

Read this booklet carefully before using the machine for the first time.

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MULTIPURPOSE MAST WITH R4000P AUTOMATION

Index D from 01/12/23

Notice 16-05-002



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INTRODUCTION..... 1
 SYMBOLS..... 2
GENERAL INFORMATION..... 2
SAFETY..... 4
MAINTENANCE..... 7
 MAINTENANCE..... 7
 CLEANING..... 7
 STORAGE..... 7
 ORDERING SPARE PARTS..... 7
MULTIPURPOSE MAST -..... 8
 PRESENTATION..... 8
 COMMISSIONING..... 11
 MAINTENANCE..... 14
MINIMAL PRUNER..... 16
 PRESENTATION..... 16
 COMMISSIONING..... 18
 MAINTENANCE..... 25
PRE-PRUNER..... 28
 PRESENTATION..... 28
 COMMISSIONING..... 31
 MAINTENANCE..... 37
4-HEADED VINE SHOOT REMOVER..... 39
 PRESENTATION..... 39
 COMMISSIONING..... 41
 MAINTENANCE..... 49
 Procedure for initialising ground tracking sensors:.. 53
MULTIPURPOSE MAT..... 54
TROUBLESHOOTING..... 55
 General malfunction..... 55
 Minimal pruner..... 57
 Pre-pruner malfunction..... 60
 Malfunctioning Double shoot remover..... 62
Machine hydraulic specifications FERRAND..... 64

INTRODUCTION

This booklet provides detailed instructions for the use and maintenance of your equipment.

We would like to congratulate you on your choice and remind you to carefully follow the instructions in this booklet, which will ensure that your machine operates smoothly and safely.

The manufacturer declines all responsibility for problems caused by failure to follow the instructions given, changes to the factory settings, or negligence on the part of the operator.

All machines have an identification plate showing the machine's manufacturing information. This information must be cited when requesting spare parts. If the information is not clear enough, please contact our technical support to avoid potential errors.

This booklet is organised into chapters and paragraphs to give you clear and precise information.

INTRODUCTION

**THIS MACHINE COMPLIES WITH THE MACHINE DIRECTIVE
2006/42/EC:
NO UNINTENTIONAL RESTARTING OF THE CUTTING ELEMENTS**

SYMBOLS

This booklet uses three "graphic safety symbols" which emphasise different levels of danger or specific information.

DANGER



This draws the operator's attention to situations which may compromise the safety of people.

WARNING



This draws attention to situations which may compromise the correct operation of the equipment, without threatening the safety of people.

IMPORTANT



This symbol is placed beside general information which does not compromise either the safety of people or the operation of the machine.

| SYMBOL | DESCRIPTION |
|---------|---|
| | Danger to the user: do not open or remove the safety guards while the machine is operating. |
| | |
| 540 | Power takeoff: 540 rpm |
| | Possible projection of objects: keep away from the machine. |



Caution: read the instructions before using the machine.



Wear safety shoes.
Cut-resistant gloves must be worn when working on the machine, particularly on the protective cutting components.



Wear a protective helmet.



Danger to the user: rotating tools. Keep back from the machine.

Switch off the engine and remove the key before carrying out any maintenance or repair operations.

Keep the safety protections in position while the machine is operating.

PROTECTION OF WORKERS AGAINST RISKS RELATED TO THE EXPOSURE TO NOISE AND VIBRATION AT WORK

| | |
|--|----------------|
| Sound pressure level of machine alone | LpA = 80 dB(A) |
| Sound power level of the machine alone | LwA = 82 dB(A) |
| Maximum sound pressure level (peak) machine only | LpC <130 dB(C) |



GENERAL INFORMATION

MACHINE IDENTIFICATION

The machine identification plate (fig.1) is located on the chassis and contains the following information:



Figure 1: *YEAR* *REGISTRATION* *TYPE OF MACHINE*

IMPORTANT: Specify the type of machine when requesting any information or technical assistance.

PERMITTED USE

- The FERRAND tool presented in this instruction booklet is a device that has been designed exclusively for agricultural work.
- Any other use will put operators' health and safety at risk.

CONTRAINDICATED USES

When using a FERRAND tool, it is absolutely forbidden to:

- Hitch the machine to tractors that are insufficiently powerful or heavy.
- Use the device if the shafts, spacers, and pins are not installed.
- Climb on the machine during work or transport.
- Use the device without the basic settings as described in this manual.
- Use the device without blocking the lower arm stabilisation systems.



IMPORTANT: The machine is delivered with settings which have been optimised for transport, and as a result, it cannot be used before all the required settings have been made.

ROAD USE

- ✓ Comply with the national rules of the related country when driving on roads.
- x Hydraulic system: driving with the device in operation or in the deployed position is strictly forbidden.



SAFETY WHILE WORKING

Most accidents at work with machines while operating or during servicing or repair are caused by a failure to follow elementary safety standards. Always be aware of potential risks and pay attention to the effects of what you are doing.

Being aware of potentially dangerous situations can prevent any accident.

OPERATOR QUALITIES

The personnel who use and work with the machines must be competent and have the following qualities:

- **Physical:** Perfect vision, coordination and ability to carry out all the necessary operations safely.
- **Mental:** Ability to understand and apply the established standards, the rules and the safety precautions. They must be attentive and have a high level of awareness of their own and others' personal safety. They must want to perform their job correctly and responsibly.
- **Training:** they must read carefully the booklet, the graphs and diagrams in the appendix and the instruction and warning labels. They must be specialised and qualified in use and maintenance.

WORK CLOTHES

While working, but above all while servicing or repairing the machine, you must be suitably dressed and always use personal protective equipment.

- Overalls or other comfortable clothing. Avoid any clothes whose sleeves are too wide and any other objects which may be caught by moving parts.
- Protective gloves for hands.
- Protective glasses or mask for the eyes and face.

GENERAL SAFETY STANDARDS

If you need to couple the equipment on-site, you must have a flat and stable zone with suitable dimensions. While the machine is operating, it is prohibited to enter the working range of the machine or its accessories. Ensure that the device is stable before performing any manoeuvres.



SAFETY

WORK PREPARATION

- Drinking or taking any alcoholic beverages, medicines, or other substances that impair working ability is strictly forbidden before and during work.
- Check that there is enough fuel to prevent the machine from stopping suddenly, especially during a critical manoeuvre.
- Do not use the machine if the specified safety conditions are not guaranteed. For example: it is forbidden to make dangerous repairs before starting a job or working at night if the work zone is not sufficiently lit.

PRECAUTIONS

- Follow the instructions in this manual to the letter.
- Labels and stickers indicating how controls are used and signalling dangers must never be removed or erased.
- Never remove safety devices, covers or guards unless this is required for maintenance. If they need to be removed, stop the engine and proceed with caution. Then put the devices back before starting the engine again and using the machine.
- It is forbidden to grease, clean, or adjust moving parts.
- It is forbidden to perform manual maintenance or adjustment operations for which specific tools are intended.
- Do not use damaged or unsuitable tools.
- Before any work on pressurised hydraulic hoses or removing any components, make sure that the hydraulic link has been depressurised and does not contain any hot fluid.
- Check the connectors and all the connections before pressurising the hydraulic links, then again one hour after first use.
- Do not clean, grease, repair or adjust the machine with the engine started and the machine raised.
- **WARNING:** there may be crushing or shearing zones on mechanisms which are remotely controlled, especially those which are hydraulically powered.

SAFETY

- Before starting up the machine and beginning work, check the immediate area and sound a warning (horn). Make sure you have adequate visibility. Pay attention to the projection risks. You must stop the machine when you exit a row.
- After the maintenance or repair work is completed, check that there are no tools, rags, or other materials in machine compartments containing moving parts.
- While working, it is prohibited to give instructions or indications to more than one person at a time.
- Any instructions or indications must only be given by an operator.
- Avoid speaking to the operator without reason, frightening them or throwing objects.
- Always pay attention to any people present, especially children.
- Make sure that there is no-one within the tool's operating range.
- Never carry a person on top of the machine.
- If the machine is inactive, stop the engine and park the vehicle on flat ground, with 1st gear and the parking brake engaged, the machine on the ground and power takeoff disengaged.
- Never operate the machine on steep slopes which could compromise the machine's stability. Be especially careful on bends, taking account of the overhang, the length, the height, and the weight of the machine.



Before any manual intervention on the machine:

- Cut off tractor contact and remove keys
- Press the electrical control emergency stop and unplug it
- No person on the driver's seat



MAINTENANCE

MAINTENANCE

Maintenance is one of the most important aspects of the service life and performance of a farm implement. Ensuring that the machine is always in good condition not only guarantees the quality of the work, but also provides a longer service life and enhanced safety during work.

The maintenance intervals indicated in this booklet are for information purposes only and are based on normal conditions of use. As a result, they can change depending on the type of operation, workplaces which are more or less dusty, climatic factors, etc.

CLEANING

It is strictly forbidden to spray the high-pressure jet directly onto pivots, bearings, lip seals, or any other sensitive components without re-greasing them after cleaning.

STORAGE

To uncouple, perform the uncoupling operation in reverse. Ensure that all parts are stable. The following precautions are recommended during a prolonged period of inactivity:

- Carefully wash and dry the machine.
- Check the machine carefully and replace any damaged parts.
- Tighten the screws and bolts.
- Carefully grease the machine, protect it with a cover, and store it in a dry place.

If these operations are performed carefully, the device will remain in perfect condition when returned to service.

ORDERING SPARE PARTS

See the related catalogue when ordering spare parts.

Orders must be sent to the dealer or service centre and must always indicate:

- The type and width of the equipment.
- The code of the desired part. If there is no code, indicate the number of the plan that shows the part and the corresponding reference.
- A description of the part and the required quantity.
- The method of shipment.

While taking specific care with the delivery of equipment, if this information is not provided, the reseller or service centre rejects any responsibility for delivery delays caused by force majeure.

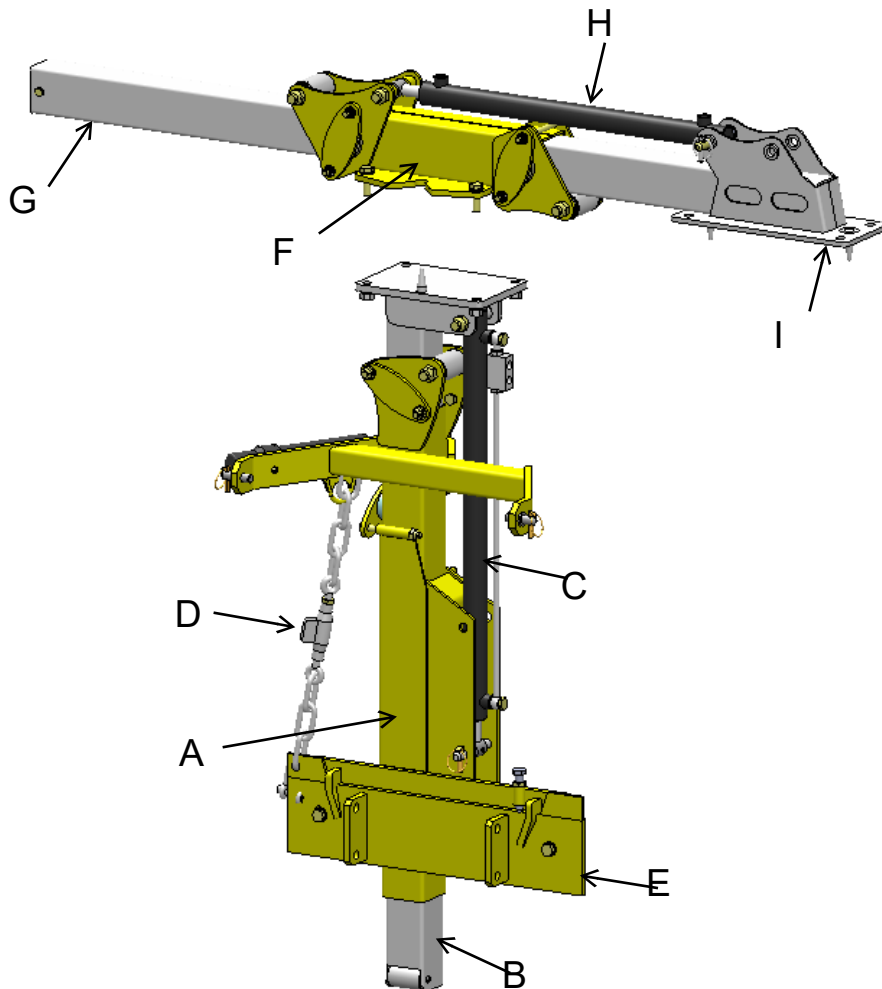
Transport costs are always borne by the customer.



MULTIPURPOSE MAST - PRESENTATION

TERMINOLOGY OF THE MAIN COMPONENTS R4000P MAST + R630P STEM

| R4000P mast | | R630P stem | |
|-------------|--|------------|--|
| A | Mast sheath | F | Stem sheath |
| B | Mast plunger | G | Stem arm |
| C | Raise/lower cylinder 25-40 stroke 750mm | H | Shift arm cylinder 25-40 stroke 600mm |
| D | Stabilising chain | I | Machine coupling plate |
| E | Tractor interface plate | | |

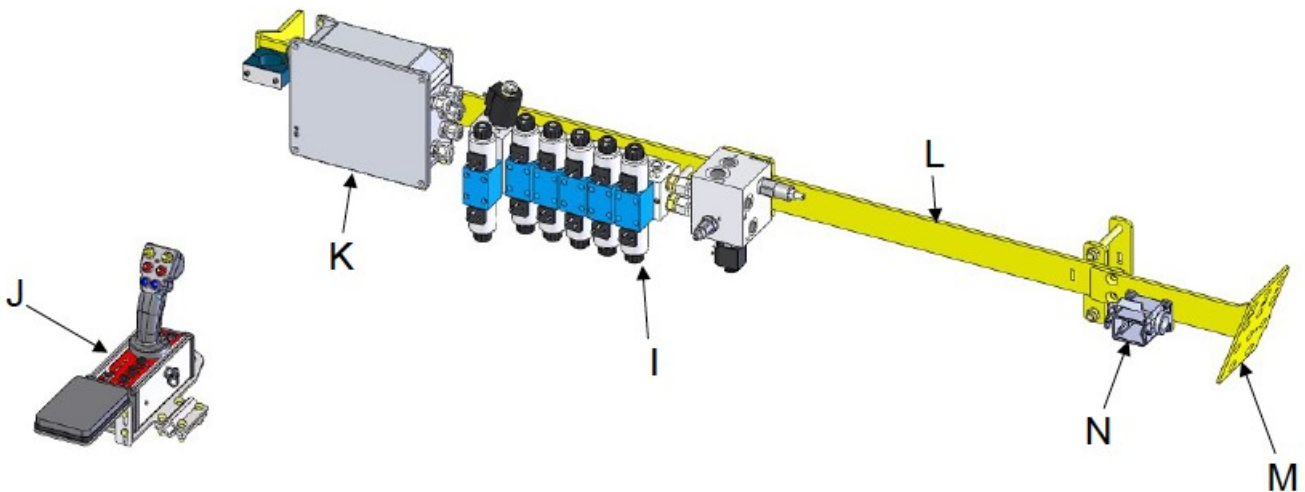




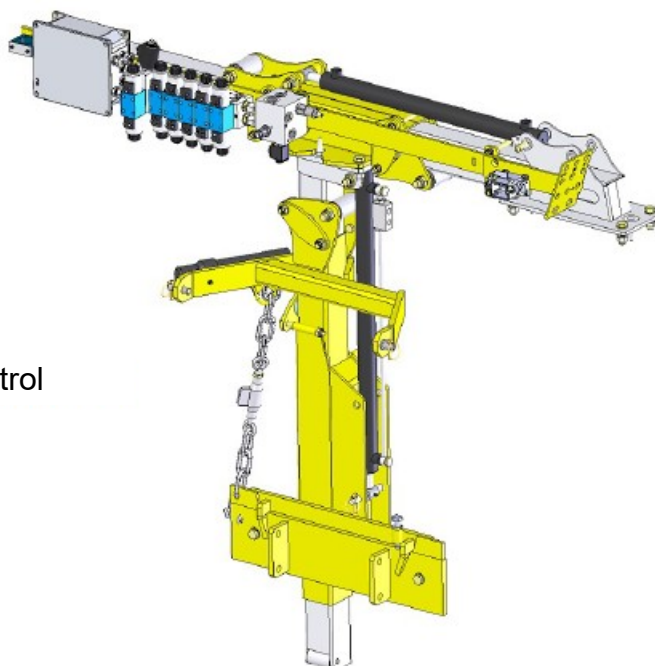
MULTIPURPOSE MAST - PRESENTATION

TERMINOLOGY OF THE MAIN COMPONENTS - CMX1306 CONTROL

| CMX1306 control | |
|-----------------|--|
| I | Hydraulic distributor |
| J | Electric control |
| K | Circuit board housing |
| L | Distributor support bar |
| M | Hydraulic coupler plate for machine connection |
| N | Electrical socket for machine connection |



R4000P mast
+R630P stem
+CMX1306 control



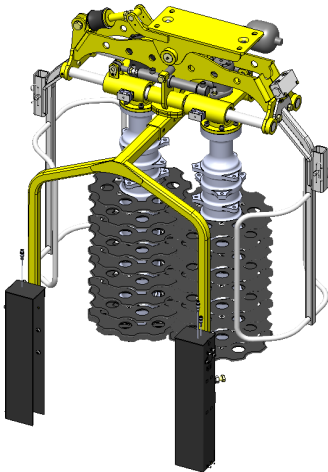


MULTIPURPOSE MAST - PRESENTATION

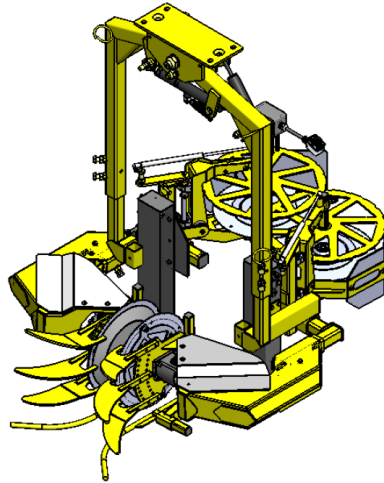
ADAPTABLE TOOLS

The FERRAND multipurpose mast with automation (R4000P + R630P + CMX1306) can be fitted with the following machines:

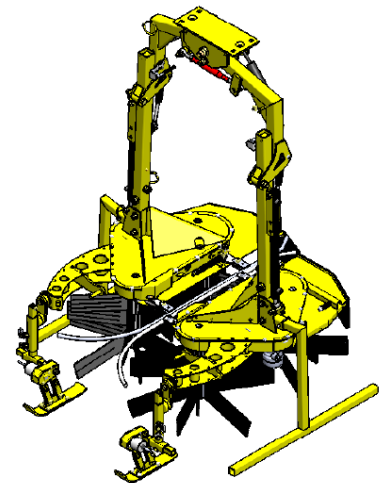
Machines with automation:



Pre-pruner with auto opening
around posts
(P4260 + P80X)

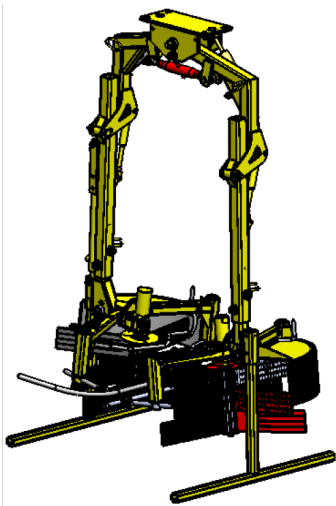


Minimal pruner with auto
cordon tracking
(TMX1210)

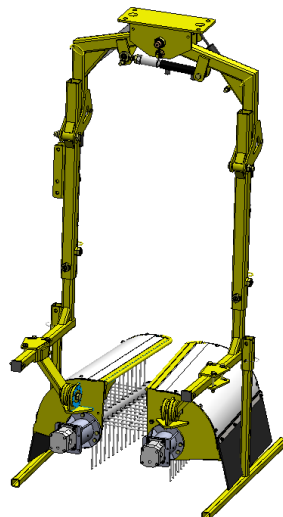


4-headed shoot remover with
auto ground tracking
(DTX2130)

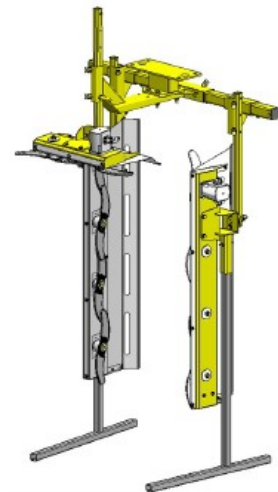
Machines without automation:



Two head vine shoot remover
(ELP2140)



Shoot remover with wire
(EFP4240-4260)



1 row trimmer
(R5910P)

The machines with automation are also available in a non-automated version.



MULTIPURPOSE MAST - COMMISSIONING

Mounting on the tractor

Mast coupling:

By default, the mast is coupled to the tractor by an interface plate to be fixed on the load carrier.

There is also an option (R270P) for coupling to 3-point front lifting.

Hydraulic connections.

Connect the pressure hose to a single-acting tractor valve outlet or to the hydraulic unit's pressure outlet.

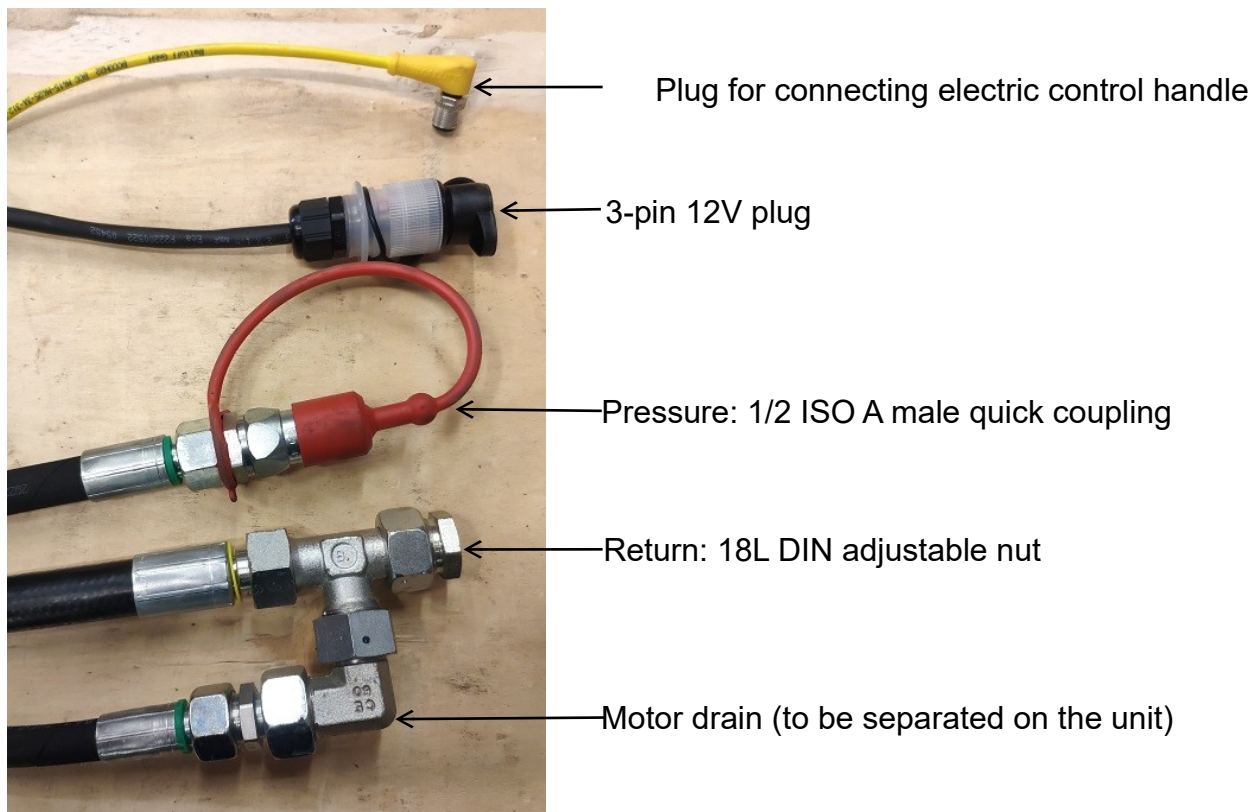
To ascertain the correct flow pressure, refer to the pages concerning the machine coupled to the mast (see table of contents).

