

**PANDROL**



# Head Wash Grinder

**MODEL 09300**

**OPERATION AND MAINTENANCE  
MANUAL**



**ENG\_OMM\_HEAD\_WASH\_GRINDER\_P01**

09th November 2021

**Partners in excellence**

**Thank you for choosing Head Wash Grinder!**  
**You are now the owner of a quality product from Pandrol.**

## 1. Preface

This manual aims to help you get to know your new Head Wash Grinder, 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

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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 flash point of approximately 450°F. Make sure hoses are completely clear of sparks and hot debris. Have another person stand close to hydraulic power source controls to observe operation and for emergency shutdown if necessary. Qualified personnel

### 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 Head-Wash Grinder (HWG) is a hydraulic powered, track mounted machine that is designed to efficiently grind the ball of the rail in preparation for the Pandrol Head-wash repair weld (HWR). This specially designed grinder provides a precision grind to compliment the hwr process in defect removal. The compact and lightweight grinder allows for quick setup and breakdown on track while the ergonomic profile allows the operator to quickly and comfortably grind the ball to the appropriate depth and width.



Fig 1.

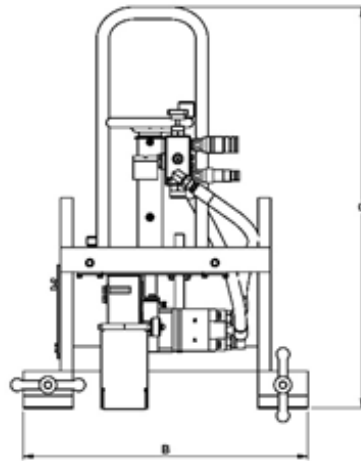


Fig 2.

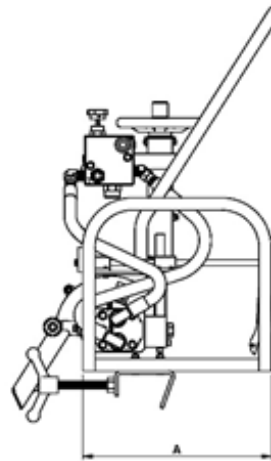


Fig 3.

Flow	Pressure	RPM	Dimensions	Weight
10 GPM (38 LPM)	2000 PSI (140 BAR)	4000	A - 16" (40.6 cm) B - 23" (58.4 cm) C - 32" (81.3 cm)	68 lbs (30.8 kg)

### Accessories:

09298 - 8" X 2" x 1" stone

09281 - HWR depth gauge



## 5. Operation

The head-wash repair grinder is designed to operate a 8" x 2" x 1" grinding stone. Set the base of the head-wash repair grinder on the ball, centering it over the defect area. Once set, lock the grinder onto the ball with the clamps.



Fig 4.



Fig 5.



Fig 6.



### NOTE!

Be sure to use the head wash repair weld depth gage to mark the ball of the rail for grinding depth. The ball should always have 1/4" ball remaining after the grind, regardless of head loss/wear.



Fig 7.



Once the head-wash repair grinder is securely clamped onto the rail and the stone is centered over the defect, connect the hoses while the power source is off. Make sure the stone is not touching the rail at this time and the spark shield is down



**NOTE!**

- Turn the headwash repair grinder on to supply 10 GPM.



Fig 8.



Fig 9.

With the headwash repair grinder on, slowly lower the stone to make contact with the rail head.



Fig 10.

The operator must maintain positive control on the handle and the wheel during operation. Ensure the hoses are out of the way and no tripping hazards are present.



Fig 11.



Fig 12.

Slide the grinder back and forth over the rail head, constantly maintaining contact.



Fig 13.



Fig 14.



Fig 15.



**NOTE!**

- It is important to adjust the depth as you grind the rail.



Once the operator reaches the desired depth, turn the grinder off, turn the powersource off and disconnect the hoses.

Once the hoses are disconnected, unclamp the head wash repair grinder from the rail.



