

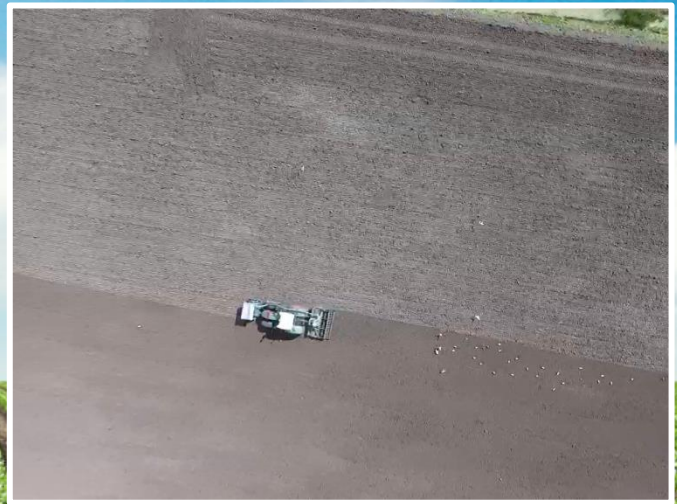
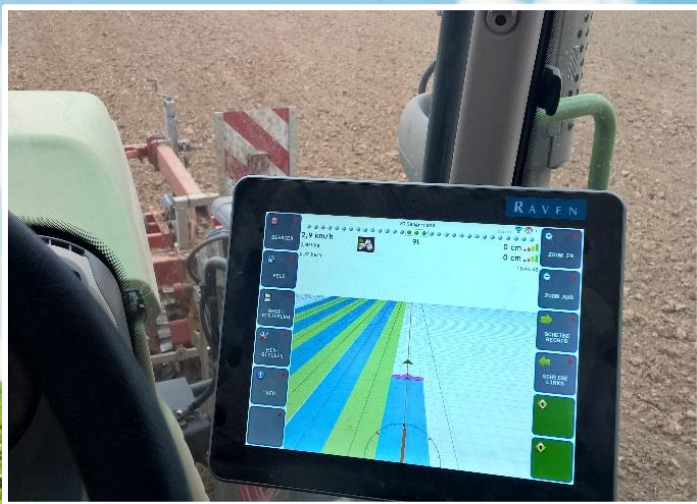


USER MANUAL
(ENGLISH) (TRANSLATION)

SBGuidance 4.2.0

Software operation

016-8000-012EN Rev. A



Performing perfection.



Warning!

This user manual must be made available to anybody who is involved in the installation, commissioning, operation, servicing and repair of this product.

Name of device:	
Type designation:	
Serial no. of manifold:	
Serial no. of terminal:	
Serial no. of Steering Controller:	
Serial no. of DynamIQ:	
Year of manufacture:	
Options:	
Installed software modules:	
1	
2	
3	
4	
5	

Your dealer:

Preface

This user manual is intended for anybody who is responsible for operating the SBGuidance software. It contains important instructions which must be followed when commissioning, operating and servicing your SBGuidance system. This manual must therefore be read and understood by responsible personnel BEFORE the system is used and must always be kept in the close vicinity of the machine.

This manual is a translation of the original Dutch document. This manual has been compiled with the utmost care. SBG Precision Farming assumes no responsibility for any errors or omissions in this document.

Please send any comments or questions to service-eu@ravenind.com.

Neither SBG Precision Farming nor any of its suppliers may be held liable for any injury or damage to property which may arise during use of the SBGuidance system.

The installed SBG system produces less than 70 dB(A).

In this user manual, a number of phrases are used to draw attention to particular aspects of the SBGuidance system.

Tip!
Provides recommendations on how certain activities can be performed much easier.


Please note!
Indicates certain problems that the user should take note of.


Caution!
Indicates that the machine can be damaged.


Warning!
Indicates a risk of injury.





Disclaimer


-  **Warning!**


The safety instructions contained in the operating manual of the tractor or the machine must be complied with at all times.
-  **Warning!**


It is strictly forbidden to use the SBGuidance system on public roads.
-  **Warning!**


It is strictly forbidden to leave a machine being operated with or without the SBGuidance steering system activated.
-  **Warning!**


In order to prevent personal injury or fire, defective or blown fuses may only be replaced by fuses of the same type and amperage.
-  **Warning!**


The SBGuidance steering system is not capable of identifying and avoiding obstacles. Any obstacles along the driving path must be avoided by the driver.
-  **Warning!**


Only allow authorised persons to operate the system. Authorised persons include: Persons who have read and understood the operating manual and who are both physically and mentally fit to operate the system.
-  **Warning!**


The system contains moving parts. Make sure that the immediate vicinity of the machine is clear of people.
-  **Warning!**


Always wear personal protective equipment when operating/adjusting/repairing the system outside of the tractor cabin.
-  **Warning!**

In case of system failure or breakdown switch of the tractor and disconnect the electrical power source to avoid further damage. Contact your dealer for further instructions on how to repair your system.
-  **Caution!**

Always start the machine first, before activating the SBGuidance steering system in order to prevent the occurrence of a peak voltage.
-  **Caution!**

Only touch the touch-screen with your finger or with a special touch-screen stylus. Sharp objects may cause irreparable damage to the touch-screen.
-  **Caution!**

Only clean the screen using a damp cloth. Never use caustic or other aggressive substances.
-  **Please note!**

If the terminal is not used for a long period, better remove the terminal from the tractor and store in a heated environment. This will extend the life span of the electronic components.
-  **Please note!**

To prevent theft, it is better to not let the terminal and GPS antenna unattended in the tractor on the field.

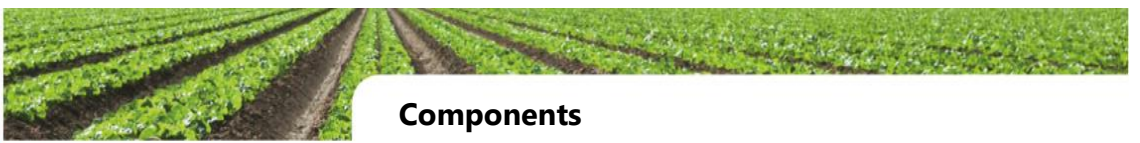
Content

Preface	3
Disclaimer	4
1. Components	9
1.1. Viper 4+ terminal.....	9
1.2. Viper 4 terminal	10
1.3. SlingShot field hub 2.0	11
1.4. GPS antenna.....	11
1.5. Terminal mounting bracket.....	12
1.5.1.RAM-D mount.....	12
1.5.2.RAM-C mount.....	12
1.6. Connecting the terminal	13
2. Starting the system	15
2.1. Conditions of use	15
2.2. SBGuidance Loader	16
3. Main menu	19
3.1. Soft keys	19
3.2. Top information bar	20
4. Fields	21
4.1. Creating a new field	21
4.1.1.A+ field	22
4.1.2.A-B field	23
4.1.3.Contour field	24
4.1.4.Saving a line/field	26
4.2. Defining a new operation	27
4.3. Defining additional operations or headland lines.....	31
4.4. Loading a field.....	32
4.5. Loading fast.....	33



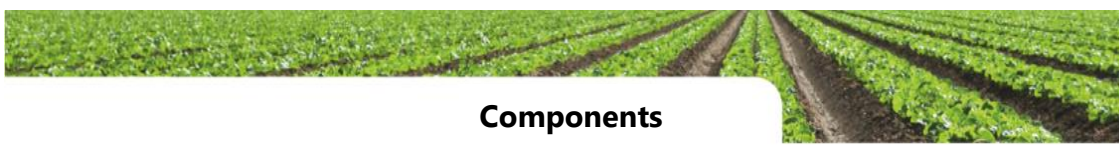
4.6. Editing a field.....	34
5. Registration	37
5.1. Points of interest	37
5.2. Lines	38
5.2.1. Reference line	38
5.2.2. Navigation line	38
5.3. Height.....	41
5.4. Task (Crop registration)	42
6. Settings.....	43
6.1. Vehicle settings.....	43
6.1.1. SBGuidance Auto	44
6.1.2. SBGuidance Side-Shift.....	48
6.1.3. SBGuidance TWIN / Side-Shift.....	50
6.1.4. SBGuidance TWIN / Disc	50
6.1.5. SBGuidance Vario ploughs.....	51
6.1.6. SBGuidance Onland ploughing	53
6.1.7. SBGuidance SmartProfiler.....	55
6.2. GPS set-up.....	57
6.2.1. Receiver	57
6.2.2. Modem.....	59
6.3. System set-up	61
6.4. SmartSwitch (Section Controller)	62
6.5. VRA (Variable Rate Application)	63
7. Info	65
7.1. GPS info.....	65
7.1.1. Position.....	65
7.1.2. Orientation	67
7.2. Field info	69

7.2.1. Details.....	69
7.2.2. Work data	69
7.2.3. Map	70
7.2.4. Edit	71
7.3. System info	71
7.3.1. Error messages	71
7.3.2. Version	71
7.3.3. Debug.....	72
7.3.4. Licence	73
7.4. Internet info	75
7.5. CAN info.....	76



Components

Intentionally left blank.



Components

1. Components

1.1. Viper 4+ terminal



Figure 1 Viper 4+ terminal.

In Figure 1 all the connections for the Viper 4+ terminal are numbered.

- 1. Radio (optional):** coax small (TNC).
- 2. GPS antenna 2:** coax small (TNC).
Connection for second antenna (GPS 2).
- 3. GPS antenna 1:** coax small (TNC).
Connection for main antenna (GPS 1).
- 4. WiFi antenna:** FNC.
- 5. Main power switch**
- 6. USB:** 2x.
- 7. Power:** 4-pin connection for 12V power supply.
- 8. Main interface:** 20-pin connector for serial and CAN-bus communication.
- 9. Ethernet:** 8-pin network connector.
- 10. External display:** DVI.
- 11. CAN-bus:** CAN-bus connector.
- 12. Camera input:** camera connection (not supported in combination with SBGuidance).
- 13. Touch-screen:** full operation via a colour touch-screen.



1.2. Viper 4 terminal

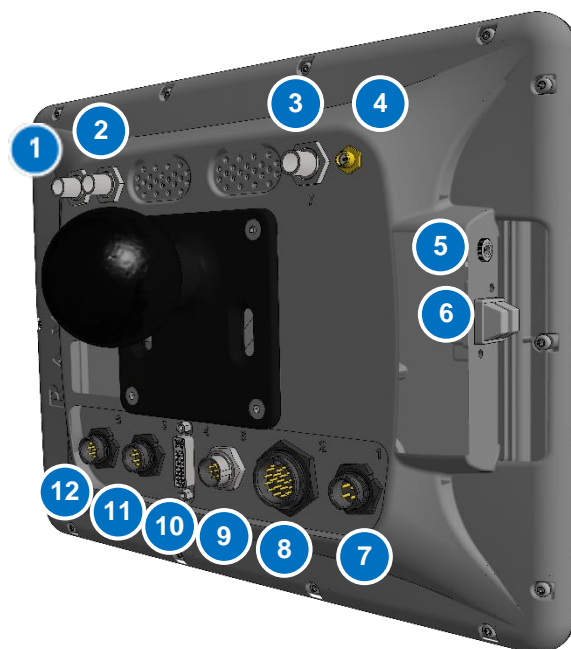


Figure 2 Viper 4 terminal.

