



PRESIDIO 2700



OPERATION AND MAINTENANCE MANUAL

67021904 -101

**PLEASE READ THIS MANUAL CAREFULLY AND COMPLETELY
BEFORE USING THE MACHINE**

IF YOU DO NOT UNDERSTAND ANY PART OF THIS MANUAL, THEN PLEASE CONTACT YOUR "APPROVED DEALER". FOR EXPLANATIONS REGARDING THIS MACHINE, DEMONSTRATIONS OR INFORMATION ABOUT SAFETY PRECAUTIONS, CONTACT YOUR "APPROVED DEALER".

N° vehicle		Date
<input type="text"/>	<input type="text"/>	Edition of 05/2017



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0 GENERAL INFORMATION

This operation manual should be considered as an integral part of the **PRESIDIO**. Any persons selling new or used **PRESIDIO** are recommended to keep written proof that this manual was supplied with the **PRESIDIO**.
Always keep the operation and maintenance manual in the cabin of the PRESIDIO.

0.1 GENERAL COMMUNICATION

Definition of the **PRESIDIO**:

The **PRESIDIO** is a Tractor or PRESIDIO Agricultural Machine according to the type of vehicle as defined by the legislation in force.

Definition of "**APPROVED DEALER**":

The "**APPROVED DEALER**" is a professional approved by **HARDI** that has received special training in the operation and maintenance of the machine as delivered.

Definition of left-hand side:

The side located on the left when facing in the usual direction of forward movement of the **PRESIDIO**.

Definition of right-hand side:

The side located on the right when facing in the usual direction of forward movement of the **PRESIDIO**.

This manual is designed to help you with the running-in, driving, operation and maintenance of your machine.

Your **PRESIDIO**, which can be used as a vehicle is designed for normal usage according to best agricultural practices. Given that the conditions of operation are so diverse, **HARDI** is not in a position to publish any definitive or complete statements regarding the performance or the usage methods of the machine, nor to accept liability for any loss or damage that may result from any statements, errors or omissions. If the machine is to be used under abnormal and potentially damaging conditions, then contact your "Approved Dealer" or **HARDI** for special instructions. Failure to do so may lead to the warranty being refused.

Customers are strongly recommended to consult an officially "Approved Dealer" to solve any technical problems or issues that may occur and or to change the machine settings.

The "Approved Dealer" is specially trained and equipped to solve technical problems and to advise customers on the operation of the **PRESIDIO** under local conditions.

The **PRESIDIO** is designed and built to offer the best possible performance, cost efficiency and ease of operation under a broad range of working conditions. In order to maintain these conditions and protect the correct, problem-free operation of the machine, it is important to perform the operations described in the paragraph "MAINTENANCE" at the recommended frequencies.

As part of its policy to improve its products, **HARDI** reserves the right to change the specifications of its machines at any time, without such modifications requiring **HARDI** to give any notice, pay any indemnities or modify machines that have already been sold. **HARDI** shall not be held liable for any differences that may exist between the specifications of these machines and the specifications included in these publications.

It is forbidden to make any modifications to the **PRESIDIO**, other than those that are specifically authorised in writing by the **HARDI** After-Sales Service or Technical Division.

0.2 INSPECTION – START-UP

The "Approved Dealer" is bound to perform a number of operations when supplying a new **HARDI PRESIDIO**. These operations include a complete inspection before delivery to check that the **PRESIDIO** is ready for immediate operation. Due to its special technological design, the **PRESIDIO** must be used by experienced or well-informed operators only. On delivery, the "Approved Dealer" must provide the customer with complete instructions on the basic principles, the operation and maintenance of the **PRESIDIO** and indicate the limits of use, beyond which the safety conditions may become precarious (condition of the ground, manoeuvring speed, driving style, incorrect use of accessories, etc.) and place the user in danger. These instructions apply to controls and instruments, routine maintenance and safety. All persons involved in the operation and maintenance of the **PRESIDIO** must be present when the instructions are given.



0.3 COMMUNICATION FOR APPROVED DEALERS

The “Approved Dealer” appointed by **HARDI** is responsible for starting up the **PRESIDIO**. Read the operation and maintenance manual and the safety rules. Check that all points in the pre-delivery and delivery check lists have been carefully verified and corrected if necessary before handing over the **PRESIDIO** to its new owner. If in doubt of any area please contact HARDI before continuing any further.

0.4 COMMUNICATION FOR THE OWNER

Thank you for choosing the **HARDI PRESIDIO**. The machine has been designed and built to be used for many years. Just like any other mechanical system, the machine requires regular cleaning and maintenance. Maintain and use the **PRESIDIO** as indicated in this manual. Observe the instructions or prohibitions shown on the stickers on the **PRESIDIO**.

If you do not understand any part of this manual, contact your “Approved Dealer”.

Your “Approved Dealer” has been specially trained in the maintenance of this machine. He also has access to the original parts and the tools required delivering a quality service.

This manual is intended for worldwide distribution. Availability of the fitted equipment, either as a basic **PRESIDIO** or as an option may vary depending on the country in which the **PRESIDIO** will be used. Details of equipment available in your region can be obtained from your “Approved Dealer”.

The purpose of this manual is to enable the owner to use and maintain the **PRESIDIO** efficiently and safely. If these instructions are carefully followed, then the machine will deliver many years of quality service.

Get into the habit of performing daily maintenance tasks and carefully note the operating hours.

Some of the illustrations in this manual may use photographs of the prototype **PRESIDIO**. Certain details may be different from the standard series production models.

0.5 CLEANING THE SPRAYER

Your **PRESIDIO** is a modern system with sophisticated electronic controls and hydraulic components. This fact must be kept in mind when cleaning the **PRESIDIO**, especially if high-pressure devices are used. Even if precautions have been taken to protect connections and electronic components, the pressure generated by certain cleaning devices is such that complete protection against water influx cannot be guaranteed.

When using a high-pressure cleaning device, do not stand too close to the **PRESIDIO** and avoid directing the high pressure water jet directly towards electric connections, electronic components, breathers, axle seals, engine seals, radiators and filling caps, etc. Never spray a hot engine or exhaust pipe with cold water.

When cleaning or washing the **PRESIDIO**, make sure that you use suitable products that are not aggressive, are environmentally-friendly and are compatible with the protection requirements of the surfaces being cleaned (paint, etc.). The cleaning agent must be tested on a very small surface of the **PRESIDIO** to check that it is compatible with paints and protective coatings.

If these precautions are not taken, then **HARDI** is entitled to refuse any warranty and shall not be held liable for the financial consequences of the choice of an inappropriate cleaning agent.

If in doubt, contact your “Approved Dealer”.

Remove any mud or dirt concealing the safety stickers.

0.6 CHEMICAL ATTACK (ACID/ALCALI PRODUCTS OR FERTILISERS)

Many phytosanitary products or fertilisers may attack the paint used on your **PRESIDIO**. Before any operations, spray the paintwork with efficient protective products for increased protection and in order to make the paint last longer. If in doubt, contact your “Approved Dealer”.

0.7 SAFETY

The chapter “NOTES AND CAUTIONS ABOUT SAFETY” in this manual includes a list of precautions to protect the safety of yourself and others. Please read this list of safety precautions and follow the instructions before starting the **PRESIDIO**



0.8 REGULAR CHECKS OF THE PRESIDIO

At the beginning of the "Maintenance" section in this manual, you will find details of routine maintenance operations. These checks must be made by your "Approved Dealer" immediately after the first 80 hours of operation.

As a general rule it is the owner's responsibility to ensure regular preventative maintenance is performed and safety standards and checks are in place.

Consult your "Approved Dealer" for the parts and if required they will perform the required operations.

0.9 SPARE PARTS

The use of parts that are not original **HARDI** parts may have a damaging effect on the operation of your **PRESIDIO** and affect performance and safety. **HARDI** will not be held liable for any damage that may result from the use or installation of non-original parts or parts that are not approved by **HARDI**.

Only original **HARDI** parts must be used. Any adaptable parts will annul the warranty. Consult your "Approved Dealer" for original parts. Your "Approved Dealer" can also install the parts or advise you on how to install and use them.

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



0.10 WARRANTY

HARDI sells new products to "Approved Dealers" with, (if certain conditions are observed), a warranty, that the products are free of material and production faults. Purchasers of new **HARDI** equipment should request complete details from the distributor supplying the equipment.

The warranty is automatically annulled if the **PRESIDIO** is not used, adjusted or maintained according to the instructions in this manual.

Filtration of engine oil and diesel fuel

The suppliers of internal combustion engines installed in our vehicles have indicated that in order to satisfy the warranty conditions, the engines must be fitted with original engine oil and diesel fuel filters.

The capacity of the original filters fitted on the engines is determined by the engine specifications and is defined by the manufacturer of the engine. **These capacities must absolutely be respected.**

Several cases of engine malfunction have been caused by the use of non-compliant filters.

You are informed that you will be required to pay any expenses incurred to solve any similar problems.

Internal combustion engine

The warranty only covers work done by engine supplier agents.

Once the warranty period has expired, your "Approved Dealer" is free to work on the internal combustion engines at his own risk. Spare parts must be supplied by **HARDI**.



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1 NOTES AND CAUTIONS ABOUT SAFETY

Operator safety is one of the major concerns in the design and development of a new machine. This is the reason why the designers at **HARDI** integrate as many safety systems as possible. Nevertheless, many accidents occur every year that could be avoided by a few moments of thought and attention on the part of the user and by more careful operation of agricultural equipment and tools.

Please read this manual carefully and learn the best way to correctly use the **PRESIDIO** and its different functions in complete safety. Never allow a person who has not received these instructions to use the machine.

The operator must be particularly careful when operating, moving, transporting, cleaning or maintaining the **PRESIDIO**.

Observing these safety instructions will avoid many accidents.

1.1 IDENTIFY AND UNDERSTAND THE SAFETY SYMBOLS AND WARNINGS

This is the warning symbol. This symbol is used on the **PRESIDIO** or in this manual to warn of the risk of injury.

	<p>Follow all the safety instructions and the general accident prevention instructions.</p> <p>Take care to protect your own safety. This symbol indicates that:</p> <ul style="list-style-type: none"> ➤ The safety instructions must be followed. ➤ Attention is required. ➤ Dangerous practices may cause injury.
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The safety symbol is accompanied by a text, such as DANGER, WARNING or CAUTION.

- The term **IMPORTANT** is used to indicate that failure to observe instructions may cause damage to the **PRESIDIO**.
- The terms **WARNING**, **CAUTION**, **DANGER** are used with the safety warning symbol to indicate the level of danger to your safety.

 ATTENTION	<p>Draws your attention to a danger that may cause injury or result in death if the appropriate precautions are not taken.</p>
 WARNING	<p>Reminds you of safety rules. Failure to observe these rules may result in injury.</p>
 DANGER	<p>Draws your attention to severe danger that will certainly cause irreparable injury or result in death if certain precautions are not taken.</p>

1.2 FOLLOW THE SAFETY INSTRUCTIONS



Carefully read all the safety instructions in this manual and the instructions affixed to the **PRESIDIO** on stickers. Read the safety instructions on a regular basis and check the stickers routinely.

Make sure that all the stickers are legible.

Replace any stickers that are missing or damaged. Make sure that the appropriate stickers are affixed to new equipment and spares. Replacement stickers can be obtained from your "Approved Dealer".

1.3 CONDITIONS OF USE

The **PRESIDIO** is designed exclusively for use in usual agricultural applications or similar works. Any other use shall be considered as abnormal operation. Strict observation of the conditions of operation, maintenance and repair, as specified by the manufacturer, are also an integral part of normal use.

The **PRESIDIO** must only be used, maintained and repaired by persons who are familiar with the machine's special characteristics and who are familiar with the corresponding safety procedures.



Rules to prevent accidents, all rules governing safety, rules defined by work health and safety authorities and regulations applying to road traffic shall be obeyed at all times.

Any arbitrary modifications made to the **PRESIDIO** may relieve the manufacturer of all responsibility for any consequent damage or injury.

1.4 QUALIFICATION OF THE OPERATOR

The **PRESIDIO** must only be used, maintained and repaired by persons who are familiar with the machine's special characteristics and who are familiar with the corresponding safety procedures.

Learn to use and handle the controls. Never allow untrained persons to use the **PRESIDIO**. Due to its unusual technological design, the **PRESIDIO** must be used by experienced or well-informed drivers only.

Before using the **PRESIDIO**, make sure that you are familiar with all the controls and the operation.

Once you have started using the machine, it will be too late to do this.

1.5 DEFINITION OF THE WORKSTATIONS

 **ATTENTION** The operator station in the cab is the main work station.

 **ATTENTION** The work zone giving access to the remote electrical controls of the engine and fluid pump, the fluid and chemical filling controls and tank filling point, placed near the ladder is an authorized work stations outside of the cab.

 **ATTENTION** When you leave the work stations mentioned above:

- Stop the **PRESIDIO** .
- put on the parking brake
- turn off the fluid pump
- place the levers at the neutral point, lower the boom on the support provided for transport or to the ground
- stop the engine
- remove the switch key
- Put the battery isolation switch to off.

Beware of the hot zones of the **PRESIDIO**.

No person other than the driver shall enter the cab of the **PRESIDIO**

Only an operator that is familiar with the functions of the work zone (giving access to the remote electrical controls of the engine and fluid pump, the fluid and chemical filler controls and tank filling point) should work within this zone.

Only use the proper means of accessing the workstations (ladders, steps, gangways, etc.).

Never leave the cab when the **PRESIDIO** is running without checking all the safety devices (brakes, etc.) are active.

Never get on or off the **PRESIDIO** when it is moving nor leave the operators seat when sprayer is moving.

Always start the engine from the driver's seat, with the forward/reverse movement lever and fluid pump switch in neutral and park brake on.



1.6 DEFINITION OF DANGER ZONES

**DANGER**

All zones around the **PRESIDIO**, apart from the workstations, are considered as danger zones when the **PRESIDIO** is operating.

**DANGER**

Keep children and all third parties clear of the **PRESIDIO**.

Pay attention to any spectators and to children in particular. Always look around you for any hazards and sound the horn before moving the **PRESIDIO** or starting the engine.

The **PRESIDIO** is fitted with a reverse warning buzzer that sounds whenever the vehicle is in reverse gear. Never disable the reverse warning.

1.7 PRESIDIO SAFETY



WARNING

*It is forbidden to make any modifications to the **PRESIDIO**, other than those that are specifically authorised in writing by HARDI After-Sales Service or Technical Division.*

It is forbidden to remove any safety covers unless all the conditions described hereafter are met at the same time: the **PRESIDIO** is at a standstill, engine switched off, parking brake on, ignition key removed and circuit pressure zero. Boom should be in transport frames. After any work, always replace the safety covers.

Always use the handles and steps when getting on or off the **PRESIDIO** to avoid falling. Keep the steps and the floor clean and free of mud and debris. Always close the cabin door before driving the **PRESIDIO**. Keep the windows clean for clear visibility in all directions.

Check that the reverse warning buzzer is in working order.

Never let anyone other than the driver enter the **PRESIDIO**. There is not enough room to carry passengers. Never carry any passengers.

You are recommended to keep a fire extinguisher and a first aid kit in the **PRESIDIO**. You can usually obtain these from your "Approved Dealer".

The cabin in the **PRESIDIO** is fitted with an active carbon filter that needs to be replaced regularly, depending on the type of work done, but at least every six months.

Pressurised liquids that escape from tiny holes are almost invisible but represent a serious health and safety hazard.



1.7.1 SAFETY STICKERS

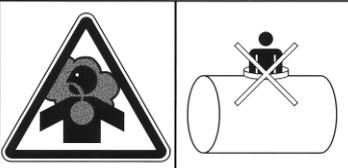
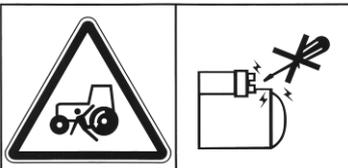


WARNING

It is most important that the safety stickers remain in place and in good condition. The stickers will draw your attention to all the possible dangers and refer to the operation and maintenance manual. Replace any safety stickers that are missing, illegible or damaged. Clean off any mud or dirt that makes the safety stickers illegible.

<p>PRECICULTURE Deutz 2011/2012 D/TD/TCD 2011/2012 API CG-4 - API CH-4 Deutz Quality Class TD/TCD 3.6 L4 TCD 4.1 L4 / 6.1 L4 DQC III LA/ DQC IV LA (low ash oil) www.deutz.com DE0001-01</p>	<p>PRECICULTURE ISO46 DIN51524 TEIL 3 HVLP ISO6743/4HV NF E 48603-HV DE0001-04</p>	<p>PRECICULTURE GAZOIL EN590 DE0001-03</p>
<p>PR-DE 0002</p>	<p>PR-DE 0003</p>	<p>PR-DE 0004</p>
<p>PR-DE 0006</p>	<p>PR-DE 0007</p>	<p>PR-DE0008</p>
<p>PR-DE 0009</p>	<p>PR-DE 0010</p>	<p>PR-DE 0011</p>
<p>PR-DE 0012</p>	<p>PR-DE 0013</p>	<p>PR-DE 0014</p>
<p>PR-DE 0016</p>	<p>PR-DE 0017</p>	<p>DS 46 (HV) NFE 48603 PR-DE 0018</p>



 <p>PR-DE 0019</p>	 <p>PR-DE 0070</p>	 <p>PR-DE 0071</p>
 <p>PR-DE 0072</p>	 <p>PR-DE 0073</p>	 <p>PR-DE0154</p>
 <p>PR-DE 0157</p>	 <p>PR-DE 0160</p>	 <p>PR-DE 0161</p>
 <p>97808704</p>	 <p>97809504</p>	 <p>97809404</p>
 <p>97808404</p>	 <p>97808304</p>	 <p>97808404</p>
 <p>97808904</p>		



REF.	DEFINITION
PR-DE 0001-01	Service liquids.
PR-DE 0001-03	Hydraulic oil
PR-DE 0001-04	Fuel
PR-DE 0002	Banking = risk of turning over.
PR-DE 0003	Risk of crushing
PR-DE 0004	Do not climb onto, park or get off the machine whilst working
PR-DE 0005	Before carrying out any welding work, disconnect both the battery and the alternator.
PR-DE 0006	Remove the ignition key before leaving the working position and lock your cabin door.
PR-DE 0007	Stay a safe distance away from the machine.
PR-DE 0008	Keep all protective devices in place.
PR-DE 0009	Elements allowing you to safely get onto and off the machine.
PR-DE 0010	Risk of burns.
PR-DE 0011	Get into the habit of frequently consulting the user and maintenance manual.
PR-DE 0012	High pressure. Never tighten a connection which is under pressure. Shut down the engine and bring the residual pressure in the circuit down before carrying out any maintenance operation.
PR-DE 0013	Draining.
PR-DE 0014	Risk of being crushed by a wheel.
PR-DE 0016	Risk of vertical crushing.
PR-DE 0017	You must check that the wheel nuts are still tight after 2 hours' running, then periodically. Regularly check that your tyres are properly inflated.
PR-DE 0018	Oil.
PR-DE 0019	Fuel.
PR-DE 0070	Risk of crushing the hand.
PR-DE 0071	Risk of toxic fumes
PR-DE 0072	Ear protectors must be worn. Tank. Risk of emanation of toxic fumes.
PR-DE 0073	Engine start-up risk.
PR-DE 0156	Travel lever
PR-DE 0157	Speed adjustment
PR-DE 0160	Diagnostic test socket
PR-DE 0161	12V DIN socket / Battery shut off
97808704	Safety decal handwash tank
97809504	Safety decal rear plate (big)
97809604	Safety decal rear plate (small)
97809404	Safety decal inside front cab window
97808404	Safety decal chem hopper
97808304	Safety decal work zone, left and right side
97809004	Safety decal on all wheel dishes



1.8 SAFETY/DRIVING & OPERATION OF THE PRESIDIO

1.8.1 DRIVING ON PUBLIC ROADS

Users must obey the rules of the Highway Code in force in the country of use, when driving the **PRESIDIO** on public roads. All rules to prevent accidents and all regulations applying to road traffic must be obeyed at all times.

When driving on public roads switch on the flashing light and always use the indicator lights whenever the law requires you to do so. Always obey local regulations applying to road traffic when driving on public roads.

Never exceed the total authorised laden weight or the maximum axle load of the road to be travelled on.

- Modifications made to the **PRESIDIO** may have an impact on the relevant Highway Code so it is recommended to be familiar with and or consult the appropriate authorities.
- Depending on the state of use, **PRESIDIO** is often required to observe special regulations when driving on public roads.
- Users are responsible for obtaining information about local orders from their local authority. The user must carry any relevant orders when driving the **PRESIDIO** on public roads.

Slow down when approaching corners to avoid the risk of the vehicle turning over.

Take special care when operating the **PRESIDIO** on sloping surfaces.

Never use the **PRESIDIO** on steep slopes

SLOPING GROUND = DANGER OF VEHICLE TURNING OVER

Always select a track that is suited to the **PRESIDIO** and the terrain

1.8.2 LIGHTS, NIGHT WORK

Only use the **PRESIDIO** in day light. Otherwise, use the lighting systems provided on delivery or additional lighting systems.

1.8.3 LIFTING

All lifting operations using the **PRESIDIO** or systems attached to the **PRESIDIO** must be performed in accordance with the usual safety rules applying to lifting (suitable individual protective clothing, use of suitable slings, use of lifting tools that meet health and safety requirements, etc.).

Lifting operations must follow the instructions in this manual in the "LIFTING OPERATIONS" section of the "MAINTENANCE" chapter.

1.8.4 FIRE PREVENTION

Preventive measures and warnings about inflammable products

Keep the **PRESIDIO** clean.

Keep all parts of the **PRESIDIO** free of grass, leaves or excess grease.

Handle the fuel with care because it is highly inflammable and gives off explosive vapours.

Never store fuel container or tanks containing fuel in premises where flames or sparks may occur.

Never fill the fuel tank indoors. Do not smoke when filling the fuel tank.

Never remove the fuel tank filler cap or fill the fuel tank when the engine is running or still hot.

Fire

Stop and/or leave the **PRESIDIO** in safety.

Disconnect the machine from all electric power sources (battery main switch).

In the event of fire, keep calm and take steps to control the fire

OR

Immediately move clear of the machine and make sure that no-one else is nearby.

Owners are strongly recommended to install a fire extinguisher in the **PRESIDIO**. The extinguisher must be easily accessible and regularly checked.



1.8.5 RISKS DUE TO OVERHEAD ELECTRIC POWER LINES



DANGER Operating agricultural machinery near power-lines presents a potentially fatal hazard. It is the responsibility of the operator to make sure that minimum safe clearance is strictly observed. In particular when transporting, raising, tilting or lowering the boom. Also be aware that during hot or windy weather sagging or swaying of power lines can reduce safe working clearance. When there is a danger of coming into contact with overhead power lines, check the maximum working height of the **PRESIDIO** if folding/unfolding the booms installed on the **PRESIDIO** or when operating the **PRESIDIO**.



Remember to check the radio antenna, all original accessories and all accessories installed subsequently that may alter the height of the **PRESIDIO**

1.8.6 MAINTENANCE OF THE PRESIDIO

- Perform all maintenance work on the **PRESIDIO** under safe conditions.
- Stop the engine before servicing your **PRESIDIO**.



WARNING

Stop the engine and depressurise the pressure circuits before connecting or disconnecting any hoses or pipes. Tighten all couplings before starting the engine or pressurising the circuits.

- Always keep the **PRESIDIO** and its sub-systems, especially the steering and brakes, in perfect working order for safe driving conditions and in order to comply with all legislation in force.
- Before making any adjustments, always stop the **PRESIDIO**, apply the parking brake, disengage the fluid pump, set all levers to neutral, lower the centre and boom fully. Or fold the boom into the transport rests. Stop the engine and remove the ignition key before leaving the driver's seat.



ATTENTION

Before starting the engine when indoors, make sure that the premises are suitably ventilated. Never run the engine in closed premises. The exhaust fumes can cause death.



WARNING

Never perform any maintenance work on the **PRESIDIO** when the engine is running or still hot, or when the **PRESIDIO** is moving.

- You are recommended to consult your "Approved Dealer" for all repairs and adjustments, which must be made by suitably trained staff.



WARNING

Handle all liquids with care. If you suffer injury by coming into contact with or absorbing a liquid, then consult a doctor immediately.



DANGER

Pressurised liquids escaping through tiny holes are almost invisible but may be a major threat to health and safety. Check for leaks using a piece of cardboard or wood. Never check for leaks using your hands.

- Always disconnect all the cables from the battery (negative cable first), before changing any settings or working on the electrics.
- Never use the **PRESIDIO** hydraulic system as a jack to raise the vehicle. Always use a suitable support to raise the **PRESIDIO**.



DANGER

When adjusting, unfolding or moving the boom at the rear of the **PRESIDIO**, make sure that no-one is located in the vicinity before operating the hydraulic system.



ATTENTION

Use the secure equipment provided when performing any maintenance work on the **PRESIDIO** and use any suitable additional equipment required, such as step ladders or platforms, to avoid the risk of falling (Including fillings of fuel, oils and cooling liquid.)



1.8.6.1 Engine



ATTENTION

Before doing any work on the engine, apply the park brake, switch the engine off, remove the ignition key and wait for it to cool down.

1.8.6.2 Fuel

-  **DANGER** Handle the fuel with care. It is highly inflammable. Do not smoke when filling the tank or working on the fuel feed circuit and stay clear of naked flames.
-  **WARNING** Stop the engine before filling the tank. Always fill the tank in the open air.
-  **WARNING** Always wipe off any spilt fuel.
-  **ATTENTION** Never completely fill the fuel tank. Fill to a level just below the filler tube to allow for possible expansion of the fuel.
-  **DANGER** Never add any gasoline, alcohol or other combustible mixtures to the fuel. These mixtures may be a further danger of fire or explosion.
-  **ATTENTION** Always carefully close the filler cap of the fuel tank.
-  **DANGER** Do not smoke when filling the fuel tank. Stay clear of flames when filling the fuel tank.
-  **ATTENTION** Always keep a firm hold on the filler nozzle when filling the tank with fuel.
-  **ATTENTION** To fill up the fuel tank, use all personal protection and required safety equipment at your disposal, such as step ladders or platforms, to avoid the risks of falling.
-  **ATTENTION** Only use fuel that is compatible with the engine in the **PRESIDIO**. Using fuels that are not listed in the document below (CIRCULAR 0199-3005 fr / DEUTZ) may cause irreparable damage to the engine that may not be covered by the warranty.



Technical Bulletin

0199 - 99 - 3005/7 EN



This Circular supersedes: TR0199-99-3005/6

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Fuels

The 7th replacement was introduced due to more detailed specifications of

- Light heating oils for TIER III and EURO IV engines.
- Introduction of diesel fuel with 7% bio diesel according to DIN 51628
- Release of plant oils for DEUTZ NATURAL FUEL ENGINE®



This Technical Circular applies for all air-cooled and liquid-cooled compact engines made by DEUTZ. This TC applies accordingly for engines which are no longer built.

General

The following fuels are permitted for the compact engines made by DEUTZ:

- Diesel fuels
- MDF distillate fuels
- Light heating oils
- Jet fuels
- Bio fuels

For general fuel data, see subsection:

- Biological contamination in fuels
- Fuel additives

Distillate fuels with residue oil percentages or mixed fuels may not be used in DEUTZ compact engines.

The DEUTZ vehicle engines are designed for diesel fuels in accordance with EN 590 and DIN 51268 with a cetane number of at least 51. DEUTZ engines for mobile machinery are designed for a cetane number of at least 45. When using fuels of a low cetane number, troublesome white smoke and ignition misfires are to be expected under some circumstances.

Note:
 The part numbers indicated in this document are not subject to updating.
 Binding for the identification of spare parts is exclusively the spare parts documentation.



Technical Bulletin

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A cetane number of at least 40 is permissible for the US market, therefore special engine models have been developed to avoid starting difficulties, extreme white smoke or increased hydrocarbon emissions (EPA specification – US EPA REGULATIONS FOR LARGE NONROAD COMPRESSION-IGNITION ENGINES).

If the white smoke behaviour is unacceptable when using a very low cetane number, the use of ignition improvers is to be recommended as a later remedial measure. If the use of fuels with a very low cetane number can be anticipated, we recommend ordering engines in the EPA version.

The certification measurements for compliance with the legal emission limits are carried out with the test fuels prescribed by law. These correspond to the diesel fuels in accordance with EN 590, DIN 51628 and ASTM D 975 described in subsection 1. No emission values are guaranteed with the other fuels described in this bulletin. It is the obligation of the owner to check permissibility for the use of fuels in accordance with regional regulations.

Engines which are fitted with an exhaust aftertreatment via a particle filter, oxidation catalyst or SCR system (**S**elective **C**atalytic **R**eduction), may only be operated with diesel fuel according to EN 590 or DIN 51628. Otherwise, compliance with emissions requirements and durability are not guaranteed.

Diesel fuels

Diesel fuels are released and can be used according to the following specifications:

Fuel	Specifications
EN 590 (max. 5% bio-diesel)	Appendix 2
DIN 51628 (max. 7% bio-diesel)	Appendix 3
ASTM Designation: D 975 Grade-No 1-D and Grade Low Sulphur No. 1-D	Appendix 4
ASTM Designation: D 975 Grade-No 2-D and Grade Low Sulphur No. 2-D	Appendix 4
JIS K 2204 Grade 1 Fuel and Grade 2 Fuel	Appendix 5
NATO F-54, corresponds to diesel fuel in accordance with EN 590	Appendix 2

The European standard EN 590 has the status of a national standard with national appendix in most European countries, e.g. EN 590.

For DEUTZ engines for Tier III and EURO III/IV with electronic injection, US diesel fuels according to ASTM D 975 Grade-No 1-D and 2-D are approved. Japanese diesel fuels in accordance with JIS K 2204 Grade 1 Fuel and Grade 2 Fuel are only approved if the lubricating properties comply with the diesel fuel EN 590 (HFRR max. 460 micrometer according to EN ISO 12156).

Lubricity in low sulphur and sulphur-free fuels

Insufficient lubricity can lead to serious wear problems, above all in common rail injection systems. A lubricity which is too low is a particular problem in fuels with a low sulphur content (and in this regard, sulphur contents of <50mg/kg may be considered low). In low sulphur (<50mg/kg) and sulphur-free (< 10mg/kg or <15mg/kg) diesel fuels, in accordance with EN 590, DIN 51628 and ASTM D 975, sufficient lubricity is guaranteed by appropriate additives. The lubricity of low sulfur diesel fuels which do not comply with these standards must be guaranteed by additives. The parameter for adequate lubricity is a maximum wear spot of 460 micrometers in the HFRR test (ISO 12156-1).



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High sulphur content in the fuel

Fuels with sulphur content > 0.5 weight % require a shorter lubricating oil change interval (see Technical Circular 0199-99-3002). Fuels with a sulphur content >1.0 weight % are not permissible due to high corrosion and considerable shortening of the engine life.

Low-ash engine oils (low SAPS oils, sulphated ash <1.0 weight%) may not be used with fuels with sulphur content > 500 mg/kg.

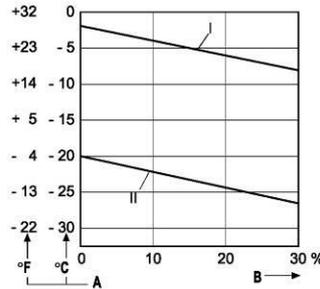
Winter operation with diesel fuel

Special demands are made on the behaviour in cold (temperature limit of filterability) for Winter operation. Suitable fuels are available at fuel stations at the specified times.

If only summer diesel fuel is available, up to 30% petroleum can be mixed with the diesel according to the diagram below at low temperatures to ensure the flow properties.



Mixing with petroleum is not allowed for TCD 2013 4V engines and fuels in accordance with ASTM D 975 1-D/2-D.



A 1 Mixing petroleum with the summer diesel fuel

Mixing should take place in the engine tank: First fill with the necessary amount of petroleum and then top up with diesel.

Mixing of regular gasoline is not permissible for safety and technical reasons (cavitation in the injection system). Diesel fuels up to - 44 °C are available for an Arctic climate. Mixing flow improvers with the diesel fuel is possible. The choice of a suitable additive and the necessary dosing and mixing procedure should be made in agreement with the fuel supplier.

Marine distillate fuels

These are distillate fuels which are principally used in ships. Only marine distillate fuels which contain no residual oils (residues from the distillation process) may be used.



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The following marine distillate fuels may be used for DEUTZ marine engines:

Fuel	Specifications
ISO 8217 DMX	Appendix 6
ISO 8217 DMA (restriction: sulphur content max 1.0 weight%)	Appendix 6
NATO F-75	Appendix 7
NATO F-76	Appendix 8

- Marine distillate fuels are not approved for engine series 2008, 2009, 2015 and engines for Tier III and EURO IV with electronic injection.
- The cetane number must be at least 40, otherwise starting difficulties, extreme white smoke or increased hydrocarbon emission may occur.
- The higher density requires a return blocking in the injection pump (may only be carried out by authorised DEUTZ personnel).
- The possible high sulphur content ≥ 0.5 weight% requires a shorter lubricating oil change interval. Fuels with a sulphur content >1.0 weight % are not permissible due to high corrosion and considerable shortening of the engine life. Please bear in mind, therefore, that fuels in accordance with ISO 8217 DMA are only permissible, when the sulphur content is a maximum of 1.0 weight%.
- Due to the possible severe soiling, the fuel purification is particularly important, and if necessary an additional fuel filter with water separator may be installed.

Non-road fuels and light heating oils

In some European countries, non-road fuels are defined with the same properties as heating oil, but they are treated differently from heating oil for tax purposes. In Germany, systems which benefit from permission to use heating oils are described in the Energy Taxation Law (Section 3). Heating oils are usually not allowed in diesel engines. The user must always keep to the relevant tax regulations. These are not the subject of this bulletin. Regarding their application in engines (warranty claims), there is no difference between the corresponding non-road fuels and light heating oils.

The following non-road fuels and light heating oils can be used:

Fuel	Specifications
DIN 51603	Appendix 9
ASTM D 396 Grade-No 1	Appendix 10
ASTM D 396 Grade-No 2	Appendix 10
BS 2869 Class A2	Appendix 11
CSR 441	Appendix 12



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- The cetane number must be at least 40, otherwise starting difficulties, extreme white smoke or increased hydrocarbon emission may occur.
- At a density of > 0.869g/cm³ a return blocking in the injection pump is necessary (may only be carried out by authorised DEUTZ personnel).
- For engines for Tier III and EURO IV with electronic injection, light heating oils may only be used if they comply with all limit values of EN 590 except the fuel density, the cetane number and the sulphur content. For these parameters, the following limit values apply:

Fuel parameter	Unit	Limit value	Test method
Cetane number		min. 49	EN ISO 5165
Fuel density at 15°C	kg/m ³	820 - 860	EN ISO 3675 or EN ISO 12185
Sulphur content	mg/kg	max. 1000	EN ISO 14596

Jet fuels

The following jet fuels can be used:

Fuel	Specifications
F 34/F 35 (kerosene, NATO designation)	Appendix 13
F 44 (kerosene, NATO designation)	
F-63 (kerosene, NATO designation, equivalent to F-34/F-35 with additives)	
F-65 (kerosene, NATO designation, 1:1 mixture of F-54 and F-34/F-35)	Specifications available on request
JP-8 (kerosene, US military designation)	
JP-5 (kerosene, US military designation)	
Jet A (kerosene for civil aviation)	
Jet A1 (kerosene for civil aviation)	

- Jet fuels F 34 and F 35 are equivalent for use in diesel engines.
- The 1011/2011/912/913/914/2012/2013/2015 engine series are released up to Tier II and Euro III. These series are also released for Tier III in the case of engines with mechanical injection. Tier III and EURO IV engines with electronic injection are not approved for jet fuels
- Jet fuels may not be used for the 226/327/302/916/2008/2009/2010 engine series.
- The cetane number must be at least 40, otherwise starting difficulties, extreme white smoke or increased hydrocarbon emission may occur.
- A power loss of up to 10% is possible due to the lower density and the greater leak fuel rate due to lower viscosity, depending on engine speed and torque. **Blocking of the fuel injector is not allowed.**



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- Since the jet fuels F 34/F 35 and F 44 are kerosene, there are some problematical fuel properties (viscosity, lubricity and low boiling point). A slight increase in wear on the injection system is to be expected, which may be reflected in a statistically shorter life of these components. The engine guarantee is retained when these fuels are used.
- Jet fuels can be mixed with each other. Mixing of kerosene with diesel fuel in accordance with EN 590 in order to improve the flow properties in winter operation is permitted.

Bio fuels

We understand bio fuels to mean bio-diesel and pure plant oils (rape seed oil).

Bio-diesel

At first only rape seed oil methylester (RME) was sold as bio-diesel in Europe, but fatty acid methylesters (FAME) based on other oils have come onto the market increasingly in recent years. However, with the latter there is a risk that the limit values of EN 14214 are not kept in the field. Since the quality of bio-diesel available in the market does not always meet requirements, DEUTZ customers in Germany are recommended to ensure quality by buying bio-diesel with an AGQM certificate (Arbeitsgemeinschaft Qualitäts-Management Biodiesel e. V.). Customers should also ensure that suppliers can confirm their compliance with quality requirements by showing a current certificate of analysis from a certified laboratory.

The use of US bio-diesel based on soy oil methylester is only permissible in mixtures with diesel fuel with a bio-diesel part of a max. 20 weight%. The US bio-diesel used for the mixture must comply with the ASTM D6751-07a (B100) standard. The use of bio-diesel whose quality has been assured in accordance with BQ 9000 is recommended.

Fuel	Specifications
Bio-diesel in accordance with EN 14214	Appendix 14
US bio-diesel in accordance with ASTM D6751 - 07a (B100) (only permissible for mixtures with diesel fuel of 20 weight%)	Appendix 15

Released engines

- The 912, 913, 914, 1011, 2011, 1012, 2012, 1013, 2013, 413 and 513 series are released for bio-diesel from year of manufacture 1993 under compliance with the basic conditions specified below.
- The TCD 2012 2V/4V and TCD 2013 2V/4V series for mobile machinery are released for bio-diesel in accordance with EN 14214 as well as a mixture of up to 20% US bio-diesel in accordance with ASTM D6751-07a (B100). The TCD 2013 4V series for commercial vehicles (EURO III/EURO IV) are not released for bio-diesel fuels.
- The 909, 910, 1015, 2008, 2009, 2015 series are not released for bio-diesel as a series standard. Further information is available from head office.
- Turbocharged engines are excepted from release for applications which are usually operated with a high load above 80% of rated output power.
 - Engines in district heating power stations
 - Engines in electricity generators with mains/parallel operation
 - Engines in harvesting machinery



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Basic conditions to be observed

- A power loss of 5-9% and increased fuel consumption of 7-8% in relation to diesel fuel in accordance with EN 590 is possible due to the lower heating value. Blocking of the fuel injector is not allowed.
- The lubricating oil quality must correspond to TR 0199-99-3002. The lubricating oil change interval must be halved in relation to operation with diesel fuel in accordance with EN 590.
- Shutdown periods of longer than 4 to 6 weeks must be avoided with bio-diesel. Otherwise the engine must be started and stopped with diesel fuel.
- Engines with a low annual running time, e.g. emergency generators, are excluded from operation with bio-diesel.
- In series engines, the fuel hoses, the manual fuel supply pumps and the LDA diaphragms (series 1012, 1013, 2012, 2013, TCD 2012 2V mechanical and TCD 2013 2V mechanical) are not resistant to bio-diesel and must be changed once a year. Since the fuel hoses may disintegrate earlier with increasing fuel temperature and long running times, they may have to be replaced before the year is out. The fuel hoses must be checked for damage (swelling) in the course of daily maintenance E 20. The use of bio-diesel-resistant fuel hoses (Viton) is recommended, in which case there is no need to change them every 12 months.
- Bio-diesels can be mixed with normal diesel fuel, but the basic conditions described in this subsection apply for mixtures. Mixtures with a percentage of 5% or 7% (V/V) bio-diesel (B5 or B7), as permissible in EU countries according to national legislation, are excluded. In any case, however, bio-diesel mixtures must comply with EN 14214.
- Approx. 30-50 oh after changing over from diesel fuel to bio-diesel, the fuel filter should be changed as a precaution to avoid a drop in performance due to clogged fuel filters. Deposited fuel ageing products are dissolved by bio-diesel and transported into the fuel filter. They should not be changed immediately, but after approx. 30 to 50 hours, because the dissolving of dirt takes a certain amount of time.
- The fuel pre-filter must be suitable for operation with bio-diesel.

