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Translation of the Original Operator's Manual ULTRA GUIDANCE PSR ISO

Automatic Steering System for
Tractors, self-propelled Machinery and Sliding Frames
in Agriculture and Forestry

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Content

1 General Information

This Operator's Manual describes the configuration and operation of PSR Guidance Systems of *Reichhardt GmbH Steuerungstechnik*. In addition, small assembly works to be carried out by the operator are explained.

1.1 Reading and Observing the Manual

Please precisely observe and comply with all information and instructions to ensure proper functioning of the PSR Guidance System and to prevent personal injury and damage to property.
In case of problems in understanding parts of this manual or for other support, please contact your dealer.

The operator's manual is an integral part of the steering system and must be passed on after sale to the new owner of the system.

1.2 Understanding the Manual

Dimensions

The dimensions in this manual correspond to the metric system. Manuals in English language do also consider the imperial system if required.

Directions

The directions "right" and "left" are generally to be understood from the driver seat in the direction of travel.

Figures

The figures shown in this manual only serve for reference. Figures for installation may deviate according to the vehicle model/equipment and the individual installation situation and do not have any influence on the functionality of the system. Software figures may also slightly deviate from actual displays due to different software versions and steering modes.

Language

This manual is possibly available in other languages. For further information, please contact us via phone or email.

1.3 Safety Messages

This is a safety alert symbol: ⚠
When you see this symbol on the vehicle or in this manual, be alert to the potential for personal injury. Please also heed the blue notices to ensure proper and damage-free operation.

DANGER The signal word DANGER is used with the safety alert symbol to identify a hazardous situation that, if not avoided, will result in death or serious injury.

WARNING The signal word WARNING is used with the safety alert symbol to identify a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION The signal word CAUTION is used with the safety alert symbol to identify a hazardous situation that, if not avoided, could result in minor or moderate injury.

NOTICE The signal word NOTICE indicates important information that, if disregarded, can result in property damage or malfunction of the steering system or the vehicle. Follow these instructions to ensure long life and proper functionality of the steering system and the vehicle.

1.4 Warranty and Liability

Warranty or liability claims shall be applicable according to the General Terms and Conditions of Reichhardt GmbH Steuerungstechnik. You can find the General Terms and Conditions at www.reichhardt.com.

Reichhardt will not assume any liability for damages resulting from an improper use.

Use of not approved Accessories and Spare Parts

Only accessories and spare parts approved by Reichhardt may be used for PSR Guidance Systems. These are specifically designed for the PSR Guidance System and meet high standards in terms of safety and reliability. Reichhardt expressly points out that accessories and spare parts not approved by Reichhardt must not be used with Reichhardt systems. Otherwise, the safety and operational readiness of the system might be impaired. Furthermore, malfunctions of the system may lead to personal injury or property damage.
Reichhardt will not assume any liability for the use of not approved accessories or spare parts.

Unauthorised Modifications of the PSR Guidance System

Any changes to the system which have not expressly been authorized by Reichhardt shall void all warranty claims as well as any liability of Reichhardt for possible malfunctions of the system. Additionally, the EU Declaration of Conformity (CE marking) or other regulatory approvals might become ineffective. This also applies for removal of factory-applied seals or sealing paint.

Quality of Work Results

PSR Guidance Systems support the user in his work and facilitate the single work steps. However the driver himself shall be responsible for the quality of his work. As for all other vehicles, the following shall apply: the more exact the system is configured and operated, the higher the quality of the results will be.

1.5 Service and Repair

If you have any questions concerning the PSR Guidance System as well as the ordering of system supplements or spare parts, please contact your dealer or the manufacturer.

Always notify your dealer immediately in case of damage to the product.

2 For your own Safety

PSR Guidance Systems are thoroughly designed and manufactured according to the accepted rules of engineering. There are however residual risks when handling PSR Guidance Systems which might endanger the safety and health of persons. These residual risks shall be avoided by the intended use of the PSR Guidance System. It is therefore indispensable to observe the intended use and the instructions of the enclosed manual.

Please read the safety instructions carefully and completely. Persons configuring or operating the PSR Guidance System must know and observe the safety instructions. Non-observance of the safety instructions may lead to personal injuries and damage.

Please observe – in addition to the notices in these instructions – the generally applicable regional provisions for occupational safety, health protection, accident prevention and road traffic regulations.

2.1 Intended Use

PSR Guidance Systems are designed exclusively for the controlled use in agriculture and forestry, including special cultures (e.g. vineyard, fruit and vegetable cultivation), gardening and landscaping and municipal technology, for the use on non-public roads and lanes.
Any other use shall be deemed unintended and is therefore prohibited.

Unintended Use

The steering system is not suitable for use on narrow dikes or dams or on steep slopes on which the vehicle is at risk of rolling-over or in an explosive environment.

The individual components of the PSR Guidance System must not come into contact with chemicals such as acids, lyes, oils, lubricants or aggressive substances from petrol chemistry.

Furthermore, the Following shall apply:

The intended use also includes compliance with the operating conditions as well as the maintenance and servicing provisions specified by Reichhardt.

For damage resulting from unintended use, Reichhardt will not accept any liability. The risks of an unintended use shall be borne solely by the user.

2.2 Requirements of the Operating Personnel

Every person who autonomously configures or operates the PSR Guidance System, must meet the following minimum requirements:

- Has a driving license for the relevant vehicle.
- Is in the physical and mental condition to control the vehicle and to operate the PSR Guidance System.
- Is not under the influence of medication, alcohol or drugs which impair the ability to react in any way.
- Understands the mode of operation of the vehicle and is allowed to guide it (has a driving license for the relevant vehicle).
- Has read and understood these instructions completely, understands the mode of operation of the PSR Guidance System and is able to safely perform works on the vehicle and the PSR Guidance System as well as to identify and avoid potential dangers and risks during the works to be performed.

2.3 Safety Instructions for Installation and Servicing

Installation, configuration and servicing works require that the procedures are known.

If technically possible, installation and servicing of the PSR Guidance System must always be carried out with the vehicle fully at standstill and with the engine switched off. The operator of the vehicle must ensure that the vehicle cannot be started unintentionally or against prior arrangement by unauthorised persons. As necessary, remove the ignition key.

If installation or servicing is required at the running vehicle or PSR Guidance System, only authorised personnel are allowed to access the danger zone (refer to Fig. 2) after clear confirmation by the operator. These personnel have to be informed precisely on any potential dangers before entering the danger area. All tasks have to be precisely agreed on in advance by the operator and these personnel.
Always ensure that hands, feet and clothing do not project into the danger zone of moving components. Switch off all drive systems and de-pressurise the system at the dedicated operating equipment.

In addition, the following installation and servicing provisions must be observed:

- Properly use and dispose of cleaning agents, substances and materials.
- Take into account that components might have been heated by the operation of the vehicle.
- Remove accumulations of lubricants, oil or dirt on the vehicle.
- Use a ladder or a platform in order to facilitate installation, deinstallation or servicing of components at higher positions. Pay attention to a stable, safe position and use stable, safe handles.
- Do not perform any installation or servicing works at higher positions under wet or icy weather conditions.
- Please observe the safety instructions regarding the electrics (see Chapter 2.4) and hydraulics (see Chapter 2.5).
- Report and/or remedy any damage immediately.
- Always pay attention to a good condition and proper assembly of all components.
- Obtain the parts to be replaced (screws, hose lines, etc.) only from Reichhardt in order to ensure reliability, proper function and safety of the vehicle and of the PSR Guidance System.

2.4 Safety Instructions for Electrics

When performing works on the electrical system of the vehicle, you need to disconnect the power supply of the vehicle for safety reasons. Switch off the battery master switch. If there is no switch or if you want to perform welding works on the vehicle or works in the vicinity of the battery, you need to disconnect the battery.

The battery may represent a danger due to electrical currents, short circuit with high current, leaking battery acid or an explosion. This could result in severe burns or corrosion. Always take the battery in and out of operation properly.

When removing and installing the battery, the following precautions must be observed:

- Remove jewelry and other metallic objects.
- Use tools with insulated handles.
- Do not place any tools or metallic objects on the battery.
- Disconnect the NEGATIVE terminal first and then the POSITIVE terminal (see Fig. 1).
- Always place the battery horizontally on a clean surface.
- When inserting the battery, fix it with the bracket provided for this purpose.
- Connect the POSITIVE terminal first and then the NEGATIVE terminal.
- When installing additional equipment, make sure that there will be no contact with other metallic objects.

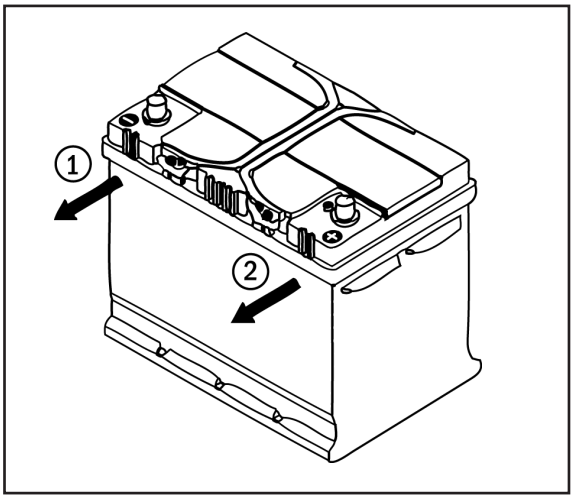


Fig. 1: Disconnecting the battery

2.5 Safety Instructions for the Hydraulic System (for Hydraulic Steering Systems)

During operation of the vehicle, hydraulic oil might escape from defective or not securely fixed hose lines under high pressure and lead to severe injuries of the skin or cause infections. Immediately seek medical attention. If hydraulic oil has penetrated the skin, it must be removed surgically within a few hours.

Never try to find or seal leaks in hydraulic hoses manually. Keep a sufficient distance, protect you and your hands and use suitable means to search for leaky spots.

Have old, worn or damaged hose lines replaced by parts approved by Reichhardt immediately.

The duration of use of hydraulic hoses should not exceed six years (operating duration including a maximum of two years storage period). For hoses and lines made of thermoplastics, other reference values may apply.

2.6 Application and Servicing of Warning Signs

Vehicles equipped with the PSR Guidance System must be marked with warning signs to point out potential dangers.
Please attach warning signs to the A column of the vehicle so they are clearly visible.

The warning signs are an integral part of the PSR Guidance System and are enclosed with the operator's manual.

Warning signs must always be kept in a clean and clearly readable condition. Damaged or unreadable warning signs must be replaced immediately. Warning signs are available for order from Reichhardt.

The warning signs are also available in other languages. For further information, please contact us by phone or e-mail.

Art. no.: 250109

CAUTION!
Prior to commissioning of the PSR Guidance System, read and observe the operating instructions and all safety instructions and warnings within.

Art. no.: 250122

WARNING!
The automatic steering system must be deactivated on all roads and public pathways.

2.7 Obtaining an Approval for Road Operation

Contact a responsible traffic approval authority in order to receive information on an official approval for road operation in your country. An approval not granted might lead to the loss of the public operating authorization of the vehicle.

2.8 Safety Instructions for Commissioning and Operation

The PSR Guidance System must not be used on public roads and pathways. Prior to road travel, deactivate the PSR Guidance System.

Immediately switch off the steering system in dangerous situations or drive the vehicle manually to avoid personal injury or material damage.

Be prepared to drive the vehicle manually at the end of the track, since the steering system does not turn the vehicle automatically.

Watch out for obstacles when using the steering system in order to prevent damage to the vehicle and other components. The steering system is not able to detect them automatically.

Discontinue operations if it is no longer possible to detect obstacles or persons quickly enough as a result of poor visibility conditions.

When the driver seat is vacated, the PSR Guidance System is deactivated automatically. Switch it off additionally at the activation switch and secure the vehicle against unintended start-up and rolling before leaving it.

To avoid personal injury and material damage during operation, follow these instructions:

- As soon as the steering system is switched on, nobody may remain in the danger zone (see Fig. 2). When using an implement, observe the safety clearances according to the instructions of the implement.
  The operator is obliged to stop the vehicle immediately as soon as persons enter the danger zone. Persons in the danger zone are exposed to the risk of serious or even fatal injury. Persons might be rolled over by the vehicle if there is a vehicle malfunction. The operator may only start the steering system again if there are no persons in the danger zone.
- The transport of persons on the passenger seat is ONLY permitted for training, service or brief observation purposes. Additional persons might distract the operating or service staff or obstruct their view. During training courses, only particularly experienced persons may be commissioned to drive the vehicle which is equipped with this steering system.
- For safety reasons, you should always keep one hand at the steering wheel when using the automatic steering system at speeds higher than 6 mph (10 km/h). You can thus react immediately if danger points, persons or obstacles appear in the field or if malfunctions occur in the steering system.

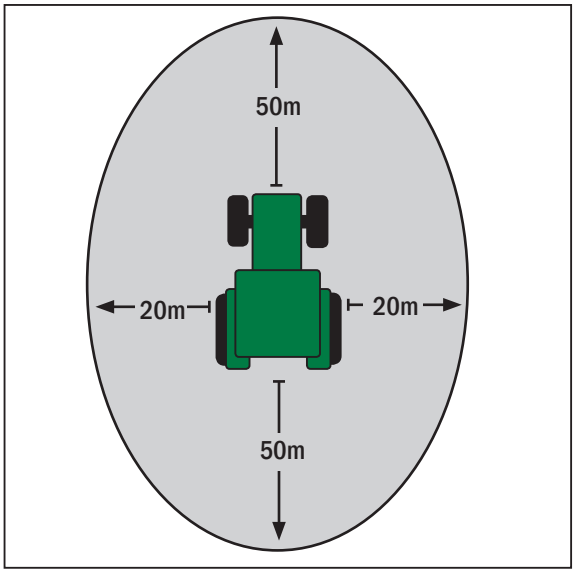


Fig. 2: Danger zone

2.9 Safety Instructions regarding Disposal

For the disposal of the PSR Guidance System, please observe the following safety provisions:

- Dismount the PSR Guidance System and sort the parts according to material characteristics.
- Obtain information on how to dispose of the single components from your relevant municipality or waste management facility. Some of the components shall be subjected to a special waste treatment.
- Dispose of all components according to applicable regulations.

3 System Description

PSR Guidance Systems comprise a wide range of systems for automatic steering of vehicles or implements.

The steering systems use different types of sensors to automatically steer a vehicle/implement along tracks or using satellite-based position signals.

PSR Guidance Systems are configured and operated via the ULTRA GUIDANCE PSR ISO software.

3.1 Automatic Steering System for Vehicles

Automatic steering systems can be used on vehicles equipped with hydraulic steering or pre-equipped for an ISOBUS-compatible automatic steering system.

There are three basic forms of PSR Guidance Systems for a vehicle:

1. PSR hBasic

The steering system is implemented via the steering hydraulics of the vehicle and is therefore suitable for all types of hydraulic systems (constant oil pump and “load sensing”).

Benefits:

- Preliminary setup of several vehicles for an easy replacement of the components
- Extremely responsive
- Ideally suited for driving speeds of > 15km/h (9mph)

2. PSR eBasic

Steering signals are transmitted to the vehicle by means of an electronic motor on the steering wheel.

Benefits:

- Easy installation
- Economic preliminary setup
- Ideally suited when used on several vehicles

3. PSR ISO

The steering hydraulics are controlled via the vehicle‘s own steering system interface. This variant is therefore suitable for many vehicles that are already factory-equipped for an automatic steering system.

Benefits:

- Plug & Go – the easiest installation
- Economic version
- No changes on the vehicle (steering is not modified)

3.2 Sliding Frame PSR SLIDE

The sliding frame PSR SLIDE is an active implement steering system that can be used independently of the vehicle and implement. It is controlled hydraulically via the vehicle.

Benefits:

- The implement is guided exactly in the track
- Suitable for front and rear mounting
- Compensates for inaccuracies caused by vehicle and terrain

Information on commissioning the PSR SLIDE can be found in the “PSR SLIDE Quick Start Guide”.

3.3 Sensors

PSR Guidance Systems can be supplied with steering signals via four different signal sources.

3.3.1 PSR SKY

PSR SKY is satellite-supported steering with high precision. It can be used wherever accurate parallel steering without tramlines or plant rows is required or where device working widths must be optimally used by parallel tracking as accurate as possible (see Fig. 3). The GPS receivers mounted on the vehicle process EGNOS, WAAS, Beacon, OMNISTAR or RTK correction signals, as required by the customer. PSR SKY is also compatible with the customer’s existing GPS receivers. Prerequisite is a transmission rate of at least 19200 baud, NMEA 0183 compatibility and an update rate of at least 5 Hz.

Fig. 3: PSR SKY

3.3.2 PSR SONIC

PSR SONIC is an operation version with ultrasound scanning for high-precision steering along existing tracks, plant rows, track markers, dams, swaths, tramlines or crop edges.
There are several sensor input configurations available. Thanks to the contact-free detection of the leading lines, the SONIC sensors, which can be adjusted without tools, operate in a wear-free manner. With a precision of less than 3 cm (1,18”), PSR SONIC is ideally suited for sowing, planting, harvesting and care in agriculture and vegetable gardening (see Fig. 4).

Fig. 4: PSR SONIC

3.3.3 PSR TAC

PSR TAC receives the steering signals via one/several flexible tactile sensor/s. Unique low-wear flexible synthetic tactile feeler detect plants in closed row seed stocks (e.g. corn) in a gentle and precise manner (see Fig. 5).

Fig. 5: PSR TAC

3.3.4 PSR MEC und MEC+

PSR MEC and MEC+ is high-precision steering with a mechanical row finder. It guides the vehicle exactly along the row. High precision can thus be achieved even with nearly closed row seed stocks. Additionally, PSR MEC and MEC+ preserve the plants and avoid damage to the plant (see Fig. 6 and Fig. 7).

Fig. 6: PSR MEC

Fig. 7: PSR MEC+

3.4 Installation of specific System Components

Upon delivery, the PSR Guidance System will be mounted and commissioned by authorized service personnel in accordance with the relevant safety regulations and the generally accepted rules of technology.

You can interchange some components of the steering system between vehicles or you must, with the PSR steering assistants RDU and RDU2, tilt them away/remove them from the steering wheel while driving on public roads. The first subchapters (Chapter 3.4.1 and Chapter 3.4.2) describe the mounting and dismounting of the PSR steering assistant. The following chapters describe the mounting and dismounting of the GPS receiver and the terminal.

3.4.1 RDU Steering Assistant with Friction Wheel Motor

Upon initial mounting, the RDU is properly mounted and delivered ready for operation.

⚠ WARNING

Danger of accidents and injuries due to uncontrolled steering.
Safe steering with tilted steering wheel motor is not possible in road traffic.
The steering wheel motor may hamper you when steering manually.
Always tilt the steering wheel motor away from the steering wheel when driving on roads.

Implement RDU in another vehicle

- Place the mounting slider onto the bracket on the steering column.
- Slide the RDU between the bracket on the steering column and the mounting slider using the lug of the bracket (see Fig. 8).
- Slide the motor close enough to the steering wheel so that the friction wheel is approx. 4cm (1.5”) (from the steering wheel with tilted steering motor.
- Fix the RDU in this position on the steering wheel on the steering wheel bracket. Tighten the tommy screw on the bottom side of the slider by hand. Do not use any tools or other auxiliaries.
- Link the connection cable of the RDU with the connection of the PSR harness.
- For automatic steering, pull the motor away from the steering wheel until the latching mechanism is released (see Fig. 9 – 1) and it is automatically pulled to the steering wheel. The RDU steering assistant is now ready for operation (see Fig. 9 – 2).
- Dismounting shall be carried out in reverse order.

NOTICE

If the steering wheel is not sufficiently moved by the friction wheel during active operation, the contact pressure is too low. Mount the RDU closer to the steering wheel or increase the spring preload.

Fig. 8: Insert RDU into mounting slider

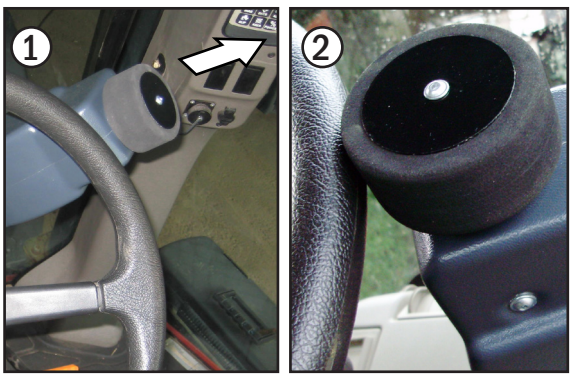


Fig. 9: Make RDU ready for operation

3.4.2 RDU2 Steering Assistant with Sprocket Motor

Upon initial mounting, the RDU2 is properly mounted and delivered ready for operation.

⚠ WARNING Danger of accidents and injuries due to uncontrolled steering.
Safe steering with attached steering wheel motor is not possible in road traffic. The steering wheel motor may hamper you when steering manually.
Always remove the motor element of the RDU2 from the steering wheel in road traffic.

Install RDU2 in another Vehicle

- Take the steering wheel motor RDU2 and open the closure.
- Place the RDU2 on the bottom side into the central opening of the bracket on the steering column using the screw (see Fig. 10 – 1).
- Place the RDU2 on the premounted sprocket on the steering column (see Fig. 10 – 2).

NOTICE Ensure that the guide wheels of the Steering wheel motor are positioned correctly on the guide rail of the sprocket.

- Close the locking ring of the motor element (see Fig. 11).
- Connect the connection cable of the RDU2 to the motor unit of the steering wheel motor (see Fig. 11) and the PSR harness. The RDU2 steering assistant is now ready for operation and can be switched on and off using the “ON/OFF switch” on the motor element.
- Dismounting shall be carried out in reverse order.

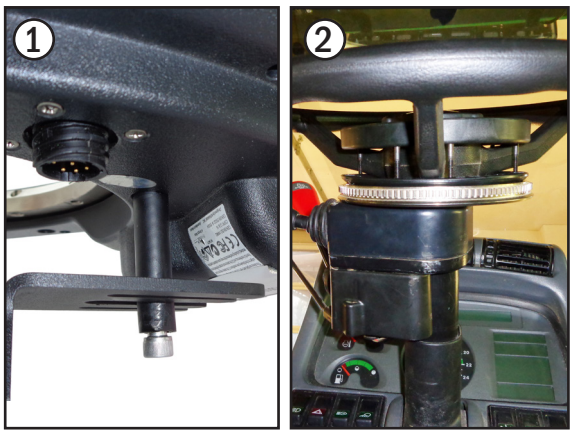


Fig. 10: Place RDU2 in the bracket and on the sprocket

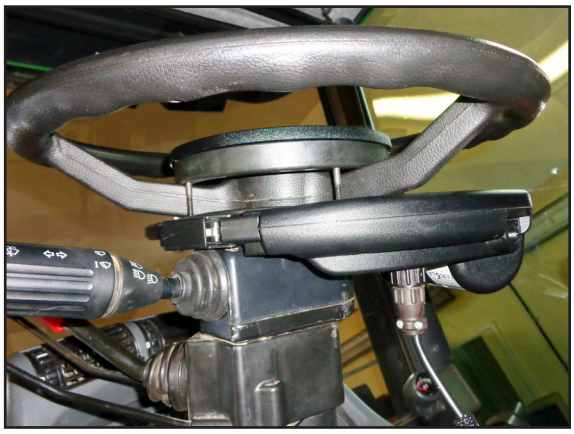


Fig. 11: Locking ring closed and RDU2 connected

3.4.3 GPS Receiver (when changing Vehicles)

Changing a GPS receiver (e.g. Reichhardt RGS 101 or RGS 325) is quick and simple.

At first, loosen the receiver connection cable (see Fig. 12). It will remain on the vehicle. Protect the free connection from environmental influences with a cover cap.

Now, remove the GPS receiver from its bracket. The bracket will remain on the vehicle.
Fig. 13 illustrates the mounting/dismounting of a Reichhardt RGS 101 on a magnetic bracket on a metal plate.

⚠ CAUTION

Risk of crushing!
The magnet of the mounting kit is very strong and might lead to crushing of the skin.
During mounting/dismounting, pay attention that no body parts are between the bracket plate and the magnet.

NOTICE

The GPS receivers RGS 101 and RGS 325 from Reichhardt are supplied with a magnet mounting kit for easy changing. However, GPS receivers may also be mounted on the vehicle with different brackets. Please pay attention to the different attachments of the receivers and the brackets.

Mounting on another vehicle shall be carried out in reverse order.

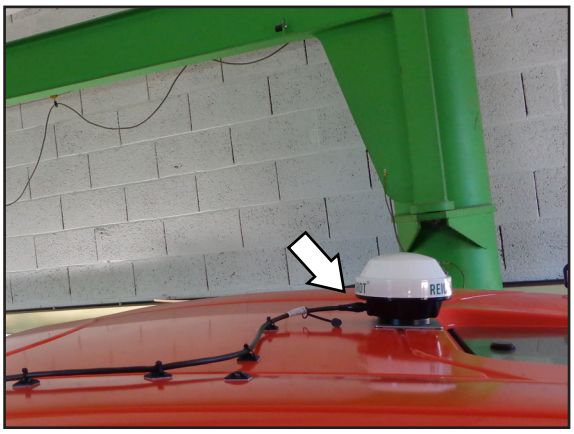


Fig. 12: Loosen receiver connection cable

Fig. 13: Remove GPS receiver from the metal plate

3.4.4 Terminal (when changing Vehicles)

Changing a non-integrated ISO-VT (e.g. Reichhardt Basic Terminal) is quick and easy.

Reichhardt Terminals are supplied as standard with a bracket for the B-pillar or with the *PSR REI/ME Terminal RAM-Mount bracket kit* (702868) as an option (see Fig. 14).

For mounting/dismounting, loosen the screw connection on the terminal bracket and remove the terminal from the bracket (see Fig. 14).

NOTICE

Other brackets and terminals require different installation methods. If you have any questions, please contact your responsible customer service.

Fig. 14: Terminal mounted with RAM-Mount bracket

4 Main Screen

ULTRA GUIDANCE PSR ISO is operated via the main screen of the PSR software.

4.1 Start Screen

Switch on ULTRA GUIDANCE PSR ISO via the ignition/ activation switch.
The PSR mask is displayed on an ISOBUS terminal (see Fig. 15).

Depending on the terminal, you first may need to select the PSR application.

NOTICE

At initial startup/after a software update, the mask is loaded on the terminal. This can take up to five minutes.

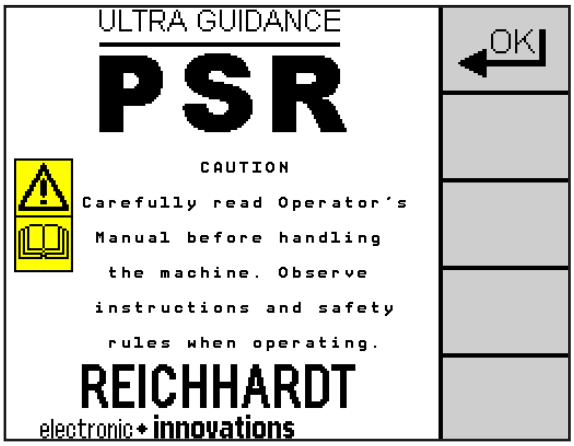


Fig. 15: Start screen

4.2 Warning Messages

Whenever an error occurs, ULTRA GUIDANCE PSR ISO outputs warning messages (see, for example, Fig. 16).

Please refer to the error code list (see Chapter 14) for information on how to proceed in this case.

Press “ESC” to confirm the error message.

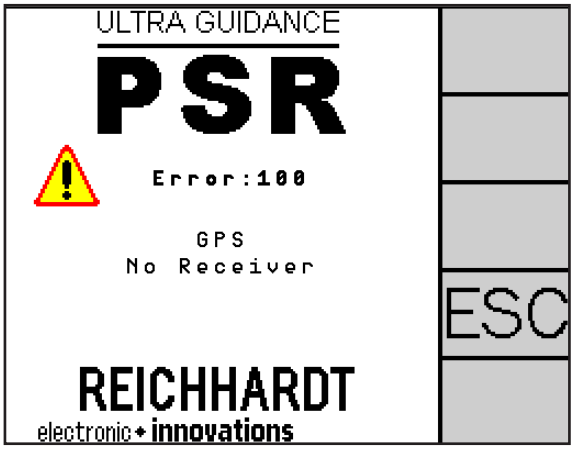


Fig. 16: Warning screen

4.3 Overview Main Screen

The display of the PSR mask can be divided into three parts (see Fig. 17):

A: Main display field
B: Information fields
C: Soft keys

The three parts are described in the following sections.

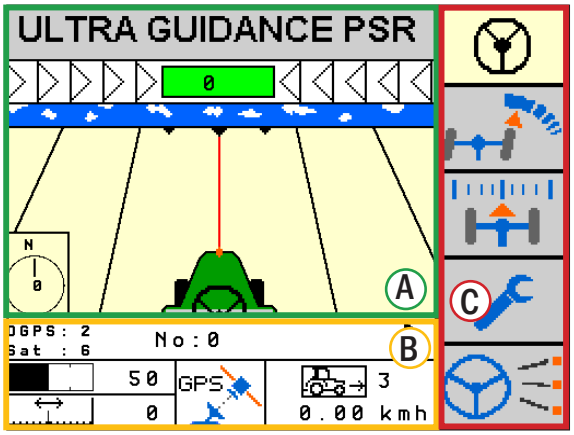


Fig. 17: Overview main screen

4.3.1 Main Display Field

The main display field shows the vehicle on its track (see Fig. 18 – A).

The deviation from the current leading track is represented by the arrows at the top. In PSR SKY, and PSR SONIC the deviation is additionally represented with a numerical value in cm (or inches) (see Fig. 18 – 1). In GPS mode (PSR SKY), this number field can be pressed to calibrate the reference track.

Press this part of the field (see Fig. 18 – 2) to set one of three field colours (yellow, green and brown).

Press on the tractor (see Fig. 18 – 3) to select one of 16 tractor colours.

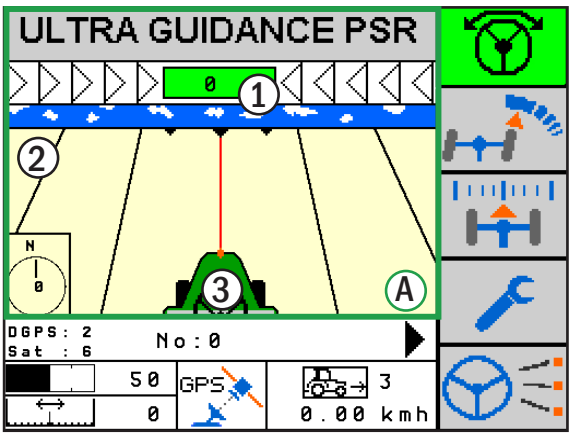


Fig. 18: Main display field

4.3.2 Information Fields

The information fields (see Fig. 19 – B) show information on the current steering mode (PSR SKY, PSR SONIC, PSR TAC, PSR MEC) as well as general vehicle information.

The individual information fields contain the following information (see Fig. 20):

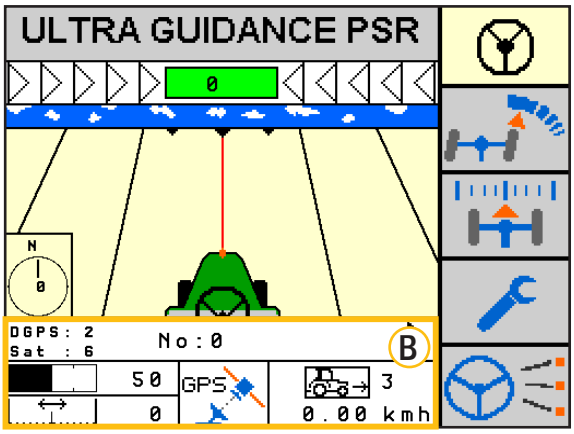


Fig. 19: Information fields

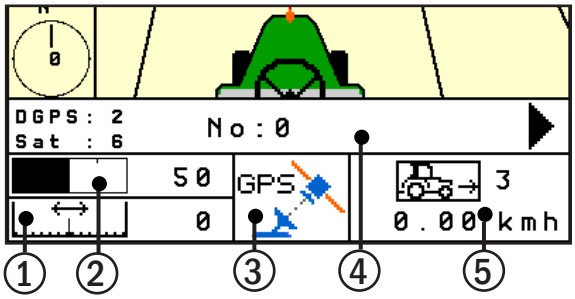


Fig. 20: Functions of the individual information fields

1. Distance/Nudging

Display of the currently set center offset or the set distance to the reference edge for the current steering mode. A negative value indicates a shift to the left, a positive value to the right.
When using the PSR SONIC steering mode with both sensor pairs, you can invert the value (from + to -), by pressing this number.

2. Reaction

Display of the currently set reaction to deviations from the nominal track for the selected steering mode and direction.

3. Steering Mode/Sensor Input Configuration

Display of the currently selected steering mode. If the steering mode PSR TAC or PSR SONIC is selected, the sensor configuration input is displayed.

4. Additional information field

Display of additional information on the current steering mode, such as mode or track number. The information displayed is described in the chapters of the respective steering modes.

5. Vehicle information

Display of the steered object (vehicle or moving frame), direction indicator, vehicle number according to the list in “Teach vehicle code” as well as current speed.

4.3.3 Soft Keys

Use the soft keys to make entries and call up menus. Depending on the action called up, the function of the soft keys can vary (see Fig. 21 – C). The different available soft keys are described below.

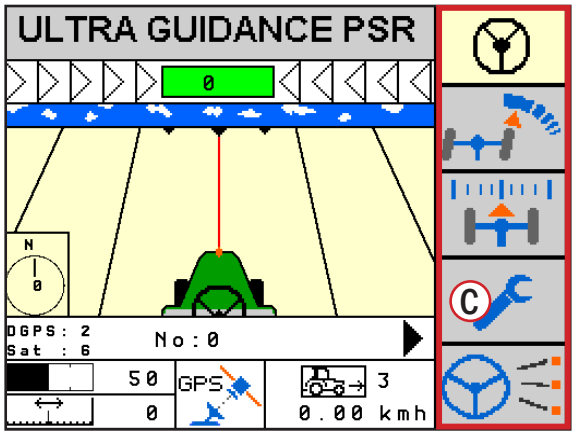
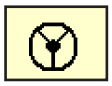


Fig. 21: Soft keys

Engange Steering Key

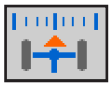


Engages/disengages automatic steering.

Reaction Adjustment

- Calls the reaction adjustment.
- Confirms the set reaction.
- Switches to the next multi track (PSR SKY).

Nudge Adjustment

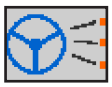


- Calls the nudge adjustment.
- Confirms the set dictance/nudge.
- Calibrates the reference track in GPS mode.
- Switches between one-sided and two-sided use of the sensors (PSR SONIC).

Main Menu

- Press and hold to enter the main menu.
- Press to enter the steering mode configuration.

Steering Mode Selection

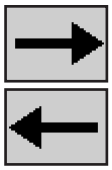


- Calls the steering mode selection.
- Confirms the selected steering mode.
- Switches between automatic steering mode and manual mode (if enabled)..

Escape

Moves one menu level back or cancels the current entry and resets the previous state.

Arrow right/left



- Browses the menu structure.
- Serves as an electronic steering wheel in manual mode.
- Moves the sliding frame PSR SLIDE in manual mode.
- Increaeses or decreases e.g. nudge values.

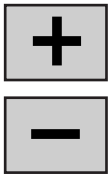
SLIDE Central Position

Brings the sliding frame PSR SLIDE into the central position.

OK Key

Confirms the menu selection/entry.

Plus/Minus Key

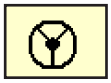


- Increases or decreases e. g. input values.
- Switches between the different steering modes in the steering mode selection.

4.4 Engaging and Disengaging the Steering System

The status of ULTRA GUIDANCE PSR ISO is indicated by the colour and symbol of the top soft key (engange steering key) (see Fig. 22 and following description).

Red: Steering cannot be engaged because of an error. Press the soft key to display the error number/error.



Yellow: Automatic steering disengaged and ready to engage.

Flashing green: Automatic steering enabled, but not active.

Continously green: Automatic steering engaged. Active steering.

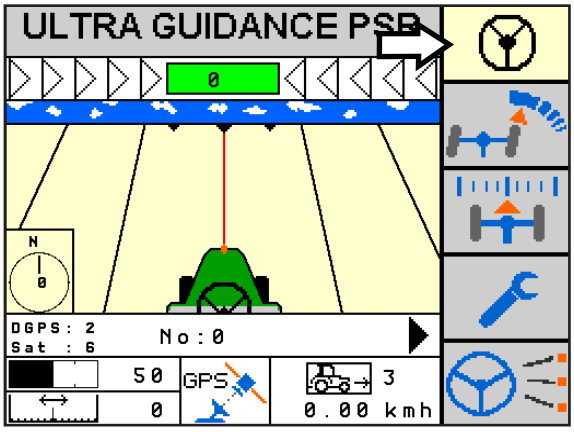


Fig. 22: Main Screen with engange steering key

Activating the Steering System

The steering system can only be engaged when:

- the main screen of the PSR mask is displayed,
- the engage steering key is yellow (see Fig. 23) and
- the currently driven speed is not higher than 20 km/h (12.43 mph) (vehicle-dependent deviation possible).

⚠ WARNING Risk of accident!
Never engage the steering system while driving on public roads.

Engage the steering system by using one of the following options:

- Press the engage steering key in the PSR mask (see Fig. 23);
- Actuate the foot switch;
- Actuate the activation switch;
- Actuate an external activation switch (depending on the vehicle);
- PSR joystick;
- ISO AUX-N joystick.

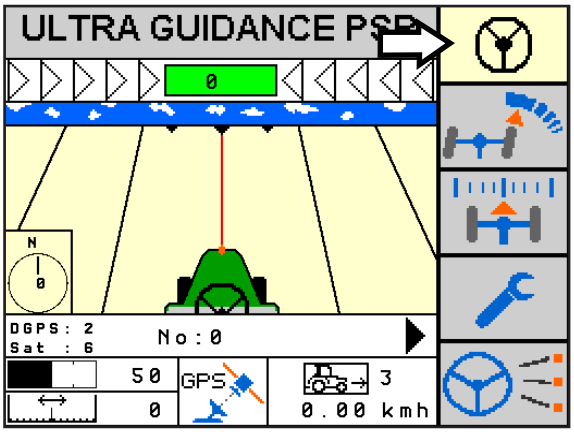


Fig. 23: Steering system disengaged – engage steering key yellow

Deactivating the Steering System

Disengage the steering system by using one of the following options:

- Press the engage steering key in the PSR mask (see Fig. 24);
- Actuate the foot switch;
- Actuate the activation switch;
- Move the steering wheel manually;
- Actuate an external activation switch (depending on the vehicle);
- PSR joystick;
- ISO AUX-N joystick.

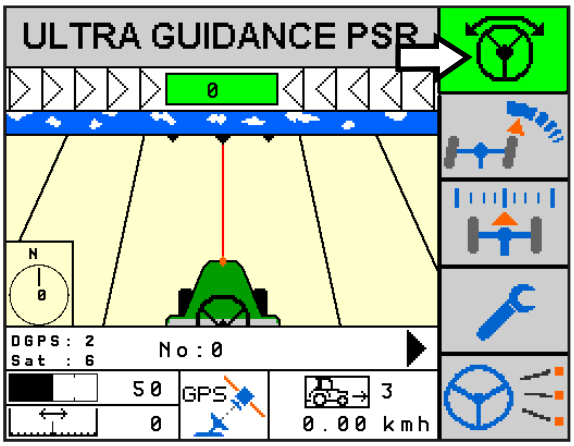


Fig. 24: Steering system engaged – engage steering key green

Automatic Deactivation of the Steering System

The steering system will disengage automatically:

- at excessive speed;
- if a system error has occurred;
- when the cabin door is opened or when the driver seat is left (depending on version);
- at 0km/h (0mph) after 45 seconds;
- if there is an error in the terminal software, ISO-BUS or similar.

4.5 Steering Modes

ULTRA GUIDANCE PSR ISO provides an automatic steering guidance on the basis of various leading track registration systems. The type of leading track registration depends on the sensors used, and therefore different steering modes are distinguished. Before you work with ULTRA GUIDANCE PSR ISO, you need to set the desired steering mode.

4.5.1 Automatic Steering Mode

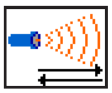
Overview

Depending on the steering system version, the following steering modes are available. Four steering modes are available.

PSR SKY

PSR TAC

PSR MEC



PSR SONIC

Select Steering Mode

Change to the main screen.

Press and hold the soft key “steering mode selection” until the symbol flashes (see Fig. 25).

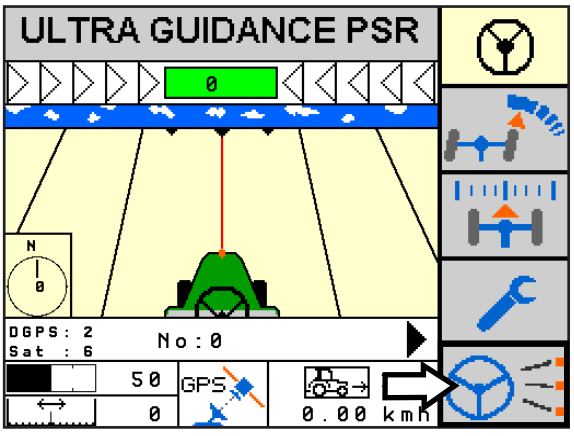


Fig. 25: Call up steering mode selection

Set the desired steering mode using the displayed plus/minus key (see Fig. 26 – 1).

In the central display of the information fields (see Fig. 26 – 2) you can now see the currently set steering mode.

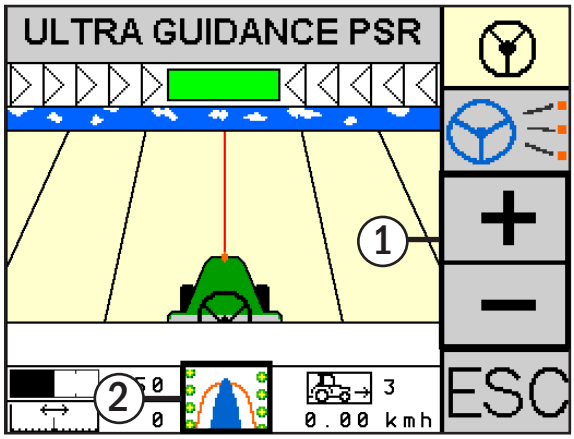


Fig. 26: Select steering mode

Confirm the selected steering mode by briefly pressing the soft key for the steering mode selection (see Fig. 27).

NOTICE

If the steering mode selection is not completed correctly, the selected steering mode is not saved and the previous steering mode will remain active.

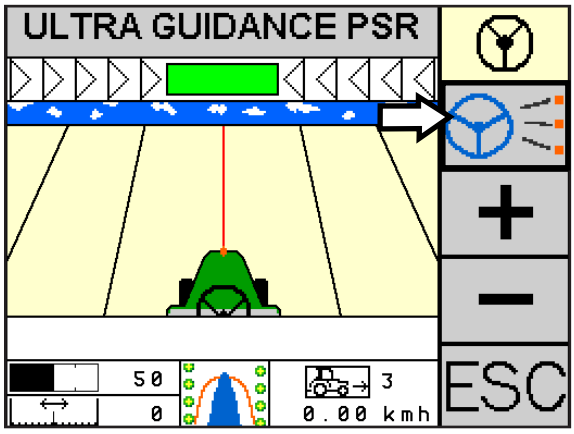


Fig. 27: Confirm steering mode

Sensor input configurations within PSR SONIC and PSR TAC:

The steering modes PSR SONIC and PSR TAC provide different sensor input configurations which are displayed instead of the steering mode symbol after selecting a steering mode (see Fig. 28).

More detailed information on the individual steering modes (and on sensor input configurations) can be found in the respective steering mode chapters (see Chapter 6, Chapter 7, Chapter 8 and Chapter 9).

