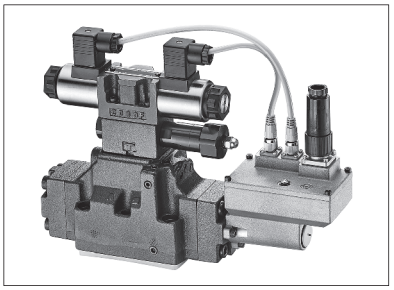
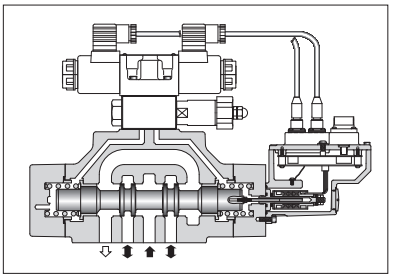
Proportional Electro-Hydraulic Directional and Flow Control Valves (with Main Valve Feedback Control)

OBE (on-board electronics) type proportional electro-hydraulic directional and flow control valve with a LVDT for spool position detection built into the main valve. High accuracy is achieved by configuring a closed loop.





Features

Simpler

Highly accurate hydraulic control can be obtained only by supplying 24 V DC power and inputting a command signal

High Accuracy

Hysteresis : 0.5 % or less

Safety

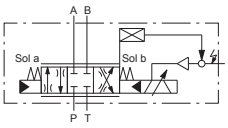
The valves support a fail-safe function to ensure safe operation in the event of electric failure (power failure, power cable disconnection, etc.).

High Flow

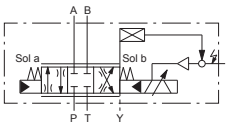
Significantly increased flow rate compared to current products

Graphic Symbols

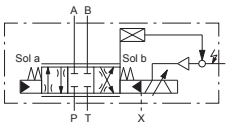
Spool Type “3C2” , “3C21, “3C22”



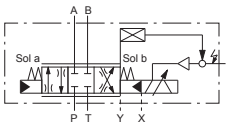
Internal Pilot
Internal Drain Type



Internal Pilot
External Drain Type

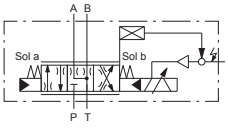


External Pilot
Internal Drain Type

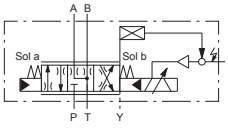


External Pilot
External Drain Type

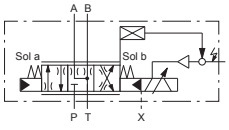
Spool Type “3C40”



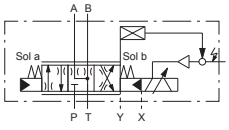
Internal Pilot
Internal Drain Type



Internal Pilot
External Drain Type



External Pilot
Internal Drain Type



External Pilot
External Drain Type

Specifications

Model Numbers			ECDFHG-04EH-150	ECDFHG-04EH-200	ECDFHG-06EH-350	ECDFHG-06EH-500
Rated Flow [ΔP=1 MPa (4-Way Valve)] ΔP = 0.5 MPa per Land		L/min	3C21(P→B, B→T) 3C22(P→A, A→T) :120	3C2, 3C40 : 200	3C21(P→B, B→T) 3C22(P→A, A→T) :230	3C2, 3C40 : 500
			3C2, 3C40 3C21(P→A, A→T) :150 3C22(P→B, B→T)		3C2, 3C40 3C21(P→A, A→T) :350 3C22(P→B, B→T)	
Max. Operating Pressure		MPa	35		31.5	
Pilot Pressure★1		MPa	2.5 - 35		2.5 - 31.5	
Pilot Flow Rate★2		L/min	5.5		7.5	
Proof Pres. at Return Port★3	External Drain T Port	MPa	31.5		25	
	External Drain Y Port	MPa	1 or less		1 or less	
	Internal Drain T&Y Ports	MPa	1 or less			
Internal Leakage★4	Pilot Valve	L/min	1.2 or less			
	Main Valve	L/min	3C2, 3C21, 3C22 : 1.0 or less	3C2 : 1.4 or less	3C2, 3C21, 3C22 : 1.5 or less	3C40 : 2.0 or less
			3C40 : 1.4 or less	3C40 : 2.8 or less	3C40 : 2.0 or less	3C40 : 4.0 or less
Step Response (0 → 100%)★5		ms	38		45	
Frequency Response ±25% Amplitude★5	Phase: -90°	Hz	26		24	
	Gain: -3 dB	Hz	30		27	
Hysteresis			0.5% or less			
Repeatability			0.5% or less			
Power Supply			21.6 - 26.4 V DC Included Ripple			
Ambient Temperature			˚C		-15 - +60	
Current		A	2 (Impulse Loud 3)			
Power Input		VA	75			
Coil Resistance at 20 ºC		Ω	4.6			
Input Signal			±10V, 4 - 20 mA, ±10 mA			
Electric Connection			6 + PE Connector [EN 175201 Part 804]			
Protection			Equivalent to IP64			
Approx. Mass		kg	13		21	

