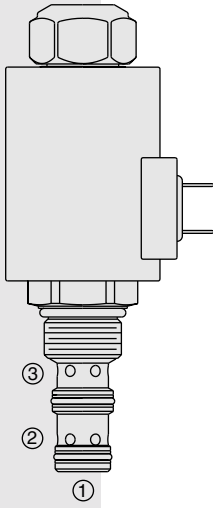


# ELECTRO-PROPORTIONAL VALVES—FLOW CONTROL

## ZL70-31 Proportional, Bi-Directional Flow Control,

U.S. Patent  
6,167,906



### DESCRIPTION

A solenoid-operated, electrically-variable, three-port, pressure-compensated, spool-type, normally open when de-energized, proportional, bi-directional, flow control valve. An internal compensator spool provides compensated flow across the proportional orifice regardless of flow direction.

### OPERATION

The ZL70-31 provides regulated flow from port ② to port ③, or regulated flow from port ③ to port ②. Port ① should be blocked. Regulated flow is inversely proportional to electric current applied to the solenoid.

#### Operation of Manual Override:

To Engage: Turn clockwise approximately 1 turn to reach start point. Continue another approximately 5 turns to full shift.

To Disengage: Turn counterclockwise approximately 6 turns until positive stop is found.

### FEATURES

- Excellent linearity and hysteresis characteristics.
- Hardened spool and cage for long life.
- Optional coil voltages and terminations.
- Efficient wet armature construction.
- Manual Override option.

### RATINGS

**Maximum Operating Pressure:** 240 bar (3500 psi)

**Regulated Flow:** Range A: 0–19 lpm (0–5.0 gpm); Range B: 0–9.5 lpm (0–2.5 gpm)

**Internal Leakage:** 0.38 lpm (0.10 gpm) maximum at zero current

**Electrical:** 2 standard voltage ratings

Coil Voltage	Threshold Current	Max. Control Current
12 VDC	50 ± 50 mA	1300 ± 100 mA
24 VDC	25 ± 25 mA	650 ± 50 mA

**Temperature:** -40 to 120°C with 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 ssu)

**Installation:** No restrictions; See page 9.020.1.

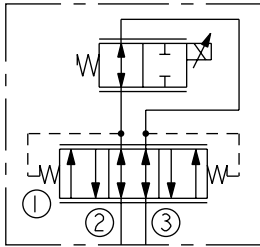
**Cavity:** VC10-3; See page 9.110.1

**Cavity Tool:** CT10-3X-XX; See page 8.600.1

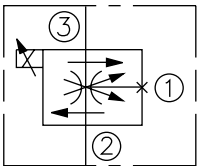
**Seal Kit:** SK10-3X-MM; See page 8.650.1

### SYMBOLS

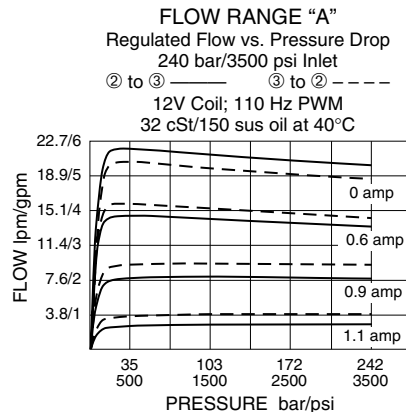
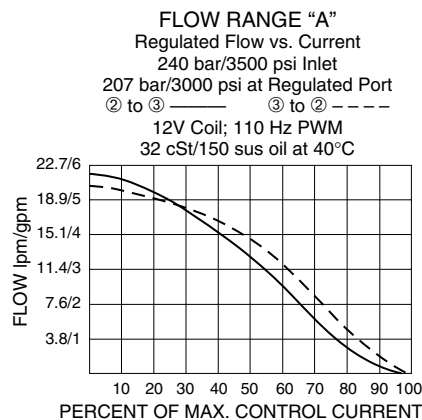
#### USASI/ISO:



#### ABBREVIATED SYMBOL:



### PERFORMANCE



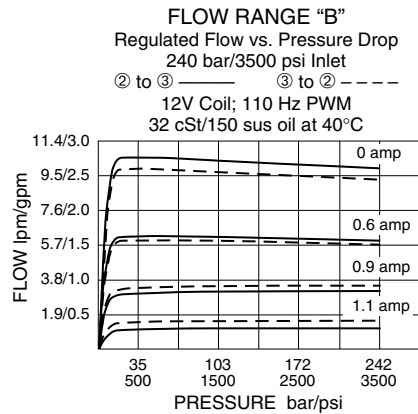
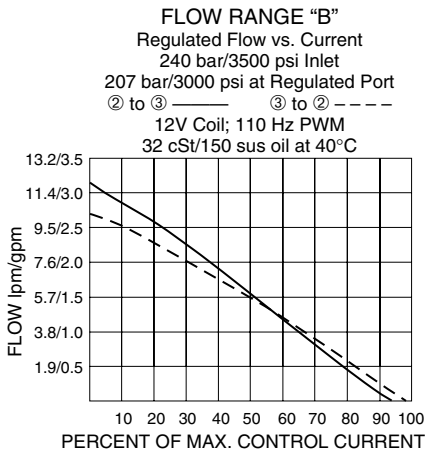
#### Recommended Controllers (See Section 3)

