PANDROL

Electric Power Unit

MODEL 03700A

OPERATION AND MAINTENANCE MANUAL

ENG_OMM_ELECTRIC_POWER_UNIT_P01

30th November 2021

Partners in excellence

Thank you for choosing Electric Power Unit!

You are now the owner of a quality product from Pandrol.

1. Preface

This manual aims to help you get to know your new Electric Power Unit, to use it in the best way and to maintain it properly for a long lifetime. It also presents important safety regulations and warnings.

The manual is intended for people who handle and operate the machine. It is originally written in English and translated into the local language by Pandrol.

Pandrol reserves the right to change specifications, equipment, instructions and maintenance guidelines without prior notice.

The manual contains instructions about the following topics:

1. Installation
2. Operation
3. Safety features and warnings
4. Maintenance and troubleshooting

(1) refers to a component in a figure/illustration.

IMPORTANT

This manual contains ordered actions, e.g.

1. Do this
2. ...and then this...
3. ...and finally this

These actions **must** be done in the numerical order presented.

2. Revision

Revision	Date	Comments
P01	2021-11-30	New Manual

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3. Safety Information

3.1. General

- Tool operators and maintenance personnel must always comply with the safety precautions given in this manual, and with all stickers and tags attached to the tool and hoses.
- All safety precautions are given for your safety. Read to understand and follow all safety, maintenance and operation instructions before you use or maintain the tool.
- Review the manual daily before using the tool.
- Follow all safety guidelines given you by your supervisor. Do not use the tool if you have any questions about the operation, safety or maintenance of this tool . Failure to follow these instructions can result in personal injury or equipment damage.
- Pandrol has no control over the tool use or operation once it leaves the plant. Pandrol has no control over operator or maintainer selection. The customer must assume responsibility for the tool suitability for a particular function.
- During use of the tool, good judgement must be used to work safely and efficiently without endangering themselves or bystanders.
- Understanding of the operation and maintenance manual is essential for anyone using or maintaining the tool.
- Warnings and safety precautions described in this document shall only be considered as a minimum. National conditions, standards and regulations override conditions, standards and regulations described in this document.
- Work with the machine is only to be carried out by qualified personnel, well-informed and educated in general railway workmanship and specifically in the conditions, standards and regulations on specific rail track.
- The machine may only be used for its specified purpose.
- Any adjustments or service on the machine is only allowed to be done by qualified personnel that have read and understood this manual and have had training and information from Pandrol.

3.2. Safety actions

- Read and understand all safety regulations and warnings before installation, operating or performing maintenance on this machine.
- Do not operate the tool until you have been thoroughly and properly trained or under the supervision of an instructor.
- Check power source daily to determine if correct flow and pressure are available. Never exceed flows or pressures for the tool being used. Personal injury or damage to the tool can result.
- Operators must clear the work area of non-essential personnel. Flying debris can cause serious injury.
- The operator must be familiar with all prohibited work areas such as unsafe grades, poor footing areas and overhead hazards.
- Use standards and regulations, accident prevention regulations and regulations concerning special ambient conditions (e.g. areas potentially endangered by explosive materials, heavy pollution or corrosive influences).
- Maintain balance and proper footing at all times. Never overreach to the extent that a broken part or sudden movement of the tool can cause you to lose your balance and fall, or cause injury to your self or someone else.

- Do not operate the tool at excessive fluid temperatures operator discomfort and potential burns can result at high oil temperatures.
- Do not clean inspect or repair the tool while connected to the power source. Accidental engagement of the tool can cause serious personal injury.
- Oil injection hazard exists with this tool. Oil injection is a condition where hydraulic oil is injected under the skin from pressure in the line. Always wear gloves and repair any leaks immediately. Never carry a tool by the hoses.
- Do not use damaged equipment. Immediately replace any damaged hoses, fittings, or other components showing wire braid, nicks, cuts, damage or abrasions. Failure to do so may result in equipment damage and / or personal injury or death.
- Clean up any oil or fluid spills immediately.

3.3. Personal/Safety equipment

- Never wear loose clothing that can get entangled in the working parts of the tools or be careless with hands, feet or other body parts around the working parts of the tools. Hydraulic tools exert high torque and force and can cause serious injury or death if improperly used.
- When working near electrical conductors, always assume that the conductors are energized and that hoses and clothing can conduct harmful electricity. Use hoses labeled and certified as nonconductive.
- Always wear safety equipment such as oil injection resistant work gloves, safety glasses, safety boots, ear protection and other safety apparel dictated by your supervisor applicable for the job you are doing and the tool you are using.
- The use of an compressed air, which must be less than 8 BAR (116 PSI), to blow parts clean or to blow them dry after being cleaned with a solvent will cause particles of dirt and/or droplets of the cleaning solvent to be airborne. These conditions may cause skin and/or eye irritation. When using an air jet do not direct it toward another person. Improper use of air jet could result in bodily injury.

3.4. Safety precautions

- Always wear protective equipment such as gloves, safety glasses, ear protection and safety shoes.
- Do not wear clothing which may become entangled in the tool.
- Always keep work area free of tools or any other objects which may impair sound footing.
- Caution oil injection hazard exists with this tool. Oil injection is a condition where the hydraulic oil is forced under the skin through pressure in the line. Always wear gloves, do not carry the tool by hydraulic hoses, and repair leaks immediately.
- Do not operate the power unit until you have been properly trained or under the supervision of a qualified instructor.
- Never store engine oil or hydraulic oil near oxygen tanks or lines.
- Never add engine oil or hydraulic oil when a spill might come in contact with your oxygen lines, torch or fittings.
- Clean up spills immediately.
- Never perform grinding or sawing operations that direct sparks into the close proximity of the power unit or flammable materials.
- Always turn power unit "OFF" and disconnect hoses before performing any maintenance.

3.5. Qualified personnel

The machine is only to be used by trained personnel, thoroughly familiar with and trained in general railway workmanship. The equipment should be operated according to the conditions and standard regulations applying to the track they are working on.

The equipment must be serviced, maintained, or in any way modified only by trained personnel, who are familiar with the Operation & Maintenance Manual and have received training and information from Pandrol.

In order to avoid personal injury and/or material damage, everyone involved with assembling, starting-up or overhaul must possess relevant knowledge of the equipment, its use, maintenance requirements and procedures.

WARNING!

- **Do not touch electrical connections before you first ensure the power has been disconnected. Only qualified personnel should attempt the installation and maintenance of this equipment.**

4. Summary

The Pandrol Electric Power Unit is designed to deliver 2-5 GPM circuits or 1-10 GPM circuit at 2000 PSI for hydraulic tool operations in buildings or other closed environments. It is perfect for maintenance shop testing of tool repairs. The unit is equipped with heavy duty wheels for mobility.

Fig 1.