Connect the return hose directly to the tractor or hydraulic unit **without using a quick coupling**. If the machine is connected to a unit equipped with a return filter or an air cooler, it is imperative that the drain is separated from the return. The drain should then be connected to the tank without passing through either the filter or the air cooler. Back pressure exerted on the drain could damage the motors.

Electrical connections:

Connect the 3-pin 12V power plug to the tractor.

Connect the mast cable to the electric control handle.

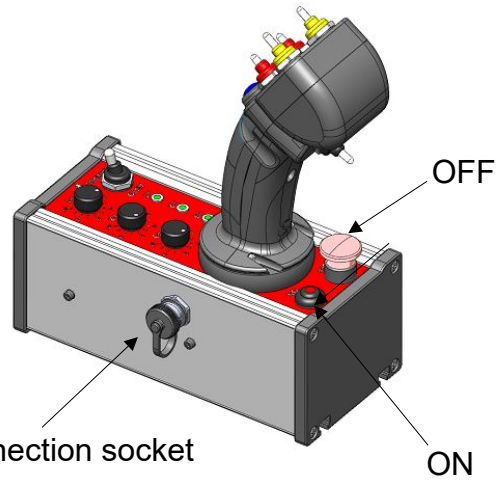
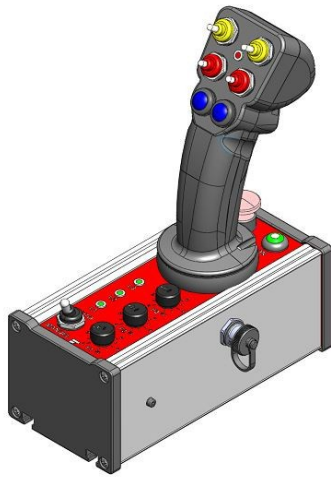




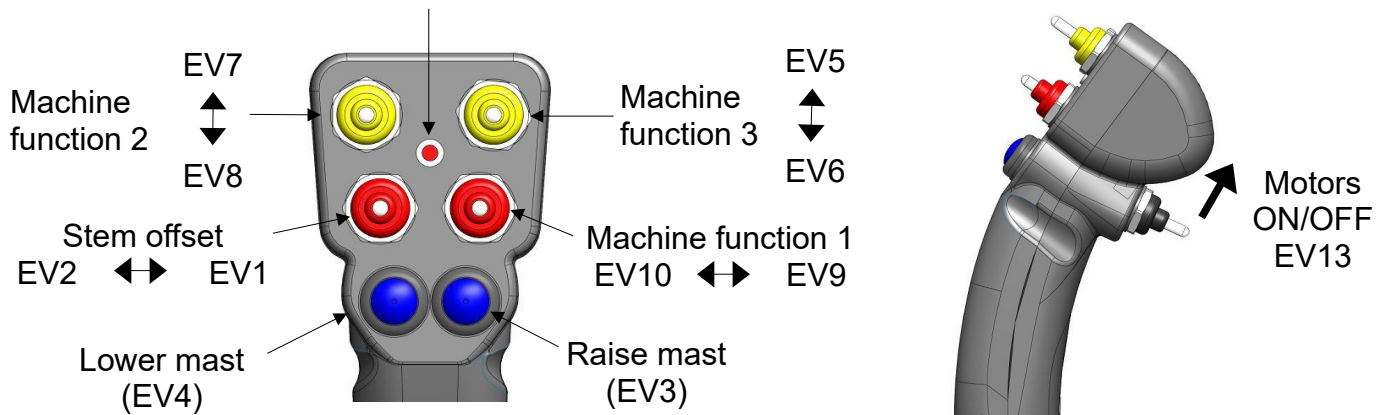
MULTIPURPOSE MAST - COMMISSIONING

Electric control

The control handle of the CMX1306 option can be used to control all mast and coupled machine functions from the driver's position.



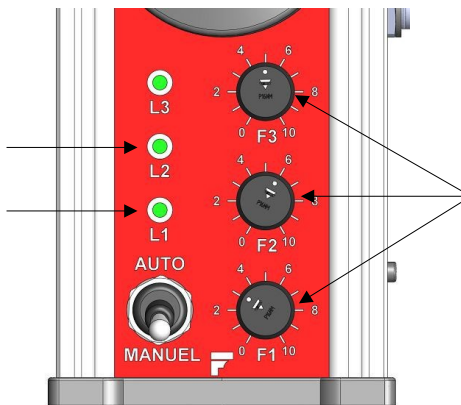
Motors On/Off light (L4)



Automation activation light

Arch held open light

Start-up automation system



Automation settings

Refer to the pages of the mast-mounted machine for details on machine functions and automation settings (see table of contents).

MULTIPURPOSE MAST - COMMISSIONING

Reversing the direction of control of the Up/Down commands:

The mast's up/down function (blue buttons) can be reversed.

To do this, before turning on the handle, press and hold one of the two blue buttons while pressing the power ON button for at least 1 second.

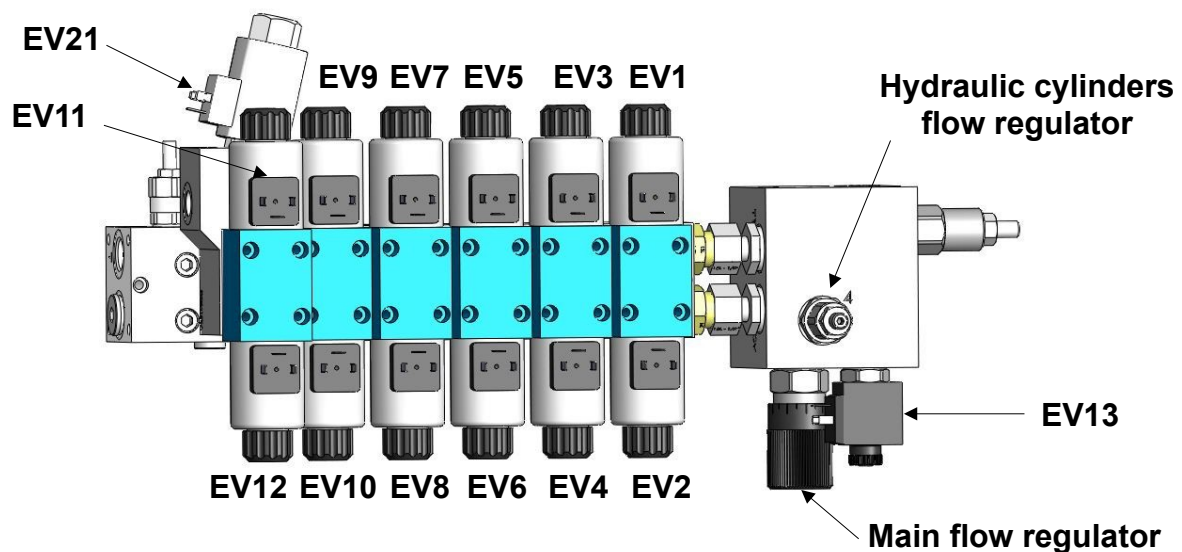
The same operation can be performed to simultaneously reverse the control direction of the 2 yellow switches (machine functions 2 and 3).

Before turning on the handle, press and hold one of the two yellow switches while pressing the power ON button for at least 1 second.

- The red L4 light flashes 3 times to confirm the operation.
- The setting is stored in the memory.
- Perform the same operation for returning to the initial setting.

Hydraulic distributor

The CMX1306 option's hydraulic distributor can distribute oil to all the hydraulic functions of the machine: cylinders, motors.



The only adjustable element on this valve is the main flow regulator valve on the bottom of the block. This regulator can adjust the speed of the motors of the machine coupled to the mast. It must be adjusted when changing machines.

This block should not be adjusted in any other way unless the dealer is present.

For any **additional information** concerning the ELECTRICAL, HYDRAULIC, etc. parts, please contact your DEALER (DOC 16-11-04 + 16-11-02)



MULTIPURPOSE MAST - MAINTENANCE

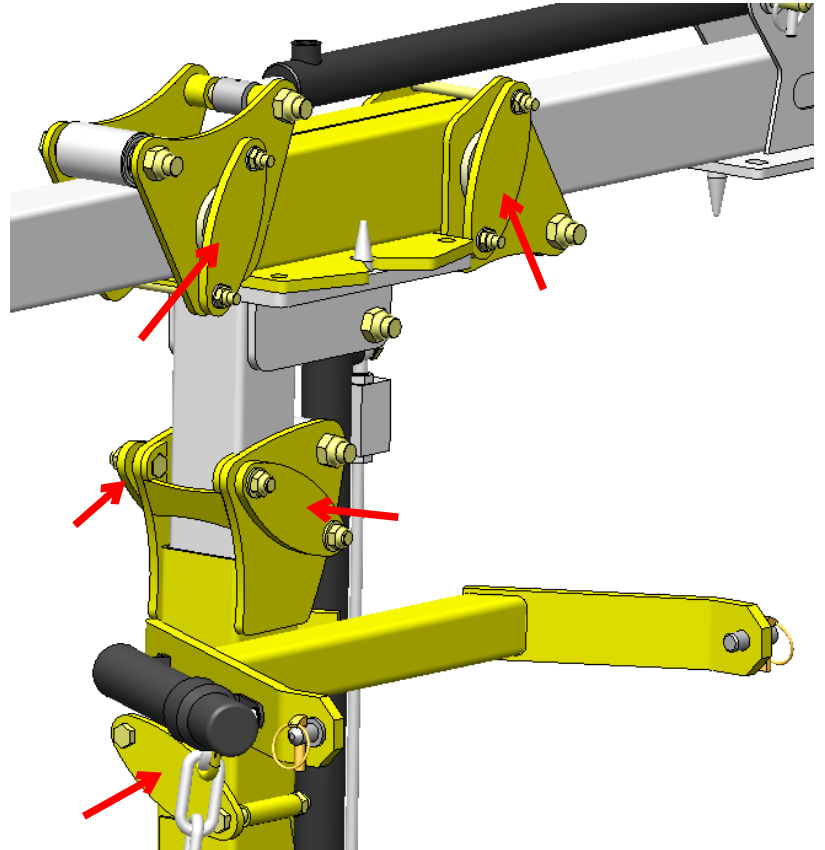
Play adjustment

The mast is equipped with play adjustment systems to ensure that the arms slide smoothly inside the sheaths.

There are 3 adjustments on the vertical part and 2 on the horizontal stem.

The adjustment pads must be kept in contact with the moving parts without being tightened. The adjustment screws must simply be touching.

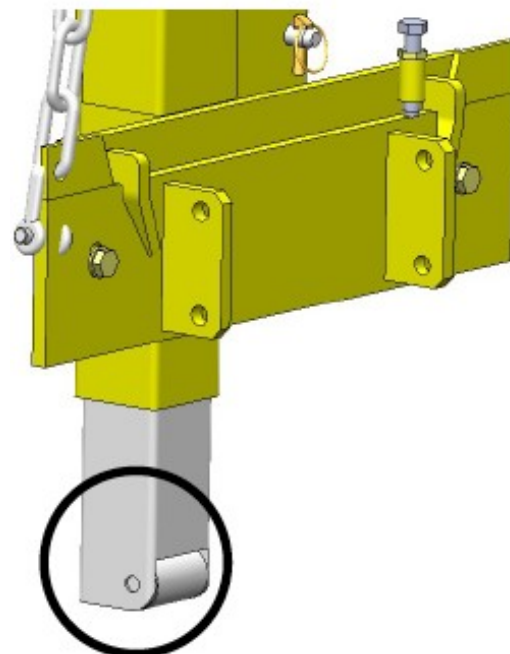
The mast and stem arms should be regularly greased using a brush to facilitate their movement.



The mast plunger is equipped with a roller at its lower end.

Grease this roller together with the rest of the plunger with a brush.

This roller is accessible when the mast is fully lowered.





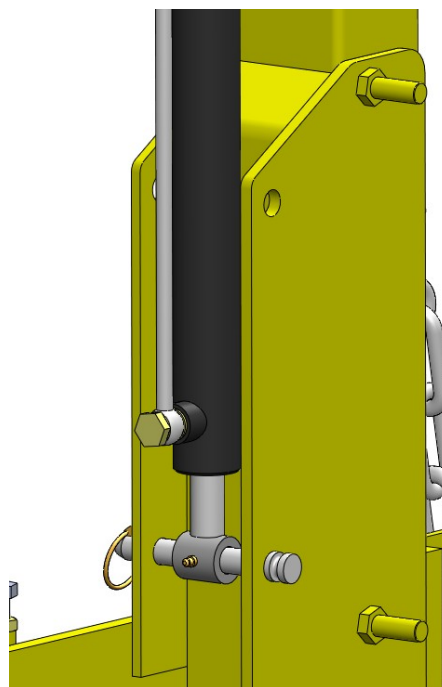
MULTIPURPOSE MAST - MAINTENANCE

Changing the height of the raising/lowering cylinder

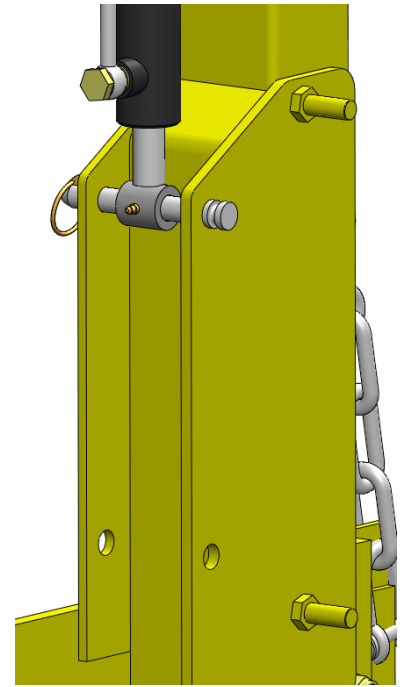
If the course of the cylinder that raises/lowers the mast is not sufficient for bringing the machine into the working position, its anchorage can be changed.

A locking hole in the plunger allows the anchor to be changed when the machine is coupled to the tractor.

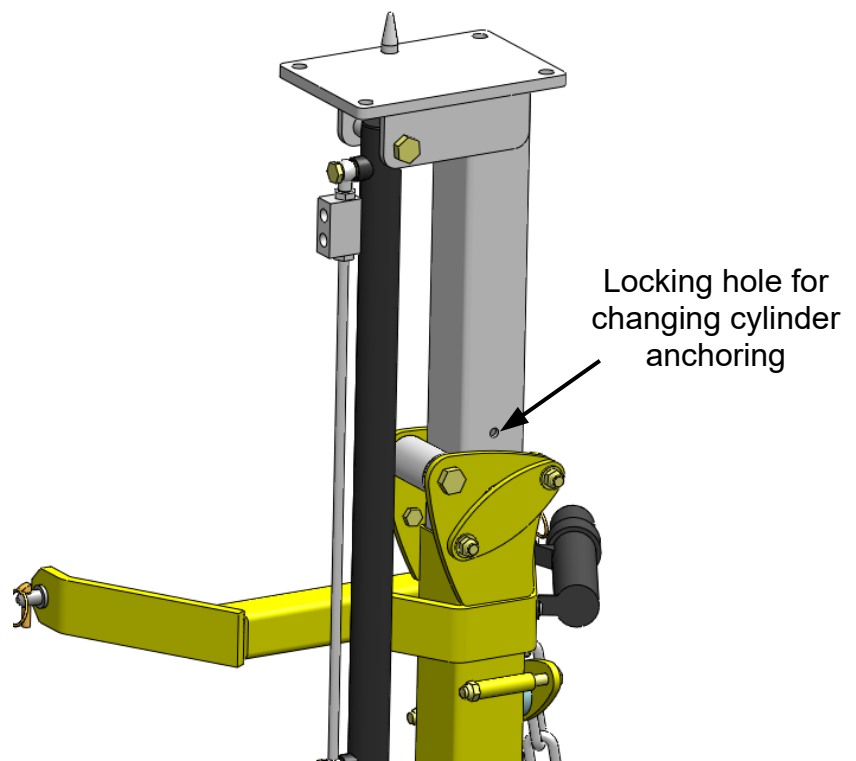
1. raise the mast until the locking hole is visible above the sheath.
- 2- insert a metal rod into the locking hole. This should be long enough to extend beyond both sides of the plunger.
- 3- lower the mast until the locking rod is resting on the sheath.
- 4- remove the pin from the cylinder rod.
- 5- raise or lower until the cylinder rod is in front of the other hole.
- 6- replace the pin in the cylinder rod.
- 7- raise the mast and remove the locking rod.



Cylinder in lower position



Cylinder in upper position



MINIMAL PRUNER PRESENTATION

The FERRAND minimal pruner is available with or without automatic cordon tracking.

Cordon tracking means that the cutting height is automatically controlled. The machine raises or lowers automatically to ensure a constant cutting height above the cordon.

The use of this system is suitable for vines with the following characteristics:

- regular trellising
- a regular and sufficiently developed cordon (about 20mm in diameter)
- sufficiently short pre-pruning for optimising cordon detection and to avoid any problems with clogged saws.

Recommended driving speed: 1.5 to 2.5 km/h depending on the quality of the cordon.
For optimal detection, please ensure that you stay within this speed range by driving neither too slowly nor too fast.

The optimal hydraulic flow rate for mast operation with the minimal pruner is 50L/min.

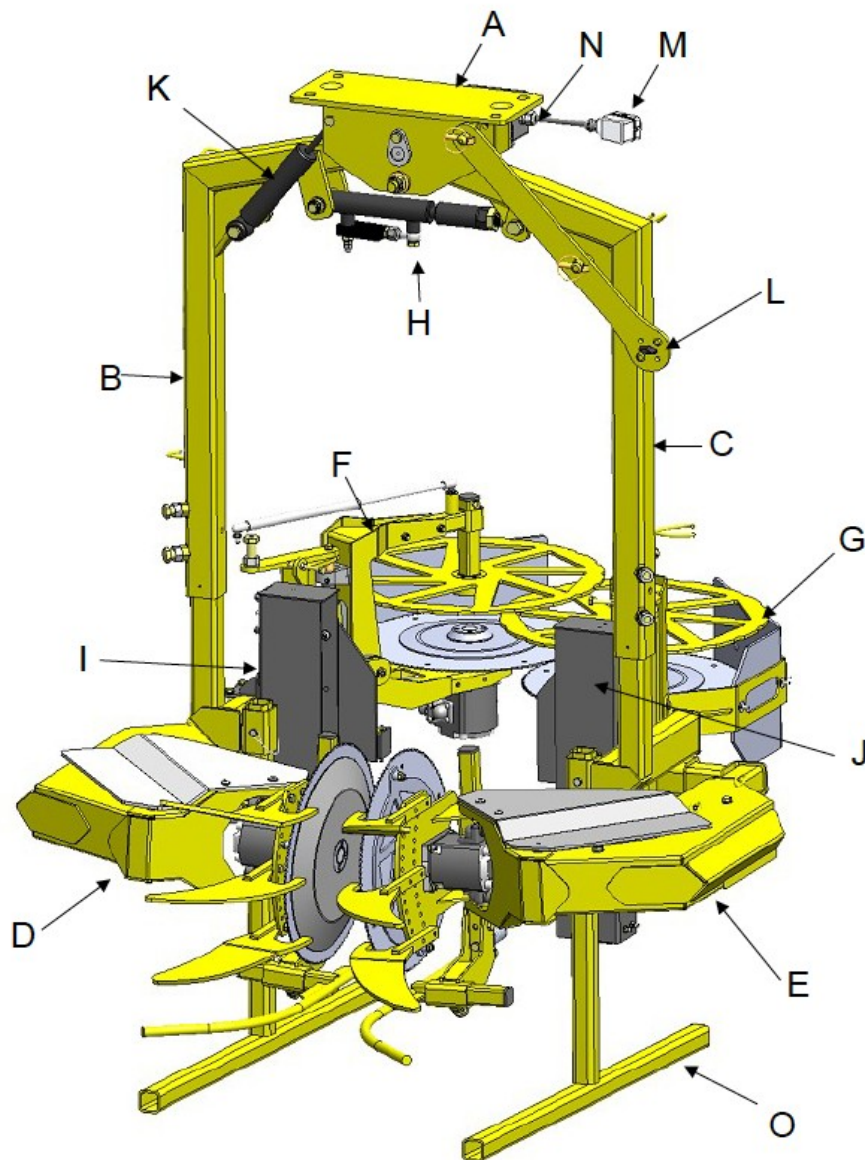




MINIMAL PRUNER PRESENTATION

TERMINOLOGY OF THE MAIN COMPONENTS - MINIMAL PRUNER TMX1210

| Minimal pruner TMX1210 | | | |
|------------------------|---------------------------------------|---|---------------------------------|
| A | Mast mounting plate | I | Transmitter sensor (right side) |
| B | Right hand side arch arm | J | Receiver sensor (left side) |
| C | Left hand side arch arm | K | Pendulum shock absorber |
| D | Right hand side vertical saw module | L | Pendulum restraining bar |
| E | Left hand side vertical saw module | M | Machine connection pin |
| F | Right hand side horizontal saw module | N | Machine terminal box |
| G | Left hand side horizontal saw module | O | Stands |
| H | Arch opening cylinder | | |

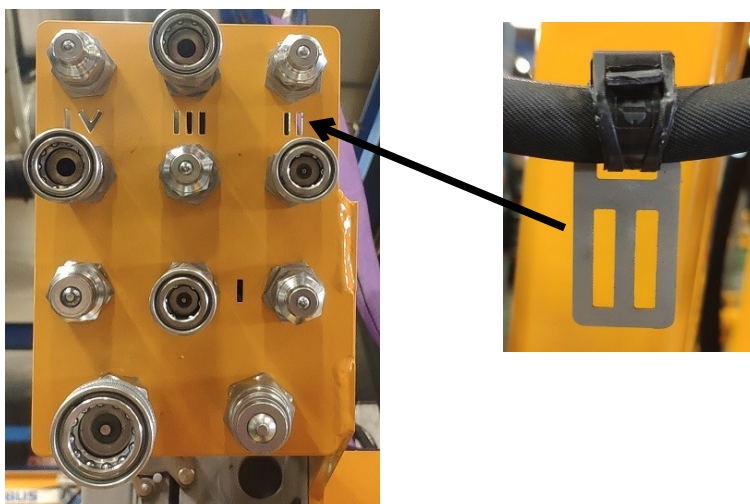




MINIMAL PRUNER - COMMISSIONING

Coupling the minimal pruner to the multipurpose mast

- 1- Ensure that the machine is on a flat and stable surface.
- 2- Position the mast so that the stem's arm plate is aligned with the connecting plate of the minimal pruner.
- 3- Lower the mast until it touches the 2 plates.
- 4- Attach the minimal pruner with the 4 M16 screws supplied with the mast.
- 5- Stop the tractor and turn off the electric control handle.
- 6- Connect the machine's hydraulic hoses to the mast using the quick couplings. The cylinder hoses are identified with stainless steel labels.



- 7- Connect the machine's electrical plug to the mast:





MINIMAL PRUNER - COMMISSIONING

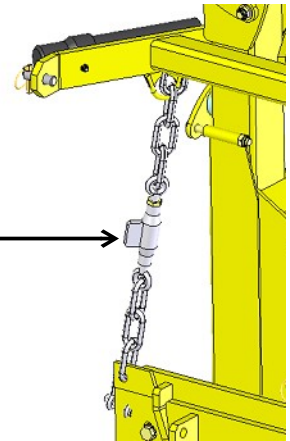
8- Restart the tractor, turn the handle back on, and start the hydraulics.

9- Raise the mast and ensure that it remains as vertical as possible.

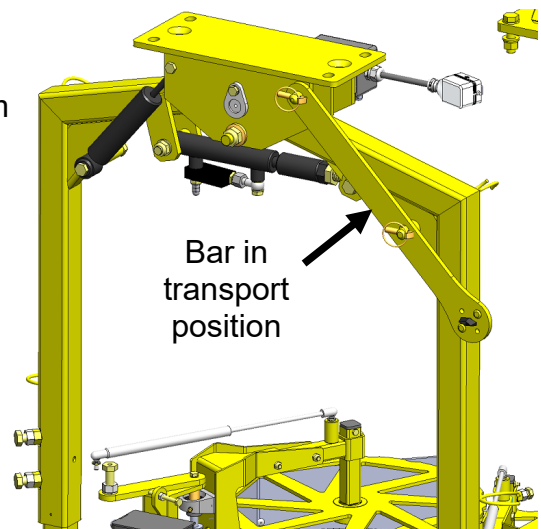
If the mast tilts when lifting, lower the machine to the ground and tighten the stabiliser chain.

