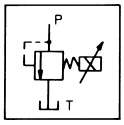
EPR Series

Electro-hydraulic Proportional Pilot Relief Valve (EPR)

This is a direct acting type relief valve based on a balance between the attraction force of a DC solenoid and a hydraulic force.
This valve can be utilized in a small capacity hydraulic system or connected to the vent-port of a balance piston type pressure control valve to perform continuous control of the pressure in proportion to the input current.

Hydraulic symbol



Specifications

Item \ Model	EPR-G01-※-※※※※-※11
Rated flow //min (gpm)	1.2 (0.3)
Pressure adjusting range kgf/cm² (psi)	B: 3 ~ 25 (43 ~ 357) 1: 7 ~ 70 (100 ~ 1000) 2: 10 ~ 140 (143 ~ 2000) 3: 15 ~ 210 (214 ~ 3000) 4: 15 ~ 280 (214 ~ 4000)
Rated current mA	800
Coil resistance Ω	20 (20°C) (68°F)
Hysteresis	3% or less Note 1).
Weight kgf (lbs)	1.6 (3.5)

Note 1). This is the hysteresis value when Nachi amplifier is provided for the valve. (With dither)

Model Code

EPR-G01-2-(※※※※S)-※11

- Design Code
- Mounting bolt No code: Metric thread, E: Unified thread
- Moving core shockless type
- Symbol for tank port orifice (Example) 09: ϕ0.9 (0.04 Dia), See table. 1
- Symbol for pressure port orifice (Example) 12: ϕ1.2 (0.05 Dia), See table. 1
- Pressure adjusting range. B, 1, 2, 3
- Valve Size: 01
- Mounting G: Gasket Mounting
- Electro-hydraulic Proportional Pilot Relief Valve

Table. 1 Symbol of Pressure port and Tank port orifice

Symbol	00	08	09	10	11	12	13
Orifice size	None	ϕ0.8 (0.031)	ϕ0.9 (0.035)	ϕ1.0 (0.039)	ϕ1.1 (0.043)	ϕ1.2 (0.047)	ϕ1.3 (0.051)

Unit = mm (inch)

Note) Standard size is as below.

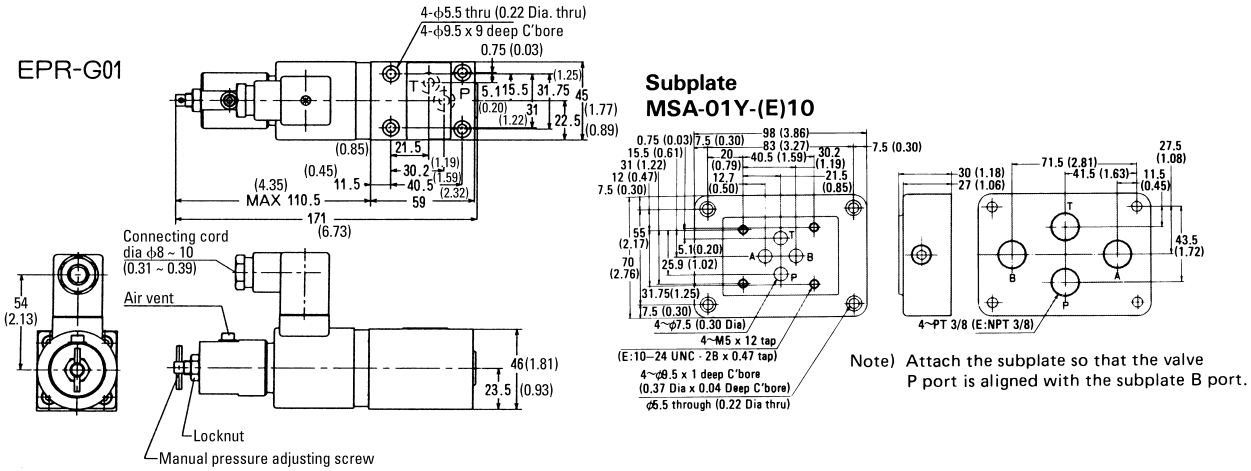
Pressure range	Symbol of orifice
B, 1 type	0013S
2, 3 type	0012S
4 type	1212S

