS568-228 (NBR, Hs90)	1
19	007912919	AS568-129 (NBR, Hs90)	1
25	007911119	AS568-111 (NBR, Hs90)	2
26	008050619	JIS B 2401 1B-G50	1
27	007922419	AS568-224 (NBR, Hs90)	3
31	007912919	AS568-129 (NBR, Hs90)	1
37	007901219	AS568-012 (NBR, Hs90)	1
46	007901219	AS568-012 (NBR, Hs90)	1

EPFRG-03

No.	Part No.	Standard	Qty
5	007912219	AS568-122 (NBR, Hs90)	1
13	007901019	AS568-010 (NBR, Hs90)	2
14	007901119	AS568-011 (NBR, Hs90)	1
15	007913119	AS568-131 (NBR, Hs90)	1
16	007912719	AS568-127 (NBR, Hs90)	1
19	007912119	AS568-121 (NBR, Hs90)	1
25	007901219	AS568-012 (NBR, Hs90)	3
26	007912919	AS568-129 (NBR, Hs90)	1
27	007921719	AS568-217 (NBR, Hs90)	3
31	007912119	AS568-121 (NBR, Hs90)	1
37	007901219	AS568-012 (NBR, Hs90)	1
43	007900719	AS568-007 (NBR, Hs90)	1

EPFG-06/10



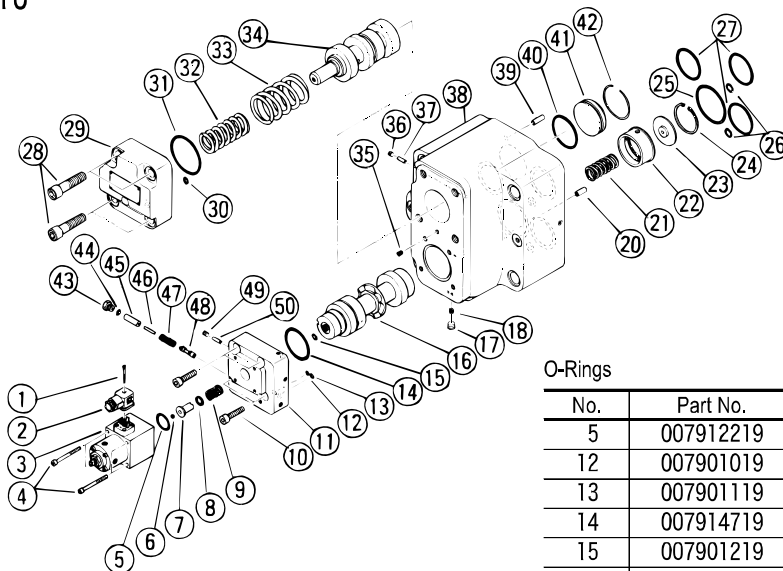
O-Rings
EPFG-06

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
18	007901319	AS568-013 (NBR, Hs90)	1
24	007921719	AS568-217 (NBR, Hs90)	2
25	007913319	AS568-133 (NBR, Hs90)	1
26	007901319	AS568-013 (NBR, Hs90)	1
29	007922619	AS568-226 (NBR, Hs90)	1
34	007991219	AS568-912 (NBR, Hs90)	2
36	007922719	AS568-227 (NBR, Hs90)	1
40	007901219	AS568-012 (NBR, Hs90)	1
46	007900717	AS568-007 (NBR, Hs70)	1

EPFG-10

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
18	007911219	AS568-112 (NBR, Hs90)	1
24	007922419	AS568-224 (NBR, Hs90)	2
25	007914119	AS568-141 (NBR, Hs90)	1
26	007911219	AS568-112 (NBR, Hs90)	1
29	007923219	AS568-232 (NBR, Hs90)	1
34	007921819	AS568-218 (NBR, Hs90)	2
36	007923419	AS568-234 (NBR, Hs90)	1
40	007901219	AS568-012 (NBR, Hs90)	1

EPFRG-10



O-Rings

No.	Part No.	Standard	Qty
5	007912219	AS568-122 (NBR, Hs90)	1
12	007901019	AS568-010 (NBR, Hs90)	1
13	007901119	AS568-011 (NBR, Hs90)	1
14	007914719	AS568-147 (NBR, Hs90)	1
15	007901219	AS568-012 (NBR, Hs90)	1
25	007914919	AS568-149 (NBR, Hs90)	1
26	007911219	AS568-112 (NBR, Hs90)	2
27	007922819	AS568-228 (NBR, Hs90)	3
30	007901319	AS568-013 (NBR, Hs90)	1
31	007923219	AS568-232 (NBR, Hs90)	1
40	007922819	AS568-228 (NBR, Hs90)	1
44	007901219	AS568-012 (NBR, Hs90)	1