10- Remove the stands from the minimal pruner.

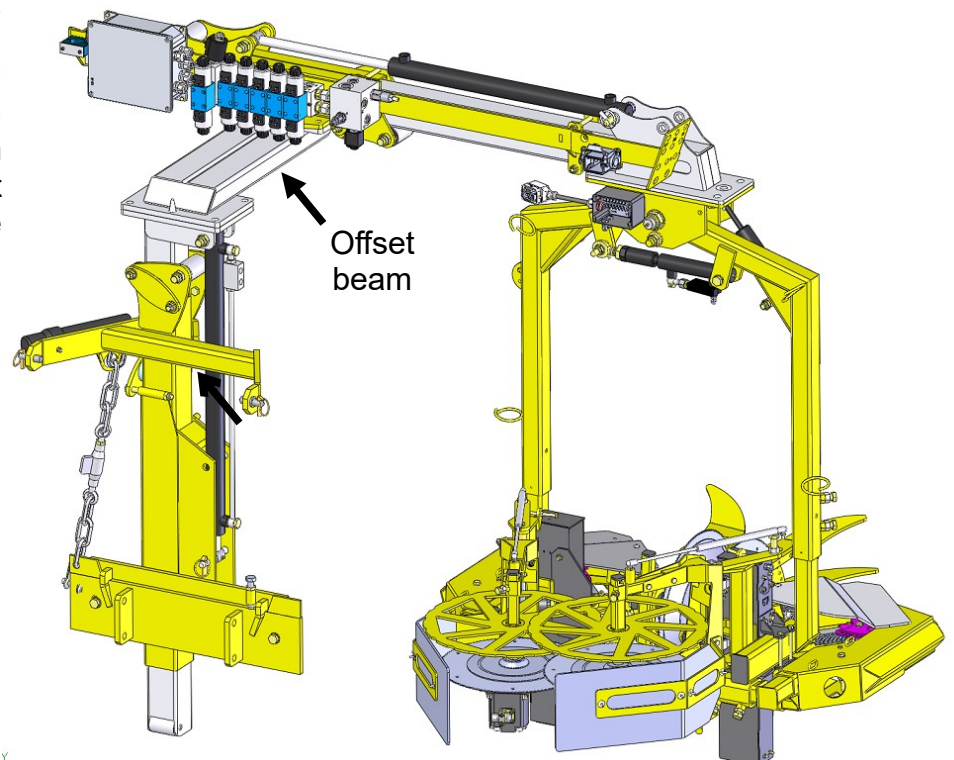
11- Test all of the machine's hydraulic functions.



Before starting work, remember to remove the pendulum restraining bar from the arch. Replace this bar before transporting.



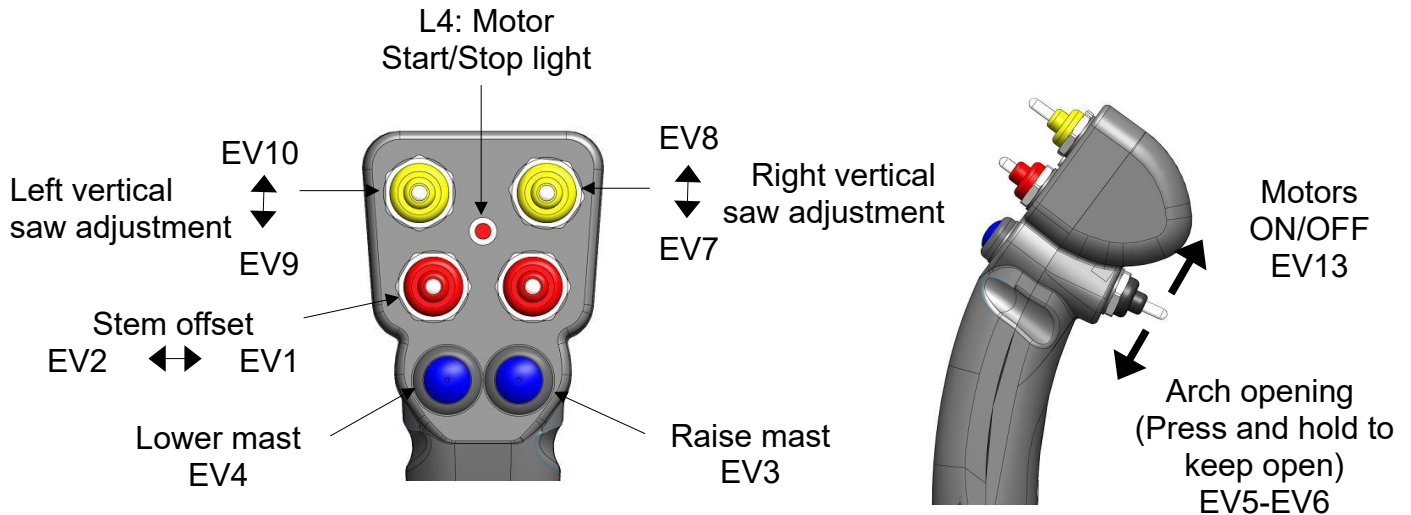
If the machine is coupled to a tractor with a front 3-point linkage, the offset beam that is mounted between the mast and the stem can be removed. This beam offsets the machine by moving it forwards 600mm away from the tractor wheels.





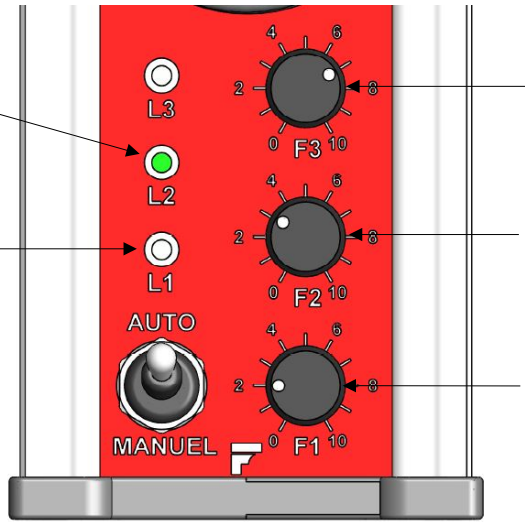
MINIMAL PRUNER - COMMISSIONING

Electric control



L2: Activation light for automatic cordon tracking

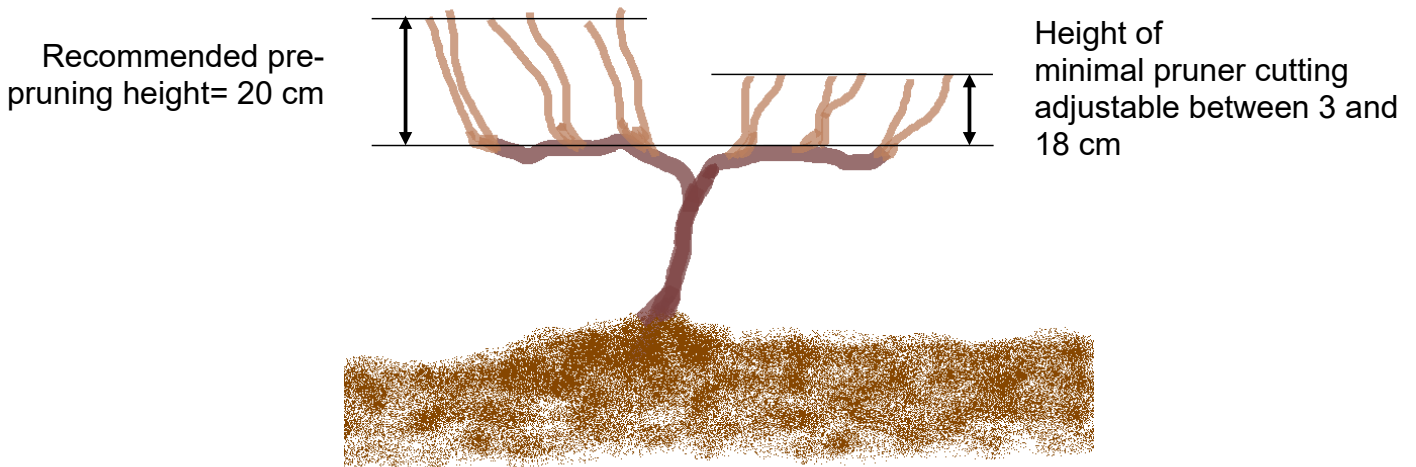
L1: Permanent light = arch held open
Flashing light = safety start (arch needs to be closed to activate automation or presence of vegetation)



F3: Cutting height adjustment
0= 3cm 10=18cm
Factory setting: 7

F2: Lifting speed setting
0= slow speed 10= fast speed
Factory setting: 4

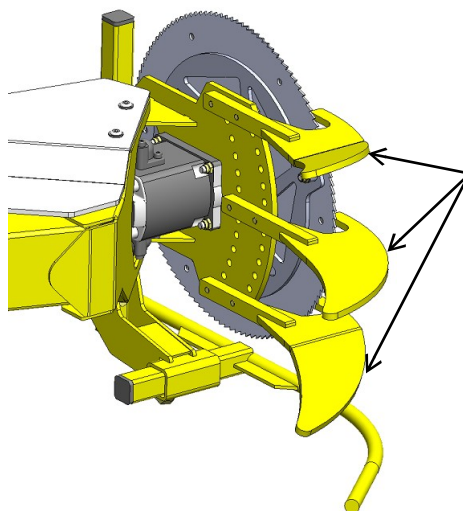
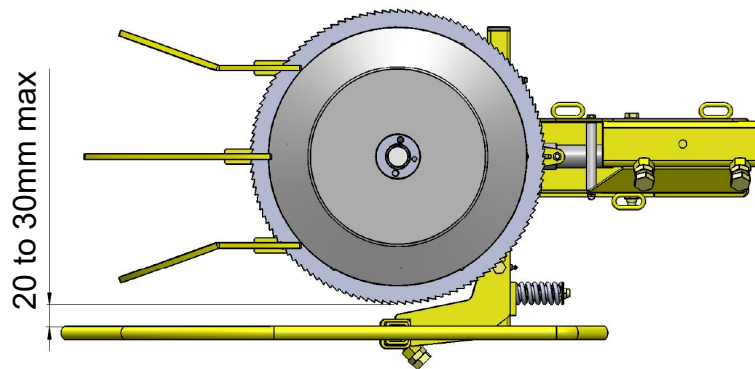
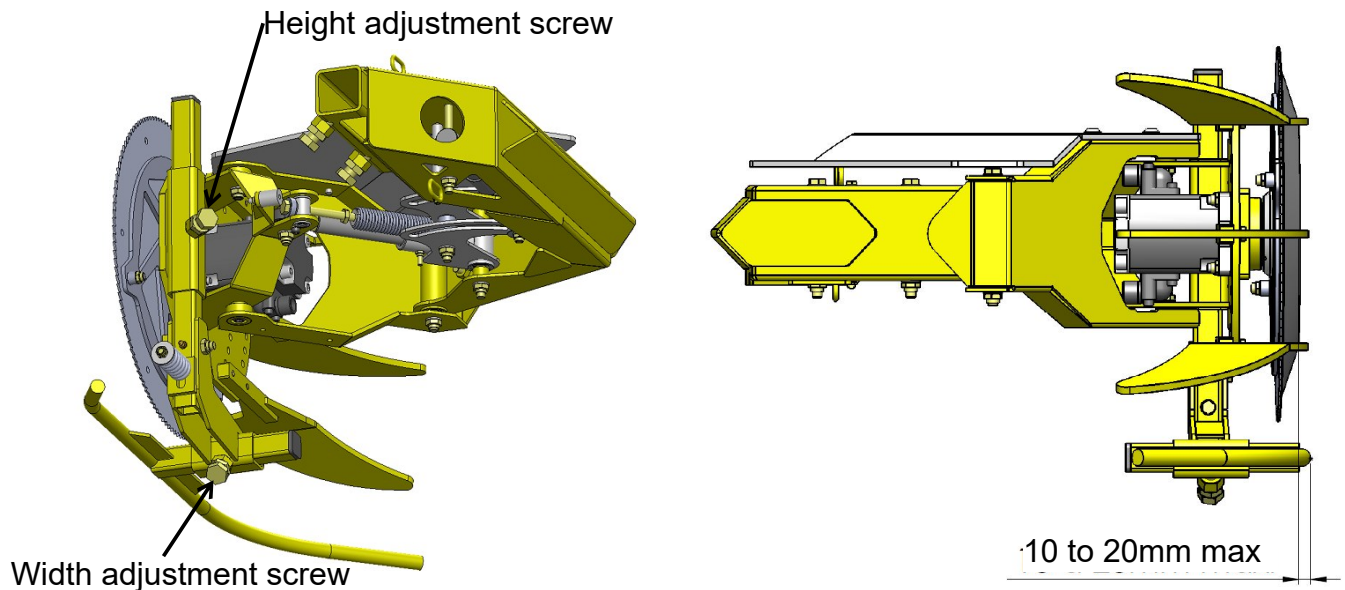
F1 : Lowering speed setting
0= slow speed 10= fast speed
Factory setting: 2



MINIMAL PRUNER - COMMISSIONING

Cutting element' adjustments

Bottom guides for vertical saws:



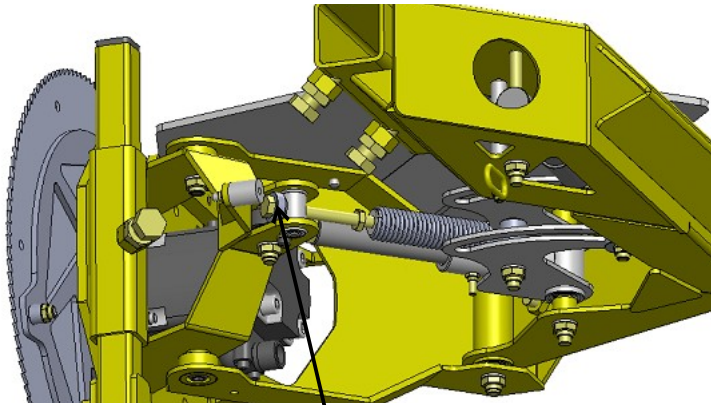
Saw blade guides:

They allow the vine to push back the parallelogram supporting the saws.

These guides can be brought closer together using the different possible attachments

MINIMAL PRUNER - COMMISSIONING

Firmness of the vertical saw support parallelogram:

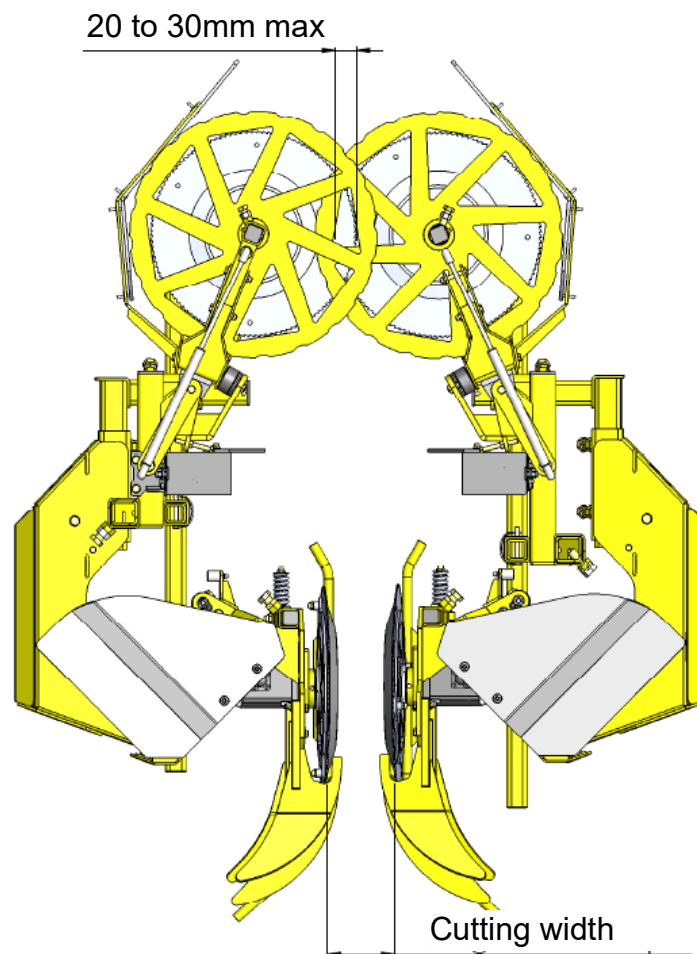


Screw in to increase the force/screw out to decrease it

Cutting width:

The cutting width can be adjusted with the electric control handle. 2 hydraulic cylinders act on the saw support parallelograms.

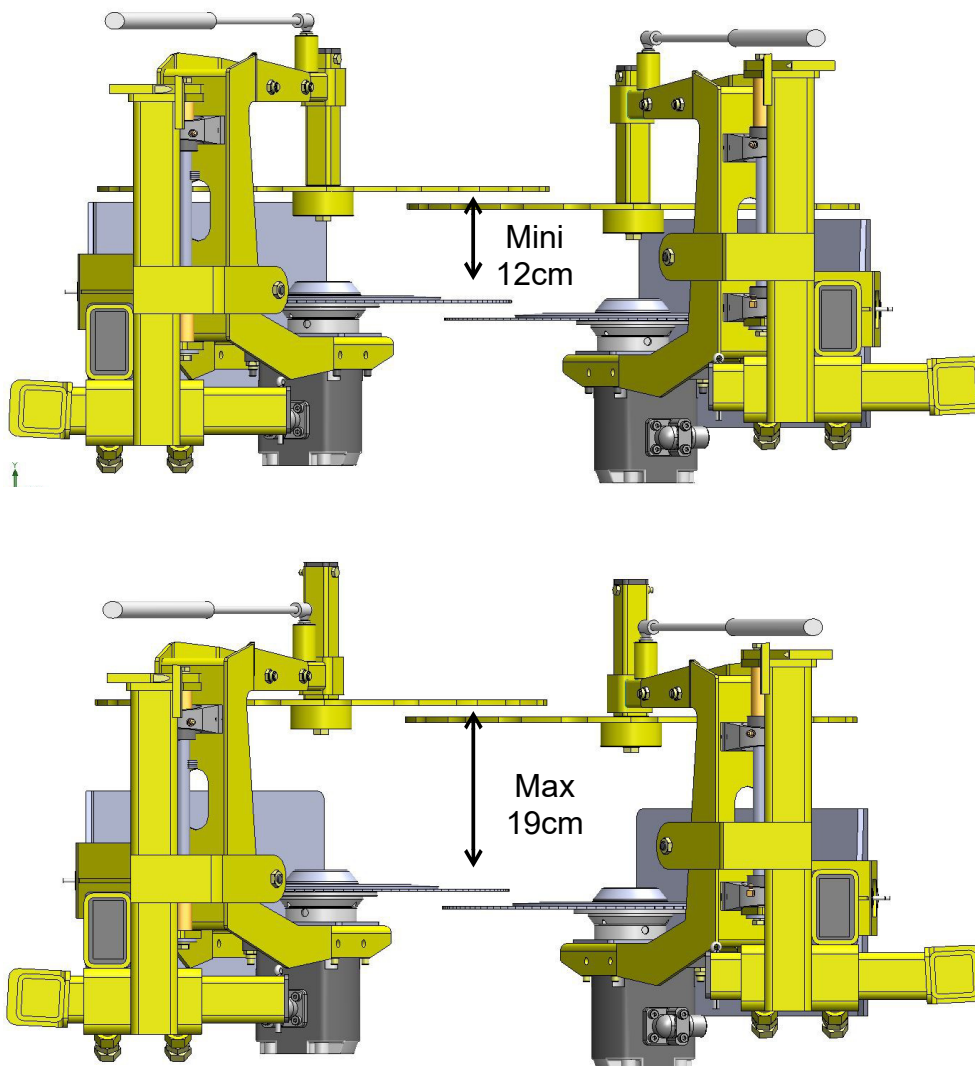
Overlap of horizontal saws:





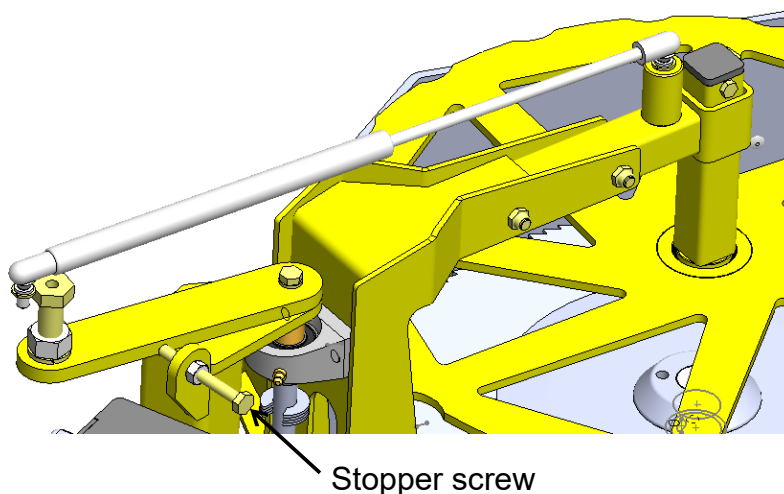
MINIMAL PRUNER - COMMISSIONING

Height of the opening discs of the horizontal saws:



Retraction resistance of horizontal saws:

Loosen the pivot screw and then screw in the stop screw to increase the resistance of each horizontal saw's retraction. Remember to retighten the pivot screw after adjustment.





MINIMAL PRUNER - COMMISSIONING

Start-up in the vineyard:

- Remove the pendulum restraint bar from the arch.
- Set the tractor to its working speed.
- Open the arch by holding down the trigger on the back of the handle until the L1 open-arch light is on.
- Turn on the saw motors by pushing up the trigger on the back of the handle and wait until they have reached their maximum rotation speed (± 2800 rpm).
- Position the machine between the rows of vines.
- Adjust the height of the machine so that the cordon is within the sensors' detection zone.
- Close the arch by pressing the trigger on the back of the handle.
- Activate the auto mode, the machine will position itself at the height set by the potentiometer F3.
- Open the arch when entering or leaving each row to avoid damaging the trellis wires.

Remarks:

When the arch is open, the detection system is automatically switched off.

Manual control takes priority over automatic mode. It is possible to take control of the machine at any time to control raising or lowering while keeping the automatic mode activated.

Sensor alignment procedure

This should only be done if the sensors have been moved during adjustment or replaced for maintenance.

IMPORTANT: Stop the tractor and turn off the hydraulics before working on the machine.

- 1 Check that there are no obstacles between the sensors.
- 2 Check that the sensors are clean. Clean if necessary with a soft cloth.
- 3 Check that the sensors are positioned at the same height in the housings.
- 4 Check that the sensors are aligned vertically ($\pm 10\text{mm}$).
- 5 Check that the sensors are aligned horizontally ($\pm 10\text{mm}$).
- 6 Check that the sensors are parallel to each other (adjust the parallelism of the arch arms if necessary).
- 7 Turn the control handle ON.
- 8 Remove the screws from the small inspection hatch at the rear of the left sensor box (as seen from the tractor).
- 9 Push the white "Teach" button on the back of the sensor to align the barriers. The yellow "Alignment" light should go out after a few seconds.
- 10 The green RS485 light should flash every second.
- 11 Check that it is working correctly by passing your hand between the right and left sensors: the yellow light on the left sensor lights up when you pass your hand and should go out when you remove it.