*Fig 16.*



*Fig 17.*

## 5.1. Changing the grinding stone

- Disconnect the tool from the power source.
- Using the wrench provided loosen the two hex fasteners or bolts and remove the stone guard.
- Rotate the stone slowly by hand while depressing the shaft locking pin mechanism located on the side of bearing housing.
- When the pin engages, locking the shaft, remove the nut holding the stone and flanges to the shaft
- Install the new stone. Be sure that the flanges have been replaced and that the grinding stone is equipped with a blotter.
- Tighten the nut on the shaft. Do not over tighten as this may cause the stone to fail while in use.
- Release the locking mechanism and check to make sure it is released from the shaft before beginning to use.
- Reinstall the stone guard.
- Refer to manufacturer 's specifications for torque settings on stone attachment



### NOTE!

- **Refer to manufacturer's specifications for torque settings on stone attachment**



Fig 18.



Fig 19.

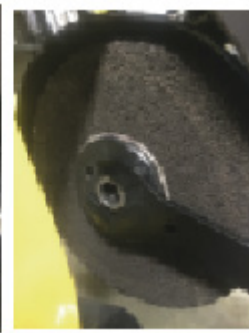


Fig 20.



Fig 21.



Fig 22.

## 10 GPM tools:

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



### 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.

## 5.2. 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

**GPM =**

$$\frac{\text{CID X RPM}}{231}$$

**HP =**

$$\frac{\text{GPM X PSI}}{1714 (.85)}$$

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

$$\frac{10 \text{ GPM X } 1500 \text{ PSI}}{1456.9}$$

$$= \frac{15000}{1456.9} = 10.3 \text{ HP}$$

(subtract back pressure for tool HP)

Estimated HP delivered by pump or used by tool

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

#### 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**

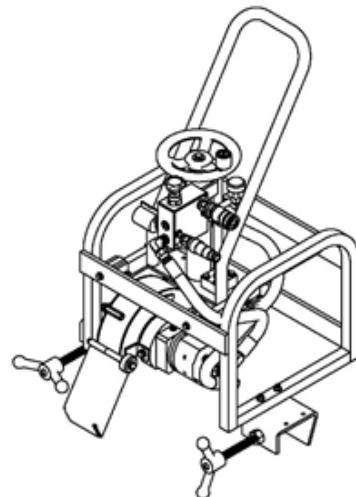
Drill bits  
Shear Blades  
Saw Blades  
Grinding Stones  
Sockets

