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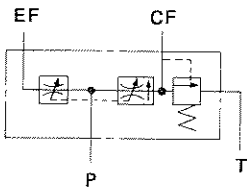
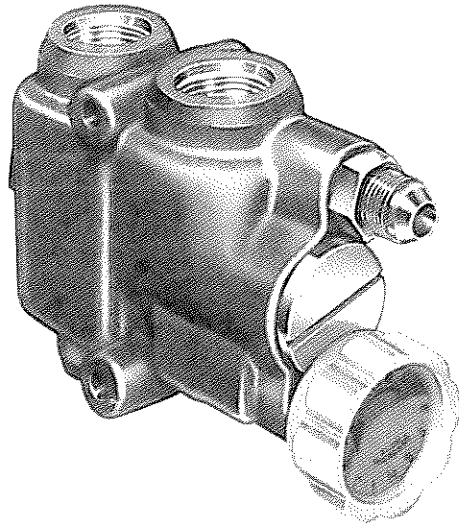
	MODEL	PAGE NO.
FLOW DIVIDERS To serve two separate hydraulic circuits from one pump	DC25 CFD, CFDA PD, PDC	4, 6, 8, 10
CUSHION VALVES Designed to minimize or eliminate shock in hydraulic systems	DXV DWV	12
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Dana Corporation reserves the right to discontinue, modify or revise the specifications for the products described herein. All specifications are approximate and may vary depending upon installation.



MODEL DC25 | PRIORITY TYPE FLOW DIVIDER

8380



Gresen's Model DC25 Priority Flow Divider is designed for applications where two separate hydraulic power circuits are to be served from a single pump. The Flow Divider provides priority flow to the primary circuit, and any excess flow to a secondary circuit or tank.

An optional hand adjusting knob with 12 positive detent positions is available for readily adjusting the flow from 1 to 20 GPM [3,8 to 76 litres/min] at the controlled-flow port.

FEATURES

- **Differential Poppet Relief Valve In The Controlled Flow Circuit** — also available without relief valve (NR).
- **Available With Adjustable Or Non-Adjustable Flow to The Controlled-Flow Circuit.**
- **Adjustable Divider Offers 12 Flow Adjustment Positions (Positive Detents) in 360° Rotation Of Knob.**
- **Non-Adjustable Divider Has An Interchangeable Orifice Restrictor In The Spool** — to change flow, simply change orifice restrictor — not the spool.
- **High Strength, Cast Iron Body.**
- **Hardened Metering Spool.**
- **Excess Flow Can Be Used In A Secondary Circuit.**

OPERATION

Flow enters the inlet port and passes through a control orifice. The control orifice is of fixed size in the non-adjustable unit or can be varied externally in the adjustable unit.

Flow through the control orifice causes a pressure drop, which is sensed across the compensator spool. Any tendency to exceed the flow setting increases this pressure drop causing the spool to shift and bypass the excess flow. If the secondary circuit (excess flow) pressure is greater than the controlled-flow pressure, the spool will shift even further and begin to throttle the controlled-flow to maintain the preset flow.

If the controlled-flow port is blocked, the compensator spool will return to the closed position allowing no flow through the Flow Divider. To protect the system, if this condition occurs, an optional differential poppet relief valve may be installed in the controlled-flow circuit to insure flow to the secondary circuit under all operating conditions.

SPECIFICATIONS

Capacity (Nominal)	
Input Flow	Up To 30 GPM [113 litres/min]
Adjustable Controlled-Flow Range . . .	1 to 20 GPM [3,8 to 76 litres/min]
Non-Adjustable Controlled-Flow Range (14 Orifice Sizes Available) . . .	1 to 16 GPM [3,8 to 62 litres/min]
Maximum Operating Pressure	*3500 PSI [242 bar]
Knob Rotation (Full Adjustment)	360°
Control Accuracy of Controlled-Flow	±10% (Accuracy of controlled-flows of less than 3 GPM [11 litres/min] will be a slightly higher percentage tolerance.)
Minimum Operating Pressure Drop	70 PSI [4,8 bar]
Shipping Weight	8 Pounds [3,6 kg]
Filtration Required (Min.)	33 micrometre

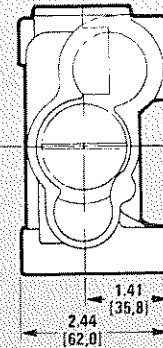
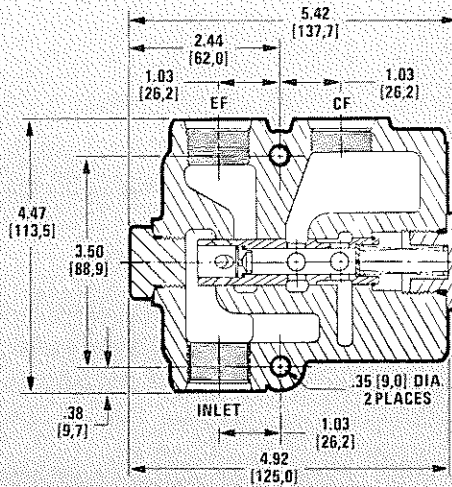
*Limited to 2000 PSI [136 bar] when NPT pipe ports are used.

DIMENSIONS

ALL DIMENSIONS ARE IN INCHES (MILLIMETERS) AND ARE FOR REFERENCE ONLY

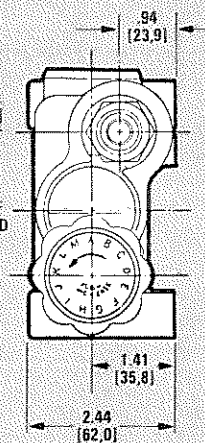
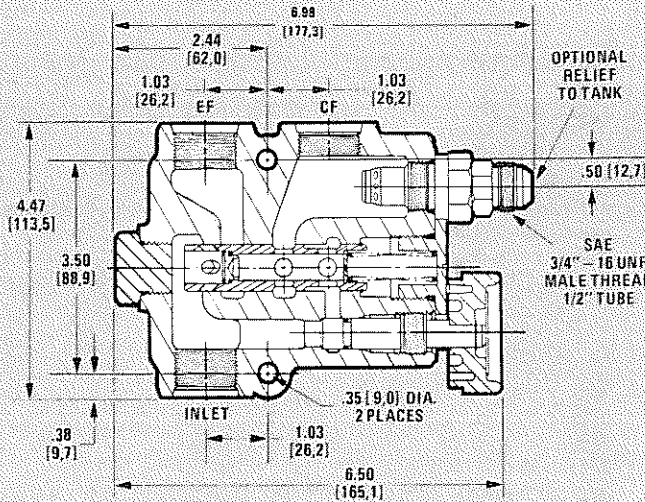
DC25

**MODEL DC25
NON-ADJUSTABLE
LESS RELIEF VALVE**



1 GPM

**MODEL DC25
ADJUSTABLE
WITH RELIEF VALVE**



ORDERING INSTRUCTIONS

MODEL NO. DC25 N - 10 - 6 - R - 2000 PSI

FLOW CONTROL	
A	Adjustable
N	Non-Adjustable

PORT SIZES*	
IN, CF and EF PORTS ONLY	
10	SAE 10 (7/8" - 14 UNF)
12	SAE 12 (1-1/16" - 12 UNF)
50	1/2" - 14 NPT
75	3/4" - 14 NPT
51	1/2" - 14 BSP
71	3/4" - 14 BSP

*Relief tank port available only with SAE 8 (3/4" - 16 UNF Male Thread) 1/2" Tube.

NOTES:

1. NPT Pipe Ports are not recommended for pressures above 2000 PSI [138 bar].
2. All ports in the housing must be the same type. SAE, BSP and NPT cannot be intermixed.

Specify cracking pressure for relief valve setting

RELIEF VALVE	
R	Relief*
NR	No Relief

*Unless otherwise specified, relief valve will be set at 1500 PSI [103 bar] (Crack).

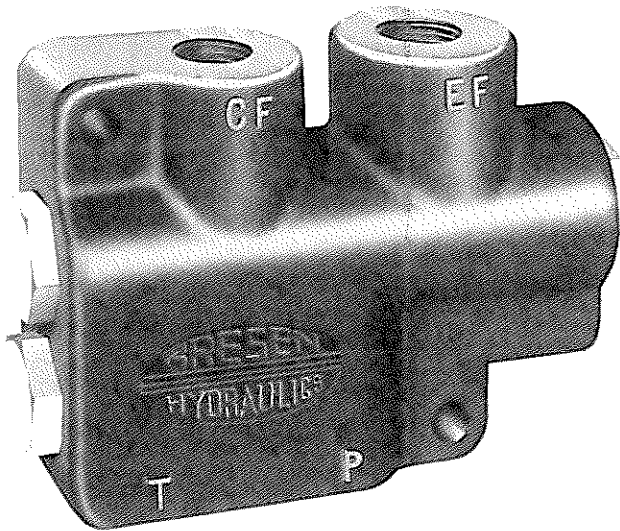
PRE-SET FLOW FROM CONTROLLED-FLOW WORK PORT	
0	Adjustable
1	1 GPM [3,8 litres/min]
1.5	1.5 GPM [5,7 litres/min]
2	2 GPM [7,6 litres/min]
3	3 GPM [11,3 litres/min]
4	4 GPM [15,1 litres/min]
5	5 GPM [18,8 litres/min]
6	6 GPM [22,7 litres/min]
7	7 GPM [26,5 litres/min]
8	8 GPM [30,3 litres/min]
9	9 GPM [34,0 litres/min]
10	10 GPM [37,9 litres/min]
12	12 GPM [45,4 litres/min]
14	14 GPM [53,0 litres/min]
16	16 GPM [60,6 litres/min]



MODEL
CFD

CONSTANT VOLUME/PRIORITY TYPE FLOW DIVIDER

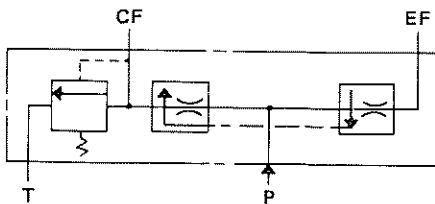
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The Model CFD, Constant-Volume, Priority-Type Flow Divider is designed for power steering systems and other applications where two separate hydraulic power circuits are to be served from a single pump. Hydraulic oil is divided into two separate flows. One, a constant flow (regardless of input pressure) and the other, a flow in excess of the constant flow. Flow can be reversed through the Controlled Flow Work Port but is not pressure compensated. Hydraulic oil flow through the Excess Flow Port cannot be reversed. The constant flow output is determined by the type of Metering Spool which is installed.

FEATURES

- Integral Relief Valve in Constant Flow Circuit. (Adjustable with shims.) Also available without Relief Valve (NR).
- Cross-Drilled, Shifting-Type Spool—provides extremely accurate metering.
- Ten Metering Spool Sizes Available.
- Hardened Metering Spools Are Interchangeable.
- High-Tensile Cast Iron Body.

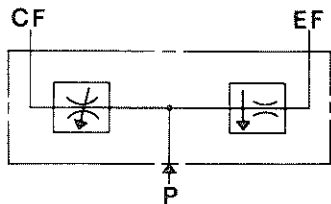
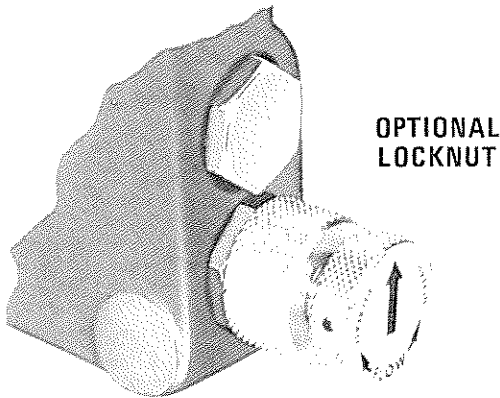
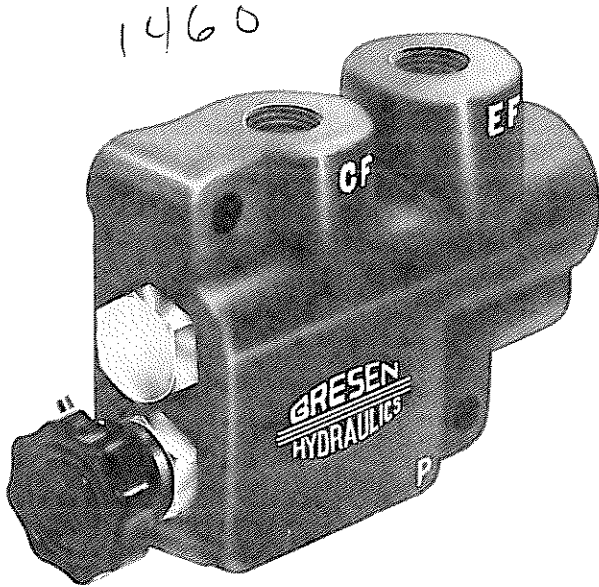


SPECIFICATIONS

Capacity (nominal)	20 GPM [75 litres/min]	Input
Maximum Operating Pressure	3000 PSI [207 bar]	
Constant-Flow Relief Valve		
Pressure Setting	Up to 2500 PSI [172 bar]	(Cracking)
Shipping Weight	8 Pounds [3,6 kg]	



MODEL | PRESSURE COMPENSATED-ADJUSTABLE CFDA | FLOW DIVIDER



HOW TO USE THE PRESSURE DROP DATA

Example:

With a 15 GPM [56,8 litres/min] pump outlet, adjust Control Knob to deliver 3 GPM [11,4 litres/min] thru CF port. Pressure drop thru CF port is 4 PSI [0,3 bar], while remaining 12 GPM [45,4 litres/min] flow is directed thru EF port with 35 PSI [2,4 bar] pressure drop.

The Model CFDA Adjustable Flow Divider offers an inexpensive, dependable means of obtaining flow adjustment up to 15 GPM [15,8 litres/min]. Provides easy manual control where frequent flow change is required. Pressure compensation provides a smooth, constant output flow regardless of pressure changes at the Controlled Flow Work Port.

Rotating the adjusting knob varies the flow from the Controlled Flow Work Port. After the controlled flow demand is satisfied, the balance of the inlet flow passes through the Excess Flow Port and returns to the tank. The Excess Flow Port is not a work port.

Flow through the Controlled Flow Work Port can be reversed but is not pressure compensated. The Model CFDA is not available with a built-in relief valve.

