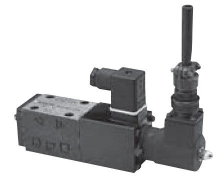
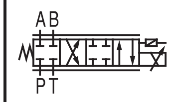
High-Response Proportional Flow Control Valve ESH-G01

2.6 to 13.2 gpm
4640 psi





Features

Frequency response equivalent to an electro-hydraulic servo valve.
Direct spool by a high-output proportional solenoid.
Differential transformer for accurate spool positioning with minor feedback.
Recovery of all port block positions following amp power off or wiring disconnection (Failsafe Function).
Steel spool and spring for long life.

Specifications

Item \ Model No.		ESH-G01-H510A-10	ESH-G01-H520A-10	ESH-G01-H540A-10
Maximum Operating Pressure P, A, B psi		4640		
T Port Allowable Back Pressure psi		362 max.		
Rated Flow Rate ℓ/min (gpm) (Valve pressure drop 1000 psi)		10 (2.6)	20 (5.2)	40 (9.2)
Maximum Flow Rate gpm		5.8	9.2	13
Limit Valve Pressure Drop psi		4640	3045	2030
Hysteresis %		0.5 max.		
Step Response ms (0→100% Displacement)		16 max. (Note 1)		
Frequency Response Hz (90° Phase Delay ±10% Displacement)		At least 80 (Note 1)		
Center Drift	Supply Pressure	0.5% max/FS (∆p=3625 psi)		
	Fluid Temperature	1.5% max/FS (∆t=104°F)		
Filtration		Class NAS9 max.		
Operating Fluid Temperature Range ° F (Recommended Fluid Temperature Range ° F)		32 to 140° F (86 to 140° F)		
Water and Dust Resistance		IP53		
Weight lbs		5		

Note: 1. Step response is typical value for a supply pressure of 1000 psi and fluid temperature of 104° F (kinematic viscosity: 40 centistokes)

Understanding Model Numbers

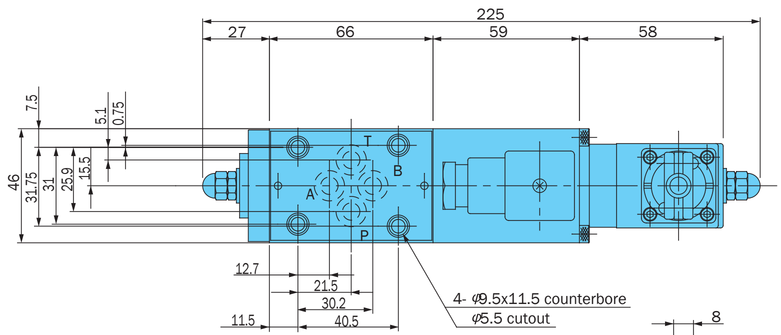
ESH – G 01 – H 5 20 A * 10

- 10: Design number
- *: E: Unified Threads
- A: Center valve position lap value
  A: 0.5% max. (zero lap)
- 20: Rated flow rate:10, 20, 35ℓ/min
  (Valve pressure drop 1000 psi)
- 5: Relieve position flow path
  : 5 (all ports blocked)
- H: Operation method: H (spring offset type)
- G 01: Mounting method G: Gasket type
  Nominal diameter : 01 (01 size)
- ESH: High-response proportional flow control valve

