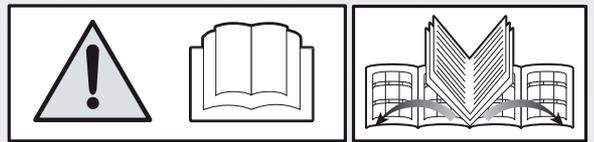


# DM RM

# MAJOR

# Magnum

# Super Rain<sup>®</sup>



- I Istruzioni d'uso**  
Si prega di leggere le istruzioni e di conservarle.
- GB Instruction for use**  
Please read and save these instruction.
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- D Gebrauchsanweisung**  
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Por favor leia e conserve em seu poder.
- NL Gebruiksaanwyzing**  
Lees en let goed op deze advizen.
- DK Bruksanvisning**  
Var god läs och tag tillvara dessa instruktioner.
- SF Käyttöohje**  
Lue ja säilytä.
- S Brugsanvisning**  
Beakta säkerhetsföreskrifterna och var rädd om bruksanvisningen.



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Augusto Ramenzoni  
Presidente



Super Rain®

Matricola/Serial number

Anno/Year

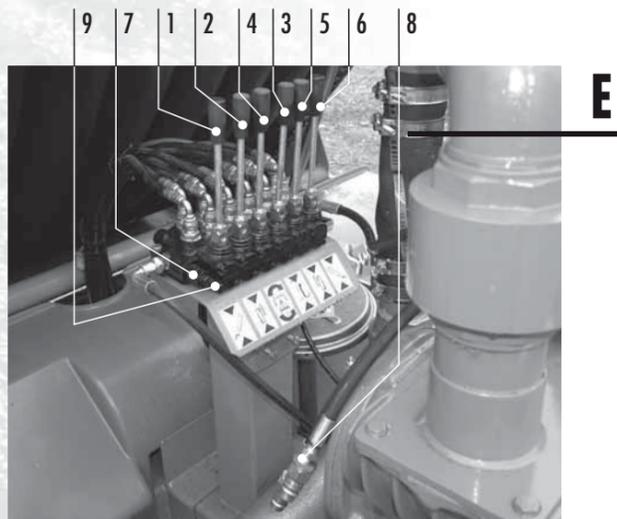
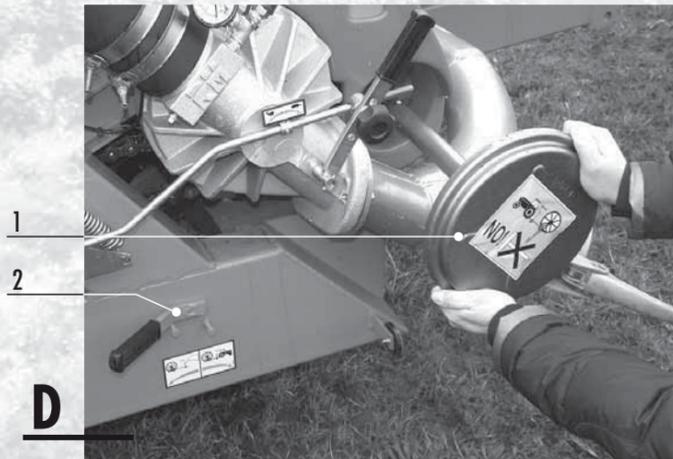
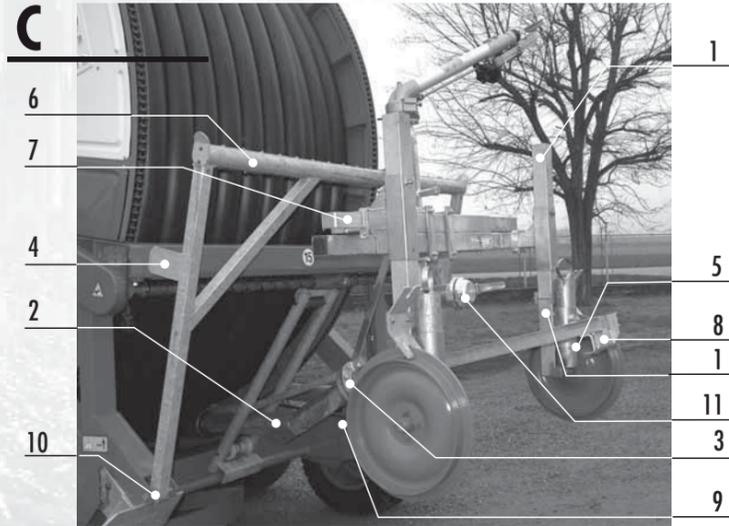
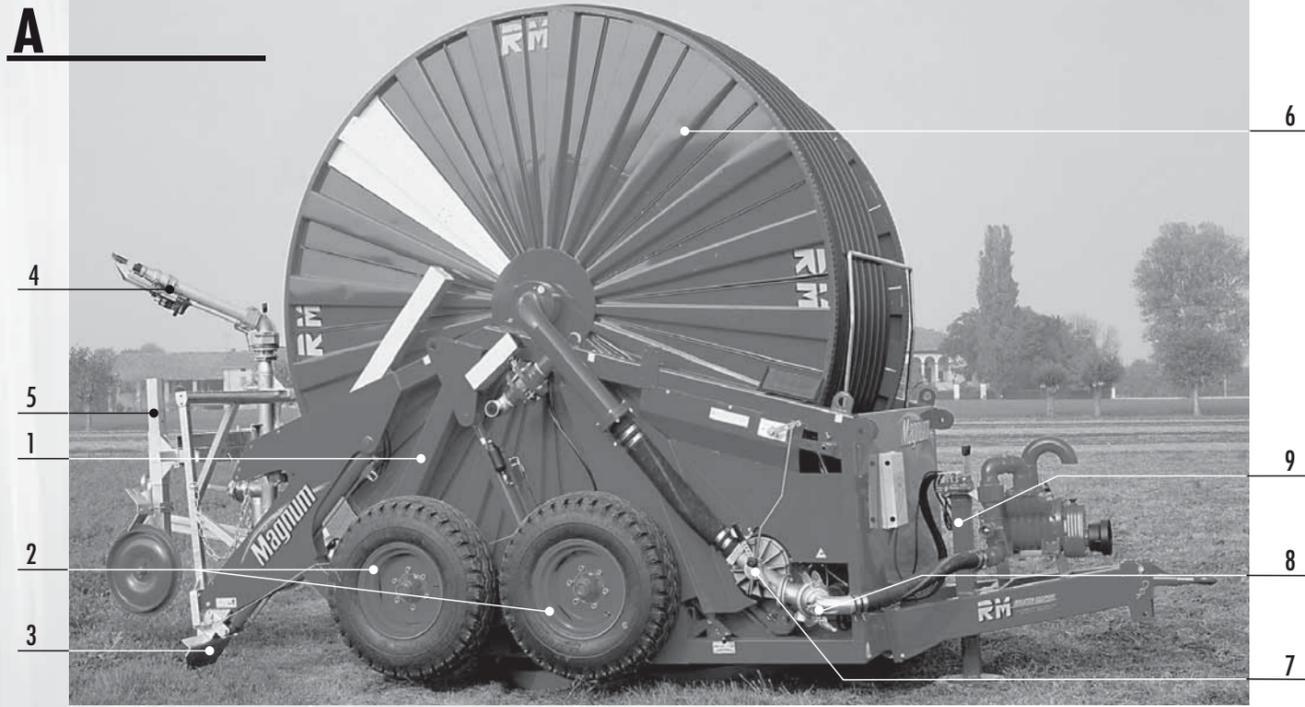
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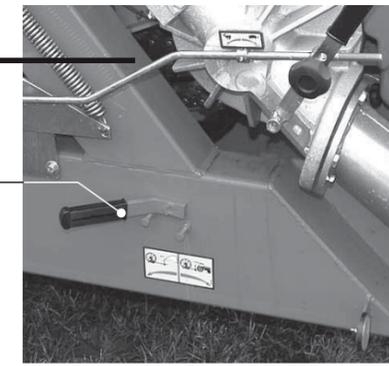
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43010 S. Quirico di TreCasali (Parma) - ITALY  
Telefono 0521.872.321 - Telefax 0521.874.027  
International telephone: +39.0521.872.321

<http://www.rmirrigation.com> • E-mail: [info@rmirrigation.com](mailto:info@rmirrigation.com)



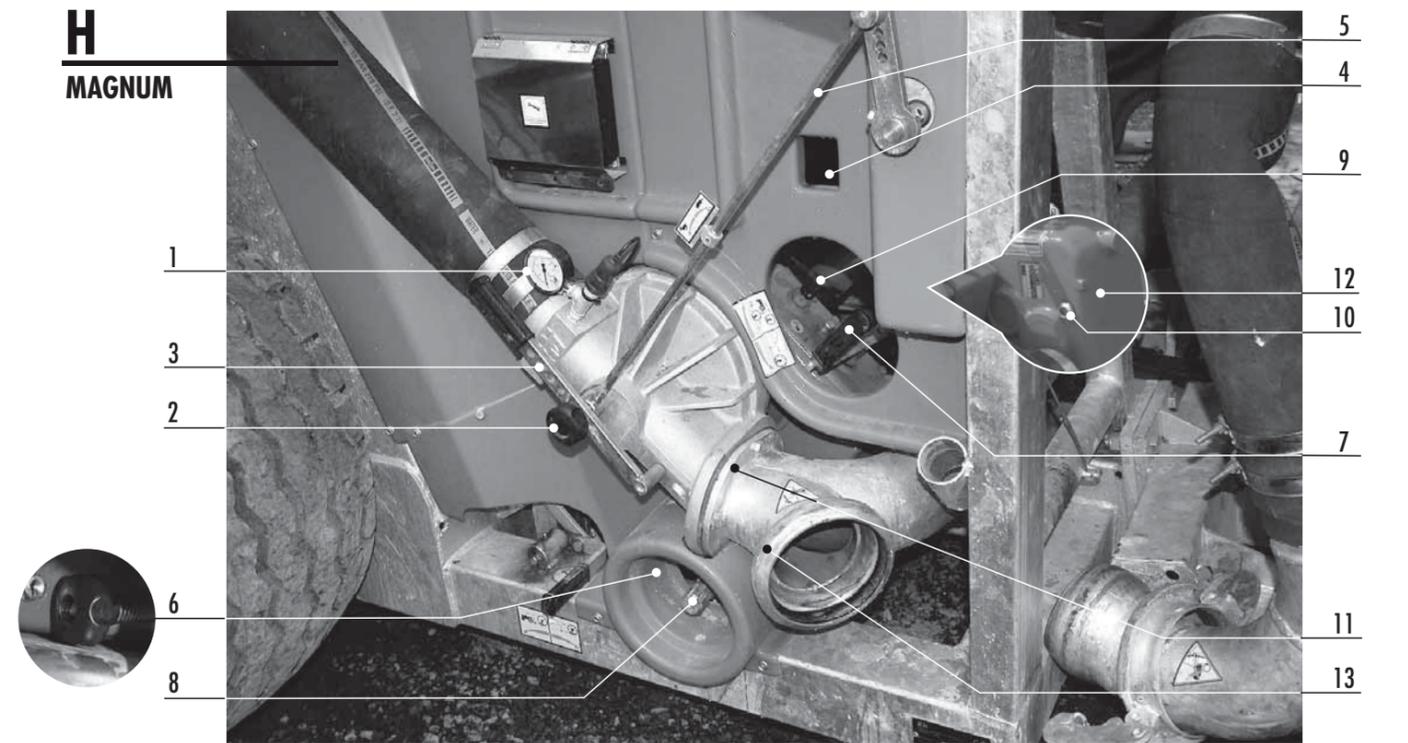
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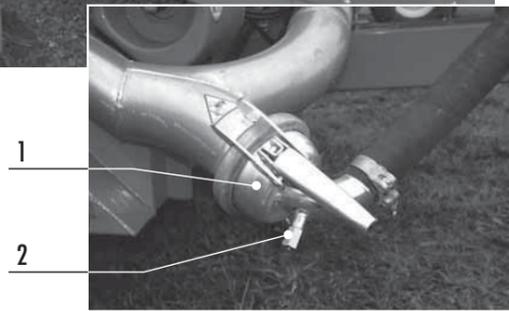
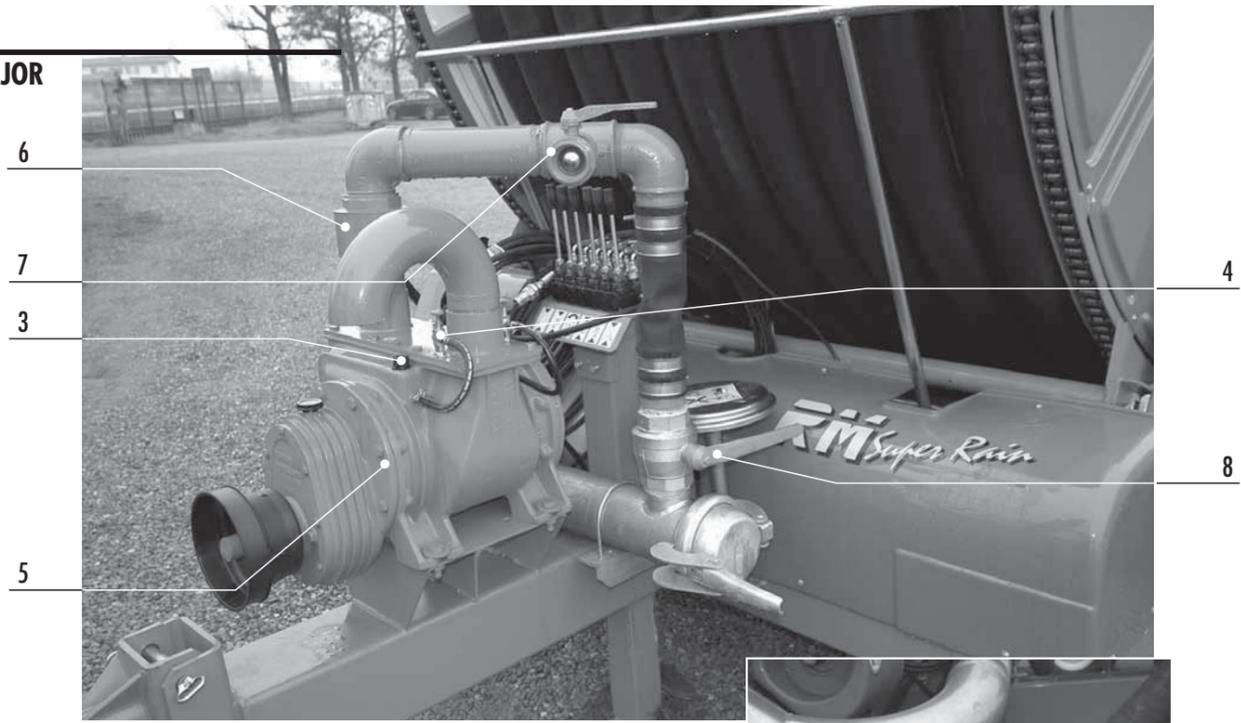