In Figure 2 all the connections for the Viper 4 terminal are numbered.

- 1. Radio (optional):** coax small (TNC).
- 2. GPS antenna 2:** coax small (TNC). Connection for second antenna (GPS 2).
- 3. GPS antenna 1:** coax small (TNC). Connection for main antenna (GPS 1).
- 4. WiFi antenna:** FNC.
- 5. External audio:** 3.5 mm jack plug.
- 6. USB:** 2x.
- 7. Power:** 4-pin connection for 12V power supply.
- 8. Main interface:** 20-pin connector for serial and CAN-bus communication.
- 9. Ethernet:** 8-pin network connector.
- 10. External display:** DVI.
- 11. CAN-bus:** CAN-bus connector.
- 12. Camera input:** camera connection (not supported in combination with SBGuidance).
- 13. Touch-screen:** full operation via a colour touch-screen.
- 14. Main power switch**

1.3. SlingShot field hub 2.0

A GSM modem is required in order to receive the RTK correction signal over a mobile internet connection. A SlingShot field hub is a GSM modem with a dual GSM antenna which enables it to receive very low GSM signal strengths.

In Figure 3 all the connections for the SlingShot field hub are numbered.



Figure 3 SlingShot field hub.

1. **GSM antenna (main)**
2. **GPS antenna**
3. **GSM antenna (diversity)**
4. **RS-232:** COM port for serial communication; sends correction signal.
5. **Ethernet**
6. **Power**
7. **SIM slot (after removing dust cover)**
8. **LED lamps:** provide information about the connection status.

1.4. GPS antenna

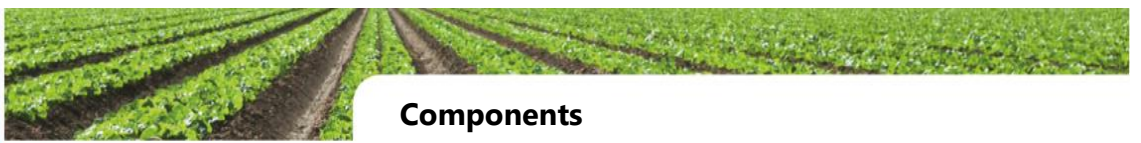
Figure 4 shows an installed GPS antenna:



Figure 4 GPS antenna.

1. **GPS antenna**
2. **UNC screw** (for mounting the GPS antenna).
3. **Dummy connector**
4. **Antenna cable with coaxial connection**

i Please note!
When removing the GPS antenna, always screw the antenna cable onto the dummy connector provided. This prevents dirt and/or water from penetrating into the antenna cable connector.



1.5. Terminal mounting bracket

The RAM-D is the standard mount for installing the Viper 4+, Viper 4 or GeoStar in the cab. A smaller RAM mount (RAM-C) is also available.

1.5.1. **RAM-D mount**

RAM-C mount shows a terminal installed with RAM-D ball joints. The RAM-D mount is standard for Geostar terminals. The RAM-D mount is recommended for Viper 4(+) terminals with an external GSM modem.

This type of mount allows the terminal position to be adjusted to suit the individual needs of the user.



Caution!

Ensure that the terminal does not fall when unscrewing the RAM arm.



Caution!

After installing the terminal, always check that the RAM arm is screwed in place tightly.

1.5.2. **RAM-C mount**

Figure 6 shows a terminal installed with RAM-C ball joints. The RAM-C mount is the smaller version of the RAM-D mount.



Figure 5 Viper 4+ with RAM-D mount.



Figure 6 Viper 4+ with RAM-C mount.

1.6. Connecting the terminal

To connect the terminal and cables, follow the steps below:

Viper 4 / Viper 4+ (before 2017 wiring):

1. Connect the data cable (Figure 7).
2. Connect the power supply cable.
3. Install the terminal using the RAM arm.
4. Connect the GPS antenna cable(s) and the radio or UMTS cable.
5. Screw the GPS cable into the correct position.
6. Unscrew the GPS antenna cable from the dummy connector and screw the cable onto the GPS antenna.



Figure 7 Connected Viper 4 terminal.

Viper 4 / Viper 4+ (2017 wiring):

1. Connect the DATA cable (Figure 8).
2. Connect the POWER cable.
3. **Connect the CAN cable (additional).**
4. Install the terminal using the RAM arm.
5. Connect the GPS antenna cable(s) and the radio or GSM cable(s).
6. Install the GPS cable in the correct position (on the roof).
7. Unscrew the GPS antenna cable from the dummy connector and screw the cable onto the GPS antenna.



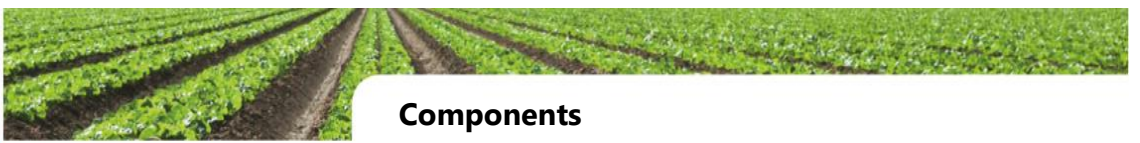
Figure 8 Connected Viper 4 terminal.

Please note!

Ensure that all connectors are pushed together correctly and fully tightened.

Caution!

Ensure that the RAM mount is sufficiently tightened.



Components

Intentionally left blank.



Starting the system



2. Starting the system

Start the terminal by briefly pressing the main power switch.

The system takes approximately 30 seconds to start up.

2.1. Conditions of use

Before you can start using the system, the conditions of use for the system are displayed. The user must read and accept these conditions (Figure 9).

The user accepts these conditions by tapping on **I AGREE**.

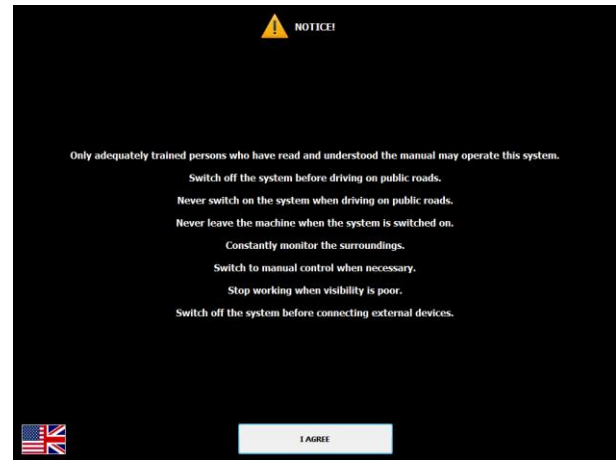


Figure 9 Conditions of use.

The language used to display the conditions of use can be changed by tapping the flag at bottom left of the screen. Changing the language also changes the language settings in applications such as the Field Manager and Machine Manager.

The screen shown in Figure 10 is then displayed. Choose a language by tapping the corresponding flag, then confirm your choice.



Figure 10 Language options for SBGuidance Loader.

Tap to confirm.



Tap to cancel.





Starting the system

2.2. SBGuidance Loader

Once the conditions of use have been accepted on the disclaimer screen, the SBGuidance Loader is displayed (Figure 11).

The Loader displays all the available tractors/ implements that are equipped with a SBGuidance system.

Select the required tractor or implement by tapping the green arrows or the name. The selected machine is then highlighted in blue and displayed centrally at the top of the screen.

After you have selected the machine, tap on **SBGUIDANCE** under the options window. The software starts and the relevant parameters are loaded. The start-up screen is displayed (Soft keys).

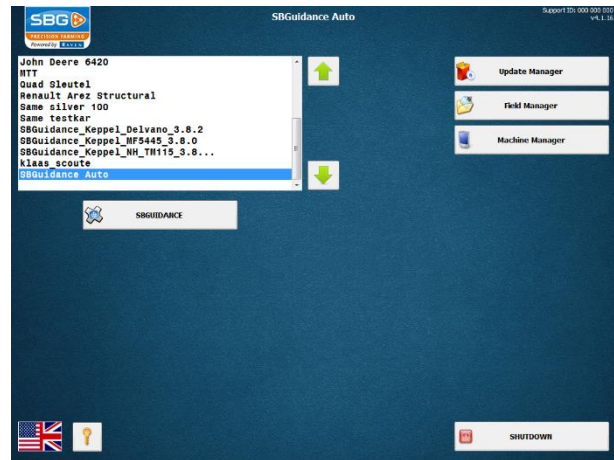


Figure 11 SBGuidance Loader.





Figure 12 Start-up screen.

Please note!

The tractor must always be stationary while the software starts up. The electronic terrain compensation module will now be calibrated.

To exit the system, tap on **SHUTDOWN** at the bottom right of the screen. The exit screen is then displayed (Figure 13).

Tap  to confirm. Tap  to cancel.

In addition to machine selection, the Loader also provides access to the following applications:

- ➔ **Base Manager:** can be used to select, add, change or remove a radio base station.
- ➔ **Slingshot Manager:** can be used to change the settings for a connected GSM Slingshot modem.

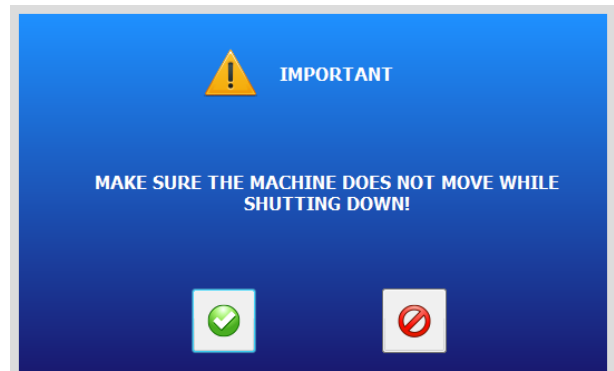


Figure 13 Exit screen.



Starting the system



- **Field Manager:** fields can be exchanged between operating terminals or with the SBGuidance Office Manager desktop software via the cloud or a USB memory stick.
- **Machine Manager:** can be used to exchange machine profile settings between different terminals.
- **Update Manager:** can be used to update the system.
- **WiFi Manager:** can be used to connect a terminal to an available WiFi network.

For further information on using these applications, refer to the manual for the application itself. These manuals can be found at:

<http://www.raveneurope.com/en/support/usermanuals/>



Starting the system

Intentionally left blank.

3. Main menu

After you have selected the machine and pressed the **SBGUIDANCE** button, the main menu of SBGuidance is displayed (Creating a new field).

Please note! The tractor must always be stationary while the software starts up. The electronic terrain compensation module is calibrated during this period.