★1. Pilot pressure should be between 2.5 MPa and 35 MPa (04EH), 2.5 MPa and 31.5 MPa (06EH), and should exceed 60% of the actual supply pressure to main valve.
★2. Pilot flow is calculated with the above step response time at pilot pressure 3 MPa.
★3. Return pressure should be less than the actual supply pressure.
★4. This value is measured at a supply pressure of 14 MPa, pilot pressure of 14 MPa, and viscosity of 30 mm^2 /s; it may vary depending on the actual circuit/operation conditions.
★5. This value is measured for each valve based a pilot pressure of 14 MPa; it may vary depending on the actual circuit/operation conditions.

Details of the Valve Fail-Safe Functions

With reference to the information given below, select the option for the fail-safe function according to the use of applications.
A separate safety circuit should be provided if the hydraulic actuator must be reliably held or stopped.

No.	Model Numbers	Fail-Safe Function★	
		Spool Position	Function
1	ECDFHG-＊EH-＊-3C2-XY-＊＊-C ECDFHG-＊EH-＊-3C21-XY-＊＊-C ECDFHG-＊EH-＊-3C22-XY-＊＊-C	Neutral	All Ports Blocked 
2	ECDFHG-＊EH-＊-3C40-XY-＊＊-C		A, B, T Connection 

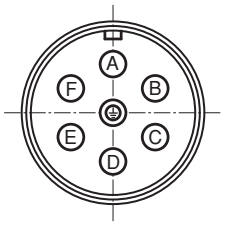
★The fail-safe function's activation time depends on the electric and hydraulic conditions.

Model Number Designation

ECDFHG	- 04	EH	- 150	- 3C2	- XY	- E	T	- C	- D	- 10
Series Number	Valve Size	Amplifier Type	Rated Flow L/min ΔP= 1 MPa (4-Way Valve)	Spool Type	Direction of Flow	Pilot Type	Drain Type	Fail-Safe Function★2	Input Signal/ Spool Travel Monitoring	Design Number
★1 **ECDFHG:** Proportional Electro-Hydraulic Directional and Flow Control Valves (with Main Valve Feedback Control)	04	**EH:** OBE Type	150 : 150 L/min	3C2 3C40 3C21 3C22	**XY:** Meter-in/ Meter-out	**None:** Internal Pilot **E:** External Pilot	**None:** External Drain **T:** Internal Drain	**C:** Neutral	**D:** Voltage Signal ± 10 V (PABT Flow with Positive Input) **E:** Current Signal 4 to 20 mA (PABT Flow with 12 to 20 mA Input) **F:** Current Signal ± 10 mA (PABT Flow with Positive Input)	10
			200 : 200 L/min	3C2 3C40						
	06		350 : 350 L/min	3C2 3C40 3C21 3C22						
			500 : 500 L/min	3C2 3C40						

★1. Phosphate ester type fluids are also supported. When phosphate ester type fluids are used, prefix "F-" to the model number because the special seals (fluororubber) are required to be used.
★2. Refer to the previous page for details on the fail-safe function.

