

# SARITOR TERRA FORCE



**Original**

## **Instruction book**

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We congratulate you for choosing a HARDI plant protection product. The reliability and efficiency of this product depend upon your care. The first step is to carefully read and pay attention to this instruction book. It contains essential information for the efficient use and long life of this quality product.

The original instruction book is approved and published in English. All other languages are translations of the original. In the event of any conflicts, inaccuracies or deviations between the English original and other languages the English version shall prevail.

Illustrations, technical information and data in this book are to the best of our belief correct at the time of printing. As it is HARDI INTERNATIONAL A/S policy permanently to improve our products, we reserve the right to make changes in design, features, accessories, specifications and maintenance instructions at any time and without notice.

HARDI INTERNATIONAL A/S is without any obligation in relation to implements purchased before or after such changes.

HARDI INTERNATIONAL A/S cannot undertake any responsibility for possible omissions or inaccuracies in this publication, although everything possible has been done to make it complete and correct.

As this instruction book covers more models and features or equipment, which are available in certain countries only, please pay attention to paragraphs dealing with precisely your model.

Published and printed by HARDI INTERNATIONAL A/S

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## EC Declaration of Conformity



The Manufacturer:

HARDI-EVRARD

43 rue du Cuivre-BP 59

77542 SAVIGNY-LE-TEMPLE CEDEX

FRANCE

declares that the following equipment:

**TERRA FORCE SARITOR**

- Fulfils all the relevant provisions of Machinery Directive 2006/42/EC, and
- Conform to the provisions of Council Directive 2004/108/EC (EMC).
- Satisfied with all of the provisions of the annex contained at the end of the title 1 of the book of the fourth part of the French labour code

Beaurainville, 06.01. 2012

Christophe Parent

Managing Director

HARDI-EVRARD



### Operator safety

#### Symbols

These symbols are used throughout this book to draw the reader's attention to certain points. This is the meaning of the four symbols.



This symbol means DANGER. Be very alert as your safety is at risk!



This symbol means WARNING. Be very aware as your safety may be at risk!



This symbol means ATTENTION. This guides you towards better, easier and safer use of your sprayer!



This symbol means NOTE.

#### Recommendations to users of products of treatment

This sprayer has been designed and manufactured by HARDI EVRARD to operate with treatment products that you select. For the proper functioning of the sprayer, we invite you to comply with strictly to our recommendations, such as occasions in the Instructions for Use which is delivered to you at the time of the sale of the sprayer.

But, it is your sole responsibility of user to you strictly comply with recommendations given by the manufacturers of products for treatment that you will use.

It is particularly strongly recommended that any user of:

- Read carefully the(s) labels(s) of the manufacturer of the (or of) product(s) of treatment uses(s) and to respect the instructions given therein (metering, personal protective equipment, etc...);
- Mix only the products, whose compatibility was expressly recognized by the manufacturer of phytosanitary products;
- Avoid incorporating air to fill the container for your sprayer to avoid the formation of foam and cause problems with overflow;
- Follow the precautions for use and the warnings indicated by the manufacturer of the plant protection product, in terms of storage of the products of processing and focus on always the key to local farms and located out of the reach of children and animals;
- Observe the precautions relating to the reprocessing of packaging, in accordance with the recommendations of the manufacturers of phytosanitary products;
- Observe the areas not treated;
- Move closer to the manufacturer of the plant protection product (or his representative), in case of doubt or element not entered.

Before using the sprayer, read the following recommendations and the safety instructions:

- Read this instruction book carefully before using the equipment. It is equally important that other operators of this equipment also read this book.  
If any parts of this instruction book remain unclear after reading it, contact your retailer for further information before using the sprayer.
- Local legislation may require operators to have a certificate of competence in the use of the equipment. Respect the applicable local legislation.
- The driver's seat is the intended working place during operation.
- Wear protective clothing. Clothing may differ according to the plant protection chemicals used. Respect the applicable local legislation.  
After spraying, the operator should have a wash and change his clothes. Clean any equipment that may have become soiled.
- Do not eat, drink or smoke during the use and maintenance of your sprayer.  
In case of poisoning, immediately seek medical advice or call the emergency service, see instructions indicated on the packaging of the products used.



## 2 - Safety notes

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### Filling and application

- No persons are allowed in the operational area of the sprayer. Take care not to harm people or surroundings when manoeuvring the sprayer, especially when reversing.
  - Slow down when driving on uneven terrain as the sprayer may become unbalanced and overturn.
  - Keep children away from the sprayer.
  - Do not attempt to enter the tank.
  - Do not go under the machine unless it is secured. The boom is secure when placed in the transport brackets.
  - For further information, see the Spray Technique book.
- 

### Usage

This HARDI EVRARD self-propelled sprayer is exclusively intended for use in farming work, i.e. the application of plant protection chemicals and liquid fertilisers.

Any other use is considered contrary to normal usage and is therefore forbidden.

- Carry out a pressure test with clean water prior to filling with chemicals. Never dismantle the hose while the sprayer is in operation.
  - DANGER! Do not exceed the maximum recommended rotation speed of the pump.
  - Rinse and wash the equipment after use and before servicing.
  - Never service or repair the equipment while it is operating. Always replace all safety devices or shields immediately after servicing or repair.
  - Disconnect the electrical power before servicing and depressurise the equipment after use and before servicing.
  - If an arc welder is used and connected to any part of the sprayer, disconnect the power leads from the battery before welding. Remove all inflammable or explosive material from the welding area.
  - The External Cleaning Device should not be used if important parts of the equipment have been damaged, including safety devices, high pressure hoses etc.
  - Take all precautions to avoid the risks related to unintentional contact with overhead power lines. A sticker placed near the operator's seat warns of the risk of contact with overhead power lines.
- 

### Sprayer usage

This HARDI EVRARD self-propelled sprayer is exclusively intended for use in farming work, i.e. the application of plant protection chemicals and liquid fertilisers.

Any other use is considered contrary to normal usage and is therefore forbidden.

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### Operator's skill

The machine should be used and maintained by people who are aware of its special use and safety characteristics.

Before using your machine, familiarise yourself with all the commands. When working it will be too late to do so.

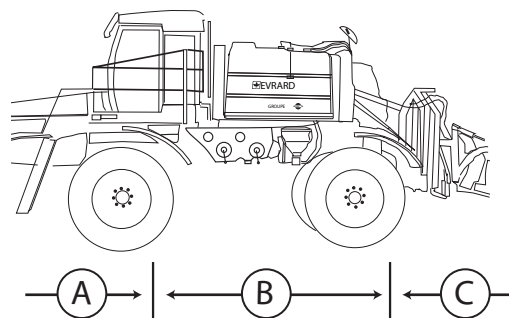
Ensure that you have the skills required for protecting crops and the environment, and for handling and spraying plant protection chemicals. For more information about personal and environmental protection, see the SPRAY TECHNIQUES book.

### Definition of the working place

Never leave the operator's seat when the machine is moving.  
The following is considered as the working place:

1. the outside area where the valves are located that can be handled during tank filling and liquid preparation operations
2. the operator's seat
3. the access ladder and the footboard for accessing the tank opening

A. Clean Zone	engine cabin access ladder and gangway operator's seat access to main tank
B. Work zone	liquid system valves filling with plant protection chemicals external connectors (filling - transfer)
C. Spraying zone	spraying boom and nozzles boom hydraulic controls



### Responsibilities of the manufacturer and the user

- Comply with all recommendations for installation, carrying out adjustments, maintenance and repair contained in this instruction book.
- Use only original spare parts and accessories conforming to the manufacturer's recommendations.
- Do not modify or have your machine and its accessories modified by someone else (mechanical, electrical, hydraulic and pneumatic characteristics) and, more generally, the parts of the machine affecting user safety, without first requesting written agreement from the manufacturer.
- Failure to respect these rules may make your machine dangerous. In the event of damage or injury, HARDI EVRARD shall not be held liable in any way.

### Lights, working at night

If there is insufficient light for working at night, the spraying boom should be equipped with boom lights. For more information on this equipment, contact your HARDI EVRARD retailer.

### Driving on public roads

When driving on public roads where the highway code and any other regulations apply, these must be observed, particularly regarding mandatory equipment such as lights, indicators, hazard lights etc.

You should be aware of the vehicle's size and weight, particularly the overall width and height.



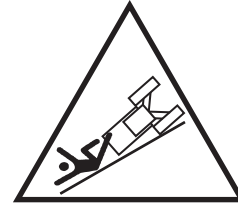
**ATTENTION!** In all circumstances, you should adapt to road driving, particularly by reducing your speed on bends, on meeting or being overtaking by another vehicle, depending on the state of the road surface and how full the tank is.

## 2 - Safety notes

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### Driving in fields

It is advisable to pay a lot of attention to the risks of overturning, especially in 4-wheel steering mode and when travelling at speeds of more than 15 km/hr.



ATTENTION! As a general rule:

- Adapt your speed and driving to suit the terrain you are driving on. Be aware and take care!
- In all circumstances and particularly on uneven and sloping terrain, drive the machine at a low speed, especially on bends and avoid sudden changes of direction.
- Do not brake or start up suddenly when going up or down a slope, bearing in mind the variable volume of liquid in the sprayer tank.



WARNING! Boom manoeuvres should be carried out with the engine shut down and on flat ground. Ensure that there are no obstacles nearby (electricity lines, people, poles etc.).

---

### Safety decals

When you purchased your sprayer the dealer would have informed you of safe operating procedures and areas of potential danger. The orange triangle decals on your sprayer will caution you in regards to hazards that may be encountered in their locality.

This manual contains explanations for the decals which are found on your sprayer.

### Operator safety

Read and understand this source book in conjunction with your operator's instruction before using the equipment. It is equally important that other operators of this equipment also read and understand this book. Local law may demand that the operator is certified to use spray equipment. Adhere to the law.

The following recommended precautions and safe operating practices, which should be adhered to regardless of the decals.

You must:

- Wear protective clothing.
- Rinse and wash equipment after use and before servicing.
- Never service or repair the equipment while it is operating.
- Replace all safety devices or shields immediately after servicing.
- Do not eat, drink or smoke while spraying or working with contaminated equipment.
- Wash and change clothes after spraying.
- Wash tools if they have become contaminated.
- In case of poisoning, immediately seek medical advice. Remember to identify chemicals used.
- Keep children away from the equipment.
- If any portion of this instruction book remains unclear after reading it, contact your HARDI dealer for further explanation before using the equipment.
- Be careful not to hit people or surroundings when using the sprayer, especially when reversing.

### Personal safety equipment

Depending on which type of chemical is used, some or all of the following protective clothing and equipment will be required:

1. Ear muffs,
2. Safety goggles or face shield
3. Respirator
4. Chemical resistant coveralls
5. Chemical resistant gloves
6. Chemical resistant boots



### Contaminated clothing

Contaminated clothing should be removed and safely stored and laundered. Do not contaminate the inside of the tractor cab with soiled clothing.

Illustrations, technical information and data in this book are to the best of our belief correct at the time of printing.

As it is HARDI Australia policy permanently to improve our products, we reserve the right to make changes in design, features, accessories, specifications and maintenance instructions at any time and without notice.

HARDI INTERNATIONAL is without any obligation in relation to implements purchased before or after such changes.

HARDI INTERNATIONAL can not undertake any responsibility for possible omissions or inaccuracies in this publication, although everything possible has been done to make it complete and correct

## 2 - Safety notes

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### Explanation of symbols on safety decals

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#### Mandatory

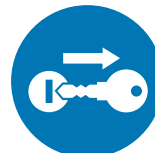
##### Read manual

- Consult Safety Manual, located inside the black manual canister or in manual slot in the cab.



##### Remove key

- Used in conjunction with 'Read Manual' symbol to warn that manual must be read before operating the sprayer.



#### Personal protective equipment

- Overalls, face screen, mask and gloves must be worn to operate in this area.



#### Maintenance

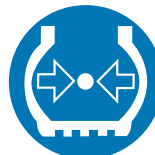
- A regular check and maintenance schedule is needed to keep this part operating safely.

Consult Operator's Manual for maintenance schedule.



#### Tyre pressure check

- A regular check and maintenance schedule is needed to keep tyres operating safely.
- Consult Operator's Manual for recommended pressure levels



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#### Prohibited

##### Speed limit

- Maximum speed limit while operating the sprayer.
- Extra care must be taken on hills and on cornering.



##### No passengers on sprayer

Do not climb onto tank or into it

- Danger of injury or death.



### Do not drink

- Handwash tank water is only for personal hygiene use.



### Do not overfill tank

- Risk of contamination
- Risk of tank damage



### Overhead wires

- Take care operating near wires to prevent entanglement or electrocution.



### Fluids under pressure

- Wear glove and face screen



### Chemical hazards

- Read manufacturers labels.
- Wear personal protective equipment; including face screen and gloves when handling these.
- Provide adequate ventilation.



### Danger overhead

- Do not enter paralift area or stand under booms
- Take care when opening lids - loose items may be present in them



### Danger toxic fumes may be present

- Take care when opening lids - fumes may be present
- Do not inhale tank fumes



### Danger of toppling over on hillside or slope

- Drive with extreme caution
- Widen axle track width to minimise risk





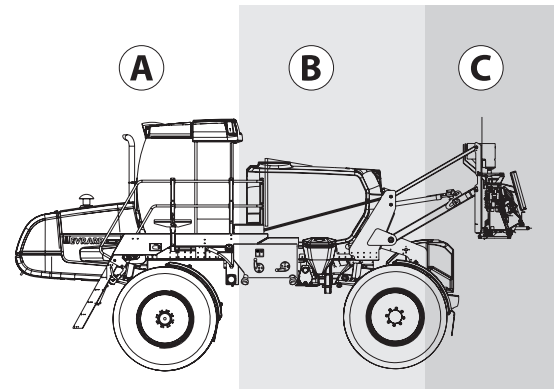


## General information

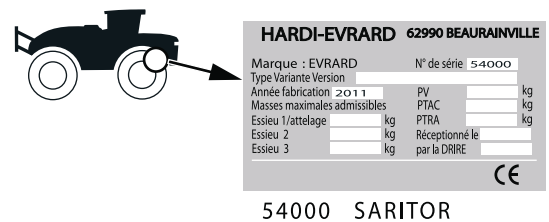
### General View

The SARITOR is divided into 3 zones: a Clean zone, a Working zone and an Application zone, referring to the level of possible pesticide contamination see "Sprayer identification plates" on page19. In the following the functions and features are listed by zones. Please note that some of the features are optional equipment.

A: clean area	Engine
	Working platform with ladder
	Cabin
	Tap for hand washing
	Access to Main tank
A: Working Zone	Tank level indicator
	Multipath Valves
	FastFiller coupler
	ChemFiller
A: Working Zone	Boom lift, up/down
	Boom
	Nozzles
	Mudguards
	Suspension



### Sprayer identification plates



### Roadworthiness

When driving on public roads and other areas where the highway code applies, or areas with special rules and regulations for marking and lights on implements, you should observe these and equip implements accordingly.

It is imperative to follow the directions of the Highway Code or any other regulations regarding the mandatory equipment on the farm equipment (lighting, beacon, etc. ). The sprayer should be conform to the standards in force. Be sure to read before any use of overall dimensions, including the height and width of the sprayer

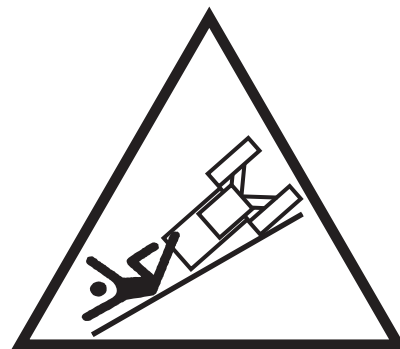
**!** DANGER! You must in all circumstances adapt your driving on the road, particularly by reducing your speed in the turns, depending on the state of the floor, in the case of dipped or overrun by another vehicle.

## 3 - Description

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### Conduct in the field

It should be very careful with risks of overturning linked at a speed greater than 15 km/h in 4 steering wheels, as well as to the slope of the field.



**DANGER!** Boom manoeuvres should be carried out with the engine shut down and on flat ground. Before any maneuver of the boom, make sure that there is no obstacle in the vicinity (electrical line, person, pole, etc. ...).

---

### Sprayer usage

The HARDI sprayer is for the application of crop protection chemicals and liquid fertilisers. It is not allowable to use the sprayer for other purposes. If no local law demands that the operator must be certified to use spray equipment, it is strongly recommended to be trained in correct plant protection and in safe handling of plant protection chemicals to avoid unnecessary risk for persons and the environment when doing your spray job.

---

### Chassis

Very strong and compact frame which also has a strong chemical and weather resistant electrostatic lacquer coat. The hardware is either stainless steel, to be treated against corrosion. The front and rear suspension is provided by a pneumatic system.

---

### Tanks

The main tank made of impact-proof, UV-resistant and chemical resistant polyethylene, has a purposeful design with no sharp corners for easy cleaning. Nominal content 5000 l. A large, easy to read tank contents indicator is placed beside the platform and is visible from the tractor cabin. The filling hole is placed so it can be accessed from the platform. The SARITOR is standard equipped with a water tank with a capacity of 575 liters, and a reserve of clear water (tank washing hands), with a capacity of 100 liters.

### Boom

#### Boom and terminology

The TERRA FORCE boom is either pendulum or trapeze suspended, fully hydraulically operated with all functions controlled via the Direct Hydraulic System (D.H.) and SetBox

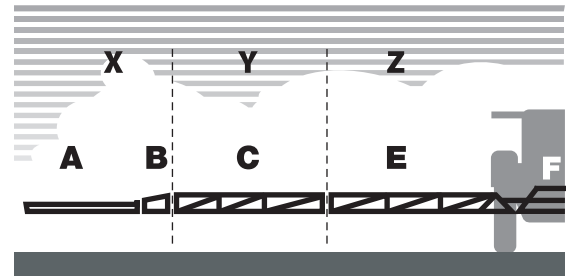
The TERRA FORCE boom is suspended from a parallelogram with nitrogen accumulators and is available in 36, 38, 40 and 42 m working width. All booms are 3-folded.

Boom features:

- Hydraulic centre lock
- Third outer sections incorporate spring-loaded breakaway
- Wing tilt control
- AutoTerrain or DynamicCentre with trapeze suspension
- Partial folding of outer sections. This enables alternative boom widths

For 3-folded booms the terminology is as follows:

- A. Breakaway section
- B. Third outer section
- C. Second outer section
- A. First outer section
- B. Centre section



NOTE! When controlling the boom at the SetBox, the folding sections are:

- A. Third outer and breakaway section
- B. Second outer section
- C. First outer section

#### Dynamic Centre with trapeze

The DynamicCentre control system can adapt the boom suspension for different conditions.

DynamicCentre provides hydraulic remote control of the suspension resistance. The settings are selected on the go and will change the boom behavior from being free to fully stabilized.

The system is adjustable in 5 steps between two absolute points of adjustment:

DynamicCentre step	Pendulum state	Terrain
1	Free	Flat field
2-4	Partly stabilized	Field with slopes
5	Fully stabilized	Hilly field

## 3 - Description

---

### Boom

---

#### AutoTerrain with pendulum centre (optional equipment)

AutoTerrain is a computer controlled pre-emptive boom stability & auto height control system which maintains the correct relationship and height of the boom to the different field conditions. AutoTerrain highly tuned computer controlled proportional electro-hydraulics and ultrasonic sensors help spray more safely, reducing potential ground strikes and prevents incorrect spray height.



#### WARNING!

- Stability control roll sensor and indicator must be correctly aligned to prevent uncontrolled and continuous boom oscillation.
- The pendulum centre stability control linkage points must be regularly lubricated to protect swivel balls from moisture penetration and prevent swivel ball seizure.
- The boom should never be used to spray with the pendulum lock engaged.



#### ATTENTION!

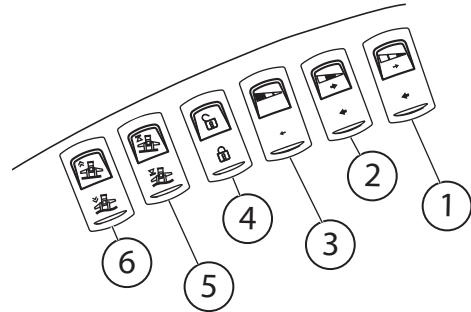
- For optimum AutoTerrain performance the stability & height control sensors must be checked and cleaned regularly.
- Dusty, damp or missing sensors pads will not read accurately and AutoTerrain will be compromised. Foam pads must be washed and dried daily. The boom should not be used if foam pads are missing from the sensors.
- Regarding AutoTerrain, please refer to specific book for information about Operation, Calibration and Maintenance

### Boom

#### Folding the boom

The SetBox works in combination with the Grip controls; the volume rate, foam marker, SafeTrack, HeadlandAssist, pendulum lock, boom folding and DynamicCentre functions. Furthermore two optional functions can be controlled. The buttons on the console control the following functions:

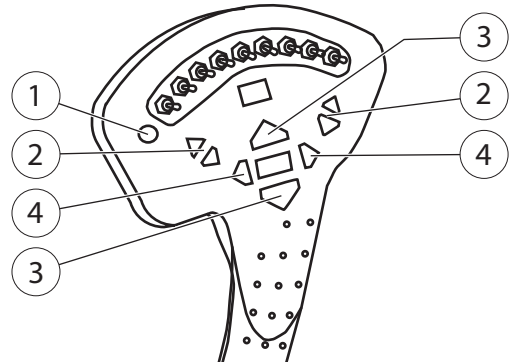
1. Unfold/Fold 3 th concurrent arm.
2. Unfold/Fold 2 th concurrent arm.
3. Unfold/Fold 1 concurrent arm
4. / Locking central framework.
5. Dynamic adjustment of the central framework by increments of 1 to 5 or 5 to 1
6. Adjust the stop maximum or minimum of the position of the central framework.
7. Optional Features A-B.
8. Centering the suspended 'AutoTerrain' (if installed).



#### Commands of the boom from the Grip

Command of the following functions by the handle

1. Status of the ISO system bus
2. Individual control of the angle of the boom arm (variable geometry left and right)
3. Command of the rise of the rail
4. Command of the descent of the rail



## 3 - Description

### Liquid system

#### General information - valve system

All of the spray functions are operated via centrally situated valves with colour coded pictorial symbols for easy operation. The fluid system is located on the self-propelled sprayers left side under the cover. To access the Fluid Working Zone open the cover. Most valves can be operated from both the Fluid Working Zone or from the cab.

#### Pump

The centrifugal pump has a simple design. The pump and valves are easy to access, they isolate the moving parts from the liquid.

#### Valves and symbols

The valves are identified by coloured symbols according to their function. They correspond to the different possible functions of the valves, thus facilitating their use. A function is activated by turning the handle towards the desired function.

#### Suction valve

##### Suction valve = blue symbols

Turn the handle towards the symbol for the required function



Filling chemicals  
via the TurboFiller



Vacuum Source



Side Banjo Filtered Fast  
Filling System  
(optional)



Clean Water Induction



Chemical Induction  
(Fast filling)



Front Banjo Filtered  
Fast Filling System  
(optional)



Quick Fill the Rinse  
Tank



Quick Fill the Main Tank

#### Pressure valve

##### Pressure valve = green symbols

Turn the handle towards the symbol for the required function



Chemicals Filler  
Ejector



Boom Nozzles

### TurboFiller

#### TurboFiller = yellow symbols

The TurboFiller is located in the Fluid Working Zone on the sprayers left side. When being used it should be unlocked by pulling out the lock pin(2) situated to the right of the TurboFiller and pushed down by grabbing the handle (1) on the TurboFiller until it clicks into locked down-position.

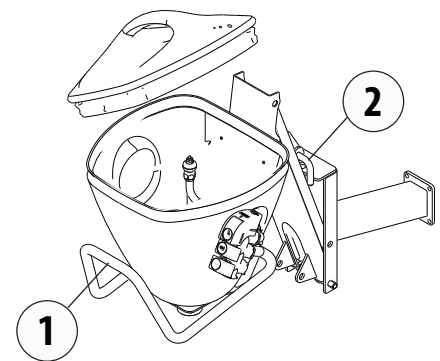
When retracting the TurboFiller after use, Pull the handle (1) upwards until it is back in storing position. secure it by refit the lock pin(2).



**DANGER!** Never operate the cleaning nozzle with the lid open unless it is covered by a chemical container!

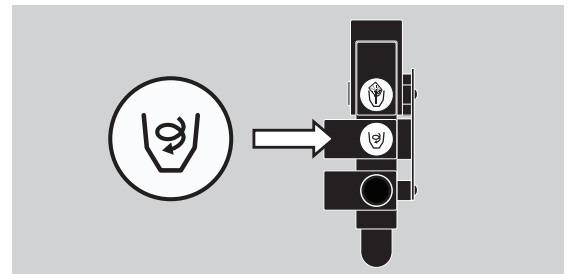


**WARNING!** Before releasing the lock (A) always keep a hand on the grip to avoid abrupt movement of the TurboFiller!



#### TurboDeflector valve

This TurboDeflector valve activates the vortex flushing of the TurboFiller. The valve is the middle valve situated to the left side of the TurboFiller and is activated in two ways. Push the valve lever down to get a quick flush in the hopper. Lift the lever to lock it in open position for continuous liquid rotation in the hopper.



#### Chemical container cleaning lever

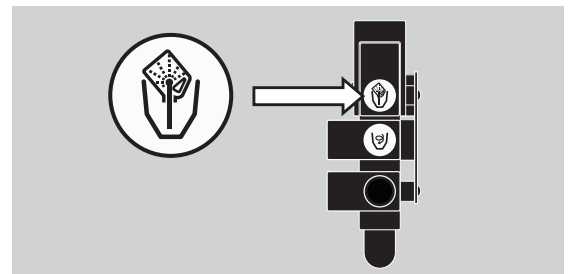
The upper level located to the left of TurboFiller are used for two purposes:

When TurboFiller lid is open: For cleaning empty containers. Put container over the rotating flushing nozzle in the middle of the TurboFiller to rinse inside of the container.

When TurboFiller lid is closed: Use the Chemical Container Cleaning lever to rinse the hopper after filling of chemicals has ended.



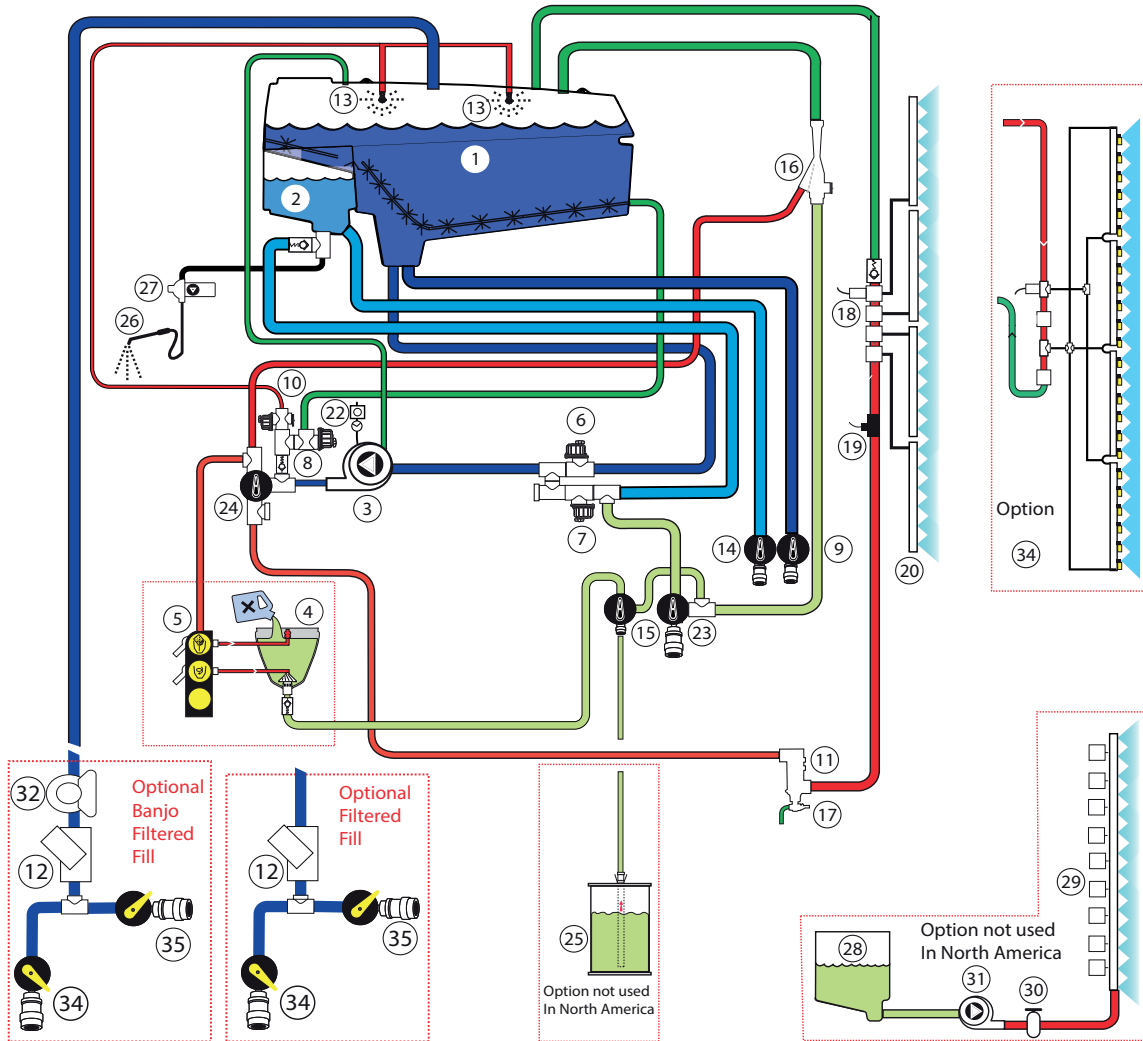
**DANGER!** Do not press lever unless the multi-hole nozzle is covered by a container to avoid spray liquid hitting the operator.





### 3 - Description

Diagram - Liquid system with optional extra



- |                           |                                      |
|---------------------------|--------------------------------------|
| 1. Main Tank              | 19. Flow Meter                       |
| 2. Flush Tank             | 20. Spray Boom                       |
| 3. Main Fluid Pump        | 21. Section Valves                   |
| 4. Turbo Filler           | 22. Pump Bleed Valve                 |
| 5. Turbo Filler controls  | 23. Chemical Induction Valve         |
| 6. Main Tank Valve        | 24. Chemfiller/Ejector / Electeur    |
| 7. Rinse Tank Valve       | 25. Chemical Tank (not supplied)     |
| 8. Agitation Valve        | 26. Wash Down Hose                   |
| 9. Main Tank Empty Valve  | 27. Flow Jet Pump                    |
| 10. Rinse Nozzles Valve   | 28. Camera Boom Tank (option)        |
| 11. Cyclone Filter        | 29. Camera Boom (option)             |
| 12. Filling Filter        | 30. Manual Regulation Valve (option) |
| 13. Rinse Nozzles         | 31. Second Fluid Pump (option)       |
| 14. Flush Tank Fill Valve | 32. Banjo Filling Pump (option)      |
| 15. Vacuum Source Valve   | 33. PrimeFlow Boom (option)          |
| 16. Ejector - Fast Fill   | 34. Front Filling Valve (option)     |
| 17. Filter Bypass Return  | 35. Side Filling Valve (option)      |
| 18. Pressure Sensor       |                                      |

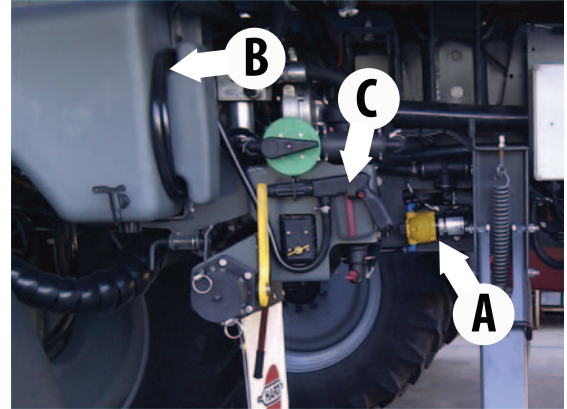
### External Cleaning Device

The External Cleaning Device comprises a hose (B), spray gun(C) and a electric pump (A).



**DANGER!** The External Cleaning Device operates at very high pressure and could potentially cause serious personal injury, it is therefore essential the following Safety rules be observed and strictly enforced:

1. Never point the water jet at people, animals, electric installations or equipment, overhead power lines or other sensitive objects.
2. Never try to clean clothing or foot wear, especially if being worn by a persons.
3. Pressure can penetrate skin and cause severe injury. Never work with un-protected eyes, bare feet or sandals.
4. Never operate without approved chemical safety wear including face mask, gloves, respirator, boots and cover-alls.
5. Beware of fluing particles being dislodged by the cleaning jet.
6. The spray gun and hose are affected by "recoil" when the handle is released during operation - therefore always hold the insulation on top of the gun with one hand and the pistol grip with the other hand to facilitate better control of the device.



### Filters

A Cyclone filter is fitted in the liquid area on the right side of the TurboFiller. It has a built in self-cleaning function.

In-line pressure filters can be fitted at each section as an option.

Nozzle filters are fitted at each nozzle.

All filters should always be in use and their function checked regularly. Pay attention to the correct combination of filter and mesh size. The mesh size should always be less than the average of the nozzles in use.

## 3 - Description

### CycloneFilter

With the CycloneFilter any impurities in the spray liquid will by-pass the filter and be recirculated back to the tank via the return flow.

Function diagram

1. Filter lid
2. From pump
3. To boom
4. Return to tank
5. Return valve

Valve (5) has three positions marked with small dots on the lever:

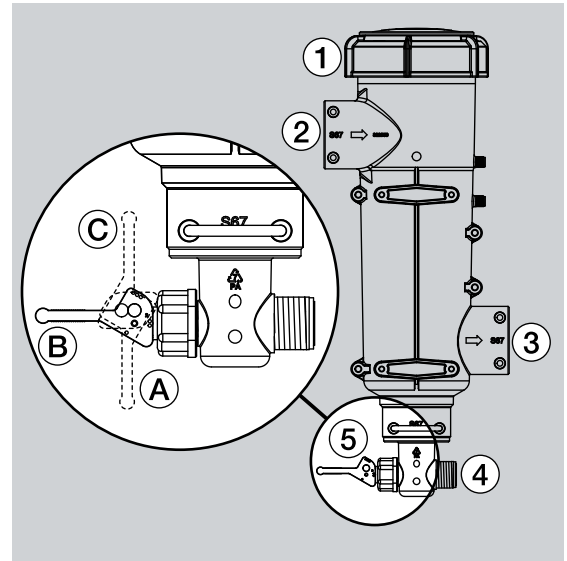
- A. This position marked with 1 dot: There is no return flow. Position is used when rinsing the boom if there is spray liquid in the main tank. Also used when high spraying volume is required.
- B. This position marked with 2 dots: Normal spraying position. With return flow to prevent filter is going to be clogged when spraying. This position is used when rinsing the boom if the main tank is empty.
- C. This position marked with 3 dots: Flushing position which is used if filter is clogged. Lift and hold the lever to use this position which largely increases return flow and flushes the filter. The pressure SmartValve must be set to "Spraying".



**DANGER!** The suction valve must always be turned to the closed position and the pressure SmartValve to "Main tank" before opening the Cyclone filter! If not then spraying liquid can hit you when opening the filter and drain the main tank content!