Handling

1. Air Bleeding
   Loosen the air vent to bleed the air and fill the solenoid with oil at the start of operation to obtain good pressure control. The position of the air vent can be changed by turning the cover.
2. Installation Method
   The minimum pressure will become approximately 2kgf/cm² (29 psi) higher when this valve is attached on a vertical plane.
3. Manual Pressure Adjusting Screw
   When there is no input current supplied to the valve as in the case of initial adjustment or due to an electrical fault, the valve pressure can be controlled temporarily by turning the manual adjusting screw. In normal operation, this manual adjusting screw must be retracted completely and fixed with the lock nut.
4. Minimum Relief Flow
   Since the setting pressure may become unstable in case of low flow rate, use this valve at a flow rate of 0.3 //min (0.08 gpm) or more.
5. Load Capacity
   When the circuit pressure is to be controlled directly by this valve, the load capacity must be 40cc (2.4 in³) or more.
6. Mounting bolts
   M5 x 45ℓ (E: 10-24 UNC-3Ax1¾")
7. Subplate
   When a subplate is required, specify the following type in the purchase order. MSA-01Y-※10 (refer to dimensions in the figure below.)
8. Oil temperature
   -20°C ~ 70°C (-4°F ~ 158°F)
9. Oil viscosity
   12 ~ 400 cSt
   15 ~ 60 cSt is recommended.

EPR Series

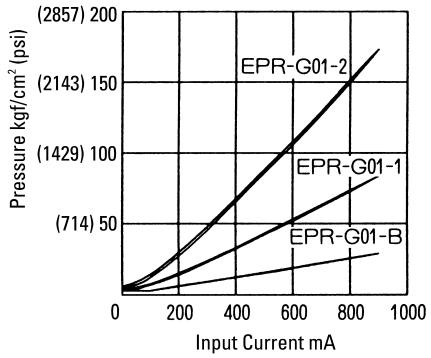
Installation Dimensions mm (inch)

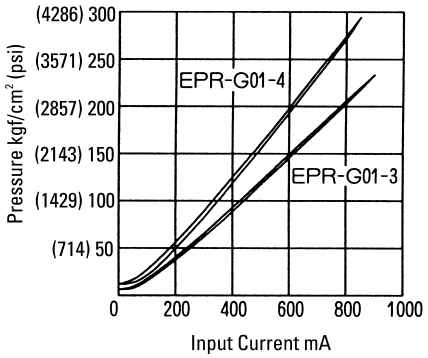


Note) Attach the subplate so that the valve P port is aligned with the subplate B port.

Performance Curve Oil viscosity = 32 cSt

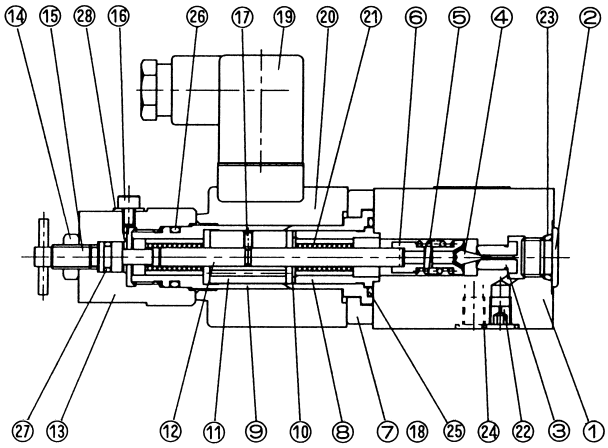
Input Current—Pressure Characteristics





Cross Section Drawing

EPR-G01-※-※※※※-※11



No.	Name of part
1	Body
2	Plug
3	Seat
4	Poppet
5	Spring
6	Retainer
7	Cover
8	Stopper
9	Guide
10	Shim
11	Plunger
12	Rod
13	Cover
14	Nut
15	Screw
16	Screw
17	Screw
18	Screw
19	Connector
20	Coil
21	Ballbush
22	Orifice
23	O ring
24	O ring
25	O ring
26	O ring
27	O ring
28	Seal

Coil = EA64-D2-1A

List of Seals

No.	Name of part	Number of part	Qty
23	O ring	RO-P11-90	1
24	O ring	RO-P9-90	2
25	O ring	RO-P22-90	1
26	O ring	RO-P16-90	1
27	O ring	RO-P7-90	1
28	Seal	DS-1-4	1

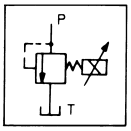
ER Series

Electro-hydraulic Proportional Relief Valve (ER)

This valve is a combination of the electro-hydraulic proportional pilot relief valve (EPR Series) and a balance piston type relief valve and is used to perform pressure control in proportion to the input current.