# 10. Assembly

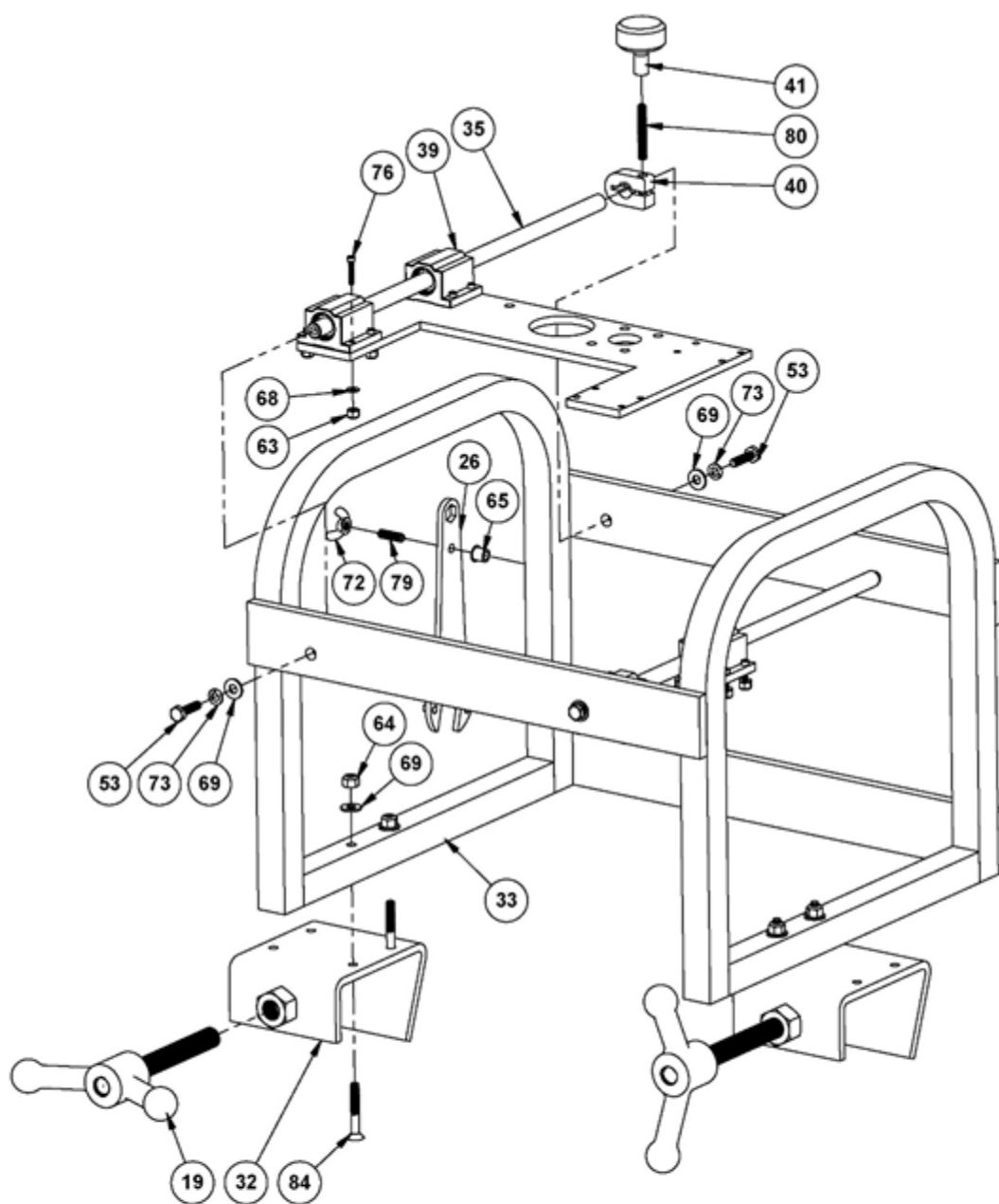
## 10.1. Parts List

ITEM NO.	PART #	DESCRIPTION	QTY.
1	00137	CONTROL VALVE w/KNOB	1
2	00138A	REPLACEMENT KNOB ONLY	1
3	00145	QUICK DISCONNECT COUPLER	1
4	00146	QUICK DISCONNECT NIPPLE	1
5	00402	FLANGE	1
6	00403	INTERNAL RETAINING RING	1
7	00410B	HYDRAULIC MOTOR	1
8	00412	LOCKING PIN	1
9	00413	SPRING	1
10	00415	PLUG	1
11	00705	1 5/8 INTERNAL RETAINING RING	2
12	00706	3/4 EXTERNAL RETAINING RING	1
13	00709	REPLACEMENT SEALING WASHER ONLY	1
14	00710	OIL SEAL	1
15	00713	HEIGHT ADJUSTMENT BEARING	1
16	00795	FLOW CONTROL MANIFOLD	1
17	00796	FLOW REGULATOR VALVE	1
18	00806-01	3/16 SQ. KEY	1
19	00832	CLAMP SCREW	2
20	03930A	DISCONNECT CRANK HANDLE KNOB	1
21	03931A	HOSE	2
22	05916	HEIGHT ADJUSTMENT SHAFT	1
23	05917	HEIGHT ADJUSTMENT SCREW	1
24	05919	HAND WHEEL w/SEALING WASHER	1
25	05940	1/2 WAVE WASHER	1
