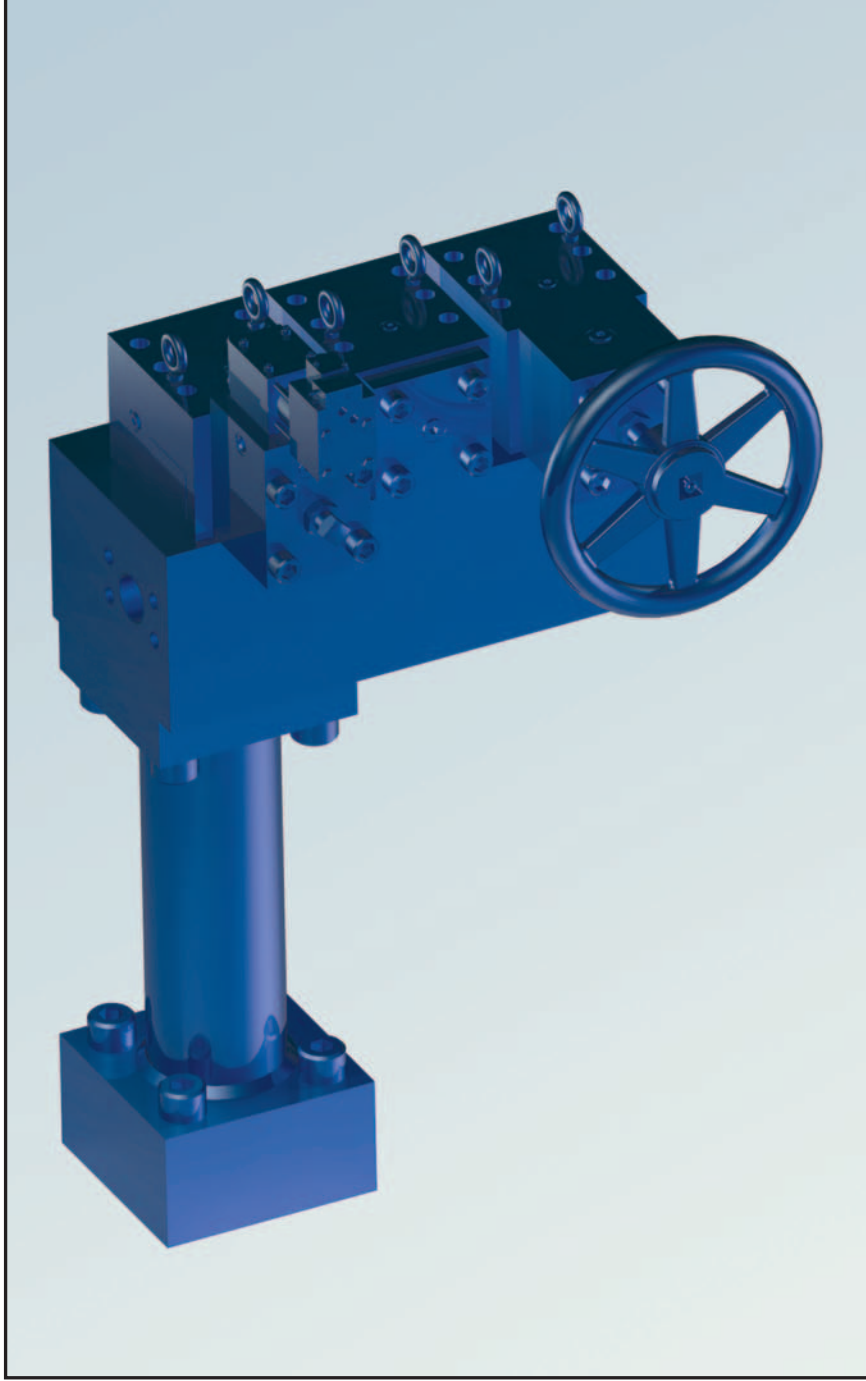


PUMP UNLOADING VALVES

www.elwood.com



ISO 9001:2000
CERTIFIED COMPANY

Features

Designed for the manufacturing environment, Elwood offers a full line of Pump Unloading equipment specifically designed to meet customer's specifications. Standard Elwood components and proven design concepts packaged into a single assembly, built on 30 years of experience, ensure a reliable long-lasting easy-to-maintain systems.

