



# 90V SERIES DIRECTIONAL CONTROL VALVE

90 GPM (342 LPM) • 2,500 PSI (172 BAR) • SECTIONAL TYPE

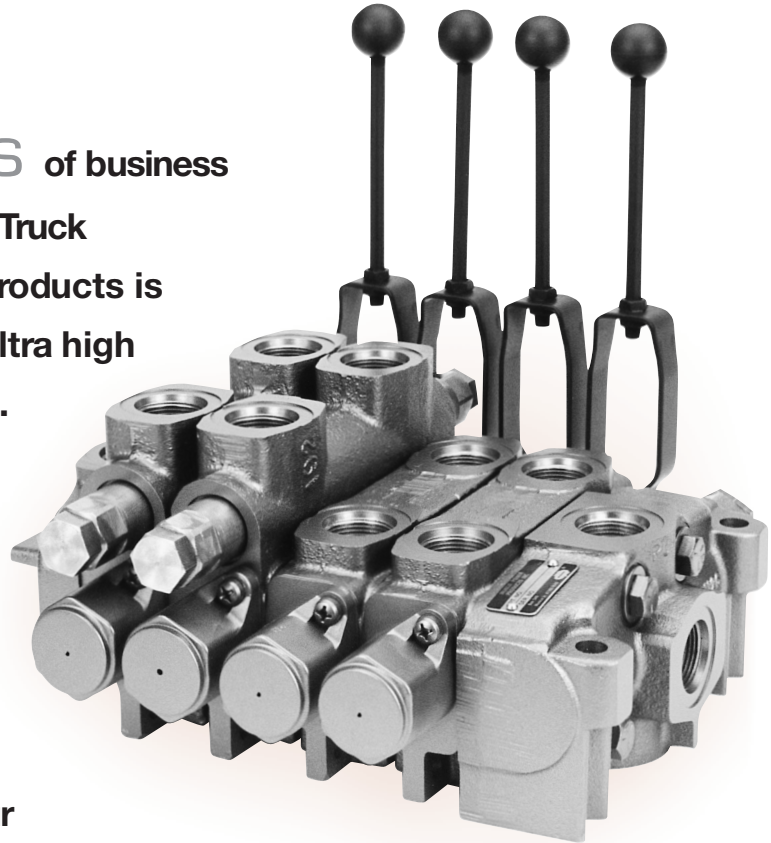


Muncie Power Products, Inc.

With over 70 years of business

and expertise solely dedicated to the Truck Equipment market, Muncie Power Products is pleased to offer a complete line of ultra high capacity Directional Control Valves.

The new 90V Series Valve line can handle high flow capacities with minimal open center pressure losses. Our sectional style parallel design valves can be assembled with numerous spool types, control styles and port options to fit all of your specific application needs. Call today so we can help put you back in control of your hydraulic system.



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## APPLICATIONS

SNOW AND ICE CONTROL SYSTEMS

UTILITY EQUIPMENT

DUMP BODIES

SPREADERS

TOW RECOVERY VEHICLES

LUBE TRUCKS AND CRANES

REFUSE EQUIPMENT

BULK FEED BODIES

BULK TANKERS

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## VALVE FEATURES

- Steel castings for durability and shock load resistance for your high pressure needs.
  - Full flow relief valves.
  - 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 for a broad range of applications.
  - Stackable (sectional) design allows for customizing the assembly to your specific needs.
  - Low open center pressure drop.
  - Modern machinery and SPC manufacturing procedures produce assemblies with minimal internal leakage to 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, 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

<b>Construction</b> .....	Sectional	<b>Spool Force</b> .....	50 Lbs. (22.7 Kg) Maximum
<b>Circuit</b> .....	Parallel/Open Center	<b>Temperature</b> .....	-20°F to 200°F (-29°C to 93°C)
<b>Capacity</b> .....	60 GPM (228 LPM) Nominal 90 GPM (342 LPM) Maximum	<b>Seal Type</b> .....	Buna-N
<b>Maximum System Pressure</b> ...	2,500 PSI (172 Bar) SAE O.D.T.	<b>Relief Valve</b> .....	Differential Type Adjustable from 1500 to 3,000 PSI (103.5 to 207 Bar) [preset at 2,000 PSI (138 Bar)]
<b>Maximum Tank Pressure</b> .....	150 PSI (10 Bar)		
<b>Filtration</b> .....	25 Micron		

