PROPORTIONAL PRESSURE CONTROL VALVES AND SYSTEMS

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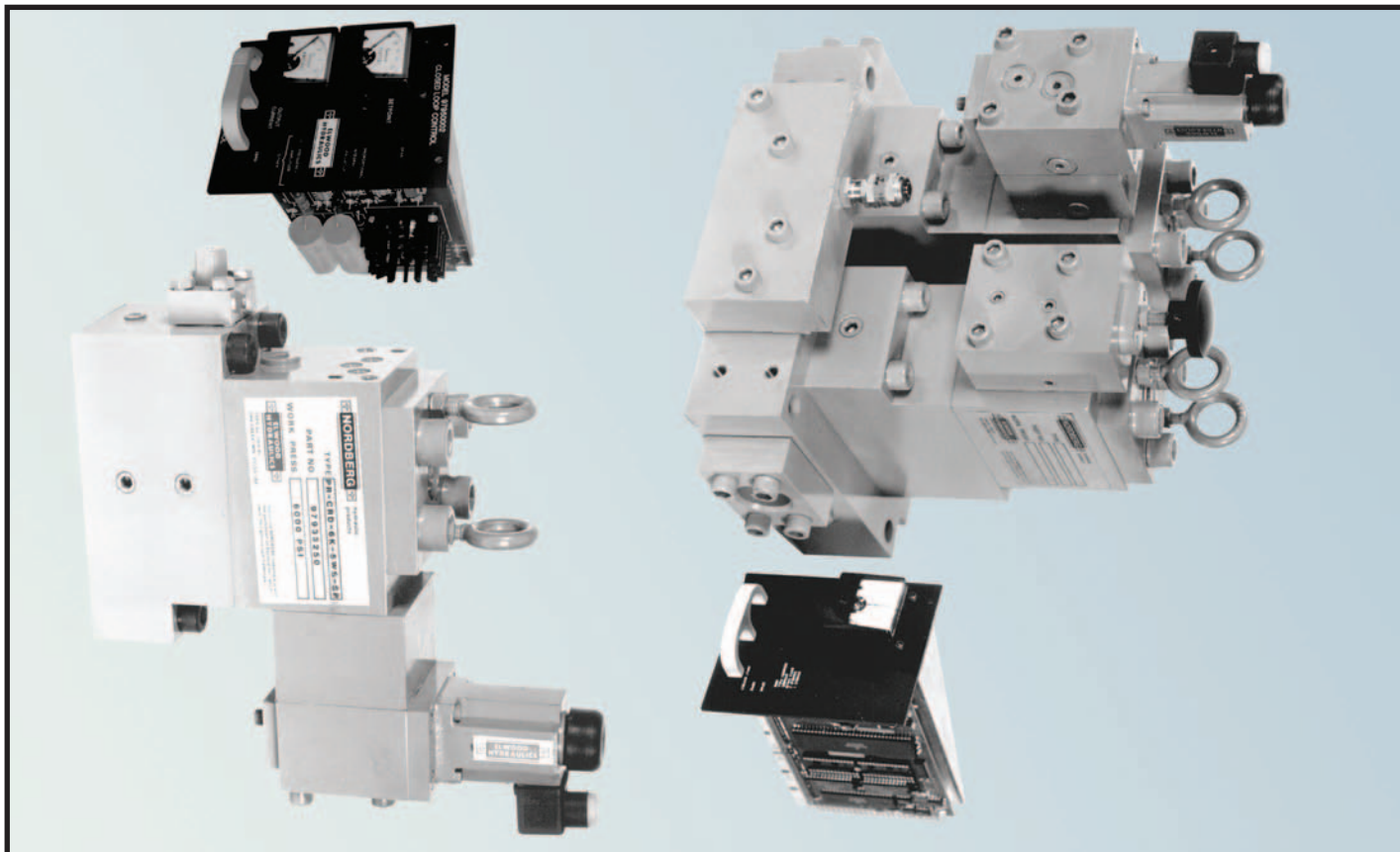
ISO 9001:2000 CERTIFIED COMPANY

