



OBE (On-Board Electronics) Type Direct Operated Linear Servo Valves (Size: 01 & 03) LSVG-01-EH-*.**-**-10, LSVG-03EH-*.**-**-10/1006

Release of New Products

We are pleased to announce the release of OBE (on-board electronics) type direct operated linear servo valves.

Based on the design concepts of our high speed linear servo valves (LSVG) and OBE type linear servo valves (LSVHG-*EH), the direct operated servo valves provide “high accuracy, simple operation, and user-friendliness.”



■ Features

● High Accuracy

The valves have a low hysteresis of 0.1 % or less, achieving high accuracy. They allow the main unit to operate with much higher repeatability.

● High Response

The valves provide higher levels of step and frequency responses, which are typically used as measures of response characteristics; the step response is 3 ms (0 ⇔ 100 %)*, and the frequency response is 260 Hz/- 3 dB (± 25 % amplitude)* (*: typical values for LSVG-03EH with the Y port (dry type)).

● Simple Operation

Just with 24 V DC power supply and command signal input, the valves allow the accurate operation of hydraulic control systems.

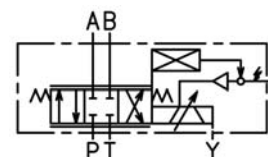
● User-friendliness

The on-board amplifier has a fault indicator lamp. If a valve error occurs and causes a deviation between the command signal and the spool position, the lamp indicates the error immediately.

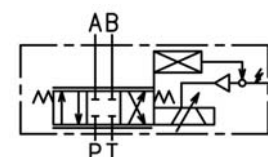
● Excellent Contamination Resistance

The simple structure of the direct operated valves and the adoption of a powerful linear motor provide excellent contamination resistance. The permissible level of fluid contamination for these valves is up to NAS class 10.

JIS Graphic Symbols



With Y Port (Dry Type)



Without Y Port (Wet Type)

■ Model Number Designation

F-	LSVG	- 03	EH	- 60	- W	A	- A	1	- 10
Special Seals	Series Number	Valve Size	Amplifier Type	Rated Flow at ΔP = 7 MPa	Drain Port (Y) and Permissible Back Pres.	Fail-Safe Function	Input Signal/Spool Travel Monitoring	Connector Type	Design Number
F: Special Seals for Phosphate Ester Type Fluid (omit if not required.)	LSVG: Direct Operated Linear Servo Valve	01	EH: OBE Type	4: 4 L/min	None: With Y Port (Dry Type) (Permissible Back Pres.: 0.05 MPa)	A: PABT B: PBAT C: Neutral	A: Voltage Signal ± 10 V (P→B→A→T Flow with Positive Input) B: Current Signal 4 - 20 mA (P→B→A→T Flow with 12 - 20 mA Input) C: Current Signal ± 10 mA (P→B→A→T Flow with Positive Input) D: Voltage Signal ± 10 V (P→A→B→T Flow with Positive Input) E: Current Signal 4 - 20 mA (P→A→B→T Flow with 12 - 20 mA Input) F: Current Signal ± 10 mA (P→A→B→T Flow with Positive Input)	1: 6 + PE Pole 2: 11 + PE Pole - With “Enable” Function - With “Valve Ready” Function - With “Alarm Output” Function	10
				10: 10 L/min					
				20: 20 L/min					
		03		40: 40 L/min	W: Without Y Port* (Wet Type)			10 1006 (Mounting bolt: M6)	
				60: 60 L/min					

★For the wet type, water-glycol fluids cannot be used.

Specifications

The values in parentheses in the specification table below are applicable to the models "LSVG-*EH-*-W*" (wet type).

Model Number		LSVG-01EH-4*	LSVG-01EH-10*	LSVG-01EH-20*	LSVG-03EH-40*	LSVG-03EH-60*
Item						
Rated Flow at ΔP = 7 MPa (1)		4 L/min	10 L/min	20 L/min	40 L/min	60 L/min
Max. Operating Pres.		35 MPa			31.5/35 MPa (2)	
Proof Pres. at Return Port		21 MPa (7 MPa)			35 MPa (2) (7 MPa)	
Drain Port (Y) Permissible Back Pres. (3)		0.05 MPa (The valves with the model number “W” have no Y Port.)				
Internal Leak	Ps = 14 MPa Viscosity: 32 mm²/s	0.4 L/min or less	0.8 L/min or less	1.2 L/min or less	1.7 L/min or less	
Hysteresis		0.1 % or less				
Step Response (Typical) (4)	Ps = 14 MPa (0⇔100 %)	3 (3.5) ms				4 (4.5) ms
Frequency Response (±25 % Amplitude) (Typical) (4)	Gain: -3 dB	240 (230) Hz			260 (240) Hz	250 (220) Hz
	Phase: -90 °	300 (270) Hz			310 (310) Hz	260 (220) Hz
Vibration Proof		100 m/s²				
Protection		IP65				
Ambient Temperature		0 - +50 °C				
Spool Stroke to Stops		±0.5 mm				±0.75 mm
Polarity		See the description about I/O signal characteristics on page 3.				
Linear Motor Specification	Current	1.5 A (Max. 2.2 A)				
	Coil Resistance	7 Ω (at 20 °C)				
Approx. Mass		4.3 kg			5.2 kg	
Electric Connection		6 + PE/11 + PE Connector				

Note ⁽¹⁾ Select the valve that meets the valve pressure difference – flow rate relationship within the graphs below, referring to "Range of Flow Control."