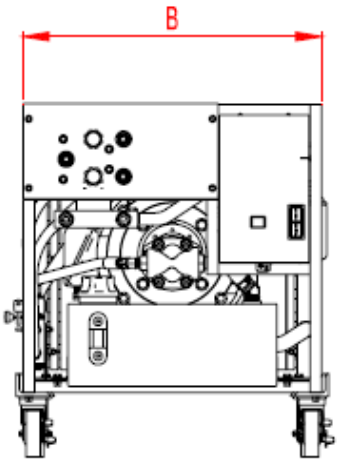


Fig 2.

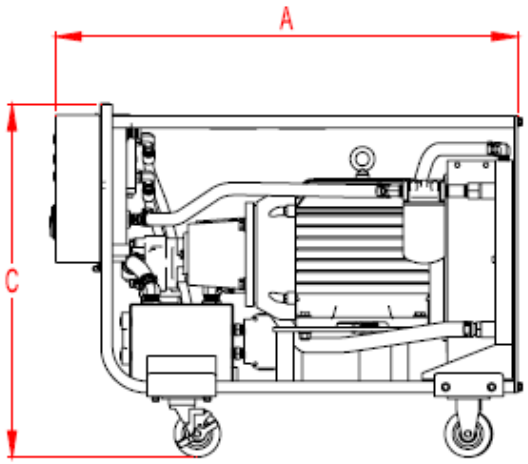


Fig 3.

Engine	Flow	Pressure	Dimensions	Weight
20 Hp electric 240/360/480 Vac 3 Phase * See note about hertz requirements	5 GPM (19 LPM) or 10 GPM (38 LPM) Fluid: hydraulic 5 us gal (18.9) liters	200 PSI (140 BAR)	A - 40” (101.6 cm) B - 26” (66 cm) C - 30” (76.2 cm)	486 lbs (220 kg)

* Hertz requirements vary by country.

Specify requirements when ordering.

Accessories:

02326E - Hose reel equipped with 50’ transmission hose.

02323K - Hose reel equipped with 25’ transmission hose.

5. Operation

BEFORE STARTING!

- **This power unit is driven by an electric motor. It is factory wired for the voltage requested by the purchaser. Electrical contacts and wiring vary at different locations. Due to this, have a qualified person or technician ensure electrical system compatibility**

Always check the power unit's hydraulic fluid level and fill reservoir as required before starting

- To start the power unit, check to make sure that both control valves are in the "OFF" position.
- Depress the start button on the breaker box located on the front of theunit.
- Connect the power transmission hose to either the 5 or 10 GPM ports, depending on the flow required for the tool you will be using.
- Connect the tool(s) to the power transmission hose before turning control valves at power unit "ON".
- Rotate appropriate flow control valves. (See "valve positioning" in this manual.)
- To change tools, turn the control valves to the off position.
- To shut down the power unit turn the control valves to the "OFF" position and depress the red stop button on the breaker box.

5.1. Valve positioning

The 03700a power unit is designed to operate either (1) tool at 10 GPM (38 LPM) or (2) tools simultaneously at 5 GPM (19 LPM). Refer to operating instructions for each tool to determine flow requirements.

NOTE!

- **When operating a 10 GPM tool you cannot have any other tool connected to the 5 GPM ports, even if the tool is not being used.**

5 GPM tools:

To operate a 5 GPM tool, connect both tools to the ports marked 5 GPM and turn "ON" the valve corresponding to each tool port.

10 GPM tools:

To operate a 10 GPM tool, connect it to the port marked 10 GPM and turn on both control valves.

5.2. Changing tools

- Turn the control knobs to the "OFF" position before disconnecting hoses.
- Once the tool has been changed, turn the valves to the "ON" position depending on flow requirements of the tool being used.

5.3. Cold weather operation

Hydraulic system performance is affected when the temperature drops below 50°F. Therefore, measures should be taken to pre-warm tools and fluids before operating.

NOTE!
- **Refer to operating procedures of this manual before starting**

6. Trouble shooting guide

- Before any troubleshooting, check hydraulic fluid level and add hydraulic. Oil As required. Also check electrical power supply.
- Repair any leaks or obvious damage to power unit.
- Maintenance to be performed by qualified maintenance personnel only. Read Operation manual to understand operational characteristics before making Any adjustments.

Problem	Remedy
Motor will not start	• Check source of power. • Check overloads, fuses, control, etc. • Verify hydraulic control valves are in the "OFF" position.
Power unit flow greater or less than 10 GPM. **Note: If adjustments are to be made, refer to calibration system section, page 18**	• Check flow rate under load. With flow and pressure test gauge (part #03600) • Attached to power unit, slowly “dial in” 1500 PSI. Power unit should still deliver • 9.5 – 10 GPM on the 10 GPM port with both control valves on.
Bottom 5 GPM port drops flow under load, and won’t deliver 2000 PSI Relief pressure. Other ports ok.	• Adjust flow control valve (part #0141-01). See flow control setting from calibration procedures page 20. • Service precaution: do not take system relief valve and flow control valves out and install them in the wrong holes. If you do, damage to the pump will result.
Hydraulic oil overheats	• Check temperature with thermal measurement device. If over 140 Degrees F. (60 Degrees celsius), Check the following: - Hydraulic oil to full mark in tank - Adequate clearance for air circulation around power unit. Power unit should be moved so unrestricted air movement is available In front, rear and sides of unit. Remember, the cooler draws air from Around the power unit. If the cooler can only draw hot exhaust, captured Air next to bulkhead, or superheated air in truck body hot hydraulic Oil will be the result. • Check tool flow rate. Operate 5 GPM tools only on 5 GPM. Excess Flow at 10 GPM can cause overspeeding of the tool or heat buildup Depending on the tool design. • Make certain that only the control knobs needed for the tool being used are turned on. Having both knobs turned on and only using one 5 GPM tool will allow fluid to be forced over the relief causing over heating. • Check system for excessive back pressure. Back pressure should not exceed 250 PSI - see back pressure section page 34.

7. Calibration procedures for 03700A manifold

A flow and pressure test gauge is required for calibrating hydraulic power sources. Pandrol part number 03600 flow and pressure test gauge.

Note: procedures should only be performed after the engine has been warmed and the hydraulic oil has reached approximately 70-90 degrees (21-32 celsius).

7.1. Flow calibration

Connect the 03600 female coupling onto the 10 GPM (male) port, and the male coupling into the return (female) port. Open top and bottom control valves and read the flow meter, make certain the needle valve is open not restricting flow. You should have a reading of 10 GPM. (As shown)

Fig 4.

8. Relief pressure calibration

With flow and pressure test gauge connected to the 10 GPM port, close the needle valve, and turn on top control valve noting the pressure shown on the gauge. Proper relief setting will be 2000-2100 PSI. (Turn valve off after checking pressure)

If you need to adjust the 00139 pressure relief valve. Loosen the jam nut on the 00139 relief valve with a 3/4” deep socket. (Or similar tool) turn the adjustment screw clockwise to increase relief setting. (A 1/4” hex key will be needed for adjustment) turn top valve on noting the pressure on the gauge. After relief pressure has been reached, tighten the jam nut on the 00139 relief valve being careful not to turn pressure adjustment screw. Turn the valve off after setting pressure.

