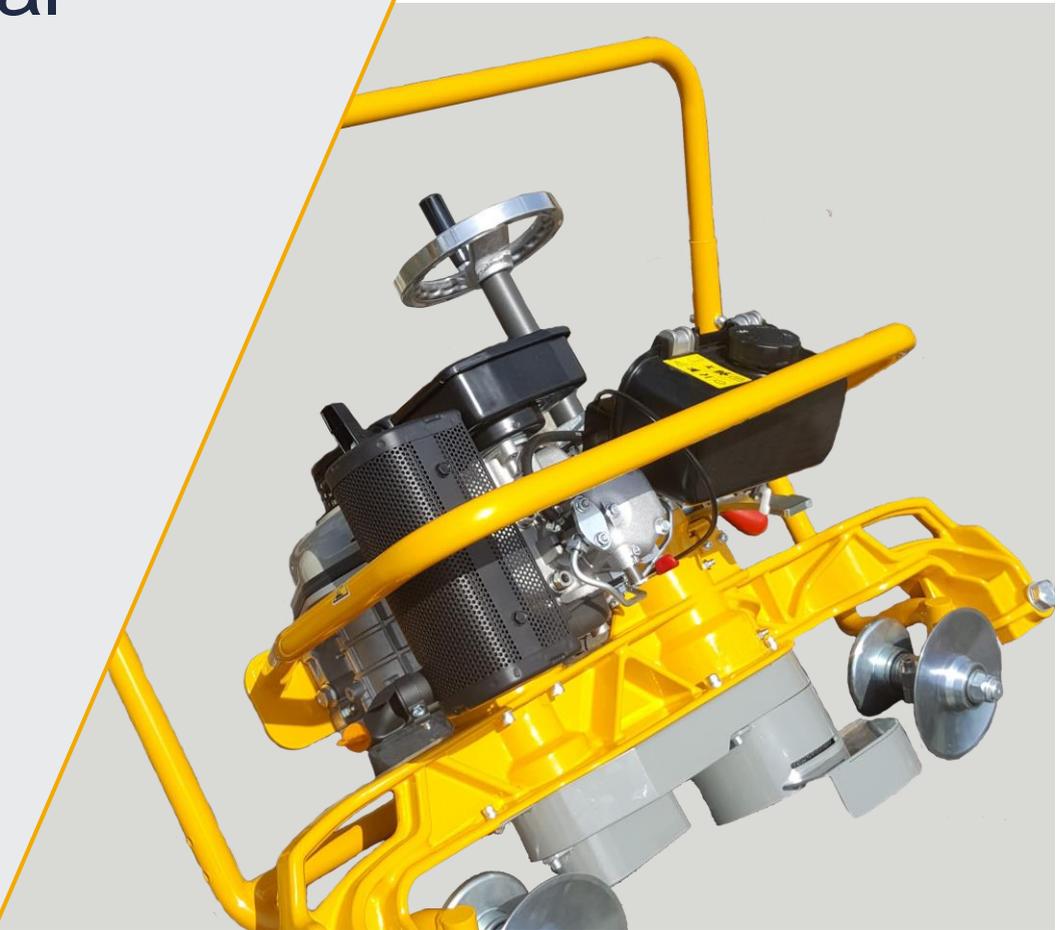


PANDROL



User Manual

GAMMA GRINDER



Revision 01

Partners in excellence



Revision History

Version	Date	Author	Comments
01	22/05	CHA	First edition

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8. Conformance to gauge

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1. Explanation of symbols



DANGER

it refers to dangers dealing with the described activity. When there is “DANGER” we refer to activities that could occur while using the machine and could endanger people.



ATTENTION

it refers to dangers dealing with the described activity. When there is “ATTENTION” we refer to activities that could occur while using the machine and could endanger the machine.



WARNING

We refer to integrations or suggestions for a correct use of the machine and to illustrate basic characteristics.

1.1 Security’s pictograms

Pictograms inside a triangle indicate DANGER.

Pictograms inside a circle impose a PROHIBITION/OBLIGATION.

Pictograms	Description
	Danger electric tension.
	Arms crushing.
	Hitching on.
	Dragging.
	Generic danger.

Pictograms	Description
	No entry for not authorized personnel.
	Don't remove security devices.
	Don't clean, oil, grease, repair or adjust working parts by hand.
	Don't execute works before remove tension.
	Obligatory protection gloves.
	Obligatory safety footwear.
	Obligatory safety helmet.

1.2 Unified symbols on the machine

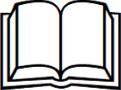
Unified symbols that follows indicate danger operation or situations that could occur while using the machine.

ATTENTION



If the decals (illustrated above) are not legible, you have to substitute them with new ones.

Table 1: Unified symbols and meanings

Meaning	Symbol
This symbol indicates that you have to consult the manual.	
This symbol is applied near grip devices for lifting.	
This symbol indicates burn danger due to high temperature near thermic engine (silencer, manifold, etc)	
This symbol is applied next to the fuel's tank's socket with mixture engine	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center; color: red; font-weight: bold;">MIXTURE 4 %</div>
This symbol is applied next to the fuel's tank's socket with petrol engine	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center; color: red; font-weight: bold;">PETROL</div>
This symbol is applied next to the fuel's tank's socket with diesel engine	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center; color: red; font-weight: bold;">DIESEL</div>

2. General safety instructions

2.1 General warning

- The machine could be used on rails with a maximum banking of 200 mm, and a maximum slope of 4%.
- If you lean to the ground the machine, it remains bridled avoiding run away movements or if you use on sloping ground the machine must be used with a safety lanyard to avoid accidental runaway.
- The operator and all the personnel that interact with the machine must be equipped of specific individual protection's devices (DPI).
- Machine's movement and use are reserved only for personnel in charge.
- Before starting the engine, make sure that the throttle of the engine is a little more than the minimum, and that the grindstone is in the fully raised position.
- Before starting the movement, you have to ensure that in the sphere of activity of the machine there aren't people. If you need, signal the start of the operation.
- You constantly have to check the working area to identify dangerous situation as an area where means or people pass.
- Before performing maintenance operations, stop the engine
- Perform fuelling only with off engine
- Don't use the machine in a room or close place to avoid inhaling poison gases.
- Never work without the protection of the grindstone and without the protective cover of the pulleys
- Gradually lower the grindstone down until it is close to the working area avoiding sharp blows to the cup grindstone
- After the cup wheel replacement, make the machine idle (without grinding) at working rotation speed for 5 minutes
- Don't move the machine with on engine.
- Avoid make the cup grindstone to be close to any material to avoid that this one is thrown
- Lift the machine with care and only throughout the special prone handles.
- Adequately light the working area.

ATTENTION



It is impossible to list all the possible safety rules, so we entrust operator good sense, who, if he works with care and caution, guarantees the best safety against every kind of accident.

2.2 Environmental conditions

The machine in standard configuration is designed to be used in these environmental conditions:

- Work temperature: -10° C + 40° C

ATTENTION



It is forbidden the use of the machine in standard execution in areas that are different from the listed above.

2.3 Prohibited uses

- Use the machine for aims that are different from those it is designed for
- Not correctly or moved and started according to its safety/service rules
- Carelessness and/or absence of maintenance as prescribed or use of non-original spare parts
- Use of the machine out of allowable environmental conditions
- Use the machine with excluded or damaged safety devices
- Use the machine modified in any of its parts without a written PANDROLI authorization
- Use of the machine on rails without respect the rules of the railway body owner of the railway
- Use of the machine on rails open to traffic
- Use of the machine on track circuit
- Use the machine in presence of a third rails
- Use the machine in presence of inclination superior or equal to 4%
- Go away from the machine leaving the engine running - Not under the influence of drugs or alcohol.

2.4 Allowed uses

- Use the machine built only with the compatible equipment, in specific working conditions.
- Use the machine only on non-open traffic rails.

2.5 Care and maintenance

To execute maintenance and repairs, you have to move the machine in a place authorized by the team leader of the yard.

To maintain the machine clean, never use liquids easy flammable and corrosive products.

Stop the engine before every repair, maintenance and fuelling work. After fuelling screw on the top of the tank. Avoid fuelling with hot engine. If necessary, leave the maximum level at $\frac{3}{4}$ of its capacity.

If the fuel leaks don't start the engine but clean the area tainted by the fuel. Periodically verify that there aren't fuel leaks. In case of any leaks or bad functioning stop the machine and repair when the engine is cold.

Observe the normal fire rules and fuelling with engine off, always keeping in mind tank's capacity to avoid fuel spilling, in particular with hot engine.

Execute check and maintenance work prescribed according to the engine's maintenance table, as well as all the little repairs and check tightening of bolts.

The eventual lifting of the machine should be made only using the handles. For the maintenance is fundamental the use of suitable tools.

ATTENTION



It is impossible to list all the possible safety rules, so we entrust operator good sense, who, with care and caution, guarantees the best safety against every kind of accident.

2.6 Residual risk

Dangers that couldn't be deleted from safety measures adopted by the manufacturer couldn't be caused by an incorrect use of the machine or by a failed respect, due to the user, of the rules described in this manual.

The personnel in charge of the machine must be equipped of specific individual protection's devices required by law.

ATTENTION



During every kind of work pay attention of high voltage line, if you are next to them could cause DEATH.

2.7 Required operator's training

Every operator must read entirely with full attention this manual and respect what is written.

The Employer is obliged to verify that the operator owns all the abilities required for the operation of the machine and has carefully reviewed the manual and has to give to machine's user devices for personal protection (gloves, shoes, clothes, etc.) according to rules in force.



The endothermic engine and the parts near it reach high temperatures during the operation of the machine that may cause severe burns. Use extreme care not to come into contact with these parts.

2.8 Noise

The level of pressure and acoustic power that follows have been done with the machine's engine at the maximum speed.

Level of acoustic pressure continue equivalent thought out LPA in the workplace at 85dB (A)

Level of acoustic power continue equivalent thought out LWA in the workplace at 100 dB (A).

2.9 Expected use

The machine has been designed and made by PANDROL for rail grinding and profiling.

There must be carefully respected safety prescriptions passed from Railway Administrations for works on rails and near them. You have to start working only after the officials in charge for safety have given their go ahead.

You have quickly and carefully executed the guidelines conveyed by the Site Manager or the safety responsible. Always leave devices and material in a way that these ones can't collide with other railway vehicles. In case of use in the presence of the third rail, it is essential to make sure that the third rail is isolated otherwise do not work.

2.10 Not expected use



Not observe the prescribed limits is equivalent to an improper use of the machine. If this happens, PANDROL will not assume any liability for accidents to persons or damage to property or the machine itself.

