Pub. EC-1301

YUKEN

EH SERIES
PROPORTIONAL ELECTRO-HYDRAULIC CONTROL VALVES

Pilot Relief / Relief / Reducing and Relieving / Flow Control / Flow Control and Relief / Directional and Flow Control

PROPORTIONAL CONTROLS

Up to 24.5 MPa (3550 PSI), 400 L/min (106 U.S.GPM)

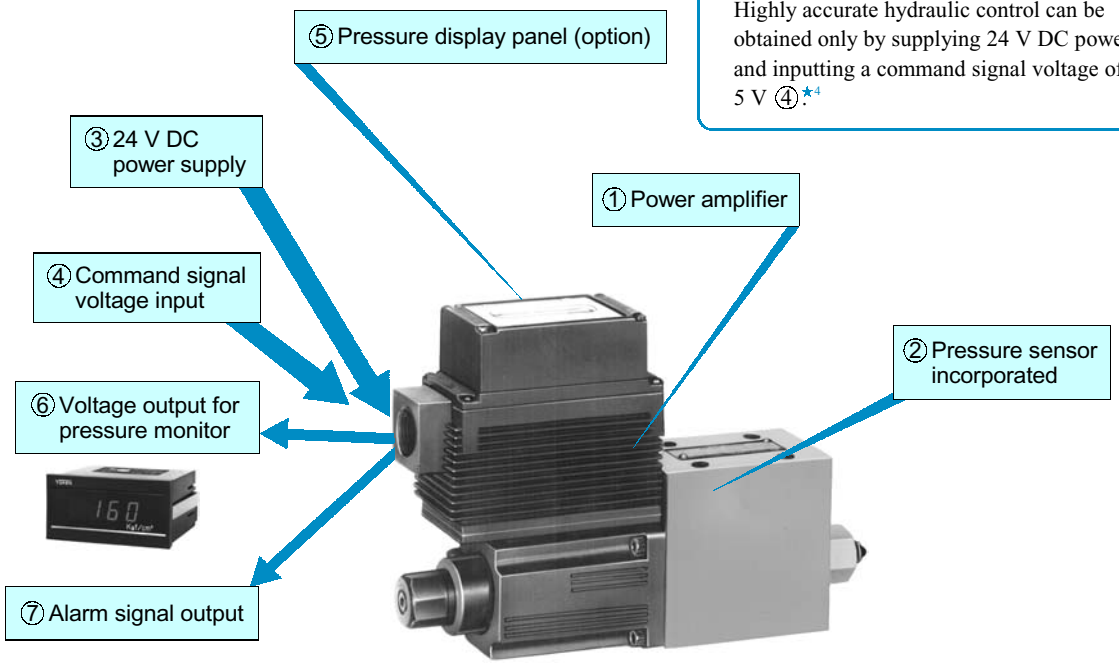
H

This catalogue introduce the outline of the EH series. Please refer to the catalogue titled "EH Series-Hybrid Components" (Cat. No. Pub. JC-1320) for the details such as performance characteristics and dimensions.

High-accuracy, simple, convenient
EH Series realizes your dreams.

Why simple ?

Highly accurate hydraulic control can be obtained only by supplying 24 V DC power ③★3 and inputting a command signal voltage of 0 to 5 V ④.★4



Details of Proportional Electro-hydraulic Relief Valve

Why high-accuracy ?

The power amplifier ① and pressure sensor ②★1 are integrated in the control valve.
Furthermore, the closed-loop control★2 design greatly improves the linearity, hysteresis and stability in control pressure.

Why convenient ?

Control pressure★5 can be shown digitally on the optional pressure display panel ⑤.

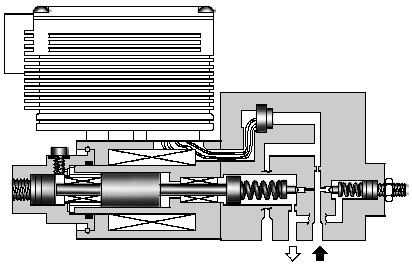
Analog voltages can be output by using the incorporated sensor for monitoring pressure, etc. ⑥★5.
Pressure can be displayed remotely with the Yuken's digital panel metre or any indicators obtainable in the market and also can be transmitted into a computer.

If any trouble arises in the system and the command signal does not match to the output, the alarm signal ⑦ is dispatched.
The trouble, if arises, can be easily detected by monitoring the dispatch of the alarm signal with sequence controller or computer.

