PANDROL

Modular Power Unit

MODEL 02050RM

OPERATION AND MAINTENANCE MANUAL

ENG_OMM_MODULAR_POWER_UNIT_P01
19th November 2021

Partners in excellence

Thank you for choosing Modular Power Unit!

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

1. Preface

This manual aims to help you get to know your new Modular Power Unit, 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	2022-02-21	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

- 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.
- Do not operate the power unit until you have been properly trained or under the supervision of a qualified instructor.
- Never store engine oil or hydraulic oil near oxygen tanks or lines.
- Never add engine oil or hydraulic oil when a spill might come in contact with your oxygen lines, torch or fittings.
- Clean up spills immediately.
- Never perform grinding or sawing operations that direct sparks into the close proximity of the power unit or flammable materials.
- Never operate the power unit with any part of the exhaust system or the heat deflector removed.
- Periodically, inspect the fuel tank, fuel line and fittings for cracks or leaks and repair or replace as required.

- Avoid over filling the fuel tank; wipe up any spills immediately and properly dispose of the cleaning rags.
- Always turn power unit "OFF" and disconnect hoses before performing any maintenance.

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 Modular Power Unit is designed to be easily transported in two light-weight sections and it simply couples together for immediate use. It delivers 9 GPM of flow which will operate all critical hydraulic tools. Where size and weight are primary concerns, this unit is perfect for the job. Two compact sections allow for ease of getting into tight work locations while being lightweight and safe for operators to carry to the work site.

Fig 1.

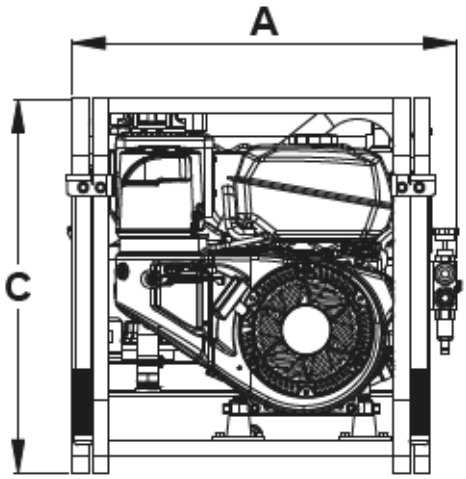


Fig 2.

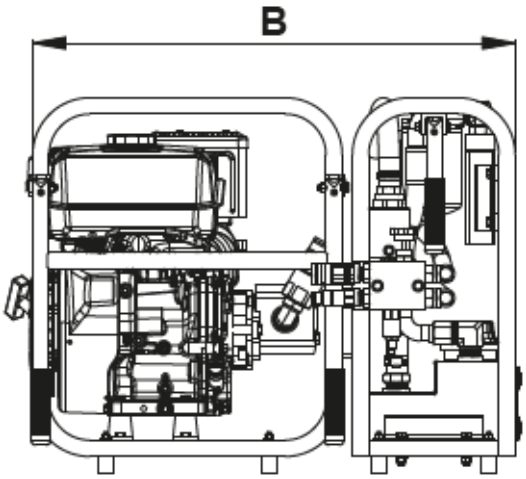


Fig 3.

Engine	**Flow**	**Pressure**	**Dimensions**	**Weight**
14hp kohler Fuel: Gasoline 7.4 Qts (7.0 L) Start: Pull	9 Gpm (34 lpm) Fluid: hydraulic 3.5 Us gal (13.2l)	2000 PSI (140 BAR)	A - 29 ½” (74.9cm) B - 23 ½” (59.6cm) C - 25” (63.5cm)	161 lbs(74 kg)

Weight-Engine Module	**Weighthydraulic Tank module**
100 lbs (45 kg)	61 lbs (27 kg)

5. Operation

Before starting the power unit, check all fluid levels. Add fuel, motor oil and hydraulic oil as required. The two sections of this power unit must be connected together by the associated hoses and interlocked prior to starting this modualr power unit.

WARNING!

- **Carbon monoxide can cause severe nausea, fainting or death. Avoid inhaling exhaust fumes. Engine exhaust gases contain poisonous carbon monoxide. Carbon monoxide is odorless, colorless, and can cause death if inhaled.**

The hydraulic lines that connect the power unit engine to the reservoir must be connected and the frames interlocked prior to starting the unit.