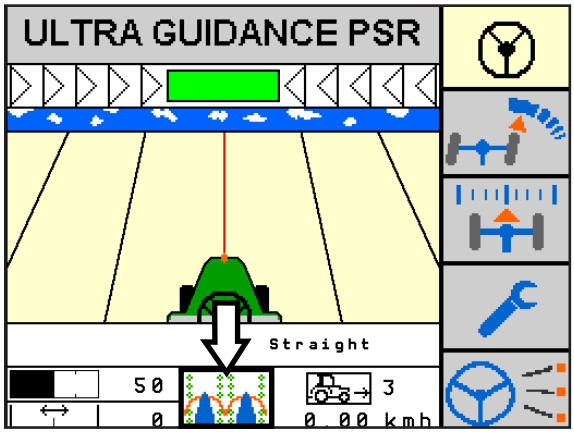


Fig. 28: Steering mode PSR TAC with sensor input configuration “Dual TAC sensor”

4.5.2 Steering Mode “Manual Mode”

The manual mode is used e.g. for steering via the terminal or with a joystick as well as for manual control of the PSR SLIDE sliding frame.

NOTICE The manual mode is only available with the corresponding activation.

Switching between Automatic Steering Mode and Manual Mode

Briefly press the steering mode soft key in order to change between the selected automatic steering mode and the manual mode (see Fig. 29 – 1).

Thereupon a hand symbol is shown instead of the steering mode/sensor input configuration (see Fig. 29 – 2).

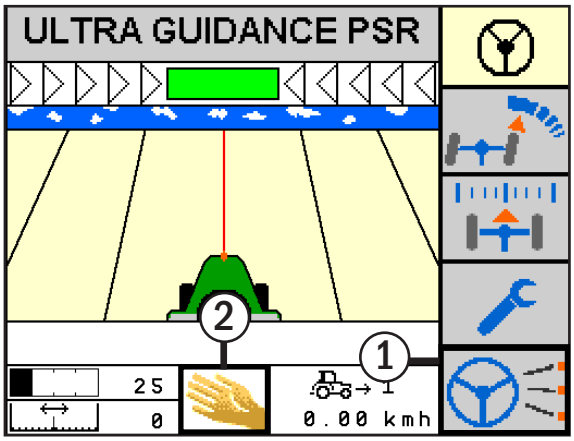


Fig. 29: Manual mode activated

Manually Steering the Vehicle

When steering is engaged, you can use the left and right arrow key (see Fig. 30 – 1) to steer the vehicle manually.

WARNING Risk of accident and injury.
The vehicle is steered via the PSR software. Observe the reaction of the vehicle to avoid accidents.

The vehicle steers to the left/right as long as you press and hold the soft key with the left/right arrow.

The steering speed depends on the set reaction (see Fig. 30 – 2).
The higher the reaction, the faster the steering angle. For information on the reaction please read Chapter 4.6.

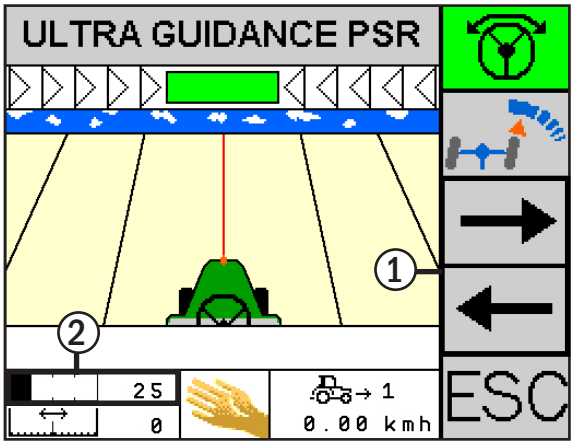


Fig. 30: Manually steering the vehicle

Moving the Sliding Frame PSR SLIDE manually

When the steering is engaged, you can move the sliding frame to the left and right using the arrow keys shown on the right (see Fig. 31 – 1).
Press and hold the corresponding key as long as you want to move the sliding frame.

Via the soft key with the PSR SLIDE symbol (see Fig. 31 – 2) you can adjust the sliding frame manually to the central position.
When driving at speeds above 1 km/h (0.62 mp/h), briefly press the soft key to move the sliding frame to the central position.
When the vehicle is stationary or driving at speeds below 1 km/h (0.62 mp/h), press and hold the soft key until the central position is reached.

The speed of the shifting process depends on the set reaction (see Fig. 32 – 3).
The higher the reaction, the faster the shifting process. For information on the reaction please read Chapter 4.6.

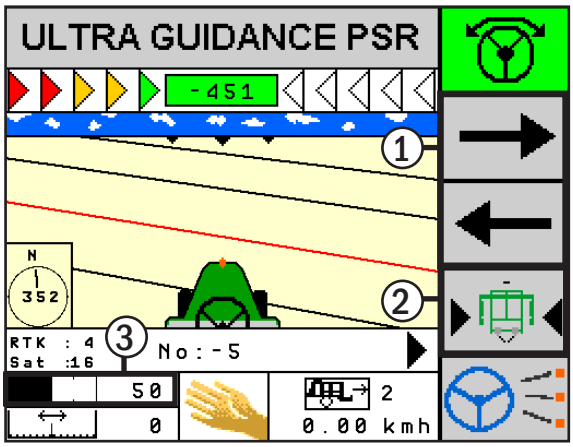


Fig. 31: Moving the PSR SLIDE manually / to the central position

4.6 Reaction Adjustment

"Reaction" denominates the sensitivity of the steering system to movements of the vehicle/the sliding frame or deviations of the vehicle from the nominal track.

If the reaction is high, the steering system reacts very sensitively. The steered axle moves more strongly, the vehicle steers in a more aggressive way.
If the reaction is low, the steering reacts less sensitively. The vehicle only makes a small steering movement.

Press and hold the reaction adjustment key until the symbol flashes (see Fig. 32).

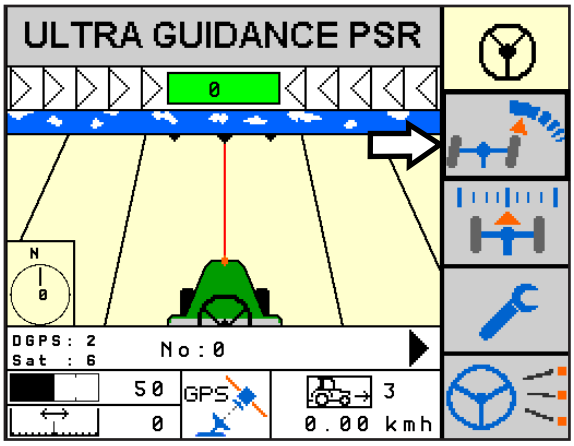


Fig. 32: Reaction adjustment

Press the plus or minus key (see Fig. 33 – 1) in order to increase or decrease the reaction level. The adjustment range is from 0 % to 100 % (see Fig. 33 – 2).

Press the reaction adjustment soft key again after the adjustment in order to save the new settings.

NOTICE

If no entry is made within 30 seconds, the menu will automatically change back to the main screen. The currently set reaction level will be saved.

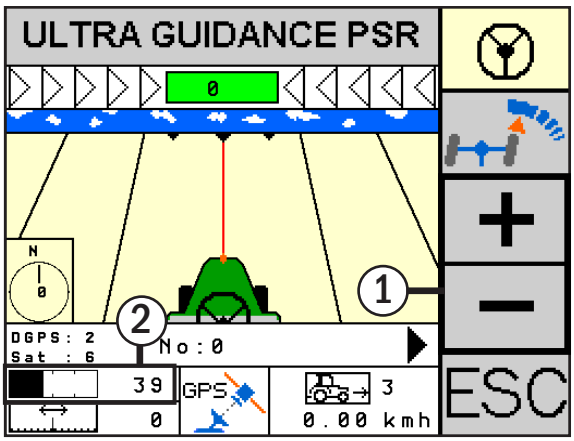


Fig. 33: Adjusting the reaction

Observe the direction indicator (see Fig. 34). If direction detection is activated, you can set the reaction for forward and reverse separately. For information on direction detection see Chapter 4.8.

The set reaction for the selected direction of travel is displayed.

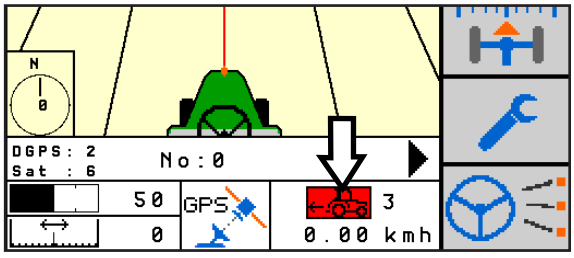


Fig. 34: Direction indicator

4.7 Nudge Adjustment

The nudge is the distance between the vehicle and the crop (for one-sided scanning with PSR SONIC).
The nudge also describes the deviation (offset) from the nominal track (for all other driving modes).
The setting of this values may be necessary in order to seamlessly utilize an implement on tracks that have already been processed. In addition, this enables off-centre working between rows in the sensor steering modes (PSR SONIC, PSR TAC, PSR MEC).

Press the nudge adjustment soft key until the symbol flashes (see Fig. 35).

Set the nudge using the left and right arrow keys (see Fig. 36 – 1). The value is displayed in the information field (see Fig. 36 – 2).

A negative value indicates a nudge to the left, a positive value to the right.

Note that a separate nudge is set for each steering mode.

When using the steering mode PSR SKY the nudge can be set in a value range from -50 to +50 cm (-19.7” to -19.7”).

When using the steering modes PSR TAC and PSR MEC the nudge is set in points within a value range from -50 to +50. The larger the value, the bigger the nudge.

When using the PSR SONIC steering mode, the nudge varies depending on the one-sided or double-sided scanning with the sensors.
When scanning on both sides, the nudging value range extends from -30 to +30 cm (-11.8” to -11.8”).
For one-sided scanning, a dictance of 30 to 120 cm (11.8” to 47.24”) can be set.

Press the nudge adjustment soft key briefly after the adjustment, in order to save the new settings (see Fig. 36 – 3).

When using the PSR SONIC steering mode with both sensor pairs, you can invert the value (from + to -).
To do this, press the nudge field in the information field (see Fig. 37 and Fig. 38).

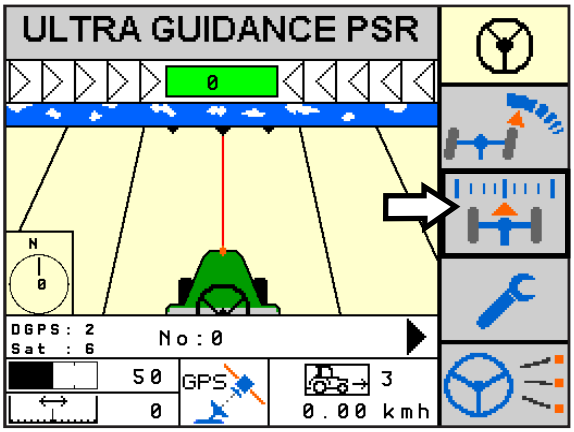


Fig. 35: Nudge adjustment

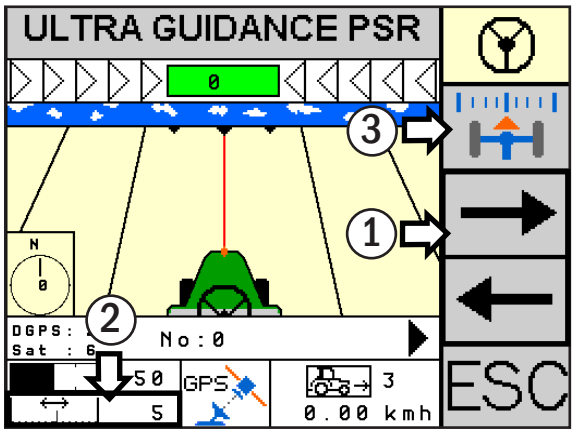


Fig. 36: Adjust nudge

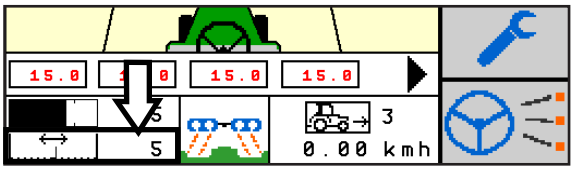


Fig. 37: Steering mode PSR SONIC – nudge value

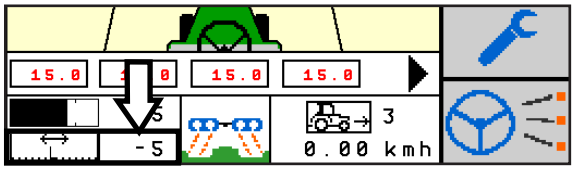


Fig. 38: Steering mode PSR SONIC – inverted nudge value

4.8 Direction of Travel

ULTRA GUIDANCE PSR ISO detects the reverse movement of a vehicle. Active, automatically steered reverse driving, however, is only possible with a tractor equipped with PSR SKY at a speed of up to 10 km/h (6.21 mp/h). Active automatic steering is not possible for all other steering modes and vehicles (except PSR SLIDE). The engange steering key then flashes green (see Chapter 4.4).
When using the PSR SLIDE with reverse driving, the control directions are reversed.

The status of the driving direction (forward/reverse) is displayed in the information field of the main screen (see Fig. 39 und Fig. 40).

Depending on the configuration, the system automatically detects reverse driving or you need to adjust manually.
The appropriate configuration is activated by the dealer in the vehicle depending on the equipment of the vehicle.

In a manual configuration, you can press the direction indicator to manually change the direction of travel.

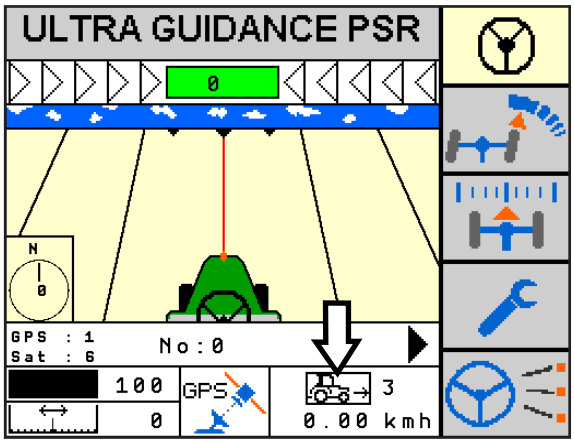


Fig. 39: Direction of travel – forward

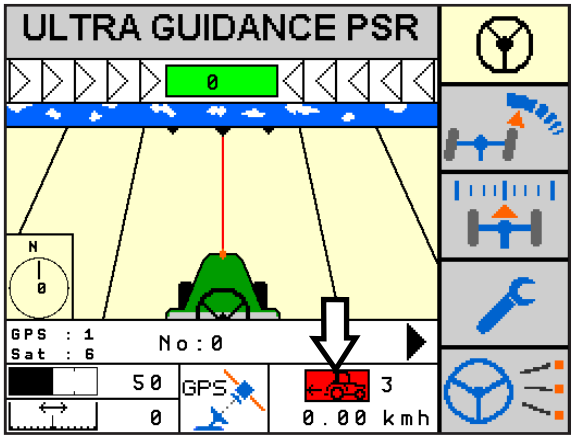


Fig. 40: Direction of travel – reverse

5 Menu

Using the PSR software menu, you can perform basic system configurations, enable/disable functions, and check system states of ULTRA GUIDANCE PSR ISO.

5.1 Menu Structure

The menu is divided into several levels and can be called up by pressing and holding the button with the wrench icon (see Fig. 41).

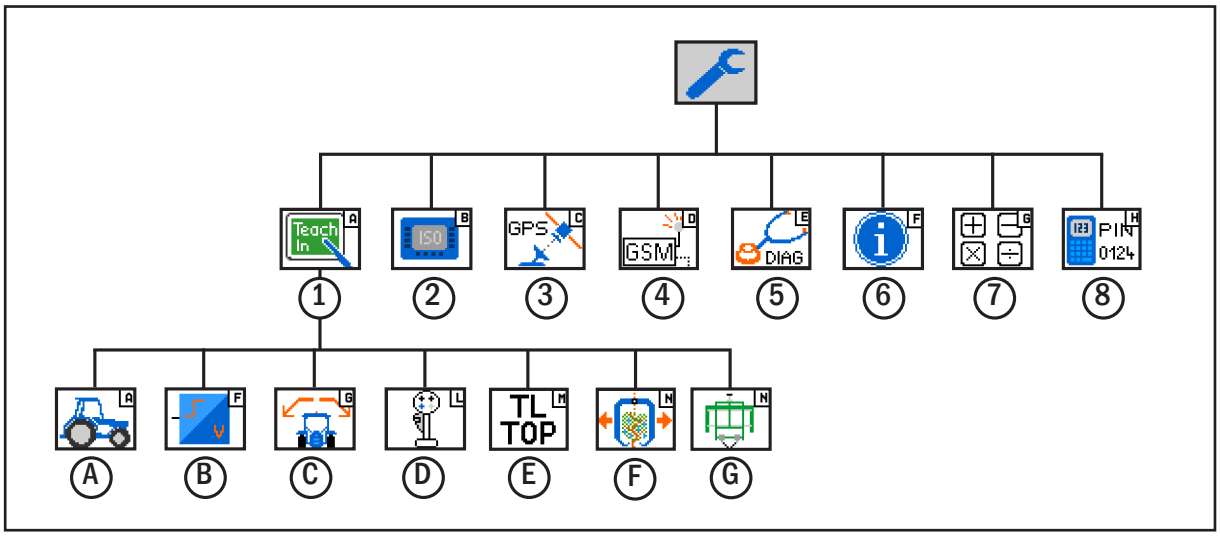


Fig. 41: Menu structure

Main Menu

(1) Teach menu
(2) Terminal configuration
(3) GPS configuration
(4) CLUE modem configuration
(5) Diagnostics
(6) System information
(7) Calculator
(8) Enter ccde

Teach Menu

(A) Teach vehicle code
(B) Teach speed sensor
(C) Teach terrain sensor
(D) Teach joystick
(E) Teach TRACK-Leader TOP
(F) Teach harvest basket*
(G) Teach SLIDE*

* Optionally available.

5.2 Call up Main Menu

Press the soft key with the wrench icon for approx. two seconds to get to the main menu of ULTRA GUIDANCE PSR ISO (see Fig. 42).

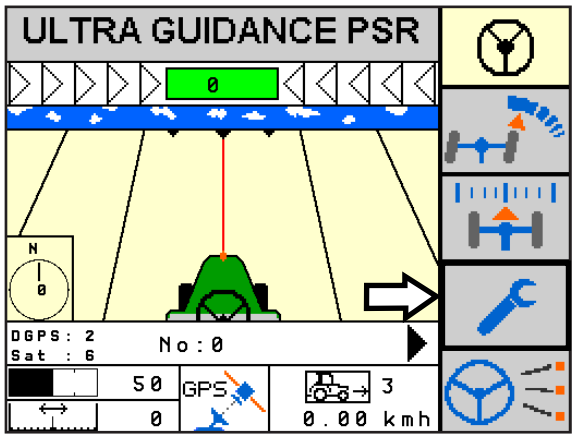


Fig. 42: Call up main menu

5.3 Display of Menus

Main Menu and Teach Menu

The main menu and the teach menu contain further submenus which are displayed as icons (see e.g. Fig. 43).
Select an icon to open the respective menu.

The individual submenus of ULTRA GUIDANCE PSR ISO are described from Chapter 5.5.

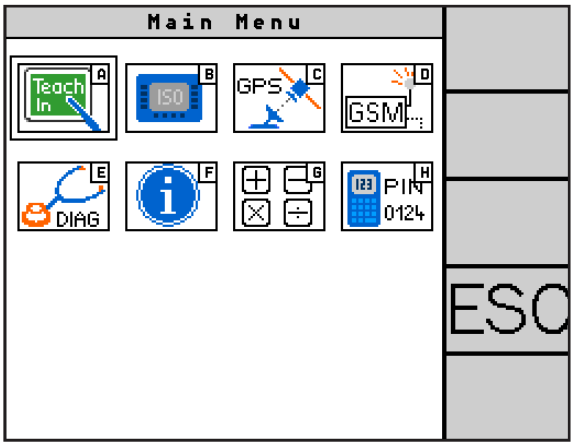


Fig. 43: Menu display – main menu

Submenus

Submenus contain text information and, if necessary, input forms with text/number fields, checkboxes, scroll bars or buttons (see Fig. 44).

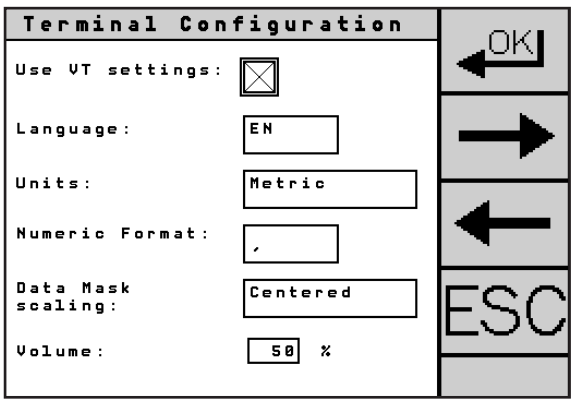


Fig. 44: Menu display – "Terminal configuration" submenu

5.4 Editing of Submenus

The configuration of ULTRA GUIDANCE PSR ISO is mainly done via menus with input fields.
The actions described below must be carried out repeatedly. Your knowledge is therefore a prerequisite for configuring ULTRA GUIDANCE PSR ISO.

5.4.1 Numerical Input

If numerical values are required, an input mask similar to the one in Fig. 45 is opened.

Enter the desired value via the numeric keypad.

“Min” and “Max” define the possible range of values.

Confirm the entered value with the Enter button or the OK soft key.

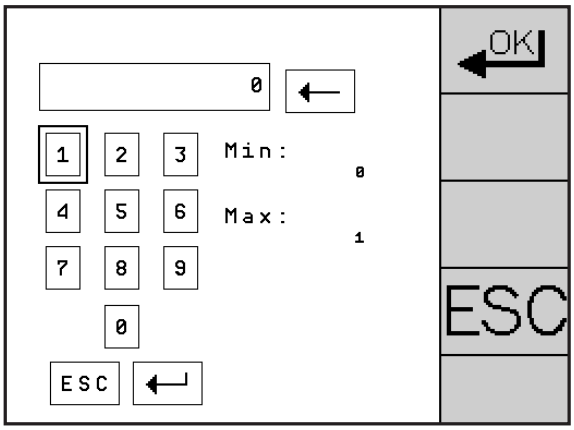


Fig. 45: Numerical input

5.4.2 Text Entry

If the input of a text is required, the input mask shown in Fig. 46 is opened.

Enter the desired text and confirm with “OK”.

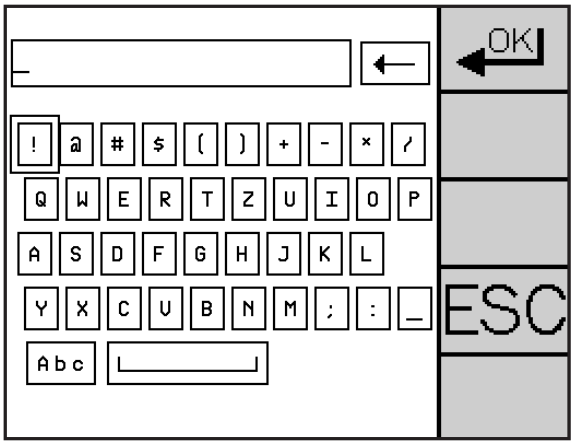


Fig. 46: Text entry

5.4.3 Save Settings

After you have made settings in a menu, you must save these as changes in the system (see Fig. 47).

Select the floppy disk icon and save the changes with “OK”.

Select the crossed-out floppy disk icon to discard the change.

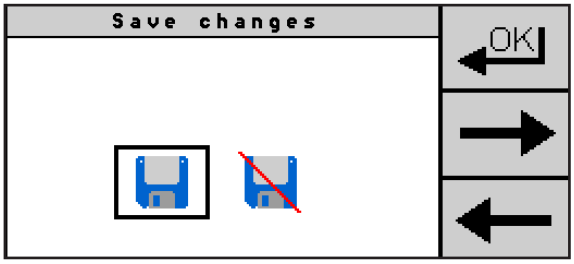


Fig. 47: Save/discard changes

5.5 Teach Menu

In the teach menu, system-specific configurations can be made. This process is referred to as “teaching”. Configurations are normally only required when the system is put into service for the first time or when there are changes in the system (e.g. new software version; other components; changes to the vehicle or components). This includes, for example, the selection/configuration of the vehicle, the speed sensor including the CAN bus to be used, the terrain sensor, the joystick and the PSR SLIDE sliding frame.
In addition, you can can activate and deactivate the TRACK-Leader TOP mask and configure a harvest basket (if available).

Select the “Teach-In” icon (A) in the main menu (see Fig. 48) to call up the teach menu.

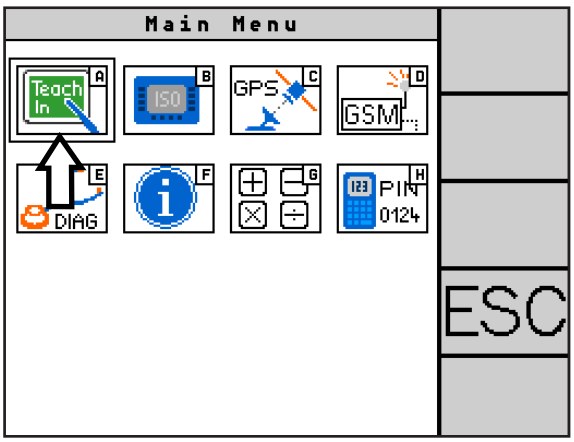


Fig. 48: Accessing the teach menu

The display of the teach menu (see Fig. 49) and the individual submenus depends on the vehicle code (see Chapter 5.5.1). The figures in this manual may deviate from the actual display on the terminal.

The overview in Fig. 41 shows all submenus of the teach menu available in ULTRA GUIDANCE PSR ISO.

NOTICE

It is recommended to edit the teach menu from top left to bottom right.

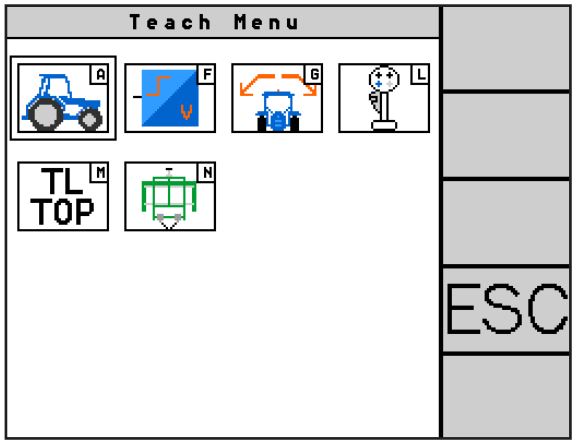


Fig. 49: Example view of the teach menu

5.5.1 Teach Vehicle Code/Select Vehicle

The vehicle code in ULTRA GUIDANCE PSR ISO indicates the vehicle or equipment type (e.g. tractor, grape harvester or sliding frame). In addition, vehicle-specific properties and specifications are set, such as the vehicle dimensions and the turning diameter.

NOTICE This setting is very important and must therefore be made at the beginning of the teaching process. Each time the PSR iBox is used in a different vehicle, the corresponding vehicle must be selected with the appropriate vehicle code.

Select the tractor symbol (A) (see Fig. 50) in the teach menu to call up the “Teach vehicle code” menu.

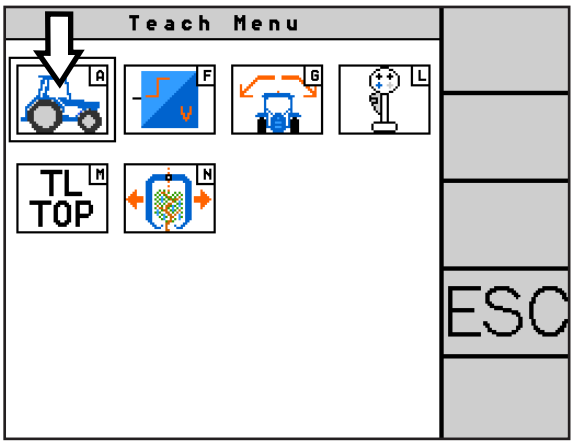


Fig. 50: Accessing the vehicle code teaching

Select Vehicle

Your dealer can create up to eight different vehicles with different vehicle codes.

Press the field with the vehicle designation (see Fig. 51 – 1) to display the stored vehicles. Select a vehicle.

Rename Vehicle

Via the pencil icon (see Fig. 51 – 2) you can rename the selected vehicle. Enter the name using the keyboard that appears and confirm it by pressing “OK”.

Determine the Vehicle Code

The vehicle code is shown in the four number fields (see Fig. 51 – 3). You cannot change the vehicle code. It is required for service purposes.

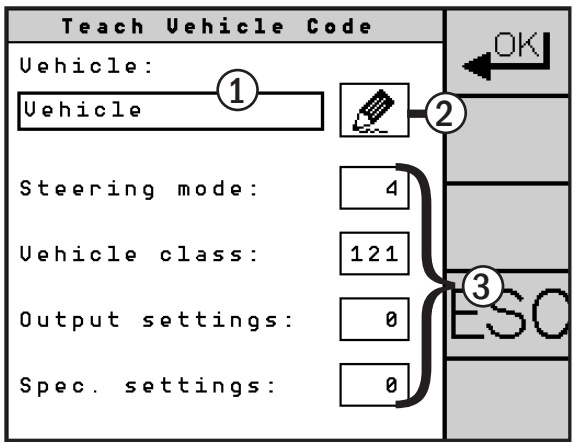


Fig. 51: Determine the vehicle code

5.5.2 Teach Speed Sensor

ULTRA GUIDANCE PSR ISO requires the speed of the vehicle for the steering process. The vehicle can be steered automatically from a speed as low as 0.03km/h, depending on version and activation.

Call up the “Teach Speed Sensor” (F) menu in the teach menu (see Fig. 52).

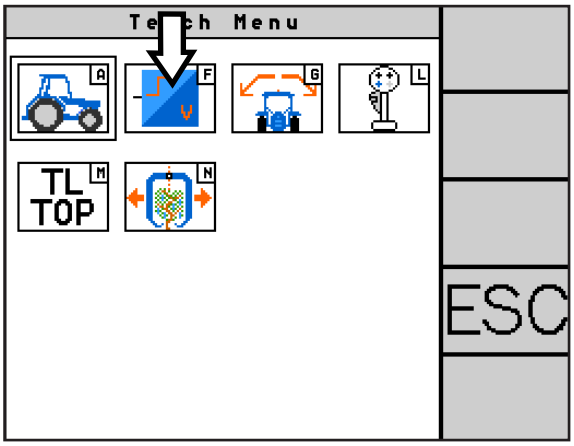


Fig. 52: Accessing the speed sensor teaching

Selection of the Signal Type

Press the field below “Type of Signal” (see Fig. 53) and select a signal type/speed source (see Fig. 54):

- **GPS Receiver**
  Speed signal from GPS receiver via RS 232, J1939 or NMEA2000.
- **ISO GBSD**
  ISOBUS 11783 message Ground Based Speed: This speed is measured on the ground, e.g. with a radar sensor.
- **ISO WBSD**
  ISOBUS 11783 message Wheel Based Speed: This speed corresponds to the speed of the wheel including slip.
- **NMEA 2000**
  Speed from GPS receiver via NMEA 2000.
- **J1939 – CCVS1**
  Speed from vehicle via J1939.
- **Wheel/Radar sensor**
  Speed pulses from the vehicle/radar sensor.
- **Vehicle specific**
  Vehicle-specific speed message.

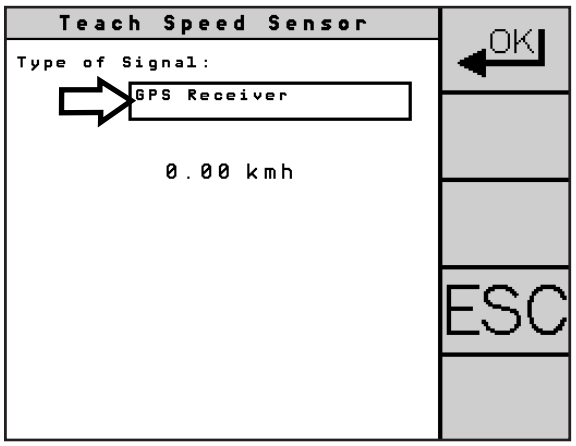


Fig. 53: Select type of signal

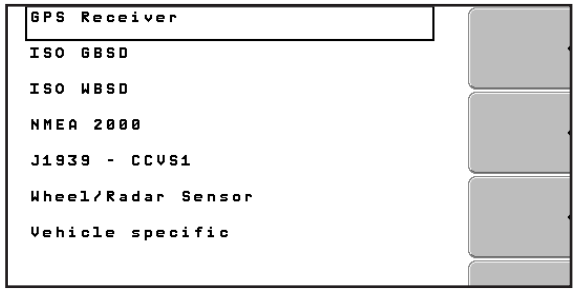


Fig. 54: Signal types

Using CAN Bus 1 or CAN Bus 2

If you have selected “ISO GBSD”, “ISO WBSD”, “NMEA 2000” or “J1939 CCVS1” as the signal type, you must specify which CAN bus uses it.

Press the field below “Using” and select the CAN bus (see Fig. 55).

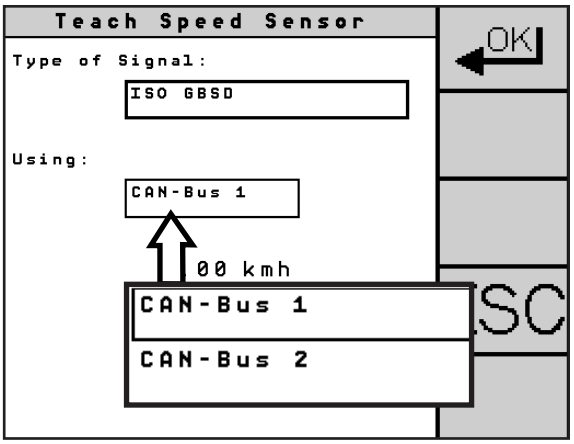


Fig. 55: Select CAN bus

Using the Speed Pulses from the Vehicle

If you have selected “Wheel/Radar sensor” as signal type, in the next step you must select how the speed pulses are transmitted to the steering system.

You have the option

- to automatically record the speed pulses (see Fig. 56 – 1) or
- to set the speed pulses manually (see Fig. 56 – 2).

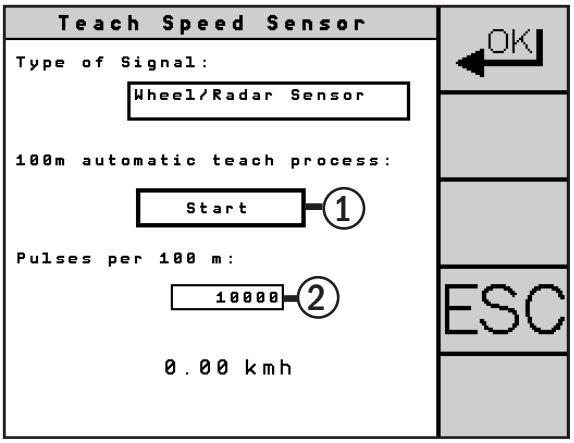


Fig. 56: Speed calibration

Automatic Speed Calibration

In order to automatically record speed pulses from the wheel/radar sensor, you need to drive a distance of exactly 100m (328 ft).

Press the “Start” button under “100m automatic teach process” (see Fig. 57).

Now drive a distance of exactly 100m (328 feet).

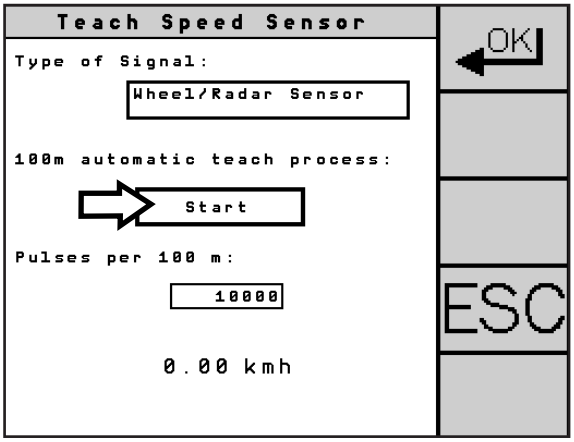


Fig. 57: Start automatic speed calibration

Stop after 100m (328 ft) and press “Stop” (see Fig. 58 – 1).

Compare the speed in the menu (see Fig. 58 – 2) with that on the speedometer. If necessary, correct the value using the manual speed input.

Confirm the speed detection with “OK”.

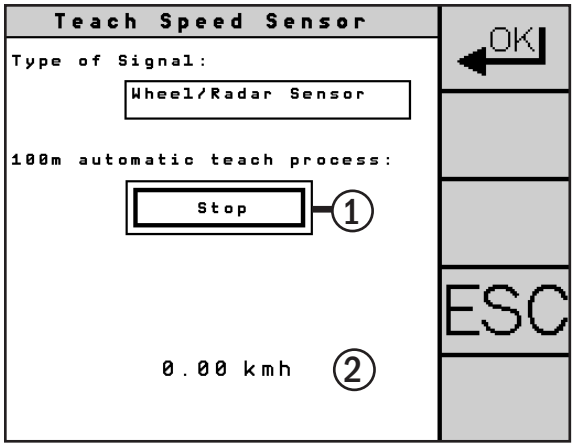


Fig. 58: Stop automatic speed detection

Manual Speed Entry

Select the field below “Pulses per 100m” (see Fig. 59 – 1) and enter the pulse rate via the numerical input.

Confirm your entry with “OK”.

Drive the vehicle at a consistent speed of 5 km/h (3.11 mph) in order to check the set pulse rate.
Compare the speed in the menu (see Fig. 59 – 2) with that on the tractor meter.
If the speed displayed in the menu is too high, you need to increase the pulse rate.
If the speed displayed in the menu is too low, you need to decrease the pulse rate.

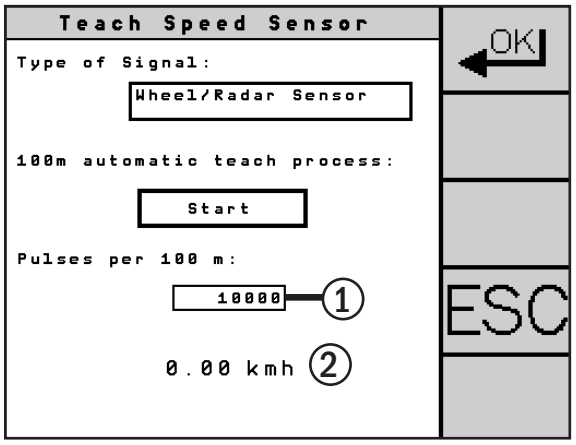


Fig. 59: Manual speed entry

5.5.3 Teach Terrain Sensor

The terrain sensor enables automatic slope compensation.
In the menu “Teach Terrain Sensor”, you can calibrate the terrain sensor, switch it on and off, and select different terrain sensors.

Call up “Teach terrain sensor” (G) in the teach menu (see Fig. 60).

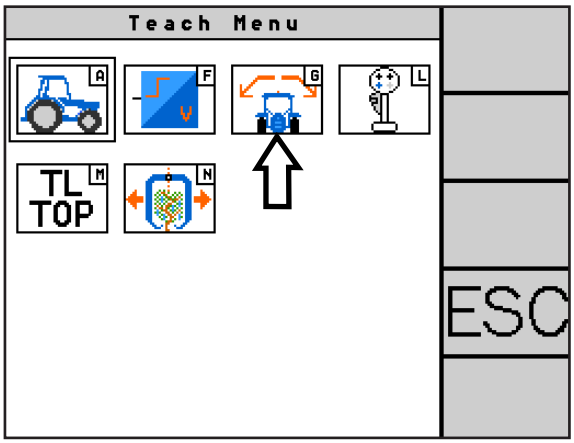


Fig. 60: Accessing the terrain sensor teaching

Sensor Type

The field “Sensor type“ (see Fig. 61) indicates if an external sensor or an internal gilt module is used. A gilt module is a combination of tilt sensors and gyroscopes.

The sensor type is set by your dealer and depends on the used PSR iBox.

PSR iBox MC: Internal gilt module is used.
PSR iBox LT: External sensor required.
PSR iBox LT 6D: Select “Internal” or “External”.

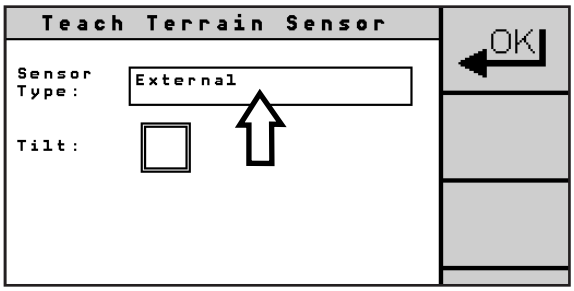


Fig. 61: Sensor type

Position (only with internal Sensor)

The PSR iBox can be mounted in one of 24 positions (mounting positions). This is set in the “Position” field (see Fig. 62) by your dealer.

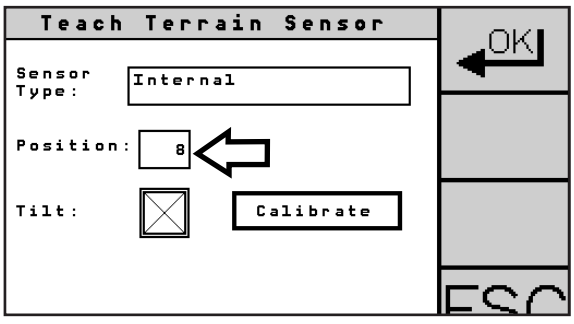


Fig. 62: Position (mounting position)

Switching the Terrain Sensor on/off

Press the check box next to “Tilt” to turn the terrain sensor on or off (see Fig. 63).

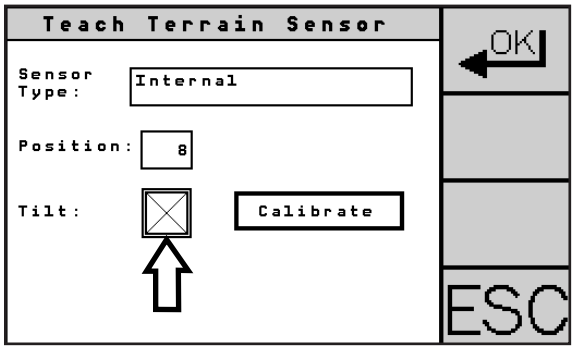


Fig. 63: Activate/deactivate tilt

Calibrating the Terrain Sensor

NOTICE

Calibration must be carried out on a flat surface, such as a truck scale.

The terrain sensor must be calibrated during initial commissioning, when the PSR iBox is remounted, after structural changes to the vehicle (other tires, front loaders, etc.) and each time the tire pressure changes.
During calibration the load of the vehicle must not change, e.g. changing or additional persons in the vehicle.

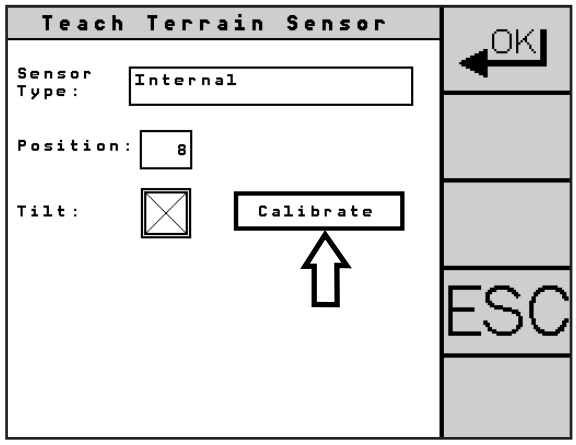


Fig. 64: Calibrating the terrain sensor

Press “Calibrate” (see Fig. 64) to calibrate the terrain sensor.

The display shows a tractor and a flag with the number “1” (see Fig. 65).
Position the vehicle and let it settle.

NOTICE

The detection of the vehicle position only takes place at exactly 0 km/h (0 mph) and with an available speed signal.

