

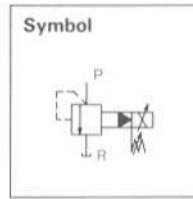
Soneoid operated proportional valves

Sonenoed operated proportional relief valves (Series EHR3)

Employing new control system, this relief valve is designed for continuous and stepless remote control of pressure of the hydraulic circuit. In place of conventional method of pressure setting by spring, a control amplifier is employed to control the input current to DC solenoid of the pilot section which directly presses the poppet with its suction force to set the pressure. Remote control and programmed control of pressure are easily conducted.



EHR3-BG5R-06



• Features

1. Quick response.
2. Continuous and stepless remote control of pressure is possible.
3. Control amplifier is separable from hydraulic unit, which enables operation under severe operating conditions.
4. Programmed control is possible.
5. Less affected by dust compared with servo valves, this valve causes little trouble and can be easily maintained.

• Model coding

EHR 3 - B G 5 R - 06

Solenoid operated proportional relief valve
 Max. operating pressure 3: 21 MPa 3,000psi
 Structure B: balance piston type
 Piping method G: gasket

Nominal size
 R: Safety valve (excluded 025 Type)
 Pressure adjusting range (see below)

• Specifications

at 38mm²/s

Pipe size	Rated flow		Max. flow		Max. operating pressure		Pressure adjusting range		Model
	ℓ /min	gpm	ℓ /min	gpm	MPa	psi	MPa	psi	
1/4	8	1.3	20	5.3	21	3,000	0.7 ~ 21	100 ~ 3,000	EHR3-BG5-025
1/2	40	10.6	80	21.2					EHR3-BG5R-04
3/4	120	31.7	190	50.3			0.8 ~ 21	100 ~ 3,000	EHR3-BG5R-06
1-1/4	320	84.6	500	132.3					EHR3-BG5R-10

• Solenoid characteristics

Nominal size	Model	Coil input current	Coil resistance Ω
025	SDM2-02-C	0 ~ 1,000	12
04	SDM2-02M-C		13
06			
10			

• Sub-plate

Nominal size	Model	Remark
025	SHD025-02T※	P and R ports available.
	SHD025-03T※	
04	SHR04-04T※	
	SHR04-06T※	
06	SHR06-06T※	
	SHR06-08T※	
10	SHR10-10T※	
	SHR10-12T※	

• Sub-plate should be separately ordered.

• Control amplifier

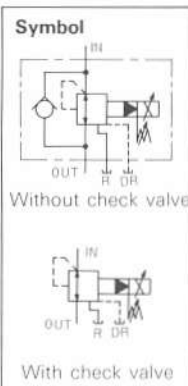
Model ECAP-RD2-※ is provided as an amplifier for this valve.
 For its specifications please refer to page 58.

Solenoid operated proportional pressure reducing valves (Series EHG3)

This valve serves to control pressure by controlling the input current to the DC solenoid of the pilot section, enabling continuous and stepless remote control of pressure.



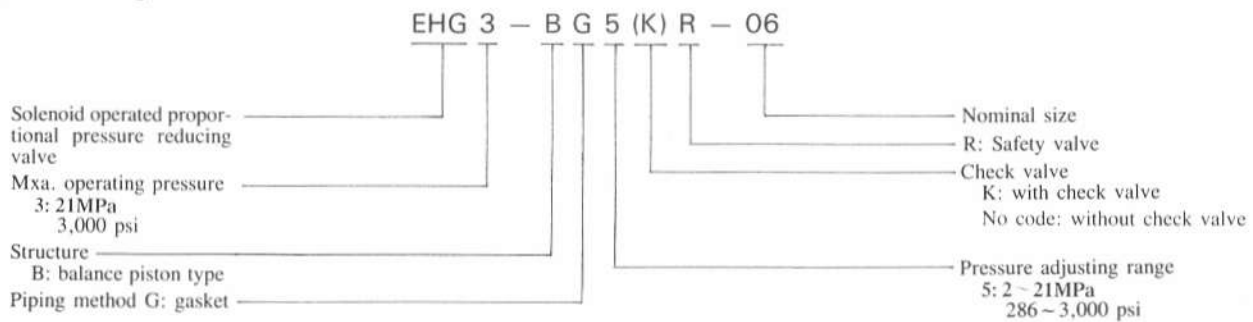
EHG3-BG5KR-03



● Features

1. Continuous and stepless remote control of pressure is possible.
2. Control amplifier is separable from hydraulic unit, which enables operation under severe operating conditions.
3. Programmed control is possible
4. Less affected by dust compared with servo valves, this valve causes little trouble and can be easily maintained.