2.11 Safety work

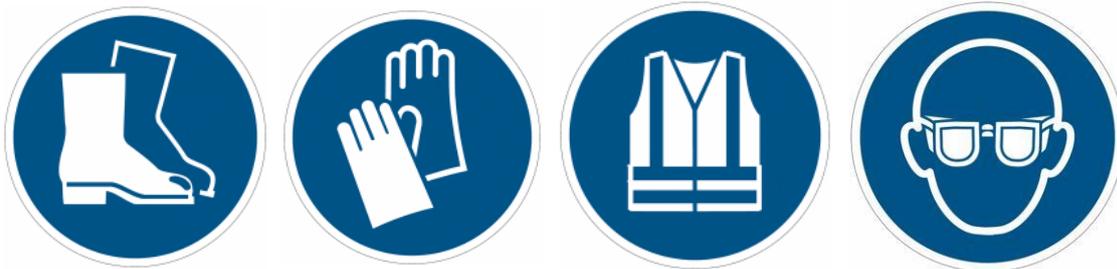
Pandrol doesn't answer for accidents, working's anomalies and/or damages during the machine's use, due to user's nonobservance of laws, prescriptions, dispositions and rules in force.

The use of the machine is allowed only at the trained personnel. Only authorized people can stay near the machine. You have always to stay by safety distances from mobile parts and check that during its work normal safety prescriptions are respected. You always have to assure that advertisement given to other people are understand and executed.

Dangers that couldn't be deleted from safety measures adopted by the constructor couldn't be caused by an incorrect use of the machine or by a failed respect, due to the user, of the rules described in this manual.

2.12 Prevention of accident risks during work

- Check the wheel rotation speed is compatible with the machine speed
 - Grinding wheel diameter : 150 mm
 - Min. speed : 3600 rpm
 - Thickness : 70 mm
 - Fastening : 4 x M8 sunk thread inserts
- Stop the engine before replacing the grinding wheel.
- Never use damaged grinding wheels.
- Any new or reassembled grinding wheel must be run at idle for 30 seconds; personnel must be kept at a distance during the test, except for the operator who must hold the machine in such a way that he/she is outside the safety guard opening side.
- Measure the grinding wheel rotation speed at regular intervals, and imperatively every time the machine is repaired.
- Check the tightening of the grinding wheel in order to prevent any accident during grinding.
- Fix and tighten the safety guard before operating the grinder.
- Replace the safety guard if a grinding wheel bursts.
- Store the grinding wheels in a dry place.
- Wearing personal protective equipment is mandatory



2.13 Precautions before commissioning

Refer to the instructions of the engine manufacturer

Check the oil level of the engine on a daily basis.

3. Presentation

3.1 General

The rail grinding machine is a machine with a mechanical function for the grinding of the rail head after the weld. The machine is made of a strong aluminium frame which supports a thermic or an electric engine that throughout a V-belt transmits the movement to the chuck equipped with a cup grindstone. A steering wheel allows to adjust the vertical position of the grindstone. Clockwise increases the penetration of the wheel counterclockwise decreases it. A lever blocks the movement of the steering wheel. On the two ends of the frame there are two rollers that allow the longitudinal displacement of the machine, two side supports that ensure the stability of the machine during the grinding operation when the set angle varies on the railhead.

The machine is equipped with a handlebar in order to allow the operator the grinding operations of the upper part of the rail head or of the side of the rail head, tilting the machine and having full control of the same. The protected action of the grindstone ensures operator safety.

Table 2: General characteristics

ENGINE	YANMAR
*4 stroke engine	(3.3 Kw) at 3600 rpm
*Wheel rotation speed	3600 rpm
*Reference wheelbase	935 mm
*Weight	71 Kg
*Size	1000 x 840 x 990 mm
Vibration level at the handle	2.5 m/s ²
*Sound pressure	85 dB
*Sound power	99 dB

3.2 Components

- Kickstand. The machine is equipped with a kickstand to park it on the ballast, sleepers and on the ground. Turn the machine towards the operator with the appropriate lever to make sure that the same is in a safe position. The kickstand must be planted in the ground, as in the figure below and in a suitable position in order to maintain safe the machine and the personnel near it.

Figure 1: Machine components



DANGER



The operator should never leave the machine while the engine is running.

- Engine protection. The machine is equipped with a strong steel protection which protect the engine compartment and the fuel tank from any accidental drops.

4. Use

4.1 Transport and movement

The lifting of the machine can be done only by using highlighted devices' grips that are on the machine.

During the movement, the machine must be located in a position as in the picture.

ATTENTION



Lifting operations have to be done with engine off.

It is forbidden to lift the machine hooking it from the handlebar.

We recommend to use expected personal safety devices as: gloves, safety footwear with steel toe and overalls.

DANGER



Bump and crushing danger. During the lifting and moving you have to operate carefully.

Figure 2: Rest position



4.2 Handling

- The weight of the grinder in order to work is 77 Kg.
- For its handling four persons are recommended, one at each handle at the two extremities and a third at the handle in the middle of the machine.

Figure 3: Weight distribution



4.3 Starting up the engine

At the first start of the machine you have to execute checks that follow:

1. Verify that the machine has:
 - a. - Declaration of conformity CE
 - b. - Engine Use and Maintenance's manual
 - c. - Engine's manual (where expected)
 - d. - Equipment's handbook
2. General visual check of the machine
3. Check and verification of the presence of identification's plate and of safety labels
4. Check and verify oil level in the engine
5. Check and verification of:
 5. Fuel' s level.
 6. Machine's operation buttons on the switchboard.
 7. Verify electric cables' status (check the eventual presence of scratches, weakens, spelled wires or shealts, etc.)
 8. Check the functionality of safety and emergency devices
 9. Check commands and indicators' efficiency
 10. Varnishing's check
 11. Execute a functioning's test to idle in every expected operative condition
 12. After executing tests verify if there are lacks
 13. Operate the machine only after an adequate warming-up period.

ATTENTION



Before starting the machine, the operator in charge has to read completely this manual

4.4 Checks at the beginning of every working day

Before the start of every working day you have to check:

1. General check of the machine in particular verify if there are liquids' lacks (fuel, etc.)
2. Verify the electric cables (check the eventual presence of scratches, weakens, spelled wires or shealts,etc)
3. Check the functionality of safety and emergency devices
4. Check commands and indicators' efficiency
5. Varnishing's check
6. Verify fuel level

If one or more described points are damaged, don't use the machine and provide for re-establish the machine in efficiency conditions.

If there are any anomalies that the operator couldn't solve, contact PANDROL.

4.5 Protection and storing

When it is expected that the machine has to remain idle for a quite long period, it is necessary to take precautions to preserve machine's functionality.

ATTENTION



When you store the machine, you have to close the fuel cap and locate the machine with the engine head facing upward.

Figure 4: Good storing position



Figure 5: Wrong storing position



4.5.1 In preparation for a short inactivity

1. Put the machine in a way that can guarantee an adequate safety.

4.5.2 Storing and preparation for a long inactivity

As above, also:

2. Clean the air filter of the engine
3. Protect the muffler to avoid that foreign bodies could enter
4. Cover the machine with a protective oil.
5. If possible, store the machine in a covered place, dry and non-dusty, or protect the machine with a plastic sheet to avoid storm damages

4.5.3 Reclamation after a long inactivity

As above, also:

1. Carefully clean the machine
2. Remove the protection on the muffler
3. Verify fuel's level
4. Open the tap of the fuel tank
5. Start the engine and idle it for some minutes
6. Check the functionality of safety and emergency devices
7. Check commands and indicators' efficiency

4.6 Lifting the machine

Use lifting points shown by arrows below.

Figure 6: Lifting points



ATTENTION



Lifting operations must be carried out not using the engine. We recommend to use expected personal safety devices as: gloves, safety footwear with steel tip and overalls.

DANGER



Bump and crushing danger. During the lifting and moving you have to operate carefully.

4.7 Machine's removal away from rails

Removal operation of the machine from rails must be done this way:

1. Switch off the machine.
2. Lift the machine using lifting points.

The necessary time to do the machine's removal manoeuvre from rails is approximately 40 seconds, in normal operative conditions. The number of necessary operators for machine's removal from rails is at least 2.

ATTENTION



Lifting operations must be done with engine off. We recommend to use of personal safety devices as: gloves, safety footwear with steel toe and overalls.<Insert key message text>