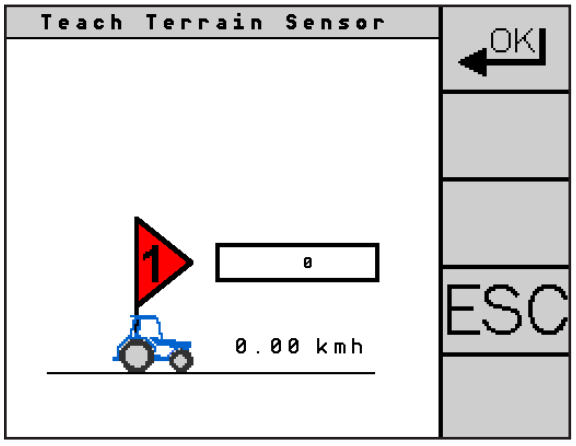


Fig. 65: Position vehicle and confirm position

Confirm the vehicle position with “OK”. The calibration is carried out. This is shown by the blue loading bar (see Fig. 66).

NOTICE

The vehicle must not be moved during the calibration process. Otherwise, the setting values could be falsified.

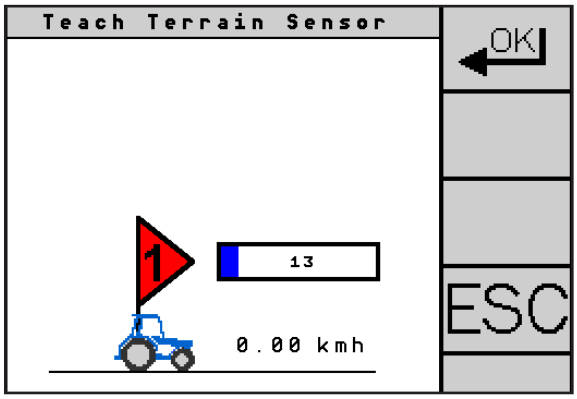


Fig. 66: Calibration – step 1

When the first calibration is complete, the menu automatically switches to the second calibration step.

The display now shows the tractor in the reversed direction and a flag with the number “2” (see Fig. 67).

Do not press any button!

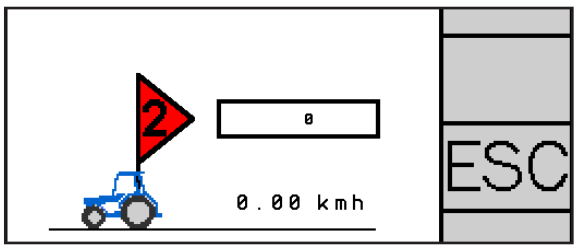


Fig. 67: Calibration display

Get out of the vehicle and mark the position of the non-steered axle (axle centre) on the ground as shown in Fig. 68.
Turn the vehicle by 180° and position it again exactly on the marked position with the non-steered axle.

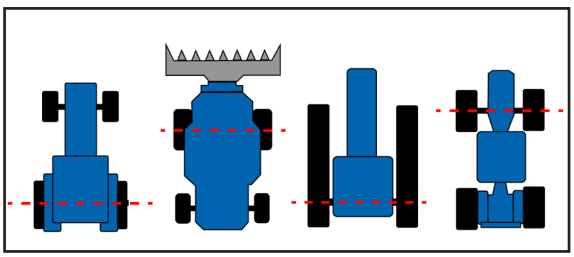


Fig. 68: Mark position of the non-steered axle

Confirm the vehicle position with “OK”.
The calibration is carried out. This is shown by the blue loading bar (see Fig. 69).

NOTICE

The vehicle must not be moved during the calibration process. Otherwise, the setting values could be falsified.

When calibration is complete, the memory prompt appears automatically.

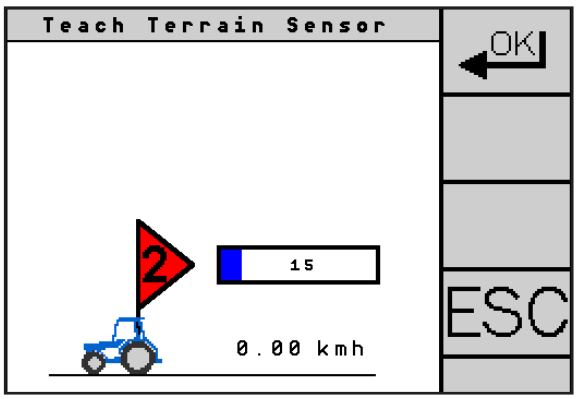


Fig. 69: Calibration – step 2

5.5.4 Teach Joystick

You have the possibility to operate ULTRA GUIDANCE PSR ISO with a joystick. Depending on the vehicle code, the “PSR Joystick” and an “ISO AUX-N Joystick” such as ISO CONTROL are compatible. A “vehicle-specific” selection may also be possible.

Select the joystick symbol (L) in the teach menu (see Fig. 70) to call up the “Teach joystick” menu.

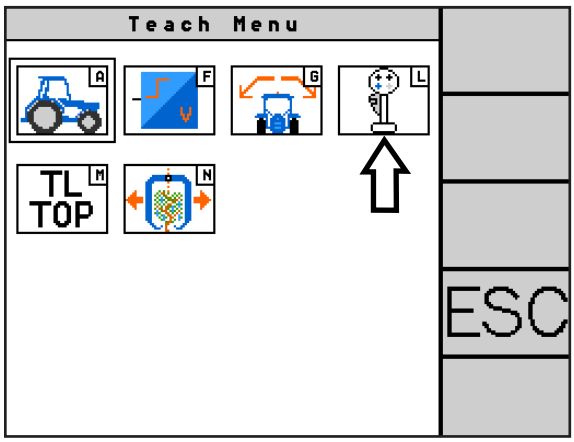


Fig. 70: Accessing the joystick teaching

5.5.4.1 Select Joystick

Press the field below “Joystick type” to select a joystick or deactivate the function (see Fig. 71).

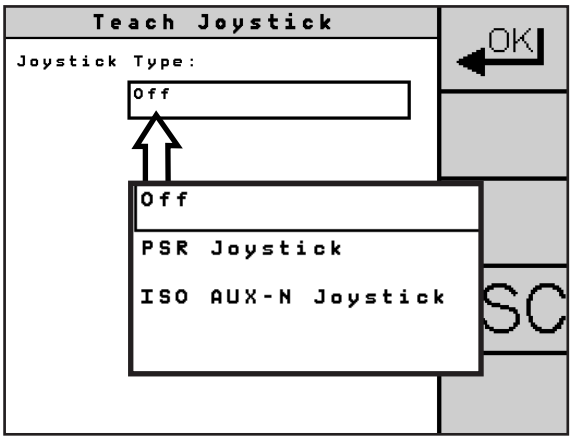


Fig. 71: Select joystick type

5.5.4.2 PSR Joystick

With the PSR joystick (see Fig. 72) you can activate/deactivate ULTRA GUIDANCE PSR ISO and switch between automatic and manual steering mode. Moreover, you can control the vehicle in the manual mode.

The PSR joystick has one X axis and two buttons, one on the front (dead-man switch) (see Fig. 72 – 1) and one on top (top button) (see Fig. 72 – 2).

- Using the dead-man switch, you can switch between manual and automatic mode.
- The top button is used as activation switch.

If the system is in manual mode, the joystick can be used to steer along the X axis (left and right movement).
If the system is in automatic mode, you can set the distance/offset via the X axis (see Chapter 4.7). The distance/offset is reset after the steering is deactivated.

Fig. 72: PSR joystick in the vehicle

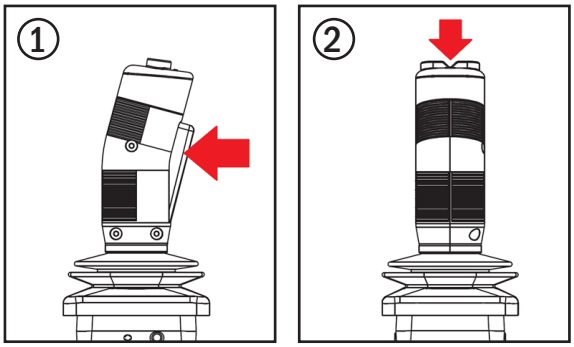


Fig. 73: Buttons of the PSR joystick

Joystick Configuration

Select “PSR Joystick” as the joystick type (see Fig. 74 – 1).

Invert X-Axis

By activating the check box next to “Invert X-Axis” (see Fig. 74 – 2) you can reverse the X axis and thus swap the travel directions or distance settings.

Calibrate Zero Position

To use the PSR joystick properly, you must calibrate the center position (zero position) of the joystick. Make sure that the joystick is in the idle state and press the “Calibrate” button (see Fig. 74 – 3). The current value is displayed in the white field and the last calibrated value in the black field.

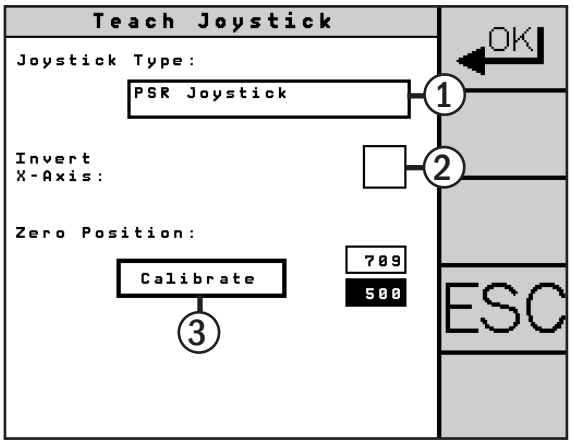


Fig. 74: PSR joystick

5.5.4.3 ISO AUX-N Joystick

ULTRA GUIDANCE PSR ISO supports the use of AUX-N devices and functions such as the Reichhardt ISO CONTROL joystick (see Fig. 75).

AUX-N devices can be used to make settings in ULTRA GUIDANCE PSR ISO. This includes, for example activation, switching the steering mode as well as setting the distance/nudge and reaction.

Fig. 75: ISO CONTROL joystick

Joystick Configuration

Select “ISO AUX-N Joystick” as the joystick type (see Fig. 76 – 1).

Delete all Assignments

In the menu you can delete previous function assignments of the joystick (see Fig. 76 – 2).
The assignments are made in an external joystick mask (not integrated in ULTRA GUIDANCE PSR ISO). Further information on the function assignment of an ISO CONTROL joystick can be found in the *ISO CONTROL operating manual*.

Invert X-Axis

By activating the check box next to “Invert X-Axis” (see Fig. 76 – 3), you can reverse the control direction in manual mode.

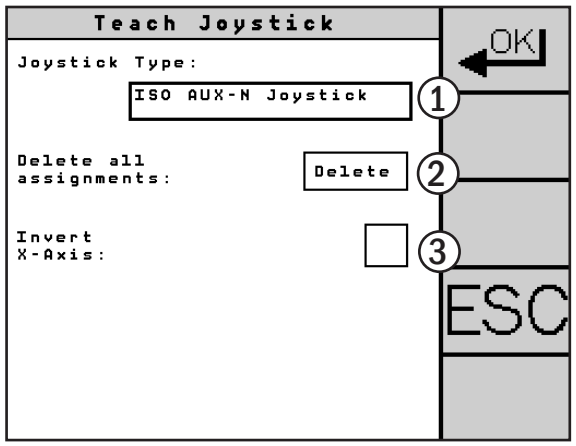


Fig. 76: ISO AUX-N joystick

Available Functions in the external Joystick Mask

The following functions can be assigned to an ISO AUX-N joystick in the external joystick mask:

Activates/deactivates the automatic steering

Change between automatic steering mode and “manual” steering mode


Set reaction


Increase reaction


Reduce reaction


Set distance/nudge


Adjust distance/nudge


Adjust distance/nudge


Activation for manual steering ("manual mode")


Steer left/right ("manual mode")


Manual steering to the right ("manual mode")


Manual steering to the left ("manual mode")


SLIDE center position

5.5.4.4 Vehicle-specific Joystick

For some vehicles (e.g. some BRAUD grape harvesters) it is possible to select a vehicle-specific joystick (see Fig. 77 – 1).

Vehicle-specific options can then be activated in the menu (see Fig. 77 – 2 and 3).

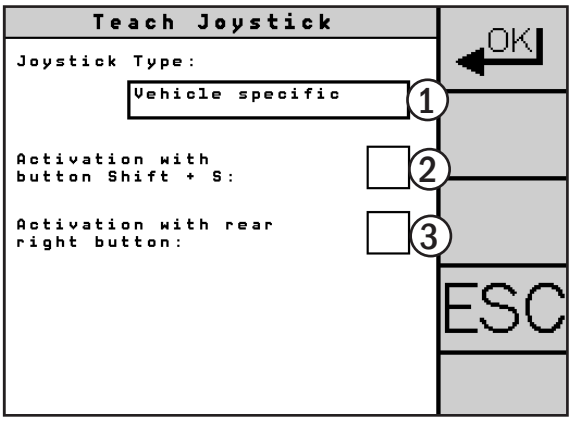


Fig. 77: Vehicle-specific joystick (example)

5.5.5 Activate/deactivate TRACK-Leader TOP

TRACK-Leader TOP enables you to extend the scope of functions of ULTRA GUIDANCE PSR ISO.

NOTICE

For information on TRACK-Leader TOP, please refer to the installation and operating instructions for the terminal and the TRACK-Leader operating instructions. The terminal must be enabled for TRACK-Leader TOP.

Select “TL TOP” (M) in the teach menu (see Fig. 78) to access the “Teach TRACK-Leader TOP” menu.

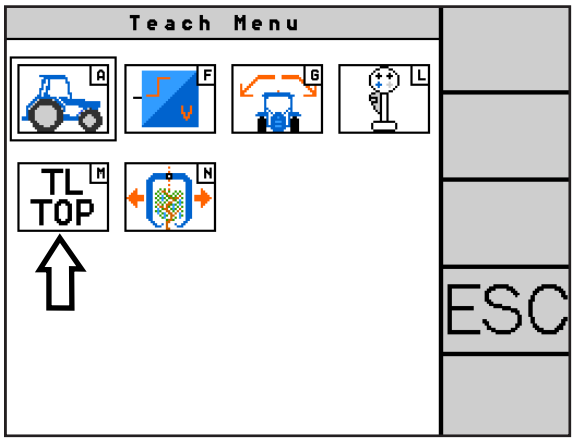


Fig. 78: Accessing TRACK-Leader TOP teaching

Press the check box next to “Enable TL TOP” to activate or deactivate TRACK-Leader TOP (see Fig. 79).

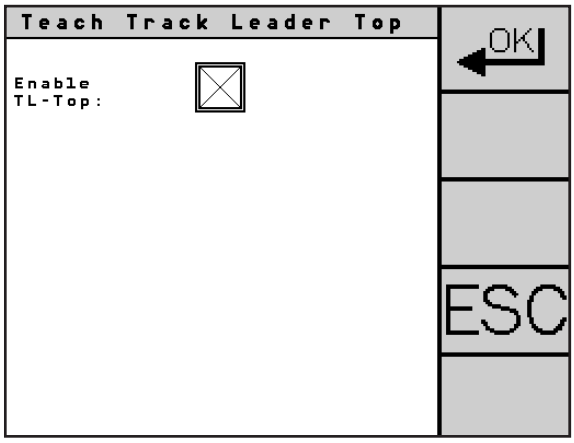


Fig. 79: Activate/deactivate TRACK-Leader TOP

5.5.6 Teach Harvest Basket

NOTICE This menu is only available if it is necessary for calibration.

By entering the corresponding vehicle code, the “Teach Harvest Basket” menu is displayed for grape harvesters. You can configure ULTRA GUIDANCE PSR ISO so that it takes into account the swivel angle of the harvesting basket during automatic steering.

Select the harvest basket symbol (N) in the teach menu (see Fig. 80) to call up the “Teach harvest basket” menu.

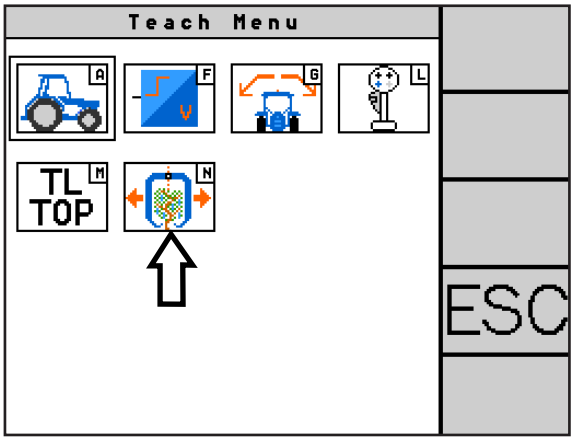


Fig. 80: Accessing harvest basket teaching

Activate the check box next to “Enable sensor” to activate or deactivate the harvest basket (see Fig. 81 – 1).

When the sensor is activated, you can set the sensitivity of the sensor (see Fig. 81 – 2).

In addition, you can calibrate the center position (zero position) of the harvest basket for certain vehicles (depending on the vehicle code). Make sure that the vehicle is on level ground and that the basket is in the idle state and press the “Calibrate” button (see Fig. 81 – 3).
The current value is displayed in the white field and the last calibrated value in the black field.

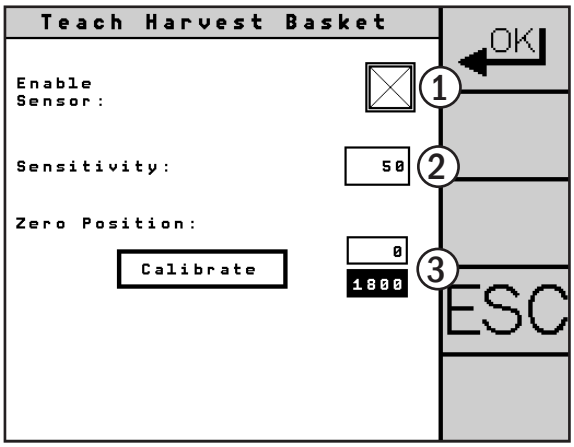


Fig. 81: Teach harvest basket

5.5.7 Teach Sliding Frame

NOTICE This menu is only available if it is necessary for calibration.

By entering the corresponding vehicle code, the “Teach sliding frame” menu is displayed.
In this menu you can configure the active attachment steering PSR SLIDE.

Select the PSR SLIDE symbol (N) in the teach menu (see Fig. 82) to call up the “Teach SLIDE” menu.

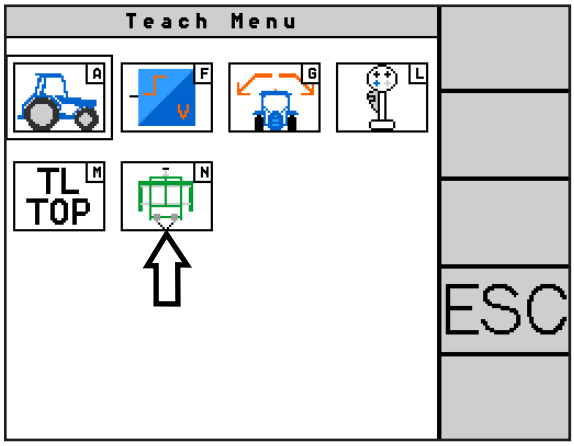


Fig. 82: Accessing SLIDE teaching

Mounting Location

Select the field below “Mounting location” (see Fig. 83) to indicate whether you are using the sliding frame at the front or rear of the vehicle (see Fig. 84).

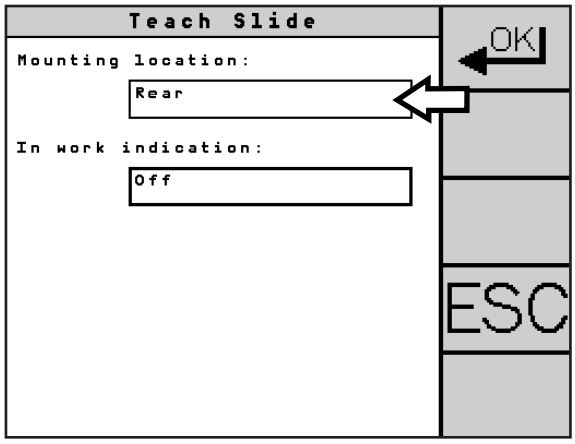


Fig. 83: Select mounting location

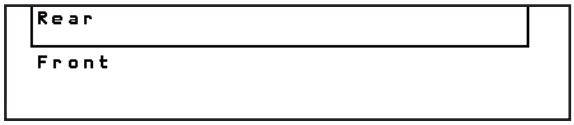


Fig. 84: Possible mounting locations

In Work Indication

Select the field below “In work indication” (see Fig. 85) to indicate the working position sensor of the vehicle's power lift (see Fig. 86).

Off:	The vehicle does not have a working position sensor.
ISO Hitch:	The vehicle is equipped with a working position sensor whose signals are available on the ISOBUS.
Ext. Sensor analog:	The vehicle has an analogue working position sensor.
Ext. Sensor digital:	The vehicle has a digital working position sensor.

If necessary, contact your responsible dealer to find out which in work indication the vehicle has.

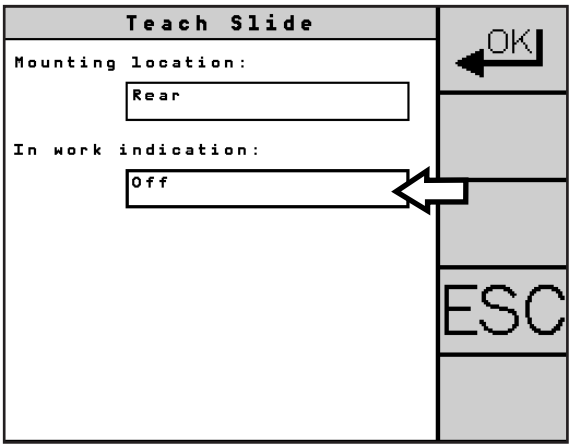


Fig. 85: Select an in work indication

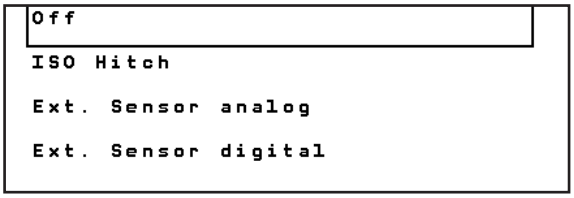


Fig. 86: In work indication options

Invert Signal

This option is only displayed if you have selected an in work indication.

With the option “Invert signal” (see Fig. 87) you can invert a signal coming from the in work indication for the working and transport position.
You should activate this setting if the working and transport positions of the vehicle are reversed when changing from sensor mode to manual mode.

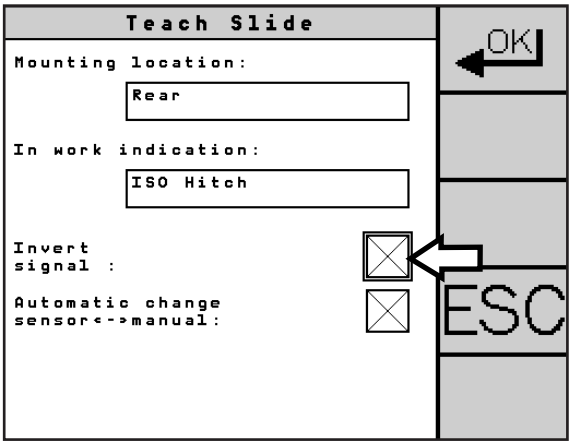


Fig. 87: Invert signal of the in work indication

Automatic Change Sensor ↔ Manual

This option is only displayed if you have selected an in work indication.

With the option "Automatic change sensor ↔ manual" (see Fig. 88) you can have ULTRA GUIDANCE PSR ISO automatically switch to manual mode when the power lift is lifted and move the sliding frame to the center position.
For information about the manual mode, see Chapter 4.5.2.

As soon as the vehicle stops, the sliding frame stops the automatic sliding process.

When you return the power lift to the working position, the system returns to the sensor mode.

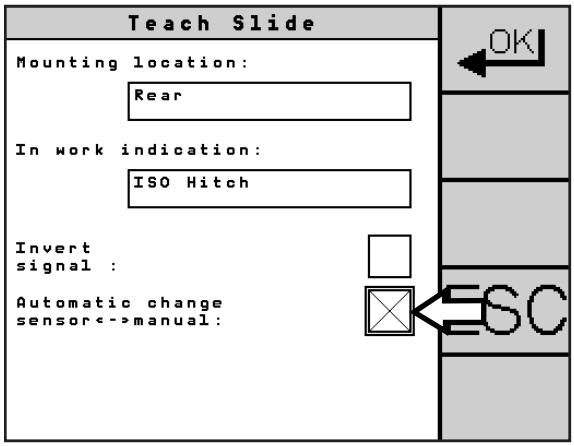


Fig. 88: Automatic change sensor ↔ manual activated

NOTICE

If you have not activated this option, the sliding frame will continue to be automatically steered and perform sliding movements during the turning operation. If the option is deactivated, it is therefore recommended to deactivate automatic steering before lifting.

5.6 Terminal Configuration

In the “Terminal Configuration” menu you can make settings for the display of ULTRA GUIDANCE PSR ISO on the ISOBUS terminal.

In the main menu, select the symbol with the ISO terminal (B) (see Fig. 89) to call up the terminal configuration.

The terminal configuration is divided into two pages, through which you can scroll using the arrow keys.

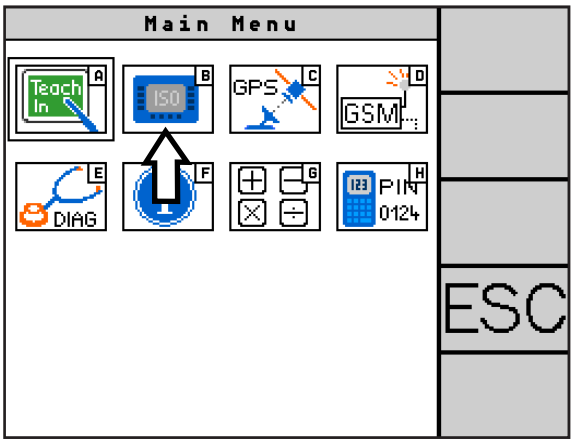


Fig. 89: Call up terminal configuration

On the first page, you can make the settings described below (see Fig. 90).

Use VT settings:
Terminal settings are applied to the PSR software. Language, units and number format can then no longer be selected.

Language:
Languages available for the PSR mask: German (DE), English (EN), French (FR), Italian (IT), Dutch (NL), Polish (PL), Romanian (RO), Spanish (ES) and Japanese (JA).

Units:
Units for speeds, distances, etc. (“metric” or “imperial”)

Numeric Format:
Separator for decimal numbers (, or .).

Data Mask scaling:
Display of the PSR mask on the terminal (“centered” or “stretched”).
Centered: 200x200 resolution of the PSR mask is stretched by the largest possible integer factor. Example: 400x400 at a resolution of 480x480.
Stretched: The PSR mask is adapted to the screen resolution. This may result in distortion of individual symbols/characters.

Volume:
Volume for signal tones.

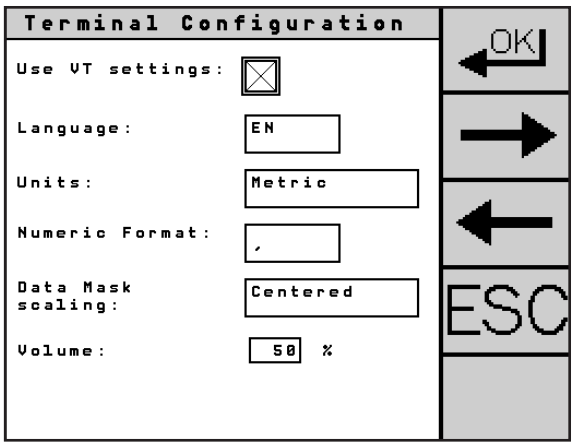


Fig. 90: Terminal configuration page 1

On the second page, you can make the settings described below (see Fig. 91).

Use VT of:

Selection of the CAN bus (CAN bus 1, CAN bus 2). A selection between different CAN buses is only possible if the CAN bus 2 is connected and the vehicle code allows this.

Change VT:

The “Select” button opens the terminal selection for several available VTs (see Fig. 92).

The currently used terminal is displayed as “Active VT”. Press the “Next” button until the terminal on which the PSR mask is to be loaded is displayed under “Available VT”.

Save the setting by pressing and holding the OK button for a few seconds. The PSR mask will then be uploaded to the selected terminal.
This setting is saved permanently, even after a restart of ULTRA GUIDANCE PSR ISO.

Time to wait for selected VT:

Time (0-60 seconds) that ULTRA GUIDANCE PSR ISO waits until it loads the PSR mask on another terminal if the selected one is not available.

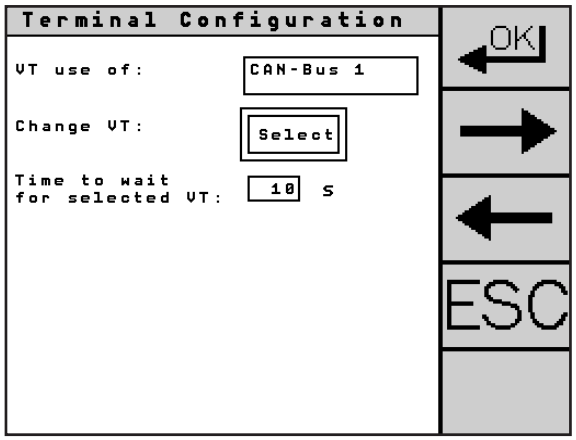


Fig. 91: Terminal configuration page 2

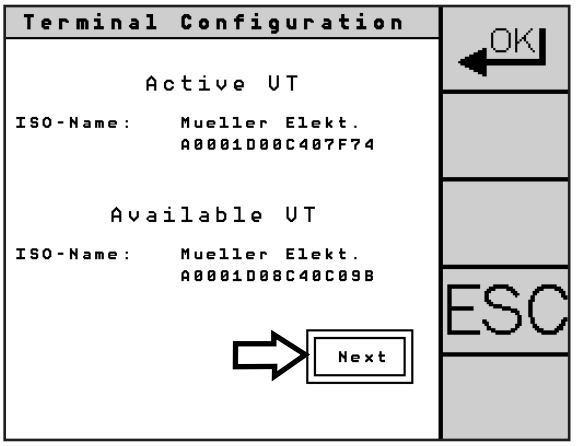


Fig. 92: Select VT

5.7 GPS Configuration

In the receiver configuration, you specify which input and output are used and set the baud rate, update rate, message format etc.

Select the GPS symbol (C) in the main menu (see Fig. 93) to call up the receiver configuration.

The receiver configuration is divided into three pages, through which you can scroll with the arrow keys on the right in the menu.

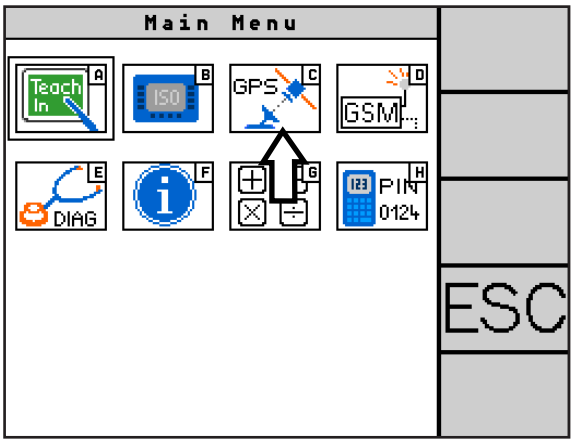


Fig. 93: Call up GPS configuration

5.7.1 Setting the Input

The GPS configuration varies depending on the receiver used.

Using the button under “Input”, select the protocol/ interface used by the connected receiver (see Fig. 94).

ULTRA GUIDANCE PSR ISO can process three different inputs:

- RS 232 (serial)
- NMEA 2000 (CAN bus)
- J1939 (CAN bus)

You can usually find out which signal source the respective receiver uses from the data sheet of the receiver.

Reichhardt/Hemisphere:

Receivers from Reichhardt and Hemisphere are connected in series and use the RS 232 protocol.

John Deere StarFire:

John Deere StarFire receivers are usually used in series via RS 232.
In addition, it can be used via the CAN bus using J1939.

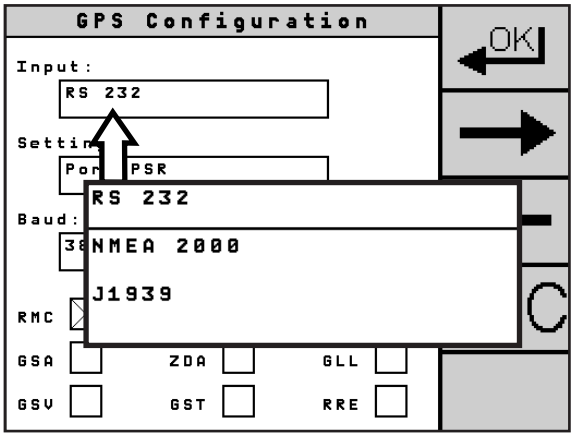


Fig. 94: Setting the input

5.7.2 Input “RS 232”

The configuration of the input “RS 232” is explained below.

5.7.2.1 Receivers from Reichhardt or Hemisphere

If you use a Reichhardt or Hemisphere receiver, two ports (“Port PSR” and “Port Other”) must be configured and general settings must be made.

Reichhardt receivers are usually preconfigured. However, the preconfiguration should be checked.

Use the button under “Setting” to call up the three items (“Port PSR”, “Port Other” and “General”) in order to perform/check the corresponding configurations (see Fig. 95).

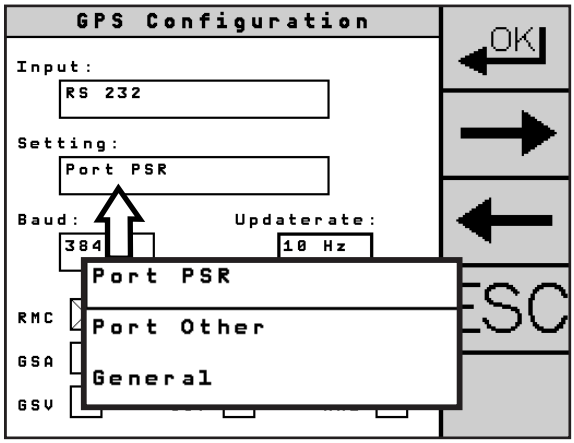


Fig. 95: Select setting

Configuration for “Port PSR” and “Port Other”

Under “Port PSR” you set the communication of the receiver to ULTRA GUIDANCE PSR ISO.

Under “Port Other” you configure the second port of the receiver for attachments or communication with the RTK modem.

The menu pages for “Port PSR” and “Port Other” are equally structured.

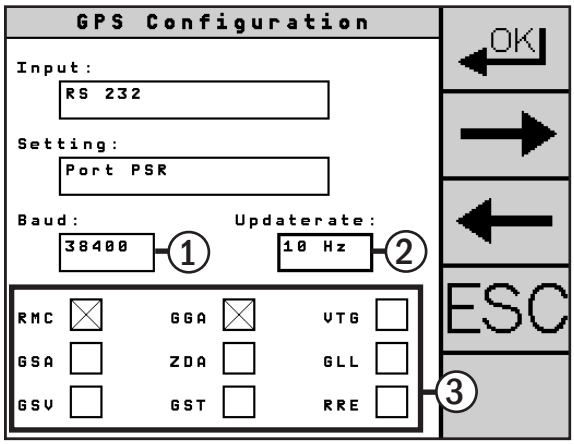


Fig. 96: Configuration of "Port PSR” and “Port Other”

Baud:

The baud rate is the transmission speed between ULTRA GUIDANCE PSR ISO and the GPS receiver. The following baud rates are possible: 4800, 9600, 19200, 38400, 57600 (see Fig. 96 – 1).

Update rate:

With the update rate (see Fig. 96– 2), you can set the frequency with which all messages are transmitted. The following update rates are possible: 1, 5, 10 Hz.

Message format:

Specify the message formats via which the receiver is to transmit its data (see Fig. 96 – 3).

Specifications for "Port PSR" (see Fig. 97)

1. Setting: "Port PSR"
2. Baud: 38400
3. Update rate: 10 Hz
4. Message format: "RMC" and "GGA" activated

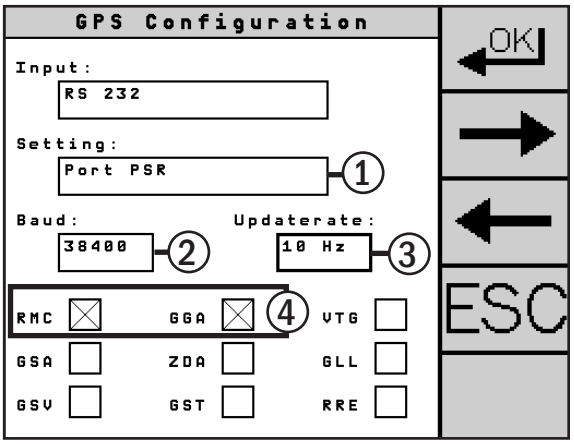


Fig. 97: Specifications for "Port PSR"

Defaults for "Port Other" if an RTK CLUE modem is connected (see Fig. 98)

1. Setting: "Port Other"
2. Baud: 19200
3. Update rate: 1 Hz
4. Message format: "GGA" activated

Please refer to the data sheet of the respective device for specifications for other modems or attachments.

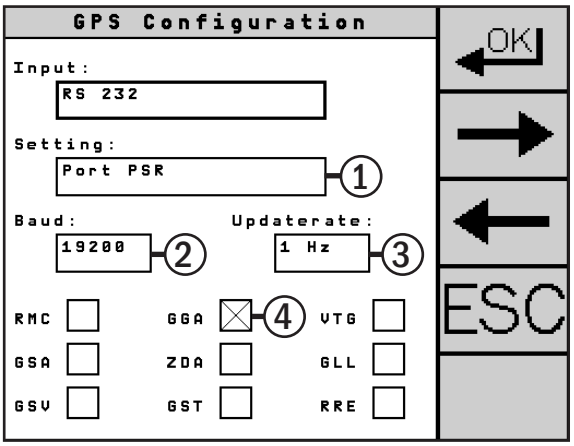


Fig. 98: Specifications for "Port Other"

Configuration for “General”

Under “General” (see Fig. 99 – 1) you make general settings that apply to Port PSR and Port Other.

PRN (Priority Number):

Under “PRN” (see Fig. 99 – 2), you enter the satellite from which the correction signal (DGPS) is to be obtained. For Europe, set “123 - EGNOS” or “136 - EGNOS”. For North America, set “138 - EGNOS”.

Decimal pl.:

Number of decimal places of the received correction data (see Fig. 99 – 3). Make sure that “7” is set.

Application:

Select the application (see Fig. 99 – 4) that is to be used to determine the correction data. Set “WAAS” for a DGPS receiver without RTK (e.g. RGS 101). Select "MFA" for an RTK-enabled receiver (e.g. RGS 325).

RTK/Correction:

The “RTK” item (see Fig. 99 – 5) appears when the “MFA” application is selected (see Fig. 99 – 4). Set whether to use RTK correction data (“On”) or not (“Off”).

The “Correction” item (see Fig. 100 – 5) appears when the “WAAS” application is selected (see Fig. 100 – 4). Specifies which correction data is to be obtained.

Specifications for “General” with RTK (see Fig. 99)

1. Setting: General
2. PRN: 123-EGNOS (for Europe)
3. Decimal: 7
4. Application: MFA
5. RTK: AN

Specifications for “General” without RTK (see Fig. 100)

1. Setting: General
2. PRN: 123-EGNOS (for Europe)
3. Decimal: 7
4. Application: WAAS
5. Correction: WAAS

Software-Ver:

The software version of the selected application is displayed at the bottom of the menu page (see Fig. 99 – 6).

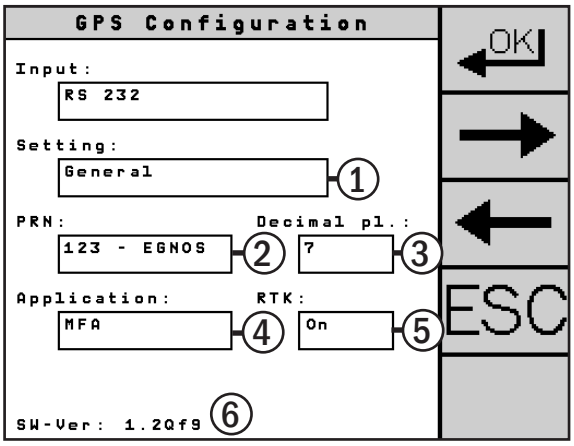


Fig. 99: Possible settings for “General” with RTK (RGS 325)

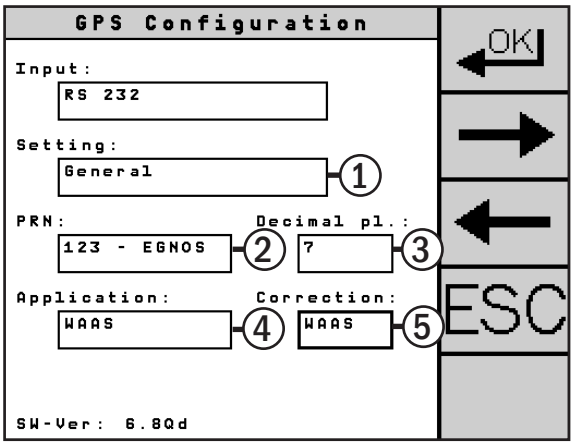


Fig. 100: Possible settings for “General” without RTK (RGS 101)

5.7.2.2 Serial Receiver from other Manufacturers/No receiver detected

External Receiver

If you do not use a receiver or use a serially connected receiver that is not from Reichhardt or Hemisphere, the menu page shown in Fig. 101 appears.

Enter the baud rate of the receiver. The baud rate is the transmission speed between ULTRA GUIDANCE PSR ISO and the GPS receiver.

Please also make the following settings directly on the receiver (via the corresponding software):

- GGA with 10 Hz
- RMC with 10 Hz
- Baud: 38400

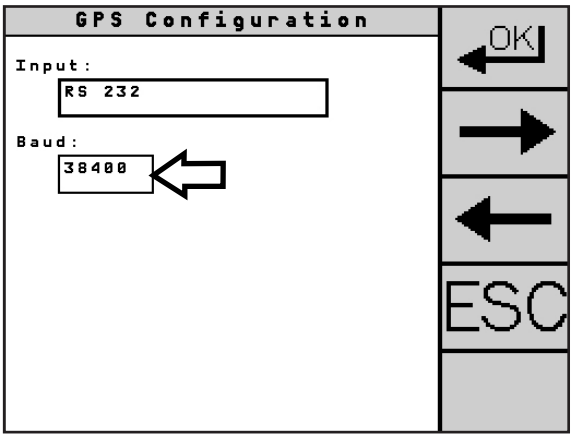


Fig. 101: Receiver configuration – RS 232 – external receiver/no receiver

No Receiver detected

If you are using a receiver from Reichhardt or Hemisphere and the screen in Fig. 101 is still displayed, the receiver is not connected.

Verify that

- the receiver you are using is connected correctly,
- the receiver is correctly configured,
- the PSR and receiver baud rates match.

The receiver LED (see Chapter 6.3) shows you whether the receiver is switched on and receiving data.

You can use the diagnostics (see Chapter 5.9) to check whether receiver data is being received.

5.7.3 Inputs “NMEA 2000” and “J1939”

The menu pages for the inputs “NMEA 2000” and “J1939” (via CAN bus) have the same structure.

Input:

With the input (see Fig. 102/Fig. 103 – 1) select the protocol used by the receiver.

Active Nav Controller:

The active Nav Controller displays the name and ID of the currently connected navigation controller (GPS receiver) (see Fig. 102 – 2).

If ULTRA GUIDANCE PSR ISO is not connected with any navigation controller, “not present” is displayed (see Fig. 103 – 2).

Available Nav Controller:

Shows name and ID of available navigation controller (GPS receiver) (see Fig. 102 – 3).
Using the “Next” button (see Fig. 102 – 4), call up the next available Nav Controller.
Select the displayed available Nav Controller as active Nav Controller using the “Select” button (see Fig. 102 – 5).

