EN

INSTRUCTIONS AND WARNING MANUAL
HOSE REEL TRAVELLING RAINGUNS
Models:VR3 - VR4 - VR5 - VR6 - VR7- VR7/1

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The company protects its proprietary rights according to the law.

Documentation drawn up in compliance with the definitions under item 1.7.4 of EC directive 2006/42/EC (Directive on the approximation of the laws of Member States relating to machinery).

The Manufacturer would like to thank you for purchasing one of its products and recommends reading this manual and all manuals and documents listed in chapter 9.

In this manual you will find all the information necessary for the proper handling of the machine supplied.

The user is therefore kindly requested to strictly adhere to the warnings herein and to read the manual in its entirety.

Furthermore, we urge you to directly contact the Manufacturer for any spare parts, suggestions on selecting any special equipment or simply for instructions on the machine you have purchased.

Referencing this manual is supported by the general table of contents shown on the first page and by the Manual layout, which allows topics to be located immediately.

The chapters are arranged according to a structure that makes the required information easier to find.

A special note at the beginning of the chapter highlights the fact that it deals with topics and provides information of speci ficinteresttoskilled

personnel.

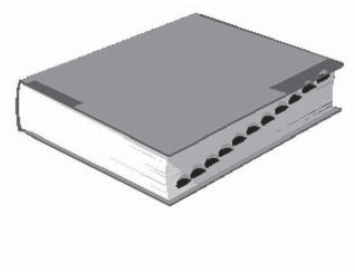
The documentation supplied with the machine consists of the following Instructions and Warning Manual as well as the manuals for the equipment, machines, partly-completed machinery and components listed in chapter 9 which are an integral part of this manual and for which the same recommendations/requirements set out herein apply.

The instructions contained in this manual are: TRANSLATION OF ORIGINAL INSTRUCTIONS.

ORGANISATION OF THE DOCUMENTATION

The instruction and warning manual is organised as follows:

a) General machine manual, the chapter structure of which is set out below

 Operating instructions manual	**Chapter 0** Contents	• Contents of the manual
	Chapter 1 General information	• Manual composition • Warranty • Terminology and abbreviations used • General remarks
	Chapter 2 Technical specifications and Layout	• Technical specifications • Identification code • General Layout
	Chapter 3 Description	• Description of the machine and installed parts • Configuration by type
	Chapter 4 Safety	• Technical standards applied • Certification of the machine • Safety devices applied to the machine • Disconnection of power sources • Residual risks and warning plates
	Chapter 5 Transport and Installation	• Packaging and transport • Assembly and placement • Connections • Checks and inspections after installation
	Chapter 6 Use and Operation	• Preliminary information • Procedures for operating • Operator interface devices
	Chapter 7 Maintenance	• General maintenance information • Personnel in charge of maintenance • Maintenance plan • Cleaning • Maintenance procedures
	Chapter 8 Troubleshooting - Diagnostics - Solutions	• Troubleshooting • Diagnostics and Solutions
	Chapter 9 List of annexes	• Reference to diagrams, manuals and relevant documentation for component equipment which makes up the supplied machine
	Chapter 10 Lists of Spare Parts	• Lists of machine spare parts recommended by the Manufacturer for the machine

b) Specific Manuals for the main Process Units designed by the Manufacturer.
c) Instruction manuals drawn up by the respective OEMs for the main trade systems purchased by the Manufacturer and integrated into the machine.
d) Circuit diagrams (oil hydraulic, electrical, etc.), spare part list, setting up charts, etc.

CONTENTS

GENERAL INFORMATION

CH. 1

1 GENERAL INFORMATION

1.1 WARNINGS FOR THE BUYER

The manual, like the CE certificate of conformity, is an integral part of the machine and must always accompany it each time it is transferred or resold. It is the user's responsibility to maintain this documentation intact, to allow it to be referenced throughout the entire service life of the machine.

In the event of loss or destruction, a copy may be obtained from the Manufacturer, specifying exactly the model, serial number and year of production. The manual reflects the state of the art at the time of supply. The undersigned company reserves the right to make any amendment to its products it may deem appropriate, without being obliged to upgrade manuals and machines for previous production batches.

The Manufacturer disclaims any liability for production faults and damage caused by the machine to property, persons and animals in the following cases:

- Misuse of the machine or use with functions other than those for which it has been constructed.
- Use by unsuitable or unauthorised personnel.
- Faults in oil hydraulic, water supply, etc.
- Non compliance with technical power supply specifications
- Insufficient or poor periodic maintenance.
- Incorrect installation at the site or location it is intended for.
- Use of inadequate hoses or delivery hoses and/or hoses unsuitable for the pressures the machine has been designed for.
- Modifications or procedures not agreed with and/or authorised by the Manufacturer.
- Use in a non-Agricultural setting.
- Use of non-original parts or parts that are not specific to the model.
- Use by persons under the age of 18.
- Total or partial failure to comply with these instructions.
- Use not complying with the machine safety laws and/or with the safety standards set forth by specific European and/or national laws in force.
- Use of trailer or transfers on public roads without Road Use Approval.
- Exceptional events.

Responsibility for the application of the safety requirements set out below lies with the user, who must ascertain that authorised personnel:

- are qualified to perform the required activity
- are familiar and strictly comply with the requirements herein
- are familiar with and apply general safety rules applicable to the machine and those in force at the utilisation site.
- are familiar with the safety rules concerning the risks arising from treatment of the products the machine is intended for.

It is a mandatory requirement for the technical maintenance personnel to have read and understood this manual and the documentation set out in chapter 9 which is an integral part thereof, to be familiar with and skilled in the basic principles of mechanics, hydraulics, water engineering and electricity, to be familiar with connection and wiring procedures and with the symbols used in mechanical and fluid power diagrams, and to be experienced in using equipment and machinery.

Failure to comply with the safety standards may cause injury to personnel and damage the components and control unit of the machine.
Reading this manual, albeit comprehensively, cannot in any case replace adequate operator expertise.
The user may contact the Manufacturer at any time to request information additional to that contained herein, as well as to contribute proposed improvements.

CAUTION
We hereby remind you that the documentation provided by the Manufacturer solely concerns the machine supplied to the user by the Manufacturer and not the overall system/assembly within which it may be installed and used.

DANGER
Due to the process features, improper machine use and installation involve significant risks and are forbidden.

CAUTION
It is the user's unequivocal responsibility to complement the instructions herein with any operating procedures in force in the place of the machine's use and to provide all additional information to the personnel in charge of machine use and maintenance.

This manual is an integral part of the machine it refers to and contains the required information for:
- Properly raising operator awareness of relevant safety issues;
- Machine handling under safe conditions;
- Thorough knowledge of its operation and limitations;
- Its proper use under safe conditions;
- Performing maintenance procedures in a correct and safe manner;
- Dismantling the machine under safe conditions and complying with applicable standards protecting workers' health, safety and the environment.

Operators must be carefully trained on operation and proper use of the installed safety devices.

DANGER
The machine must be exclusively used by skilled operators trained on the procedures, and it is to be used complying with the recommendations herein.

The user is also responsible for ensuring that - in the event this document should undergo any amendments by the Manufacturer - only updated Manual versions are actually present at the utilisation sites.
All the manuals and documentation set out in chapter 9 are an integral part of this manual.

DANGER
Hazardous use of the machine may cause severe injury to the operator and/or persons near the operations area.
It is therefore indispensable to adhere to the provisions of this manual.
Operators and personnel in charge of maintenance must read this manual before starting work.
The manual must be kept on board the machine, for referencing and periodic review by all personnel who need to operate it.
The machines in question CANNOT be towed on public roads unless they are provided with proper Road Use Approval issued and recognised by the Body responsible for issuing the Registration Document in the country where they are used.
When the machines are provided with Road Use Approval for towing on public roads, it is indispensable to adhere to the rules and requirements set out in the Registration Document issued by the Body responsible of the country where they are used.

1.2 INTRODUCTION

In order to assure the utmost operating reliability, the Manufacturer has performed careful selection of the materials and components to be employed in constructing the machinery, submitting it to proper testing before delivery. Its good performance over time depends on proper use and adequate preventive maintenance, according to the instructions herein and in the documentation supplied with the machine.

All construction elements, coupling and control parts have been designed and constructed with a degree of safety such as to be able to withstand abnormal strain or at any rate higher than those specified.

The materials are of the best quality and their treatment in the company, storage and use in the shop are constantly monitored, in order to assure the absence of damage, deterioration or malfunction.

Despite all design and construction solutions, for the aims of correct use, safety, durability and reliability of the machine, it is crucial to carefully follow the Manufacturer's instructions and install and use the same in accordance with these instructions and with the legal requirements in force in the country/site of use of the machine.

The purpose of this manual is to provide technical information to the personnel in charge of using and maintaining the machine produced by the Manufacturer.

The instructions herein are aimed at operators with adequate knowledge in the field of mechanics, hydraulics, water engineering and electrics.
The instruction and warning manual contains the information required to understand the methods for installing, operating and properly using the machine, specifically: technical description of the various functional assemblies, safety equipment and systems, operation, use of the instrumentation and interpretation of any diagnostics signals, main procedures and information concerning maintenance operations.

For proper use of the machine it is assumed that the work environment complies with applicable regulations on health and safety.

CAUTION
Before proceeding with machine installation or making it operational, using or performing maintenance on the machine, read this manual very carefully and faithfully follow the instructions and recommendations herein.

Training is also recommended for the above personnel in order to assure perfect familiarity and knowledge of the machine.

1.3 MANUFACTURER'S ADDRESS

INSTRUCTIONS TO REQUEST SERVICING

The machine is a product serviced worldwide with direct coordination with the Manufacturer's technical support.
The undersigned Company is always available to meet Customer needs concerning any kind of information or clarification on installation, use, maintenance, etc.
The Customer should ask questions in a clear language, with references to this manual and always provide the details shown on the machine's identification data plate.
Any request for information or servicing at the Customer's premises or for clarifications concerning technical aspects of this document must be sent to:

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6 Breene Place, Morningside 4170
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Tel. +61 7 3399 1288
Fax. +61 7 3902 0088
www.ibinternational.com.au
info@ibinternational.com.au

In particular, the Customer must provide the following data to the manufacturer:
- type of machine, serial number, year of installation
- faults detected
- exact address of the site/facility where the machine is installed
- contact person.

1.4 SAFETY RULES SET OUT IN THE MANUAL

The safety requirements, instructions, rules and relevant notes, set out in the various chapters of the manual, have the purpose of defining behaviour and a set of obligations one should adhere to in performing the various activities, in order to operate under safe conditions for personnel, the equipment and the surrounding environment.

The safety rules herein are aimed at all authorised personnel, instructed and assigned to perform the following various operations:
- transport
- installation
- operation
- use
- handling
- maintenance
- cleaning
- decommissioning and dismantling

which represent the intended methods of use for the machine in question.

SUPPLEMENTARY INFORMATION
Please refer to chapter 4 for further information concerning training.

1.5 GLOSSARY OF TERMS USED

The manuals employ technical terminology or terminology having a meaning different from common usage.
below is an explanation of the terms and abbreviations used:

HAZARD: (Annex I, 1.1.1 Directive 2006/42/EC).
a potential source of injury or damage to health;

DANGER ZONE: (Annex I, 1.1.1 Directive 2006/42/EC).
any zone within and/or around the system where the presence of an exposed person represents a risk for that person's health and safety;

EXPOSED PERSON (Annex I, 1.1.1 Directive 2006/42/EC).
Any person wholly or partially in a danger zone;

RISK: (Annex I, 1.1.1 Directive 2006/42/EC).
a combination of the likelihood and severity of an injury or damage to health that may arise in a hazardous situation;

GUARD: (Annex I, 1.1.1 Directive 2006/42/EC).
a part of the machinery used specificallytoprovideprotectionbymeansofaphysicalbarrier;

PROTECTIVE DEVICE: (Annex I, 1.1.1 Directive 2006/42/EC).
a device (other than a guard) which reduces the risk, either alone or in conjunction with a guard;

INTENDED USE: (Annex I, 1.1.1 Directive 2006/42/EC).
the use of the machinery in accordance with the information provided in the instructions for use;

MISUSE: Use of the machinery in a way not intended in the instructions for use, but which may result from readily predictable human behaviour;

RESIDUAL HAZARD: Hazard that has not been possible to eliminate or reduce by design, against which the guards are not (partially or totally) effective;
the Manual (chapter 4) contains the residual hazards and information, instructions and warnings/requirements for managing Residual Risks, the responsibility for which must lie with the user (Ref. UNI EN ISO 12100:2010).

HOSE REEL TRAVELLING RAINGUN: Type of movable irrigation machine equipped with a fixed structure with a hose reel, onto which a flexible hose is wound through which irrigation water flows, towing a movable trolley onto which the distribution system is secured, generally consisting of a long range raingun. (Ref. 3.1 EN 908).

LONG RANGE RAINGUN: Large-sized raingun used on hose reel travelling rainguns and on other systems. (Ref. 3.2 EN 908).

WINDING: One of the operations performed by the hose reel travelling raingun while it is irrigating. The hose reel travelling raingun progressively reels in all the flexible polyethylene hose onto the drum, allowing the long range raingun to move evenly through the plot to be irrigated. When the long range raingun reaches the machine, reeling in is completed and the machine stops. . (Ref. 3.3 EN 908).

GUIDE SYSTEM: Side hose guide device to wind it evenly with close-knit loops. . (Ref. 3.4 EN 908).

GUIDE SYSTEM ACTUATION DEVICE: Mechanism that powers the guide system assuring even winding of the hose in layers. (Ref. 3.5 EN 908).

COVER AREA: Range of various turret positions corresponding to all possible orientations. (Ref. 3.6 EN 908).

For a comprehensive description of the terminology used please refer to the definitions contained in annex I of machine directive 2006/42/EC and standards EN ISO 12100 and EN 908.

PERSONAL PROTECTION EQUIPMENT (PPE): Personal protection equipment refers to any equipment intended to be worn and/or used by the worker for the purpose of protecting them from one or more risks likely to threaten their safety or health during work, as well as any item or accessory intended for that purpose.

Personal protection equipment does not include the following:
- Ordinary work clothes and uniforms not specifically designed to protect the worker's health and safety;

USER: User (entrepreneur / firm) refers to whoever employs the machine for the intended use, or entrusts its use to skilled and suitably trained persons.

MAN MACHINE INTERACTION: Any situation where an operator interacts with the machine in any operating stage at any time during its service life.

MACHINE STATUS: The machine status includes operating modes, e.g. running, dead-man control, stop, etc., the condition of the safety devices fitted on the machine such as the guards included, the guards bypassed, the emergency stop, the type of insulation from energy sources, etc.

In this manual, the term operator or personnel in charge is used to refer to the person or persons authorised to perform machine installation as well as those intended to commission it, operate it and carry out maintenance in compliance with the classification set out herein.

The definition of machine as set forth under art.2 of directive 2006/42/EC and included below should be deemed as consisting of the whole: hose reel on frame with wheeled traveller, equipped with polyethylene hose and raingun trolley with or without optional accessories.

The term Manufacturer used in this manual refers to the company specified under paragraph 1.3

1.6 PERSONNEL QUALIFICATIONS

The symbols shown in the table are used in the Manuals next to the notes in bold to indicate important information/requirements concerning the required professional qualification.

PROFESSIONAL ROLES	
Symbol	**Description**
	**OPERATOR:** User's personnel trained and qualified for the use and operation of the machine for production purposes for the activities it has been constructed and supplied for. They must be able to perform all the required procedures for proper machine operation and for their own safety and that of any assistants. They must have proven experience in proper use for this type of machine for the work involved. In the event of any doubts they must report any fault to their supervisor. They are not authorised to perform any maintenance activity.
	**LIFTING AND HANDLING EQUIPMENT DRIVER:** Personnel qualified for the use of equipment for lifting and handling materials and machines (strictly adhering to instructions issued by the Manufacturer), in compliance with applicable laws in force in the machine user's country.
	**MECHANICAL MAINTENANCE TECHNICIAN:** Qualified technician able to run the machine as the operator, to work on mechanical parts, internal combustion engine, oil hydraulic and water systems for adjustments, maintenance, repairs, and who is also able to read water and hydraulic diagrams, technical drawings and spare part lists. In extraordinary cases, they are authorised to operate the machine with reduced safety devices. They are not qualified to work on live electrical installations (if present). Where necessary, they may issue instructions to the operator for proper use of the machine for production purposes.
	**ELECTRICAL MAINTENANCE TECHNICIAN:** Qualified technician able to run the machine as the operator, to work on electrical adjustments and systems for maintenance, repairs, and replacement of worn parts. They are also able to read wiring diagrams and to check the correct functional cycle. They are able to work on live electrical boards, junction boxes, control equipment, etc. only if they are suitable (Instructed Person) (See EN50110-1). Where necessary, they may issue instructions to the operator for proper use of the machine for production purposes.
	**MANUFACTURER'S TECHNICIAN:** A technician qualified by the Manufacturer and/or their distributor for complex operations, as they are familiar with the machine's construction manufacturing cycle. This person must act according to the user's requirements. Their skills must be, as the case may be, in mechanics and/or electrics and/or electronics and/or software.

1.7 SYMBOLS USED WITHIN THE MANUAL

Certain symbols are used within the manual to draw the reader's attention and highlight certain particularly significant aspects of the content.
The following table describes the meaning of the various symbols used.

Symbol	Meaning	Notes
	Danger	Indicates a danger with injury hazard for the user, even fatal. Pay the utmost attention to blocks of text marked by this symbol.
	Caution	Represents an alert to possible deterioration or damage to the machine, equipment or other personal property belonging to the buyer/user. Pay attention to blocks of text marked by this symbol.
	Warning Note	Indicates a warning or note on key functions or useful information. Pay attention to blocks of text marked by this symbol.
	Supplementary information	The blocks of text that contain ancillary information are introduced by this symbol. This information is not directly related to the description of a function or steps of a procedure. They might be references to other ancillary documentation such as attached operating instruction manuals, technical documents or to other sections in this manual.
	Avoid damaging the material	Remark referring to a strong risk of damaging a part, for instance by using the wrong tool or assembling according to an incorrect procedure.
	Special tool	Indicates that use of a special tool or equipment is required for the operation.
	Visual observation	Indicates that the reader must perform a visual observation. This symbol is also found in operating instructions. The user is required to read a measurement figure, to check a signal, etc.

1.8 SYMBOLS USED WITHIN THE MANUAL

Symbol	Meaning	Notes	Code Manufacturer
	Obligation to stop the machine before performing maintenance and/or repair operations on it.	Indicates a mandatory requirement for the maintenance personnel to read and understand the instruction manual provided before performing maintenance activities on the machine or its units. Obligation to stop the machine before performing maintenance operations. Pay the utmost attention to the signs and areas where this symbol is displayed.	60201
	Obligation to read the instruction manual before starting and using the machine.	Indicates a mandatory requirement for the operating personnel in charge of running the machine or its units to read and understand the instruction manual provided before performing operating activities on the machine or its units.	60203-O
	Electrocution hazard.	Indicates a danger with injury hazard for the personnel in charge/user. Obligation to keep a safe distance between the hose trolley and the power lines or substations and not to aim the water jet at power lines. Pay the utmost attention to the signs and areas where this symbol is displayed.	CE7/1
	Entanglement hazard.	Indicates a danger in area/s with moving parts. It is forbidden to put your hands close to the moving PTO shaft or to the trolley that places the hose on the reel. ***Only use CE certified PTO shafts, with adequate guards and which are in a good state of repair.*** The personnel in charge/user must pay the utmost attention to the signs and areas displaying this symbol and remain at a safe distance.	60200
	Shearing hazard, keep your hands away.	Indicates a danger with injury hazard, even fatal, for the personnel in charge/user. Pay the utmost attention to the signs and areas displaying this symbol and do not access areas thus signalled unless the area in question has had supply lines and/or power pre-emptively removed.	60209
	Crushing hazard, do not stand between the machine and the tractor.	Indicates a danger with injury hazard for the user. It is mandatory to comply with the safety distances and never to stand between the tractor and the machine. Pay the utmost attention to the signs and areas where this symbol is displayed.	60208
	Impact / entanglement hazard. Moving parts. Do not leave the handwheel on when unwinding the hose with the tractor.	Indicates a danger with injury hazard for the personnel in charge/user. It is forbidden to leave the handwheel on when the irrigation hose is unwound with the tractor. Pay the utmost attention to the signs and areas where this symbol is displayed.	CE8
	Danger - pressurised hoses	Indicates a danger with injury hazard for the personnel in charge/user. It is mandatory to wear appropriate clothing such as shoes, overalls, face protection shields, gloves, etc. Pay the utmost attention to signals and areas where this symbol is displayed and keep away from these areas.	60204
	Automatic operation machine with moving parts.	Indicates a danger with injury hazard for the personnel in charge/user. Do not stand within the operating range of the machine especially during rotation on the vertical axis. Do not go near the rear of the machine, where the hose is wound onto the rotating reel. Pay the utmost attention to the signs and areas where this symbol is displayed.	CE45
			60202
	Slipping and falling hazard.	Indicates a danger with injury hazard for the personnel in charge/user. Prohibition to climb on the machine. Pay the utmost attention to the signs and areas where this symbol is displayed.	60215
	Carbon monoxide hazard.	Caution - the engine releases carbon monoxide, which is a toxic and poisonous gas. Do not operate the engine in closed premises.	60214
	Fuel.	Fuel is extremely flammable. Turn off the engine and let it cool before refuelling. The same requirement applies before performing any maintenance activity.	60216

Symbol	Meaning	Notes	Code Manufacturer
	Indicates a hazard connected to the hydraulic turret rotation function.	Indicates the function performed by the lever on the distributor. It is mandatory to keep a safe distance from the machine during turret rotation. Pay the utmost attention to the signs and areas where this symbol is displayed.	CE4
	Indicates a hazard connected to the rear hydraulic anchors function.	Indicates the function performed by the lever on the distributor. It is mandatory to keep a safe distance from the anchors, and ensure no one can come into contact with them. Pay the utmost attention to the signs and areas where this symbol is displayed.	CE2
	Indicates a hazard connected to the front hydraulic leg function.	Indicates the function performed by the lever on the distributor. It is mandatory to keep a safe distance during the operation of the leg stabiliser, and ensure no one can come into contact with it. Pay the utmost attention to the signs and areas where this symbol is displayed.	CE3
	Indicates year and month of construction with related warning, danger and prohibition symbols	Indicates a prohibition for the personnel in charge/user concerning the battery compartment and requirements to be complied with in handling the battery. Pay the utmost attention to the signs and areas where this symbol is displayed.	See BATTERY manual
	Foot crushing hazard under the front stabiliser leg.	Indicates a danger with injury hazard for the personnel in charge/user. It is mandatory to keep a safe distance during the operation of the leg stabiliser, and ensure no one can come into contact with it. Pay the utmost attention to the signs and areas where this symbol is displayed.	60210
	Foot crushing hazard under the rear stabilisers.	Indicates a danger with injury hazard for the personnel in charge/user. It is mandatory to keep a safe distance during the operation of the rear stabilisers, and ensure no one can come into contact with them. Pay the utmost attention to the signs and areas where this symbol is displayed.	60211
	Hazardous temperature	Indicates a danger with injury hazard for the personnel in charge/user. It is mandatory to wear appropriate clothing such as shoes, overalls, high temperature gloves, etc. Pay the utmost attention to the signs and areas where this symbol is displayed.	60212
	Hazard of being thrown from the high pressure water jet	Indicates a danger with injury hazard for the personnel in charge/user. It is mandatory to wear appropriate clothing such as shoes, overalls, face protection shields, gloves, etc. and to always stand clear of the water jet exiting the machine. Pay the utmost attention to signals and areas where this symbol is displayed and keep away from these areas.	60213
	Indicates the type of function performed by the machine in the three positions of the control lever.	Indicates an operating mode of the control lever in the three permissible positions: • with the lever to the left, the functions are hose UNWINDING or QUICK WINDING; • with the lever in the centre, the functions are MACHINE RELEASE, STATIONARY or TOWING; • with the lever to the right, the function is OPERATION.	60192
	Indicates the position where the hooks for lifting the machine need to be inserted	Indicate the hooking points with chains or wire ropes fitted with hooks. Indicates a mandatory requirement on the equipment to be used. Pay attention to these plates and only use permissible lifting/handling systems using cranes and/or overhead travelling cranes of suitable capacity.	60210
	Limb crushing hazard.	Indicates a danger with injury hazard for the personnel in charge/user. Pay the utmost attention to the signs and areas where this symbol is displayed.	
	Entanglement hazard.	Indicates a danger with injury hazard for the user. It is mandatory to wear appropriate clothing such as shoes, overalls, gloves, etc. Pay the utmost attention to the signs and areas where this symbol is displayed.	
	Danger of moving parts.	Indicates a danger in area/s with moving parts. The personnel in charge/user must pay the utmost attention to the signs and areas displaying this symbol and remain at a safe distance.	

Symbol	Meaning	Notes	Code Manufacturer
	Keep hands clear. Do not touch.	Indicates a danger with injury hazard for the personnel in charge/user. It is mandatory to wear appropriate clothing such as shoes, overalls, gloves, etc. Pay the utmost attention to the signs and areas where this symbol is displayed.	
	Risk of cutting or violent impact with high pressure fluid.	Indicates a hazard with risk of injury, even fatal, to the user, due to impact with high pressure fluid. It is mandatory to wear appropriate clothing such as shield, shoes, overalls, gloves, etc. Pay the utmost attention to the signs and areas where this symbol is displayed.	
	It is forbidden to remove the protective casings.	Indicates a prohibition for the personnel in charge/user to remove the guards installed on the machine/plant. It is strictly forbidden to operate the machine without the protective casings it is supplied with. Pay the utmost attention to the signs and areas where this symbol is displayed.	
	Prohibition to approach and go beyond the barrier/area when machine is in operation.	Indicates the prohibition for the personnel in charge/user to approach and go beyond the area where this sign is displayed. Pay the utmost attention to the signs and areas where this symbol is displayed.	
	It is forbidden to lubricate with parts in motion.	Indicates the prohibition for the personnel in charge/user to lubricate machine/plant parts with moving parts. Pay the utmost attention to the signs and areas where this symbol is displayed.	
	It is forbidden to smoke near engines or electrical or hydraulic control units or anywhere near the machine.	Indicates the prohibition for the personnel in charge/user to smoke near engines or electrical control units and in any case in any area where this sign is displayed. All prohibitions in force in the country of use of the machine/plant remain valid, as well as internal facility or plant provisions set out by the employer.	
	It is forbidden to aim water jets at electrical equipment.	Indicates a prohibition to use or aim water jets at electrical equipment and in any case in all areas where this sign is displayed.	
	Do not touch.	Indicates the prohibition for the personnel in charge/user to touch the areas of the machine where this symbol is displayed. Pay the utmost attention to the signs and areas where this symbol is displayed.	
	It is forbidden to climb on parts of the machine.	Indicates the prohibition for the personnel in charge/user to climb on the machine or its parts, including the raingun trolley where this symbol is displayed. Pay the utmost attention to the signs and areas where this symbol is displayed.	60190
	Speed limit for machines without Road Use Approval.	Indicates a prohibition to exceed the set speed for machines without Road Use Approval. It is strictly forbidden to exceed the indicated speed limit.	60027
	Warning: periodically grease the teeth of the crown gear	Indicates to grease every 100 hours of work all the teeth of the crown gear located on one side of the machine.	60105

1.9 DESCRIPTION OF PERSONAL PROTECTION EQUIPMENT (PPE)

The personnel in charge of operation, use and maintenance must use the personal protection equipment that allows them to decrease all possible risks arising from the various permissible activities on the machine, such as:

- head protection helmet
- safety glasses or face mask to protect against chips, dust or oil jets, or debris resulting from the process.
- masks to protect against any vapours, inhalation, etc. arising from work hazards.
- safety gloves, shoes and boots as needed and according to the type of products used in the process in question.
- ear protectors

CAUTION
The clothing of whoever operates or performs maintenance on the machine must comply with the essential safety requirements set forth by EC directives 89/656/EC and 89/868/EC and with the laws in force in the country of installation.

CAUTION
It is the end user's unequivocal responsibility to ensure that the personnel in charge are duly instructed on the residual risks connected to the process and use the proper PPE, as well as assessing the need for any required integration.

DANGER
During handling and maintenance operations, personnel must wear appropriate work clothing to prevent accidents.
In order to prevent mechanical risks such as entrainment, entrapment and the like, it is forbidden to wear accessories such as bracelets, watches, scarves, rings or chains during work and maintenance operations.

DANGER
In performing work that might give rise to flying splinters or hazardous materials for oneself or other persons operating nearby, the operator must arrange screens or other appropriate safety devices or obtain them from those responsible.

Symbol	Meaning	Notes	Code Manufacturer
	Use of the protective helmet is mandatory.	Indicates a mandatory requirement for maintenance personnel to use the protective helmet. PPE to be always used when performing machine maintenance.	
	Use of protective shield or protective goggles is mandatory.	Indicates a mandatory requirement for personnel to use the protective shield. PPE to be always used when performing machine maintenance. Use of protective shield or goggles is mandatory in the event of flying objects or materials hazard.	
	It is mandatory to protect one's hearing.	Indicates a mandatory requirement for personnel to use earmuffs or ear plugs to protect their hearing. PPE to be used at all times when operating the machine and/or at the processing site or during maintenance.	
	It is mandatory to use protective and insulating gloves.	Indicates a mandatory requirement for the personnel to use protective and insulating gloves. PPE to be used at all times when operating the machine and/or at the processing site or during maintenance.	
	It is mandatory to use safety shoes.	Indicates a mandatory requirement for personnel to use protective footwear. PPE to be used at all times when operating the machine and/or at the processing site or during maintenance.	
	It is mandatory to wear appropriate work clothing.	Indicates a mandatory requirement for personnel to wear appropriate and protective work clothing. PPE to be used at all times when operating the machine and/or at the processing site or during maintenance.	

NOTE
The PPE set out herein must be supplemented by the user according to the processing site (type and materials to be processed, etc.), to set requirements and according to the provisions in force in the country of use.

SUPPLEMENTARY INFORMATION
The various chapters of this manual contain the detailed description of the “pictograms” and “PPE” specifically provided for the machine supplied. This paragraph only lists and explains the meanings of the “pictograms” and “PPE”.

1.10 MANUAL LANGUAGE

The original manual was drawn up in Italian and translated into the language indicated on the manual's cover.

Any translations into additional languages must be done starting from the original instructions.
The Manufacturer is only responsible for the information contained in the Original Instructions; translations into other languages cannot be fully verified, hence should an inconsistency be found, refer to the text in the original language or contact our Technical Documentation Department.

1.11 MACHINE HANDLING

Handling of the machine is only allowed to authorised personnel, suitably instructed or at least possessing a sufficient technical knowledge and experience.

The personnel in charge of machine operation and maintenance must be aware of the fact that knowledge and application of safety regulations is an integral part of their job.
Specifically, it is the User/Customer's unequivocal responsibility:

- To ensure the utilisation site complies with statutory provisions in force in the country of use.
- To check and arrange for the required transit and escape routes and operating and maintenance clearances around the machine.
- Carefully read this manual and the manuals listed in chapter 9.
- Know what guards, safety and emergency stop devices the machine is equipped with, and their location and operation.

DANGER
Unauthorised personnel must not access the machinery's operating area or the control system.
It is forbidden to disengage or partially remove guards and safety devices protecting from hazardous parts.
the same rule applies to signs (warning, danger, prohibition plates, etc.).
It is strictly forbidden to open boards, battery compartments and/or control and power units during operation or immediately after switching off.

DANGER
The safety guards and devices must be maintained in perfect working order so that they operate correctly. In the event of a fault or malfunction, they must be immediately repaired or replaced.

DANGER
Unauthorised use of trade components and accessories belonging to the safety guards and devices may cause malfunctions and lead to hazardous situations for the operating personnel.

NOTE
Most accidents and injuries occurring in workplaces and specifically on farms are caused by failure to comply with certain simple and fundamental rules of prudence and safety. That is why, in most cases, they may be avoided by operating with the necessary caution and prudence.

In the event of failure to comply with the instructions herein, any possible accident cannot be wholly ruled out with this type of machine, however well designed and constructed.
A watchful and prudent operator is the best guarantee against accidents.

DANGER

- **Incorrect operation and maintenance of the machine may be hazardous and lead to serious injury or death.**
- **The operator using the machine and the personnel in charge of its maintenance must read this manual in its entirety, before starting to operate the machine.**
- **Certain actions concerning machine operation and maintenance may cause severe accidents unless they are undertaken in the manner described by this manual.**
- **The procedures and precautions described in this manual only apply to the intended and stated uses for the machine.**
- **In no case must the machine be used for actions strictly forbidden in this manual.**

NOTE
Strict compliance with a single and elementary safety rule is enough to prevent a high number of serious injuries.
That rule is:
Never perform any cleaning, lubrication or maintenance operation while the machine is moving and/or water is pressurised.

1.12 WARRANTY

The warranty applied by the Manufacturer is set out in the contractual documents, to which you should refer.

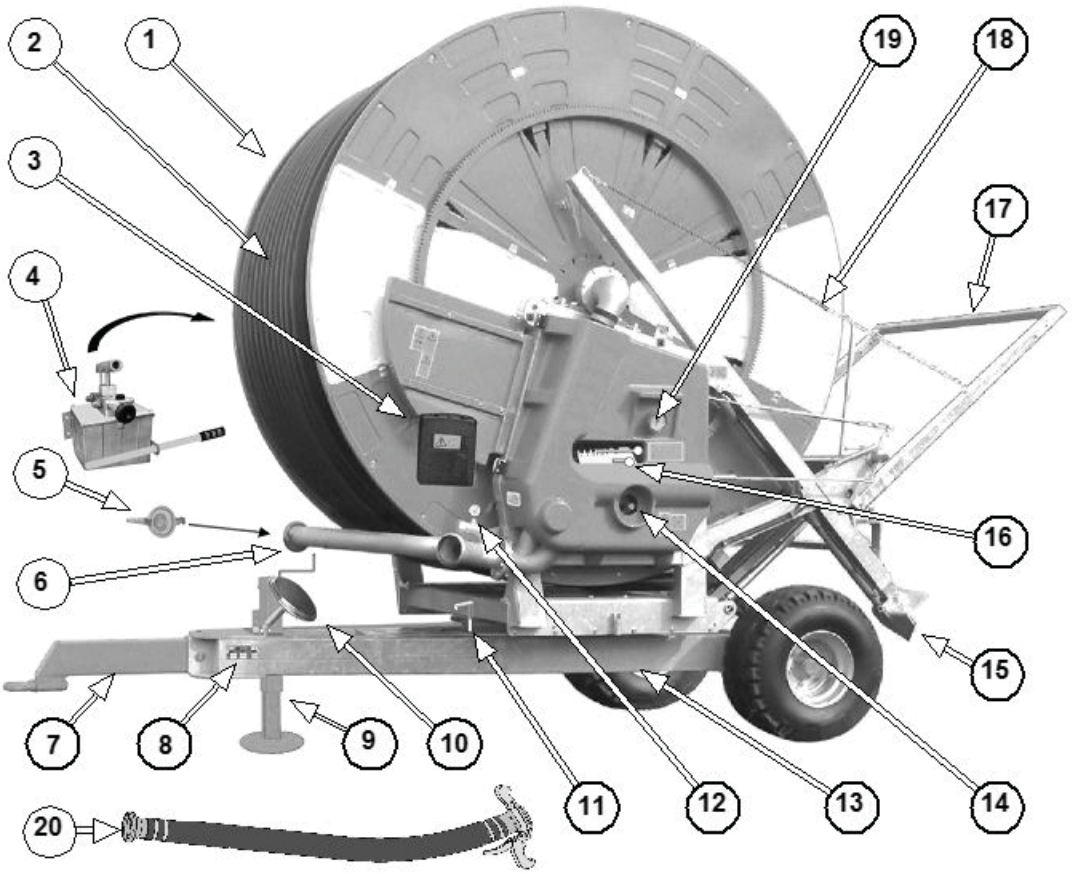
TECHNICAL SPECIFICATIONS AND LAYOUT

CH. 2

2 TECHNICAL DESCRIPTION OF THE MACHINE

2.1 DESCRIPTION OF MAIN PARTS

The hose reel travelling raingun is a farm machine which is towed for moving it and is used for irrigating fields and plots of land after it has been put in place.
The suitable drawbar “eye” must be used for moving the machine and placing it in the field. The machine consists of the following assemblies/sections, shown in the Drawing below.



Ref.	Description	Ref.	Description
1	Hose Reel / Reel	11	Turret rotation locking pin
2	PE irrigation hose	12	Water pressure gauge
3	Document holder	13	Two-wheel traveller
4	Manual hydraulic pump for rear stabilisers and trolley frame lifting	14	Quick winding PTO
5	Closing cap	15	Rear stabilisers
6	Water inlet	16	Turbo gearbox levers
7	Drawbar with drawbar eye	17	Trolley loading frame
8	Identification plate	18	Wires + chain for lifting the trolley loading frame
9	Hand crank operated front stabiliser leg	19	Metre counter
10	Handwheel for manual winding	20	Water supply hose

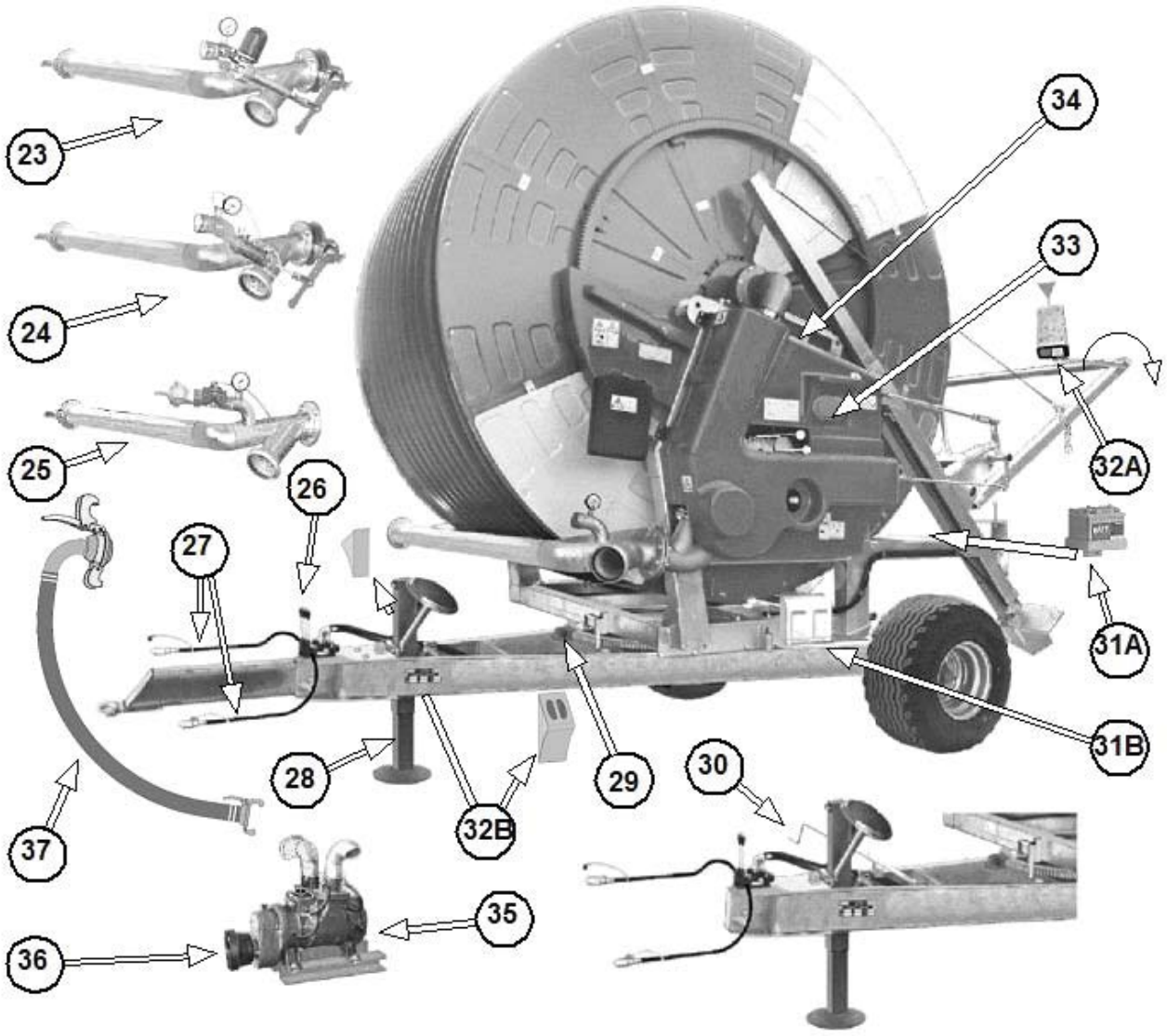
2.2 DESCRIPTION OF MAIN PARTS FOR 4-WHEEL OPTION

The 4-wheel option is also supplied with the units listed below.

