R2 S.a.s. di Rinaldi Roberto & C.

Registered Office
Via Valsecchia, 25-29
40060 - Toscana di Dozza
Dozza - Bologna (ITALY)

Head office
Via degli Artigiani, 23
40024 - Castel San Pietro Terme
Bologna (ITALY)
Tel (0039) 051.94.30.42
Fax (0039) 051.69.42.086

www.R2RINALDI.com
R2@R2RINALDI.com

Mill Grader
Mod. MT - MTL - MTHi - MTLhi
Instructions and maintenance manual
(Translation of the original instructions)
WARNING
Always keep a safe distance when you are in view of the danger symbol placed on the side of the machine.
Never climb on the roller group or on the machine.

Before using the machine read the instruction booklet.

Turn off the walking tractor or tractor before making any adjustment in the machine, take the key and read the instruction booklet.
Introduction

We would start by thanking you for having chosen our product and hope that you will be happy with your choice.

In order that your MILL GRADER Mod. MT - MTL - MTHi - MTLhi can offer the maximum efficiency for many years, we ask you to pay attention to the instructions for use and maintenance which you will find in this manual. Observance of these regulations will prevent breakdowns and accidents for which our company will not accept responsibility.

This use and maintenance manual is to be considered an integral part of the machine and therefore it must always accompany the machine when it is sold, even in the event of its sale to third parties. If you keep this manual in a safe place and in good condition, you - and whoever must use the machine - will be able to have a complete, legible reference on hand at all times.

Description of the symbols used in the manual

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>This symbol will be used in the manual to indicate actions (misuse) elements, behaviours and situations that could risk your security and the one of other people.</td>
</tr>
<tr>
<td>!</td>
<td>The rounded symbols with white pictograms will be used in the manual to indicate the individual Protective Devices necessary while using the machine or while making any adjustments.</td>
</tr>
<tr>
<td>!</td>
<td>This symbol will be used in this manual to indicate that the described operation must be done with the walking tractor or tractor turned off and the key disconnected.</td>
</tr>
</tbody>
</table>

NOTE: This manual concerns the use and maintenance description of the mechanized mill graders MT-MTL, which corresponds largely to the hydraulic models MTLhi and MTHi; the differences between the two models will be indicated with a caption (*note n mod. hi) (n indicates the note number) and examined in an specific section of the manual

1 - Machine identification

Each R2 machine has a CE plate with the main details of the R2 company and of the machines. The plate is positioned on the top center of the machine.

Fig. 1

![CE Plate Image]
2 - Description of the machine and its proper use.

The MILL GRADER Mod. MT – MTL – MTlh is the only machine that can be applied to all types of walking tractors or tractors of 12-14-18 HP with flange attachment; it levels, mills and compresses the soil in a single operation.

As can be seen from the illustration (Fig. 2), the MILL GRADER Mod. MT – MTL – MTlh is equipped with an adjustable –height scraper on the front to shift the earth, a central rotating harrow to mill the soil and a special grilling roller at the back, which makes it possible to adjust the working depth of the rotating harrow to compress the soil.

The MILL GRADER Mod. MT – MTL – MTlh is used in the preparation of the soil for fields, gardens, sporting facilities, vegetable gardens and for anyone who needs the ground to be perfectly levelled, also in small spaces.

Fig. 2

A - Main body of the machine (harrow)
B - Roller group
C - Register roller adjustment
D - Hoes
E - Scaper
F - Screw adjustment scraper
G - Walking tractor coupling
H - Side and side extension
I - Protctions

THE MILL GRADERS Mod. MT – MTL – MTlh - MTLlh are designed to be applied exclusively to professional driven tools with CE certificate and appropriate HP (walking tractors, tractors with flange attachment or hydraulic drive) THE MILL GRADERS Mod. MT – MTL – MTlh are designed exclusively to prepare the soil.

Any other type of use is considered improper and so dangerous. In all those cases that the MILL GRADERS Mod. MT – MTL – MTlh are used for different purposes of those determined, the manufacturer disclaims all liability for damages of any nature.

