



VO40 Open-Center Directional Control Valve

*Catalog HY17-8505/UK
April 2007*



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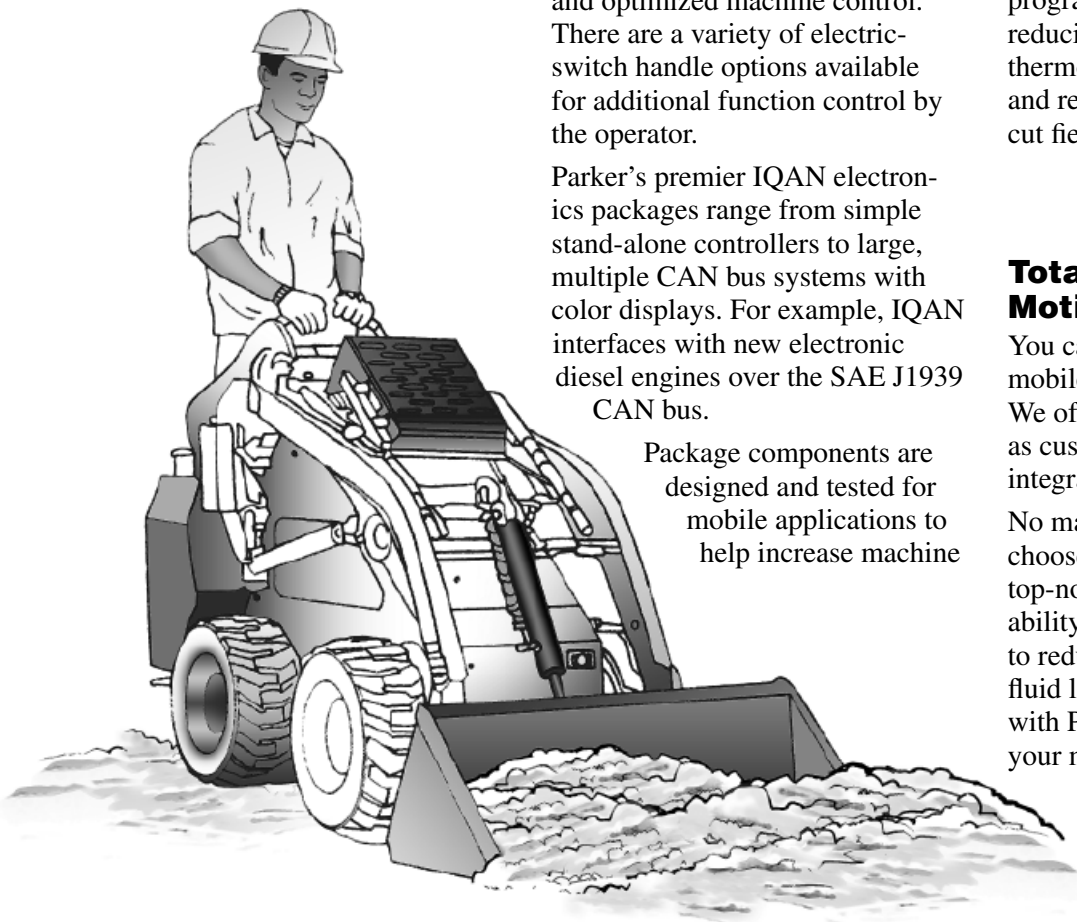
Conversion factors

1 kg	= 2.2046 lb
1 N	= 0.22481 lbf
1 bar	= 14.504 psi
1 l	= 0.21997 UK gallon
1 l	= 0.26417 US gallon
1 cm ³	= 0.061024 in ³
1 m	= 3.2808 feet
1 mm	= 0.03937 in
$9/5 \text{ } ^\circ\text{C} + 32$	= $^\circ\text{F}$

Breadth of Line

Parker Hannifin is a Fortune 500 company with sales of \$9 billion and over 400,000 customers in 43 countries. Parker is the world's leading supplier of motion control components and system solutions serving the mobile, industrial and aerospace markets.

Parker is your single source for any hydraulic valve requirement. We provide a wide selection of open-center and load-sense directional control valves for any construction, off-highway, or on-highway application. Many of our open-center valves can be adapted and used as closed-center, constant-pressure, and constant-pressure unloaded valves. Each of these technologies offers unique features for improved machine performance over traditional, open-center control valves.



When remote control is required, Parker provides a broad line of pilot controllers that are compact and pressure-matched with our control valves to provide consistent and optimized machine control. There are a variety of electric-switch handle options available for additional function control by the operator.

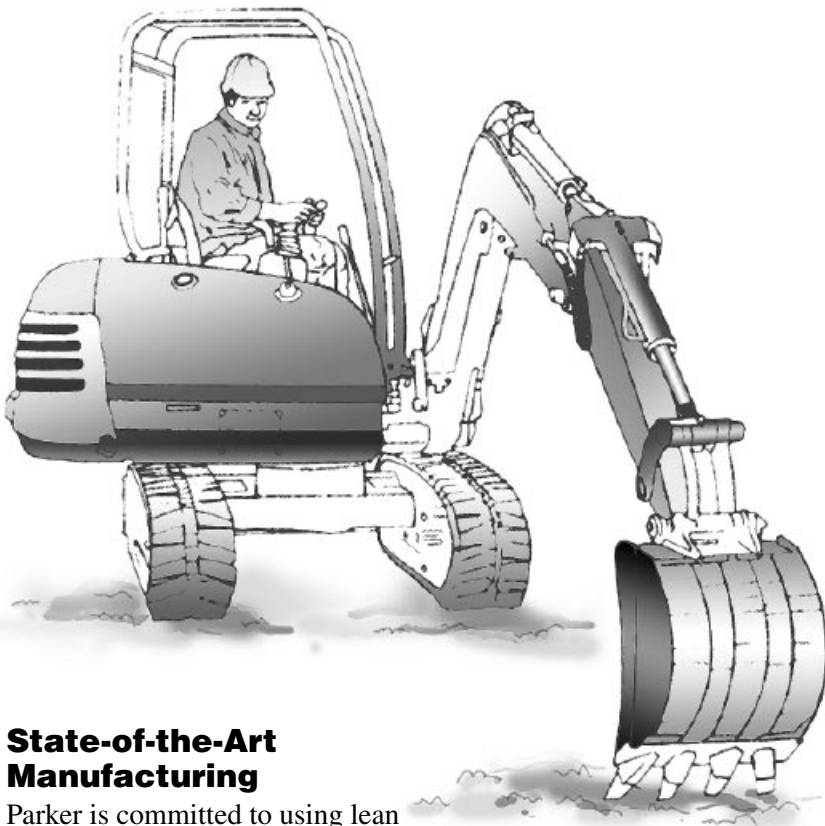
Parker's premier IQAN electronics packages range from simple stand-alone controllers to large, multiple CAN bus systems with color displays. For example, IQAN interfaces with new electronic diesel engines over the SAE J1939 CAN bus.

Package components are designed and tested for mobile applications to help increase machine

uptime. The IQAN valve drivers offer superior control of proportional hydraulic functions resulting in increased machine productivity. Non-programmers find IQAN's programming interface easy to use, reducing development time. Furthermore, excellent diagnostic tools and remote modem connection help cut field service time.

Total Machine Motion Control

You can turn to us for all your mobile motion control solutions. We offer stand-alone valves, as well as custom-designed manifolds with integrated directional control valves. No matter what type of system you choose, Parker solutions provide top-notch performance and reliability. Our systems are optimized to reduce complexity, size, cost, and fluid leakage. Therefore, working with Parker can significantly cut your machine-build time.



**State-of-the-Art
Manufacturing**

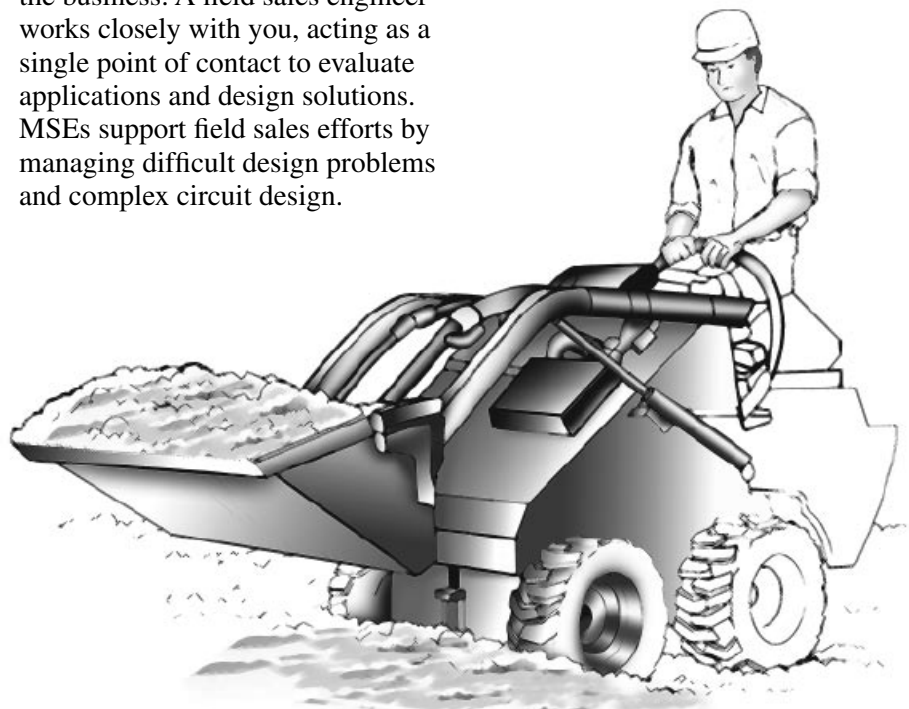
Parker is committed to using lean manufacturing to eliminate waste while streamlining processes. Lean technology helps us meet customer request dates quickly and cost-effectively. We also rely on state-of-the-art equipment and technology, such as computer-aided machining, to ensure product quality.

We regularly invest in our ISO 9001 certified manufacturing facilities because we are committed to meeting all international standards for safety and quality. The hydraulic valves we manufacture comply with relevant ISO, CSA, CE, and AMEX standards.

In addition, Parker hydraulic valves and valve manifolds are fully tested and certified before being released to the customer. You can expect Parker hydraulic valves to work the first time, every time.