FUNCTION

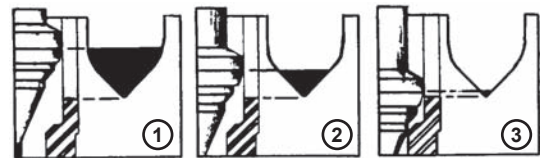
The Unloading Valve system is designed to maximize efficiencies of the high-pressure hydraulic pumps, while reducing the overall energy requirements for the hydraulic system. In the event of a power failure, either pneumatic or electrical, the control valve automatically shifts to the open position, allowing fluid to flow back to the tank. The Breakdown Orifice assembly uses a cartridge design sized and positioned to eliminate cavitation, fluid vapor pressure, vibration and minimize noise. The basic Unloading Valve System consists of: Manifold-mounted Stop Valve, Manifold-mounted Check Valve, Pneumatic/hydraulic-operated Pilot Valve, Din cartridge-style two-way Control Valve, and a replaceable cartridge-style Breakdown Orifice assembly. In a typical system when pump capacity exceeds system demands, the Unloading Valve is opened, and when system demand exceeds pump capacity, the Unloading Valve is closed, supplying high-pressure hydraulic fluid to the system. When the Unloading Valve is open, hydraulic fluid is directed through the two-way control valve and Breakdown Orifice assembly back to the tank. The Breakdown Orifice creates a pre-determined load on the high-pressure pump, providing a significant savings in energy requirements per pump, when the unloading valve is in the bypass position. In a single or multi-pump system, the Stop Valve provides a means for isolating the hydraulic pump unit including, Check Valve, Unloading Valve, and Breakdown Orifice assembly from the hydraulic system to allow for servicing. The Check Valve eliminates the potential back flow of hydraulic fluid from the main hydraulic system whenever the system pressure is greater than the hydraulic pressure at the pump. In a multi-pump system, the Check Valve isolates the individual high-pressure hydraulic pumps that are out of service or off line, from the main hydraulic system. In a system that is designed with a single hydraulic pump that incorporates an accumulator, the Check Valve isolates the accumulator from the hydraulic pump, preventing back flow between accumulator to hydraulic pump. The Control Valve directs fluid flow to either hydraulic system or to Breakdown Orifice back to tank.

FEATURES

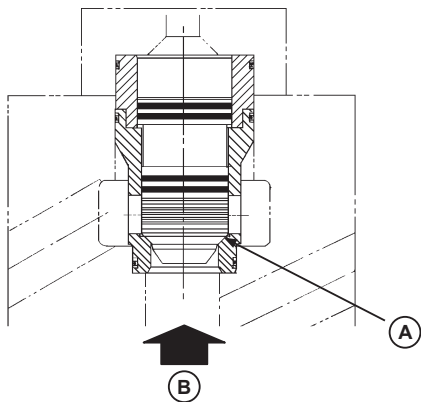
- Capacities to 1200 GPM (455 LPM) with 3600 PSI (250 Bar) working pressure
- Two-way valve features a removable Din-style Stainless Steel Cartridge design for easy serviceability, excellent corrosion-resistance, reliability, and long-lasting performance
- Removable Stainless Steel Cartridge style Breakdown Orifice Assembly. Designed in accordance with customer pump specification to ensure proper load control when system is in the bypass mode.
- Designed to operate with low viscosity fluids and raw water
- Reversible Soft Composition Disc
- V-Notch Shock Technology with Velocity Control Ports
- Eliminates Cavitation with Multi-stage Orifice Design
- Capable of passing large particles without clogging
- Low noise level
- Poppet position indicator available for electrical interlock ensuring valve position

V-NOTCH SHOCK TECHNOLOGY

Uses specially-designed orifices machined into outer sleeve and precision contours on the poppet assembly to control flow and reduce hydraulic shock in the system.



As the valve is opened, fluid flows past the disc and is discharged through the special V-Notch orifices machined into the annular area of the sleeve located above the sealing area of the disc. (1) As the valve closes, the poppet reduces the V-Notch area, rapidly at first, (2) then at a decreasing rate for each increment of poppet movement, until, (3) at the very peak of the V-Notch, flow is stopped before the disc is seated. The fluid is brought to rest gradually, eliminating harmful shock or water hammering.



