PANDROL

Impact Wrench

MODEL 02500

OPERATION AND MAINTENANCE MANUAL

ENG_OMM_IMPACT_WRENCH_P01

09th November 2021

Partners in excellence

Thank you for choosing Impact Wrench!

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

1. Preface

This manual aims to help you get to know your new Impact Wrench, 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	2021-11-09	New Manual

@Pandrol 2021

Table of Contents

@Pandrol 2021

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.

@Pandrol 2021

- 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 and repair leaks immediately.
- Do not carry the tool by the pigtail hoses.
- Do not over torque track and frog bolts.
- Do not use defective sockets or those not manufactured for impact wrenches.
- Do not attempt to loosen locked up wrench with any hand tool. Disconnect from power source and then repair wrench.
- Use a socket retaining ring to keep socket on the anvil.

@Pandrol 2021

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.

@Pandrol 2021

4. Summary

The 1” Impact Wrench is capable of handling the toughest jobs. Crossing,frog or track bolts are no problem for this rugged tool. Anti-vibration designand optional handle provide an efficient,safe and ergonomic work position for the task at hand. A torque adjustmentknob “dials in” torque from 0-3500 ft lb. Designed for 5 or 10 GPM.

Fig 1.

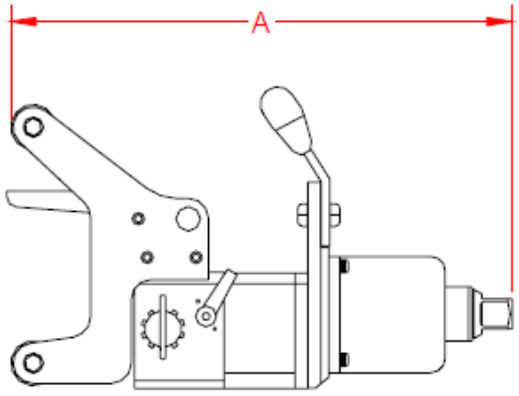


Fig 2.

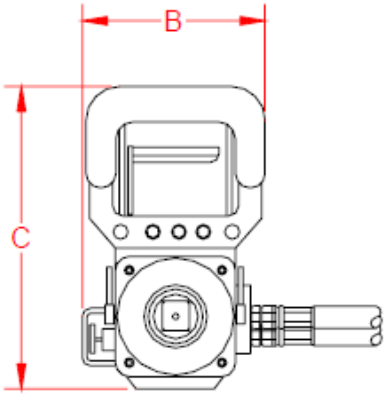


Fig 3.

Flow	**Pressure**	**Dimensions**	**Weight**
5 GPM (19 LPM) or 10 GPM (38 LPM)	2000 PSI (140 BAR)	A - 18” (45.7 cm) B - 8” (20.3 cm) C - 10” (25.4 cm)	37 lbs (16.8 kg)

@Pandrol 2021

5. Operation

- With the power source in the “OFF” position, connect the hoses. Do not drag the service hose by pulling with the tool. Loop the service hose in the work area in such a way to relieve stress on the hose and quick disconnect fittings while working. Be aware of hose location at all times.
- Connect the tool to the power source.
- Turn the power source “ON” to supply 10 GPM to tool.
- To tighten bolts, push the lever handle (located on both sides of impact wrench manifold) forward. To loosen bolt, pull lever handle back.
- Pull the trigger up to start the wrench.
- Never operate the tool on any higher flow than 10 GPM. The tool is designed to accept only the recommended 10 GPM and will malfunction and overheat the oil if used otherwise.
- Turn the power source “OFF” before disconnecting wrench.

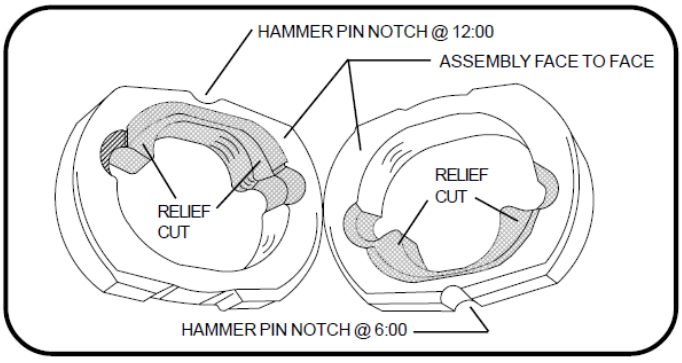
@Pandrol 2021

5.1. Hammer installation

Although the hammers are identical parts, they must be installed in opposing positions for proper operation.
The relief cut sides will face each other when properly fitted inside the hammer
Frame, but the hammer pin notch will be assembled 180° apart with (1) at the 12:00
Position and the other at the 6:00 position.