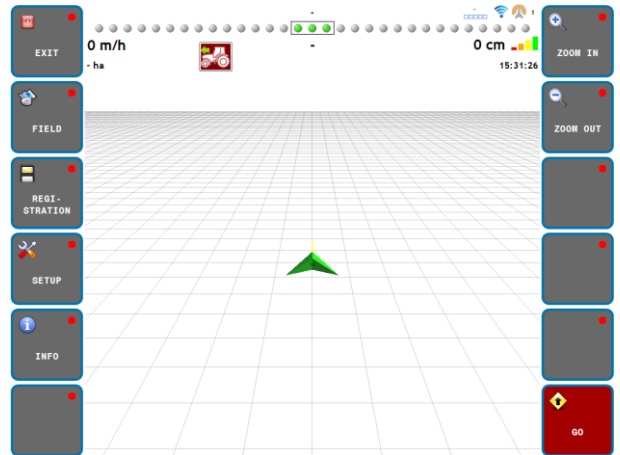


Figure 14 SBGuidance main menu.

3.1. Soft keys

An overview of the buttons (soft keys) available in the main menu appears below.

	<p>Close the software. Press and hold the button for ± 3 sec. The software closes down and the Loader is displayed again.</p>	<p>Zoom in (display)</p>	
	<p>Go to field menu</p>	<p>Zoom out (display)</p>	
	<p>Go to registration menu</p>		
	<p>Go to settings menu</p>		
	<p>Go to info menu</p>		
		<p>Activate/deactivate autosteer</p>	



3.2. Top information bar

General information is displayed at the top of the main menu (Figure 15). The user can see this information all the time, regardless of which menu is open.

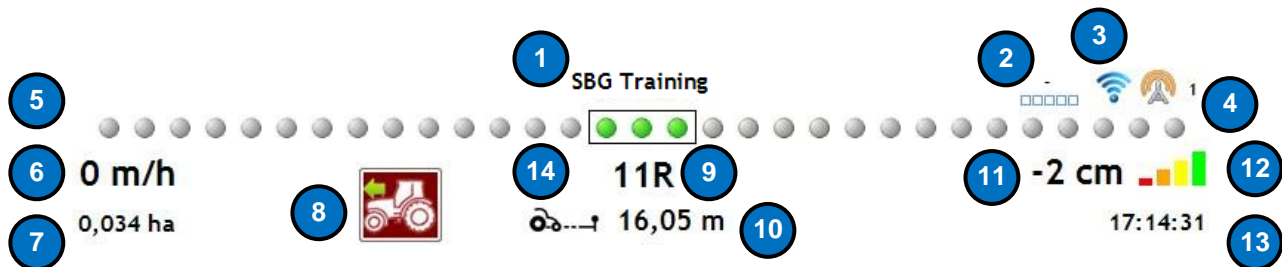







Figure 15 Top information bar.

1. **Name of the selected field**
2. **GeoConnect signal strength:** if you are using a correction signal over a GeoConnect GSM connection, the signal strength and type of GSM connection are displayed here: Orange boxes = 2G connection. Green = 3G connection. If a Slingshot field hub is used, the signal strength is not shown here.
3. **Internet connection:**
Blue icon = internet access
Grey icon = no internet access
4. **Diff. Age:** age of the correction signal in seconds.
5. **LED bar:** displays the position in relation to the reference line. The scale of the LEDs can be changed by touching the LED strip.
6. **Speed:** speed based on GPS.
7. **Area worked:** this area is linked to the loaded field.
8. **Forwards/reverse indicator:** if the direction displayed is different from the actual direction, this can be adjusted by touching the button.
9. **Track number**
10. **Distance to headland line**
11. **Deviation from reference line**
12. **GPS quality indicator:**
 -  No GPS signal
 -  GPS signal without corrections
 -  GPS signal + EGNOS
 -  RTK Float
 -  RTK Fix
13. **GPS time**
14. **Crop registration status:** if crop registration is activated, a diskette icon flashes at this position. A pause icon flashes during pauses in crop registration. If crop registration is not in use, this position is empty.

4. Fields

Figure 16 shows the functions that can be invoked by pressing the **FIELD** button.

An application can be cancelled at any time by tapping on **CANCEL** at the top left of the screen. To return to the main menu, tap on **BACK** at top left of the screen.

Please note! When you press **CANCEL**, all the data that has been entered is lost, as well as all defined points and reference lines. For this reason, the user is always asked to confirm the action when this key is pressed.

4.1. Creating a new field

A field consists of one or more straight and/or curved field boundaries or a complete contour. Each field boundary has a starting point and an end point. Corner points must be set for all types of field.

To create a new field: tap on **FIELD** in the main menu and then on **NEW FIELD**. Three different options for defining the field are then displayed at the bottom of the screen. A schematic overview is shown in Figure 17.

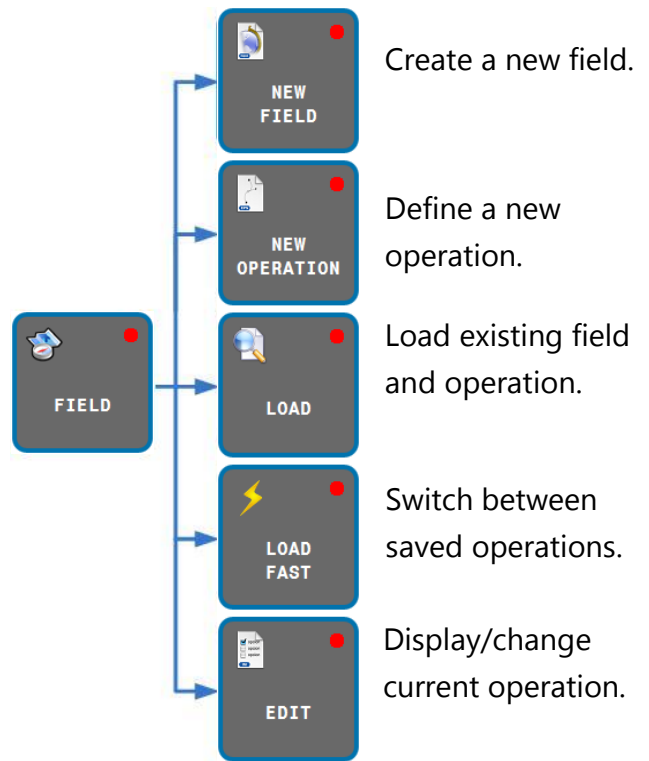


Figure 16 Field menu.

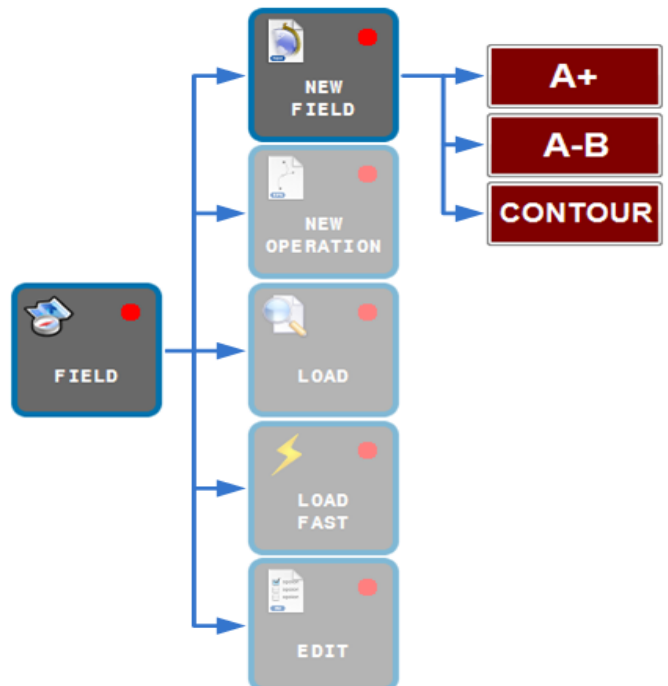


Figure 17 Options for creating a new field.



Fields

4.1.1. A+ field

When defining a field in this way, a reference line is created based on a fixed point. A prerequisite for this method is that the direction of the reference line must be known.

Tap the **A+** button at the bottom of the screen. The **Create field: A+** menu will be displayed (Saving a line/field).

Now drive your vehicle to the correct position. The front of the vehicle should be pointing towards the end of the field. Tap on "A" at the bottom of the screen to define the starting point of the reference line. The A coordinate is now saved. This can also be seen from the numbers following **Latitude**, **Longitude** and **Height**.

i Tip! When defining the A point, the vehicle must be stationary. This makes it easier to precisely define where the point should be. Point A is the position of the GPS antenna on the tractor.

Then press the **A+** button and use the numbers to set the direction (Figure 19) by entering a value between 0.000 and 360.000 degrees.

i Tip! To ensure the highest degree of accuracy, always enter the direction to three decimal places.

In addition to manual direction entry, you can also drive a few metres so that a value appears in **Average GPS direction**. In this case, just tap the button showing the value and it will automatically be entered in **Direction**. When the line is finished, it can be saved. For more information on saving, go to section 4.1.4.



Figure 18 Creating a field: A+.



Figure 19 Setting the direction.



Fields



4.1.2. A-B field

When defining a field in this way, a reference line is created between two fixed points.

Tap on the **A-B** button at the bottom of the screen. The **Create field: A-B** menu will be displayed (Figure 20).

Define point A by driving to the position where the reference line will start, then tap on the **A** button. Now drive to the end of the field and tap on the **B** button. SBGuidance automatically draws a straight line between the two points. The distance between points A and B is displayed at the bottom of the screen. It must be at least 20 metres. As long as the field has not been saved, it is possible to define one of the two points again. To ensure that the AB line runs parallel to the edge of the field, it is important for point A and point B to be the same distance from the edge of the field.

Tip!

When defining points A and B, the vehicle must be stationary. This makes it easier to precisely define where the point should be. The corner point is the position of the GPS antenna on the tractor.

[Optional step]

After both points have been set, it is possible to add a rotated line, for example as a headland line, by selecting **Rotate AB line**. Select the point from which the rotation will take place (Figure 21), then tap the button with the direction of rotation icon. Then enter the number of degrees for the rotation.

You can return to the previous menu at any time by tapping the blue arrow at bottom right.

When the line is finished, it can be saved. For more information on saving, go to section 4.1.4.

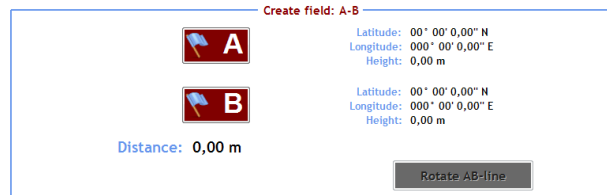


Figure 20 Creating a field: A-B.

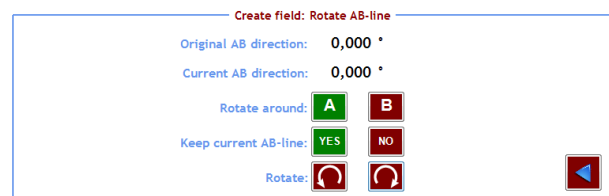


Figure 21 Rotating the AB line.