⁽²⁾ For LSVG-03EH-*-*-1006 (mounting bolt: M6), the pressure should be 31.5 MPa.

⁽³⁾ Back pressure at the drain port (Y) should be 0.05 MPa or less and not be a negative pressure.

⁽⁴⁾ This value is measured on a per-valve basis; it may differ depending on the actual circuit/operation conditions.

Attachment

Mounting Bolts

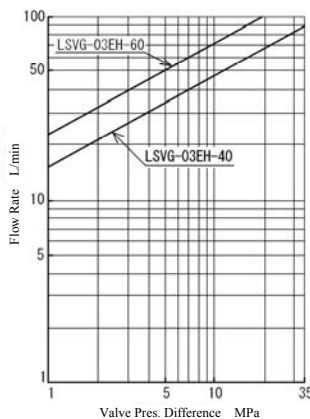
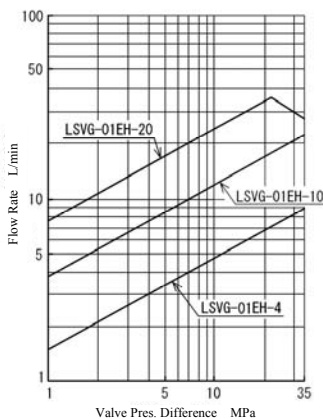
Model Number	Mounting Bolt	Qty.	Tightening Torque
LSVG-01EH-	Hex. Soc. Head Cap Screw: M5 $\times$ 55L	4	6.0 - 8.0 Nm
LSVG-03EH*-10	Hex. Soc. Head Cap Screw: M8 $\times$ 65L	4	30.8 - 37.7 Nm
LSVG-03EH*-1006	Hex. Soc. Head Cap Screw: M6 $\times$ 60L	4	13.0 - 16.0 Nm

Connector

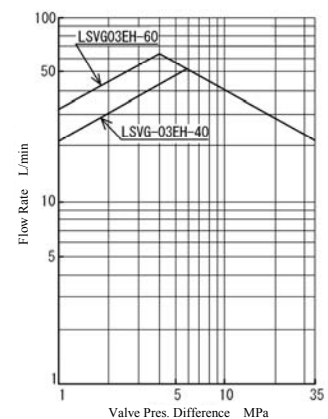
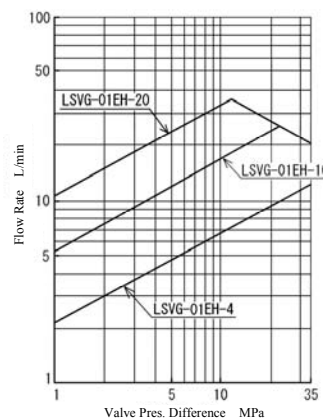
Model Number	Connector	Qty.	Remarks
LSVG-*EH-*-*-1	6 + PE Electrical Plug	1	Compatible with EN175201 Part 804
LSVG-*EH-*-*-2	11 + PE Electrical Plug	1	

Range of Flow Control

Control Method: 4-Way Valve



Control Method: 3-Way Valve



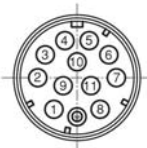
■ Electrical Specifications

● 6 + PE Connector



Valve Model		LSVG-*EH-*-A1 LSVG-*EH-*-D1	LSVG-*EH-*-B1 LSVG-*EH-*-E1	LSVG-*EH-*-C1 LSVG-*EH-*-F1
Pin A	Power Supply	24 V DC (21.6 - 26.4 V DC Included Ripple), 100 VA or more		
Pin B		0 V		
Pin C	Signal Common	COM (0 V)		
Pin D	Input (+) (Differential) ⁽¹⁾	0 - ± 10 V	4 - 20 mA	0 - ± 10 mA
Pin E	Input (-) (Differential) ⁽¹⁾	$R_i = 100 \text{ k } \Omega$	$R_i = 200 \text{ } \Omega$	$R_i = 200 \text{ } \Omega$
Pin F	Spool Travel Monitoring	0 - ± 10 V $R_L \geq 10 \text{ k } \Omega$	4 - 20 mA $R_L = 100 - 500 \text{ } \Omega$ ⁽²⁾	0 - ± 10 mA $R_L = 100 - 500 \text{ } \Omega$ ⁽²⁾
Pin	Protective Earth	—		