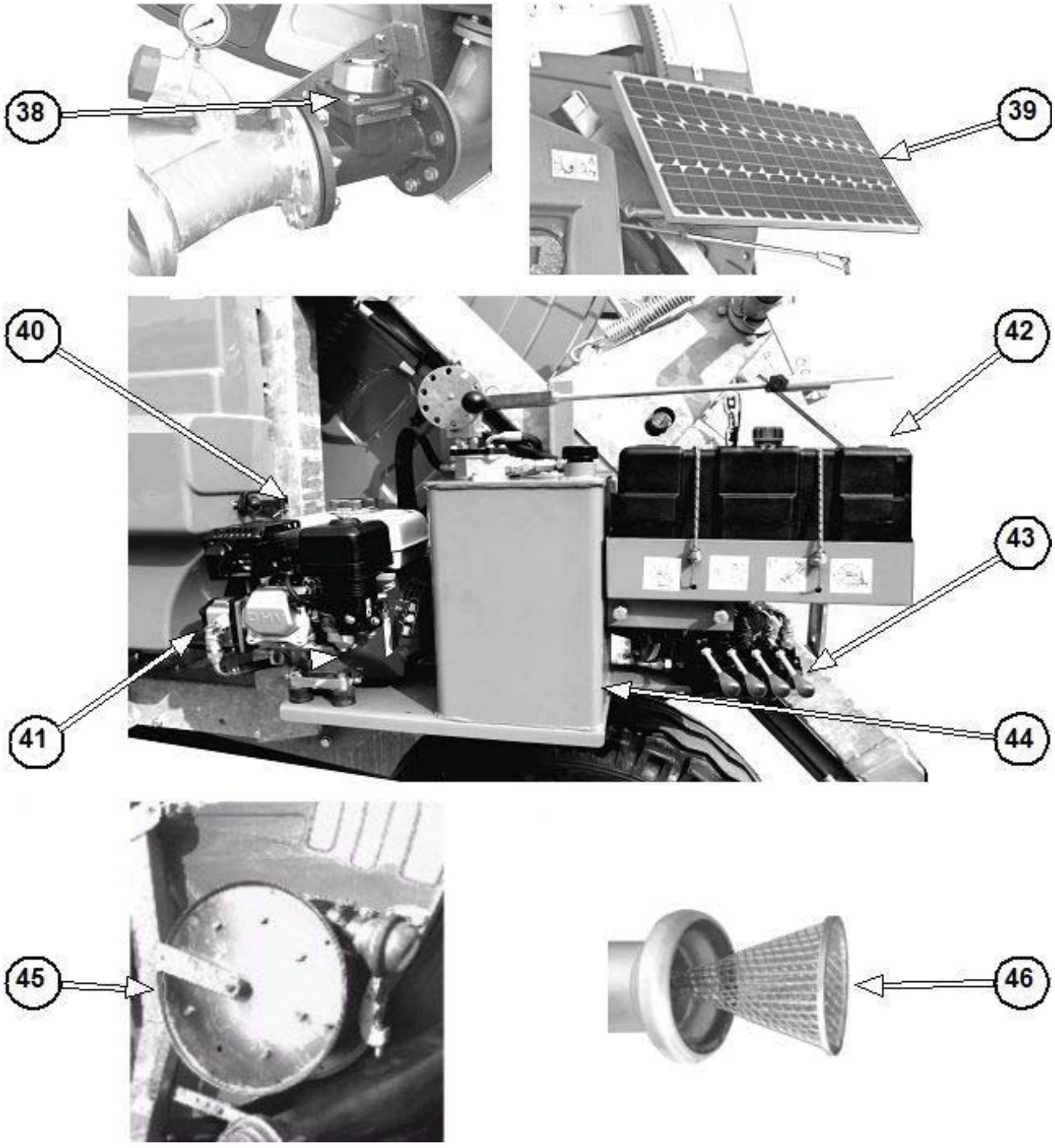
Ref.	Description	Ref.	Description
21	Four-wheel traveller drawbar (USA type)	22	Traveller with rocker arms for four wheels

2.3 DESCRIPTION OF OPTIONAL PARTS

Below is a description of the optional parts that may be supplied with the machine according to the customer's specific requirements.



Ref.	Description	Ref.	Description
23	Electrical inlet valve	31B	Battery + battery holder x VR4 # VR7/1
24	Water inlet valve	32A	Road use approval
25	Discharge valve	32B	Wheel stop wedges for machines with Road Use Approval without parking brake
26	Hydraulic distributor with control levers	33	Computer (Aqua System or Rain Control)
27	Hydraulic pipes for tractor jack coupler	34	Photovoltaic panel to recharge battery
28	Front hydraulic stabiliser	35	Compressor
29	Hydraulic rotation	36	Compressor PTO
30	Mechanical rotation hand crank	37	Compressor Hose
31A	Battery + battery holder x VR3		



Ref.	Description	Ref.	Description
38	Mechanical flow meter	43	Levers for hydraulic movements
39	Photovoltaic panel to recharge battery with self-propulsion	44	Hydraulic oil tank and engine support frame
40	Internal combustion engine for self-propulsion and/or hose winding	45	Winder for layflat hose
41	Hydraulic pump for self-propulsion	46	Water inlet filter
42	Fuel tank		

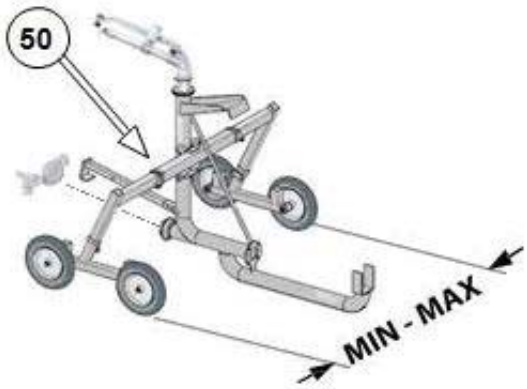
2.4 DESCRIPTION OF RAINGUN TROLLEYS

2.4.1 DESCRIPTION OF MAIN PARTS AND WHEEL WIDTH

47	Raingun trolley 2-wheel slide for hoses Ø 75 – 82 mm MIN OPENING : 1.7 m. MAX OPENING : 2.3 m. 2 Solid tyres code 00425

48	Raingun trolley 3 WHEELS for hoses Ø 75 – 82 mm MIN OPENING : 1.7 m. MAX OPENING : 2.3 m. 2 Solid tyres code 00425 1 Pneumatic nose wheel code 00405

49	Raingun trolley SIDE UNWINDING 3 WHEELS for hoses Ø 75 – 82 mm MIN OPENING : 1.5 m. MAX OPENING : 1,8 m. 2 Solid tyres code 00435 1 Pneumatic nose wheel code 00405

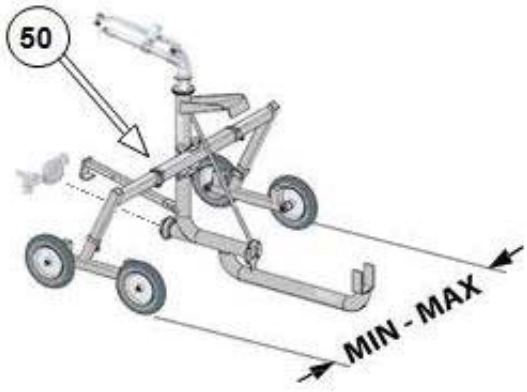


50	Raingun trolley 4-wheel slide for hoses Ø 90 – 100 mm MIN OPENING : 1.7 m. MAX OPENING : 2.3 m. 4 Solid tyres code 00425

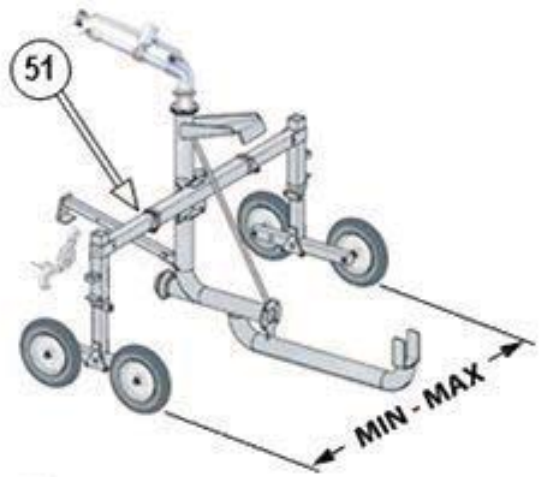
47	Raingun trolley 2-wheel slide for hoses Ø 2.95 – 3.22 in MIN OPENING : 5.57 ft MAX OPENING : 7.54 ft 2 Solid tyres code 00425

48	Raingun trolley 3 WHEELS for hoses Ø 2.95 – 3.22 in MIN OPENING : 5.57 ft MAX OPENING : 7.54 ft 2 Solid tyres code 00425 1 Pneumatic nose wheel code 00405

49	Raingun trolley SIDE UNWINDING 3 WHEELS for hoses Ø 2.95 – 3.22 in MIN OPENING : 4.92 ft MAX OPENING : 5.90 ft 2 Solid tyres code 00435 1 Pneumatic nose wheel code 00405



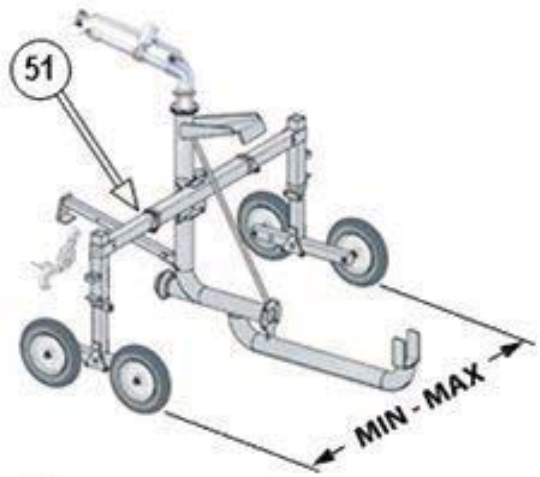
50	Raingun trolley 4-wheel slide for hoses Ø 3.54 – 3.93 in MIN OPENING : 5.57 ft MAX OPENING : 7.54 ft 4 Solid tyres code 00425



51	Raingun trolley 4-WHEEL SLIDE (ST3) for hoses Ø 110 mm MIN OPENING : 1.7 m. MAX OPENING : 2.3 m. 4 Solid tyres code 00425 ---------- 4-WHEEL SLIDE (ST2) for hoses Ø 120 – 125 -135 - 140 mm MIN OPENING : 1.7 m. MAX OPENING : 2.3 m. 4 Solid tyres code 00425

52	Raingun trolley 5 WHEELS (SL3) for hoses Ø 90 – 100 -110 mm MIN OPENING : 1.7 m. MAX OPENING : 2,5 m. 4 Solid tyres code 00435 1 Pneumatic nose wheel code 00367 ---------- 5 WHEELS (SL2) for hoses Ø 120 – 125 -135 - 140 mm MIN OPENING : 1.7 m. MAX OPENING : 2,5 m. 4 Solid tyres code 00435 1 Pneumatic nose wheel code 00485

53	Raingun trolley SIDE UNWINDING 5 WHEELS (SL3) for hoses Ø 90 – 100 -110 mm MIN OPENING : 1.5 m. MAX OPENING : 2.3 m. 4 Solid tyres code 00435 1 Pneumatic nose wheel code 00367 ---------- SIDE UNWINDING 5 WHEELS (SL2) for hoses Ø 120 – 125 -135 - 140 mm MIN OPENING : 1.5 m. MAX OPENING : 2.3 m. 4 Solid tyres code 00435 1 Pneumatic nose wheel code 00485

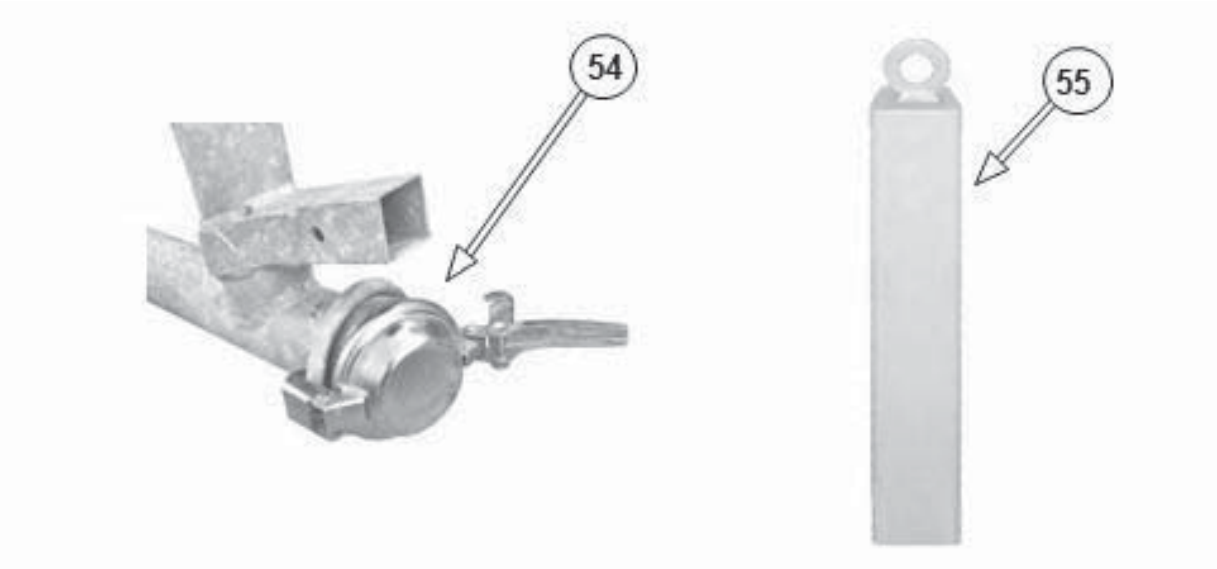


51	Raingun trolley 4-WHEEL SLIDE (ST3) for hoses Ø 4.33 in MIN OPENING : 5.57 ft MAX OPENING : 7.54 ft 4 Solid tyres code 00425 ---------- 4-WHEEL SLIDE (ST2) for hoses Ø 4.72 – 4.92 -5.31 - 5.51 in MIN OPENING : 5.57 ft MAX OPENING : 7.54 ft 4 Solid tyres code 00425

52	Raingun trolley 5 WHEELS (SL3) for hoses Ø 3.54 – 3.93 - 4.33 in MIN OPENING : 5.57 ft MAX OPENING : 8.2 ft 4 Solid tyres code 00435 1 Pneumatic nose wheel code 00367 ---------- 5 WHEELS (SL2) for hoses Ø 4.72 – 4.92 -5.31 - 5.51 in MIN OPENING : 5.57 ft MAX OPENING : 8.2 ft 4 Solid tyres code 00435 1 Pneumatic nose wheel code 00485

53	Raingun trolley SIDE UNWINDING 5 WHEELS (SL3) for hoses Ø 3.54 – 3.93 -4.33 in MIN OPENING : 4.92 ft MAX OPENING : 7.54 ft 4 Solid tyres code 00435 1 Pneumatic nose wheel code 00367 ---------- SIDE UNWINDING 5 WHEELS (SL2) for hoses Ø 4.72 – 4.92 -5.31 - 5.51 in MIN OPENING : 4.92 ft MAX OPENING : 7.54 ft 4 Solid tyres code 00435 1 Pneumatic nose wheel code 00485

2.4.2 DESCRIPTION OF THE MAIN ACCESSORIES



Ref.	Description	Ref.	Description
54	Discharge cap for trolley	55	Trolley balancing ballast

2.4.3 DESCRIPTION OF OPTIONAL ACCESSORIES

Ref.	Description	Ref.	Description
56	Raingun reduction and/or adapter		
57	Extension for maize trolley	59	Jack foot to adjust trolley height and/or width

2.5 TECHNICAL DATA

2.5.1 MACHINE WEIGHTS BASED ON MODEL

VR3			with 2 STANDARD 0.0/75 10PR WHEELS		with 4 STANDARD 0.0/75 10PR WHEELS	
Ø hose	Hose thickness	Hose length	Weight without water	Weight with water	Weight without water	Weight with water
mm	mm	m	kg	kg	kg	kg
75	6.0	450	1,871	3,279	2,110	3,518
82	6.5	450	1,981	3,669	2,220	3,908
82	7.5	500	2,165	3,933	2,404	4,172
90	6.7	350	2,000	3,620	2,239	3,859
90	7.0	380	2,081	3,811	2,320	4,050
100	7.0	300	2,000	3,751	2,239	3,990
100	7.5	340	2,128	4,066	2,367	4,305
110	8.0	240	2,000	3,676	2,239	3,915
120	9.0	220	2,117	3,915	2,356	4,154

VR4			with 2 STANDARD 0.0/75 10PR WHEELS		with 4 STANDARD 0.0/75 10PR WHEELS	
Ø hose	Hose thickness	Hose length	Weight without water	Weight with water	Weight without water	Weight with water
mm	mm	m	kg	kg	kg	kg
82	7.5	500	2,640	4,408	2,879	4,647
90	7.0	380	2,556	4,286	2,795	4,525
90	7.0	400	2,593	4,414	2,832	4,653
90	7.5	470	2,778	4,861	3,017	5,100
90	7.5	500	2,837	5,052	3,076	5,291
100	7.5	340	2,603	4,541	2,842	4,780
100	7.5	360	2,647	4,699	2,886	4,938
100	8.0	390	2,765	4,935	3,004	5,174
110	8.0	300	2,631	4,723	2,870	4,962
110	8.0	330	2,709	5,010	2,948	5,249
110	8.2	350	2,781	5,200	3,020	5,439
120	9.0	270	2,753	4,971	2,992	5,210

VR5			with 2 STANDARD 11.5/80 12PR WHEELS		with 4 STANDARD 0.0/75 10PR WHEELS	
Ø hose	Hose thickness	Hose length	Weight without water	Weight with water	Weight without water	Weight with water
mm	mm	m	kg	kg	kg	kg
100	8.0	450	3,424	5,926	3,628	6,130
100	8.5	500	3,606	6,319	3,810	6,523
110	9.1	400	3,536	6,194	3,740	6,398
110	9.1	450	3,682	6,670	3,886	6,874
110	10.0	470	3,859	6,858	4,063	7,062
120	9.0	400	3,684	6,965	3,888	7,169
125	9.3	320	3,508	6,367	3,712	6,571
125	9.3	350	3,610	6,736	3,814	6,940
125	9.3	380	3,713	7,105	3,917	7,309
135	11.0	300	3,709	6,733	3,913	6,937
140	10.4	290	3,653	6,906	3,857	7,110

VR6			with 2 STANDARD 11.5/80 12PR WHEELS		with 4 STANDARD 0.0/75 10PR WHEELS	
Ø hose	Hose thickness	Hose length	Weight without water	Weight with water	Weight without water	Weight with water
mm	mm	m	kg	kg	kg	kg
100	9.1	600	4,210	7,371	4,414	7,575
110	10.0	500	4,220	7,410	4,424	7,614
110	10.0	550	4,378	7,886	4,582	8,090
110	10.0	570	4,441	8,077	4,645	8,281
120	10.4	460	4,340	7,907	4,544	8,111
125	9.3	400	4,047	7,617	4,251	7,821
125	10.4	440	4,341	8,106	4,545	8,310
135	11.0	380	4,320	8,146	4,524	8,350
140	10.4	350	4,175	8,098	4,379	8,302

VR7			with 2 STANDARD 12.5/80 14PR WHEELS		with 4 STANDARD 0.0/75 10PR WHEELS	
Ø hose	Hose thickness	Hose length	Weight without water	Weight with water	Weight without water	Weight with water
mm	mm	m	kg	kg	kg	kg
100	9.1	650	4,875	8,299	5,118	8,542
110	10.0	550	4,912	8,420	5,155	8,663
110	10.0	600	5,070	8,896	5,313	9,139
120	11.4	540	5,325	9,343	5,568	9,586
125	10.4	450	4,912	8,763	5,155	9,006
125	10.4	500	5,101	9,378	5,344	9,621
135	11.0	400	4,940	8,967	5,183	9,210
140	10.4	380	4,837	9,094	5,080	9,337

VR7/1			with 2 STANDARD 12.5/80 14PR WHEELS		with 4 STANDARD 10.0/75 10PR WHEELS	
Ø hose	Hose thickness	Hose length	Weight without water	Weight with water	Weight without water	Weight with water
mm	mm	m	kg	kg	kg	kg
110	11,0	700	5.914	10.181	6.157	10.424
110	12,5	750	6.382	10.646	6.625	10.889
120	12,0	620	6.070	10.569	6.313	10.812
125	11,4	550	5.787	10.311	6.030	10.554
125	13,0	600	6.285	10.915	6.528	11.158
135	12,0	460	5.706	10.172	5.949	10.415
140	11,0	450	5.706	10.644	5.949	10.887

Note: All the weights shown refer to machines having a standard set-up with slide raingun trolley.

VR3			with 2 STANDARD 0.0/75 10PR WHEELS		with 4 STANDARD 0.0/75 10PR WHEELS	
Ø hose	Hose thickness	Hose length	Weight without water	Weight with water	Weight without water	Weight with water
in	in	ft	lbs	lbs	lbs	lbs
2.95	0.24	1,476	4,125	7,229	4,652	7,756
3.23	0.26	1,476	4,367	8,089	4,894	8,616
3.23	0.30	1,640	4,773	8,671	5,300	9,198
3.54	0.26	1,148	4,409	7,981	4,936	8,508
3.54	0.28	1,247	4,588	8,402	5,115	8,929
3.94	0.28	984	4,409	8,270	4,936	8,796
3.94	0.30	1,115	4,691	8,964	5,218	9,491
4.33	0.31	787	4,409	8,104	4,936	8,631
4.72	0.35	722	4,667	8,631	5,194	9,158

VR4			with 2 STANDARD 0.0/75 10PR WHEELS		with 4 STANDARD 0.0/75 10PR WHEELS	
Ø hose	Hose thickness	Hose length	Weight without water	Weight with water	Weight without water	Weight with water
in	in	ft	lbs	lbs	lbs	lbs
3.23	0.30	1,640	5,820	9,718	6,347	10,245
3.54	0.28	1,247	5,635	9,449	6,162	9,976
3.54	0.28	1,312	5,717	9,731	6,243	10,258
3.54	0.30	1,542	6,124	10,717	6,651	11,244
3.54	0.30	1,640	6,255	11,138	6,781	11,665
3.94	0.30	1,115	5,739	10,011	6,266	10,538
3.94	0.30	1,181	5,836	10,360	6,363	10,886
3.94	0.31	1,280	6,096	10,880	6,623	11,407
4.33	0.31	984	5,800	10,412	6,327	10,939
4.33	0.31	1,083	5,972	11,045	6,499	11,572
4.33	0.32	1,148	6,131	11,464	6,658	11,991
4.72	0.35	886	6,069	10,959	6,596	11,486

VR5			with 2 STANDARD 11.5/80 12PR WHEELS		with 4 STANDARD 0.0/75 10PR WHEELS	
Ø hose	Hose thickness	Hose length	Weight without water	Weight with water	Weight without water	Weight with water
in	in	ft	lbs	lbs	lbs	lbs
3.94	0.31	1,476	7,549	13,065	7,998	13,514
3.94	0.33	1,640	7,950	13,931	8,400	14,381
4.33	0.36	1,312	7,796	13,655	8,245	14,105
4.33	0.36	1,476	8,117	14,705	8,567	15,155
4.33	0.39	1,542	8,508	15,119	8,957	15,569
4.72	0.35	1,312	8,122	15,355	8,572	15,805
4.92	0.37	1,050	7,734	14,037	8,184	14,487
4.92	0.37	1,148	7,959	14,850	8,408	15,300
4.92	0.37	1,247	8,186	15,664	8,636	16,114
5.31	0.43	984	8,177	14,844	8,627	15,293
5.51	0.41	951	8,053	15,225	8,503	15,675

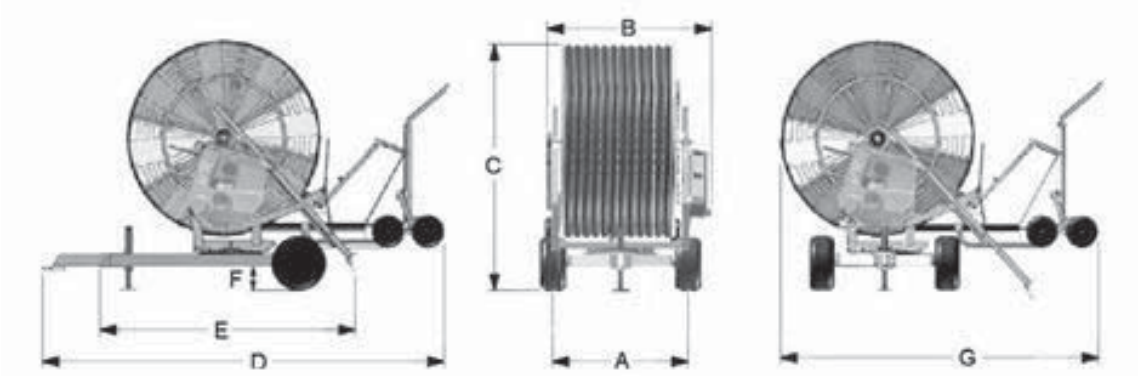
VR6			with 2 STANDARD 11.5/80 12PR WHEELS		with 4 STANDARD 0.0/75 10PR WHEELS	
Ø hose	Hose thickness	Hose length	Weight without water	Weight with water	Weight without water	Weight with water
in	in	ft	lbs	lbs	lbs	lbs
3.94	0.36	1,969	9,281	16,250	9,731	16,700
4.33	0.39	1,640	9,304	16,336	9,753	16,786
4.33	0.39	1,804	9,652	17,386	10,102	17,835
4.33	0.39	1,870	9,791	17,807	10,240	18,256
4.72	0.41	1,509	9,568	17,432	10,018	17,882
4.92	0.37	1,312	8,922	16,793	9,372	17,242
4.92	0.41	1,444	9,570	17,871	10,020	18,320
5.31	0.43	1,247	9,524	17,959	9,974	18,409
5.51	0.41	1,148	9,204	17,853	9,654	18,303

VR7			with 2 STANDARD 12.5/80 14PR WHEELS		with 4 STANDARD 0.0/75 10PR WHEELS	
Ø hose	Hose thickness	Hose length	Weight without water	Weight with water	Weight without water	Weight with water
in	in	ft	lbs	lbs	lbs	lbs
3.94	0.36	2,133	10,748	18,296	11,283	18,832
4.33	0.39	1,804	10,829	18,563	11,365	19,099
4.33	0.39	1,969	11,177	19,612	11,713	20,148
4.72	0.45	1,772	11,740	20,598	12,275	21,134
4.92	0.41	1,476	10,829	19,319	11,365	19,855
4.92	0.41	1,640	11,246	20,675	11,782	21,211
5.31	0.43	1,312	10,891	19,769	11,427	20,305
5.51	0.41	1,247	10,664	20,049	11,199	20,585

VR7/1			with 2 STANDARD 12.5/80 14PR WHEELS		with 4 STANDARD 10.0/75 10PR WHEELS	
Ø hose	Hose thickness	Hose length	Weight without water	Weight with water	Weight without water	Weight with water
in	in	ft	lbs	lbs	lbs	lbs
4,33	0,43	2.297	13.038	22.445	13.573	22.980
4,33	0,49	2.461	14.069	23.470	14.605	24.006
4,72	0,47	2.034	13.382	23.300	13.918	23.836
4,92	0,45	1.804	12.758	22.732	13.294	23.267
4,92	0,51	1.969	13.856	24.063	14.392	24.599
5,31	0,47	1.509	12.579	22.425	13.115	22.961
5,51	0,43	1.476	12.579	23.466	13.115	24.002

Note: All the weights shown refer to machines having a standard set-up with slide raingun trolley.

2.5.2 DIMENSIONS OF MACHINES WITH 2 WHEELS



VR3	2 Wheels	um	A min	A max	B	C	D	E	F	G
10.0/75-15.3 - 10PR	STANDARD	cm	173	190	231	308	645.5	337	37	484
13.0/55-16 - 14PR	OPTIONAL		179	189		308.5			37.5	
11.5/80-15.3 - 12PR	OPTIONAL		176	190		312			41	
10.0/75-15.3 - 10PR	STANDARD	in	68.11	74.80	90.94	121.26	254.13	132.68	14.57	190.55
13.0/55-16 - 14PR	OPTIONAL		70.47	74.41		121.46	0.00		14.76	
11.5/80-15.3 - 12PR	OPTIONAL		69.29	74.80		122.83	0.00		16.14	

VR4	2 Wheels	um	A min	A max	B	C	D	E	F	G
10.0/75-15.3 - 10PR	STANDARD	cm	189	206	240	332.5	683	387	42	471
13.0/55-16 - 14PR	OPTIONAL		188	205		333			42.5	
11.5/80-15.3 - 12PR	OPTIONAL		188	206		337			46	
10.0/75-15.3 - 10PR	STANDARD	in	74.41	81.10	94.49	130.91	268.90	152.36	16.54	185.43
13.0/55-16 - 14PR	OPTIONAL		74.02	80.71		131.10			16.73	
11.5/80-15.3 - 12PR	OPTIONAL		74.02	81.10		132.68			18.11	

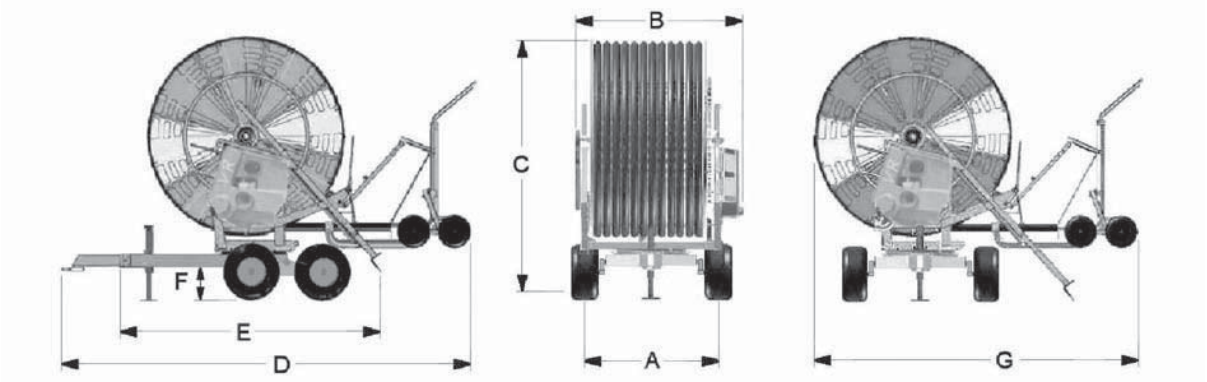
VR5	2 Wheels	um	A min	A max	B	C	D	E	F	G
11.5/80-15.3 - 12PR	STANDARD	cm	194.5	205.5	255	378	721	390	38	512
13.0/55-16 - 14PR	OPTIONAL		194	205		374.5			34.5	
400 /60-15.5 - 14PR	OPTIONAL		195	206		379.5			39.5	
12.5/80-15.3 - 14PR	OPTIONAL		194.5	205.5		380			40	
11.5/80-15.3 - 12PR	STANDARD	in	76.57	80.91	100.39	148.82	283.86	153.54	14.96	201.57
13.0/55-16 - 14PR	OPTIONAL		76.38	80.71		147.44			13.58	
400 /60-15.5 - 14PR	OPTIONAL		76.77	81.10		149.41			15.55	
12.5/80-15.3 - 14PR	OPTIONAL		76.57	80.91		149.61			15.75	

VR6	2 Wheels	um	A min	A max	B	C	D	E	F	G
11.5/80-15.3 - 12PR	STANDARD	cm	194.5	205.5	255	397	748	390	38	530
13.0/55-16 - 14PR	OPTIONAL		194	205		393.5			34.5	
400 /60-15.5 - 14PR	OPTIONAL		195	206		398.5			39.5	
12.5/80-15.3 - 14PR	OPTIONAL		194.5	205.5		399			40	
11.5/80-15.3 - 12PR	STANDARD	in	76.57	80.91	100.39	156.30	294.49	153.54	14.96	208.66
13.0/55-16 - 14PR	OPTIONAL		76.38	80.71		154.92			13.58	
400 /60-15.5 - 14PR	OPTIONAL		76.77	81.10		156.89			15.55	
12.5/80-15.3 - 14PR	OPTIONAL		76.57	80.91		157.09			15.75	

VR7	2 Wheels	um	A min	A max	B	C	D	E	F	G
12.5 /80-15.5 - 14PR	STANDARD	cm	202	219.5	255	403	739	406	39.5	537
400/60-15.3 - 14PR	OPTIONAL		202.5	220		402.5			39	
12.5 /80-15.5 - 14PR	STANDARD	in	79.53	86.42	100.39	158.66	290.94	159.84	15.55	211.42
400/60-15.3 - 14PR	OPTIONAL		79.72	86.61		158.46			15.35	

VR7/1	2 Wheels	um	A min	A max	B	C	D	E	F	G
12.5 /80-15.5 - 14PR	STANDARD	cm	202	219.5	255	403	739	406	39.5	537
400/60-15.3 - 14PR	OPTIONAL		202.5	220		402.5			39	
12.5 /80-15.5 - 14PR	STANDARD	in	79.53	86.42	100.39	158.66	290.94	159.84	15.55	211.42
400/60-15.3 - 14PR	OPTIONAL		79.72	86.61		158.46			15.35	

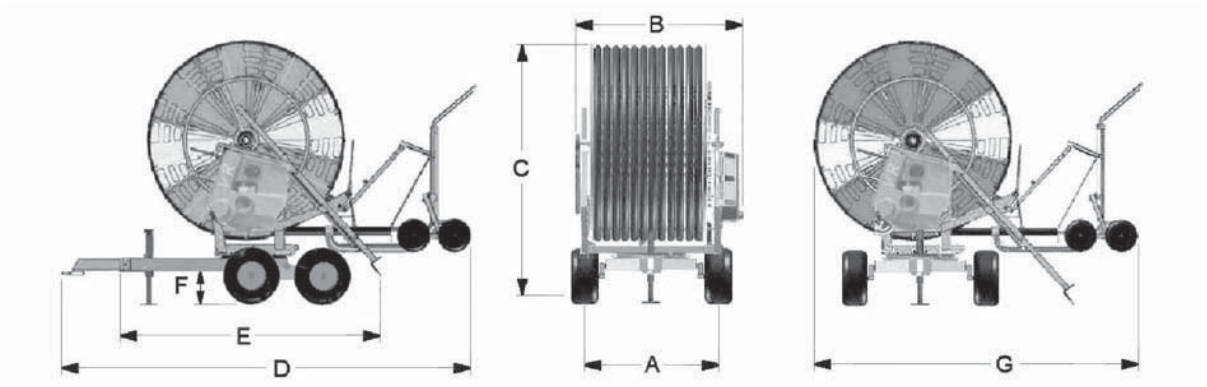
2.5.3 DIMENSIONS OF MACHINES WITH 4 WHEELS



VR3	4 Wheels	um	A min	A max	B	C	D	E	F	G
10.0/75-15.3 - 10PR	STANDARD	cm	194	239	231	331	645.5	337	60	484
13.0/55-16 - 14PR	OPTIONAL		193	238		331.5			60.5	
10.0/75-15.3 - 10PR	STANDARD	in	76.38	94.09	90.94	130.31	254.13	132.68	23.62	190.55
13.0/55-16 - 14PR	OPTIONAL		75.98	93.70		130.51			23.82	

VR4	4 Wheels	um	A min	A max	B	C	D	E	F	G
10.0/75-15.3 - 10PR	STANDARD	cm	202	247	240	350.5	683	387	60	471
13.0/55-16 - 14PR	OPTIONAL		200	246		351			60.5	
11.5/80-15.3 - 12PR	OPTIONAL		201	246		355			64	
10.0/75-15.3 - 10PR	STANDARD	in	79.53	97.24	94.49	137.99	268.90	152.36	23.62	185.43
13.0/55-16 - 14PR	OPTIONAL		78.74	96.85		138.19			23.82	
11.5/80-15.3 - 12PR	OPTIONAL		79.13	96.85		139.76			25.20	

VR5	4 Wheels	um	A min	A max	B	C	D	E	F	G
10.0/75-15.3 - 10PR	STANDARD	cm	188	233	255	394.5	721	390	54.5	512
13.0/55-16 - 14PR	OPTIONAL		186	232		395			55	
11.5/80-15.3 - 12PR	OPTIONAL		195	240		404			64	
400 /60-15.5 - 14PR	OPTIONAL		195	241		405.5			65.5	
12.5/80-15.3 - 14PR	OPTIONAL		195	240		406			66	
10.0/75-15.3 - 10PR	STANDARD	in	74.02	91.73	100.39	155.31	283.86	153.54	21.46	201.57
13.0/55-16 - 14PR	OPTIONAL		73.23	91.34		155.51			21.65	
11.5/80-15.3 - 12PR	OPTIONAL		76.77	94.49		159.06			25.20	
400 /60-15.5 - 14PR	OPTIONAL		76.77	94.88		159.65			25.79	
12.5/80-15.3 - 14PR	OPTIONAL		76.77	94.49		159.84			25.98	



VR6	4 Wheels	um	A min	A max	B	C	D	E	F	G
10.0/75-15.3 - 10PR	STANDARD		188	233		413.5			54.5	
13.0/55-16 - 14PR	OPTIONAL		186	232		414			55	
11.5/80-15.3 - 12PR	OPTIONAL	cm	195	240	255	423	748	390	64	530
400 /60-15.5 - 14PR	OPTIONAL		195	241		424.5			65.5	
12.5/80-15.3 - 14PR	OPTIONAL		195	240		425			66	

10.0/75-15.3 - 10PR	STANDARD		74.02	91.73		162.80			21.46	
13.0/55-16 - 14PR	OPTIONAL		73.23	91.34		162.99			21.65	
11.5/80-15.3 - 12PR	OPTIONAL	in	76.77	94.49	100.39	166.54	294.49	153.54	25.20	208.66
400 /60-15.5 - 14PR	OPTIONAL		76.77	94.88		167.13			25.79	
12.5/80-15.3 - 14PR	OPTIONAL		76.77	94.49		167.32			25.98	

VR7	4 Wheels	um	A min	A max	B	C	D	E	F	G
10.0/75-15.3 - 10PR	STANDARD		201	262		418			54.5	
13.0/55-16 - 14PR	OPTIONAL		199	261		418.5			55	
11.5/80-15.3 - 12PR	OPTIONAL	cm	208	269	255	427.5	739	406	64	537
400 /60-15.5 - 14PR	OPTIONAL		208	267		429			65.5	
12.5/80-15.3 - 14PR	OPTIONAL		208	269		429.5			66	

10.0/75-15.3 - 10PR	STANDARD		79.13	103.15		164.57			21.46	
13.0/55-16 - 14PR	OPTIONAL		78.35	102.76		164.76			21.65	
11.5/80-15.3 - 12PR	OPTIONAL	in	81.89	105.91	100.39	168.31	290.94	159.84	25.20	211.42
400 /60-15.5 - 14PR	OPTIONAL		81.89	105.12		168.90			25.79	
12.5/80-15.3 - 14PR	OPTIONAL		81.89	105.91		169.09			25.98	

VR7/1	4 Wheels	um	A min	A max	B	C	D	E	F	G
10.0/75-15.3 - 10PR	STANDARD		201	262		426,5			54.5	
13.0/55-16 - 14PR	OPTIONAL		199	261		427			55	
11.5/80-15.3 - 12PR	OPTIONAL	cm	208	269	255	436	739	406	64	541
400 /60-15.5 - 14PR	OPTIONAL		208	267		437,5			65.5	
12.5/80-15.3 - 14PR	OPTIONAL		208	269		438			66	

10.0/75-15.3 - 10PR	STANDARD		79.13	103.15		167,9			21.46	
13.0/55-16 - 14PR	OPTIONAL		78.35	102.76		168,1			21.65	
11.5/80-15.3 - 12PR	OPTIONAL	in	81.89	105.91	100.39	171,6	290.94	159.84	25.2	213
400 /60-15.5 - 14PR	OPTIONAL		81.89	105.12		172,2			25.79	
12.5/80-15.3 - 14PR	OPTIONAL		81.89	105.91		172,4			25.98	

2.5.4 WHEEL SIZE AND TECHNICAL SPECIFICATIONS

Code	Tyres	Inflation pressure
00364	10.0 / 75 - 15.3 10PR - (≈ Ø 750 - 265 mm / 29.53 - 10.43 in)	5.1 bar / 73.97 psi
00428	13.0 / 55 - 16 14PR - (≈ Ø 775 - 325 mm / 30.51 - 12.80 in)	5.1 bar / 73.97 psi
00322	11.5 / 80 - 15.3 12PR - (≈ Ø 845 - 300 mm / 33.27 - 11.81 in)	5.3 bar / 76.87 psi
00354	400 / 60 - 15.5 14PR - (≈ Ø 875 - 400 mm / 34.45 - 15.75 in)	4.8 bar / 69.62 psi
00372	12.5 / 80 - 15.3 14PR - (≈ Ø 885 - 300 mm / 34.84 - 11.81 in)	5.6 bar / 81.22 psi

2.5.5 RAINGUN TROLLEY WHEEL SIZE AND TECHNICAL SPECIFICATIONS

code	Solid wheels
00425	SOLID WHEEL - Ø 450 x 80 mm / 17.72 x 3.15 in (STANDARD x SLIDE TROLLEYS)
00435	OVERSIZED SOLID WHEEL - Ø 516 x 140 mm / 20.31 x 21.26 in

code	Iron wheels with steering ridge
00439	WHEEL WITH RIDGE - Ø 530 x 120 mm / 20.86 x 4.72 in (OPTIONAL)

code	Pneumatic Pivoting Nose Wheel	Inflation pressure
00405	13.5.00 x 6” 4PR - (≈ Ø 320 - 122 mm / 12.60 x 4.80 in)	2.8 bar / 40.61 psi
00367	15.6.00 x 6” 4PR - (≈ Ø 366 - 155 mm / 14.41 x 6.10 in)	2.1 bar / 30.46 psi
00485	16.6.50 x 8” 4PR - (≈ Ø 406 - 165 mm / 15.98 x 6.50 in)	2.9 bar / 42.06 psi

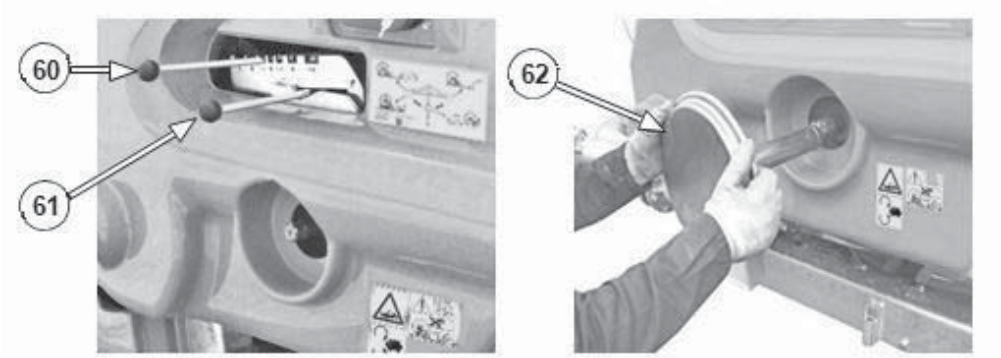
code	Iron wheels
00493	IRON NOSE WHEEL - Ø 320 x 130 mm / 12.60 x 5.12 in (OPTIONAL)
00487	IRON NOSE WHEEL - Ø 400 x 150 mm / 15.75 x 5.91 in (OPTIONAL)

2.5.6 NOISE LEVEL

Noise level	
Guaranteed sound power for machines without internal combustion engine L WA	70 dB
Guaranteed sound power for machines with internal combustion engine L WA	104 dB

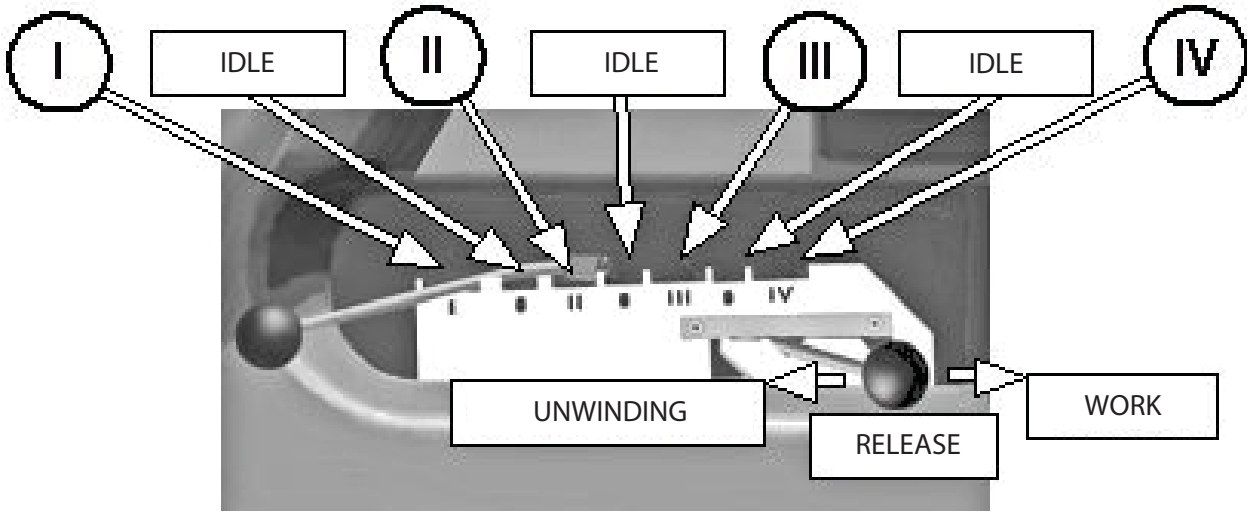
2.6 DESCRIPTION OF CONTROLS

2.6.1 MECHANICAL CONTROLS ON THE MACHINE

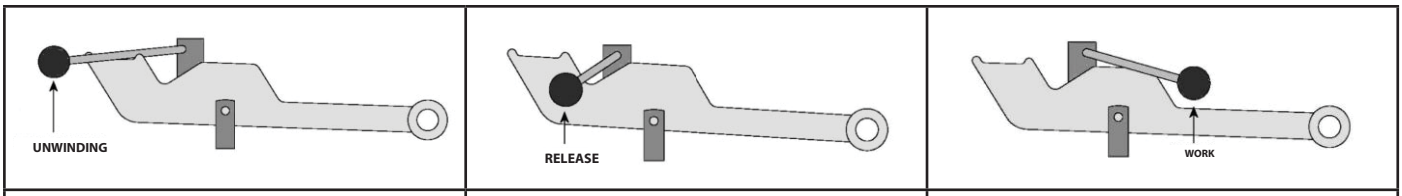


Ref.	Description	Function
60	Speed change lever	It allows the reel rotation gearbox speed to be selected
61	Gearbox engage lever	It allows the reel rotation gearbox to be set to neutral or in gear
62	PTO handwheel	It allows the reel rotation to be manually actuated

The picture below and related table describe the hose winding speed according to the gear lever position for every machine model.



