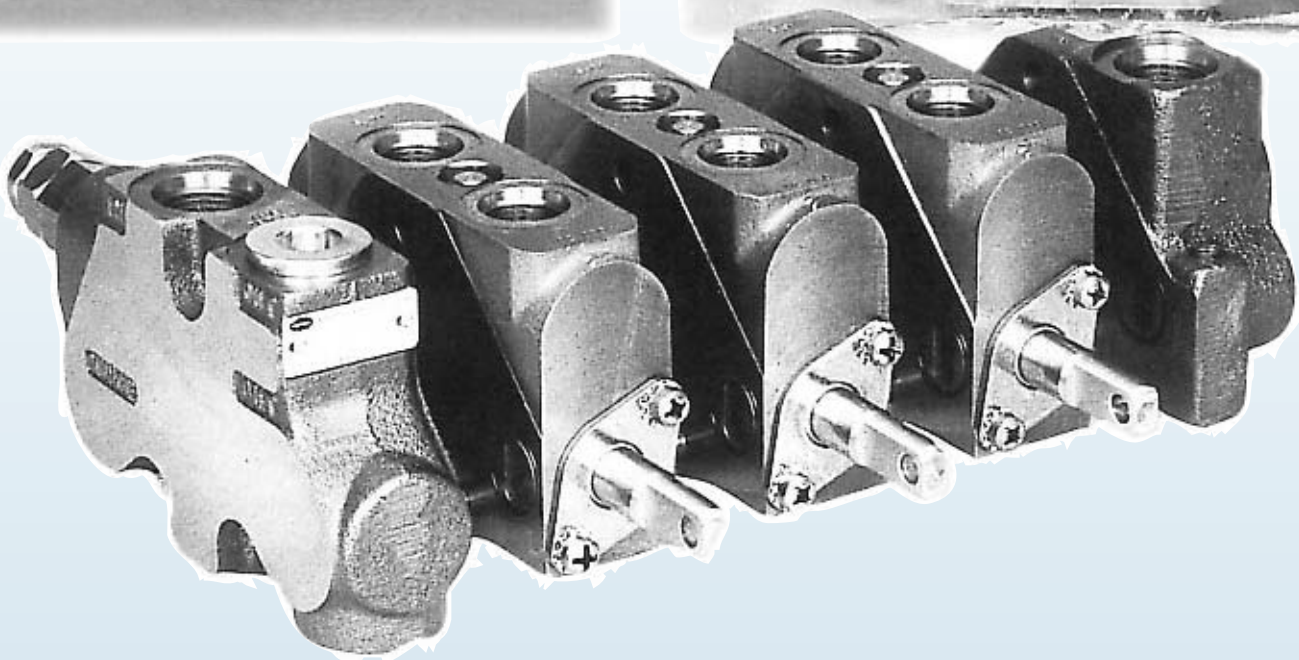




31V SERIES DIRECTIONAL CONTROL VALVE



30 GPM (114 LPM) • 3500 PSI (242 BAR) • SECTIONAL TYPE

Muncie Power Products, Inc. General Offices and Distribution Center • P.O. Box 548 • Muncie, IN 47308-0548
(765) 284-7721 • FAX (765) 284-6991 • E-mail info@munciepower.com • Web site <http://www.munciepower.com>
Drive Products, Inc., Toronto, Exclusive Agents for Canada

With over 65 years of business and expertise solely dedicated to the Truck Equipment market, Muncie Power Products is proud to offer a new line of high quality Directional Control Valves for your most rigorous application needs. An innovative leader in up-to-date state-of-the-art hydraulic components, we have brought to market the product you have been demanding from us for years. Now you can have the same high quality technical service and support in controlling your hydraulic systems that you've been getting for years with our other product lines.



Valves are available for same day shipment, with a wide range of options to meet your specific needs. Call today...we can solve all your control valve problems...so you can be back in control.

APPLICATIONS

- Snow And Ice Control Systems • Utility Equipment • Dump Bodies • Spreaders •
- Tow Recovery Vehicles • Lube Trucks And Cranes • Refuse Equipment •

VALVE FEATURES

- High tensile steel castings for durability and shock load resistance for your high pressure needs.
- Compact size and light weight to fit your installation needs.
- Parallel circuit design permits all spools to be operated independently or simultaneously with the lightest load receiving priority.
- Precision machined spools are hard chrome plated for maximum life and corrosion resistance.
- Excellent metering characteristics and extra low spool force effort result in design acceptance in a broad range of applications.
- Stackable design allows for customizing the assembly to your specific needs.
- Modern machinery and manufacturing procedures produce assemblies with minimal internal leakage but yet maintain maximum load holding ability.
- Large variety of spool types and backcap actions.
- Transition load checks are standard to prevent load shift between spool positions.
- Wide range of port options including work port reliefs, anticavitation valves, port restrictors, pilot operated check valves (lock valves), and H.P.C.O. power beyond, provide flexibility for all your design needs.
- Work Sections are 100% preassembled and pretested before shipping.
- Experienced personnel to assist in proper selection and service of your application needs.