Read always the instruction booklet of the working equipment (walking tractor or tractor) before fitting and using the R2 machine.

The proper use of the machine implies:

- The respect of the rules of use and maintenance established by the manufacturer and gathered in this manual.
- The exclusive use of spare parts and original R2 accessories.

The machine must be used, maintained and repaired only by competent staff.

The qualified staff enabled to use the machine must be properly trained and informed of the proper use of the equipment and the risks that could be run.

The user is required to comply with the rules and existing Legislation relating to fire prevention, safety at work and traffic in public roads.

Guarantee

Our equipment is covered by guarantee against manufacturing and/or assembly defects for 2 years from the date of delivery to the customer.

This guarantee is limited to the replacement of defective parts and does not include labour costs or transport.

This guarantee does not cover the following cases:

- When the user has made adaptations to the original machine.
- When the machine has been used in excess of its power limits.
- When R2 spare parts are not used.
- When the equipment is not used in accordance with the manual instructions.
- When the equipment has been used incorrectly.

The R2 Company reserves the right to modify the data in this manual whenever this is considered necessary for technical or commercial improvements regarding the product itself.

Certification

The EC certification supplied with the machine certifies that the machine complies with the current provisions of Law.

INFORMATION

The EC certificate is enclosed with the machine documentation and contains the manufacturer's details, the machine data and the machine's declaration of conformity according to the Directive EC as in the copy shown in the figure beside.

R S a s
Via Valtellina 25 - 29
40040 Toscanello di Dobba - DOZZA - BOLOGNIA - ITALY

The user is forbidden to copy this booklet or part of it without the authorization.
Adjust the working depth using the screw crank.

General rules for the hydraulic motor use:
- Working oil temperatures in the hydraulic system should be kept between +30°C and +60°C. The anti-wear and lubrication properties of the oil are greatly reduced at higher temperatures.
- The ambient temperature around the engine should be between -30°C and +90°C.
- Only use an oil containing antiwear additives ISO 46 or with a viscosity at normal operating temperature of approx. 37 cSt; it should also have an adequate viscosity index. Under no circumstances should oil viscosity be outside the range of 22 cSt to 75 cSt.
- Before starting the hydraulic system, check oil level and firm mounting of all components.
- Run the system unloaded for 10-15 minutes to purge air from the circuit to prevent foaming and deviation.
- Check for leaks, rectify and refill reservoir.
- Check oil level regularly and clean filters or replace them according to filter manufacturers advice.

For maximum life from motor oil contamination should never exceed the 20/16 (see ISO 4406).

To ensure this level, return line filters should maintain 40 μm absolute or 25 μm nominal in open circuit, 20 μm absolute and 10 μm nominal in closed circuit.

4 Handling and transportation of the machine.

- The machine must be handled with lifting equipment. Make sure that such equipment (including the straps and the strings) have a carrying capacity appropriate to the weight to be lifted and that they are in good maintenance conditions.
- The machine can be anchored in the coupling point as indicated in Fig. 4; because of the position of the center of gravity, the machine will lean while lifted of 25° (Fig. 4).
- In order to make handling operations safely, always wear safety shoes and make sure that there are no people or animals nearby while working.
- The machine can be transported by professional means of conveyance (trucks, vans, etc.). Transportation by car is permitted only if the car roof is divided by the driving / passenger seat with a barrier that can hold the machine in case of frontal collision. In all cases, before transporting the machine, make sure that it is well anchored with straps and strings and that it is stable enough. The anchor points can be the roller group support and the front scraper. Make sure that the scraper adjustment screws are properly tightened.
- Always check that any walkways, ramps, etc. that must be crossed with means of conveyance and lifting equipment are well anchored and have a capacity capable of supporting the total load of the vehicle + machine + operator. When using ramps for loading, ensure that the vehicle has the handbrake on and have been positioned the wedges suitable for locking the wheels.
Most accidents that happen at work, during the maintenance or the shifting of a machine, are due to negligence in the observance of the most elementary rules of accident prevention.