Fig 5.

Fig 6.

9. Flow control setting

You will need the pressure test gauge connected to the 10 GPM port. Using the 3/4” deep socket (or similar tool) and 1/4” hex key, loosen jam nut on the 00141-01 flow control valve and turn adjustment screw clockwise until it seats. (Do not over tighten)

Fig 7.

Turn bottom control valve on and off until pressure remains on gauge. (Approximately 1500 PSI) this pressure will remain on the gauge until the 00141-01 flow control valve is adjusted.

Slowly turn the adjustment screw counterclockwise until pressure suddenly drops to zero. Tighten the jam nut on the 00141-01 flow control valve being careful not to turn the adjustment screw. Check the initial setting by turning the control valve on (full relief 2000-2100 PSI) and off making sure that the pressure drops to zero.

10. Final calibration and double check

Connect the test gauge to the top 5 GPM port. With needle valve opened, turn on top control valve. Flow meter should read 5 GPM. Turn needle valve in to pressurize system to 1500 PSI and note the flow meter. You should not see more than 1/ 2 a GPM drop. (4 1/2 GPM flow) the bottom 5 GPM port will be tested in the same manner. (Using the bottom control valve)

If the bottom 5 GPM port reads any less than 4 1/2 GPM, then you will have to recalibrate the 00141-01 flow control valve. Loosen jam nut and very slightly turn adjustment nut clockwise and tighten jam nut. Remove the gauge and turn valves on and off, connect it to the 10 GPM port. If it goes on easily, adjustment is complete.

Move the gauge to the 10 GPM port and turn both control valves on. Flow meter should read 10 GPM turn needle valve in to pressurize system to 1500 PSI and note the flow meter. You should not see more than 1/2 a GPM drop. (9 1/2 GPM flow)

Fig 9.

Fig 8.

This completes the calibration procedure. If any problems are encountered, please contact Pandrol for technical service.

11. Review of hydraulic principles

Tool circuit

11.1. Hydraulic formulas

$$GPM = \frac{CID \times RPM}{231}$$

$$HP = \frac{GPM \times PSI}{1714\ (.85)\ 1456.9}$$

Example: HP required to deliver 10 GPM at 1500 PSI.

$$\frac{10\ GPM \times 1500\ PSI}{1456.9} = \frac{15000}{1456.9} = 10.3\ HP$$

(subtract back pressure for tool HP)

Estimated HP delivered by pump or used by tool

	PSI					
GPM	**500**	**1000**	**1500**	**2000**	**2500**	**3000**
3	1.03	2.06	3.09	4.12	5.15	6.18
5	1.72	3.43	5.15	6.86	8.58	10.30
10	3.43	6.86	10.30	13.70	17.20	20.60
15	5.15	10.30	15.40	20.60	25.70	30.90

11.2. Back pressure

Back pressure measured at the tool return port must not exceed the manufacturers back pressure rating. Most manufacturers list the maximum back pressure for their hydraulic tools at 250 PSI. Back pressure measured on the return side of the tool is the force required to get the oil back to the tank. In almost all cases the lower the back pressure the better the tool performance. First, the back pressure is subtracted from the maximum tool pressure to arrive at a maximum tool operating pressure. For example, tools with 2000 PSI operating pressure are installed on a system with 250 PSI back pressure. This leaves 1750 PSI as a maximum tool pressure. Imagine a system with 500 PSI back pressure. 2000 Minus 500 PSI back pressure leaves only 1500 PSI for the tool. Second, tools are designed for pressure to build on the pressure side of the tool. If too much pressure builds on the return side, not only is performance effected, but seals may blow. This is why it is very important to direct the flow into the tool correctly. Reversing the hoses to test may result in blown seals, damage to the tool, and personal injury.

12. Maintenance

12.1. General

Maintenance and overhaul is to be carried out by qualified personnel only
Warranty is based on parts and spares delivered by Pandrol.

Check tools DAILY for proper operation, leaks, or damage.

Inspect hoses DAILY. Replace cut, burned, or otherwise damaged hoses.

Keep quick disconnect couplers clean and lubricated.

Use hydraulic fluids that comply with HTMA Specification 5.7, The hydraulic fluid should have a viscosity between 100 and 400 SSU (20-82 centistokes) at the maximum and minimum expected operating temperatures. Petroleum based hydraulic fluids with anti-wear properties and a viscosity index of over 140 work for a wide range of operating conditions.

The following oils meet HTMA Specification 5.7

AMOCO RYKON MV	CITGO A/W ALL TEMP
SUNVIS 706	MOBIL D.T.E. 13
CHEVRON EP-MV	TEXACO "RANDO" HDAZ

Other fluids that meet or exceed this specification can be used.

*** See cold weather operation hydraulic oil note.**

Have tool inspected, at least annually, by Pandrol or a Pandrol qualified service representative to determine if tool is in need of safety changes or worn part replacement.

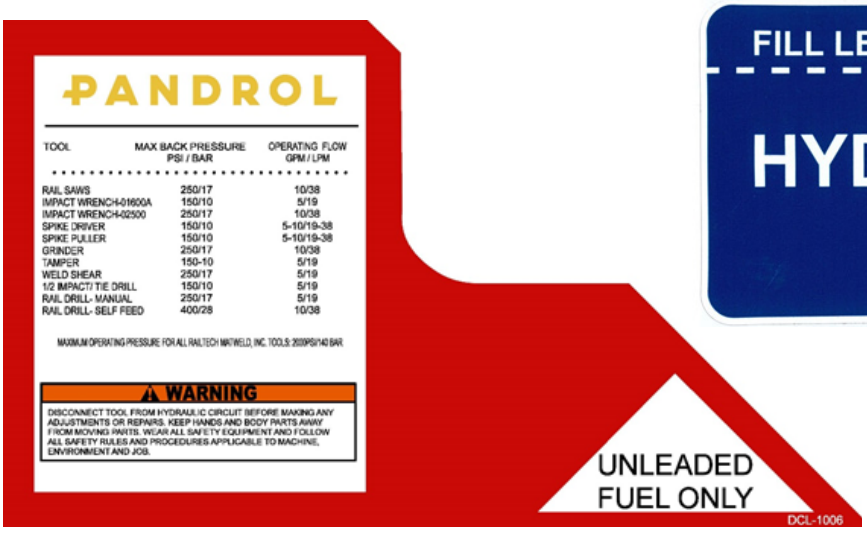
Contact Pandrol on a periodic basis, at least annually, for service Bulletins, safety notices, or other important information pertaining to this tool.