PERFORMANCE AND SPECIFICATIONS

TECHNICAL DATA

Construction	Sectional
Circuit	Parallel/Open Center
Capacity	20 GPM (76 LPM) Nominal 30 GPM (114 LPM) Maximum
Maximum System Pressure ...	3500 PSI (242 Bar)
Maximum Tank Pressure	150 PSI (10 Bar)
Filtration	25 Micron
Spool Force	50 Lbs. (22.7 Kg) Maximum
Temperature	-20°F to 200°F (-29°C to 93°C)
Seal Type	Buna-N
Relief Valve	Differential Type Adjustable from 1500 to 3500 PSI (103.5 to 242 Bar) [preset at 1800 PSI (125 Bar)]

OPEN CENTER PRESSURE DROP (INLET TO OUTLET)

VALUES IN PSI (BAR)

PRESSURE DROP TESTS WERE RUN AT 100 SSU (20.6 CS) AND AT 125°F (52°C)

FLOW IN GPM (LPM)	NUMBER OF SECTIONS					
	1	2	3	4	5	6
5 (19)	3 (0.20)	6 (0.40)	8 (0.52)	11 (0.76)	13 (0.89)	16 (1.04)
10 (38)	10 (0.65)	18 (1.20)	25 (1.72)	33 (2.27)	40 (2.75)	49 (3.38)
15 (57)	21 (1.45)	35 (2.41)	51 (3.52)	65 (4.48)	78 (5.37)	94 (6.48)
20 (76)	36 (2.48)	59 (4.07)	83 (5.72)	106 (7.31)	126 (8.68)	152 (10.48)
25 (95)	55 (3.79)	89 (6.13)	121 (8.34)	152 (10.48)	181 (12.48)	217 (15.00)

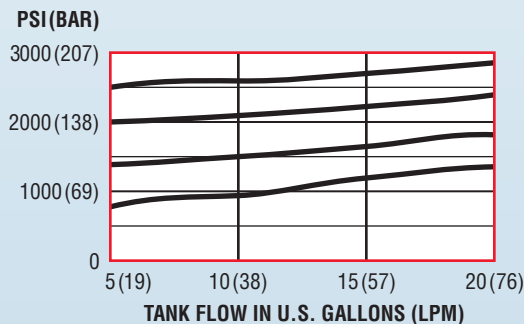
INTERNAL PRESSURE DROP (WORK PORTS)

VALUES IN PSI (BAR)

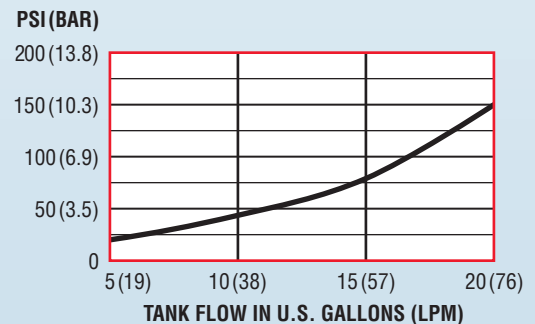
PRESSURE DROP TESTS WERE RUN AT 100 SSU (20.6 CS) AND AT 125°F (52°C)

FLOW IN GPM (LPM)	NUMBER OF SECTIONS							
	1		2		3		6	
	INLET TO WORK PORT	WORK PORT TO OUTLET	INLET TO WORK PORT	WORK PORT TO OUTLET	INLET TO WORK PORT	WORK PORT TO OUTLET	INLET TO WORK PORT	WORK PORT TO OUTLET
5 (19)	4 (0.26)	2 (0.13)	5 (0.34)	2 (0.13)	6 (0.40)	2 (0.13)	7 (0.48)	3 (0.20)
10 (38)	16 (1.10)	8 (0.52)	17 (1.17)	9 (0.62)	18 (1.20)	9 (0.62)	22 (1.42)	11 (0.76)
15 (57)	35 (2.41)	19 (1.31)	37 (2.55)	20 (1.38)	40 (2.75)	22 (1.43)	46 (3.17)	25 (1.72)
20 (76)	59 (4.07)	35 (2.41)	64 (4.41)	38 (2.62)	70 (4.55)	41 (2.84)	80 (5.52)	45 (3.10)
25 (95)	87 (6.00)	54 (3.72)	94 (6.48)	56 (3.86)	101 (6.96)	61 (4.20)	116 (8.00)	67 (4.62)

