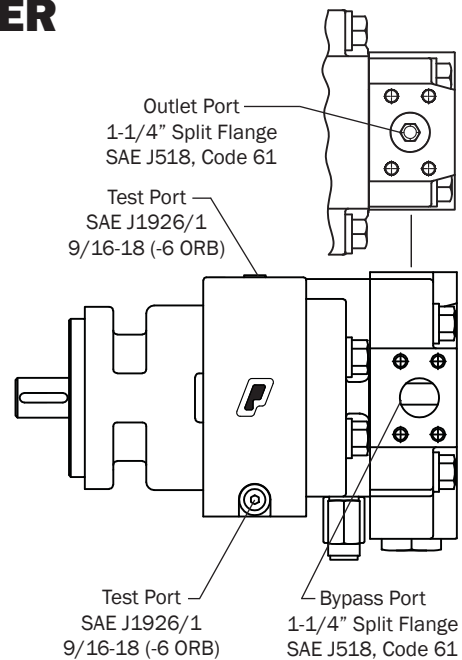
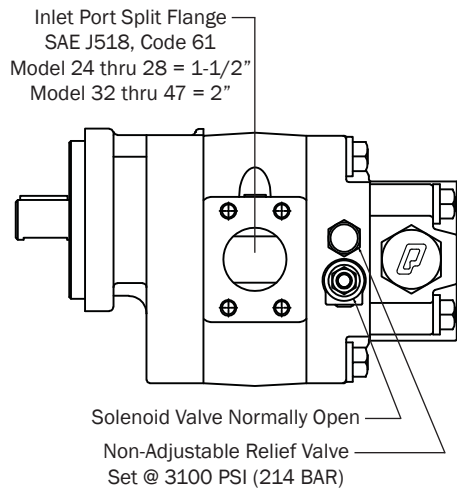




VERSA-PAK FLOW CONTROL/UNLOADER REFUSE PUMP SYSTEM

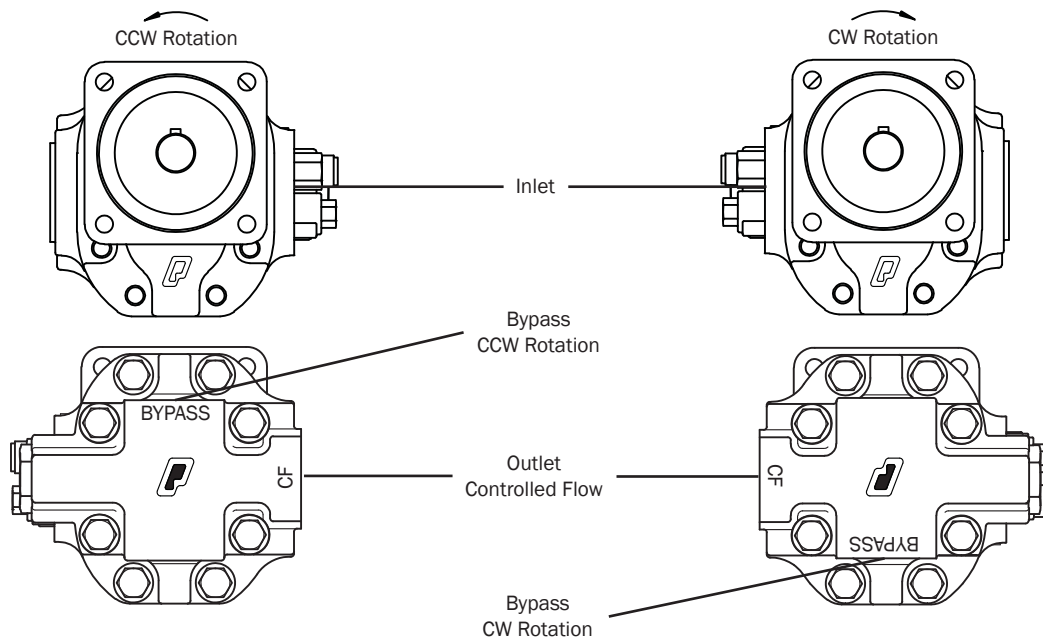
PUMP PORT LOCATIONS



The **VERSA-PAK FLOW CONTROL/UNLOADER** pump has a built-in non-adjustable relief valve set at 3100 PSI (214 BAR). This relief valve is not meant to be used as the systems primary circuit protection. A main system relief valve is still required adjusted to the systems required pressure setting. Individual port reliefs are still required for particular functions that have a lower pressure setting requirement than that of the main system relief setting.