## 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
30 (114)	11 (0.75)	12 (0.82)	21 (1.44)	35 (2.41)	41 (2.82)	51 (3.51)
40 (152)	15 (1.03)	31 (2.13)	39 (2.68)	57 (3.93)	70 (4.82)	84 (5.79)
50 (190)	23 (1.58)	43 (2.96)	62 (4.27)	85 (5.86)	105 (7.24)	123 (8.48)
60 (228)	34 (2.34)	60 (4.13)	87 (6.00)	115 (7.90)	142 (9.79)	171 (11.79)
70 (266)	43 (2.96)	76 (5.24)	123 (8.48)	149 (10.27)	185 (12.75)	215 (14.82)
80 (304)	54 (3.72)	96 (6.62)	156 (10.75)	190 (13.10)	234 (16.13)	273 (18.82)
90 (342)	83 (5.72)	152 (10.48)	174 (12.00)	298 (20.55)	370 (25.50)	430 (29.65)

## INTERNAL PRESSURE DROP (WORK PORTS)

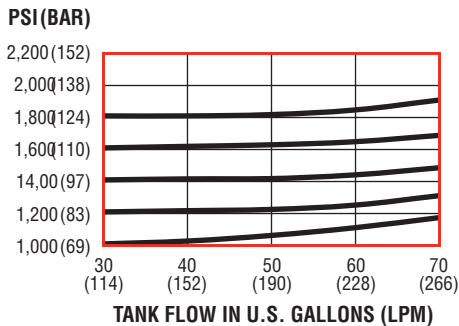
VALUES IN PSI (BAR)

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

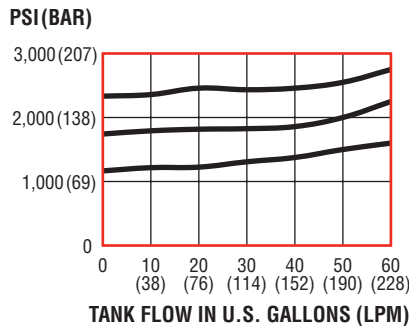
FLOW IN GPM (LPM)	NUMBER OF SECTIONS					
	1	2	3	4	5	6
30 (114)	52 (3.58)	54 (3.72)	57 (3.93)	59 (4.06)	61 (4.20)	63 (4.34)
40 (152)	82 (5.65)	85 (5.86)	90 (6.20)	94 (6.48)	98 (6.75)	102 (7.03)
50 (190)	128 (8.82)	130 (8.96)	138 (9.51)	141 (9.72)	146 (10.06)	151 (10.41)
60 (228)	181 (12.48)	185 (12.75)	190 (13.10)	200 (13.79)	205 (14.13)	210 (14.48)
70 (266)	238 (16.41)	241 (16.62)	249 (17.17)	253 (17.44)	261 (18.12)	270 (18.62)
80 (304)	306 (21.10)	309 (21.31)	320 (22.06)	325 (22.41)	336 (23.17)	347 (23.93)
90 (342)	362 (24.96)	370 (25.51)	380 (27.58)	400 (27.58)	410 (28.27)	420 (28.96)

**Note:** Values shown are for the total valve loop, inlet to work port – work port to tank. Approximately 30% of the value shown is the work port to tank pressure drop.