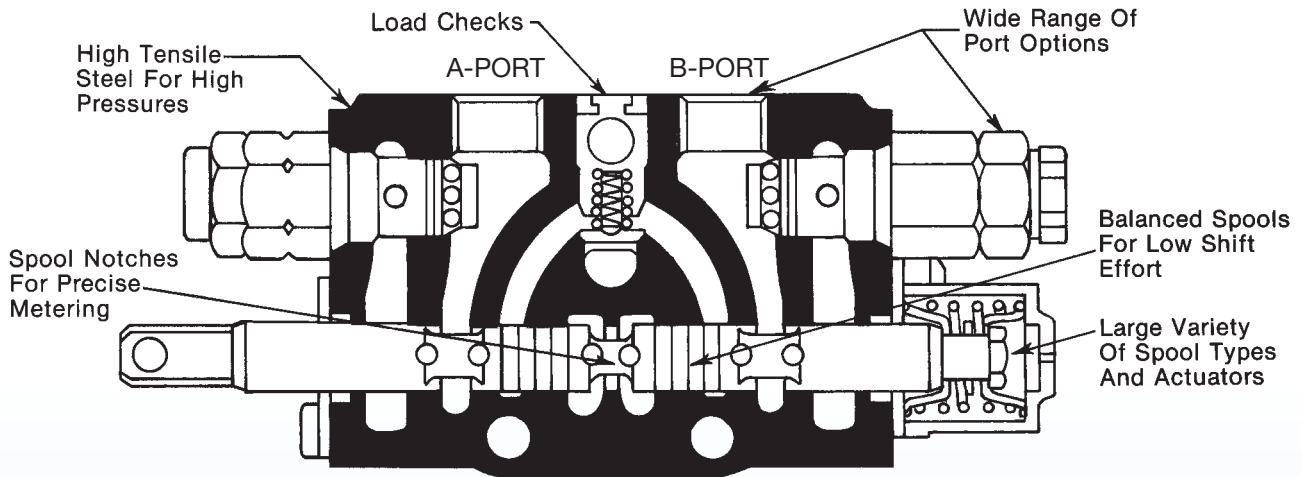
MAIN RELIEF VALVE CURVE



ANTI-CAVITATION VALVE CURVE

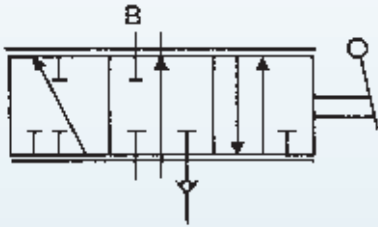


VALVE CONSTRUCTION



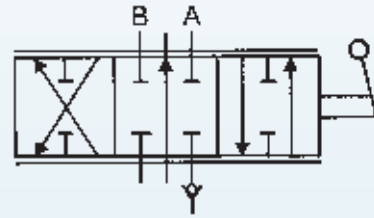
SPOOL FUNCTION OPTIONS

P (SINGLE ACTING)
3 Position – 3 Way



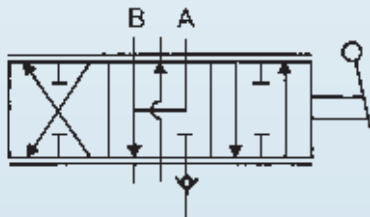
For single acting cylinder and non-reversing motors.

D (DOUBLE ACTING)
3 Position – 4 Way



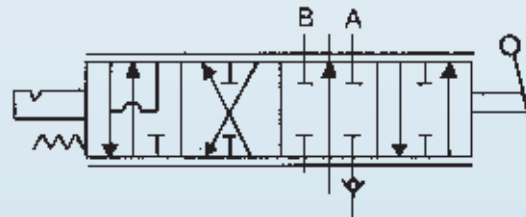
For double acting cylinders.

C (MOTOR)
3 Position – 4 Way



For reversible motors.

F (FLOAT)
4 Position – 4 Way



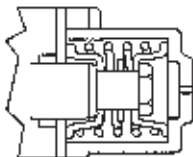
For single or double acting cylinders with 4th position work ports open to tank.

Note: Tandem style spools are available upon special request.

On small 1 ton type snow plows, plow drift may be experienced because of the small cylinders used on this type of equipment.

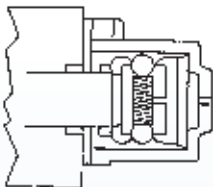
SPPOOL ACTION OPTIONS

SPRING CENTERED (CODE 1)



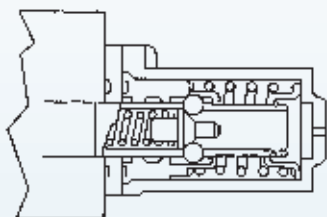
Three positions with spring return to neutral.

DETENT (CODE 2)



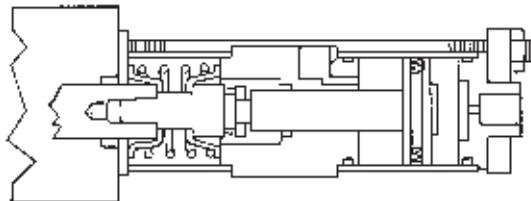
Will remain in any of the three detented positions. No spring return to neutral.

SPRING CENTERED/FLOAT (For DA Cylinders) (CODE 3)



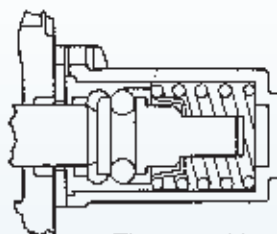
Three positions with spring return to neutral, and a fourth position detented. (Use only with F spool.) Adds 1/4" to spool stroke.

AIR SHIFT (CODE 7)



Three positions with spring return to neutral but air shifted.

SPRING/DETENT (For SA Cylinders) (CODES 5 & 6)

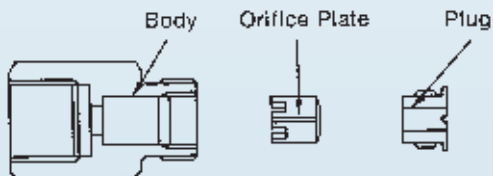


Three positions with spring centered to neutral on one side and detented on the other side. Metering capabilities limited.