NOTE!

- **Choke position for starting may vary depending upon temperature and other factors. Once engine is running and warm, turn choke to OFF position.**

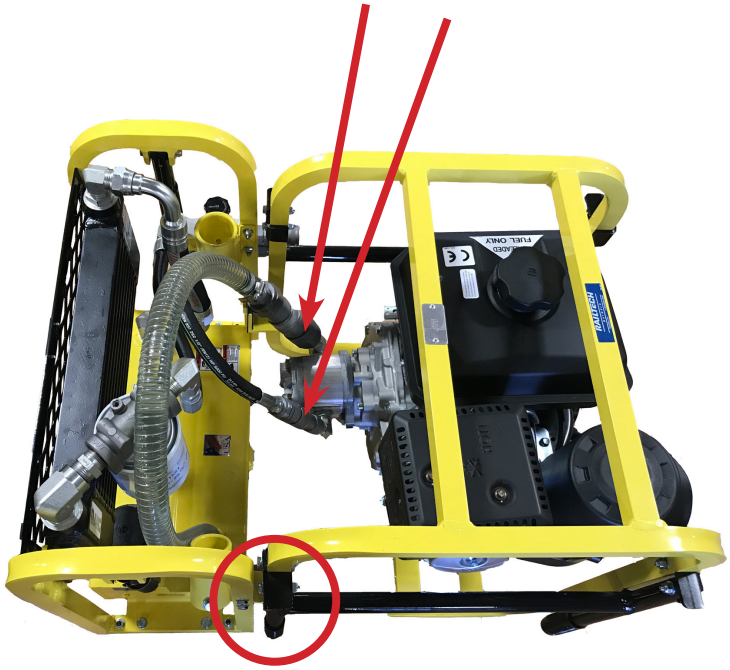
NOTE!

- **Extend starter cord periodically to check its condition. If cord is frayed have it replaced immediately.**

To start the power unit, check to make sure the hydraulic control valve is in the “OFF” position.

- Turn fuel shut-OFF valve to on position.
- Start engine as follows: cold engine: place throttle control midway between slow and fast positions. Place choke control into on position. Warm engine: place throttle control midway between slow and fast positions. Return choke to OFF position as soon as engine starts. A warm engine usually does not require choke on.
- Retractable start: slowly pull starter handle until just past compression-stop! Return starter handle; firmly pull straight out to avoid excessive rope wear from starter rope guide.
- Gradually return choke control to OFF position after engine starts and warms up. Engine/equipment may be operated during warm up period, but it may be necessary to leave choke partially on until engine warms up.
- Connection to the power unit: turn control knob to "OFF" position before attaching or disconnecting any transmission hoses to the power unit or tools. Turn control knob to "on" position to operate attached tools.
- To turn OFF engine, turn the fuel shut OFF valve to OFF position.

Hydraulic tank module connects by means of two quick disconnects into pump



Both frames join together using interlock tabs (one each side).

Close up of interlocking tabs that join the frames of
Hydraulic module to engine module (one each side).

5.1. Changing tools

- Always return the engine to “IDLE” and turn the control knobs to the "OFF" position before disconnecting hoses.
- Once the tool has been changed, advance the engine to “FULL” throttle and turn the valve(s) to the "ON" position depending on flow requirements of the tool to be used.

5.2. Cold weather operation

The power unit and tools will perform well in extreme cold weather if the warm-up procedures are followed. These precedures should be used anytime the temperature is below 40 degrees fahrenheit (4.4 C). In extremely cold climates, changing to an aircraft quality hydraulic oil (mil. Spec. H-5606) will reduce the warm up time required. When warm weather returns, be sure to change back to a higher viscosity hydraulic oil.

- Start the power unit and let it run until it is running smoothly with the choke OFF.
- Connect the power transmission hoses to the power unit and couple the power transmission hose tool ends together forming a “loop”.
- Turn tool control valve “ON” to circulate oil through the hose.
- When the oil reaches 50 degrees fahrenheit (10 C) you may begin to operate the tools.

NOTE!

- **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

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

$$HP = \frac{GPM \times PSI}{1714\ (.85)\ 1456.9}$$

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

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	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.

