

RUBICON 9000 RA Boom

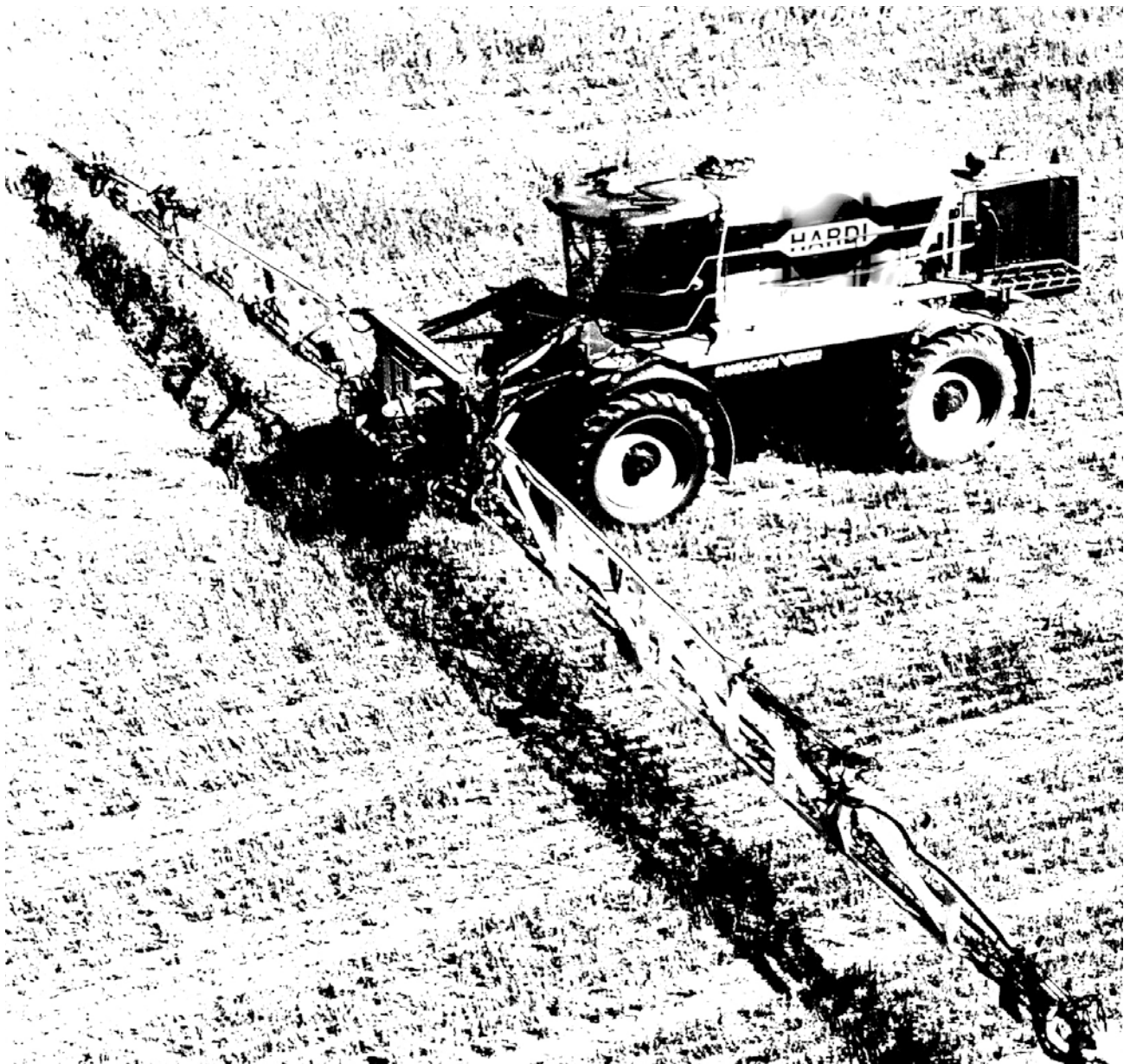


Original

Instruction book

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Foreword

Thank you for choosing a HARDI Rubicon self-propelled vehicle, we are honoured that you have placed your trust in us.

We kindly ask that you read this operating manual carefully as well as the service manual. These two documents contain all the information you need to use, adjust and maintain your vehicle.

Scope of application

This appliance, which is reserved for professional use, is exclusively designed for the application of phytosanitary products (fungicides, herbicides and insecticides) and liquid nitrogen fertilisers in fields. It should only be used for its intended purpose. Any other use is considered contrary to the normal usage of the machine and is therefore forbidden.

General safety instructions



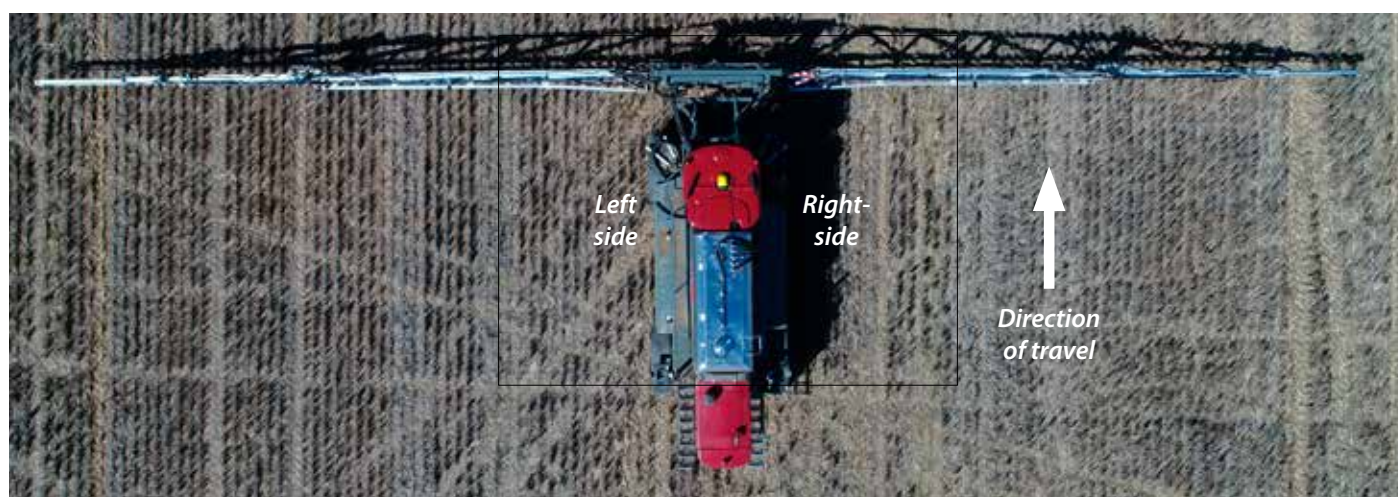
This machine must be used in accordance with the safety instructions included in the operating manual. Negligence or error on the part of the user could lead to serious injury.

Failure to follow the instructions could cause serious injuries and even death.

RESPONSIBILITY OF THE OWNER: This machine must only be used by persons who have read, understood and respect the warnings and instructions included in this operating manual.

- 1** The Rubicon HARDI self-propelled vehicle must be used by personnel who have been trained on how to drive and use the vehicle, as well as the treatment products or fertilisers used with this machine.
- 2** Before using the machine, the user must have read, understood and absorbed all the instructions and warnings included in this manual. This information aims to warn of situations that could cause serious damage and indicate the precautions to take to avoid these. Keep the manual close at hand so that you can refer to it.
- 3** When handling the products and using the machine, the user must always wear personal protective equipment to limit the risks resulting from contact and/or inhalation of toxic products, gas, vapours, mists and dust that may be created by the sprayer. The user must follow the recommendations of the treatment product's manufacturer.
- 4** Familiarise yourself with the controls and their functions before use. You must know how to stop the controls and the machine quickly.
- 5** Only responsible adults who are familiar with the machine's functioning must be authorised to use it.
- 6** Do not allow any person other than the driver to remain on the machine.
- 7** Ensure that there is no-one standing in the sprayer's spraying range when using the hydraulic, electric or other controls. Switch off the machine's controls if someone approaches.
- 8** Never wear loose fitting clothing when working with the machine as these may become trapped by moving parts.
- 9** Never place your hands or feet close to a moving part. Risk of serious or even life-changing injuries.

- 10** Always use your common sense in situations that have not been dealt with in this operating manual.
- ☒ The Rubicon HARDI self-propelling vehicle must be checked and maintained with the utmost respect for the checks and maintenance schedule outlined in this manual.
- 12** The machine must only be maintained and repaired by persons who are familiar with the specific characteristics of the machine.
- 13** Certain illustrations in this manual may show parts of the Rubicon HARDI self-propelled vehicle without a crankcase, grill or protection to ensure better understanding and/or visibility. The Rubicon HARDI self-propelled vehicle must never be used without these safety guards.
- 14** The Rubicon HARDI self-propelling vehicle is approved for driving on the road and guarantees optimum safety for the user. This does not exempt the user from being familiar with and respecting the regulations in force relating to:
- National and State Occupational Health and Safety issues
 - Regulations for driving on a public road.
- 15** The left side is the side to the user's left when the machine is facing forwards in the normal direction of travel.
- The right side is the side to the user's right when the machine is facing forwards in the normal direction of travel.



Starting the machine

- 16** Press the acoustic alarm several times to announce the imminent start up of the machine.
- 16** Never use the engine in an enclosed area without adequate ventilation. The exhaust gases are toxic and could cause asphyxiation.

Driving on the road

- 17 Adapt the machine speed to the driving conditions and the condition of the road surface.
- 18 When descending, reduce the engine or machine speed using the control lever.
- 19 Check the condition of the indicator lights and warning lights before driving on the road.
- 20 Avoid using the work lamps on the road as far as possible: risk of dazzling other drivers.

Using the machine

- 21 Check that all the safety components are in place before using the machine.
- 22 **Never** leave the driver's seat when the machine is moving.
- 23 Before leaving the driver's post, activate the parking brake, stop the engine and remove the keys from the starter.
- 24 Before working on the machine parts, it is **ESSENTIAL** that you:
 - Activate the parking brake.
 - Stop the engine.
 - Remove the keys from the starter.
- 25 Make adjustments and perform a water spray test before preparing the liquid.
- 25 When working on steep land:
 - Be vigilant and take care.
 - Adapt your speed to the conditions of the land, particularly bends.
 - Avoid sudden changes in direction.
 - Do not brake or accelerate suddenly when climbing up or descending a slope.
- 25 Comply with all recommendations for installation, operation, carrying out adjustments, maintenance and repair contained in this instruction book.

Recommendations for users of treatment products

This sprayer was designed and manufactured by our company for use with treatment products which you will select. To ensure the proper functioning of the sprayer, we advise you to adhere closely to our recommendations, as included in the Operating Manual provided to you when you buy the sprayer.

However, it is your sole responsibility as the user to strictly adhere to the recommendations provided by the manufacturers of the treatment products that you will use.

Each user is strongly recommended to:

- Carefully read the manufacturer's label(s) on the treatment product(s) used and respect the instructions provided (dosage, personal protective equipment, etc.).
- Only mix products whose compatibility has been expressly recognised by the manufacturer of the phytosanitary products.
- Avoid getting air inside the sprayer tank to avoid the formation of foam and problems of overfilling.
- Follow the instructions and warnings provided by the manufacturer of the phytosanitary product, in terms of storage of treatment products and always store in premises that are locked with a key and away from the reach of children and animals.
- Respect the recommendations relating to the reprocessing of packages in accordance with the recommendations of the manufacturers of phytosanitary products.
- Respect untreated zones.
- Contact the manufacturer of the phytosanitary product (or their representative) in the event of doubt or if there is something you are unsure about.

Guarantee

The proper functioning of the equipment is only guaranteed with the use of original HARDI replacement parts.

The contractual guarantee does not cover equipment that has been modified or which has not been used in accordance with the technical recommendations included in this manual, nor equipment which has been misused or has not undergone regular maintenance.

Do not modify yourself and do not ask someone else to modify the equipment and its accessories (mechanical, electric, hydraulic, pneumatic characteristics), without asking for the prior written agreement of HARDI Australia Pty Ltd.

Failure to respect these rules may make your machine dangerous. In the event of damage or injury, the manufacturer shall not be held liable in any way.

Miscellaneous

HARDI Australia Pty Ltd does not accept any liability with respect to any inaccuracies contained in this manual, if these are due to transcription or printing errors.










Any communication or reproduction of this document, in any form whatsoever, any use or communication of its content is forbidden, unless expressly authorised by HARDI Australia Pty Ltd.

All the information, drawings and characteristics contained in this document are up to date at the time of publication. HARDI Australia Pty Ltd. reserves the right to make any change deemed necessary without any specific notification.

This manual along with the maintenance log form an integral part of the equipment. They must be provided along with the vehicle to each new owner or even when on loan.

Symbols

Throughout this manual, symbols are used to attract your attention to a particular point. They are presented below along with their meaning.

	This symbol will be used for all safety warnings, which, if not adhered to, can cause a direct risk for the health or life of the persons concerned. Please follow these carefully. Inform your operating staff of the safety instructions.
	This symbol indicates a risk for the machine if misused or poorly handled (risk of irreparable mechanical damage). Please follow the instructions in this manual.
	Important information. This symbol does not indicate danger but does draw your attention to important information or a particular adjustment to allow optimum use of the equipment.
	Symbol indicating that you will find more information in the CUMMINS <i>Instruction Manual</i> .
	Symbol indicating that you will find more information in the CUMMINS <i>Maintenance Log</i> .
	Maintenance symbol. Information relating to the frequency of maintenance as well as consumable materials is indicated at this level.
	This symbol indicates that certain maintenance operations must be performed by a HARDI technician or agent or, possibly, with HARDI Australia's approval, by the user himself.
	Symbol referring to precautions to take to recover and recycle clear oils (hydraulic oils for example).
	Symbol referring to precautions to take to recover and recycle black oils (hydraulic oils for example).

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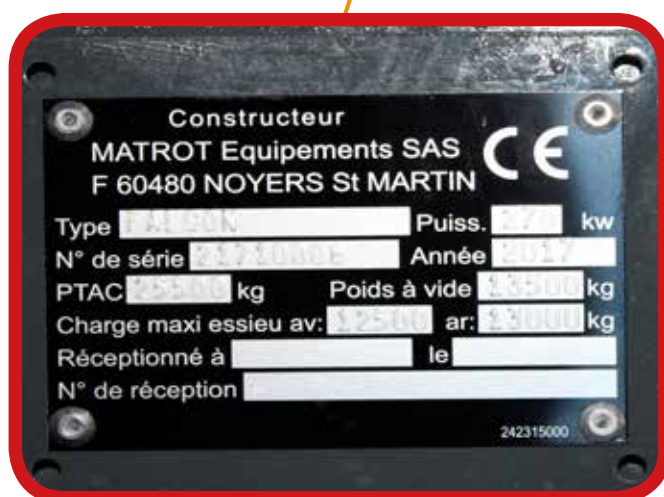
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Identification of the sprayer

The serial numbers of the machine, engine and authorisation are in the following locations:





MADE IN GREAT BRITAIN	Engine No 22230798	EPA	FEL	CARB	5285417
BY CUMMINS INC. www.cummins.com	Family ACEXL0540AA	4.0	12.5	12.5	2 of 2
Date of Mfg 24OCT16	Model QSL	E/C W91006.02	0.20 PM	PM	22230798
CPL 0031 FR91518 CID/L 540 / 8.9	Valve Lash Cold 0.3051	0.559 Exh	Timing - TDC	EMISSION CONTROL INFORMATION: This engine is solely for export and is therefore exempt under 40 CFR 1058.230 from U.S. emission standards and related requirements. Outside the U.S., this engine may be subject to other emission regulations. WARNING: Injury may result and warranty is voided if fuel rate, rpm or altitudes exceed published maximum values for this model and application.	
Ref No: GACQSL9MATT3A1	Fuel rate at adv HP/kW 192 mm3/st	Ad. HP/kW 365 / 272 at 2100 rpm	Firing Order 1 5 3 6 2 4		
5285417 1 of 2	ECS	DDI ECM TC CAC	Idle Speed (rpm) 750		

Located on the rocker cover

Please note the following information about your equipment

Type:	
HARDI serial number:	
Matrot serial number:	
Year of manufacture:	
Engine serial number (SER NO):	
Date of first use of the self-propelling vehicle:	
Dealer's telephone number:	
Tyres:	

Do not remove the manufacturer plates and engine.

I. SAFETY

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 laws 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 Australia is without any obligation in relation to implements purchased before or after such changes.

HARDI Australia 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.

Decal location



Diesel only
97812904



Hydraulic oil tank
(on grey cover)
97812504



Check hydraulic oil
level with boom
unfolded and at
spraying height

Hydraulic oil level
(under grey cover)
97813304



Overhead danger
97808804



Wheel dish x2 front only
97812604



Wheel dish x2
rear only
97814004



CAUTION
Engine zone danger
97812704



Overhead danger
97808804



CAUTION
Chem hopper lid
97808404



Handwash tank
97808704



Jacking point X4
97812404



CAUTION
Inside front cab window
97812804



WARNING
Turn off GPS
steering before
using public roads.
Inside front, right
side cab window
97813904

Decal location



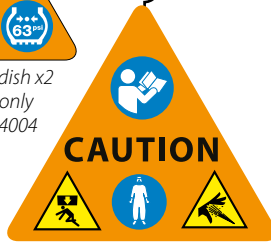
Overhead danger
97808804



Engine zone danger
97812704



Wheel dish x2
rear only
97814004



Workzone danger
97813004



Main tank
97808904



Wheel dish x2
front only
97812604



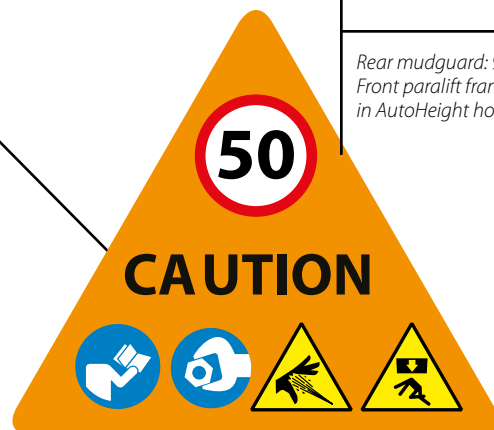
Overhead danger
97808804



Handwash tank
97808704



Overhead danger
97808804



Rear mudguard: 97808104
Front paralift frame,
in AutoHeight housing: 97813204

Explanation of symbols on safety decals

Mandatory

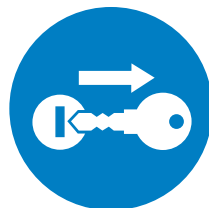
Read manual

- Consult Safety Manual, located inside the black manual canister or in manual slot in the cab.
- Read and understand the Operator's Manual delivered with the sprayer.



Remove key

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



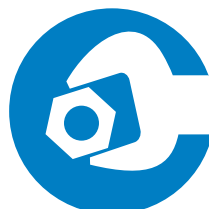
Personal protective equipment

- 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.
- Recommended pressure level is 56psi.



Prohibited

• Speed limit

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



No passengers on sprayer

Do not climb onto tank or into it
Do not stand on tank

- Danger of injury or death.



Do not drive with chem hopper loaded and in down position

- Danger of damage.
- Empty hopper and lock in transport mode.



Explanation of symbols on safety decals

Do not drink

- Handwash tank water is only for personal hygiene use.



Do not overfill tank

- Risk of contamination
- Risk of tank damage



Turn off GPS steering before using public roads.

- Risk of loss of control



Hazard

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
- Watch for rear hydraulically operated access ladders
- Take care when opening lids - loose items may be present in them



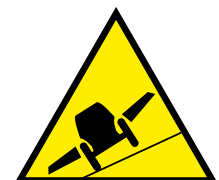
Danger toxic fumes may be present

- 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



Explanation of symbols on safety decals

Keep clear when the machine is working

- Danger of injury or death



Turn engine off

- Take care when working near the the cooling fan.



Moving parts

- Beware of moving belts and shafts.
- Secure loose clothing, long hair etc.
- Do not open or remove guards while the engine is running.



Diesel only

- Use correct fuel



Hydraulic oil only



Corrosive products present

- Use appropriate Personal Protective Equipment (PPE)



Replace guards and covers after maintenance

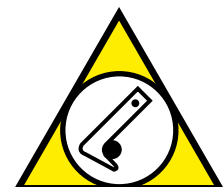


Safe jacking point



Engage safety lock before driving on roads or in fields.
Engage lock before carrying out any work on the boom.

Danger of injury or sprayer damage



1.2. The safety hammer

A glass breaker hammer is located on the right side of the cab.

It can be used to break the side and back windows to get oneself out of the vehicle, if required.



1.3. General safety information

- In general, if the driver needs to leave the driving position, he/she needs to:

- Stop the vehicle.
- Stop the sprayer pump.
- Activate the parking brake.
- Stop the engine.
- Remove the ignition key.

- Dismantle all components with care.

- When dismantling spraying components, make sure that no product is spilled.
- When dismantling heavy parts, place supporting structures under the parts to dismantle.
- Dismantle any hydraulic hoses with care.
- There should be no residual pressure inside the circuit.
- Prepare a container to collect any oil discharge.



It is recommended to have a first-aid kit within reach.

Avoid contact with skin, eyes and mouth for products such as fuels, oils, solvents, antifreeze and cleaning products. Most of them contain substances that are harmful to health. Should an incident occur, consult a physician.

Strictly observe the instructions shown on the safety labels of toxic product containers. The batteries contain sulphuric acid. In case of skin contact, rinse with plenty of clear water and consult a physician.

Any leaking pressurised hydraulic fluid can be corrosive enough to penetrate into the skin and cause serious injuries.

If any part of the body comes into contact with the fluid, immediately consult a physician.

1.4. Fire prevention

To avoid any risk of fire:

- Make sure that the machine and its accessories are clean.
- Keep the area around the engine as well as all rotating components free from any grass, leaves or excess grease.

Handle the fuel with care. It is extremely flammable and the vapours are explosive.

Never store the fuel canister or the machine with a tank that still has some fuel in premises where the vapours could ignite or spark.

Never fill the fuel tank inside a building. Do not smoke when filling up.

Never remove the fuel tank cap or add fuel in the tank when the engine is running.

In the event of fire, leave the machine immediately and evacuate the area.

II. TECHNICAL SPECS

Engine

Type:	Cummins
Coolant:	Liquid
Number of cylinders:	6 in-line
Stroke volume in cm ³ :	8900
Dry air filter:	dried
Power:	260 kW

Transmission

Hydraulic transmission
4-wheel drive

Brakes

In operation: integrated into the geared motor
Stopped: integrated into the geared motors

Steering

Hydrostatic – 4-wheel steering
Adjustable tilt steering
Turning radius of 4.53 metres for 4-wheel steering (valve 2.93 m)
Turning radius of 8.95 metres for 2-wheel steering (valve 2.93 m)

Dimensions and weight

Unladen weight:	17,060 kg	
Maximum authorised total weight: :	25,400 kg	
Overall width:	3.55 m	
Overall length:	10.20 m	
Overall height:	3.95 m	
Ground clearance:	1.85 m	
Wheelbase:	4.80 m	

Boom

Material:	Aluminium
Width:	36.5 to 52.5 m
Working height:	0.5 m to 2.7 m

Suspension

Independent tyres on 4 wheels
4 three-stage cavities
Displacement +/- 80mm

Tyres

480/70 R 54 166 Titan LSW

Cabin

Panoramic, pressurised, soundproof, category 4
Pantographic windscreen wiper
Windscreen washer
Centralised controls
Air conditioning
Filtration that complies with NF EN 15695-2 standard

Electrical equipment

Battery 12 VDC – 160 A
Alternator 12 VDC – 95 A
Hazard lights
Work lights
Lighting and signals
Hydraulic oil level alarm
Coolant level alarm

Tanks

Fuel:	1000 litres
Hydraulic:	200 litres
Main tank:	9000
Rinse tank:	650 l
Chem Hopper	60 l

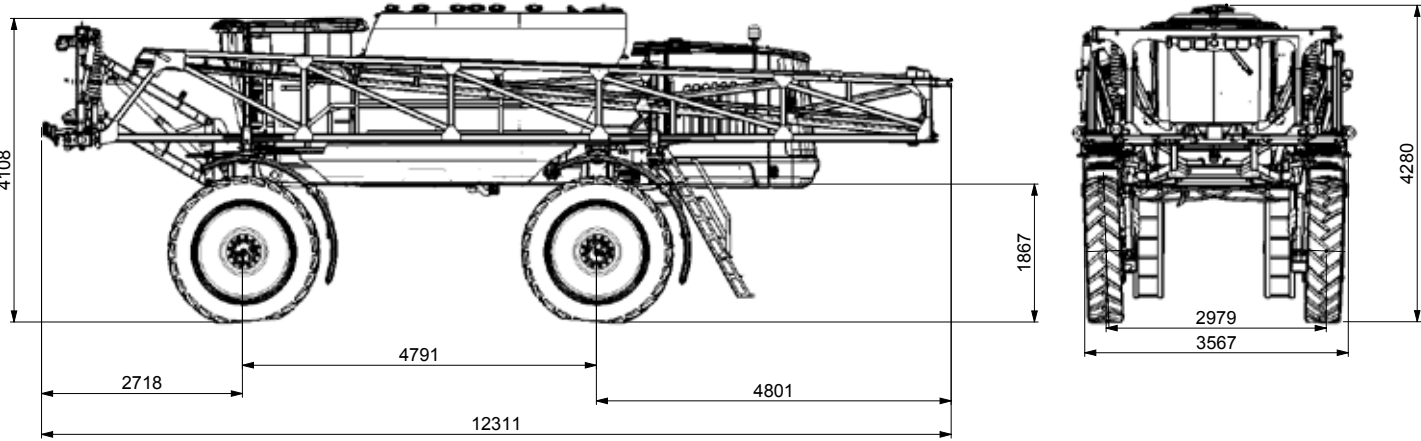
Valves

from 3.00 to 4.00 m

Driving speed

Range	Field	Road
Velocity	0 to 35 km/h	0 to 50 km/h

Dimensions



- Rear overhang in relation to the rear axle:
- Version A (boom 36 to 38 m): 2.85 to 3.2m
 - Version B (boom 40 to 42 m): 3.65 to 4.4m
 - Version C (boom 44 to 52 m): 4.65 to 6.4 m but can only drive under article 435-1

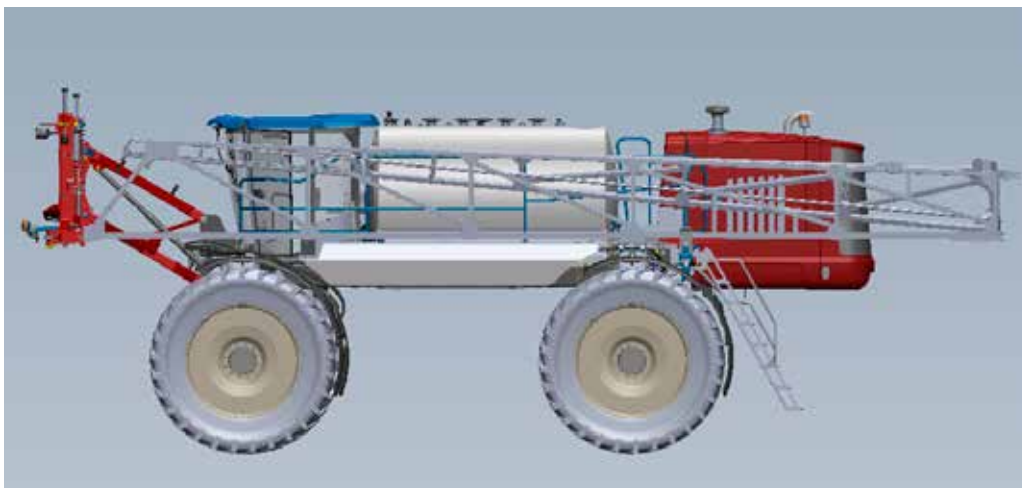
Weight

Model	48 metres
Unladen weight (kg)	17,060 kg
Maximum authorised laden mass (kg)	25,400 kg

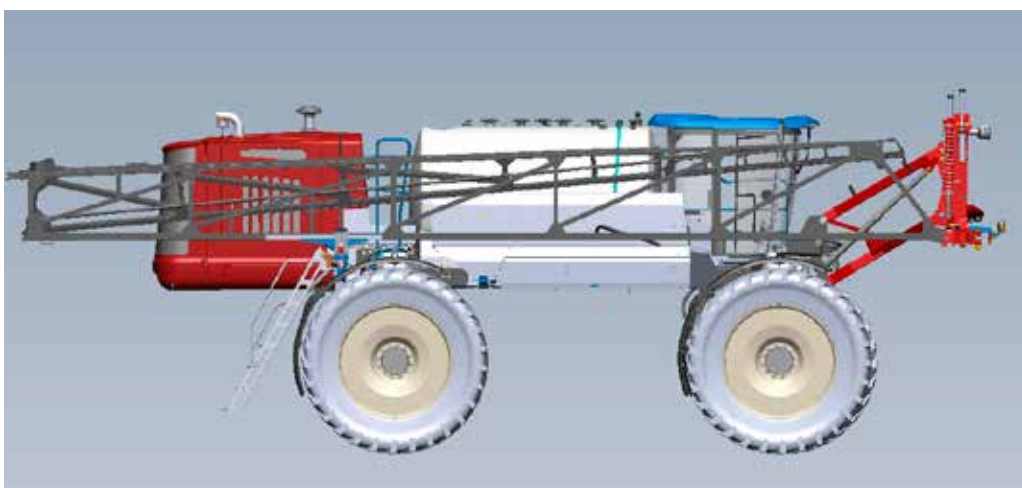
General introduction to Rubicon



Front



Left side



Right side

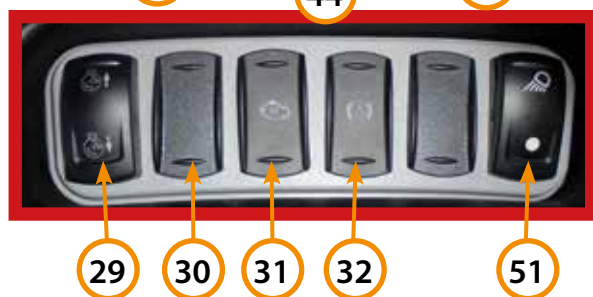
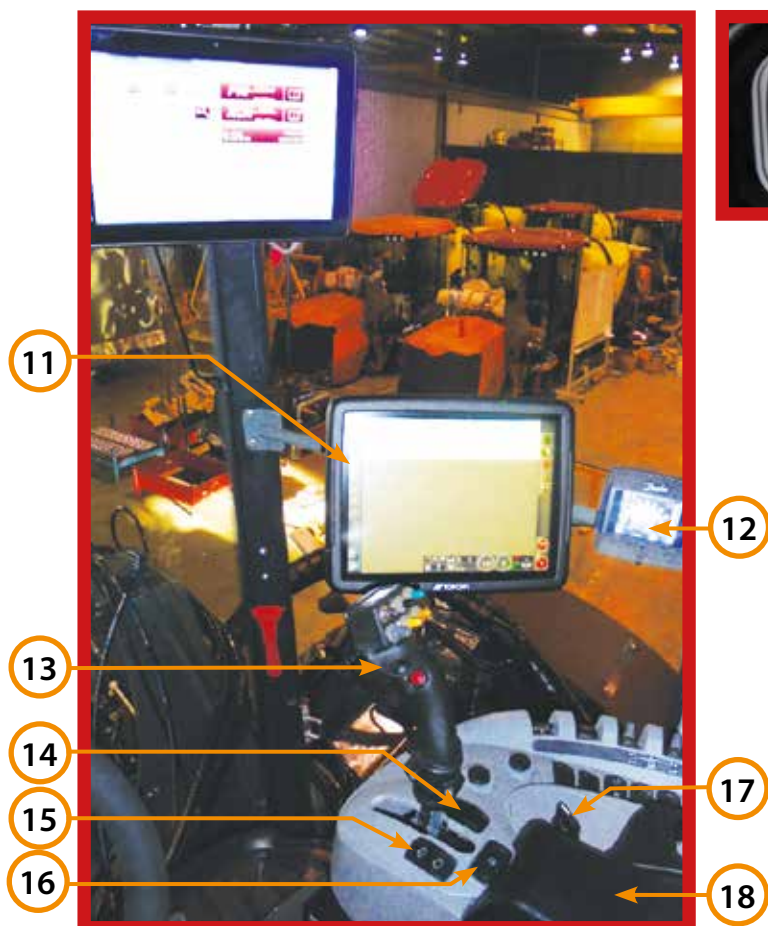
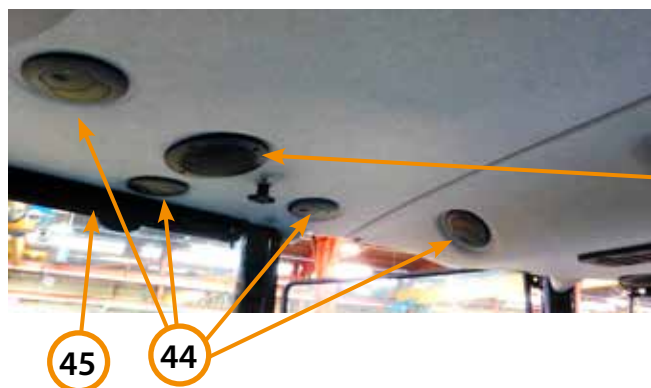
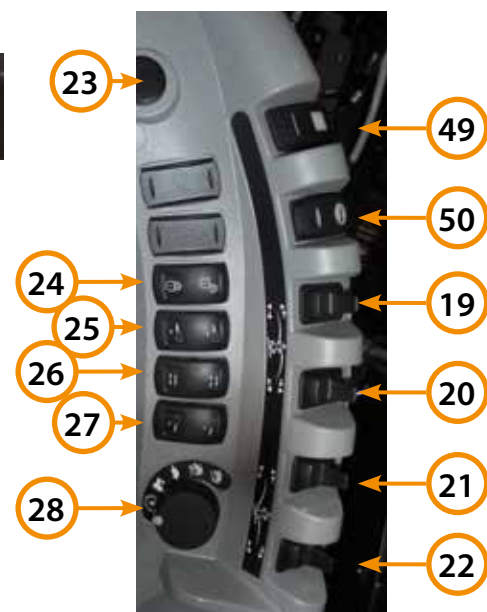
III. COMMANDS AND CONTROLS

3.1. Steering column

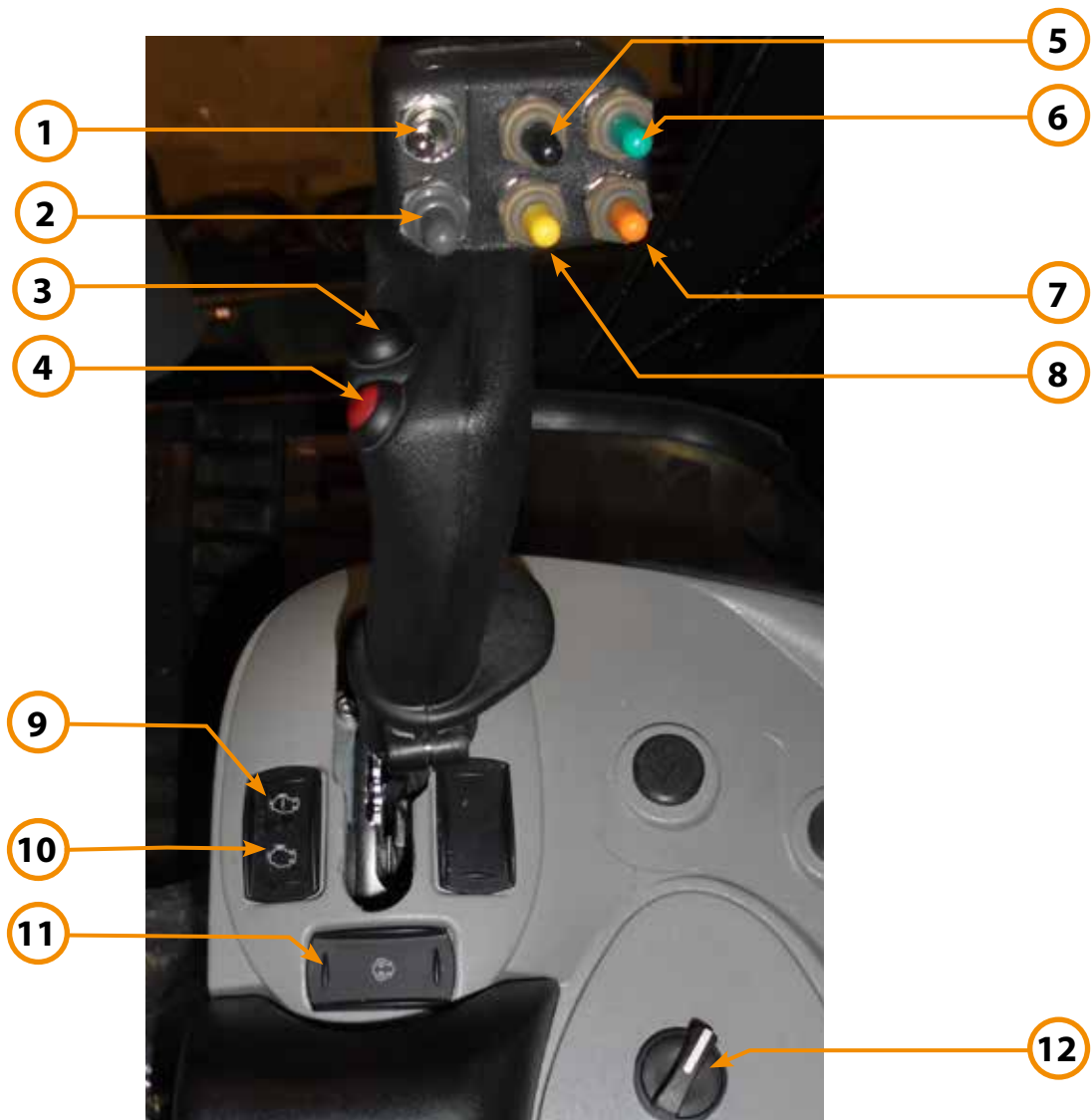
1. Hazard light switch
2. Switch: direction indicators, alarm, low beam
3. Control to adjust the height of the steering column
4. Reverse pedal (optional)
5. Display
6. Steering wheel
7. Foot pedal
8. Emergency brake pedal
9. Column incline control
10. Column full tilt control

3.2. Console and armrest controls

11. Terminal TOPCOM X35
12. Control screen for the engine and transmission
13. Multi-functional control lever
14. Indicators particle filter regeneration
15. Engine fault indicators
16. Indicator for clogging of air filter and regeneration temperature
17. Button for blocking and unblocking front lift
18. Armrest with compartment
19. Adjust front left valve width
20. Adjust front right valve width
21. Adjust rear left valve width
22. Adjust rear right valve width
23. Control button for the rear camera
24. Control for pendulum lock ram
25. Unfold/fold left outside arm
26. Unfold/fold left main arms
27. Unfold/fold right outside arm
28. Gear selector and parking brake
29. Engine speed accelerator
30. Stop/start particle filter regeneration
31. Engine preheating indicators
32. Service break oil pressure indicator
33. 3-position windscreen wiper switch
34. Windscreen wiper switch
35. Front cabin lights switch
36. Rear cabin lights switch
38. Warning lights switch
39. Ventilation speed adjustment
40. Temperature adjustment
41. Air conditioning start/stop
42. Cabin lighting
43. Speakers
44. Ventilation holes
45. Retractable sun visor
46. Key switch to start/stop combustion engine
47. 12 V socket
48. Radio position
49. Topcom X35on/off
50. AutoGrease
51. Platform ladder light
52. Centre work light
53. Work lights cab roof
54. Centre work lights



3.3. Multi-functional lever and armrest



Lever controls

1. Spray start/stop
2. Raise/lower lift
3. Opening to the left and right for the section valves in sequence
4. Closing to the left and right for the section valves in sequence
5. High/low left tilt adjustment
6. High/low right tilt adjustment
7. High/low right slant
8. High/low left slant

Armrest controls

9. Engine problem indicator: Stop engine immediately
10. Engine problem indicator: Fault
11. Air filter clogging indicator
12. Button for blocking and unblocking front lift

3.4. TOPCOM Terminal



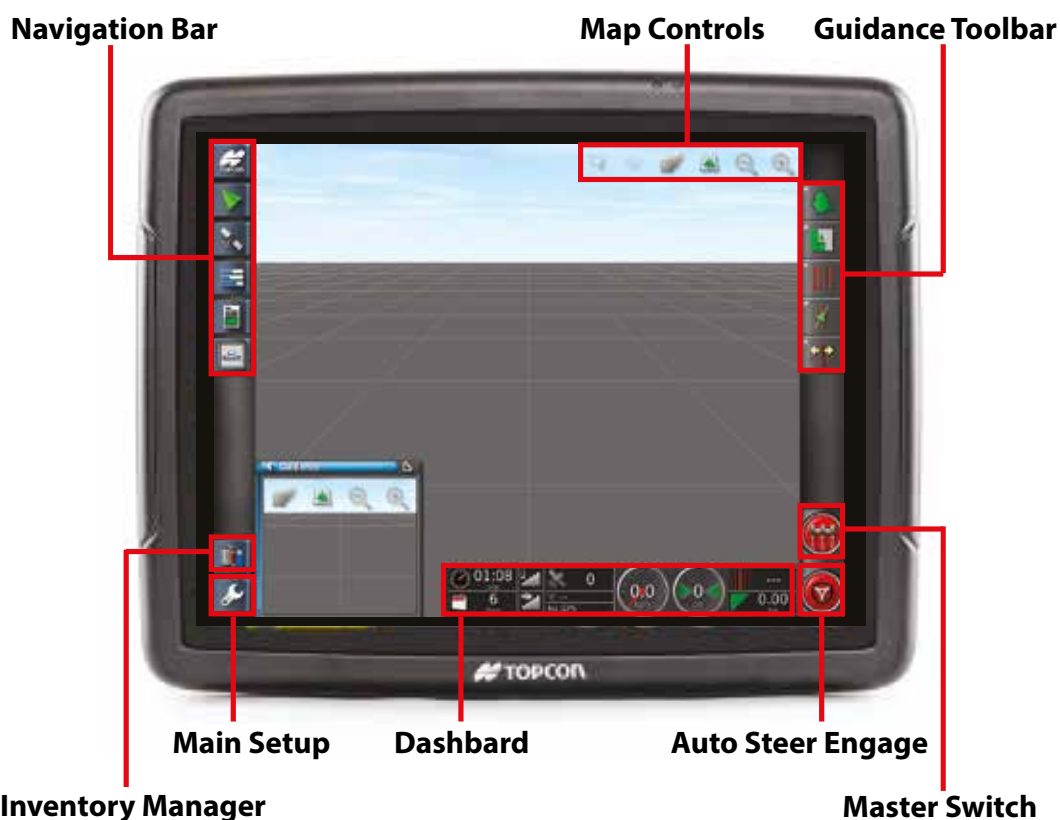
Attention!