PORT OPTIONS

- Port Relief (Screw Adjustable)
- Tamper-proof Port Relief (Screw Adjustable)
- Anti-cavitation Valve
- Combination Port Relief and Anti-cav Valve
- Combination Tamper-proof Port Relief and Anti-cav Valve
- Port Restrictors (Meter In or Meter Out) O.D.T. Only
- Fixed Port Restrictor
- Pilot Operated Check Valve (Lock Valve)

PORT RESTRICTOR ASSEMBLY



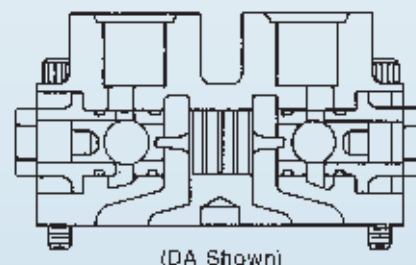
Part Numbers	
Fixed	31V-9000-004
Out\In	31V-9000-003

Restrictors are used to control the speed of a cylinder function and are not recommended for continuous duty or motor applications. Orifice plate is shipped blank and must be drilled to the appropriate size by the customer. The flow/pressure drop across the orifice can be calculated by the following formula: (Formula based on orifice coefficient of .6 and oil specific gravity of .895. Formula does not allow for viscosity change or regain of downstream pressure).

$$\text{GPM} = (24.12 \times A \text{ in sq.in.}) \times \sqrt{\text{Pressure Drop in PSI}}$$

$$\text{LPM} = (53.9 \times A \text{ in sq.cm.}) \times \sqrt{\text{Pressure Drop in Bars}}$$

LOCK VALVE

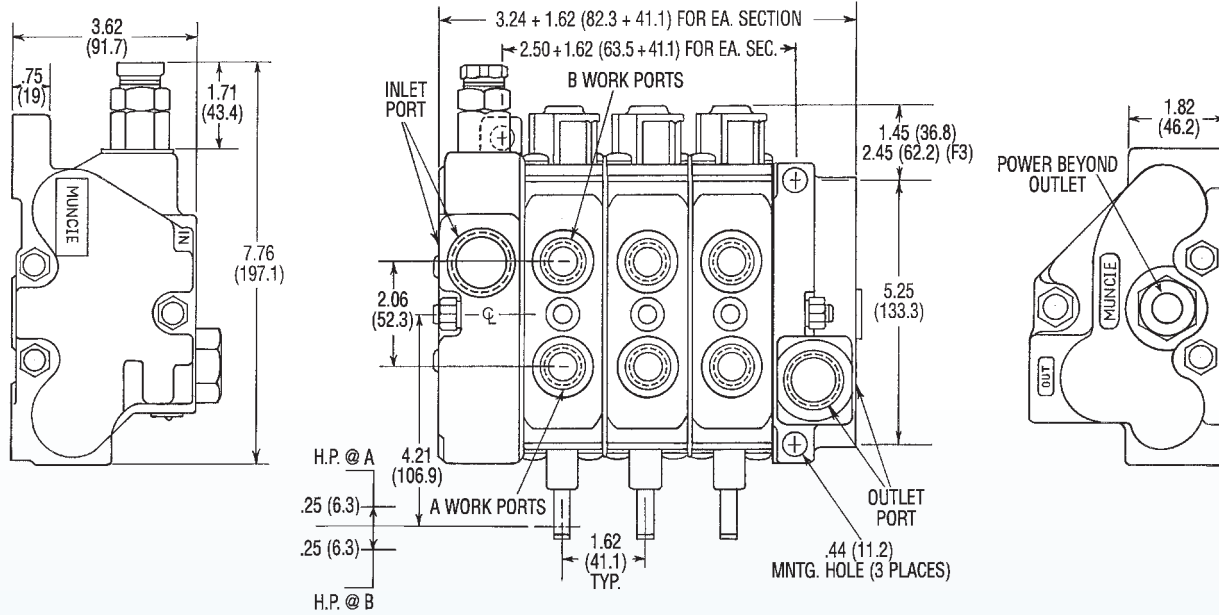


Lock Valves are pilot operated check valves and are used to lock a cylinder in position to prevent drifting. The check valve is unseated by an internal pressure signal from the appropriate work section.



DIMENSIONAL DATA

IN INCHES (MM)



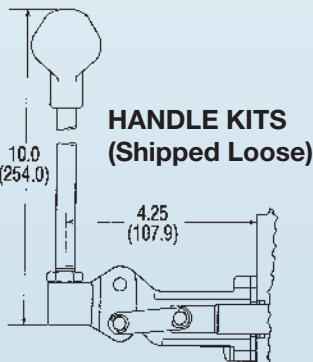
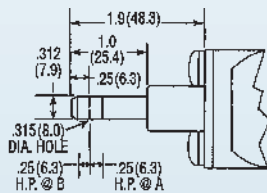
PORT SIZES	INLET	OUTLET	WORK PORTS	POWER BEYOND
SAE O.D.T. [Standard]	-12 (1 ¹ / ₁₆ -12)	-12 (1 ¹ / ₁₆ -12)	-10 (⁷ / ₈ -14)	-10 (⁷ / ₈ -14)
Pipe Thread [2500 PSI (172 Bar) Max]	-12* (³ / ₄ -14)	-12* (³ / ₄ -14)	-8 (¹ / ₂ -14)	-8 (¹ / ₂ -14)

*When on the side. When on the top -8 (1/2-14)

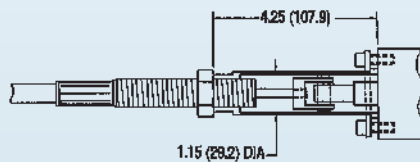
WEIGHTS	6 lbs. (2.72 kgs.)	4.6 lbs. (2.08 kgs.)	6.9 lbs. (3.13 kgs.)	NA
Stud Torque: 20 in.lbs. initial, 240 in.lbs. final.				

