

PANDROL



Spike Driver

MODEL 08300

OPERATION AND MAINTENANCE
MANUAL



ENG_OMM_SPIKE_DRIVER_P01

16th November 2021

Partners in excellence

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

1. Preface

This manual aims to help you get to know your new Spike Driver, 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	2021-11-16	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 and repair leaks immediately.
- Do not carry the tool by the pigtail hoses.
- Never allow anyone other than a properly trained service representative to service accumulator. The accumulator is under high pressure, improper disassembly can cause serious injury or death. Do not use the tool or hook to a power source if it appears that the accumulator has been tampered with. Immediately return the tool to Pandrol for inspection and service.
- Always keep a firm grasp on the driver, with both hands, at all times.
- Do not lean on the tool while in operation. The failure of the bit or any other part could cause you to loose your balance and cause serious injury.
- Avoid free blows (the piston does not hit the tool), as this will lead to unnecessary heating of the oil and in the long run damage both seals and the tool.

- To minimize the possibility of anvil breakage, replace anvil annually and inspect casting for cracks or damage.
- Do not “dry fire” the tool. Always set the spike driver on the spike before pulling the trigger.

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 Spike Driver is equipped with torsion dampened handles which reduce the vibration level to a minimum. An excellent heavy duty tool designed to drive spikes and hairpins into the toughest ties in seconds.



Fig 2.

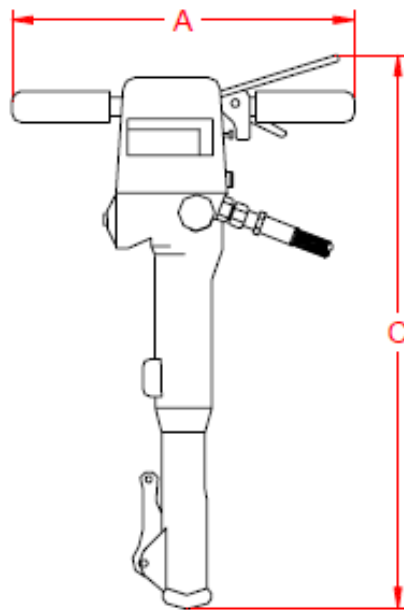


Fig 3.



Fig 1.

Flow	Pressure	Dimensions	Weight
10 GPM (38 LPM)	2000 PSI (140 BAR)	A - 33" (83.8 cm) B - 18" (45.7 cm) C - 6" (15.2 cm)	65 lbs (30 kg)

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.
- Make sure spikes that are to be driven are securely set.
- With the tool placed on top of a spike and positioned ready for work, release the safety trigger and press the trigger lever down towards handle.
- Keep a steady pressure on spike until properly seated.
- Release the trigger when the tool is being repositioned to another work area. The safety trigger automatically re-locks the trigger lever.
- Turn the power source "OFF" before disconnecting tool.

5.1. Oil supply and pressure

Your new Pandrol breaker is designed for certain oil supply, working pressure and maximum pressure. A too high oil supply and/or a too high pressure results in overload of the breaker, meaning that the lifetime of your new Pandrol breaker will not be as expected, and that your service and repair cost will be too high.

It is important to check that the breaker is not supplied with an oil flow beyond its design capacity, that the working pressure is correct and that the maximum allowed pressure is not exceeded.

5.2. Vibration level

There are many examinations about the risk of contracting the so-called “white fingers” disease as a consequence of the use of tools with high vibration level. Hand-held electric, pneumatic and hydraulic breakers belong to this category.

To reduce the risk of injury, a number of guidelines for maximum daily use have been laid down. The risk is minimized if you keep the times of maximum daily use.

It is therefore important to manufacturers of hand held breakers that they offer breakers with a low vibration level. At Pandrol, we attach great importance to the protection of our customers in the form of a very low vibration level.

Therefore, your new Pandrol breaker is equipped with a handle designed for the lowest possible vibration level, even though the breaker has high performance. On all Pandrol breakers we mount our best vibration-damped handle as standard to protect you as user.

If you wish to obtain further information about the guidelines for maximum daily use, please contact us.