5.2. Cold weathe

Hydraulic system perform ore, measures should be taken to pre-warm tools a



PROPER HAMMER ORIENTATION

Fig 4.

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

@Pandrol 2021

6. Trouble shooting guide

6.1. Repair troubleshooting

Problem	Remedy
Impact Wrench overheats	• Operate wrench on 10 GPM
Impact wrench spins but won't impact…	• Inspect front end for broken hammer pins or other broken parts.
Impact wrench only works in one direction…	• Check front end for broken parts • Check reversing valve for trash on one or more valve parts
Impact wrench works slow and has low power…	• •Check that torque adjustment valve is screwed in and not adjusted all the way out. • Check that flow is 10 GPM and system pressure is set at 2000 PSI
Trigger sticks…	• Check for dirt or clearance in trigger housing • Check for reverse flow (pigtails or qd's recently changed) • Check back pressure on return line (at tool return should be 150 PSI or less).
Hydraulic oil running out of front end…	• Replace front shaft seal using part no. 02598 Shaft seal kit.

@Pandrol 2021

6.2. Torque / tension calibration procedure

(Using Pandrol part #01650 – Torque gauge)

- Install test gauge in pressure line at tool and connect to power source supply hoses – 5 GPM.
- Refer to bolt tightening chart specification required for the grade and size bolt being used. **(Always follow manufacturer's recommendations.)**
- Loosen lock collar on torque adjustment knob.
- If torque adjustment knob is turned all the way in, back adjustment knob out one and a half turns **counterclockwise** to decrease initial torque.
- Begin tightening bolt, keeping a close watch on the torque gauge. Turn the adjustment knob in **clockwise** increasing the pressure until the desired setting is reached.
- Loosen and retighten the test bolt a couple of times to verify the setting.
- Retighten the lock collar.
- Torque gauge may be removed once desired torque is set. Over-torquing bolts will cause bolt failure under traffic.

@Pandrol 2021

6.3. Torque / Tension calibration

WARNING!

- **Over-torquing bolts will cause bolt failure under traffic.**

Grade 5 – track and frog bolts:

Size	Wrench PSI	Torque FT. LB	Tension LB
3/4"	460	300	21,500
7/8"	500	485	29,500
1"	540	730	39,000
1 1/8"	565	900	46,000
1 3/8"	750	1700	69,000

Grade 8 – Track and frog bolts:

Size	Wrench PSI	Torque FT. LB	Tension LB
3/4"	470	400	28,000
7/8"	525	640	36,000
1"	600	960	50,000
1 1/8"	670	1360	63,000
1 3/8"	890	2500	95,000

NOTE!

- **Refer to the wrench calibration instructions on the previous page or follow guidelines set forth by the railroad. If the torque setting of a particular fastener type is critical, the wrench should be set as close to the desired torque as possible and a calibrated torque wrench used to verify or check the fastener torque periodically.**

@Pandrol 2021

7. Review of hydraulic principles

Tool circuit

7.1. 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

GPM				**PSI**		
	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

7.2. 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.

@Pandrol 2021

8. Maintenance

8.1. 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.

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**

@Pandrol 2021

8.2. 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.

9. 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.

9.1. 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

9.2. 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.