Input Sig. w/12V Coil	DIN Coil Mount	PCB Board	Metal Box	DIN Rail Mount
0-5 VDC	7114950	4000046	4000049	4000136
0-10 VDC	4000070	4000141	4000124	4000137
4-20 mA PWM	4000123	4000143	4000130	4000139
		4000144	4000133	4000140
w/24V Coil				
0-5 VDC	4000161	4000194	4000174	4000136
0-10 VDC	4000165	4000141	4000182	4000137
4-20 mA PWM	4000169	4000143	4000186	4000139
		4000144	4000133	4000140

# Normally Open

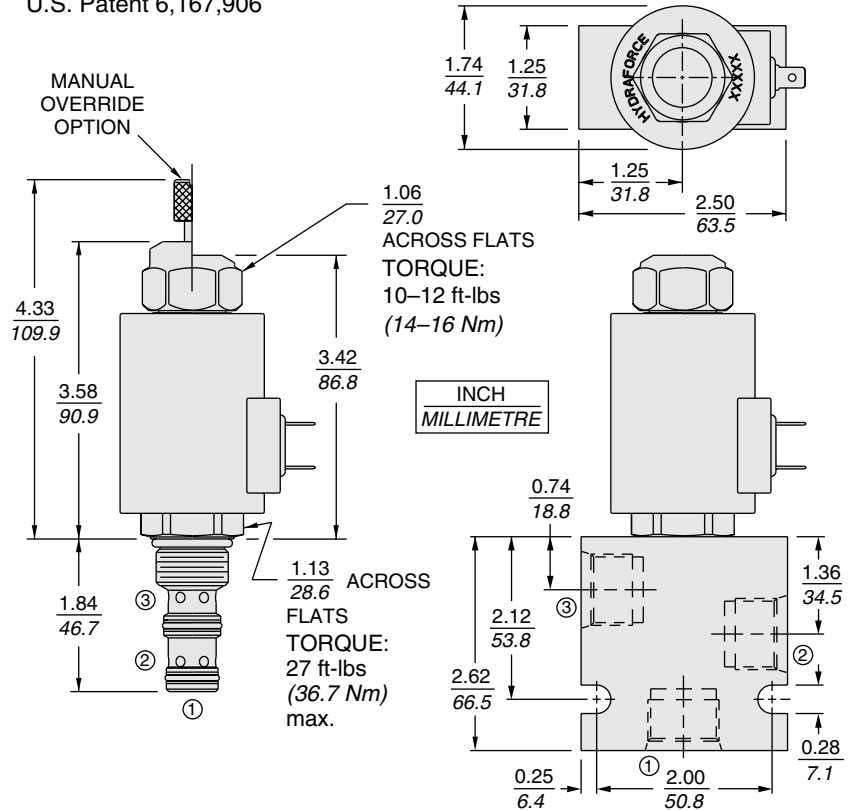
# ZL70-31

## PERFORMANCE (continued)



## DIMENSIONS

U.S. Patent 6,167,906



## MATERIALS

**Cartridge:** Weight: 0.32 kg. (0.7 lbs.); Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

**Standard Ported Body:** Weight: 0.59 kg. (1.3 lbs.); Anodized high-strength 6061 T6 aluminum alloy, rated to 240 bar (3500 psi); See page 8.010.1. Steel and ductile iron bodies available; dimensions may differ; consult factory.

**PV70 Series Coil:** Weight: 0.32 kg. (0.7 lbs.); Unitized thermoplastic encapsulated, Class H high temperature magnet-wire; See page 3.200.7.

## TO ORDER

<b>ZL70-31</b>		-	-	-	-	-	-
<b>Range</b>	<b>A</b>						
0-19 lpm (0-5.0 gpm)							
<b>Range</b>	<b>B</b>						
0-9.5 lpm (0-2.5 gpm)							
<b>Option(s)</b>	None (Blank)						
Manual Override	<b>M</b>						
<b>Porting</b>	Cartridge Only	<b>0</b>					
	SAE 6	<b>6T</b>					
	SAE 8	<b>8T</b>					
	SAE 10	<b>10T</b>					
<b>Terminations</b>	<b>DS</b>	Dual Spades					
	<b>DG</b>	DIN 43650					
	<b>DL</b>	Leadwires (2)					
	<b>DL/W</b>	Leads w/Weatherpak® Connectors					
	<b>DR</b>	Deutsch DT04-2P					
<b>Voltage</b>	<b>0</b>	Less Coil					
	<b>12</b>	12 VDC					
	<b>24</b>	24 VDC					
<b>Seals</b>	<b>N</b>	Buna N (Std.)					
	<b>V</b>	Fluorocarbon					

Coils with internal diode are available. Consult factory.