5. Machine's use

5.1 How to use the machine

Figure 7: General machine view



Figure 8: Machine description 1



Figure 9: Machine description 2

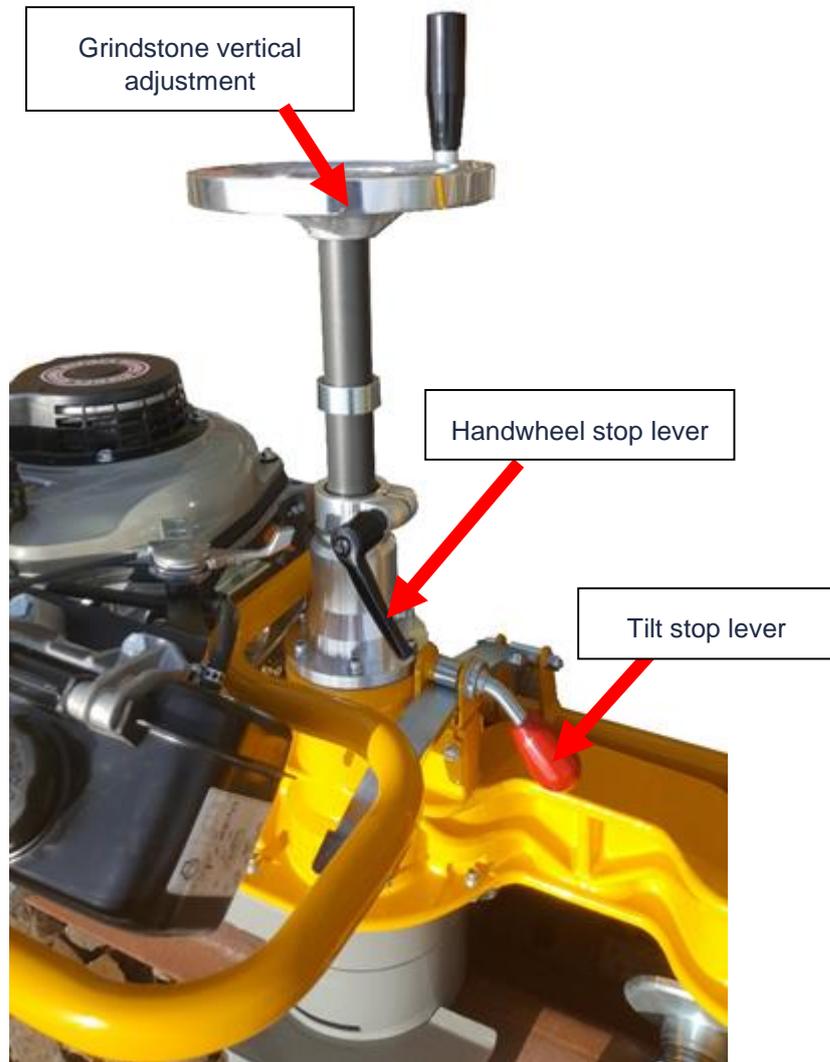
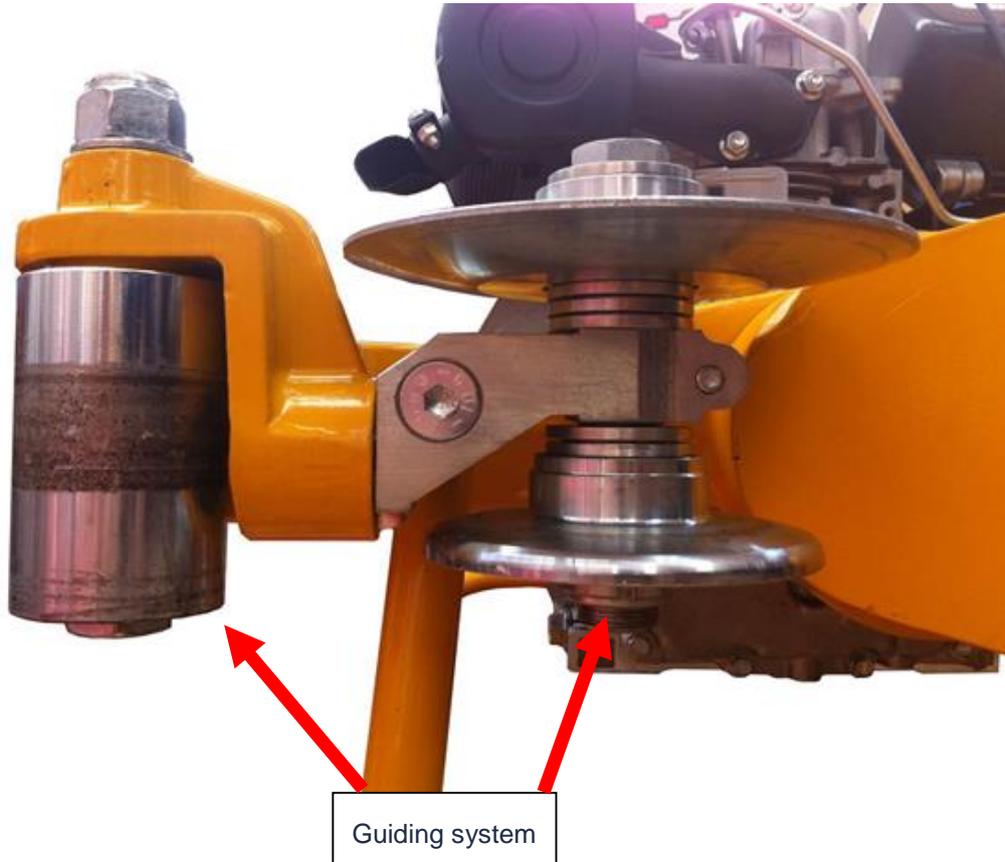
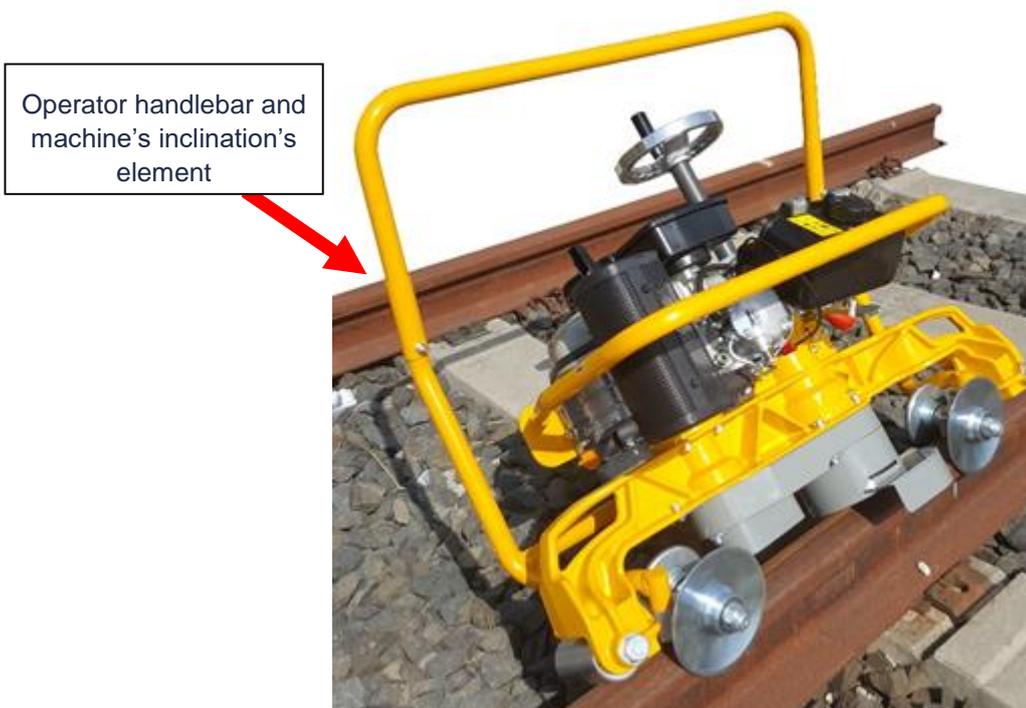


Figure 10: Machine description 3



- Verify the integrity of the steel sparks guard .
- Place the machine on the rail to let it run freely on the head, lay both rollers on the rail and drive supporting laterally the machine through the operator handlebar
- Start the engine (see engine instructions). Regarding the MPR 4000 E version, you have to push the green START button.
- Start grinding the welded part of the rail, moving the machine in oscillatory way during the process. If the grinding of the weld isn't enough you have to increase the penetration of the grindstone throughout the special steering wheel. A complete run of the wheel corresponds to 2,5 mm of displacement of the grind stone. To unlock the wheel you must use the wheel blocking lever. The weld on the rail will become smooth when you reach the same level of the rail before and after the weld.
- It's possible to tilt the machine of 90° (polishing stone perpendicular to the part to grind) and in this new position you can grind the internal and external part of the head rail. With the block tilting lever you can adjust the tilting of the machine respect to the operator handlebar, so as to allow the operator to maintain the best working position. The block oscillation lever of the machine must be used in the following way:

Figure 11: Machine description 4



- Turn the lever, when finished the free angle, lift the handle following its axis, turn it and release the handle which, thanks to an internal spring, returns into its place to be ready to continue to screw and unscrew.
- Apply the screwing and unscrewing torque to the handle only after it is returned in its place not to endanger its operating. Simply loosen the screw to tilt the machine.
- It is wrong to loosen the lever almost completely and then tilt the machine.
- It is wrong to tilt the machine towards the opposite side of the operator.
- Before turning the machine, to grind the external part, you have to lift up the smoothing stone in the highest position, and once you've turned the machine the grindstone will gradually go down.
- The handlebar allows to steer the machine in safety and with extreme precision.
- Once finishing the grinding of the rail, you have to switch off the machine bringing it to the minimum and moving the selector in off position.

Figure 12: Wrong tilting operation



Figure 13: Tilting operation



Figure 14: After tilting operation



ATTENTION



Execute the oscillation of the machine from vertical position to inclined position and vice-versa slowly and in a controlled way, this allow the internal lubrication of the engine to operate in the best way slightly increasing the life of the engine and of the machine.

ATTENTION



The machine must always be used with the engine head positioned upwards or in a horizontal position.

5.2 Rotation of the machine during use

For working on the opposite profile with respect to the positioning of the machine, rotate the machine, taking care to completely lift it from the rail, using the appropriate handles. The number of operators necessary for removing the machine from the rail is at least 2.

Figure 15: Handles positions



ATTENTION



The machine must not be rotated using as a fulcrum point the rolls on the rail, this can damage the bearings of the machine.

ATTENTION



The structure of this type of machine, requires special attention during grinding. In the event of improper use of the above listed, PANDROL is not liable for any problems and / or malfunctions.

Figure 16: Not allowed operation 1



Figure 17: Not allowed operation 2



Figure 18: Not allowed operation 3



ATTENTION



Tilt the machine from the vertical position and vice versa in a slow and controlled way. In this manner, the internal lubrication of the engine will be able to operate in an optimal way, significantly increasing the engine and the machine life.

ATTENTION



The machine must always be used with the engine head pointing upwards or in a horizontal position.

5.3 Refuelling

Always consult the engine use manual to identify the correct fuel to use.

Engine tank has to be filled throughout the socket indicated on the tank and indicated on the machine by

After fuelling close the tap of the fuel tank. Avoid spilling fuel on hot engine. If necessary leave the maximum level at $\frac{3}{4}$ of its capacity.

If the fuel leaks don't start the engine but clean the area effected by the fuel. Periodically verify that there aren't leaks of fuel. In case of any anomaly or bad functioning stop the machine and repair when the engine is cold.

Observe the normal fire rules when adding fuel with engine off, always keeping in mind tank's capacity to avoid leaks of fuel, in particular with hot engine.

DANGER



Petrol is extremely inflammable and explosive. A fire or an explosion could burn you and others.

Fill the tank in open space, at cold engine, and clean the accidental leaks or spills.

Do not handle petrol near to free flames or sparks.

ATTENTION



The structure of this kind of machine needs a particular care during fuelling operation.

For the approach to fuelling's points, use only scales that refers to safety guidelines given from D.Lgs 81/2008.

If the fuelling is done throughout cans, remember that the capacity of each can has to be of a maximum of 25 l.

5.4 Grindstone substitution

For the replacement of the cup grindstone you have to remove the grindstone protection's block, bring down the grindstone with the wheel to insert the 24 mm hexagonal wrench to take firm the shaft. Remove the grindstone with a 5 mm socket-head screw, unlock the 4 screws and install the new grindstone by reversing the procedure. Tighten the screws of the grindstone and raise it with the wheel. Reassemble the grindstone protection's block.

Then you have to assure throughout soft hits the sound that the stone gives off, it must be the characteristic sound of a compact mass.

Assemble the grindstone in the machine and idle the engine for 5 minutes at working speed without grinding. Ensure the integrity of the spark protection block.

5.5 Adjustment of the belt tension

For the correct functioning of the machine and to avoid the early damage of the engine transmission's belt, it

Figure 19: <Insert Figure Title here>



should be run at midrange rpm.

The machine is equipped with an automatic belt-tension system.

5.6 Tensioning

- Loosen the screws of the belt tensioner with a 5 mm wrench;
- Remove the carter of the belt tensioner;
- Loosen the screw TE M10 of about 7 mm for removing the belt tensioner from its location. In this way, the tensioner can be removed from the anti-rotation pin in the carter of the belt and it can rotate around the axis of the screw;
- Use the CH24 wrench on the hexagonal nut CH24 that is below the locking screw as above;
- Rotate the wrench clockwise, until the white sign in the tie reaches the green part (look at figures 1-3 and 1-4);
- At this point, push the tensioner to the belt carter so as maintain into position the anti-rotation pin;
- Tighten again the screw TE M10 with an hexagonal screw CH17.

