ALPHA evo VariTrack TWIN FORCE

Translation of the original

Instruction book

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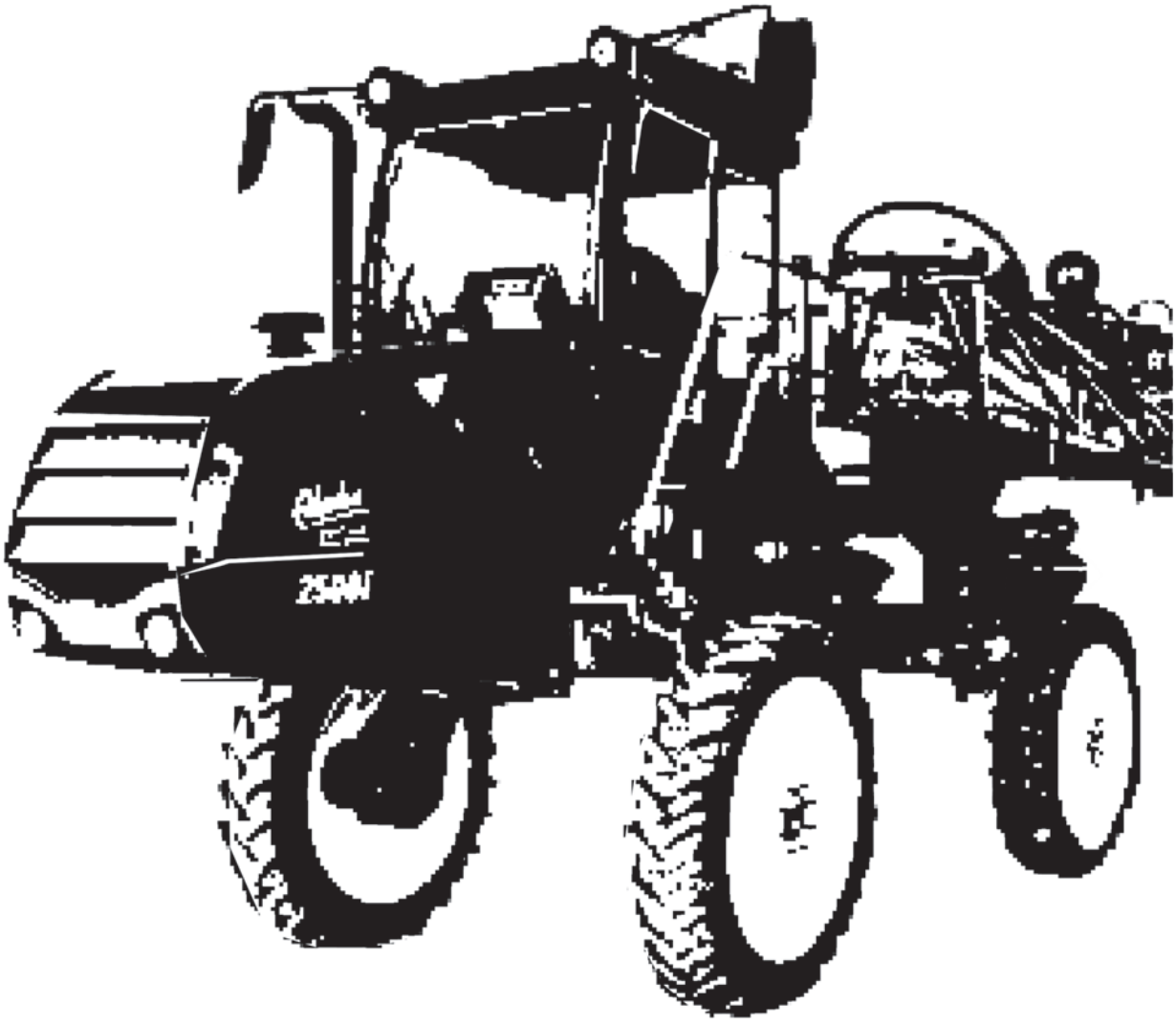

www.hardi-fr.com

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

As this instruction book covers all models, including all hydraulic boom versions, please pay attention to the paragraphs dealing with precisely your model.

This book is to be read in conjunction with the "Spray Technique" book.

The original instruction book is in French. The versions in other languages are translated from the original. In the event of contradiction or inaccuracy between the original French version and the versions in other languages, the original French version shall prevail.

The illustrations, technical information and specifications in this book are to the best of our belief correct at the time of printing. As it is HARDI-EVRARD 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-EVRARD is without any obligation in relation to equipment purchased before or after such changes.

HARDI-EVRARD has made every effort in writing this instruction book to make it as accurate and complete as possible. It may not be held responsible for any omissions or inaccuracies.

As this instruction book covers all models, characteristics or equipment only available in certain countries may be described. Pay special attention to the paragraphs concerning the model that you own.

Published and printed by HARDI EVRARD S.A.S

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EC Declaration of Conformity

The Manufacturer:

HARDI-EVRARD

43 rue du Cuivre-BP 59

77542 SAVIGNY-LE-TEMPLE CEDEX

FRANCE

declares that the following equipment:

ALPHA VARITRACK evo self-propelled vehicles

- Conform to all of the relevant provisions of the Machinery Directive 2009/127/EC of 21 October 2009 amending Directive 2006/42/EC with regard to machinery for pesticide application.

- Conform to the provisions of Council Directive 2004/108/EC (EMC).

- Comply with the provisions of Appendix I provided in article R.4312-1 appearing at the end of title 1, book III of the fourth section of the French Labour Code, amended by Decree No. 20011-1480 of 9 November 2011 related to work equipment and personal protective equipment.

1 - EC Declaration of Conformity

Operator safety

Symbols

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


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


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


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


This symbol means NOTE.

User recommendations for spray products

This sprayer was designed and manufactured by HARDI-EVRARD to be used with the spray products of your choice. In order for the sprayer to function well, we advise you to strictly follow our recommendations, which are detailed in the User Manual that you will have received when you purchased the sprayer.

However, it is your sole responsibility as the user to ensure you comply strictly with the recommendations given by the manufacturers of the spray products that you use.

In particular, it is strongly recommended that all users:

- Carefully read the manufacturer label(s) on the spray product(s) used and follow the instructions given (measurements, personal protective equipment etc.)
- Only mix products whose compatibility has been expressly recognised by the plant protection chemical manufacturer
- Avoid letting in air when you fill the sprayer tank in order to stop foam forming and prevent overflowing
- Follow the usage precautions and the warnings provided by the plant protection chemical manufacturer in terms of storing spray products and always store the products in a locked area out of the reach of animals and children
- Follow the precautions relating to the reprocessing of packaging, in accordance with chemical manufacturers' recommendations
- Respect untreated zones
- Contact the plant protection chemical manufacturer (or the manufacturer's representative) if you have any questions or need more information.

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

- Read this instruction book carefully before using the equipment. It is equally important that other operators of this equipment also read this book.

  If any parts of this instruction book remain unclear after reading it, contact your retailer for further information before using the sprayer.
- Local legislation may require operators to have a certificate of competence in the use of the equipment. Respect the applicable local legislation.
- The driver's seat is the intended working place during operation.
- Wear protective clothing. Clothing may differ according to the plant protection chemicals used. Respect the applicable local legislation.
  After spraying, the operator should have a wash and change his clothes. Clean any equipment that may have become soiled.
- Do not eat, drink or smoke during the use and maintenance of your sprayer.

  In case of poisoning, immediately seek medical advice or call the emergency service (see information on the packaging of the products used).

2 - Safety notes

Filling and application

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

Usage

This HARDI EVRARD trailed sprayer is exclusively intended for use in farming work, i.e. the application of plant protection chemicals and liquid fertilisers.
Any other use is considered contrary to normal usage and is therefore forbidden.

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

Operator's skill

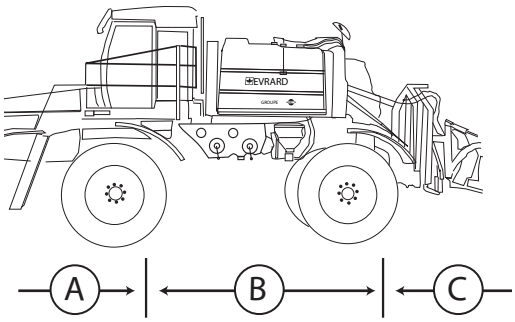
The machine should be used and maintained by people who are aware of its special use and safety characteristics.
Before using your machine, familiarise yourself with all the commands. When working it will be too late to do so.
Ensure that you have the skills required for protecting crops and the environment, and for handling and spraying plant protection chemicals. For more information about personal and environmental protection, see the SPRAY TECHNIQUES book.

Definition of the working place

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

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

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



Responsibilities of the manufacturer and the user

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

Lights, working at night

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

Driving on public roads

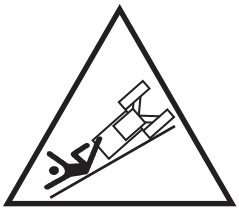
When driving on public roads where the highway code and any other regulations apply, these must be observed, particularly regarding mandatory equipment such as lights, indicators, hazard lights etc.

You should be aware of the vehicle's size and weight, particularly the overall width and height. For more information, see section “Overall dimensions” on page 115 and “Weight” on page 116.

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

Driving in fields

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



ATTENTION! As a general rule:

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

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

Safety symbols

Safety symbols show the different locations of the sprayer that present risks for your safety. These symbols should be respected by all people working on or near the machine.

The safety symbols should always be clean and readable. Worn or damaged labels must be replaced with new ones. Contact your local dealer for new labels.

NOTE! The list of warnings presented below may vary according to the function of the equipment.

Clean water not fit for drinking!

Fill the rinse tank and the hand wash tank with clean water only

Lifting point!

Service!

Shut off engine and remove ignition key before performing maintenance or repair.

Risk of falling off!

Do not ride on platform or ladder during use.

Service!

Tighten with torque according to instruction book.

Risk of tipping!

Be aware when disconnecting the sprayer.

Risk of squeeze!

Keep hands away.

Risk of burn!

Stay clear of hot surfaces.

Risk of injury!

Do not open or remove safety shields while engine is running.

Risk of squeeze!

Stay clear of raised unsecured loads.

Risk of electrocution!

Keep a sufficient distance away from electrical power.

Risk of poisoning

Tank entry prohibited

Handle!

Use the cabin access ladder.

Handling chemicals!

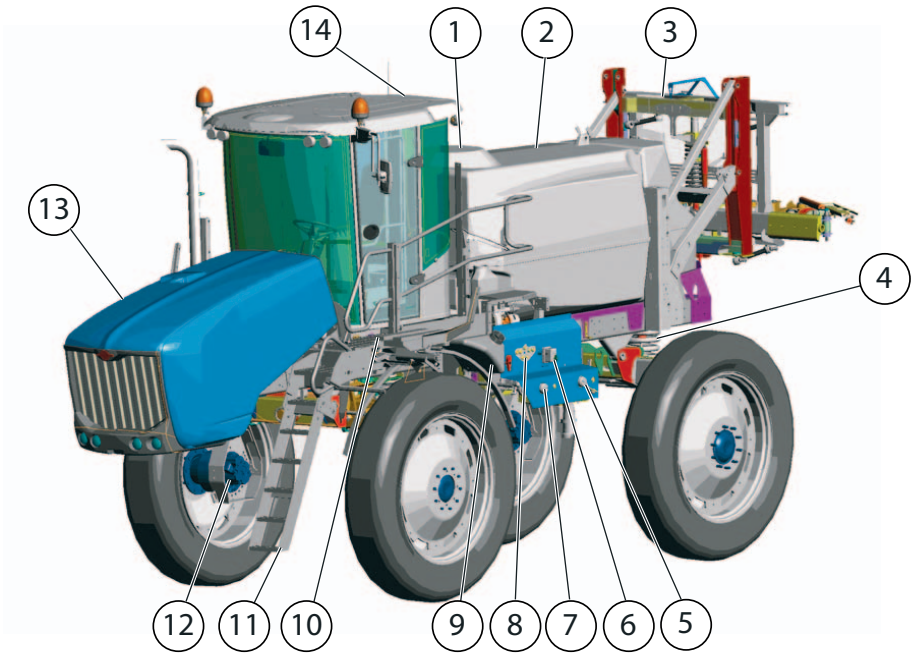
Carefully read the information about chemical preparation before operating the machine. Observe the instructions and safety instructions when operating.

Regulations on the use of plant protection chemical waste

For further information on using waste, see section “Environmental Protection” in the SPRAY TECHNIQUE book.

General information

Overview



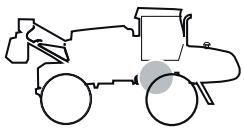
1. Main tank lid
2. Main tank
3. Central boom frame
4. Rear damper
5. Multi-way suction valve
6. Agitation valve
7. Multi-way pressure valve
8. External controls
9. Hand wash tank
10. Cabin access gangway
11. Cabin access ladder
12. Hydraulic motors
13. Engine cover
14. GPS receiver

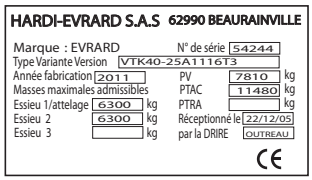
3 - Description

Sprayer identification plate

A manufacturer's plate is fixed to the right-hand side of the chassis. It indicates the following elements:

- Serial number.
- Type and variant.
- Year of manufacture.
- Empty weight and maximum authorised total weight.
- Axle weight 1 (front axle).
- Axle weight 2 (rear axle).
- Date and place of receipt of sprayer.
- Cold marking on chassis (Serial No. - Type- Variant).





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ATTENTION! The identification plate is regulatory, it should always be in place on the sprayer. For all information about the machine, please quote the serial number of the sprayer.

Other identification plates are attached to the machine components, see section “Component identification plates” on page116.

Boom

Boom and terminology

The TWIN FORCE booms have a stable and robust parallelogram lift and are pendulum suspended. There are two versions: HAY and HAZ.

The TWIN blowers are driven by hydrostatic transmission integrated into the self-propelled vehicle. The blower speed can be adjusted by increments from the cabin.

The 18-28 m HAY boom is pendulum suspended and has 4 hydraulic rams. The raising/lowering and folding/unfolding functions are operated via the sprayer hydraulics.

The 18-28 m HAZ boom is pendulum suspended and operates hydraulically. All functions are operated by direct acting hydraulics (D.A.H.). The boom is also equipped with an individual slanting boom control and hydraulic locking of the suspended pendulum.

The end sections of all booms are break-away sections.

Booms are available in 18, 20, 21, 24, 27 and 28 m widths. All booms can be folded away into 2 sections.

The boom can also be used half-folded. Half folded widths are as follows:

Full working width	1/2 folded
18 metres	12 metres
20 metres	12 metres
21 metres	12 metres
24 metres	12 metres
27 metres	14 metres
28 metres	14 metres

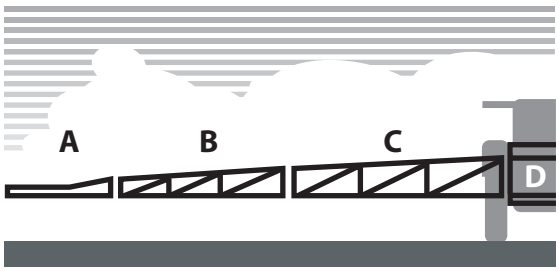
For 2-folded booms the terminology is as follows:

A. Break-away section

B. Outer section

C. Intermediate section

D. Central section



3 - Description

Liquid system

General information - valve system

All of the spray functions are operated via centrally situated valves with colour coded pictorial symbols for easy operation.

Pump

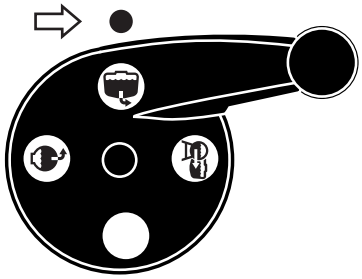
The 6-diaphragm pump has a simple design. The diaphragms and valves are easy to access, they isolate the moving parts from the liquid. The ALPHA Evo self-propelled vehicle may be equipped with the model 463-10 or 463-12 with respective flow rates of 276 l/min and 322 l/min.

Valves and symbols

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

Suction valve = blue symbols

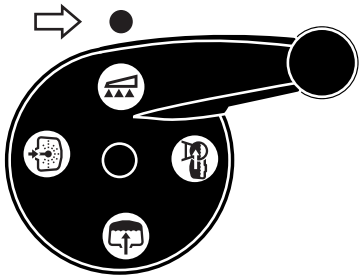
Turn the handle so the symbol for the required function is pointing towards the indicator. The valve is closed when the handle is not pointing towards a symbol.



	Suction in main tank
	Suction in rinse tank
	External suction

Pressure valve = green symbols

Turn the handle so the symbol for the required function is pointing towards the indicator.



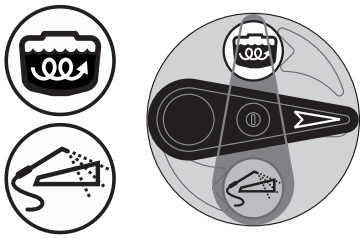
	Spray pressure		Tank rinse
	Filling with chemicals		Direct filling

Agitation valve = green symbols

With the adjustable agitation valve it is possible to combine spraying with a low volume rate at high pressure with agitation at the same time. This is continuously controlled by the agitation valve.
The valve is marked with an arrow on the disc, which indicates the amount of liquid that passes through the valve. If the valve handle is turned to the right, there is less agitation in the tank. Conversely if the handle is turned to the left, the volume is higher and there is maximum agitation in the tank.

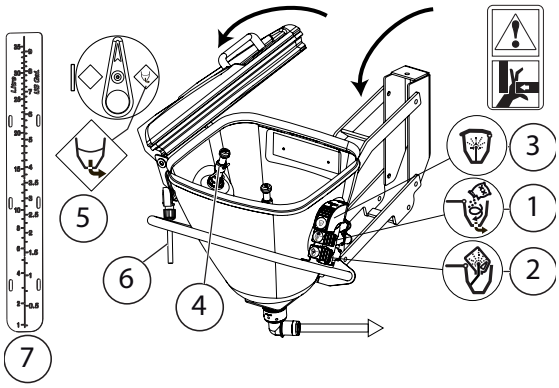
Adjustable agitation

External cleaning



TurboFiller = yellow symbols

1. Liquid filler and mixer valve
2. Container rinsing valve
3. Chemical TurboFiller rinsing valve
4. Container rinsing nozzle
5. Main tank filler valve
6. TurboFiller tank rinsing spray
7. Dipstick



The chemical TurboFiller is situated in the working zone on the sprayer's left side. To lower the TurboFiller to working height, gently raise the handle and pull it to lower the TurboFiller to the low position.

After use, raise the TurboFiller to its high position again, making sure that it locks.

WARNING! You should hold the handle throughout adjustment of the TurboFiller.

The values indicated by the dipstick fig.7 located inside the filler tank are given for information purposes. Only values indicated on the packaging or a measuring cylinder are to be taken into consideration.

Before doing anything to the TurboFiller it is obligatory to release and remove the spring in order to prevent any risk of injury.

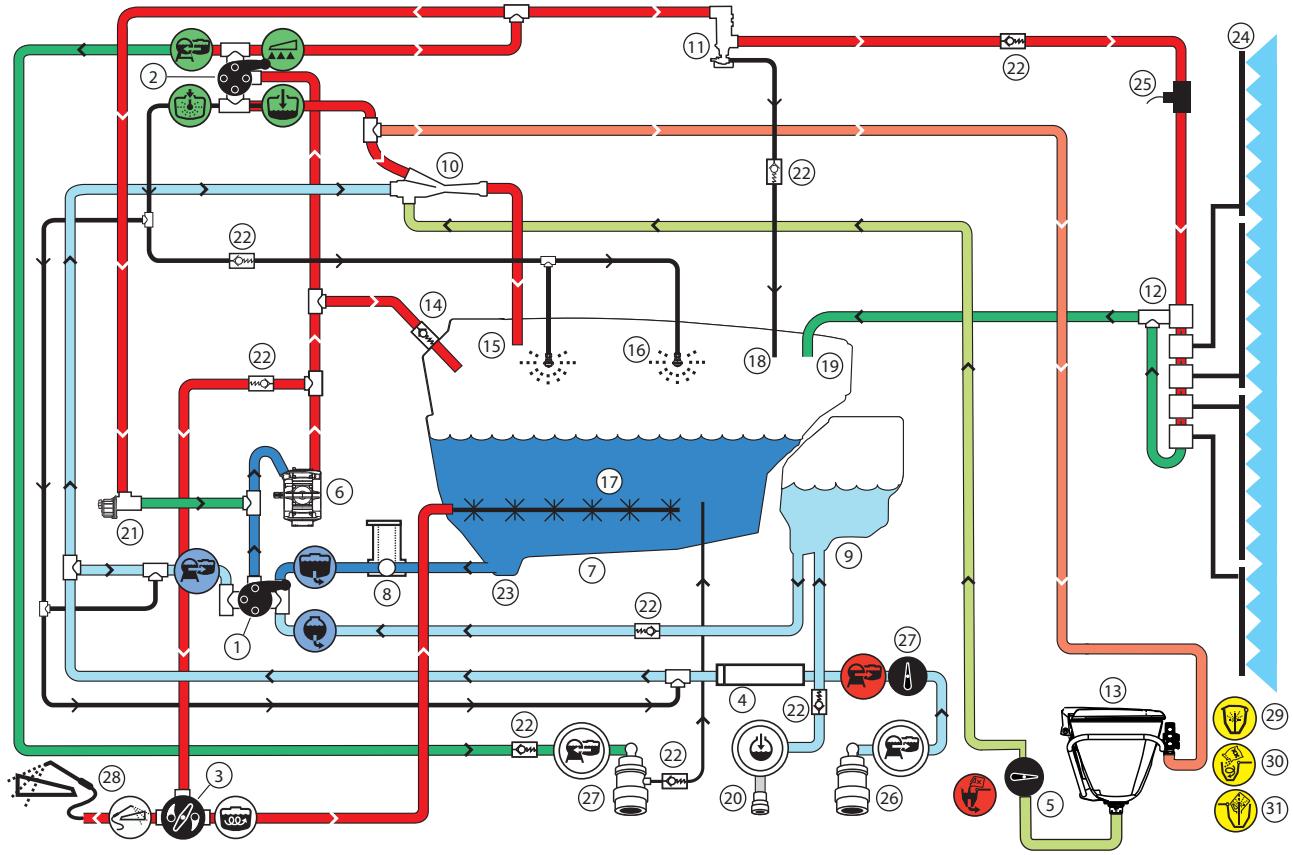
Mixing the liquid

Rinsing the TurboFiller

Rinsing the containers

WARNING! The handle should be held all the time while the TurboFiller is being lowered.

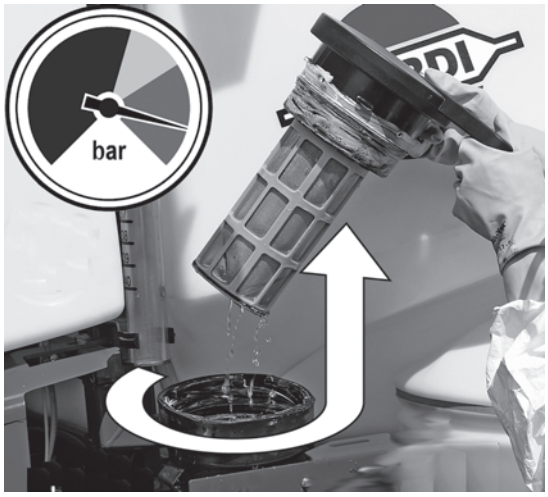
Diagram - Liquid system



1. Suction SmartValve
2. Pressure SmartValve
3. Agitation valve
4. Suction line filter
5. Filler valve
6. Spray pump
7. Main tank
8. EasyClean suction filter
9. Rinse tank
10. Injector
11. CycloneFilter
12. Section valve
13. Chemical filler
14. Safety valve
15. Tank injection entrance
16. Tank rinsing nozzles
17. Agitation
18. CycloneFilter return
19. Spray section valve returns
20. Rinse tank valve connector
21. Pressure control valve
22. One-way valves
23. Drain valve
24. Drainage connector
25. Flow transducer
26. Suction connector
27. Transfer connector
28. External spray washer
29. Chemical filler cleaning valve
30. Vortex nozzle valve
31. Container rinsing valve

EasyClean filter

The EasyClean filter is fitted in the working zone. It has a built-in valve that automatically closes when the filter is opened.
To open filter, turn the handle counterclockwise and pull it up, as shown in the picture.



A clogging indicator is fitted in the front of the cabin and is visible from the operator's seat.

Green indicator = filter clean - no cleaning required

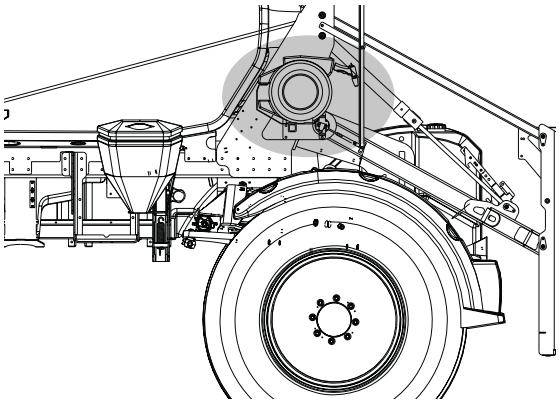
Yellow indicator = cleaning recommended at the end of the spray job

Red indicator = filter clogged - clean immediately

External cleaning

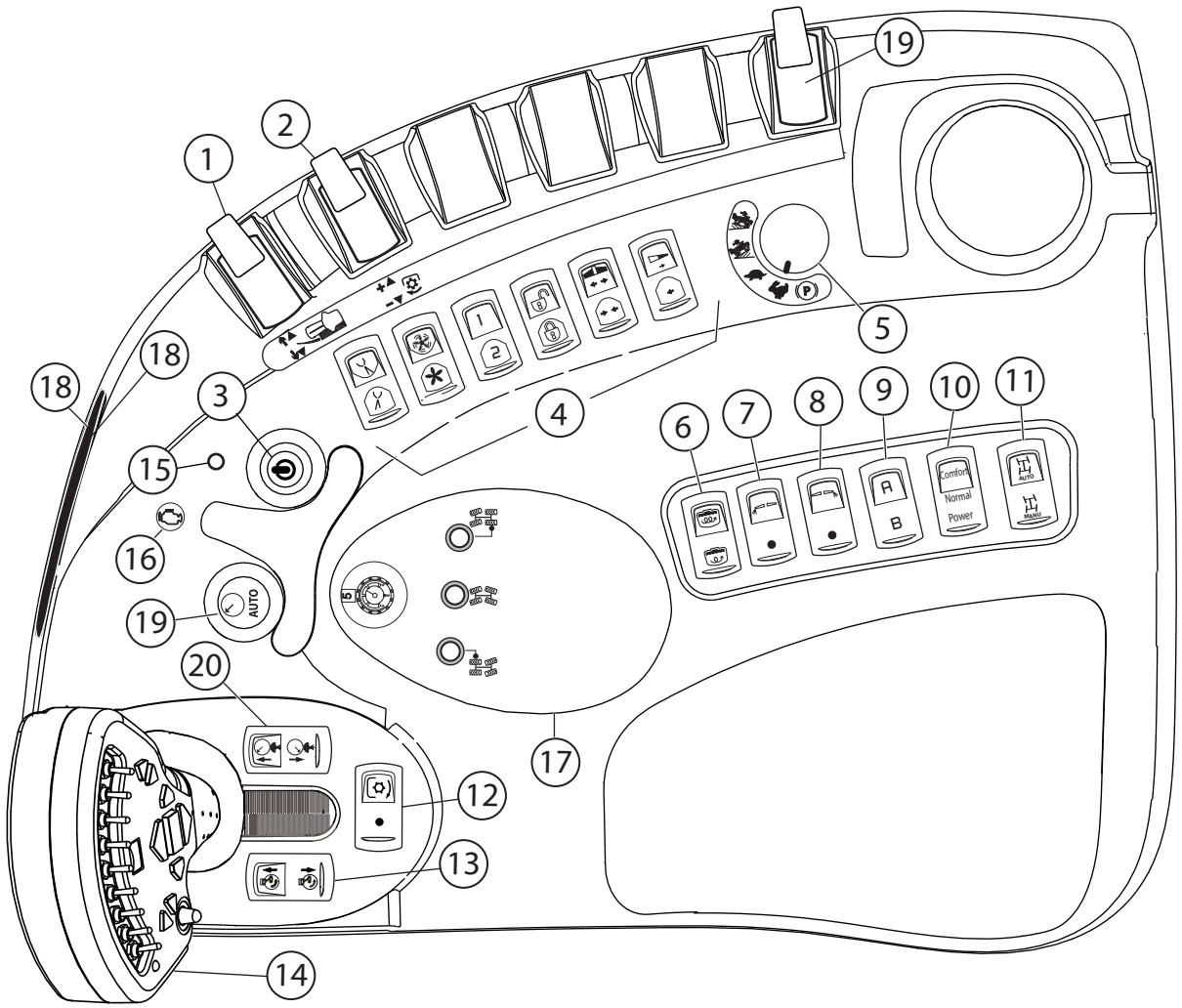
The ALPHA VariTrack evo can be equipped with an optional cleaning device comprising an automatic hose reel. Contamination can be prevented by following these steps:

- Before carrying out any maintenance or repairs, read the applicable chapters of this instruction book carefully.
- A clean sprayer is a safer sprayer, ready for use and more resistant to corrosion as a result of pesticides and solvents.
- It is sometimes necessary to leave spray liquid in the tank for short periods, e.g. until the weather becomes suitable for spraying again. If this is the case, the liquid systems must be rinsed and the exterior of the machine must be cleaned as soon as possible, and all precautions should be taken when parking the vehicle, which must stay out of the reach of all people and animals.
- Cleaning of the sprayer should always be carried out according to the regulations in force.



Cabin

Description of console

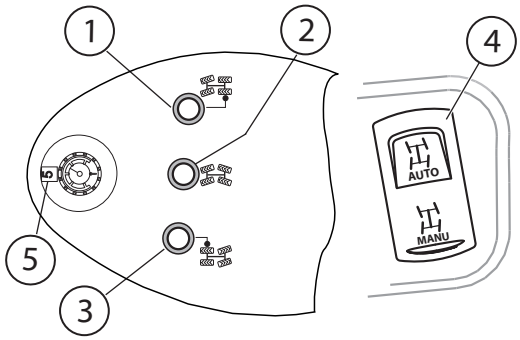


1. Open/Close gangway switch
2. Spray pump rotation speed adjustment switch
3. Antiskid on/off switch (optional)
4. Boom hydraulic function switches
5. Gear selector and parking brake
6. Main tank agitation switch
7. Left end nozzle control switch
8. Right end nozzle control switch
9. Option control switch for HC 9500
10. Driving mode selector switch
11. Automatic 4-wheel steering system Start/Stop switch
12. Spray pump clutch switch
13. Engine speed variation switch
14. Multi-functional forward handle
15. Computers activated indicator
16. Engine fault indicator
17. Control panel for 2/4 wheel steering mode and forward speed limiter
18. Ash pan
19. Track adjustment on/off switch.

Description of console - 4-wheel steering/speed limiter

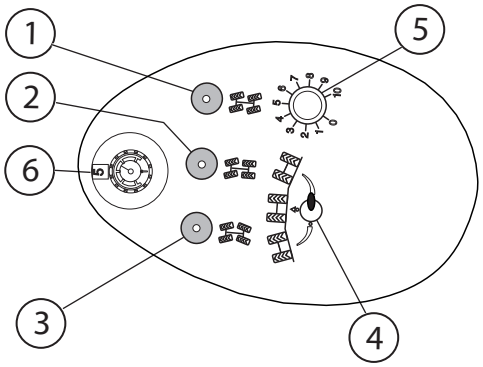
4-wheel steering with automatic realignment

1. Green indicator - rear wheels aligned.
2. Blue indicator - 4-wheel steering mode active.
3. Green indicator - front wheels aligned.
4. Start/Stop - AUTO mode - MANUAL mode
5. Forward speed limitation adjustment.