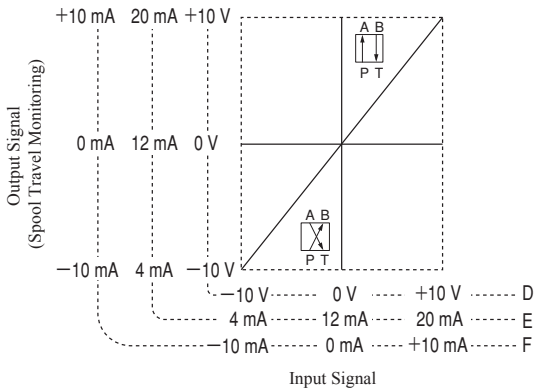
Electrical Specifications



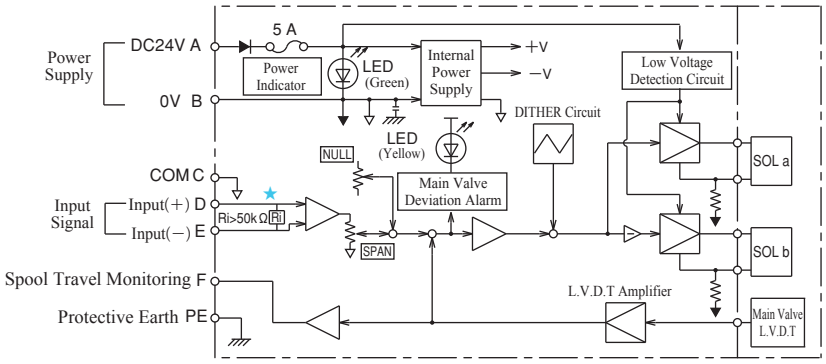
Input Signal		Voltage Signal "D"	Current Signal "E"	Current Signal "F"
Pin A	Power Supply	24 V DC (21.6 - 26.4 V DC Included Ripple), 75 VA or more		
Pin B		0 V		
Pin C	Signal Common	COM (0 V)		
Pin D	Input (+)(Differential)★1	0 - ±10 V R i≧50 kΩ	4 - 20 mA R i=200 Ω	0 - ±10 mA R i=200 Ω
Pin E	Input (−)(Differential)★1			
Pin F	Spool Travel Monitoring	0 - ±10 V R_L≧10 kΩ	4 - 20 mA R_L=100 - 500 Ω★2	0 - ±10 mA R_L=100 - 500 Ω★2
Pin ⏚	Protective Earth	—		

★1. Differential input signals can be used only for the valves with the voltage signal specifications of ±10V. (ECDFHG-✻EH-✻-D)
★2. The recommended load resistance is 200 Ω.

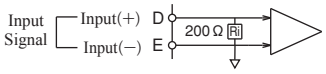
I/O Signal Characteristics



Block Diagram



★The input stage for the current signal "E" and "F" is as follows.



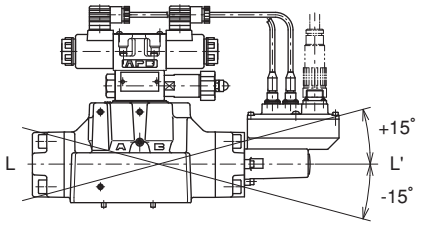
Accessories

Mounting Bolts

Valve Model Numbers	Mounting Bolt	Qty.	Tightening Torque Nm
ECDFHG-04EH	Hex. Socket Head Cap Screw: M6 × 55L	2	12.9 - 15.9
	Hex. Socket Head Cap Screw: M10×60L	4	60.6 - 74.1
ECDFHG-06EH	Hex. Socket Head Cap Screw: M12×85L	6	104 - 127