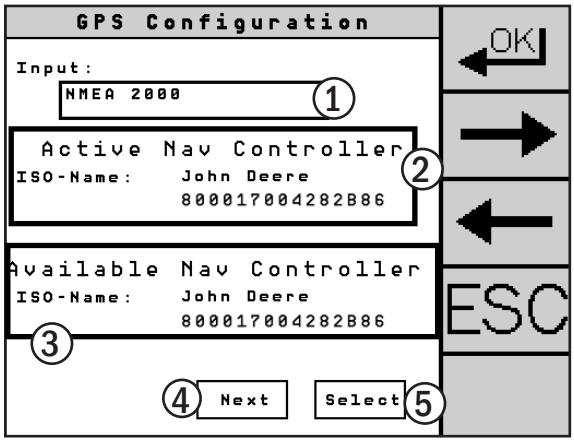


Fig. 102: Configurations for input “NMEA 2000”

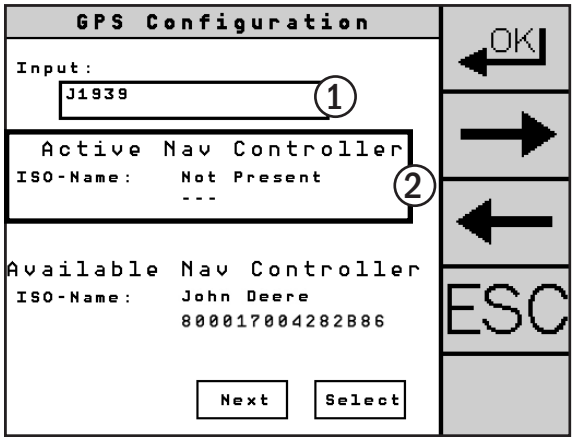


Fig. 103: Configurations for input “J1939” without selected, active nav controller

5.7.4 Settings for Information Messages

Use the arrow keys on the right of the menu to navigate to the second page of the receiver configuration (see Fig. 104). Here you can make settings for info messages that can be displayed when GPS quality changes.

NOTICE Information messages are only displayed if you have not activated TRACK-Leader TOP (see Chapter 5.5.5).

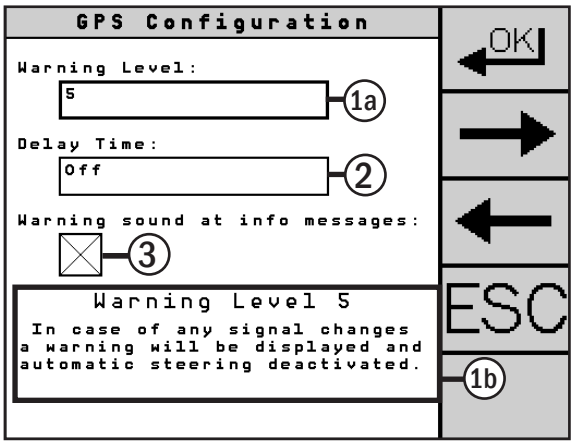


Fig. 104: Settings for information messages

Warning Level:

Switch the warning level to “Off” to deactivate the information messages, or select one of the five warning levels (1-5) (see Fig. 104 – 1a).
The warning level determines when information messages are displayed. Warning level 1 is the lowest. Warning levels 4 and 5 are the highest, which also lead to the deactivation of automatic steering. The warning level is explained at the bottom of the menu page (see Fig. 104 – 1b).

Delay Time:

You can use the delay time to set the delay with which the information messages are to be displayed after the quality change has occurred (see Fig. 104 – 2).

Warning sound for info messages:

By activating the check box under “Warning sound for info messages” you can activate or deactivate an accompanying warning tone (see Fig. 104 – 3).

5.7.5 Signal Output, TCM Correction and Follow-up Time

Use the arrow keys on the right of the menu to navigate to the third page of the receiver configuration (see Fig. 105).

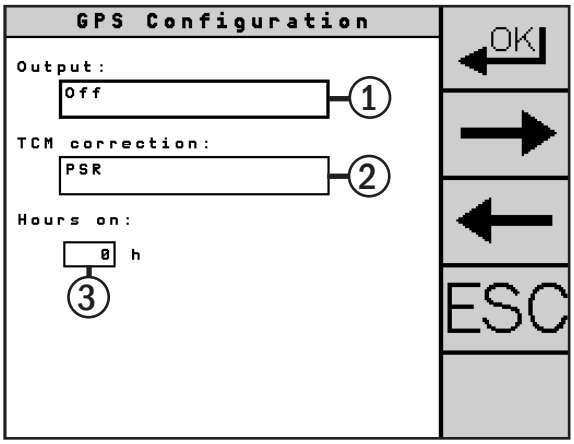


Fig. 105: Signal output, TCM correction and setting the follow-up time

Output:

If you are also using an external system that requires position data as well (such as area documentation on an external system or section control), you can set under “Signal output” which protocol (“NMEA 2000” or “J1939”) is to be used for the transmission of the position data to the ISOBUS (see Fig. 105 – 1 and Fig. 106):

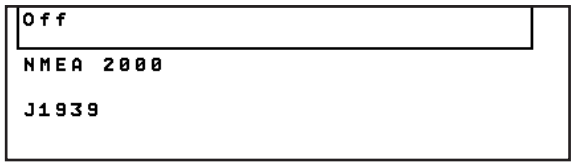


Fig. 106: Signal output options

Deactivate the signal output via “Off” if you do not need position data for other systems.

TCM correction:

Under “TCM correction”, set the tilt correction to be used (see Fig. 105 – 2 and Fig. 107).

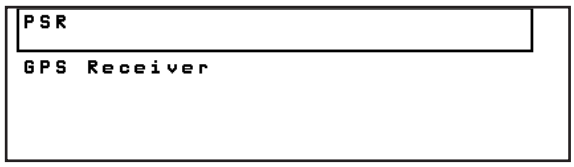


Fig. 107: TCM correction options

Select “PSR” for a receiver without tilt correction. “PSR” is used to correct the tilt compensation of ULTRA GUIDANCE PSR ISO.

Select “GPS Receiver” if you want to use the tilt compensation correction from a receiver with built-in tilt module. Configure the receiver according to the manufacturer's specifications.

NOTICE

For receivers from Reichhardt and Hemisphere always select “PSR” in order to use the tilt compensation correction of the ULTRA GUIDANCE PSR ISO.

Hours on:

With the follow-up time (see Fig. 105 – 3) you set how long the GPS receiver should be supplied with power after switching off ULTRA GUIDANCE PSR ISO. This means that position data is available more quickly when the system is restarted. It is possible to set a follow-up time of 0-24 hours.

(This option is only available if the receiver is connected to the PSR iBox. It is not available when using a PSR iBox MC or when the receiver is connected to a roof dock.)

5.8 CLUE Modem Configuration

NOTICE The CLUE modem configuration is not possible when using external receivers, but only when using a receiver from Reichhardt/Hemisphere.

Via the CLUE modem configuration, you can configure the RTK CLUE modem directly.

Select “GSM” (D) in the main menu (see Fig. 108) to call up the CLUE modem configuration.

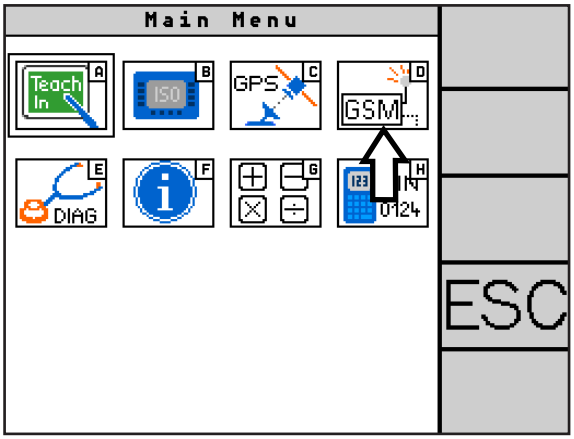


Fig. 108: Call up CLUE modem configuration

Modem not connected/connect Modem

A red display indicates that the modem is not connected or that no data is being received (see Fig. 109 – 1).

Press the “Connect” button (see Fig. 109 – 2) to connect the modem.
The red indicator flashes during the connecting process.

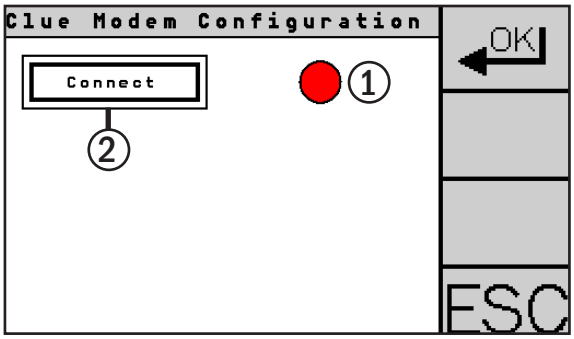


Fig. 109: Connect modem

Modem connected

If a connection with the modem is established, this will be visualized by a green signal (see Fig. 110 – 1).

The buttons “NTRIP” and “SIM” are also displayed (see Fig. 110 – 2 and 3).

The modem type and the software version are displayed at the bottom of the menu page (see Fig. 110 – 4).

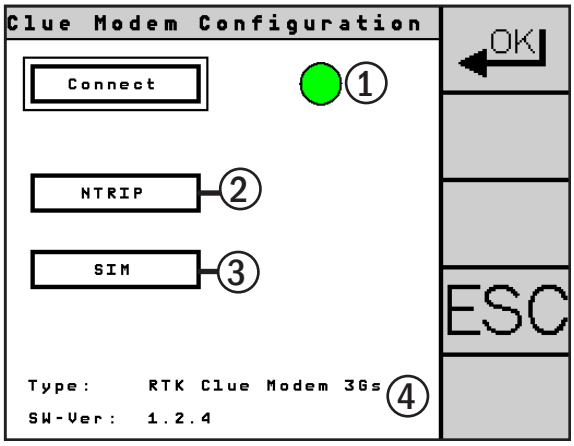


Fig. 110: Modem connected

NTRIP Configuration

Via the button “NTRIP” (see Fig. 110 – 2) you can view the NTRIP configuration and specify the mount point (the base station to be used) (see Fig. 111).

If you would like to make further changes to the NTRIP configuration, please contact your dealer.

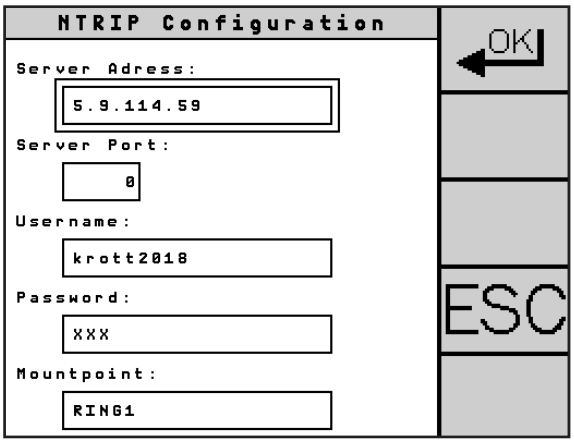


Fig. 111: NTRIP configuration

SIM Configuration

Via the “SIM” button (see Fig. 110 – 3) you can view the SIM data. These are displayed in the SIM configuration during the connection with the modem (see Fig. 112).

If you would like to make changes to the SIM configuration, please contact your dealer.

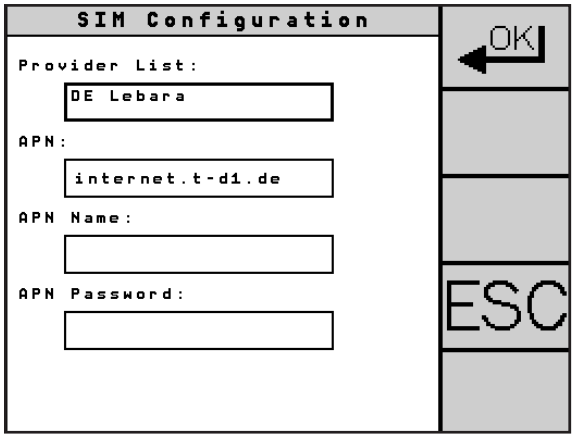


Fig. 112: SIM configuration

Saving the CLUE Modem Configuration

The changes in the CLUE modem configuration are not saved until you press the OK key (see Fig. 113).

A green flashing display indicates that the data is being saved and the connection to the modem is terminated.

Once the connection is terminated, the view automatically returns to the main menu.

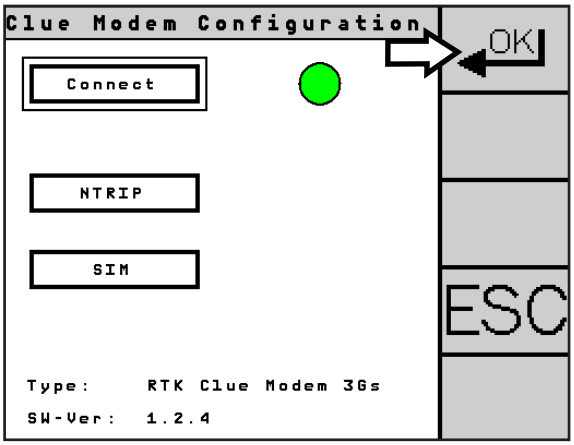


Fig. 113: Save Changes

5.9 Diagnostics

The diagnostics menu provides you with an overview of the current state of the system. Additionally, it supports you in locating malfunctions.

NOTICE In order to ensure a perfect connection of all electrical components, you must check the function of all inputs after each change of the PSR iBox to another vehicle.

Select “DIAG” (E) from the main menu (see Fig. 114), to open the diagnostics.

The diagnostics menu is divided into several pages which you can scroll through using the arrow keys:

- Inputs
- Terrain Sensor
- GPS
- CLUE Modem
- Communication
- System 1
- System 2
- Error History
- HW/SW information

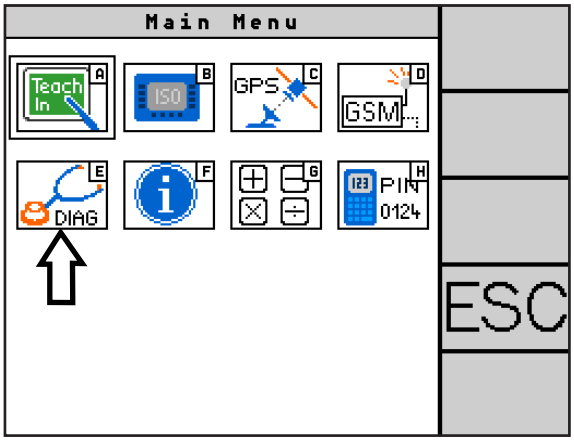


Fig. 114: Call up diagnostics menu

Inputs

Overview of the states of the signal inputs (see Fig. 115).

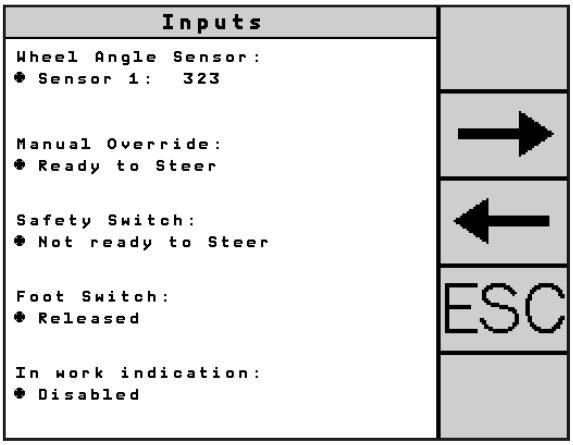


Fig. 115: Diagnostics page “Inputs”

Terrain Sensor

Displays the current position of the terrain sensor used in the system (see Fig. 116). The terrain sensor must first be enabled and calibrated in the teach menu.

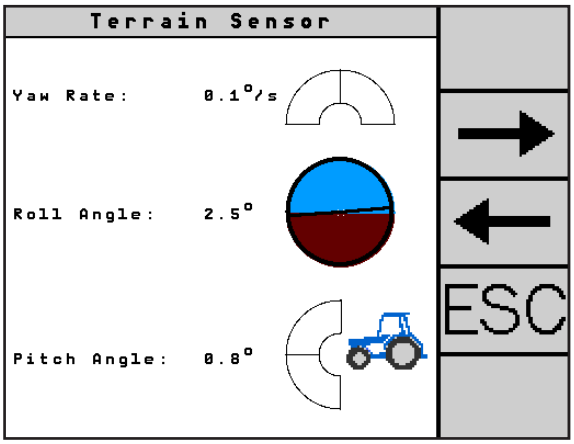


Fig. 116: Diagnostics page “Terrain Sensor”

GPS

Overview of the received and set GPS data (see Fig. 117).

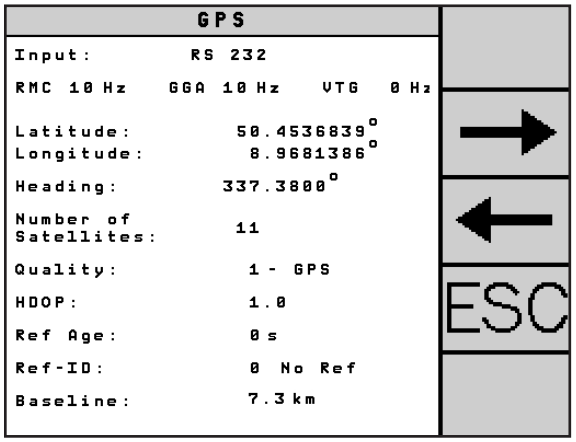


Fig. 117: Diagnostics page “GPS”

CLUE Modem

Overview of the current CLUE modem data (see Fig. 118).

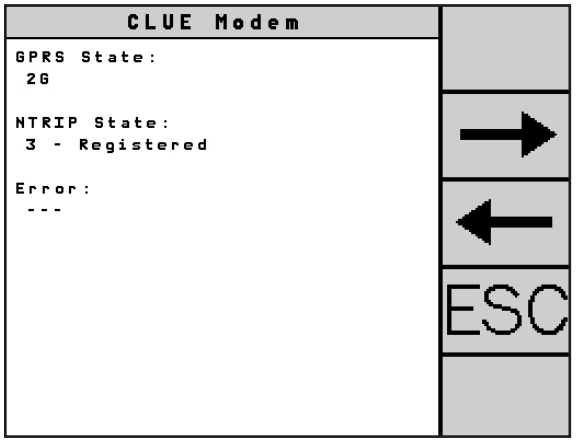


Fig. 118: Diagnostics page “CLUE Modem”

Communication

Overview of all settings for communication ports of the PSR iBox (see Fig. 119).

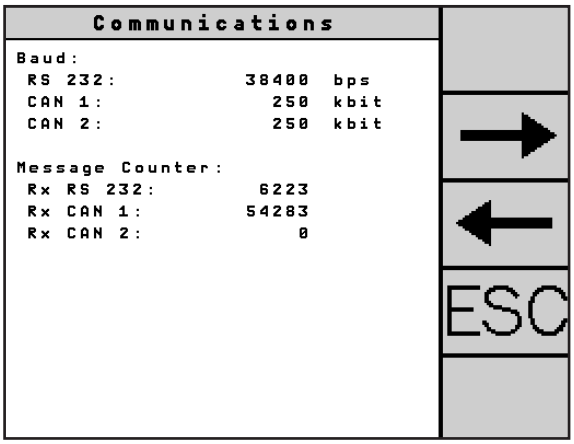


Fig. 119: Diagnostics page “Communication”

System 1

General system information (see Fig. 120).

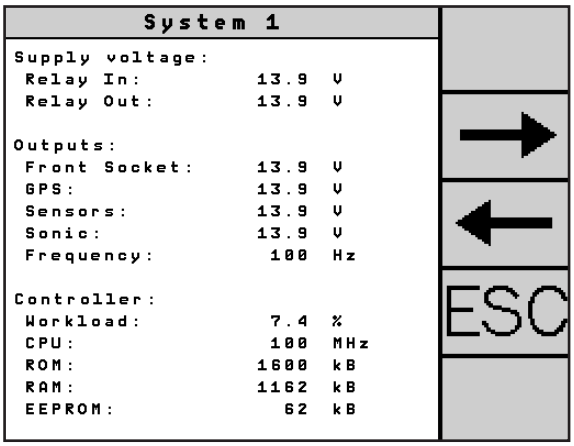


Fig. 120: Diagnostics page “System 1”

System 2

Additional system information (see Fig. 121).

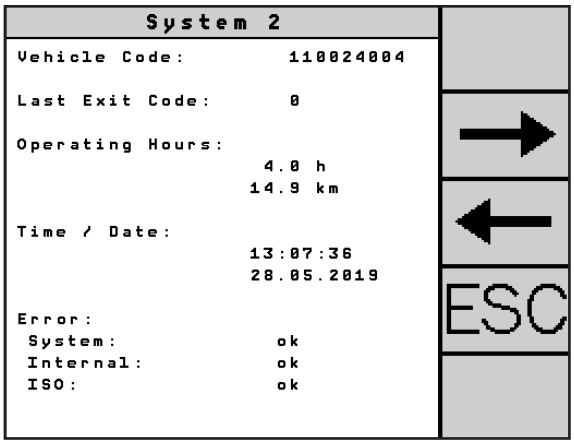


Fig. 121: Diagnostics page “System 2”

Error History

The last 20 errors that occurred in the system are recorded in the error memory. This information can be used for diagnostic purposes.

Press the arrow button below the table (see Fig. 122) to navigate through the error memory.

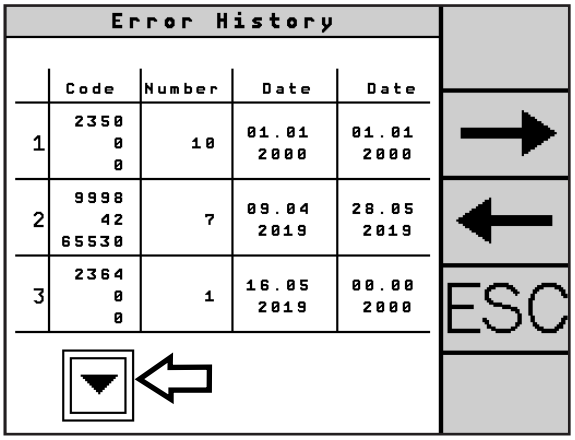


Fig. 122: Diagnostics page “Error History”

HW/SW Information

Overview of the hardware and software used (see Fig. 123).

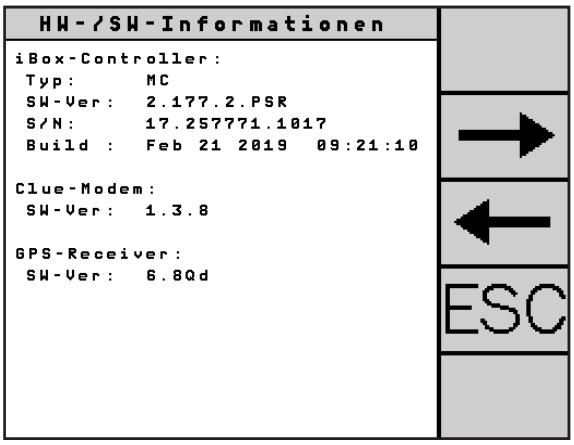


Fig. 123: Diagnostics page “HW/SW Information”

5.10 System Information

The “System information” provides information about the service partner responsible for you.

Select the “i” symbol (F) in the main menu (see Fig. 124) to access the system information and display the service partner (see Fig. 125).

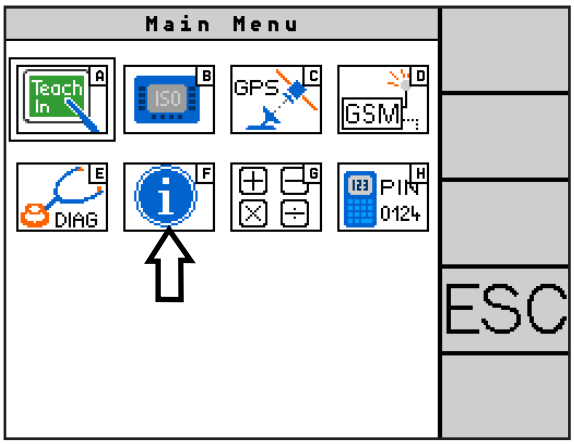


Fig. 124: Call up system information

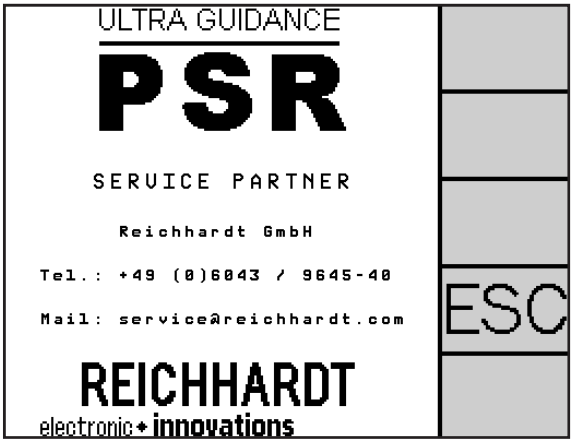


Fig. 125: Service partner

5.11 Calculator

ULTRA GUIDANCE PSR ISO has a calculator function.

Select in the main menu the calculator symbol (G) (see Fig. 126) to call up the calculator (see Fig. 127).

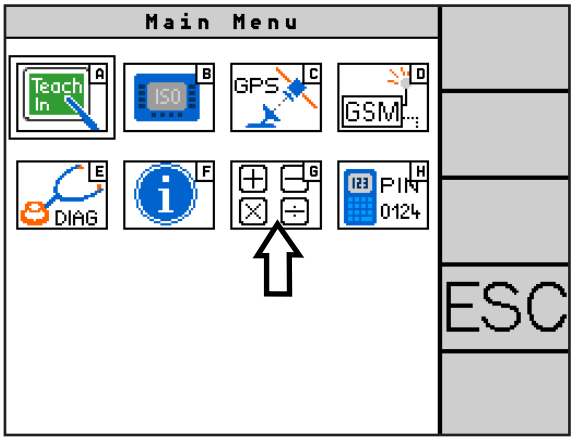


Fig. 126: Call up calculator

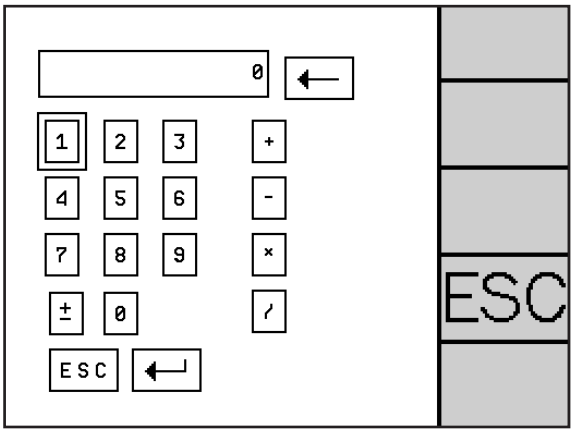


Fig. 127: Calculator

5.12 Enter Code

Via the code entry, acquired codes for different activations can be entered.

Select the PIN symbol (H) in the main menu (see Fig. 128) to call up the code input.

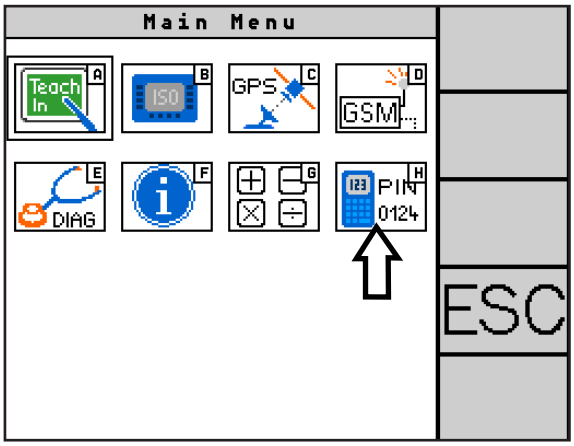


Fig. 128: Call up code entry

Select the code field (see Fig. 129) and enter the corresponding code using the keyboard that appears. Confirm the entry by pressing “OK”.

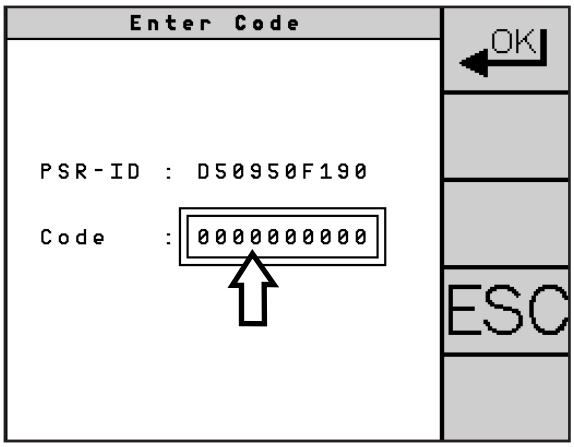


Fig. 129: Select code field

6 PSR SKY

The PSR SKY steering mode is satellite-supported steering with high precision.
PSR SKY is used wherever applications are required for which there are no scanning options or similar in the field.
Accuracy and range depend on the PSR SKY option used (WAAS/EGNOS or RTK).

During operation of ULTRA GUIDANCE PSR ISO, PSR SKY is operated from the main screen (see Chapter 6.1).
At the same time, this provides information on the steering mode.
Basic configurations and default settings are made in the GPS menu (see Chapter 6.2).
Chapter 6.3 explains the different colors of the LED on the RGS 101 and RGS 325 receivers.

6.1 Main Screen

On the main screen you get basic information about the current configuration and connection of PSR SKY and you can make settings that are required during operation. The following contents are described below (see Fig. 130):

1: Display of the distance to the guide track
2: Information field
3: Compass
4: “Reaction adjustment” soft key
5: “Nudge adjustment” soft key

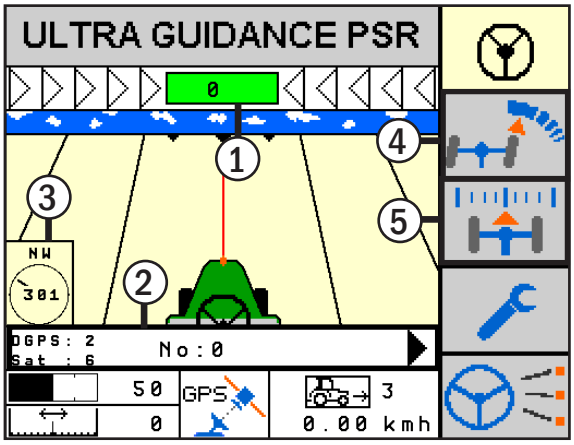


Fig. 130: Main screen

6.1.1 Distance Display with Calibration Function

Distance Display

The upper display (see Fig. 131) shows the deviation from the current guide track in centimeters/inches (depending on the selected unit). The deviation is additionally depicted by arrows. The arrow direction corresponds to the required steering correction.

Zero Calibration

When using PSR SKY, by pressing the distance display, you can calibrate the reference track and all other tracks so that the distance to the track is set to zero.

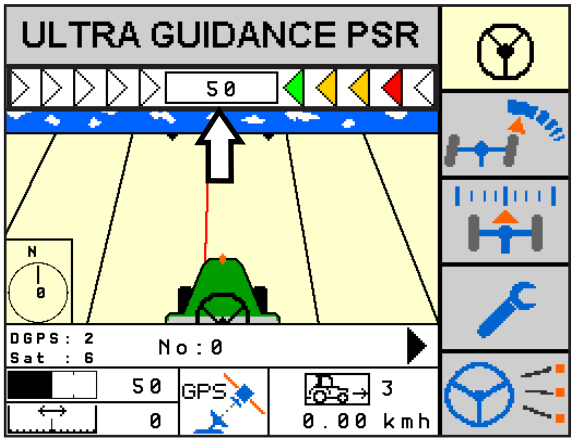


Fig. 131: Deviation from the guide track

6.1.2 Information Field

When PSR SKY steering mode is active, the information field of the main screen displays additional information on the GPS status and settings of PSR SKY (see Fig. 132).

By clicking on the arrow button on the right you can switch between different information in the information field on the left.

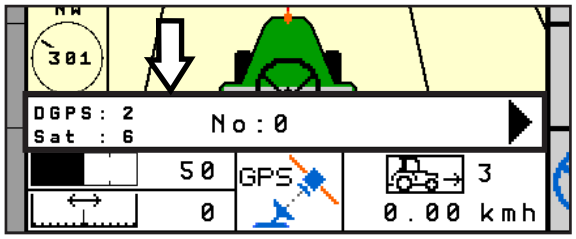


Fig. 132: Information field

6.1.2.1 GPS Status

The GPS status includes the quality of the GPS signal and the number of satellites (see Fig. 133). The GPS status is to be interpreted as follows:

INV : 0 = no signal available
GPS : 1 = GPS
DGPS : 2 = DGPS
RTK : 4 = GPS with RTK Fixed
RTKf : 5 = GPS with RTK Float

“Sat : 6” shows the number of satellites. In this example, six satellites are available.

As soon as the GPS status is not displayed in the information field, the GPS quality and the number of satellites are displayed in the lower right corner of the main display field (see Fig. 134 – 1).

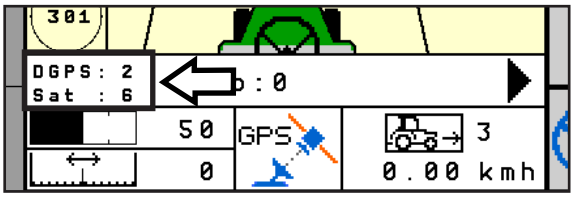


Fig. 133: GPS status

6.1.2.2 Mode

The first line shows the active mode.
The second line shows the name of the selected track (see Fig. 134 – 2).
Both can be set via the GPS menu (see Chapter 6.2).

In the “Multi line” mode, the name of the multi line created (“Field”) is also displayed in the first line.

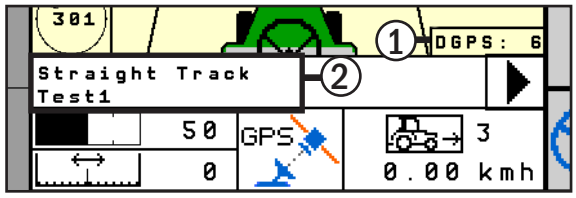


Fig. 134: Mode

6.1.2.3 Heading/Working Width

Heading: Shows the cardinal direction of the track in degrees (see Fig. 135 – 1).
No heading is displayed when the “Circle track” mode is selected.

Width: Shows the working width set in the GPS menu (see Fig. 135 – 2).

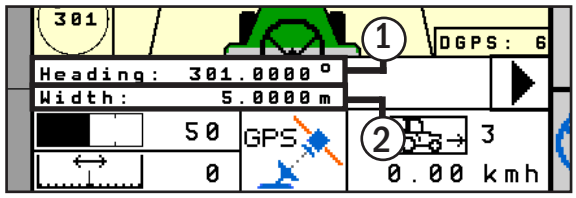


Fig. 135: Heading/working width

6.1.2.4 Signal Strength

GSM: Shows the GSM reception strength (see Fig. 136 – 1).

- 99: No reception
- 0-10: Weak reception
- 11-50: Full reception

You will only have GSM reception displayed if you have an RTK-CLUE modem installed. If you are not using an RTK receiver (e.g. WAAS/EGNOS receiver), the following will be displayed: “GSM: 99”.

Ref-ID: Indicates from which base station/satellite the correction signal is received (see Fig. 136 – 2).
If you are not using an RTK receiver (e.g. EGNOS receiver), the following will be displayed: “Ref-ID: 0”.

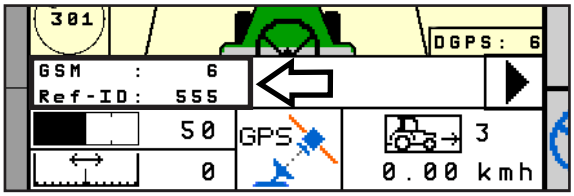


Fig. 136: Signal strength

6.1.2.5 Track Number

The track counter in the information field (see Fig. 137) shows the current track number where the vehicle is located. Track number “0” is the logged reference track.

Tracks to the right of the reference track are positive. Tracks to the left of the reference track are negative.

If the track number is not displayed in the information field, it is shown at the top of the main display field (see Fig. 138).

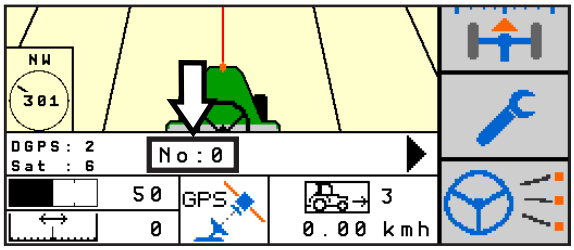


Fig. 137: Track number

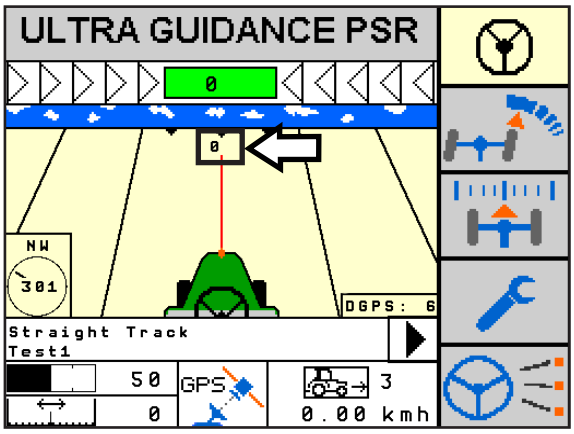


Fig. 138: Track number in main display field

6.1.3 Compass

The compass shows the cardinal direction in degrees and with abbreviations, in which the vehicle drives (see Fig. 139).

N = North
NE = Northeast
E = East
SE = Southeast
S = South
SW = Southwest
W = West
NW = Northwest

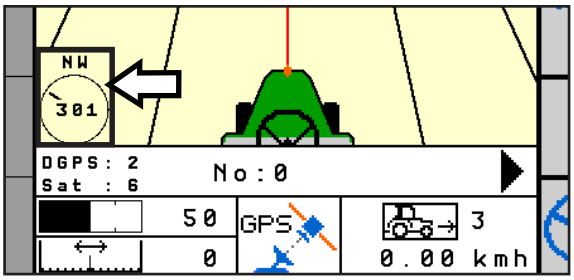


Fig. 139: Compass

6.1.4 “Reaction Adjustment” Soft Key

When using the PSR SKY steering mode, the soft key has various functions.

6.1.4.1 Adjust Reaction

By pressing and holding the “Reaction adjustment” soft key (see Fig. 140), you can set the reaction. For more information please read Chapter 4.6.

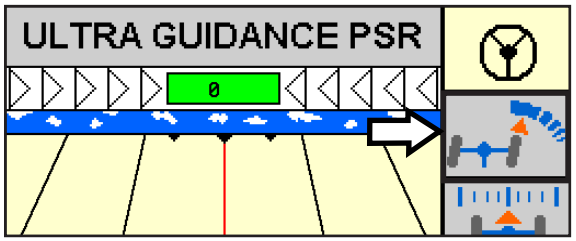


Fig. 140: “Reaction adjustment” soft key

6.1.4.2 Calling up the next Straight Track of a Multi Line

When the “Multi line” mode is active (see Chapter 6.2.4), you can also use the reaction adjustment soft key to switch to the next straight track.

Display the mode in the information field (see Fig. 141 – 1).

Briefly press the “Reaction adjustment” soft key (see Fig. 141 – 2) .

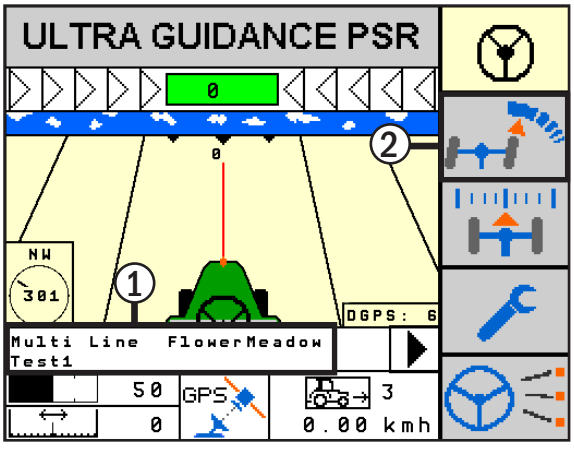


Fig. 141: Change to the next AB line

The next straight track is selected (see Fig. 142).

After reactivating the automatic steering, the new track is used.

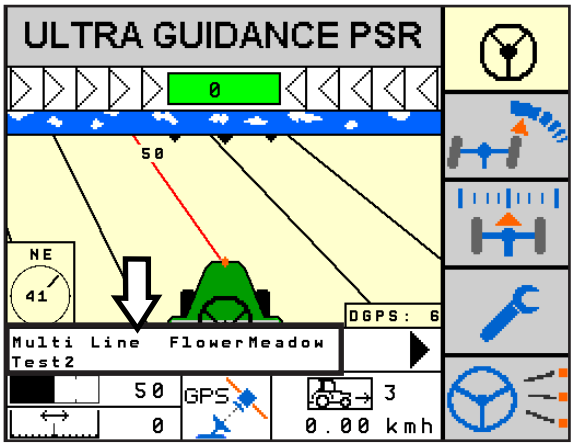


Fig. 142: Next straight track called up

6.1.5 “Nudge Adjustment” Soft Key

When using the PSR SKY steering mode, the soft key has various functions.

6.1.5.1 Adjusting Nudge

Press and hold the “Nudge adjustment” soft key (see Fig. 143) to set the distance (distance of the vehicle to the target track). For more information please read Chapter 4.7.
The distance is shifted by the nudge increment set in Chapter 6.2.5.3.

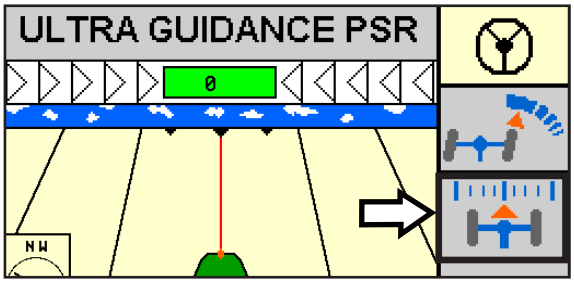


Fig. 143: “Nudge adjustment” soft key

6.1.5.2 GPS Line Recenter

After work breaks, an intermediate satellite drift can cause a shift in the reference track and thus in all other tracks. If the deviation is too large, the track must be calibrated. Therefor you can use the “Nudge adjustment” soft key.

Preferably drive on the reference track.
If this is not possible, you can also select a position where you paused work.

Briefly press the “Nudge adjustment” soft key (see Fig. 144 – 1) to call up the “GPS line recenter” menu (see Fig. 145).

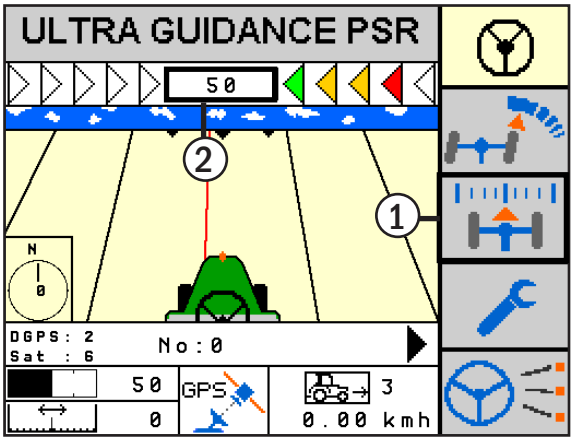


Fig. 144: Calibrate main screen with reference track

Press the button under “Zero calibration” (see Fig. 145 – 1) or “OK” (see Fig. 145 – 2), to reset the track to zero.

Press the button under “Reset zero calibration” (see Fig. 145 – 3) to undo the zero calibration.

Zero calibration can also be performed by pressing the distance display (see Fig. 144 – 2).

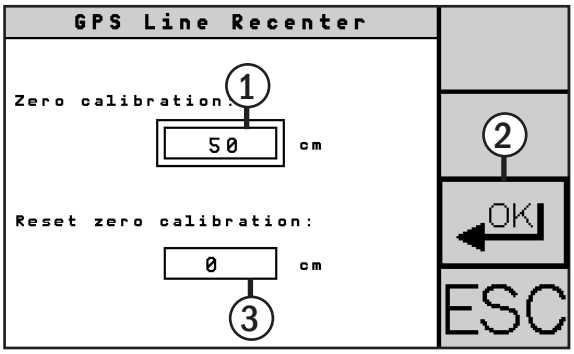


Fig. 145: GPS line recenter

6.2 GPS Menu

With “GPS” steering mode selected, briefly press the Menu soft key with the wrench (see Fig. 146) to get to the GPS menu.
The configurations for the PSR SKY steering mode are made there.