The configuration that you will find on starting your machine is the default screen configuration.

If you press the button you will find the original Hardi configuration.

To turn on the screen, always stop the equipment completely using the ignition key.

This ensures that the computers will be properly taken into account when you restart the screen.



Always wait at least 15 seconds before you restart the system.

For more information on the screen configuration, please refer to the installation and operating manual provided with your Rubicon self-propelling vehicle.

IV. DRIVING THE RUBICON

4.1. Adjusting the steering wheel

The steering column has three adjustment options.

To adjust the height of the steering wheel:

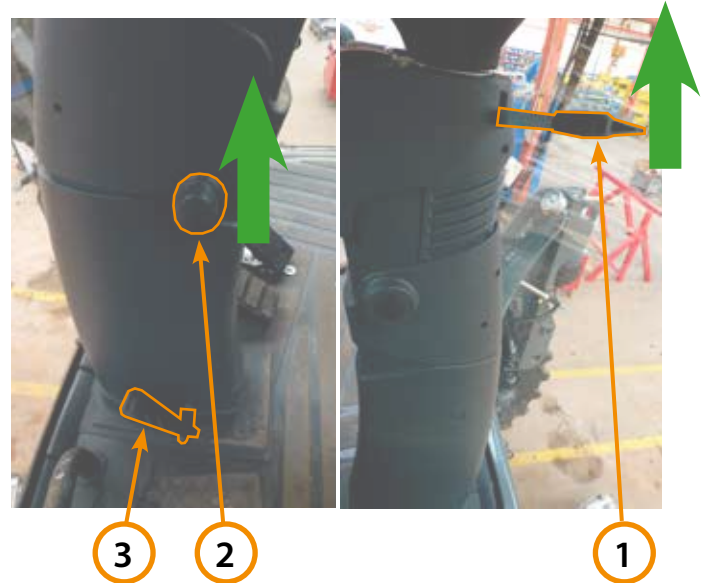
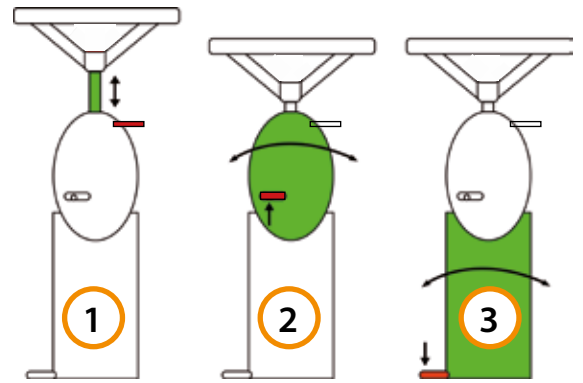
1. Pull the lever under the steering wheel ①.
2. Adjust the position of the wheel to the desired height.

To adjust the middle part of the column:

3. Lift the small handle upwards ②.
4. Adjust to the desired position.

To adjust the lower part of the column:

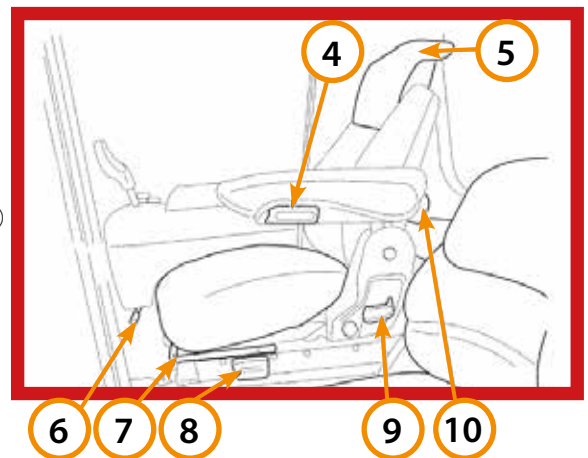
5. Press on the pedal ③.
6. Adjust to the desired position.



Make these adjustments with the engine switched off.

4.2. Adjusting the seat

- Lever for adjusting the height of the armrest ④
- Adjustable height headrest ⑤
- Lever for adjusting the console forwards or backwards ⑥
- Lever for adjusting the position of the seat forwards or backwards ⑦
- Lever for adjusting the height for the seat ⑧
- Adjusting the inclination of the backrest ⑨
- Adjusting the lumbar support ⑩



Make these adjustments with the engine switched off.

4.3. Lighting and signals

Switch on the ignition to use the following controls.

Hazard lights

Press switch ⑪ to turn the hazard lights on.



Sidelights

Turn the ring switch on the stalk from the 0 position to position ⑫.

Main and dipped beam headlights

- Turn the ring switch on the stalk to position ⑬.
- Operate the stalk:
 - To the left for main beam headlights ⑭.
 - To the right for dipped beam headlights ⑮.
- Keep the stalk in position ⑯ to flash your headlights.



Indicator lights

Pull or push the stalk (as shown in the photo) forwards or backwards.



Horn

Push the area on the stalk (as shown in the photo).

Hazard light

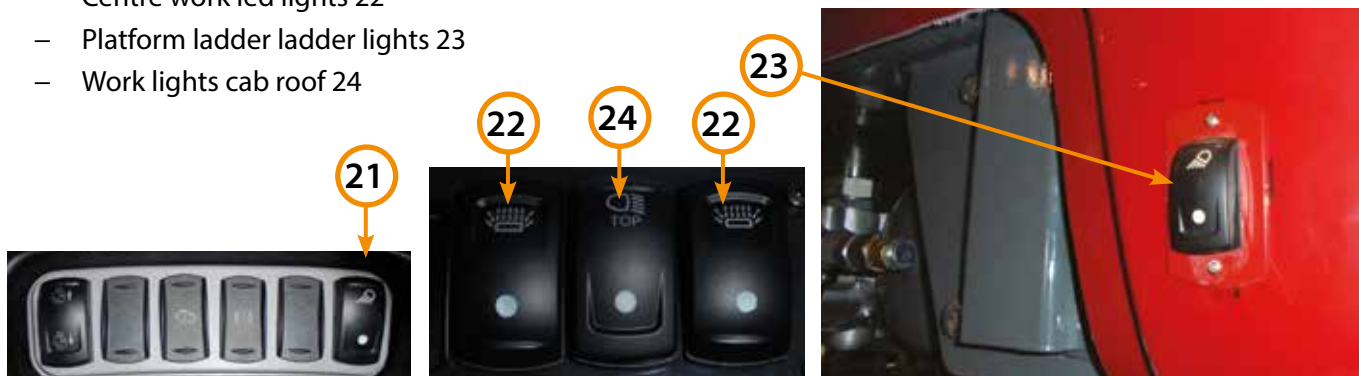
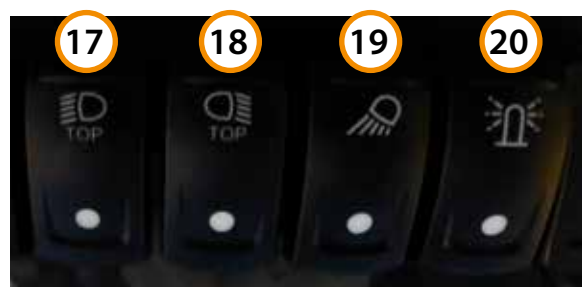
On/off switch ⑳.

Work lights



Controlled by switches ⑰ to 22, and must never be used on during road travel.

- Front cab headlights switch ⑰.
- Rear cab headlights switch ⑱.
- Light bar/frame switch ⑲.
- Platform ladderlight 21
- Centre work led lights 22
- Platform ladder ladder lights 23
- Work lights cab roof 24

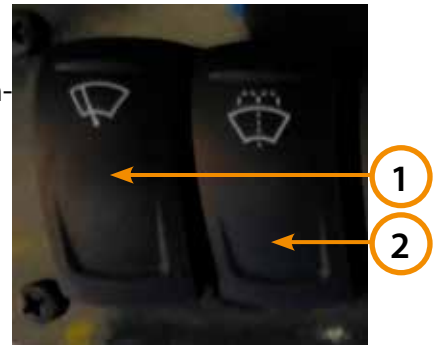


Windscreen wipers

Switch ① (previous page) has three positions (off, intermittent, continuous).

Windscreen washer

Windscreen washer switch ② (previous page).



Cab lighting

Ceiling lighting and "door open + ON/OFF switch" ③ .
Temporary lighting 'ON/OFF' switch ④ .



4.4. Adjusting rear vision mirrors



Adjust when the engine is turned off and the parking brake is on.

- Objects in the wing mirrors may seem further away than they actually are.
- Adjust your wing mirrors before travelling on a road.
- Move the wing mirrors up, down, left or right to adjust them.

4.5. Heating and air conditioning

Your Rubicon is equipped with a category 4 cab in keeping with European standard EN 15695-1. This standard aims to protect farm machinery drivers against toxic substances such as dust, aerosols and vapours that may be created during spraying or spreading.

Protection is provided by:

- A pressure of at least 20Pa.
- Renewal of air at a rate of 30 m³/h.
- A filter that complies with European standard EN 15695-2.
- A warning light that indicates a pressure fault.

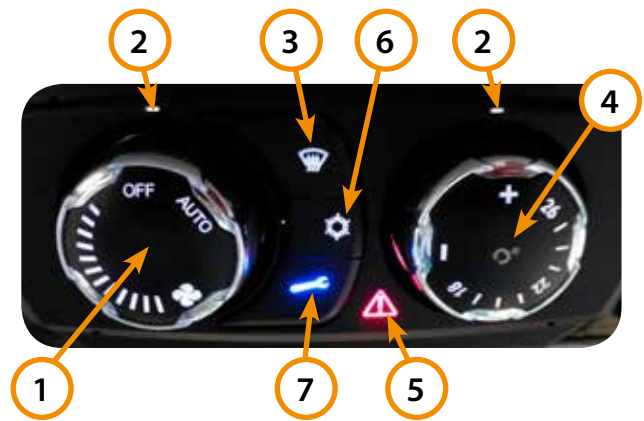
For the system to operate most effectively, you must ensure that:

- The right-side door and window are closed.
- That the right-side door/window and other window seals function correctly. They must be changed if they are damaged or worn.
- The pressure regulator is not blocked.
- You check the water-tightness of control and cable entry points into the cab. If a new entry point is required, ensure you fill in any remaining gaps with silicone.
- You wash your hands before climbing into the cab.
- You check that your clothes and shoes are clean.
- You use the appropriate personal protective equipment when preparing the spray liquid, filling the sprayer and during cleaning. You must remove them before climbing into the cab.
- You do not store personal protective equipment in the cab.
- You do not bring plant protection products into the cab.
- You clean the cab access area after each spraying operation.
- Get your air conditioning system checked by an approved person.
- You clean the sprayer thoroughly after each treatment, paying special attention to the outside of the cab and the cab access area.
- You avoid getting out of the cab unnecessarily during the treatment process. If you really need to leave the cab:
 - wait until the product has settled
 - avoid walking in treated areas
 - wear gloves to handle and adjust equipment or products
 - wash the gloves each time you use them
 - wash your hands before you get back into the cab.
- You service, repair, adjust and maintain the sprayer and the tractor to avoid breakdowns or problems with adjustments and use in the fields.
- If an incident occurs during the treatment process, move away from the treatment zone before taking action.
- You keep the sprayer's filling and cleaning stations tidy.
- You do not smoke, eat, or drink during the treatment process.
- You take a shower and wash thoroughly after.
- You work in the best possible weather conditions.
- You regularly wash the sprayer to reduce the amount of contact with products outside of treatment periods.

Hardi shall not be held liable for any modifications made to the cab after delivery, especially where additional cable entry points are concerned.

4.5.1. Description of the ceiling control unit

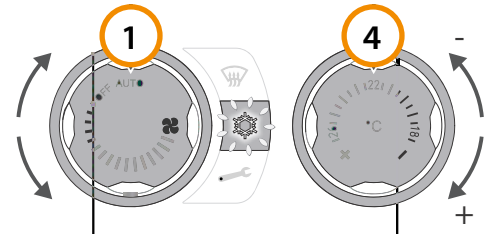
1. Fan control.
2. Signal lamp (always on).
3. Demisting control.
4. Temperature adjustment.
5. Cab pressure signal lamp.
6. Air conditioning.
7. Repair signal lamp.



4.5.2. Automatic mode

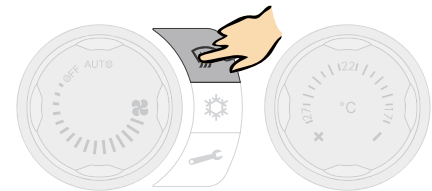
Turn the control button ① to AUTO. The air conditioning signal lamp ⑥ comes on.

Turn the control button ④ to the desired temperature. The speed of the fan adjusts itself according to the selected temperature.



4.5.3. Demisting

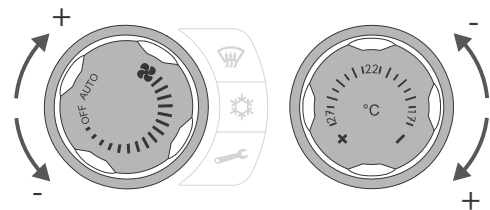
When you press the de-icing button ③, signal lamp ⑥ comes on. The air conditioning, heating and maximum fan speed come on.



4.5.4. Heating

Turn the temperature control button ④ to adjust the temperature.

Then turn the fan control button ① to the desired speed.



4.5.5. Air conditioning

Turn the temperature control button ④ to set the minimum set-point temperature.

Press the air conditioning button ⑥. The signal lamp comes on.

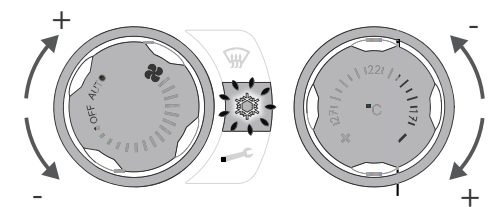
Control the speed of the fan by turning button ①.

4.5.6. Cab air pressure

The control panel is delivered with a pre-installed microprogram which controls cab pressure. The microprogram checks and maintains:

an air flow rate of 30 m³/h.

a cab air pressure greater than 23 Pa.



Note: If the **WARNING** lamp comes on, this means that cab air pressure is too low.

4.6. Brakes

4.6.1. Hydrostatic brakes

The dynamic braking capabilities inherent in hydrostatic transmission ensure the standard required deceleration.

Simply bring the control lever to neutral position and stop the self-propelled vehicle.

4.6.2. Foot brake

The foot brake is integrated into the geared motor. It is activated when the driver presses the brake pedal ⑤.



4.6.3. Hand brake

To release the parking brake, turn button ⑥ on the armrest to one of the following positions:

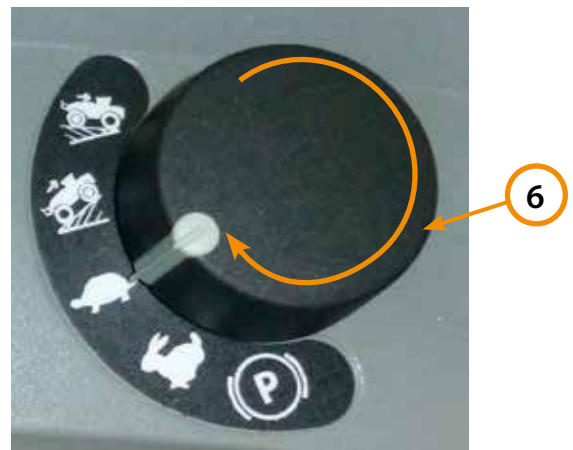
- Road mode.
- Field mode.
- Uphill.
- Downhill.

To engage the parking brake:

1. Bring the control lever to neutral position.
2. Turn the button to position (P).

When the parking brake is engaged:

- The Forward/Backward drive function on the multifunction control lever is deactivated.
- The reverse gear is deactivated.

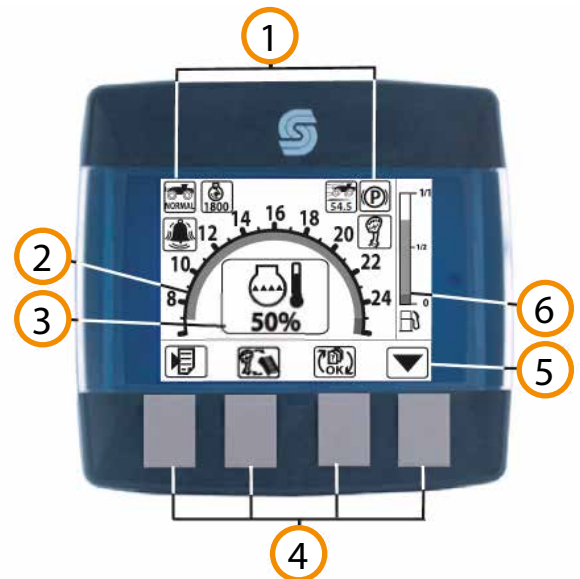


4.7. Multifunction display

The multifunction display shows information relating to the operation of the engine, (tachometer, temperature, etc.) and the

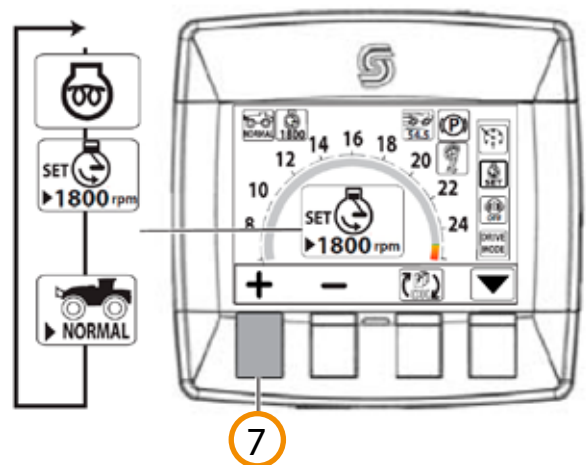
various modes (Road, Field, etc.). The display also shows errors that may occur during the use of the machine (engine temperature, oil pressure, transmission error, etc.).

- Current mode symbols ①
- Tachometer ②
- Display of engine and transmission functions ③
- Push buttons for controls and settings ④
- Horizontal Menu ⑤
- Vertical Menu ⑥



4.7.1. Display of functions

Press button ⑦ to scroll through the various functions.



4.7.2. Horizontal Menus

Press button below symbol to select corresponding menu.

- Normal Mode of Operation ⑧
- Settings ⑨
- Hour meter ⑩
- Management of engine (DTC) and transmission (SD) errors ⑪

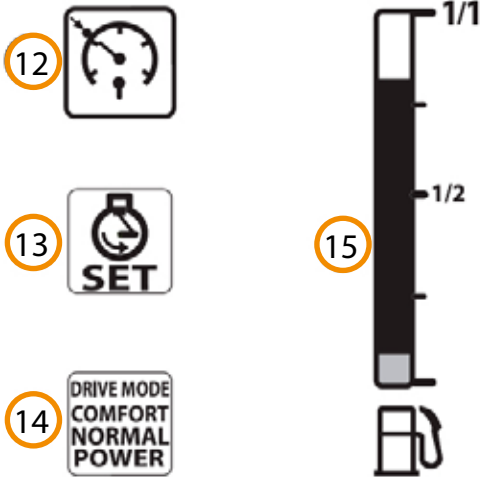


4.7.3. Vertical menu

Press button below the menu to scroll through the available options.

- Forward speed limitation ⑫
- Engine speed limitation ⑬
- Different driving modes (Comfort/Normal/Power) ⑭
- Fuel level ⑮

Note: The fuel level ⑮ is automatically displayed following 5 seconds of inactivity.



4.7.4. The different signals

	Engine temperature 0 to 100%.		Battery charge voltage
	Engine oil pressure		Limitation of the motor speed [Field] mode See "Limitation of engine speed - hydraulic oil temperature too high" on page 5.10
	Turbocharger pressure		Restricting the travel speed in [Road] mode
	Hydraulic pressure of the transmission		Restricting the travel speed in [Field] mode
	Instant fuel consumption		Displays the speed of the engine
	Power supplied by the engine		Displays if transmission error occurs See "Transmission error codes" on page 7.1
	Displays if engine errors occur (level 1)		Preheating of the engine

4.7.5. Messages in selection mode



COMFORT Driving Mode
See "Drive mode behaviour"



Anti-slip disabled
See "Traction Control System"



NORMAL Driving Mode
See "Drive mode behaviour"



Anti-slip engaged
See "Traction Control System"



POWER Driving Mode
See "Drive mode behaviour"

4.7.6. Alarm Messages - priority

WARNING! The display of these alerts necessitates the immediate shutdown of the engine.



Alarm engine overheating



Alarm pressure of the turbo-compressor



Alarm engine oil pressure



Alarm engine defect (level 3)

4.7.7. Alert Messages - Operation limited

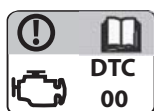
± WARNING! These warning messages are displayed when operating anomalies appear on the self-propelled.



Temperature of the hydraulic transmission too high



Temperature of the hydraulic transmission too low



Alert default engine (Level 2)

4.7.8. Alert Messages - Maintenance

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



Maintenance (level 1)



Maintenance (level 2)

4.8. Ladders



Ladders should be used as follows:

- *On level ground.*
- *With the self-propelled sprayer turned off.*
- *With the parking brake engaged.*
- *With the ignition keys removed.*

Keep at least 3 points of contact on a ladder.

Ladders to access the platform have a hydraulic fold/unfold system.

The control is operated via a touch screen using the application from Hardi:

1. Press ① to raise the ladders.
2. Press ② to lower the ladders.



The control can also be operated from the walkway:

1. Press ③ to raise the ladders.
2. Press ④ to lower the ladders.



WARNING: *The ladder goes up automatically as soon as the vehicle reaches a certain speed.*

Default setting 3 km/h.

4.9. Covers



The guards must be well-maintained and closed before the machine is restarted.

4.9.1. Valve cover

The valve cover is opened and shut manually. Opening assisted by a jack. The casing has a double notch joint ① for a better grip.

Be careful with the covers's offset during opening.

4.9.2. Engine casings

To open the side covers:

1. Press the buttons below the levers for the side cover
2. Lift the cover to remove it from its housing.

To close the side covers:

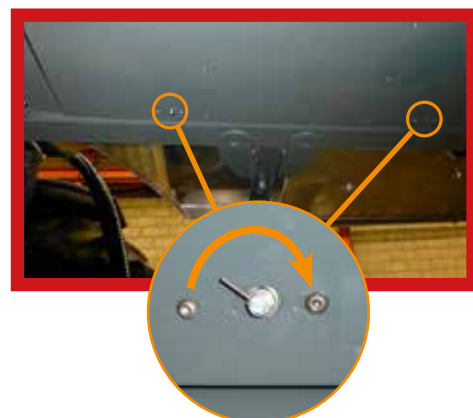
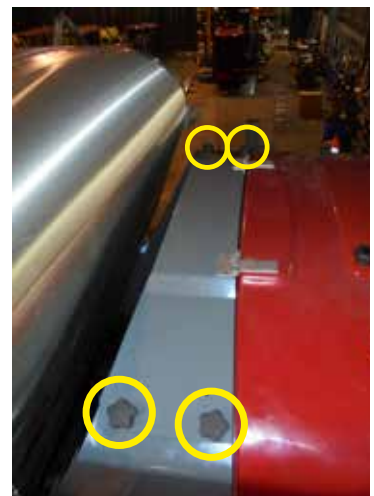
1. Hold the cover using both hands.
2. Position the cover on the top tube.
3. Press the cover against the engine cell and lock it using the release buttons.

To open the upper cover:

1. Tilt the cover up.

4.9.3. Lower covers

Opening the lower covers does not require a key.
These covers are hinged, which enables fast access to the various components.



V. STARTING THE ENGINE

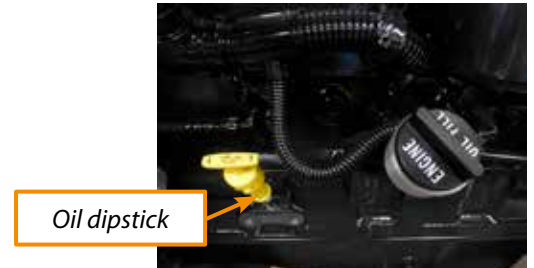


It is forbidden to climb on the platforms to access the cab, on the tank or on any other part of the machine during operation.

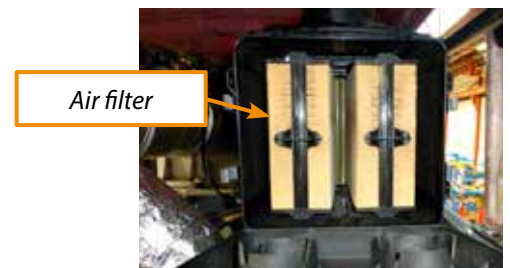


5.1. Pre-start checks

1. The multi-function control lever must be in neutral position.
2. Check engine oil level.



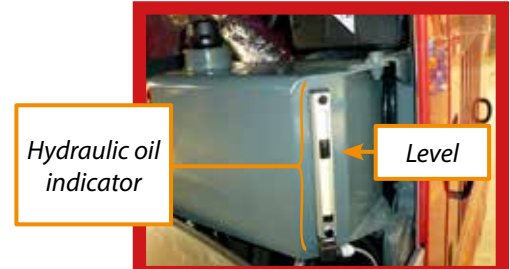
3. Check cleanliness of air filter cartridges.



4. Check coolant level.



5. Check hydraulic oil level ($\frac{3}{4}$ of level indicator).



6. Ensure that the circuit breaker is activated and check the battery's electrolyte level.



5.2. Filling up with diesel and additives

5.2.1. Filling up with diesel

Filling up with diesel is carried out on the left walkway of the machine. It should be done when the self-propelled sprayer is stopped, with the engine turned off.

1. Turn the engine off.
2. Clean around the cap to ensure that no impurities enter the tank.
3. Do not smoke when filling up.

GNR tank



5.3. Starting the engine

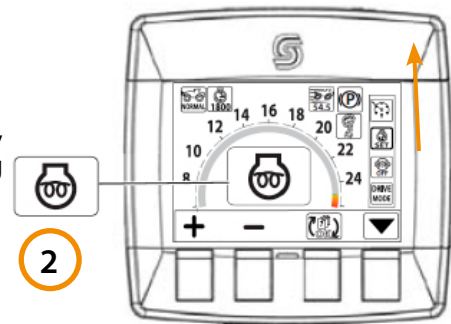
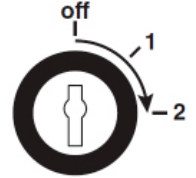
5.3.1. Starting up



Before starting the engine:

- **Make sure that no one is in the immediate vicinity of the machine.**
- **Activate the warning buzzer to show that the machine is starting up.**

1. The multi-function control lever is in neutral position.
2. Warm-up (if required):
 - Turn the key ① one notch to the right and then release
 - Once the warm-up indicator light ② goes off, start the engine.
3. Turn the ignition key fully to start the engine.
4. As soon as the engine is running, release the key.
5. With a light load and by adjusting the accelerator ③, the engine and the hydraulic oil reach their operating temperature.



It is essential to let the machine warm up for 5 to 10 minutes before setting off on the road.

When the engine starts up, the hydraulic oil is not hot.

When it is cold outside, a beep indicates that the suction filter is clogged (as it is difficult for the cold oil to get through the cartridge).

Before setting off, wait for the beep to stop.



5.3.2. Reasons why the engine fails to start



Refer to the *Operating Manual* for the CUMMINS engine.

5.3.3. Engine speed

The normal idling speed is 900 rpm.

The hydraulic pump and spraying pump flows are calculated based on the engine speed.

5.3.4. Engine monitoring

Monitoring the different engine parameters is carried out via the multi-function screen (temperature and pressure of the cooling circuit, temperatures and pressures of the engine oils and the transmission oils, etc.).

As soon as the indicator lights ④ come on, check the error displayed on the multi-function screen:

- Engine oil pressure is too low ⑤.
- Engine overheating ⑥.
- Turbo pressure too low ⑦.



5.4. Moving

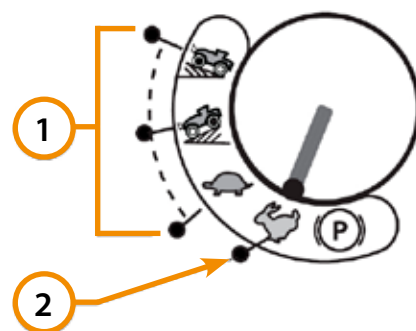
5.4.1. Gear selection

Choose Field and Road modes on the gear selector as shown opposite.

Field mode ①.

Road mode ②.

Field mode is managed by an engine and transmission computer. In these modes, you need to manually adjust the engine speed using the switch on the console unit.



In Road mode, depending on the controller chosen, the computer automatically checks the engine speed according to the position of the pedal or the multi-function lever.

The Rubicon's acceleration and deceleration response is predefined in the engine and transmission calculator.

5.4.2. Moving and stopping the machine

Reduce speed when driving downhill on a road. To do so, pull the lever towards the neutral position.

Never let the self-propelled sprayer go above the maximum authorised speed.

Stop the machine by putting the control lever back into the neutral position. The self-propelled sprayer slows down and stops.

Use the foot brake if necessary.



Before getting out of the cab:

- Ensure that the control lever is in neutral position.
- Activate the parking brake.
- Turn the engine off.
- Remove the ignition key.

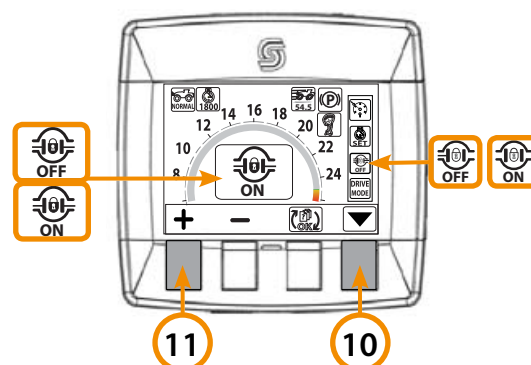
5.4.3. Anti-skid system

Sensors integrated to the hydraulic engines constantly measure the speed of each wheel. A computer compares these speeds and, if necessary, reduces the hydraulic power in a wheel when it starts to slide.

When turning, in order to improve the anti-skid system, sensors placed on the front axle measure the angle of the wheels to enable the calculator to optimise the anti-skid system.

The anti-skid function can only be used in Field mode.

- Press button ⑩ to select the anti-skid symbol.
- Press button ⑪ to activate the anti-skid system.



Note: Anti-skid can be activated or de-activated whilst driving.

5.4.4. Driving modes

Road Mode

In Road mode, the forwards movement of the Rubicon can be controlled using the pedal or the multi-purpose control lever.

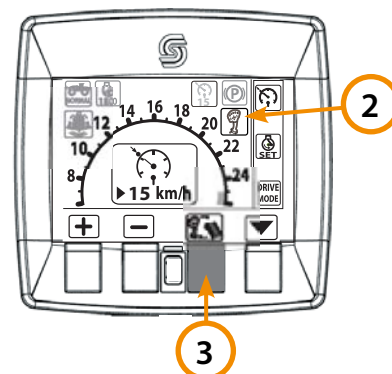
Icon ② indicates which controller is selected (pedal or control lever).

To change controller:

- place the control lever in the neutral position;
- then press button ③ to change the controller.

If the pedal is selected, the control lever provides the forwards direction.

- Control lever pushed: press the pedal to move forward.
- Control lever pulled: press the pedal to reverse.



Warning: The driving mode can only be changed when the control lever is in the neutral position.

Note: the pedal is deactivated in Field mode.

Note: by default the controller will be the control lever.

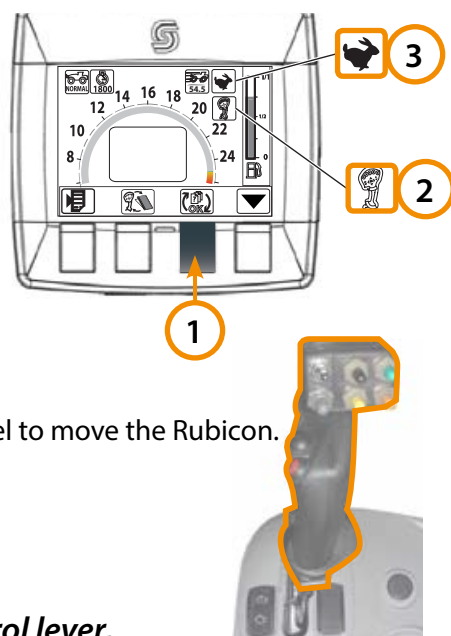


Road Mode with the control lever

The speed and direction of travel are controlled using the control lever. Push the control lever forwards to move the sprayer forwards. Pull the control lever backwards to move the sprayer backwards. In road mode, the engine speed varies according to the position of the control lever. The further the control lever is pushed or pulled, the faster the travelling speed.