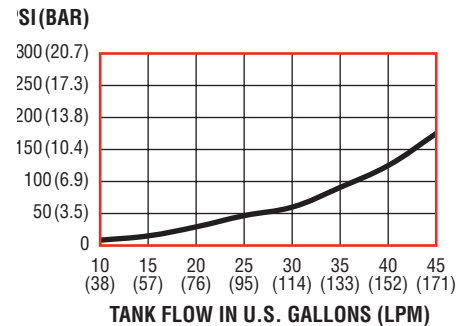
## MAIN RELIEF VALVE CURVE



## WORK PORT RELIEF VALVE CURVE

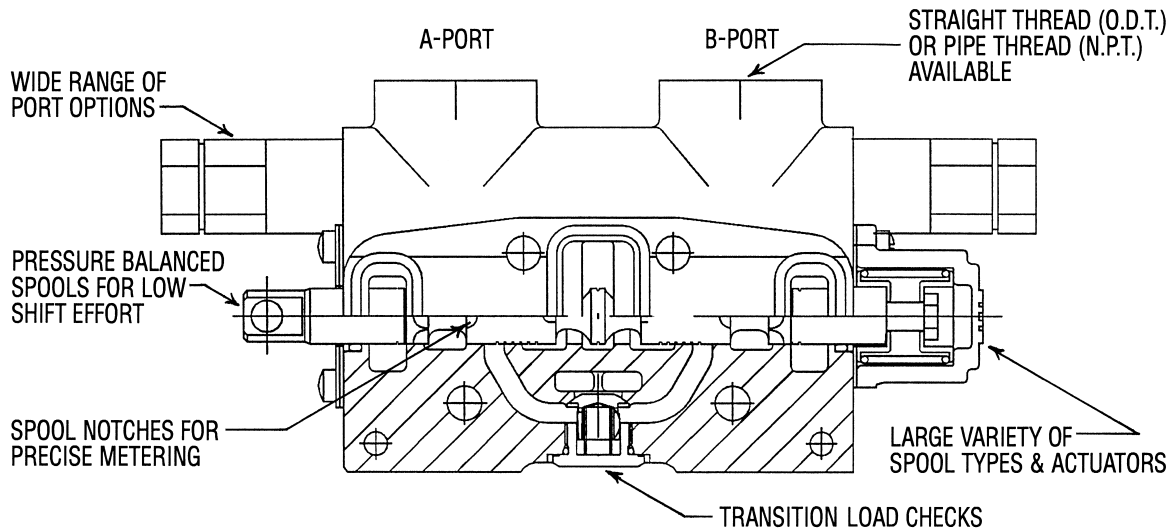


## ANTI-CAVITATION VALVE CURVE





# VALVE CONSTRUCTION



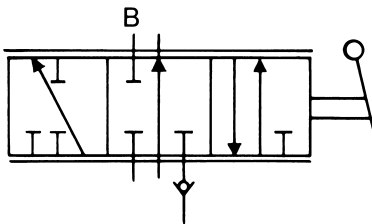
## PORT OPTIONS

- Port Relief (Shim Adjustable)
- Anti-Cavitation Valve
- Combination Port Relief and Anti-Cavitation Valve
- Port Restrictors (O.D.T. Only)

## SPOOL FUNCTION OPTIONS

### P (SINGLE ACTING)

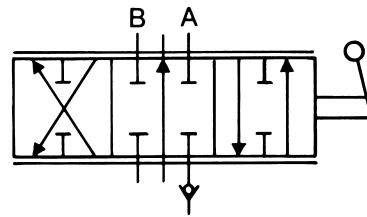
3 Position – 3 Way



For single acting cylinder and non-reversing motors.

### D (DOUBLE ACTING)

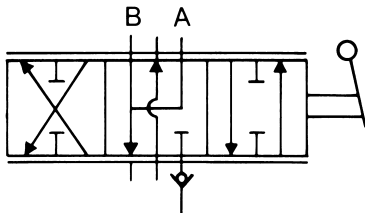
3 Position – 4 Way



For double acting cylinders.

### C (MOTOR)

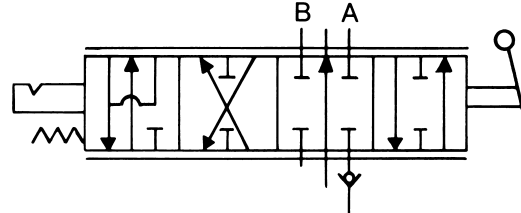
3 Position – 4 Way



For reversible motors.

### F (FLOAT)

4 Position – 4 Way

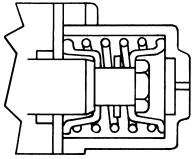


For single or double acting cylinders with fourth position work ports open to tank.