@Pandrol 2021

10. 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

@Pandrol 2021

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

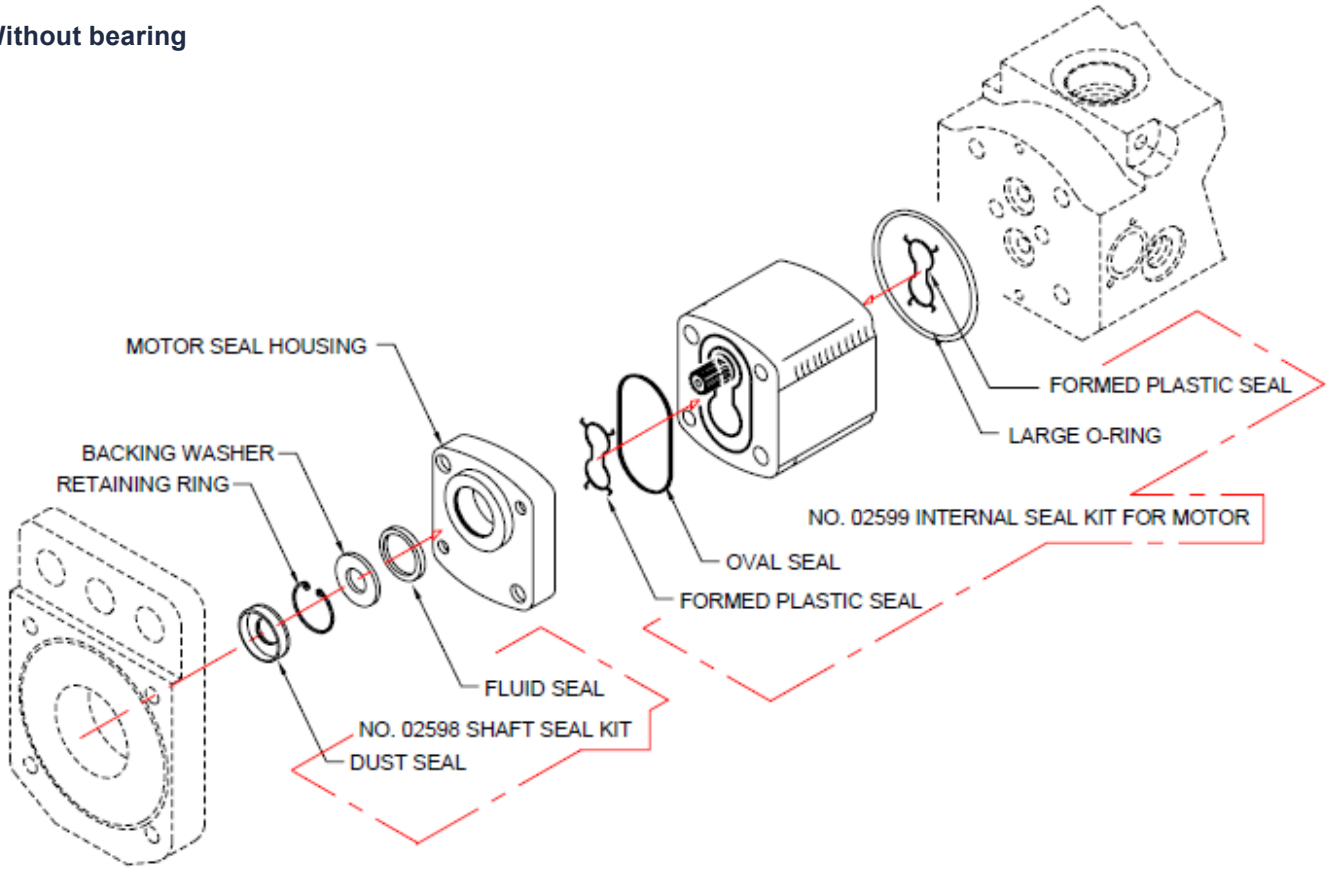
Drill bits
Shear Blades
Saw Blades
Grinding Stones
Sockets