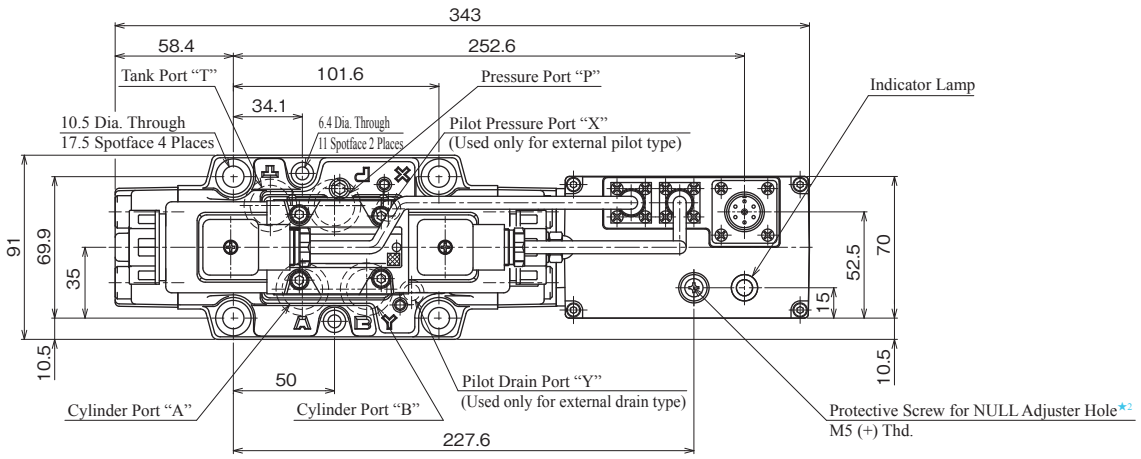
Mounting Position

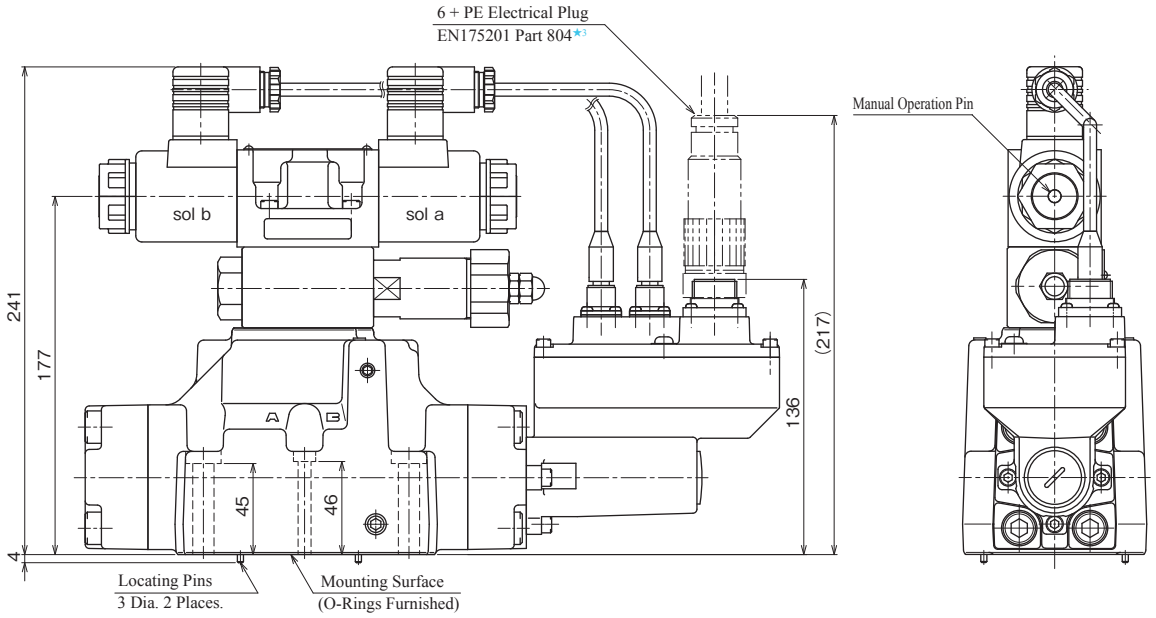
Mount the valve with the angle of the axis line L-L' within about ±15° from the horizontal plane as shown in the right figure. When the principal vibration direction is consistent with the axial direction of the spool, the spool may malfunction due to external force. Make sure that the principal vibration direction is not consistent with the axial direction of the spool.



ECDFHG-04EH

Mounting Surface: ISO 4401-07-07-0-05★1





Indicator Lamp

Color	Indicator Lamp
Green	Power Supply
Yellow	Main Valve Deviation Alarm

O-Rings

Port	O-Ring	Qty.
P,A,B,T	OR NBR-90 P22-N	4
X,Y	OR NBR-90 P9-N	2

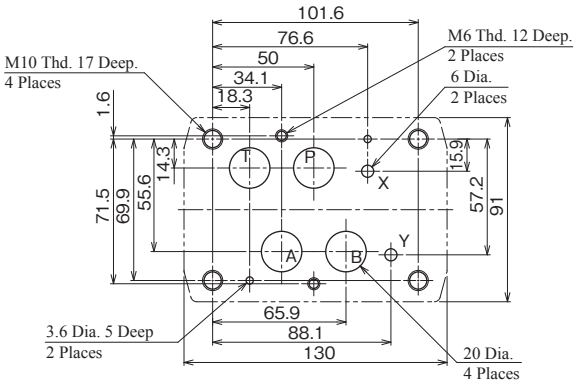
★1. This valve can be mounted on ISO mounting surface.
However, in this case, the pressure loss becomes large and the rated flow rate cannot be achieved.

★2. For NULL adjustment, remove the protective screw and turn the trimmer behind the screw. After adjustment, be sure to attach the protective screw.

★3. The 6 + PE Electrical Plug is not included with the valve.
Prepare it separately.
YUKEN parts number: TK290457-1

