

vale



**MAINTENANCE MANUAL
AND
GENERAL OPERATION
PROCEDURES**

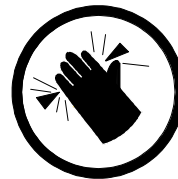
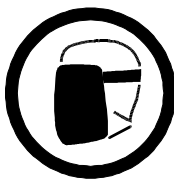


FORWARD	4
POWER UNIT SPECIFICATIONS	5
POWER UNIT DESCRIPTION AND OPERATION	6
INSTALLATION	6
Start-Up Procedure	7
Setting the Relief Valve.....	8
Bleeding the Tool	9
Cold Weather Operation.....	9
HYDRAULIC FLUIDS.....	9
FLUID RECOMMENDATIONS.....	10
Petroleum Based Fluids.....	10
Fire Resistant Fluids	10
FLUID FILTERING.....	11
TOOL ATTACHMENTS.....	11
Hoses	11
MAINTENANCE.....	11
Daily	11
Monthly	11
Motor Lubrication	12
Changing Filter Element.....	12
Removal of Directional Control Valve.....	12
Removal of Manifold Block.....	13
Removal of Hydraulic Pump.....	13
Removal of Electric Motor.....	13
V-5 Power Unit front view drawing.....	15
V-5 Power unit top view drawing	16
V-5 Power Unit end view drawing.....	17
V-5 Spare parts listing.....	18
V-5 1 Tool Electrical Schematic	19
V-5 2 Tool Electrical Schematic	20
V-5 2 Tool Relay Wiring.....	21
V-5 Hydraulic Schematic	22



**SAFETY INSTRUCTIONS**

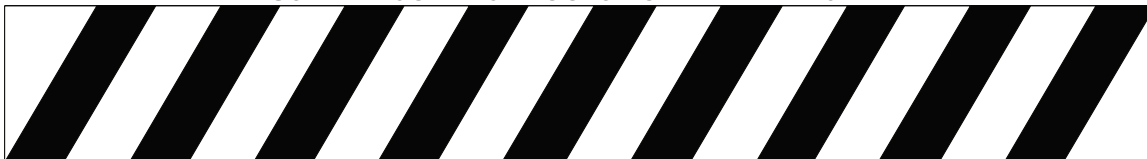
READ THESE INSTRUCTIONS CAREFULLY!
FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN
SEVERE PERSONAL INJURY

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** 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), 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, 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

V-5 D1500 (One tool) or V-5 D1501 (Two tool)

Operating Pressure: 4500 PSI

Displacement: 5.5 gpm

Motor: 7.5 HP, 1800 RPM, TEFC,

Pump: Fixed Displacement Axial Piston

Control Valve: D04 size, Pilot Activated, Single or Double Solenoid Pilot Valve

Relief Valve: Cartridge Type, Adjustable from 150 to 6000 PSI

Suction Filter: 125 Micron, In Tank

Reservoir: 13-Gallon Capacity, Welded Steel.

Starter: Combination Magnetic, 120-Volt Control

Weight With Oil: 480 Pounds (220 KG)

Dimensions: Length- 36 inches (900 mm)
Width- 15 inches (380 mm)
Height- 24 inches (610 mm)

Drawings: Power Unit Assembly - D-1500 (1 Tool)
D-1501 (2 Tool)
Electric Schematic - A-3510 (1 Tool)
A-3512 (2 Tool)
Hydraulic Schematic - A-3511



POWER UNIT DESCRIPTION AND OPERATION

The basic configuration of **Vale** Power Units conforms generally to JIC Standards. The reservoir is made of welded steel with a bolt on cover. The motor, pump, manifold block and valves are all mounted on the top of the reservoir for ease of maintenance. All power units are shipped ready for service (less hydraulic fluid) with exception of incoming electric hook up.

Operation

The power unit is designed for either a single tool or a double tool design. If operating two 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 through the suction filter and into the pumping cavity. The fluid is then pumped through a high-pressure tube into the manifold block. 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.

If the switch remained activated after the work was completed, the cartridge relief valve would open at its set pressure (normally 4500 PSI) and the pump would continue to hold pressure in the tool until the switch was released.