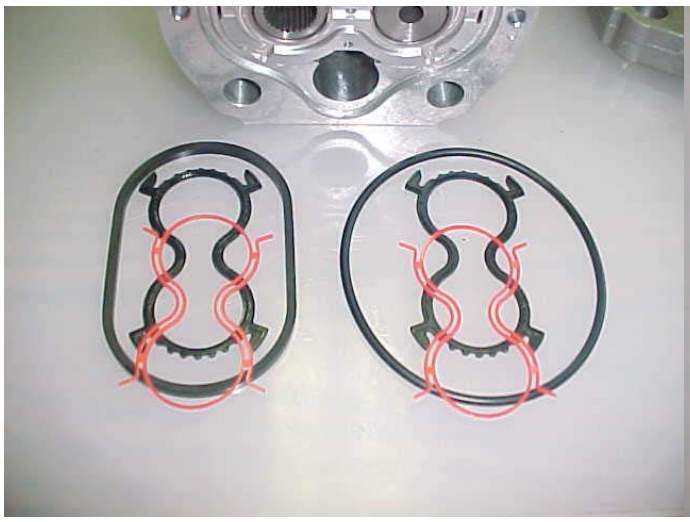
@Pandrol 2021

11. Seal kit information

Seal kit for motors without bearing manufactured after april 2003

Without bearing





#02599 - Internal seal kit

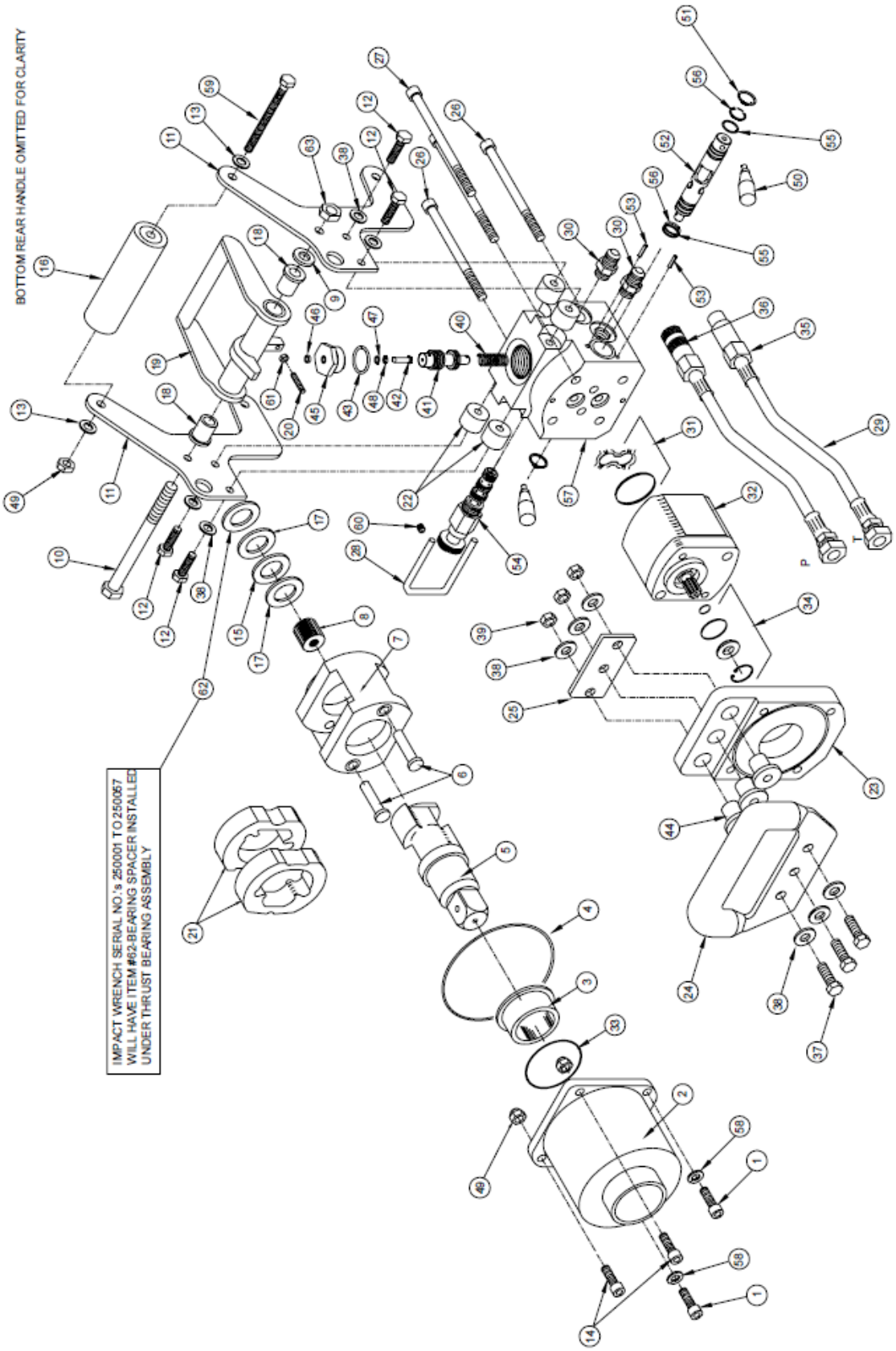
Fig 5.

#02598 - 18mm shaft seal kit

Fig 6.

