

Bulletin HY14-2722-B1/US

Series V86 Directional Control Valves

**Pressure Compensated for use with
Variable or Fixed Displacement Pumps**

Effective: October 1, 2002
Supersedes: Cat. No. GPD-1455 dated 7/98

Features

- Individual proportioning-type (post) pressure compensation.
- Precise metering spools offering compensated flows up to 90 GPM (340 lpm).
- Optional inlet unloading valve permits use in fixed displacement systems.
- Utilized many common components such as relief valves, spool positioners and handles with Series V70.
- 4-way or 4-way free flow operation.
- Spools are internally vented in neutral to eliminate power drift.
- Numerous manual spool actuator plus hydraulic, pneumatic, and electric remote options are available.
- Port reliefs and anti-cavitation checks standard.

Description

Parker's Series V86 sectional directional control valves provide proportioning-type, pressure compensated operation for closed center and load sensing systems. A variety of spool variations, spool actuator options, and relief valve cartridges are available to customize the valve to your particular applications.

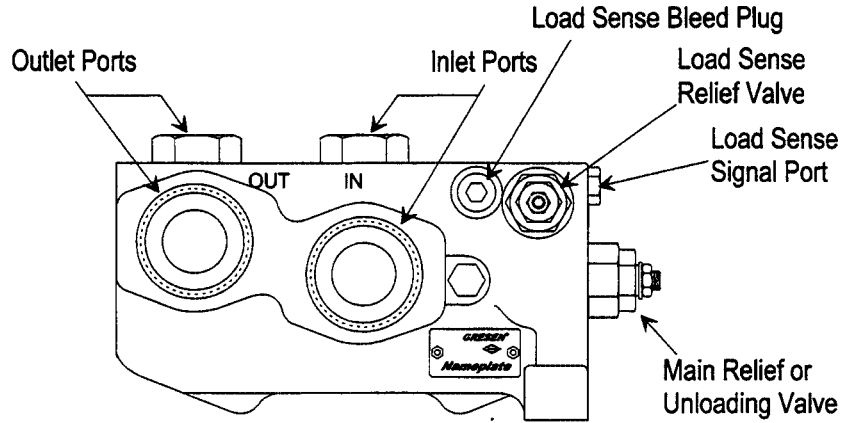
Specifications

Maximum Flow Rating .....	.90 GPM (340 lpm)
Operating Pressure (maximum)	
Continuous Operating .....	.3500 PSI (242 bar)
Exhaust Core .....	.500 PSI (34 bar)
Operating Temperature	-20° to +180°F (-29° to +82°C)
Standard Port Sizes	
Inlet	SAE 24, 1-1/2" Split Flange
Outlet	SAE 24, 1-1/2" Split Flange
Work Sections	SAE 24, 1" Split Flange
Load Sense Port	SAE 4
Number of Work Sections	1-6
Fluid	Petroleum Based, 60-14000 SSU (10-216 cSt)
Filtration Required (minimum) .....	.10 micrometer
Seals	Buna-N (Standard) - Viton (Optional)
Weight (approx.)	
No. 23221 Inlet Cover	Approximately 35 lbs. (15.9 kg)
No. 8545 Outlet Cover	Approximately 25 lbs. (11.4 kg)
No. 24553 Work Sections	Approximately 30 lbs. (13.6 kg)
Mounting Position .....	.Not Restricted

V86 Inlet Covers

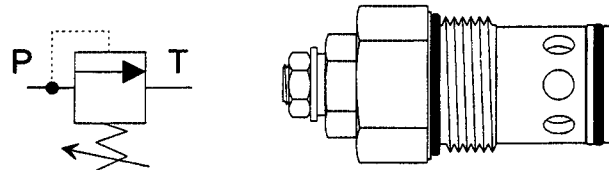
No. 23221 Inlet Covers

No. 23221 Inlet Covers are available with top and/or end inlet and outlet ports. Also machined are the load sense signal port and gauge port. All unused ports must be plugged.



Main Relief Valves

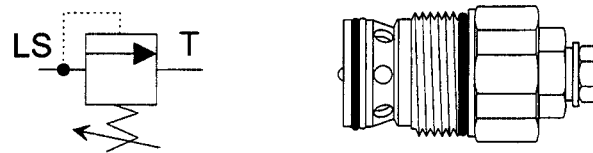
The primary function of the main relief valve is to prevent excessive pressure spikes. Main relief valve cartridges are available in adjustable (RP70A) or tamper resistant (RP70N) configurations, offering a pressure range of 500 to 3500 PSI (34 to 242 bar).