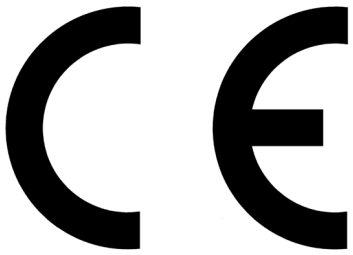
Contact Pandrol on a periodic basis, at least annually, for service Bulletins, safety notices, or other important information pertaining to this tool.

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**

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.



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7.3. Engine maintenance

Follow the hourly or calendar intervals, whichever occur first. More frequent service is required when operating in adverse conditions noted below.

- Check oil level every 5 hours or daily
- Service air cleaner every 25 hours or season*
- Change oil every 50 hours or season*
- Change oil filter and spark plugs every 100 hours or season*
- Service air cleaner cartridge every 100 hours or season**
- Clean cooling system every 100 hours or season**
- Replace in-line fuel filter every 50 hours or season
- Change oil after first 5 hours then after every 50 or season

* Change oil more often when operating under heavy load or high temperatures.

** Clean more often under dusty conditions or when airborne debris is present.

Replace air cleaner parts if very dirty.

It is very important that the service intervals are thoroughly followed to guarantee the safety and the performance of the machine

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:

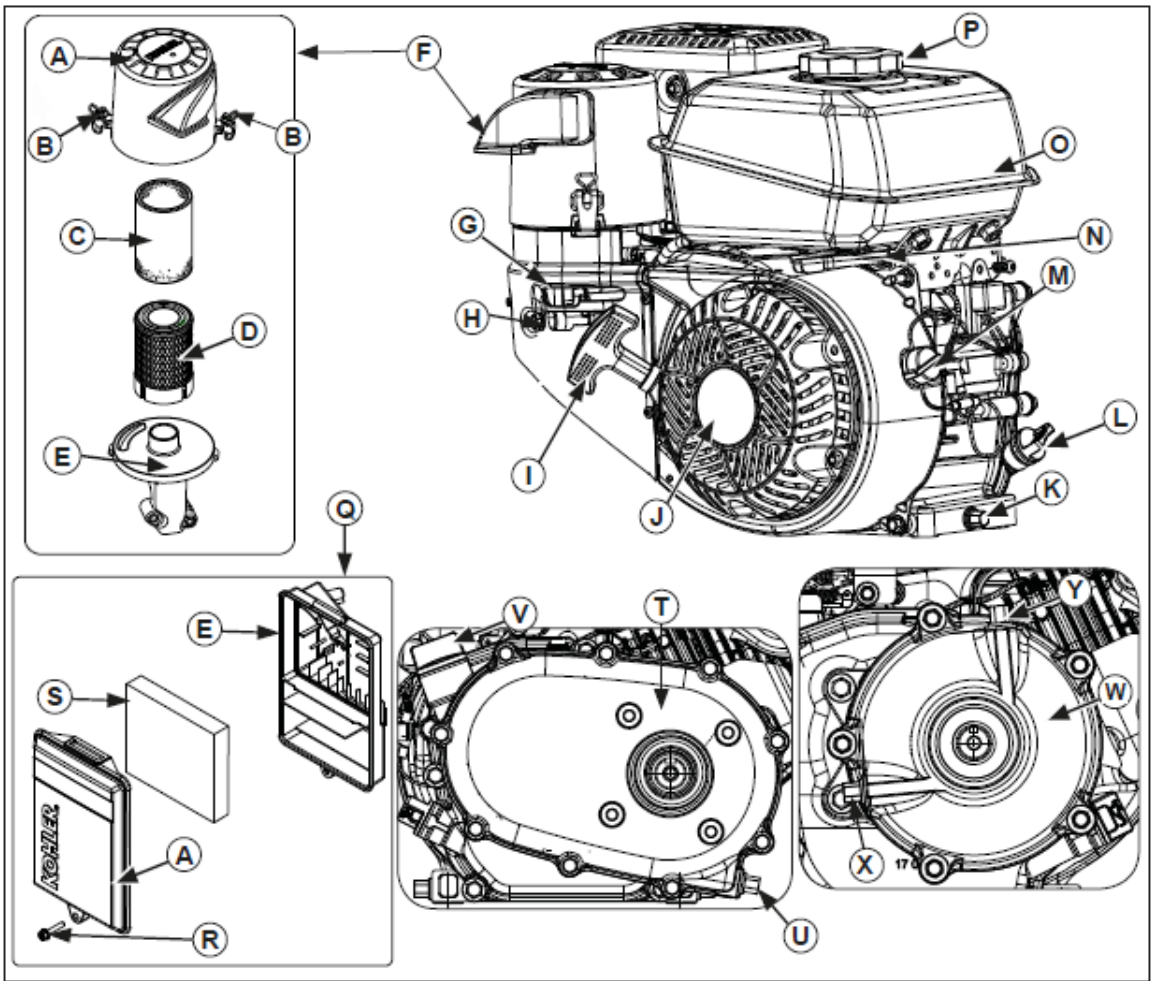
Hydraulic manifolds
Hydraulic test gauges
Hose reels
Hydraulic hoses