12. Assembly

12.1. Parts diagram



@Pandrol 2021

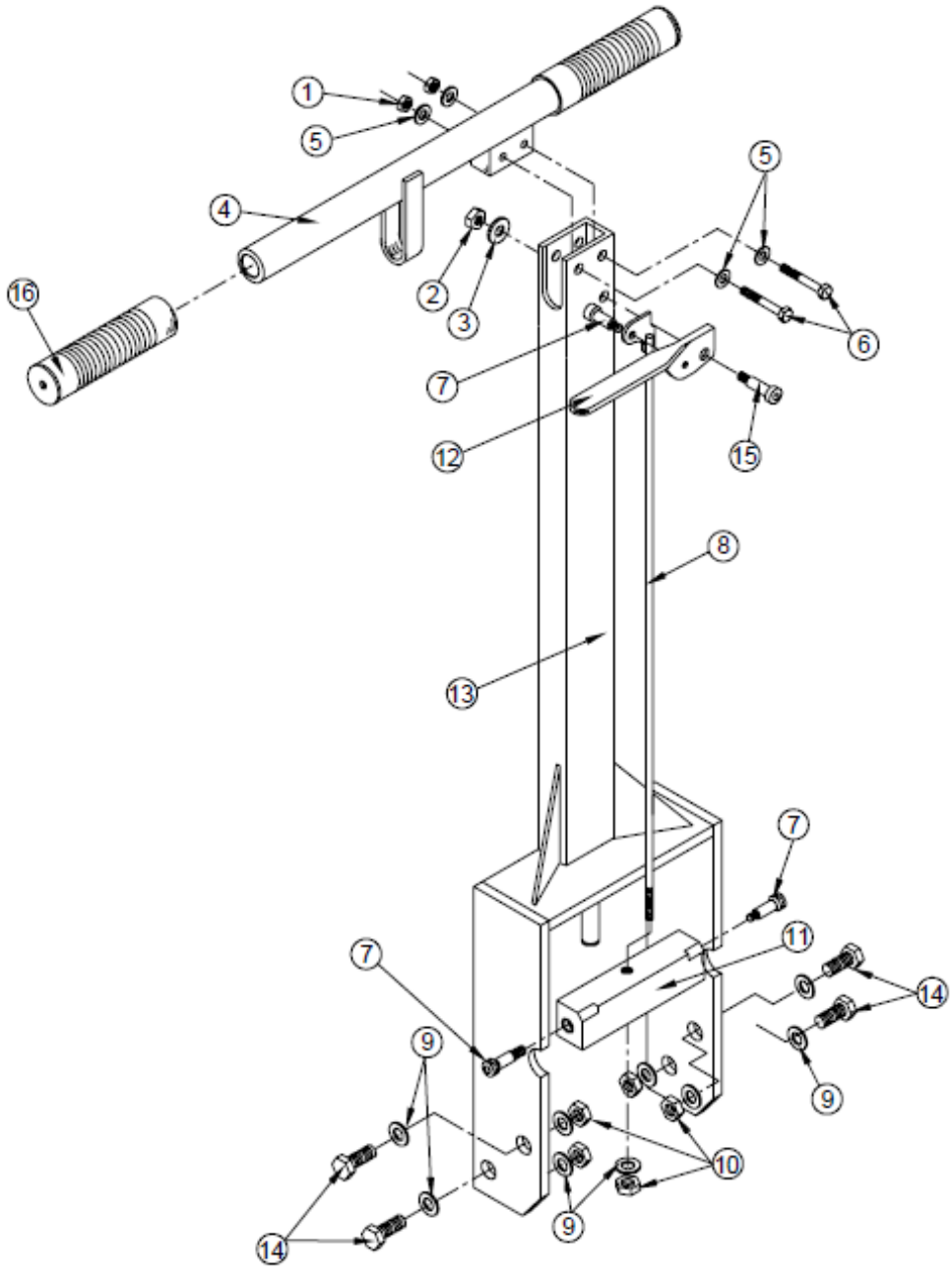
12.2. Parts list

ITEM NO.	PART NO.	DESCRIPTION	QTY.
*1	A5448	5/16-18 x 1 SHCS	2
*2	01603	HAMMER CASE w/BUSHING	1
*3	01604	HAMMER CASE BUSHING	1
*4	01630	O-RING HAMMER CASE	1
*5	01605	ANVIL 1" SQUARE DRIVE	1
*6	01606	HAMMER PIN	2
*7	01608	HAMMER FRAME	1
*8	01609A	SPLINE ADAPTER	1
9		OMIT	
10	A1098	1/2-13 X 6 HEX HEAD BOLT	1
11	02505	SIDE HANDLE	2
12	A1045	3/8-16 x 1 3/4 HEX HEAD BOLT	4
13	A2191	5/16 SAE FLAT WASHER	4
14	A5449	5/16-18 x 1 1/4 SHCS	2
15	02513	THRUST BEARING	1
16	02508	HANDLE	2
17	02512	THRUST BEARING WASHER	2
18	02507	1/2" FLANGED BRONZE BUSHING	2
19	02503	TRIGGER ASSEMBLY	1
20	A6330	#10-24 x 1 BHCS	1
21	01607	HAMMER	2
22	02506	ISOLATION PADS	4
23	01613D	MOTOR HANDLE ADAPTER	1
24	02509	FRONT HANDLE	1
25	02510	RETAINING PLATE	1
26	A5480	3/8-16 x 6 1/2 SHCS	2
27	A5485	3/8-16 x 7 SHCS	2
28	02511	PROTECTION BAR	1
29	00816	PIG TAIL HOSE ASSEMBLY	2
30	315-08-08	1/2 NPT x #8 MJIC HEX NIPPLE	2
31	02599	INTERNAL SEAL KIT	1
32	02502	HYDRAULIC MOTOR	1
33	03519	O-RING	1
34	02598	SHAFT SEAL KIT	1
35	00146	Q.D. NIPPLE	1
36	00145	Q.D. COUPLER	1
37	A1046	3/8-16 x 2 HEX HEAD BOLT	3
38	A2192	3/8 SAE FLAT WASHER	10
39	A2050	3/8-16 NYLOCK NUT	3
40	02501-03	SPRING	1
41	02501-04	SPOOL PLUNGER	1
42	02501-05	PIN ACTUATOR	1
43	02501-06	O-RING AS 568-916	1
44	A3816	WELL NUT - RUBBER WASHER	3
45	02501-02	PLUG END	1