NOTICE The menu is only available when automatic steering is not active.

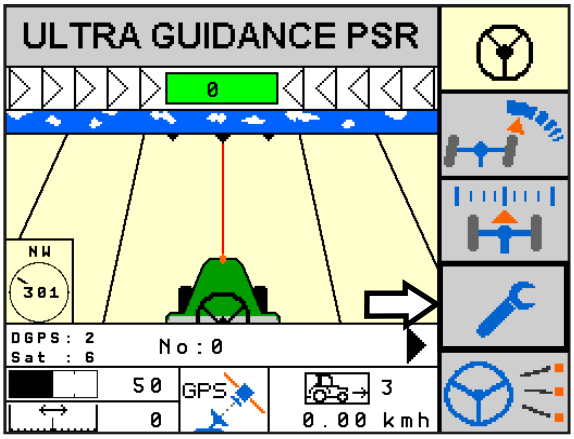


Fig. 146: Open GPS menu

The GPS menu consists of the following submenus (see Fig. 147):

- Straight track (A)
- Circle track (B)
- Multi line (C)
- GPS configuration (D)

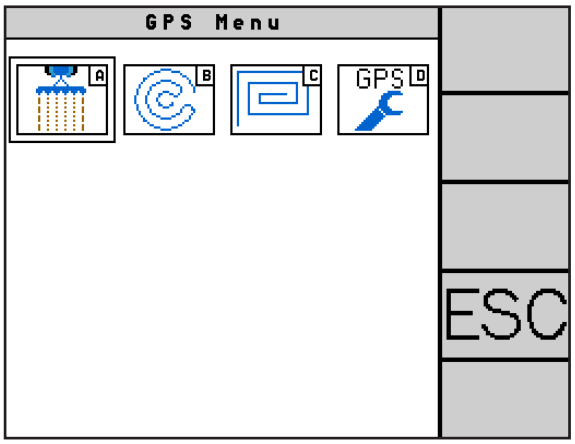


Fig. 147: GPS menu

6.2.1 Mode – Overview

"Straight Track" Mode

In the "Straight track" mode, a straight reference track is created. Based on the specified working width, ULTRA GUIDANCE PSR ISO automatically determines the parallel guide tracks.

The reference track can be created using various methods:

- You can set two points manually ("A + B") or using coordinates ("Lat/Lon") (see Fig. 148). Regardless of the actual distance driven, ULTRA GUIDANCE PSR ISO creates a straight track through the two points.
- You can also specify a point and cardinal direction ("A + heading" or "Lat/Lon + heading") and create a track from this.

NOTICE ULTRA GUIDANCE PSR ISO can store up to 200 different reference tracks (straight tracks).

The creation and configuration of straight tracks is described in Chapter 6.2.2.

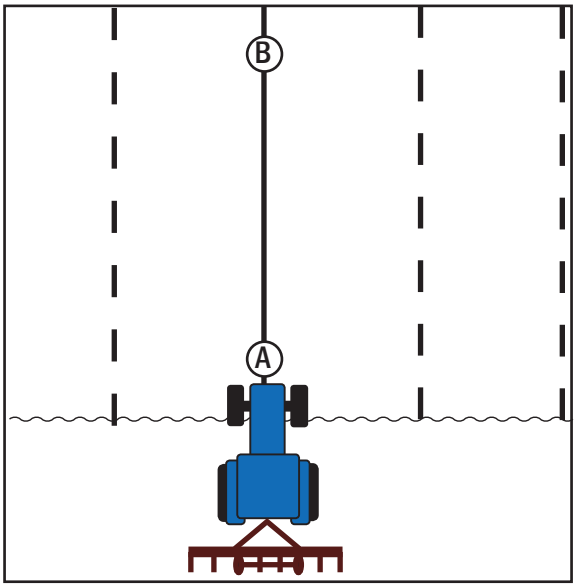


Fig. 148: "Straight track" mode

"Circle Track" Mode

In "Circle track" mode, you can set a center point manually ("Set center") or by using a coordinate ("Lat/Lon"). ULTRA GUIDANCE PSR ISO creates circle tracks (parallel guide tracks) around this center point at the distance of the working width (see Fig. 149).

Alternatively, you can also record a driven track and have the center point and the parallel guide tracks generated.

This GPS mode is suited for working fields when e.g. circle tracks for irrigations must be driven.

The creation and configuration of circle tracks is described in Chapter 6.2.3.

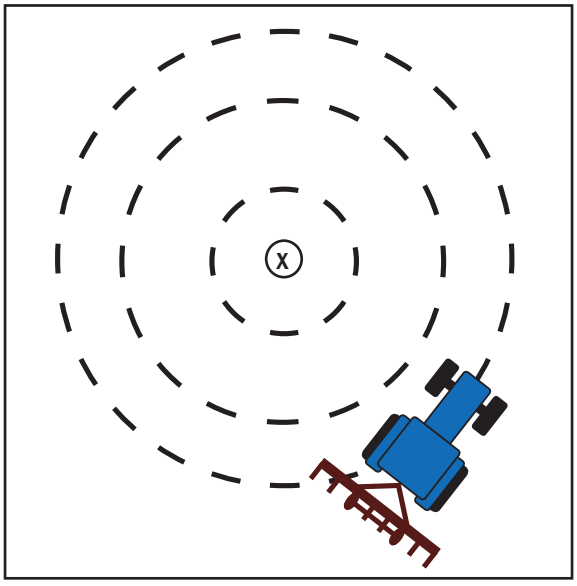


Fig. 149: "Circle track" mode

“Multi Line” Mode

The GPS mode “Multi line” links up to eight straight tracks and is suitable for working a field according to the scheme below (e.g. sowing grain) (see Fig. 185).

NOTICE

ULTRA GUIDANCE PSR ISO can store up to 50 multi lines (fields) from up to 200 different straight tracks.

The creation and configuration of multi lines is described in Chapter 6.2.4

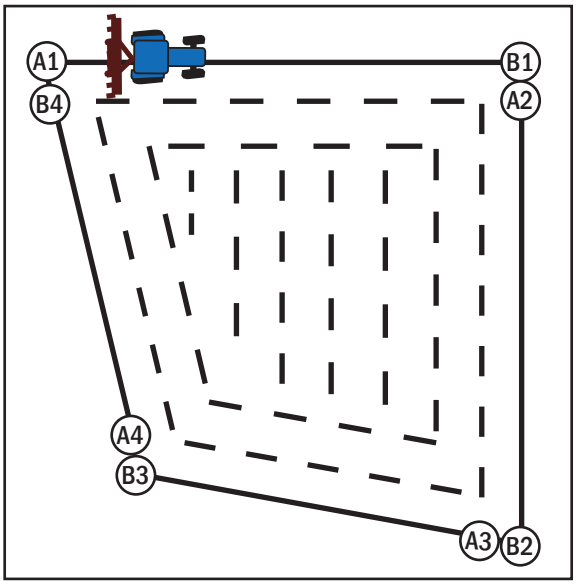


Fig. 185: “Multi line” mode

6.2.2 “Straight Track” Mode

In the GPS menu, select “Straight track” (A) (see Fig. 150) to create straight tracks.

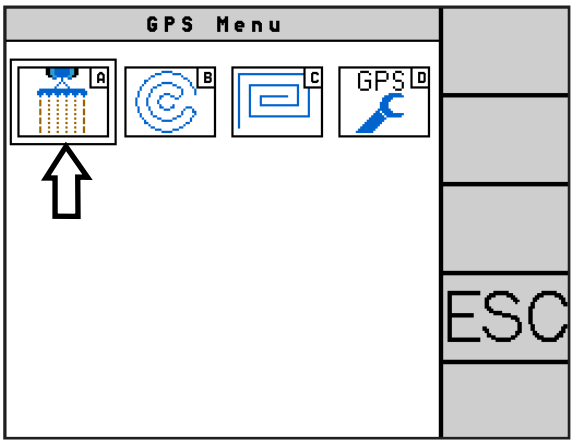


Fig. 150: Select “Straight track” mode

The page for creating straight tracks is opened (see Fig. 151).

① Line: Allows you to select a straight track from existing tracks.

② New: Allows you to create a new straight track.

③ Link: The symbol shows that this straight track is included in a multi line.

NOTICE When deleting a straight track, a message appears indicating that multi lines that use this straight track will also be deleted.

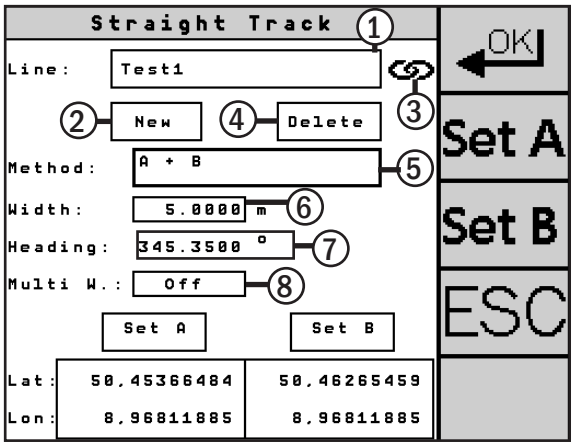


Fig. 151: "Straight track" settings

④ Delete: The selected straight track is deleted.

⑤ Method: Specifies how the straight track is to be created. You have the following options:

- A + B (see Chapter 6.2.2.1)
- A + heading (see Chapter 6.2.2.2)
- Lat/Lon (see Chapter 6.2.2.3)
- Lat/Lon + heading (see Chapter 6.2.2.4)

⑥ Width: Desired working width. (Applies to all existing tracks.)

NOTICE The working width can only be set if "Multi W." (multi width) is switched off.

NOTICE If necessary, schedule an overlap to avoid working gaps. This overlap depends on the quality of the GPS signal. It varies between ±2cm (±0.8"; RTK signal) and ±30cm (11.8"; DGPS). The ideal overlap width shall be determined on site by conducting own trials.

Overlapping can be achieved by reducing the track spacing, i.e. the working width.

Calibrate the track after changing the working width (see Chapter 6.1.5.2).

⑦ Heading: Cardinal direction in degrees.

⑧ Multi W:. Multi width (see Chapter 6.2.2.5).

6.2.2.1 Method “A + B” (define Point A and B)

With the method “A + B” a straight track is created by two points set while driving. The parallel tracks are created based on the specified working width.

Select the “A + B” method (see Fig. 152 – 1).

Move to the starting point of the straight track.
Set point A with the “Set A” button (see Fig. 152 – 2).
Drive at least 20m (66 ft) to a second point and set point B with the button “Set B” (see Fig. 152 – 3).

You can also use the soft keys on the right of the toolbar (see Fig. 152 – 4).

The heading is automatically determined in degrees after pressing “Set B”.

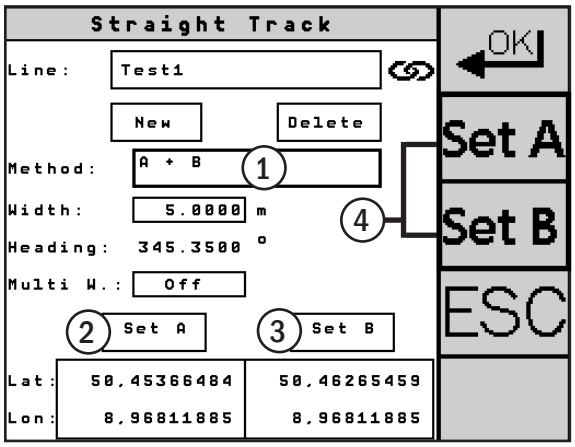


Fig. 152: Defining points A and B

NOTICE

The track runs beyond points A and B in both directions. Therefore, you do not have to set the points exactly at the field boundaries, however this achieves a higher accuracy.

6.2.2.2 Method “A + Heading” (set Point A and define Cardinal Direction)

With the method “A + heading”, a track is determined by setting an approached point and specifying a heading. Parallel tracks are created at the working width spacing.

Select the “A + heading” method (see Fig. 153 – 1).

Drive the vehicle in the desired heading.
Press the “Set A” button (see Fig. 153 – 3) or the soft key on the right of the toolbar (see Fig. 153 – 4), to set point A.
If moving, the heading is automatically determined in degrees (see Fig. 153 – 2). Alternatively, you can enter the heading manually.

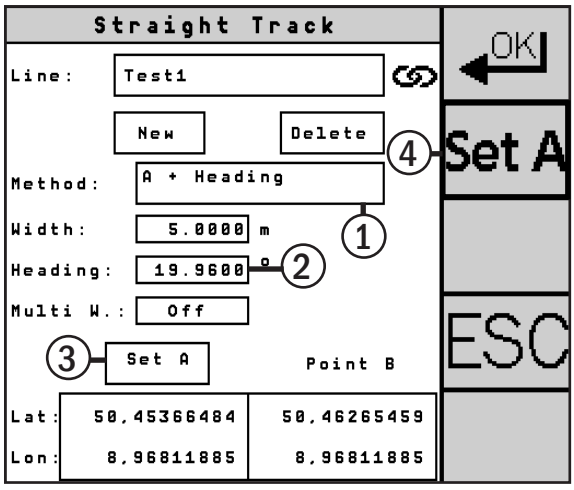


Fig. 153: Defining point A and specifying the cardinal direction

6.2.2.3 “Lat/Lon” Method (specify Point A and B as Coordinates)

With the “Lat/Lon” method, two points are set on the basis of latitude and longitude. A generated straight line running through these points serves as a reference track. The specified working width is used to create the parallel tracks.

Select the “Lat/Lon” method (see Fig. 154 – 1).

Then enter the desired coordinates in the “Lat”/“Lon” fields of points A and B (see Fig. 154 – 2 and 3).

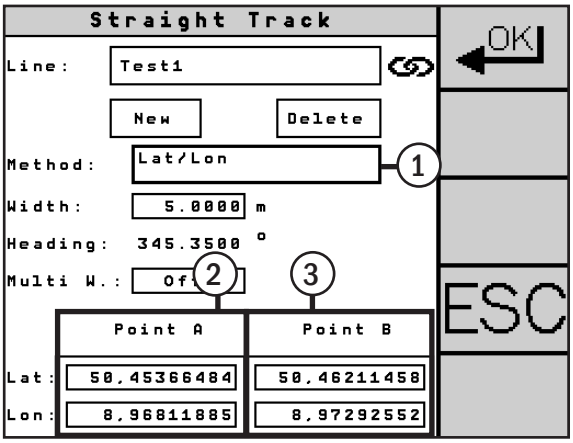


Fig. 154: Indicating points A and B as coordinates

6.2.2.4 “Lat/Lon + Heading” Method (specify Point A as Coordinate with Cardinal Direction)

With the “Lat/Lon + heading” method, a track is determined by specifying a coordinate and a heading. The parallel tracks are determined via the working width.

Select the “Lat/Lon + heading” method (see Fig. 155 – 1).

Using the fields “Lat”/“Lon” of the point A enter the latitude and longitude (see Fig. 155 – 2).

Drive in the desired heading. The heading is determined automatically in degrees.
You can also enter the heading manually (when the vehicle is stationary) (see Fig. 155 – 3).

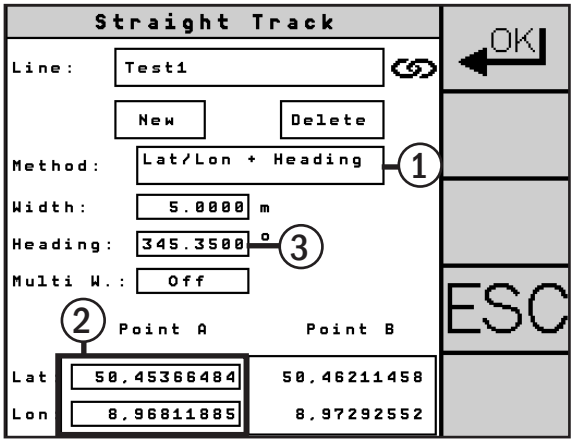


Fig. 155: Indicating point A as coordinate with cardinal direction

6.2.2.5 Multi Width

The “Multi width” setting is suitable for fields with tracks of different widths, such as tram paths and seed rows. Example:

- 3 tracks for onions with a working width of 9m
- 2 tram paths for irrigation with a working width of 4m

On the “Straight track” page, select the field next to “Multi W.” (see Fig. 156).

This opens the page for activating and configuring multi width (see Fig. 157):

1: Enable Multi Width

Switch function on or off.

2: Type of AB Line “0”

- Type of line: Specifies the type (seed row or tram path) with which the multi width should start.

  Use “Seed row” if you want to start with a seed row.

  Use “Tram path” if you want to use the track as a tramline.

- Line no.: Specifies with which number the selected seed row/tram path will begin with.

3: Seed Rows

- Width: Working width of the seed row
- Number of rows: Number of rows between the tram paths

4: Tram Paths

- Width: Working width of the tram path
- Number of rows: Number of rows between the seed rows

Confirm your entry with “OK”.

The coordinates/heading of the current straight track are used for the multi width.

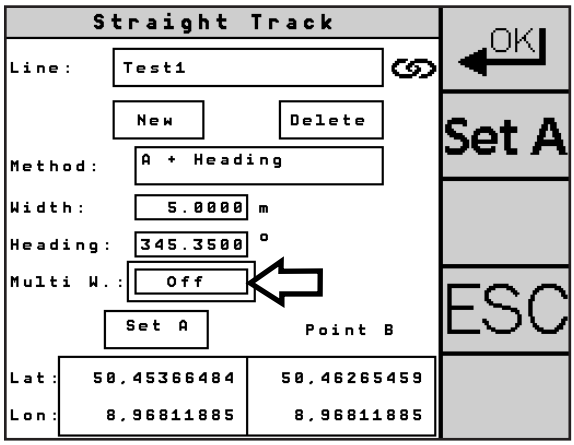


Fig. 156: Open multi width

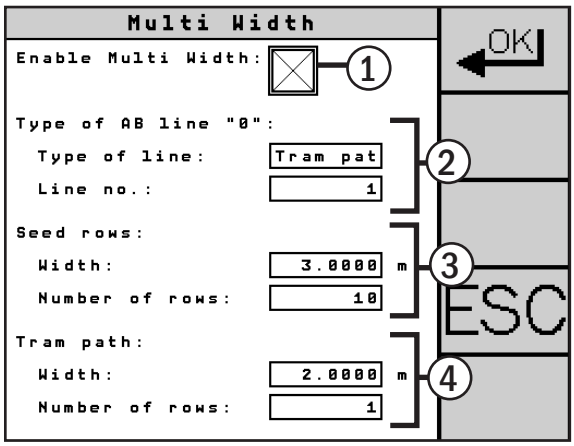


Fig. 157: Settings for multi width

Example 1 for Multi Width

You have two seed rows (B1-B2) with a working width of 3m and four tram paths (P1-P4) with a working width of 6m. And you want to start at track P2 (see Fig. 158).
Make the following settings (see Fig. 159):

Enable multi width: On

Type of AB line “0”:

- Type of line: Tram path
- Line no.: 2

Seed rows:

- Width: 3.0000m
- Number of rows: 2

Tram paths:

- Width: 6.0000m
- Number of rows: 4

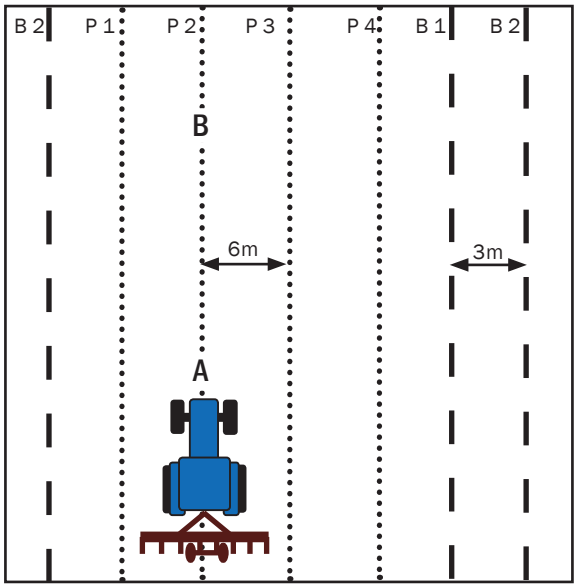


Fig. 158: Example 1 Multi width

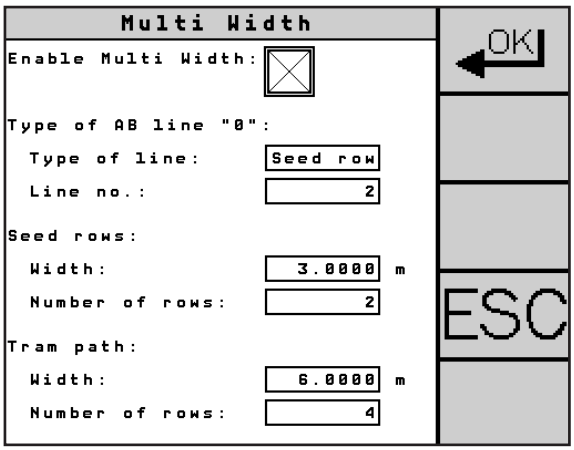


Fig. 159: Settings for example 1

Example 2 for Multi Width

You have five seed rows (B1-B5) with a working width of 2m and two tram paths (P1-P2) with a working width of 0.5m. And you want to start at track B2 (see Fig. 160).
Make the following settings (see Fig. 161):

Enable multi width: On

Type of AB line “0”:

- Type of line: Seed row
- Line no.: 2

Seed rows:

- Width: 2.0000m
- Number of rows: 5

Tram paths:

- Width: 0.5000m
- Number of rows: 2

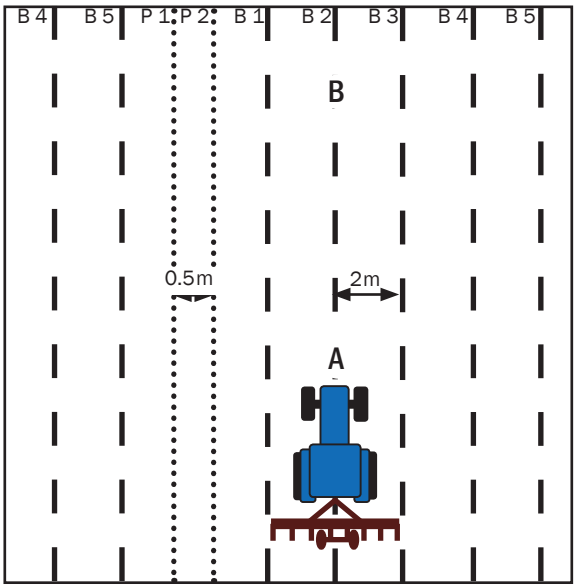


Fig. 160: Example 2 Multi width

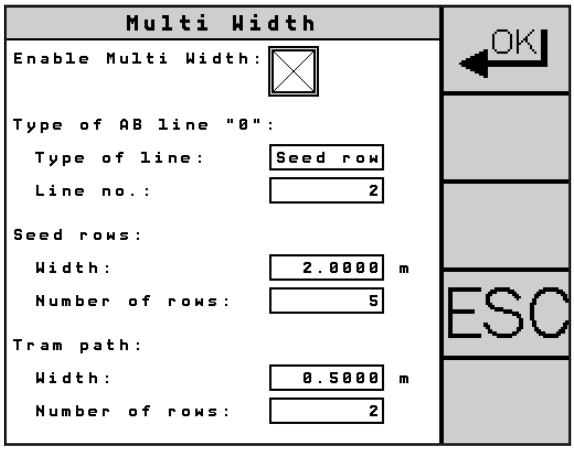


Fig. 161: Settings for example 2

6.2.3 "Circle Track" Mode

In the GPS menu, select "Circle track" (B) (see Fig. 162) to create circle tracks.

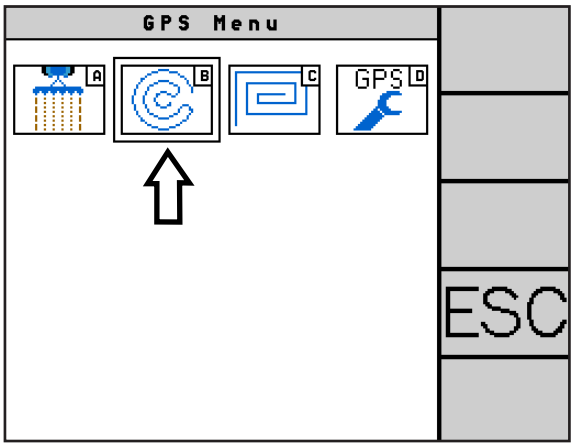


Fig. 162: Select "Circle track" mode

The page for the "Circle track" mode is opened (see Fig. 163).

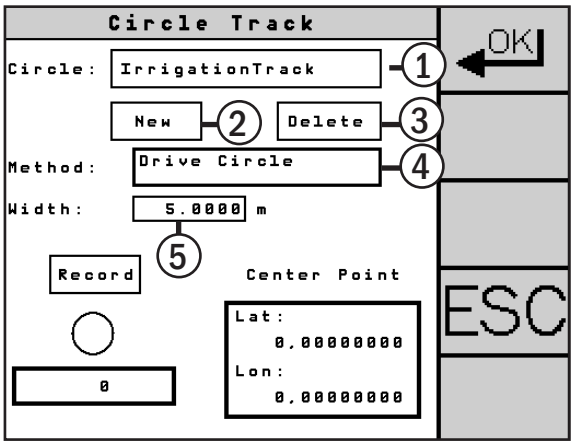


Fig. 163: "Circle track" settings

① Circle: Enables the selection of a circle track from already created circle tracks.

② New: Enables the creation of a new circle track.

③ Delete: The selected circle is deleted.

④ Method: Specifies how the circle is to be created. You have the following options:

- Drive circle (see Chapter 6.2.3.1)
- Lat/Lon (see Chapter 6.2.3.2)
- Set center (see Chapter 6.2.3.3)

⑤ Width: Desired working width. (Applies to all existing tracks.)

NOTICE

If necessary, schedule an overlap to avoid working gaps. This overlap depends on the quality of the GPS signal. It varies between ±2cm (±0.8"; RTK signal) and ±30cm (11.8"; DGPS). The ideal overlap width shall be determined on site by conducting own trials.

Overlapping can be achieved by reducing the track spacing, i.e. the working width.

Calibrate the track after changing the working width (see Chapter 6.1.5.2).

6.2.3.1 “Drive Circle” Method

Driving a circle track determines the center point for all subsequent tracks that are generated at the working width distance from the center point.

Select the “Drive circle” method (see Fig. 164 – 1).

Press “Record” to start or stop the recording (see Fig. 164 – 2). Now drive at least a three-quarter circle. The status bar indicates the progress (see Fig. 164 – 3).

Confirm your entry with “OK”.

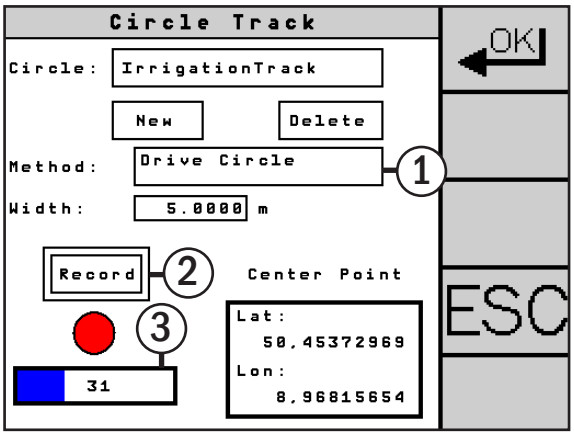


Fig. 164: Define center point by driving a circle

6.2.3.2 “Lat/Lon” Method

With the “Lat/Lon” method, the center of the circle is defined by latitude and longitude. From there, tracks are generated at a distance of the working width.

Select the “Lat/Lon” method (see Fig. 165 – 1).

Enter in the fields “Lat” and “Lon” the exact coordinate of the center of the circle (see Fig. 165 – 2).

Confirm your entry with “OK”.

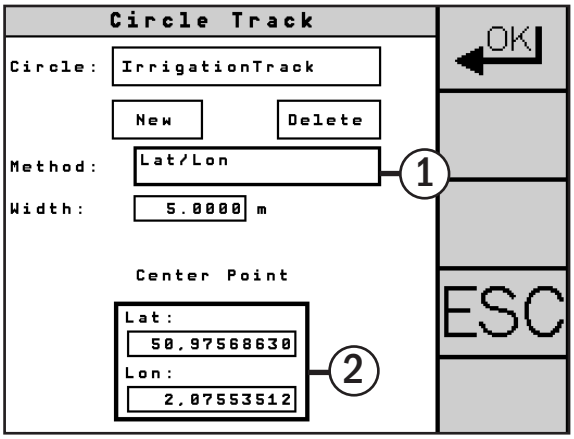


Fig. 165: Enter coordinate of the center point

6.2.3.3 “Set Center” Method

The “Set center” method is used to set an approached circle center point. From there, tracks are generated at a distance of the working width.

Select the “Set center” method (see Fig. 166 – 1).

Move to the point you want to define as the center of the circle. The current coordinate is displayed in the bottom field with “Lat” and “Lon”.

Press “Set center” (see Fig. 166 – 2) or the soft key on the right (see Fig. 166 – 3) to save the current coordinate as the center of the circle.

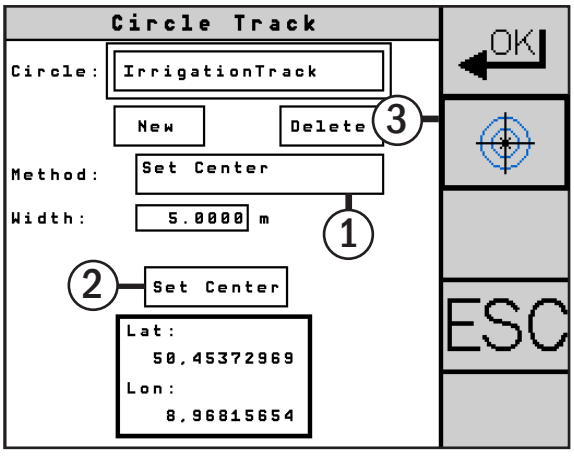


Fig. 166: Apply location as center of circle

6.2.4 “Multi Line” Mode

The “Multi line” mode links several AB lines to form a field.

In the GPS menu, select “Multi line” (C) (see Fig. 167).

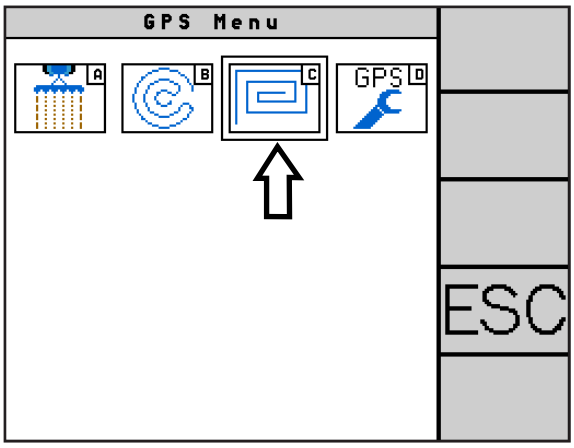


Fig. 167: Select “Multi line” mode

Multi Line Menu Overview

The “Multi line” mode menu is structured as follows (see Fig. 168).

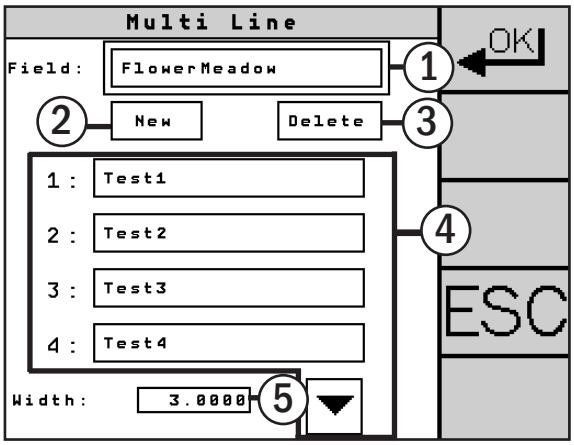


Fig. 168: “Multi line” settings

① Field: Enables the selection of a multi line from already created multi lines.

② New: Enables the creation of a new multi line.

③ Delete: The selected multi line is deleted.

④ AB lines: Displays all AB lines assigned to the multi line. Tracks can also be assigned and deleted.

⑤ Width: Desired working width. (Applies to all existing tracks.)

NOTICE

If necessary, schedule an overlap to avoid working gaps. This overlap depends on the quality of the GPS signal. It varies between ±2cm (RTK signal) and ±30cm (DGPS). The ideal overlap width shall be determined on site by conducting own trials.

Overlapping can be achieved by reducing the track spacing, i.e. the working width.

Calibrate the track after changing the working width (see Chapter 6.1.5.2).

Create new Multi Line (“Field”)

Select “New” (see Fig. 169).

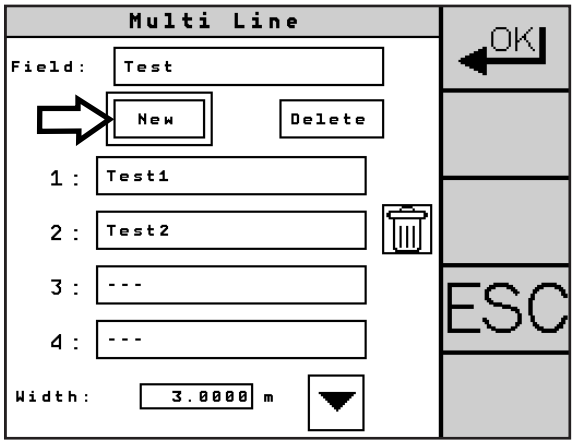


Fig. 169: Create new multi line (field)

Enter a name for the multi line (the field) using the text input that appears (see Fig. 170).
Use unique designations to avoid confusion.

Confirm the entry by pressing “OK”.

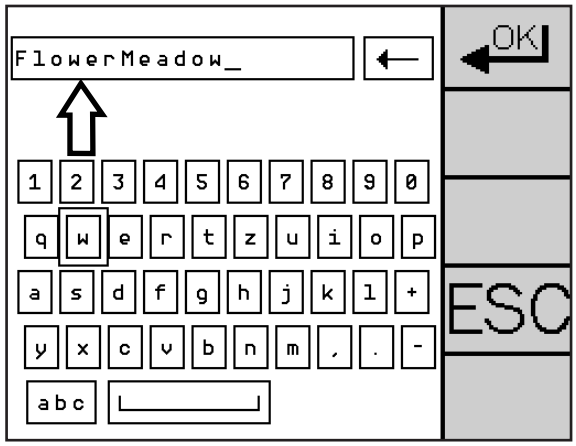


Fig. 170: Name of the multi line

Assigning Straight Tracks to a Multi Line

You can assign up to eight straight tracks to a multi line. The assignment can be made when creating a multi line, or later.

In the multi line menu or in the menu that appears when creating a new multi line, press the fields below the field name in order (see Fig. 171 – 1).

The track fields 5-8 can be displayed using the arrow key below the fourth field (see Fig. 171 – 2).

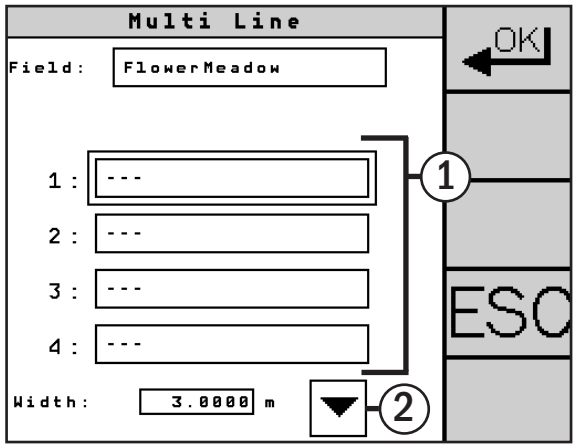


Fig. 171: Assigning straight tracks to the multi line

When you press one of the fields, a view appears with all the straight tracks created so far (see Fig. 172). Select one to add it to the multi line.

Use the arrow keys to navigate to other straight tracks.

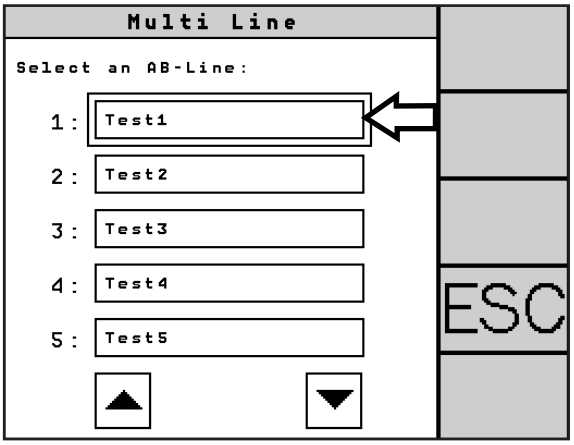


Fig. 172: Selection of an AB line (straight track)

The selected straight track is then displayed below the name of the multi line (see Fig. 173).

Assign additional straight tracks in the desired order.

Confirm the assignment by pressing “OK”.

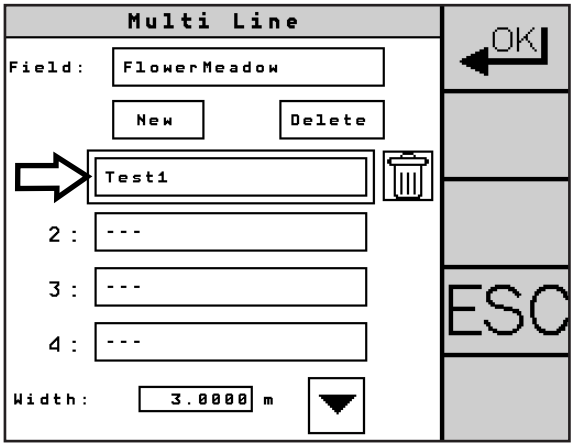


Fig. 173: Straight track assigned to the multi line

Deleting Straight Tracks from the Multi Line

Only the last straight track can be deleted from a multi line. You can then delete the next track.

Click on the trash can icon behind the track to remove it (see Fig. 174).

The tracks 5-8 can be displayed using the arrow key below the fourth field.

Confirm the changes by pressing “OK”.

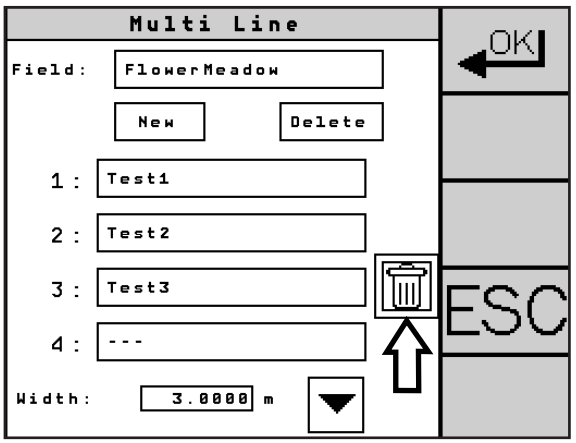


Fig. 174: Delete straight track

6.2.5 GPS Configuration

In the “GPS configuration” menu you can make advanced settings for using PSR SKY.

The menu is divided into two pages.
On the first page you find settings for entering the track.
On the second page you make settings for the implement offset, the nudge increment (nudging) and the axis correction.

Select the “GPS configuration” menu point in the GPS menu (see Fig. 175).

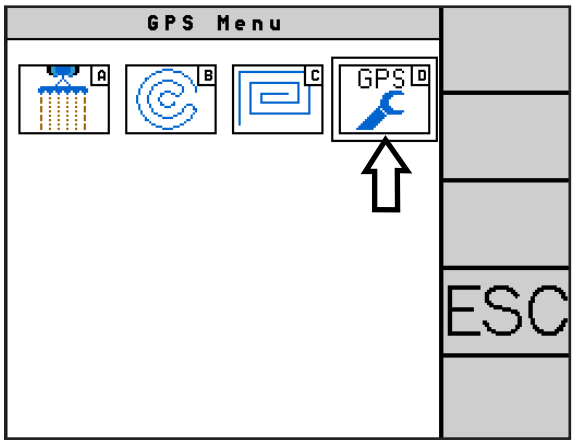


Fig. 175: Call up GPS configuration

6.2.5.1 Pull-in Behavior (Line Acquire Angle and Undershoot/Overshoot)

Use the arrow keys in the toolbar on the right to call up the page of the menu shown in Fig. 176.

Set the driving direction (forward/backward) of the vehicle by pressing the tractor symbol (see Fig. 176 – 1).

Set the line acquire angle and the pull-in behavior (undershoot/overshoot) using the plus and minus buttons (see Fig. 176 – 2 and 3).
Explanations of the settings can be found on the next page of this manual.

Then make the settings for the other direction of travel (see Fig. 177).

Confirm the changes by pressing “OK”.

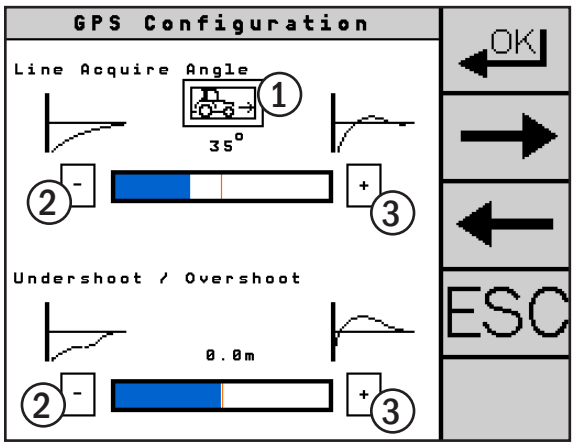


Fig. 176: Forward pull-in behavior

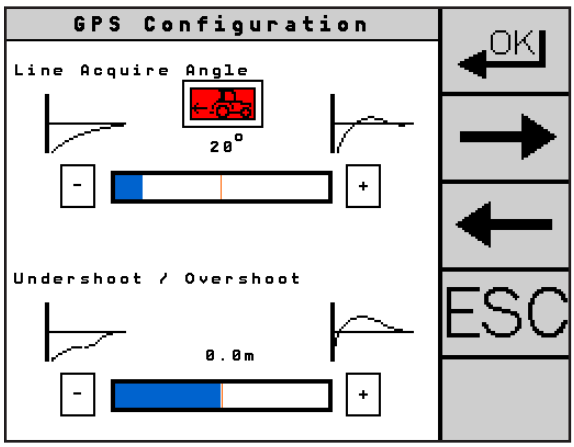


Fig. 177: Backward pull-in behavior

Select a flat line acquire angle for a flat and prolonged entering into the track (see Fig. 178 – 1).

Select a steep line acquire angle for a steep and shortened entering into the track (see Fig. 178 – 2).

The angles range from 10° to 80°.

NOTICE

If the vehicle moves too strongly when entering the track, the line acquire angle is too large.

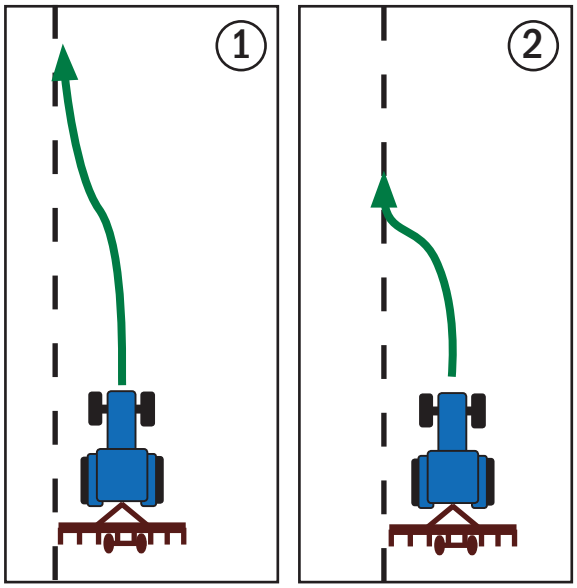


Fig. 178: Examples for flat/steep line acquire angles

Select “Undershoot” (value range from -3m to 0m / -9.8ft to 0ft) for implements with large booms (e.g. spraying device) (see Fig. 179 – 1).

Select “Overshoot” (value range from 0m to 3 m / 0ft to 9.8ft) for long, trailed implements (see Fig. 179 – 2).