This is followed by a detailed description of the lever position for better understanding



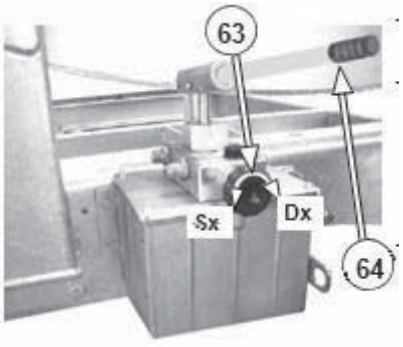
Lever in unwinding position	Lever in release position	Lever in working position

Machine	Gear position	Unit of measurement	Hose winding speed
VR3 - VR4 - VR5 - VR6 - VR7-VR7/1	I	m/h (ft/hr)	10 ÷ 15 (33 ÷ 49)
VR3 - VR4 - VR5 - VR6 - VR7-VR7/1	II	m/h (ft/hr)	15 ÷ 30 (49 ÷ 98)
VR3 - VR4	III	m/h (ft/hr)	30 ÷ > 60 (98 ÷ > 197)
VR5 - VR6 - VR7-VR7/1	III	m/h (ft/hr)	30 ÷ 60 (98 ÷ 197)
VR5 - VR6 - VR7-VR7/1	IV	m/h (ft/hr)	> 60 (> 197)

Note: The gear position is indicative. At certain points during work, a different gear might be required since the speed may vary according to the pressure and/or flow rate.

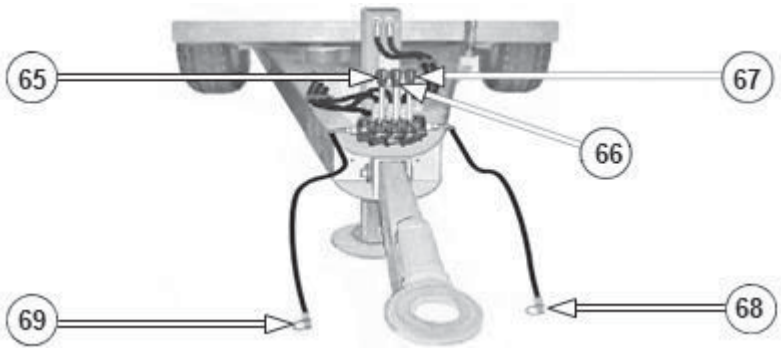
DANGER
ENTANGLEMENT HAZARD:
The turbo-gearbox levers must only be actuated with the casing closed. It is dangerous and strictly forbidden to start the machine if the protection casing is open.

2.6.2 HYDRAULIC CONTROLS ON THE MACHINE



Ref.	Description	Function
63	Selection knob: with RH and LH rotation	With RH rotation it allows the stabilisers and trolley frame to be lowered. With LH rotation it allows the stabilisers and trolley frame to be raised.
64	Lever for actuating the manual pump	It allows the rear stabilisers and trolley frame to be raised or lowered.

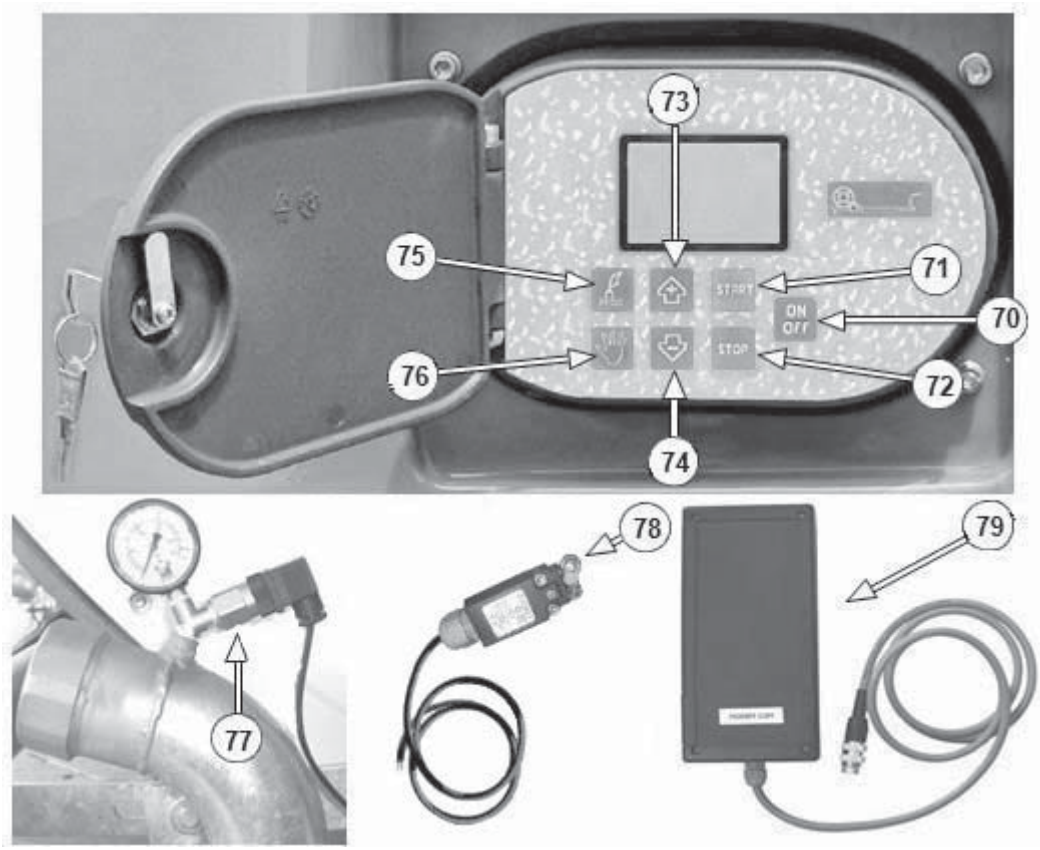
2.6.3 OPTIONAL HYDRAULIC CONTROLS



Ref.	Description	Function
65	Lever for reel rotation on the vertical axis of the traveller	It is used to rotate the reel with respect to the vertical axis of the traveller, modifying the reel's angle and irrigation direction.
66	Lever to raise or lower the rear stabilisers and trolley frame	It is used to anchor the rear stabilisers to the ground at the same time as lowering the trolley frame to the ground. It is used to release the rear stabilisers from the ground at the same time as lifting the trolley frame.
67	Front stabiliser leg lifting / lowering lever	It is used to support the front of the machine's traveller during operation or when parked.
68	Quick tractor jack coupler for oil delivery to the machine (blue)	It is used to pressurise the machine's hydraulic system and to use the control levers.
69	Quick tractor jack coupler for oil return to the tractor (red)	It allows oil to go back from the machine's distributor to the tractor.

CAUTION
Hydraulic actuator levers must be operated one at a time!
It is forbidden to control more than one hydraulic actuator at the same time.

2.6.4 OPTIONAL COMPUTER CONTROLS



Ref.	Description	Function
70	Power button	It switches the computer on. It has two positions, ON and OFF.
71	Cycle start button	It starts the raingun's working cycle: START.
72	Cycle stop button	It stops the raingun's working cycle: STOP.
73	+ Button (▲)	It is used to increase numerical values, which are flashing.
74	– Button (▼)	It is used to decrease numerical values, which are flashing.
75	Programming (PROG)	The PROG button is used to enter the programming menus and to confirm selections.
76	Manual function	It has the purpose of manually controlling the turbine by-pass and adjusting the machine's work speed through the buttons: + INCREASE - DECREASE
77	Pressure switch (standard supplied with computer Rain Control and as optional feature for Aqua System)	It is used to send the 'pressure on' signal to the computer.
78	Limit micro-switch (only available with computer Rain Control)	It sends the electrical signal to the computer when the machine's work is over.
79	Modem x GSM (only available with computer Rain Control)	It is used to remotely monitor the machine's operating status with a mobile phone.

MACHINE DESCRIPTION | CH. 3

3 MACHINE DESCRIPTION

The whole range has been designed with criteria of excellence in performance and ease of use, together with high indeformability and structural resistance, assured by checks on the main welded structures.

3.1 INTENDED USE

The hose reel travelling raingun is a farm machine which is towed for moving it and is used for irrigating fields and plots of land after it has been put in place.
The machine has been designed to irrigate large agricultural surfaces with raingun or spray booms.
It is normally used in farming to irrigate various types of crops.

3.2 UNAUTHORISED USE

This machine must solely be used for the explicit purposes for which it has been designed by the Manufacturer.

Any other type of use, or broadening the intended use, does not fall within the use it has been designed for by the Manufacturer, hence the latter disclaims any liability for any ensuing damage.

The methods of utilisation specified in the manual as incorrect must never be allowed under any circumstance.
Misuse of the machine and poor maintenance may involve serious hazard situations for the safety of personnel.
The actions described below, which obviously cannot cover the entire range of potential "non permissible use" of the machine, represent however the most "reasonably" foreseeable ones and should be deemed as strictly forbidden.

Specifically:
- do not use the machine unless it has been correctly installed according to the regulations in force;
- do not use the machine as a support, not even when it is not working (there is a serious risk of falling and damaging the machine);
- do not climb on the machine and/or on the raingun trolley, whether stationary or moving;
- do not place the machine on unstable terrain or terrain with a grade greater than 8.5 degrees;
- do not use the machine unless it has been correctly positioned as described in this manual (front stabiliser leg, rear stabiliser legs and raingun trolley);
- do not tow the machine at speeds exceeding 10 km/h and in any case at lower speeds depending on the type of terrain (muddy, potholes, slopes, etc.) present at the site;
- do not move the machine if the terrain conditions are hazardous and if no measures have been taken to prevent a possible tilting hazard;
- do not perform transversal manoeuvres with respect to the axis of the machine on sloping surfaces, since this might cause the machine to overturn;
- do not move the machine if there are any people near the machine's manoeuvre area;
- do not reel the hose back in if it sticks to the ground due to mud or similar. There is a risk of damaging the machine and causing hazardous situations for people;
- do not remove the casings protecting the machine's moving parts;
- do not tow the machine unless the suitable safety rotation locking pin has been properly inserted;
- never stand in front of the raingun: high pressure water hazard;
- never operate the machine unless the water hose has been suitably connected to the raingun trolley and the raingun has been placed at the right height from the ground;
- never put your hands or other parts of your body between the machine's moving parts. Do not perform inspections, cleaning and/or maintenance operations inside the machine before the rotating parts have come to a complete halt and the power and other supply lines have been isolated from the machine.
- do not use the machine outside permissible environmental conditions (see chapter 4);
- do not use the machine under forbidden conditions and comply with the provisions of this manual indicated by danger and/or warning notes;
- do not use the machine near aerial power lines, electrical distribution substations, etc.;
- do not use the machine near roads, motorways or in any interference situation with public or private areas such as dwellings, the roofs or windows of houses, etc.
- no other use is allowed, with the exception of the provisions set out in paragraph 3.1.

Use of the machine, associated control systems and actuation equipment under conditions other than those set out in this manual is not allowed.
Any modification to operation must be notified to the Manufacturer and authorised by them in writing.

Any modification that alters the risks and/or functions of the machine, if it is carried out without the Manufacturer's authorisation, shall forfeit any form of warranty, liability as well as its CE declaration of conformity.

CAUTION
The Manufacturer disclaims any liability in the event of damage to property or harm to persons should the product be misused.

NOTE
It is the buyer's unequivocal responsibility to carry out a product inspection upon receipt of the product and to ensure the supply matches the order specifications.

Immediately inform the Manufacturer in the event of any non conformity.
Also ensure there has been no damage during transport.
Should any damage due to shipping be observed, in order not to forfeit the contractual warranty, we recommend immediately stopping any installation operation and use of the machine. Send a written complaint to the Manufacturer, documented with photographs of the damaged parts, within and not later than 15 days after the product's date of delivery.
Also, ensure the packaging contains all the optional features you have ordered and all standard supplied components.

3.3 MACHINE DESCRIPTION

The machine has been designed to irrigate large agricultural surfaces with raingun or spray booms.

It is normally used in farming for growing various types of crops.

The essential concept is to irrigate wide surfaces without the physical need for personnel to manually move the water hoses from one area of the site to be irrigated to the next, since the hose is unwound and reeled back in by the suitably designed automations provided.

The solution has stemmed from the use of a semi-hard polyethylene hose which has made it possible to wind it onto a spindle (reel).

The hose is unwound on the soil to be irrigated by towing the raingun trolley with the tractor only after the hose reel travelling raingun has been properly positioned. The hose is then reeled back in mechanically.

Once the raingun trolley has been properly positioned on the surface to be irrigated, the operating logic entails conveying the pressurised water to the water inlet of the machine, which, by the effect of the liquid's intrinsic force, actuates the turbine impeller located on the speed gearbox input shaft, and which, in turn, rotates the reel around which the polyethylene hose is wound.

The hose has one end fastened to the reel's rotating centre shaft and the other end is normally connected to a wheeled trolley that supports the equipment (raingun) through which the liquid irrigates the surface of the site.

The structure the machine consists of is placed on a two or four-wheel traveller which may be towed by a tractor to adequately move it to the various work positions. It is also equipped with independent actuators (manual, mechanical or hydraulic) to adjust orientation and assure its stability in operation.

A significant feature is the automatic hose reeling stop at the end of the work run. When the hose has completely been reeled in and the raingun trolley reaches its end position, a specific mechanical lever system interrupts the reel's rotation.
Guards and protection devices have been provided to prevent contact with mechanical moving parts, in order to meet the provisions of applicable regulations for the type of machine.

The surfaces of the metal structure, including the traveller and the raingun trolley, are heat treated by hot dip galvanising for durability over time, thus preventing oxidation due to contact with the liquid that is sprayed and/or to exposure to the weather.
To identify which of these machines is the one most suited to the specific use, calculate how many square metres need to be irrigated, the flow rate, the length of the hose, after which the hose diameter is identified, as is the size of the machine to be used, as set out in this manual.

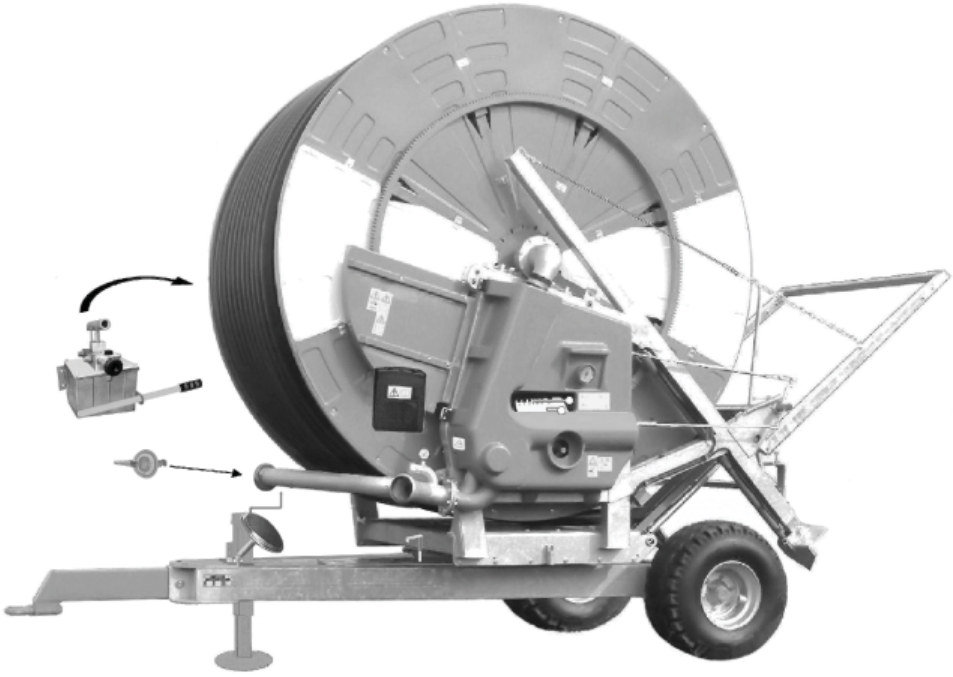
In order to make functional utilisation easier, a range of optional accessories is available, such as:
- computer;
- independent movements;
- inlet valve;
- discharge valve;
- emptying compressor;
- and so on.

Please refer to chapter 2 for further details and descriptions of the optional accessories that may be supplied with the machine.

3.4 STANDARD OUTFITTING FOR THE MACHINE

The hose reel travelling raingun is standard supplied with the following outfitting:

- Hot dip galvanised two-wheel traveller and turret;
- Reel painted with epoxy primer and two-component polyurethane paint;
- Galvanised and painted steel moulded reel side guards:
- Double hot dip galvanised water supply inlet;
- Safety guards;
- Mechanical drawbar lifting;
- Manual turret rotation with mechanical locking pins;
- Telescopic rear anchor brackets with hydraulic motion;
- Hydraulic raingun trolley lifting with manual pump;
- Flanged turbine on the gearbox fitted with by-pass;
- Set of 3 nozzles with different Ø;
- VarioRain gearbox with synchronised gears;
- PTO on the gearbox;
- Hand crank (Handwheel) for manual hose winding;
- Speed offset device in hose winding;
- Hose metre counter tachymeter;
- Pressure gauge in glycerine bath for checking the machine inlet water pressure;
- Hose with couplings for connection from the pumping station to the machine;
- Hot dip galvanised, adjustable track width wheeled raingun slide trolley;
- Raingun.
- Irrigation rate chart



3.5 ACCESSORIES THAT MAY BE SUPPLIED WITH THE MACHINE

Below is a list of accessories that may be supplied with the hose reel travelling raingun:

- Traveller with four rocker arm wheels (as an alternative to two wheels).
- (the four-wheeled traveller is only supplied with the 5-wheeled raingun trolley).
- Hydraulic drawbar lifting with manual pump or tractor jack coupler (as an alternative to mechanical lifting).
- Mechanical turret rotation (as an alternative to manual rotation) (except VR7).
- Hydraulic turret rotation (as an alternative to manual rotation).
- Hydraulic raingun trolley lifting with tractor jack coupler (as an alternative to hydraulic lifting with manual pump).

Note: The selection of the above hydraulic actuators is subject to the combinations established by the Manufacturer.

- Wheel size other than standard.
- Aqua System Computer to control the main operation functions (as an alternative to metre counter tachometer), such as:
  1. Working time
  2. Unwound hose, in m or ft.
  3. Working speed, in m/h or ft/h.

- Rain Control Computer for more comprehensive control of operation functions (as an alternative to metre counter tachometer), such as:
  1. Flow rate in l/min or G.P.M.
  2. Work area number.
  3. Work run end time.
  4. Unwound hose, in m or ft.
  5. Working speed, in m/h or ft/h.
  6. Total delivered flow rate in m3

- GSM Modem jointly with the Rain Control computer only, for remotely checking:
  1. Battery low (voltage less than 8 Volt.)
  2. Short circuit on external power supply.
  3. Flow meter error.
  4. Speed fault.
  5. No pressure.
  6. Work run end.
  7. It lets you know the metres of unwound hose, reeling in speed and work run end time.
  8. It also allows you to send the Stop command in case of need.

- Photovoltaic panel to recharge the battery.
- Hose reeling in with internal combustion engine and with or without turbine.
- Supplementary hose reeling in with hydraulic motor and turbine.
- Electrical device to stop the internal combustion engine due to insufficient pressure (water only).
- Switch for turbine / Internal combustion engine computer.
- Supplementary manure inlet after the turbine in order to bypass it.
- Pressure switch to use the machine with manure.
- Motor pump (internal combustion engine + pump + control unit).
- " Kirpy " vacuum priming device.
- Independent hydraulic actuation (drawbar lifting + turret rotation + rear anchoring and raingun trolley lifting) with electrical hydraulic unit with photovoltaic panel, with or without remote control.
- Independent hydraulic actuation (drawbar lifting + turret rotation + rear anchoring and raingun trolley lifting) with internal combustion engine.
- Water inlet closing valve (mechanical or by computer).
- Discharge diaphragm valve for stop in vacuum (mechanical or by computer).
- Hydraulic arm device for guided rear hose unwinding.
- Device for layflat hose winding.
- Road Use Approval (Italy – France).
- Drawbars with special eyes.
- Compressor for emptying water from the machine.
- Application of second raingun on loading or trolley with or without valves.
- Hot dip galvanised, three or five-wheel or side unwinding trolley with adjustable track width (as an alternative to the slide one).
- Slide trolley fitted with maize extension.
- Trolley with Spray Boom (as an alternative to the slide one).
- Water inlet filter screen.

SAFETY CH. 4

4 SAFETY

4.1 GENERAL INFORMATION

It is the user's responsibility to instruct personnel on the risks of an accident, on safety devices and on general accident prevention rules set forth by EC directives and by the laws of the country where the machine is installed and used.

The personnel in charge must be aware of the position and operation of all controls and familiar with the machine's features.

They must also have read this manual in its entirety as well as all the manuals and documentation listed in chapter 9, which are an integral part of this manual.

In the event of doubts on the correct interpretation of the instructions, contact the Manufacturer, to obtain the required clarifications.


The information contained in this manual must be carefully read and understood by all concerned prior to operating on the machine, especially with regards to the safety precautions set out in this chapter.

Installation and maintenance procedures must be performed by skilled personnel after suitably preparing the machine.

DANGER
Tampering with or unauthorised replacement of one or more parts of the machine, installation of accessories that modify its use and use of replacement materials other than the recommended ones, may cause accidents risks and are forbidden.

4.1.1 PERSONNEL TRAINING

CAUTION
The hose reel travelling raingun is a farm machine which is towed for moving it and is used for irrigating fields and plots of land after it has been put in place.

The customer must ensure that the personnel in charge of installation and/or use and/or maintenance are appropriately instructed and trained.

Installation, use and maintenance of the machine must only be performed by instructed and duly trained personnel who possess mechanics, hydraulics and water engineering technical knowledge - as well as any applicable requirements in the country of use of the machine - in compliance with the personnel qualifications set forth in Chapter 1.

To this end the Manufacturer provides, on demand, a training course with its own skilled personnel upon commissioning.
The following topics are to be dealt with during training of the personnel in charge of machine use and maintenance:

THEORETICAL ISSUES
PROFESSIONAL PROFILE AND ROLES
TECHNOLOGY OF THE TYPE OF MACHINE
THEORETICAL ISSUES
INTEGRATION/INSTALLATION, COMMISSIONING AND DECOMMISSIONING OF THE MACHINE
USE OF THE APPARATUS AND SAFETY RULES
USE/OPERATION CRITERIA
INSPECTION, MAINTENANCE
KNOWLEDGE OF THE CONTENTS OF THIS MANUAL
PRACTICAL ISSUES
OPERATING EXERCISES
OPERATING EXERCISES, TESTS, MAINTENANCE
EMERGENCY SITUATIONS

NOTE
Certain special situations that might arise during the various stages of installation and/or operation might not be covered by the rules in this manual.

4.1.2 DIRECTIVES APPLIED AND TECHNICAL STANDARDS OF REFERENCE

The machine has been designed, constructed and tested complying with the following EC directives:

- Machine Directive 2006/42/EC concerning approximation of the laws of Member States relating to machinery.
- EMC Directive 2004/108/EC
- Directive 2000/14/CE (Legislative Decree 262/2002) and Directive 2005/88/EC on the Noise Emission in the environment by machines and equipment for outdoor use. (procedure as per Annex V – Item 2) (Only for models with internal combustion engine)
- Technical standards listed in the declaration of conformity

4.1.3 CERTIFICATION OF THE MACHINE

Directive 2006/42/EC states the conditions according to which the machine may be marketed in the European Union.

The machine supplied by the Manufacturer does not fall within one of the categories of machines listed under Annex IV of Directive 2006/42/EC, hence for the aims of certifying conformity of the machine to the provisions of said directive the Manufacturer applies the conformity assessment procedure with internal inspection on machine construction as per annex VIII of Directive 2006/42/EC.

In order to certify the machine's conformity to the provisions of the Directive, before placing the machine on the market the Manufacturer performed a risk assessment with the aim of assessing compliance with the essential health and safety requirements set forth in Directive 2006/42/EC, as well as the tests and inspections set forth by the applicable standards of reference.

The technical construction file has been prepared complying with the provisions of annex VII of Directive 2006/42/EC and is available for inspection by the supervisory bodies upon substantiated request, as provided for by applicable laws in force.
The Manufacturer therefore markets the machine providing it with the following adjuncts:

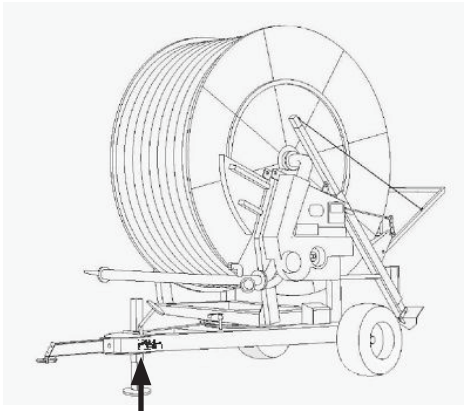
- CE Marking
- CE Declaration of Conformity
- Instruction and warning manual

The machine always features identification plate " A " which is visibile on the side of the traveller near the tow bar.

CE MARKING DESCRIPTION:

1. Manufacturer's company name and address
2. CE mark proving conformity to Directive 2006/42/EC
3. Type
4. Serial number
5. Year of construction
6. Overall unladen machine weight
7. Overall weight of the machine filled with water

Below is a facsimile of the identification plate displayed on the machine.



The machine marking complies with the provisions of EN 908, specifically, in addition to the above information, the following is also provided:

- The controls for adjusting the circle sector of the long range raingun rotating part are clearly marked and identified;
- A warning has been installed on the machine to alert to the risk of contact between the machine or water jet with aerial power lines.

Below are facsimiles of the Declaration of Conformity without internal combustion engine and with internal combustion engine

OCMIS IRRIGAZIONE S.p.A.

DECLARATION OF CE CONFORMITY

(pursuant to annex II 1.A of the Machinery Directive 2006/42/EC)

The undersigned **OCMIS Irrigazione S.p.A.** with registered office in Via S.Eusebio, 7, 41014 Castelvetro (MO) ITALY declares as manufacturer, under its responsibility, that the machine:

- **Generic Name :** **Irrigator (Raingun)**
- **Model :** **Hose Reel Irrigator (Raingun) Traveller**
- **Type :** **.....**
- **Serial No. :** **.....**
- **Year of construction :** **.....**
- **Control Computer :** ☐
- **Tube Dimensions :** **Ø =..... mm** **L=..... m**

this declaration refers to complies with the provisions:

of the Machinery Directive 2006/42/EC

Of directive 2004/108/EC concerning electromagnetic compatibility and which repeals directive 89/336/EC

and with special reference to the following regulatory provisions:

EN ISO 12100, EN 908, EN 1553, EN 953, EN ISO 13857, EN ISO 4413

It also declares

It is the Customer's responsibility to check and if necessary adapt the new and/or used machines and equipment Owned by them inserted or ancillaries to the same machine covered by this declaration.
The model, serial number and year of construction are set out on the manufacturer's heading plate fastened to the machine
The CE plate is applied to the machine's structure and contains the manufacturer's data as well as the above details.
The plate is riveted to the machine.

The technical file has been set up by OCMIS Irrigazione S.p.A. as a legal person
- Via S.Eusebio, 7 - 41014 Castelvetro (MO)

Legal Representative

Castelvetro (MO), on . . / . . / . . . .

(Translation of Original Instructions)

FAC - SIMILE

OCMIS IRRIGAZIONE S.p.A.

DECLARATION OF CE CONFORMITY

(pursuant to annex II 1.A of the Machinery Directive 2006/42/EC)

The undersigned **OCMIS Irrigazione S.p.A.** with registered office in Via S.Eusebio, 7, 41014 Castelvetro (MO) ITALY declares as manufacturer, under its responsibility, that the machine:

- **Generic Name :** **Irrigator (Raingun)**
- **Model :** **Travelling Hose Reel Irrigator with Motor**
- **Type :** .....
- **Serial No. :** .....
- **Year of construction :** .....
- **Motor Model :** .....
- **Control Panel Model :** .....
- **Motor Power :** **Pmax..... kw** **..... RPM**
- **Control Computer :**
- **Tube Dimensions :** **Ø =..... mm** **L=..... m**

this declaration refers to complies with the provisions:

of the Machinery Directive 2006/42/EC

Of directive 2004/108/EC concerning electromagnetic compatibility and which repeals directive 89/336/EC

Directive 2000/14/CE (Legislative Decree 262/2002) and Directive 2005/88/EC on the Noise Emission in the environment by machines and equipment for outdoor use. (procedure as per Annex V – Item 2)

Measured sound power level	LwA	103 dB(A)
Guaranteed sound power level	LwA	104 dB(A)

and with special reference to the following regulatory provisions:

EN ISO 12100, EN 908, EN 1553, EN 953, EN 1679-1, EN ISO 3744, EN 55014-1, EN 55014-2

It also declares

It is the Customer's responsibility to check and if necessary adapt the new and/or used machines and equipment
Owned by them inserted or ancillaries to the same machine covered by this declaration.
The model, serial number and year of construction are set out on the manufacturer's heading plate fastened to the machine
The CE plate is applied to the machine's structure and contains the manufacturer's data as well as the above details.
The plate is riveted to the machine.

The technical file has been set up by OCMIS Irrigazione S.p.A. as a legal person
- Via S.Eusebio, 7 - 41014 Castelvetro (MO)

Legal Representative

Castelvetro (MO), on . . / . . / . . . .

FAC - SIMILE

(Translation of Original Instructions)

4.1.4 INTENDED USES AND APPLICATION LIMITS

The machine is intended for the uses and applications described in chapter 3 of this manual.
The use of unsuitable material or material not included within the field of application of the machine may cause severe damage and jeopardise proper operation.

CAUTION
Use of the machine for processes and types of application not intended by the Manufacturer represents misuse. In that event, all liability for damage to property and/or persons is disclaimed, and any kind of warranty is forfeited.
The Manufacturer disclaims any liability in the event of tampering with the machine as supplied by unauthorised modifications or maintenance operations performed by personnel not duly informed, trained and instructed.

DANGER
In the event of abnormal machine behaviour, any type of operation is the responsibility of the properly trained maintenance personnel.

4.1.5 HAZARDOUS AREAS

The machine in question is intended to be installed by personnel skilled and properly trained on its use, who are familiar with the situations/issues concerning this type of machine and are well aware of the existing risks in the workplace.

The machine in question features assemblies and parts deemed hazardous. All areas deemed hazardous must be delimited and/or duly marked in order to prevent access to them whilst the machine is in operation.

All areas such as PTO coupling, the rear area where the hose is reeled in, hydraulic turret rotation area, hydraulic outriggers must be deemed hazardous.

DANGER
Fence off these areas or, should that not be possible, mark them with suitable signs prohibiting access to the machine during operation.
Use of the machine is not permitted unless it has been correctly positioned for operation.

DANGER
Special attention should be paid to positioning the machine on stable ground.
Use of the machine on land with a grade exceeding 8.5 degrees is forbidden.

DANGER
The hazardous areas must be accessed safely and performing all the operations and methods set out in this chapter and under chapter 6 "Use and Operation".
Access to hazardous areas is restricted to authorised and skilled personnel for performing the intended operations on the machine.

Adequate prevention and protection measures have been taken in order to reduce risks in hazardous areas. The instructions set out in this manual - in terms of procedures as well as related to "Personal Protection Equipment" - must be complied with.

SUPPLEMENTARY INFORMATION
During the machine design stage, the various risk factors involved in use and maintenance have been assessed, and the relevant prevention and protection measures have been taken.
All workers are obliged to know and correctly apply the general rules of proper conduct.

Workers are also under precise obligations on matters of safety.

They must take care of their own health and safety and that of other workers in the workplace, in accordance to training and instructions they received and to the means and resources made available by the employer (or manager), and they must comply with the applicable provisions as well as with the information in this manual.

4.1.6 ENVIRONMENTAL OPERATING CONDITIONS

The environment where the machine performs its work is outdoors, where temperatures must as a guideline be between -5°C / -41°F and +45°C / 113°F.

Use of the machine, of the associated control systems and actuation equipment in other work conditions is not allowed.

Specifically, the environment of use and storage must not involve:

- Exposure to corrosive fumes;
- Exposure to excessive humidity,
- Exposure to abrasive dust;
- Exposure to oily vapours;
- Exposure to explosive mixtures of powders or gases;
- Exposure to vibrations, impacts or shocks,
- Exposure to weathering outside the permissible limits;
- Exposure to unusual transport or storage conditions (other than those set out in chapter 5).

4.1.7 VIBRATIONS

The vibrations produced by the machine, according to its handling methods, are not dangerous to the operator's health.

CAUTION
Excessive vibration may only be caused by a mechanical failure, which must be immediately reported and removed, in order not to affect the machine's safety and that of the operators.

4.1.8 NOISE

Noise level measurements have been carried out in accordance with the provisions of EN 11201 and EN ISO 3744 standards.

The machine supplied on its own is not fitted with sound absorbing protection since it is intended to be used for agricultural irrigation.

Machine without internal combustion engine:
During operation, running noise exposure of the operating personnel does not exceed 76 dB.

Machine with internal combustion engine:

Measured sound power level	LwA	103 dB(A)
Guaranteed sound power level	LwA	104 dB(A)

The actual noise level during operation of the installed machine differs from the detected level since it is affected by certain factors such as:
- type and characteristics of the site;
- other operating machines nearby;

The user is under the unequivocal responsibility to apply related preventive and protective measures, in compliance with the laws of the country of installation and use of the machine.

The operator working near the machine with internal combustion engine is required to use personal noise protection equipment (ear muffs).

CAUTION
It is the user's responsibility to carry out the noise risk assessment and apply the related preventive and protective measures, in compliance with the laws of the country of installation and use of the machine.

DANGER
The use of noise protection equipment is required during operation and adjustment of the machine with internal combustion engine.

4.1.9 ELECTROMAGNETIC EMISSIONS

Depending on the optional parts you have purchased, the machine may contain electronic components subject to Electromagnetic Compatibility regulations, affected by conducted and radiated emissions.

The emission values comply with regulatory requirements thanks to the use of components compliant with the Electromagnetic Compatibility directive, suitable connections and installation according to the requirements of the component suppliers.

Conformity with maximum emission and immunity levels is achieved by applying the principles of product Harmonised Technical Standards.
The machine is therefore compliant with the Electromagnetic Compatibility directive (EMC).

CAUTION
Any maintenance activities on the electrical installations performed in a non compliant manner or incorrect component replacements may impair the efficiency of the solutions implemented.

4.2 DISPOSAL OF WASTE MATERIALS

After its installation and in normal operation, the machine does not involve environmental pollution, however, throughout the entire period of use some waste materials are produced in special conditions, such as oil and filter replacement, oil filling/topping up.

Disposal of these materials is regulated by specific environmental protection regulations in every country.
It is the customer's obligation to be aware of the appropriate laws in force in their country and to operate in compliance with these laws, according to the indications set out in the safety data sheets of the products used.

CAUTION
We would like to remind you of the requirement to comply with applicable laws on the disposal of mineral oils, battery acid, etc.

SUPPLEMENTARY INFORMATION
Please refer to the safety data sheets of the oils and other substances in chapter 9 for more information on disposal methods.

Disposal of toxic waste consisting of collection, transport and treatment, defined as required transformation operations for recovery, as well as storage and dumping on the ground, are activities in the public interest subject to compliance with the following general principles:
a) Any damage or danger for the health and safety of the community or individuals must be prevented.
b) Compliance with health and safety requirements must be assured and any risk of air, water, soil and subsoil pollution must be prevented.

Systems for recovering and recycling materials and energy must hall be promoted, by complying with criteria of economy and efficiency.

4.2.1 INSTRUCTIONS FOR SPECIAL WASTE

Special waste refers to residue from industrial processing and materials from demolition of deteriorated and obsolete machinery and equipment.
The manufacturers who produce the special waste, including toxic and harmful waste, are responsible for their disposal, either directly or through firms, authorised agencies or by transferring the waste to the entities running the public service, with whom an agreement has been entered into.

Each local council is responsible for providing residents with all the available information on waste disposal in their region.

IMPORTANT INFORMATION FOR THE USER PURSUANT TO "WEEE" DIRECTIVE 2012/19/EU (REPEALING DIRECTIVE 2002/96/EC AND DIRECTIVE 2003/108/EC) ON WASTE FROM ELECTRIC AND ELECTRONIC EQUIPMENT.

Pursuant to "WEEE" Directive 2012/19/EU, if the component/equipment you have purchased is marked with the crossed out wheelie bin symbol shown below, this means that, at the end of its service life, the product must be disposed of separately from other waste.

Separate collection of this equipment/component at the end of its service life is arranged and managed by the manufacturer. The user who wishes to discard this equipment must therefore contact the manufacturer and follow the system implemented by them to separately collect equipment at the end of its service life.
Appropriate separate collection for subsequent conveyance of the decommissioned equipment for recycling, treatment and compatible environmental disposal contributes to avoiding possible adverse effects on the environment and human health and fosters reuse and/or recycling of the materials the equipment consists of.