ACTUATORS

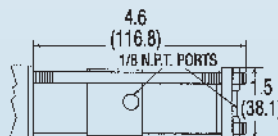
SPOOL EYE



REMOTE CABLE (Shipped Loose)



AIR SHIFT



AIR CYLINDER ACTIVATION KITS

(Spring Centered Toggle)

Includes all necessary tubing and fittings to hook up to truck air system.



No. of Sections	Kit No.
1	31VAK-1
2	31VAK-2
3	31VAK-3
4	31VAK-4
5	31VAK-5
6	31VAK-6

Air Cylinder is a separate item.

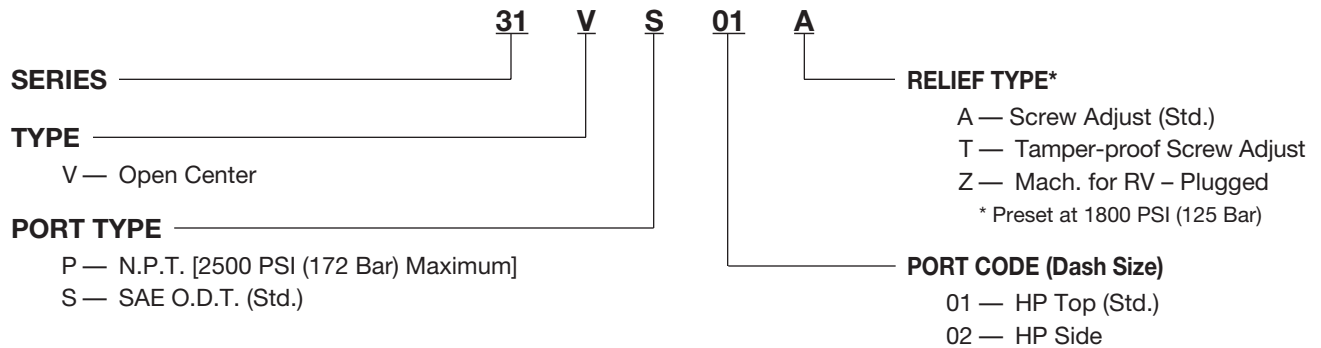
TOGGLE SWITCH ONLY

Spring Centered	1461A
Detented	1461D
Spring/Detented	1461AD

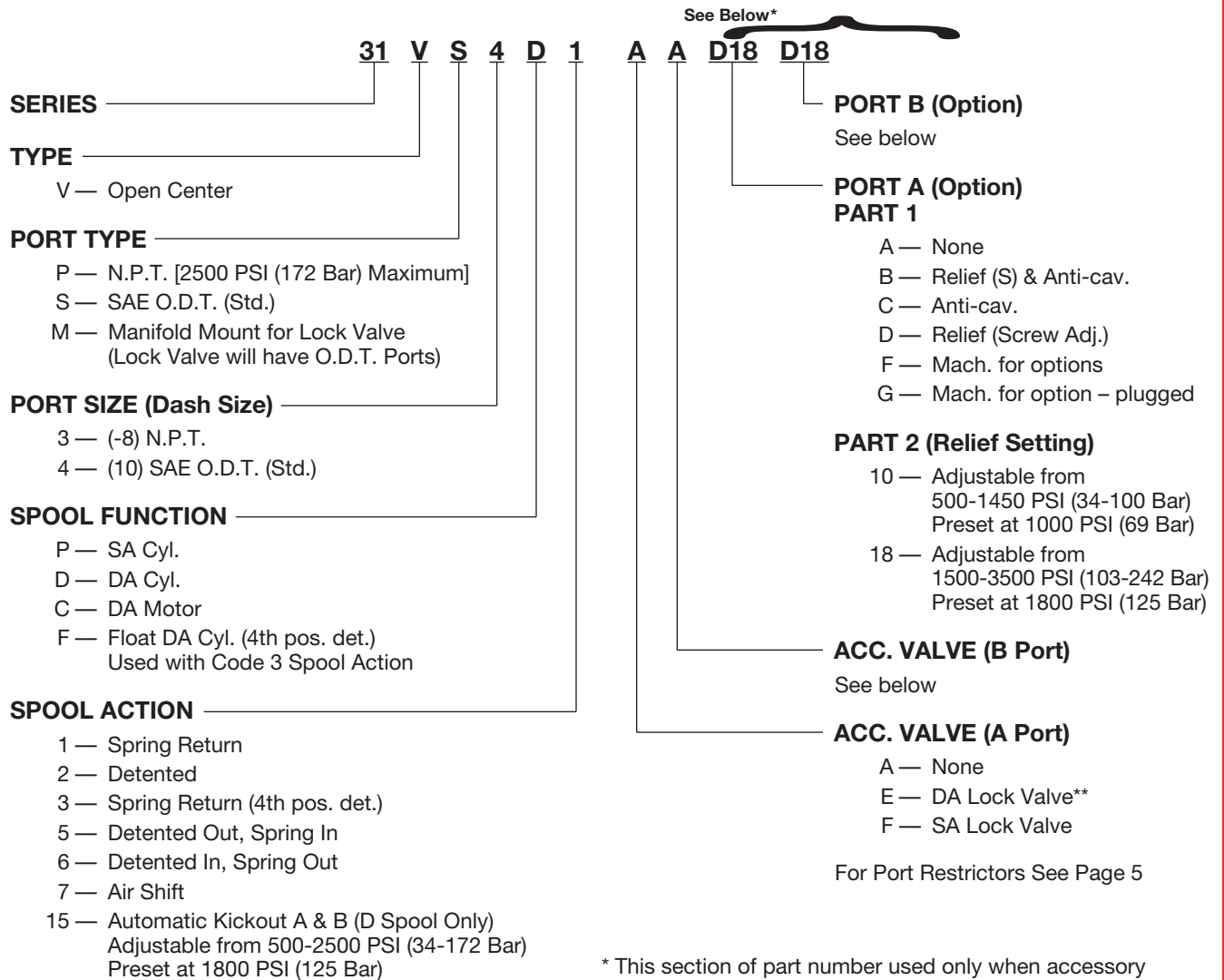


MODEL NUMBER CONSTRUCTION

INLET SECTION



WORK SECTION



Note: For DA Dump Body Cylinder, the Down Side Relief Valve should be in the A Port.

* This section of part number used only when accessory valves or port options required. If any option is required in this part number section, a code in each field must be used.

** Recommended to be used with C Spool.



MODEL NUMBER CONSTRUCTION

SPECIALTY SECTIONS (MID-INLET, FLOW CONTROL)

MID-INLETS

Used in conjunction with Tandem pumps. The section contains a pressure relief valve for system protection and has one inlet and one outlet port (-12 O.D.T.).

