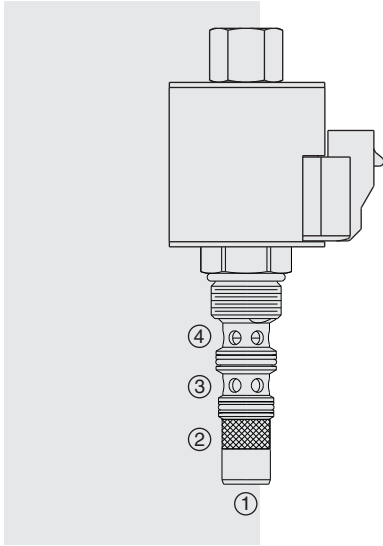


# ELECTRO-PROPORTIONAL VALVES—PRESSURE CONTROLS

## TS90-31 Proportional Electric Reducing/Relieving



### DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type reducing/relieving valve, which can be infinitely adjusted across a prescribed range using a variable electric input. Pressure output is proportional to DC current input. This valve is intended for use as a pressure control device in demanding applications.

### OPERATION

Without applied current, the **TS90-31** allows flow from ③ to ④ while blocking ②. When the coil is energized, ③ is connected to ②, and pressure at ③ is controlled proportional to the amount of current applied to the coil. If pressure at ③ exceeds the setting induced by the coil, pressure is relieved to ④.

Back pressure on port ④ becomes additive to the pressure setting at a 1:1 ratio.

Note: This product may be customized for special OEM performance characteristics. Consult factory.

### FEATURES

- 12 and 24 volt coils standard.
- Optional waterproofed E-Coils rated up to IP69K.

### RATINGS

**Maximum Operating Pressure at Ports 1 and 2:** 207 bar (3000 psi)

**Maximum Tank Pressure at Port 4:** 69 bar (1000 psi)

**Regulated Pressure Range from Zero to Max. Control Current:**  
0 to 137.9 bar (2000 psi)

**Maximum Control Current: E-Coils:** 0.88 amps for 12 VDC coil; 0.44 amps for 24 VDC coil; **D-Coils:** 0.68 amps for 12 VDC coil; 0.34 amps for 24 VDC coil

**Deadband:** 0.150 amps @ 12 VDC; 0.075 amps @ 24 VDC

**Hysteresis:** 3.0% PWM

**Rated Flow:** 38 lpm (10 gpm)

**Maximum Pilot Flow:** 0.85 lpm (0.23 gpm) with No Current

**Flow Path:** Free Flow: ③ to ④ coil de-energized; Reduced: ② to ③ coil energized; Relieving: ③ to ④ coil energized; Port ① is not plumbed externally

**Temperature:** -40 to 100°C (-40 to 212°F) with standard Buna N seals  
-26 to 204°C (-15 to 400°F) with Fluorocarbon seals

**Filtration:** See page 9.010.1

**Fluids:** Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

**Installation Recommendation:** When possible, the valve should be mounted below the reservoir oil level. This will maintain oil in the armature preventing trapped air instability. If this is not feasible, mount the valve horizontally for best results.

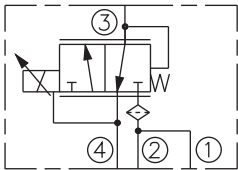
**Cavity:** VC98-3; See page 9.110.1; **Cavity Tool:** CT98-3XX; See page 8.600.1