NEVER EXCEED THE MAXIMUM PUMP PRESSURE RATING. Models VP24, VP28 and VP32 have a maximum pressure rating of 3000 PSI (207 BAR); Models VP37, VP42 and VP47 have a maximum pressure rating of 2500 PSI (172 BAR). Consult factory for additional information.

ROTATION AND PUMP PORT LOCATIONS



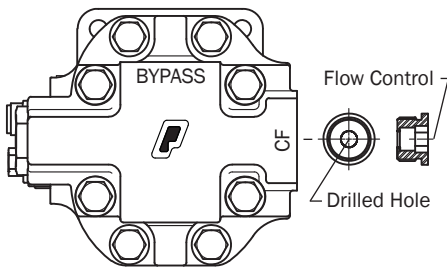
PUMP SELECTION AND OPERATION

The **VERSA-PAK FLOW CONTROL/UNLOADER** pump uses a modulating element feature that provides a low return to tank pressure of approximately 20 PSI (1.37 BAR) in the unload “off” mode. When the pump is switched to the “on” mode the modulating element suspends the unload “off” mode and varies the flow to the preset GPM flow rate. When sizing the pump it is important to remember that typically the engine is running at high RPM’s, the pump should be sized so the bypass flow is no higher than 50% of the desired controlled flow.

Example:

System required flow: (a pump flow control setting of 55 GPM (208 LPM) would be used)..... 55 GPM (208 LPM)
 Flow from a VP47 pump operating at 2000 RPM..... 79 GPM (299 LPM)
 Bypass flow 24 GPM (91 LPM)

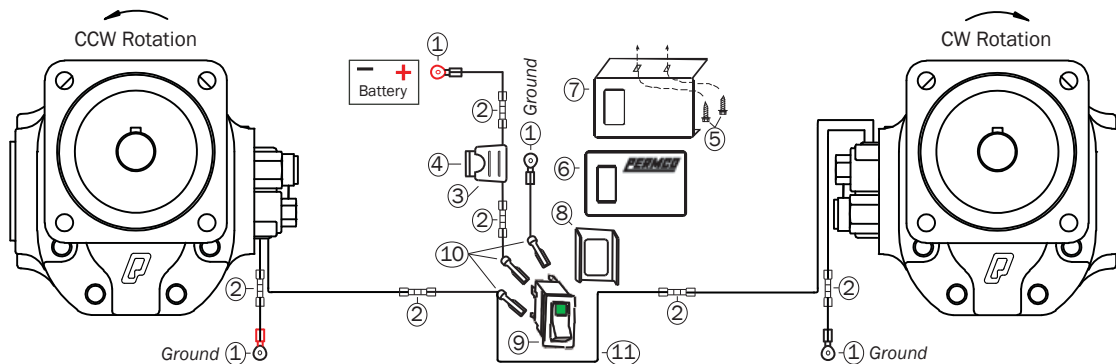
FLOW CONTROL FUNCTION/ADJUSTMENT



Flow GPM (LPM)	Part #	Drill Size	Flow GPM (LPM)	Part #	Drill Size
Blank	No Orifice Installed		50 (189)	514-01556-50	.3906
25 (95)	514-01556-25	.2812	55 (208)	514-01556-55	.4062
30 (114)	514-01556-30	.3125	60 (227)	514-01556-60	.4218
35 (132)	514-01556-35	.3281	65 (246)	514-01556-65	.4375
40 (115)	514-01566-40	.3593	70 (265)	514-01566-70	.4531
45 (170)	514-01566-45	.3750	75 (284)	514-01566-75	.4687

The **VERSA-PAK FLOW CONTROL/UNLOADER** pump has an easily changeable controlled flow orifice. The orifice screws into the pressure port and can be easily removed for changing the desired system flow or can be drilled out to a larger size for increased flow. Consult factory for flows and drill sizes not listed. O-ring (not shown) part number K-2995-920 supplied with orifice.