● 11 + PE Connector



Valve Model		LSVG-*EH-*-A2 LSVG-*EH-*-D2	LSVG-*EH-*-B2 LSVG-*EH-*-E2	LSVG-*EH-*-C2 LSVG-*EH-*-F2
Pin 1	Power Supply	24 V DC (21.6 - 26.4 V DC Included Ripple), 100 VA or more		
Pin 2		0 V		
Pin 3	Enable (Servo ON) Input	Input Current = 3 - 5 mA at 4.8 - 28 V DC		
Pin 4	Input (+) (Differential) ⁽¹⁾	0 - 10 V	4 - 20 mA	0 - ± 10 mA
Pin 5	Input (-) (Differential) ⁽¹⁾	$R_i = 100 \text{ k } \Omega$	$R_i = 200 \text{ } \Omega$	$R_i = 200 \text{ } \Omega$
Pin 6	Spool Travel Monitoring	0 - ± 10 V $R_L \geq 10 \text{ k } \Omega$	4 - 20 mA $R_L = 100 - 500 \text{ } \Omega$ ⁽²⁾	0 - ± 10 mA $R_L = 100 - 500 \text{ } \Omega$ ⁽²⁾
Pin 7	Signal Common	COM (0 V)		
Pin 8	Valve Ready Output	OPEN Collector Output Voltage: Max. 30 V, Current: Max. 20 mA		
Pin 9	—	—		
Pin 10	—	—		
Pin 11	Alarm Output	OPEN Collector Output Voltage: Max. 30 V, Current: Max. 20 mA		
Pin	Protective Earth	—		

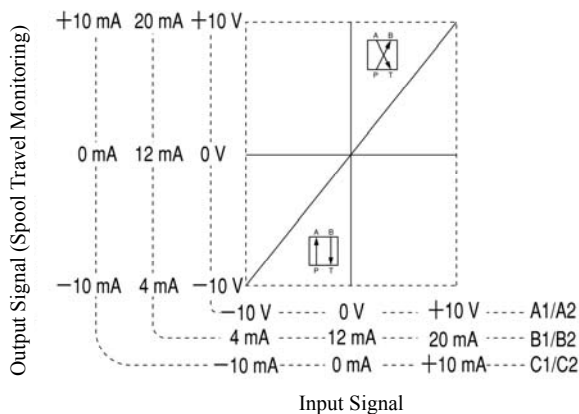
Note

⁽¹⁾ Differential input signals can be used only for the valves with the voltage signal specifications of ± 10 V (LSVG-*EH-*-A*/D*).

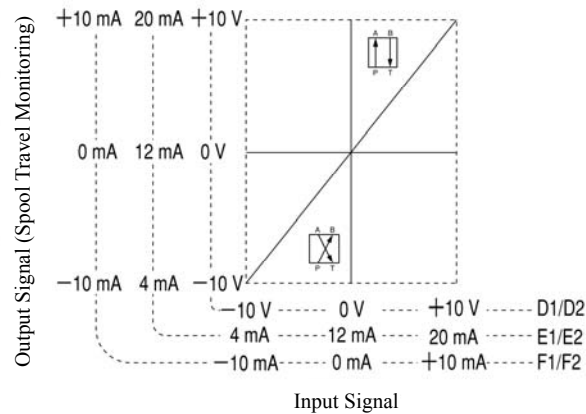
⁽²⁾ The recommended load resistance is 200 Ω .