**Seal Kit:** SK90-3X-BM; See page 8.650.1

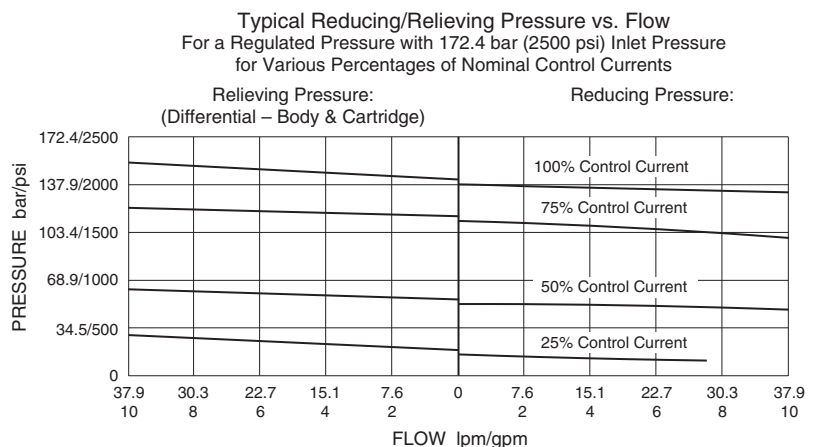
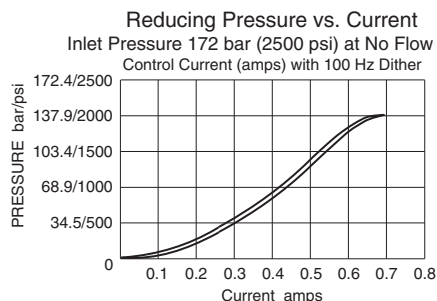
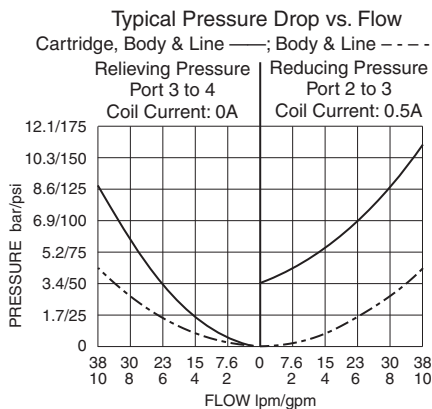
**Coil Nut:** Part No. 4540560

### SYMBOLS

#### USAS/ISO:



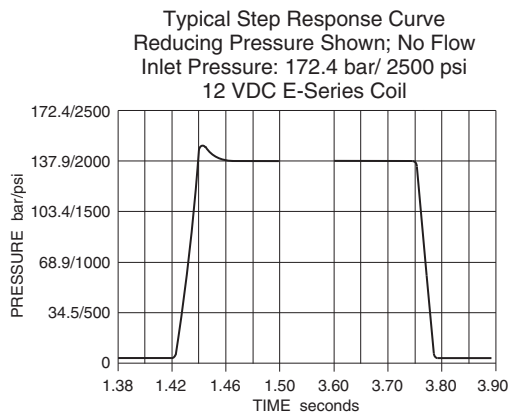
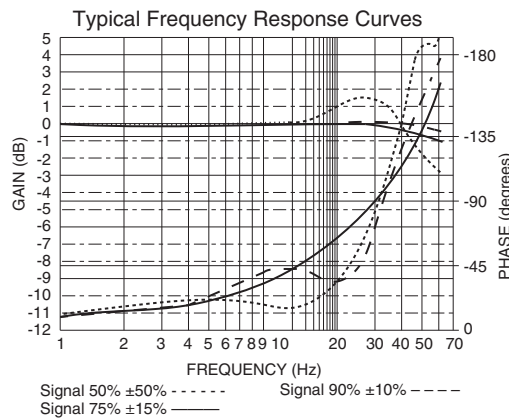
### PERFORMANCE