★1. The sensor in directional control valves is to monitor the spool position. Valves without sensor are also available in both pressure control valves and directional control valves.
★2. Open-loop types are also available.
★3. EHDFG-04 and 06: ±24V DC power supply is needed.
★4. EHDFG-01, 03, 04 and 06: 0 to ±5V DC command signal is needed.
★5. EHDFG-04 and 06: The spool displacement is shown as a percentage.

EH SERIES
Pilot Relief Valves
EHDG-01∗-∗-∗∗-∗-PNT∗∗-50
1/8, Sub-plate Mounting

The valve can be used as a pilot valve of the Proportional Electro-Hydraulic Control Valves.
The valve can also be used as a relief valve for the hydraulic system where a small flow rate and continuous pressure control are required.

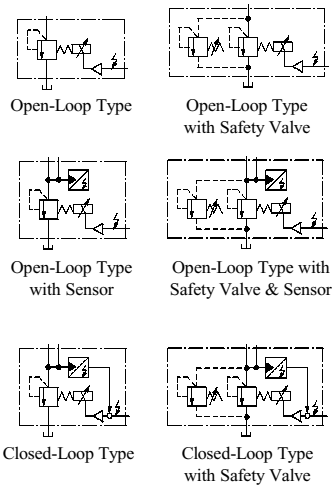


Specifications

Description \ Model Numbers	EHDG-01∗
Max. Operating Pres.	24.5 MPa (3550 PSI)
Max. Flow	2 L/min (.53 U.S.GPM)
Min. Flow	0.3 L/min (.08 U.S.GPM)
Pressure Adjustment Range	Refer to Model Number Designation
Coil Resistance	10 Ω
Hysteresis	Less than 3% (1%) ★1
Repeatability	Less than 1% ★2
Frequency Response	**B :** 10 (27) Hz ★1 **C :** 10 (27) Hz ★1 (-90 degree) **H :** 12 (27) Hz ★1
Supply Electric Power	24 V DC (21 to 28 V DC Included Ripple)
Power Input (Max.)	28 W
Input Signal	**B :** 6.9 MPa (1000 PSI) / 5 V DC **C :** 15.7 MPa (2275 PSI) / 5 V DC **H :** 24.5 MPa (3550 PSI) / 5 V DC
Input Impedance	10 kΩ
Alarm Signal Output (Open Collector)	Voltage: Max. 30 V DC Current: Max. 40 mA
Pressure Signal Output	**B :** 5 V DC / 6.9 MPa (1000 PSI) **C :** 5 V DC / 15.7 MPa (2275 PSI) **H :** 5 V DC / 24.5 MPa (3550 PSI)
Ambient Temperature	0 - 50°C (32 - 122°F) (With Circulated Air)

★1. The value in ( ) is for the closed-loop type.
★2. The repeatability of the valve is obtained by having it tested independently on the conditions similar to its original testing.

Graphic Symbols



H

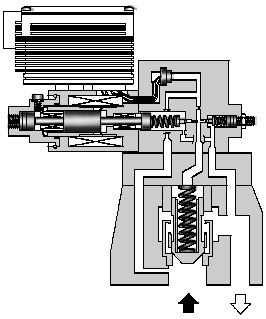
Model Number Designation

EHD	G	-01	V	-B	-S	D	-1	-PN	T15	M10	-50
Series Number	Type of Mounting	Valve Size	Applicable Control	Pres. Adj. Range MPa (PSI)	Control Type	DPM	Safety Valve	P-Line Orifice	T-Line Orifice	P-B Line Orifice	Design Number
EHD : Proportional Electro-Hydraulic Pilot Relief Valve	**G :** Sub-Plate Mounting	**01**	**None :** For general use **V :** Vent Control of Relief Valve (Omit if not required)	**B :** 0.5 - 6.9 (70 - 1000) **C :** 1 - 15.7 (145 - 2275) **H :** 1.2 - 24.5 (175 - 3550)	**None :** Open-Loop	**None :** Without DPM	**None :** Without Safety Valve **1 :** With Safety Valve	**PN :** Without Orifice (Standard)	**T15** **T13** **T11** ★2	—	**50**
					S : Open-Loop with Sensor	**None :** Without DPM				**M10 :** Standard Orifice	
					L : Closed-Loop ★1	**D :** With DPM					

★1. For closed-loop models, specify applicable control code "V" even though the valve may not be used as vent control of relief valve.
★2. Standard of T-line Orifice.
Pres. Adj. Range B: T15, C: T13, H: T11.