Fields

4.1.3. Contour field

Creating a field in this way allows the entire perimeter of the field to be defined.

Tap the **CONTOUR** button at the bottom of the screen. The **Create field: Contour** menu will be displayed (Figure 22).

First enter the distance from the GPS antenna to the field boundary by selecting **Antenna offset**. Use the minus symbol (-) to move the offset to the left or right. In Figure 23, the green arrow indicates the vehicle (GPS antenna) and the green cross indicates the position of the field boundary.

Defining the corner points:

Start by defining the first corner point by stopping at the desired starting position and tapping on **Add corner**. Corner point 1 is now defined. For a field where all the sides are straight, repeat this step until all the corner points have been defined (Figure 23).

Tip!

It is often difficult to position the vehicle precisely in the corner of a field. Therefore, always define two corner points in each corner! Defining corner points further away from the corner also ensures that the direction of the sides can be defined more accurately.

Recording a curve:

A curve can be recorded in order to define a curved field boundary. Stop the vehicle at the desired starting position (where the curve starts) and tap on **Record curve**. SBGuidance will ask whether this location is a corner point. Select **Yes** if the location is a corner point of a field. Select **No** if the current position is on the same field boundary as the curve.

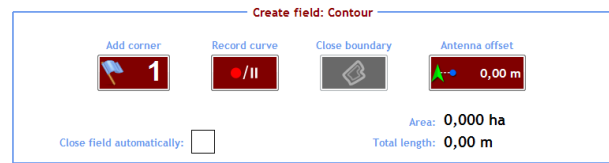


Figure 22 Creating a field: Contour.

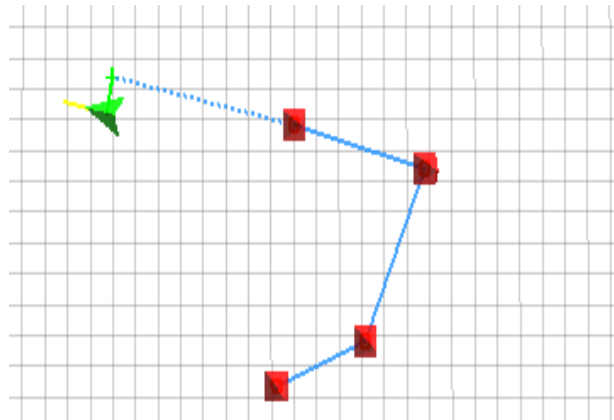


Figure 23 Example of corner points.

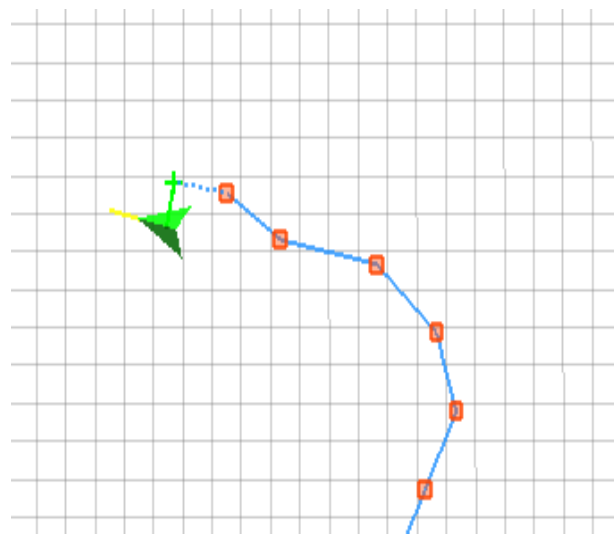


Figure 24 Example of recording a curve.

The record button in **Record curve** now turns green. Drive as parallel as possible to the curved side in order to ensure an accurate recording (Figure 24).

When recording a curve, if you reach a corner of the field or the end of the reference line, tap on **Add corner**. SBGuidance will now set a corner point at the last position (red pyramid on the screen).

It is possible to define straight and curved line sections of a field alternately by activating or deactivating the **Record curve** button.

A curved section can be joined to a straight section on the same boundary line by tapping on **Record curve** at the transition between the straight and curved sections. You will then be asked: **Is this point a corner point?** If you want to join the straight section to the curved section, the response to this question should be **No**. This allows a field edge consisting of a curved and a straight section to be used as a single reference line (Figure 25). If you answer **Yes** to this question, a corner point will be created. The straight and curved sections are then defined as two different sides of the field.

Now tap on **Close field** to draw a straight reference line from the last corner point to the first corner point. When the field is closed, the area within the defined contour is calculated (see Figure 26).

If **Close field automatically** is selected, SBGuidance closes the field automatically when the vehicle is within a radius of 5 metres from the first corner point.

Please note!

A corner point separates two different sides of a field. Do not set a corner point in the middle of a side that should be considered as a whole.

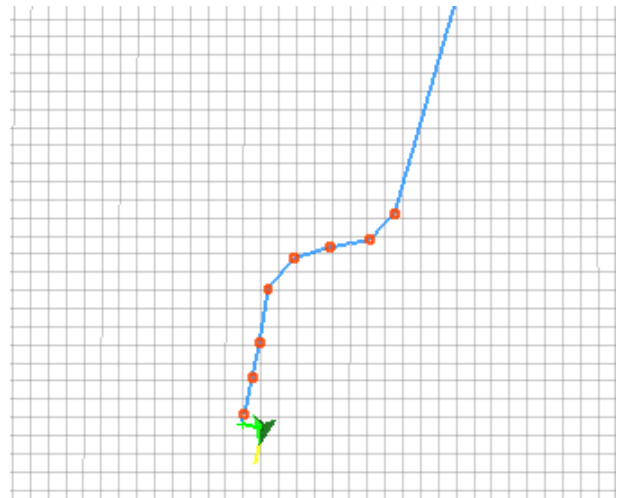


Figure 25 Example of a combination of a curved and straight line section.



Figure 26 Example of a field.



Fields

4.1.4. Saving a line/field

The field created can now be saved (Figure 27) by tapping on **READY** at the top left of the screen or cancelled by tapping on **CANCEL** at the top left of the screen.

You will then be asked if you want to save the field. If you tap on **YES** you can then name the field so that it is easier to find in the list of fields. If you tap on **NO** the field will be saved with the name **TEMPORARY FIELD**. The temporary field will be lost if you create another new field and decide not to save it.

After you have created a field, with or without saving, an option is displayed at the bottom of the screen to create a **NEW FIELD** or define a **NEW OPERATION** (Figure 28).

To create a new field, see section 4.1.

To define a new operation, see section 4.2.



Figure 27 Saving a field.

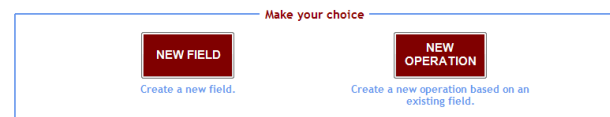


Figure 28 New field or new operation.

4.2. Defining a new operation

In order to perform an operation on a field that has been created, you must first define an operation in SBGuidance. Operations are always linked to a particular field. Therefore, at least one operation must be defined for each field before the field can be used in SBGuidance.

Figure 29 shows which buttons to tap in order to define a new operation. In addition, SBGuidance offers the option of creating a new operation after a new field is saved.

Tap on **NEW OPERATION**. The first menu for defining a new operation is then displayed at the bottom of the screen.

The procedure for defining a new operation involves five steps, as follows:

1. **Select the desired field**
2. **Select the desired reference line**
3. **Define the machine width**
4. **Define the track offset**
5. **Define the headlands (optional)**

Select the field where the operation will take place (selection is highlighted in blue, see Figure 30).

Detailed information about the selected field is displayed at the bottom of the screen. The distance from the current position to the field is also displayed to the right of the field name.

You can change the order in which the list is displayed by tapping on **A-Z**. In the options window you can sort operations by date, name or distance.

Tap on **Next step** ().

Select the reference line (field edge) parallel to which the operation will be performed.

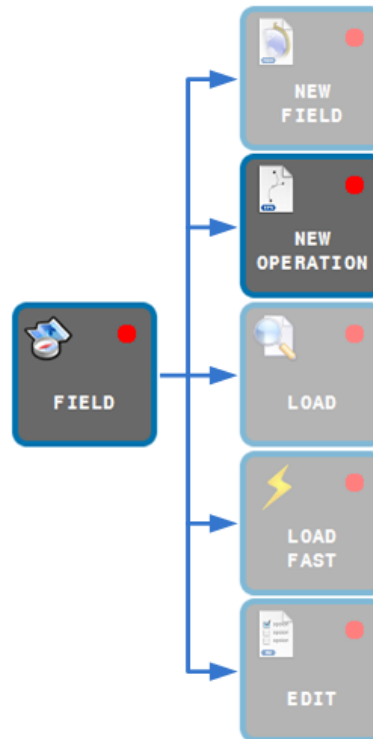


Figure 29 Defining a new operation.



Figure 30 Defining an operation, Step 1.

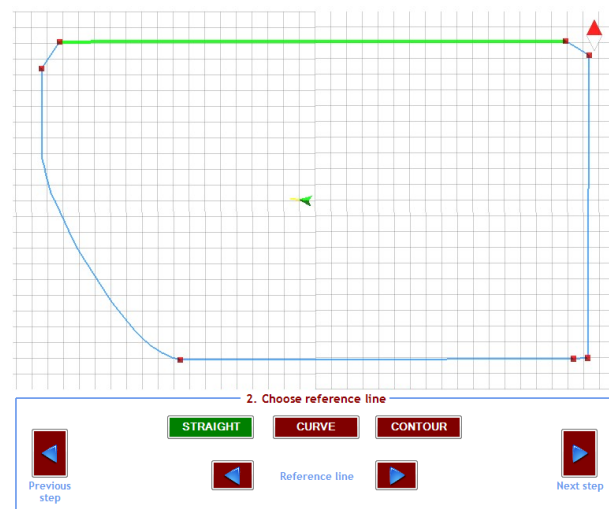


Figure 31 Defining an operation, Step 2.



Fields

Select the desired driving mode (straight, curved or contour) and use the arrows to the left and right of the word **Reference line**. The selected reference side is highlighted in green (Figure 31).

i Please note!

Straight lines which are shorter than 20 metres in length cannot be selected in order to define an operation.

i Please note!

If two straight lines on opposite sides of the field run more or less parallel, only one of the two lines can be selected in order to define an operation.

Tap on **Next step**. If necessary, change the **Working width** for the operation to be defined. If necessary, also change the **Spray width**.

In the **Spray path offset** input field, you can enter the distance between the defined field boundary and the first spray path. This is normally half the spray width, so for a spray width of 28 metres it is 14 metres (Figure 32).