4-wheel steering with crab steering. (Optional equipment).

1. "CRAB" mode control.
2. 2-WHEEL STEERING mode control.
3. 4-WHEEL STEERING mode control.
4. Right and left SLANTING mode selection.
5. Rear wheel inclination control in SLANTING mode.
6. Forward speed limitation adjustment.



Track adjustment

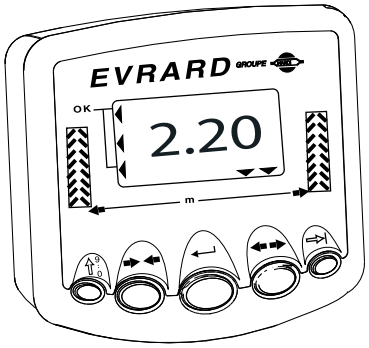
This device makes it possible to change the track of the self-propelled vehicle easily and continuously over a 45-cm range from the base track.

As standard, this adjustment is carried out mechanically using manually adjustable tie-rods.

The "hydraulic track adjustment" option allows the user to adjust the track continuously via an electrical unit in the cabin.

The hydraulic track adjustment option allows the user to:

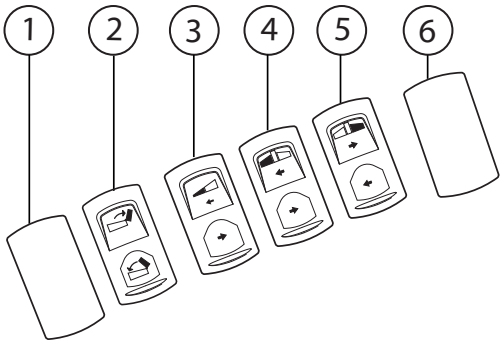
- Adapt very quickly to the different row spacing of various grain, vegetable and specialised crops.
- Minimise the amount of space the machine takes up on the road in order to increase the speed of road travel safely.



LPA2 central frame hydraulic function controls

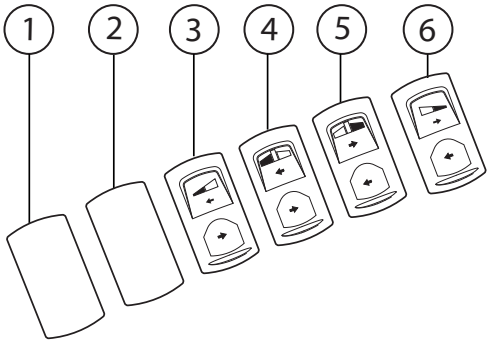
This configuration relates to sprayers equipped with the LPA2 central frame with simultaneous control of the inner and outer sections.

1. Not used
2. Switch for folding and unfolding the left and right extensions.
3. Switch for folding and unfolding the left-hand and right-hand sections.
4. Switch for folding and unfolding the left-hand inner section.
5. Switch for folding and unfolding the right-hand inner section.
6. Not used



This configuration relates to sprayers equipped with the LPA2 central frame with simultaneous control of the independent inner sections and the outer sections.

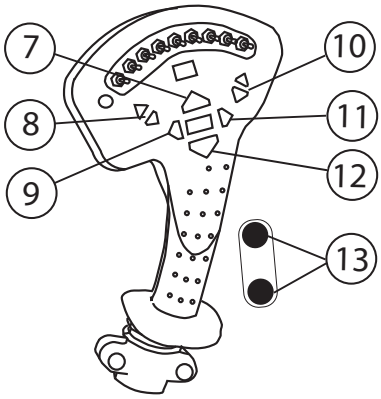
1. Not used
2. Not used
3. Switch for folding and unfolding the right-hand and left-hand outer sections.
4. Switch for folding and unfolding the left-hand inner section.
5. Switch for folding and unfolding the right-hand inner section.
6. Not used



HAZ boom hydraulic function controls

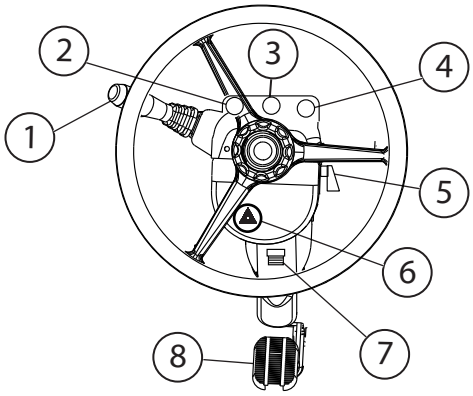
This configuration relates to sprayers equipped with the HAZ central frame with simultaneous control of the inner and outer sections.

1. Air outlets inclination control switch
2. Blower speed variation switch
3. Switch for folding and unfolding the right-hand and left-hand outer sections.
4. Switch for folding and unfolding the inner boom sections of the right-hand and left-hand boom.
5. Not used
6. Not used

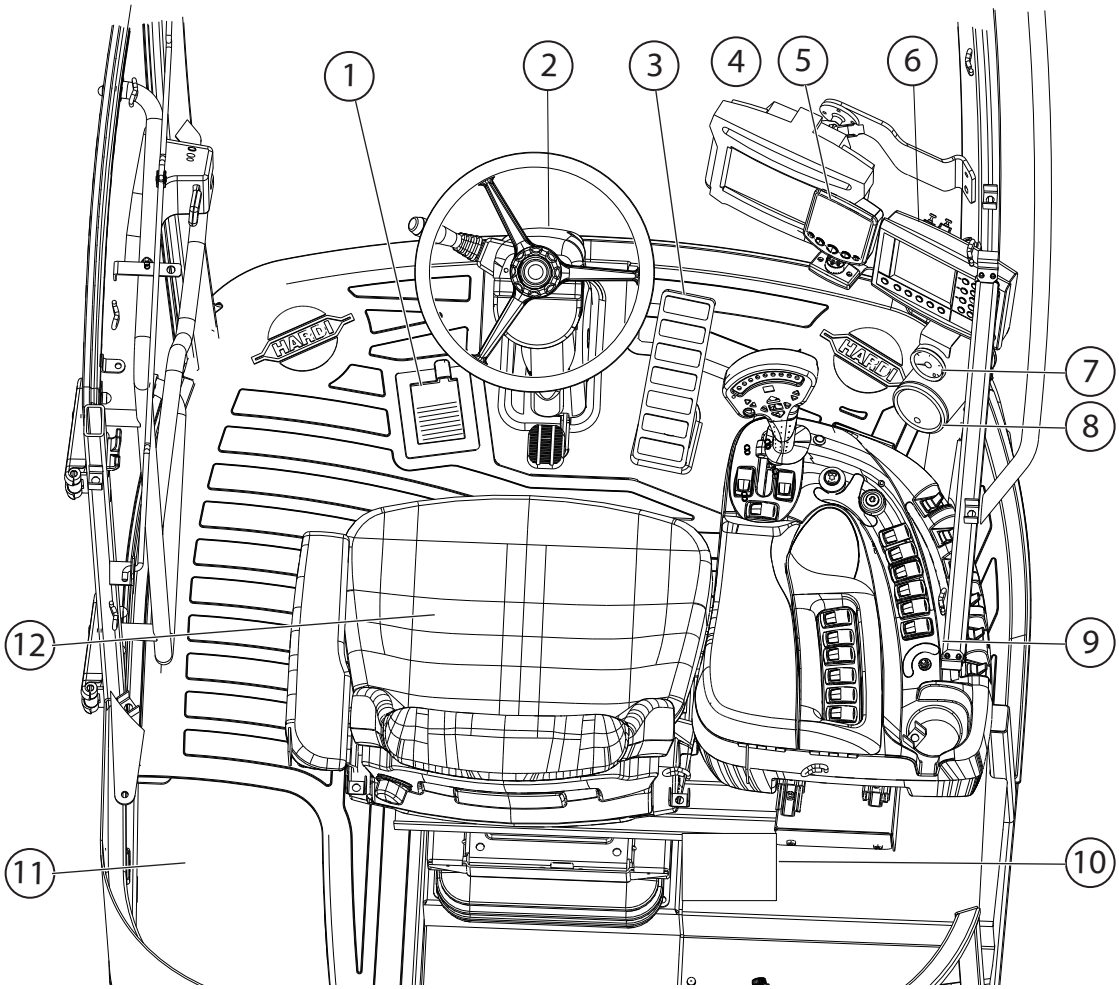


The steering column

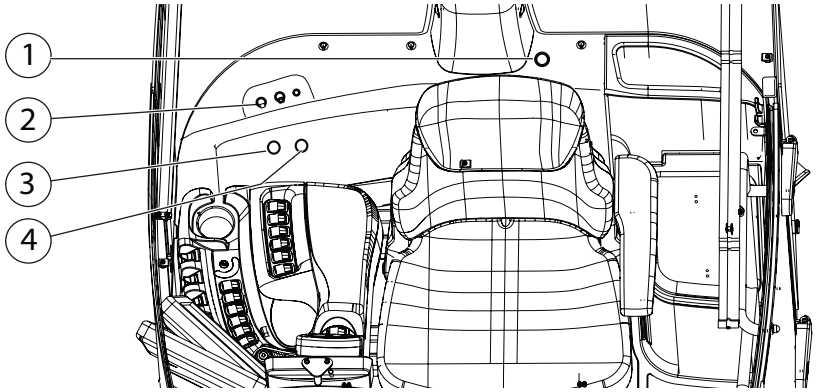
1. Lights, indicators and horn controls
2. Green light for left indicator
3. Blue light for main beam headlights
4. Green light for right indicator
5. Ignition key
6. Pushbutton hazard light control
7. Steering column upper inclination adjustment
8. Steering column inclination adjustment



General description of operator's seat

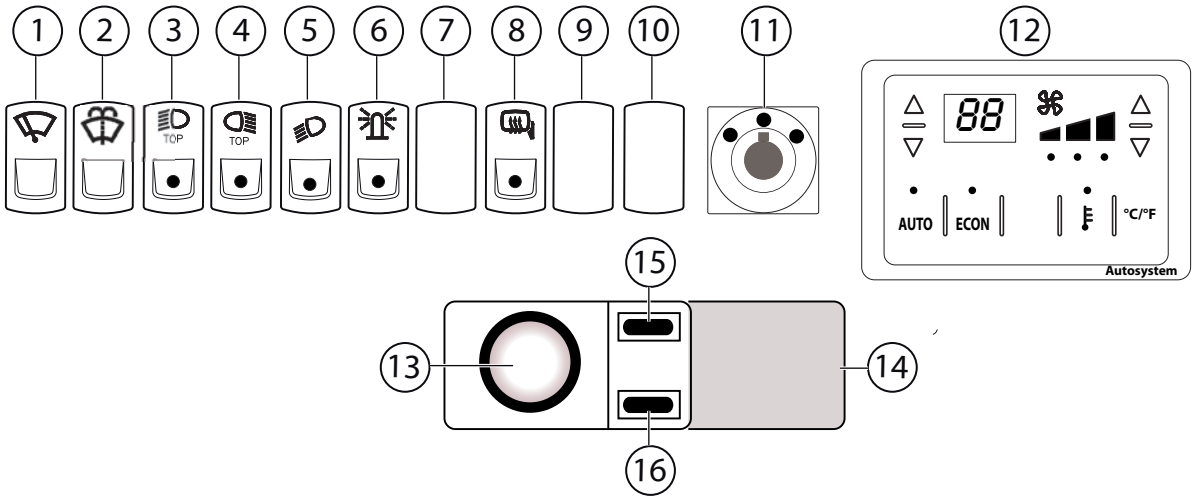


1. 4-wheel steering control pedal
2. Adjustable steering column
3. Brake pedal (optional)
4. TRIMBLE CFX-750
5. Hydraulic track adjustment — HTA
6. REGULOR 6
7. Fuel gauge
8. CAN cockpit rev counter
9. Side console
10. Hydraulic track adjustment computer (on ALPHA VariTrack only)
11. Storage box
12. Adjustable driver's seat



1. Cigarette lighter socket
2. 12 V sockets
3. Diagnostic socket
4. Diagnostic socket

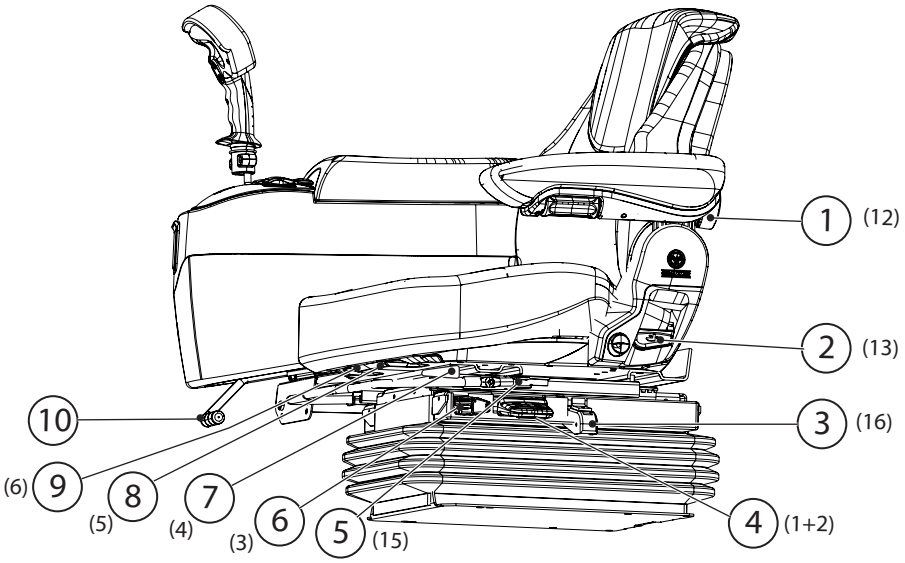
Cabin ceiling controls



1. 2-position windscreen wiper switch (permanent, intermittent)
2. Windscreen washer switch
3. Front working headlights switch
4. Rear working headlights switch
5. Not used
6. Hazard light switch
7. Not used
8. Wing mirror de-icing switch
9. Not used
10. Not used
11. Wing mirror adjustment switch
12. Cabin air conditioning control panel
13. Swivelling "map light" switch
14. Internal cab lighting
15. 3-position ceiling light switch (on, off, door)
16. "Map light" switch.

Description of driver's seat

ALPHA evo self-propelled vehicles are fitted with high-quality professional seats. A user guide for the seat is supplied separately. You should read it in full before using the vehicle for the first time, and comply with the safety instructions on how the seat operates.



1. Adjusting the backrest
2. Adjusting the inclination of the backrest
3. Seat damping
4. Weight + seat height adjustment
5. Rotation mechanism
6. Horizontal damper
7. Lengthwise adjustment
8. Seat inclination adjustment
9. Seat depth adjustment
10. Lengthwise adjustment of console

NOTE! The numbers in brackets correspond to the description in the GRAMMER seat user manual.

General information

Unloading the sprayer

NOTE! The machine can only be unloaded if the engine is running. It cannot be towed if the engine is not running (parking brake engaged when engine is stopped).

WARNING! Ensure that no one is parked near the unloading area.

WARNING! The machine can only be unloaded if you are familiar with the method described below.

Method

- Turn the battery switch to supply the machine's electrical and electronic circuits.
- Move the forward handle to neutral and check that the parking brake is on.
- Turn the contact key to start the engine and accelerate to at least 1600 rpm.
- Turn the speed selector from the [PARKING] position to the [SLOW] position.
- Push the forward lever gently forwards or backwards to move the machine in the required direction.

Accessories

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

1. Key for tightening the external connectors
2. Hexagonal key
3. Multi-jet spray (1)
4. ISO nozzle disc
5. Table of ISO nozzle flow rates
6. Drain plugs (rinse tank-hand wash tank-storage box, filter)
7. Spray pump drain plug
8. Instruction books (2)
9. Break release lever (1)
10. Nozzles (3)
11. External suction hose and filter
12. Socket spanner
13. 60-ml oil bottle for pneumatic system (depending on equipment)

(1) Optional
(2) Variable according to nozzle type and quantity ordered
(3) The number of manuals varies according to the equipment

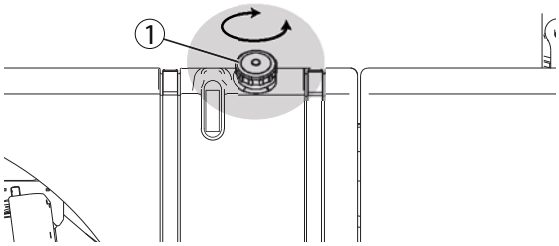
Precautions before putting the sprayer into operation

Your sprayer is protected by a resistant lacquer coat. However, we recommend regular application of a layer of anti-corrosion lubricant on all metal parts to avoid plant protection chemicals and fertilisers damaging the paintwork. If this is done before the sprayer is put into operation for the first time, it will be easier to clean the sprayer and keep the paintwork clean for many years. This treatment should be carried out every time the protection film starts to wash off.

4 - Sprayer setup

Filling the fuel tank

The fuel tank has a 260-litre capacity. Before filling, shut down the engine and do not smoke. Clean the plug fig.1 carefully so that no impurities can enter the tank. Use a funnel if necessary.

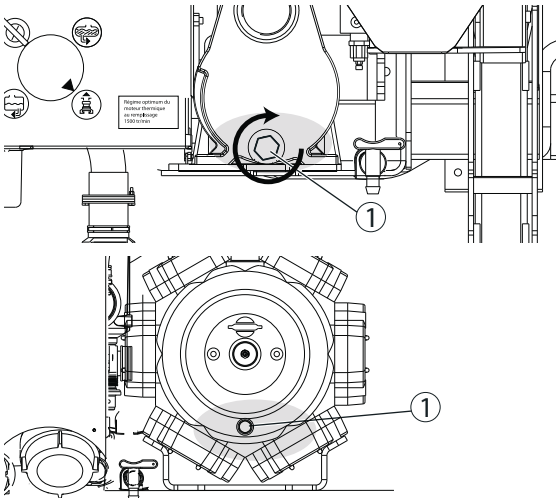


NOTE! Before a prolonged stoppage, we recommend filling the tank to avoid condensation.

NOTE! The electronic fuel injection engine complies with the TIER3 A standard. Fuel that complies with the standards in force should therefore be used.

Spray pump

- Screw the 2 plugs fig.1 to the diaphragm pump.



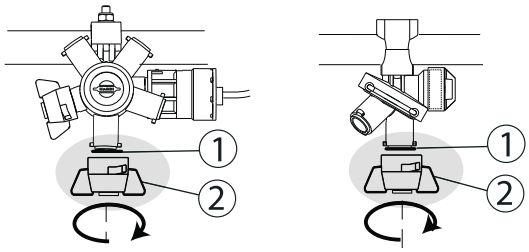
CycloneFilter

The filter is 80 mesh as standard. However, you can use different sized filters, such as 50 or 100 mesh if necessary. Check the condition of the seals, grease and lubricate them if necessary before refitting them.

Fitting the nozzles

To choose the correct nozzle for use and to achieve optimum spray quality according to the restrictions of the application and environment, see the SPRAY TECHNIQUE book

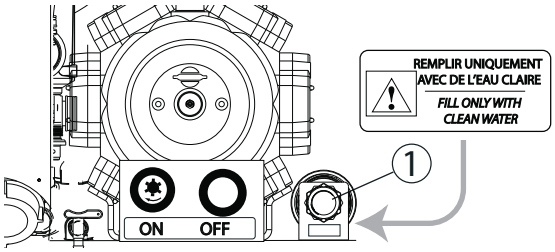
- Place the seal fig.1 in the nozzle nut fig.2.
- Fit the nozzles equipped with their seal to the nozzle holder, by turning the nut a 1/4 turn.



Filling the rinse tank

The rinse tank may be filled under pressure by connecting a hose directly to a threaded connector (***1" cylindrical gas fitting)*** fig.1.

A one-way valve prevents the tank from draining



Altering the track gauge

The track gauge of the ALPHA VariTrack evo self-propelled vehicle can be adjusted by mechanical axle gliding according to the table below:

Base axle	Possible track gauge (m) (1)
S	1.80 to 2.25
M	2.00 to 2.45
L	2.00 to 2.45

(1) with 380/85R34 tyres.

The track adjustment involves obtaining the same front and rear wheelbase, which means that the front and rear wheels must be aligned.

The track is the distance measured at the base and in the middle of the tyres.

To carry out track adjustment, see chapter "Track gauge adjustment" on page 91.

Tyre pressure

- Check the tyre pressures.

WARNING! An incorrectly inflated tyre could burst and wears out more quickly.

TWIN air assistance

Adjusting the air assistance

The air flow rate and the air flow direction should always be adjusted individually for each spraying operation and according to weather conditions. It is always a good idea to try out a new sprayer out in a field with only clean water in the tank, following this procedure:

1. Start with the vertical angle
2. Set the air speed: see section "Adjusting the air speed"
3. Select the best angle: see section "Air flow and nozzle angle"
4. Fine tune the air speed: see section "Adjusting the air speed"

ATTENTION! Fine tuning of air speed and angling will often be necessary all through the spraying job.

ATTENTION! It is easiest to find the best air setting to reduce drift when the sun is low and behind the boom (backlight). These conditions make the drift more visible.

Adjusting the air speed, rules of thumb

Step 1:

Find the range of speeds that can control drift.

1. Start with the air setting at zero and keep increasing the air speed just to the point where you can see that the drift cloud is minimised - note the minimum setting.
2. Then increase the air flow rate until you see drift again - note the maximum setting.

The range of air flow rates that should make it possible to obtain the least drift is now defined.

Bare ground/low crops: The range of air speeds is usually very small.

Taller crops: The taller the crop the wider the range of air speeds that can reduce

drift.

At high wind speeds: the sprayer requires more air flow. It is also recommended to drive more slowly and to lower the boom as far as it will go (40 cm).

Too high air flow over bare ground/low crop can cause reflection of the spray liquid and leave dust on the leaves of plants, which can again reduce the effect of the plant protection chemicals.

Step 2:

Adjust the optimum air flow rate within the range of possible rates mentioned above.

Air flow rate recommendations:

Bare ground/low crops: Define the maximum air flow within the possible range.

Taller crops: A higher air flow rate in the sprayer encourages penetration (if in doubt, check with moisture-sensitive paper).

Forward speed: A higher air flow rate is required in the sprayer in the case of higher forward speed.

Application volume: Lower application volumes require more air assistance to prevent drift.

Angling of air and nozzle flow, rules of thumb

To control wind drift the influence of wind speed and wind direction as well as the horizontal air current around the boom due to forward speed must be minimised. Because it is a sum of two forces with variable direction and size that we have to counteract for, the following can only be very rough guidelines.

Wind direction:

Headwind: Angle forward.

Tailwind: Angle back (if the forward speed is higher than the wind speed: angle forward).

Side wind/no wind: Angle vertical or back. Only high forward speeds may require forward angling.

Types of crops:

Bare ground/low crops: Low air speed and angling back will often be the best setting to avoid reflection of spray liquid.

Dense crops: The angling feature is ideal to help open the canopy and improve penetration. If you follow the crop movement as you are varying the angling you will find the right setting.

If the wind speed, wind direction or forward speed changes during spraying, the angling must be

changed too. With certain combinations of air flows and angling there is a risk of "closing" or flattening the crop and making penetration impossible - follow the crop movement intensively, especially when adjusting the air assistance and keep an eye on the crop throughout the spraying operation.

- It is essential for the operator to be familiar with the basic rules above before using the TWIN.
- All volume rates, pressures and air adjustments stated in the following tables are given for information purposes. Special conditions regarding climate, crop type, spraying positioning and chemical applied can change this information. The tables show practices in northern Europe, and conditions may be very different in other countries. If you want some local advice, please contact the TWIN application expert in your country.
- As a general rule, the application volume may be half of the application volume used with a conventional sprayer, with a minimum of 50- 60 l/ha at 7-8 km/hr. This does not apply to weedkillers and liquid fertilisers whose selectiveness is based on large droplets that only cling to weeds.
- Drift limitation nozzles can also be used on a TWIN. They contribute to reducing drift.
- Observe all specific instructions about droplet size, operating pressure, application volume etc. that may appear on the label of the product used.

ATTENTION! It will sometimes be necessary to drive with two different anglings, so the angling is changed when making a half turn at the end of the field.

Water sensitive paper

USE PAPER THAT IS SENSITIVE TO WATER TO HELP FIND THE BEST AIR SETTING.

The best way to learn to use the TWIN is to conduct tests with clean water on different crops, checking the application with paper that is sensitive to water. The paper can be cut into smaller pieces and fixed with double sided tape at relevant places in the crop to simulate the target. Then spray with clean water and check the blue spots (droplets) on the paper. This way you can test different application techniques. Moisture-sensitive paper is available at your local HARDI dealer, part No. 893211.

Transport

Transport position

The boom position can be adjusted for transport to obtain the required height.

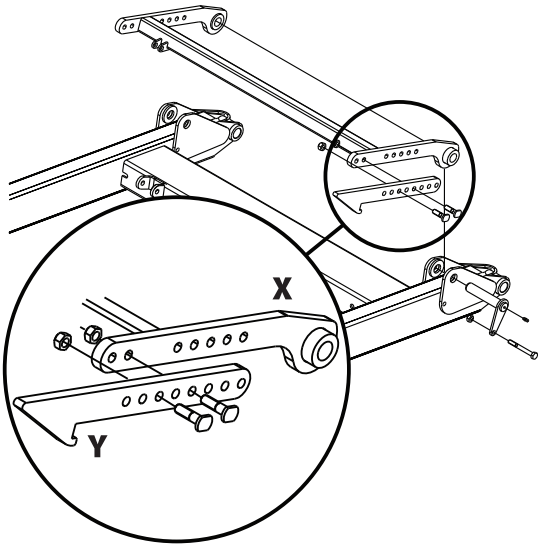
To change position:

Lift the boom and unfold the inner sections until the transport hook is disengaged.

Lower the boom completely.

Loosen and remove the two bolts, which keep the parts (X) and (Y) assembled.

Reassemble parts (X) and (Y) according to the desired position.



ATTENTION! Always put the two bolts back in position. The position must be identical on both sides.

ATTENTION! The settings of the rear brackets must correspond to the settings of the front brackets in such a way that the boom rests properly on the two plates.

WARNING! The maximum transport height must never exceed 4 m. Always measure the actual height and choose settings that do not exceed 4 m.

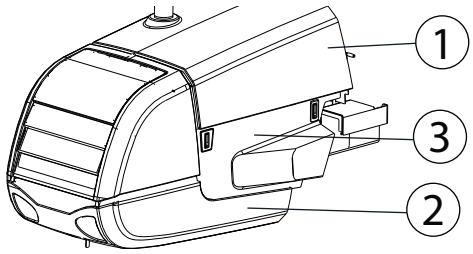
Engine cover

General information

The engine compartment is accessed by opening the upper cover and removing the right and left side covers.

Description

1. Upper cover
2. Lower cover
3. Side housing



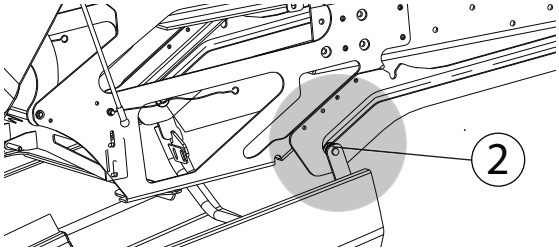
Opening and closing the cover

Lower cover

- Hold down the lower cover
- Pull the unlocking lever fig.1 forward
- Pull the lower cover forward right up to the stop fig.2

Closing the lower cover

- Unlock the cover by gently raising it.
- Push the cover completely down to lock it.

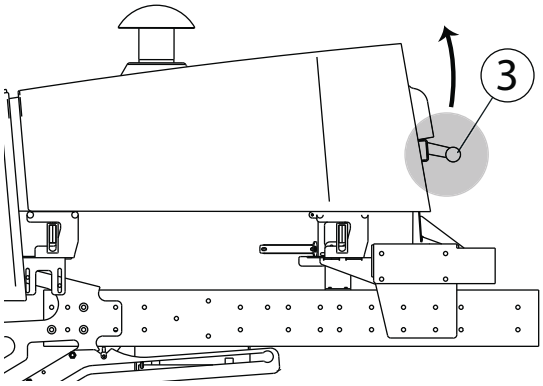


NOTE! Cables keep the lower cover in the open position.

Upper cover

The lower cover must be lowered before the upper cover is opened.

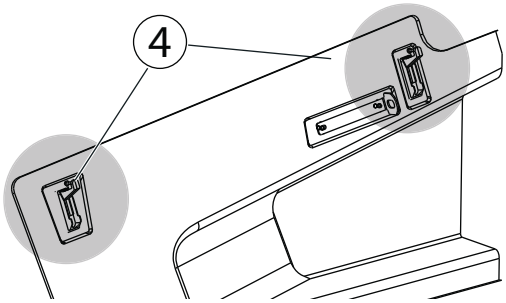
- Pull the handle fig.3 and then raise the upper cover. Damping cylinders make it possible to keep the cover in the open position.



Side housing

The lower cover must be lowered and the upper cover must be raised before the side housing is removed.

- Press on the levers fig.4 pour to unlock the side housing.
- Gently raise the housing to free it from its bracket.



5 - Operation

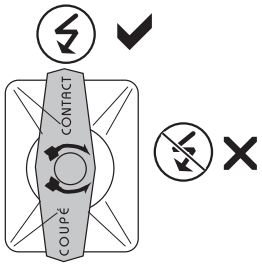
Driving

Starting up and shutting down the engine

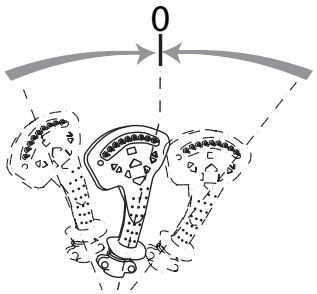
NOTE! Before starting the engine, check the level of the engine oil, coolant, fuel and hydraulic oil. Check that the engine radiator air filter is clean.

Starting up

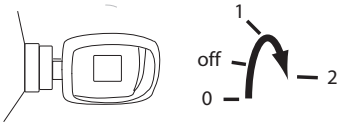
- Turn the battery switch to the [CONTACT] position (handle vertical).



- Place the forward handle in neutral. A position detector ensures safe engine start-up.



- Turn the contact key to position [1] to power the electrical and electronic circuits.
- Turn the contact key to position [2] to start the engine. Release it after start-up and the key will automatically return to position [1].



WARNING! If the engine fault light remains lit after starting the engine or if the CAN cockpit rev counter emits an acoustic signal, shut down the engine immediately and correct the fault.

Shutting down

- Place the forward handle in neutral to shut down the machine.
- Engage the parking brake.
- Turn the contact key to position [0] to shut down the engine.
- Disconnect the electronic control units (REGULOR, TRIMBLE etc.).
- Turn the battery switch to the [CUT-OFF] position (handle vertical).

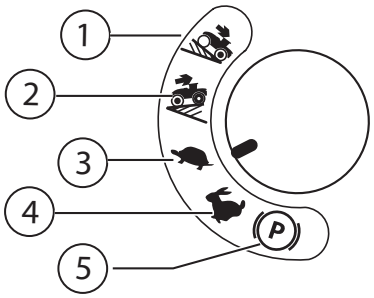
NOTE! Reduce the engine speed for a few seconds to slow down the turbocharger and stabilise the engine temperature.

NOTE! Do not leave the headlights on when the engine is no longer running. The battery will quickly run down and the engine will no longer start.