● Model coding



● Specifications

Pipe size	Rated flow		Max. flow		Max. operating pressure		Pressure adjusting range		Model	
	ℓ/min	gpm	ℓ/min	gpm	MPa	psi	MPa	psi	w/o check valve	w/ check valve
3/8	40	10.6	80	21.2	21	3,000	1.5 ~ 21	214 ~ 3,000	EHG3-BG5R-03	EHG3-BG5KR-03
3/4	120	317.7	190	50.3					EHG3-BG5R-06	EHG3-BG5KR-06
1-1/4	320	84.6	500	132.3					EHG3-BG5R-10	EHG3-BG5KR-10

● Solenoid characteristics

Model	Coil input current mA	Coil resistance Ω
SDM2-02M-C	0 ~ 1,000	13

● Sub-plate

Model	Piping size Rc (PT)
SHQ03-03T1	3/8
SHQ06-06T1	3/4
SHQ10-10T1	1-1/4

In case a sub-plate is required, take SHQ ϕ - ϕ T1 sub-plate for standard sequence valve. In and Out ports of the valve correspond to those of the sub-plate but R port of the valve relates to DR port of the sub-plate and DR port of the valve relates to PLT port of the sub-plate.

● Control amplifier for solenoid operated proportional pressure control valve (EHR3 and EHG3)

This control amplifier provides relief valve or reducing valve with the current required to control their solenoids.

Model	Voltage	Input voltage	Max. gain	Input impedance	Output current	Ambient temperature	Consumptive power
ECAP-RD2	AC85 ~ 250V 50 ~ 60 Hz DC110 ~ 250V	0 ~ +5V	1A/5V	10k Ω	1A	0 ~ 50°C	50VA

Solenoid operated proportional directional control valves (Series EHD3)

This valve serves to control direction and flow of oil remotely by controlling the input current to the solenoid. Flow valve can be infinitely controlled in proportion to the current value.



EHD3-Y60P-G3BCA-03

• Features

1. Structure of the hydraulic circuit can be simplified.
2. Mounting dimensions of types 06 and 10 are the same as those of the solenoid valves. Counterbalancing circuit and cylinder lock circuit are simply and compactly made, if this valve is combined with stack valves.
3. Only normal maintenance of hydraulic fluid is needed.
4. Its solenoid consumes 3.6W of power. The load pressure sensitive type controls pump pressure to minimal required value according to the variation of load pressure in order to ultimately save power.

• Model coding

EHD 3 - (Y) 150 (P) - G 3 BCA - 06

Solenoid operated proportional direction control valve
Max. operating pressure 3: 21MPa
3,000 psi

No code : meter-out system
Y : meter-in system

Flow adjusting range
03 type : 60 l/min 159.9 gpm
06 type : 150 39.7
10 type : 350, 92.6,
500 132.3

No code : variable throttle type
P : pressure compensation type
PG : pressure compensation type with pressure reducing valve
L : load pressure sensitive type
LR : load pressure sensitive type with relief valve
} meter-in system only

Nominal size
Spool symbol
BCA: closed center
BGA: ABR connection (meter-in system only)
No. of position
3: 3 positions
Piping method
G: gasket connection (ISO Standard)

Sub-plate should be separately ordered.