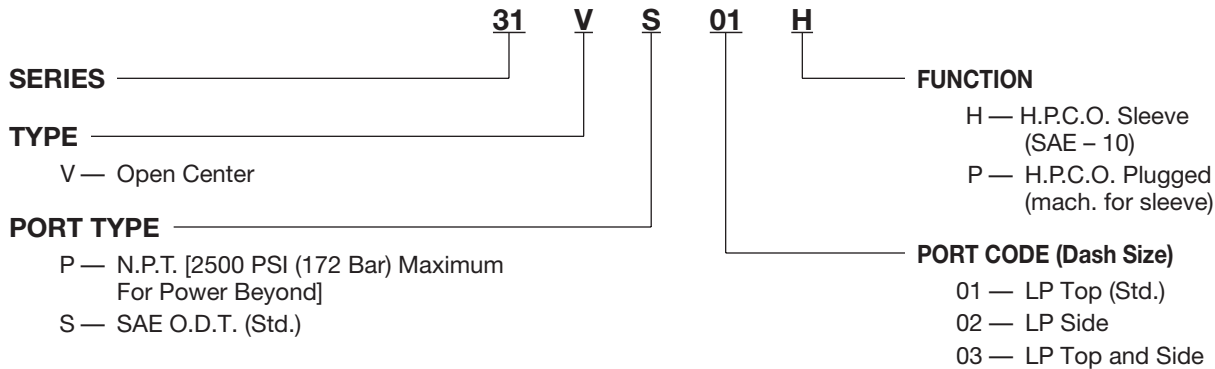
Split Flow Section: 31VSXSOA
 Combined Flow Section: 31VSXCOA

FLOW CONTROL

When positioned in valve stack assembly, any downstream work section will be able to be limited in flow by a pressure compensated adjustable flow control [Preset at 6 GPM (23 LPM)]. Adjustment range is from 3-11 GPM (11-42 LPM). Excess oil is bypassed back to tank.

Flow Control Section: 31VXXFOX

OUTLET SECTION



ASSEMBLY EXAMPLE

INLET WORK SECTION WORK SECTION OUTLET
31VS01A - 31VS4D1 - 31VS4P1 - 31VS01H

Section Part Number

31VS01A.....Inlet
 31VS4D1.....Work Section
 31VS4P1.....Work Section
 31VS01H.....Outlet (H.P.C.O. Sleeve)
 31V-STD-2.....Studs (Required for Assembly)

Notes: Valve Assembly Part Number Not Available.
 Does Not Include Handles (Part No. 31V-HVK-10)



31V SERIES VALVE ORDER FORM

ORDER FORM

CUSTOMER: _____

ORIGINATOR: _____

APPLICATION: _____

FLOW/PSI: _____

MISC: _____

INLET SECTION		C O D E
PORT TYPE	SAE O.D.T. (Std.)	S
	N.P.T.	P
PORT POSITION	High Pressure Top (Std.)	01
	High Pressure Side	02
RELIEF	Screw Adjust. (Std.)	A
	Tamper-Proof Screw Adjust	T
RV. SET	1800 PSI (125 Bar)	
PART NO. 31V _____		