A. Reversible Composition Disc

The soft composition disc is designed to provide reliable maintenance-free drop tight sealing around scratches or scored surfaces between the disc and seat. Damaged discs are easily reversed to provide extended seal life, reducing long term maintenance costs.

B. Inverse Flow Technology

Inverse flow concept uses the direction of fluid flow through that valve in conjunction with the operating direction of the poppet assembly. The flow of the fluid through the valve is directly opposing the movement of the poppet as it closes. This prevents the poppet from slamming into the valve seat as the poppet approaches the fully-closed position. If fluid flow is in the same direction as the poppet movement, a large imbalance is created, causing the poppet to slam into the valve seat.

Technical Data

HYDRAULIC Minimum Operating Pressure	400 PSI (28 bar) (Consult Factory for pressures below 400 PSI)
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 Operating Pressure Rating	3600 PSI (248 bar) 6000 PSI (414 bar)
Fluid Temperature Range	HWFC 35° to 150° F (2° to 65° C) Mineral Oil 5° to 150° F (-15° to 65° C)
Recommended Filtration	Minimum - 149 Micron (100 mesh)

Valve Sizing

Valve sizing and selection requires consideration in two (2) areas: Pipe Velocity and Pressure Drop through the valve.

PIPE VELOCITY

Allowable maximum pipe velocity is based on various system considerations and fluid velocity, and resulting pressure drop. Generally, the following flow rates are acceptable parameters for most piping systems:

- for short-to-medium length runs, 26 ft/sec (8 m/sec), and a maximum of 30 ft/sec (9 m/sec)
- for long piping runs, 20 ft/sec (6 m/sec)

PRESSURE DROP THROUGH THE VALVE

For peak performance and extended valve life pressure drop through the valve should be a consideration. Use the manufacturer's stated Cv Factor as an effective method in calculating a valve's pressure drop.

$$1. \Delta P = \left(\frac{\text{GPM}}{\text{Cv}} \right)^2$$

$$2. \text{Cv} = \sqrt{\frac{\text{GPM}^2}{\Delta P}}$$

$$3. \text{GPM} = \text{Cv} \sqrt{\Delta P}$$

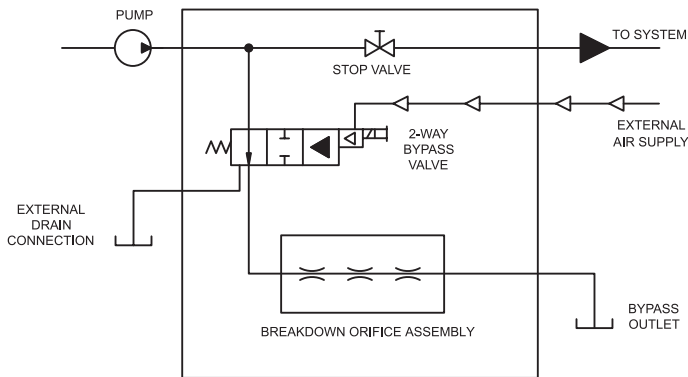
ΔP = Pressure drop (PSI)
GPM = Flow (GPM)
Cv = Cv factor

Pump By-Pass Valve System Configuration

Systems with Variable Flow Rates (Centrifugal Pumps)