FEATURES

- Adjustable Flow Rate
- Cross-Drilled, Shifting-Type Spool—provides extremely accurate metering
- Hardened Metering Spool
- High-Tensile Cast Iron Body

SPECIFICATIONS

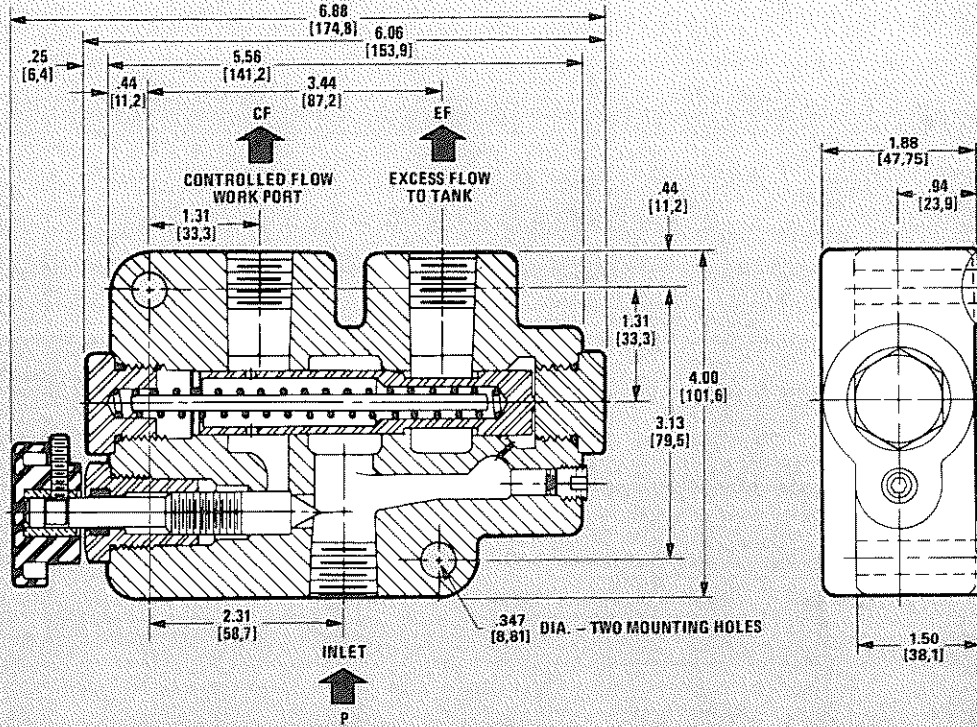
Capacity (nominal) Adjustable . . . Up to 15 GPM [56 litres/min]
 Maximum Operating Pressure 2500 PSI [172 bar]
 Flow Adjustment Approx. 6 turns of knob
 from min. to max. flow
 Shipping Weight 8 Pounds [3,6 kg]

PRESSURE DROP		
Typical Test Figures Using 150 SUS Oil at 100°F [37,8°C]		
OUTPUT GPM [litres/min]	PRESSURE DROP THRU CF PORT PSI [bar]	PRESSURE DROP THRU EF PORT PSI [bar]
3 [11,3]	4 [0,2]	45 [3,1]
6 [22,7]	7 [0,4]	43 [2,9]
9 [34,0]	17 [1,1]	40 [2,7]
12 [45,4]	28 [1,9]	35 [2,4]
15 [56,7]	40 [2,7]	32 [2,2]

DIMENSIONS

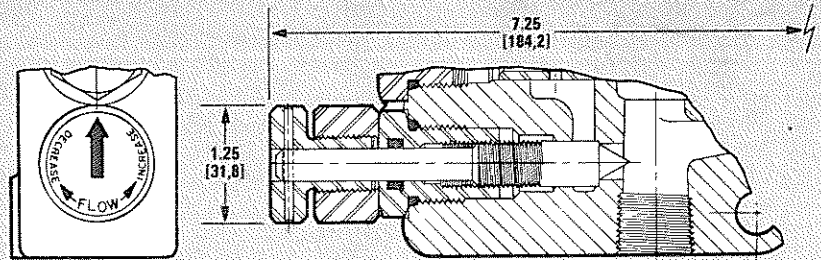
ALL DIMENSIONS ARE IN INCHES (MILLIMETRES)
AND ARE FOR REFERENCE ONLY

CFD-A



OPTIONAL LOCK NUT ASSEMBLY

An optional adjusting knob arrangement with a Locking Nut to lock the adjusting screw in a selected position is available. Extremely helpful in applications where vibration may cause flow adjustment to change.



ORDERING INSTRUCTIONS

MODEL NO. CFDA - L - 10

ADJUSTING KNOB	
-	Standard Knob
L	With Locking Nut

PORT SIZES (ALL PORTS)	
10	SAE 10 (7/8" - 14 UNF)
50	1/2" - 14 NPT
75	3/4" - 14 NPT
51	1/2" - 14 BSP
71	3/4" - 14 BSP

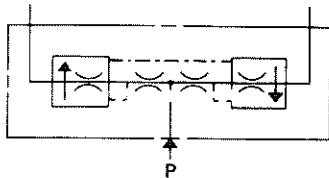
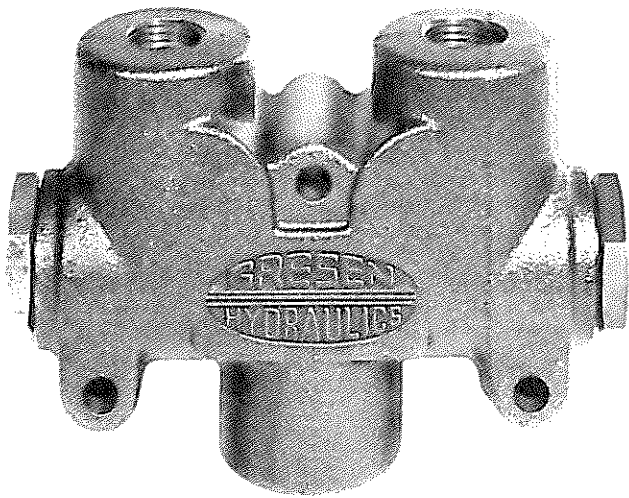
NOTE: NPT pipe ports are not recommended for pressures above 2000 PSI [138 bar].



**MODEL
PD
PDC**

PROPORTIONAL TYPE — PRESSURE COMPENSATED FLOW DIVIDER WITH OPTIONAL COMBINER FEATURE

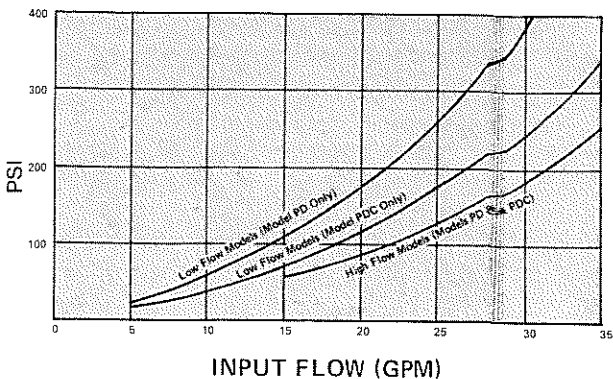
240



MODELS PD AND PDC PRESSURE DROP

Typical results derived from laboratory tests run with 150 SUS oil at 100°F [37,81 °C].

IN DIVIDER MODE FROM INLET TO JOINED LEGS



The Model PD, Proportional-Type, Pressure-Compensated Flow Divider offers an efficient means of proportionately dividing a single flow of hydraulic oil. The flow ratio from the outlet ports remain constant although the work being done by one ports may be considerably greater than that done by the other. Outlet flow ratios are preset at the factory and a range of ratios from 50/50 to 90/10 are available.

Flow through the Model PD Divider cannot be reversed. It is a flow divider only — not a flow combiner.

A Model PDC with a combiner feature is offered by substituting a combiner spool assembly for a standard spool. This feature not only divides flow, but flow may be combined in reverse direction and synchronized in both directions.

The Model PDC is only available with a 50/50 flow dividing ratio. If other ratios are required with the combiner feature, contact the factory for a special order.

Model PD and PDC Flow Dividers will divide the inlet flow to $\pm 10\%$ of the specified, major output flow when used within recommended capacities.

FEATURES

- Pressure Compensated.
- Optional Model PDC Synchronizes in Both Directions.
- Cross-Drilled, Shifting-Type Spool — provides accurate metering.
- Six Ratios Available in Model PD.
- High-Tensile Cast Iron Body.
- Hardened Metering Spool.

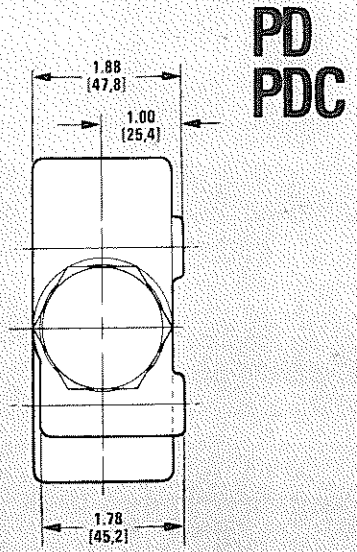
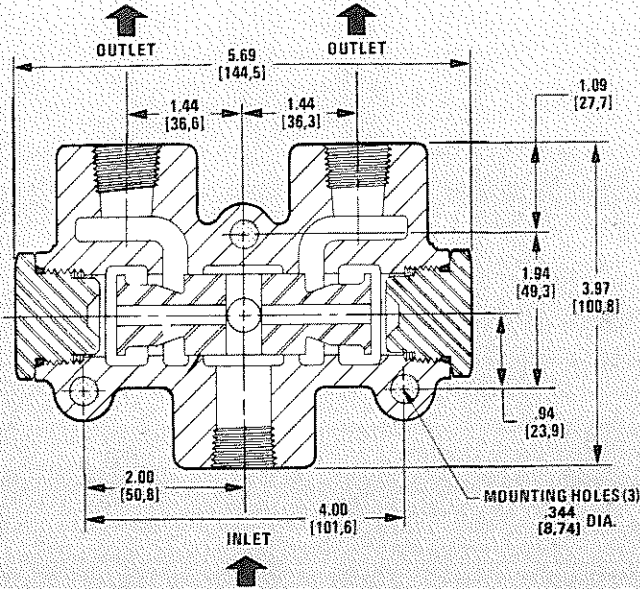
SPECIFICATIONS

Capacity (nominal)
 Low Flow Models 5-20 GPM [18-94 litres/min]
 High Flow Models 20-35 GPM [56-132 litres/min]
 Maximum Operating Pressure 2500 PSI [172 bar]
 Shipping Weight Approx. 7 Pounds [3,2 kg]

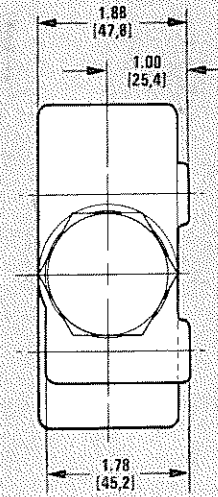
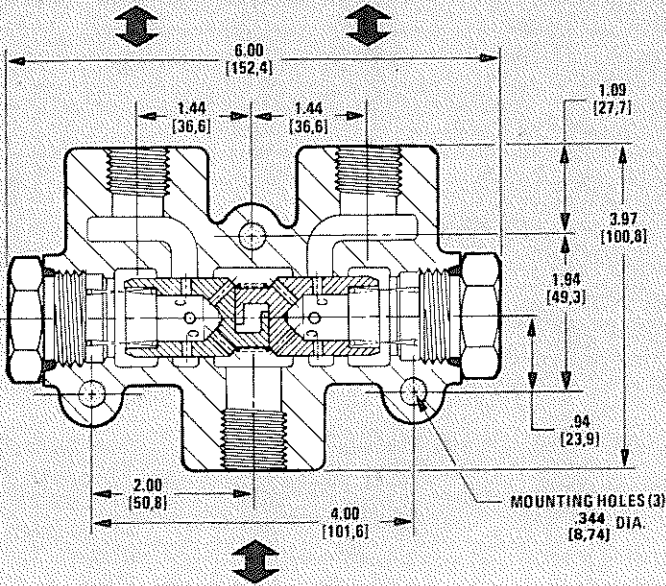
DIMENSIONS

ALL DIMENSIONS ARE IN INCHES (MILLIMETERS) AND ARE FOR REFERENCE ONLY

**MODEL PD
STANDARD
FLOW DIVIDER**



**MODEL PDC
FLOW DIVIDER
WITH
COMBINER FEATURE
AVAILABLE WITH
50/50 FLOW DIVIDING
RATIO ONLY**



ORDERING INSTRUCTIONS

MODEL NO. PDC - 75 - 50

MODEL	
PD	Flow Divider only
PDC	Flow Divider and Combiner

PORT SIZES (ALL PORTS)*	
Low Flow Models	
8	SAE 8 (3/4" - 16 UNF)
10	SAE 10 (7/8" - 14 UNF)
50	1/2" - 14 NPT
51	1/2" - 14 BSP
High Flow Models	
12	SAE 12 (1-1/16" - 12 UNF)
75	3/4" - 14 NPT
71	3/4" - 14 BSP

FLOW DIVIDING RATIO	
50	50%/50%
60	60%/40%
67	66-2/3%/33-1/3%
70	70%/30%
80	80%/20%
90	90%/10%

*All ports must be the same.

NOTE: NPT pipe ports are not recommended for pressures above 2000 PSI [138 bar].



MODELS

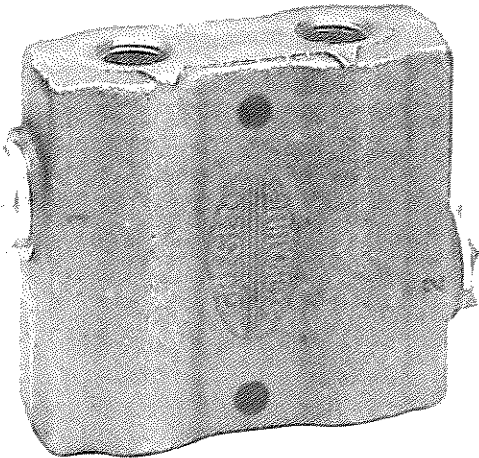
DXV

DWV

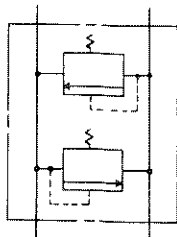
DOUBLE RELIEF CUSHION VALVES

FOR USE WITH CYLINDERS OR MOTORS OF EQUAL DISPLACEMENT

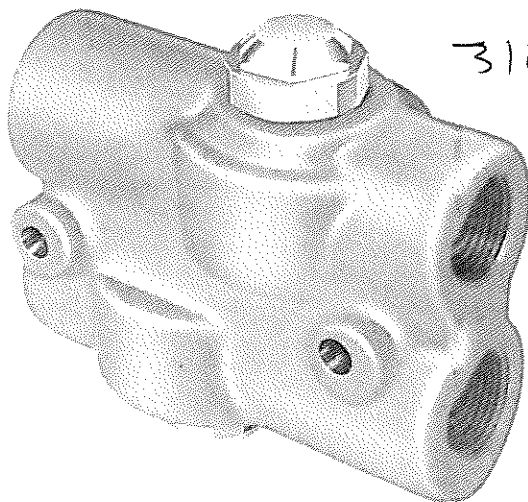
7594



MODEL DXV
Ball/Spring Relief Valve



MODEL DWV
Uses Model WH
Relief Cartridge
Differential Poppet Type



The Models DXV and DWV Cushion Valves are designed to eliminate or minimize shock, surge and overload conditions on hydraulic equipment. They may be used with one or more cylinders (of equal displacement) in a multiple hydraulic circuit—regulating surge pressure without disturbing pressure demands of any other cylinder in the system.

Under standard conditions, when a control valve is in neutral or hold position, the excess pressure created by overload, shock or stress has no possibility of relief through the primary relief valve. Cushion Valves located between control valve and cylinders minimize or eliminate this condition. Sudden shock experienced in starting and stopping hydraulic motors may also be controlled by the same installation.

The need for an anti-cavitation check is eliminated. Relieved oil is directed into the opposite side of the Cushion Valve preventing cylinder or motor cavitation.

Model DXV with ball spring relief valve has hardened seats for long, trouble-free service. It is available with a 5 PSI [0,3 bar] check spring which will allow the cushion valve to act as a relief in one direction and permits free-flow at 5 PSI [0,3 bar] in the opposite direction.

Model DWV has cartridge-type, hydraulically dampened reliefs (Model WH). Designed to meet requirements for a "quieter" operating relief and to provide a smaller differential between "cracking" and "full-flow" pressures. An optional adjustable relief is available.