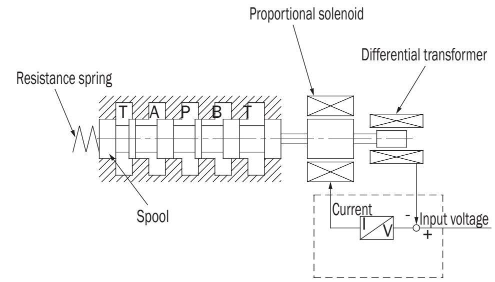
• Handling

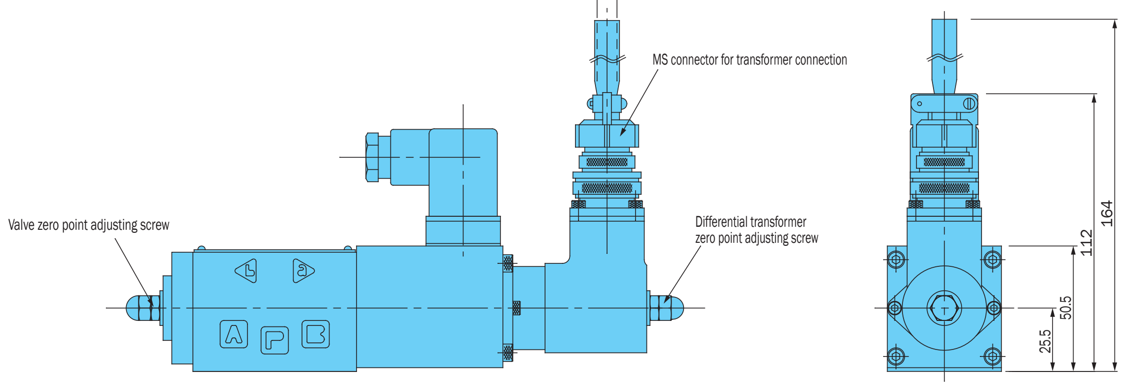
1. The amp and valve are adjusted to match at the factory, so be sure to use items that have the same MFG No.
2. The differential transformer zero adjust screw and valve zero adjust screw are adjusted and fixed at the factory. Because of this, you should not touch the screws (sealed cap nuts).
3. Install the valve so the spool axis line is horizontal.
4. In the case of 3-port applications and for the direction that throughflow is most common, use of the following flow is recommended P→A→B→T. P→A limit differential pressure is greater than that of P→B.
5. Be sure to perform sufficient flushing before a test run.
6. Use steel piping for this valve and the main actuator, and keep piping as short as possible.
7. There is no air bleeding.
8. Mineral oil hydraulic operating fluid is standard. Use an R&O type and wear resistant type of ISO VG32, 46, or 68 or equivalent.
9. Use an operating fluid that conforms to the both of the following.
   Kinematic viscosity: 20 to 140 centistokes
   Oil temperature: 86 to 140° F
10. Filtration
    Maintain hydraulic operating fluid contamination so it is at least NAS Class 9.
11. Electrical wiring between the amp and valve should be no longer than 30 meters. For the solenoid valve use VCTF 2 mm², 2-conductor shielded wire, and for the differential transformer use VCTF 0.5 mm², 4-conductor shielded wire.
12. After disassembling the valve, be sure to fill the inside of the guide with operating fluid before reassembling.
13. Bundled Accessories (Valve Mounting Bolts)
    (4) 10-24 x 1 3/4”
    Tightening Torque: 3.5 to 5 ft lbs

Installation Dimension Drawings



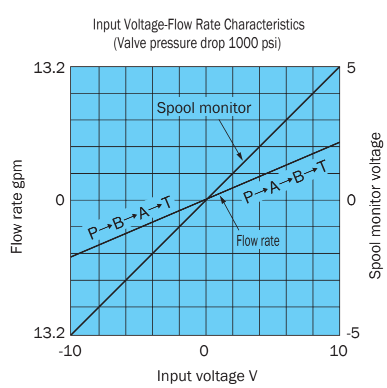
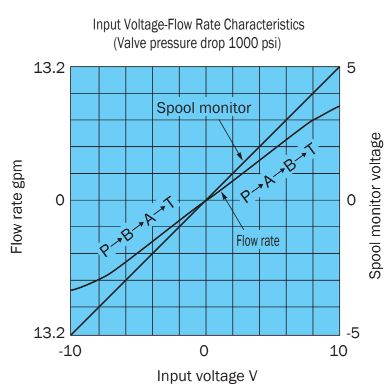
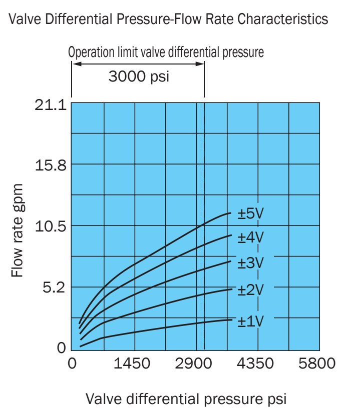
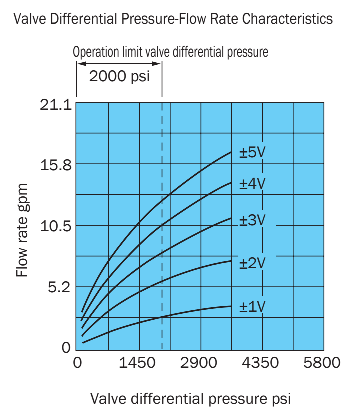
Operation Principle





The gasket mounting method conforms to ISO4401-AB-03-4-A.

Performance Curves

ESH-G01-H520A-10	ESH-G01-H540A-10
	
	

Note: ±10V input amp factory default data.
Rotating the GAIN trimmer clockwise (rightward) increases the flow rate by up to 10%.

- Valve Pressure Drop and Rated Flow Rate

Valve Pressure Drop (ΔP_X)
$=P_S-P_L-P_T$
P_S : Valve supply pressure
P_L : Load pressure
P_T : T Port back pressure
The rated flow rate is the value when the above valve pressure drop is 1000 psi.

- Valve Pressure Drop and Control Flow Rate

The following is the maximum control flow rate when the size of the obtained valve pressure drop is ΔP_X,

$$Q_x = Q_{rate} \times \sqrt{\frac{\Delta P_x}{7}}$$

Qrate : Rated flow rate
$\Delta P_X=P_S-P_L-P_T$

- Calculation example

When ESH-G01-H520A-10 is used under the following conditions:
P_S=102kgf/cm² (1450 psi)
P_L=61kgf/cm² (870 psi)
P_T=10kgf/cm² (145 psi)
Maximum control flow rate Q_X is as shown below:

$$Q_x = Q_{rate} \times \sqrt{\frac{P_S - P_L - P_T}{7}}$$

$$= 20 \times \sqrt{\frac{10-6-1}{7}} = 13\ \ell/\text{min}$$

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Proportional Valves