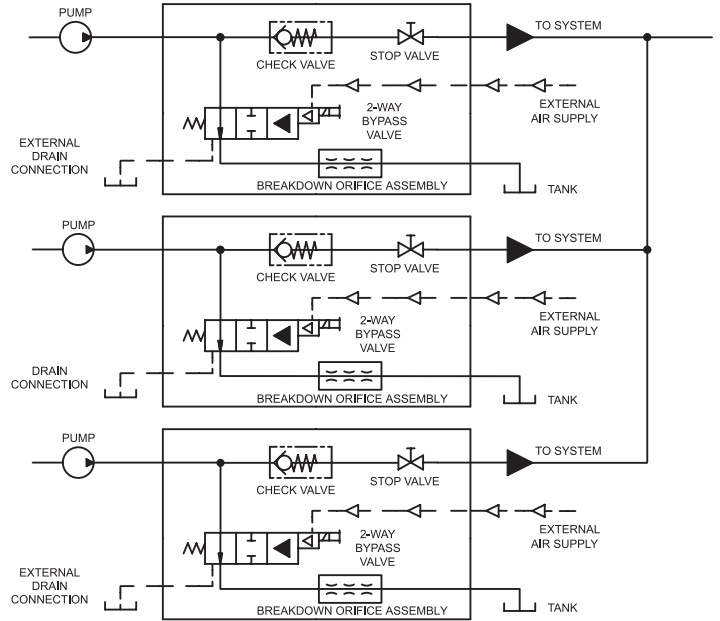
System 1A

Single Pump with Breakdown Orifice



System 1B

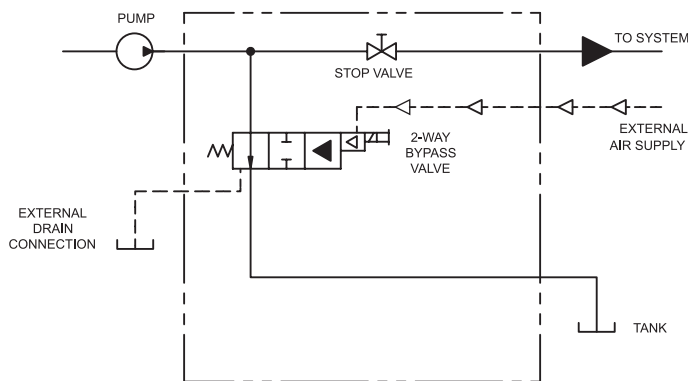
Multiple Pumps with Breakdown Orifice



Systems with Continuous Flow Rates (Positive Displacement Pumps)

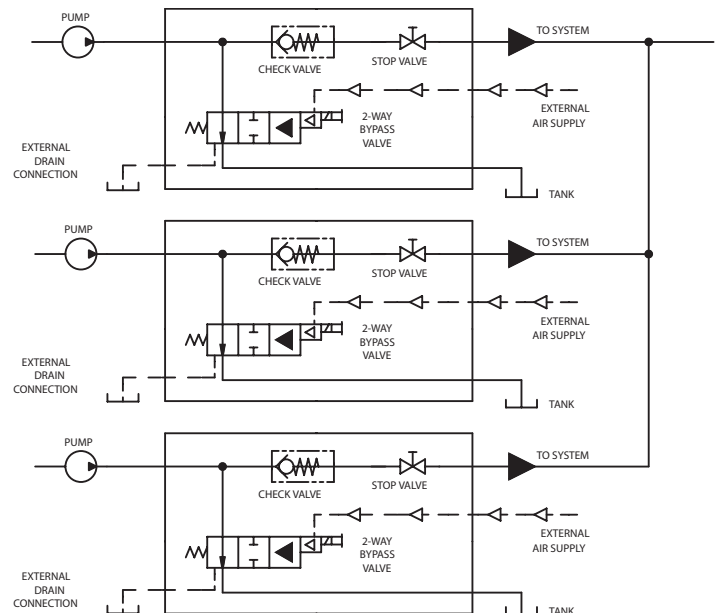
System 2A

Single Pump

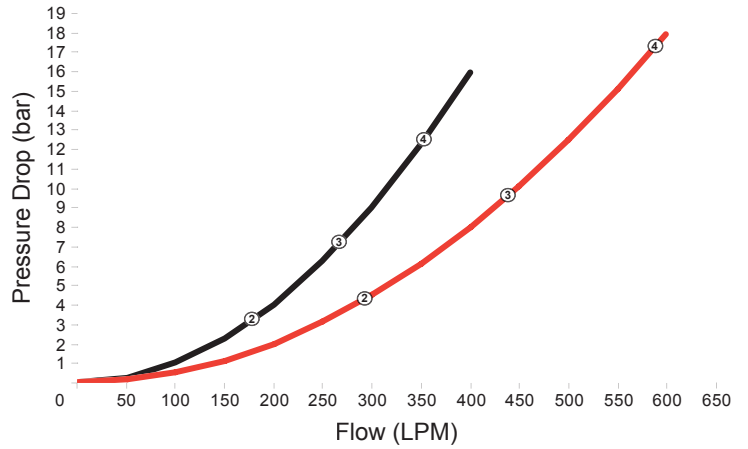
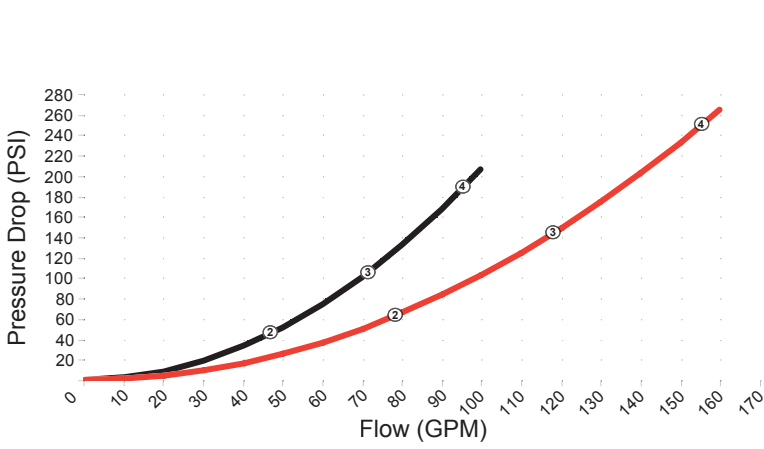