CAUTION
Illegal disposal of the product by the owner involves the application of the administrative penalties set forth by applicable laws.

IMPORTANT
If the equipment is not marked with the crossed out wheelie bin symbol, this means that product disposal is not the manufacturer's responsibility, in which case common waste disposal regulations are applicable.

4.3 SAFETY DEVICES APPLIED TO THE MACHINE

The machine is equipped with the following safety devices:

Safety devices the machine is fitted with
- CONTROL LEVERS
- FIXED GUARDS

4.3.1 CONTROL LEVERS

The machine is fitted with a set of control levers that act directly on the circuit to operate it or stop it immediately.

DANGER
It is strictly forbidden to tamper with, disconnect of by-pass the actuators.

Periodically check the correct operation of stop and actuation devices.

TEST PROCEDURE:
With safety circuits on, check the efficiency of actuators before any work cycle.
Select one control at a time and ensure consistency of the control with the direction of the motion as specified in chapter 6.
The operation must be repeated with the remaining controls.
It is recommended to record the periodic test procedure of these devices on a suitable form.

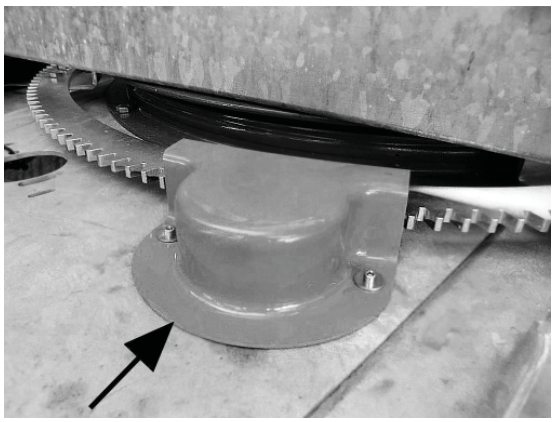
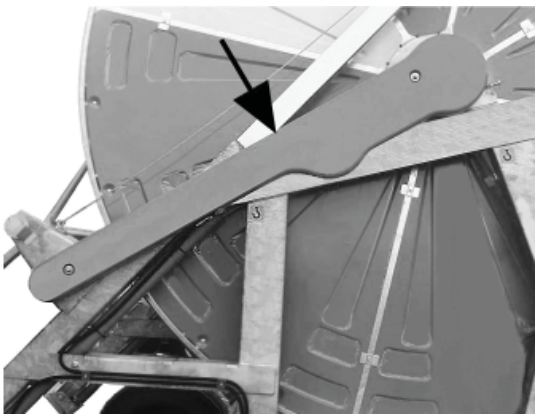
4.3.2 FIXED GUARDS

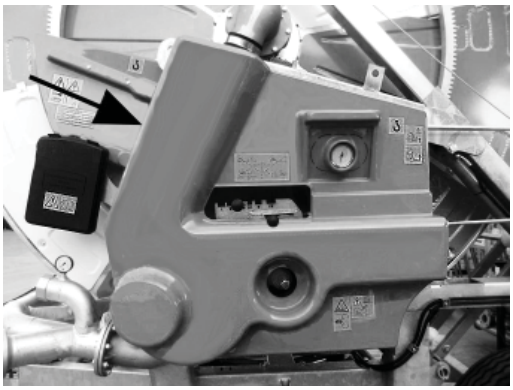
Fixed protection devices consist of fixed guards that have the purpose of preventing access to the various moving parts of the machine during operation.
The machine is fitted with fixed covers, which are located in areas exclusively accessed during maintenance and require specific tools to be removed.

DANGER
it is strictly forbidden to restart the machine after it has undergone maintenance without properly restoring the guards.

Periodically check the integrity of the fixed guards and relevant attachments to the structure, with a special focus on the casings protecting the machine's mechanics.

The following table shows the main components of the safety system.

Main components of the safety system	
Fixed type casing installed to protect the reel rotation cog wheel.	
Fixed type casing installed to protect the turntable rotation pinion.	
Fixed type casing to protect the reel moving chain.	

Main components of the safety system	
Fixed casing to protect the machine's turbine.	
Fixed guards on the sides of the reel.	

4.3.3 POWER DISCONNECTION

Please refer to chapter 6 for comprehensive information on disconnecting the power supplies used in the machine.

4.4 RESIDUAL RISKS

Hazardous areas or parts have been assessed in the design stage, consequently all the required precautions have been taken to avoid risks for persons and damage to machine components, as indicated in the previous paragraphs.

CAUTION
Periodically check the operation of all safety devices.
Do not disassemble the machine's fixed or removable guards.
Do not introduce foreign objects or tools into the machine's operation area.

Although the machine is equipped with the above mentioned safety systems, certain risks remain which cannot be eliminated but may be reduced through corrective actions by the end customer and through correct operating methods, which are mandatory for whoever operates the machine.

Below is a summary of the risks remaining in the machine during:
- Normal operation
- Adjustment and setting up
- Maintenance
- Cleaning.

4.4.1 IMPACT AND CRUSHING:

- Crushing and entrapment hazard between the PE (Polyethylene) hose and the reel. Do not let any part of your body come into contact with the area between the hose and the reel during machine operation. Ensure no unauthorised person can come into contact with the machine.
- Entrainment and crushing hazard between the reel support upright and the reel when it is rotating. This risk may be incurred during hose unwinding. Always ensure there are no persons in contact with the machine and that the work area is not accessible to unauthorised persons.
- Do not access moving parts of the machine
- Before connecting the power sources, ensure no maintenance operations are under way on the machine.
- Residual pressure may be present on actuator components (engine, cylinders, gears, coil, etc.) and on piping, which in the event of operations on the component might lead to hazardous situations. Before any operation it is therefore necessary to discharge the fluid circuit and disconnect the supply source.

Residual Risks		Protection Equipment	

4.4.2 SHEARING:

- Risk of shearing may occur mainly due to the operator going near the machine while parts are in motion.
- The hazard is greater in the event that any guards and casings protecting from moving parts have been removed.
- Before connecting the power source ensure there are no machine maintenance operations under way and that all guards are on and securely fastened to the machine.
- The same risk occurs during maintenance of the machine's piping unless the fluid power has been previously turned off.

CAUTION
It is strictly forbidden to remove the safety guards or to open parts of the machine fitted with inspection hatches secured by fastening screws prior to disconnecting the machine's fluid power supply.

Do not introduce foreign objects or tools into the machine's operation area.

Residual Risks		Protection Equipment	

4.4.3 FIRE:

In the event of any faults, the plastic material used (e.g. sheaths, electrical wires) is self-extinguishing and complies with applicable Standards.
The raw materials used on the unit are usually flammable. The customer must implement all the required fire prevention measures. In particular, the following recommendations should be adhered to:

- Do not smoke near the machine.
- Do not use naked flames.
- Keep the machine clean from any accumulated dust.
- Do not perform any welding/grinding operations and/or entailing production of sparks near the machine.

The machine is not equipped with its own fire system since it is to be used in an outdoor agricultural setting.
The user must assess the need for an appropriate fire system at the site where the machine and its units are used, in compliance with the safety and fire prevention standards in force in the country of use and with internal regulations.

DANGER
In the event of a fire always stop the machine.

4.4.4 EXPLOSIVE ATMOSPHERE:

The machine is not suited to operating in explosive or classified environments.

- It is strictly forbidden to use it in an explosive or partially explosive atmosphere.

The machine is therefore not suited to operating in the following environments:

- **explosive or partially explosive**
- **classified**
- **where corrosive atmospheres are present**
- **with high concentration oil suspensions.**
- **with fire hazard arising from any material or source of ignition.**

- It is strictly forbidden to use it in all the environments listed above.

4.4.5 BLINDING:

Existing risk in all stages of utilisation and in maintenance and cleaning.

- It is strictly forbidden to stand near the machine and its irrigation area while it is operating due to the risk of coming into contact with the high pressure water jet.
- While cleaning the machine with compressed air, personnel must wear suitable protection goggles.
- Risk of violent impact with the raingun's water jet. When the machine starts, water is sprayed forcefully from the raingun's nozzle, therefore avoid standing in front of it or within its operating range.
- Risk of violent impact with the water closing caps located on the machine's ducts. If the machine's hoses are pressurised never release the caps, as they might be ejected violently if the internal pressure is not released.
- Risk of violent impact with the pressurised hydraulic oil. Before acting on these circuits always discharge the pressure within them, regardless of any type of system they consist of.

CAUTION
It is obligatory to use eye and face protection.

Residual Risks		Protection Equipment	

4.4.6 ENTANGLEMENT:

- Entanglement hazard. The turbo-gearbox levers must only be actuated with the casing closed.
- It is dangerous and strictly forbidden to start the machine if the protection casing is open

4.4.7 FALLING, FLYING OBJECTS:

- Avoid leaving work tools and objects, even temporarily, along and on the machine to prevent them from falling or flying off it.
- It is forbidden to climb on the machine as this entails a falling hazard.

CAUTION
It is obligatory for the operator to use head (protective helmet), face (protective shield) and body protection equipment.
It is the user/customer's responsibility to provide other protection systems as an equally effective alternative.
It is forbidden to climb on the machine or any part thereof, including the raingun trolley.

Residual Risks		Protection Equipment	

4.4.8 SLIPPING:

Any leaks of lubricants and/or processing residue may cause use and operation personnel to slip.

CAUTION
The areas near the machine must be accessed with non-slip shoes and within the limits of feasibility they must always be kept clean. Periodic inspections should be performed according to use.

Residual Risks		Protection Equipment	

4.4.9 WHIPLASH EFFECT:

Rupture or damage to the hoses or high pressure piping of the fluid systems may cause hose snaking.

- It is obligatory to perform periodic checks and replace anchors and piping.
- It is forbidden to use fluid pipes or hoses as a support for your feet and/or parts of your body.
- All pipes and hoses must be fastened at close points to prevent the "whiplash effect" or protected with other guards to prevent or restrain "jet" spraying.

4.4.10 TRIPPING:

Disorderly placement of material in general may pose a tripping hazard and partial or total hindrance of escape routes in the event of need.

- Assure operating, transit areas and escape routes are free from hindrances and compliant with applicable regulations.

4.4.11 CIRCUIT FAILURES:

Due to possible faults, the control, safety, power and supply circuits/components may lose some of their effectiveness with relevant lowering of the safety level.

- Periodic operational checks must be performed on the devices/components the machine is equipped with and all connections.

4.4.12 LOSS OF STABILITY:

- Risk of machine overturning. This risk may occur when transporting the machine over terrain which has a side grade exceeding 8.5°. It is therefore forbidden to use the machine on terrain or surfaces with a grade exceeding 8.5 degrees.
- Risk of sudden reel turret rotation if the machine is not fitted with the mechanical or hydraulic rotation system (accessory on demand). When the machine is on sloping ground during reel turret rotation orientation, partial, sudden and uncontrolled rotation of the turret may occur if the movement is not controlled by hand when the locking pin is removed. To perform the operation in these conditions, there must be another person supporting and restraining partial rotation.
- Pay special attention to the placement operation.
- Machine toppling hazard during reel frame rotation. Should the machine be equipped with a rain boom, fill the PE hose with water before lifting this accessory with the trolley-loader and/or turret rotation in order to give more stability to the machine.

4.4.13 LIGHTING:

In view of the type of machine and its use in an agricultural setting, it is not equipped with any kind of lighting system.

The machine is not equipped with a lighting system. For night-time use or in the event of insufficient visibility, the user must provide a lighting system to assure the operator is able to perform manoeuvres and checks in complete safety. In the event no electricity is available, average lighting of at least 500 lux is recommended.
Should supplementary lighting be required for special and unusual maintenance operations, in view also of the extreme unlikelihood of these

operations, the user must provide safety portable lamps (powered at 24 Vdc/ac not included in the supply).
No lighting is supplied with the machine.

4.4.14 BURN/SCALDING HAZARD:

There is a potential burn hazard owing to the temperature of the engine and hydraulic parts.
This hazard may also be present on the exhaust pipe.

- The personnel in charge of maintenance operations or accessing the internal combustion engine, the hydraulic circuit and exhaust pipes should be informed.

Before accessing these areas wait for the parts to cool and wear adequate heat protective gloves, paying the utmost attention.

In addition to complying with the maximum admissible temperatures for all other components of the machine's hydraulic circuit, special attention must be paid to avoiding hot parts in areas accessible to the operator.
The hydraulic systems have been designed in order to protect personnel from surface temperatures exceeding contact tolerability either with appropriate positions or guards, or where this should not be possible by using warning plates.
The burn hazard is also present on the compressor and delivery hoses. Use heat protective gloves and wait for the parts to cool.

The operating personnel should use suitable PPE such as heat protective gloves, overalls, safety shoes, protective shield.

4.4.15 LIGHTNING - ELECTROCUTION HAZARD:

Because installation is outdoors and the equipment is not fitted with protections from the effects of lightning, the user/end customer is responsible for providing the necessary lightning protection equipment, in order to discharge any electrical discharges to the ground.

- It is forbidden to carry out any activity on the machine in the event of adverse meteorological conditions (risk of lightning or storms).
- Electrocution hazard. Ensure there are no power lines or substations within the raingun's operating range to avoid contact with the water jet, which would cause electrical discharges to the ground through the machine's structure.

4.4.16 NOISE:

Personnel who need to operate near the machine while it is in operation are required to wear the suitable noise protection devices.

4.4.17 VIBRATIONS:

In its normal operation the machine does not feature hazardous vibrations for the operator.
Any excessive or abnormal vibrations may be due to poor operation of the rotating parts, incorrect coupling with the hose, incorrectly positioned or damaged tools, etc.

Under these conditions the maintenance personnel must immediately be alerted and the machine must be stopped for check/repair.

4.4.18 RISKS DUE TO HANDLING:

The machine is shipped to the User's premises disassembled into modules.

Operations for:

- unloading the packages from the truck, from the container or from the case
- opening the packages
- handling parts

expose operators to the suspended loads and crushing hazard.

The same risk exists throughout all subsequent stages of machine handling.

These operations are to be exclusively carried out by personnel skilled in driving lifting equipment and who have been suitably trained for the purpose.

It is recommended to carefully read chapter 5 of the manual before operating.

4.4.19 RISKS CAUSED TO PUBLIC OR PRIVATE ROAD CIRCULATION OR OTHER PRIVATE AREAS;

Place the raingun trolley so that in no case the water jet affects transit areas (roads, motorways, etc.), power lines, substations and installations or other private areas including private residences, facilities, buildings in general, etc. as serious damage may be caused to property or persons.

It is strictly forbidden to use or aim the water jet at these areas or buildings.
The Manufacturer disclaims any liability in the event of failure to comply with this mandatory requirement.

4.5 ADDITIONAL DANGER WARNINGS

DANGER
The high pressure water jet will cut off any part of the human body. Never touch the water jet flow or come into contact with it in any way.

DANGER
The high pressure hydraulic output flow may cause damage to property and persons.
Ensure all connections to the oil hydraulic circuit have been properly connected and tightened to the actuators using appropriate pipes and fittings for the operating pressures.
Never come into contact in any way with the generated oil hydraulic flow.

DANGER
All high pressure couplings must be tightened according to their torque values. Never operate the machine if there are traces of oil seepage from the motors, piping or fittings.

DANGER
Helmet, safety shoes, protective gloves, protective clothing and safety goggles/shield must be worn during machine operation and maintenance.
PPE complying with the essential safety requirements set forth by EC directives 89/656/EC and 89/868/EC and with the laws in force in the country where the machine is installed/used.

DANGER
Only use parts, piping and fittings that are certified for an operating pressure exceeding the maximum generated by the hydraulic part (225 bar / 3263 psi) with the due safety factors.

DANGER
Never exceed the operating pressure and factory settings.

DANGER
Never aim the raingun's water jet at persons, animals or property other than for the purposes the machine has been constructed for.
Failure to comply with this requirement may cause serious injury and even death.

DANGER
Before operating the machine, ensure the high pressure output piping of the machine has been correctly connected with no risk of coming off or disconnecting.

DANGER WITH HIGH PRESSURE OIL
- **Do not forget that the raingun's hydraulic circuits are pressurised.**
- **Do not add or remove oil, or perform inspections or maintenance prior to completely removing the internal pressure from the hydraulic circuits.**
- **If the oil seeps out of the sleeves, the high pressure jet may hit your skin and/or eyes.**
- **Always wear face protection shields and thick gloves and use a piece of cardboard or wood to check for oil leaks.**
- **If you are hit by a high pressure oil jet, immediately seek medical attention.**

DANGER
Never perform any routine or extraordinary maintenance activity with pressurised fluid power circuits.
Always pre-emptively power off all supply circuits and ensure there is no residual pressure. Always discharge residual pressure.

HAZARD FROM DAMAGED MACHINE
- **Do not use a damaged or malfunctioning machine.**
- **Perform careful preoperative machine inspection and test all functions before starting to operate. Immediately mark out and put out of service a damaged or malfunctioning machine.**
- **Ensure all maintenance operations have been performed according to the specifications in this manual.**
- **Ensure all the safety labels and signs are in the right place and legible.**

ELECTROCUTION HAZARD

- **The machine does not provide protection from contact with electricity or atmospheric discharges.**
- **Always keep the machine and all its parts at a safe distance from power lines, substations and apparatus according to the laws in force, as set out in the following table.**
- **Pay attention not to aim the water jet at power distribution lines or electrical substations.**
- **Take into account the machine's movement and lowering of power lines and beware of strong wind gusts.**
- **Keep away from the machine if it comes into contact with live power lines or become electrically charged because of wet soil.**
- **Do not use the machine if there are storms under way as it might be struck by lightning and consequently create a hazardous situation for persons nearby.**
- **Do not use the machine as a ground for welding operations.**

Voltage (kV)	Minimum safety distances	Voltage (kV)	Minimum safety distances
0 - 0.3	Avoid contact	350 - 500	7.6 m / 25 ft
0.3 - 50	3 m / 10 ft	500 - 750	10.7 m / 35 ft
50 - 200	4.6 m / 15 ft	700 - 1000	13.7 m / 45 ft
200 - 350	6 m / 20 ft		

HAZARD: RISKS CONNECTED WITH THE BATTERY

- **The battery electrolyte contains acid which can burn holes in clothing and can irritate/burn skin and damage eyes.**
- **If the acid comes into contact with skin of the human body, immediately clean the area with running water.**
- **If the battery acid is sprayed into someone's eyes it can cause blindness. If the acid comes into contact with your eyes, immediately wash with plenty of running water and seek medical attention. Obligation to use a face protection shield.**
- **Should acid be accidentally ingested, do not drink any substances and do not induce vomiting for any reason. Do not panic and go to the emergency services for the required checks. Indicating the ingested amount will help the doctors in selecting the most suitable therapy.**
- **When the operator or any other person operates or comes into contact with the battery, they must always wear a face shield and protection gloves.**
- **Batteries generate hydrogen gas, which is extremely explosive and ignites easily with a small spark or flame.**
- **Always unplug the connections of the two poles + / - before working on the battery. First unplug the negative pole then the positive one.**
- **Never touch the two poles (+ and -) on the battery simultaneously with your hands or tools as a hazardous short circuit would be created.**
- **Securely tighten the terminals on the ends of the two electrical wires to the battery.**
- **Loosened terminals may generate electrical sparks and cause an explosion.**
- **It is indispensable to pay the utmost attention when connecting the terminals of the two electrical wires to the battery:**
  - the terminal on the end of the red cable must be inserted in the pole with the (+) sign of the battery and connected before the negative pole.
  - the terminal on the end of the black cable must be inserted in the pole with the (–) of the battery.
- **Screw the caps of the battery tightly and securely.**
- **When repairing the electrical system or performing welds, disconnect the battery to interrupt the flow of electricity and prevent short circuits.**



4.6 ADDITIONAL WARNINGS AND REQUIREMENTS

CAUTION
Ensure all the personnel in charge of maintenance and using the machine are adequately trained according to the correct safety and operation procedures.

Ensure all the operative personnel are aware of the risks arising from using the machine.

CAUTION
Never perform maintenance on the machine when it is in operation.

CAUTION
Never perform maintenance on the machine when the power sources are connected or on.

CAUTION
Pressurised water might be in the circuit. Never uncouple any connection before completely draining the pressure circuit and ensuring there is no danger of coming into contact with it. The same requirement applies to the oil hydraulic circuit.

CAUTION
Ensure all safety devices are connected and in good operating conditions. Never modify or by-pass any safety device.

CAUTION
REQUIREMENTS TO BE COMPLIED WITH BEFORE STARTING WORK:

- **a) The operator must ALWAYS remain near the machine while using it. The operators are responsible for using the equipment and for the damage it may cause to persons or property if it is improperly operated. They must therefore always strictly prevent OTHER PERSONS FROM APPROACHING THE MACHINE DURING OPERATION.**
- **b) Before leaving the operating machine unattended, ensure there are no unauthorised people and especially children in the area where the machine is to perform its work, and clearly affix visible danger signs to the perimeter of the area in question for greater safety.**

CAUTION
During maintenance, as well as during operation, it is recommended to pay attention to the oil and/or engine temperature, which may reach temperatures exceeding 50°C / 122°F in normal operation.

PRECAUTIONS WHEN OPERATING AT HIGH TEMPERATURES AND WITH PRESSURISED OILS

When performing any kind of operation on the internal combustion engine and/or components controlled by it, it is indispensable for:

- The engine to be off and cold
- The engine and/or hydraulic oil to be cold and not pressurised.
- The oil containment caps must be unscrewed slowly, for the internal pressure to be decreased without causing forceful sprays.

CAUTION
The high temperatures and high pressure the oils are subject to, may create hazardous situations, causing severe injury and/or the death of the person who either intentionally or inadvertently acts on the engine and/or the components controlled by it unless the precautions described above are complied with.

CAUTION: FIRE PREVENTION

- **The fuel and oil might ignite if they come into contact with a flame.**
- **Do not start the engine if any fumes or fuel leaks are detected near it.**
- **Keep flames away from these flammable liquids.**
- **Stop the engine, do not smoke and do not use mobile phones when refuelling and or filling oil.**
- **Tightly screw on all the caps of tanks containing fuel and oil.**
- **Refuelling and filling with oil must be performed in well ventilated areas.**
- **Keep the fuel and oil stock in a protected area, suited to containing flammable and/or explosive substances and not accessible to unauthorised persons.**
- **The external surfaces of the internal combustion engine must always be free from flammable materials such as leaves, twigs, paper, rags, oil and solvent soiling, etc.**
- **Always check the fuel, oil tanks and the connecting pipes to ensure there are no leaks.**
- **Caution - the engine releases carbon monoxide, which is a toxic and poisonous gas. Do not run the engine in a closed place in order to avoid carbon monoxide poisoning.**
- **Fuel is extremely flammable and explosive. Turn off the engine and let it cool before refuelling.**

CAUTION: RECOMMENDATIONS

- **Maximum towing speed 10 Km/h. (see paragraph 6.3.1 point 4).**
- **It is not allowed to use the machine if the reel casings and/or guards or if they are damaged and/or improperly secured in their original housings.**
- **Never leave the handwheel engaged in the PTO.**
- **At the start of every irrigation season unwind the hose leaving only 2 loops wound on the reel. (see paragraph 6.4 item 9 under NOTE)**
- **Never change gears unless the turbine RPMs have been decreased (see chapter 6.6 item 3).**
- **If the hose is partially unwound several times, it must be periodically unwound fully to allow it to retain its elastic properties and to be correctly reeled on.**
- **For quick winding of the hose with shaft drive see paragraph 6.6.2 in order to prevent damage to the gearbox**
- **In order to avoid the reeling in trajectory of the raingun trolley to be modified, act as follows:**
  - **for 2 or 4-wheel trolleys, ensure the slide and wheels evenly adhere to the ground.**
  - **for 3 or 5-wheel or side unwinding trolleys, ensure all wheels are evenly in contact with the ground and in some case, where provided, use the ballasts supplied with the trolley.**
- **Failure to comply with the above requirements and the requirements expressly set out in all chapters of this Manual, may entail forfeiture of the Warranty issued by the Manufacturer for the machine in question.**

4.7 WARNING NOTICES

According to the residual risks of various nature identified for the machine, the Manufacturer has equipped it with hazard, warning and obligation notices defined according to the European regulations on graphic symbols to be used on plants (Directive 92/58/EC).
The notices in question are in a prominent position.

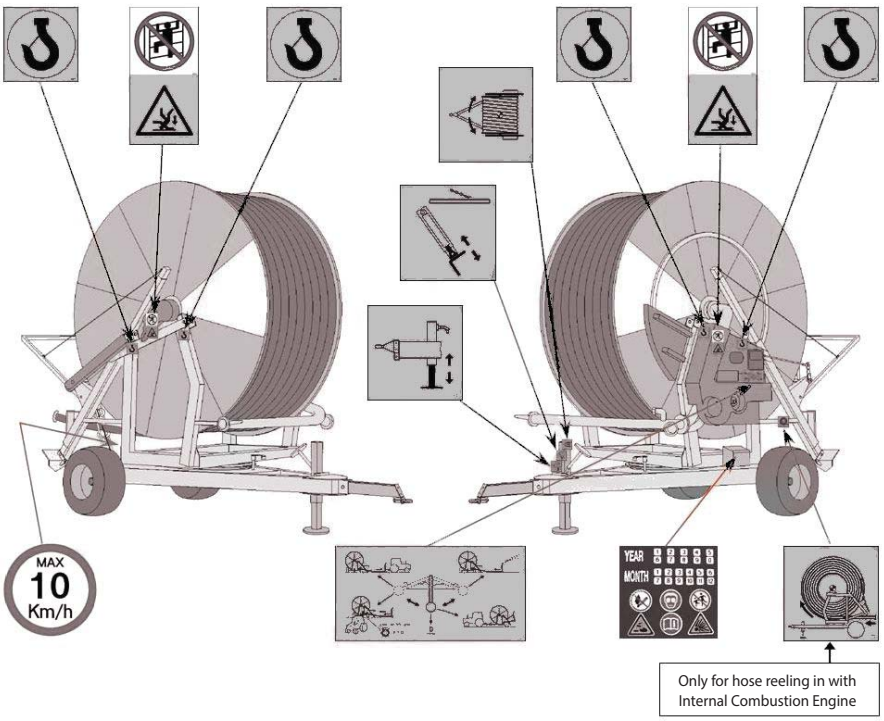
CAUTION
It is strictly forbidden to remove the warning plates from the machine.
The Manufacturer disclaims any liability on machine safety in the event of non compliance with this prohibition.

CAUTION
Following installation of the machine within an agricultural site, it will be the customer/end user's responsibility to install the required signs according to the existing residual risks.

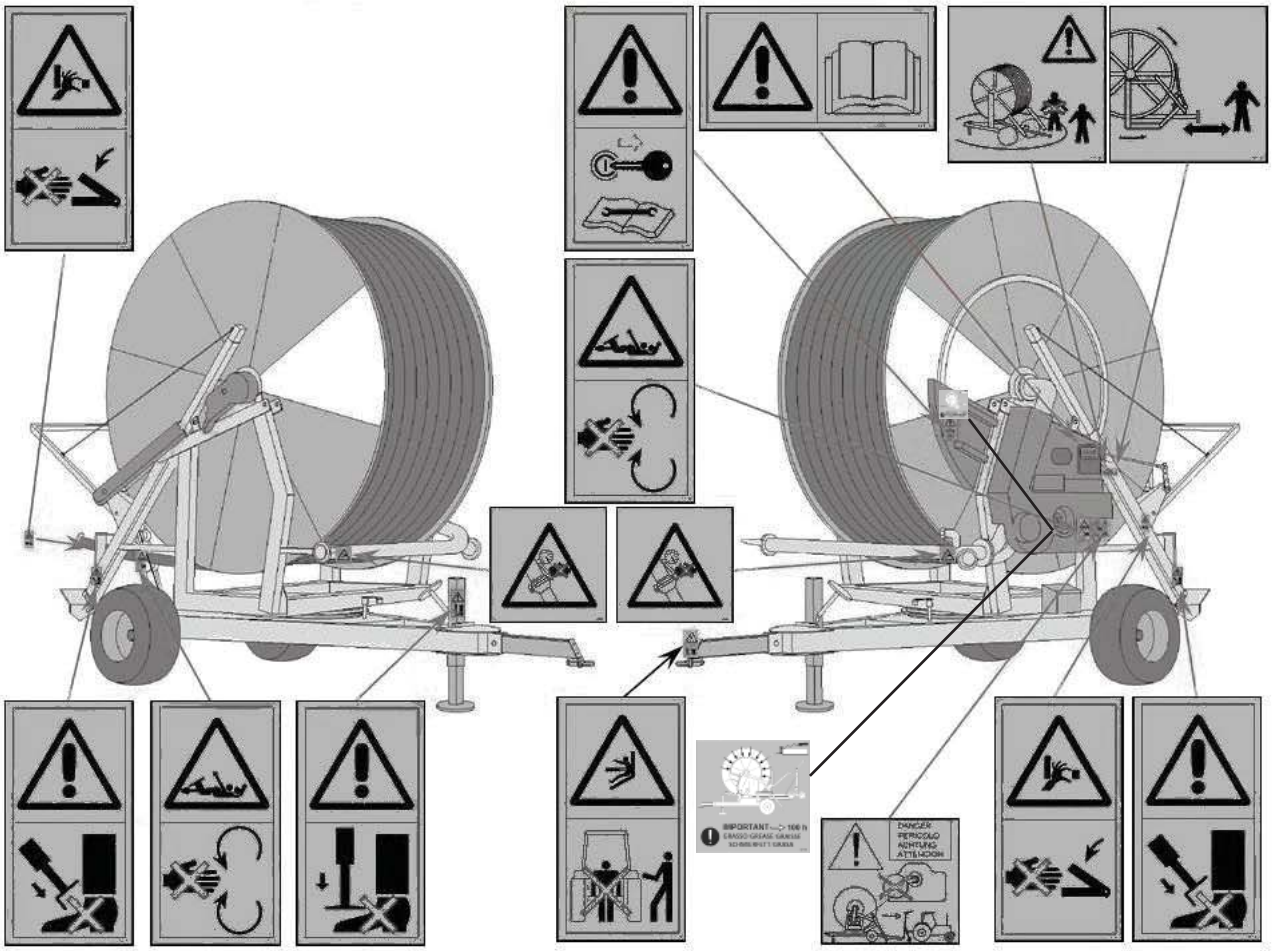
CAUTION
The user is under the obligation to replace the warning notices that might be illegible due to wear.

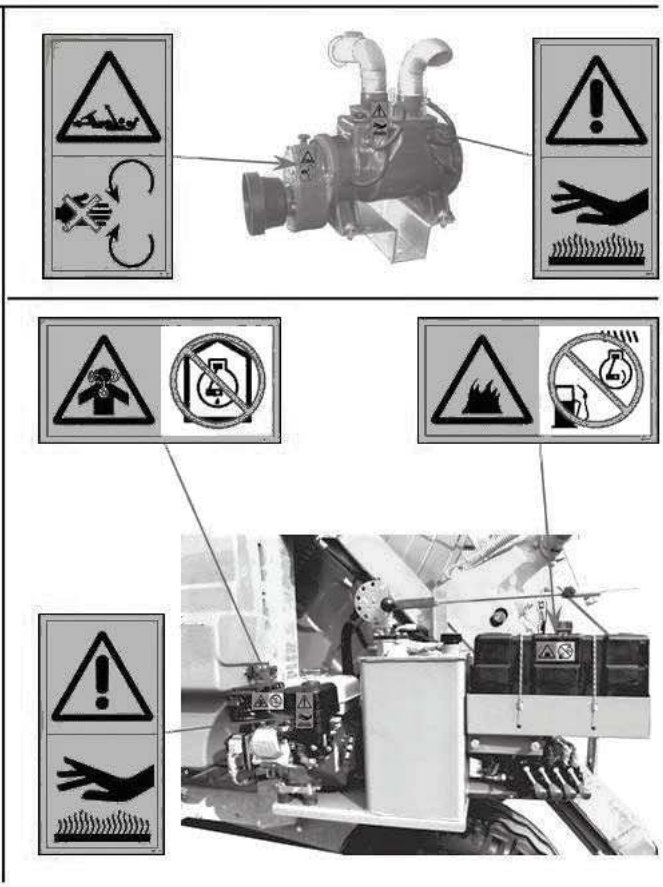
NOTE
For the type and position of the warning notices located on the machine, refer to their pictures in the following section of this chapter.
The "Manufacturer code" column of the table shown in chapter 1 shows the code of the decal to be provided to our parts department for the purchase order.

4.8 POSITION AND MEANING OF THE OPERATION PICTOGRAMS



4.9 POSITION AND MEANING OF THE WARNING PICTOGRAMS





4.10 CONSIDERATIONS AND SAFETY WARNINGS FOR OILS AND LUBRICANTS

4.10.1 CLASSIFICATION AND DESCRIPTION OF THE DEGREE OF HAZARDOUSNESS OF PRODUCTS

The oil and lubricants placed in the machine by the manufacturer (see ch. 7 pars. 7.7.1) are classified as NON HAZARDOUS based on Directive 1999/45/EC. In fact these have refined mineral origin and have a DMSO-extract value determined by IP 346 method of less than 3%; hence classified as NOT CARCINOGENIC pursuant to Directive 94/69/EC Note L, introduced with the 21st adaptation to technical progress of Directive 67/548.

4.10.2 FIRST AID MEASURES

Employees that will provide first aid shall not expose themselves to any action involving personal risks without having previously undertaken appropriate training.

- In the event of contact with the eyes, immediately wash with water for a few minutes keeping the eyelids open.
- In the event of contact with the skin remove contaminated parts of clothing, wash the affected body surface with water and soap or skin detergent.

In either case if pain and/or reddening symptoms appear seek medical attention.

- If hit by a pressurised jet that has caused lesions in one or more parts of the body, the victim must be taken to hospital without waiting for the appearance of symptoms.
- If for any reason you are surrounded by an atmosphere of oil vapours or mist, you must move or be moved to a well ventilated area, positioned so as to facilitate breathing and seek medical attention if symptoms occur.
- If in addition to inhalation minor ingestion has also occurred, the mouth must be rinsed, to not induce vomiting and seek medical attention.
- If ingestion has been more significant and the victim is conscious, administer water in small amounts and take to the Emergency Services, if the victim is not conscious immediately call for an ambulance.

4.10.3 FIRE PREVENTION MEASURES

Employees that will put out the fire shall not expose themselves to any action involving personal risks without having previously undertaken appropriate training.
Employees that will put out the fire shall wear protective gear complete with self contained breathing apparatus with face shield, suitable fire protection clothing including: helmets, protective boots and gloves. All the above in compliance with European Standard EN 469.

- Promptly isolate the hazardous area, removing people and animals if present in the vicinity of the fire.
- Appropriate fire extinguishing equipment is class B: Carbon dioxide, dry chemical powder, foam, water spray, sand, earth.
- Do not use water jets to put fires out but only to cool the surrounding exposed surfaces that in this case might be the tanks containing liquids - their internal pressure might significantly increase due to heat and they might explode.
- Avoid breathing the combustion smokes which might contain carbon, sulfur, nitrogen and unburned hydrocarbons compounds.

4.10.4 MEASURES FOR ACCIDENTAL SPILLAGE

The employees who will intervene to counter the spillage shall wear protective clothing suitable for the purpose, shall not be exposed to any action involving personal risks without having previously undertaken appropriate training.

- Avoid contact with eyes and skin
- Promptly isolate the hazardous area, removing people and animals if present in the vicinity of the incident.
- Prevent the spilled liquid from dispersing and entering soil, sewers or surface waters.
- Collect the spilled liquid cleaning up the area, transfer it to suitable impermeable containers suitable for transportation and storage and dispose of in accordance with local regulations.
- Alert the local authority if the liquid has caused environmental pollution.

4.10.5 HANDLING AND PERSONAL PROTECTION

Suitable clothing and protection shields must be worn for handling. This in order to avoid contact of the products with eyes or skin.
References for suitability of main protection equipment: Goggles ref. Standard UNI-EN 166, Gloves Ref. Standard UNI-EN 374.

4.10.6 TOXICOLOGICAL INFORMATION

No significant effects or critical dangers are known.

4.10.7 ENVIRONMENTAL INFORMATION ON STORAGE AND DISPOSAL

- Impermeable non perishable containers must be used for storage, suitable for transportation and fitted with tight lids.
- For disposal of waste oils and lubricants or recovery from accidental spillage, Specialised Firms must be contacted according to the provisions contained in Presidential Decree 691/82 (Obligatory Waste Oil Consortium) and in part IV of the Environmental Code (Law Decree No. 152/2006) as amended and added.

INSTALLATION CH. 5

5 INSTALLATION

5.1 GENERAL INFORMATION

CAUTION
In view of the fact that installation operations (including assembly and commissioning) may feature risks for unskilled personnel, since they require specific knowledge of the machine, the manufacturer therefore requires the machine to be exclusively handled and installed at the user customer's premises by skilled personnel instructed by the Manufacturer.

5.2 TERMS OF SUPPLY

5.2.1 PACKAGING AND TRANSPORT

The machine is shipped by the Manufacturer, from the production facility to that of the Principal, either assembled or partially disassembled depending on the overall dimensions required for transport.
According to the transport distance, shipment of the machine takes place in the following ways:

- without protective packing for short and medium distances
- protective packing for transport by sea or on Customer demand.

Shipment must be done with means of transport that are suitable for the capacity and dimensions of the type of load to be carried.

The hooking points for lifting are indicated on the machine for proper and safe handling.

Correct anchoring of the machine on the means of transport is left to the discretion of the forwarder, with whom lies the responsibility for it.

The machine is accompanied by a transport document which contains the following data: :

- addressee and sender's addresses
- the number of packages it consists of
- total gross weight

The packing list is only supplied when expressly required.

Due to the transport constraints on overall dimensions, the machine may be delivered to the Customer with some disassembled parts, such as: wheels, water inlet pipe, raingun trolley and/or others. The Manufacturer or whoever acts on their behalf shall complete the assembly of the disassembled parts within the agreed time frames.
Paragraph 7.4.3 must be referred to for the correct tightening torques to be applied to the missing connections.

CAUTION
The precautions and warnings listed below must be complied with in order to assure stability and prevent the risks arising from machine handling.

- Do not improvise any manoeuvre that is not approved by competent personnel.
- Important: ropes or chains must have suitable capacity for the weight of the machine.
- It is recommended to use cranes or an overhead travelling crane for lifting and placement, using the suitable eyebolts and slings.
- Caution - do not stand under suspended loads.

Trained personnel must be exclusively appointed to perform these operations (slingers, crane operators, etc.). In the event visibility should be obstructed by the load's overall dimensions, a signal person must be required to assist the operator and oversee all handling stages.

5.3 PREPARATION OF THE OPERATING ENVIRONMENT

5.3.1 GENERAL INFORMATION

With the due exceptions set out by contract, the customer the machine is intended for must arrange the following:

- Appropriate lifting equipment for the parts it consists of according to the loads to be handled.
- Connections to the machine's power supply points

The above details are provided in the following paragraphs.

NOTE
The Manufacturer shall not be liable for abnormal operation in the event that the power supply does not comply with the required specifications for the machine.

Installation is performed by skilled personnel on the basis of the documentation sent by the manufacturer to the Customer, who must provide all the required documentation for arranging the required infrastructures.

CAUTION
All external power supply connections must be performed by the customer/buyer's personnel in the installation stage.

CAUTION
It is the customer's responsibility to ensure that the ground/surface can withstand the machine's overall static/dynamic load (base, etc.).
the static load is provided in chapter 2.
The dynamic load should be considered as 10% greater than the static load.

CAUTION
For operating environmental conditions, refer to chapter 4 which sets out the features that the installation premises must have.

5.3.2 PROFESSIONAL PROFILES AND MANDATORY PPE

Below is a list of professional profiles and related PPE required for the installation stage.

	Personal protection equipment set out under paragraph 1.9

5.3.3 CHOICE OF PREMISES AND ASSESSMENT OF INSTALLATION REQUIREMENTS

The area for machine installation and use must be sufficiently wide to comply with:
- operating spaces
- transit ways
- escape routes.

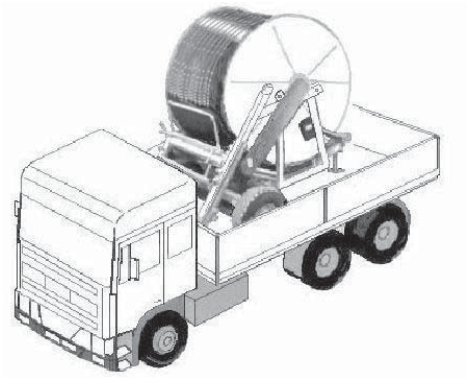
However, it is the customer's unequivocal responsibility to inspect the final installation in compliance with applicable statutory requirements.
The ground/surface of the selected installation and use site must be even, level and conforming to the application specifications, as well as be able to withstand the machine's weight specifications as per the provided static and dynamic loads.
Minimum space requirements according to the overall dimensions provided must be made available in order to handle/place the machine.
It is the buyer/customer's unequivocal responsibility, according to the risk assessment carried out based on the complete machine's intended final use, to assess the minimum space requirements for all activities such as maintenance, connection, inspection as well as any transit areas, escape routes, etc. in compliance with applicable regulations and laws in the installation site and country of use.
The minimum safety distances from walls, the ceiling and any machine or site encumbrances must be taken into account by the customer, to perform inspections and/or maintenance operations on the machine.

NOTE
The dimensions of the machine and related components are provided in chapter 2.5.2.

The supply consists of a load bearing structure (base) on which the machine is constructed.
Machine configuration upon Ex Works delivery.

Please refer to chapter 2 for placement of the machine and its components and relevant minimum distances to be complied with. At any event, suitable operating space should be left between and around components to grant convenient access for maintenance activities.
The Manufacturer requires maintenance space around the base of at least 2,000 mm / 78.74 in.