Forward speed selection

This chapter describes the different driving modes in fields and on the road. A 5-position rotary selector switch gives the following speeds: road, field, uphill and downhill. The last position is for the parking brake.

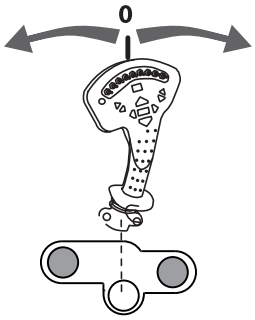
1. "DOWNHILL" mode.
2. "UPHILL" mode.
3. "FIELD" mode.
4. "ROAD" mode.
5. PARKING brake.



Forward movement and braking

The machine is made to move forward as follows:

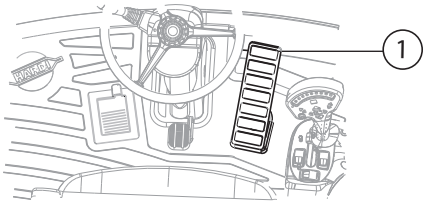
- Fold away the gangway only on ALPHA self-propelled vehicles 40 km/h version, which come with a retractable gangway.
- Turn the speed selector to move out of the parking brake position fig.5.
- Increase the engine speed if the selector is in FIELD, UPHILL or DOWNHILL position.
- Push the forward handle forwards to move ahead or backwards to reverse the machine.



For self-propelled vehicle 25km/hr versions, the braking is hydrostatic; it is achieved as follows:

- Pull the forward handle towards neutral to make the machine brake (hydrostatic braking). The machine comes to a complete stop when the forward handle is in neutral.

For self-propelled vehicle 40 km/hr versions, the braking is dynamic; it is achieved as follows:



- Gradually press the brake pedal fig.1. The system will respond in order to achieve the best braking performance. If the brake is applied until the machine comes to a complete stop, in order to move again you should pull the forward handle into neutral then push it or pull it to start again in forward or reverse gear.

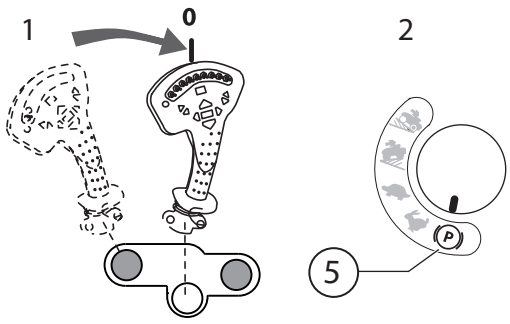
  If the brake is applied slightly, i.e. without the machine coming to a complete stop, the speed will be reduced. As soon as the brake pedal is released, the machine will accelerate again to reach the travelling speed corresponding to the position of the forward handle.

5 - Operation

Parking brake

The parking brake is used to keep the machine at a standstill. It acts on discs incorporated into the front and rear hydraulic motors. The brakes are activated when the hydraulic pressure reaches zero. To engage the parking brake you should:

- Pull the forward handle into neutral to stop (hydrostatic braking).
- Turn the speed selector to the parking brake position fig.5 to immobilise the machine.



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

To disengage the parking brake:

- Turn the speed selector to move out of the parking brake position.
- First make sure that the forward handle is in neutral before pushing or pulling it to move the machine.

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

NOTE! In the event of an emergency stop, the machine will initially stop according to a deceleration rate until the flow from the transmission pump is cancelled and the parking brake is then engaged.

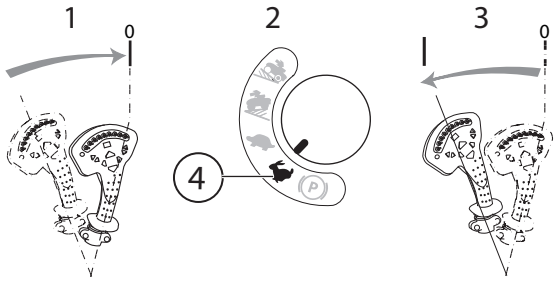
Travelling in "ROAD" mode

ROAD mode is associated with the combustion engine automotive mode. In this case, the engine speed is directly proportional to the forward handle position, except during the braking phase where the engine speed depends directly on the capacity of the hydraulic motors. (1/2 displacement front and rear).

NOTE! The change from FIELD position to ROAD position is taken into account and the engine speed is slowed down when the forward handle returns to neutral.
The change from ROAD position to FIELD, UPHILL or DOWNHILL position is taken into account when the forward handle returns to neutral and the engine has already been slowed down.

Travelling in ROAD mode:

- Pull the forward handle into neutral.
- Turn the switch to ROAD mode fig.4.
- Gradually push the forward handle forwards to achieve the required travelling speed. The engine speed varies according to the position of the forward handle.

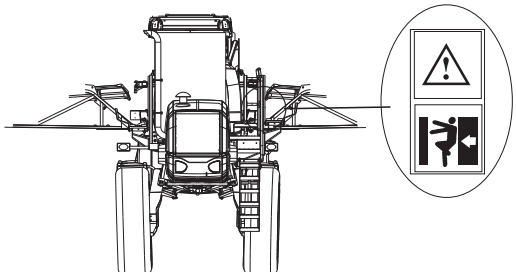


NOTE! The travelling process in reverse gear is exactly the same as described above.

40-km/h version self-propelled vehicles are fitted with a retractable gangway allowing the boom to be maintained at the authorised road size.

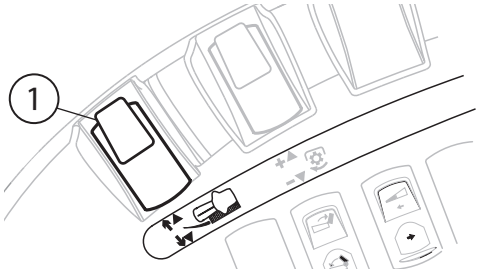
DANGER! Before moving the retractable gangway, ensure that no one is on or near the gangway.

A sticker shows the safety instructions.



To control the retractable gangway you should:

- Press the switch (fig.1) to retract or extend the gangway and the boom.



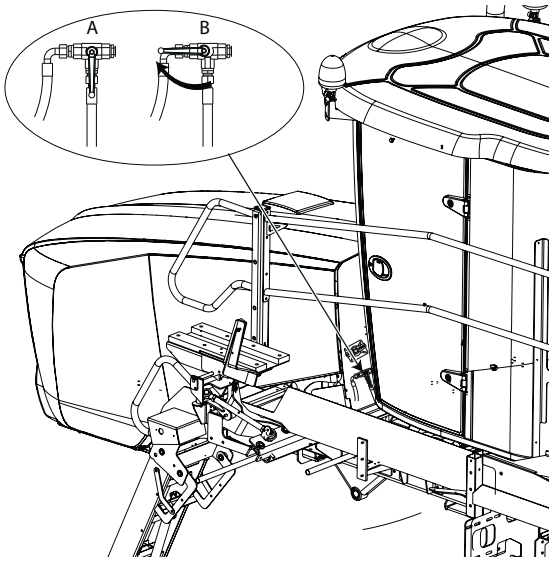
ATTENTION! The retractable gangway automatically moves away from the operator's seat when the engine is shut down. In this case allow the boom to move outwards.

With self-propelled vehicles equipped with an LPA5 central frame, it is possible that, in the event of an electrical or hydraulic fault, the retractable gangway will not move away from the operator's seat. To rectify this, an emergency valve positioned outside the operator's seat makes it possible to release the gangway and boom.

A. Normal use mode (handle vertical)

B. Emergency mode: only to be used if the retractable gangway is jammed. If this is the case:

- Turn the handle as shown in the picture (handle in the horizontal position)
- Return the handle to the vertical position immediately after use.



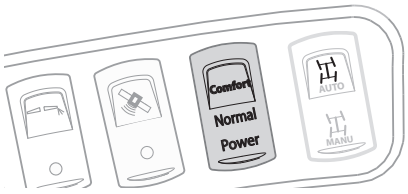
"COMFORT - NORMAL - POWER" driving mode

ALPHA evo 25 and 40 km/h self-propelled vehicles are fitted with EASY DRIVE transmission. This optimises the overall performance of the transmission (Speed/Torque, gradual acceleration and braking) according to the variations in the conditions of use of the machine. The driving mode can be modulated.
3 driving modes:

1. COMFORT: Gradual acceleration of machine.
2. NORMAL: Higher acceleration than in COMFORT mode.
3. POWER: More responsive driving.

To change the machine driving mode:

- Press the 3-position switch to select one of the modes [COMFORT-NORMAL-POWER].



NOTE! The mode can be changed while driving.

NOTE! To keep control of the machine in all circumstances, adapt the driving mode to the conditions of use both on the road and in the field.

"FIELD - UPHILL - DOWNHILL" mode

ALPHA Evo 25 and 40 km/hr self-propelled vehicles have 3 user modes. Each of these modes has a direct effect on the travelling speed of the machine and the transmission torque.

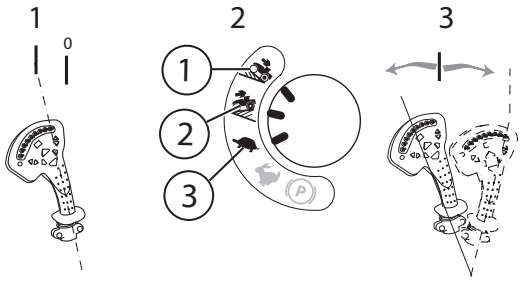
In FIELD, UPHILL and DOWNHILL modes, the engine speed remains constant and does not depend on the position of the forward handle.

NOTE! The change to one of these 3 modes (FIELD - UPHILL - DOWNHILL) can take place while the machine is moving.

ATTENTION! FIELD, UPHILL or DOWNHILL modes require a minimum engine speed of 1500 rpm for the transmission to give enough traction and braking torque.

To select FIELD, UPHILL or DOWNHILL mode:

- Accelerate the engine to a minimum speed of 1500 rpm
- Turn the switch to one of the three modes fig.1, fig.2, fig.3.
- Move the forward handle to achieve the required speed. The engine speed remains constant.



FIELD mode has 2 gears that switch over automatically when the speed varies between 15 and 20 km/h, which corresponds to the maximum flow rate of the transmission pump. For first gear, the front and rear hydraulic motors are at full displacement. When second gear is engaged, only the front hydraulic motors change to 1/2 displacement, which allows the speed rate in FIELD mode to be increased.

In UPHILL mode, the front hydraulic motors are at 1/2 displacement and the rear motors are at full displacement.

In DOWNHILL mode, the front hydraulic motors are at full displacement and the rear motors are at 1/2 displacement.

NOTE! The travelling process in reverse gear is exactly the same as described above.

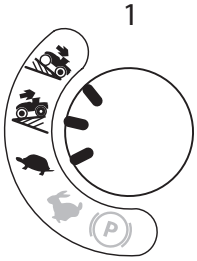
Forward speed limitation

ALPHA evo self-propelled vehicles are equipped with a forward speed limitation device. It allows a constant forward speed to be maintained when the forward handle is pushed forward as far as it will go.
The speed limitation is only active in FIELD, UPHILL and DOWNHILL modes.

To use the speed limiter you should:

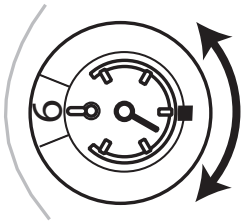
- Place the forward handle in neutral and select one of the modes: FIELD-UPHILL-DOWNHILL

1

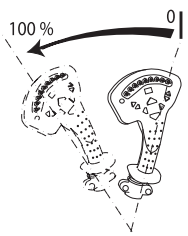


- Turn the speed selector to achieve the required forward speed.
- Push the forward lever as far as it will go to travel at the selected speed.

2



3



To deactivate the speed limiter you should:

- Turn the speed selector to position [10] to deactivate the speed limitation device.

NOTE! If the speed limiter is in position [0], the machine will not move.

NOTE! The speed limitation does not work in reverse gear.

Engine anti-stall device

This device avoids engine stalling if the power demanded by the transmission is higher than that supplied by the engine. This can happen, for example, on steep hills in fields or on the road. In this case, the capacity of the transmission pump is automatically reduced, which will significantly reduce the forward speed.
This function ensures that the engine speed will not fall below a defined threshold. This results in an automatic reduction in the forward speed.

Engine overspeed

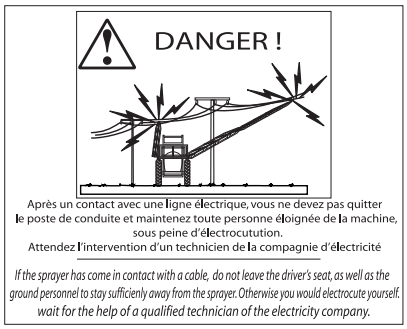
Management of engine overspeed is only available in ALPHA Evo self-propelled vehicles version 40 km/h that have a brake pedal.
This function avoids the transmission making the engine accelerate beyond a maximum acceptable speed on braking caused by the forward handle (hydrostatic braking). This results in slower deceleration of the machine, so that the engine speed does not exceed a maximum acceptable value.

5 - Operation

Boom

Safety information

WARNING! Working near overhead power lines can be dangerous and special precautions should be taken. You are considered as working near overhead power lines when the sprayer or the booms can reach minimum "priming" distances. This distance can be up to 2 metres for low voltage lines and up to 8 metres for very high voltage lines. When you unfold or fold away the booms, warn any personnel on the ground to keep a sufficient distance away from the sprayer.
If the machine comes into contact with a power line, above all you must not leave the seat of the vehicle. Otherwise, you could be electrocuted by placing your foot on the ground. Wait for help from the electricity company and keep everyone away from the machine. A sticker placed on the windscreen contains the safety instructions.



NOTE! Before folding or unfolding the boom, make sure that no one is in the operating area of the boom.

NOTE! If maintenance work has to be carried out on the boom hydraulic system, ensure that it is completely unfolded and placed on steady axle stands.

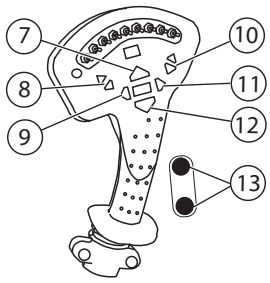
NOTE! The boom must always be folded and unfolded with the machine shut down. If this rule is not observed you risk damaging the booms.

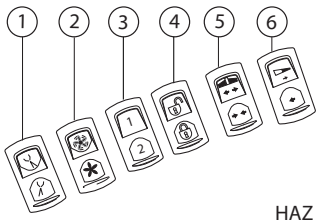
HAZ boom folding and unfolding

To unfold the boom do the following:

1. Press the switch fig.4 to lock the suspension.
2. Press the pushbutton fig.7 to release the boom from the transport brackets.
3. Press the switch fig.5 to unfold the inner sections. The rear transport hooks disengage automatically.
4. Press the pushbuttons fig.8 and fig.10 to reset the tilt adjustment.
5. Push the switch fig.6 to the left to unfold the outer sections.
6. Press the pushbutton fig.9 and fig.11 to correct the slant angle.
7. Press the switch fig.12 to adjust the working height.
8. Press the switch fig.4 to unlock the suspension.

The folding procedure is the reverse of the unfolding procedure.





HAZ

WARNING! Ensure that the pendulum suspension is locked before using the fold functions.

WARNING! Before unfolding the boom, ensure that transport safety chains are removed (certain countries only) and the boom is clear from the transport brackets.

WARNING! The folding/unfolding functions (switches fig.3 and fig.4) must only ever be operated when the vehicle is stationary. Otherwise the boom could be damaged.

Hydraulic slanting control

The hydraulic slanting control fig.9 and fig.11 is used to incline the entire boom. This function is particularly useful when spraying on slopes.

Always reset position to neutral (middle) before folding the boom.

Alternative boom widths

The boom can also be used half-folded. If applicable, only unfold the inner sections using the switch fig.5. In the EFC control unit, also deactivate the sprayer sections on the outer sections.

Boom tilt function

The tilt adjustment (switches fig.8 and fig.10) can change the inclination of the boom individually on the left or right.

Boom support wheels

The boom is equipped with two support wheels. When spraying with low boom heights on bare ground or plants in the first growth stage it is recommended to fold down the support wheels. In later growth stages the wheels should remain folded up.

ATTENTION! On public roads the support wheels should be folded up and secured in order to keep the sprayer's overall dimensions in accordance with the regulations in force!

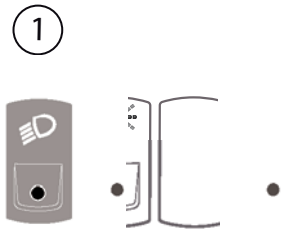
Hydraulic break-away function

The boom includes a hydraulic break-away function to avoid damage, e.g. on hitting the ground. If this function is activated after clogging, an alarm is displayed on the controller. This alarm remains active until the boom is folded to its maximum position and the switch fig.6 is pressed again.

Boom lighting

The boom light control switch is located on the cabin ceiling.

- Press the switch fig.1 to switch on the boom lights.

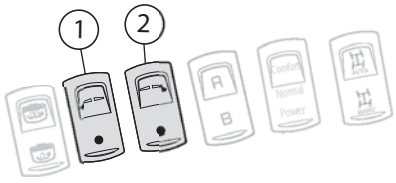


To avoid any risk of dazzle and to save battery, we recommend switching off the boom lights on leaving the field.

Electrically controlled end nozzles (optional)

The boom can be fitted with end nozzles.

- Press the switch fig.1 to operate the end nozzle on the left side of the boom.
- Press the switch fig.2 to operate the end nozzle on the right side of the boom.



TWIN air assistance

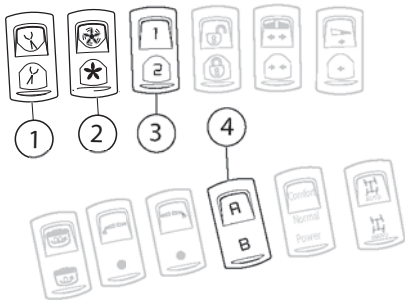
General information

The air flow rate and the air stream direction should always be adjusted individually for each spraying operation and according to weather conditions.

TWIN operation

The switches on the control panel console control the following TWIN functions:

1. TWIN air stream direction.
2. Blower speed
3. TWIN preset.
4. Customisation of A-B functions.



By pressing the switch (1) the air stream and nozzles are angled in steps 0 to 4 backwards and from 0 to 6 forwards, which corresponds to approx. 30° backwards and 40º forwards compared to vertical position. For settings, see section "TWIN air assistance" on page32.

The air flow rate can be adjusted in levels from 0 to 10 by pressing the switch (2). The blower rotation speed is displayed on the HC 9500 controller screen. The max. revolutions for the fan are 3100 rpm, which equates to full air flow speed of approx. 40 m/s When the boom sections are half-folded, reduce the rotation speed or spray pressure by 25% to obtain the same air speed in the nozzles as in the total width of the boom.

Spraying

Safety information

WARNING! Always be careful when working with plant protection chemicals. Protective clothing and equipment should be worn when handling chemicals, preparing the liquid and when spraying and cleaning the sprayer. For further information, see the [SPRAY TECHNIQUE] book.

WARNING! To fill the main tank, follow the rules for using the filling devices. Ensure that you can fill from open water (lakes, rivers etc.). For further information, see the [SPRAY TECHNIQUE] book.

WARNING! Ensure that the hand wash tank is always full and ready for use. It is always advisable to have clean water available, especially during the liquid preparation phase.

WARNING! Always clean and wash the sprayer after use.

WARNING! Only mix chemicals in the tank after having checked their compatibility and always according to the directions given by the manufacturer.

WARNING! Rinse the various liquid systems carefully before using a new chemical.

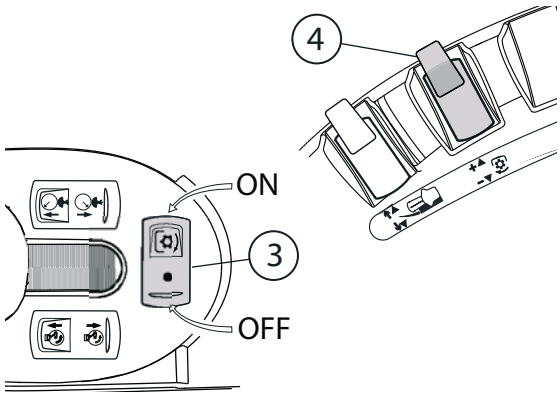
The following sections describe the procedures to follow to get the best out of your equipment, particularly when filling the main tank, rinse tank and hand wash tank, filling with chemicals, spraying and rinsing the liquid systems.

Starting and adjusting the speed of the spray pump

The spray pump clutch can be activated in the cabin or by a control located outside fig.2.

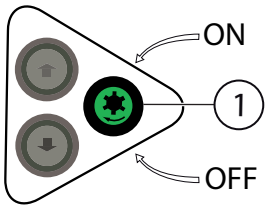
System start-up

- Press the pushbutton fig.1 or fig.3 to start the spray pump. Its speed can be adjusted using the control fig.4.



Shutting down the pump

Press the pushbutton fig.1 or fig.3 to shut down the spray pump.

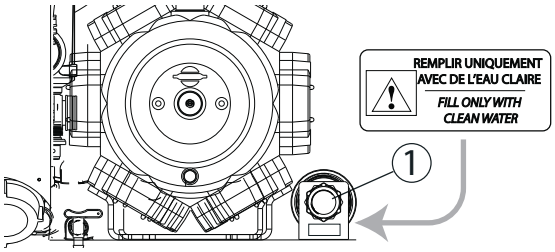


5 - Operation

Filling the rinse tank

The rinse tank may be filled under pressure. Its 1" filling connector fig.1 is located near the valves and spray pump.

A one-way valve prevents any leak from the rinse tank filling connector.



REMPLIR UNIQUEMENT
AVEC DE L'EAU CLAIRE
FILL ONLY WITH
CLEAN WATER

DANGER! A sticker placed near the rinse tank offers a reminder that the tank should always be filled with clean water. You must never put any chemicals into it.

To avoid algae developing always drain the tank if the sprayer is not in use for a longer period of time.

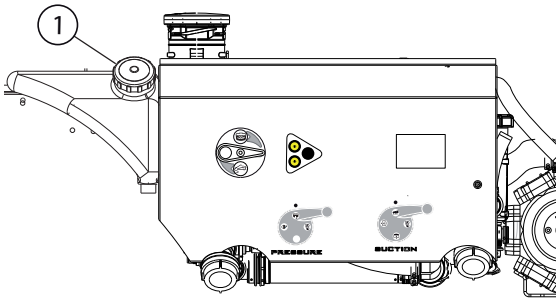
Filling and use of hand wash tank

The hand wash tank has a 15-litre capacity.

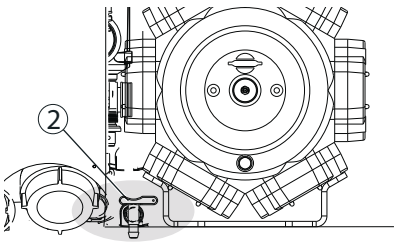
WARNING! For your own safety, ensure that this tank is always kept filled with clean water and ensure that no chemicals are ever put into it. This water is reserved for washing the hands.

REMPLIR UNIQUEMENT
AVEC DE L'EAU CLAIRE
FILL ONLY WITH
CLEAN WATER

- Unscrew the plug and fill the tank with clean water.



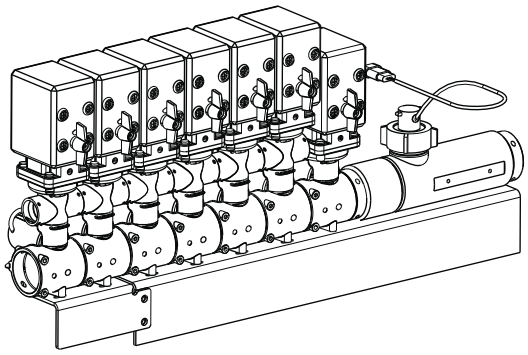
- Open the valve fig.2 to use the water from the hand wash tank.



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

Adjustment of EFC section shut-offs

Before spraying, calibrate the EFC operating unit using clean water (without chemicals).



- Choose the nozzle size according to the spraying. Turn the Quadrilet nozzle holders to select the nozzles. Make sure that all nozzles are the same type and capacity. See the "Spray Techniques" book.
- Activate the on-off switch of the spraying control unit.
- Switch the general valve and all section switches to the spraying position.
- Activate the pressure regulation switch until regulation valve stops rotating (minimum pressure).
- Stop the vehicle and run the engine at the forward speed that you will use. The P.T.O. must be kept between 300 and 600 rpm (pump 540 rpm) or between 650 and 1100 rpm (pump 1000 rpm).
- Press the pressure regulation switch until the required pressure is shown on the pressure gauge.

Filling with chemicals through the tank opening

Chemicals can be poured directly into the sprayer tank. In this case, check the method on the chemical label.

⚠ DANGER! To prevent any risk of splashing or spillage, take precautions by lifting the chemicals up to the tank opening.

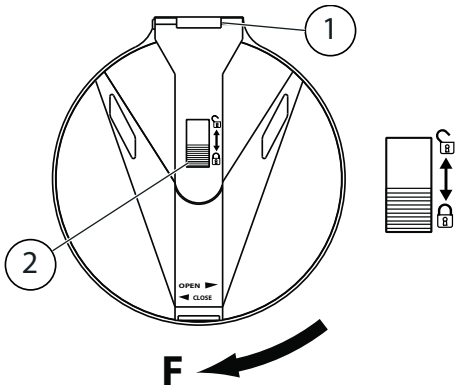
- Check that the general spraying is closed.
- Position the multi-way valves as shown in the picture.
- Start the sprayer pump.

ℹ NOTE! For further information, see the [SPRAY TECHNIQUE] book.

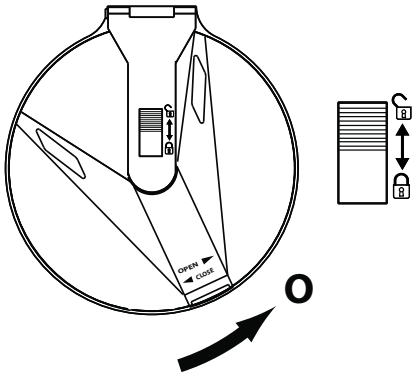
5 - Operation

Filling the tank through the main tank lid

The tank lid has a hinge fig.1 so it can be lifted. A locking mechanism fig.2 prevents it from being opened.



FERMETURE



OUVERTURE

Opening:

- Unlock and turn the lid anticlockwise, then lift.

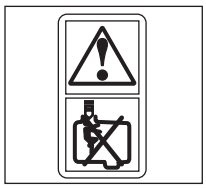
Closing:

- Put the lid down and turn it clockwise, then lock it.

NOTE! The lid filter should always remain in place to avoid foreign bodies falling into the tank.

NOTE! The tank lid should always be locked before moving the vehicle.

DANGER! Do not attempt to enter the tank.



ATTENTION! Before filling the tank ensure that none of the multi-way valves are in the [SUCTION] and [TRANSFER] position. The filling and transfer connectors should be fitted with their plugs.

- Fill the tank at least 1/3 full with water before adding chemicals. Always follow the instructions given on the plant protection chemical container. Take care not to introduce impurities into the tank by always leaving the filter in place.

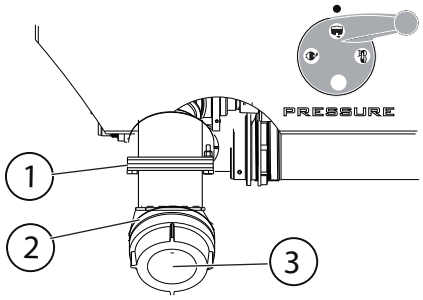
- Take care not to put the filling pipe in the tank by holding it at the level of the opening. Otherwise, you would risk the liquid returning in the event of a drop in pressure during the filling operation, thus contaminating the water channelling point.

Filling the main tank by external suction

ATTENTION! To fill the main tank, follow the rules for using filling devices. Ensure that you can fill from open water (lakes, rivers etc.).

NOTE! For further information, see the [SPRAY TECHNIQUE] book.

1. One-way valve
2. Filling connector
3. Plug

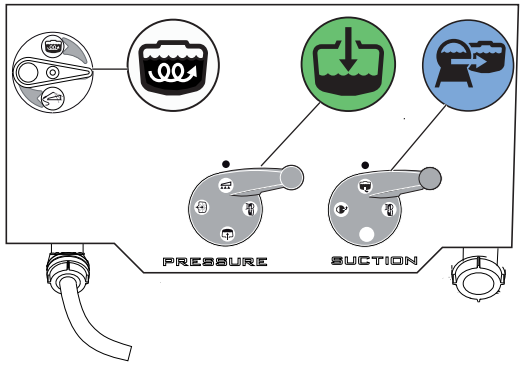


ATTENTION! The sprayer is fitted with a one-way valve fig.1 on the external filling connector fig2. It forms an integral part of the filling device and should not be modified or removed. Check regularly to see that it is working correctly.

ATTENTION! After use always replace the plug fig.3 on the connector.

External filling functions in the following way: remove the connector plug and connect the supply pipe.

- Turn the Smartvalve pressure valve as shown in the picture.
- Start the sprayer pump by rotating it at its nominal speed.
- Turn the Smartvalve suction valve as shown in the picture.
- Check the main tank gauge.
- At the end of filling, turn the suction valve to stop the filling process.
- Disconnect the water hose and put the plug back in the connector.

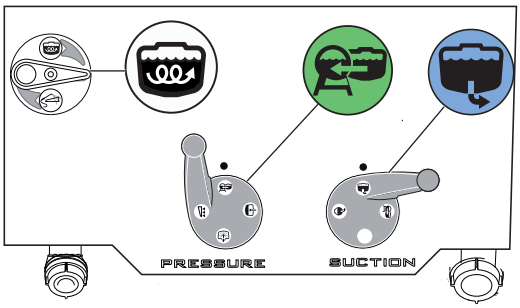


Filling chemicals through the tank opening

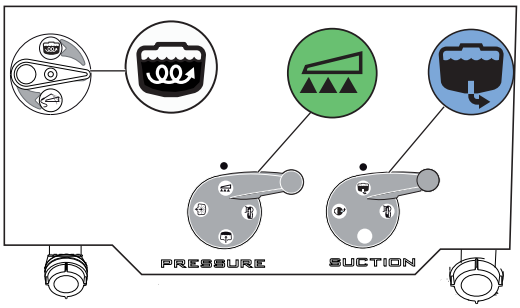
Before pouring chemicals directly through the tank opening, read the chemical label carefully.

Take precautions by lifting the chemicals up to the tank opening to prevent any risk of spillage or splashing.

- Check that the sprayer is in the closed position.
- Place the SmartValves in the correct position as shown in the picture.
- Start the sprayer pump.
- Add the chemicals through the tank opening.



- When the spray liquid is well mixed, turn the SmartValves as shown in the picture.
- Keep the pump working to continue agitation in the tank.



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Before positioning the SmartValve pressure pump in the [TRANSFER] position, it is important to check that the transfer connector plug has been screwed in correctly and is completely closed. If this is not the case, there is a risk of contamination and injury from the effect of the pressure if the plug is not correctly in place. If the plug is not completely sealed, lubricate the seal and the thread.

Filling with chemicals

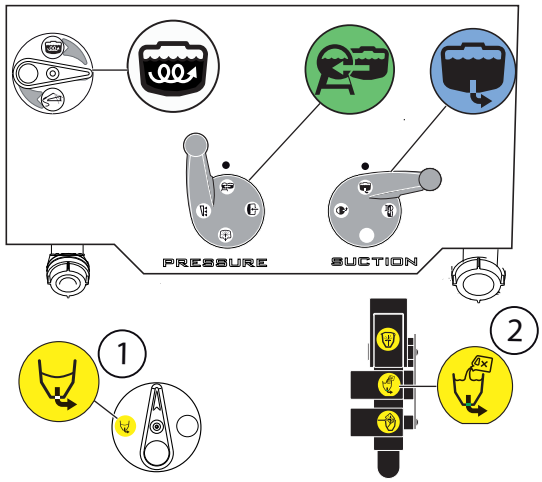
Safety information

Before using the TurboFiller, follow the safety instructions, see on page 42.