OUTLET SECTION		C O D E
PORT TYPE	SAE O.D.T. (Std.)	S
	N.P.T.	P
PORT POSITION	Low Pressure Top (Std.)	01
	Low Pressure Side	02
	L.P. Top and Side	03
FUNCTION	Machined for H.P.C.O. (Std.)	P
	H.P.C.O. Sleeve Installed	H
PART NO. 31V _____		

WORK SECTIONS		C O D E	NO. OF SECTIONS					
			1	2	3	4	5	6
PORT TYPE	SAE O.D.T.	S						
	N.P.T.	P						
	Machined for Lock Valve	M						
PORT SIZE	N.P.T. (-8 Only)	3						
	SAE O.D.T. (-10 Only)	4						
SPOOL FUNCTION	Single Acting (Cylinder)	P						
	Double Acting (Cylinder)	D						
	Double Acting (Motor)	C						
	Float (4th Pos. Detent)	F						
SPOOL ACTION	3 Pos. Spring Return	1						
	3 Pos. Detented	2						
	Spring Return (4th Pos. Detent)	3						
	3 Pos. Detented Out/Spring In	5						
	3 Pos. Detent In/Spring Out	6						
	Air Shift	7						
	3 Pos. w/Automatic Kickout (DA only)	15						
ACCESSORY VALVE (A PORT)	None	A						
	Restrict In Only	B						
	Restrict Out Only	C						
	Restrictor Fixed	D						
	DA Lock Valve	E						
	SA Lock Valve	F						
ACCESSORY VALVE (B PORT)	None	A						
	Restrict In Only	B						
	Restrict Out Only	C						
	Restrictor Fixed	D						
	DA Lock Valve (Use w/C Spool)	E						
	SA Lock Valve	F						
PORT A OPTION	None	A						
	Screw Adj. R.V. & Anti-Cav.	B						
	Anti-Cav. Only	C						
	Screw Adj. Relief Only	D						
	Machined for Option (open hole)	F						
	Machined for Option (plugged)	G						
	Relief Setting added to above codes [10-1000 PSI (125 Bar), 18-1800 PSI (69 Bar)]	*						
PORT B OPTION	None	A						
	Screw Adj. R.V. & Anti-Cav.	B						
	Anti-Cav. Only	C						
	Screw Adj. Relief Only	D						
	Machined for Option (open hole)	F						
	Machined for Option (plugged)	G						
	Relief Setting added to above codes [10-1000 PSI (69 Bar), 18-1800 PSI (125 Bar)]	*						

PART NO. 31V _____

PART NO. 31V _____

PART NO. 31V _____

PART NO. 31V _____

PART NO. 31V _____

PART NO. 31V _____

STUD KIT _____

HANDLES () _____

COMPLETE ASS'Y NO. _____



GLOSSARY OF VALVE TERMS

ANTI-CAVITATION VALVE — allows tank line oil into workline when spool is returned to neutral to prevent cylinder or motor cavitation.

BACK PRESSURE — refers to pressure encountered on the return side of the system.

BALANCED SPOOLS — incorporate grooves or balancing rings to allow ease of movement under pressure.

CLOSED CENTER — is a condition in which all valve ports are blocked in the neutral position.

CRACKING PRESSURE — is the pressure at which a pressure actuated valve begins to pass fluid.

DIRECTIONAL CONTROL VALVE — selectively directs or prevents fluid flow to desired channels.

FLOAT SPOOL — connects working ports to reservoir.

FLOW CONTROL VALVE — controls the rate of oil flow. Rate can vary under different pressures.

FOUR WAY DIRECTIONAL CONTROL VALVE — alternately pressurizes and exhausts two working ports.

FULL FLOW PRESSURE — is the pressure at which a pressure actuated valve passes the full system flow.

HIGH PRESSURE CARRYOVER (POWER BEYOND) — is used for piping flow to another valve in the system. Flow to the second valve is available only when all spools in the first valve are in the neutral position.

LOAD CHECKS — allow the flow of fluid in one direction only.

LOCK VALVES — are pilot operated check valves used to hold cylinders in position and prevent drifting.

METERING — is a regulation of flow rate.

MOTOR SPOOL (OPEN CENTER) — is a spool in which the center position connects all ports.

PARALLEL CIRCUIT — is one in which components are interconnected so that flow can pass through any of the components anytime.

POPPET — is that part of certain valves which prevents flow when it closes against a seat.

PRESSURE COMPENSATED FLOW CONTROL VALVE — controls the rate of flow independent of system pressure.

PRESSURE RELIEF VALVE — limits system pressure.

PRESSURE DIFFERENTIAL (PRESSURE DROP) — is the difference in pressure between any two points of a system or a component.

PRIORITY FLOW DIVIDER — is a valve which directs flow to one operating circuit at a fixed rate and directs excess flow to another operating circuit.

RESTRICTORS — are a means of controlling flow and subsequent cylinder speed via an orifice (Not pressure compensated).

SELECTOR VALVE — is a two position, three way valve which alternately pressurizes two ports.

SERIES CIRCUITS — is one in which components are interconnected so that flow must pass through one component before moving on to the next.

