VHP-3
POWER UNIT
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vale

MAINTENANCE MANUAL AND GENERAL OPERATION PROCEDURES

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SAFETY INSTRUCTIONS

READ THESE INSTRUCTIONS CAREFULLY!
FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN SEVERE PERSONAL INJURY

OPERATING MACHINE

- READ OPERATING INSTRUCTIONS
- WEAR EYE, FACE, AND FOOT PROTECTION
- INSPECT TOOL DAILY FOR UNSAFE CONDITIONS
- CHECK THAT ALL GUARDS ARE IN PLACE AND ALL SAFETY DEVICES ARE WORKING PROPERLY. DO NOT OPERATE TOOL WITH ANY SAFETY GUARDS REMOVED.
- DO NOT WEAR LOOSE CLOSING OR JEWELRY
- NEVER PUT ANY PART OF YOUR BODY INTO, UNDER, OR NEAR MOVING PARTS
- NEVER OPERATE TOOL ABOVE SPECIFIED PRESSURE
- DO NOT EXCEED RECOMMENDED PERFORMANCE LIMITATIONS

SERVICING MACHINE

- SHUT OFF & LOCK OUT POWER SOURCE TO TOOL
- NEVER LIFT HEAVY TOOLS BY HAND. USE MACHINERY MOVING EQUIPMENT.
- FOLLOW THE MAINTENANCE INSTRUCTIONS IN YOUR MANUAL
- USE THE CORRECT TOOLS TO REPAIR MACHINE

FORWARD

The main purpose of this manual is to provide information regarding the operation, servicing, and maintenance of the standard line of ***Vale*** tools and power units. This manual therefore, should be directed into the hands of your service or maintenance department. The manual details general maintenance procedures for this hydraulic equipment that also apply to most specially designed hydraulic tools as well. It also includes supplemental information (i.e., safety notices, drawings, supporting component service literature, etc.), regarding specific tools or power units. You will find that your ***Vale*** Tools are of a simple and rugged construction requiring very little maintenance. When the need for service does become necessary, apply good mechanical principles, handle parts carefully, and be sure they are clean and not marred or nicked when assembled. When ordering spare parts, order by number and description, so as to minimize errors in filling orders. If you should require more information or service assistance, call your local representative or the factory direct where your calls or letters will receive prompt attention.

POWER UNIT SPECIFICATIONS

VHP-3 C-2137 (One Tool) or VHP-3 C-2138 (two Tools)

Operating Pressure: 10,000 PSI max.

Displacement: 1.5 gpm

Motor: 5 HP, 1725 RPM, TEFC

Pump: Radial Piston

Control Valve: D03 size, Double Solenoid

Relief Valve: Cartridge Type, Factory set and non-adjustable

Reservoir: 10 Gallon Capacity

Starter: Manual Starter

Weight With Oil: 249 Pounds (93 KG)

Dimensions: Length- 17.5 inches (445 mm)
Width- 16 inches (406 mm)
Height- 34 inches (864 mm)

Drawings:		
	Power Unit Assembly -	C-2137, C-2138
	Electric Schematic -	A-4408 (1 Tool)
		A-4409 (2 Tool)
		A-4964 (2 Tool Relay Socket)
	Hydraulic Schematic -	A-4412

POWER UNIT DESCRIPTION AND OPERATION

The basic configuration of ***Vale*** Power Units conforms generally to JIC Standards. The reservoir is a two piece welded steel housing with a steel cover. The reservoir serves as the base for the power unit; the manifold block and valve are mounted on the top of the reservoir for ease of maintenance. All power units are shipped ready for service with the exception of incoming electric hook up.

Operation

The power unit is designed for either a single tool or a double tool design. If operating 2 tools, the system works on a priority basis, that is the operator who activates the tool first will be able to complete the cutting action.

The fluid is directed to the tool by means of a solenoid-operated control valve that is actuated by a trigger switch on the tool. When actuated, fluid flows from the reservoir and into the pumping cavities. The fluid is then pumped into the manifold block. From there the fluid is then directed by the control valve to the tool and prevented from flowing back into the tank. The tool is thereby allowed to stroke and build pressure for cutting. When the switch is in the non-activated mode the fluid is free to pass from pressure to tank, therefore there is no excess heat build-up.