Model RP70 Relief Cartridge

Load Sense Relief Valves

The load sense relief is used to control the maximum system pressure. Load sense relief valves are available in adjustable (RP30A) or tamper resistant (RP30N) configurations, offering a pressure range of 500 to 3500 PSI (34 to 242 bar).

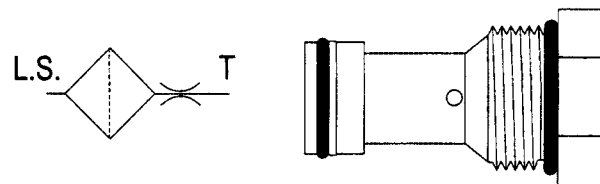


Model RP30 Relief Cartridge

If multiple V86 Valves are connected in parallel, only one load sense relief valve is required for the circuit.

Load Sense Bleed Plugs

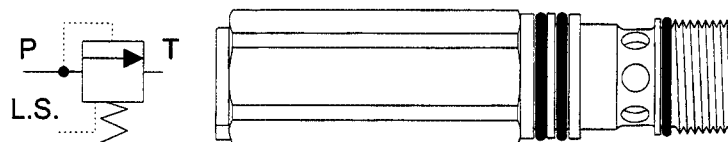
The load sense bleed plug contains a screened orifice to bleed-off the load sense signal when all functions (work sections) are in neutral. One bleed-off orifice is required in each load sense system. An optional no-bleed plug is available for use in systems having the load sense bleed-off orifice located in the load sense pump.



Load Sense Bleed Plug

(Optional) Unloading Valve

An optional Inlet Unloading Valve is available to allow the V86 Valve to be used in fixed displacement (open center) circuits. The unloading valve requires a unique cavity in place at the main relief machining. Maximum valve pressure is controlled with the load sense relief. The Load Sense Bleed-Off Plug is required with the unloading valve.



Unloading Valve Cartridge

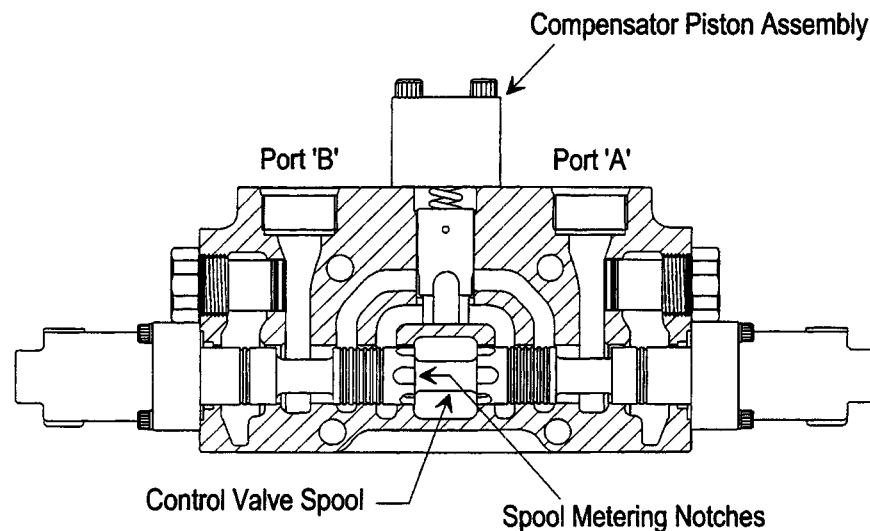
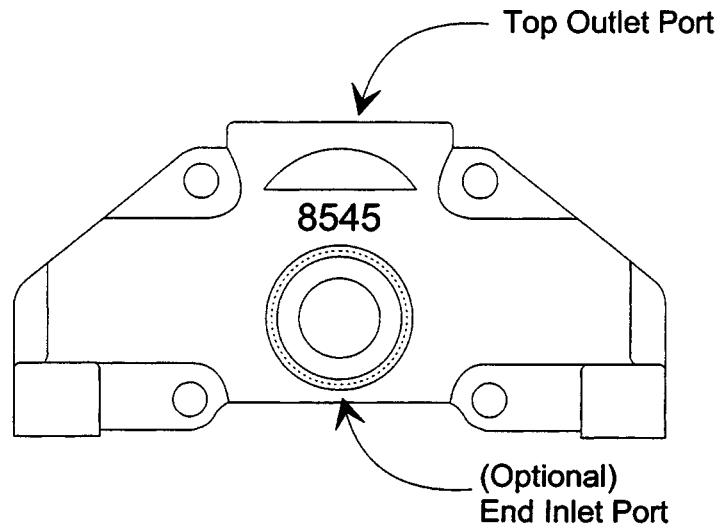
V86 Outlet Cover