System 2B

Multiple Pumps



Flow and Capacity Curves

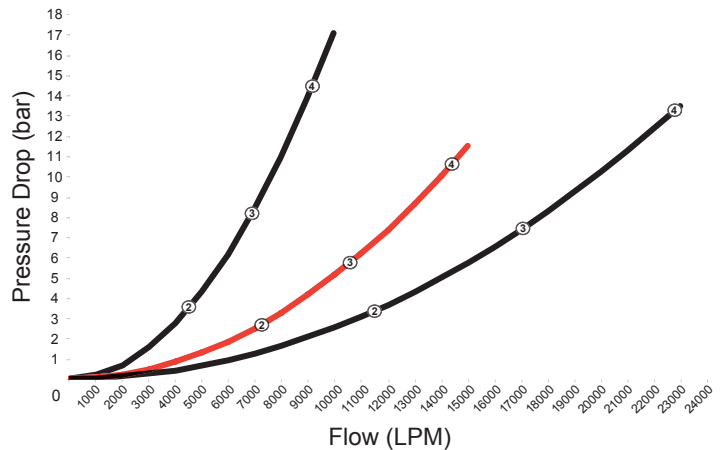
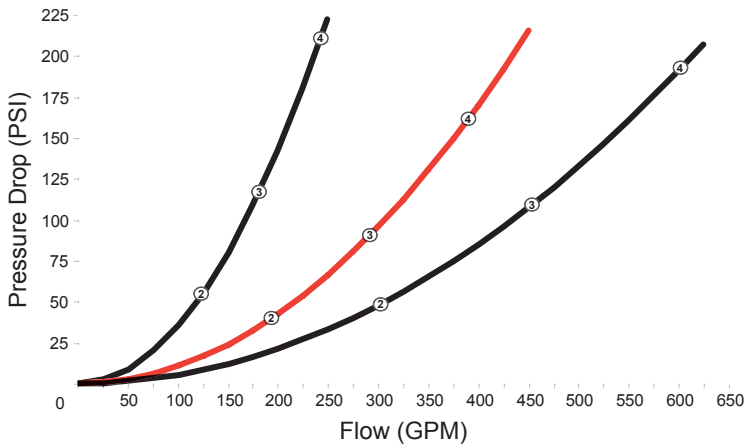


MODELS:

- DIN 25
- DIN 32

FLOW RATES:

- ② - 20 ft/sec (6.1 m/sec)
- ③ - 30 ft/sec (9.1 m/sec)
- ④ - 40 ft/sec (12.2 m/sec)