If the switch remained activated after the work was completed, the cartridge relief valve would open at its set pressure (normally 10,000 PSI) and the pump would continue to hold pressure in the tool until the switch was released.

NOTE: Do not hold the trigger on the tool closed for longer than is necessary. Holding the trigger closed can cause the motor to stall and heats the hydraulic fluid unnecessarily. Release the trigger as soon as the cut is complete and no damage will occur to the power unit.

INSTALLATION

Vale equipment should be installed in your work area with the following considerations for location.

•Proximity to the work area - Minimum hose or pipe runs will assure proper operational tool cycle requirements. Long pressure lines will slow down the tool cycle due to the need of pressurizing and de pressurizing the connected tool and power units. NOTE: The longer the hose or pipe runs, the greater number of fittings (elbows, tees, etc.) the longer the cycle time. It is also recommended that the hose lengths in excess of 15 feet not to be used unless approved by the factory. Limit the flexible hose installation to that length which will adequately insure tool maneuverability within the limits of the work area.

•Protect the pressure runs from physical damage. Connecting hose or pipe should not be subjected to the physical abuse of trucking, vehicle, abrading of dragging on rough flooring, sharp objects, etc. For most severe applications and/or additional safety from hose burst, it is recommended that the use of ***Vale*** safety hose coverings be employed.

•Accessibility to the power unit is of prime importance to insure adequate routine observation and availability to maintenance personnel for periodic checking

•Protect the equipment from extremes of temperatures. Exposure to extremely low temperatures will cause difficulty with the pump and tool daily start up. Hydraulic fluid will become more viscous and stiff. Flow into the pump or through valving and hoses will be retarded until the fluid has built up some frictional heat. The use of a heat exchanger may be required for cooling hydraulic fluid if ambient temperatures exceed 110° F or 43° C. Consult the factory for recommendations.

•Ensure the power unit reservoir is filled with hydraulic fluid compatible with the seals in the tool and power unit.

CAUTION: Fire resistant fluids (phosphate esters) are not compatible with this power unit. Consult factory for compatible fire resistant fluids that are compatible with this power unit.

Fluid Filtering

It is recommended that for long life and optimum performance, to protect the pump from foreign particles in the fluid medium, the fluid being placed in this power unit be filtered to at least 10 micron before being put into the reservoir.

START-UP PROCEDURE

1. Remove filler/breather and check to see that the power unit reservoir is filled with the appropriate type of hydraulic fluid. **Keep the fluid to within 1 inch of the top of the reservoir.**
2. Connect the ***Vale*** tool to the power unit. See Connecting the Tool Section on the next page.
3. Check to see that the blades (or ram set) are tightly secured in the C-frame and ram.
4. Check electrical motor nameplate, electrical data, and service voltage. Check to insure that the motor is wired for the correct service voltage, hertz and phase of the power circuit available.
5. Check that the relief valve should be set at 10,000 PSI.

CAUTION: Never adjust pressure over 10,000 P.S.I. or damage to system components may occur.

6. Check components for damage or leaks.
7. After cycling remove filler/breather and check oil level again since connecting hose and tool(s) will have depleted part of the supply of hydraulic fluid. **Keep the fluid to within 1 inch of the top of the reservoir.**
8. The power unit can now be turned on.

Setting the Relief Valve

The pressure relief valve is located inside the reservoir just below the valve manifold. Relief valve pressure is factory set at 10,000 P.S.I. and should not need any adjustment. If adjustment is needed, consult the factory directly before attempting to change the relief valve setting.

Connecting the Tool

•When connecting hoses to the power unit or tool, avoid over tightening of fittings. Refer to flow circuit diagrams for flow patterns and connection points for various control methods and valve components available. Start the power unit and allow oil to circulate freely. Operate tool at intermittent interval to purge lines, cylinders, etc., of air before operating the tool in working cycle.

•When first connected, the tool will seem sluggish and slow to begin its cutting stroke. A delay will be noticed between the time the trigger is activated and the ram begins to move. This is caused by air trapped in the hose between the power unit and the tool. Under normal operation the air will eventually work it way back to the reservoir, it does however, cause the tool to cycle more slowly until the air is finally purged from the system. If this delay is found to be objectionable for the time it occurs, the air can be bled by following the instructions below.