■ I/O Signal Characteristics

• LSVHG-*EH-*-A*/B*/C*

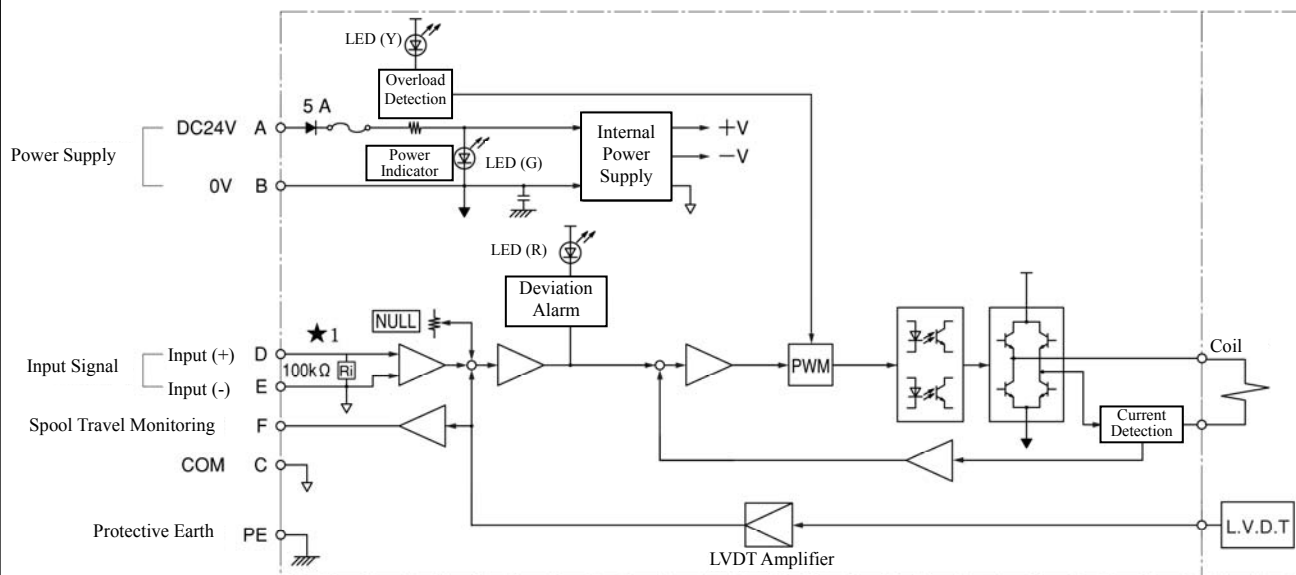


• LSVHG-*EH-*-D*/E*/F*

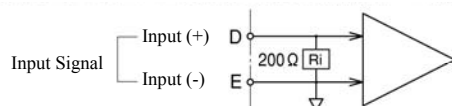


■ Block Diagram

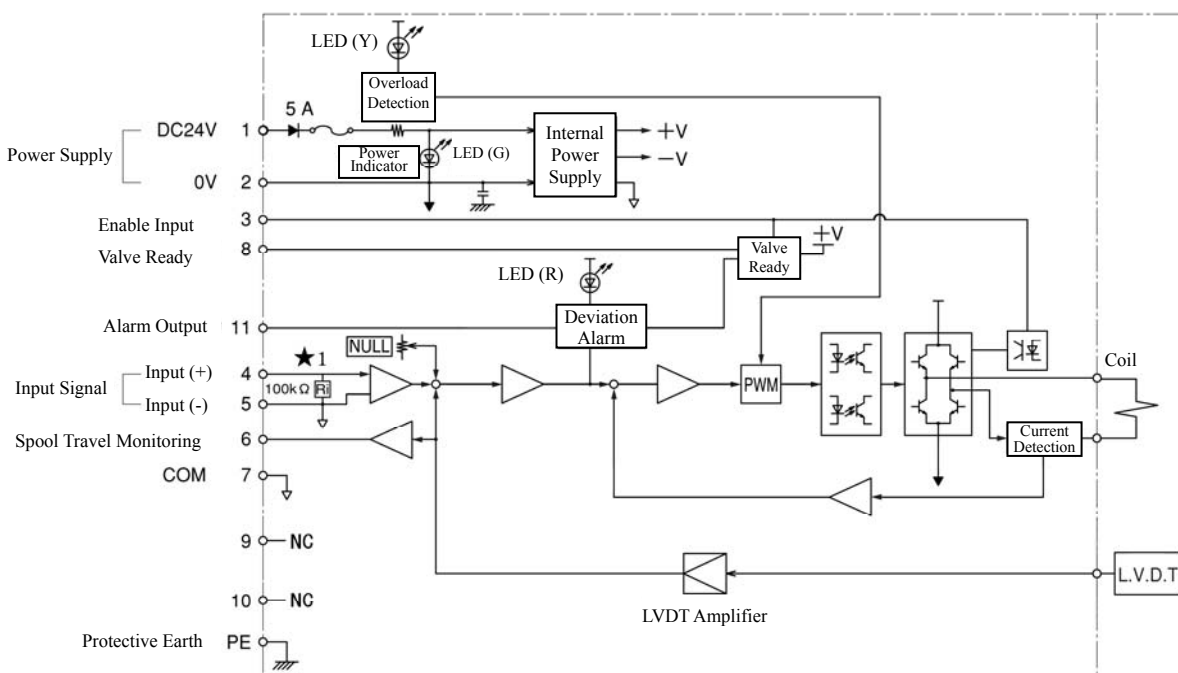
● LSVG-EH-*-A1/B1/C1/D1/E1/F1 (6 + PE Connector)



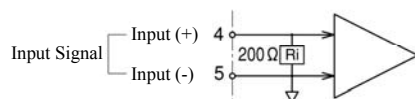
★ 1. The input stage for the models LSVG-EH-*-B1/C1/E1/F1 (current signal) is as follows.



