

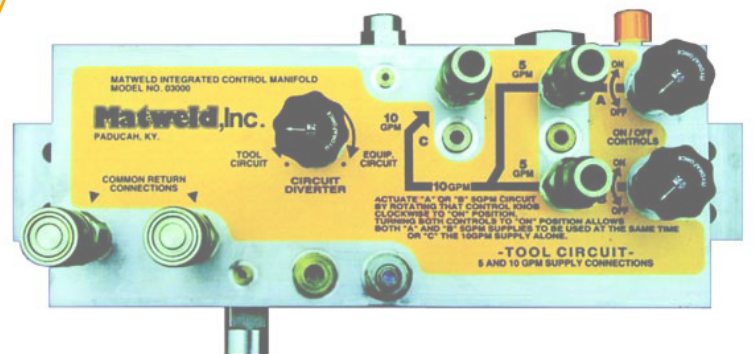
PANDROL



Hydraulic Manifold

MODEL 03000

OPERATION AND MAINTENANCE
MANUAL



ENG_OMM_HYDRAULIC_MANIFOLD_P01

28th September 2021

Partners in excellence

Thank you for choosing Hydraulic Manifold!
You are now the owner of a quality product from Pandrol.

1. Preface

This manual aims to help you get to know your new Hydraulic Manifold, 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	2021-09-28	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..
- Never change stones with the power source valve(s) in the "ON" position, turn the power source "OFF".
- Never attempt to carry the grinder with the power source in the "ON" position, turn the power source "OFF".
- Never touch or try to stop a moving stone.
- Always check the work area for any trash which may ignite from sparks.
- Always check the area for smoldering ties or trash before leaving the site.
- When changing stones, follow all grinding stone manufacturers instructions for safety and operation. Use only stones that comply with ansi standards. Before using, run new grinding stone for one minute at full speed to check for defects or vibration.
-

- Most hydraulic oils have a flashpoint of approximately 450 degrees (f). Make sure hoses are completely clear of sparks and hot debris. Have another person stand close to hydraulic power source cont

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.

4. Summary

The Pandrol Hydraulic Manifold Circuit is a self contained flow and directional control assembly. The manifold can be installed on any vehicle which is already equipped with a hydraulic system capable of producing at least 10 GPM at 2000 PSI. The manifold can be installed and takes up very little space. The manifold circuit provides a safe and cost effective way of adding hydraulic tool capabilities to your existing fleet of equipment.



Fig 1.

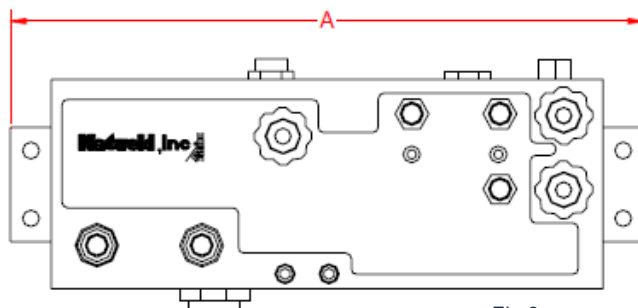


Fig 2.

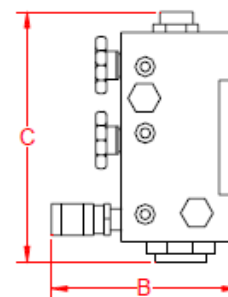


Fig 3.

Flow	Pressure	Dimensions	Weight
5 GPM (19 LPM) or 10 GPM (38 LPM)	2000 PSI (140 BAR)	A - 18-3/4" (47.625 cm) B - 7" (17.78 cm) C - 8-1/2" (21.59 cm)	30 lbs (13.61 kg)

5. Operation

5.1. Pre-installation check procedure

- Verify that installation will not interfere with the vehicles operation, cause damage to the vehicle, associated equipment or create safety hazards.
- Verify the vehicle has at least 10 GPM (38 LPM) and 2000 PSI (140 BAR) constant capability at the point of kit installation.
- Verify that system back pressure, at the point of installation, is below 50 PSI at 10 GPM. Read at the return quick disconnect coupler on 03000 manifold.
- Verify that flow, at point of installation, cannot be reversed by other valving equipment.
- Verify that, should oil temperature be above 130 degrees fahrenheit after tools are put in service on the vehicle, an oil cooler can be added if necessary
- Verify that, system has a filtration system of at least 10 micron capability.
- Verify that, it will be possible to add a ½" line directly to the tank, for the secondary return line.
- Verify that in cold weather operation the oil can be warmed to 50 +f before tool use. Extremely cold weather operation may require an "in tank" heater. If all of the above conditions have been met successfully, continue with the installation.