NOTE: When the power unit is under full load (4500 PSI), the current draw will substantially exceed the rated current of the motor. This is normal for this power unit because the full load is only achieved for very brief periods of time. The overload will not damage the motor when used properly. Do not hold the trigger on the tool closed for longer than is necessary. Holding the trigger closed will eventually cause the overload heaters to activate, which then shuts the motor off. In some cases, due to production variations, holding the trigger closed can cause the motor to stall. 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 30 feet NOT 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 or 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: When fire resistant fluids are to be used, it will be necessary to order units equipped with seals compatible with these fluids.

NOTE: The use of synthetic fire resistant fluids (phosphate esters) will also tend to retard the return speed of the tool since these fluids tend to be more viscous than mineral based fluids. Consult the factory for recommendations if fire resistant fluids are to be used.

Fluid Filtering

The power unit is protected by a screen mesh suction filter located in the reservoir. Although its suction filter will protect the pump from foreign particles in the fluid medium, it is still recommended that for long life and optimum performance, the fluid in this power unit be filter to at least 25 micron before being put into the reservoir.

START-UP PROCEDURE

1. Check to see that the power unit reservoir is filled with the appropriate type of hydraulic fluid. Keep the fluid at least 3/4 full in the sight gauge.
2. Connect the **Vale** tool to the power unit.
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 motor is rotating in the proper direction (see arrow on the pump housing). If not reverse circuit polarity.



6. The starter overload heaters are set for the full rated current as shown on the motor nameplate, even though the motor will see higher current draws during operation. the relief valve should be set at 4500 PSI.

CAUTION: Never adjust pressure over 5,000 P.S.I. or damage to system components may occur.

7. Check components for damage or leaks.
8. The power unit can now be turned on.

Setting Relief Valve

The pressure relief valve is located on the manifold block behind the pressure gauge. The following steps should be followed to set the relief valve:

1. Open the pressure gauge valve by turning counter clockwise.
2. Remove the protective cover over the relief valve.
3. Loosen the lock nut at the base of the setscrew.
4. Activate the trigger switch, read the pressure and release the trigger.
5. If the pressure is too low, turn the setscrew clockwise. If the pressure is too high, turn the setscrew counterclockwise.
6. Repeat steps 4 and 5 until the pressure is 4500 PSI.
7. Tighten the lock nut and recheck the pressure and reset the pressure if necessary.
8. Replace the protective cover and close the pressure gauge valve.

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 strike. 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 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 sluggishness 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
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, an 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 two duties; transfer and lubrication. 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 by 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 retardant fluids, phosphate ester fluids should be considered.

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

FIRE RESISTANT FLUIDS WITH WATER ADDITIVES ARE NOT RECOMMENDED.

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:

If fire resistant fluids are desired, *Vale* recommends the use of phosphate ester type fluids. Use Houghton International's Houghto-Safe 1115 or equivalent for cold weather applications; Houghto-Safe 1120 or Monsanto Chemical 10-E20 ELT, or 50 E or other equivalent for most applications; Houghto-Safe 1130 or equivalent for high temperature applications.

**NOTE: FIRE RESISTANT FLUIDS ARE FOR USE WITH VITON SEALS AND O-RINGS ONLY!
CONSULT FACTORY BEFORE USING.**

Petroleum Based Fluids:

<i>Application</i>	<i>Viscosity SUS @ 100°F</i>	<i>ISO Viscosity Group/Grade Ident.</i>
<i>Continuously Cold Ambient Temp.</i>	150	32
<i>Most Applications</i>	200	46
<i>Continuously Hot Ambient Temp.</i>	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.

NOTE: When fire resistant fluids are used, it will be necessary to order tools and power units equipped with seals compatible with these fluids. (Refer to the **Vale** Catalog for information on ordering.) Note that the use of phosphate ester fluids will cause the return stroke to be slower than normal

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 25 micron before using. The power unit is equipped with a filtering system to keep the fluid at an acceptable contamination level. And although the filter will protect the **Vale** tool and power unit from foreign particles in the fluid medium, it is still recommended that for long life and optimum performance, the fluid used be filtered to at least 25 micron before being put into the power unit reservoir.