Plant oil



Pure plant oils (e.g. rape seed oil, soy oil, palm oil) are not classified as bio-diesel and exhibit problematic properties for engines which were not designed for operation with plant oils (strong tendency to coke, risk of piston seizure, extremely high viscosity, poor evaporation behaviour).

DEUTZ NATURAL FUEL ENGINE®

DEUTZ has developed the first series engines based on the TCD 2012 2V/4V and TCD 2013 2V/4V series with the DEUTZ Common Rail System® (DCR) for use with rape seed oil.

These engines are released for use with 100% rape seed oil (raffinate or cold-pressed) in accordance with DIN V 51605 (appendix 16) and bio-diesel in accordance with EN 14214 (appendix 14).



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**Basic conditions to be observed**

- A power loss of 5-10% and increased fuel consumption of 4-5% in relation to diesel fuel in accordance with EN 590 is possible due to the low heating value. Blocking of the fuel injector is not allowed.
- This motor has a 2 tank system with the possibility of using diesel fuel/rape seed oil. Alternatively, bio-diesel can also be used in place of rape seed oil and/or diesel fuel.
- Rape seed oil must be replaced by diesel fuel or bio-diesel at temperatures of under 5°C.
- Shutdown periods of longer than 4 to 6 weeks must be avoided with bio-diesel and rape seed oil. Otherwise the engine must be started and stopped with diesel fuel.
- The lubricating oil quality must correspond to TR 0199-99-3002. The lubricating oil change interval must be halved in relation to operation with diesel fuel in accordance with EN 590.
- Important fuel properties, such as for example water content; oxidation stability; calcium, magnesium and phosphorous content; and the total contamination, are particularly influenced by the harvest time, the pressing process in the oil mill, the storage of the rape seed oil and the continuing logistics chain. Therefore, due to continual infringements of limit values by decentralised oil mills, customers are recommended to confirm the quality of the supply of rape seed oil fuel with a certificate of analysis. In case of doubt, the quality can be proven with an analysis by a laboratory accredited according to ISO 17025 (e.g. ASG Analytik GmbH, D-86356 Neusäß, Tel. ++49 (0)821-450-423-0).
- Mixing with other plant oils, such as sunflower oil, soy oil or palm oil, is not permitted.

Notes for the storage of rape seed oil in fuel stations for own use:

- Store in the dark and at consistent low temperatures (maximum 20°C, ideally in underground tanks at 5-10°C). Storage temperatures of lower than freezing should be avoided, for this reason also underground tanks are ideal. Tanks must not be translucent (no polyethylene tanks).
- The storage of rape seed oil at storage temperatures of up to 20°C is limited to a maximum of 6 months, in underground tanks <10°C maximum 12 months).
- Due to the hygroscopic (attracting water) properties of rape seed oil, works fuel stations should if possible be fitted with dehumidification on the air exchange system.
- Minimise contact with air with the use of thick locks.
- Contact with metals with a catalytic effect, above all copper or brass, must absolutely be avoided. These materials must not be used at all in the storage system (e.g. pipes, screws, pumps, etc).
- Avoidance of gathering of sediments by removal approx. 10cm above the tank floor.
- The tanks should be regularly cleaned, if a bacterial infestation occurs the bactericide Grotamar 71 should be used by a specialised firm.



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Series diesel engines

The conversion of other DEUTZ engines to operation with pure plant oil with conversion kits and modified tanks systems of various manufacturers is not allowed and leads to loss of the guarantee rights.

Only engines of the 912W/913W/413FW/413W series with the 2-tank system from Henkelhausen, D-47809 Krefeld, Fax no. ++49 (0)2151 574 112, can be operated with rape seed oil fuel according to the DIN pre-standard DIN V 51605, see appendix 15.

Biological contamination in fuels

Symptoms

The following symptoms may indicate that a fuel tank is contaminated by micro-organisms:

- Internal tank corrosion,
- Filter blockage and the associated loss of power due to gel-like deposits on the fuel filter (especially after long downtimes)

Cause

Micro-organisms (bacteria, yeasts, fungi) can form bio-sludge under favourable conditions (favoured particularly by heat and water).

Penetration by water is usually caused by condensation of the water in the air. Water does not dissolve in fuel so that the penetrating water collects at the bottom of the tank. The bacteria and fungi grow in the watery phase, at the phase boundary to the fuel phase, from which they draw their nutrition. There is an increased risk of this especially with bio-diesel (FAME).

In suspicious cases, biological contamination can be analysed according to DIN 51441 (determination of the number of colonies in mineral oil products in the boiling range below 400 °C) by laboratories certified according to ISO 17025 (e.g. PetroLab GmbH, D-67346 Speyer, Tel.: ++49 (0) 6232-33011).

Remedial measures

- Keep the storage tank clean, regular cleaning of the tank by specialist companies
- Installation of fuel pre-filters with water traps, especially in countries with frequently fluctuating fuel qualities and high percentage of water. (e.g. Separ filter or RACOR filter use of biocide Grotamar 71 from

Fa. Schülke & Mayr GmbH,
D-22840 Norderstedt,
Tel.: +49 (0)4052 100-0,
E-mail: sai@schuelke-mayr.com

if the fuel system and storage tank have already been attacked by micro-organisms. The biocide must be dosed according to the manufacturer's specifications.

- Avoid direct exposure of the storage tank to sunlight- Use smaller storage tanks with corresponding low holding times of the stored fuel



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Fuel additives

The use of fuel additives is not permitted. The flow improvers mentioned above are an exception. Use of unsuitable additives will result in loss of warranty.

Service Information

This document has been created digitally and is valid without a signature.



1.8.6.3

Battery



Keep the batteries and starter devices clear of naked flames.

If using auxiliary starter cables follow the instructions for the safe operation and avoid sparks that may cause an explosion.

Always check the voltage using a voltmeter. Always disconnect the negative cable from the battery first.

1.8.6.4

Wheels and tyres



Regularly check that all nuts and bolts are tight, especially the wheel hub and wheel nuts.

The wheels of the **PRESIDIO** are very heavy. They must be handled with care and stored in a secure position to avoid accidents.

1.8.6.5

Hydraulic system



Switch off the engine, block the wheels and make sure that the circuits are cold before doing any maintenance or servicing work on the hydraulic system.

Check that all hydraulic couplings are tight. Depressurise and ensure boom is lowered to ground and fully open before disconnecting any hoses. Leaks of pressurised oil may cause serious injury.

When using tools or accessories, always follow the safety instructions indicated in the corresponding operating manual.

1.8.6.6

Air conditioning



Never attempt to work on the air conditioning system. Leaks of coolant may cause cold burns or serious injury. Special tools, gas and equipment are required to work on the air conditioning system.

Consult your “Approved Dealer”.

1.8.6.7

Tanks, fluid lines and pipes



Pay special attention to fluid and fuel tanks, air tanks, pipes and hoses. They must not be subject to chemical, thermal or mechanical attack and must be kept clean and free of corrosion or visible faults.

If in doubt about the condition of these components, then immediately consult your “Approved Dealer”.

The amended order of July 23, 1943 regarding gas pressure systems applies to the air tank for the pneumatic suspension system: hydraulic tests are required every ten years and internal and external inspections every three years.

1.8.6.8

Waste



Incorrect disposal of waste may be environmentally harmful. Some of the liquids or components used such as oil, fuel, coolants, filters and batteries may cause pollution.



Make sure waste liquids are collected in watertight sealed containers. Do not use recipients for food or drinks to avoid the risk of accidental consumption of the fluids.



Never pour waste onto the ground, into the sewers or any other place that may result in pollution.

The coolants used in the air conditioning system may pollute the atmosphere if released into the air.

Consult the local authorities or your “Approved Dealer” about the measures to be taken when disposing of waste.

1.8.6.9

Decommissioning and scrapping

Your “Approved Dealer” is generally responsible and aware of the procedures to scrap parts of the **PRESIDIO**. Please consult your “Approved Dealer” whenever necessary.



1.9 INDIVIDUAL PROTECTION/OPERATION AND MAINTENANCE



ATTENTION

Always wear protective clothing and individual protective gear for the hands, eyes, ears, feet and head.



ATTENTION

Never wear loose clothing that may become caught in the moving parts of the **PRESIDIO**.



ATTENTION

Special safety equipment may be necessary when working with fertilisers, toxic pesticides, etc. Follow the instructions provided by the manufacturer or supplier of chemical products.



ATTENTION

Use required individual respiratory protection equipment if the use of the **PRESIDIO** presents any risks of exposure to dust, particles, fogs or liquid, solid or gas vapour.

Any failure on this instruction would be responsibility of the user.

HARDI cannot be responsible of injuries to the user of the **PRESIDIO**.

1.10 NOISE LEVEL

Noise level = 71 dB (A).

Measuring equipment: Lucas CEL Instruments Ltd. N° 5687071.

Measurement conditions: measured at a height of 0.7 m and 0.2 m to the right of the driver's seat. Driver seated in the cabin with the doors shut and the cabin ventilation off.

Engine running at 2,100 rpm, with the vehicle at a standstill.



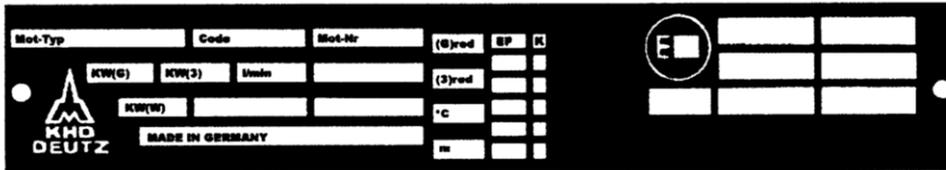
2 IDENTIFICATION OF THE PRESIDIO

Never remove the manufacturer's identification plates or the CE numbering affixed to the **PRESIDIO**.

The **PRESIDIO** is identified by a serial number that is cold stamped on the side of the chassis and the manufacturer's conformity plate indicating the type of machine and the serial number.

PRECICULTURE S.A. 51230 FERE-CHAMPENOISE		CE
TYPE	Numéro	
PV	Puissance	Année
PTAC	Charge maxi essieu avant	
PTRA	Charge maxi essieu arrière	
réception n°	du	DRIRE Champagne-Ardenne

The engine has its own type and serial number. A plate is affixed to the right-hand side of the engine.



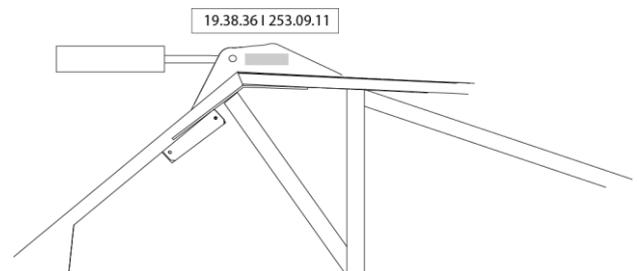
For quick and efficient service when ordering spares or requesting information or technical explanations, please specify the HARDI AUSTRALIA serial number, the chassis and engine serial numbers.

It is recommended to record all of these numbers in following spaces:

- HARDI AUSTRALIA serial number.....
- Chassis type and number:
- Engine type and serial number:
- Type of PRESIDIO:
- Transmission serial number:
- Cabin serial number:
- Boom Type.....
- Owner/operator:
- Selling Dealer

Aluminium boom

The serial number of the aluminium boom is engraved on the inner section. This serial number is identical for both sides of the boom.



PRESIDIO-MANUAL-1.00-version



3 CONTROLS, INSTRUMENTS AND OPERATION

3.1 OPERATOR'S COMPARTMENT

Reminder :

 **ATTENTION** The operator station in the cab is the main work station.

 **DANGER** Near the **PRESIDIO** , when the **PRESIDIO** is in running, all zones other than the work stations are dangerous zones.

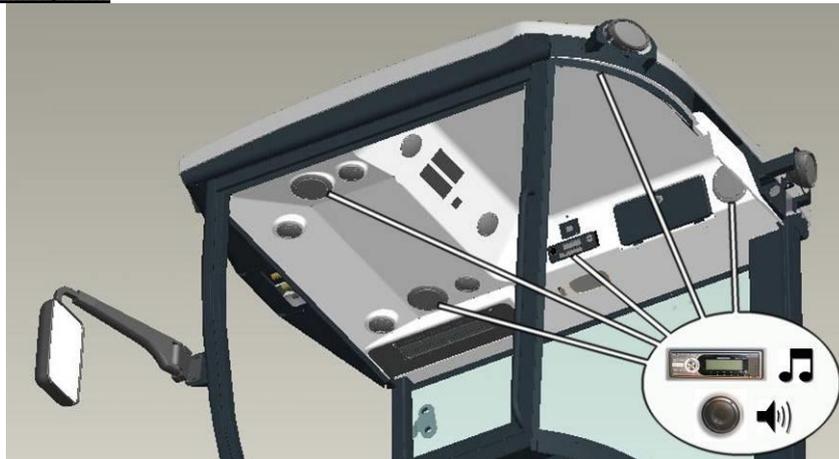
 **ATTENTION** When you leave the operator station in the cab to the "workzone" giving access to the remote electrical controls of the engine and fluid pump, the fluid and chemical filler controls and tank filling points placed near the ladder for access to the driving cab:

- Stop any movement of the **PRESIDIO** .
- Bring the lever to the neutral point
- Put on the parking brake
- Lower the boom on the support provided for storage or to the lowest height if unfolded

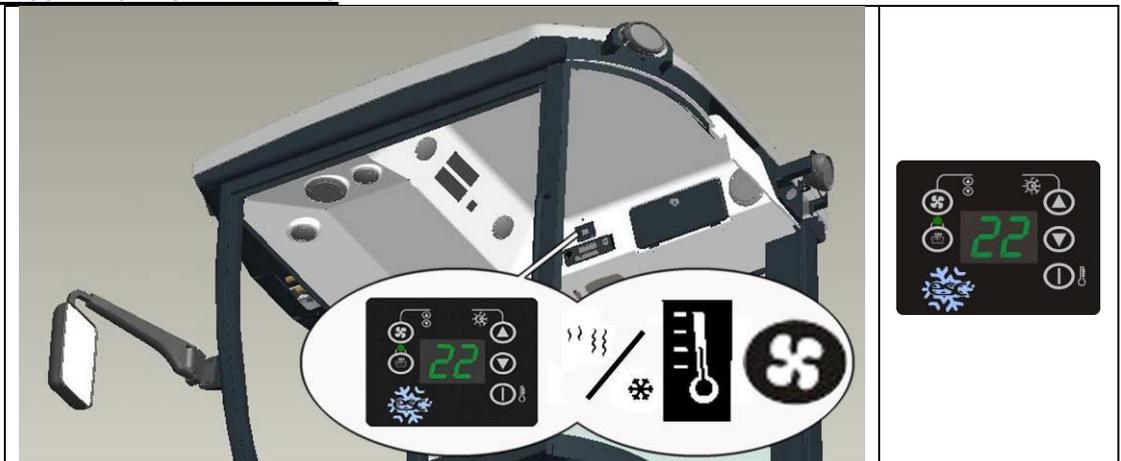
Beware of the hot zones of the **PRESIDIO**.

3.1.1 CAB CEILING AREA

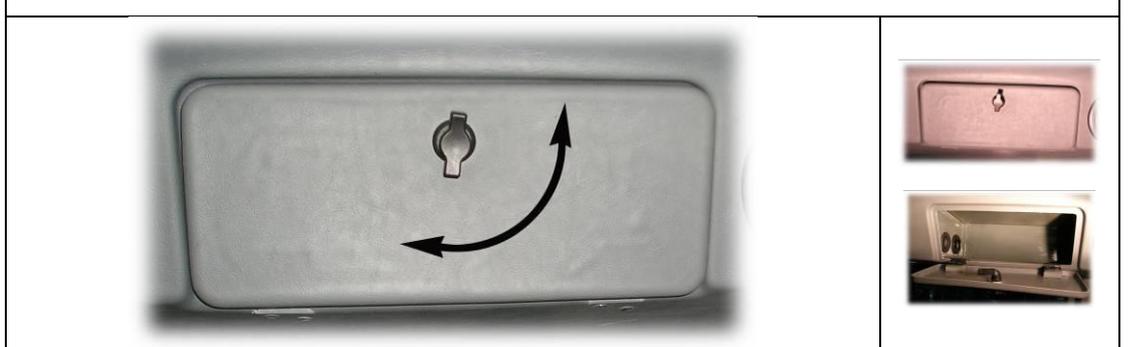
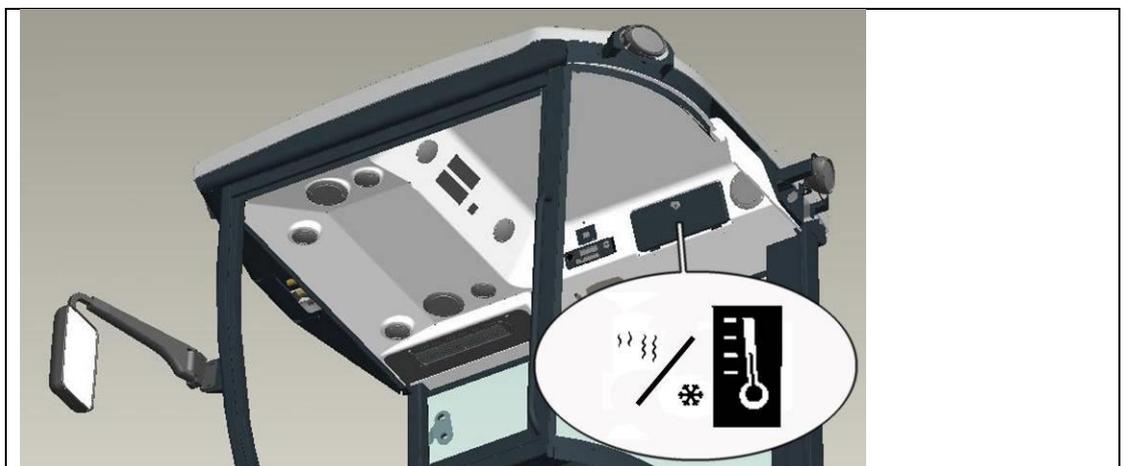
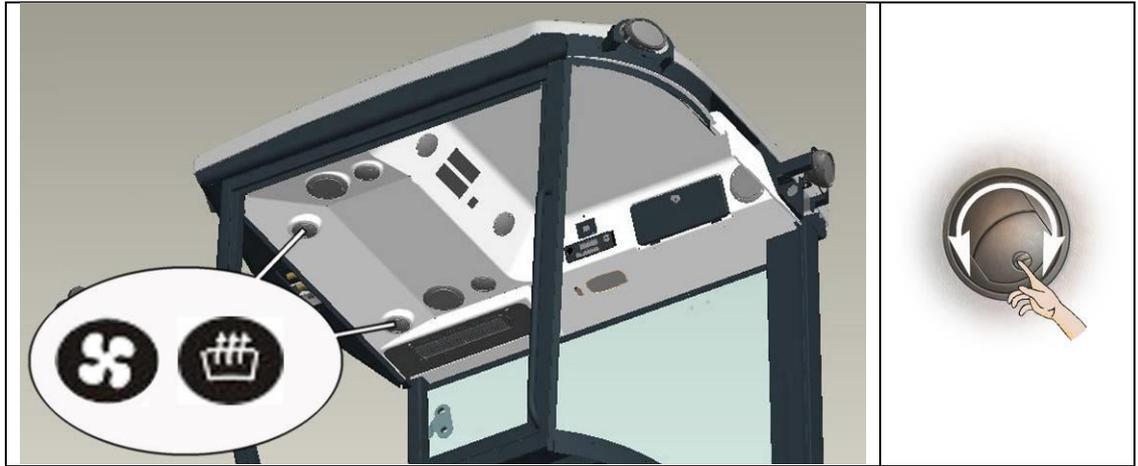
Audio system



AIR CONDITIONING AND HEATING



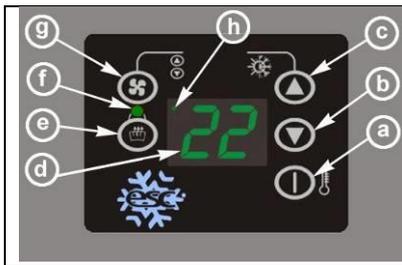
PRESIDIO-MANUAL-1.00-version:67021904-100 PRESIDIO USER MANUAL



PRESIDIO-MANUAL-1.00-version67021904-100 PRESIDIO USER MANUAL



SYSTEM OPERATION



When the panel is powered, it will show the panel software version. Then the display's decimal point « h » will start to blink, indicating that the panel is operating in standby mode.

To turn the panel on « d », press « a »  for 3 seconds, and the numeric display will show the vehicle internal temperature.

To turn the panel off, press « a »  for 3 seconds..

The display usually shows the vehicle internal temperature or setpoint, depending on the parameter. It also warns the operator whenever the system presents any failure.

Setpoint (is the desired temperature inside the vehicle).

- Press « c »  or « b »  to adjust it.
- The **setpoint** temperature will blink on the display.
- Press one of these buttons again until you obtain the temperature you want for inside the vehicle.

Ventilation

The ventilation will work even if the air conditioner function is not activated.

The panel has the VENTILATION option, which works in three different speeds: **u1** (low speed) , **u2** (medium speed) and **u3** (high speed).

Initially, the system will start in **RU** mode, meaning Automatic ventilation control, which will be controlled by the temperature **setpoint**.

To change the ventilation speed, press « g »  and then press « c »  (VENT_UP) or « b »  (VENT_DOWN), selecting the desired speed or the automatic ventilation.

Refrigeration and Heating

- Air-conditioning :
 - With external temperature lower than 5°C, the refrigeration will not be active.
 - With external temperature equal or higher than 5°C, the refrigeration will be automatically turned on whenever the temperature is higher than the **setpoint**. The refrigeration will be automatically turned off whenever the temperature is lower than the **setpoint** or the external temperature is lower than 5°C.
- Heating :
 - The heating will turn on whenever the temperature is lower than **setpoint**.
 - The heating will turn off whenever the temperature is greater than **set-point**.

Defrost Control



- The Defrost control is activated manually by pressing « e » .
- Refrigeration and Heating will turn on together, on High Ventilation. The refrigeration will turn off when the external temperature is lower than 5°C.
- To change the ventilation speed, press « g »  (VENT) and then press « c »  (VENT_UP) or « b »  (VENT_DOWN), selecting the desired speed for Defrost.
- ON period of Defrost: 2 min.
- Once the ON period of Defrost is over, the system returns to previous status.



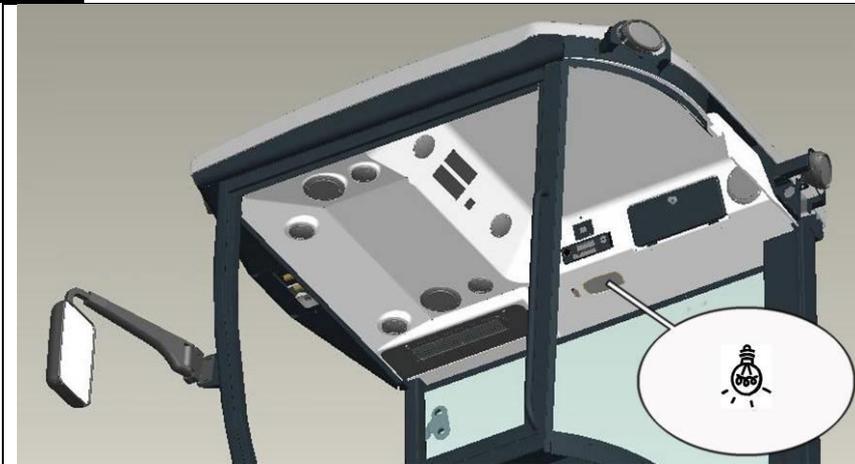
The Defrost led « f » will be ON during the cycle. At the end, it will flash twice.

Viewing external temperature « h »

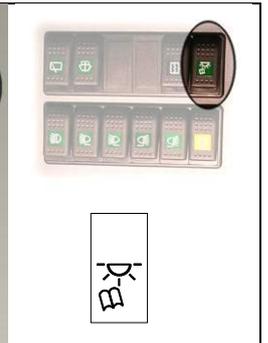
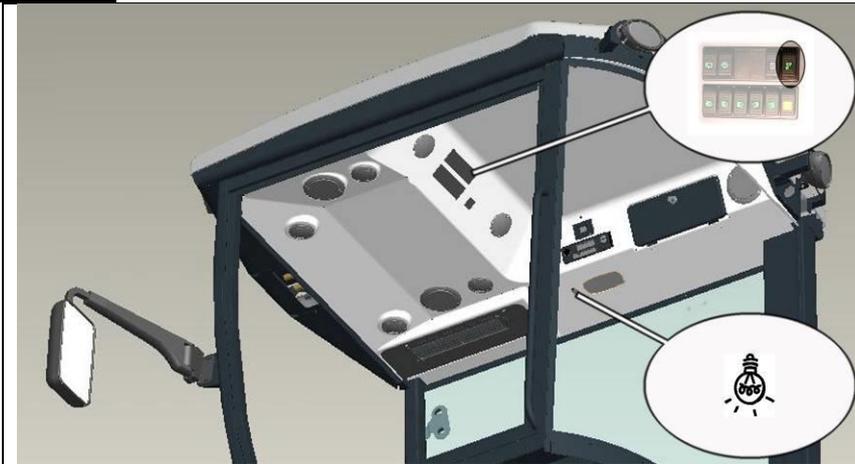


The external temperature will be shown for 3 seconds by pressing (short press) the « a »  (POWER), and the display's decimal point « h » will be ON.

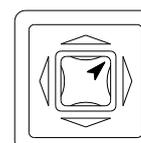
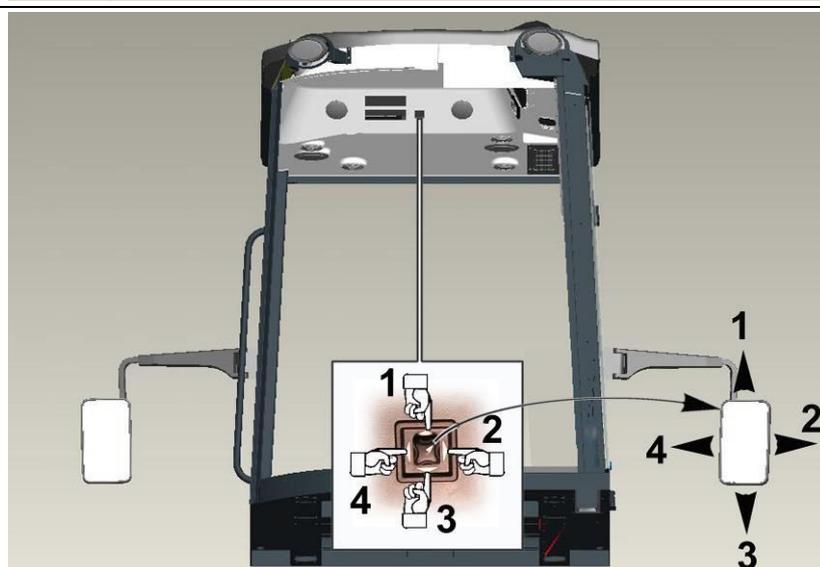
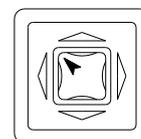
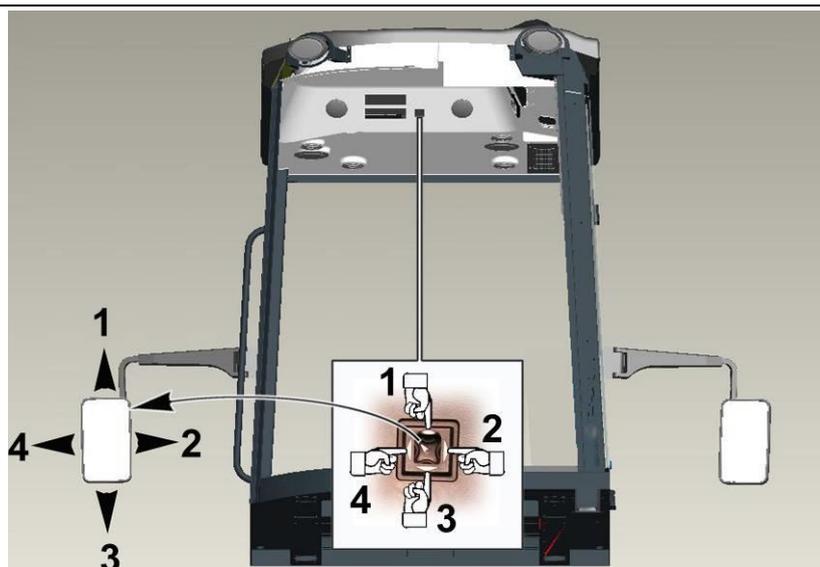
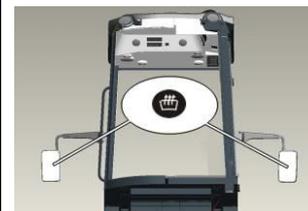
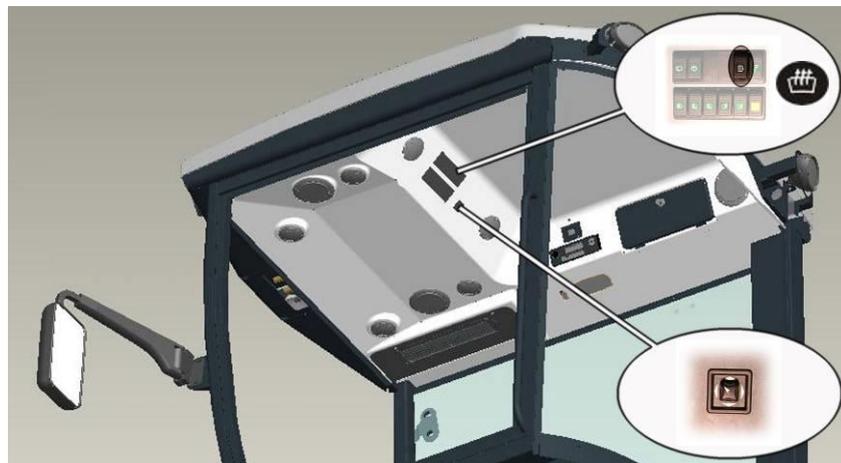
Cab light

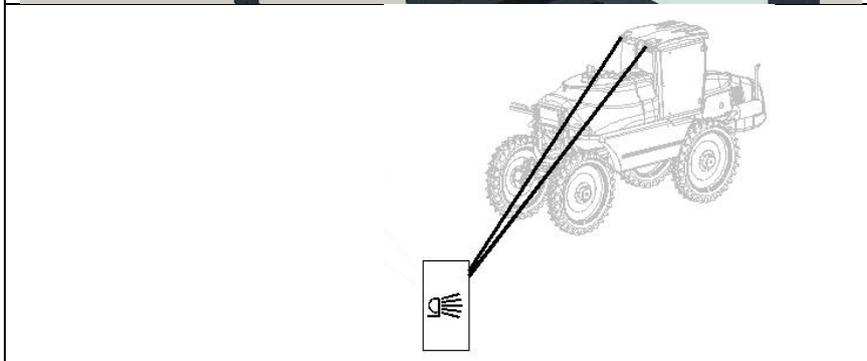
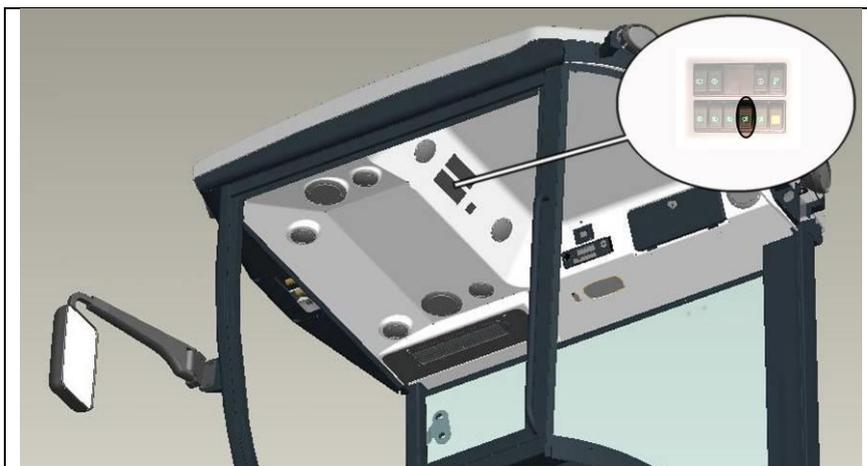
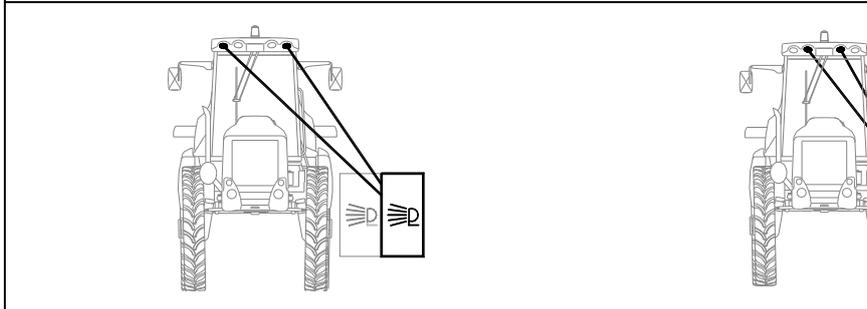
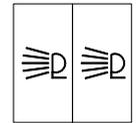
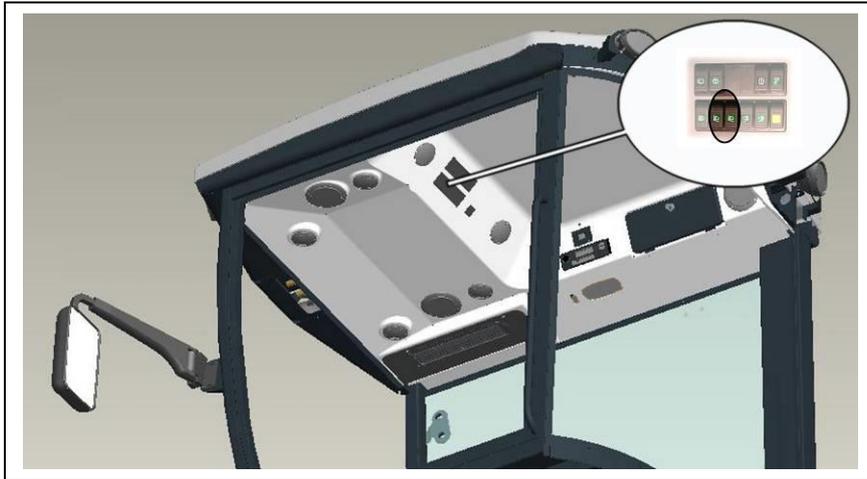


Card reader



Rear view mirror controls

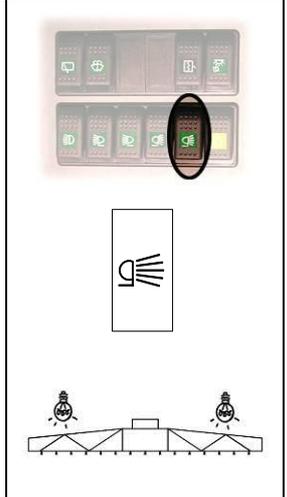
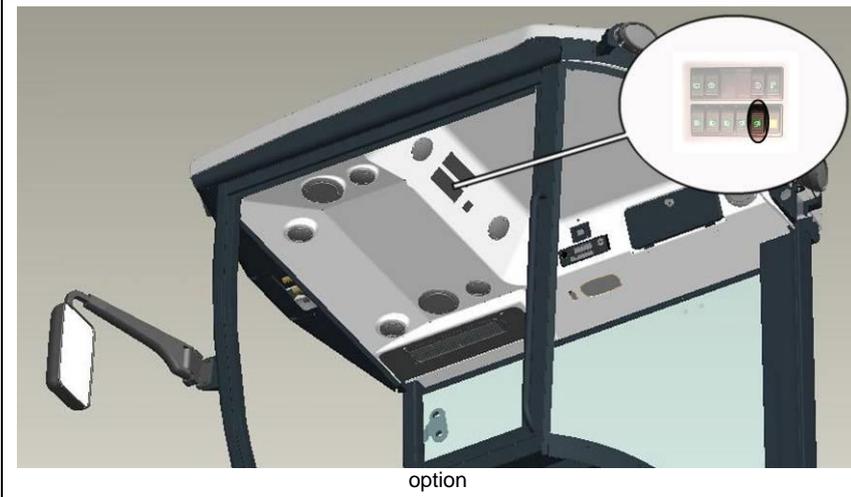




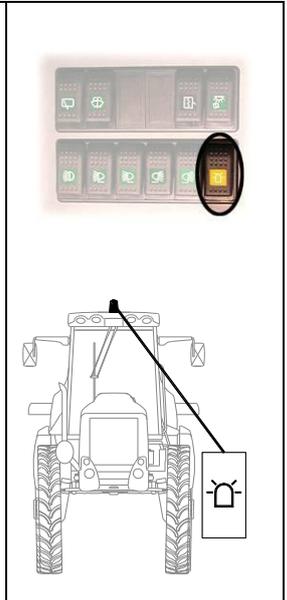
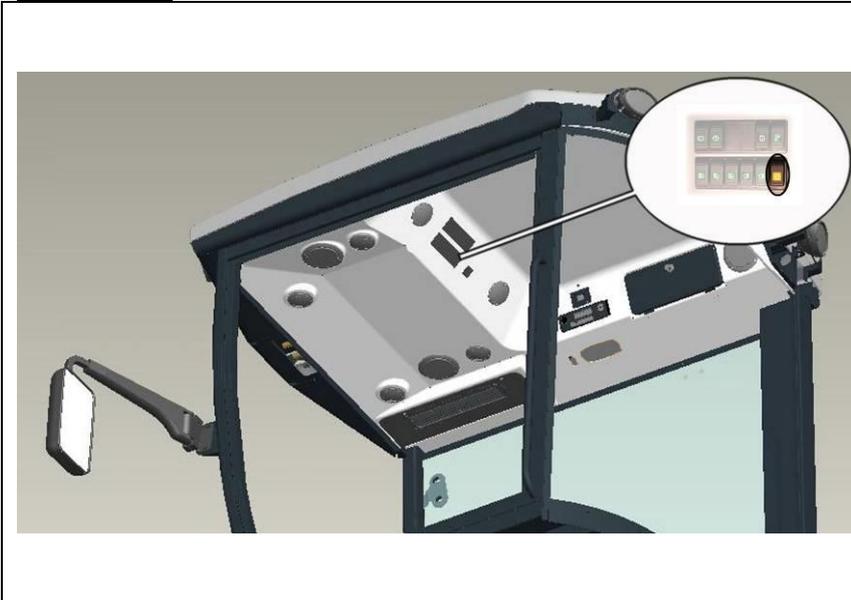
PRESIDIO-MANUAL-1.00-versi67624984-488-PRESIDIO-USER-MANUAL