Hydrostatic braking is obtained by moving the control lever to the neutral position. The Rubicon stops moving forwards when the control lever is placed in the neutral position. Dynamic braking is obtained by pressing the brake pedal.

- Icon ③ indicates the road mode (Hare).
- Icon ② indicates that the selected controller is the control lever.
- Press button ① to select the control lever as controller.
- Progressively move the control lever in the desired direction of travel to move the Rubicon.



Attention! When the driving mode is selected by the control lever, the pedal is inactive.

Note: in road mode, the maximum speed is 50 kph.

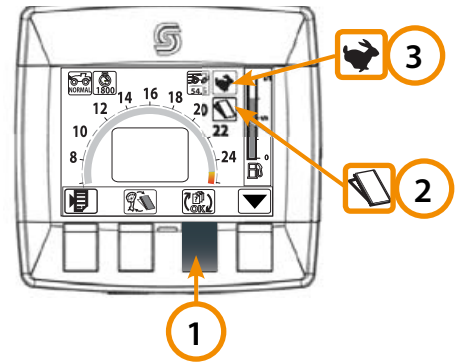
Road Mode with the pedal

Using the pedal makes the Rubicon easier to drive. In this mode, the engine speed is linked to the travelling speed. The transmission ratio is automatically controlled by the management of the hydraulic pump and motors, which reduces fuel consumption.

When you use the pedal, the travelling speed is controlled by the pedal, whereas the direction of travel is controlled by the control lever (forwards or backwards).

Hydrostatic braking is achieved either by releasing the pedal to the stop or by moving the control lever to the neutral position. Dynamic braking is obtained by pressing the brake pedal.

- Icon ③ indicates the Road mode.
- Icon ② indicates that the selected controller is the pedal.
- Press button ① to select the control lever as controller.



- Press or pull the control lever to select the direction of travel.
- Press the pedal to move the self-propelled vehicle, the speed increases as the pedal is pressed.



Note: In road mode, the maximum speed is 50 kph.

Field Mode

In the Field modes, management of the hydraulic motors depends on the selected Field mode.

The engine speed can be manually adjusted using the engine speed switch on the dashboard and is not affected by the position of the control lever.

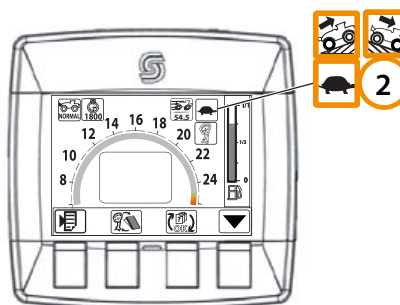
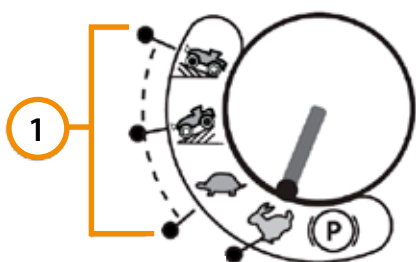
Field mode requires a minimum engine speed of 1500 rpm in order for the transmission to provide the necessary torque to move forwards and to brake. Hydrostatic braking is obtained by moving the control lever to the neutral position. The Rubicon completely stops when the control lever is placed in the neutral position. Dynamic braking is obtained by pressing the brake pedal.

There are 3 Field modes: flat, uphill and downhill mode:

- Flat Mode: the transmission pump flow is proportionally distributed throughout all of the hydraulic motors.
- Uphill Mode: allows sliding of the front wheels to be limited. When driving uphill, the power of the rear hydraulic motors is greater than that of the front hydraulic motors.
- Downhill mode: allows sliding to be limited downhill, the power of the front hydraulic motors is greater than that of the rear hydraulic motors.

To use one of the field modes:

- Turn the speed selector ① to one of the Field modes.
- Display ③ indicates the current mode.
- Press the engine accelerator switch ②.



- Progressively move the control lever in the desired direction of travel to move the Rubicon.



WARNING! When one of the Road or Field modes is selected, the cab access ladder automatically rises.

Note: it is possible to switch between the 3 Field modes while the Rubicon is moving.

Note: in field mode, the maximum speed is 35 kph.

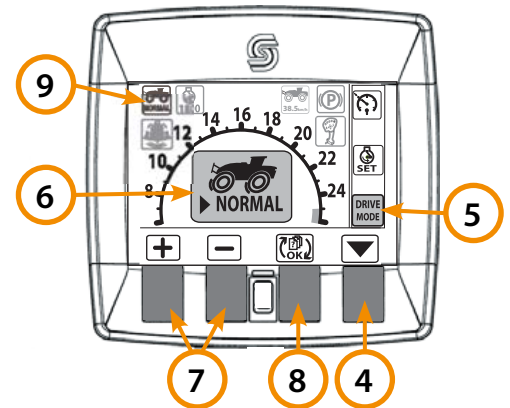
Driving control

The Rubicon self-propelled sprayer has 3 driving modes for optimising the overall performance of the transmission (speed/torque, progressive acceleration and braking) according to the operating conditions.

1. The **[COMFORT]** mode. This mode integrates more progressive acceleration of the self-propelled vehicle (*flexible driving*).
2. The **[NORMAL]** mode. This mode integrates normal acceleration (*intermediate driving*).
3. The **[POWER]** mode. This mode integrates more aggressive acceleration of the self-propelled vehicle (*responsive driving*).

To change the driving mode:

- Press button ④ until the ⑤ icon is selected. The driving mode will appear on the screen ⑥.
- Press the up and down buttons ⑦ to change the driving mode ⑥.
- Press button ⑧ to enter the value and return to the previous menu.
- The symbol ⑨ indicates the driving mode currently in use.



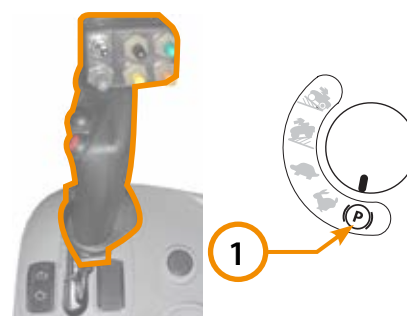
Note: the driving mode can be changed while driving.

Note: the default mode is the **[NORMAL]** mode.

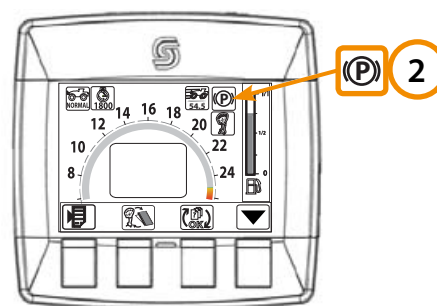
5.4.5. Hand brake

The hand brake uses the mechanical action of the discs inside the wheels to keep the machine stationary. To engage the hand brake:

- Pull the control lever to the neutral position (0) to stop the machine.
- Then turn the selector to the hand brake position ①.



- The display indicates that the hand brake is on ②.
- When the hand brake is activated, the forward/reverse function of the multi-purpose control lever is deactivated.



To disengage the hand brake:

- Check that the multi-purpose control lever is in the neutral position.
- Then turn the speed selector to the Road position or to one of the Field positions.

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

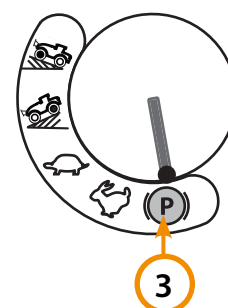


WARNING! When the hand brake is engaged, the cab access ladder automatically lowers.

WARNING! The hand brake is activated without hydraulic pressure in the braking system.

5.4.6. Engine shut down

- Place the control lever in the neutral position to stop the self-propelled vehicle.
- Turn the selector to the hand brake position ③.
- Reduce the engine speed for a few seconds to slow down the turbocharger and stabilise the engine temperature.



WARNING! When the hand brake is engaged, the cab access ladder automatically lowers.

- Turn the ignition key to the "stop" position to shut down the engine.
- Engage the battery main switch to disconnect the entire electrical power supply and prevent the battery from discharging during prolonged stoppage of the Rubicon.

5.4.6. Towing

Call your dealer in relation to towing the self-propelled vehicle.



WARNING!

The following manoeuvre must only be taken to allow the apparatus to come off the public thoroughfare by a few metres.

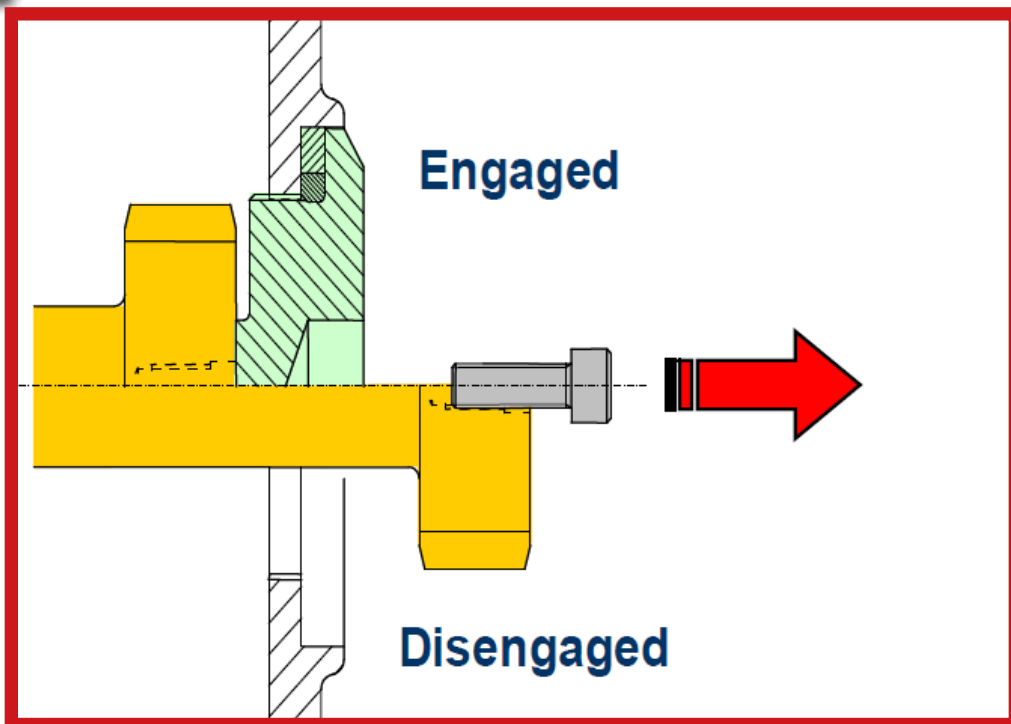
Implement all of the necessary road sign safety precautions.

There is no "dead centre". To tow the self-propelled vehicle you must uncouple the transmission shafts:

- between the transfer box and the rear axle;
- between the front axle and the transfer box.



Ensure that the self-propelled vehicle is wedged before releasing the hand brake.



5.5. Engine Management

5.5.1. Anti-stall system management

This device prevents the engine from stalling if the power required by the transmission is higher than that which is supplied by the engine.

To prevent the engine from dropping below the normal operating threshold, the force required by the hydraulic motors will be reduced by means of pumps.

Note: when the anti-stall function is activated, the travelling speed drops slightly compared to the normal operation of the self-propelled vehicle.

5.5.2. Engine overspeed management

This feature prevents the transmission from accelerating the engine beyond its maximum bearable speed during a deceleration.

If the engine speed exceeds a specified threshold, the setpoint of the hydraulic motors thus decreases the speed of the pumps so as to reduce the speed of the engine.

When the engine overspeed function is activated, hydrostatic braking is less efficient compared to the normal operation of the self-propelled vehicle.

Note: Engine overspeed management is not active when the brake pedal is used.

Travelling speed limitation in Road mode

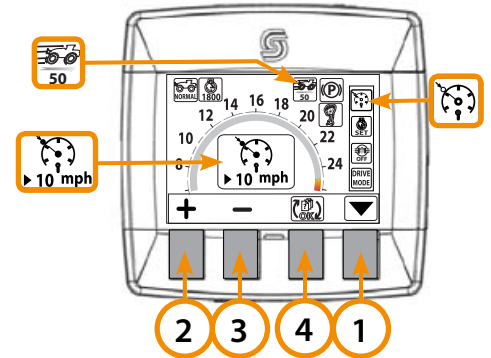
The travelling speed can be limited in Road mode:

- Turn the Road mode selector.
- Press button ① to select the "speed limiter" symbol.
- Press button ② or ③ to set the value.
- Press button ④ to enter the value and return to the previous menu.

Note: The maximum value is 50 kph.

Note: The minimum value is 3 kph.

Note: The default value is 25 kph.



Travelling speed limitation in Field mode

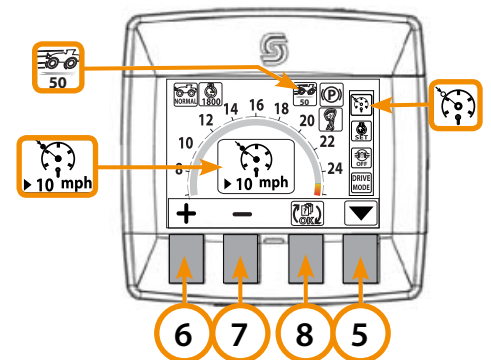
The travelling speed can be limited in Field mode:

- Turn the driving mode selector to one of the 3 Field modes (flat, uphill, downhill).
- Press button ⑤ to select the "speed limiter" symbol.
- Press button ⑥ or ⑦ to set the value.
- Press button ⑧ to enter the value and return to the previous menu.

Note: The maximum value is 35 kph.

Note: The minimum value is 3 kph.

Note: The default value is 25 kph.



Pre-set the engine speed

The engine speed can be pre-set to values between 1200 rpm and 2500 rpm.

To change the pre-set engine speed value:

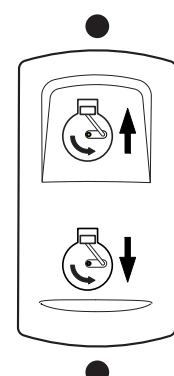
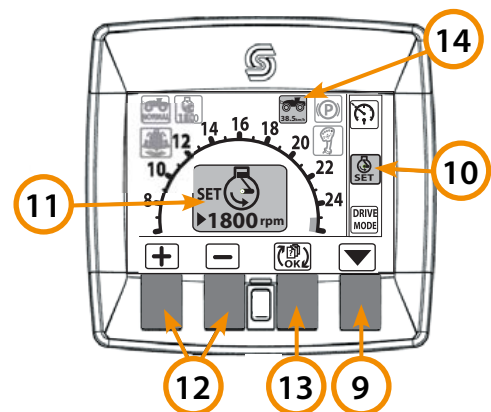
- Press button ⑨ until the "SET" symbol ⑩ is selected.
- The ⑪ icon will display the pre-setting function with the currently pre-set engine speed.
- Press the + or - key ⑫ to increase or decrease the value in 100 rpm increments.
- Press button ⑬ to enter the value and return to the previous menu.

The symbol ⑭ indicates the pre-set value of the engine speed.

The fuel gauge reappears after 5 seconds of inactivity.

To deactivate the pre-set engine speed, press the adjacent button.

Note: 2500 rpm is the default engine speed.



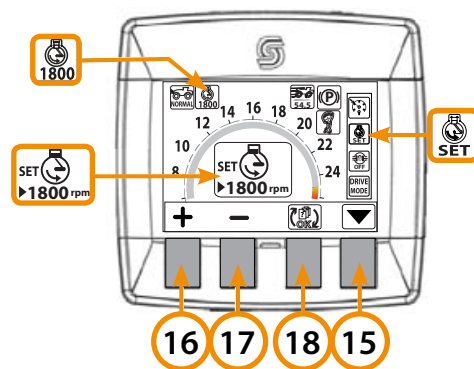
Engine speed limitation in Field mode

The engine speed can be limited. This limitation is only applicable in Field mode.

- Press button ⑮ to select engine speed limitation.
- Press button ⑯ or ⑰ to set the value.
- Press button ⑱ to enter the value and return to the previous menu.

Note: The maximum value is 2500 rpm.

Note: The minimum value is 1000 rpm.



Engine speed limitation – hydraulic oil temperature too low

When the hydraulic oil temperature is below 30°C, the engine speed is limited to 1500 rpm. This limitation protects the hydraulic transmission components.

When the hydraulic oil temperature exceeds 30°C, the engine automatically accelerates to reach 2500 rpm. However, the forward speed remains constant.

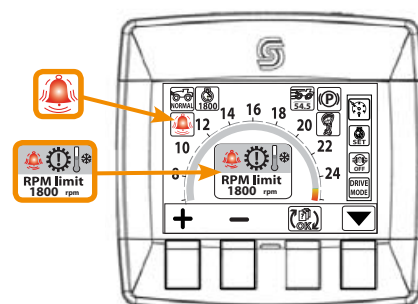
To return to normal use of the system:

A. Field Modes:

Reduce the engine speed below 2200 rpm, then push the control lever to return to the normal operating conditions.

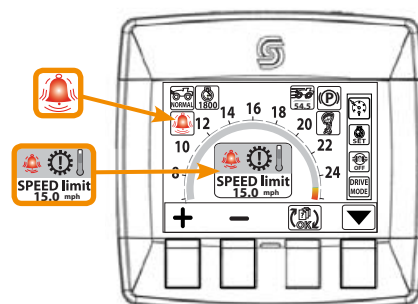
B. Road Mode:

Pull the control lever to the neutral point to drop the engine speed below 2200 rpm, then push the control lever to return to the normal operating conditions.



Engine speed limitation – oil temperature too high

When the oil temperature in the transmission reaches 90°C, the computer reduces the oil flow in the hydraulic system, which limits the speed of the self-propelled vehicle.



WARNING! The self-propelled vehicle will stop if the hydraulic oil temperature reaches 95°C.

5.6. Track width adjustment

The track width of the front and rear axles of the machine is adjustable. The maximum variation of the track width is 1 metre, each wheel is adjusted independently.

- ①. Front left wheel.
- ②. Front right wheel.
- ③. Rear left wheel.
- ④. Rear right wheel.



To change the track gauge:

- Hold in the switches to move the axles to the desired width.



WARNING! To prevent imbalances in the machine, the clearance between the left and right wheels must be identical (relative to the centre).

Note: adjusting the width of the track gauge must be carried out in the field, away from deep ruts, travelling at low speed.

5.7. Unfolding/Folding booms



Before manoeuvring the boom in any way, make sure that no-one is in the operating area of the machine, there are no power lines overhead and no obstacles are present. The self-propelled vehicle must be at a standstill during the folding/unfolding process.



5.7.1. Unfolding the booms

- Make sure that the self-propelled vehicle is on level ground and at a standstill (speed at zero and the control lever in neutral) and the engine is at 1500 rpm.
- Push button ① upwards to tilt the left-side frame up. The left boom is released from its support.
- Push button ② upwards to tilt the right-hand frame up. The right boom is released from its support.
- Press button ③ to check that the entire boom is properly locked before opening the arms.
- Press button ④ to unfold the main sections.
- Push button ⑤ downwards to activate the left-side tilt adjustment and bring the left-hand boom to a horizontal position.
- Push button ⑥ downwards to activate right-side tilt adjustment and bring the right-hand boom to a horizontal position.
- Push button ⑦ upwards to raise the entire boom.
- Turn button ⑧ clockwise to release the frame of the boom.
- Push button ⑨ downwards to lower the entire boom to a height of one metre from the ground.
- Press button ⑩ to unfold the left outer section.
- Press button ⑪ to unfold the right outer section.
- Press button ⑫ to unlock the entire frame.
- The boom is now in *Work* mode.

} To be carried out at the same time

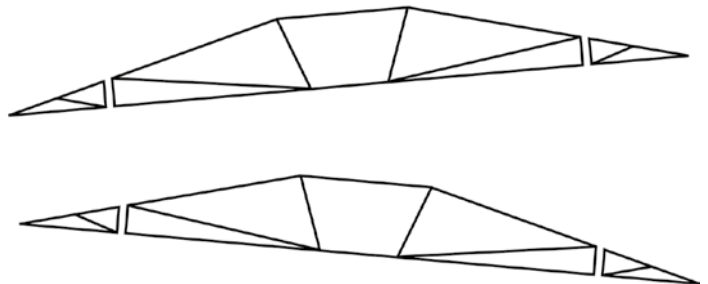
Do not manoeuvre outer and inner sections at the same time.



Buttons ⑬ and ⑭ are used to adjust to slopes.

Towards the left, the boom slants as shown.

Towards the right, the boom slants as shown.





5.7.2. Folding the booms

1. Make sure that the self-propelled vehicle is on level ground and at a standstill (speed at zero and the control lever in neutral) and the engine is at 1500 rpm.
2. Make sure that the unfolded boom is in a horizontal position.
3. Press button ① to lock the entire boom.
4. Press button ② to fold the right outer section.
5. Press button ③ to fold the left outer section.
6. Push button ④ upwards to activate the right-side tilt adjustment and raise the right-hand boom to the topmost position.
7. Push button ⑤ upwards to activate the left-side tilt adjustment and raise the left-hand boom to the topmost position.
8. Push button ⑥ upwards to raise the entire boom to the topmost position.
9. Lock the boom by turning button ⑦ anti-clockwise.
10. Push button ⑧ downwards to lower the boom. Wait a few seconds to relieve the nitrogen accumulators.
11. Press button ⑨ to fold the main sections.
12. Push button ⑩ downwards to place the right boom back into its support.
13. Push button ⑪ downwards to place the left boom back into its support.
14. Maintain buttons ⑩ and ⑪ pushed down for 4 to 5 seconds to relieve nitrogen accumulators.

} To be carried out at the same time

The boom is in Road mode.



ALWAYS REMEMBER:

The booms must be unfolded and folded with the engine at 1500 rpm.



Do not forget to relieve nitrogen accumulators sufficiently to avoid the booms from bouncing on the supports due to bumps on the road, as this may cause damage to boom sections and supports.

5.8. The H-Tronic® device (option)

5.8.1. How the H-Tronic works



The H-Tronic serves to optimise spraying and make the self-propelled vehicle easier to drive. It automatically positions the boom to a pre-set height, and lifts the boom away from the crops at the end of the field.


The function is activated in the Hardi application by tapping #. Tap again **ON** to deactivate the function.

The boom positioning and returning to the high position take place at start and end of spraying ①.


5.8.2. Adjusting the H-Tronic®

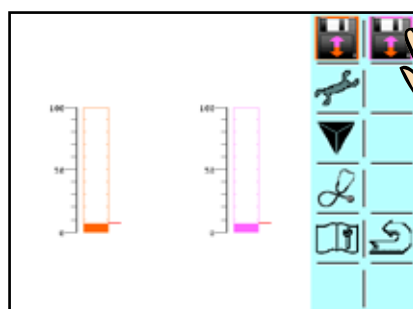
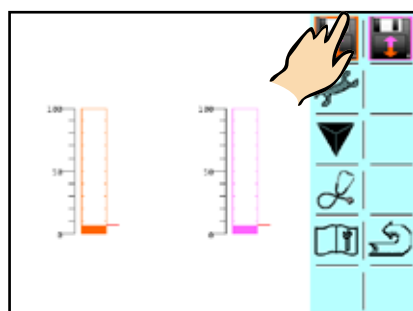
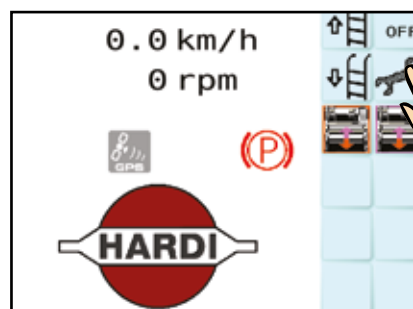
H-Tronic adjustment is accessed in the Hardi application by tapping the button as shown. The Settings screen is displayed. You can see two bars with measurements at the side. The left-hand bar is used to set the lowest position (spraying position), and the right-hand bar is used to set the highest position (end-of-field position).

Setting the low position:

- Lower the boom to the desired working height.
- Confirm by tapping #.
- A red bar appears in the  left-hand chart.

Setting the high position:

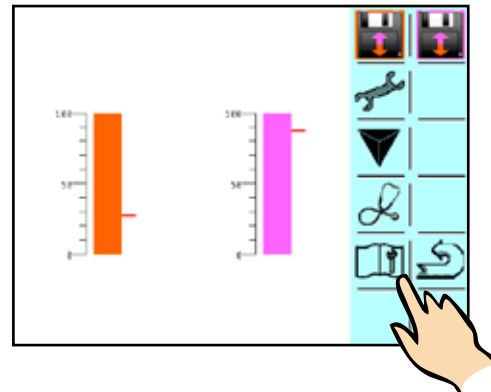
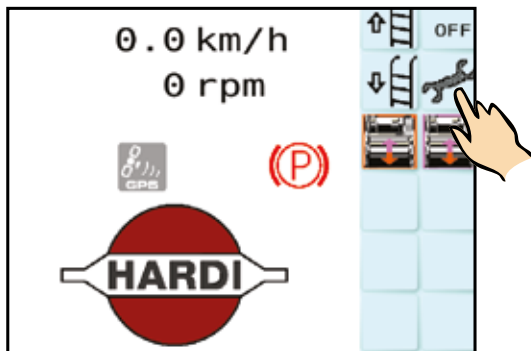
- Raise the boom to the desired 'end-of-field' position.
- Confirm by tapping #.
- A purple bar appears in the  right-hand chart.




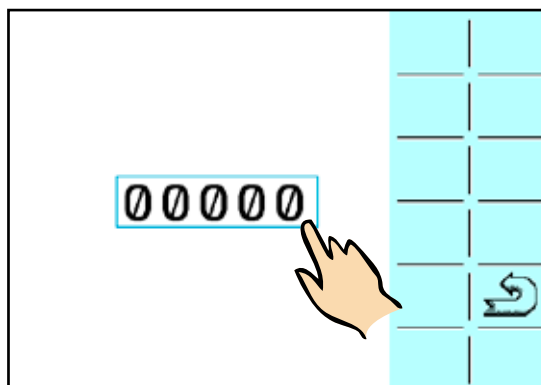
VI. MAINTENANCE

Maintenance can be followed up with the help of the terminal. The terminal enables you to view and enter the drainage intervals, along with the replacement quantities and types of fluid. It also enables you to view the references and the intervals for changing filter elements.

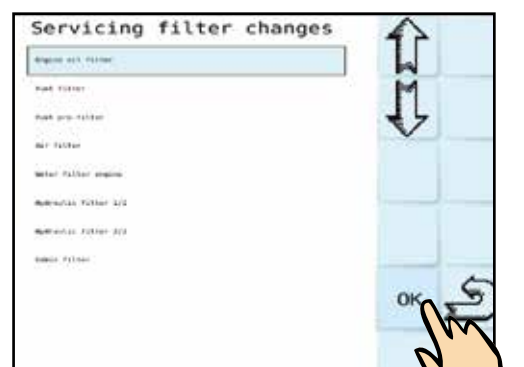
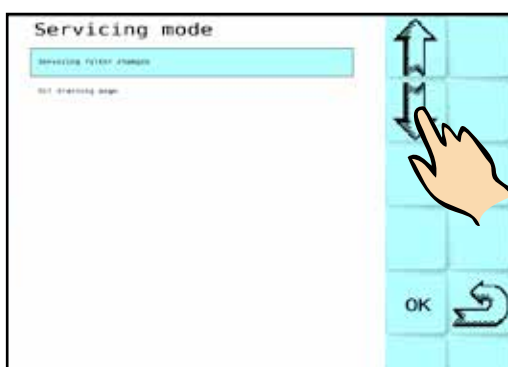
To open the maintenance menu:



In the Engine Interface View, tap the key, then  the key.

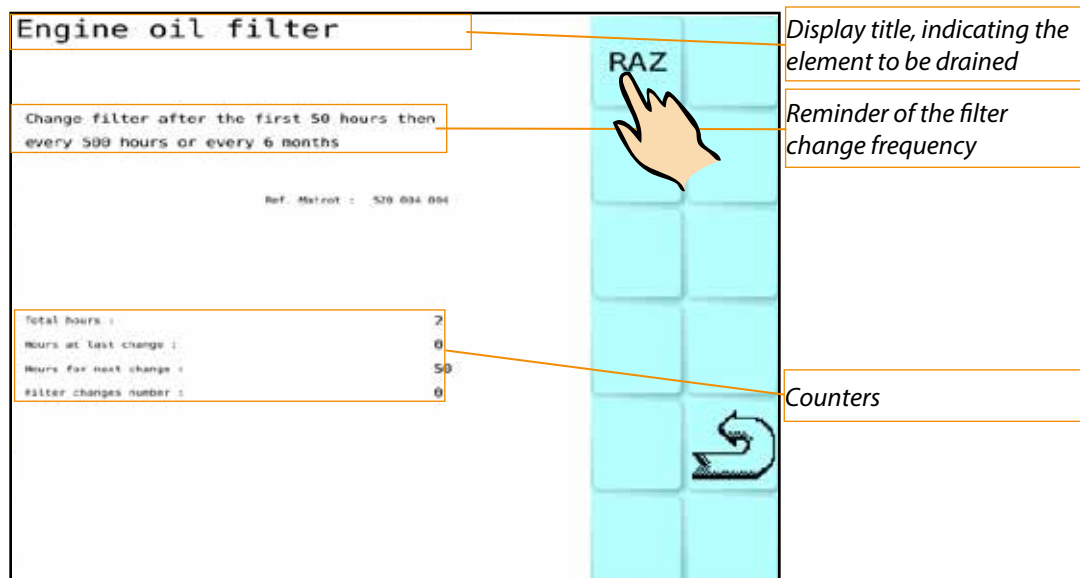


Enter the code 0000 using the number keypad and confirm (not illustrated).

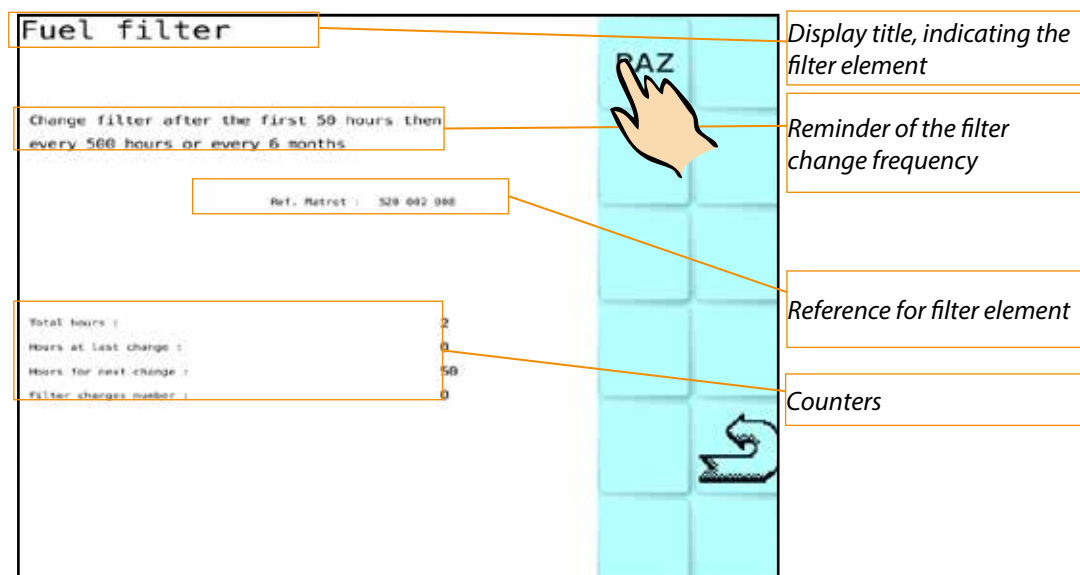


In the maintenance menu, use the arrows (keys 1 and 2) to scroll up and down, and tap OK to confirm and open the filter view or drainage view.


Example of a Drainage view



Example of a Filter view



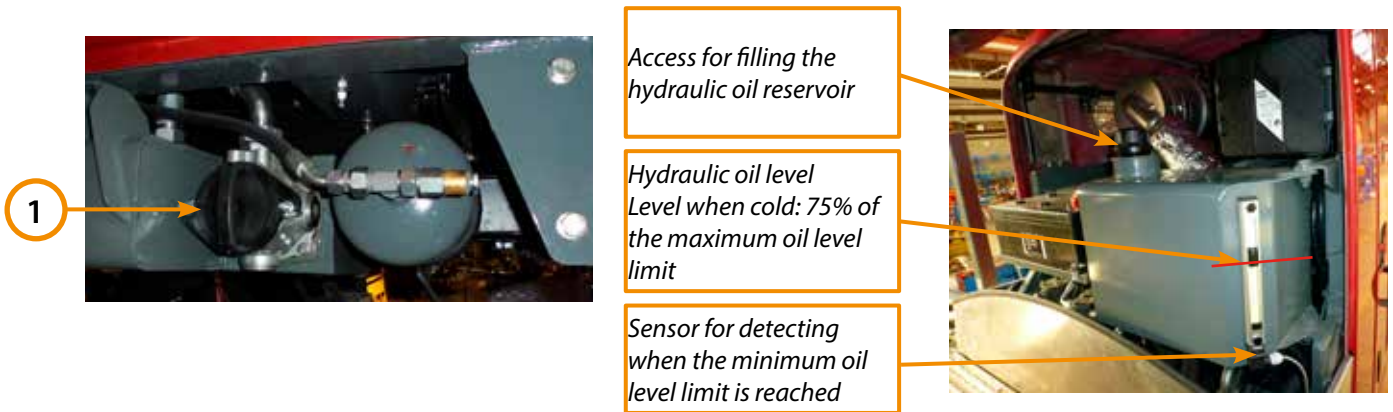
To put all the counters back to zero, tap the RAZ key in the view corresponding to the filter element or drainage conducted.

The key is used to  return to the Drainage and Filter views.

6.1. Hydraulics

6.1.1. Filters

Suction filter between the tank and the pump.



Under normal operating conditions, filter element ① must be replaced at the following intervals:



Every 400 hours after the vehicle was first commissioned, or every year
Thereafter: refer to the Rubicon maintenance booklet
Filter cartridge reference:
ma 520,001,012

The filter cartridge is changed with the engine switched off.

To replace the cartridge:

1. Unscrew the filter cover and remove the cartridge.
2. Clean the gasket surface of the filter housing.
3. Engage the cartridge into the filter housing.
4. Screw the filter cover back on (oil the gasket).

Only genuine HARDI spare parts can guarantee your self-propelled vehicle



Inspect for leaks: a leak in the suction system can cause considerable damage to the pump and hydraulic motor.



Never disconnect an electrical probe as this may lead to considerable damage to the pump and the hydraulic motor.

6.1.2. Replacing oil and oil levels

Under normal operating conditions, hydraulic oil is replaced:



Every 800 hours or every two years

- A buzzer, located on the relay card and fuse box, sounds when the oil level is too low.
- It is recommended you drain the system when the oil is hot.
- The oil level must be 75% higher than the limit marked on the hydraulic oil tank.
- Dispose of used oil in compliance with environmental protection legislation (Directive no. 87/101/EEC).



Product	'Light' used oils
Hazard level	Dangerous
Specific regulations	No. General regulations for oils
Type of possible re-use	Material
Advice	<ul style="list-style-type: none">– Do not mix with other products– Store them in well-closed leak-tight containers– Contact an approved oil collecting and/or a 'light' used oil regeneration/recycling company to get your oil collected and recycled.



The Rubicon self-propelled vehicle is delivered with TOTAL EQUIVIS ZS 46 oil.

- **175 110 000 in 20 litre quantities,**
- **175 279 000 in 60 litre quantities.**



Once the reservoir has been drained, you need to change the filter cartridge – the new oil may have impurities in it.

Refer to the Rubicon maintenance booklet for more information.



6.1.3. Precautions after changing filter cartridges or oil

1. Start the engine and let it idle for one minute to allow the feed pump to be correctly primed.
2. Ensure that there are no leaks in the suction lines.
3. Drive the self-propelled vehicle forwards and then in reverse it to check it operates correctly.

6.1.4. Practical advice



- If you change a hydrostatic pump or a flexible hose on the pump, once it has been assembled and before the engine is started, you must fill the crankcase via the draining tube hole.
- The leak-tightness of hydraulic systems must be checked regularly.
- The oil cooler must be cleaned regularly ② (clean the honeycomb grills).
- Check the feed pressure (between 20 and 30 bar).
- Any disassembly and reassembly must take place in a clean location.



6.1.5. Pressure filters

1. Make sure you have a container at hand to collect any oil that may drip from the filters.
2. Unscrew the filter shaft.
3. Remove the filter cartridge and replace it with a new one.
4. Screw the shaft back into place.

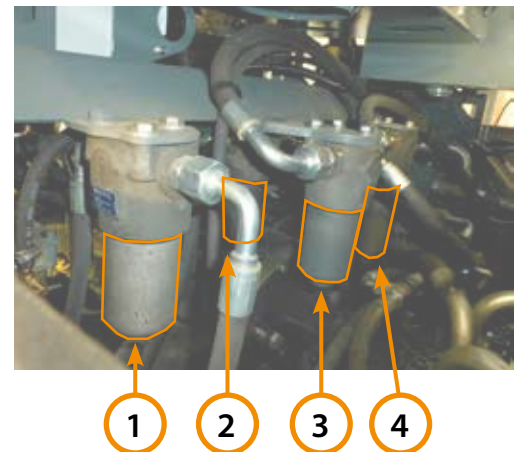
Filter cartridge reference:

Cartridge (*forward direction*) ①: ma 520,001,010

Cartridge (*brake + reverse direction*) ②: ma 520,001,010

Cartridge (*boom*) ③: ma 520,001,010

Cartridge (*spraying pump*) ④: ma 520,001,014



SAFETY



Never store machine with an empty hydraulic system.