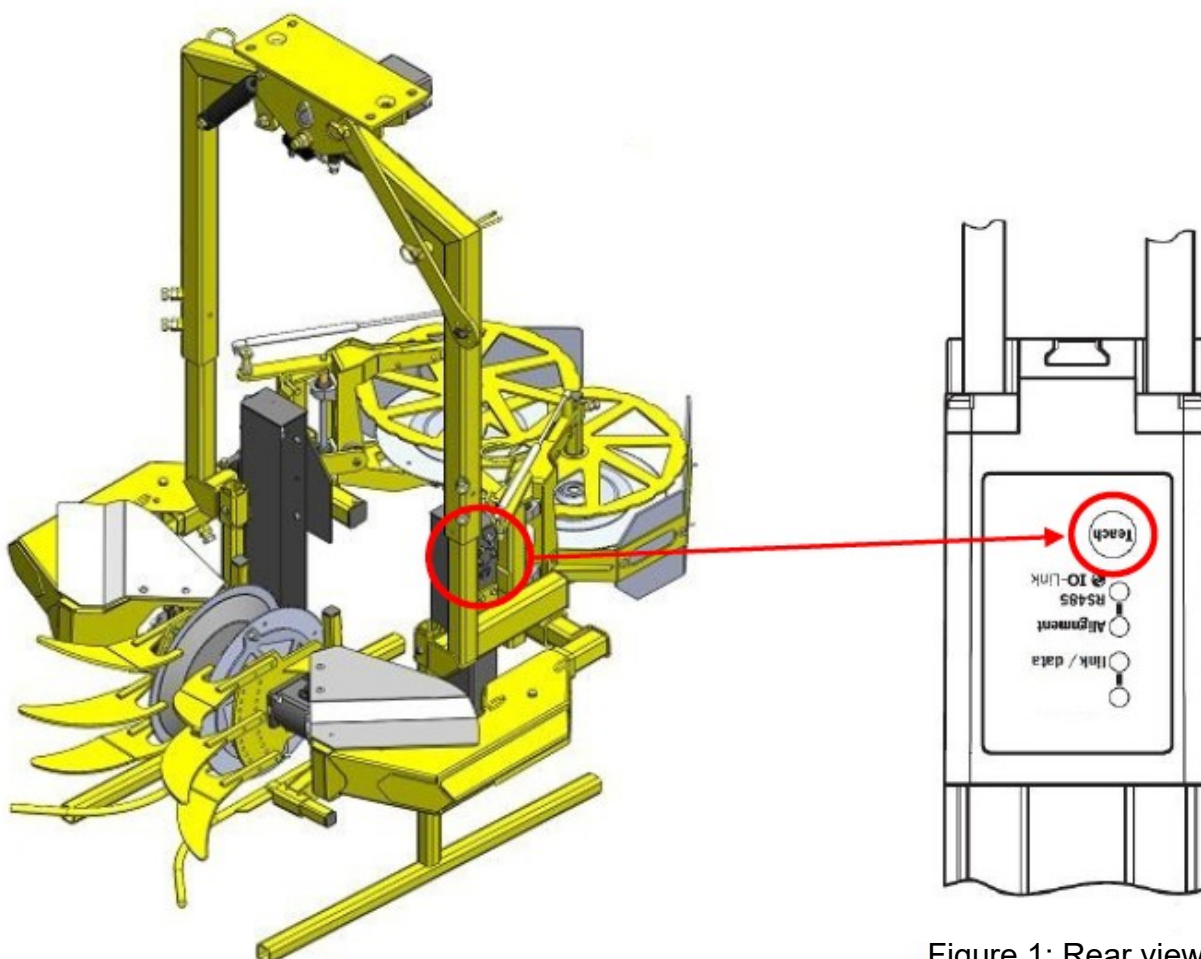


Figure 1: Rear view of left-hand sensor

MINIMAL PRUNER - MAINTENANCE

Changing saws:

WARNING: The tractor MUST be off when working on the saws.

Saws can be qualified as wear parts. To ensure the quality of cutting they must be sharpened or replaced on a regular basis.

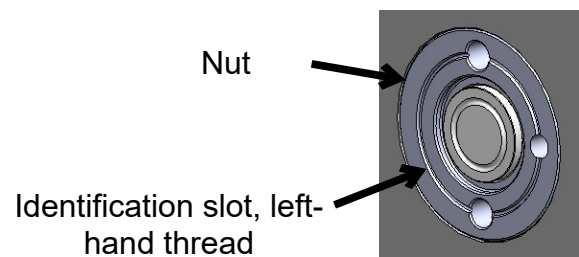
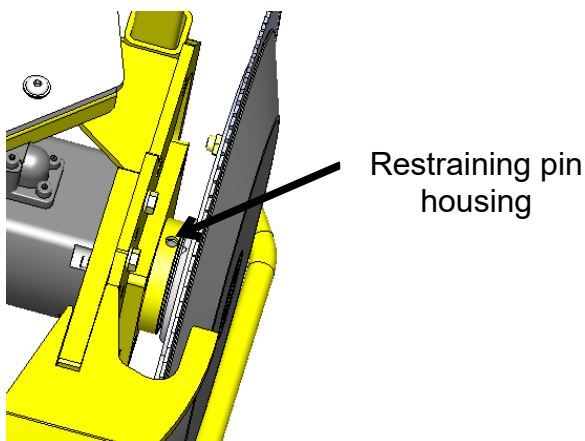
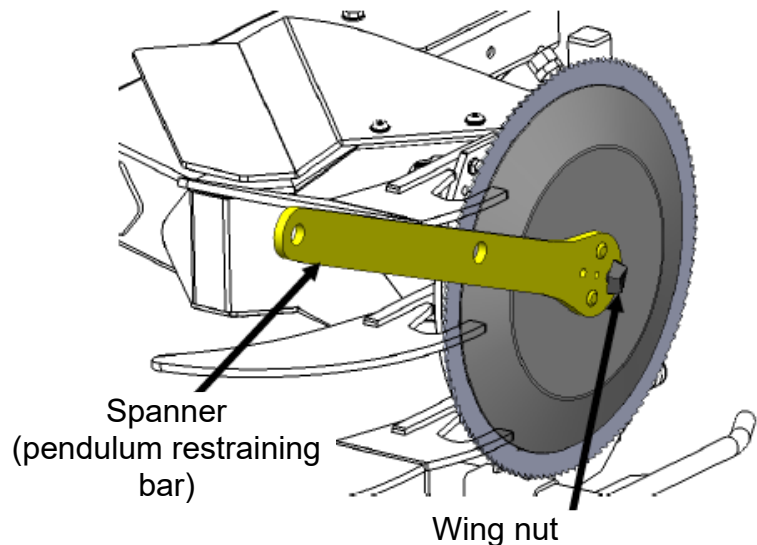
Always wear gloves when working on the blades.

Vertical saws:

The pendulum restraining bar also serves as a key for dismantling the saws.

- Insert the pins of the spanner into the central nut, then screw the wing screw into the threaded hole in the nut to hold the spanner in place.

- Insert the shaft restraining pin into its housing

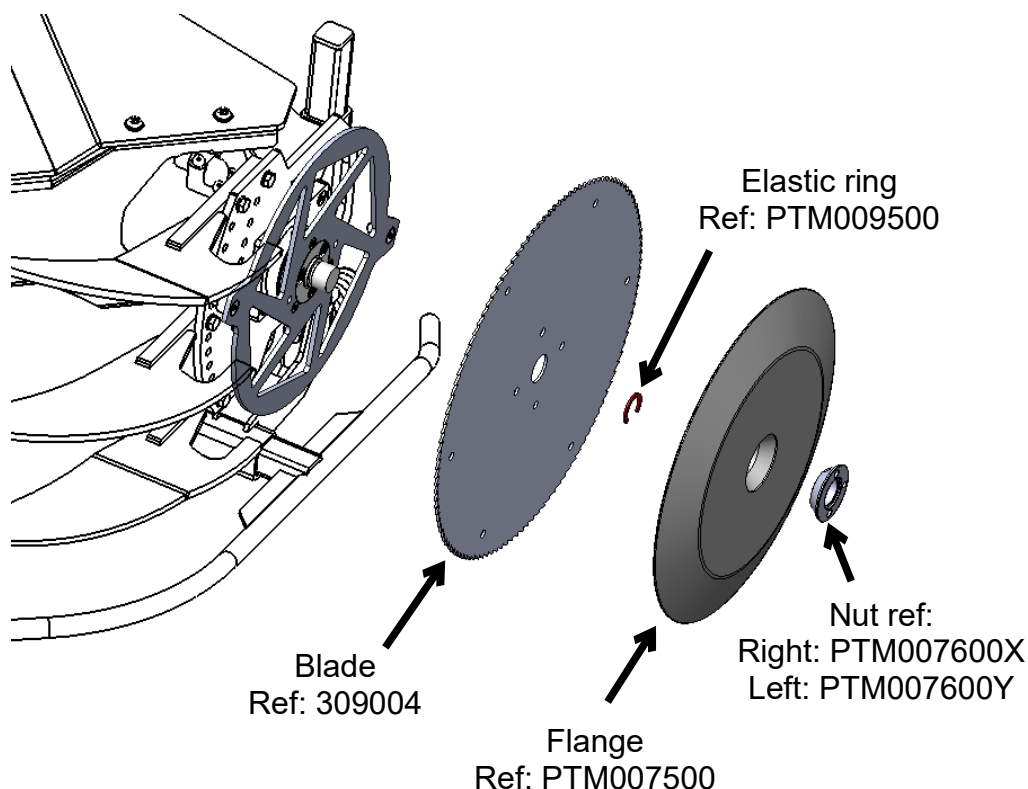


Unscrew the nut.

CAUTION: The left saw nut has a left-hand thread, turn the spanner clockwise to loosen.



MINIMAL PRUNER - MAINTENANCE

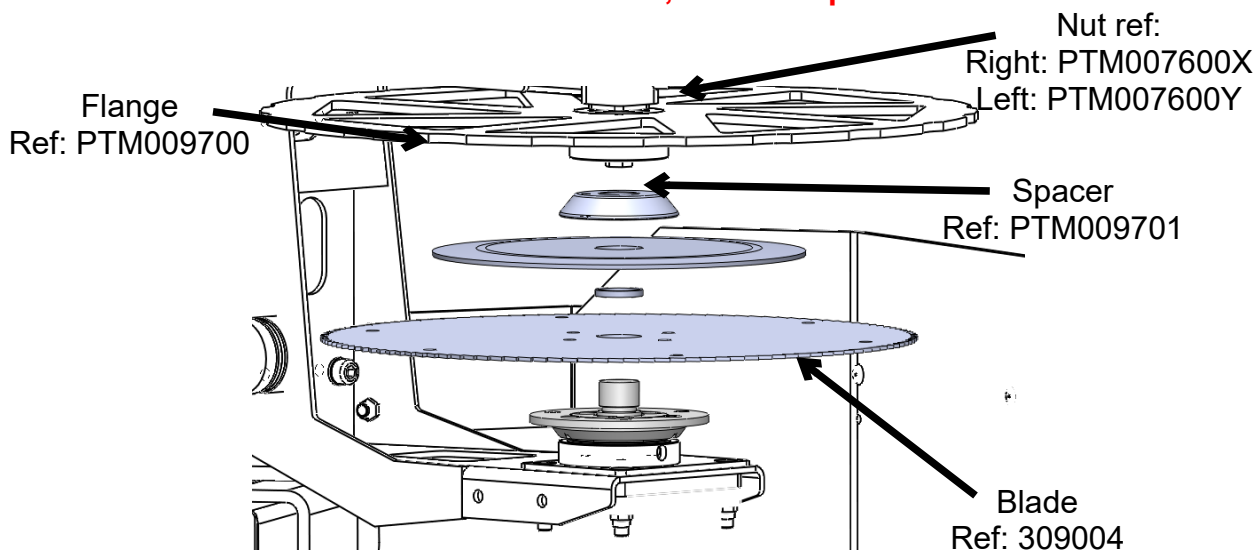


Ensure that you replace the elastic ring after reassembling the blade.

Horizontal saws:

These are replaced in the same way as the vertical saws.

CAUTION: The left saw nut has a left-hand thread, turn the spanner clockwise to loosen.



Ensure that you replace the elastic ring after reassembling the blade.



PRE-PRUNER PRESENTATION

The FERRAND pre-pruning machine is available with or without an automatic mechanism for opening around posts.

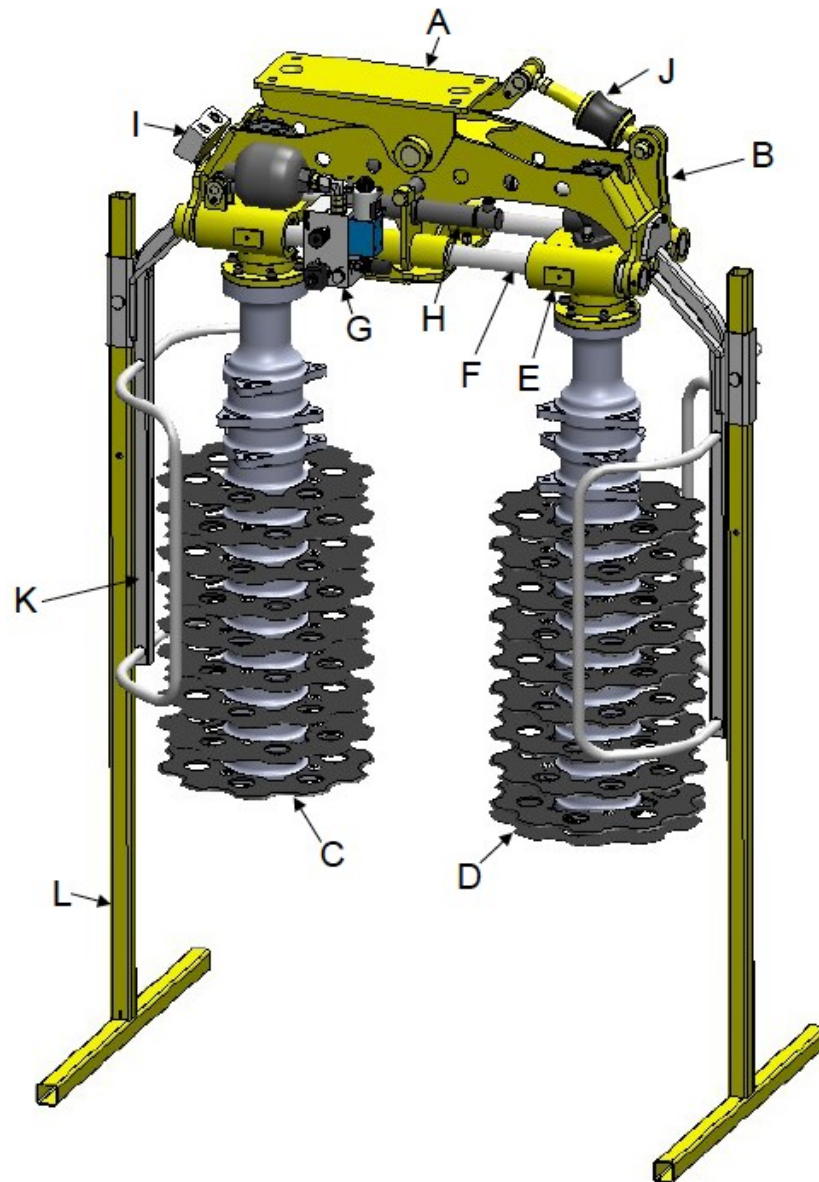
The optimal hydraulic flow rate for mast operation with the minimal pruner is 45L/min.





TERMINOLOGY OF THE MAIN COMPONENTS - PRE-PRUNING MACHINE P4260

| PRE-PRUNING MACHINE P4260 | | | |
|---------------------------|---------------------|---|---------------------------------------|
| A | Mast mounting plate | G | Hydraulic distributor |
| B | Arch frame | H | Opening cylinders |
| C | Right shaft | I | Flow rate dividing unit |
| D | Left shaft | J | Shock absorber (or optional cylinder) |
| E | Hub holder slides | K | Protection |
| F | Chrome bars | L | Stands |

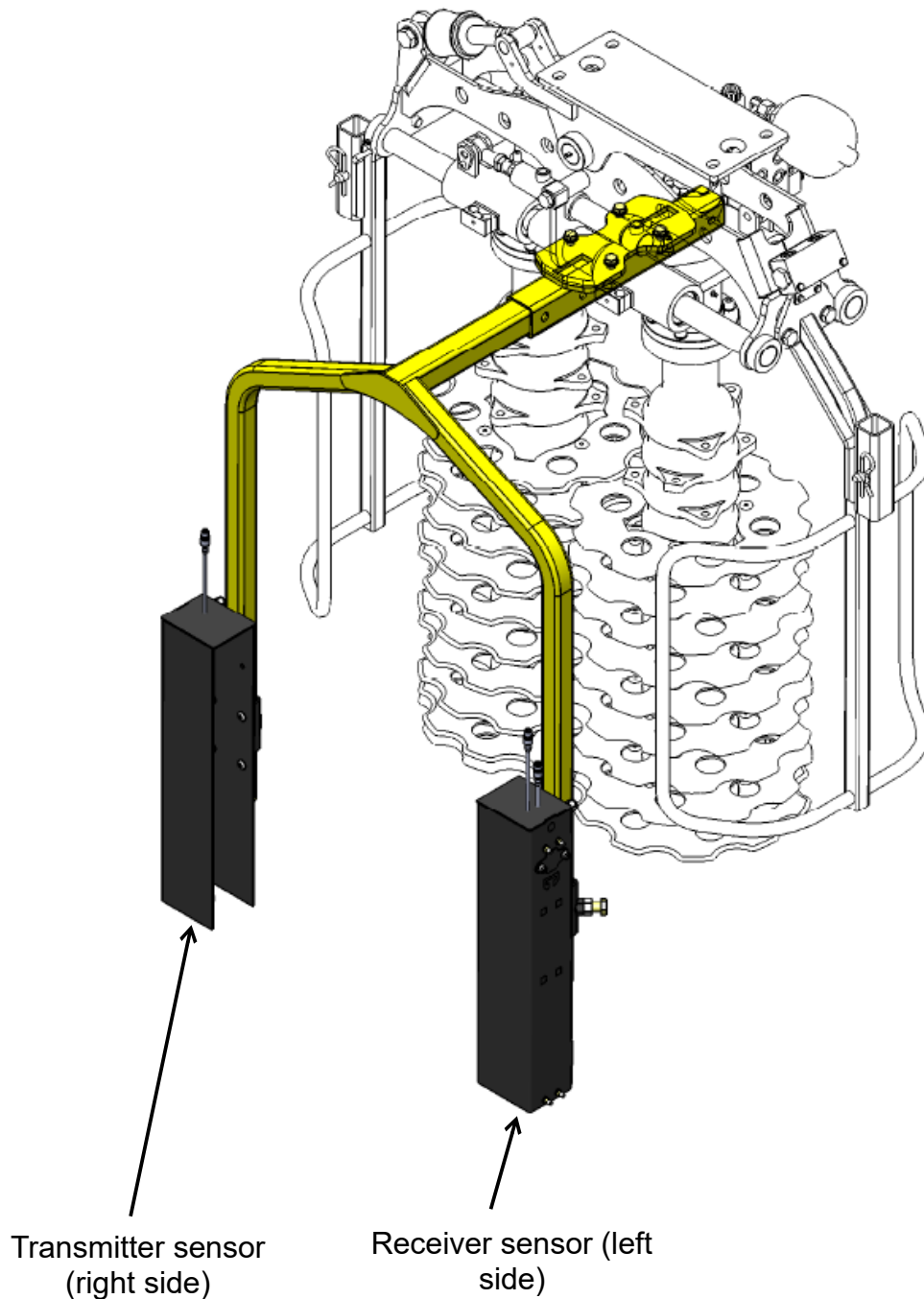




PRE-PRUNING MACHINE - PRESENTATION

OPTIONAL AUTOMATIC OPENING AROUND POSTS P80X

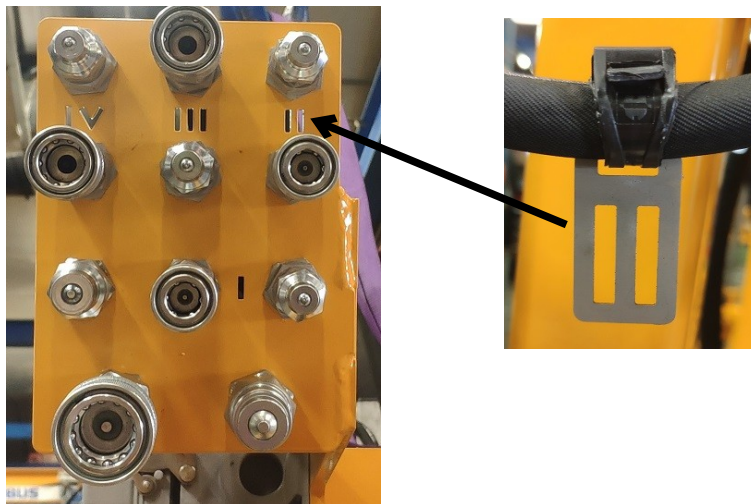
Automatic opening around posts allows the machine to detect the trellis posts so that it opens automatically when the discs pass.





Coupling the pre-pruner to the multipurpose mast

- 1- Ensure that the machine is on a flat and stable surface.
- 2- Position the mast so that the stem's arm plate is aligned with the connecting point of the pre-pruner.
- 3- Lower the mast until it touches the 2 plates.
- 4- Attach the pre-pruner with the 4 M16 screws supplied with the mast.
- 5- Stop the tractor and turn off the electric control handle.
- 6- Connect the machine's hydraulic hoses to the mast using the quick couplings. The cylinder hoses are identified with stainless steel labels.



- 7- Connect the machine's electrical plug to the mast:

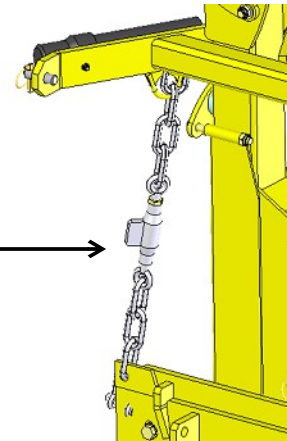




PRE-PRUNER COMMISSIONING

8- Restart the tractor, turn the handle back on, and start the hydraulics.

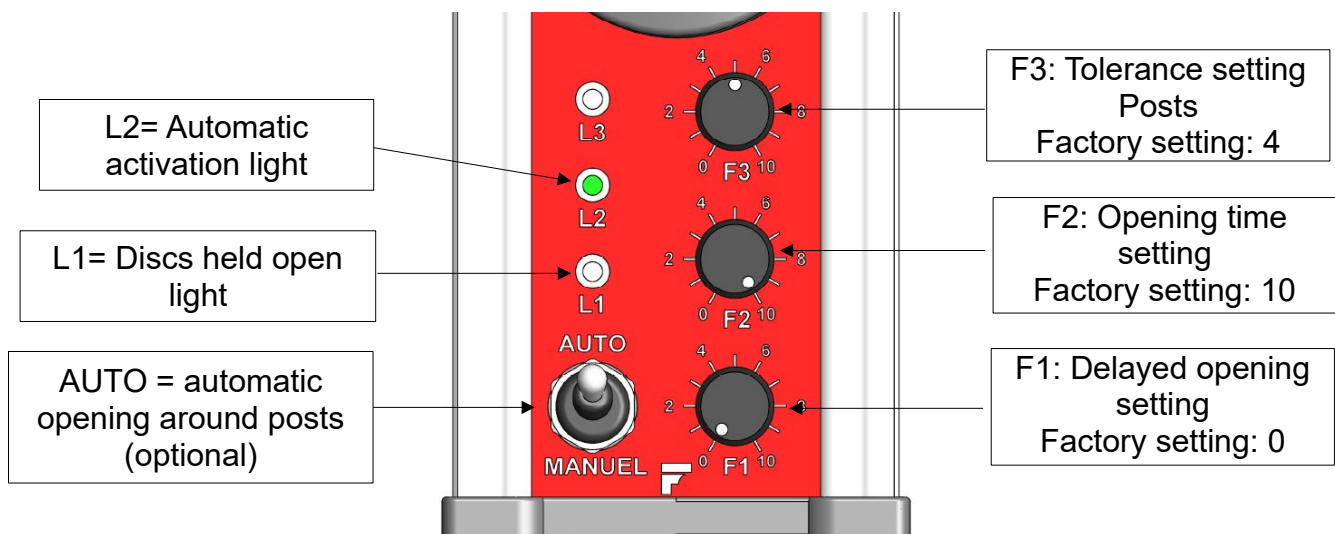
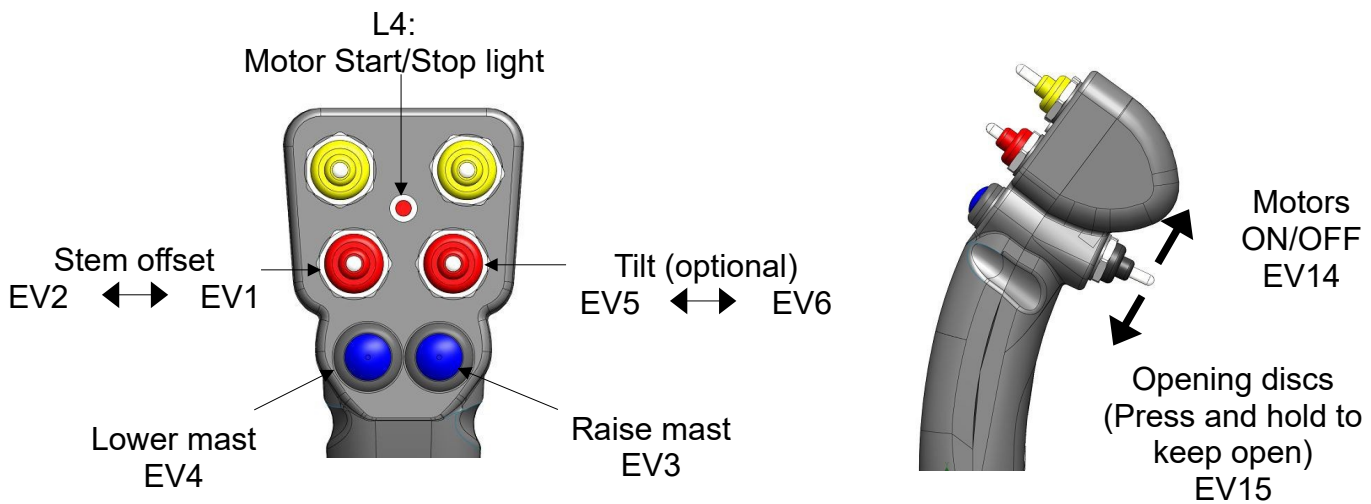
9- Raise the mast and ensure that it remains as vertical as possible.
If the mast tilts when lifting, lower the machine to the ground and tighten the stabiliser chain.