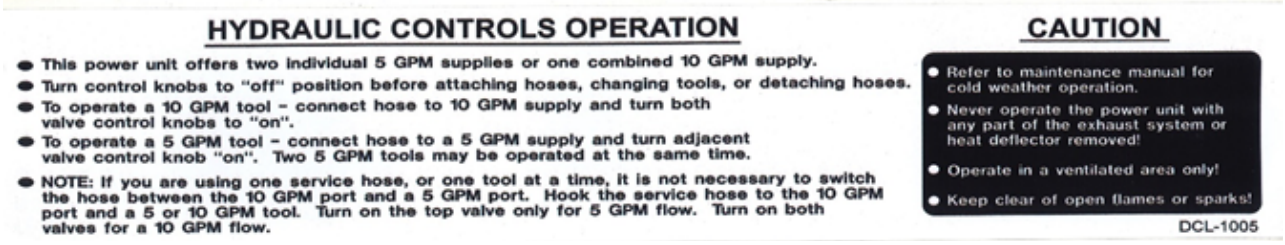
WARNING!

- **All adjustments work, overhaul and service must take place with the machine turned off. Failure to do so could lead to fatal injury.**
- **It is of great importance that qualified personnel accomplish all service and overhaul**

12.2. Warning labels and information symbols

Below are examples of warning labels and information symbols on the machine. If any of these labels become damaged or lost, they are to be replaced with new original warning labels that are available from Pandrol.





13. Limited warranty

Pandrol, INC warrants to the original purchase of this product that the product will be free from defects in material and workmanship for the period of one (1) year after the delivery of such product to the customer. Other equipment and parts used, but not manufactured by Pandrol are covered directly by the warranty of the manufacturer of those products. Proof of purchase must be documented including reference to a serial number located on each tool. The purchaser's only remedies under this limited warranty shall be limited at Pandrol's sole option to the following: repair, replacement or refund of the purchase price of the defective products. Each of these remedies requires timely notification of the defect in the product and substantiation that the product has been properly stored, maintained and used. Pandrol's obligations hereunder extend only to the purchaser of the product and not to any third party.

As a condition precedent to Pandrol's obligation hereunder, the defective product must not have been altered or modified without the express written approval of Pandrol. The product must not have been subjected to deliberate damage, shipping damage, neglect, tampering by unauthorized personnel or damage by improper use, storage or maintenance. Serial numbers must not have been altered, defaced or removed. Such action voids limited warranty.

13.1. Exclusions to limited warranty

This limited warranty is exclusive and is in lieu of any other warranty, written or oral, expressed or implied, including, without limitation, any implied warranty or merchantability or fitness for a particular purpose.

Limited warranty does not cover normal wear and tear items such as filters, hoses, couplers, bits, sockets, augers, and batteries

13.2. Limitation of liability

Except as provided above, Pandrol shall in no event be liable or responsible for any injury, loss or damage, direct, incidental or consequential, arising out of the use or misuse or inability to use the product, however caused and on any theory of liability including, without limitations, breach of contract, tort, (including negligence or street liability) and not withstanding any failure of any remedy herein of its essential purpose, even if Pandrol was aware of this possibility of such damage. Pandrol's limited warranty as set forth above shall not be enlarged, diminished or affected by, and no obligation or liability shall arise or go out of the rendering of technical advice or service by Pandrol or its agents. The foregoing may not be changed except by written agreement signed by an authorized officer of Pandrol, the remedies set forth herein are exclusive.

14. Customer information

Name _____

Company _____

Serial # of your Pandrol tool _____

Upon receiving your Pandrol tool, make sure to list serial number above so that a good record is kept for order information.

Pandrol hydraulic tool list

All Pandrol Hydraulic Tools operate at 5 GPM (19 LPM) or 10 GPM (38 LPM) @ 2000 PSI (140 BAR)

Power units:

00100K – Gasoline powered (1) 10 GPM or (2) 5 GPM circuits

02900A – Diesel (1) 10 GPM or (2) 5 GPM circuits (optional catalytic exhaust)

05500 – Twin power dual circuit (1) 10 GPM or (2) 5 GPM circuits & 5000 watt generator

02050RM – Modular power unit (1) 9 GPM

03700A – Electric power (1) 10 GPM or (2) 5 GPM circuits

Grinders:

09200A – Precision frog grinder

06000 – Profile grinder

06950 & 06950A – Multi-purpose grinder

05900 – Frog/profile grinder (trigger version available)

00700 – Rail surfacing guide

04600 – Straight stone grinder cw rotation (trigger version available)

04700 – Straight stone grinder ccw rotation (trigger version available)

07500 – Chamfer tool

04800 – 6" Cup stone grinder (trigger version available)

00600 – 8" Cup stone grinder

05400 – Angle grinder

09300 - Head wash grinder

Track tools:

03900A – Reversing rail saw
05100A & 05100B – Power weld shear
03500 – Self feed rail drill
04500D – 1/2” Hydraulic drill impact wrench
08200 – Tamper
02800A – 60 Ton bridge spreader
01200 – Spring anchor applicator
01100A – Spike puller (Single, 2 stage & trigger versions available)
00800A – 16” Rail saw
05000 – Hand pump weld shear
02500 – 10 GPM 1” Impact wrench
08300 – Spike driver
01600A – 5 GPM 1” Impact wrench
01100RM – Light-weight spike puller

Other products:

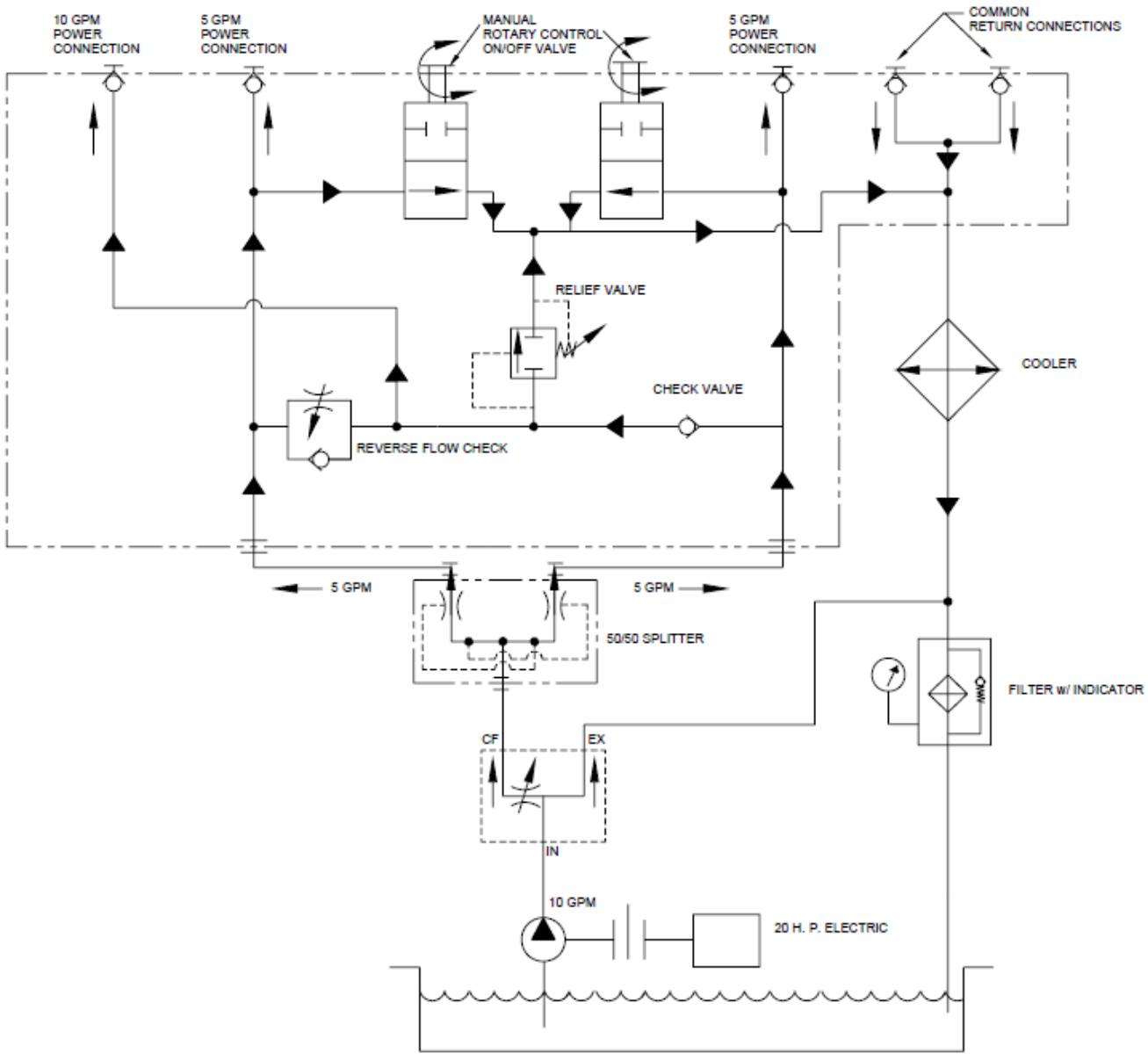
Hydraulic manifolds
Hydraulic test gauges
Hose reels
Hydraulic hoses