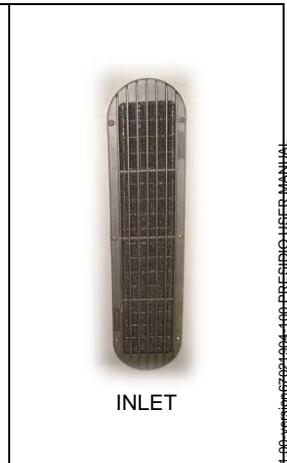
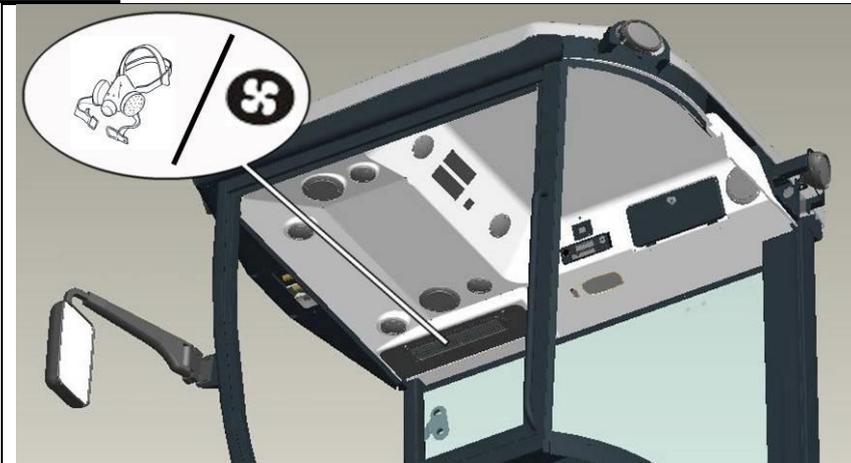
Boom Lights (if Fitted)



Rotating light



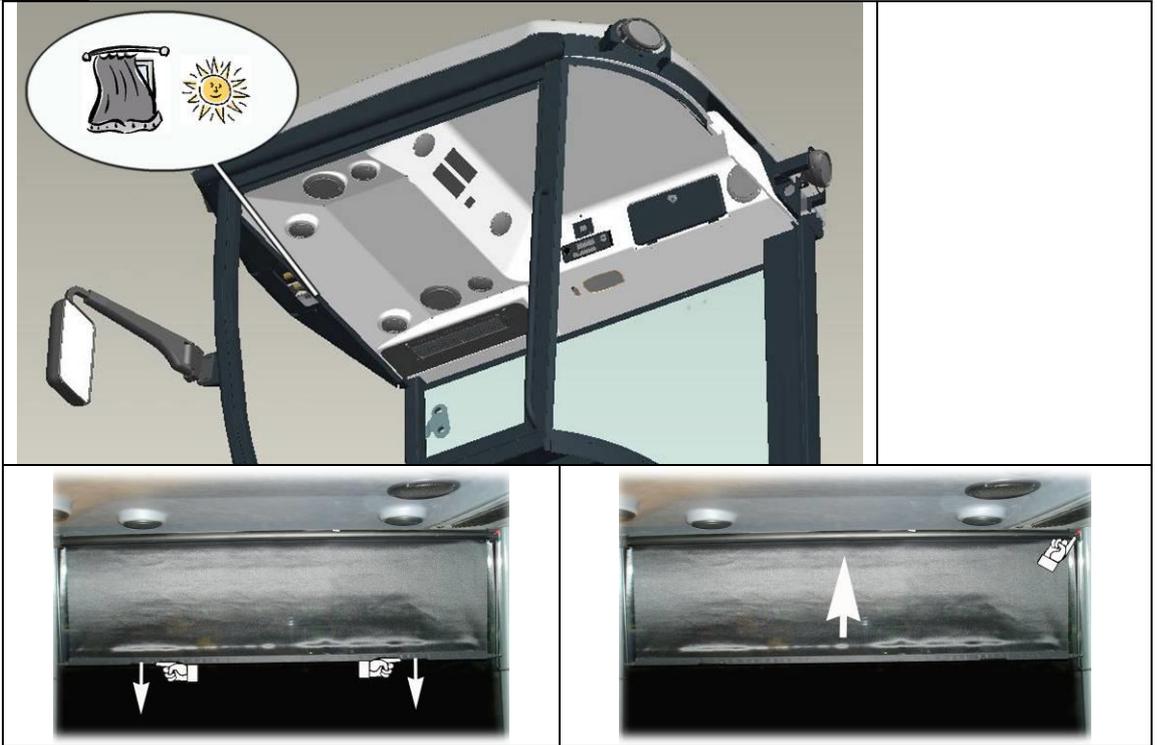
Cab air filter



PRESIDIO-MANUAL-1466-ver-06-07-2024-1466-PRESIDIO-USER-MANUAL



Sun shield



Hammer for emergency exit

 **ATTENTION** In the event of a dangerous situation, the hammer can be used to escape from the cab.

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3.1.2 INSTRUMENT PANEL AREA

Steering wheel



 DANGER



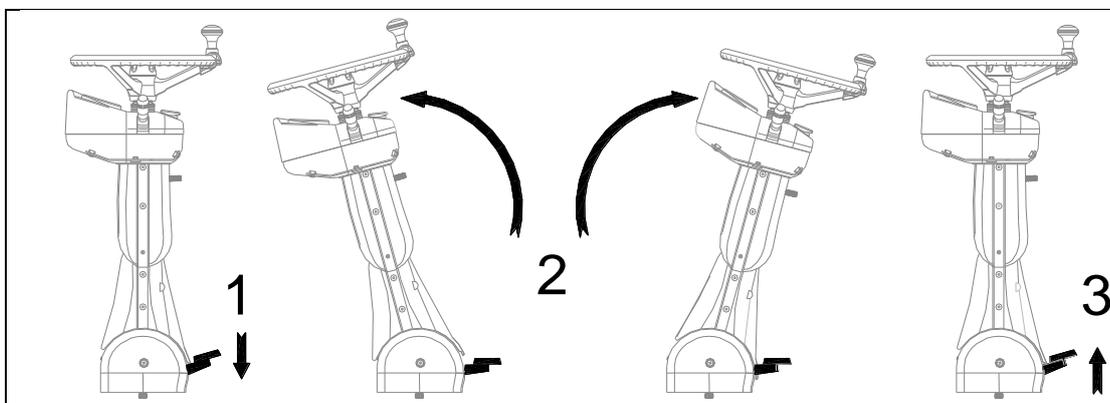
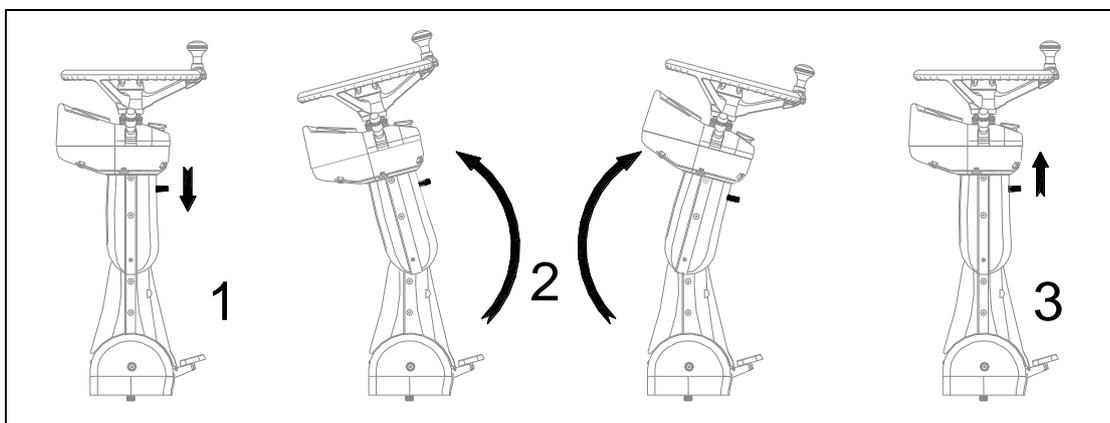
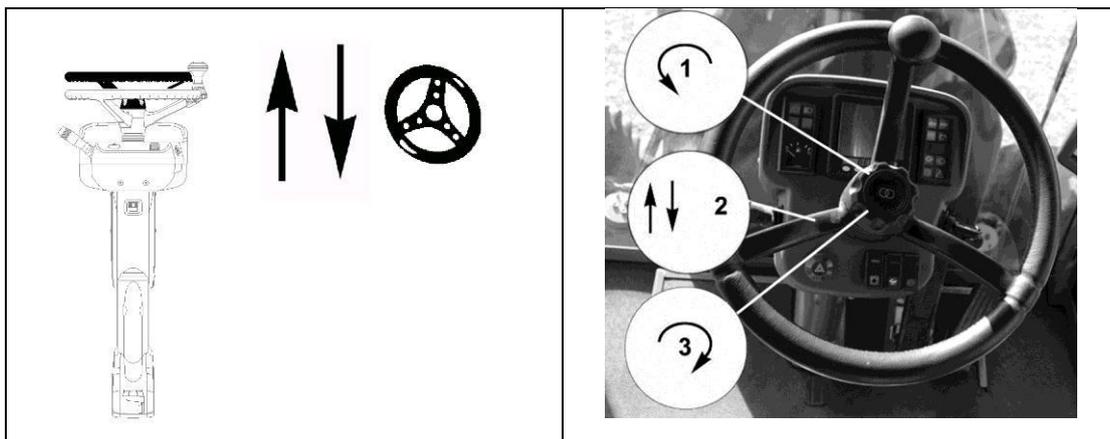
DE 0007



DE 0003

Ensure nobody is around vehicle when turning steering as it is possible to crush or kill a person in this area

Steering column adjustment



Key switch

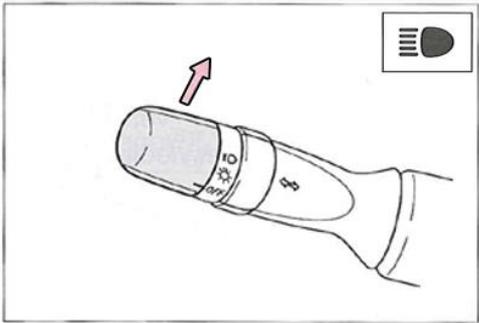
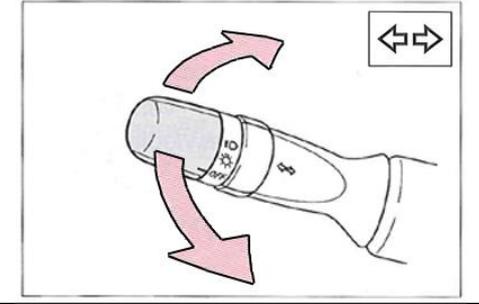
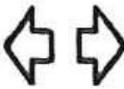
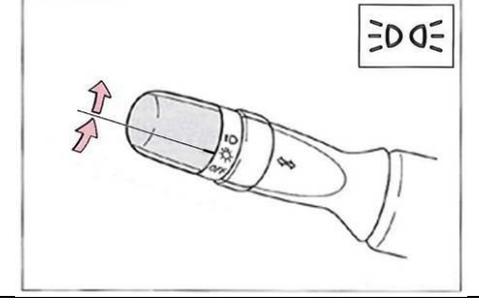
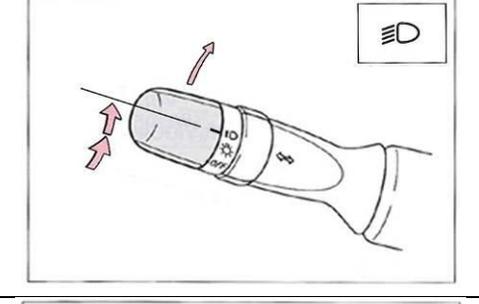
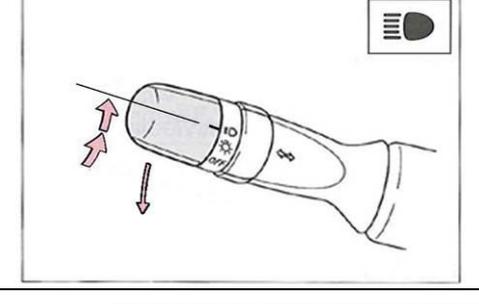
	0	 No Voltage	Acc. OFF
	1	 Voltage	Acc. ON
	D	START	

DE 0007

Light Switch

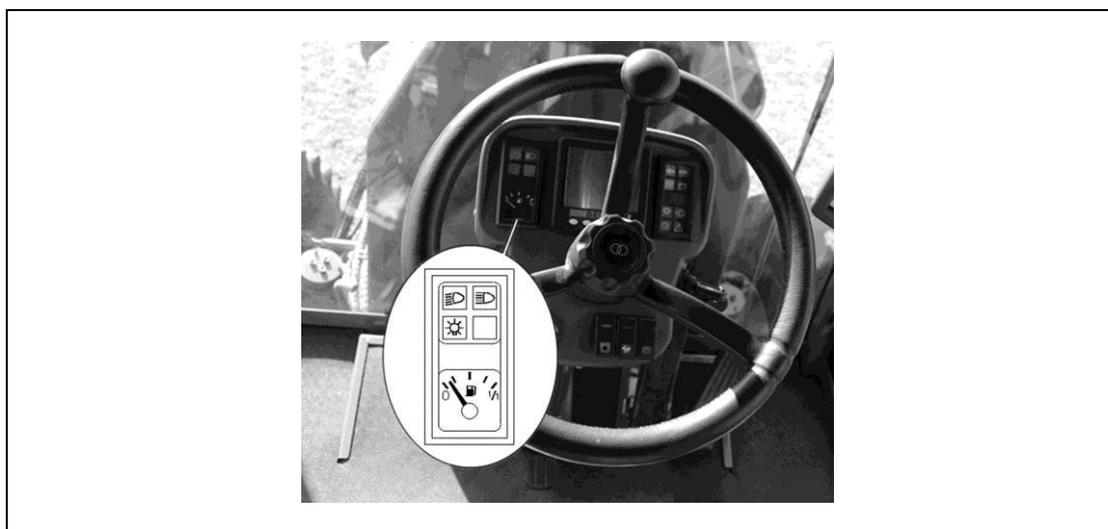




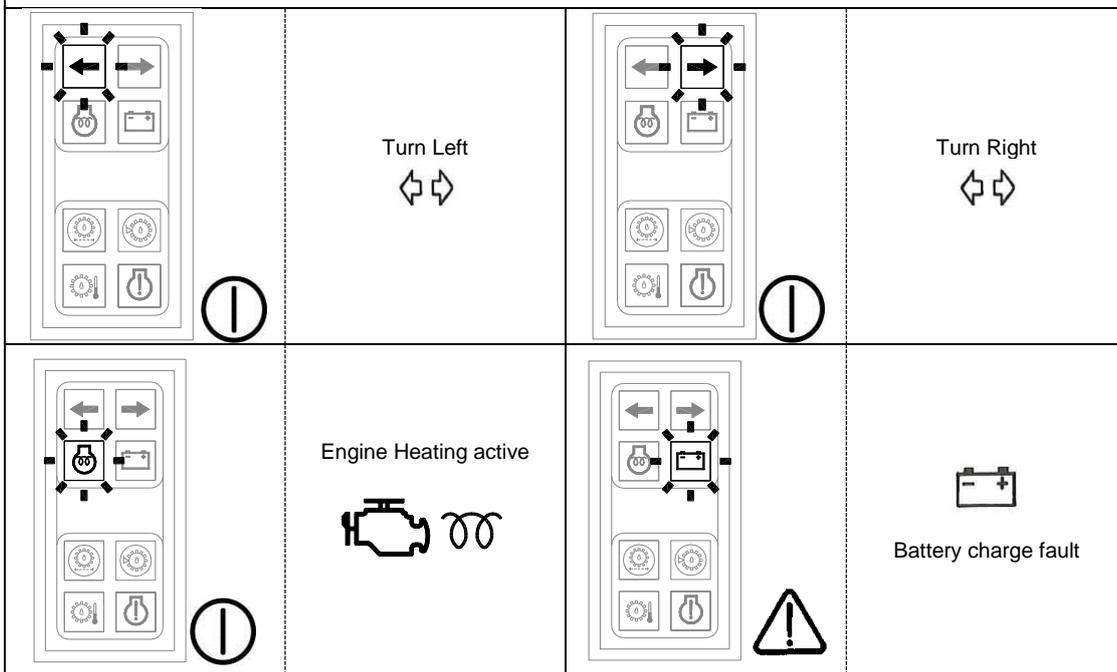
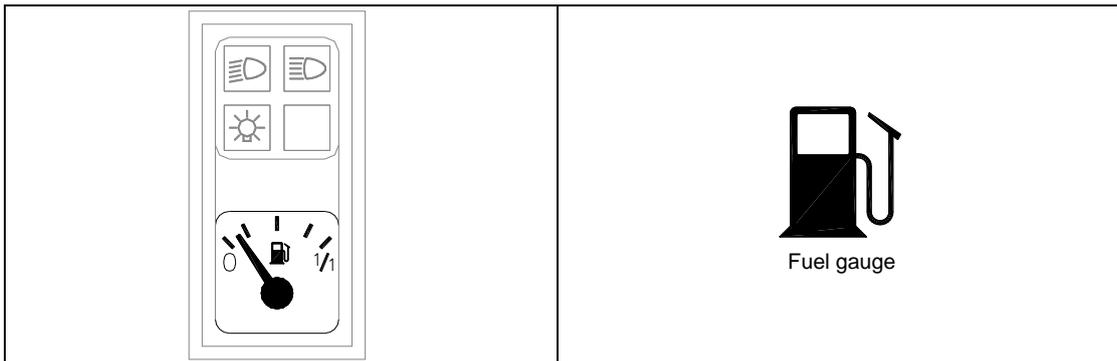
	 
	
	
	
	

Instrument panel and indicator lamp

	<p>Operating inspection</p>



	<p>Low beam</p>		<p>High Beam</p>
	<p>Park Lights</p>		<p>Hydraulic all wheel lock</p>





	<p>Oil filter clogged/ transmission</p>		<p>Oil/transmission low level</p>
	<p>High oil/ transmission temperature</p>		<p>Fault/engine</p>

If any of the above are active immediately stop machine and correct problem



Engine panel



General Description

The Deutz Display is a compact, robust panel-mountable module that enables a user to remotely request and display engine data.

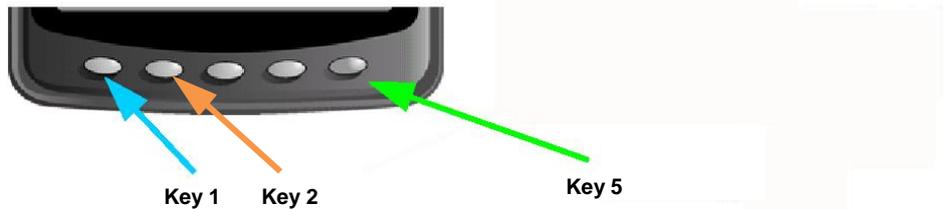


Figure 5.1: 'Soft' Keys

User Guide

General

On power-up the Deutz Display performs a series of self-test routines. The progress of these is shown in the lower right-hand corner of the display. In the unlikely event of a fault occurring the unit will emit a low-toned bleep. The user can attempt to rectify the fault by reverting to the factory defaults.

Following successful self-test, Deutz Display will commence to display engine data using the configuration settings held in its non-volatile memory.

Press any of the four key #1 to key #4 to make the menu bar visible on the LCD. Press the key below the relevant icon to select a display mode.

A folded page icon with an arrow on the page indicates that pressing the associated key will step through the various displays associated with a particular display format.



The menu bar will disappear after approximately five seconds of key inactivity.

It is recommended that these keys should not be pressed when driving the machine.

Setting Display Contrast and Lighting

Pressing the key 5 (see figure 5.1) when the menu icons are not on display will bring up the lighting and contrast menu.

The LCD has four back-light levels that allow the display to be read in the dark. The appropriate level is selected by pressing key #1 to decrease the illumination or key #2 to increase it (see figure 7.2.1).

Adjusting the contrast of the LCD to an optimum level ensures that the display is clearly legible and that grey-scales are appropriately displayed. Contrast is reduced by pressing key #3 (which will tend to lighten the display) and increased by pressing key #4 (which will tend to darken the display) (see figure 7.2.2).

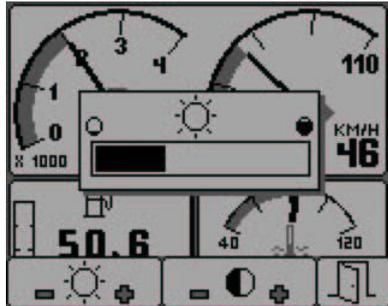


Figure 7.2.1: Lighting Adjust

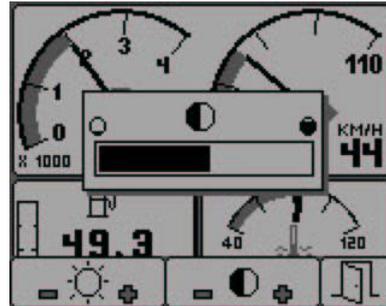


Figure 7.2.2: Contrast Adjust

Press button #5 to exit the contrast and lighting menu..

The chosen settings are stored in non-volatile memory and will be automatically reinstated whenever the Deutz Display is powered up.

CONTRAST RESET.
 If the display contrast was to be set so that the display was unreadable and so could not be adjusted back, press all four grey keys together.
 This will reset the contrast to a central value and will reset the lighting to full. All other settings will not be lost.

Using the Soft Keys.

The use of 'soft' keys vastly simplifies the Deutz Display operator interface by ensuring the user is only presented with active keys that are appropriate to the current function. This is achieved by using the LCD to display icons that represent the current function of each key.

Positioning the icons above the appropriate key allows each key's function to change whilst ensuring that the operator is always presented with a clear and unambiguous understanding of what each key-press will do (see figure 7.3.1).

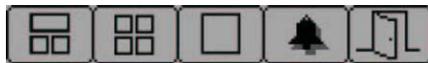


Figure 7.3.1: Main key Menu

The Main Engine Display

This display incorporates three independent windows and is intended to show the most important and frequently

accessed engine data .

To select the main engine display, press any of the four grey keys to show the top-level menu icons and then press key #1 (the left-hand key).

The main window, at the top of the display, shows two gauges; engine rpm on the left and speed on the right. Note that if speed data is not available the right-hand gauge will display engine oil pressure.

The window at the bottom-right of the display shows the coolant temperature.

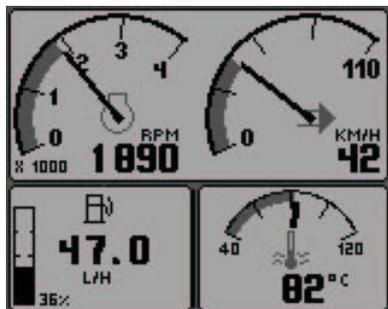


Figure 7.4.1: Main Screen

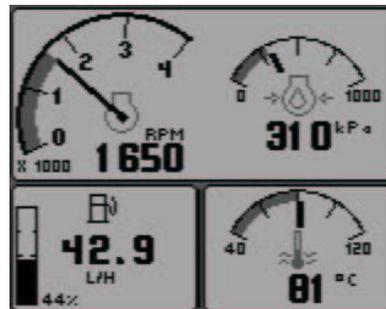


Figure 7.4.2: Main Screen (without Speed)

The window at the bottom-left of the display gives access to the fuel computer data and is similar to an automotive in-car fuel computer.

Various parameters can be displayed by repeated presses of key #1 (the left-hand key) which sequentially steps the window through the displays shown below. Note that fuel data parameters can only be shown if the required data is being received from the engine.



<p>Instantaneous Fuel Rate The instantaneous fuel rate received from the engine displayed as a volume per hour.</p>	
<p>Average Fuel Rate per hour If total fuel consumption and fuel rate are being received then the average will be calculated since the last trip fuel and trip hours reset. This is displayed in units of volume per hour.</p>	
<p>Average Fuel Consumption per distance If vehicle speed is being received then the average will be calculated since last trip fuel reset. This is displayed in units of volume per distance.</p>	
<p>Trip Fuel If total fuel used is received from engine then this will be calculated since the last reset.</p>	
<p>Engine Hours Total engine hours received from engine.</p>	
<p>Trip Engine Hours Engine hours since last reset. Calculated from Total Engine hours.</p>	

To carry out a 'reset' for each **reset**-able fuel computer parameter allow the menu bar to disappear and press and hold key [1] for at least 3 seconds.

Note: If the menu bar is not allowed to disappear then the display will move to the next parameter before the 'reset'.

The Quad Display

This display gives the user quick access to four screens, each displaying four gauges. The first screen shows four digital gauges, whilst the second and third screens each show four analogue gauges. Example displays are shown below.

To select the quad display, press any of the four grey keys to show the top-level menu icons and then press key #2.

Using the adjust mode, each individual gauge displayed on the screens can be configured by the user to show a different engine parameter selected from an extensive list. The adjust mode is entered by pressing key #5 when the Deutz Display is running in quad display mode and the menu is visible (if the menu isn't visible, simply press any of the grey keys to make it re-appear).

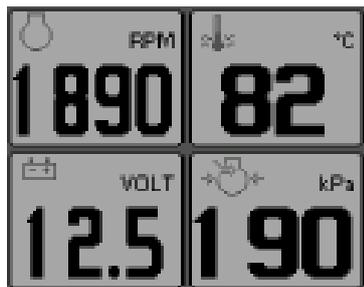
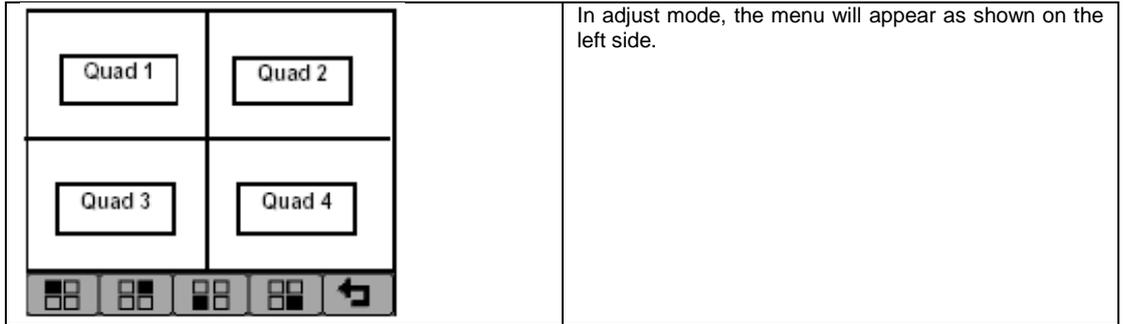


Figure 7.5.1: Representative view of first screen, showing four digital gauges.



Figure 7.5.2: Representative view of second and third screens showing four analogue gauges.



In adjust mode, the menu will appear as shown on the left side.

Pressing key #1 will cycle the top-left display through all available engine parameters, key #2 will cycle the top-right display etc. The adjust mode is exited by pressing key #5.

For a list of engine parameters that can be displayed see section “The Quad and Graph Parameters”.

The Graph Display

The graph display shows data trends in one large window and is analogous to a traditional data plotter.

This mode is selected by pressing any of the four grey keys to show the top-level menu icons and then pressing key #3.

Data is shown in graph form, with the most recent data scrolling from the right of the display towards the left. The viewed time range can be adjusted in the configuration menu from 2, 10 or 30 minutes up to 1, 2, 4 or 8 hours. See other section of this document for further details.

The maximum and minimum values of the Y axis (defining the span of readings displayed) are adjusted automatically to give the optimum view of the visible data.

The data to be displayed can be selected by repeatedly pressing key #3 whilst in the graph display mode.

For a list of engine parameters that can be displayed see section “The Quad and Graph Parameters”.

The Quad and Graph Parameters

Following is a list of engine parameters that can be displayed in the Quad and Graph screens:

	Paramètres	Quad	Graph	Ico
a)	Engine Speed (rpm)	X	X	
b)	Coolant Temperature	X	X	
c)	Battery Voltage	X	X	
d)	Turbo Pressure	X	X	
e)	Coolant Pressure	X	X	
f)	Fuel Pressure	X	X	
g)	Engine Oil Pressure	X	X	
h)	Transmission Oil Pressure	X	X	
i)	Transmission Oil Temperature	X	X	
j)	Exhaust Temperature	X	X	
k)	Engine Oil Temperature	X	X	
l)	Inlet Manifold Temperature	X	X	
m)	Engine Torque (actual)	X	-	
n)	Accelerator Position	X	-	
o)	Fuel Rate	-	X	

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The Alarm Display Screen

The Deutz Display recognises alarm messages received from the engine via the data link. When a new alarm is received the Deutz Display will start to beep, a flashing pop-up window will appear with the latest alarm details.

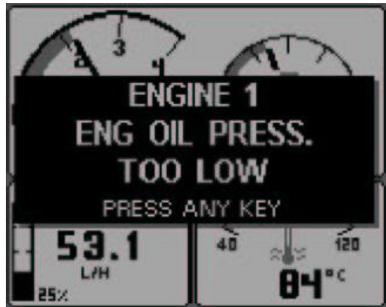


Figure 7.8.1: A representative alarm pop-up message, showing low engine oil pressure.

Pressing any key will display the alarm list screen which contains details of all previous alarms. Those that have already been acknowledged are shown as black text on a grey background. New alarms, that have not yet been acknowledged, are shown as highlighted grey text on a black background. If engine hour's data is available, the list will also indicate the engine hours when the alarm message was first received.

When first entering the alarm page the list will automatically go to the most recent alarm received. If the list is longer than the screen size, the alarm list can be scrolled up and down using keys #1 and #2.

The screen cannot be exited until all alarms have been acknowledged by pressing key #3. Alarm messages will be automatically cleared from the list if no longer received.

The alarm list screen can be viewed, at any time, by pressing key #4.

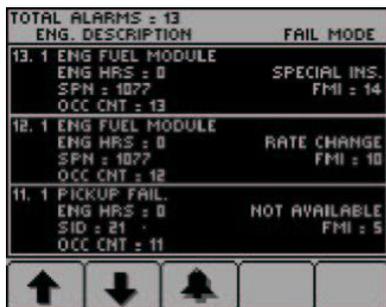


Figure 7.8.2: The alarm list screen, showing unacknowledged alarm conditions.

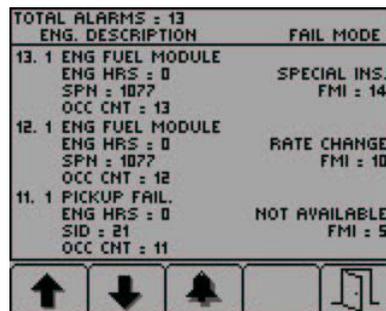


Figure 7.8.3: The alarm list screen, showing that alarm conditions have been acknowledged. Note that the exit key (key #5) has now been activated.

Pop-up Messages and Warnings

In the configuration menu (see section 7.10), the user can set the engine service interval in hours. When the Deutz Display determines that an engine service is due, it will display a "SERVICE REQUIRED" message overlaying the start-up screen which appears for seven seconds following power-up.

Should the Deutz Display not detect valid engine data, a flashing pop-up window will appear displaying a "Communications Failure" icon denoting this fault condition. Once engine data transmissions have been detected the pop-up window will disappear and normal data display will continue.

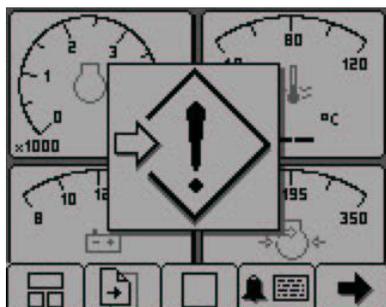


Figure 7.9.1: The communications failure icon.

Configuration

The configuration mode allows the user to set various operating parameters and modes of the Deutz Display. These include such choices as imperial or metric units, scale limits for the speedometer gauges, engine service interval etc.

The configuration menu is entered by pressing and holding key #5 (the blue key) for at least 3 seconds when the Deutz Display is in its normal operating mode. The top-level configuration menu will be displayed on the LCD, as shown below.

Keys #1 and #2 allow the operator to move up and down the menu whilst key #4 enters the highlighted menu item. Key #5 exits the configuration menu and saves all configuration data into non-volatile memory.

The SETTINGS sub-menu allows the Deutz Display to be configured according to the user's preferences whilst SYSTEM accesses maintenance and low-level system configuration settings.

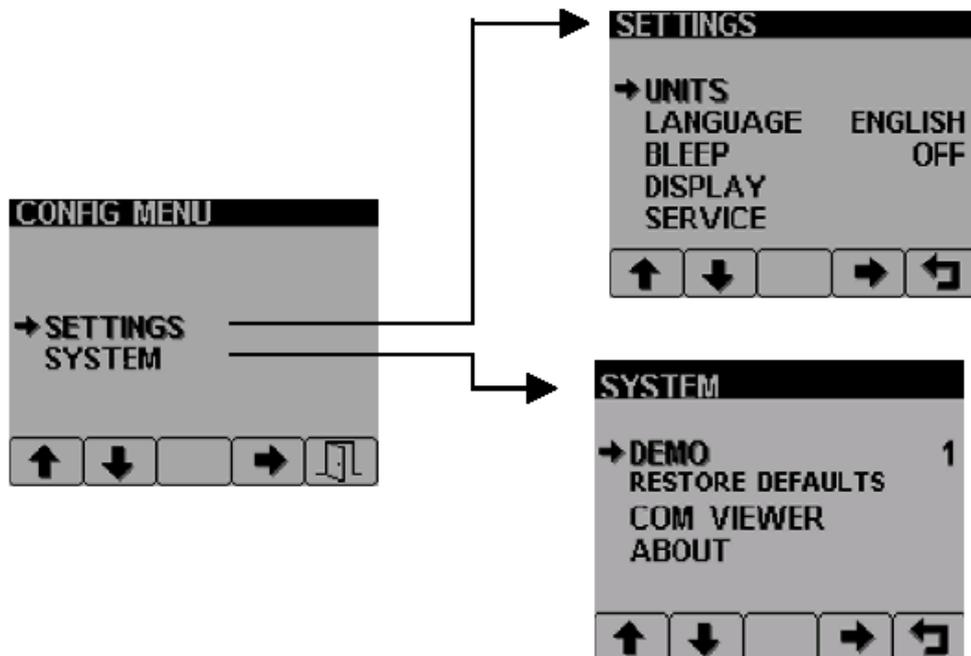


Figure 7.10.1: The top-level configuration menu and SETTINGS and SYSTEM sub-menus.

<p>Selecting UNITS from the SETTINGS submenu gives access to five parameters which can be displayed in units selected from a list. Use the up and down keys (key #1 and key #2) to select the required parameter, then press key #4 to cycle through the permitted units of measurement. Pressing key #5 returns the user to the main SETTINGS menu.</p>	<p>The 'UNITS' sub-menu displays five parameters with their current units: SPEED (KM/H), DISTANCE (KM), PRESSURE (kPa), VOLUME (LITRE), and TEMP (°C). The 'SPEED' option is highlighted with a right arrow. The screen has the same five control buttons at the bottom as the other menus.</p>
--	---



<p>The LANGUAGE sub-menu allows the user to select which language Deutz Display uses to display messages and prompts. Use the up and down keys (key #1 and key #2) to highlight the required language and then press key #4 to select it. Pressing key #5 returns the user to the main SETTINGS menu.</p> <p>BLEEP selects whether each key press is acknowledged with an audible bleep. Note that, even with BLEEP switched off, the audible alarm will still sound if an alarm condition occurs.</p> <p>The DISPLAY sub-menu allows the user to define the maximum rpm shown on the tachometer, the maximum speed shown on the speedometer and the speed with which the display scrolls when using Deutz Display in the graph display mode (see section "The Graph Display" for further details of the graph mode).</p>	
<p>SERVICE allows the user to set the engine service interval so that the Deutz Display can, on power-up, remind the operator when a service becomes due. See section "Pop-up Messages and Warnings" for details of the pop-up message that signals this event.</p>	

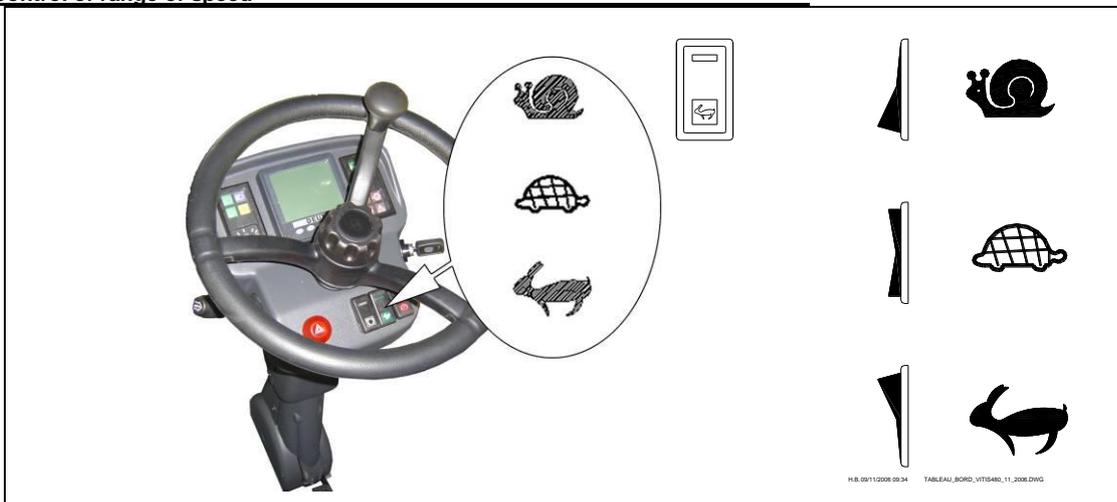
DEMO, the first item on the SYSTEM menu, allows the Deutz Display to run in a demonstration mode, showing its capabilities even if not connected to a valid engine data stream. There are three different demo modes. DEMO 1 has speed data simulated by the Deutz Display, DEMO 2 does not generate simulated speed data, DEMO 3 simulates various alarm conditions. For normal use, the demo mode must be switched to OFF.