Figure 20: Belt tensioning 1

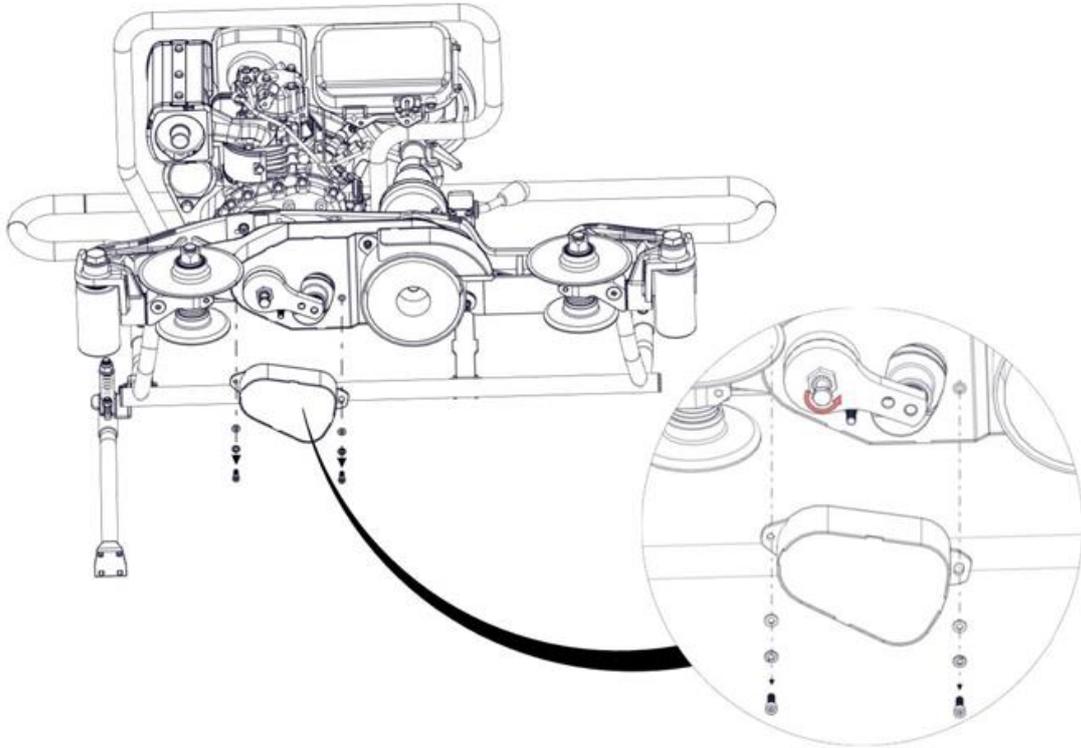
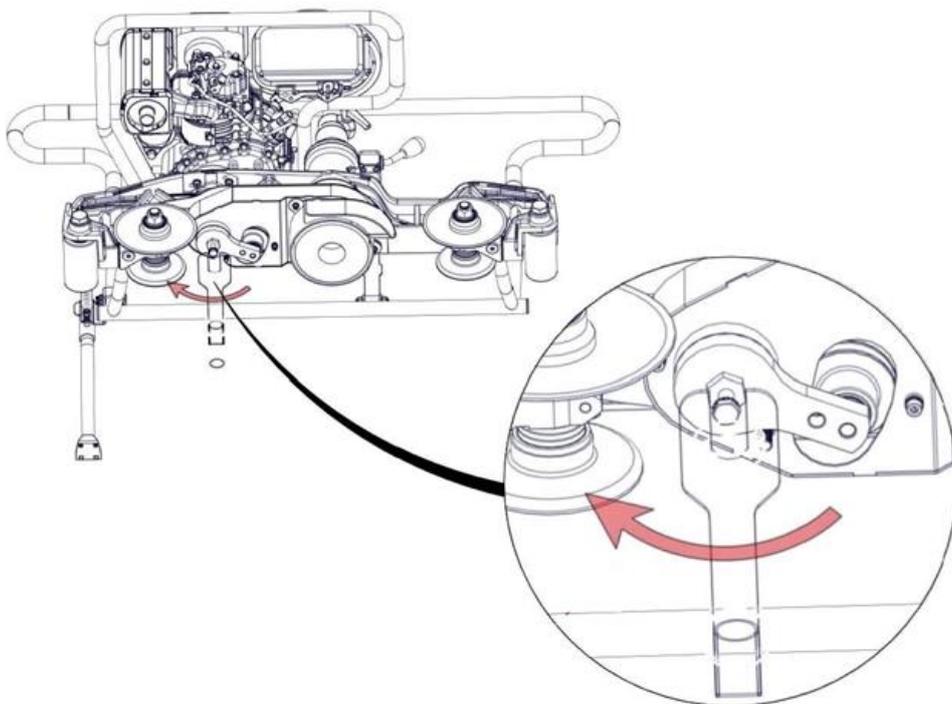


Figure 21: Belt tensioning 2



fweqfweqfweqf

Figure 22: Not sufficient tensioning

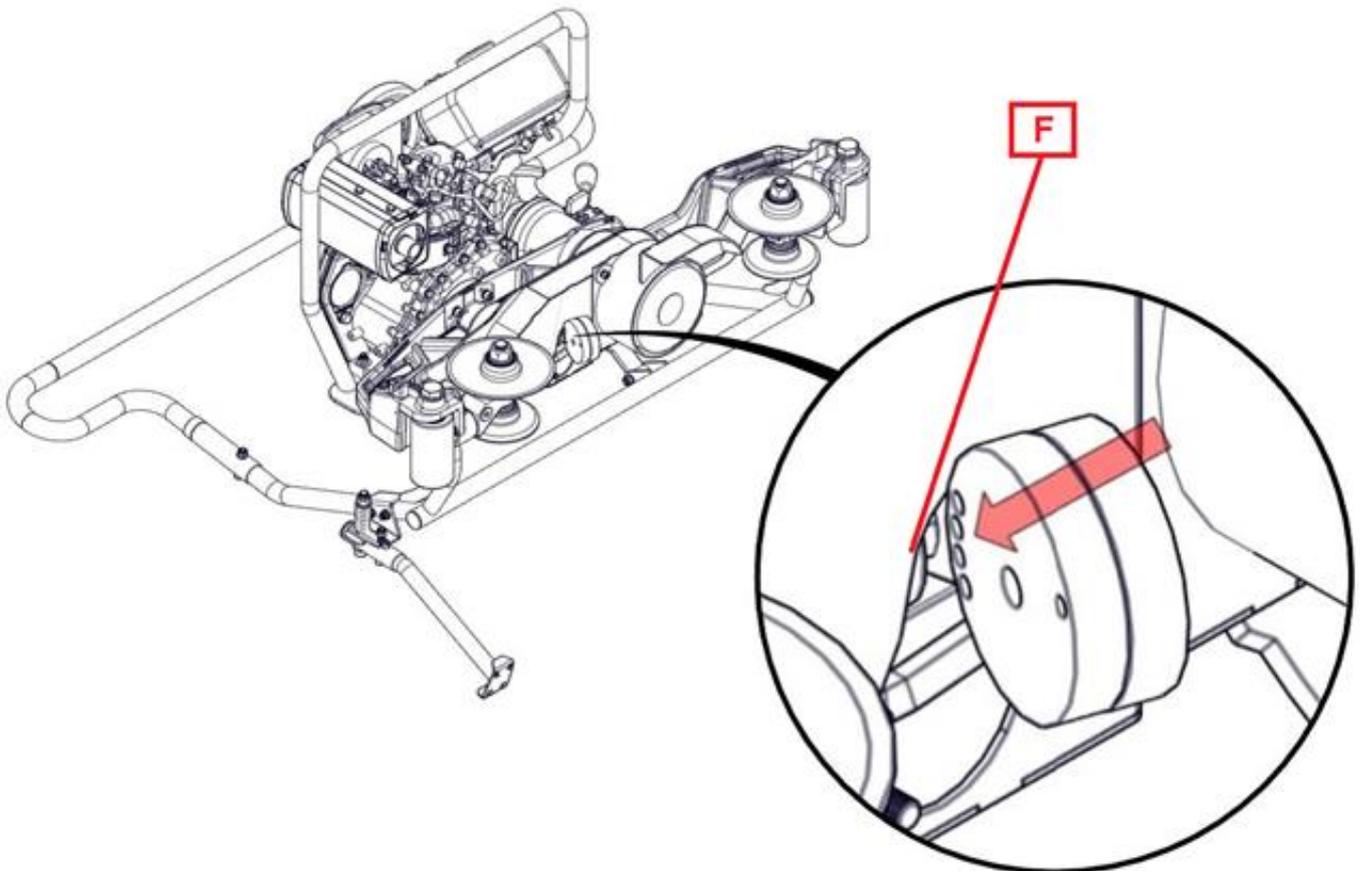


Figure 23: Correct tensioning



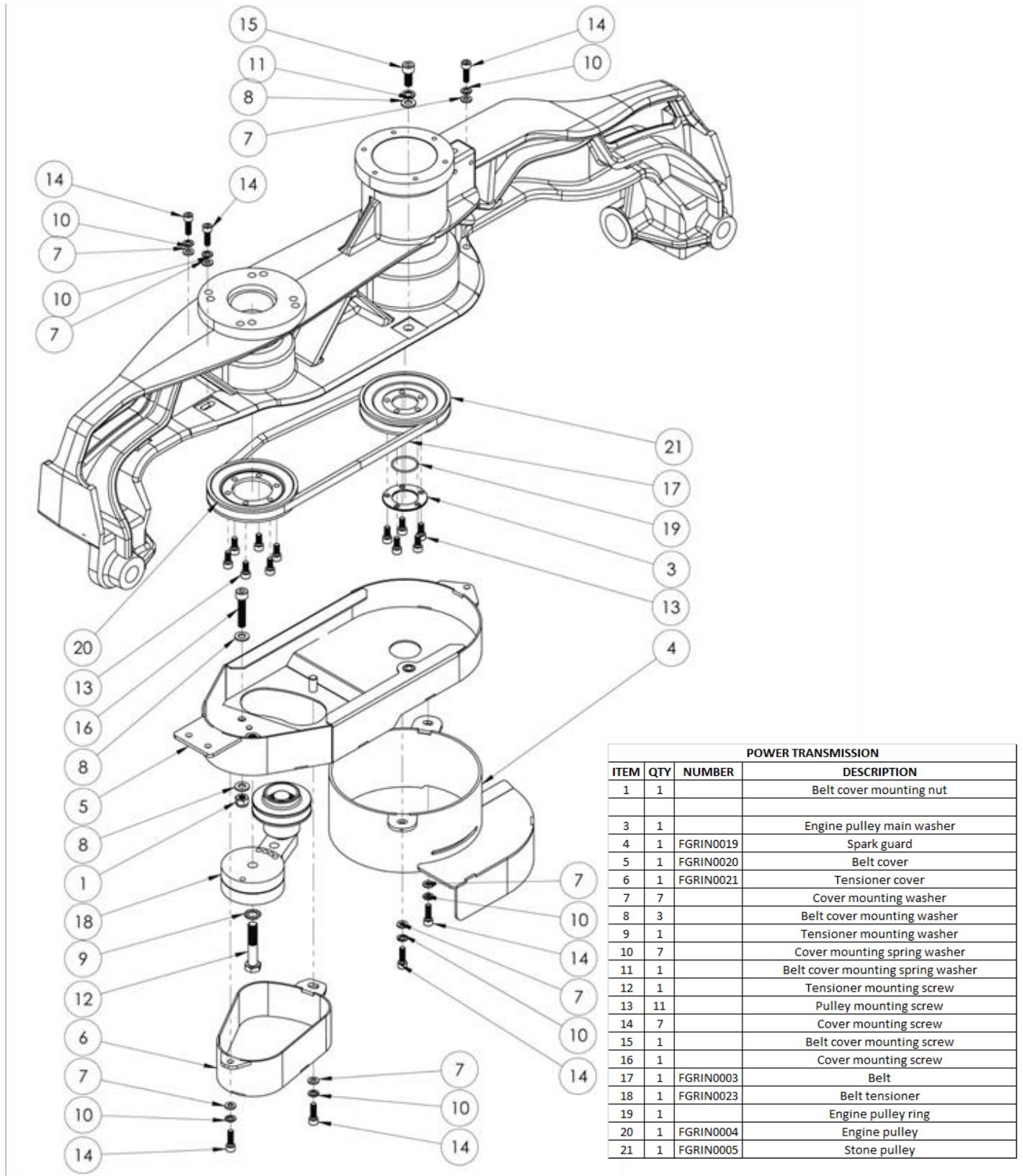
- The tighten allows to change the position of the hole, positioning the pin in the hole under the tie (F) (fig. 1.5).
- Once finish this operation (after tighten the screw TE M10),
- Check again the position of the white sign, making sure that it is in the green part (look at figure 1-4).