• Model

Model	Variable throttle type		Load pressure sensitive type		Pressure compensation type		
	Meter-in	Meter-out	Meter-in		Meter-in		Meter-out
			-	w/ relief valve	-	w/ pressure reducing valve	
Model	EHD3-Y-#-G3-#-#	EHD3-#-G3BCA-#	EHD3-Y-#-L-G3-#-#	EHD3-Y-#-LR-G3-#-#	EHD3-Y-#-P-G3-#-#	EHD3-Y-#-PG-G3-#-#	EHD3-#-P-G3BCA-#
Symbol							
Functions	Flow control	○	○	○	○	○	○
	Pressure compensation	—	—	○	○	○	○
	Load pressure sensitive	—	—	○	○	—	—
	Pump unloading in neutral	—	—	○	○	—	—
	Relief control	—	—	—	○	—	—
Pressure reducing control	—	—	—	—	—	○	—

(Note) For the spool symbol, only BCA and BGA are available. Please specify either one. 03 type has reverse positions of sol b and a.
Sub-plate should be separately ordered.

● Specifications

Item	Type	03 type			06 type			10 type		
		①	②	③	①	②	③	①	②	③
Max. operating pressure MPa psi		21	3,000		21	3,000		21	3,000	
Max. controllable flow ℓ/min. gpm		60	15.9		150	39.8		350 500	92.8 132.3	350 92.8
Rport Permissible back pressure MPa psi		21	3,000		21	3,000		21	3,000	
Drain port Permissible back pressure MPa psi		0.2	28.5		0.2	28.5		0.2	28.5	
Drain flow ℓ/min. gpm		3 or under	0.8 or under		3.5 or under	0.9 or under		3.5 or under	0.9 or under	
Supplied flow to P Port ℓ/min. gpm		—	80 21.2	—	—	190 50.3	—	—	500 132.3	—
Pressure adjusting range of relief valve MPa psi		—	3.5 ~ 21 500 ~ 3,000	—	—	3.5 ~ 21 500 ~ 3,000	—	—	3.5 ~ 21 500 ~ 3,000	—
Pressure adjusting range of pressure reducing valve MPa psi		—	—	3.5 ~ 21 500 ~ 3,000	—	—	3.5 ~ 21 500 ~ 3,000	—	—	3.5 ~ 21 500 ~ 3,000

- ① : variable throttle type
- ② : load pressure sensitive type
- ③ : Pressure compensation type

● Solenoid characteristics

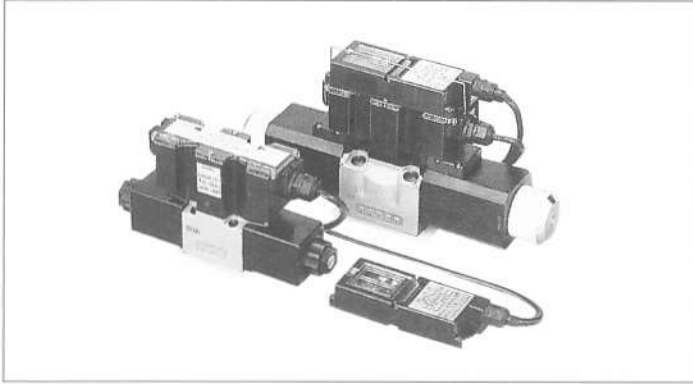
Model	Coil input current mA	Coil resistance Ω
ESH-0103-D3	0 ~ 300	34

● Control amplifier

This control amplifier provides directional control valve with the current required to control their solenoid.

Model	Voltage	Input voltage	Max. gain	Input impedance	Output current	Ambient temperature	Consumptive power
ECAD-D1F-A	AC100V 50/60Hz	—	300m A/5V	—	0 ~ 300mA	0 ~ 50℃	16VA
ECAD-D1F-B	AC200V 50/60Hz						
ECAD-D1FB-A	AC100V 50/60Hz	0 ~ 10VDC		25k Ω			
ECAD-D1FB-B	AC200V 50/60Hz						
ECAD-D2	AC85 ~ 250V 50 ~ 60 Hz DC110 ~ 250V	0 ~ +5V		10k Ω			