Accessories

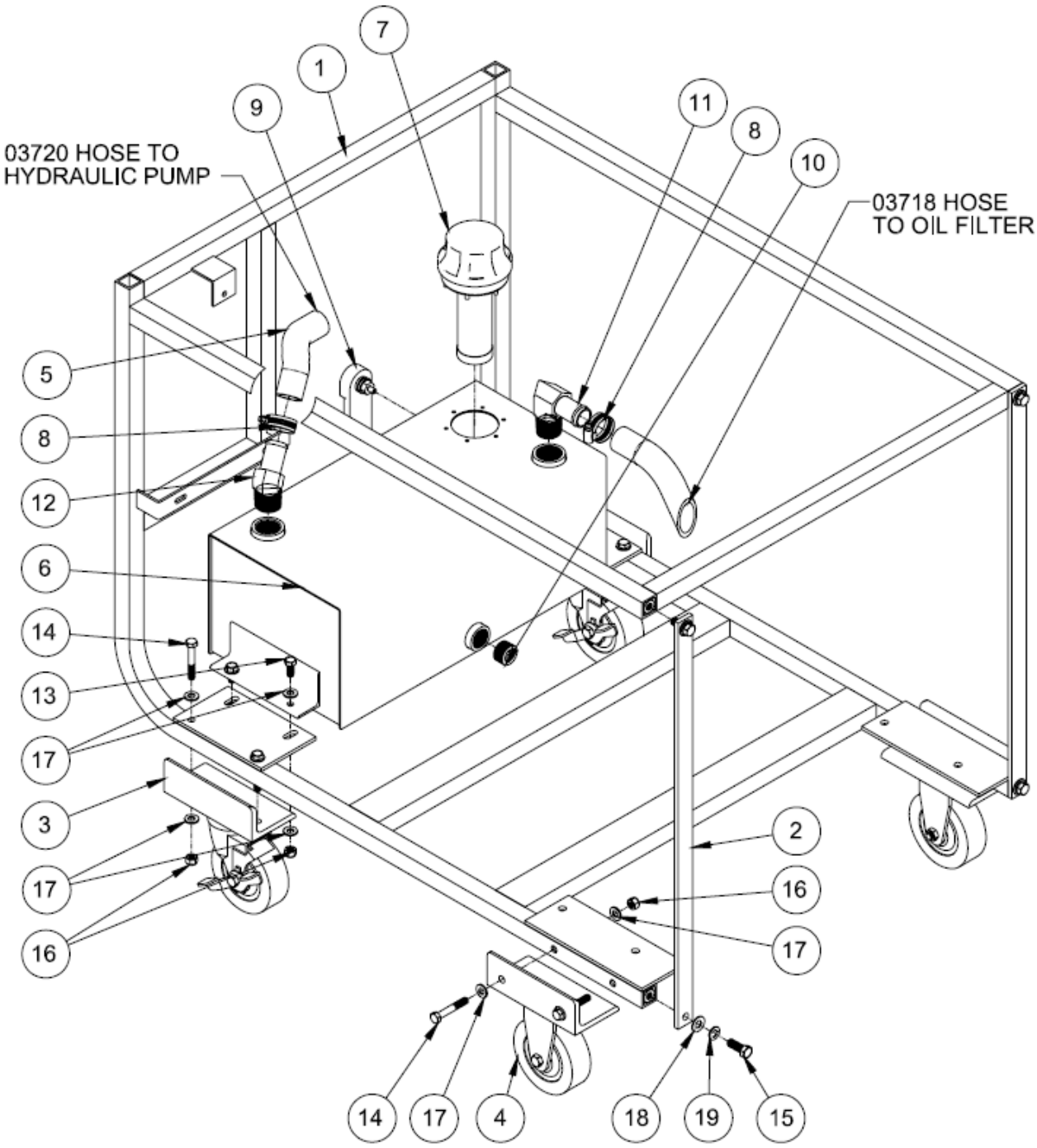
Drill bits
Shear Blades
Saw Blades
Grinding Stones
Sockets