Never start the engine if there is no oil in the system.



**If the oil level is abnormally low, an alarm sounds.
Stop the engine immediately and find the cause.
Refill with the recommended oil.**

6.2. Engine



For more information, refer to the *Cummins instruction manual* supplied when your self-propelled vehicle was delivered.

6.2.1. Recommended lubricants



Refer to the *Cummins instruction manual*.

The motor oil used to fill the engine's crankcase is an API 'CD/SF' classed oil **TOTAL RUBIA SAE 30 suitable for the running-in period.**

6.2.2. Drainage intervals



1st oil change after 50 hours of operation
Then every 500 hours



See the *Rubicon maintenance booklet*.



Do not spill used oil on the ground. Dispose of used oil in compliance with environmental protection legislation! (Directive no. 87/101/EEC).



Check the oil level every morning.



Oil level

Filling opening



Drainage



Check battery electrolyte levels every 125 hours.



6.2.3. Air filter

Your Rubicon self-propelled vehicle is equipped with a dry air filter.



Refer to the *Cummins instruction manual* for additional practical information.



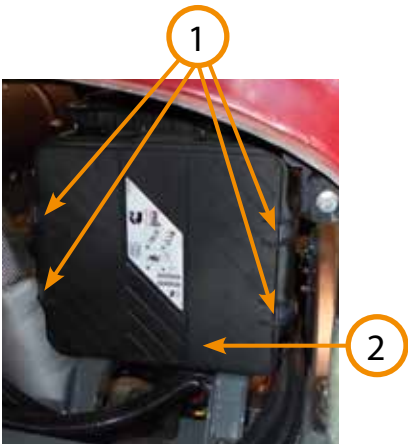
For information on air filter cleaning and filter cartridge replacement frequencies, see the Rubicon maintenance booklet.

To access the filter cartridges:

- Release the clips ①.
- Remove the cover ②.

Air filter cartridge references:

	Primary cartridge	Backup cartridge
Tier IV	ma 520,003,001	ma 520,003,002



A warning light ③ comes on when cartridges are clogged.



6.2.4. Oil filter



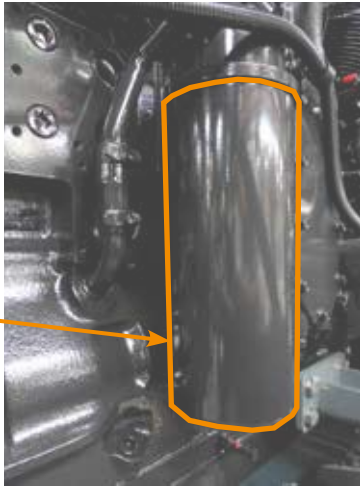
Refer to the *Cummins instruction manual* for more information.



Also refer to the *Rubicon maintenance booklet* for maintenance frequencies.

Number	Product name	References
④	Oil filter	ma 20,004,004

4



6.2.5. Fuel filters



Refer to the CUMMINS instruction manual for more information.



Also refer to the Rubicon maintenance booklet for maintenance frequencies.

Only genuine HARDI spare parts can guarantee your self-propelled vehicle.

Number	Product name	References
①	Fuel filter	ma 520,002,008
③	Fuel/water separator pre-filter	ma 520,002,007

1

3



6.2.6. Intake and exhaust manifold fittings

Regularly check the tightness of collars and the state of hoses.



6.2.7. Engine cooling system



Refer to the Cummins instruction manual for more information.



Also refer to the Rubicon maintenance booklet for maintenance frequencies.

Number	Product name	References
③	Coolant filter	ma 520,007,001

3



The cooling system is filled with a -35°C anti-freeze product such as:

- TOTAL COOLELF AUTO SUPRA -37°C

Water must not be added to the coolant.

The multifunction display is used to monitor the temperature.
HARDI shall not be held liable if temperatures fall below freezing and in the event of incorrect maintenance.



Clean the cooling radiator regularly (honeycomb grills).



6.3. Type of oil and capacity

6.3.1. Engine



1st oil change after 50 hours of operation
Then every 500 hours or once a year

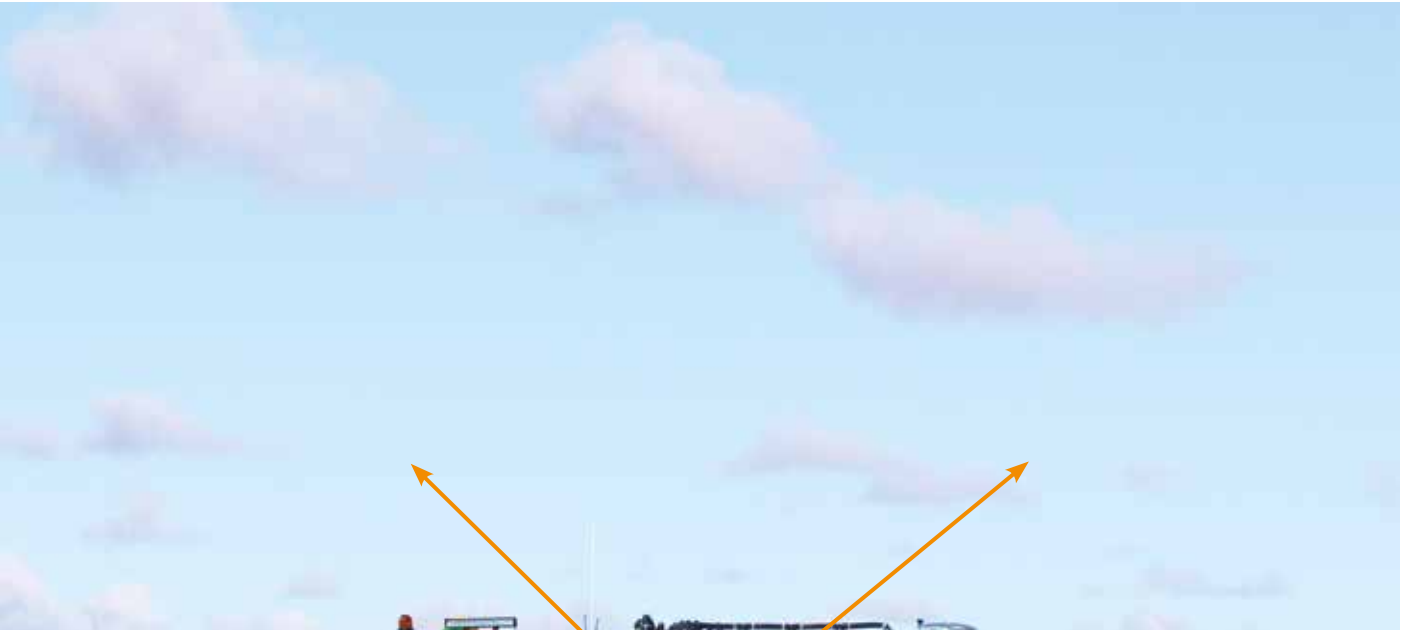
COMPONENTS	TYPE (TOTAL brand)	CAPACITY in litres
CUMMINS engine	15w40	Without oil filter, 22.7 litres With oil filter, 26.48 litres

6.3.2. Transmission parts

COMPONENTS	TYPE of oil	1 st oil change	Following oil changes	Capacity in litres
Reducers	80/90 Total TM	500h	1000 hrs or once a year	3.5 Litres/Reducer



Make sure you check the tightness of nuts after 20 hours of use. Then after every 50 hours of use.



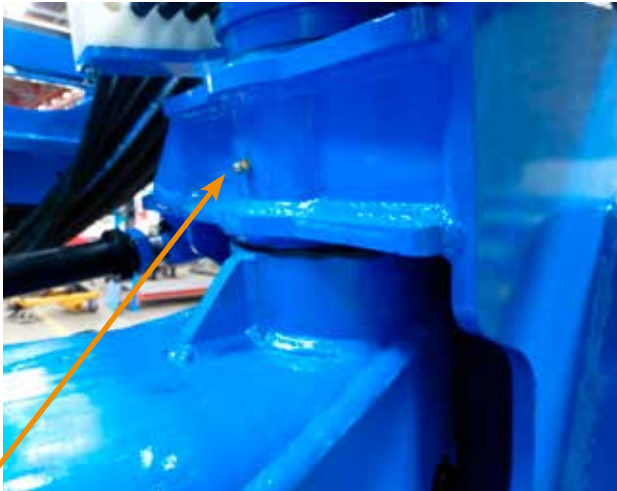
Maximum tightening torque:
70 daN/m

6.4. Lubrication

6.4.1. Chassis

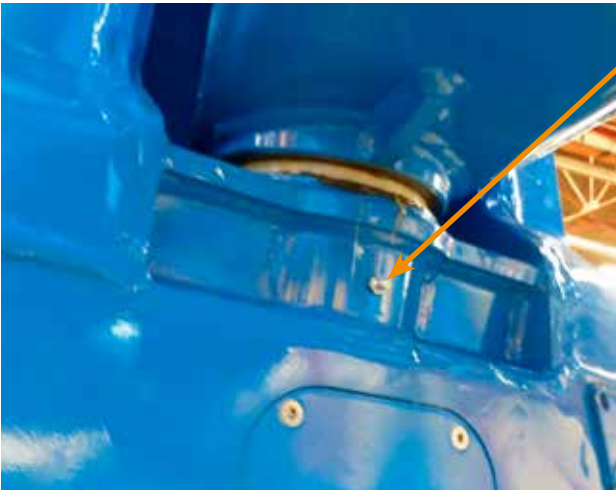


Upper left-side front/back pivot



Upper right-side front/back pivot

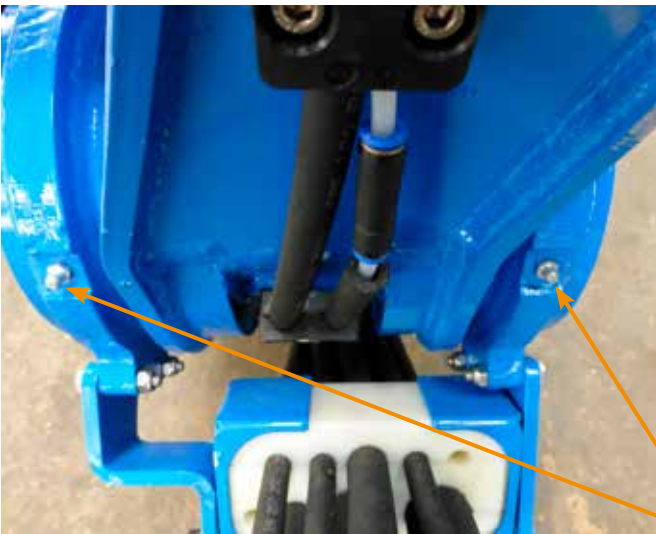
125 hours



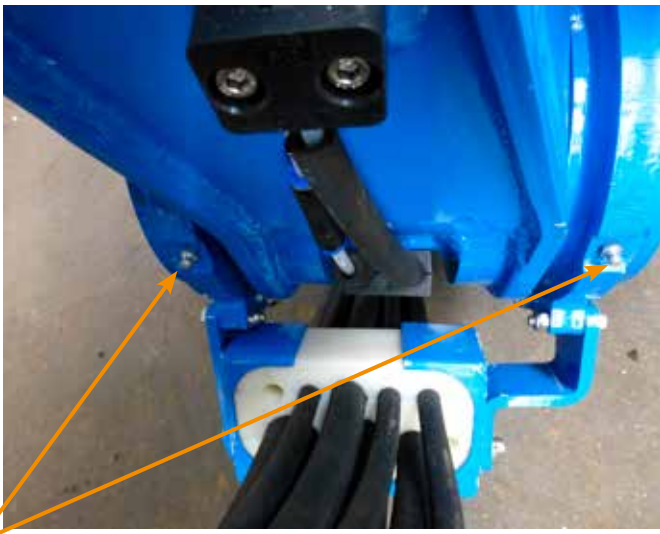
Lower left-side front/back pivot



Lower right-side front/back pivot

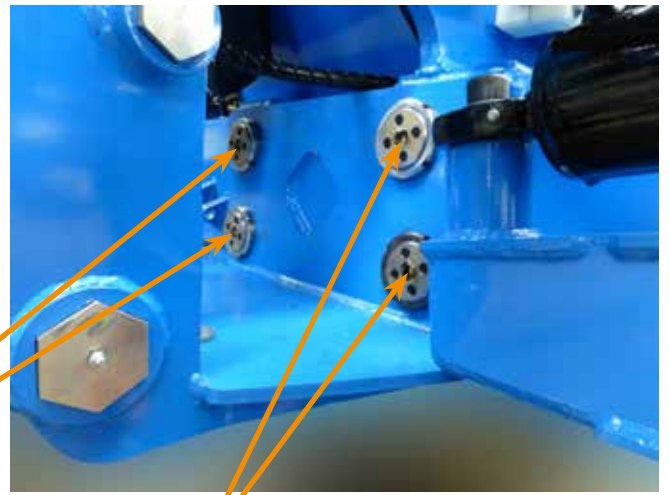
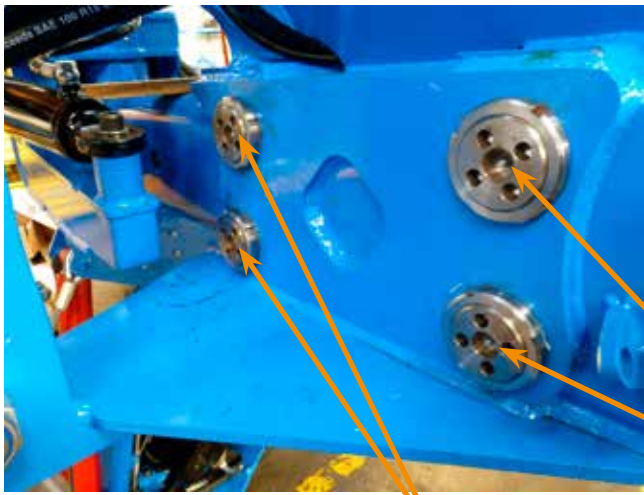


Left-side front/back suspension pivot

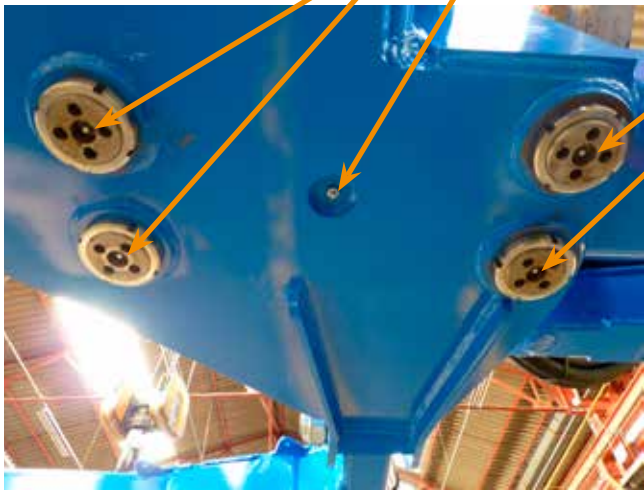


Right-side front/back suspension pivot

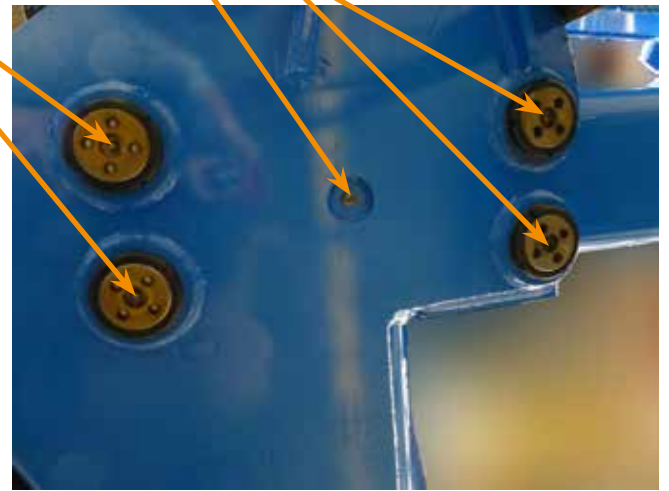
Every...



Every...



Right-side front/back adjustable width axles

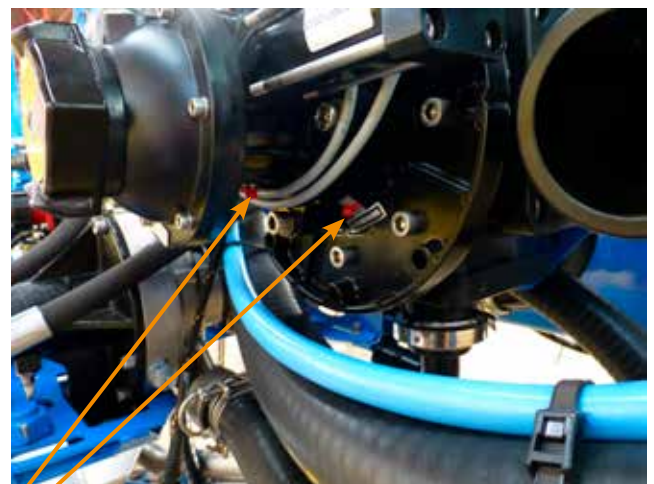


Left-side front/back adjustable width axles

Every...



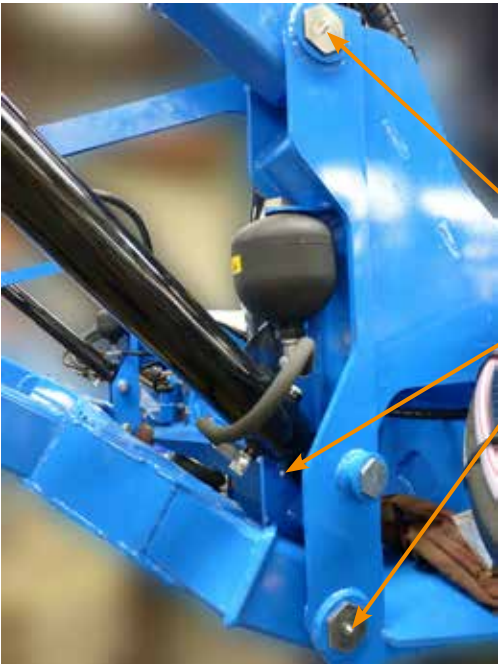
TurboFiller lowering pivot



Motorised suction/pressure valve

Every...

6.4.2. Lifting mechanism and front frame

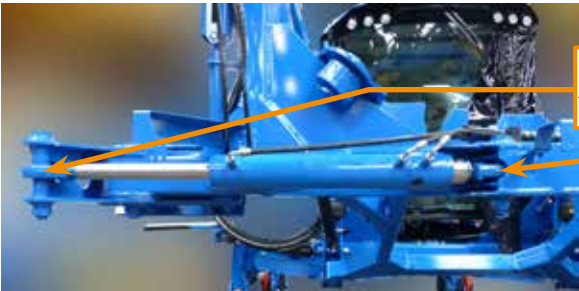


Left-side frame lifting mechanism

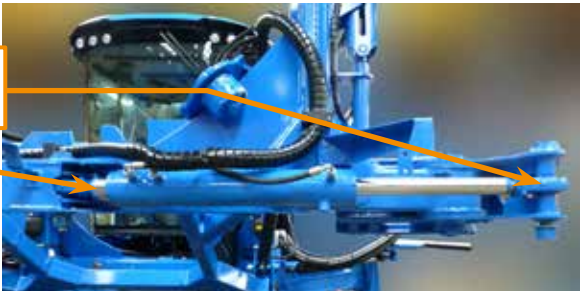


Right-side frame lifting mechanism

70 hours – once a week



Right-side boom unfolding cylinder

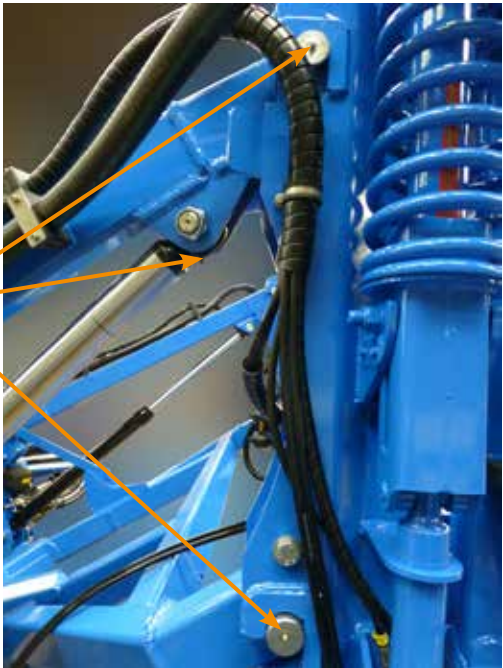


Right-side boom unfolding cylinder

70 hours – once a week



Left-side frame lifting mechanism



Right-side frame lifting mechanism

70 hours – once a week

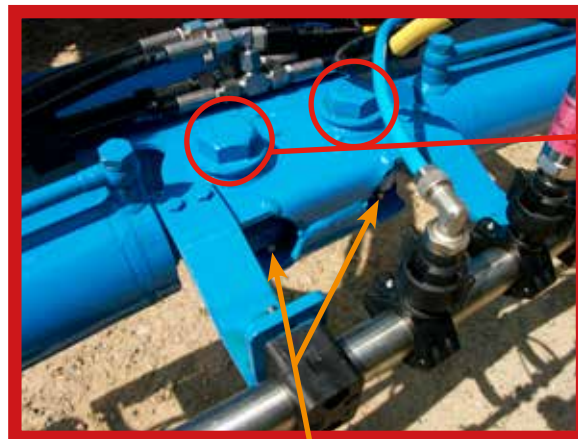


70 hours –
once a week



Tightness to be checked
every 50 hours.

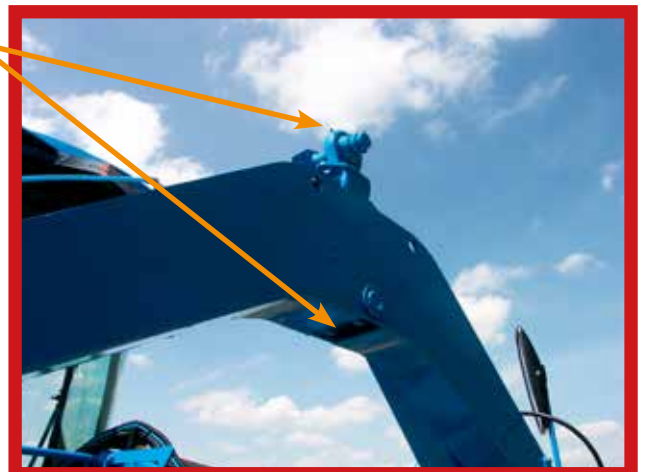
Torque: **143 daN/m**



70 hours –
once a week



70 hours –
once a week



6.4.3. Booms



70 hours –
once a week



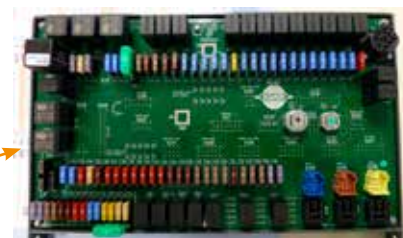
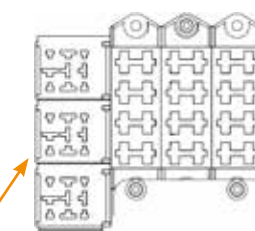
6.5. Relays and fuses

Protection (fuses, photo below)

Fuses are located behind the armrest. Move the seat forwards and fold the backrest down for easier access.



Relays and fuses



6.6.1. Relays

Relays	Current	Product name
K01	30A	Fan speed 3 relay
K02	30A	Fan speed 2 relay
K03	30A	Air conditioning and fan speed 1 relay
K04	25A	Air conditioning compressor micro relay
K05	25A	Additional micro relay
K06	25A	Additional micro relay
K07	25A	Left boom light relay
K08	25A	Right boom light relay
K09	25A	Hazard light micro relay
K10	25A	Micro relay for cab central work headlight
K11	25A	Micro relay for cab external work headlight
K12	25A	Micro relay for cab middle work headlight
K13	25A	Micro relay for cab central work headlight
K14	25A	Micro relay cab frame work headlight
K15	25A	Micro relay cab frame work headlight

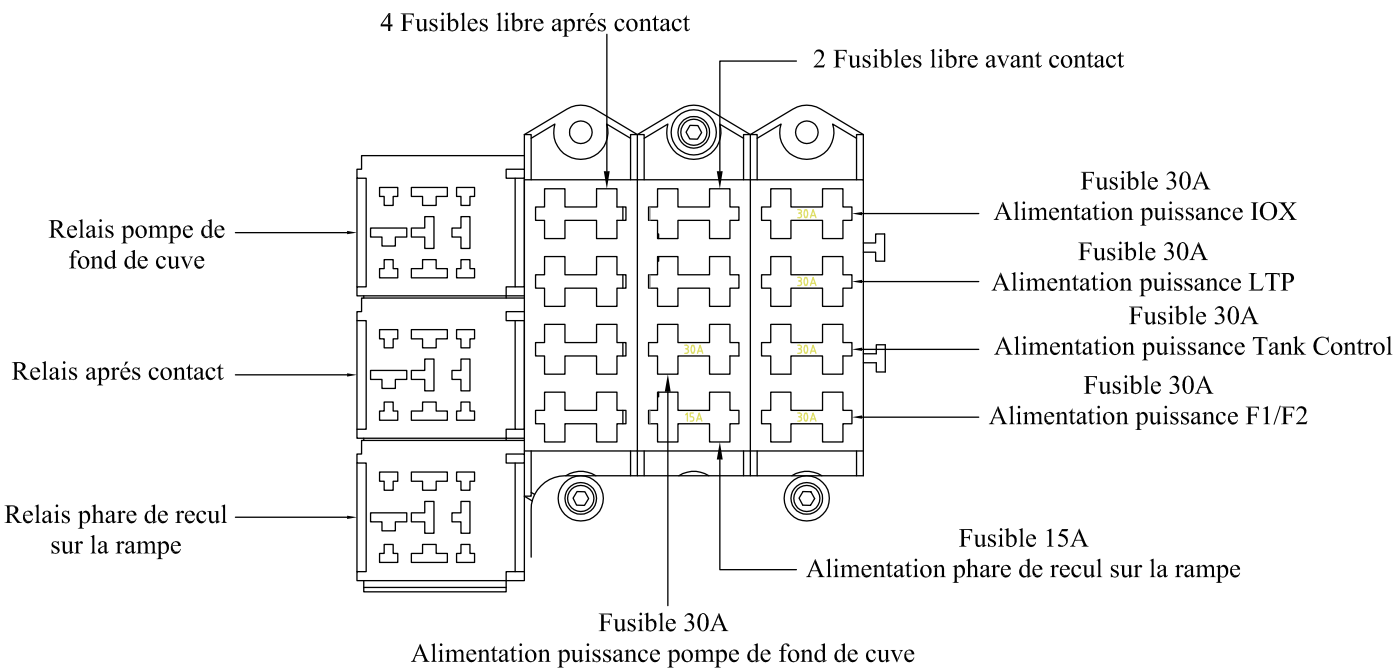
Relays	Current	Product name
K16		Timer
K17	25A	Sidelight micro relay
K18	25A	Micro relay for controller-released starter
K19	25A	Ignition micro relay for neutral position
K20	40A	After ignition relay
K21	40A	After ignition relay
K22	25A	Brake light relay
K23	25A	Tool option relay
K24	25A	Micro relay for parking brake solenoid valve
K25	25A	Micro relay for valve group lighting
K26	25A	Additional micro relay 1
K27	25A	Micro relay for spraying pump shutdown at braking
K28	25A	Micro relay for PVG input at braking
K29	40A	Additional micro relay 4
K30	40A	Additional micro relay 5
K31	40A	Additional micro relay 6

6.6.2. Fuses

Fuse no.	Current	Product name
F1	3A	Timer
F2	25A	Sidelight fuse
F3	3A	Cab inside lighting fuse
F4	15A	Fuse for main beam, low beam and sidelight switch input
F5	15A	Fuse for K01 relay – fan speed 1
F6	15A	Fuse for K02 relay – fan speed 2
F7	30A	Fuse for air conditioning and K03 relay – fan speed 3
F8	5A	Before ignition fuse for vehicle radio
F9	7.5A	Electronic side rear-view mirror fuse
F10	5A	Air conditioning compressor fuse
F11	7.5A	Sauer controller input fuse
F12	7.5A	Sauer controller input fuse
F13	10A	No. 268 EC fuse for LTP controller
F14	10A	No. 288 EC fuse for F1/F2 controller
F15	10A	No. 269 Power fuse for IOX module – handle
F16	15A	Free
F17	15A	Free
F18	20A	Fuse for battery flashing indicator unit
F19	15A	Boom light fuse
F20	15A	Boom light fuse
F21	15A	Hazard light fuse
F22	15A	Fuse for cigarette lighter and 12 V socket
F23	15A	Fuse for pneumatic seat compressor unit
F24	15A	Fuse for cab central work headlights
F25	15A	Fuse for cab external work headlights
F26	15A	Fuse for cab middle work headlights
F27	15A	Fuse for cab central work headlight
F28	15A	Fuse for headlights on frame
F29	15A	Fuse for headlights on frame

Fuse no.	Current	Product name
F29	15A	Fuse for headlights on frame
F30	15A	Fuse for ignition key input
F31	10A	Fuse for starter
F32	15A	Fuse for low beam headlights
F33	15A	Fuse for main beam headlights
F34	10A	Fuse for valve group lighting
F35	25A	Fuse for windscreen washer and wipers
F36	7.5A	Fuse for audible alarms
F37	10A	No. 20 After ignition fuse for Cummins engine controller
F38	10A	No. 244 After ignition fuse for LTP controller probes
F39	10A	No. 310 After ignition fuse for LTP, IOX, F1, F2 controller display
F40	10A	No. 22 After ignition fuse for terminal, ladder and TurboFiller switch
F41	10A	No. 16 After ignition fuse for adjustable width axles and PVG at braking
F42	10A	Fuse for parking brake solenoid valve
F43	10A	Brake light fuse
F44	7.5A	Sauer controller input fuse
F45	7.5A	12 V Battery not used
F46	7.5A	Sauer controller input fuse
F47	5A	Sauer controller input fuse
F48	5A	Free in X290-15
F49	5A	Fuse for nitrogen ball oil pressure buzzer
F50	5A	Fuse for hydraulic oil level buzzer + 1 free connected input
F51	7.5A	Fuse for reverse ignition input, rear camera and engine indicator light
F52	5A	Fuse for Sauer display
F53	5A	After ignition fuse for flashing indicator unit
F54	5A	Fuse for cab headlight switch input
F55	3A	After ignition fuse for air conditioning
F56	3A	Fuse for CAN diagnostics socket
F57	7.5A	Fuse for rear sidelights
F58	7.5A	Fuse for front sidelights

6.6.3. Additional relays and fuses in the controller compartment



6.6. Filters

The filter is under the roof in the cab.



The filter contains active carbon which becomes saturated over time with humidity.

The filter must be changed:

- As soon as it is saturated.
- As soon as you can smell plant protection products in the cab.
- At least every 200 hours.
- At the start of each spraying season (spring/autumn).

Before changing the filter in the cab, make sure you wear personal protective equipment.

Release the two clips ①, to access the filter.

Remove the used filter and put it into a bag. Dispose of it via the appropriate recycling procedure.

Replace it with a filter suitable for your cab:

Cab type	Filter type	Reference
Category IV	All-in-one filter (cl-4)	ma 520,003,003



Never blow compressed air through the filter
Never wash the filter



Clean the condenser now and again (honeycomb grills) ②.

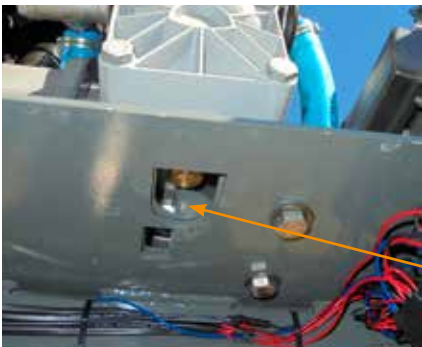
Only genuine HARDI spare parts can guarantee your self-propelled vehicle.



For your safety, you must use genuine HARDI cab filters. Other equivalent filters do not meet the same requirements as genuine HARDI cab filters.

6.7. Rinse pump

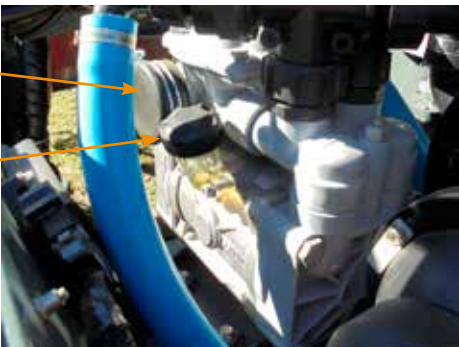
TYPE (TOTAL brand)	CAPACITY in litres	FREQUENCY
TOTAL RUBIA TIR 8600	1 litre	1 st oil change after 50 hours of operation Then once a year.



Filling opening

Level

Drainage cap



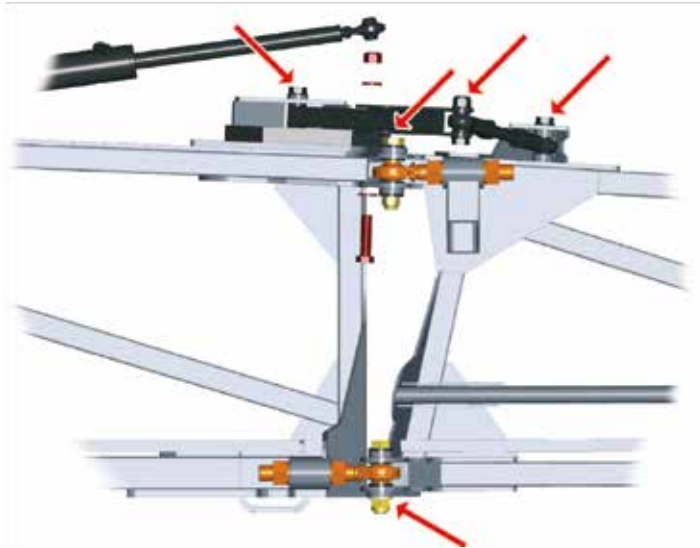
6.8. RA boom maintenance

6.8.1 Boom adjustment

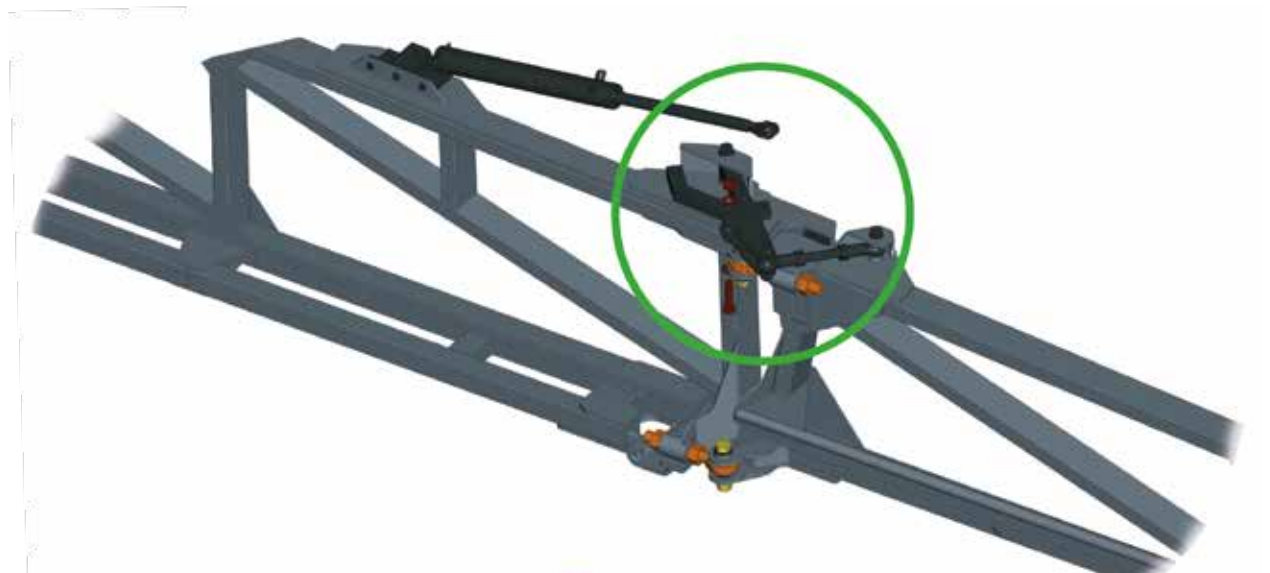
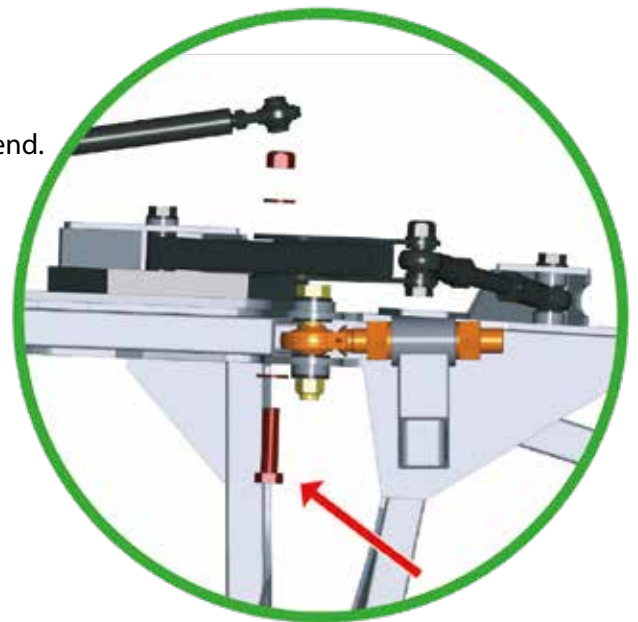
Tighten all the bolts at the hinge points before adjusting the boom.