Accessories

Drill bits
Shear Blades
Saw Blades
Grinding Stones
Sockets

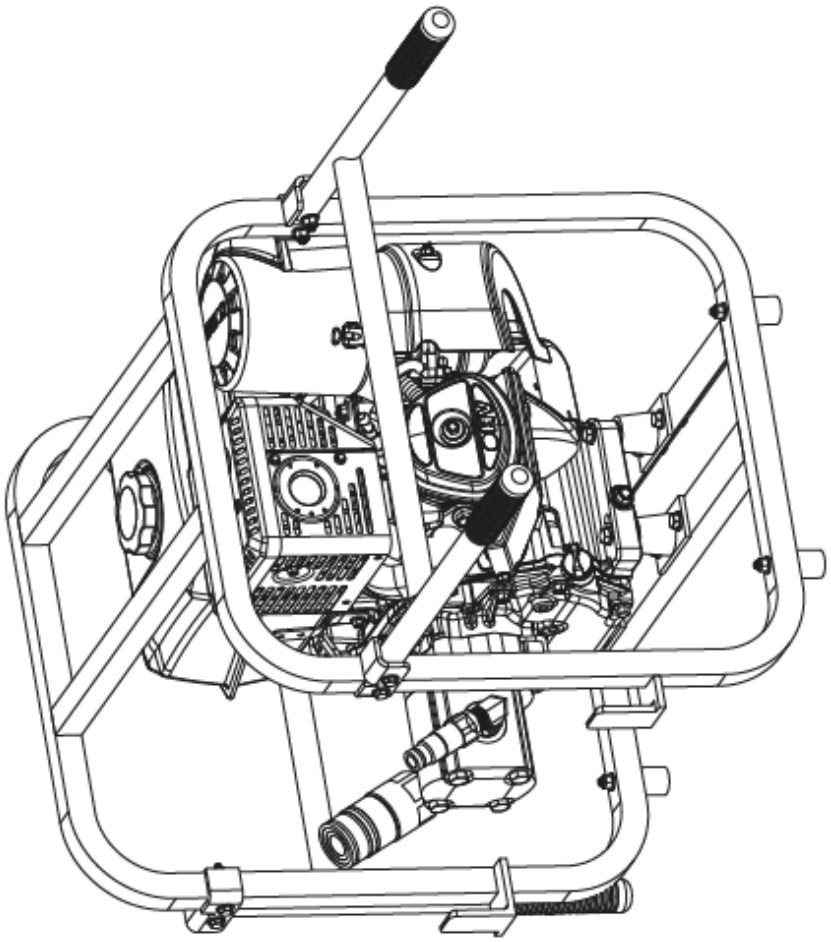
10. Assembly

10.1. 14 Hp kohler engine breakdown



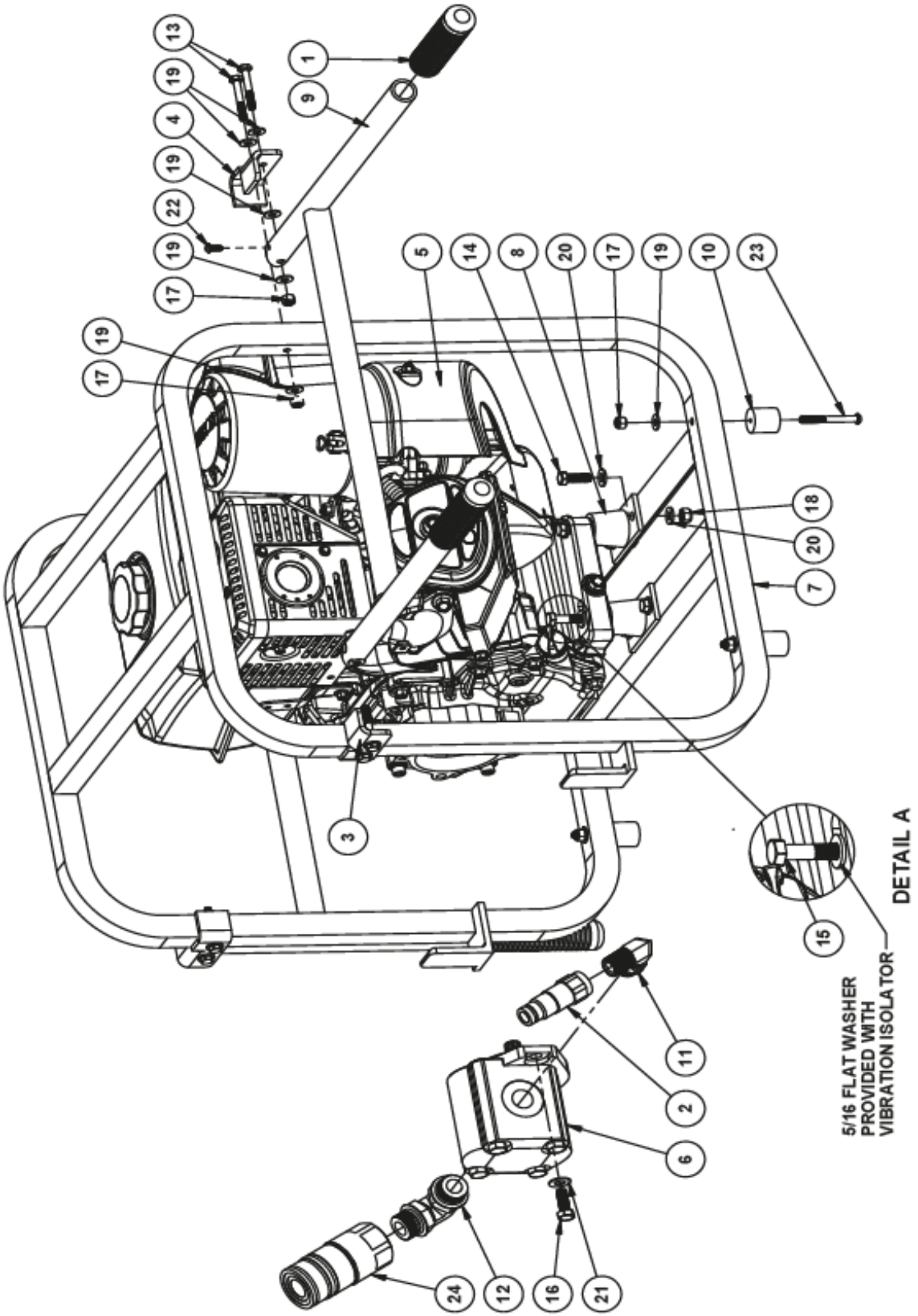
A	Air Cleaner Cover	B	Bail	C	Precleaner	D	Paper Element
E	Air Cleaner Base	F	Quad-Clean™ Air Cleaner	G	Choke Lever	H	Fuel Shut-Off (and Ignition, if equipped)
I	Starter Handle	J	Retractable Starter	K	Oil Drain Plug	L	Dipstick/Oil Fill Plug
M	On/Off Switch (if equipped)	N	Throttle Lever	O	Fuel Tank	P	Fuel Cap
Q	Low-Profile Air Cleaner	R	Screw	S	Foam Element	T	2:1 with Clutch Reduction System (CH270, CH395, CH440)
U	Drain Plug	V	Gear Box Dipstick	W	6:1 Reduction System (CH270)	X	Oil Level/Drain Plug
Y	Oil Fill Plug						