Figure 24: Belt tensioning 3



5.7 Belt replacement

Figure 25: Belt replacement



- Loosen the carter of the belt tensioner (fig. 1-1), removing the two screws TCEI M6 (n. 14 exploded drawing) and also the screws (n. 14 exploded drawing) of the grindstone carter (n. 4) .
- Completely loosen the grindstone and the support M20 from grindstone shaft.
- Loosen the three screws TCEI M6 (n. 14) of the belt carter (n. 5) and also the screw TCEI M8 (n. 15) and remove the carter. Remove the worn belt (n. 17).

5.8 Adjustment of the guide rollers

To adjust the guide rollers you have to add or to remove the washers between the disk and the guide.

For the different types of rail, you have to add or to remove the washers until you have a 5 to 10mm play between the disk and the rail. Using all the spacer washers in the kit, the maximum grinding width of the head is 80mm, taking into consideration the necessary clearance for the correct operation of the machine. However, PANDROL reserves the right to verify the correct operation of the machine in every limit situation upon sending the construction drawing of the rail.

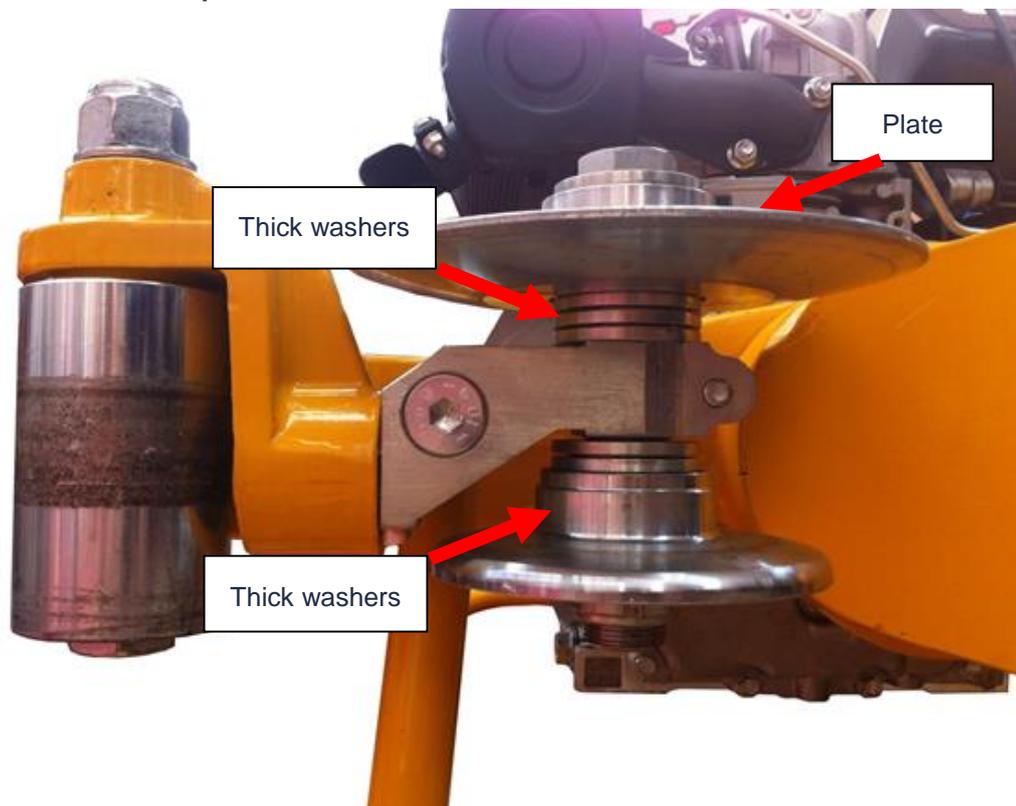
The removed washers have to added on the external side of the big disk and consecutively lock the nuts.

In this adjustment there must be maintained the axis of symmetry of the lane respect to the revolution axis of the disk-driving to the correct grinding of the machine on its working positions.

In this setting the thick washers should be adjusted in equal amounts on the side of the larger plate and part of the smaller plate. In the case of thicknesses is different put one more on the side of the larger plate.

In the case of rails with a head wider than the 80mm above mentioned, it is possible to request a kit of rollers for grinding rails with a head width up to 130mm, always maintaining the necessary clearance between the rail head and the plate. Also in this case, in order to verify the correct operation of the machine, PANDROL reserves the right to verify it, after sending the construction drawing of the rail to be grind.

Figure 26: Guide rollers description



6. Maintenance

ATTENTION



Maintenance operations have to be executed only by PANDROL Customer Service or by qualified personnel

6.1 Preface

In order to obtain best performances and to assure all the elements the maximum life, is necessary that use and maintenance's rules are carefully followed by the operators in charge. For this we suggest to Customers, in their interest, to carefully read these notes and to consult the manual every time they need suggestions to avoid eventual drawbacks.

For further clarifications call up our customer care:

- All the maintenance's operations have to be performed with engine shut off.
- Ordinary maintenance includes all the necessary information for the good functioning and preservation of the machine.
- We suggest to let the same operator do maintenance operations, he is familiar with the machine how it works and has to know what is in the manual.
- Check of lubricant's levels must be done at cold machine and set on a lever place. Before checking levels, carefully clean areas to inspect to avoid foreign bodies enter. In case of re-establishment, use clean bins and assure that foreign bodies don't enter in the lubricant.
- Hydraulic oil, engine oil, grease, cooling liquid and any other liquid use for the good working of the machine, must be of good quality, without contaminations and brand-new.
- The substitution of engine oil must be done when hot to assist the flow.
- Some maintenance's interventions to the engine must be researched in the specific manual.
- During the disassembling and re-assembling you always have to use the extractor, keys and suitable equipment to avoid deteriorate parts.
- To unlock parts solidly adherent, use copper's hammer or suitable tools.
- Separate clearly elements of various groups and screw back the nut in part on its pins or studs. Clean the parts with a rag and then clean with de-grease blowing off residuals with compressed air.
- After grinding process or remachining with abrasive bodies , carefully clean the parts or blow them with compressed air assuring the complete aspiration of the abrasive dust.
- During the re-assembling of various parts, assure that they are clean and then carefully lubricate.

Ordinary maintenance's operations indicated on the table that follows must have the same frequency of the machine's working hours indicated on the column at the right, under period.

6.2 Maintenance table

Nº	OPERATION	PERIOD
1	Check the correct engine oil lever and eventual top up (only petrol and diesel version). For MPR 4000 E version, check the status of the electrical connections and of the console	Before every use
2	Replacement of the engine oil (only petrol and diesel engine)	1 TIME AFTER 20 HOURS – AND SUBSEQUENTLY AFTER EVERY 50 HOURS
3	Check the trapezoidal belt tension (if there is a belt tensioner)	40 HOURS
4	Grease the machine with grease SYLAN 3	40 HOURS
5	Check and eventual clean the air filter of the engine	CHECK AFTER EVERY 50 HOURS
6	Replacement of the air filter of the engine	AFTER 200 HOURS
7	Check and eventually replace the spark plug of the engine (only petrol and mixture version)	As needed
8	Check of the fuel filter of the engine	EVERY 20 HOURS
9	Replacement of the fuel filter of the engine	AFTER 200 HOURS
10	Check of the rubber gasket integrity	3 months
11	Replacement of the rubber gasket	AFTER 2 YEARS
12	Check of the power plant	EVERY 50 HOURS
13	Replacement of the power plant	EVERY 2 YEARS
14	Check of the tightening of the bolts	1 time after 16 hours – and subsequently after 80 hours
15	Check of the thermic engine fixing	1 time after 16 hours – and subsequently after 80 hours

ATTENTION



To increase the life of the engine and then the machine it is advisable to change the engine oil every 50 hours, thus decreasing the amount of time recommended on the manual of use and maintenance of the engine (only with petrol and diesel engine).

ATTENTION



Refuel and substitute the engine oil till the correct level placing the machine as the engine sump is in the lower position as possible and parallel to the ground.

ATTENTION



For the maintenance engine refer to the manual of use and maintenance of the same engine.

6.3 Machine's greasings points

Grease the machine, following the instructions of the maintenance table at point 7.1.2, using the appropriate greasers installed on the machine. The greasing points are those in the figure: A, B, C.

Always use SYLAN 3 grease, specific for bearings.

The quantity of grease is unquantifiable, because it depends of the quantity used during the work. We can hazard to say that for every greasing point, you have to put about 3cm^3 of grease (about 3-5 pumps by using a greasing pump). Keep in mind that, during the top up of the grease in the machine, the grease does not exceed when you strongly turn the lever of the greaser. The grease has to flow inside the mechanism.

6.4 Fire

In case of start of a fire, use a CO2 extinguisher (not supplied) according to guidelines in force.

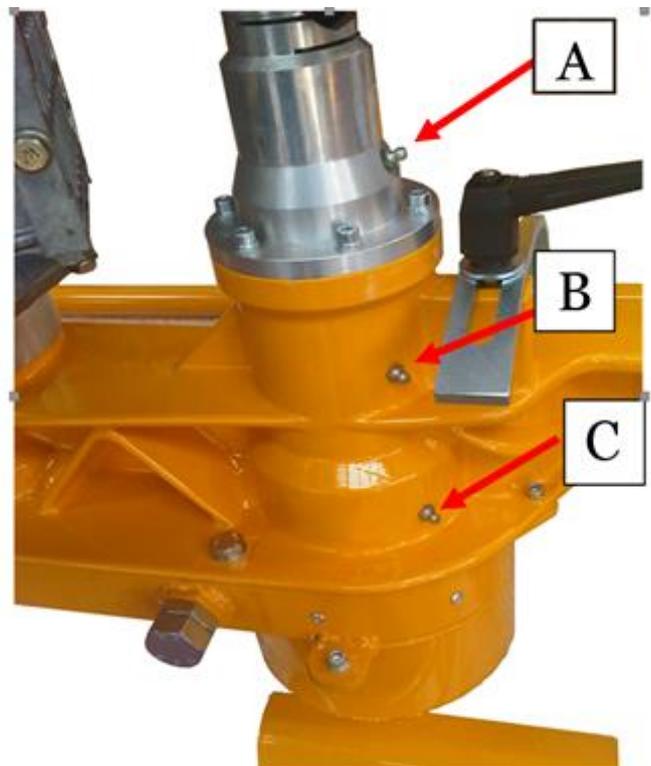
In case of machine's fire or if the machine is near a fire, give the alarm in the yard and call the fire brigade.

