Frequency Response

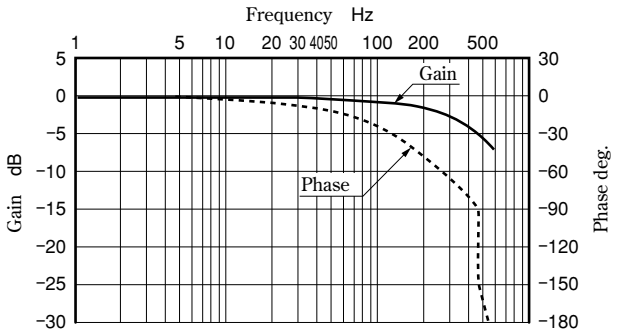
〈Conditions〉

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

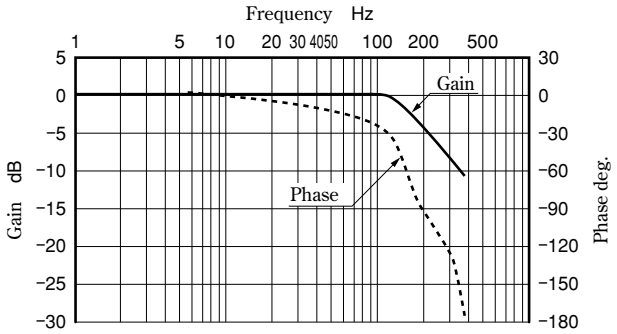
●LSVG-03-4/10/20/40-10

Amplifier：AMLS-A-D48-＊-10 (Power Supply: 48 V DC)

Input Signal ±25 %

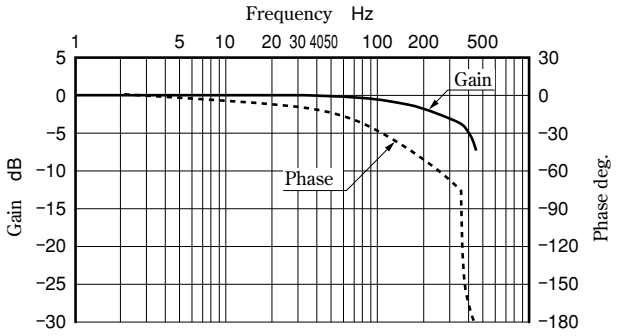


Input Signal ±100 %

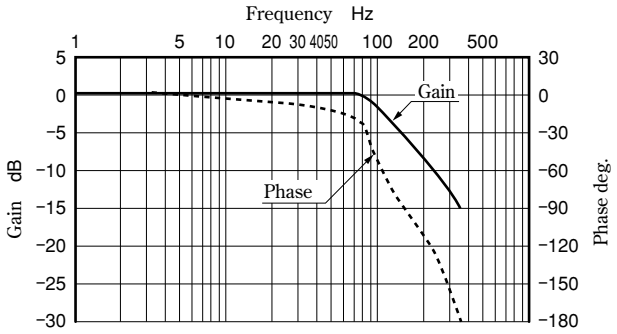


Amplifier：AMLS-A-D24-＊-10 (Power Supply: 24 V DC)