No. 8545 Outlet Cover

No. 8545 outlet cover is available with top outlet port only.

Turn Around Option

For plumbing convenience, the outlet port may be located in the inlet cover. By plugging the outlet port in the outlet cover, the return oil may exit thru one of the outlet ports located in the inlet cover.



V86 Pressure Compensated Work Sections

Parker's Model V86 is a pressure compensated, load sensing sectional valve that provides precise pressure and flow control for simultaneous operation of multiple functions.

It also gives you the ability to consistently meter flow to specific requirements regardless of load changes or system pressure fluctuations.

Custom main spools are available with flow rates to 90 GPM (340 lpm) to match the performance of each work section to the requirements of each specific function.

The compensator assembly acts as a variable restrictor, maintaining a constant pressure differential across the spool metering notches. With a constant pressure differential across the spool notches, the output flow remains constant, regardless of changing load pressures.

If the flow requirements of a Model V86 valve assembly exceeds the pump capacity, all functions will continue to receive flow. Unlike traditional parallel circuit control valves where only the lowest pressure function receives flow, Parker Model V86 divides pump flow proportionally between all operating sections, regardless of the individual working pressures.

Pressure Drop and Spool Metering Data

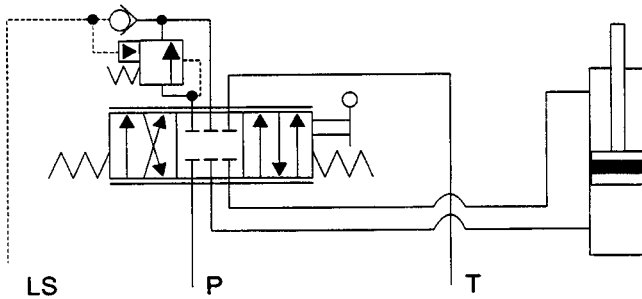
Consult the factory with specific flow requirements.

V86 Main Spool Options and Work Port Relief Valves

Main Spool Options

(04) 4-Way Cylinder Spool

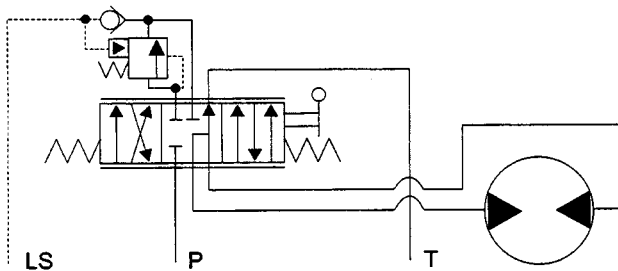
For control of double acting cylinders or reversible hydraulic motors where floating a cylinder or motor freewheeling is not required. Both work ports are blocked in the neutral position.



(F4) 4-Way Free Flow Motor Spool

For control of double acting cylinders or reversible hydraulic motors. Because both work ports are open to tank in the neutral position, free flow spools will allow a motor to coast.

Caution: If using this spool configuration in cylinder lift applications, it must be used in conjunction with a load holding device to prevent the load from free falling when the spool is in the neutral position. A free falling load could cause serious bodily injury or property damage if the holding device is not installed. Be sure to clear the work area prior to testing cylinder lift applications to avoid a potential dangerous situation.



Work Port Relief Valves

The primary function of a work port relief valve is to limit a part of a circuit to a pressure less than the main relief setting. Port relief valves will also provide high pressure protection while the valve is in neutral. The relief setting at 'crack' or 'full flow' must be specified when ordering.