It is therefore necessary that whoever uses the machine read and respect the rules written below and on the adhesive stickers of the machine.

1. Verify that on the machine are stuck all the safety signs and that they are readable.
2. Before cleaning the machine, making any adjustments or reparations, turn off the walking tractor or tractor engine. Before each operation put the machine on the floor or on steady supports.
3. Never approach to the machine moving parts.
4. The MILL GRADER Mod. MT - MTL - MThi - MTLhi has been manufactured for a specialized use. It must, therefore, always be in perfect working conditions and only R2 spare parts should be used when making any reparations.
5. Before using the machine, check the tightening of the nuts and screws, in particular those of the hoses.
6. Keep away all the people or animals before starting to work.
7. Be careful when working alongside roads, pathways or sloping ground.
8. Do not leave the machine working without supervision.
9. While checking or repairing the machine, be sure that nobody can start it up accidentally.
10. Wear tight-fitting clothes that do not cause any footholds in the rotating parts of the machine.
11. Do not climb on the machine at work.
12. Do not interfere with objects on the machine while working.
13. Never use the machine without the back roller or without the protections delivered with the machine. Never remove the protections.
14. In order to adjust the scraper, always turn off the walking tractor or tractor engine and make this operation safely.
15. In case the machine blocks, before making any reparations, turn off the walking tractor or tractor engine and remove the key.
16. Always read the instruction booklet of the working equipment (walking tractor or tractor) before fitting and using the R2 machine. Do not remove or evade the security systems of the working equipment; before starting working, be sure that the security systems of the walking tractor or tractor work correctly; if not, do not use the machine.
17. Do not carry people, animals or objects on the machine.
18. In case of road traffic respect the regulations in force in your country; put on the machine all the signals required.
The power harrows MTHi and MTLH can be lifted anchoring the lifting equipment to the frame (Fig. 9 Ref. 2; pay attention to the machine inclination while lifting it.

For the hydraulic machines, it is important to consider the following rules to prevent accidents:

- Caution: the hydraulic system is under pressure.
- Before connecting a hose to the hydraulic circuit of the tractor, be sure that the circuits side of the tractor and side of the machine are not under pressure.
- The pipe connections are protected by rubber stoppers, to prevent foreign bodies from entering. When the Mill Grader R2 is disconnected from the tractor, it is recommended to place the protective caps on the pipe fittings. When the Mill Grader R2 is connected to the tractor, the caps remain attached through a ring to the hoses, so that they can be repositioned next time.
- Check regularly the hydraulic hoses! The damaged or worn out must be replaced immediately. The new ones must have the specifications and the quality required by the constructor (contact our technical service).
- If there is a leak, you must repair it immediately to avoid accidents.
- All the liquids under pressure, especially the hydraulic circuit oil, can cause serious skin accidents! In case of wounds, go immediately to the doctor: there can be risk of infection!
- Before working on the hydraulic circuit, lower the machine, remove the pressure from the hydraulic circuit, stop the tractor and remove the key from the console.
- In case of repair or work: wear nitrite gloves and protective glasses.

6- Components assembly and coupling of the working equipment.

Note: all the components that make part of the machine and that must be assembled before using it, have been designed to minimize the user's work; the parts should be assembled using hand tools (wrenches).

The assembly must be made on a steady surface or on an homogeneous level floor. During the assembly wear leather gloves and accident-prevention shoes.

6.1 Roller group and roller adjustment rod assembly.

Put the roller group screwing the two arms (Fig. 5 - Ref. A) in the holes that you will find in the back part of the power harrow. (Fig. 5 - Ref. B).

Screw the roller adjustment rod (Fig. 5 - Ref. C) in the points indicated on the roller support (Fig. 5 - Ref. D) and in the power harrow (Fig. 5 - Ref. E).

NOTE: the screws used to fit the roller group and the roller adjustment rod must be well tightened in order that all the elements can turn during the adjustment.