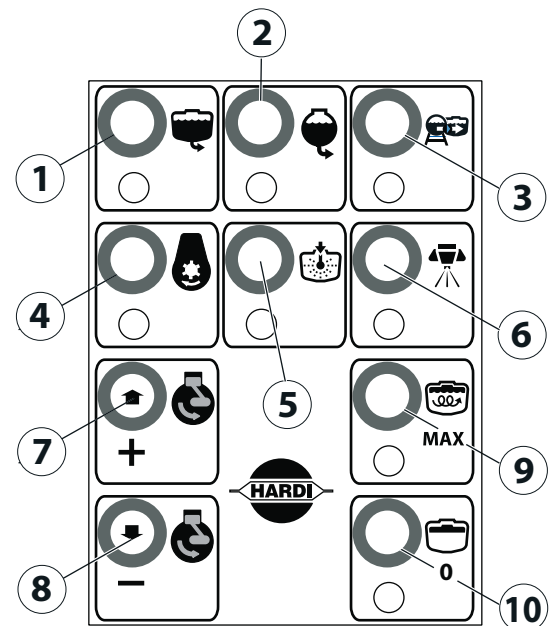
**ATTENTION!** Use of position (C) is no guarantee for a clean filter. Always regularly do a visual inspection and cleaning of the filter. If needed see "10 hours service - Cyclone filter" in the Maintenance section.



### External controls

A panel of ten push buttons allows the external control of the main functions of spraying and the engine speed. The commands are grouped together by color to allow to simplify their use. Indicators show the function activation.

1. Suction from main tank
2. Suction from rinsing tank
3. Pressure emptying
4. Spray pump control
5. Tank rinsing nozzles
6. Open/Close spraying
7. Throttle Control of the engine
8. Engine deceleration control
9. Agitation of main tank
10. Spray pump OFF



### Cabin

#### Access to the cab

To open the cab door, press the lever ref.1

Two keys to closing of the door of the cab is also provided

#### Emergency Exit

In case of emergency, a device to the emergency exit is placed to the right of the driver's seat, on the opposite side to the access door to the cab.

To exit the cab using the emergency door, proceed in the following way:

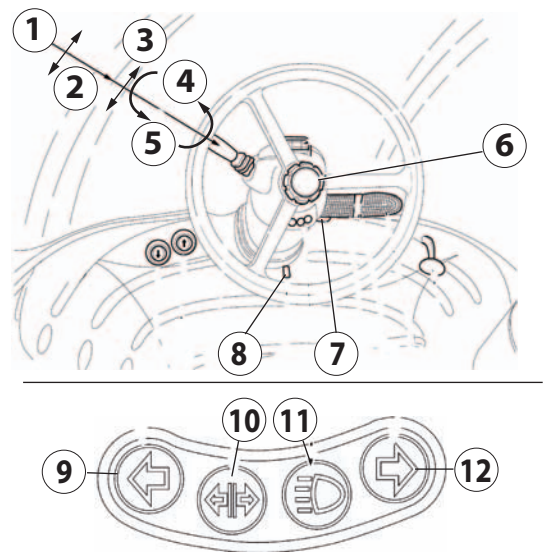
- Unlocking the door of relief:
  - Place the handle of the emergency door horizontally
  - Slightly open the emergency door until the metal pin that attaches to the door is visible at the bottom of the button on the handle of the door
  - Act on the handle of the door to the release of the axis
- Open the door completely dce relief
- Exit the cab.



The gateway of access to the cab flanked remain free of any obstacle, to allow access in case of emergency.

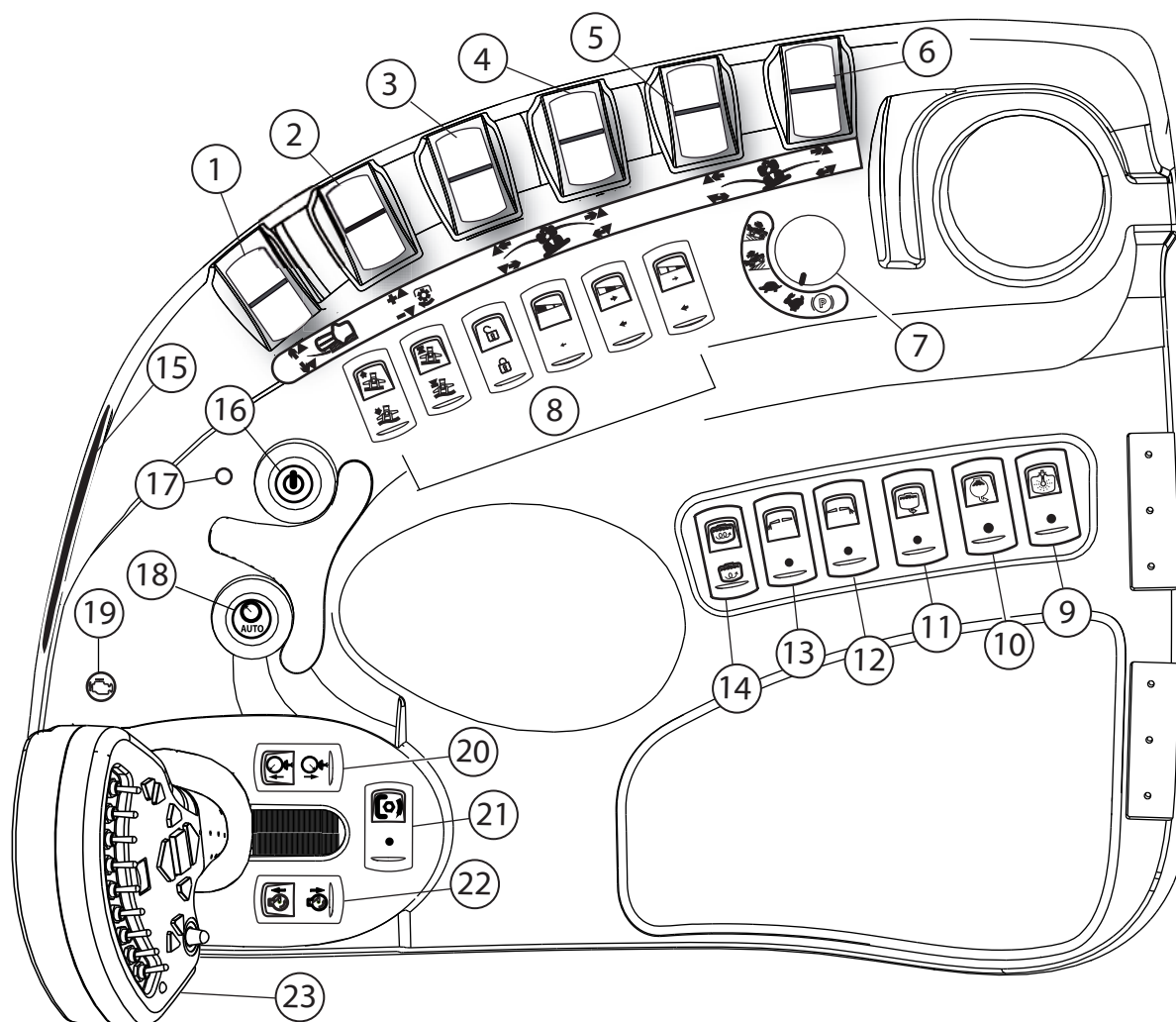
#### Steering column

1. Direction indicator
2. Horn
3. Selection of lights road (top) and high-beam headlights (bottom)
4. Position Lights
5. Rotary switch for lights of road
6. Adjusting the height of the steering wheel
  - Unscrew the bolt, then raise or lower the steering wheel to the desired height
7. Tilt of the steering wheel
8. Steering column inclination adjustment
9. Direction indicator left
10. Hazard warning lights
11. Road Lights
12. Direction indicator right



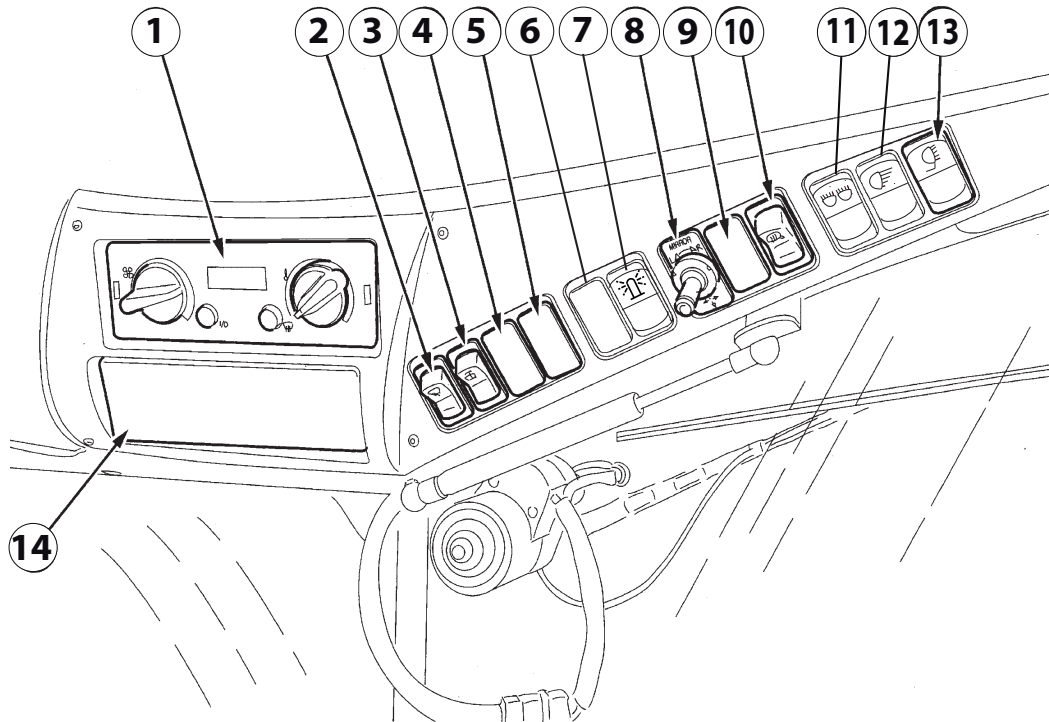
### 3 - Description

#### Instrument panel



- |   |   |
|---|---|
| 1. Not used   | 15. Ashtray                                   |
| 2. Not used   | 16. On/Off button of the electronic computers |
| 3. Switch to the track on the left front wheel                | 17. Power on LED for computers                |
| 4. Variation of the track Switch Front Right                  | 18. Auto Switch/Manu for pressure regulation  |
| 5. Variation of the track Switch Rear Left                    | 19. Engine fault indicator                    |
| 6. Variation of the track Switch Right Rear                   | 20. Spray pressure                            |
| 7. Speed selector and parking brake                           | 21. Spray pump clutch switch                  |
| 8. Boom hydraulic controls See "Folding the boom" on page 23. | 22. Engine speed variation switch             |
| 9. Tank rinsing nozzles                                       | 23. Multi-functional forward handle           |
| 10. Suction from rinsing tank                                 |   |
| 11. Suction tank Main Switch                                  |   |
| 12. Right end nozzle control switch                           |   |
| 13. Left end nozzle control switch                            |   |
| 14. Command of the agitation                                  |   |

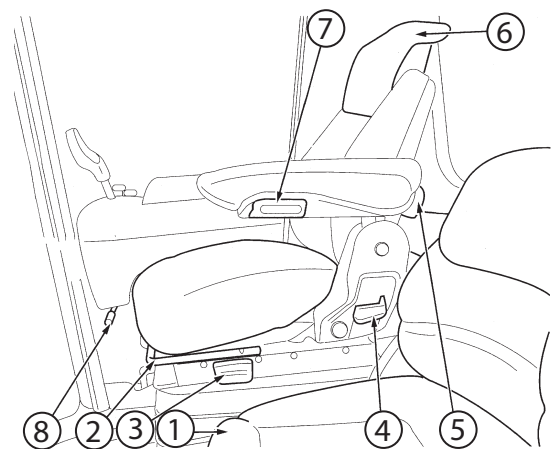
### Cabin roof instrumentation



- |                              |                                  |
|------------------------------|----------------------------------|
| 1. Air-conditioning controls | 8. Adjusting the door mirrors    |
| 2. Switch of the wipers      | 9. Not used                      |
| 3. Switch window washer      | 10. De-icing of the door mirrors |
| 4. Not used                  | 11. Front work lights            |
| 5. Not used                  | 12. Side work lights             |
| 6. Not used                  | 13. Rear lights                  |
| 7. Beacon Light              | 14. Location of the radio        |

### The seat

1. Passenger Seat Cushion
2. The driver's seat before and after settings
3. Settings of the weight and height of the seat
4. Adjusting the inclination of the backrest
5. Lumbar adjustment
6. Top adjustment of the height of the folder
7. Adjust the armrest of the left side
8. Setting right-hand side of the module from front to back



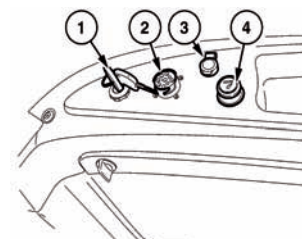
## 3 - Description

### Start-up and diagnostics of the engine

The start module and diagnostic of the engine is placed on the right hand side at the rear of the seat.

1. Ignition key and start (4 positions)

- Not used
- OFF
- Contact
- Starting the engine



The position 'Contact' engages the power of the electrical circuits and the engine preheat

2. Diagnostic socket of the engine -IS<sup>1</sup>

3. Taken 12 volts (permanent)

4. Cigarette lighter

### The multi-function handle

1. O/F indivudelle sections of spraying

2. Status of the ISO system bus

3. Variable geometry left side

4. Roll Left Side

5. Not used

6. Boom lower

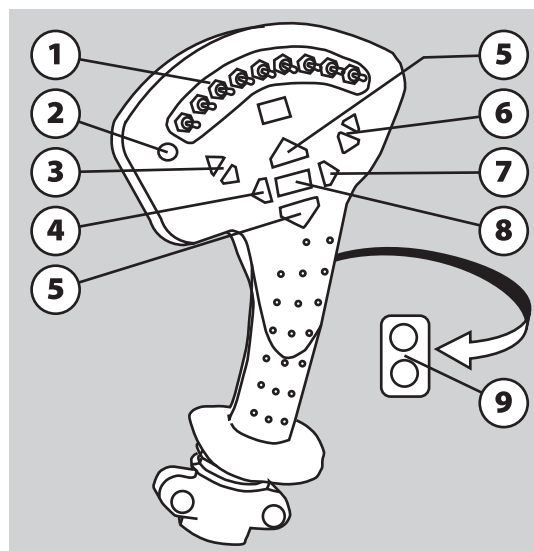
7. Boom lift

8. Variable geometry right-hand side of the boom

9. Cant right-hand side of the boom

10. Main valve ON/OFF

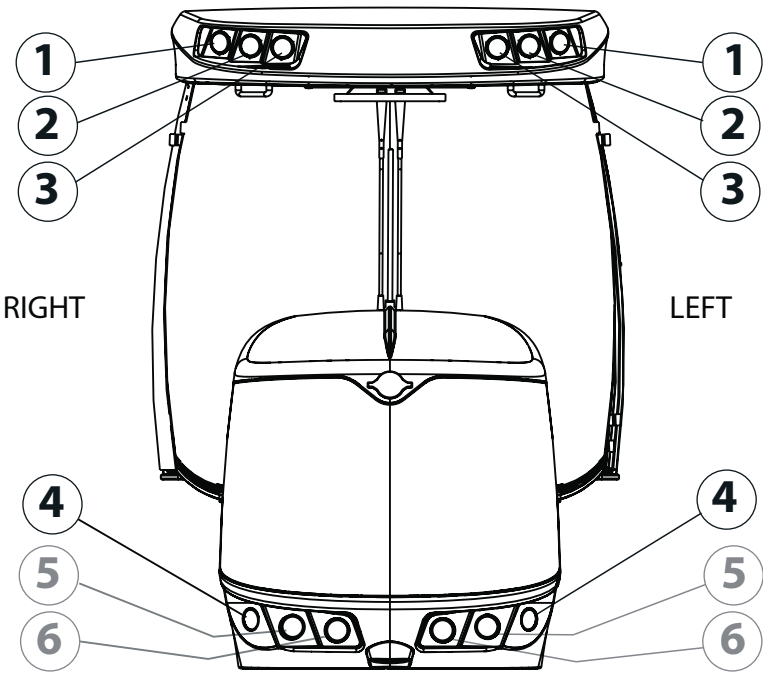
11. Flap settings of the Twin air



1.IS Electronic Service Tools (diagnostic tool of engine)



Lighting and cab light



1. Cab front outer working lights	4. Hood working lihts
2. Cab front center working lights	5. Dipped headlights
3. Cab front inner working lights	6. Road Lights

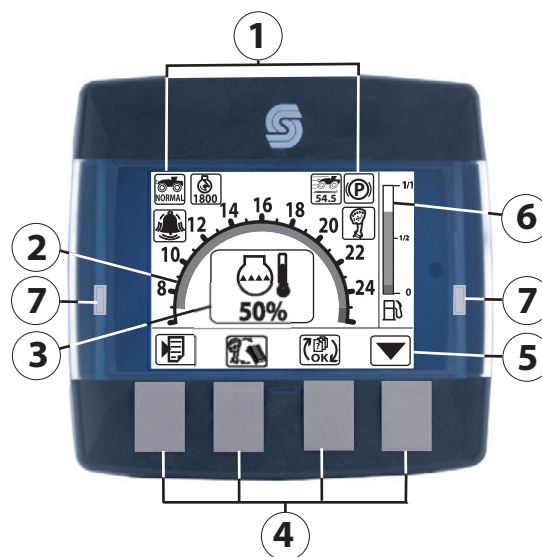
**i** The headlights ref. 1 and ref.3 will light up simultaneously.

## 3 - Description

### The multifunction display

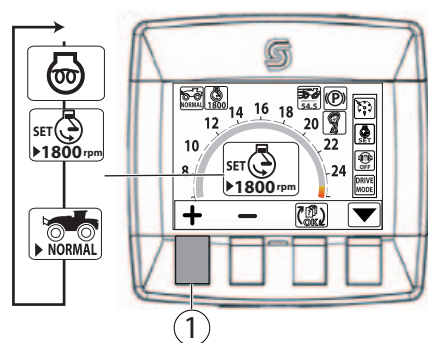
The multifunction display mounted the information relating to the operation of the engine, (tachometer, temperature, etc. ) and the various modes of lines (hare, tortoise, etc. ). The display also shows the errors that may occur during the use of the machine (temperature and pressure the engine oil, transmission error, etc. .. ).

1. Logos of the statutes
2. Tachometer
3. Display of the functions of the engine and transmission
4. Push Buttons of controls and settings
5. Horizontal Menu
6. Vertical Menu

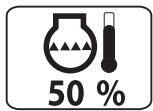


### Display of functions

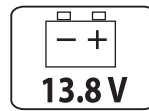
- Press the push button ref.1 to scroll through the various functions



### Messages in normal operating mode



Engine temperature  
0 à 100%.



Battery charge voltage



Engine oil pressure



Limitation of the motor speed mode [field]  
See "Limitation of engine speed - hydraulic oil temperature too high" on page 51.



Turbocharger pressure



Restricting the speed of movement in mode [route]



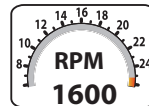
Hydraulic pressure of the transmission



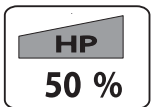
Restricting the speed of movement in mode [Field]



Instant fuel consumption



Displays the speed of the engine



Power supplied by the engine



Errors of functioning of the driveshaft  
See "Transmission error codes" on page 109.



Displays if errors of engine operation to occur (level 1)



Preheating of the engine

### 3 - Description

---

#### Messages in selection mode



COMFORT Mode of conduct  
See "Driving mode" on page 49.



Anti-slip disabled  
See "Traction Control System" on page 49.



NORMAL Driving Mode  
See "Driving mode" on page 49.



Anti-slip engaged  
See "Traction Control System" on page 49.



Mode of conduct POWER  
See "Driving mode" on page 49.

---

#### Alarm Messages - priority



The display of these alerts imposes the immediate shutdown of the engine.



Alarm engine overheating



Alarm pressure of the turbo-compressor



Alarm engine oil pressure.



Alarm engine defect (level 3)

---

#### Alert Messages - Mode 'Degraded'



These warning messages are displayed when the operating anomalies appear on the self-propelled



Temperature of the hydraulic transmission too high



Temperature of the hydraulic transmission too low



Alert default engine (Level 2)

### Alert Messages - Maintenance

These warning messages are displayed when maintenance work must be performed on the self-propelled



Maintenance (level 1)

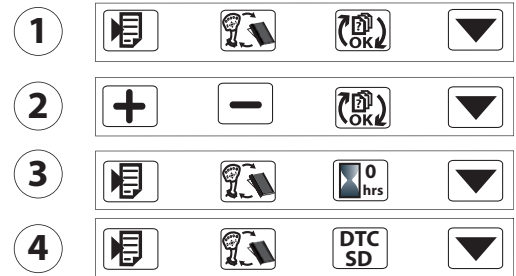


Maintenance (level 2)

### Horizontal Menus

Press button to select the menu corresponding to the symbol.

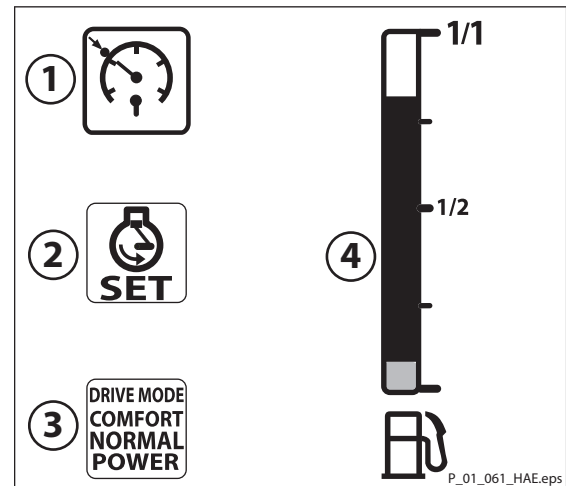
1. Normal Mode of Operation
2. Settings / settings
3. Hourmeter
4. Management of errors of the transmission (SD) and the engine (DTC).



### Vertical Menus

Press button to select the menu corresponding to the symbol.

1. Forward speed limitation
2. Engine speed limitation
3. Driving mode selector switch
4. Fuel gauge



The fuel gauge ref.4 is displayed by default, or after 5 seconds of inactivity on one of the push buttons placed vertically.



### General information

#### Unloading the sprayer from the truck

The machine can only be unloaded if the engine is running. In effect the braking system is disengaged that if the engine is running. To move the self-propelled, you must observe the following points

Turn the slice-battery to power the electrical circuits

Place the forward handle in neutral.

Check that the parking brake is engaged.

Turn the ignition key to start the engine

Press the switch of the acceleration of the engine

Push the handle of progress very slowly toward the front to move forward, toward the back to back

Ensure that no one is in the unloading area.

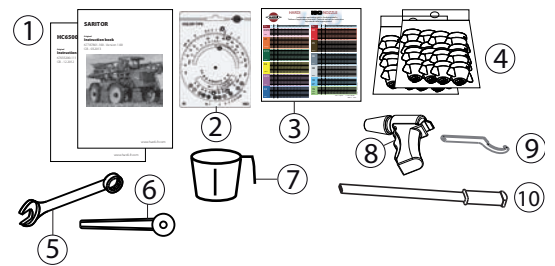
Do not unloading the sprayer that if you are familiar with the instructions described above

To ensure a sufficient traction and braking of the self-propelled in the inclined planes, the engine rpm must be a minimum of 1500 rpm.

#### Accessories

Some accessories are supplied separately with the machine. The list varies according to the equipment and options

1. instruction books	6. brake release handle
2. ISO nozzle disc	7. graduated pot
3. table ISO nozzle	8. Multi-jets spray
4. nozzles	9. key for external connector
5. socket spanner	10. Hydraulic pump lever (brake release-bonnet open



#### Access to the engine

To access the engine, you must lift the hood. For more information on the periodic maintenance of the engine, see the chapter. "Maintenance" on page 81

#### Opening the hood

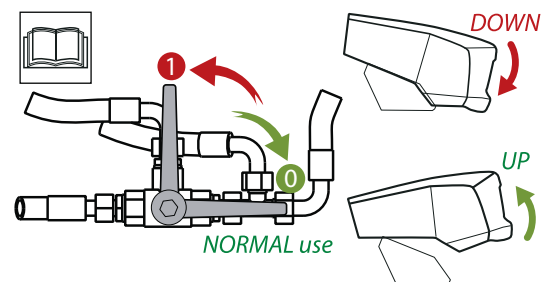
- Turn the valve on the position (1).
- Use the manual pump to lift and hold the hood open to the desired height.

#### Closing the hood

- Gradually turn the valve to the position (0) to close the hood



**NOTE!** The valve should remain in the position (0) when the hood is lowered.



#### Check engine

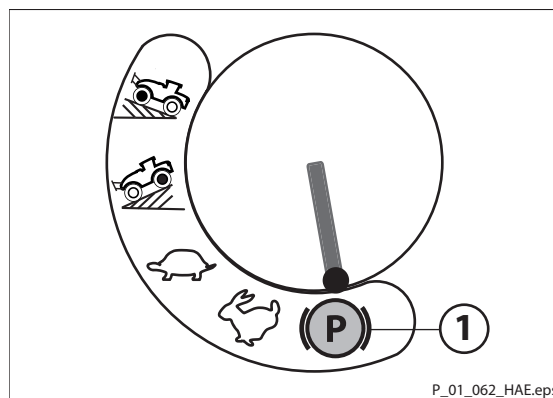
The main elements must be verified before the first commissioning of the engine:

- Coolant Level and engine Oil Level
- Correct tightness of the cartridge of oil and fuel
- Tension on the belts

## 4 - Sprayer setup

### Access to the driving position

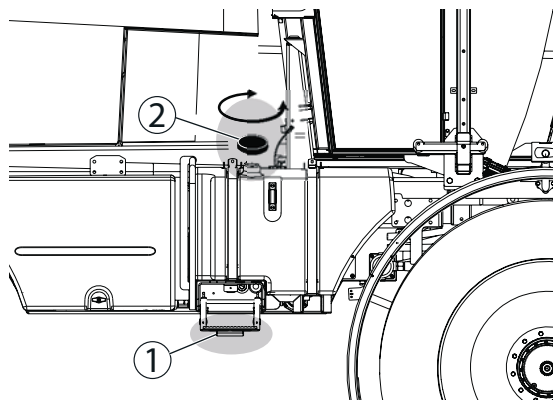
When the engine is off, the ladder to access to the driving position is lowered. It goes back automatically as soon as the engine is running and the parking brake is no longer engaged (pos.1).



### Filling the fuel tank

The fuel tank has a 550-litre capacity. Before filling, you devez:

- Stop the engine
- Pull and lower the access ladder ref.1 to access the reservoir
- Thoroughly clean the plug ref.2 to prevent the introduction of impurities into the tank. Use a funnel and a filter if necessary.
- Do not smoke not during the filling of the tank



**i** We must avoid that the tank does not empty completely, in order not to introduce any impurities or air in the circuit.

**i** Before a prolonged shutdown, it is preferable to keep the tank filled to the maximum qty, in order to avoid any trace of condensation in the tank.

The CUMMINS engines with electronic injection standards meet the US, CANADA and Europe. The engines must operate with diesel to low sulfur (ultra-low ULSD diesel - ULSD), with a maximum of 15 ppm for the United States and Canada, and 10 ppm for Europe.

The mixture of fuels to low sulfur (ULSD) and biodiesel is accepted up to 20% in order to meet the certification B9000.

**i** • Refer to CGE Cummins Service Bulletin 3379001 "Fuels For Cummins Engines" for more details.



### Hydraulic Oil Level

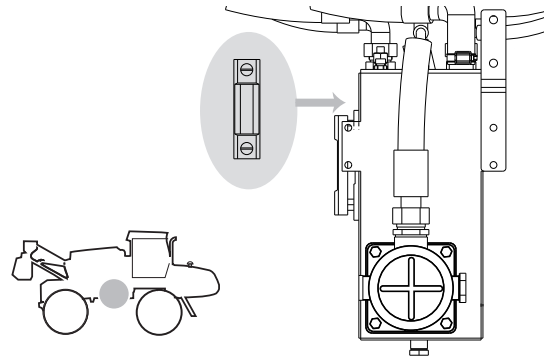
A visual gauge is installed on the hydraulic reservoir with a capacity of 100 liters. A detector warns the user that the level in the tank is too low. Periodically check hydraulic oil level.



To avoid any risk of damage to the hydraulic components, when the audible alarm sounds, stop immediately the self-propelled and stop the engine.

The fill hole of the hydraulic reservoir is located in the vicinity of the platform for access to the cab. To fill the tank, it is recommended that:

- Thoroughly clean the tank cap, to eliminate all traces of dirt and moisture.
- Filter the oil when filling
- It is essential to observe the quality of the recommended oil. See "Table of recommended lubricants" on page 79.



### Oil Level in the moto-reducers of wheel

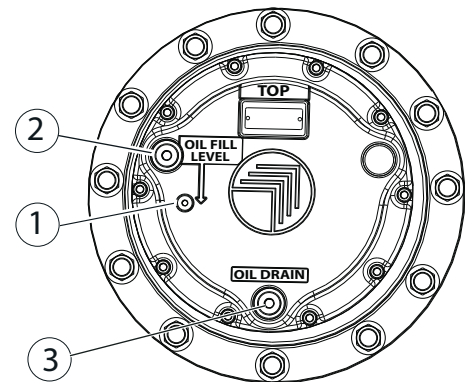


Before traveling, check the oil level in the gearboxes of wheel:

- Move the self-propelled to orient the reducers of wheel as shown in the illustration
- Unscrew the level rep.1
- Add oil if necessary, by the port (REF. 2); discard, until the oil flows through the port of level rep. 1.



Use exclusively recommended transmission oil. See "Table of recommended lubricants" on page 79.

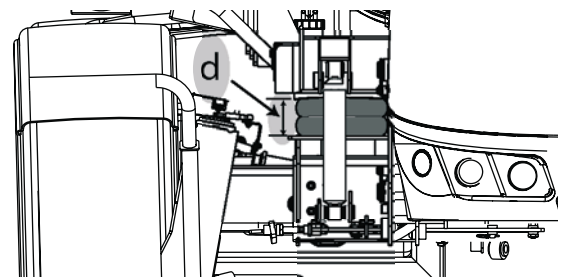


### Air Suspension

Height of the suspension cushions (distance d), when the pressure of service is reached

Before = 254 mm (10 in)

Rear = 235 mm (9.25 in).



If this is not the case, see chapter: "Air suspension adjustment" on page 92

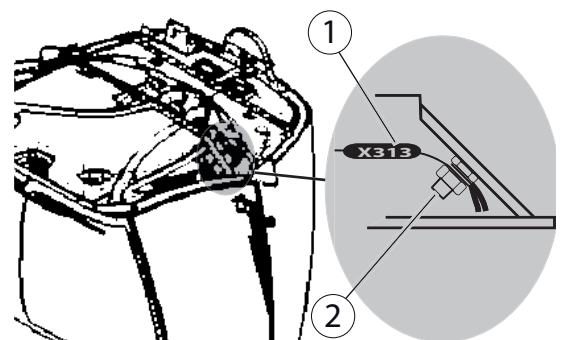
### Selection of temperature unit

A wire marked X313 is located at the right hand side of the cab :

- Open the cab roof
- Select the temperature unit Celsius or Fareinheit

Celsius (°C) = wire (1) is connected to the nut (2) (ground)

Fareinheit (°F) = Disconnect and isolate the wire (1)



## 4 - Sprayer setup

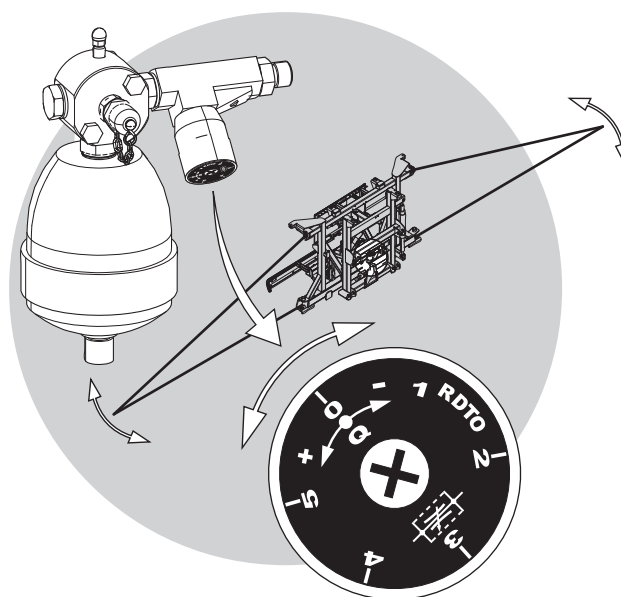
### Boom

#### Yaw damper adjustment

Yaw movement is when the boom wings move backward and forward which is caused by cornering, braking, acceleration and self-propelled sprayers oscillation.

The yaw dampening mechanism in the boom center absorbs the energy from the boom to stabilize yaw movement and can be adjusted to compensate for different driving conditions.

The needle valve is used to control the speed of yaw movement, restricting the oil flow through the damper. If there is too much gold boom yaw oscillation movement then the needle valve can be adjusted in the minus direction to stiffen the boom through the center.



Steering behavior	Dampening	Adjust screw direction
High speed in uneven terrain	Increase	Clockwise (negative)
Low speed in flat terrain	Decrease	Counterclockwise (positive)

#### Default setting

If out of adjustment, the starting point is set as follows:

1. Turn adjust screw all way in (clockwise/negative direction).
2. Then turn the screw out 2.5 turn (counterclockwise/positive direction).



#### WARNING!

- The needle valve should not be totally closed to prevent boom yaw movement. To do so may damage the boom.
- Sudden changes in direction, auto steering corrections, poor ballasting, too low a tire pressure, too high a forward speed, breaking and accelerating will causes yaw movement.
- Failure to control yaw will lead to damage of the boom.
- The hydraulic accumulator must be correctly charged at 30 bar (bar 25 min - tb 35 bar max). Too low year oil pressure in the yaw circuit will put undue stress on the yaw parallelogram mechanism, the yaw cylinder & accumulator, fold cylinders and boom wings.
- The hydraulic circuit must be correctly bled of all air.



#### ATTENTION!

- The yaw mechanism must be greased regularly to lubricate, protect pine bushes & bearing and prevent moisture penetration.

## Starting and stopping of the machine

### General information



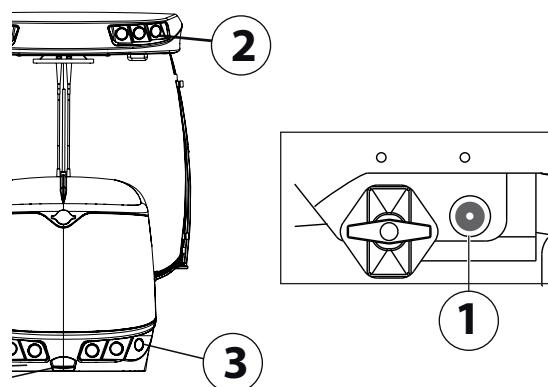
Before starting the engine, check the level of the engine oil, coolant and hydraulic oil. Check that the engine radiator and air filter is clean.

### Lighting of the gateway of access to the driving position

The self-propelled SARITOR is equipped with a light at the side of the ladder and the gateway to facilitate access to the workstation of conduct

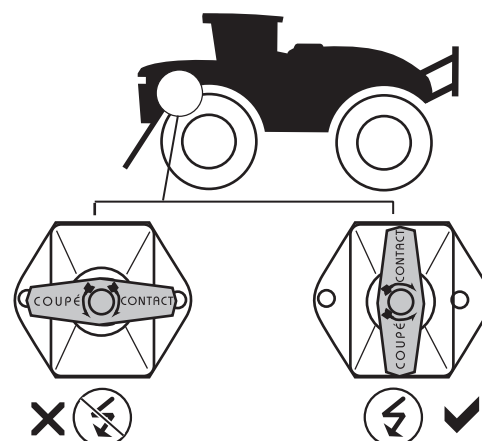
Press the push button ref.1 to turn on the headlights rep2 and rep3

The extinction of the headlights is automatic after a few minutes.