6.5 Breaking up and disposal

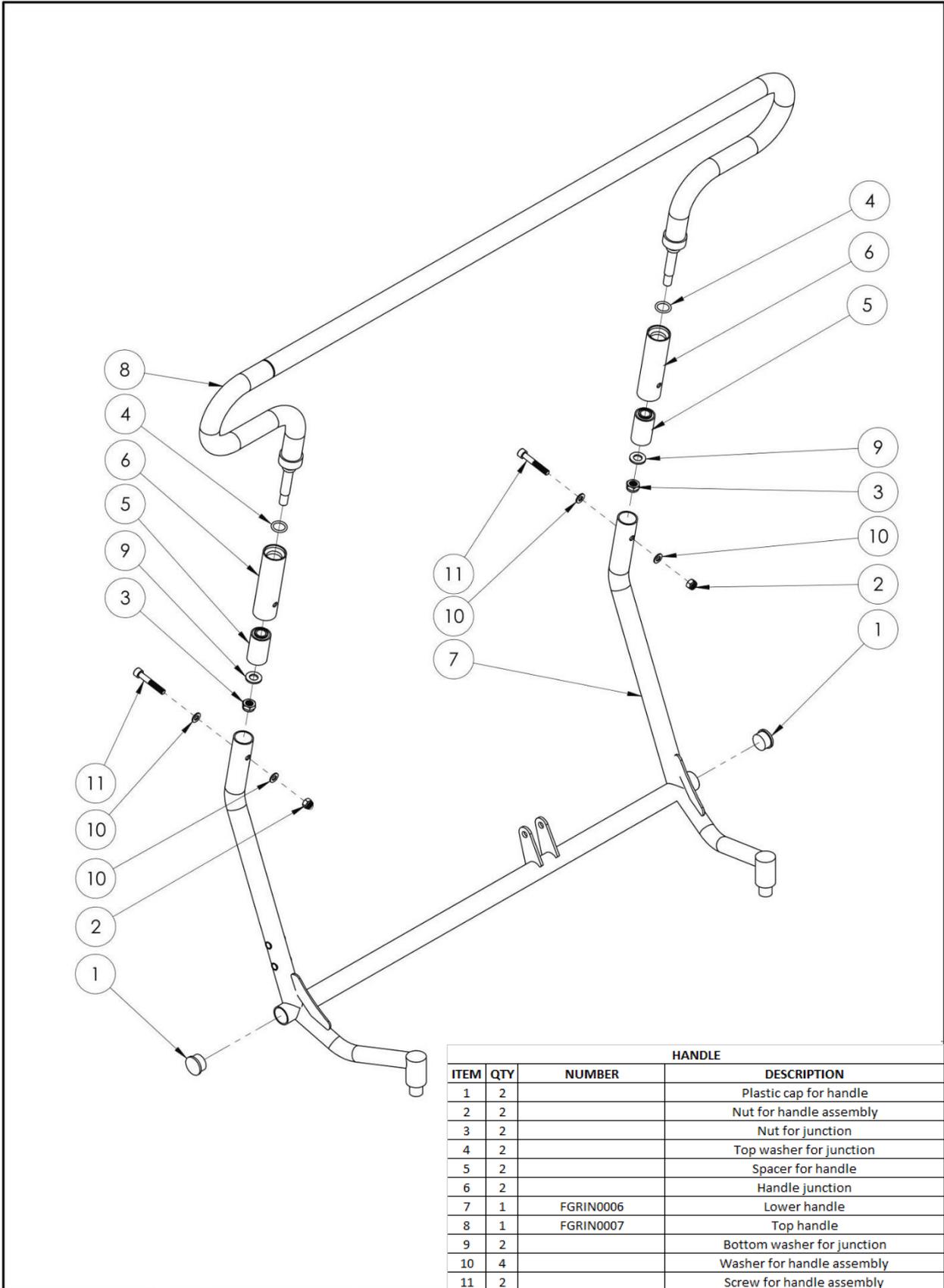
At the end of machine's life, remember that the owner of the machine must provide for its dismantling for the machine disposer according to guidelines in force.

Remember that every time that you substitute oil, hose and every machine's detail prone to different disposal, you always need to make reference to rules in force and to authorized disposals.