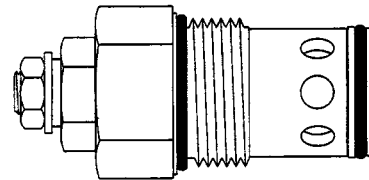
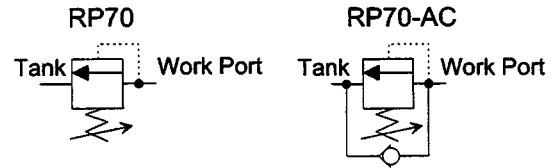
Model V86 work sections are available with or without work the port relief cavities machined.

Model RP70 Work Port Relief Valves

Model RP70 work port relief valves are available in adjustable (RP70-A) and tamper resistant (RP70-N) configurations, offering a pressure range from 500 to 3500 PSI (34 to 242 bar).

Combination relief/anti-cavitation check cartridges (Models RP70-AAC and RP70-NAC) are also available.

The 'NR' no relief cavity plug must be installed in the work port relief option cavity when a work port option is not required.

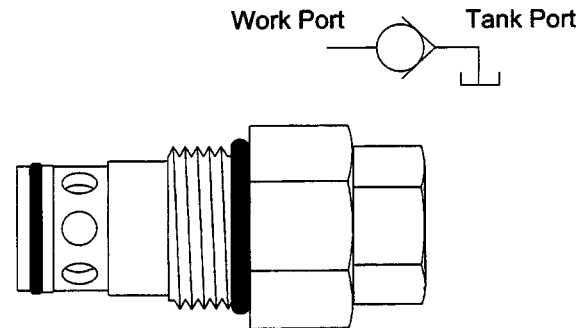


RP70 Relief Valve Cartridges

Anti-Cavitation Checks

Anti-cavitation (also referred to as anti-void) check valves are available for use in the work port option cavity to prevent cylinder or motor cavitation. It allows the cavitating work port to refill from the exhaust core.

Anti-cavitation check valves are non-adjustable and will open whenever the work port pressure is lower than the exhaust core pressure.

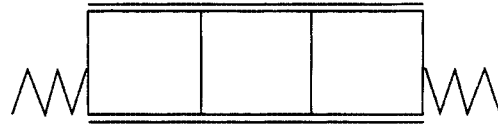


Anti-Cavitation Check Valve

V86 Spool Positioner and Actuator Options

Spring Return Spool Positioner

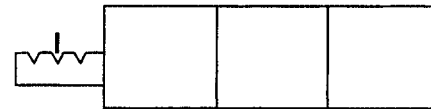
The spring return spool positioner 'spring returns' the valve spool to neutral from the 'A' and 'B' power positions when the handle is released.



Spring Return Spool Positioner

'D' Detent Spool Positioner

The 'D' detent spool positioner 'detents' the valve spool in neutral and the 'A' and 'B' power positions. The valve spool will remain in the position in which it was manually placed when the handle is released.



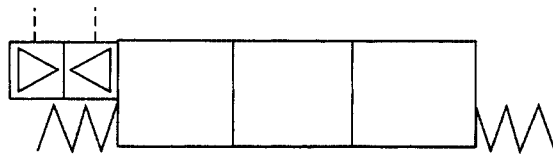
'D' Detent Spool Positioner

This option is NOT intended for use as a positive spool-locking device against excessive external forces or machine vibration.

'PA' Pneumatic Remote Spool Actuators

'PA' Pneumatic actuators provide for remote pneumatic operation of two and three position V86 work sections.

The exposed valve spool end may be fitted with a handle and used as a means for emergency manual operation, or for multiple station operation.

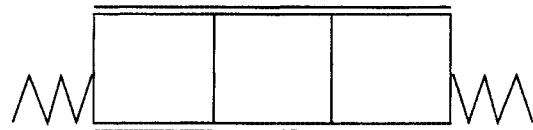


'PA' Pneumatic Remote Spool Actuator

'HR' and 'HRO' Remote Spool Actuators

'HR' Hydraulic Remote Spool Actuators provide for remote hydraulic operation of two and three positions V86 work sections.

'HRO' Hydraulic Remote Spool Actuators have an optional external adjustment screw override. This override provides a means for emergency manual operation in the event of pilot pressure failure. It may also be used as a spool travel limiter.



'HR' Hydraulic Remote Spool Actuator

Pneumatic Remote Actuator Specifications

Maximum Pressure Rating [Ⓞ]	150 PSI (10,3 bar)
Minimum Pressure Requirement [Ⓞ]	90 PSI (6,2 bar)
Actuator Port Size	1/4 - 18 NPTF
Operating Temperature	-20° to +200°F (-29° to +93°C)
Approximate Shipping Weight	1.96 Lbs (0,89 kg)

[Ⓞ] Supply air must be clean and dry.