<u>Blow frequency:</u> 1560 1/min	<u>Vibration level:</u> 133.6 dB (4.8M/S ²)	<u>Sound pressure</u> <u>Level (Ipa) Im:</u> 94 dB
<u>Blow energy:</u> 60 Joule		<u>Sound power level</u> <u>(LWA):</u> 105 dB

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

Problem	Cause	Remedy
Spike Driver does not start, there is no pressure in P-hose	<ul style="list-style-type: none"> Trigger mechanism does not actuate trigger piston correctly 	<ul style="list-style-type: none"> Dismount top cover, and check and adjust as required
Spike Driver does not start, there is pressure in P-hose	<ul style="list-style-type: none"> Striking piston is stuck in cylinder 	<ul style="list-style-type: none"> Check for broken roll pins and replace as needed. Seizing between cylinder and striking piston. Polish or replace components.
	<ul style="list-style-type: none"> Defective Q.D. coupling 	<ul style="list-style-type: none"> Check Q.D. coupling
	<ul style="list-style-type: none"> Oil supply is made to T-connection 	<ul style="list-style-type: none"> Switch pump and tank line
Spike Driver works irregularly	<ul style="list-style-type: none"> Impurities in hydraulic oil 	<ul style="list-style-type: none"> Refer to owners manual for power source
	<ul style="list-style-type: none"> Oil level in power source too low 	<ul style="list-style-type: none"> Add hydraulic oil
	<ul style="list-style-type: none"> Anvil is broken 	<ul style="list-style-type: none"> Replace anvil and check lower tube for damage.
Bad performance	<ul style="list-style-type: none"> Internal leak 	<ul style="list-style-type: none"> Dismount valve housing and replace O-rings
	<ul style="list-style-type: none"> Oil flow from the power source is not correct for the spike driver 	<ul style="list-style-type: none"> Check oil flow
	<ul style="list-style-type: none"> Accumulator pressure too low 	<ul style="list-style-type: none"> Charge with nitrogen to 50 BAR (725 PSI)
	<ul style="list-style-type: none"> Defective diaphragm 	<ul style="list-style-type: none"> Replace diaphragm
	<ul style="list-style-type: none"> Defective Q.D. couplings 	<ul style="list-style-type: none"> Check Q.D. couplings
	<ul style="list-style-type: none"> Return pressure too high 	<ul style="list-style-type: none"> Check power source/hoses back pressure exceeds 250 PSI. Optimum back pressure should be 150 PSI or less.
	<ul style="list-style-type: none"> Hose diameter too small 	<ul style="list-style-type: none"> Check hoses

7. Review of hydraulic principles

Tool circuit

7.1. 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

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.

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.

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.

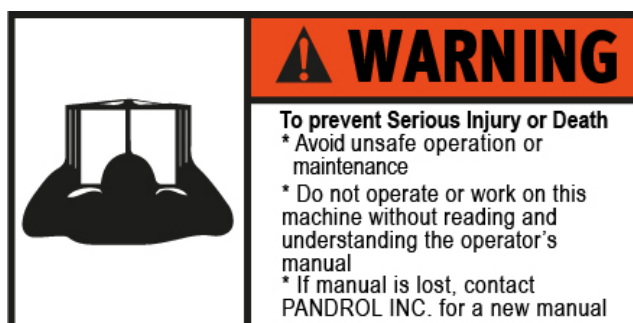


WARNING!

- 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**

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.