Note: Series style spools are available upon special request.

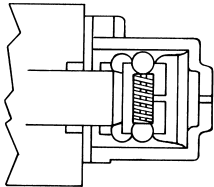
## SPPOOL ACTION OPTIONS

### SPRING CENTERED (CODE 1)



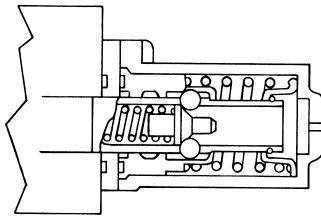
Three positions with spring return to neutral.

### DETENT (CODE 2)



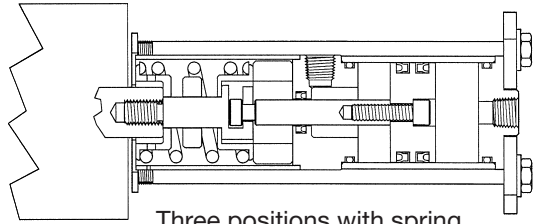
Will remain in any of the three detented positions. No spring return to neutral.

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



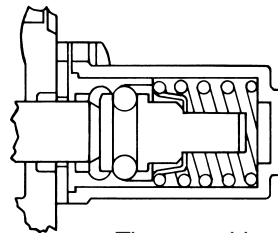
Spring return to neutral with a fourth detented (float) position. (Use only with F spool.)

### AIR SHIFT (CODE 7)



Three positions with spring return to neutral but air shifted.

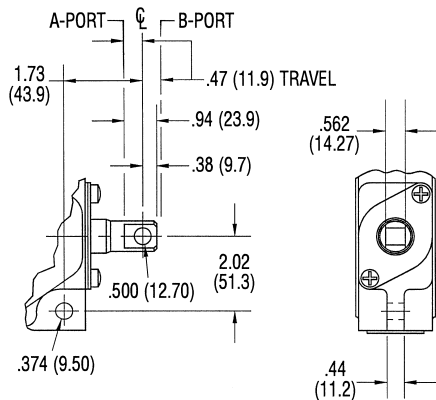
### SPRING/DETENT (For SA Cylinders) (CODE 6)



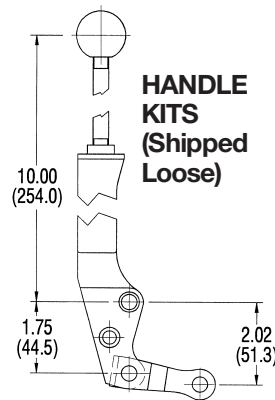
Three positions with spring centered to neutral on one side and detented on the other side.

## ACTUATORS

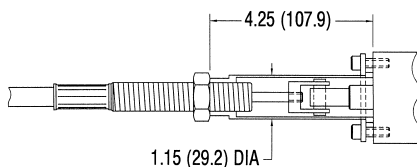
### SPPOOL EYE



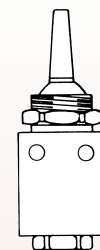
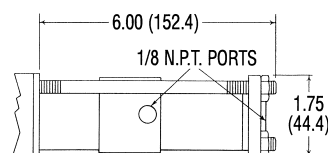
### HANDLE KITS (Shipped Loose)