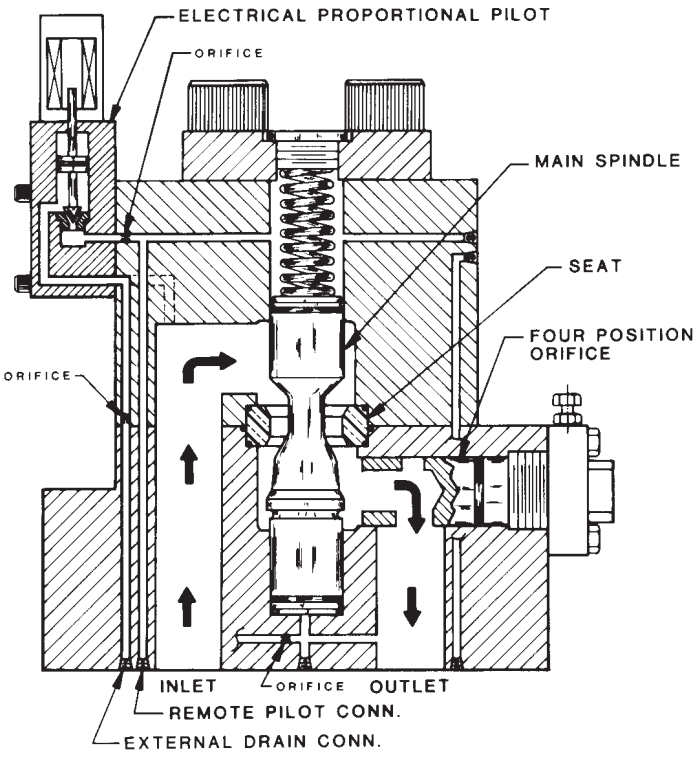
ELWOOD® FLUID POWER



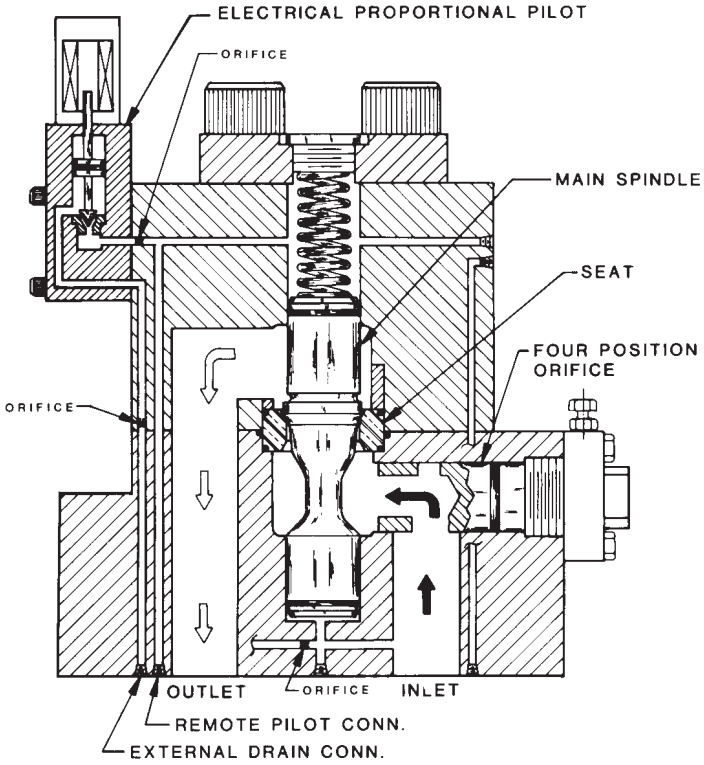
Proportional Pressure Control Valves

The Elwood Proportional Pressure Control Valves are pilot operated Relief and Reducing Valves utilizing the spindle design. The valves have a three piece construction consisting of a top plate, upper body and lower body. The valves also contain a spindle, reversible-replaceable seat, a four position orifice plug and a pilot head with proportional force controlled solenoid.