EH SERIES
Relief Valves
EHBG-03/06/10 (3/8, 3/4, 1-1/4)
Sub-plate Mounting

These valves, consist of a small size but high performance EH series electro-hydraulic proportional pilot relief valve and a low noise type relief valve. The valves control the system pressure proportionally through a controlled input voltage.

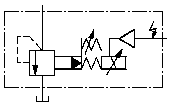


Specifications

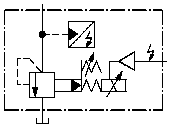
Model Numbers / Description	EHBG-03	EHBG-06	EHBG-10
Max. Operating Pres.	24.5 MPa (3550 PSI)		
Max. Flow	100 L/min (26.4 U.S.GPM)	200 L/min (52.8 U.S.GPM)	400 L/min (106 U.S.GPM)
Min. Flow	3 L/min (.79 U.S.GPM)	3 L/min (.79 U.S.GPM)	3 L/min (.79 U.S.GPM)
Pressure Adjustment Range	Refer to Model Number Designation		
Coil Resistance	10 Ω		
Hysteresis	Less than 2% (1%) ★1		
Repeatability	Less than 1% ★2		
Frequency Response	**C :** 10 (22) Hz ★1 **H :** 10 (25) Hz ★1 (-90 degree)	**C :** 7 (15) Hz ★1 **H :** 9.5 (18) Hz ★1 (-90 degree)	**C :** 7 (10.5) Hz ★1 **H :** 6 (14) Hz ★1 (-90 degree)
Supply Electric Power	24 V DC (21 to 28 V DC Included Ripple)		
Power Input (Max.)	28 W		
Input Signal	**C :** 15.7 MPa (2275 PSI) / 5 V DC **H :** 24.5 MPa (3550 PSI) / 5 V DC (At Max. Flow)		
Input Impedance	10 kΩ		
Alarm Signal Output (Open Collector)	Voltage: Max. 30 V DC Current: Max. 40 mA		
Pressure Signal Output	**C :** 5 V DC / 15.7 MPa (2275 PSI) **H :** 5 V DC / 24.5 MPa (3550 PSI)		
Ambient Temperature	0 - 50°C (32 - 122°F) (With Circulated Air)		

★1. The value in ( ) is for the closed-loop type.
★2. The repeatability of the valve is obtained by having it tested independently on the conditions similar to its original testing.

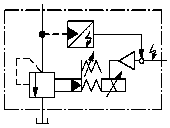
Graphic Symbols



Open-Loop Type



Open-Loop Type with Sensor



Closed-Loop Type

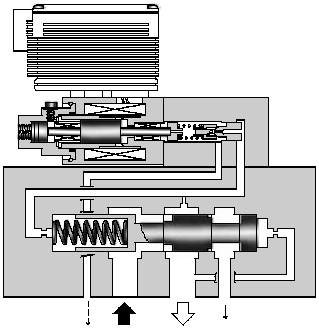
Model Number Designation

EHB	G	-03	-C	-S	D	-50
Series Number	Type of Mounting	Valve Size	Pres. Adj. Range MPa (PSI)	Control Type	DPM	Design Number
EHB : Proportional Electro-Hydraulic Relief Valve	**G :** Sub-Plate Mounting	**03**	**C :** 0.6 [0.8]★ - 15.7 (85 [115]★ - 2275) **H :** 0.6 [0.8]★ - 24.5 (85 [115]★ - 3550)	**None :** Open-Loop	**None :** Without DPM	**50**
		06	**C :** 0.9 [1.0]★ - 15.7 (130 [145]★ - 2275) **H :** 0.9 [1.0]★ - 24.5 (130 [145]★ - 3550)	**S :** Open-Loop with Sensor	**None :** Without DPM	**50**
		10	**C :** 1.1 [1.4]★ - 15.7 (160 [205]★ - 2275) **H :** 1.1 [1.4]★ - 24.5 (160 [205]★ - 3550)	**L :** Closed-Loop	**D :** With DPM	**50**

★Each value of minimum adjustment pressure is of at 50% flow rate of the Max. Flow shown on the Specifications.
The value in [ ] is for the closed-loop type.