5.3.4 LOADING, UNLOADING, LIFTING AND HANDLING PROCEDURES



Loading and unloading the machine on to and from a means of transport always involves potential risks, that is why IT IS INDISPENSABLE TO PAY THE UTMOST ATTENTION.
Always block the wheels of the trailer and place blocks underneath both ramps used to load or unload the machine.
Always use ramps of adequate strength that are able to withstand the weight of the machine.
Ensure the ramps are long enough to provide safe loading and unloading grade (less than 8.5°) and ensure their width is adequate for the wheels of the machine (minimum ramp width should be twice the width of a wheel).
Ensure the ramps are correctly placed and securely fastened to the vehicle the machine is to be transported with and that they are aligned at the same level and cannot move or slip while the machine is loaded or unloaded.
Ensure the surfaces of the ramps are clean and free from grease, oil, ice and loose materials.
Never perform hazardous manoeuvres to correct a trajectory on the ramps. If necessary, take the machine back to the start position, get off the ramps, correct the trajectory to be travelled and repeat the manoeuvre from the start.
After loading the machine on to the transport vehicle, block the trailer wheels, adequately and securely fasten the machine to the vehicle with safety tie downs.

PRECAUTIONS FOR LIFTING THE MACHINE AND/OR ITS PARTS

The following instructions must be complied with to perform operations for lifting and handling the items the machine consists of.
The load capacity of the lifting equipment must at least be equal to the machine's mass (see chapter 2), increased according to the requirements of safety regulations.
The overall mass of the machine in the standard configuration is provided in chapter 2 “TECHNICAL SPECIFICATIONS AND LAYOUT”.

NOTE
In handling the items, adhere to the instructions and pictograms displayed on them, using suitable tools and equipment.

NOTE
Item lifting and handling operations must exclusively be carried out by skilled personnel who have been duly instructed and possess load handling qualifications and experience.

DANGER
Before use, check the condition and correct fastening of the equipment and devices arranged for lifting. Use adequate slings and equipment (adequate PPE).

It is obligatory to wear safety gloves

It is obligatory to wear safety shoes

Ropes and chains should always be checked before using them, as well as periodically

It is forbidden to walk/drive under suspended loads

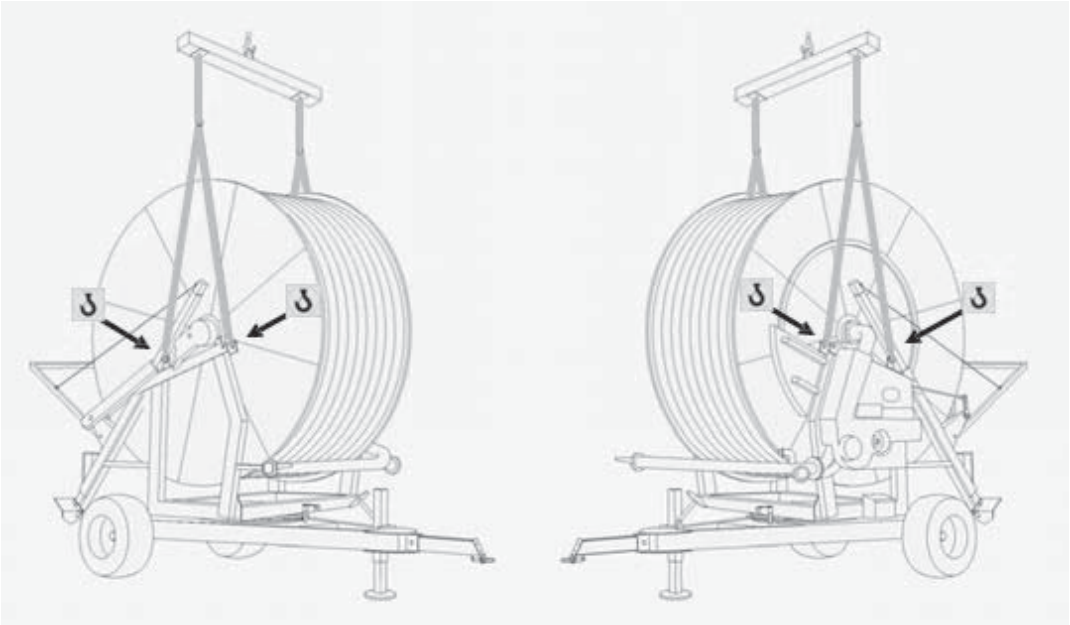
- The operational area must be kept as clear as possible from persons and materials that might obstruct or limit visibility, restrict escape routes, create any obstruction or hindrance.
- The items the machine consists of must be handled through an adequate lifting system such as forklift truck and ropes, hooks and lifting accessories of approved type and adequate capacity, exceeding the weight to be lifted.

CAUTION
Adequate lifting equipment is required to lift the items, taking into account the safety margins set forth by the laws and safety standards in force

Lifting equipment such as a crane, overhead travelling crane, etc. may be used for all loading, unloading, handling, lifting and placement operations, of suitable size and capacity with regards to the load to be lifted (see paragraph 2.5.1) and complying with the specific requirements set out below.

Always use approved spreader beams with chains or wire ropes suited to the capacity to be lifted, with the due safety coefficients and certificates.
Never use lifting accessories of insufficient capacity. Always check for any water in the hose wound on the reel before lifting the machine, since the weight might increase (see paragraph 2.5.1)
Do not use torn, worn, kinked or spliced wire ropes.
When lifting the machine and/or its parts do not allow anyone to enter the manoeuvring area or the surrounding area.
Perform lifting operations only on flat, sound and sufficiently resistant grounds.
Hook the lifting accessories in the hooking points provided, keeping the load stable and balanced during lifting.

HOOKING LIFTING POINTS



CAUTION
Always check the hose before lifting since the machine weight might vary depending on whether it is full or empty, therefore refer to paragraph 2.5 for increased safety.

- Never climb on the machine or on the raingun trolley, whether stationary or moving.
- Never use the machine or the raingun trolley as a means to climb to higher positions

Before starting handling operations of the machine and its structure:
- remove protective covers and packaging (if present);
- remove any fastening tie downs used for transport;
- ensure the ground/surface of the site selected for placement is even, level and can withstand the weight specifications of the machine set out in paragraph 2.5.1.

Always perform pre-lifting by a few centimetres to check the correctness and safety of the sling as well as to balance the load
After performing the actions set out above, you may proceed with lifting for placement, ensuring the base remains level during lifting and is not subject to swinging or unbalancing.

After perfect balancing is achieved you may proceed with load lifting and handling and subsequent placement in the proper position.

CAUTION
In the event the operator's visibility is obstructed by the overall dimensions and/or operating situation, signal personnel must be required to stand outside the operating range of the lifting equipment.

DANGER
Never walk or drive under suspended loads, never handle the load above personnel operating at the site.

DANGER
Should it be required to operate on higher machine parts, operators must pay the utmost attention and use adequate lifting systems and personal protection equipment to avert the risk of falling.

CAUTION
Unloading, handling, lifting, etc. of the structure and machine must not be carried out in the event of adverse atmospheric conditions (such as wind exceeding 0.3 m/minute).

CAUTION
Dispose of packaging materials in compliance with the regulations in force in the country of installation.
Disposal of packaging materials is the responsibility of the customer.

5.4 ASSEMBLY AND PLACEMENT

NOTE
The machine may be delivered to the customer either fully assembled or partly separated due to transporting issues, and complete assembly must be performed by skilled and instructed personnel, who possess the required expertise, technical knowledge, documentation and equipment.
For proper machine assembly, comply with the specific technical documentation, consisting of:

- **General machine drawings**
- **Connection diagram**
- **This manual**
- **Manuals for the main trade components installed on the machine.**

NOTE
The spreader beam, 3000 mm / 118.11 in long chains or ropes with load capacity compliant with the weight to be lifted (see chapter 2 for the individual model) are not supplied with the machine.
It is the customer's responsibility to procure them and make them available.
The Manufacturer only and exclusively provides the lifting eye bolts fitted on the machine, which must always be checked before use by the personnel in charge.

TILTING HAZARD

- **Should the machine need to be moved on uneven, muddy or slippery terrain or near potholes or slopes, exercise extreme caution and use low speeds. In any case never exceed 10 km/h when towing the raingun, even on roads.**
- **Do not move the machine if the terrain conditions are hazardous and if no measures have been taken to prevent a possible tilting hazard.**
- **Do not manoeuvre crosswise on slopes, as this might lead to the machine overturning.**
- **In any event, never travel on grades exceeding 8.5°.**

DANGER OF HITTING PERSONS OR PROPERTY

- **Prior to performing any machine movement, ensure there are no persons or property within the operating area, since the position of the controls on one side does not afford fully unrestrained visibility.**
- **Do not move the machine if there are any people near its manoeuvre area.**

HAZARD IN PARKING THE MACHINE

- **Always park the machine on level ground.**
- **Lower the front stabiliser leg, the rear anchoring legs and the raingun trolley to the ground.**
- **If the machine is road-approved and you need to park it in a public area for any reason, the parking brake needs to be engaged if the machine is equipped with it or use wheel wedges (see paragraph 2.3 item 32B).**

NOTE: TRAVEL ON PUBLIC ROADWAYS
The machines in question may travel on public roadways only if approved complying with the laws in force in the country of destination, and the maximum speed they may be towed at is generally 40 km/h for Italy and 25 km/h for France. (the recommended speed on public roads is 20÷25 km/h).
Prior to travelling on public roadways, the correct operation of visual indication systems and the efficiency of the braking system, where provided, must always be checked.
The features of the systems for type-approved machines vary depending on the country of destination.

5.5 LUBRICATION OF MACHINE PARTS

After completing the power supply connection and prior to starting up, check whether any machine parts need to be lubricated.
For the above operations please refer to this manual under chapter 7 “MAINTENANCE” in the paragraph covering the “Lubrication Plan”.

5.6 CHECKS AND INSPECTIONS PRIOR TO STARTING UP

Prior to performing the operations for starting up the machine described in Chapter 6 below “USE AND OPERATION”, a series of general checks and inspections need to be carried out, concerning mechanical assemblies and the oil hydraulic system, to prevent risks or operation issues.

DANGER
These checks and preparation to first start-up must be performed by a skilled technician with the adequate skills and mechanics and oil-hydraulics knowledge.

The checks and inspections listed below should be deemed normal maintenance operations, listed in detail under chapter 7 “MAINTENANCE”.

Upon successfully completing installation/placement of the machine and the checks set out in the manual and in this chapter, and prior to performing any functional operation, the personnel in charge must carefully check and ensure all process valves are in the position shown in chapter 6.

CAUTION
It is strictly forbidden to operate the machine prior to ensuring the valves are in the position set out in chapter 6 (either open or closed).

5.6.1 GENERAL CHECKS ON MECHANICAL ASSEMBLIES

Proceed with a general inspection of the mechanical part, specifically:

1. Perform a general visual inspection of the assemblies the machine consists of, ensuring there are no special mechanical abnormalities, foreign matter in operating areas and that all components (actuators, raingun trolley, proximity switch, etc.) are properly fastened and securely positioned as set out in this manual.
2. Ensure the mechanical assemblies are perfectly assembled and aligned, connected and fastened to their structure.
3. Check the tightening of screws and nuts of the machine's main components
4. Ensure moving components are greased and able to move freely.
5. Ensure the area where the machine is placed is free from objects that may hinder its movement and that of the attending personnel.
6. Check the oil level in the turbo-gearbox.
7. Check the hydraulic fluid level in the unit tank.
8. Check the oil level of the internal combustion engine if the machine is equipped with it.
9. Check the oil level of the compressor if the machine is equipped with it.
10. After performing the general inspections, start the procedures set out in chapter 6.

Please refer to the manuals for the installed components for the specific checks to be performed on them.

DANGER
The checks and inspections on mechanical assemblies are to be performed with the machine stationary and the power disconnected.

5.6.2 CHECK ON SAFETY SYSTEMS

Prior to operating the machine, ensure it is correctly installed and that the fixed guards and safety devices it is equipped with are correctly assembled and operable.

Safety devices and relevant check procedures are described in Chapter 4 “SAFETY”.

NOTE
This procedure must be implemented as a standard maintenance procedure.

CAUTION
The machine's safety is not assured in the event that safety devices have been removed or tampered with.

5.7 DECOMMISSIONING

The following paragraph contains some suggestions and instructions to perform decommissioning, dismantling and removal of the machine at the end of its service life.
When decommissioning, the operations described below as well as the instructions in the manuals of the components used must be taken into account.

The machine essentially consists of the following materials:
1. painted, plastic coated or galvanised ferritic steel;
2. stainless steel;
3. plastic polyethylene material;
4. elastomers, PTFE, graphite;
5. Polyethylene hosing;
6. gear oil;
7. actuation devices.
8. Battery
9. Internal combustion engine (if the machine is equipped with engine)
10. etc.

After disassembling the machine according to the instructions provided, the various materials must be separated in compliance with the statutory requirements of the country where it is to be disposed.

The operations described below are only allowed to personnel qualified for this purpose and authorised:
- arrange for enough space around the machine to perform all operations with no risks for the personnel.
- ensure the machine has cooled down sufficiently.
- disconnect the machine's power supply shut-off devices and lock them in the open position.
- disconnect the water supply pipes and ensure the residual water has been drained.
- disconnect the oil hydraulic supply pipes and ensure the residual hydraulic energy has been discharged.
- Always use the appropriate PPE for these operations as set out in chapter 4.
- Only after carrying out all the above activities proceed with disassembling the machine, from the top down and paying special attention to the machine assemblies/parts subject to falling by gravity and to all parts where there may be residue such as oil, battery acid or fuel in the engine tank.

Additional information concerning disassembly of trade parts such as the battery, engine, etc. is provided in the relevant manuals supplied with the machine.
After disassembling the machine according to the disassembly procedure set out above, the various materials must be separated in compliance with the statutory requirements of the Country where the machine is to be disposed.

DANGER
Pay the utmost attention as falling parts or components during removal may pose a serious hazard for the operating personnel.

- Remove movable parts and separate the various components by type of materials as much as possible. The parts to be separately disposed of need to be separated by type of material (plastic, metal, etc.).
- The materials obtained from demolition need to be disposed of by specialist firms.
- Remove the various parts of the machine from the working area and handle them using all required precautions
- Before lifting parts of considerable dimensions, check the correct fastening of lifting equipment and only use adequate slings and equipment as described in the previous paragraphs.

NOTE
Disposal operations must be performed in accordance with the laws of the country where the machine is installed. The user is obliged to operate in compliance with the laws in force in their country.

NOTE
In the event of difficulties in disassembly, demolition and dismantling of the components the machine consists of, contact the technical design department of the Manufacturer, which will indicate the operating methods according to the principles of environmental safety and protection.

CAUTION
Take into account the fact that certain components of considerable size and weight may only be handled with appropriate lifting equipment.

CAUTION
All decommissioning activities must be carried out by skilled and trained personnel equipped with adequate personal protection equipment (PPE).

Also refer to chapter 4 with regards to the section **“4.2.1 INSTRUCTIONS FOR SPECIAL WASTE”.**

USE AND OPERATION | CH. 6

6 USE AND OPERATION - GENERAL INFORMATION

This chapter has the purpose of providing information required by the customer/buyer for correctly using and operating the machine.
Additional detailed information is provided in the documentation attached to this manual (chapter 9).

CAUTION: ONLY OPERATE IF
The principles concerning safe use of the machine set out in this instruction and warning manual have been learnt and implemented.
Avoid hazardous situations. Learn and understand safety regulations before moving to the following sections. In particular, it is strictly required to:
Always perform a preoperative visual inspection.
Always perform functional tests prior to use.
Inspect the work area.
Only use the machine for the uses it has been designed for.
This manual has been read and the following regulations have been complied with:
- **employer safety rules and regulations of the place of operation.**
- **applicable law provisions.**

You are properly trained to be able to operate safely.

CAUTION: SAFETY FEATURES
Ensure all protection devices and guards are in their proper position. If protection devices and guards are damaged, they must be repaired and/or replaced. Correctly use the safety systems and devices the machine is equipped with.
Never remove or tamper with any protection/safety system and/or device.
It is indispensable for them to be maintained in a good operating condition in order to correctly perform their function.
Improper use of safety systems and devices may cause serious injury or death.

CAUTION: PPE REQUIRED TO OPERATE THE MACHINE
Every operator's undivided attention is required to operate the machine safely.

Always wear the statutory personal protection equipment listed below:
- **Ear protectors**
- **Protective gloves**
- **Safety shoes**
- **Protective overalls**

6.1 PROFESSIONAL PROFILES AND MANDATORY PPE

Below is a list of professional profiles and related PPE required for the installation stage.

Personal protection equipment for the operator as set out above

Personal protection equipment for the operator as set out above

6.2 CHECK PRIOR TO STARTING WORK

6.2.1 PREOPERATIVE INSPECTION

It is the operator's responsibility to perform a preoperative inspection.
This visual inspection must be performed by the operator before each new work shift and prior to starting up the machine. The inspection has the purpose of uncovering any fault or damage of the machine.
A damaged machine must never be used. Should any damage or change be detected with respect to the initial standard conditions, the machine must be marked out and put out of service for the required repairs.
When the repairs have been performed, the operator must again perform a preoperative inspection and must perform functional tests prior to using the machine.

Please refer to the following list and check each listed element and/or part:

1. Ensure the use and maintenance manual is complete, legible and is in the suitable document holder box on the machine.
2. Ensure all the warning and danger decals / pictograms are in the right place and legible.
3. Check the levels and/or amounts of lubricants for:
   - gearbox oil (see par. 7.7.1)
   - hydraulic oil (see par. 7.7.1)

CAUTION: HYDRAULIC OIL LEVEL CHECK
Do not add oil beyond the maximum level. This might damage the hydraulic components and cause oil to seep out. Do not add oils other than the recommended ones.

4. Check the following components to ascertain any damage or loosened or missing parts:
   - pipes, fittings and cylinders of the oil hydraulic system;
   - pipes, fittings and valves of the irrigation water system;
   - nuts, bolts and other fastening devices (see tightening torques paragraph 7.4.3)
   - electrical components, wiring and electrical cables
5. Check the entire machine to identify any:
   - damage or detached parts;
   - cracking of welds or structural components.
6. Ensure all the casings and guards are intact and correctly locked in their housings.
7. Check the electrical system if the machine is equipped with it
8. Check the battery status if the machine is equipped with it, namely:
   - proper fastening of + / - terminals
   - electrical charge
   - electrolytic liquid level

6.2.2 FUNCTIONAL TESTS WITH REELED IN HOSE AND MACHINE STATIONARY

It is the operator's responsibility to perform functional tests.
The purpose of the functional tests is to uncover any malfunction before the machine is started up. The operator must follow the instructions step by step in order to test all the machine's functions.
A damaged machine must never be used. Should any damage or change be detected with respect to the initial standard conditions, the machine must be marked out and put out of service for the required repairs.
When the repairs have been performed, the operator must again perform a preoperative inspection and must perform functional tests prior to using the machine.
Please refer to the following list and check each listed element and/or part

6.2.2.1 TESTS ON MANUAL AND/OR OIL HYDRAULIC ACTUATIONS FOR MACHINE PLACEMENT FUNCTIONS

Prior to performing the movements listed below, the responsible Operator must ensure that:
- The ground on which the machine is to be placed is level, not on a slope and adequately firm.
- There are no persons, animals or property in the manoeuvre area in front of the machine.

1) FRONT STABILISER LEG, EITHER MANUALLY ACTUATED OR WITH HYDRAULIC LEVER

With a suitable hand crank at the top of the front stabiliser leg (see ref. 9 par.2.1)
turn clockwise to lower the bottom plate to the ground, or use the hydraulic lever, if the machine is equipped with it (see 67 par. 2.6.3), located on the traveller near the drawbar and identified with the suitable pictogram next to it.

2) MANUAL, MECHANICAL OR HYDRAULIC REEL ROTATION WITH RESPECT TO THE VERTICAL AXIS

Prior to performing this movement, ensure the machine is on even ground and not on a slope. This is to avoid a change in masses from causing sudden partial rotation. Should you wish to manually rotate it on minimally sloping ground, another person is needed to manually help the operator in supporting the reel, for the rotation to be controlled.
If the terrain where the machine is to be operated is sloping, it is recommended as a precautionary measure to purchase a machine with mechanical or hydraulic rotation, to make the manoeuvre easier and safer.
Remove the locking pin on the traveller (see ref. 11 par. 2.1) and push by hand, or if the machine is equipped with it, use the mechanical rotation hand crank (see ref. 30 par. 2.3), or use the hydraulic lever (see ref. 65 par. 2.6.3) located on the traveller near the drawbar and rotate the reel to the right or left on the vertical axis until the desired position is reached, then insert the locking pin again in the closest housing to the working position.

3) REAR ANCHOR SUPPORTS WITH MANUAL PUMP OR HYDRAULIC LEVER

With manual pump, rotate the knob clockwise (see ref. 63 par. 2.6.2) and operate the lever (see ref. 64 par. 2.6.2) to lower the rear anchors and trolley frame to the ground. Or if the machine is equipped with it, use the hydraulic lever (see ref. 66 par. 2.6.3), located on the traveller near the drawbar and identified with the suitable pictogram next to it.

6.2.2.2 TESTS ON OPERATION CONTROLS WITH MACHINE STATIONARY

1) TEST LEVERS ON TURBO-GEARBOX TO SELECT GEARS AND MANUAL TRACTION ENGAGE / DISENGAGE

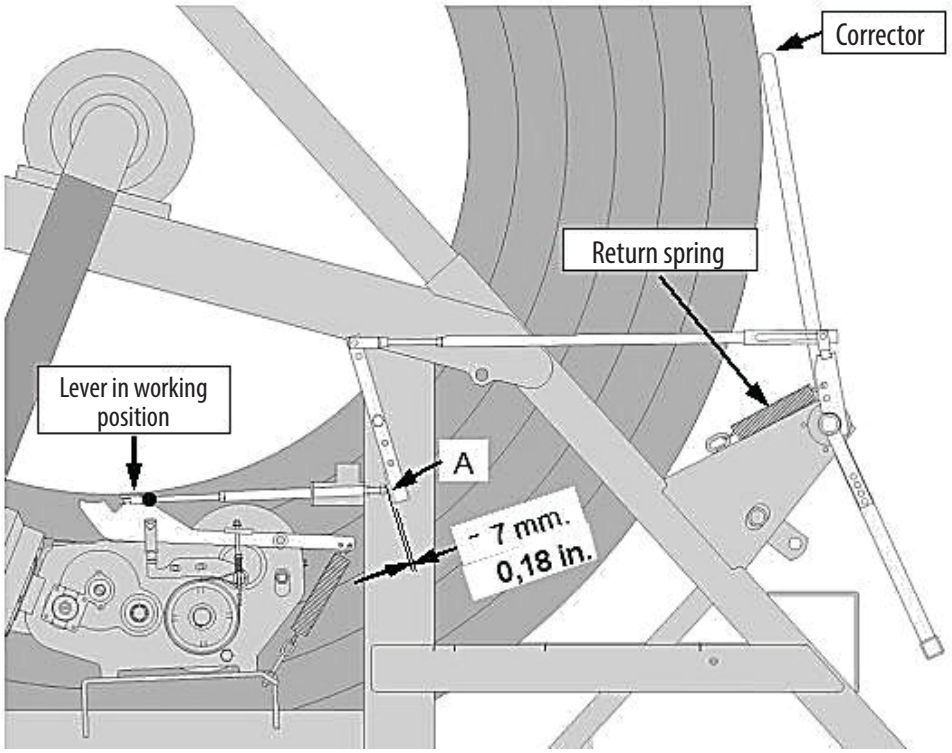
CAUTION:
Prior to operating the gears selection lever, set the turbine RPM to the minimum with the manual by-pass lever or with the computer.

Move the lever (see ref. 60 par. 2.6.1) into positions I - O - II - O - III - O – IV and check proper engagement.
Move the lever (see ref. 61 par. 2.6.1) into the 3 positions UNWINDING - RELEASE - OPERATION and check proper engagement.
Insert the handwheel (see ref. 62 par. 2.6.1) in the PTO located on the turbo-gearbox and with the lever in the UNWINDING position ensure the hose is reeled on when it is rotated anti-clockwise.

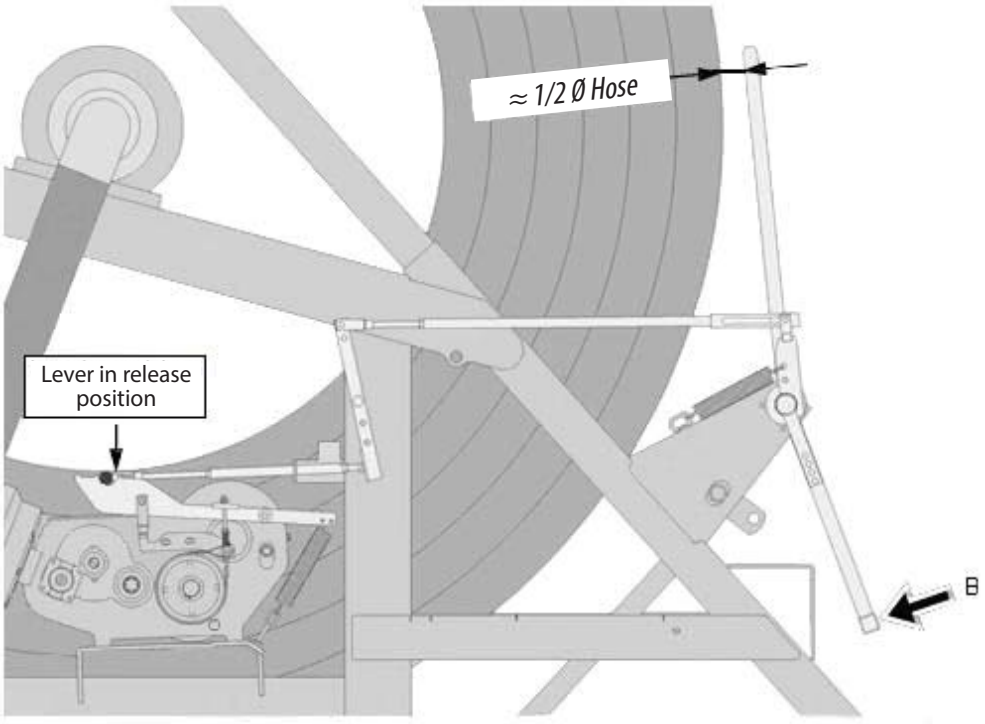
2) TEST AUTOMATIC TRACTION DISENGAGEMENT PRIOR TO: CONNECTING THE TROLLEY TO THE HOSE AND/OR UNWINDING THE HOSE

Premise: all adjustments for proper operation of the machines are carried out in the factory in the testing stage, however in order to be more confident that no tampering or either voluntary or accidental movements have occurred during transport, it is recommended to perform some checks as follows:

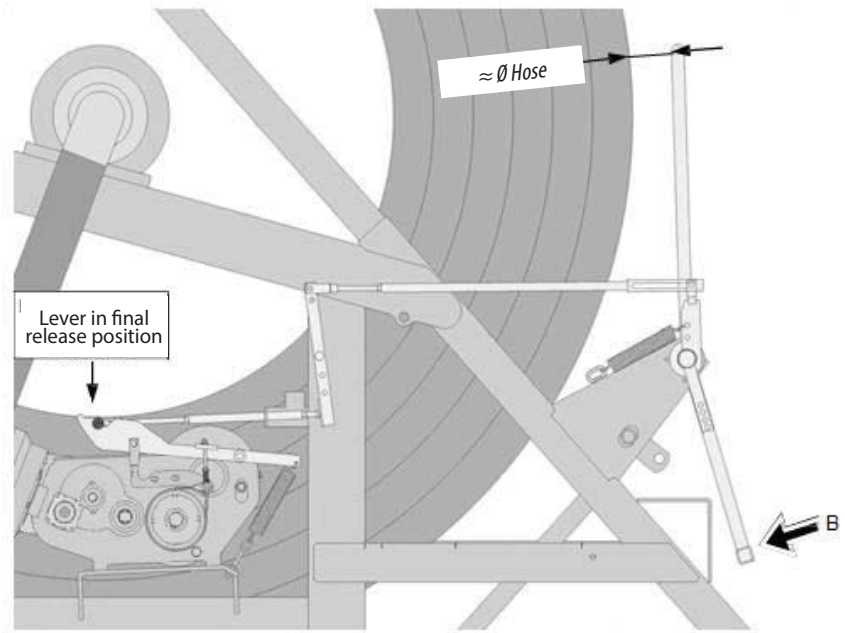
a) When the lever is moved to the operating position, the upper part of the corrector must touch the hose and by effect of the return spring, the strike plate " A " must move away from the control head of the rod by about 7 mm / 0.28 in., as shown in the picture



b) When the lower rod " B " of the corrector is pushed, the lever on the gearbox must consequently move into the release position and the top part of the corrector must move away from the hose by about 1/2 Hose Ø, as shown in the picture.



c) By further pushing the lower rod " B " of the corrector, the lever on the gearbox must consequently move into the final release position, i.e. the lever stem must be housed at the bottom of the groove and the top part of the corrector must move away from the hose approximately by the Hose Ø, as shown in the picture.

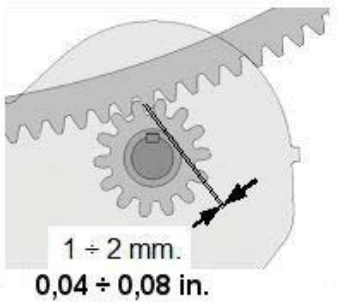


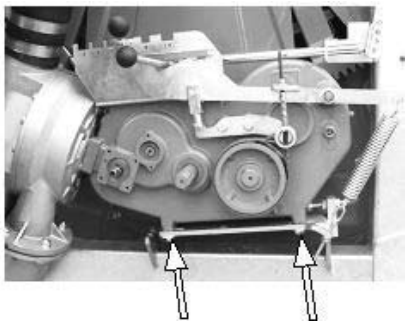
3) TEST ON MACHINE STOP FOR RAINGUN TROLLEY STROKE END AND RELEVANT HITCHING FOR LOADING THE SAME ON TO THE SUPPORT FRAME

Premise: the adjustments under items 1 - 2 - 3 on the following page have been performed in the factory during testing, while those under items 5 - 6 on the following page are to be performed after connecting the raingun trolley to the polyethylene hose wound on the machine's reel, and in any case after anchoring the rear of the machine to the ground (as shown under item 4 on the following page).

Procedure to be followed for connecting the raingun trolley to the machine, the stop bracket to the hose and for performing the relevant adjustments as shown in the following pictures:

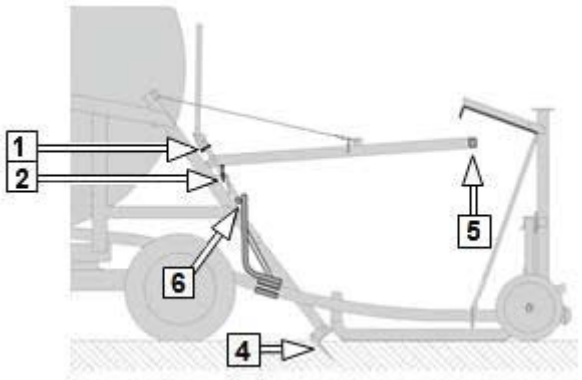
- Lower the rear stabilisers (see ref. 15 par. 2.1) so that they are properly anchored to the ground (as shown under item 4 on the following page), as a consequence the trolley frame is lowered (see ref. 17 par. 2.1). Refer to paragraph 6.2.2.1 (item 3) to perform this operation.
- Move the lever (see ref. 61 par.2.6.1) into the unwinding position and simultaneously pull the hose, unwinding 3 - 4 metres.
- Use the handwheel (see ref. 62 par.2.6.1) to rotate clockwise and unwind 3 - 4 metres of hose, in order to connect the trolley outside its lifting area.
- While unwinding the hose, ensure the pinion located on the gearbox output shaft meshes properly with the cog wheel on the side of the reel (maximum clearance tolerance between 1÷ 2 mm / 0.4 ÷ 0.8 in.).
- To adjust the clearance, loosen the 4 fixing screws on the gearbox and then slightly move the gearbox to the side to achieve optimal unwinding position.





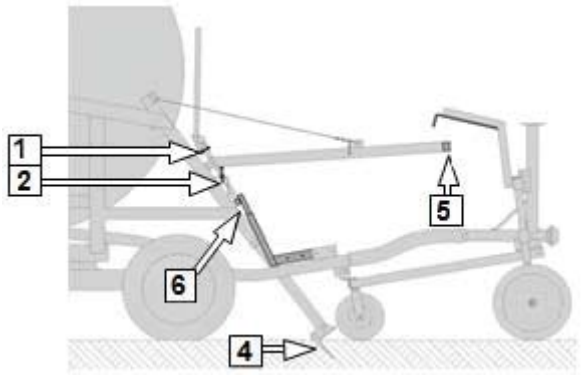
- Connect the hose to the trolley.
- Insert the handwheel (see ref. 62 par. 2.6.1) turn anti-clockwise to reel the hose back in and move the trolley closer to the machine up to the optimal position for hitching to the frame (as shown under item 5).
- Place the stop bracket on the hose (as shown under item 6).
- Lay the upper part of the bracket to the lower rod of the corrector, complying with condition b) set out above.
- Lock the stop bracket on the hose with the appropriate screws. Mount the raingun on the trolley
- Caution: for safety reasons only the use of slow return rainguns is allowed, with speed not exceeding 1 RAD-S-1
- Adjust the height of the raingun trolley so that: for Slide trolleys (see ref.47, 50 and ref.51 par. 2.4.1), the slide is placed evenly on the ground; for 3 - 5-wheel or Side Unwinding trolleys (see ref.48 - 49 and ref. 52, 53 par. 2.4.1), the base of the raingun operates horizontally.
- Upon completing the above operations, the trolley may be lifted from the ground. To do so, follow the instructions in paragraph 6.2.2.1 (item 3) the only difference being, the knob (see ref. 63 par. 2.6.2) must be rotated anti-clockwise.

2-WHEEL TROLLEY / SLIDE
FOR HOSES Ø 75 – 82 mm / 2.95 - 3.22 IN
Ref. 47 par. 2-4



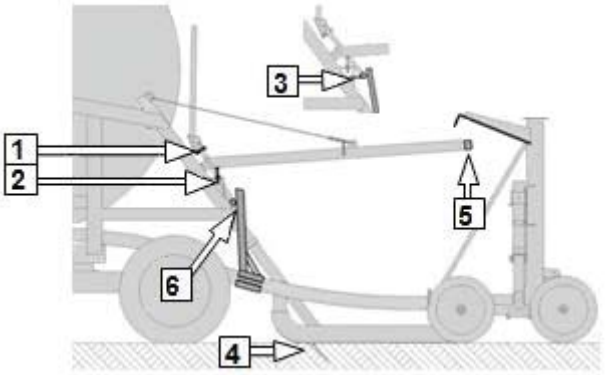
3-WHEEL TROLLEY
FOR HOSES Ø 75 – 82 mm / 2.95 - 3.22 IN
Ref. 48 par. 2-4

SIDE UNWINDING
FOR HOSES Ø 75 – 82 mm / 2.95 - 3.22 IN
Ref. 49 par. 2-4



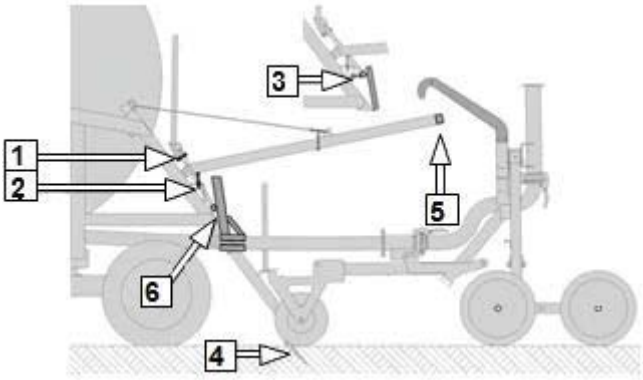
4-WHEEL TROLLEY / SLIDE
FOR HOSE Ø 90 – 100 mm / 3.54 - 3.93 in
Ref. 50 par. 2-4

ST3
HOSE Ø 110 mm / 4.33 in
ST2
FOR HOSES Ø 120 to 140 mm / from 4.72 to 5.51 in
Ref. 51 par. 2-4



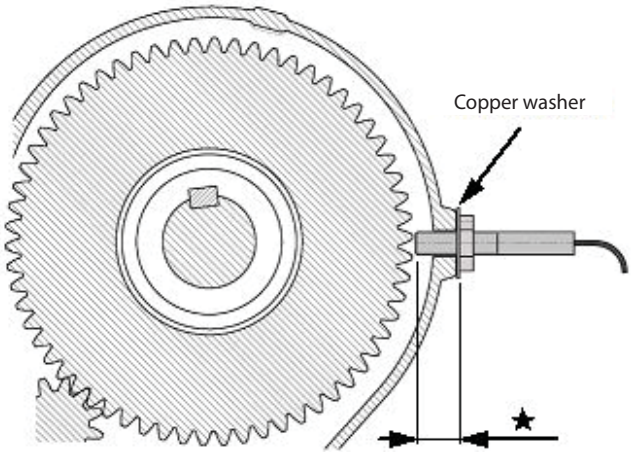
5-WHEEL TROLLEY
SL3
FOR HOSES Ø 90 to 110 mm / from 3.54 to 4.33 in
SL2
FOR HOSES Ø 120 to 140 mm / from 4.72 to 5.51 in
Ref. 52 par. 2-8

SIDE UNWINDING
SL3
FOR HOSES Ø 90 to 110 mm / from 3.54 to 4.33 in
SL2
FOR HOSES Ø 120 to 140 mm / from 4.72 to 5.51 in
Ref. 53 par. 2-8



4) CHECKS TO BE PERFORMED FOR MACHINES EQUIPPED WITH COMPUTER (OPTIONAL FEATURE)

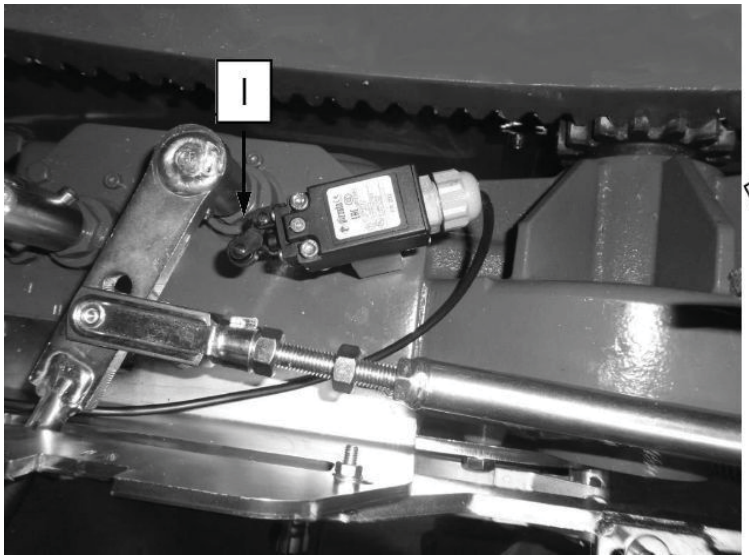
- Check the correct insertion distance of the inductive sensor cylinder in the gearbox.

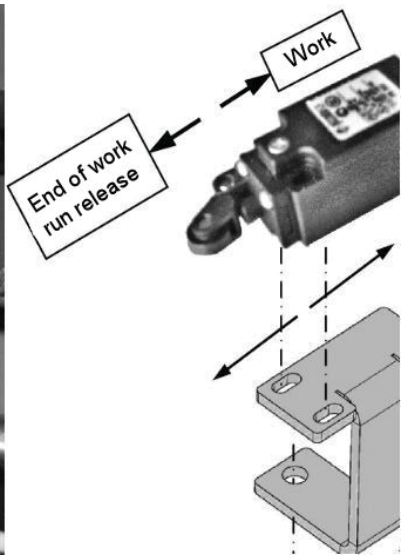


Machine	Gearbox	Inductive sensor distance
VR3 - VR4	855	14 mm / 0,55 in
VR5 - VR6 - VR7 - VR7/1	854	13 mm / 0.51 in

- Turn on the computer and check proper operation.
- To perform this test, refer to the specific Manual.
- Check the proper operation of the limit Micro-switch only if the machine is equipped with the Rain Control computer

In addition to the indications under (b) par. 6.2.2.2, the limit Micro-switch must send the end-of-work signal to the computer.
If this should not occur or occurs before the end of the procedure under (b) par. 6.2.2.2, the limit micro-switch must be adjusted on the support plate, moving it towards or away from the plate built into the lever as indicated under point (l).





5) CHECKS TO BE PERFORMED FOR MACHINES EQUIPPED WITH (OPTIONAL) INLET AND/OR DISCHARGE VALVES, EITHER MECHANICAL OR ELECTRICAL

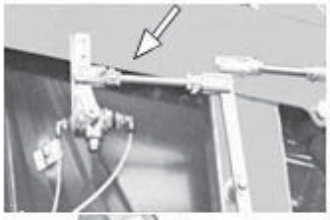
The valves, be they mechanical or electrical, must operate as follows:
a) The slow closing INLET valve must be:
OPEN, when the machine starts operating - CLOSED, when the machine finishes operating
b) The DISCHARGE valve must be:
CLOSED, when the machine starts operating - OPEN, when the machine finishes operating

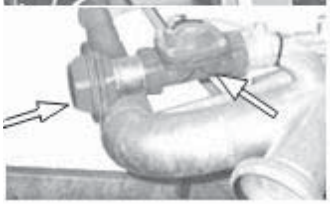
MECHANICAL VALVES operating with pressurised water
Depending on Customer needs, the INLET or DISCHARGE valve is normally required. However, both of them might be required, in which case the INLET valve is subject to operation of the DISCHARGE valve

MECHANICAL VALVES operating with pressurised water

DISCHARGE valve

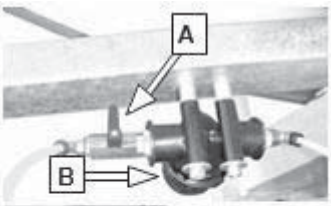
- Ensure the three-way cock that controls the DISCHARGE valve is actuated simultaneously with automatic stroke end disengagement, and if required adjust the stroke of the lever controlling the cock.
- Remove the cap at the head of the fitting and ensure the DISCHARGE valve opens when there is pressurised water. To do so you must act on the three-way cock, taking care not to stand in front of the fitting in order to prevent being hit by a forceful jet of pressurised water.