10- Remove the stands from the pre-pruner.

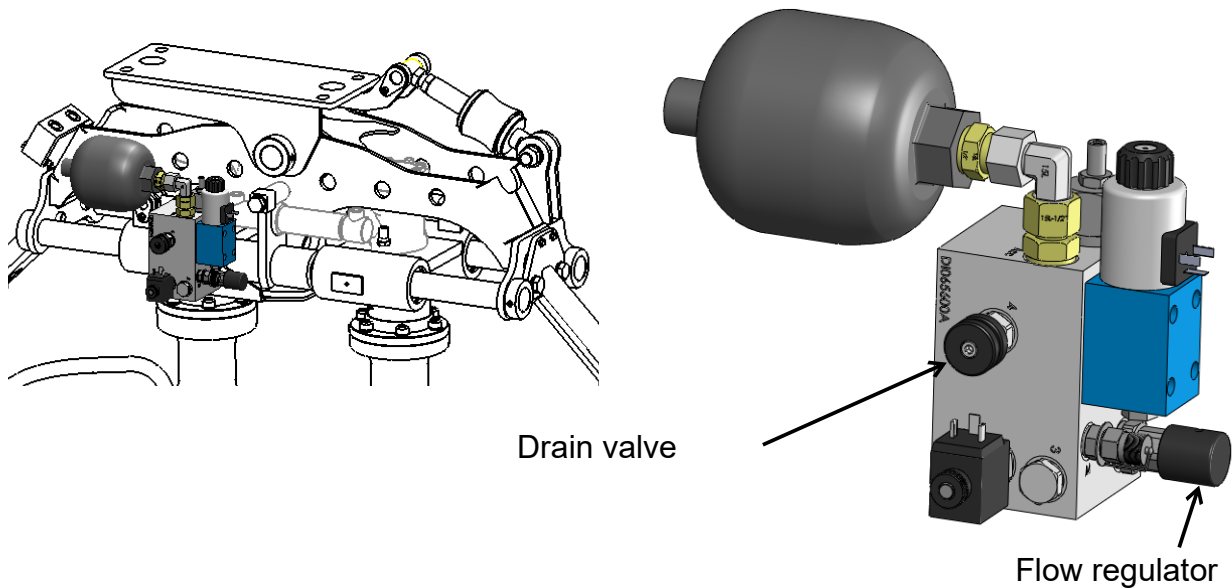
11- Test all of the machine's hydraulic functions.

Electric control



Hydraulic distributor

The pre-pruner is equipped with a hydraulic valve that opens the arch and rotates the rotor motors.



The drain valve must be opened before any manual work on the machine. This releases the pressure contained in the block.

This valve must remain closed when using the machine.

The flow regulator splits the flow entering the block between the arch opening and the motors. Unscrewing it increases the speed that the arch opens but decreases the speed of the rotors. The speed of the motors must then be readjusted using the control knob on the mast block (see section on commissioning the multi-purpose mast).

If the motors do not run fast enough even with the mast distributor's control knob fully open, then the control knob of the pre-pruner's distributor (above) must be closed until the desired speed is reached.

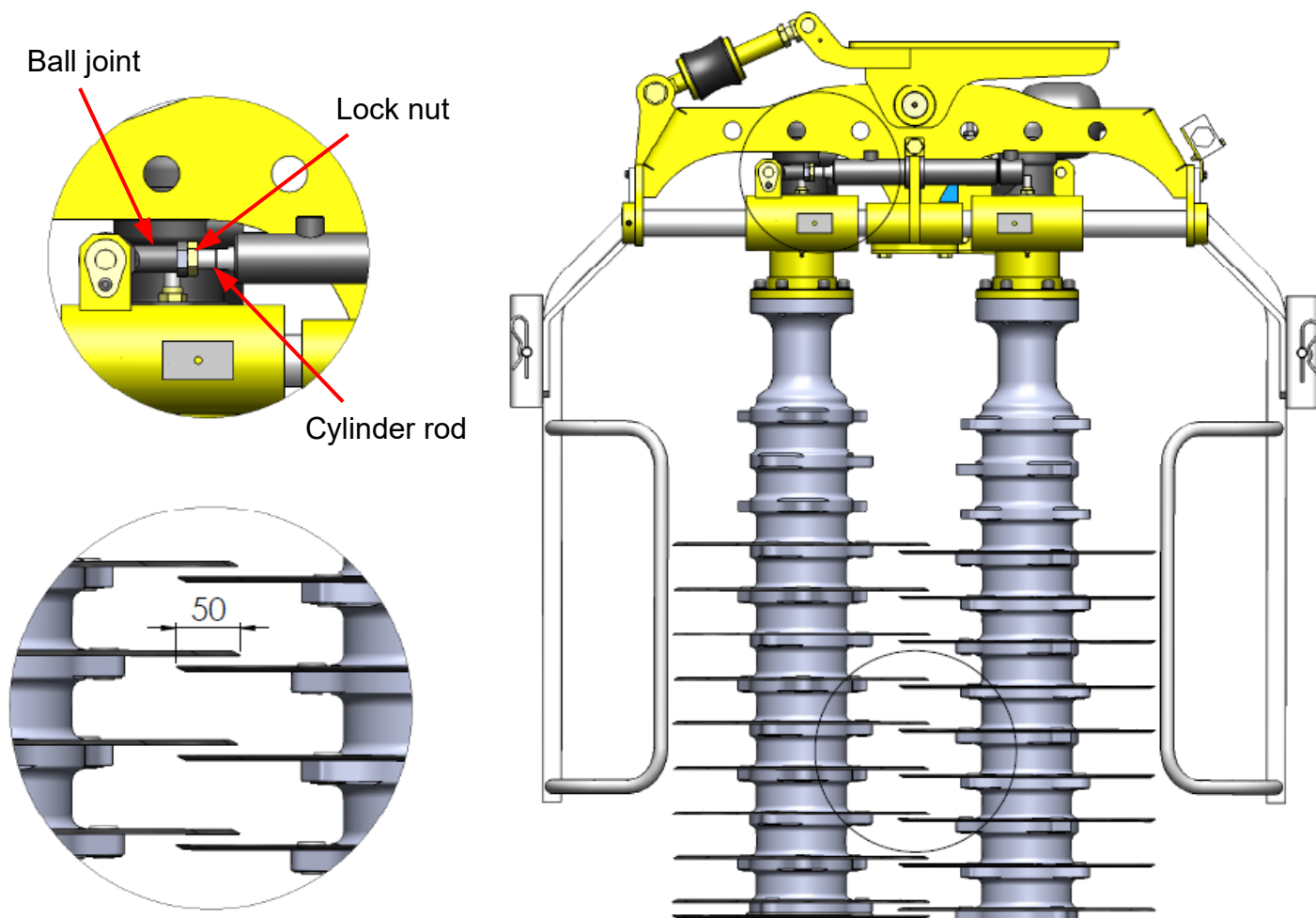
The machine's right-hand rotor should rotate at about 400 rpm.

This block should not be adjusted in any other way unless the dealer is present.

For any **additional information** concerning the **ELECTRICAL, HYDRAULIC,** etc. parts, please contact your **DEALER (DOC 16-11-05)**

Settings

Overlap of discs:



- 1- Unscrew the lock nut of the ball joint at the end of the cylinder with a 24 mm spanner.
- 2- Screw the cylinder rod with a 17 mm spanner into the ball joint to increase the overlap. Unscrew to reduce the overlap.
- 3- Tighten the lock nut with the 24 mm spanner.
- 4- Perform the same operations on the opposite cylinder.

PRE-PRUNING MACHINE - COMMISSIONING

OPTIONAL AUTOMATIC OPENING AROUND POSTS

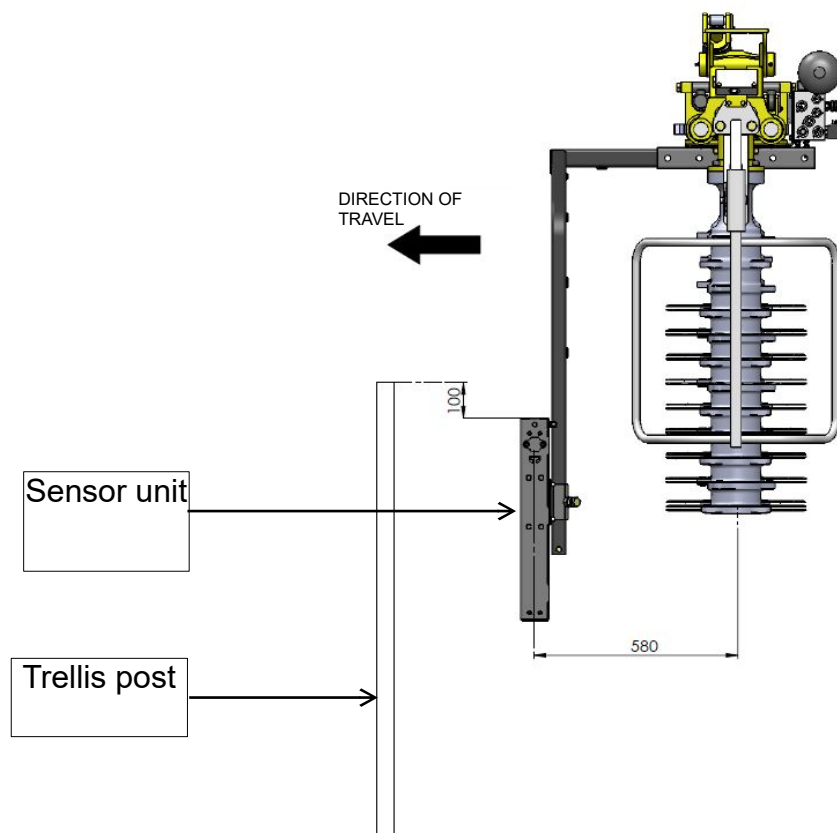
This system detects the trellis posts and automatically opens the pre-pruning discs when passing around the posts.

Conditions of use:

- Works on all types of posts >25mm wide: wood, angle iron, galvanised.
- Leafless vines
- Recommended driving speed: 3 to 6 km/h.

Pre-adjustments:

- To function, the sensors must detect the entire height (45cm) of an obstacle: position the sensor units at least 10cm below the post-heads.
- Check the position of the sensors, they must be in parallel and vertically aligned with each other.
- **IMPORTANT:** After adjusting the sensors, perform the sensor alignment procedure (see next page).
- Regularly check that the sensors are clean. Clean the front with a soft cloth if necessary.



PRE-PRUNING MACHINE - COMMISSIONING

OPTIONAL AUTOMATIC OPENING AROUND POSTS

Setting advice:

- Activate the automated system with the AUTO switch on the control handle: the L2 light switches on.
- Set the handle potentiometers: **F1= 0**, **F2 =10** and **F3= 4**.
- Once you have stabilised your speed, adjust to fine tune the work:
 - Increase F1 as you progress to get closer to the post before each automatic opening.
 - Then decrease F2 to reduce the opening time and work as close to the post as possible when the discs close.
 - If there are unexpected openings between posts (due to vertical shoots), lower F3.
 - The faster the tractor drives, the lower the detection accuracy, increase F3 if the system does not detect the posts.

Settings:

- **Tolerance:** potentiometer F3.
0 = no tolerance 10= maximum tolerance
- **Opening time:** potentiometer F2.
0= short opening 10= long opening
- **Delayed opening:** potentiometer F1 .
0= fast tractor speed 10= slow tractor speed

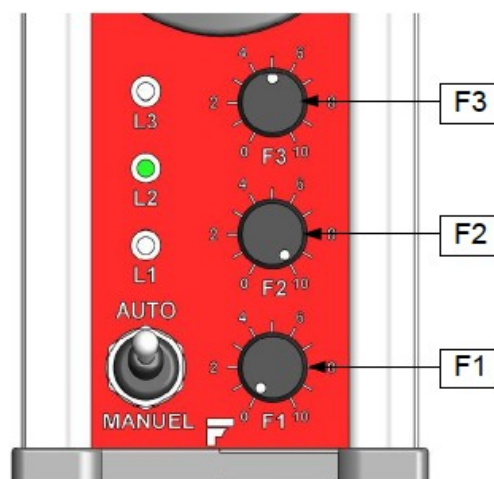
Potentiometer F3 works in steps:

- Step 1: F3 <1
- Step 2: F3=2
- Step 3: F3= 5
- Step 4: F3= 7
- Step 5: F3= 9
- Step 6: F3=10

Recommendations:

Posts without holes: F3=0

Galvanised posts with holes: F3=2 (minimum level 2).



Remarks:

- Manually open the discs with the control handle to enter and leave the row and avoid the wires (tilted outer posts).

OPTIONAL AUTOMATIC OPENING AROUND POSTS

Sensor alignment procedure

This should only be done if the sensors have been moved during adjustment or replaced for maintenance.

IMPORTANT: Stop the tractor and turn off the hydraulics before working on the machine.

- 1- Check that there are no obstacles between the sensors.
- 2- Check that the sensors are clean. Clean if necessary with a soft cloth.
- 3- Check that the sensors are positioned at the same height in the housings.
- 4- Check that the sensors are vertically aligned (+-10mm).
- 5- Check that the sensors are aligned horizontally (+-10mm).
- 6- Check that the sensors are parallel to each other (adjust the parallelism of the arch arms if necessary).
- 5- Turn the control handle ON.
- 6- Remove the screws from the small inspection hatch at the rear of the left sensor box (as seen from the tractor).
- 7- Push the white " **Teach** " button on the back of the sensor to align the barriers. The yellow "Alignment" light should go out after a few seconds.
- 8- The green RS485 light should flash every second.
- 9- With the tractor switched off, check the operation by passing an object between the right and left sensors: the yellow light on the left sensor lights up when the object passes and should turn off when removed.

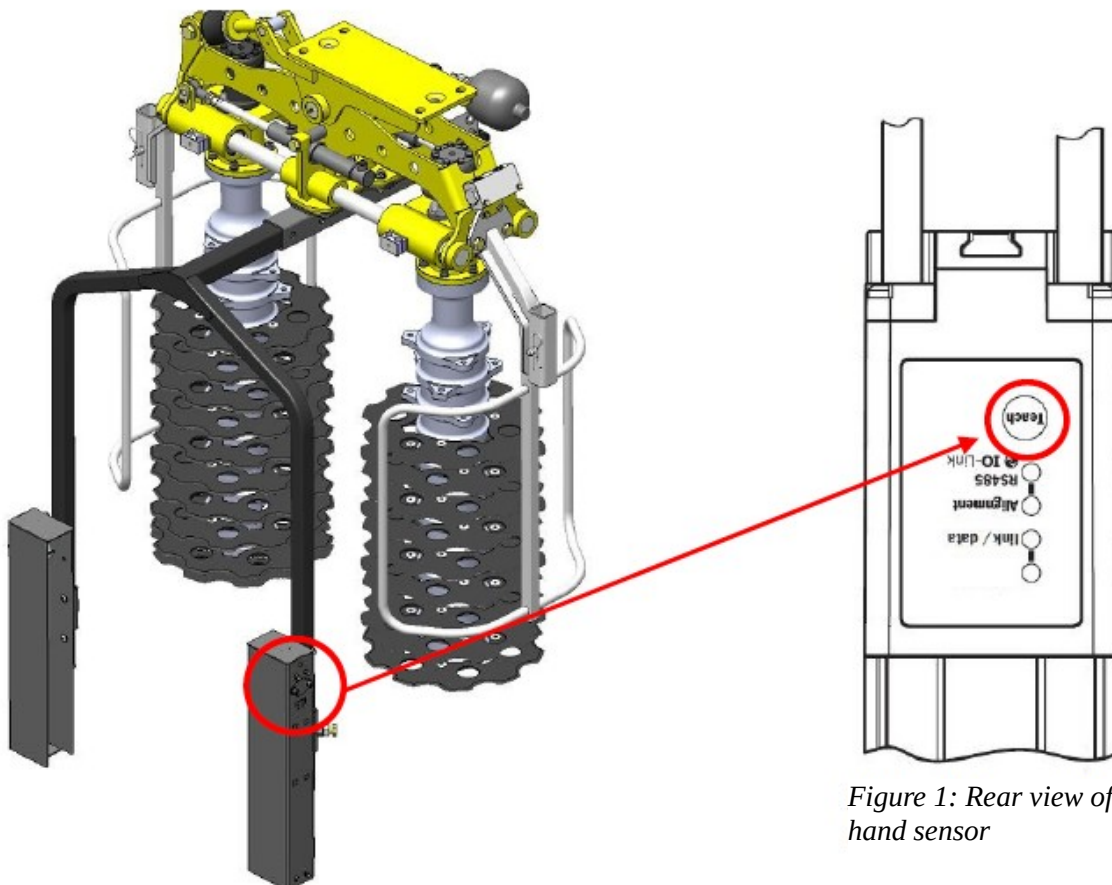


Figure 1: Rear view of left-hand sensor



PRE-PRUNING MACHINE - MAINTENANCE

Changing discs

WARNING: The tractor MUST be switched off before working on the discs.

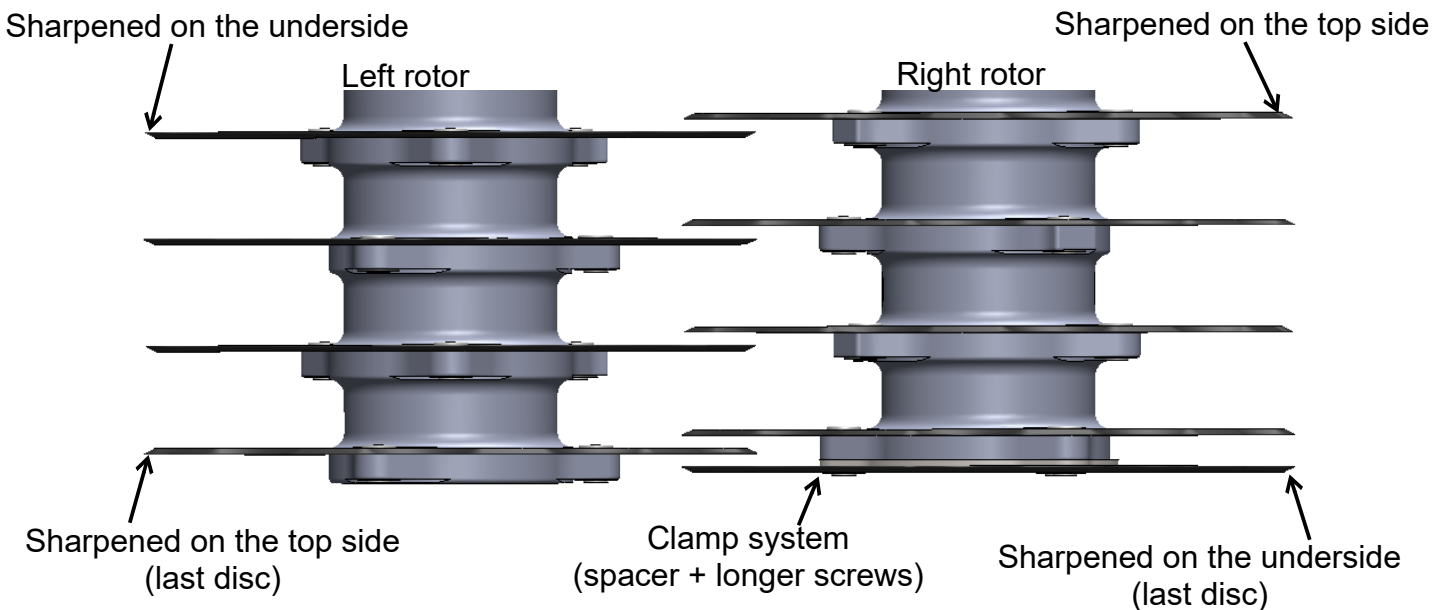
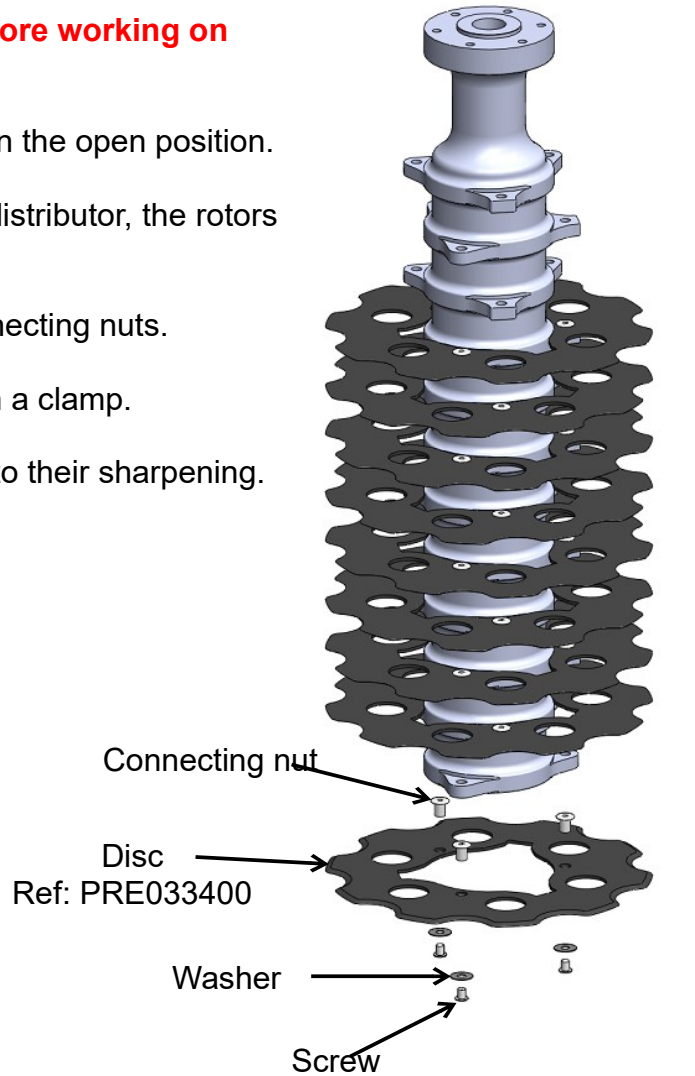
To change the discs, the machine must be stopped in the open position.

To do this, open the drain valve of the pre-pruner's distributor, the rotors can then be moved apart manually.

Each disc is held in place by 3 sets of screws + connecting nuts.

The last disc on the right-hand rotor is equipped with a clamp.

Pay attention to the direction of the discs in relation to their sharpening.





4-HEADED VINE SHOOT REMOVER PRESENTATION

FERRAND vine shoot removers are available with or without automatic ground tracking.

Ground tracking allows the height of the flails to be automated in relation to the ground. The machine is automatically lifted and lowered independently on the right and left to remain at a constant height from the ground.

Recommended driving speed: 3 to 5 km/h.

The optimal hydraulic flow rate for mast operation with a 4-headed vine shoot remover is 45L/min.

