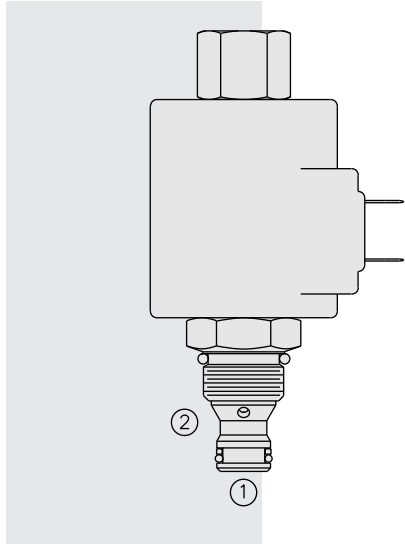


# ELECTRO-PROPORTIONAL VALVES—PRESSURE CONTROLS

## TS38-20 Proportional Electric Relief Valve



### DESCRIPTION

A screw-in, cartridge-style, direct acting, poppet-type hydraulic relief 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 limiting device in demanding applications.

### OPERATION

The TS38-20 blocks flow from 1 to 2 until sufficient pressure is present at 1 to offset the electrically induced solenoid force. With no current applied to the solenoid, the valve will free flow from 1 to 2.

**Note:** Back pressure on port 2 becomes additive to the pressure setting at a 1:1 ratio.

The optional manual override allows the valve to be set when the electric supply is lost. The manual setting is added to the electric setting. To prevent the system from being over pressurized, the manual override should always be disengaged prior to applying power to the coil.

### FEATURES

- 12 and 24 volt coils standard.
- Optional waterproof E-Coils rated up to IP69K.
- Industry common cavity.
- Manual override optional.

### RATINGS

**Pressure Rating:** 248.2 bar (3600 psi)

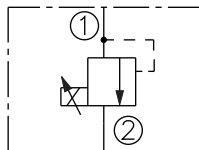
**Proof Pressure:** 268.9 bar (3900 psi)

**Burst Pressure:** 751.5 bar (10900 psi)

**Electrical Parameters:**

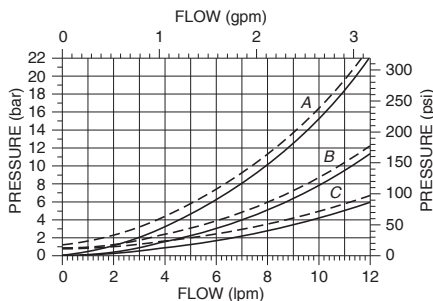
COIL SERIES	NOMINAL VOLTAGE (VDC)	TYPICAL RESISTANCE AT 20°C (68°F) (OHMS)	VALVE INDUCTANCE (Mh)	MAXIMUM CONTROL CURRENT (A)
D	12	7.2 ± 3%	141	1.10
	24	28.8 ± 5%	626	0.55
E	12	7.1 ± 3%	139	1.32
	24	28.5 ± 5%	600	0.66

### ISO SYMBOL

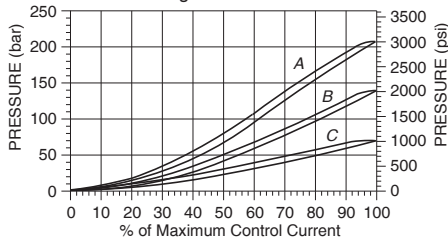


### PERFORMANCE

Pressure Drop vs. Flow Characteristic  
For Flow 1 to 2 with Coil De-energized  
Vertical Mount - - - Horizontal Mount —



Relief Pressure vs. Current (DC) 250 Hz Dither  
Relieving Pressure 1 to 2



Performance info. continued on following page.

**Control Signal:** DC or PWM (Significant improvements in valve performance occur with superimposed dither, with either control method.)

**Dither Frequency:** 200 Hz or higher

**Hysteresis with Dither 250 Hz:** 3.3% (7% maximum without dither)

**Operational Relief Pressure Range from Zero to Maximum Control Current:**

**A:** 0–207 bar (0–3000 psi); **B:** 0–138 bar (0–2000 psi); **C:** 0–69 bar (0–1000 psi)

**Note:** Minimum pressure setting is dependent on flow through the valve. (See Pressure Drop Curve)

**Rated Flow:** **A:** 11.4 lpm/3 gpm @ 20 bar/290 psi pressure drop **B:** 11.4 lpm/3 gpm @ 10 bar/150 psi pressure drop **C:** 11.4 lpm/3 gpm @ 5.5 bar/80 psi pressure drop

**Note:** See Pressure Drop Curve.

**Internal Leakage:** 1 ml/min (20 drops/minute) max. at 207 bar (3000 psi)

**Step Response:** T<sub>ON</sub> <50 ms; T<sub>OFF</sub> <7 ms

**Flow Path:** Free Flow: 1 to 2 coil de-energized; Relieving: 1 to 2 coil energized

**Temperature:** -40 to 100°C (-40 to 212°F) with standard Buna N 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.

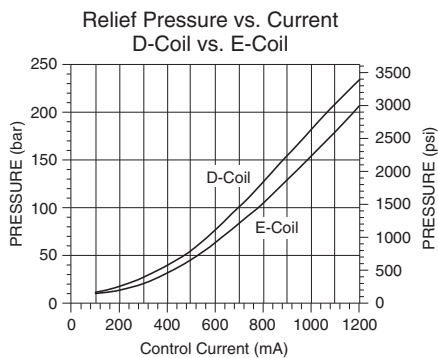
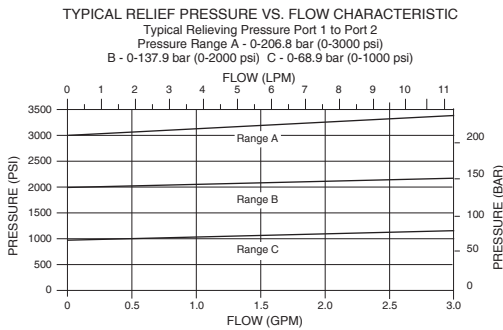
**Cavity:** VC08-2; See page 9.108.1;

