

High Speed Linear Servo Valves

High-speed linear servo valves have outstanding features of high response and exceptional contamination resistance. These features are achieved by the compact and powerful linear motor which directly drives the spool and gives electric feedback of the spool position. These valves have garnered an excellent reputation since their launch by Yuken in 2001. Direct type LSVG-03 and two stage type LSVHG-04/06/10(which use the LSVG-03 as a pilot) are available.

Direct Type High Speed Linear Servo Valves

- **High accuracy**

These 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 2 ms ($0 \leftrightarrow 100\%$)*, and the frequency response is 450 Hz/- 90° ($\pm 25\%$ amplitude)*. Thus, the valves ensure that the main unit can achieve unprecedented high response.

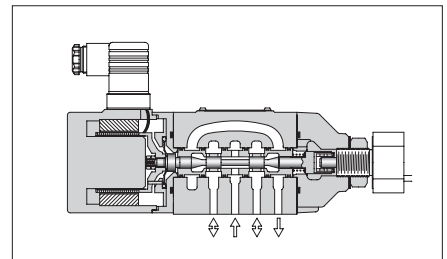
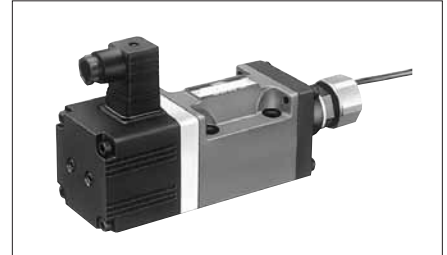
(*: Representative values)

- **Excellent vibration-proof characteristics**

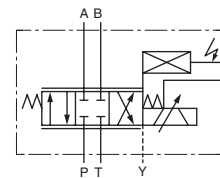
With a simple structure, the valves offer high vibration resistance.

- **Excellent contamination resistance**

The valves are also featured by excellent contamination resistance since they have a simple structure that directly connects the linear motor moving coil, the spool, and the position sensor. Compared to conventional servo valves for which the permissible contamination level is up to NAS 1638 class 7, the direct type linear servo valves can accept the contamination level of up to NAS 1638 class 10. These valves can contribute to greatly reducing the cost of fluid management.



Graphic Symbol



Model Number Deignation

F-	LSVG	-03	-40	-R	-10
Special Seals	Series Number	Valve Size	Rated Flow @ $\Delta P = 7 \text{ MPa}$ (@ $\Delta P = 1020 \text{ PSI}$)	Cable Departure Direction	Design Number
F Special Seals for Phosphate Ester Type Fluid (Omit if not required).	LSVG: Direct Type High Speed Linear Servo Valves	03	4 = 4 L/mi n (1.06 U. S. GPM) 10 =10 L/mi n (2.64 U. S. GPM) 20 =20 L/mi n (5.28 U. S. GPM) 40 =40 L/mi n (10.57 U. S. GPM) 60 =60 L/mi n (15.85 U. S. GPM)	(Viewed from the linear motor side) None: Upper (Standard) R: Right L: Left	10

Specifications

The specifications below are for use with a 48 VDC type exclusive amplifier; for use with a 24 VDC type amplifier, see the values in parentheses { }.

Model Numbers		LSVG-03-4/10/20/40	LSVG-03-60
Description			
Rated Flow @ $\Delta P = 7 \text{ MPa}$ (1020 PSI) ⁽¹⁾		4, 10, 20, 40 L/min (1.06, 2.64, 5.28, 10.57 U. S. GPM)	60 L/min (15.85 U. S. GPM)
Max. Operating Pressure		35 MPa (5080 PSI)	
Proof Pres. at Return Port		35 MPa (5080 PSI)	
Drain Port (Y) Permissible Back Pres. ⁽²⁾		0.05 MPa (7 PSI)	
Null Leakage @ $P_s = 14 \text{ MPa}$ (2030 PSI) 32 mm ² /s (150 SSU)		1.7 L/min (.45 U.S. GPM) or less	
Hysteresis		0.1 % or less	
Step Response ($0 \leftrightarrow 100 \%$, Typical) ⁽³⁾		2 ms { 3 ms }	3 ms { 4 ms }
Frequency Response ($\pm 25 \%$ Amplitude, Typical) ⁽³⁾	Gain: - 3 dB	350 Hz { 300 Hz }	330 Hz { 240 Hz }
	Phase: - 90°	450 Hz { 370 Hz }	410 Hz { 330 Hz }
Vibration Proof ⁽⁴⁾		Frequency: 10 - 60 Hz, Amplitude: 4 mm (.157 in.), Acceleration: 7.8 - 282 m/s ² (25.6 to 925 ft./s ²) Frequency: 61 - 2000 Hz, Amplitude: 4 - 0.0038 mm (.157 - .00015 in.), Acceleration: 294 m/s ² (965 ft./s ²)	
Protection		IP 64	
Ambient Temperature		- 15 to + 60 °C (5 to 140°F)	
Spool Type		Neutral / Zero Lap	
Spool Stroke to Stops		$\pm 0.5 \text{ mm}$ ($\pm .0197 \text{ inches}$)	$\pm 7.5 \text{ mm}$ ($\pm .0295 \text{ inches}$)
Linear Motor Specification	Current	2 A [Max. 6 A]	
	Coil Resistance	4.5 Ω [at 20 °C (68 °F)]	
Mass		5 kg (11.0 lbs.)	
Applicable Servo Amplifier		AMLS-A-D*-*-10	AMLS-B-D*-*-10

Note: (1) Use the valves so that the relationship between the valve pressure difference and the flow rate, as specified below in "Range of Flow Control" is met.

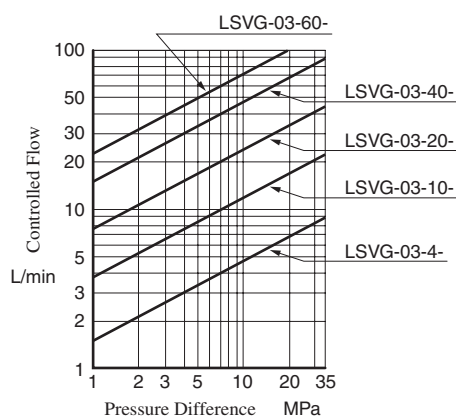
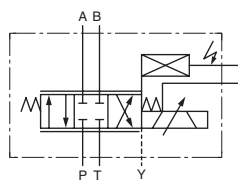
(2) Back pressure at the drain port (Y) should be 0.05 MPa (7 PSI) or less and not be a negative pressure.

(3) This value is measured for each valve; it may differ depending on the actual circuit.

(4) There are restrictions on the mounting position; consult Yuken for details.

Range of Flow Control

Control Method: 4-Way Valve



Control Method: 3-Way Valve