Use a box spanner to tighten the bolts all the way home.



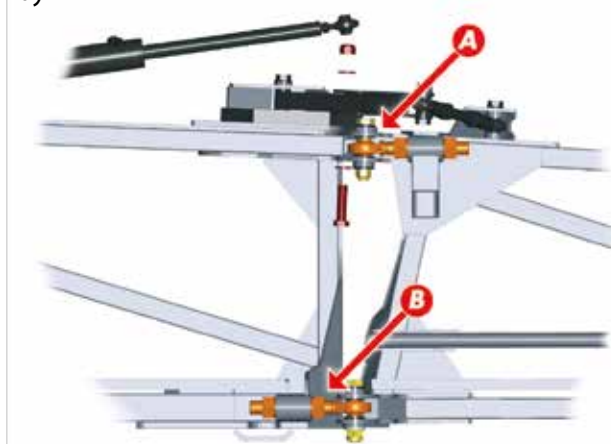
1. Open out the boom and remove the bolt at the cylinder rod end.



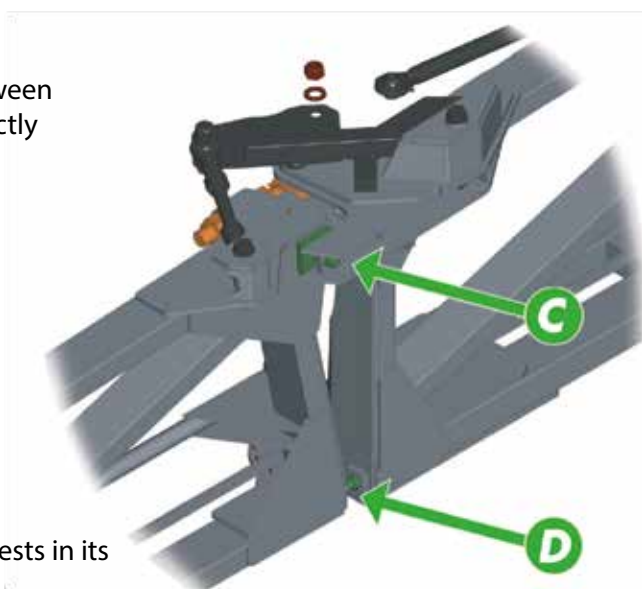
2

Ensure that the 1st and 2nd arms are perfectly horizontal by tightening or loosening the two ball joints A and B.

Tighten the ball joint nuts very slightly once the boom is perfectly horizontal.



At the same time, pre-adjust the two stops C and D between the 1st and 2nd arms so that the boom is lined up perfectly straight.



3

Stow the boom by hand so that the 2nd section gently rests in its bracket on the 1st section.



Boom set too low



Correct setting



Boom set too high



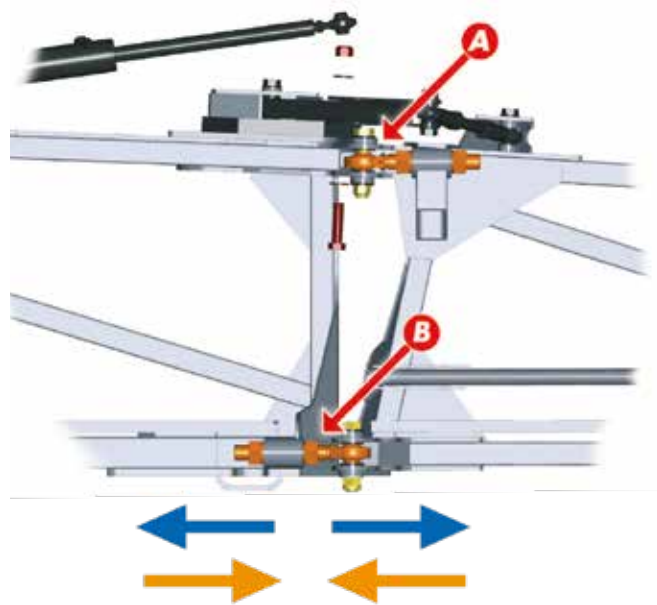
4

If the 2nd section is too high, swing the boom out again and, without disturbing the horizontal setting of either arm, adjust the two ball joints A and B to move the 1st arm away from the 2nd arm.

If, on the other hand, the 2nd arm is too low when stowed against the 1st arm, bring the 1st arm closer to the 2nd arm.

When the 2nd arm sits snugly in its bracket, you can tighten the ball joint nuts. We recommend that you attach an extension bar to the end of the spanner to ensure the nuts are fully tightened.

Check again that boom is aligned and tweak the stops C and D to make adjustments.



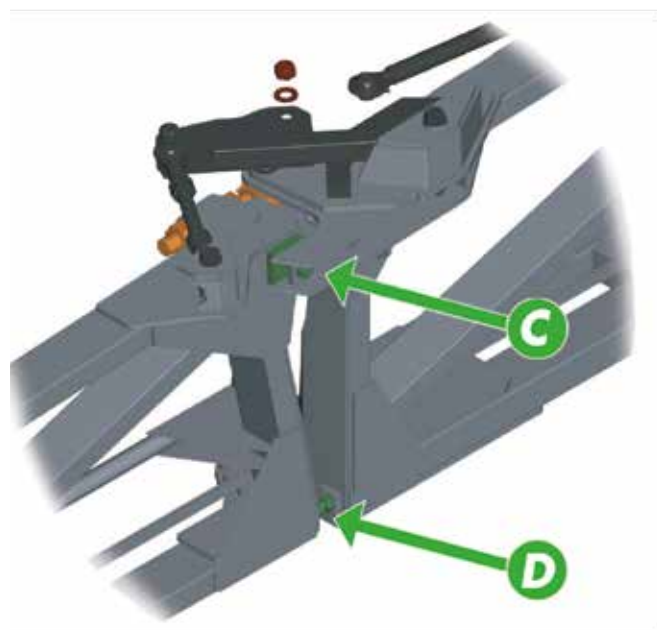
Very Important



*Stop D should be touching the other section.
There should be a 2-mm gap between stop C and the aluminium*

5

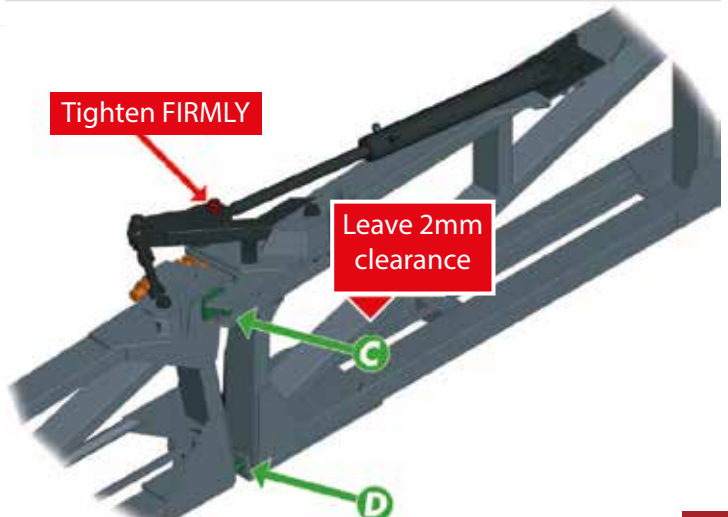
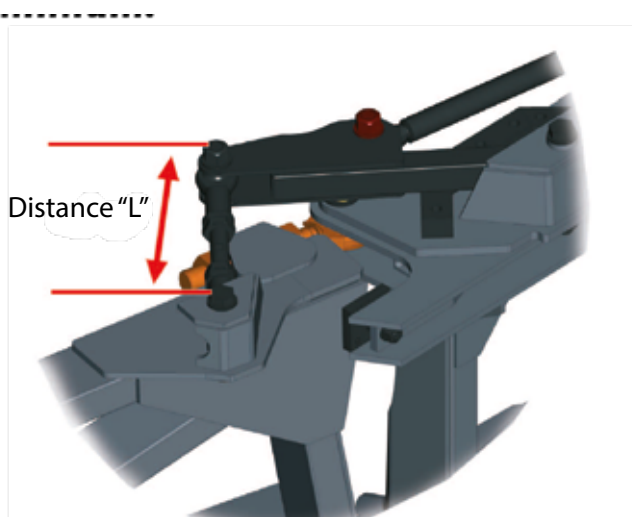
Re-attach the rod end of the cylinder to the hinge arm and bolt firmly into place.



6

Close the distance «L» as much as possible between the sockets on the double ball joint. Fully extend the cylinder hydraulically and then increase the distance «l» until the lower stop D is touching the other section.

When stop D is touching the other section, stop C is still at 2mm from the aluminium.



7

Continue increasing the distance «L» until stop C comes into contact with the other section..

8

Loosen the double ball joint again until you see the cylinder rod buckle slightly (this buckling increases the rod stroke by approx. 2 to 3mm).



CAUTION

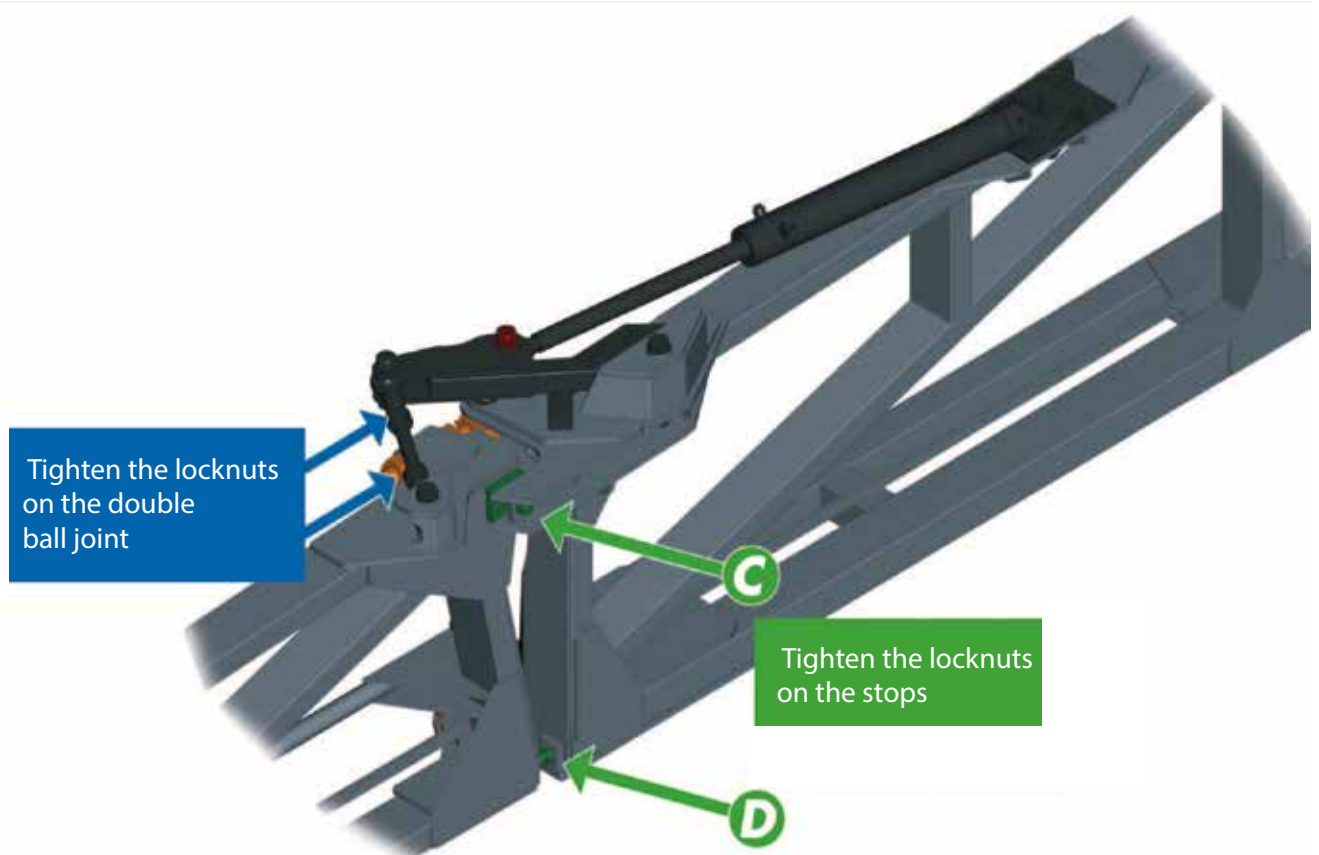
During this step, make sure that the cylinder is fully extended and that it does not retract when you loosen the double ball joint.

9

The force of the cylinder can put the boom slightly out of alignment - check again whether the boom is still properly aligned.

Repeat step 6 if you need to adjust the stops C and D.

With the boom perfectly straight, firmly tighten the locknuts on the stops C and D and on the double ball joint.



6.8.2 Adjusting the end-of-stroke dampers:

If Screw H adjusts the end cushioning of the retraction stroke; screw I adjusts the end cushioning of the extension stroke.

Fold the boom out approximately halfway, then undo the locknut and tighten screw H all the way home without forcing. Fold the boom in.

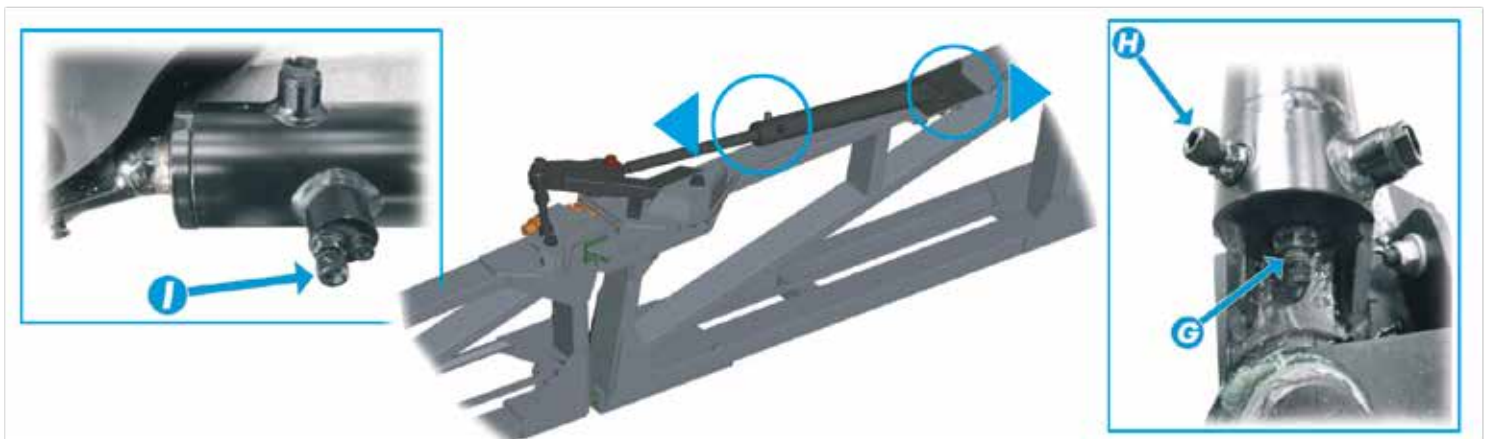
The boom will suddenly stop at the point where cushioning takes effect. Now loosen off screw H to control the speed at which the boom moves and prevent it smashing into the bracket.



Very Important

The setting is very sensitive, so proceed slowly, rotating the screw one tenth of a turn at a time. It is better to carry out the adjustment while the oil is hot.-

When adjustment is complete, keep a firm hold of screw H and tighten the locknut, then adjust screw I in the same way for the extension stroke.



Remove the hydraulic hoses and loosen screw G; fold the boom in by hand so that the 2nd arm is in its bracket on the 1st arm.

Tighten screw G until you feel it resist. This means that the screw is pushing against the cylinder rod. When the screw is in contact with the rod, undo it by approx. 2 or 3 mm and tighten the locknut. Screw G adjusts the retraction stroke of the cylinder rod.



Boom lubrication

Refer to section 6.4.3 of this manual for boom maintenance and lubrication schedules.

6.8.3 Weekly checks

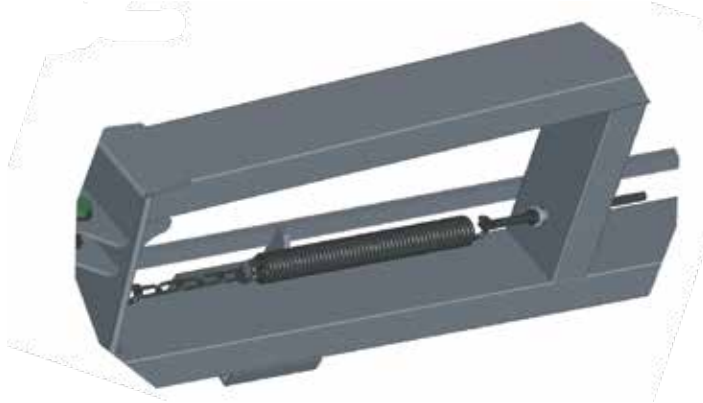
Bolts and nuts

-Check that all the bolts and nuts are properly tightened and re-tighten where necessary using suitable tools (spanner with 1-metre-long extension bar).retraction stroke of the cylinder rod.



Springs

-Check the tension of the safety spring. The tension of the spring is its zero state plus 100 mm



Lubrication

--Lubricate all the hinge points (8 lubricating points along the boom) and all the ball joints and pin joints.



6.8.4

Service and Maintenance intervals

Daily

- Check sprayer filters
- Check engine oil
- Fill the fuel tank
- Check hydraulic oil level
- Clean the engine radiator
- Check air filter is not clogged

Maintenance intervals								
Maintenance to perform	Interval (hours)							
	10	50	150	250	500	1000	2000	5000
				3 Months	6 Months	1 Year	2 Years	4 Years
Tighten wheel bolts	X							
Inspect hoses and hydraulic oil level	X							
Boom lubrication		X						
Bleed compressed air tank.	X							
Clean the engine radiators		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 engine radiators				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				
Change engine oil and filter					X			
Verification engine vibrations							X	
Check engine fan belt tension						X		
Check spray pressure gauge				X				
Air conditioning						X		
Verification engine								X
Transmission reducers						X		

VII. PNEUMATIC SYSTEM

The mechanical compressor fills the air storage tank to 10 bar.

Regulator 1 maintains a constant pressure (10 bar) for the air suspension bellows, the blow gun and the pneumatic seat.

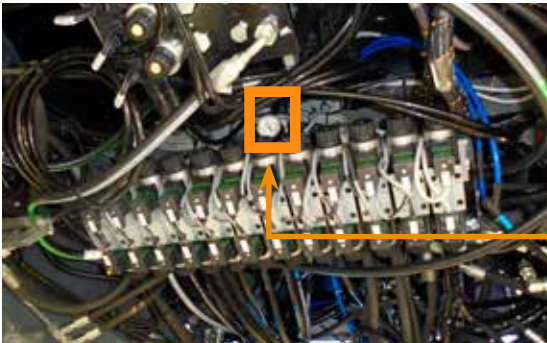
Regulator 2 maintains a constant pressure (5 bar) in boom solenoid valves, the box's interlock system and the catch for the front lifting mechanism.



Air storage tank

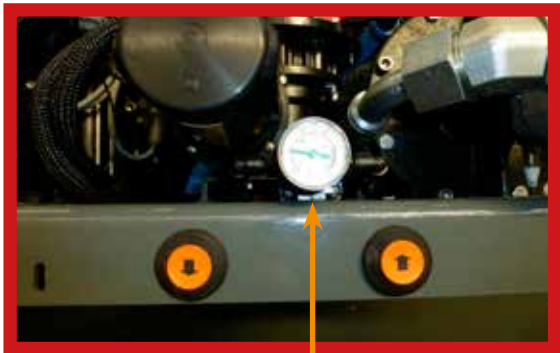
Alcohol evaporator

Bleed Storage tank



Regulator 1

Regulator 2



Alcohol evaporator liquid in one litre bottles
Ref.: 244,141,000

Air system bleeding frequency:
Every morning

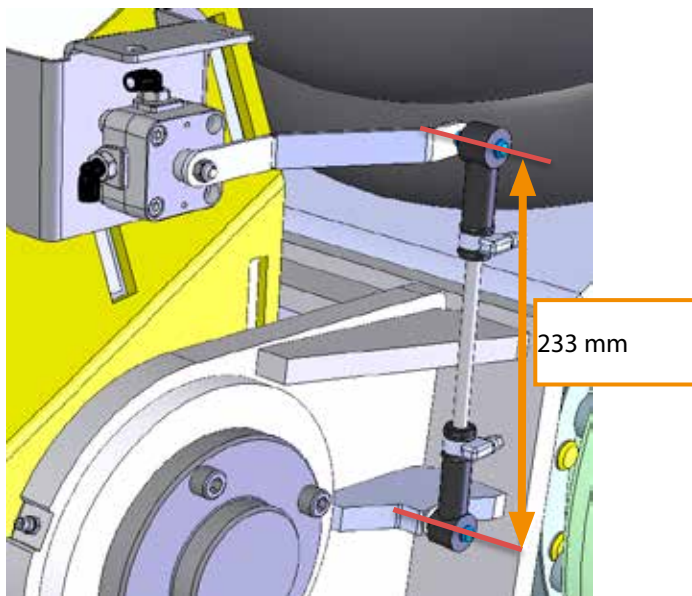
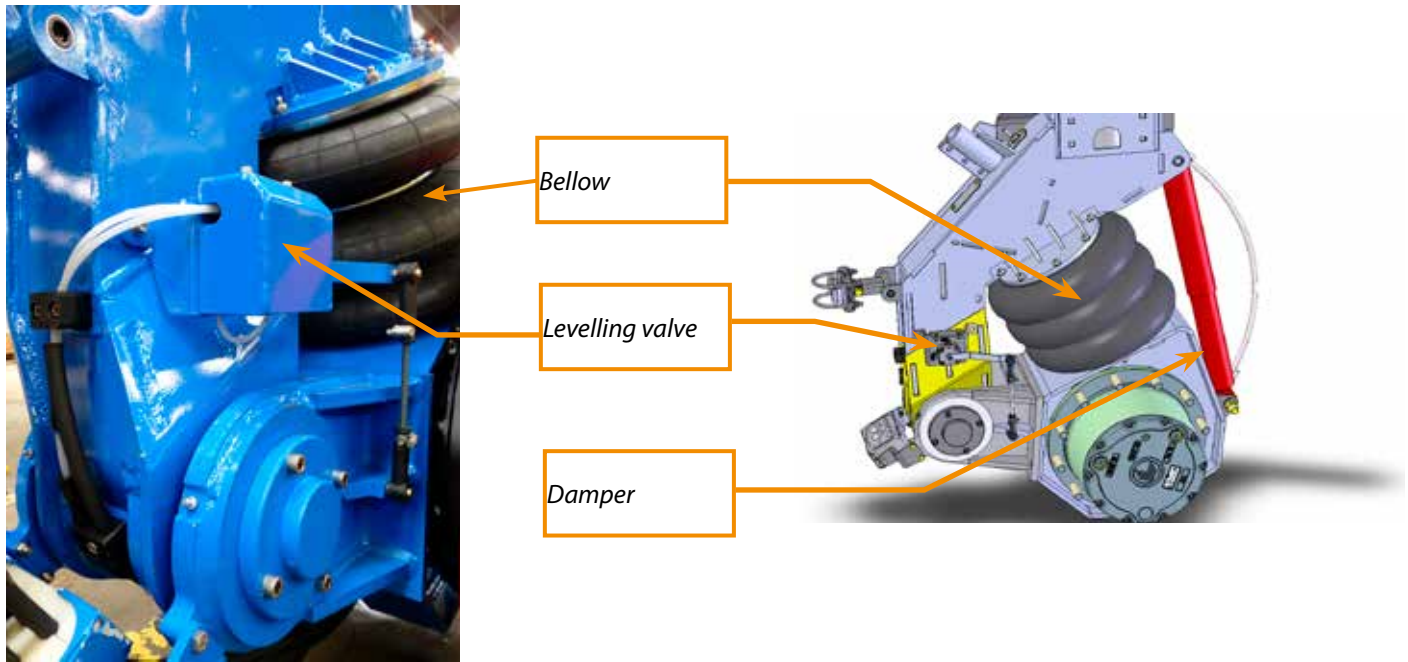
VIII. SUSPENSION

The air storage tank provides an air pressure set at 10 bar.

Regulator 1 maintains the height in the air suspension bellows.

A levelling valve mounted on each wheel maintains a constant suspension height, whatever the load (full/empty tank).

The dampers mounted on each wheel minimise the bounce effect.



XI. TYRE MOUNTING TABLE

					Power (cv)	380 cv
					Tank (l)	9,000l
					Boom (m)	36-48
					Type	
					Load on front axle (kg)	10,320
					Load on rear axle (kg)	15,080
Tyre mounting						
Brand	Range	Size	Index	Axle	Inflation Pressure	
Titan		480/70 R54	181D	Front	56 PSI / 39BAR	
				Rear	56 PSI / 39BAR	

X: Not suitable for this machine set-up



Note :

The recommended pressures correspond to the nominal water load for the self-propelled sprayer. If the sprayer is used with a higher density liquid, the tank should be filled accordingly to avoid exceeding the permitted load for tyres.



Attention!

If a tyre larger than the tyres supplied with the sprayer is mounted, the capacity of hydraulic motors must be adjusted by HARDI.

X. SPRAYING



WARNING

For most options described in this section, it is imperative to wear Personal Protective Equipment (PPE) suitable for spraying, such as:

- Long gloves resistant to the products used
- Protective suit with hood
- Wrap-around goggles, full-face screen or mask
- Mask with filter and cartridges suitable for the products used
- Boots

This PPE should not be stored in the Rubicon cab, otherwise it may contaminate the atmosphere inside.

The Rubicon self-propelled sprayer has 2 valves that can be controlled either with levers or electronically using two interfaces.

All options go through these 2 valves (fill, blend, job, rinse, transfer, etc.): A suction valve and a discharge valve. The suction valve is marked using letters. The discharge valve is marked using numbers.



ALL VALVE OPERATIONS NEED TO TAKE PLACE WITH THE PUMP DISENGAGED

Do not exceed the maximum working pressure of 4.5 bar.

Notes on spray drift

Spray drift is the transfer of small droplets out of the spraying area.

Spray drift leads to:

- Damage on the surrounding fauna and flora (soil, water, air).
- A treatment that is less effective on the target area.
- Risk of damage on nearby crops.
- An additional cost resulting from product wastage.

The spray drift phenomenon can appear due to the following factors:

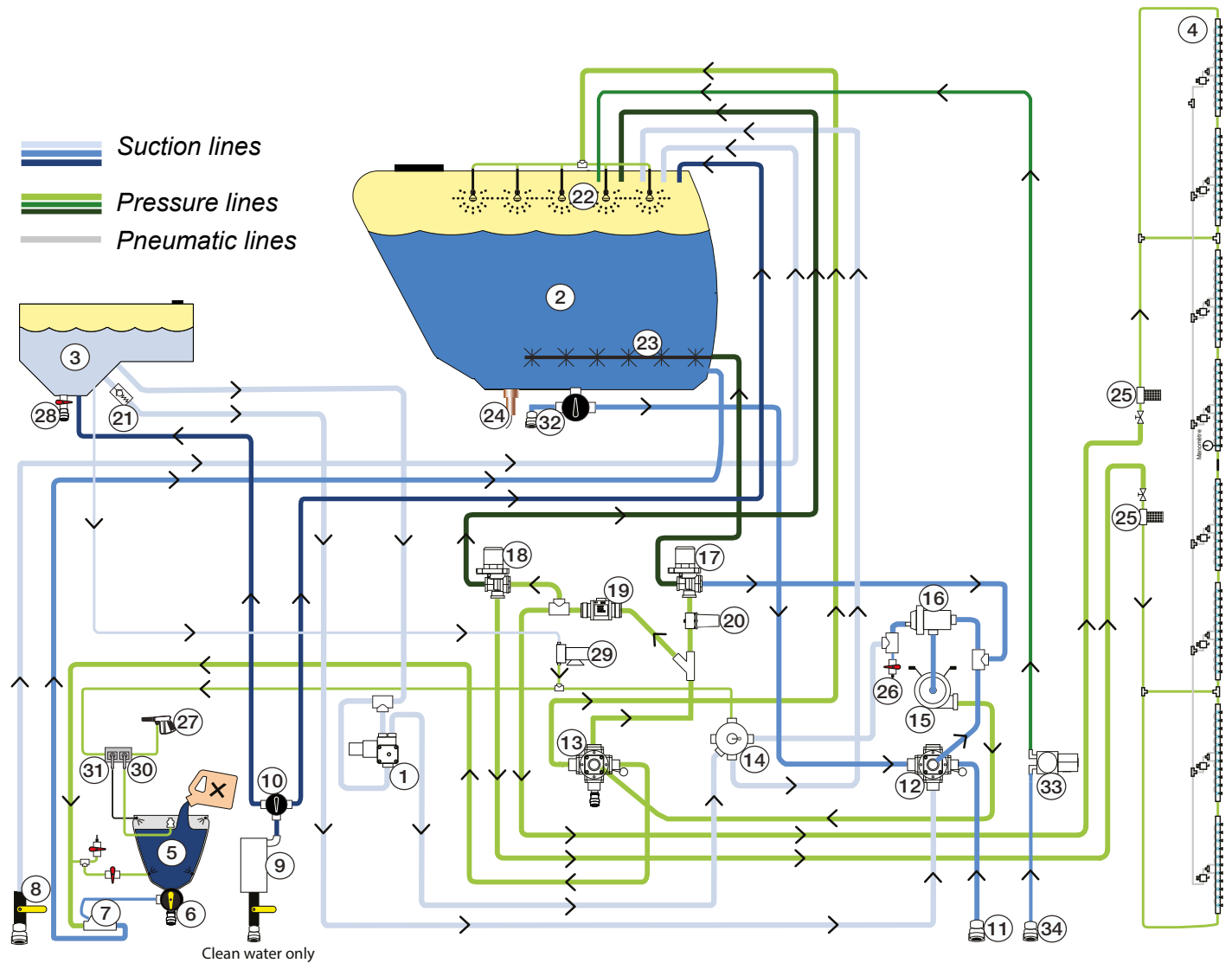
- Excessive spraying speed.
- Excessive air temperature.
- Low humidity.
- Excessive spraying pressure.
- An inadequate spraying height.
- Droplets that are too small.
- High wind speed.

In addition to using anti-drift nozzles, spray drift can be mainly reduced by:

- Ensuring that the self-propelled sprayer is always clean.
- Cleaning the nozzles and checking that they are in good working order.
- Adjust the height of the booms depending on the nozzles used (refer to the guidelines from the nozzle manufacturer).
- Choosing the nozzle according to the application.
- Adjusting the spraying speed.
- Applying the treatment at the best possible conditions in terms of temperature and humidity (morning, evening).
- By setting the spraying pressure.

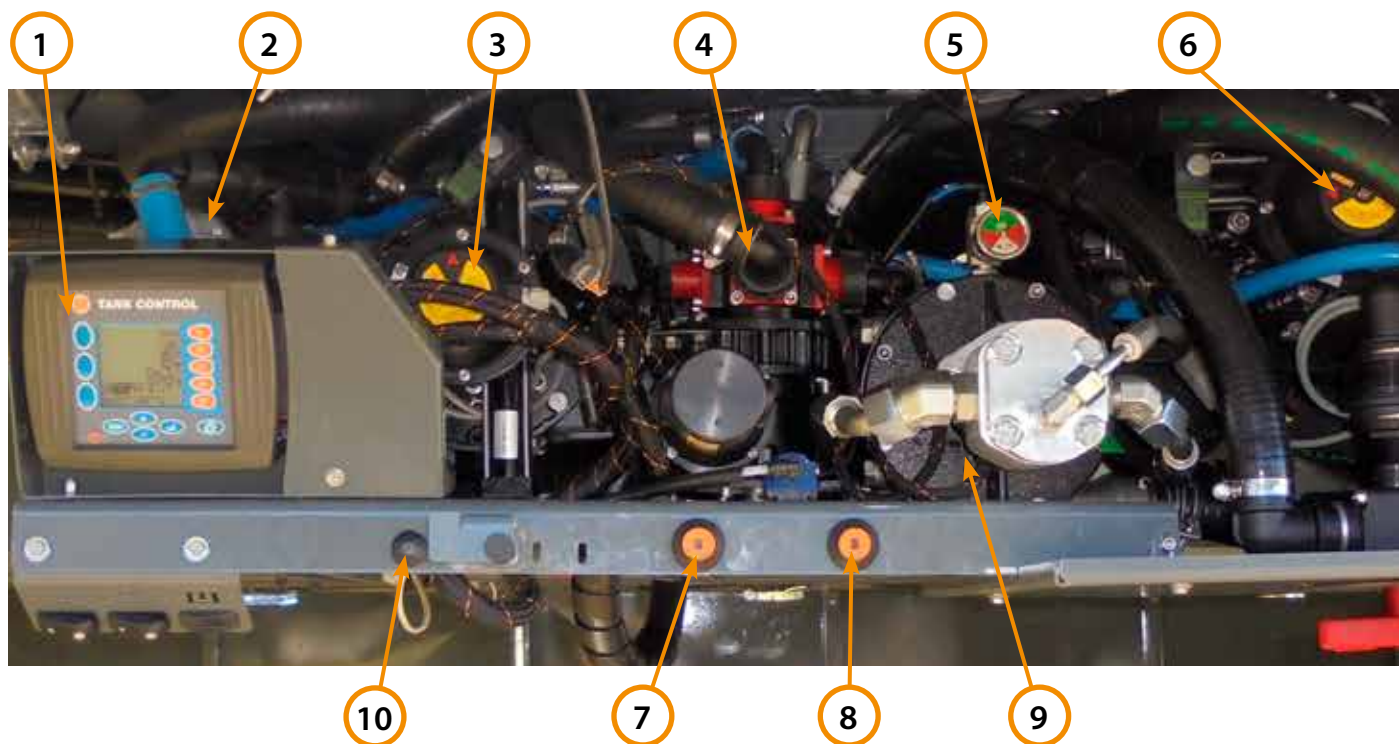
In any case, refer to the guidelines from the manufacturer of the phytosanitary product.