DANGER! Possible risk of splatters and splashes! In the event of accidental spraying, use clean water from the hand wash tank. This tank's tap is near the TurboFiller.

Preparation

- Fill the tank at least 1/3 full with water (unless something else is stated on the chemical container label).
- Set the Smartvalve suction valve to [in the main tank], the SmartValve pressure valve to [TRANSFER] or to another function not in use. The agitation valve to the position as indicated in the picture
- Start the sprayer pump by rotating it at its nominal speed.

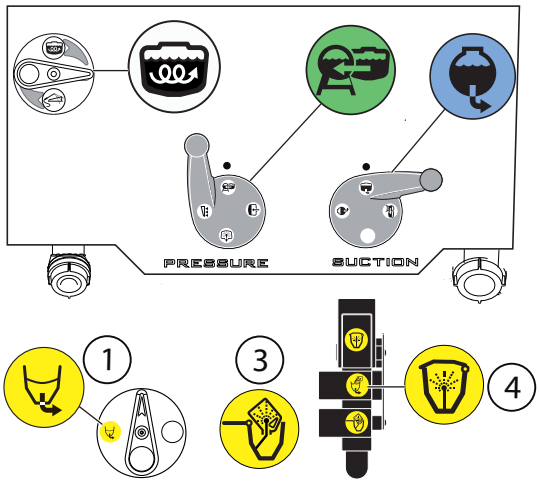


Usage

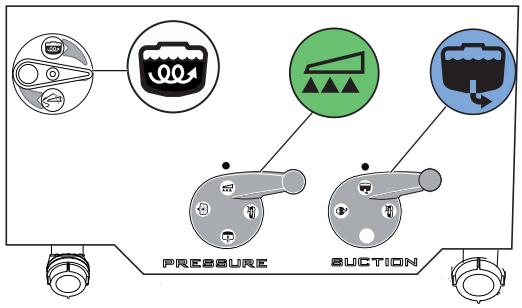
- Open the TurboFiller lid, measure the required amount of chemical and pour it into the TurboFiller.
- Open the TurboFiller suction valve fig.1 and press the lever fig.2 to transfer the contents from the TurboFiller to the main tank.

Rinsing

- Turn the Smartvalve suction valve to the position shown in the picture.
- Hold the container upside down over the multi-hole nozzle and press the control lever fig.3.
- Close the TurboFiller lid again and press the TurboFiller rinse control lever fig.4.
- Close the TurboFiller suction valve fig.1 after rinsing the TurboFiller.



- When the spray liquid is well mixed, turn the SmartValves as shown in the picture.
- Keep the pump working to continue agitation in the tank.



Before positioning the SmartValve pressure pump in the [TRANSFER] position, it is important to check that the transfer connector plug has been screwed in correctly and is completely closed. If this is not the case, there is a risk of contamination and injury from the effect of the pressure if the plug is not correctly in place. If the plug is not completely sealed, lubricate the seal and the thread.

For the TurboFiller gauge reading to be reliable, the sprayer must be on flat ground. For greater accuracy, use a measuring cylinder.

5 - Operation

Before using the container rinsing lever, hold the container or flask over the rotary nozzle to avoid any risk of the liquid splashing.

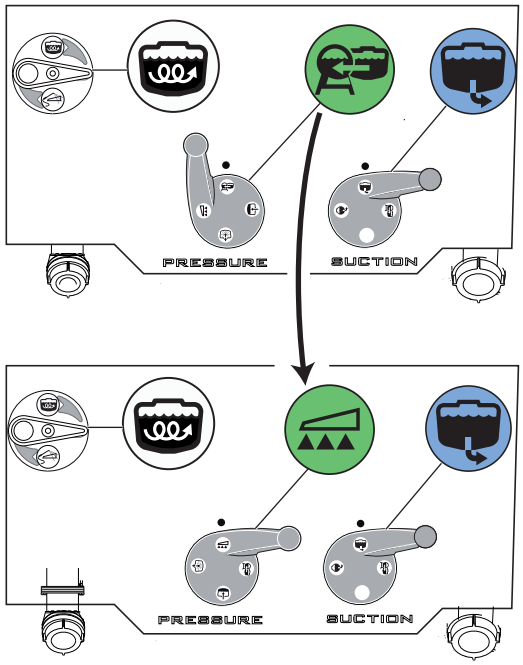
The container rinsing device uses the liquid. Use clean water to rinse containers several times before disposing of them.

Carefully clean the inside of the TurboFiller with clean water at the end of the spraying job.

Agitation before re-starting spraying

If a spraying job has to be interrupted for a while, some sedimentation may occur depending on the chemicals being used. Before re-starting a spray job, the sedimented material must first be mixed in.

- Turn the SmartValve suction and pressure valves and the agitation valve as shown in the picture. The other valves are closed.
- Start the sprayer pump by rotating it at its nominal speed.
- Agitation has started and should be continued for at least 10 minutes.
- Spraying can begin again. Turn the SmartValve pressure valve as shown in the picture and start the application.



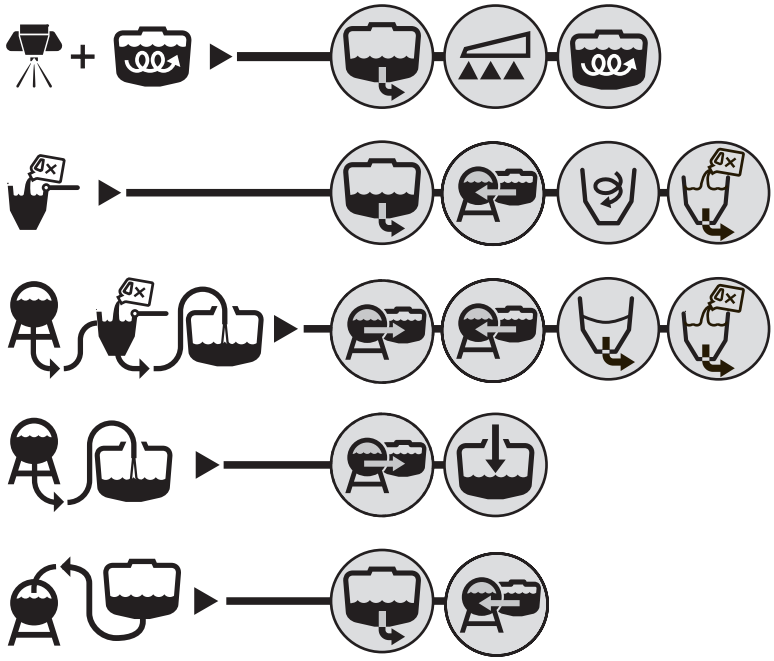
- Press the switch fig.1 to modulate the agitation of the liquid in the main tank.

Too much agitation may cause foam to form in the tank. Agitation should be adapted according to the volume of liquid remaining in the tank.

Before positioning the SmartValve pressure pump in the [TRANSFER] position, it is important to check that the transfer connector plug has been screwed in correctly and is completely closed. If this is not the case, there is a risk of contamination and injury from the effect of the pressure if the plug is not correctly in place. If the plug is not completely sealed, lubricate the seal and the thread.

Quick reference - Operation

The following diagrams describe the SmartValve positions according to different operations.



5 - Operation

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! Read the different chapters carefully. Before carrying out an inspection or a repair, first read the relevant chapters. If any part remains unclear or requires facilities which are not available, then for safety reasons please contact 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.

ATTENTION! Before cleaning, read the chapter on the filling/cleaning area.

Guidelines

- Read the instructions carefully for the products that you use. Follow the specific instructions regarding your protection, deactivating agents etc. Read the detergent and deactivating agent instruction labels. If cleaning procedures are given, follow them.
- Follow current legislation regarding the storage of pesticides, leaching, mandatory decontamination methods etc. If in doubt, contact the appropriate local department, e.g. department of agriculture.
- Rinsing of pesticides usually takes place in a cleaning field. This is a field that is not used for crops. No liquid flow or leak should reach streams, ditches, wells, springs etc. Use an appropriate cleaning area with a hard, impenetrable surface (concrete), with drainage to a tank to avoid unexpected contamination of the groundwater. The rinsing water should be diluted and spread over a larger surface to ensure biodegradation. Always respect the applicable local legislation.
- Cleaning starts with the calibration, as a well calibrated sprayer will ensure the minimal amount of remaining spray liquid.
- Get into the good practice of cleaning the sprayer immediately after use. It will be safe and ready for the next spraying job. This also prolongs the life of its components.
- 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. See also Parking the sprayer on page 50.
- If the product applied is corrosive (e.g. liquid fertilisers), it is recommended to coat all metal parts of the sprayer before and after use with a suitable rust inhibitor.

Cleaning the tank and liquid system

- Dilute remaining liquid in the tank with at least 10 parts of water and spray the liquid out in the field you have just sprayed.
- Use appropriate protective clothing. Select detergent suitable for cleaning and suitable deactivating agents if necessary.
- Rinse and clean the sprayer and tractor externally. Use detergent if necessary.
- Remove the tank and suction filters and clean. Be careful not to damage the mesh. Replace the suction filter. Replace the filters after complete cleaning of the sprayer.
- Start the pump and rinse the inside of the main tank. Remember to clean the top of the tank. Rinse and operate all components that have been in contact with the liquid. Before opening the sections to spray the rinsing water out, ensure that the water will be sprayed safely, either in the field that has just been sprayed or in a containment tank.
- When the tank is empty, stop the pump and refill it to at least 1/5 of its capacity with clean water. Note that some chemicals require the tank to be completely filled. Add a detergent and/or deactivating agent, e.g. soda ash or triple ammonia. Specific detergents for sprayers are recommended because some are also involved in lubricating built-in valves etc.
- Start the pump and operate all controls, allowing the liquid to come in contact with all the components. Save the sections for the end. Some detergents and neutralising agents work best if left in the tank for a short period. Check their usage instructions.
- Drain the tank and let the pump run. Rinse inside of the tank, again letting the pump run.
- 9. Stop the pump. If the pesticides used have a tendency to block nozzles and filters, remove and clean them immediately.
- Replace all the filters and nozzles and store the sprayer. If, from previous experiences, it is noted that the solvents in the pesticide are particularly aggressive, store the sprayer with the tank lid open.

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

ATTENTION! If a cleaning procedure is recommended by the manufacturer of the used product, follow it closely.

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

Cleaning and maintenance of filters

Clean filters ensure the good functionality of:

- regulation, valves and diaphragms
- nozzles
- the pump

which could be irreversibly damaged if the filters are not clean.

The most important filter is the suction filter. It protects all sprayer components. Check it regularly.

Use of rinse tank and rinsing nozzles

The incorporated rinse tank can be used for two different purposes:

A. For diluting the remaining liquid and spraying it in the field before cleaning the sprayer. This cleaning

procedure is divided into three main steps:

Rinsing the liquid system:

1. Empty the tank as much as possible. Close the agitation valve and spray until air comes out of all nozzles.
2. Turn the SmartValve suction valve to "Rinse tank" and the pressure valve to "Filling".
3. Engage and run the pump at approx. 300 rpm
4. When another 1/3 of the content in the rinse tank has been used, turn the SmartValve suction valve to "Main tank". Next activate all valves on the pressure side to rinse the hose and components, in the following order:
   Open the suction valve of the TurboFiller, open the Vortex jets and then close them when clean water appears. Close the TurboFiller lid and press the container cleaning control trigger. Open the TurboFiller lid again and check that the funnel is empty. When empty, close the TurboFiller suction valve again.
5. Turn the SmartValve suction valve to "Main tank" and the SmartValve pressure valve to "Spraying" and spray the tank content in the field you have just sprayed.

Rinsing the main tank:

6. Turn the SmartValve suction valve to "Rinse tank" and the pressure valve to "Tank cleaning".
7. When approx. 1/6 of the content in the rinse tank has been used (75 l), turn the SmartValve suction valve to "Main tank".
8. Turn the SmartValve pressure valve to "Spraying" and spray the content of the tank in the field you have just sprayed.
9. Repeat points 6 - 8 one more time.

External rinsing:

10. Turn the SmartValve suction valve to "Rinse tank" and the pressure valve to "Tank cleaning".
11. When approx. 1/3 of the content in the rinse tank has been used (150 l), turn the SmartValve suction valve to "Main tank".
12. Turn the SmartValve pressure valve to "External Cleaning Device" and wash the device using the spray gun located on the front right of the sprayer (optional).
13. Stop the pump.

B. For rinsing the pump, operating unit, spray lines etc. in case of unexpected shutdown of spraying before the main tank is empty.

Rinsing the liquid system:

1. Turn the SmartValve suction valve to "Rinse tank" and the pressure valve to "Spraying".
2. Close the agitation valve.
3. Engage the pump and spray the content of the rinse tank into the field until the nozzles give out clean water.
4. Stop the pump.

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

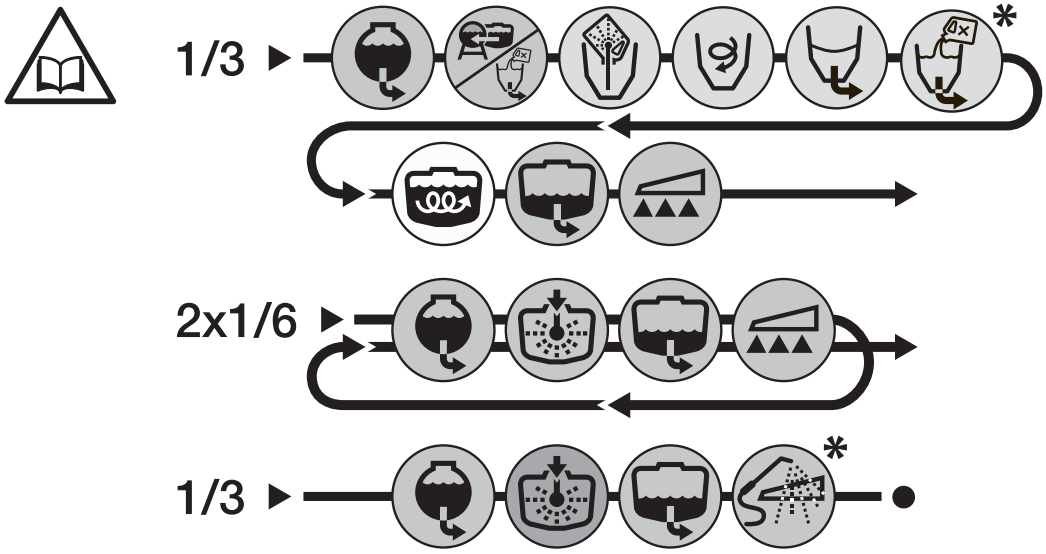
ATTENTION! It is advisable to increase the forward speed (drive twice as fast if possible) and reduce the pressure to 1.5 bar (20 psi). The diagrams below describe the valve positions according to different operations.

ATTENTION! If a cleaning procedure is recommended by the manufacturer of the used product, follow it closely.

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

Quick reference - Cleaning

The diagrams below describe the valve positions according to different operations.



Technical residue

Inevitably a quantity of spray liquid will remain in the system as the pump takes in air when the tank is about to become 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.

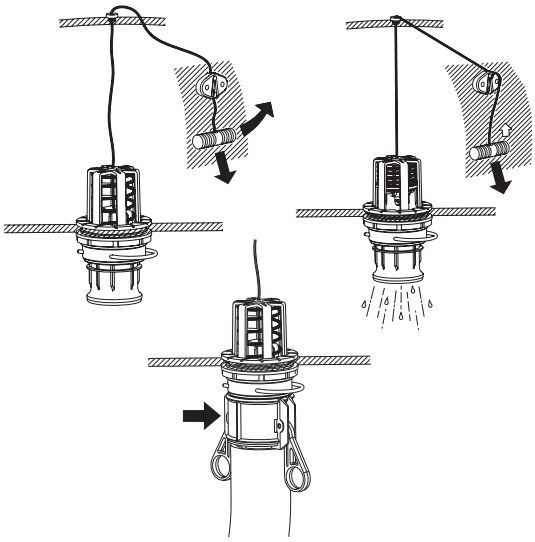
The technical residue varies between 55 and 60 litres, depending on the boom length and tank capacity. These values are measured with the sprayer on level ground. The residues in the tank should be diluted immediately in a ratio of 1:10 with clean water and should then be sprayed on the crop just sprayed at double the driving speed.

For more information about waste management, see the SPRAY TECHNIQUES book.

Using the drain valve

The drain valve is located and operated from the platform just beside the main spraying tank lid. Pull the string to open the drain valve. The valve is spring-loaded, but can be kept open by pulling the string upwards in the V-shaped slit. To release, pull the string downward and the valve will close automatically.

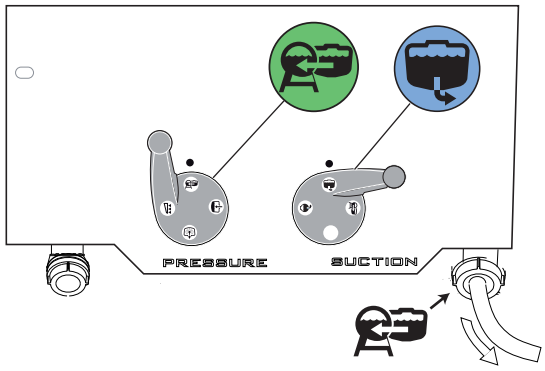
If draining the content of the tank into a reservoir, a snap-connector with hose can be connected to the drain valve.



Transfer to external tank

This is done the following way:

- Connect a hose from an external tank to the snap-connector on the sprayer (pressure).
- Turn the SmartValve pressure valve to "Transfer".
- Turn the SmartValve suction valve to "Main tank".
- Start the pump.



External cleaning - Use of External Cleaning Device (optional equipment)

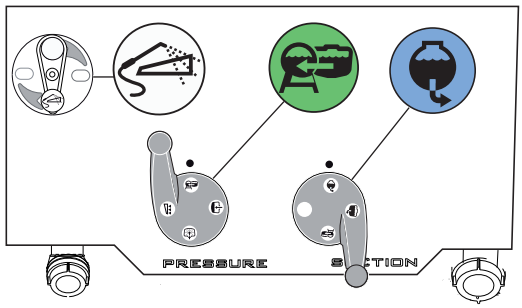
Use the External Cleaning Device to wash everything on the outside of the sprayer.

This prevents contamination of storage places, etc. and gives the sprayer a longer life.

Cleaning of the sprayer should always be carried out according to the regulations in force. For further information, see the SPRAY TECHNIQUE book.

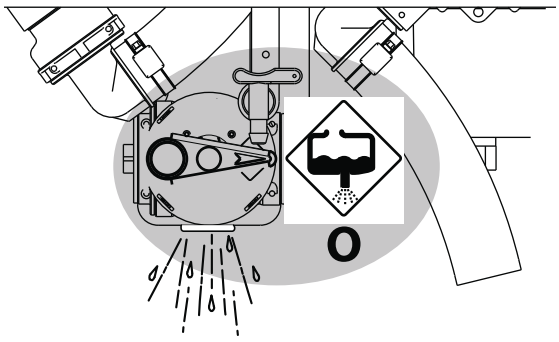
The external cleaning equipment is located on the left side of the sprayer. To use the equipment:

- Start the pump and adjust the speed to around 300 rpm.
- Turn the SmartValve suction valve to "Rinse tank" and the pressure valve to "Transfer".
- Check that the pressure snap-connector is fully plugged.
- Turn the agitation valve to "External Cleaning Device" and then clean sprayer.
- After cleaning, close the agitation valve.
- Roll the hose up onto its hose reel.

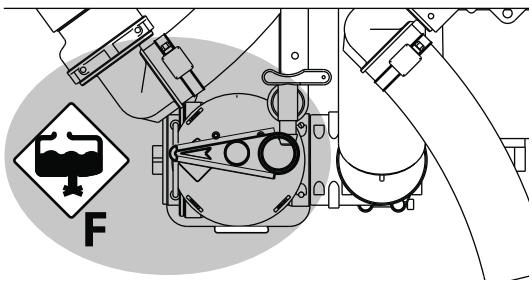


Draining the main tank

- The valve is accessible from the left side of the vehicle. For more information about effluent handling, refer to the regulations in force.
- To open the drain valve, turn the valve handle to position O.



- To close the drain valve, turn the handle to position F.



Air conditioning

General information

The air conditioning installed in the cabin gives the required temperature very quickly and maintains it irrespective of the outside conditions (vehicle speed, variation in sunshine level or outdoor temperature).

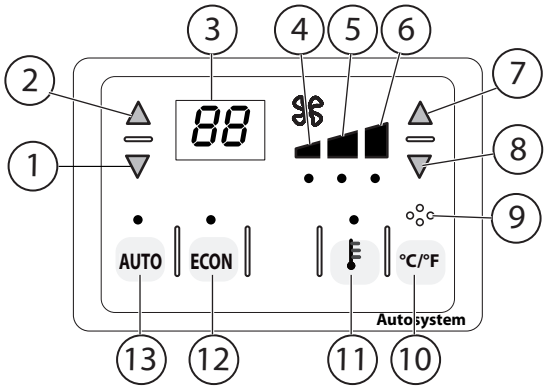
The comfort temperature is maintained in the cabin when the outdoor temperature is between -20 °C and +45°C.

The temperature regulation system is automatic (microprocessor technology), which makes it possible to offer maximum comfort without modification of the manual temperature control.

WARNING! To maintain good air quality in the cabin, it is essential to keep the cabin door firmly shut and to ensure that the air conditioning is permanently working.

Description of air conditioning control unit

1. Reduction in interior temperature.
2. Increase in interior temperature.
3. Programmed temperature display.
4. 1st ventilation speed indicator light.
5. 2nd ventilation speed indicator light.
6. 3rd ventilation speed indicator light.
7. Increase in ventilation speed.
8. Reduction in ventilation speed.
9. Interior temperature sensor.
10. Celsius/Fahrenheit temperature selection.
11. Exterior temperature reading.
12. Shutdown of air conditioning compressor.
13. Automatic function activation.



Operation of air conditioning control unit

The temperature is obtained by pressing the adjustment keys fig.7 or fig.8 and the AUTO key fig.13. The following functions are activated:

- Automatic regulation of interior temperature
- Automatic adjustment of ventilation speed

AUTO control

- Press the AUTO key to activate automatic mode; the corresponding LED lights up.

ECON control

This control is generally used when the outdoor and interior temperatures are similar.

- Press the ECON key to deactivate the air conditioning compressor; the corresponding indicator lights up. If the required temperature is not reached, the AUTO LED automatically switches off

Temperature increase or decrease

- Press the keys fig.1 or fig.2 to select the required temperature, between 16°C and 32°C. If you select a value lower than 16°C, the display will indicate [LO] (low). Conversely, if the value is higher than 32°C, the display will indicate [HI] (high).

If you select [LO], you will obtain maximum cooling. In this case:

- Ventilation is at its maximum.
- The air conditioning compressor is engaged.

If you select [HI], you will obtain the following operation:

- Ventilation is at its maximum.
- The air conditioning compressor is disengaged.

NOTE! When [LO] or [HI] is activated, the automatic temperature regulation is deactivated and the AUTO indicator is switched off.

Increase or decrease in ventilation speed

- Press the key fig.7 or fig.8 to adapt the ventilation speed. The speed indicators fig.4, fig.5 and fig.6 light up according to the ventilation speed.

NOTE! By pressing on the [AUTO] key, the ventilation speed returns to the initial speed

NOTE! If the ventilation is completely shut down, the air conditioning control unit is deactivated. It can be restarted by pressing the [AUTO] key.

Outdoor temperature display

- Press the key fig.11, to display the outdoor temperature. When it is close to 0°C the corresponding indicator lights up to show a risk of black ice.

Temperature unit selection °C/°F

Press the key [°C/°F] to select the required display mode. The indicator shows that the temperature is displayed in Fahrenheit.

NOTE! When the temperature rises above 37°C (99 °F), the display indicates [HI].

Air conditioning error codes

In the event of operating anomalies in the air conditioning, the control unit will display the code [E] followed by the error code.

E1	outdoor air temperature sensor cut off
E2	outdoor air temperature sensor short circuited
E3	interior air temperature sensor cut off
E4	interior air temperature sensor short circuited
E5	mixed air temperature sensor cut off
E6	mixed air temperature sensor short circuited

When temperature regulation in automatic mode is no longer possible, the temperature inside the cabin is no longer regulated and the ventilation is locked at medium speed.

As soon as the fault disappears, the control unit starts to function again after it is reset to zero with the contact key.

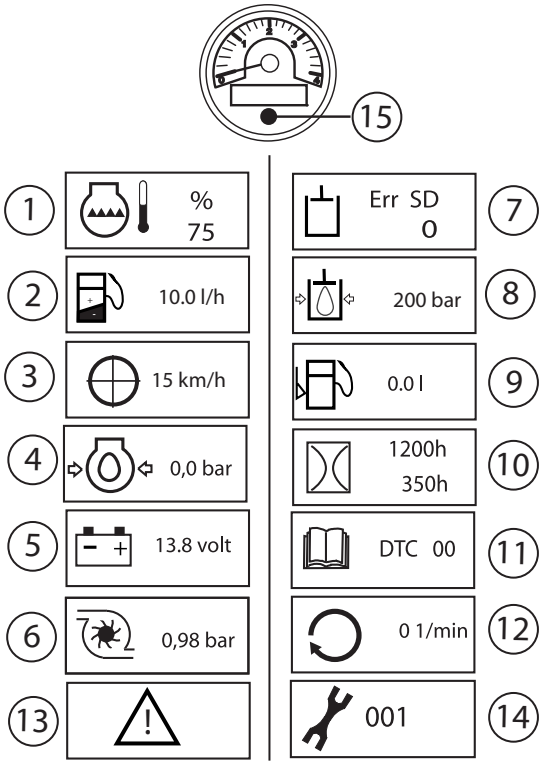
Multi-function rev counter - CAN cockpit

General information

The multi-function rev counter is dedicated to engine management. It is made up of an electronic rev counter and a display that shows the main engine data, the frequency of maintenance operations and any errors in the engine and the hydraulic transmission.

Description of messages

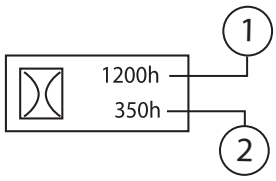
1. Engine water temperature
2. Volume of fuel in the tank
3. Theoretical forward speed
4. Engine oil pressure
5. Battery charge voltage
6. Turbocharger pressure
7. Faults in hydraulic transmission
8. Hydraulic pressure of the transmission
9. Immediate fuel consumption
10. Partial and total hour meter
11. Engine faults
12. Engine rev counter
13. Priority faults in hydraulic transmission (SD error)
14. Maintenance intervals (001-002-003)
15. Pushbutton for information display



Partial and total hour meter

1. Total number of hours
2. Partial number of hours

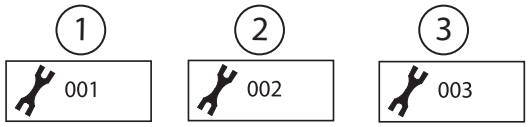
- Press the pushbutton fig.4 for 5 seconds to reset the partial hour counter to zero.



Maintenance

The maintenance frequency is defined as follows:

1. First servicing after 150 hours
2. Servicing every 500 hours
3. Servicing every 1000 hours



After maintenance operations, the period displayed should be reset.

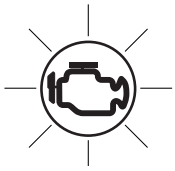
- Turn the battery switch to disconnect it.
- Hold the pushbutton down fig.11, then turn the starter key (without starting up), the display shows a dark area.
- Release the pushbutton; the display indicates the maintenance code to be reset
- Press the pushbutton again until this screen switches off completely, then release the pushbutton. The CAN cockpit goes into auto test mode (the rev counter needle moves, the display is backlit), and the software version is displayed, then the CAN cockpit returns to normal user mode.

Engine faults

Engine faults are displayed in the format DTC xx.

The number [xx] indicates the number of ongoing faults. An indicator lights up on the control panel to indicate the presence of an engine fault.

If xx = 0 is displayed, this means that there are no engine faults.



NOTE! If the engine fault indicator lights up on the control panel, stop the engine immediately.

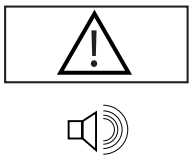
- Press the pushbutton fig.11 several times until the symbol [DTC] and the fault number appear.

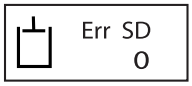
NOTE! If the fault found corresponds to one of the following codes: SPN100 - SPN102 - SPN110, the engine will operate in downgraded mode, i.e. its power will be automatically reduced

Faults in transmission

Faults in transmission are identified in the format Err SD x. The figure [x] denotes the number of ongoing faults. If x = 0 is displayed, this means that there are no transmission faults.

The symbol fig.1 and an acoustic alarm indicate the presence of one or more faults in the transmission.





- Press the pushbutton as many times as necessary to cancel the acoustic alarm.
- Press the pushbutton again to display the message [Err SD x].

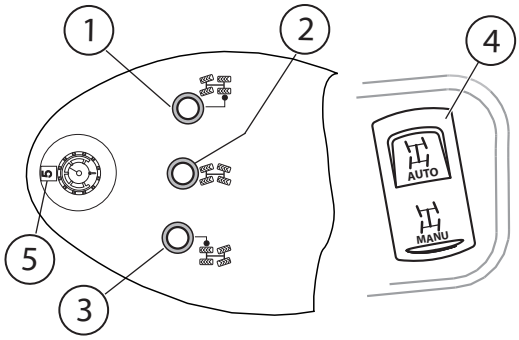
General information

The steering is hydrostatic. As a safety measure, in the event of malfunction of the system, the steering acts as a pump, thus allowing steering control. The hydraulic steering pump also controls the hydraulic systems of the boom through a priority valve.

The automatic 4-wheel steering is made up of two position sensors fitted on the front and rear rods, a 4-wheel steering activation pedal, a switch and indicators on the control panel.

1. Green indicator: rear wheels aligned.
2. Blue indicator: 4-WHEEL STEERING in operation.
3. Green indicator: front wheels aligned.
4. M/A switch - 2- and 4-wheel steering mode

NOTE! As a safety measure, before travelling on the road, ensure that the rear wheels are aligned. The indicator fig.1 lights up indicating that the rear wheels are aligned.



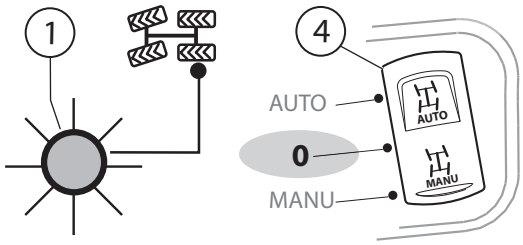
Start-up

- Press the switch fig.4 to [AUTO] or [MANU] depending on the mode of operation.

Shutting down

Before travelling on the road you must:

- Put the device in 2-wheel steering mode. The indicator fig.1 must be lit up.
- Put the 3-position switch into the central position.



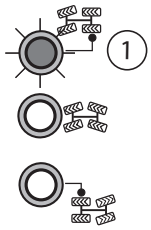
Travelling in 2-wheel steering

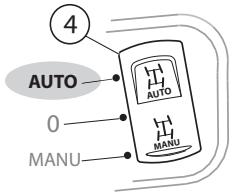
In this mode, only the front wheels turn and the rear wheels remain in a straight line.

- Press the switch to activate [AUTO] mode.

If the rear wheels are not in a straight line, the indicator fig.2 remains lit up and the indicator fig.1 is switched off:

- Turn the steering wheel until the rear wheels are aligned, the indicator fig.1 lights up continuously and the indicator fig.2 is switched off.