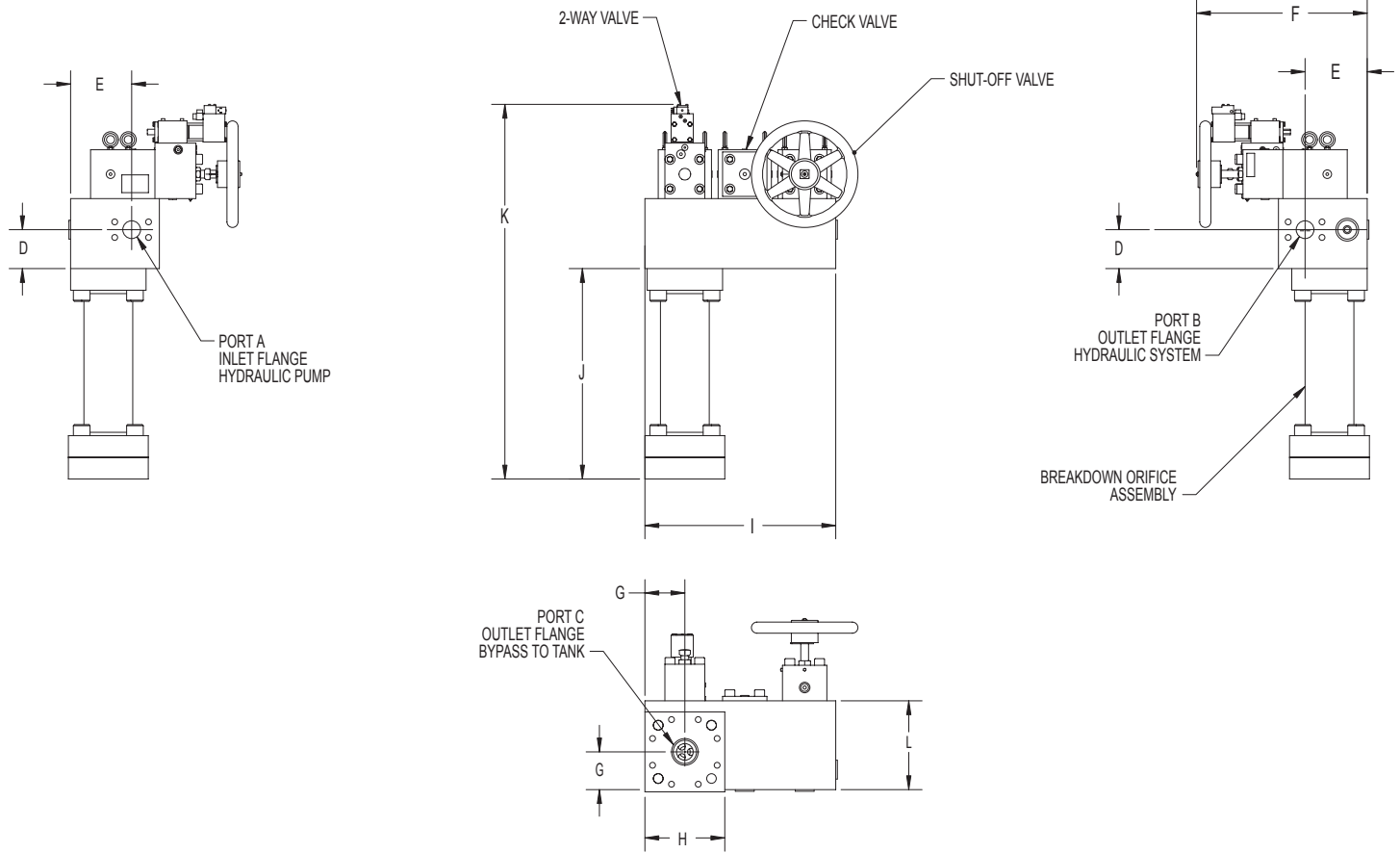
MODELS:

- DIN 40
- DIN 50
- DIN 63

FLOW RATES:

- ② - 20 ft/sec (6.1 m/sec)
- ③ - 30 ft/sec (9.1 m/sec)
- ④ - 40 ft/sec (12.2 m/sec)

Dimensional Data



DIMENSIONAL DATA - PUMP UNLOADING SYSTEM

SIZE	CV FACTOR	PORT A		PORT B		PORT C		WEIGHT	
		Type	Size	Type	Size	Type	Size	Lbs	kgs
DIN 25	6.9	SAE	1 1/4"	SAE	1 1/4"	ASA	300# RF	385	175
DIN 32	9.8	SAE	2"	SAE	2"	ASA	300# RF	475	215
DIN 40	16.74	SAE	2 1/2"	SAE	2 1/2"	ASA	300# RF	775	351
DIN 50	30.6	SAE	3"	SAE	3"	ASA	300# RF	1385	628
DIN 63	43.3	SAE	3"	SAE	3"	ASA	300# RF	2375	1077