TOOL ATTACHMENTS

Hoses

The **Vale** Hi-Pressure hoses are supplied in 3/8", 1/2" and 3/4" inside diameters. The inside diameter selected depends upon the tool cycle requirements and power unit selection. Standard **Vale** power units and tools are fitted with compatible sized fitting to receive the applicable hose ends. Hose lines are stocked in lengths suitable for most applications. We **DO NOT** recommend hose lengths in excess of 30 feet unless approved by the factory as the internal fluid friction of long lengths influences the effectiveness of the tool return spring force to return the cylinder fluid to the reservoir in optimum time. The pressure rating of the standard 3/8", 1/2" and 3/4" diameter **Vale** hose is 5000 P.S.I. working and 20,000 P.S.I. burst pressure.

MAINTENANCE

Daily:

- Check oil level in reservoir, if necessary add oil to bring up to level indicated by sight gauge.

Monthly:

- Check oil level in reservoir, if necessary add oil to bring up to level indicated by sight gauge.
- Inspect the system for hydraulic fluid leaks



Motor Lubrication:

•This motor has re-greasable ball bearings. Motors are shipped with grease for initial operation. It is necessary to re-lubricate the bearings on the motor periodically depending upon the type of service to provide maximum bearing life. **Excessive or too frequent lubrication may damage the motor.**

•Re-Lubrication Schedule

Standard Conditions: 8 hours operation per day, clean and 40° C. ambient conditions - Re-lubricate every 7 years.

Severe Conditions: 24 hours operation per day, dirt and dust conditions - Re-lubricate every 3 years.

Extreme Conditions: 24 hours operation per day, heavy vibration or dust conditions - Re-lubricate every 6 months.

•If re-lubrication is performed with the motor running, stay clear of rotating parts. After re-greasing, allow the motor to run for twenty to thirty minutes.

WARNING: SHUT OFF AND TAG OUT ALL ELECTRICAL POWER BEFORE PROCEEDING.

Removal of Directional Control Valve:

1. Remove four screws from the directional control valve (11) wiring box and remove cover.
2. Note wire connections and dis-connect wires from the directional control valve (11).
3. Dis-connect conduit from the conduit connector at the control valve (11), and remove wires from the valve.
4. Remove the four socket head cap screws (38) from the directional control valve (11).
5. Remove the directional control valve (11).
6. Re-assembly is the reverse of removal.



Removal of Manifold Block:

1. Remove the directional control valve (11), see above.
2. Dis-connect the ¾" high pressure hose (19) from the fitting (27).
3. Remove the two socket head cap screws securing the manifold block (7) to the reservoir cover (5).
4. Remove the manifold block (7).
5. Re-assembly is the reverse of removal.

Removal of Hydraulic Pump:

1. Remove the ½" high pressure tubing (18) from fitting (26) and flange (25).
2. Remove the ¾" high pressure tubing (19) from fitting (20) and fitting (27).
3. Remove Suction line (17) at fitting (21) and flange (25).
4. Remove the two screws from the pump/motor adapter (4) cover plate and remove cover plate.
5. Remove the two hex. Head bolts and washers securing the hydraulic pump (3) to the pump/motor adapter (4).
6. Carefully remove the pump (3) from the power unit.
7. Re-assembly is the reverse of removal.

Removal of Electric Motor:

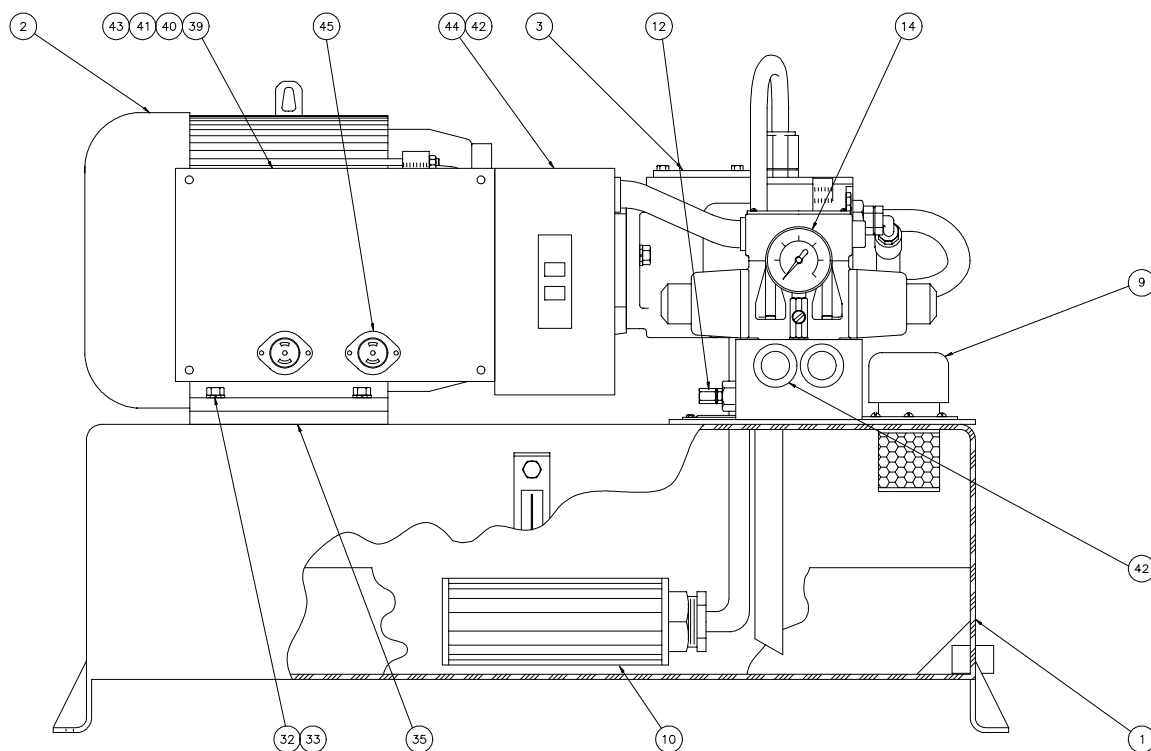
1. Remove the hydraulic pump (3), see above.
2. Remove the four hex. Head bolts (34) securing the pump/motor adapter (4) to the motor (2).
3. Remove the pump/motor adapter (4).
4. Remove the four screws securing the motor wiring box cover to the electrical box (39).
5. Remove the motor wiring box cover.
6. Note the wiring positions and dis-connect wires.



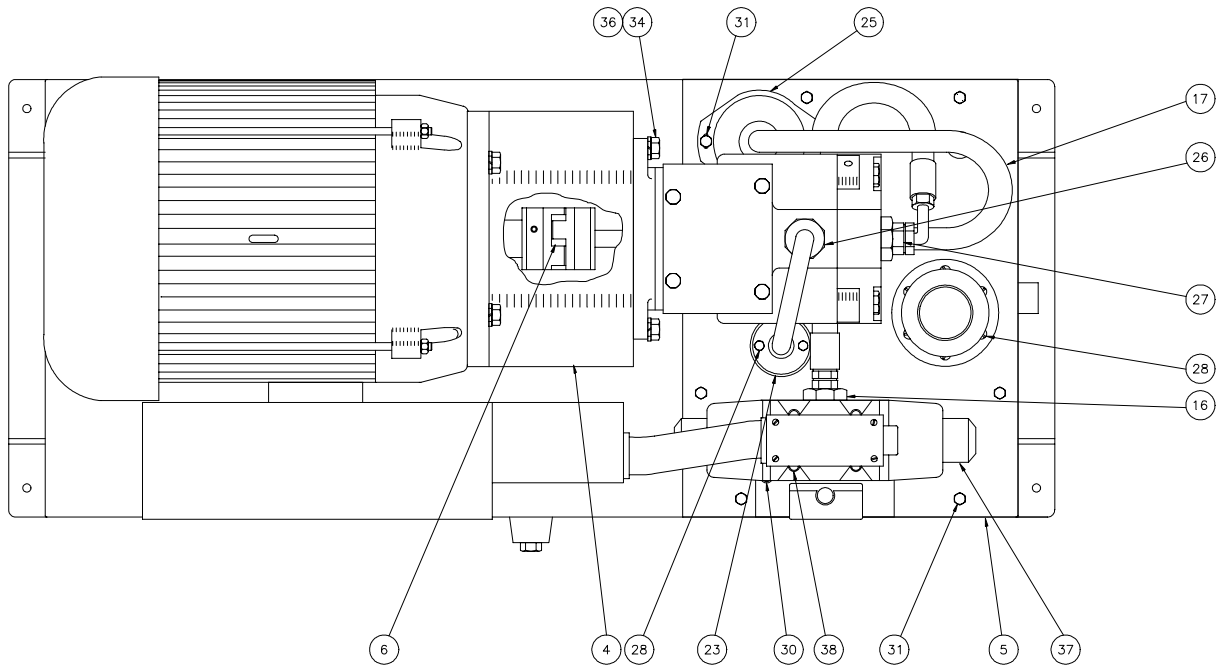
7. Note the wiring positions and dis-connect wires.
8. Loosen connector at the motor wiring box and remove the wires from the motor (2).
9. Remove the four hex. Head bolts (32) and four lockwashers (33) securing the motor (2) to the reservoir (1).
10. Remove the motor (2).
11. Re-assembly is the reverse of removal.