Setting	Metric	Imperial
Language	German	
max RPM	4000	
max Speed	110 Km H	70 MPH
Graph range	2 m i n s	
Speed	Km H	MPH
Distance	Km	Miles
Pressure	kPa	PSI
Volume	L	Gal
Temperature	° C	° F

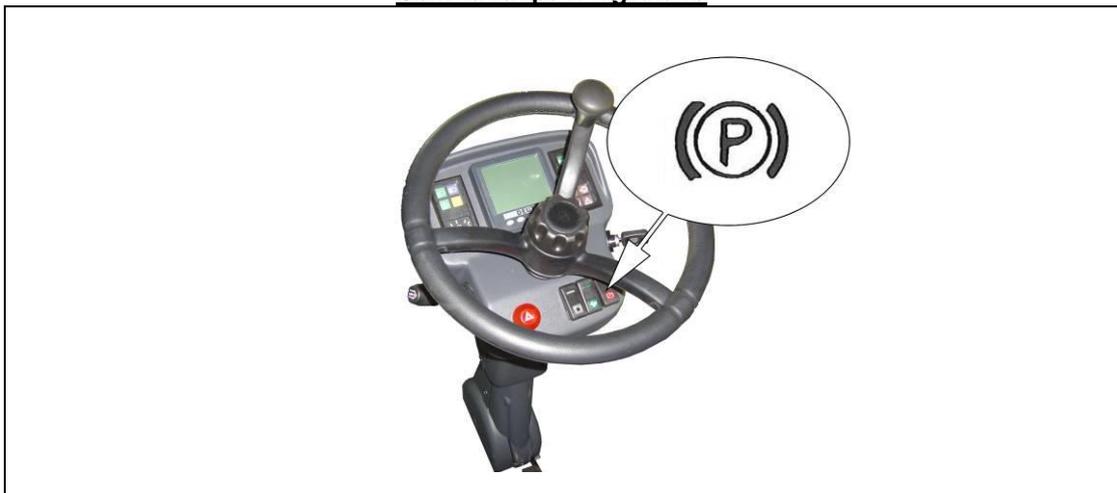
Hazard light control switch



Control of range of speed



Control of parking brake



Lockout control

	<table border="0"> <tr> <td data-bbox="957 952 1021 1108"> </td> <td data-bbox="1085 985 1212 1075"> </td> <td data-bbox="1260 974 1372 1086"> </td> </tr> <tr> <td data-bbox="957 1187 1021 1344"> </td> <td data-bbox="1085 1220 1212 1310"> </td> <td data-bbox="1260 1187 1372 1299"> </td> </tr> <tr> <td data-bbox="957 1422 1021 1579"> </td> <td data-bbox="1085 1444 1212 1534"> </td> <td data-bbox="1260 1411 1372 1523"> </td> </tr> </table> <p style="font-size: small; margin-top: 5px;"> aire Propriétaire... 28/04/2011 10:04 blocaje_PR2540_04-2011.dwg </p>									

Caution when this button is depressed steering is to a degree reduced but traction is increased.

Brake pedal



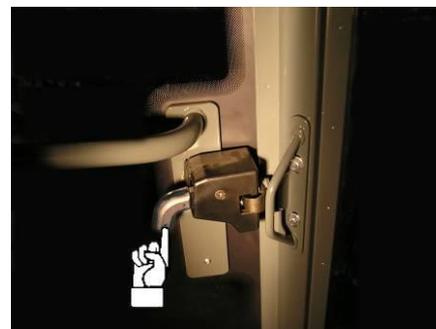
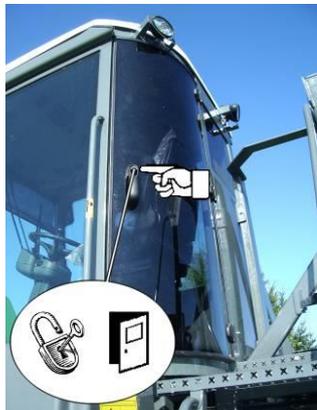
Brake pedal, push to activate

Accelerator pedal



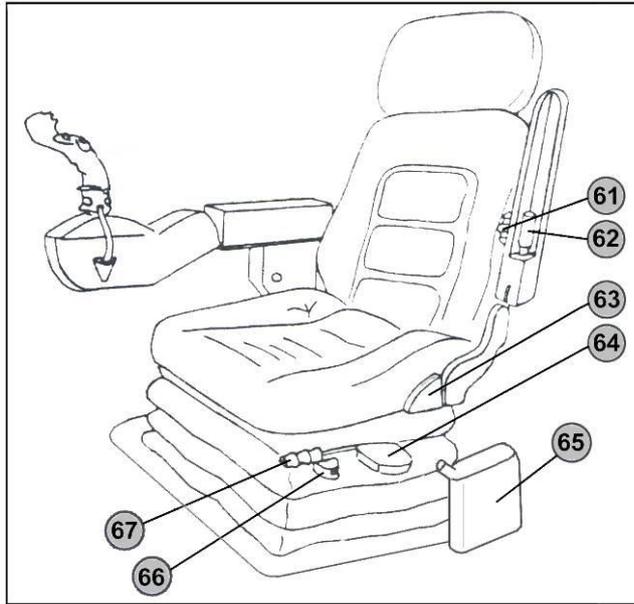
3.1.3 OPERATORS SEAT AREA

Opening/closing the door





SEAT

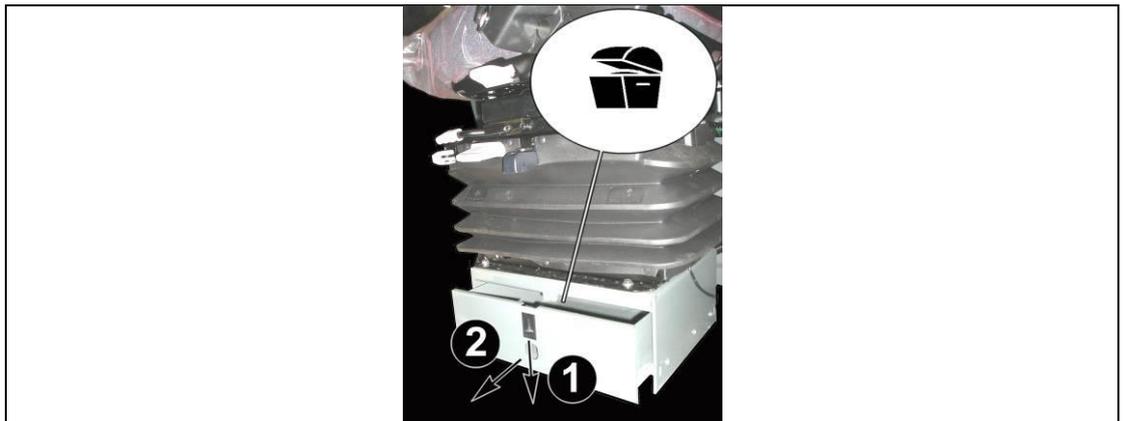


- 61 - Dorsal adjustment**
- 62 - Adjusting the arm-rest**
- 63 - Adjust the back angle**
- 64 - Adjusting the seat height**
- 65 - Windscreen washer**
- 66 - Locking the horizontal cushioning**
- 67 - Longitudinal adjustment of the seat**

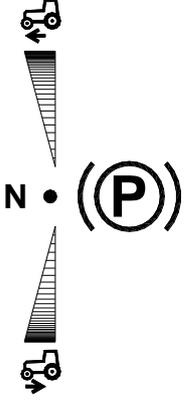
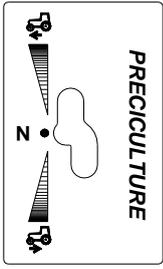
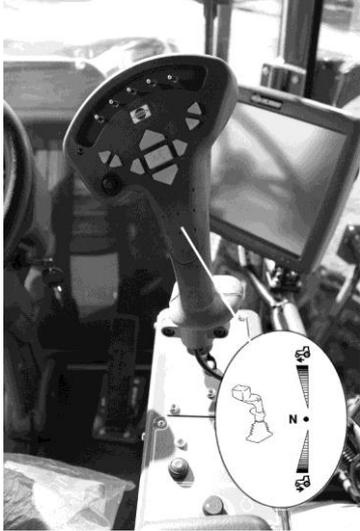


- 68 - Seat rotation**
- 69 - Storage**

Storage compartment (below seat)



Travel lever



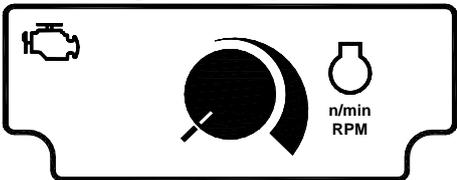
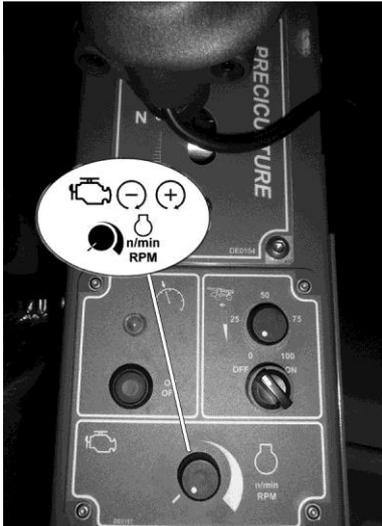
Parking brake automatically activated in neutral position (N)

⚠ DANGER



DE 0007 DE 0014

Console no. 1



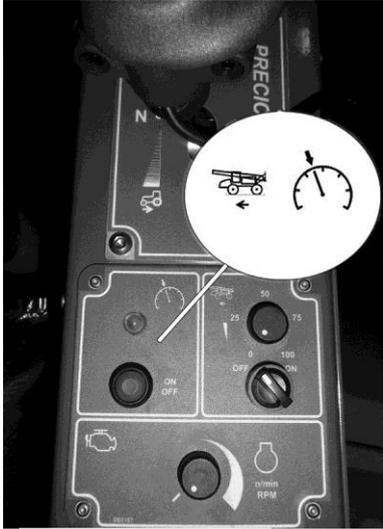
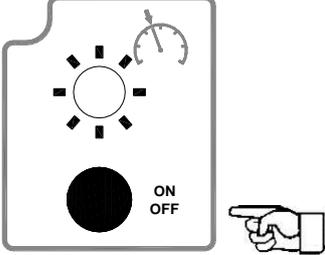
Engine Speed adjustment

n/min RPM



	<p>Speed limit</p>
	<p>100 % : The total stroke of the travel lever covers the entire gamut of the speed range selected</p>
	<p>50 % : The total stroke of the travel lever covers half the gamut of the speed range selected.</p>
	<p>25 % : The total stroke of the travel lever covers a quarter of the gamut of the speed range selected.</p>











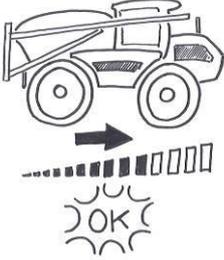


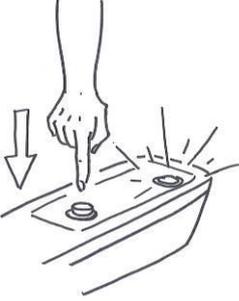



*EVITARE DI COLPITI, URTI, VIBRAZIONI

Constant speed





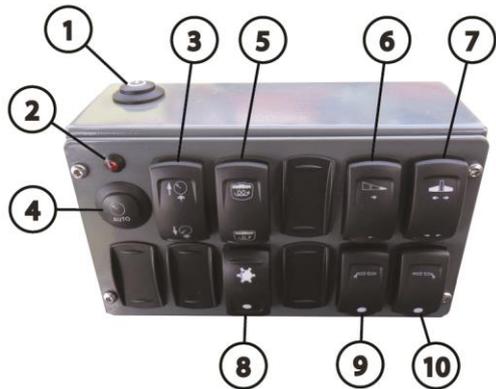
Activated or deactivated = push-button (ON/OFF).
 The indicator flashes.
 Storage of the speed, after 3 seconds without variation
 The indicator lights up continuously.

The change of speed or the speed limit potentiometer will lead to the storage of a new constant speed.



Electrical control box

1. System power On/Off
2. Status light
3. Manual spray pressure
4. Automatic spray pressure
5. Agitation (increase/decrease)
6. Outer fold button
7. Main fold button
8. Fluid pump On/Off
9. Left end nozzle
10. Right end nozzle





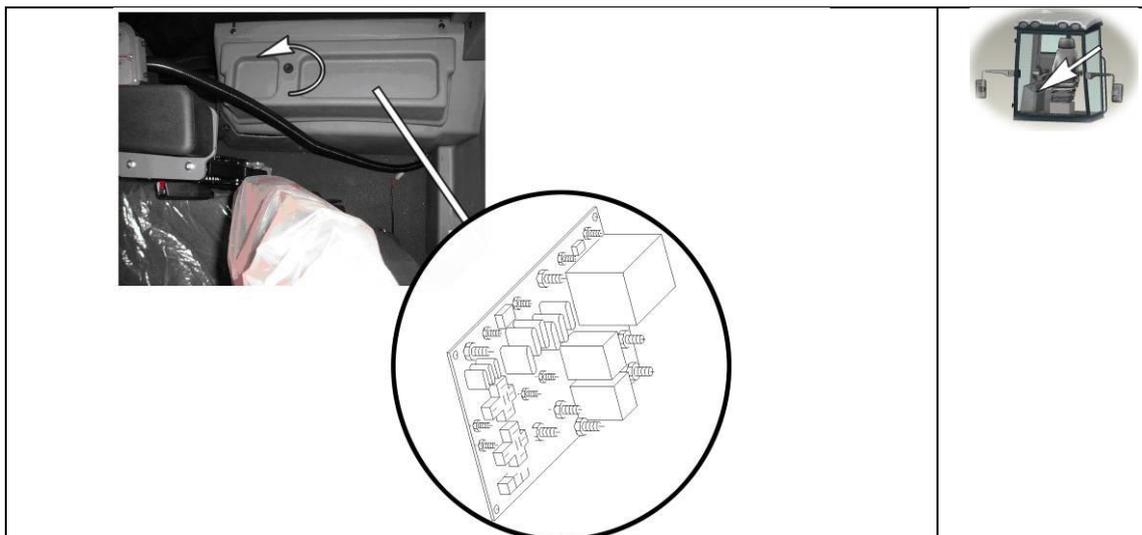
	Windshield washer	

	Battery shut-off	
		<p>Note: System remains active for 30 seconds after switch is turned off</p> <p>(30 s)</p>

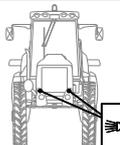
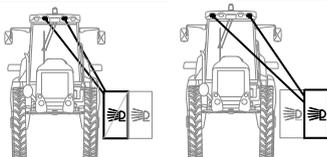
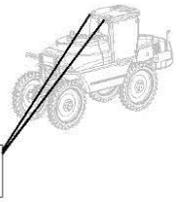
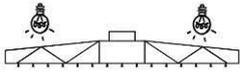
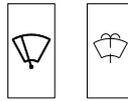
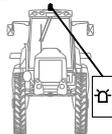


	DIN 12 V socket	
		<p>15 => + 31 => - 82 => +</p> <p>15 & 31 : 20 A maxi 82 : 5A</p>
20 A MAXI		

	Diagnostic test points	
	Libre Free	Libre Free



Fuses

Items	Functions	Current
F2	 	30
F3	Relay control  (heating solenoid valve, ventilation, air conditioning compressor, power supply air conditioning regulator)	2
F4	Air conditioning compressor 	5
F5		10
F6		20
F7		15
F8		20
F9		15
F10		7,5

PRESIDIO-MANUAL-1-66-v01-01-004-100-PRESIDIO-USER-MANUAL



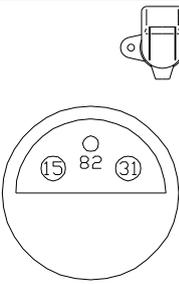
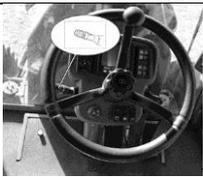
Items	Functions	Current
F11		7,5
F12		7,5
F13	Free	15
F14	Free	15
F15	Free	15
F16	Free	15
F17	Free	15

Non-contractual representation

Items	Current	Functions	-
1	10 A		Before battery isolation switch
2	5 A	+ Power board control	Before battery isolation switch
3	30 A	Heat engine (power)	After battery isolation switch
4	2 A	Heat engine (control)	After battery isolation switch

PRESIDIO USER MANUAL - 100-67924904-100-PRESIDIO-USER-MANUAL



5	2 A		After battery isolation switch
6	15 A	Free	After battery isolation switch
7	10 A	Pneumatic seat	After battery isolation switch
8	15 A	Fluid Pump	After battery isolation switch
9	15 A	 <p>15 => + 31 => - 82 => +</p> <p>15 & 31 82 = 0</p>	After battery isolation switch
10	10 A	 + Turn signal lights	After battery isolation switch
11	15 A	Commodo (dim/headlight power supply)	After battery isolation switch
12	3 A	Electronic board power supply (drive)	After battery isolation switch
13	15 A	Brake - speed range	After battery isolation switch



right side window



-  This window is secured shut by a safety screw that is accessible from external of the cabin on the right hand base of the window. If screw is removed window will open with latches from inside.
- It is recommended for best sealing to have screw secured
- Close window always before travel
- Do not open window with screw secured



3.2 CAB EXTERIORS

Reminder :

 **DANGER** Near the **PRESIDIO** , when the **PRESIDIO** is running, all zones other than the workzone are dangerous zones.

 **ATTENTION** When you leave the operator station in the cab to the “workzone” Stop any movement of the **PRESIDIO** .

- Bring the lever to the neutral point
- Put on the parking brake
- Lower the boom on the support provided for storage or to the lowest height if unfolded

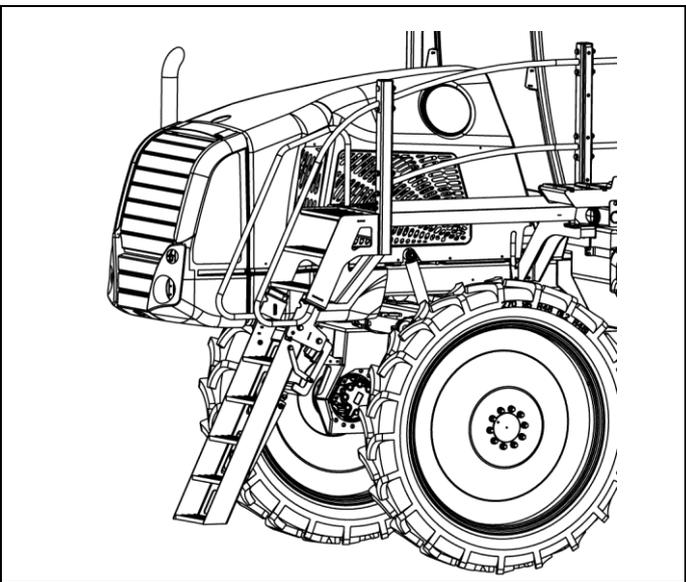
Beware of the hot zones of the **PRESIDIO**.

Ladder for access to the cab

The ladder to the platform will automatically lowered when parking brake is engaged. The ladder will automatically be lifted when the parking brake is disengaged.



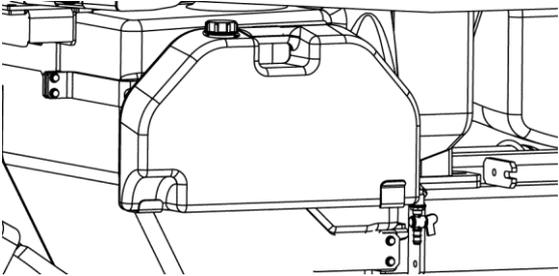
 **ATTENTION** The motor has to be running for the ladder to operate.



Hand water tank







This water must never be used for drinking water.

PRESIDIO-MAN-NB-1100-1304-100-PRESIDIO-USER-MANUAL



3.3 LIQUID SYSTEM

3.3.1 GENERAL INFORMATION - VALVE SYSTEM

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

3.3.2 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

3.3.3 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.

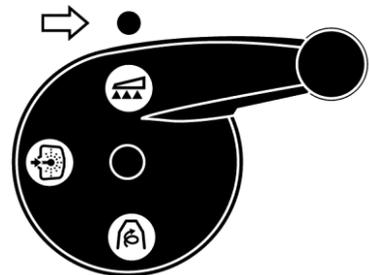
	Suction from main tank
	Suction from rinse tank



3.3.4 PRESSURE VALVE = GREEN SYMBOLS

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

	Boom spraying
	TurboFiller
	Rinse nozzle

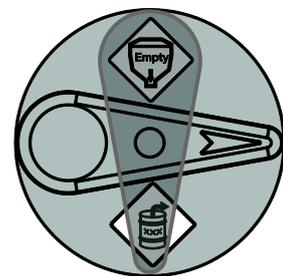


3.3.5 CHEMICAL SUCTION SOURCE VALVE

The chemical suction valve can be directed to suction from TurboFiller or it can be directed to suction from Chem probe. The valve is closed in horizontal position.

⚠ ATTENTION To activate the Chemical Suctions Source valve the pressure valve has to be set to Chemical Inductor.

	Suction from TurboFiller
	Suction from Chem probe





3.3.6 TURBOFILLER = YELLOW SYMBOLS

The TurboFiller is located in the Fluid Working Zone on the sprayers left side. Pull the handle straight out to lower the TurboFiller into fill position.

When retracting the TurboFiller after use, Pull the handle straight out and then upwards until it is back in transport position.

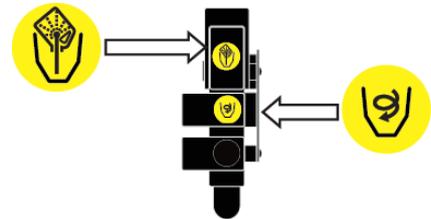


Never operate the cleaning nozzle with the lid open unless it is covered by a chemical container!

3.3.7 TURBO DEFLECTOR VALVE



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



3.3.8 CHEMICAL CONTAINER CLEANING LEVER



The upper lever is located to the left side of TurboFiller and is used for two purposes:

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

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



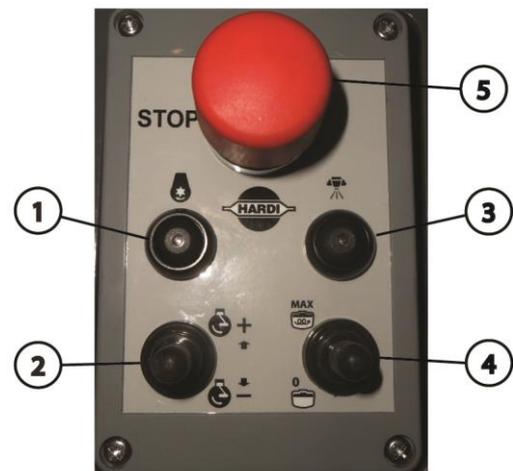
Do not press lever unless the multi-hole nozzle is covered by a container to avoid spray liquid hitting the operator

3.3.9 EXTERNAL ELECTRICAL CONTROLS



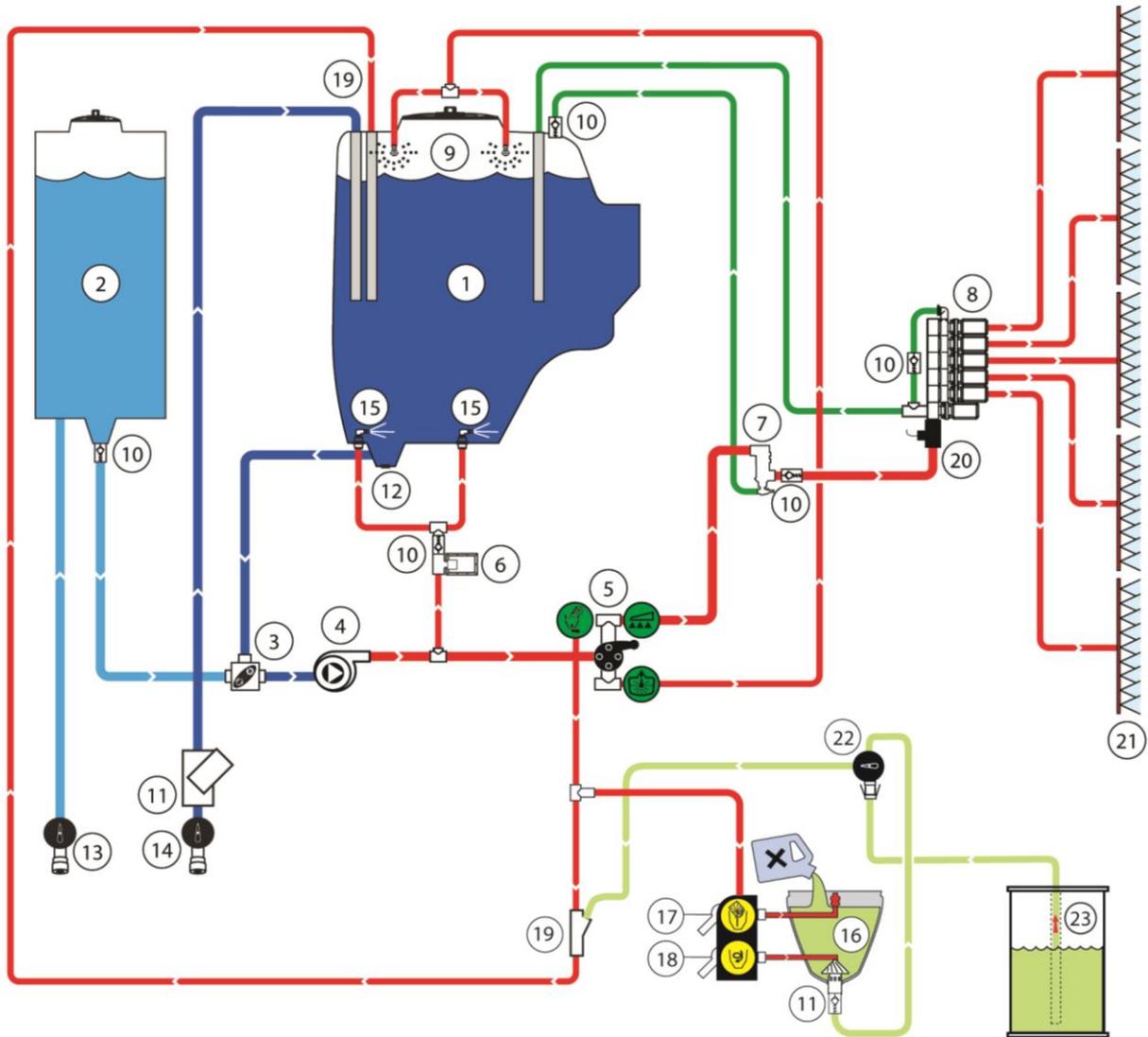
ATTENTION The accelerator control is only active if the parking brake is activated.

- 1) Pump on/off switch
- 2) Motor acceleration / retardation control
- 3) Spray On/Off switch
- 4) Agitation switch
- 5) Emergency motor stop switch





3.3.10 DIAGRAM - LIQUID SYSTEM



- | | |
|-------------------------------|-----------------------------------|
| 1. Main Tank | 16. HARDI® Turbo Filler |
| 2. Rinse Tank | 17. Chemical Container Rinse |
| 3. Suction Valve | 18. Chemical Mix |
| 4. Pump | 19. Venturi |
| 5. Pressure SmartValve | 20. Flow Meter |
| 6. Agitation Valve (electric) | 21. Sprayer boom |
| 7. CycloneFilter | 22. Chemical Suction Source Valve |
| 8. EFC Distribution Valves | 23. Chem Suction Probe |
| 9. Rinse Nozzles | |
| 10. One Way Valves | |
| 11. FastFill Filter | |
| 12. Tank Drain | |
| 13. Rinse Tank Quick Fill | |
| 14. Main Tank Quick Fill | |
| 15. Agitation nozzles | |
-
- | | |
|--|-----------------------------------|
| | Main Tank Supply - Suction |
| | Fluid under pressure |
| | Flush Tank Supply / External Fill |
| | Chemical Induction |
| | Bypass |



3.3.11 FILTERS

All filters should always be in use and their function checked regularly. Pay attention to the correct combination of filter and mesh size. The mesh size should always be less than the average of the nozzles in use. In-line pressure filters can be fitted at each section as an option. Nozzle filters are fitted at each nozzle.

3.3.12 CYCLONE FILTER

The cyclone filter is located behind the fluid control panel it has a built in self-cleaning function. There is a lid in the platform to access the mesh filter. The return valve (5) is located under the fluid control panel.

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

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

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

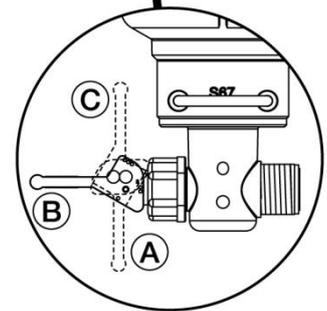
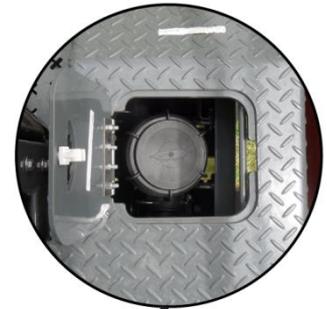
- A. This position marked with 1 dot: There is no return flow. Position is used when rinsing the boom if there is spray liquid in the main tank. Also used when high spraying volume is required.
- B. This position marked with 2 dots: Normal spraying position. With return flow to prevent filter being clogged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



Both the suction and pressure valve has to be turned to closed position before opening the Cyclone filter! If not spraying liquid can hit you when opening the filter and drain the main tank content!



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



3.3.13 FILLING FILTER

Access to this filter is from below the sprayer immediately behind the work zone.
 This filter is used to clean fluid that is pumped into the main tank via the LH side coupling. The screen is an 80 mesh. Periodically this filter should be cleaned to ensure filling is not restricted to main tank. This filter may also have to be cleaned if operator chooses to chemical batch fill into main tank as it can be source of contamination. The bowl of the filter is fitted with a ½ inch tap to drain contents prior to any work that may be done on this filter. Please see further instructions in maintenance section of this manual.



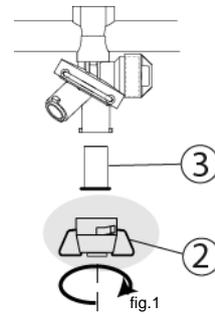
Filling Filter

3.3.14 FITTING THE FILTER 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 TECHNIQUES book
 The HARDI nozzle and cap requires a seal between nozzle and body. Generally this seal is contained on the nozzle filter.

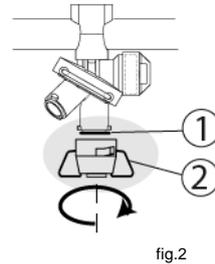
With Nozzle filter (fig.1):

1. Place (3) nozzle filter with seal into cap
2. Fit (2) nozzle cap into body and turn ¼.



Without Nozzle filter (fig.2):

1. Place (1) seal into cap
2. Fit (2) nozzle cap into body and turn ¼.





4 STARTING AND USE

Planned use conditions



Reminder:

This **PRESIDIO** is exclusively intended to be used for standard agricultural work. Any other use is considered contrary to normal use.

The sprayer has many safety functions such as warning lights, warning buzzers and interrelated switches. Ensure these machine safety elements are continuing to functioning. Upkeep and repair specified by the manufacturer are also essential elements of normal use.

This **PRESIDIO** should only be operated, maintained and repaired by people who are very familiar with its particular characteristics and who know the corresponding safety procedures.

Accident prevention, all other regulations generally recognized with regard to occupational health and safety and the regulations concerning road traffic are operator responsibility and must be observed at all times.

Any modifications made arbitrarily on this **PRESIDIO** may remove the liability of the manufacturer for any resulting damage or injury.

Qualification of the Operator



Reminder:

The **PRESIDIO** should only be used, maintained and repaired by people who are very familiar with and understand particular characteristics of the product and who know the machines corresponding safety procedures.

Learn to use and handle the controls. Do not assign the **PRESIDIO** to a person who is not trained for this. The **PRESIDIO**, because of its particular technological design, must be used by **drivers who are experienced** or well informed.

Before using your **PRESIDIO**, familiarize yourself with all of the controls and its proper use. If in doubt please ask your Dealer or HARDI personal

Definition of the work stations - Definition of the dangerous zones

Reminder :



ATTENTION The operator station in the cab is the main work station.



ATTENTION The "workzone" giving access to the remote electrical controls of the engine and fluid pump, the fluid and chemical filler controls and tank filling points placed near the ladder for access to the driving cab is the only authorized work station outside of the cab.



DANGER When the **PRESIDIO** is functioning, all zones other than the operator station (cabin) are dangerous zones.



ATTENTION When you leave the operator station in the cab to the "workzone" giving access to the remote electrical controls of the engine and fluid pump, the fluid and chemical filler controls and tank filling points placed near the ladder for access to the driving cab:

- Stop any movement of the **PRESIDIO** .
- Bring the lever to the neutral point
- Put on the parking brake
- Lower the boom on the support provided for storage or to the lowest height if unfolded

Beware of the hot zones of the **PRESIDIO**.



Safety of the **PRESIDIO**

Reminder:



WARNING

Modifications of the **PRESIDIO** are forbidden, except for those authorized specifically and in writing by the After-Sale Service Department or Technical Department of "HARDI".

It is forbidden to remove the protection covers unless all of the conditions mentioned below are met simultaneously:

PRESIDIO stopped, engine stopped, parking brake on, key removed, pressure in the circuits reduced to zero. After the service, put all of the covers back in their places.

To avoid falling, use the hand rails and the steps for getting into and out of the **PRESIDIO** . Keep the steps and the floor clean and free of mud and other debris. Always make sure to properly close the door of the cab before driving the **PRESIDIO** . Keep the windows clean in order to ensure good panoramic visibility.

Verify the proper functioning of the reversing indicator.

Never let anyone, with the exception of the driver, get into the **PRESIDIO** . There is no room for passengers other than the driver. Never transport passengers.

Safety / Driving & use of the **PRESIDIO**

Reminder:

Driving on public roads

Users must comply with the rules of the traffic code in effect in the country where they are located when operating the **PRESIDIO** and its accessories on public roads. Rules for the prevention of accidents and all road traffic regulations must be observed at all times.

On public roads, use an orange rotating light, and lights to indicate changes of direction when these are required by law. Always observe local road traffic regulations during journeys on public roads.

Do not exceed the total authorized load weight nor the maximum loads per axle on the road you are travelling.

**Driving and use in general**

Rules for the prevention of accidents, all the other regulations generally recognized in terms of occupational health and safety must be observed at all times.

Before starting the PRESIDIO, activate the parking brake system, set the pump control (or controls for the activation of tools in general) to the "stop" position, and the drive lever in neutral position.

If there is the least failure of a control or instrument or fitting on the **PRESIDIO**, the user must:

- Stop the PRESIDIO, avoiding any dangerous situation.
- Turn off the key and set the battery isolation switch to off.

Call the "AUTHORIZED DEALER" immediately to request that the fault be remedied.

Do not by-pass the start-up safety systems of the engine, of the transmission or the fluid pump control switch. Consult your "AUTHORIZED DEALER" in the event of defective start-up safety systems. Only use auxiliary start-up cables in the recommended way.

Be careful not to unintentionally move the drive lever when the engine is running. This can cause an untimely movement of the PRESIDIO.

In the case of work done near electrical power lines; make sure that there is a sufficient safety distance between the PRESIDIO and the electrical power line.

In the event of a breakdown of the power steering or the engine, immediately stop the PRESIDIO, otherwise, it may become very difficult to control (you must stop in a perfectly secure area).

Before getting out of the PRESIDIO, park it on a flat area, put on the parking brake, lower the boom down to the ground, or put the boom in the boom rest if it is folded, disengage the fluid pump control switch and stop the engine. Do not park on an incline.

Do not run the PRESIDIO in a closed building without making sure that there is adequate ventilation. Exhaust gases are toxic and can lead to fatal accidents.

Do not overload the PRESIDIO. Use and maintain the tools and accessories according to the indications from the manufacturer of the equipment.

A PRESIDIO, because of its technological design, should only be used by experienced users. Based on their professional experience, users must themselves determine, for each piece of equipment or each model, the limits of use beyond which the conditions of safety would become precarious.

Many external factors such as the condition and slope of the terrain, the travelling speed, the mode of driving, poor quality maintenance, etc... can immediately put the user in danger.

The steering and braking performances can be significantly influenced by boom movement.
Never pull or tow the PRESIDIO.

Always start the engine from the driver's seat, with the drive and fluid pump control switch levers in the neutral position and park switch on.

Never allow start-up safety system to be inoperative by directly connecting to starter terminals to start the engine. This could cause a sudden movement of the machine. If the starting switch is not working, consult your "AUTHORIZED DEALER".

Drive at a speed that allows you to stop the PRESIDIO efficiently and in full safety in the event of an emergency.

Reduce speed when approaching turns in order to avoid the risk of overturning.

The accessories mounted on all of the PRESIDIOS must be those recommended by the "AUTHORIZED DEALER" and mounted according to his instructions, under his responsibility, observing the equilibrium of loads, and the stability of the whole while making sure not to exceed the load capacity of the tires.
Your "AUTHORIZED DEALER" can advise you on this subject.

Make sure to totally stop the PRESIDIO at the neutral point of the hydrostatic drive control lever.

When you stop the PRESIDIO remove the key.



Personal protection / use and maintenance

Reminder:

Wear protective clothing and personal protective equipment for your hands, eyes, ears, feet and head.

Do not wear loose clothing that could be caught in the moving parts of the **PRESIDIO**

Special safety equipment may be necessary for the application of fertilizer, toxic pesticides, etc... Follow the recommendations given by the supplier and the manufacturer of the chemical products.

If the use of the **PRESIDIO** involves a risk of exposure to dust, particles, fogs or vapors, whether solid, liquid or gaseous, wear appropriate personal protective equipment. Any breach of this instruction is under the sole and full responsibility of the user of the **PRESIDIO**. Consequently, "**HARDI**" may in no way be held responsible for any injury to the user of the **PRESIDIO** if it turns out that this instruction was not followed.

Precautions before putting the sprayer into operation

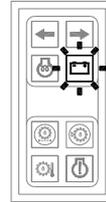
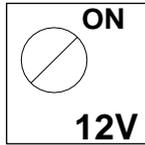
Your sprayer is protected by a several coated paint layers. However, we recommend regular application of a layer of anti-corrosion lubricant on all painted metal to avoid plant protection chemicals and fertilisers damaging the paintwork. If this is done before the sprayer is put into operation for the 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.



4.1 PRELIMINARY OPERATIONS

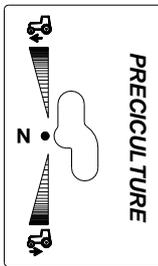
Check all of the levels: engine oil, hydraulic oil, coolant and fuel (The reference is always the number on the gauge) are correct. Please read this manual fully to find correct method of checking and verifying levels.

1. Verify the tightness of all of the nuts and bolts.
Wheel nuts to be tightened to min 400 foot pound torque
Tightening of fasteners must always be the responsibility of the machine operator.



2. Set the battery isolation switch to ON. (the battery indicator lamp of the dashboard comes on)

3. Travel lever in neutral position (N)



4. Parking brake activated (ON)



5. Fluid pump switch must be off



ATTENTION



DE 0007

Before starting, make sure that there is nobody in the working area of the **PRESIDIO**



4.2 STARTING THE ENGINE



Starting the engine

	0	 No circuit voltage	
	1	 Service voltage	
	D	Starting	



1. Put the key into the key switch
 Position 0 =No circuit voltage, turn the key (clockwise) to the right.

2. Turn the key clockwise in the key switch
 Position 1 =Circuit voltage, the indicator lights are turned on. (This position automatically starts the preheating of the heat engine when the outside temperature is low).