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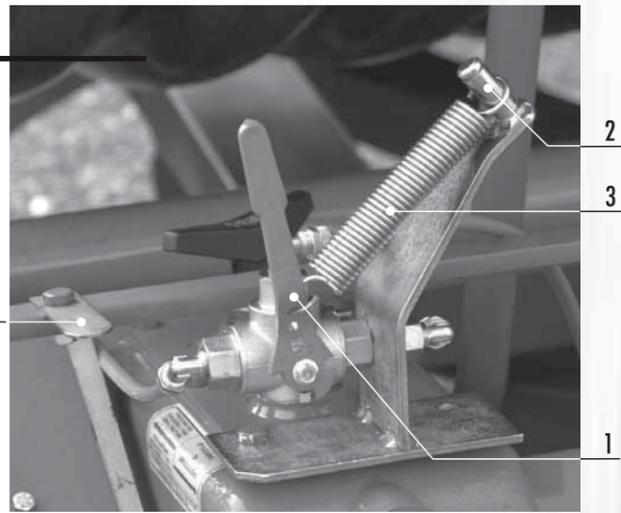


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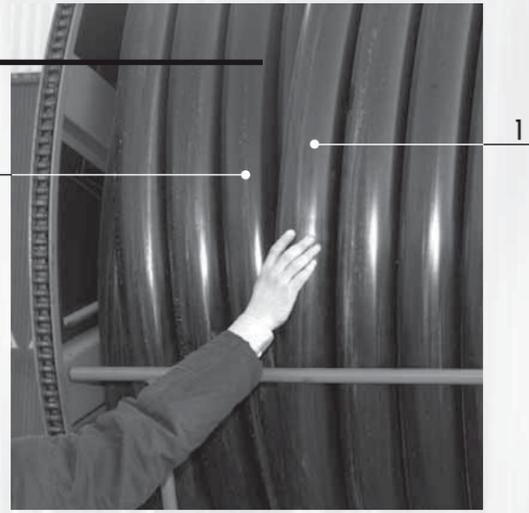
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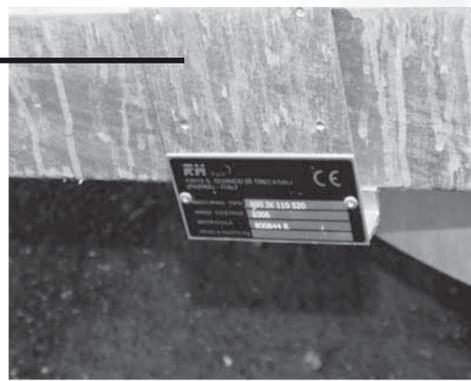
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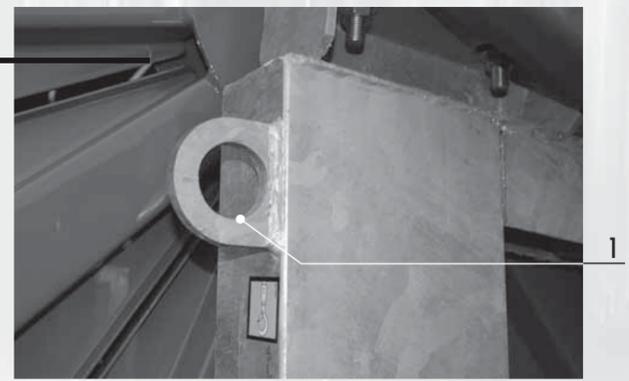
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**M**

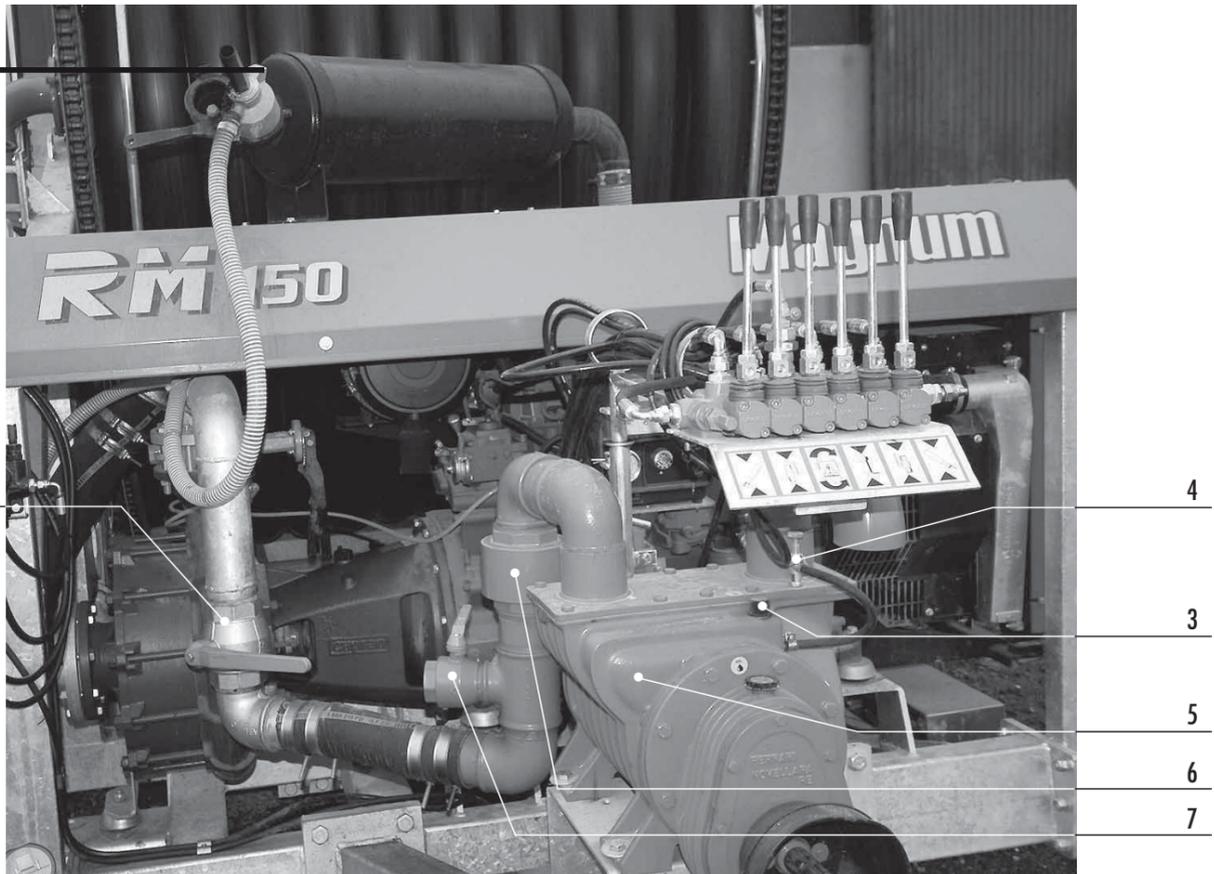


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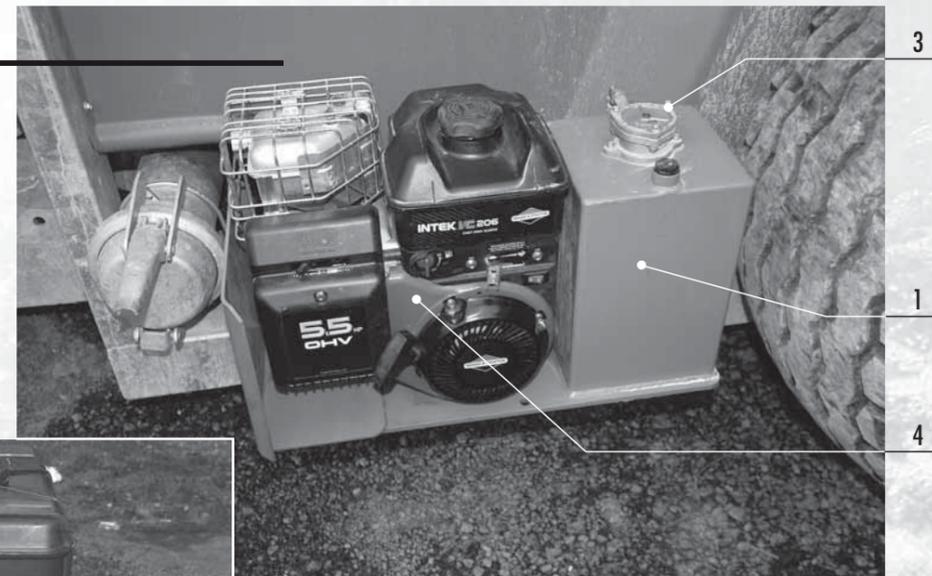


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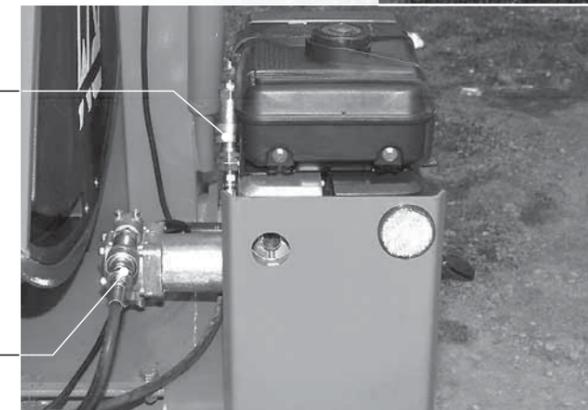
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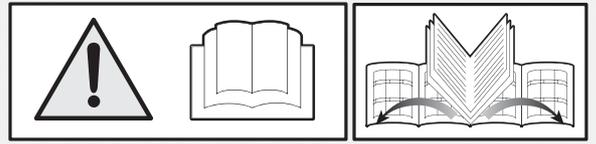
*Super Rain*

# DM RM

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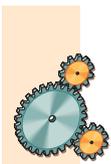
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# INTRODUCTION

## PART I



## NOTICES

This Operating and Maintenance Manual is an integral part of the sprinkler system and must follow the machine whenever sold to another owner or transferred among farms.

The manual should be kept carefully, read and placed readily at the disposal of all persons involved with it. In particular, this manual must be read carefully and fully understood by the machine operators and the people responsible for safety on the farm.

In tune with the overall design of the machine, this manual has been prepared in complete compliance with European Union directives, EEC 89/392, EEC 91/368, EEC 93/44 and EEC 93/68 (Machinery Directives). Furthermore, the manual has been prepared in compliance with the latest regulations and legislation concerning hygiene and safety in the work place published under EEC Directive 89/391.

## LEGEND

The symbols detailed below have been adopted in this manual to warn the reader of potential danger to persons or risk of damage to the machine.

There are two types of symbol:

Danger symbols: are triangular and are used when an operation executed incorrectly can cause serious personal injury.

Warning symbols: are round and used to forbid specified operations to prevent the machine malfunctioning.