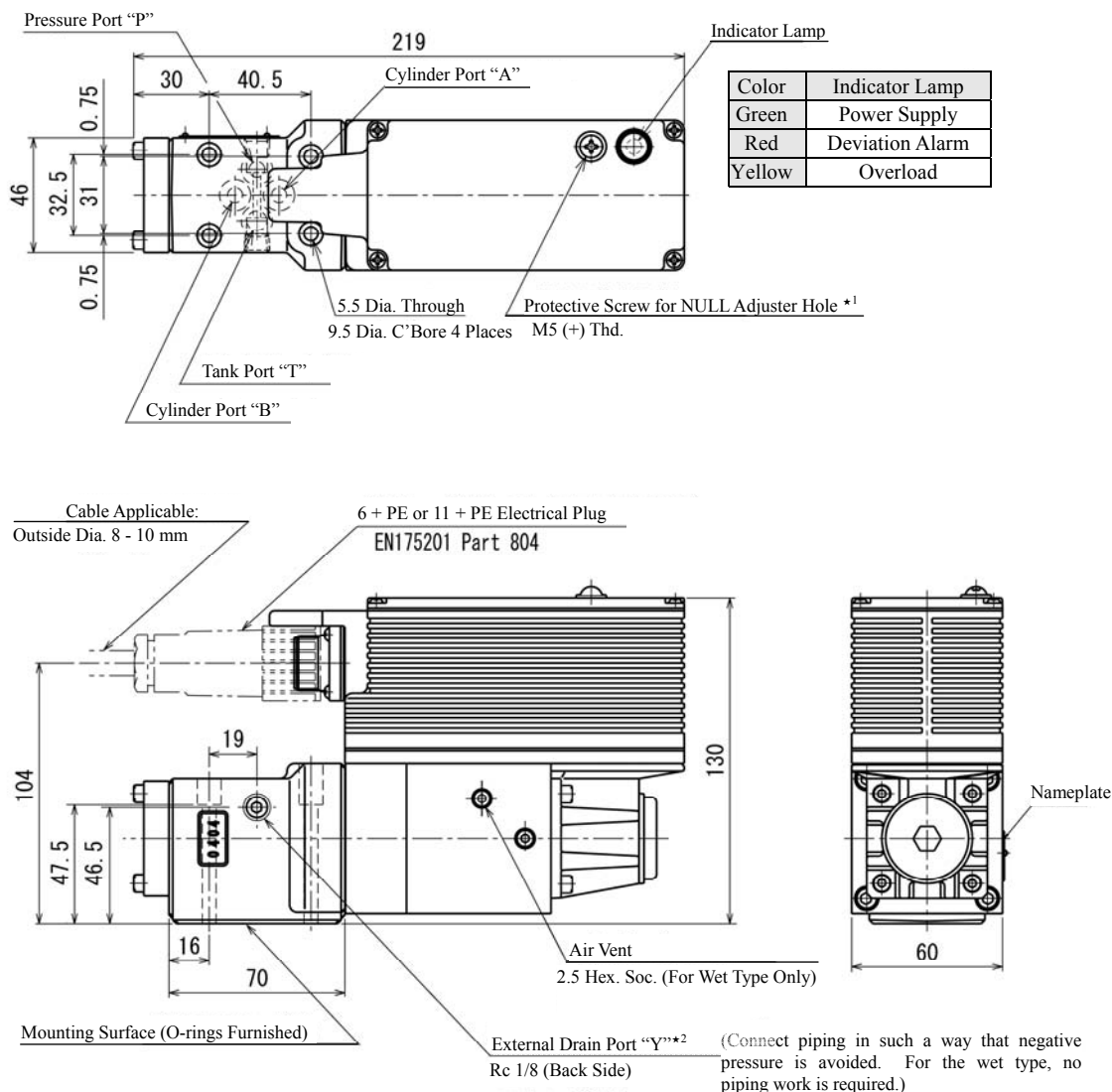
● LSVG-EH-*-A2/B2/C2/D2/E2/F2 (11 + PE Connector)



★ 1. The input stage for the models LSVG-EH-*-B2/C2/E2/F2 (current signal) is as follows.



LSVG-01EH



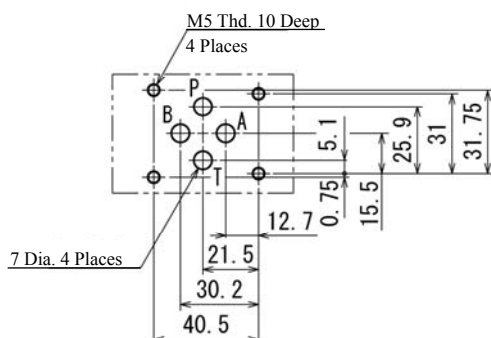
●O-rings for the Ports

AS568-012 (NBR, Hs 90): 4 pieces

O-rings made of fluorinated rubber are required to use phosphate ester type fluids.

●Dimensions of Mounting Surface

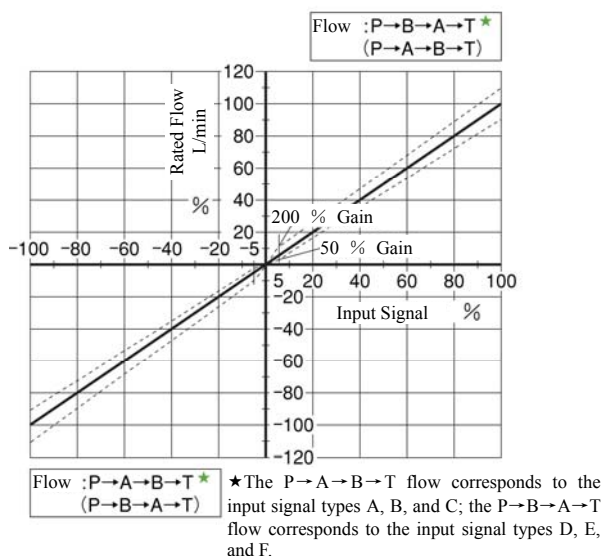
Prepare the mounting surface as shown below. Basically, the dimensions of the mounting surface conform to ISO 4401-03-02-0-94 (ISO 4401-AB-03-4-A-80). The mounting surface should have a good machined finish, e.g. surface roughness of 6-S.



Characteristics of LSVG-01EH-4/10/20 (Fluid Viscosity: 30 mm²/s)

■ No-Load Flow Characteristics

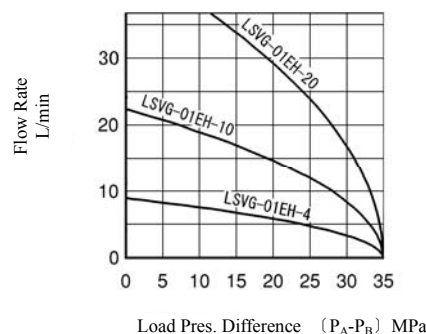
<Conditions> ● Valve Pres. Difference: 7 MPa