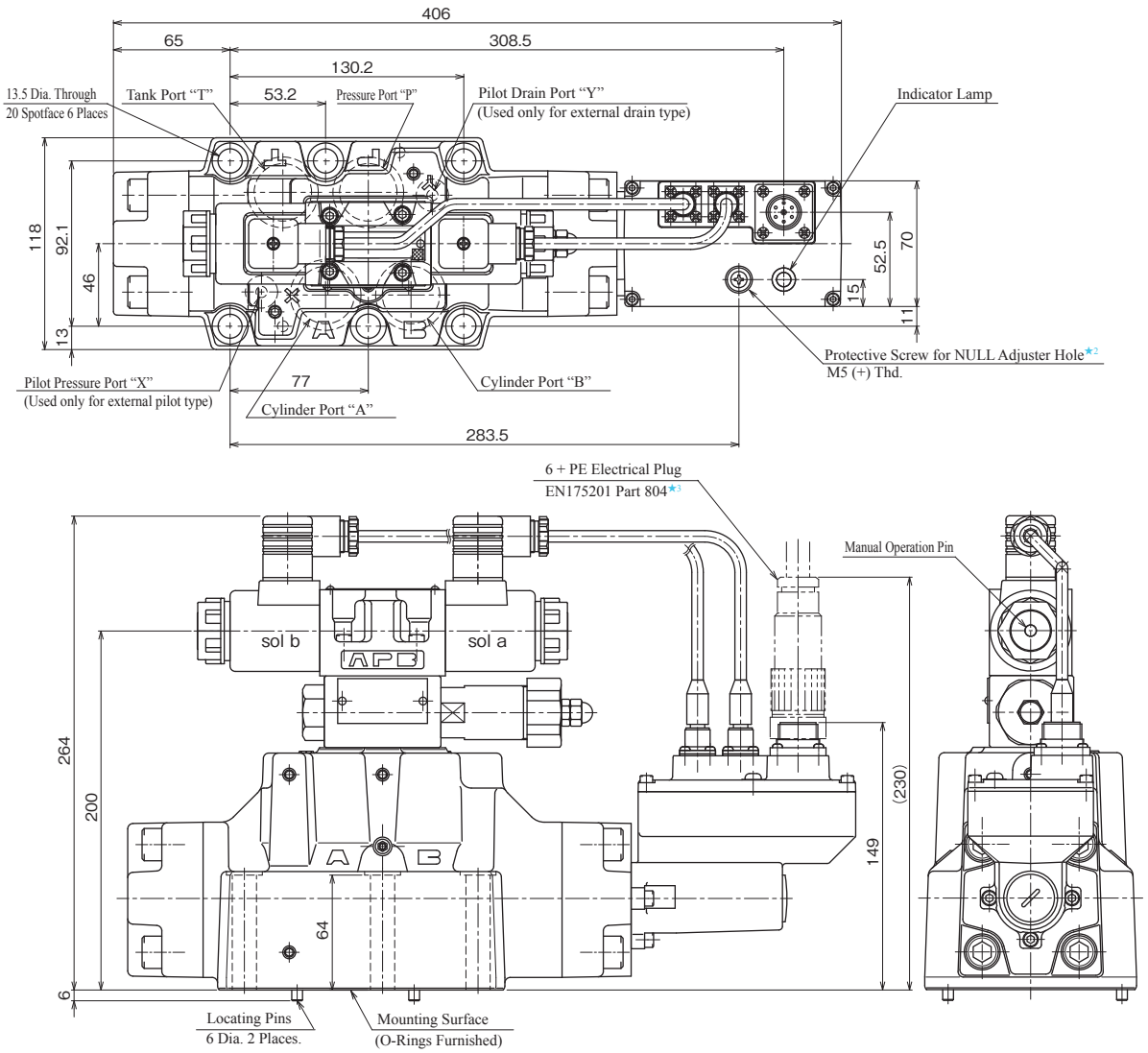
Dimensions of Mounting Surface

Prepare the mounting surface as shown in the figure below.
The mounting surface should have a good machined finish (▽).



ECDFHG-06EH

Mounting Surface: ISO 4401-08-08-0-05★1



Indicator Lamp

Color	Indicator Lamp
Green	Power Supply
Yellow	Main Valve Deviation Alarm

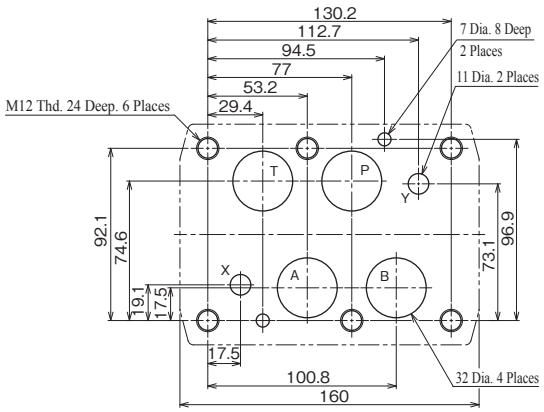
O-Rings

Port	O-Ring	Qty.
P,A,B,T	AS568-126 (NBR-90)	4
X,Y	OR NBR-90 P14-N	2

★1. This valve can be mounted on ISO mounting surface.
However, in this case, the pressure loss becomes large and the rated flow rate cannot be achieved.
★2. For NULL adjustment, remove the protective screw and turn the trimmer behind the screw. After adjustment, be sure to attach the protective screw.
★3. The 6 + PE Electrical Plug is not included with the valve.
Prepare it separately.
YUKEN parts number: TK290457-1

Dimensions of Mounting Surface

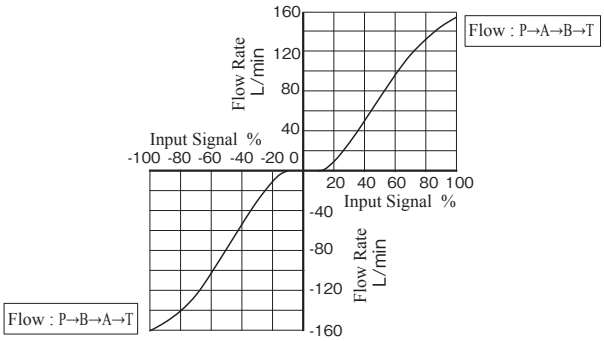
Prepare the mounting surface as shown in the figure below.
The mounting surface should have a good machined finish (▽).