PUMP SWITCH KIT INSTALLATION



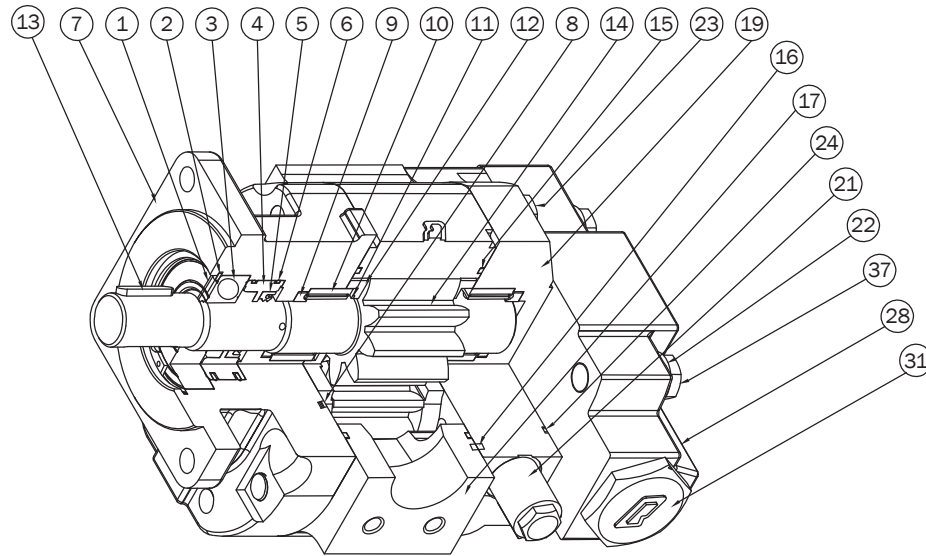
Switch Kit Part Number 999-01576
12 Volt Electric/Hydraulic Shift
Includes Items 1 thru 11

*Solenoid lead wires are not polarity sensitive.
 Use either when making switch and ground connections.

Item #	Part #	Description	Qty
1	999-00926	18-14 Gauge Ring Terminal	3
2	999-00927	16-14 Gauge Butt Splice	4
3	999-00928	16 Gauge Fuse Holder	1
4	999-00929	10 Amp Fuse	1
5	900-01270	10-18 x 1/2" Self Tap Screw	2
6	999-00931	Adhesive Face Plate	1
7	999-00932	Switch Bracket	1
8	999-00933	Switch Guard	1
9	999-00934	Switch with Light	1
10	999-00935	Female Blade Terminal	3
11	999-00925-30	30' 16 Gauge Wire	1



PARTS BREAKDOWN



*Valve assembly not sold separately.