10.2. Engine module assembly



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	00106	GRIP	4
2	00146	QUICK DISCONNECT NIPPLE	1
3	00187	RIGHT HAND BRACKET	2
4	00188	LEFT HAND BRACKET	2
5	02008	ENGINE	1
6	02025	HYDRAULIC PUMP	1
7	02026	ENGINE FRAME	1
8	02039	VIBRATION ISOLATOR	4
9	02041	ENGINE LIFT HANDLE	2
10	03874	VIBRATION FEET	4
11	6806-10-08	-10 O-RING x 1/2 NPT 90 ELBOW	1
12	6807-12-12	-12 O-RING x -12 O-RING 90 ELBOW	1
13	A1005	1/4-20 x 1 3/4 HEX HEAD BOLT	8
14	A1022	5/16-18 x 1 HEX HEAD BOLT	8
15	A1024	5/16-18 x 1 1/2 HEX HEAD BOLT	4
16	A1042	3/8-16 x 1 HEX HEAD BOLT	2
17	A2046	1/4-20 NYLOCK NUT	12
18	A2048	5/16-18 NYLOCK NUT	8
19	A2190	1/4 SAE FLAT WASHER	24
20	A2191	5/16 SAE FLAT WASHER	16
21	A2192	3/8 SAE FLAT WASHER	2
22	A6325	#10-24 X 1/2 BHCS	4
23	A6363	1/4-20 X 2 1/4 BHCS	4
24	HQ19-F-12S	.75 FEMALE QUICK DISCONNECT NIPPLE	1