**DANGER** Danger of serious personal injury from moving parts.



**DANGER** Generic danger



**WARNING** Generic warning

## WHO TO CONTACT FOR A PROBLEM

When the need arises, the customer can contact our Technical Assistance Service by calling the following numbers:

In ITALY                      0521 872321  
from abroad                ++39 0521 872321

This service offers the customers the solutions to the various problems that can crop up or will provide an on-site visit by a specialist Service Engineer.

Many technical problems can be solved by very minor service work. We, therefore, recommend reading this Manual carefully before contacting our Technical Assistance Service.

## IDENTIFICATION PLATES

Identification plates and stickers are especially important down the years since they ensure that the manufacturer can supply the customer, quickly and correctly, technical information and support services of every kind.

Do not modify or remove the information needed to identify the machine. The actual identification data are indelibly stamped and engraved on a plate. These data comprise everything needed to recognise the machine and should be included in correspondence between the user and the manufacturer-e.g., when asking for Technical Assistance, ordering spare parts, etc.

### IT IS ABSOLUTELY FORBIDDEN TO REMOVE OR TAMPER WITH THE IDENTIFICATION PLATE.

The following data are stamped on the plate:

Essential data to be specified in all correspondence between user and manufacturer:

#### **MACHINE MODEL**

This identifies the model of the machine, the diameter (in mm) and length (in m) of the hose.

#### **YEAR OF CONSTRUCTION**

Specifies the year the machine was built.

#### **SERIAL NUMBER**

Specifies the machine's Serial Number.

<b>RM S.p.a.</b>		<b>CE</b>
43010 S. Quirico di Trecasali (Parma) - Italy		
<input type="radio"/> MACHINE MODEL	<input type="text"/>	<input type="radio"/>
<input type="radio"/> YEAR OF CONSTR.	<input type="text"/>	
<input type="radio"/> SERIAL NUMBER	<input type="text"/>	

***The machine's Identification plate is located on the right side of the machine (looking at the machine from the front drawbar) (see photo M).***

## **TECHNICAL SPECIFICATIONS**

### **- ENVIRONMENTAL SPECIFICATIONS**

- Operating temperature range      min. +10°C max. +40°C.

### **- NOISE LEVEL**

**Due to its very nature, the machine is not noisy.**

### **- SAFETIES**

The machine is complying with European Union Directives:

EEC 89/392 dated 16/6/89; EEC 91/368 dated 20/6/91; EEC 93/44 dated 14/6/93; EEC 93/68 dated 22/7/93 (machine directive); EEC 89/391 (work site safety and hygiene).

### **- SPECIFIED USE**

The RM sprinkler systems: Super-Rain 600XJ-700XJ-800XJ-900XJ-Major are machines used to irrigate any kind of crop provided they are supplied with water under pressure.

Commissioning and operating the machines is extremely simple. However, for correct use of the machine and fully observance of safety regulations, this manual must be read carefully and fully understood.

*We recommend commissioning your machine following the instructions in this manual step by step.*

## **FUNCTIONING**

*The machine described in these pages is a hose-reel irrigation machine.*

It operates by irrigating the soil with jets of water. When the machine is operating, the water is led through a turbine that operates the central motor that rewinds the hose and the return of the rain gun carriage.

## **GENERAL SAFETY NOTICES**

### **OPERATOR REQUIREMENTS**

The sprinkler is a completely automatic machine and, hence, does not need an operator under normal working conditions.

- **Service Engineer (level 1)**

A qualified technician capable of running the plant under normal conditions, run in manual mode, work on the mechanical and pneumatic components to make all the necessary regulations, maintenance work and repairs.

- **Manufacturer's Service Engineer (level 2)**

A qualified technician made available by manufacturer to carry out complicated service work also under special conditions.

## NUMBER OF OPERATORS REQUIRED

The operations described in this manual, covering every stage on the machine's working life, have been carefully analysed by RM Spa. Therefore the number of operators detailed for each operation is adequate for carrying out the operation in the best possible way. The use of a lesser or greater number of people can prevent achievement of the desired results or endanger the personnel involved in the work.



### IMPORTANT

The Table below lists the number of operators required, their professional qualification level and the operations involved.

Operation	Operators	Level
Installing the machine	1	1
Mechanical maintenance	1	1
Extraordinary maintenance	1	1
	1	2

## GENERAL SAFETY REGULATIONS

Safety warnings and notices, in addition to specific notices, have been used in this manual to call operator and servicemen attention to potential dangers stemming from improper use of the machine.

THE INSTRUCTIONS SUPPLIED DESERVE YOUR COMPLETE ATTENTION AND THE ONE OF YOUR PERSONNEL TOO.

- Follow the safety prescriptions given on the machine and in this manual. Do not modify the safety devices. Use the machine in full compliance with its operating instructions.
- Failure to observe safety prescriptions and/or improper use of the machine can cause serious injury to people and domestic animals or damage to property.
- The instructions and safety notices are not intended to take the place of current safety regulations. They are intended to integrate these latter and encourage their application.
- An efficient machine is a safe machine and hence the importance of following the maintenance schedule meticulously.
- Safety notices do not, by themselves, eliminate danger!
- All the information and notices given in this manual do not refer solely to factory new machines but are usually applicable also to second-hand machines.

**GENERAL SAFETY CONDITIONS**

When the machine is put on work for the first time and at start up each day, the automatic cycle, the normal work cycle and, in fact, whenever the machine is used, the following general safety conditions must be applied:

- Before starting the machine, read this manual completely and carefully and apply all the safety prescriptions it details.
- Publicise the contents of this manual with all the people who work with the machine and also with those in charge of safety matters in general.
- Observe general work site hygiene and safety regulations, industrial accident prevention regulations and the prohibitions posted by the manufacturer of the machine to protect people from injury and the machine from damage.
- Do not become over-confident in the use of the machine. Always pay complete attention to what you are doing. Before confirming an operation, check to make sure that everything is in perfect working condition.

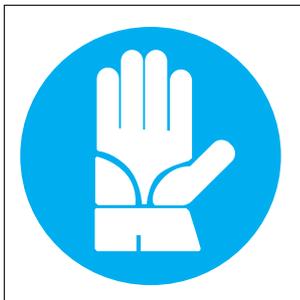
**GENERAL SAFETY REGULATIONS**

**It is very important for the user to observe meticulously all industrial accident prevention regulations. Furthermore, notices should be affixed to the sides of the machine to ensure immediate visual identification of dangerous conditions. These notices should have the following specifications:**

<b>TRIANGULAR</b>	To identify danger
<b>ROUND</b>	To identify prohibited/obligatory actions
<b>RECTANGULAR</b>	To give information

**PERSONAL PROTECTION EQUIPMENT**

When you are working on or near the machine, installing it or routine maintenance and regulation, observe general industrial accident prevention regulations and, in particular:



Do not work with your bare hands.  
Wear adequate gloves.



Wear safety footwear (with steel reinforced toe-cap).

## PROHIBITIONS

The following prohibitions must be observed when operating the machine:

- Do not tamper with or cut out safety devices.
- Do not inspect the machine while it is running.
- Do not sit on the protective casings.
- Do not lean on the machine when it is running.
- Do not sit on the components making up the machine.
- Do not use the machine or parts of it for uses other than those detailed in this manual.
- Regulations to the machine must be done by a single person and while the work is under way, unauthorised people must be kept away from the machine.
- Do not modify and/or move parts of the machine.
- Do not add other equipment to the machine.
- Do not use any kind of solvent, such as alcohol, petrol or thinner to clean any surface on the machine.
- Do not allow personnel whose qualification level is different from those detailed in the section on «MACHINE OPERATORS» to perform any kind of work on the machine.
- Keep hands, arms and, in general, all parts of the body, away from moving parts.
- When trouble-shooting and fixing any kind of malfunction on the machine, apply all the precautions described in this manual. These, in fact, are designed to prevent injury to people or animals and damage to property.
- Before beginning any job, concentrate fully on what you are doing.
- Always be very wide awake and ensure that your reflexes are quick and sharp. This is extremely important for the operator.
- Do not operate the machine or its equipment under the influence of alcohol, drugs or medicine.
- Operator clothing must be as suitable as possible. In other words, not too loose nor too tight. Do not wear flapping or dangling items that could become trapped in moving parts.
- Do not wear belts, rings, bracelets, chains, etc.
- This machine must not be used by people with physical handicaps.
- This machine must not be used by people under 18 years of age.
- It is absolutely forbidden to use the rewinding crank handle improperly (before using it, read carefully the instructions on page 25).
- Do not aim the sprinkler jet towards roads, railway lines and near high voltage lines.
- During work transfers, do not exceed a speed of 15 km/h. (Before rewinding the hose, read carefully the instructions given on page 27).
- Do not use the machine on a gradient of more than 3%.
- Do not disconnect the feed hose when the water is under pressure.



### IMPORTANT

***RM Spa declines any and all liability for defects, injury to people, damage to property and any loss by failure to observe the safety regulations and prohibitions detailed above.***





# HANDLING

## PART II

**TRANSPORTING THE MACHINE**

Use adequate steel wires to load or unload the sprinkler machine. Use the specific hoisting lugs (one or two on each side of the machine's chassis) (See photo N).

Follow these steps to hoist the machine:

1. A portal crane or other lifting equipment with adequate lifting capacity should be available so that you can hoist the machine from above.  
**RM self-propelled sprinklers have not been engineered to be lifted using forklift trucks and therefore, this operation must not be attempted.**
2. Hook the machine to the lifting equipment using wires adequate for the weight to be lifted (refer to the Table below).

<i>MACHINE</i>	<i>WEIGHT kg (empty)</i>	<i>WATER WEIGHT (KG)</i>	<i>TOTAL WEIGHT</i>
600 (110/300)	2500	2000	4500
700 (120/300)	2900	2400	5300
800 (125/380)	3500	3200	6700
900 (125/500)	4750	4200	8950
Major (125/600)	6760	5000	11760

3. Lift the machine up slightly and check to make sure that the load is balanced. In particular, the sprinkler skid **must not be installed** because, if it is, the load will be unbalanced.



**WARNING**

**Hoist the machine only if the angle between the lift wires is less than 40° or 20° to the vertical.**

4. When hoisting the machine pay special attention to make sure that the steel wires do not damage the machine. In particular, make sure that the two sides of the hose reel are not squashed.



**DANGER**

**All loading and unloading operations must be done exclusively by expert and authorised personnel.  
 RM Spa declines any and all injury to people or damage to property caused by incorrect handling of machine parts or their incorrect installation.**

## STORING THE MACHINE

If the machine is not installed immediately and needs to be stored temporarily, it must be stored in a dry covered place.

## DISPOSING OF THE COMPONENTS

The estimated working life of the machine is 25,000 work hours under normal conditions. At the end of the machine's working life, the owner must dispose of it in full compliance with current regulations. First, all lubricants should be emptied out and all the parts cleaned. Then the various materials making up the machine should be separated.

Each type of material can then be disposed of in compliance with the regulations current in the country where the machine is operated in.



### WARNING

During disposal, observe all regulations in force in your country. Store polluting material such as oil and solvents in metal containers.

## MATERIALS USED IN THE MACHINE:

<b>MATERIAL</b>	<b>USE</b>
PAINTED METAL	Chassis
HOT GALVANISED IRON	Rain gun skid
NICKEL PLATED IRON	Fittings
POLYETHYLENE (PEMD)	Hose
RUBBER	Tyres, sleeves
CAST IRON	Gear unit box, hose slide



# INSTALLATION

## PART III



**INSTALLATION INSTRUCTIONS**

1. Before placing the machine on the ground, install the wheels and the drawbar fixing them with the appropriate bolts (pos. 1 & 2, photo B).  
The bolts used to fix the wheels must be fixed with the flat part towards the outside and the convex part towards the wheel.  
**CHECK WHEEL RETAINER TIGHTENING PERFORMANCE AFTER THE FIRST MOVEMENTS.**  
If the machine was shipped out with the drawbar detached, fix it in position using the requisite bolts.
2. Install the rain gun skid as shown in the photograph. Beforehand, use a file to remove any burrs left by the galvanising process.  
Make sure you do not switch the leg mountings around (pos. 7, photo C): the fixing bracket must always clamp the leg mountings on the wheel side (not on the opposite side). Fix the legs (pos. 1, photo C) with the pins in the topmost hole.  
Screw in the carriage lift device (pos. 6, photo C) with its screws (pos. 10, photo C) fixing it at a middle position along the screw.
3. Pull out about 2 m of hose (pos. 2 photo C). Refer to the section on "USING THE MACHINE" for complete instructions on how to do this.  
Screw on the flange (pos. 3, photo C) to the tailstock (pos. 2, photo C) using the bolts in the kit. Don't forget to install the rubber sealing O-ring on the flange. Reel in the hose with the crank to raise the carriage with the hydraulic lift (pos. 6, photo C).  
At this point the carriage track can be regulated for the area the machine will be working in. Wheel track (measure from wheel centre to centre) should never be less than 1.9 m. A lesser carriage track can prejudice stability during operation.  
If the nozzle installed has a diameter of more than 30 mm, the carriage track should be at least 2.4 m.
4. Position the round steel ballast sections in the machine's equipment kit. These will be installed on the ballast holders (pos. 5, photo C) on the carriage legs.
5. Install the machine's rain gun fixing it to its carriage skid (pos. 5 photo A).  
The tapped fitting on the skid carriage must be covered with Teflon or other sealing material before screwing down the rain gun.  
Tightening performance on the rain gun must be extremely firm to prevent it from working loose during operation. Tighten it using a socket wrench.
6. Make a preliminary regulation of the rain gun's sector and install a nozzle sized for the water supply volume.
7. Check to make sure that the stop dog is inserted in the chain (pos. 4, photo F) and check if the carriage life mechanism (pos. 6, photo C) is at end travel (that is, with the stops near the machine).
8. Insert two hydraulic fittings (photo E POS.8) into the tractor's hydraulic plant. To operate the hydraulic plant on RM sprinklers, the tractor must be equipped with at least a double acting spooling valve with the lever locked in one of the working positions. If the tractor has an adjustable pressure hydraulic pump, the pump must be set for medium low pressure settings (max. 180 bar).  
To lift the machine from the ground, use the spooling valve levers on the sprinkler (photo E).