Hydraulic Remote Actuator Specifications

Max. Pressure Rating	750 PSI (51 bar)
Pilot Press to Initiate Flow	60 PSI (4,2 bar)
Pilot Pressure at Full Stroke	220 PSI (15,2 bar)
Pilot Flow	2 to 4 GPM (7,5 to 15 liters/min)
Actuator Port Size	SAE 6

Handle End Options

The clevis (handle end) of the spool may be located at either the 'A' or 'B' port end of the valve section. Unless otherwise specified, the handle end will be located at the 'A' port end for all sections.

Valve spools may be reversed in the housing to offer 'B' port handle.

The following handle end options are available:

- **CVHA** (Complete Vertical Handle Assembly)
- **CHHA** (Complete Horizontal Handle Assembly)
- **LHO** (Less Handle Only)
- **HBO** (Handle Bracket Only)
- **LCHA** (Less Complete Handle Assembly)

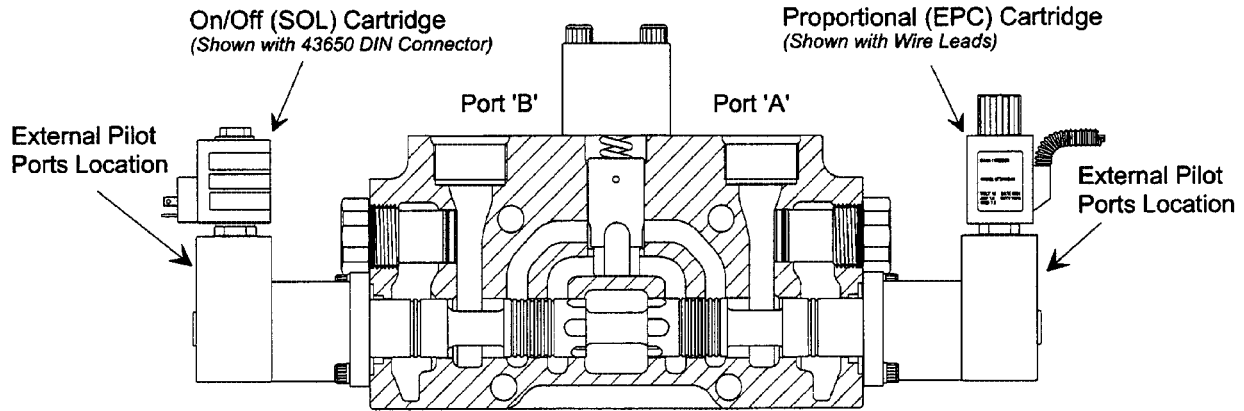
V86 Electric Solenoid Spool Actuators

Electric solenoid spool actuators are available for use on V86 work sections. Solenoid actuators provide for remote electric solenoid actuation of two- and three-position V86 work sections.

Since solenoid actuation is a bolt-on option, there is no internal pilot source within the V86 valve assembly. External pilot and drain connections are provided in the solenoid bonnet.

Solenoid actuators are available in both 12 VDC and 24 VDC, On/Off (SOL) or proportional (EPC) versions.

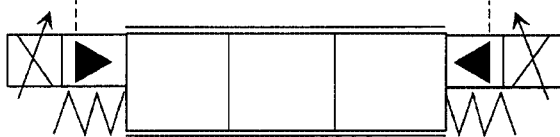
Several solenoid coil connector options are available, including: flying wire leads, 43650 DIN, 1/4" male spade, Weather Pack® and DT04-2P Deutsch®.



Proportional (EPC) Solenoid Actuators

Proportional (EPC) solenoid actuators provide for remote electric (proportional) actuation of two and three-position solenoid work sections. A 12 VDC or 24 VDC electronic controller producing a PWM (50hz - DC) signal is required to drive the proportional solenoid. Several proportional controller options are available thru Parker.

When using an electronic controller with a proportional actuator, the oil flow from the work port may be varied from zero to full flow.