5.2. Installation

- Choose a location on the vehicle where it will be accessible to service, protected from being damaged and usable for the tool operators.
- Mount the circuit block using the tabs on each end.
- Install the system pressure line (from pump) to port "P", this line should be a minimum size of ½".
- Install the system return line (to tank or cooler) to port "T1", this line should be a minimum size of ¾". A larger size may be necessary if the back pressure exceeds 50 PSI. (See note 3 – section above)
- Install the secondary return line (direct to tank) to port "T2", this line should be a minimum size of ½".

5.3. Test procedure

- To set the tool circuit pressure at 2000 PSI (140 BAR) put a pressure gauge on the 10 GPM port. Set truck rpm to 10 GPM throttle setting.
- Turn the equipment/tool circuit valve to tools.
- Turn both 5 GPM control valves to the "ON" position and read maximum pressure on pressure gauge.
- To adjust the pressure to 2000 PSI (140 BAR), loosen jam nut and turn the allen screw on the relief valve clockwise to increase the pressure and counterclockwise to decrease the pressure. Retighten jam nut.
- To test the flow, install a flow gauge on the 10 GPM port and connect it to either of the return couplers. Set truck rpm to 10 GPM setting.
- Turn the equipment/tool circuit valve to tools.
- Turn both 5 GPM control valves to the "ON" position.
- The flow meter should now be showing 10 GPM.
- At 10 GPM the back pressure should read 50 PSI or less, measured at the manifold return coupler.
- Verify that flow rate cannot exceed 10.5 GPM.
 - A.) Connect test gauge to 10 GPM port and turn gauge to 10 GPM port and turn both 5 GPM valves on. (No hoses should be connected to 5 GPM ports)
 - B.) Set truck rpm to 10 GPM throttle setting.
 - C.) Observe gauge to see that flow meter shows 10 GPM.
 - D.) Manually advance truck throttle an additional 500 – 700 rpm while watching flow gauge. Flow should not exceed 10.5 GPM. If flow exceeds 10.5 GPM contact Pandrol for technical assistance.
 - E.) If flow does not exceed 10.5 GPM test is complete.
- Return truck RPM to idle, turn valves OFF, set equipment/tool valve to equipment.

5.4. Operation:

- Once the vehicle is in place and the tools are ready to be used, turn the equipment/tool circuit valves to the tools setting.
- Connect the tool to be used to the proper flow port.
- Advance throttle to “tool run” position. (This RPM setting must be provided by vehicle equipment company.)



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.**

5.5. 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. Review of hydraulic principles

Tool circuit

6.1. Hydraulic formulas

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

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

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

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

(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

6.2. 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.

7. Maintenance

7.1. 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
 SUNVIS 706
 CHEVRON EP-MV

CITGO A/W ALL TEMP
 MOBIL D.T.E. 13
 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.