26	06910SP	OPEN END SPANNER WRENCH	1
27	09223A	MOTOR BEARING BLOCK	1
28	09242	8in GUARD COVER	1
29	09228A-05	2" STONE SPACER	1
30	09237	SUPPORT SHAFT BLOCK	1
31	09281	HWR DEPTH GAUGE	1
32	09301	CLAMP BASE	2
33	09302A	SUPPORT FRAME	1
34	09303	GRINDER HEAD BASE	1
35	09304	GUIDE RAIL	2
36	09305	HEIGHT ADJUSTMENT SUPPORT SHAFT	1
37	09306	TRANSITION BLOCK	1
38	09307A	SPARK GUARD	1
39	09308	1/2" LINEAR BEARING	4
40	09317	SHAFT CLAMP BLOCK	1
41	09318	CLAMP HAND KNOB	1
42	09320	SPARK GUARD FLAP	1
43	09321	FLAP LOCK KNOB	1
44	046003	DRIVE SHAFT BEARING	1
45	046004	OIL SEAL	1
46	046005	EXTERNAL RETAINING RING	1
47	047001	CCW DRIVE SHAFT	1
48	047009	1" STONE ADAPTER	1
49	231P-04	-04 O-RING PLUG	2
50	355-08-08	1/2 NPT X -08 JIC 45 ELBOW	1
51	405-08-08	1/2 NPT x -08 JIC 90 ELBOW	1
52	69-08-08	1/2 NPT x 1/2 NPT HEX NIPPLE	2
53	A1002	1/4-20 x 1 HEX HEAD BOLT	4
54	A1005	1/4-20 x 1 3/4 HEX HEAD BOLT	4