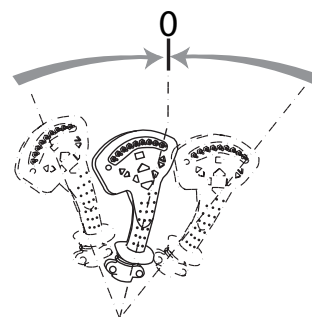


### Initialize the system more+One

- Turn the handle of the cup-battery to power the electrical circuits of the self-propelled



- Place the forward handle in neutral to start the engine.



- Turn the ignition key to position [1] to initialize the Plus+One system.

- Turn the key start the engine on the pos. 2. Release it after start-up and the key will automatically return to position [1].



## 5 - Operation

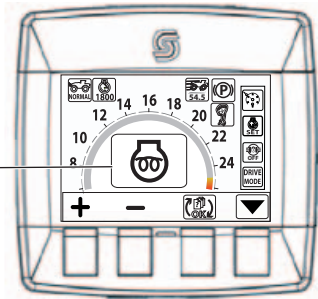


The symbol only appears if the engine preheat is required to start.

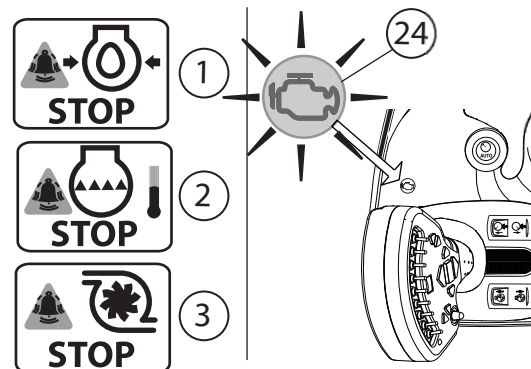
- Turn the ignition key to position B to start the engine.



After starting the engine, if the light of default ref.24 lights up and that one of the 3 priority messages appears on the screen, you must stop the engine immediately and proceed to audits under penalty of deterioration of the engine.



1. Engine oil pressure is too low.
2. Engine overheating.
3. Pressure turbo-compressor too low.

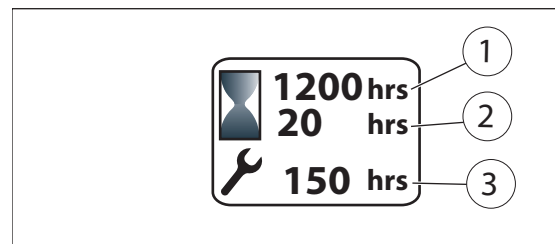


For more information on the error messages, see the chapter of maintenance "CUMMINS engine error codes" on page 110.

### Hour Meter

#### Description

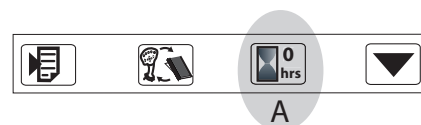
1. Total hours meter
2. Counter partial time
3. Hour Meter for maintenance



For more information on the maintenance of the self-propelled sprayer, see the chapter "Periodic Maintenance" on page 82.

#### Reset the Hour Meter

At any time, you can reset the Hour Meter, by pressing the button (A) during few seconds.

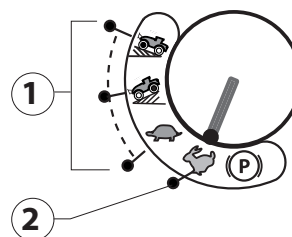


## Field Mode / Road

### Selector Mode

The mode selection fields / Road is obtained from the selector 5 positions.

1. "FIELD" mode.
2. Mode [ROAD] - (automotive)



The mode [field] is managed by the computer Plus+One. In this case, you must act on the switch ref.27 on the console to adjust the engine speed.

In the [road] mode the computer directly controls the engine speed depending on the position of the handle of progress or of the pedal, depending on the option chosen (mode Automotive).

The responsiveness of the acceleration and deceleration of the self-propelled are predefined in the computer more+One. To select the mode of conduct, see the chapter. "Driving mode" on page 49

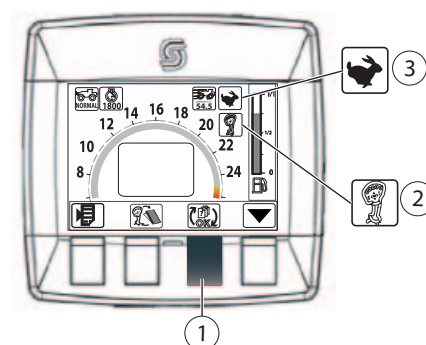
### Mode [Road] using the joystick

The sprayer travel toward the front is obtained by pushing the joystick forward or pulling for reverse travel.

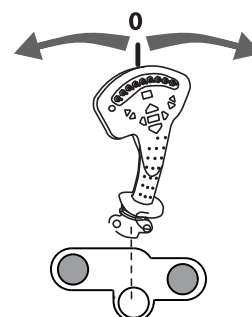
The engine speed varies according to the position of the forward handle.

Braking is achieved by pulling the handle of progress toward the neutral point. The self-propelled is at a complete stop when the joystick is in the neutral position.

1. Select button.
2. Handle mode selected.
3. Selected [road] mode
4. Press the key ref.1 to select the mode [handle].



- Push the joystick of progress to move the self-propelled



In [Road] mode, the pedal is inoperative.

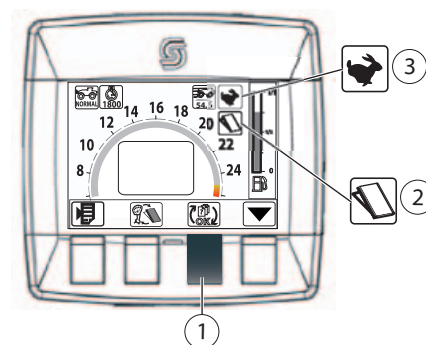
## 5 - Operation

### [Road] mode using the foot pedal

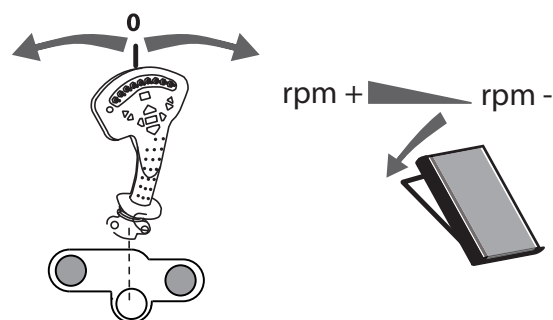
The sprayer travel toward the front is obtained by pressing the pedal. The direction of movement of the self-propelled is obtained by pushing the joystick forward or by pulling it toward the rear.

Braking is achieved by either releasing the pedal up to the full stop, or by pulling the joystick in the neutral position.

- Press the key ref.1 to select the mode [foot].



- Push the joystick to select the direction of travel
- Press the pedal to move the self-propelled, the speed increases as a function of the support on the pedal.



In [road] mode, the maximum speed is 50 km/h. However the ground speed may be limited. For more information, see section "Restricting the speed of movement in [road] mode" on page 50.

### Mode displacement [field]

The mode [field] has 3 modes of use. Each of these modes is directly on the speed of travel as well as the torque of the transmission.

In this mode the speed of the engine remains constant, regardless of the position of the joystick.

**i** The passage in one of the 3 modes (field-mounted-lowering) can be performed when the self-propelled is in motion.

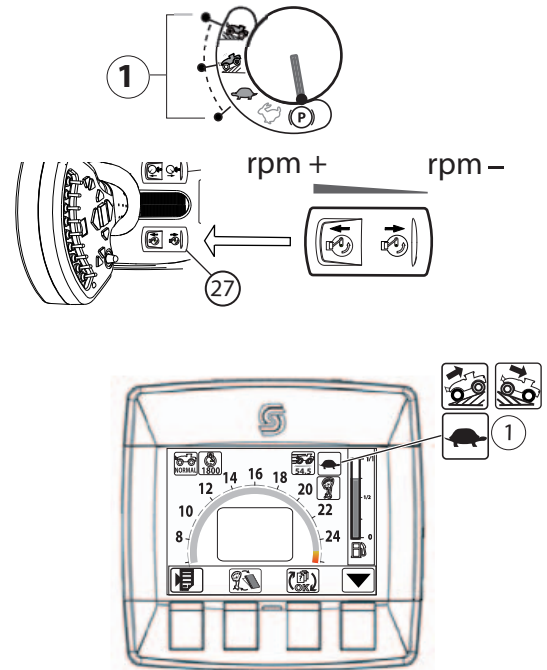
FIELD mode require a minimum engine speed of 1500 rpm for the transmission to give enough traction and braking torque.

- Mode [field] (tortoise): The transmission pump flow is evenly distributed in all the hydraulic motors. This flow is proportional to the position of the joystick.
- "UPHILL" mode. In order to limit the slippage of the front wheels in the foretes mounted, the displacement of the rear hydraulic motors is superior to that of the engines before hydaruliques
- "DOWNHILL" mode. In order to limit the slipping of the self-propelled in the strong raids, the displacement of the hydraulic motors before is superior to that of hydaruliques rear engines.

- Turn the selector switch on one of the modes
- Press the switch rep 27 to accelerate the engine
- Push the joystick to obtain the desired travel speed.

The display shows the current mode of use ref.1

**i** In mode [field], the maximum speed is 30 km/h. However the ground speed may be limited. For more information, see section "Restricting the speed of movement in mode [Field]" on page 50.

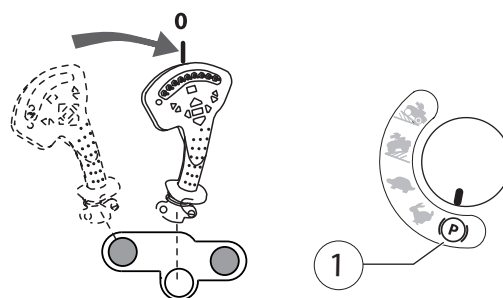


## 5 - Operation

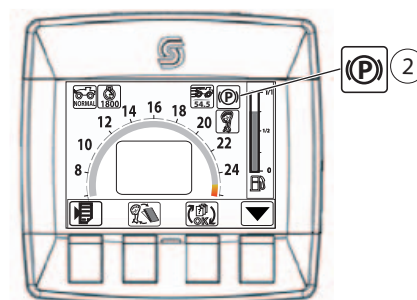
### Parking brake

The parking brake is used to keep the machine at a standstill. To engage the parking brake:

- Pull the joystick in the neutral position to immobilise the self-propelled
- Turn the speed selector switch on the parking position.



1. The display indicates that the parking brake is engaged ref.2



**i** When the parking brake is on, any action on the forward handle will not make the machine move.

- Verify that the joystick is in the neutral position
- Turn the speed selector to [field] or [road], and then push the joystick to move the self-propelled

If the self-propelled is in motion and that the parking brake is engaged (selector on the position [P] ), the braking is performed following a deceleration ramp up to the cancellation of flow of the pump and hydraulic motors.



The parking brake is very effective. Avoid engaging it when the machine is moving, except in an extreme emergency.

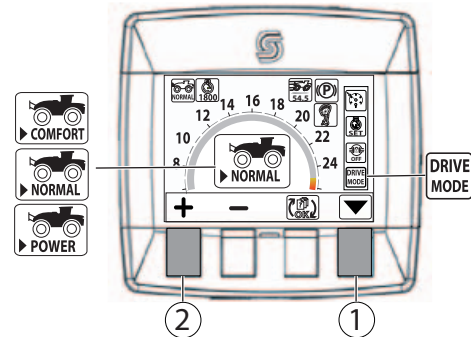


## Driving mode

The self-propelled SARITOR has 3 modes of conduct, which allows you to optimize the overall performance of the transmission (speed/torque, acceleration and progressive braking) depending on the variations and conditions of use.

The mode [COMFORT] is designed for a gradual acceleration of the self-propelled. The [NORMAL] allows a superior acceleration compared to the mode COMFORT. The [POWER] mode allows a conduct more reactive to the self-propelled.

- Press the key ref.1 to select [DRIVE MODE]
- Press the key ref.2 to change the driving mode.



**i** The mode can be changed while driving.

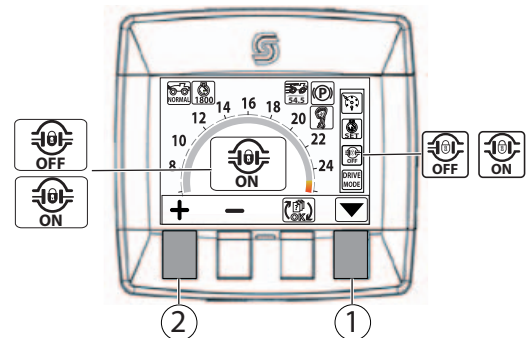
## Traction Control System

Sensors built into the hydraulic motors constantly measure the speed of each wheel. A computer compares these speeds and if necessary operates a reduction in the hydraulic power in the current wheel slip.

To improve the control of the traction control system in the turns, the angular sensors placed on the front axle measure the turning angle of the wheels to allow the computer to optimize the traction control system.

The traction control function is operational only in the mode [field]

- Press the key ref.1 to select the traction control system
- Press the rep button. 2 To engage the traction control system



**i** Activation can intervene in rolling stock

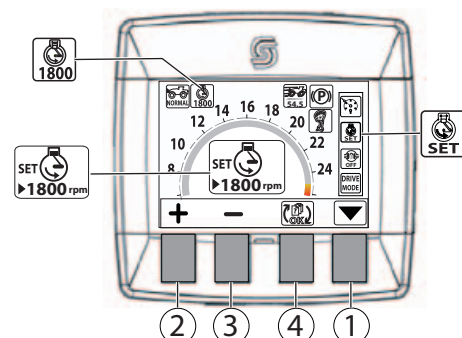
## Limitation of engine speed

It is possible to limit the speed of the engine. This limitation applies only in mode [Field]

- Press the key ref.1 to select the engine speed limitation
- Press the rep button. 2 Or ref.3 to adjust the value
- Press the key ref.4 to validate

Maximum Value = 2500 rpm

Minimum Value = 1000 rpm



## 5 - Operation

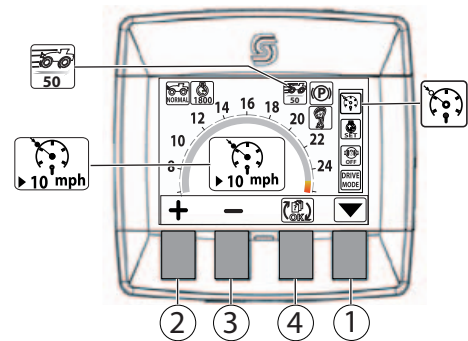
### Restricting the speed of movement in mode [Field]

It is possible to limit the travel cruise mode [Field].

- Turn the speed selector switch on one of the 3 positions of the mode [Field] (tortoise-raise-lowering)
- Press the key ref.1 to select restricting the speed of movement
- Press the pushbuttons fig. 2 Or ref.3 to adjust the value
- Press the key ref.4, to validate the data.

Maximum Value = 30 km/h or 18 mph

Minimum Value = 3 rpm or 1.8 mph



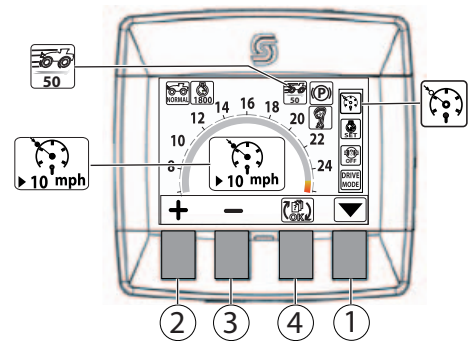
### Restricting the speed of movement in [road] mode

It is possible to limit the travel cruise mode [Road].

- Turn the speed selector switch on the mode [road] (rabbit)
- Press the push button ref.1 to select restricting the speed of movement
- Press the pushbuttons ref. 2 Or ref.3 to adjust the value

Maximum Value = 50 km/h or 31 mph

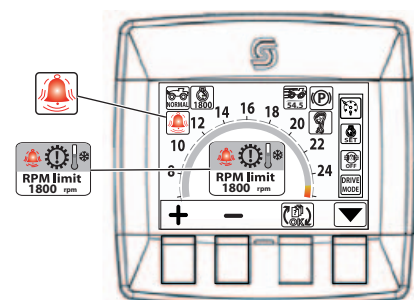
Minimum Value = 3 km/h or 1.8 mph



### Limitation of engine speed - hydraulic oil temperature too low

When the temperature of the hydraulic oil is less than 30 degrees Celsius, the engine speed is limited to 1500 rpm, this in effect to protect components of the hydraulic transmission

When the hydraulic oil temperature becomes greater than 30 degrees Celsius, the engine accelerates automatically to reach 2500 rpm, but the speed of avancement remains constant.



To return to the normal use of the system

- "FIELD" mode

Reduce the speed of the engine below 2200 rpm, and then push the joystick to return to the normal conditions of use.

[road] mode = (automotive)

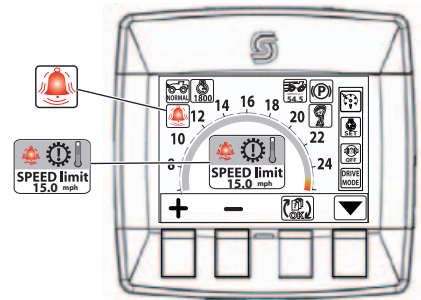
- Pull the joystick toward the neutral point to reduce the engine speed below 2200 rpm, and then push the joystick to return to the normal conditions of use.

### Limitation of engine speed - hydraulic oil temperature too high

When the temperature of the oil in the transmission reaches 90 degrees celsius, the computer reduces the flow of oil in the engines, which has the effect of limiting the speed of movement of the self-propelled.



THE forager will stop if the hydraulic oil temperature reaches 95 degrees Celsius.



### Engine management

#### Management of the system Anti-stall

This device avoids engine stalling if the power demanded by the transmission is higher than that supplied by the engine.

To prevent the engine from dropping below the threshold of normal operation, the displacement of hydraulic motors increase, then the displacement pumps will be reduced.

When the anti-stall feature is enabled, the ground speed decreased slightly compared with the normal operation of the self-propelled

#### Management of the engine overspeed

This feature allows that the transmission does not accelerate the engine beyond a maximum speed bearable , during a hydrostatic deceleration.

If the engine speed value exceeds a specified threshold, the displacement of the engines and then decrease the displacement pumps return more slowly to the neutral point.

When the overspeed function is enabled, the hydrostatic braking is less effective in relation to the normal operation of the self-propelled.



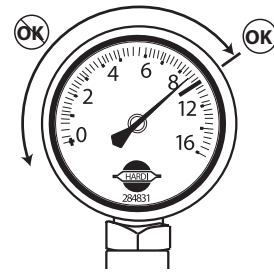
The management of the engine overspeed is not active when the brake pedal is used.

## 5 - Operation

### Air Suspension

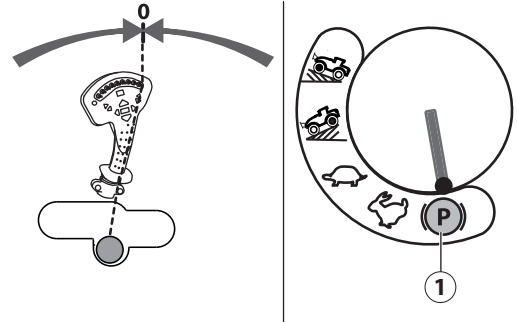


Before travelling, wait until the air suspension is operational. A pressure gauge installed on the outside of the cab indicates the pressure in the circuit. The value must be understood to be 9 bar (130 psi) and 10 bar (145 psi). To adjust the air pressure, see the chapter. "Compressed air pressure adjustment" on page 92



### Stopping the engine

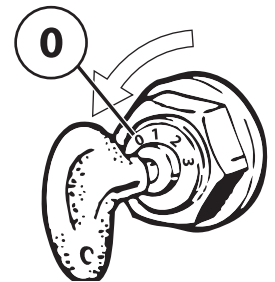
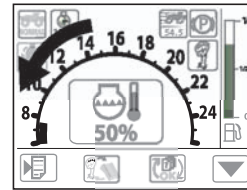
- Place the handle in the neutral position (pos.0) to immobilise the self-propelled, and then turn the gear selector on the parking brake position (pos.1).
- Reduce the engine speed for a few seconds to slow down the turbocharger and stabilise the engine temperature.
- 



- Turn the ignition key to position 0 to shut down the engine.



The judgment of the engine causes the automatic lowering of the access ladder to the cab.



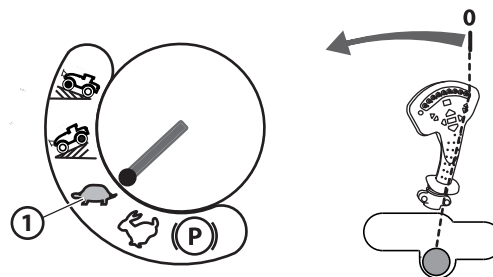
- Turn the handle of the cup on the pos.1 battery cut off power to the electrical and electronic circuits and thus prevent the discharge of the battery during the prolonged shutdown of the machine.

## Driving

### Mode Automotive

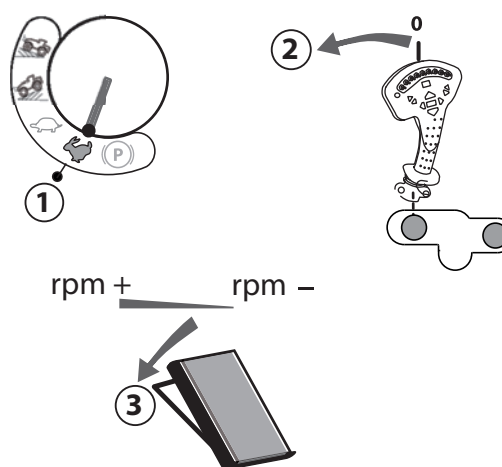
The mode AUTOMOTIVE simplifies the conduct of the self-propelled, acting only on the pedal.

In this mode, the engine speed is related to speed of movement of the self-propelled. The transmission ratio is established by managing the rotation speed of the motor, the displacement hydraulic pumps, and the displacement of the hydraulic motors. It significantly reduces the fuel consumption.



To use the AUTOMOTIVE mode

- Place the handle of progress in the neutral position (pos.0), the engine then turns to idle
- Turn the speed selector switch on the pos.1
- Push the handle of progress toward the front, or toward the back to indicate the direction of the displacement pos.2
- Gradually press on the pedal, to accelerate the motor and starts to move, depending on the position of the handle of progress pos.3
- Release more or less the pedal to slow down the machine. The speed of the engine automatically adapts to the forward speed of the machine.
- Press the brake pedal to slow down and stop the machine.



Braking is more or less effective depending on the pressure exerted on the brake pedal.



To restart, first place the handle of progress at the neutral point, and then push it again in the desired direction.



To limit the speed of progress in automotive mode, see the page 56.



To preset the engine speed, see the page 56.

## 5 - Operation

### Field Mode

In the FIELD mode, the engine speed is set by using the switch on the instrument panel.. The ground speed depends on the engine speed and the position of the handle of progress.

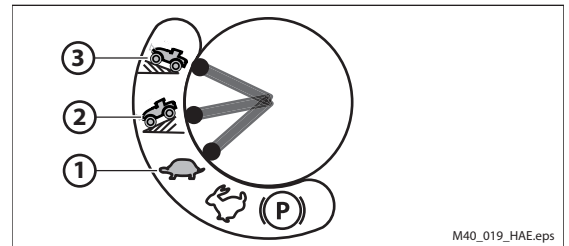
In the mode 'Tortoise' pos.1 the displacement of the hydraulic pumps is maximum, in order to transmit a high transmission power to the 4 wheels. The displacement of the hydraulic motors adapt depending on the speed of the engine and of the maximum speed allowed in the field mode.

In the 'Up' mode, 2ND layer, the displacement of the hydraulic motors at the rear is maximum, and the displacement of the hydraulic motors at the front decreased, to obtain a power of transmission than on the rear axle of the machine.

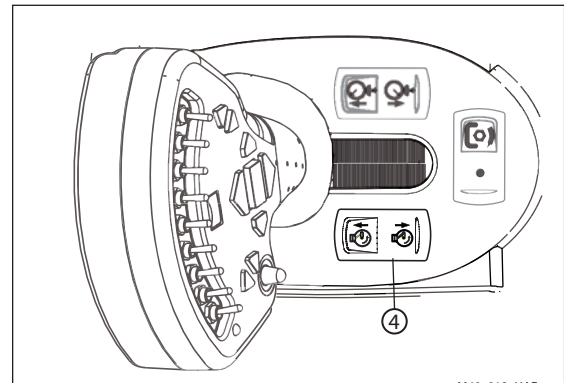
In the 'Down' mode, 3RD layer, the displacement of the hydraulic motors at the front is at a maximum, and the displacement of the hydraulic motors to the front down, to obtain a power of transmission than on the front axle of the machine.

To use one of the Field modes:

- Place the handle of progress in the neutral position, the engine speed decreases engine and spent in the idle.
- Turn the speed selector switch on one of the positions (Tortoise pos.1-Mounted pos.2-Lowering pos.3).



- Accelerate the engine using the switch pos. 4



- Move the lever to gradually progress toward the front or the back to move forward or backward.



In the FIELD mode, before any movement, the engine rpm must be minimum of 1500 rpm, to allow a maximum yield of traction and braking.



The passage between the modes 'Tortoise', 'Raise' or 'down' can be performed with the vehicle rolling. It is not necessary to place the handle of progress in the neutral position.



To limit the speed of progress in the field mode, refer to the page 55.

To pre-adjust the engine speed, see the page 56.

### Braking

The braking of the machine is obtained in 2 ways:

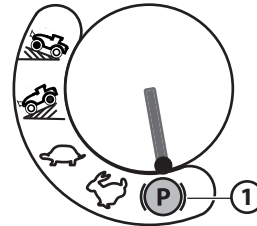
1. By pulling the joystick in the neutral point or by releasing the accelerator pedal (hydrostatic braking),
2. By pressing the brake pedal (dynamic braking) .

## Parking brake

The parking brake to mechanical action acts on the disks incorporated in the gears of the wheel. The parking brake is activated in the absence of hydraulic pressure in the brake system.

To engage the parking brake:

- Immobilize the machine.
- Turn the speed selector switch on, 1ST layer.



The parking brake is very effective. Avoid engaging it when the machine is moving, except in an extreme emergency.



When the parking brake is engaged, the access ladder to the position of line drops automatically, see the chapter "Parking brake" on page 55

## Field mode forward speed limitation

The limitation of the speed of progress in the field mode is valid only when one of the modes 'Tortoise', 'Raise' or 'Down' is selected.

To change the value of the speed limitation:

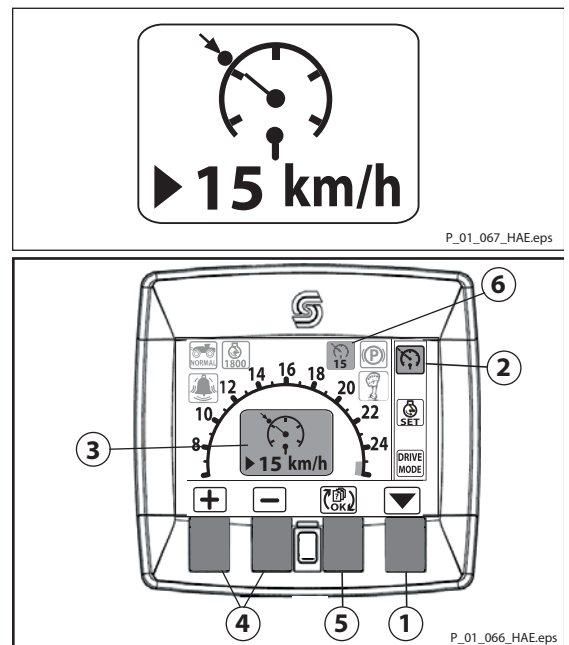


Make sure that one of the modes 'Tortoise', 'Raise' or 'Down' is selected.

- Press 1 time on the push button rep. 1 The symbols ref. 2 and ref.3 are displayed.
- Press the push-buttons ref.4 to increase or decrease the value sui varies from 1 km/h to each support on the one or the other of the pushbuttons.
- Press the key ref.5 to save the value and return to the previous menu.

The symbol of state rep. 6 Shows the value of speed limitation.

The fuel gauge reappears after 5 seconds of inactivity on the push buttons.



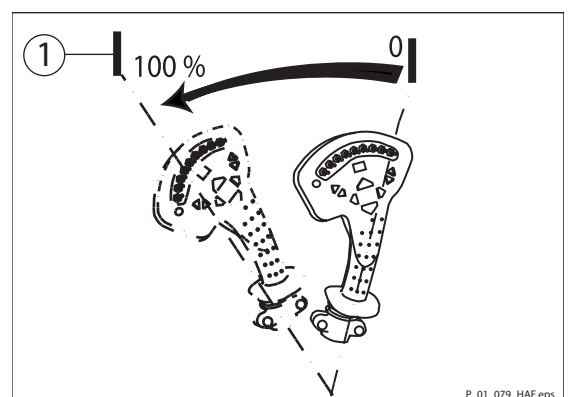
The minimum speed of progress in the field mode: 3 Km/h.



Default forward speed limitation: 30 Km/h.

To use the mode speed limitation:

- Push the lever completely to progress toward the front (pos. 1) To obtain the speed set by the limitation of speed.



## 5 - Operation

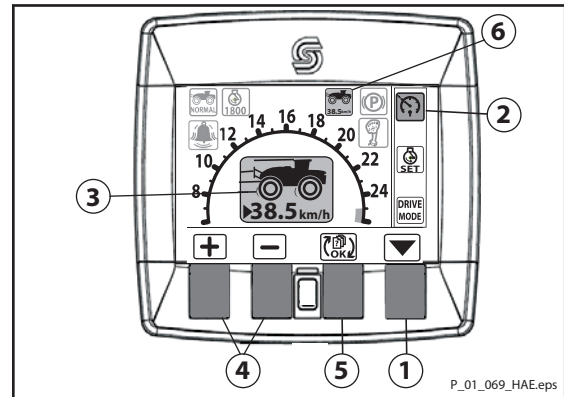
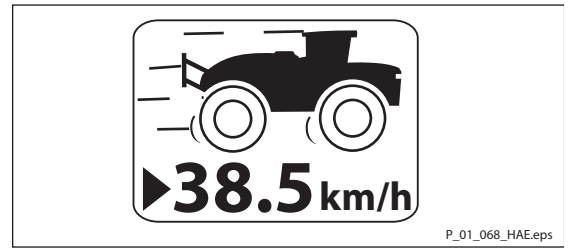
### Automotive mode forward speed limitation

The limitation of speed in Automotive mode is valid only when the 'Hare' mode is selected.

To change the value of the speed limit:

- i** Make sure that the 'Hare' mode is selected.
  - Press 1 times on the push button rep. 1 The symbols ref. 2 and ref.3 shows that the function of the speed limitation in Automotive mode is selected.
  - Press the push-buttons ref.4 to increase or decrease the value sui varies from 1 km/h to each support on the one or the other of the pushbuttons.
  - Press the key ref.5 to save the value and return to the previous menu.

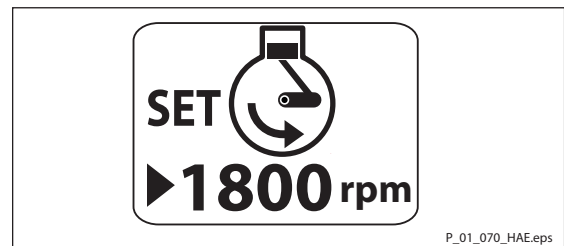
The symbol rep. 6 Shows the value of the speed restriction currently in use.



- i** The fuel gauge reappears after 5 seconds of inactivity on the push buttons.
- i** The minimum speed of progress in Automotive mode: 3 Km/h.
- i** Default forward speed limitation: 50 Km/h.

### Preset the speed of the engine

This feature allows you to optimize the power of the engine, while reducing fuel consumption. Preset the engine speed varies between 1200 rpm and 2500 rpm.

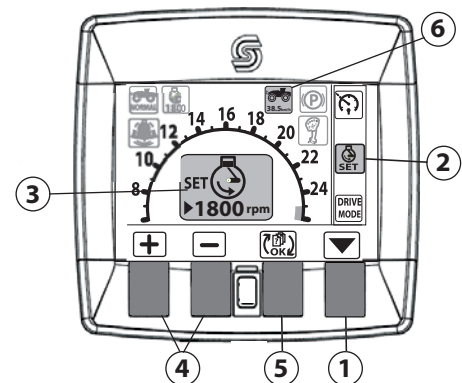


To change the value of the preset of the engine speed:

- Press 2 times on the push button rep. 1 The symbols ref. 2 and ref.3 show that the preset function of the engine speed is selected.
- Press the push-buttons ref.4 to increase or decrease the value , it varies from 100 rpm to each support on the one or the other of the pushbuttons.
- Press the key ref.5 to save the value and return to the previous menu.

The symbol ref.6 indicates the value of the pre-adjustment of the engine speed.

- i** The fuel gauge reappears after 5 seconds of inactivity on the push buttons.

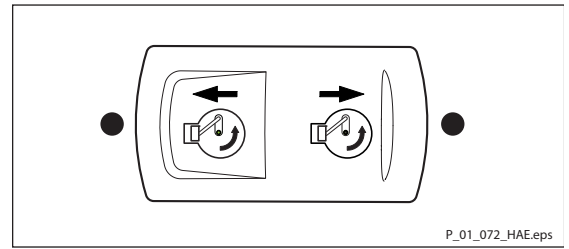




To disable the pre-setting the speed of the engine, it is sufficient to press the accelerator switch on the dashboard.



The default speed: 2500 Tr/min.



### Driving mode selector switch

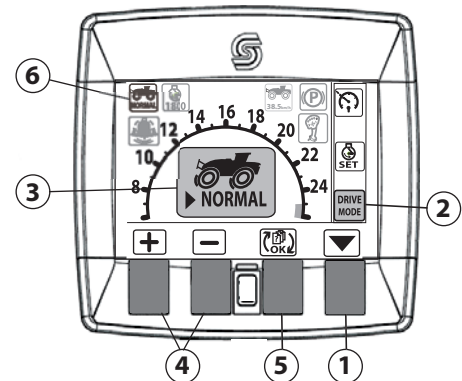
The driving mode allows you to change the behavior of the machine in the acceleration and deceleration phases. You have 3 modes of conduct.

1. COMFORT: This mode corresponds to a gradual acceleration of the machine.
2. NORMAL: This mode is typically used for a intermediate throttle.
3. POWER: This mode allows you adopt a more active line of the machine.



To change the machine driving mode:

- Press 3 times on the push button rep. 1 The symbols ref. 2 and ref.3 show that the function of the driving mode is selected.
- Press the push-buttons ref.4 to select one of the modes of conduct.
- Press the key ref.5 to save the value and return to the previous menu.
- The symbol ref.6 indicates the mode of conduct currently in use.



Mode of conduct by default: NORMAL

### Command Mode on the progress

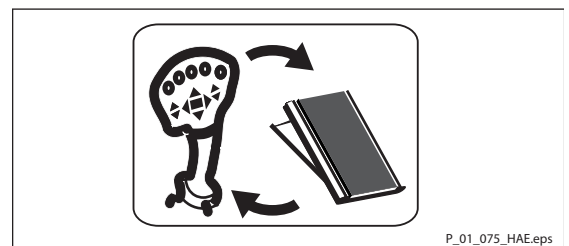
The command of the progress of the machine can be achieved using, either the lever of progress, or the foot pedal.



