PANDROL

Light Weight Two-Stage Spike Puller

MODEL 01100RM

OPERATION AND MAINTENANCE MANUAL

ENG_OMM_SPIKE_PULLER_RM_P01
17th November 2021

Partners in excellence

Thank you for choosing Light Weight Two-Stage Spike Puller!

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

1. Preface

This manual aims to help you get to know your new Light Weight Two-Stage Spike Puller, 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	2021-11-17	New Manual

Table of Contents

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

1. Always wear protective equipment such as gloves, safety glasses, ear protection and safety shoes.

2. Do not wear clothing which may become entangled in the tool.

3. Always keep work area free of tools or any other objects which may impair sound footing.

4. 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..

5. Do not carry the tool by the pigtail hoses.

6. Never put your fingers or any other object near the jaws while the tool is connected to a power source.

7. Never use your fingers to dislodge a spike, even with the tool disconnected from the power source. There may still be pressure in the tool which could cause sudden movement of the jaws.

8. Never perform maintenance on the tool while it is connected to the power source.

9. Never exceed maximum tool flow rate or 2000 PSI pressure. Damage to tool or personal injury or death may result.

10. Never lean on tool or use it for prying.

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 Light Weight Spike Puller is twenty five percent (25%) lighter than our standard ver-sion. Weighing only 39 pounds, it generates the same pulling force of 13,000 pounds in a lighter design. A safe, internal two-speed design ensures operators grasp the spike with a slower speed, avoiding a jerking motion- common with most spike pullers. The safety trigger provides a positive lock that prevents accidental activation of the tool. Its efficient design enables the operator to grab the spike from either side of the rail without repositioning, yet allowing the operator to pull and automatically drop the spike at the top of the stroke in one motion. All moving parts are fully enclosed for safety and the jaws can be changed without special tools within minutes at the work site.

Fig 1.

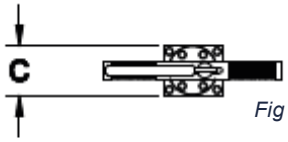


Fig 2.

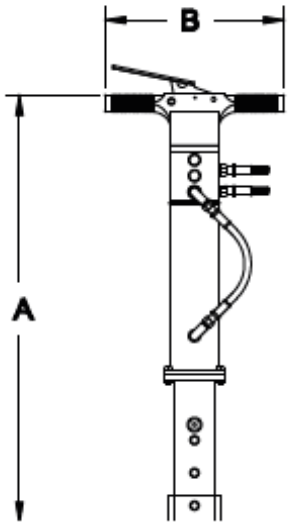


Fig 3.

Flow	**Pressure**	**Dimensions**	**Weight**
5 GPM (19 LPM) or 10 GPM (38 LPM)	2000 PSI (140 BAR)	A - 30" (76.2 cm) B - 13" (33 cm) C - 4" (10 cm)	39 lbs (17.7 kg)

Accessories:

01145 - Hair pin puller kit (See page 23 for details)

5. Operation

This tool is designed with integrated two speed operation. This permits safe, controlled pulling of spikes.

- 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 5 or 10 GPM to tool

NOTE!

- **With the handles positioned perpendicular to the rail (across the rail) and the lower tube assembly in the orientation as shown in the picture on the front page, the spike puller jaws are orientated to grab the spike on the elongated sides of the spike head. If operation of the tool is desired from the gauge or field sides of the rail, then the spike puller tube assembly can be rotated 90°. Failure to rotate the tube assembly can cause the jaws to not be properly aligned on the spike which will result in premature wear of the jaws.**

- Set the spike puller down on top of the spike to be pulled. Depress the trigger to grab the spike. This grabbing of the spike or loading operation is a low speed procedure internally designed to ensure safe control of the tool. The tool senses the load against the spike after seating and then speeds up to complete the pull. After the spike is pulled there is no resistance or load and then operation shifts back to low speed. When the tool cylinder reaches the top of the stroke the spike automatically drops out, release the trigger. Cylinder automatically extends into position for the next pull.

CAUTION!

- **Always maintain secure footing and use proper body position.**
- **Hold the tool away from your body and keep arms relaxed and free to flex, should minor jerking of the tool occur during operation.**

5.1. Applying lubricant to spike pullers

Observe the following steps when applying grease or lubricant on the spike puller ramps and jaws:

- Depress operating lever to retract jaws inside spike puller housing.
- Turn off hydraulic power to tool with operating lever still depressed. Disconnect tool from power source.
- Apply grease via grease fitting. One full movement of grease gun will provide sufficient grease to jaws and ramp bar. Keep hands clear of jaw area while applying grease.
- Reconnect tool to power source and turn on, jaws will return to down position. Cycle spike puller several times to assure an even coating of lubricant.