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

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

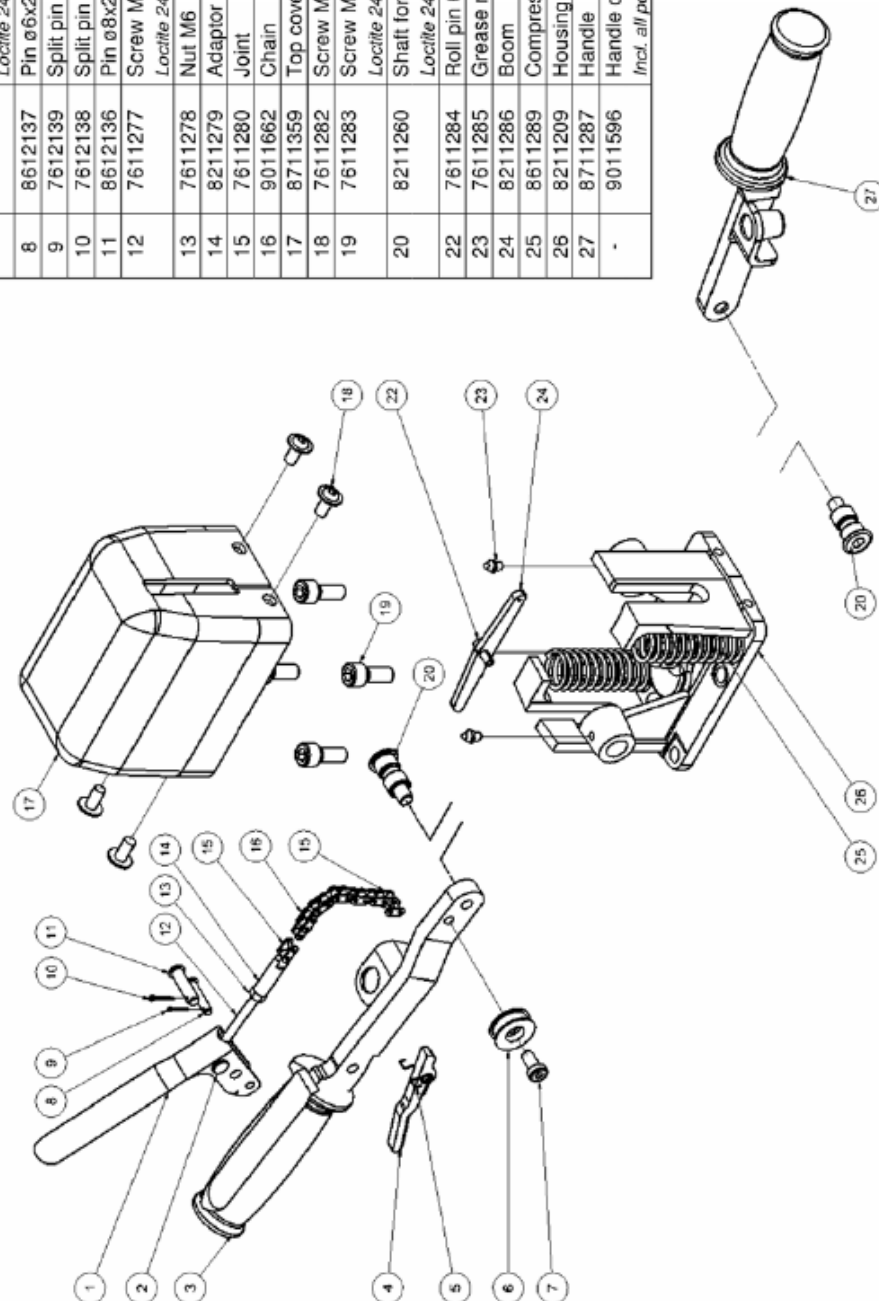
Accessories

Drill bits
Shear Blades
Saw Blades
Grinding Stones
Sockets

11. Assembly

11.1. Parts diagram and list

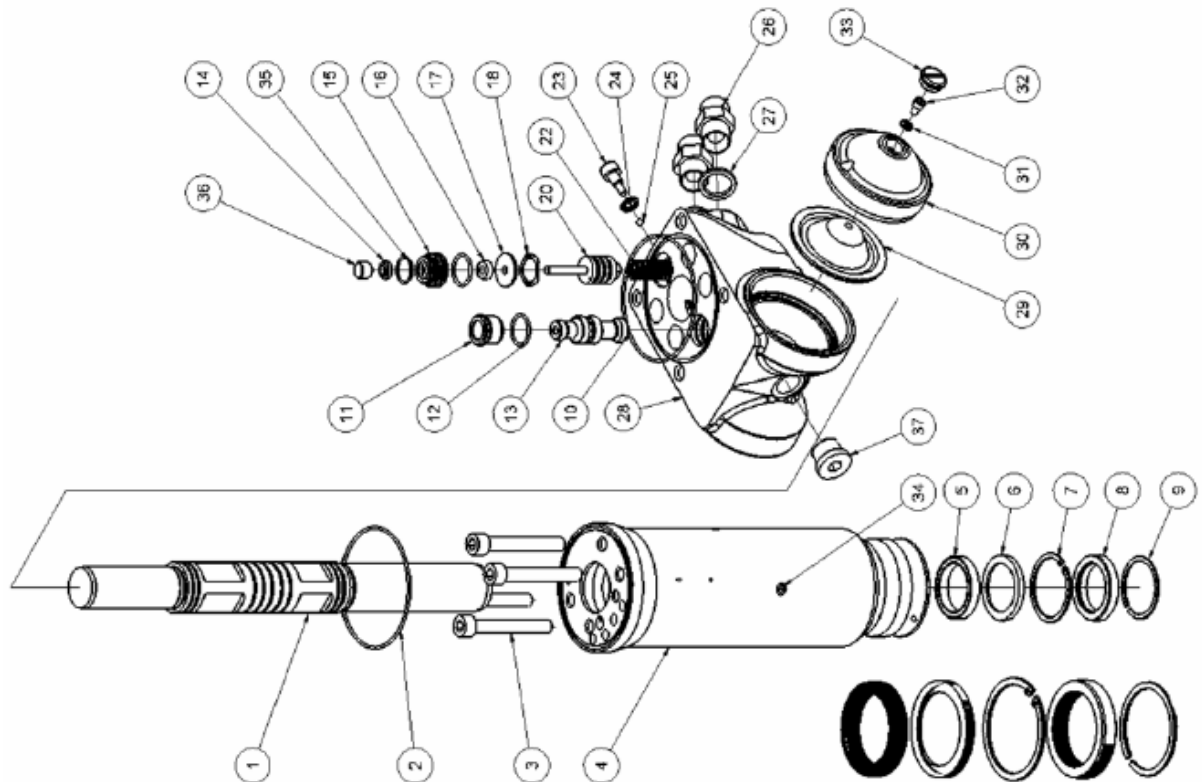
Pos.	Part No.	Description	Pcs.
1	8211270	Trigger lever	1
2	8211271	Cross pin	1
3	8711275	Handle (trigger side)	1
4	8211273	Safety trigger	1
5	8611291	Spring	1
6	8211276	Chain spool	1
7	7611290	Screw M8x16 Locite 243	1
8	8612137	Pin ø6x27	1
9	7612139	Split pin ø1.6x10	1
10	7612138	Split pin ø2.0x12	1
11	8612136	Pin ø8x27	1
12	7611277	Screw M6x80	1
13	7611278	Nut M6	1
14	8211279	Adaptor	1
15	7611280	Joint	2
16	9011662	Chain	1
17	8711359	Top cover black w/o logo	1
18	7611282	Screw M8x16	4
19	7611283	Screw M10x25 Locite 243 - 80 Nm	4
20	8211260	Shaft for handle Locite 243 - 80 Nm	2
22	7611284	Roll pin 6x20	1
23	7611285	Grease nipple M6	2
24	8211286	Boom	1
25	8611289	Compression spring	2
26	8211209	Housing	1
27	8711287	Handle	1
-	9011596	Handle complete Incl. all positions except 17, 18 and 19	1