Depending on the hydraulic layout ordered by the customer, the levers will have the following functions:

- 2 LEVER SYSTEM:	Lever 1 = left wheel;	Lever 2 = right wheel
- 3 LEVER SYSTEM:	Lever 1 = left wheel; Lever 3 = right wheel	Lever 2 = drawbar support foot;
- 4 LEVER SYSTEM:	Lever 1 = left wheel; Lever 3 = turntable rotation;	Lever 2 = drawbar support leg; Lever 4 = right wheel.
- 5 LEVER SYSTEM:	Lever 1 = left rear bracket; Lever 3 = drawbar support leg; Lever 5 = right rear bracket	Lever 2 = left wheel; Lever 4 = right wheel;
- 6 LEVER SYSTEM:	Lever 1 = left rear bracket; Lever 3 = drawbar support leg; Lever 5 = right wheel;	Lever 2 = left wheel; Lever 4 = turntable rotation; Lever 6 = right rear bracket.



**USE THE LEVERS ONE AT TIME TO RAISE THE MACHINE WITHOUT TILTING IT. RAISE THE DRAWBAR TO THE TRACTOR'S TOW EYE.**

Fix the wheel adjustable position rods using the requisite pins as shown in pos. 1 photo F (only for 700-800-900).

9. Hook the machine up to the tractor and take it to its work site (refer to the following section).
10. Check to make sure that one of the couplings on the hose supplied in the machine's kit is compatible with the fittings on the line supply water to the machine.



### WARNING

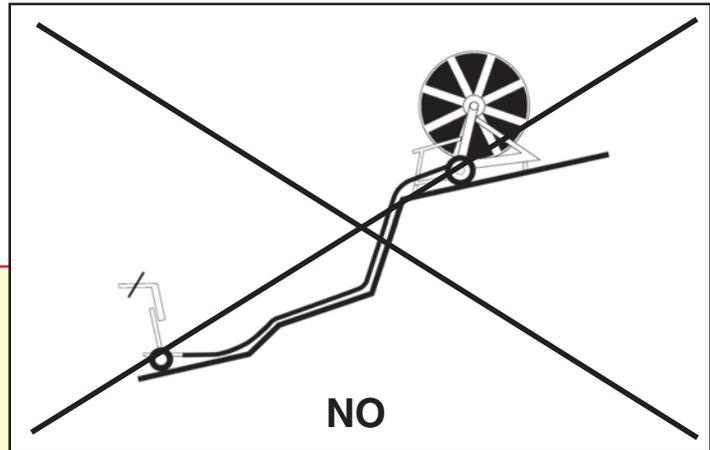
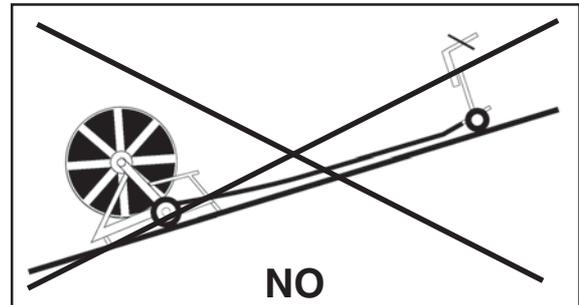
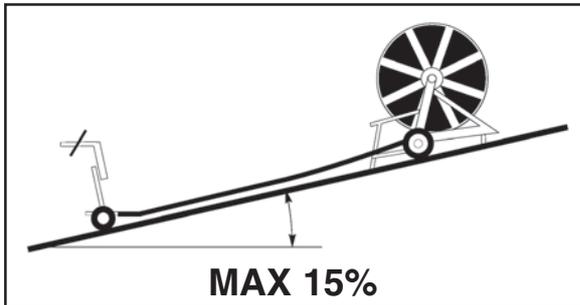
**RM Spa declines all liability for injury to people or animals or damage to property caused by oversight or improper installation and connection work carried out on the machine.**



**USING THE SPRINKLING SYSTEM ON LAND THAT IS NOT FLAT**

The RM sprinkler is a machine designed to work on flat land but, in exceptional cases, it can be used on hilly land. In this case, a number of conditions must exist:

1. The gradient must not exceed 15%.
2. There must not be large differences in level along the route followed by the rain gun.
3. The rain gun carriage must be perpendicular to the down gradient.
4. The rain gun carriage must be perpendicular to the axis of the reeling in drive motor.
5. The rain gun carriage must always be downstream from the reel carriage;



**DANGER**

**It is absolutely forbidden to work on land with abrupt drops**

# USING THE MACHINE

## PART IV



**OPERATING CONDITIONS**

1. The machine must be towed by a tractor whose weight is greater than or at least equal to the weight of the machine plus the weight of the water inside the hose. For more details on this refer to the section on "TRANSPORTING AND HANDLING THE SPRINKLER".
2. The Highway Code current in the country of use must be followed whenever the machine is transported on road.

*Note that RM sprinkler machines are not certified for on-road operation.*

The machine must be fitted with a rear light assembly connected to the tractor's electric system and attached on the back of the machine, i.e. on the rain gun skid carriage.


**WARNING**

**RM Spa recommends all users of its equipment to obtain information on the current Highway Code in force in the country where the machine will be used. RM Spa declines all liability for injury to people or damage to property caused by road accidents.**



**Tractor speed when towing RM equipment must not exceed 15 Kph. Speed higher than this can cause the sprinkler's tyres to explode with serious consequences for operator safety or that of other users of the road.**

3. Water supply to the machine must be done by means of a pressurised water line (*supplied by the mains water supply, a pump connected to a tractor, an electric pump, etc.*).

It is essential that the operating pressure at machine intake is between 3 and 12 bar (pos. 1, photo H) at the volume indicated in the rain gun's user Chart. Pressure must be constant and at full operating volume, must not vary by more than 1 bar.

If the supply water line is subject to the so-called "hammer effect" (*this is often in the case of water company supply lines*), a pressure relief valve set at 11-12 bar should be installed at machine intake.

**Failure to take this precaution can cause serious damage to the machine and also be a source of danger to the operator.**

*It is recommended to check to make sure that the fittings used on the water feed line are good quality. It is absolutely not advised to change the fittings factory installed on the hose with others available on the market.*

4. RM sprinkler systems have been designed to have a centre of gravity as low as possible. However, it is good standard practice to pay special attention when operating or simply towing on rough roads, gradients or bad surfaces in general.

It is important to remember that, once the machine has been used for the first time, the water in the hose will not only increase the weight of the machine but also shift its centre of gravity upwards. This means that there is an increased risk of the machine tipping up or over.


**WARNING**

**Do not operate with the machine inclined at an angle on gradients higher than 3%. This is extremely dangerous.**

Position the machine at its work area. The sprinkler *will appear as illustrated in Photo A.*  
*To make it operational, the following steps will be required:*

- A. Leave the hydraulic line quick couples attached to the tractor or, if installed, the hydraulic pump. Use the spooling valve to operate the equipment. If the tractor does not have a mechanical retainer on its spooling

valve, you will need a second operator whose job is solely to hold the spooling valve on the tractor in the required position.

- B.** Use the RM machine's spooling valve to operate the drawbar support foot. Raise it and thus release it from the tractor's towing hitch.  
If a mechanical support leg is fitted, use the hand crank to raise it.
- C.** Get back on the tractor and move it about 0.3 m from the machine.  
When this operation is executed, pay special attention:



### WARNING

**Drawbar support foot lowering must be done by a single person who must check to make sure there are no obstacles in the contact zone.**  
**RM Spa declines any liability for injury to people or damage to property caused by failure to observe this safety regulation.**

- The ground under the support leg must be compact. If not, put a piece of wood under the foot to increase its contact surface.
  - Never put your feet under the drawbar support foot.
  - When you move the tractor away, check to make sure you do not over-stretch the hoses connecting to the hydraulic system.
- D.** At this point, move the right and left wheel to release the safety pins (pos. 1, photo F) once you have pulled out the locking clips (pos. 2, Photo F) (only for 700-800-900).
- E.** Put the pins in the housings (pos. 3, Photo F) and use the spooling valve wheel controls to lower the machine.  
Lower the machine to the ground alternating between the wheel levers and the drawbar support foot lever so that the machine is lowered without tilting excessively.



### WARNING

**If the machine is tilted at an excessive angle, it can tip over and this is a very dangerous situation. RM Spa declines any liability for injury to people or damage to property caused by the machine tipping over.**

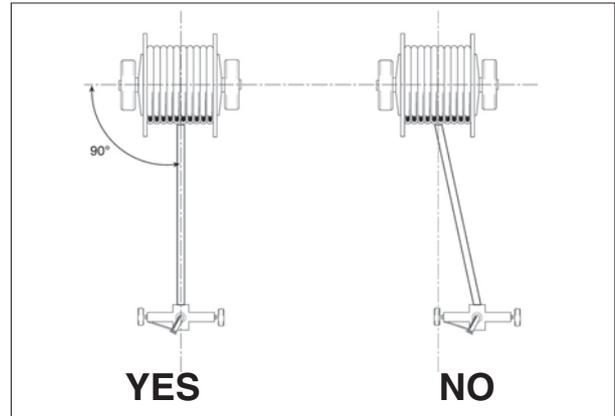
- F.** Check to make sure that the wheels are fully raised. The drawbar support foot (pos. 9, Fig. A) and the rear support legs (pos. 1, Fig. G) must also be raised. At this point you can turn the machine in the direction in which the hose is to be reeled out.  
The machine is turned manually by pushing on the back of the rain gun carriage (pos. 5, photo A). You can do this with very delicate movements of the hydraulic revolver (optional). Use the hydraulic revolver very carefully keeping at least 1 m from the machine's drawbar. Check to make sure there are no bystanders in the machine's working range.
- G.** When the machine is turning on its turntable, check to make sure there are no obstacles on the ground that could bump against, for example, the rear support legs (pos. 1, photo G), the rain gun carriage wheels or other elements. If present, these obstacles must be removed because they can cause serious problems later when it comes to realign the machine at the end of a work cycle (they can also damage the hydraulic revolver system if installed).



- H. Place the hose reel so that it is perfectly lined up with the direction in which the hose will be unreeled. To do this, use as your reference point the side of the reel opposite the turbine gear unit side.

Reel alignment is particularly important for unreeling since this ensures excellent working performance and, more importantly, good re-reeling. The hose can be unreeled even if the ground is not perfectly flat. What ever the situation, the first 50-60 meters of hose leaving the machine must be perfectly lined up with the reel.

If it is not possible to line the hose up perfectly with the side of the reel, the machine will have to be repositioned.



- I. Once the reel has been lined up, lower the rear support legs (pos. 1, photo G) to the ground using the spooling valve levers (pos. 1 and 5, photo E). They can also be lowered manually if the machine is equipped with mechanical rear support legs. In either case, the rear support legs must be in firm contact with the ground so that the turntable on which the machine rests on is actually slightly raised.



### WARNING

**If the rear support legs are not firmly in contact with the ground, this can cause the machine to rotate when the hose is being reeled in and this can cause the hose to break.**

The ground under the rear support legs must be very solid and compact. The rear legs must never extend more than 37 cm from their housings.

Wheels and the drawbar support leg must be raised from the ground when the machine is working.

RM Spa declines any liability for injury to people or damage to property caused by failure to observe these regulations.

- L. At this point, switch the tractor off and use the tractor's spooling valve (with the engine off) to dump the hydraulic fluid in the circuit and disconnect the hoses from the tractor. Coil them and replace the ends (that is, the quick couplers) in their housing (you can see them in photo E).

If the tractor is not used for other work, the hydraulic hoses can be left attached to the tractor.

Regulate rain gun carriage wheel track using the fixing bolts. The track must never be less than 2 m and the distance between the wheels and the axis of the rain gun must be the same for both wheels.