Input Signal ±25 %



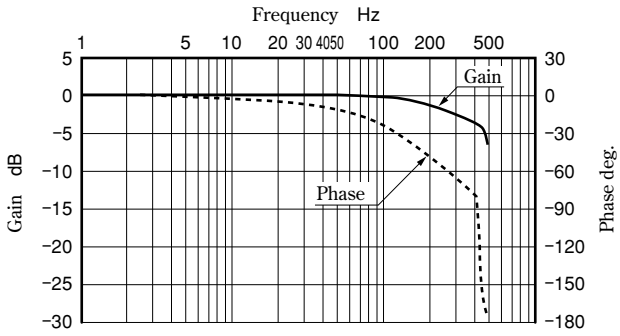
Input Signal ±100 %



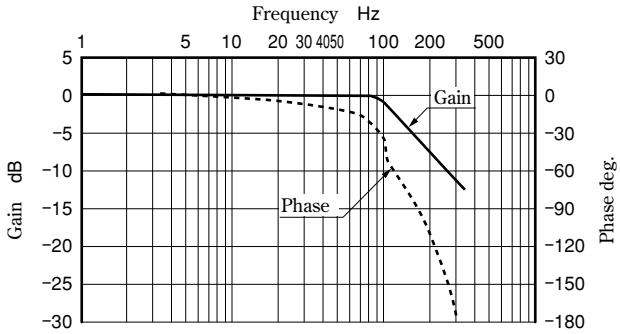
●LSVG-03-60-10

Amplifier：AMLS-B-D48-＊-10 (Power Supply: 48 V DC)

Input Signal ±25 %

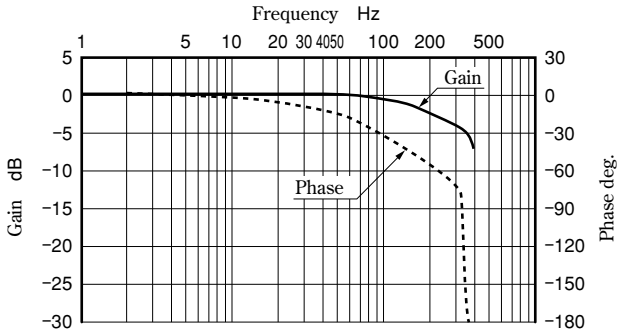


Input Signal ±100 %

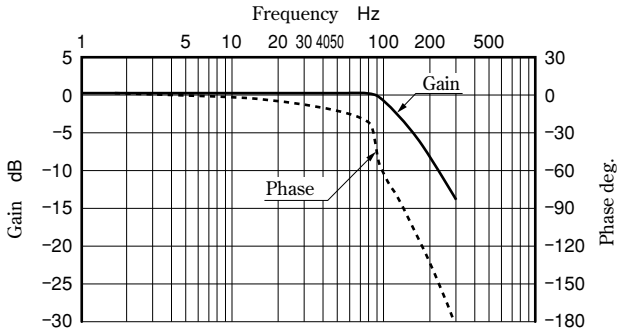


Amplifier：AMLS-B-D24-＊-10 (Power Supply: 24 V DC)

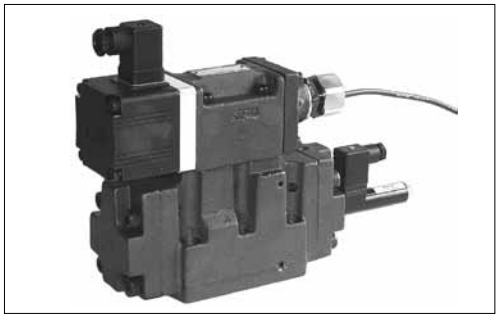
Input Signal ±25 %



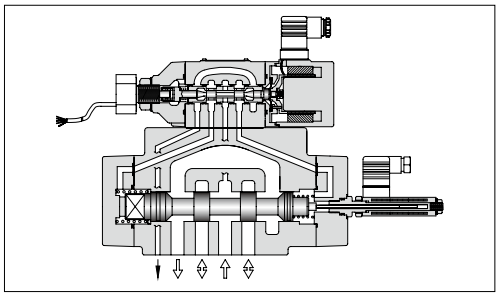
Input Signal ±100 %



Tow Stage Type High-Speed Linear Servo Valves



Two stage type linear servo valves are a type of high-flow servo valve that has a direct type high speed linear servo valve in its pilot stage to drive the main spool. These valves control the positions of the pilot and main spools with electrical feedback, achieving high accuracy and response.



●High flow

The valves consist of two stages to provide a high flow rate (Rated flow at ΔP =7 MPa: 750 - 3800 L/min).

●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.