**Customer Service
with A Global Reach**

Parker's worldwide network of field sales engineers and Mobile Systems Engineers (MSEs) are the best in the business. A field sales engineer works closely with you, acting as a single point of contact to evaluate applications and design solutions. MSEs support field sales efforts by managing difficult design problems and complex circuit design.



You also benefit from Parker Mobile Technology Centers (MTCs) that are staffed by specially trained distributors who provide only the highest levels of customer service. These one-stop shops offer complete hydraulic systems design for mobile applications, as well as technology services such as diagnostics, troubleshooting, computer design, testing, and integration of electronic controls.

Finally, our thousands of dependable distributors are strategically located in your markets. They carry inventory to meet specific, local market needs, and they ensure that products arrive when and where they are needed. You can count on Parker distributors to minimize downtime.

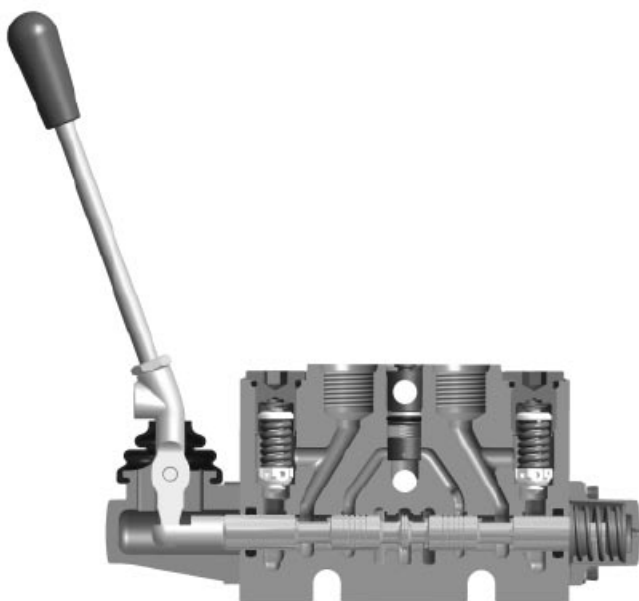
To locate your nearest distributor for the latest information on the VO40 Directional Control Valve, or our entire mobile valve line-up, visit us at www.parker.com/eurohyd.

General Description

The VO40 is an open-center directional control valve with the flexibility of sectional construction. Consistent with this technology, it is simple in its application, reliable, easy to troubleshoot, and cost effective. The global design reflects the performance and quality expected by today's machine designers. Spools have metering notches in the three critical areas – open-center, parallel path and tank, which optimizes simultaneous metering. Contemporary honing technology is used to deliver low work port to tank leakage. Additionally, each work section has a transition check to ensure that a load does not “dip” during simultaneous operation. All of these features, plus those listed below, were intended to take machine controllability to the next level.

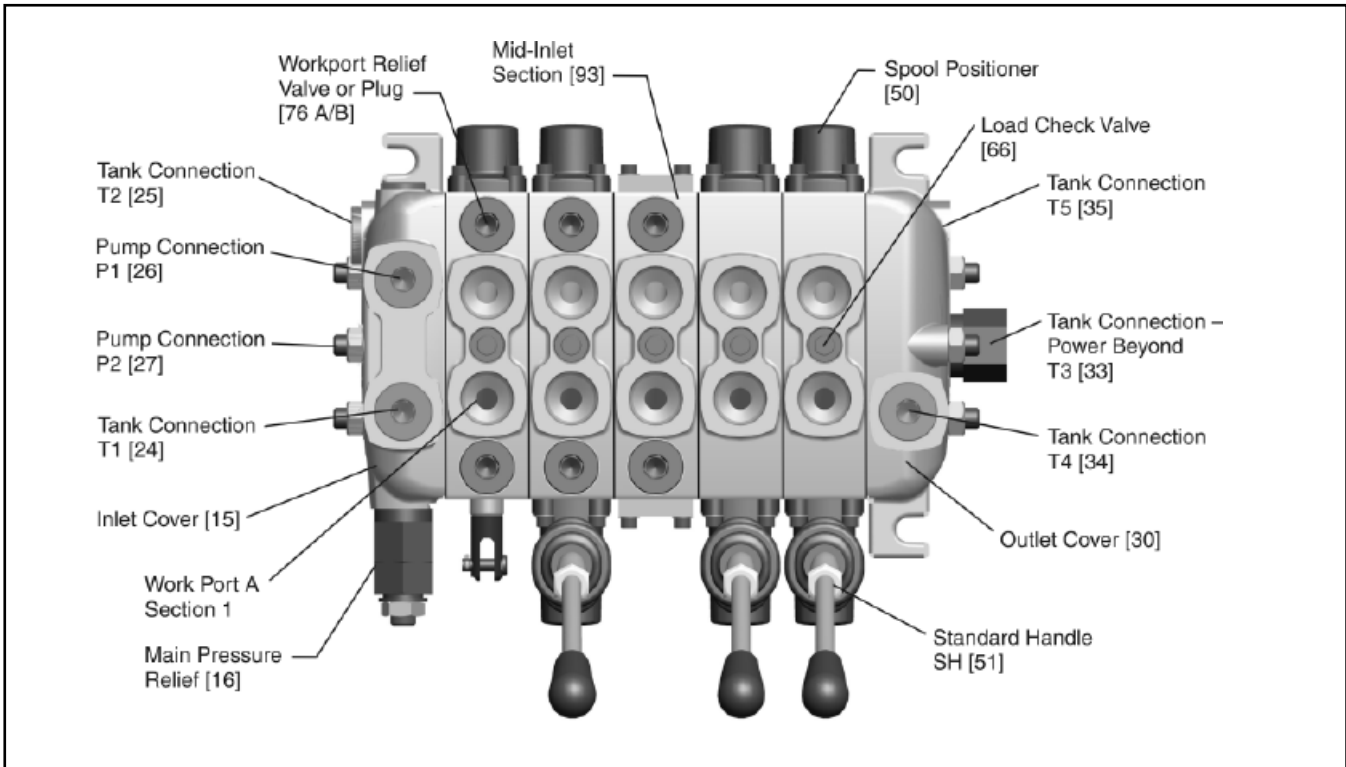
Operation

The VO40 incorporates traditional open-center technology. It is usually interfaced with a constant flow pump, whose flow is routed directly to tank when the spools are in neutral. When one or more spools are selected, flow is directed to the actuators. The throttling of that flow depends upon the spool position and the design of the metering notches. Spool notches can be designed to accommodate resistive loads (meter-in) and negative loads (meter-out). To accommodate multiple pump circuits, split flow and combined flow mid inlets are available.



Benefits

- **Enhanced metering** – especially during simultaneous operation, this is accomplished by having notches in the three critical areas of the spool: open center, parallel path and tank.
- **Improved simultaneous metering** – having a transition check in each work section ensures that a load does not “dip” downward when metering two or more work-sections.
- **Repeatability** – consistent metering from valve to valve is achieved by flycutting all of the critical cast lands. This means that the notch position relative to the spool stroke is controlled and predictable. The result is consistent machine control.
- **Reduced operator fatigue** – the open-center core is a split wing or “Y” core design, which provides for a consistent lever force when selecting the spool from neutral to both power positions.
- **Reduced function drift** – low internal leakage accomplished thru the use of contemporary honing technology. Also, for those functions requiring near zero drift, pilot-operated checks are available.
- **Small footprint** – port accessories are installed vertical to the spool, allowing the handle to be positioned closer to the valve body.
- **Ease of service** – the bottom two stud assemblies are slotted, enabling a work section to be replaced without completely disassembling the valve assembly. This is accomplished by loosening the top tie bolt and then lifting the section out of the assembly. Downtime is minimized.
- **Easy conversion from a left-handed to a right-handed section** – the work section housing and spool are symmetrical, which enables the spool to be inserted in either end of the housing.
- **Improved spool seal life** – the enclosed handle assembly protects the spool and spool seal area from contamination and the potential corrosion.



Specifications

Pressures	Inlet Port: 300 bar (4350 PSI) Tank Port: 50 bar (725 PSI) Work Ports: 300 bar (4350 PSI)
Flow Rates (maximum recommended)	40 LPM (10.6 GPM)
Internal Pilot Pressure	Required for solenoids – contact Parker
Spool Leakage from work port to tank	Max. 6 mL/min @172 bar (2500 PSI) Oil temp. 50°C (122°F), and viscosity 40 cSt

Weights

Weights are approximate due to number of variations available.

Inlet with relief	1.92 kg (4.2 lbs)
Outlet	1.88 kg (4.1 lbs)
Work section with reliefs and manual actuator	1.93 kg (4.3 lbs)
Work section and manual actuator without reliefs	1.98 kg (4.4 lbs)
Work Section, PO Checks with manual actuator	2.1 kg (4.6 lbs)
Joystick assembly	0.8 kg (1.8 lbs)

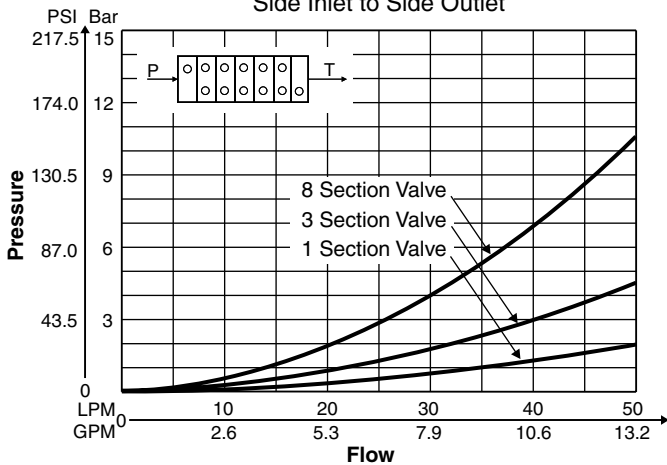
Connections

Standard valves are available in 3/8" BSP (DIN 3852/2), SAE-6 or SAE-8 (J1926/1).