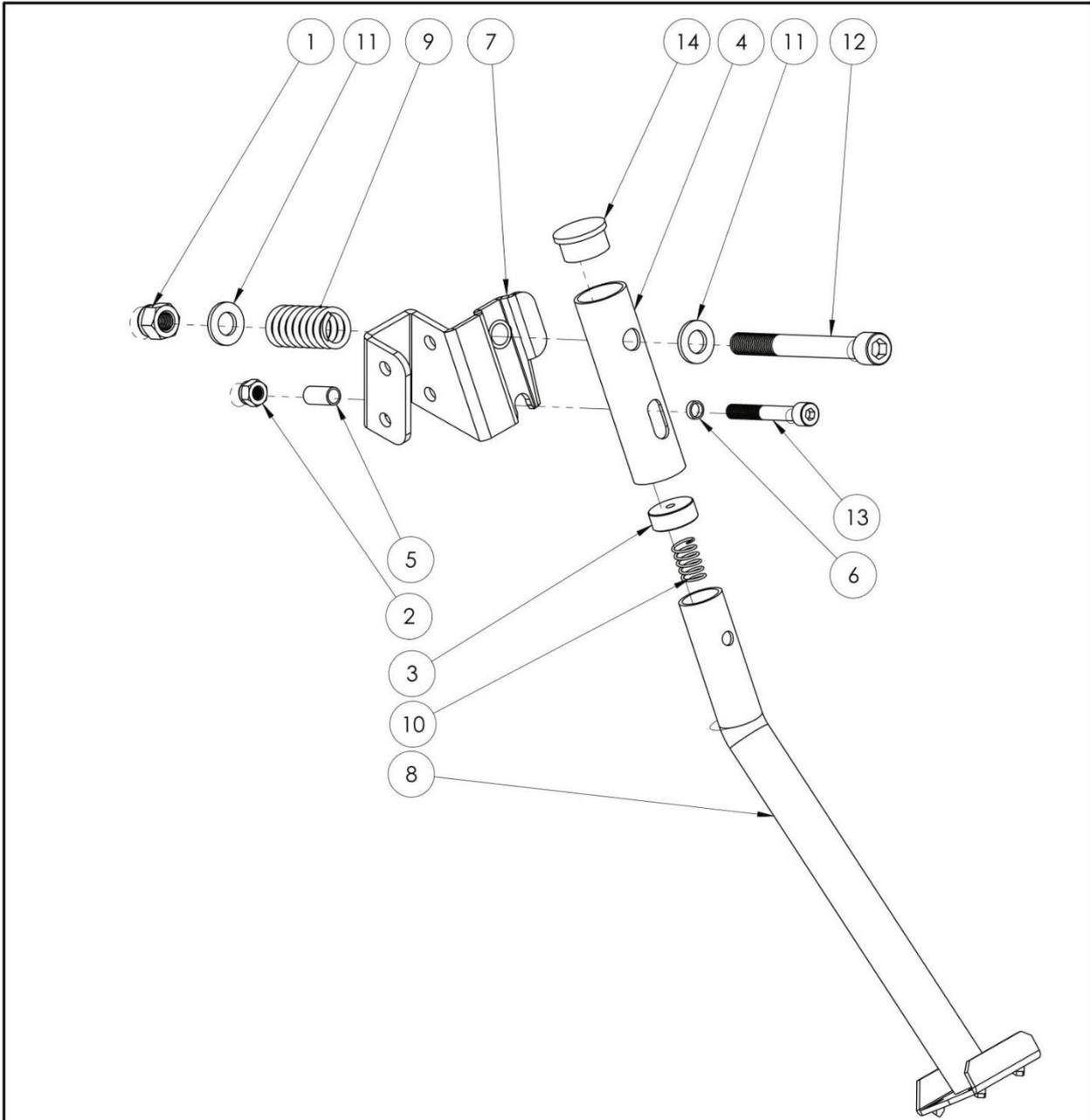
Figure 27: Greasing points



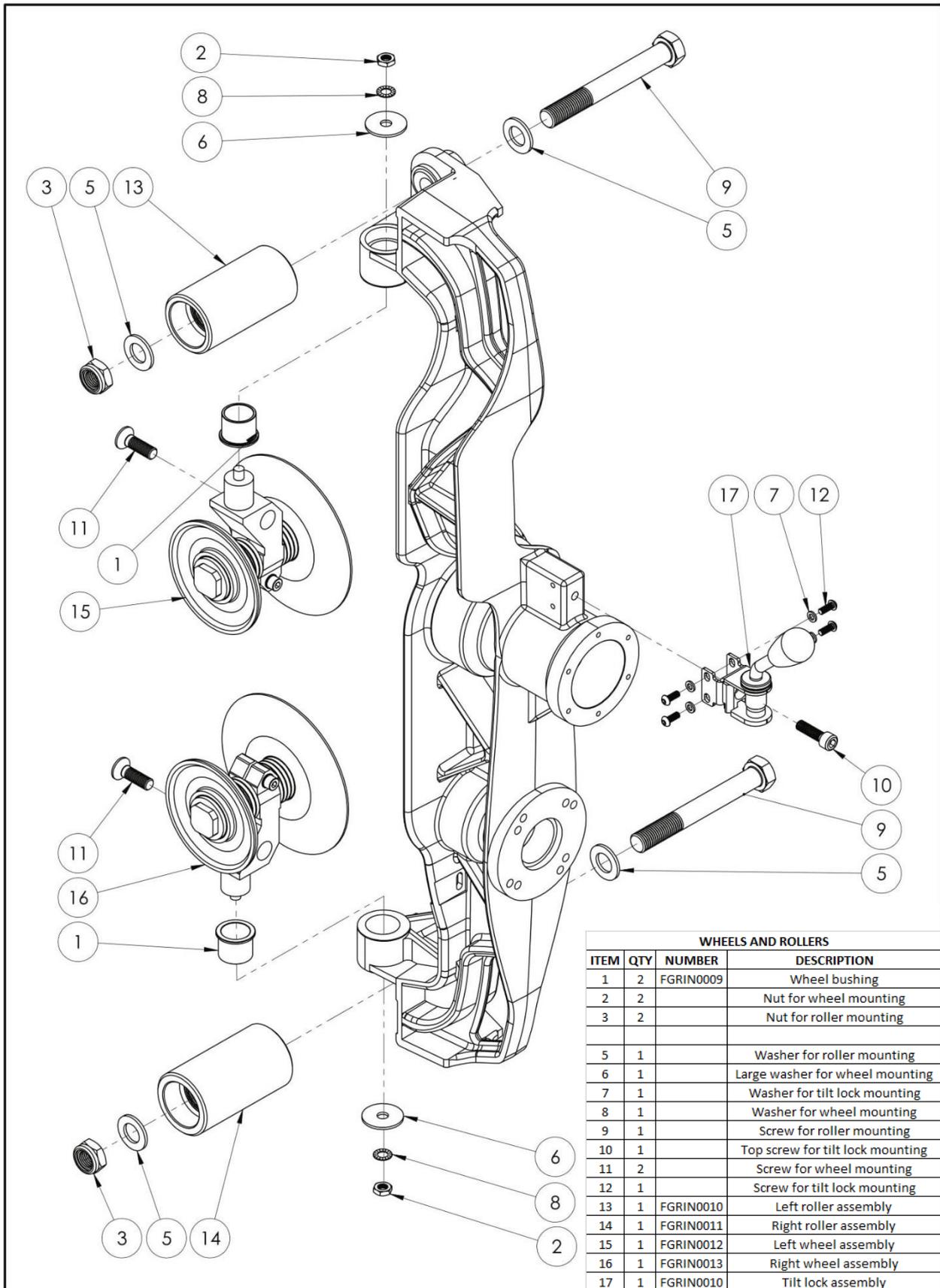
7. Spare parts

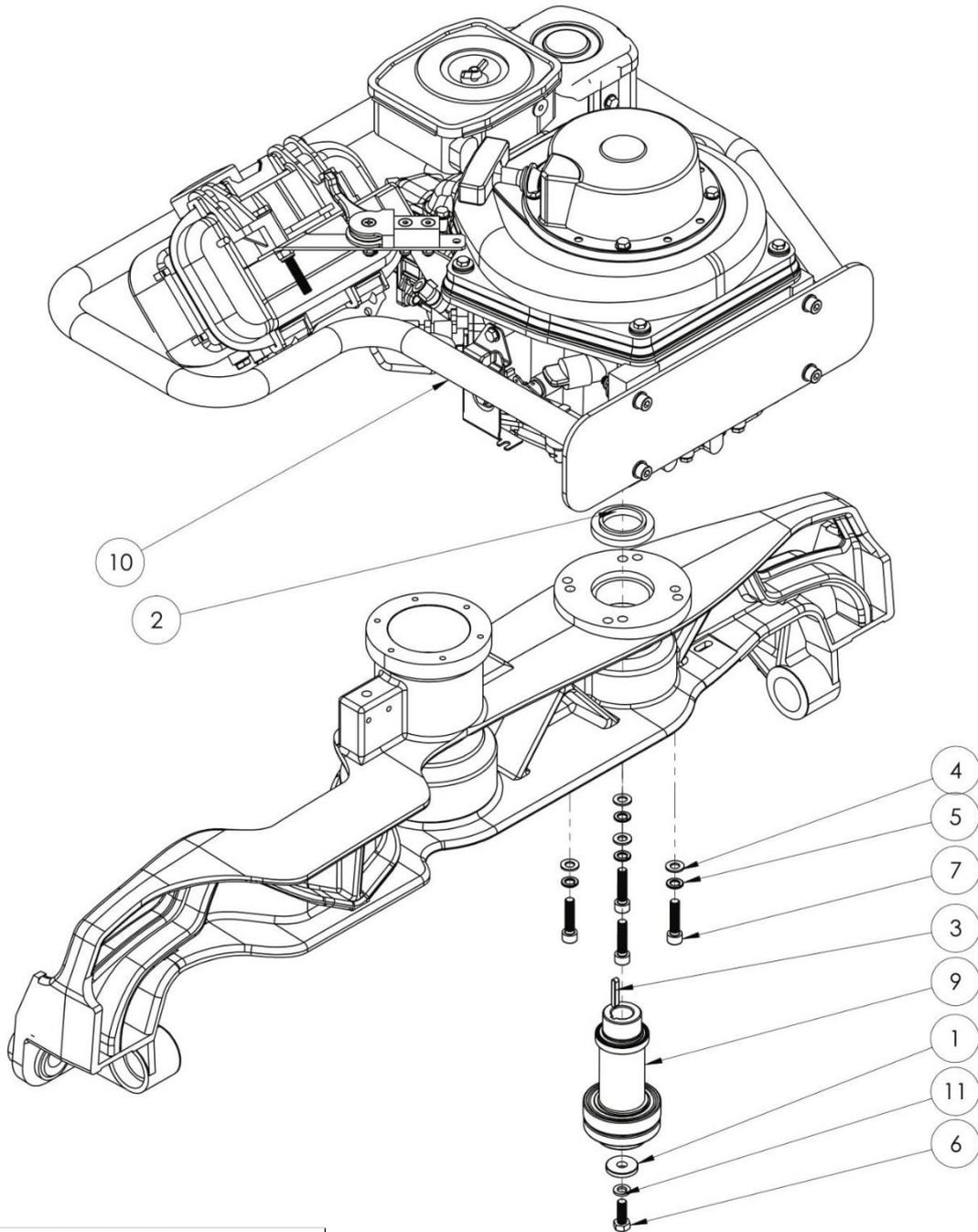


HANDLE			
ITEM	QTY	NUMBER	DESCRIPTION
1	2		Plastic cap for handle
2	2		Nut for handle assembly
3	2		Nut for junction
4	2		Top washer for junction
5	2		Spacer for handle
6	2		Handle junction
7	1	FGRIN0006	Lower handle
8	1	FGRIN0007	Top handle
9	2		Bottom washer for junction
10	4		Washer for handle assembly
11	2		Screw for handle assembly



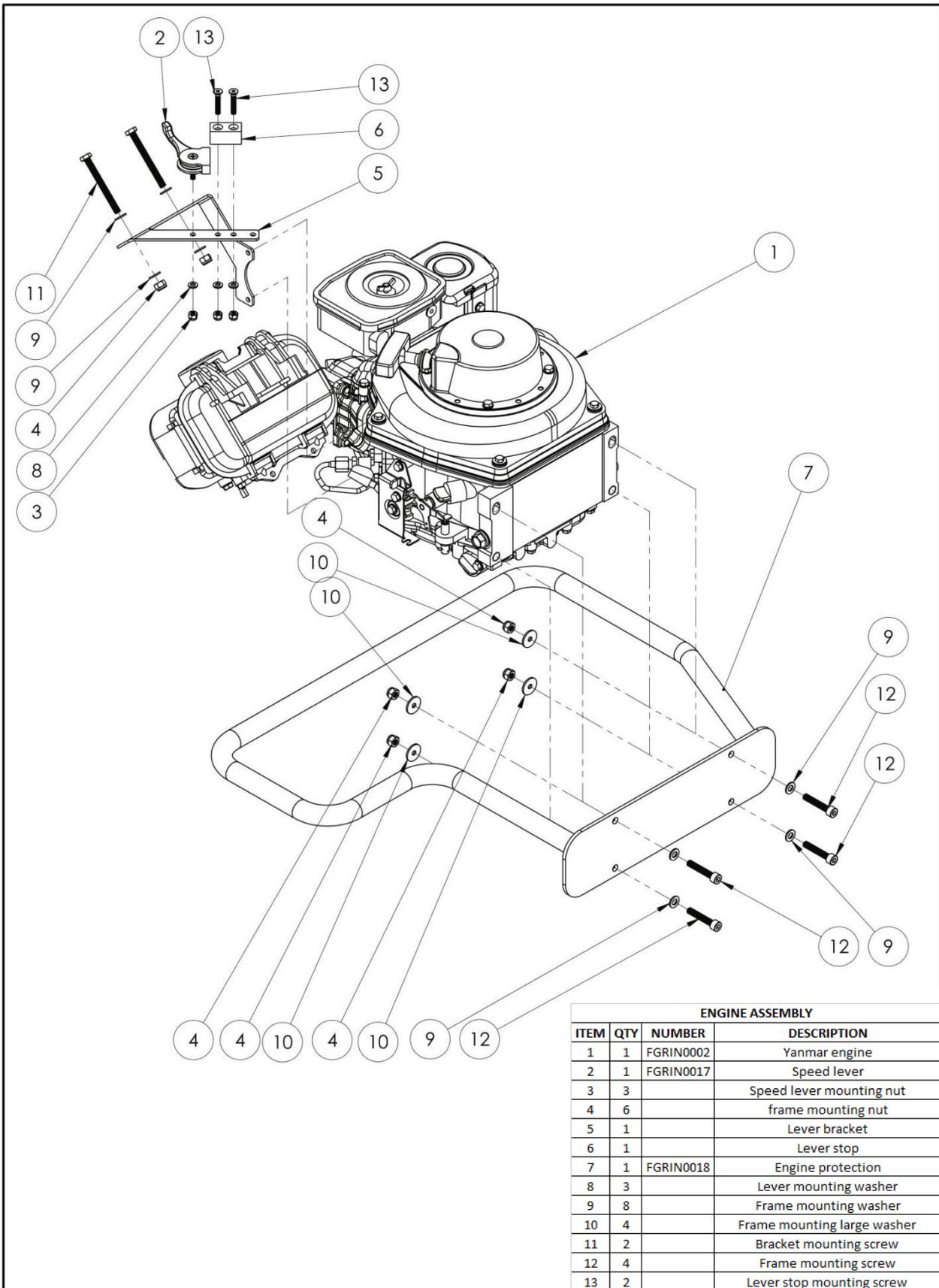
KICKSTAND			
ITEM	QTY	NUMBER	DESCRIPTION
1	1		Nut for pivot
2	1		Nut for lock assembly
3	1		Support washer
4	1		Pivot body
5	1		Spacer for lock assembly
6	1		Washer for lock assembly
7	1		Kickstand mounting bracket
8	1	FGRIN0008	Kickstand
9	1		Pivot spring
10	1		Locking spring
11	2		Washer for pivot
12	1		Screw for pivot
13	1		Screw for lock assembly
14	1		Plasctic cap for kickstand