EH SERIES
Reducing & Relieving Valves
EHRBG-06/10 (3/4, 1-1/4)
Sub-plate Mounting

These valves consist of a small size but high performance electro-hydraulic proportional pilot relief valve and reducing valve with relief function. The valves control the system pressure proportionally through a controlled input voltage. Moreover, a good response speed in reducing the pressure even at a large load capacity can be obtained with the relief function of the valves.



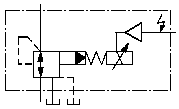
Specifications

Model Numbers / Description	EHRBG-06	EHRBG-10
Max. Operating Pres.	24.5 MPa (3550 PSI)	
Max. Flow	100 L/min (26.4 U.S.GPM)	250 L/min (66 U.S.GPM)
Max. Relieving Flow	35 L/min★1 (9.24 U.S.GPM)	15 L/min★1 (3.96 U.S.GPM)
Pressure Adjustment Range	Refer to Model Number Designation	
Coil Resistance	10 Ω	
Hysteresis	Less than 3%	
Repeatability	Less than 1%★2	
Frequency Response	**B:** 4 Hz **C:** 3 Hz (-90 degree) **H:** 3 Hz	
Supply Electric Power	24 V DC (21 to 28 V DC Included Ripple)	
Power Input (Max.)	28 W	
Input Signal	**B:** 6.9 MPa (1000 PSI) / 5 V DC **C:** 13.7 MPa (2000 PSI) / 5 V DC **H:** 20.6 MPa (3000 PSI) / 5 V DC (at Flow Rate Zero)	
Input Impedance	10 kΩ	
Pressure Signal Output	**B:** 5 V DC / 6.9 MPa (1000 PSI) **C:** 5 V DC / 13.7 MPa (2000 PSI) **H:** 5 V DC / 20.6 MPa (3000 PSI)	
Ambient Temperature	0 - 50°C (32 - 122°F) (With Circulated Air)	

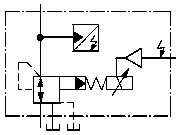
★1. The figures shown are those obtained where the differential pressure between the secondary pressure port and tank port is 14 MPa (2030 PSI).

★2. The repeatability of the valve is obtained by having it tested independently on the conditions similar to its original testing.

Graphic Symbols



Open-Loop Type



Open-Loop Type with Sensor

H

Model Number Designation

EHRB	G	-06	-C	-S	D	-50
Series Number	Type of Mounting	Valve Size	Pres. Adj. Range MPa (PSI)	Control Type	DPM	Design Number
EHRB: Proportional Electro-Hydraulic Reducing & Relieving Valve	**G:** Sub-Plate Mounting	**06**	**B:** 0.8 - 6.9 (115 - 1000) **C:** 1.2 - 13.7 (175 - 2000) **H:** 1.5 - 20.6 (220 - 3000)	**None:** Open-Loop	**None:** Without DPM	**50**
		10	**B:** 0.9 - 6.9 (130 - 1000) **C:** 1.2 - 13.7 (175 - 2000) **H:** 1.5 - 20.6 (220 - 3000)	**S:** Open-Loop with Sensor	**D:** With DPM	**50**

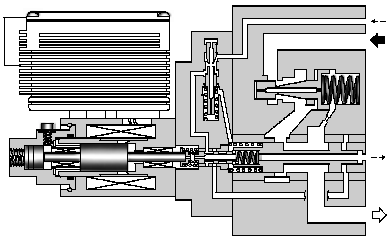
EH SERIES
Flow Control (and Check) Valves
EHFG/EHFCG-03/06 (3/8, 3/4)
Sub-plate Mounting

The system flow rate can be controlled remotely as desired by regulating input voltage. Further, since pressure and temperature compensation functions are provided, the preselected flow rate is not affected by pressure (load) or temperature (fluid viscosity).