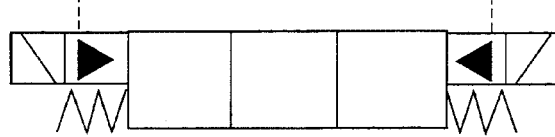


(EPC) Proportional Solenoid Actuator

On/Off (SOL) Solenoid Actuators

On/Off (SOL) solenoid actuators provide for remote electric (on/off) actuation of two- and three-position solenoid work sections. Since these actuators use on/off type coils, a controller producing a PWM signal is not required. These solenoid coils may be energized using either switches or on/off type controllers. Several on/off controller options are available thru Parker.

With an on/off actuator, the oil flow from the work port may not be metered. Oil flow is either full 'off' or full 'on'.



(SOL) On/Off Solenoid Actuator

Electric Solenoid Spool Actuator Specifications

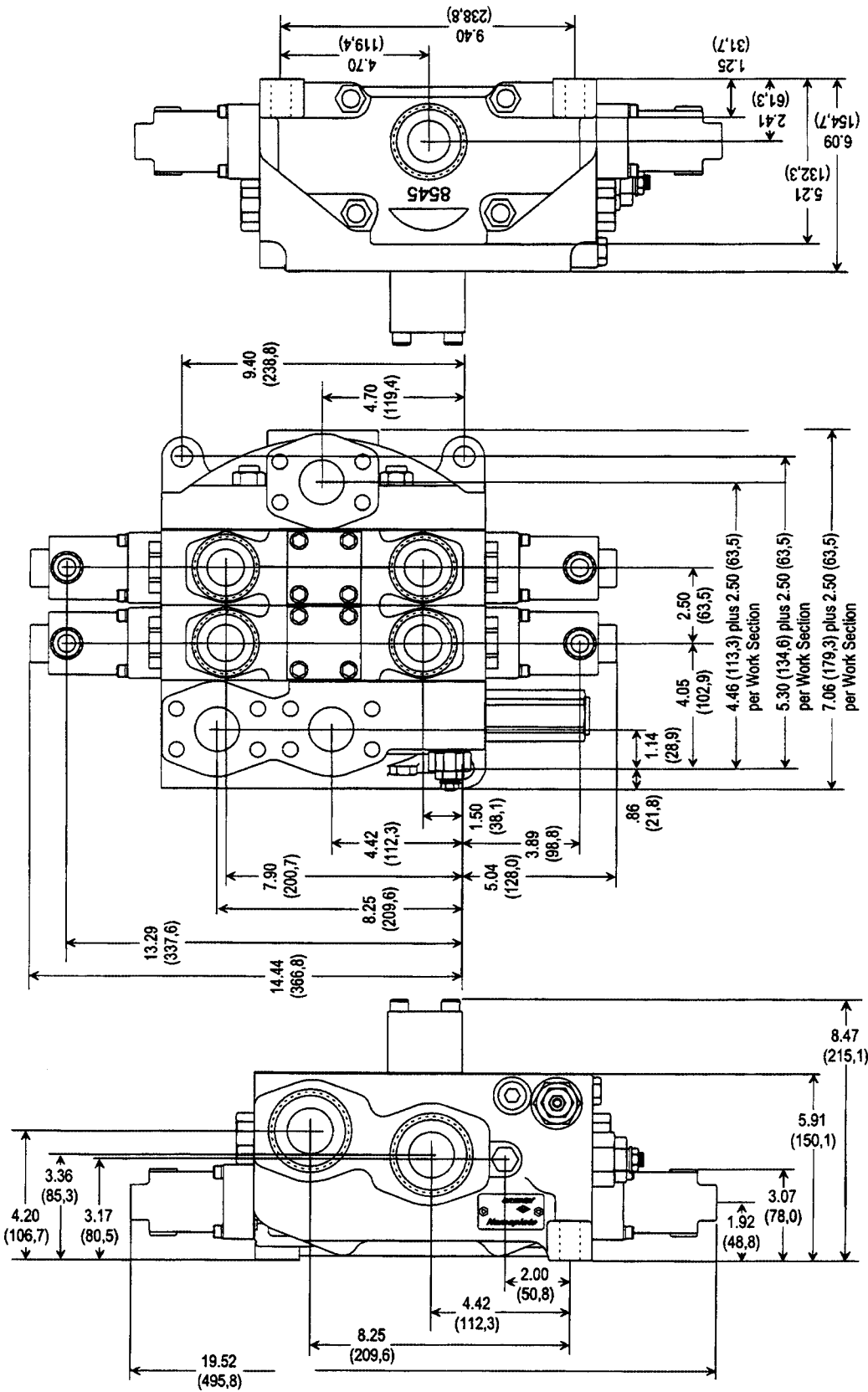
Electrical Requirements

Operating Voltage	.....12 VDC or 24 VDC
Coil Resistance	.....@ 68°F (20°C)
12V Proportional (1.6 Amp)	.....7.5 ohms
24V Proportional (.8 Amp)	.....30 ohms
12V On/Off Solenoid (1.8 Amp)	.....6.5 ohms
24V On/Off Solenoid (.9 Amp)	.....26.6 ohms
Signal (for proportional solenoid)	.....PWM, 50 Hz frequency

Hydraulic Pilot Supply Requirements

Minimum Pressure	.....250 PSI (17 bar)*
*250 PSI above control valve exhaust core pressure	
Maximum Pressure	.....750 PSI (52 bar)
Flow (minimum)	.....1.5 GPM (5,7 liters/min)
Filtration Required (nominal)	.....10 Micron
Response Time	.....Less than 150 milliseconds*
* Neutral to full flow or full flow to zero flow	

V86 Dimensions



V86 Ordering Information

<u>Options</u>	<u>Code Symbol</u>	<u>Options</u>	<u>Code Symbol</u>
<u>Inlet Cover Options</u>		<u>Spool Action Options</u>	
No. 23221 Inlet Cover		Spring Return to Neutral-	
Top and End Inlet Ports	(Standard)	3-Position Detent . . . . .	.D
Top and End Outlet Ports	(Standard)	Pneumatic Remote Actuator . . . . .	.PA
Gauge Port (Plugged)	(Standard)	Hydraulic Remote Actuator . . . . .	.HR
Load Sense Port (Plugged)	(Standard)	Hydraulic Remote Actuator with Override . . . . .	.HRO
Main Relief Valve	(Standard)	On/Off Solenoid Actuator [Ⓞ]SOL
Load Sense Relief Valve	(Standard)	Proportional Solenoid Actuator [Ⓞ]EPC
Inlet Unloading Valve	(Optional)	Travel Limiter/Spool Override (for SOL and EPC)	-