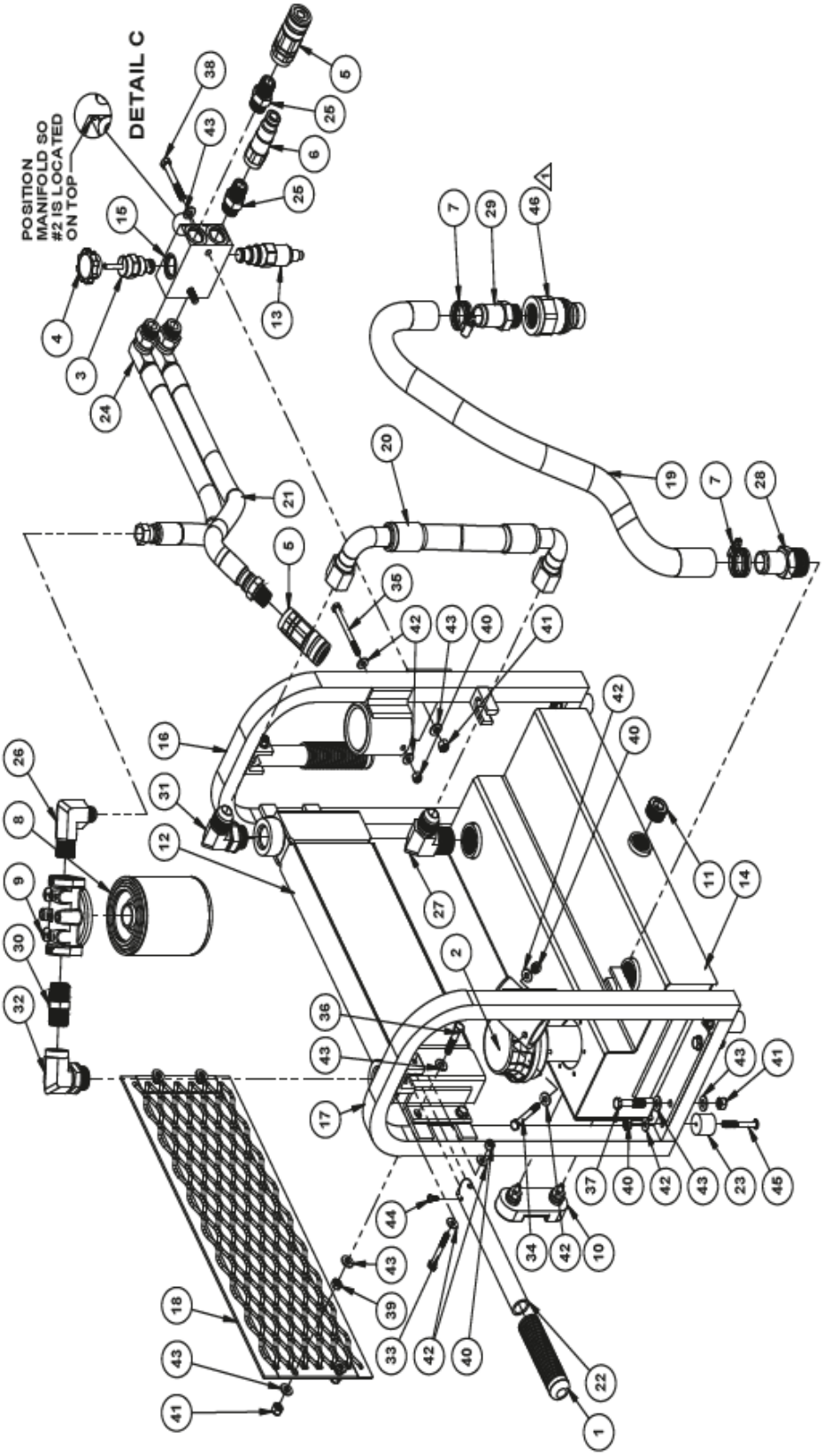
10.3. Engine module assembly breakdown



10.4. Hydraulic tank module assembly

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	00106	GRIP	2
2	00131	FILLER/BREATHER ASSEMBLY	1
3	00137	CONTROL VALVE w/KNOB	1
4	00138A	REPLACEMENT KNOB ONLY	1
5	00145	QUICK DISCONNECT COUPLER	2
6	00146	QUICK DISCONNECT NIPPLE	1
7	00147	3/4 - 1 1/2 HOSE CLAMP	2
8	00149	HYDRAULIC OIL FILTER	1
9	00160	HYDRAULIC FILTER BODY	1
10	00182	HYDRAULIC SIGHT GLASS	1
11	00197	3/4 NPT MAGNETIC PLUG	1
12	02027	C8 HYDRAULIC COOLER	1
13	02028	REGULATOR VALVE	1
14	02029	OIL RESERVOIR	1
15	02030	MANIFOLD	1
16	02031	RIGHT HYDRAULIC FRAME	1
17	02032	LEFT HYDRAULIC FRAME	1
18	02033	COOLER GUARD	1
19	02034	SUCTION HOSE	1
20	02035	COOLER TO TANK HOSE	1
21	02036	MANIFOLD TO QD HOSE	1
22	02042	HYDRAULIC LIFT HANDLE	2
23	03874	VIBRATION FEET	4
24	03931A	MANIFOLD TO FILTER HOSE	1
25	249-10-08	-10 O-RING x 1/2 NPT HEX NIPPLE	2
26	2501-08-12	3/4 NPT X -08 JIC 90 ELBOW	1
27	2501-12-16	-12 JIC X 1" NPT 90 ELBOW	1
28	4404-16-16	1 BARB x 1 NPT	1
29	4604-16-12	1 BARB x -12 O-RING	1
30	5404-12-12	3/4 NPT HEX NIPPLE	1
31	6801-12-12	-12 O-RING x -12 JIC 90 ELBOW	1
32	6805-12-12	-12 O-RING x 3/4 FEMALE NPT 90 ELBOW	1
33	A1006	1/4-20 x 2 HEX HEAD BOLT	2
34	A1008	1/4-20 x 2 1/2 HEX HEAD BOLT	1
35	A1010	1/4-20 X 3 HEX HEAD BOLT	1
36	A1024	5/16-18 x 1 1/2 HEX HEAD BOLT	4
37	A1025	5/16-18 x 1 3/4 HEX HEAD BOLT	4
38	A1027	5/16-18 x 2 1/4 HEX HEAD BOLT	2
39	A1452	5/16-18 HEX JAM NUT	4
40	A2046	1/4-20 NYLOCK NUT	8
41	A2048	5/16-18 NYLOCK NUT	10
42	A2190	1/4 SAE FLAT WASHER	12
43	A2191	5/16 SAE FLAT WASHER	24
44	A6325	#10-24 X 1/2 BHCS	2
45	A6363	1/4-20 X 2 1/4 BHCS	4
46	HQ19-M-12S	.75 BODY QUICK DISCONNECT COUPLER	1

10.5. Hydraulic tank module assembly breakdown



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

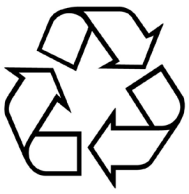
13. Recycling and Environment

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

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