Bleeding the Tool

CAUTION: Never advance the ram to its extreme position during this procedure as this could cause a maximum pressure build up which could cause a high pressure stream of oil to be expelled from the fitting.

- The fitting connecting the hose to the tool must be loosened enough to allow air to escape.
- This is accomplished by cracking the fitting loose and cycling the tool until a thin stream of oil escapes from the fitting.
- It will be noted that the oil is a milky white color and usually contains visible air bubbles.
- The tool should be actuated so that the ram **only extends part way** and then is returned.
- Continue this procedure until the oil stream becomes clear and free from air bubbles.

Cold Weather Operation

When ***Vale*** tools and power units are used with the temperature near freezing, the ram of the tool may be slow in returning due to the viscosity of the oil. If it is essential that the tool be operated under these extreme conditions, the following steps may be taken:

1. Check to make sure the spring is in good condition (i.e. not broken)
2. Keep the hose reasonably free from kinks and bends and eliminate as many fittings as possible, especially those fittings which change the direction of the oil flow (i.e., elbows, tees, etc.).
3. Start power unit in advance of operation to permit the warm up period.
4. An oil with lower viscosity rating may be used (consult factory for recommendations).

NOTE: Remember that ram return times are directly proportioned to the amount of force necessary to force the oil back through the hose to tank. For example, a 25-foot hose will permit the return of the oil back to the pump reservoir more easily than a 50-foot hose due the increase in wall frictional area.

HYDRAULIC FLUIDS

The hydraulic fluid in your ***Vale*** Tool has to fulfill three duties; energy transfer, lubrication, and cooling. It is therefore **extremely important** that the proper fluid is selected for optimum performance of the tool.

In the selection of fluids the viscosity temperature characteristics must be taken into consideration. Preferably, fluids with low change in viscosity with temperature change should be used; also a fluid with good shear strength and lubrication quality be means of HD or EP additives is recommended. To keep pressure drop low in outside cold weather installations, especially thin fluids, ISO viscosity group 36 should be used. Fluids for year-round outside use or in non-heated buildings, ISO viscosity group 46 is usually adequate.

The thick fluids, such as viscosity group 68 are used mostly in closed rooms and building where ambient temperatures are extremely high. Since the life and efficiency of fluids at high temperatures decrease, maximum temperature should not exceed 80° C. or 175° F.

If it becomes necessary, because of hazardous locations, to employ the use of fire retarding fluids, **phosphate ester fluids cannot be used, consult factor for alternative fluids**.

NOTE: When fire resistant fluids are to be used, it will be necessary to order units equipped with seals compatible with these fluids.

FLUID RECOMMENDATIONS

Petroleum Based Fluids:

Vale recommends the use of a good grade of general purpose, detergent, hydraulic fluid be used in your power unit. Use Amoco AW 32, Gulf Harmony 32 or equivalent for cold weather applications: Amoco AW 46, Gulf Harmony 46 or equivalent for most applications: and Amoco AW 68, Gulf Harmony 68 or equivalent for high temperature applications.

Fire Resistant Fluids:

Phosphate Esters cannot be used in this power unit. **CONSULT FACTORY FOR ALTERNATIVES.**

Petroleum Based Fluids:

Application	Viscosity SUS @ 100° F.	ISO Viscosity Group/Grade Identification
Continuously Cold Ambient Temperatures (Consult Factory)	150	32
Most all Applications	200	46
Continuously High Ambient Temperatures (Consult Factory)	300	68

When ambient temperatures vary greatly, ***Vale*** recommends the use of a heating element or heat exchange depending on the oil being used and the temperature variations. For almost every application viscosity group 46 should be used. If temperatures will be in either extreme or vary greatly, consult with your local oil distributor, engineering department or factory directly.

FLUID FILTERING

Many of the parts in ***Vale*** units have precision finished surfaces working together. Contamination such as acid, water, grit etc. in the hydraulic fluid will cause trouble and the need for repairs. Handle all fluid in clean containers, and filter the fluid to be used to at least 10 micron before using to protect the ***Vale*** tool and power unit from foreign particles in the fluid medium. It is recommended that for long life and optimum performance, the fluid used be filtered to at least 10 micron before being put into the power unit reservoir.