# Valve, Internally Piloted

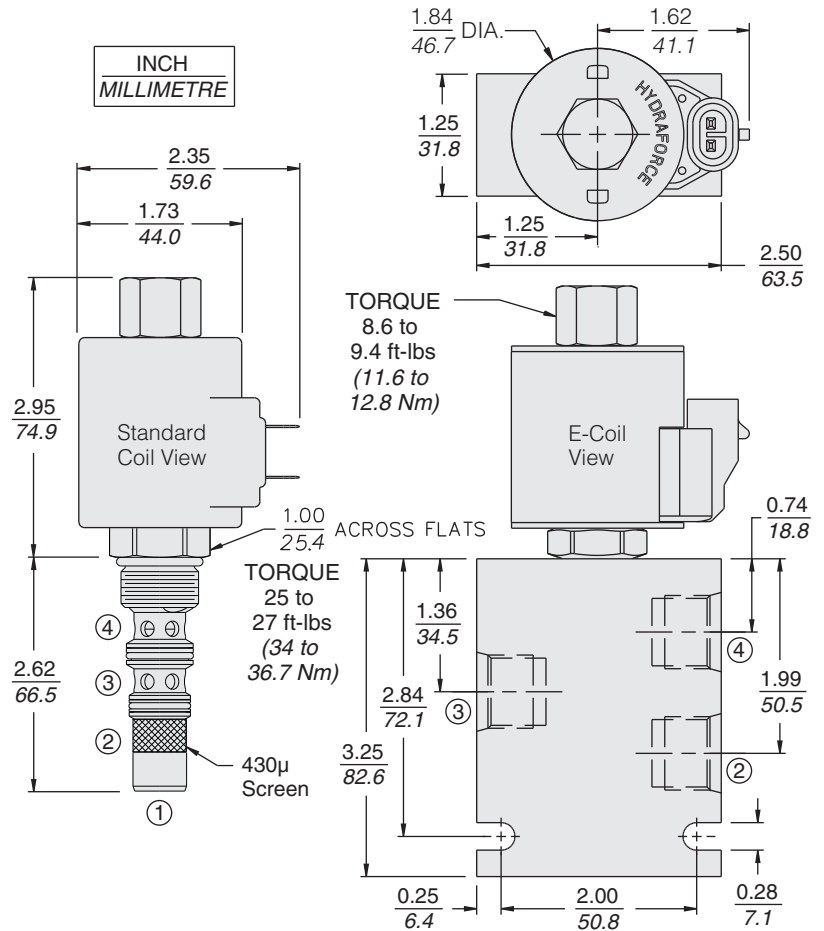
TS90-31

## PERFORMANCE (continued)



**Recommended Electronic Controllers:**  
See page 2.001.1 or our Electronics catalog.

## DIMENSIONS



## MATERIALS

**Cartridge:** Weight: 0.25 kg. (0.55 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. O-rings standard.

**Standard Ported Body:** Weight: 0.34 kg. (0.75 lbs.) Anodized high-strength 6061 T6 aluminum alloy, rated to 207 bar (3000 psi). Ductile iron bodies available; dimensions may differ. See page 8.010.1.

**Standard Coil:** Weight: 0.32 kg. (0.70 lbs.) Unitized thermoplastic encapsulated, Class H high temperature magnet-wire. See page 3.200.1

**E-Coil:** Weight: 0.41 kg. (0.9 lbs.) Perfect wound, fully encapsulated with rugged external metal shell. Rated up to IP69K with integral connectors.

**Note:** See page 3.400.1 for all E-Coil retrofit applications.

## TO ORDER

<b>TS90-31 -</b>			
<b>Porting</b>			<b>Termination Std. D-Coil</b>
Cartridge Only	<b>0</b>		<b>DS</b> Dual Spades
SAE 6	<b>6T</b>		<b>DG</b> DIN 43650
SAE 8	<b>8T</b>		<b>DL</b> Leadwires (2)
			<b>DL/W</b> Leads w/Weatherpak® Connectors
			<b>DR</b> Deutsch DT04-2P
			<b>Termination E-Coil</b>
<b>Seals</b>			<b>EG</b> DIN 43650 (IP65 Rated)
Buna N	<b>N</b>		<b>EL</b> Leadwires (2) (IP69K Rated)
Fluorocarbon	<b>V</b>		<b>ER</b> Deutsch DT04-2P (IP69K Rated)
			<b>EY</b> Metri-Pack® 150 (IP69K Rated)
			<b>EJ</b> Amp Jr. Timer (IP69K Rated)
			Coils with internal diode are available. Consult factory.
<b>Voltage</b>			
Less Coil	<b>0</b>		
12 VDC (0.88 amps max.)	<b>12</b>		
24 VDC (0.44 amps max.)	<b>24</b>		
Consult factory for other voltages			

**Note:** This valve uses a 10-size coil and the VC98-3 cavity, which is a variation of a 10-size cavity.