3. Turn the key clockwise in the key switch
 Position D =Start-up: release the key as soon as the engine starts. The control lights go off. When the outside temperature is low, let some time pass between position 1 and position D so that the system reaches the automatic starting of the preheating of the heat engine.

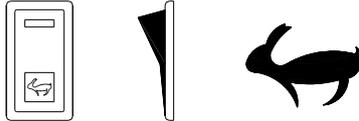


4.3 DRIVING IN AUTOMOTIVE MODE (ROAD)



4.3.1 DRIVING THE VEHICLE IN ROAD MODE

1. Select the road speed range.



2. Engine idling

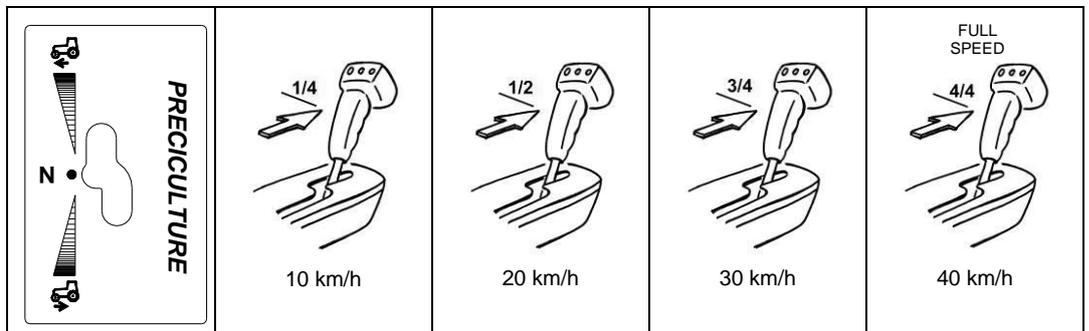
3. Release the parking brake. The access ladder to the platform will automatically be lifted.



Make sure the access ladder has been lifted completely before start driving



4. Move the travel lever forward to advance or backward to reverse to the approximate position indicated below for the desired speed



5. Accelerate (foot controlled)



The travel speed of the vehicle will depend on the action on the accelerator pedal and the position of the hand control.

4.3.2 STOPPING THE VEHICLE

1. Release the accelerator pedal.

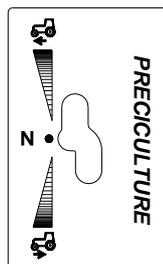


ATTENTION

2. In the event of an emergency apply the Brake pedal.



3. In normal driving
Return the lever slowly to point N. With this action the engine and transmission will brake the motion of the machine and at stage N the brakes will be applied.



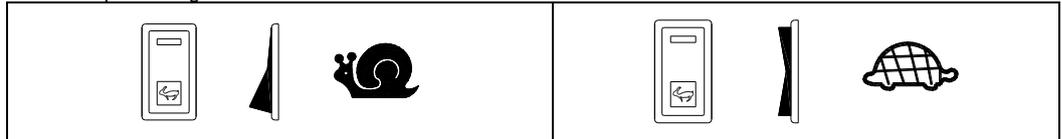


4.4 DRIVING IN NORMAL MODE (FIELDS)



4.4.1 DRIVING THE VEHICLE IN FIELD MODE

1. Select a field speed range.



2. Release the parking brake. The access ladder to the platform will automatically be lifted.



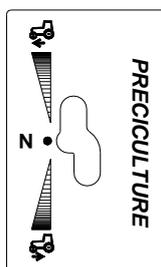
Make sure the access ladder has been lifted completely before start driving



3. Accelerate

	<p>From 1200 to 2100 rpm depending on the work to be carried out</p>
--	--

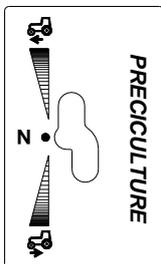
4. Move the travel lever forward to advance or backward to reverse.



 The travel speed will depend on the position of the travel lever and action on the accelerator.

4.4.2 STOPPING THE VEHICLE

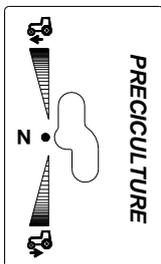
1. Return the travel lever to N.
Return the lever slowly to point N. With this action the engine and transmission will brake the motion of the machine and at stage N the brakes will be applied.



2. In the event of an emergency: Brake (brake pedal).

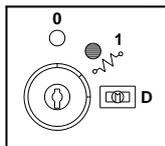


3. Return the lever to point N. Activate the parking brake.



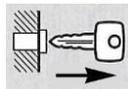
4.5 STOPPING THE ENGINE

1.



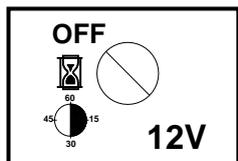
Return the key to 0.

2.



Remove the key

3.

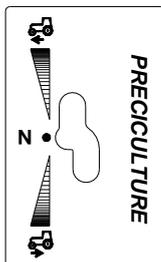


Battery shut-off Turn switch to OFF

4.6 STATIC BRAKING

The **PRESIDIO** transmission has the capacity to brake the forward speed of the machine If the operator returns the lever toward the central neutral position.

It is not recommended to make violent movements of this lever at any time.





4.7 WHEELS AND TYRES



(Tyre manufacturer)

Only the mounting of tyres mentioned below is authorised.

Verify the load on each wheel motor according to the rim offset.

Verify the max loads per axle in function of the approval granted.

4.7.1 TABLE INDICATING TYRE PRESSURES (FOR MAX LOAD).

	 (bar)
270/95R48 142A8/142B	3,6
480/80R38 152A8	1,9
380/90R46 155A8	2.2

4.7.2 INSTALLATION OF FRONT AND REAR WHEELS

The original installations must be fully respected. **HARDI** may not be held responsible in case of problems if different installations are carried out.

4.7.3 ADJUSTMENT OF VARIABLE TRACKS.

Contact your "APPROVED DEALER" or HARDI



4.8 BOOM OPERATION WITH THE HC6400 SET BOX AND GRIP CONTROL



WARNING Only operate the folding functions when the sprayer is stationary! Failure to do so may damage the boom.

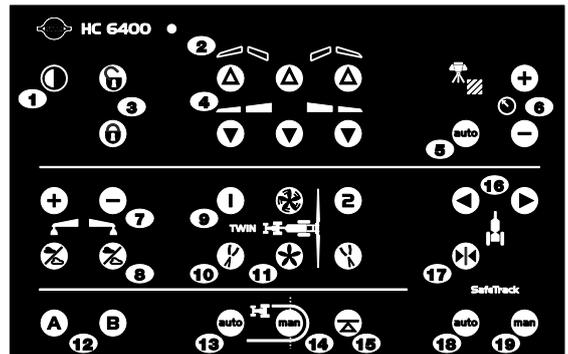


WARNING The HC6300 grip sits on the **PRESIDIO** travel lever. If this lever is inadvertently moved forward or rearwards the machine can move. Ensure parking brake is active and lever is not moved.

4.8.1 ACTIVATING HC6400 SETBOX

The HC6400 control unit that is fitted in the cabin turns the Job-Com power and HC6300 Joystick on and off and controls boom folding.

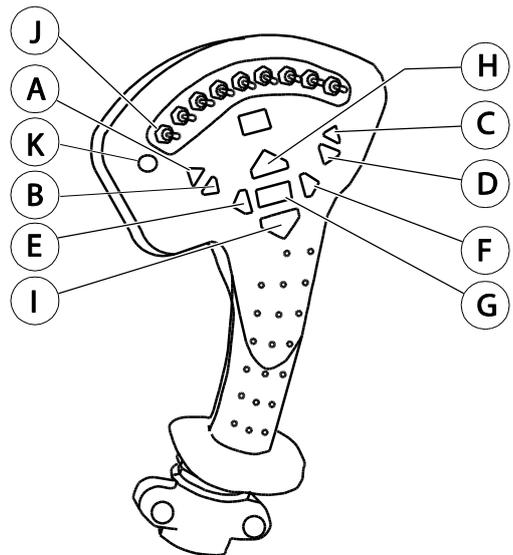
- To turn on the system press the on/off button (1).
A red light will flash to indicate that power is switched to the Job-Com and a light will first flash on the joystick until full communication is established. The light on the joystick will become steady red when correct. The system is now ready to activate



4.8.2 HC6300 GRIP

The letters indicate:

- A. Left side tilt up
- B. Left side tilt down
- C. Right side tilt up
- D. Right side tilt down
- E. Left side slant (TR4 only)
- F. Right side slant (TR4 only)
- G. Master boom valve on/off
- H. Boom paralift raise
- I. Boom paralift down
- J. Boom
- K. Led indicator light



4.8.3 TO UNFOLD THE BOOM

- Press and hold button (H) boom lift on the HC6300 Grip. Lift boom to max height to clear boom cradles.
- On the HC6300 Grip press and hold buttons (A) and (C) to tilt boom wings up
- On the HC6400 SetBox press and hold button (2) to unfold the boom.
- On the HC6300 Grip press and hold buttons (B) and (D) to tilt boom wings down
- On the HC6300 Grip press and hold button (I) to lower the boom to required boom height.

4.8.4 TO FOLD THE BOOM

- On the HC6300 Grip press the boom lift button (H) to raise the boom to the highest possible position.
- On the HC6300 Grip press and hold buttons (A) and (C) to tilt boom wings up
- On the HC6400 SetBox press and hold button (4) to fold the boom
- On the HC6300 Grip press and hold button (I) until it rest in the transport locks.
- On the HC6300 Grip press and hold buttons (B) and (D) to tilt boom wings down into the transport rest.



4.9 HC 8600 OR HC9600 CONTROL

A separate manual is provided specifically on the HARDI controller. If fitted to your machine. Before starting this product it is recommended that you read and follow this manual to understand the operation of this product.

4.10 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

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

Decontaminate completely the various liquid systems before using a new chemical. Refer to Chemical container for instructions.

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.

4.10.1 STARTING AND ADJUSTING THE SPEED OF THE SPRAY PUMP

- The fluid pump can be turned On/Off from either the electrical control box in cabin button 8 (fig.1) or from the workzone by pressing button 1 (fig.2)
- The spray pressure can manually be increased/decreased on button 3 (fig.1).
- If pressing button 4 (fig.1) the spray pressure will be automatically adjusted.

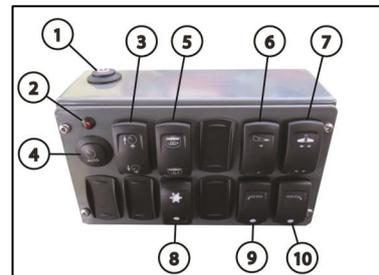


Fig.1

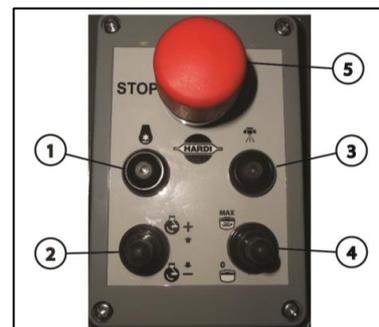


Fig.2



4.10.2 PRESSURE GAUGE

The machine is fitted with a pressure gauge that is visible from the cabin that shows the operator the pressure that is in the boom circuit.



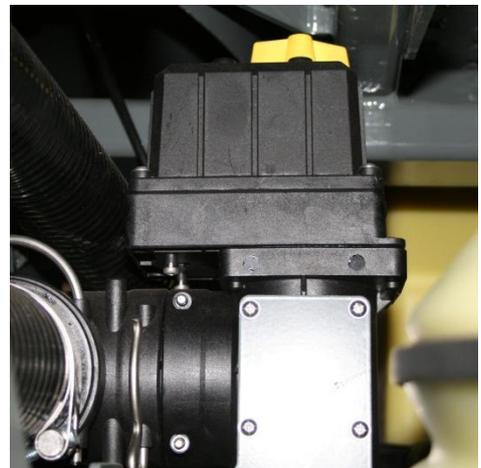
4.10.3 PRESSURE CONTROL VALVE

The HARDI pressure control is a simple valve that restricts or increases flow of liquid to the boom. This valve is fitted with a long life ceramic piston and cone. The pump is constant flow and the flow that is not used is directed back to the suction side of the pump.

Note When charging the tank with less than 300 litres it may be necessary to purge air that is trapped in the fluid system through the constant pressure valves on the Boom distribution valves otherwise air will be recirculated through the pressure bypass back to the suction side of the pump continually.

Procedure for purging air:

- Set boom Distribution valves to off.
- Increase pressure control to full pressure until you read "End Stop Alarm" on controller.
- Turn on pump and run for 1 to 2 minutes.
- The fluid system is purged when you see max pressure on the pressure gauge.



4.10.4 BOOM DISTRIBUTION VALVES

The machine is fitted as standard with heavy duty HARDI EVC twin dump distribution valves. These valves distribute liquid evenly across the boom. They are stacked together and each valve is dedicated to a section of the spray line on the boom. As they are turned on or off, they allow the flow from the pump to be mostly constant (if speed is constant) thus application rate is constant. To ensure that the valve works correctly the system must be set correctly for flow rates. These valves allow the boom to quickly reduce pressure in the boom lines at the nozzle so rapidly allowing the nozzle to stop spraying and reduce overspray.



Green Handle

Gauge Pressure

Electronic Pressure Sensor

Pressure Constant Valve

It is important to set the constant pressure valve based on the nozzles fitted. To set the constant pressures follow the below instructions.

1. Have machine in park
2. Fill flush tank with clean water
3. Select flush tank with suction valve
4. Start engine and open boom and lower to ground.
5. Turn all boom distribution valves to on.
6. Start pump and set pressure to around 3 bar on gauge.
7. Turn off Set Box
8. Move to rear of boom.
9. Ensure all nozzles are spraying correctly and pattern is even.
10. There is a pressure gauge mounted on the Boom distribution valves.
11. Note pressure of gauge.
12. Turn off one section of the distribution valves with the green handle.
13. Pressure in gauge should remain constant.
 - a. If pressure increases turn constant pressure valve anticlockwise until gauge reads same original pressure.
 - b. If pressure falls turn constant pressure valve clockwise until gauge reads same original pressure.
14. Turn on the section and confirm pressure and repeat on another sections
15. When all sections have been checked system is correctly set.



4.10.5 FLOW METER

A simple inline flow meter is fitted directly at the boom distribution valves that counts flow to the boom. The system is set up to know that the distribution valve bypasses the same volume back to tank when valve is turned off. If a different reading to tank contents is noted it can be caused by the fact that the operator has not set the constant pressure boom distribution valves correctly.

Flow Meter



4.10.6 HARDI RUN DRY PUMP

Pump fitted is a stainless steel centrifugal pump. This pump has been specifically made for HARDI and has a “run dry” feature that allows operator to run the tank dry without fear of damaging seal. Wet Seal Technology prevents the pumped liquid from contacting the shaft seals. The seals operate in a reservoir filled with a specially formulated barrier fluid for seal face lubrication and heat dissipation. Additionally, air pressure is introduced to prevent pump fluid from contaminating the seal reservoir. This isolation of the seals prevents abrasive wear of the seal faces and run dry seal failures.





4.11 USE AND CONTROLS OF THE SPRAYER FLUID CONTROLS

To understand and use the fluid controls it is recommended to initially have both tanks with only clean water. In this way all functions and features of the controls can be understood and importantly checked for satisfactory operation.

The machine will now need to be started from the cabin as previously learned.
 Parking brake must be on
 Main fluid pump switch must be set to off for engine to start.

Reminder:

Wear protective clothing and personal protective equipment for the hands, eyes, ears, feet and head.

Do not wear loose clothing that could be caught in the moving parts of the **PRESIDIO**

Special safety equipment may be necessary for the application of fertilizer, toxic pesticides, etc... Follow the recommendations given by the supplier and the manufacturer of the chemical products.

If the use of the PRESIDIO involves a risk of exposure to dust, particles, fogs or vapors, whether solid, liquid or gaseous, wear appropriate personal protective equipment. Any breach of this instruction is under the sole and full responsibility of the user of the **PRESIDIO**. Consequently, "**HARDI**" may in no way be held responsible for any injury to the user of the **PRESIDIO** if it turns out that this instruction was not followed.

4.11.1 FILLING OF WATER MAIN TANK & RINSE TANK



ATTENTION

The 2 inch Rinse tank valve also acts as a Rinse Tank drain valve, failure to pressurise the source supply line before opening the valve will result in reverse flow of the tank content if the tank is not empty.

Filling/washing location requirements

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

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

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

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

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

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

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

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



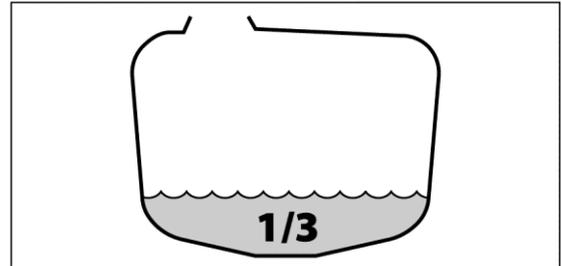
ATTENTION

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



4.11.2 FILLING OF WATER

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



4.11.3 FILLING OF MAIN TANK

The main tank can be filled with clean water or premixed chemicals.



The main tank is filled via the 2" cam-lock connection piece at the valve system:

- 1) Remove the cap, then fit the external water hose to the connection piece.
- 2) Engage external water pump,
- 3) Keep an eye on the level indicator in order not to overfill the tank.
- 4) Stop filling and refit the cap.



ATTENTION

If filled with premixed chemicals make sure to connect to a clean water source to clean the filling line, the filler filter will also needed to be disassembled and cleaned.

4.11.4 FILLING OF RINSE TANK



Filling of rinsing tank

The rinsing tank is filled via the 2" cam-lock connection piece at the valve system:

- 1) Remove the cap, then fit the external water hose to the connection piece.
- 2) Engage external water pump,
- 3) Keep an eye on the level indicator in order not to overfill the tank.
- 4) Stop filling and refit the cap.



ATTENTION

Only fill rinsing tank with clean water! To avoid algae developing in the rinsing tank always drain the rinsing tank if the sprayer is not in use for a longer period of time.



ATTENTION

For cleaning purposes etc. the rinsing tank is also accessible via the tank lid on top of tank.



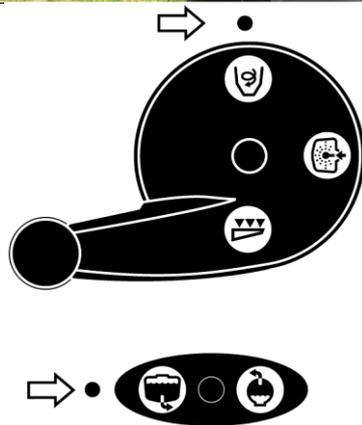
4.11.5 FILLING CHEMICALS BY TURBOFILLER

	<p>⚠ ATTENTION Make sure the main tank is filled 1/3 of water before start filling chemicals</p> <ol style="list-style-type: none"> 1) Turn pressure valve to Turbofiller 2) Turn suction valve to Main Tank
	<ol style="list-style-type: none"> 3) Turn on the fluid pump (1) 4) Increase engine rpm to approx. 2/3rd (2) 5) Turn on agitation (4)
	<ol style="list-style-type: none"> 6) Pull the handle on the TurboFiller straight out to lower the TurboFiller to operating position. 7) Open TurboFiller lid. Open TurboDeflector valve and turn the Chemical Source valve towards suction from hopper.  8) Measure the correct quantity of chemical and sprinkle it into the hopper as fast as the transfer device can flush it down. The Chemical Source valve must be open for at least 20 seconds after the chemical is no longer visible in the hopper in order to completely empty the transfer hoses into the main tank. 9) Rinse chemical container if required by turning suction valve to rinse tank and then pressing the Chemical Container Cleaning lever.  <p>⚠ DANGER In order to avoid spray liquid hitting the operator, do not press lever unless the multi-hole nozzle is covered by a container as spray liquid may otherwise hit the operator!</p> <ol style="list-style-type: none"> 10) Flush the TurboFiller with clean water from the Rinsing tank. The Chemical Source valve must be open for at least 20 seconds after the rinse water is no longer visible in the hopper in order to completely empty the transfer hoses into the main tank. 11) When the spray liquid is well agitated, turn handle of the Pressure Valve towards "Spraying" position. Keep agitation on so the spray liquid is continuously agitated until it has been sprayed on the crop.

4.11.6 FILLING CHEMICALS BY CHEM PROBE

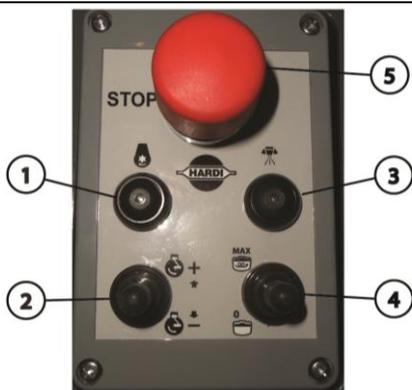


- 1) To access the Chemical Source valve, pull the handle on the TurboFiller straight out to lower the TurboFiller.
- 2) Turn suction valve to Main Tank

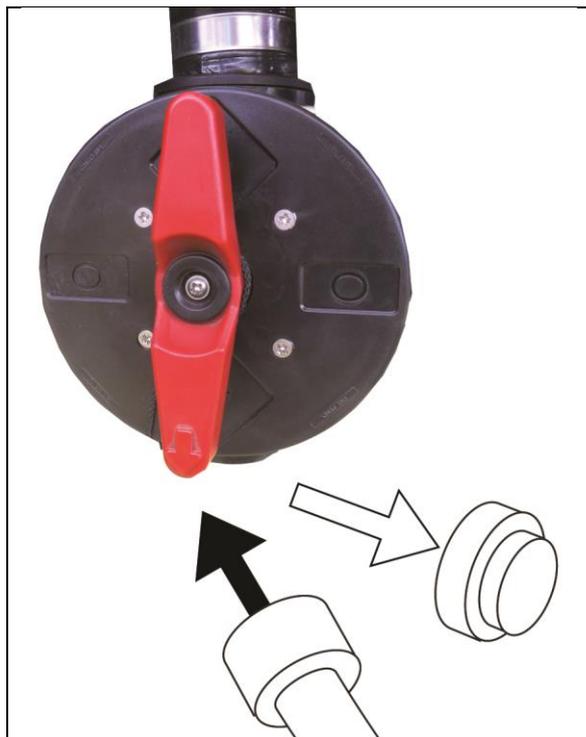


 **ATTENTION** Make sure the main tank is filled 1/3 of water before start filling chemicals

- 3) Turn pressure valve to Turbofiller
- 4) Turn suction valve to Main Tank



- 5) Turn on the fluid pump (1)
- 6) Increase engine rpm to approx. 2/3rd (2)
- 7) Turn on agitation (4)



- 8) Connect suction hose to the camlock fittings on the Chemical Suction source valve and the other end to the drum coupling.
- 9) Open the valve by turning the handle downwards
- 10) When filling is completed connect the hose to a clean water source to clean the suction line.
- 11) Close the valve when finished and refit the cam lock cap.
- 12) When the spray liquid is well agitated, turn handle of the Pressure Valve towards "Spraying" position. Keep agitation on so the spray liquid is continuously agitated until it has been sprayed on the crop.



4.12 CLEANING

4.12.1 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** Refer always to chemical manufacture instructions for correct sprayer decontamination

Guidelines

1. Read the instructions carefully for the products that you use. Take note of any particular instructions regarding your protection, deactivating agents etc. Read the detergent and deactivating agent instruction labels. If cleaning procedures are given, follow them closely.
2. Be familiar with local legislation regarding the storage of pesticides, washing them, mandatory decontamination methods etc. If in doubt, contact the appropriate local department, e.g. department of agriculture.
3. 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.
4. Cleaning starts with the calibration, as a well calibrated sprayer will ensure the minimal amount of remaining spray liquid.
5. 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.
6. It is sometimes necessary to leave spray liquid in the tank for short periods, e.g. overnight, or until the weather becomes suitable for spraying again. Unauthorised persons and animals must not have access to the sprayer under these circumstances.
7. If the product applied is corrosive (e.g. liquid fertilisers), it is recommended to coat all metal parts of the sprayer before and after use with a suitable rust inhibitor.

4.12.2 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.

4.12.3 USE OF RINSING TANK AND RINSE NOZZLES

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

- A. Full internal rinsing or cleaning.**
- B. Rinsing spray circuit without diluting main tank content.**

-  **ATTENTION** The cleaning procedures stated requires the TurboFiller to be cleaned on beforehand (directly after the last chemical filling). If the TurboFiller for some reason is not cleaned please carry out this cleaning before attempting the cleaning procedures A, B or C - see "TurboFiller rinsing" on page 74.
-  **ATTENTION** that this cleaning will then use water from the rinsing tank reducing the available quantity for cleaning procedures A, B or C.
-  **ATTENTION** Do NOT fill any cleaning detergents into the rinsing tank. If cleaning agents are to be used this should be added the main tank.



4.12.4 A) FULL INTERNAL RINSING:

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



ATTENTION

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



ATTENTION

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



ATTENTION

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



ATTENTION

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

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

1. Empty the sprayer as much as possible. Close the agitation valve (no agitation). Allow the pump to run for at least minute after the liquid fan from the nozzles has collapsed to ensure that all relevant liquid has been expelled.
2. Turn suction valve towards "Rinsing tank" and pressure valve towards "Rinse nozzles". Turn on agitation and adjust it to max
3. Turn on the spray pump
4. Use 1/3 of the rinsing tank content at this valve setting.
5. Shut off all nozzles by the main ON/OFF button on the grip.
6. Turn suction towards "Main tank" and the pressure towards "Spraying". Set the spraying pressure at 3-5 bar. If the pressure is set outside this range the rinsing result may be insufficient.
7. Allow the rinsing water in the main tank to circulate for minimum 45 seconds with the nozzles shut to flush the return lines from boom to tank.
8. Open all nozzles and spray the rinsing water from the main tank through the nozzles while driving in the field. Choose a different location each time to distribute the rinsing water over larger areas. Continue until all fluid is expelled from the boom tubes and nozzle - this may take several minutes after the spray fan has collapsed.
9. Shut off all nozzles by the main ON/OFF switch.
10. Turn the suction towards "Rinsing tank" and the pressure to "Tank rinsing". Use another 1/3 for this.
11. Turn the suction towards "Main tank" and the pressure towards "Spraying". With the nozzles shut allow the liquid to circulate for minimum 30 seconds to flush the return lines from boom to tank.
12. Open all nozzles by the main ON/OFF switch and spray the rinsing water from the main tank through the nozzles until all liquid is expelled from the boom tubes/nozzles.
13. Repeat step 10-14 another time until the rinsing tank is empty.
14. Shut off the nozzles at the main ON/OFF button once the rinsing process is complete.



4.12.5 RINSING SPRAY CIRCUIT WITHOUT DILUTING MAIN TANK CONTENT.

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

Rinsing of the liquid system

1. Stop Spraying by turning off the master boom valve.
2. Stop driving and place machine in Park
3. Stop Main Fluid Pump
4. Switch off Agitation from Cabin
5. Move out of Cabin to work station.
6. Turn the suction valve to Rinse Tank. (Keep the pressure valve in Spray position)
7. Turn off Self Clean filter bypass
8. Enter cabin
9. Turn on master boom valve.
10. Turn on the fluid pump.
11. Start driving
12. Flush boom lines and after a period, turn fluid pump off
13. Remember when resuming spraying turn suction valve to main tank and agitation back on.

**ATTENTION**

The rinsing nozzles cannot always guarantee 100% cleaning of the tank. Always complete the cleaning manually with a 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).

**ATTENTION**

Always read the suppliers instructions before use.
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



4.12.6 FULL INTERNAL CLEANING (SOAK WASH)

This cleaning procedure is always used when:

**ATTENTION**

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

**ATTENTION**

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

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

1. Rinse the sprayer in the field (See chapter "Full internal rinsing").
2. Drive to a farm fill station.
3. Prepare sprayer for cleaning with cleaning agent, e.g. AllClearExtra. Fill water in the main tank to 10% of capacity. Fill the rinsing tank completely. This water is used later for rinsing.
4. Turn suction towards "Main tank" and pressure towards "Tank Rinsing". Set agitation valve to "Full agitation".
5. Start the fluid pump
6. Allow the liquid to circulate for 3 minutes.
7. Turn the pressure valve to the blank mark instead for minimum 3 seconds to burst and flush the safety valve.
8. Turn the pressure valve to TurboFiller, then turn the Chemical Suction Source valve to TurboFiller and open the deflector valve and allow liquid to circulate for 3 minutes.
9. Close the lid and activate the container rinsing valve to clean the hopper inside.
10. Shut the 2 valves on the TurboFiller again, and the chemical source valve
11. Verify that all nozzles are shut at the main ON/OFF button on the grip.
12. Turn the Pressure valve towards "Spraying".
13. Allow the liquid in the main tank to circulate for minimum 3 minutes with the nozzles shut to clean the return lines from boom to tank.
14. Turn the Pressure valve towards "Tank cleaning nozzles" and circulate liquid for further 3 minutes.
15. Spray out water with cleaning agent and chemical residue. Set the spray pressure at 3-5 bar. Note that the washing water still contains active chemical and choose an appropriate area to spray out this. Alternatively the washings can be dumped at the Filling/washing location and retained in an appropriate receptacle (E.g. slurry tank or similar) – see section "Filling/washing location requirements". Spot contamination and accumulation must be avoided. Continue to spray until all liquid is expelled from the boom tubes and nozzles.
16. Shut off all nozzles by the main ON/OFF switch.
17. Rinse the sprayer again with clean water to rinse out all remains of the cleaning agent. See section "Use of rinsing tank and rinsing nozzles" subchapter A. "Full internal rinsing" This to avoid that the cleaning agent remains in the fluid system. Remains could damage the next spray chemical filled into the main tank. Include rinsing of the TurboFiller in step 17. Operate all 3 valves during this process. Dismantle all filters (suction, pressure, in-line and nozzle filters) and clean the filter screens using clean water and detergent.

**ATTENTION**

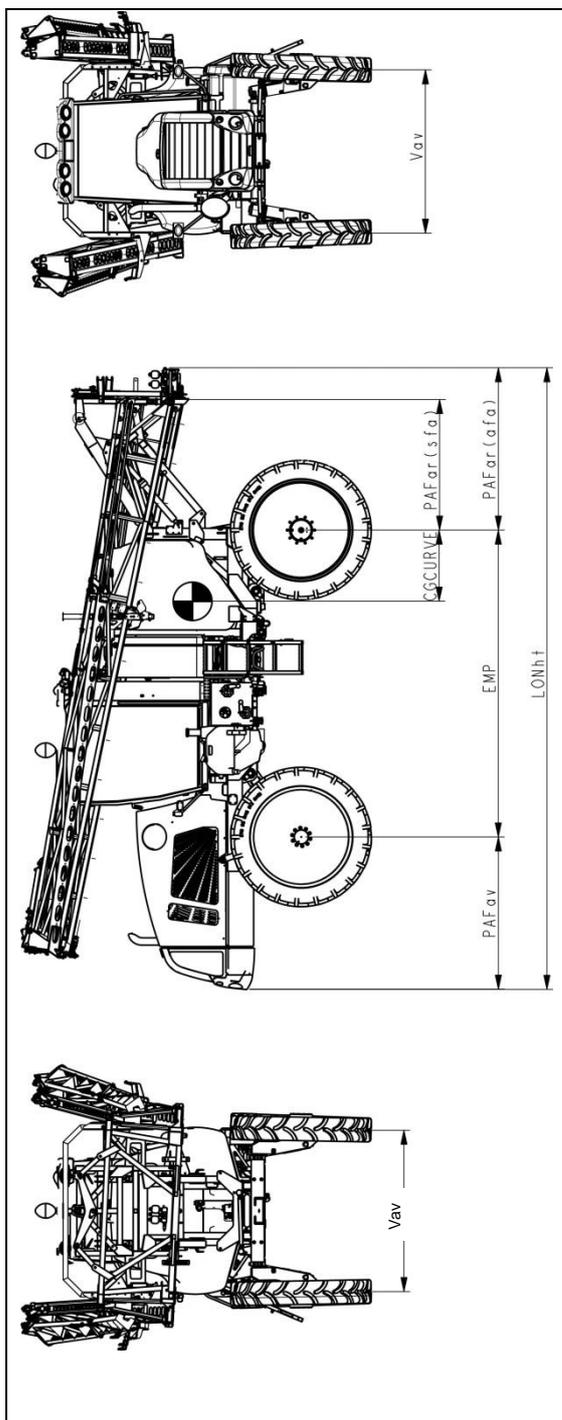
The rinsing nozzles cannot always guarantee a 100% cleaning of the tank. Clean manually with a high pressure cleaner afterwards, especially if crops sensitive to the chemical just sprayed are going to be sprayed afterwards!



4.12.7 TECHNICAL RESIDUE

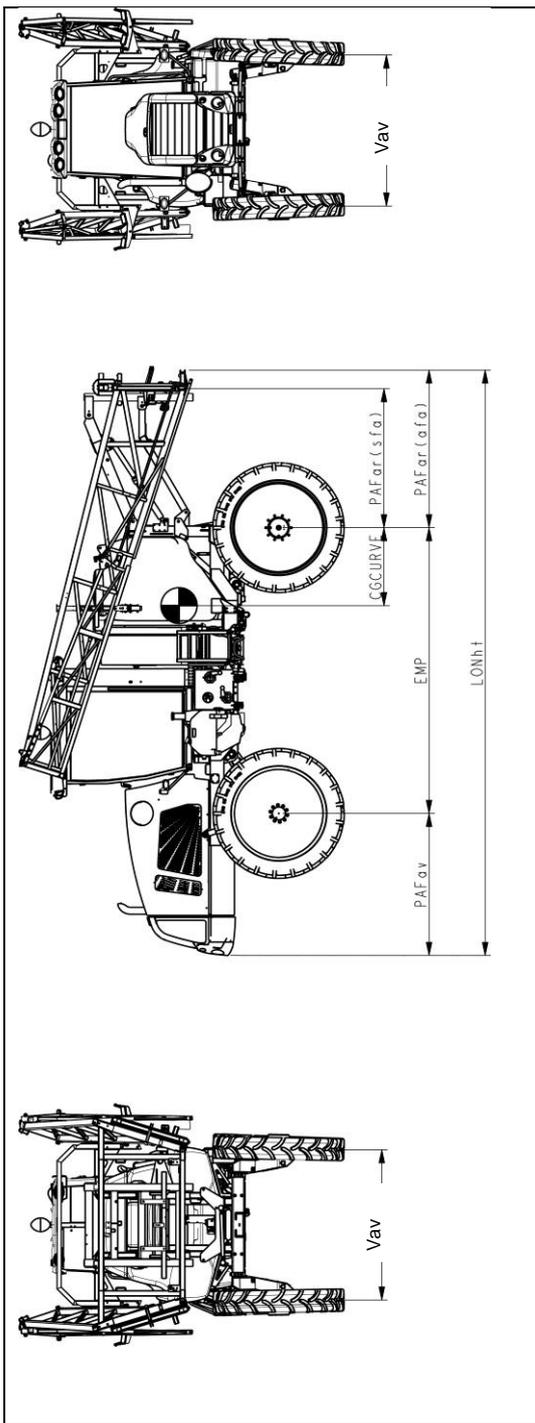
Inevitably a quantity of spray liquid will remain in the system as the pump takes in air when the tank is about to become Empty. This technical residue is defined as the remaining liquid quantity in the system as the first clear pressure drop on the pressure gauge is read. The technical residue varies 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.

4.13 SPECIFICATIONS OF THE SELF PROPELLED SPRAYER



PRESIDIO TR4

		NARROW		WIDE	
	Version	Min	Max	Mini	Maxi
Vav	MN	2.00	2.6		
Vav	MO1	2.20	2.8		
Vav	MO2	2.00	2.6		
Vav	MO3			2.50	3.03
Vav	MO4			2.70	3.23
Vav	MO5			2.50	3.03
		MIN	MAX		
PAFav		1.90	1.86		
PAFar(sfa)		1.62	1.86		
PAFar(afa)		2.01	2.25		
EMP		3.77	3.77		
LongHT		7.71	7.95		
CGCUVE		0.85	0.85		



PRESIDIO EAGLE BOOM

		NARROW		WIDE	
	Version	Min	Max	Mini	Maxi
Vav	MN	2.00	2.6		
Vav	MO1	2.20	2.8		
Vav	MO2	2.00	2.6		
Vav	MO3			2.50	3.03
Vav	MO4			2.70	3.23
Vav	MO5			2.50	3.03
		MIN	MAX		
PAFav		1.90			
PAFar(sfa)		1.73	1.98		
PAFar(afa)		1.98	2.23		
EMP		3.77			
LongHT		7.67	7.92		
CGCUVE		0.85			



PR2700

Type	PR	Vehicle family
	2700	Load capacity family of the vehicle
	40	Vehicle speed family

Axle variant	NARROW	WIDE
--------------	--------	------

Tyre version	MN	MO1	MO2	MO3	MO4	MO5
Tyres mounting:	270/95R48 142A8/142B	480/80R38 152A8	380/90R46 155A8	270/95R48 142A8/142B	480/80R38 152A8	380/90R46 155A8
	270/95R48 142A8/142B	480/80R38 152A8	380/90R46 155A8	270/95R48 142A8/142B	480/80R38 152A8	380/90R46 155A8

Dimensions (kg)

Version	MN	MO1	MO2	MO3	MO4	MO5
Front/rear track *	From 2,00 to 2,60	From 2,20 to 2,8	From 2,00 to 2,60	From 2,50 to 3,03	From 2,07 to 3,23	From 2,50 to 3,03
Front/rear track *	From 2,0 to 2,60	From 2,20 to 2,80	From 2,00 to 2,60	From 2,50 to 3,03	From 2,07 to 3,23	From 2,50 to 3,03
Wheel base:	3,94					
Overall length *	From 7,67 to 7,95 *					
Overall width *	2,55*					

* Can vary depending on configuration

Weight (kg)

Presidio with TR4 Alu wing	Folded wing		Open wing	
	Empty	Full	Empty	Full
Weight (Both Tanks)	4110	4790	3810	4510
Front Axle:	3990	6330	4280	6580
Rear Axle:	8100	11120	8090	11090
Total:				

Presidio with 24m Eagle wing	Folded wing		Open wing	
	Empty	Full	Empty	Full
Weight (Both Tanks)	4120	4840	3860	4530
Front Axle:	4260	6530	4500	6860
Rear Axle:	8380	11370	8360	11390
Total:				



5 MAINTENANCE

Upkeep of the PRESIDIO

Reminder:



WARNING

Carry out the upkeep of the **PRESIDIO** in full safety.

Stop the engine before doing maintenance work on your **PRESIDIO**.

Stop the engine and loosen the pressures before connecting or disconnecting a tube. Tighten all of the connectors before starting the engine or putting the tubes under pressure.

Maintain the **PRESIDIO** and the equipment, particularly the brakes and the steering, in perfect operating condition to ensure safety in operation.

Before making any work adjustments, stop the **PRESIDIO**, put on the parking brake, stop the Fluid pump control switch, place the levers at the neutral point, lower the boom to the ground, stop the engine and remove the switch key before leaving the seat.

Before starting the engine within an area, make sure that there is sufficient ventilation. Never run the engine in a closed area. Exhaust gases can be deadly.

Do not carry out upkeep for the **PRESIDIO**, with the engine in operation or when it is hot, or if the **PRESIDIO** is in motion. For repairs or adjustments, we recommended consulting your "AUTHORIZED DEALER" and having the work done by trained personnel.