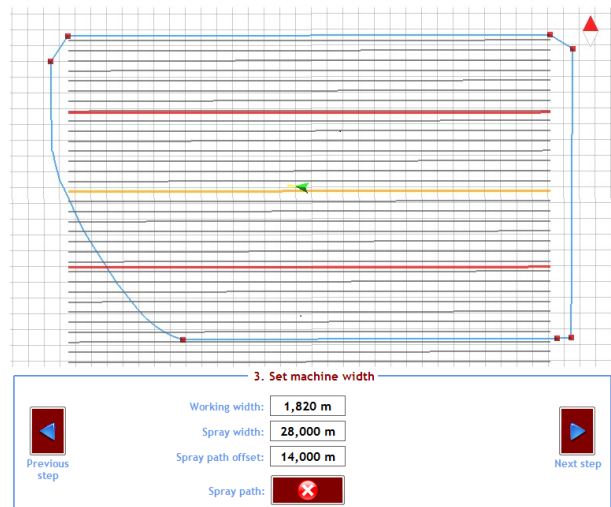


Figure 32 Defining an operation, Step 3.



Fields



When performing operations on spray paths with a different working width, the position of the spray paths can be defined by tapping on the button next to **Spray path** (Figure 33).

The number of normal machine tracks is indicated on the basis of the spray width entered. The figure shows the tracks in the form of beds. The blue mark on the left indicates the field boundary and the red mark the position of the first spray path.

Use the left-hand button to set the number of tracks to the first spray track. The reference line (A+, AB or contour reference line) is always taken as the reference for the first spray track. The right-hand button displays the number of tracks between all subsequent spray tracks. The number of tracks can be changed by pressing these buttons.

Use the two middle buttons to enter the additional/reduced space to the left and/or right of the spray track. If you enter a negative value, the spray path width is reduced (the value entered is subtracted from the working width (negative value) or increased (if a positive value is entered).

Tip! A spray track at a different location (e.g. because of an obstacle) is best created by manually marking a normal track as a spray track. For more information see section 4.6.

Tap on **Next step**.

Shift the tracks to the correct location (Lines). In a contour field, the displacement defaults to half the working width. In an AB field the default displacement is 0 metres (the AB line is then under the tractor).

By selecting **Limit track number**, the user can limit the number of visible and usable tracks to a freely selectable number.

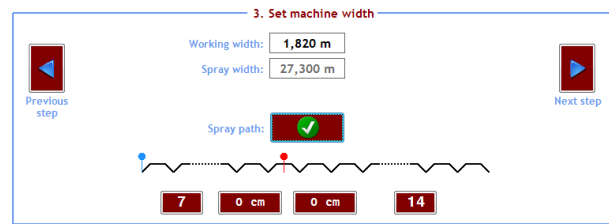


Figure 33 Defining an operation, Step 3: spray paths.

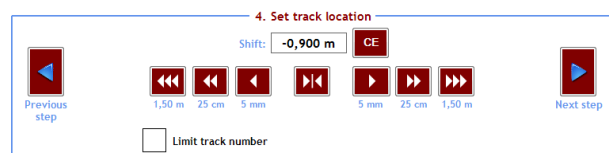


Figure 34 Defining an operation, Step 4.



Fields

Tap on **Next step**.

If necessary, define the headland lines. Use the white arrows to the left and right of the word **Headland #X** to select the desired field edge. The selected edge is marked in purple, as shown in Reference line. Select **UPDATE** to assign the defined **distance**. A different **distance** can be defined for each headland. You can change the headland distances at any time at a later date. Headlands cannot be added subsequently.

i Tip! Place a minus sign (-) before the distance to position the headland line on the other side of the field boundary.

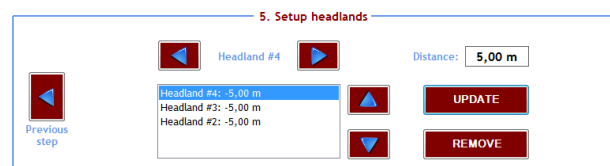


Figure 35 Defining an operation, Step 5.

The operation is now fully defined.

Tap on **READY** (Figure 36) to save the operation or **CANCEL** to cancel the operation.

A message is displayed. If you select **YES** you can then name the operation. The operation will be saved under the field.

If you select **NO**, the operation is loaded but not saved. The operation will be lost as soon as another field is selected.



Figure 36 Saving an operation.



Fields



4.3. Defining additional operations or headland lines

In a field, extra lines can be added at a later date to create an operation or headland.

For example:

- If a contour field does not have the correct reference line to define an operation (Figure 37).
- If an extra operation line is needed in an AB field.
- To add headland lines in an AB or A+ field.
- To add a headland line in the middle of a contour.
- If guidance lines are not parallel.

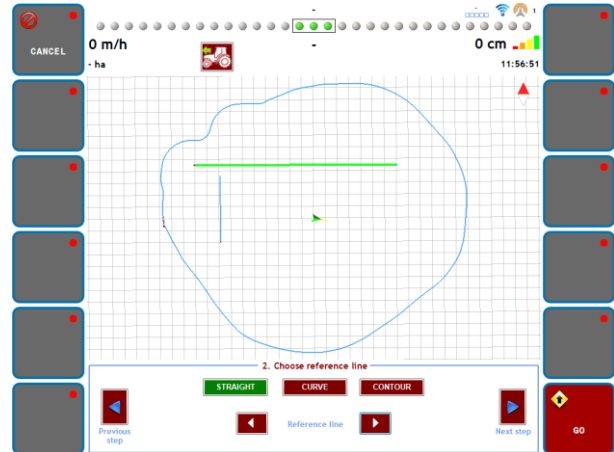


Figure 37 Extra line in contour field.

To do this, go to **REGISTRATION > LINES**. This is explained in section 5.2.



Fields

4.4. Loading a field

Select **FIELD**, then **LOAD** (Figure 38).

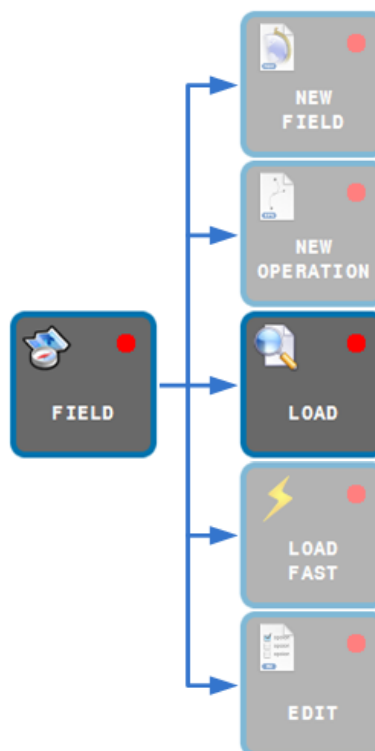



Figure 38 Loading a field.

Select the desired field (Figure 39).

Tap on the **Next step** button () and then select the desired operation (Figure 40).

If the desired operation is not shown for the field, you will have to define it. To do this, go to section 4.2.

If the desired operation has already been defined, it must be selected. Then confirm the selection by tapping on **READY** at top left of the screen.

An options window is displayed (Figure 41). Select **YES** if you want to start the new operation and remove the overlap data from the previous operation. Select **NO** to continue with an existing operation and re-load the existing overlap data.

The field and operation are then loaded.



Figure 39 Selecting a field.

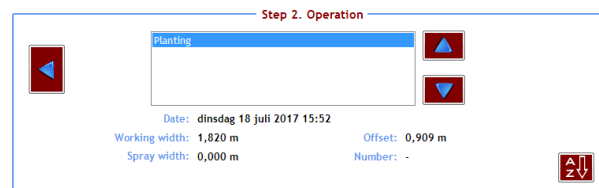


Figure 40 Selecting an operation.

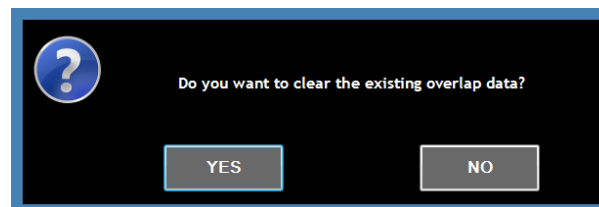


Figure 41 Options for loading a field.

4.5. Loading fast

After loading a field, it is possible to switch rapidly between the saved operations. Tap on FIELD, then on LOAD FAST (Figure 42).

The **Operation** menu will then be displayed.

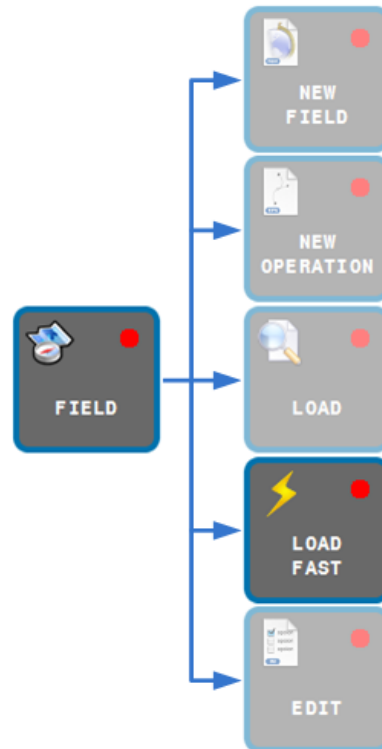




Figure 42 Loading fast.

Tap on the arrows ( / ) in the menu (Figure 43) to switch between the different saved operations for the loaded field. It is possible to activate the auto steering (GO button) from this menu. However, the GO button must be deactivated before you can switch between operations.

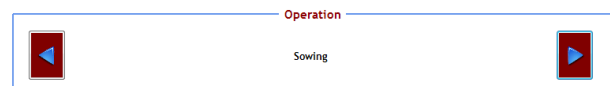


Figure 43 Switching operation.



Tip!

Use this function to switch quickly between different operations (for example, when working on the headlands).




4.6. Editing a field

Select **FIELD**, then **EDIT** (SBGuidance Auto). The **Edit operation** menu will now be displayed. The menu has six tabs:



Location and shift

The location / position of the guidance lines can be changed here. Move the nearest line so that it is directly under the machine () or a number X of centimetres.




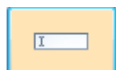
Working width and spray paths

In the working width and spray path tab, the normal working width and spray working width can be edited (SBGuidance Auto). It is also possible to manually mark a track as a spray path so that a spray path can be defined once, after which the pattern is followed (SBGuidance Auto).

It is possible to mark several spray paths manually

using .

If a manually marked spray path is the nearest track, this line can be removed by tapping on .



Name

The name of the field, the operation and the creator can be changed here.