FEATURES

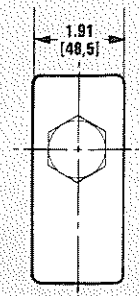
- Non-Adjustable Type Reliefs—can be adjusted by adding or subtracting shims.
- Adjustable Relief Available for Model DWV
- Factory Pre-Set to Customer's Specific Pressure Requirements
- High-Tensile Cast Iron Body

SPECIFICATIONS

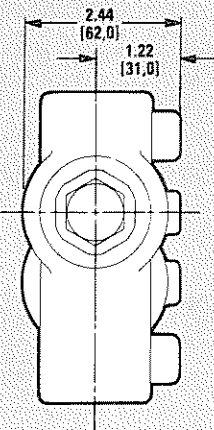
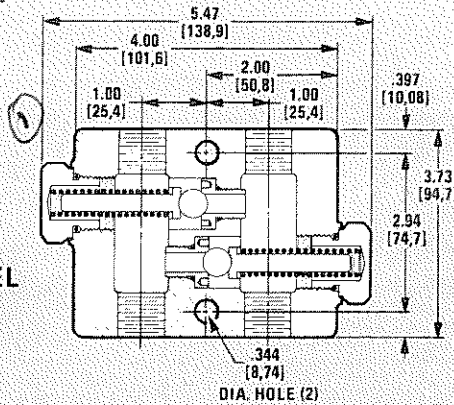
	MODEL DXV	MODEL DWV
Capacity (nominal)	10 GPM [37 litres/min]	30 GPM [113 litres/min]
Minimum Operating Pressure	5 PSI [0,3 bar]	300 PSI [20 bar]
Maximum Operating Pressure	2500 PSI [172 bar]	3000 PSI [207 bar]
Shipping Weight	4 Pounds [1,8 kg]	5 Pounds [2,3 kg]

DIMENSIONS

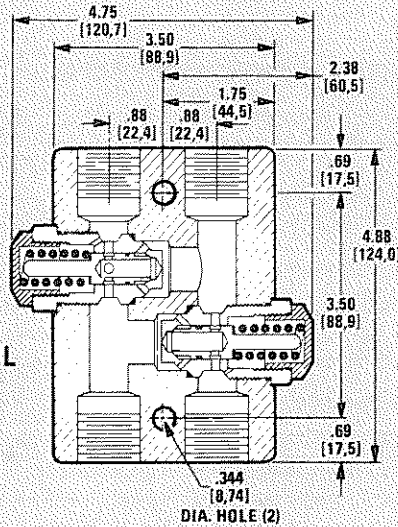
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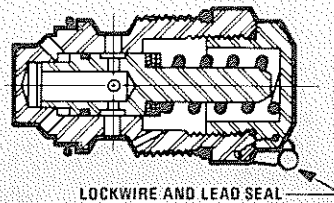
MODEL DXV



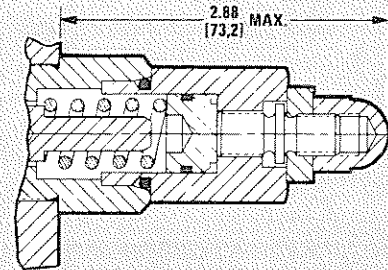
MODEL DWV



**DXV
DWV**



**OPTIONAL TAMPER PROOF RELIEF
FOR DWV ONLY**



OPTIONAL ADJUSTABLE RELIEF

An Adjustable Relief Cartridge is available for the Model DWV only and is adjustable within range of the spring installed.

OPTIONAL STAINLESS STEEL SPRINGS
(Standard in Model DWV "Adjustable"; Not available in Model DXV.)

Gresen standard relief valve springs are of a spring steel material. Where hydraulic systems tend to run at temperatures above 160°F [71,17°C] stainless steel relief springs are recommended. These optional stainless steel springs are available but must be specified if required.

For best system performance and longest oil life, the ideal oil temperature range in a hydraulic system could be approximately 100°F to 130°F [37,81°C to 54,49°C], when measured at the oil reservoir.

Standard relief valve springs (spring steel) will begin to decay as temperatures increase. System decay will vary depending on the relief valve setting and spring load.

ORDERING INSTRUCTIONS

MODEL NO. DWV - 8 - A - 2500 PSI

MODEL	
DXV	Ball/Spring Relief Valves
DWV	Differential Poppet Relief Valves

PORT SIZES (ALL 4 PORTS)	
8	SAE 8(3/4" - 16 UNF)
10	SAE 10(7/8" - 14 UNF)
12	SAE 12(1-1/16" - 12 UNF) DXV only
38	3/8" - 18 NPT DXV only
50	1/2" - 14 NPT
75	3/4" - 14 NPT
51	1/2" - 14 BSP (DWV only)
71	3/4" - 14 BSP

NOTE: NPT pipe ports are not recommended for pressures above 2000 PSI [138 bar].

Specify cracking pressure for relief valve setting

ADJUSTMENT OPTIONS		
-	Standard, Shim Adjustable	
A	Adjustable Relief Option Model DWV Only Reliefs are adjustable within range of spring installed	
	Adjustment Range (Cracking pressure)	Spring Part No.
	500-1350 PSI [34-93 bar]	1869-001
	1351-1750 PSI [93-120 bar]	7638-001
	1751-2000 PSI [120-138 bar]	7078-001
	2001-2600 PSI [138-179 bar]	1870-001
	2601-3000 PSI [179-207 bar]	7497-001
NJ	Tamperproof, with lockwire and lead seal (DWV only)	



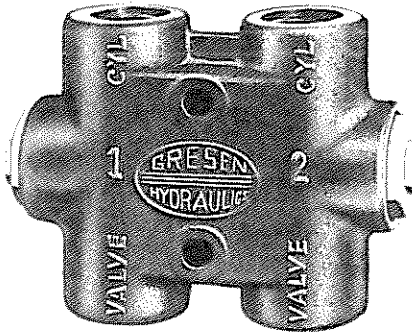
MODELS

LO
LOA

LOCK VALVES PILOT OPERATED CHECK VALVES

210

MODEL LO
Standard



315



MODEL LOA

Optional Cylinder Manifold Mounting Available. Mounts Lock Valve directly against cylinder to eliminate any possibility of line failure between Lock Valve and cylinder.

The Models LO and LOA Lock Valves are designed to lock a cylinder, or part of a circuit, without leakage while a control valve is in a neutral position. Lock Valves function as check valves, allowing flow to cylinder and blocking reverse flow until pilot pressure is applied to "unlock" the circuit.

These Valves may be used as safety devices to prevent movement of a load while pressure source is inactive and control valve is accidentally operated.

Designed for applications where fluid leakage through control valve could adversely affect the performance of the system such as clamps, outriggers and work platforms.

FEATURES

- Hardened Ball Check Seats
- Ball/Spring Checks
- High-Tensile Cast Iron Body

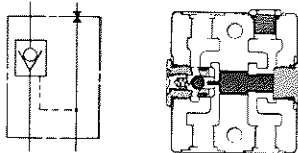
SPECIFICATIONS

	LO	LOA
Capacity (nominal)	25 GPM [94 litres/min]	10 GPM [37 litres/min]
Maximum Operating Pressure	3000 PSI [207 bar]	3000 PSI [207 bar]
Ratio of pilot piston area to check valve seat area	3.36 to 1	3.36 to 1
Shipping Weight	6 Pounds [2,7 kg]	2-3/4 Pounds [1,3 kg]

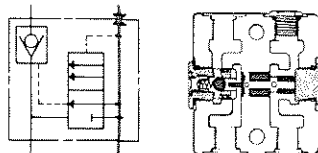
TYPES AVAILABLE

Besides model variation in port sizes and capacities, three different types are available.

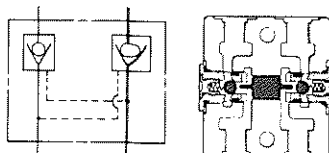
SINGLE TYPE (S), Designed for use with a single-acting cylinder or to lock one side of a double-acting cylinder.



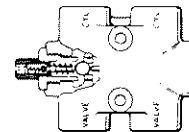
SINGLE-UNLOADING TYPE (SU), available for Model LO only. May be used only with single-acting cylinders. This type unloads the pump after unlocking the circuit. "U" is stamped on plug for identification.



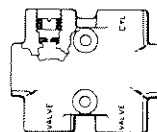
DOUBLE-TYPE (D), used with a double-acting cylinder or motor where it is necessary to lock both circuits.



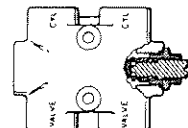
OPTIONS



EXPANSION RELIEF (IR), prevents build up of pressure in a locked circuit due to temperature rise.



ORIFICE RESTRICTOR (T), restricts rate of return flow after unloading prevents chattering by maintaining unloading pressure. Not available for Model LOA.

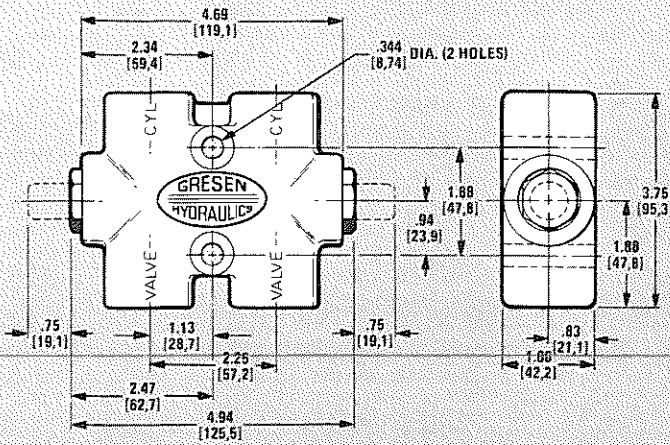


MANUAL UNLOCK (M), enables circuit to be unlocked manually in event that hydraulic unlocking pressure is insufficient. For S and SU options only. Not available for Model LOA.

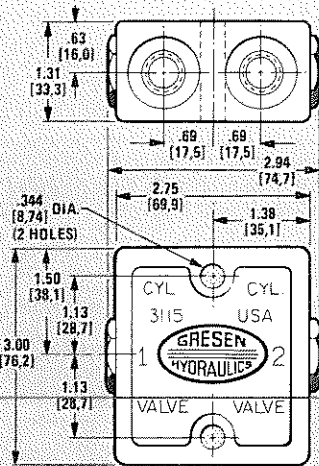
DIMENSIONS

ALL DIMENSIONS ARE IN INCHES (MILLIMETRES) AND ARE FOR REFERENCE ONLY

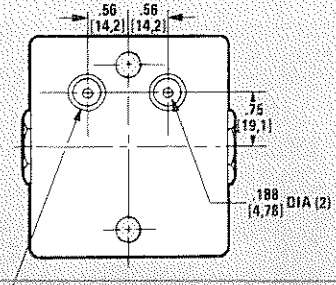
LO LOA



MODEL LO



MODEL LOA



MODEL LOA WITH MANIFOLD MOUNTING

APPLICATION DATA

Control Valves

- A 4-way control valve is required for all lock valve circuits, including single-acting cylinders, in order to apply unlocking pressure to the pilot circuit.
- A control valve with a free-flow (motor) spool should be used on any circuit which includes a lock valve to prevent pressure build-up between the Lock Valve and the Control Valve.

Unlocking Pressure (Single-Acting Cylinders)

Pressure required in the pilot circuit of the valve to unlock a single-acting cylinder is 30% of the locked pressure.

Unlocking Pressure (Double-Acting Cylinders)

In double-acting cylinder installations the unlocking pressure is a function of trapped pressure, cylinder and rod areas as follows:

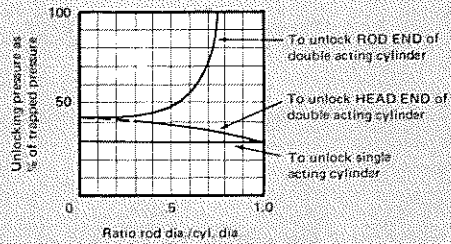
When cylinder HEAD END circuit is locked:

$$\text{Unlocking Pressure} = 3.36 \left(\frac{\text{Rod End "Locked" Pressure} \times \text{Cyl. Area}}{\text{Cyl. Area} - \text{Rod Area}} \right)$$

When cylinder ROD END circuit is locked:

$$\text{Unlocking Pressure} = 3.36 \left(\frac{\text{Head End "Locked" Pressure} \times \text{Cyl. Area}}{\text{Cyl. Area} + \text{Rod Area}} \right)$$

Results of these formulæ are shown graphically below for various ratios of rod/cylinder diameters.



CAUTION: Note that when the rod end of a double-acting cylinder is locked, if the rod diameter exceeds approximately .75 times the cylinder diameter, unlocking pressure becomes excessive and the lock valve should not be used.

EXAMPLE:

A 6" diameter double acting cylinder has a 2" diameter rod. Pressure trapped in head end is 1000 psi.

Using the formula

$$\text{Pressure needed to unlock head end} = \frac{1000}{3.36 - \left(\frac{28.27 - 3.14}{28.27} \right)} = 405 \text{ psi}$$

Using the graph

Ratio of rod dia./cyl. dia. = 2/6 = .333
Enter the graph at bottom edge at ratio .333 and move vertically to intersect "UNLOCK HEAD END" curve, then horizontally to 40.5 on percentage scale at left.
1000 psi x 40.5% = 405 psi unlocking pressure

ORDERING INSTRUCTIONS

MODEL NO. LOA - C - 10 - S - R1

MODEL	
LO	Up to 25 GPM [94.6 litres/min]
LOA	Up to 10 GPM [37.9 litres/min]

LOA ONLY	
-	Standard Porting Location
C	Cylinder Manifold Mounting (LOA only)

PORT SIZES	
LO Only (4 Ports)	
10	SAE 10 (7/8" - 14 UNF)
50	1/2" - 14 NPT
51	1/2" - 14 BSP
LOA Only (4 Standard Ports or 2 Lower Ports if Cylinder Manifold Mount is specified)	
6	SAE 6 (9/16" - 18 UNF)
25	1/4" - 18 NPT
21	1/4" - 19 BSP (All Ports)
31	3/8" - 19 BSP (Manifold Mount)

LOCATION OF OPTION	
Selected option may be located on either end or both ends on a "Double" Lock Model. Specify.	
1	Left Side of Valve (Marked NO. 1 on Valve).
2	Right Side of Valve (Marked NO. 2 on Valve).

OPTIONS—Omit if no options wanted	
R	Expansion Relief (Factory set at 3500 PSI [241 bar] cracking unless otherwise specified)
T	Orifice Restrictor (LO Valves only)
M	Manual Unlocking (LO Valves only)*

*For S and SU options only.

TYPE	
S	Single
SU	Single Unloading (LO Valves only)
D	Double

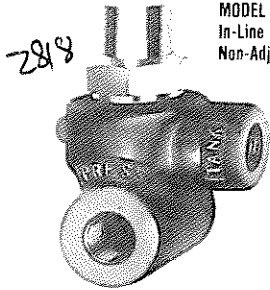
NOTE: NPT pipe ports are not recommended for pressures above 2000 PSI (138 bar).