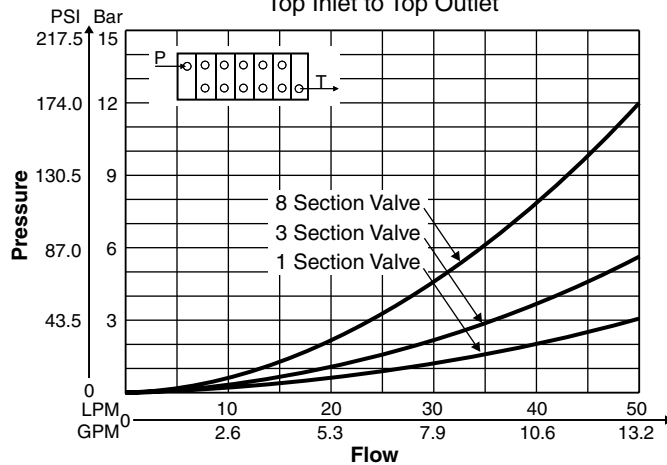
Connection	Location	SAE -8	SAE-6	BSP
P1, P2	Inlet	3/4-16 UNF	9/16-18 UNF	3/8-19
T1, T2	Inlet	3/4-16 UNF	9/16-18 UNF	3/8-19
P3	Outlet	3/4-16 UNF	9/16-18 UNF	3/8-19
T3	Outlet	3/4-16 UNF	9/16-18 UNF	3/8-19
PB1	Outlet	3/4-16 UNF	9/16-18 UNF	3/8-19
Work Ports	Work Sections	3/4-16 UNF	9/16-18 UNF	3/8-19
GAGE PORT	Inlet	7/16-20 UNF	7/16-20 UNF	1/4
PC (Hyd. Conn.)	Work Sections	7/16-20 UNF	7/16-20 UNF	1/4
PT (Pneu.Conn.)	Work Sections	1/8 NPT	1/8 NPT	1/8 NPT

Performance Curves

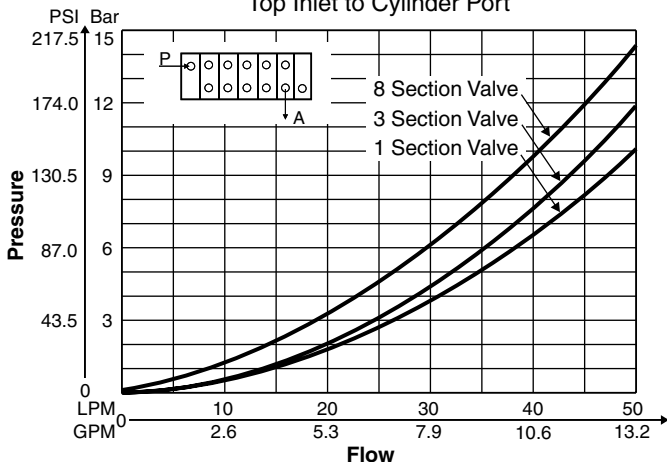
Pressure Drop - Open Center P→T
 Side Inlet to Side Outlet



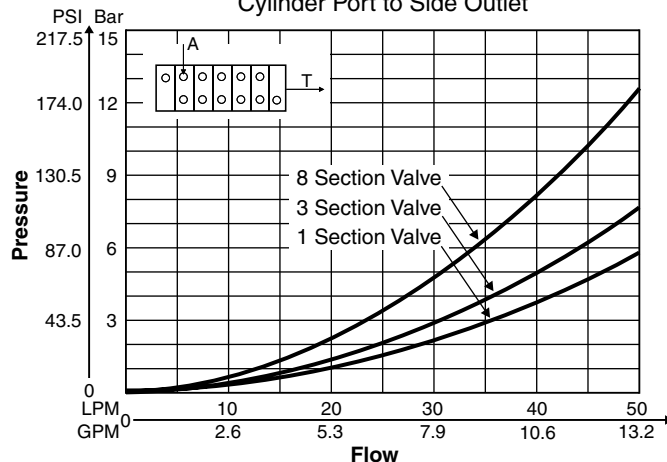
Pressure Drop - Open Center P→T
 Top Inlet to Top Outlet



Pressure Drop - P→A
 Top Inlet to Cylinder Port



Pressure Drop - A→T
 Cylinder Port to Side Outlet



NOTE: ISO VG 46 oil @ 50 °C

Environmental Characteristics

The valve can be mounted in all conceivable directions. However, the mounting base should be flat and stable so that the valve is not subjected to strain.

While the o-rings in the valve are normally of nitrile rubber, there are a number of special fluorocarbon variants. Please contact Parker for further information.

Temperature

Oil temperature, working range:
 +20°C to 90 °C (68 to 194 °F)*

Filtration

Filtration must be arranged so that Target Contamination Class 20/18/14 according to ISO 4406 is not exceeded. For the pilot circuit, Target Contamination Class 18/16/13 according to ISO 4406 must not be exceeded.

Hydraulic Fluids

Best performance is obtained using mineral-base oil of high quality and cleanliness in the hydraulic system.

Hydraulic fluids of type HLP (DIN 51524), oil for automatic gearboxes Type A and engine oil type API CD can be used.

Viscosity, working range: 15-380 mm²/s (15-380 cST)**

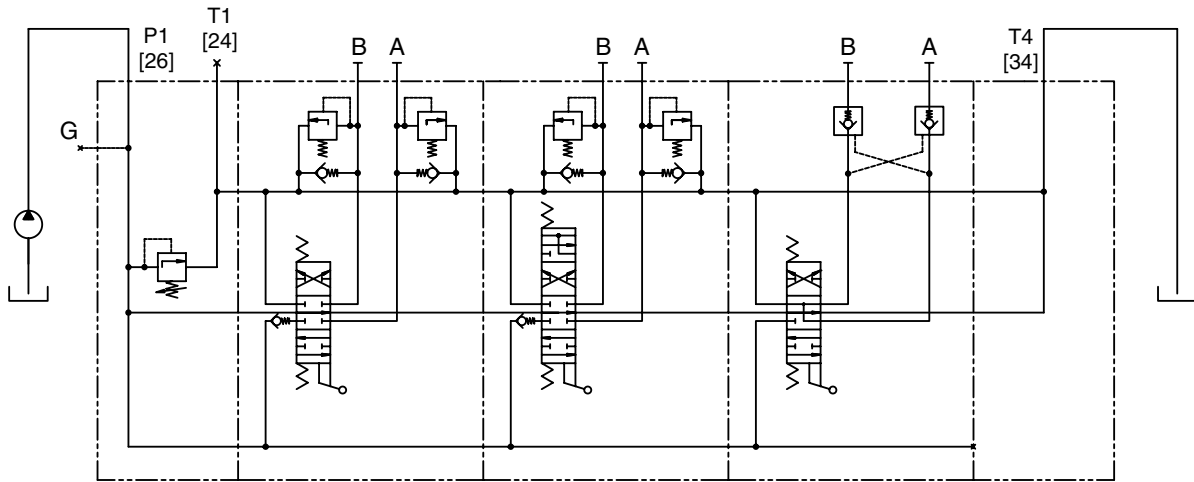
Technical information in this catalog is applicable at an oil viscosity of 30 mm²/s (30 cST) and temperature of 50 °C (122 °F) using nitrile rubber seals.

* Product operating limits are broadly within the above range, but satisfactory operation within the specification may not be accomplished. Leakage and response will be affected when used at temperature extremes and it is up to the user to determine acceptability at these levels.

** Performance efficiency will be reduced if outside the ideal values. These extreme conditions must be evaluated by the user to establish suitability of the product's performance.

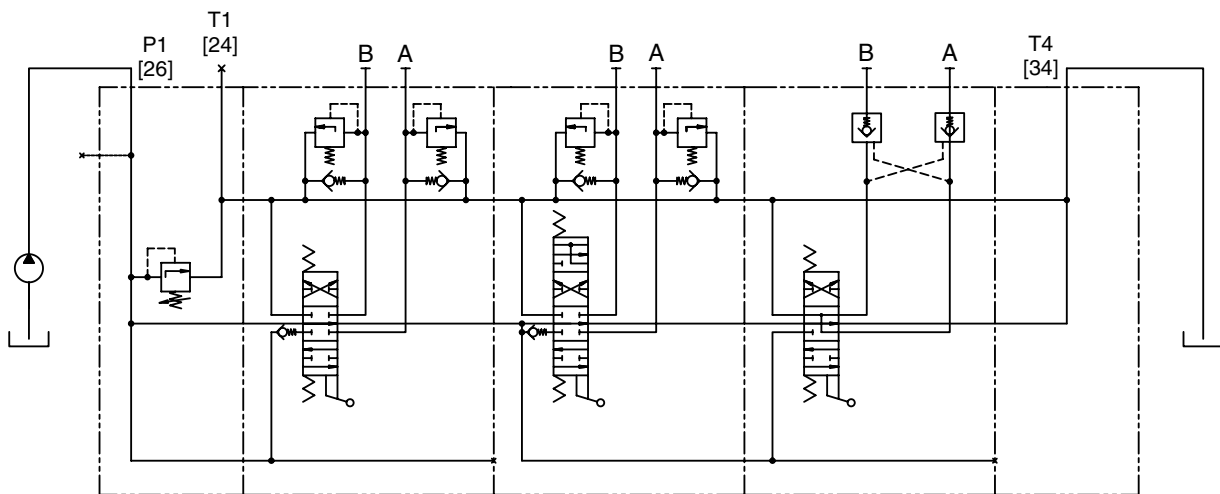
Circuit Types – Parallel Circuit

In the open-center parallel circuit, oil flows through the open-center passage when all of the spools are in neutral. When spools are shifted, oil is diverted into the parallel path and available to each of the selected work-sections. Simultaneous operation can be achieved, when two or more spools are selected. However, since oil will take the path of least resistance the operator must meter the flow to each function to get a desired function speed.