MAINTENANCE

Daily:

- Inspect the system for hydraulic hose damage and leaks.

Monthly:

- Check oil level in reservoir, if necessary add oil to bring up to within 1 inch of the top of the reservoir.
- Inspect the system for hydraulic fluid leaks

PROCEDURES FOR DISASSEMBLY

WARNING: Ensure that power unit is disconnected from power supply.

Disconnect hydraulic pressure hose(s) from Manifold Block (9).

Removal of Directional Control Valve

1. Remove four screws from Directional Control Valve (8) wiring box cover, and remove cover.
2. Make a note of wire connections and disconnect wires.
3. Unscrew Conduit Connector (46) sleeve and remove Conduit (36) and wires from Directional Control valve.

NOTE: A small amount of hydraulic fluid will exit the valve on removal.

4. Unscrew and remove the four Socket Head Cap Screws (31) securing the Directional Control Valve (8) to the Manifold Block (9).
5. Remove the Directional Control Valve (8) from the Manifold Block (9), noting that there are o-ring seals present.
6. Inspect and replace the o-ring seals as necessary.
7. Reassembly is the reverse of disassembly.

Removal of Manifold Block

1. Remove Directional Control Valve (see above).
2. Remove two Socket Head Cap Screws (45).
3. Remove Manifold Block (9) from Manifold Bolster Plate (39), noting that there are o-ring seals present.
4. Inspect and replace o-ring seals as required.
5. Reassembly is the reverse of disassembly.

Removal of Pump/Motor Assembly

1. Remove four Hex. Head Bolts (19) from Reservoir Cover (6).
2. Remove Pump/Motor/Reservoir Cover as one assembly.
3. Reassembly is the reverse of disassembly.

Removal of Motor

1. Remove Pump/Motor Assembly (see page 10).
2. Remove four Hex. Head Bolts securing the wiring box cover to the Electrical Enclosure (42), and remove the cover.
3. Note the wiring positions and disconnect wires.
4. Unscrew Conduit Connector (47) sleeve and remove Conduit (36) and wires from Motor (2).
5. Remove four Socket Head Cap Screws (17) and four Lockwashers (18) securing the Motor (2) to the Reservoir Cover (6) and Pump/Motor Adapter (3).
6. Remove Motor (2).
7. Reassembly is the reverse of disassembly.

NOTE: Coupling (4) halves should be fitted together 'snugly'. DO NOT force together, as binding will result.