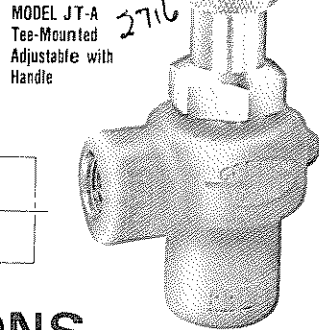
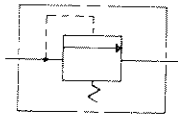
MODELS

JT
JL

UP TO 20 GPM CAPACITY RELIEF VALVES



MODEL JL-N
In-Line Mounted
Non-Adjustable



MODEL JT-A
Tee-Mounted
Adjustable with
Handle

The Models JT and JL Relief Valves are used for limiting the maximum pressure which can be applied to the portion of the hydraulic circuit to which they are connected. May be used as a system relief when installed between pump and the first of a series of separate control valves or as a cylinder port relief by installing in line between control valve cylinder port and cylinder or motor.

Except for "N" Valves, adjustments are easily made. On the "N" Valves, adjustments can be made by adding or subtracting shims. Once the setting has been established, it is not readily changed thus discouraging pressure setting changes in the field.

SPECIFICATIONS

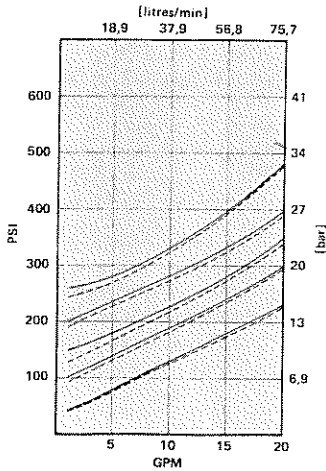
Capacity (nominal) Up to 20 GPM [75 litres/min]
 Maximum Operating Pressure 2500 PSI [172 bar]
 Shipping Weight Approx. 2-1/2 Pounds [1,1 kg]

FEATURES

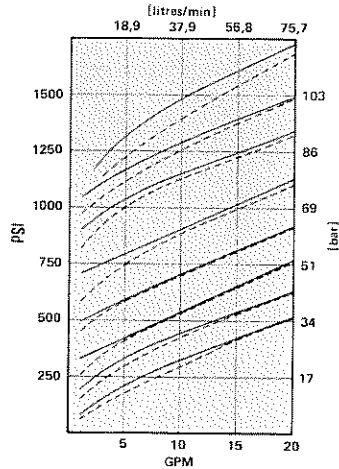
- Two Housings Available For Tee-Mounting or In-Line Mounting.
- Compacted Graphite Bodies.
- Adjustable and Non-Adjustable Models Available.
- Replaceable. Hardened Seat.

TYPICAL PRESSURE RANGE PERFORMANCE CURVES (150 SUS OIL)

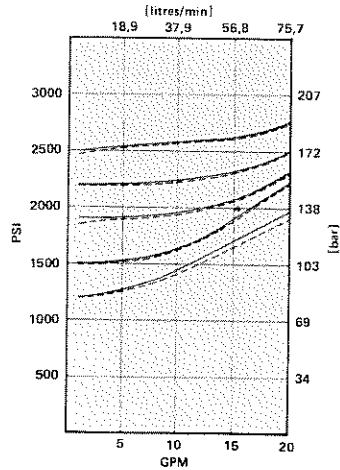
JT (LP) RELIEF WITH 953-001 SPRING
145-400 PSI [10-27.6 bar]. CRACK



JT RELIEF
290-1200 PSI [20-83 bar]. CRACK

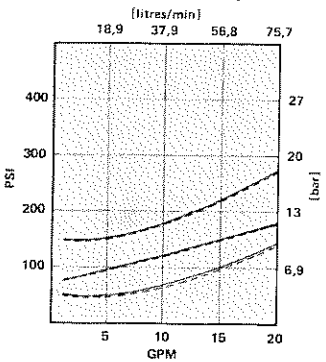


JT (HP) RELIEF
1201-2500 PSI [83-172 bar]. CRACK

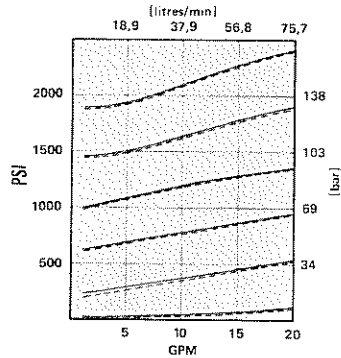


INCREASING
FLOW ————
DECREASING
FLOW - - - - -

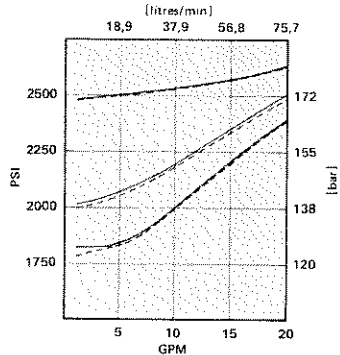
JT-N (LP) RELIEF WITH 987-001 SPRING
50-200 PSI [3.4-13.8 bar]. CRACK



JT-N RELIEF
300-1800 PSI [20.7-124 bar]. CRACK



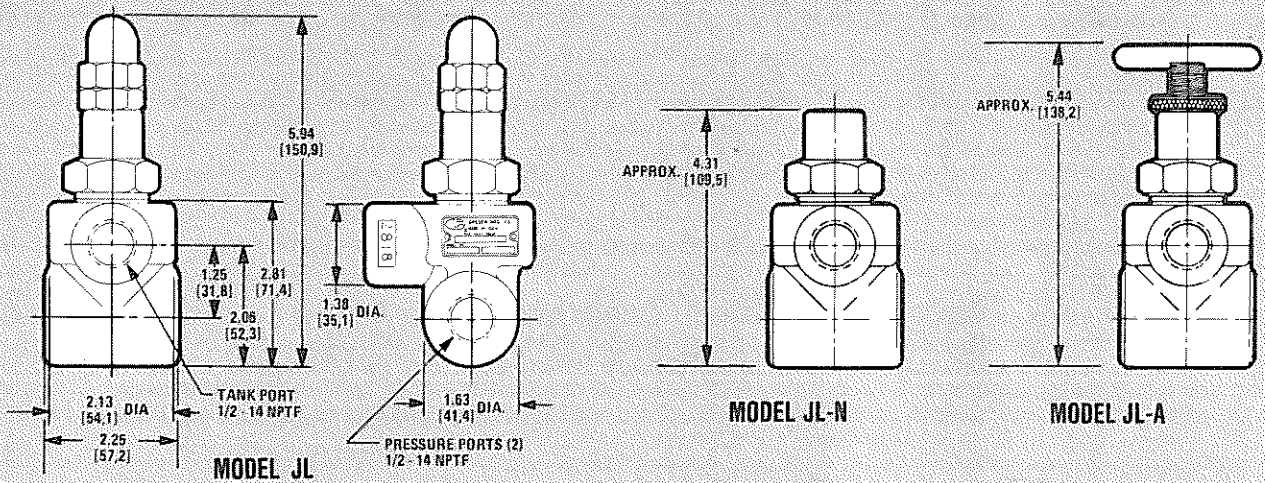
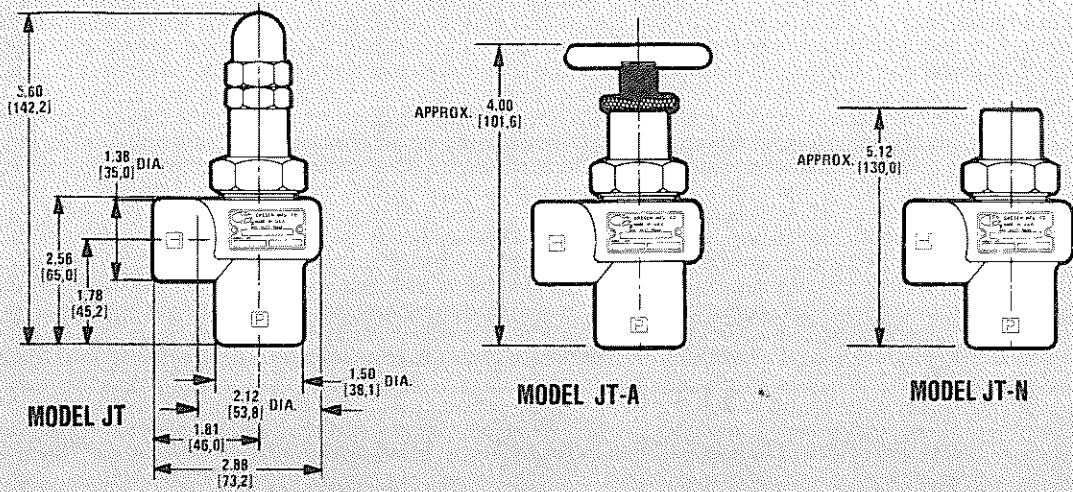
JT-N (HP) RELIEF
1801-2500 PSI [124-172 bar]. CRACK



DIMENSIONS

ALL DIMENSIONS ARE IN INCHES [MILLIMETRES] AND ARE FOR REFERENCE ONLY

JT
JL



ORDERING INSTRUCTIONS

MODEL NO. JT-10-N-HP-1500 PSI

TYPE OF MOUNTING	
JT	Tee-Mounted
JL	In-Line Mounted

Specify pressure setting. If not specified, settings will be arbitrarily set on adjustable models. Pressure setting must be specified on non-adjustable models.

PORT SIZES	
Model JT (Both Ports)	
10	SAE 10 (7/8" - 14 UNF)
50	1/2" - 14 NPT
51	1/2" - 14 BSP
Model JL	
10	SAE 10 (7/8" - 14 UNF) All Ports
50	1/2" - 14 NPT All Ports
75	3/4" - 14 NPT Pressure Ports 1/2" - 14 NPT Tank Ports
51	1/2" - 14 BSP All Ports
71	3/4" - 14 BSP All Ports

PRESSURE SETTING AT CRACK (1 GPM [3,8 litres/min])	
Adjustable Models	
LP	145-400 PSI [10-27.6 bar]
-	290-1200 PSI [20-83 bar]
HP	1201-2500 PSI [83-172 bar]
Non-Adjustable Models	
LP	50-200 PSI [3.4-13.8 bar]
-	300-1800 PSI [20.7-124 bar]
HP	1801-2500 PSI [124-172 bar]

ADJUSTMENT OPTIONS	
-	Standard, Screw Adjustable
N	Non-Adjustable. Can be adjusted with shims.
A	With Hand-Adjusting Handle.

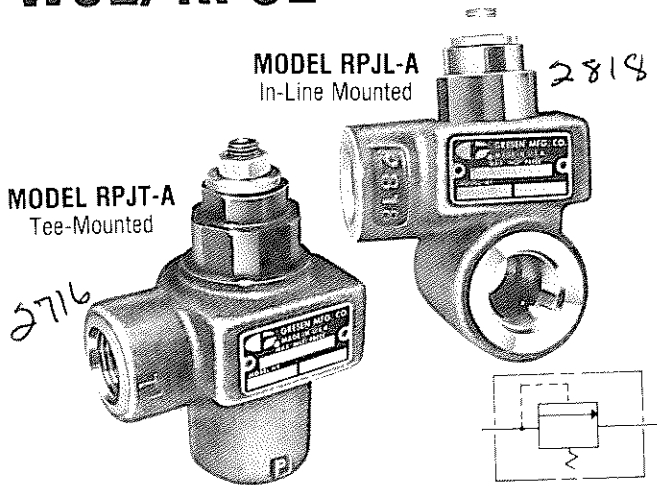
NOTE: NPT pipe ports are not recommended for pressures above 2000 PSI [138 bar].

GRESEN®



MODELS
WJT/RPJT
WJL/RPJL

UP TO 25 GPM CAPACITY
RELIEF VALVES



The Models WJT/RPJT and WJL/RPJL Relief Valves are used for limiting the maximum pressure which can be applied to the portion of the hydraulic circuit to which it is connected.

These Valves have housings constructed of high strength compacted graphite cast iron. Differential Poppet Reliefs allow pressure settings up to 3000 PSI [207 bar]. Pilot-Operated Reliefs allow pressure settings up to 5000 PSI [345 bar].

All units are factory "pre-set" to customer's specific setting requirements. Standard Valves may be reset at any time by adding or subtracting shims. An optional adjustable feature is available.

SPECIFICATIONS

Capacity (nominal) Up to 25 GPM [94 litres/min]
 Maximum Operating Pressure (WJ) 3000 PSI [207 bar]
 (RPJ) 5000 PSI [345 bar]
 Shipping Weight 3 Pounds [1,4 kg]

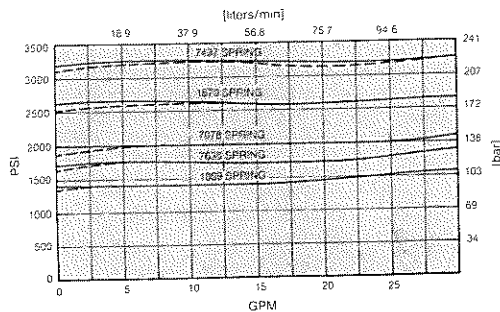
FEATURES

- Compact, Low Profile Design
- Compacted Graphite Bodies
- All Units Are Factory "Pre-set"

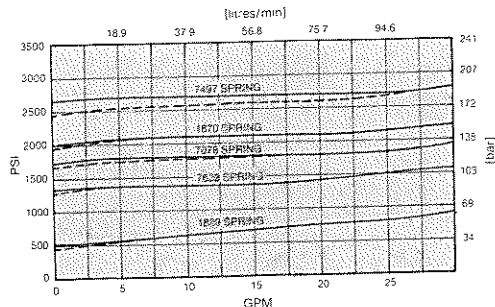
TYPICAL PRESSURE RANGE PERFORMANCE CURVES (150 SUS OIL)

INCREASING FLOW ———
 DECREASING FLOW - - -

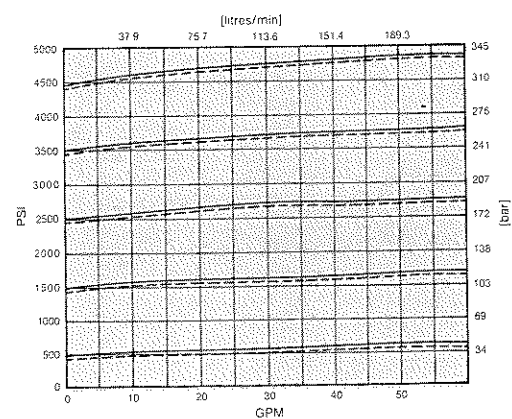
MODEL WJT/WJL
 500-3000 PSI [34-207 bar], CRACK
 PERFORMANCE AT HIGH END OF SPRING RANGES