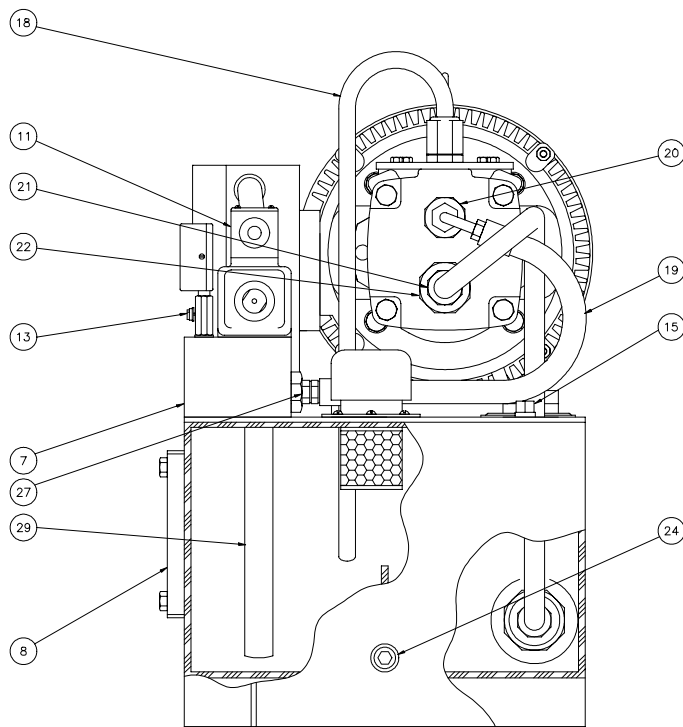
V-5 Power Unit Front View



V-5 Power Unit Top View



V-9 Power Unit End View



V-5 Power Unit Spare Parts Listing (refer to drawings on pages 15,16 &17)

DET	PART No.	DESCRIPTION	QTY
1	D-1700	Reservoir	1
2	A-1650	Motor	1
3	A-3061	Pump	1
4	A-3097	Pump/Motor Adapter	1
5	C-2102	Reservoir Cover	1
6	A-3098	Coupling Assembly	1
7	C-2169	Manifold Block	1
8	A-1759	Fluid Level/Temp Gauge	1
9	A-1764	Filler Breather	1
10	A-2577	Suction Filter	1
11	A-1967	Control Valve	1
12	A-3124	Relief Valve	1
13	A-2748	Needle Valve	1
14	A-1507	Pressure Gauge, 6,000PSI	1
15	A-3695	¾" NPT Hex Head Plug	1
16	A-4255	-12 to -8 Adapter	1
17	A-2738	5/8" O.D. Suction Tube	1
18	A-2052	½" O.D. Case Drain Tube	1
19	A-4719	3/8" x 20" Hose Assembly	1
20	A-4266	-16 to -8 Adapter	1
21	A-4717	-10 to 5/8" OSTF	1
22	A-4716	-20 to -10 Bushing	1
23	A-2059	Return Line Flange	1
24	A-4520	½ NPT Square Head Plug	1
25	A-2579	Suction Tube Flange	1
26	A-4718	-10 to ½" OSTF	1
27	A-4257	-8 ORFS Union	2
28	A-2114	10-32 x 0.375 Hex Head Bolt	8
29	A-2556	¾ NPT Blk Return Pipe	1
30	A-2110	3/8-16 x 3 Socket Head Cap Screw	2
31	A-2606	¼-20 x 0.75 Hex Head Bolt	9
32	A-3676	3/8-16 x 1.0 Hex Head Bolt	4
33	A-2018	3/8 Lockwasher	4
34	A-2714	½-13 x 1.25 Hex Head Bolt	6
35	A-2038	Motor Mount	2
36	A-1698	½" Lockwasher	6
37	A-3136	Solenoid	2
38	A-1806	¼-20 x 1.0 Socket Head Cap Screw	4