REDUCER



REFLIEF



PRESSURE RELIEF OR REDUCING VALVE

System pressure is adjusted in relationship to a current signal to the proportional solenoid. For the valve's pressure setting, a pressure balance on the main spindle allows the spring to hold the valve in a closed position (relief valve) or an open position (reducing valve) - refer to valve cutaways above. When system pressure working on the pilot poppet exceeds the solenoid force, a pilot flow is established to the external drain. This pilot flow creates a differential force on the main spindle because of a pressure drop through the orifices installed in the pilot.

An electronic amplifier card, or adaptive control module, controls the current to the proportional solenoid in relationship to a control voltage (0 to +10V). The amplifier card is available as "Open Loop" or "Closed Loop" (with use of a pressure transducer). The "Adaptive Control Module" is used in closed loop when extreme accuracy is required.

NOTE: The adjustable orifice plug allows a pre-pressure drop to occur in the valve allowing the main spindle to create a larger opening in the sealing area, adding to the life of the valve.

Technical Data

HYDRAULIC	REDUCER	RELIEF
Maximum Operating Pressure		
Hydraulic Media	HWCF, 97/3 Soluble Oil in Water, Synthetics, Mineral Oils and Kerosene	
Viscosity Range at 100°F (38°C)	20 SSU (1.2 Cst.) to 1800 SSU (385 Cst.)	
Maximum Pressure Rating	**3 Ranges** 1500 psi (103 bar), 3000 psi (207 bar), 5000 psi (345 bar)	
Minimum Set Pressure at Pressure Rating		
1500 psi (103 bar)	250 psi (17 bar)	300 psi (20 bar)
3000 psi (207 bar)	250 psi (17 bar)	450 psi (31 bar)
6000 psi (414 bar)	500 psi (34 bar)	550 psi (38 bar)

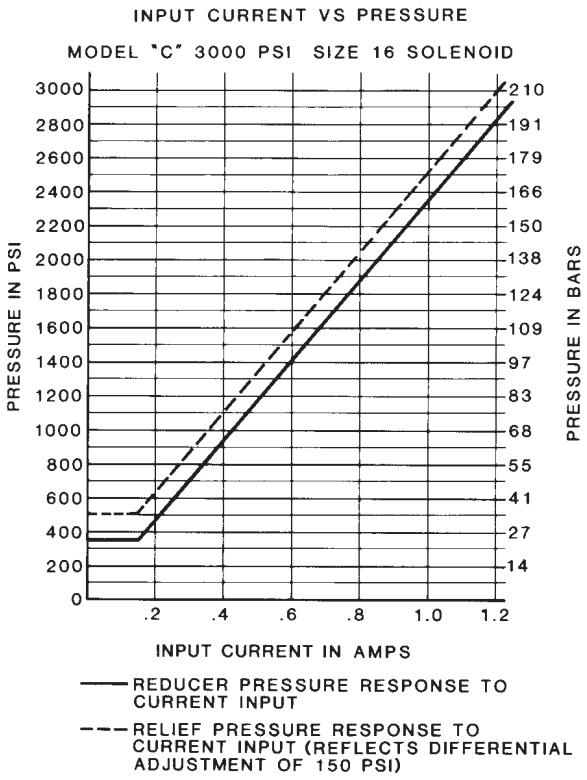
Sizes:	FLOW RATE GPM (L/MIN.)			
	Nominal	Max.	Nominal	Max.
at 3000 psi (207 bar)				
A 1/2"	11 (42)	15 (57)	15 (57)	20 (76)
C 3/4"	30 (114)	50 (190)	60 (227)	85 (322)
D 1 1/4"	80 (303)	120 (455)	125 (473)	190 (719)
at 2500 psi (172 bar)				
E 2"	180 (681)	200 (757)	250 (946)	300 (1136)