Item#	Description	Part #	Qty	Item#	Description	Part #	Qty
1	Special Outboard Seal	W62-26-75	1	18	Plug (-6 ORB) (not shown)	W046-38	2
2	Snap Ring	W85-315	1	19	Port End Cover	592-01542	1
3	Outboard Ball Bearing	W58-48	1	20	12 Volt Solenoid (not shown)	999-01557	1
4	Seal Retainer	QZ-0961	1	21	Relief Valve	999-01558	1
5	Shaft Seal	W62-26-10	1	22	5/8" Washer	W033-2	8
6	O-Ring	K-2995-164	2	23	Cap Screw/Hex		4
7	Shaft End Cover		1		Cap Screw/Hex 5/8-11 x 5" (VP24)	W1-14	
	SAE-C-4-Bolt Shaft End Cover (Code 4C)	SA-0574-3D			Cap Screw/Hex 5/8-11 x 5-1/2" (VP28)	W1-78	
	SAE-B-4-Bolt Shaft End Cover Code 4B)	RA-0574-3D			Cap Screw/Hex 5/8-11 x 5-1/2" (VP32)	W1-78	
	SAE-C-2-Bolt Shaft End Cover (Code 2C)	UA-0574-3D			Cap Screw/Hex 5/8-11 x 6" (VP37)	W1-65	
8	Plug	S-0280	1		Cap Screw/Hex 5/8-11 x 6" (VP42)	W1-65	
9	Extra Service Ring Seal	VA-0558-1XS	3		Cap Screw/Hex 5/8-11 x 6-1/2" (VP47)	W1-89	
10	Roller Bearing	Q-0921	4	24	O-Ring 161-90 Duro	K-2995-2235	1
11	Unloader Thrust Plate Seal	280-1774-939	4	25	O-Ring 125 1.30ID x .103W (not shown)	K-2995-125	1
12	Unloader Thrust Plate	AZ-0947-DVS	2	26	Alignment Sleeve (not shown)	514-01549	1
13	Shaft Key (for SAE-C-Keyed Shaft)	W09-27	1	27	Orifice Plug (-4 ORB) (not shown)	514-01554	1
14	Gear/Shaft Set (G/S)		1	28	Valve Body	514-01543	1
	SAE-C-Keyed G/S Set 1-1/4" (VP24) (Code 0)	ZE-0024L-1-12		29	Orifice (not shown) (25 thru 75 GPM)		1
	SAE-C-Keyed G/S Set 1-1/2" (VP28) (Code 0)	ZE-0024L-1-15			Orifice 25 GPM	514-01556-25	
	SAE-C-Keyed G/S Set 1-3/4" (VP32) (Code 0)	ZE-0024L-1-17			Orifice 40 GPM	514-01556-40	
	SAE-C-Keyed G/S Set 2" (VP37) (Code 0)	ZE-0024L-1-20			Orifice 45 GPM	514-01556-45	
	SAE-C-Keyed G/S Set 2-1/4" (VP42) (Code 0)	ZE-0024L-1-22			Orifice 50 GPM	514-01556-50	
	SAE-C-Keyed G/S Set 2-1/2" (VP47) (Code 0)	ZE-0024L-1-25			Orifice 55 GPM	514-01556-55	
	SAE-C-Spline G/S Set 1-1/4" (VP24) (Code 6)	MD-0024L-1-12		30	O-Ring 920 (-20 ORB) (not shown)	K-2995-920	1
	SAE-C-Spline G/S Set 1-1/2" (VP28) (Code 6)	MD-0024L-1-15		31	Spool End Cap	514-01553	1
	SAE-C-Spline G/S Set 1-3/4" (VP32) (Code 6)	MD-0024L-1-17		32	Regulating Spring (not shown)	216-01547	1
	SAE-C-Spline G/S Set 2" (VP37) (Code 6)	MD-0024L-1-20		33	Orifice Spring Seat (not shown)	514-01552	1
	SAE-C-Spline G/S Set 2-1/4" (VP42) (Code 6)	MD-0024L-1-22		34	Unload Spring (not shown)	216-01548	1
	SAE-C-Spline G/S Set 2-1/2" (VP47) (Code 6)	MD-0024L-1-25		35	Poppet (not shown)	514-01551	1
15	Square Housing Gasket	TA-2995-252	2	36	Spool (not shown)	514-01550	1
16	Dowel Pin	280-1971-033	4	37	Cap Screw/Hex		4
17	Housing		1		Cap Screw/Hex 5/8-11 x 8" (VP24)	W1-81	
	Housing 1-1/2" Split Flange (VP24)	577-01569-12			Cap Screw/Hex 5/8-11 x 8" (VP28)	W1-81	
	Housing 1-1/2" Split Flange (VP28)	577-01569-15			Cap Screw/Hex 5/8-11 x 8-1/2" (VP32)	W1-990	
	Housing 2" Split Flange (VP32)	577-01569-17			Cap Screw/Hex 5/8-11 x 8-1/2" (VP37)	W1-990	
	Housing 2" Split Flange (VP37)	577-01569-20			Cap Screw/Hex 5/8-11 x 9" (VP42)	W1-351	
	Housing 2" Split Flange (VP42)	577-01569-22			Cap Screw/Hex 5/8-11 x 9" (VP47)	W1-351	
	Housing 2" Split Flange (VP47)	577-01569-25					