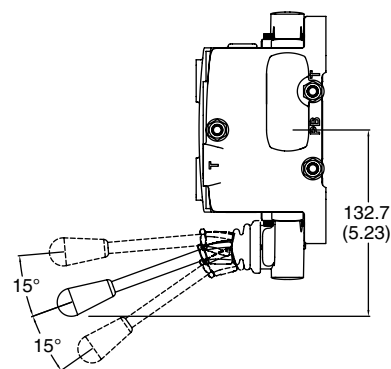
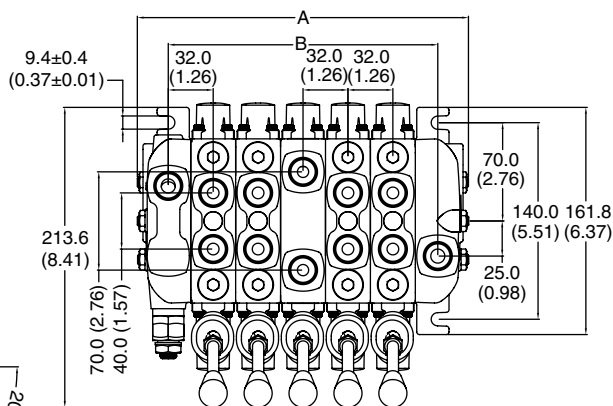
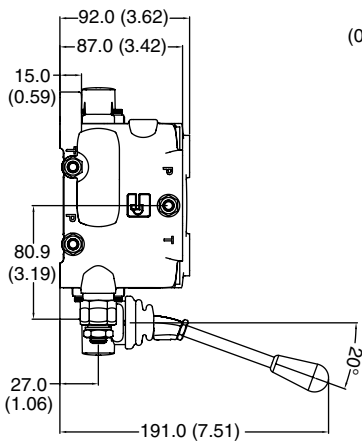
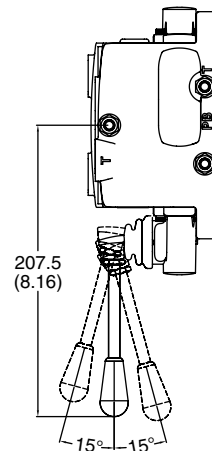
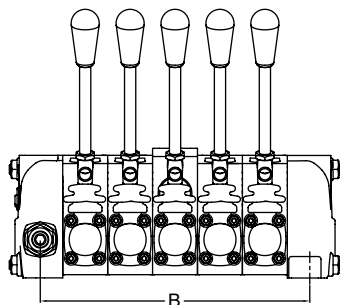
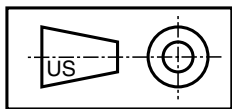
Circuit Types – Tandem Circuit (Priority)

In the open-center tandem circuit, oil flows through the open-center passage when all of the spools are in neutral. Tandem work-sections are fed from the open center and the parallel path is blocked. A tandem work-section will give priority to an upstream work-section.



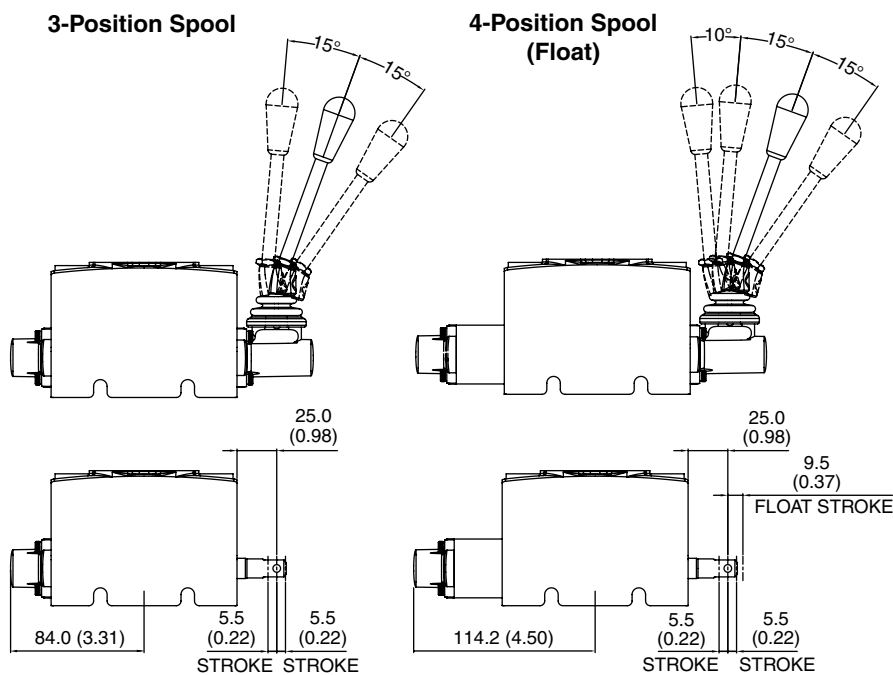
Inch equivalents for millimeter dimensions are shown in (**)

Assembly

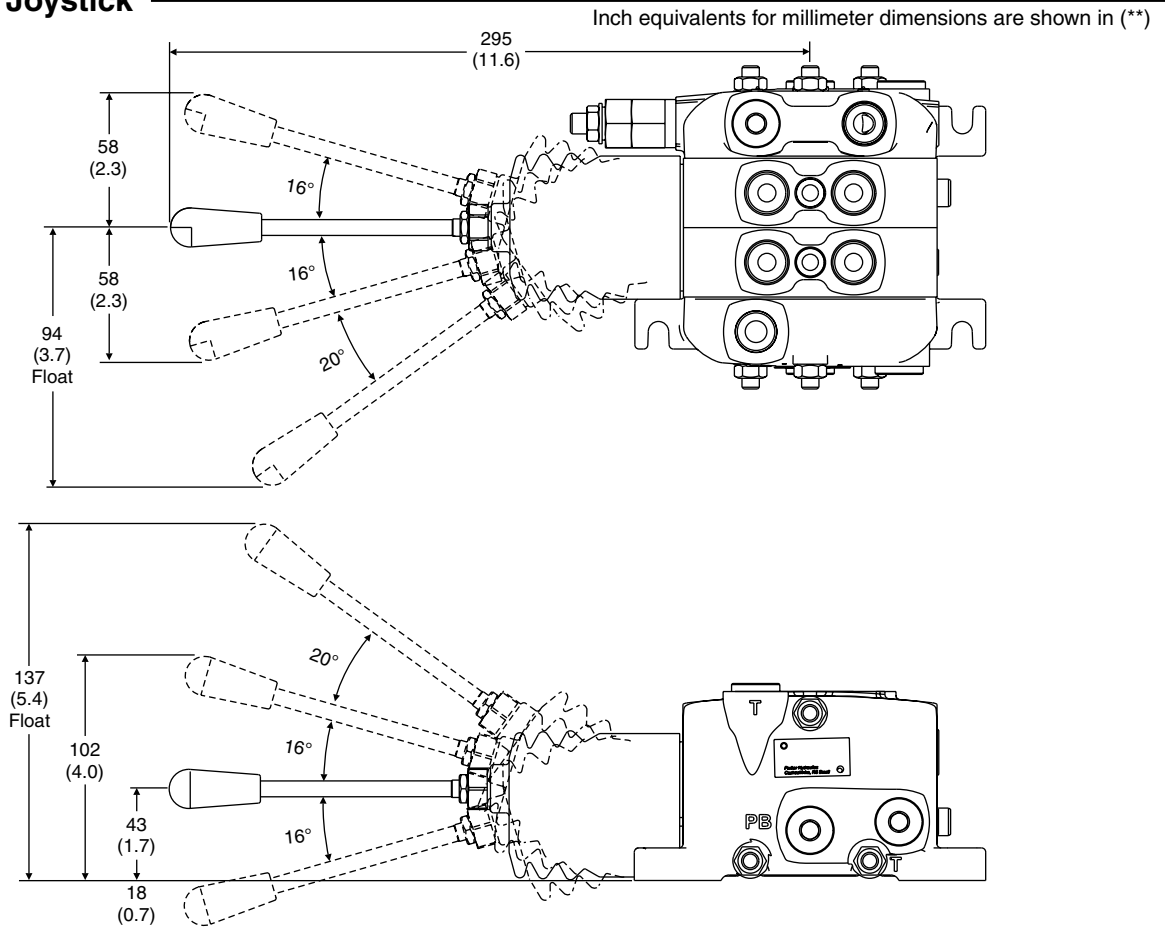


$A = 76.0 (3.00) + 32.0 (1.26) \times \text{No. WORK STATIONS}$
 $B = 32.0 (1.26) + 32.0 (1.26) \times \text{No. WORK STATIONS}$

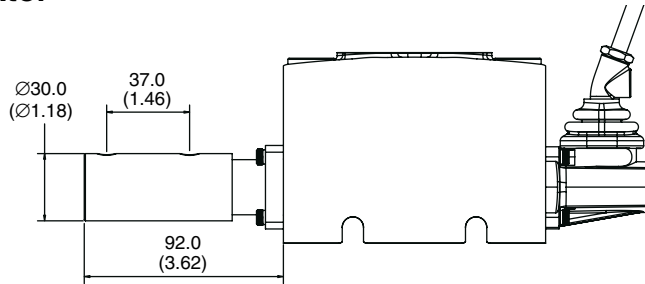
Spool Stroke of Work Sections



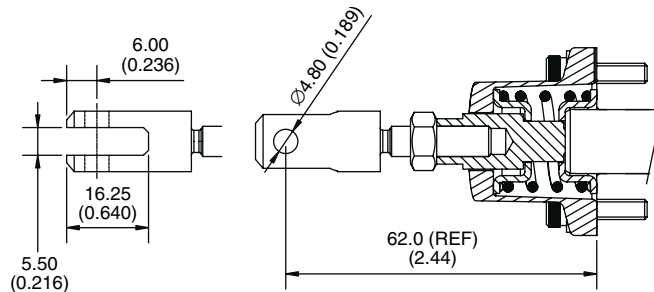
Mechanical Joystick



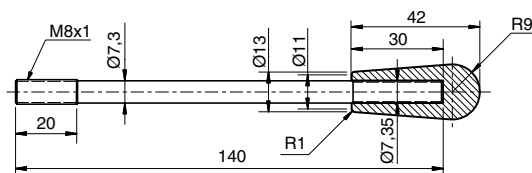
Pneumatic Actuator



Dual Actuator



Handle Rod



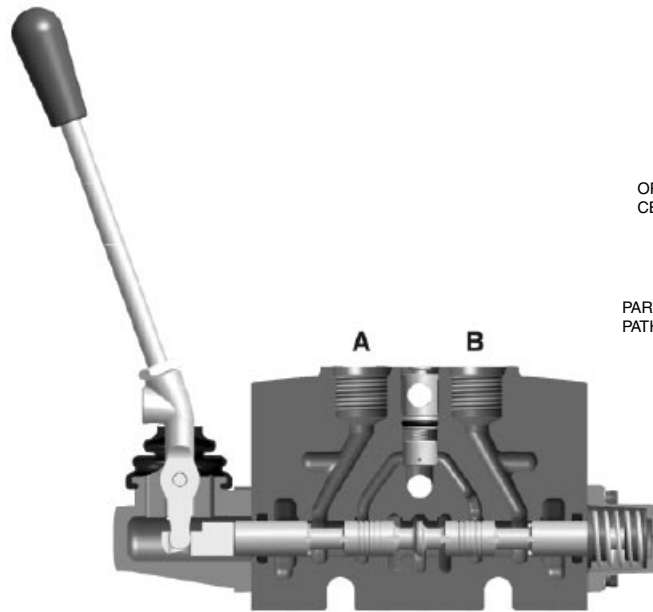
Handle Actuation vs. Spool Direction



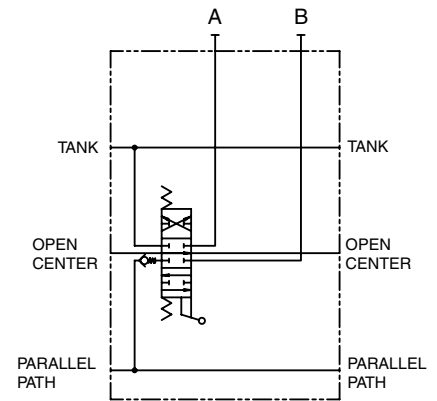
- Spool Out
- Energize port "B"
- Port "A" to tank