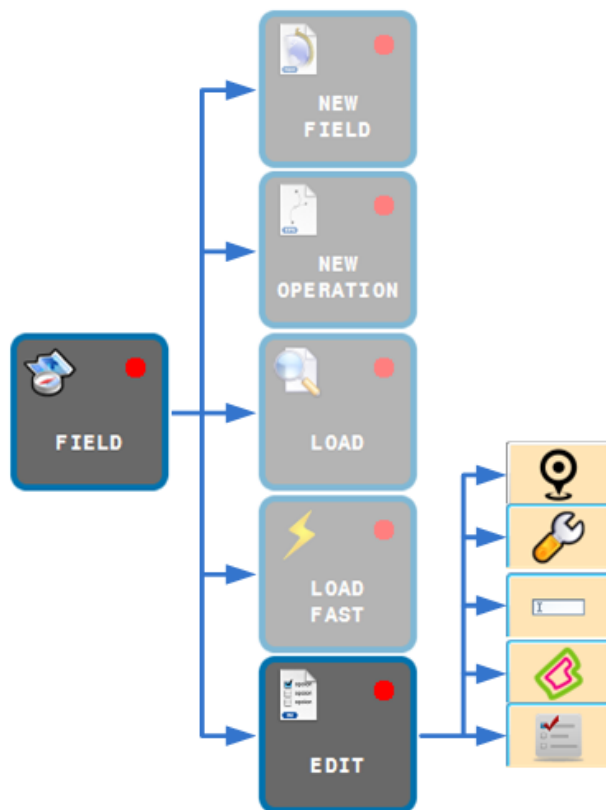


Figure 44 Editing an operation.

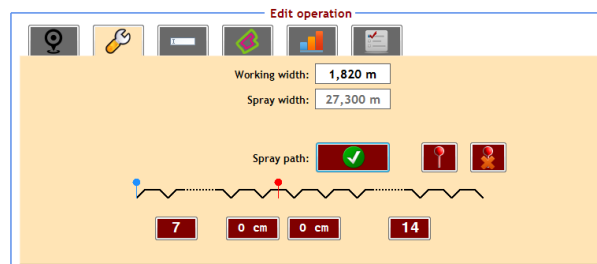


Figure 45 Menu to mark a track as a spray path.

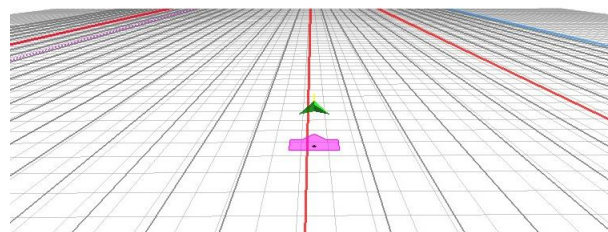


Figure 46 Track marked as a spray path.



Headlands

The width of the headlands in the current operation can be changed here, or headlands can be removed. Headlands cannot be created here. They can only be created when defining an operation (see section 4.2).



Colour settings

Delete the overlap (reset hectare counter) and/or hide the overlap (no colouring shown). This screen can also be used to select when the colouring starts and stops. The default 'Trigger' status is 'Autosteer' (SBGuidance Auto); colouring starts when automatic steering is activated.

When the Trigger is set to 'Opmode', colouring is started by an external signal (for example, lowering the hitch or starting the machine).

i Please note!

The external signal must be connected in order for it to work. Please contact your dealer.

In addition, direction-based field colouring (SBGuidance Auto) of the field can be switched on and off and the colour can be selected.



Lock

The operation can be locked.

i Please note!

The lock function is irreversible. Once an operation has been locked, it is no longer possible to change it.

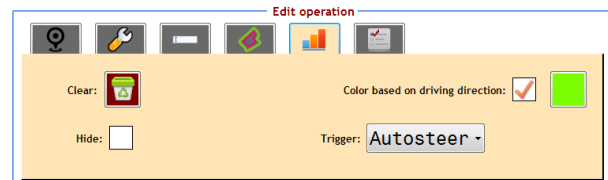


Figure 47 Colour settings.

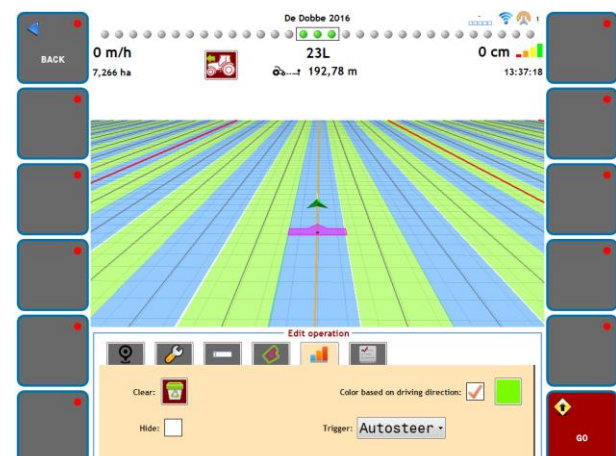
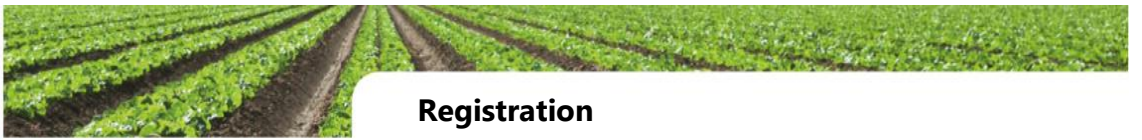


Figure 48 Direction-based colouring.



Registration

Intentionally left blank.



Registration

5. Registration

Figure 49 shows the functions that can be invoked by pressing the **REGISTRATION** button.

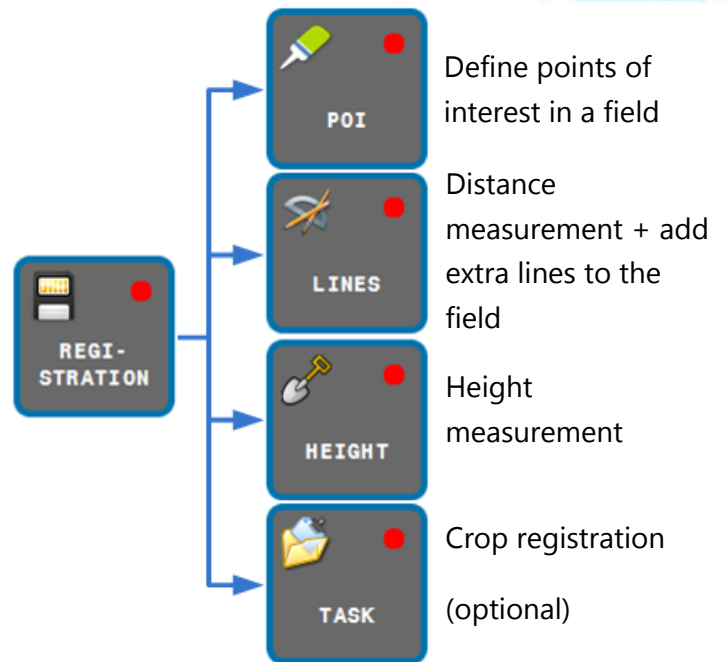


Figure 49 Registration menu.

5.1. Points of interest

The **POI** button is used to open the POI (Points of Interest) menu. To define a point of interest, follow these steps:

1. Stop the machine at the desired location.
2. In the **POI**-menu (Figure 50) tap on the **+** button to add a POI. An input menu is displayed (Figure 51).
3. Enter the desired name, colour and size of the POI. Tap on the checkmark icon to add the POI. A cone icon appears on the field display at the current location.

The POIs are saved in the currently loaded field. After reloading the field, the saved POIs are automatically loaded and displayed. In the POI menu, the table view ranks the POIs by distance. The nearest POI appears at the top.

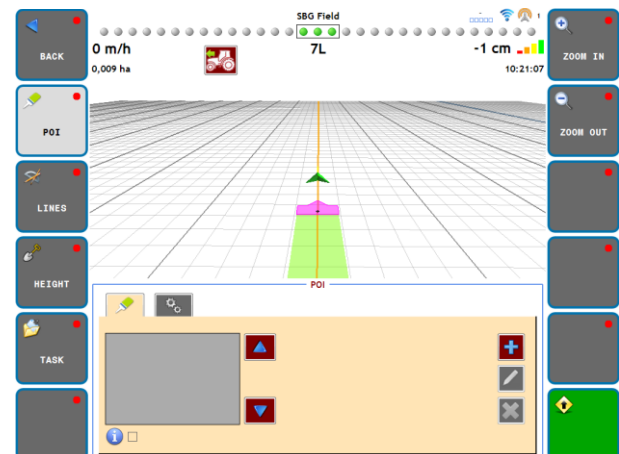


Figure 50 POI menu - Points of interest.

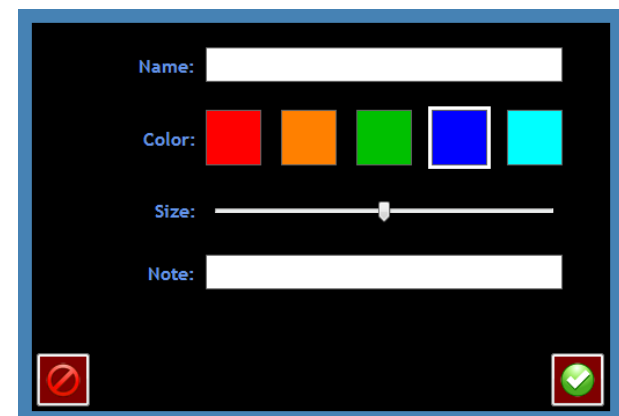


Figure 51 Add POI.



Registration

On the second tab of the POI menu, you can set the distance at which a proximity warning is given (Figure 52). The warning sound when approaching a point of interest can be switched on and off.



Figure 52 Proximity warning for POIs.

5.2. Lines

In the **LINES** menu, you can add extra reference lines or navigation lines to the loaded field. It is also possible to measure distances.

5.2.1. Reference line

If the recorded line is saved as a **reference line**, an extra line is added to the loaded field. It can be selected in order to create an operation or headland line. This option can be useful, for example, if a contour field does not have a suitable side which can be used to carry out an operation (Figure 54). The added reference line can then be used as the main line for the operation.

5.2.2. Navigation line

If the recorded line(s) is/are saved as a **navigation line**, one or more individual tracks are added to the loaded field. This option can be useful, for example, when recording beds or orchards which have not been created with RTK-GPS. Each bed or row of trees can be recorded separately as an individual track.

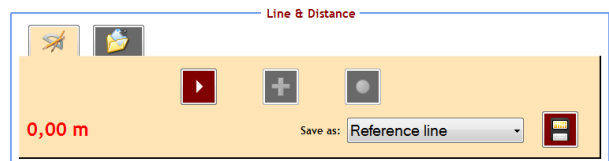
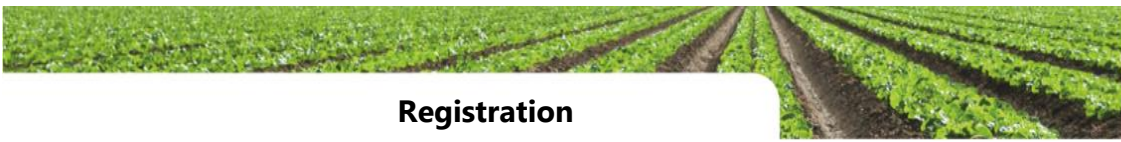








Figure 53 Line & distance menu.