Main Relief Valve Options		[Ⓞ] <i>Solenoid Actuators require external pilot and drain connections.</i>	
Pilot Operated, Adjustable	RP70-A	<u>Work Port Reliefs and Anti-Cavitation Checks</u>	
Pilot Operated, Non-Adj (Tamper Resistant)	RP70-N	Relief Cavity Plug (No Relief) . . . . .	.K-70-NR
Relief Cavity Plug (No Relief)	K-70-NR	Anti-Cavitation Check Valve . . . . .	.K-70-AC
Load Sense Relief Options		Pilot Operated Relief Valve (Ext Adj) . . . . .	.RP70-A
Pilot-Operated, Adjustable	RP30-A	Relief Valve (Tamper Resistant) . . . . .	.RP70-N
Pilot-Operated, Non-Adj (Tamper Resistant)	RP30-N	Combination Relief & Anti-Cav (Ext Adj) . . . . .	.RP70-AAC
<u>Outlet Cover Options</u>		Combination Relief & A/C (Tamper Resistant) . . . . .	.RP70-NAC
No. 8545 Outlet Cover		<u>Handle End Options</u>	
Top Outlet Port	(Standard)	Complete Standard Vertical Handle Assembly . . . . .	.CVHA
Turn-Around Flow	(Outlet used in inlet cover)	Complete Standard Horizontal Handle Assembly . . . . .	.CHHA
<u>Work Section Options</u>		Handle Bracket Only . . . . .	.HBO
No. 24553 Work Section		Less Handle Only . . . . .	.LHO
Pressure Compensated	(PC)	Less Complete Handle Assembly . . . . .	.LCHA
Spool Variations		Protective Spool Boot Assembly	-
4-Way, 3-Position04		
4-Way, 3-Position Free FlowF4		

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2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 18 months from date of shipment from Parker Hannifin Corporation. **THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED. NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGNS OR SPECIFICATIONS.**

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7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges

paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. Buyer's Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property, Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. Patents, U.S. Trademarks, copyrights, trade dress and trade secrets (hereinafter 'Intellectual Property Rights'). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights. If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter 'Events of Force Majeure'). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

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