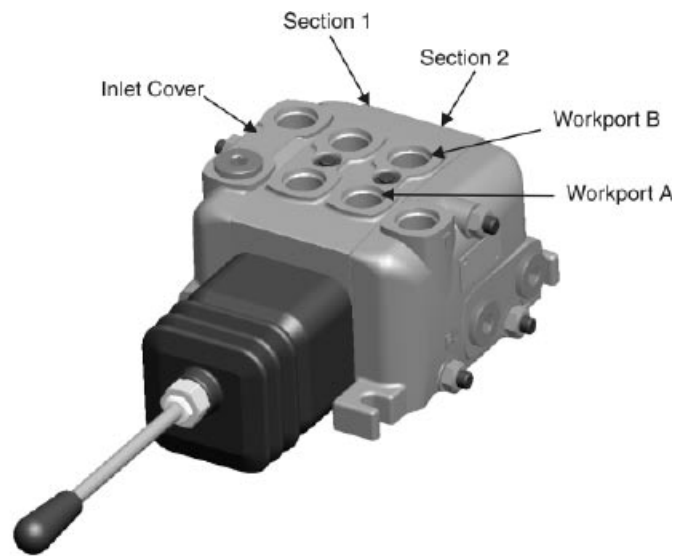
- Spool In
- Energize port "A"
- Port "B" to tank



Upstream View

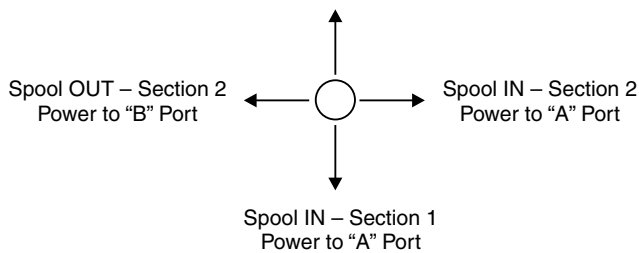


Note:
 Circuit reflects spool position, not handle position.



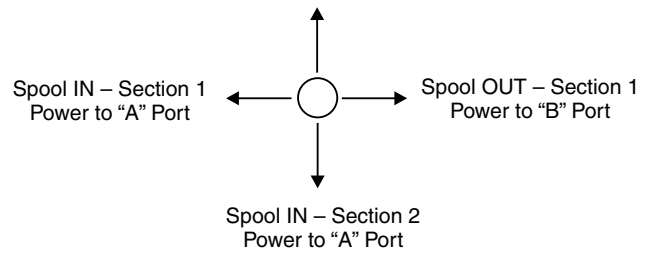
Left-Hand Joystick

Spool OUT - Section 1
 Power to "B" Port



Right-Hand Joystick

Spool OUT - Section 2
 Power to "B" Port



How to Order the VO40 Valve Assembly

A specification sheet is located in the back of this book, and is also available in an electronic Excel format on our web site. This form should be used to configure a valve assembly. The layout starts from the inlet cover on the left, work sections and mid-inlets in the middle and the outlet cover on the far right. Each field will require an entry, and the fields are represented with a position reference [] to help guide you to the option codes listed in the catalog pages 11 to 21.

Inlet Cover Portion of Spec Sheet

Code Position Reference

Customer Information

Section Number starting with the Inlet Cover

CUSTOMER			
CITY:		STATE:	
DATE:		FILLED BY:	
[04] CONNECTIONS THREAD	U8	G = ALL PORTS 3/8" BSP U = ALL PORTS 9/16" UNF (SAE #6) U8 = ALL PORTS 3/4" UNF (SAE #8) U6 = P AND T 3/4" UNF AND WORK PORTS 9/16" UNF	

STACK POS # 1			# 2		
INLET			WORK SECTION		
pos	description		pos	description	
12	Max. Inlet flow (GPM)	23	47	Circuit type	
15	Type of Inlet	I	50	Spool actuator	
16	Main relief valve	PB	51	Lever Bracket / handle	
17	Pressure setting (PSI)	140	51C	Clevis or Handle location	
17C	Relief Flow Setting (GPM)	23	52	Spool pos. indication	
24	Tank connection T1	T1	60	Spool function	
25	Tank connection T2	T2B	62	Piston head side	
26	Pump connection P1	P1B	76A	Port A valve	
27	Pump connection P2	P2	76B	Port B valve	
P/N SECTION			88A	Restrictor on port A	
P/N MCH. CAST			88B	Restrictor on port B	
			SPACER SECTION		
			90	Spacer Section	
			MID INLET		
			93	Mid Inlet type	
			94	Main relief valve	
			98	Pressure setting (PSI)	
			98C	Relief Flow Setting (GPM)	

Example: Inlet Cover (Sect #1)

Customer has 23 l/min pump flow, requires a pilot operated main relief set 140 bar and wants all SAE-8 work ports.

- Reference position [4] calls out the thread option for the entire valve assembly (SAE or BSP) (“U8” is the code for all SAE-8 size ports).
- Note:** There is a separate specification sheet which utilizes metric units.
- Reference position [12] calls out the system flow and can be listed in LPM or GPM depending on which spec sheet you are using (23 is entered for flow).
- Reference position [15] gives you an option for a standard type inlet “I” or an unloader type inlet cover “IU” (“I” is entered for std inlet cover).
- Reference position [16] indicates the type of main relief valve: (“PB” is the code for a pilot operated RV).
- Reference position [17] Enter desired relief valve setting (140 bar is entered).
- Reference position [17C] Enter desired flow for relief valve setting (23 l/min is entered).
- Reference position [24-27] calls out the inlet/outlet porting (machined/plugged) options:
 T1 is the top tank port open.
 T2B is code for side tank port plugged.
 P1B is code for top inlet port plugged.
 P2 is code for top inlet port open.

Valve Assembly – General Information

The VO40 has two basic thread versions - UNF (SAE) or BSP.

[04] – Connections Thread

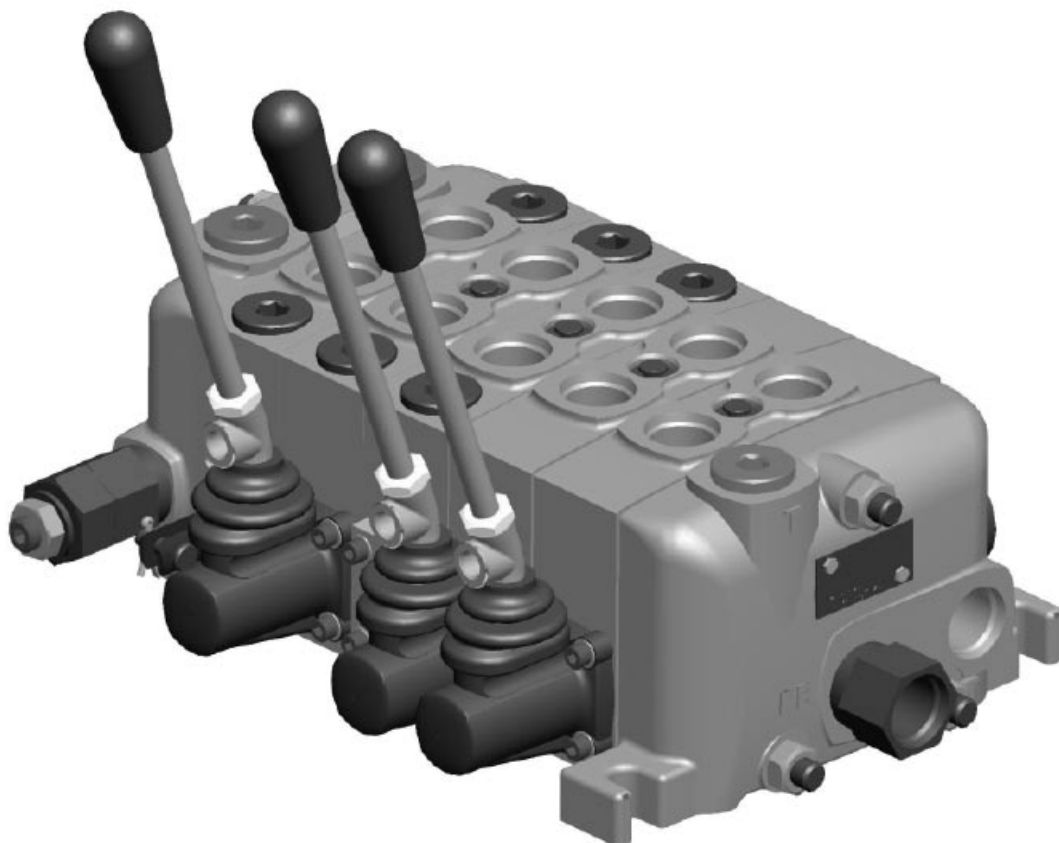
- G** 3/8 BSP Inlet, Outlet & Work Ports.
- U** 9/16" UNF (SAE-6) Inlet, Outlet & Work Ports.
- U6** 9/16" UNF (SAE-6) Work Ports, 3/4" UNF (SAE-8) Inlet/Outlet Ports.
- U8** 3/4" UNF (SAE-8) Inlet, Outlet & Work Ports.