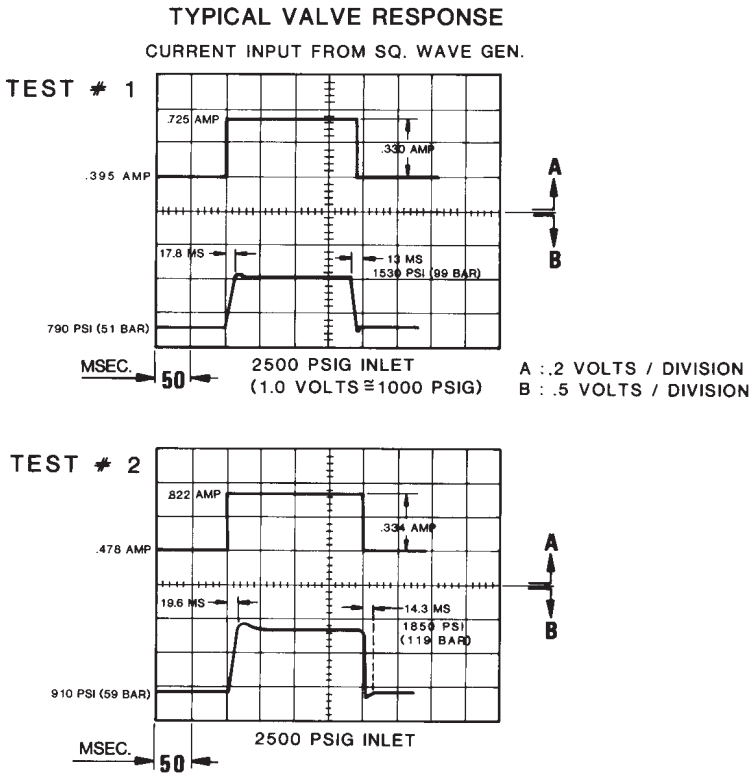
Maximum Pressure for "E" Valve is 5000 psi (345 bar)	***Note:*** At 5000 psi (345 bar) Line Size Must Be Larger For Maximum Flow
Fluid Temperature Range	HWCF 35° - 150°F (2° - 66°C) Mineral Oil 5° - 150°F (-15° - 66°C)
Recommended Filtration	50 Micron - 60 Micron Pilot Filter Provided
Repeatability	Open Loop with Dither ± 10% Closed Loop with Dither ± .5% (± .07% with Electronic Adaptive Control)
Hysteresis (test data for "C" size valve)	With Dither ± .5%
Response Time/Step Change (test data for "C" size valve)	800 - 2500 psi (55 - 172 bar) 32 ms 800 - 1500 psi (55 - 103 bar) 20 ms 400 - 800 psi (28 - 55 bar) 20 ms
Drain Flow	At 3000 psi (207 bar) - .5 gpm (2 l/min.)

ELECTRICAL		
Type of Supply	**Direct Current (DC)**	
	#16 Solenoid	#20 Solenoid
Minimum Control Current	(3000 psi) 150 ma	(6000 psi) 175 ma
Maximum Control Current	1400 ma	1600 ma
Coil Resistance	10.6 ohms	
Coil Rating	Continuous	
Maximum Ambient Temperature	175°F (79°C)	
Electrical Connection	Hirshmann Type DIN 43650	
Insulation	Exceeds NEMA Class B Requirement	

* For higher pressure, consult factory

Solenoid Power Draw Curve





Note: Test data shown is with a "C" size reducer at 2500 PSI.

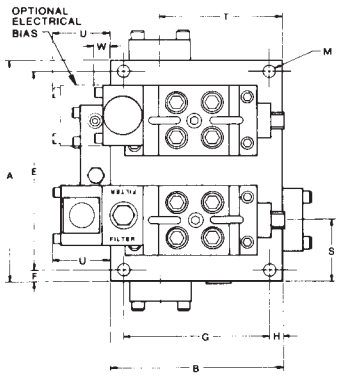
CIRCUIT: The test results shown reflect the pressure response of the "C" size Proportional Reducer/Relief Assembly reacting on a three gallon volume of fluid. The input current was supplied in a square wave form from a frequency generator.

RESULTS: The above graphs illustrate the current (Channel A) and pressure (Channel B) wave forms as displayed on a storage type oscilloscope.

NOTE: It is recommended that the hydraulic supply pressure be maintained at a level of 15% higher than the maximum set pressure to obtain optimum performance from the valve.