Tighten firmly all the bolts on the carriage and check to make sure the pin is in the top hole of the wheel rod (pos. 1, photo C).



### WARNING

**If the level difference is between the rain gun carriage wheels and the machine wheels is more than 0.3 m, the sprinkler machine will have to be repositioned to eliminate this condition. It is also important to check to make sure that the rain gun skid wheels are not in a dip when the carriage contacts the disengage bracket (pos. 6, photo C).**

The machine is now ready to have the sprinkler hose reeled out (see the following section).

## REELING THE HOSE OUT

Follow these steps to reel the hose out correctly:

1. Disengage the ratchet stop dog by turning it 180° from the position shown (pos. 2, photo D). To disengage the stop dog easily, turn the PTO (pos.8 photo H) slightly counterclockwise with the handle (pos. 1 photo D).



### WARNING

**After this operation, immediately remove the handle and put it on its support. The forgetfulness of the handle on the PTO can cause big damages to the machine and injury the operator!**

2. Position the gear drive lever (pos. 7, photo H) pulling it towards the rain gun skid carriage (that is back). The gear lever does not need to be touched (pos. 9, photo H).
3. The brake/gear unit (pos. 6, photo H) is factory calibrated. This system brakes the hose when it is being reeled out but does not do anything when it is being reeled in. These conditions are automatically selected by the machine.  
If an adjustment has to be made, use the appropriate handwheel but make use the braking action is not too high since this can cause mechanical problems.  
Braking function regulation should always be with the handwheel (pos. 6, photo H) with very slight adjustments per time.
4. Hook up the rain gun skid carriage tow coupling (pos. 8, photo C) to the tractor. The tractor's lift arms should be fitted with a steel cross-bar.
5. Unreel the hose by towing the rain gun skid carriage in a straight line and, more importantly, at a low speed (max. 3 Kpm).



### WARNING

**IT IS ABSOLUTE FORBIDDEN to accelerate abruptly, slow down suddenly or change gear when unreeling the hose.**

If this prohibition is not observed, there is a real risk of over-running the hose and breaking it.

Leave at least one and a half turns of hose on the reel. If the machine cannot be seen at the end of the unreeling, have a second operator give a clear and certain signal that the hose is approaching the end of the reel. This will prevent the hose from being detached from the machine.

6. When the hose has been unreeled, before going back to the machine, check to make sure that the rain gun carriage is correctly positioned.
7. Reinsert the stop dog (pos. 2, photo D) and check to make sure that the turns of hose still on the reel are nicely close together (pos. 1 photo L).  
If they are not, bring them together and tension them using the crank on the PTO (pos. 1, photo D). As soon as this operation has been completed, remove the crank handle immediately!



### DANGER

**Do not use this crank when the hose is being reeled in.**





**DANGER**

Do not begin to reel in the hose if the turns are not perfectly next to each other on the reel. There is a real danger of getting your hands caught and crushed by the coils. Be extra careful and vigilant whenever working on the reeled in hose.

8. Connect the delivery coupling to the water feed line. If the fittings are very stiff, lubricate the rubber seal on the ball joint.

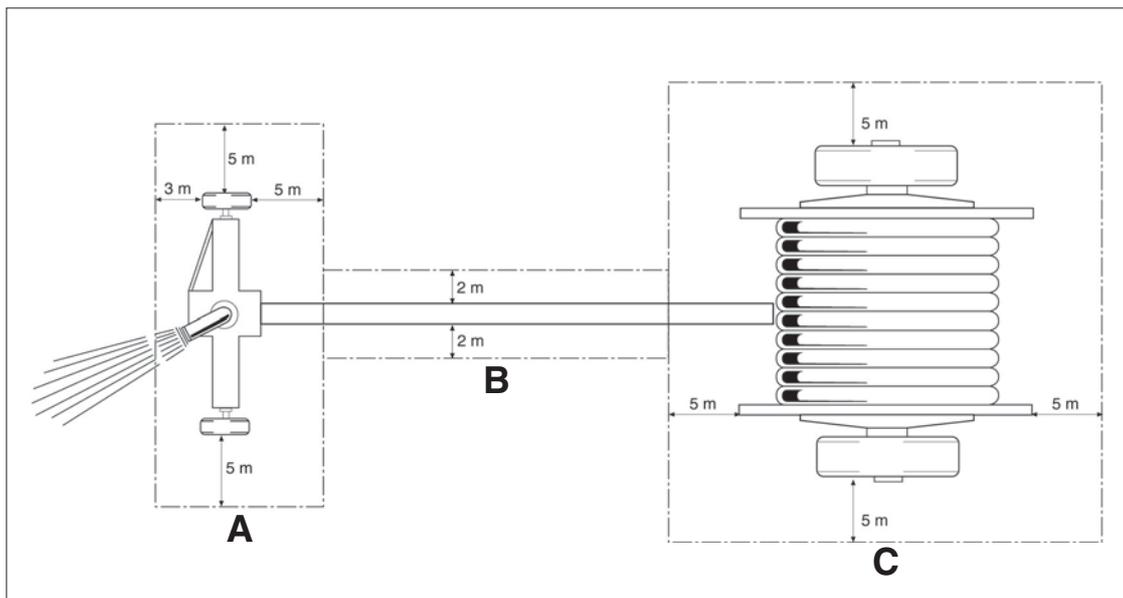
You can now feed in the pressurised water supply by opening *very slowly* the supply valve and accelerating *very slowly* the feed pump motor.

Wait until the hose fills completely with all the air vented from the water line. Then increase the water supply to the operational level.

Leave the machine with the lever (pos. 7 photo H) in the position used to unreel the hose, carry out a sprinkling cycle without reeling in the hose.

For best results, leave the lever in this position for at least 15 minutes. Then move the lever to the position for reeling in the hose.

To give you a clearer vision of what is meant by “safety distance”, the illustration below summarises the distances to be observed during the various stages.



Three operational areas are shown:

**A =** The rain gun carriage: this is where irrigation actually takes place. The minimum distances are 5 m at the sides and 3 m from the back.

**B =** Hose: the water transfer area is not dangerous but it is better to maintain a safety distance of 2 m.

**C =** The sprinkler machine: The danger is higher here and a safety zone of 5 m should be maintained around it.

## MACHINE DRIVE AND SPEED ADJUSTMENT

Engage the drive lever (Pos. 7, photo H) and use the gear lever to engage the desired drive speed (pos. 9, photo H). To adjust the speed: slacken off knob (pos. 2 photo H), engage the manual by-pass valve (pos. 3, photo H). Set the speed as required and then re-tighten knob (pos. 2, photo H) to lock the machine at that speed.

**It is important to achieve maximum performance with minimum loss of pressure inside the turbine, to use the machine with the manual by-pass as open as possible. In other words, using the highest speed possible (for example: 3rd or 4th gear) so that turbine Rpm is as low as possible.**

It is good standard practice to make the definitive reeling in rate setting after the lever has been engaged for some minutes (pos. 7, photo H) so that the hose has been pit into traction.

The working pressure and reeling in rate can be read off the instruments on the machine (pos. 1 and 4 photo H). Refer to page 34 for instructions on the VDO digital tachometer.



### IMPORTANT

**When the machine is operated at maximum speed, the load loss inside the turbine increase considerably but this is normal.**

## AUTOMATIC SPEED COMPENSATION

The machine has an automatic speed compensation system that permits the rain gun carriage to be reeled in at a constant speed throughout the irrigation work.

This regulation is done by means of a control operated by a probe on the hose at the back of the machine and this in turn acts on the main by-pass valves.

A machine with 300 meters of hose set for a reel in rate of 20 m/h must have an irrigation time of 15 hours.

If there are more hours (16), there is very little compensation and the control lever must be moved downwards using the holes on the lever (pos. 3, photo H). If there are less hours (14), compensation is high and the lever will be moved upwards using the same reference holes.

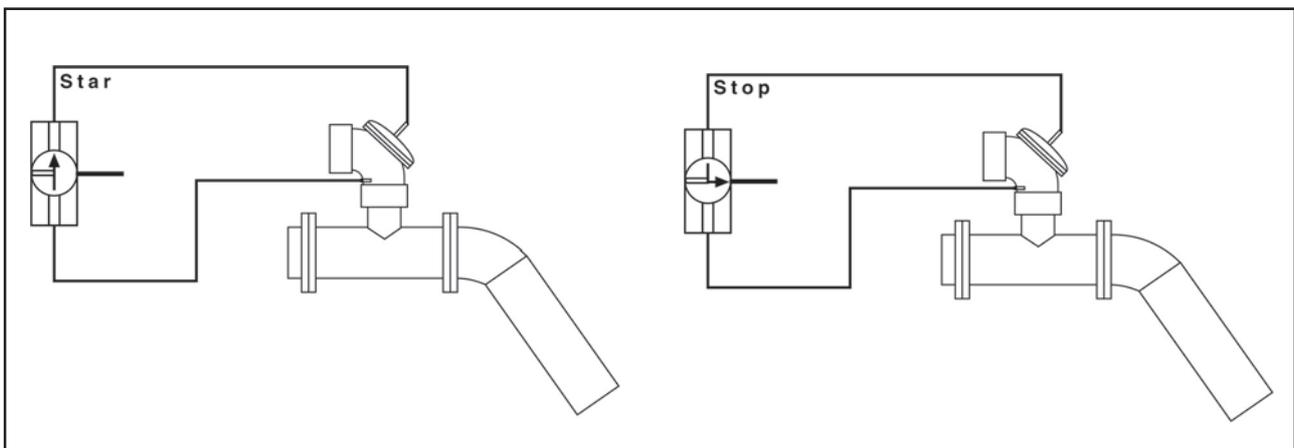
A further regulating device is on the opposite side of the control lever (empty tapped hole). This latter adjustment is used only in exceptional cases. It is important that the speed is measured with the help of a chronometer to determine the exact time (this regulation device is installed on all models built after 1/1/96).



### DRAIN VALVE (IF INSTALLED)

If the machine has an automatic water drain system at reel in end (optional for all models: it works by means of a water valve piloted by the drive motor), the following instructions should be followed:

1. If you do not want to drain the water at the end of the reel in, pull spring (pos. 3, photo I) from the pin (pos. 2, photo I) and release the lever on the 3-way valve (pos. 1, photo I) above the stop (pos. 4, photo I). When the carriage reaches its limit stop, the machine will stop automatically by disengaging the drive unit without opening the drain valve.
2. If you want to drain the water at the end of the reel in: fix the lever (post 1 photo I) above the stop (pos. 4, photo I) holding spring (pos. 3, photo I) in traction. At the end of the carriage travel and before the gear unit stops, the drain valve will automatically open.



### END TRAVEL WATER SHUT OFF VALVE (IF INSTALLED)

If the machine has an automatic end travel water shut off system (optional available for all models: it works with a water piloted water control valve), apply the following instructions:

1. This accessory can only be used on machines supplied from pressurised water line. Do not use this accessory with machines supplied directly by electric pumps or engine-driven pumps.
2. It is essential to check to be sure that the fittings used to supply water to the machine are good quality and, above all, capable of carrying the pressure peak generated when the valve closes (this check should be made by a technician with plumbing and hydrodynamic expertise).
3. If you do not want to shut off the water at reel in end, pull spring (pos. 3, photo I) from the pin (pos. 2, photo I) and release the lever on the 3-way valve (pos. 1, photo I) above the stop (pos. 4, photo I). When the carriage reaches its limit stop, the machine will stop automatically by disengaging the drive unit but without shutting off the in-feed water (thus the machine will continue to irrigate). In some versions, the system used to cancel this valve's operation is a small cock on the 3-way switch. To prevent the valve from closing at the end of a cycle, it is sufficient to close this cock.  
*There is no need to move lever (pos. 1 photo I) under stop (pos. 4, photo I).*
4. If you want to drain the water at the end of the reel in: fix the lever (post 1 photo I) above the stop (pos. 4, photo I) holding spring (pos. 3, photo I) in traction.