11.2. Parts diagram and list

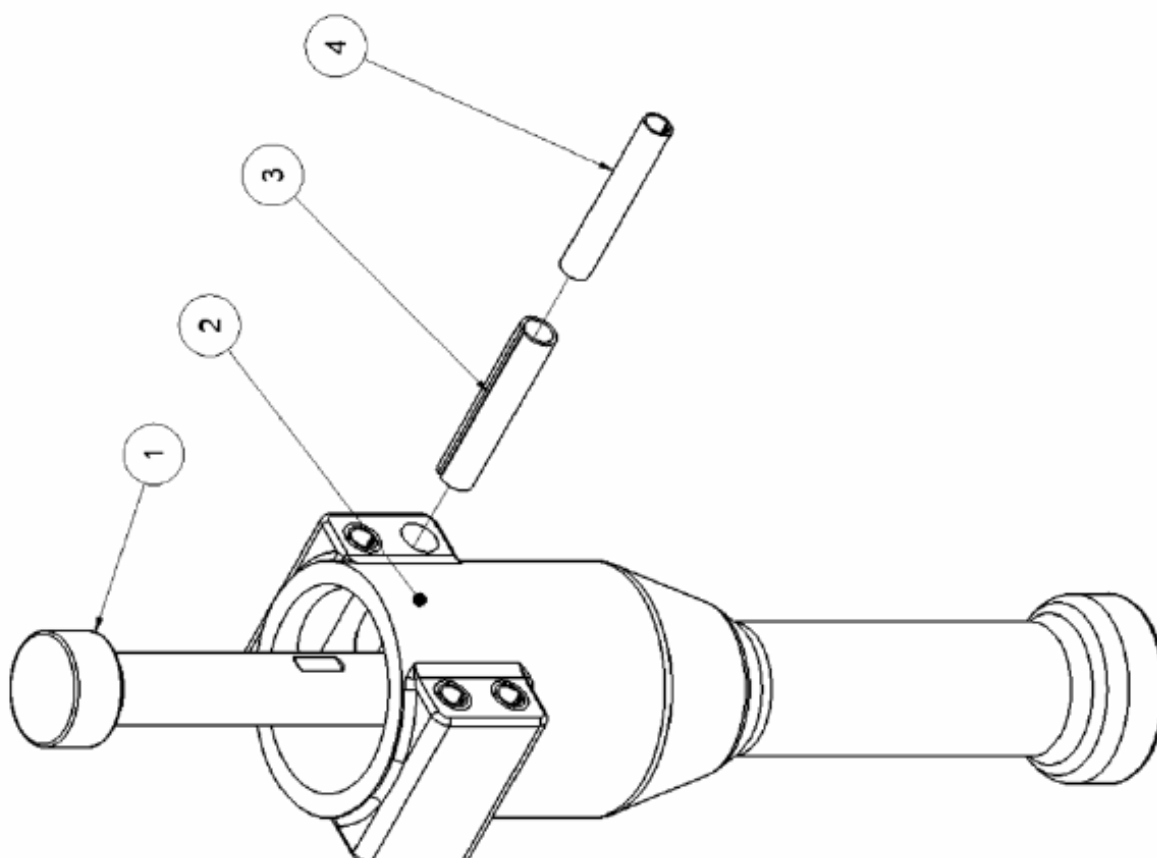
Pos.	Part No.	Description	Pcs.
1	8211755	Striking piston <i>Spray with Loctite 8191</i>	1
*2	7512001	O-ring 86x2	1
3	7611244	Screw M10x70 <i>Tighten crosswise 20-40-80 Nm</i>	4
4	9012070	Cylinder	1
*5	7512005	Seal $\varnothing 36/\varnothing 46 \times 7.3$	1
*6	8212006	Supporting washer	1
*7	7612007	Retaining ring	1
*8	9012025	Rod wiper complete	1
*9	7612009	Spring ring	1
*10	7512002	O-ring 90x2	1
11	8211228	Sleeve	1
*12	7511248	O-ring 20x2	2
13	8211772	Spool	1
*14	7521013	Seal	1
15	8211226	Seal housing	1
*16	7521014	Seal	1
17	8211251	Washer	1
18	7611252	Crinkled spring washer 23.8x17.3x0.3	1
20	9011750	Trigger piston complete	1
22	8611249	Compression spring 1.25x12.5x62.5	1
23	8611255	Screw M8 f/lock nut	1
*24	7511254	Seal ring M8	1
25	7611253	Ball $\varnothing 5$ mm	1
26	7421343	Fitting 1/2"x3/4" JIC	2
*27	7521072	Seal ring 1/2"	2
28	8211756	Valve housing	1
29	7711091	Diaphragm	2
30	8211216	Accumulator cover	2
*31	7511268	Seal ring M5	2
32	8611269	Screw M5 f/accumulator	2
33	8211256	Plug	2
34	7621037	Pipe plug 1/8"	6
*35	7511300	O-ring 17x1.5	1
36	8211227	Distance piece	1
37	7621075	Threaded plug 1/2" w/seal	1

* Items sold in 9012071 seal kit only



11.3. Parts diagram and list

Pos.	Part No.	Description	Pcs.
1	8212000	Anvil	1
2	8211998	Nose part	1
3	7612003	Roll pin $\varnothing 14 \times 70$	4
4	7612069	Roll pin $\varnothing 11 \times 70$	4



12. Disclaimer

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

13. Contact

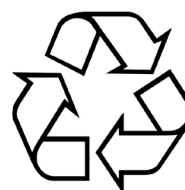
Address	Phone	Internet and E-mail
		www.Pandrol.com

14. 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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Find out more at
pandrol.com

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