All liquids must be handled with care. If you are injured by a leaking liquid or if you absorb it, see a doctor immediately.

Liquids under pressure that could escape through a very small hole are almost invisible but present a major danger for safety and health. To check for leaks, always use a piece of cardboard or wood. Never try to locate leaks using your hands.

Before making any adjustments or doing work on the electrical circuit, unplug all of the battery cables (negative first).

Do not use the hydraulic system of the **PRESIDIO** as a jack for lifting it. Lift the **PRESIDIO** with an appropriate support.

During adjustments or mounting of equipment on the **PRESIDIO** (front or rear), make sure that there is no one nearby before activating the hydraulic system.

During maintenance operations on the **PRESIDIO** use all the secured means at your disposal and use the additional adapted means such as secured boom lifts and step ladders to avoid all risk of falling. (Including the fillings and refilling to level of fuel, oil and coolant if any. It is therefore essential to do the fillings in an appropriate place reserved for these operations and not in the work place).

Personal protection / use and maintenance

Reminder:

Wear protective clothing and personal protective equipment for the hands, eyes, ears, feet and head.

Do not wear loose clothing that could be caught in the moving parts of the **PRESIDIO**

Special safety equipment may be necessary for the application of fertilizer, toxic pesticides, etc... Follow the recommendations given by the supplier and the manufacturer of the chemical products.

If the use of the PRESIDIO involves a risk of exposure to dust, particles, fogs or vapors, whether solid, liquid or gaseous, wear appropriate personal protective equipment. Any breach of this instruction is under the sole and full responsibility of the user of the **PRESIDIO**. Consequently, "HARDI" may in no way be held responsible for any injury to the user of the **PRESIDIO** if it turns out that this instruction was not followed.

Call your "APPROVED DEALER".

Before any service, shut-down the engine and let the entire machine cool.

PRESIDIO-MANUAL-1.00-version



The symbol requires you to take special precautions for recycling and/or disposal

5.1 MAINTENANCE TABLE SELF PROPELLED SPRAYER

	Every day	Hours												Every year or if alert		
		80	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750		3000	3250
		← H + 250 H														
		Periodicity														
OIL TRANSMISSION																
OIL TRANSMISSION LEVEL	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
HYDROSTATIC ELEMENT		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
WHEEL REDUCTION GEARS OIL		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
ENGINE OIL		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
ENGINE OIL LEVEL	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
FUEL FILTER		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
WATER SEPARATOR FILTER		□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
ENGINE OIL FILTER		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
AIR FILTER	●	●	●	●	●	○	●	●	●	○	●	●	●	○	●	○
AIR FILTER SAFETY ELEMENT		●	●	●	●	○	●	●	●	○	●	●	●	○	●	○
Empty the dust discharge valve		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
FAN BELT		●	●	●	●	●	●	●	○	●	●	●	●	●	●	●
COOLANT LEVEL	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
COOLANT						○				○				○		
CHECKING THE EFFICIENCY OF THE PARKING BRAKE	●	●	●	●	●	●	●	●	●	●	●	●	●	○	●	●
checking the dynamic braking efficiency	●	●	●	●	●	●	●	●	●	●	●	●	●	○	●	●
CHECKING BRAKE Accumulator		●		●		●		●		●		●		●		○ (5 year)
TIGHTENING OF WHEELS	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TYRE PRESSURE		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
GREASE (GREASE GUNS)		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
GREASE ball and socket joint frame (3)		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
FUEL TANK		□				□				□				□		□
Air reserve	□	○ (10 year)														
CAB COAL FILTER		○ (6 months)														
CAB PAPER FILTER		○ (6 months)														
VALVE CLEARANCE																●
INJECTORS																○
TO VERIFY : ●		TO REPLACE * : ○												TO BLEED : □		
* REPLACE ONLY BY ORIGINAL HARDI COMPONENTS TO HAVE THE ADVANTAGE OF THE CONTRACTUAL GUARANTEE..																
(DEUTZ TCD2012 2V)																

5.2 SERVICE AND MAINTENANCE INTERVALS

5.2.1 10 HOURS SERVICE - CYCLONE FILTER



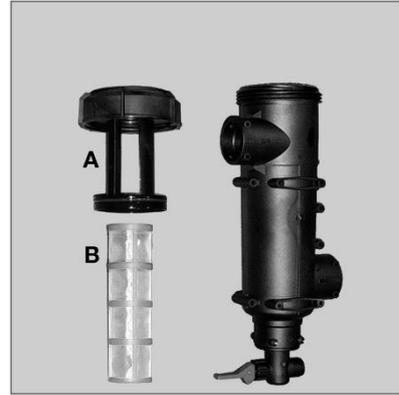
The suction and pressure valve must always be turned to the closed position before opening the Cyclone filter! If not spraying liquid can hit you when opening the filter and drain the main tank content!

To service the Cyclone filter:

1. Turn suction SmartValve to off. Unscrew filter lid (A).
2. Lift the lid and filter (B) from housing.
3. Separate filter from the integrated filter guide in the lid and clean the filter.

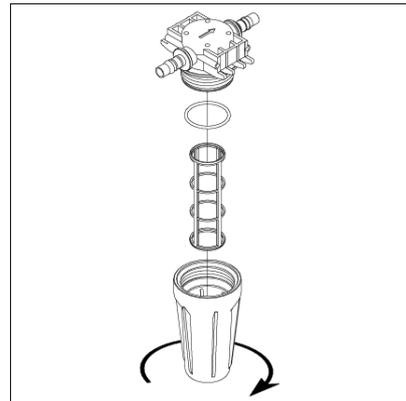
To reassemble:

1. Grease the two O-rings on the lid / filter guide. Due to small space at lid for example use a brush to grease with.
2. Mount the filter onto the recess (which must not be greased) in the lid/filter guide.
3. Place the filter/filter lid into housing and screw the lid until it hits the stop.



5.2.2 10 HOURS SERVICE - IN-LINE FILTER (OPTIONAL EQUIPMENT)

If the boom is equipped with In-Line Filters unscrew the filter bowl to inspect and clean the filter. When reassembling the O-ring should be greased. Alternative filter meshes are available. See section on Technical specifications - filters and nozzles.



5.2.3 10 HOURS SERVICE - NOZZLE FILTERS

Check and clean.



5.2.4 10 HOURS SERVICE - SPRAYING CIRCUIT

Fill with clean water, operate all functions and check for leaks using higher spray pressure than normal. Check nozzle spray patterns visually using clean water.

5.2.5 250 HOURS SERVICE - HOSES AND TUBES

Check all hoses and tubes for possible damages and proper attachment. Replace damaged hoses or tubes.

5.2.6 250 HOURS SERVICE - READJUSTMENT OF THE BOOM

5.3 LUBRICATION

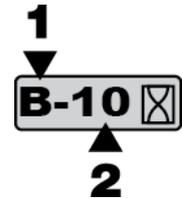
5.3.1 GENERAL INFO

Store lubricants in a clean dry and cool place, preferably at a constant temperature, to avoid contamination from dirt and condensation.

Keep oil-filling jugs, hoppers and grease guns clean, and clean the lubricating points thoroughly before lubricating. Avoid skin contact with oil products.

Always follow the quantity recommendations. If no quantity is recommended, feed lubricant until new grease becomes visible, or follow this greasing technique:

- Fully grease the boom on installation. After one full days use regrease all grease points once more. Those grease points that visibly take less than one pump do not need daily greasing and can be left for weekly greasing. However those points that take more than one pump of grease should be greased daily. The frequency of greasing often depends on the duty cycle of the sprayer, the temperature and conditions the sprayer is being used.



Pictograms in lubrication & oiling plans designate the following:

- Lubricant to be used (see "Recommended lubricants").
- Max recommended intervals (hours).
- See page 18 and 19 for grease points



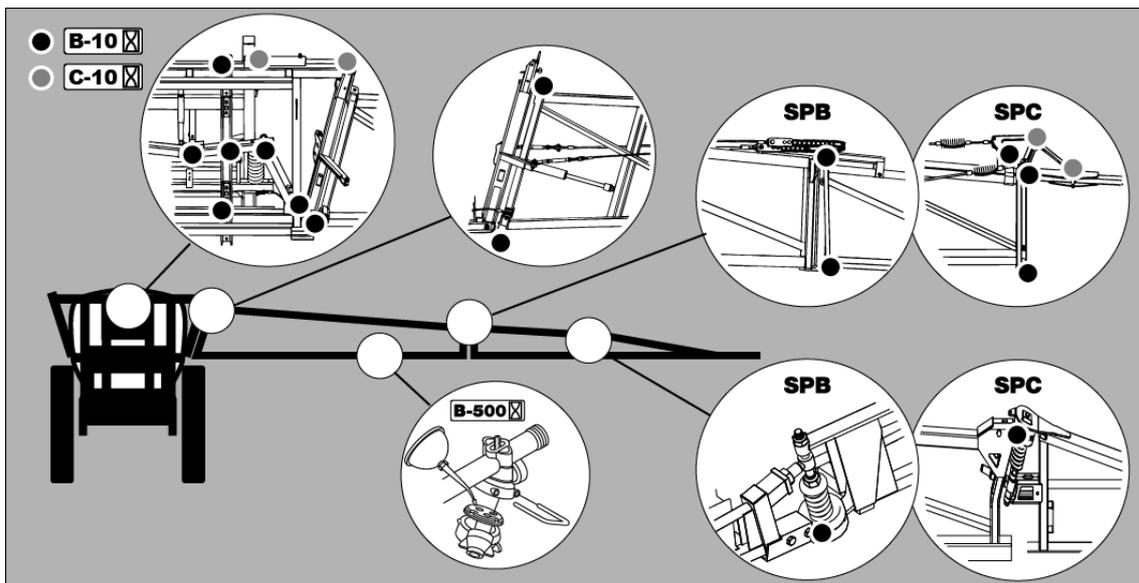
ATTENTION

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

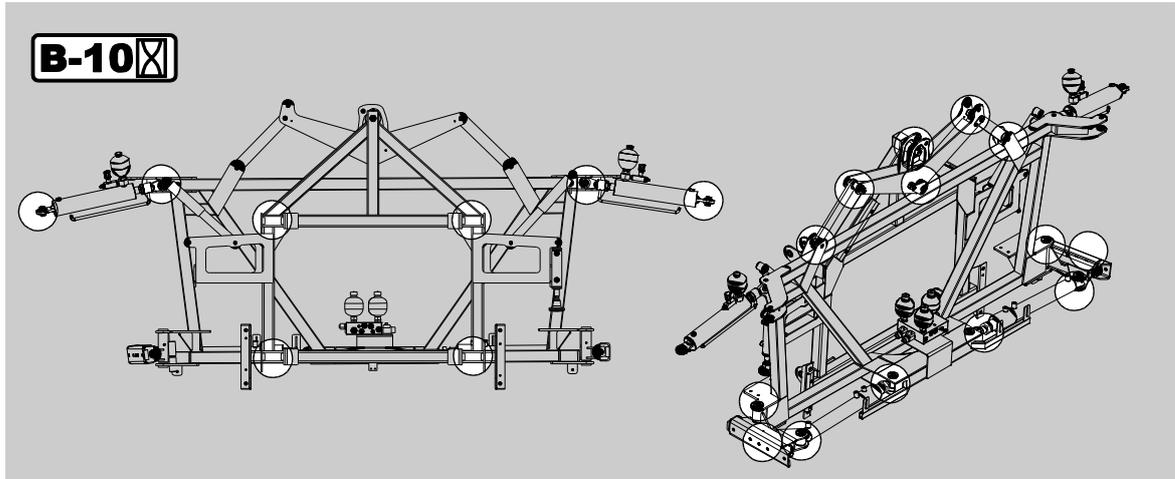
Recommended lubricants

 <p>SLIDE BEARINGS: Lithium grease with Molybdenumdisulphide or graphite SHELL RETINAX HDM2 CASTROL MOLYMAX</p>	 <p>OIL LUB. POINTS: TOTAL Transmission TM SAE 80W/90 Castrol EPX 80W/90 SHELL Spirax 80W/90</p>
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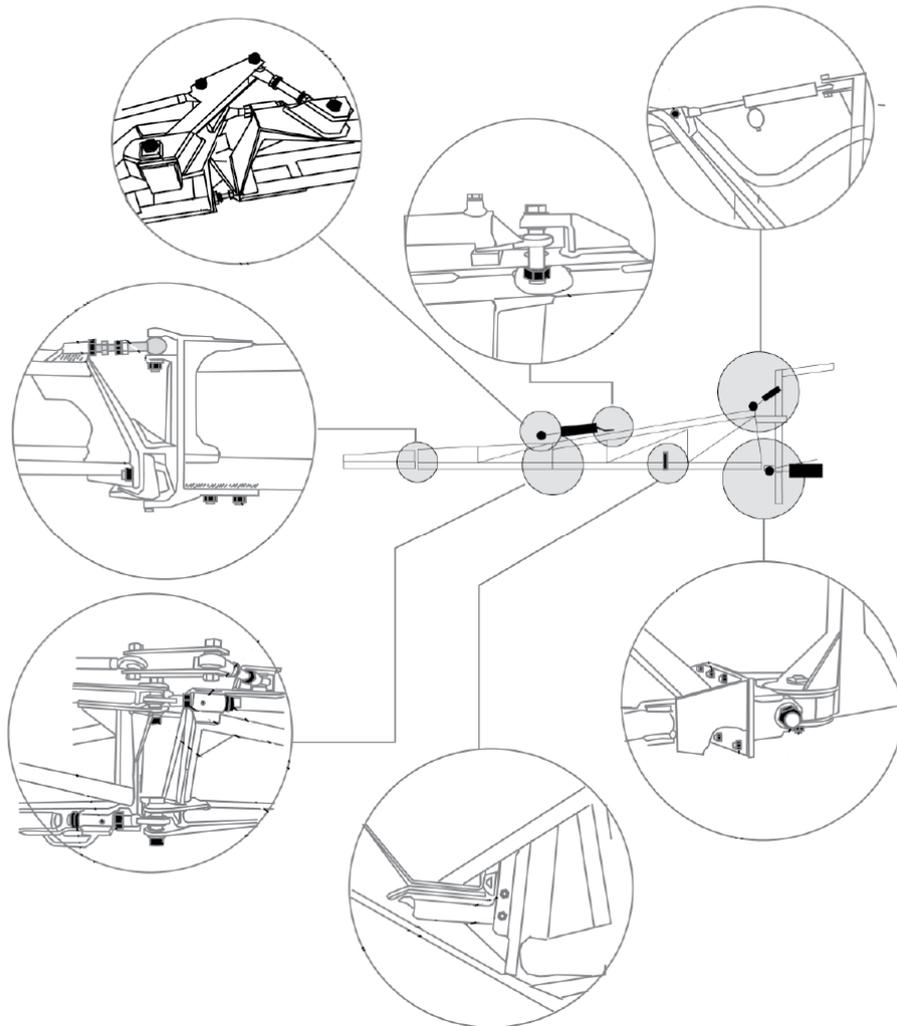
5.3.2 BOOM LUBRICATION & OILING PLAN SPC/SPB



5.3.3 BOOM LUBRICATION TR4



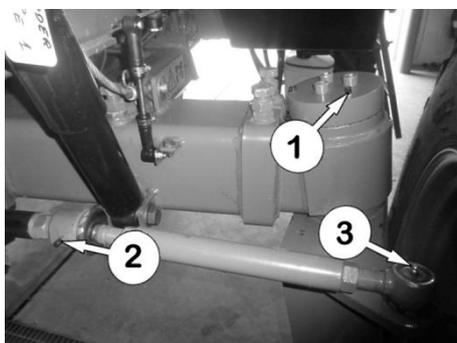
5.4 ALUMINIUM BOOM CHECKS



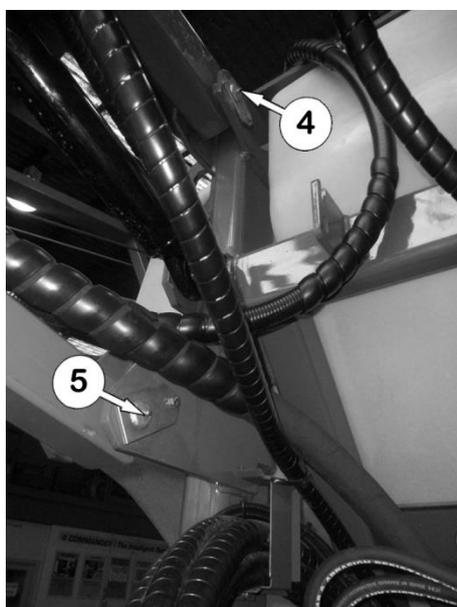
ATTENTION Check and tighten the bolts on the boom after 500 hectares, then at regular weekly intervals.

5.5 GREASE FITTINGS

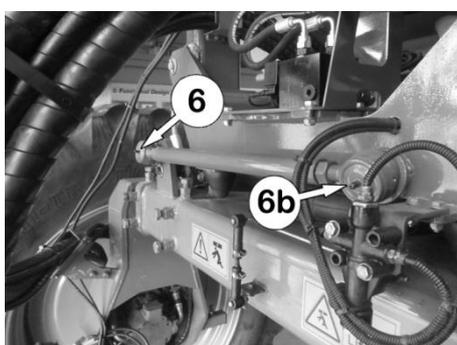
Use high quality grease in the fittings as indicated below and as shown in the boom service manual.
 Some of the grease nipples on the machine are high so it is recommended that a ladder or platform should be used
 Before any service, stop the engine and let the whole machine cool down.
 Grease frequency depends on hours of use, dust and type of conditions that the machine is working in.



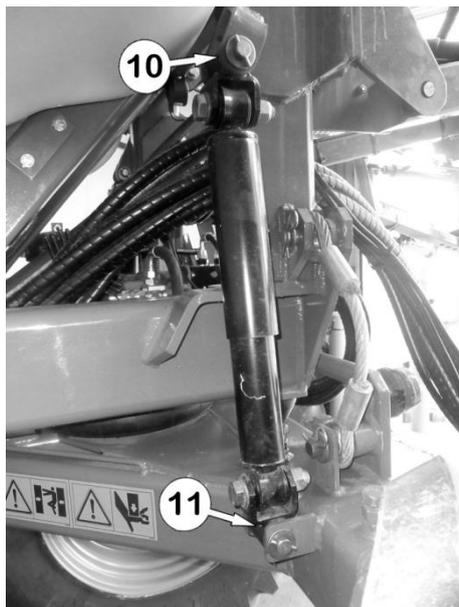
Grease fittings numbers 1, 2, 3.
 Front left of the vehicle
 Front Right of vehicle also



Grease fittings numbers 4, 5.
 Rear left parallelogram arms
 Rear right parallelogram as well



Grease fittings numbers 6, 6b.
 Rear left of the vehicle



Grease fittings numbers 10, 11.
Rear left of the vehicle
Right side of vehicle as well

5.6 WARRANTY INSPECTION 80 HR



ATTENTION

These maintenance operations represent a safety warranty. It is important to perform an overall inspection of the **PRESIDIO** at least once a year.

STEERING WHEEL BRAKES

- Check that the brakes are in good working order.
- Check the steering system and its hydraulic circuit.
- Check that the front and rear wheels are correctly tightened:
 - o Steering pivot nuts
 - o Hydraulic motor nuts
 - o Wheel nuts

CONTROLS

- Check the forward travel
- Check the Fluid pump controls (engine should not start with this engaged)
- Check the settings of the neutral position if necessary.

HYDRAULIC CIRCUIT

- Check the feed pressure (30 bars at full r.p.m).
- Check the oil level.

ELECTRICS

- Check the tank level sensors and the filter sensors.

OTHER CHECKS

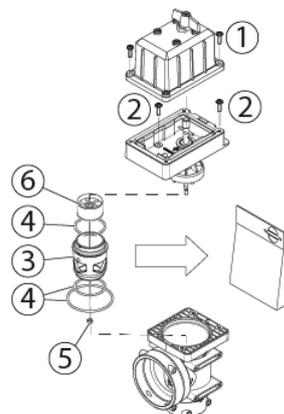
- Check the level of electrolyte in the battery.
- Check the battery terminals.
- Check all electrical connections.
- Check the electric equipment and the alternator belt.
- Lubricate all joints and transmission subsystems fitted with a greaser.
- Lock all nuts and screws.
- Check that all nuts and screws are tight.
- Check the tyre pressure.
- Check that the fuel tank is clean and clean if necessary.
- Check that all hydraulic couplings are tight.
- Visually check the condition of the hydraulic pipes and all hydraulic components.

MIXING DIFFERENT BRANDS OF OIL MAY CAUSE IRREPARABLE DAMAGE TO THE HYDRAULIC CIRCUIT.

ALWAYS USE NEW CARTRIDGES IN THE OIL AND FUEL FILTERS;

5.7 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 cone rep.6.
 - Reassemble in reverse order.



5.8 DISTRIBUTION VALVE SEAL CHECK/REPLACEMENT

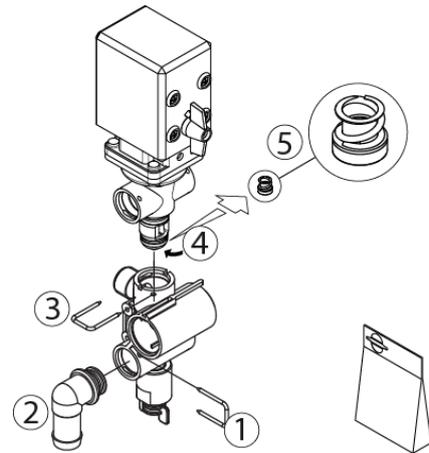
Regularly check the tightness of distribution valves with clean water.

Check

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

Replacement

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



5.9 BOOM CONNECTIONS AND 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 case of leaks:

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. All connectors should only be tightened by hand.

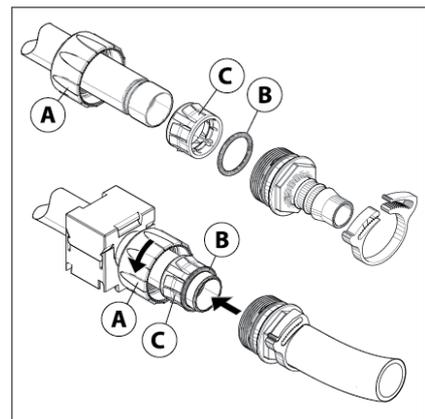
5.9.1 FEED PIPE SNAP-LOCK ASSEMBLY

Disassembly

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

Reassembly

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



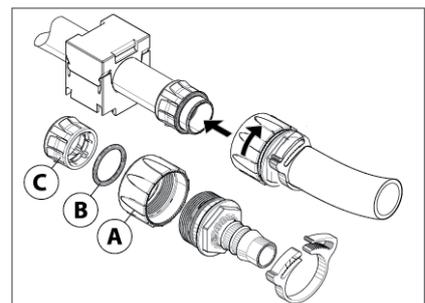
Initial fitting of fittings



ATTENTION

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

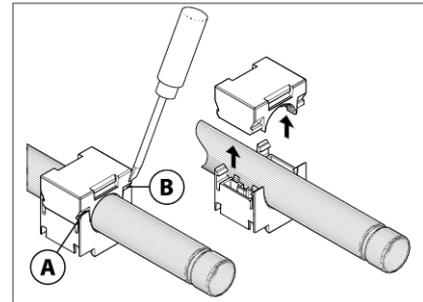
1. Fit the barbed lock ring (C) to the feed pipe with barb pointing away from pipe opening.
2. Fit the oiled O-ring (B) on top of the lock ring.
3. Screw the union nut (A) partly on the hose barb.
4. Press the feed pipe and hose barb together.
5. Tighten the union nut (A) by hand.



5.9.2 FEED PIPE CLAMP ASSEMBLY

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

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



5.9.3 OPENING THE CABLE TRAYS (IF FITTED)

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

Disassembly

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

Assembly

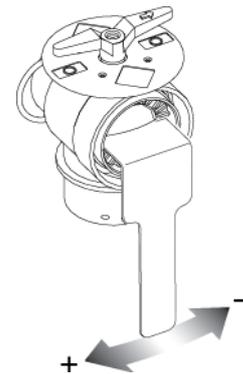
1. Press the cover on by hand until it hits the hooks of the cable tray.



5.9.4 ADJUSTMENT OF 3-WAY VALVE

The MANIFOLD valve can be adjusted if it is too tight to operate – or if it is too loose (=liquid leakage). Correct setting is when the valve can be operated smoothly by one hand. Use a suitable tool and adjust the toothed ring inside the valve as shown on the drawing. Use a suitable tool and adjust the toothed ring inside the valve as shown on the drawing.

ATTENTION The small ball valves (s67) cannot be adjusted.



5.10 BOOM ADJUSTMEN EAGLE MODELS

5.10.1 BOOM ADJUSTMENT - GENERAL INFORMATION

Before commencing adjustment jobs, please check the following points:

- 1) The sprayer must be well lubricated (see "Lubrication").
- 2) Place sprayer on level ground (horizontal).
- 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.

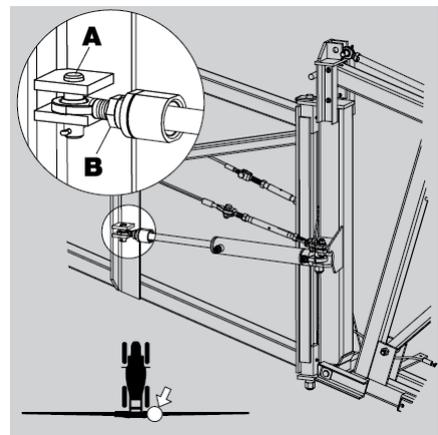


DANGER

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

5.10.2 ALIGNMENT OF CENTRE AND INNER WING SECTIONS

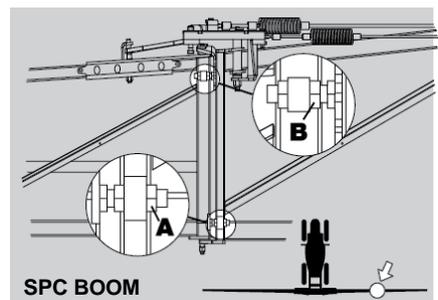
1. Unfold the boom and check alignment of the inner section with the centre section.
2. If adjustment is necessary, relieve pressure from the cylinder by folding the boom a few centimetres.
3. Disconnect cylinder rod eye (A) from the inner section. Note that some cylinder rods have a machined flat which can be used for adjustments. If using this one for adjustment, leave the rod eye pinned to the boom.
4. Loosen counternut (B) and adjust the length of the rod eye (A).
IN = to move the boom forward
OUT = to move the boom rearward
5. Tighten the counternut (B) again. (Reattach the cylinder rod to the boom again, if it has been loosened).
6. Pressurize the cylinder to check boom alignment.



5.10.3 ALIGNMENT OF INNER AND OUTER WING SECTIONS

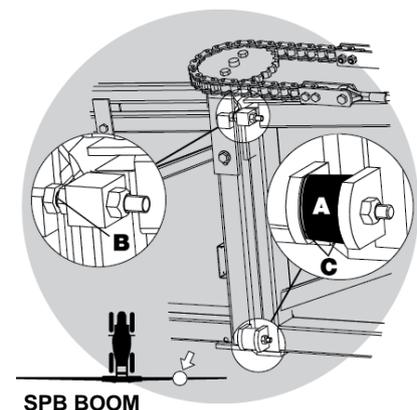
Unfold the boom and check that the boom wing is aligned. If adjustment is necessary:

1. SPB type: Remove stop device (A) from the inner section. SPC type: Loosen stop device (A).
2. Adjust the position of the adjusting bolt (B) on the inner section so that the cap of the bolt head (B) contacts top stop plate on outer section with inner and outer sections aligned. Tighten it in this position.
3. SPB type: Fit stop device (A) again. SPC type: Tighten stop device (A) again.



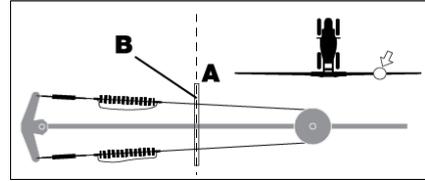
SPB only

Please note that the rubber stop (= stop device (A)) should be compressed 3-5 mm. Therefore, check that the distance between the tabs (C) is a little less than the length of the rubber stop itself. The rubber stop may need to be spaced out with 1 or more flat washers in order to obtain correct compression. Tighten nut to hold it in place.



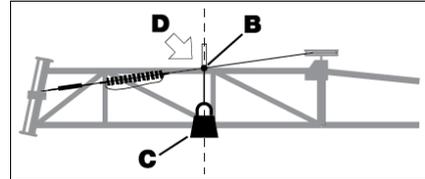
5.10.4 ADJUSTING THE FRONT FOLD CABLE

The performance of the SPB/SPC boom while spraying depends very much on the front fold cable adjustment. A correctly adjusted cable will also control the movement of the outer section.



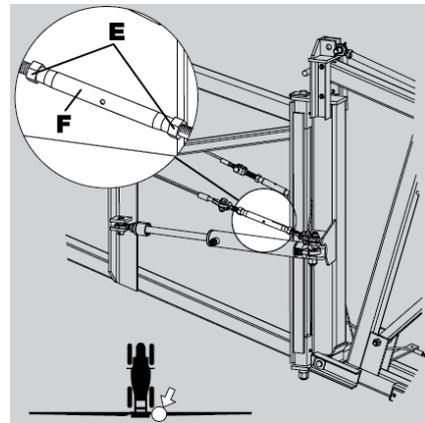
The rear cable can snap and injure you or someone else if tensioned when the boom is unfolded. Always adjust the front cable first - with the boom unfolded and the rear cable last - with the boom folded in transport position.

1. Unfold the boom.
2. Check security of turnbuckle anchors to its hinges.
3. Slide a straight edge (A) down the underside of the inner section until it contacts the front cable = contact point (B).
4. Suspend a weight of 4.5 kg (C) from the straight edge-to-cable contact point (B) and check deflection by measuring the distance from the straight edge to the cable. Cable should deflect 13-22 mm (D).



If adjustment is necessary:

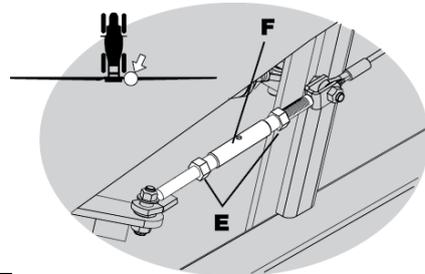
5. Loosen conternuts (E) on the turnbuckle assembly and adjust turnbuckle (F) for proper cable deflection.
6. Tighten conternuts (E) again and remove weight.



WARNING Check boom alignment again. If front cable was tightened, the wing assembly will move a bit forward. If front cable was loosened, the wing assembly will move a bit rearward. Therefore, adjust fold cylinder, if necessary, as described in the section 'Alignment of centre section and inner wing sections'.

5.10.5 ADJUSTING REAR CABLE

- 1) Raise boom to its highest position. Fold it to transport position with tilt cylinders fully extended. Make sure that fold cylinders are pressurized and that the boom is folded all the way in.
- 2) Ensure the boom transport brackets are in contact with the outer wing. Adjust if necessary.
- 3) Loosen the conternuts (E) on the ends of turnbuckle (F). Adjust the turnbuckle (F) so that the outer section contacts the boom transport bracket.



Boom size	Tightening
18-21 m	Turn the turnbuckle another 4 complete turns.
24-28 m	Turn the turnbuckle another 3 complete turns.

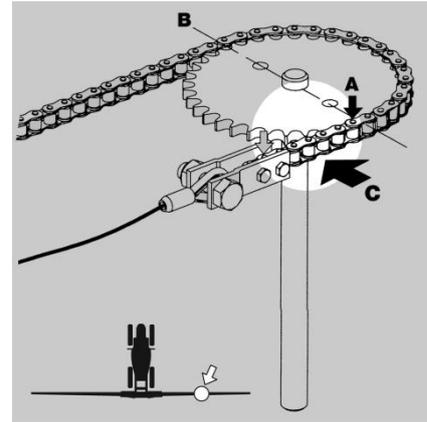
- 4) Secure conternuts (E) again.



WARNING The rear cable can snap and injure you or someone else if tensioned when the boom is unfolded. Always adjust the front cable first - with the boom unfolded and the rear cable last - with the boom folded in transport position.

**5.10.6 CHECK/ADJUST SPROCKET TIMING
(SPB ONLY)**

- 1) Unfold the boom and stand on its rear side.
- 2) Check that the pin connection (A) in the timing chain is aligned with the centreline (B) between the sprocket. Note forward driving direction (C) - adjustment is done at rearside of the boom. (A) is the 7th pin connection on the chain.
- 3) To adjust timing, loosen turnbuckles on the front and rear cables until slack.
- 4) Line up the chain and sprocket as indicated in step 2 above.



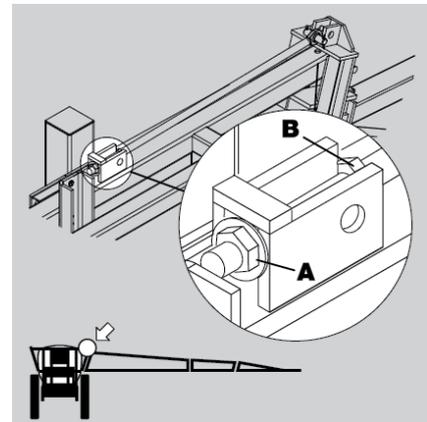
5.10.7 ADJUSTING BOOM LEVEL TO GROUND

Unfold the boom and check that the boom sections are parallel to the centre frame and level to the ground. Adjust if necessary, as described below. Adjustment is carried out with the boom unfolded.

For SPB-Y & SPC-Y models the following procedure is used:

- 1) Loosen counternut (A).
- 2) Adjust nut (B) - in or out - until boom wing is level to the ground.
- 3) Secure counternut (A) again.

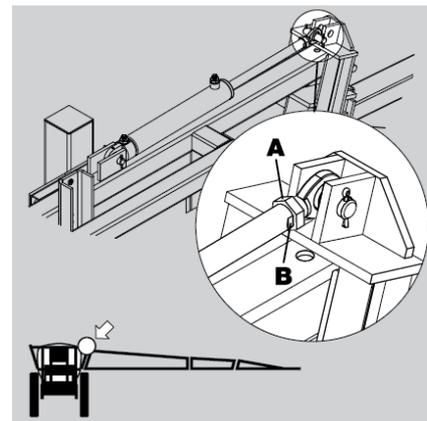
Same procedure applies to both sides.



For SPB-Z & SPC-Z models the following procedure is used:

- 1) Ensure that cylinder is fully extended.
- 2) Loosen counternut (A).
- 3) Apply an adjustable wrench to the machined surface at (B).
- 4) Turn the cylinder rod until boom is level to the ground.
- 5) Secure counternut (A) again.

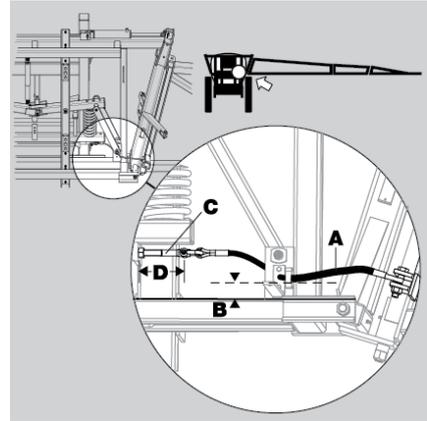
Same procedure applies to both sides.



5.10.8 ADJUSTING CENTRE SECTION CABLES

The centre section cables keep the centre frame in correct position during folding procedure or when spraying with one side raised and folded (SPB-Z only).

- 1) Fold the boom into transport position.
- 2) Check that the tilt cylinders are completely extended. Adjust if necessary (SPB-Z only).
- 3) Check that centre section cable (A) is routed over centre section nozzle bracket (B).
- 4) Loosen counternuts on the bolt assembly (C). This applies both boom wings.
- 5) Adjust the threaded bolt(s) (C). Alternate from side to side while making adjustments. As a guideline for adjustment, the distance (D) shown at the bolt assembly should be 110 mm. Properly adjusted cables will be very tight and only deflect a small amount (mm) when pulled by hand.



ATTENTION Cables will be loose when the boom is unfolded.

- 6) Tighten counternuts on the bolt assembly (C) again.
- 7) Unfold the boom and inspect that the centre frame is correctly centred.

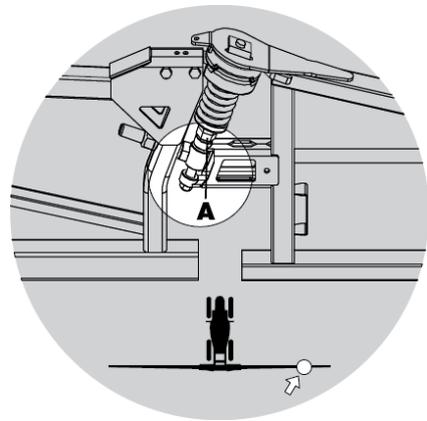
ATTENTION Adjust both boom wings in one sequence. Adjust one cable a small amount at the time, and then the other cable, to equalize cable tension and maintain a level centre frame.

WARNING Never adjust the centre cables without having folded the boom all the way into the transport position.

5.10.9 BREAKAWAY SECTION ADJUSTMENT

The function of the breakaway section is to prevent or reduce boom damage, should it strike an object or the ground. Adjust the screw (A) until the breakaway will release at a force of 80 N at the extremity. Please note that the clutch must be well greased before adjustment is commenced.

SPC type breakaway is shown here. Same principle applies for SPB type.



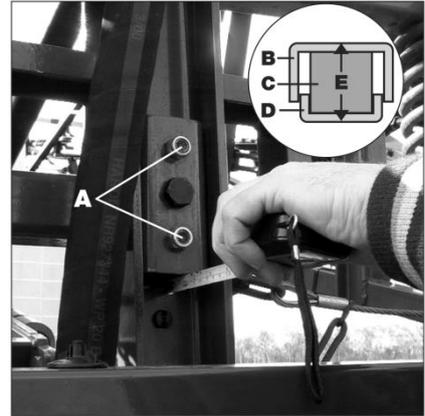
5.10.10 YAW RUBBER DAMPERS (SPC ONLY)

Inspect basic adjustment of the rubber yaw dampers.

Basic adjustment

On figure the channel section (B) is a part of the centre section frame, and yaw (C) is hold by the fixing (D).

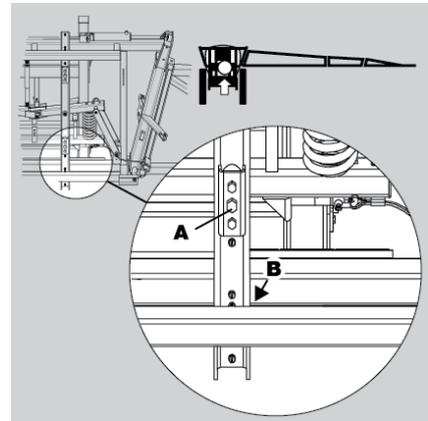
- The compression of the yaw (C) should correspond to a distance (E) of 34 mm (+/- 0,5).
- Measure and adjust the yaw if necessary by means of the two M12 bolts (A).



5.10.11 YAW DAMPING

Tighten/loosen bolt (A) to adjust slack at point (B).

Behavior	Adjustment
Boom does not work smoothly or works in 'steps'.	Loosen bolt (A).
Boom works too loosely or swings uncontrollable.	Tighten bolt (A).