### 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. 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

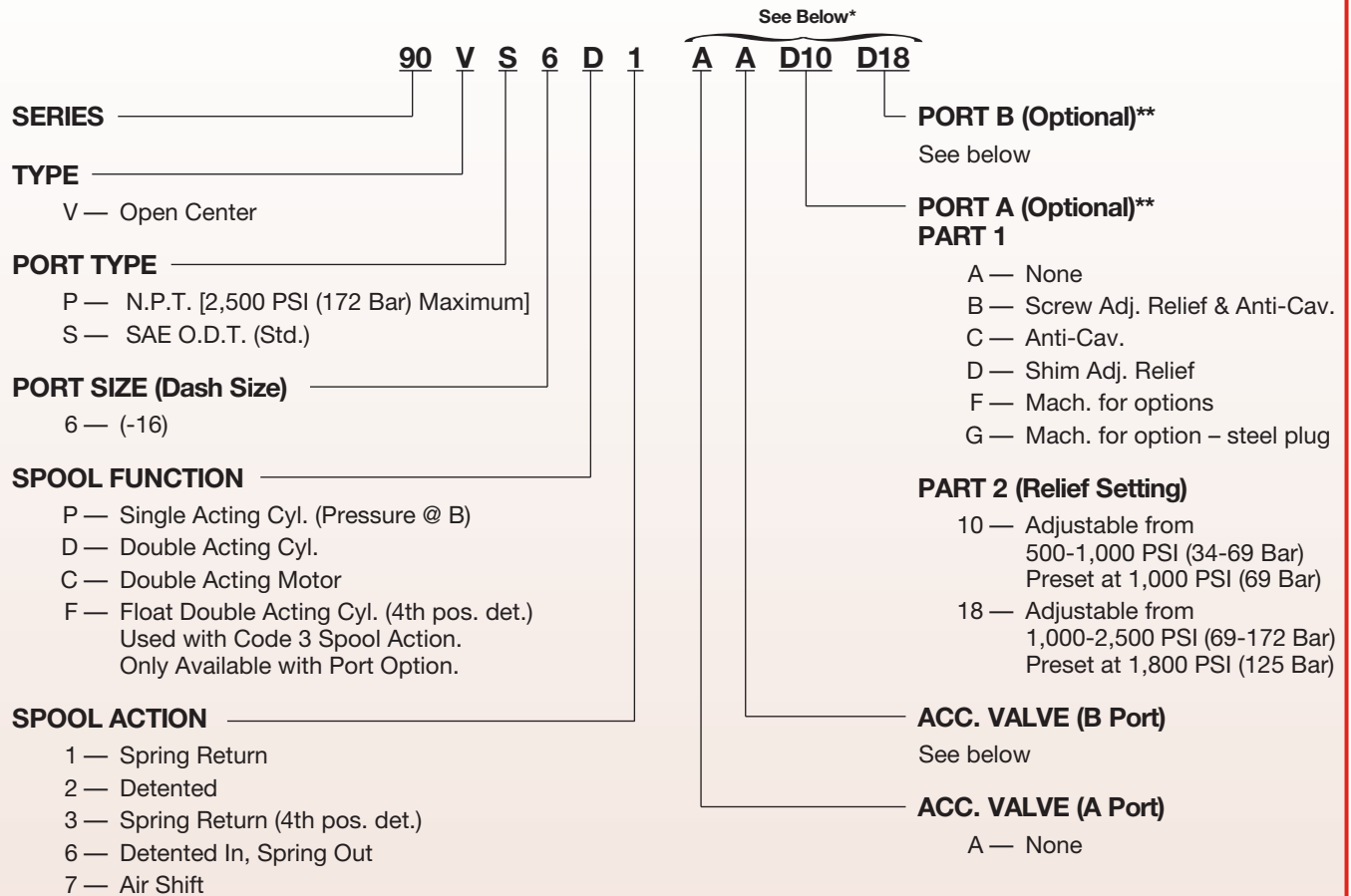
Spring Centered	1461A
Detented	1461D
Spring/Detented	1461AD