The command of the progress by the pedal is not active in the field mode.



The change of mode is only possible when the lever is in neutral.



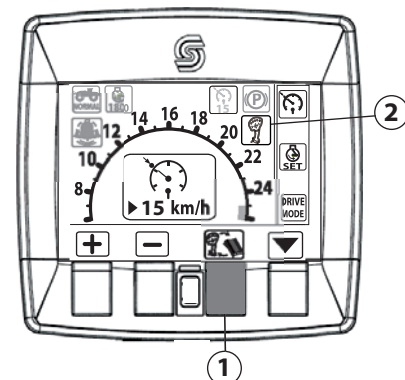
To change the operating mode of the progress:

- Place the forward handle in neutral.
- Press the pushbutton fig. 1 To change the command mode on the progress.
- When the pedal mode is selected, push the lever for progress toward the front or the rear to define the sensz progress (forward or reverse).

The symbol ref.2 indicates what is the progress mode used.



Default Control Mode: Forward lever.

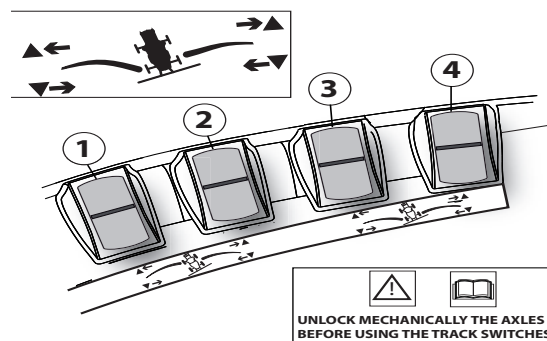


## 5 - Operation

### Track width adjustment

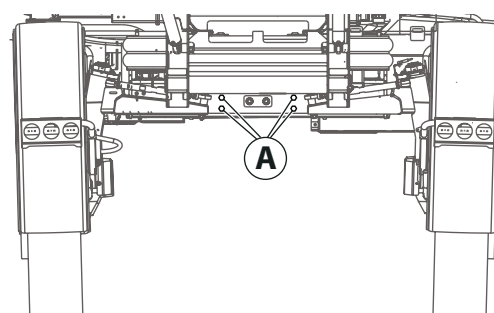
The track of the front axle and rear of the machine is adjustable. The maximum variation of the track is 1.00 meter, and the distance of the tire in relation to the frame of the machine is adjustable independently.

1. Left Front Wheel
2. Right Front Wheel
3. Left Rear Wheel
4. Right Rear Wheel

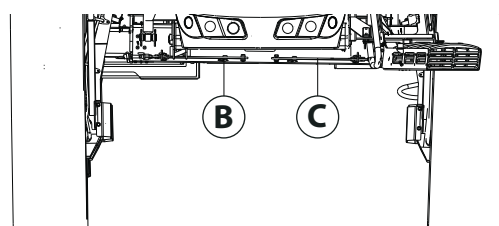



 Before pushing the track variation switches (1-2-3-4), it is important to follow procedure

- loosen the screws (A) located on front and rear axles (only if equipped)



- Remove the pin (B) from the rule (C) and take place it to obtain the correct track.



 The adjustment of the track is preferably be carried out in the field, in the absence of deep rut and at a low speed of travel

- Press and hold the switches to move the axles until it stops
- After adjustment of the track, tighten the screws (A).

 To prevent imbalances of the machine, the wheel spacing must be identical in relation to the axis of the machine.

 2 types of rules are available (METRIC - P/N 61024501) or IMPERIAL - P/N 61025901 )

### Tracks obtained according to the tires

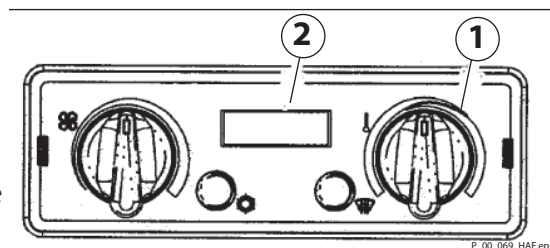
Size Tires	Minimum Track MM / (in)	Track Maximum MM / (in)
380/90R50 (14.9R50)	3000 (118.1)	4000 (157.4)
480/80R50 (18.4R50)	2997 (118)	3997 (157.3)
520/85R46 (20.8R46)	3057 (120.3)	4057 (159.7)
620/70R42 (24.5R42)	3181 (125.2)	4181 (164.6)

## Cabin ceiling controls

### Control Module of the ATC air conditioning

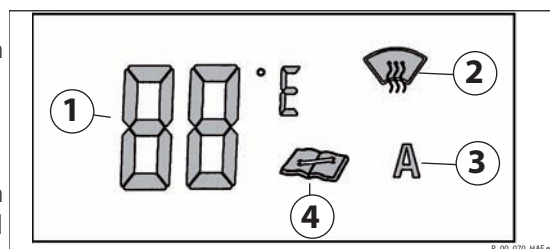
Automatic Temperature Control (ATC)

1. Temperature control in the cab
  - Turn the rotary knob rep. 1 In a clockwise direction to increase the temperature, or in the opposite direction to lower the temperature in the cab
2. Controller



The display allows you to view the information, in particular:

- The display of the desired temperature in the cab to the degree Celsius or Fahrenheit - Rep.1= (see "Selection of temperature unit" on page 41)
- The modes of operation. The symbol 'A' ref.2 indicates that the system is in automatic mode. In this case the water valve and the compressor are commands automatically in such a way to maintain the desired temperature. Otherwise, if the letter 'A' is not displayed on the screen, this means that the fan speed is controlled manually.
- Displaying the symbol ref.3 indicates that the window fogging is in operation.
- Displaying the symbol ref.4 indicates a fault of operation of the ATC system<sup>1</sup>. A diagnostic code linked to the default spinbutton to facilitate troubleshooting .
- The ATC operates in the temperature range between 16 °C (61 °F) and 30 °C (90 °F).

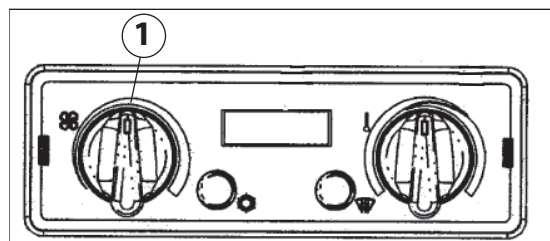


**i** The symbol ref. 3 is not displayed when the programmed temperature is minimum or maximum.

### Ventilation Control

You can increase or reduce the ventilation by turning the rotary button ref. 1.

- Turn the rotary knob ref.1 clockwise to increase the air flow of components placed at the top of the cab



**i** If the automatic control of the air conditioning (ATC) is engaged, the command of the breakdown by the rotary knob ref.1 is without effect on the speed of the ventilation.

**i** If this proves necessary, the automatic control of the air conditioning (ATC) will vary the speed of the ventilation, in such a way as to maintain the required temperature in the cab

If the ATC mode is engaged and as you turn the knob rep 1, the ATC mode is disabled to go to manual mode. The symbol 'A' disappears.

To reengage the ATC mode, you need to toggle the ATC switch OFF and then ON to reset the automatic mode. The automatic temperature control works even if the symbol 'A' is displayed or not.

When the automatic air conditioning function or demisting is in operation, the ventilation increases to obtain a temperature difference of 2 °F between the set temperature and that measured in the cab

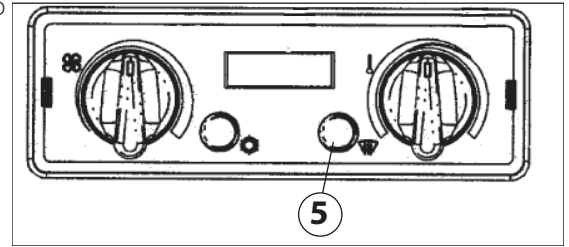
When the evaporator sensor senses a temperature below 26 °C (80 °F), and that the system request to heat, the fan speed does not increase, as long as the temperature of the evaporator will not increased.

1. ATC - Automatic Temperature Control

## 5 - Operation

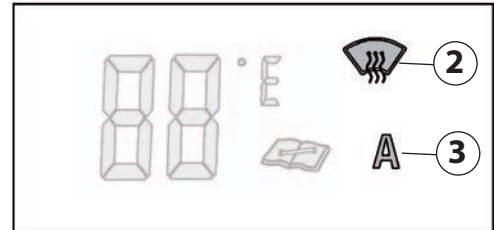
### Driving mode

Once you have activated the ATC mode, you can press the switch ref.5 to switch the AUTO mode and the defog mode.



In the automatic mode, the system heats or cools the air to maintain the desired temperature in the cab. In this mode, the display shows the symbol ref. 3.

In defog mode, the air conditioning compressor operates full-time, and the air is warmed up to promote the demist the windows. In this mode, the display indicates the symbol ref.2

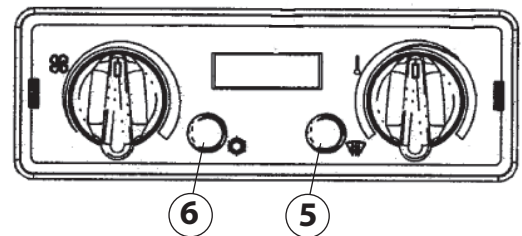


### The Command window demisting

The demist the windows useful the air conditioning to reduce the moisture in the air for the purpose of drying the windows of the cab.

- Press the switch ref.6 to activate the AUTO mode.
- Toggle the switch ref.5 on the defog mode of the windows.

The display shows the symbol (2) (windshield-sound level meter)



The temperature control knob can be adjusted to the desired value. If the temperature of the air in the cabin is too cold, the temperature control knob can be rotated in a clockwise direction to allow for an increase in the hot air. The temperature in the cab is controlled by a probe measuring the recycling of air, while maintaining the temperature requested by means of a heater valve. During the operation of demisting the windows, the a/c compressor is running continuously, except if the evaporator probe detects that it is too cold, which may result in an early deposit of ice .

The computer of the ATC automatically regulates the speed of the fan to maintain the required temperature in the cab. It is normal that the temperature of the air at the start in the morning is more cold, caused by the engine still cold. If you reduce the fan speed, during the heating of the engine, the computer of the ATC will disable the automatic mode of adjustment of fan speed. To re-engage the automatic mode of the adjustment of fan speed, the switch of the ATC must be tilted

### Operational problems

An error code is displayed, if a malfunction is shown on the air conditioning system. For more information on the errors, see the chapter on the "Cabin error codes" on page 109.

### Wipers

Switch of the wipers

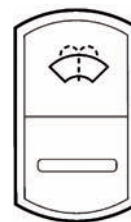
- Market Position (continues)
- Market Position (intermittent)
- OFF Position



### Window Washer

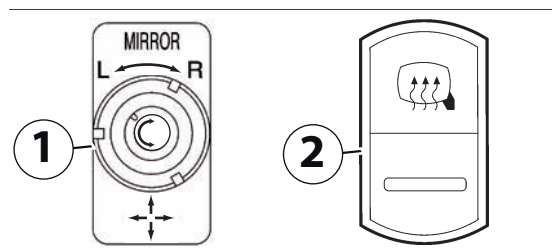
Switch window washer

- Market Position
- Position ARRÊT



### Exterior mirrors to electrical control

1. Wing mirror adjustment switch
  - Left Arrow, command of the mirror on the left side
  - Right Arrow, command of the right side mirror
2. Defog Switch mirrors ref.2



## 5 - Operation

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### Boom

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#### Safety info



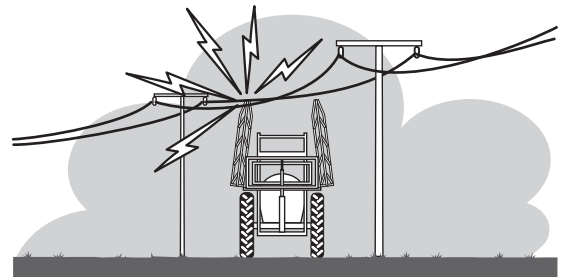
##### WARNING!

- The boom must not be folded/unfolded while driving!
- Never use the folding/unfolding functions before the sprayer has been stopped! FOLDING THE BOOM WHILE DRIVING WILL DAMAGE THE BOOM.



##### DANGER!

- Before unfolding the boom it is important to connect the sprayer to the tractor to prevent overbalancing of the sprayer
- When folding or unfolding the boom, make sure that no persons or objects are within the operating area of the boom.
- Always follow the guidelines listed below when driving in areas with overhead power lines:
  - Never use the folding/unfolding functions in areas with overhead power lines.
  - Unintended boom movements may cause contact with overhead power lines.



##### ATTENTION!

- A label (ref. no. 978448) follows the sprayer. This label must be placed in the cabin visible from the operator's seat.
- Only unfold and fold the boom on level ground.

---

#### Operating the boom



##### WARNING!




- The centre lock is automatically activated when pressing one of the folding buttons. Boom folding is not possible if the centre is unlocked. A manual override of the centre lock is possible by activating switches 2 or 3.
- Only operate the folding functions when the sprayer is stationary! Failure to do so may damage the boom. The centre lock automatically opens at speeds exceeding 0.5 km/h

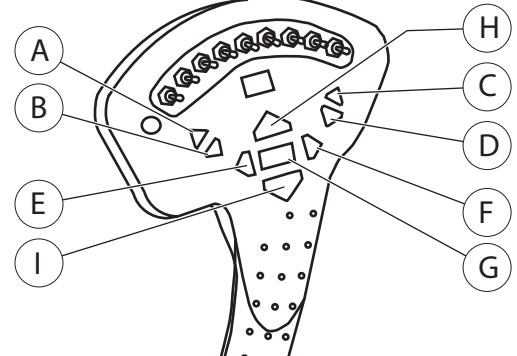
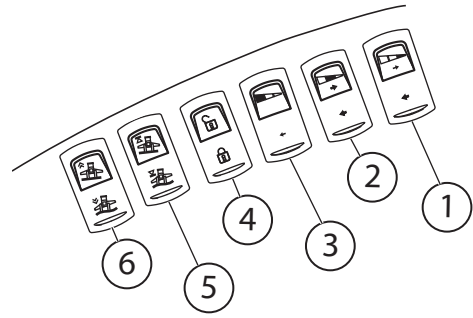


##### ATTENTION!

- If a folding sequence is not completed, a warning message will ask you to complete this sequence before starting next sequence.
- Only buttons relevant for boom functions are mentioned here. Refer to "Boom" on page 10 for descriptions of other buttons.



### To unfold the boom

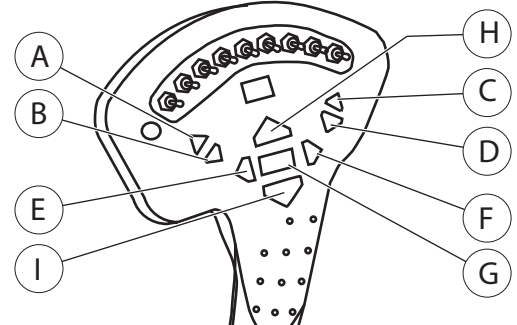
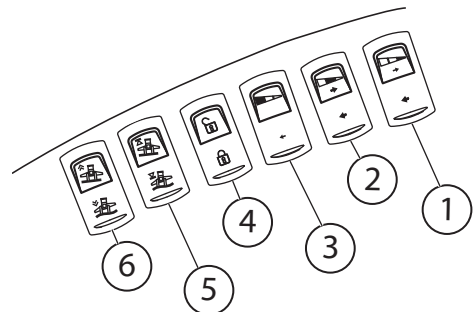
- Press the boom lift up button (H) to lift the boom clear of the transport brackets. The  symbol appears in display until centre is locked. This takes approximately 10 seconds.
- Press + hold (A) and (C) to tilt boom wings up.
- Press + hold the button (3) to unfold the first outer sections completely (approximately 5 sec. or a warning will appear). Check that the centre locked symbol  is visible in the display
- Press + hold (B) and (D) to tilt boom wings down.
- Press + hold the button (2) to unfold the second outer sections.
- Press + hold the button (1) to unfold the third outer & breakaway sections.
- Press + hold the boom down button (I) to lower the boom to the correct working height.
- If not unlocked, then press (4) and symbol  appears in display until centre is unlocked. This takes approximately 10 seconds.



**WARNING!** The centre lock automatically opens when first outer wing are open and you begin to drive. Drive slowly until the centre is completely unlocked.

### To fold the boom

- Press and hold buttons (17) to automatically neutral slant angle (AutoTerrain only).
- Press the boom lift button (H) to raise the boom to the highest possible position.
- Press + hold the button (1) to fold the third outer sections & breakaway. The symbol  appears in display until pendulum is locked. This takes approximately 10 seconds.
- Press + hold the button (2) to fold the second outer sections. Check that the pendulum lock symbol  is visible in the display.
- Press + hold (A) and (C) to tilt boom wings up.
- Press + hold the button (3) to fold the first outer sections.
- Press + hold boom down button (I) to lower the boom until it rests in the transport locks
- Press + hold (B) and (D) to tilt boom wings down into the transport rests



## 5 - Operation

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### Liquid system

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#### Filling/washing location requirements

When filling the sprayer with chemicals and water it is important to avoid spot contamination by spray chemicals in order to protect the subsoil water resources.

- A. If the sprayer is always filled at the same place, a special filling/washing location should be established. This should have a hard, liquid-impenetrable surface (e.g. concrete) and edges securing against run-off to the surrounding areas. The place should be drained to an adequate receptacle (e.g. slurry tank or similar).

Any spillage or washings should be retained and diluted in order to be distributed on a larger area to ensure minimal environmental impact and avoid build-up of larger chemical concentrations at one spot.

If no other requirements of distances exist, the following general recommendation of distance could be used. Not closer than:

- 1) 50 metres from public water supplies for drinking purposes,
- 2) 25 metres from non-public water supplies for drinking purposes and from treatment sumps and cesspools of drainage systems, and
- 3) 50 metres from surface water (watercourses, lakes and coastal waters) and from nature reserves.

- B. Alternatively the sprayer can be filled in the field where the spraying is to take place. If so, choose a different location for each refilling.

If no other requirements of distances exist, the filling should not take place closer than:

- 1) 300 metres from public or non-public water supplies for drinking purposes and
- 2) 50 metres from surface water (watercourses, lakes and coastal waters), treatment sumps, cesspools of drainage systems, and nature reserves.



ATTENTION! Legislation and requirements vary from country to country. Always follow local legislation in force at any time.



NOTE! It is the responsibility of the sprayer owner/operator to comply with all relevant legislation. HARDI cannot undertake any responsibilities for incorrect operation and use.

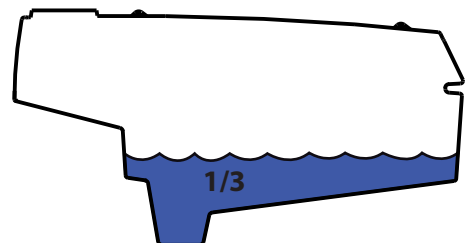
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#### Filling of water

Tank should normally be filled 1/3 with water before adding chemicals. Always follow instructions given on the chemical container!



WARNING! If the sprayer is put aside with liquid in the main tank all MANIFOLD valves must be closed.





### Main Tank Filling

The Main Tank can be filled in 4 different ways:

1. Quick Fill System
2. Venturi Fast Fill system
3. Banjo Filtered Fast Fill System (optional)
4. Filtered Fast Fill System

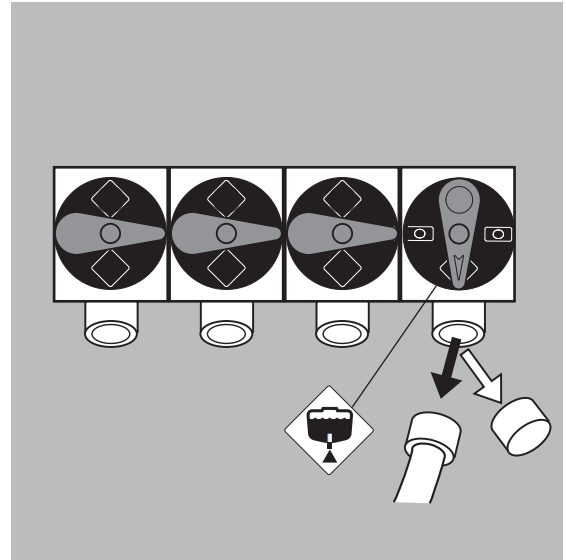
### Quick Fill System

The Quick Fill System allows the operator to fill the using an auxiliary pump. The operator can also control the speed at which is filling takes place by adjusting the quick fill ball valve on the sprayer.



**ATTENTION!** Quick Fill System circuit does not include a filter or strainer! It is highly recommended you use a remote in line filter to remove any debris and impurities. For more information please contact your HARDI dealer.

1. Remove the cap from the 2 inch Cam-lock and connect the suction hose to a water source.
2. Start the water supply or remote fill pump that will be connected to a clean water supply.
3. Open the Main Tank Empty Valve
4. Fill Main Tank to required volume
5. Turn off water supply or remote fill pump.
6. Disconnect hose if required, fit the cam-lock cap and lift the fluid refill arm to transport position.

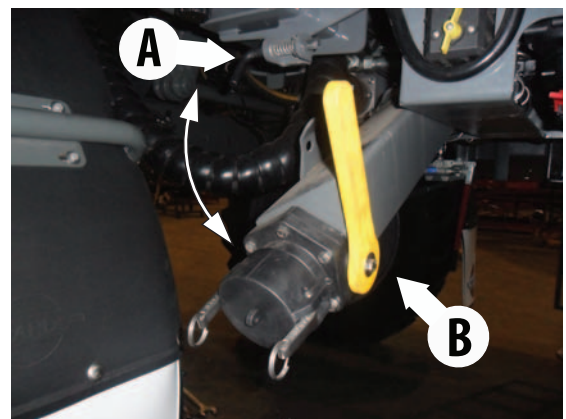


### Filtered Fast Fill System

The fluid is filtered through a filling filter.

The Cam Lock coupling size is 2,0 (Standard) or 3,0 (Optional) inch and can be located on side of the sprayer, or in the front of the sprayer or on both places.

1. For easy filling the fluid refill arm (B) can be lowered, to do so release locking pin (A) at same time pull the arm down.
2. Remove the cap from the Cam Lock and connect the hose.
3. Start the water supply or remote fill pump that will be connected to a clean water supply.
4. Open the valve
5. Fill Main Tank to required volume, then close valve (B)
6. Turn off water supply or remote fill pump.
7. Disconnect hose if required, fit the cam-lock cap and lift the fluid refill arm to transport position.



**WARNING!** After filling ensure that the fluid refill arm is upper position and the lock is engaged.



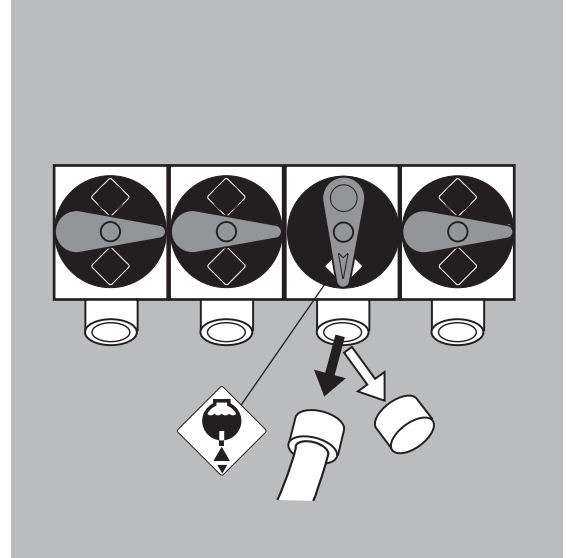
### Filling of Rinse tank

The rinse tank is filled via the 2 inch quick coupler. To fill the rinse tank proceed as follows:

1. Fit the external hose to the quick coupler on the sprayer, below the flush tank valve as illustrated.
2. Start water supply or remote fill pump that is connected to a clean water supply
3. Open the Flush Tank Fill Valve.
4. Keep an eye on the level indicator.
5. When Tank is full turn off the Flush Tank Fill Valve.
6. Turn off water supply or remote fill pump.
7. Disconnect hoses.



**ATTENTION!** Only fill the rinse tank with clean water. To avoid algae developing, always drain the rinse tank if the sprayer is not used for an extended period of time.



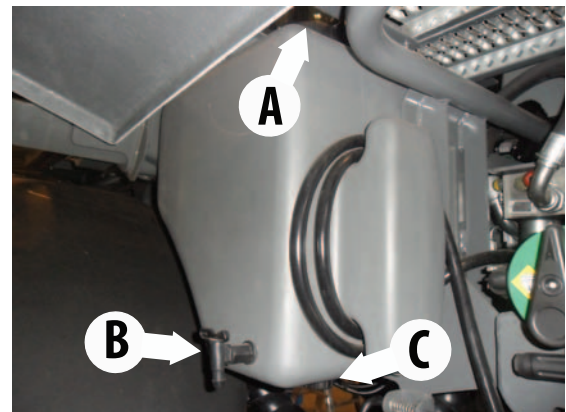
### Filling of clean water tank

A clean water tank is fitted below the platform in the fluid working zone on the sprayers left side.

To fill the clean water tank remove lid (A) is accessible from upside of the platform. Fill with clean water and reposition tank lid. To tap water from the clean water tank use valve (B) The water from this tank is for hand washing, cleaning of clogged nozzles etc. Only fill the clean water tank with clean water from the well. To drain the clean water tank remove lid (C) and reposition the lid.



**WARNING!** Although the clean water tank is only filled with clean water, this water must never be used for drinking.



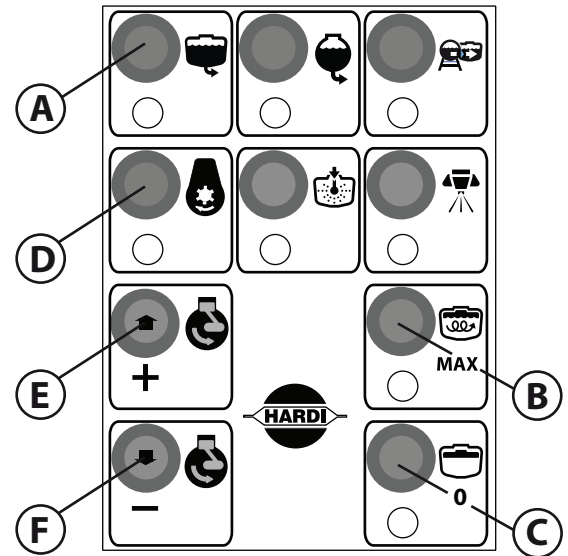
## 5 - Operation

### Agitation

The agitation in the Main Tank can be controlled from the work zone beside the Self propelled sprayer on the external control panel. It can also be controlled from the cabin

For controlling the agitation (on/off) on the external control panel.

1. For turning on the agitation press button (B)
2. For Turning off the agitation press button (C)



For controlling the agitation on the cab:

1. Press the switch (1) to modulate the agitation of the liquid in the main tank



ATTENTION! Too much agitation may cause foam in the tank. The amount of foam depends on what type of chemicals is being used and how much water it is in the tank. Agitation should be adapted according to the volume of the liquid remaining in the main tank.

### Agitation before re-starting spraying

If a spraying job has been interrupted for a while, severe sedimentation can occur depending on chemicals being used. When re-starting spray job it might be necessary to agitate homogenise the liquid.

1. Press electric Main Tank Valve (A) on the external control panel, to turn it on.
2. Engage the spray pump (D)
3. Adjust the engine rpm to 1500 by pressing the (E) and (F) buttons
4. For turning on the agitation press button (B)
5. Agitation has started and should be continued for at least 10 minutes.
6. Press Button (C) for turning off the agitation.

### Parking the sprayer

To avoid spot contamination the sprayer should always be parked at either the washing/filling place or under roof. This avoid rainfall to washing down chemical residues from the sprayer's surfaces.

- Parking at the washing/filling location will retain residues.
- Always park the machine out of reach of children, animals or unauthorized persons.

### Safety precautions - crop protection chemicals



WARNING! Always be careful when working with crop protection chemicals!



WARNING! Always wear correct protective clothing before handling chemicals!

### Personal protection

Depending on chemical type, protective gear /equipment should be worn to avoid contact with the chemicals, e.g.:

- Gloves
- Waterproof boots
- Headgear
- Respirator
- Safety goggles

Chemical resistant overall



WARNING! Protective clothing/equipment should be used when preparing the spray liquid, during the spray job and when cleaning the sprayer. Follow the chemical manufacturer's instructions given on the chemical label.



WARNING! It is always advisable to have clean water available, especially when filling the sprayer with the chemical.



WARNING! Always clean the sprayer carefully and immediately after use.



WARNING! Only mix chemicals in the tank according to directions given by the chemical manufacturer.



WARNING! Always clean the sprayer before changing to another chemical.

## 5 - Operation

### Chemical Filling

Chemical filling can be done via the TurboFiller or by using the Chemical Induction valve to draw chemicals from a batch plant.



**DANGER!** Before turning Pressure SmartValve to "Pressure draining" it is very important to be sure that the quick coupler lid is correct and completely mounted to the filling stud into its locked position. Failure to do so may cause risk of contamination and injury from quick coupler lid being "shot" off when pressurized! If not possible to mount lid completely, lubricate the rubber seal and the grip hooks.



**ATTENTION!** The ruler graduated in the hopper can only be used if the sprayer is parked at level ground! It is recommended to use a measuring jug for best accuracy.



**DANGER!** Do not press lever unless the multi-hole nozzle is covered by a container to avoid spray liquid hitting the operator.



**ATTENTION!** Rinsing device uses spray liquid to rinse containers for concentrated chemicals. Always rinse the chemical containers with clean water several times until they are clean before disposal.



**ATTENTION!** The hopper rinsing device is using spray liquid for rinsing the hopper for concentrated chemical! The FILLER must always be cleaned together with the rest of the sprayer when the spray job is done.

### Filling chemicals via the TurboFiller

1. Fill the Main Tank at least 1/3 with water (unless something else is stated on the chemical container label).
2. Press electric Main Tank Valve on the external control panel, to turn it on.
3. Turn on the ChemFiller/Ejector valve to ChemFiller. This will activate the TurboFiller.
4. Turn on the Spray Pump from the external control panel
5. Increase the engine rpm to 1500.
6. Open the TurboFiller lid. Open the TurboDeflector valve



**DANGER!** Always wear face shield and other appropriate personal safety equipment when filling chemicals.

7. Turn the Chemical Induction Valve to direct suction from TurboFiller. The chemicals will now be drain from the TurboFiller into the Main Tank.
8. Measure the correct quantity of chemicals and slowly add it into the hopper as fast the transfer device can flush it down.



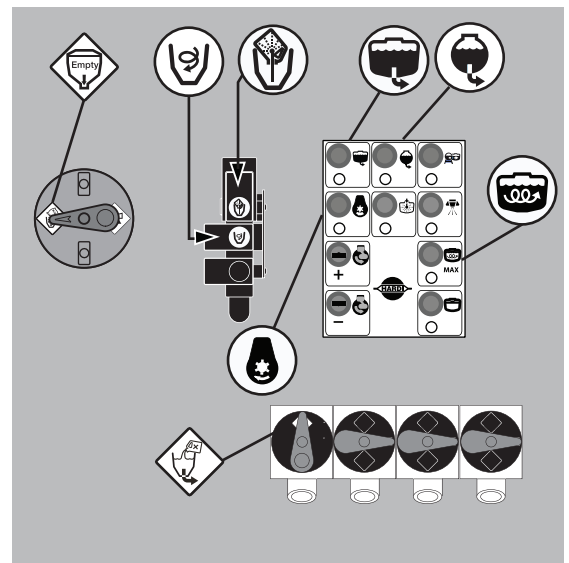
**ATTENTION!** The ruler graduated in the hopper can only be used if the sprayer is parked on level ground! It is recommended to use a measuring jug for best accuracy.

9. If the chemicals container is empty it can be rinsed by the Chemical Container Cleaning device. Place the container over the multi-hole nozzle and push the upper lever to the left of the TurboFiller.



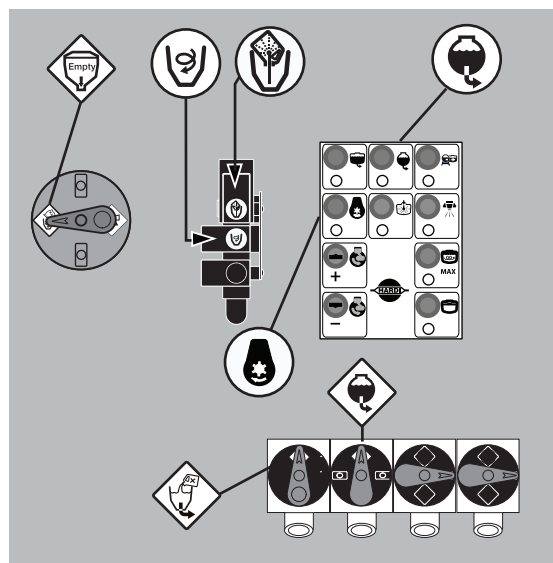
**DANGER!** In order to avoid spray liquid hitting the operator, do not press lever unless the multi-hole nozzle is covered by a container as spray liquid may otherwise hit the operator.

10. Close the TurboFiller lid again.



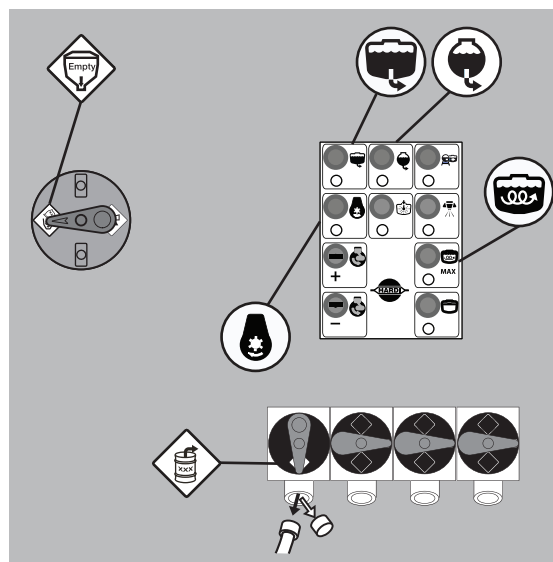
## Rinsing TurboFiller

11. Turn off the Main Tank Valve from the external control panel.
12. Turn on the Flush Tank Valve from the external control panel.
13. Rinse the hopper by using the Control valves on the TurboFiller, and then turn them off.
14. (If the was the Chemical Induction Valve was turn off.) Turn it on again to direct suction from TurboFiller. The chemicals will now be drain from the TurboFiller into the Main Tank.
15. Turn off the Flush Tank Valve from the external control panel.
16. Turn off the Chemical Induction Valve.
17. Continue filling the Main Tank.



### Filling chemicals via the chemical induction valve

1. Remove the cam lock cover from the Chemical Induction valve
2. Attach a suction hose onto the cam lock at the Chemical Induction Valve with the other end connected to an external chemical source.
3. Turn on the ChemFiller/Ejector valve to ChemFiller.
4. Press electric Main Tank Valve on the external control panel, to turn it on.
5. Turn on the Spray Pump from the external control panel
6. Increase the engine rpm to 1500
7. Turn the Chemical Induction Valve to direct suction from External source. The chemicals will now be transferred into Main Tank.

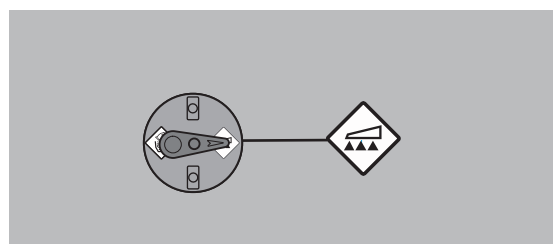


### Rinsing after using the chemical induction valve

8. Turn off Chemical Induction Valve
9. Disconnect the suction hose from the chemical source
10. Connect the suction hose to a clean water source
11. Turn on the Chemical Induction Valve again to clean the hose and valves.
12. Turn off both the Chemical Induction Valve and the ChemFiller/Ejector valve
13. Disconnect the suction hose and fit the cam lock cover
14. Continue filling the Main Tank.