RUBICON Fluid Diagram with options



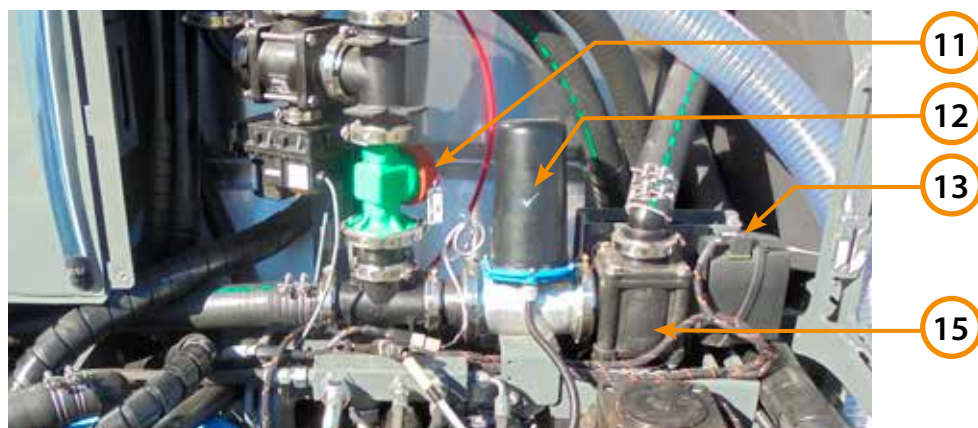
- | | | | | | |
|----|-----------------------------------|----|---------------------|----|----------------------------|
| 1 | Rinse Pump | 13 | Pressure Valve | 25 | Boom Pressure Filter |
| 2 | Main Tank | 14 | Rinse Valve | 26 | Drain Valve Suction Filter |
| 3 | Rinse Tank | 15 | Suction Pump | 27 | Cleaning Gun |
| 4 | Spray Boom | 16 | Suction Filter | 28 | Drain Valve Rinse Tank |
| 5 | Chem Filler | 17 | Agitation Valve | 29 | 12V Flojet Pump (optional) |
| 6 | Chem Filler Suction Valve | 18 | By Pass Valve | 30 | Canister Rinse Valve |
| 7 | Chem Filler Ejector | 19 | Flowmeter | 31 | Chem Filler Rinse Valve |
| 8 | 3" Direct Fill Main Tank Valve | 20 | Regulating Valve | 32 | Main Tank Drain Valve |
| 9 | Filling Pump (optional) | 21 | One-Way Valve | 33 | Chem Fill Pump (optional) |
| 10 | Directional Fill Valve (optional) | 22 | Rinsing Nozzles | | |
| 11 | 3" Main Tank Fill Valve | 23 | Agitation Tubes | | |
| 12 | Suction Valve | 24 | Electric Tank Gauge | | |

10.1. The valves

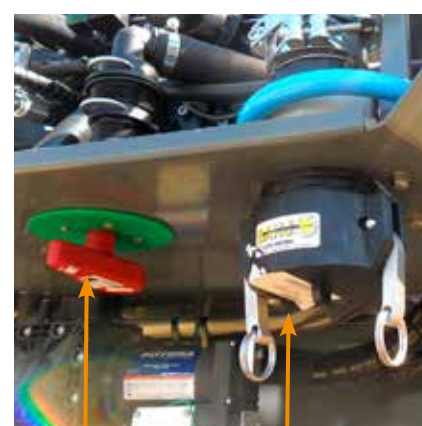
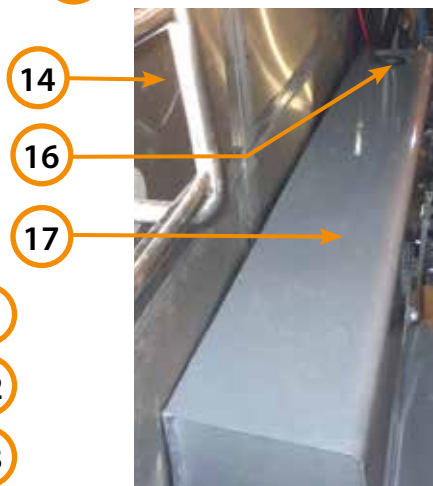


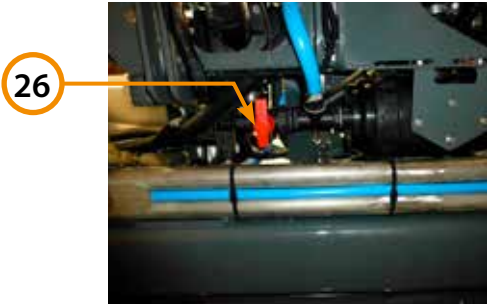
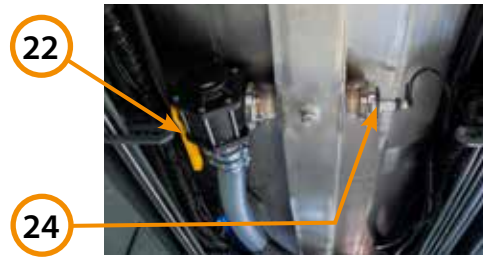
1. Tank Control
2. Rinse pump
3. Pressure valve
4. Rinse valve
5. Pump pressure manometer

6. Suction valve
7. Lowering the blender
8. Lifting the blender
9. Suction pump
10. Lighting



11. Flow meter
12. Regulating valve
13. General stop valve
14. Main tank
15. Flushing valve
16. Rinse tank cover
17. Rinse tank
18. Direct fill of the rinse tank
19. Rinse tank drain
20. Directional FastFill
21. 3" Main Tank Filtered Fill Valve



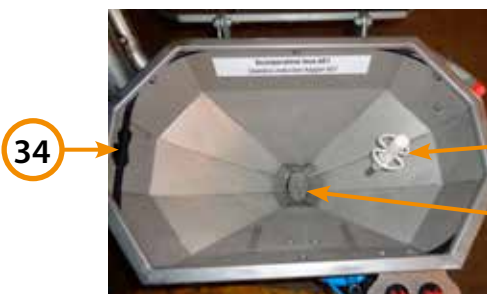
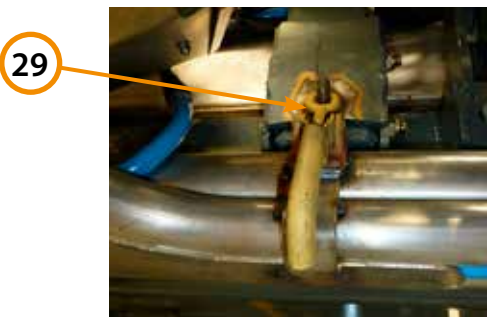


22. Main tank drain

26. Drain valve suction filter

24. Electronic gauge

27. Closed Chem Hopper



28. Chem Hopper strap

29. Canister rinse valve

30. Chem Hopper rinse valve

31. Vibrator On / Off

32. Cover for external suction

33. Chem Hopper rinse nozzles

34. Canister rinse nozzle

35. Grid

36. Chem Hopper valve

37. External suction non-return valve

38. Lifted blender

39. Cleaning gun

40. Pump speed control

10.2. Terminal



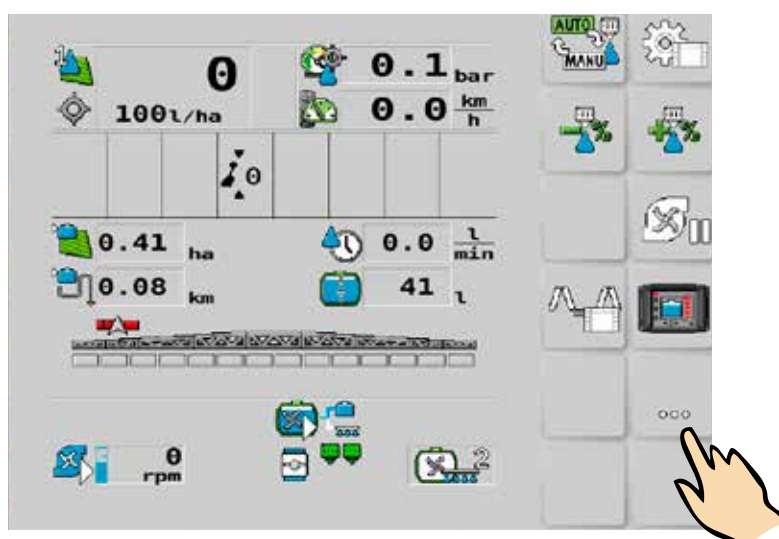
Attention!

Never use key  to turn your terminal off!

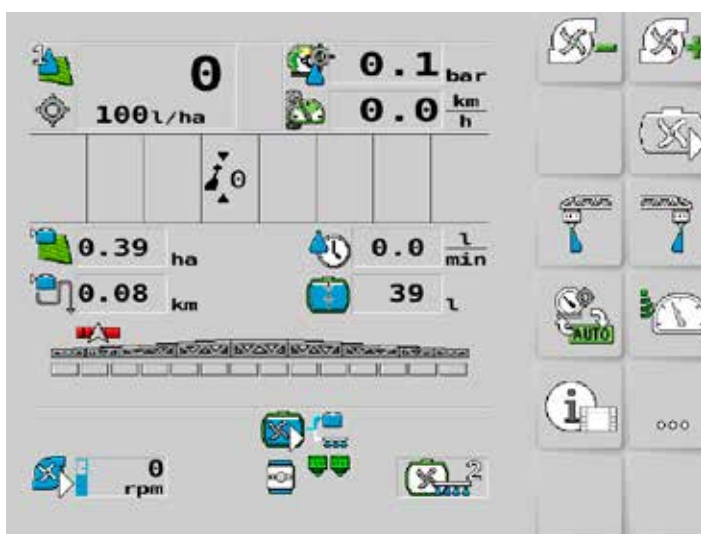
Always choose to turn your machine off completely, using the ignition key.

Always wait at least 10 seconds before you restart the system.

10.2.1. Description of the spray application























Page 1



Page 2

10.2.2. The keys

	Choose the dosage control mode. In Automatic mode, the application will be controlled by the regulating valve. in Manual mode, it is controlled by the user.
	Manual control of dosage: Reducing the flow. Automatic control of dosage: Reducing the dosage needed.
	
	Displays the boom control application.
	Displays the settings and calibration page.
	Manual control of dosage: Increasing the flow. Automatic control of dosage: Increasing the dosage needed.
	To start and stop the spray pump.
	Displays the application enabling to control the valves and pumps as well as the calibration of the tank and the fill options.
	Displays the next page.
	Reduces the set point of the spray pump.
	
	Activates the left border jet.
	Pressure control sensor: Pressure/Pressure & Flow.
	Displays the "meter" application that contains the daily and the total meters.
	Increases the set point of the spray pump. If the pump is already operating at maximum capacity, this key will not have any effect.
	Enables to start and to stop the flushing.
	Activates the right border jet.
	To manually select the speed source used to calculate pressure control: By GPS or by mechanical measure. (The GPS speed will be chosen by default).
	Displays the next page.
	

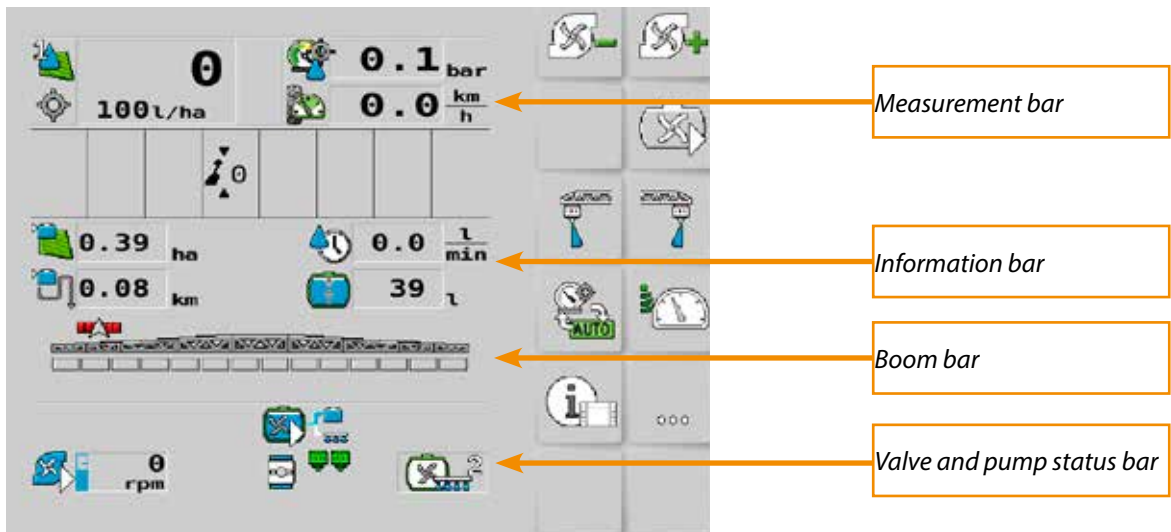
Specific cases:

The pressure control sensor will automatically switch to Pressure Sensor mode when the flow becomes too low, or when the flow meter is faulty. Similarly, the flow meter will be automatically chosen if the Pressure Sensor is faulty. The indicator for a faulty sensor will appear on a red background (refer to section 10.2.3 – Indicators).

The speed measure will automatically switch to mechanical speed if the GPS signal is lost. The indicator for mechanical speed will appear on a red background (refer to section 10.2.3 – Indicators).

10.2.3. Indicators

The spray application screen is divided into 4 independent bars, as shown on the image below:



The Measurement section

The Measurement section incorporates three values of your self-propelled sprayer subject to constant monitoring: dose sprayed, operational speed and circuit pressure. It also contains the indicators relating to these elements.

The image below shows where these indicators are displayed:

- (1) The dose currently being sprayed.



- (2) The pressure control mode chosen:

Indicates that we are in Auto mode and that the set point is 250 litres/ha.



Indicates that we are in Manual mode.



Icon indicating that the pressure control is temporarily in Manual mode as the speed is lower than the minimum speed authorising the Automatic mode.



- (3) Shows which sensor is used for pressure control:

Indicates that the pressure control is only based on the flow meter.



Indicates that the pressure control is only based on the pressure sensor.



(Flashing icon) Indicates that the pressure control is based a combination of the two (pressure sensor/flow meter).

- (6) The operational speed taken into account for pressure control purposes.

- (7) Source of speed measurement:

Indicates that the GPS system makes the measurement.



Indicates that the measurement taken into account is the mechanical speed.



GPS signal speed as speed sensor is faulty.



Speed sensor speed as GPS signal is faulty.



Simulated speed (obtained by engaging the parking brake).



- (8) Circuit pressure.

This indicator turns red when the pressure is automatically controlled.

The Information bar

The Information bar displays the tank volume status, the flow, the distance and the area covered by the spraying.

The image below shows where these indicators are displayed:



(1) The volume of liquid remaining in the tank.

(2) Realtime flow.



Indicates a fault in the flow meter.



Indicates a fault in the pressure sensor.

(3) Distance covered by the sprayer.

(4) Area covered by the sprayer.

The Boom bar

The Boom bar displays the boom section status as well as the information about the boom itself. It shows the following information:



(5) Option active GPS, display of automatic section control system.

(6) Boom used.

(7) Size of drop used.

(8) Boom section status:



Active and open sections.

Active and closed sections.

Non-active and open spray sections.

Non-active sections (GPS) and closed spray.

Active and open sections but closed by the Mbox (joystick).

Closed spray and sections shut off by the Mbox (joystick).

(9) Border jet status:



Border jet activated.

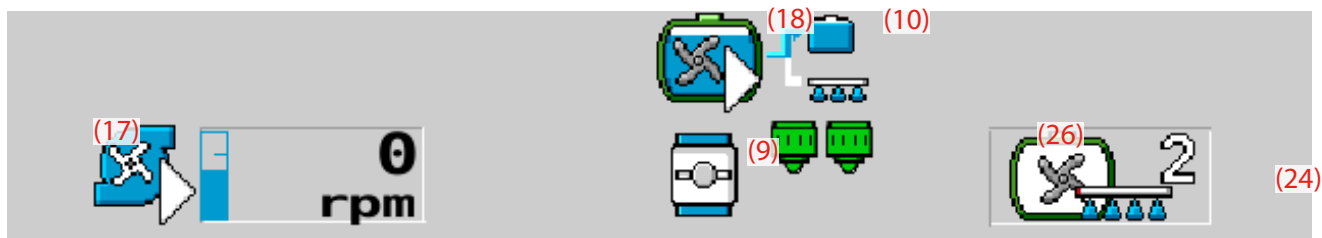
Border jet deactivated.

Valve and Pump status bar

The Valve and Pump status bar shows the status of all your valves and pumps in realtime on the same screen.

The bar is divided into two parts separated by a red line: the valve and pump indicators are on the left, and on the right you can find the actuator control mode used (manual/automatic) and, where appropriate, an indicator representing the desired automatic option.

This bar shows the following:



(9) Regulating valve.



Valve completely opened.



Valve completely closed.



Valve in Regulating position.

(10) General valve.



Spraying (to boom).



Return flow to tank.

(17) Spray pump:



Disabled pump: Grey background.



Activated pump: Blue background.

The bar graph shows the set point in % for the possible operational range.

The numerical value corresponds to the pump speed in revolutions/minute.

(18) Flushing valve. Displayed when the flushing is activated.

(24) Indicator of the actuator control mode.

Manual control.



Automatic control option (icon changes depending on option chosen).



(26) M-Select indicator:

10.3. Tank Control

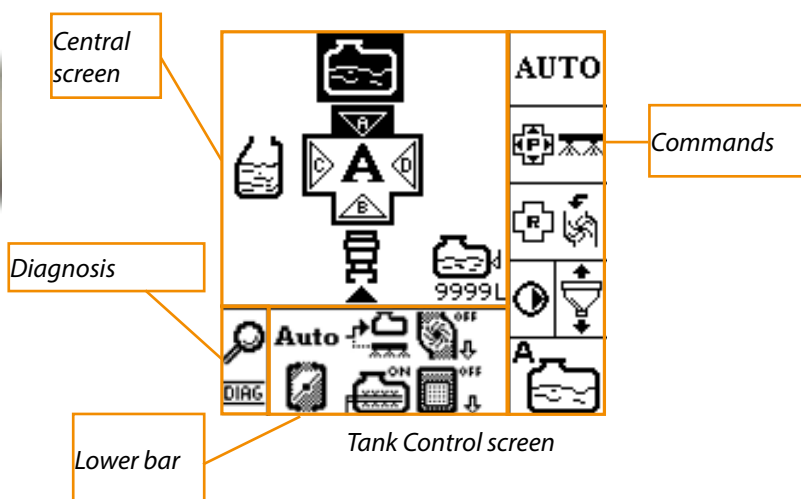
The self-propelled sprayer lets you control the valves and the pumps from the cab using the terminal, as well as from the blending station using the Tank Control screen.

However, some of the valves are only accessible via the cab terminal. (Refer to table below).

Actuator	Terminal	Tank Control
General valve	○	●
3-way valve of the back jets	●	○
Pneumatic electrovalve of the back jets (behind the wheels)	●	○
Pneumatic electrovalve of the back jets (between the wheels)	●	○
Bottom tank drain pump	●	○
Flushing valve	●	●
Electric valve for rinse tank	●	●
Pressure valve	●	●
Suction valve	●	●
Tank drain valve	●	●
Pump drain valve	●	●
Rinse pump	●	●
Spray pump	●	●
Spray pump control	●	●
Regulating valve	●	●
Chem Hopper	●	●
Engine accelerator	●	●
Cab ladder	●	●



Tank Control case



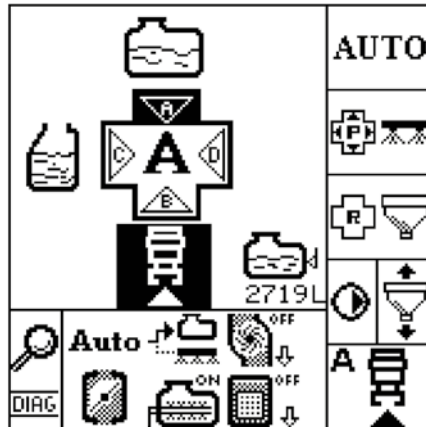
Use the + and - keys to navigate in the central area and in the lower bar as well as any changes to be made to the numerical values in some of the menus.

Keys **F1** to **F5** give access to the commands of the menu on the right hand side.

To change the status of an actuator (the Suction Valve in our example):

1. Display the area for the actuator using the controls on the right (**F1, F2, F3, F4, F5**).
2. Reach the desired position using the + and - keys of the Tank Control.

You can see that the image near key **F5** has changed and now shows the expected status, as shown in the image below:



3. Press the **F5** key to start the change process.

The relevant indicator is highlighted to show the current position of the valve. In the example above, the valve is in position **A** (Main tank) and will switch to position **B** (External suction) if **F5** is pressed.

The lower bar indicates the real-time status of the actuators represented. Position the cursor on one of them to modify its status, using the **F5** key once again.

10.3.1 Manual control mode

This mode enables independent and direct control of all or part of the valves and pumps of the self-propelled sprayer. You can select any of the options shown on the table in Paragraph 10.2, depending on your requirements.

However, there are some automatic safety settings:

Safety setting 1: In the motorized valve mode, the Spray Pump will automatically stop when you activate the Pressure Valve or the Suction Valve.

Safety setting 2: The Rinse Pump will automatically stop when you activate the Rinse Valve.

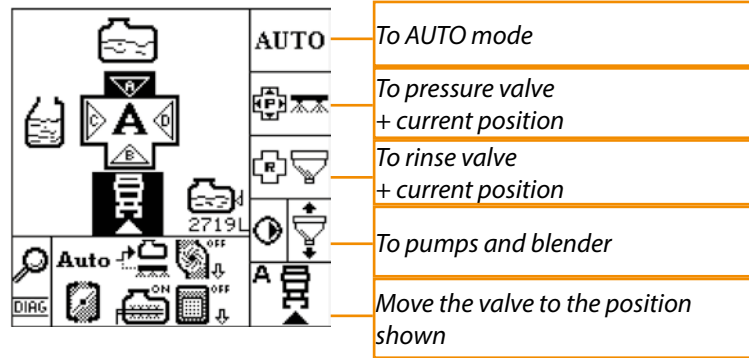
Warning



As the configuration is completely flexible, this control mode requires in-depth knowledge of the circulation system of your Rubicon self-propelled sprayer.

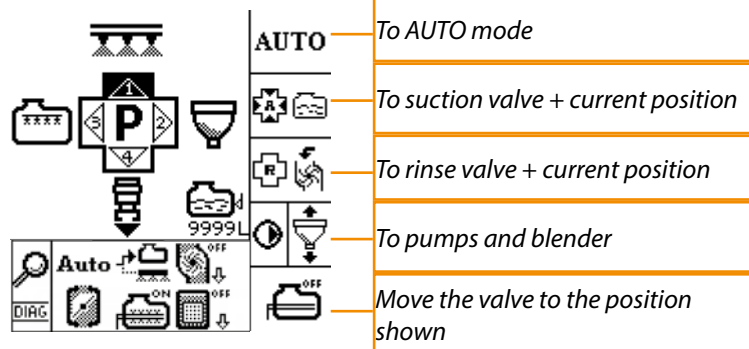
Each valve and each pump has its own configuration screen:

Suction valve



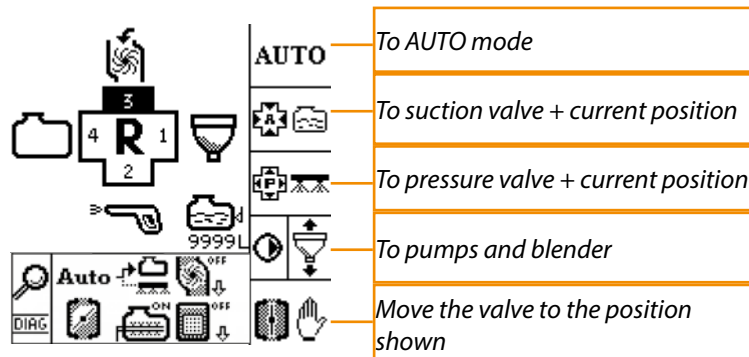
- Suction from main tank
- Filling device
- Suction from rinse tank

Pressure valve



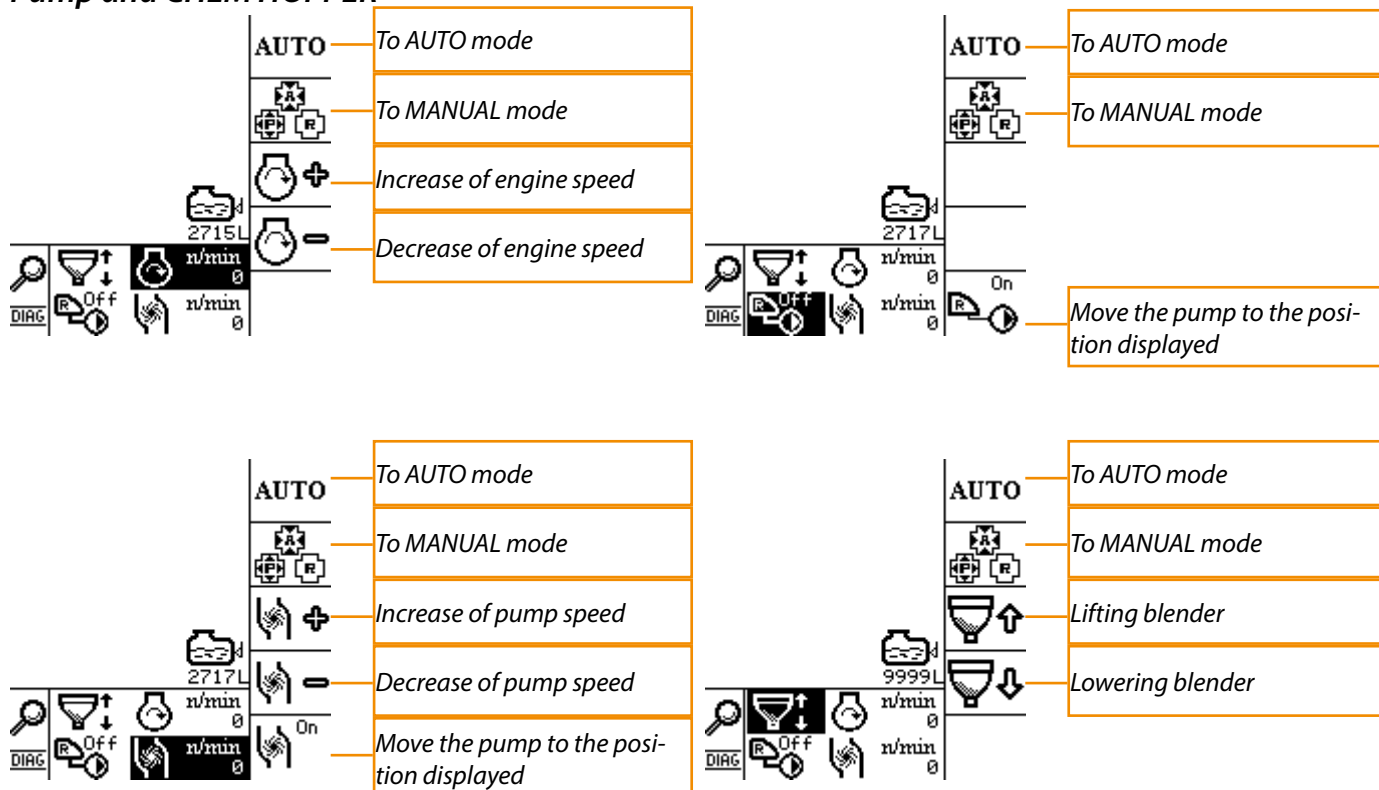
- Spray/Fill position
- To blender
- To the outside (Transfer)
- To main tank rotating rinsers

Rinse valve

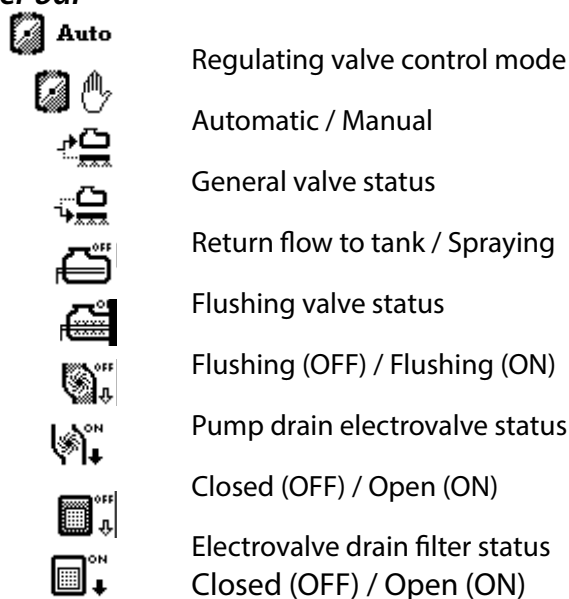


- To blender
- Water jet
- Spray pump priming
- To main tank

Pump and CHEM HOPPER



Lower bar



We can move from one status to the next by pressing F5 when the indicator is  highlighted.





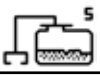


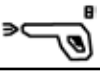

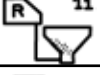
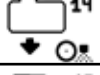

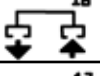
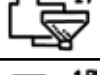






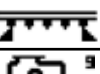


Note: The tank volume appears in all areas and is shown by the indicator:



10.3.2. Automatic control mode

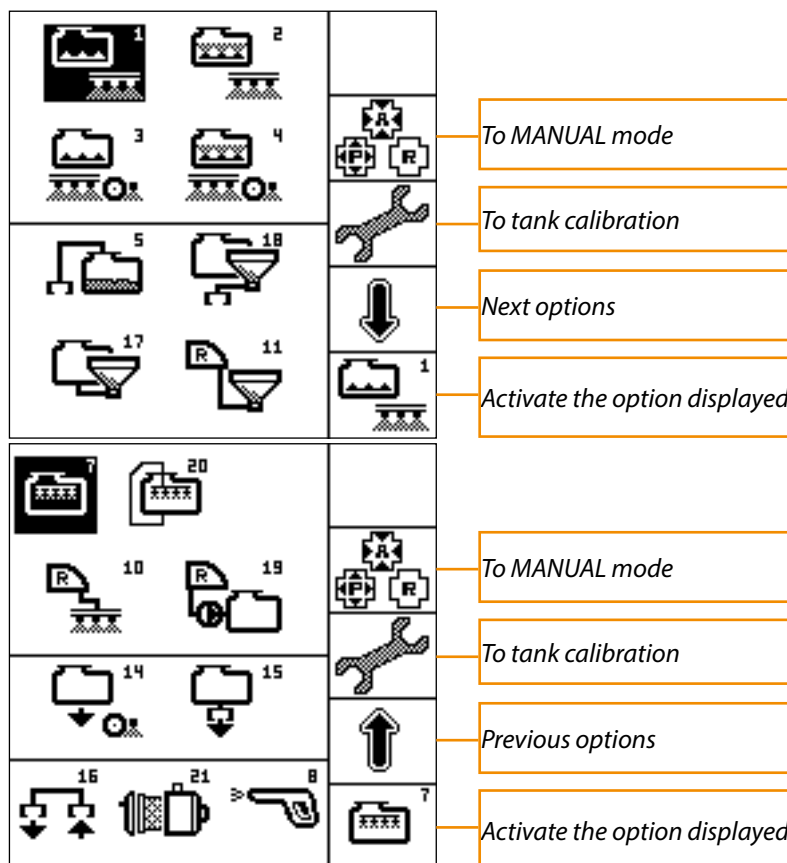
This is a fully secure mode in which you can set the status of your self-propelled sprayer according to your requirements, using just one button.

24 basic options are saved and ready to be activated. They are represented as numbered icons:

Number	Indicator	Description of option
1		Continuous circulation spraying without flushing.
2		Continuous circulation spraying with flushing.
3		Not available: Continuous circulation spraying without flushing with back jets behind the wheels.
4		Not available: Continuous circulation spraying without flushing with back jets behind the wheels.
5		External suction fill.
6		Spray pump priming.
7		Cleaning the tank using rotating rinsers by suction in the rinse tank.
8		Cleaning the outside with water jet.
10		Rinsing the boom by suction in the rinse tank.
11		Rinsing the blender by suction in the rinse tank.
14		Not available: Main tank drain using the bottom tank pump and the back jets.
15		Transfer of the main tank to the outside.
16		External suction to External transfer.
17		Blend with suction of the main tank.
18		Blend with external suction.
19		Transfer of the rinse tank to the main tank.
20		Cleaning the tank using rotating rinsers and by suction in the main tank.
21		Cleaning the filters.
22*		Not available: Independent right border jet.
23*		Not available: Independent left border jet.
24*		Not available: Simultaneous, independent border jets.
9*		Not available: Dead Volume Reduction.
13*		Not available: Dead Volume Reduction with back jets.

* This option is automated, it therefore does not appear in the option selection menu.

The main screen of the automatic control mode is as follows:



Note: Detailed information on each option of the status of actuators can be found at the end of this manual.

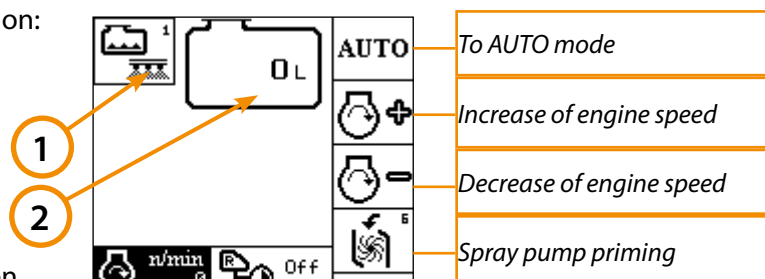
Option 6 does not appear in this area. This is because it can already be accessed from a key in the options where it could be needed. Similarly, options 9 and 13 are not directly accessible because they are part of a separate automated system.

In most cases, the valves and pumps of your Rubicon self-propelled sprayer will position themselves automatically, as soon as the screen for the selected option is displayed.

The image below shows the screen for each option:

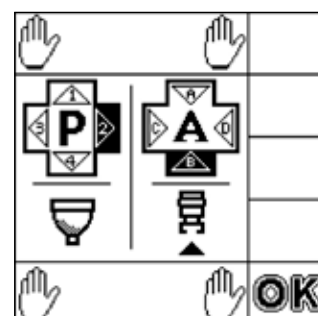
① Current option.

② Volume left in tank.



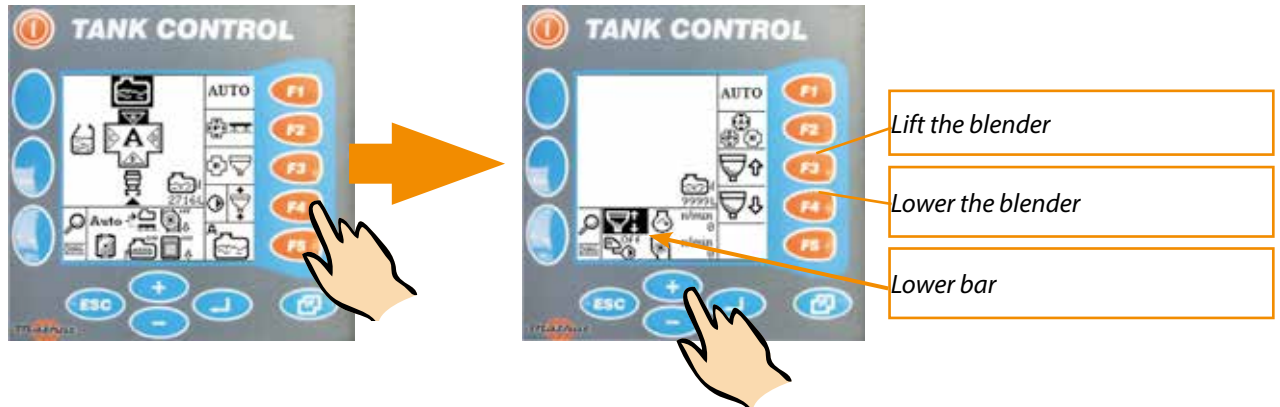
Otherwise, the following screen will appear when you confirm a option, showing you how to place the Suction and Pressure Valves

In this example, you are asked to place the Pressure Valve (P) in position 2 on the right, and the Suction Valve (A) in position **B** at the bottom. Once the valves are correctly positioned, press the **F3** key (OK) so that the other actuators position themselves automatically, and as a result, to activate the option selected.



10.3.3. Lowering Chem Hopper

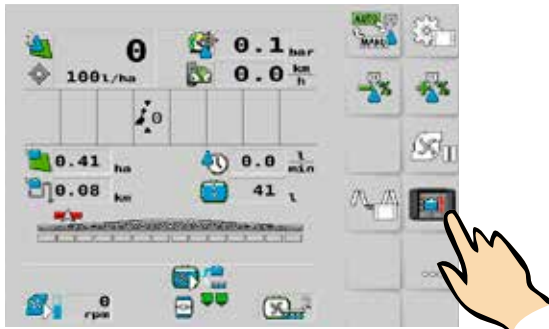
From the Tank Control



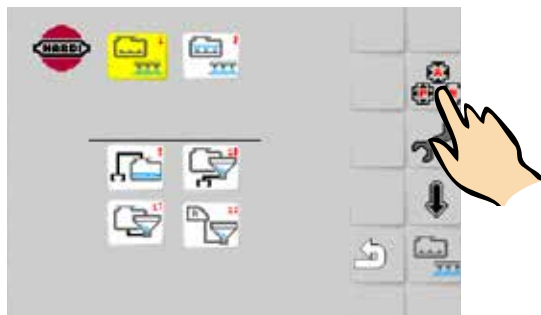
To lower the Chem Hopper

1. Press the **F4** key from the valve display screen to access to the up and down controls of the blender.
2. Press the +/- keys to choose the blender from the lower bar.
3. Press the **F3** key to lift the blender or the **F4** key to lower the blender.

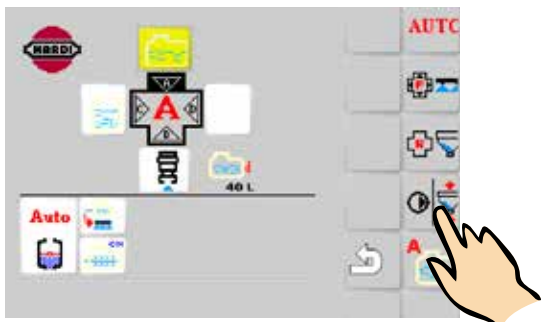
From the cab



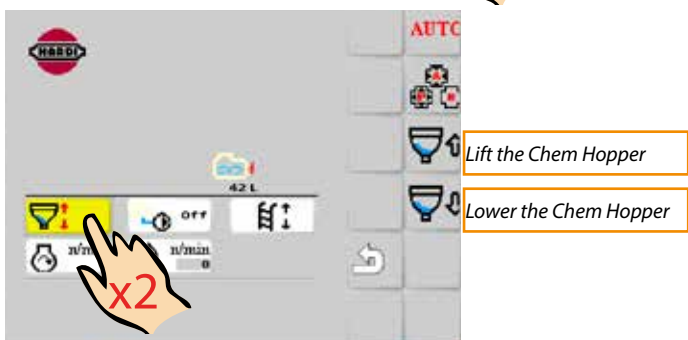
Press the key shown below from the spray application to access the Tank Control screen.



4. Press the key 'P''A''R'



5. Press the key shown below to access the controls to lift and to lower the Chem Hopper.



6. Double-click "Lift, Lower" to select this option.
7. Then, press the relevant keys to lift or to lower the Chem Hopper.

10.4. Filling/washing location requirements

Always wear personal protective equipment and strictly adhere to the guidelines from the manufacturer of spraying products.

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 or 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 anytime.



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.

Water Tank Filling

Filling options	Main Tank	Filling Flush Tank	Filling Filtered Fill
Main Tank Direct Fill	yes	no	no
Directional Pump Filling (optional	yes	yes	no
Main Tank Filtered Fill	yes	no	yes

10.4.1 Main Tank Direct Fill

The Main Tank Filtered Fill can be used to fill the Main Tank with either clean water or premixed chemicals.



ATTENTION! If filled with premixed chemicals. The Direct Fill line must be cleaned with clean water during the cleaning process of sprayer after use. To clean the Direct Fill, connect it to a clean water source and fill with clean water until clean.



1. Remove the cover on the coupling 9 and connect the filling hose to the coupling
2. Open the fill valve
3. Start the external auxiliary pump, make sure not to overfill the tank.
4. After filling close the fill valve
5. Disconnect the hose and re-fit the cover on the fill coupling.

10.4.2 Directional Pump Fill (optional)

The Directional Pump Fill can be used to fill Main tank or Rinse tank with clean water. The pump and the fill coupling is located on the hopper.



ATTENTION!
Only fill with clean water.



1. Remove the cap
2. Connect the hose to the fill coupling
3. Open the fill valve
4. Turn directional fill valve either Main tank or Rinse tank
5. Start the fill pump
6. Control the filling by the increasing or decreasing the pump speed by adjusting the pump control lever
7. After filling turn off the pump and refit the cap. tank.