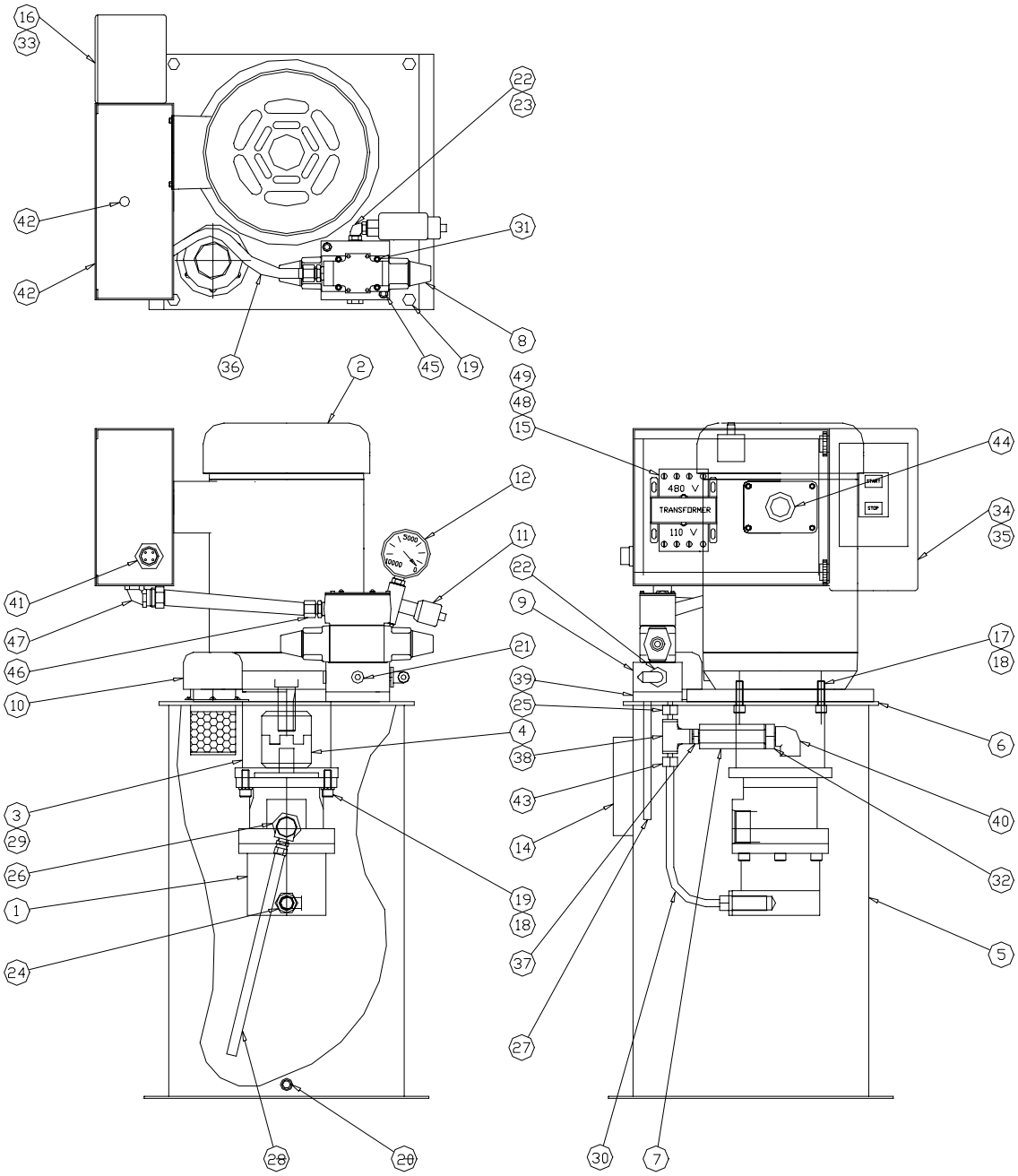
Removal of Hydraulic Pump

1. Remove Pump/Motor Assembly (see page 10).
2. Remove Motor (see above).
3. Remove four Socket Head Cap Screws (19) and four Lockwashers (18) securing the Pump (1) to the Pump/Motor Adapter (3).
4. Remove Pump (1).
5. Reassembly is the reverse of disassembly.