### Prepare self propelled sprayer for Spraying

1. Before entering the cabin turn the Ejector Spray valve to Spray position. The rest of the functions for spraying can be controlled from the cabin.



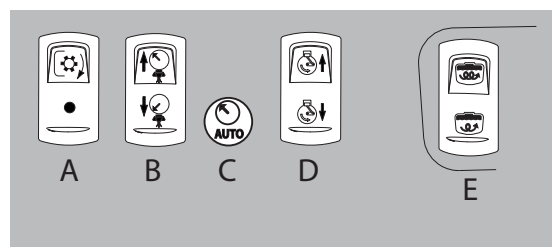
## 5 - Operation

---

### Spraying controls from the cab

The functions for spraying can be controlled from the control panel of the cab.

1. Turn on the Main Fluid Pump (A)
2. Adjust the engine rpm by pressing the switch (B)
3. Press the button the button (C) to engage the automatic mode
4. Press the switch to desengage the Automatic Variable Rate Application
5. Press the button (E) to select manually the level of the agitation



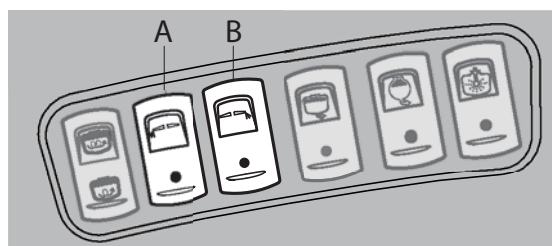
For detail on using this function, refer to the HC6500 instruction book

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### Electrically controlled end nozzle (optional)

The boom can be fitted with end nozzles.

1. Press the switch (A) to operate the end nozzle on the left side of the boom.
2. Press the switch (B) to operate the end nozzle on the right side of the boom.



For detail on using this function, refer to the HC6500 instruction book



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### Cleaning

---

#### General information

In order to derive full benefit from the sprayer for many years the following service and maintenance program should be followed.



ATTENTION! Always read the individual paragraphs. Read instructions for service/maintenance jobs carefully before starting on the job. If any portion remains unclear or requires facilities which are not available, then for safety reasons please leave the job to your HARDI dealer's workshop.



ATTENTION!

Clean sprayers are safe sprayers.

Clean sprayers are ready for action.

Clean sprayers cannot be damaged by pesticides and their solvents.

---

#### Guidelines

1. Read the whole chemical label. Take note of any particular instructions regarding recommended protective clothing, deactivating agents, etc. Read the detergent and deactivating agent labels. If cleaning procedures are given, follow them closely.
2. Be familiar with local legislation regarding disposal of pesticides washings, mandatory decontamination methods, etc. Contact the appropriate department, e.g. Dept. of Agriculture.
3. Pesticide washings can usually be sprayed out on a soakaway. This is an area of ground that is not used for cropping. You must avoid see page or run off of residue into streams, water courses, ditches, wells, springs, etc. The washings from the cleaning area must not enter sewers. Drainage must lead to an approved soakaway.
4. Cleaning starts with the calibration, as a well calibrated sprayer will ensure the minimal amount of remaining spray liquid.
5. It is good practice to clean the sprayer immediately after use and thereby rendering the sprayer safe and ready for the next pesticide application. This also prolongs the life of the components.
6. It is sometimes necessary to leave spray liquid in the tank for short periods, e.g. overnight, or until the weather becomes suitable for spraying again. Unauthorised persons and animals must not have access to the sprayer under these circumstances.
7. If the product applied is corrosive, it is recommended to coat all metal parts of the sprayer before and after use with a suitable rust inhibitor.

---

#### Cleaning and maintenance of filters

- Clean filters ensure:
- Sprayer components such as valves, diaphragms and operating unit are not hindered or damaged during operation. Nozzle blockages do not occur whilst spraying.
- Long life of the pump. A blocked suction filter will result in pump cavitation. The main filter protecting sprayer components is the suction filter. Check it regularly.

## 5 - Operation

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### Use of rinsing tank and rinsing nozzles

The incorporated rinsing tank can be used for three different purposes:

- A. Full internal rinsing or cleaning.
- B. External cleaning (can only be carried out on completion of "A").
- C. Rinsing spray circuit without diluting main tank content.



ATTENTION! The cleaning procedures stated requires the TurboFiller to be cleaned on beforehand (directly after the last chemical filling). If the TurboFiller for some reason is not cleaned please carry out this cleaning before attempting the cleaning procedures A, B or C - see "Rinsing TurboFiller" on page 71

Note that this cleaning will then use water from the rinsing tank reducing the available quantity for cleaning procedures A, B or C.



ATTENTION! Do NOT fill any cleaning detergents into the rinsing tank. If cleaning agents are to be used this should be added the main tank.

---

### A. Full internal rinsing

In-field diluting of remaining spray liquid residues in the spraying circuit for spraying the liquid in the field, before cleaning the sprayer.



NOTE! This rinsing is adequate/sufficient when the sprayer is going to be used again shortly (E.g. next day) in same or similar crops (No risk by cross contamination and subsequent crop damages).



WARNING! If the next crop to be sprayed is sensitive to the latest chemical used a full cleaning should be carried out. See "Full internal cleaning (Soak wash)" on page 76 "Full internal cleaning (Soak wash)" on page 76.



WARNING! Never clean the sprayer if there are risks of contamination of surface or underground water! Choose a different spot for cleaning every time to avoid spot contamination to build up.



DANGER! Before commencing this rinsing procedure ensure that the blind cap is securely fitted and tightened on the Pressure. Empty quick-coupler! If this is not fitted and tightened properly it may burst off during the rinsing process and lead to personal injuries to the operator or persons in proximity of the machine!.

This rinsing procedure will rinse the spraying circuit and main tank as follows:

1. Open the spray boom if it isn't opened and lower the boom.
2. Empty the sprayer as much as possible. Close the agitation valve (no agitation). Allow the pump to run for at least 1 minute after the liquid fan from the nozzles has collapsed to ensure that all relevant liquid has been expelled.
3. Turn on the Rinse Tank Valve. (This will automatically turn off the Main Tank Valve)
4. Turn on the Agitation valve.
5. Engage the pump
6. Use 1/6 of the rinsing tank content at this valve setting
7. Turn the ChemFiller/Ejector valve to off
8. Turn off the Agitation Valve for 10 seconds
9. Turn on the Tank Rinse nozzles for 20 seconds.
10. Turn the Chemfiller/Ejector valve to boom. "Spraying".



NOTE! If you want to spray out the diluted liquid in the field, go now to the cabin. The rest of the cleaning process can be manoeuvred from there.



NOTE! If you want to spray out the liquid in e.g beside the field with the sprayer parked, the rest off cleaning process can be controlled from the side of the machine.

11. Open the Boom Spray nozzles by the ON/OFF switch.
12. Open the cyclone filter tap located at the bottom of the cyclone filter fully by pressing it upwards for 10 seconds. This will flush out the sedimentations in bottom of the filter.
13. Press the Main Tank valve to turn it on, this will automatically close the Rinse Tank valve.
14. If powder has been used, turn on the agitation from the control panel if the agitation is too strong you can decrease it gradually from the cabin. Spray out the content fully. If spraying in the field choose a different location each time to distribute the rinsing water over larger areas. Continue until all fluid is expelled from the boom tubes and nozzles - this may take several minutes after the spray fan has collapsed.
15. Turn on the Rinse Tank valve, this will automatically close the Main Tank valve.
16. Turn on the Rinse Tank nozzle and turn off the Boom Spray nozzle and run it for 1 minute.
17. Turn off the Rinse Tank nozzle. Turn on the Main Tank valve. Turn on the Boom Spray nozzle spray until the Main Tank is empty.
18. Repeat step 15-17 another 3 times using 1/6 off the rinsing tank content in each of the 3 sequences until the Rinse Tank is empty
19. Shut off nozzles once the rinsing process is completed.

### B. External cleaning

This procedure is used to rinse the sprayer on the outside in the field as required.

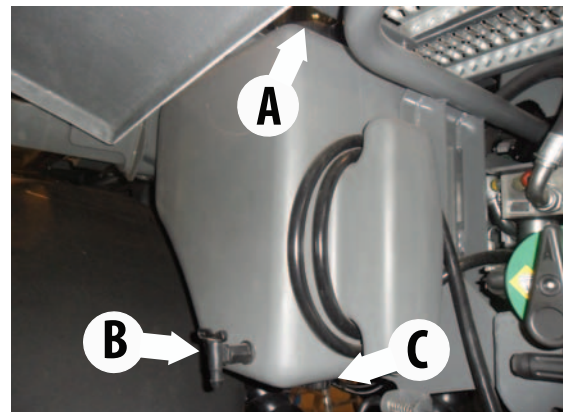


**WARNING!** Never clean the sprayer if there are risks of contamination of surface or underground water! Choose a different spot for cleaning every time to avoid spot contamination to build up.

Use the External Cleaning Device to wash everything on the outwards side of the sprayer. This prevents contamination of storage place etc. and let the sprayer last for a longer life. When the External Cleaning Device is going to be used, open the cover for the fluid system on sprayers left side.

The cleaning gun is located on the inner side of the cover.

1. Un-roll the hose from the reel (B) and take the handle (C).
2. Engage clean water pump (A) by pressing the ON/OFF switch at the end of the pump.
3. After cleaning turn of the clean water pump by pressing the ON/OFF switch.
4. Roll the hose to the reel again and close cover



## 5 - Operation

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### C. Rinsing spraying circuit without diluting main tank content

This procedure is used to rinse the pump, operating unit, spray lines, etc. in case of stop in spraying before main tank is empty (e.g. beginning rain etc.).

#### Rinsing of the liquid system

1. Turn off the pump.
2. Turn on the Rinse Tank valve.
3. Turn on the Boom nozzles
4. Turn off the agitation valve (no agitation)
5. Press the Cyclone Filter Boost Valve to down position to avoid dilution of main tank content.
6. Engage the pump and spray water from rinsing tank in the field until all nozzle tubes/nozzles are flushed with clean water.
7. Disengage the pump again.



Don't turn Boom Spray nozzles off until the pump has fully stopped, otherwise diluting will occur in the Main Tank.



ATTENTION! It is advisable to increase the forward speed (double if possible) and reduce the pressure to 1.5 bar (20 psi) when spraying diluted remaining liquid in the field just sprayed.



ATTENTION! If a cleaning procedure is given on the chemical label, follow it closely.



ATTENTION! If the sprayer is cleaned with a high pressure cleaner lubrication of the entire machine is recommended.

---

### Full internal cleaning (Soak wash)



NOTE! This cleaning procedure is always used when:

- A. The next crop to be sprayed is at risk to be damaged by the chemical just used, or
- B. The sprayer is not going to be used again for same chemical or crop right away, or
- C. Before any repair or maintenance job is going to be carried out on the sprayer.



NOTE! Wash of sprayer between jobs with incompatible crops must be done according to prescriptions from the chemical producer. Use e.g. AllClearExtra, as this is a commonly used cleaning agent. If your chemical prescribes another cleaning agent and/or another cleaning procedure, you must follow that.

Procedure for wash with a cleaning agent, e.g. AllClearExtra:

1. Rinse the sprayer in the field (See chapter "Use of rinsing tank and rinsing nozzles" subchapter A).
2. Drive to farm fill station.
3. Prepare sprayer for cleaning with cleaning agent, e.g. AllClearExtra. Fill water in the main tank to 10% of capacity (. Fill the rinsing tank completely. This water is used later for rinsing.
4. Turn on the Main Tank Valve
5. Turn on the Agitation Valve
6. Engage the pump
7. Allow the liquid to circulate for 3 minutes.
8. Turn the Chemfiller/Ejector valve towards the Chemfiller.
9. Turn the Chemical Induction valve so it point upwards (The Vacuum Source Valve is now off.)
10. Open the TurboFiller deflector valve and allow liquid to circulate for 3 minutes.
11. Close the lid and activate the container rinsing valve to clean the hopper inside.
12. Shut off container rinsing valve and the deflector valve and the on the TurboFiller.

13. Verify that all Boom nozzles are shut off.
14. Turn the Chemfiller/Ejector valve towards "Spraying".
15. Allow the liquid in the main tank to circulate for minimum 3 minutes with the nozzles shut to clean the return lines from boom to tank.
16. Spray out water with cleaning agent and chemical residue. Set the spray pressure at 3-5 bar. Note that the washing water still contains active chemical and choose an appropriate area to spray out this. Alternatively the washings can be dumped at the Filling/washing location and retained in an appropriate receptacle (E.g. slurry tank or similar). Spot contamination and accumulation must be avoided. Continue to spray until all liquid is expelled from the boom tubes and nozzles.
17. Shut off all nozzles by the main ON/OFF switch
18. Rinse the sprayer again with clean water to rinse out all remains of the cleaning agent. See section "Use of rinsing tank and rinsing nozzles" subchapter A. "Full internal rinsing" This to avoid that the cleaning agent remains in the fluid system. Remains could damage the next spray chemical filled into the main tank.
19. Include rinsing of the TurboFiller in step 17. Operate all 3 valves during this process.
20. Dismantle all filters (suction, pressure, in-line and nozzle filters) and clean the filter screens using clean water and detergent.



ATTENTION! The rinsing nozzles cannot always guarantee a 100% cleaning of the tank. Always clean manually with a brush afterwards, especially if crops sensitive to the chemical just sprayed are going to be sprayed afterwards!



NOTE! It is the responsibility of the sprayer operator or owner that the sprayer is cleaned sufficiently to avoid contamination of the environment, crop damages and health & safety hazards to operator and the public. HARDI cannot be held responsible for any damages or incidents related to insufficient cleaning.

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### Use of detergents

It is recommended to use an appropriate cleaning detergent suitable for cleaning agricultural sprayers.

- The cleaning detergents which contains a suitable lube or conditioner is recommended.
- If for some reasons this is not available and e.g. triple ammonia water is used, it is important to rinse the circuit immediately after and add some lubricant to the rinsing water to avoid e.g. ball valves seizing up.
- Use of automotive antifreeze/radiator coolant (ethylene glycol) will protect the valves, seals etc. from drying or seizing up.

---

### Technical residue

Inevitably a quantity of spray liquid will remain in the system. It cannot be sprayed properly on the crop, as the pump takes in air when the tank is about to be empty.

This Technical Residue is defined as the remaining liquid quantity in the system as the first clear pressure drop on the pressure gauge is read.

The dilutable residue must be diluted 10 times with clean water and sprayed to the crop just sprayed before cleaning the sprayer.



## Lubrication

### General information

Always store lubricants in a clean, dry and cool place - preferably at a constant temperature. Keep oil filling jugs, hoppers and grease guns clean, and clean the lubricating points thoroughly before lubricating. Avoid skin contact with oil products for longer periods. Always follow the recommendations concerning quantity. If no quantity is indicated, lubricate up to the required level, unless otherwise indicated.

For the opening of the engine hood, see the chapter. "Access to the engine" on page 39

### Table of recommended lubricants

Components	Capacity (litres)		Recommended lubricants - TOTAL
	Housing (1)	With filter(1)	
Engine Cummins QSB 6.7	18	18.5	RUBIA WORKS 1000 15W-40 ACEA E7 (E5) API CI-4 / CH-4 / CF / SL
Hydraulic Transmission and Hydraulic system	100 l		EQUIMIS ZS46 AFNOR NF E 48-603HV ISO 6743/4HV
Moto-reducers of wheel	3		TRANSMISSION SYN FE 75W-140
Coolant	25		COOLELF AUTO SUPRA -37°C COOLELF AUTO SUPRA -37°C/AFNOR NFR 15-601 - BS 6580
General lubrication	--		Multi EP2 ISO-L-XBCFB 2



The data values in the table above are indicative to titles. Only the level indicated by the gauge should be taken into consideration.

## 6 - Maintenance

### Maintenance intervals

	Hours	10	50	150	250 3 Months	500 6 Months	1000 1 Year	2000 2 Years	5000 4 Years
Tightening of the wheel bolts		X							
Inspect hoses and oil level hyd.		X							
Track drive gearbox oil level				X			X		
Track drive gearbox draining						X			
Boom lubrication			X						
Bleed compressed air tank.			X						
Cleaning the radiators engine			X						
Drain hydraulic tank				X					
Hydraulic Filters				X					
Coolant Level				X					
Engine air filter					X				
Piping engine air filter					X				
Engine air filter hoses					X				
Compressed air compressor					X			X	
Inspection of radiators engine					X	X			
Drain the coolant						X		X	
Fuel filters						X			
Bleed fuel prefilter					X				
Replace fuel filter						X			
Replace the cabin active carbon filter						X			
Drain and engine oil filter						X			
Verification engine vibrations								X	
Tension of the fan belt engine							X		
Spray pressure gauge					X				
Air conditioning							X		
Verification engine									X

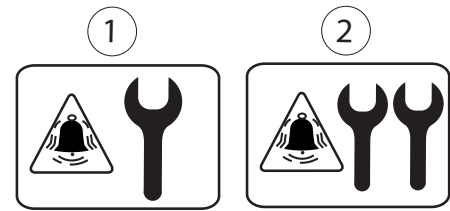


## Maintenance

### Display of the frequency of maintenance

When maintenance work is to perform on the self-propelled, the display shows the symbols of alerts corresponding to the different periods:

1. Maintenance after 150 hours of use
2. Servicing every 500 hours



The message ref.1 appears only once in 150 hours to indicate that the maintenance work is to perform on the machine.

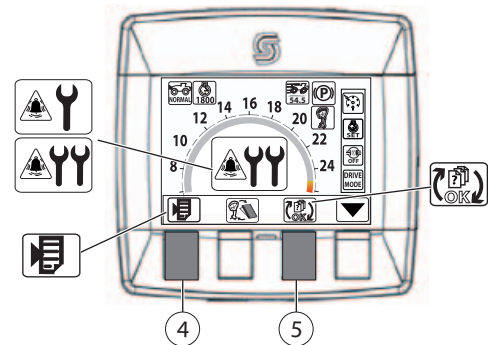
The message ref.2 appears periodically all 500 hours to indicate that the maintenance work is to perform on the machine.

### Reset the Hour Meter

- Simultaneously press the keys rep. 4 And ref.5 for 5 seconds to reset the hour meter for maintenance



The cancellation of the message is to be performed when the work of maintenance have been made.



### After 10 hours - Hydraulic system

- Check the tightness of the hydraulic hoses and the oil level in the hydraulic reservoir.
- Check the tightness of the wheel studs.

### After 250 hours - Operations on the engine



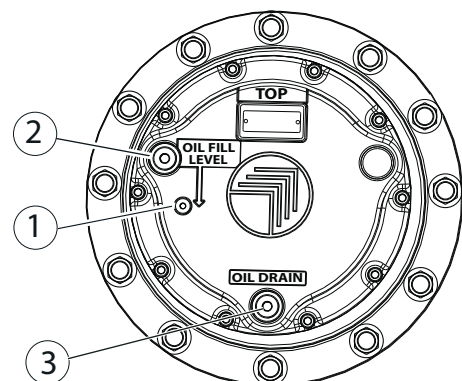
For further information, see the CUMMINS engine user and maintenance manual.

### After 500 hours - Draining the track drive gearbox

- Move the self-propelled to orient the reducers of wheel as shown in the illustration
- Unscrew the cap rep.1 and rep.3 to drain the gearbox
- Check the oil level every 100 hours.



Use exclusively recommended transmission oil. See "Table of recommended lubricants" on page 79.



## 6 - Maintenance

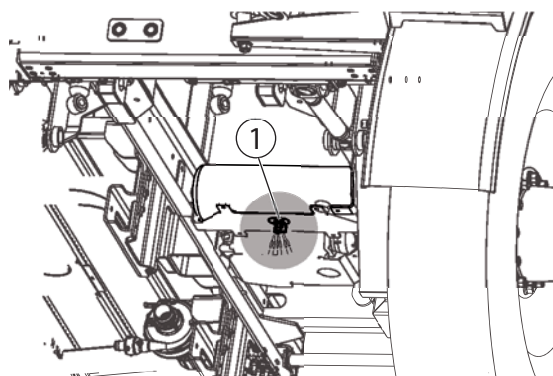
### Periodic Maintenance

#### Daily

- Check sprayer filters.
- Check engine oil level
- Filling the fuel tank
- Check hydraulic oil level
- Cleaning of the engine radiators
- Check air filter is not clogged

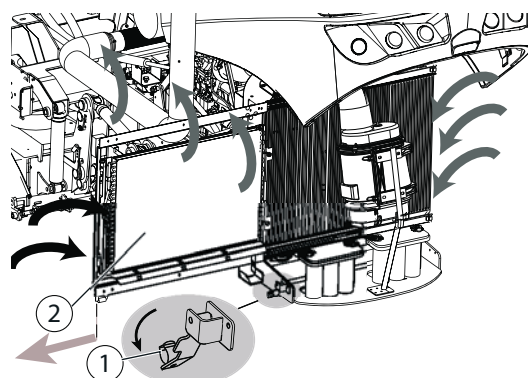
#### Every 50 hours - compressed air tank

- Turn the bleed valve ref.1 to eliminate the condensate content in the tank.



#### Every 50 hours - engine radiators

- Lift the motor cover fully.
- Switch the attached ref.1 down.
- Slide the radiator ref.2 as shown in the illustration
- Remove the dust from the filter with compressed air from the inside to the outside.



During cleaning operations, take precautions so as not to damage the cells of the exchangers of temperature



When the machine is operating in areas with a lot of dust or pollen, the cleaning intervals can be shortened.



The residue of oil and fuel promotes the clogging of the engine and the radiators. That is why it is advised to carefully check the sealing of the circuits of the engine.

#### Every 250 hours - hydraulic filter

The hydraulic suction filters are fitted with clogging indicators.

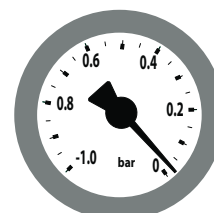
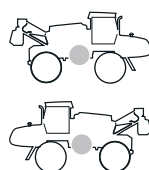


NOTE! The clogging indicator is read when the hydraulic oil is at the normal temperature for use.

- Regularly check the clogging level.

Less than 0.2 = filters in good condition.

More than 0.2 = filters to be replaced.

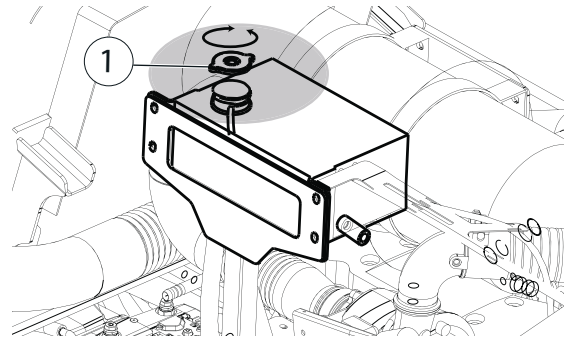


### Every 150 hours - Coolant level



In the event of overheating of the engine's cooling system, wait a few minutes before opening the expansion tank plug, in order to avoid any risk of projection that could cause serious burns.

- Regularly check the coolant level.



To avoid burns, unscrew the plug ref.1 when the temperature is below 50 °C.



For further information, see the CUMMINS engine user and maintenance manual.

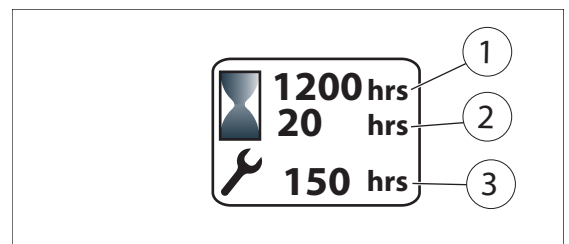


Only use the coolant recommended, see the chapters "Table of recommended lubricants" on page 79 and "Coolant" on page 123.

### Every 500 hours - Hour Meter

This message appears all 500 hours of use, to indicate that an intervention of mandatory maintenance is to perform on the machine.

1. TOTAL hourly Counter .
2. Counter Partial Time
3. Counter clockwise from the first MAINTENANCE



- Change of engine oil and replacement of oil filter cartridge.
- Replacement of fuel filter.
- Bleed the fuel pre-filter.
- Inspection of tightness and tension of engine belts.
- Draining of the hydraulic reservoir and replacement of hydraulic filters.
- Replace the cabin active carbon filter.

## 6 - Maintenance

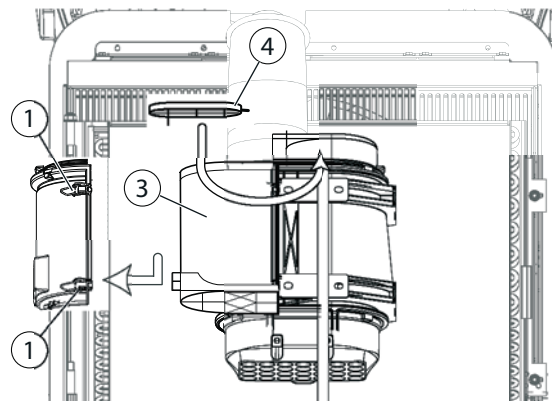
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### Every 500 hours - Replacement air filters engine



Wear goggles and a mask for protection to avoid the inhalation of dust and protect the eyes.

- Lift the motor cover fully.
- Remove the 4 straps ref.1 and remove the lid (REF. 2); discard.
- Gently push the main filter ref.3 down to the release of its housing, then remove.
- Remove the filter Ref.4
- Replace the filters ref. 3 and ref.4



When reassembling:

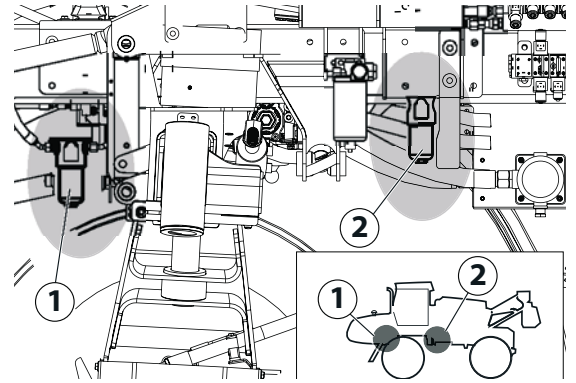
- Check the surface of the seals - clean with a slightly damp cloth
- Inspect the air inlet of the engine and the tightening the fasteners
- Check that the filter is not damaged.
- Check that the filter is completely in place during the - reassemble



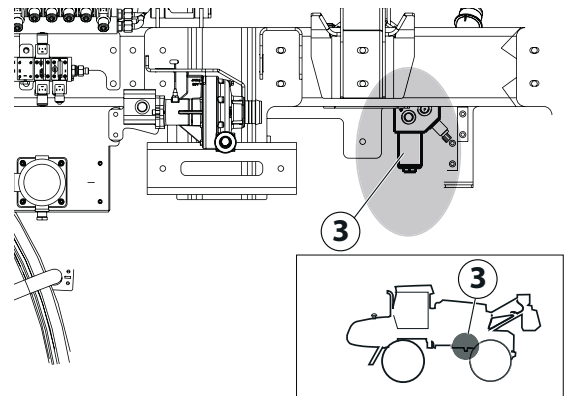
To ensure the best protection, make sure you use the air filters of origin.

### Every 500 hours - auxiliary hydraulic filter

1. Braking Circuit
2. Circuit bondage



3. Control spray circuit



To replace the filter cartridge:

- Unscrew the filter housing fig.1.
- Remove the filter cartridge fig.2 and replace it with a new one.



**WARNING!** It is essential to use an original filter.

### Every 500 hours - hydraulic filters in the tank (version 1)



**WARNING!** Before replacing the filters, wear protective gloves to avoid the oil making any contact with the skin.



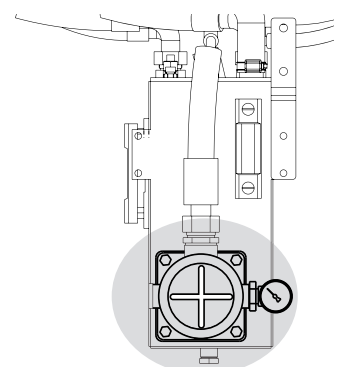
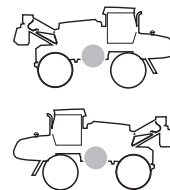
**DANGER!** Hot oil can cause serious burns.



**WARNING!** It is essential to use an original filter.

The filters elements should be fitted on either side of the tank. They should always be replaced at the same time.

A drip pan should be put in place to collect the used oil contained in the filter housing. A valve at the end of the filter housing retains the oil from the tank.



- Completely unscrew the lid and remove the filter assembly.

A small quantity of oil will escape from the filter housing; it must be collected in a container provided for this purpose. A one-way valve at the end of the filter housing retains the oil from the tank.

## 6 - Maintenance

- Unscrew the knob fig. 1 to remove the filter. To facilitate this operation, gently press the spring fig.2.
- Remove the cups from the filter element fig.3.
- Carefully clean the magnetic core fig.4 with a cloth.

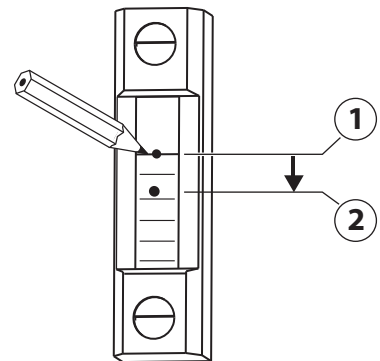


WARNING! It is essential to use original filter elements.



WARNING! Before replacing the parts, note the oil level in the tank fig.1.

1. initial level before refitting filters
  2. level after refitting the filters
- Refit the new filter. The oil level will drop by around 10 mm, which means that the filters have been fitted correctly.
  - Top up with oil to the maximum level fig.2.
  - Start the engine on idle then stop it after a few seconds. This evacuates the air contained in the hydraulic system.
  - Start the engine again on idle and then gradually increase the engine speed.



NOTE! The oil running from the filters must never be re-used as it may damage the hydraulic system components.

### Every 500 hours - hydraulic filters in the tank (version 2)



WARNING! Before replacing the filters, wear protective gloves to avoid the oil making any contact with the skin.



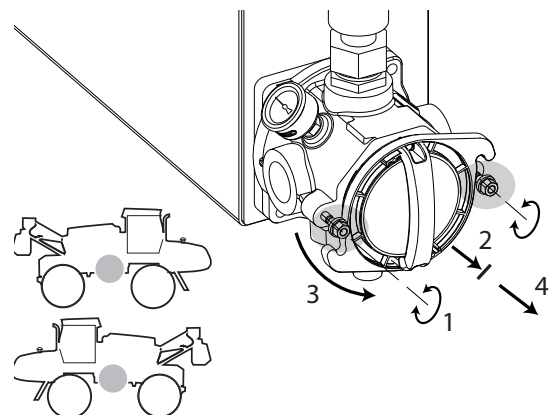
DANGER! Hot oil can cause serious burns.



WARNING! It is essential to use original filter elements.

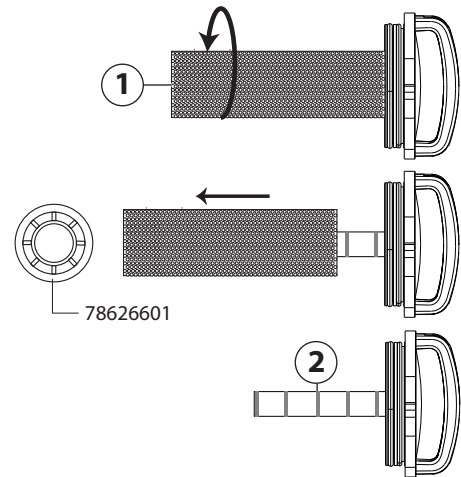
The filters elements should be fitted on either side of the tank. They should always be replaced at the same time.

A drip pan should be put in place to collect the used oil contained in the filter housing. A valve at the end of the filter housing retains the oil from the tank.



Remove the filter cap

- Unscrew the 2 nuts, without disassemble
- Pull out the cover up to the limit stop of the nuts. A one-way valve at the end of the filter housing retains the oil from the tank
- Turn the cover and completely pull the assembly



### Remove the filter element

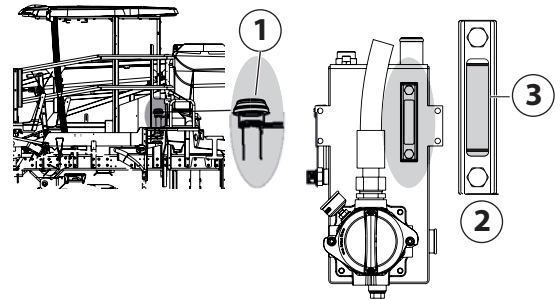
- Unscrew the filter element
- Clean carefully the magnetic core ref.4 with a cloth
- Replace the filter element



NOTE! The oil running from the filters must never be re-used as it may damage the hydraulic system components.

After reassembling the filters elements

- To up to the maximum level ref.1
- Start the engine on idle then stop it after a few seconds. This evacuates the air contained in the hydraulic system.
- Start the engine again on idle and then gradually increase the engine speed.
- Top up again with oil to the maximum level fig.2.



Left & Right filter element Part Number: 78626601

### Every 500 hours - Cab active carbon filter

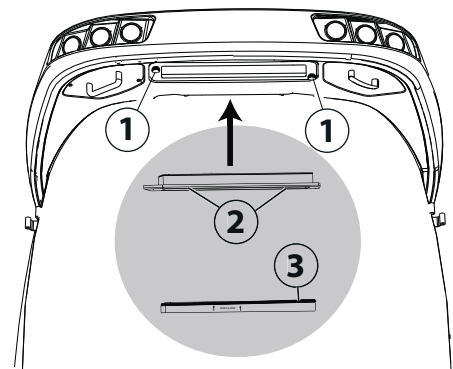
The cab is fitted with an active carbon filter that purifies the air entering the cab interior. It is fitted outside the cab at the front.



ATTENTION! Wearing a mask and protective goggles is recommended to avoid inhaling the dust and protecting the eyes from it.

For the disassemble of the activated carbon filter:

- Remove the thumbscrews ref.1 and remove the filter assembly to coal.
- Detach the filter from its bracket by removing the screws (ref. 2); discard.
- Replace the charcoal filter active observing the direction of movement of the air.
- Refit the assembly to the cabin.



WARNING! The frequency of replacement is given for information purposes. However, if bad odours would appear in the cab, that would mean that the filter is no longer completely effective, it must be replaced in the shortest time possible, to avoid any risk of contamination.



WARNING! When the sprayer is not used, it is advisable to store the active charcoal filter, if possible in a plastic bag.