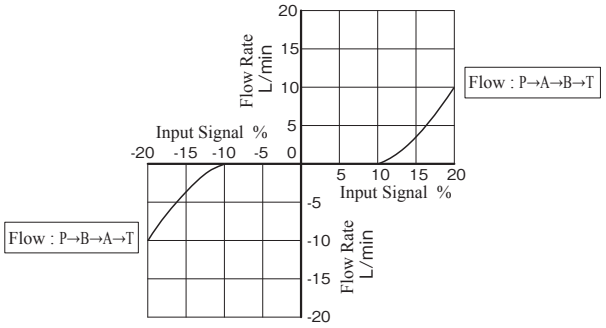
No-Load Flow Characteristics

〈Conditions〉 ●Valve Pressure Difference: 1 MPa (4-Way Valve/Pressure Difference per Land: 0.5 MPa)
●Viscosity: 30 mm^2/s

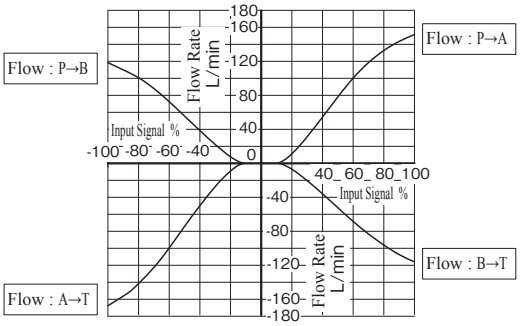
ECDFHG-04EH-150-3C2/3C40



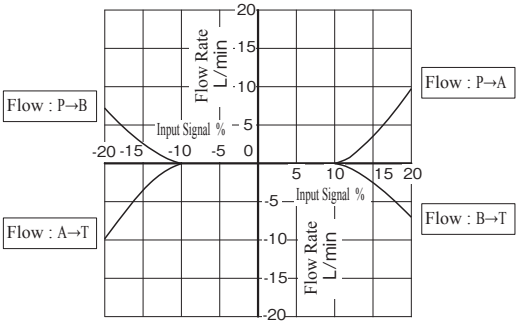
Around Null Position
Input Signal -20⇔+20%



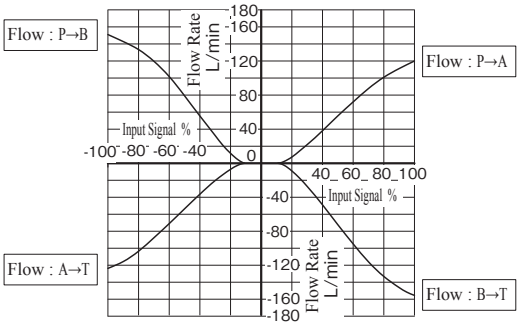
ECDFHG-04EH-150-3C21



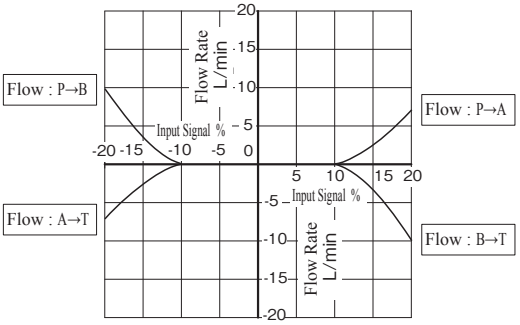
Around Null Position
Input Signal -20⇔+20%