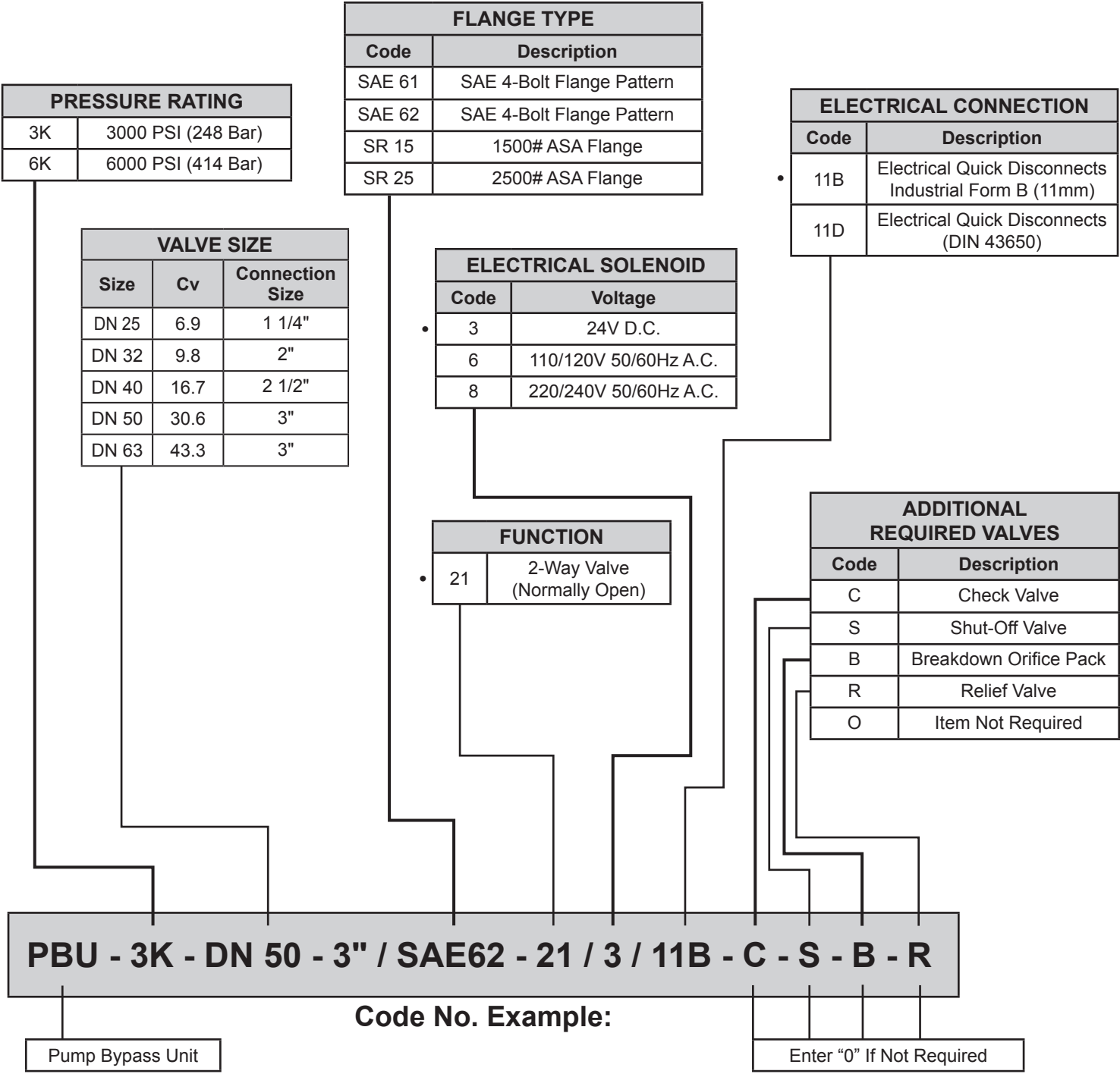
DIMENSIONAL DATA - CONT.