**Cavity Tool:** CT08-2XX; See page 8.600.1

**Seal Kit:** SK08-2X-B; See page 8.650.1

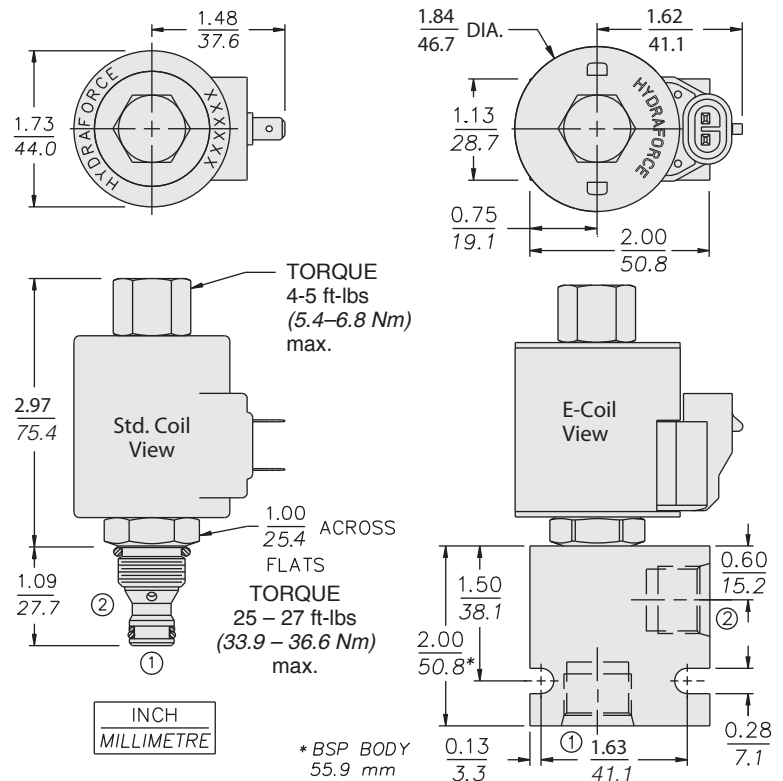
**Coil Nut:** Part No. 4540560; Note: For E-coils manufactured prior to 1-1-04, see page 3.400.1 for coil nut info.

**PERFORMANCE** (continued)



**Recommended Electronic Controllers:**  
 Model **EFDR2** Multi-Input Fan Drive Controller.  
 For more information go to:  
<http://www.hydraforce.com/Electro/fandrive.htm>  
 or see catalog page 2.001.1 (Table 2)

**DIMENSIONS**



**MATERIALS**

**Cartridge:** Weight: 0.18 kg. (0.39 lbs.)  
 Steel with hardened work surfaces.  
 Zinc-plated exposed surfaces.  
 Buna N O-rings and polyester  
 elastomer back-ups standard.

**Standard Ported Body:** Weight:  
 0.16 kg. (0.35 lbs.) Anodized high-  
 strength 6061 T6 aluminum alloy,  
 rated to 207 bar (3000 psi). Ductile  
 iron bodies available; dimensions  
 may differ. See page 8.008.1

**Standard Coil:** Weight: 0.32 kg.  
 (0.7 lbs.) Unitized, thermoplastic  
 encapsulated, Class H high  
 temperature magnetwire.  
 See page 3.200.1.

**E-Coil:** Weight: 0.41 kg. (0.9 lbs.) 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**

**TS38-20**

**Maximum  
 Relief Pressure**

- 207 bar (3000 psi) **A**
- 138 bar (2000 psi) **B**
- 69 bar (1000 psi) **C**

**Option**

- None (Blank)
- Manual Override **M**

**Porting**

- Cartridge Only **0**
- SAE 6 **6T**
- 3/8 in. BSP\* **3B**
- 1/2 in. BSP\* **4B**

\*BSP Body; U.K. Mfr. Only

**Seals**

- Buna N (Std.) **N**
- Fluorocarbon **V**
- Polyurethane **P**

**Termination Std. Coil**

- DS** Dual Spades
- DG** DIN 43650
- DL** Leadwires (2)
- DL/W** Leads w/Weatherpack®  
Connectors
- DR** Deutsch DT04-2P
- Termination E-Coil**
- ER** Deutsch DT04-2P  
(IP69K Rated)
- EY** Metri-Pack® 150  
(IP69K Rated)
- EL** IP69K Rated
- EJ** Amp. Jr. Timer  
(IP67 Rated)
- EG** DIN 43650 (IP65 Rated)

**Voltage**

- 0** Less Coil
- 10** 10 VDC (1/3 amps max.)
- 12** 12 VDC (1.10 amps max.)
- 20** 20 VDC (0.65 amps max.)
- 24** 24 VDC (0.55 amps max.)