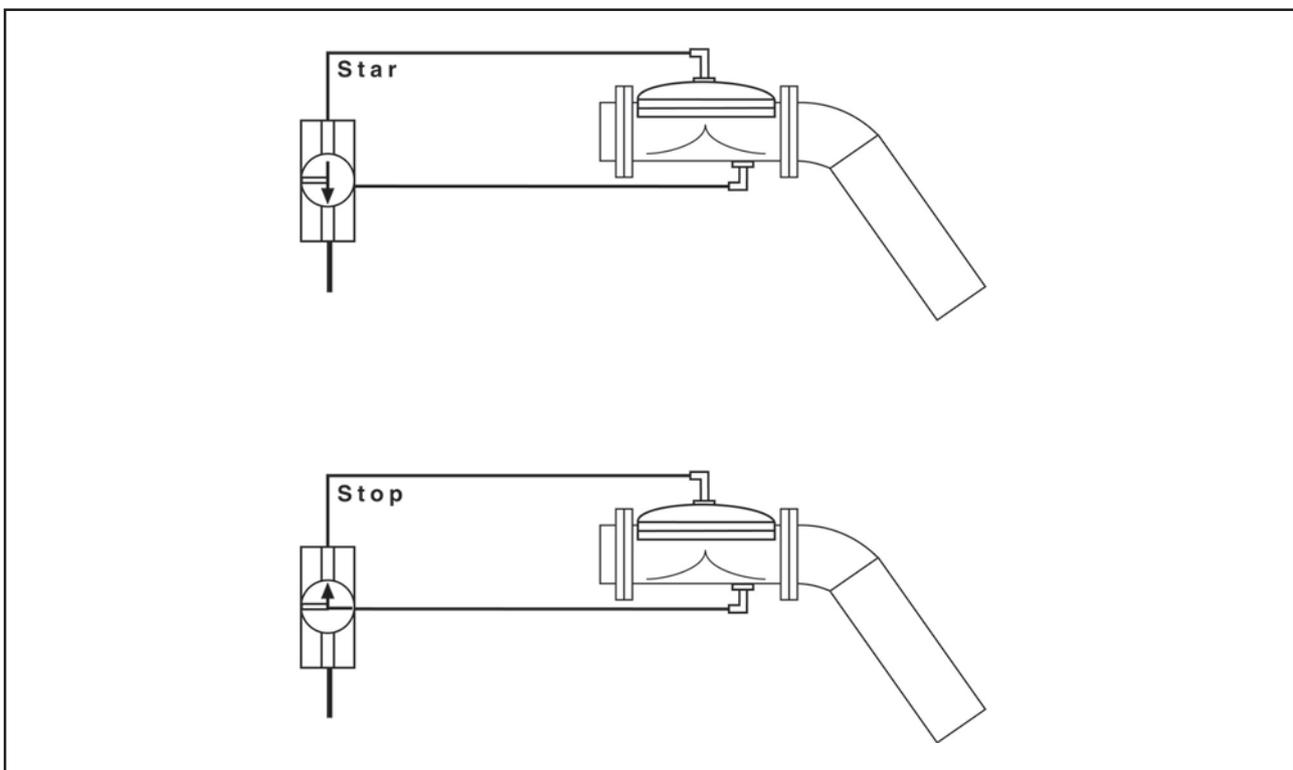
At the end of the carriage travel and before the gear unit stops, the water piloted valve will close and prevent the water from draining.



## DANGER

Before disconnecting the water supply from the machine, check the pressure gauge (pos. 1, photo H) for the pressure inside the feed line; if the gauge shows even a minimum pressure, **it is absolutely essential to vent off the remaining pressure in the machine's supply circuit.**

To do this, close the water supply upstream from the machine and then open the drain cock by the gauge (pos. 1, photo H). *This cock is installed only on machines with the optional end travel water shut off valve.*



On the water piloted shut off valve kit produced after 1/9/96 a ball valve with big diameter has been installed before the piloted valve. This is used to drain the water from the reeled in hose when it is unreeled by the tractor. To drain the hose in this way, open the ball cock before unreeling the hose and close it when the hose has been unreeled.



## FAST HOSE EMPTYING AND REWIND

To empty the hose, it should be unwound for not more than 50% of its length following the instructions given in the section on "UNREELING THE HOSE".

Reel the hose back with the PTO (pos. 8 photo H) with the gear unit lever in the disengage position (lever pos. 7 photo 7); it must be moved towards left, looking at it from the front side, and the joint must be disconnected (pos.3 photo C).

The hose must be reeled in exclusively with the PTO running at 540 Rpm at low speed and a sufficiently long PTO shaft for max. 30 Hp transmitted power.

When the rain gun carriage is close to the end travel bracket and the hose reeled out 1 m, it must be reeled in completely with the requisite crank handle (pos. 1, photo D).



### WARNING

**Reeling in with the PTO shaft will not stop automatically and therefore this operation must be done with the utmost care and attention.**

**Do not use the crank handle when the hose is reel out for more than 1 m because handle spring back, caused by the elasticity of the hose, could cause serious injury to operator limbs.**

## USING AND REGULATING THE SPRINKLER

Follow meticulously manufacturer instructions. You will find these in the spare nozzle box.



### DANGER

**To ensure your safety, do not aim the water jet towards high voltage lines. Always check to make sure that the jet is never directed towards houses, paved roads, electric cabins, etc.**

**You will be held liable for any damage done if there is a power down or other problems caused by your irrigation work.**

## USING THE COMPRESSOR

A compressor (pos. 5, Fig. 0) can be installed on all models to empty the water inside the hose.

This accessory can be supplied when the machine is purchased or retrofitted later.

If it is ordered after the machine has been delivered, specify if the machine's drawbar is already pre-engineered (standard on all models from 1/1/96) with the distance between centres for the 4 fixing holes.

When the compressor is powered by a tractor, it blows air back down the hose and drives the water in the hose out through the rear plug on the rain gun (pos, 11, photo C).

This system evacuates 70% of the water in the line, provided that the water discharge is made immediately after the end of irrigation, when the hose is still completely full. After 5-10 minutes from end of irrigation, the hose's self-discharge could create air inside of it: this can make the emptying more difficult or impossible with the compressor.

Follow these steps to operate the compressor system:

1. Connect the ball coupling (pos. 1, photo O) to the water in-feed (pos. 13, photo H) making sure that the connection is perfect.
2. Remove the plug from the rear drain opening on the rain gun carriage (pos. 11, photo O).
3. Connect the compressor's PTO to a tractor rated at least 100 Hp using a PTO shaft rated for a power transmission of at least 80 Hp. Check to make sure that the plastic casing on the Cardan shaft and those on the PTO are fully compatible and, above all, not damaged. If they are not compatible or damaged, change the casings.



### DANGER

**Don't use the compressor together with other transmission systems.**

4. Check to make sure that the lubricating oil tank is full (about 23lt). Check the level (pos. 3, photo O) and if necessary top up with oil (see "TABLE OF SUGGESTED OILS").  
It is good standard operating practice when the compressor is used for the first time or after a long period of inactivity (for example, after its winter storage), to put about 0.7 L of fluid directly into the air intake (through the sleeve pos.4 photo O). Also do this at the end of the season by pushing a rubber hose into the air suction line and then fill the compressor using a funnel.
5. Open the lubricant batching valve (pos. 4, photo O) completely and operate the compressor solely with the PTO at 540 Rpm running the tractor at around 1800-2000 Rpm until all the water has drained from the hose.



### WARNING

**The compressor must only run continually for a maximum of 4 minutes. Do not operate it for a longer period since you run the risk of overheating the compressor which, in turn, can cause its vanes to break.**

6. Regulate lubrication when the compressor is running using the batching valve (pos. 4, photo O). You must be able to see the oil through the sight glass in the valve. A thin trickle of oil must drop continually. When the water, which flows out from rear trolley outlet, is finishing, before stopping the tractor, slightly open the valve pos.7 photo O and in the meantime slightly close the valve pos.8 photo O. Continue this operation until the complete closing of the valve pos.8 and opening of the valve pos.7; then stop the tractor.



- Once the hose has been emptied, stop the tractor and vent any pressurised air still in the hose connected to the machine.


**WARNING**

Open the stop cock (pos. 2, photo O) and wait until all the pressurised air has vented out. Water can also come out of the air vent orifice during this operation but this is completely normal.

- Do not leave the ball coupling (pos 1, photo O) connected to the water in-feed (pos 13, photo H) when the machine is being transferred. There is the risk of the water getting into the compressor.
- To guarantee compressor long working life, check regularly the condition of the small lubrication pipes and also the level of the lubricating oil. Also check the oil level in the over-drive (oil level plug on the PTO side).
- Every time the compressor is used, check the tightening performance of the bolts fixing it to the machine. Check to be sure that the coupling weldings are in good condition..


**DANGER**

When the compressor is working, keep a minimum 3 m safety distance from it. Always wear gloves when working around the compressor after it has been running. The compressor can become extremely hot and therefore must never be touched with bare hands when it is running.

**TABLE OF SUGGESTED OILS**
**PUMP LUBRICATION**

Trade mark	Normal temperature 5°-30°C ISO 46 - SAE 20	Temperature >40°C ISO 150
Agip	Diesel sigma 5	Acer 150
BP	Venelus C3	Energol CS/50
Esso	Essolube D3	Nuray 150
Mobil	Delvac 1310	Vactra oil extra heavy
Shell	Rinula	Talpa G150

## GEARBOX LUBRICATION

Trade mark	ISO 220
Agip	Blasia 220
BP	Energol GR-EP 220
Esso	Spartan EE 220
Mobil	Vactra oil 4
Shell	Machoa R220

## USING AND REGULATING THE SPRINKLER

Follow with care the manufacturer's instructions, inside the bag of the nozzles.



### DANGER

To ensure your safety, do not aim the water jet towards high voltage lines. Always check to make sure that the jet is never directed towards houses, paved roads, electric cabins, etc.

You will be held liable for any damage done if there is a power down or other problems caused by your irrigation work.



## OPERATING INSTRUCTIONS FOR THE VDO DIGITAL TACHOMETER

The VDO digital speedometer installed on the machine has been factory programmed. This instrument can read instantaneously the hose rewinding rate and show this on the display as meters per hour.

The display also gives the first decimal for the speed and the current time. Speed range is from 5 to 140 m/h.

This instrument works with a 3V battery (Type CR 2032/Sony) with a working life of around 2 years.

The instrument is automatically switched on when the hose is reeled in or out. To prevent the battery from being run down, the liquid crystal display will automatically switch off about 5 minutes after the machine is stopped.

## FUNCTIONS AND OPERATION

### ACTUAL SPEED DISPLAY

The digital tachometer displays the temporary rewinding speed. This function is always activated on the **VDO SPRINT** instruments (oval **MODE** key and red round **SET** key) and on the **VDO CYTEC C05** instruments (one key only).

To display the current time with **VDO SPRINT** instruments, press **MODE** key, for at least 2 seconds. With the **VDO CYTEC C05** instruments, press once or more the key to display **CLK**. The display will show the current time, the symbol **CLK** and the temporary rewinding speed.

With the **VDO EURO** instruments (rectangular **MODE** key), the temporary speed is activated only when the symbols **SPD** and **CLK** besides the current time are displayed; if this is not the case, they can be activated by pressing **MODE** key until both symbols are displayed.

The displayed speed is perfectly correct only when the pipe is completely unwound until the last layer; when the pipe is completely wound, the displayed speed is slightly low than the real one.

## CHANGING THE BATTERY AND PROGRAMMING THE INSTRUMENT

If the battery has to be changed (display off), follow these steps:

1. Remove the display from its mounting as shown in figure 2. Use your right hand to push the instrument down and use your left thumb to press the black knurled button under the instrument to release it from its mounting.

On VDO Cyttec C05 push slightly the head and turn it counterclockwise, then remove the head from its holder.

2. Use a coin to unscrew the battery enclosure cover. Remove the battery and replace it with the new one (Fig.3).

Insert the new battery with the positive pole towards the top and replace the cover. When the battery is changed the data remain in the memory for about 15 seconds.