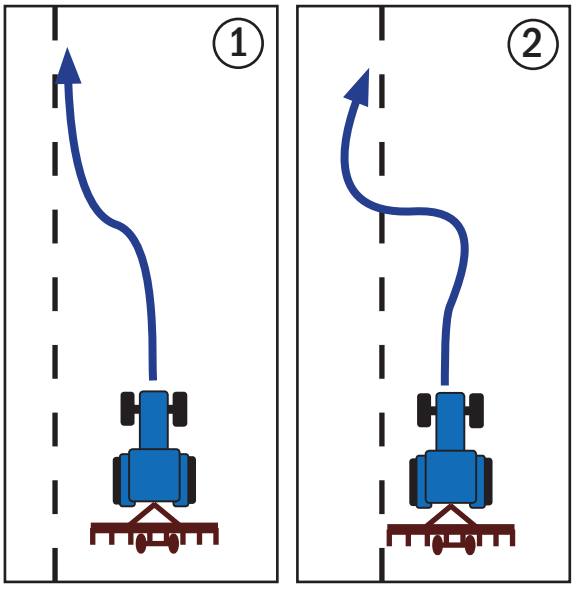


Fig. 179: Example undershoot/overshoot

6.2.5.2 Setting the Implement Offset

If you are using an implement that does not exactly follow the track of the towing vehicle and drifts to one side, after driving in three tracks you will notice that one part of the surface has been worked twice (see Fig. 180 – 1) and another part remains unworked (see Fig. 180 – 2).

This lateral displacement must be corrected via the implement offset.

NOTICE

Only change the implement offset if the offset occurs despite correctly set vehicle geometry/ offset data.
The vehicle geometry/offset data is set by Customer Service.

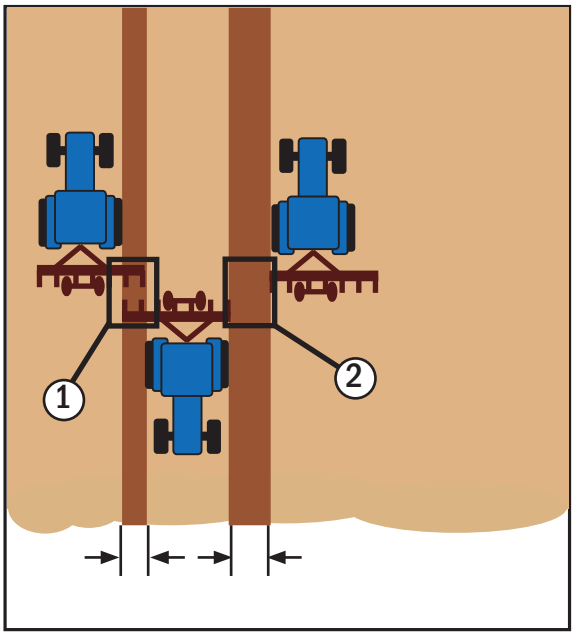


Fig. 180: Implement offset

Please proceed as described below:

You need to measure the distance of the unworked surface after the third track using a tape measure.

Use the arrow keys in the toolbar on the right to call up the page of the menu shown in Fig. 181.

Enter the offset of the implement via the field under “Implement offset” (see Fig. 181).

- If the implement has an offset to the right, i.e. the unworked surface is on the left (in driving direction), the measured distance must be entered as negative value.
- If the implement has an offset to the left, i.e. the unworked surface is on the right (in driving direction), the measured distance must be entered as positive value.

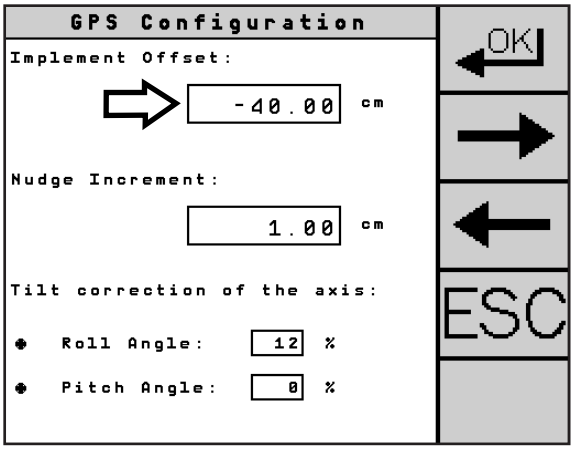


Fig. 181: Setting the implement offset

Confirm the changes by pressing “OK”.

Check the settings by driving three tracks again.

6.2.5.3 Setting the Nudge Increment

In the "Nudge increment" menu item, you determine the amount of centimeters/inches the distance is shifted by in the PSR SKY steering mode per keystroke on the "Nudge adjustment" soft key in the PSR main screen. The nudge adjustment is described in Chapter 4.7.

Use the arrow keys in the toolbar on the right to call up the page of the menu shown in Fig. 182.

Enter the nudge increment using the field under "Nudge increment" (see Fig. 182).

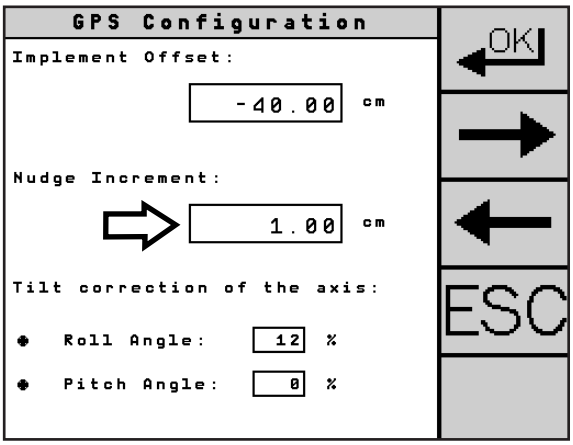


Fig. 182: Setting the nudge increment

6.2.5.4 Tilt Correction of the Axis

In the PSR SKY steering mode, the tilt correction can be used to adjust the increase in axis control in hilly terrain as a function of the roll angle.

Roll Angle

Via the "Roll angle" setting, you can set the percentage proportion of the tilt sensor values being offset against the axis control.

Select "Roll angle" (see Fig. 183 – 1) and enter the desired value.

Pitch Angle

For use in inclines, the roll angle value can be offset.

- Uphill = tilt sensor value is increased as a percentage
- Downhill = tilt sensor value is reduced as a percentage

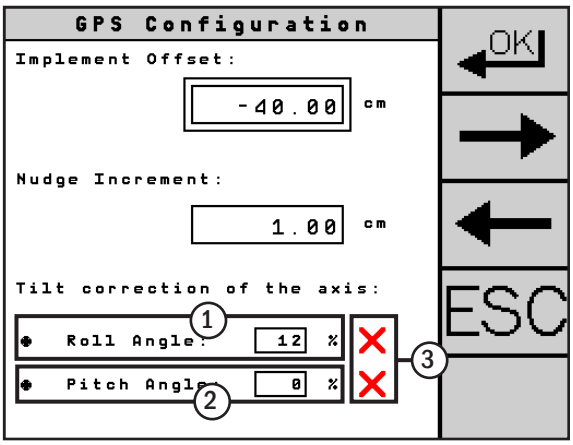


Fig. 183: Tilt correction of the axis

Select "Pitch angle" (see Fig. 183 – 2) and enter the desired percentage correction value. We recommend a value between 0 and 20%.

The pitch angle is only displayed if the roll angle has a value other than "0%".

Roll Angle and Pitch Angle deactivated

Red X symbols behind "Roll angle" and "Pitch angle" (see Fig. 183 – 3) indicate that the tilt correction is deactivated. The values for roll angle and pitch angle are not used.

The activation of the tilt correction is described in Chapter 5.7.7.

6.3 Receiver LED (RGS 101/325)

The RGS 101 and RGS 325 GPS receivers also have an LED that indicates the current status of the receiver and data reception (see Fig. 184).

red = receiver is switched on
orange = receiver gets GPS data
green = receiver gets correction data (EGNOS/ WAAS or RTK)

Fig. 184: LED on the GPS receiver

6.4 Super Low Speed Function

Super Low Speed enables automatic steering from 30m/h (98.5ft/h).

NOTICE Super Low Speed is an additional function subject to a charge, the activation for which must be purchased separately. If required, please contact your responsible contact person.

The Super Low Speed function is especially suited for the use in special crops where slow operation is required for lossless working.

NOTICE Prerequisites for Super Low Speed are an RTK receiver, a GSM modem, a GSM antenna and an RTK activation.

7 PSR SONIC

PSR SONIC is steering with ultrasound by scanning of existing crop or crop edges.

7.1 Mount and Set SONIC Sensors

It may become necessary to dismount the components of PSR SONIC and remount them on e.g. another vehicle or to make application-specific changes to the sensor settings. This will also require recalibration of the sensors.

7.1.1 Single Sensors

Single sensors are sensor housings with one sensor. They are mainly suitable for scanning existing edges on the ground.

7.1.1.1 Mounting

The sensors are mounted ready for operation upon commissioning (see Fig. 186).

If you want to mount the sensors on another vehicle, proceed in the same way as for the initial mounting. This is described in the vehicle-specific installation manual. Dismounting of the components shall be carried out in reverse order.

Mount the sensor mounting assembly on the vehicle using the bracket.

NOTICE

The design of the sensor mounting assembly and its fixture is individual for each vehicle. If you have any questions concerning the mounting of the mounting assembly, please refer to your retailer.

Fig. 186: SONIC sensors ready for operation

Connect the sensors to the front socket of the vehicle using the corresponding connection cable.

NOTICE

During the installation of the sensor, please note that sensor no. 1 (S1) is always positioned on the left side with respect to driving direction.

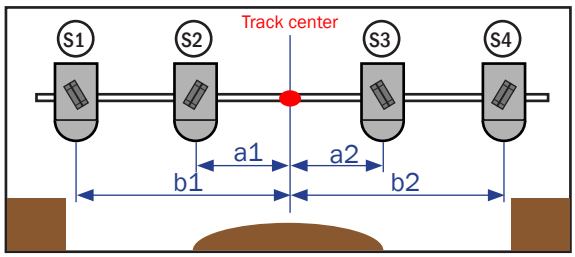


Fig. 187: Example for setting of the sensors (in driving direction)

During mounting to another vehicle, please consider that the symmetry of the sensors must be accurate. Define a center point and check that the distances a1 and a2 as well as b1 and b2 are each identical (see Fig. 187). Please also check the setting of the height.

7.1.1.2 General Settings

Each ultrasound sensor is mounted on a sensor plate, swiveling and latching. It is manually adjustable by ± 90° from the vertical (see Fig. 188).

To adjust, loosen the cross head nut on the back of the sensor plate (see Fig. 189). Grasp under the housing cover (not shown here) and move the sensor into the desired position (also see Fig. 188).

NOTICE

Please observe that the sensor locks into place in one of the specified positions. Otherwise, the sensor can be unintentionally adjusted during operation.

NOTICE

It is recommended to adjust the sensors to an angle of 45° and induce necessary setting changes by e.g. changing the height.

The sensor plates are enclosed by a housing and mounted on the sensor carrier. This way, they can be adjusted to the track width of the respective vehicle.

Adjust the sensors in such a way that the distance to the measuring object (edge, track) is between 40 and 80cm (15.75” and 31.5”) (see Fig. 190). In order to obtain this measure, you must either adjust the height of the sensor carrier or slide the sensors laterally.

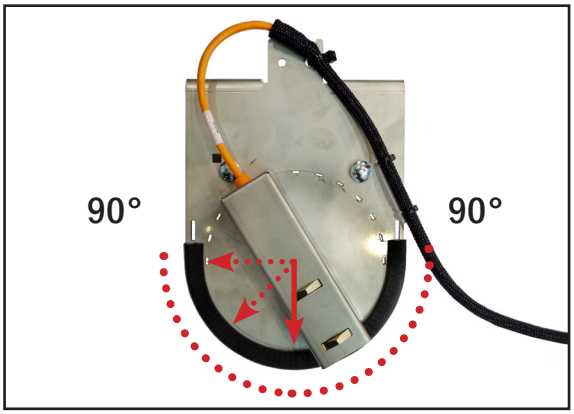


Fig. 188: Adjust sensor angle

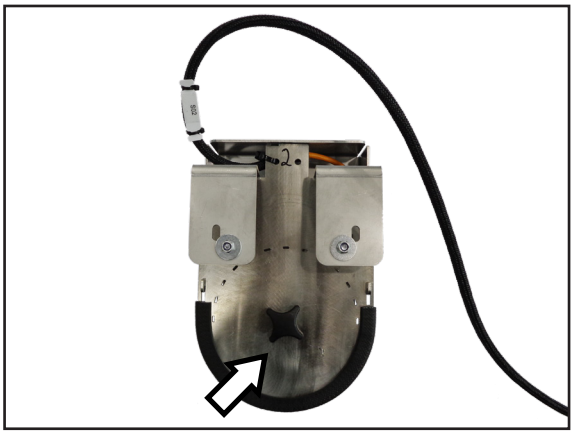


Fig. 189: Star knob nut of a sensor

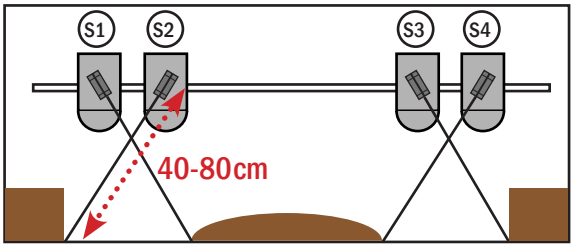


Fig. 190: Adjusting the sensors for “Intersection” sensor input configuration

The sensors of PSR SONIC can reliably detect plants from a plant height of 10cm (3.94”).

When scanning a track with marker, make sure that the track is similar to the one shown in Fig. 191.

NOTICE

When setting the sensors in the working ranges, please ensure that the sensors are directly pointing to the measuring object.

Use e.g. a folder meter to determine and extend the beam direction (see Fig. 192).

NOTICE

Make sure that there are no implements in the working range of the sensors. This may distort the measurement.

NOTICE

If you have problems with the settings, please contact your responsible customer service.

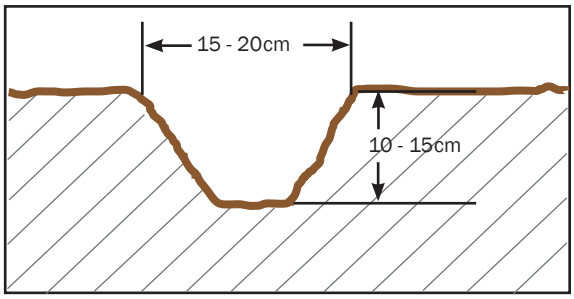


Fig. 191: Track marker specifications

Fig. 192: Adjust sensors

7.1.1.3 Settings specific to the Sensor Input Configuration

The PSR SONIC steering mode has various sensor input configurations. Depending on the selected sensor input configuration, the sensors must be positioned and adjusted. For information about the sensor input configurations, see Chapter 7.3.2.

Sensor Input Configuration “Outside”, “Outside left” and “Outside right”

The sensors have to be adjusted similarly to Fig. 193 (both sides) or Fig. 194 (left).

Make sure that the external sensor hits the upper third and the internal sensor hits the lower third of the crop edge.

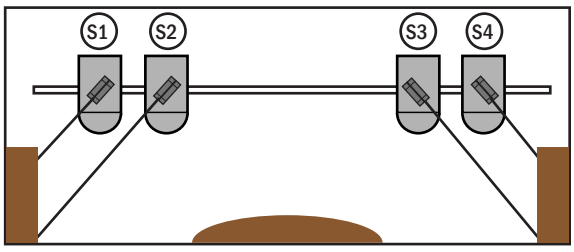


Fig. 193: Sensor setting for “Outside” sensor input configuration

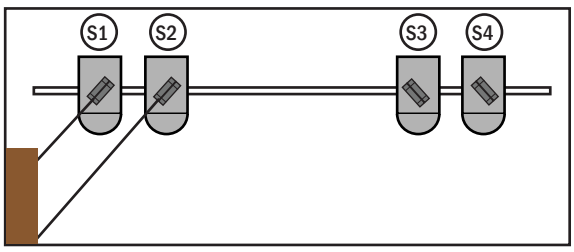


Fig. 194: Sensor setting for “Outside left” sensor input configuration

Sensor Input Configuration “Intersection”, “Intersection left” and “Intersection right”

The sensors have to be adjusted similarly to Fig. 195 (both sides) or Fig. 196 (left). Make sure that the sensors are exactly oriented towards the inside of the crop edge. However, the intersected sensors must point at the same angle to each other.

When using four sensors:

Depending on the type of application, it may be sensible to mount the sensors in staggered rows rather than next to each other (S1/S2 in the front, S3/S4 behind). The crop edge can thus be captured twice in order to obtain the required accuracy. This may be the case e.g. during sowing along marker track.

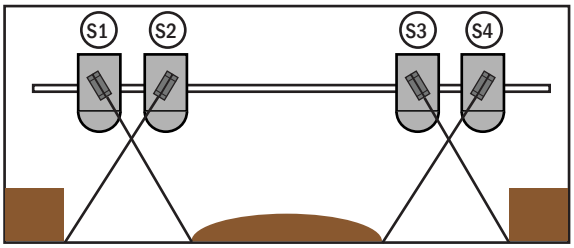


Fig. 195: Sensor setting for “Intersection” sensor input configuration

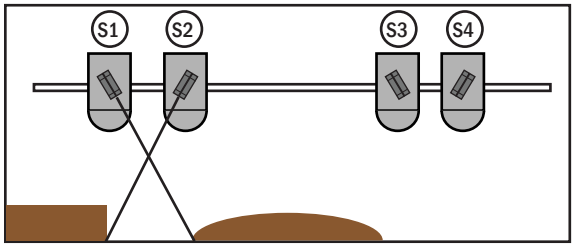


Fig. 196: Sensor setting for “Intersection left” sensor input configuration

Sensor Input Configuration “Inside”

The sensors are to be adjusted similarly to Fig. 197. Make sure that the external sensors scan the bottom edge of the crop and the internal sensors capture the upper area.

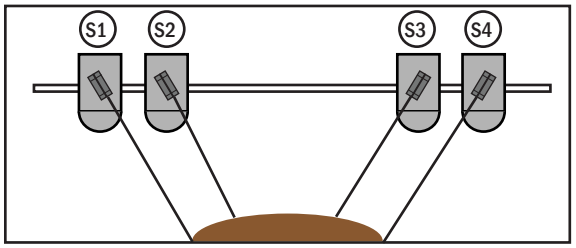


Fig. 197: Sensor setting for “Inside” sensor input configuration

7.1.2 Tramline Sensor

Tramline sensors are SONIC sensors with two integrated sensors. They are mainly suitable for lateral scanning of the crops.

7.1.2.1 Installation

The sensors are mounted ready for operation upon commissioning (see Fig. 198).

If you want to mount the sensors on another vehicle, proceed in the same way as for the initial mounting. This is described in the vehicle-specific installation manual. Dismounting of the components shall be carried out in reverse order.

Mount the two SONIC housings to the holding device (hose holder) on the vehicle.

NOTICE

If you have any questions regarding the installation of the housings, please contact your responsible customer service.

Connect the sensors with the front socket of the vehicle using the connection cable.

Fig. 198: PSR SONIC tramline sensors ready for operation

7.1.2.2 Settings

The two ultrasound sensors of a SONIC sensor are mounted on the sensor plate and can be swiveled. They are manually adjustable by ±60° upwards and downwards (see Fig. 199).

The sensors should be mounted so that they protrude just above the front edge of the recess on the sensor plate, but not out of the sensor housing.

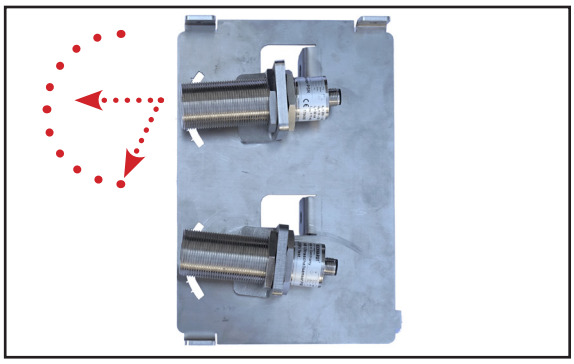


Fig. 199: Adjust sensor angle

To adjust, loosen the cross head nut on the back of the sensor plate (see Fig. 200). Grasp under the housing cover (not shown here) and move the sensor into the desired position (also see Fig. 199).

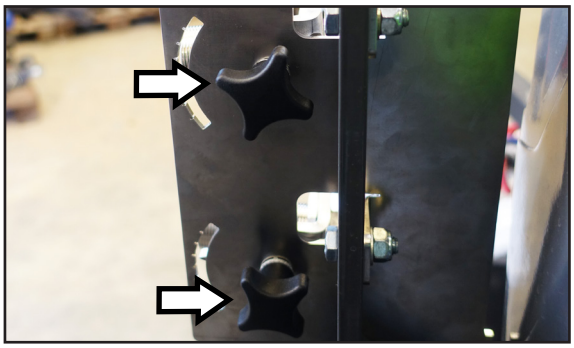


Fig. 200: Star knob nut for adjusting the sensors

When using tramline sensors, the sensors must be set similarly to Fig. 201 (double-sided scanning) or Fig. 202 (scanning on the left).

The sensors of a pair of sensors should ideally scan the crops as orthogonally as possible (or pointing slightly away from each other). They should never be directed to the same point. The area to be scanned should be as flat and without gaps as possible.

If two SONIC sensors (two sensor pairs) are used, the upper and lower sensor of one SONIC sensor must each be set at a mirrored angle to the two sensors of the opposite SONIC sensor (see Fig. 201).

Example for scanning grapes:
In the vegetation, set the sensors so that the lower sensors scan the grape zone and the upper sensors scan the leaves above.
For winter use, set the sensors so that the lower sensors scan the vines and the upper sensors scan the area at the height of the fruit rod.

NOTICE

When setting the sensors in the working ranges, please ensure that the sensors are directly pointing to the measuring object.

Use e.g. a folder meter to determine and extend the beam direction.

NOTICE

Make sure that there are no implements in the working range of the sensors. This may distort the measurement.

NOTICE

If you have problems with the settings, please contact your responsible customer service.

NOTICE

The flatter the surface to be scanned, the more precisely the system will steer.

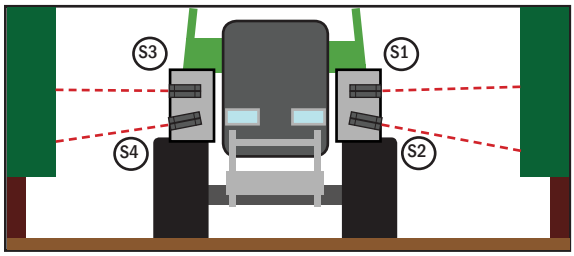


Fig. 201: Sensor setting for “Tramline” sensor input configuration

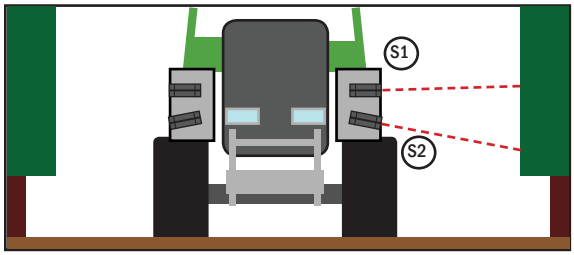


Fig. 202: Sensor setting for “Tramline left” sensor input configuration

7.2 Main Screen

Information Field

When the PSR SONIC steering mode is set, the current values of the individual SONIC sensors are displayed in the upper part of the information field on the main screen (see Fig. 203 – 1). Press the arrow to display the set mode (“Combi mode” and “Sensor +”, not “Standard”). For information about the mode, see Chapter 7.3.5.

In the lower area of the information field you will find the already known information (see Fig. 203 – 2 and Chapter 4.3.2).
The field in which the steering mode is displayed shows the selected sensor input configuration (see Fig. 203 – 2b). For information about the sensor input configuration, see Chapter 7.3.2.

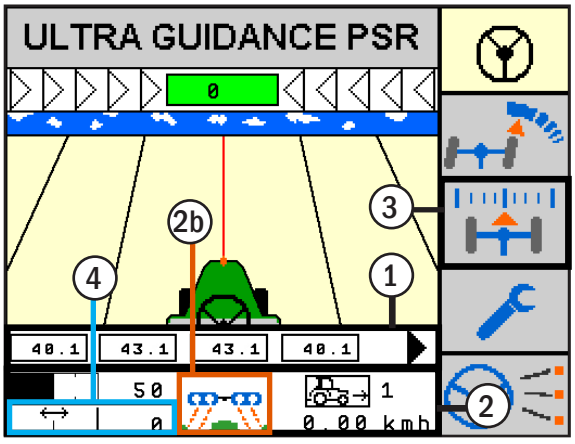


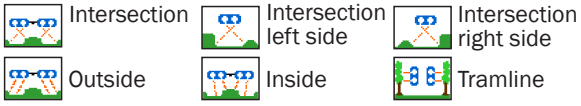
Fig. 203: Main screen

Pressing the “Nudge adjustment” Soft Key briefly – changing the Sensor Input Configuration

By briefly pressing the “Nudge adjustment” soft key (see Fig. 203 – 3), you can change the sensor input configuration if you have selected a manual usage setting (see Chapter 7.3.3).

Keeping the “Nudge adjustment” Soft Key pressed – Nudge/Distance

In the sensor input configurations below, the distance indicates a lateral displacement (nudge) of the vehicle to the left (0 to -30cm; 0 to -11.8”) or to the right (0 to 30cm; 0 to +11.8”) from the guide track (see Fig. 204):



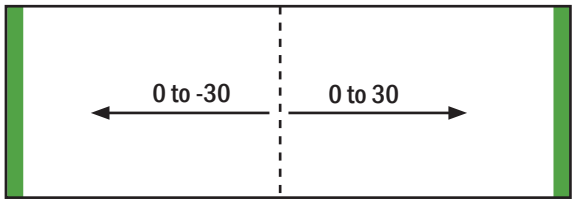
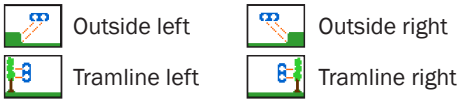


Fig. 204: Displacement (nudge) from the guide track

In the sensor input configurations below, you can specify the distance of the sensors to the crop edge/to the crops (between 30 and 120 cm; 11.8” to 47.24”).

The average of the distance values of both sensors of a sensor pair is used for this purpose (see Fig. 205 and Fig. 206):



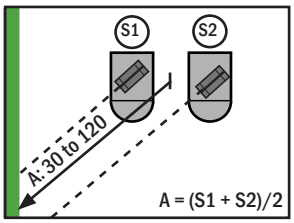


Fig. 205: Average distance value to the left crop edge (“Outside left” sensor input configuration)

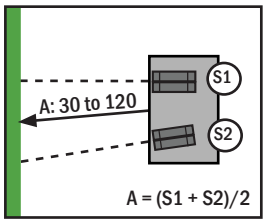


Fig. 206: Average distance value to left crop (“Tramline left” sensor input configuration)

When using the sensor input configurations “Outside”, “Intersection”, “Inside” and “Tramline” with all sensor pairs, you can invert the nudge value by pressing the distance/nudge field (see Fig. 203 – 4) (from + to -).

7.3 SONIC Configuration

With “PSR SONIC” steering mode selected, briefly press the menu soft key (see Fig. 207) to get to the SONIC configuration.

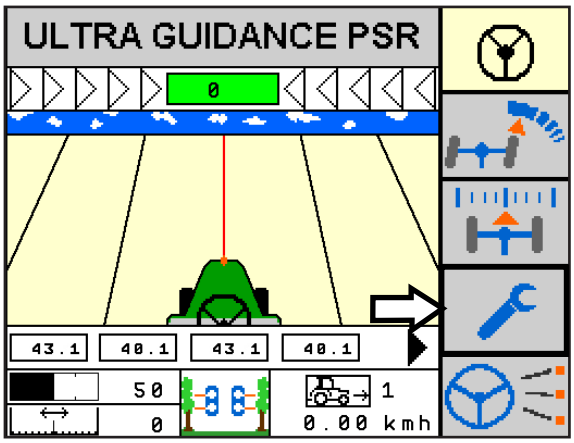


Fig. 207: Call up SONIC configuration

On the menu page of the SONIC configuration, you can make different settings (see Fig. 208).

The upper area shows the available sensors and their current values (see also Fig. 208).

The color of the sensor value indicates the validity of the measured values:

- **Red** = No current measured value in valid range.
- **Black** = Measured values in valid measuring range (15-200 cm).

NOTICE

During active driving, the values should preferably be permanently black (within the valid range). If this is not the case, check for dirt and incorrect settings.

Additional settings of the SONIC configuration are described individually below.

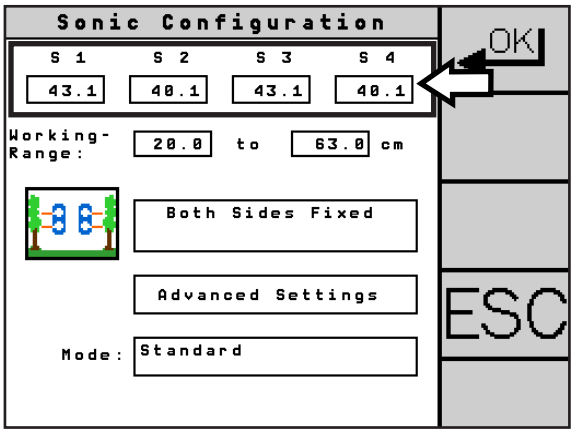


Fig. 208: SONIC configuration – display of sensor values

7.3.1 Working Range

The working range is the area where sensor values for automatic steering are used. Values outside this range are discarded.

Measure the distance of the sensors to the measurement object and enter a working range of ±20cm (±7.87”) of the value.
If the sensor values differ greatly from each other, the working range should be 20cm (7.87”) smaller than the smallest and 20cm larger than the largest measured value.

Consider the valid value range of 15-200cm (5.9” to 87.74”).

Enter the minimum and maximum values in the fields next to “Working range” (see Fig. 209).

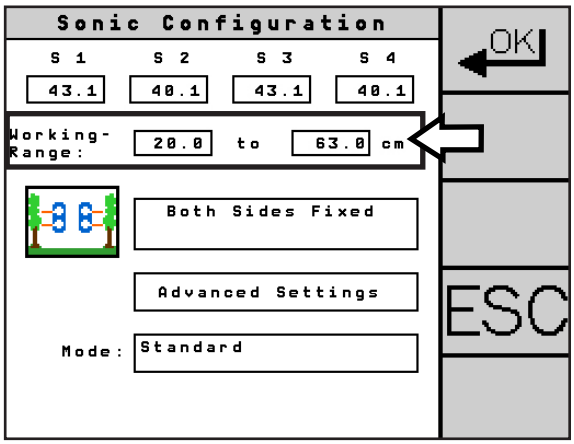


Fig. 209: Set working range

7.3.2 Sensor Input Configuration

Select Sensor Input Configuration

PSR SONIC can be used in ten different sensor input configurations.

The four main sensor input configurations can be called up via the graphic button “Sensor input configuration” (see Fig. 210) and can then be selected (see Fig. 211).

For three of the sensor input configurations there is a sensor input configuration “left” and “right” respectively to drive either with the left or right sensor pair. This sensor input configuration can be activated via the usage setting (see Chapter 7.3.3).

The different sensor input configurations of PSR SONIC are explained below.

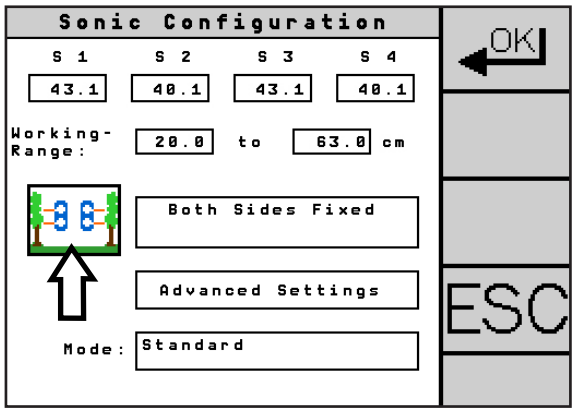


Fig. 210: Set sensor input configuration

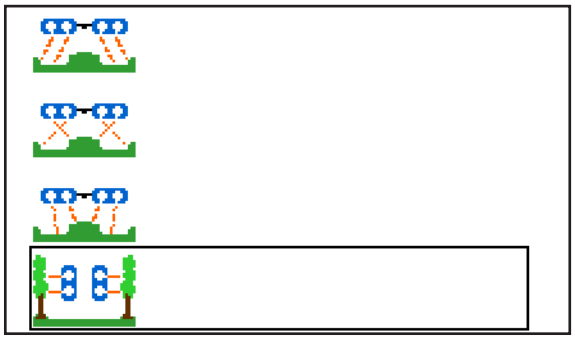
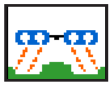


Fig. 211: Overview sensor input configuration

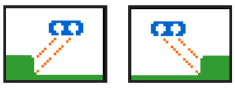
Overview

PSR SONIC offers the following sensor input configurations:

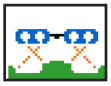
Sensor Input Configurations for Scanning with the PSR SONIC Single Sensors



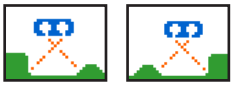
Outside
Steering guidance with clearly defined external crop edges, which serve as guidelines.



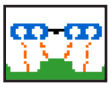
Outside left/right
Select this sensor input configuration if the crop edge used as a guideline is only on one side



Intersection
Steering guidance on the basis of a crop edge by scanning crosswise. This is the ideal sensor input configuration for subsequent field processing (e.g. fertilizing, spraying.).

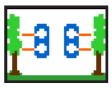


Intersection left/right
You can select this sensor input configuration if the crop edge used as guideline is only on one side (e.g. potato or asparagus ridges).

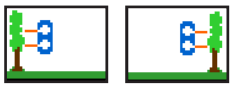


Inside
Uses one crop edge (harvested yield, straw, hay, row, etc.) in the middle of the sensors as a guideline.

Sensor Input Configurations for Scanning with the PSR SONIC Tramline Sensors



Tramline
Steering guidance by means of a tramline (grapes, etc.), limited on both sides by crops.



Tramline left/right
Steering guided by means of a tramline delimited by crops on one side (left or right).

7.3.3 Usage Setting “one-side/two-side Use”

For the sensor input configurations “Outside”, “Intersection” and “Inside”, you must select how you want to use the sensor input configuration.

Select the button to call up the usage setting (see Fig. 212).

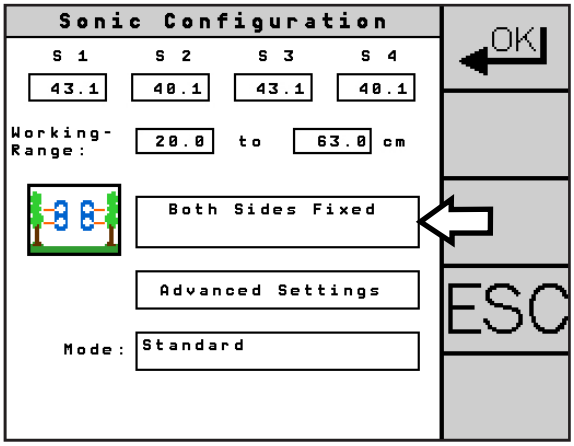


Fig. 212: Call up usage setting

The various settings define the use of the connected sensors (see Fig. 213):

- **Both Sides fixed**
  Use of both sensor pairs (left and right)
- **Manual select left <-> right**
  Manual selection between left and right sensor pair.
- **Manual select L -> All -> R**
  Manual selection between left sensor pair, all sensors and right sensor pair.

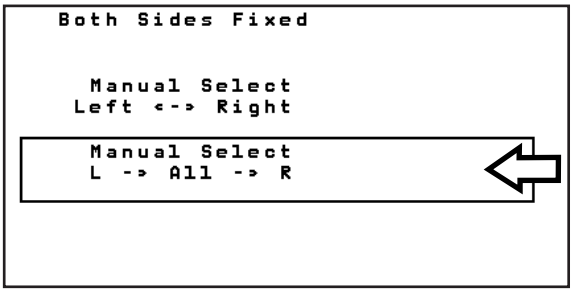


Fig. 213: Select usage setting

Change Sensor Input Configuration while driving

If you have selected a manual setting, you can switch between the different sensor input configurations while driving.

On the main screen, briefly press the “Nudge adjustment” soft key (see Fig. 214 – 1) to switch between the different sensor input configurations.

The active sensor input configuration is displayed at the bottom of the information field (see Fig. 214 – 2).

The number of sensor values displayed depends on the sensor input configuration used.

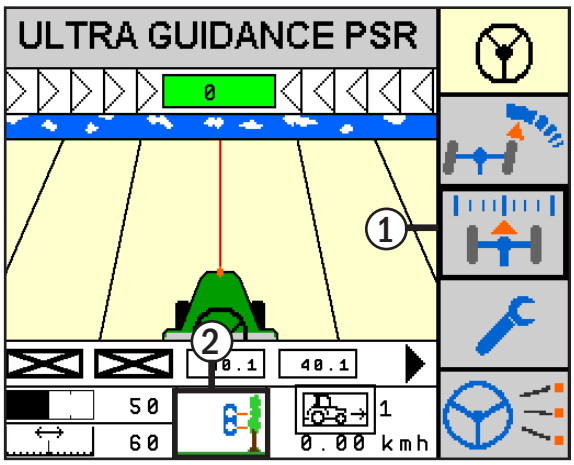


Fig. 214: Change sensor input configuration via soft key “Nudge adjustment”

7.3.4 Advanced Settings

Press the “Advanced settings” button to access the advanced SONIC configuration (see Fig. 215).

Here you can make response and filter settings as well as configurations for working range detection and the type of pull in. You can also specify the tilt correction.

The advanced settings are divided into two pages. Use the arrow keys to switch between the two pages.

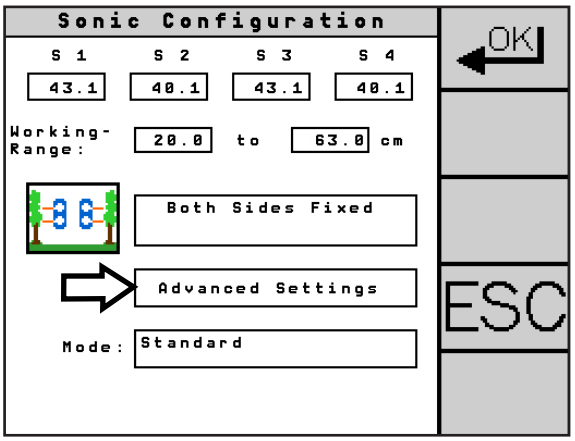


Fig. 215: Accessing the advanced settings

7.3.4.1 Response

Use the “-/+” keys of the SONIC response to set how aggressively the system should respond to deviations from the target track (see Fig. 216 – 1).

0% = low response
100% = high response

At lower values, the vehicle responds less strongly to a deviation. At higher values, the vehicle responds to even the smallest deviations.

Via the “Default” button (see Fig. 216 – 2) the recommended value for the vehicle type is set. The default value varies depending on the vehicle code.

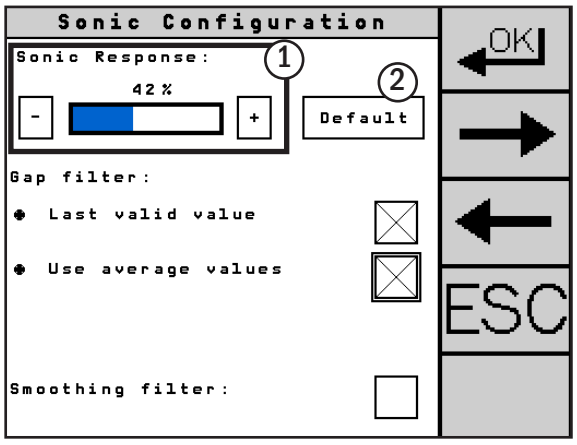


Fig. 216: Advanced settings – SONIC response

7.3.4.2 Gap Filter

The “Gap filter” function (see Fig. 217) specifies how the system shall react and/or how the vehicle shall steer in case of gaps in the crops or measurement failures.

You can choose the following settings:

- **Last valid value:**
  The last measured value is applied.
- **Use average values:**
  The average value is calculated from all last measured values (within the valid working range).
- **Switch off group (1-2)| |(3-4):**
  (Available in sensor input configuration “Intersection”)
  If a sensor detects a gap, the values of a sensor pair are no longer used.
  If no more values are used because at least one sensor of each sensor pair has measured a gap, the vehicle drives straight ahead until values are identified again.

Activate/deactivate the respective gap filter via the corresponding check box (see Fig. 217).

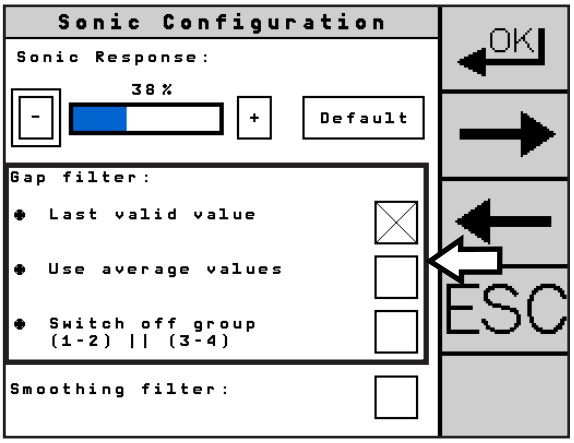


Fig. 217: Advanced settings – gap filter activate/deactivate

Example for Gap Filter “Last valid Value” and “Use average Values”

Fig. 218 shows the case of a gap in the crops. If the “Last valid value” and “Use average values” filter settings are selected, the system jumps to the average value of the last measured values within the valid working range (see Fig. 218 – 1).
The vehicle will not steer (see Fig. 218 – 2).

If the filter setting “Last valid value” WITHOUT “Use average values” is selected, the system uses ONLY the last measured value.

If only the filter setting “Use average value” is selected, the system calculates an average value from all measured, last values within the valid working range. The vehicle may therefore steer slightly (see Fig. 218 – 3).

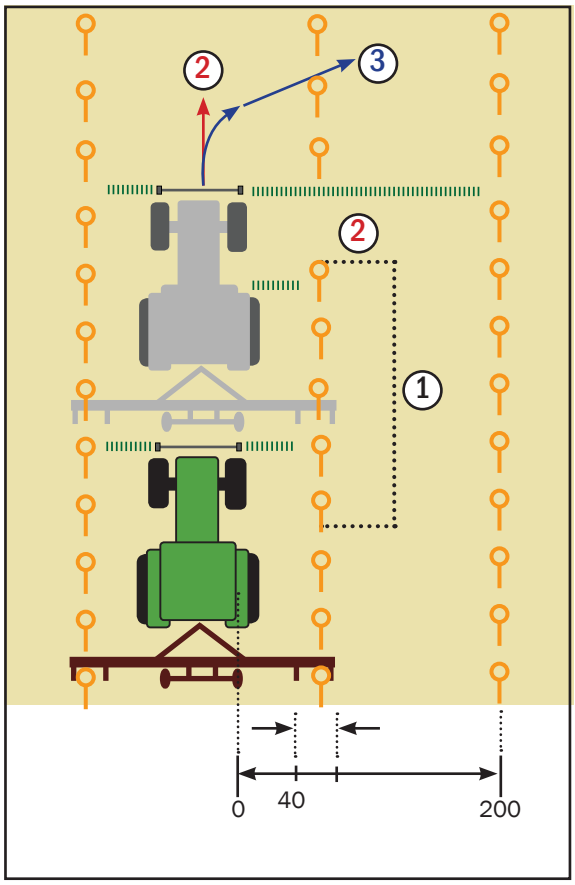


Fig. 218: Example sketch “Last valid value” and/or “Use average values”

7.3.4.3 Smoothing Filter

The “Smoothing filter” function equalizes outliers in uneven crops that lie within the valid working range. These are therefore not taken into account for steering purposes.

Activate/deactivate the smoothing filter via the corresponding check box (see Fig. 219).