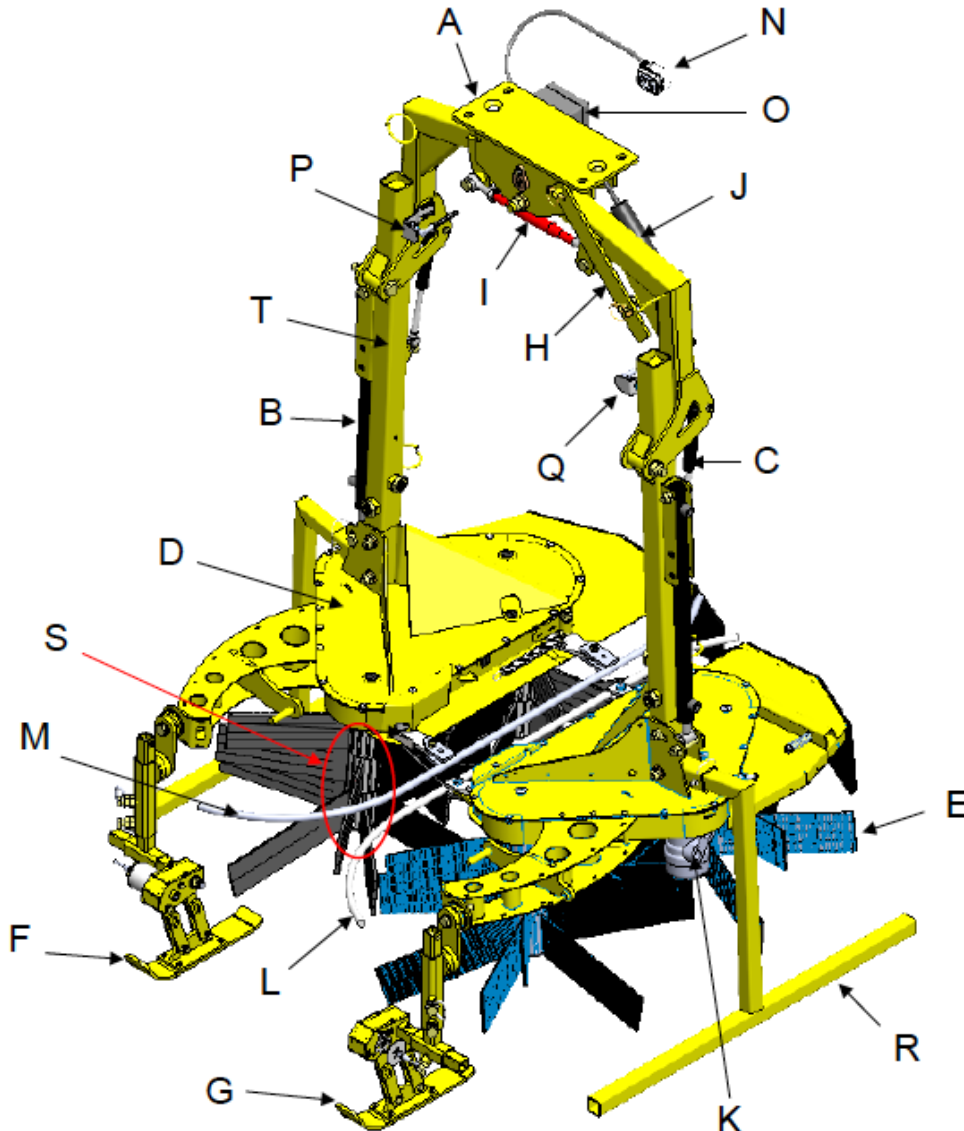




4-HEADED VINE SHOOT REMOVER - PRESENTATION

COMPONENT TERMINOLOGY - DTX2130 4-HEADED VINE SHOOT REMOVER

| | | | |
|---|---|---|---------------------------------|
| A | Mast mounting plate | K | Flail rotation motor |
| B | Module height cylinder | L | Left auto re-centring feeler |
| C | Safety gas cylinder | A | Right auto re-centring feeler |
| D | Casing (right side) | N | Machine connection pin (24-pin) |
| E | Flails | O | Machine connection unit |
| F | Ground tracking runner (right side) | P | Safety sensor (right side) |
| G | Ground tracking runner (left side) | Q | Safety sensor (left side) |
| H | Pendulum restraining bar | R | Stands |
| I | Push bar (optional arch opening cylinder) | S | Shoot removal module |
| J | Pendulum shock absorber | T | Vertical arm (right side) |

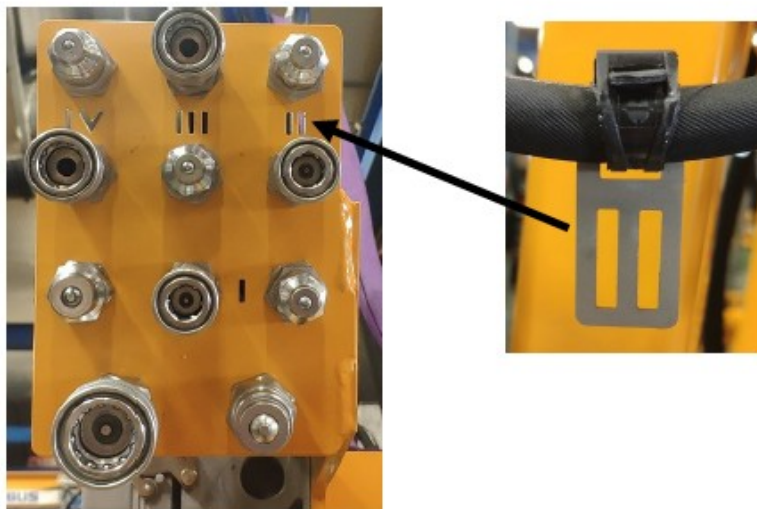




4-HEADED VINE SHOOT REMOVER COMMISSIONING

Coupling the 4-headed shoot remover to the multipurpose mast

- 1- Ensure that the machine is on a flat and stable surface.
- 2- Position the mast so that the stem's arm plate is aligned with the connecting plate of the 4-headed vine shoot remover.
- 3- Lower the mast until it touches the 2 plates.
- 4- Attach the 4-headed vine shoot remover with the 4 M16 screws supplied with the mast.
- 5- Stop the tractor and turn off the electric control handle.
- 6- Connect the machine's hydraulic hoses to the mast using the quick couplings. The cylinder hoses are identified with stainless steel labels.



- 7- Connect the machine's electrical plug to the mast:






4-HEADED VINE SHOOT REMOVER MACHINE - COMMISSIONING

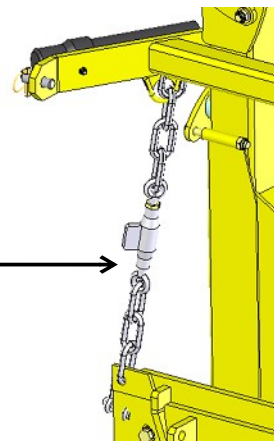
8- Restart the tractor, turn the handle back on, and start the hydraulics.

9- Raise the mast and ensure that it remains as vertical as possible.

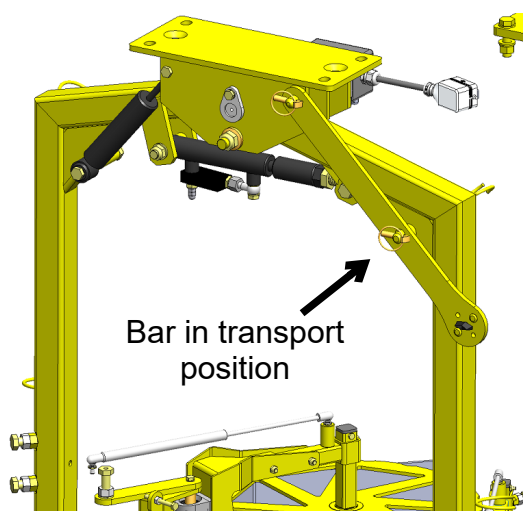
If the mast tilts when lifting, lower the machine to the ground and tighten the stabiliser chain. 

10- Remove the stands from the 4-headed shoot remover machine.

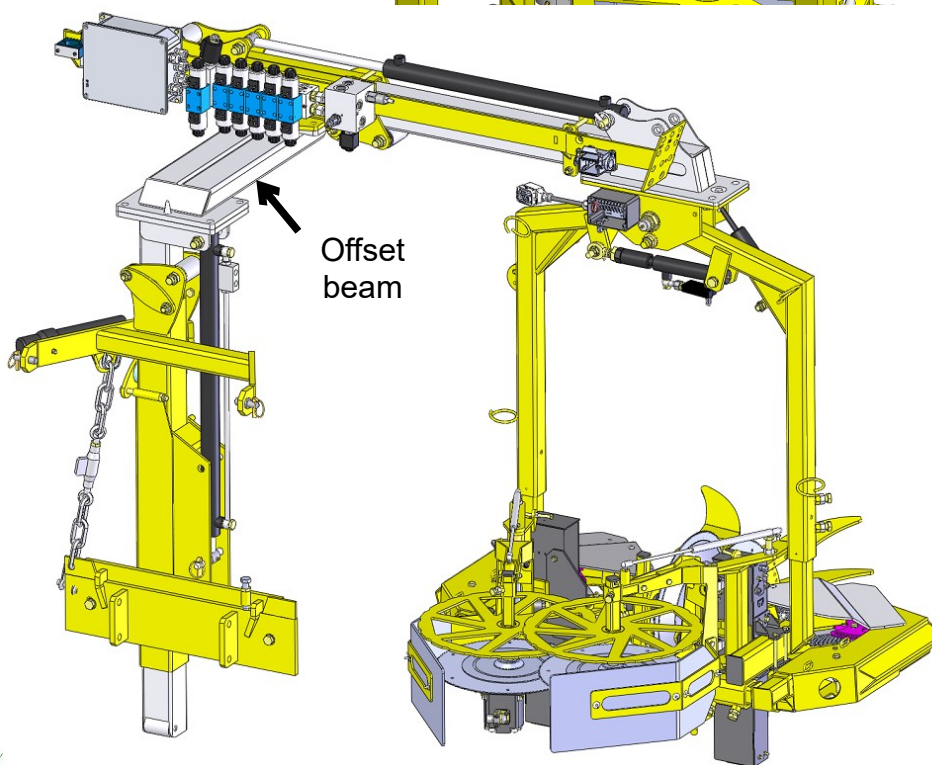
11- Test all of the machine's hydraulic functions.



Before starting work, remember to remove the pendulum restraining bar from the arch. Replace this bar before transporting.



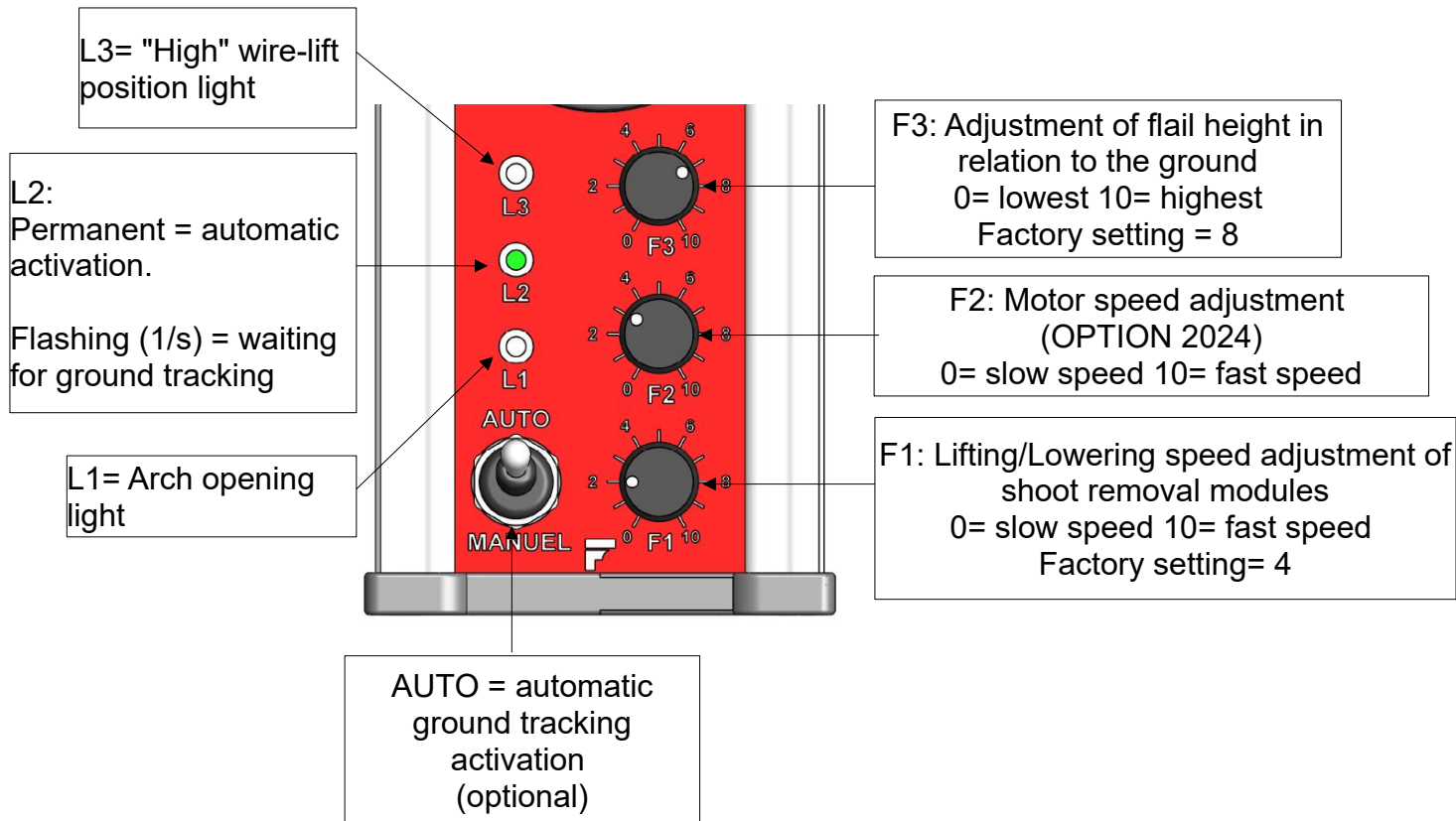
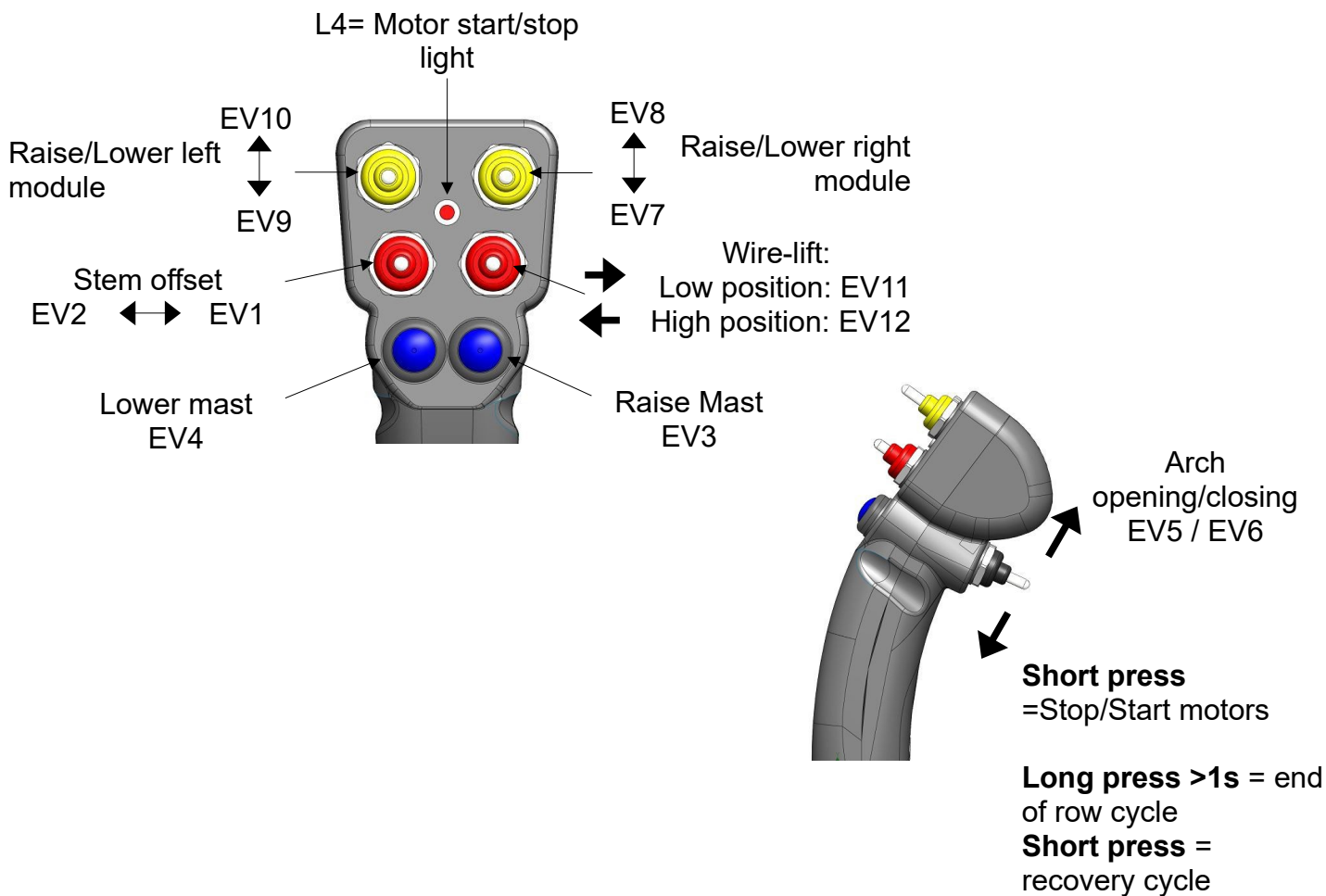
If the machine is coupled to a tractor with a front 3-point linkage, the offset beam that is mounted between the mast and the stem can be removed. This beam offsets the machine by moving it forwards 600mm away from the tractor wheels.





4-HEADED VINE SHOOT REMOVER MACHINE - COMMISSIONING

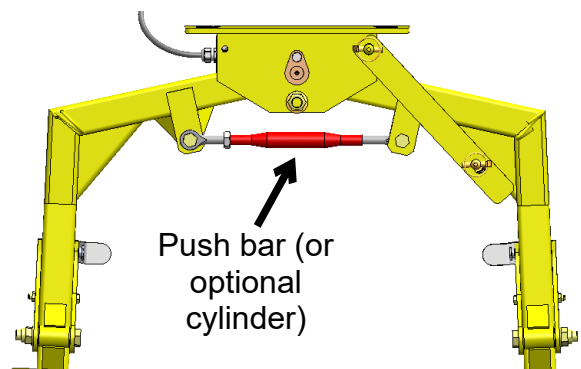
Commande électrique



4-HEADED VINE SHOOT REMOVER MACHINE - COMMISSIONING

Settings

Flail overlap:



Adjust the length of the push bar to change the flail overlap.

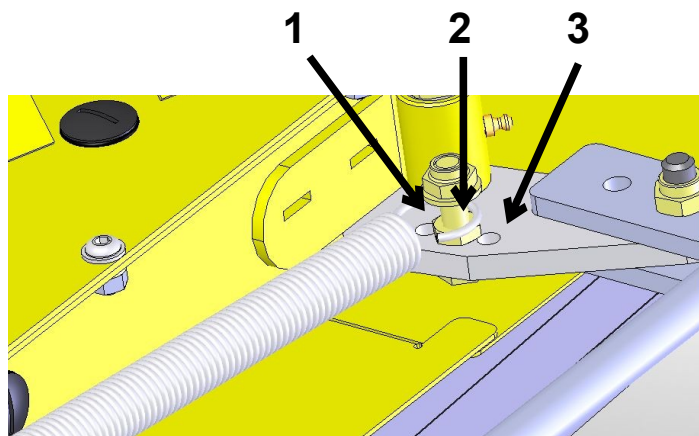
If the machine is equipped with the hydraulic arch opening option, the cylinder has an adjustment system that is identical to that of the push bar.

Re-centring feeler

The stiffness of the re-centring feelers can be adjusted by moving a screw.

The 3 possible positions:

- 1: softer spring
- 2: intermediate position
- 3: stiffer spring

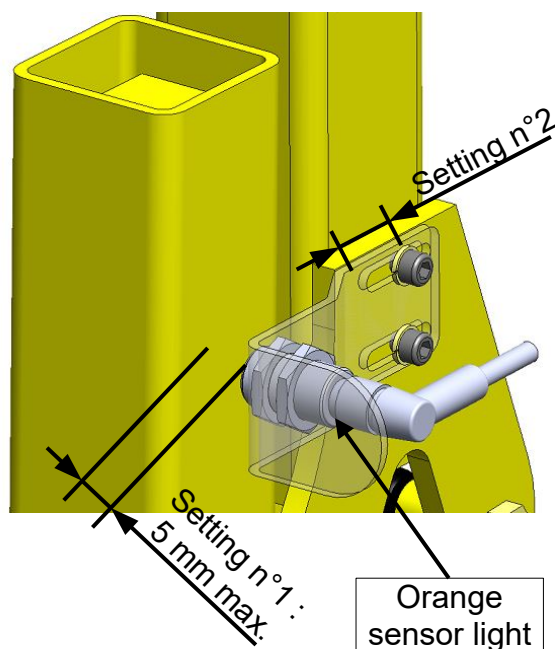


Arch safety sensors:

This sensor is located at the hinge of the shoot removal modules' vertical arms.

If the arm becomes snared, it retracts backwards and the sensor activates the safety system: the motors are switched off and the snared module (right or left) is raised.

- When working, the sensor light is on (orange).
- When the arm retracts, the light goes out and the safety device is activated.
- Setting n°1 : distance to be respected for optimal safety device operation.
- Setting n°2 : increase this value by moving the sensor towards the front of the machine to slow down the moment when the safety device is activated.



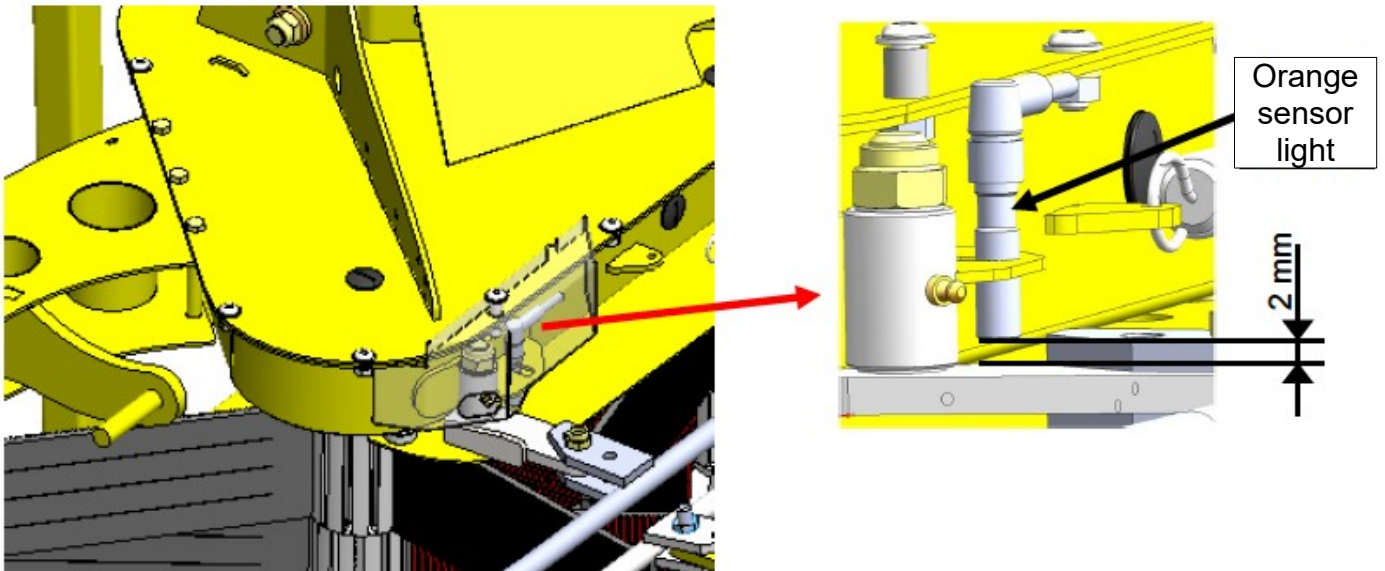


4-HEADED VINE SHOOT REMOVER MACHINE - COMMISSIONING

Feeler sensors for centring:

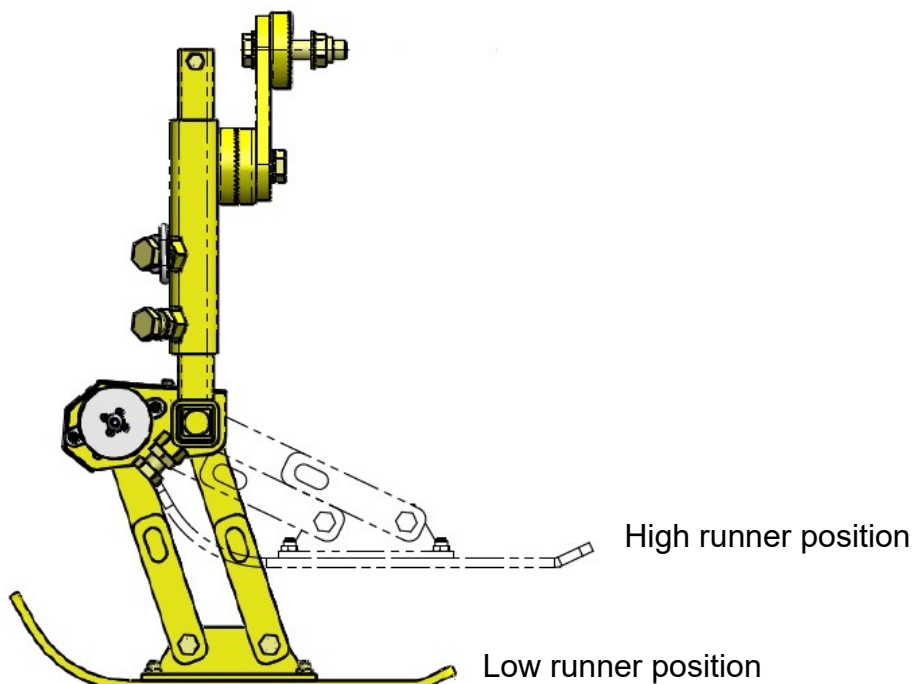
These sensors (right and left) are located at the re-centring feelers' axis of rotation at the front of the machine.