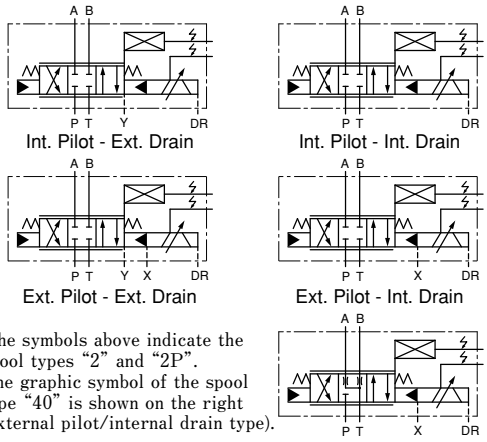
●High response characteristics

The valves provide significantly high levels of step and frequency responses, which are typically used as measures of response characteristics; the step response is 8 ms (0 <=> 100 %), and the frequency response is 105 Hz/-90° (±25 % amplitude) (Representative values for LSVHG-06-900). Thus, the valves ensure the achievement of unprecedented high response.

●Excellent contamination resistance

As is the case with the direct type linear servo valves, the permissible level of fluid contamination for these valves is up to NAS 1638 class 10.

Graphic Symbols



Note) The symbols above indicate the spool types "2" and "2P". The graphic symbol of the spool type "40" is shown on the right (external pilot/internal drain type).

■ Model Number Designation

F—	LSVHG	—06	—900	—2P	—E	T	—R	—A	—10
Fluid Type	Series Number	Valve Size	Rated Flow @ΔP = 7 MPa	Spool Type	Pilot Connection	Drain Connection	Cable Departure Direction	Fail-safe Function	Design Number
F : Special Seals for Phosphate Ester Type Fluid (Omit if not required)	**LSVHG :** Two Stage Type High Speed Linear Servo Valvesv	**04**	**750 :** 750 L/min	**2 :** 10% Overlap **40 :** Open Centre A, B & T **2P :** Zero Lap (Dual Flow Gain)	**None :** Internal Pilot **E :** External Pilot	**None :** External Drain **T :** Internal Drain	(Viewed from the linear motor side) **None :** Upper (Standard) **R :** Right **L :** Left	**None :** P→B→A→T Position Valve Opening: Full **A :** P→A→B→T Position Valve Opening: Full	**10**
		06	**900 :** 900 L/min **1300 :** 1300 L/min						
		10	**3800 :** 3800 L/min						**20**

■ Exclusive Amplifiers

To ensure stable performance, it is recommended to use Yuken's AMLS series linear servo amplifiers.

Valve Model Number	Amplifier Model
LSVHG-04-750	AMLS-C2-D＊-＊-10
LSVHG-06-900	AMLS-C-D＊-＊-10
LSVHG-06-1300 LSVHG-10-3800	AMLS-D-D＊-＊-10

■ Attachment

Model Number	Mounting Bolt	Qty.	Bolt Tightening Torque
LSVHG-04	Hex. Soc. Head Cap Screw:M 6 ×55L	2	12.9 - 15.9 Nm
	Hex. Soc. Head Cap Screw:M10×60L	4	60.6 - 74.1 Nm
LSVHG-06	Hex. Soc. Head Cap Screw:M12×85L	6	104 - 127 Nm
LSVHG-10	Hex. Soc. Head Cap Screw:M20×90L	6	494 - 603 Nm