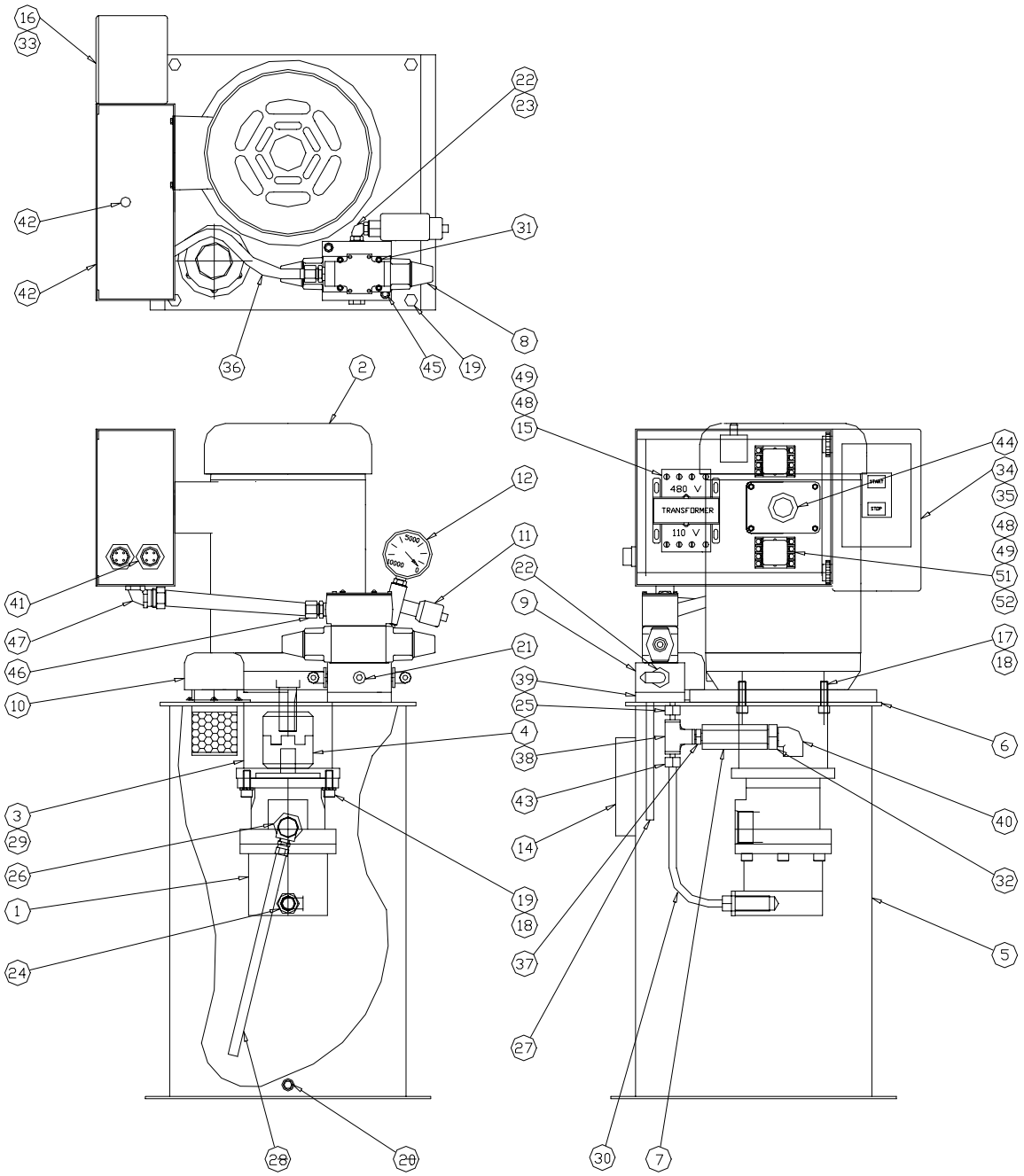
Replacement of Relief Valve

1. Remove Pump/Motor Assembly (see page 10).
2. Remove Hydraulic Elbow Fitting (40) and Hydraulic Bushing (32) from the Relief Valve (7).
3. Remove the Relief Valve (7) from the Hydraulic Nipple (37).
4. Reassembly is the reverse of disassembly.