They can activate the mast offset arm to centre the machine in the row. When the feeler is retracted, the sensor light turns "orange" and activates re-centring.



Ground tracking runners (optional) :

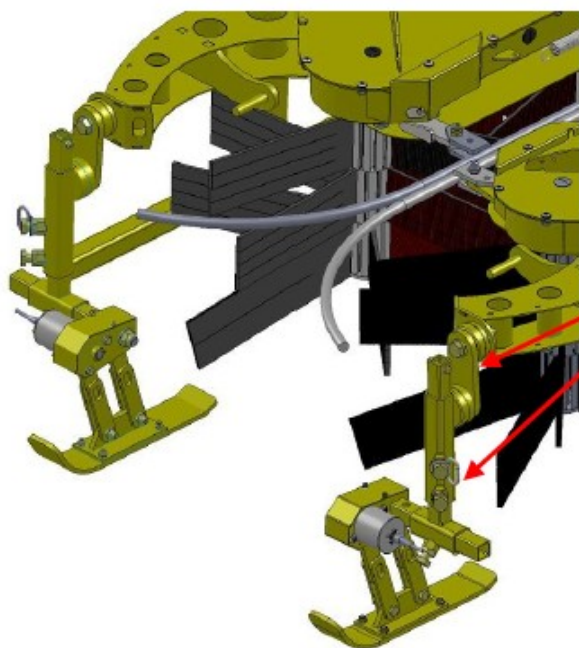
The ground tracking runners automatically adjust the height of the shoot remover in relation to the ground, with each module moving independently (right and left).



4-HEADED VINE SHOOT REMOVER MACHINE - COMMISSIONING

GROUND TRACKING ADJUSTMENT:

The height and position of the runners in relation to the ground must be adjusted manually using the vertical tube and the notched washers (with a 24 mm spanner).



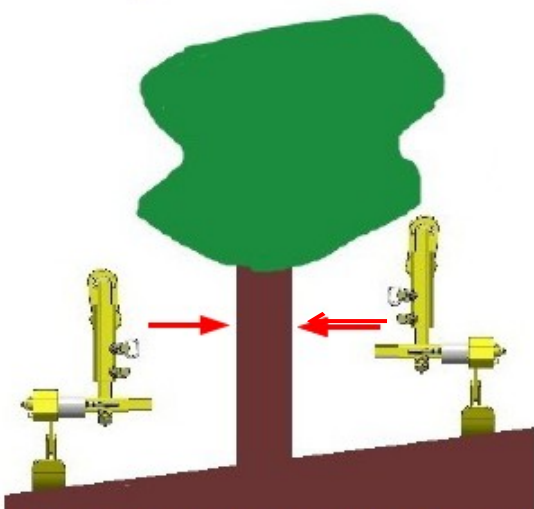
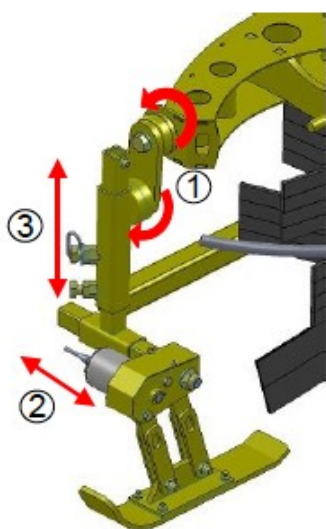
1st adjustment: laterally with the notched washers. The height adjustment tube must be vertical after the adjustments.

2nd adjustment: laterally with the horizontal tube.

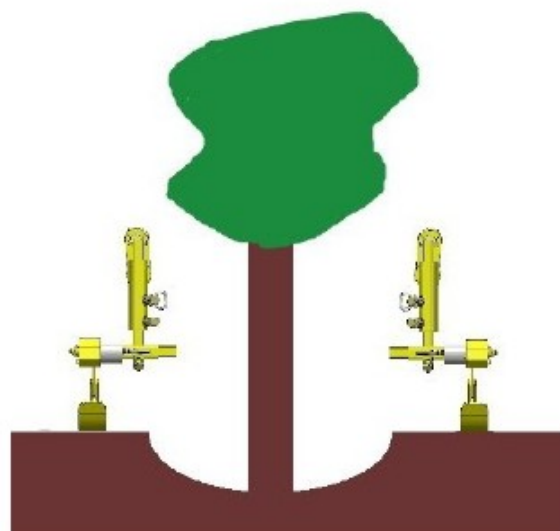
For lateral adjustments, it is best to position the runners along the axis of the shoot remover rotors.

3rd adjustment: height adjustment with the vertical tube.

4th adjustment: height adjustment in the cab using the handle and the F3 adjustment. Use a high setting (between 7 and 10) on uneven ground.



On sloping ground, move the runners closer to the vines to reduce the distance between them.

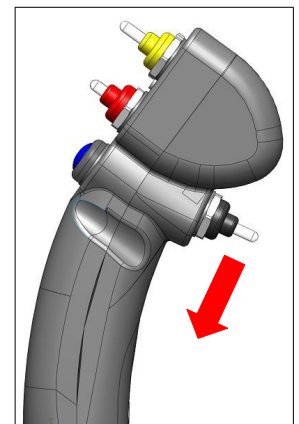


Position the runners on the flattest possible strip of land.

4-HEADED VINE SHOOT REMOVER MACHINE - COMMISSIONING

Start-up in the vineyard:

- 1 Remove the pendulum restraint bar from the arch.
- 2 Unlock the emergency stop and press ON.
- 3 Set the handle switch to AUTO to activate automatic ground tracking.
- 4 Position the machine along the axis of the vine row.
- 5 Lower the wire-lifts (optional).
- 6 Close the arch (trigger pushed up).
- 7 Set the tractor to its working speed (PTO).
- 8 Lower both shoot remover arms to the half-height of the cylinder travel.
- 9 Adjust the height of the mast until the ground tracking runners touch the ground and the green L2 light is permanently lit. If one of the two runners does not touch the ground (L2 flashing), lower the height of the module with the handle (yellow button) until the runner touches the ground.
- 10 The machine automatically positions the modules to the height of the F3 setting on the handle.
- 11 Pull the trigger (press) to activate the motors.
- 12 Pull the trigger (press) to stop the motors (to avoid an obstacle or a young plant).
- 13 Pull the trigger (press) to start work again.
- 14 At the end of the row, hold down the trigger (>1s) to activate the "End of Row Cycle":
 - Engine stops, ground tracking stops, wire-lifts lowered, mast raised, arch opened, mast raised.
- 15 After the manoeuvre, pull the trigger (press) to activate the Recovery Cycle:
 - Mast lowers, arch closes, mast lowered until the runners touch the ground (L2 light is permanently lit).
- 16 Back to step 11.





4-HEADED VINE SHOOT REMOVER MACHINE - COMMISSIONING

Notes for use in AUTO mode:

- GROUND TRACKING SAFETY:

- Mast lowering (blue button) is disabled if one of the runners is touching the ground.
- Shoot removal lowering (yellow button) is deactivated if the runner is touching the ground.



- VOLUNTARY DEACTIVATION OF RIGHT OR LEFT GROUND TRACKING:

- Ground tracking is independent on each side.
- The operator can deactivate one side by lifting the module using the handle (yellow button).
- The raised side is deactivated if the runner is no longer touching the ground (L2 light flashing).
- To reactivate automatic tracking, lower the module (yellow button) until the runner is touching the ground.



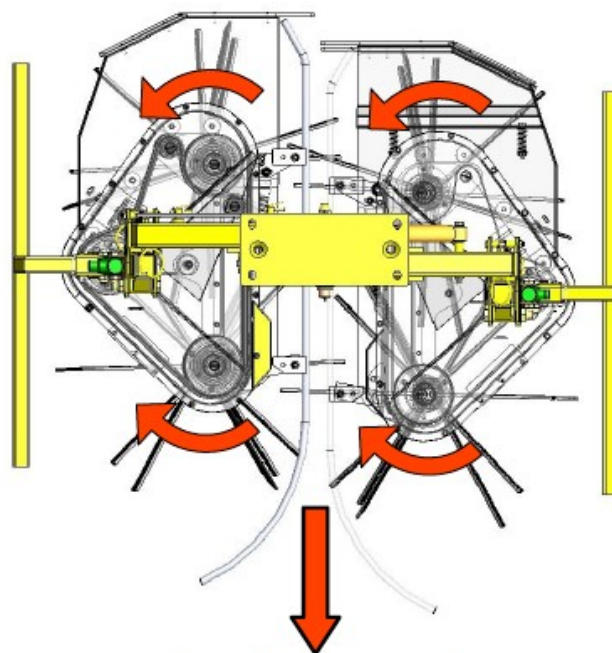


4-HEADED VINE SHOOT REMOVER MAINTENANCE

Removing the flails:

The flails' direction of movement is not the same depending on their position (front or back).

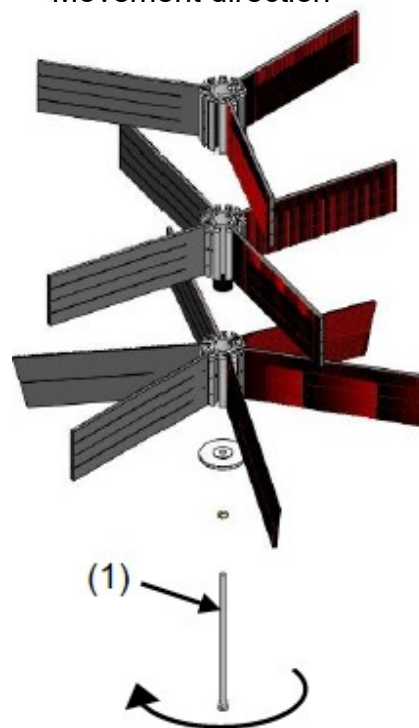
The two heads at the front rotate in a clockwise direction.
The two heads at the rear rotate counterclockwise.



Movement direction

- Fully loosen the screw (A) which holds the modules,
- Remove each module in order (starting from the bottom).
- Remove the flails with pliers.
- Refit the new flails taking into account the correct direction (the grainy side of the flail shown in red must be facing the direction of rotation).

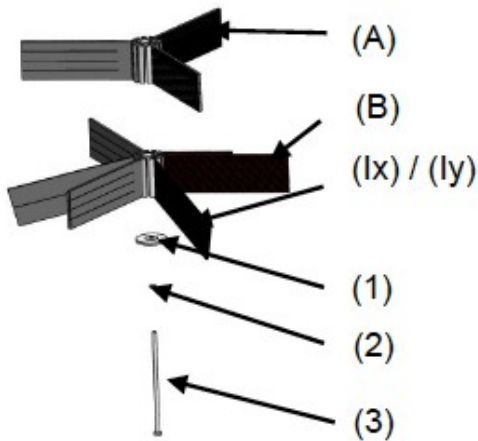
***NB:** Remember to grease the part that slides in the slot of the module as well as checking flail wear (grainy side) and changing them if necessary.*



4-HEADED VINE SHOOT REMOVER - MAINTENANCE

Position of flails

2 modules: (H = 200 to 250 mm)

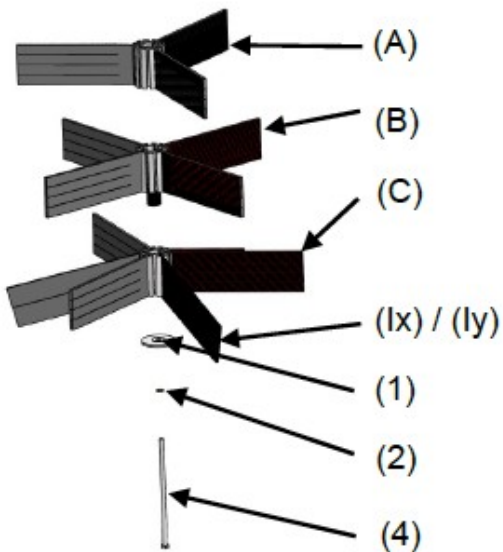


- (A) x 3; L = 295 mm (12 flails per machine)
- (B) x 3; L = 310 mm (12 flails per machine)
- (Ix) x 3; L = 350 mm (6 flails per machine)

For rear module A and B do not change

- (Iy) x 3 L=350 (6 flails per machine)
- tilted flails Inverted**

3 modules:(H = 300 to 350 mm)

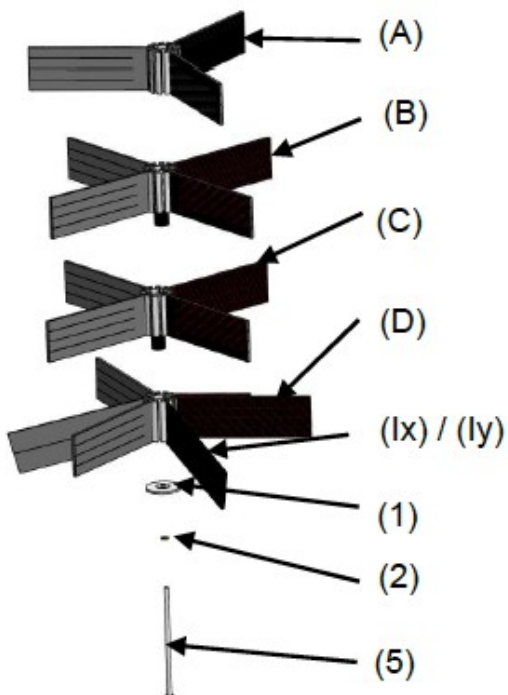


- (A) x 3; L = 295 mm (12 flails per machine)
- (B) x 4; L = 310 mm (16 flails per machine)
- (C) x 3; L = 330 mm (12 flails per machine)
- (Ix) x 3; L = 350 mm (6 flails per machine)

For rear module A, B and C do not change

- (Iy) x 3; L = 350 mm (6 flails per machine)
- tilted flails Inverted**

4 modules:(H = 400 to 450 mm)



- (A) x 3; L = 295 mm (12 flails per machine)
- (B) x 4; L = 310 mm (16 flails per machine)
- (C) x 4; L = 330 mm (16 flails per machine)
- (D) x 3; L = 350 mm (12 flails per machine)
- (Ix) x 3; L = 350 mm (6 flails per machine)

For rear module A, B, C and D do not change

- (Iy) x 3; L = 350 mm (6 flails per machine)
- tilted flails Inverted**

- | | |
|---------------------|-------------------------------|
| (A) ref = EP027900 | (1) ref = FE310 |
| (B) ref = EP028000 | (2) ref = Grower washer M10 |
| (C) ref = EP028100 | (3) ref = M10x80 FT AZI screw |
| (D) ref = 05FE420 | (4) ref = EP033000=240mm |
| (Ix) ref = EP012800 | (5) ref = EP030300=320mm |
| (Iy) ref = 05FE430 | |



4-HEADED VINE SHOOT REMOVER - MAINTENANCE

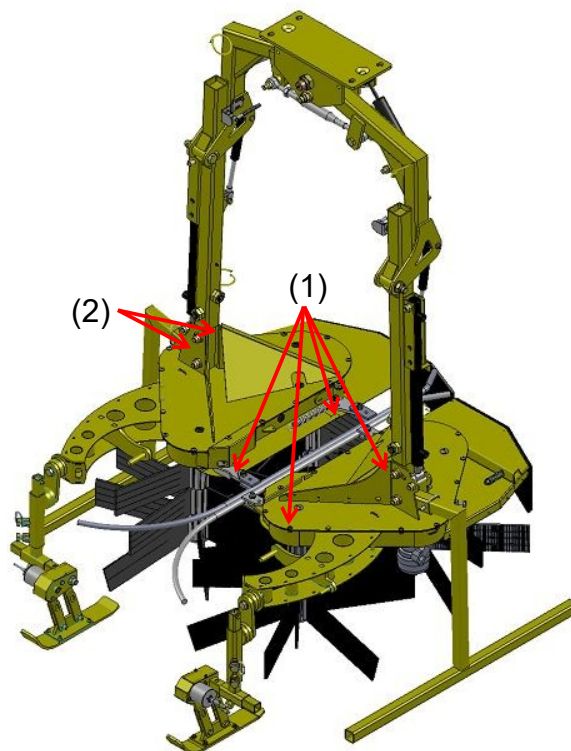
Regular maintenance

Every day:

- Grease the 4 pivots of the centring feelers (1).
- Check that the screws securing the modules are tight
- Clean the sliding parts with a cloth and grease them with a brush
- Check the flails for wear

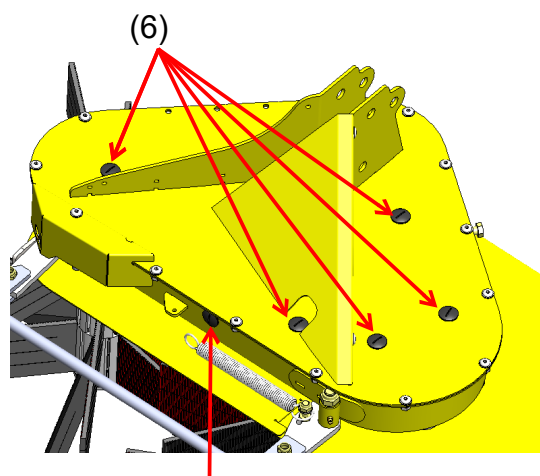
Every week:

- Check that all the screws are tight
- Check the play of the arms, remove with the play adjusters (2) (the arms must be raised to maximum height)

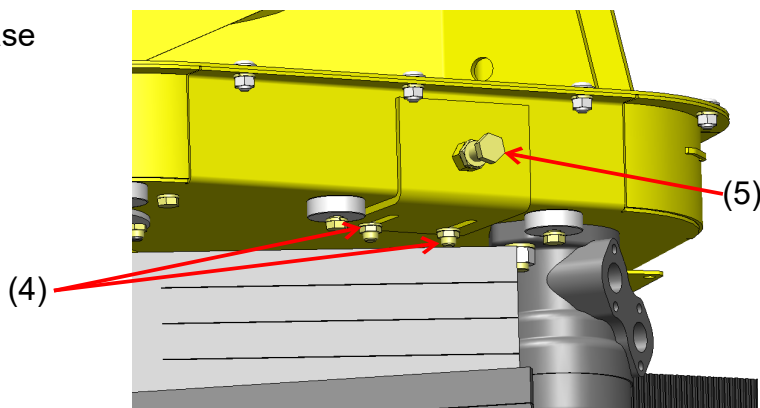


Every month:

- Check the tension of the belts
 - remove the side plugs from the casings (3)
 - Gently press on the belt; you should be able to depress it a maximum of 5mm
- Retense the belts
 - loosen the 2 screws securing the tensioners (4)
 - loosen the locking nut of the tensioning screw (5)
 - tighten the tensioning screw (5)
 - tighten the lock nut and the 2 screws (4)
- Grease the pulley and roller bearings
 - remove the plugs (6)
 - grease moderately using the grease nipples



(3)



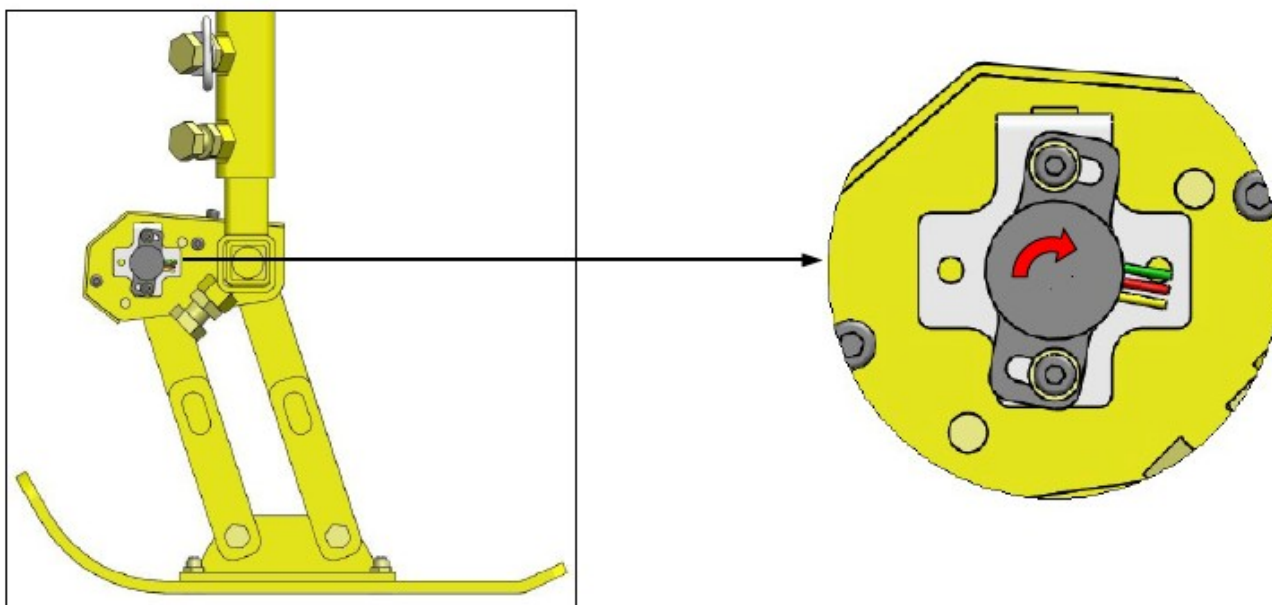
4-HEADED VINE SHOOT REMOVER - MAINTENANCE**GROUND TRACKING SENSORS:**

Check the correct positioning of the sensors and sensors drive shaft for optimal operation (thread on the lower part of the shaft to screw in the needle screw from bottom to top).
Check that the needle screw is tight on the sensor flat.