6.2 Flange assembly and coupling of the machine to the walking tractor or tractor.

Before fitting the machine flange (Fig. 5 - Ref. F), which varies according to the model of the walking tractor, we advise you to apply some grease on the external diameter of the machine hub (Fig. 5 - Ref. G) in order that the machine oscillates. Fit in the flange with two special screws (grub screws) (Fig. 5 - Ref. H) and two nuts; in order to fix the flange on the hub do as follows:

- Screw the grub screws completely and then turn back of one turn, close the nuts and tighten. Once you have finished, check that the flange oscillates freely without tightening or seizing, otherwise repeat all again.
- Put the transmission sleeve (Fig. 5 - Ref. I) on the machine shaft previously lubricated. Afterwards, bring the walking tractor near to the machine paying attention that the sleeve engages with the connecting-shaft of the walking tractor and that the two flanges, the one of the walking tractor and the one of the machine, fit perfectly well; then tighten the machine with the rods of the walking tractor or tractor.

Fig. 5
7 - Preparation for use

Before using the machine it is necessary to perform the following controls with the walking tractor or tractor off and the key off:
- Check that the lubricant is at the indicated level.
- Check the bolts tightening and that all the elements are in perfect conditions.
- Check that the signs security are present and legible.

8 - Working depth adjustment

The working depth is adjusted by the roller support pin (Fig. 6 - Ref. A), choosing a hole on the rod the working depth can vary from 0 to 14 cm. It is important that while the operator works, the machine leans on its roller.
To transport the machine applied to the walking tractor, use the first hole of the adjustment rod (maximum extent of leverage), in this way the power harrow will not touch the soil and the roller will function as a wheel.

In order to prevent the hooves from remaining exposed and to avoid any dangerous situation during the milling, it is important that the extension sides (Fig. 6 - Ref. B) are adjusted in such a way that they always touch the soil, the extension sides adjustment must be made with the walking tractor or the tractor off and the key off.

9 - Levelling adjustment

The levelling is made with the front shovel (Fig. 6 - Ref. C); the scraper is adjusted manually with the two special screws and depends on the working depth chosen (Fig. 8 - Ref. D). For a good levelling result, be sure that while working there is always earth in front of the scraper.

In order to prevent the hooves from remaining exposed and to avoid any dangerous situation during the milling, it is important that the scraper is adjusted in a way that it touches lightly the soil surface.

Adjust the scraper always with the walking tractor or tractor off and the key off. Wear protective gloves to prevent injury to the skin of the hands.

Fig. 6

Specific references for the hydraulic machines

(*note 1 mod. N)
The power harrows MTHl and MTLhl have been designed to be applied to hydraulic machines which have an oil pressure between 160 and 170 bar.
1 - Register adjustment roller (screw crank)
2 - Register adjustment roller support
3 - Hydraulic motor

(*)note 2 mod. N)

<table>
<thead>
<tr>
<th>Model</th>
<th>MTL 50 hl</th>
<th>MTL 75 hl</th>
<th>MTL 100 hl</th>
<th>MT 60 hl</th>
<th>MT 90 hl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum height from the ground (Fig. 5 - Ref. 6)</td>
<td>70 cm</td>
<td>70 cm</td>
<td>70 cm</td>
<td>70 cm</td>
<td>70 cm</td>
</tr>
<tr>
<td>Oil pressure requested</td>
<td>160-180 bar</td>
<td>160-180 bar</td>
<td>160-180 bar</td>
<td>160-180 bar</td>
<td>160-180 bar</td>
</tr>
</tbody>
</table>

Technical specifications of the hydraulic motor.
NOTE: the following data which concerns to the engine specifications are given by the manufacturer of the hydraulic motor, for the specifications of the engine application to the R2 machine look at the previous table and the considerations of the following notes.