Specifications

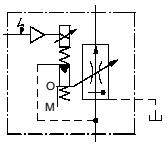
Description \ Model Numbers		EHF✻G-03-60 / 125	EHF✻G-06-250
Max. Operating Pres. MPa (PSI)		20.6 (3000)	24.5 (3550)
Max. Metred Flow L/min (U.S.GPM)		**60 :** 60 (15.8) **125 :** 125 (33)	250 (66)
Min. Metred Flow L/min (U.S.GPM)		1 (.26)	2.5 (.66)
Min. Differential Pressure ★1 MPa (PSI)		1.0 (145)	1.0 (145)
Free Flow L/min (U.S.GPM) (Only with Check Valve)		130 (34.3)	280 (73.9)
Pilot Flow L/min (U.S.GPM)	at Normal	0.5 (.13)	1 (.26)
	at Transition	2.6 (.69)	4 (1.06)
Min. Pilot Pressure MPa (PSI)		1.0 (145)	1.5 (215)
Frequency Response		12 Hz (-90 degree)	
Hysteresis		Less than 3%	
Repeatability		Less than 1% ★2	
Coil Resistance		10 Ω	
Supply Electric Power		24 V DC (21 to 28 V DC Included Ripple)	
Power Input (Max.)		28 W	
Input signal		Max. Metred Flow / 5V DC	
Input Impedance		10 kΩ	
Ambient Temperature		0 - 50°C (32 - 122°F) (With Circulated Air)	

★1. Minimum differential pressure means fine pressure compensation at inlet and outlet port.
★2. The repeatability of the valve is obtained by having it tested independently on the conditions similar to its original testing.

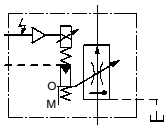


Graphic Symbols

EHFG

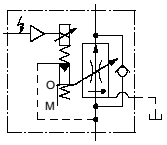


Internal Pilot

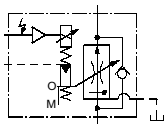


External Pilot

EHFCG



Internal Pilot



External Pilot

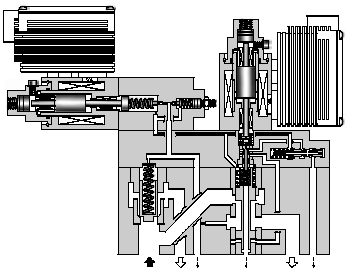
Model Number Designation

EHF	G	-03	-60	-E	-50
Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min (U.S.GPM)	Pilot Connection	Design Number
EHF : Proportional Electro-Hydraulic Flow Control Valve	**G :** Sub-Plate Mounting	**03**	**60 :** 60 (15.8) **125 :** 125 (33)	**None :** Internal Pilot	**50**
EHFC : Proportional Electro-Hydraulic Flow Control and Check Valve		**06**	**250 :** 250 (66)	**E :** External Pilot	**50**

EH SERIES
Flow Control and Relief Valves
EHFBG-03/06/10 (3/8, 3/4, 1-1/4)
Sub-plate Mounting

PROPORTIONAL CONTROLS

These are proportional electro-hydraulic flow control valves having functions for controlling the direct electric current of metre-in type and for pressure control. They are energy-saving valves for supplying the minimal pressure and flow required to operate actuators.

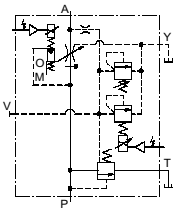


Specifications

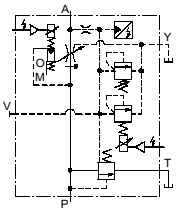
Description \ Model Numbers			EHFBG-03- 60 / 125	EHFBG-06-250	EHFBG-10-500
Max. Operating Pressure MPa (PSI)			24.5 (3550)	24.5 (3550)	24.5 (3550)
Max. Flow L/min (U.S.GPM)			**60 :** 60 (15.8) **125 :** 125 (33)	250 (66)	500 (132)
Metred Flow Capacity L/min (U.S.GPM)			**60 :** 1-60(.26-15.8) **125 :** 1-125(.26-33)	2.5-250 (.66-66)	5-500 (13.2-132)
Min. Pilot Pressure MPa (PSI)			1.5 (215)	1.5 (215)	1.5 (215)
Pilot Flow L/min (U.S.GPM)		at Normal	1 (.26)	1 (.26)	1 (.26)
		at Transition	3 (.79)	4 (1.06)	6 (1.59)
Differential Pressure MPa (PSI)			0.6 (85)	0.7 (100)	0.9 (130)
Flow Controls	Hysteresis		Less than 3%		
	Repeatability		Less than 1%★		
	Input Signal		Max. Flow / 5 V DC		
	Coil Resistance		10 Ω		
	Supply Electric Power		24 V DC (21 to 28 V DC Included Ripple)		
	Input Impedance		10 kΩ		
	Power Input (Max.)		28 W		
Pressure Controls	Pres. Adj. Range MPa (PSI)	Adj. Range: **C**	1.2-15.7 (175-2275)	1.4-15.7 (200-2275)	1.5-15.7 (215-2275)
		Adj. Range: **H**	1.4-24.5 (200-3550)	1.4-24.5 (200-3550)	1.5-24.5 (215-3550)
	Hysteresis		Less than 2%		
	Repeatability		Less than 1%★		
	Coil Resistance		10 Ω		
	Input Signal		Max. Operating Pres. / 5 V DC		
	Supply Electric Power		24 V DC (21 to 28 V DC Included Ripple)		
	Input Impedance		10 kΩ		
	Power Input (Max.)		28 W		
Output Signal			**C :** 5 V DC / 15.7 MPa (2275 PSI) **H :** 5 V DC / 24.5 MPa (3550 PSI)		
Ambient Temperature			0 - 50°C (32 - 122°F) (With Circulated Air)		