## 6 - Maintenance

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### Every 1000 hours

Cleaning of the hydraulic reservoir

Check the engine belts

Drain the engine coolant

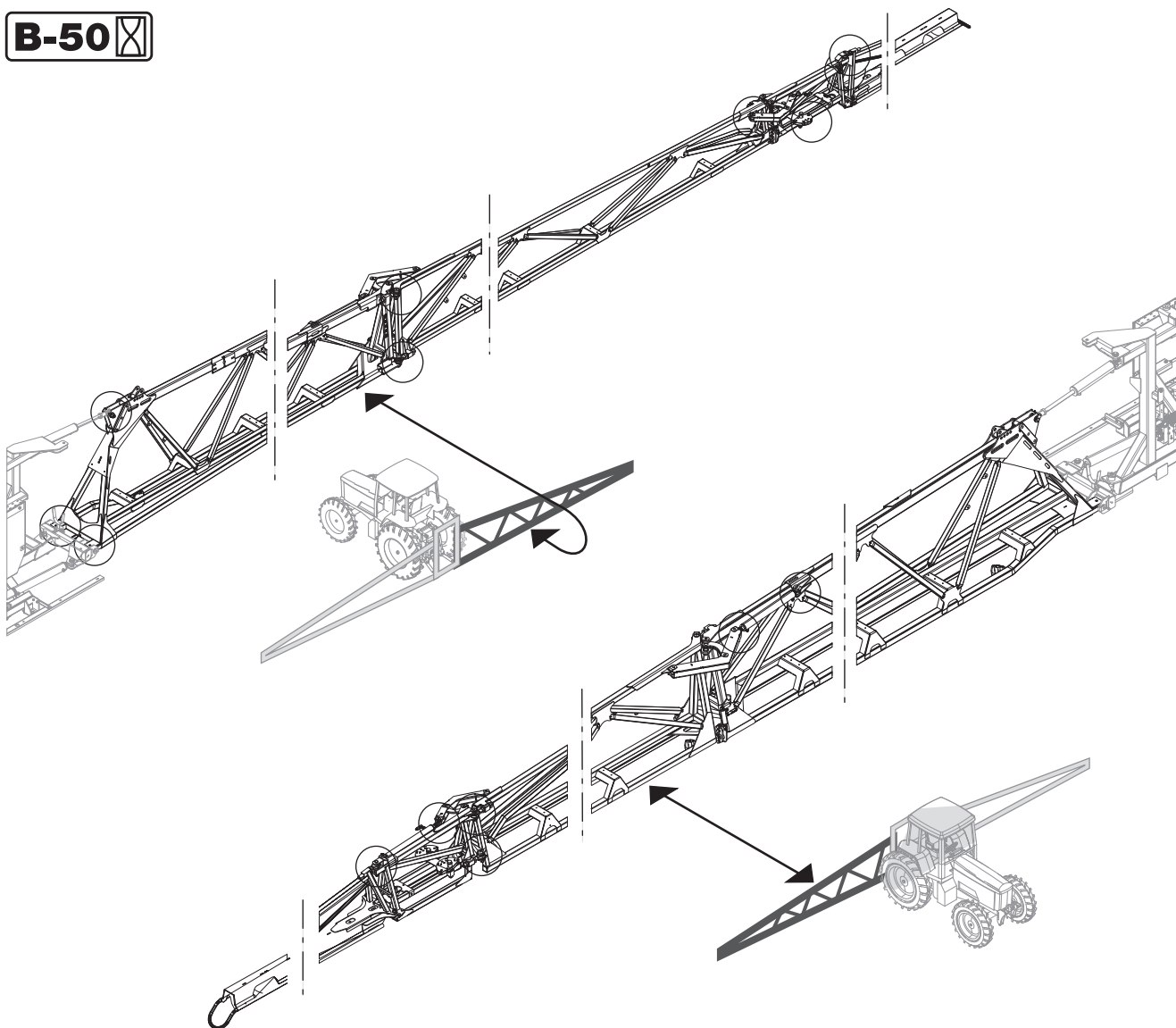
Checking the charge of gas from the air conditioning

Cleaning the condenser of the air conditioning.

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### Boom lubrication

**B-50** 

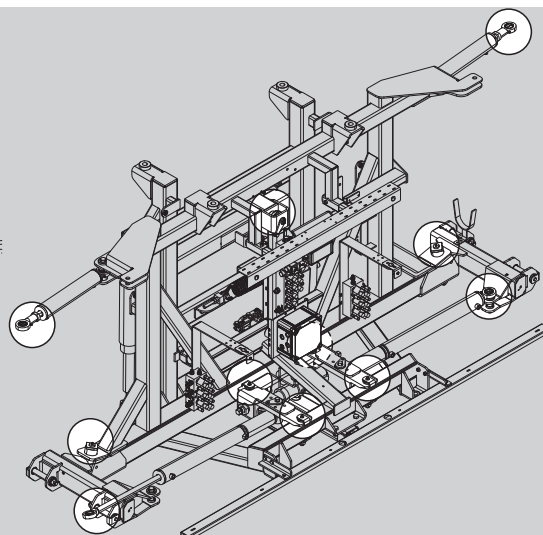
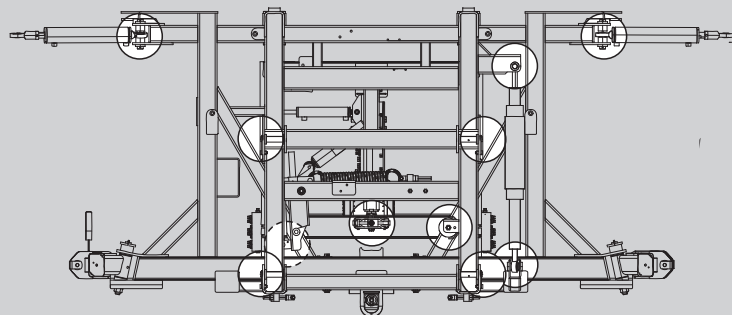




### Boom lubrication Pendulum AutoTerrain center

**B-8** 

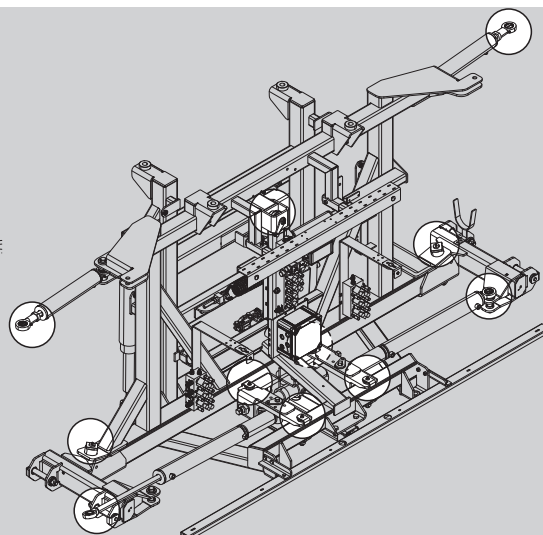
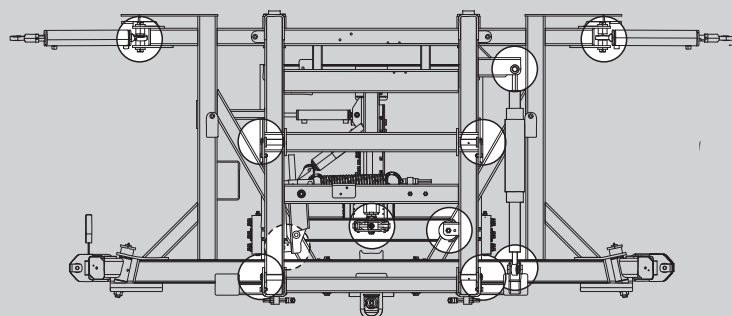
**AutoTerrain**



### Boom lubrication Trapeze center

**B-8** 

**AutoTerrain**



## 6 - Maintenance

### Service and maintenance intervals

#### 8 hours service - AutoTerrain centre

Some lubrication points on the boom and centre parts need extra attention when having AutoTerrain system. These lubrication points, marked "10" in "Boom lubrication" on page 19, need attention every 10 working hours to work correctly.

#### 8 hours service - Trapeze suspension

Grease the trapeze swivel eye ball ends on a regular basis to protect the balls, prevent moisture penetration, seizure and breakage and ensure free movement.

Adjust DynamicCentre cable and spring tension to ensure correct operation in flat and hilly terrain and to prevent uncontrolled boom movement.

#### 250 hours service - Readjustment of the boom

See section "Occasional maintenance" on page 24.

#### Airbag Boom wheel (Optional)

The boom wheel can be used when spraying with a low boom height in the early stages of the crop development. They should be removed when there is a risk that the boom wheel can be dragged into the crop canopy. The airbag provides a pneumatic suspension which reduces the shock transfer to the boom in the event of a ground strike.



#### ATTENTION!

- The air bag boom wheel is mounted to the second outer boom section as illustrated. Boom will not rest in horizontal position if wheels are not located on even distance from centre.



#### WARNING!

- The boom wheel hangs lower than the boom structure and it is the operator responsibility to make sure it is not at risk of getting hooked on anything or caught in the crop.
- The airbag boom wheel is not designed for constant ground engagement. Running the boom wheel on the ground can damage the boom.



#### ATTENTION!

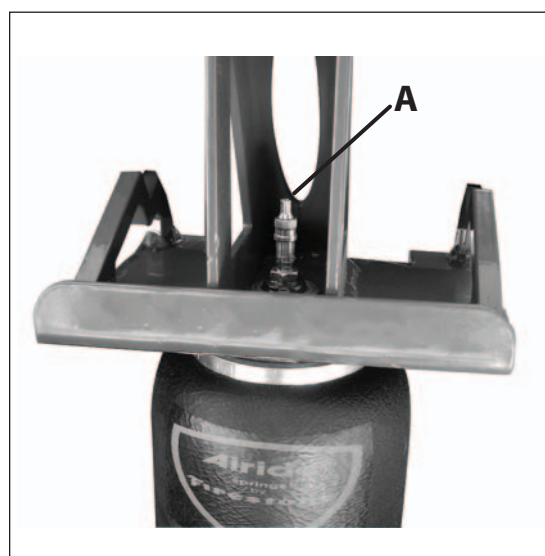
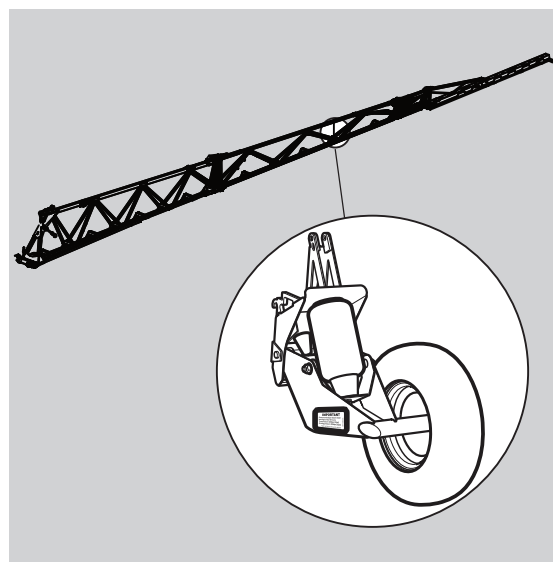
- Maintain correct boom wheel tire and airbag pressures to support the boom in the event of a ground strike. To inflate or check the air bag remove the valve cap A and use an automotive tire inflation device.

Pressure	kPa	psi
Airbag	206	30
Tire	220	32



#### ATTENTION!

- Ensure boom wheel is free rolling on a daily or weekly basis depending on use. Check, repack and adjust wheel bearings as required.
- Boom wheel must be removed for road transportation.



### Boom wing suspension damper (trapeze center)

The individual wing suspension reduces shock transfer through the boom that causes wing tip movement. Vertical forces are absorbed through a linkage arm and damper element connected to the tilt cylinder.



NOTE! They should be checked on a regular basis for their integrity and replaced if necessary.



---

### Break-away

Adjustment should be performed regularly to prevent uncontrolled breakaway movement during cornering and when avoiding obstacles.

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### Surface treatment

Some chemicals mixed together can have a reaction on polyester powder coated surfaces if poor hygiene is practiced. Regular cleaning is highly recommended.

## 6 - Maintenance

### Occasional maintenance

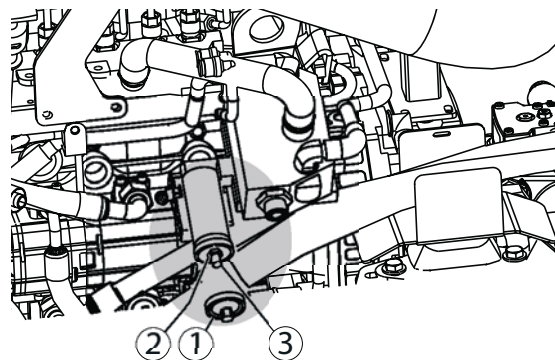
#### General information

The servicing and maintenance intervals mainly depend on the conditions of use of the sprayer and, as a result, the maintenance intervals may not be stated.

#### Compressed air pressure adjustment

The compressor of compressed air is used for the operation of the suspension of the sprayer. The pressure of service must be between 9 bar (130 psi) and 10 bar (145 psi).

- Raise the engine cover to access the adjustment of the air compressor, located on the left side of the engine.
- Unscrew the cover of protection ref.1
- Loosen the lock nut ref. 2 and ref.2 turn the screw to adjust the pressure of service of the suspension.



#### Air suspension adjustment

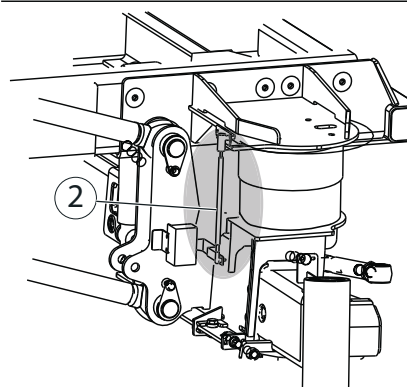
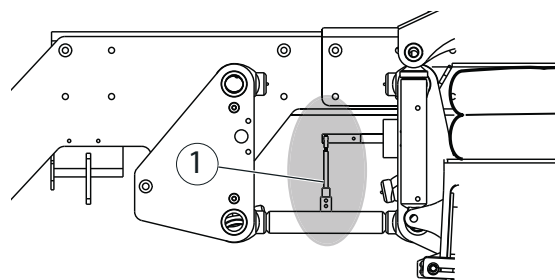


The adjustment of the suspension is to achieve empty tank.

- Check beforehand that the compressed air pressure is adjusted correctly.

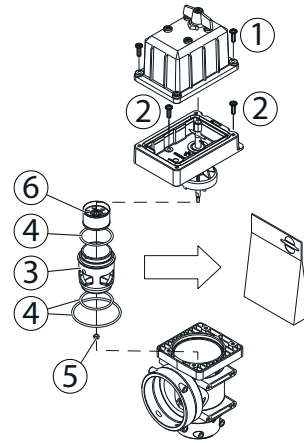
If the height of the pneumatic cushion is different from 284 mm (11.18 in) , you can modify it by acting on the valve of leveling:

- Adjust the linkage ref.1 to change the height of the front air bag.
- Adjust the linkage ref.2 to change the height of the rear air bag.



### Verification/replacement of a bushel of the regulating valve

1. The pressure may no longer be sufficient or it may become unstable. In this case, replace the cone and the cylinder of the control valve (EFC valve).
  - Loosen the 4 retaining screws fig.1 and remove the lid.
  - Loosen the 4 screws fig.2.
  - Replace the cylinder fig.3 and the seals fig.4.
  - Loosen the nut fig.5, and remove and replace the cone rep.6.
  - Reassemble in reverse order.



### Distribution valve seal check/replacement

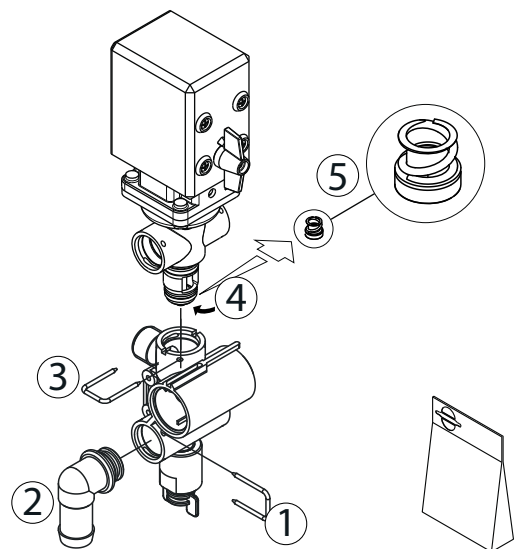
Regularly check the tightness of distribution valves with clean water.

#### Check

- Open all distribution valves (open spraying).
- Remove the pin fig.1 and remove the connector fig.2. When the housing is drained, there should be no liquid flow through the return line. If a leak is found, the seal must be replaced fig.5.

#### Replacement

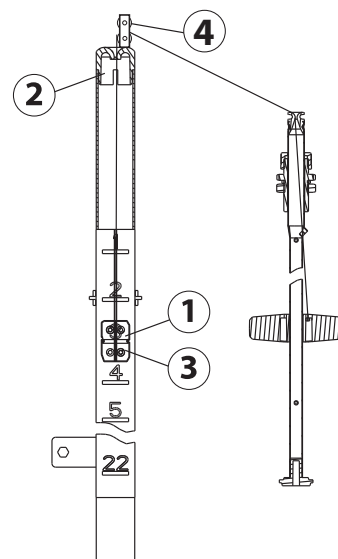
- Gently lift the pin fig.3 and remove the motorised valve from its housing.
- Loosen the screw fig.4 and replace the seal fig.5
- Reassemble in reverse order.



### External gauge adjustment

The gauge reading should be checked regularly. The machine should be parked on flat horizontal ground.

- Fill the tank with a known volume of water, the bushing marker should correspond with the graduation of the gauge. If this is not the case:
- Remove the cord guide.
- Loosen the screw fig.3 and adjust the position of the indicator with respect to the indications on the pole.
- Check that the wheels fig.4 turn freely.



## 6 - Maintenance

### Gauge cord replacement

If the cord on the gauge has to be changed, the float guide pole is removed from the tank:

- Remove the drain valve (see below "Drain valve seal replacement") and loosen the fitting holding the pole in position.
- Pull the pole down through the drain valve hole till it is free in the top of the tank.
- The pole can now be taken out of the tank through the filling hole.



**DANGER** Do not enter the tank - the parts can be changed from the outside.

### Drain valve seal replacement

If you find a leak in the drain valve, check that the valve is clean. If the leak persists the valve seal should be replaced.

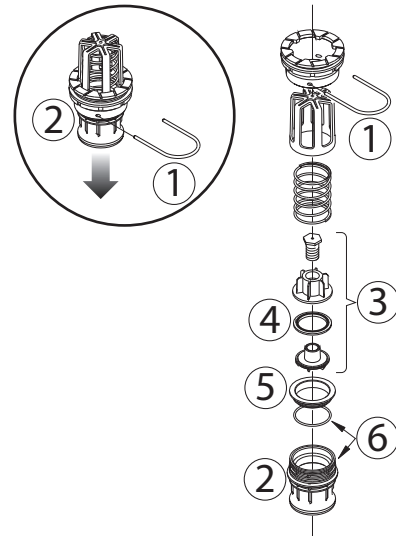


**DANGER!** Do not enter the tank - the parts can be changed from the outside.



**WARNING!** Use a face protection mask and goggles when dismantling the drain valve.

- Ensure that the tank is completely empty.
- Close the drain valve and release the control cord.
- Remove the pin fig.1 and pull on the part fig.2 The drain valve assembly can be removed downwards.
- Check the wear on the cord and the valve assembly fig.3, replace the seal fig. 4, then reassemble.
- Reassemble the drain valve assembly, replace the housing fig.5. Lubricate the O-ring ref.F on reassembly.
- Reassemble the pin fig.1 and check the tightness of the drain valve.



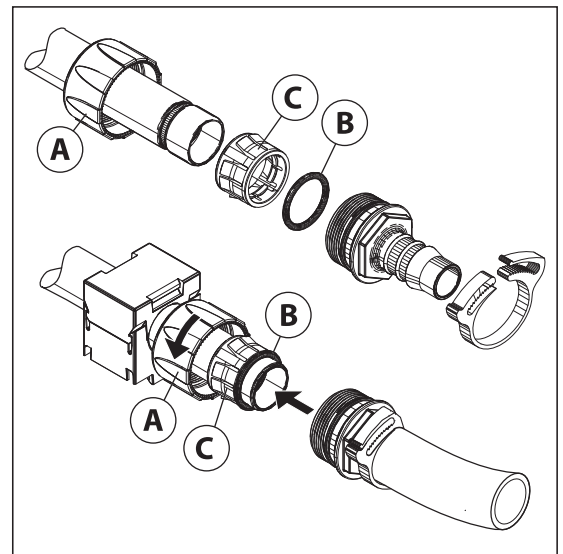
### Feed pipe snap-lock assembly

#### Disassembly

1. Screw the union nut (A) completely off.
2. Pull the feed piping and hose barb apart.
3. Take out the O-ring (B).
4. Inspect and oil O-ring (B). Change the O-ring (B) if worn, before reassembly.

#### Reassembly

1. Check that the barbed lock ring (C) is fitted to the feed pipe with barb pointing away from pipe opening.
2. Fit the oiled O-ring (B) on top of the lock ring (C).
3. Push the feed pipe and hose barb together.
4. Screw the union nut (A) on the hose barb and tighten union nut (A) by hand.

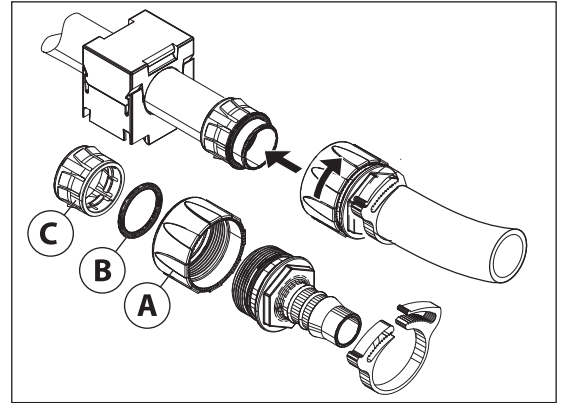


### Initial fitting of fittings



ATTENTION! This method can only be used for pipes not fitted into pipe clamps.

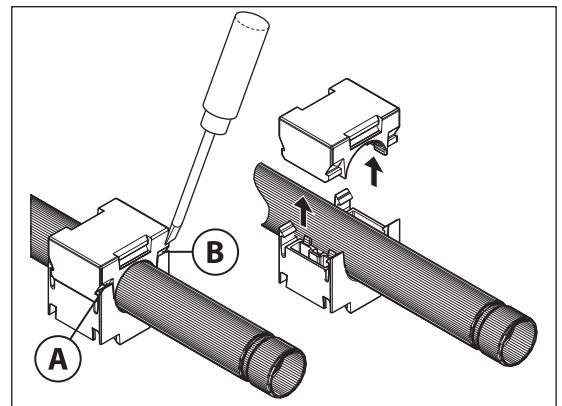
1. Fit the barbed lock ring (C) to the feed pipe with barb pointing away from pipe opening.
2. Fit the oiled O-ring (B) on top of the lock ring.
3. Screw the union nut (A) partly on the hose barb.
4. Press the feed pipe and hose barb together.
5. Tighten the union nut (A) by hand.



### Feed pipe clamp assembly

A feed pipe can be removed from the pipe clamps the following way:

1. Use a flat bladed screwdriver to prize the cover off the first corner (A).
2. Hold the clamp top with your hand and prize off the opposite corner (B) with the screwdriver.
3. Prize off the other side of the pipe clamp with the screwdriver.
4. Take out the feed pipe.



### Opening the cable trays

The cable trays on the boom can be opened for servicing or re-wiring.

#### Disassembly

1. Use a screwdriver at the end of a cable tray to prize the cable tray cover off the lock hooks.
2. Pull the cable tray cover off.

#### Assembly

1. Press the cover on by hand until it hits the hooks of the cable tray.

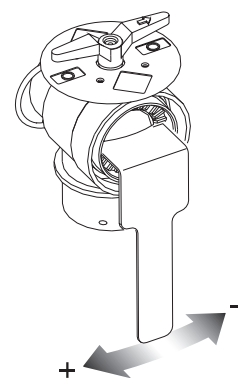


## 6 - Maintenance

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### Adjustment of 3-way-valves

If a 3-way valve is difficult to turn or if it turns too easily or there is a risk of leak, the serrated washer can be adjusted as shown in the picture.



NOTE! This procedure is also valid for electric valves.



### Readjustment boom - general info

Before commencing adjustment jobs please go through this check list.

1. The sprayer must be well lubricated (see section about lubrication).
2. Connect the sprayer to the tractor.
3. Place tractor and sprayer on level ground (horizontal).
4. Unfold boom.
5. Set slanting angle to neutral position (horizontal) for AutoTerrain.



ATTENTION!

- For information on boom terminology see "Boom and terminology" on page 23



NOTE!

- Adjustment of hydraulic cylinders is to be carried out without pressure in the system.



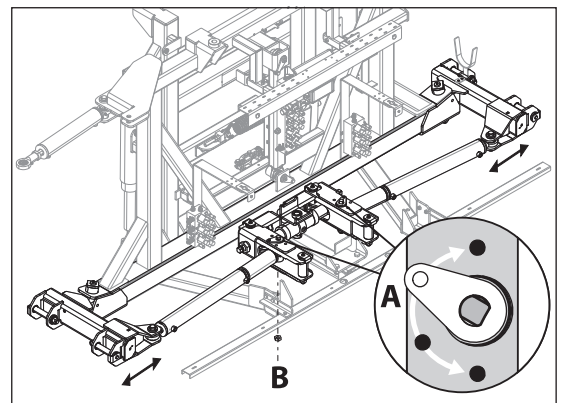
WARNING!

- Nobody is allowed to be under the boom whilst adjustment is carried out.

### Horizontal alignment of centre and inner wing sections

The boom must be completely unfolded before adjustment.

1. Remove nut and washer (B) on the underside of the beam.
2. Lift the exccentric bolt (A) up until the guide pin is free of the hole.
3. Remove outer exccentric bush
4. Turn the exccen)(tric bolt (A) until the boom aligns. The boom tip must point slightly forward (100-500 mm at boom tip).
5. Insert outer exccen)(ric bush and refit washer and nut (B) but don't tighten it.
6. Push the exccentric bolt (A) back in place. Use the guide hole closest to the pin.
7. Tighten the nut (B) again.



### Yaw mechanism adjustment

To arrest steering, cornering, breaking, acceleration and oscillation boom Yaw movement the anti-yaw system must be correctly maintained and adjusted.

The nitrogen accumulator must be correctly charged to 25 bar and the hydraulic circuit bleed of all air and the circuit pressure pre-charged to 30 bar. The yaw mechanism must be greased regularly to maintain free movement and adjusted to take out any free play between the buffers.



WARNING!

- Before any work is performed on the yaw mechanism the sprayer must be on a level ground, boom opened, centre and wings fully supported on suitable stands.

The yaw mechanism consists of a parallelogram linkage with compressible buffers, a hydraulic plunge cylinder and nitrogen accumulator through which the different boom yaw movements are transferred and absorbed.

## 6 - Maintenance

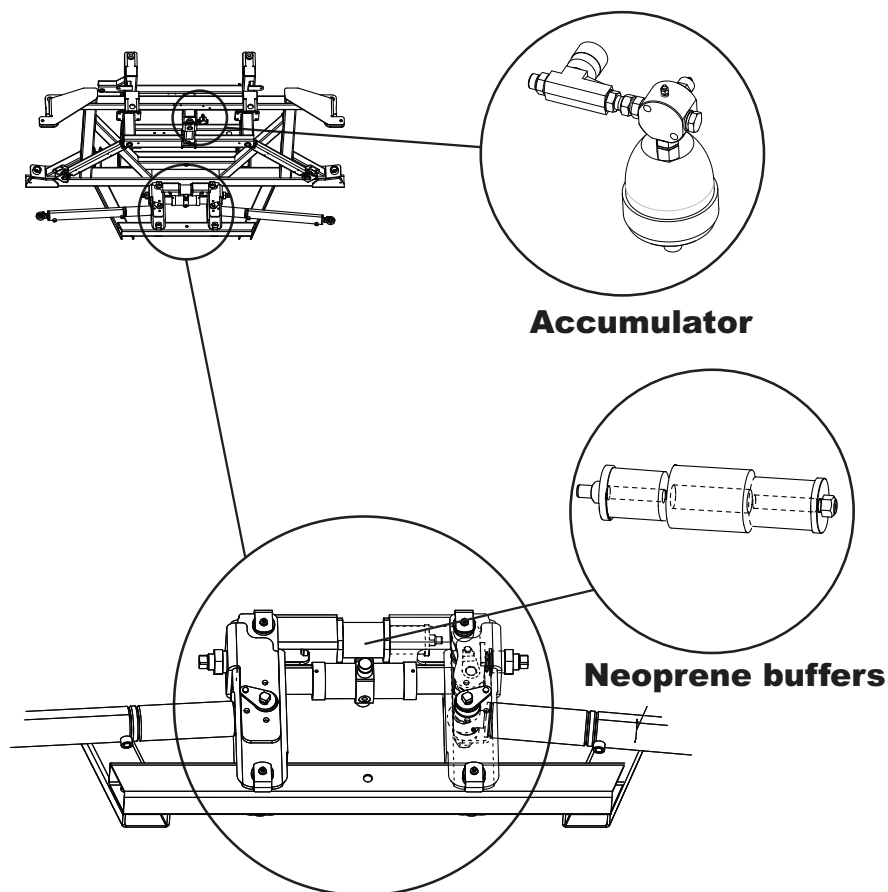
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There are 3 compressible polyurethane buffers which absorb and dampen the braking and acceleration yaw forces. The double acting hydraulic plunge cylinder coupled to a nitrogen accumulator absorbs and dampen steering, cornering, tractor trailer oscillation yaw movement.



### WARNING!

- Incorrectly adjusted or set up auto steering systems, faulty or worn steering linkage can cause excessive yaw movement which can damage the boom.

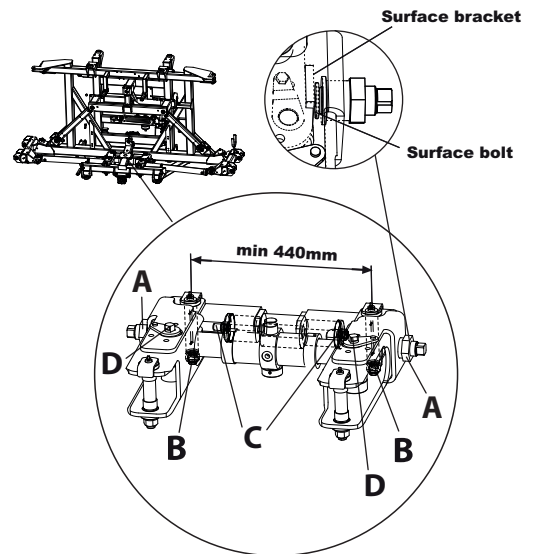


### To maintain and correctly adjust the Yaw system

There are a number of wearing elements in the Yaw system that should be monitored to ensure a long and satisfactory life. The 3 polyurethane buffers in the Yaw mechanism can be deformed over time, they must be monitored, adjusted and replaced if worn. If cracks appear replace buffers immediately. Buffer life depends on the use conditions and duty cycle.

To check the polyurethane buffers follow this procedure:

1. Measure the length of the shock link connecting the two parallelogram arms together between nuts (B) and (B). Distance should be 451mm (+/- 2mm).
2. If the shock link shows free movement between the buffers (floating apart or together) then nuts (C) should be adjusted but not over tightened.
3. First loosen lock nut and adjuster screws (A) fully. Then adjust screws (C) to take up the free movement between the neoprene buffers making them snug but not compressing them. If the distance between nuts (B) is less than 440mm then replace the buffers.
4. Screw the adjusters (A) in evenly each side to take up any slack in the yaw mechanism. Do not over tighten! The adjuster screws (A) should only take up the slack between the link connecting the piston and the parallelogram arm.



NOTE!

- Over tightening the adjuster screws will have the tendency to compress the hydraulic damper cylinder while stretching apart the shock link. If this happens the distance between (B) and (B) will be greater than 451mm (or what you set it at) and the shock link will show signs of free movement between the buffers and there will be reduced yaw control and dampening effect.
- 5. Test the yaw movement by pushing the boom wing backwards and forwards. If adjusted correctly you should feel immediate resistance.



NOTE!

- For best performance the oil flow restrictor should be set at 2.5 turn from the closed position.

## 6 - Maintenance

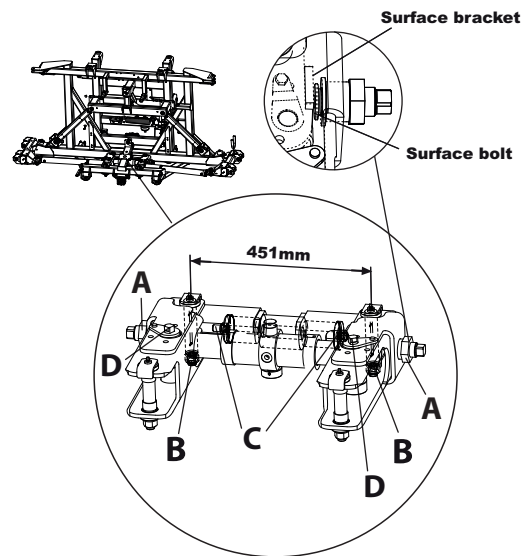
### Replacing polyurethane buffers

If the shock link measurement is below 440mm then replace all 3 neoprene buffers by following this procedure:



#### WARNING!

- The boom wings will be no longer constrained after next step and must be supported on stands.
1. Loosen fully lock nut and screw (A).
  2. Remove nut (B) and remove the pin.
  3. Remove the pins (D) that holds the wing fold cylinder to the parallelogram arms.
  4. Pull apart the parallelogram arms so that the shock link can be removed.
  5. Unscrew bolt (C) and replace all polyurethane buffers.
  6. Adjust screws (C) to take up the free movement between the neoprene buffers making sure they are snug but not compressed. Distance between pin hole centres of nuts (B) and (B) should be 451mm (+/- 2mm).
  7. Replace the shock link, refit pins and tighten nuts (B).
  8. Screw the adjusters (A) in evenly each side to take up any slack in the yaw mechanism. Do not over tighten! The adjuster screws (A) should only take up the slack between the link connecting the piston and the parallelogram arm.
  9. Test the yaw movement by pushing the boom wing backwards and forwards. If adjusted correctly you should feel immediate resistance.



#### NOTE!

- For best performance the oil flow restrictor should be set at 2.5 turn from the closed position.

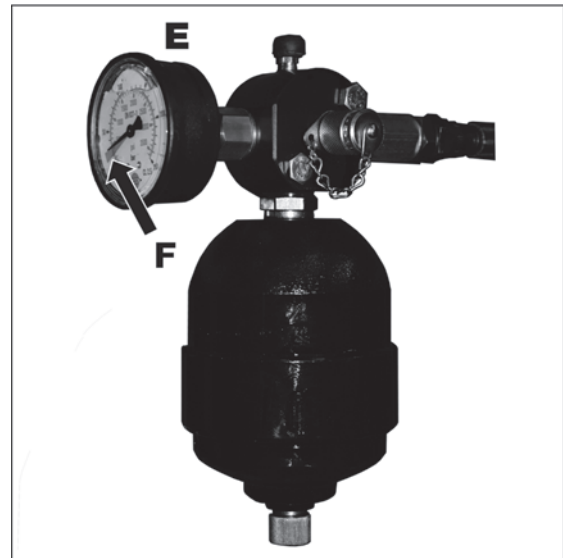
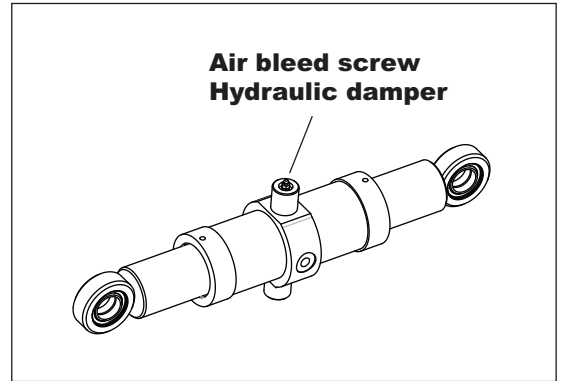
### Inspection and Service of plunge cylinder and accumulator

The Hydraulic plunge cylinder, hydraulic circuit and nitrogen accumulator is a closed system. The nitrogen accumulator must be correctly charged to 25 bar and the hydraulic circuit bleed of all air and the circuit pressure pre-charged to 30 bar. It is important to inspect the system for loss of oil from any of the hydraulic fittings, seals, hose or the plunge cylinder. A pressure drop in the system can be seen on the hydraulic circuit pressure gauge fitted to the sprayer.