# MODEL NUMBER CONSTRUCTION

## WORK SECTION

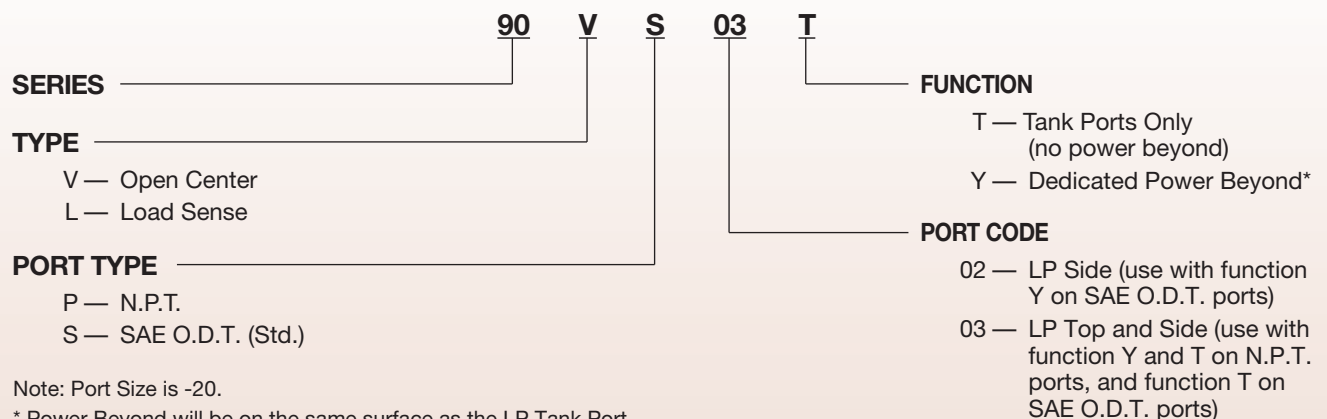


Note: For Double Acting Dump Body Cylinder, the Down Side Relief Valve should be in the A Port.

\* 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.

\*\* Both ports are machined to accept the relief valve (except for the P Spool/Port A). If only one relief valve is used, the other hole must be plugged with the steel plug code G.

## OUTLET SECTION



Note: Port Size is -20.

\* Power Beyond will be on the same surface as the LP Tank Port.



# MODEL NUMBER CONSTRUCTION

## SPECIALTY SECTION (MID-INLET)

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

FLOW SECTION	STR. THD. (O.D.T.)	PIPE THREAD
SPLIT FLOW	90VS6MSOA	90VP6MSOA
COMBINED FLOW	90VS6MCOA	90VP6MCOA

## STUD KITS

NUMBER SECTIONS	PART NUMBER	LENGTH [IN (MM)]
ONE SECTION	90V-STD-1	5.00 (127.00)
TWO SECTIONS	90V-STD-2	7.00 (177.80)
THREE SECTIONS	90V-STD-3	9.00 (228.60)
FOUR SECTIONS	90V-STD-4	11.00 (279.40)
FIVE SECTIONS	90V-STD-5	13.00 (329.00)
SIX SECTIONS	90V-STD-6	15.00 (381.00)

**Note:** Torque to 20 in.lbs. initial, 400 in.lbs. final.

## ASSEMBLY EXAMPLE

**INLET                      WORK SECTION                      WORK SECTION                      OUTLET**  
**90VS03A - 90VS6D1AAD10A - 90VS6P1 - 90VS03T**

### Section Part Number

90VS03A.....Inlet  
 90VS6D1AAD10A .....Work Section  
 90VS6P1 .....Work Section  
 90VS03T .....Outlet (Tank Ports)  
 90V-STD-2.....Studs (Required for Assembly)

**Notes:** Valve Assembly Part Number Not Available.  
 Does Not Include Handles (Part No. 90V-HVK-10)





# 90V SERIES VALVE ORDER FORM

**ORDER FORM**

**CUSTOMER:** \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**ORIGINATOR:** \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

**APPLICATION:** \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

**FLOW/PSI:** \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

**MISC:** \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

<b>INLET SECTION</b> (See Page 6)		<b>C O D E</b>
<b>PORT TYPE</b>	SAE O.D.T. (Std.)	S
	N.P.T.	P
<b>PORT POSITION</b>	High Pressure Top & Side	03
<b>RELIEF</b>	Screw Adjust. (Std.)	A
<b>R.V. SET</b>	2,000 PSI (138 Bar)	
PART NO. 90V _____		

<b>OUTLET SECTION</b> (See Page 7)		<b>C O D E</b>
<b>PORT TYPE</b>	SAE O.D.T. (Std.)	S
	N.P.T.	P
<b>PORT POSITION</b>	L.P. & H.P.C.O. Top	01
	L.P. & H.P.C.O. Side (Std.)	02
	L.P. Top and Side	03
<b>FUNCTION</b>	Dedicated H.P.C.O. (Std.)	Y
	Dedicated Tank Ports	T
PART NO. 90V _____		