VHP-3 1 Tool Assembly



VHP-3 2 Tool Assembly



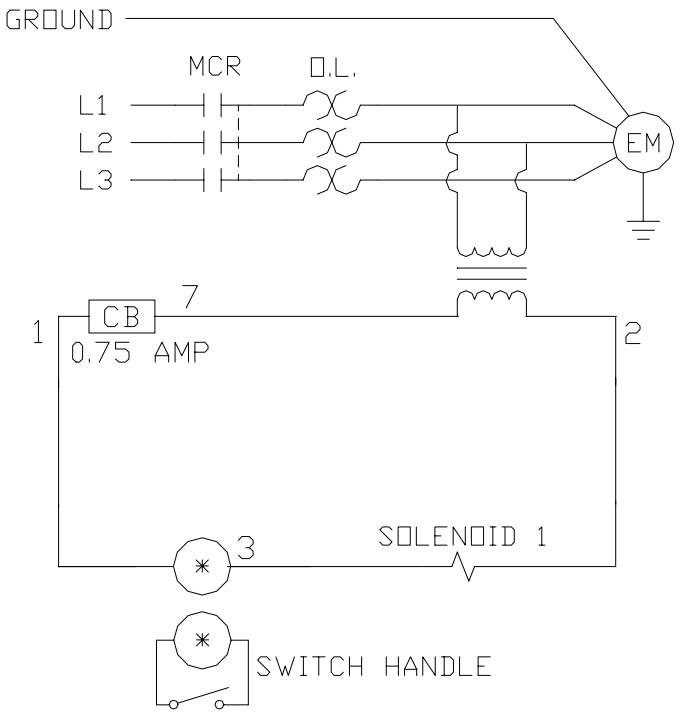
SPARE PARTS LISTING

DET.	PART No.	DESCRIPTION	QTY.
1	A-4784	PUMP, 10,000 P.S.I.	1
2	A-4785	MOTOR, 1 H.P.	1
3	A-4786	PUMP/MOTOR ADAPTER	1
4	A-4787	COUPLING	1
5	A-4788	RESERVOIR	1
6	A-4790	RESERVOIR COVER	1
7	A-4395	RELIEF VALVE	1
8	A-4222	CONTROL VALVE	1
9	A-4391	MANIFOLD BLOCK	1
10	A-1764	FILLER, BREATHER	1
11	A-4228	NEEDLE VALVE	1
12	A-4229	PRESSURE GAUGE, 10,000 P.S.I.	1
13	A-4793	RESERVOIR GASKET	1
14	A-1759	SIGHT/LEVEL GAUGE	1
15	A-1870	TRANSFORMER	1
16	A-4965	W-49 HEATER	3
17	A-2078	3/8-16 x 1.25" SOCKET HEAD CAP SCREW	4
18	A-2018	3/8" LOCKWASHER	6
19	A-3676	3/8-16 x 1.0" HEX. HEAD BOLT	6
20	A-4250	½" N.P.T. SOCKET PLUG	1
21	A-2857	-6 S.A.E. SOCKET PLUG	1
22	A-4233	-6 S.A.E. TO –4 J.I.C. 90° ELBOW	2
23	A-4484	¼" N.P.T. TO –4 J.I.C. FEMALE ADAPTER	1
24	A-5015	13/16 BUTECH to –4 J.I.C. 90°	1
25	A-4387	¼" N.P.T. HEX. NIPPLE	1
26	A-3915	-12 S.A.E. to –8 J.I.C. 90° ELBOW	1
27	A-4332	3/8" x 6.0" LONG BLACK PIPE NIPPLE	1
28	A-2363	½" x 3.0" LONG J.I.C. TUBE	1
29	A-2053	ADAPTER GASKET	1
30	A-4390	¼" O.D. x .065" WALL J.I.C. TUBE	1
31	A-2634	¼-20 x .875" SOCKET HEAD CAP SCREW	4
32	A-4360	¾" TO 3/8" N.P.T. BUSHING	2
33	A-1948	MANUAL STARTER	1
34	A-2095	½" BLK. PIPE CLOSE NIPPLE	2
35	A-3164	7/8" I.D. NARROW WASHER	2
36	A-1695	½" CONDUIT	1
37	A-4388	¼ NPT to 3/8 NPT NIPPLE	1
38	A-2516	¼ NPT TEE	1
39	A-4397	MANIFOLD BOLSTER PLATE	1
40	A-1562	3/8" NPT STREET ELBOW	1
41	A-4396	RECEPTACLE	1(2)

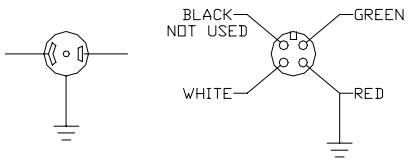
CONTINUED ON NEXT PAGE

42	*C-2227*	*ELECTRICAL ENCLOSURE*	*1*
48	*A-2788*	*¼ NPT to ¼ JIC ADAPTER*	*1*
44	*A-1816*	*RUBBER GROMMET*	*1*
45	*A-2204*	*5/16-18 x 1.5" SHCS*	*2*
46	*A-1694*	*½ SEALTITE CONNECTOR – STRAIGHT*	*1*
47	*A-2504*	*½" x 45° CONDUIT CONNECTOR*	*1*
48	*A-4823*	*10-32 x 0.5" RHMS*	*4*
49	*A-2120*	*10-32 HEX NUT*	*4*
50	*A-3910*	*CIRCUIT BREAKER*	*1*
51	*A-4393*	*RELAY*	*0(2)*
52	*A-4394*	*RELAY SOCKET*	*0(2)*