PERFORMANCE AT LOW END OF SPRING RANGES



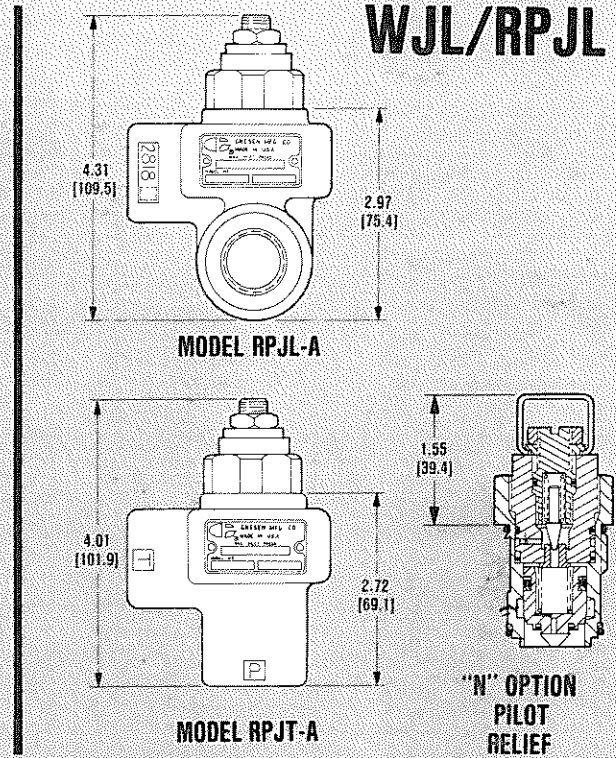
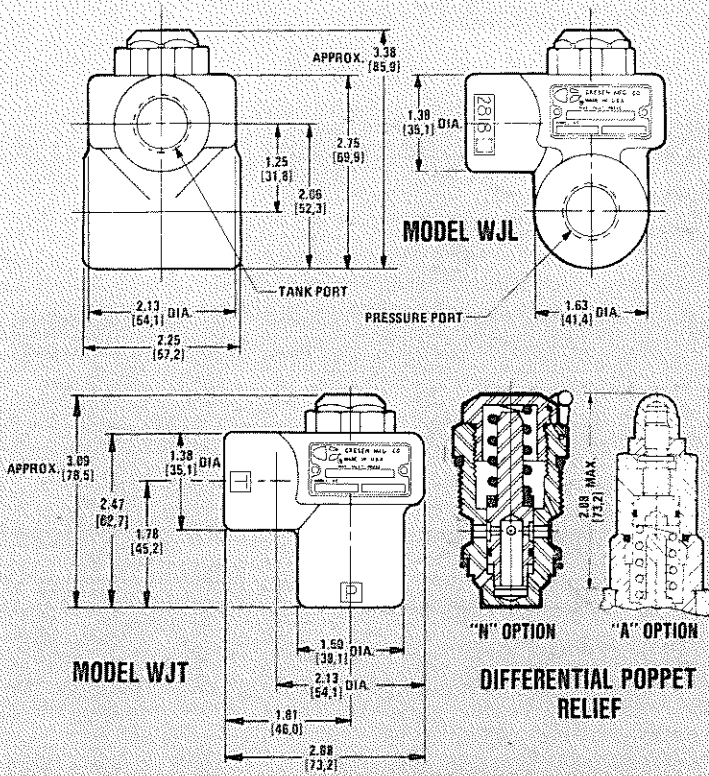
MODEL RPJT/RPJL
 500-5000 PSI [34-345 bar], CRACK



DIMENSIONS

ALL DIMENSIONS ARE IN INCHES (MILLIMETRES) AND ARE FOR REFERENCE ONLY

WJT/RPJT WJL/RPJL



STAINLESS STEEL SPRINGS (Standard in Model WJL/WJT "Adjustable" and Model RPJL/RPJT)

Model WJL/WJT standard relief valve springs are of a spring steel material. Where hydraulic systems tend to run at temperatures above 160°F. (71°C) stainless steel relief springs are recommended. These optional stainless steel springs are available but must be specified if required.

For best system performance and longest oil life, the ideal oil

temperature range in a hydraulic system should be approximately 100°F to 130°F (38°C to 54°C), when measured at the oil reservoir.

Standard relief valve springs (spring steel) will begin to decay as temperatures increase. System decay will vary depending on the relief valve setting and spring load.

ORDERING INSTRUCTIONS

MODEL NO. WJT - 10 - A 1500 PSI

MODEL	
WJT	Tee-Mounted (WH Differential Poppet Relief)
WJL	In-Line Mounted (WH Differential Poppet Relief)
RPJT	Tee-Mounted (RP51 Pilot-Operated Relief)
RPJL	In-Line Mounted (RP51 Pilot-Operated Relief)

Specify cracking pressure for relief valve setting

PORT SIZES (Omit if only Relief Cartridge is required.)	
TEE - MOUNTED	
10	SAE 10 (7/8" - 14 UNF)
50	1/2" - 14 NPT
51	1/2" - 14 BSP
IN-LINE MOUNTED	
10	SAE 10 (7/8" - 14 UNF) All Ports
50	1/2" - 14 NPT All Ports
75	3/4" - 14 NPT Pressure Ports 1/2" - 14 NPT Tank Port
51	1/2" - 14 BSP All Ports
71	3/4" - 14 BSP Pressure Ports 1/2" - 14 BSP Tank Port

ADJUSTMENT OPTIONS		
-	Standard, Shim Adjustable (Model WJT/WJL)	
A	Adjustable within range of spring installed (Model WJT/WJL)	
	Adjustment Range (Cracking pressure)	Spring Part No.
	500-1350 PSI [34-93 bar]	1869-001
	1351-1750 PSI [93-120 bar]	7638-001
	1751-2000 PSI [120-138 bar]	7078-001
	2001-2600 PSI [138-179 bar]	1870-001
	2601-3000 PSI [179-207 bar]	7497-001
	Adjustable, 500-5000 PSI (Model RPJT/RPJL)	
N	Non-Adjustable, with lockwire and lead seal (Model WJT/WJL)	
	Non-Adjustable, with tamperproof cap (Model RPJT/RPJL)	

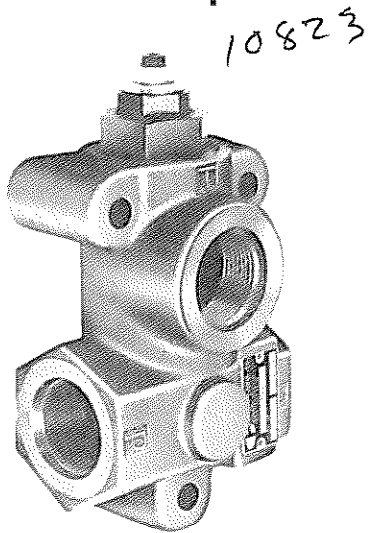
NOTE: NPT pipe ports are not recommended for pressures above 2000 PSI [138 bar].



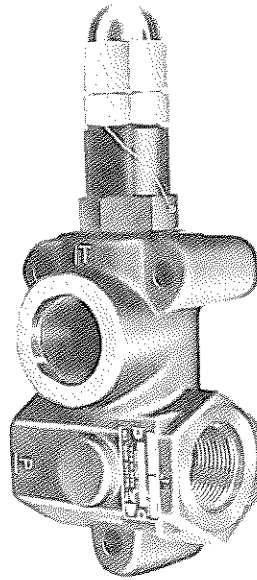
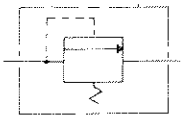
MODELS

KL
RPL

UP TO 60 GPM CAPACITY RELIEF VALVES



MODEL RPL-A



MODEL KL-N

These Relief Valves have been designed to give long, smooth performance. Affords over-load protection for hydraulic circuits as well as structural members of tools and machines due to excessive pressure build-up.

RPL Pilot Relief Valves and KL Ball/Spring Relief Valves are available either as adjustable or non-adjustable. An optional gage port is available.

FEATURES

- In-Line Mounting
- Compacted Graphite Body
- Smooth and Quiet Operation
- Adjustable
- Optional Gage Port

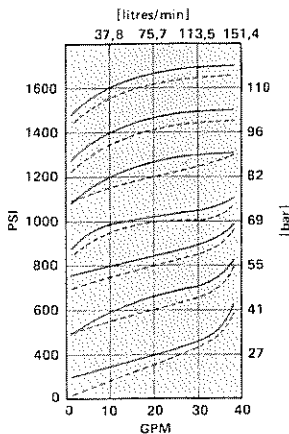
SPECIFICATIONS

	PILOT OPERATED RPL	BALL/SPRING KL
Capacity (nominal)	Up to 60 GPM [227 litres/min]	Up to 38 GPM [143 litres/min]
Maximum Operating Pressure	500-5000 PSI [34-345 bar]	300-2000 PSI [20-138 bar]
Shipping Weight6 Pounds [2,7 kg]	6¾ Pounds [3,1 kg]

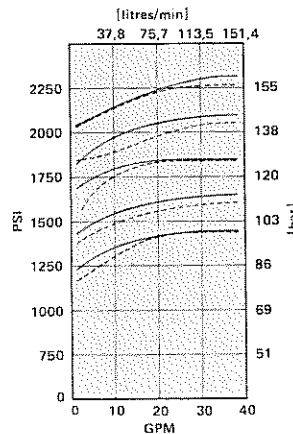
TYPICAL PRESSURE RANGE PERFORMANCE CURVES (150 SUS OIL)

INCREASING FLOW ——— DECREASING FLOW - - - - -

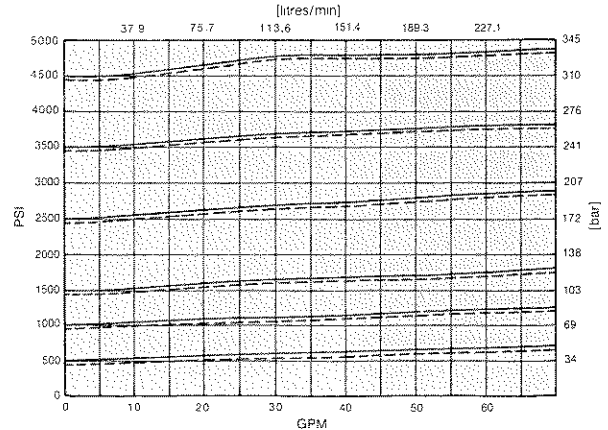
MODEL KL
300-1500 PSI [20-103 bar]. CRACK



MODEL KL (HP)
1 501-2000 PSI [103-138 bar]. CRACK



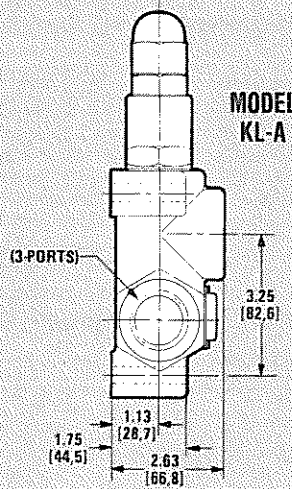
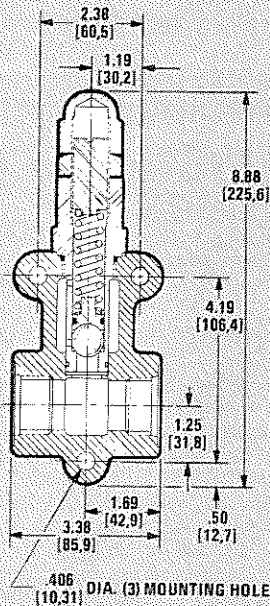
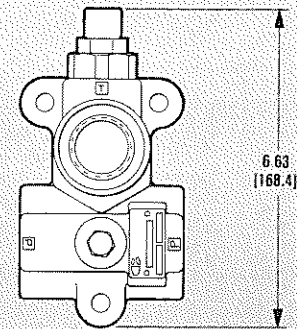
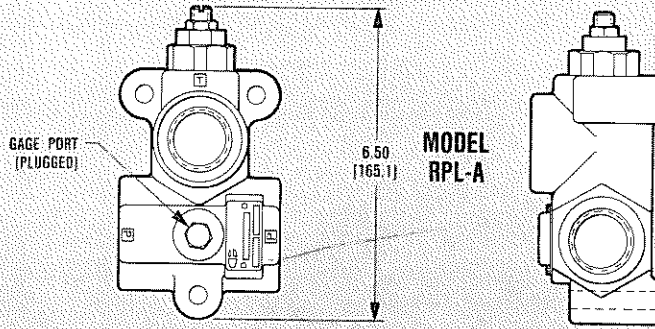
MODEL RPL
500-5000 PSI [34-345 bar]. CRACK



DIMENSIONS

ALL DIMENSIONS ARE IN INCHES (MILLIMETRES) AND ARE FOR REFERENCE ONLY

KL RPL



MODEL RPL-N

STAINLESS STEEL SPRINGS (Standard in Model RPL)

Model KL Standard relief valve springs are of a spring steel material. Where hydraulic systems tend to run at temperatures above 160°F [71°C] stainless steel relief springs are recommended. These optional stainless steel springs are available but must be specified if required.

For best system performance and longest oil life, the ideal oil temperature range in a hydraulic system should be approximately 100°F to 130°F [38°C to 54°C], when measured at the oil reservoir.

Standard relief valve springs (spring steel) will begin to decay as temperatures increase. System decay will vary depending on the relief valve setting and spring load.

ORDERING INSTRUCTIONS

MODEL NO. KL - 16 - N - G (1500 PSI at 30 GPM)

MODEL	
KL	Ball/Spring Type (KC Cartridge)
RPL	Pilot-Operated (RP60 Cartridge)

PORT SIZES (All Ports)	
16	SAE 16 (1-5/16" - 12 UN)
75	3/4" - 14 NPT
100	1" - 11-1/2 NPT
71	3/4" - 14 BSP
101	1" - 11 BSP

NOTE: NPT pipe ports are not recommended for pressures above 2000 PSI [138 bar].

Specify relief setting. If not specified, Relief Valves will be factory-set at 1000 PSI [69 bar] crack.

GAGE PORT OPTION*	
—	None (Standard)
G	Gage port provided

ADJUSTMENT OPTIONS	
A	Adjustable (Model KL or RPL)
N	Non-Adjustable, with lockwire and lead seal (Model KL)
	Non-Adjustable, with tamperproof cap (Model RPL)

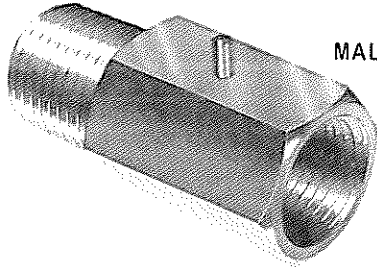
*If gage port is specified, port size must be indicated (SAE 4 or 1/4" NPTF).



MODELS

LT
LTF

UNIDIRECTIONAL LINE CHECK VALVES LINE THROTTLE VALVES



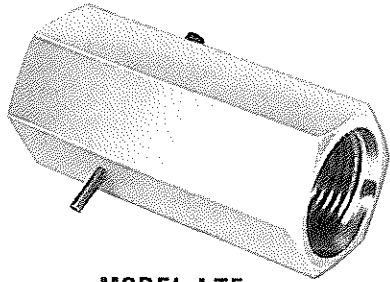
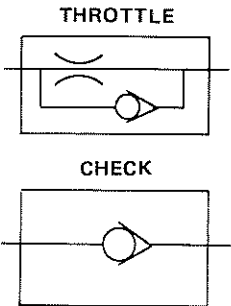
MODEL LT
MALE-FEMALE PORTS

The Model LT and LTF Valves will operate satisfactorily when installed in any position—horizontal or vertical. These Valves may be used as Line Check Valves, permitting full flow of hydraulic oil in one direction only or as restrictors.

An assortment of restrictors are available. When restrictors are installed, the Valve becomes a Line Throttle Valve permitting full flow of hydraulic oil in one direction and a restricted flow in the opposite direction.

Line Throttle Valve Applications Are:

- Accurate control of Double-acting cylinder by having both sides of the piston pressurized.
- For improving control of the lowering stroke of a cylinder.
- For preventing cavitation of a cylinder or motor having an inertia load.
- For metering oil flow to a hydraulic motor for proper motor speed.
- For improving control of the extend stroke of a hydraulic cylinder.