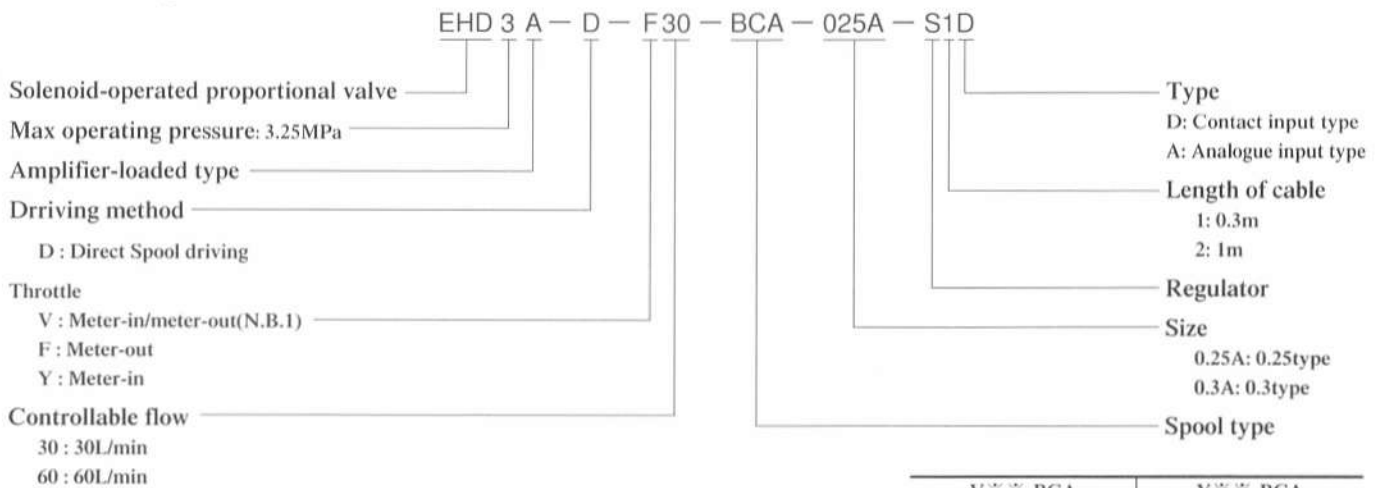
Solenoid-operated proportional valve connected with amplifier (Series EHD3A)



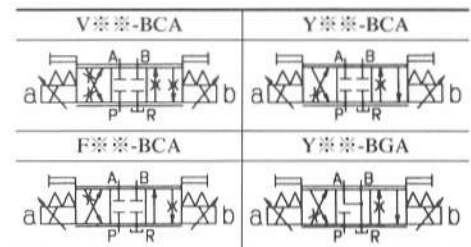
• Characteristics

1. Dual speed and shock reducing controls can be easily made.
2. Digital regulator serves to make speed and shock reducing controls with easy and excels in reproduction.
3. Digital regulator can be easily detached from a valve and adjusted in sight of actuators.
4. Meter-in, meter-out and meter-in/meter-out controls are available.
5. It has the same mounting size with correspondent 025 and 03 solenoid valves.

• Model coding



(N.B.1) Open area of meter-in, meter-out throttle: P → A, P → B > B → R, B → A it gives priority to meter-in throttle.

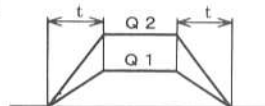


● General specifications

Size		025 type	03 type
Max. operating pressure	MPa	25	
Flow adjusting range	ℓ /min	0.5~30	1~60
Permissible counter pressure	MPa	7	16
Amplifier	Supplied power source (For control)	Voltage V	DC24(DC21~28)
		Current A	1.3(at DC24V)
	Analogue input (without digital regulator)	Voltage V	DC0~5
		Input resistance kΩ	10
	Power source for external regulator	Voltage V	DC5.6
		Loaded current mA	15
Regulator	Resolution of flow setting (F1, F2)		1/100
	Switching time adjusting range (t1, t3) sec		0~10(N.B.1)
	Resolution of switching time adjustment sec		0.05
	Switching time control mode		Fixed acceleration control and fixed acceleration rate control are available (N.B.2)
	Switching signal	ON voltage V	DC12~32
		OFF voltage V	DC0~8
		Current mA	10/1
		Input interface	Bi-directional photo coupler
	Analogue input (Analogue input type)	Voltage V	DC0~5
		Input resistance kΩ	20
	Length of cable m		0.3, 1
Operating temperature range °C		0~60	
Accessary(4bolts)		JISB1176M5x45	JISB1176M8x60
Weight kg		2.7	6.5
Solenoid model		LHS-M46T0	SDM3-03-D

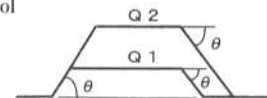
(N.B.1) Fixed acceleration rate control is provided with a setting time which follows 100% output. (N.B.2) Fixed acceleration time control and fixed acceleration rate control are as follows.