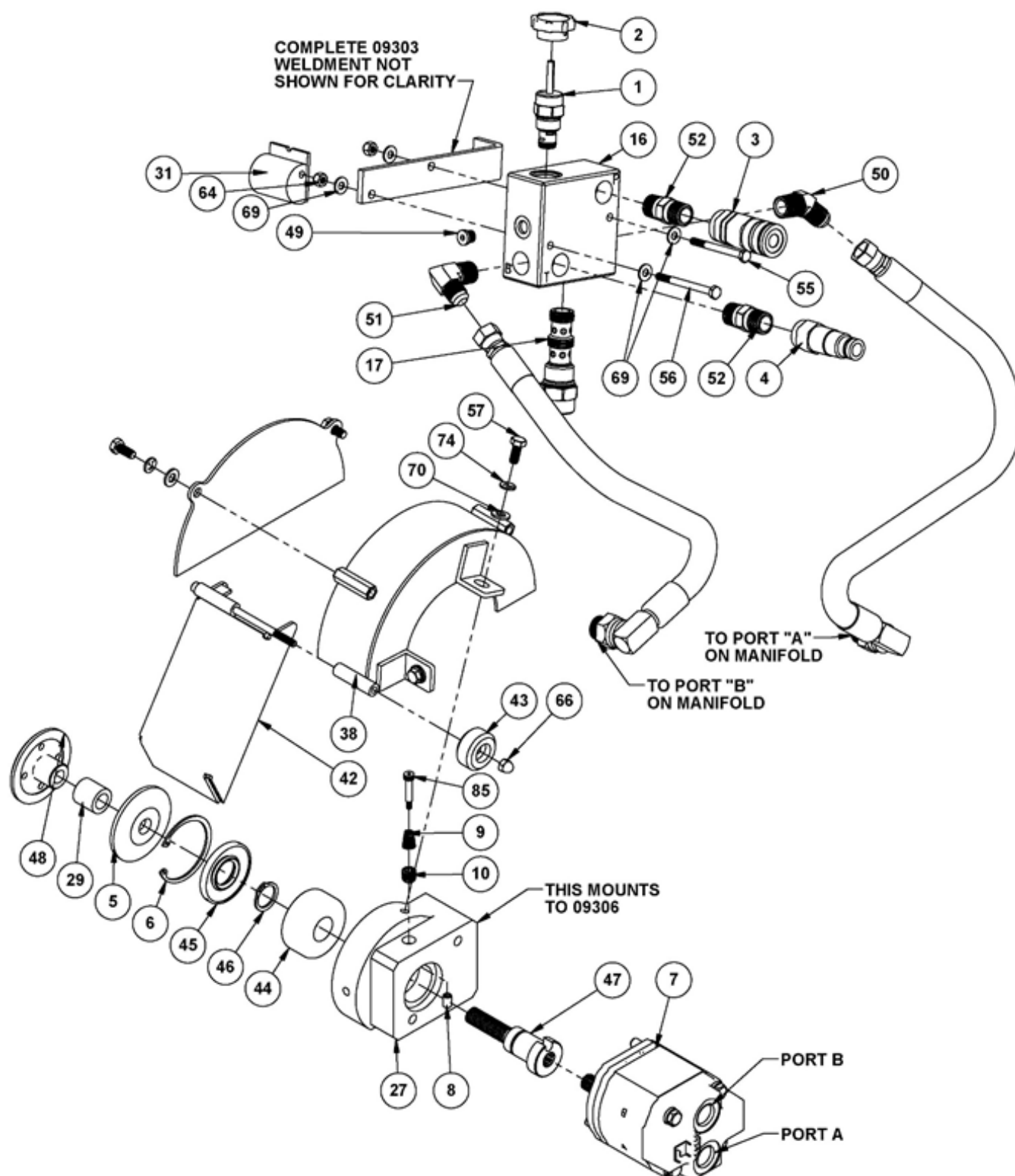
ITEM NO.	PART #	DESCRIPTION	QTY.
55	A1009	1/4-20 x 2 3/4 HEX HEAD BOLT	1
56	A1010	1/4-20 X 3 HEX HEAD BOLT	1
57	A1021	5/16-18 x 3/4 HEX HEAD BOLT	4
58	A1041	3/8-16 x 3/4 HEX HEAD BOLT	1
59	A1127	5/8-11 x 3 HEX HEAD BOLT	1
60	A1452	5/16-18 HEX JAM NUT	2
61	A1454	3/8-16 HEX JAM NUT	2
62	A1481	DIA. 1/2 x 1 SHOULDER BOLT	1
63	A2040	#6-32 NYLOCK NUT	16
64	A2046	1/4-20 NYLOCK NUT	10
65	A2062	1/4-20 NUT CERT	1
66	A2066	1/4-20 SS ACORN NUT	1
67	A2163	3/8 USS FLAT WASHER	1
68	A2187	#6 SAE FLAT WASHER	16
69	A2190	1/4 SAE FLAT WASHER	20
70	A2191	5/16 SAE FLAT WASHER	4
71	A2200	14 GA. 3/4" FLAT WASHER	1
72	A2499	1/4-20 WING NUT	1
73	A3809	1/4 LOCK WASHER	4
74	A3810	5/16 LOCK WASHER	7
75	A3814	5/8 LOCK WASHER	1
76	A5400	#6-32 x 3/4 SHCS	16
77	A5448	5/16-18 x 1 SHCS	1
78	A5454	5/16-18 x 2 1/2 SHCS	3
79	A5608	1/4-20 x 7/8 SET SCREW	1
80	A5610	1/4-20 X 1 3/4 STAINLESS STEEL SET SCREW	1
81	A5624	5/16-18 x 1/2 NYLON TIP SET SCREW	2
82	A5626	3/8-16 X 3/4 CONE POINT SET SCREW	2
83	A5627	3/8-16 X 1/4 SET SCREW	1
84	A6303	1/4-20 x 1 3/4 FLAT HEAD CAP SCREW	4
85	A6910	DIA. 1/4 x 1 SHOULDER BOLT	1