<table>
<thead>
<tr>
<th>Data</th>
<th>Value (Cont. Func.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geometric displacement (cm³/hv.)</td>
<td>102</td>
</tr>
<tr>
<td>Max input pressure (bar)</td>
<td>210</td>
</tr>
<tr>
<td>Max operating pressure (bar)</td>
<td>175</td>
</tr>
<tr>
<td>Max torque (daNm)</td>
<td>26</td>
</tr>
<tr>
<td>Max flow (l/min)</td>
<td>75</td>
</tr>
<tr>
<td>Max rotating speed (rpm)</td>
<td>730</td>
</tr>
<tr>
<td>Max power (kw)</td>
<td>17</td>
</tr>
<tr>
<td>Max cont. Return pressure without drain line (bar)</td>
<td>0 = 100 rpm</td>
</tr>
<tr>
<td>Max cont. Return pressure without drain line (bar)</td>
<td>100 = 300 rpm</td>
</tr>
<tr>
<td>Max cont. Return pressure without drain line (bar)</td>
<td>&gt; 300 rpm</td>
</tr>
<tr>
<td>Max return pressure with drain line (bar)</td>
<td>110</td>
</tr>
<tr>
<td>Max starting pressure with load (bar)</td>
<td>10</td>
</tr>
<tr>
<td>Min. starting torque (daNm) at max. ΔP</td>
<td>25</td>
</tr>
</tbody>
</table>
13 — End of work and storage of the machine

If the MILL GRADER Mod. MT – MTL – MTL hi must remain unused for a long period, it is necessary to perform the following steps:
1. Wash thoroughly the MILL GRADER Mod. MT – MTL – MTL hi and then dry it.
2. Check thoroughly the working of all the moving parts and replace the damaged, worn or deteriorated ones.
3. Check the tightening of all the bolts.
4. Check the lubricant level.
5. Protect and lubricate all the metal unpainted parts, then cover the machine and keep it in a dry place, it will be ready for use at any time.

Attention: Before using the machine again, refer to the “Maintenance” chapter.

Keep the machine in a way that people or animals do not run any risk (stumbling, machine falling down) and protect the prominent parts in order that they do not cause injury.
To avoid danger situations, store the machine in a way that does not hamper the escape routes, the emergency exits, fire protections (fire extinguishers, hydrants, etc.) and first aid (first aid boxes, etc.) form the storage place.

If the washing and/or cleaning of the machine is made by compressed air or water, be sure that there are no people or animals in the working area and wear protective glasses and if necessary a dust mask. Do not direct the jet of compressed air or water to people or animals.

14 — Scraping and disposal of the components and packaging.

In case of machine scraping it is necessary to make it unusable to prevent that others can use it again; the reuse of the machine by a third party, can be dangerous and accidents can be prosecuted according to Civil and Criminal Procedure, under the laws in force in your country towards those that get rid of the machine without precautions.
In order to make the machine unusable, it is necessary to disassemble the pinion-hub (Fig. 5 — Ref. G) and dispose it separately from the rest of the machine.

The machine is made of metal parts and of lubricant substances; they must be disposed in special waste disposal centers.
According to the type of transport, the machine can be packed in a cardboard (box) wood (pallet) plastic (polypropylene strapping and stretch film polyethylene) and metal (steel strapping seal or wire if the machine is delivered directly on a pallet); these items must be disposed in special waste disposal centers.

Attention: The polyethylene stretch film must not be used as a children toy because it may cause suffocation.

Recycle

For the environment respect, dispose the materials in centers for separate collection of rubbish.

10 — Machine use

10.1 — Soil working

Once you have made the adjustments, it is possible to operate the walking tractor (or tractor) and so the PTO that will determine the hooves rotation. Pressing the forward, the working soil will start. The operator's position is at the rear of the walking-tractor (or semi- laterally where it is possible to adjust the handlebars) or at the driver's tractor seat. It is important to remember that while driving you should not make any turning maneuvers (the hooves are inserted into the ground) but only small corrections of direction.
To change direction do as follows:
1. Stop the motion of the walking tractor or tractor feed.
2. Stop the PTO motion.
3. Lift the machine using the walking tractor handlebars or the tractor lift group.
4. In order to change direction, place yourself in the track you would like to follow.
5. Lower the machine.
6. Operate again the PTO motion.
7. Operate again the forward motion.