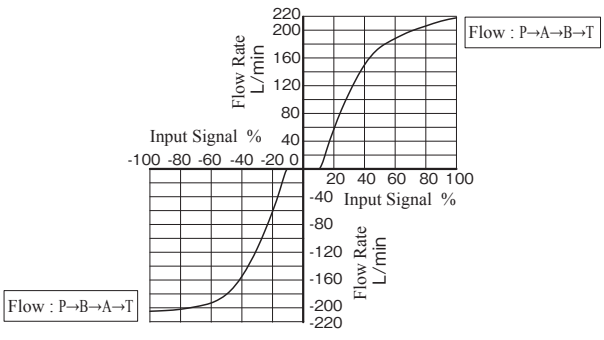
ECDFHG-04EH-150-3C22



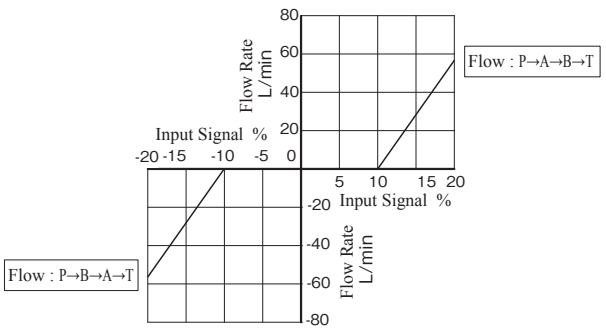
Around Null Position
Input Signal -20⇔+20%



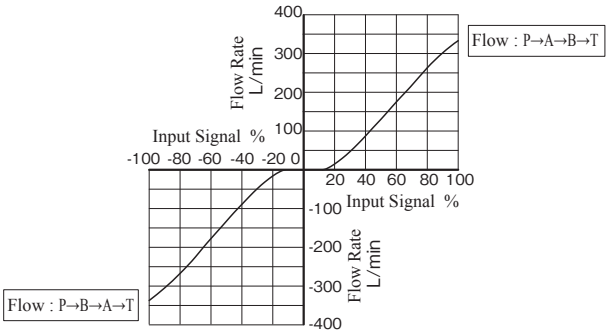
ECDFHG-04EH-200-3C2/3C40



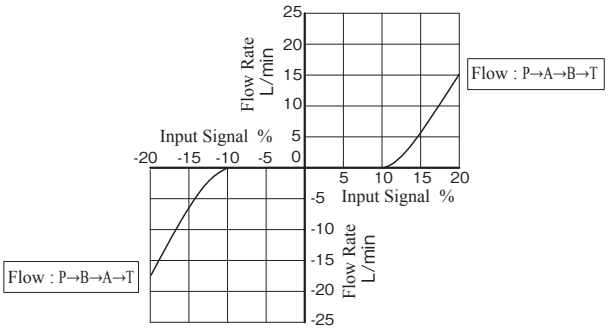
Around Null Position
Input Signal -20⇔+20%



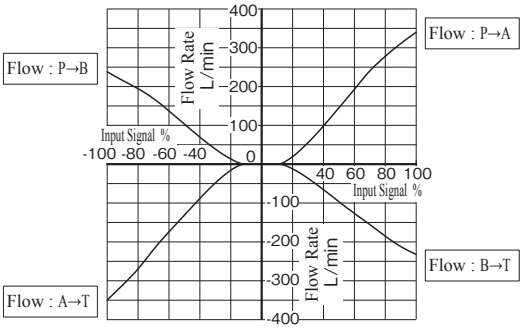
ECDFHG-06EH-350-3C2/3C40



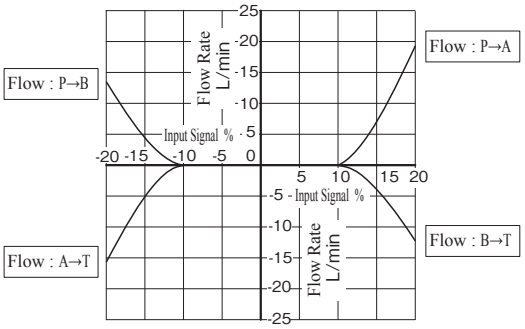
Around Null Position
Input Signal -20⇔+20%



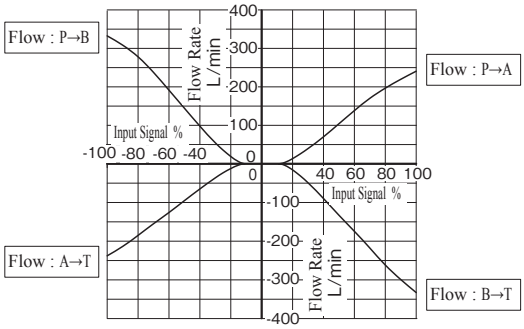
ECDFHG-06EH-350-3C21



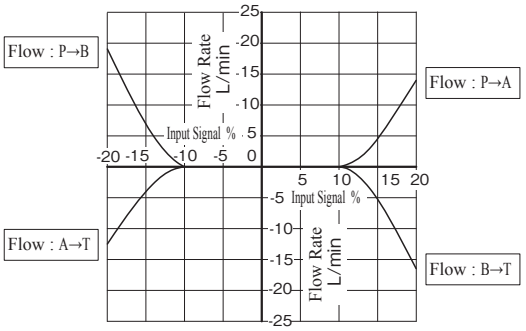
Around Null Position
Input Signal -20⇔+20%