15. Assembly

15.1. Flow diagram



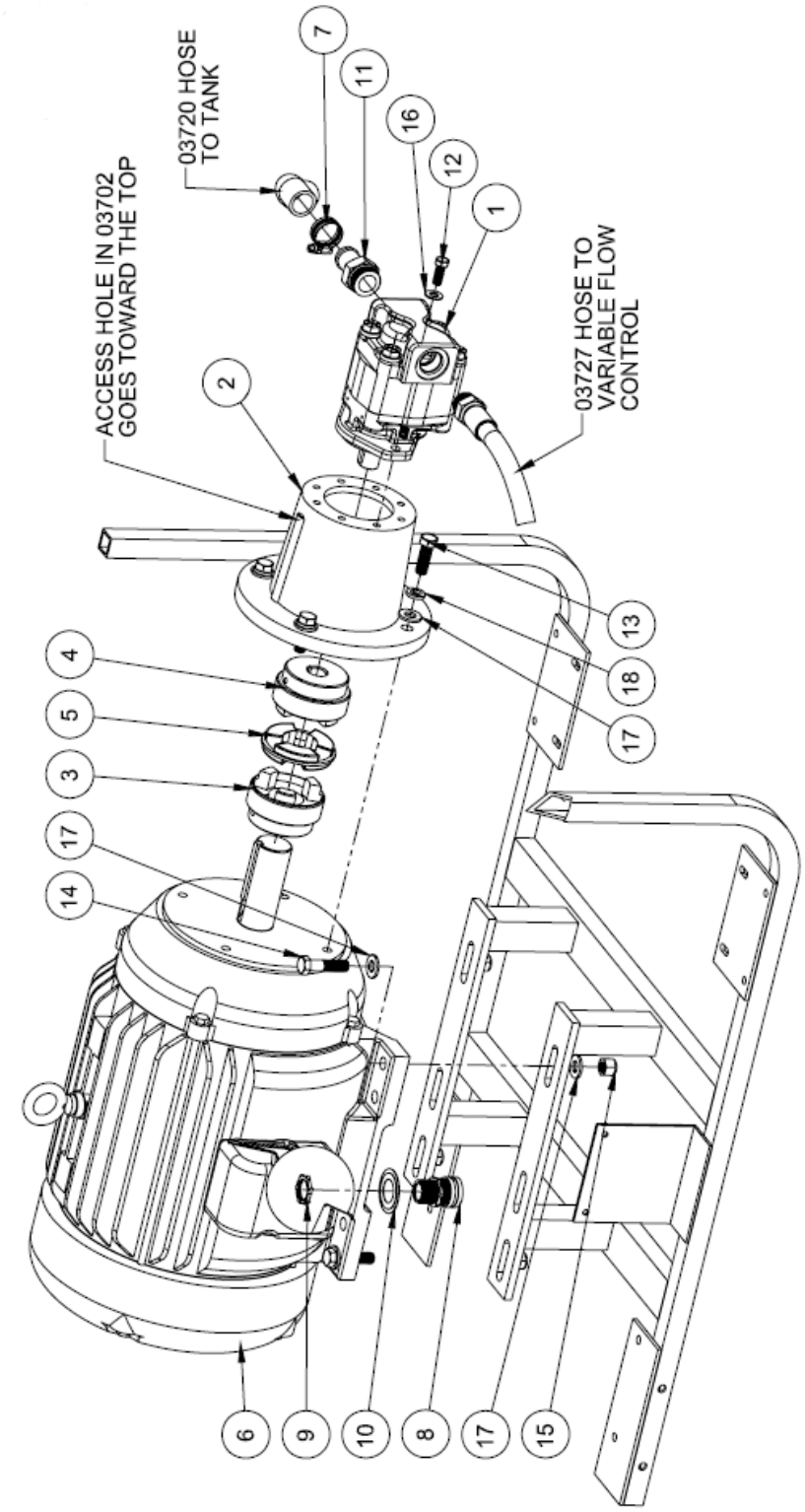
15.2. Frame parts diagram



15.3. Frame parts list

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	03710A	POWER UNIT FRAME	1
2	03710A-06	REAR FRAME STRAP	2
3	03713	SWIVEL CASTER	2
4	03714	RIGID CASTER	2
5	03720	SUCTION HOSE	1
6	01008A	OIL RESERVOIR	1
7	00131	HYDRAULIC FILL NECK	1
8	00147	3/4 - 1 1/2 HOSE CLAMP	2
9	00182	HYDRAULIC SIGHT GLASS	1
10	00197	3/4 NPT MAGNETIC PLUG	1
11	4501-16-16	1 BARD x 1 NPT 90 ELBOW	1
12	4503-16-16	1 BARB x 1 NPT 45 ELBOW	1
13	A1021	5/16-18 x 3/4 HEX HEAD BOLT	4
14	A1026	5/16-18 x 2 HEX HEAD BOLT	8
15	A1042	3/8-16 x 1 HEX HEAD BOLT	4
16	A2048	5/16-18 NYLOCK NUT	12
17	A2191	5/16 SAE FLAT WASHER	24
18	A2192	3/8 SAE FLAT WASHER	4
19	A3811	3/8 LOCK WASHER	4