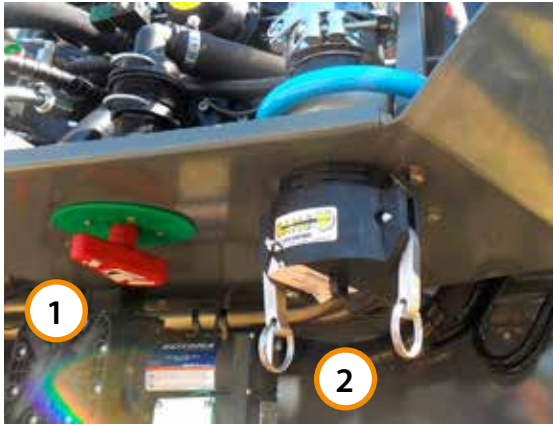
10.4.3 Main Tank Filtered Fill

The Main Tank Filtered Fill can be used to fill the Main Tank with either clean water or premixed chemicals.

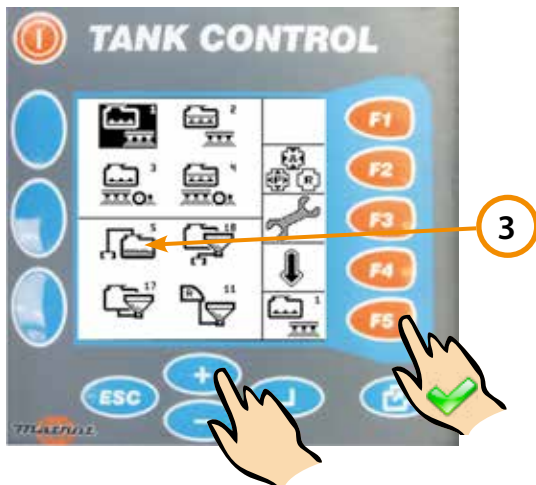


ATTENTION!


If filled with premixed chemicals. The Main Tank Filtered Fill line must be cleaned with clean water. During the cleaning process of sprayer after use, connect the Main Tank Filtered Fill to a clean water source and fill with clean water until clean.



1. Make sure that the valve is closed ①.
2. Remove the cap ②.
3. Connect the pipe (an adapter is provided with the equipment, if required).
4. Open valve ①.



5. Using the keys,  choose the following option:

-  External suction fill ③.

6. Confirm the start by pressing the **F5** key.
The pump adjusts to the maximum set point.

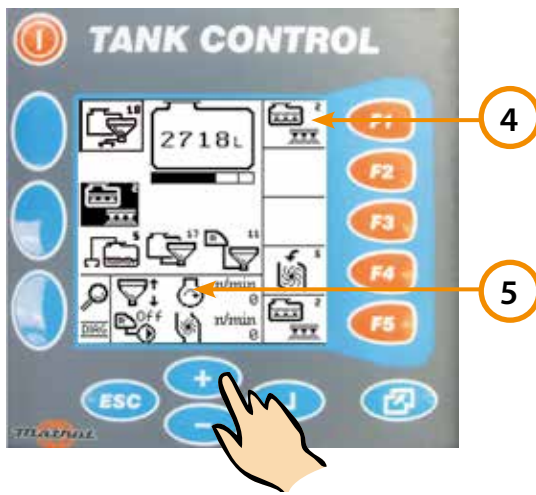
7. For this option, you are initially asked to specify the volume to fill. Your 2 options are as follows:
 - State the volume to add.
 - State the desired final volume.

Make this selection on the screen, as shown:

- (1) Represents the current option.
- (2) Volume currently in tank.
- (3) Entry field for volume to add.
- (4) Entry field for final volume.

8. After stating the desired volume, confirm by pressing the **F4** key to start the fill





9. If required, accelerate the engine.

- Using the +/- keys, please select the engine speed ⑤.
- Press the **F2** key to accelerate (1,750 rev/min. max).

*NB: Press the **F3** key to slow down.*

Filling automatically stops once the volume requested is reached.

The valves will position themselves so as to carry out the option indicated on the top right of the screen④.

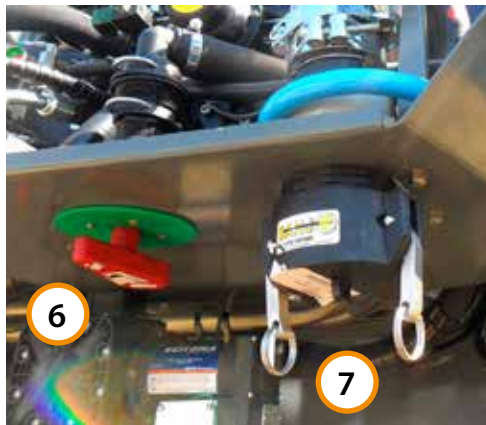
10. If required, decelerate the engine.

- Using the +/- keys, please select the engine speed ⑤.
- Press the **F3** key to slow down.

11. Close valve ⑥.

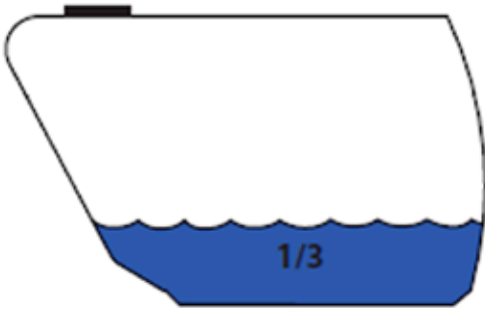
12. Disconnect the pipe.

13. Put the cover on ⑦.



10.5 Chemical Filling

Filling of water



Tank should normally be filled 1/3 with water before adding chemicals.

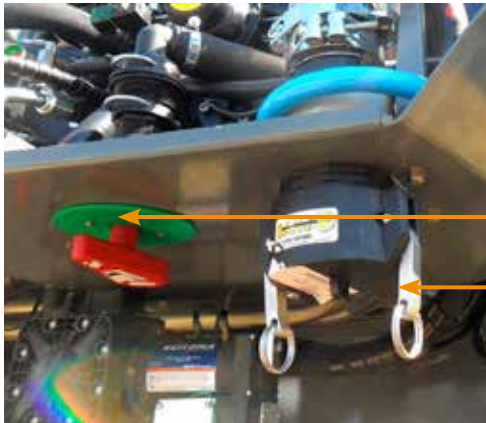
Always follow instructions given on the chemical container!

10.5.1 Pre-fill main tank with water

Filling of water



Always wear personal protective equipment and strictly adhere to the guidelines from the manufacturer of spraying products.





1. Make sure that the valve is closed ②.
2. Remove the cap ③.
3. Connect the pipe (an adapter is provided with the equipment, if required).
4. Open the valve ②.



5. Using the keys, choose one of the two following options:



-  External suction fill.
-  Blend with external suction.

6. Use key **F5** to confirm.
7. For these options, you are initially asked to specify the volume to fill. Your 2 options are as follows:
 - State the volume to add.
 - State the desired final volume.

Make this selection on the screen, as shown:



- (1) Represents the current option.
- (2) Volume currently in tank.
- (3) Entry field for volume to add.
- (4) Entry field for final volume.

8. After stating the desired volume, confirm using the **F4** key to start the fill.

Whichever field you filled in, the other option is automatically calculated. In our example, if we decide to add 1,000 litres, we enter "1,000 " in the entry field (3) (shown on previous page).

Setting (4) is automatically calculated as 3,717 litres; at this value, the fill will stop.

Note: if none of the volumes are filled in, the fill shall automatically stop once the maximum value tolerated by the tank has been reached.



(1) Represents the current option.

(2) Area to select switch options.

This screen enables to interrupt the fill by positioning the system on option 1 (Continuous spraying without flushing) or to switch to one of the options most commonly used at fill periods. It is also possible to prime the spray pump from this page using the **F4** key.

You can directly switch to one of the options from this screen:

– With the + / - keys, select the option in the area (2).

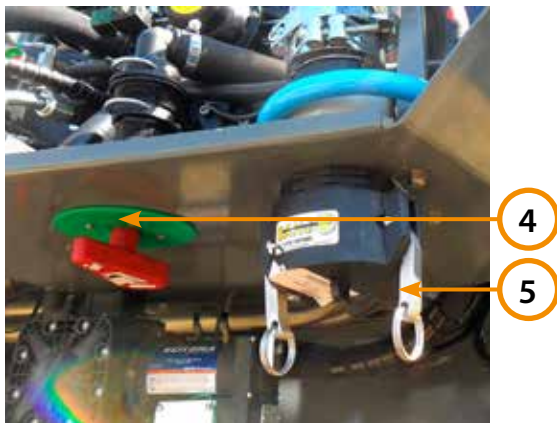
– Confirm with the **F5** key, bottom right. The screen of the option selected is then displayed.

Note: An alarm, shown as a flashing icon, may appear on the top left of your



If you see this alarm, it means that the sensor to measure the volume of remaining liquid in the tank is damaged and that as a result, this information is no longer available. The options using this measure, such as fill options, remains manually available, but the automated procedures such as the automatic stop are deactivated.

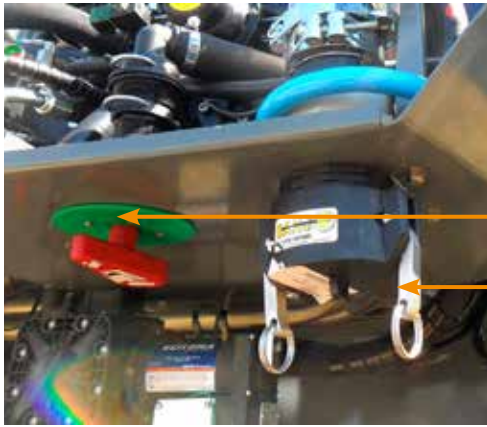
Contact your authorised dealer if this alarm keeps going off.



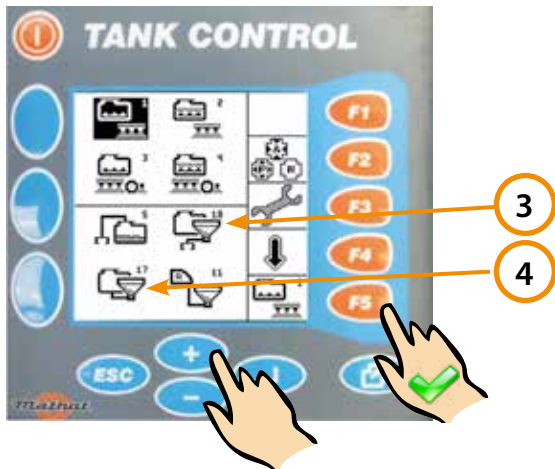
1. Close the valve ④.
2. Disconnect the pipe.
3. Put the cap on ⑤.

10.5.2 Chemical filling using the Chem Hopper

Note: Before carrying out any work, ensure that the tank is not full. If the tank is full, the blending option is disabled.



1. If using option 18, make sure that the valve is closed ①.
2. If option 18 is used, remove the cap ②.
3. If option 18 is used, connect the pipe.
4. If option 18 is used, open the valve ①.



5. Using the keys, choose one of the two following options:

– Blend with external suction ③.

– Blend with suction in the main tank ④.

Press the **F5** key to confirm.

7. For these options, you are initially asked to specify the volume to fill. Your 2 options are as follows:

- State the volume to add.
- State the desired final volume.

Make this selection on the screen, as shown:

- (1) Represents the current option.
- (2) Volume currently in tank.
- (3) Entry field for volume to add.
- (4) Entry field for final volume.

8. After stating the desired volume, confirm using the **F4** key to start the fill.

9. Open the valve ⑤.





6

10. If required, accelerate the engine.
 - USING the +/- keys, please select the engine speed ⑥.
 - Press the **F2** key to accelerate (1,750 rev/min. max).

NB: Press the **F3** key to slow down.

11. Put the different products into the cone blender (liquid, micro-granules or powder).

12. When blending, take care not to completely empty the blender to avoid creating any emulsion in the main tank.

As soon as the blending phase is completed:

13. Close valve ⑦.

Filling automatically stops once the volume requested is reached.



7

The valves position themselves so as to carry out the option indicated on the top right of the screen ⑧.



8

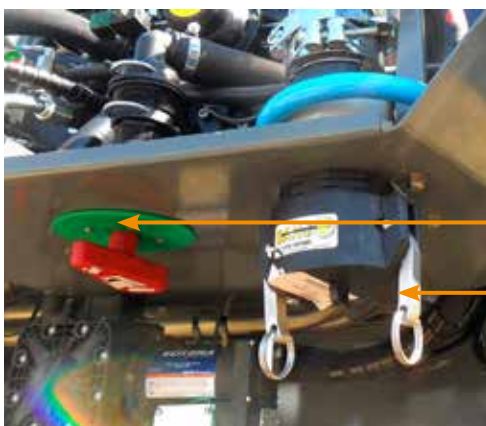
9

14. If required, decelerate the engine.
 - USING THE +/- keys, select the engine speed ⑨.
 - Press the **F3** key to slow down.

15. If option 18 is used, close the valve ⑩.

16. If option 18 is used, disconnect the pipe.

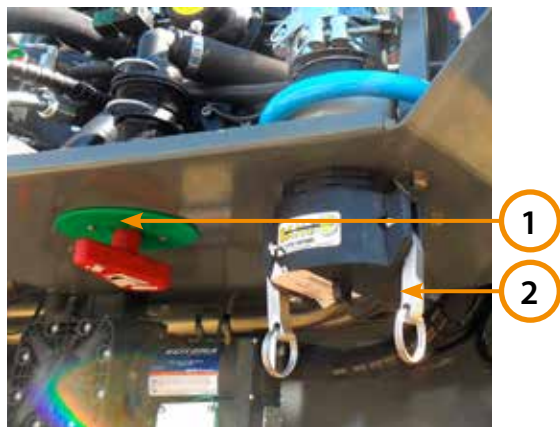
17. If option 18 is used, put the cap on ⑪.



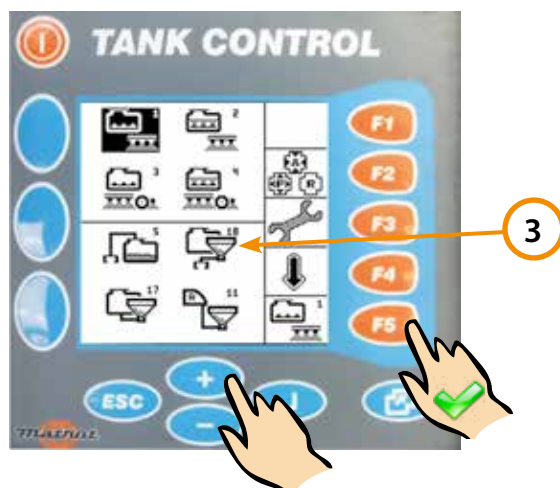
10


11


Additional information



1. Make sure that the valve is closed ①.
2. Remove the cap ②.
3. Connect the pipe (an adapter is provided with the equipment, if required).
4. Open the valve ①.



5. Using the keys, choose the  following options:

-  Blend with external suction ③.
6. Press the **F5** key to confirm.
 7. For these options, you are initially asked to specify the volume to fill. Your 2 options are as follows:
 - State the volume to add.
 - State the desired final volume.

Make this selection on the screen, as shown:

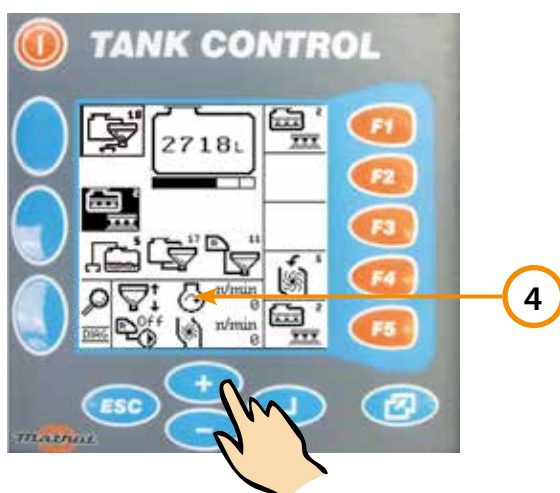
- (1) Represents the current option.
- (2) Volume currently in tank.
- (3) Entry field for volume to add.
- (4) Entry field for final volume.

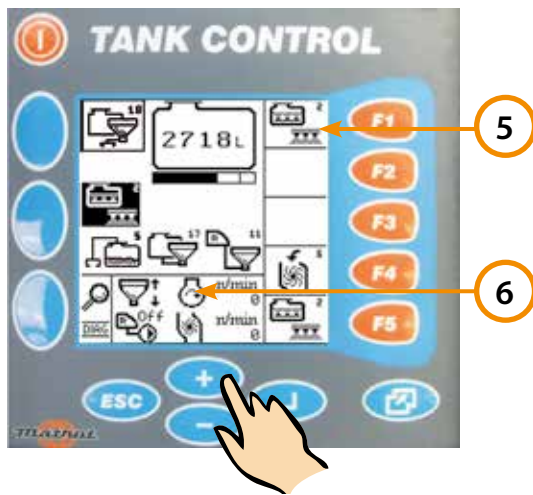
8. After stating the desired volume, confirm using the **F4** key to start the fill.

9. If required, accelerate the engine.
 - USING the +/- keys, please select the engine speed ④.
 - Press the **F2** key to accelerate (1,750 rev/min. max).

*NB: Press the **F3** key to slow down.*

Filling automatically stops once the volume requested is reached.





The valves position themselves so as to carry out the option indicated on the top right of the screen ⑤.

10. If required, decelerate the engine.

- USING the +/- keys, select the engine speed ⑥.
- Press the **F3** key to slow down.

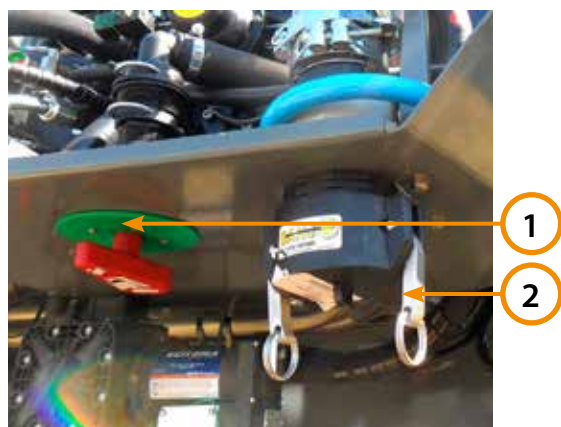


11. Close the valve ④.

12. Disconnect the pipe.

13. Put the cover on ⑤.

10.5.3 Rinse the Chem Hopper



1. If using option 18, make sure that the valve is closed ①.
2. If option 18 is used, remove the cap ②.
3. If option 18 is used, connect the pipe.
4. If option 18 is used, open the valve ①.



5. Using the keys, choose one of the two following options:
 - Blend using external suction ③.
 - Rinse the hopper using suction in rinse tank ④.



7. For these options, you are initially asked to specify the volume to fill. Your 2 options are as follows:
 - State the volume to add.
 - State the desired final volume.

Make this selection on the screen, as shown:

- (1) Represents the current option.
- (2) Volume currently in tank.
- (3) Entry field for volume to add.
- (4) Entry field for final volume.



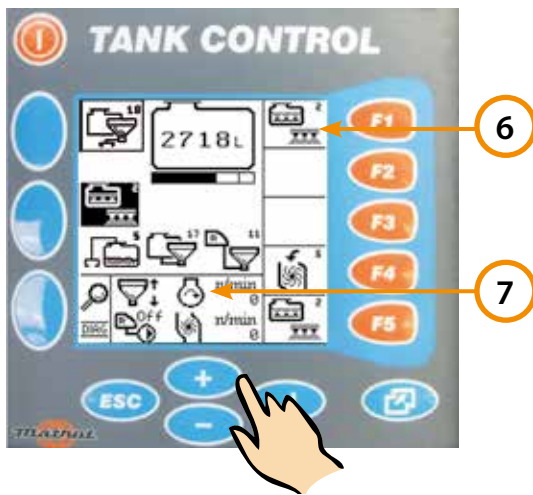
8. After stating the desired volume, confirm using the **F4** key to start the fill.

9. If required, accelerate the engine.
 - USING the +/- keys, please select the engine speed ⑤.
 - Press the **F2** key to accelerate (1,750 rev/min. max).

*NB: Press the **F3** key to slow down.*

Filling automatically stops once the volume requested is reached.





The valves position themselves so as to carry out the option indicated on the top right of the screen ⑥.

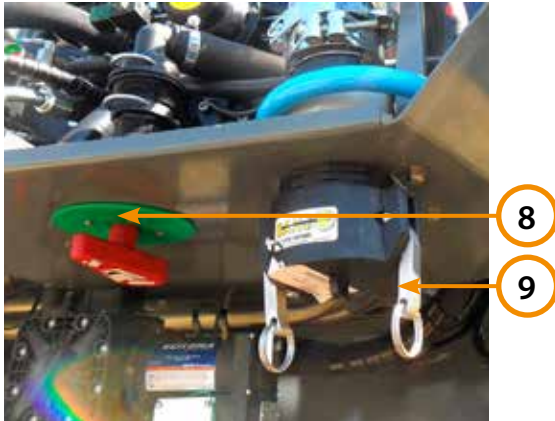
10. If required, decelerate the engine.

- USING THE +/- keys, please select the engine speed ⑦.
- Press the **F3** key to slow down.

11. If option 18 is used, close the valve ⑧.

12. If option 18 is used, disconnect the pipe.

13. If option 18 is used, put the cover ⑨.



10.5.4. Rinsing the canister



1. Open the valve ②.
2. Open the cover of the Chem Hopper.



3. Place the tank on the nozzle
4. Lift the valve ③.



5. Place the canister on the boom and apply vertical force downwards with the canister ④.
6. Close the valve ③.
7. Leave the canister to drain for a short time on the nozzle and close the Chem Hopper.

10.5.5. Rinse the Chem Hopper



1. Make sure that the cover of the blender is closed.
2. Lift the valve ⑤ to start rinsing the Chem Hopper
3. Lower the valve ⑤ to stop rinsing the Chem Hopper.



Do not lift the hem Hopper cover when the valve ⑤ is open.



4. Once the Chem Hopper is empty, close the valve ⑥.



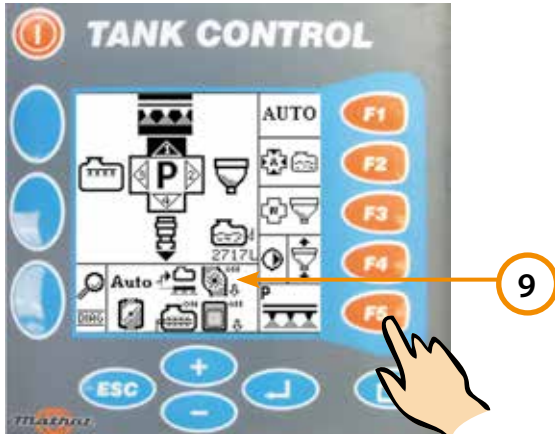
5. Stop the rinse pump by pressing the **F5** key.



6. Slow the engine down.
 - USING the +/- keys, please select the engine speed ⑦.
 - Press the **F3** key to slow down.



7. Close the valve ⑧.



8. Disengage the pump.

- USING the +/- keys, please select the pump ⑨.
- Confirm the stoppage by pressing the **F5 key**.

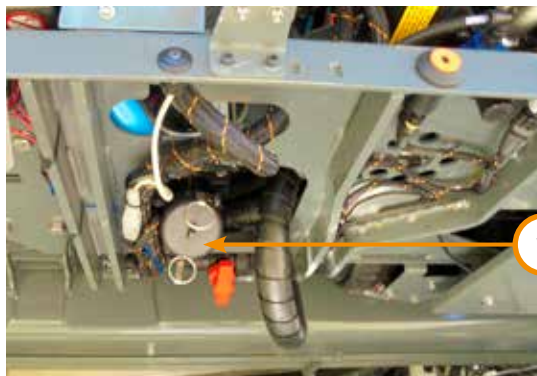


9. Disconnect the pipe.

10. Put the cover on ⑩.

11. Lift the Chem Hopper (ref. section 10.3.3. Lowering the Chem Hopper).

10.6. Transfer



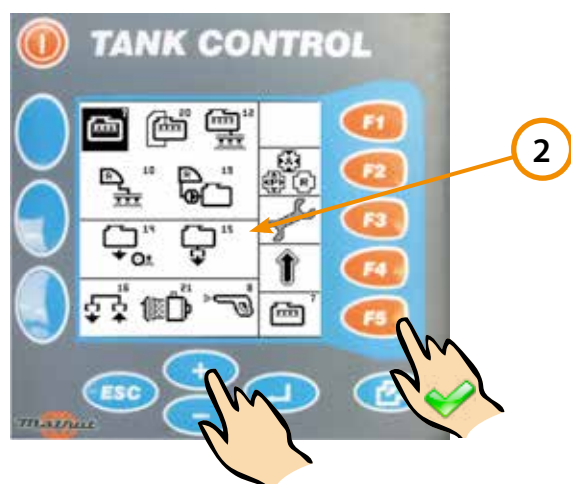
1. Remove the cap ①
2. Connect the pipe (an adapter is provided with the equipment, if required).




3. On the Tank Control, press the F1 key.



4. Press the F4 key to go to the next page.



5. Using the +/- keys, select option 15:
 15 Transfer the main tank to the outside ②.
6. Press the F5 key to confirm.

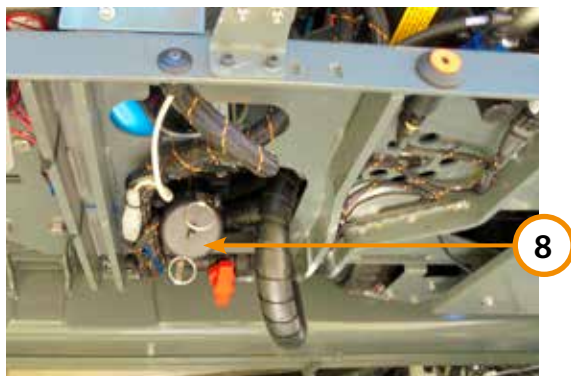


7. If required, accelerate the engine
 - USING the +/- keys, select the engine speed ⑥.
 - Press the **F2** key to accelerate (1,750 rev/min. max).

*NB: Press the **F3** key to slow down.*

AT the end of the transfer:

8. Press the **F3** key to slow the engine speed down.
9. USING the +/- keys, choose the pump ⑦.
10. Press the **F5** key to **stop the spray pump**.
11. Disconnect the pipe.
12. Put the cap on ⑧.



10.7. 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 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.

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 unauthorised persons.

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 15 sprayed before cleaning the sprayer.

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.

Rinse and cleaning

The incorporated rinsing tank can be used for different purposes:



Note! Only Full internal cleaning will clean the whole fluid system!

A. Full internal rinsing:

This procedure is used when:

- 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, or no risk for crop protection sedimentation in the fluid system)

B. External cleaning:

This procedure is used to:

- Rinse the sprayer on the outside in the field as required (can only be carried out on completion of "A").

C. Rinsing spray circuit without diluting main tank content

This procedure is used when:

- In case of stop in spraying before main tank is empty (e.g. beginning rain etc.). It will rinse the pump, operating unit, spray lines, etc.

D. Full internal cleaning (Soak wash)

This cleaning procedure is always used when:

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

ATTENTION! The cleaning procedures stated requires the Hopper to be cleaned on beforehand (directly after the last chemical filling). If the Hopper for some reason is not cleaned please carry out this cleaning before attempting the cleaning procedures A, B or C - see "Rinsing The Chem Hopper" section 10.5.5. Note that this cleaning will then use water from the rinsing tank reducing the available quantity for cleaning procedures A, B, C and D.

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.

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.



10.7.1 Full internal rinsing



NOTE!

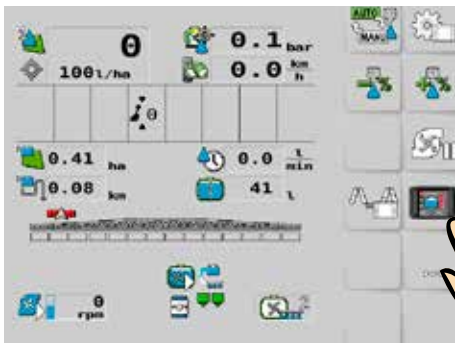
This cleaning procedure is always used when:

- *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 or if the spraying is not going to be done straight away a full cleaning should be carried out. See "D. Full internal cleaning (Soak wash)" This rinsing procedure will rinse the spraying circuit and Main Tank as follows:



1. From the spray application, press the key shown.

2. Make sure that you are in the area shown (AUTO).



If that is not the case, press the key on the terminal. (Not shown)

3. Press the key shown to go to the next page. **AUTO**



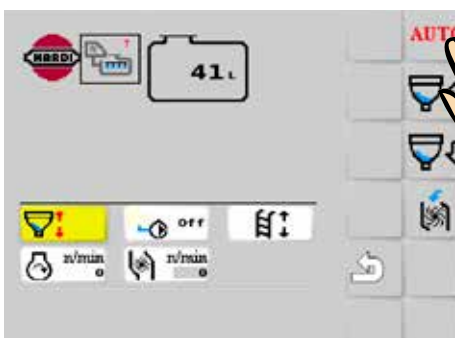
4. Double-click option 7



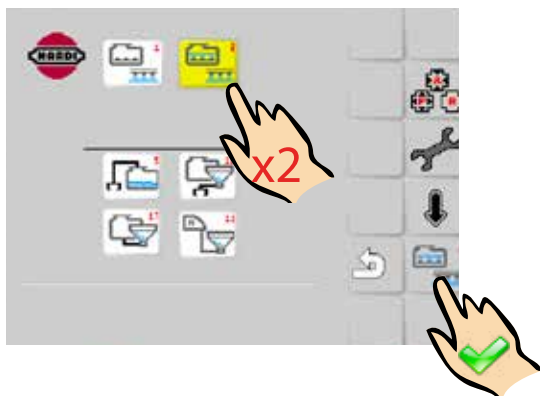
– Cleaning the tank with rotating rinsers.

5. Confirm your selection.



6. Keep the option for 100/150 litres. On the terminal, monitor the change in quantity. Maintain an engine speed of at least 1,500 rev/min.



7. Press the key on the terminal, as shown, to return to the AUTO area.

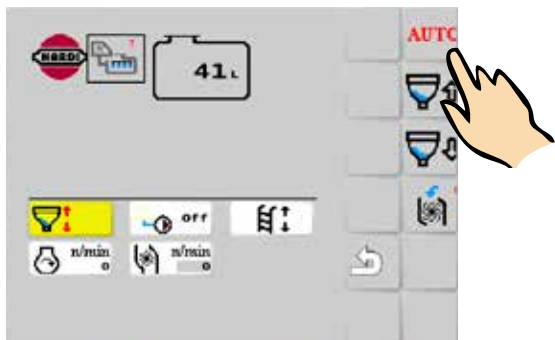


8. Double-click option 2 or 4; if back jets are raised, the cursor turns yellow.

-  Continuous circulation spraying with flushing.
-  Continuous circulation spraying without flushing with back jets behind the wheels.

9. Confirm your selection.

10. Keep the option for several minutes. Check that the pressure obtained is between 1 to 2 bar.



11. Press the key shown to return to the AUTO area.



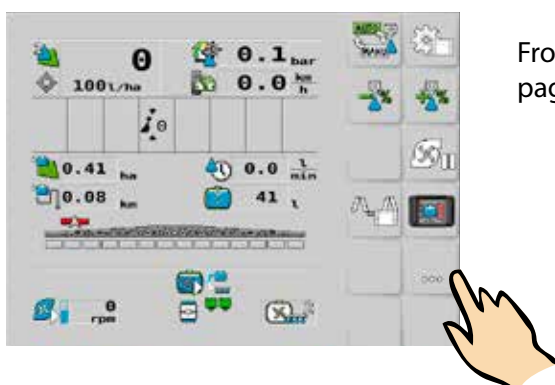
12. Double-click option 1 or 3; if back jets are raised, the cursor turn yellow.

- Continuous circulation spraying without flushing
- Continuous circulation spraying without flushing with back jets behind the wheels.

13. Confirm your selection.

14. Keep the option for 1 minute. Check that the pressure obtained is between 1 to 2 bar.


15. Spray the tank volume. Open the sections ② and the general valve ①.

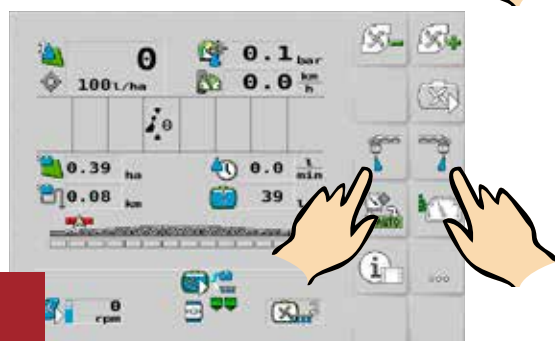


16. Remember to activate the border jets, if set up.

From the job area on the terminal, press the key shown to go to the second page.

– Press the key for the left border jet.

– Press the key for the  right border jet.



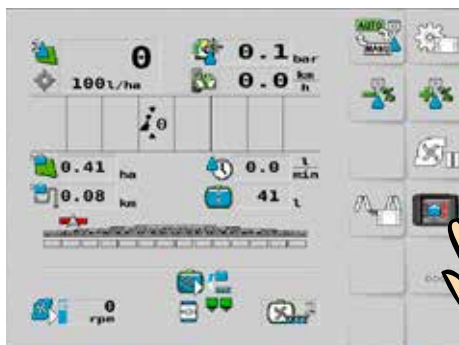
10.7.2 Rinsing spraying circuit without diluting main tank content

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).



± **WARNING!**

If the next crop to be sprayed is sensitive to the latest chemical used or if the spraying is not going to be done straight away a full cleaning should be carried out. See "D. Full internal cleaning (Soak wash)" on page 79.



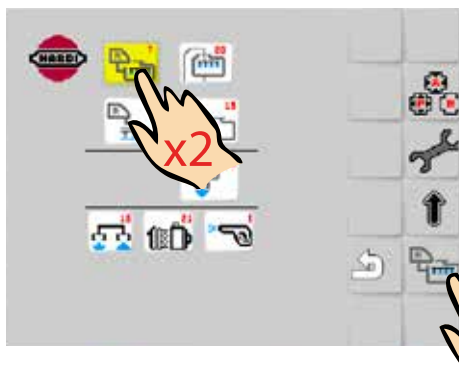
Rinsing of the boom, filter, spray pump

1. From the spray application, press the key shown to access the screen



2. Make sure that you are in the area shown (AUTO).
If that is not the case, press the key on the **AUTO** terminal.
(Not shown)

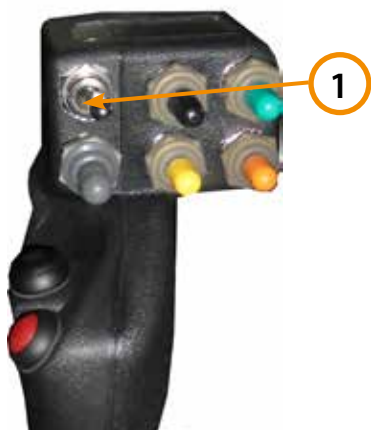
3. Press the key shown to access more options.



4. Double-click option 10, the cursor turns yellow.
– Rinsing the boom by suction in the rinse tank.



5. Confirm your selection.
6. The system automatically sets the pressure to 2 bar.



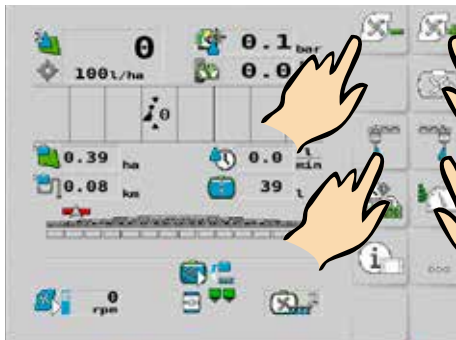
7. Spray as soon as the pump starts up, to avoid any return flow to the tank, open the sections ② and the general valve ①.





1. If the pressure cannot be reached, adjust the engine speed or the spraying pump speed
 - To increase engine speed: press the corresponding engine speed button ③.
 - To reduce engine speed: press the corresponding engine speed button ④.





2. To increase or reduce pump speed:
 - Press the key to go to the second page.

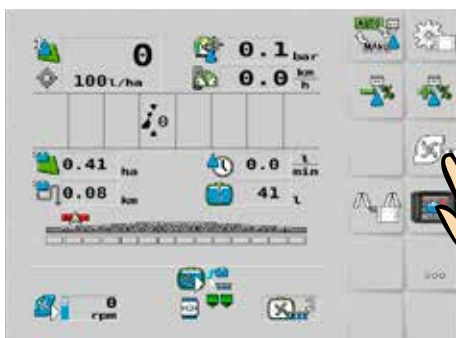
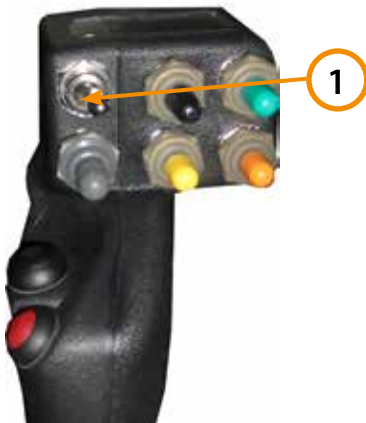


- Then press  the key to increase the pump speed.
- Then press  the key to decrease the pump speed.

3. Remember to activate the border jets, if set up.

- Press  the key for the left border jet.
- Press  the key for the right border jet.

4. To stop spraying, close the sections ③ and/or the general valve ①.



5. Press the key shown to stop the pump.

Components rinsed: Boom, filter, spray pump.