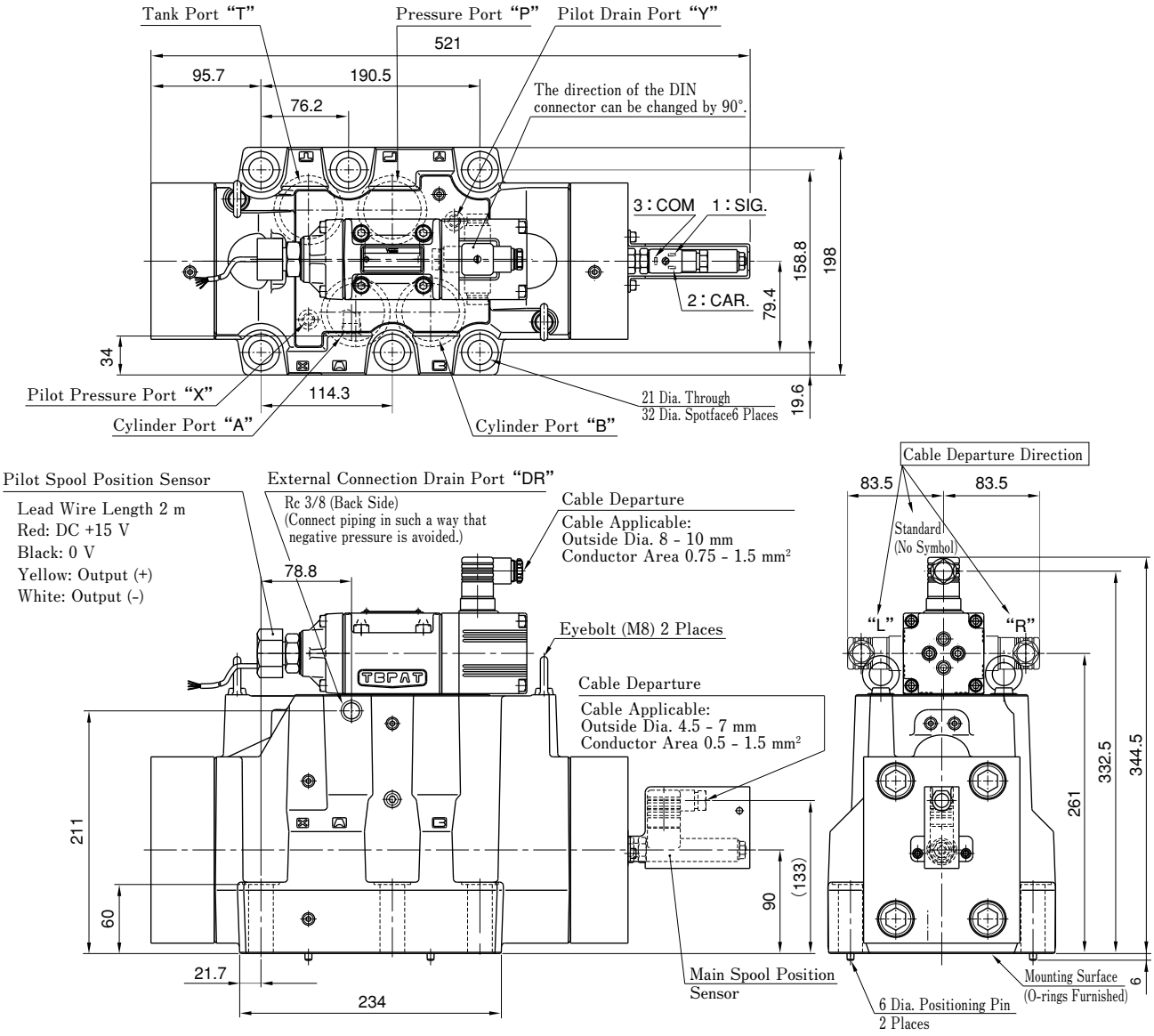
Specifications

The specifications below are for use with a 48 V DC type exclusive amplifier; for use with a 24 V DC type amplifier, see the values in parentheses ( ).