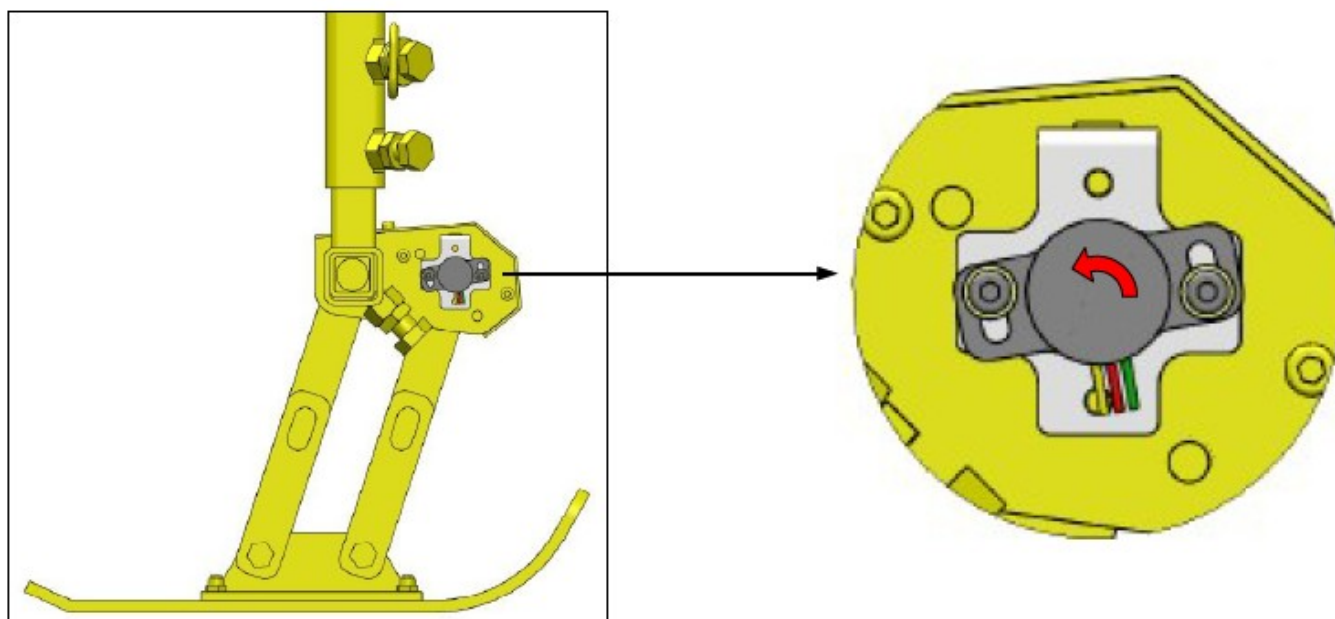
See [page 62](#) for checking sensor voltages.

Left sensor position:

- Wires running towards the back of the machine.
- Sensor stopped on the slotted holes in the clockwise direction.

**Right sensor position:**

- Wires running downwards.
- Sensor stopped on the slotted holes in the anticlockwise direction.

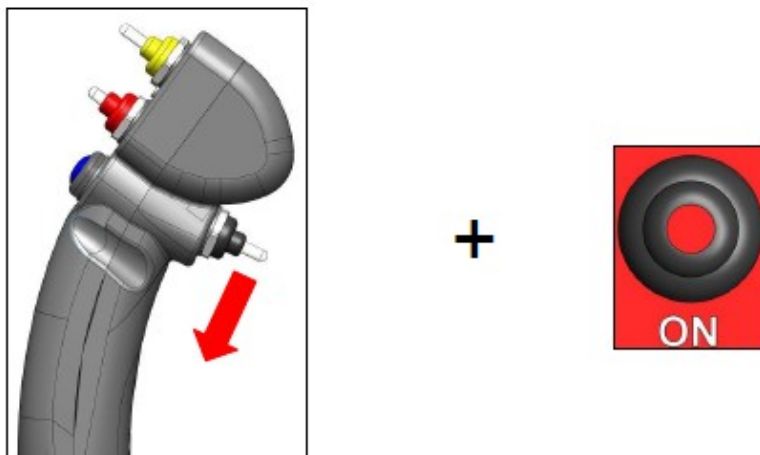


4-HEADED VINE SHOOT REMOVER - MAINTENANCE

Procedure for initialising ground tracking sensors:

Perform this procedure to calibrate the "0" position of the sensors after each service intervention on the runner mechanics or the positioning of the ground tracking sensors, or after replacing the main electronic board on the mast:

- 1 Position the tractor and the machine on a flat and stable surface.
- 2 Check that the runners are not touching the ground and that they are **fully extended to their mechanical stop** (very important).
- 3 Turn off the control handle. Wait 3 seconds.
- 4 Unlock the emergency stop button.
- 5 Hold down the switch (trigger) on the back of the control handle while pressing ON for 1 second. Then release the buttons.

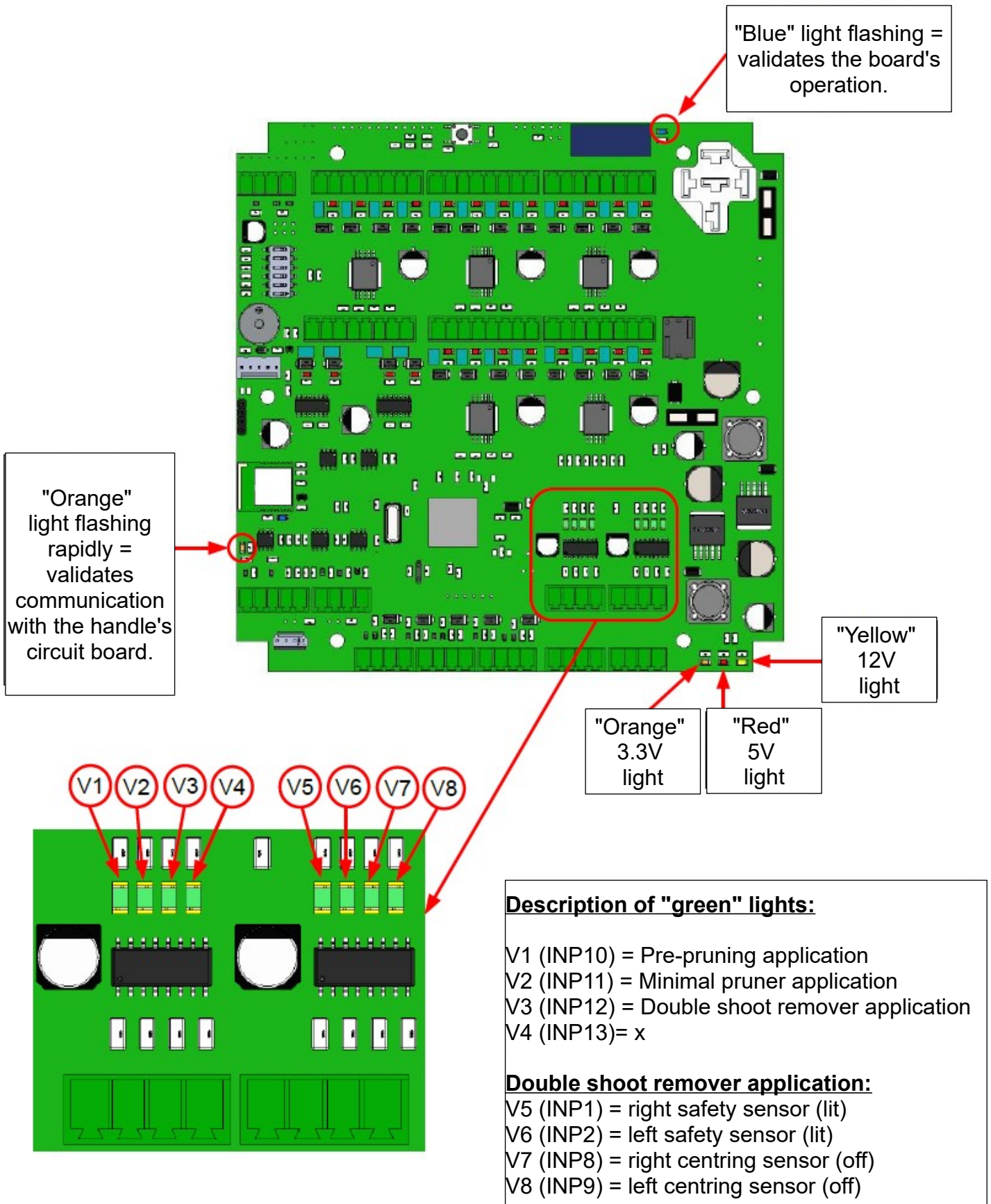


- 6 **The red "motor" L4 light must flash for 1 second** to confirm the procedure and the initialisation of the sensor stops. If the light does not flash, repeat the above steps.
- 7 The stops are saved and remain in memory, even after the handle has been turned off.
- 8 After this operation, the "green" L2 light on the control handle should flash once per second.
- 9 If the "green" L2 light flashes rapidly (4 times per second) or pulses can be seen between the 1 second flashes (1 pulse or 2 pulses): see electrical troubleshooting ([page 62](#)).



MULTIPURPOSE MAT

Description of the lights on the "Chassis" circuit board:





TROUBLESHOOTING

General malfunction

ALL MACHINES: ELECTRICAL MALFUNCTION

| Problem | Possible causes | Solution |
|--|-----------------------------|---|
| <p>Permanent general malfunction:</p> <p>The 3 power supply lights (orange 3.3V, red 5V, yellow 12V) on the electronic boards do not switch on.</p> | <p>Power supply problem</p> | <p>Open the machine casing at the mast:</p> <p>Press the ON button on the handle, the 3 lights on the bottom right of the circuit board should light up. If this is not the case, use a multimeter to check the 12V voltage at the supply terminals under the black relay.</p> <p>With a second person, manipulate the tractor's 3-pin plug and the entire length of the power cable, while checking the voltage at the circuit board's power terminals. If no voltage is detected, or if a voltage variation is detected, perform the following checks:</p> <p>Check the condition of the 2-wire power cable that connects the machine to the tractor's 3-pin plug.</p> <p>Check the condition of the 3-pin male machine plug (check the internal wiring).</p> <p>Check the condition of the tractor's 3-pin plug. It must be clean and tight-fitting.</p> <p>Check the condition of the wiring harness that connects the tractor battery to the 3-pin plug.</p> <p>Check the condition of the battery terminals (correctly tightened and free of "green-grey" oxidation). If necessary, clean the terminals with a wire brush and apply battery terminal grease before reconnecting the terminals.</p> <p>Check the battery charge (tractor running).</p> |
| | <p>Connectivity problem</p> | <p>Check the condition of the M12 cable connecting the control handle to the machine's electronic housing. It must not be "pinched".</p> <p>Check that all the wires running from the M12 connector (attached to the mast's electronics housing) are connected to the green 5-pin connector (gently pull each wire to check).</p> |



ALL MACHINES: ELECTRICAL MALFUNCTION

| Problem | Possible causes | Solution |
|--|---|--|
| <p>Random general malfunction:</p> <p>The 3 power supply lights (orange 3.3V, red 5V, yellow 12V) on the electronic boards are correctly lit.</p> <p>But no functions are activated: no lights are activated on the solenoid connectors and no lights are lit on the mast's circuit board when a cylinder is controlled by the handle.</p> <p>Or the machine malfunctions randomly.</p> | <p>Communication problem with electronic boards</p> | <p>Check the status of the communication lights on both electronic boards (mast and handle). Orange light flashing rapidly to the left of the boards and blue light flashing slowly at the top right.</p> <p>Check the connections (see following procedures).</p> |
| | | <p>Compatibility problem of the mast-handle circuit board following a program update or replacement of the electronic board or control handle. Contact your dealer for an update.</p> |
| | <p>Connectivity problem</p> | <p>Check that the connectors inside the control handle are correctly connected to the board.</p> |
| | | <p>Check the condition of the 5-wire M12 cable. Replace if damaged.</p> <p>Check the condition of the M12 connector on the handle board (it must not move during rotation). Short circuits may occur if it has been damaged (overtightened during assembly or through customer use).</p> <p>Check by activating the AUTO mode with a machine connected (24-pin connection) and check the status of the L2 light on the handle while slowly moving the connector. If the L2 light goes off and on, the circuit board is damaged. Contact your dealer.</p> |
| <p>Check that all the wires of the 5-pin connector inside the machine electronics housing are firmly connected (gently pull each wire to check).</p> | | |
| <p>The ON button light on the handle (red or green) lights up when the emergency stop is released.</p> | <p>The handle is switched off and on too quickly. No impact on the machine's operation.</p> | <p>Wait 3 seconds before unlocking the emergency stop after having pressed it to turn off the handle.</p> |



MINIMAL PRUNER: ELECTRICAL MALFUNCTION

| Problem | Possible causes | Solution |
|--|---|--|
| The cordon tracking function does not work. Switch in AUTO position. | The L2 (AUTO) light on the handle is not on: no machine is recognised | Check the "Minimal pruner" machine recognition: look in the electronic housing of the "mast" board to see if the "green" V2 light is on (see page 54). If the light is not on, check that the machine plug (24-pin) is properly connected. |
| | No sensor signal | Check that the sensors are powered with 24V (green light lit on the front of the sensors). Check the connections in the machine terminal box. Check the condition of the sensor cables. Check the connections in the mast electronics housing and the connection of wires No.21 and 22 (sensor signal) and 23 and 24 (V/J). |
| The automatic system does not work correctly in automatic mode: the cutting height is not regular. | Incorrect positioning of the machine in relation to the vine (horizontal saws must be parallel to the cordon) | <u>On the tractor's front linkage:</u> adjust the height of the lifting arms and the length of the third point to correctly align the machine. <u>On tractor mass holder:</u> check the coupling. Adjust the tilt screw of the spring safety plate (option P70RE) on top of the machine. |
| | Excessive mechanical play of the arch | Check the following tightening mechanisms and retighten if necessary: - the central screw of the 2 vertical arms. - the safety spring screw (option P70RE). |
| | Incorrect lifting/lowering speed settings | Check the settings of the potentiometers: Choose a low lowering speed (F1=2). Choose a medium lifting speed (F2= 4 to 5). |
| | Incorrect setting of the flow control valve on the hydraulic control unit | Check the general flow rate of the cylinders: loosen the cylinder flow regulator's lock nut and fully tighten the knob. Loosen the knob by 1.5 turns and retighten the locknut. This setting restricts the cylinders to approximately 11L/min. |



MINIMAL PRUNER: ELECTRICAL MALFUNCTION

| Problem | Possible causes | Solution |
|---|--|--|
| <p>BIS</p> <p>The automatic system does not work correctly in automatic mode: the cutting height is not regular.</p> | <p>Sensor alignment problem: the yellow light on the left sensor is permanently lit or flashes when the machine moves.</p> | <p>Raise the machine, close the arch. Leave the row, switch to MANUAL mode and turn off the tractor, without cutting the 12V power supply. Check that there are no obstacles between the sensors.</p> <p>The green light at the top left of both the right and left sensors indicates that the sensor is powered.</p> <p>Gently rock the right side of the machine while observing the front of the left sensor: If the light in the upper right corner flashes yellow, it means that the sensors are not properly aligned, that they are dirty, or that the sensor glass is damaged:</p> <p>See sensor alignment procedure (page 25).</p> |
| | <p>The machine lifts up by itself, forcing you to take manual control:</p> <p>Horizontal shoots detected in front of the sensors higher than the cordon or unsuitable vine (uneven cordon or old vine with clumps of shoots)</p> | <p>Bring the vertical saws closer together using the control handle to remove as many shoots as possible before the sensors pass.</p> <p>Pre-prune as close as possible to the cordon with the pre-pruning machine to remove as many shoots as possible that could create "false cordons".</p> |
| | <p>Vines not suitable for automated functions: uneven cordon or old vine with clusters of shoots, creating "false" cordons above the desired cordon.</p> | <p>Work in manual mode: Switch the handle switch to MANU.</p> |



MINIMAL PRUNER: ELECTRICAL MALFUNCTION

| Problem | Possible causes | Solution |
|---|--|--|
| In AUTO mode and with the motors switched on, none of the functions are activated when the arch is opened (manual or automatic), so the handle has to be switched off and on again to return to normal operation. | Software problem | Dealer intervention required: Update the software for the handle's electronic board to at least V1.254. Update the software for the mast's electronic board to the latest version (at least version \geq V0.75). |
| The arch of the machine opens but does not close, while the solenoid valve connector lights up (yellow light). | | Dealer intervention required: Update the software for the mast's electronic board (at least version \geq V0.75). |
| The arch opens quickly. The movement is violent. | Incorrect adjustment of the opening cylinder's throttle screw. | Tighten the throttle screw on the check valve of the arch opening cylinder. |



Pre-pruner malfunction

PRE-PRUNER: ELECTRICAL MALFUNCTION

| Problem | Possible causes | Solution |
|--|---|---|
| The automatic function that opens around posts does not work. | The L2 (AUTO) light on the handle is not on: no machine is recognised | Check the "Pre-pruner" machine recognition: look in the electronic housing of the "mast" board to see if the "green" V1 light is on (see page 54). If the light is not on, check that the machine plug (24-pin) is properly connected. |
| | No sensor signal | Check that the sensors are powered with 24V (green light lit on the front of the sensors). |
| | | Check the connections in the machine terminal box. |
| | | Check the condition of the M12 cables that connect the sensors to the terminal box. Check the connections in the mast's electronics housing and the connection of wires No.21 and 22 (sensor signal) and 23 and 24 (V/J). |
| | Random problem: Incorrect positioning of the sensors in relation to the posts, the sensors extend beyond the posts | Lower the sensors on the tubes as far as possible. Leave the row and perform the sensor alignment procedure on page 37. |
| The red light on the left sensor (transmitter) flashes: sensor alignment problem. | Leave the row and perform the sensor alignment procedure on page 37. | |
| The automatic function that opens around posts does not work correctly: the machine "bites" into the posts. | Incorrect positioning of the sensors in relation to the posts, the sensors extend beyond the posts | Lower the sensors on the tubes as far as possible. Check that the two sensors are correctly aligned. |
| | Sensors are not aligned | After moving the sensors, press the white Teach-in button on the left sensor (at the back of the housings after unscrewing the cover) to align the sensors. |
| | Incorrect handle settings | Increase the F3 potentiometer. See settings on pages 32 and 36. |



PRE-PRUNER: ELECTRICAL MALFUNCTION

| Problem | Possible causes | Solution |
|---|---------------------------|---|
| The automatic function that opens around posts does not work correctly: Unexpected openings between posts (too often in the same row). | Sensors are not aligned | Perform the sensor alignment procedure (see page 37). |
| | Incorrect handle settings | Lower the tolerance potentiometer (F3) (see page 36). |
| | Software error | Dealer intervention required: Update the software for the mast's electronic board (with a version \geq V0.75). |



Malfunctioning Double shoot remover

DOUBLE SHOOT REMOVER: ELECTRICAL MALFUNCTION

| Problem | Possible causes | Solution |
|--|---|--|
| <p>The automatic ground tracking function does not work:</p> <p>The L2 (AUTO) light does not come on.</p> | <p>Machine recognition problem.</p> | <p>Check that the machine is recognised as a "Shoot remover": look in the electronic housing of the "mast" board to see if the "green" V3 light is on (see page 54).</p> <p>If the light is not on, check that the machine plug (24-pin) is properly connected.</p> |
| <p>The automatic ground tracking function does not work:</p> <p>L2 light flashes rapidly (4/second)</p> <p>+ Pressing the right or left runners does not activate the tracking cylinders.</p> | <p>Sensor signal problem:</p> <ul style="list-style-type: none"> • Sensors not initialised following a service intervention or machine commissioning. • both signals (right and left) are missing. <p>incorrect sensor positioning.</p> | <ul style="list-style-type: none"> - Perform the sensor alignment procedure (see page 53). - Check the connections in the machine terminal box. - Check the condition of the ground tracking sensor wires inside the covers. - Check the condition of the M12 cables that connect the sensors to the terminal box. They should be tightened by hand without being forced. - Check the connections in the "mast" electronics housing and the connection of wires No.5 (right sensor signal) and No.6 (left sensor). |
| <p>The automatic ground tracking function does not work on one side (right or left):</p> <p>L2 light flashes or remains lit but with 0.1s pulses.</p> | <p>1 pulse= problem on left sensor signal.</p> <p>2 pulses = problem with the right sensor signal.</p> | <ul style="list-style-type: none"> - Using a multimeter, check that the general voltage between wires 3 and 4 is 5V inside the machine's terminal box. Raise the machine, extend the runners as far as possible, then check the sensor voltages (+-0.3V): - between wire No.1 and 3 (right sensor): <ul style="list-style-type: none"> • right runner extended= 2.25V • right runner retracted = 1.70V - between wire No.2 and 3 (left sensor): <ul style="list-style-type: none"> • left runner extended= 1.65V • right runner retracted = 2.20V <p>Check that the sensors are correctly positioned if the values do not match (page 52).</p> <p>- If the problem persists, unscrew the sensor covers and check that the sensors are rotated when the runner moves. Check that the grub screw on the flat section of the sensor shaft is tight (tighten the screw with the BLUE threadlocker if it comes loose).</p> <p>Check that the sensor drive shaft is correctly positioned (grub screw tightened from bottom to top).</p> |



DOUBLE SHOOT REMOVER: ELECTRICAL MALFUNCTION

| Problem | Possible causes | Solution |
|---|---|--|
| The speed of the shoot remover module's vertical cylinders is too fast or too slow. | Incorrect setting on the control handle. | Decrease the F1 setting to reduce the responsiveness of the hydraulic cylinders or increase F1 to increase the speed. See setting on page 43 . |
| | Movements are slow: reduction in 12V supply voltage due to battery failure or a cooler starting up on a hydraulic unit. | Check the voltage and charge of the tractor battery (>13V). Separate the cooler and the machine's power supply by connecting an additional line directly to the tractor battery with a 3-pin plug; this will limit voltage drops. |
| In AUTO mode: While working, the motors switch off and the module's right or left cylinders are raised for 1s. + The L2 light is flashing. | Right or left arm safety activated: <ul style="list-style-type: none">• snared by an obstacle.• Incorrect adjustment of the sensor in relation to the tube.• Sensor cable breakage.• Connectivity problem. | Check that the right or left arm has returned to its working position. Check that the lights around the arm safety sensors are on and lit in orange. If not: <ul style="list-style-type: none">- Check the distance between the front of the sensor and the tube (<5mm) (page 44).- Check the condition of the M12 cables that connect the sensors to the terminal box.- Check the connections in the machine terminal box (wire 5= 12V, wire 6= right signal, wire 7= left signal, wire 8 = GND). |
| Problem uncoupling the machine from the tractor: the mast lowering control does not work. | Runner safety activated: the mast lowering command is deactivated if one of the two runners (right or left) touches the ground in AUTO mode. | Change the position of the handle switch to MANUAL to uncouple the machine. |



Machine hydraulic specifications

FERRAND

Operating pressure = 180 bar

Maximum pressure on the return line = 5 bar

To connect to a hydraulic power unit, separate the drain return to send it directly into the tank without passing through the filter and the air cooler.

In no case can the return be connected with quick couplers.

| Hydraulic flow required for the machines | | | | |
|---|--------------------------------|----------------------------------|--------------------------------------|---------------------------------|
| Machine | Speed of rotation (rpm) | Minimum flow rate (L/min) | Recommended flow rate (L/min) | Operating pressure (bar) |
| Inter-row hoe | | | | |
| Pair of single inter-row hoes | / | 25 | 30 | 80 to 150 |
| Pair of inter-row hoes + cylinders | / | 30 | 40 | 80 to 150 |
| Wire shoot removers | 400 to 800 | 15 | 20 | 140 max |
| Flail mowers | 800 to 1800 | 20 | 26 | - |
| Cutter mowers | 2000 | 15 | 20 | - |
| Rotocep | 200 | 20 | 25 | - |
| Multipurpose (mast flow rate to be added to machine flow rate) | | | | |
| Mast with single block | / | 5 | 10 | - |
| Mast with automation | / | 10 | 10 | - |
| Pre-pruner | 400 (right rotor) | 35 | 40 | 50 to 90 |
| Minimal pruner | 2800 | 35 | 40 | - |
| Double shoot remover | 400 | 32 | 35 | - |
| Flail shoot remover | 400 | 15 | 20 | - |
| Arch wire shoot remover | 400 to 800 | 15 | 20 | 140 max |
| Arch wire mower | 800 to 1800 | 20 | 26 | - |
| Front trimmer | 2200 | 20 | 25 | - |
| Front trimmers | | | | |
| Front trimmer | 2200 | 25 | 30 | - |
| Double front trimmer + lower blades | 2200 | 45 | 50 | - |



MULTIPURPOSE MAST WITH R4000P AUTOMATION

Index B from 22/05/23

Notice 16-05-002



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MULTIPURPOSE MAST WITH R4000P AUTOMATION

Index C from 22/05/23

Notice 16-05-002