Since the control pressure is affected very little by changes of flow rate or oil temperature, even complicated pressure (power) control can be performed by an open loop system.

Hydraulic symbol



Specifications

Item \ Model	ER-G03-※-※10	ER-G06-※-※10	ER-G10-※-※10
Rated flow //min (gpm)	50 (13.2)	170 (44.9)	380 (100.4)
Pressure adjusting range kgf/cm² (psi)	B: 3 ~ 25 (43 ~ 357) Note 1). 1: 7 ~ 70 (100 ~ 1000) 2: 10 ~ 140 (143 ~ 2000) 3: 15 ~ 210 (214 ~ 3000) 4: 15 ~ 250 (214 ~ 3571)		
Rated current mA	800		
Coil resistance Ω	20 (20°C) (68°F)		
Hysteresis	3% or less Note 2).		
Minimum relief flow //min (gpm)	8 (2.1)	10 (2.6)	20 (5.3)
Weight kgf (lbs)	5 (11)	6.5 (14)	10.1 (22)

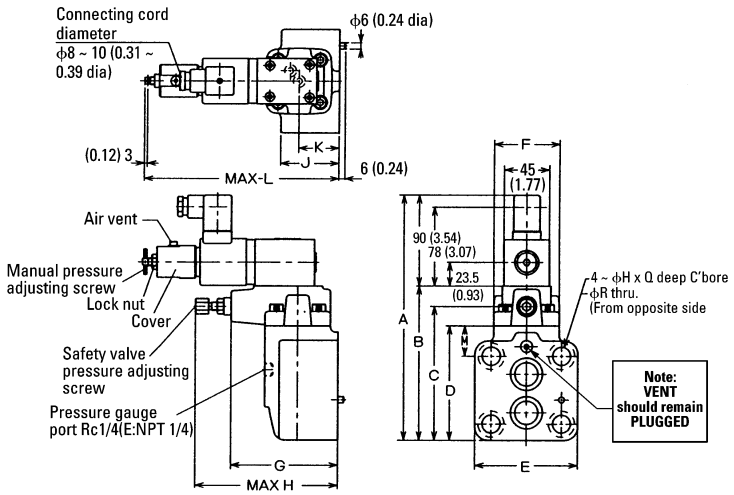
Note 1). The G03 model only available. But the flow is restricted to 20 l/min (5.3 gpm).
2). This is the hysteresis value when Nachi amplifier is provided for the valve. (With dither)

Model Code

ER-G03-3-※10

- Design number.
- Mounting bolt No code: Metric thread, E: Unified thread
- Pressure adjusting range. 1, 2, 3, 4
- Valve size. 03, 06, 10
- Mounting. G: Gasket mounting
- Electro-hydraulic Proportional Relief Valve

Installation Dimensions mm (inch)



	A	B	C	D	E	F	G	H	J	K	L	M	N	Q	R
ER-G03	242 (9.53)	152 (5.98)	112 (4.41)	89 (3.54)	79 (3.15)	68 (2.68)	98.5 (3.88)	140.5 (5.33)	70 (2.76)	37.5 (148)	195 (7.68)	25 (0.98)	17.5 (0.69)	10.8 (0.43)	11 (0.43)
ER-G06	241.5 (9.51)	151.5 (5.96)	131.5 (5.18)	112.5 (4.23)	102 (4.02)	65 (2.56)	106 (4.17)	141 (5.55)	58 (2.28)	40 (1.57)	193 (7.60)	29.7 (1.17)	25 (1.02)	1 (0.04)	18 (0.71)
ER-G10	252.5 (9.94)	162.5 (6.40)	143 (5.63)	120.5 (4.74)	127 (5.00)	86 (3.39)	113 (4.48)	148 (5.83)	80 (3.15)	50 (0.97)	194 (7.64)	36.1 (1.42)	32 (1.26)	1 (0.04)	22 (0.87)

Handling

1 Air Bleeding
Loosen the air vent to bleed the air thoroughly and fill oil in the solenoid at the start of operation to obtain good pressure control.