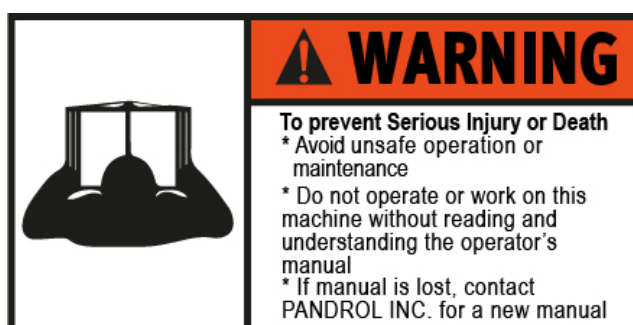
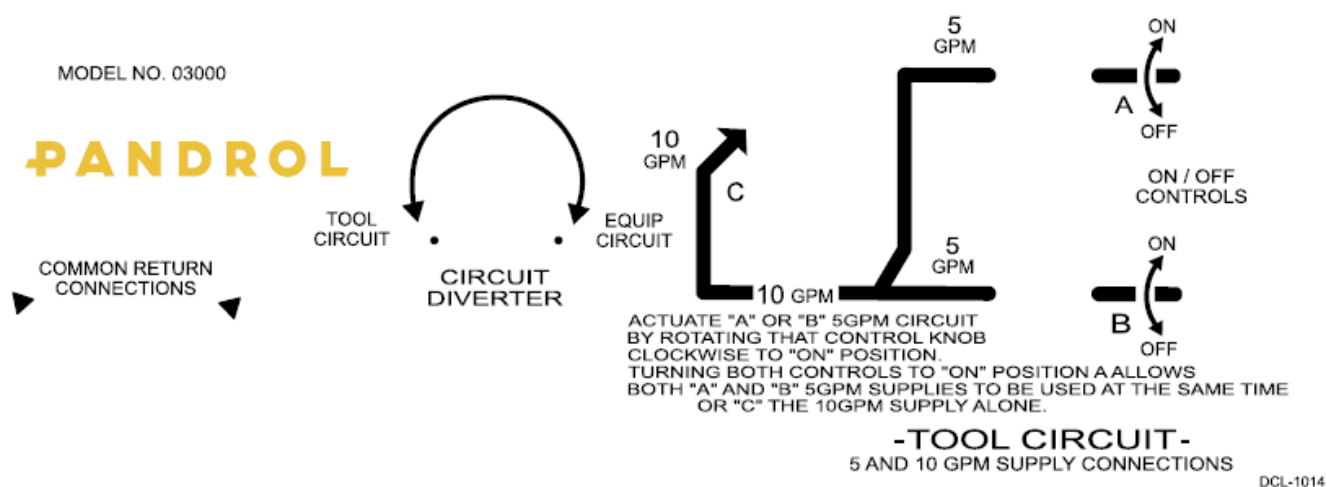


WARNING!

- 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**

7.2. 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.



8. 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.

8.1. 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

8.2. 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.



9. 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:

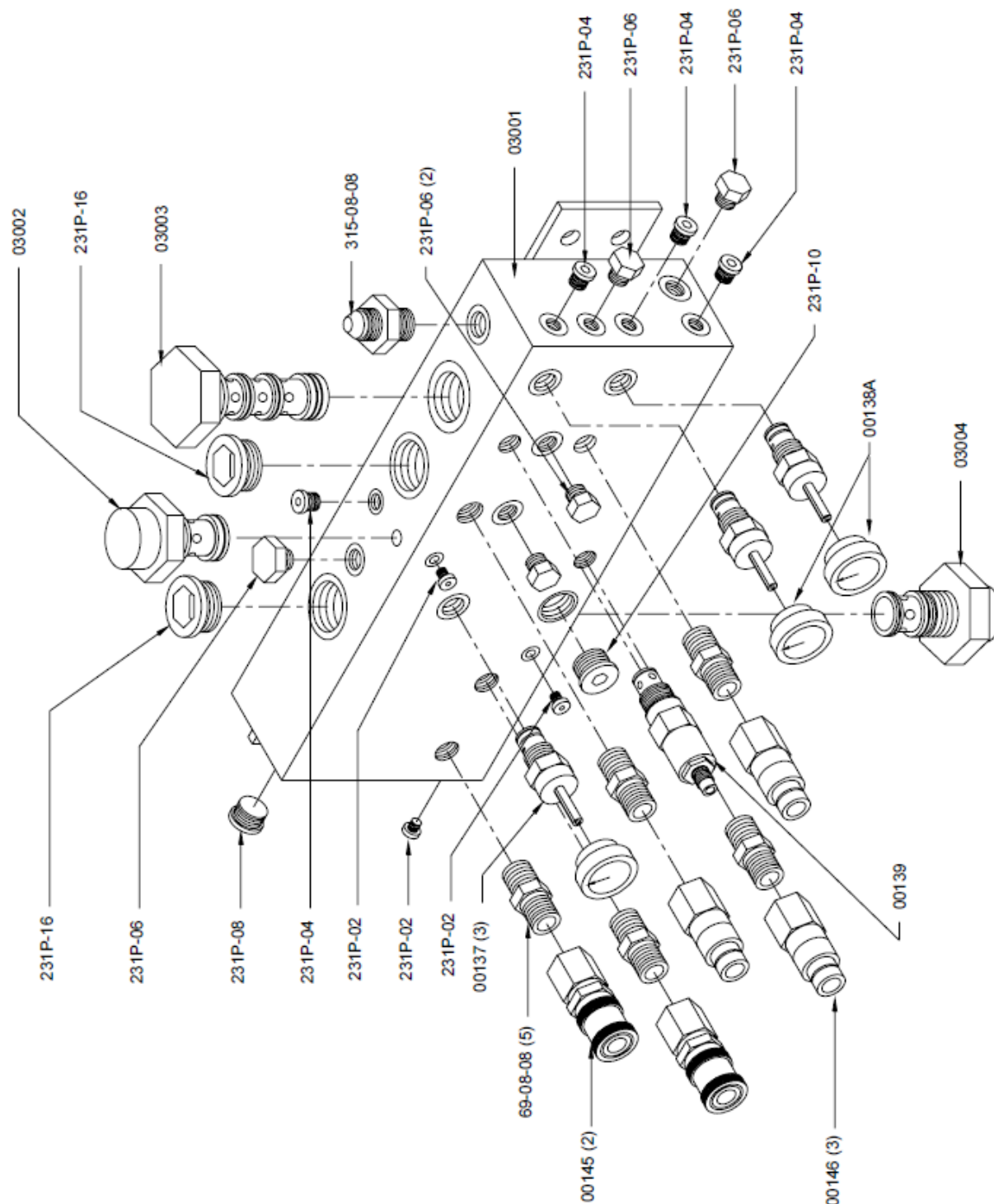
Hydraulic manifolds
Hydraulic test gauges
Hose reels
Hydraulic hoses