ATTENTION Do not stress the bolt (A). Only tighten till contact is reached at point (B).

5.11 TR4 ALUMINIUM BOOM

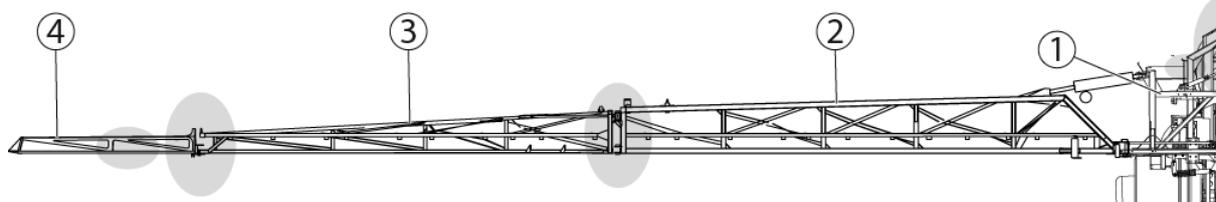
General information

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 horizontal ground.
3. The boom must be unfolded and horizontal.



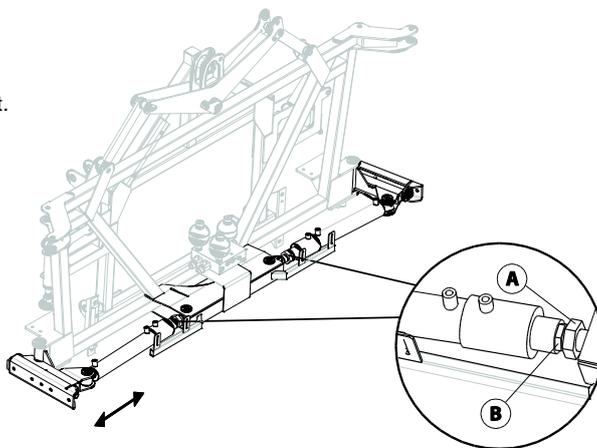
WARNING As a safety measure, there should be no one near the boom during adjustment operations.



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

5.11.1 HORIZONTAL ALIGNMENT OF INNER SECTION

- Unfold the boom completely.
- Loosen lock nut (A)
- With a 24mm spanner adjust the cylinder (B) to desired alignment.
- Tighten the lock nut again.

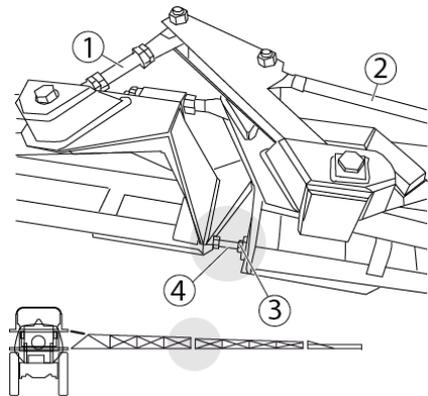


5.11.2 HORIZONTAL ALIGNMENT OF OUTER SECTIONS (TR4)

This adjustment is for changing the alignment of the outer section with respect to the inner section.

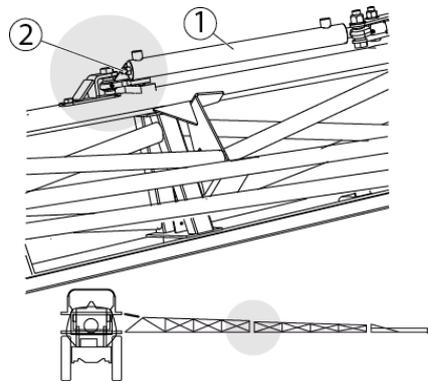
Step 1 Horizontal alignment

- Unfold the boom completely.
- Loosen the counter-nut (3) and turn the screw (4) to change the alignment of the outer section
- Ensure that the ram rod (2) is fully out.
- Adjust the length of the rod (1) until the wing is straight. Adjust the screw (4) until it is supported.



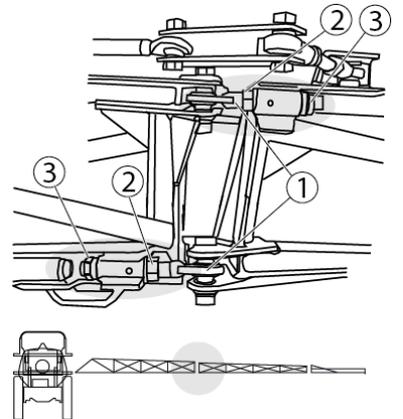
Step 2 Adjustment for wing to lock into transport

- Fold the outer section completely.
- Loosen the nut (2) to increase the holding of the outer section in transport.



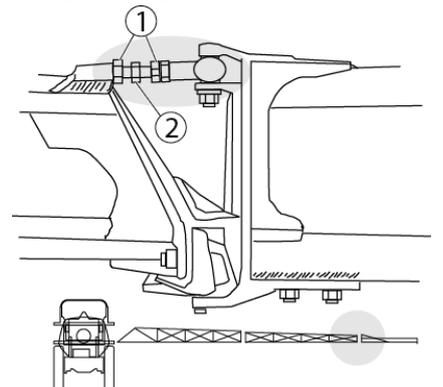
5.11.3 VERTICAL ALIGNMENT OF OUTER SECTIONS AND END SECTIONS (TR4)

- Depending in which direction the wing is needs to be adjusted. Loosen the nut (3) or (2) on one side and work on the nut to adjust the eyelet (1).
- Work equally on the top and the bottom eyelet.
- After adjustment, tighten the nuts.



5.11.4 VERTICAL ALIGNMENT OF OUTER SECTIONS WITH BREAK-AWAY SECTIONS (TR4)

- Loosen the counter-nuts (1)
- Turn the rod (2) for vertical adjustment of the outer section.
- Tighten the counter-nuts (1) again.



5.11.5 ADJUSTMENT OF BREAK-AWAY SECTIONS - (TR4)

The end sections of the boom can break away. The spring tension determines activation of break-away when the section encounters an obstacle.

- Change the spring tension by working on the nuts (1)

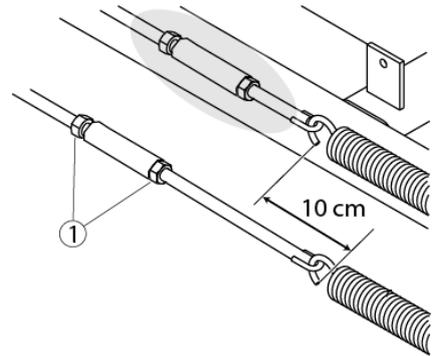
The 10 cm distance corresponds to the spring tension.

The tension corresponds to the distance of the spring when idle, to which 10 cm should be added.



ATTENTION

A tension value that is too low can cause untimely activation of the safety system.





5.12 LIFTING OPERATIONS



Qualification of the operator



Reminder:

The **PRESIDIO** should only be used, maintained and repaired by people who are very familiar with its particular characteristics and who know the corresponding safety procedures.



ATTENTION

The dismantling and lifting of certain elements of the **PRESIDIO** (Complete vehicle, heat engine, tank, cab ...) should only be done by specialized personnel because it is necessary to work on the hydraulic bushes, wiring harnesses, etc. Contact your **"AUTHORIZED DEALER"**.

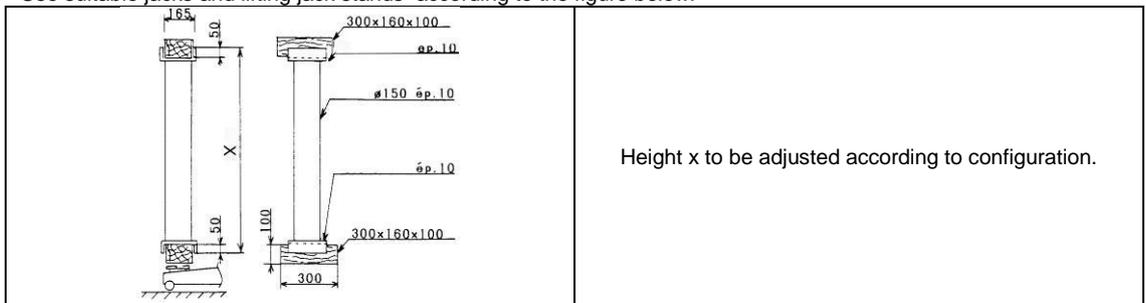
For upkeep and repairs, your **"AUTHORIZED DEALER"** has received training including technical work sessions. He has the original spare parts and tools needed to give you full satisfaction.

The lifting must be carried out only if:

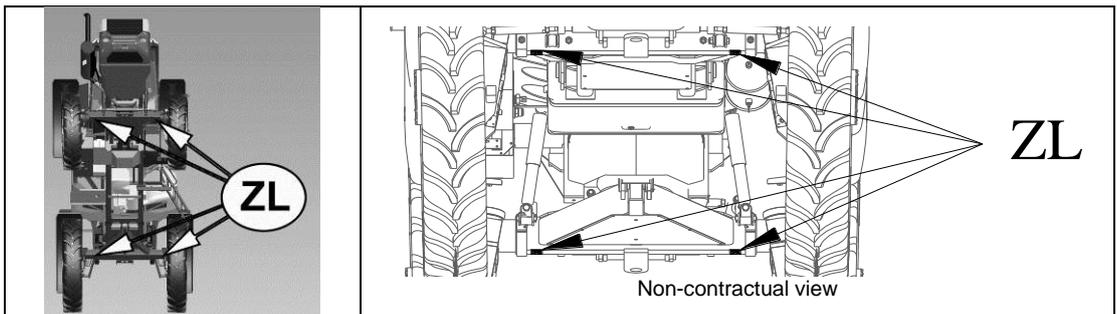
- Immobilise the vehicle (on a flat surface) and its accessories
- Engine cooled down and shut-down.
- Ignition key removed
- Parking brake engaged
- Battery shut-off on OFF
- Shimming of wheels on each side on front and rear axles.
- Cab door closed.

5.12.1 LIFTING THE VEHICLE

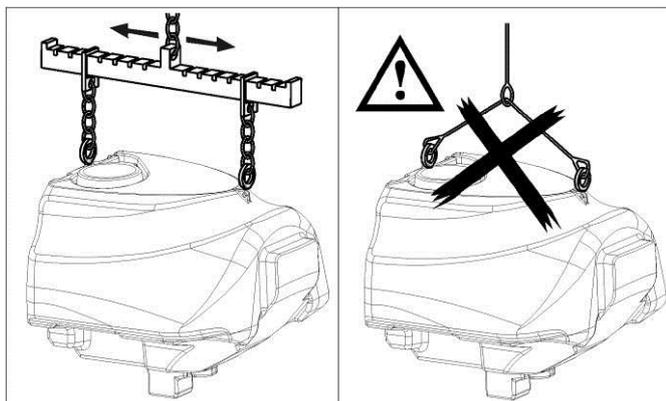
Do not use the hydraulic system of the **PRESIDIO** as a jack to raise it.
Use suitable jacks and lifting jack stands according to the figure below.



Support the **PRESIDIO** at the locations indicated below (ZL: Lifting area).



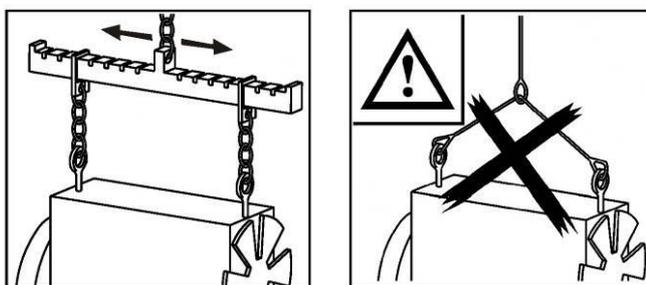
5.12.2 LIFTING THE TANK



150 to 200 Kg

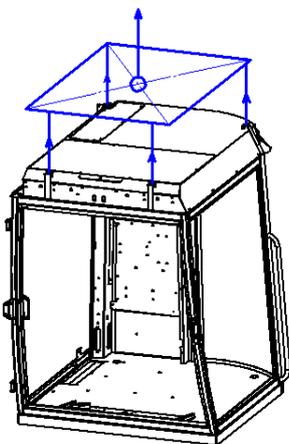
Non-contractual view

5.12.3 LIFTING THE ENGINE



500 to 600 Kg

5.12.4 LIFTING THE CAB



Approximately 600 kg



5.13 HYDRAULIC OIL FILLING LEVELS



The Operator on a daily basis should check the Hydraulic, Water and Fuel levels at least



Reminder:

The **PRESIDIO** should only be used, maintained and repaired by people who are very familiar with its particular characteristics and who know the corresponding safety procedures.

Before any service, stop the engine and let the whole machine cool down.

5.13.1 OIL GRADE

HVLP fluid according to DIN51524-3 VI>140
 ISO grade 46 to 68 depending on temperature
 Similar to Castrol Hyspin AWH-46 or 68 depending on temperature of region of operation.

If hydraulic fluid from different manufacture or different types from same manufacture are mixed, gelling silting and deposits may occur. These, in turn, may cause foaming, impaired air separation ability and malfunction which can result in damage the hydraulic system.

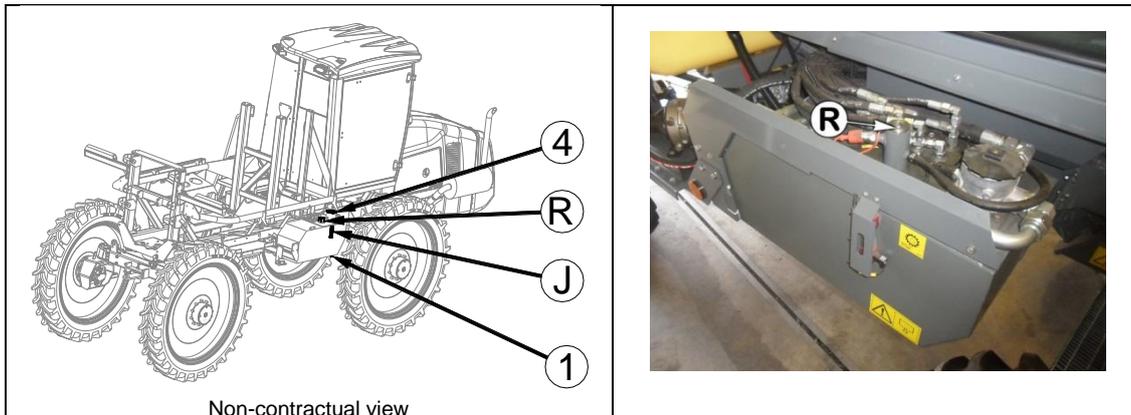
Mixing with other hydraulic fluids is not generally permitted.

5.13.2 HYDRAULIC OIL LEVEL GAUGE

Gauge (J)	
<p>Non-contractual view</p>	<p style="font-size: small;">H.B. 02/12/2008 15:2 Jauge_huile_PR3240_12_2008.dwg</p> <ul style="list-style-type: none"> ○ F: Float level ○ N: Normal oil level ○ M: Minimum oil level

5.13.3 FILLING THE HYDRAULIC OIL RESERVOIR

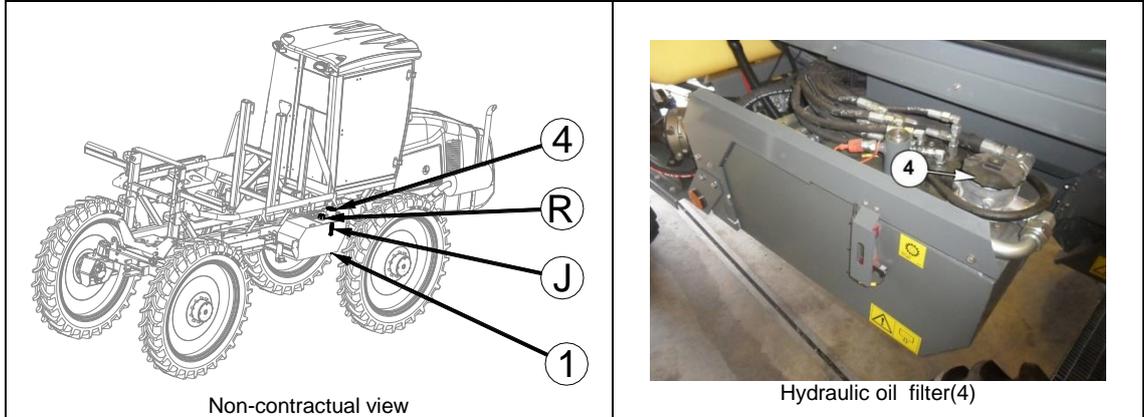
The reservoir has quick release male fitting to allow safe filling when or if required.



Ensure oil is clean and correct grade for temperature of operation

5.14 HYDRAULIC OIL FILTER REPLACEMENT

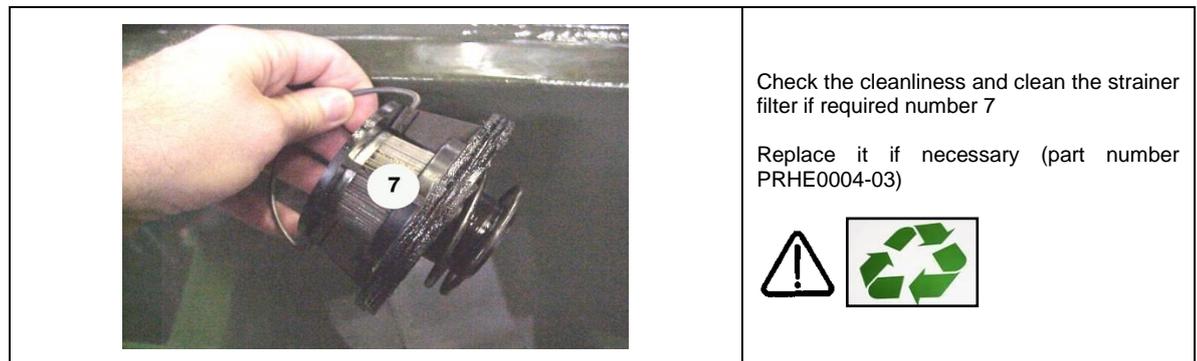
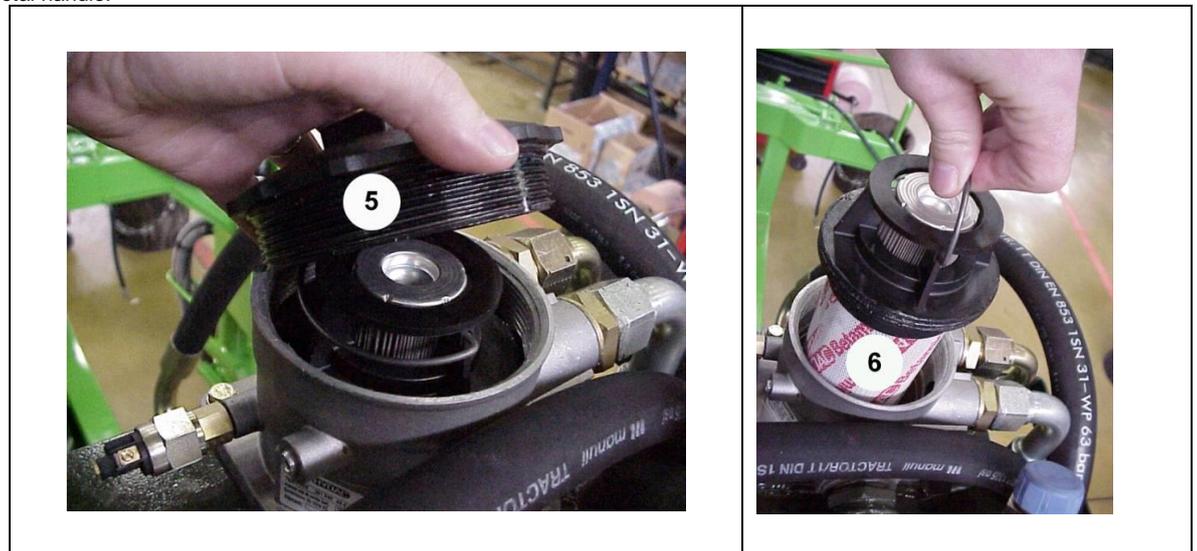
Before any service, stop the engine and let the whole machine cool down.
Clean area before doing any work on this assembly
The cleanliness of the hydraulics is paramount to a long life of service.



Non-contractual view

Hydraulic oil filter(4)

Unscrew and remove the cover (number 5), Remove the filter element (number 6) (HE0005) and its bracket using the metal handle.



Check the cleanliness and clean the strainer filter if required number 7

Replace it if necessary (part number PRHE0004-03)



- Replace the filter element (number 6) (part number PRHE0005) (lubricate the seal).
- Replace the filter element and its bracket in the "shaft" of number 4.
- Screw back the cover (number 5) of number 4 after having cleaned it carefully.
- Check the oil level.

This filter is fitted with an electrical clogging indicator sensor.
In severe cold, it is possible that, in spite of changing this filter, the clogging indicator lamp (INSTRUMENT PANEL) remains alight. The engine must be left running at 1800 rpm and travel forward very slowly for 10 to 15 min so that the heat is distributed in the hydraulic system and the oil reaches a more viscous level.



5.15 DRAINING THE HYDRAULIC RESERVOIR

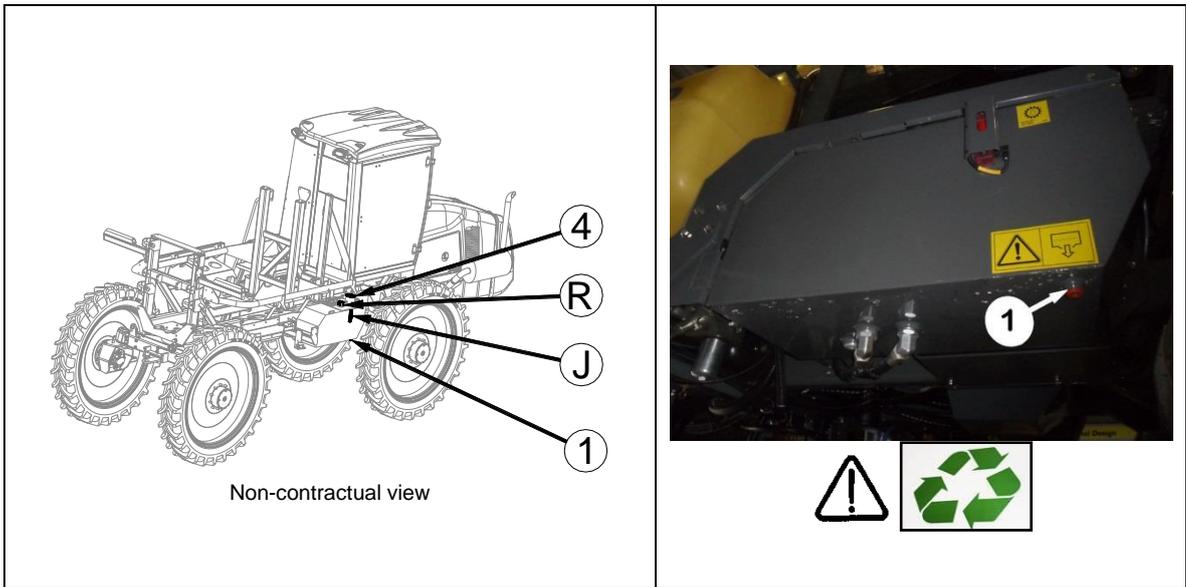


This should be performed in a clean location by competent people



The **PRESIDIO** should only be used, maintained and repaired by people who are very familiar with its particular characteristics and who know the corresponding safety procedures.

Before any service, stop the engine and let the whole machine cool down.



Oil should be drained when required by removing plug as indicated in 1 above.
If sprayer is warm (after running) then the oil will drain more freely.
Ensure the plug is cleaned and screwed back in firmly before refilling oil reservoir with correct oil
Capacity of hydraulic system is 170 liters.



5.16 RADIATOR ENGINE (CLEANING)



This should be performed in a clean location by competent people



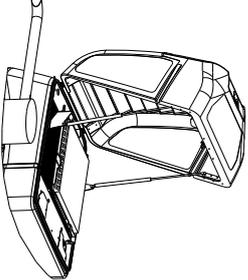
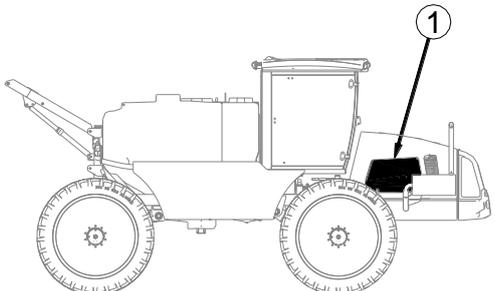
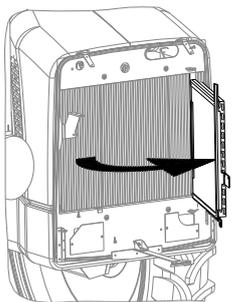
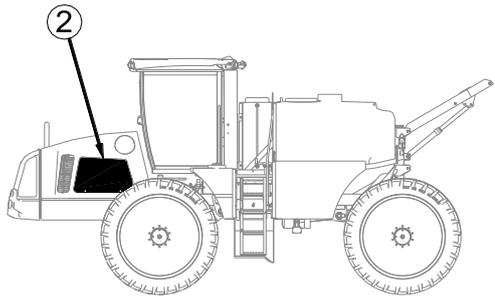
The **PRESIDIO** should only be used, maintained and repaired by people who are very familiar with its particular characteristics and who know the corresponding safety procedures.

Before any service, stop the engine and let the whole machine cool down.

Use a compressed air or low pressure water jet.
High pressure water blasters are not recommended for radiator cores



In case of use in a dust or debris laden atmosphere, it is strongly recommended to carry out this cleaning every day or several times a day if required.

<p>Open the front hood</p> 	<p>Remove the side hoods numbers 1 & 2.</p> 
<p>Pivot the air conditioning radiator</p> 	 <p>Non-contractual view</p>



5.17 HYDRAULIC HOSES



This should be performed in a clean location by competent people



The **PRESIDIO** should only be used, maintained and repaired by people who are very familiar with its particular characteristics and who know the corresponding safety procedures.

Before any service, stop the engine and let the whole machine cool down.



All liquids must be handled with care.
If you are injured by a leaking liquid or if you absorb it, see a doctor immediately.

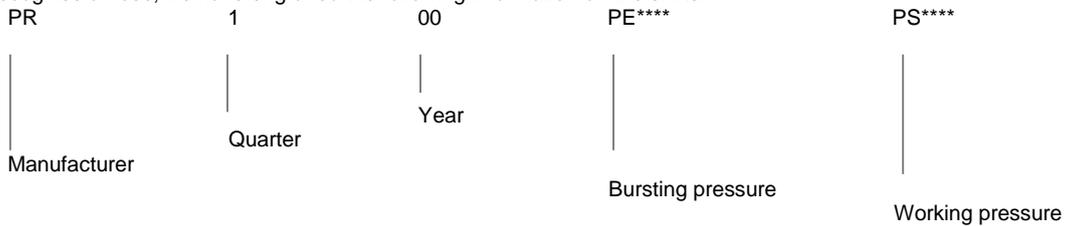
Liquids under pressure that could escape through a very small hole are almost invisible but present a major danger for safety and health. To check for leaks, always use a piece of cardboard or wood. Never try to locate leaks using your hands.

We would like to draw your attention to the importance of the technical characteristics of the components of a hydraulic hose: the pipes, the ferrule and the nozzles.

Each pipe is defined by a standard specifying its dimensions, its working pressure (WP) and its bursting pressure (BP). So we strongly advise you, when replacing a hydraulic hose, to use exactly the same characteristics as the original hose.

- That is to say:
- The same diameter; this can be found on the pipe
 - The same type of pipe; the standard can be found on the pipe as can the working pressure (WP)
 - The same end
 - The same ferrule

To help you to recognise a hose, we have engraved the following information on the skirts:



So we advise you to periodically check that your hoses are in good condition, especially transmission hoses, and change them frequently.



5.18 CHECKING THE EFFICIENCY OF BRAKES

The brakes should be regularly checked.



Any service work or repair on the system or components making up the braking (hydrostatic or friction braking, dynamic or static) will have to be exclusively carried out by your "APPROVED DEALER".

5.18.1 CHECKING THE DYNAMIC BRAKING EFFICIENCY

- Load the vehicle.
- Start the vehicle at its maximum speed.
- Press down the brake pedal fully.

Braking distance: approximately 19 m

5.18.2 CHECKING THE EFFICIENCY OF THE PARKING BRAKE

- Load the vehicle.
- Place the vehicle on a slope at maximum 18%

The vehicle must remain stationary with the engine stopped.

5.19 TOWING THE VEHICLE



This work should be performed by competent people



Reminder:

The **PRESIDIO** should only be used, maintained and repaired by people who are very familiar with its particular characteristics and who know the corresponding safety procedures.

Before any service, stop the engine and let the whole machine cool down.

The rear wheel motors of the unit are fitted with inboard spring applied hydraulically released wet disc brakes. In the event of a blown hose or an engine failure the static brakes will apply. In an emergency it may be needed to tow the vehicle a short distance. To tow the vehicle it will be necessary to uncouple the drive reduction from the brakes

5.19.1 OPERATION METHOD TO BE ADOPTED FOR UNCOUPLING DRIVE

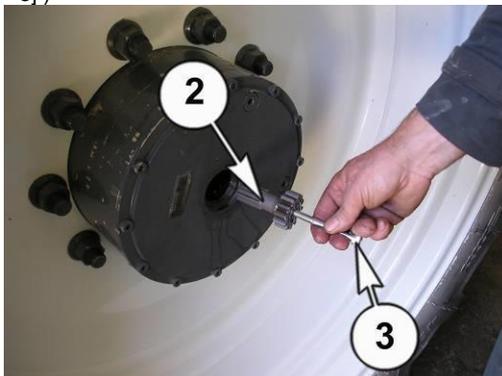
- Connect the equipment to the towing vehicle using a towing bar.
- The towing bar is required as the static parking brakes are disconnected when the gear is removed.
- Operate the uncoupling device only when the Sprayer is stopped.
- Be careful about the temperature of the reduction gear (a working/running hub generates quite some heat.)
 - Clean the plug area of the reduction gear.
 - Remove the screwed plug (number 1).



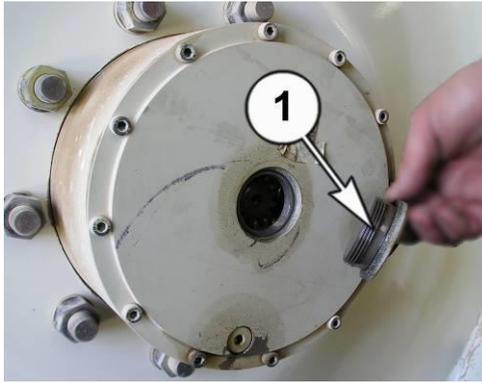
- Recover the oil that may come out.



- Completely remove the shaft from the planet gear (number 2) of the reduction gear (use a bolt as shown [number 3])



- Refit the screwed plug (number 1) into the cover.



Before towing, fill the reduction gear with oil.

The uncoupled drive is used only to tow the vehicle over a short distance.

Check that you do not exceed 2 to 3 km/h.

Before removing the towing bar, refit the shaft in the reduction gear (see below) or take suitable measures ie chock the wheels of the sprayer, so that the machine does not start rolling.

5.19.2 OPERATION METHOD TO BE ADOPTED FOR COUPLING DRIVE

Connect the equipment to the towing vehicle using a towing bar.

Be careful about the temperature of the reduction gear in case the device has rotated beforehand.

- Clean the area.
- Remove the screwed plug (number 1).
- Recover any oil that may come out in suitable containers.
- Insert the shaft of the planet gear (number 2) in the reduction gear.
- Screw the screwed plug (number 1).
- Before removing the towing bar take suitable measures ie chock the wheels of the sprayer, so that the machine does not roll before you are sure brake system is operating
- Before starting, fill the reduction gear with oil.



5.20 REPLACING THE BRAKE DISCS



Any service work or inspection on the system or components making up the braking (hydrostatic or friction braking, dynamic or static) will have to be exclusively carried out by your "APPROVED DEALER".

For upkeep and repairs, your "AUTHORIZED DEALER" has received training including technical work sessions. He has the original spare parts and tools needed to give you full satisfaction.



5.21 MAINTAINING REDUCTION GEAR OF REAR WHEEL MOTOR



This work should be performed by competent people



Reminder:

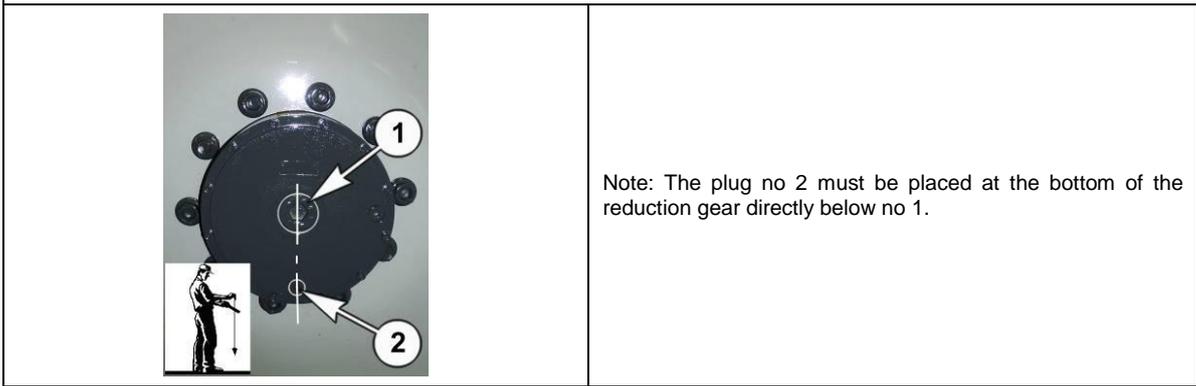
The **PRESIDIO** should only be used, maintained and repaired by people who are very familiar with its particular characteristics and who know the corresponding safety procedures.

Before any service, stop the engine and let the whole machine cool down.

- Perform weekly visual inspections.
- Check the tightness of the reduction gear.
- Regularly ensure that the reduction gear does not emit suspicious noises.
- Regularly check the oil level.

5.21.1 DRAINING THE REDUCTION GEARS - SAE 80W-90

Always drain the hot oil immediately after the reduction gear is shut-down.
 The draining of reduction gears is done from the plug number 2 (open the plug number 1 to facilitate flow).



Open the plugs numbers 1 & 2.
 Recover the oil



5.21.2 FILLING OIL IN THE REDUCTION GEARS.

SAE 80W-90

- Maintain the position of the reduction gear as above.
- Refit the plug number 2.
 - Fill from the plug port number 1 until the oil attains the level of the plug port (ie runs out of number 1). Approximately 1 liter per hub.
 - Refit the plug number 1.



5.22 MAINTAINING BOOM OR PARALIFT



Qualification of the operator



Reminder:

The **PRESIDIO** should only be used, maintained and repaired by people who are very familiar with its particular characteristics and who know the corresponding safety procedures.

Before any service, stop the engine and let the whole machine cool down.

5.22.1 PARALIFT



1 - Raising safety

2 - Accumulator

During storage or maintenance of the **PRESIDIO** you must move the safety bar number 1 from position T (work) to position S (safety).



ATTENTION

The hydraulic accumulators must be checked every three years and must be replaced every ten years



ATTENTION

Reminder :

It is essential to pay special attention to the tanks, piping and fluid and energy accumulators. They must not be subjected to any chemical, thermal or mechanical attack and must be kept in a good state of cleanliness and free of all corrosion and all visible flaws.

If you have the slightest doubt regarding the integrity of one of these components, immediately seek the advice of the Authorised Dealer

5.23 AIR RESERVOIR



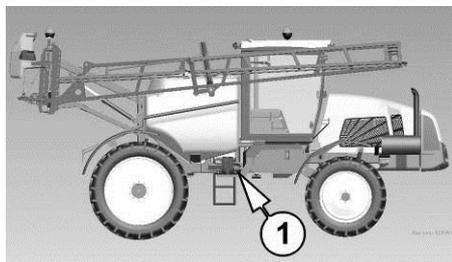
Reminder :

It is essential to pay special attention to the tanks, piping and fluid and energy accumulators. They must not be subjected to any chemical, thermal or mechanical attack and must be kept in a good state of cleanliness and free of all corrosion and all visible flaws.

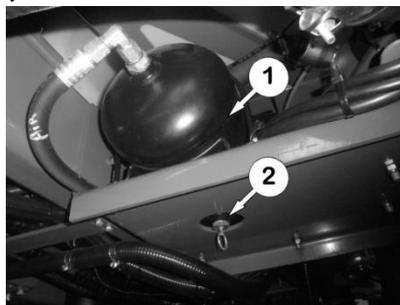
If you have the slightest doubt regarding the integrity of one of these components, immediately seek the advice of the "AUTHORIZED DEALER".

The air tank intended for the pneumatic suspension is subject to the decree of July 23, 1943 amended concerning gas pressure devices:

Hydraulic test every ten years, and have an exterior and interior inspection every three years.



Bleed the air reserve (number 1) using the device number 2 every day





5.24 PNEUMATIC SUSPENSION

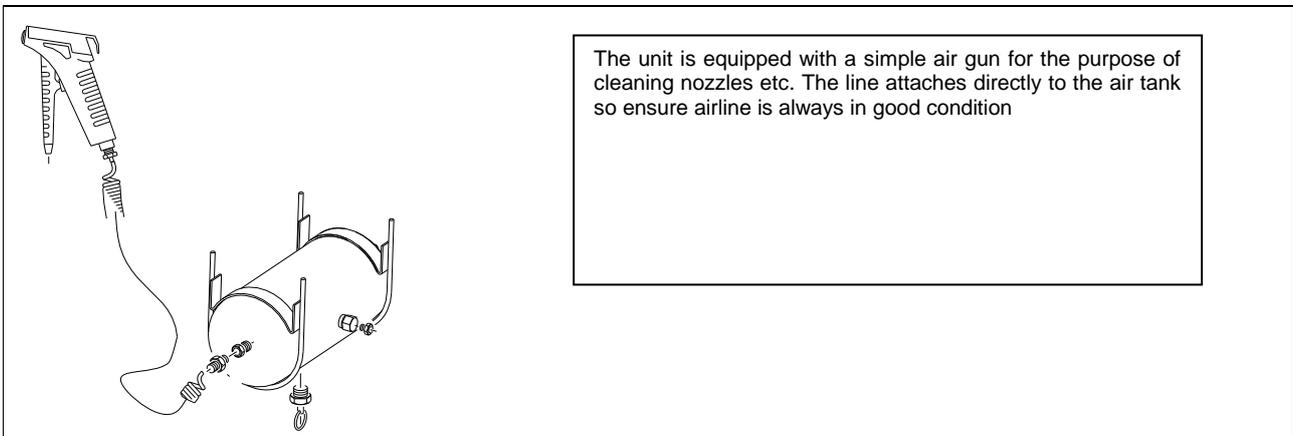
Before any service, stop the engine and let the whole machine cool down.

The machine is equipped with two air bags that work on the front and rear axle. It is recommended to visually inspect daily that air springs are in good condition and are inflated. Ensure the area around the two air springs is kept clean and free of oil and contaminants

Any servicing operation on the pneumatic system must be done by your "APPROVED DEALER".