Registration

To create a reference line or navigation line, follow these steps:

1. In the 'Save as' field, choose whether you want to save a reference line or a navigation line (Figure 53).
2. Tap on the  button to set the first point (the 'A' point is defined). Recording of the line section starts simultaneously. Then drive to the end point of the line (Figure 54).
3. Tap on the  button to record a curve automatically if a curve is needed in the line. Tap on the button again to stop continuous recording (Figure 56).
4. Tap on the  button to end a connected line section, as shown in Offsets (the 'B' point is defined).
5. Tap on the  button to add bends to the line section manually.
6. Tap on the  button to save the line section and add it to the loaded field. It is possible to record several lines before saving them. You can also save them as you go along.
7. Tap on the  button again to define the first point of the next line section.

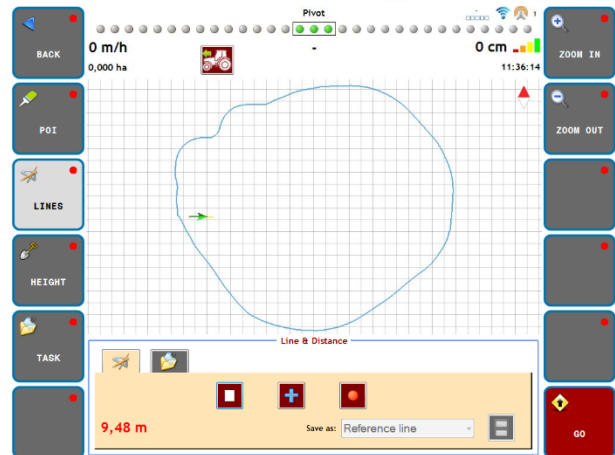


Figure 54 A point defined.

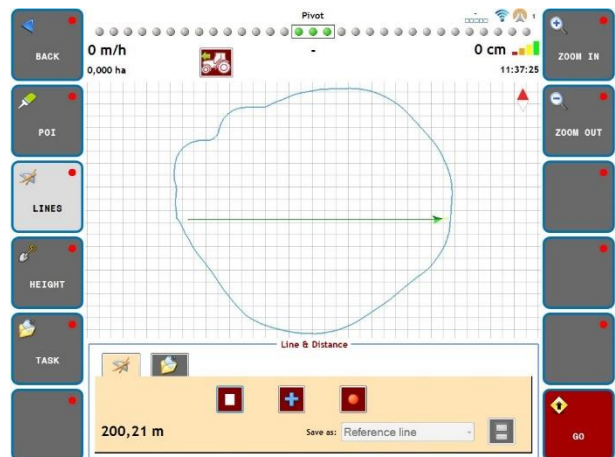


Figure 55 Defining the B point.

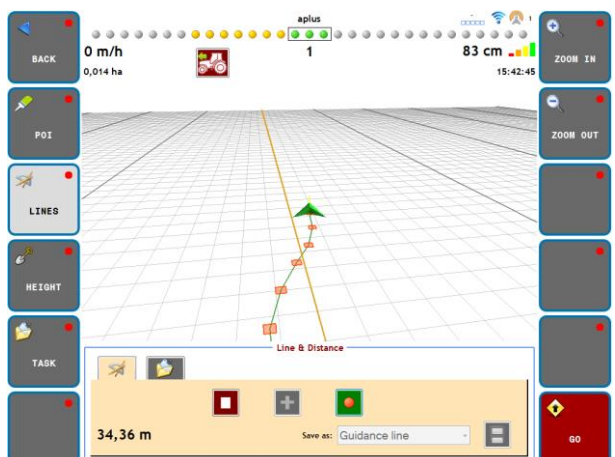


Figure 56 Automatic recording of curves.



Registration

If one or more recorded line sections are saved as a reference line, you can define a new operation based on this reference line by choosing **FIELD > NEW OPERATION** (Figure 57) and selecting the added reference line, as also described in section 4.2. It is also possible to define the line as an (extra) headland line (Figure 58).

Please note!

To select an added reference line for a new operation, the recorded line must have a minimum length of 20 m.

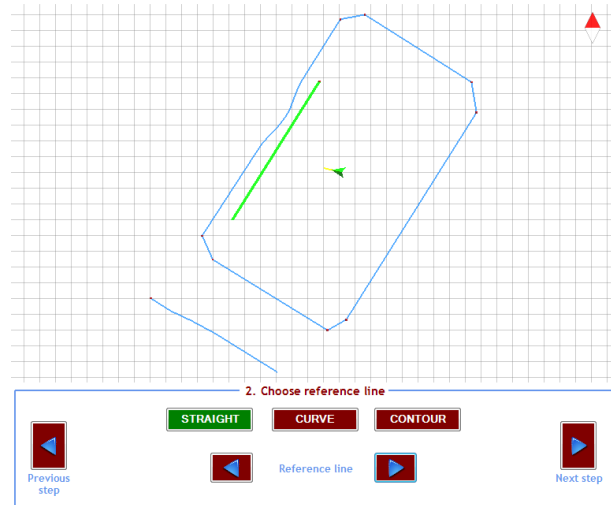


Figure 57 New operation on added reference line.

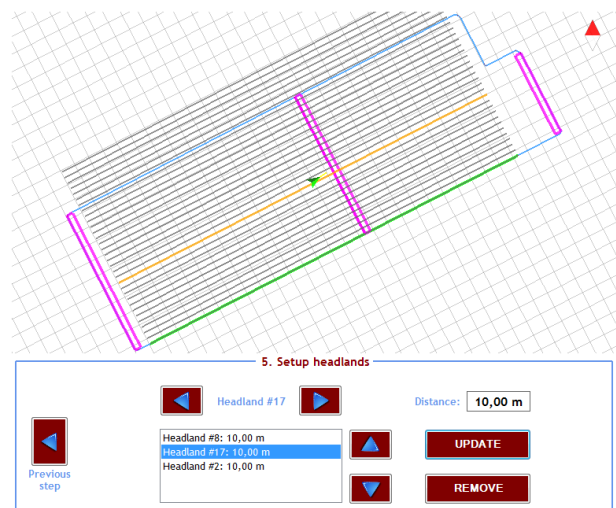


Figure 58 Extra headland line.

If one or more recorded line sections are saved as a navigation line, you can steer automatically along this navigation line by choosing **FIELD > LOAD** and selecting the Guidance Line operation under the relevant field. In the field view, only the recorded navigation lines will now be displayed (Figure 59).

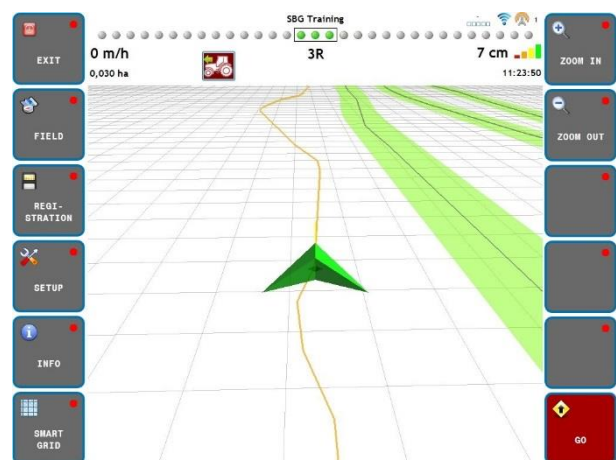
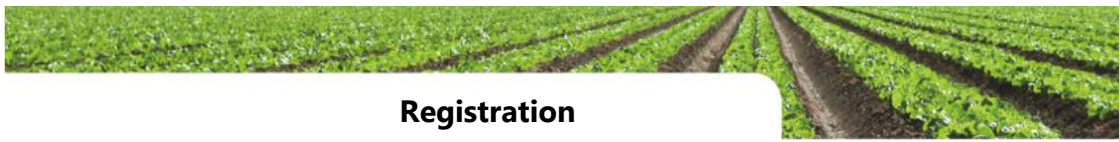


Figure 59 Automatic steering on the navigation.



Registration




The additional lines can be deleted on the second tab of the Line & Distance menu. Select the line to be deleted and tap on the red cross (Figure 60).

5.3. Height

The SBGuidance software enables the user to record height measurements within a specified field. These height maps can then be displayed (if desired, using the SmartProfiler software during levelling operations). Height measurements can be recorded while working in the field. A contour field is required.

Follow the steps below:

- Load a contour field and an operation.
- Go to the height registration menu (Figure 61) by tapping on **REGISTRATION > HEIGHT** and selecting the white box next to **Display height map**.
- You will then be asked if you want to start registering new height measurements (Figure 62), select **YES** to create a new height map and **NO** to add measurement data to an existing height map.
- Tap on the **record/pause** button to temporarily interrupt and restart height registration.
- You can exit the menu while height registration is running.

Tap on  to refresh the information. The recorded height data is automatically saved to the field that is active when SBGuidance is closed. Select **Display height map** to display the recorded height data on the main screen while working in the field.

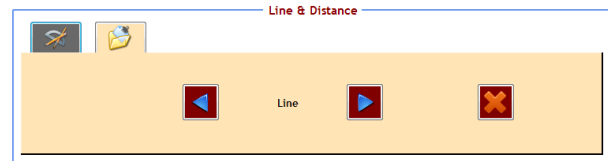


Figure 60 Delete additional reference and or guidance lines.

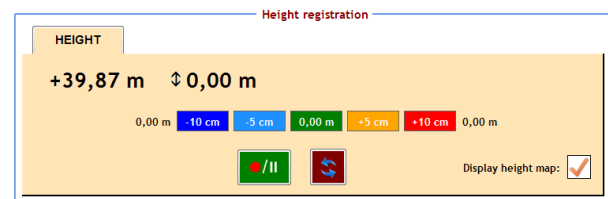


Figure 61 Height recording.

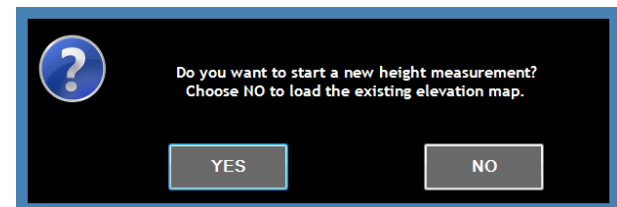


Figure 62 New height measurement.



Registration

5.4. Task (Crop registration)

In the SBGuidance software there is an option of carrying out crop registration within a particular field. To do this, go to **REGISTRATION > TASK** (Figure 63). A licence is required to use this crop registration module.

The recorded data can be viewed and processed subsequently using the SBGuidance Office Manager desktop program.

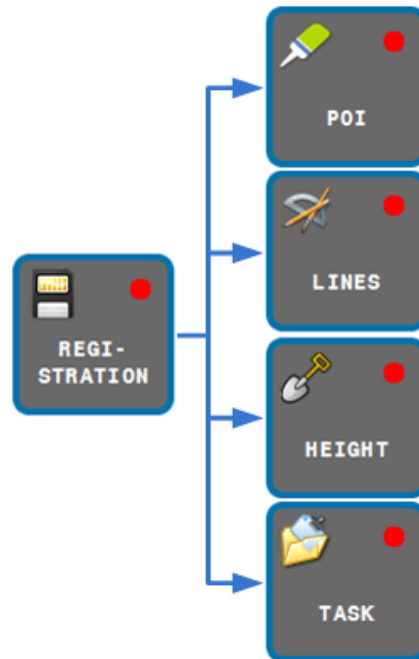


Figure 63 Task registration.