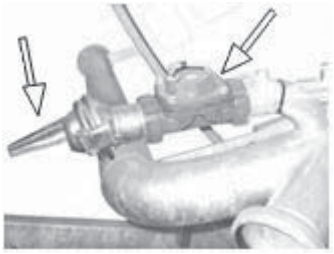
Slow closing INLET valve

- Ensure that:
  - the cock “A” can be be opened and closed easily and is not obstructed, oxidised or broken.
  - the filter inside container “B” is clean and the box is properly tightened.
- Ensure the mechanical piston can be opened and closed easily. To do so, the discharge cocks located in front of and behind the piston must be opened, and the manual lever must be operated. After that, the discharge cock located behind the piston must be closed.



Both the slow-closing INLET valve and the DISCHARGE valve are present

- In this case where operation of the INLET valve is subject to the operation of the DISCHARGE valve, in addition to the above directions it is also required to plug the head of the fitting and ensure the DISCHARGE valve opens when there is pressurised water. To do so you must act on the three-way cock. However, in the event the DISCHARGE valve should be required to perform its actual function, the plug at the head of the fitting must be removed as above, and after that ensure the inlet valve has remained open, or open it manually with the appropriate lever.



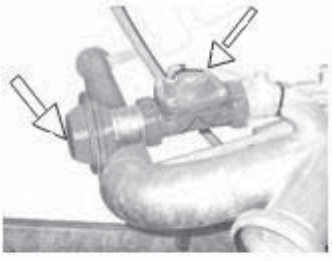
When both valves are present, one must choose whether to use the slow closing INLET valve or the DISCHARGE one since they CANNOT simultaneously perform their specific functions

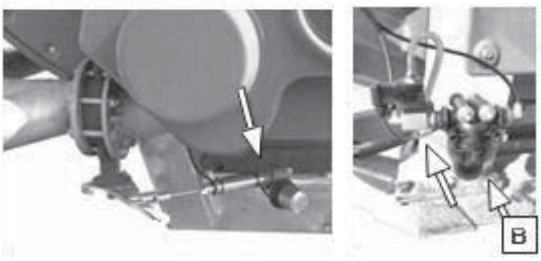
Computer controlled ELECTRICAL VALVES

- Remove the plug at the head of the DISCHARGE valve fitting.
- Ensure the filter inside container “B” is clean and the box is properly tightened.
- Simulate from the computer the work START then work STOP, check the following:
  - when the power button is pressed, followed by the + control, the electrical piston of the slow closing INLET valve must open the butterfly valve and send the order to the solenoid valve to close the DISCHARGE valve.
  - when the STOP or work end button is pressed, the electrical piston of the slow closing INLET valve must close the butterfly valve and send the order to the solenoid valve to open the DISCHARGE valve.

If the closing speed of the electrical piston is too high or too slow, adjust it with the computer by changing the setting (number of pulses), in order to achieve the desired speed. To perform this operation refer to the Computer Manual.

Note: Should the above operations not take place, ensure there are no faults in electrical connections and that there is enough electricity in the battery.





6.2.3 OPERATING SITE INSPECTION

It is the operator's responsibility to perform a careful inspection of the operating site.
This essential inspection has the purpose of assessing any risks connected with using the machine. The operator must be prepared to deal with and prevent these situations, during movement, placement and use of the machine.

Please refer to the list below, in order to know and prevent the following risks:
- slopes or inclines;
- potholes, bumps, obstacles on the ground;
- aerial obstructions and electrical voltage wires;
- inadequate consistency of the ground or supporting surface to withstand all the load forces generated by the machine;
- presence of unauthorised persons;
- insufficient lighting;
- other possible conditions of risk.

Never use the machine at a work site if even just one of the above issues is present. The machine might overturn or lose its stability, with ensuing risk of severe injury to persons and damage to property.

6.3 REMOVAL FOR PLACEMENT IN THE FIELD

This chapter provides instructions and procedures to be followed to place the machine in the operating field.
It is the operator's responsibility to follow all safety rules and all the instructions contained in this manual.

The machine must only be operated by trained and authorised personnel

In the event several operators are required to use the machine, they must all be duly qualified and follow all the safety rules and the instructions contained in this manual.

UTILISATION HAZARD
It is forbidden to detach the water hoses with machine in operation, i.e. with pressurised water. It is forbidden to place the machine and aim the water jet at buildings, roads, tracks or paths which might be used by persons and/or vehicles.
It is forbidden to operate the machine unless the water hose has been connected to the raingun trolley and the raingun is at the right height from the ground.

HEARING PROTECTION HAZARD (in case of internal combustion engine)
Should you need to stand near the machine when it is operating, always use protection ear plugs or earmuffs.

6.3.1 TOWING THE MACHINE

1) Before hitching the machine to the tractor ensure that:
- the tractor has the required power and capacity to tow the machine;
- the tyres of the machine are inflated (see par.2.5.4);
- The safety turret rotation locking pin (see ref. 11 par.2.1) is correctly inserted in the suitable housing provided on the traveller.
- the raingun trolley is correctly hitched on the support frame (see ref. 17 par.2.1)
- the rear stabilisers (see ref. 15 par.2.1) and consequently, the raingun trolley also are lifted off the ground.
- (for type-approved machines only) the mechanical stops are correctly inserted in the rear anchors.
- the lower lever located on the turbo gearbox (see ref. 61 par.2.6.1) is in the RELEASE position.
- the machine is lifted off the ground and resting on the wheels and front support.

2) Hook the drawbar eye at the end of the machine's tow bar to the tractor's drawbar.
- to perform hitching correctly, the hydraulic or mechanical front stabiliser leg must be used to change the height from the ground, so that the machine's drawbar eye is at the same height as the drawbar on the tractor.

3) Engage the parking brake on the tractor then lift the manual front stabiliser leg of the machine (see ref. 9 par.2.1) or the Optional hydraulic one (see ref. 28 par.2.3) (only for type-approved machines without braking system, remove the parking stop wedges from the wheels and put them back in the appropriate housings provided on the traveller).

For machines provided with Optional Road Use Approval, it is indispensable to refer to the Registration Document issued by the responsible Body in the country where they are to travel on public roads.
This contains: the required conditions for the machine and specific outfittings during travel, requirements, rules to be complied with, etc.

4) When the machine is equipped with the tractor jack coupler (Optional feature), release it from the tractor before towing the machine away.
5) Tow the machine to the work site (maximum speed 10 km/h).
6) When the destination is reached, the machine must be oriented in a position approximately orthogonal to the unwinding trajectory of the irrigation hose.

With regards to the machine's stability and safety, the tractor driver may check from the driver's seat whether the machine moves when the brake pedal is released.
Before uncoupling the machine from the tractor, it is essential to ascertain the condition of the ground where the machine is to be placed, which must be adequately firm and without any slopes, in order to assure good static stability.

6.4 PLACEMENT OF THE MACHINE IN THE FIELD

Note: If oil hydraulic actuations are with tractor jack coupler, the machine's quick couplers must be connected to the tractor and the sequences set out below must be performed.

1) Lower the front manual stabiliser leg (see ref. 9 par.2.1) or the Optional hydraulic one (see ref. 28 par.2.5) until a sufficient height from the ground of the drawbar eye is reached for the machine to be unhitched from the tractor.
2) Release the drawbar eye of the machine from the tractor, then check traveller planarity to the ground, and if needed correct height from the ground of the front stabiliser leg.
3) If the machine is Road-approved, the braking and lights systems between machine and tractor need to be disconnected, it is also essential to remove the extension safety stops.

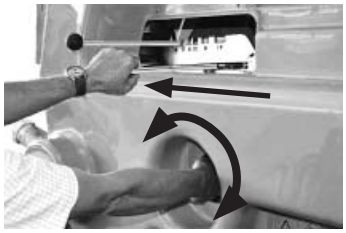
DANGER
Failure to comply with this rule leads to structural damage and hazard situations.

4) Remove the rotation locking pin (see ref. 11 par.2.1) and rotate the reel with respect to the machine's vertical axis, either manually or mechanically (see ref. 30. par.2.3) or with the hydraulic lever (see ref. 65 par.2.6.3), steering the reel towards the area to be irrigated, taking care it is as parallel as possible with regards to the hose unwinding direction.
5) Insert the rotation locking pin in the seat of the spokes on the traveller and closest to the selected position.
6) With manual pump (see ref. 4 par.2.1) or with the Optional hydraulic lever (see ref. 66 par.2.6.3) lower the rear anchoring supports, and the raingun trolley is simultaneously lowered. This anchoring manoeuvre to the ground must provide maximum stability to the traveller and turret of the machine during hose unwinding and reeling in. (To perform this movement with manual pump, rotate the switch knob of the side hydraulic pump (see ref. 63 par.2.6.2) clockwise (RH) and actuate the suitable lever (see ref. 64 par.2.6.2).
7) Turn the computer on if the machine is fitted with it.
8) Move the lever on the turbo gearbox (see ref.61 par.2.6.1) into the UNWINDING position

Push the lever to the left with your left hand

and to make the manoeuvre easier,

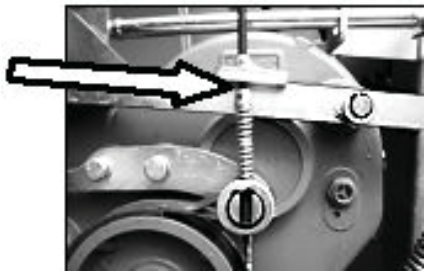
with your right hand slightly rotate alternatively clockwise and anti-clockwise the protruding shaft of the PTO, using a glove for this operation.



9) Hitch the tractor to the appropriate towing point of the raingun trolley and start the hose unwinding operation, which must take place complying with a constant speed of 2 - 3 km/h and gradually slow down near the point of arrival.

   Note: Always leave one loop of hose wound on the reel.

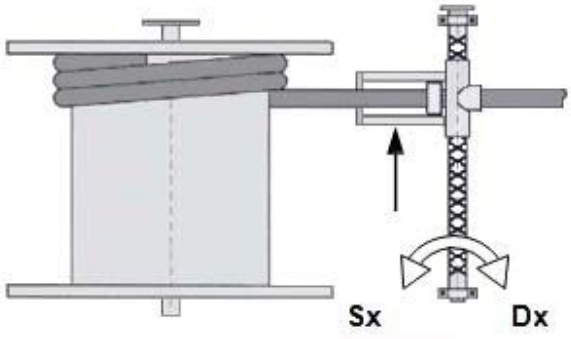
Upon first hose unwinding, ensure the automatic braking is correct. The automatic band brake on the gearbox is adjusted with the appropriate screw.



   Upon first commissioning at the start of the irrigation season, the hose must be fully unwound leaving only 2 loops wound on the reel. This is in order to check the correct operation position of the hose guide fork (see chapter 6.5 item 1).

10) Unhitch the tractor from the raingun trolley.

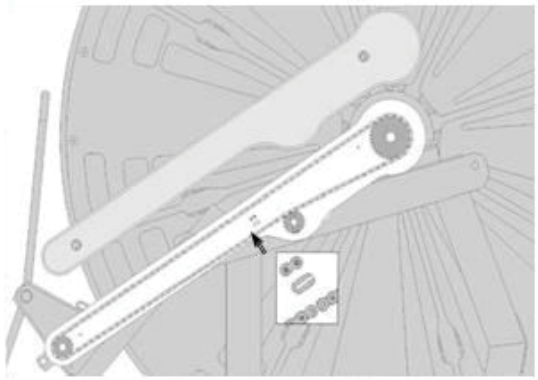
6.5 CHECKS TO BE PERFORMED WITH UNWOUND HOSE AND PRIOR TO STARTING IRRIGATION

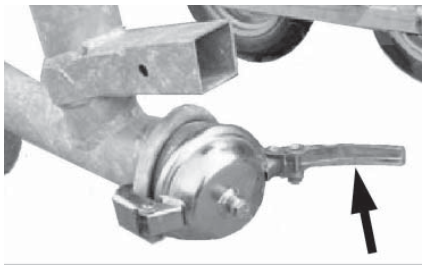


1) Ensure the hose guide fork is aligned with the hose or slightly moved towards the last wound coil.
This check must be performed with the hose completely unwound.

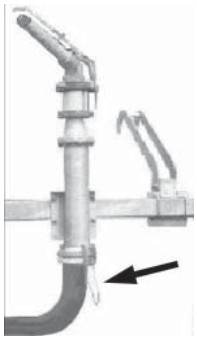
If this is not the case, act as follows:

- Take down the side casing covering the chain.
- Remove the chain's connecting link to make the hose guide bar free to rotate.
- Rotate the hose guide bar to the right or left until the hose guide fork is in the correct position.
- Fit the chain's connecting link back on.
- Fit the side casing covering the chain back on.





2A) For slide and 3-wheel trolleys (see ref.47, 48, 49, 50 and ref.51 par.2.4.1) ensure the cover is engaged and closed on the half-coupling at the end of the hose on the trolley's head.



2B) For 5-wheel trolleys and 5-wheel trolleys with side unwinding (see ref. 52, 53 par.2.4.1) ensure the connecting hose is correctly hooked.

3) If the machine is equipped with a computer:
- check the length of the unwound hose on the display.
- set the required rain and time parameters for the type of crop to be irrigated.

It is recommended to read the specific Manual to make these settings easier.

4) Close with the plug one of the two inlets on the water inlet pipe of the machine (see ref. 5 par.2.1)
5) Connect the hose to the free input on the machine's water inlet (see ref. 20 par.2.1)
6) Prior to connecting the water piping to the machine, let a sufficient amount of water flow out to allow any foreign matter that might clog the turbine to be removed.
7) Connect the water supply pipe to the hose (see ref. 20 par.2.1)
8) Refer to the irrigation rate chart (see ref. 9 of chapter 9 ANNEXES) supplied with the machine to identify the most suitable hose retrieval speed.

6.6 STARTING WORK

1) Move the gearbox lever to one of the selected gears (see ref. 60 par.2.6.1) according to the recommendations of the irrigation rate chart attached to the machine's documentation.
2) Gradually let water flow in the machine's inlet pipe and wait for the whole system to reach the proper operating pressure. To ensure that, just check the reading of the pressure gauge located on the machine's water inlet.

CAUTION
If water delivery is interrupted by the pumping station, the machine stops. As soon as it is restored, the machine automatically resumes operation. As a precautionary measure, it is then recommended to check proper operation of set functions again.

3) Move the gearbox lever to the WORK position (see ref. 61 par.2.6.1), after which the machine starts reeling the hose in and irrigating the field.

CAUTION
To change gears, the number of turbine RPMs must be decreased:
- **refer to the specific manual if the machine is equipped with a computer**
- **if the machine is not equipped with a computer move the knob described below to the left (-) then move it back to the previous position after the gear has shifted.**

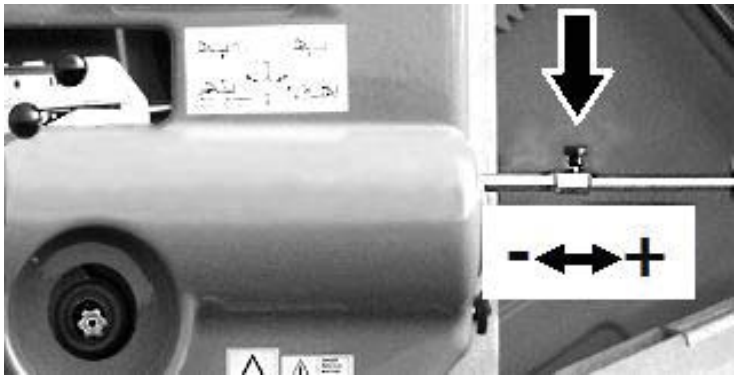
Note: The action described above is especially necessary when moving from third to fourth gear.

CAUTION
Should the machine be put in neutral either willingly or unwillingly while the hose is being dragged, the reel might violently turn in the opposite direction. It is therefore essential to pay the utmost attention in ensuring no people are near the machine.

6.6.1 ADJUSTMENT OF AUTOMATIC SPEED CORRECTION

If the machine is equipped with the optional computer, the computer maintains a constant speed.

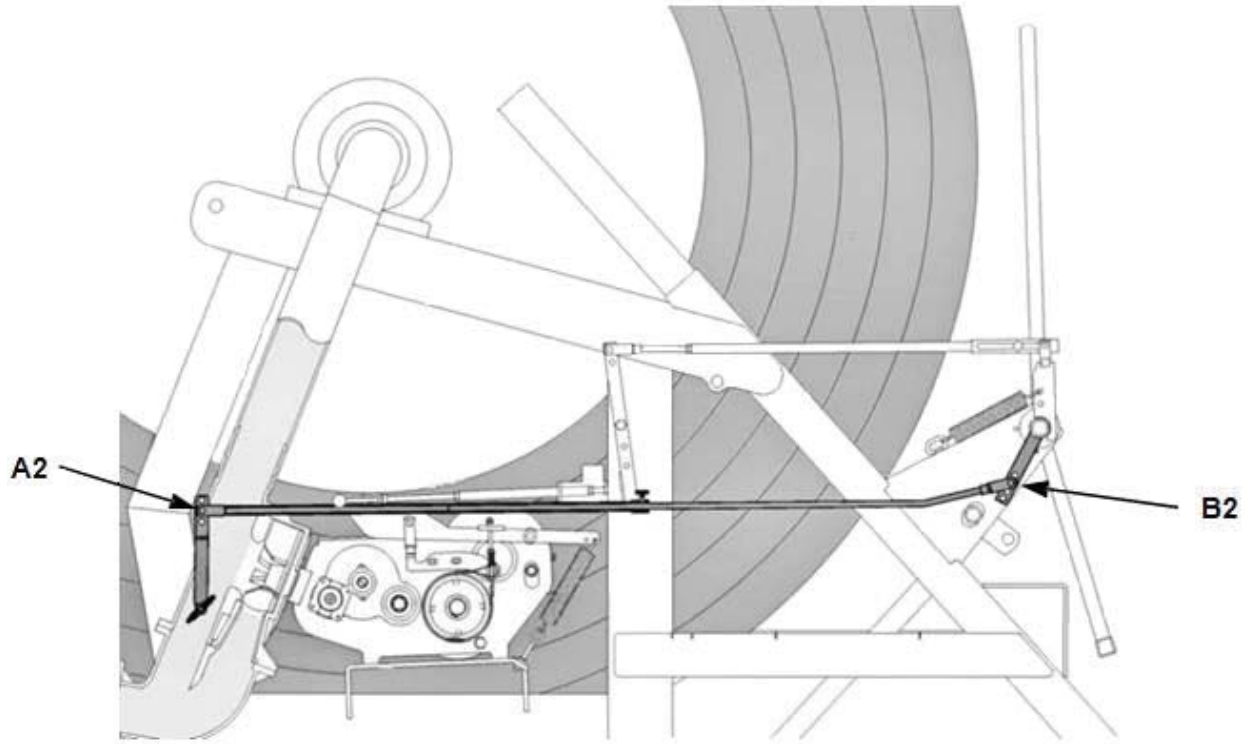
If the machine is not equipped with a computer, in order to optimise hose retrieval speed you must act on the by-pass. This is done by manually loosening the screw inserted in the knob and moving to the right (+ to increase speed) or left (- to decrease speed) the bush welded on the telescopic rod, then lock again by manually tightening the knob.



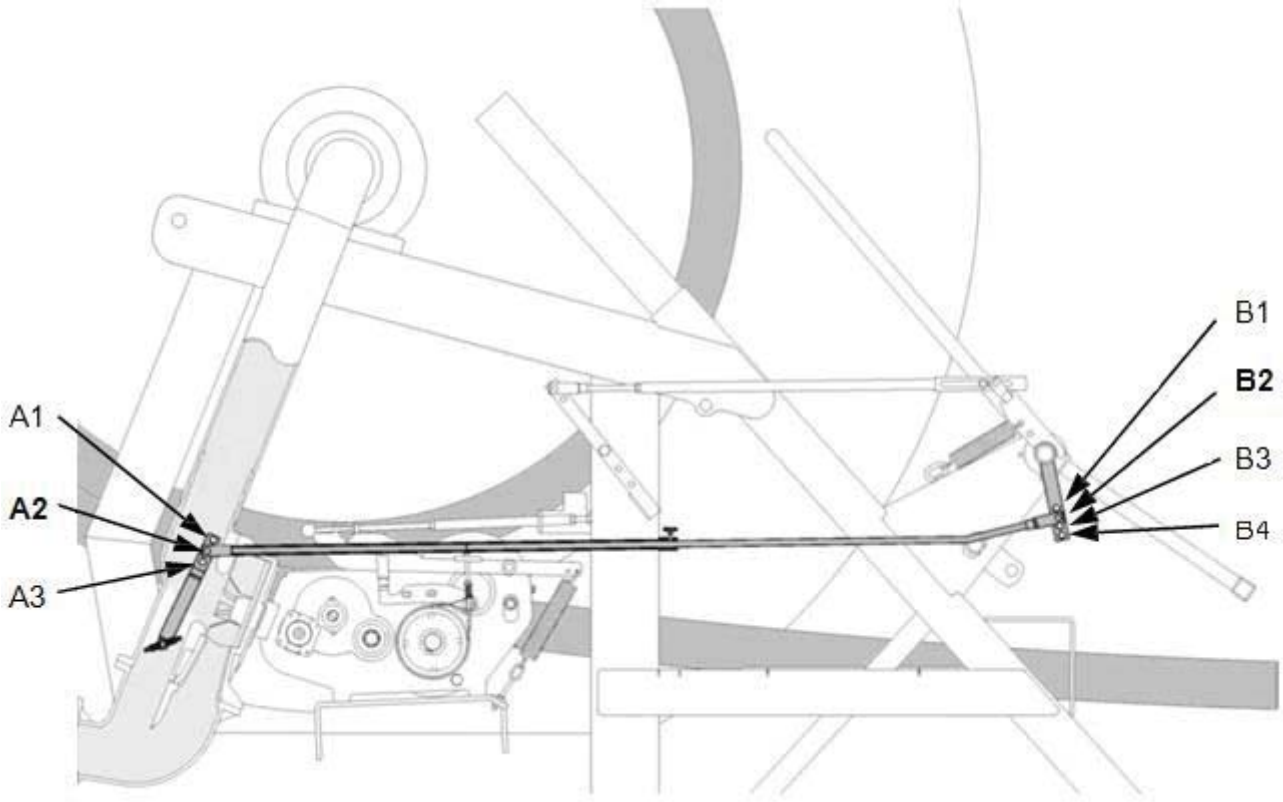
the engaging position of the levers needs to be changed to correct the hose retrieval speed.

Note: In the factory testing stage, this adjustment is done by engaging the lever in A2 and B2 (following page) to achieve the following conditions:

- with the hose completely wound on the machine the by-pass butterfly valve is almost completely open in order to let water flow directly to the raingun without any reel rotation;



- with the hose completely unwound onto the ground the by-pass butterfly valve is almost completely closed in order to let water move the reel for hose reeling in rotation.



If the machine's speed changes noticeably during the hose retrieval stage, the engaging position of levers A and B needs to be changed:
If the speed decreases, it is recommended to change the attachments: from A2 to A1 and from B2 to B1 in order to allow the by-pass to open less and send more water to the turbine.
If the speed increases, it is recommended to change the attachments: from A2 to A3 and from B2 to B3 or B4 in order to allow the by-pass to open more and send less water to the turbine.
During irrigation it is recommended to keep the hose winding on the reel under control and if necessary repeat the steps set out in the first paragraph of chapter 6.5.

6.6.2 QUICK HOSE WINDING

Should it be required to reel the hose back in rapidly, follow the instructions below:

Note: If the unwound hose has remained on the ground for some time and has been exposed to the weather, it is certainly stuck to the ground, which is why it is essential to detach the hose from the ground prior to starting the machine, either by moving it by hand or running a rope underneath it for the entire unwound length.

CAUTION
If the machine is started with the hose stuck to the ground, it is certainly going to be irreparably damaged.

1) Move the lever (see ref. 61 par. 2.6.1) into the UNWINDING position.

2) With a certified PTO coupling, in good state of repair and fitted with regular protection devices, connect the tractor's PTO to that of the machine which is located on the gearbox (see ref.14 par.2.1).

3) IMPORTANT: If the length of the hose to be reeled in is over 30% of the total length, it is essential to pressurise or maintain pressurised the water inside the hoses as in normal irrigation. This is in order to prevent certain out-of-roundness of the hose, leading to unevenness in looping on the reel.

4) Actuate PTO rotation from the tractor, paying attention to the direction of rotation and maximum number of RPMs, which must not exceed the limit of 540 g/1.

5) Rapid hose reeling in with shaft drive does not include the automatic stroke end stop as in a normal work cycle, it is therefore essential to stop rotation of the PTO when 2 or 3 metres of unwound hose remain on the ground.

6) Remove the shaft drive between tractor and machine.

7) Engage the handwheel (see ref. 62 par.2.6.1) in the machine's PTO and rotate it manually to reel in the last few metres of hose still unwound.

8) Interrupt water delivery from the pumping station.

9) Move the lever (see ref.61 par.2.6.1)

Note: If the machine remains placed in the current position awaiting subsequent irrigation of the same field, at the time of the next irrigation just repeat the operations as per paragraph 6-4 starting from item 7. If however the work place changes, the operations for preparing to tow must be completed, as set out in chapter 6.7 starting from item 2.

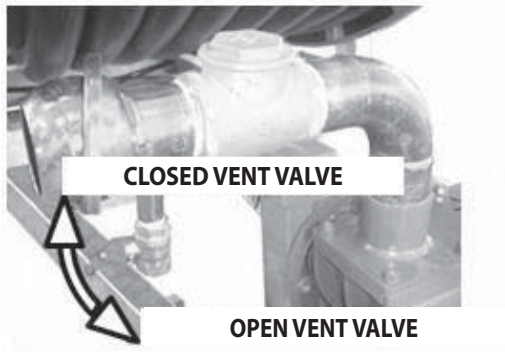
6.7 END OF WORK AND PREPARING TO TOW

The machine is stationary when: the hose is all reeled in, the stop bracket (located on the hose near the coupling flange to the raingun trolley) has actuated the lower bar of the corrector due to stroke end, and the lever located on the gearbox has automatically moved to the RELEASE position. It is therefore required to proceed as follows:

1) Stop water delivery from the pumping station if it is not equipped with automatic stop.
2) Let water flow for the water pressure to be reduced to zero.
3) Disconnect the water delivery hose.
4) Ensure the raingun trolley is positioned so that it may be lifted
5) With the manual pump or hydraulic lever if the machine is equipped with it, lift the rear anchors and consequently lift the raingun trolley.
6) Remove the turret rotation locking pin and either manually or mechanically with hand crank or hydraulic lever if the machine is equipped with either of the latter options, rotate the turret into the transport position and lock it by inserting the pin in the appropriate housing.
7) If the machine is provided with Road Use Approval and is to be towed on public roads, it is essential to insert the mechanical stops on the extensions.
   The Registration Document must also be referred to in order to apply the statutory requirements.
8) For towing refer to the instructions under 6.3.

6.8 USE OF THE COMPRESSOR (OPTIONAL FEATURE)

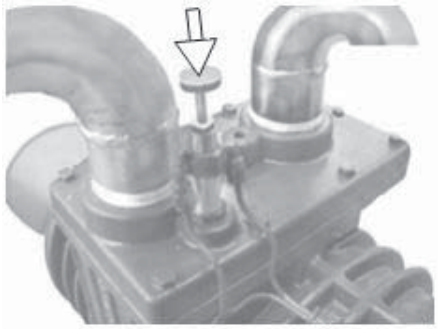
1) Connect one end of the specific hose to the air delivery pipe of the Compressor and the other end to one input of the machine's water inlet (see ref. 37 par.2.3)
2) With the specific plug close the second water inlet (see ref. 5 par.2.1)
3) Open the venting valve on the connecting pipe
4) Remove the plug at the head of the trolley (see item 2A par. 6.5) in the case of a slide or 3-wheel trolley, otherwise uncouple the connecting hose (see item 2B par. 6.5)
   in the case of a 5-wheel trolley or 5-wheel trolley with side unwinding.
5) Connect the tractor's PTO to that of the Compressor with a certified universal joint (CE), in good state of repair and fitted with regular protection devices (see ref. 36 par.2.3)
6) Actuate the shaft drive from the tractor bringing maximum rotation speed to 540 g/min.
7) Close the vent valve so that air completely fills the machine. When the emptying operation is completed (max. 3 min.) stop PTO shaft rotation and carefully open the vent valve.



CAUTION
During water emptying, the compressor and relevant ducts overheat, that is why, during these operations, it is essential to use gloves to protect your hands from burns.

DANGER
Upon completing this operation, a residual pressure of approximately 2-3 bar (29-43 psi) remains inside the hose. That is why it is dangerous to remove the closing plugs prior to opening the vent valve.

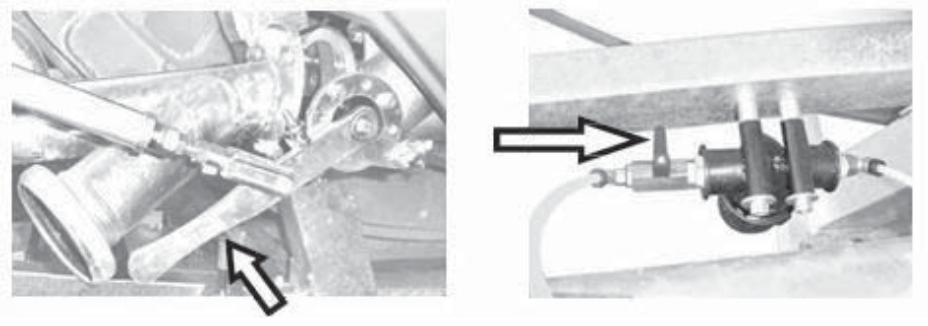
During emptying check compressor lubrication. Oil must drip from the distributor located on its cover, and this is visually checked by looking through the regulator's transparent glass. Use the appropriate screw to adjust the flow.



6.9 USE OF THE MECHANICAL OR ELECTRICAL SLOW CLOSING INLET VALVE (OPTIONAL FEATURE)

The following instructions need to be applied prior to pressurising the water in the machine.

When the machine is equipped with a mechanical valve
1) Ensure the butterfly valve is open. To do so, just check whether the piston rod has completely retracted and if needed, manually act on the suitable lever as shown in the picture below
2) Ensure the closing speed adjustment cock located on the filter is completely closed



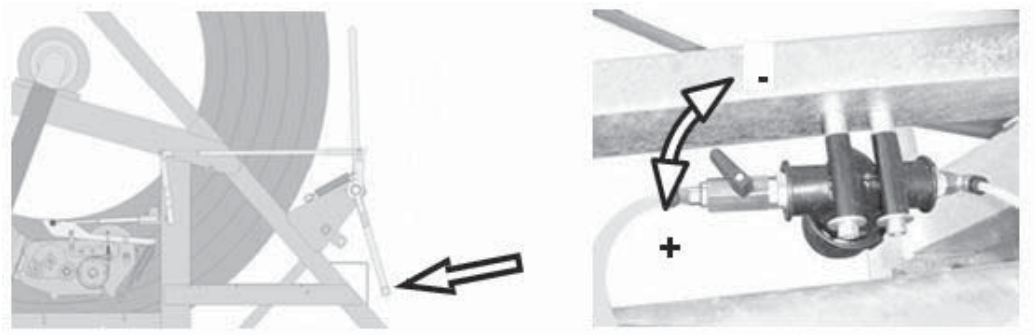
CAUTION
Should the adjustment of the cock located near the filter be tampered with during machine operation, the valve might close suddenly, generating strong water hammer shocks or failing to close.

When the machine is equipped with an electrical valve, ensure the butterfly valve opens after turning on the computer and pressing the + key on the keyboard as required by the program displayed on the monitor and if needed, manually operate the suitable lever.
(in both cases, the lever that controls the valve may be in different directions, according to the size of the machine)
If the above conditions are met and the hose is unwound, the system delivering water to the machine may be pressurised. After that, only when the INLET valve is mechanical, the cock on the filter must be opened slowly so the three-way valve may control the piston.

CAUTION
If the machine is equipped with slow closing inlet valve, the pumping station must be equipped with an automatic stop. In the event it is not, the pumping station must be stopped intentionally and in due time in order to prevent hazardous situations due to excessive pressure in the machine's water inlet pipes and/or downstream of the station.

6.9.1 ADJUSTMENT OF SLOW CLOSING INLET VALVE

When the machine is equipped with a mechanical valve
1) Simulate the stroke end stop by acting on the corrector as shown in the picture below
2) Adjust + / - opening of the cock on the filter in order to achieve the desired closing speed



When the machine is equipped with an electrical valve, the parameter set on the computer must be adjusted to change its closing time, the computer Manual must therefore be referred to.

6.9.2 OPERATION TO BE PERFORMED ON THE MACHINE PRIOR TO MOVING IT, IF IT IS EQUIPPED WITH SLOW CLOSING INLET VALVE

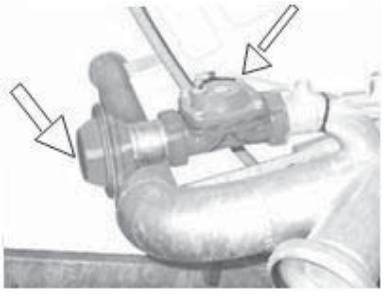
When the machine has completed work and in any case where it should be required to interrupt work for any need to move it, the following operations must be performed:

NOTE
Prior to disconnecting the pipes delivering water to the machine and/or to moving the machine, it is essential to ensure the pumping station has automatically switched off at the end of work or has been intentionally shut off to interrupt operation. Consequently, the valve in question must have either automatically shut off or been shut off by the operator and the water delivery pipe is still pressurised.

1) Close the valve upstream of the piping (pumping station) conveying water to the machine
2) Manually open the vent cock located on the slow closing inlet valve
3) Open the butterfly valve using the suitable handle, in order to reduce internal pressure to zero.
4) When the pressure is fully down, close the vent cock located on the slow closing inlet valve.
5) Disconnect the hose delivering water to the machine and proceed with its preparation for moving.

6.10 USE OF THE DISCHARGE VALVE (OPTIONAL)

When the machine is equipped with a mechanical discharge valve, the following steps must be followed:
1) Remove the plug located at the head of the valve discharge fitting.
2) Start up the machine.
3) Ensure the valve is opened by the 3-way cock controlling it when the stroke end stop is simulated (see item 5.par. 6.2.2.2)



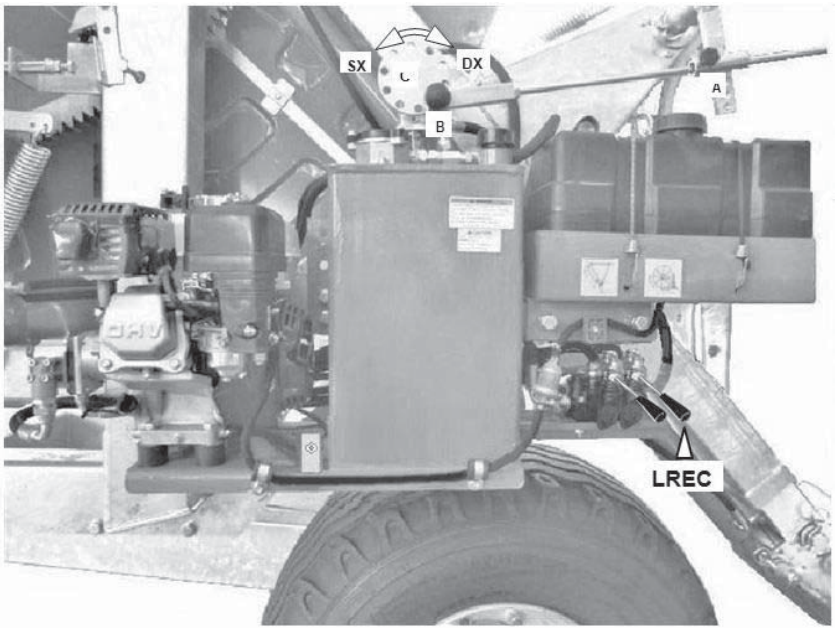
When the machine is equipped with a computer controlled discharge valve, the following steps must be followed:
1) Remove the plug located at the head of the valve discharge fitting.
2) Turn the computer on and press the + key on the keyboard as required by the program that is displayed on the monitor and ensure the solenoid valve has received the impulse to close the valve.
3) Ensure the valve is opened by the impulse received by the solenoid valve when the stroke end stop is simulated either by acting on the corrector or pressing the STOP key on the computer keyboard (see item 5.par. 6.2.2.2).

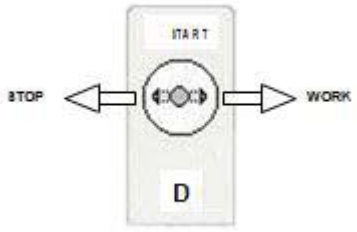
DANGER
When the discharge valve opens, water flows out suddenly and forcefully. Do not stand in the immediate vicinity of the outlet hose.
If the machine is positioned near a road or work place, ensure the water expelled by the discharge valve does not reach persons or transit areas.
To prevent this hazard, a rubber hose must be connected to the discharge valve outlet fitting, so the water flows to the ground without creating any hazardous situations.

6.11 HOSE RETRIEVAL WITH INTERNAL COMBUSTION ENGINE WITHOUT TURBINE

6.11.1 HOSE RETRIEVAL WITH INTERNAL COMBUSTION ENGINE WITHOUT TURBINE WITHOUT COMPUTER

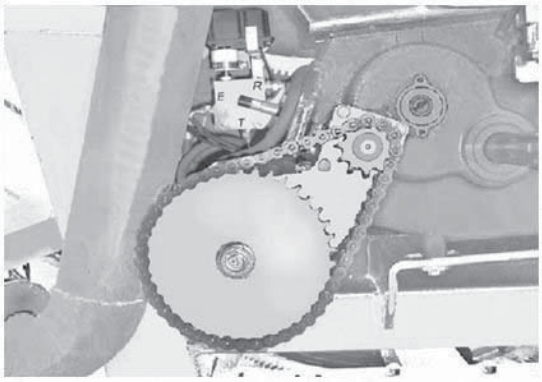
MECHANICAL FLOW METER

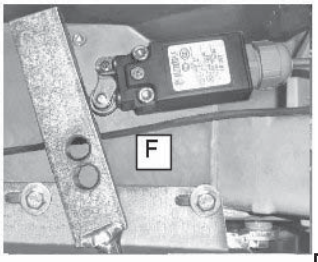




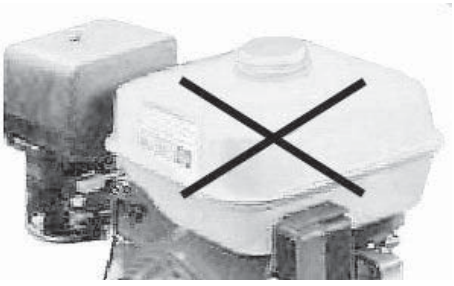
FOR PETROL ENGINE

FOR DIESEL ENGINE





LIMIT MICRO-SWITCH



CAUTION: Never use the tank on the motor

When the machine is equipped with an internal combustion engine (optional feature) without turbine and without computer, act as follows to retrieve the hose:

Note: In this type of application, in addition to the hose retrieval performed by the internal combustion engine, the hydraulic actuation of rear stabilisers is also provided. In fact, two levers are present. It is however possible to integrate it with other OPTIONAL hydraulic functions such as: actuation of the front stabiliser leg and/or rotation of the reel support frame. An extra module with lever is obviously added to the control distributor for each additional hydraulic actuation.

Note: Before starting the definitive hose retrieval, the end of work internal combustion engine turning off needs to be simulated. In order to do so: for

petrol engines, place the switch toggle (D) to START and start the engine. For diesel versions, the engine is started by turning the key (E) to the right to START. Move the lever placed on the gearbox to the WORK position and the machine starts reeling in the hose. After that, place toggle (D) of the switch to WORK or quickly turn the key (E) to the left in WORK.
The latter operation provides the electrical contact to the limit micro-switch. At this stage manually push the lower bar of the corrector to the RELEASE position of the lever on the gearbox, and the flexible rod of the limit switch must have received the enable from the lever to turn off the engine at the same time.
If this is not so, the stroke of the micro-switch ' F ' support bracket must be adjusted..

6.11.1.1 PLACEMENT IN THE FIELD

To move machines equipped with the OPTIONAL internal combustion engine, in addition to following the instructions in this manual the specific engine's manual must also be referred to.