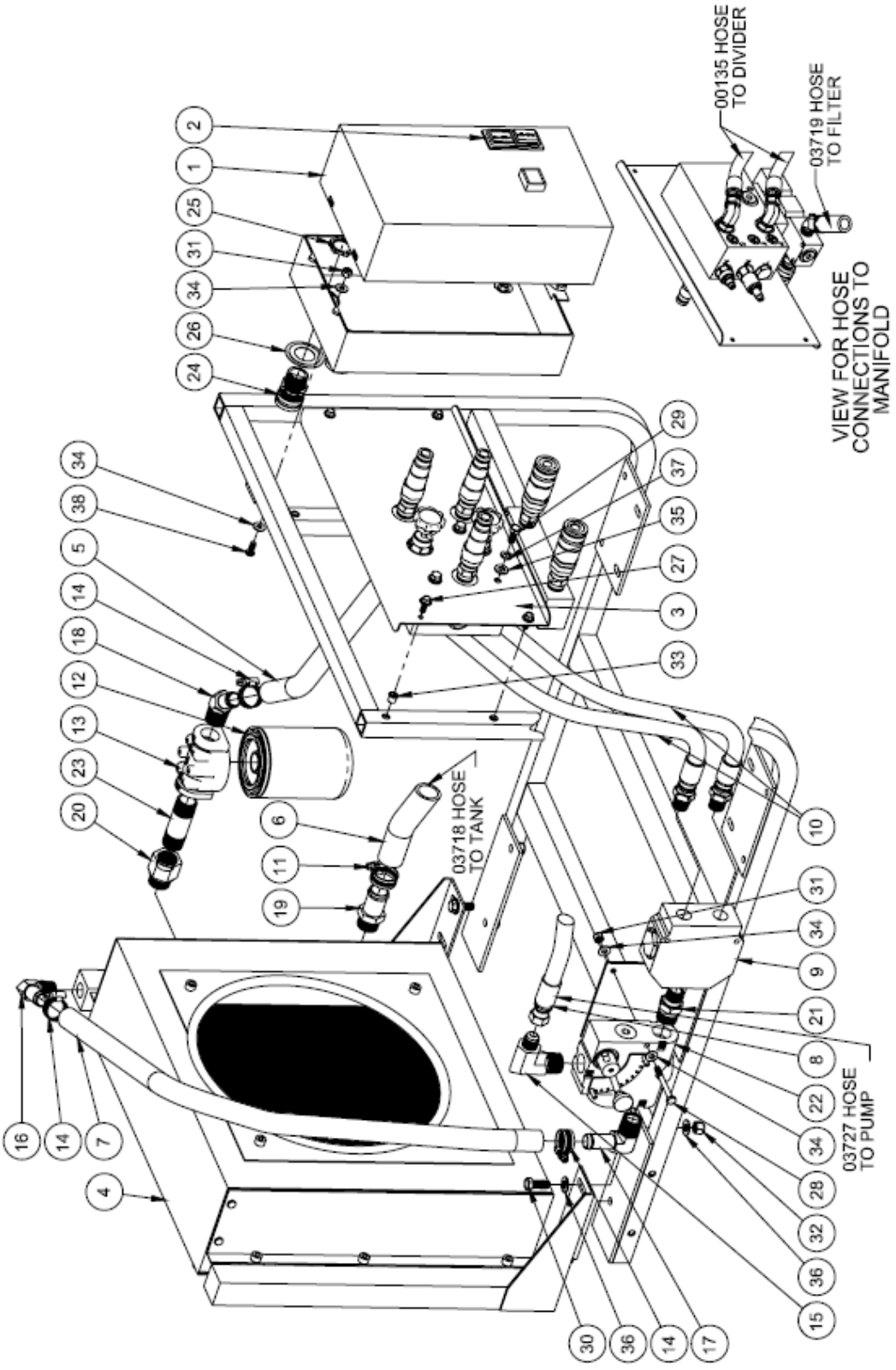
15.4. Engine and pump parts diagram



15.5. Engine and pump parts list

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	03701	14 GPM HYDRAULIC PUMP	1
2	03702	PUMP MOUNT BRACKET	1
3	03703	MOTOR COUPLING	1
4	03704	PUMP COUPLING	1
5	03705	COUPLING SPIDER	1
6	03706	ELECTRIC MOTOR	1
7	00147	3/4 - 1 1/2 HOSE CLAMP	1
8	05533	CORD GRIP	1
9	05534	LOCK NUT	1
10	05535	1 1/4 TO 3/4 WASHER	1
11	4604-16-16	-16 O-RING x 1 BARB	1
12	A1042	3/8-16 x 1 HEX HEAD BOLT	2
13	A1083	1/2-13 x 1 1/2 HEX HEAD BOLT	4
14	A1085	1/2-13 x 2 HEX HEAD BOLT	4
15	A2054	1/2-13 NYLOCK NUT	4
16	A2192	3/8 SAE FLAT WASHER	2
17	A2194	1/2 SAE FLAT WASHER	12
18	A3813	1/2 LOCK WASHER	4

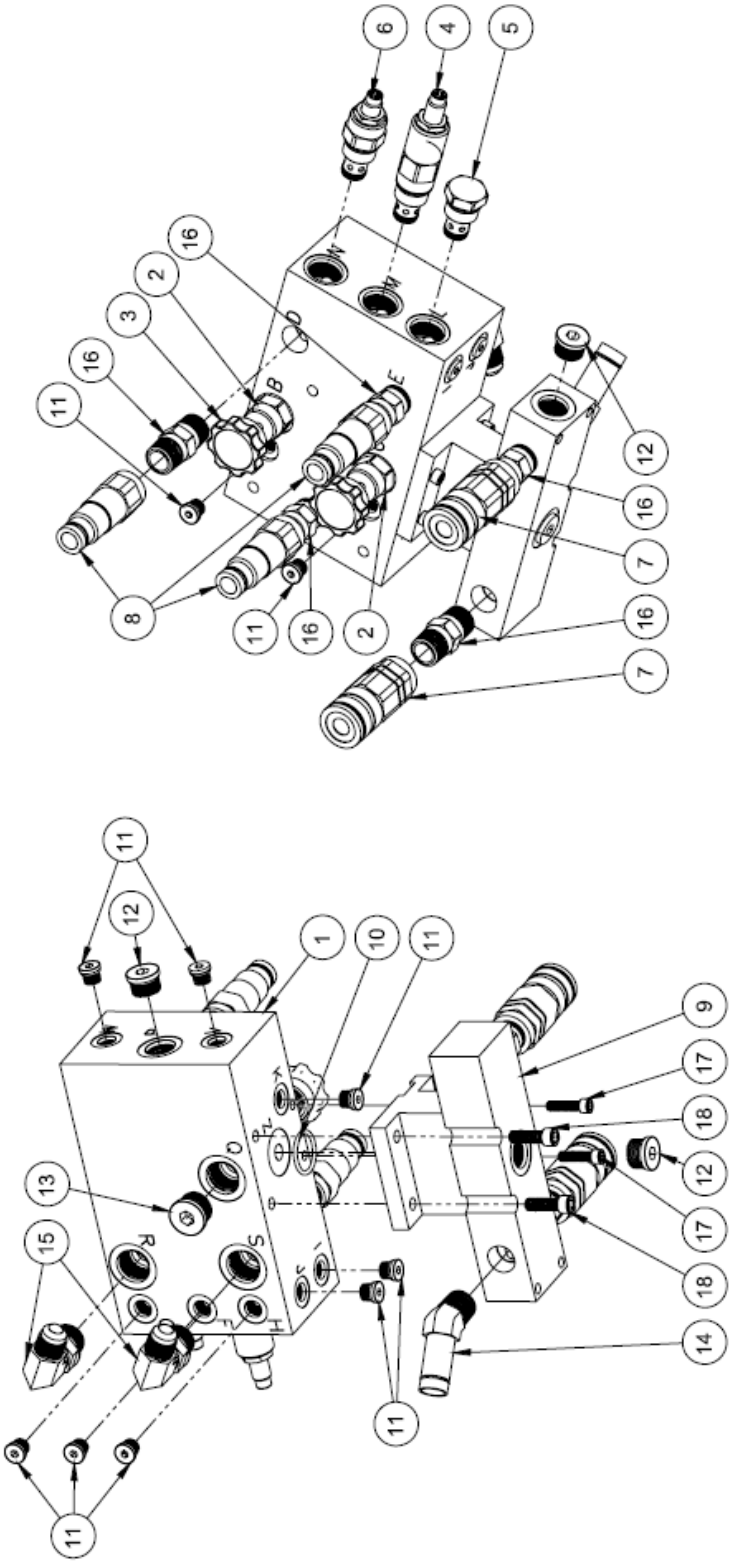
15.6. Hydraulic and starter relay parts diagram