* Seal Kit Part Number VPFUL-SK
Includes Item(s) 1, 5, 6, 11, 15, 24, 25 and 30

* Item(s) Numbers 19, 28, 31, 32, 33, 34, 35 and 36 are Non-Service Part Items. Consult Factory

* Torque Relief Valve and Solenoid to 20 Foot Pounds

* Torque Coil Nut to 5 Foot Pounds

* Torque Orifice Plug to 86 Foot Pounds

* Torque Cap Screws to 200 Foot Pounds

The product described herein including without limitation, product features, specification and design are subject to change by Permco without notice



OIL SPECIFICATIONS

Use premium quality hydraulic fluid with a viscosity range of 150-300 SUS (32-65 CST) at 100°F (38°C). Normal operating viscosity range is between 10-1000 SUS (16-220 CST). Maximum start-up viscosity should not exceed 4000 SUS. Oil should have maximum anti-wear properties, foam depressant, rust and corrosion inhibitors, oxidation stability of 1500 hours minimum along with a low flash and fire point. Other desirable characteristics include a high demulsibility (low emulsibility) for separation of water, air and contaminants, resistance to the formation of sludges, acids, gums, tars and varnishes. Operation in cold conditions requires special oil consideration so maximum start-up viscosity is not exceeded. Under normal conditions of continuous operation, fluid temperature should not exceed 150°F (65°C). In no instance should the temperature exceed 185°F (85°C) for mineral based fluids. For water glycol and invert emulsions information, consult factory.

Maximum inlet vacuum not to exceed 5 IN HG (.17 BAR) or a positive pressure greater than 20 PSI (1.37 BAR). Degassing of the fluid and subsequent cavitation may occur if these values are exceeded.

FILTRATION

For maximum pump life, the system should be protected from contamination at a level not to exceed 250 particles greater than 10 micrometers per milliliter of fluid. A 25 micrometer return line filter with a B 10 rating of at least 2.2 should provide this level of purity. A 149 micrometer suction strainer is also suggested for added pump protection, however very high viscosities may dictate not using a suction strainer. Consult your vehicle body manufacturers service manual for filtration details.

HOSE SELECTION

Selecting the proper hose size and type is critical to proper system operation and hydraulic component longevity. Fluid velocities and pressure are determining factors, reference your hose manufacturing catalog for actual hose selection.

Recommended Fluid Velocities

Inlet Line..... 4 Feet per Second
Pressure Line..... 15 Feet per Second
Return Line..... 8 Feet per Second

Recommended Hose Type

Inlet Line.....SAE 100R4
Pressure Line..... SAE 100R2 or higher
Return/Bypass Line..... SAE 100R1

SHAFT ALIGNMENT

To assure maximum pump and drive line life proper mounting of the pump is critical. In front mount applications the pump should be mounted parallel to the engine crankshaft within 1.5°. Universal joints need to be in phase and the drive line should be balanced to the maximum operating engine RPM. Shaft offset should be between 3-7°.

PTO direct mount units should have anti-seize grease applied to the pump and PTO shaft splines; annual re-applications are suggested along with semi-annual re-applications for severe duty cycles; refer to your PTO and/or vehicle body maintenance guide.

REPLACEMENT PUMP

If you are replacing a pump on a system that has had a pump failure, it is important that the hydraulic system be thoroughly cleaned to protect your new pump. Often damaging debris and contamination is still within the system hoses, cylinders, control valves, filters, and hydraulic tank. The systems main relief valve and system port reliefs can also be affected, a malfunctioning relief or port relief can severely damage the pump. To insure the hydraulic system is properly flushed and the relief valve are working properly, refer to your vehicle body manufacturers service manual for hydraulic and filtration system cleaning details.

Before you begin operating the pump, back-off the systems main relief valve to a 0 PSI setting. Run the pump at engine idle RPM's for about 5 minutes (or until oil heats up) at 0 PSI with all the control valves in the neutral position. If everything seems to function properly and no unusual noises are heard, gradually adjust the main relief valve to the required system pressure setting. Refer to your vehicle body manufacturers service manual for adjusting relief valve details. **Never exceed the pressure rating of the pump.**

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