2 Manual Pressure Adjusting Screw
When there is no input current supplied to the valve as in the case of initial adjustment or due to an electrical fault, the valve pressure can be controlled temporarily by turning the manual adjusting screw. In normal operation, this manual adjust screw must be retracted completely and fixed with the locknut.

3 Tank Port Back-Pressure
Use the valve with a tank port back-pressure which is as low as possible. 2 kgf/cm² (29 psi) or less is recommended.

4 Setting Pressure of Safety Valve
The safety valve is set for a pressure that is 15~20 kgf/cm² (214~286 psi) above the maximum adjusting pressure. Adjust this safety valve setting in accordance with the pressure to be actually used.

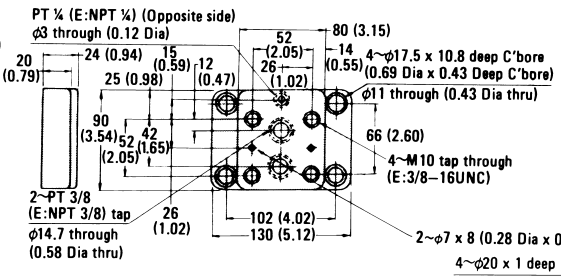
5 Mounting bolts

Model	Bolt Size	Quantity
ER-G03	M10 x 75/ (E: 3/8-16 UNCx3")	4
ER-G06	M16 x 80/ (E: 5/8-11 UNCx3 1/8")	4
ER-G10	M20 x 105/ (E: 3/4-10 UNCx4 1/8")	4

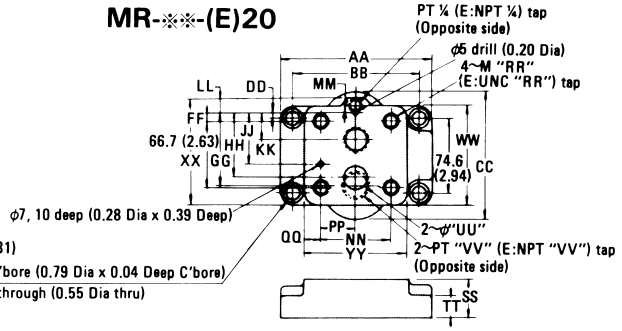
6. Oil temperature
-20°C ~ 70°C (-4°F ~ 158°F)
7. Oil viscosity
12 ~ 400 cSt
15 ~ 60 cSt is recommended.

ER Series

Subplate
MR-03-(E)10



MR-※※-(E)20

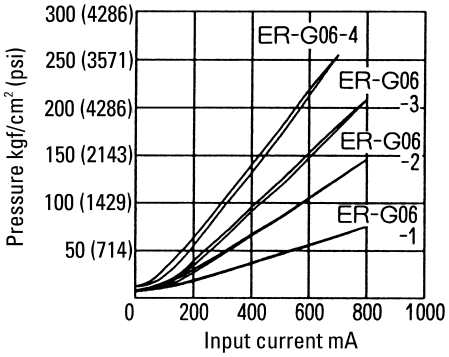


Model	AA	BB	CC	DD	FF	GG	HH	JJ	KK	LL	M	MM	NN	PP	QQ	RR	SS	TT	UU	VV	W	WW	XX	YY
MR-06-(E)20	150	127	125	1.6	9.5	72	65	52.4	27	14.2	5	5	69.9	34.9	16.1	16	38	22	22	¾	103	98.5	106.5	102
MR-06X-(E)20	(5.91)	(5.00)	(0.49)	(0.06)	(0.37)	(2.83)	(2.60)	(2.06)	(1.06)	(0.60)	(0.20)	(0.20)	(2.75)	(1.37)	(0.63)	(0.63)	(1.50)	(0.87)	(0.87)	1	(4.06)	(3.88)	(4.19)	(4.02)
MR-10-(E)20	175	152.4	150	9.5	15.9	87.2	74.6	66.7	30.2	9.7	10	10	92.1	46.1	17.5	20	55	22	28.5	1¼	102.5	102.5	110	127
MR-10X-(E)20	(6.89)	(6.00)	(5.91)	(0.37)	(0.63)	(3.43)	(2.94)	(2.63)	(1.19)	(0.38)	(0.39)	(0.39)	(3.63)	(1.81)	(0.69)	(0.79)	(2.17)	(0.87)	(1.12)	1½	(4.04)	(4.04)	(4.33)	(5.00)