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. Trouble shooting guide

Problem	Remedy
Spike puller won't pull spikes:	• Spike driven too close to tie plate. • Worn spike puller jaws – replace • Tube ramps need lubrication – grease • Tube deformed and jaws will not grab spike • puller hangs in fully retracted position and will not release until power is • Shut off - inspect check valve • Check relief pressure on power supply – adjust to 2000 PSI • Trigger valve not depressing enough, causing loss of pressure – adjustor replace (check by installing test gauge in pressure side of spike pullerand depressing trigger and letting piston "dead head" at top of stroke,the pressure should equal the maximum pressure reading on the powerunit – approximately 2000 PSI).

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

	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	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**

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:

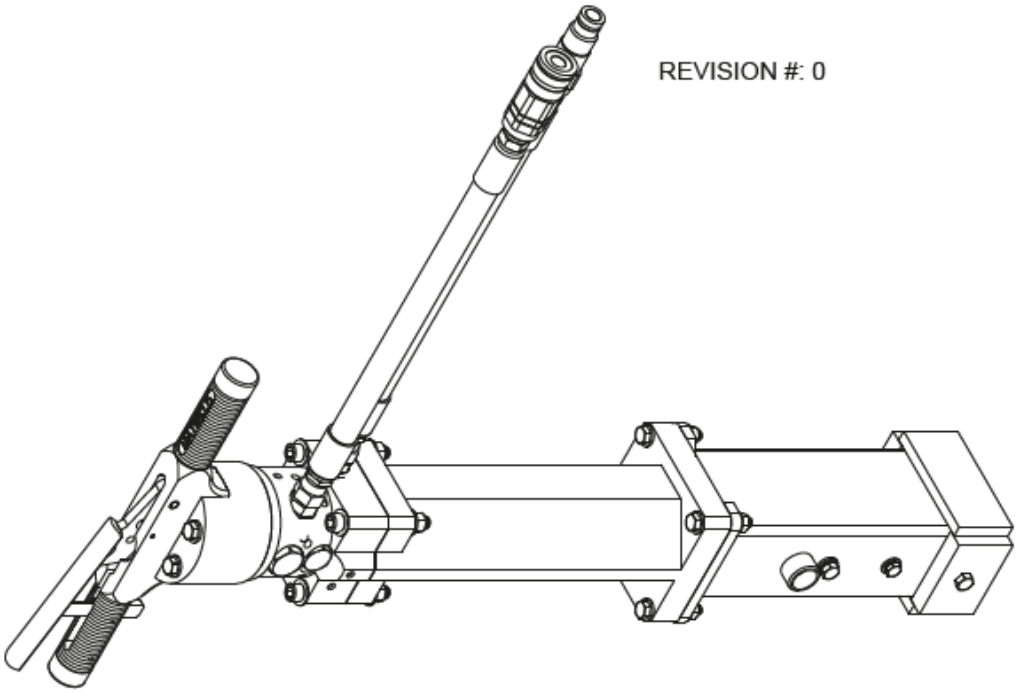
Hydraulic manifolds
Hydraulic test gauges
Hose reels
Hydraulic hoses