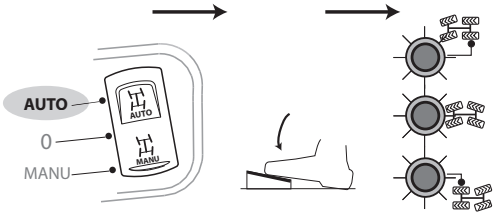




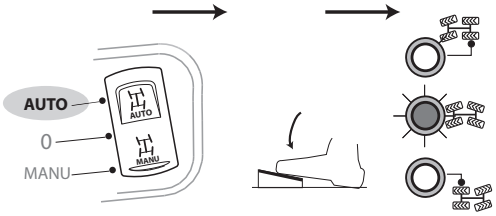
Travelling in 4-wheel steering

In this mode, the front and rear wheels turn in opposite directions.

- Press the switch to activate [AUTO] mode.
- Press the pedal and turn the steering wheel until the front wheels are in a straight line. The three indicators light up to indicate that the operating conditions for 4-WHEEL STEERING have been met.



- Keep the pedal pressed down and turn the steering wheel to use 4-WHEEL STEERING mode.



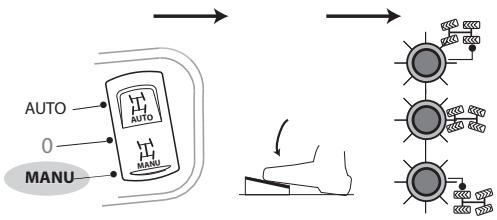
To leave 4-WHEEL STEERING mode:

- Release the pedal and turn the steering wheel to put the rear wheels back in a straight line. The indicator fig.2 lights up.

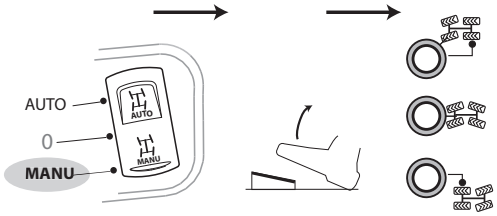
Travelling in offset 2-wheel steering

In this mode, only the front wheels can turn, while the rear wheels are slightly inclined to the left or right to offset the sliding of the wheels on slopes.

- Press the switch to activate [AUTO] mode.
- Press the pedal and turn the steering wheel until the front wheels are in a straight line. The three indicators light up to indicate that the operating conditions in offset rear wheel steering have been met.
- Keep the pedal pressed down and turn the steering wheel to position the rear wheels.

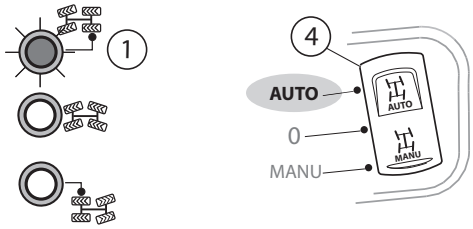


- Release the pedal to keep the rear wheels in position. The three indicators are unlit.



To leave offset mode:

- Turn the switch to [AUTO] to activate 4-wheel steering mode.
- Turn the steering wheel until the rear wheels come back into a straight line. The rear wheel alignment indicator fig.1 lights up (2-wheel steering mode).



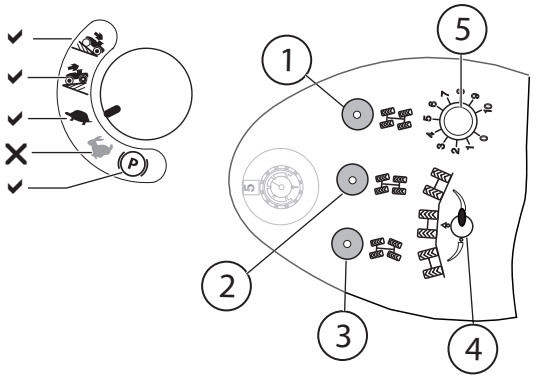
Steering - 4-wheel steering version with crab steering (optional)

General information

The steering is hydrostatic. As a safety measure, in the event of malfunction of the system, the steering acts as a pump, thus allowing steering control. The hydraulic steering pump also controls the hydraulic systems of the boom through a priority valve.

As an option, the ALPHA EVO self-propelled vehicle can be equipped with an electronic 4-wheel steering mechanism with automatic alignment and "CRAB" steering.

1. "CRAB" mode control.
2. 2-WHEEL STEERING mode control.
3. 4-WHEEL STEERING mode control.
4. Right and left SLANTING mode selection.
5. Rear wheel inclination control in SLANTING mode.



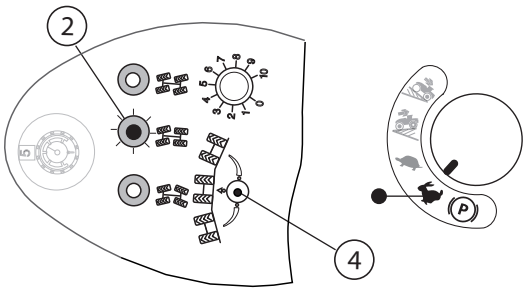
NOTE! As a safety measure, when ROAD mode is selected, the rear wheels are automatically aligned in a straight line and the system is deactivated after a few seconds.

On start-up, 2-WHEEL STEERING is selected by default. However, make sure that the switch fig.4 is in the middle position so that the rear axle remains in a straight line.

2-wheel steering mode

In this mode the rear wheels turn automatically to return to a straight line position. To activate this mode:

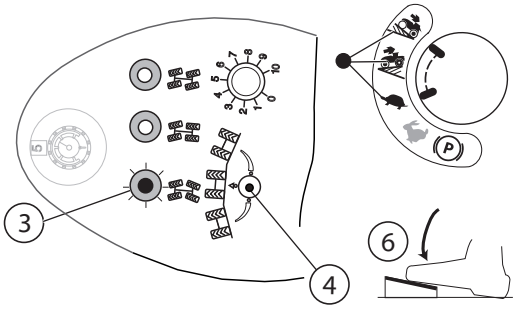
- Ensure that the switch fig.4 is in the central position.
- Press the pushbutton fig.2; the corresponding indicator lights up.



4-wheel steering mode

In this mode, the 4 wheels, front and rear turn simultaneously in opposite directions. To activate this mode:

- Ensure that the switch fig.4 is in the central position.
- Press the pushbutton fig.3.
- Keep the pedal fig.6 pressed down to use 4-wheel steering mode; the indicator fig.3 lights up.



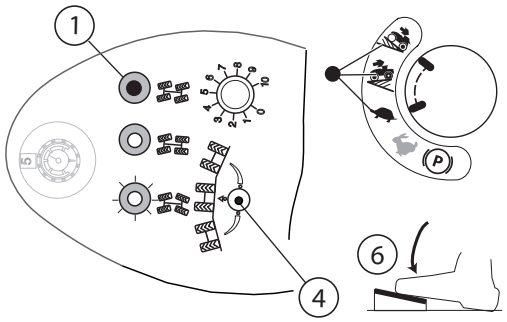
To deactivate 4-wheel steering mode, either release the pedal or turn the selector to the [fast] position.

5 - Operation

"CRAB" mode

In this operating mode, the front and rear wheels turn simultaneously in the same direction and remain parallel. To activate this mode:

- Ensure that the switch fig.4 is in the central position.
- Press the pushbutton fig.1; the corresponding indicator lights up.
- Hold down the pedal fig.6 to activate CRAB mode; the indicator fig.1 will light up.

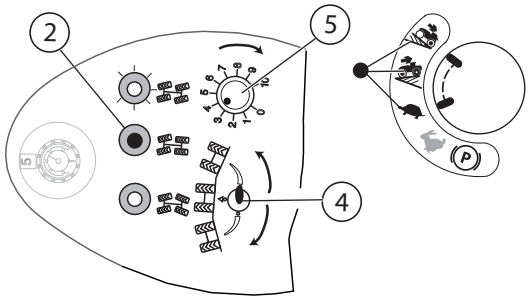


To deactivate CRAB mode, either release the pedal or turn the selector the [fast] position.

Travelling in "SLANTING" mode

In this mode, the rear wheels are positioned at an angle proportional to the rotating button pointer fig.5. The direction of the wheel inclination is obtained by turning the switch fig.4 to the left or right.

- Ensure that the machine is in 2-wheel steering mode.
- Turn the switch fig.4 to select the wheel inclination direction
- Turn the rotating button fig.5 slightly to obtain the required wheel inclination.
  Position 10 corresponds to the maximum wheel turning angle.



- To deactivate slanting mode, put the switch fig.4 into the central position; the rear wheels will realign automatically.

Lubrication

General information

Always store lubricants in a clean, dry and cool place - preferably at a constant temperature Keep the containers and funnels. Clean lubrication points before applying the lubricants.
Always follow the recommendations concerning quantity. If no recommended quantity is given, feed lubricator until new grease becomes visible.

1. Lubricant to be used (see table below).
2. Lubrication intervals.

Table of recommended lubricants

Parts	Capacity (litres)		Recommended lubricants - TOTAL
	Housing (1)	With filter (1)	
DEUTZ TCD2012 L06 engine	15.0 l -15.5 l	16.5 l	RUBIA TIR 8600 API ACEA E4 10W40
Hydrostatic transmission			EQUIVIS ZS46
Hydraulic system	60		AFNOR NF E 48-603HV ISO 6743/4HV
General lubrication			Multi EP2 ISO-L-XBCFB 2
Coolant	20		COOLELF AUTO SUPRA -37°C COOLELF AUTO SUPRA -37°CAFNOR NFR 15-601 - BS 6580
Pneumatic lubricator			Mineral oil for pneumatic system ISO VG 22 viscosity 22 mm^2/s at 40°C
Pneumatic Pentanozzles			Lubricant for synthetics (plastic/plastic)

ATTENTION! The values given are for information only. Only the level indicated by the gauge should be taken into consideration.

6 - Maintenance

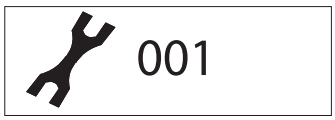
Maintenance after first-time use

After 10 hours

- Visual checks of rubber pipes and hoses and hydraulic oil level in tank.
- Inspection and tightening of wheel nuts - See on page 68.

After 150 hours

- Change of engine oil and replacement of oil filter cartridge (*).
- Replacement of fuel filter (*). See chapter "Every 500 hours - drainage and replacement of the oil filter".
- Inspection of tightness and tension of engine belts (*).



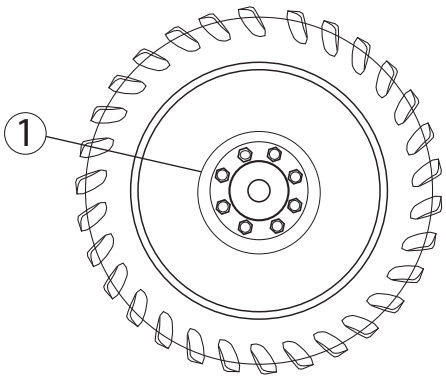
- Draining of hydraulic tank. See chapter "Every 1000 hours - drainage and cleaning of the hydraulic tank".
- Replacement of hydraulic system filters. See chapter "Every 500 hours - brake system hydraulic filter".
- Inspection and tightening of bolts on aluminium boom. See on page 78.

(*) see instructions in the DEUTZ user and maintenance manual.

Wheel bolts

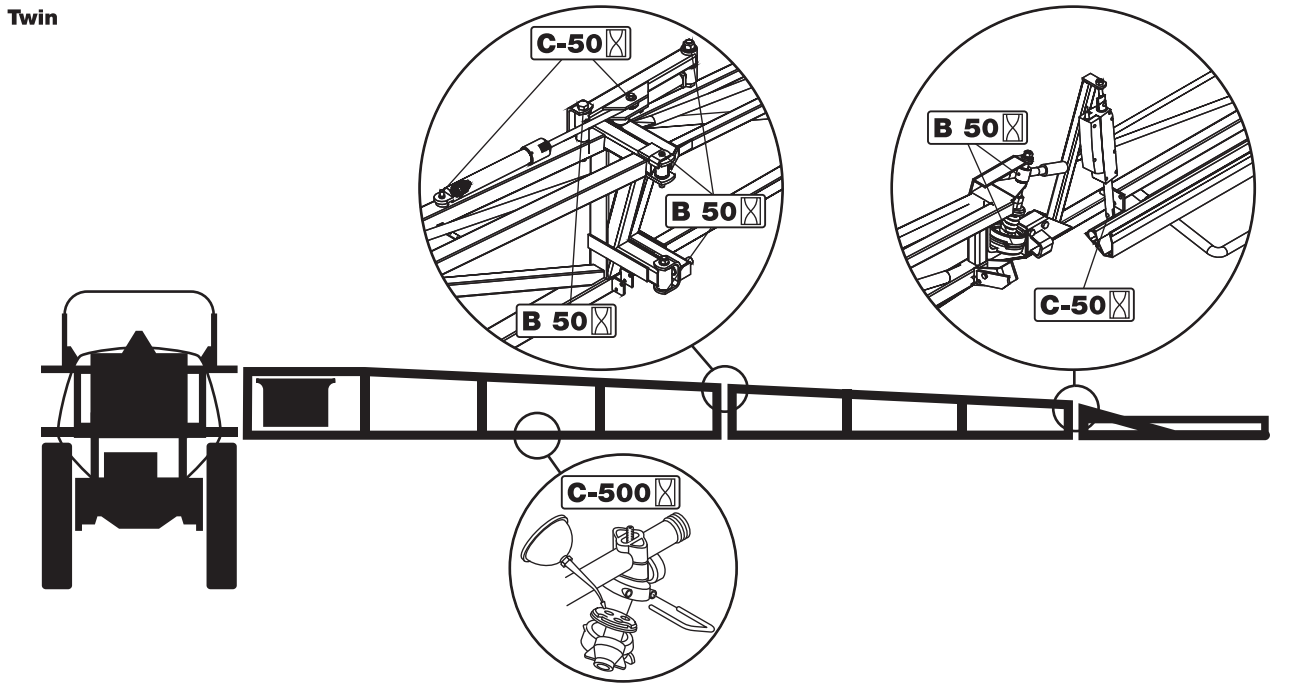
Check wheel nuts fig.1 and tighten if necessary applying a tightening torque of 60 daN.m (442.4 lbf.ft).

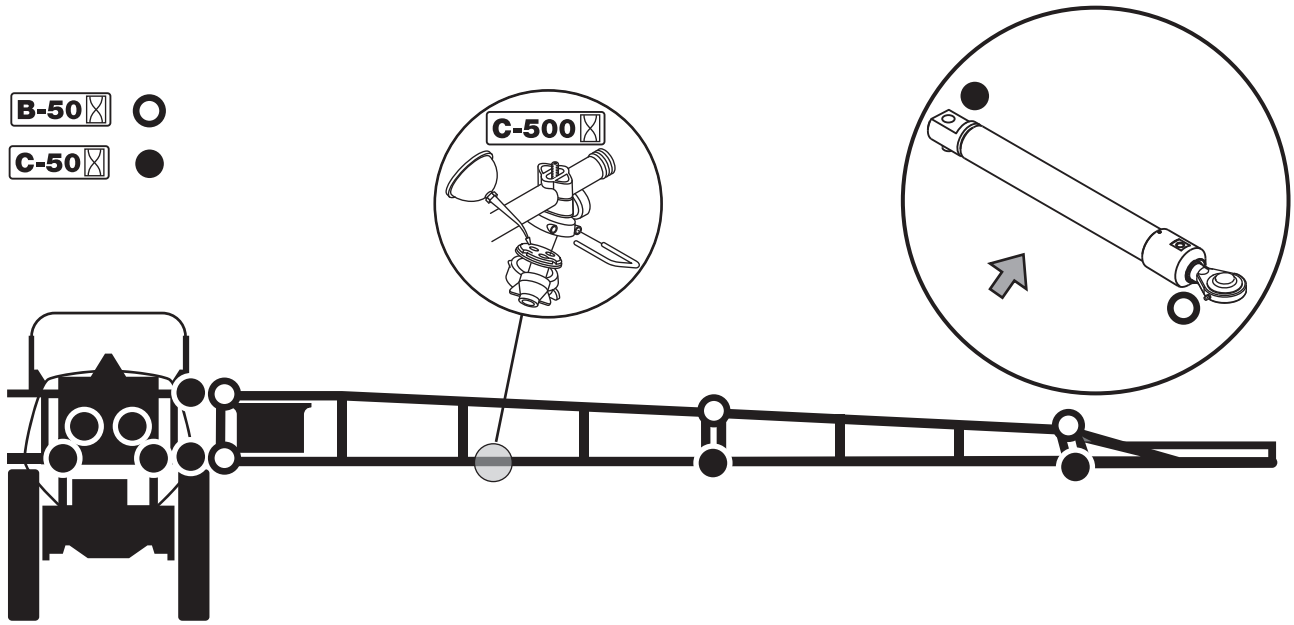
WARNING! Never oil or grease the wheel nut threads. Observe the tightening torque.



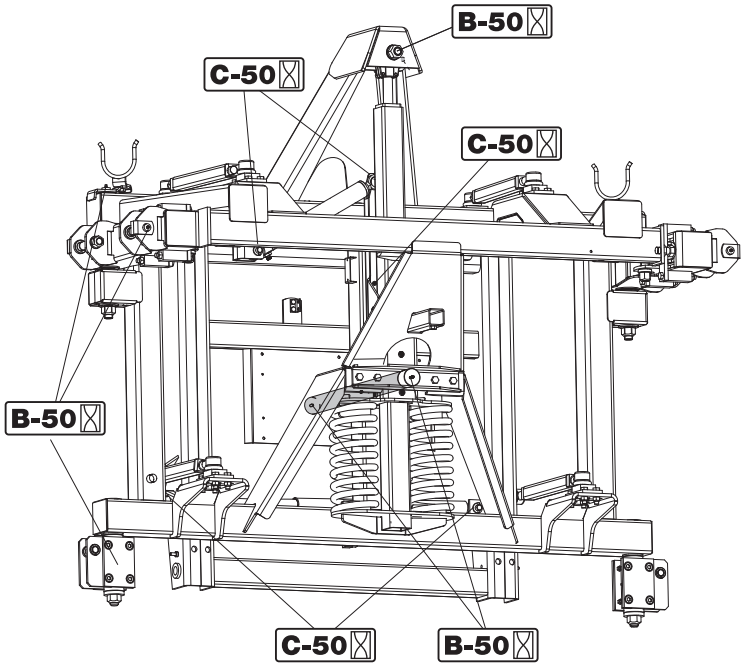
HAZ boom lubrication & oiling plan

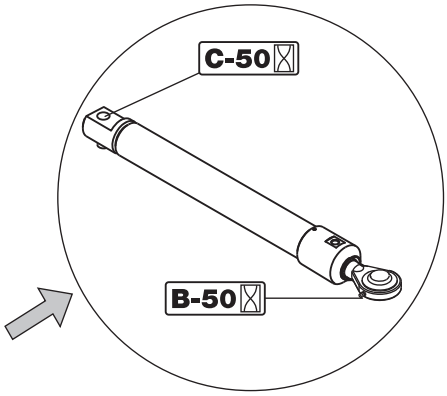
Twin

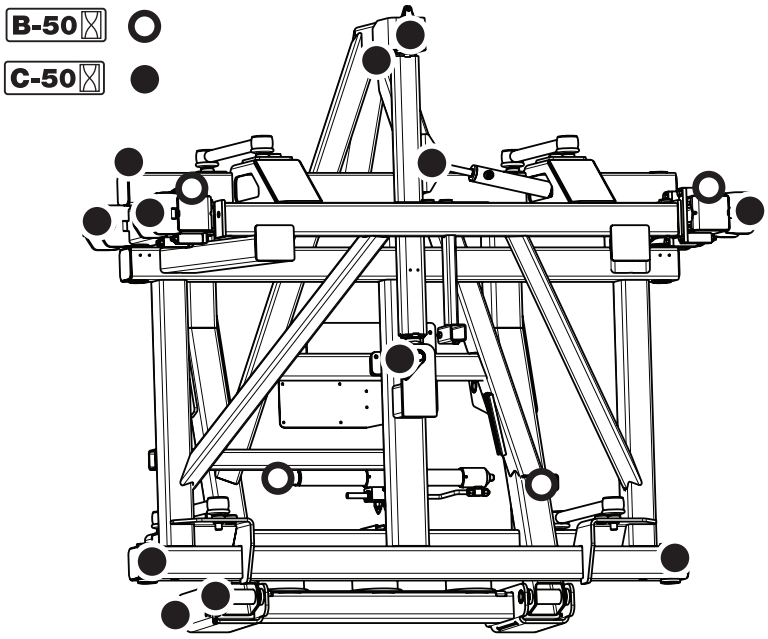


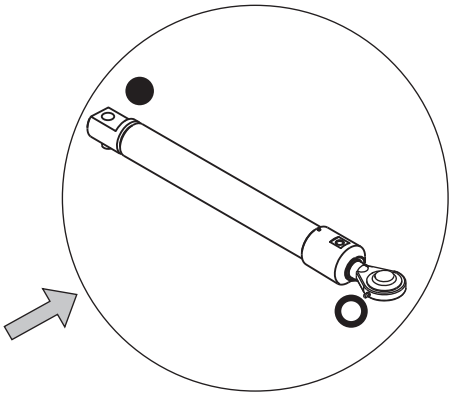


HAZ boom lubrication points and frequency (32-36 m)









Regular maintenance

Frequency	
Daily	Check sprayer filters. Check engine oil level (*). Check hydraulic oil level. Clean engine radiators (*). Check air filters are not clogged (*). Bleed compressed air tank (if installed).
Every 50 hours	Lubricate chassis and boom. Lubricate 463 pump (diaphragm pump). Check tightening of bolts on aluminium boom. Check pneumatic lubricator filter level (if installed). Check hydraulic filter clogging.
Every 500 hours or at the start of each season  002	Drain and replace the hydraulic system filters. Change engine oil and replace the engine oil filter (*). Bleed the fuel pre-filter. Replace the cabin active carbon filter. Check the liquid system and the accuracy of the settings. Check the nozzles. Adjust the boom if necessary.
Before storage	Grease the DG control valve.
Every 1000 hours  003	Check the engine belts (*). Replace the fuel filter and pre-filter. Replace the coolant (*). Check the engine air filter (*). Replace the engine air safety filter. Check the air conditioning coolant level (R134a). Clean the air conditioning condenser. Clean the hydraulic tank. Check the steering (wheel alignment).
Every 5 years	Completely drain and refill the engine cooling circuit.

6 - Maintenance

Resetting the CAN COCKPIT

The CAN cockpit displays the different frequencies of maintenance operations. After each maintenance operation, you can reset the CAN cockpit.

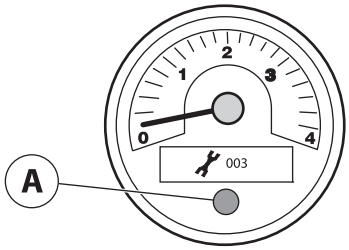
001 = Maintenance to be carried out once at 150 hours.

002 = Maintenance to be carried out every 500 hours.

003 = Maintenance to be carried out every 1000 hours.

To reset one of the 3 periods of the CAN COCKPIT displayed:

- Turn the battery switch to disconnect it.
- Hold down the button fig. A and turn the contact key (without starting the engine), the display shows a dark area.



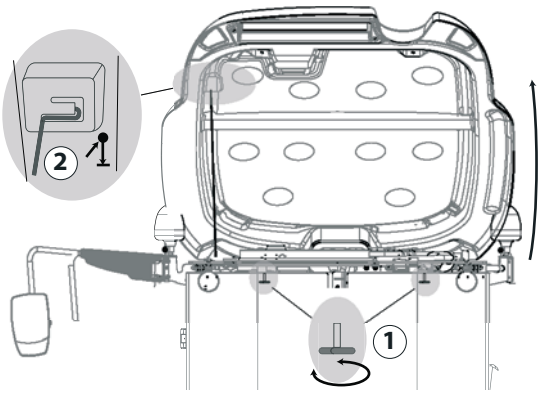
- Release the pushbutton, the display indicates the maintenance code.
- Press the pushbutton again until this screen switches off completely then release the pushbutton.

The CAN cockpit then goes into auto test mode, the rev counter needle moves and the display is backlit, and the software version is displayed. The counter is then reset and returns to normal user mode.

Access to cabin roof

To work on certain cabin components (air conditioning, fuses, electrical circuits etc.), you have to raise the cabin roof.

- Unscrew the 2 screws fig.1 located inside the cabin.
- Raise the roof and position the holding bar in the notch provided for this purpose.

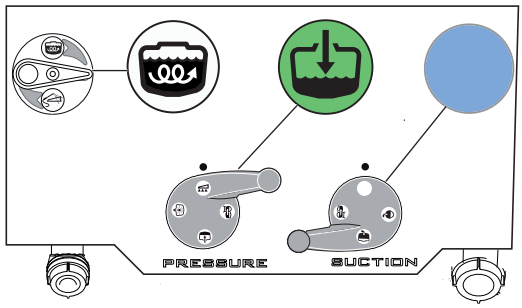


WARNING! To avoid the roof falling, ensure that the holding bar fig.2 is correctly in place as shown in the picture.

Every 10 hours - CycloneFilter

DANGER! To avoid chemicals coming into contact with the skin, wear protective clothing and gloves.

Before opening the CycloneFilter and to avoid any risk of splashing or accidental drainage of the tank, turn the valves as in the picture.

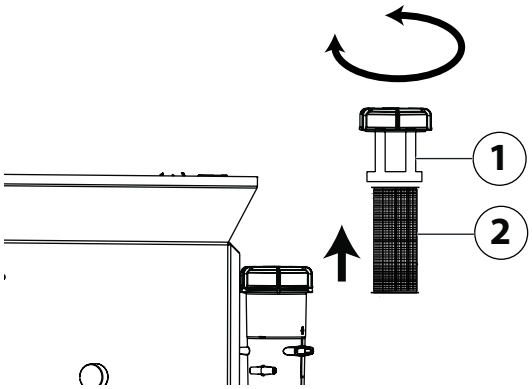


Disassembly

- Unscrew the lid fig.1.
- Lift the lid and the filter element fig.2 from the filter housing.
- Separate the filter element from the lid and clean it.

Reassembly

- If necessary, lubricate the 2 seals located on the lid and filter housing.
- Mount the filter onto the housing (which may not be greased).
- Place the assembly into the filter housing and screw the lid until it hits the stop.



Every 10 hours - EasyClean filter

DANGER! To avoid chemicals coming into contact with the skin, wear protective clothing and gloves.

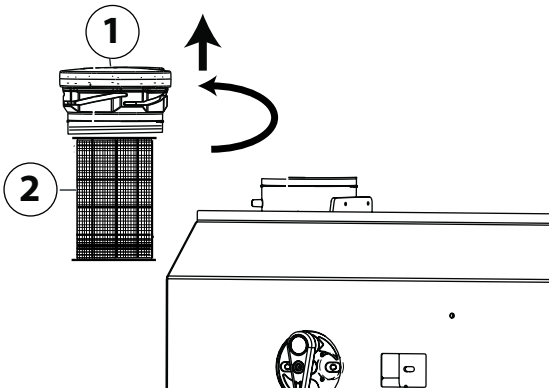
The filter comprises a clogging indicator as stated in the section "Description". However, the filter should be cleaned regularly.

Opening

- Turn the lid fig.1 anticlockwise.
- Remove the lid and the filter element.
- Clean the filter element.

Reassembly

- Grease the seal on the filter lid if necessary.
- Insert the filter element into the recess on the lid.
- Replace the assembly in the filter housing.
- Turn filter lid clockwise to close the lid.



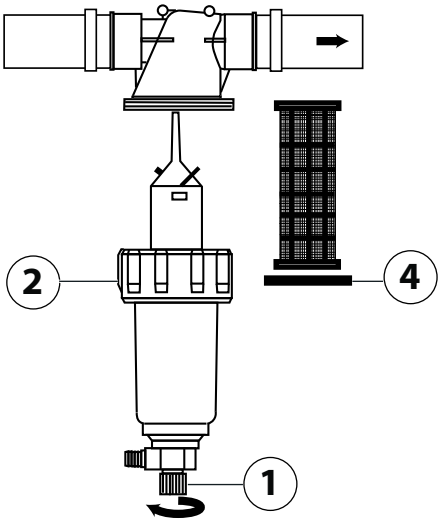
6 - Maintenance

Every 10 hours - pressure filter

DANGER! To avoid chemicals coming into contact with the skin, wear protective clothing and gloves.

Pressure filters are only available on certain equipment. They are placed on the central frame near the spray nozzles. To clean you should:

- Unscrew the bleed screw fig. 1 to drain the filter
- Unscrew the filter housing fig. 2
- Clean the filter element fig.3 if necessary.
- Check the fitting of the seal fig.4 before reassembly.

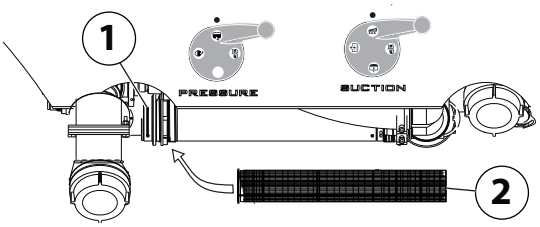


Every 50 hours - in-line filter for external suction

DANGER! To avoid chemicals coming into contact with the skin, wear protective clothing and gloves.

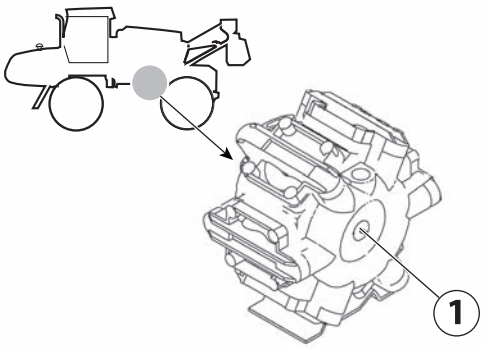
The filter should be cleaned when external suction performance is reduced.

- Remove the pin fig.1 and remove the connector.
- Remove the filter element and clean it.



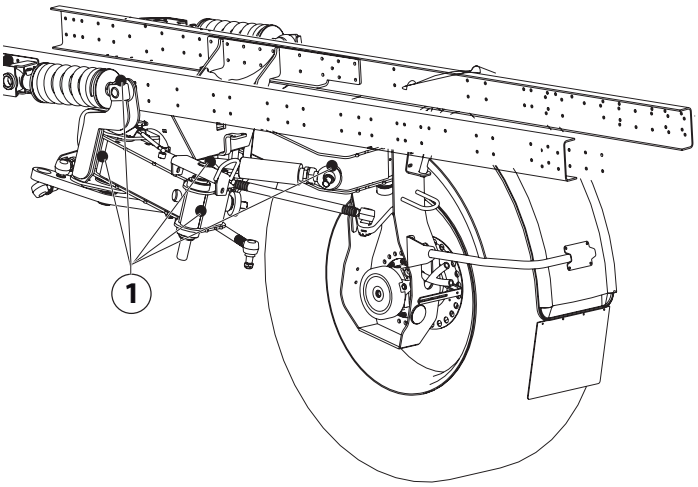
Every 50 hours - lubrication of diaphragm pump 463

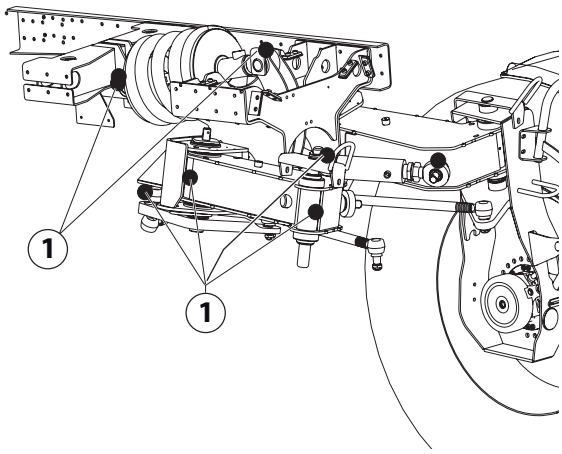
- Lightly grease the lubrication point located at the end of the pump.