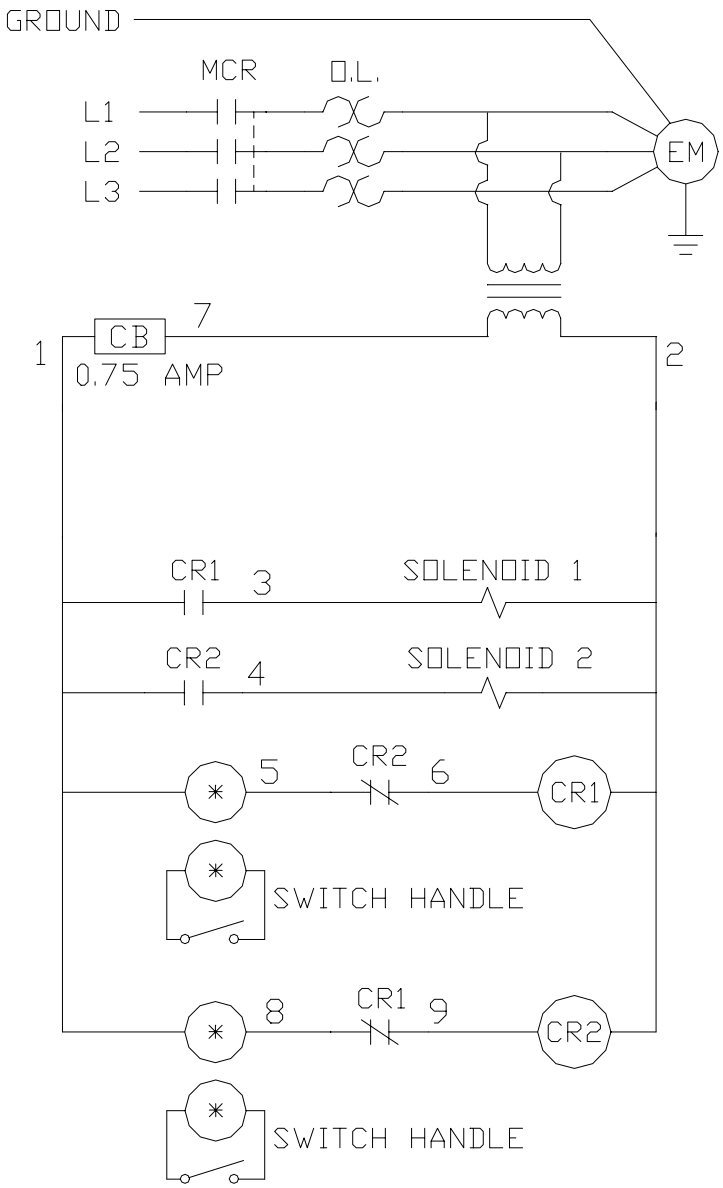
Electrical Schematic – 1 Tool



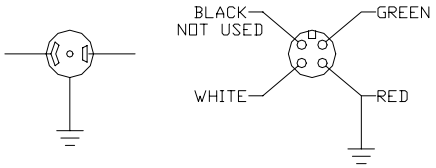
* SEE DIAGRAM BELOW FOR CORRECT CONNECTOR



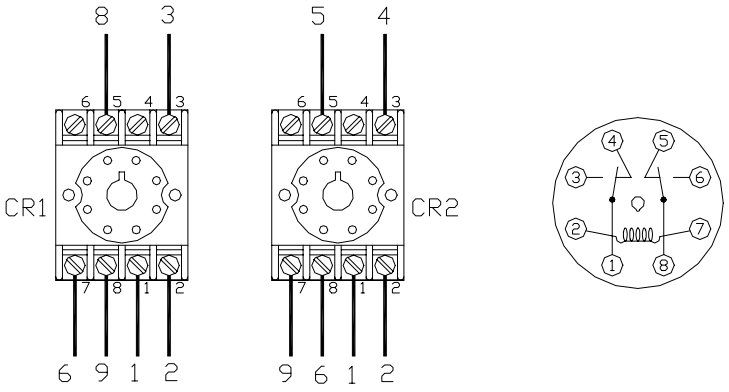
Electrical Schematic – 2 Tool



* SEE DIAGRAM BELOW FOR CORRECT CONNECTOR



Relay Wiring Details – 2 Tool



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Hydraulic Schematic