The following sequences for placement in the field must be adhered to, which are the same in paragraph 6-4 from item 1 to item 6 ; the only difference being that to perform oil hydraulic actuations the internal combustion engine must be started, then the following must be applied:
1) Turn off the internal combustion engine when placement is completed
2) Repeat operations starting from item 8 of paragraph 6-4
3) Perform checks as per paragraph 6-5

6.11.1.2 STARTING WORK

The following sequences for starting work must be adhered to:
1) Gradually let water flow in the machine's inlet pipe and wait for the whole system to reach the proper operating pressure. To ensure that, just check the reading of the pressure gauge located on the machine's water inlet
2) Move the lever on the gearbox to one of the selected gears (see ref. 60 par.2.6.1)
3a) For petrol engines, place the switch toggle (D) into START, start the engine with the key or pull start and slide the toggle to WORK
3b) For diesel engines, start the engine by turning the key (E) to the right in START then quickly turn the key left to WORK
4) Move the lever on the gearbox to the WORK position (see ref. 61 par.2.6.1) and operate the lever "LREC" as indicated in par. 6.11.1.
With these last operations the machine starts winding the hose.

CAUTION
If the machine is not equipped with the OPTIONAL pressure switch and water delivery from the pumping station is accidentally interrupted, the machine continues reeling the hose in even with no pressure.

CAUTION
Should the machine be put in neutral either willingly or unwillingly while the hose is being dragged, the reel might violently turn in the opposite direction. It is therefore essential to pay the utmost attention in ensuring no people are near the machine.

6.11.1.3 ADJUSTMENT OF AUTOMATIC SPEED CORRECTION

During irrigation it is recommended to keep the proper hose winding on the reel under control and if necessary repeat the steps set out in paragraph 6.5.

To optimise the hose retrieval speed without changing gears, to perform the following:

1) To decrease, loosen knob (A), release the pin holder knob (B), rotate flange (C) clockwise (RH) by a few holes until the desired speed is reached, then restore the previous connections. (see par.6.11.1).
2) To increase, loosen knob (A), release the pin holder knob (B), rotate flange (C) anti-clockwise (LH) by a few holes until the desired speed is reached, then restore the previous connections. (see par.6.11.1).

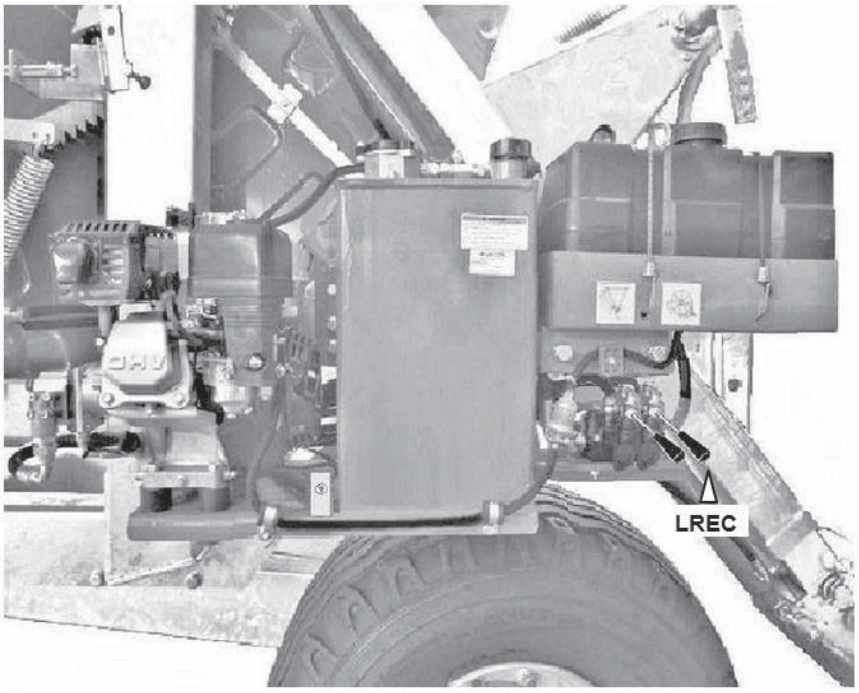
6.11.1.4 QUICK HOSE WINDING

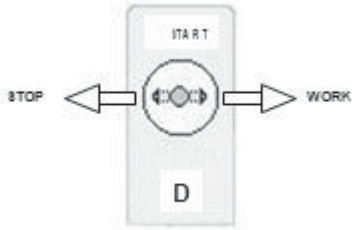
To reel the hose in rapidly, the instructions set out in paragraph 6.6.2 must be followed, the difference being that it is recommended to turn off the internal combustion engine before performing this operation.

6.11.1.5 END OF WORK AND PREPARING TO TOW

To do that properly, the instructions set out in chapter 6.7 must be followed.

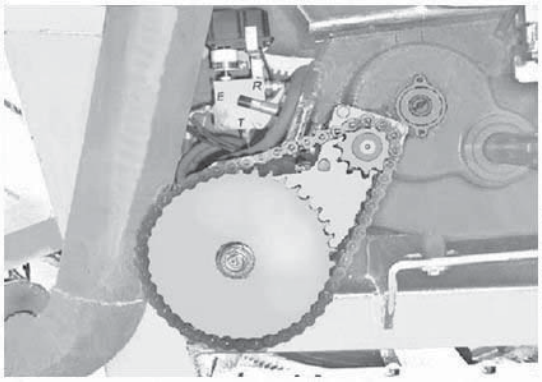
6.11.2 HOSE RETRIEVAL WITH INTERNAL COMBUSTION ENGINE WITHOUT TURBINE WITH COMPUTER

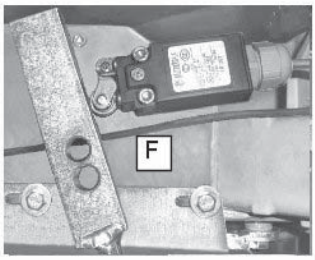




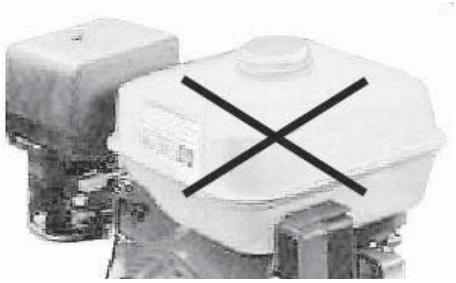
FOR PETROL ENGINE

FOR DIESEL ENGINE





LIMIT MICRO-SWITCH



CAUTION: Never use the tank on the motor

When the machine is equipped with the internal combustion engine (optional feature) without turbine and with a computer, act as follows to retrieve the hose:

Note: In this type of application, in addition to the hose retrieval performed by the internal combustion engine, the hydraulic actuation of rear stabilisers is also provided. In fact, two levers are present. It is however possible to integrate it with other OPTIONAL hydraulic functions such as: actuation of the front stabiliser leg and/or rotation of the reel support frame. An extra module with lever is obviously added to the control distributor for each additional hydraulic actuation.

Note: Before starting the definitive hose retrieval, the end of work internal combustion engine turning off needs to be simulated. In order to do so: for petrol engines, place the switch toggle (D) to START and start the engine. For diesel versions, the engine is started by turning the key (E) to the right to START. Move the lever placed on the gearbox to the WORK position and the machine starts reeling in the hose. After that, place toggle (D) of the switch to WORK or quickly turn the key (E) to the left in WORK.
The latter operation provides the electrical contact to the limit micro-switch. At this stage manually push the lower bar of the corrector to the RELEASE position of the lever on the gearbox, and the flexible rod of the limit switch must have received the enable from the lever to turn off the engine at the same time.
If this is not so, the stroke of the micro-switch ‘ F ‘ support bracket must be adjusted..

6.11.2.1 PLACEMENT IN THE FIELD

To move machines equipped with the OPTIONAL internal combustion engine, in addition to following the instructions in this manual the specific engine's manual must also be referred to.
The following sequences for placement in the field must be adhered to, which are the same in paragraph 6-4 from item 1 to item 6; the only difference being that to perform oil hydraulic actuations the internal combustion engine must be started, then the following must be applied:
1) Turn off the internal combustion engine when placement is completed
2) Repeat operations starting from item 7 of paragraph 6-4
3) Perform checks as per paragraph 6-5.

6.11.2.2 STARTING WORK

The following sequences for starting work must be adhered to:
1) Gradually let water flow in the machine's inlet pipe and wait for the whole system to reach the proper operating pressure. To ensure that, just check the reading of the pressure gauge located on the machine's water inlet
2) Move the lever on the gearbox to one of the selected gears (see ref. 60 par.2.6.1)
3a) For petrol engines, place the switch toggle (D) into START, start the engine with the key or pull start and slide the toggle to WORK
3b) For diesel engines, start the engine by turning the key (E) to the right in START then quickly turn the key left to WORK
4) Move the lever on the gearbox to the WORK position (see ref. 61 par.2.6.1) and operate the lever “LREC” as indicated in par. 6.11.1.

With these last operations the machine starts winding the hose.

CAUTION
If the machine is equipped with the OPTIONAL computer (AQUA SYSTEM) where a pressure switch is not normally provided and water delivery from the pumping station is accidentally interrupted, the machine continues reeling the hose in even with no water.

CAUTION
Should the machine be put in neutral either willingly or unwillingly while the hose is being dragged, the reel might violently turn in the opposite direction. It is therefore essential to pay the utmost attention in ensuring no people are near the machine.

6.11.2.3 ADJUSTMENT OF AUTOMATIC SPEED CORRECTION

During irrigation it is recommended to keep the proper hose winding on the reel under control and if necessary repeat the steps set out in paragraph 6.5.

To optimise the hose retrieval speed without changing gears, act on the parameters set on the computer, and to do so the specific manual must be referred to.

6.11.2.4 QUICK HOSE WINDING

To reel the hose in rapidly, the instructions set out in paragraph 6.6.2 must be followed, the difference being that it is recommended to turn off the internal combustion engine before performing this operation.

6.11.2.5 END OF WORK AND PREPARING TO TOW

To do that properly, the instructions set out in chapter 6.7 must be followed.

6.12 HOSE RETRIEVAL WITH INTERNAL COMBUSTION ENGINE

6.12.1 HOSE RETRIEVAL WITH INTERNAL COMBUSTION ENGINE WITH TURBINE WITHOUT COMPUTER

This type of application entails machine operation in traditional mode with a turbine, or without a turbine but with hose retrieval with engine connected to the PTO, when there is dirt in the liquid to be irrigated which might clog the turbine (e.g. manure). In fact, in the latter case the turbine is isolated by a gate valve (with handwheel to be opened and closed manually) interposed between hose and swivel connector; while the liquid to be conveyed to the raingun passes through a specific inlet placed between gate valve and swivel connection.

Note: The (OPTIONAL) application of the internal combustion engine is as described under paragraph 6.11.1, which however describes actuation by the hydraulic motor flanged on the gearbox of assembly G.

ACTUATIONS AND PLACEMENT IN THE FIELD

For actuations and placement in the field of machines equipped with this OPTIONAL application, the following changes are required to the content of this manual:

- omission of .7 in paragraph 6.4 since it is without computer
- connection to the water inlet may be:

normal when operation is with a turbine, paying attention to ensure the gate valve is open and the inlet between hose and swivel connection is closed with a plug;
or, specific when operation is without a turbine, where however it is essential to close the gate valve and connect the delivery pipe to the inlet between hose and swivel connection.

STARTING WORK

CAUTION
For reasons of safety, before conveying water to the machine it is essential to ascertain that which is set out in par. 4.5.

- If with turbine and without internal combustion engine (see paragraph 6.6)
- If without a turbine but with internal combustion engine the following must be adhered to:

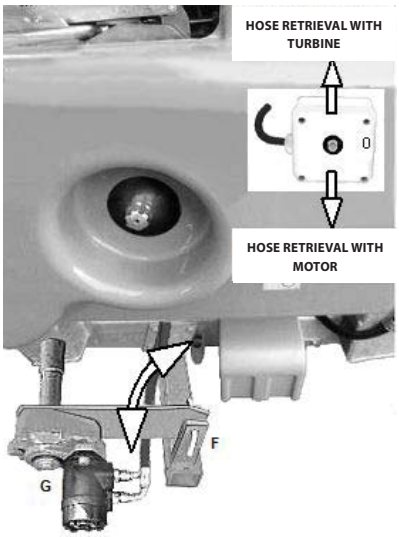
1 Move the lever on the gearbox into the UNWINDING position.
2 Extract pin F. At the same time support and lift assembly G, insert the slotted sleeve in the PTO and replace the support plate of assembly G so that pin F may be inserted.
3 Slowly open the valve upstream of the pipe that conveys water to the machine and wait for the entire system to reach the correct operating pressure.
4 Start the internal combustion engine and with the appropriate hydraulic lever, start the hose retrieval rotation.
5 When the hose is completely reeled in and the internal combustion engine has turned off, it is essential to extract assembly G from the PTO on the machine and place it in the rest condition. To do so perform the previous operations in reverse order.

CAUTION
If water delivery is interrupted by the pumping station, the machine continues reeling the hose in.

6.12.2 HOSE RETRIEVAL WITH INTERNAL COMBUSTION ENGINE WITH TURBINE WITH COMPUTER

This type of application entails machine operation in traditional mode with a turbine, or without a turbine but with hose retrieval with engine connected to the PTO, when there is dirt in the liquid to be irrigated which might clog the turbine (e.g. manure). In fact, in the latter case the turbine is isolated by a gate valve (with handwheel to be opened and closed manually) interposed between hose and swivel connector; while the liquid to be conveyed to the raingun passes through a specific inlet placed between gate valve and swivel connection.

Note: The (OPTIONAL) application of the internal combustion engine is as described under paragraph 6.11.1, which however describes actuation by the hydraulic motor flanged on the gearbox of assembly G.



ACTUATIONS AND PLACEMENT IN THE FIELD

For actuations and placement in the field of machines equipped with this OPTIONAL application, the following changes are required to the content of this manual:

Prior to turning on the computer and starting the hose UNWINDING stage, select on the switch whether hose retrieval takes place with the turbine or with internal combustion engine.
connection to the water inlet may be:
normal when operation is with a turbine, paying attention to ensure the gate valve is open and the inlet between hose and swivel connection is closed with a plug;
or, specific when operation is without a turbine, where however it is essential to close the gate valve and connect the delivery pipe to the inlet between hose and swivel connection.

STARTING WORK

CAUTION
For reasons of safety, before conveying water to the machine it is essential to ascertain that which is set out in par. 4.5.

- If with turbine and without internal combustion engine (see paragraph 6.6)
- If without turbine but with an internal combustion engine the following must be adhered to:

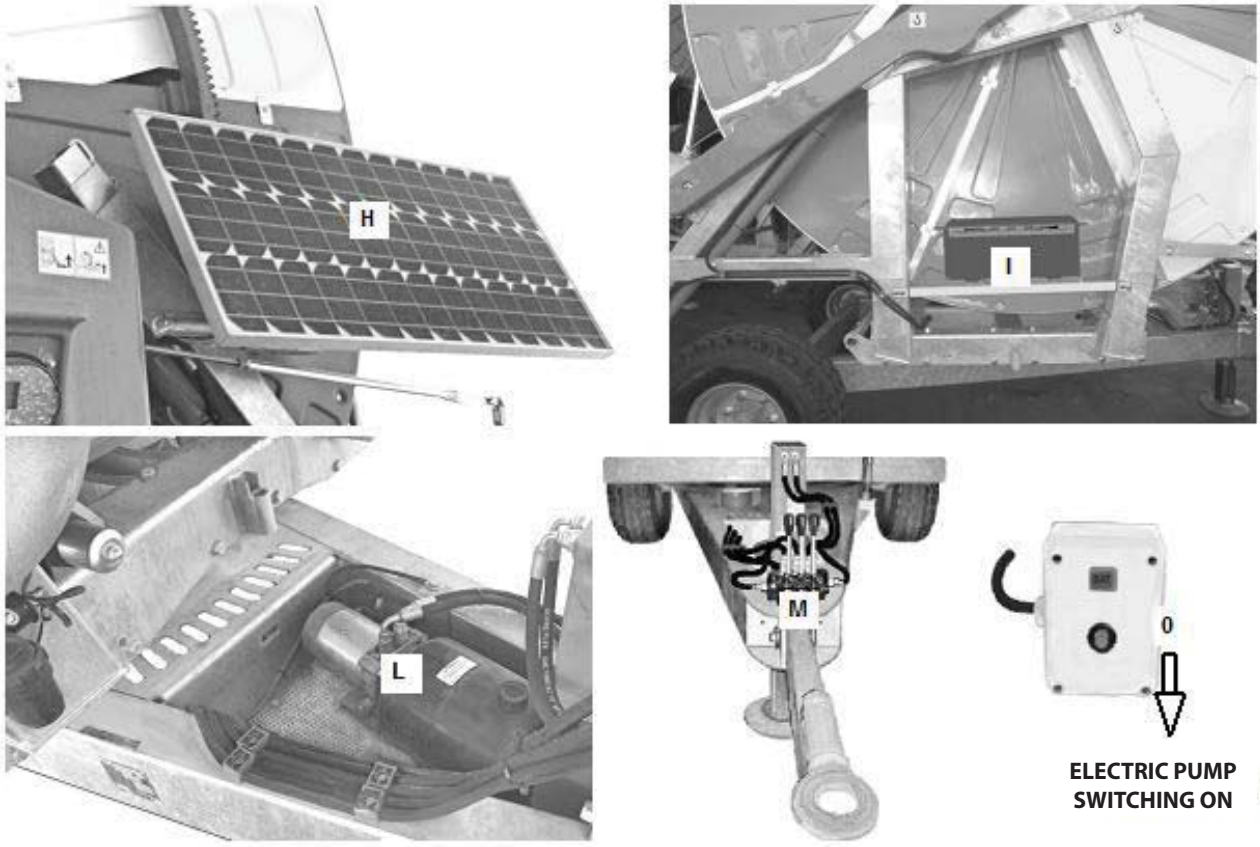
1 Move the lever on the gearbox into the UNWINDING position.
2 Extract pin F. At the same time support and lift assembly G, insert the slotted sleeve in the PTO and replace the support plate of assembly G so that pin F may be inserted.
3 Slowly open the valve upstream of the pipe that conveys water to the machine and wait for the entire system to reach the correct operating pressure.
4 Start the internal combustion engine and with the appropriate hydraulic lever, start the hose retrieval rotation.
5 When the hose is completely reeled in and the internal combustion engine has turned off, it is essential to extract assembly G from the PTO on the machine and place it in the rest condition. To do so perform the previous operations in reverse order.

CAUTION
If water delivery is interrupted by the pumping station, the machine continues reeling the hose in.

6.13 INDEPENDENT HYDRAULIC ACTUATIONS WITH INTERNAL COMBUSTION ENGINE

Independent hydraulic actuations with internal combustion engine are options integrated in the applications described in paragraphs 6.11.1 and 6.11.2 under NOTE.

6.14 INDEPENDENT HYDRAULIC ACTUATIONS WITH PHOTOVOLTAIC PANEL



When the machine is equipped with this OPTIONAL application the following must be adhered to

- Select switching on of ELECTRIC PUMP " L " on switch " O "
- Act on levers " M " normally located on the traveller near the drawbar, to perform the following operations: lifting and lowering the front stabiliser leg, anchoring or lifting the rear stabilisers and reel rotation on the vertical axis.

CAUTION: ACTUATION OF LEVERS FOR HYDRAULIC CONTROLS
Hydraulic actuator levers must be operated one at a time.
It is forbidden to control more than one hydraulic actuator at the same time.

Winter storage requires disconnecting the battery and storing it in an appropriate and safe place.
To this end refer to the provisions of chapter 4 "SAFETY".

MAINTENANCE CH. 7

7 MAINTENANCE

7.1 GENERAL INFORMATION

This chapter, dedicated to maintenance technicians and those of the Manufacturer's TECHNICAL SUPPORT CENTRES (hereinafter referred to as T.S.C.), describes maintenance operations to be performed on the machine.
Maintenance operations described below have the purpose of keeping the machine efficient and in good working order, with the aim of preventing any faults or breakdowns.

The term maintenance includes activities for:

Preventative or routine maintenance
- the whole set of operations carried out at predetermined intervals or according to prescribed criteria and intended to reduce the likelihood of failure or degradation of a machine's performance; preventive maintenance includes operations of inspection, check, adjustment, cleaning and lubrication.

Specialist or extraordinary maintenance
- Specialist maintenance refers to the whole set of operations carried out at predetermined intervals or following faults and breakdowns aimed at restoring machine operation. Specialist maintenance includes operations of overhaul, repair, restoring nominal operating conditions or replacement of a faulty, worn or defective assembly

NOTE
Preventative and specialist maintenance operations may be carried out according to the instructions set out on the sheets, by the user or by the Manufacturer's Technical Support Centres (T.S.C.)
Owing to their complexity, some specialist maintenance operations have been intentionally omitted from the manual and are to be exclusively carried out by the T.S.C., which have the technical knowledge, documentation and equipment required to perform the activities.

Directive 2006/42/EC (Machinery Directive) defines **Operator as the "Person qualified to install, operate, adjust, clean and perform maintenance on the machine".**
The definitions of professional profiles set out by the Manufacturer and listed in chapter 1 are valid and must be adhered to in the various operations performed on the machine.

7.1.1 PROFESSIONAL PROFILES AND MANDATORY PPE

Below is a list of professional profiles and related PPE required for the installation stage.

Personal protection equipment set out in paragraph 1.9.

NOTE
The frequency of performing repairs must be:
A) According to the wear condition:
A repair is performed after assessing the outcome of a preliminary overhaul, in order to prevent the assembly in question from being damaged.
B) Following a fault or deterioration:
an overhaul, during which the fault or deterioration is ascertained, precedes the repair.

The repair must be performed after assessing the outcome of the overhaul.

It should be remembered that correctly performed maintenance operations may reduce downtimes due to a fault to the minimum as well as extend the machine's service life and its performance, reducing inconveniences and operating costs.

A repair performed in due time avoids further deterioration.

Use original spare parts and carefully repair faulty components to restore them to their nominal state.

Use original spare parts and carefully perform the indicated maintenance operations. In the event of a fault or malfunction, contact the Manufacturer who will intervene on demand with their own skilled personnel (contact information in chapter 1 "GENERAL INFORMATION").

NOTE
The Manufacturer shall not be liable for faults or malfunctions during the machine's warranty period if there have been maintenance deficiencies, lack of lubrication, replacements of machine parts either non original or not authorised by the Manufacturer and use of the machine in a manner other than specified in this instruction manual.

Any spare parts must be original (under pain of forfeiting the warranty).
Non original spare parts may affect proper operation of the machine and limit its service life and/or performance.

7.2 PERSONNEL IN CHARGE OF MAINTENANCE

Specifically, the maintenance operator must:

- Have knowledge of the directives in force in the country of use relating to the prevention of accidents during work carried out on machines, and be able to apply them.
- This Instruction and warning manual and the documentation listed in chapter 9 have been read and understood in their entirety.
- Be able to correctly use and reference the technical design documentation, including machine diagrams, components manuals, bills of materials, mechanical drawings, fluid power schematics, etc.
- Perform the operations under their responsibility (Mechanics, Oil Hydraulics, etc.) for which they are authorised to intervene.
- Be able to use the most appropriate troubleshooting instrumentation and know the most suitable equipment for maintenance operations.

CAUTION
Only duly instructed personnel may perform maintenance, adjustment and set-up operations.

CAUTION
Setting the machine in work conditions with disabled protection devices requires adequate skills and knowledge and the utmost attention by the maintenance technician. It is generally forbidden unless required by special conditions which cannot be avoided. In this case the utmost attention must be paid.

CAUTION
Should a malfunction or fault be detected during normal operation on assemblies or equipment, you are required to stop the machine and immediately alert the maintenance personnel and/or support centre.

7.3 GENERAL SAFETY PRECAUTIONS

The personnel in charge of machine maintenance must be well trained and have thorough knowledge of accident protection rules. Unauthorised personnel must remain outside the maintenance/work area during operations.
The safety precautions set out in this paragraph must always be strictly complied with during machine maintenance, in order to avoid injuries to personnel and damage to the equipment.
The personnel using the machine and especially those in charge of its maintenance must be aware of the risks arising from the use of hose reel travelling rainguns.

7.3.1 DANGER NOTES

Below is a series of danger notes to be taken into account during maintenance operations.
They indicate a danger with even fatal injury hazard for the person.

DANGER
In the event it should be required to disable guards and safety devices in order to carry out certain maintenance operations, remember that:
In such an event the operating personnel are exposed to dangerous conditions, hence the following rules must be strictly adhered to:
The personnel in charge of performing maintenance activities must be authorised and suitably trained on safety and operational procedures to be followed, on dangerous situations that may arise and the correct methods to prevent them and the provisions in force at the site of installation of the country where the machine is installed and used.
During these operations, the personnel must in any event work by paying the utmost attention and operate with the utmost caution.

DANGER
Prior to performing inspections for any maintenance operations and/or carry out maintenance as described in this manual, maximum static stability should be assured to the machine by placing it on a flat and appropriately firm surface able to withstand its weight; this in order to avoid sudden movements and/or overturning, which may create a hazardous situation to any maintenance operator. Prior to performing maintenance operations that are not set out and described in this manual, it is essential to contact the Manufacturer's support service.

- Affix specific warning signs such as: EQUIPMENT UNDER MAINTENANCE - DO NOT POWER ON, WORK IN PROGRESS - DO NOT OPERATE or DO NOT START (see picture below) at the access areas to the machine and any part of it where the maintenance operation is carried out, ensuring these signs are clearly visible.

DANGER
Prior to starting maintenance operations affix the signs indicating machine status under maintenance in order to ensure that:
- **The machine is stationary and safely placed in order not to cause shifting and/or accidental and sudden actuations.**
- **There is no pressure in the piping delivering water to the machine.**
- **The hydraulic circuits are locked or de-pressurised if the operations concern them**
- **The turbo-gearbox is in neutral**
- **The traveller wheels are blocked**
- **The internal combustion engine is off and cold (if the machine is equipped with it).**

Should any other person start the machine or operate the controls during maintenance or lubrication, serious hazards might be created of injury or death for the maintenance technician.
Always place the WARNING PLATES: on the controls of the turbo-gearbox, on the levers of hydraulic actuators, on the water delivery pump and on the internal combustion engine, to warn others of the machine downtime for maintenance in progress and not to actuate anything that might endanger the maintenance technician. If necessary, attach other identical warning plates around the machine.

- Voltage may cause death by contact. Always operate with the utmost caution and according to accident protection rules in force.
- Contact with toxic or harmful products may cause damage to persons and the environment. Always operate with the utmost caution, according to the information set out in the safety data sheets of the products and to the safety standard in force.
- Operating machines feature moving parts that may cause severe injury to people. In this connection, maintenance operations related to checks, disassembly or replacement of machine components or on the control unit must be performed with machine off and power supplies disconnected and locked.
- Prior to performing maintenance operations on components, ensure the fluid systems are not pressurised. Prior to operating, maintenance personnel must ensure fluid power supplies are disconnected and pressurised systems have been drained. To this end, prior to operating on pressurised components, the internal pressure of the machine undergoing the operation must be reduced to the same value as ambient pressure.
- Prior to performing maintenance operations on hot parts, ensure they have cooled down. Caution - burn hazard. Use suitable PPE.

DANGER
Prior to starting maintenance operations or removal of jammed machine parts, disconnect and padlock/lock all power sources and discharge all fluid power systems.

- Keep away from holes, nozzles and/or bleed cocks during operations to discharge circuit pressure.
- Keep away from any component that might be actuated by the oil hydraulic pressure, if this has not been completely discharged from the circuit.
- Ensure all fittings and couplings are properly tightened, prior to pressurising the machine after a repair operation.
- Ensure units with vertical actuation are placed in the low rest position, or alternatively supported with adequate lifting systems, in order to prevent accidental motions or drops, especially when the actuators or devices that move them need to be replaced.
- Prior to performing maintenance operations on movable parts, ensure the shutters are correctly inserted.

DANGER
Prior to starting maintenance operations secure vertical units with movement or drop hazard (if any).

- Never bypass the safety and protection devices installed on the machine. Should this be required, signal the condition with suitable warning signs and operate with the utmost caution. Restore all safety and protection devices as soon as possible.
- Failure to connect the equipment and the structures in general to the ground may cause severe injury to people. Always ensure the grounding connections are in place and compliant with the standards.
- Prior to starting up the machine following a maintenance operation, always ensure that the maintenance personnel are at a safe distance and that tools or materials used for maintenance have been removed form the machine and from its immediate vicinity.
- Installation and use of the equipment must always comply with accident prevention standards. All moving parts and transmission parts must be protected against accidental contact. Always ensure all guards are in place, correctly positioned and closed before starting up the equipment.
- Prolonged overloads or faults may cause overheating of the equipment with production of harmful fumes; immediately disconnect the power supply and do not approach the equipment until the fumes have been dispersed through adequate ventilation and the equipment has cooled down. Avoid inhaling the lingering fumes during repair operations.
- Do not use water jets in the event of fire, especially on electrical equipment: immediately disconnect all power supplies and use CO_2 extinguishers. Alert the site's fire fighting service or the Fire Services.
- During maintenance operations use appropriate clothing and personal protection equipment (shoes, face shields and safety gloves, etc. in compliance with the provisions of chapter 4), according to the type of activity to be performed. When operating on higher parts, use safety fall arrest equipment.
- It is forbidden to wear personal clothing and items such as chains, bracelets, etc. as they might get entangled in the machine and in the equipment, act as conductors and cause entrainment.

DANGER
The personnel must wear all the required personal protection equipment to prevent accidents.

DANGER
Repair and maintenance operations on components in contact with the products must be performed by skilled and trained personnel equipped with PPE and familiar with the MSDS (material safety data sheet).

- Ensure maintenance tools are suitable for the use and in perfect conditions, and fitted with insulating grips. Ensure the insulation of cables and wires of the test equipment do not show any signs of breakage or damage.
- Tighten all screws and nuts with the proper tightening torques. Incorrect tightening may cause malfunctions and hazard situations.
- Troubleshooting activities must be performed as much as possible remaining outside the protected space. Should it be required, during the troubleshooting activity, to perform operations with powered control unit and machine, all the precautions required by safety standards must be taken.
- Upon completing the maintenance and troubleshooting activity, the disabled safety devices must be restored (panels, casings, guards, limit switches, interlocks, etc.).
- The maintenance, repair and troubleshooting activity must end by checking correct operation of the machine and all its safety devices.

DANGER
Before restarting the machine, the utmost attention must be paid and make sure that no personnel are still operating inside the working area of the machine, indicated by danger signs.

DANGER
Before restarting the machine, check the entire system again in accordance with the start up procedures, in compliance with the safety standards in force in the country of use of the machine.

7.3.2 WARNING NOTES

Below is a series of general warning notes to be taken into account during maintenance operations.
They represent an alert to possible deterioration or damage to the machine, equipment or other personal property belonging to the user.

- Maximum machine reliability and minimum maintenance costs are the outcome of a scheduled maintenance program strictly followed throughout the entire service life of the machine. Strictly comply with the established maintenance intervals.
- Ensure machine parts are correctly lubricated. Insufficient or faulty lubrication may cause damage and malfunctions.
- Prior to starting check and maintenance operations it is recommended to remove processing residues and dirt in general from the machine by cleaning with water or air.
- In the event of using compressed air, be especially aware of liquid sprays or flying dry materials and always use protective goggles and masks.
- During disassembly, mark individual parts with an identification plate, to ensure they are correctly reassembled later. After every maintenance operation involving disconnecting wiring and/or fixed and movable parts, check the consistency of the number/plate on fixed part and movable part.
- When using the megohmmeter to check insulation of equipment, ensure all electronic control equipment (if any) is disconnected, to avoid damaging components.
- Always use perfectly dry air during cleaning operations and with pressure not exceeding **0.2 MPa (2 bar / 29 psi)**.
- Always use tools in perfect repair conditions and especially designed for the operation to be performed. Using unsuitable and inefficient equipment may cause severe damage.
- Perform repair operations in clean settings and as free from dust as possible. Protect all connection openings with plastic caps and carefully cover all the machined surfaces of the disassembled parts (with a thin layer of oil, etc.) until they are fitted back on the machine. Requirement to be complied with especially in the case of maintenance to the internal combustion engine, compressor, turbine, etc.
- Replace all machine parts with original spare parts.

7.4 RECOMMENDATIONS CONCERNING MAINTENANCE

7.4.1 OPERATIONS CONNECTED WITH EXTENDED DOWNTIMES

Should it be required to stop machine operation for a long period of time, the maintenance technician must pre-emptively prepare it, complying with the following procedure:

- Clean the machine from processing material residues or dirt.
- Thoroughly clean the machine and use specific rags and products.
- Spread machined parts and moving parts with specific oil.
- Clean and dry all the remaining surfaces of the machine.
- Periodically operate the machine for short periods and check for any operation issues prior to switching on.
- The machine must be stored in a covered area. In the event of prolonged storage, cover all moving parts to protect them from the dust.

For additional information refer to the manuals of the individual parts the machine consists of (chapter 9).

7.4.2 MACHINE CHECK PROCEDURE WITH MOTOR OFF.

Place the machine on a flat surface and ensure there can be no accidental shifting.
Engage the parking brake and insert stop wedges on the wheels of the machine.
Open the motor compartment and ensure that there are no leaks either on the motor or hydraulic connections and that all parts are in good working order.
Below are the instructions for checking the various parts of the machine to be done only and exclusively with motor off.

7.4.2.1 HYDRAULIC SYSTEM OIL

At the operating temperature the hydraulic oil is HOT.
Avoid contact with the skin and/or parts of the body.
Pay attention not to let any dirt enter the system while checking the oil level or while replacing the filter.
Never operate the hydraulic pump without oil in the hydraulic circuit.
Dry operation of the hydraulic pump without oil will irreparably damage the pump.
The hydraulic oil level must be checked when the oil is at operating temperature, and the machine is stationary with the motor off.
Only top up with suitable oil to the level mark.
If too much hydraulic oil is added, it will seep out of the vent during operation.
The oil level indicated by the dipstick is more precise when the oil temperature is between 50°C / 122°F and 90°C / 194°F.

We would like to remind you of the requirement to comply with applicable laws on the disposal of mineral oils.

7.4.2.2 PIPING

Periodically replace the following important components for fire prevention.
Supply system: fuel delivery and return pipes.
Hydraulic system: main delivery pipes of the hydraulic pump and connecting piping to the hydraulic motors.
Even if they appear to be in good condition, these components must be replaced periodically with new piping. Over time, in fact, these components tend to deteriorate.
Should one of these parts turn out to be faulty, replace it immediately.
Do not forget that working circuits are always pressurised; that is why, when hydraulic oil needs to be added or drained, maintenance or inspection of the hydraulic circuit should only be carried out after discharging the residual pressure.
Small leaks from pressurised pipes and the sprays from them are highly dangerous and harmful since they may damage the skin and enter the bloodstream or hit your eyes in the event of contact.
That is why appropriate gloves and goggles should always be worn during inspections.
Should you be hit by a jet of high pressure oil or even slightly injured, immediately seek medical attention for a dressing and suitable treatment

Precautions when performing maintenance with high temperatures and high pressure

When the machine is stopped at the end of work, motor cooling liquid, oil and all parts are hot and the hydraulic circuits are pressurised.
If the cooling liquid, hydraulic oil and motor oil need to be drained to be replaced or for the filters to be replaced, the conditions are more hazardous, including severe burn hazard.
Perform the maintenance and procedures set out in the maintenance section of this manual, only when the temperatures fall back within normal parameters (30-35°C / 86-95°F).

Handling high pressure pipes

Do not bend or rub high pressure pipes with abrasive or sharp objects.
Do not use bent or cracked pipes or hoses that have already been scrapped due to leaks or fastening defects as they might burst during use.
Always repair or replace any loosened or defective fuel or oil pipe. Any fuel or oil leak may cause a fire.

7.4.2.3 FUEL SUPPLY SYSTEM

It is strictly forbidden to use naked flames to check the fuel level or check for any leaks in the system.
All fuels are highly flammable and may burn or cause an explosion.
Should a fuel leak be detected contact the Manufacturer for information on how to proceed.
Do not forget that fuel containers, even when empty, may cause explosion hazard due to fuel vapours.
Never operate the machine until the repair has been properly performed.
Check the fuel supply system to ensure there are no leaks.
To perform refuelling, the engine needs to be turned off and the key must be turned to “OFF”.
Upon completing refuelling, ensure that there have been no leaks or spills before closing the tank cap well and restarting the engine.
In the event of spills dry and clean up any traces of fuel.
Refuelling must be exclusively carried out in areas specifically intended for the purpose and fitted with the safety features (fire systems, etc.) set forth by the regulations in force in the country of use of the machine.
The engine must not be restarted until the fuel dispenser has been removed, the fuel cap/s has/have been replaced and any spilled fuel has been mopped up.
Ensure the right fuel is dispensed for the type of engine

7.4.2.4 BATTERY CHECK

The acid in the electrolyte may cause injuries.
In the event of contact with the electrolyte wash with plenty of water and clean the area.
Use a baking soda solution to neutralise the acid.
Acid in your eyes must be immediately rinsed with water.
It is a mandatory requirement to always wear safety goggles and gloves when working on the battery.
Do not forget that batteries generate explosive vapours.
Keep the cover vents clean.
Avoid the presence of naked flames, sparks or electric arcs in the areas intended for recharging the battery.
Never perform any cleaning, lubrication or maintenance operation with the battery connected. The upper surface of the elements must be kept dry and the battery terminals must be kept clean.
With the exception of maintenance-free batteries, for all other ones the electrolyte level must be checked and distilled water added if necessary.
Keep the electrolyte level above the plates and separators.

When repairing the electrical system, disconnect the battery to interrupt the current flow.
First disconnect the negative ground wire (-) then the positive wire (+).
Upon completing the maintenance activity first connect the positive wire (+) then the negative one (-).
If electrical welds need to be performed on the machine, the accumulator needs to be disconnected.

CAUTION
Periodically check the charge and electrolyte liquid level and if necessary perform recharge and/or topping up.
At the end of the season detach the battery, store it in a dry place and out of the reach of children.
If the battery is left inactive for a long period of time it discharges, and is irreparably damaged.

7.4.2.5 TYRES

Remember that the tyres and wheels of the machine are important parts for the safety of the vehicle and persons and require by the user proper use and periodic checks as well as constant maintenance.
During tyre fitting and removal operations certain safety precautions need to be adhered to in order to prevent possible errors and carelessness which may cause serious injuries.
For reasons of safety and functionality it is not allowed to use wheels or fastening elements other than those intended by the machine Manufacturer.
The fastening screws and nuts do not require to be lubricated, not even to make fitting and removal easier
Consistent wheels and tyres must be used on the machine and on the same axle: by the same supplier and with the same pattern.

CAUTION
The air pressure in the tyres may cause parts of them to burst.
The explosion of tyre parts may cause serious injury.

Check integrity of tyres and remove any foreign matter from the tread.
Check for any deformation or damage to the wheels.
Check whether there are any loosened or missing parts.
For trolleys with tyres, keep the tyres at the correct pressure set out in the technical specifications table in chapter 2.
Air pressure must be adjusted with warm tyres.
When adjusting the pressure of a tyre, remember to check all the other tyres on the same axle in order to have the same pressure on all wheels.
The air pressure of warm tyres must always be the same as or greater than the specified one for cold tyres.

Inflation must be performed within a sturdy safety cage which is able to provide protection in the event the tyre should fail.
During inflation stay beside the tyre and never in front of it:
"Explosion hazard"
Always stand to the side of the tyre to correct tyre pressure.
Always restore inflation pressure.

Completely deflate the tyre before starting to remove the wheel.
Ensure the wheel nuts are tight.
Adhere to the instructions set out in the maintenance program to achieve consistent and effective locking of the nuts.
After fitting the wheels, check the condition of all the nuts of the wheel after 3-4 hours of operation.
Tighten the nuts crosswise with the required torque or according to the order set out in the relevant paragraph. When the nuts remain tightened for ten hours, the interval to check the torque may be extended to 200 hours.

Removal of the wheels

The wheels may only be replaced by qualified and authorised technical personnel.

- Handle all parts with the utmost care.
- Do not place your hands, fingers and limbs between parts.
- Wear safety clothing and approved PPE such as goggles, gloves and safety shoes.
- Ensure the tyre is completely deflated before starting removal.
- Place the machine on a flat surface and block it with the parking brake;
- Place wedges under the wheels that remain in contact with the ground

Before proceeding with any subsequent operation, completely deflate the tyre, also removing the middle body of the valve for more complete and safer air removal.
With the wheel to be replaced still in contact with the ground, partially loosen its fixing screws or nuts.
Then lift the machine until the wheel is sufficiently detached from the ground and secure the trolley by placing it on adequate and stable supports.
Proceed with full removal of the wheel's screws or nuts and extract it from the hub.

7.4.2.6 WHEEL RIMS

Fitting the rims

Upon fitting check integrity and conformity of the components used:

- Do not use or repair damaged or warped wheels
- Do not repair rims or discs by welding
- Replace faulty elements with others of the same type, profile and size.
- Clean all coupling surfaces and protect them from rust.
- Use a rubber mallet to assemble the parts.
- Spread a solution of soap in water or specific grease for tyre fitting on the rim groove and on the base of the tyre.
- Never use petroleum based lubricants or antifreeze.
- Ensure the rim is of suitable size for the wheel.
- Lubricate the parts of the wheel in contact with the heel and the inner tube.

Removing rims from the wheels

Prior to starting disassembly of a wheel of the vehicle, ensure the tyre is completely removed and ensure the tyre casing and/or rim are not damaged.

- Remove the nuts fastening the two parts of the rim.
- Loosen the heel of the tyre from the side flange.
- Remove the rim from the wheel.
- Remove the inner tube.

7.4.2.7 SCREW TIGHTENING TORQUES

During maintenance procedures it is often required to tighten steel screws of varying types and sizes with a torque wrench.
The following tables show the maximum tightening torque to be used according to the resistance of the material and screw size.