★The repeatability of the valves is obtained by having it tested independently on the conditions similar to its original testing.

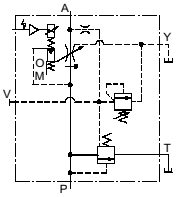
Graphic Symbols



Models with Proportional Pilot Relief Valves



Models with Proportional Pilot Relief Valves and Sensor



Models without Proportional Pilot Relief Valves

External Pilot Pres. Connection

Model Number Designation

EHFB	G	-03	-60	-C	-E	-S	D	-50
Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min (U.S.GPM)	Pilot Relief Valve Pres. Adj. Range	Pilot Connection of Flow Control	Pressure Controls	DPM of Pres.★	Design Number
EHFB : Proportional Electro-Hydraulic Flow Control and Relief Valve	**G :** Sub-Plate Mounting	**03**	**60 :** 60 (15.8) **125 :** 125 (33)	**None :** Without Proportional Pilot Relief Valve	**None :** Internal Pilot	**None :** Open-Loop	**None :** Without DPM	**50**
		06	**250 :** 250 (66)		**E :** External Pilot	**S :** Open-Loop with Sensor	**D :** With DPM	**50**
		10	**250 :** 500 (132)	**C, H :** See Specifications				**50**

★DMP is available only for the models with Pressure Controls "S".

H

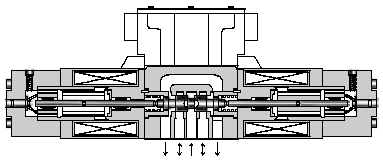
EH SERIES
Directional and Flow Control Valves
EHDFG-01/03 (1/8, 3/8)
Sub-plate Mounting

These valves incorporate two control functions - flow and direction - which simplify the hydraulic circuit composition and therefore the cost of the system is reduced.

Specifications

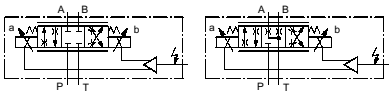
Description \ Model Numbers		EHDFG-01	EHDFG-03
Max. Operating Pressure MPa (PSI)		24.5 (3550)	24.5 (3550)
Max. Tank Line Back Pres. MPa (PSI)		7 (1020)	7 (1020)
Rated Flow L/min (U.S.GPM) [Valve ⊿P 6.9 MPa (1000 PSI)]		30 (7.92)	60 (15.9)
Hysteresis		Less than 5%	
Repeatability		Less than 1%★	
Frequency Response		20 (-90 deg.) Hz	17 (-90 deg.) Hz
Coil Resistance		10.5 Ω	8.0 Ω
Supply Electric Power		24 V DC (21 to 28 V DC Included Ripple)	
Input Voltage	By Controlling Variable Resistance (Using of Power from Amp.)	1 - 2 kΩ Volume Range	
	By Controlling Voltage (Using of Power outside Amp.)	0 ~ -5 V for SOL a 0 ~ +5 V for SOL b	
Input Impedance		10 kΩ	10 kΩ
Power Input (Max.)		40 W	45 W
Ambient Temperature		0 - 50°C (32 - 122°F) (With Circulated Air)	

★The repeatability of the valves is obtained by having it tested independently on the conditions similar to its original testing.