15.7. Hydraulic and starter relay parts list

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	03708	STARTER RELAY	1
2	03708-01	STARTER RELAY SWITCH	1
3	03717A	CONTROL PANEL	1
4	03716	HYDRAULIC OIL COOLER	1
5	03717	FILTER TO MANIFOLD HOSE	1
6	03718	COOLER TO TANK HOSE	1
7	03719	RETURN FLOW HOSE	1
8	03727	PRESSURE HOSE	1
9	00119	FLOW DIVIDER	1
10	00135	DIVIDER TO MANIFOLD HOSE	2
11	00147	3/4 - 1 1/2 HOSE CLAMP	1
12	00149	HYDRAULIC OIL FITLER	1
13	00150	HYDRAULIC FILTER BODY	1
14	00152	1/2 - 1 1/4 HOSE CLAMP	4
15	2501-08-12	3/4 NPT x -08 JIC 90 ELBOW	1
16	4501-12-08	3/4 BARB x 1/2 NPT 90 ELBOW	1
17	4501-12-12	3/4 BARB x 3/4 NPT 90 ELBOW	1
18	4503-12-12	3/4 BARB x 3/4 NPT 45 ELBOW	1
19	4604-16-12	1 BARB x -12 O-RING	1
20	6405-12-12	-12 O-RING x 3/4 NPT BUSHING	1
21	69-12-08	3/4 NPT x 1/2 NPT HEX NIPPLE	1
22	701006	VARIABLE FLOW CONTROL	1
23	3-4 X 3 - 40 NIPP	3/4 NPT x 3 SCH 40 NIPPLE	1
24	05533	CORD GRIP	2
25	05534	LOCK NUT	2
26	05535	1 1/4 TO 3/4 WASHER	2
27	A0999	1/4-20 x 5/8 FLANGE NUT	4
28	A1008	1/4-20 x 2 1/2 HEX HEAD BOLT	2
29	A1021	5/16-18 x 3/4 HEX HEAD BOLT	4
30	A1042	3/8-16 x 1 HEX HEAD BOLT	4
31	A2046	1/4-20 NYLOCK NUT	5
32	A2050	3/8-16 NYLOCK NUT	4
33	A2062	1/4-20 NUT CERT	4
34	A2190	1/4 SAE FLAT WASHER	10
35	A2191	5/16 SAE FLAT WASHER	4
36	A2192	3/8 SAE FLAT WASHER	8
37	A3810	5/16 LOCK WASHER	4
38	A6349	1/4-20 x 5/8 BHCS	3

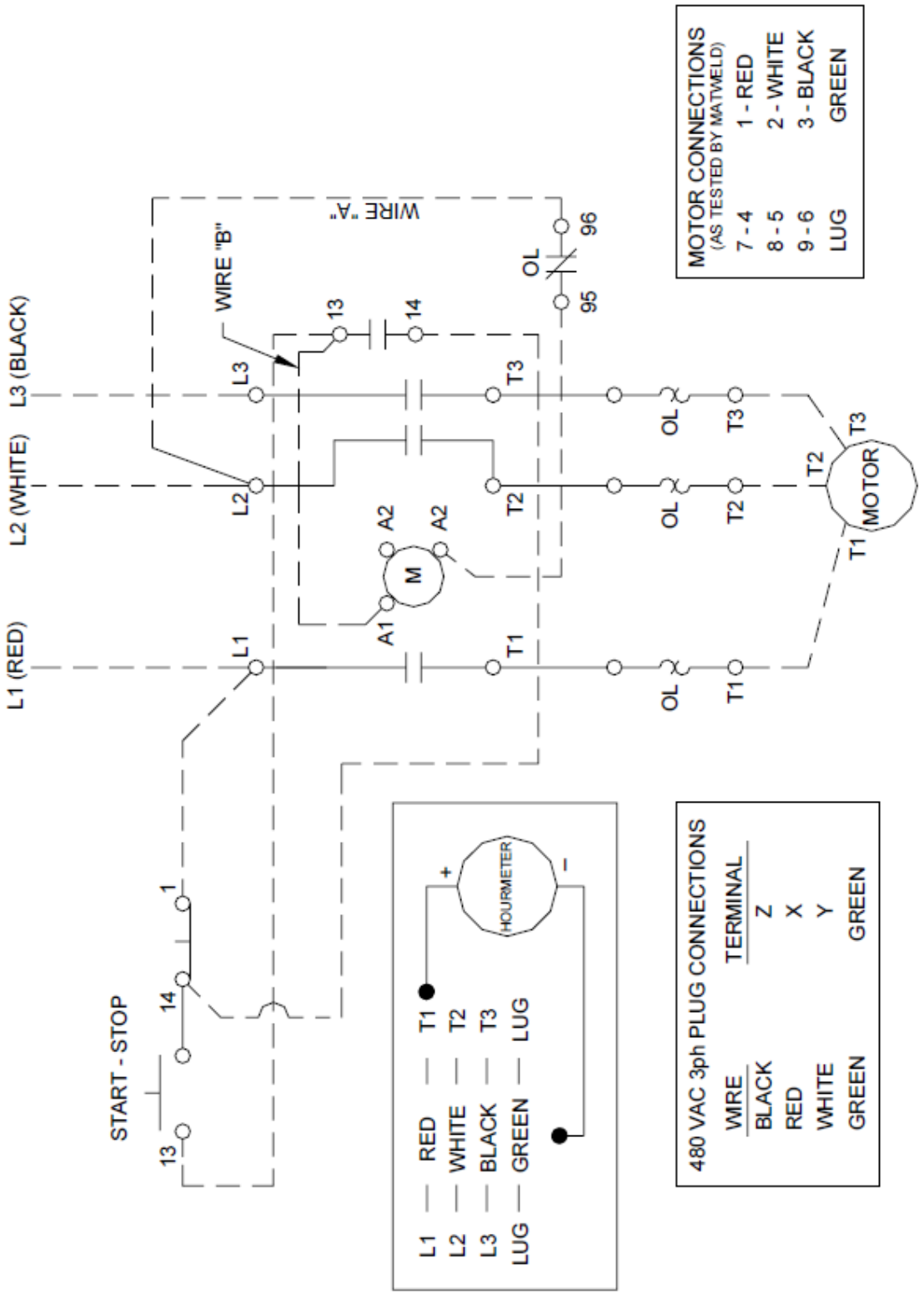
15.8. Tool manifold parts diagram



15.9. Tool manifold parts list

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	00136A	TOOL HYDRAULIC MANIFOLD	1
2	00137	CONTROL VALVE w/KNOB	2
3	00138A	REPLACEMENT CONTROL	2
4	00139	VALVE KNOB ONLY	1
5	00140	RELIEF VALVE	1
6	00141-01	FLOW CONTROL VALVE	1
7	00145	FEMALE QUICK DISCONNECT	2
8	00146	MALE QUICK DISCONNECT	3
9	00175	RETURN MANIFOLD	1
10	00183	RETURN MANIFOLD O-RING	1
11	231P-04	-4 O-RING PLUG	10
12	231P-08	-8 O-RING PLUG	3
13	231P-10	-10 O-RING PLUG	1
14	4503-12-08	3/4 BARB x 1/2 NPT 45 ELBOW	1
15	515-08-10	-8 JIC x -10 O-RING 90 ELBOW	2
16	69-08-08	1/2 NPT HEX NIPPLE	5
17	A5435	1/4-20 x 1 SHCS	2
18	A5448	5/16-18 x 1 SHCS	2

15.10. Electric diagram



16. Disclaimer

Pandrol exempts itself from liability in the event of usage that deviates from that recommended in this manual.

17. Contact

Address	Phone	Internet and E-mail
		www.Pandrol.com

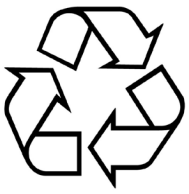
18. Recycling and Environment

Sustainable environment is a great part of Pandrol.

All components of the product can either be:

- Recycled
- Taken care of
- Be re-used

We recommend you to follow your local region regulations of environmental and recycling policies.



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