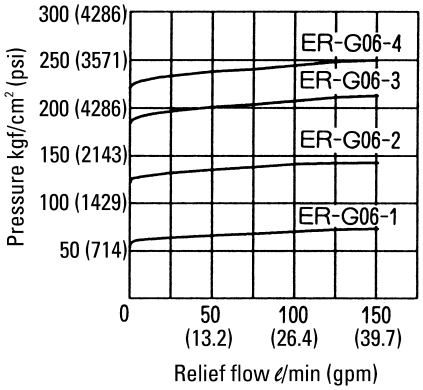
Performance Curve

Oil viscosity = 32 cSt

Input Current—Pressure characteristics

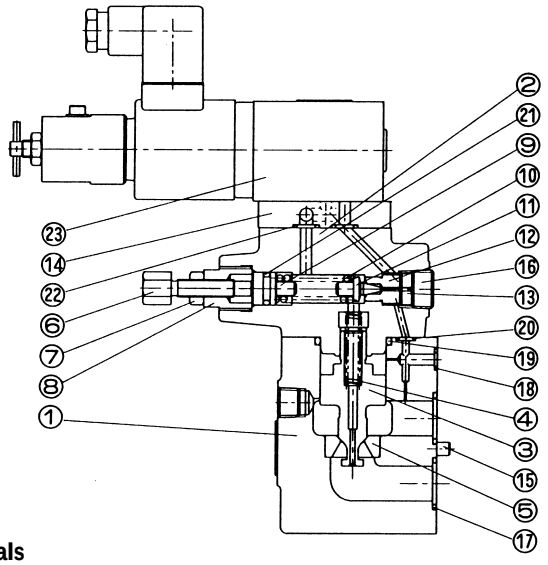


Pressure Override Characteristics



Cross Section Drawing

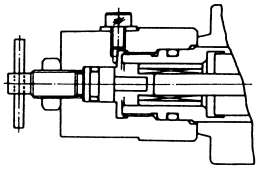
ER-G※※-※-※10



Combination with EPR valve

Model	EPR valve model
ER-G03-B-10	EPR-G01-B-0011S-11
ER-G03-1-10	1-0011S-11
ER-G03-2-10	2-0009S-11
ER-G03-3-10	3-0009S-11
ER-G03-4-10	4-1212S-11
ER-G06-1-10	EPR-G01-1-0010S-11
ER-G06-2-10	2-0010S-11
ER-G06-3-10	3-0009S-11
ER-G06-4-10	4-1212S-11
ER-G10-1-10	EPR-G01-1-0000-11
ER-G10-2-10	2-0000-11
ER-G10-3-10	3-0000-11
ER-G10-4-10	4-1212S-11

Manual pressure adjusting section



List of Seals

No.	Name of part	Model / Number of part			Qty
		ER-G03-※-※10	ER-G06-※-※10	ER-G10-※-※10	
17	O ring	RO-P20-90	RO-P26-90	RO-P35-90	2
18	O ring	RO-P7-90	RO-P9-90	RO-P9-90	1
19	O ring	RO-G30-90	RO-G30-90	RO-G40-90	1
20	O ring	RO-P6-90	RO-P6-90	RO-P7-90	1
21	O ring	RO-P11-90	RO-P11-90	RO-P11-90	1
22	O ring	RO-P9-90	—	—	2

No.	Name of part
1	Body
2	Cover
3	Piston
4	Spring
5	Seat
6	Screw
7	Nut
8	Retainer
9	Guide
10	Spring
11	Poppet
12	Seat
13	Collar
14	Plate
15	Pin
16	Plug
17	O ring
18	O ring
19	O ring
20	O ring
21	O ring
22	O ring
23	Pilot relief valve

Coil = EA64-D2-1A