46	02501-07	WIPER RING	1
47	02501-08	BACK UP WASHER	1
48	02501-09	O-RING AS 568-010	1
49	A2048	5/16-18 NYLOCK NUT	4
50	02501-10	HANDLE	2
51	02501-11	EXTERNAL RETAINING RING	2
52	02501-12	DIRECTIONAL SPOOL	1
53	0250`-13	SPRING ROLL PIN	4
54	02501-01	TORQUE ADJUSTMENT VALVE	1
55	02501-14	O-RING	2
56	02501-15	BACK UP RING	2
57	02501	MANIFOLD	1
58	A3812	5/16 HIGH COLLAR LOCK WASHER	2
59	A1039	5/16-18 x 6 HEX HEAD BOLT	2
60	A5602	1/4--20 x 5/16 SET SCREW	4
61	A6749	#10-24 HEX NUT	1
62	02514	BEARING SPACER	1
63	A2054	1/2-13 NYLOCK NUT	1

@Pandrol 2021

12.3. Parts diagram and list

1	A2046	1/4-20 NYLOCK NUT	2
2	A2048	5/16-18 NYLOCK NUT	1
3	A2191	5/16 SAE FLAT WASHER	1
4	01636	HANDLE ASSEMBLY	1
5	A2190	1/4 SAE FLAT WASHER	4
6	A1004	1/4-20 x 1 1/2 HEX HEAD BOLT	2
7	A6930	DIA. 3/8 x 1 SHOULDER BOLT	3
8	01638	ACTUATOR ROD ASSEMBLY	1
9	A2192	3/8 SAE FLAT WASHER	9
10	A2050	3/8-16 NYLOCK NUT	5
11	02516	ACTUATOR BAR	1
12	01640	TRIGGER	1
13	02515	EXTENSION ARM WELDMENT	1
14	A1042	3/8-16 x 1 HEX HEAD BOLT	4
15	A6930	DIA. 3/8 x 1 SHOULDER BOLT	1
16	00106	HANDLE GRIP	2



@Pandrol 2021

13. Disclaimer

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

14. Contact

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

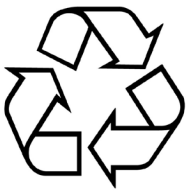
15. Recycling and Environment

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 2021

PANDROL

Find out more at

pandrol.com

Pandrol

©Pandrol

Partners in excellence