Accessories

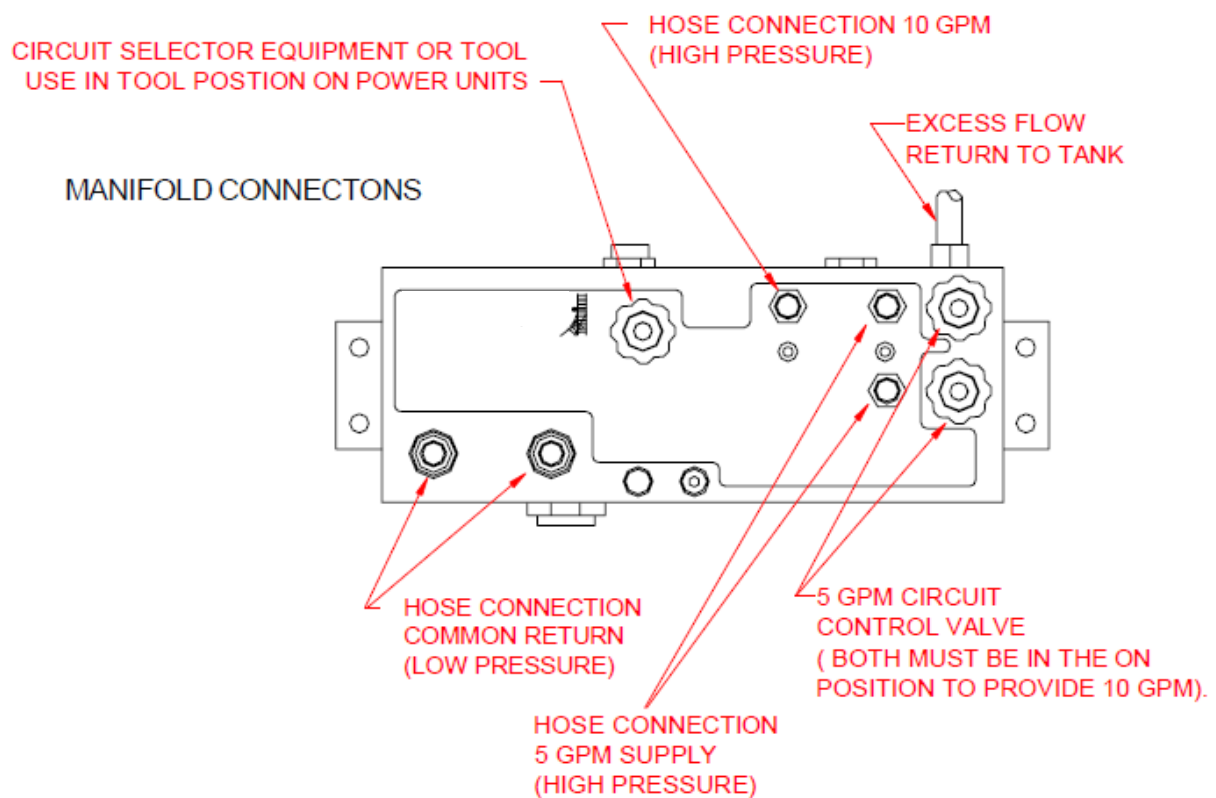
Drill bits
Shear Blades
Saw Blades
Grinding Stones
Sockets