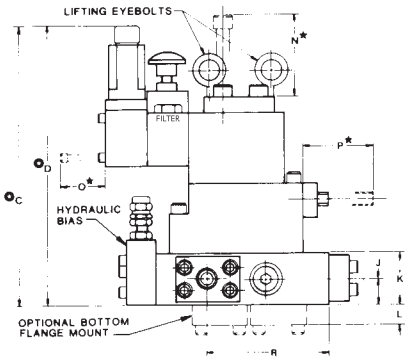
Dimensional Data

Dual Package

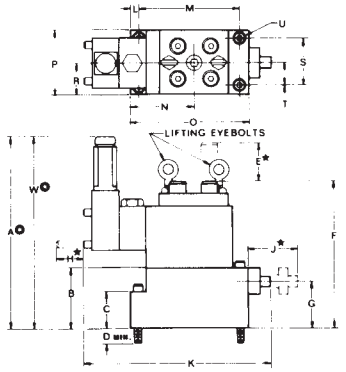


	PR-CRD/CRL inch (mm)
A	8.75 (222.3)
B	11.0 (279.4)
C	19.5 (495.3)
D	14.5 (368.3)
E	7.5 (190.5)
F	.62 (15.9)
G	9.88 (250.9)
H	.56 (14.3)
J	1.25 (31.8)
K	2.50 (65.5)
L	1.0 (25.4)
M	65dia.(16.7)
N	6.5 (165.1)
O	3.0 (76.2)
P	3.5 (88.9)
R	6.0 (152.4)
S	3.0 (76.2)
T	6.0 (152.4)
U	2.75 (69.9)
W	.75 (19.1)

★ REQUIRED FOR REMOVAL
ⓄC: 5000 PSI (345 BAR) MODEL
ⓄD: 1500 PSI (105 BAR) & 3000 PSI (210 BAR) MODELS

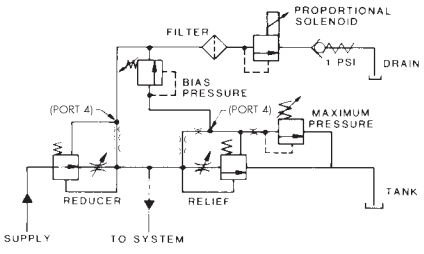


Single Valve



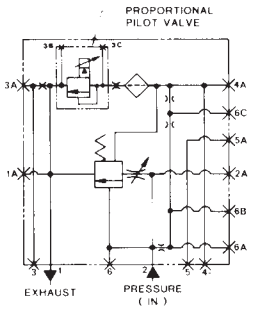
★ REQUIRED FOR REMOVAL
ⓄW: 5000 PSI (345 BAR) MODEL
ⓄA: 1500 PSI (105 BAR) & 3000 PSI (210 BAR) MODELS

	MODEL " "	MODEL "C" inch (mm)	MODEL "D" inch (mm)	MODEL "E" inch (mm)
A	REQUEST DRAWING	12.0 (304.8)	14.0 (355.6)	16.5 (419.1)
B		3.5 (88.9)	4.5 (114.3)	6.0 (152.4)
C		2.0 (50.8)	3.0 (76.2)	6.0 (152.4)
D		.88 (22.2)	1.25 (31.8)	1.5 (38.1)
E		6.5 (165.1)	7.0 (177.8)	7.5 (190.5)
F		8.4 (213.4)	10.8 (274.3)	14.5 (368.3)
G		2.7 (68.6)	3.4 (86.4)	4.3 (109.2)
H		3.0 (76.2)	3.0 (76.2)	3.0 (76.2)
J		3.5 (88.9)	5.0 (127.0)	6.0 (152.4)
K		11.2 (284.5)	13.6 (345.4)	16.1 (408.9)
L		.44 (11.2)	.75 (19.1)	.88 (22.2)
M		5.62 (142.7)	8.00 (203.2)	10.50 (266.7)
N		3.44 (87.4)	5.0 (127.0)	6.38 (162.1)
O		6.50 (165.1)	9.50 (241.3)	12.3 (312.4)
P		3.5 (88.9)	4.5 (114.3)	6.0 (152.4)
R		1.75 (44.5)	2.25 (57.2)	3.0 (76.2)
S		2.25 (57.2)	3.00 (76.2)	3.75 (95.3)
T		1.12 (28.4)	1.50 (38.1)	1.88 (47.6)
U		1/2"-13UNC	3/4"-10UNC	1"-8UNC
W		17.0 (431.8)	19.0 (482.6)	21.5 (546.1)