■ Load Flow Characteristics

<Conditions> ● Input Signal: 100 %

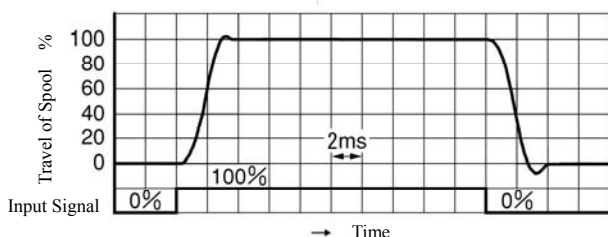
Note) Tolerance for Load Flow: ± 10 %



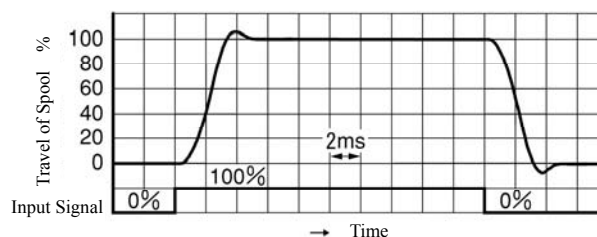
■ Step Response

<Conditions> ● Input Signal: 0 ⇔ 100 % ● Supply Pressure: 14 MPa

● LSVG-01EH-4/10/20-**-10 (Dry Type)



● LSVG-01EH-4/10/20-W**-10 (Wet Type)

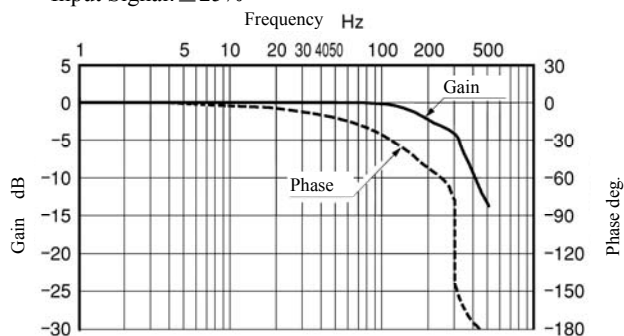


■ Frequency Response

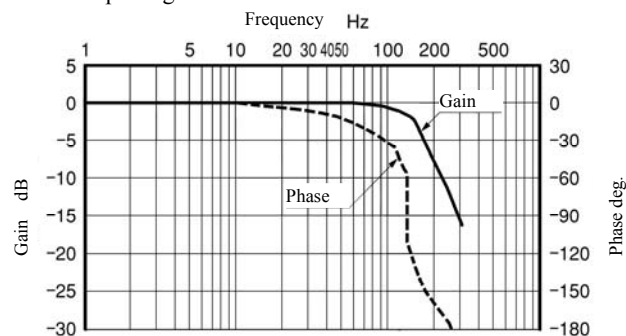
<Conditions> ● Hydraulic Circuit: Port A/B Closed ● Supply Pressure: 14 MPa

● LSVG-01EH-4/10/20-**-10 (Dry Type)

Input Signal: ± 25 %

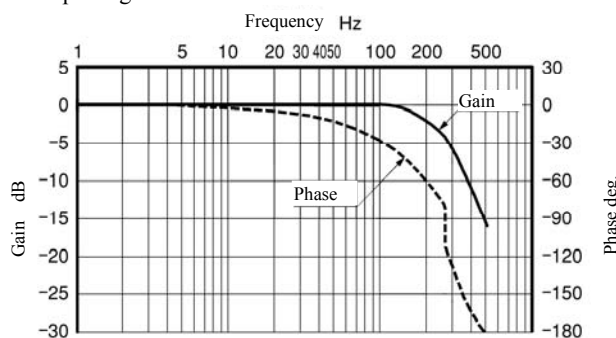


Input Signal ± 100 %

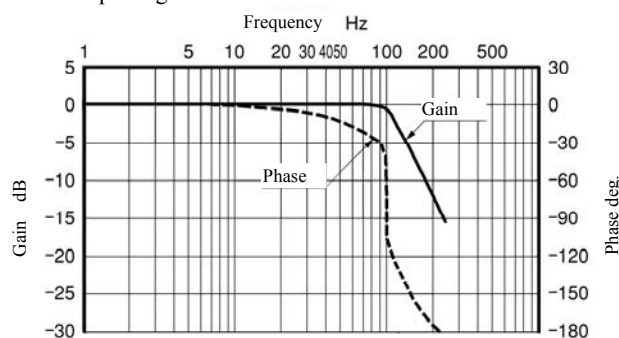


● LSVG-01EH-4/10/20-W**-10 (Wet Type)

Input Signal ± 25 %



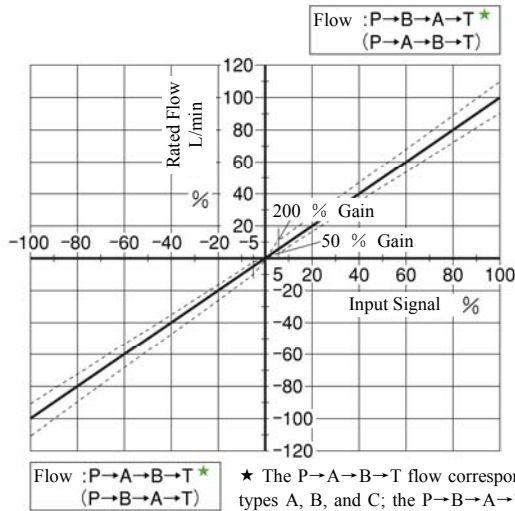
Input Signal ± 100 %



Characteristics of LSVG-03EH-40/60 (Fluid Viscosity: 30 mm²/s)