OPEN CENTER — is a condition where the pump flow is piped to reservoir.

THREE WAY DIRECTIONAL CONTROL VALVE — alternately pressurizes and exhausts one working port.

VALVE ACTUATOR — is the device to which force is applied to move or position a valve spool.

TROUBLESHOOTING HYDRAULIC VALVES

TROUBLES	PROBABLE CAUSE	REMEDY
Oil leaks between sections.	Pinched or blown section seal. Studs not correctly torqued. Mounting plate not level.	Replace seal. Replace seal and torque. Shim mounting surface.
Oil leaks at either end of spool.	Damaged o-rings in valve body. Overpressurized tank core.	Replace o-rings. Correct high pressure tank line condition.
Unable to push spool in.	Oil leakage past spool seal into spool cap.	See above.
Spring-centered spools do not return to neutral.	Broken springs. Excessive back pressure in tank line. Foreign particles. Misalignment of operating linkage.	Replace springs. Relieve condition. H.P.C.O. may be required. Clean system and valve. Check linkage for binding condition.
Detent type spools will not stay in detent position.	Worn poppet. Worn detent barrel. Weak or broken detent ring.	Replace poppet. Replace detent barrel. Replace detent ring.
No motion, slow or jerky action of hydraulic system.	Defective pump. Defective cylinder. Relief valve not properly set. Relief valve does not function properly. Dirt or foreign particles lodged between relief valve plunger and seat. Spool not moved to full stroke. Low oil level, pump inlet restricted.	Check pressure. Repair or replace. Check pressure setting. Repair and readjust. Disassemble, clean and reassemble. Check travel. See above. Add oil to reservoir, check lines.
Load will not hold.	Oil bypassing between spool and body. Cylinder leaking or worn. Dirt in port relief.	Replace valve section. Check/repair cylinder. Clean or replace.
Load drops when spool is moved from neutral to a power position.	Dirt or foreign particles lodged between check valve poppet and seat. Scored check valve poppet.	Disassemble, clean and reassemble. Replace poppet.



VALVE WARRANTY

The Muncie 31V Series Valve is warranted against any defect in material and workmanship which existed at the time of sale by Muncie, according to the following provisions, subject to the requirements that the Valve must be used only in accordance with catalogue and package instructions.

The Valve is warranted for a period of one year from date of installation. If during the warranty period the Valve fails to operate to Muncie's specifications due to a defect in any part in material or workmanship that existed at the time of sale by Muncie, the defective part will be repaired or replaced, at Muncie's election, at no charge, if the defective part is returned to Muncie with transportation prepaid.

Warning. The above warranty shall terminate if any alterations or repairs are made to the Valve other than at a Service Center owned by Muncie, or if the Valve is used upon any equipment other than the equipment upon which it is first installed.

THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER OBLIGATIONS AND LIABILITIES, INCLUDING NEGLIGENCE AND ALL WARRANTIES OF MERCHANTABILITY AND SUITABILITY, EXPRESSED OR IMPLIED AND STATE MUNCIE'S ENTIRE AND EXCLUSIVE LIABILITY AND BUYER'S EXCLUSIVE REMEDY FOR ANY CLAIM OF DAMAGES IN CONNECTION WITH THE SALE, REPAIR OR REPLACEMENT OF THE ABOVE GOODS, THEIR DESIGN, INSTALLATION OR OPERATION. MUNCIE WILL IN NO EVENT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, AND OUR LIABILITY UNDER NO CIRCUMSTANCES WILL EXCEED THE CONTRACT PRICE FOR THE GOODS FOR WHICH LIABILITY IS CLAIMED.

OPTIONAL CONTROL VALVES

MSV-16 Selector Valve



A two position, three-way selector valve provides a simple method of directing the flow of oil to two separate hydraulic functions.

Max. Flow – 90 GPM (341 LPM)
Max. Pressure – 3000 PSI (207 BAR)
Ports – 1" N.P.T. or O.D.T.

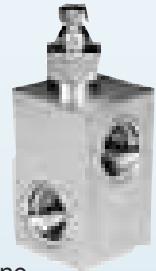
PFD-30 Priority Flow Divider



Priority Flow Divider valve provides simultaneous flow for two separate hydraulic circuits from a single pump. The priority flow is adjustable from 0 to 30 GPM (114 LPM). The excess or bypass flow can be used in a second circuit or directed to reservoir.

Max. Flow – 30 GPM (114 LPM)
Max. Pressure – 3000 PSI (207 BAR)
Ports – 3/4" N.P.T.

RV-30, RV-60 Pilot Operated Relief Valves



Maintaining a constant maximum pressure with widely varying flow rates. Can be mounted in-line or line mounted.

Model – RV-30
Max. Flow – 30 GPM (114 LPM)
ADJ Pressure Range –
300-3000 PSI (21-207 BAR)
Ports – .10 SAE Straight Thread
[Preset at 1000 PSI (69 BAR)]

Model – RV-60
Max. Flow – 60 GPM (227 LPM)
Range – 300-3000 PSI (21-207 BAR)
Ports – .16 SAE Straight Thread
[Preset at 2000 PSI (138 BAR)]

Call for larger capacity or higher pressure requirements.



Muncie®
Power
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