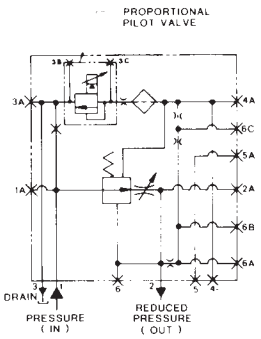
PROPORTIONAL DUAL PACKAGE SCHEMATIC

A.N.S. SYMBOL



VALVE SCHEMATIC
PROPORTIONAL RELIEF VALVE

A.N.S. SYMBOL



VALVE SCHEMATIC
PROPORTIONAL REDUCER VALVE

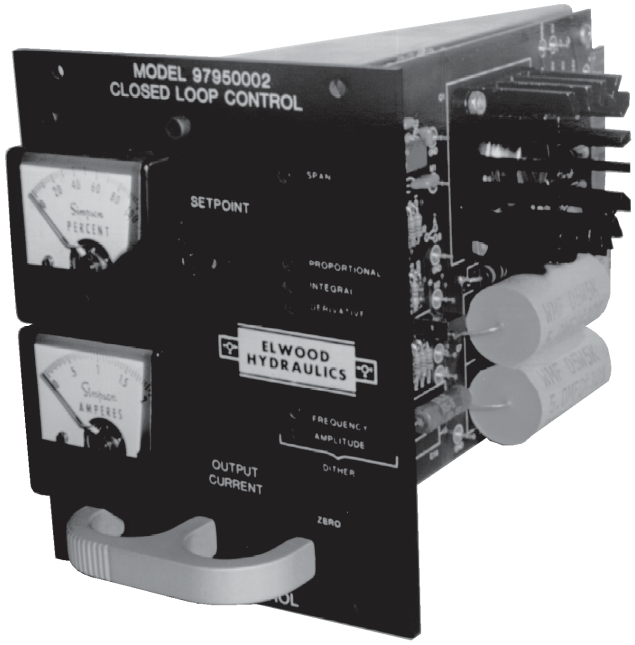
Open Loop Control

Description:
The Model 9795-0003 accepts command signals in several formats and provides current to operate the valve solenoid. The module is equipped with an integral power supply operating from line voltage.

An analog meter indicates the command signal in percent and an analog meter indicates the output current in amperage.

The Model 9795-0003 provides output current proportional to the command signal.

The Model 9795-0003 can be sub-panel mounted utilizing the Model 9795-0006 enclosure or may be rack mounted using the Model 9795-0007 enclosure.



Specifications:
Supply Voltage .....120/240 Volts, 50/60Hz., 2/1 Amps.
Output Current .....0 to 2 Amps.
Command Signal
- Panel Potentiometer.....1 turn (270°) 5,000 ohm
- Remote Potentiometer .....10 turn, 5,000 ohm
- External Voltage Command .....0-10 volts
- CMRR .....60Db at 60Hz.
- Common mode voltage .....5 volts
- External Current Command .....0-50 milliamps.
- Frequency Response .....20 Kilohertz

Indicators
- Command signal analog meter.....0 to 100 percent
- Output current analog meter.....0 to 2 Amps.
- Power on .....LED indicator

Size
- 5.25" H x 4.25" W x 8" D

Closed Loop Control

Description:
The Model 9795-0002 accepts a command signal and provides current to operate the valve solenoid. The module is equipped with an integral power supply operating from line voltage.

An analog meter indicates the command signal in percent and an analog meter indicates the output current in amperage.

The Model 9795-0002 provides a flow proportional to the command signal.

The Model 9795-0002 can be sub-panel mounted utilizing the Model 9795-0006 enclosure or may be rack mounted using the Model 9795-0007 enclosure.