■ No-Load Flow Characteristics

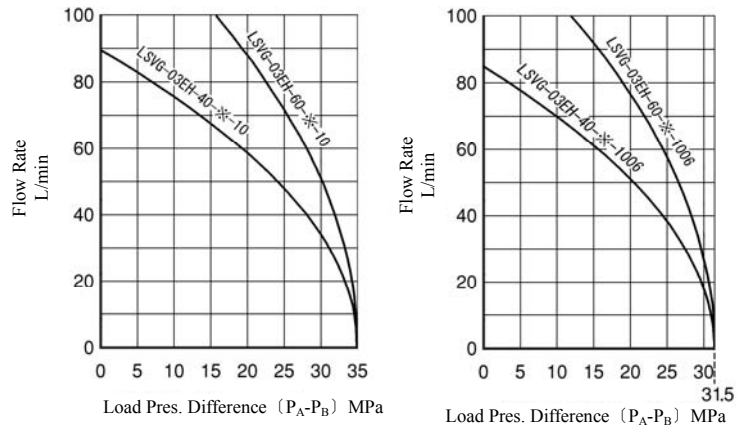
<Conditions> ● Valve Pres. Difference: 7 MPa



■ Load Flow Characteristics

<Conditions> ● Input Signal: 100 %

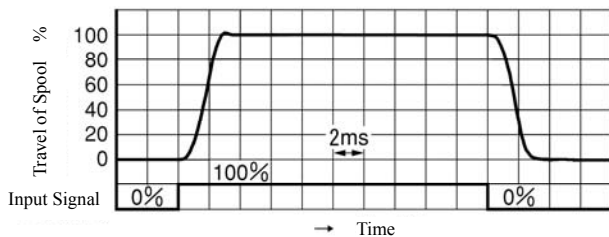
Note) Tolerance for Load Flow: ± 10 %



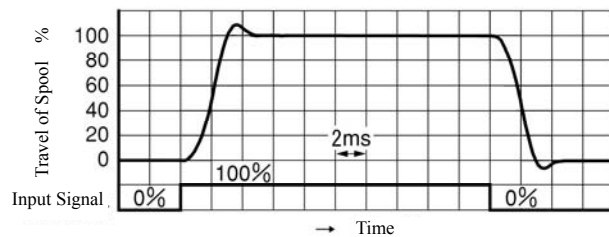
■ Step Response

<Conditions> ● Input Signal: 0 ⇔ 100 % ● Supply Pressure: 14 MPa

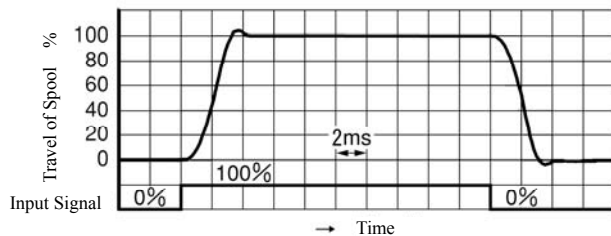
● LSVG-03EH-40-*-10 (Dry Type)



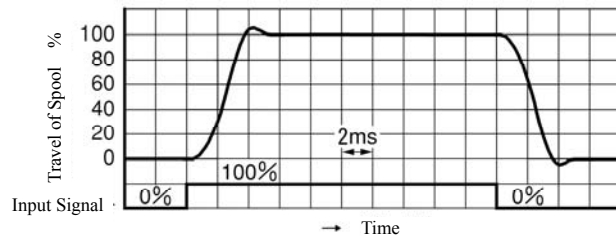
● LSVG-03EH-40-W-*-10 (Wet Type)



● LSVG-03EH-60-*-10 (Dry Type)



● LSVG-03EH-60-W-*-10 (Wet Type)

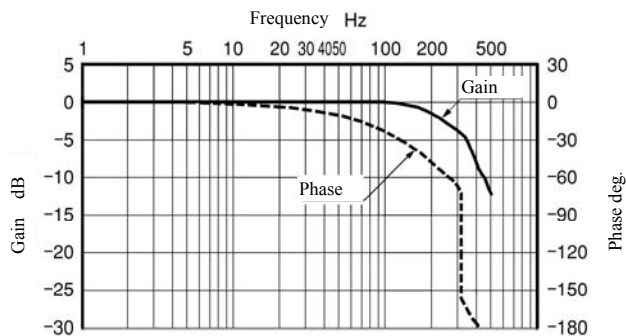


■ Frequency Response

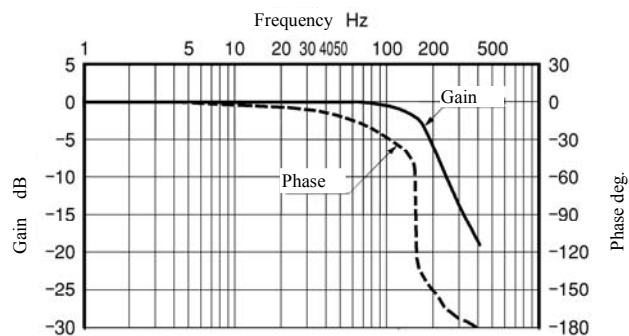
<Conditions> ● Hydraulic Circuit: Port A/B Closed ● Supply Pressure: 14 MPa