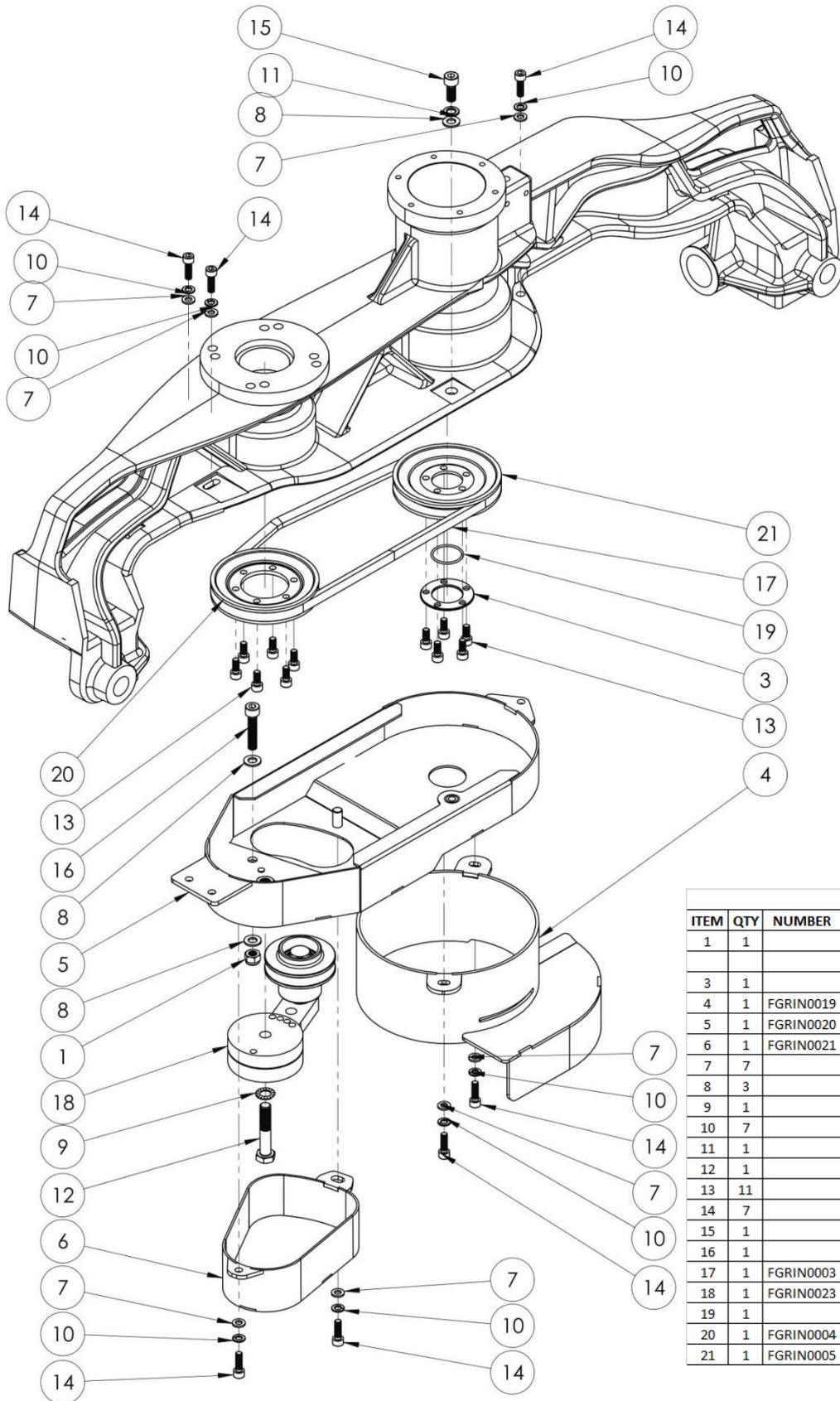




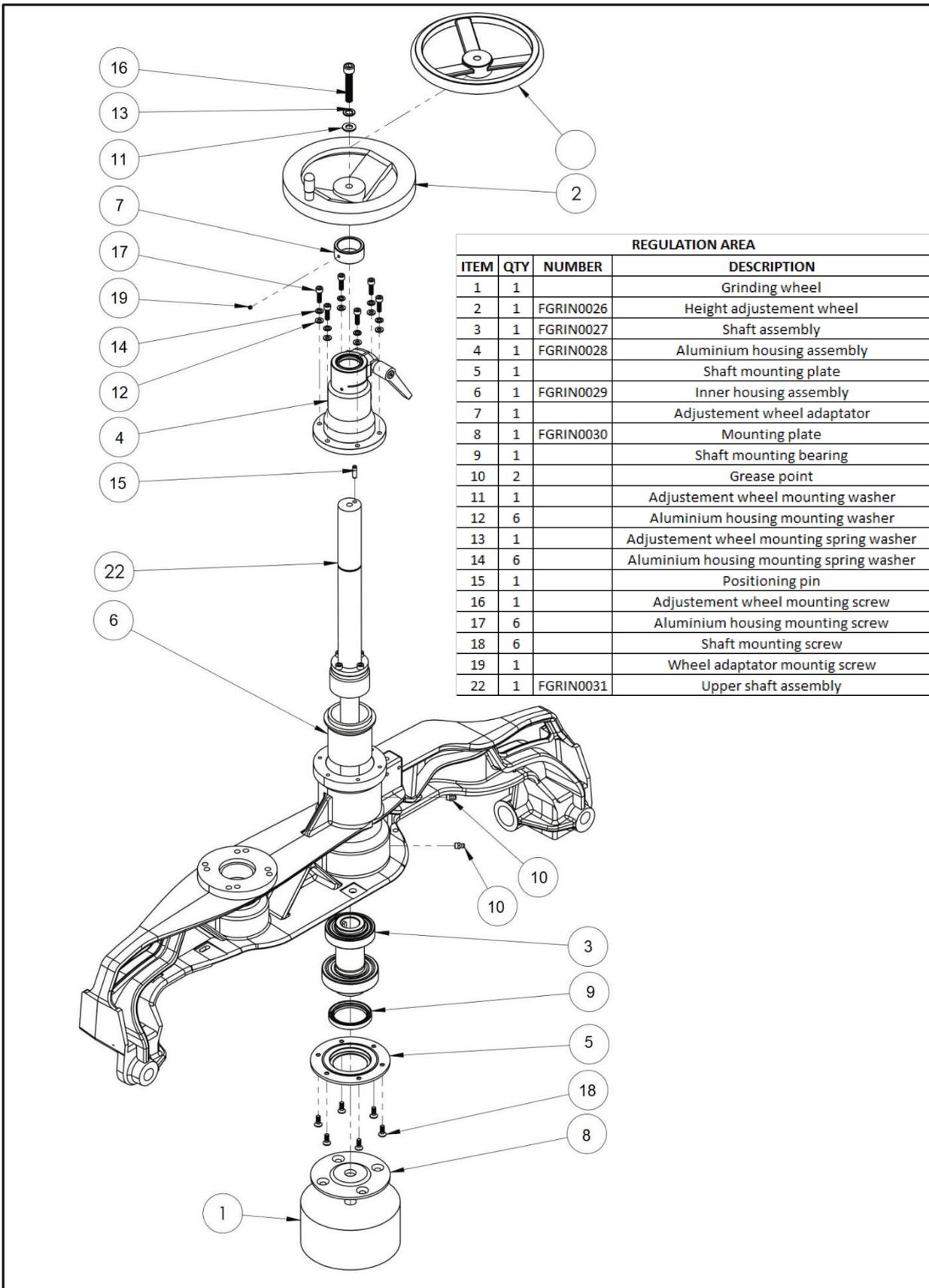
ENGINE MOUNTING

ITEM	QTY	NUMBER	DESCRIPTION
1	1		Shaft mounting large washer
2	1		Engine mounting ring
3	1		Transmission key
4	4		Engine mounting large washer
5	4		Engine mounting washer
6	1		Shaft mounting screw
7	4		Engine mounting screw
9	1	FGRIN0015	Shaft assembly
10	1		Engine assembly
11	1		Shaft mounting washer



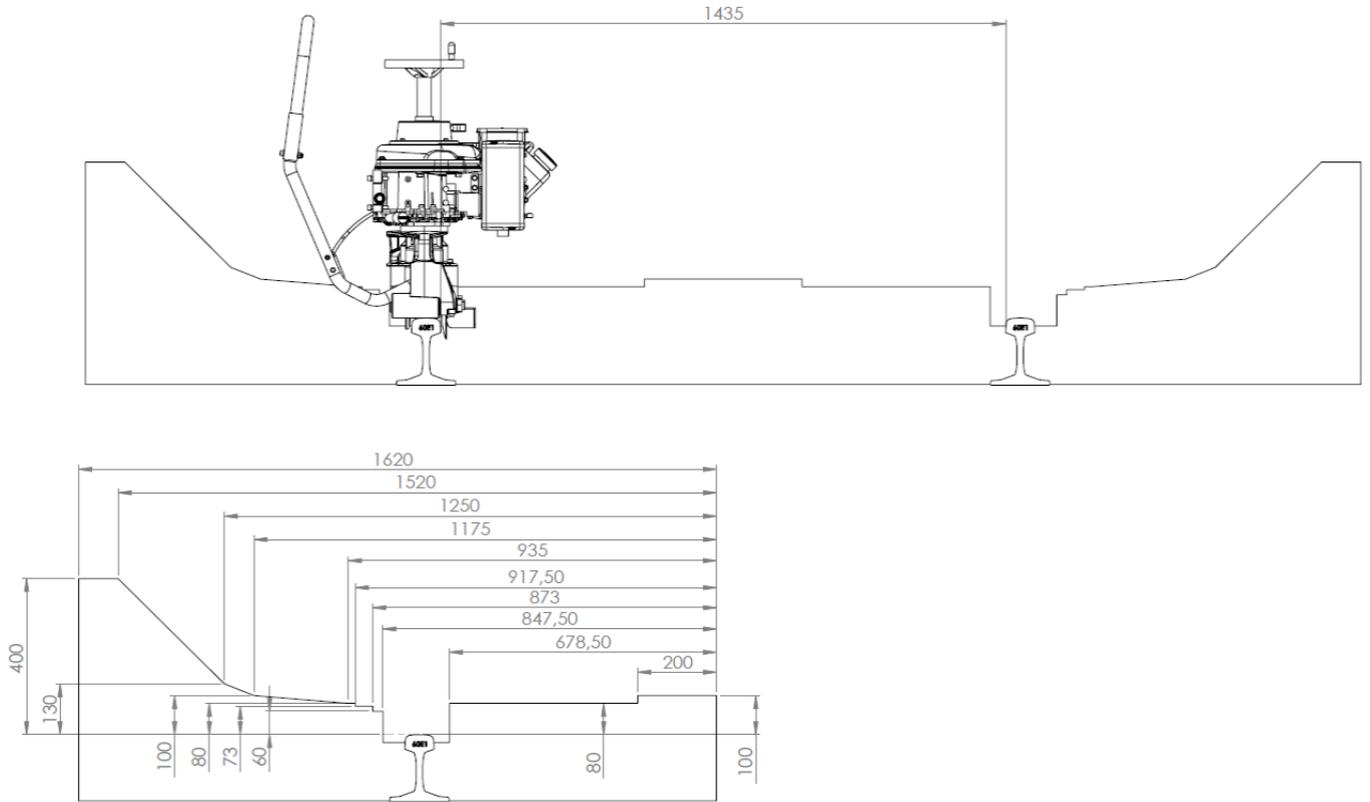


POWER TRANSMISSION			
ITEM	QTY	NUMBER	DESCRIPTION
1	1		Belt cover mounting nut
3	1		Engine pulley main washer
4	1	FGRIN0019	Spark guard
5	1	FGRIN0020	Belt cover
6	1	FGRIN0021	Tensioner cover
7	7		Cover mounting washer
8	3		Belt cover mounting washer
9	1		Tensioner mounting washer
10	7		Cover mounting spring washer
11	1		Belt cover mounting spring washer
12	1		Tensioner mounting screw
13	11		Pulley mounting screw
14	7		Cover mounting screw
15	1		Belt cover mounting screw
16	1		Cover mounting screw
17	1	FGRIN0003	Belt
18	1	FGRIN0023	Belt tensioner
19	1		Engine pulley ring
20	1	FGRIN0004	Engine pulley
21	1	FGRIN0005	Stone pulley



8. Conformance to gauge

Figure 28: Conformance to gauge



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