vale

V-5
POWER UNIT
RELEASE 9.1
AUGUST 1999

V-5 Power Unit Spare Parts Listing cont.(refer to drawings on pages 15,16 &17)

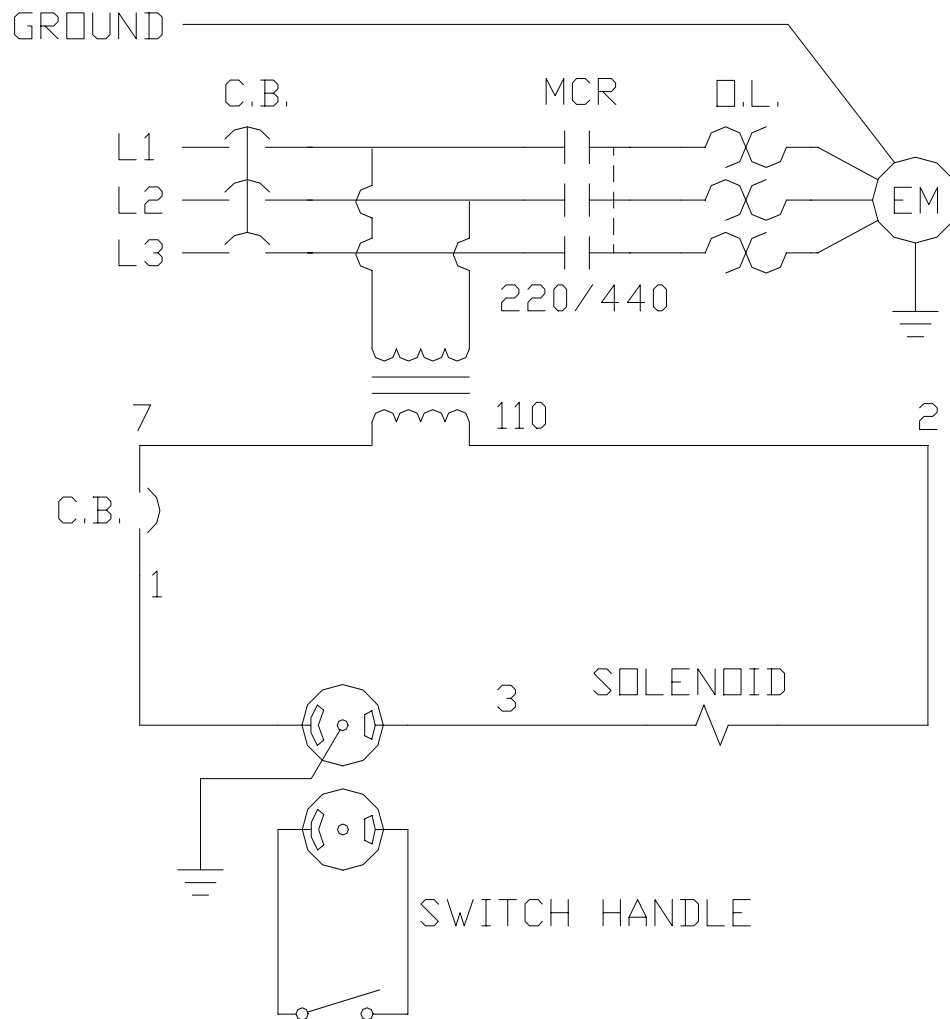
DET	PART No.	DESCRIPTION	QTY
39	C-2168	Electrical Box	1
40	A-1898	Transformer	1
41	A-3910	Circuit Breaker	1
42	A-2050	Heater	3
43	A-1948	Starter	1
44	A-3996	Twist Lock Connector	2
45	A-2350	Relay	2