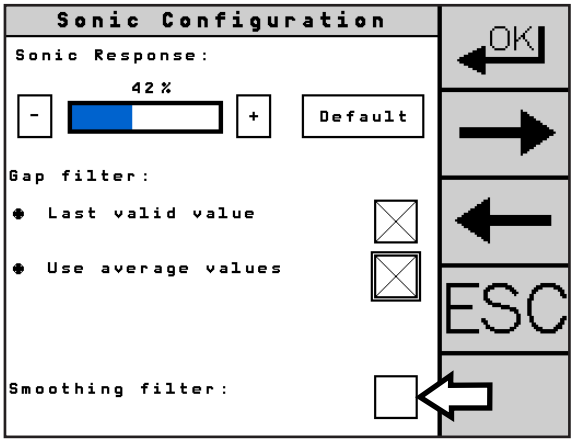


Fig. 219: Advanced settings – smoothing filter

7.3.4.4 Working Range Detection/Calibration of Sensor Spacing

The “Working range detection” function enables automatic determination of the sensor spacing/ working range.

Activate/deactivate the working range detection via the adjacent checkbox (see Fig. 220).

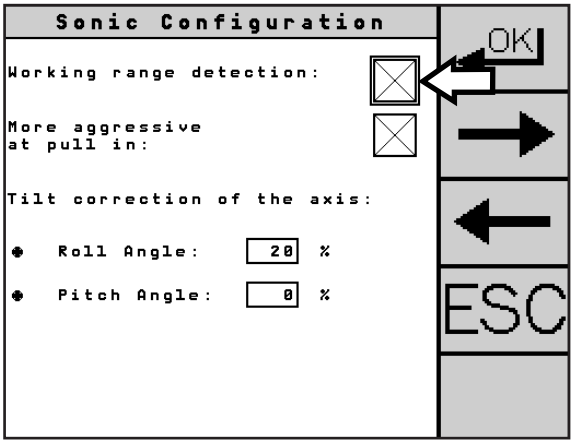


Fig. 220: Advanc. settings – working range detection

On the main page of the SONIC configuration, a calibration button (see Fig. 221) appears instead of the input fields for the working range if the working range detection is activated. The average sensor spacing can then be automatically determined in the crops.
This is particularly recommended in the event of major changes in conditions (e.g. change in track width).

Small unevennesses in the crops are automatically compensated during active travel by a permanent rescanning with activated working range detection.

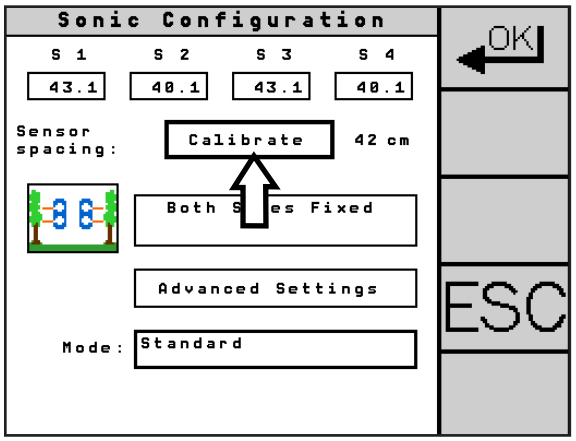


Fig. 221: Automat. working range detection activated

7.3.4.5 More aggressive at Pull in

When the “More aggressive at pull in” function is activated, the system allows the vehicle to steer more aggressively for the first six meters (19.7 feet).

Activate/deactivate the function via the checkbox next to “More aggressive at pull in” (see Fig. 222).

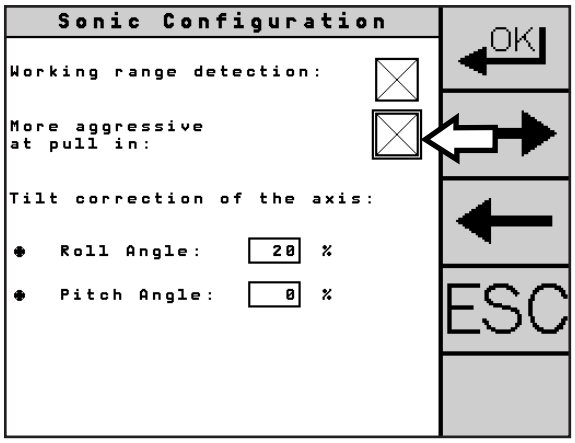


Fig. 222: Advanc. settings – more aggressive at pull in

7.3.4.6 Tilt Correction of the Axis

The values of the tilt sensors of ULTRA GUIDANCE PSR ISO can be transmitted to the sensors of PSR SONIC.

Roll Angle

NOTICE

Use the “Tilt correction of the axis” function especially for works on slopes and in hilly terrain.

Via the “Roll angle” setting, you can specify the percentage proportion of the tilt sensor values being offset against the SONIC steering mode.

Select “Roll angle” (see Fig. 223 – 1) and enter the desired value.

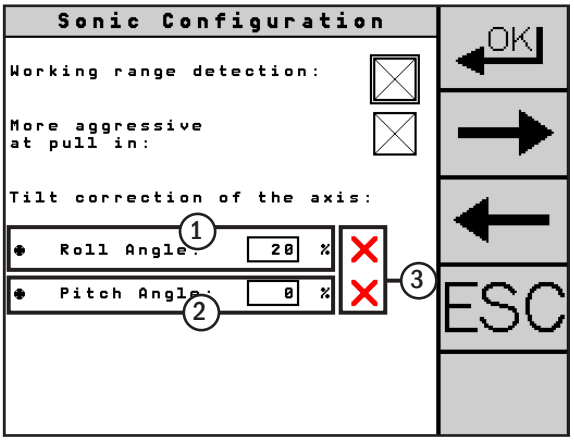


Fig. 223: Advanced settings – tilt correction of the axis

Pitch Angle

For use in inclines, the roll angle value can be offset.

- Uphill = tilt sensor value is increased as a percentage
- Downhill = tilt sensor value is reduced as a percentage

Select “Pitch angle” (see Fig. 223 – 2) and enter the desired percentage correction value.
The pitch angle is only displayed if the roll angle has a value other than “0%”.

Roll Angle and Pitch Angle deactivated

Red X symbols behind roll angle and pitch angle (see Fig. 223 – 3) indicate that the tilt correction is deactivated. The values for roll angle, pitch angle and sensor height are not used.

The activation of the tilt correction is described in Chapter 5.7.7.

7.3.4.7 Sensor Height

(This setting is only available in the “Tramline” sensor input configuration.)

For an exact steering result on a slope, a height correction of the sensors is necessary.

Measure the height (center of the two sensors – top/bottom). Select “Sensor height” and enter the measured value (see Fig. 224).

Red X symbols behind roll angle and pitch angle (see Fig. 223 – 3) indicate that the tilt correction is deactivated. The values for roll angle, pitch angle and sensor height are not used.

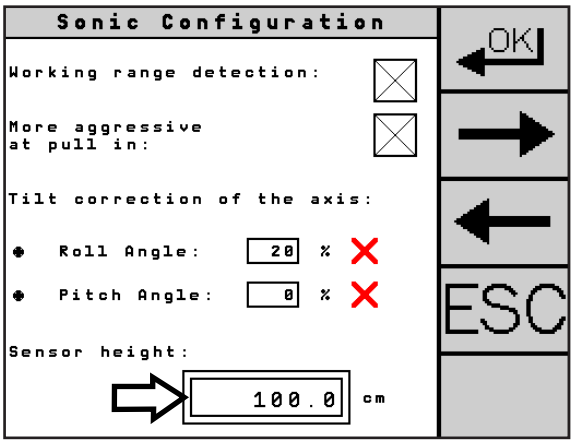


Fig. 224: Advanced settings – sensor height

7.3.5 Mode

With the mode, you specify how you want to use PSR SONIC. You can use PSR SONIC independently or in combination with PSR SKY (with GPS support).

Press the field next to “Mode” (see Fig. 225) to select a mode that is suitable for the intended purpose (see Fig. 226):

- Standard: Steering with PSR SONIC.
- Combi mode: Interaction of PSR SONIC and PSR SKY. It enables correct and easy entering into the next track with PSR SKY after turning at the end of the field. In the rows, you work with the set PSR SONIC sensor input configuration.

  For more information on the combi mode, see Chapter 10.1.
- Sensor +: Steering with PSR SONIC and PSR SKY on track.
  Pulling in using PSR SKY is not possible in this mode.

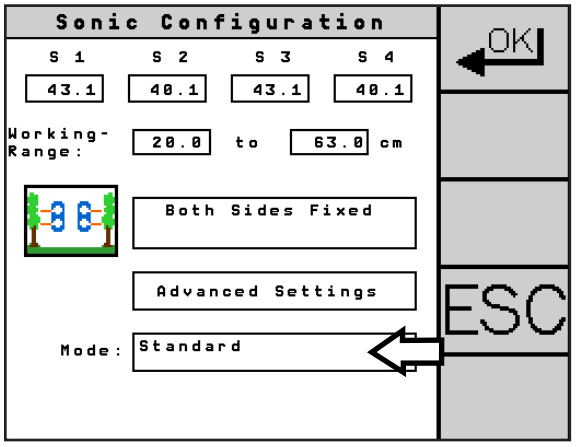


Fig. 225: Set mode

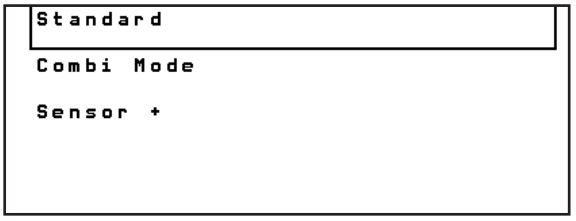


Fig. 226: Mode options

Setting the Working Width in Combi Mode

If the combi mode is selected, the (actual) working width must be set additionally (see Fig. 227). It is not necessary to calculate an overlap.

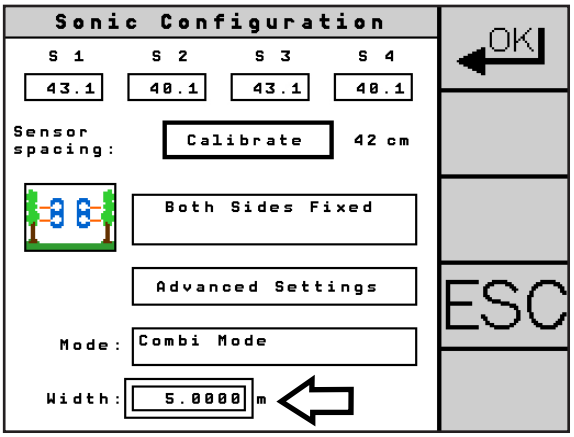


Fig. 227: Set working width

Setting the Heading in "Sensor +" Mode

If the "Sensor +" mode is selected, the cardinal direction (heading) must also be entered (see Fig. 228).

NOTICE

In order to determine the exact cardinal direction, it is advisable to change to the PSR SKY steering mode and create a straight track with the "A + B" method (see Chapter 6.2.2.1).
In the menu you can read off the heading driven and then transfer it to the SONIC configuration.

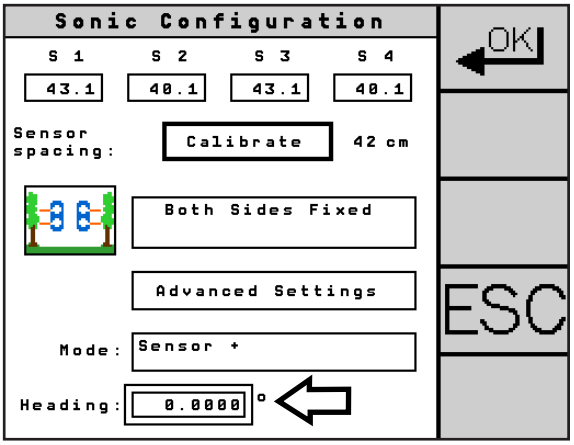


Fig. 228: Select/set cardinal direction

8 PSR TAC

PSR TAC is steering with a flexible tactile sensor by scanning of plant rows. Thanks to the sensors, the vehicle will be guided exactly along the rows.

8.1 Mount and Set TAC Sensor

Upon commissioning, the sensor is installed ready for operation (see Fig. 229).

When the implement is changed, you only need to connect the plug of the sensor connection cable with the vehicle-dependent plug connection (e.g. front socket or Deutsch connector).

NOTICE

The execution of the assembly individually depends on the vehicle. If you have any questions concerning the mounting or reassembly on another vehicle, please refer to your retailer.

Fig. 229: PSR TAC sensor ready for operation

If the sensor is mounted to a special bracket, the entire bracket including sensor must be reassembled (see Fig. 230).

NOTICE

If you have problems with the assembly, please contact your retailer.

Fig. 230: PSR TAC sensor in operation

8.2 Main Screen

When the PSR TAC steering mode is set, only the selected mode is displayed in the upper part of the information field on the main screen (see Fig. 231 – 1). For information about the mode, see Chapter 8.3.1.

In the lower area of the information field you will find the usual information (see Fig. 231 – 2 and Chapter 4.3.2).
The field in which the steering mode is displayed shows the selected sensor input configuration (see Fig. 231 – 2b). For information about the sensor input configuration, see Chapter 8.3.1.

The nudge adjustment can be accessed by briefly pressing the nudge adjustment soft key (see Fig. 231 – 3). For information on the nudge adjustment, see Chapter 4.7.

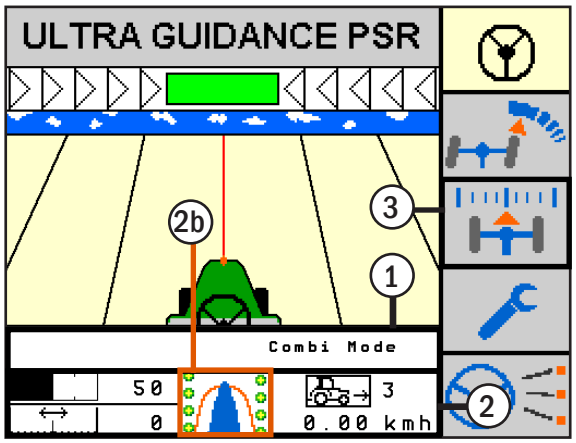


Fig. 231: Main screen with information field in the combi mode

8.3 TAC Configuration

With “PSR TAC” steering mode selected, briefly press the main menu soft key (see Fig. 232) to get to the TAC configuration.

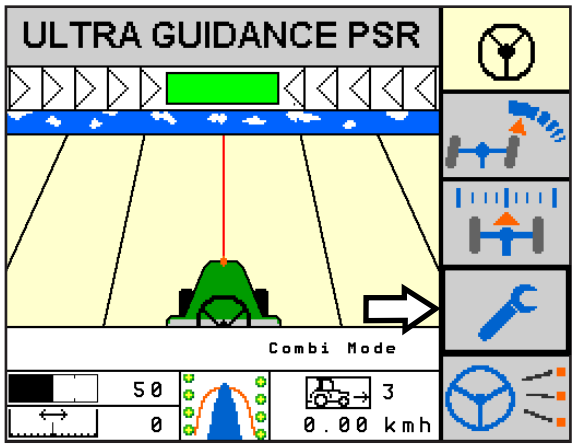


Fig. 232: Access TAC configuration

On the menu page of the TAC configuration, you can make different settings (see Fig. 233).

The upper area of the menu page shows the sensor values of the PSR TAC sensors:

- The first line shows the current sensor values (see Fig. 233 – 1).
- The second line shows the last saved sensor values (see Fig. 233 – 2).

A TAC sensor provides one sensor value if it is a single-sided TAC sensor and two sensor values if it is a double-sided TAC sensor.
Two single-sided, one double-sided or two double-sided TAC sensors can be used.
For further information please read Chapter 8.3.1.

Additional settings of the TAC configuration are described individually below.

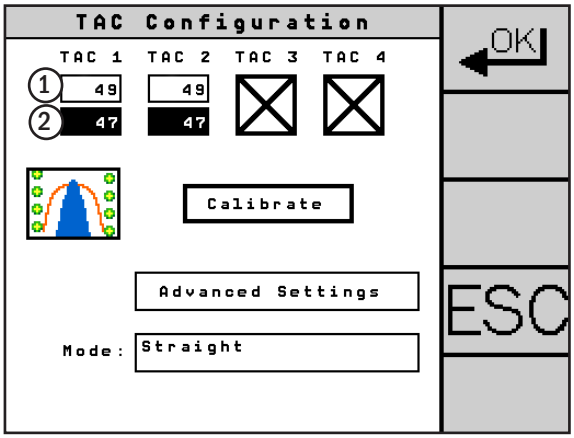


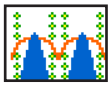
Fig. 233: Display of the sensor values with one double-sided TAC sensor

8.3.1 Sensor Input Configuration

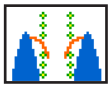
Overview

PSR TAC offers the following sensor input configurations:

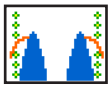
Single Sensor – One double-sided TAC Sensor (TAC 1 and 2)
Steering guided by means of two closed crop rows, e.g. corn row.



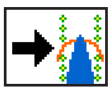
Dual Sensor – Two double-sided TAC Sensors (TAC 1,2,3 and 4)
Uses four crop rows as guidance.
In case of gaps in the crops, the steering behavior can be improved thanks to the second TAC sensor.



Inner Sensors – Two single-sided TAC Sensors (TAC 2 and 3)
Steering guided by means of two crop rows with one-sided internal scanning.



Outer Sensors – Two single-sided TAC Sensors (TAC 1 and 4)
Steering guided by means of two crop rows with single-sided external scanning.



Right Sensor – Two double-sided TAC Sensors (TAC 3 and 4)
Steering guided by means of a tramline with two crop rows. Only the TAC sensor on the right side is used as reference track.

Left Sensor – Two double-sided TAC Sensors (TAC 1 and 2)
Steering guided by means of a tramline with two crop rows. Only the TAC sensor on the left side is used as reference track.

Set Sensor Input Configuration

Press the “Sensor input configuration” button (see Fig. 234).

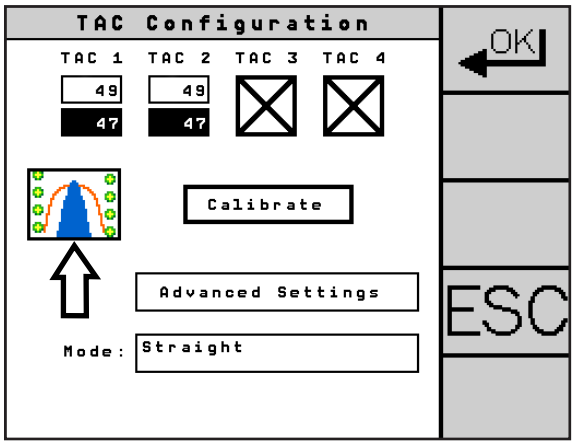


Fig. 234: Set sensor input configuration

Select the desired sensor input configuration (see Fig. 235).

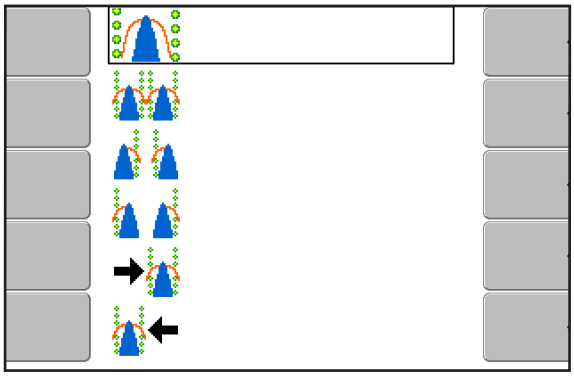


Fig. 235: Overview sensor input configuration

The selected sensor input configuration is displayed (1) and the number of sensors is adjusted (2) (see Fig. 236).

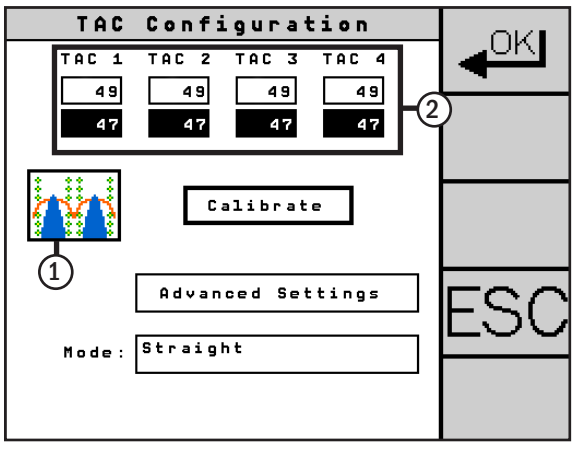


Fig. 236: Different sensor input configuration selected

8.3.2 Calibrate TAC Sensor

To get the best results with PSR TAC, it is required to recalibrate the sensor(s) periodically. This is especially important when the TAC sensor is used for the first time or after lengthy periods of no use.

NOTICE Ensure that the synthetic tactile sensors are at rest position and not moved. The displayed value shall be between 40 and 70.

Press the “Calibrate” button (see Fig. 237).
All connected TAC sensors are calibrated.

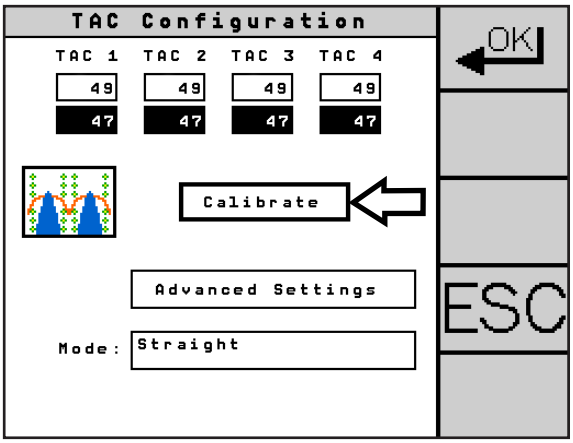


Fig. 237: Calibrate TAC sensor

8.3.3 Advanced Settings

Press the “Advanced settings” button to access the advanced TAC configuration (see Fig. 238).

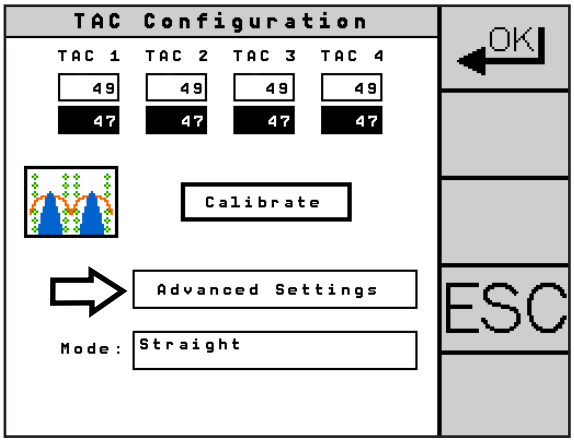


Fig. 238: Accessing the advanced settings

8.3.3.1 TAC Response

Use the "-/+" keys of the TAC response to set how aggressively the system should respond to deviations from the target track (see Fig. 239 – 1).

0% = low response
100% = high response

In case of delayed response of the system (e.g. with curvy crops) you should increase the response.
If the system responds too strongly, which is accompanied by jerky steering movements, you should reduce the response.

Via the "Default" button (see Fig. 239 – 2) the recommended value for the vehicle type is set. The default value varies depending on the vehicle code.

8.3.3.2 Gyro Stabilization

Use the "-/+" keys of the gyro stabilization to set the degree to which the measured values of the PSR TAC sensor are to be stabilized with the values of the gyroscope (see Fig. 239 – 3).

0% = low stabilization
40% = high stabilization

0% is suitable for combines (with slow speed).

An approximate value of 30% should be selected for sprayers and vehicles moving at high speeds.

Via the "Default" button (see Fig. 239 – 4) the recommended value for the vehicle type is set. The default value varies depending on the vehicle code.

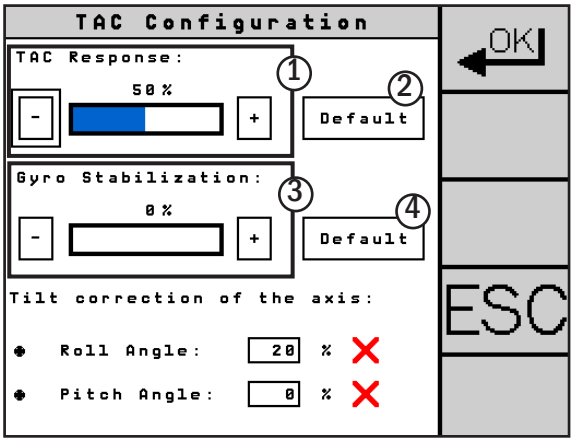


Fig. 239: Advanced settings – TAC response and gyro stabilization

8.3.3.3 Tilt Correction of the Axis

The values of the tilt sensor of ULTRA GUIDANCE PSR ISO can be transmitted to the sensors of PSR TAC.

NOTICE Use the “Tilt correction of the axis” function especially for works on slopes.

Roll Angle

Via the “Roll angle” setting, you can set the percentage proportion of the tilt sensor values being transmitted.

Select “Roll angle” (see Fig. 240 – 1) and enter the desired value.

Pitch Angle

For use in inclines, the roll angle value can be offset.

- Uphill = tilt sensor value is increased as a percentage
- Downhill = tilt sensor value is reduced as a percentage

Select “Pitch angle” (see Fig. 240 – 2) and enter the desired percentage correction value.

The pitch angle is only displayed if the roll angle has a value other than “0%”.

Roll Angle and Pitch Angle deactivated

Red X symbols behind “Roll angle” and “Pitch angle” (see Fig. 240 – 3) indicate that the tilt correction is deactivated. The values for roll angle and pitch angle are not used.

The activation of the tilt correction is described in Chapter 5.7.7.

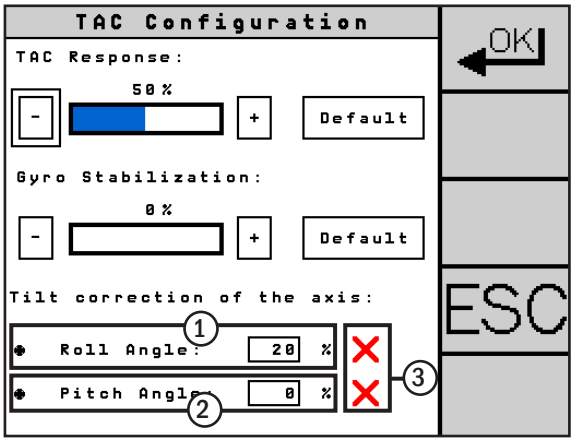


Fig. 240: Advanced settings – tilt correction of the axis

8.3.4 Mode

With the mode, you specify how you want to use PSR TAC. You can use PSR TAC independently (as sensor travel on straight or curvy tracks) or in combination with PSR SKY (with GPS support).

Press the field next to “Mode” (see Fig. 241) to select one of the following modes (see Fig. 242):

- Straight: Optimizes the system to achieve an optimum result on straight tracks.
- Curves: Optimizes the system to follow curves better. Ideal for stalks that are planted in contours or circles.
- Combi mode: Interaction of PSR TAC and PSR SKY. It enables correct and easy entering into the next track with PSR SKY after turning at the end of the field. In the rows, you work with the set PSR TAC sensor input configuration.

  For more information on the combi mode, see Chapter 10.1.

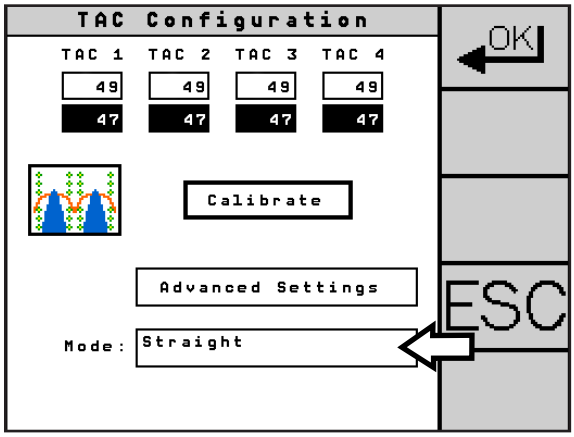


Fig. 241: Set mode

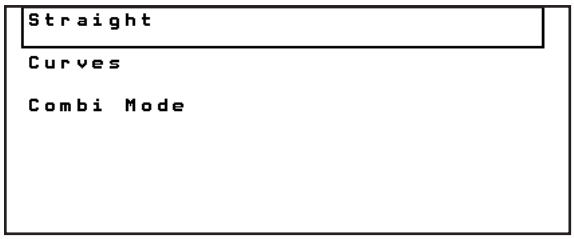


Fig. 242: Mode options

Setting the Working Width in Combi Mode

If the combi mode is selected, the (actual) working width must be set additionally (see Fig. 243). It is not necessary to calculate an overlap.

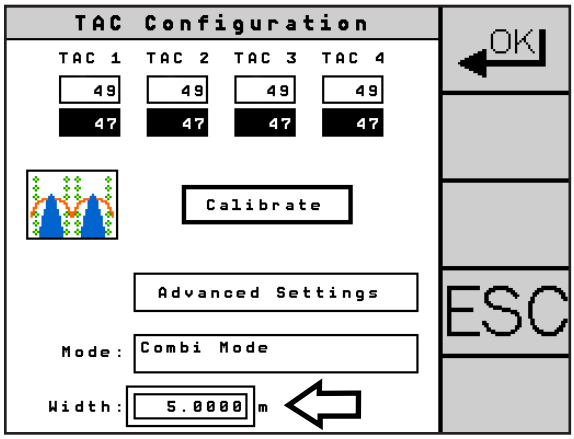


Fig. 243: Set working width

9 PSR MEC and PSR MEC+

PSR MEC and MEC+ enables steering with a mechanical row finder. Thanks to the row finder, the vehicle will be guided exactly along the rows.

9.1 Mount MEC Sensors

Upon commissioning, the mechanical row finders PSR MEC and PSR MEC+ are mounted ready for operation on the vehicle (see Fig. 244). Usually, PSR MEC and PSR MEC+ are mounted to the vehicle by means of a special bracket (see Fig. 245). This bracket is often mounted to the front of the vehicle.

NOTICE Mounting the bracket to the vehicle may be different for all vehicle types.

When changing the vehicle, you need to loosen the vehicle-dependent plug connection of the PSR MEC connection cable first.

⚠ CAUTION Risk of crushing!
Due to its high dead weight, the mechanical row finders PSR MEC/ PSR MEC+ may cause crushing of the skin by sliding back into the bracket. If possible, have the mechanical row finder pulled out of the bracket by two persons or secure it against slippage from below.

Now release the screw connection on the bracket and pull the mechanical row finder from the bracket.

When using the PSR MEC+ on the vehicle front, an additional bracket element will be required (see Fig. 246).

NOTICE The fixture of the bracket may individually depend on the vehicle. If you have any questions concerning the assembly or reassembly on another vehicle, please refer to your retailer.

Mounting on another vehicle shall be carried out in reverse order.

NOTICE If you have problems with the assembly/setting, please contact your retailer.

Fig. 244: PSR MEC and MEC+ ready for operation

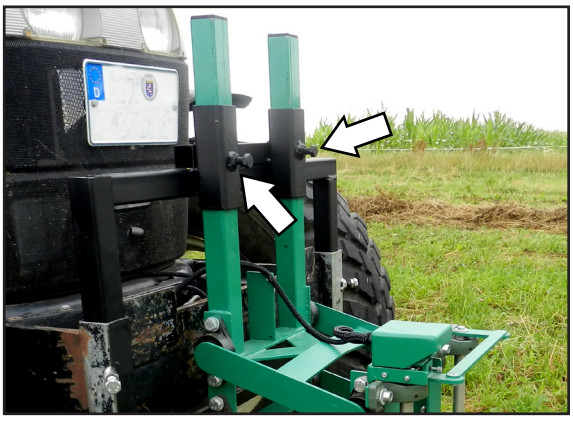


Fig. 245: Mount/dismount PSR MEC

Fig. 246: Mount/dismount PSR MEC+

9.2 Main Screen

When the PSR MEC streeing mode is set (includes the PSR MEC and PSR MEC+ products), the upper area of the information field in the main screen remains empty. Only a selected combi mode is displayed (see Fig. 247 – 1). For information about the mode, see Chapter 9.3.4.

In the lower area of the information field you will find the usual information (see Fig. 247 – 2 and Chapter 4.3.2).

The nudge adjustment can be accessed in the PSR MEC steering mode by briefly pressing the nudge adjustment soft key (see Fig. 247 – 3).
For information on the nudge adjustment, see Chapter 4.7.

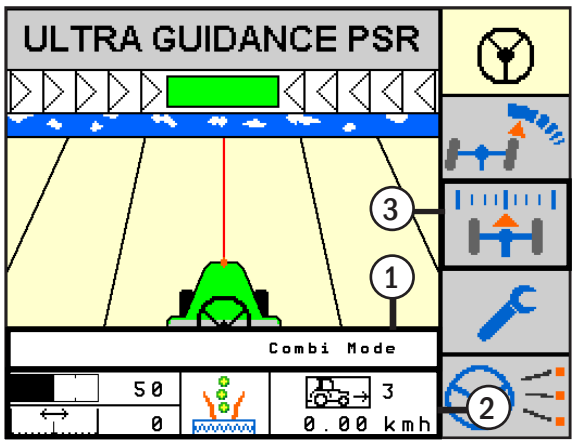


Fig. 247: Main screen with information field in the combi mode

9.3 MEC Configuration

With “PSR MEC” steering mode selected, briefly press the main menu soft key (see Fig. 248) to get to the MEC configuration.

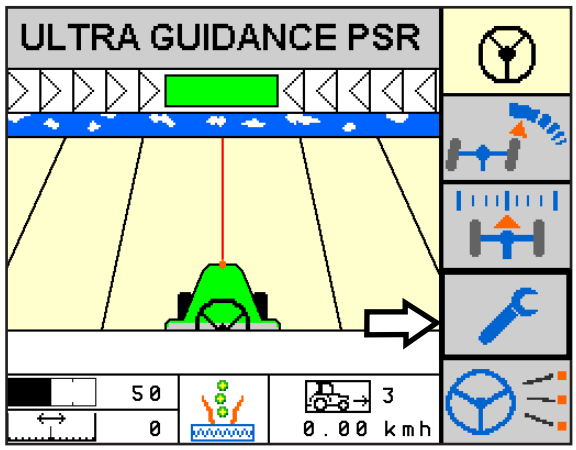


Fig. 248: Call up MEC configuration

On the menu page of the MEC configuration, you can make different settings (see Fig. 249).

Below the lettering “MEC” you will see two fields with numerical values:

- The first line shows the current value of the sensor (see Fig. 249 – 1).
- The second line shows the last saved value (see Fig. 249 – 2).

Additional settings of the MEC configuration are described individually below.

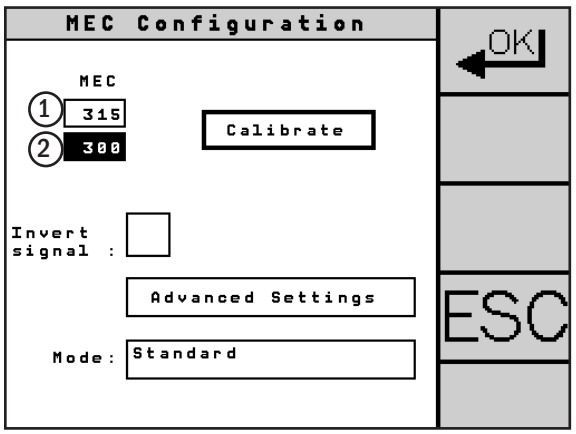


Fig. 249: Display sensor value

9.3.1 Calibrate PSR MEC

To get consistently good results with the mechanical row finder PSR MEC, it is required to recalibrate it periodically. This is especially important when the PSR MEC is used for the first time or after lengthy periods of no use.

NOTICE Ensure that the PSR MEC is at rest position and not moved.

Press the “Calibrate” button (see Fig. 250).
The connected PSR MEC is calibrated.

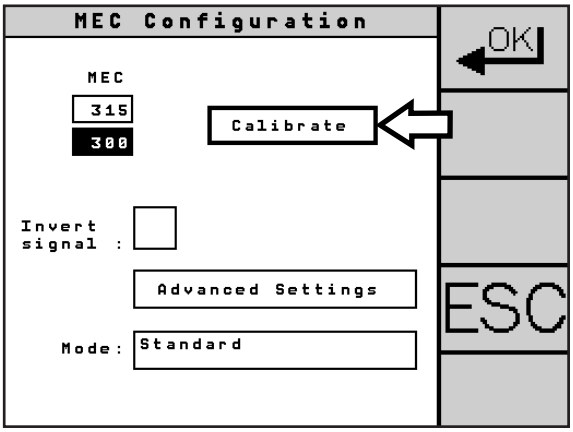


Fig. 250: Calibrate PSR MEC

9.3.2 Invert Signal

Depending on the installation position of the PSR MEC (oriented backwards, possibly turned by 180° due to lack of space), it may become necessary to invert the received signal. If the sensor e.g. steers to the left and the vehicle to the right, you need to invert the signal.

Select the check box next to “nvert signal” (see Fig. 251). The determined value is now inverted.

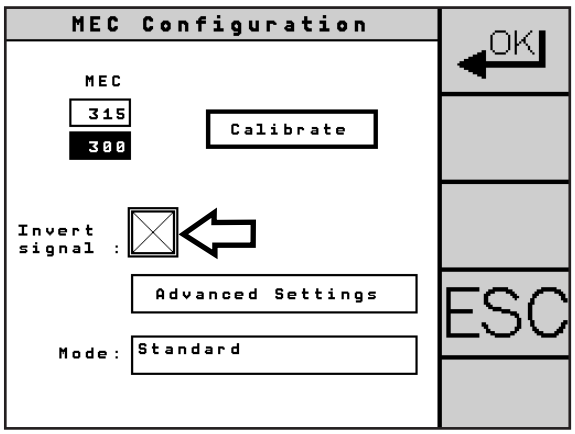


Fig. 251: Invert signal

9.3.3 Advanced Settings (Tilt Correction of the Axis)

Press the “Advanced Settings” button to access the advanced MEC configuration (see Fig. 252).

The values of the tilt sensor of ULTRA GUIDANCE PSR ISO can be transmitted to the sensor of PSR MEC.

NOTICE

Use the “Tilt correction of the axis” function especially for works on slopes.

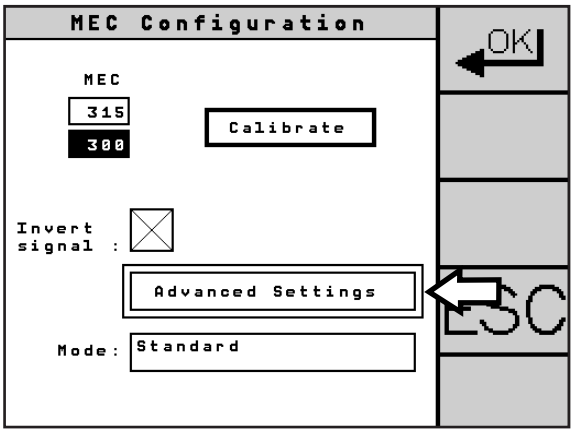


Fig. 252: Accessing the advanced settings

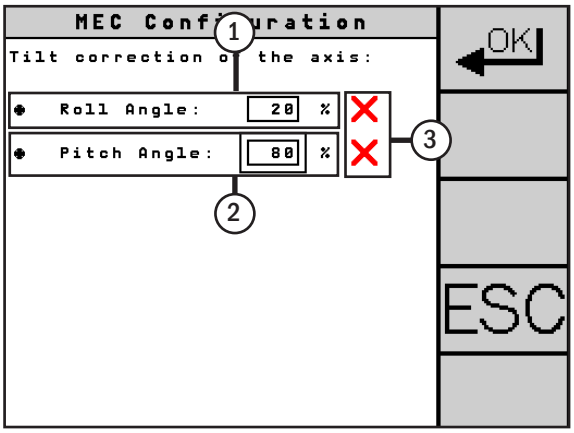


Fig. 253: Advanced settings – tilt correction of the axis

Roll Angle

Via the “Roll Angle” setting, you can set the percentage proportion of the tilt sensor values being transmitted.

Select ”Roll Angle” (see Fig. 253 – 1) and enter the desired value.

Pitch Angle

For use in inclines, the tilt sensor value can be offset.

- Uphill = tilt sensor value is increased as a percentage
- Downhill = tilt sensor value is reduced as a percentage

Select “Pitch Angle” (see Fig. 253 – 2) and enter the desired percentage correction value.

The pitch angle is only displayed if the roll angle has a value other than “0%”.

Roll Angle and Pitch Angle deactivated

Red X symbols behind “Roll Angle” and “Pitch Angle” (see Fig. 253 – 3) indicate that the tilt correction is deactivated. The values for roll angle and pitch angle are not used.

The activation of the tilt correction is described in Chapter 5.7.7.

9.3.4 Mode

With the mode, you specify how you want to use PSR MEC. You can use PSR MEC independently (as sensor travel) or in combination with PSR SKY (with GPS support).

Press the field next to “Mode” (see Fig. 254) to select one of the following modes (see Fig. 255):

- Standard: Steering with PSR MEC.
- Combi mode: Interaction of PSR MEC and PSR SKY. It enables correct and low-loss entering into the next track with PSR SKY after turning at the end of the field. In the rows, steering is carried out with the PSR MEC steering mode.

  For more information on the combi mode, see Chapter 10.1.

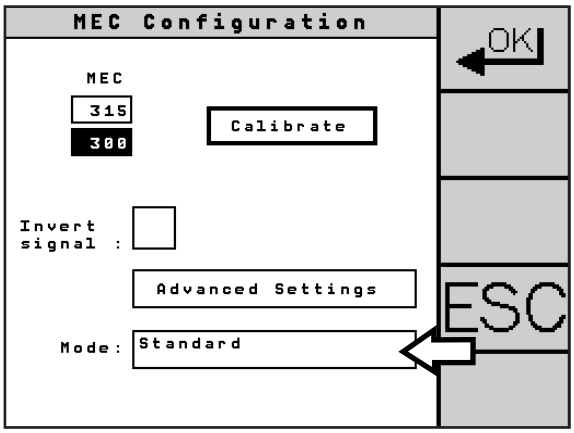


Fig. 254: Set mode

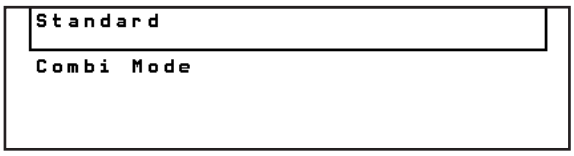


Fig. 255: Mode options

Setting the Working Width in Combi Mode

If the combi mode is selected, the (actual) working width must be set additionally (see Fig. 256). It is not necessary to calculate an overlap.

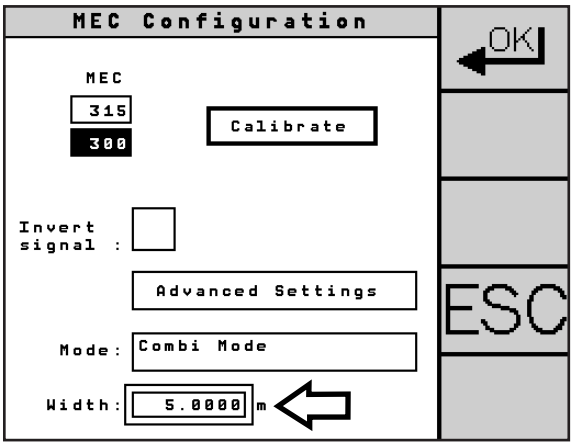


Fig. 256: Set working width

10 Advanced Functions

This chapter explains advanced functions when using ULTRA GUIDANCE PSR ISO.

10.1 Combi Mode

The simultaneous use of a sensor steering mode (PSR SONIC, PSR TAC, PSR MEC) in combination with PSR SKY enables a precise entering into the new track after turning at the end of the row.

Works in the crop are carried out with the preferred sensor steering mode. After turning at the end of the row, PSR SKY will guide the vehicle – reliably and without any loss of time – onto the new track in accordance with the previously set working width.

Example: Spraying Corn with PSR TAC

After turning at the end of the row, PSR SKY takes over the entering into the next track. Counting and marking the rows can thus be omitted (see Fig. 257).

The combination can be switched on or off for each sensor steering mode.

NOTICE If the combi mode is activated, switching between the automatic steering mode and the manual steering mode (see Chapter 4.5.2) is no longer possible.