Specifications:
Supply voltage..... 120/240 Volts, 50/60Hz., 2/1 Amps.
Output Current ..... 0 to 2 Amps

Command Signal
- Panel Potentiometer..... 1 turn (270°) 5,000 ohm
- Remote Potentiometer ..... 10 turn, 5,000 ohm
- External Voltage Command ..... 0-10 volts
- CMRR ..... 60Db at 60Hz.
- Common mode voltage ..... 5 volts
- External Current Command ..... 0-50 milliamps

Resolution..... 1 PSI
Frequency Response..... 20 Kilohertz
Pressure Transducer
- Excitation..... 10 Vdc
- Input Sensitivity ..... 30 mV. full scale

Auxilliary Output
- Pressure ..... 0-10 Vdc full scale at 5 mA.

Indicators .....
- Command signal analog meter..... 0 to 100 percent
- Output current analog meter..... 0 to 2 Amps
- Power on ..... LED indicator

Size
- 5.25" H x 4.25" W x 8" D

Ordering Data Proportional Pressure Control

PR	PROPORTIONAL PRESSURE CONTROL 24 V D.C.

PRESSURE RANGE	
1.5K	250 - 1500 PSI (17 - 103 BAR)
3K	250 - 3000 PSI (17 - 207 BAR)
6K	500 - 6000 PSI (34 - 414 BAR)

PORT LOCATION [2]		
SP	SIDE PORT (STANDARD)	[1]
BP	BOTTOM PORT (OPTIONAL)	[1]

[1] DUAL PACKAGE
[2] SINGLE PROPORTIONAL PRESSURE CONTROL VALVE BOTTOM PORT IS STANDARD

REDUCER		
	FLOW GPM (L/MIN.)	STD. SIZE INCH (MM)
A	9 - 15 (34 - 57)	1/2 (19.05)
C	10 - 50 (114 - 190)	3/4 (31.8)
D	40 - 120 (303 - 455)	1-1/4 (50.8)
E	80 - 200 (681 - 757)	2 (76.2)

RELIEF		
	FLOW GPM (L/MIN.)	STD. SIZE INCH (MM)
A	0 - 20 (0 - 76)	1/2 (19.05)
C	10 - 85 (255 - 325)	3/4 (31.8)
D	40 - 190 (475 - 720)	1-1/4 (50.8)
E	80 - 300 (950 - 1135)	2 (76.2)

PORT FLANGE CODE #	
	INCH (MM)
3	3/4 (19.05)
5	1-1/4 (31.75)
8	2 (50.8)
2	1/2 (76.2)
MM	SPECIFY SIZE

SEE CHART BELOW FOR OPTIONAL SIZES

OP	OPEN LOOP
CL	CLOSED LOOP
ADC	ADAPTIVE CONTROL

TR	TRANSDUCER INCLUDED IN "CL" AND "ADC"

FP	FRONT PANEL MOUNT
SP	SUB PANEL MOUNT

TYPE OF VALVE	
RD	REDUCER
RL	RELIEF

TYPE OF BIAS	
HB	HYDRAULIC
EB	ELECTRONIC

TYPE OF CONNECTION	
WS	SOC. WLD. STRAIGHT
NS	NPT STRAIGHT
M	MANIFOLD MOUNT
SAE	SAE O-RING STRAIGHT THD. CONN.

SCI	OPT. SERIAL COMPUTER INTERFACE
PCI	OPT. PARALLEL COMPUTER INTERFACE

PR - CRD/CRL - HB - 3K 5 WS - SP - CL - TR - SP - SCI

REQUIRED ONLY FOR DUAL PACKAGE (MOUNTED ON SINGLE MANIFOLD)

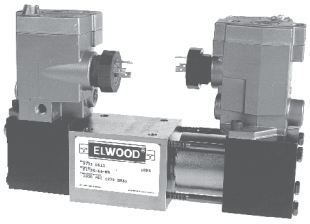
ELECTRICAL OPTIONS

	# PORT SIZES AVAILABLE - INCH (MM)							
MODEL	1/2 (12.7)	3/4 (19.05)	1 (25.4)	1-1/4 (31.8)	1-1/2 (38.1)	2 (50.8)	2-1/2 (63.5)	3 (76.2)
A	•	•	a	---	---	---	---	---
C	---	---	+	•	a	---	---	---
D	---	---	---	---	+	•	a	---
E	---	---	---	---	---	---	+	•