[05] – System Voltage To be determined when the solenoid option is released

[07] – Surface Treatment (Paint)

- X** No Paint.
- P** Paint valve black.

[08] – Customer Designated ID: Enter Customer Part Number



The inlet cover of VO40 is available in two versions. One is the standard inlet and the other is an inlet with a solenoid pump unloader (in development). The porting location options for the standard inlet are:

- 1) Top/side – inlet and outlet ports. Any unused ports can be plugged.
- 2) Top – inlet and outlet ports only.

All inlet bodies have a gage port, that comes plugged. SAE #4 (7/16"x20 UNF thread) or 1/4" BSP.

The coding to specify an inlet cover is accomplished by eight fields, as shown below:

[12] – Max Pump Flow

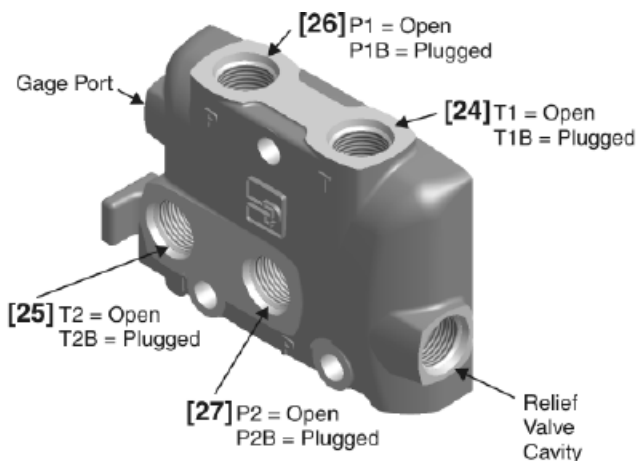
The pump inlet flow can be selected in LPM or GPM.

[15] – Type of Inlet

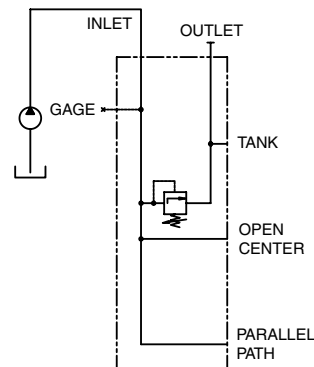
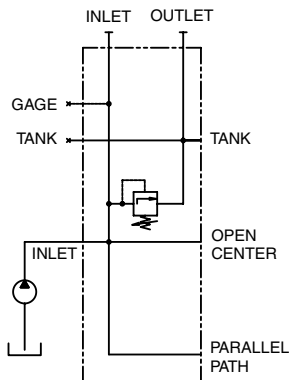
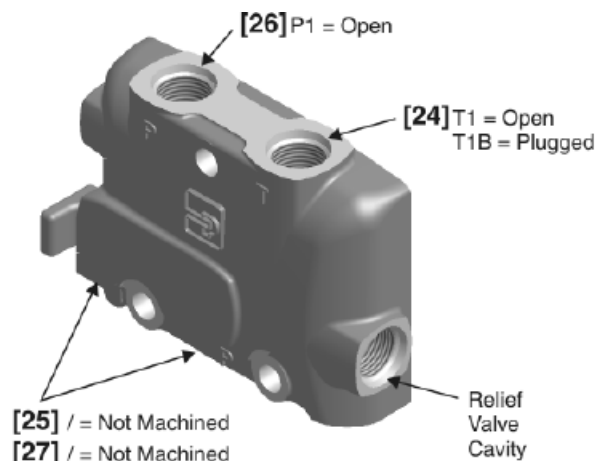
- I** Standard Inlet.
- IU** Inlet with pump unload, solenoid actuated (in development).

[24] to [27] – Inlet Porting Options

1) Standard – Top & Side Inlet/Outlet Ports



2) Standard – Top Inlet/Outlet Ports

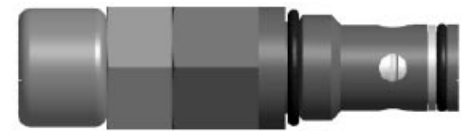


[16] - Main Relief Options

PS Adjustable main pilot-operated relief.
Adjustment range: 50 to 300 bar (725 to 4300 PSI).



PB Adjustable main pilot-operated relief
(Tamperproof aluminum cap).
Adjustment range: 50 to 300 bar (725 to 4300 PSI).



PN Adjustable main direct-acting relief.
Adjustment range: 60 to 207 bar (900 to 3000 PSI).



PA Adjustable main direct-acting relief
(Tamperproof aluminum cap).
Adjustment range: 60 to 207 bar (900 to 3000 PSI).



Y Y plug (cavity machined and plugged).



[17] – Pressure Setting – Enter pressure setting (PSI or Bar)

Note: Relief valve code PN and PA max setting is 207 bar (3000 PSI).

[17C] – Relief Flow Setting

Flow in LPM or GPM.

The VO40 outlet cover is available in two versions: Standard or with pilot generation and regulation for proportional solenoid applications.

The standard outlet has two porting configurations available:

- 1) Top and side outlet ports along with machining for conversion to power-beyond or closed-center.
- 2) Top outlet only.

The coding to specify an outlet is made by four fields as shown below:

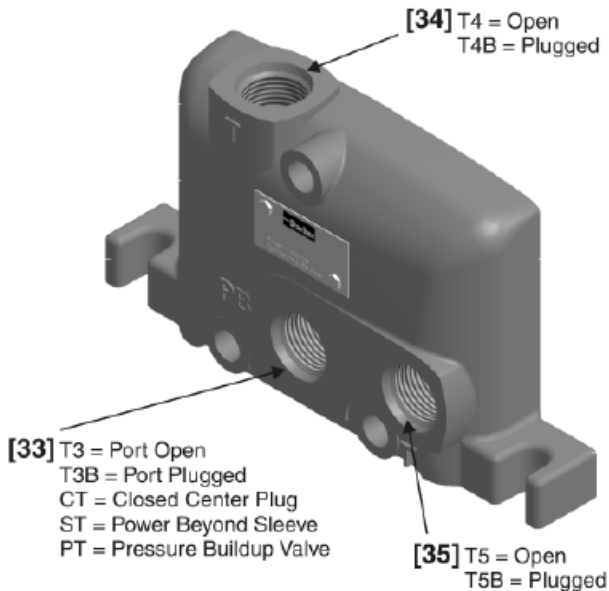
[30] – Type of Outlet

US Standard.

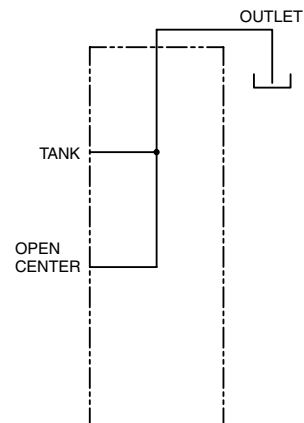
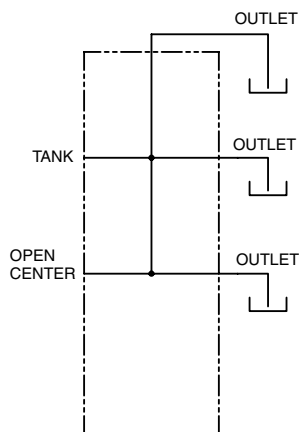
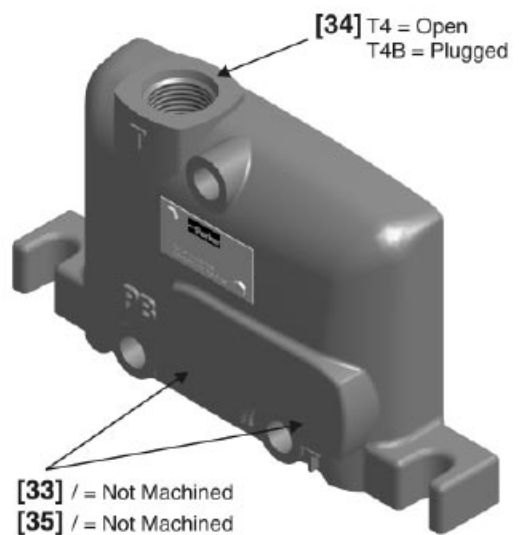
USP With pilot-pressure generation (to be used on solenoid valves) (in development).

[33] to [35] – Outlet Porting Options

1) Top and Side Outlet Ports

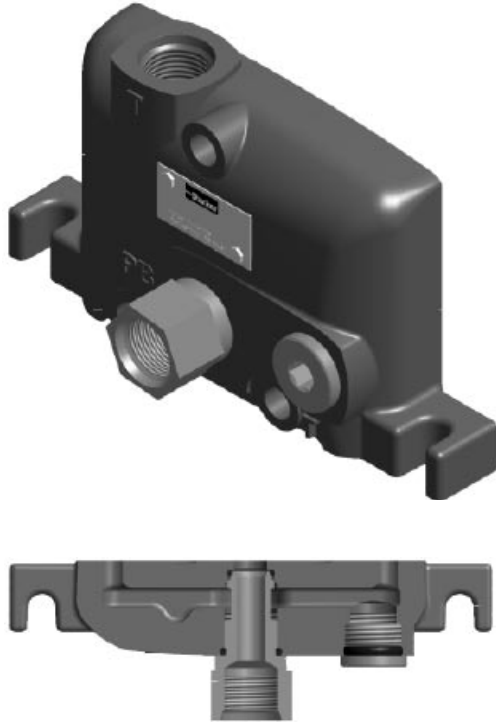


2) Top Outlet Port Only

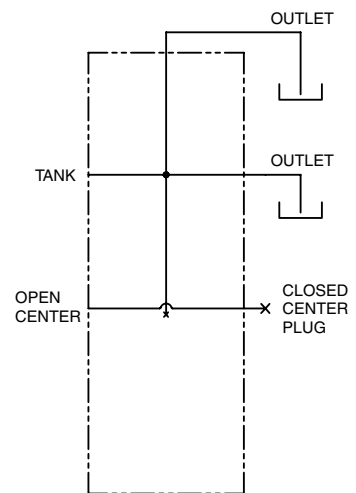
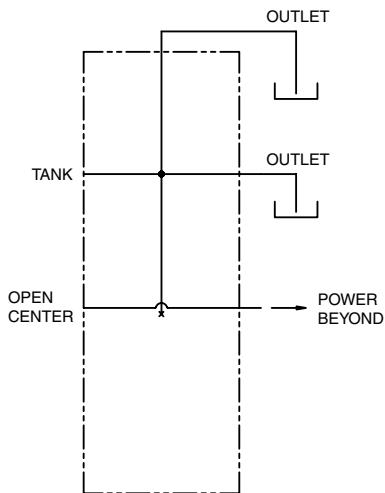