Components not rinsed: Tank, flushing circuit, tank suction + suction valve, Chem Hopper



ATTENTION!

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

ATTENTION!

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

10.7.3 Full internal cleaning (Soak wash)



NOTE! This cleaning procedure is always used when:

- The next crop to be sprayed is at risk to be damaged by the chemical just used, or
- The sprayer is not going to be used again for same chemical or crop right away, or
- 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. All Clear DS, as this is a commonly used cleaning agent. If your chemical prescribes another cleaning agent and/or another cleaning procedure, you must follow that.



NOTE! For extra “sticky” combinations such as carfentrazone-ethyl plus glyphosate allow the cleaning solution to remain in contact with all internal surfaces of the spray equipment for 24 hours to increase product residue removal. If it is suspected that hoses and spray lines are contaminated, contact time with the cleaning solution should be increased to 48 hours.

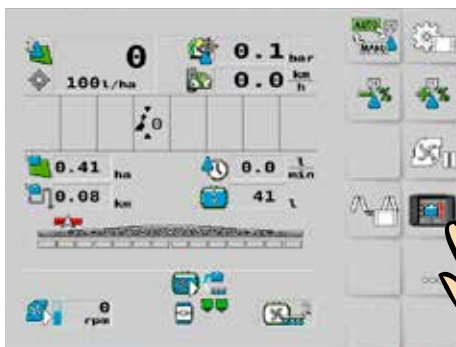


NOTE! Below is general cleaning guidelines of your sprayer, it is important to remember that the best source of information is the pesticide label. Consult labels for the products that were previously in the tank, and for the products that will be used for the next application.

Procedure for wash with a cleaning agent, e.g. All Clear DS:

1. Rinse the sprayer in the field (See chapter “A.”) during the rinsing open all the boom flush tap and let water from the rinse tank, flush the line until clean. Do the same for all flush taps on the boom.

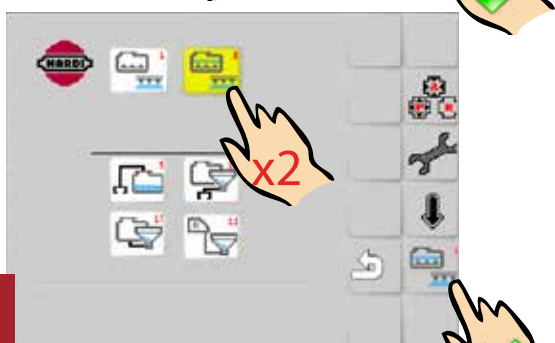
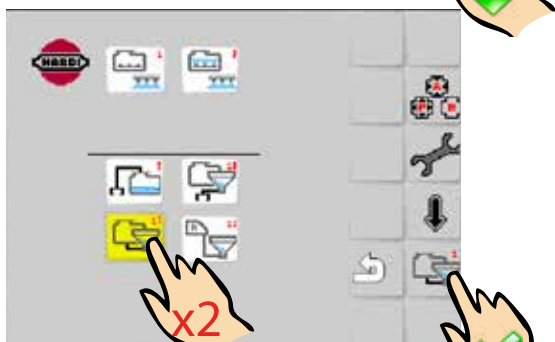
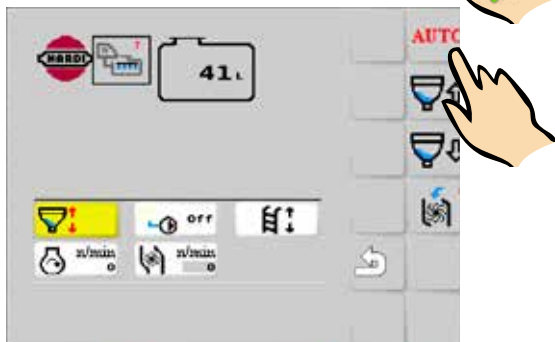
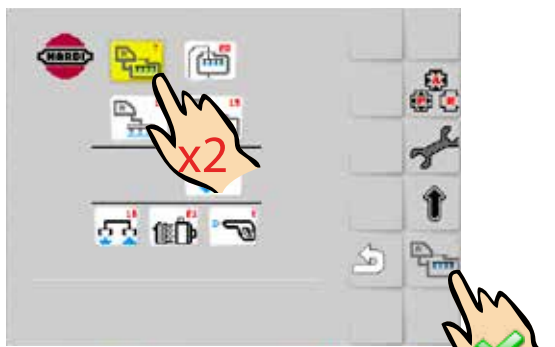
Full rinse after pre-rinse



1. In the spray application, press the key shown to access the Tank Control screen.



2. Make sure that you are in the area shown (AUTO). If that is not the case, press the key on the terminal. (Not shown)
3. Press the key shown to go to the next page.



4. Double-click option 7

- Cleaning the tank with rotating rinsers.


 5. Confirm your selection.

6. Keep the option for 100/150 litres. On the terminal, monitor the change in quantity. Maintain an engine speed of at least 1,500 rev/min.

7. Press the key shown to return to the AUTO area.

8. Press the key shown to go to the next page.

9. Double-click option 20, the cursor turns yellow.


-  20 Cleaning the tank using rotating rinsers and by suction in the main tank.

10. Confirm your selection.

11. Keep the option for several minutes.

12. Double-click option 17, the cursor turns yellow.

- Blend with suction in the main tank.

 13. Confirm your selection.

14. Keep the option for several minutes.

15. If required, rinse the canister + rinse cone blender.

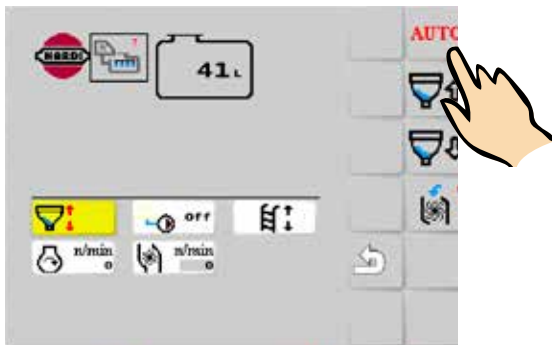
16. Double-click option 2, the cursor turns yellow.

- Continuous circulation spraying with flushing.

17. Keep the option for several minutes. Check that the pressure obtained is between 1 to 2 bar.



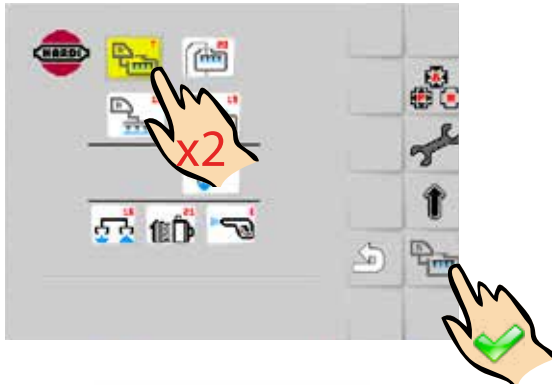
18. Press the key on the terminal, as shown, to return to the AUTO area.



19. Double-click option 1, the cursor turns yellow.

- Continuous circulation spraying without flushing.
- Continuous circulation spraying without flushing with back jets behind the wheels.

20. Confirm your selection.



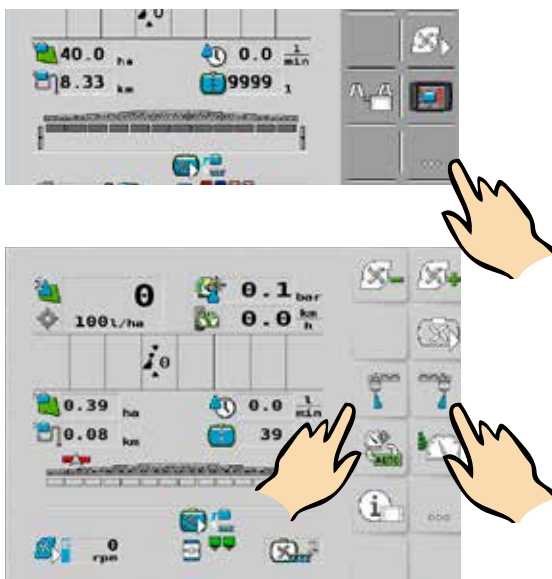
21. Keep the option for 1 minute. Check that the pressure obtained is between 1 to 2 bar.



22. Press the main On/Off toggle button ① to start spray .



23. Remember to activate the border jets, if set up.

From the job area, press the key shown to get to the second page.



- Press the key for the  left border jet.
- Press the key for the  right border jet.

10.8. Cleaning the filters



Always wear personal protective equipment and carefully follow manufacturer's instructions for the products to be sprayed.



10.8.1. Suction filter

With or without any liquid in the (main or rinse) tanks

As the pump is disengaged.

1. Using the +/- keys, select option 21:

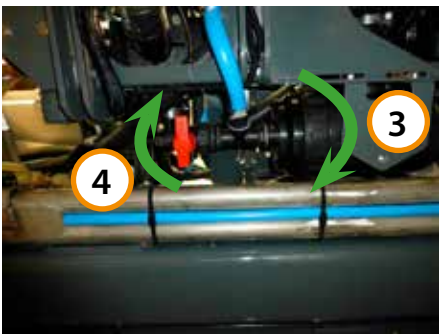
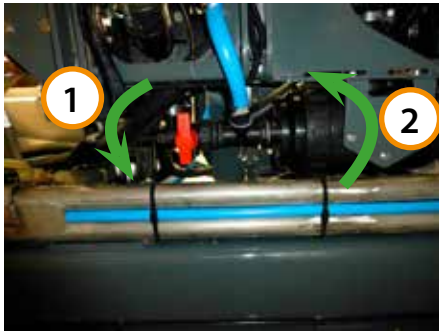


Cleaning the filters.

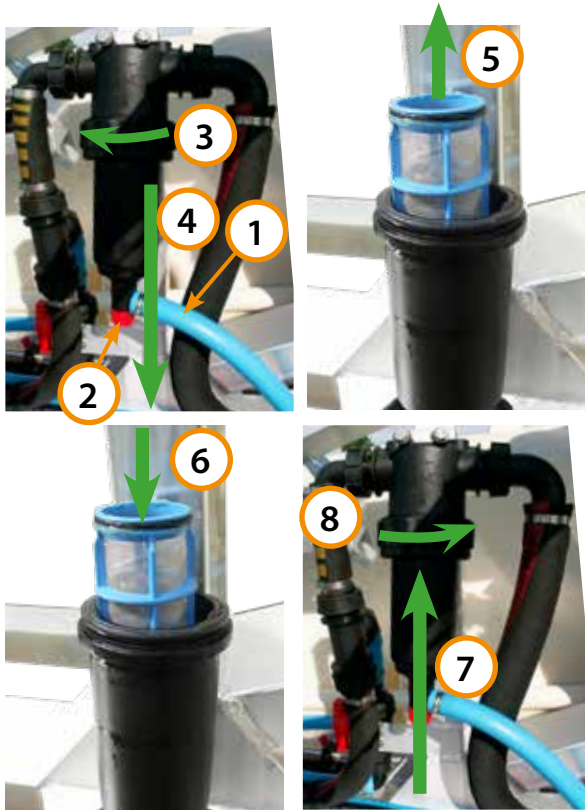
2. Use key F5 to confirm.
3. Place a container under the filter valve.
4. Open the filter valve to drain it ①.

As soon as the liquid stops flowing:

5. Loosen the retaining nut for the filter cover ②.
6. Pull on the cover to access the strainer.
7. Remove the strainer and clean it, check that it is in perfect condition.
8. Check the state of the strainer's joints and the filter cover and grease them before putting them back in.
9. Slip the sieve back inside the filter, put the cover back on and tighten the pressure nut ③.
10. Close the filter valve ④.



10.8.2. Boom filters



1. Place a container at the end of the filter's drain pipe ①.
2. Turn the tap on ② and drain the filter.

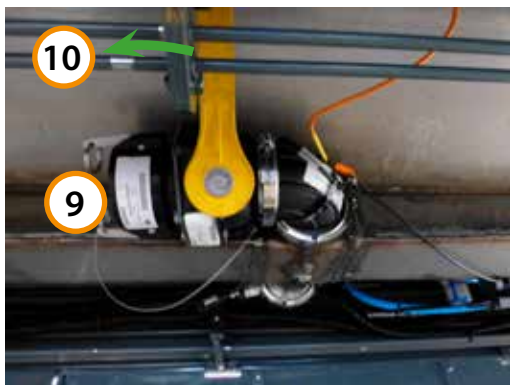
As soon as the liquid stops flowing:

3. Turn the tap off ②.
4. Loosen the retaining nut for the main part of the filter ③.
5. Pull on the bowl to access the strainer ④.
6. Remove the strainer ⑤ and clean it, check that it is in perfect condition.
7. Check the state of the strainer's joints and the filter cover and grease them before putting them back in.
8. Slip the strainer back inside the main part of the filter ⑥, put the main part of the filter back ⑦ and tighten the pressure nut ⑧.

10.9. Drainage

Always wear personal protective equipment and carefully follow manufacturer's instructions for the products to be sprayed.

10.9.1. Main tank drain



1. Put a container under the drain cap of the main tank ⑨.
2. Remove the cap ⑨.
3. Turn the valve ⑩ in the direction shown.

As soon as the liquid stops flowing:

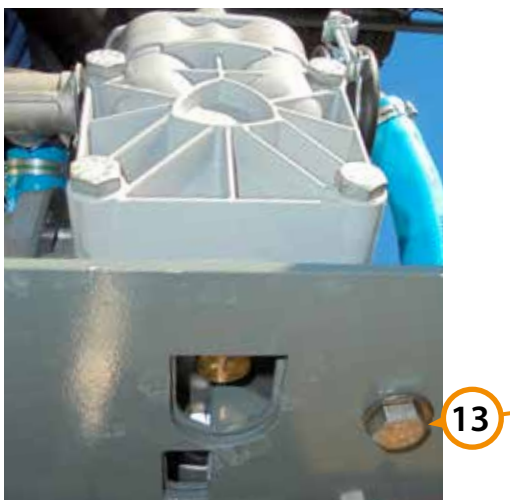
4. Turn the valve ⑩ upwards.
5. Put the cap back ⑨.

10.9.2. Spray pump drain



1. Put a container at the spray pump outlet ⑪.
2. Loosen the hose clamp ⑫ and remove the pipe to drain the pump.
3. Put the pipe back into its original position and tighten the hose clamp ⑫ to stop the drain.

10.9.3. Rinse pump water drain



1. Put a container under the drain cap of the rinse pump ⑬.
2. Unscrew the cap ⑬.

As soon as the liquid stops flowing:

3. Tighten the cap ⑬.

10.9.4. Rinse tank drain



1. Put a container under the drain cap of the main tank ⑭.
2. Unscrew the cap ⑭.

As soon as the liquid stops flowing:

3. Screw the cap back on ⑭.



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. Prepare sprayer for cleaning with cleaning agent, e.g. All Clear DS. Read the All Clear DS instructions carefully. Fill water in the main tank to 10% of capacity (. Fill the rinsing tank completely. This water is used later for rinsing. Turn on the Main Tank Valve

10.10. Spraying




During spraying, the door of the cab needs to be shut.

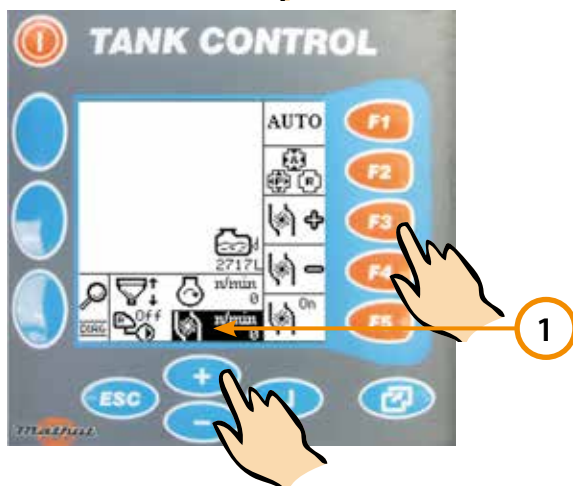
10.10.1. Spraying with flushing



1. Using the +/- keys, select option 2:

-  Continuous circulation spraying with flushing.

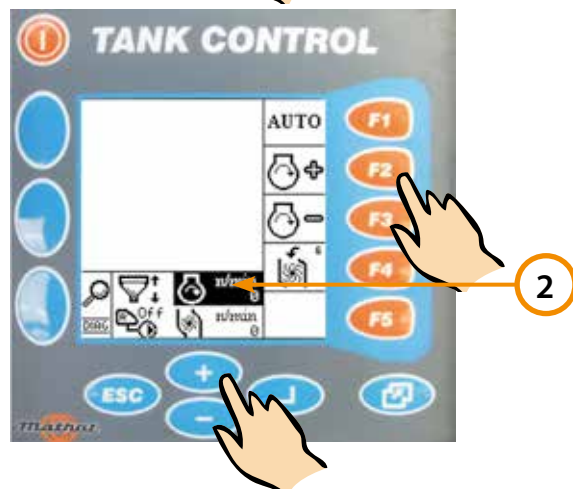
2. Press the F5 key to confirm.



3. Steadily accelerate the pump until it reaches its maximum speed:

- USING the +/- keys, please select the centrifugal pump ①.
- Press the F3 key to accelerate (around 6 sec. to reach the pumps maximum speed).

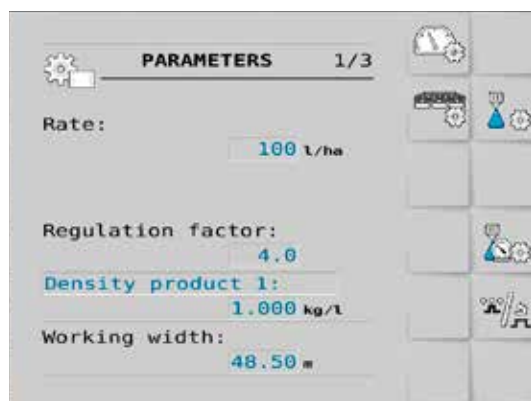
NB: Press the F4 key to slow down.



4. If required, accelerate the engine.

- USING the +/- keys, please select the engine speed ②.
- Press the F2 key to accelerate (**1,750 rev/min. max**).

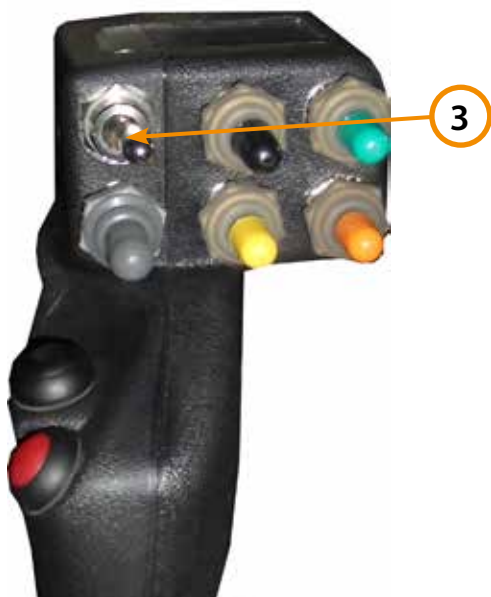
NB: Press the F3 key to slow down.



5. On the terminal, set the type of nozzle to use as well as the dose/hectare.

NB: Refer to section 10.12. Spray settings., page 141 To start spraying. Press the main On/Off toggle button ③.


6. To Stop spraying. Press the main On/Off toggle button ③.



Also see notes on page 112

10.10.2. Spraying with flushing + back jets



1. Using the +/- keys, select option 4:
 -  Continuous circulation spraying with flushing + back jets.
2. Press the F5 key to confirm.



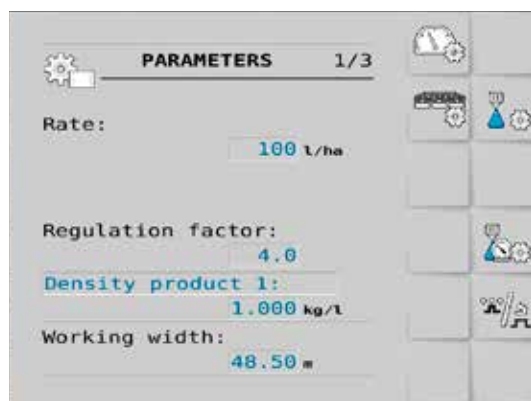
3. Steadily accelerate the pump until it reaches its maximum speed:
 - USING the +/- keys, please select the centrifugal pump ②.
 - Press the F3 key to accelerate (around 6 sec. to reach the pump's maximum speed).

NB: Press the F4 key to slow down.



4. If required, accelerate the engine:
 - USING keys +/-, please choose the engine speed ③.
 - Press the F2 key to accelerate (**1,750 rev/min. max**).

NB: Press the F3 key to slow down.



1. On the terminal, set the type of nozzle to use as well as the dose/hectare.

NB: Refer to section 10.12. Spray settings, page 141




2. To start spraying. Press the main On/Off toggle button ④.
3. To Stop spraying. Press the main On/Off toggle button ④.

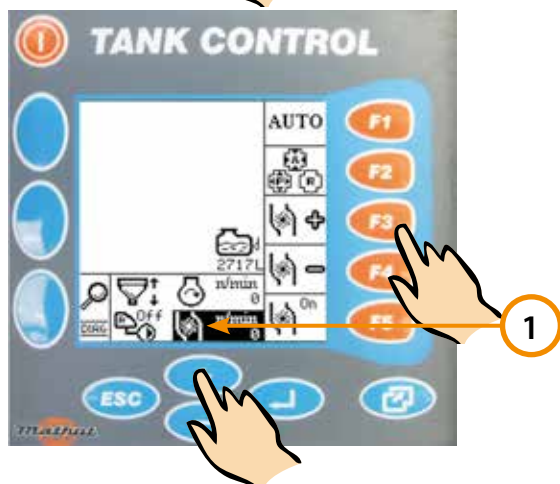
10.10.3. Spraying without flushing



1. Using the +/- keys, select option 1:

-  Continuous circulation spraying without spraying.

2. Press the F5 key to confirm.



3. Steadily accelerate the pump until it reaches its maximum speed:

- USING the +/- keys, please select the centrifugal pump ①.
- Press the F3 key to accelerate (around 6 sec. to reach the pumps maximum speed).

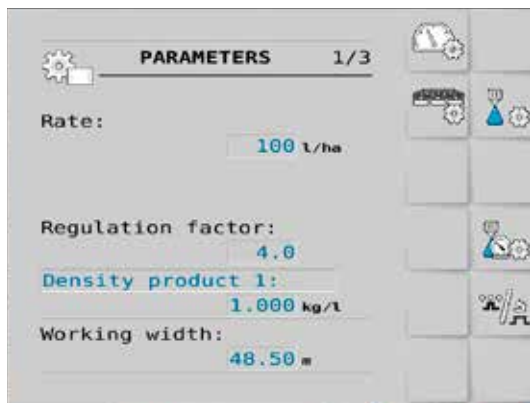
NB: Press the F4 key to slow down.



4. If required, accelerate the engine.

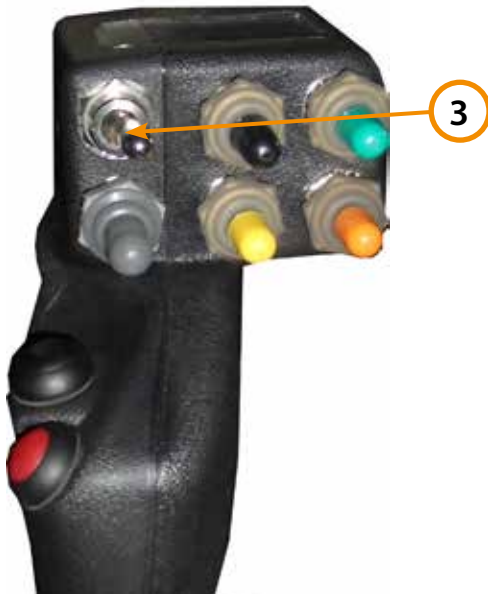
- USING the +/- keys, please select the engine speed ②.
- Press the F2 key to accelerate (**1,750 rev/min. max**).

NB: Press the F3 key to slow down.



5. On the terminal, set the type of jet to use as well as the dose/hectare.

NB: Refer to section 10.12. Spray settings, page 141




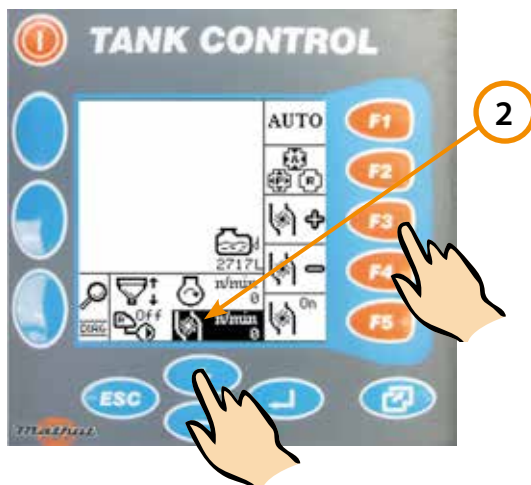
6. To start spraying. Press the main On/Off toggle button③
7. To Stop spraying. Press the main On/Off toggle ③.

10.10.4. Spraying without flushing + back jets



In motorized valve mode

1. Using the +/- keys, select option 3:
 -  Continuous circulation spraying without flushing + back jets.
2. Press the F5 key to confirm.



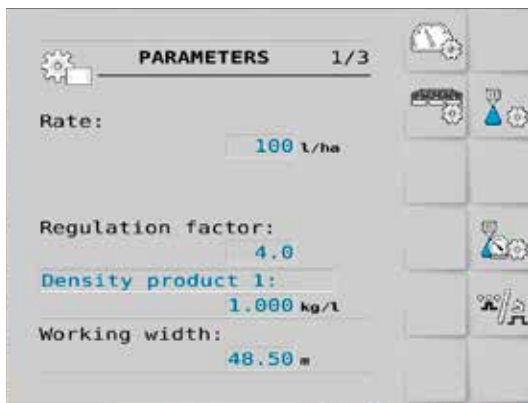
3. Steadily accelerate the pump until it reaches its maximum speed:
 - USING the +/- keys, please select the centrifugal pump ②.
 - Press the F3 key to accelerate (around 6 sec. to reach the pump's maximum speed).

NB: Press the F4 key to slow down.



4. If required, accelerate the engine:
 - USING keys +/-, please choose the engine speed ③.
 - Press the F2 key to accelerate (**1,750 rev/min. max**).

NB: Press the F3 key to slow down.



5. On the terminal, set the type of jet to use as well as the dose/hectare.

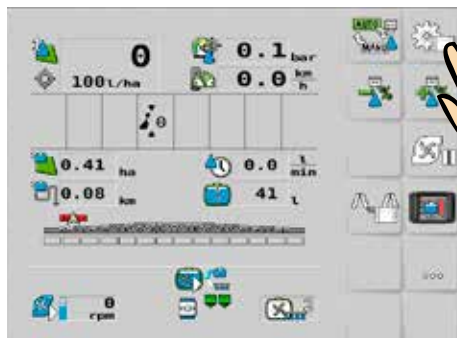
NB: Refer to section 10.12. Spray settings, see next page



6. To start spraying. Press the main On/Off toggle button ④
7. To Stop spraying. Press the main On/Off toggle ④.

See notes page 112

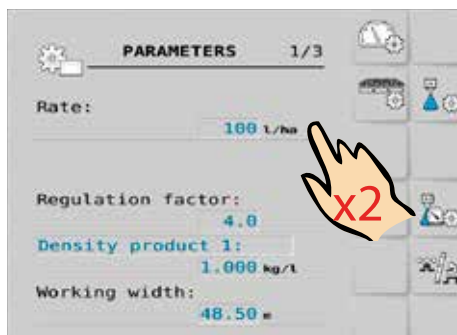
10.12. Spray settings



From the spray application, press the key to access the spray settings.

10.12.1. Rate/ha settings

1. Select "Rate" by clicking on it.



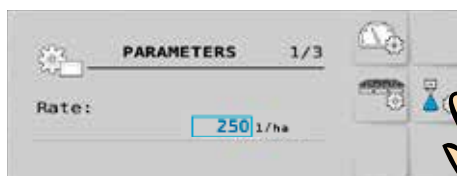
2. Enter the desired volume per hectare using the numeric keypad.



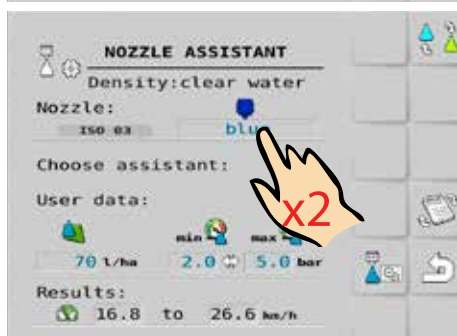
 Confirm.

10.12.2. Nozzle selection

1. Press the key shown to access the settings.




2. Select "Nozzle" by double-clicking on it.



3. Select the nozzle and confirm.



10.12.3. Boom width selection


1. Select "Working Width" by double-clicking on it.
2. Enter the desired scope of job per hectare using the numeric keypad.
3. Confirm. 

Note: Never change the width of the boom, which is automatically amended when selecting Boom no. 1 or Boom no. 2

10.12.4. Regulating factor settings

This factor defines the reactivity of the regulating valve:


- 1: As it is not highly reactive, reaching the set point could take a long time.
- 9: Highly reactive, risk of unstable regulation (Yo-yo effect).
- 3: Factory setting.

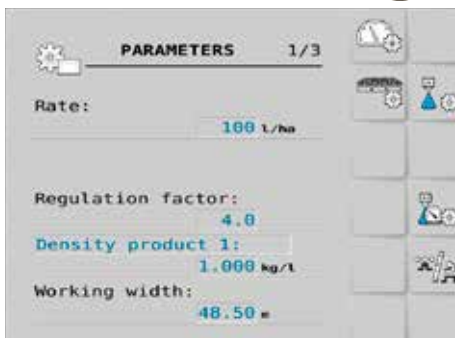
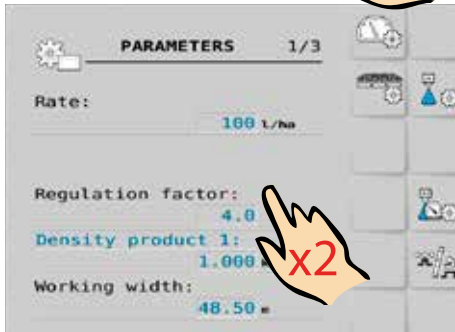
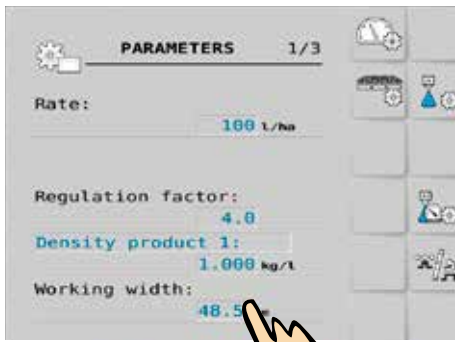
1. Select "Regulatory factor" by double-clicking on it.
2. Choose a reactivity coefficient using the numeric pad.
3. Confirm. 

10.12.5. Density settings

When "Liquid density" is displayed, it is taken into account in the adjustment and for the electronic gauge.

When "Liquid density" is not displayed, the adjustment assumes a density of 1.

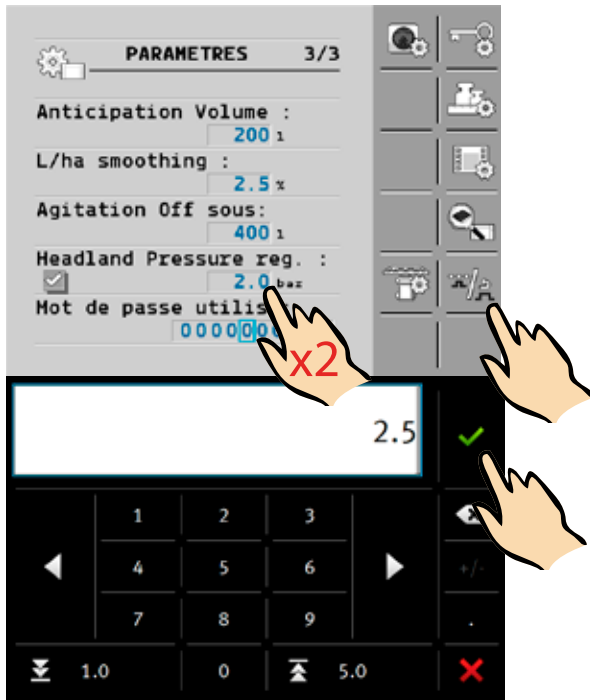
1. Click on "Kg/" to display the liquid density, or click on "Product density" to select a product that is already saved.
2. Double-click "Liquid density".
3. Enter the desired density coefficient.
4. Confirm the density. 




10.12.6. Stand-by pressure settings

When "SprayerPressurOFF" is displayed, the stand-by pressure corresponds to the pressure in the spray circuit before spraying starts. This stand-by pressure ensures there is no drop in pressure when spraying starts.

When "SprayerPressurOFF" is not displayed, there is no stand-by pressure.



1. From the spraying settings area, press on the icon shown to display the 3/3 menu.
2. Select "SprayerPressureOFF" by double-clicking it.
3. Enter the stand-by pressure using the numeric keypad.
4. Confirm. 

XI. OFF-SEASON STORAGE

When the spraying season is over, we recommend you protect the equipment.



- Wash the entire self-propelled vehicle with water (take care around the electrical connections).
- Check all housing and case levels.
- Check the tyre pressures.
- Put the spraying system in frost protection mode (see section 12.1).
- PLEASE REFER TO THE ENGINE MANUAL FOR 'LOOKING AFTER THE ENGINE'.
- Clean the water cooler, oil and air conditioning condenser honeycomb grills.
- Ensure the batteries are sufficiently charged and check electrolyte levels.
- Replenish replacement filter components.
- Run the engine at moderate speed once a month for about twenty minutes.
- Lubricate the transmission and the different lubricant dispensers.
- Apply lubricant to the exposed cylinder rods.
- STORE THE MACHINE WITH A FULL FUEL TANK OFF-SEASON.

11.1. Winter storage



1. Empty the rinse tank (see section 10.11. Drainage).
2. Empty the hand wash container.
3. Empty the windscreen washer reservoir or fill it with winter windscreen washer fluid.
4. Empty the main tank (see section 10.11. Drainage).
5. Clean all the filters (see section 10.10. Cleaning filters).
6. Drain the two pumps (see section 10.11. Drainage).
7. Pour at least 100 litres of antifreeze into the rinse tank.
8. In the spraying program, tap the key to open the parameter view, and go to the second page. Set the valve volume to 20l.
9. Lower the TurboFiller (see section 10.3.3. Lowering the TurboFiller).
10. Select function 18 (Filling with external suction).
11. Operate the container cleaner, then the filler cone rinsing device and the external rinsing pipe.
12. Remove the suction connector cap.
13. Open the suction valve.
14. Feed the main pump until the liquid flows out of the suction connector. Use the +/- keys to select engine speed ①, then tap and hold **F4**. Release F4 once the liquid flows out of the connector. Close the suction valve.
15. Select function 8 (External cleaning with water jet).
16. Select function 7 (Cleaning of the main tank with rotating rinsing nozzles).
17. Select function 19 (Transfer from rinse tank to main tank).
18. Select function 17 (Filling with suction into the main tank).
 - Open the TurboFiller valve to draw in the contents.
 - Operate the container cleaner, then the filler cone rinsing device and the external rinsing pipe.

19. Select function 1 (Spraying without agitation).
 - Pump at maximum speed.
 - Engine at 1500 rpm.
 - Duration: 5 min.

Note: Check the pressure gauge reading. If the reading is below 1.5 bar, close the control valve.

20. Select function 2 (Spraying with agitation).
 - Pump at maximum speed.
 - Engine at 1500 rpm.
 - Duration: 5 min.

Note: Check the pressure gauge reading. If the reading is below 1.5 bar, close the control valve.

Note: For the rear jet option, select function 4.

21. Open the main spray valve + all the sections.

Note: For side or rear jets, do not forget to activate the corresponding options.

22. Slow the engine down.
 - Disengage the pump.
23. Open the connector under the pressure gauge.
24. Select function 2 (Spraying with agitation).
 - Pump at maximum speed.
 - Engine at 1500 rpm.
 - Duration: until the antifreeze flows out of the pressure gauge pipe.
25. Disengage the pump and put the pipe back on the pressure gauge.
26. In the spraying program, tap the key to open the parameter view, and go to the second page. Set the valve volume to 200l.

11.2. Starting the sprayer again for the new spraying season

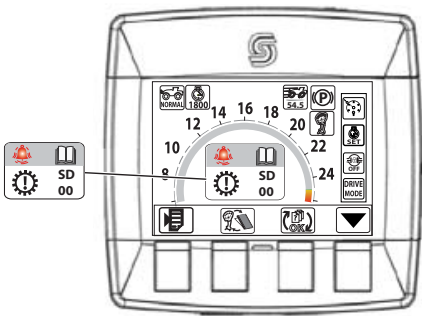
1. Check all housing and case levels.
2. Check the tyre pressures.
3. Check the tightness of wheels and transmission joints.
4. Check the state of filters.
5. Fill in the rinse tank with clear water.
6. Fill the hand wash container with clear water.
7. Fill the windscreen washer reservoir.
8. Prepare a container that is large enough to collect all the antifreeze contained in the main tank.



Always wear personal protective equipment and carefully follow manufacturer's instructions for the products to be sprayed.

XII. FAULT CODES

12.1. Transmission



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	Analog 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		

12.2. Engine

SPN	Component / Location	Description (Error location)	FMI
29	Hand throttle	Cable break or short circuit, signal implausible compared to signal or 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

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 above 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 sent 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

Notes

[illegible]