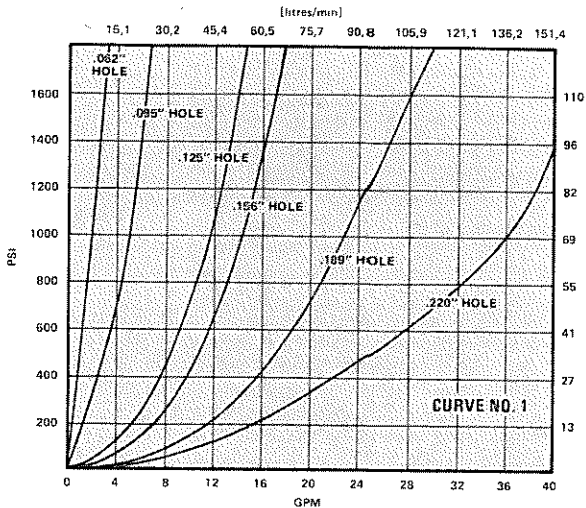


MODEL LTF
FEMALE-FEMALE PORTS

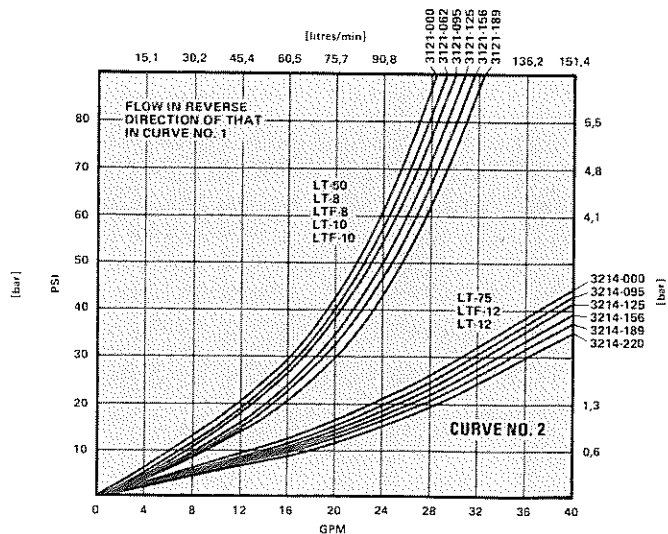
SPECIFICATIONS

Maximum Operating Pressure 3000 PSI [207 bar]

**FLOW CHARACTERISTICS THRU
RESTRICTED ORIFICE
(150 SUS OIL)**



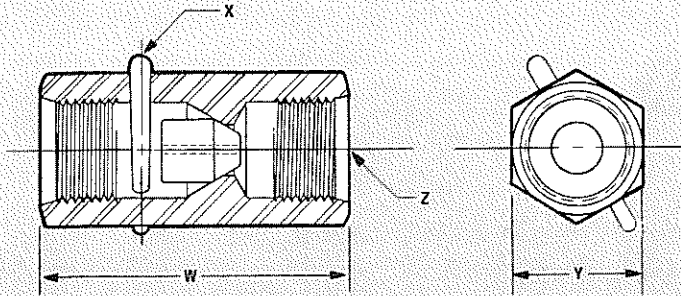
**FREE FLOW PRESSURE DROP
(150 SUS OIL)**



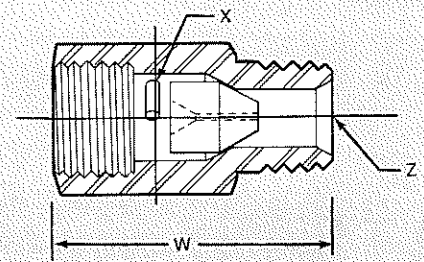
DIMENSIONS

ALL DIMENSIONS ARE IN INCHES (MILLIMETRES) AND ARE FOR REFERENCE ONLY

LT
LTF



MODEL LTF



MODEL LT

DIMENSIONS				
MODEL NO.	"W" LENGTH IN. [mm]	"X" "O" TYPE TAPER PIN LENGTH IN. [mm]	"Y" HEX SIZE IN. [mm]	"Z" THREAD (BOTH ENDS)
LT-50	2.13 [54,1]	1.50 [38,1]	1.00 [25,4]	1/2" - 14 NPT
LT-8	2.13 [54,1]	1.50 [38,1]	1.00 [25,4]	SAE 8 (3/4" - 16 UNF)
LT-10	2.31 [58,7]	1.75 [44,5]	1.13 [28,7]	SAE 10 (7/8" - 14 UNF)
LT-12	3.06 [77,7]	2.00 [50,8]	1.38 [35,1]	SAE 12 (1-1/16" - 12 UN)
LT-75	2.88 [73,2]	2.00 [50,8]	1.38 [35,1]	3/4" - 14 NPT
LTF-8	2.44 [62,0]	1.50 [38,1]	1.00 [25,4]	SAE 8 (3/4" - 16 UNF)
LTF-10	2.69 [68,3]	1.75 [44,5]	1.13 [28,7]	SAE 10 (7/8" - 14 UNF)
LTF-12	3.25 [82,6]	2.00 [50,8]	1.38 [35,1]	SAE 12 (1-1/16" - 12 UN)

Note: Dimensions W, X, Y, and Z apply to both LT and LTF models.

ORDERING INSTRUCTIONS

MODEL NO. LT - 8 - 4

MODEL	
LT	Male-Female Ports
LTF	Female-Female Ports

PORT SIZE	
8	SAE 8 (3/4" - 16 UNF)
10	SAE 10 (7/8" - 14 UNF)
12	SAE 12 (1-1/16" - 12 UNF)
50	(LT Only) 1/2" - 14 NPT
75	(LT Only) 3/4" - 14 NPT

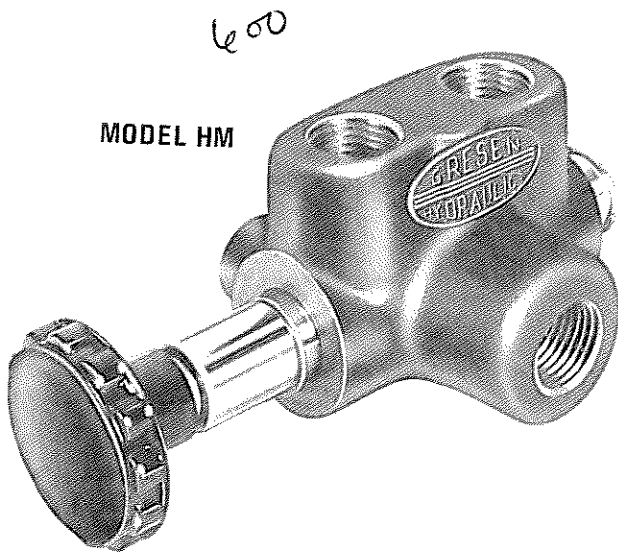
NOTE: NPT pipe ports are not recommended for pressures above 2000 PSI [138 bar].

THROTTLE AND CHECK POPPETS			
For Models LT-8, LT-10, LT-50, LTF-8, LTF-10			
POPPET ORDER SYMBOL	DIAMETER OF HOLE IN POPPET	COLOR	POPPET NO.
4	.047 [1,19]	Brown	3121-047
6	.062 [1,57]	Purple	3121-062
8	.078 [1,98]	Pink	3121-078
9	.095 [2,41]	Red	3121-095
11	.109 [2,77]	Beige	3121-109
12	.125 [3,18]	Yellow	3121-125
14	.141 [3,58]	Orange	3121-141
15	.156 [3,96]	Lt. Green	3121-156
18	.189 [4,80]	Black	3121-189
25	.252 [6,40]	Dk. Green	3121-252
0	Check (No Hole)	Beige	3121-000
For Models LT-12, LT-75, LTF-12			
90	.095 [2,41]	Red	3214-095
120	.125 [3,16]	Yellow	3214-125
150	.156 [3,96]	Green	3214-156
180	.189 [4,80]	Black	3214-189
210	.220 [5,59]	Orange	3214-220
250	.252 [6,40]	Lt. Blue	3214-252
280	.281 [7,14]	Purple	3214-281
310	.314 [7,98]	Lt. Grey	3214-314
00	Check (No Hole)	White	3214-000



MODEL
SM

TWO-POSITION THREE-WAY (SELECTOR) VALVE



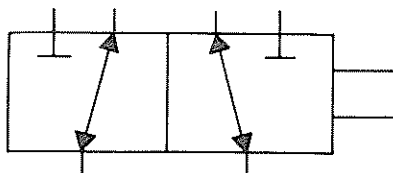
The Model SM, Two-Position Selector Valve is a two-way hydraulic selector offering a simple method of directing the flow of oil in a hydraulic system to two separate hydraulic lines. The addition of this Selector Valve to the hydraulic system will permit operation of two single-acting cylinders with one three-way control valve. In some applications, two double-acting cylinders may be operated with one four-way control valve.

The hydraulic circuit which is to be operated should be selected before pressure is applied.

Valve Spool is of the open crossover type. As Spool is moved and one outlet port starts to close, the opposite outlet port is opening.

FEATURES

- Pressure Balanced Spool
- Chrome Plated Spool
- High-Tensile Cast Iron Body



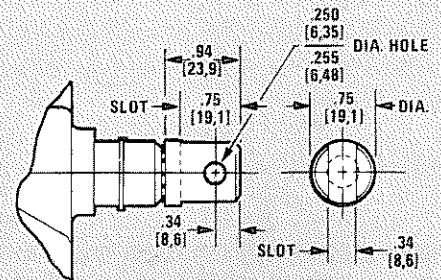
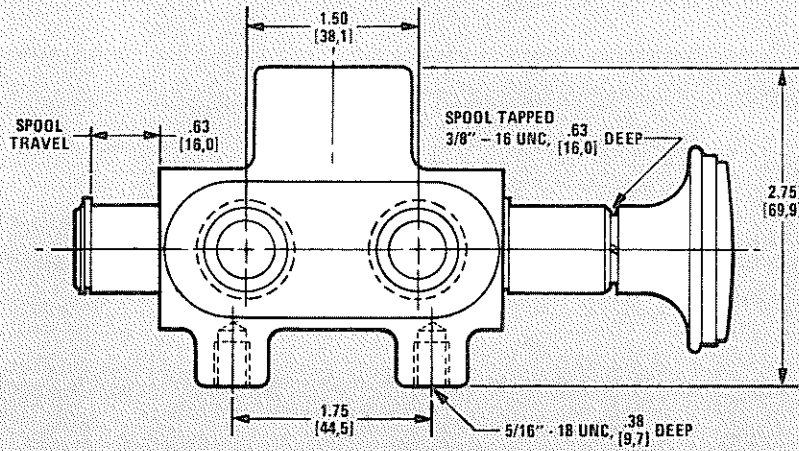
SPECIFICATIONS

Capacity (nominal)	20 GPM [75 litres/min]
Maximum Operating Pressure	2000 PSI [138 bar]
Shipping Weight	2-3/4 Pounds [1,3 kg]

DIMENSIONS

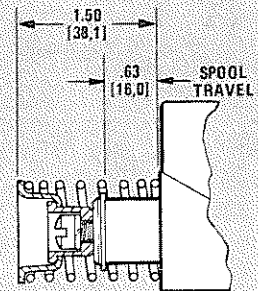
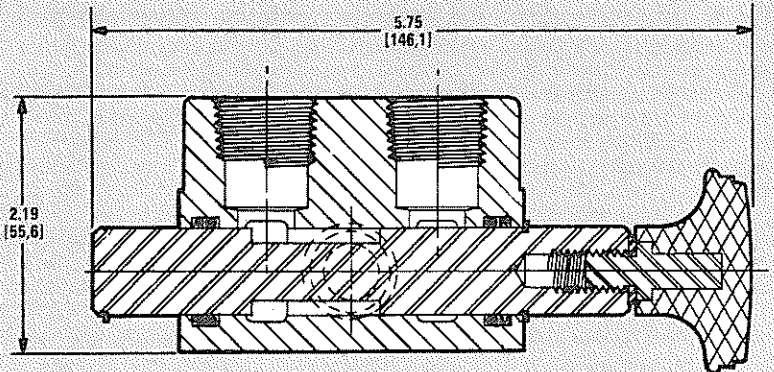
ALL DIMENSIONS ARE IN INCHES (MILLIMETRES)
AND ARE FOR REFERENCE ONLY

SM



OPTIONAL CLEVIS

An optional Clevis Assembly instead of a knob is available. Specify Part No. 1478-001.



OPTIONAL SPRING LOADED SPOOL

The spring assembly is installed on the spool end opposite the handle end and returns the spool to a "spool in" position when viewed from the handle end of the valve. The spring assembly is not contained in a bonnet, but is open to atmosphere. The spring assembly cannot be installed in the "standard" selector valves as a simple field change-over. The selector spool opposite the handle end must be drilled and tapped to mount the spring assembly.

ORDERING INSTRUCTIONS

MODEL NO. SM - 8 - R - S

PORT SIZES	
8	SAE 8 (3/4" - 16 UNF)
38	3/8" - 18 NPT
50	1/2" - 14 NPT
31	3/8" - 19 BSP
51	1/2" - 14 BSP

NOTE: NPT pipe ports are not recommended for pressures above 2000 PSI [138 bar].

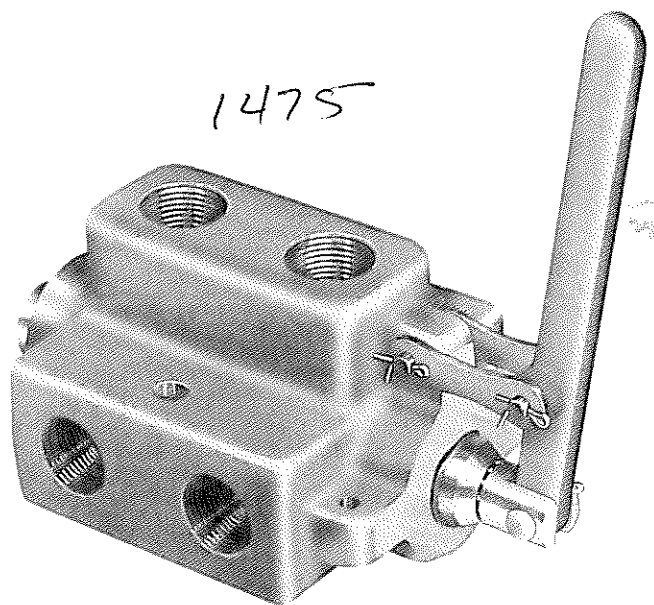
SPRING LOADED SPOOL
- Control Knob and Spool Assembly Standard as Shown
R Control Knob and Spool Assembly Reversed From That Shown

Control Knob is Standard
 Clevis is Optional
 Specify: With Clevis, Part No. 1478-001
 If Neither Control Knob Nor Clevis is Desired, Specify:
 Less Control Knob and Clevis



MODEL
DS

TWO-POSITION SIX-PORTED SELECTOR VALVE



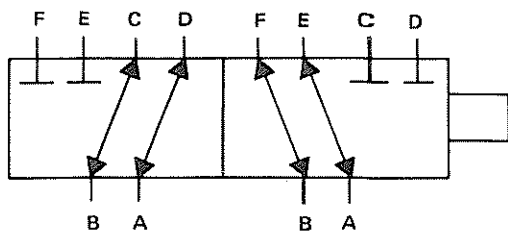
The Model DS, Two-position, Double selector Valve directs the flow of hydraulic oil to two separate circuits. This permits operation of two double-acting cylinders with one four-way control valve or four single-acting cylinders with two three-way control valves.

The hydraulic circuit which is to be operated should be selected before pressure is applied.

Valve Spool is of the open crossover type. As Spool is moved and one set of outlet ports start to close, the other set of outlet ports start to open.