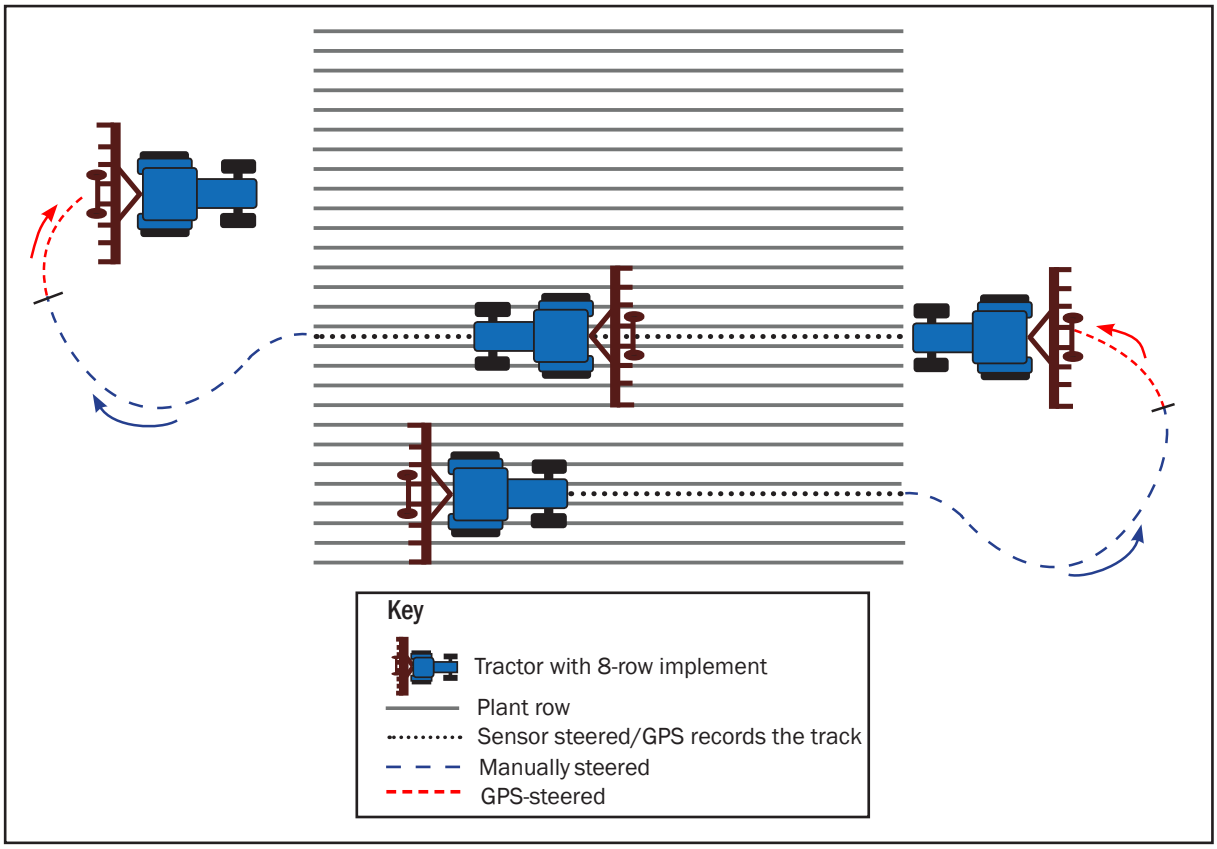


Fig. 257: Combi mode: Example spraying corn with PSR TAC

An active combi mode is displayed in the information field of the main screen (see Fig. 258).

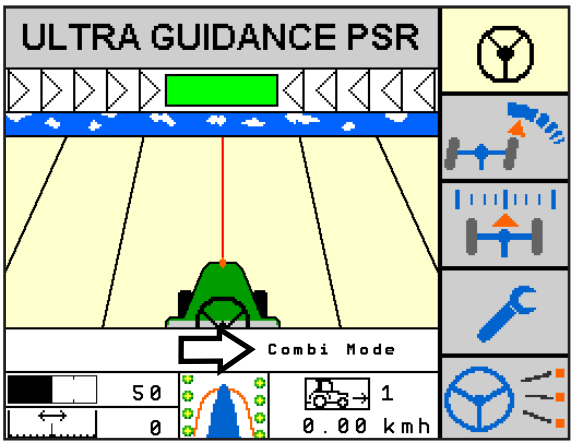


Fig. 258: Displayed combi mode

Semi-automatic Switching between Sensor Steering Mode and PSR SKY

Drive along the track by using the sensor steering mode with automatic steering (see Fig. 259).

NOTICE

Drive a distance of at least 30m using a sensor steering mode when the steering system is active. Otherwise, the automatic switching will not be activated.

Grasp the wheel at the headland in order to deactivate the automatic steering.

Start the turning procedure.

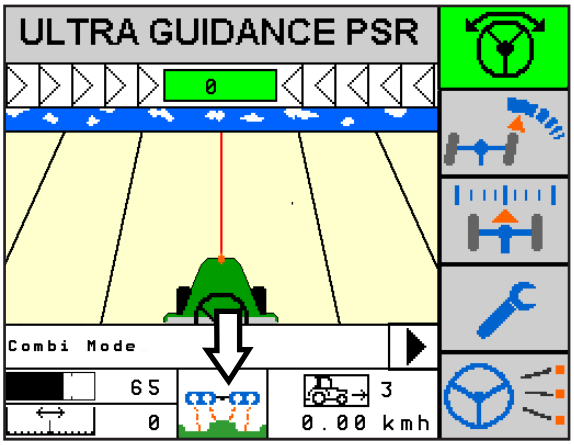


Fig. 259: Semi-automatic switching between sensor steering mode and PSR SKY sensor switched

The system automatically switches to the steering mode PSR SKY (see Fig. 260), when you enter the next track. You will hear a beep sound.

Now activate ULTRA GUIDANCE PSR ISO.

The steering system will now take over the entering into the next track.

NOTICE

If you will not enter the next track within 45 seconds after disengaging the steering system, the automatic switch to PSR SKY will not be carried out.

Also, if in PSR SKY, after 45 seconds it will switch back to sensor mode.

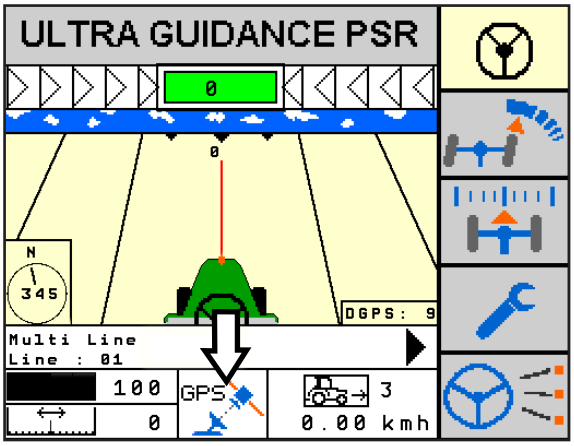


Fig. 260: Semi-automatic switching between sensor steering mode and PSR SKY (GPS)

The system independently switches to the previously used sensor steering mode (see Fig. 261), as soon as the vehicle is on the new track.

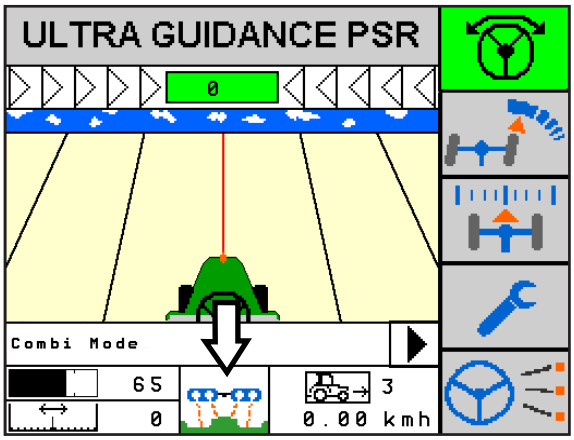


Fig. 261: Switch back to sensor steering mode

10.2 John Deere Split Screen

When using the John Deere GreenStar-Terminal, ULTRA GUIDANCE PSR ISO can also be displayed as split screen (half-size or quarter-size).

In split screen mode the following functions are available (see Fig. 262 and Fig. 263):

1. engaging of steering,
2. adjust distance / offset (nudging),
3. zero calibration.

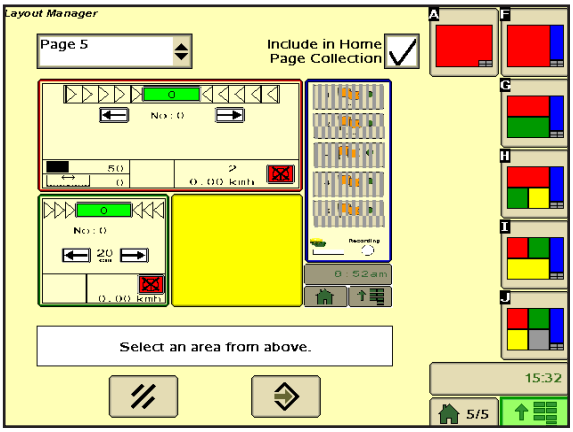


Fig. 262: John Deere Layout Manager

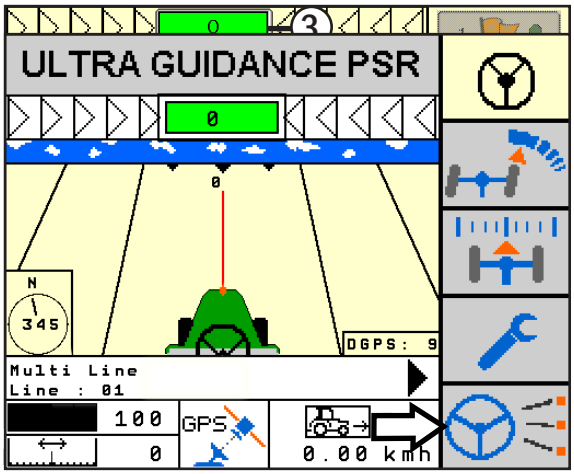


Fig. 264: Switch back to previous steering mode

11 Servicing

For a consistent high quality of the results and an extension of the system lifetime, it is necessary to check the points listed below on a regular basis.

Check Hydraulics

Have the hydraulic hoses checked for leaks, bends, cuts, breaks, abrasion points, blistering, corrosion, exposed tissues and other signs of wear or damage on a regular basis – at least once a year – by your dealer.

Check Fixtures

Check all fixtures on the components of the steering system on a regular basis.

12 Working and Storage Conditions

The electronic components of the PSR Guidance System are intended for the use under harsh environmental conditions in agricultural and similar applications.

NOTICE Do under no circumstances use a high-pressure cleaner for cleaning the components. Use a damp cloth.

To ensure a long lifetime of the components, keep not permanently installed parts of the system (including screws and accessories) in a dry, clean place during the winter.
Avoid humidity and moisture as well as places with high temperatures near ventilation systems, radiators, engines and devices generating heat.
Avoid storage near windows or roof lights which generate heat due to solar radiation.

13 Error List

Error-No.	Description	Cause	Troubleshooting
100	No receiver is correctly connected to the PSR.	- Open wire between GPS receiver and PSR iBox. - Fuse B6.1 or B6.2 defective. - No power at receiver.	- Check cables from PSR iBox to GPS receiver. - Check fuses in PSR iBox. - Check the signals from the GPS receiver to be evaluated (NMEA 0183, NMEA 2000, J1939 GPS).
101	No reception of GPS signals .	- Wrong wires are connected. - Wrong baudrate.	- Check cable between GPS receiver and PSR iBox. - Check settings of GPS receiver.
102	Poor reception of GPS signals.	- No free view to the sky. - Objects (trees, houses etc.) disturb the reception.	Move to an open area.
103	No straight track saved.	There is no straight track saved for this job.	- Save a new straight track under current job number. - select another job number, where a straight track is saved.
104	Saved straight track is too far away.	Vehicle/receiver is too far away from the original straight track.	- Save straight track again - Drive to the original straight track or recenter
105	Position is out of range.	System can be used for +/- 10000 passes.	- Save a new straight track under current job number. - Drive into range of +- 10000 passes.
106	Already receiving GPS signals, but these need to be examined.	GPS receiver has not yet properly started.	- Wait until the GPS receiver starts properly. - Move to an open area.
107	GPS quality changed – Quiet Information.	GPS quality has changed.	Check the GPS receiver settings.
108	GPS quality changed – Infomation.		
109	GPS quality changed – Warning.		
111	Message RMC is not received.	Wrong settings of the GPS receiver.	Check the GPS receiver settings.
112	Message GGA is not received.	Wrong settings of the GPS receiver.	Check the GPS receiver settings.
113	Message VTG is not received.	Wrong settings of the GPS receiver.	Check the GPS receiver settings.
114	Message J1939 VP is not received.	Wrong settings of the GPS receiver.	Check the GPS receiver settings.
115	Message J1939 VDS is not received.	Wrong settings of the GPS receiver.	Check the GPS receiver settings.
116	Message NMEA 2000 RDU is not received.	Wrong settings of the GPS receiver.	Check the GPS receiver settings.
117	Message NMEA 2000 CSD is not received.	Wrong settings of the GPS receiver.	Check the GPS receiver settings.
118	Message NMEA 2000 PD is not received.	Wrong settings of the GPS receiver.	Check the GPS receiver settings.

Error-No.	Description	Cause	Troubleshooting
119	GPS receiver lost RTK quality.	GPS receiver switched to lower gps quality than RTK.	Check reference age.
120	GPS receiver lost DGPS quality.	GPS receiver switched to lower gps quality as DGPS.	Check reference age.
121	GPS update rate is too slow.	Wrong settings of the GPS receiver.	Check the GPS receiver settings.
122	Clue Modem – Error	Any Clue Modem error.	See diagnostic for further information.
123	Clue Modem disconnect.	Connection lost.	Check contacts of connectors.
124	Baseline too far away.	Distance to RTK base station is far away.	Change RTK base station.
125	Contour – No last B-Point	Last B-point received.	System will reload the next valid contour.
126	Contour – Curve too thight	Contour is too tight in the curve.	System will reload the next valid contour.
127	Contour – Distance too small	Distance between 2 correction points too small.	System will reload the next valid contour.
128	Contour – Radius too thight	Radius too thight.	System will reload the next valid contour.
1000	No signal from angle sensor.	- Short circuit in cable. - Open wire in cable. - Sensor is defective. - Contacts of connectors are opened.	- Inspect angle sensor. - Check cables from PSR iBox to wheel angle sensor. - If all connections are good, replace wheel angle sensor. - Check contacts of connectors.
1001	Angle sensor does not work correctly.	- Axis is driven to block. - Mechanism or suspension of wheel angle sensor defective. - A new wheel angle sensor was assembled incorrectly. - An obstacle prevents the movement of the axis.	- Check mechanism of wheel angle sensor. - For new angle sensors, the sensor has to be calibrated through the „teach-in“ page.
1002	Angle sensor – teach data invalid.	-	Teach angle sensor.
1010	No signal from 2nd angle sensor.	- Short circuit in cable. - Open wire in cable. - Sensor is defective. - Contacts of connectors are opened.	- Inspect 2nd angle sensor. - Check cables from PSR iBox to wheel angle sensor. - If all connections are good, replace wheel angle sensor. - Check contacts of connectors.
1019	Recenter left and right angle sensor.	- Wheels run too far apart (out of phase). - Open wire in cable. - Sensor is defective. - Contacts of connectors are opened.	- Turn wheels from full left to full right - Check cables from PSR iBox to wheel angle sensor - If all connections are good, exchange wheel angle sensor - Check contacts of connectors
1020	Cabin door is open.	- Cabin door is open. - Open wire in cable. - Door switch is defective. - Contacts of connectors are opened.	- Close cabin door. - Check cables from PSR iBox to door switches. - Check door switches. - Check contacts of connectors.

Error-No.	Description	Cause	Troubleshooting
1040	Pressure sensor – open wire	- Pressure sensor is defective. - Open wire in cable. - Bolted connection of pressure sensor is not correct. - Contacts of connectors are opened.	- Pressure sensor is defective. - Open wire in cable. - Bolted connection of pressure sensor is not correct. - Contacts of connectors are opened.
1041	Pressure sensor – short circuit	- Pressure sensor is defective. - Short circuit in cable. - Bolted connection of pressure sensor is not correct. - Contacts of connectors are closed.	- Inspect pressure sensor. - Check cables from PSR iBox to pressure sensor. - Check bolted connection of pressure sensor. - Check contacts of connectors.
1042	Steering wheel was not turned.	Since last disengaging steering wheel was not turned.	Turn steering wheel, release and re-engage.
1080	Gyroscope – open wire	- Gyroscope is defective. - open wire in cable. - Contacts of connectors are opened.	- Inspect gyroscope. - Check cables from PSR iBox to gyroscope. - Check contacts of connectors.
1081	Gyroscope – short circuit	- Gyroscope is defective. - Short circuit in cable. - Contacts of connectors are closed.	- inspect gyroscope. - Check cables from PSR iBox to gyroscope. - Check contacts of connectors.
1082	Gyroscope – no reaction	Gyroscope is defective.	- Inspect gyroscope. - Check cables from PSR iBox to gyroscope. - Check contacts of connectors. - Check input value from gyroscope in the diagnosis menu.
1084	Gyroscope – out of range	Too sharp a turn with too high of speed	- See 1082. - Reduce speed. - Make wider turn.
1085	Gyroscope – average value is out of range	- Speed signal is defective. - Gyroscope is defective.	see 1082
1086	Gyroscope – speed is not allowed together with gyroscope	Constant speed is set in the system.	Manual speed entry needs to be adjusted by a service technician.
1087	Last error message from Gilt sensor was not received	- Sensor is defective. - SPI communication problem.	Contact your customer service.
1088	Gilt sensor – EEPROM data invalid	- Sensor is defective. - SPI communication problem.	- Contact your customer service. - Restart PSR.
1089	Gilt sensor – temperature compensation not active	- Sensor is defective. - SPI communication problem.	- Contact your customer service. - Restart PSR.
1094	Gilt sensor – invalid parameter	- Sensor is defective. - Sensor is not properly initialized.	Contact your customer service.
1095	Gilt sensor – invalid state	- Sensor is defective. - SPI communication problem.	- Contact your customer service. - Restart PSR.

Error-No.	Description	Cause	Troubleshooting
1096	Gilt sensor – invalid offset	- Sensor is defective. - Sensor is not properly initialized.	- Contact your customer service. - Restart PSR.
1097	Gilt sensor – ID failed	- Sensor is defective. - Sensor is not properly initialized.	- Contact your customer service. - Restart PSR.
1098	Gilt sensor damaged.	Sensor is defective.	Contact your customer service.
1099	Gilt sensor – no AD values	- Sensor is defective. - SPI communication problem.	Contact your customer service.
1100	TAC sensor 1 – open wire	- TAC sensor is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect TAC sensor. - Check cables from PSR iBox to TAC sensor. - Check contacts of connectors.
1101	TAC sensor 1 – short ircuit	- TAC sensor is defective. - Short circuit in cable. - Contacts of connectors are closed.	- Inspect TAC sensor. - Check cables from PSR iBox to TAC sensor. - Check contacts of connectors.
1102	TAC sensor 2 – open wire	- TAC sensor is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect TAC sensor. - Check cables from PSR iBox to TAC sensor. - Check contacts of connectors.
1103	TAC sensor 2 – short ircuit	- TAC sensor is defective. - Short circuit in cable. - Contacts of connectors are closed.	- Inspect TAC sensor. - Check cables from PSR iBox to TAC sensor. - Check contacts of connectors.
1104	TAC sensor 3 – open wire	- TAC sensor is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect TAC sensor. - Check cables from PSR iBox to TAC sensor. - Check contacts of connectors.
1105	TAC sensor 3 – short ircuit	- TAC sensor is defective. - Short circuit in cable. - contacts of connectors are closed.	- Inspect TAC sensor. - Check cables from PSR iBox to TAC sensor. - Check contacts of connectors.
1106	TAC sensor 4 – open wire	- TAC sensor is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect TAC sensor. - Check cables from PSR iBox to TAC sensor. - Check contacts of connectors.
1107	TAC sensor 4 – short ircuit	- TAC sensor is defective. - Short circuit in cable. - Contacts of connectors are closed.	- Inspect TAC sensor. - Check cables from PSR iBox to TAC sensor. - Check contacts of connectors.
1115	Joystick – open wire.	- Joystick is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect joystick. - Check cables from PSR iBox to joy-stick. - Check contacts of connectors.

Error-No.	Description	Cause	Troubleshooting
1116	Joystick – short ircuit.	- Joystick is defective. - Short circuit in cable. - Contacts of connectors are closed.	- Inspect joystick. - Check cables from PSR iBox to row-feeler. - Check contacts of connectors.
1117	Joystick – configuration invalid.	Second angle senor is used.	- Use only one angle sensor. - Disable joystick.
1120	Work position sensor – configuration invalid	A setting of configuration is invalid.	- Reconfigure the sensor. - Disable Work Position Sensor.
1121	Work position sensor – data invalid	- Sensor data invalid. - ISO message is invalid.	- Reconfigure the sensor. - Disable Work Position Sensor.
1122	Work position sensor – unknown position	Current position of sensor is unknown.	- Reconfigure the sensor. - Disable Work Position Sensor.
1150	Rowfinder – open wire.	- Rowfeeler is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect rowfinder. - Check cables from PSR iBox to row-finder. - Check contacts of connectors.
1151	Rowfinder – short ircuit.	- Rowfeeler is defective. - Short circuit in cable. - Contacts of connectors are closed.	- Inspect rowfinder. - Check cables from PSR iBox to row-finder. - Check contacts of connectors.
1152	Teach tilt sensor	Tilt sensor is not calibrated.	- Disable tilt sensor. - Calibrate tilt sensor.
1153	Terrain sensor – configuration invalid	Configuration is invalid.	Calibrate terrain sensor.
1200	Camera – no reaction.	- Camera is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect camera. - Check cables from PSR iBox to ca-mera. - Check contacts of connectors.
1210	No signal from camera while operating.	- Camera is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect camera. - Check cables from PSR iBox to ca-mera. - Check contacts of connectors.
1220	No signal from camera while operating.	- Adjustment of camera is incorrect. - Distance between camera and plants is too small. - There‘s excess vegetation between pl-antrows.	- Check mounting of the camera. - Check parameter/adjustments of the camera. - Clean camera lens. - Use additional lighting when ambi-ent lighting is poor.
1350	Speed is too fast.	Vehicle speed is too fast.	Reduce speed and activate system again.
1351	No speed information from "ISO GBSD".	Tractor ECU doesn‘t support this speed message.	Change setting of speed signal source.

Error-No.	Description	Cause	Troubleshooting
1352	no speed information from „ISO WBSD“.	Tractor ECU doesn‘t support this speed message.	Change setting of speed signal source.
1353	Invalid speed information.	- Source of speed information is invalid. - No messages received from source of speed.	Change setting of speed signal source.
1354	Constant speed is active.	- For testing, constant speed is activated WARNING Risk of injury! Once PSR is engaged, the axle is driven and the wheels can move. Ensure that no persons are in the danger zone and drive with the utmost care.	- Change settings. - Contact your customer service.
1355	Speed too high for engaging.	Current speed is too high.	Reduce speed for engagement.
1356	No speed information from "NMEA_2000".	No NMEA_2000 speed information available.	Change setting of speed signal source.
1357	Speed is out of range.	- Speed is too slow - Speed is too fast	- Speed up. - Reduce speed.
1358	Speed – configuration invalid	CAN-Bus 2 can not used.	Select CAN-Bus 1.
1400	Ultrasonic sensor 1 – open wire	- Ultrasonic sensor 1 is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect ultrasonic sensor 1. - Check cables from PSR iBox to ultrasonic sensor 1. - Check contacts of connectors.
1401	Ultrasonic sensor 2 – open wire	- Ultrasonic sensor 2 is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect ultrasonic sensor 2. - Check cables from PSR iBox to ultrasonic sensor 2. - Check contacts of connectors.
1402	Ultrasonic sensor 3 – open wire	- Ultrasonic sensor 3 is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect ultrasonic sensor 3. - Check cables from PSR iBox to ultrasonic sensor 3. - Check contacts of connectors.
1403	Ultrasonic sensor 4 – open wire	- Ultrasonic sensor 4 is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect ultrasonic sensor 4. - Check cables from PSR iBox to ultrasonic sensor 4. - Check contacts of connectors.
1404	All ultrasonic sensor – open wire	- Connector is disconnected from the front plug box. - Open wire at ground or start signal. - Contacts of connectors are opened.	- Inspect all ultrasonic sensors . - Check cables from PSR iBox to all ultrasonic sensor. - Check contacts of connectors.
1410	Ultrasonic sensor – 1 no signal	Detectable objects are out of range.	- Inspect ultrasonic sensor 1. - Check adjustment of ultrasonic sensor 1.
1411	Ultrasonic sensor – 2 no signal	Detectable objects are out of range.	- Inspect ultrasonic sensor 2. - Check adjustment of ultrasonic sensor 2

Error-No.	Description	Cause	Troubleshooting
1412	Ultrasonic sensor – 3 no signal	Detectable objects are out of range.	- Inspect ultrasonic sensor 3. - Check adjustment of ultrasonic sensor 3.
1413	Ultrasonic sensor – 4 no signal	Detectable objects are out of range.	- Inspect ultrasonic sensor 4 - Check adjustment of ultrasonic sensor 4
1414	All ultrasonic sensors – no signal	All detectable objects are out of range.	Check adjustment of all ultrasonic sensor.
1500	Lock valve left – open wire	- Lock valve is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect lock valve. - Check cables from PSR iBox to lock valve. - Check contacts of connectors.
1501	Lock valve left – short circuit	- Lock valve is defective. - Short circuit in cable. - Contacts of connectors are closed.	- Inspect lock valve. - Check cables from PSR iBox to lock valve. - Check contacts of connectors.
1502	Lock valve right – open wire	- Lock valve is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect lock valve. - Check cables from PSR iBox to lock valve. - Check contacts of connectors.
1503	Lock valve right – short circuit	- Lock valve is defective. - Short circuit in cable. - Contacts of connectors are closed.	- Inspect lock valve. - Check cables from PSR iBox to lock valve. - Check contacts of connectors.
1550	Steer valve – left open wire	- Steer valve is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect steer valve . - Check cables from PSR iBox to steer valve. - Check contacts of connectors.
1551	Steer valve – left short circuit	- Steer valve is defective. - Short circuit in cable. - Contacts of connectors are closed.	- Inspect steer valve. - Check cables from PSR iBox to steer valve. - check contacts of connectors.
1552	Steer valve – right open wire	- Steer valve is defective. - Open wire in cable. - Contacts of connectors are opened.	- Inspect steer valve. - Check cables from PSR iBox to steer valve. - Check contacts of connectors.
1553	Steer valve – right short circuit	- Steer valve is defective. - Short circuit in cable. - Contacts of connectors are closed.	- Inspect steer valve . - Check cables from PSR iBox to steer valve. - Check contacts of connectors.
1700	Front plug – no voltage	- Outlet at the PSR iBox is defective. - Short circuit in cable.	Check cables from PSR iBox to front plug.
1701	Start signal – ultrasonic no voltage	- Outlet at the PSR iBox is defective. - Short circuit in cable.	Check cables from PSR iBox to front plug.
1702	GPS – no voltage	- Outlet at the PSR iBox is defective. - Short circuit in cable.	Check cables from PSR iBox to GPS receiver.

Error-No.	Description	Cause	Troubleshooting
1703	Sensors – no voltage	- Outlet at the PSR iBox is defective. - Short circuit in cable.	Check cables from PSR iBox to all sensors.
1710	No power at relay input side.	- Fuse defective. - Power supply is not switched on.	- Check fuses in iBox and at power input. - Check power is switch on.
1711	No power at relay output side	Relay in iBox is defective.	Contact your customer service.
2100	Incremental axle	No pulse signal at channel A.	Check cables from PSR iBox to incremental sensor (for example: RDU).
2101	Incremental axle	No pulse signal at channel B.	Check cables from PSR iBox to incremental sensor (for example: RDU).
2102	Incremental axle	No pulse signal at channel A and B.	Check cables from PSR iBox to incremental sensor (for example: RDU).
2110	RDU/RDU2/RDU3 – voltage too high	Supply voltage is too high.	Change the supply voltage of the iBox to max 15V.
2150	John Deere Autotrac	No communication.	Check cables from PSR iBox to JD Autotrac Motor.
2155	AG junction motor	No communication.	Check cables between PSR an AG junction motor.
2156	Novariant motor	No communication.	Check cables between PSR an Novariant motor.
2200	Footswitch error	- Footswitch defective. - Short circuit in cable. - Footswitch engaged too long or stuck.	- Check footswitch - Check cables from PSR iBox to footswitch
2300	Challenger MT 700/800 hydraulic lockout switch engaged	The hydraulics are locked out by switch.	Check hydraulic lockout switch
2301	Challenger MT 700/800 – communication error	- Poor CAN connection. - Activate ISO implementation level 3 on the Challenger screen (A-B series).	- Check cables from PSR iBox to Challenger ISOBUS. - Verify correct vehicle code entered. - Activate ISO implemention level 3 on the Challenger screen (A-B series).
2310	ISO Fendt – communication error CAN bus 1	PSR doesn‘t receive information from CAN bus.	Contact your customer service.
2311	ISO Fendt – communication error CAN bus 2	PSR doesn‘t receive information from CAN bus.	Contact your customer service.
2312	CASE Combine – communication error	No connection to CASE Combine.	Contact your customer service.
2313	CASE Combine – System lock	System is locked by armrest switch.	Unlock system by pressing and holding armrest switch.
2314	CASE Combine – no message from PSR	CASE controller does not receive messages from PSR.	Contact your customer service.
2315	ISO AGCO Combine – communication error CAN bus 1	PSR doesn‘t receive information from CAN bus.	Contact your customer service.
2316	ISO AGCO Combine – communication error CAN bus 2	PSR doesn‘t receive information from CAN bus.	Contact your customer service.
2317	ISO AgriFac – communication error	PSR doesn‘t receive GMS messages.	Contact your customer service.
2318	ISO AgriFac – communication error	PSR doesn‘t receive vehicle / joystick messages.	Contact your customer service.

Error-No.	Description	Cause	Troubleshooting
2319	ISO Steering-Controller communication error	PSR doesn‘t receive messages from the steering controller.	Contact your customer service.
2320	ISO Challenger Tractor MT 675 C – communication error CAN bus 1	The steering is disengaged by switch.	Check switch.
2321	ISO Challenger Tractor MT 675 C – communication error CAN bus 2	PSR doesn‘t receive information from CAN bus.	Contact your customer service.
2322	ISO AGCO Windrower – communication error CAN bus 2	PSR doesn‘t receive information from CAN bus.	Contact your customer service.
2323	ISO AGCO Windrower – communication error from PSR	Windrower has not detected PSR.	Contact your customer service.
2324	ISO AGCO Windrower not ready to use.	Windrower is not moving forward.	Drive forward in gear 1 or 2.
2325	ISO Challenger Tractor 900 C – communication error	PSR doesn‘t receive any information from Challenger 900 C.	Contact your customer service.
2330	CLAAS XERION – communication error	PSR doesn‘t receive any information from XERION.	Check cables from PSR iBox to vehicle 2. CAN bus
2335	CLAAS LEXION – communication error	PSR doesn‘t receive any information from LEXION.	Check cables from PSR iBox to vehicle 2. CAN bus
2336	CNH Tractor – communication error	PSR doesn‘t receive any information from tractor.	Check cables from PSR iBox to vehicle 2. CAN-BUS.
2337	ALMACO Combine – communication error	PSR doesn‘t receive any information from combine.	Contact your customer service.
2340	Krone Big X / Big M – communication error	PSR doesn‘t receive any information from Krone.	Contact your customer service.
2341	Amazone Sprayer Pantera	No communication.	Contact your customer service.
2342	Kubota Tractor	No communication.	Contact your customer service.
2343	Miller Nitro – Auto-Steer-Ready	No communication.	Contact your customer service.
2345	Rostselmash Torum Combine – communication error CAN bus 1	PSR doesn‘t receive information from CAN bus.	Contact your customer service.
2346	Rostselmash Torum Combine – communication error CAN bus 2	PSR doesn‘t receive information from CAN bus.	Contact your customer service.
2347	Valtra Tractor – communication error CAN bus 1	PSR doesn‘t receive information from CAN bus.	Contact your customer service.
2348	Valtra Tractor – communication error CAN bus 2	PSR doesn‘t receive information from CAN bus.	Contact your customer service.
2349	Rostselmash Torum – current gear is not correct	Current gear is not correct.	Shift gears.
2350	2. CAN bus – communication error	Poor CAN connection.	Check cables from PSR iBox to vehicle 2. CAN bus.
2351	TerraGator – 1. CAN bus – communication error	Poor CAN connection.	Check cables from PSR iBox to vehicle 1. CAN bus.
2352	TerraGator – 2. CAN bus – communication error	Poor CAN connection.	Check cables from PSR iBox to vehicle 2. CAN bus.
2353	TerraGator – no valid rear axle position	No information about rear axle position	Contact your customer service.

Error-No.	Description	Cause	Troubleshooting
2360	TL TOP not ready to use	- Application has not been started - It has not yet created a GPS job	- Start application. - Setup a new gps job. - Disable TL TOP communication in teach menu.
2361	Auxiliary valve – communication error	- No TECU available - Connected TECU does not support auxiliary valve function	- Check ISO bus for TECU member. - Check ISO bus if there are more than one TECU active.
2362	TL TOP – old Version	- TL TOP using an older protocol version - PSR could using a newer protocol version	Update TL TOP software.
2363	TL TOP – newer Version	- TL TOP could using an newer protocol version. - PSR using an older protocol version.	Update PSR controller.
2364	TL TOP – connection lost	- Timeout is detected. Connection to TL TOP was lost. - TL TOP is not available.	- Contact your customer service. - Deactivate TL TOP function at teach menu.
2380	AUX function – connection lost	- Joystick has been turned off. - Communication too joystick interrupted.	Check joystick.
2381	AUX function – wrong settings	Function ID is invalid.	Contact your customer service.
2382	AUX function – duplicated function ID	Function ID is duplicated.	Contact your customer service.
2383	AUX function – assignment rejected	VT has any other issue.	Contact your customer service.
2384	AUX function – no response from VT	VT has not response the assignment.	Contact your customer service.
2385	AUX function – function ID not supported	ISO Lib doesn‘t support a function ID.	Contact your customer service.
2386	AUX function – different Types	Function type and inpunt types are not the same.	Contact your customer service.
2387	AUX function – cannot be stored	Assignment can not be stored.	Contact your customer service.
2388	AUX function – input unit	Input Unit invalid.	Contact manufacturer of input unit.
2389	AUX function – input unit	Function from input unit are invalid.	Contact manufacturer of input unit.
2390	AUX function – unknown error	Any other error.	Contact your customer service.
2400	Tilt sensor – short to ground	- Tilt sensor defective. - Short to ground. - Contacts of connectors are opened.	Check cables from PSR iBox to tilt sensor.
2401	Tilt sensor – short to battery	- Tilt sensor defective. - Short to battery. - Contacts of connectors are closed.	Check cables from PSR iBox to tilt sensor.
2402	Tilt sensor – not connected	- Tilt sensor defective. - Open wire in cable. - Contacts of connectors are opened.	Check cables from PSR iBox to tilt sensor.

Error-No.	Description	Cause	Troubleshooting
2403	Tilt sensor – no reaction	- Tilt sensor defective. - Open wire in cable. - Contacts of connectors are opened.	Check cables from PSR iBox to tilt sensor.
2410	Engagement denied by krone machine.	Operator tried to engage by footswitch or terminal.	Operator has to be engaged by joystick.
3001	Vehicle code for vehicle 1 is invalid.	Wrong vehicle code is set up, or no vehicle code entered.	Enter a valid vehicle code for vehicle 1.
3002	Vehicle code for vehicle 2 is invalid.	Wrong vehicle code is set up, or no vehicle code entered.	Enter a valid vehicle code for vehicle 2.
3003	Vehicle code for vehicle 3 is invalid.	Wrong vehicle code is set up, or no vehicle code entered.	Enter a valid vehicle code for vehicle 3.
3004	Vehicle code for vehicle 4 is invalid.	Wrong vehicle code is set up, or no vehicle code entered.	Enter a valid vehicle code for vehicle 4.
3005	Vehicle code for vehicle 5 is invalid.	Wrong vehicle code is set up, or no vehicle code entered.	Enter a valid vehicle code for vehicle 5.
3006	Vehicle code for vehicle 6 is invalid.	Wrong vehicle code is set up, or no vehicle code entered.	Enter a valid vehicle code for vehicle 6.
3007	Vehicle code for vehicle 7 is invalid.	Wrong vehicle code is set up, or no vehicle code entered.	Enter a valid vehicle code for vehicle 7.
3008	Vehicle code for vehicle 8 is invalid.	Wrong vehicle code is set up, or no vehicle code entered.	Enter a valid vehicle code for vehicle 8.
3010	Left axle position is not calibrated.	Left axle position is not calibrated.	Teach left axle positon.
3011	Center axle position is not calibrated.	Center axle position is not calibrated.	Teach center axle position.
3012	Right axle position is not calibrated.	Right axle position is not calibrated.	Teach right axle position.
3013	Current controller is not calibrated.	Current controller is not calibrated.	Teach current controller.
3014	Pressure sensor is not calibrated.	Pressure sensor is not calibrated.	Teach pressure sensor neutral position.
3015	TAC sensor is not calibrated.	TAC sensor is not calibrated.	Teach TAC sensor neutral position.
3016	Rowfinder is not calibrated.	Rowfinder is not calibrated.	Teach rowfinder neutral position.
3017	GPS receiver height is not calibrated.	GPS receiver height is not calibrated.	Teach mounted height of GPS receiver.
3018	GPS receiver offset left - right is not calibrated.	GPS receiver offset left - right is not calibrated	Teach left and right offset of GPS receiver center position.
3019	GPS receiver look ahead is not calibrated.	GPS receiver look ahead is not calibrated	Teach look ahead of GPS receiver.
3020	Joystick is not calibrated.	Joystick is not calibrated.	Teach analog signal center position for joystick.
3030	Travel direction is not set correctly.	Teach value of “axle type“ and “travel direction type“ doesn‘t match. When travel direction is “Sensor + GPS“ then axle type has to be “wheel angle sensor“.	- Change axle sensor type. - Change travel direction type.
3050	No ISO-VT present	No ISO-VT connected or switched on.	Check cables from PSR iBox and ISO-VT.

Error-No.	Description	Cause	Troubleshooting
4000	No communcation to Terra Variant.	No CAN information received from Terra Variant.	- Check cables from PSR iBox to Terra Variant - Check vehicle code
4010	No communcation to Kubota M7 VCU1.	No CAN information received from M7 VCU1.	Check cables from PSR iBox-MC to Kubota Tractor.
4011	No communcation to Kubota M7 VCU2.	No CAN information received from M7 VCU2.	Check cables from PSR iBox-MC to Kubota Tractor.
4012	Invalid resume switch state with Kubota M7.	Invalid resume switch state.	- Check cables from PSR iBox-MC to M7 VCU2. - check resume switch
4013	Invalid resume switch state with Kubota M7.	Invalid resume switch state.	- Check cables from PSR iBox-MC to M7 VCU2. - Check resume switch.
4020	Braud – field / road switch	Status „road“ is active.	Engage field status.
4021	No communciation to Braud.	No sensor readings.	Contact your customer service.
4022	No communciation to Braud.	No speed readings.	Contact your customer service.
4023	No communciation to Braud.	No safety switch readings.	Contact your customer service.
4024	No communciation to Braud.	No field/road switch readings.	Contact your customer service.
4030	Oxbo 8840 – communication error	No sensor readings.	Contact the software department.
4031	Oxbo 8840 – system locked	System is locked by vehicle.	Unlock system by vehicle.
4032	Oxbo 8840 – communication error	No safety flags readings.	Contact the software department.
4033	Oxbo 8840 – communication error	No status readings.	Contact the software department.
4034	Oxbo 8840 – no communication	No connection to vehicle.	Check CAN bus connection.
4050	TIM – system not ready to use	TIM client is not ready to use.	Engaging is only at server side possible.
4051	TIM – time out server status	Server did‘t send status messages.	Cycle power TIM server.
4052	TIM – time out External Guidance status	Server send no status for 'controlled function'.	Cycle power TIM server.
4055	TIM – Version incompatible	Version between server and client not compatible.	Contact your customer service.
4056	TIM – Guideline incompatible	Guideline version between Fendt server and client not compatible.	Contact your customer service.
4060	TIM – Requested function not supported	Client function not supported from server.	Check TIM server settings.
4061	TIM – Facilities function not supported	Client facilities function not supported from server.	Check TIM server settings.
4062	TIM – Requested function not possible	Requested function from client not possible to use.	Check TIM server settings.
4063	TIM – No server first status received	Server didn‘t send a status messages.	Cycle power TIM server.
4064	TIM – server no version response	Server didn‘t response to client.	Cycle power TIM server.
4065	TIM – server no connection response	Server didn‘t response to client.	Cycle power TIM server.

Error-No.	Description	Cause	Troubleshooting
4066	TIM – server no supported function response	Server didn‘t response to client.	Cycle power TIM server.
4067	TIM – server no function reservation response	Server didn‘t response to client.	Cycle power TIM server.
4068	TIM – Fendt server – no authentication response	Server didn‘t response to client.	Contact your customer service.
4069	TIM – Fendt server invalid authentication	Authentication is invalid.	Contact your customer service.
9000	Invalid hardware.	The hardware used is not compatible for this software.	Contact your customer service.
9001	Terminal version is too old.	Software update from PSR iBox.	Update the terminal with the latest software version available.
9002	No steering mode is selected.	- There is no steering mode selected. - A time limited license has expired.	- Select a steering mode. - Contact your customer service.
9020	No additional time licenses are possible.	A time limited license was used 3 times.	Contact your customer service.
9021	A time limited license ends	A time limited license ends.	Contact your customer service.
9050	Battery power lost before system shut down completely	- Battery / switched power wiring not correct. - Software issues.	- System has no battery power or proper switch. - Contact your customer service.
9060	Field/road switch	- Not in field position - Switch is defective.	Check switch position.
9100	EEPROM – write error	- EEPROM is defective. - EEPROM is busy.	Contact your customer service.
9101	EEPROM – read error	- EEPROM is defective. - EEPROM is busy.	Contact your customer service.
9102	Check EEPROM data.	Older software is updated.	Check all parameters and settings.
9103	EEPROM values changed automatically	After software update is it sometimes necessary to set parameters to default.	Check parameters.
9104	EEPROM value(s) out of range.	A parameter was out of range and set to default.	Contact your customer service.
9105	Vehicle offsets not taught.	after software update new vehicle offsets need to be taught.	Teach vehicle offsets.
9106	EEPROM – too small	EEPROM is not huge enought for this software.	Update to previous software.
9107	EEPROM – Read access error	Read access while write access is still active.	Contact the software department.
9108	EEPROM – Write access error	Write access while read access is still active.	Contact the software department.
9200	Direction of travel is unknown.	After startup, or in case of failure, the direction of travel is unknown.	- Drive vehicle until direction of travel is known. - Check setup, type of detection for direction of travel.
9991	Task 1 – runtime error	Task 1 requires too much time.	Contact your customer service.
9992	Task 2 – runtime error	Task 2 requires too much time.	Contact your customer service.
9993	Task 3 – runtime error	Task 3 requires too much time.	Contact your customer service.
9994	Task 4 – runtime error	Task 4 requires too much time.	Contact your customer service.

Error-No.	Description	Cause	Troubleshooting
9996	Error – UDS Lib	within the UDS - Lib an error has occured.	Please note the „Error UDS“-Number. This can be seen from the diagnostic menu. Send this number to your customer service.
9997	USER stack overflow.	USER stack size is too small.	Contact your customer service.
9998	Internal calculation errors.	Function has some problems.	Please note the "Error intern"-Number. This can be seen from the diagnostic menu. Send this number to your customer service.
9999	Error ISO Lib	Within the ISO Lib an error has occured.	Please note the "Error ISO"-Number. This can be seen from the diagnostic menu. Send this number to your customer service.