Fixed acceleration time control



In spite of variation of flow Q acceleration time t stays unchanged

Fixed acceleration rate control



In spite of variation of flow Q acceleration rate θ stays unchanged

● Environmental resistance

Item	Specifications
Noise immunity	1000Vp-p (Pulse width 1 μs)
Voltage endurance	AC1500V 1minute (Between input terminal and valve)
Insulation resistance	DC500V 10MΩ or OVER (Between input terminal and valve)
Protection structure	IP55
Vibration resistance	Fixed vibration Amplitude 4mm Frequency 30Hz 69m/s ² {7G} JIS C 0911
	Sweep vibration Amplitude 1.5mm Frequency 10-55Hz/ One minute 89m/s ² {9G} JIS C 0911
Shock resistance	147m/s ² {15G} 11ms JIS C 0912

Solenoid operated proportional flow control valves (Series EHF3)

Flow valve is infinitely controlled by controlling the input current to the solenoid. This valve has the optional speed control of actuators with the appropriate pattern as desired.

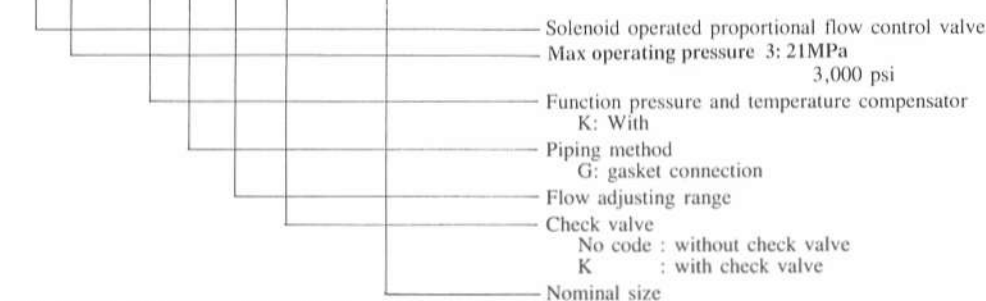


● Features

1. This valve serves to feed back throttle opening degree it has detected to the control amplifier to eliminate hysteresis for precision control.
2. Stable flow control is possible without being affected by the variation of pressure at IN and OUT ports and temperature of hydraulic fluid.
3. No special control is required for hydraulic fluid since the valve operates effectively against contaminants.
4. Mounting dimensions conform to ISO.

● Model coding

EHF3 - K G 80 (K) - 03



Sub-plate should be separately ordered.

● Specifications

Pipe size	Max. operating pressure		Flow adjusting range*1		Required min. pressure differential*2		Zero flow*3		Hysteresis (%)	Model
	MPa	psi	ℓ/min	gpm	MPa	psi	cm ³ /min	gpm		
3/8	21	3,000	0.3 ~ 80	0.08 ~ 21.2	1.2	3.2	200	0.05	2 or less	EHF3-KG80 (K)-03
3/4			0.5 ~ 200	0.13 ~ 52.9			400	0.1		EHF3-KG200 (K)-06

(Note) * 1 Flow value which can be compensated for temperature:

03: 2 ℓ/min 0.53 gpm or over

06: 5 ℓ/min 1.32 gpm or over

* 2 Minimum pressure differential between IN and OUT required to exert pressure compensation characteristics.

* 3 Flow value from IN to OUT when the input instruction is zero.

● Control amplifier

This control amplifier provides solenoid operated proportional directional control valve with the current required to control their solenoid.

Model	Voltage	Input voltage	Max. gain	Input impedance	Output current	Ambient temperature	Consumptive power
ECAF-FB2	AC85 ~ 250V 50 ~ 60 Hz DC110 ~ 250V	0 ~ +5V	1A/5V	10kΩ	0 ~ 1000mA	0 ~ 50℃	40VA