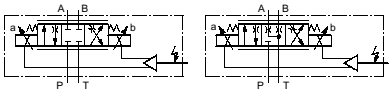


Graphic Symbols

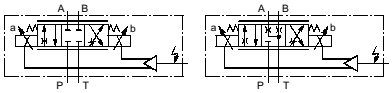
● Metre-in • Metre-out Control



● Metre-out Control



● Metre-in Control



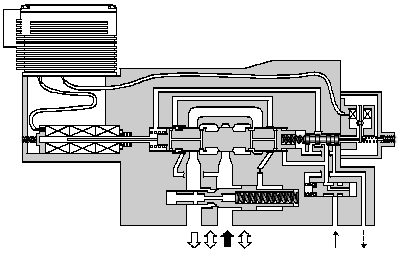
Model Number Designation

EHDFG	-01	-30	-3C2	-E	-30
Series Number	Valve Size	Rated Flow L/min (U.S.GPM)	Spool Type★	Direction of Flow	Design Number
EHDFG : Proportional Electro-Hydraulic Directional and Flow Control Valve (Sub-Plate Mounting)	**01**	**30 :** 30 (7.92)	**3C2**	**XY :** Metre-in • Metre-out	**30**
	03	**60 :** 60 (15.9)	**3C40**	**X :** Metre-in **Y :** Metre-out	**30**

★Spool type shown in the column is for the centre position.

EH SERIES
High Response Type
Directional and Flow Control Valves
EHDFG-04/06 (1/2, 3/4)
Sub-plate Mounting

These valves pursue the ultimate performance of proportional electro-hydraulic directional & flow control valves and make themselves to have high response features.
The closed-loop is composed in the valve inside by combination of a differential transformer (LVDT) and a power amplifier. Thus, high accuracy and reliability are provided.
In addition to control in the open-loop, these can be used for the closed-loop system as simplified servo valves.



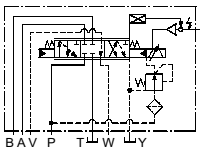
Specifications

Description \ Model Numbers		EHDFG-04	EHDFG-06
Max. Operating Pres. MPa (PSI)		15.7 (2275)	15.7 (2275)
Rated Flow L/min (U.S.GPM) Valve Pres. Difference: 1.5 MPa (215 PSI)		130 (34.3)	280 (73.9)
Min. Required Pilot Pres. MPa (PSI)		1.5 (215)	1.5 (215)
Min. Required Pilot Flow L/min (U.S.GPM)	at Normal	2 (.53)	2 (.53)
	at Transition	6 (1.59)	10 (2.64)
Max. Drain Line Back Pres. MPa (PSI)		0.1 (15)	0.1 (15)
Hysteresis		Less than 1%	
Repeatability		Less than 1%★	
Frequency Response		55 Hz (-90 deg.)	45 Hz (-90 deg.)
Coil Resistance		30 Ω	30 Ω
Supply Electric Power		±24 V DC (±21 to ±28 V DC Included Ripple)	
Input Signal		Rated Flow / ±5 V DC	
Input Impedance		10 kΩ	10 kΩ
Power Input (Max.)		20 W	20 W
Alarm Signal Output (Open Collector)		Voltage: Max. 30 V DC Current: Max. 30 mA	
LVDT Output (Sensor Monitor)		±5 V DC / Rated Travel of Spool	
Ambient Temperature		0 - 50°C (32 - 122°F) (With Circulated Air)	

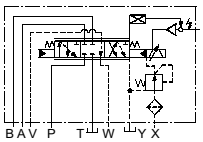
★The repeatability of the valves is obtained by having it tested independently on the conditions similar to its original testing.

Graphic Symbols

● Models without Pressure Compensator Valve

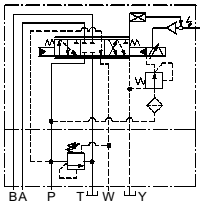


Internal Pilot



External Pilot

● Models with Pressure Compensator Valve



Internal Pilot

Model Number Designation

EHDFG	-04	-130	-2	-E	-D	-CB	-10
Series Number	Valve Size	Rated Flow L/min (U.S.GPM)	Spool Type★	Pilot Connection	DPM	Relief Type Pres. Compensator	Design Number
EHDFG: Proportional Electro-Hydraulic Directional and Flow Control Valve (Sub-Plate Mounting)	**04**	**130:** 130 (34.3)	**2**	**None:** Internal Pilot	**None:** Without DPM	**None:** Not Provided	**10**
	06	**280:** 280 (73.9)	**40**	**E:** External Pilot	**D:** With DPM	**CB:** Provided	**10**

★Spool type shown in the column is for the centre position.

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