Every 50 hours - lubrication of front and rear axle

Lubricate the front and rear axles fig.1 in accordance with the picture.





Every 50 hours - engine cooling

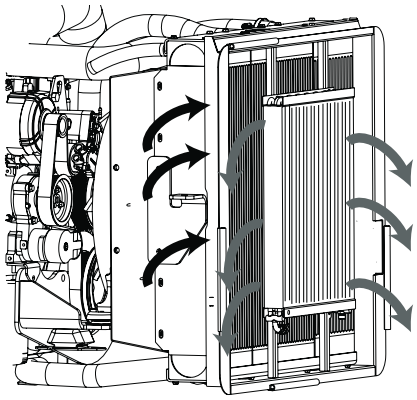
Radiator

- Lift the engine cover to access the radiators.
- Clean the radiators, preferably with compressed air, starting from the inside and working outwards.

NOTE! Take care not to damage the radiator slots during cleaning operations

ATTENTION! When the machine is operating in areas with a lot of dust or pollen, it is advisable to shorten the cleaning intervals.

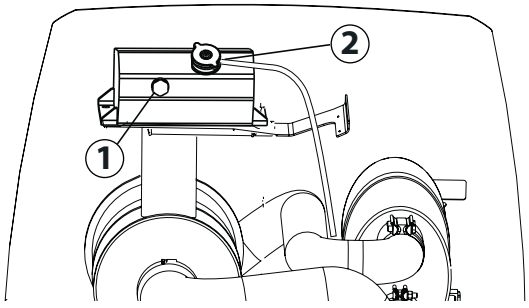
WARNING! Oil and fuel residue increase the risk of clogging. This is why it is advisable to carefully check the sealing, particularly when the machine is working in a dusty environment.



Level

- It is best to check the coolant level when the engine is cold.
- Remove the plug fig.2 to add coolant.

ATTENTION! Only use the recommended coolant. See table. Never mix with other coolants. If in doubt, drain the cooling circuit completely.



If the engine overheats, the CAN cockpit displays the temperature and an error message [DTC 110]. In this case the engine will operate in downgraded mode. You should shut it down as soon as possible and check the cooling circuit.

6 - Maintenance

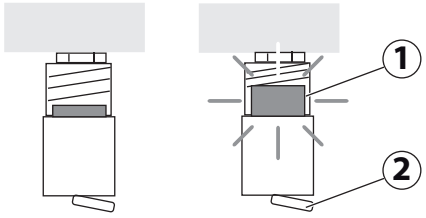
Every 50 hours - checking and cleaning the engine air filter

Air filter check

An air filter clogging indicator is placed on the engine suction hose near the air filter.

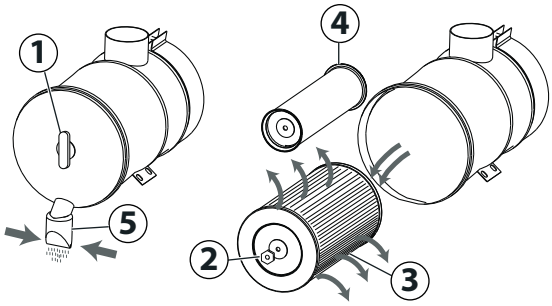
When the indicator fig.1 appears, you should clean the air filter. After cleaning.

- Reset the indicator by pressing the lever fig.2.



Dismantling the filter:

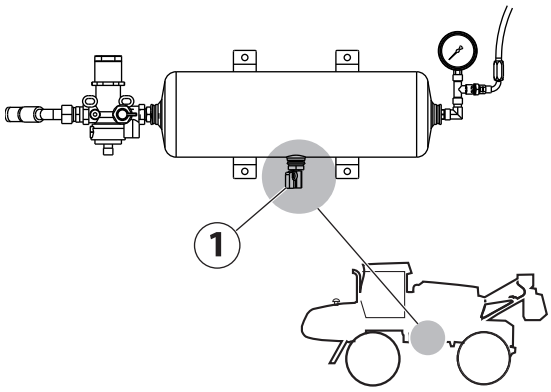
- Loosen the screw fig.1 and remove the air filter lid.
- Loosen the screw fig.2 and take out the air filter.
- Remove the dust from the filter element fig.3 with compressed air from the inside to the outside.
- Replace the filter assembly.
- Press the flap fig.5, as shown in the picture to remove the dust.



Every 50 hours – compressed air tank (special equipment)

- Turn the bleed valve fig. 1 to drain the condensation water contained in the tank.

WARNING! The compressed air tank is pressurised!



Every 50 hours - tyre pressures

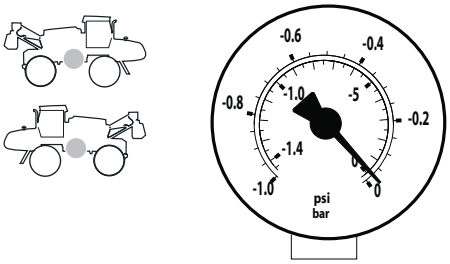
- Check the tyre pressures according to the table.

DANGER! Never inflate tyres above the recommended pressure. This could present an explosion risk and cause serious injury.

WARNING! If the tyres have to be replaced, check that they are within the load capacity rate.

Every 250 hours - Hydraulic filters

The hydraulic suction filters are fitted with clogging indicators.



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

- Regularly check the clogging level.

Less than 0.7 = filters in good condition.

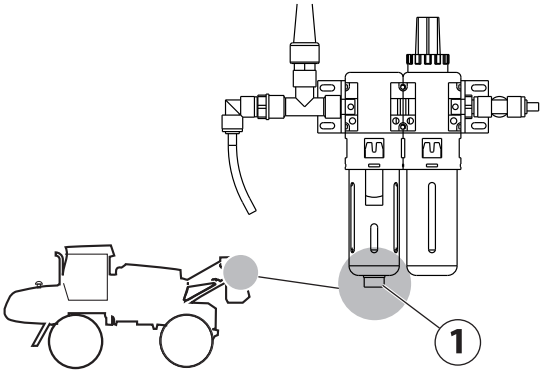
More than 0.7 = filters to be replaced.

Every 250 hours - filter and lubricator (special equipment)

Self-propelled vehicles fitted with a compressed air system have a filter and lubricator mechanism for the compressed air which is necessary for correct operation of the pneumatic components.

Bleed

- Press the pushbutton fig.1 under the filter to bleed the filter tank.



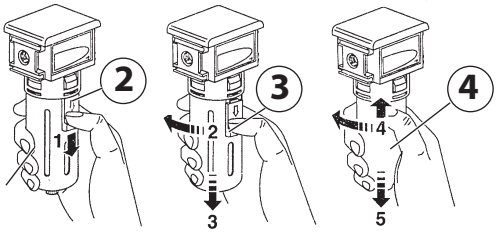
NOTE! The filter can be bled when the system is pressurised.

Lubricator filling

Insufficient lubrication of the pneumatic system can lead to the deterioration of the Pentanozzle diaphragm.

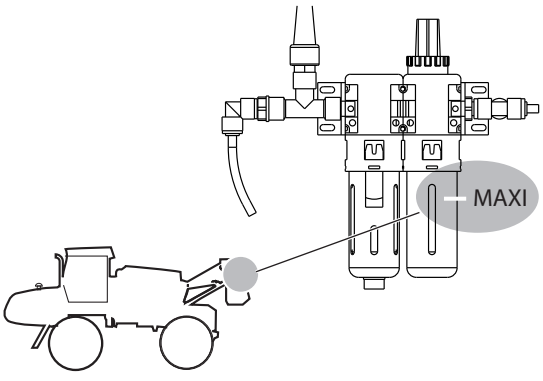
WARNING! To avoid splatter, depressurise the compressed air system before dismantling the tank.

- Press the clip fig.2 and remove the protective bowl.
- Turn the tank to remove it.



WARNING! The lubricator is designed to operate only with a special lubricant for pneumatic systems. For more information on the oil used, see “Table of recommended lubricants” on page 67.

- Fill the tank without exceeding the maximum limit.
- Fit the tank centring clamps before rotating.

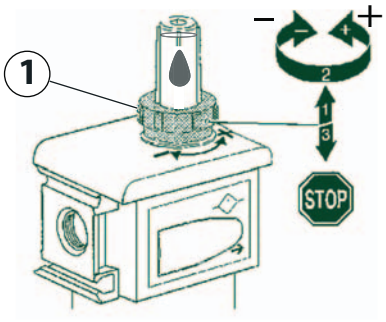


6 - Maintenance

Adjusting the oil supply

Adjustment of the oil supply is carried out using the adjustment button fig.1 with the "pull-turn-push" locking device.

Oil supply: 1 drop for 3 to 4 general openings of the sprayer.



Cleaning the tank

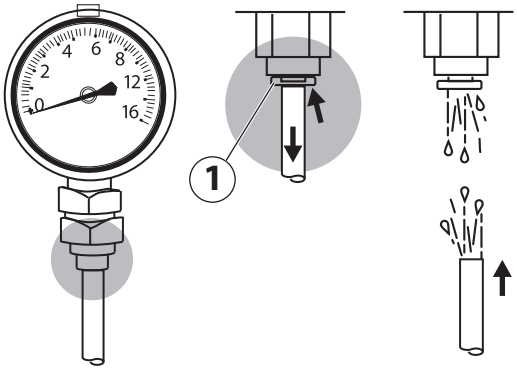
- Clean the tank with a soapy solution.

ATTENTION! The tank is made from polycarbonate, never use a solvent-based solution.

Every 250 hours - spray pressure gauge

The pressure gauge may no longer display the pressure with sufficient accuracy. This may be due to clogging of the hose connecting it to the liquid system.
In this case, you can dismantle the pressure gauge to rinse the hose.

1. Push the ring fig.1 and remove the hose.
2. Spray clean water to rinse the pressure gauge hose.
3. Reconnect the pressure gauge by simply pushing the hose into the connector.



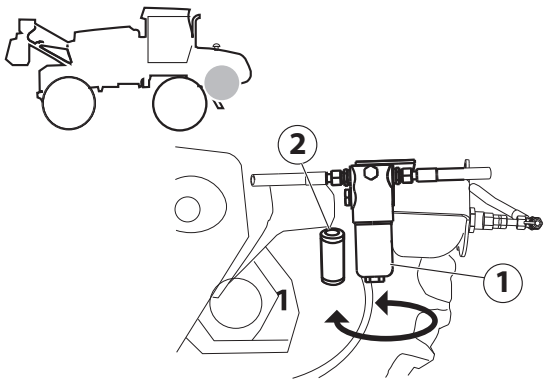
WARNING! The hose may be subject to residual pressure and cause liquid splatter. To avoid all risk of accidental splashing, wear protective goggles and gloves.

Every 500 hours - brake system hydraulic filter

To replace the filter cartridge:

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

WARNING! It is essential to use an original filter.



Every 500 hours - hydraulic filters in the tank

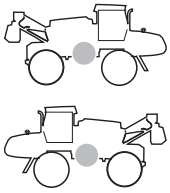
WARNING! Before replacing the filters, wear protective gloves to avoid the oil making any contact with the skin.

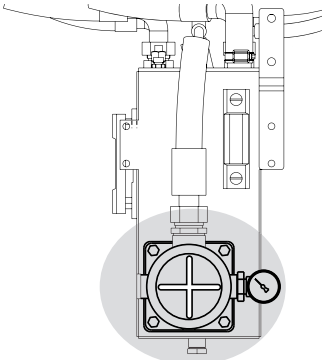
DANGER! Hot oil can cause serious burns.

WARNING! It is essential to use an original filter.

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

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

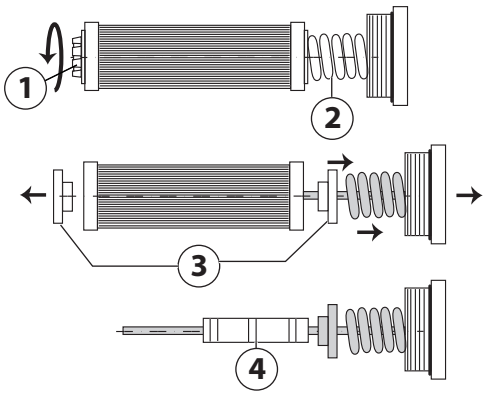




- Completely unscrew the lid and remove the filter assembly.

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

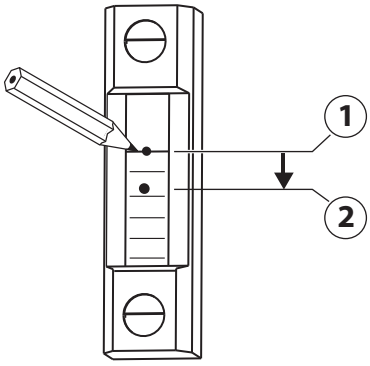
- Unscrew the knob fig. 1 to remove the filter element. To facilitate this operation, gently press the spring fig.2.
- Remove the cups from the filter element fig.3.
- Carefully clean the magnetic core fig.4 with a cloth.



WARNING! It is essential to use original filter elements.

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

1. initial level before refitting filters
2. level after refitting the filters



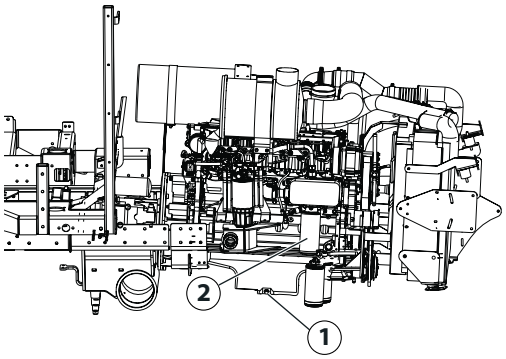
- Refit the new filter. The oil level will drop by around 10 mm, which means that the filters have been fitted correctly.
- Top up with oil to the maximum level fig.2.
- Start the engine on idle then stop it after a few seconds. This evacuates the air contained in the hydraulic system.
- Start the engine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

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

Every 500 hours - drainage and replacement of the oil filter

Drainage of the engine takes place while the engine oil is hot.

- Loosen the drainage screw.
- Loosen the oil filter and replace it with a new one.
- Fill the engine, checking the level.
- Start the engine and check the level after a few minutes of operation.

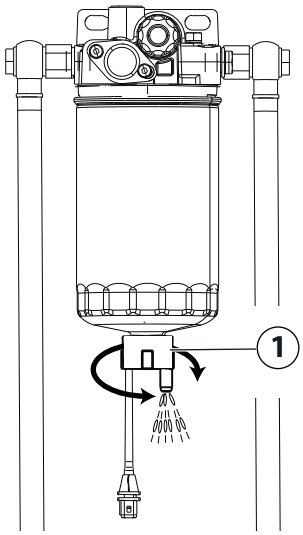


NOTE! It is essential to use original filter elements.

Every 500 hours - bleeding water separator fuel prefilter

Traces of humidity may be contained in the fuel. This may be due to condensation and this is why the prefilter is equipped with a water separator device.

1. Loosen the sensor fig.1 by approx. 2 turns to allow the water contained in the filter to escape.
2. Tighten again after the prefilter has been bled completely.



WARNING! The fuel must be collected and disposed of according to the environmental regulations in force.

If too much water is detected in the prefilter, the following error message [DTC97] will be displayed on the CAN cockpit.

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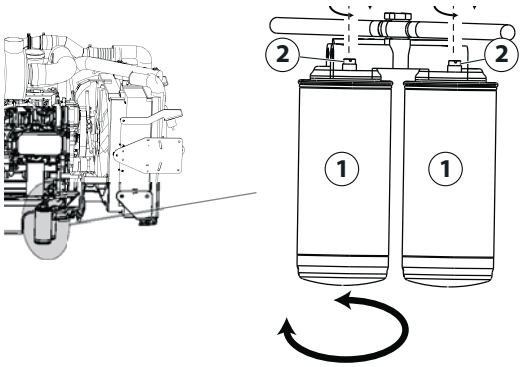
Every 500 hours - replacement of fuel filters

To guarantee optimum engine operation, you should regularly replace the 2 fuel filters.



Replacing the filters

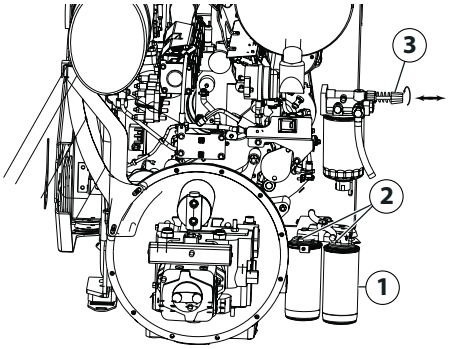
- Loosen the filter elements.
- Refit the new filters and check they are correctly sealed.

NOTE! It is essential to use original filter cartridges.

Bleed

After reassembling the fuel filters, you should bleed the supply circuit.

- Loosen the 2 bleed screws fig.2.
- Unlock the hand pump by pushing and turning the pushbutton fig.3, as shown in the picture.
- Pump until the fuel runs over the bleed screws fig.2.
- Tighten the bleed screws.
- Start the engine while continuing to operate the pump.



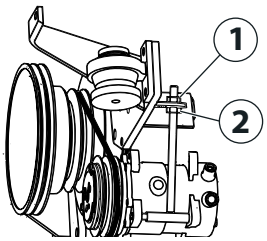
WARNING! The fuel must be collected and disposed of according to the environmental regulations in force.

NOTE! Never loosen the injection connectors as this could lead to a fuel leak.

Every 500 hours - air conditioning compressor belt

The wear and tension of the compressor drive belt should be checked regularly.

- Loosen the counter-nut fig.1.
- Tighten the nut fig.2 to retain the belt, then tighten the counter-nut.



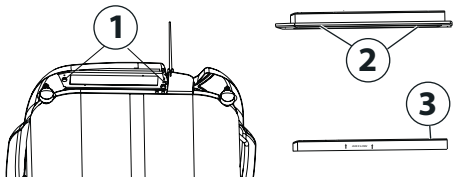
NOTE! Check the belt tension again after 8 hours of use.

Every 500 hours - active carbon filter

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

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

- Partially loosen the knurled screw on the right side of the cabin and completely loosen the screw on the left side fig.1.
- Remove the housing and active carbon filter assembly.
- Remove the filter from its housing by removing the 2 screws fig.2 using a Philips screwdriver.
- Fit the new active carbon filter respecting the direction of assembly. (The foam fig.3 should be visible).
- Refit the assembly to the cabin.



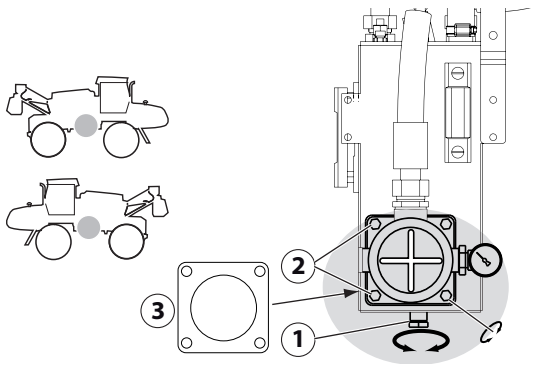
WARNING! The frequency of replacement is given for information purposes. However, if odours appear in the interior, this means that it is no longer completely effective, and it must be replaced as soon as possible.

Every 1000 hours - drainage and cleaning of the hydraulic tank

The hydraulic tank should be drained and cleaned to remove the residue that accumulates in the bottom of the tank. This operation significantly reduces the risk of pollution from the hydraulic system.

To drain and clean the tank:

- Loosen the drainage screw fig.1 to completely drain the tank.
- Loosen the 4 screws fig.2 to dismantle the filter housing.
- Carefully clean the inside of the tank.
- Refit the assembly using new seals fig.3.
- Check the tightness after filling.



NOTE! There is no need to drain the pipes.

ATTENTION! Use the recommended hydraulic oil, see section "Table of recommended lubricants" on page 67.

Every 1000 hours - battery

The battery does not require any special maintenance. It has optimum starting power even in low temperatures or intense heat.

WARNING! The electrical and electronic equipment requires a battery in good working order. A damaged battery could cause damage to the electronic equipment.

WARNING! Never disconnect the battery when the engine is running.

WARNING! Always disconnect the battery terminals before recharging it or before an arc welding operation.

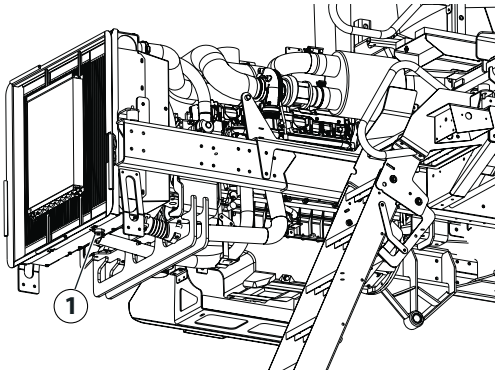
WARNING! To avoid any risk of the battery exploding, it should be recharged in a ventilated area where no smoking is allowed. Never short circuit the terminals.

WARNING! Never reverse the polarity.

Every 5 years - engine coolant replacement

The cooling system should be drained every 5 years.

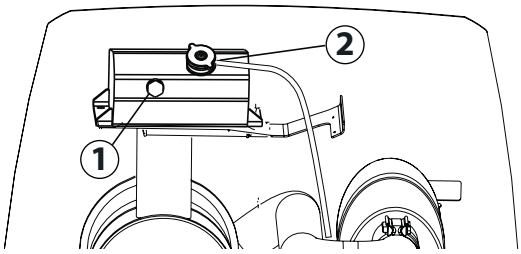
- Loosen the drainage screw fig.1 to drain the cooling system.
- Fill the system with coolant. Only use the recommended coolant.



See "Table of recommended lubricants" on page 67.

Level

- Start the engine and wait until the engine operating temperature is reached, then check the coolant level fig.1. Top up, if necessary, through the filler plug fig.2.
- Check the coolant level again when the engine is cold and top up if necessary.



DANGER! The coolant should be collected in a suitable airtight container. Never decant it into a food container or drinks bottle.

ATTENTION! Only use the recommended coolant. It should never be mixed with other coolants even if they are equivalent. See "Table of recommended lubricants" on page 67 and the DEUTZ engine user and maintenance manual.

Every 1000 hours - air conditioning

Checking of the R134a gas charge should be carried out by a specialist. The dryer filter should be replaced every 2 years. The air conditioning system contains a fluorescent tracer to detect gas leaks. It remains effective for approx. 2 years. A label indicates the fluorescent tracer filling date.

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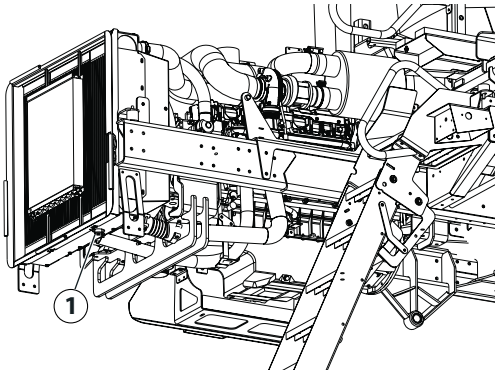
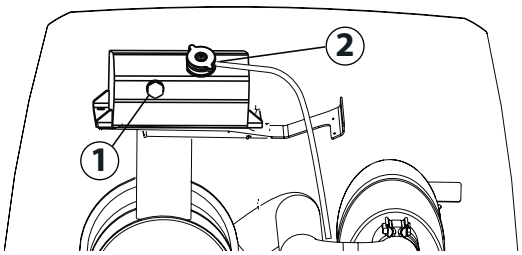
The cooling system should be drained every 5 years.

- Loosen the drainage screw fig.1 to drain the cooling system.
- Fill the system with coolant. Only use the recommended coolant. See "Table of recommended lubricants" on page 67.



Level

- Start the engine and wait until the engine operating temperature is reached, then check the coolant level fig.1. Top up, if necessary, through the filler plug fig.2.
- Check the coolant level again when the engine is cold and top up if necessary.



DANGER! The coolant should be collected in a suitable airtight container. Never decant it into food containers or drinks bottles.

ATTENTION! Only use the recommended coolant. It should never be mixed with other coolants even if they are equivalent. See "Table of recommended lubricants" on page 67. For further information, see the DEUTZ engine user and maintenance manual.

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Checking of the R134a gas charge should be carried out by a specialist. The dryer filter should be replaced every 2 years. The air conditioning system contains a fluorescent tracer to detect gas leaks. It remains effective for approx. 2 years. A label indicates the fluorescent tracer filling date.

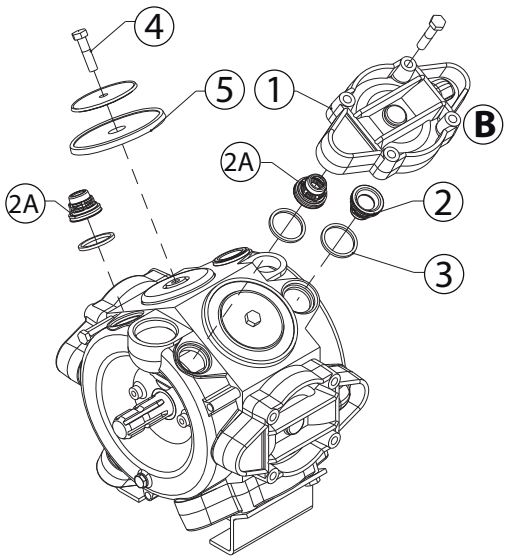
Occasional maintenance

General information

The frequency of maintenance primarily depends on the usage conditions for the sprayer and, as a result, cannot be included in the maintenance frequencies. It is therefore included in this section.

463 pump valves and diaphragms replacement

A sets of parts comprised of valves fig. 2 and fig. 2A, diaphragms fig.5 and screws fig.4 can be used to repair the 463 pump.



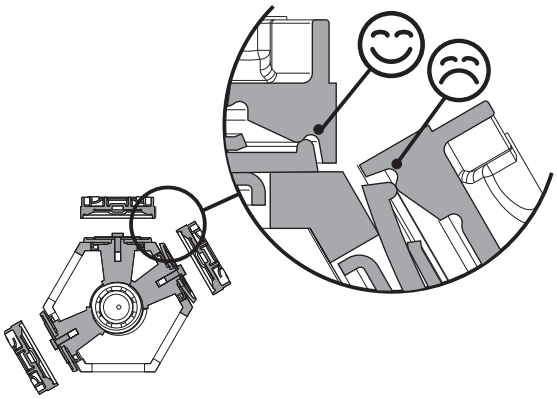
Valves:

- Remove the lid fig.1 to replace the valves fig.2 — note the orientation of the parts for correct reassembly.

WARNING! A special white valve fig.2A should be fitted at the top of the pump as shown in the illustration. The other valves are black.
New seals are recommended on reassembly fig.3.

Diaphragms:

- Remove the cup fig.6 to remove the diaphragm fig.5.



NOTE! If you find traces of damp on the crankshaft, dry it and apply a new layer of grease.

- Check that the water drainage hole is not blocked.
- Reassemble the diaphragms and cups using the original screws.

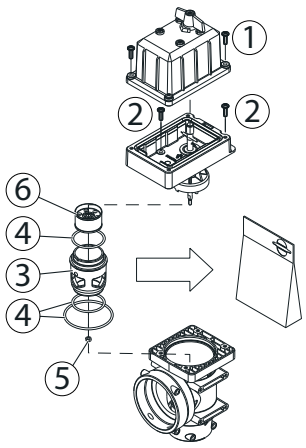
Cup tightening torque: 90 N.m.

Cover screw tightening torque fig.B: 90 N.m.

NOTE! Before tightening the cover bolts fig. B, the diaphragms should be positioned between the centre and the top to allow correct sealing between the pump body and the lid fig.B. Turn the pump shaft if necessary.

Control valve cylinder check/replacement

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



6 - Maintenance

Distribution valve seal check/replacement

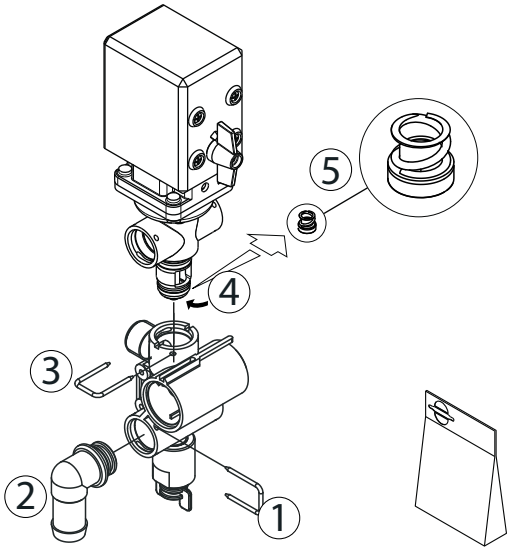
Regularly check the tightness of distribution valves with clean water.

Check

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

Replacement

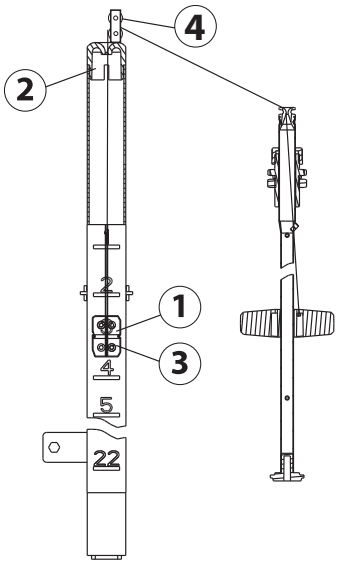
- Gently remove the pin fig.3 and remove the motorised valve from its housing.
- Loosen the screw fig.4 and replace the seal fig.5
- Reassemble in reverse order.



External gauge adjustment

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

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



Gauge cord replacement

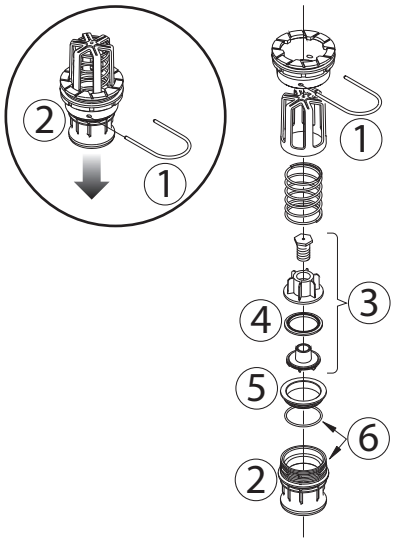
If the cord on the gauge has to be changed, the float guide pole is removed from the tank:

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

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

Drain valve seal replacement

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



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

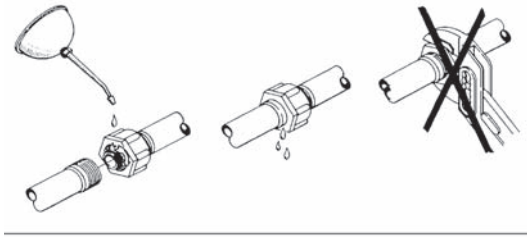
WARNING! Use a face protection mask and goggles when dismantling the drain valve.