Description \ Model Numbers			LSVHG-04-750			LSVHG-06-900			LSVHG-06-1300			LSVHG-10-3800		
Rated Flow @ ΔP = 7 MPa (4-Way Valve)		L/min	750			900			1300			3800		
Rated Flow @ ΔP' = 0.5 MPa (per Land)		L/min	283			340			490			1440		
Max. Operating Pressure		MPa	35			35			31.5			35		
Proof Pres. at Return Port	External Drain	MPa	31.5			35			25			28		
	Internal Drain (1)	MPa	31.5			35			25			28		
DR Port Permissible Back Pressure (2)		MPa	0.05											
Pilot Pressure (3)		MPa	1.5 - 35									1.5 - 25		
Pilot Flow Rate (4)		L/min	27 (22) or more			30 (24) or more			34 (27) or more			32 (27) or more		
Pilot Valve Max. Leakage	Ps=Pp=14 MPa 32 mm^2/s	L/min	1.7											
Main Valve Max. Leakage	Spool Type		-2-	-40-	-2P-	-2-	-40-	-2P-	-2-	-40-	-2P-	-2-	-40-	-2P-
	Ps=Pp=14 MPa 32 mm^2/s	L/min	0.8	1.6	6.8	0.9	1.8	7	1	2	8	3	6	10
Hysteresis		%	0.1 or less											
Step Response (0 <=> 100 %, Typical) (5)		ms	8 (10)			8 (10)			10 (13)			15 (18)		
Frequency Response (±25 % Amplitude, Typical) (5)	Gain: -3 dB	Hz	150 (140)			160 (130)			150 (110)			100 (60)		
	Phase: -90°	Hz	110 (100)			105 (100)			100 (100)			85 (75)		
Vibration Proof (6)			Frequency: 10 - 60 Hz, Amplitude: 4 mm, Acceleration: 7.8 - 282 m/s^2 Frequency: 61 - 2000 Hz, Amplitude: 4 - 0.0038 mm, Acceleration: 294 m/s^2											
Protection			IP 64											
Ambient Temperature		℃	−15 - +60											
Spool Stroke to Stops		mm	±5			±5			±7			±7		
Spool End Area		cm^2	7.1			8			8			11.3		
Polarity			See the description about I/O signal characteristics on page 18.											
Linear Motor Specification	Current	A	2 [Max. 6]											
	Coil Resistance	Ω	4.5											
質　　量		kg	12			20			21			78		

Note: (1) Pressure at the return port should be at actual supply pressure or less.
(2) Back pressure at the drain port should be 0.05 MPa or less and not be a negative pressure.
(3) Supply pressure for the pilot valve should be 1.5 to 35 MPa (1.5 to 25 MPa for LSVHG-10) and should also be 60 % of actual supply pressure or more.
(4) The pilot flow is calculated based on a pilot pressure of 14 MPa and the above step response.
(5) This value is measured for each valve based on a pilot pressure of 14 MPa; it may vary depending on the actual circuit/operation conditions.
(6) There are restrictions on the mounting position; refer to the instructions for details.

LSVHG-10



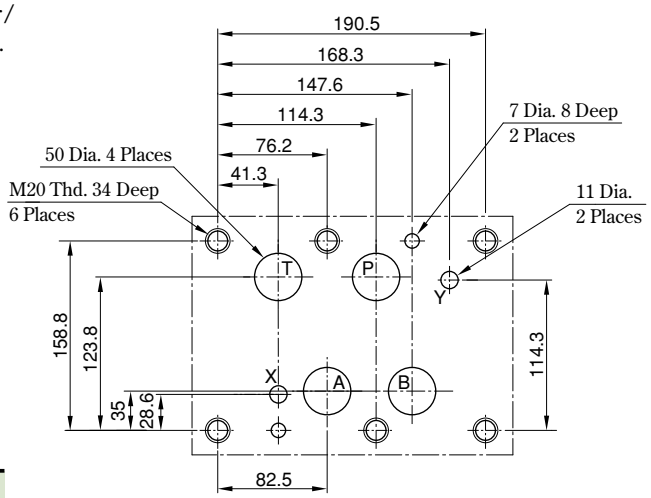
Note) Refer to the wiring diagram on page 20 for detailed connection between the pilot valve DIN connector/ position sensors (pilot and main spools) and the amplifier.

【Mounting Surface】

Prepare a mounting surface shown on the right. Basically, the dimensions of the mounting surface conform to the ISO standard, but the specifications for the ports P, A, B, and T are different as follows.

	ISO 4401-08-07-0-94	Mounting Surface for LSVHG-10
Dia. of Port P, A, B, T	36 Dia.	50 Dia.

The mounting surface should have a good machined finish.



● O-rings for the Ports

Port	O-ring Size	Qty.
P, A, B, T	AS568-227 (NBR, Hs 90)	4
X, Y	AS568-015 (NBR, Hs 90)	2

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