ELWOOD® FLUID POWER

Directional Control Valves
Packed Spool 4-Way

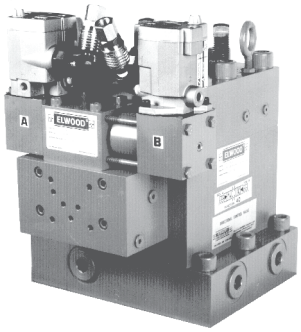
- Directional Valve for a Range of Applications Up to 46 gpm, 32 gpm Nominal
- 3000 psi (207 bar) and 6000 psi (414 bar)



- Air Solenoid Operated
- 3-Position Spring Centered
- 2-Position Spring Offset
- 2-Position Momentary Contact

REQUEST BULLETIN 82

Directional Control Valves
DIN Poppet Series 2-, 3- and 4-Way



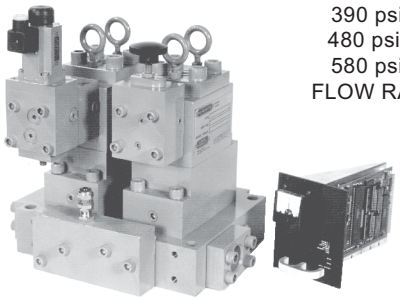
- Capacities to 1600 gpm (6057 l/min.)
- 3000 psi (207 bar), 4500 psi (310 bar) and 6000 psi (414 bar) Models Available
- Built-in Flow Control
- Manifold Mounted, NPT, Socket Weld or Flanged

REQUEST BULLETIN 395

Proportional Pressure Control System

CONTROLLED PRESSURE RANGES:

390 psi (27 bar) to 1500 psi (103 bar)
480 psi (33 bar) to 3000 psi (207 bar)
580 psi (40 bar) to 6000 psi (414 bar)
FLOW RATE: To 1000 gpm (3785 l/min.)



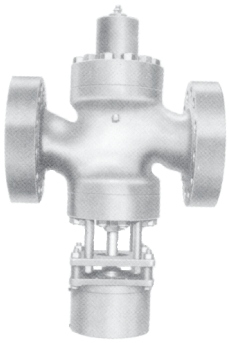
REQUEST BULLETIN 104

Modular Iso-Lock Valve

- Isolates Manifold Mounted Directional Control Valves.
- Reduces maintenance time - replace Directional Valves without depressurizing and draining hydraulic system.
- Single lever operation to close all four ports (P, T, A, B). Cylinders can remain under external load without having to be blocked.
- Lockable per OSHA safety standards.
- NFPA "DO"/CETOP and special mounting patterns available.

REQUEST BULLETIN 250

Accumulator Shut-off/Descaling

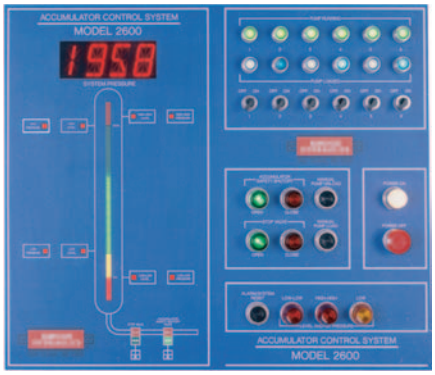


Capacities: 3000 psi (207 bar)
6000 psi (414 bar)
6000 gpm (22,710 l/min.)

Connection Sizes: 1-1/4" to 10"

A.S.O. Valves, Request Bulletin 102
Descaling Valves, Request Bulletin 396

Accumulator Control Panel



- Descaling
- Mill Systems
- Presses
- Controls
  - Level
  - Pressure
  - Pump Sequencing
  - Ballast Charging

Designed to Your Specifications

Request Bulletins 105 & 380

ELWOOD® FLUID POWER

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3/06 Bulletin 104
Rev. A
Printed in the USA