FEATURES

- Pressure Balanced Spool
- Chrome Plated Spool
- High-Tensile Cast Iron Body
- Three Handle Position Options



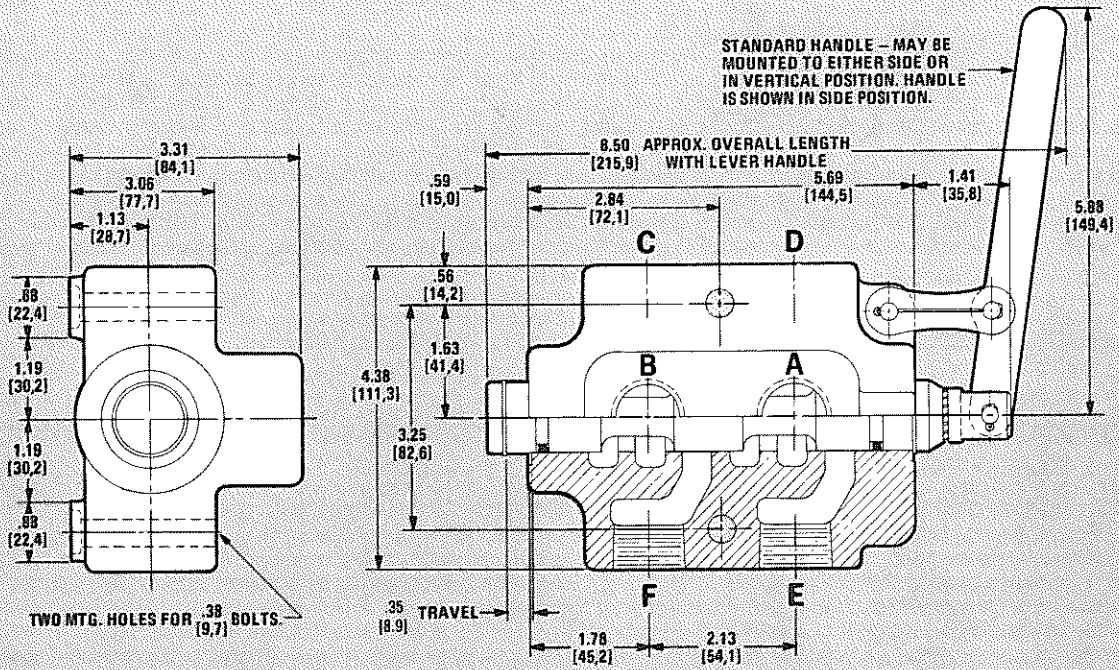
SPECIFICATIONS

Capacity (nominal)	25 GPM [94 litres/min]
Maximum Operating Pressure	
Model DS-75	2000 PSI [138 bar]
Model DS-12	3000 PSI [207 bar]
Shipping Weight	12 Pounds [5,5 kg]

DIMENSIONS

ALL DIMENSIONS ARE IN INCHES (MILLIMETRES)
AND ARE FOR REFERENCE ONLY

DS



PORTING KEY

With spool pushed into housing: (Viewed from handle end)

- Ports A and D are connected to each other.
- Ports B and C are connected to each other.

With spool pulled out of housing: (Viewed from handle end)

- Ports A and E are connected to each other.
- Ports B and F are connected to each other.

ORDERING INSTRUCTIONS

MODEL NO. DS - 12

PORT SIZES (ALL PORTS)	
12	SAE 12 (1-1/16" - 12 UN)
75	3/4" - 14 NPT
71	3/4" - 14 BSP

NOTE: NPT pipe ports are not recommended for pressures above 2000 PSI [138 bar].

If handle assembly is not required, specify: LCHA (Less Complete Handle Assembly).

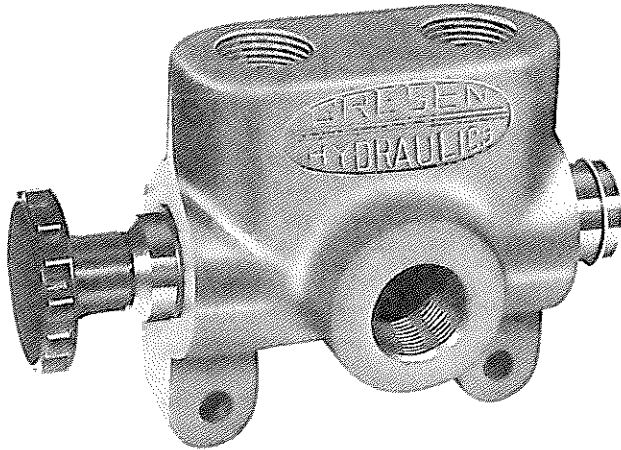


MODEL
S

TWO-POSITION THREE-WAY (SELECTOR) VALVES

3 SIZES FROM WHICH TO CHOOSE

S-50 • S-75 • S-100

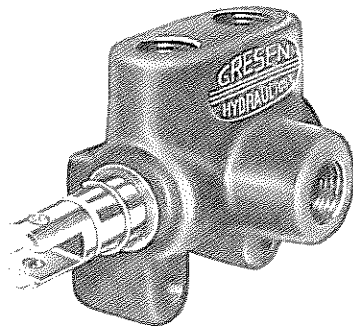


The Model S, Two-Position, Selector Valves offer a simple method of directing the flow of hydraulic oil to two separate hydraulic lines. The addition of these Selector Valves to the hydraulic circuit will permit operation of two single-acting cylinders with one three-way control valve. In some applications, two double-acting cylinders may be operated with one 4-way control valve.

The hydraulic circuit which is to be operated should be selected before pressure is applied.

Valve Spool is of the open crossover type. As Spool is moved and one outlet port starts to close, the other outlet port starts to open.

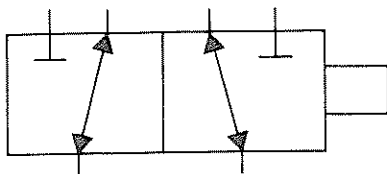
Three sizes; 15 GPM [56 litres/min], 24 GPM [90 litres/min] and 40 GPM [151 litres/min] permit selection for any application.



WITH OPTIONAL CLEVIS ASSEMBLY

FEATURES

- Pressure balanced Spool
- Easy to Mount
- Chrome Plated Spool
- High-Tensile Cast Iron Body



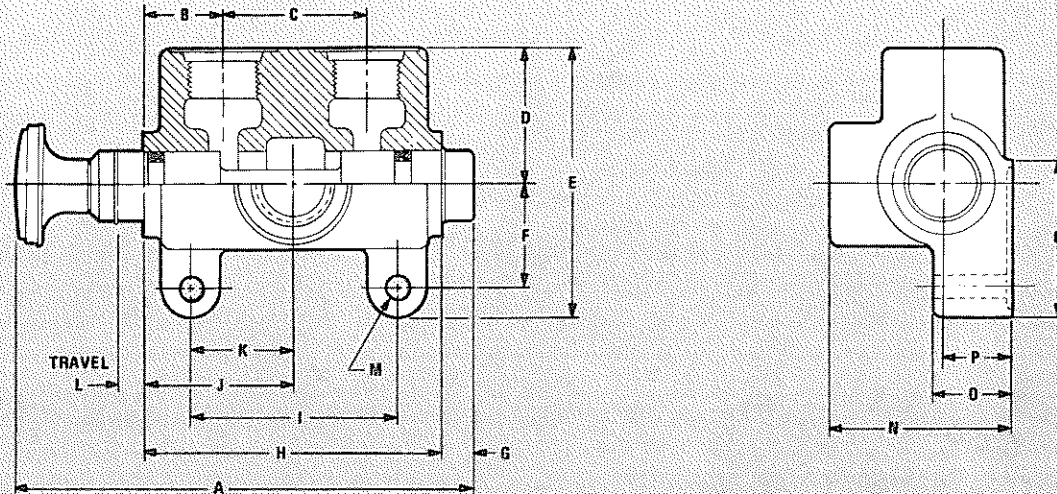
SPECIFICATIONS

	1140 S-50	1120 S-75	1310 S-100
Capacity (nominal)	15 GPM [56 litres/min]	24 GPM [90 litres/min]	40 GPM [151 litres/min]
*Maximum Operating Pressure	3000 PSI [207 bar]	3000 PSI [207 bar]	3000 PSI [207 bar]
Shipping Weight	2-3/4 Pounds [1,3 kg]	5-1/2 Pounds [2,5 kg]	9-1/2 Pounds [4,3 kg]

DIMENSIONS

ALL DIMENSIONS ARE IN INCHES (MILLIMETRES)
AND ARE FOR REFERENCE ONLY

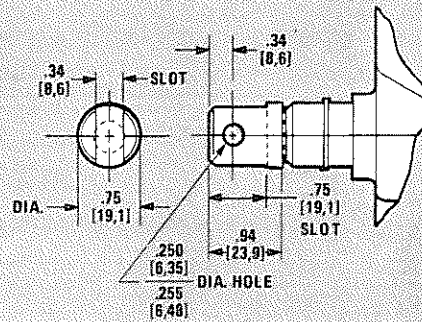
S



MODEL	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"I"	"J"	"K"	"L"	"M"	"N"	"O"	"P"	"Q"
S-50	5.69 [144,5]	.97 [24,6]	1.63 [41,4]	1.69 [42,9]	3.31 [84,1]	1.19 [30,2]	.25 [6,4]	3.56 [90,4]	2.13 [54,1]	1.78 [45,2]	1.06 [26,9]	.31 [7,9]	.31 [7,9]	2.63 [66,8]	1.13 [28,7]	1.00 [25,4]	2.00 [50,8]
S-75	6.56 [166,6]	1.13 [28,7]	2.13 [54,1]	2.00 [50,8]	3.94 [100,1]	1.50 [38,1]	.25 [6,4]	4.38 [111,3]	3.00 [76,2]	2.19 [55,6]	1.50 [38,1]	.38 [9,7]	.31 [7,9]	2.63 [66,8]	1.13 [28,7]	1.00 [25,4]	2.31 [58,7]
S-100	7.31 [185,7]	1.19 [30,2]	2.56 [65,0]	2.25 [57,2]	4.50 [114,3]	1.69 [42,9]	.25 [6,4]	4.94 [125,5]	3.44 [87,4]	2.47 [62,7]	1.72 [43,7]	.38 [9,7]	.38 [9,7]	3.50 [88,9]	1.38 [35,1]	1.25 [31,8]	2.88 [73,2]

OPTIONAL CLEVIS

An optional clevis assembly instead of a knob is available for Model S Selector Valves, specify part no. 1478-001.



ORDERING INSTRUCTIONS

MODEL NO. S - 50 - R

PORT SIZES (ALL PORTS)	
S-50 Model	
50	1/2" - 14 NPT
8	SAE 8 (3/4" - 16 UNF)
10	SAE 10 (7/8" - 14 UNF)
51	1/2" - 14 BSP
S-75 Model	
75	3/4" - 14 NPT
12	SAE 12 (1-1/16" - 12 UN)
71	3/4" - 14 BSP
S-100 Model	
100	1" - 11-1/2 NPT
16	SAE 16 (1-1/16" - 12 UN)
101	1" - 11 BSP

NOTE: NPT pipe ports are not recommended for pressures above 2000 PSI [138 bar].

-	Control Knob and Spool Assembly Standard as Shown.
R	Control Knob and Spool Assembly Reversed From That Shown.

Control Knob is standard
Clevis is optional.
Specify: With Clevis, part no. 1478-001
If neither Control Knob nor Clevis is desired, Specify: Less Control Knob and Clevis.



MODELS

H
HM

TWO-POSITION THREE-WAY (FLOAT POSITION) VALVES

The Models H and HM Float Position Valves are used with standard 4-way, 3-position valves to provide a float or free-wheeling position. These valves are designed for snow plows, loaders, winches and similar equipment applications which may require the optional function of having a cylinder able to "float" or a motor to "free-wheel".

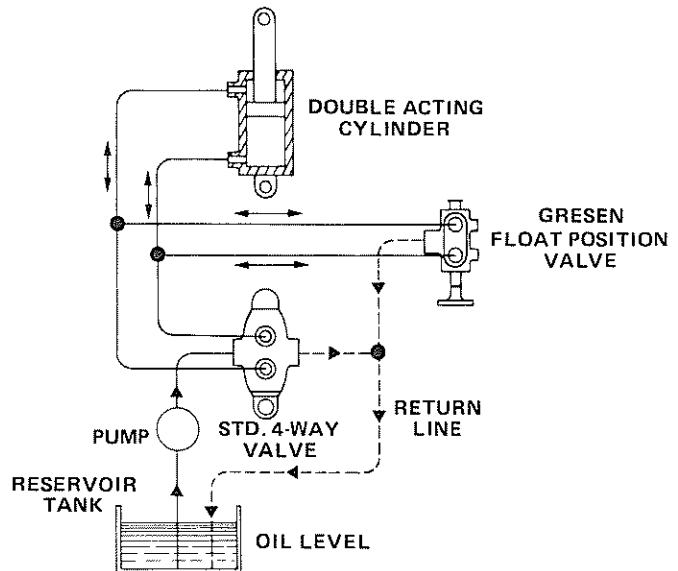
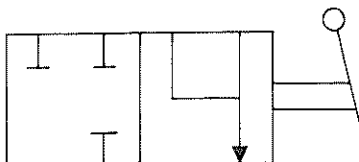
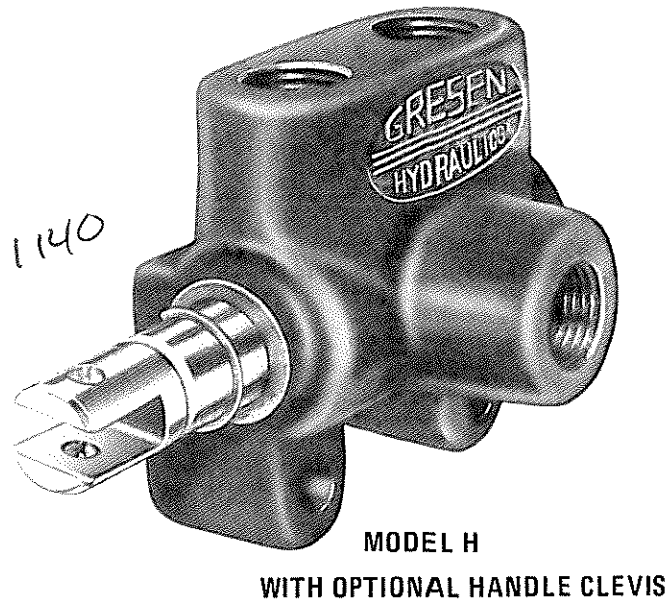
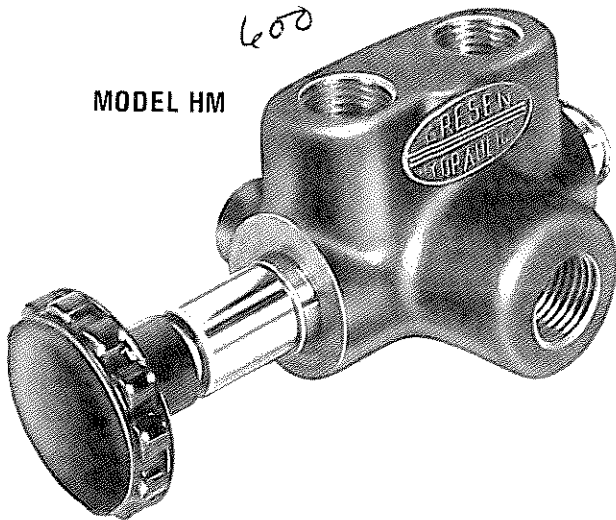
The hydraulic circuit which is to be operated should be selected before pressure is applied.