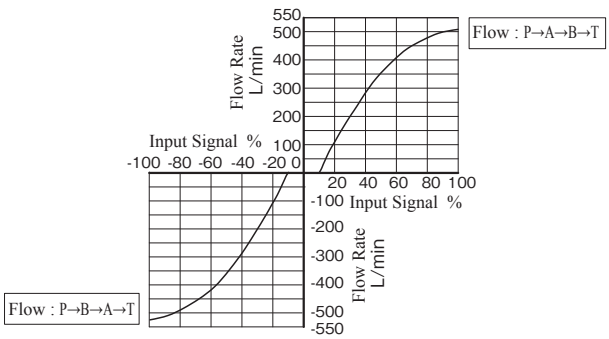
ECDFHG-06EH-350-3C22



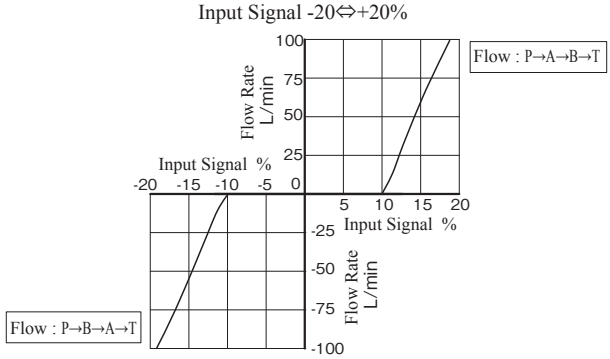
Around Null Position
Input Signal -20⇔+20%



ECDFHG-06EH-500-3C2/3C40



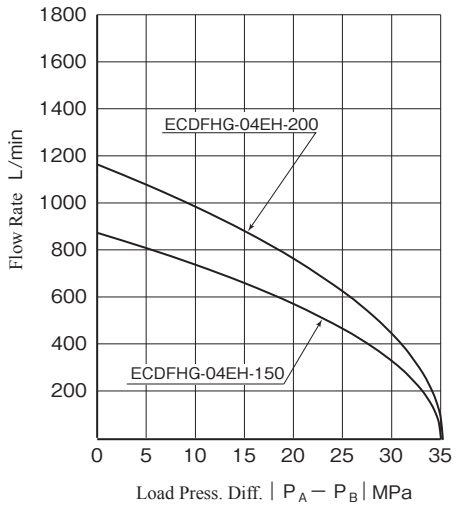
Around Null Position
Input Signal -20⇔+20%



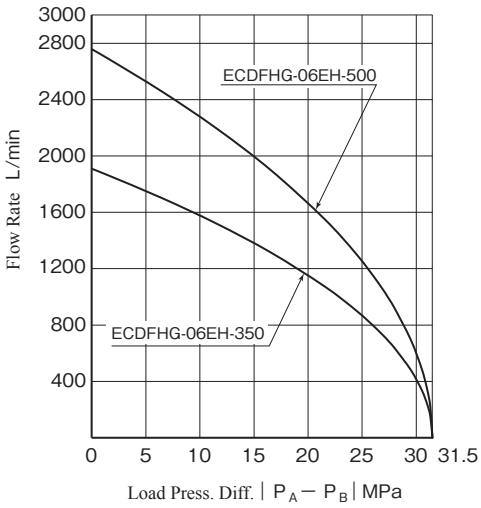
Load Flow Characteristics

〈Conditions〉 ●Viscosity: 30 mm²/s

ECDFHG-04EH-∗-3C2/3C40



ECDFHG-06EH-∗-3C2/3C40

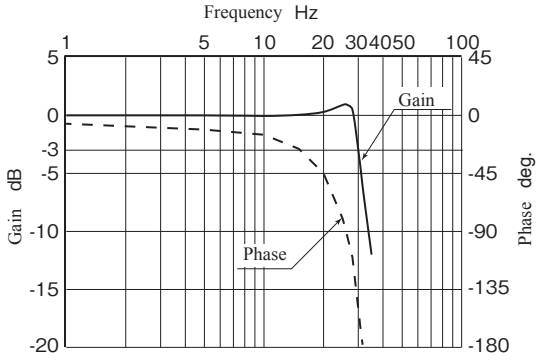


Frequency Response

〈Conditions〉 ●Hydraulic Circuit: Port A/B Closed ●Supply Pressure and Pilot Pressure: 14 MPa
●Viscosity: 30 mm²/s ●Amplitude: 50±25%

This value is measured on a per valve basis; the actual frequency response may differ depending on the actual circuit.

ECDFHG-04EH



ECDFHG-06EH