10. Assembly

10.1. Parts diagram



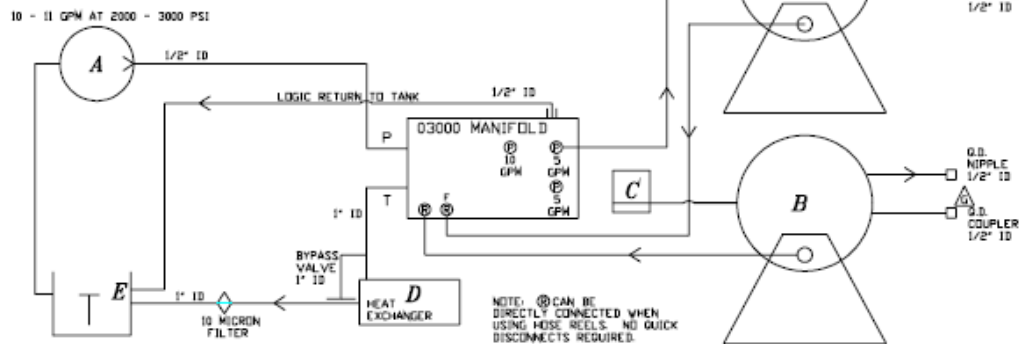
10.2. Manifold connections



10.3. Hydraulic schematic

HYDRAULIC SCHEMATIC

RECOMMENDED HYDRAULIC TOOL CIRCUIT
(HOSE REELS OPTIONAL)



- A.** TOOL STAGE OF MULTI STAGE GEAR PUMP TO DELIVER 10 GPM AT 2000 PSI AT EST. 1000 - 1500 RPM. THROTTLE SET BY ELECTRIC SWITCH IN CLOSE PROXIMITY TO 03000 MANIFOLD.
- B.** HANNAY HOSE REEL MODEL 617-25-260, 10 3/4" BARCO. INSTALL 50' 1/2" ID WIRE BRAID HOSE RATED FOR 2000 PSI MINIMUM WORKING PRESSURE. INSTALL PROTECTIVE HOSE SLEEVE (PART #00350) ON TWIN HOSE.
- C.** QUICK DISCONNECT COUPLER AND PIGTAIL TO CONNECT TO 10 GPM OR 5 GPM CIRCUIT ON 03000 MANIFOLD.
- D.** HEAT EXCHANGER WITH THERMOSTAT CONTROLLED BY PASS VALVE FOR COLD WEATHER SHUT OFF.
- E.** IN TANK HEATER, THERMOSTAT CONTROLLED FOR COLD WEATHER OPERATION.

NOTES:

** VEHICLE BACK PRESSURE MEASURED AT 03000 MANIFOLD RETURN PORT (D) SHOULD NOT EXCEED 50 PSI AND TOTAL TOOL RETURN BACK PRESSURE MEASURED AT RETURN PORT (G) SHOULD NOT EXCEED 150 PSI FOR OPTIMUM TOOL PERFORMANCE. (OIL TEMPERATURE 80 F & FLOW 10 GPM)

** CALL MATVELD AT (502) 444-0085 FOR TECHNICAL ASSISTANCE.

11. Disclaimer

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

12. Contact

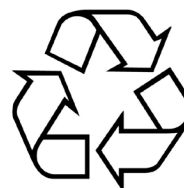
Address	Phone	Internet and E-mail
		www.Pandrol.com

13. 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.

PANDROL

Find out more at
pandrol.com

Pandrol

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