**WARNING! Batteries are special waste material to be disposed of correctly.**

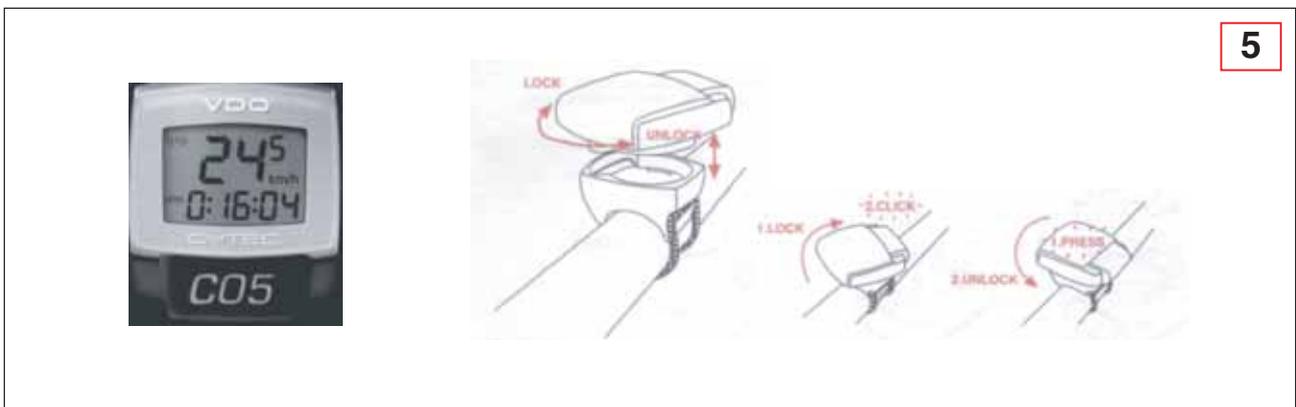
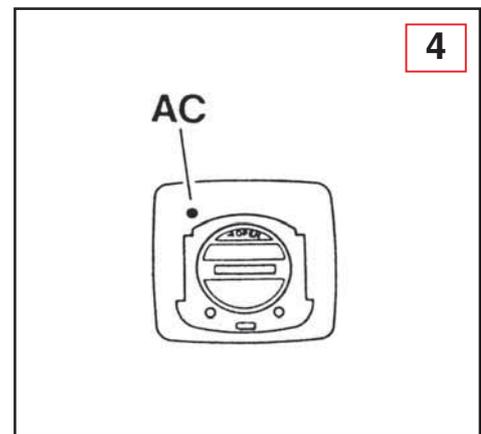
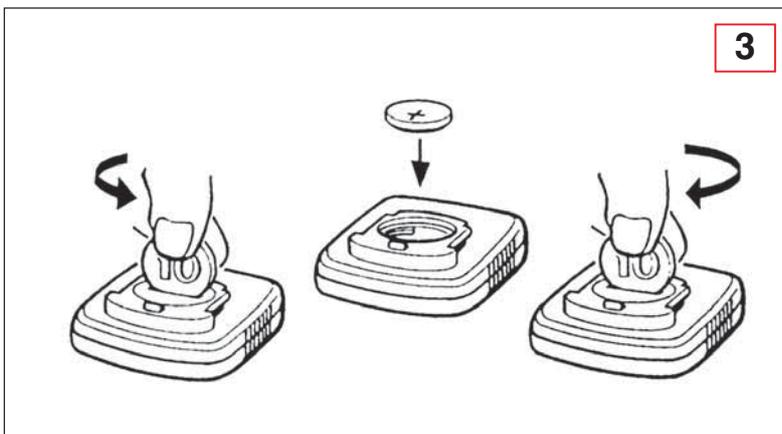
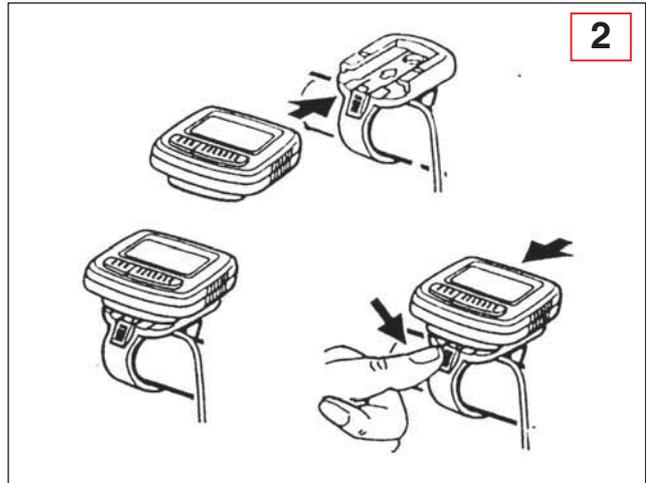
3. If the data are cancelled, reprogram the instrument as follows:

### VDO EURO AND VDO SPRINT INSTRUMENTS:

Press **MODE** key until the ODO function appears on the display. Press **SET** key for at least 3 seconds. Insert the requisite number for the machine model (see table at page IV.12).

Press **MODE** key to select the first number on the right of the display. Set it with **SET** key. Follow this process for all the numbers until they no longer flash.

On the model **VDO SPRINT**, press again **SET** key for at least 6 times, until the temporary rewinding speed is displayed, then press **MODE** key for at least 3 seconds to display the current time too.



**VDO C05 CYTEC INSTRUMENTS:**

- 1) Press some times the key to display **ODO** and then press the key for at least 3 seconds.
- 2) Now m/h and km/h are gleaming alternatively; when km/h is displayed, press the key to fix it.
- 3) The instrument is now automatically proposing the programm number (4 digits). The first digit on right starts gliding; when the correct number is displayed, press the key to confirm it. Do the same procedure for all other digits.
- 4) Now the display shows another number (5 digits); repeat the above procedure until all digits are setted on **ZERO**.
- 5) At the end, take the instrument on **CLK** again by pressing the key.

**SETTING THE CLOCK**

To set the clock on the model **VDO SPRINT**, press **MODE** key for at least 2 seconds until **CLK** is displayed; press **SET** key for at least 3 seconds, then press **MODE** key again to choose the 12 or 24 hours time and fix it with **SET** key; press **MODE** key until the desired time is displayed; then press **SET** key to fix the exact time.

To set the clock on the model **VDO EURO**, press **MODE** key until the symbol **CLK** is displayed (clock setting); press **SET** key for at least 3 seconds, then press **MODE** key again until the desired time is displayed. Press **SET** key to fix the exact time.

On model **VDO CYTEC C05**, press the key once or more to display **CLK**. To modify the actual time, already displayed, press the key for some seconds until the time only is dispalyed. Now the digit indicating hour is gliding. When the correct number is displayed, press the key to fix it and repeat the same procedure for the minutes, which have started to glide too. At the end, take the tachometer on **CLK** again by pressing the key.

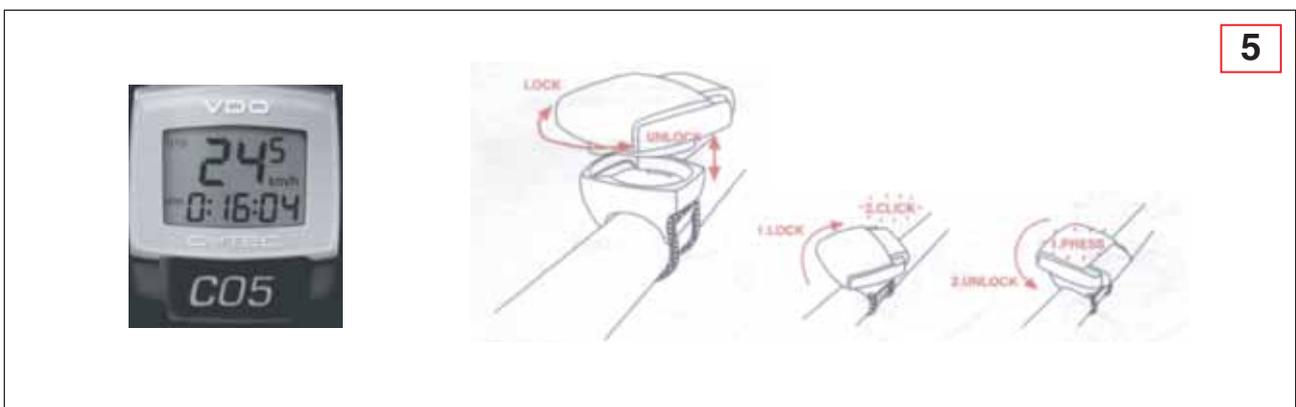
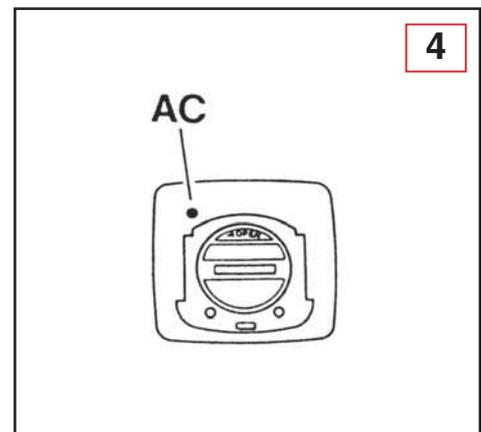
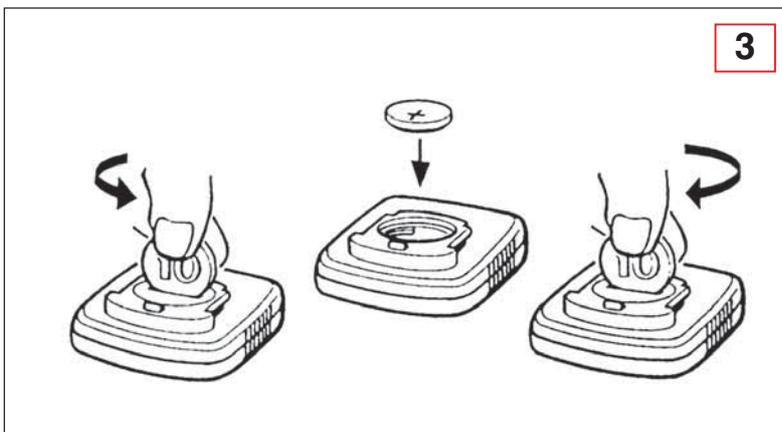
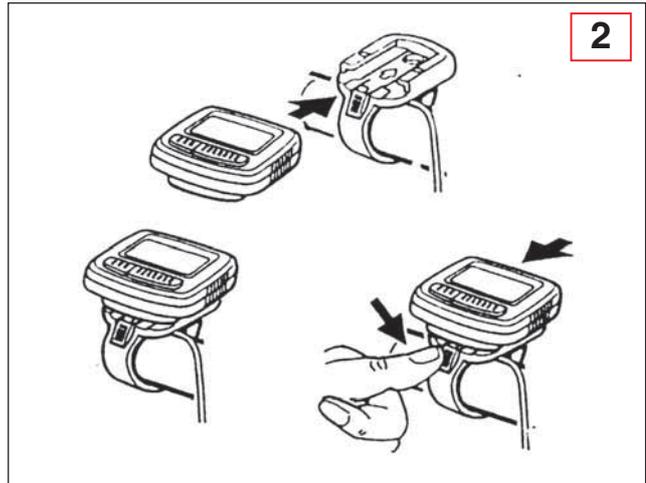
**TROUBLE-SHOOTING THE VDO SPEEDOMETER**

*Problem:* The speed is not displayed or the function symbol ((1)) doesn't sparkles while the machine is working.

- Remedy:*
- a) Check if the wire between the transmitter and mounting has been damaged or broken. Check if it has been crimped.
  - b) Check if the display unit has been pushed all the way down in its mounting to make a perfect contact. Check if the contacts are clean.  
**For VDO Cytec C05:** position the head of the computer on the support and turn until You can hear a "CLICK".
  - c) **For VDO Cytec C05:** check the exact distance between the sensor and the magnet and adjust the distance between them, if necessary.

*Problem:* **Incomplete numbers and letters appear on the display.**

*Remedy:* Press the AC button on the back of the unit (Fig. 4) to cancel all the settings memorised. Reprogram the instrument following the instructions given above.



**CALIBRATION OF VDO INSTRUMENTS:**

<b>Machine</b>	<b>Inside diameter of drum</b>	<b>Calibration with 3 magnets</b>	<b>Calibration with 1 magnet</b>
540	750	2367 (with pulley)	1183
550	870	2126	
560	870	2090	1568
570	1040	2232	1674
580	1240	2730	
581	1240	2730	1618
581 chain	1240		1441
590	1420	2773	
600	1420	2690	1594
600	1320		1553
690 chain	1320		1379
690 chain	1340		1390
690 chain	1420		1415
700	1524	2397	
700	1340	2265	1347
790	1340		1347
800	1700	2591	1541
800	1500	2476	1473
890	1500		1473
890	1700		1541
900	1920	2999	1813
900	1700	2920	1736
990	1700		1715
Major	1480	2788	1659
Major	1540		1680
Major	1620	2870	1708
Major	1700	2920	1736

# MAINTENANCE

## PART V



## GENERAL MAINTENANCE REGULATIONS

All maintenance and repair work must be done by expert and specialist personnel.

All service engineers must work in full compliance with industrial accident prevention regulations. They must wear suitable protective clothing. In this context, refer to the section on "GENERAL SAFETY NOTICES", part of the "INTRODUCTION" to this manual. When the machine is being worked on, the following notice must be attached to it:

### **DANGER! MACHINE UNDER MAINTENANCE WORK.**

## ROUTINE MAINTENANCE

The maintenance requirements of RM equipment is relatively uncomplicated. Moving parts must be greased on a scheduled basis. The hose slide shaft, the turntable, the reel bearings and the welded drive gearing on the reel must be kept well greased. Check the oil level in the gear unit and check the tight performance on all wheel nuts.