## 10.2. Parts diagram

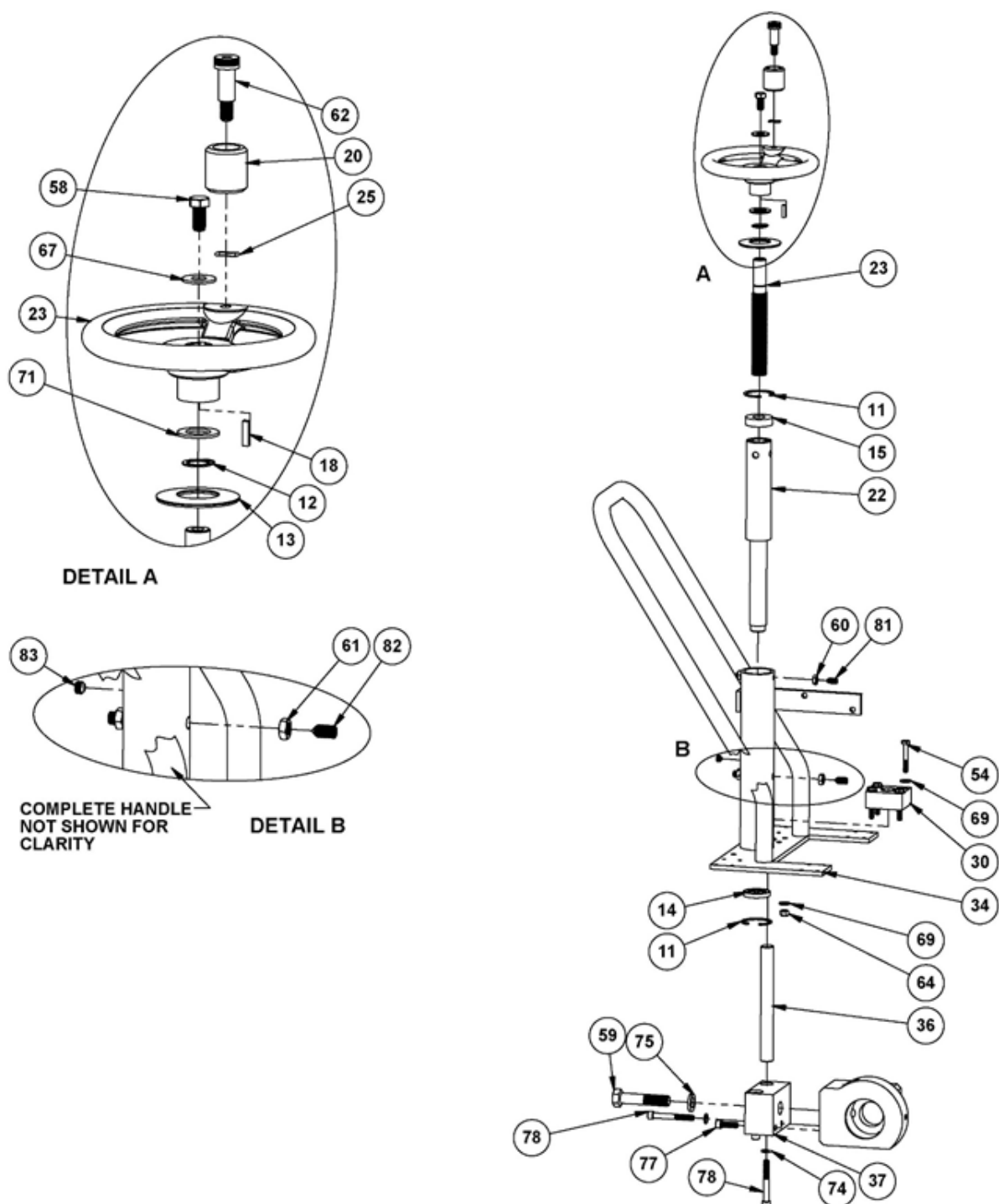


## 10.3. Parts diagram





## 10.4. Parts diagram



## 11. Disclaimer

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

## 12. Contact

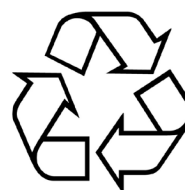
Address	Phone	Internet and E-mail
		www.Pandrol.com

## 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](https://pandrol.com)

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Partners in excellence