[33] to [35] – Outlet Porting Options

Power-Beyond



Closed-Center



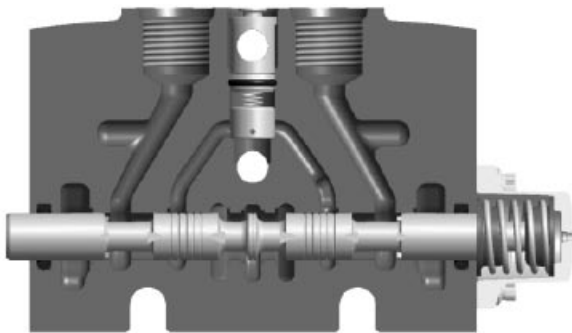
The VO40 valve can be supplied in combinations from one to ten work sections. For each work section there is a variety of spool options, actuators, positioners and port accessories. Work sections can have parallel, series, and/or tandem circuitry. All types can be combined in the same valve assembly.

All work sections with hold in neutral spools have transition checks (load checks). All work sections with free flow in neutral spools (motor) do not include transition checks (load checks). Contact Parker if you require a deviation from this configuration.

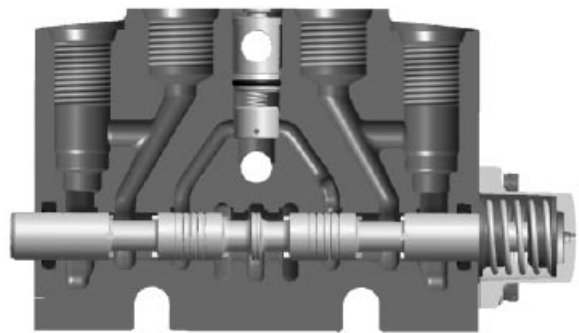
Work sections are available with or without work port option machining. Integrated pilot-operated checks (Lock-Out) are available in a specially machined casting (ordering code on page 20 [76 A/B]). A spacer section which provides for more spacing between sections is also available (ordering code on page 20 [90]).

Examples of work port machining options:

Section without RV Cavities



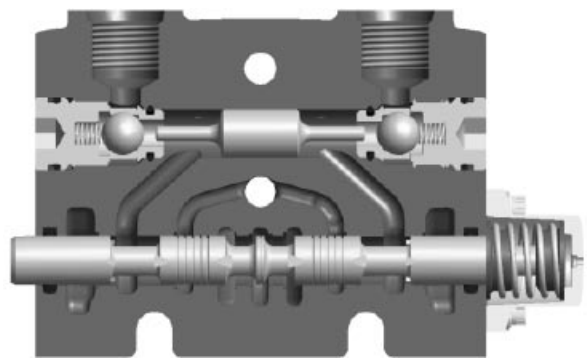
Section with RV Cavities



The VO40 Pilot-Operated Check (Lock-Out) sections provide near zero leakage and can prevent cylinder drift when the spool is in the neutral position. When the spool is shifted to a power position, oil is directed to one work port. Return oil is momentarily blocked until pilot pressure unseats the check (3.1:1 ratio). With 207 bar (3000 PSI) load, it will require 67 bar (968 PSI) into the opposite work port to unlock.

The spool is a 4-way, 3-position free flow spool which prevents system pressure leakage from building up and unlocking the PO checks.

Section with PO Checks



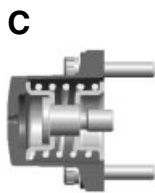
The coding to specify a work section is made by 11 fields, as shown below:

[47] – Work Section Circuitry

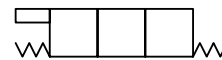
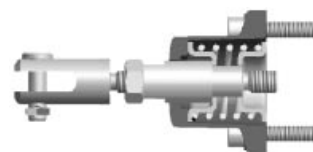
- P** Parallel Circuitry.
- T** Tandem Circuitry – Provides priority to upstream sections.
- S** Series Circuitry– (In development).

[50] – Spool Actuators

C Spring centered to neutral position.



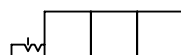
CD



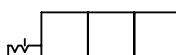
CD Spring centered with dual control.

CHA2 Two position detent – spool “IN”.
Detent in neutral and “A” positions.

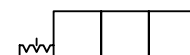
CHA2



CHB2



CHB3

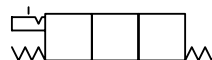
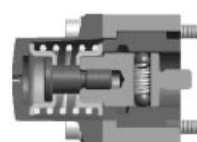


CHB2 Two position detent – spool “OUT”.
Detent in neutral and “B” positions.

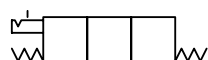
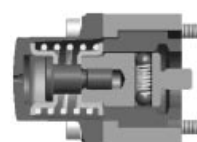
CHB3 Three position detent.

B2A Spring centered with “IN” detent.
Detent in “A” position and spring centering
to neutral position.

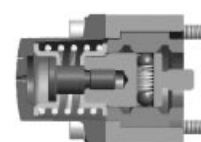
B2A



B2B



B2C

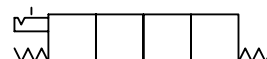
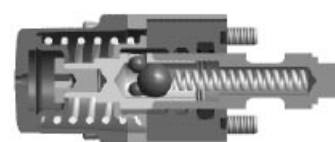


B2B Spring centered with “OUT” detent.
Detent in “B” position and spring centering
to neutral position.

B2C Spring centered with detent in two
positions “A” & “B”.

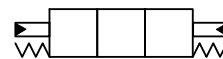
CB Spring centered with detent in fourth
position, used with float spool.

CB



PC Hydraulic Remote Actuator – Proportional.

PC

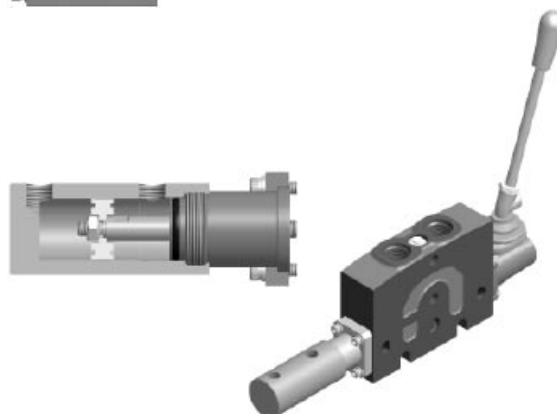


EC Solenoid Operated – Proportional.
(in development)

ED Solenoid Operated – On/Off.

ACP Pneumatic actuator – single ended.

The pneumatic actuator for the VO40 allows the spool to be operated by a pneumatic signal. The pneumatic actuator is assembled onto one side of the work section and the opposite end is open and available for the addition of a handle. A min. of 5.5 bar (80 PSI) is required. The threaded ports are both 1/8" NPT.



[51] – Lever Bracket Note: Handle Levers are sold separately (see PN listed below)

SH Standard enclosed handle bracket.



SR Standard enclosed handle bracket, but rotated 180 degrees.



/ No bracket, no handle, no boot (female clevis on spool).

LU No bracket, but with boot protector at spool end (female clevis on spool).

MJL Mechanical Joystick – left side version (must be placed on two adjacent work sections).

MJR Mechanical Joystick – right side version (must be placed on two adjacent work sections).

Handle Rod Assembly is sold as a separate line item PN: K-VO40-H1.

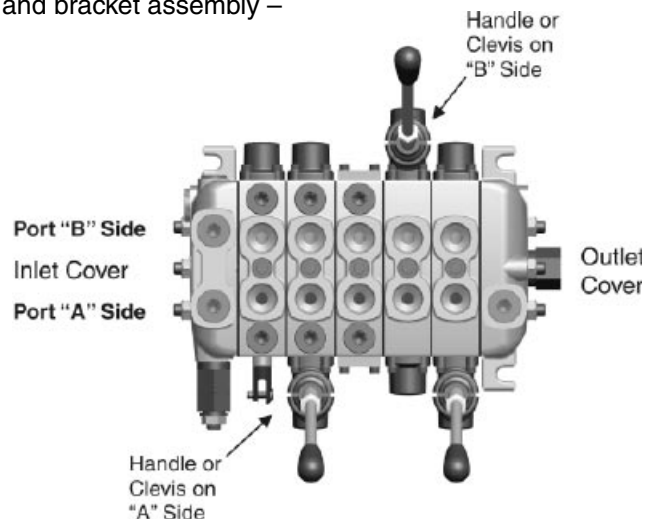


[51C] – Spool Clevis or Handle Bracket Location

This field is used to indicate the location of the handle lever and bracket assembly – adjacent to port “A” or port “B” side of the work section.

A Spool Clevis or Handle Bracket on port “A” side.

B Spool Clevis or Handle Bracket on port “B” side.



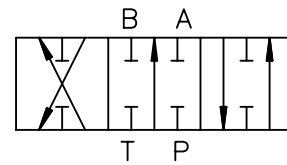
[52] – Spool Position Indication

/ Without spool position indicator.

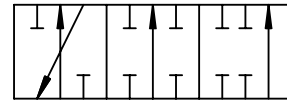
SD With micro-switch on-off indicator (in development).

[60] – Spool Function

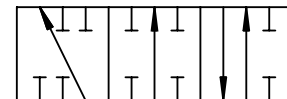
D Double-acting (4-way) spool. Work ports blocked in the neutral position.



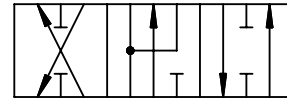
EA Single-acting (3-way) spool. Port “A” blocked in neutral. Port “A” is active and Port “B” is plugged.