**WARNING!** If there is a loss of oil pressure in the circuit, stop spraying! and follow this procedure.

1. Replace failed component, fittings and seals.
2. Then fully open flow restrictor anti clockwise.
3. Loosen fully lock nut and screws (A). See "Replacing polyurethane buffers" on page 100.
4. Connect the special hydraulic oil charge line into the pressure test port.
5. Undo air bleed screw on top of hydraulic dampening cylinder.
6. Push RH side wing fully forward to collapse hydraulic dampening cylinder and hold boom in position, close the air bleed screw and pump oil into charge line. The RH wing will now move back to fully open position.
7. Undo air bleed screw on top of hydraulic dampening cylinder again.
8. This time push the LH side wing fully forward to collapse hydraulic dampening cylinder and hold boom in position, close the air bleed screw and pump oil into charge line. The LH wing will now move back to fully open position.
9. Now check and bleed air from the accumulator block.
10. Undo air bleed screw on the accumulator block and pressurise the circuit slightly to ensure system is free of air then close the air bleed screw.
11. Now pressurise the hydraulic circuit to 30 bar.
12. Move the boom wing backward and forwards a few times then crack the bleed screw one more time to see if there is any air in the circuit. Close the air bleed screw and pressurise the hydraulic circuit to 30 bar once again. The circuit is now bled.
13. Screw the adjusters in evenly each side to take up any slack in the yaw mechanism. Do not over tighten! The adjuster screws (A) should only take up the slack between the link connecting the piston and the parallelogram arm. See "Replacing polyurethane buffers" on page 100.
14. Test the yaw movement by pushing the boom wing backwards and forwards. If adjusted correctly you should feel immediate resistance.
15. Adjust the flow restrictor. Factory default is fully close (turn clockwise) and then open 2 ½ turns.
16. Clean all oil residue away and ensure system is free of leak



**WARNING!**

- If Nitrogen charge pressure is lost, system will not function correctly and you must stop spraying!
- **WARNING!** Charge pressure verification and refill adjustment or diaphragm replacement must only be carried out by a competent HARDI dealer with correct nitrogen charging and handling equipment.
- **WARNING!** Too low oil pressure in the yaw circuit, incorrect adjustment of the yaw movement and a lack of maintenance will put undue stress on the yaw parallelogram mechanism, the accumulator, yaw cylinder, fold cylinders and the boom wings.
- Pressure must be maintained at 30 bar (25 bar min – to 35 bar max). A yaw circuit pressure gauge will show the yaw circuit pressure.

## 6 - Maintenance

### DynamicCentre cable adjustment Trapeze centre

The DynamicCentre stability can be changed on-the-run to alter the booms reaction to the trailers movement over variable ground conditions or when tilting wings often. Settings 1 (free movement) to setting 5 (more resistance) changes the behaviour of the boom.

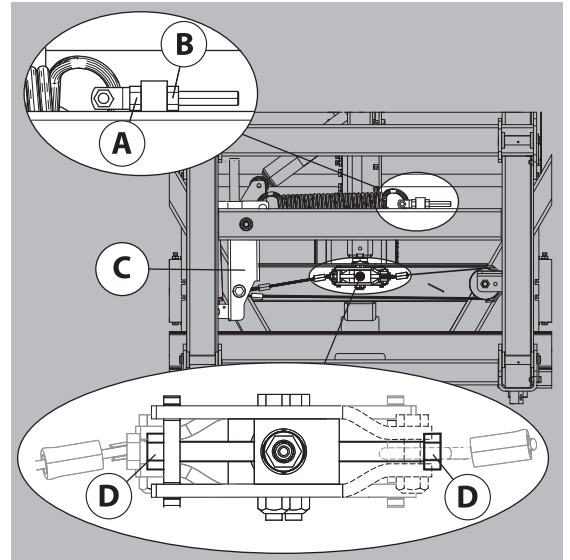


#### WARNING!

- Before any work is performed on the boom the sprayer must be on a level ground, boom opened, centre and wings fully supported on suitable stands.

Maintain the cable and spring tension adjustment to ensure correct performance of the DynamicCentre

1. Loosen counter-nut (A) and slacken the spring by undoing nut (B).
2. Position Lever (C) with cylinder fully retracted into an approximate vertical position.
3. Tighten the spring with nut (B) as slackened in 1 above however do not over tension it.
4. Adjust bots (D) to tighten the two cables as evenly as possible.
5. Retighten counter nut (A)
6. The system is now set.



#### NOTE!

- It is however possible to have a more aggressive roll dampening effect by increasing the spring tension. It is only permissible to shorten this spring setting by a further 20mm or damage and or advanced wear to the cables will result.

### Wing tilt adjustment

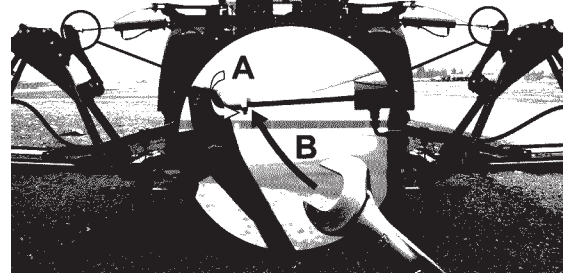
Wing tilt is used to manually tilt boom wings up and over things or to mirror the terrain being sprayed. Adjustment of the wing tilt cylinders is carried out to maintain the alignment of the left and right wing sections.



NOTE! This adjustment is different for sprayers with DynamicCentre and AutoTerrain.

The horizontal adjustment of the wings is done by the tilt cylinder. The boom must be unfolded and tilted completely down to horizontal position. If necessary, adjust the wing as follows:

1. Support the boom on jack stands to relieve the load from the hydraulic cylinder.
2. Loosen grub screw (A).
3. With a 27-spanner on key profile (B) at end of the ram, adjust the cylinder ram to get the desired wing level.
4. Tighten the grub screw (A) again.
5. Repeat steps for the other side.



### Wing Tilt AutoTerrain with pendulum

The tilt is controlled with two single acting hydraulic cylinders connecting directly to the wing (no suspension). The wings when opened will go below horizontal for AutoTerrain.

The AutoTerrain stability and auto height control when programmed correctly will maintain the centre and boom wings at the predetermined and calibrated spray distance from the target.



WARNING! If AutoTerrain is turned off the boom wings can go below horizontal. The boom should not be operated with AutoTerrain turned off otherwise the boom will be at risk of damage.

The horizontal adjustment of the wings is done by the tilt cylinder. The boom must be unfolded and tilted completely down to horizontal position or below horizontal in the case of AutoTerrain. If necessary, adjust the wing as follows:

1. Support the boom on jack stands to relieve the load from the hydraulic cylinder.
2. Loosen grub screw (A).
3. With a 27-spanner on key profile (B) at end of the ram, adjust the cylinder ram to get the desired wing level.
4. Tighten the grub screw (A) again.
5. Repeat steps for the other side.

### Wing tilt DynamicCentre with trapeze and wing suspension

The tilt is controlled with two single acting hydraulic cylinders connecting the wing through a linkage arm and damper element that gives each wing vertical suspension. For ease of operation the wing is set to horizontal when unfolded.



Warning! In the event the boom is tilted upward by an external force the tilt cylinder piston free floats along the piston rod. This is to alleviate the opposing hydraulic forces. Be aware that this is normal and there is nothing wrong with the cylinder.

The suspension element is a replaceable part.

## 6 - Maintenance

### Vertical alignment of boom between first outer, second outer, third outer & breakaway sections



NOTE!

- This is a basic adjustment of the boom. This is only to be carried out if an adjustment of the transport brackets is insufficient.

Procedure is:

1. Loosen the lock nuts (A) and (C).
2. Adjust the nuts at (B) and (D) until the boom sections align.



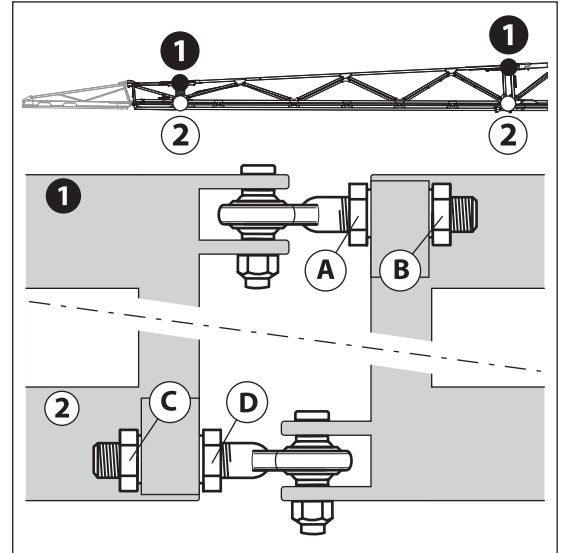
ATTENTION!

- The upper edges of the boom sections must align so the hydraulic lock will engage when folded.



NOTE! It is important that the adjustments are done simultaneously and equally on nuts (B) and (D).

3. Tighten the lock nuts (A) and (C) again.
4. Do the "Horizontal alignment of boom between inner, intermediate and short outer sections" on page 32.



ATTENTION!

- Illustration shows left boom wing.
5. Fold the boom to see if it hits and rests correctly in the transport brackets or locks.
  6. If necessary to readjust, unfold the boom and loosen the nuts (A) and (C) again.
  7. Adjust the nuts at (B) and (D) simultaneously and equally until the boom rests correctly in the lock bracket.



ATTENTION!

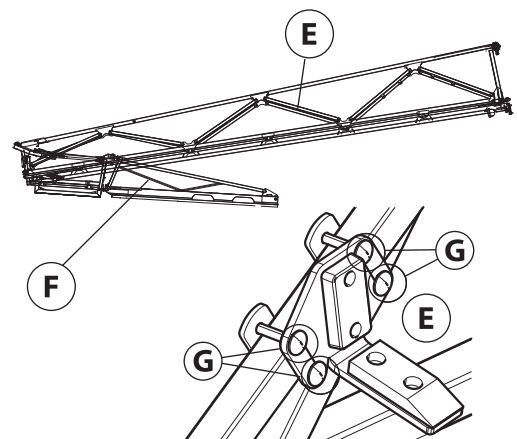
- The upper bolt adjusts only half of the travel, while the lower bolt adjusts the other half.

8. Tighten the lock nuts (A) and (C) to 300-500 Nm.

When folded, check if the boom rests correctly at the transport pads between second outer section (E) and third outer section (F).

If adjustment is necessary:

1. Loosen the four bolts (G) holding the bracket.
2. Reposition the bracket.
3. Tighten the four bolts (G) again.





### Wing sections lock mechanisms and horizontal alignment of first & second outer and second & third outer/breakaway

Wing-lock mechanisms are those positioned at the first & second and the second & third outer wing fold hinge points. They lock the wing sections together in the open position minimising movement between them during operation. They are spring applied and hydraulically released. Any misalignment between the spigot and lock plate will prevent locks from engaging and allow the wing sections to move uncontrolled. Monitor the spigot and lock plate for any sign of burring which would indicate misalignment and adjusting as required.

Boom must be unfolded and the hydraulic lock locked.

Procedure is:

1. Loosen lock nut (A).
2. Adjust the lock bolt (B) until the boom sections align.

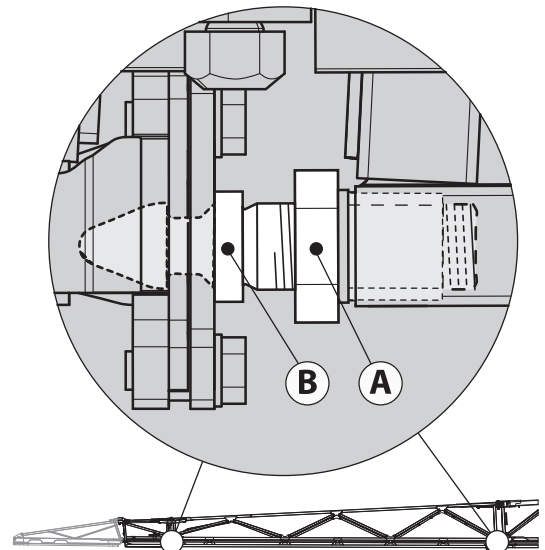


**NOTE!** The lock bolt (B) is exccentric. Therefore it is important to check that it centres on the hole in the lock mechanism while adjusting.

3. Tighten the lock nut (A) again.



**WARNING!** The boom must not be operated without the wing locks correctly engaged otherwise wing sections will be free to flounder, breakaway or whip around and damage the boom. Wing locks must be monitored observing burred steel on the nose of the spigot and lock plate for any misalignment and adjusted as required.



### Transport wing fold lock adjustment

The fold lock mechanism positioned on the top cord of the first outer wing sections is designed to retain and lock the second outer wing section during transport. The lock is spring applied and hydraulically released. Any misalignment will prevent the lock mechanism engagement and allow the boom to flounder in transport. If there has been any boom damage the lock mechanism may need to be realigned.

The "Vertical alignment of boom between first, second and third outer sections" on page 25 must be done prior to this adjustment.

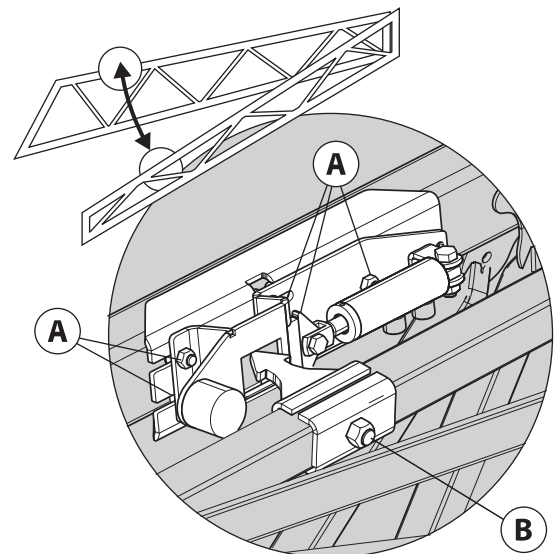
The fold lock adjustment is divided into two parts: Vertical and horizontal adjustment:

#### Horizontal adjustment

1. Loosen the five bolts (A) on the fold lock bracket.
2. Reposition the fold lock until the hook is aligning to the centre of the fold lock hole.
3. Tighten the five bolts (A) on the fold lock bracket.

#### Vertical adjustment

1. Loosen the bolt (B).
2. Turn the hook upside down if needed for better fit.
3. Tighten the hook bolt (B) again.

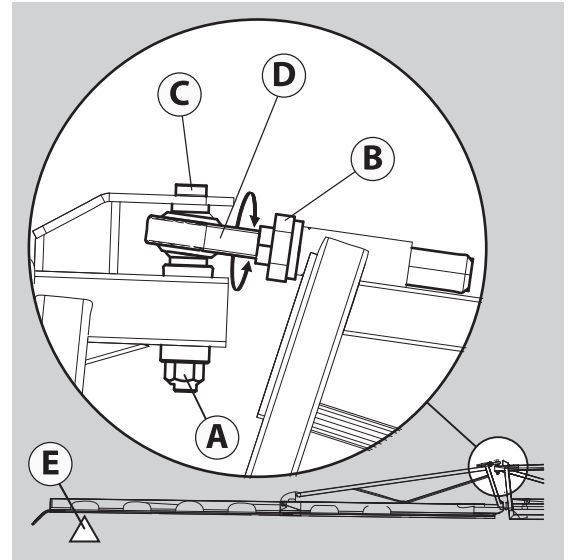


**WARNING!** Any misalignment of the wing sections will prevent the lock mechanism from engaging and will allow the boom to flounder during transport which may damage the boom.

## 6 - Maintenance

### Vertical alignment of breakaway sections

1. Support the breakaway section with a jack stand (E).
2. Loosen lock nut (B).
3. Remove nut (A).
4. Take out bolt (C).
5. Turn eye rod (D) to adjust the section.
6. Refit the bolt (C).
7. Remove the jack stand to see if the sections align.
8. If not, support the breakaway with the jack stand (E) again and repeat point 4-7 until the sections align.
9. Tighten nut (A).
10. Tighten the lock nut (B)

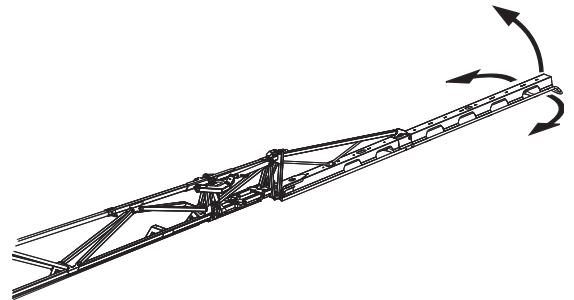


### Breakaway section adjustment

The breakaway is part of the third outer section of the boom and is designed to breakaway in the event you make contact with something for example a fence. The breakaway is held in position under spring tension and if forced is designed to breakaway in three planes as illustrated.



**WARNING!** If the breakaway hits hard enough it may be damaged beyond repair.



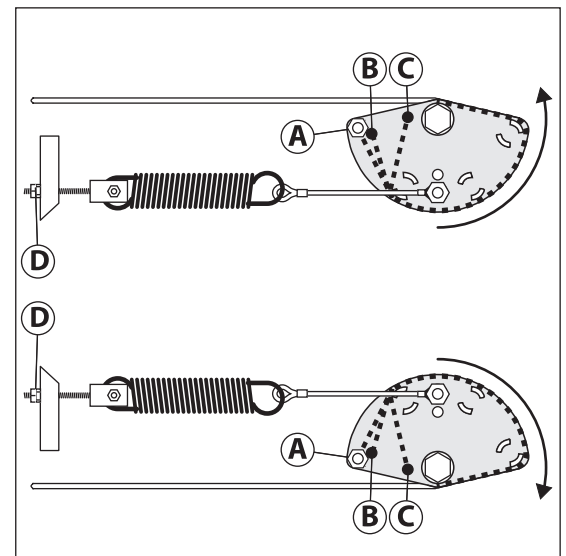
The progressive breakaway function is adjusted by altering the spring attachment point on the progressive mechanism.

The turning “half circle” part should be in a rest position as in the picture. If out of adjustment, the “half circle” part is turned more or less as in the picture and needs adjustment:

1. Loosen the nut (D) on the fork bolt to slacken the spring.
2. Remove the bolt (A) on the turning progressive mechanism that holds the breakaway wire.
3. Reposition the bolt into hole (B) or (C) to adjust the “half circle” rest position.
4. Tighten the nut (D) on the fork bolt until a suitable spring load is achieved.



**ATTENTION!** Observe the amount of spring load required when driving with the sprayer. If the breakaway sections release too much, the spring load must be increased.



### ParaLift Lock

The boom is mechanically held in transport position with paralift lock mechanisms that automatically engage when the first outer is closing. The folded channel-section locks are fixed to the top paralift arm and engage directly on the top of the paralift cylinders when lowered for transport. This means the boom is not supported by hydraulic oil pressure when in transport.



**WARNING!** when the sprayer is being transported along rough road and is bounced over potholes, in extreme cases there is a risk that the lock arms can disengage. Paralift locks should be checked before and after transport to ensure positive lock engagement.

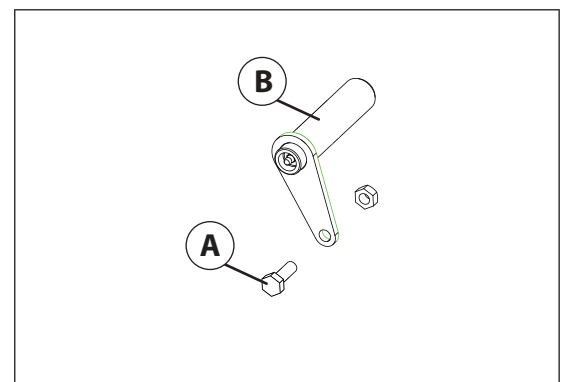
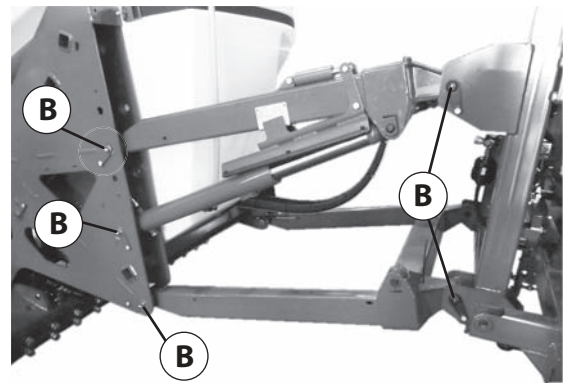


### ParaLift wear bush renewal

The ParaLift is used to raise and lower the boom height to suit the terrain however with AutoTerrain small adjustments are being made continuously. Greasing the ParaLift pivot points on a regular basis will prolong the life of the wear bushes.

Inspect and replace the wear bushes before they are worn through.

1. Connect the trailer to a tractor and unfold the booms to working position.
2. Lift the boom centre frame with a lifting device and support it until the load is taken off the parallelogram arms.
3. Remove the bolts (A), pull out the pins (B) at one of the upper parallelogram arms and replace the wear bushes.
4. Refit the arm.
5. Repeat this on the other upper arm.
6. The lower arms must be disconnected simultaneously.
7. Grease all grease nipples.
8. Remove the lifting gear again.



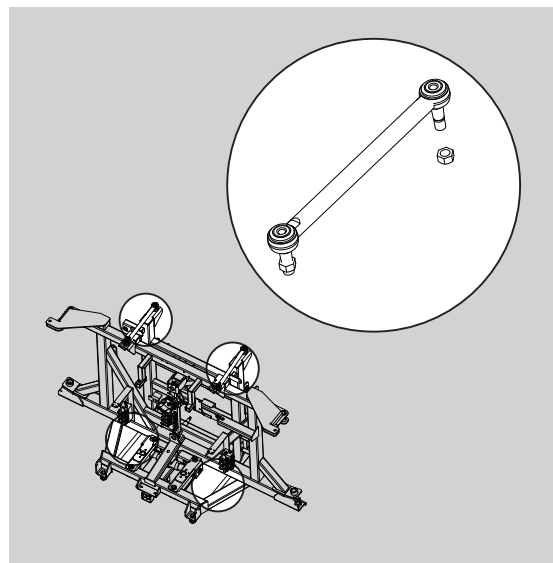
## 6 - Maintenance

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### Horizontal Parallelogram Arms

These link arms act on the boom centre as a form of suspension. The arms have no adjustment however they are fitted with a high quality ball end that has a tapered shaft locked into each side of the boom centre. It is important that these tapered shafts remain tight in their respective housing. The bolts should be done up at 160 Nm.

Inspect often to ensure bolts remain tight in housing.



## Error messages

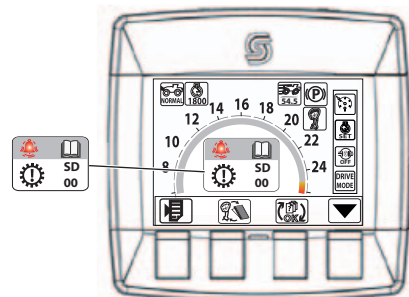
### Cabin error codes

The messages below will be displayed when a fault appears on the system of the cab's air conditioning

#### List of error codes

ERROR #	Description	Fault operation
01	High pressure switch - Wiring or cycling (2 in 1 minute)	Heat mode - compressor clutch disabled
02	Low pressure switch - Wiring or open for 1 minute	Heat mode - compressor clutch disabled only while low pressure switch is open
03	Blower speed select pot open\$/shorted to power	Auto blower speed
04	temperature select pot open /shorted to power	72°F Setpoint
05	Recirc. pot open/shorted to power	Not used on combine
06	Mode select pot open/shorted to power	Not used on combine
07	Cab temp sensor wiring - open, short, ground, power	Manual mode - compressor clutch disabled
08	Evap temp sensor wiring - open, short, ground, power	Heat mode - compressor clutch disabled
09	Outlet tmp sensor wiring - open, short, ground, power	Doesn't limit blower speed on startup
10	Outside temp sensor wiring - open, short, ground, power	Not used on combine
12	Cab pressure sensor wiring	Not currently implemented
14	Clutch output fault (overcurrent, short to ground)	Not currently implemented
15	Defog light output fault (overcurrent, short to ground)	Not currently implemented
15	Defog light output fault (overcurrent, short to ground)	Not currently implemented
19	No data from control module	Depends on cause of problem

### Transmission error codes



Error codes	Description	Error codes	Description
001	Low battery voltage	070	Loop error
002	Low battery voltage	071	PWM2 current loop error
003	12V sensor low supply voltage	074	Loop error pump 1
004	12V sensor high supply voltage	080	Brake pressure sensor signal out of range
005	5V sensor low supply voltage	083	CAN bus communication error: signal not received
006	5V sensor high supply voltage	084	High pressure sensor signal out of range
007	Stack overflow	092	Joystick sensor error
008	E2prom memory error	097	Analogue mode selector sensor error
009	FLASH memory error	100	Joystick limitation control error
010	RS232 memory error	200	Offroad SD: high battery voltage
011	CAN bus connection error	201	Offroad SD: low battery voltage
012	Current return protection	202	Offroad SD: 12V supply voltage sensor out of range
020 to 045	Internal system error		
051	MAF loading error		
052	Inconsistent key		
053	Inconsistent MAF		
054	Inconsistent input/output		
055	Error in sensitive parameter		
056	SDPHASE code error		
057	Checksum error		
058	Min/Max error in parameter		

## 7 - Fault finding

### CUMMINS engine error codes

SPN	Component / Location	Description (Error location)	FMI
29	Hand throttle	Cable break or short circuit, signal implausible compared to signal of idle sensor	2, 3, 4, 11
84	Vehicle speed signal	Speed above target range, signal missing or implausible	0, 8, 12, 14
91	Accelerator pedal	Cable break or short circuit, signal implausible compared to signal of idle sensor (analog pedal)	2, 3, 4, 11
91	Accelerator pedal	Cable break or short circuit, bad PWM signal range or frequency (digital pedal)	2, 8
91	Accelerator pedal	Bad PWM pulse-width repetition rate (digital pedal)	8, 11
94	Fuel low pressure sensor	Cable break or short circuit	3, 4, 11
94	Fuel low pressure	Below target range with system reaction	2, 11
97	Fuel filter water level sensor	Cable break or short circuit	3, 4, 11
97	Water level in fuel filter	Above target range	11, 12
100	Oil pressure sensor	Cable break or short circuit	0, 2, 3, 4
100	Oil pressure sensor	Pressure value implausible low	1, 11
100	Oil pressure	Above target range	0, 11
100	Oil pressure	Below target range	1, 11
102	Charge air pressure sensor	Cable break or short circuit	2, 3, 4
102	Charge air pressure	Outside target range with system reaction	2, 11
105	Charge air temperature sensor	Cable break or short circuit	2, 3, 4, 11
105	Charge air temperature	Outside target range with system reaction	0, 11
107	Air filter condition	Pressure loss above target range with system reaction	0, 11
108	ECU internal error	Ambient pressure sensor defective	2, 3, 4, 11
110	Coolant temperature sensor	Cable break or short circuit	2, 3, 4
110	Coolant temperature	Outside target range with system reaction	0, 11
111	Coolant Level	Outside target range with system reaction	1, 11
157	Rail pressure sensor	Cable break or short circuit	3, 4, 11
157	Rail pressure sensor	Deviation of signal during start or after-run above target range	0, 1, 11
158	Terminal 15	Ignition ON not detected	11, 12
168	Battery	Voltage below target range	0, 1, 11
168	Battery voltage	Above target range with system reaction	2, 11
174	Fuel temperature sensor	Fuel temp. sensor: Cable break or short circuit	3, 4, 11
174	Fuel temperature	Above target range with system reaction	0, 11
175	Oil temperature sensor	Cable break or short circuit	2, 3, 4
175	Oil temperature	Below target range with system reaction	0, 11
190	Engine speed sensor	Engine running with cam-shaft speed signal only	11, 12
190	Engine speed sensor	Speed signal from cam-shaft bad or missing	8, 11, 12
190	Engine speed sensor	Speed signals from crank-shaft bad or missing	8, 11, 12
190	Engine speed sensor	Speed signals of crank-shaft and cam-shaft are phase-shifted	2, 11
190	Overspeed	Engine overspeed with system reaction	0, 11
190	Overrun conditions	Overrun conditions with system reaction	11, 14
520	CAN message	Missing (message "TSC1-TR")	11, 12
563	Main relay	Short circuit to ground or emergency shut-off (relay 3)	7, 11, 12
624	Diagnostic lamp	Cable break or short circuit, disabled by ECU	2, 3, 4, 5
630	ECU internal error	EEPROM memory access	11, 12
639	CAN bus off-state	Cable break or short circuit, off-state (CAN bus A)	11, 14

SPN	Component / Location	Description (Error location)	FMI
651	Single injector	Short circuit (injector 1)	3, 4, 11, 13
651	Single injector	Cable break (injector 1)	5, 13
652	Single injector	Short circuit (injector 2)	3, 4, 11, 13
652	Single injector	Cable break (injector 2)	5, 13
653	Single injector	Short circuit (injector 3)	3, 4, 11, 13
653	Single injector	Cable break (injector 3)	5, 13
654	Single injector	Short circuit (injector 4)	3, 4, 11, 13
654	Single injector	Cable break (injector 4)	5, 13
655	Single injector	Short circuit (injector 5)	3, 4, 11, 13
655	Single injector	Cable break (injector 5)	5, 13
656	Single injector	Short circuit (injector 6)	3, 4, 11, 13
656	Single injector	Cable break (injector 6)	5, 13
657	Single injector	Short circuit (injector 7)	3, 4, 11, 13
657	Single injector	Cable break (injector 7)	5, 13
658	Single injector	Short circuit (injector 8)	3, 4, 11, 13
658	Single injector	Cable break (injector 8)	5, 13
676	Air heater relay	Cable break or wrong connection	4, 11
676	Air heater relay	Inoperable during shut-off	2, 5, 11
677	Start relay	Start relay (high side): Short circuit	3, 4, 11
677	Start relay	Start relay (low side): Cable break or short circuit, disabled by ECU	3, 4, 5, 11
701	Reserve output	Short circuit to Ubatt (output 1)	11
701	Reserve output	Short circuit to ground (output 1)	11
701	Reserve output	Cable break or ECU internal error (output 1)	11
702	Reserve output	Short circuit to Ubatt (output 2)	11
702	Reserve output	Short circuit to ground (output 2)	11
702	Reserve output	Cable break or ECU internal error (output 2)	11
703	Engine operating signal lamp	Cable break or ECU internal error	2, 3, 4, 5
704	Coolant temperature warning lamp	Cable break or short circuit	11
705	Oil pressure warning lamp	Cable break or short circuit	2, 3, 4, 5
729	Air heater relay	Cable break or short circuit	3, 4, 5, 11
730	Air heater magnetic valve	Cable break or short circuit	3, 4, 5, 11
898	CAN message	Missing (message "TSC1-TE")	11, 12
923	Engine power output	Engine power output: Cable break or short circuit	2, 3, 4, 5
975	Fan actuator	Fan actuator: Cable break or short circuit	2, 3, 4, 5
1072	Engine brake (internal)	Internal engine brake: Cable break or short circuit	3, 4, 5, 11
1074	Engine brake flap actuator	Engine brake flap actuator: Cable break or short circuit	3, 4, 5, 11
1079	ECU internal error	Wrong voltage of internal 5V reference source 1	3, 4, 11
1080	ECU internal error	Wrong voltage of internal 5V reference source 2	3, 4, 11
1081	Preheating signal lamp	Cable break or short circuit	2, 3, 4, 5
1109	Shut-off request	Shut-off request ignored by operator	2, 11
1231	CAN bus off-state	Cable break or short circuit, off-state (CAN bus B)	11, 14
1235	CAN bus off-state	Cable break or short circuit, off-state (CAN bus C)	11, 14
1237	Override switch	Switch hangs	2, 11

## 7 - Fault finding

SPN	Component / Location	Description (Error location)	FMI
1322	Multiple cylinders	Misfire detected	11, 12
1323	Single cylinder	Misfire detected (cylinder 1)	11, 12
1324	Single cylinder	Misfire detected (cylinder 2)	11, 12
1325	Single cylinder	Misfire detected (cylinder 3)	11, 12
1326	Single cylinder	Misfire detected (cylinder 4)	11, 12
1327	Single cylinder	Misfire detected (cylinder 5)	11, 12
1328	Single cylinder	Misfire detected (cylinder 6)	11, 12
1346	Misfire	Misfire detected with system reaction	0, 11
1450	Single cylinder	Misfire detected (cylinder 7)	11, 12
1451	Single cylinder	Misfire detected (cylinder 8)	11, 12
1638	Customer-specific sensor	Cable break or short circuit (sensor 2)	3, 4, 11, 12
1638	Customer-specific temperature	Outside target range with system reaction (temperature 2)	2, 11
2634	Main relay	Short circuit to Ubatt (relay 1)	3, 11
2634	Main relay	Short circuit to ground (relay 1)	4, 11
2634	Main relay	Short circuit to ground or emergency shut-off (relay 2)	7, 11, 12
2634	Main relay	Short circuit to ground or emergency shut-off (relay 3)	7, 11, 12
2791	EGR actuator (external)	Short circuit to Ubatt	3, 11
2791	EGR actuator (external)	Short circuit to ground	4, 11
2791	EGR actuator (external)	Cable break or ECU internal error	2, 5, 11
2791	EGR actuator (external)	Cable break or short circuit	2, 3, 4, 5
523212	CAN message	Missing (message "EngPrt" = engine protection)	11, 12
523216	CAN message	Missing (message "PrHtEnCmd" = Preheat and engine command)	11, 12
523218	CAN message	Missing (message "RxCCVS" = cruise control)	11, 12
523222	CAN message	Missing (message "TCO1" = speedo signal)	11, 12
523238	CAN message	Missing (message "SwtOut" = switch outputs)	11, 12
523239	CAN message	Missing or value abote target range (message "DecV1" = pseudo pedal)	2, 12
523240	CAN message	Missing (message "FunModCtl" = function mode control)	11, 12
523350	Multiple injectors	Short circuit (cylinder bank 1)	3, 4, 11, 13
523351	Multiple injectors	Cable break (cylinder bank 1)	5, 13
523352	Multiple injectors	Short circuit (cylinder bank 2)	3, 4, 11, 13
523353	Multiple injectors	Cable break (cylinder bank 2)	5, 13
523354	ECU internal error	Injector power stage A	2, 3, 12, 14
523355	ECU internal error	Injector power stage B	12
523370	Rail pressure	Compression test active: Rail-pressure monitoring is going to be disabled	11, 14
523420	ECU internal error	Watchdog counter exceeds maximum	11, 14
523450	Multi state switch	Cable break or short circuit, input voltage outside target range (switch 1)	2, 3, 4, 11
523451	Multi state switch	Cable break or short circuit, input voltage outside target range (switch 2)	2, 3, 4, 11
523452	Multi state switch	Cable break or short circuit, input voltage outside target range (switch 3)	2, 3, 4, 11
523470	Rail pressure limiting valve	Opening failure	2, 11, 12, 14
523470	Rail pressure limiting valve	Opening failure with system reaction	11, 12
523490	ECU internal error	Redundant shut-off conditions detected	3, 4, 11, 12
523500	CAN message	Time-out of at least one send message	11, 12