● LSVG-03EH-40-*-10 (Dry Type)

Input Signal $\pm 25\%$

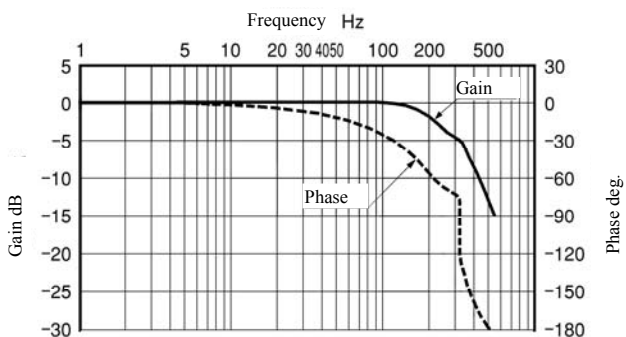


Input Signal $\pm 100\%$

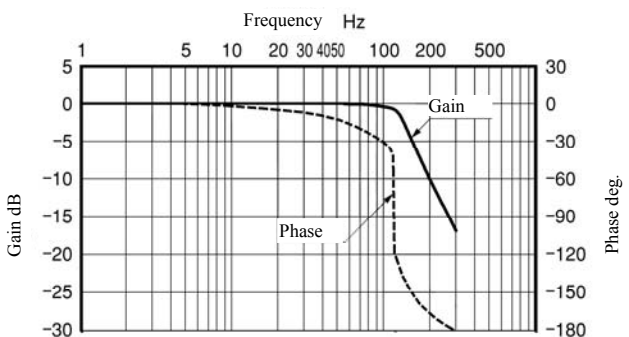


● LSVG-03EH-40-W-*-10 (Wet Type)

Input Signal $\pm 25\%$

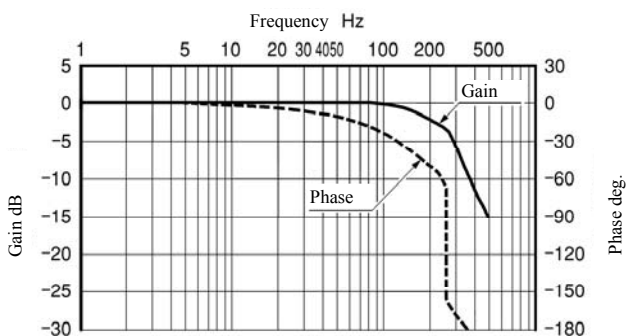


Input Signal $\pm 100\%$

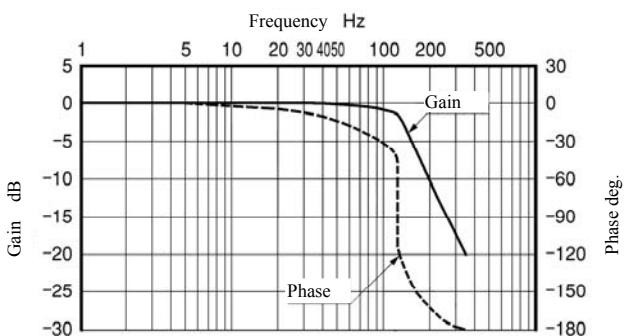


● LSVG-03EH-60-*-10 (Dry Type)

Input Signal $\pm 25\%$

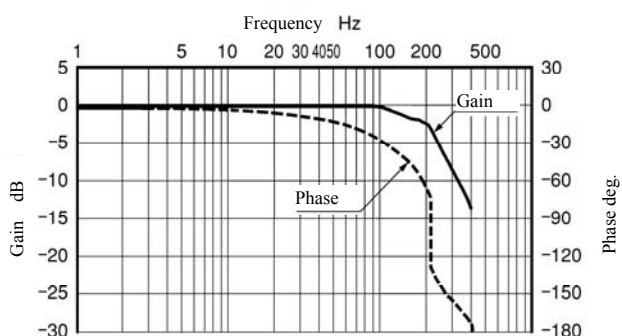


Input Signal $\pm 100\%$

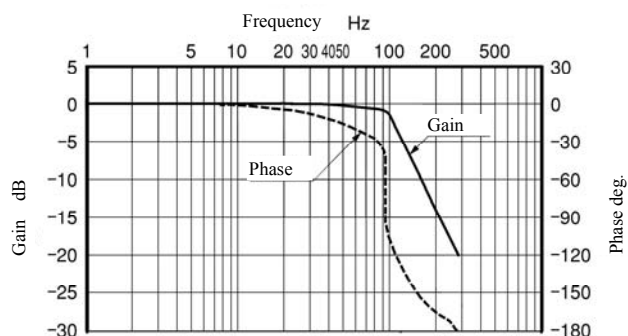


● LSVG-03EH-60-W-*-10 (Wet Type)

Input Signal $\pm 25\%$



Input Signal $\pm 100\%$



[Application]

Systems requiring high response speed, including high speed injection molding machines, various testing equipment, and steel mill equipment.

[Product Release]

We will start accepting orders for the products in June 2010.

YUKEN KOGYO CO.,LTD.

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