SIZE	D	E	F	G	H	I	J	K	L
DIN 25	3.00	5.00	10.00	3.50	5.25	17.50	18.00	33.50	7.00
	76	127	254	89	133	444	457	850	178
DIN 32	3.00	4.25	11.00	3.50	6.50	17.50	20.00	36.00	7.00
	76	108	279	89	165	444	508	914	178
DIN 40	4.38	7.00	19.25	4.50	7.50	21.50	21.50	42.19	7.88
	111	178	489	114	190	546	546	1072	200
DIN 50	4.00	5.75	10.00	8.50	8.25	30.00	23.00	46.50	10.00
	102	146	254	216	209	761	584	1180	254
DIN 63	5.00	7.75	12.00	6.50	8.25	36.00	25.00	54.50	12.00
	127	197	305	165	209	305	635	1383	305

Consult Factory for additional configurations or flange sizes.
 Above dimensions are for reference only.
 All dimensions are subject to change.

☐ = Inches; ■ = Millimeters

Ordering Data – Pump Unloading System

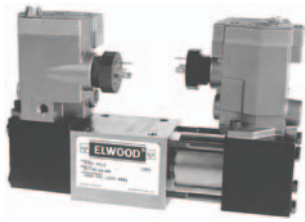


• Denotes Standard Features.

Refer to Elwood Options Brochure (number 2221) for available valve options.

Packed Spool Directional Control Valves

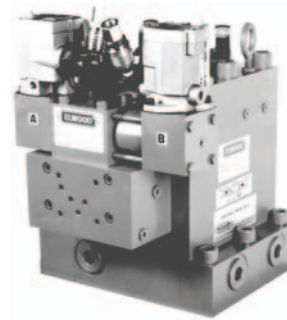
- Directional Valve for a range of applications
- Up to 46 GPM (32 GPM nominal)
- 3000 PSI (207 bar) and 6000 PSI (414 bar)



- Air Solenoid Operated
- 3-position spring centered
- 2-position spring offset
- 2-position momentary contact

Brochure 82

Poppet Type Directional Control Valves



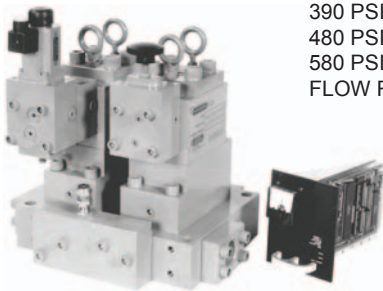
- Capacities to 1600 GPM (6057 LPM)
- 3000 PSI (207 bar), 4500 PSI (310 bar) and 6000 PSI (414 bar) models are available
- Built-in flow control
- Manifold mounted, socket weld or flanged

Brochure 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 LPM)



Brochure 104

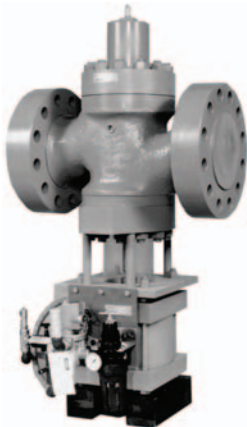
Modular ISO-Lock

- 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 the external load without having to be blocked
- Lockable per OSHA safety standard
- NFPA "DO"/CETOP and special mounting patterns available



Brochure 250

Descaling & Pump Unloading Valves



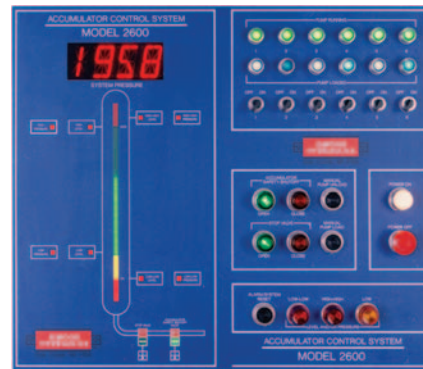
Capacities:

3000 PSI (207 bar)
 6000 PSI (414 bar)
 6000 GPM (22710 LPM)

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

Descaling Valves - Spindle – Brochure 2218
 DIN – Brochure 2219
 Pump Unloading Valves – Brochure 2213

Accumulator Systems



- Descaling
- Mill Systems
- Presses
- Controls
 - Level
 - Pressure
 - Pump Sequencing
 - Ballast Charging
- Designed to your specifications

Brochures 105, 380 & 102



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6/07 - Brochure 2213

Rev. A