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

Boom and connector pipes

Incorrect sealing of the pipes is often due to:

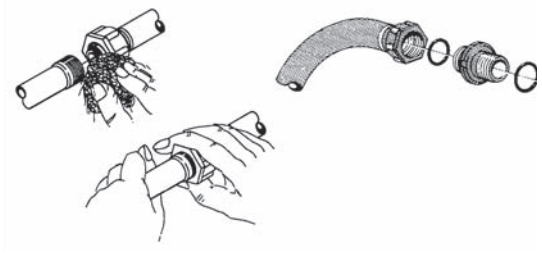
- Missing seals or bushings
- Damaged or incorrectly seated seals
- Dry or deformed seals or bushings
- Foreign bodies



In the event of a leak:
DO NOT OVERTIGHTEN. Disassemble, check condition and position of seals and bushings. Clean, lubricate and reassemble. The seals must be lubricated ALL THE WAY ROUND before refitting. Use non-mineral lubricant.

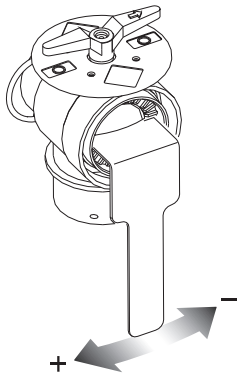
The straight connectors should only be tightened by hand.

The elbow connectors can be tightened with pliers.



Adjustment of 3-way-valves

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



NOTE! This procedure is also valid for electric valves.

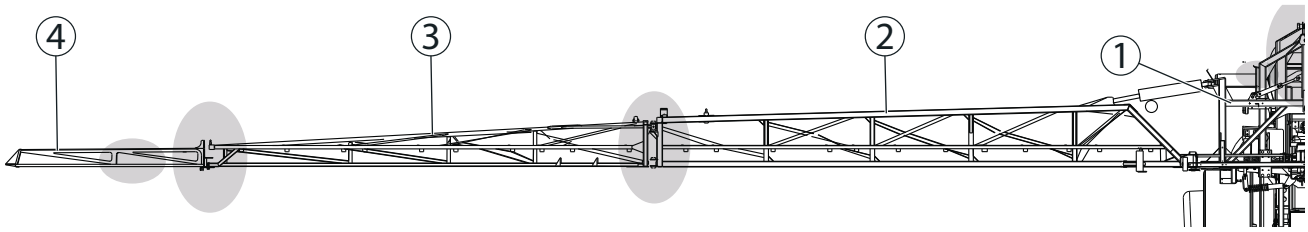
Boom

General information

Before adjusting the boom settings, check the following points:

1. The boom must be well lubricated (see "Lubrication").
2. The machine should be parked on flat ground.
3. The boom must be unfolded and horizontal.

WARNING! As a safety measure, there should be no one near the boom during adjustment operations.



1. Central frame
2. Inner section
3. Outer section
4. Break-away section

HAZ boom

Boom adjustment - general information

Before commencing adjustment, please check the following points:

1. The sprayer must be lubricated (see "Lubrication").
2. The sprayer should be on a level surface.
3. The boom must be unfolded and horizontal (slant corrector in neutral position).

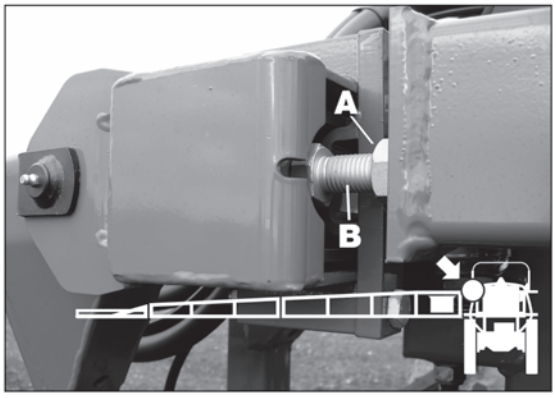
The adjustment of the hydraulic rams must take place when there is no pressure in the system.

WARNING! Nobody is allowed to be under the boom whilst adjustment is being carried out.

Alignment of central and inner boom sections

The boom tip must point slightly forward. If necessary adjust the inner section folding as follows: Depressurise the folding rams.

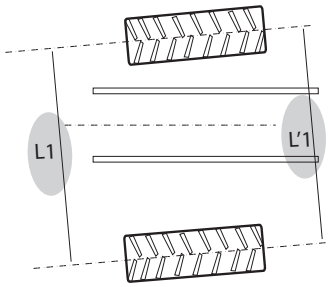
1. Loosen the counter-nut fig.A.
2. Adjust stop screw fig.B until the correct setting is reached.
3. Tighten counter-nuts again.



Axle

Adjusting the wheel alignment

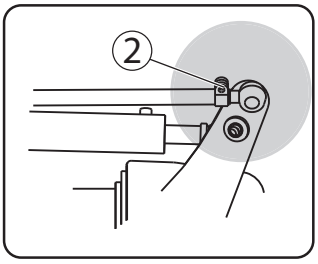
This adjustment involves positioning the wheels parallel with each other. It is carried out by adjusting the length of the tie-rod fig.1.



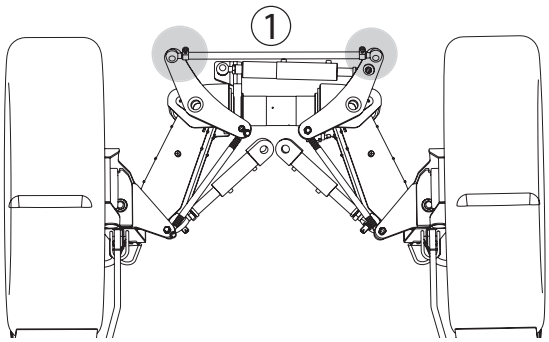
To make the adjustment:

1. Position the wheels in a straight line (the wheel position indicators will light up).

2. Loosen the clamping screws fig.2 and turn the tie-rod until the wheels are parallel with each other. (L1 = L'1)

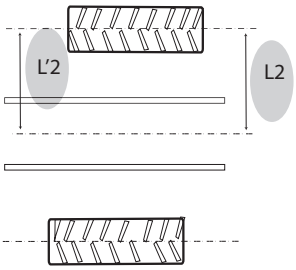


For this adjustment, it is not necessary to take into account the distance to the chassis or alignment with the machine's axle.



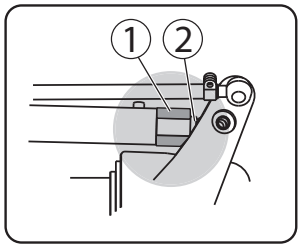
Adjustment of the wheel alignment with the chassis

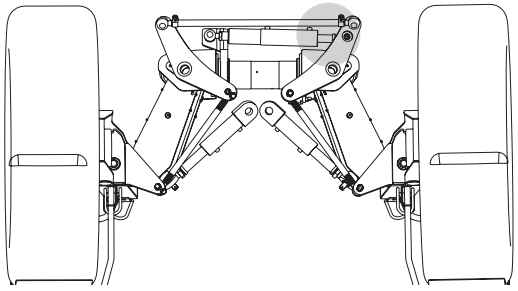
This adjustment involves positioning the wheels parallel with the chassis. It is carried out by adjusting the course of the steering cylinder.



To make the adjustment:

- Place an 88.5-mm long adjustment shim fig.1 on the steering cylinder shaft. The extension of the shaft corresponds to half a course of the steering cylinder, i.e. 78.5 mm.
- Loosen the counter-nut at the end of the cylinder shaft fig.2 using an appropriate 60-mm spanner.
- Remove the adjustment shim and turn the cylinder shaft to carry out the adjustment.
- Put the adjustment shim back in place on the steering cylinder shaft before measuring the distance L2 = L'2

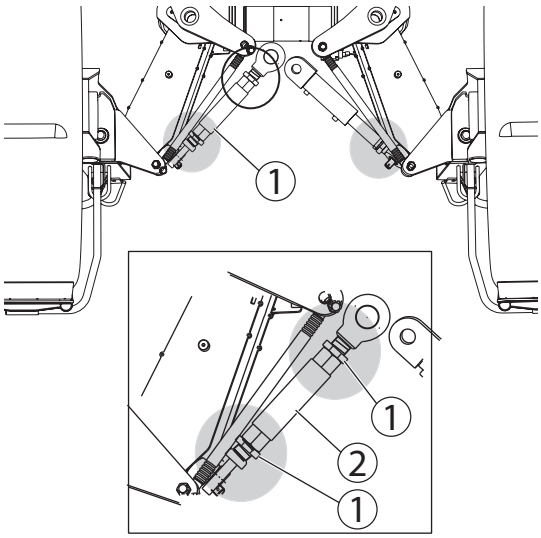




Track gauge adjustment

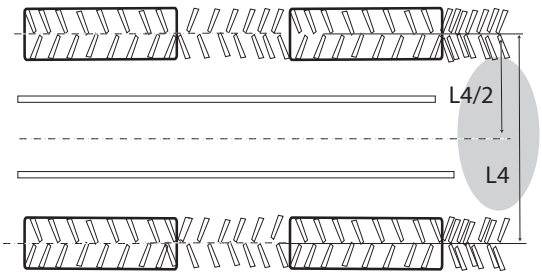
To adjust the track gauge:

- Loosen the counter-nuts fig.1.
- Turn the tie-rod fig.2 to adjust the track gauge.
- Retighten the counter-nuts.



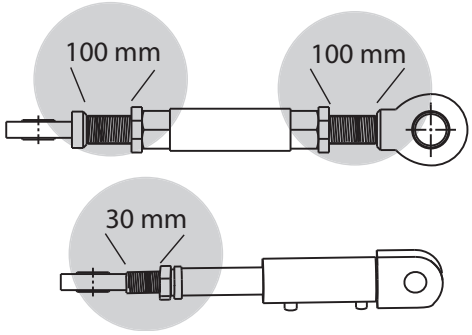
For hydraulic track adjustment:

- Spread the four wheels apart to obtain the maximum track gauge, ensuring that the course of the cylinders remains identical.



Note that the adjustment must be the same on both sides of the machine.

ATTENTION! If the steering rods are too short, they must be replaced. Consult your dealer.



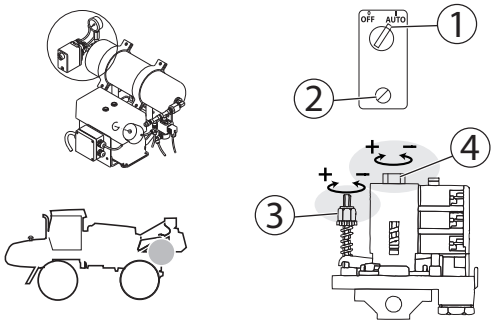
To prevent any risk of deterioration, the length of the ball joint shafts must never exceed 100 mm for the mechanical track rod or 30 mm for the hydraulic adjustable track cylinder.

6 - Maintenance

Air pressure adjustment

Air pressure adjustment is carried out by a pressure gauge located near the electrical air compressor.

- Turn the button fig.1 to the [AUTO] position.
- Remove the pressure gauge cover by loosening the screw fig.2.
- Adjust the activation threshold by working the screw fig.4.
- Adjust the activation threshold by working the screw fig.4.

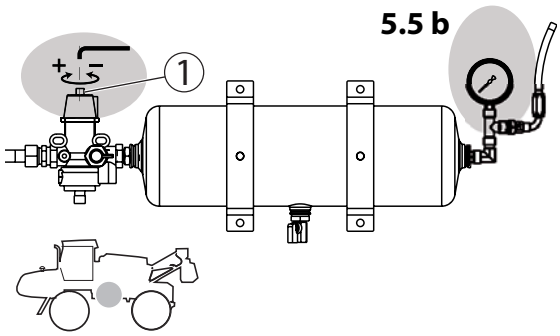


Activation pressure = 5.0 bar

Activation pressure = 4.0 bar

Compressed air pressure adjustment (special equipment)

ALPHA evo self-propelled vehicles are fitted as standard with a mechanically controlled air compressor, which is used to operate the pneumatic nozzles.



Air pressure adjustment

- Turn the screw fig.1 clockwise to increase the pressure.

Activation pressure = 6.0 bar

Maximum admissible pressure = 6.0 bar

Some ALPHA evo self-propelled vehicles may be fitted with an electrical air compressor at the rear of the machine.

Off-season storage

Storage procedure

When the spraying season is over, you should devote some extra time to the sprayer. Plant protection chemical residue can cause damage to the machine components and could harm the safety of people, animals and the environment. To guarantee a long life for the machine components and guarantee environmental safety, follow the procedure below.

- 1. Fully clean the sprayer inside and outside as indicated in the section "Cleaning the sprayer". Make sure that all pipes, valves, hoses and auxiliary equipment have been cleaned with detergent and flushed with clean water afterwards, so no chemical residue is left in the sprayer.
- Renew possible damaged seals and repair possible leaks.
- Empty the sprayer completely and let the pump run for a few minutes. Manually operate all valves, handles and levers to drain as much water off the liquid system as possible. Let the pump run until only air is coming out of any of the nozzles. Remember to drain the rinse tank too.
- Pour approx. 50 l anti-freeze mixture consisting of 1/3 anti-freeze and 2/3 water into the tank.
- Engage the pump and operate all valves so that the solution is distributed around the entire system.
- Open all sprayer sections until the solution reaches the nozzles. Anti-freeze prevents the seals, bushings and diaphragms from drying out Never use liquid fertilisers instead of anti-freeze.
- Lubricate all lubricating points according to the "Lubrication" section regardless of intervals stated.
- When the sprayer is dry, remove rust from possible scratches or damage to the paint and touch up the paint.
- Bleed and remove the pressure gauges and store them in a frost-free place in a vertical position.
- Apply a thin layer of anti-corrosion product on all metal parts, avoiding rubber parts, hoses and tyres.
- Apply grease to all ram rods that are not fully retracted in the barrel to protect against corrosion.
- Isolate the wheels from the ground to avoid them becoming warped. Protect them from damp and direct sunlight.
- Drain the compressed air tank to avoid condensation.
- To protect against dust the sprayer can be covered by a tarpaulin. Provide ventilation to prevent condensation.

Preparing after storage

After a storage period, the sprayer should be prepared for the next season in the following way:

- Check the tyre pressure.
- Wipe the grease from the ram rods and drain the tank of any remaining antifreeze.
- Fit the pressure gauges again.
- Check all hydraulic and electric functions.
- Rinse the entire liquid system with clean water.
- Fill the tank with clean water and check all functions.
- Check the function of brakes. Please note that brake power will be reduced until the rust has been removed from the drums. Always brake lightly initially.
- Drain the engine and hydraulic system if necessary according to the instructions.
- Check the air conditioning and carry out maintenance of the active carbon filter in the cabin.

Troubleshooting

General information

Breakdowns are often caused by the same factors:

- A leak on the suction side of the pump will reduce the pump capacity and can stop the suction completely.
- A clogged suction filter will hinder or prevent suction so that the pump does not operate satisfactorily.
- Clogged up pressure filters will result in increasing pressure at the pressure gauge but lower the flow at the boom.
- Foreign bodies stuck in the pump may prevent the valves from closing correctly and thereby reduce pump flow.
- Poorly reassembled pumps, especially diaphragm covers, will allow the pump to suck air resulting in reduced or no capacity.
- Hydraulic components that are contaminated with dirt lead to rapid wear to the hydraulic system.
- A poorly charged or faulty battery.

To avoid these issues, always check:

- Suction, pressure and nozzle filters are clean.
- Hoses for leaks, creases and cracks, paying particular attention to suction hoses.
- Bushings and seals are present and in good condition.
- Pressure gauge is in good working order. Correct dosage depends on it.
- Operating unit functions properly. Use clean water to check distribution valves.
- Hydraulic components are maintained clean.
- The battery and its connections are in good working order.

7 - Troubleshooting (on-going)

Spraying

FAULT	POSSIBLE CAUSES	SOLUTION
No spray from boom	Air leak on suction line	Check tightness of suction filter
		Check external hose connection
		Check diaphragm pump (diaphragms, valves, valve covers)
	Air being sucked into system	Start the sprayer pump
	Suction/pressure filter clogged	Clean the filters
Lack of pressure	Faulty fitting	Faulty safety valve (if fitted)
	Faulty pump valves (463 pump)	Check that valves are not obstructed
	Incorrect pressure reading	Check that pressure gauge is not obstructed
Pressure dropping	Filters clogged	Clean the filters and fill with clean water. If liquid is powdery, check that agitation is activated.
	Nozzles worn	Check flow rate of nozzles and replace if necessary if the difference in flow is greater than 10%
	Tank under negative pressure	Check vent is working correctly
	Sucking air towards end of tank load	Reduce pump speed
Increase in pressure	Nozzles not suitable for flow rate	Use a nozzle with a higher flow rate
Formation of foam	Air is being sucked into system	Check connectors
	Excessive agitation	Reduce pump speed
		Check safety valve (if fitted)
		Ensure returns inside tank are present
		Use foam damping additive
Liquid leaks from bottom of pump	Pump diaphragms damaged	Replace diaphragms
Motorised valve not working or malfunctioning	Blown fuse(s)	Check operation of limit switches. Use a rust removing agent for contacts if necessary.
		Check electrical current absorbed by vacuum motor: 450-500 milliamperes max.
	Polarity inversion	Brown - pos. (+). Blue - negative (-).
	Valve does not close completely	Check valve seals (obstruction)
		Check position of microswitch brackets. Loosen flange screws by 1/2 turn
	No power	Wrong polarity. Check brown wire = pos. (+), blue= neg. (-).
		Check printed circuit welds or loose connections.
		Check tightening of fuse holder and fuse.

Hydraulic functions

FAULT	POSSIBLE CAUSES	SOLUTION
No boom movements when activated	Insufficient hydraulic pressure	Check that solenoid valve is operating correctly
		Check/adjust hydraulic pressure
	Insufficient oil supply	Check hydraulic pump concerned
	Faulty fuse	Check/replace fuse
	Faulty distributor or by-pass	Check solenoid and connector
		Check distribution valve tray Replace distribution valve if necessary.
Ram not functioning	Jet clogged	Dismantle connector and clean jet
	Faulty distribution valve	Check solenoid Check distribution valve tray
	Power supply	Check multi-function handle Check printed circuits and connections

Transmission

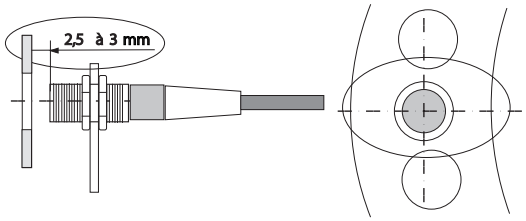
FAULT	POSSIBLE CAUSES	SOLUTION
Vehicle does move forward	Incorrect use	Check that the parking brake is disengaged. Lever in neutral.
	Electronic failure	Read the error code on the CAN cockpit and contact technical support Check electrical circuits (connections, cables etc.)
	Hydraulic failure	Check feed pressure of transmission pump (28 bar) Check operating pressure (max 450 bar)
Forward speed too low	Incorrect use	Speed limiter positioned at 10 Speed selector positioned at fast position Gangway folded away (40 km/hr version)
	Operating faults	Read the error code(s) on the CAN cockpit and contact technical support
	Electrical faults	Check retractable gangway is working correctly (position sensor)

7 - Troubleshooting (on-going)

Mechanical incidents

Speed sensor

The speed sensor used by the flow regulation is fitted to the left rear wheel of the machine. Ensure that the detection distance is correct (2.5 mm to 3.0 mm) and that the disc is not fogged.

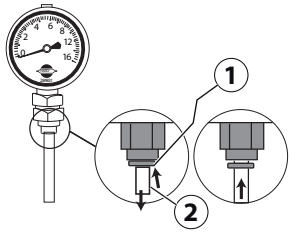


Spray pressure gauge

If the reading on the spray pressure gauge is incorrect, it may be because the pressure gauge hose is clogged. In this case you can bleed the circuit as follows:

WARNING! Wear protective goggles because liquid may be splashed on dismantling.

- Push the bushing fig.1, then remove the hose fig.2.
- Spray with clean water until the clean water runs normally from the hose.



NOTE! If the result is not satisfactory the pressure gauge should be replaced.

Hydraulic incidents

General information

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

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

Before moving the machine, you should:

1. Release the hydraulic motor brakes. See below chapter "Releasing the hydraulic motor brakes".
2. Release the high pressure valves on the transmission pump. See below chapter "Transmission pump high pressure valves".

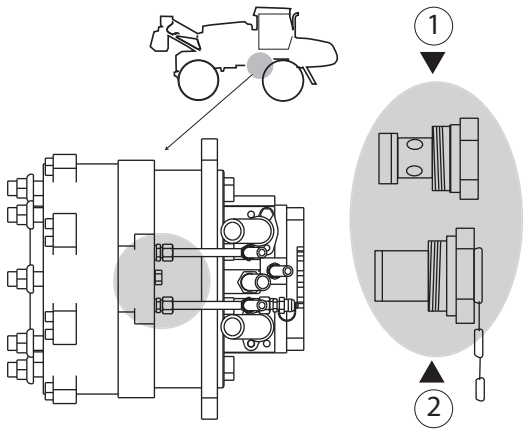
To carry out all of these operations safely, it is essential to activate the parking brake.

Front hydraulic motor brake release

Before moving the vehicle, in the absence of hydraulic pressure, you should manually release the hydraulic motor brakes using a hand pump (1) and a selector valve (2) for DYNA+ hydraulic motors, and using a clamp for standard hydraulic motors.

To release the brakes on hydraulic motors you should:

1. Shut down the motor
2. Completely unscrew the plugs fitted with a jet fig.1 (1 plug per hydraulic motor).
3. In their place on the hydraulic motor, screw a plug fig.2 fitted with a chain, which is designed to maintain hydraulic pressure in the hydraulic motor braking mechanism.



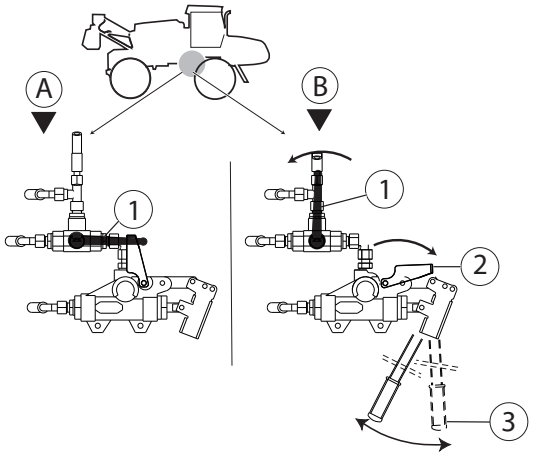
Releasing the hydraulic motor brakes

A. Valve in NORMAL operating mode.

B. Valve in BRAKE RELEASE mode.

To release the brakes of the hydraulic motors, apply the following procedure:

- Move the safety bar fig. 2 and put the valve handles into a vertical position.
- Fit the handle fig.3 to the hand pump.
- Work the pump until the brakes on both motors are fully released.



NOTE! The hand pump handle fig.3 is stored in the cabin.

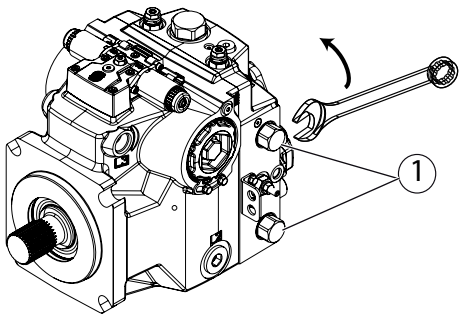
NOTE! Do not continue to work the hand pump after the brakes have been fully released. Excessive pressure could damage the motor braking mechanism.

7 - Troubleshooting (on-going)

Transmission pump high pressure valves

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

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



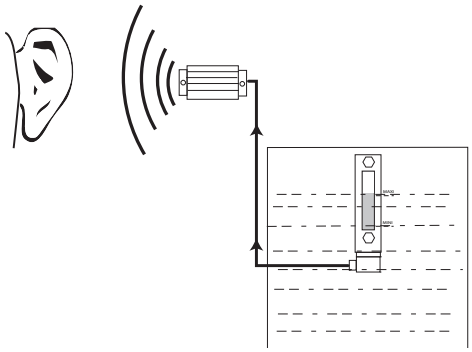
The high pressure valves should be tightened before the machine is started up again.

After towing or before putting the machine back into operation, always re-engage the parking brake by turning the valve handle to the horizontal potion and placing the safety bar in position; See “Releasing the hydraulic motor brakes” on page 99.

Hydraulic tank level alarm

The hydraulic tank is fitted with a level detector fig. connected to an acoustic warning signal fig.2 located near the driver's seat. If this alarm sounds:

- Shut down the machine and stop the engine.
- Check the tightness of the hydraulic system and make any necessary repairs.
- Add oil to the tank in line with the technical specification. See “Table of recommended lubricants” on page 67.

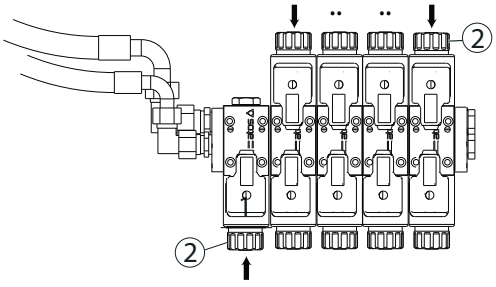


Hydraulic block - manual control and pressure adjustment

A. Manual control:

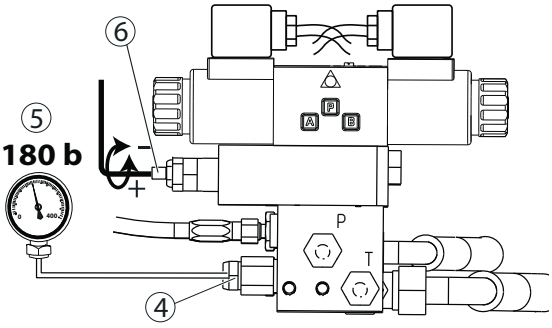
If the electrical control of the hydraulic distribution valves is faulty, it is possible for the rams to be controlled manually using the emergency pushbutton.

- Simultaneously push the By-pass distributor spool valve and the distributor spool valve of the function involved.



- Pressure regulation.
- Connect a pressure gauge fig.4 to the pressure socket fig.5.
- Remove the protective cover from the pressure limiter.
- Activate the hydraulic function as far as it will go to activate the pressure limiter.
- Turn the adjustment screw fig. 6 to obtain the usage pressure.

Maximum pressure = 180 bar.

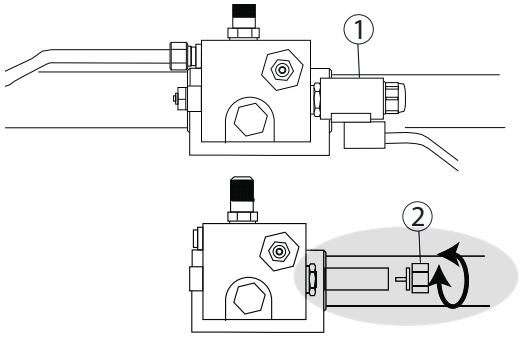


Boom damper control - manual unlocking

The damper is unlocked by applying 12 VCC to the solenoid coil terminals.

In the event of failure of the solenoid coil, the damper can be unlocked manually:

- Remove the solenoid coil.
- Tighten the screw fig.2 to unlock it.



7 - Troubleshooting (on-going)

Error messages

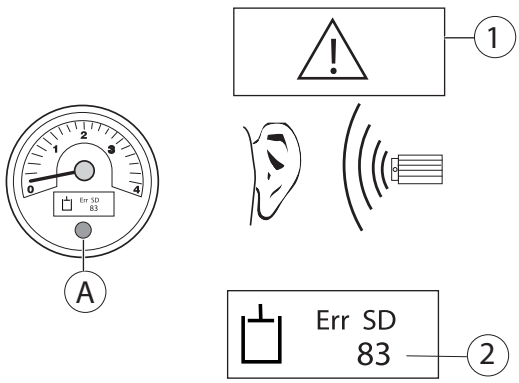
Transmission errors

When an operating anomaly appears in the hydraulic transmission the symbol on the right is displayed on the CAN cockpit.

1. Alarm connected to the machine transmission (SD).
2. Error code of alarm in progress.

If an operating fault appears in the transmission, an acoustic alarm placed near the operator's seat sounds and the message fig.1 is displayed in the CAN cockpit.

- Press the pushbutton fig. A to display the error code [SD] in progress fig.2.



Example

Err SD 83 CAN bus communication error

NOTE! The error code automatically disappears when the operating anomaly has been resolved.

Table of SD error codes

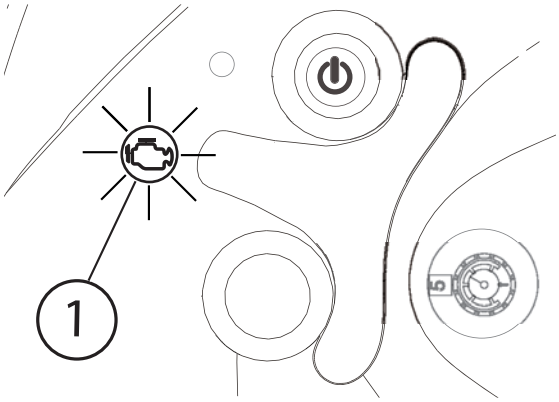
Error codes	Description	Error codes	Description
001	Low battery voltage	**070**	Loop error
002	Low battery voltage	**071**	PWM2 current loop error
003	12V sensor low supply voltage	**074**	Loop error pump 1
004	12V sensor high supply voltage	**080**	Brake pressure sensor signal out of range
005	5V sensor low supply voltage	**083**	CAN bus communication error: signal not received
006	5V sensor high supply voltage	**084**	High pressure sensor signal out of range
007	Stack overflow	**092**	Joystick sensor error
008	E2prom memory error	**097**	Analogue mode selector sensor error
009	FLASH memory error	**100**	Joystick limitation control error
010	RS232 memory error	**200**	Offroad SD: battery voltage too high
011	CAN bus connection error	**201**	Offroad SD: battery voltage too low
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		

Engine errors

When an operating anomaly in the engine appears, the engine changes to one of the following downgraded modes:

1. Limitation of engine speed to 1500 rpm.
2. Power limitation.

A fault indicator appears on the control panel to show that the engine is operating in downgraded mode. Shut down the engine immediately and carry out the checks.



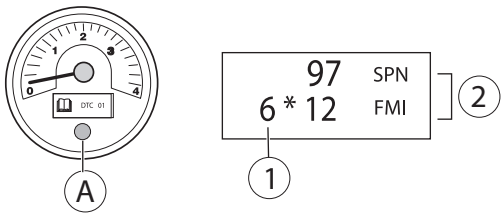
An error code is displayed in the CAN cockpit.

1. Alarm connected to the machine transmission (SD).
2. Error code of alarm in progress.

If a priority fault appears in the engine, a message [DTC x] fig.1 is displayed automatically in the CAN cockpit. Otherwise, press the pushbutton fig. A to display the message on the right. This message also indicates the number of errors in progress in the engine.

- Press the pushbutton fig. A to display details of the error in progress.

1. Number of cycles for this fault.
2. SPN and FMI code (see table).



Example

6 Error has appeared 6 times.
97 -12 Water present in fuel prefilter.

NOTE! Most of the messages are automatically cancelled when the fault disappears.