For upkeep and repairs, your "AUTHORIZED DEALER" has received training including technical work sessions. He has the original spare parts and tools needed to give you full satisfaction.

5.25 AIR GUN



5.26 AIR REGULATOR ON RUN DRY FLUID PUMP

How to check seal reservoir pressure:

The reservoir pressure gauge gives a direct pressure reading.

Pressure should remain within the 30 to 35 psi during operation. The recommended cold reservoir pressure is 25 to 30 psi. 1.7 to 2 bar



Note:

Pressure may increase during operation as the fluid is heated.

Steps to pressurize seal reservoir:

- Verify that fill and drain plugs are installed and tight.
- An air regulator is fitted to ensure pressure remains constant.

To adjust up or down turn the regulator handle clockwise for up and anticlockwise to reduce pressure

Caution: Do not over pressurize. Relieve excess air pressure if necessary.



5.27 HARDI RUNDRY FLUID PUMP

A separate instruction manual is provided with this pump to instruct the operator in overhaul procedure.

How to check seal reservoir fluid level:

View the site gauge window on the side of the seal reservoir.

The fluid level should be visible in the window when properly filled.



Note: The fluid is clear - look closely.

If the fluid is not visible, add fluid by following these steps:

- Relieve reservoir air pressure.
- Remove air lines and remove (unscrew) regulator on top of seal reservoir.
- Add barrier fluid (Ace Part #55032 - available in quarts) until level is at top edge of site window.

Caution: Do not overfill.

- Replace regulator and hoses and recharge air pressure per instructions above.

Note the oil as used in the run dry pump is a special fluid that is hazardous and must be handled with care.

Fluid sight gauge

5.28 ACTIVATED CARBON FILTERS (IN CABIN)

Before any service, stop the engine and let the whole machine cool down.

The cabin is fitted with two activated carbon filters that work with the circulation of the air in cabin from the air conditioning system.

The filters are important for the cleanliness of the air in the cabin environment. Before operator enters cabin it is recommended that contaminated clothing boots etc should be removed as this will extend the operating life of the filters and importantly the comfort and safety of the operator.

5.28.1 GENERAL

The life of filters depends on the type of chemical products used.

The activated charcoal absorbs the chemicals as they are blown through the filter.

It is extremely difficult to detect the saturation level of the filters so minimum it is recommended that every 6 months these filters should be changed.

5.28.2 REPLACING FILTERS

<ul style="list-style-type: none"> ○ Remove the 2 screws number 1 ○ Remove the hood number 2 	
<ul style="list-style-type: none"> ○ Pivot the support lug number 3 	
<ul style="list-style-type: none"> ○ Remove the filter number 4 <p>Part number: CARA06400056</p>	
<ul style="list-style-type: none"> ○ Remove the filter number 5 <p>Part number: CARA06400055</p>	

- Insert 2 new filters



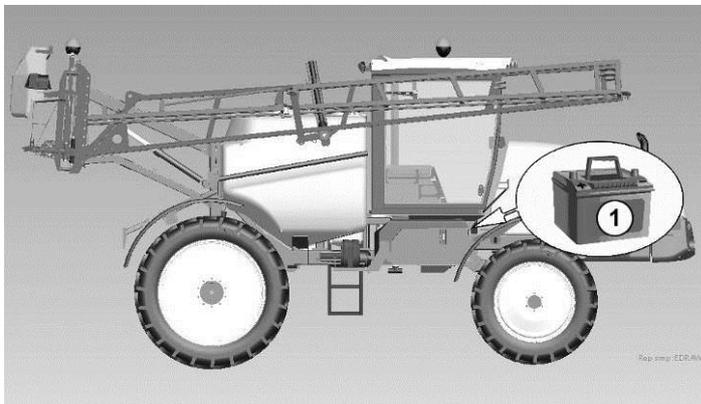
ATTENTION

- The flats forward and upward.
- Respect the order of filters :
 1. CARA06400055 (paper)
 2. CARA06400056 (charcoal)

Put back the lug, the hood and the screws

5.29 ALTERNATOR & BATTERY

The unit is fitted with an in cabin battery disconnect switch for all electrics.
 Battery is located on LH side of unit between hydraulic tank and frame
 Keep battery connections clean.



Never disconnect the battery (1) or place the battery master switch on OFF when the engine is operating.
 Before carrying out a weld on the **PRESIDIO**, disconnect the battery (1) and the alternator.



5.30 FUEL SUPPLY

The Self Propelled sprayer uses diesel fuel.
 All refilling of the machine should be done with the engine turned off, parking brake on, ignition key removed battery isolation switch disconnected and machine should be in open air.
 It is not recommended to fill when machine is hot.
 Care the platform to fill the tank is high use a ladder or platform.



ATTENTION

Handle fuel with care as it is extremely inflammable.
 Never smoke when filling
 Keep away from naked flames.

In any fire situation, use common sense and do your best to bring it under control.
 OR
 Immediately move away from the machine and make sure that there is no one close to it.

It is particularly recommended that the owner install an extinguisher on the PRESIDIO. This extinguisher must be put in a place that is easily accessible and it must be checked regularly.

- Keep the fuel cap (2) clean.
- Use a standardized fuel (See § 1.8.11.2)

The fuel cap is located on the platform, under the access lid closest to the ladder.

Pull the lid upwards to open it.

After filling put the fuel cap back in place.





5.31 ENGINE

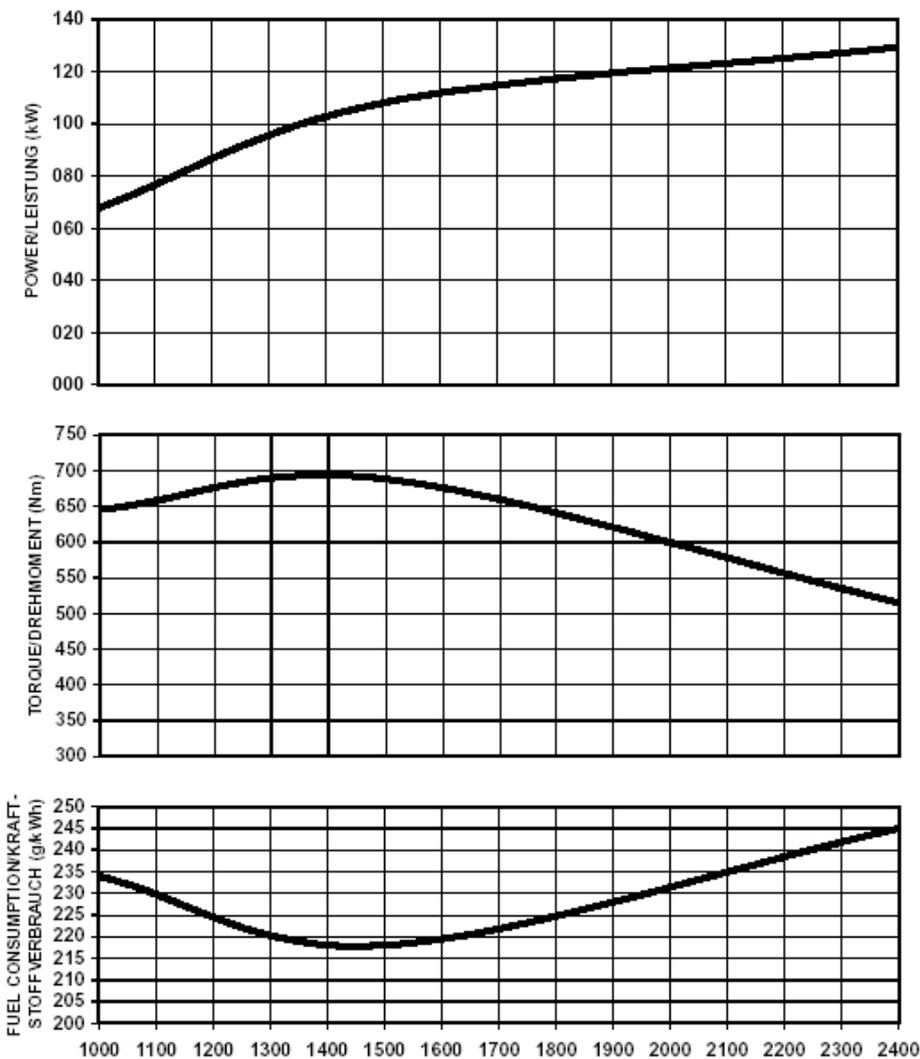
All work that is done on the engine must be carried out when the engine is cool, parking brake on ignition off and battery isolator off.

Before any service, stop the engine and let the whole machine cool down.

5.31.1 ENGINE PERFORMANCE CURVE 129.4 KW

ENGINE PERFORMANCE CURVES / MOTORKENNLINIEN

ENGINE TYPE / MOTORTYP	TCD 2012 L06 2V
STANDARD / NORM	ISO 14396
RATED POWER / NENNLEISTUNG	129.4 kW at/bei 2400 rpm/U/min
MAX. TORQUE / MAX. DREHMOMENT	688 Nm at/bei 1500 rpm/U/min

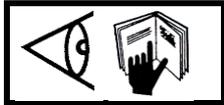


COMPILED BY / ERSTELLT VON	DATE / DATUM	CUSTOMER / ERSTELLT FUER	FILE / DATEINAME
0	01/10/2010	0	C3UI129A

CURVES ARE BASED ON POCKETBOOK DATAS. DEVIATIONS OF SERIES PRODUCTION RESERVED.
 KURVEN BASIEREN AUF TASCHENBUCHDATEN. ABWEICHUNGEN BEI SERIENFERTIGUNG VORBEHALTEN.



5.31.2 MAINTENANCE OF ENGINE AND ACCESSORIES

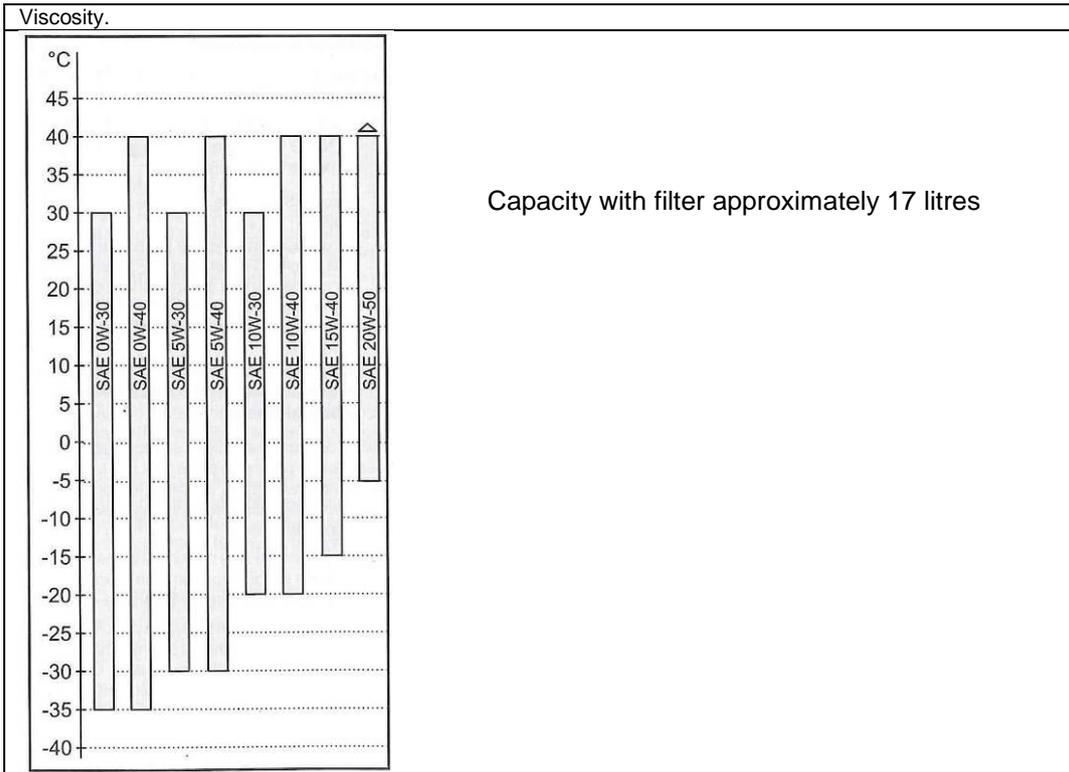


DEUTZ TCD2012 2V

It is recommended to read the Deutz instruction manual included with the machine.

5.31.3 ENGINE LUBE

Recommended quality class.
ACEA: E5-02
API: CH4



5.31.4 BEFORE STARTING EVERY DAY

Check the level of all filling fluids : fuel, engine oil, coolant.
Make sure that the air filter is not clogged.

5.31.5 TO BE MONITORED

Fuel system

Avoid operating the engine with the fuel reservoir at the minimum (risk of formation of condensates and system losing its prime).

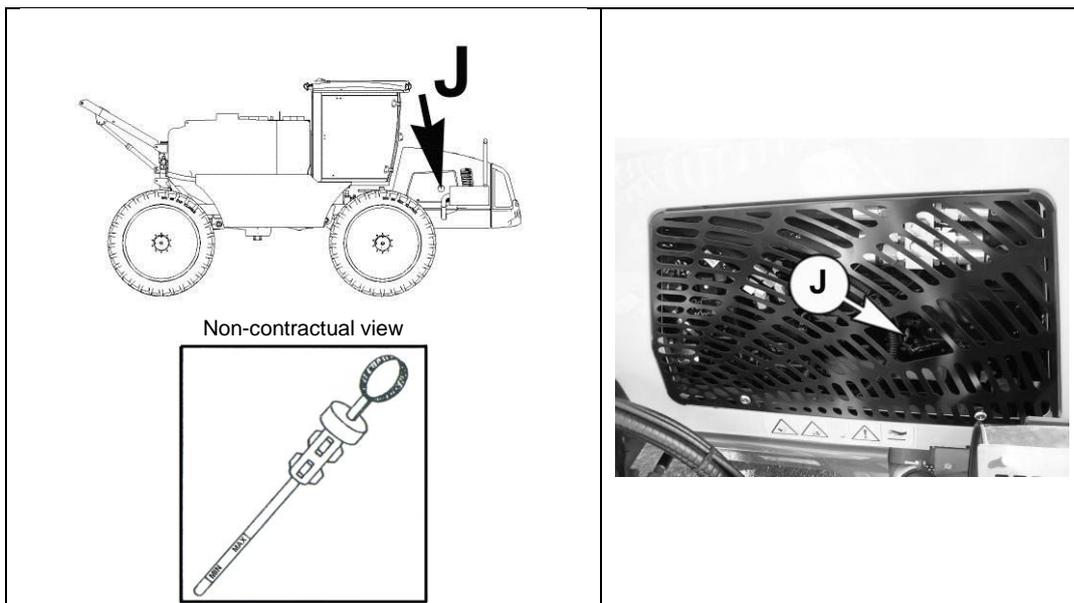
Suction and exhaust system

Regularly check the cleanliness of the air inlet system (idem for exhaust).

Electrical starting system

Periodically verify the charge of the battery and top up the electrolyte level if required

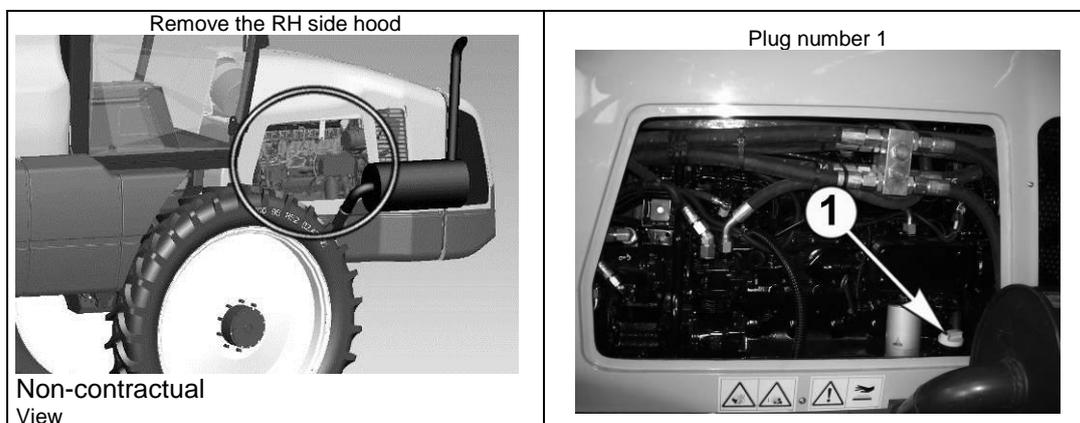
5.31.6 PERIODIC INSPECTION OF OIL LEVEL OF ENGINE.



Test: when engine stopped and cold.
 The oil level: should be between minimum and maximum of the dipstick gauge.

5.31.7 ENGINE OIL FILLER

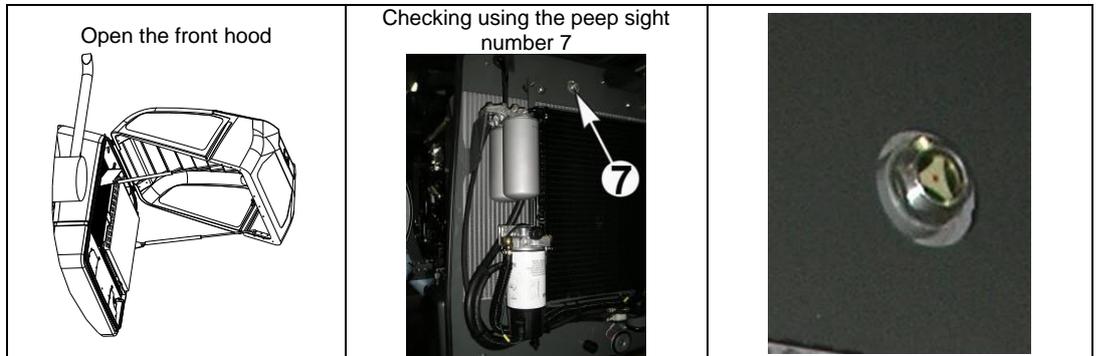
All work that is done on the engine must be carried out when the engine is cool, parking brake on ignition off and battery isolator off.



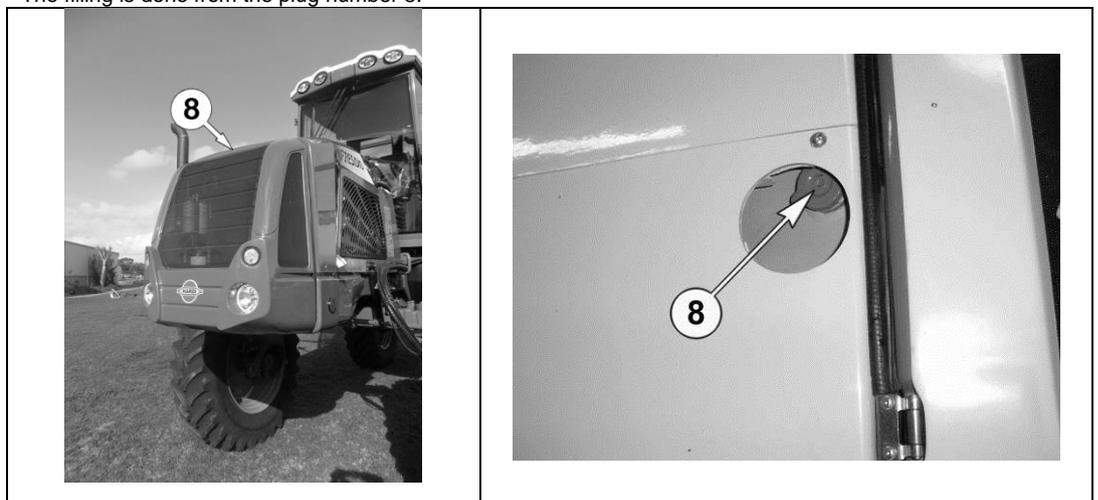
The oil filler is as indicated in the pictures above.

5.31.8 COOLANT LEVEL

All work that is done on the engine must be carried out when the engine is cool, parking brake on ignition off and battery isolator off.



The filling is done from the plug number 8.





5.31.9 CARE AND MAINTENANCE AIR FILTER

Air Filter is a dual element dry type.
Severity of service such as dust will define the service interval needed



Daily Check.

	<p>If the indicator light is red (see "Before Starting"), it may be necessary to clean the air filter. Proceed as follows :</p>
--	---

<p>Cleaning</p>	
	<p>Remove any dust from the outlet valve (1) by pressing the outlet orifice in the direction indicated by the arrows. Make sure that no dust enters the sleeve. Clean the outlet orifice from time to time.</p>

	<p>Remove the filter cap then remove the filter cartridge. Clean the cartridge with a jet of dry, compressed air directed from the inside outwards. Air pressure must not exceed 5 bar. Replace the filter cartridge (3) after one year at the most.</p> <p>Before installing the cartridge, check that it is in good condition using a torch. If the cartridge is torn or has holes, then replace it.</p> <p>Check that the lining inside the cartridge is in good condition.</p> <p>To install the cartridge, repeat the operations in reverse order, taking care to position the cartridge correctly in its housing.</p>
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ATTENTION

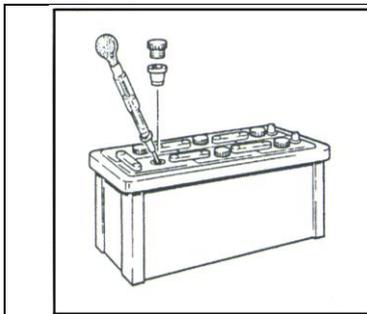
If the cartridge is not correctly installed, then unfiltered air may enter the engine and cause serious damage. We recommend that the above operations be carried out by qualified staff. Once the cartridge has been checked, repaired or replaced, reset the mechanical filter clogging indicator by pressing the pushbutton on the top of the indicator.

5.31.10 CHECKING THE ELECTROLYTE LEVEL IN THE BATTERY.

Do not use open flames near batteries or starting devices. To avoid sparks that could cause an explosion, observe the instructions given for the use of the auxiliary starting cables.

Always use a voltmeter to check the voltage. Always begin by unplugging the negative cable of the battery.

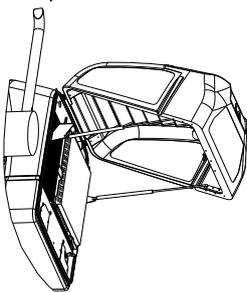
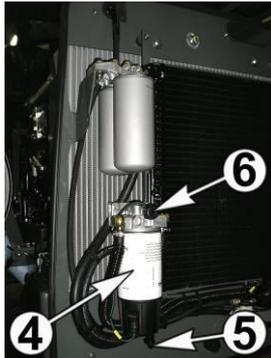
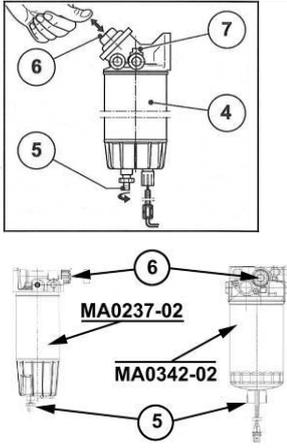
Before any service, stop the engine and let the whole machine cool down.



When the battery is not in use and cold, check that the electrolyte level is located between the max and min readings. If the level is below minimum, then top up with distilled water. Check more often in the summer. If the engine is not used for a lengthy period, then check the electrolyte level at least once. Check that the battery terminals are perfectly clean, tight and protected by a coat of Vaseline.

5.31.11 WATER SEPERATOR (FUEL SYSTEM)

The water separator in the fuel system is located at the front of the sprayer and should be daily checked
 Access is behind front hood
 All work that is done on the engine must be carried out when the engine is cool, parking brake on ignition off and battery isolator off.

<p>Open the front hood</p> 		 <ul style="list-style-type: none"> ○ Filter cartridge (number 4) ○ drain screw (number 5) ○ push rod (number 6) ○ bleed screw (number 7)
--	---	--

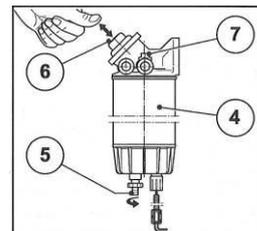
Unscrew the drain screw (number 5) and let any water contained in the separator flow out.
 Retighten the screw



There is an audible alert and warning message on the Deutz display.
 If this is active drain the filter immediately

5.31.11.1 Fuel system Priming

Operate the pump number 6 to prime the fuel system (If required, use the bleed screw 7).





5.31.11.2 Replacing the water separator element

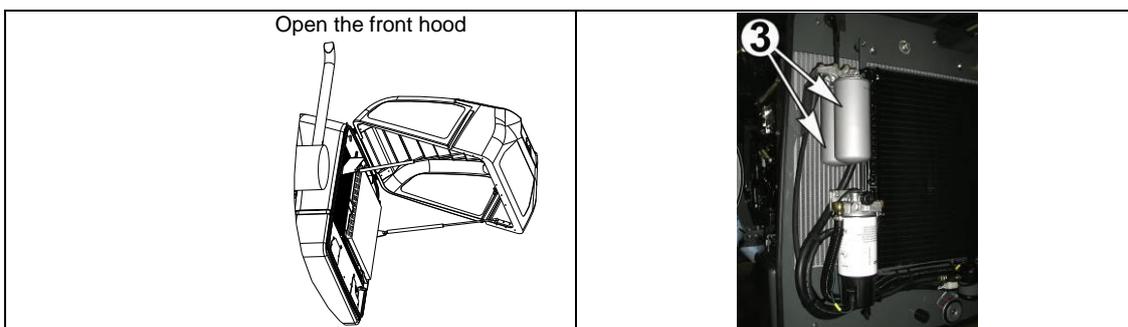
The element should be replaced as per the schedule
 Please refer to the Deutz manual provided.
 System must be primed after replacing



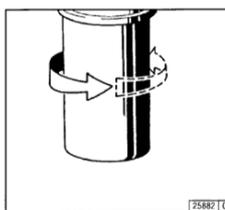
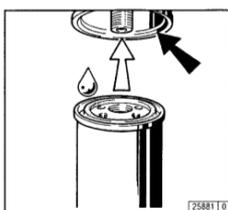
To replace the element		DEUTZ TCD2012 2V
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5.31.11.3 Replacing fuel filters

The machine has two fuel filter elements
 These should be replaced as per the chart
 It is always recommended to use genuine filters
 The filters are behind the front hood.
 The elements are unscrewed as shown
 It is always recommended to prime the system after changing filters.



Unscrew the elements number 3 and replace them.





5.31.12 AIR CONDITIONER

The system should be yearly checked for the charge of the gas.

This operation must be carried out only by your "APPROVED DEALER" or a certified air conditioning specialist
Charge in the system is 1.4KG of R134 gas

5.31.13 STEERING MAINTENANCE



Qualification of the operator



Reminder:

The **PRESIDIO** should only be used, maintained and repaired by people who are very familiar with its particular characteristics and who know the corresponding safety procedures.

Upkeep of the PRESIDIO



Reminder:

Carry out the upkeep of the **PRESIDIO** in full safety.

Before any service, stop the engine and let the whole machine cool down.

This operation must be carried out only by your "APPROVED DEALER".
Regularly check the steering cylinders, hydraulics, track rods, and king pin is are in good order and well maintained.

5.31.14 ENGINE OIL AND FILTER CHANGE



Qualification of the operator



Reminder:

The **PRESIDIO** should only be used, maintained and repaired by people who are very familiar with its particular characteristics and who know the corresponding safety procedures.

Upkeep of the PRESIDIO



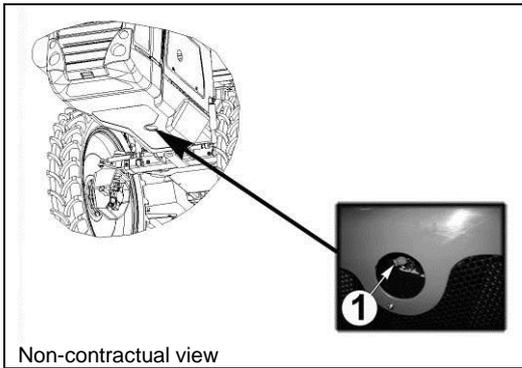
Reminder:

Carry out the upkeep of the **PRESIDIO** in full safety.

All work on the heat engine must be done with the engine turned off and cold, parking brake on, switch key removed.

Before any service, stop the engine and let the whole machine cool down.

5.31.15 OIL DRAIN



Non-contractual view

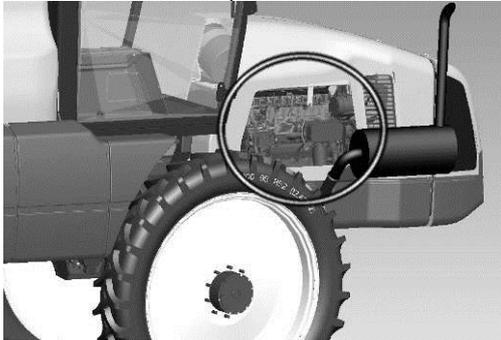
Unscrew the drain port number 1



Screw back after the operation

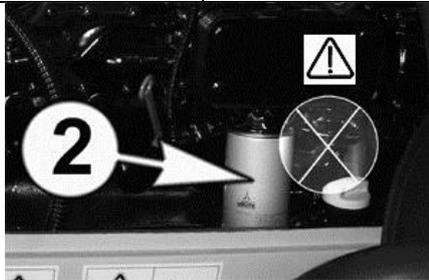
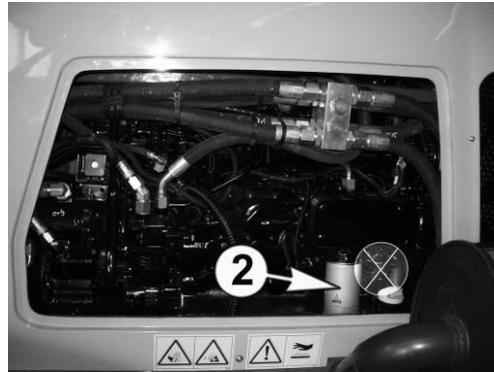
5.31.15.1 Replacing Oil Filter

Remove the RH side hood to access the engine compartment



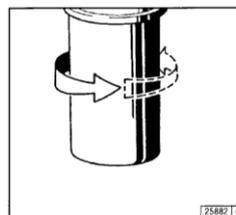
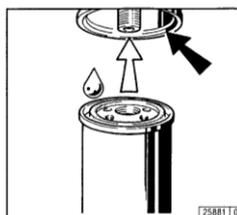
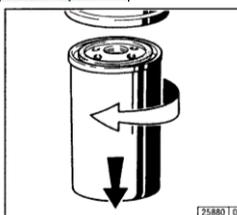
Non-contractual view

Filter number 2



Do not use the bracket on the right of filter.

Unscrew the element number 2 and replace it



Screw back after the operation
Top up the oil.



5.31.16 DEUTZ ENGINE MAINTENANCE



(Please refer to your Deutz manual provided DEUTZ TCD2012)



Maintenance TABLE of the **PRESIDIO**



5.32 STORAGE OF THE SELF PROPELLED SPRAYER



DANGER

All operations in the section "STORAGE CONDITIONS OF THE **PRESIDIO**" must be carried out on the vehicle when it is stopped and parked in its final storage position. Do not restart the vehicle without first performing the operations included in the "STARTING THE **PRESIDIO** AFTER STORAGE" section.

Information required to store the **PRESIDIO** temporarily or for the winter.

5.32.1 OFF-SEASON STORAGE PROGRAM

When the spraying season is over, you should devote some extra time to the sprayer. 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.

- Store in a well-ventilated place that is protected from poor weather and cannot be accessed by children.
- Make sure the vehicle is stable (storage supports, jacks, etc.).
- Make sure that protective devices are in place (tool guards installed, etc.).
- The maximum storage time is 3 months, after this time start and run machine and do a complete hydraulics check.
- 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 no liquid 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.
- Top up the hydraulic oil and fuel tanks to avoid any condensation.
- 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.



5.33 STARTING AFTER STORAGE



Qualification of the operator



Reminder:

The **PRESIDIO** should only be used, maintained and repaired by people who are very familiar with its particular characteristics and who know the corresponding safety procedures.

Upkeep of the PRESIDIO



Reminder:

Carry out the upkeep of the **PRESIDIO** in full safety.



Follow this procedure when restarting the machine after performing the operations included in the "STORAGE CONDITIONS OF THE **PRESIDIO**" section

5.33.1 PREPARING THE SPRAYER FOR USE 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. 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.
- Check the guards.
- Check and clean the engine air inlet circuit.
- Check and top up the liquids (coolant, hydraulic oil, fuel, battery electrolyte) to their usual operating levels.



5.34 REQUIRED PART NUMBERS, CAPACITIES

NAME		QUANTITY
ENGINE OIL FILTER	PR-MA0009	1
DIESEL FILTER	PR-MA0237-04	2
Fuel pre-filter (filter cartridge)	PR-MA0237-02 PR-MA0343-02	/ 1
AIR FILTER	PR-MA0014	1
AIR FILTER SAFETY CARTRIDGE	PR-MA0015	1
ALTERNATOR FAN BELT	PR-MA0264	1
AIR CONDITIONING COMPRESSOR BELT	PR-TMX0016	1
Filter cab « paper »	PR-CARA06400055	1
Filter cab « coal »	PR-CARA06400056	1
Hydraulic oil CARTRIDGE	PR-HE0005	1
LID + JOINT OF FILTER HE0004 (FOR CARTRIDGE HE0005)	PR-HE0004-02	1
FILTER SIEVE FOR HE0004	PR-HE0004-03	1
ENGINE OIL	LH0003	17 L (with filter) *
HYDRAULIC OIL	LH0002	170 L*
REDUCTION GEAR OIL	LH0001	1 x 4 (approximately)*
COOLANT (READY FOR USE)	LH0012	*
COOLANT (TO BE DILUTED)	01011490 (5l)**	*
	01164160 (20l)**	
	12211500 (210l)**	
* The reference is always the number on the gauge (or the level).		
** DEUTZ part numbers		



5.35 TROUBLESHOOTING

5.35.1 *SPRAYING*

FAULT	POSSIBLE CAUSES	SOLUTION
No spray from boom	Air leak on suction line	Check tightness of suction filter Check external hose connection Check pump (valves, valve covers) Start the sprayer pump Clean the filters
Lack of pressure	Air being sucked into system Suction/pressure filter clogged	Faulty safety valve (if fitted) Check that valves are not obstructed 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. Check flow rate of nozzles and replace if necessary if the difference in flow is greater than 10%
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 Excessive agitation	Check connectors Reduce pump speed Check safety valve (if fitted) Ensure returns inside tank are present Use foam damping additive
	Nozzles worn	Check vent is working correctly Reduce pump speed
	Tank under negative pressure Sucking air towards end of tank load	Check vent is working correctly Reduce pump speed

5.35.2 *BOOM FUNCTIONS*

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

5.35.3 *TRANSMISSION*

FAULT	POSSIBLE CAUSES	SOLUTION
Vehicle does not move forward	Incorrect use	Check that the parking brake is disengaged. Lever in neutral.
	Electronic failure	Read the error code(s) on the Deutz display 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
	Operating faults	Read the error code(s) on the Deutz display and contact technical support



5.35.4 ENGINE ERRORS

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



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



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



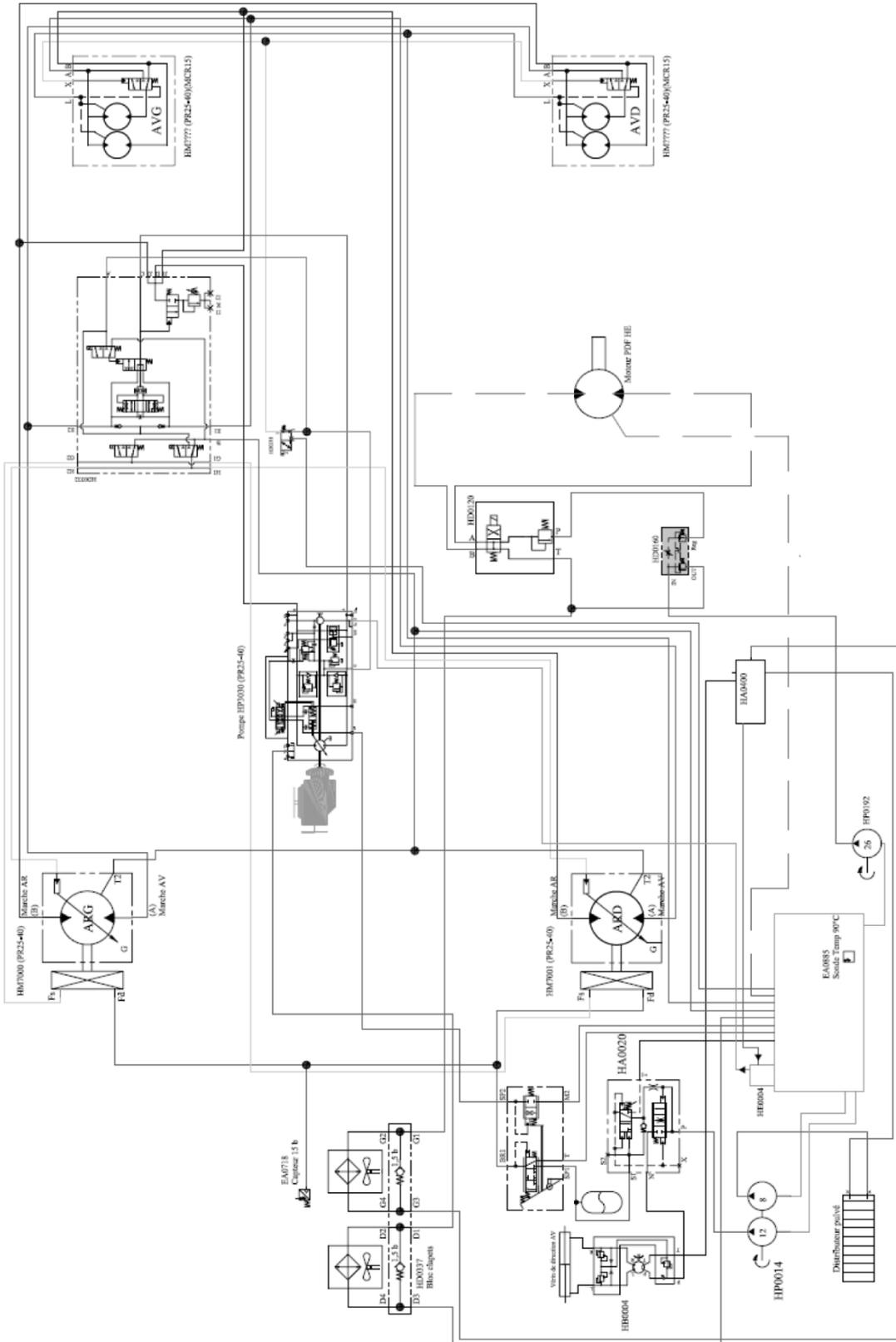
SPN	Component / Location	Description (Error location)	FMI
523550	Terminal 50	Engine start switch hangs	11, 12
523550	ECU internal error	Time processing unit (TPU) defective	2, 11
523561	Begin of injection period	Outside target range or missing (cylinder 1)	2
523562	Begin of injection period	Outside target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



6.2. CABLING DIAGRAM

Contact your "APPROVED DEALER".

6.3. HYDRAULIC DIAGRAM







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