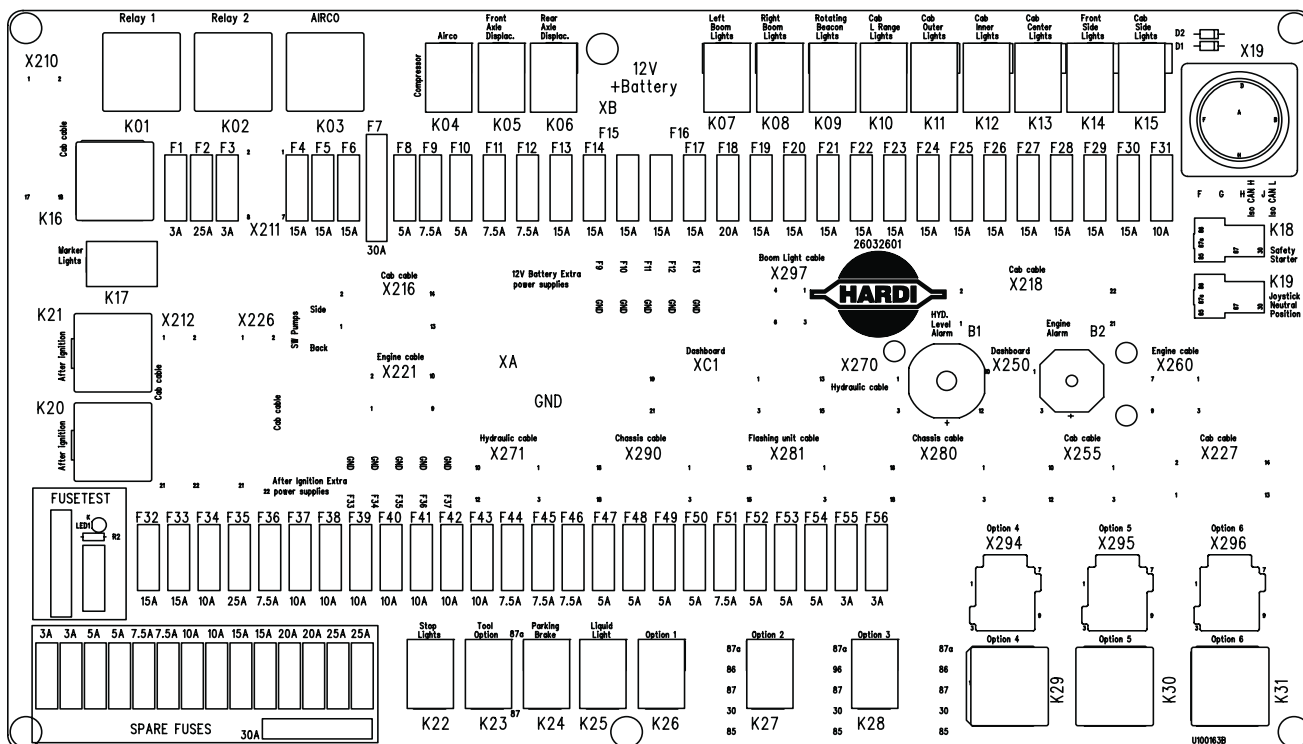


SPN	Component / Location	Description (Error location)	FMI
523550	Terminal 50	Engine start switch hangs	11, 12
523550	ECU internal error	Time processing unit (TPU) defective	2, 11
523561	Begin of injection period	Outside target range or missing (cylinder 1)	2
523562	Begin of injection period	Outside target range or missing (cylinder 2)	2
523563	Begin of injection period	Outside target range or missing (cylinder 3)	2
523564	Begin of injection period	Outside target range or missing (cylinder 4)	2
523565	Begin of injection period	Outside target range or missing (cylinder 5)	2
523566	Begin of injection period	Outside target range or missing (cylinder 6)	2
523567	Begin of injection period	Outside target range or missing (cylinder 7)	2
523568	Begin of injection period	Outside target range or missing (cylinder 8)	2
523600	ECU internal error	Serial communication interface defective	11, 12
523601	ECU internal error	Wrong voltage of internal 5V reference source 3	3, 4, 11
523602	Fan speed	Above target range with system reaction	2, 11
523604	CAN message	Missing (message "RxEngTemp" = engine temperature)	11, 12
523605	CAN message	Missing (message "TSC1-AE")	11, 12
523606	CAN message	Missing (message "TSC1-AR")	11, 12
523607	CAN message	Missing (message "TSC1-DE")	11, 12
523608	CAN message	Missing (message "TSC1-DR")	11, 12
523609	CAN message	Missing (message "TSC1-PE")	11, 12
523610	CAN message	Missing (message "TSC1-VE")	11, 12
523611	CAN message	Missing (message "TSC1-VR")	11, 12
523612	ECU internal hardware monitoring	A recovery occurred which is stored as protected	11, 14
523612	ECU internal hardware monitoring	A recovery occurred which is not stored	11, 14
523612	ECU internal hardware monitoring	A recovery occurred which is visible in the error memory	11, 14
523612	ECU internal hardware monitoring	Overvoltage	3, 11
523612	ECU internal hardware monitoring	Undervoltage	4, 11
523613	Rail pressure	Positive deviation (speed dependent) outside target range	0, 11
523613	Rail pressure	Positive deviation (flow dependent) outside target range (=> Leakage!)	0, 11
523613	Rail pressure	Negative deviation (flow dependent) outside target range	0, 11
523613	Rail pressure	Negative deviation (speed dependent) outside target range	1, 11
523613	Rail pressure	Pressure above target range	0, 11
523613	Rail pressure	Implausible (leakage, injector needle blocked in open position)	2, 11
523615	Metering unit valve	Flow rate outside target range	3, 4, 11
523615	Metering unit valve	Not connected or output disabled	5, 11, 12
523615	Metering unit valve	Short circuit to Ubatt	11, 12
523615	Metering unit valve	Short circuit to ground	11, 12
523617	ECU internal error	Communication with chip CJ940 disturbed	11, 12
-	Customer-specific sensor	Cable break or short circuit (sensor 1)	2, 3, 4, 11
-	Customer specific temperature	Outside target range with system reaction (temperature 1)	2, 11

## 7 - Fault finding

### Electrical incidents

#### Main circuit fuses and relays (U100163B)



U100163B

Code		Description	Code	Amp. (A)	Description
F1	3.0	Outdoor cab light timer	F29	15A 20 A	Cab front inner haloGen lights Cab front inner XENON lights
F2	10 A	side lights/backlighting	F30	15 A	starter contactor
F3	3 A	12 V BAT - ceiling	F31	10 A	starter solenoid
F4	15 A	flasher unit - control	F32	15 A	dipped beam
F5	15 A	not used	F33	15 A	main beam headlights
F6	15 A	not used	F34	10 A	work area lighting (optional)
F7	30 A	12V BAT - air conditionning	F35	15 A	windscreen washer pump - windscreen wipers
F8	5 A	12V BAT - car radio	F36	7.5 A	horn
F9	7.5 A	timer control	F37	10 A	12 V after ignition
F10	5 A	air conditioning compressor	F38	10 A	12 V after ignition - optional
F11	7.5 A	hydraulic ECU	F39	10 A	12 V after ignition - optional
F12	7.5 A	hydraulic ECU	F40	10 A	12 V after ignition - adjustable track width
F13	15 A	12V BATT - optional	F41	10 A	12 V after ignition - OFFROAD controller
F14	15 A	12V BATT - optional	F42	10 A	road- parking
F15	15 A	12V BATT - optional	F43	10 A	stop lights
F16	15 A	12V BATT - optional	F44	7.5 A	12 V after ignition - hydraulic ECU
F17	15 A	12V BATT - optional	F45	7.5 A	permanent 12 V battery - console
F18	20 A	flasher unit	F46	7.5 A	12 V after ignition -hydraulic ECU
F19	15 A	boom ligts 1 and 2 (HC9500 only)	F47	5 A	hydraulic ECU
F20	15 A	boom ligts 3 and 4 (HC9500 only)	F48	5 A	not used
F21	15 A	hazard lights	F49	5 A	brake pressure - display alarms
F22	15 A	cigarette lighter - 12V sockets	F50	5 A	hydraulic oil level alarm
F23	15 A	seat compressor unit	F51	7.5 A	12 V after ignition - engine error
F24	15 A 20 A	Cab front outer halogen lights Cab front outer xenon lights	F52	5 A	12 V after ignition -HC9500 console
F25	15.0 A	Right front cab lights	F53	5 A	12 V after ignition - right and left direction indicator
F26	15 A	Cab front center haloen lights	F54	5 A	12 V after ignition - cab switches
F27	15 A	not used	F55	3 A	12 V after ignition - air conditioning and car radio
F28	15 A	Hood working halogen lights	F56	3 A	12 V after ignition - J1939 diagnostic socket



Always use the appropriate fuse listed in the table located in the fuses box.

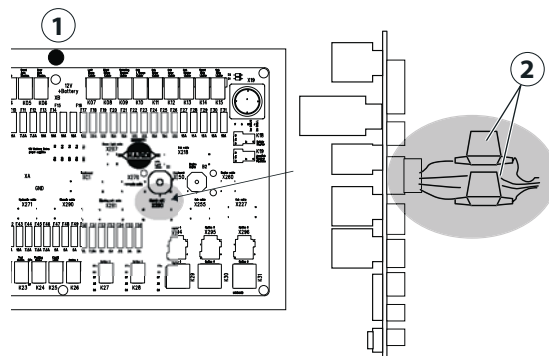
Relays	Description	Relays	Description
K01	not used	K16	not used
K02	not used	K17	backlighting - side lights
K03	air conditioning power	K18	engine starter control
K04	air conditioning compressor	K19	forward handle neutral position
K05	Not used	K20	circuit control after contact
K06	Not used	K21	circuit control after contact
K07	HC9500 only (boom lights 3 and 4)	K22	BRAKE lights
K08	HC9500 only (boom lights 1 and 2)	K23	ROAD mode
K09	hazard lights	K24	parking brake
K10	not used	K25	work area lighting (optional)
K11	right rear cabin lights	K26	not used
K12	left rear cabin lights	K27	not used
K13	not used	K28	not used
K14	front cabin lights		
K15	Front side of the cab lights		

## 7 - Fault finding

### Position Lights Fuse

Two fuses are placed at the rear of the main printed circuit to protect the lighting circuit (position lights).

- Remove the screw (REF.1) and rock the main printed circuit to access the fuses.
- Check and replace the defective fuse (7.5 A).



Spare fuses are available on the main printed circuit.



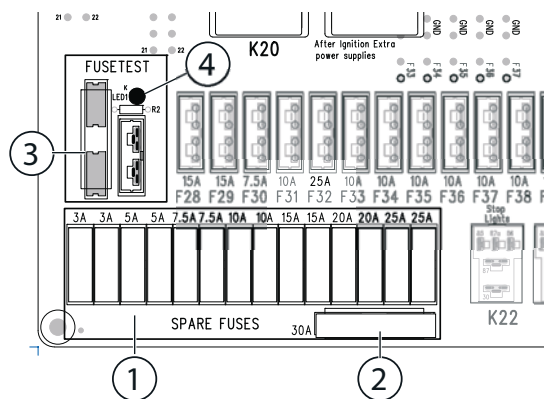
NOTE! Ensure that the replacement fuse has the same capacity as the original fuse.

### Fuse test

The main circuit has "Autofuse" type spare fuses fig.1 and a "Maxifuse" fig.2.

To test a fuse.

- Remove the fuse to be checked and place it in the fuse holder fig.3 according to the model.  
If the indicator fig.4 lights up, this means that the fuse is in good working order. If not, use an "Autofuse" fig.1 or "Maxifuse" fig.2 replacement fuse.



NOTE! Ensure that the replacement fuse has the same capacity as the original fuse.

## Boom Controller fault codes

Below is a table of Alarms, Warnings etc. relevant for TERRA FORCE, which may occur in the Terminal display. See separate instruction book for a full list of fault codes.



NOTE! The ID is the fault identifier, and Pr is alert priority. These are useful for service staff.

ID	Pr	Type	Text at display detail	Criteria for fault Operations disabled	Full screen Help text
118	5	Warning	Pendulum locking failed.	Time-out on sensor signal when attempting to lock. Reset by attempt to lock.	Attempt to move Pendulum lock cylinder did not succeed within the given time frame. Check the hydraulics connections and pressure. Check Pendulum lock position sensor adjustment.
119	6	Warning	Pendulum release failed.	Time-out on sensor signal when attempting to unlock. Reset by attempt to release.	Pendulum is locked unintentionally. The suspension will be damaged. Check the hydraulics connections and pressure. Check Pendulum lock position sensor adjustment.
120	7	Warning	STOP! PENDULUM LOCKED!	Time-out on sensor signal when attempting to unlock and speed exceeds max. speed with locked pendulum. Reset by removal of cause (either unlock succeeded or decrease speed).	Pendulum is locked unintentionally when attempting to spray. The suspension will be damaged. Check the hydraulics connections and pressure. Check Pendulum lock position sensor adjustment.
121	8	Alarm	Pendulum lock sensor.	System setup for TERRA FORCE boom hydraulics. The alarm is generated: <ul style="list-style-type: none"> <li>if the sensor signal is less than 0.5V.</li> <li>Illegal transition.</li> </ul>	No or wrong signal from sensor. Shorted or disconnected. Check Pendulum lock sensor adjustment and/or connection.
140	9	Alarm	Pendulum unlock sensor.	System setup for TERRA FORCE boom hydraulics. The alarm is generated: <ul style="list-style-type: none"> <li>if the sensor signal is less than 0.5V.</li> <li>Illegal transition.</li> </ul>	No or wrong signal from sensor. Shorted or disconnected. Check Pendulum unlock sensor adjustment and/or connection.
131	10	Warning	Boom not in transport.	System setup for TERRA FORCE boom hydraulics. The alarm is generated, if an attempt to bring the boom into transport position failed, or if the user forgot to bring it there.	Place boom in transport position before driving. Check transport lock function. Check boom height sensor.
122	11	Warning	Dynamic Centre sensor.	System setup for TERRA FORCE boom hydraulics. The alarm is generated if the sensor signal is less than 0.2V or exceeds 4.8V. Reset by pressing "enter".	Signal from sensor out of range. Shorted or disconnected. Check Dynamic centre position sensor adjustment and/or connection.
08	15	Alarm	Boom fold sensor failure.	The boom sensor signal is less than 0.5V. The boom sensor changes state, without "Boom fold inner" button is active. Auto and Manual is disabled. Only "Align" function is possible.	Boom fold sensor failure. Automatic and manual tracking is aborted. Only "Align" function is possible.
117	37	Warning	D-centre incorrect position	Time-out on sensor signal. System setup for TERRA FORCE boom hydraulics. Buttons have been activated to move the Dynamic centre. The selected setting has not been reached within 10 seconds. Reset by pressing "enter" or attempt to move Dynamic centre.	Attempt to move Dynamic centre cylinder did not succeed within the given time frame. Check the hydraulics connections and pressure. Check Dynamic centre position sensor.
28	38	Illegal action	Track Boom fold Align sprayer	User starts to fold the boom, and the SafeTrack is not locked. BoomFoldInner is disabled.	Track Boom fold Align sprayer. The alarm is present while the sprayer is not locked, and a "fold inner" button is pressed. No folding takes place.

## 7 - Fault finding

ID	Pr	Type	Text at display detail	Criteria for fault Operations disabled	Full screen Help text
29	39	Illegal action	Track unfold Boom	Alarm for attempt to switch to "Manual" or "Auto" mode in a situation where boom is not detected unfolded.  When the boom is detected unfolded, the trapeze lock is unlocked and the message disappears.  Auto and manual are disabled.	Track unfold Boom  Alarm for attempt to switch to "Manual" or "Auto" mode in a situation where boom is not detected unfolded.  Unfold the boom.  In half steer mode: Risk of bending folded side. Contact service.
103	111	Warning	Fold with unlocked pendulum	When pressing boom fold button with pendulum unlocked.	Fold with unlocked pendulum.
104	112	Warning	Boom wing loose.	Boom fold buttons are not pressed but the 4 sensors on outer boom wings change from "In spray" to "Not in spray" respectively when they change from "In transport" to "Not in transport".	Boom wing loose.
108	116	Alarm	Boom height sensor fault	Alarm is active when 2.2.4.2 Boom height at headlands is enabled  The alarm is generated if the sensor signal is less than 0.2V or exceeds 4.8V.	
112	118	Changed	Flat 1 Level 1 Hilly 5	The information pops up when DynamicCentre adjustment stepwise button has been pushed.	Defines current Dynamic centre setting for the TERRA FORCE boom.  Flat means the boom is free hanging. Hilly means the boom will follow the sprayer movements.
113	119	Changed	Flat 1 Level 2 Hilly 5	The information pops up when DynamicCentre adjustment stepwise button has been pushed.	Defines current Dynamic centre setting for the TERRA FORCE boom.  Flat means the boom is free hanging. Hilly means the boom will follow the sprayer movements.
114	120	Changed	Flat 1 Level 3 Hilly 5	The information pops up when DynamicCentre adjustment stepwise button has been pushed.	Defines current Dynamic centre setting for the TERRA FORCE boom.  Flat means the boom is free hanging. Hilly means the boom will follow the sprayer movements.
115	121	Changed	Flat 1 Level 4 Hilly 5	The information pops up when DynamicCentre adjustment stepwise button has been pushed.	Defines current Dynamic centre setting for the TERRA FORCE boom.  Flat means the boom is free hanging. Hilly means the boom will follow the sprayer movements.
116	122	Changed	Flat 1 Level 5 Hilly 5	The information pops up when DynamicCentre adjustment stepwise button has been pushed.	Defines current Dynamic centre setting for the TERRA FORCE boom.  Flat means the boom is free hanging. Hilly means the boom will follow the sprayer movements.
123	123	Warning	Folding not allowed.	Attempt to fold when speed exceeds max. speed with locked pendulum.  Folding blocked.  Reset when speed is decreased or when fold buttons are released.	It is not allowed to fold or unfold the boom whilst driving. Stop the vehicle.
132	133	Illegal action	One function only!	Appears on TERRA FORCE booms when the user tries to use more than one function at a time.	It is not allowed to use multiple folding buttons/functions simultaneously.

## 7 - Fault finding

ID	Pr	Type	Text at display detail	Criteria for fault Operations disabled	Full screen Help text
133	134	Illegal action	Unfold inner wing.	Appears on TERRA FORCE booms. Wrong folding sequence.	Do not attempt to fold intermediate or breakaway section if inner section is not fully unfolded.
134	135	Illegal action	Keep folding 1 <sup>st</sup> outer wing.	Appears on TERRA FORCE booms. Wrong folding sequence.	Finish the folding of intermediate section (1 <sup>st</sup> outer wing).
135	136	Illegal action	Keep folding 2 <sup>nd</sup> outer wing.	Appears on TERRA FORCE booms. Wrong folding sequence.	Finish the folding of breakaway section (2 <sup>nd</sup> outer wing).
136	137	Warning	Lift the boom.	Appears on TERRA FORCE booms. The position of the boom lift is too low to ensure proper function of the transport lock.	Lift the boom to a higher position.
137	138	Warning	Boom not in transport.	Boom not in transport position before driving.	Check transport lock function. Check boom height sensor.
139	139	Alarm	Dynamic centre sensor.	When dynamic centre function is enabled.	

## 7 - Fault finding

### Hydraulic incidents

#### General information

Before any towing of the machine following a failure in the engine or the hydraulic transmission, it is essential to check the hydraulic motors and the transmission pump.

**i** NOTE! To avoid any risk of damage to the transmission components (pump, motors etc.), the machine should be towed over a short distance and at low speed.

Before moving the machine, you should:

1. Release the hydraulic motor brakes. Voir chapitre ci-dessous "Releasing the hydraulic motor brakes".
2. Release the high pressure valves on the transmission pump. Voir chapitre ci-dessous "Transmission pump high pressure valves".

#### Releasing the hydraulic motor brakes

1. Valve in NORMAL operating mode.
2. Valve in BRAKE RELEASE mode.

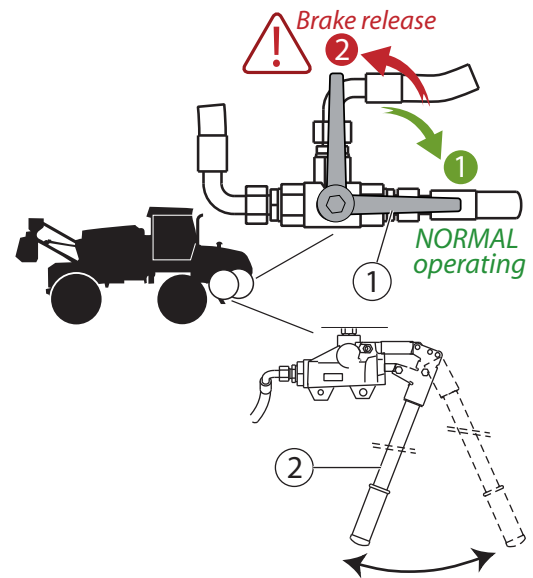
For releasing the brakes of the hydraulic motors, apply the following procedure:

- Turn the handle (1) of the release valve to the position 1
- Place the handle (2) to the hand pump.
- Operate the arm lever pump until the brakes on both motors are fully released.

**i** NOTE! The arm lever pump (2) is placed into the storage box.

**i** NOTE! Do not continue to work the hand pump after the brakes have been fully released. Excessive pressure could damage the motor braking mechanism.

**i** NOTE! An excessive towing distance and a too high speed could damage the motor braking mechanism.



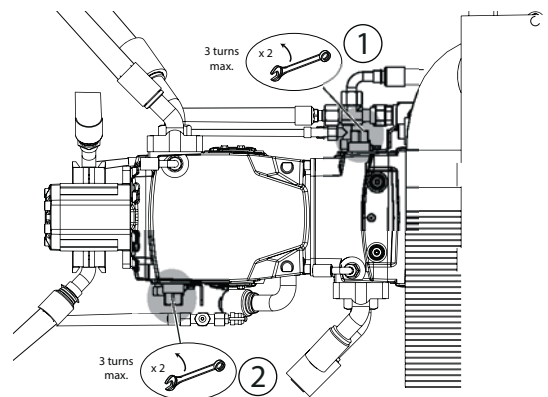
After towing or before starting the machine again, always engage the parking brake by turning the valve handle to vertical position and remove the brake release handle.

#### Transmission pump high pressure valves

This operation consists of releasing the 2 high pressure valves fig.1 located on the transmission pump to allow free circulation of oil in the system when towing the machine.

- Loosen the 2 valves (1) and (2) by a maximum of 3 turns to allow free circulation of the oil in the hydraulic transmission.

**⚠** WARNING! The high pressure valves should be tightened before the machine is started up again.





## Units of measurement

### The unit of measure Conversion

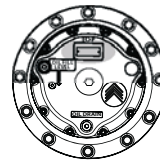
Units	US Units	Legal Units	Conversion legal units	Units Conversion US
<b>Temperature</b>	°F (Fahrenheit)	°C (degrees Celsius)	°F = 9/5 C + 32	°C = 5/9 (F-32)
<b>Distance</b>	Mid (mile)	Km (mile)	1 Mi = 1.60934 km	1 Km = 0,621 mid
<b>Pressure</b>	PSI	bar	1 psi = 0.06893 bar	1 Bar = 14.51 psi
<b>Volume</b>	Gal (US gallon)	L (liters)	1 Gal = 3,785 l	1L = 0,264 gal
<b>Rotation speed (RPM)</b>	rpm	RPM (revolutions per minute)	1 RPM = 1 rpm	1 RPM = 1 rpm
<b>Flow</b>	Gph (gallon per hour)	L/h (liter per hour)	1 Gph = 226.8 ) is shown from l/h	1 L/h = 0.0044 gph

### Tyre pressures

Sizes	Load index	Models	Inflation pressure PSI (bar)
<b>380/90R50</b>	166A8/B	DT800 TL (Tubeless)	70 (4.8)
<b>480/80R50</b>	165A8/B	Spr Trac TL (Tubeless)	46 (3.2)
<b>520/85R46</b>	169A8/B	Spc SrGrp TL (Tubless)	23 (1.6)
<b>620/70R42</b>	166A8/B	DT820 HD TL (Tubeless)	35 (2.4)

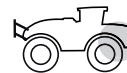
### Identification plates

A. Identification of moto-hydraulic reducers:



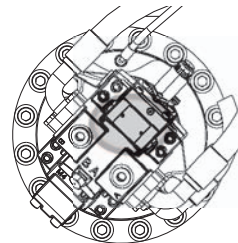
B. Identification of hydraulic pumps

1. Hydraulic Pump primary transmission, placed behind the engine.
2. Hydraulic Pump of secondary transmission.



C. Identification of hydraulic n,s

The model and serial number are shown on the identification plate, as shown in the illustration



## 8 - Technical specifications

### Technical Characteristics of the recommended lubricants

#### Moto-hydraulic reducers

- Compagny: TOTAL
- Reference: TRANSMISSION SYN FE 75W-140
- Properties: Synthetic oil for very high performance for bridges and gears and heavily loaded gears.  
Very high viscosity index. Properties Extreme-pressure and anti-wear reinforced for a optimum lubrication of bridges and hypoid non-hypoid. Excellent thermal stability. Very low viscosity at the loss of shear.
- Features

TRANSMISSION SYN FE	Units	75W-140
Volumetric mass at 15°C	kg/m <sup>3</sup>	885
Viscosity at - 40°C	mPa.s	130 000
Viscosity at 40°C	mm <sup>2</sup> /s	183
Viscosity at 100°C	mm <sup>2</sup> /s	26
Viscosity index	-	178
Pour point	°C	- 36



NOTE! Above characteristics are mean values given as an information.

- Specifications : API GL-5 SCANIA STO 1:0

#### Hydraulic oil for hydraulic transmission

Company: TOTAL

Reference: EQUIVIS ZS 46

Properties : High viscosity index-wear hydraulic oils.

- The equivis ZS46 range is recommended for all kind of hydraulic systems operating under high pressure (limit as indicated by the pump manufacturer) and high temperature (up to 100°celsius in hot points).
- Lubricants especially suitable for hydraulic systems working under extremetemperature variations and equipment operating outside : easy start up at low temperature (-30°C) and regular operating in all seasons : civil engineering, agriculture, marine, transport and other industrial applications.

International specifications :

- AFNOR NF E 48-603HV
- ISO 6743/4 HV
- DIN 51524 P3 HVLP
- CINCINNATI MILACRON P68,P69,P70
- VICKERS M-2950S, -I-286

Advantages : Long equipment life time and high opearting reliability

- Very high viscosity index.
- Excellent shear stability.
- Superior thermal stability avoiding the formation odf sludge even at high temperature.
- Very good oxidation stability ensuring a long service life of the fluid.
- High protection against wear insuring maximum equipment life.
- Excellent hydrolytic stability avoiding filter blocking.
- Remarkable filterabilty even in the presence of water.
- Excellent protection against rust and corrosion.
- Good anti-foam and air release properties by using silicon free components.

- Very low pour point.
- Good demulsibility ensuring rapid water separation.
- Typical characteristics :

Typical characteristics	Methods	Unit	Equivis ZS 46
Appearance (visual)	Internal	-	87.4
Density at 15°Celsius	ISO 3675	kg/m <sup>3</sup>	46.0
Viscosity at 40°Celsius	ISO 3104	mm <sup>2</sup> /s	183
Viscosity at 100°Celsius	ISO 3104	-	8.4
Viscosity index	ISO 2909	-	161
Cleveland flash point	ISO 2592	°Celsius	215
Pour point	ISO 3016	°Celsius	-39
FZG (A/8, 3/90)- stage fail	DIN 51354	palier	11
Filterability index (F)	NF E 48-690	-	1.02
Shear resistance 250 cycles	DIN 51382	%	5
Viscosity loss @ 40°C			



NOTE! Characteristics are means values given as an information.

### Coolant

- COOLELF PLUS is a cooling liquid based on GLACELF PLUS.
- GLACELF is a "long life" antifreeze based on monoethylene glycol and mineral corrosion inhibitors (silicates); a technology that has proven its reliability in cooling and heat transfer systems/ It also contains an organic inhibitor, it is a semi organic technology.
- COOLELF PLUS -37°C can be used in all cooling systems of combustion engines on cars, vans, trucks, buses, constructing machines and agricultural tractors.
- COOLELF PLUS -37°C contains a bitter agent to make it undrinkable and do preserves the health of children and users.
- COOLELF PLUS -37°C is the semi mineral product of our cooling liquid range with mineral

### Applications

- COOLELF PLUS -37°C is a permanent coolant fluid that can be used throughout the year: it provides effective protection against engine freezing or overheating.
- COOLELF PLUS -37°C is ready to use and is already mixed with demineralised water, the quality of which:
  - eliminates any risk of scaling that can cause engine overheating by degrading the heat transfer properties or by blocking circuits.
  - Ensures practically zero electrical conductivity, reducing the causes of electrolytic corrosion
  - It is recommended that the coolant fluid should be replaced every two years

COOLELF PLUS -37°C protects:

- It is recommended to drain the cooling liquid every 3 years.

### Specifications

Characteristics		
Colour		Blue green
Density at 15°Celsius	ASTM D1122	1.079
PH	ASTM D1122	8.3
Alkalinity reserve	ASTM D1122	80ml HCl 0.1N
Temperature at which the first ice crystals occur	ASTM D1177	- 37°C

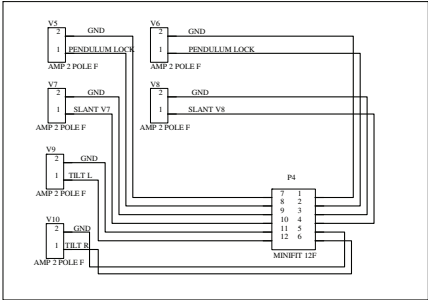


NOTE! Characteristics are means values given as an information.

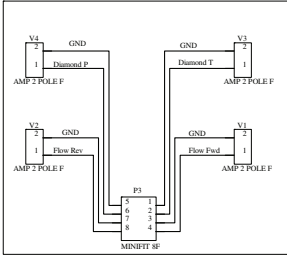
# 8 - Technical specifications

## Boom Wiring Diagram

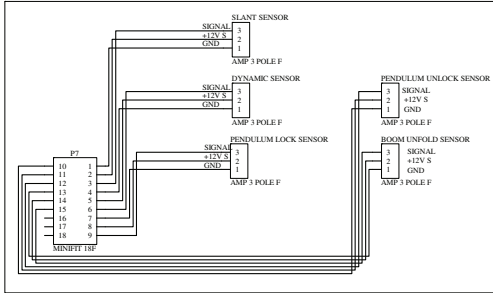
Pendulum, Slant and Tilt connects to P4  
Part Number 26034200



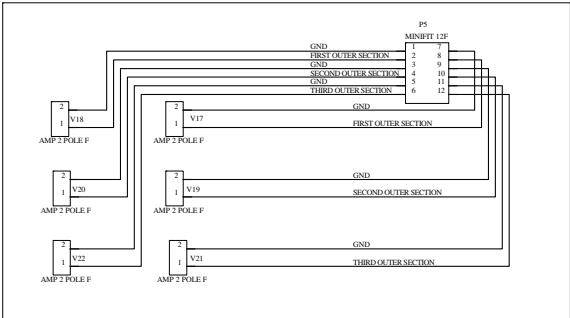
Connects to P3  
Part Number 26034300



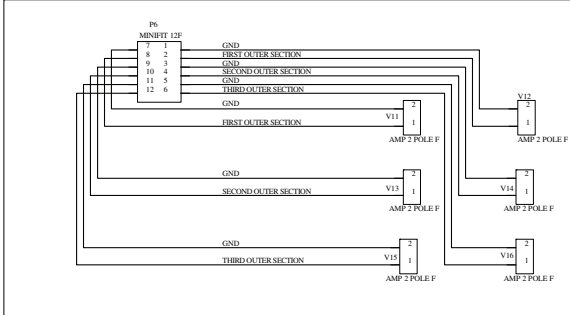
Connects to P7  
Part Number 26034400



Left Hyd Cable connects to P5  
Part Number 26034100



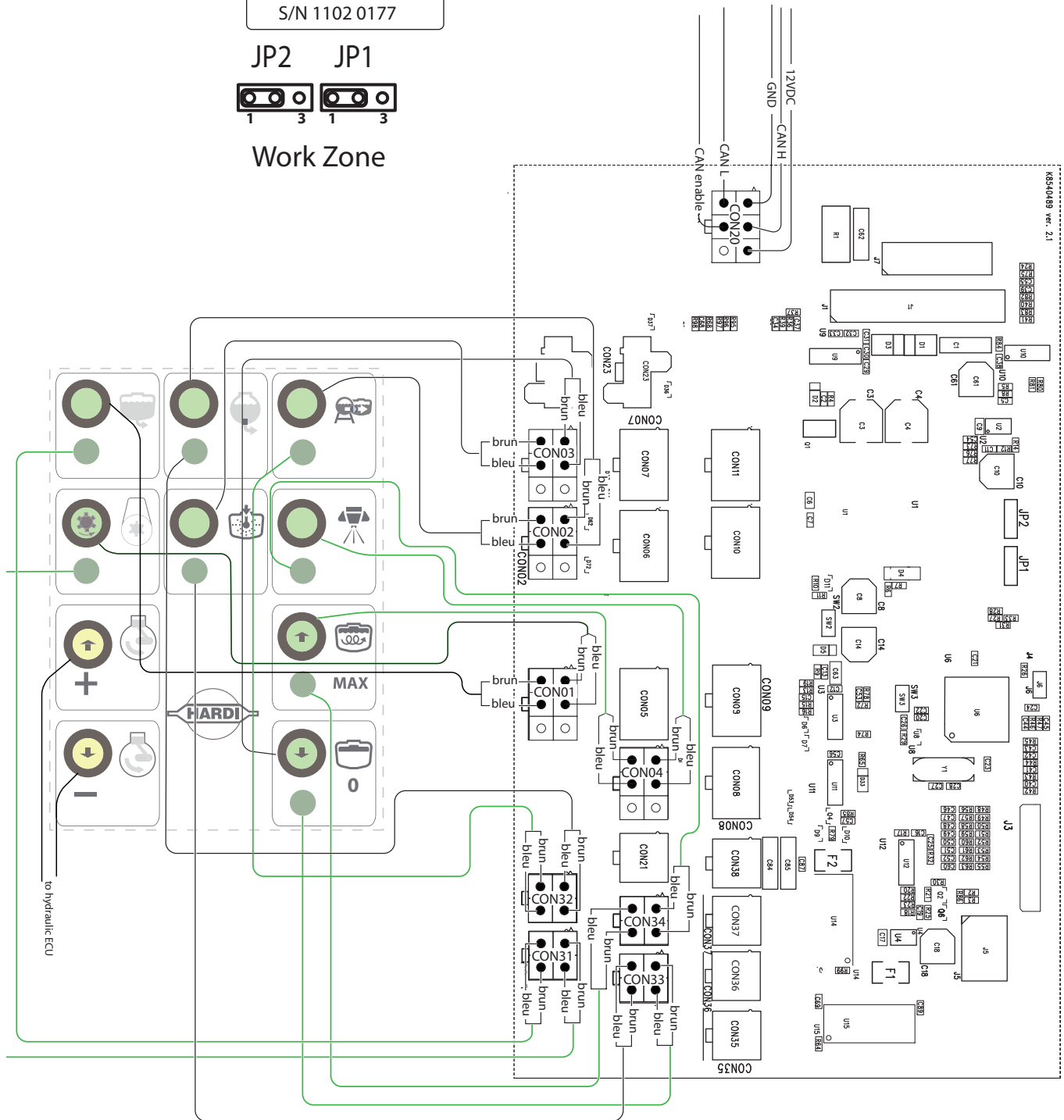
Right Hyd Cable connects to P6  
Part Number 26034100



## Wiring diagram external control

HC6400 ISO HW 2.1  
P/N 26035100  
S/N 1102 0177

JP2 JP1  
1 3 1 3  
Work Zone





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**Spare parts**

To see updated spare part information the website [www.agroparts.com](http://www.agroparts.com) can be visited. Here all parts information can be accessed when free registration has been made.



**HARDI EVRARD**

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