FEATURES

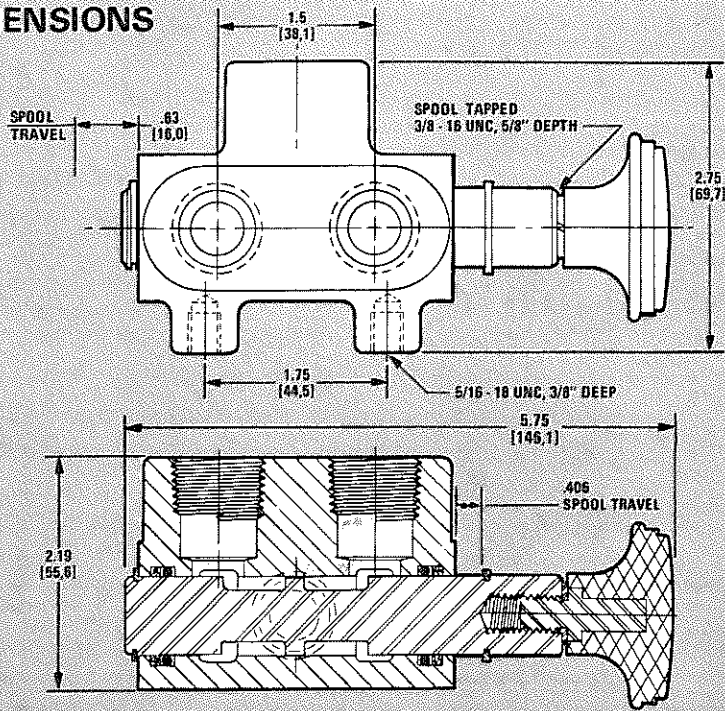
- Pressure Balanced Spool
- Chrome Plated Spool
- High-Tensile Cast Iron Body
- Easy to Mount

SPECIFICATIONS

	H	HM
Capacity (nominal)	25 GPM [94 litres/min]	10 GPM [37 litres/min]
Maximum Operating Pressure	3000 PSI [207 bar]	2000 PSI [138 bar]
Shipping Weight5-1/2 Pounds [2,5 kg]	2-3/4 Pounds [1,3 kg]

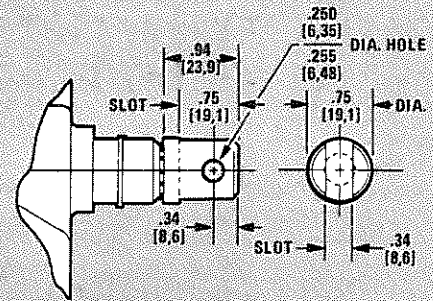


DIMENSIONS



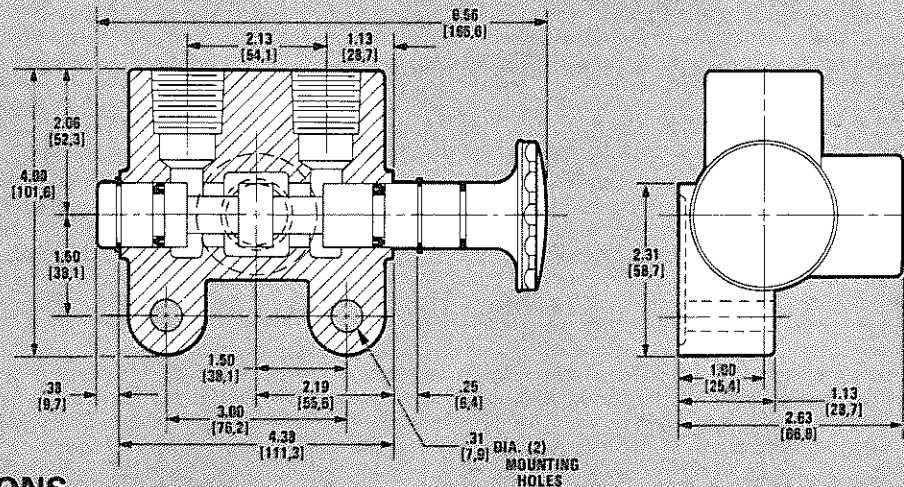
H HM

ALL DIMENSIONS ARE IN INCHES (MILLIMETRES) AND ARE FOR REFERENCE ONLY



OPTIONAL CLEVIS

An optional Clevis Assembly instead of a knob is available for Model H and HM Float Position Valves.



ORDERING INSTRUCTIONS

MODEL NO. HM - 8 - R

MODEL	
HM	10 GPM [37,8 litres/min] Rating
H	25 GPM [94,6 litres/min] Rating

-	Control Knob and Spool Assembly Standard as Shown
R	Control Knob and Spool Assembly Reversed From That Shown.

PORT SIZES (ALL PORTS)	
Model HM	
8	SAE 8 (3/4" - 16 UNF)
38	3/8" - 18 NPT
50	1/2" - 14 NPT
31	3/8" - 18 BSP
51	1/2" - 14 BSP
Model H	
12	SAE 12 (1-1/16" - 12 UN)
75	3/4" - 14 NPT
71	3/4" - 14 BSP

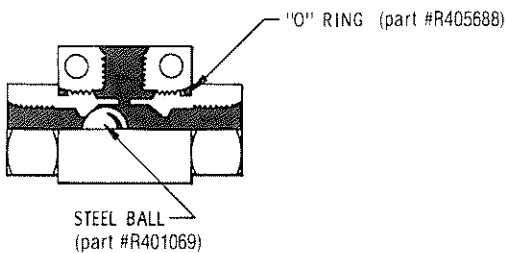
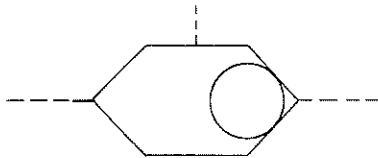
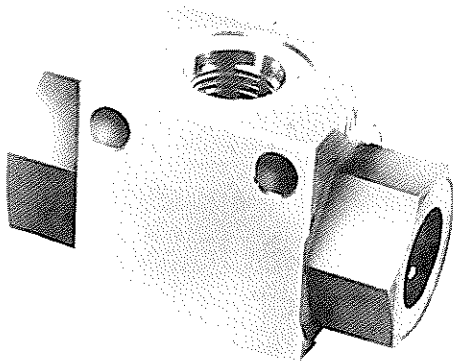
Control Knob is standard
Clevis is optional.
Specify: With Clevis, part no. 1478-001
If neither Control Knob nor Clevis is desired, specify: Less Control Knob and Clevis.

NOTE: NPT pipe ports are not recommended for pressures above 2000 PSI [138 bar].



MODEL
ASH

1/4" • 3000 PSI • 4 GPM
SHUTTLE VALVE



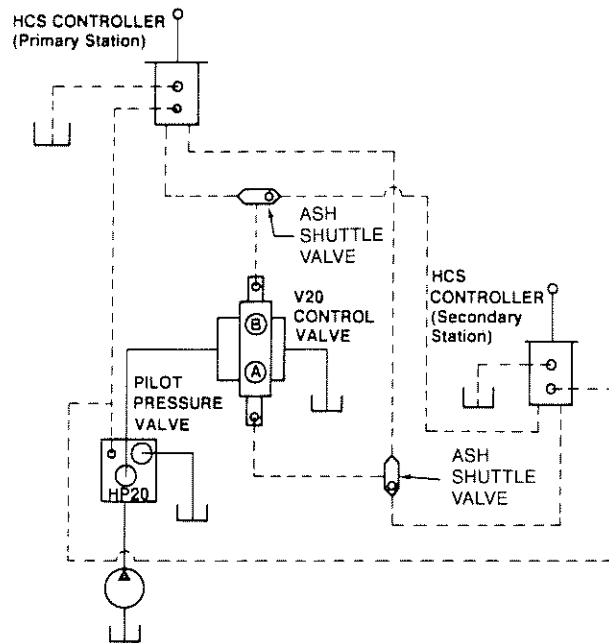
SPECIFICATIONS

Pressure Rating (Max.)	3000 PSI [207 bar]
Flow Rating	4 GPM [15.2 L/min]
Mounting	Unrestricted
Material	All steel
Weight (Approx.)	0.75 lbs. [0.34 kg]

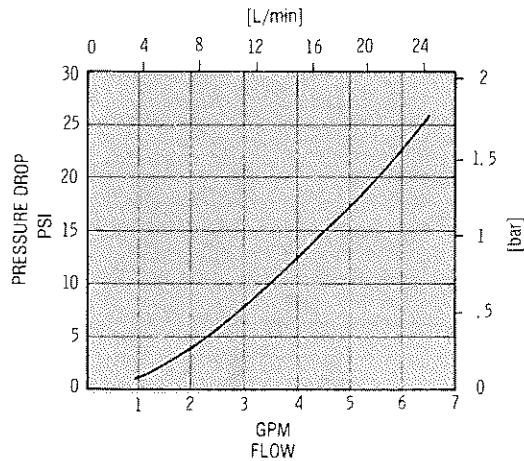
Model ASH Shuttle Valve is designed to be used in a pilot system to select the higher of two pilot pressures.

In the typical application shown, the shuttle valves allow one control valve to be remotely controlled from two separate stations.

TYPICAL APPLICATION



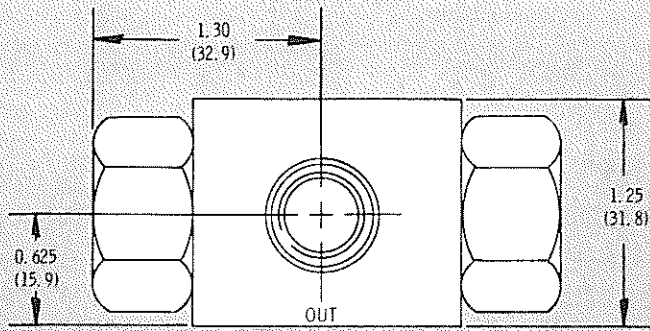
PERFORMANCE CHARACTERISTICS



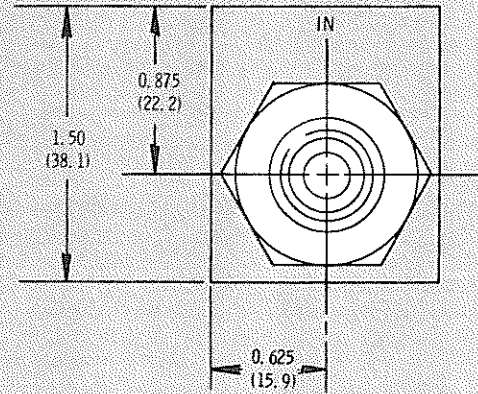
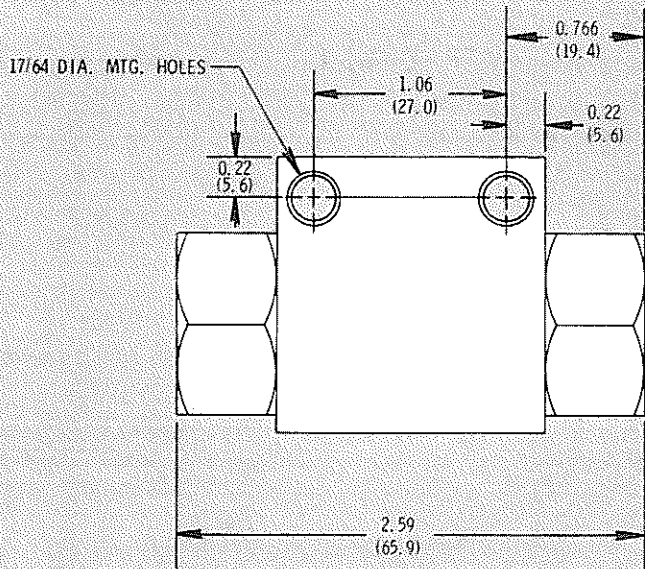
Data taken with oil viscosity of 200 SUS [43cSt] @ 100°F [37.8°C]

MAXIMUM LEAKAGE .15 in³/min [2.5 cm³/min]

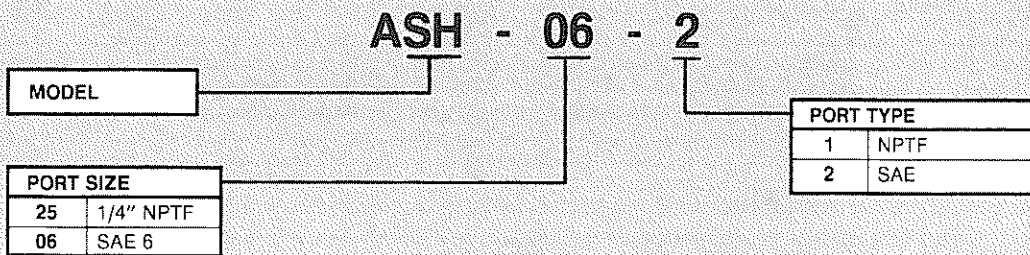
DIMENSIONS



ALL DIMENSIONS ARE IN INCHES (MILLIMETERS) AND ARE FOR REFERENCE ONLY



ORDERING INSTRUCTIONS

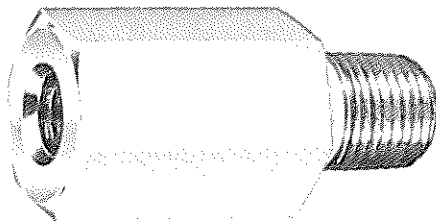




MODEL

R

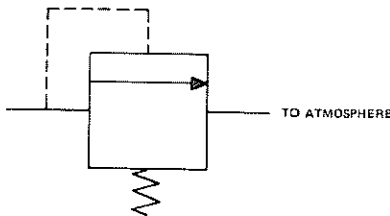
EXPANSION RELIEF VALVES



The Expansion Relief Valve is designed to prevent pressure build-up in a hydraulic circuit due to oil temperature rise. Can be installed in cylinder port lines or directly on a cylinder. Because of the very small amount of oil that is released, oil is vented to the atmosphere.

FEATURES

- Simple Installation
- Ball/Spring Design

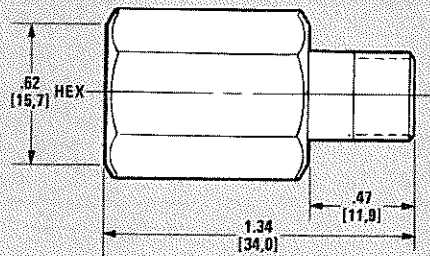
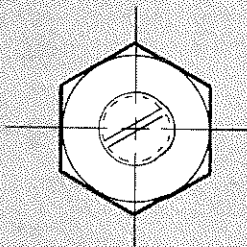


SPECIFICATIONS

Capacity 1 cubic inch [16,39 cubic cm] per minute
 Operating Pressure 2500-4000 PSI [172-276 bar] crack
 Reseat within 1000 PSI [69 bar] of crack

DIMENSIONS

R



ALL DIMENSIONS ARE IN INCHES (MILLIMETRES) AND ARE FOR REFERENCE ONLY

ORDERING INSTRUCTIONS

MODEL NO. R - 3 - 3500 PSI [bar]

PORT SIZE	
3	SAE 3(3/8-24 UNF)
5	SAE 5(1/2-20 UNF)
125	1/8" - 27 NPT

Pressure will be set at 3500 PSI [241 bar] unless otherwise specified