TCD 2012 engine errors

SPN	Component / Location	Description (Error location)	FMI
29	Hand throttle	Cable break or short circuit, signal implausible compared to signal of idle sensor	2, 3, 4, 11
84	Vehicle speed signal	Speed above target range, signal missing or implausible	0, 8, 12, 14
91	Accelerator pedal	Cable break or short circuit, signal implausible compared to signal of idle sensor (analogue pedal)	2, 3, 4, 11
91	Accelerator pedal	Cable break or short circuit, bad PWM signal or frequency range (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 value	11, 12
100	Oil pressure sensor	Cable break or short circuit	0, 2, 3, 4
100	Oil pressure sensor	Implausible low pressure value	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	Cam-shaft speed signal bad or missing	8, 11, 12
190	Engine speed sensor	Crank-shaft speed signals bad or missing	8, 11, 12
190	Engine speed sensor	Crank-shaft and cam-shaft speed signals 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 earth 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 earth (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 earth (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 5-V reference source 1	3, 4, 11
1080	ECU internal error	Wrong voltage of internal 5-V 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 earth (relay 1)	4, 11
2634	Main relay	Short circuit to earth or emergency shut-off (relay 2)	7, 11, 12
2634	Main relay	Short circuit to earth 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 earth	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" = speedometer 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	Power injector stage A	2, 3, 12, 14
523355	ECU internal error	Power injector 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

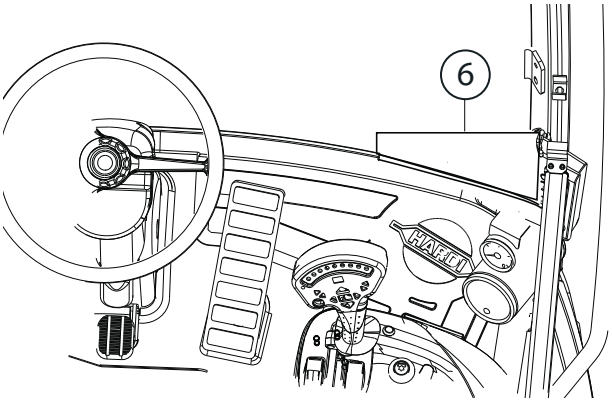
SPN	Component / Location	Description (Error location)	FMI
523550	Terminal 50	Engine start switch lock	11, 12
523550	ECU internal error	Time processing unit (TPU) defective	2, 11
523561	Begin of injection period	Outside target range or missing (cylinder 1)	2
523562	Begin of injection period	Outside target 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 5-V 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 and is stored for protection	11, 14
523612	ECU internal hardware monitoring	A recovery occurred and is not stored	11, 14
523612	ECU internal hardware monitoring	A recovery occurred and 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	Impossible (leakage, injector needle stuck 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 earth	11, 12
523617	ECU internal error	Communication with chip CJ940 disturbed	11, 12
-	Customer-specific sensor	Cable break or short circuit (sensor 1)	2, 3, 4, 11
-	Customer specific temperature	Outside target range with system reaction (temperature 1)	2, 11

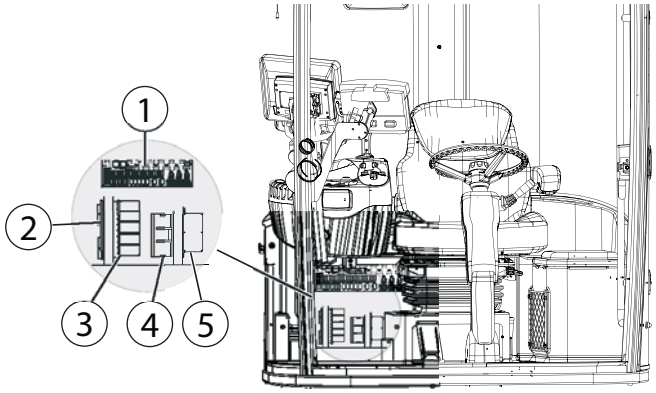
7 - Troubleshooting (on-going)

Electrical incidents

Location of main components

The main computers for the machines are fitted in the cabin and can be accessed after removal of the protective plate.



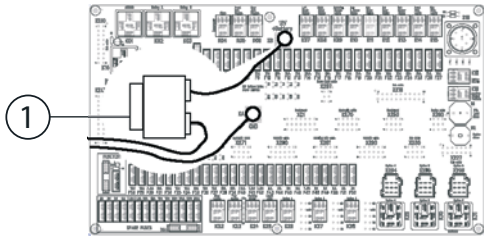


1. Main circuit fuses and relays.
2. Retractable gangway control system.
3. 4-wheel steering control system (4RD version).
4. Flashing indicator unit.
5. Hydraulic transmission computer (SD).
6. Engine computer (EMR).

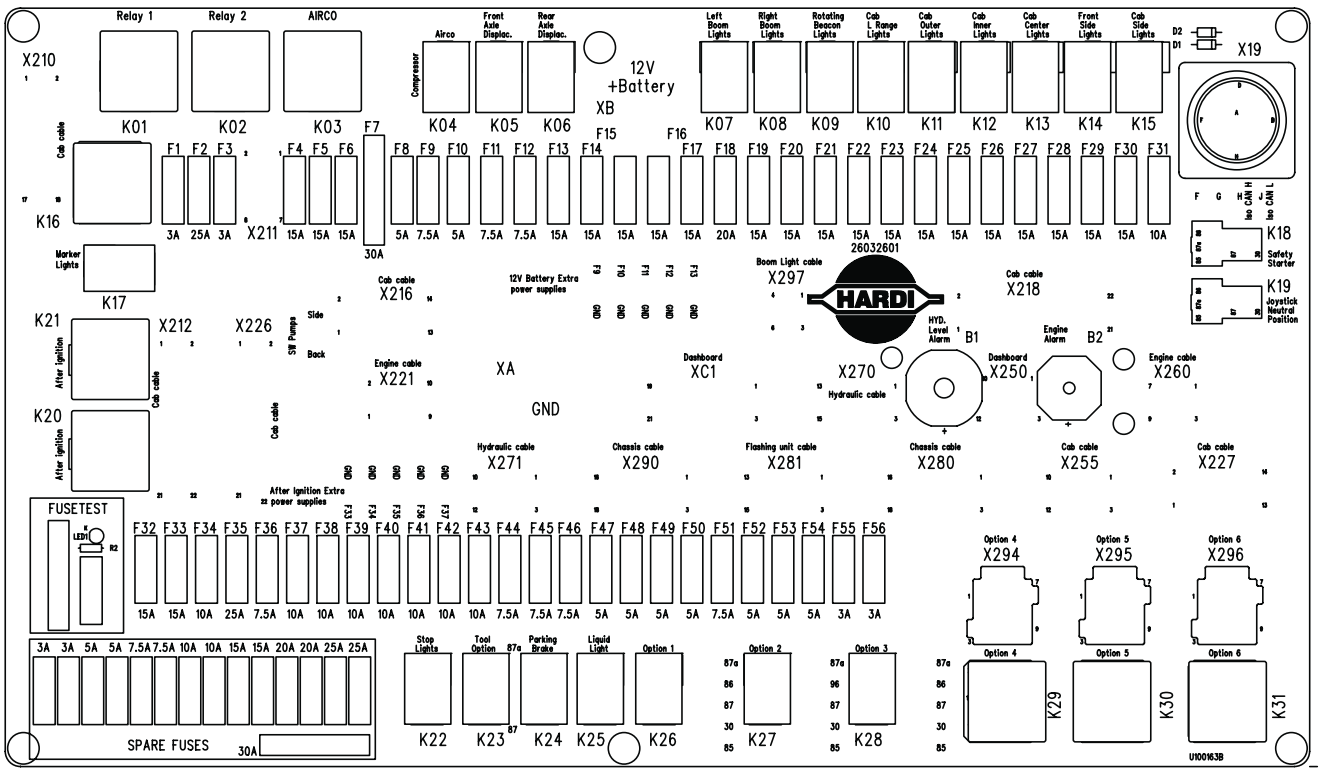
HC 9500 computer fuse

The HC9500 computer fuse is located behind the main circuit.

1. Maxifuse = 30 A
   - Switch main circuit over to access the fuse fig.1.
   - Check and replace if necessary.



Main circuit fuses and relays (U100163B).



U100163B

Code		Description	Code	Amp. (A)	Description
F1	3 A	not used	**F29**	15 A	front cabin side lights
F2	25 A	side lights/cabin backlighting	**F30**	15 A	starter contactor
F3	3 A	12 V BAT - ceiling	**F31**	10 A	starter solenoid
F4	15 A	flashing indicator unit (control)	**F32**	15 A	main beam headlights
F5	15 A	not used	**F33**	15 A	main beam headlights
F6	15 A	not used	**F34**	10 A	work area lighting (optional)
F7	30 A	12 V BAT air conditioning	**F35**	25 A	windscreen washer pump - windscreen wipers
F8	5 A	12V BAT radio	**F36**	7.5 A	acoustic alarm
F9	7.5 A	rear view mirrors	**F37**	10 A	12 V after contact - optional
F10	5 A	air conditioning compressor	**F38**	10 A	12 V after contact - optional
F11	7.5 A	front hydraulic motor capacity	**F39**	10 A	12 V after contact - optional
F12	7.5 A	rear hydraulic motor capacity	**F40**	10 A	12 V after contact - hydraulic track adjustment computer/monitor
F13	15 A	12 V BATT - Trimble CFX-750 - optional	**F41**	10 A	12 V after contact - OFFROAD computer - optional
F14	15 A	12 V BATT - AutoHeight - optional	**F42**	10 A	ROAD- parking - 4-wheel steering standard mode
F15	15 A	12 V BATT - hydraulic track adjustment monitor - optional	**F43**	10 A	BRAKE lights
F16	15 A	12 V BATT - hydraulic track adjustment computer	**F44**	7.5 A	12 V after contact with SD module- input 1
F17	15 A	12V BATT - optional	**F45**	7.5 A	12 V before contact console
F18	20 A	flashing indicator unit	**F46**	7.5 A	12 V after contact with SD module- input 2
F19	15 A	HC 9500 only (boom lights 3 and 4)	**F47**	5 A	not used
F20	15 A	HC 9500 only (boom lights 1 and 2)	**F48**	5 A	hydraulic oil level alarm
F21	15 A	hazard lights	**F49**	5 A	brake pressure - hydraulic level - alarms
F22	15 A	cigarette lighter - 12V sockets	**F50**	5 A	not used
F23	15 A	seat compressor unit	**F51**	7.5 A	12 V after contact engine error indicator
F24	15 A	not used	**F52**	5 A	12 V after contact CAN COCKPIT console
F25	15 A	right rear cabin lights	**F53**	5 A	12 V after contact right and left direction indicator
F26	15 A	left rear cabin lights	**F54**	5 A	12 V after contact cabin switches
F27	15 A	not used	**F55**	3 A	12 V after contact air conditioning unit and radio
F28	15 A	front cabin lights	**F56**	3 A	12 V after contact J1939 diagnostic socket

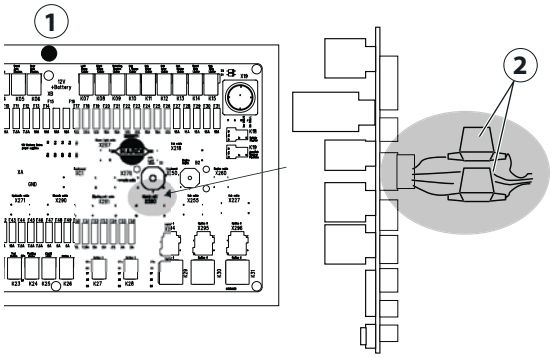
Relay	Description	Relay	Description
K01	not used	**K16**	not used
K02	not used	**K17**	backlighting - side lights
K03	air conditioning power	**K18**	engine starter control
K04	air conditioning compressor	**K19**	forward handle neutral position
K05	front hydraulic motor capacity	**K20**	circuit control after contact
K06	rear hydraulic motor capacity	**K21**	circuit control after contact
K07	HC 9500 only (boom lights 3 and 4)	**K22**	BRAKE lights
K08	HC 9500 only (boom lights 1 and 2)	**K23**	ROAD mode
K09	hazard lights	**K24**	parking brake
K10	not used	**K25**	work area lighting (optional)
K11	right rear cabin lights	**K26**	Hydraulic track adjustment
K12	left rear cabin lights	**K27**	not used
K13	not used	**K28**	not used
K14	front cabin lights		
K15	front side cabin lights		

7 - Troubleshooting (on-going)

Side light fuses

Two fuses are located at the back of the main printed circuit board to protect the lighting circuit (side lights).

- Remove the screw fig.1 and turn the main printed circuit board to access the fuses.
- Check and replace the faulty fuse (7.5 A).



Replacement fuses are available on the main printed circuit board.

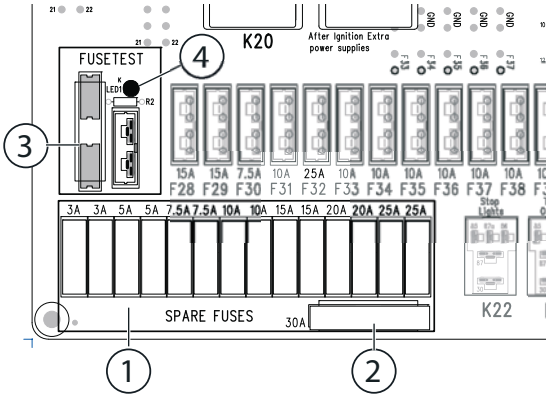
NOTE! Ensure that the replacement fuse has the same capacity as the original fuse.

Fuse test

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

To test a fuse.

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

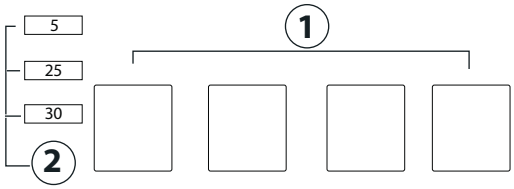


NOTE! Ensure that the replacement fuse has the same capacity as the original fuse.

Cabin fuses

These fuses are located in the cabin roof.

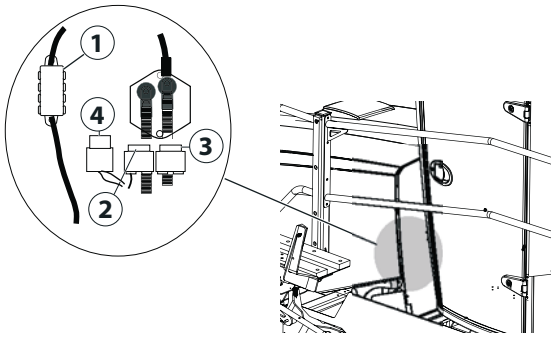
1. air conditioning control relay (motor fan)
2. air conditioning fuses



Engine - cabin - REGULOR 6 fuses

These fuses are fitted between the cabin and the engine as shown in the picture.

1. main cabin fuse "MEGAFUSE" 100 A
2. engine computer fuse -EMR: 30.0 A
3. REGULOR 6 fuse (power): 80.0 A
4. engine computer relay - EMR



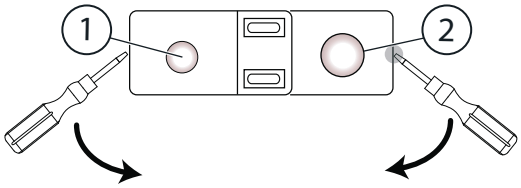
Lighting

Cabin lighting

To replace the bulbs for lighting the cabin:

- Use a flat screwdriver and lift the cover gently.
- Replace the bulb.

1. 12 V - 10W bulb
2. 12 V - 21W bulb

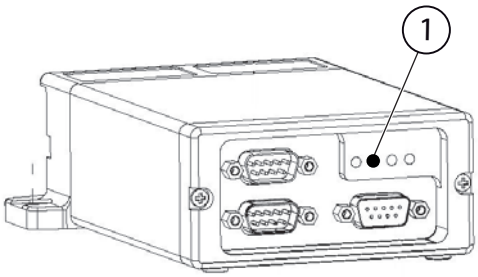


7 - Troubleshooting (on-going)

Incidents with the hydraulic track adjustment

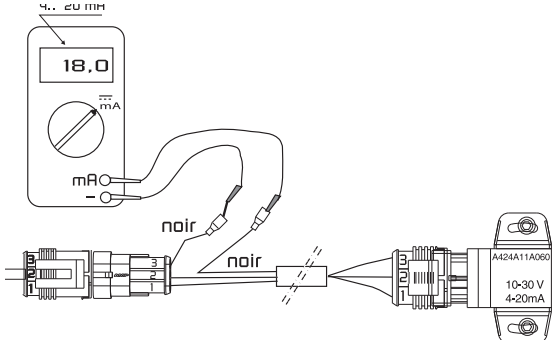
Angle sensor diagnostics

The indicator fig.1 (red) lights up when there is a fault with the angle sensor.

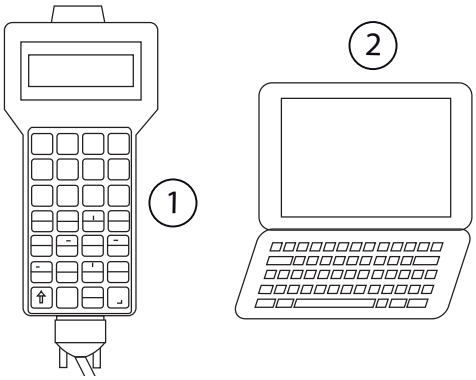


Measuring signal

Checking or replacing an angle sensor requires the use of a multimeter with a precision current meter function and a suitable cord. These sensors emit an electrical current of between 4 and 20 milliamperes.

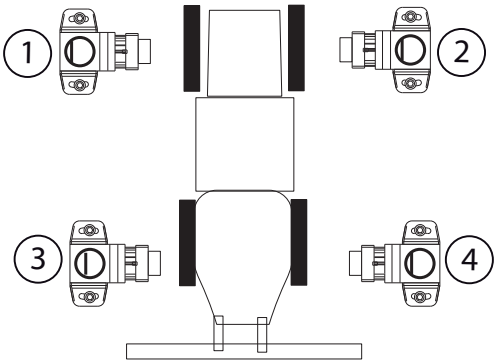


It is also possible to use a suitable programming console fig.1 or a computer fig.2 equipped with an appropriate connecting cord.



Replacing the angle sensors

1. Front left sensor
2. Front right sensor
3. Rear left sensor
4. Rear right sensor



Hydraulic distributors

In order to prevent any risk of accident involving a crash or deterioration of the hydraulic track adjustment mechanism, you should operate the vehicle at very low speed during the control operation.

Before replacing an angle sensor, ensure the track is set to the maximum gauge.

- Use the cord designed for this task, or connect the programming console or a computer (see above).
- Power up the computer and visualisation console.
- Whilst in motion, press the by-pass and solenoid valve manual controls to increase the track to the maximum gauge. The current should be approximately 18 milliamperes. If this is not the case, you should replace the angle sensor.
- Install the new angle sensor, respecting the position of the fastening plane.
- Adjust the angle sensor until the maximum current is 18 milliamperes.
- Carefully tighten the retaining screws on the angle sensor.

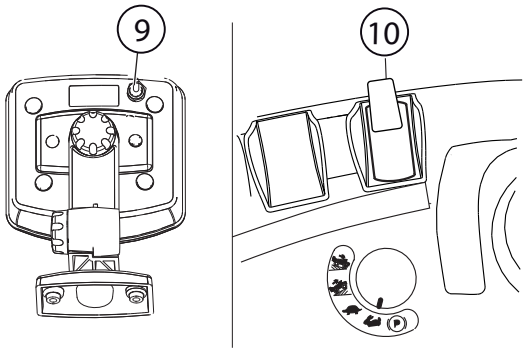
Calibrating the angle sensors

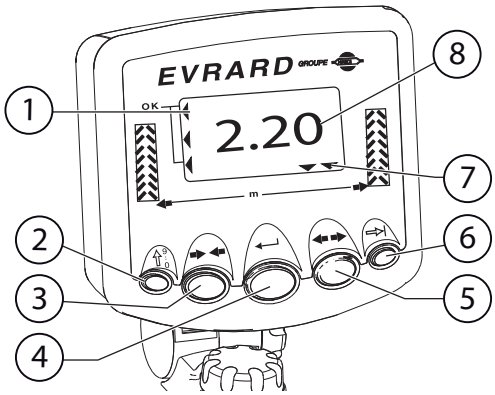
After replacing an angle sensor, it is necessary to reprogram the computer by indicating the operational range for the angle sensors (registering the end-stops).

Before starting the procedure, ensure that the engine is running and the computer is off.

For the end-stops to be calibrated, the forward speed must be between 2 and 12 km/h. The status indicator fig.1 appears on the monitor display.

- Press the switch fig.9 to turn on the track adjustment console.
- Press keys fig.3 and fig.5.
- Press key fig.10 to turn on the computer whilst holding down keys fig.3 and fig.5 until the status indicator fig.7 flashes for a few seconds to activate the calibration procedure for the angle sensors.
- Press key fig.3 for the minimum track end-stop.
- Hold down key fig.3 then key fig. 4 until the status indicator fig.7 flashes at least twice, then release keys fig.3 and fig.4. The minimum position of the angle sensor end-stops is then registered.
- Press key fig.5 for the maximum track end-stop.
- Hold down key fig.5 and press key fig.4 until the status indicator fig.7 flashes at least twice, then release keys fig.5 and fig.4. The maximum position of the angle sensor end-stops is registered.
- Press the switch fig.10 to turn the computer off, then turn it on again.

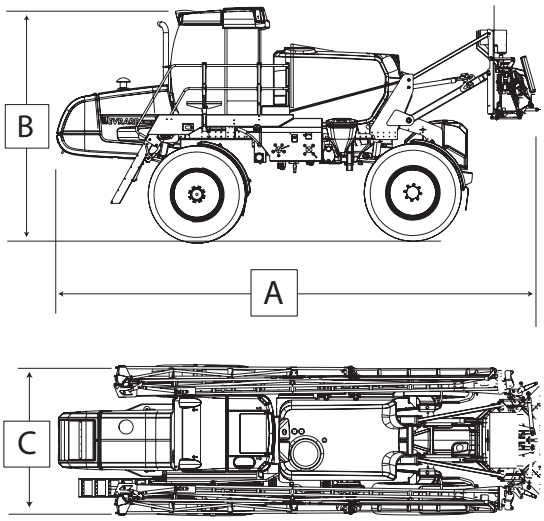




When the track is being widened or narrowed, the hazard warning lights are on. They turn off when the minimum or maximum track gauge is reached. If the end-stop calibration procedure fails, the hazard warning lights stay lit.

Features

Overall dimensions



Tank l	2500 3000
Pumps, type l/min	463 /10,276 l/min / 463 - 322 l/min
Boom	TWIN FORCE
Regulation type	HC 9500
Engine	Deutz 6cyl. 175 hp
Transmission	Hydrostatic in 4-wheel drive 25 or 40 km/hr
Suspension	Front: side coil springs with dampers - Rear: central coil spring
Steering	4-wheel drive- hydrostatic
Track gauge adjustment	Mechanical or hydraulic. 'S' axle 450-mm range - 'M' axle minimum track gauge 200 cm
Turning diameter	1140 cm in 4-wheel steering - 2022 cm in 2-wheel steering
Total length - (A)	8.420 m 24 m alu 8.260 more than 24 m alu
Total height (40 km/h, 380/90R46) - (B)	396 to 405 cm
Boom width Alu 24 - 30 m - (C)	255 cm
Boom width TWIN 18 - 30 m - (C)	301 cm
Track gauge (D)	182 - 354 cm
Wheelbase	364 cm
Ground clearance	100–112 cm depending on tyres
Rinse tank	330 l
Hand wash tank	15 l
Storage box	200 l
Fill rate	500 l/min
TurboFiller fill rate	125 l/min
Fuel tank	260 l

8 - Technical specifications (on-going)

Weight

Model	Weight when empty (Kg)	Total weight when full (Kg)
ALPHA VariTrack evo 3000	7810	11480

TCD 2012 129-kW engine - Axle: M - Ground clearance: 1.20 m - Hydraulic motors: C18

Tyre pressure

Tyre size	Pressure (bar)	Load index
16.9R30	2.7	TL149A8
380/85R34	2.4	TL146A8/146B
460/85R34	1.6	TL147A8/144B
520/70R34	1.6	TL148A8/145B
520/70R34	3.2	TL148A8/145B
300/95R42	1.6	TL143A8/154A2

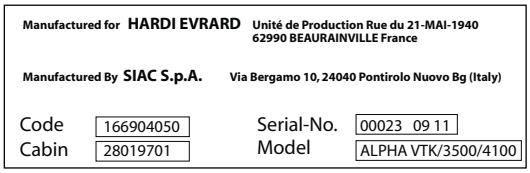
NOTE! When replacing tyres, check that the new tyres have the correct load index.

NOTE! The pressure indicated in the table must be set. If in doubt about the technical features of the tyres, consult your tyre retailer.

Component identification plates

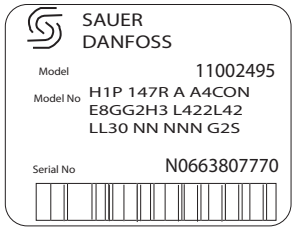
Cabin

An identification plate is fitted below the operator's seat on the left and shows the Serial No.



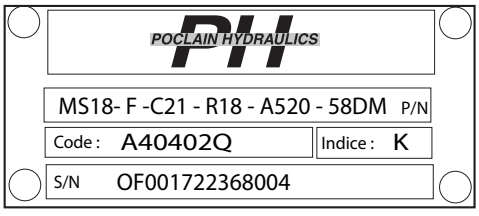
Transmission pump

An identification plate is fitted to the hydraulic transmission pump stating the Model No. and the Serial No.



Hydraulic motors

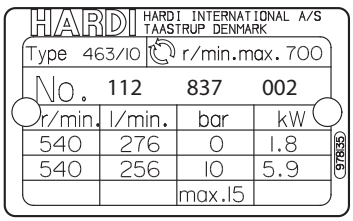
An identification plate is fitted to each hydraulic motor, which shows the model (P/N) and the serial number of the hydraulic motor (S/N).



Diaphragm pump

An identification plate is fitted to the diaphragm pump, which shows the Type and the Serial No.

model: 463-10 and 463-12.



Nitrogen accumulators

Boom	Width (m)	Pressure (bar)
TR4	24	45
	28	65
	30	80

Hydraulic pressure

Hydraulic systems	Pressure (bar)
Transmission	450
Auxiliary	180
Feed	28
Auxiliary	180
Dynamic braking	180

Air conditioning

Refrigerant gas = R134a

Charge = 1150 grammes

8 - Technical specifications (on-going)

Materials and recycling

Recycling

When the sprayer reaches the end of its life, it must be cleaned carefully before it is destroyed. The different components should be carefully sorted for the purpose of destruction. The metal parts can be scrapped. As a general rule, comply with the regulations in force on waste disposal.

Tank: HDPE

Chassis: Steel

Pump Iron and steel

Diaphragms: PUR

Hoses: PVC and EPDM

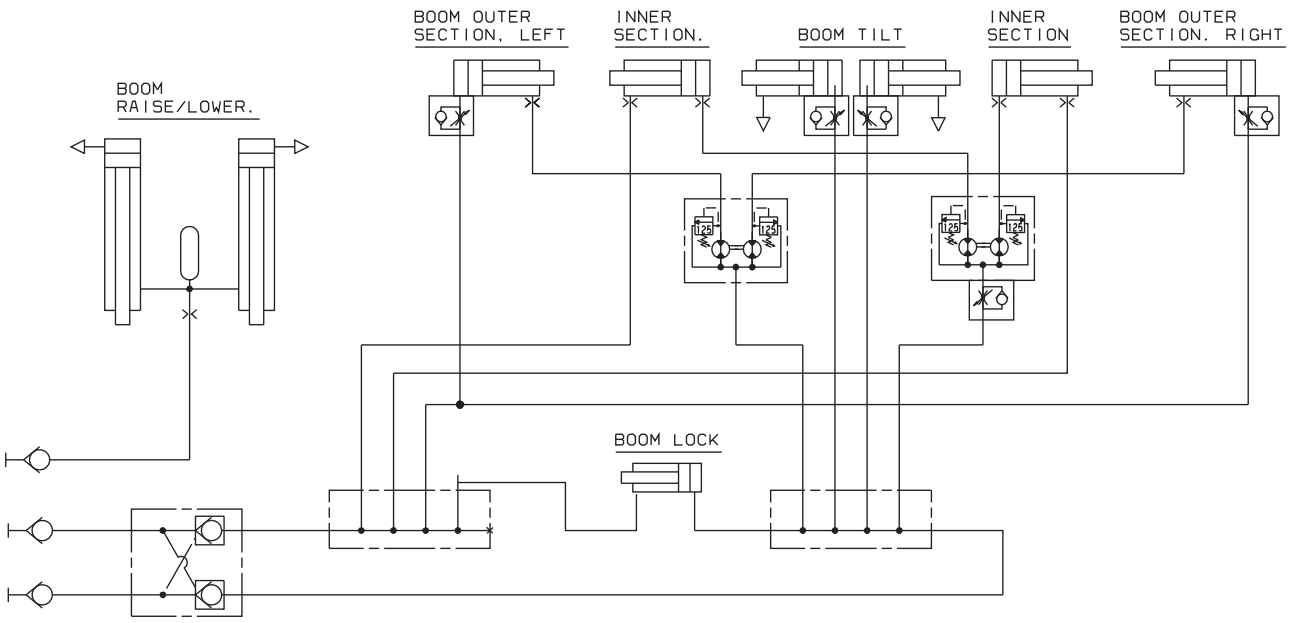
Valves and connectors: Glass reinforced PA

Filters: PP

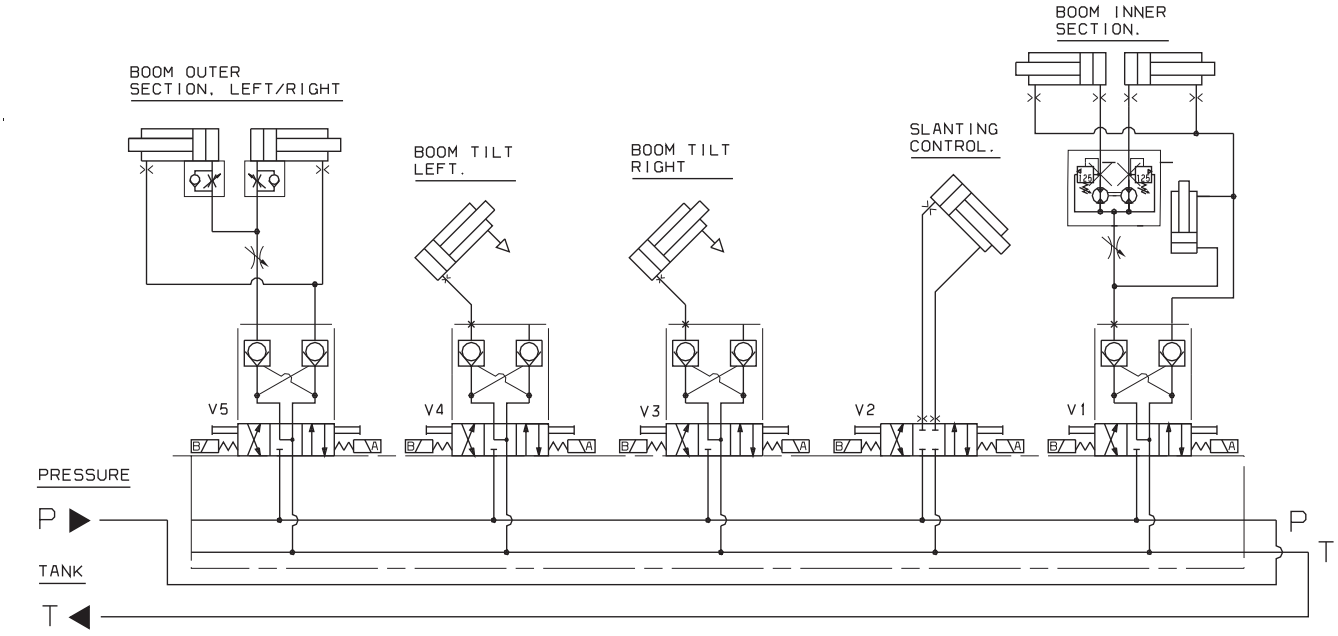
Nozzles: Free POM

Boom hydraulic systems

Boom hydraulic - Y



Boom hydraulic - Z



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Spare parts

For information about spare parts, you can visit www.agroparts.com after registering your details on the home page.

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