TIGHTENING TORQUES FOR STEEL SCREWS WITH ISO THREAD

Maximum tightening torques for metric screws with friction coefficient 0.14											
Ø SCREW	**HEXAGON**	new	►	**6.8**		**8.8**		**10.9**		**12.9**	
		old	►	6S		8G		10K		12K	
ø screw	hexagon	Pitch		Pitch		Pitch		Pitch		Pitch	
		coarse	fine	coarse	fine	coarse	fine	coarse	fine	coarse	fine
	mm	mm	mm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm
M6	10	1	-	7.8	-	10	-	15	-	18	-
M8	13	1.25	1	19	20	25	27	35	38	42	46
M10	17	1.5	1.25	37	39	50	53	70	74	84	89
M12	19	1.75	1.5	36	67	85	89	119	125	143	150
M14	22	2	1.5	101	111	135	148	190	208	228	250
M16	24	2	1.5	159	170	212	226	298	318	357	382
M18	27	2.5	2	218	233	290	310	402	436	490	523
M20	30	2.5	2	310	327	413	436	580	614	697	736
M22	34	2.5	2	426	448	568	597	798	840	958	1008
M24	36	3	2	535	586	714	781	1004	1098	1204	1317
M27	41	3	2	788	855	1050	1139	1477	1602	1772	1923
M30	46	4	2	1072	1193	1429	1590	2009	2236	2411	2648
M33	50	3.5	2	1456	1602	1941	2136	2729	3004	3275	3605
M36	55	4	3	1873	1989	2497	2652	3511	3730	4213	4476
M39	60	4	3	2431	2573	3242	3430	4559	4824	5471	5789

- The torque settings shown in the table correspond to 80% of the yield point
- For self-locking nuts or ring nuts the torque setting shall be increased by 15% .
- The settings shown are indicative

7.5 DESCRIPTION OF THE MAINTENANCE PLAN

The following maintenance plan consists of a compendium of all described maintenance operations arranged as follows:

- CLEANING OPERATIONS set out in paragraph 7.6 consisting of a set of suggestions and general measures to maintain order and cleanliness in the area involved by machine activities.
- LUBRICATION PLAN set out in paragraph 7.7 consisting of a set of suggestions and general measures to maintain efficiency of the movable elements the machine consist of.
- MAINTENANCE PLAN set out in paragraph 7.8 consisting of a set of PREVENTATIVE MAINTENANCE and DISASSEMBLY INSTRUCTIONS that contain the maintenance operations to be performed on the various assemblies in the machine.

NOTE
WITH REGARDS TO MAINTENANCE OPERATIONS TO BE PERFORMED ON MACHINE PARTS/TRADE COMPONENTS FITTED ON THE MACHINE, PLEASE REFER TO THE RELEVANT INSTRUCTIONS MANUALS LISTED IN CHAPTER 9 AND ATTACHED HEREIN.

NOTE
WITH REGARDS TO MAINTENANCE OPERATIONS TO BE PERFORMED ON THE "INTERNAL COMBUSTION ENGINE" PLEASE REFER TO THE RELEVANT MANUAL.

- SPARE PARTS CATALOGUE. The maintenance plan is complemented by the SPARE PARTS CATALOGUE, attached to this manual. The customer must always purchase original parts. In the requests, always specify the model and serial number of the machine the part refers to and complete details of the part set out in the SPARE PARTS CATALOGUE.

7.6 CLEANING OPERATIONS

The machine must be cleaned at regular intervals, following the frequency set out in the maintenance plan.
Below is a series of general notes and instructions to be taken into account during cleaning operations.

- If during cleaning operations caked dirt is found, difficult to remove with a dry cloth or brush, use a suitable cleaning liquid that does not have any harmful effects on seals, rubber parts and paint, is not toxic, not flammable and whose use is permitted.
- Do not spray the cleaning liquid by pressurised cylinders, since its volatility does not allow it to perform its cleaning action properly and may produce vapours in the workplace. Rather use well moistened soft cloths to achieve a better effect.
- Avoid prolonged contact with cleaning liquids and inhaling their vapours. Avoid using them near naked flames or heat sources, assure adequate ventilation in the site of utilisation.
- Besides using the usual caution, during cleaning operations the operator must be provided with appropriate personal protection equipment such as mask, coveralls, goggles, gloves and shoes depending on the job to be performed.
- The machine must be cleaned with care, especially on unpainted guides and sliding parts. Upon completing operations on these machined unpainted parts, a thin layer of oil must be spread to protect from corrosive agents.
- Cleaning all machine surfaces (including the polyethylene hose) is important since it reduces friction and useless additional weight, with the advantage of allowing the operator or whoever is performing the operation to immediately check all machine parts, especially oil level sight gauges.

NOTE
The machine must be cleaned at regular intervals according to the use and operating setting.

DANGER
Prior to starting any cleaning operation on the machine, disconnect and padlock/lock all power sources and secure the movable units it consists of.
Affix the sign "machine undergoing maintenance - do not power on".
Cleaning operators are forbidden from removing guards and protection devices fitted on the machine.
Wait for hot parts to cool down.

CAUTION
The parts the machine consists of must be cleaned with extreme care from dust or other substances. It is recommended to use cleaning liquids that have good grease solvent properties yet do not have harmful effects on the rubber seals.
During these operations the personnel in charge must be equipped with adequate protection clothing (mask, gloves, shoes, overalls and goggles) and use lint-free cloths and rags.

CAUTION
To clean delicate mechanisms, alignments and lubricating mechanisms, only dry and soft cloths must be used that do not leave lint, or soft bristle brushes.

NOTE
With regards to the use of cleaning liquids, the types and limitations for use dictated by the relevant regulations in force in the country of use of the machine must be complied with.

DANGER
It is forbidden to use cleaning liquids which are not allowed in the country of use of the machine and compressed air with pressure exceeding 0.2 MPa for cleaning operations.
Avoid prolonged personnel exposure to the vapours of cleaning liquids, assuring proper ventilation of the premises.
Failure to comply with these precautionary measures may cause harm to personnel.

7.7 LUBRICATION PLAN

The importance of adequate lubrication on the machine is easily understood. The correct use of appropriate lubricants significantly contributes to achieving maximum performance of the machine and to decrease faults.
While handling lubricants, adhere to the following preventive health protection measures:

- Only use the amount of lubricant required to lubricate the mechanism concerned. Dry any excess oil, grease or graphite with a lint-free cloth,
- Excess lubricant, just as its lack, may sometimes be prejudicial to the proper operation of the machine.
- Only the recommended lubricants or greases must be used, or lubricants or greases with equivalent features and tried and tested quality.
- Avoid prolonged, excessive or repeated contact of the skin with lubrication products and inhaling their vapours.
- Protect the skin by wearing appropriate clothes and protection equipment (e.g. protection overalls, goggles and gloves) or by applying a protective product.
- In the event of contact with the skin wash with plenty of water and soap or specific products.

DANGER
Lubricants are flammable products. Comply with the instructions supplied by the labels placed on the containers.

During disposal operations of waste lubricants, comply with the following environmental protection rules:

- Lubricants may contaminate water and soil. Therefore, never release lubricants on the ground, in water, in sewers. Every infringement to these rules may be prosecuted according to law. When using lubricants keep an oil binder at hand
- Carefully recover waste lubricants, separating mineral based products from synthetic based ones. Upon disposal comply with applicable regulations on waste oil disposal.

The lubricants used must have good emulsion stability and be inalterable to ageing. They must not damage the material which scraper rings, joints, rubber/plastic parts and paint of the machine are ib contact with.
Continue using the lubricants used upon first use or filling up. Where this is not be possible, only use conforming products set out in the oil compatibility charts provided by the various manufacturers. Only using suitable grades of lubricants assures safe operation of the machine.

CAUTION
It is forbidden to mix lubricants of different grades, since their composition and the additives they contain do not have the same features. This rule must be especially applied to mixes of synthetic and mineral lubricants.

For any lubricating oil topping up, it is essential to use the same product by type and brand. As an alternative, if these have exceeded 50% of their service life it is recommended to completely replace them, only by doing so can the brand be changed, albeit keeping to the same technical specifications called for by the Manufacturer.
Should you intend to use other lubricants than those set out, you must pre-emptively check whether the two products are compatible.
In the event of doubt the lubricant used up until then must be completely removed through a washing procedure of the entire circuit.

CAUTION
To prevent the contamination hazard, the lubrication procedures must be carried out paying attention to assuring absolute cleanliness.

7.7.1 RECOMMENDED LUBRICANTS: OILS AND GREASES

The machine has been designed with a view to reducing lubrication operations.

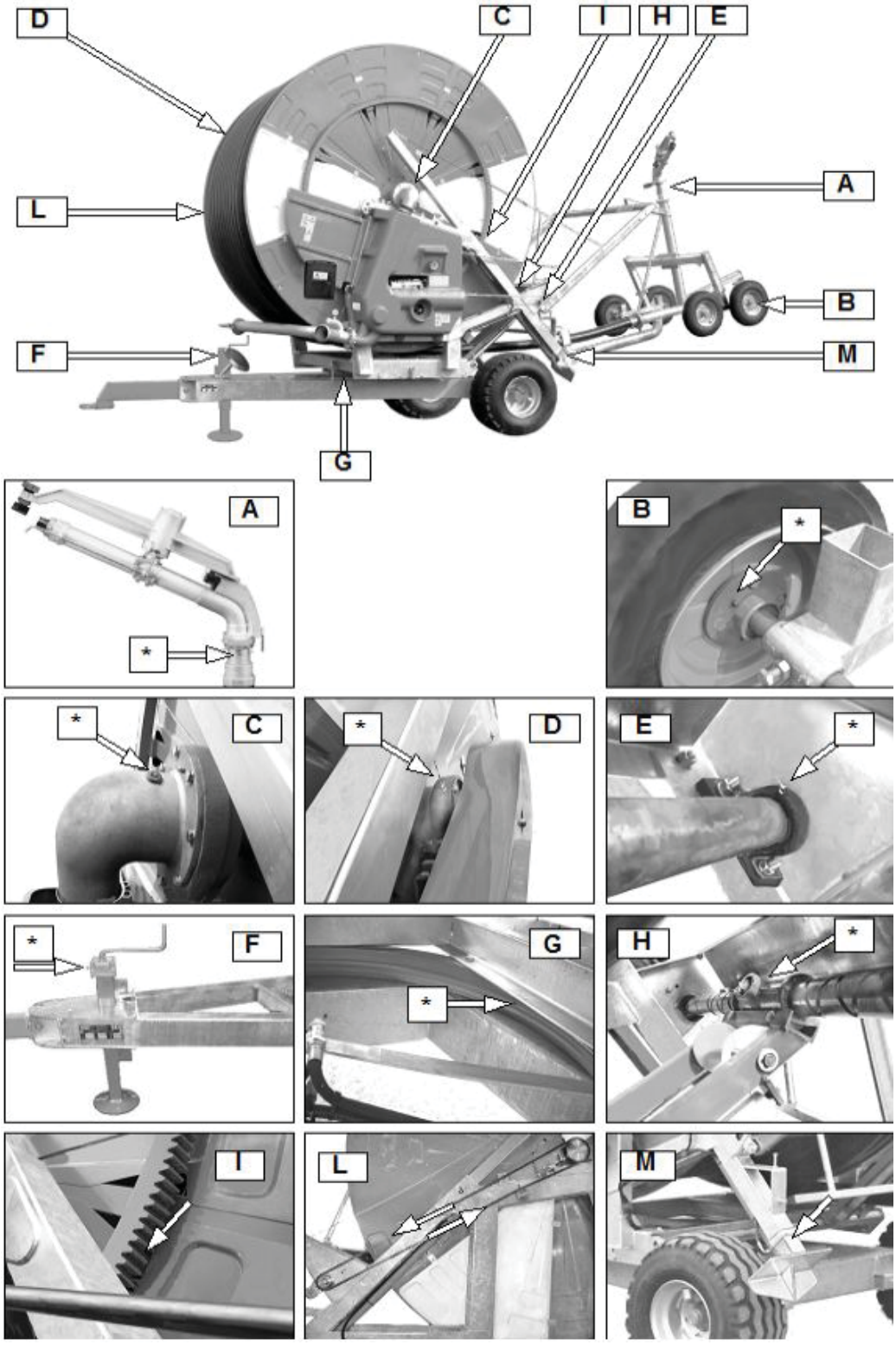
POSITION OF USE		TYPE OF FLUID	TECHNICAL SPECIFICATIONS
1	Greasing nipples for reel Supports	Molybdenum disulphide grease	HDB 340 L-XBEHB 2 ISO 6743- 9 ● KPF2P-30 DIN 51502
2	Other nipples	Grease	HDB 150 L-XBCEB 12 ISO 6743- 9 ● K2K- 25 DIN 51502
3	Gearbox	PAO synthetic oil	ISO VG 150 ISO 12925- 1 CKD ● DIN 51517- 3 CLP
4	Hydraulic system	Hydraulic oil	ISO VG 46 ISO 11158 HM ● DIN 51524- 2 HLP
5	Compressor	Refer to the Compressor Manual	
6	Compressor Step-Up	Refer to the Compressor Manual	
7	Internal Combustion Engine	Refer to the Engine Manual	

7.7.2 REQUIRED LUBRICANT AMOUNTS

Gearbox for machine	Amount of synthetic oil PAO ISO VG 150 ISO 12925-1 CKD ● DIN 51517- 3 CLP
855 x (VR3 - VR4)	4 litres / 1.06 gal (US) / 0.88 gal (UK)
854 x (VR5 - VR6 - VR7)	9.5 litres / 2.5 gal (US) / 2.09 gal (UK)

Tanks for hydraulic actuations with:	Amount of hydraulic oil ISO VG 46 ISO 11158 HM • DIN 51524- 2 HLP
Manual pump + filling pistons	4 litres / 1.05 gal (US) / 0.88 gal (UK)+ 3.5 litres / 0.92 gal (US) / 0.77 gal (UK)
Pump and electric motor + filling pistons	7 litres / 1.85 gal (US) / 1.54 gal (UK) + 3.5 litres / 0.92 gal (US) / 0.77 gal (UK)
Pump and internal combustion engine + filling pistons	25 litres / 6.6 gal (US) / 5.5 gal (UK) + 3.5 litres / 0.92 gal (US) / 0.77 gal (UK)

7.7.3 MACHINE PARTS TO BE LUBRICATED WITH GREASE



* greasing nipples fitted on machine parts

7.8 MAINTENANCE PLAN

It is recommended to organise maintenance activities of the machine components into technical maintenance sheets as shown in the example below. These stem partly from the maintenance activities the machine traditionally undergoes, partly from the outcome of systemic analyses, partly from specific data.
This makes it possible to enter, in a single document, information that also take into account the specific differences of the machine, arising from its critical issues.

NOTE
Preventative and specialist maintenance operations may be carried out according to the instructions set out on the sheets, by the user customer or by the Manufacturer's Technical Support Centres (T.S.C.)

Owing to their complexity, some specialist maintenance operations have been intentionally omitted from the manual and are to be exclusively carried out by the T.S.C., which have the technical knowledge, documentation and equipment required to perform the activities.

DANGER
Maintenance operations described below must be performed with the machine down and energies disconnected.
When it is required to perform check operations with energy on, this is indicated clearly with highlighted text and danger symbol.
In this case the utmost attention must be paid.

7.8.1 FILLING IN CRITERION

The maintenance sheets follow the filling pattern shown below.
It is recommended to use the maintenance sheets provided in order to maintain functional maintenance organisation.

Maintenance sheet			**No.**	**Date:**
Machine		**Operation**		
Reference drawing (if present)		**Number**		
Frequency of the operation		**Duration of the operation**		
Description of the operation				
Required spare parts				
Required equipment				
Detailed description of the operations to be carried out in chronological order.				
Comments				

Specifically, it is essential for the above sheet to be filled in for every maintenance activity, which must then be stored by the person in charge of maintenance in a suitable folder.

The sheet must include the following data:

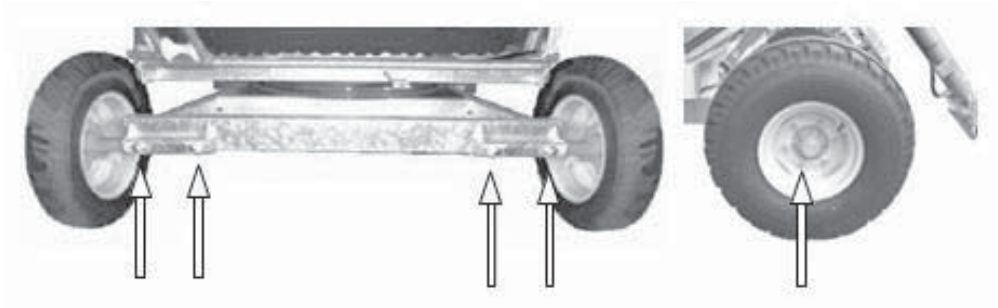
1. Type of maintenance (preventative, disassembly instructions, etc.).
2. Maintenance sheet no.
3. Date when maintenance took place
4. Machine name
5. Type of operation
6. Reference drawing (if present)
7. Reference drawing no. (if present)
8. Frequency: minimum recommended operating frequency
9. Expected duration of the operation
10. Description, also with the aid of any drawings, of the type of operation with information on the points undergoing the operation
11. Information on the required spare parts to perform/complete the operation
12. Required equipment to perform the operation: wrenches, compressed air, gloves, etc.
13. Detailed description of the operations to be performed (in chronological order) in order to properly perform the activity. This section should also include suggestions, warnings, any existing hazards in performing this maintenance activity.

7.8.2 LIST OF MAINTENANCE SHEET AND FREQUENCY

Below is information on the maintenance activities and their frequency.

7.8.2.1 EVERY 200 HOURS

- Inject the specific product with grease pump (see pos. 2 paragraph 7.7.1) in positions : A - B - E - F - G - H paragraph 7.7.3
- Inject the specific product with grease pump (see pos. 1 paragraph 7.7.1) in positions : C - D paragraph 7.7.3
- Spread the specific grease with paintbrush or spatula (see pos. 2 paragraph 7.7.1) in positions : I - L - M paragraph 7.7.3
- Periodically check the tyre pressure (of the machine and trolley) (see paragraphs 2.5.4 and 2.5.5) Note: Very important especially if the machine is towed on public roads.
- Periodically check the tightening of screws fixing the axle shafts to the traveller and tightening of wheels on axle shafts (see paragraph 7.4.4) Note: Very important especially if the machine is towed on public roads.



7.8.2.2 BEFORE STORAGE AT THE END OF THE SEASON

- It is recommended to partially empty the water from the PE hose, by unwinding half the hose as in normal irrigation, remove the plug of the trolley and reel back on with the PTO (see paragraph 6.6.2). If the machine is equipped with Optional Compressor, it is not required to perform the above as the latter is used (see chapter 6.8)
- Remove the machine water inlet plug (see ref. 5 par.2.1)
- If the machine is equipped with battery, it must be removed and stored in dry, safe premises, away from children's reach and must be recharged periodically. (see - Precautions with the battery par. 4.5)
- For longer duration of the paint, clean the machine with a pressurised water jet, when it is dry spray all metal parts with a thin layer of a mixture consisting in an anti-oxidising protective product like liquid wax.

NOTE
If the machine is equipped with: computer, battery, photovoltaic panel, internal combustion engine and/or electrical system (Road Use Approval type), pay the utmost attention not to aim the liquid jets (detergent and protective) at these parts.

7.8.2.3 EVERY YEAR BEFORE THE START OF THE IRRIGATION SEASON

- Carry out the instructions in paragraphs 7.8.2.1 and 7.8.2.2.
- Change the gearbox oil with a specific product (see pos.3 paragraph 7.7.1 and paragraph 7.7.2).
- Change the hydraulic oil in the hydraulic pump with a specific product (see pos.4 paragraph 7.7.1 and paragraph 7.7.2).
- Check the tightening of the fastening screws and/or nuts (see paragraph 7.4.4) of all load-bearing components: turntable between traveller and turret, reel fastening supports, trolley supporting frame, etc.
- Check the tightening of the fastening screws and/or nuts (see paragraph 7.4.4) of all couplings: external reel guards, water inlet with lower turbine fitting, turbo-gearbox on the frame, optional accessories, etc...
- Check tightening of the fastening screws with straps and/or flanges for couplings: of the delivery hose between turbine / reel swivel connector and of the PE hose between reel / raingun trolley.
- If the machine is equipped with optional accessories, the checks set out in the specific Manuals provided must be carried out, as well as the instructions set out in the following paragraphs.
- Prior to placement in the field carry out the instructions set out in paragraph 6.2

7.8.3 MAINTENANCE INFORMATION ON OPTIONAL ACCESSORIES

7.8.3.1 COMPRESSOR

- Please refer to the specific Use and Maintenance Manual provided with the machine.
- The oil change and checks to be performed are indispensable and must be complied with according to the terms set out by its Manufacturer.

7.8.3.2 DISCHARGE VALVE

- Before storage at the end of the season the filter containment box must be unscrewed and it must be emptied from residual water.

7.8.3.3 SLOW CLOSING INLET VALVE

- Prior to starting every new irrigation run, it is recommended to unscrew the filter containment box, wash the filter and fit it back on.
- Before storage at the end of the season the filter containment box must be unscrewed and it must be emptied from residual water.
- Prior to storage at the end of the season ensure that the butterfly valve controlled by the piston is open, then empty the piston from residual water

7.8.3.4 INTERNAL COMBUSTION ENGINE

- Please refer to the specific Use and Maintenance Manual provided with the machine
- The oil change and checks to be performed are indispensable and must be complied with according to the terms set out by its Manufacturer.
- For warnings and precautions to be adhered to (see chapter 4.0 and chapter 7.0)

7.8.3.5 BATTERY

- Please refer to the specific Use and Maintenance Manual provided with the machine
- The checks to be performed are indispensable and must be complied with according to the terms set out by its Manufacturer.
- For warnings and precautions to be adhered to (see chapter 4.0 and chapter 7.0)

7.8.3.6 PHOTOVOLTAIC PANEL

In order to assure peak performance, the glass surface covering the photovoltaic cells must be kept clean. Only use water and a soft cloth for cleaning. Do not use solvents or corrosive products.

7.8.3.7 INDEPENDENT ACTUATION ELECTRIC PUMP OIL TANK

At the start of every irrigation season, check the quantity of hydraulic oil (see paragraph 7.7.1 position 4) present in the tank. To perform the check, unscrew the red oil filling and bleeding cap located on the tank. Caution - the check must be performed with all pistons closed and the electrical motor off. To ascertain the required amount of oil, just keep the level, as a rule, 2 cm. below the filling and bleeding cap.

TROUBLESHOOTING - DIAGNOSTICS - SOLUTIONS

CH. 8

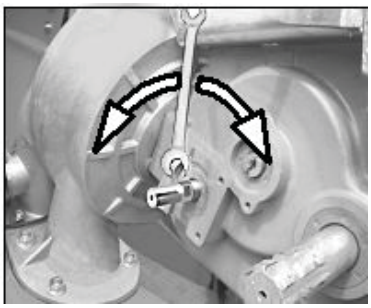
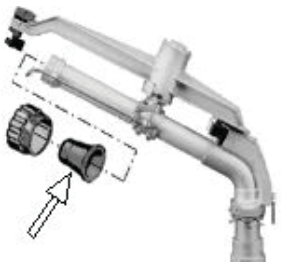
8 GENERAL DESCRIPTION OF FAILURES

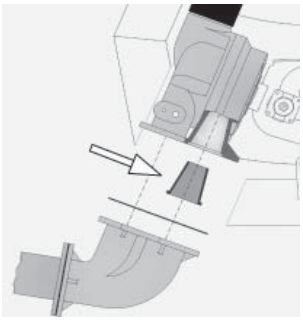
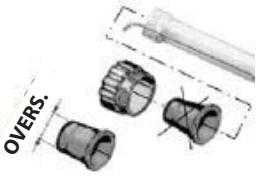
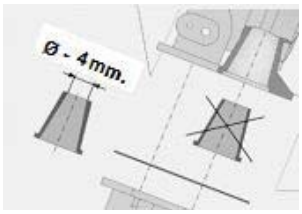
The machine supplied by the Manufacturer is either controlled manually or from a control panel with manual and/or hydraulic actuators, depending on the purchased type.
Below is a list of possible Failures, causes of the failure and solutions suggested by the machine's Manufacturer.

DANGER
Prior to performing any type of operation, it is mandatory to stop the water delivery to the machine and reduce to zero the operating pressure in order to avoid hazard situations or death of the operator and/or whoever is near the machine or its operating range.

8.1 LIST OF FAILURES - CAUSES - SOLUTIONS

The following table contains the list of potential failures or inconveniences that might occur on the supplied machine.
The "Cause" column contains the cause that has resulted in the fault condition.
The "Solution" column contains the corrective action to solve the fault condition occurred.

Fault or Inconvenience	Cause	Solution	
The machine does not reel the hose in	The impeller inside the turbine might be jammed by a foreign body.	**Remove the hazard situation by acting as indicated in the danger provision at the beginning of chapter 8** If the foreign body is not significantly large, it may be removed by acting as follows: Open the turbine cover, try rotating with a spanner and moderate force the shaft on the gearbox clockwise and/or anti-clockwise. If after first being difficult, rotation becomes easier, this means the impeller has been released. Close the cover, restore water delivery to the machine and check it operates smoothly.	
		If the foreign body is significantly large, the turbine cover must be opened, the object must be removed then the cover closed again. To perform this kind of operation it is recommended to contact the Manufacturer's after-sales service.	
	During hose UNWINDING the lever has been left in the WORK position, consequently it may have seriously damaged the turbo-gearbox.	**Remove the hazard situation by acting as indicated in the danger provision at the beginning of chapter 8** The Manufacturer's after-sales service must be contacted to repair the turbo-gearbox.	
Too little water flows out of the raingun on the trolley.	The nozzle on its head might be partially obstructed.	**Remove the hazard situation by acting as indicated in the danger provision at the beginning of chapter 8** The ring nut on the raingun head must be unscrewed, then extract the nozzle, remove the obstruction then fit everything back on.	

Fault or Inconvenience	Cause	Solution	
Too little water flows out of the raingun on the trolley.	The nozzle on the turbine water inlet might be obstructed	**Remove the hazard situation by acting as indicated in the danger provision at the beginning of chapter 8** The turbine cover must be opened, then take down the lower turbine coupling, extract the nozzle, remove the obstruction and fit everything back on, taking care to properly fit the gaskets back on and paying attention to the proper tightening torques to be applied to the connecting bolts and nuts (see 7.4.3). Close the covers, restore water delivery to the machine and check it operates smoothly.	
Too little water flows out of the raingun on the trolley.	The diameter of the nozzle on its head might be too small with regards to the machine model.	**Remove the hazard situation by acting as indicated in the danger provision at the beginning of chapter 8** Unscrew the ring nut on the raingun head, extract the nozzle and replace it with one with a larger internal diameter.	
		As an alternative, it might be sufficient to change the nozzle inserted in the turbine water inlet, with a 4 mm / 0.16 in of smaller internal diameter, to do so act as described in the previous case.	
	the operating pressure is too low	The actual pressure reading must be checked on the pressure gauge and increased. *Caution: Maximum pressure must not exceed 10 bar/145 psi.*	
The brake band has significantly overheated	During hose UNWINDING the lever has been left in the RELEASE position, consequently the brake band may have been irreparably deteriorated.	**Remove the hazard situation by acting as indicated in the danger provision at the beginning of chapter 8** The Manufacturer's after-sales service must be contacted to replace the brake band.	
Strange noises are heard in the gearbox when the gear is changed	The number of rounds of the turbine has not been sufficiently reduced	**Remove the hazard situation by acting as indicated in the danger provision at the beginning of chapter 8** The number of rounds of the turbine must be further reduced, by acting on the by pass or Computer, then repeat the procedure. The machine normally resumes operation. Should the machine not resume work, this would mean that during the first operation, an attempt was made to force the gear change and gearbox has consequently been damaged. The Manufacturer's after-sales service must be contacted in this case to repair the gearbox	

Fault or Inconvenience	Cause	Solution
The machine is not stable	The front and/or rear anchors might not have adequate grip on the ground.	**Remove the hazard situation by acting as indicated in the danger provision at the beginning of chapter 8** Stop hose reeling in by moving the lever on the gearbox in the RELEASE position (see paragraph 2.6.1). Adjust with increased strength the anchors' grip to the ground and move the lever back to the WORK position (see paragraph 2.6.1).
	The friction generated between the unwound hose and wet ground and/or a certain type of crop might abnormally overload reaction on the anchors.	**Remove the hazard situation by acting as indicated in the danger provision at the beginning of chapter 8** If the problem is caused by excessive soil wetness, wait for it to dry and possibly before resuming work, it is recommended to run a rope underneath the entire unwound length of the hose. If the problem is connected to the soil as well as the special type of crop, proceed as above and place pieces of wood underneath the hose at 10 ÷ 15 m gaps.

In the event the issue should be related to the computer or battery or internal combustion engine, or other trade components installed on the machine, please refer to the relevant manual supplied with the machine for more details.

For situations not specified in the specific documentation supplied, please contact the Manufacturer's T.S.C.

ANNEXES CH. 9

9 ANNEXES

This chapter contains the list of INSTRUCTION AND WARNINGS MANUALS and the documentation in general of the main components used in the machine.

The listed MANUALS are an integral part of the COMPLETE INSTRUCTION AND WARNINGS MANUAL of the machine supplied by the Manufacturer and must be used as reference for use, operation and maintenance of the equipment and components.

Doc. No.	DESCRIPTION	MANUFACTURER
1	Oil Hydraulic Diagram	Ocmis IrrigazioneS.p.A.
2	Oil Hydraulic unit instruction and warnings manual (if any)	HYDROVEN S.r.l.
3	Internal Combustion Engine manual (if any)	HONDA
	Internal Combustion Engine manual (if any)	KAMA
	Internal Combustion Engine manual (if any)	LOMBARDINI S.p.A.
4	List of Spare Parts	Ocmis IrrigazioneS.p.A.
5	technical battery data sheet (if any)	FIAMM S.p.A.
6	Aqua System o Rain Control Computer Manual (if present)	Ocmis IrrigazioneS.p.A.
7	Packing List (when required)	Ocmis IrrigazioneS.p.A.
8	Irrigation Rate Chart	Ocmis IrrigazioneS.p.A.
9	Compressor Manual (if any)	Battioni Pagani Pompe S.p.A.
		JUROP S.p.A.
		Pompe Ferrari S.n.c.
10	Manual of Raingun fitted at the top of the trolley (if present)	SIME Idromeccanica S.r.l.

SPARE PARTS CH. 10

10 SPARE PARTS

10.1 SPARE PART ORDER

Method to place an order for a spare part:

To place an order for a spare part, send a request to IB International or a dedicated Ocmis distributor, indicating the amount and description of the spare part you wish to order.

IB INTERNATIONAL PTY LTD
Headquarters
6 Breene Place, Morningside 4170
Australia
Tel. +61 7 3399 1288
Fax. +61 7 3902 0088
www.ibinternational.com.au
info@ibinternational.com.au

Specifically, the following information must be provided:

- Machine serial no.
- Model as shown on the plate installed on the machine
- Month and Year of construction
  (if absent provide the description of the part)
- Description
- Desired quantity

Please also specify whether this is an order or a request for a quotation.

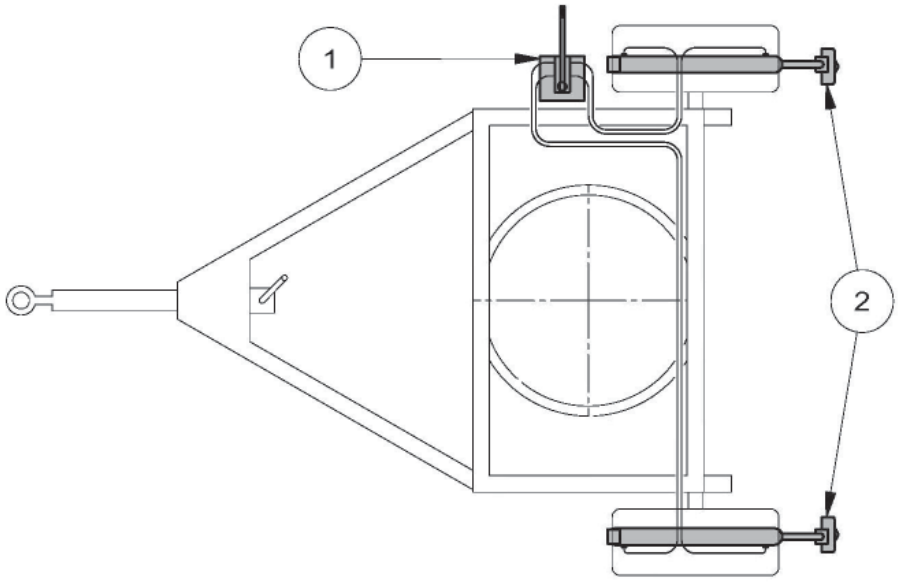
SPARE PART ORDERING FORM	
From:	To:
Delivery on: To:	Date: Order number:

MACHINE CODE	NAME	CODE	QUANTITY	PRICE
			TOTAL	

11 ANNEX 1

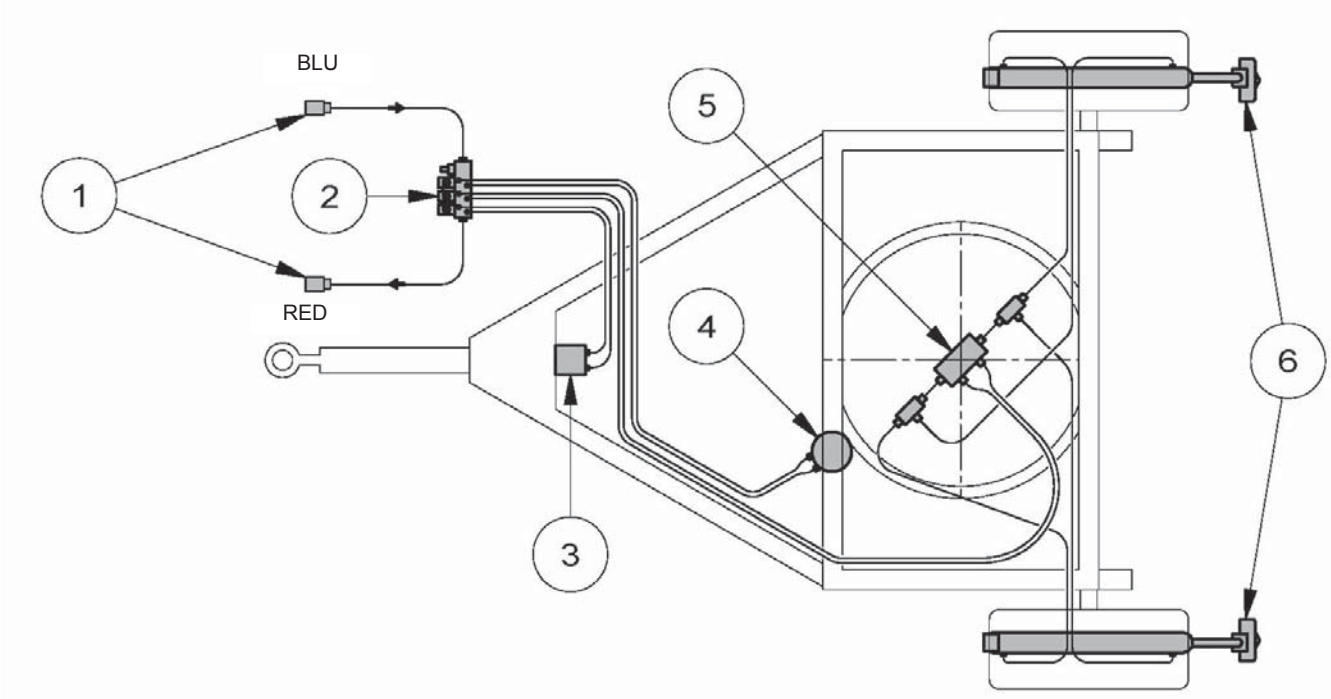
CH. 11

HYDRAULIC SYSTEM WITH: MANUAL PUMP



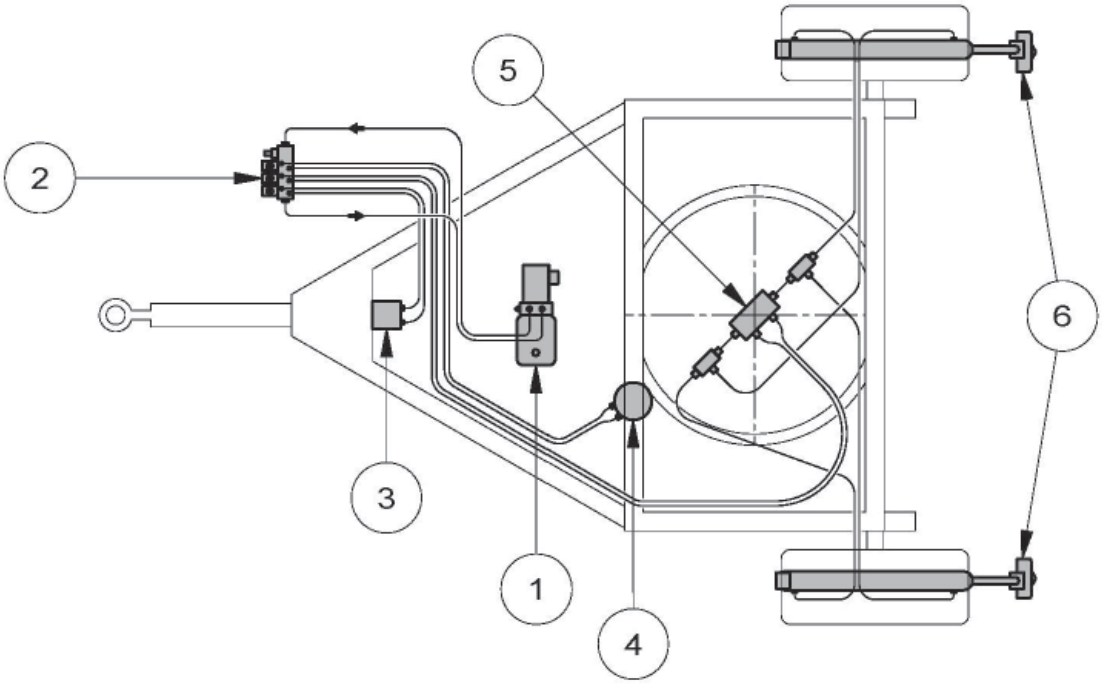
1 - Manual pump	2 - Rear hydraulic anchors

HYDRAULIC SYSTEM WITH: TRACTOR JACK COUPLER



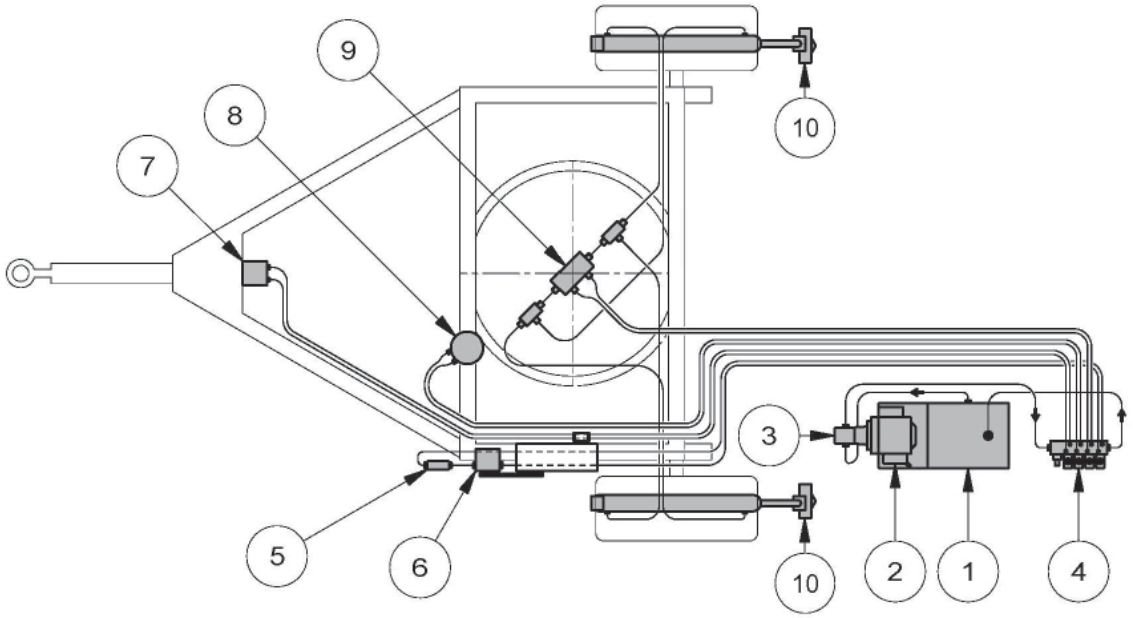
1 - Tractor jack coupler connections	4 - Hydraulic rotation
2 - 3 lever distributor	5 - Locking valve
3 - Front hydraulic stabiliser	6 - Rear hydraulic anchors

HYDRAULIC SYSTEM WITH: HYDRAULIC UNIT INDEPENDENT ACTUATION



1 - Electrical hydraulic unit	4 - Hydraulic rotation
2 - 3 lever distributor	5 - Locking valve
3 - Front hydraulic stabiliser	6 - Rear hydraulic anchors

HYDRAULIC SYSTEM WITH: MOTORISED INDEPENDENT ACTUATION + HOSE RETRIEVAL



1 - Hydraulic oil tank	6 - Hydraulic motor
2 - Internal combustion engine	7 - Front hydraulic stabiliser
3 - Hydraulic pump	8 - Hydraulic rotation
4 - 3+1 lever distributor	9 - Locking valve
5 - VRF Valve	10 - Rear hydraulic anchor

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