Accessories

Drill bits
Shear Blades
Saw Blades
Grinding Stones
Sockets

11. Assembly

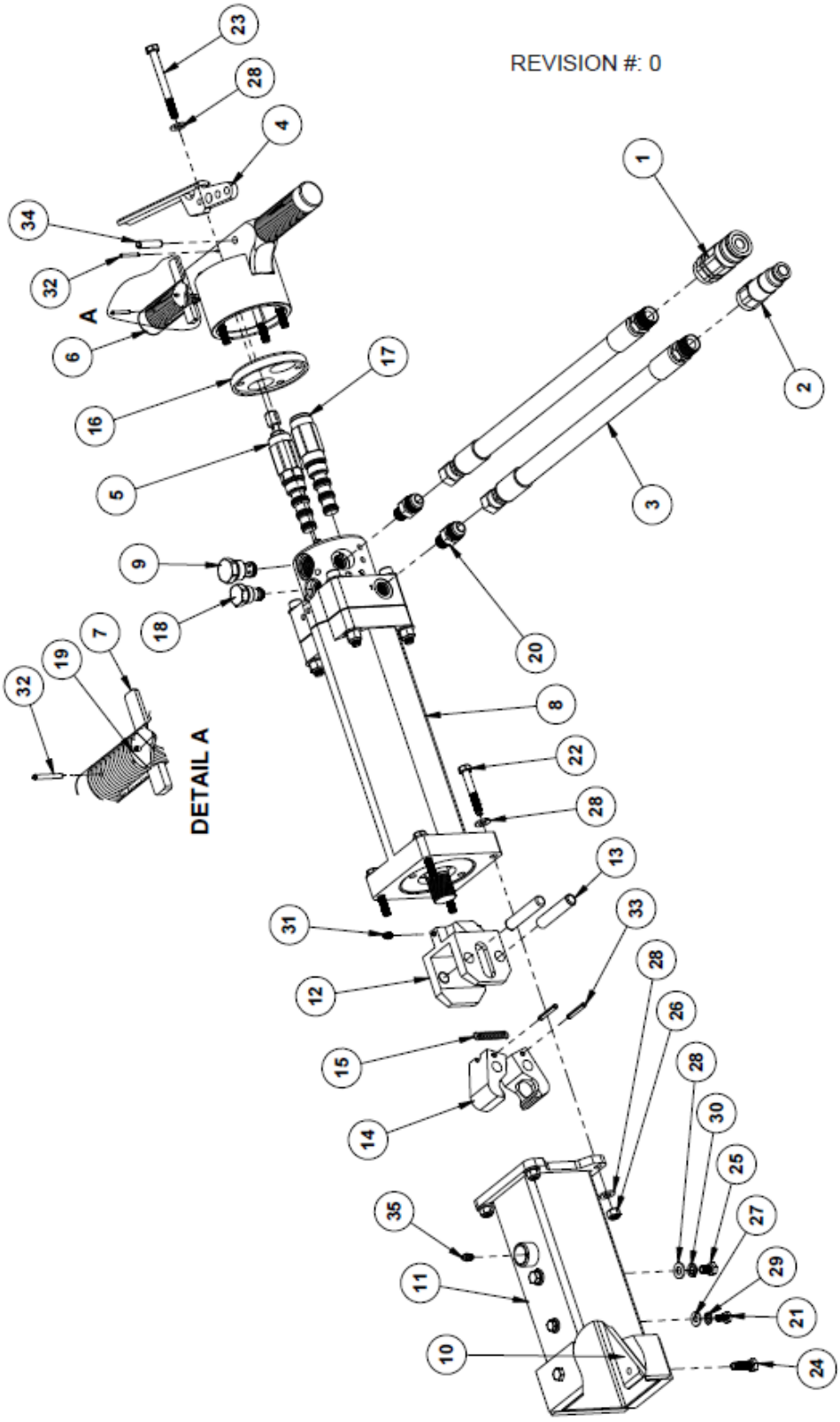
11.1. Parts list



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	00145	QUICK DISCONNECT COUPLER	1
2	00146	QUICK DISCONNECT NIPPLE	1
3	00816	PIG TAIL ASSEMBLY	2
4	01101	FABRICATED TRIGGER HANDLE	1
5	01102	TRIGGER VALVE	1
6	01103AS	SPIKE PULLER SAFETY HANDLE	1
7	01104	SAFETY LEVER	1
8	01105RM	LIGHT WEIGHT CYLINDER	1
9	01106	CHECK VALVE	1
* 10	01108-02	TUBE RAMP	2
* 11	01108-TUBE	SPIKE PULLER TUBE	1
12	01109	JAW BRACKET	1
13	01110	DIA. 1/2 X 2 1/2 DOWEL PIN	2
14	01111	SPIKE PULLER JAW	2
15	01113	SPRING	1
16	01160	HANDLE SPACER	1
17	01161	SEQUENCE VALVE	1
18	01162	FLOW CONTROL VALVE	1
19	046594	LOCK SPRING	1
20	6400-08-06	-08 JIC x -06 O-RING NIPPLE	2
* 21	A0995	1/4-28 x 1/2 HEX HEAD BOLT	2
22	A1026	5/16-18 X 2 HEX HEAD BOLT	4
23	A1031	5/16-18 x 3 1/4 HEX HEAD BOLT	4
* 24	A1033	5/16-24 x 1 HEX HEAD BOLT	2
* 25	A1035	5/16-24 x 1/2 HEX HEAD BOLT	2
26	A2048	5/16-18 NYLOCK NUT	4
* 27	A2190	1/4 SAE FLAT WASHER	2
* 28	A2191	5/16 SAE FLAT WASHER	14
* 29	A3809	1/4 LOCK WASHER	2
* 30	A3810	5/16 LOCK WASHER	2
31	A5607	1/4-20 x 3/8 DOG POINT SET SCREW	1
32	A6062	DIA. 1/8 x 1 SPRING PIN	3
33	A6080	3/16 x 1 1/4 SPRING PIN	2
34	A6108	DIA. 5/16 x 1 1/4 SPRING PIN	1
* 35	GF-101	1/4-28 GREASE FITTING	2

* SOLD IN 01108A TUBE ASSEMBLY

11.2. Parts diagram



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

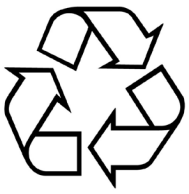
14. Recycling and Environment

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

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