## MAINTENANCE PLAN

<b>Maintenance to be effected every:</b>	<b>Description</b>	<b>Product to be used</b>
<b>300 h</b>	Greasing of hoseguide screw	Grease for agricultural machinery
<b>300 h</b>	Greasing of rotation's turntable	Grease for agricultural machinery
<b>300 h</b>	Greasing of wheel's housing - water inlet side	Grease for agricultural machinery
<b>300 h</b>	Greasing of teeth welded to the wheel	Grease for agricultural machinery
<b>300 h</b>	Greasing of ratchet stop dog	Grease for agricultural machinery
<b>see manuf.instruct.</b>	Greasing of sprinkler	Grease for agricultural machinery
<b>300 h</b>	Lubrication of by-pass valve's shaft with manual oil feeder	SAE 90EP/PP 80 oil
<b>300 h</b>	Lubrication of transmission side chain between wheel and hoseguide with manual oil feeder	SAE 90EP/PP 80 oil
<b>1000 h and min. every 2 years</b>	Replacement of gearbox oil (check the level every 300 h)	about 6 lt. SAE 90EP/PP80 oil
<b>1000 h and min. every 2 years</b>	Replacement of hydraulic system's oil (only for models with Briggs & Stratton engine with oil tank)	about 12 lt HP68 hydraulic oil
<b>20 h</b>	Turns multiplying oil of compressor for emptying (where mounted)	see table on voice "compressor"

**CHECKING OF SCREW COUPLINGS (to be effected with a dynamometrical key)**

<b>Coupling</b>	<b>Screw delle viti</b>	<b>Key measurements (mm)</b>	<b>Tightening moment</b>
Tyres nuts		27	300 Nm
Screw for fixing of tyres axle		22	150 Nm
Drawbar	M14	22	150 Nm
Rotation's turntable	M14	22	150 Nm
Drawing hook	M16	24	200 Nm
Screws for fixing of gearbox to the chassis	M12	19	85 Nm

**WARNING****CHECK TYRES NUTS AFTER 20 H OF WORK.**



# SERVICING

## PART VI



## SERVICING INSTRUCTIONS

During the machine's normal working life, the machine can stop or lose its correct regulated settings. In these situations, follow these steps:

- Refer the matter to an expert service engineer. Only a service engineer can deal with these kinds of problems.
- The service engineer should identify the type of problem from a reading of the pages below on Trouble-shooting the machine. Once the problem is identified, he can find the right solution and put the problem right.



**The machine may have problems that are more serious than expected. Once you have identified the problems and checked the solutions offered in the Trouble-Shooting pages below, if the work cannot be done under perfectly safe conditions, refer the matter to your nearest RM Technical Assistance Centre.**

## TROUBLE-SHOOTING

*The following are some typical problems that crop up when the machine is working under normal conditions. Read this section carefully since it will provide useful remedies to solve these kinds of problems.*

- PROBLEM:** *When the hose is being pulled by the tractor to unwind it, the hose will not come out.*  
**REMEDY:** Disengage the stop dog (pos. 2, photo D) from the chain (Models 600, 700, 800, 900, Major, 690, 790, 890, 990, 1000 GX) or from the reel drive gear (Model 560, 570, 581)
- PROBLEM:** *When the hose is being pulled by the tractor to reel it out, there is very strong resistance.*  
**REMEDY:** Check if lever (pos. 7, photo H) is disengaged (downs for models 560, 570 and towards the rain gun carriage for all other models), raise the rain gun carriage with the tractor lift so that the weight is on the tractor's rear axle.  
 Disconnect the hose, remove the round plug (if installed on the rain gun carriage).  
*If the resistance is still high:*  
 Slacken off the brake even more (handwheel pos. 6, photo H) and reduce the tractor speed to 5 km/h.
- PROBLEM:** *The gear unit runs hot during unreeling*  
**REMEDY:** Reduce tractor speed to 5 Km/h. A slight heating up of the gear unit box is normal during hose unreeling.
- PROBLEM:** *Water reaches the machine but does not come out of the rain gun or just a small amount does.*  
**REMEDY:** Check the pressure on the turbine gauge. It should be at least 4 bar. Try to increase the in-feed water pressure.  
*If the problems persists:*  
 Cut off the water supply and check if there are obstructions in the in-take line (pos. 13, photo H); check the rain gun nozzle for foreign bodies.  
 It is good standard operating practice to unreel the hose completely (especially when the machine is commissioned or after the winter lay up).
- PROBLEM:** *Water reaches the machine but the turbine does not turn and does not reel in the hose.*  
**REMEDY:** Check if the water volume is sufficient and if the pressure (read from the turbine gauge) is over 4bar, then follow the procedures outlined below:

- A) **Operate the turbine by-pass valve (pos. 3, photo H) by pulling it towards the water in-take (pos. 13, photo H):** check if the turbine turns normally checking the plastic coupling between the turbine and gear unit.

If the turbine turns, go on to point C).

**If the turbine does not turn or does so very slowly:**

Install a nozzle 2-4 mm larger on the rain gun (pos. 5, photo A). Try again and check the rain gun throw. If necessary try another nozzle to get a better throw (if the nozzle is too big or too small for the water volume, the throw will be shortened). Check on the in-feed gauge (pos. 1 photo H) if the pressure still exceeds 4 bar. If it is less, increase the pressure to reach the optimum level.

- B) **If the turbine still does not turn:**

Detach the water supply line and dismantle the coupling by removing the four screws on the flange (pos. 11, photo H).

Check the small orifice (where the black tapered nozzle is inserted) for foreign bodies.

Remove the tapered nozzle and check if the impeller moves easily.

To make this check, use a screwdriver to push up the fin you see in the smaller orifice (where the tapered nozzle was seated before). If the impeller does not move, remove the screws on the turbine casing, open the casing and remove the foreign body that is preventing the impeller from turning.

If the impeller still does not move, call your nearest RM Technical Assistance Centre.

- C) **The turbine turns but the machine does not reel in the hose.**

Check if lever (pos. 7, photo H) is perfectly engaged (move it a couple of times) and then check if the gear lever is set on one of the four speeds.

Try changing speed with a firm quick movement selecting first one speed and then the others.

**Make sure you are not leaving the gear lever between two gear positions.**



**DANGER**

**These operations must be done with the turbine supplied with water under pressure (that is, the turbine is turning).**

- D) **The turbine turns but when the reel in is engaged (pos. 7, photo H) it stops:**

- If the problem persists even at the first speed, follows the instructions under A) above.
- If the problem continues after these checks, change the nozzle in the turbine with a smaller diameter.

To do this: dismantle the in-feed fitting by removing the four screws on the flange (pos. 11, photo H). Remove the nozzle and replace it with one with a smaller diameter (it is normally enough to reduce the diameter by 2-4 mm).

The nozzle used in the turbine is the same types as the one in the rain gun and so check if you already have one in the machine kit. If the one installed in the rain gun is not the same, it can be ordered.

- E) **The turbine turns normally but the gear unit stops after a few turns.**

Follow the steps described under point C).

If the problem remains, cut off water supply, put the gear lever in 4th gear and hold lever (pos. 7 photo H) engaged. Attach the crank to the PTO and turn it counterclockwise for two complete turns.

When you are turning the PTO, if the force of the handle decreases in one or two points, this means that the gear unit is damaged. Refer the matter to your nearest RM Technical Service Centre.

**PROBLEM:** *The machine moves or slides on the ground when reeling in the hose*

**REMEDY:** Attach the rear support legs better.

If this does not work, act immediately with the following procedure:

Put the gear lever in 4th (refer to the section "REGULATING REELING IN SPEED"); disengage the stop dog (pos. 2, photo H); open the by-pass valve to slow down or stop the turbine. Do not touch lever (pos. 7, photo H). At this point, the reel will turn in the direction opposite to its reeling in direction. Allow the tension on the hose to slacken off.

When the machine stops, reposition the rear brackets but select a spot where the ground is more solid and compact.

If necessary, turn the turntable to move the reel's axis in line with the hose.

When the hose is unreeled for more than 3 hours under particularly damp conditions (rain or very wet ground), when re-reeling it, the hose should be raised above the ground using 10-12 cm thick wooden spacers.

This is very important otherwise there is a real risk of the hose breaking and, consequently, irreparable damage to the reel. RM Spa declines any liability for damage caused by failure to observe this standard operating procedure.

**PROBLEM:** *During re-reeling, the hose is reeled badly or is outside the reel.*

**REMEDY:** Follow these instructions for perfect re-reeling:

Unreel the entire hose (the very first time and thereafter once every four unreeling and re-reeling cycles). If the hose is partially unreeled, check at the beginning of the work cycle to make sure that the coils still on the reel are perfectly placed. It is essential that (for at least 50 m from the machine) the hose is perpendicular to the axis of the reel. Thus when the hose is reeled out by the tractor, check to make sure this is the case (if necessary, turn the turntable to achieve this alignment). It should also be noted that, in the first 20-30 unreeling cycles, hose re-reeling cannot be perfect until the hose has adapted fully to the reel.

*If the problem is not solved after carrying out the steps outlined above, remove the plastic casing on the side opposite the turbine and with the machine stopped. Count the number of teeth in pinion installed on the wheel shaft and the number of teeth on the pinion on the hose slide shaft. Give these numbers (plus the hose diameter and length) to the RM Technical Assistance Service.*

**PROBLEM:** *The rain gun carriage does not return correctly during rewinding.*

**REMEDY:** If the wheels of the rain gun carriage tend to lift off the ground during re-reeling (check this 15-20 minutes into the re-reeling cycle), widen the wheel track or add ballast on the sides of the carriage.

It is always best to have the rain gun carriage working with the right and left wheels at equal distances with the hose between them.

When the rain gun is used on one side, make a slight furrow in the ground in which the hose will be held during rewinding.

If the machine is used on hilly land or land that is not completely flat, it is best to place the rain gun carriage on the lower side so that the machine will take in the hose reeling it from above.

**PROBLEM:** *The hose is oval shaped when the machine is supplied from a well or from the water mains.*

**REMEDY:** This is caused two negative effects working together:

- the low pressure normally found in this kind of supply source.

- pressure drops in the supply to levels insufficiently high to operate the system.

Since we can do nothing to remedy the problem of low pressure main supply, due to the inconstant pressure, the machine should be used at the lowest re-reeling system possible. It is also good practice to leave the stop dog disengaged (pos 2, photo D) to allow the reel to recover partially if there is a drop in supply pressure.

**PROBLEM:** *Re-reeling speed is not constant*

**REMEDY:** It should be noted that the speedometer installed gives an approximate hose re-reeling rate reading with a an error of  $\pm 15\%$ . The instrument is calibrated on half the entire length of the hose. To solve this problem, use a lower gear unit speed (2nd rather than 3rd) with the same reeling in rate. Then increase the speed of the turbine and use a chronometer to check the actually running speed. If the problem persists, do the compensation procedure described in the section on "AUTOMATIC SPEED COMPENSATION".

**PROBLEM:** *After reeling in three-quarters of the hose, the machine stops.*

**REMEDY:** Check if the gear unit lever is still engaged (pos 7, photo H). If it is disengaged, this means that the safety protecting against incorrect hose re-reeling has tripped.

Check if the hose slide unit has clear signs of malfunction (breaks in the chain, shaft screw worn, etc.).

If everything is fine and the hose is correctly reeled, regulate the safety:

For Model 560: slacken off the clamp halfway along the steel wire and move it 10 mm towards the rain gun carriage. Tighten the clamp back in this new position.

For Models 570, 581, 690, 790, 890, 990, 1000 GX lengthen the wire connecting the probe touch the hose with lever (pos. 7, photo H).

To do this, use the register on the cable so extend the wire for about 10 mm (be careful you choose the right cable and not the one that controls the disengage).

For Models 600, 700, 800, 900, Major: bend the end opposite the rubber lever handle (pos 7, photo H) about 40 mm or adjust with the appropriate register.

If the hose is wound badly (the hose touched the frame at the bottom), do not make the registrations described above.

Unreel the hose with the tractor for at least 80-150 m and then do a fast re-reel with the by-pass closed and the gear in 4th.

If this does not solve the problem, contact your nearest RM Technical Assistance Centre.

**PROBLEM** *On Model 550, 560, 570, 580, 590, 790 and 600GX the manual work with the hand pump to lift up the carriage is extremely difficult.*

**REMEDY** Remove the ballast from the carriage and check to make sure that the stop dog (pos. 2 photo D) is disengaged when the rain gun carriage is raised or lowered.

**PROBLEM** *On model 600JX, 700, 800, 900 and Major the hydraulic plant cannot raise the machine when it is full of water. In other words, the wheels do not lower.*

**REMEDY** Try using a different type of tractor. If the problem persists, change the setting on the relief value on the hydraulic circuit.

Use a socket wrench to remove the outside cap-head screw (pos.9 photo E) while holding the inside screw (pos.7 photo E) tight with a normal wrench. Then use a hex wrench to screw in the regulating screw at least 4 turns. Replace the cap-screw and try lowering the wheels. If this is not sufficient, repeat the procedure.

**PROBLEM:** *The machine leaks from the hole under the turbine casing.*

**REMEDY:** The mechanical seal is worn or obstructed.

The working life of the mechanical seal inside the turbine can vary from 2000 to 8000 work



hours depending on the hardness and cleanness of the water (contact RM Technical Assistance Centre for instructions on how to change the seal.)

Note that some leakage through the seal is normal especially during the first working hours (the two contact surfaces forming the mechanical seal have to adapt to each other).

**It is good standard operating practice to take action as soon as you note real leaks since in this way you will prevent damage to the turbine.**

# SPARE PARTS

## PART VII



**SPARE PARTS**

When order spare parts, always specify the following information:

1. The year the machine was fabricated.
2. The machine's Serial N°
3. Diameter and length of the hose installed.
4. Order code Number for the part or an exact description of the part.
5. Short description of the presumed cause of the breakage or the wear.
6. Type of shipping required (parcel post, sea or air freight).