Vale Industries Incorporated
122 Simonds Avenue, DeKalb, Illinois 60115

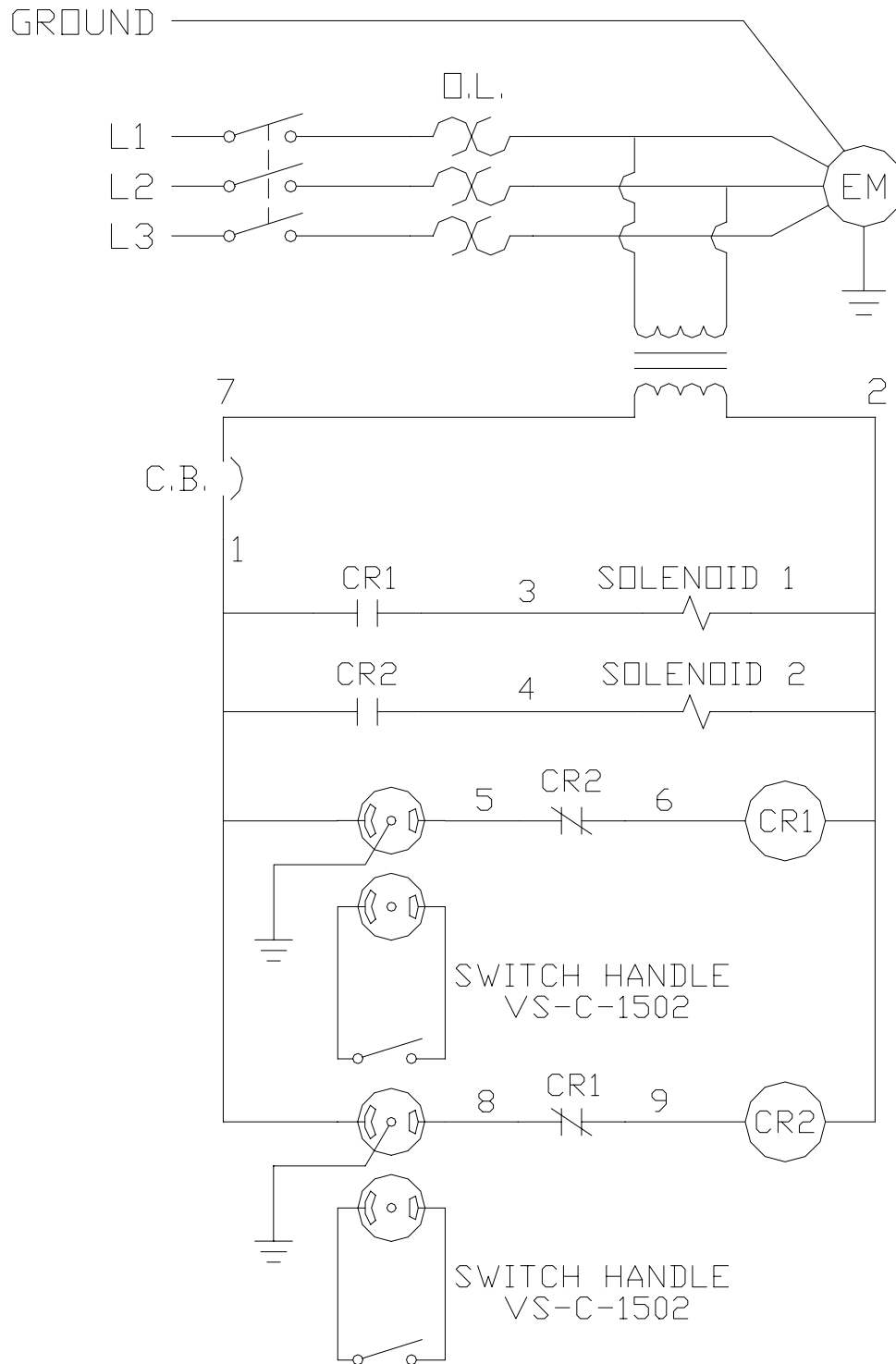
Tel: (815) 756-2426 Fax: (815) 756-2735
E-mail: info@vale-industries.com