Keep in mind the rules for the prevention of accidents mentioned in Section 5.

5. Always remember to:
- Keep away people or animals from the working area; do not allow anyone to approach the machine while working.
- Never approach to the mechanical moving parts; wear safety shoes. If while working, there is a lot of dust (which will depend on the type of soil) wear a dust mask.
- Do not use the machine in reverse; do not use the machine on steep slopes (verify the walking tractor or tractor instruction booklet).
- Before operating the machine, verify that the safety system of the walking tractor or tractor functions correctly.

10.2 — Power harrow locking

The MILL GRADER Mod. MT – MTL – MTL hi – MTL hi has been designed and constructed so as to minimize the possibility that the mill grader can lock while working.
It is not excluded, however, that this can happen if there are stones or big stones, iron wires or other elements that can fit in or roll in the hooves. In order to avoid the power harrow from locking, we advise to do as follows:
- Before starting to work, remove the big stones, the iron wires, etc. from the surface.
- Adjust the working depth needed.
- Replace the hooves when they are worn out (see paragraph 12).

If the power harrow locks, before making any adjustment, TURN OFF THE ENGINE of the walking tractor or tractor and REMOVE THE KEY. The key must be kept by the person that will remove the stuff that has locked the machine.

To unlock it, remove the stuff with a tool of lengthened shape; do not use the hands. NOTE: usually the machine is unlocked when the walking tractor or tractor engine is turned off as there is no pressure in the hooves that keep the blocking piece.
11 - Maintenance

("note 8 mod. hi")

Operations to be carried out in order to maintain the machine in good working conditions:

- Before using the machine:
  1. Check the clamping of the walking tractor tie-rods on the machine flange.
  2. Check that the screws are tight, in particular check that the hose screws are intact, if while working they break, it is necessary to stop working and replace them.

- At the beginning of the working season:
  1. Grease the roller supports (Fig. 7 Ref. A).
  2. Grease the flange using the appropriate greaser (Fig. 7 Ref. B).
  3. Check the grease level in the tank using the specially provided cap (Fig. 7 - Ref. C), this must be made when the machine has worked for several minutes.

⚠️ During the maintenance operations wear protective gloves; for the lubrication/greasing operations always wear nitrile gloves and protective glasses.

If the maintenance is made on a raised plane (for example on a workbench), always wear safety shoes. All the maintenance work must be performed with the walking tractor or tractor off and the key off.

After finishing the lubrication/greasing operations, clean the residual of lubricant left on the floor.

![Fig. 7](image)

12 - Hoses replacement

The hoses replacement must be made disassembling the roller group and placing the machine on the back side so that the hoses are parallel to the ground. Place the machine on a stable and safe plane. When mounting the new hoses, be sure that the clamping nut fits well in its seat (Fig. 8 Ref. B). It is necessary to use new nuts, bolts and washers each time the hoses are replaced. N.B. Use always original steel bolts. In order to use the hoses as much as possible, the machine has on the sides two extensions (Fig. 6 - Ref. B), this allows to work even if the hoses are worn out, the consumption must not exceed the 2/3 of the hose itself.

N.B. For low-powered walking tractors (8-10HP) check that the PTO height from the ground is at least 28-30 cms. If the height is of 25-26 cms, it is necessary to replace the hoses with shorter ones in order that the machine is in-line with the walking tractor or tractor.

Fig. 8

- A: Steel self-locking nut M10
- B: Nut seat
- C: Hoe fork
- D: Hoe
- E: Plate
- F: Spring strengthened Washer
- G: Steel screw M 10x1,25x45 DIN 960-8.8

Tightening of the hoses screws: 85 Nm

⚠️ While replacing the hoses, wear protective gloves. If the maintenance is made on a raised plane, always wear safety shoes.

All the maintenance work must be made with the walking tractor or tractor off and the key off.

If the tightening of the hoses screws is made with pneumatic screwdrivers, put on ear protections and protective glasses.