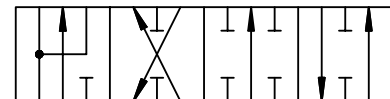
EB Single-acting (3-way) spool. Port “B” blocked in neutral. Port “B” is active and Port “A” is plugged.



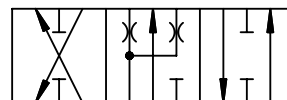
M Double-acting (4-way) spool. Work ports open to tank in the neutral position. Note: A work section with this spool does not have a transition check (load check).



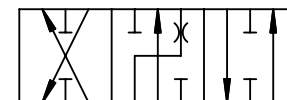
F Double-acting (4-way) spool with a 4th position in which both work ports are connected to tank (float position). Work ports are blocked in the neutral position.



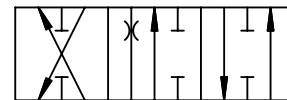
DM Double-acting (4-way) spool. Work port pressure is bled to tank, when the spool is in the neutral position.
Bleed notch is designed for 1.9 LPM @ 69 bar.
(0.5 GPM @ 1000 PSI)



DA Double-acting (4-way) spool. Work port “A” pressure is bled to tank, when the spool is in the neutral position.
Bleed notch is designed for 0.5 GPM @ 1000 PSI.
(1.9 LPM @ 69 Bar)



DB Double-acting (4-way) spool. Work port “B” pressure is bled to tank, when the spool is in the neutral position.
Bleed notch is designed for 0.5 GPM @ 1000 PSI.
(1.9 LPM @ 69 Bar)



[62] – Piston Head Side of Cylinder

The default for this field is code M. Codes A and B are only used when asymmetrical spools must be developed. For example, a cylinder that requires meter-in for one direction and meter-out for the other.

- M** Standard symmetrical spool- cylinder or motor.
- A** Piston head connected with port “A”.
- B** Piston head connected with port “B”.

[76 A/B] – Work Port Valves

This pertains to the work port accessory options.

- /** Port not machined.
- Y2** Relief Valve cavity plugged.
- N2** Anti-cavitation valve.
- ()** RV/AC Non-Adjustable: Enter Pressure setting (PSI or Bar).
Note: RV Set at 10 LPM (2.6 GPM).
- C2** Pilot-Operated Checks (Lock-out valve).
Refer to page 16.

Anti-Cavitation Check



RV/AC Non-Adjustable



Y plug for blocking RV cavity



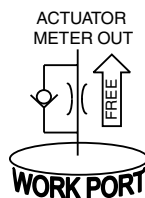
[88 A/B] – Work Port Option

- /** No Restrictor.

Work port restrictors restrict flow in one direction and are free flow in the opposite direction.

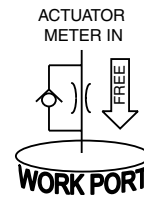
Restrict flow “out” of actuator “into” work port.

- P1** = 1mm (0.040")
- P2** = 2mm (0.080")
- P3** = 3mm (0.120")
- P4** = 4mm (0.160")



Restrict flow “out” of work port “into” actuator.

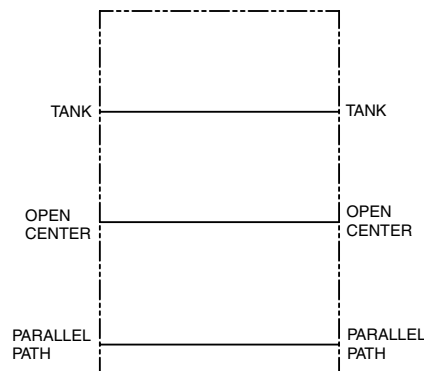
- N1** = 1mm (0.040")
- N2** = 1mm (0.080")
- N3** = 1mm (0.120")
- N4** = 1mm (0.160")



[90] – Spacer Section

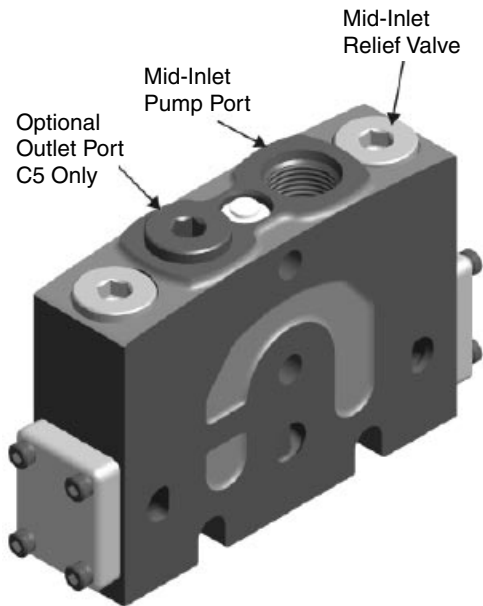
- N** Spacer Section.

This section connects the open center, parallel path and tank cores between two adjacent work sections. This section is used to provide additional spacing between two work sections. All other fields in the work section code can be left blank. (Contact Parker for size options available.)

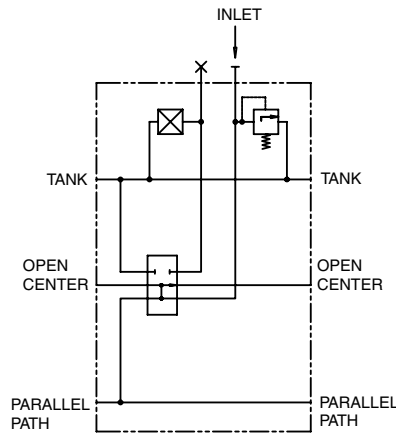


The VO40 mid-inlet options are split or combined flow. They are available with a main RV option. There is also a provision for an outlet port on the split flow version only.

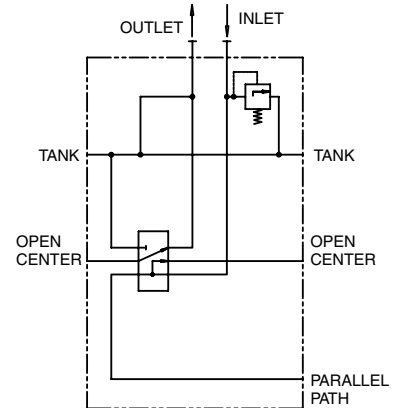
The coding to specify a mid-inlet is made by three fields as shown below:



Combined Flow, C3



Split Flow, C5



[93] – Mid Inlet Options

C3 Combined Flow (Port “A” inlet - Port “B” is plugged and not available to tank).

C5 Split Flow (Port “A” inlet - Port “B” is optional tank port).

[94] – Main Pressure Relief

Y Without pressure relief (cavity machined and plugged).

PA Direct-acting relief valve non-adjustable.



[98] – Pressure Setting - Enter pressure (PSI or Bar)

[98C] – Mid-Inlet Relief Flow Setting

Flow in GPM or LPM.

SHEET 1 DE 1

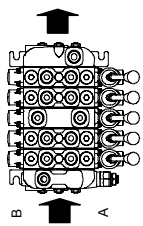
REVISION	
Date	
App.	
Replace	

PARKER HANNIFIN CORPORATION - HYDRAULICS GROUP
 VO40 - DIRECTIONAL STACK VALVE - DATA SHEET

CUSTOMER		APPLICATION	
CITY:	STATE:	CUSTOMER NUMBER:	
DATE:	FILLED BY:	MAXIMUM FLOW (GPM)	MAXIMUM PRESSURE (PSI)
[04] CONNECTIONS THREAD G = ALL PORTS 3/8" BSP U = ALL PORTS 9/16" UNF (SAE #6) U8 = ALL PORTS 3/4" UNF (SAE #6) U6 = P AND T 3/4" UNF AND WORK PORTS 9/16" UNF		[05] SYSTEM VOLTAGE 12 = 12 VCC 24 = 24 VCC [07] PAINTING P = BLACK BASE X = NO PAINTING	
		[08] CUSTOMER DESIGNATED ID:	

P/N

STACK POS	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# last											
INLET	pos	description																					
	12	Max. Inlet flow (GPM)																					
	15	Type of Inlet																					
	16	Main relief valve																					
	17	Pressure setting (PSI)																					
	17C	Relief Flow Setting (GPM)																					
	24	Tank connection T1																					
	25	Tank connection T2																					
	26	Pump connection P1																					
	27	Pump connection P2																					
	P/N SECTION																						
	P/N MCH. CAST																						
	RESTRICTORS																						
	METER OUT		<table border="1"> <tr> <th>DIA. (MM)</th> <th>CODE (88)</th> </tr> <tr> <td>1.0</td> <td>P1</td> </tr> <tr> <td>2.0</td> <td>P2</td> </tr> <tr> <td>3.0</td> <td>P3</td> </tr> <tr> <td>4.0</td> <td>P4</td> </tr> </table>											DIA. (MM)	CODE (88)	1.0	P1	2.0	P2	3.0	P3	4.0	P4
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DIA. (MM)	CODE (89)																						
2.0	N1																						
3.0	N2																						
4.0	N3																						
2.0	N4																						
SPACER SECTION																							
90	Spacer Section																						
MID INLET																							
93	Mid Inlet type																						
94	Main relief valve																						
98	Pressure setting (PSI)																						
98C	Relief Flow Setting (GPM)																						
P/N SECTION																							
P/N MCH. CAST																							
OUTLET																							
pos	description																						
30	Type																						
33	Tank connection T3																						
34	Tank connection T4																						
35	Tank connection T5																						
P/N SECTION																							
P/N MCH. CAST																							
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rev.	date	doc	app																				
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E																							
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G																							
TEST STANDARD:																							
P/N SECTION																							
P/N MCH. CAST (Leave blank if not sure)																							
P/N ACCESSORIES																							
CONNECTION PORT A																							
CONNECTION PORT B																							
ASSEMBLING KIT																							
REMARKS:																							



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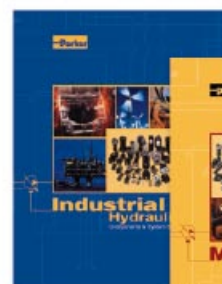
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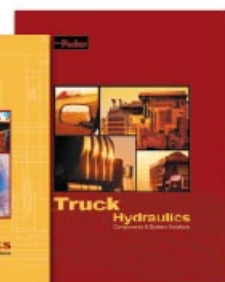
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Catalogue HY17-8505/UK
POD 04/2007 PC

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