*Return
to Index*

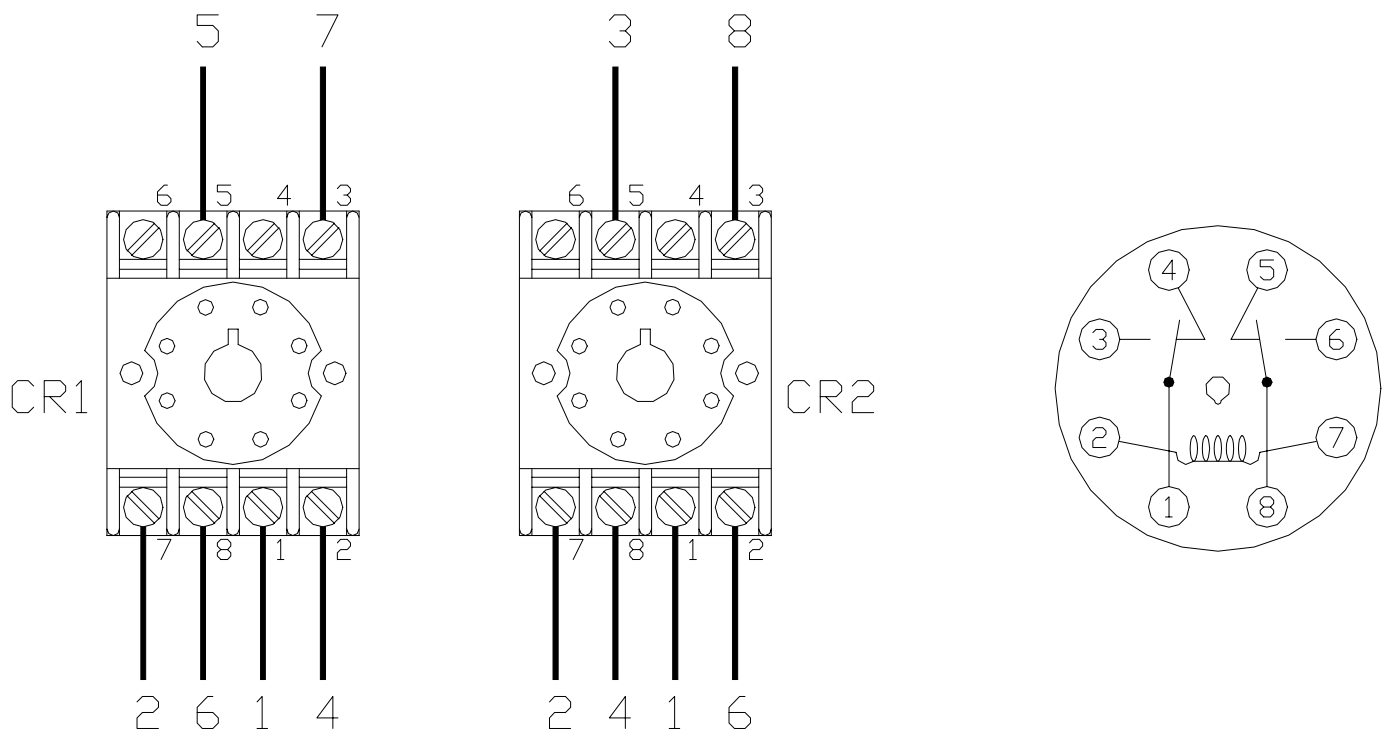


V-9 Power Unit 1 Tool Electrical Schematic

V-5 Power Unit 2 Tool Electrical Schematic



V-5 Power Unit 2 Tool Relay Wiring



V-5 Power Unit Hydraulic Schematic