<b>WORK SECTIONS</b> (See Page 7)		<b>C O D E</b>	<b>NO. OF SECTIONS</b>					
			1	2	3	4	5	6
<b>PORT TYPE</b>	SAE O.D.T.	S						
	N.P.T.	P						
<b>PORT SIZE</b>	N.P.T. (-16)	6						
	SAE O.D.T. (-16)	6						
<b>SPOOL FUNCTION</b>	Single Acting (Cylinder)	P						
	Double Acting (Cylinder)	D						
	Double Acting (Motor)	C						
	Float (4th Pos. Detent)	F						
<b>SPOOL ACTION</b>	3 Pos. Spring Return	1						
	3 Pos. Detented	2						
	Spring Return (4th Pos. Detent)	3						
	3 Pos. Detent In/Spring Out	6						
	Air Shift	7						
<b>ACCESSORY VALVE (A PORT) – None</b>		A						
<b>ACCESSORY VALVE (B PORT) – None</b>		A						
<b>PORT A OPTION</b>	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 (steel plug)	G						
	Relief Setting added to above codes [10-1,000 PSI (125 Bar), 18-1800 PSI (69 Bar)]	*						
<b>PORT B OPTION</b>	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 (steel plug)	G						
	Relief Setting added to above codes [10-1,000 PSI (69 Bar), 18-1800 PSI (125 Bar)]	*						

PART NO. 90V \_\_\_\_\_

PART NO. 90V \_\_\_\_\_

PART NO. 90V \_\_\_\_\_

PART NO. 90V \_\_\_\_\_

PART NO. 90V \_\_\_\_\_

PART NO. 90V \_\_\_\_\_

**STUD KIT** \_\_\_\_\_

**HANDLES ( )** \_\_\_\_\_

**COMPLETE ASS'Y NO.** \_\_\_\_\_



# GLOSSARY OF VALVE TERMS

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**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 CIRCUIT** — 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
<b>Oil leaks between sections.</b>	Pinched or blown section seal. Studs not correctly torqued.  Mounting plate not level.	Replace seal.  Replace seal and retorque. (20 in.lbs. initial, 400 in.lbs. final)  Shim mounting surface.
<b>Oil leaks at either end of spool.</b>	Damaged O-Rings in valve body. Overpressurized tank core.	Replace O-Rings.  Correct high pressure tank line condition.
<b>Unable to push spool in.</b>	Oil leakage past spool seal into spool cap.	See above.
<b>Spring-centered spools do not return to neutral.</b>	Broken springs.  Excessive back pressure in tank line.  Foreign particles.  Misalignment of operating linkage.	Replace springs.  Relieve condition. H.P.C.O. (power beyond) may be required.  Clean system and valve.  Check linkage for binding condition.
<b>Detent type spools will not stay in detent position.</b>	Worn poppet.  Worn detent barrel.  Weak or broken detent ring.	Replace poppet.  Replace detent barrel.  Replace detent ring.
<b>No motion, slow or jerky action of hydraulic system.</b>	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.
<b>Load will not hold.</b>	Oil bypassing between spool and body.  Cylinder leaking or worn.  Dirt in port relief.	Replace valve section.  Check/repair cylinder.  Clean or replace.
<b>Load drops when spool is moved from neutral to a power position.</b>	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 90V 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 Muncie Power Products, 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

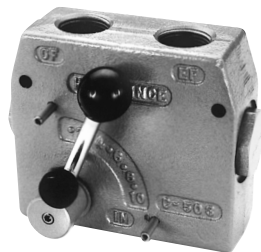
### MSV-16 Selector Valve



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 – 3,000 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 – 3,000 PSI (207 BAR)**  
**Ports – ¾" N.P.T. or O.D.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 –**  
**300-3,000 PSI (21-207 BAR)**  
**Ports – .10 SAE Straight Thread**  
**[Preset at 1,000 PSI (69 BAR)]**

**Model – RV-60**  
**Max. Flow – 60 GPM (227 LPM)**  
**Range – 300-3,000 PSI (21-207 BAR)**  
**Ports – .16 SAE Straight Thread**  
**[Preset at 2,000 PSI (138 BAR)]**

**Call for larger capacity or higher pressure requirements.**



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