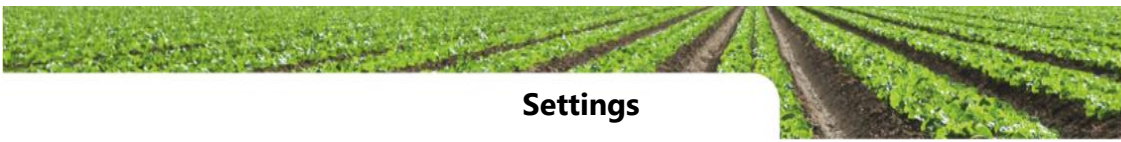
By using this module, it is possible to record what is happening in the field at any given time (Figure 64).

For a comprehensive manual covering the options and use of the Crop Registration module and the SBGuidance Office Manager, go to:

<http://www.raveneurope.com/en/support/usermanuals>



Figure 64 Example of crop registration.



6. Settings

Figure 65 shows the functions that can be invoked by pressing the **SETUP** button.

To return to the main menu, tap on **BACK** at top left of the screen.

6.1. Vehicle settings

Tap on **VEHICLE**. Use the **TUNING** and **OFFSETS** options (top right) to change the settings (Figure 66).

The default position for the **TUNING** window is at the bottom of the screen. You can use this window to change the parameters of the tractor or implement steering system. The different steering systems are discussed in more detail below.

i **Tip!**
The correct tuning will depend on the field conditions and the type of operation performed.

i **Please note!**
Changes to the tuning of a machine may result in incorrect steering. Therefore, always write down the original values before making any changes.

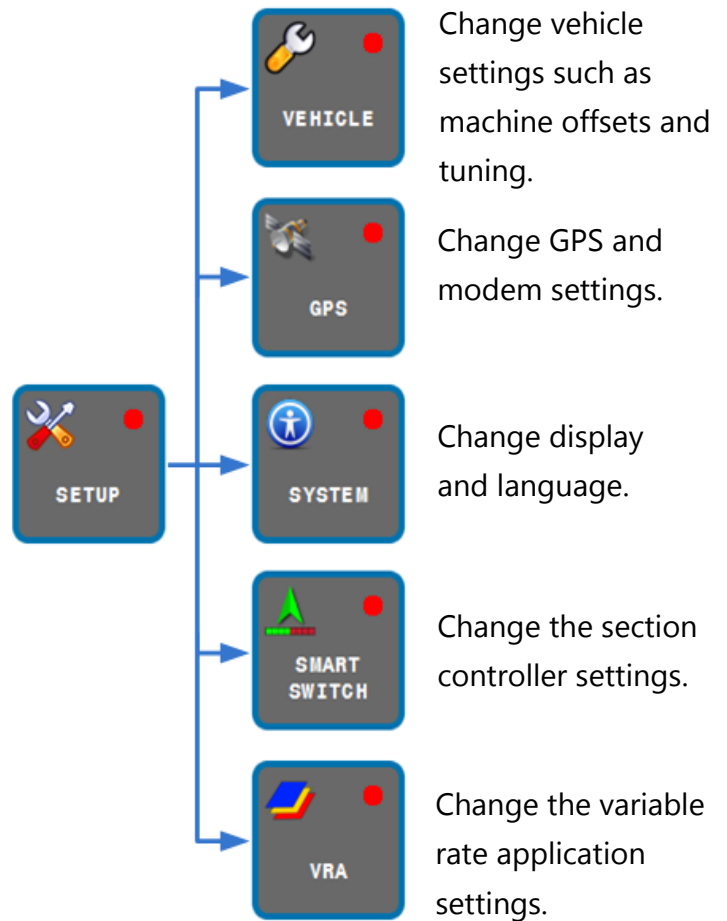


Figure 65 Settings menu.

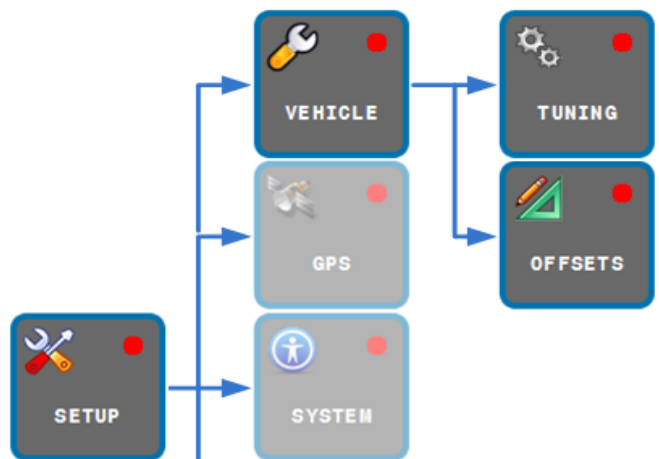


Figure 66 Vehicle settings.



Settings

6.1.1. SBGuidance Auto

Tuning

For tractor steering, only the **TRACTOR** and **OPTIONS** tabs are active (Figure 67).

If the **Centre offset** is changed, the centre of the tractor is shifted. This also changes the connection distance between the tracks. The **left** connection distance becomes **narrower** if you tap on **L** and **wider** if you tap on **R** (if you tap on **L** the tractor moves further to the left).

Example: for a measured connection distance on the left of 71 cm instead of 75 cm, the **Centre offset** must be adjusted by half the connection distance error. In this case, this is $4 \text{ cm} / 2 = 2 \text{ cm}$ (tap on **R**).

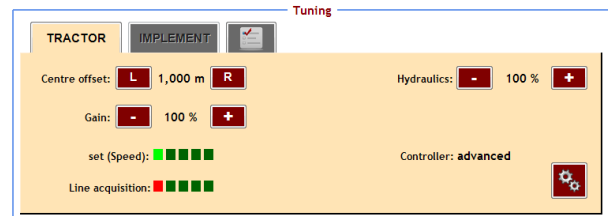


Figure 67 SBGuidance Auto, tuning.

Set (speed):	0	4.5	6.5	8	10
from	0	4.5	6.5	8	10
to	4.5	6.5	8	10	+

Figure 68 Gain set for each speed range.

Hydraulics = Steering response speed

Gain = Sensitivity

	Standard	Range
Hydraulics	100%	50 - 150%
Gain	100%	50 - 400%


If the steering does not react quickly enough, increase the **Hydraulics** setting in 5% increments until the steering responds quickly.

If the vehicle steers towards the line too slowly, without overshooting the line, increase the **Gain** in 20% increments until the steering becomes too aggressive. When the steering becomes too aggressive, reduce the gain by 20%.



Settings



The **Gain** can be adjusted separately for five speed ranges (Figure 68). The **Set (speed)** indicator shows the active speed range by means of a bright green box. Tap on the  indicator to open the input screen (Figure 69). The gain for each range can now be changed when the vehicle is stationary.

Tip!

If the steering system alternates continuously between two speed ranges, the steering system may no longer be producing the desired driving behaviour. Drive slightly faster or slower so that only one speed set remains active, or make sure that the gain percentages used in the different speed sets are the same.

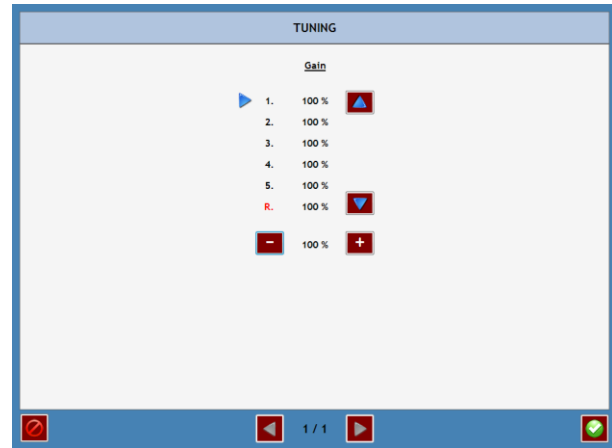



Figure 69 Changing the gain for each speed set.

With "**Line acquisition**" you can choose how quickly the tractor steers towards the line. This is particularly important if auto steer is activated while the tractor is some distance from the guidance line. Tap on the  indicator to open the input screen

(Figure 70) and select the desired value.

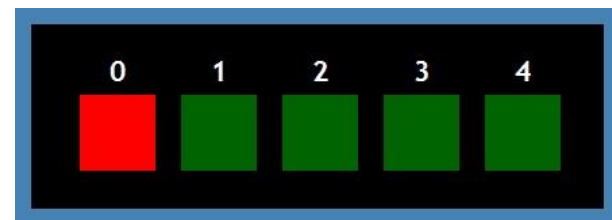



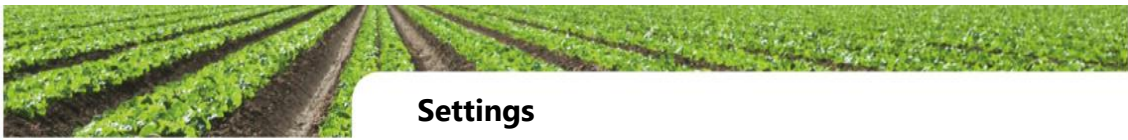
Figure 70 Line acquisition.

Value 0: drive quickly towards the guidance line (e.g. to reach the guidance line quickly when leaving the headland).

Value 4: steer towards the line slowly (e.g. when driving with a sprayer or at high speed).

Controller shows the type of controller: **advanced** (standard controller).

Calibration () can be used to change certain parameters of the steering system, such as wheel angle sensor voltage, minimum steering percentages and disengage pressure.



Settings

! Warning!

The mentioned parameters have already been entered during installation or commissioning of the machine by the dealer. Changes to these values may result in poor steering performance. Therefore please always consult your dealer before changing these values.

Options

The **OPTIONS** (Position) tab allows you to deactivate the **speed restriction**. If the speed restriction is deactivated, it is still possible to activate automatic steering at speeds above 14 km/h.

! Warning!

Activating the automatic steering at high forward speeds can result in unexpected steering behaviour, leading to extremely dangerous situations for the operator, bystanders and the machine.

Offsets

Tap on **VEHICLE** then on **OFFSETS** (top right).

The offsets menu will now be displayed (Figure 72). The **OFFSETS** option can be used to input all dimensions of the main vehicle (tractor) and any front or rear-mounted implements.

Tap on the **plus symbol** to add a new front or rear-mounted implement.

Tap on the **cross symbol** to delete the selected machine.

Tap on the pencil to open the **Machine offsets** menu for the tractor and front- or rear- mounted implement. In the **Machine offsets** menu (Figure 73 - Figure 75) enter the dimensions and name of the tractor or implement.

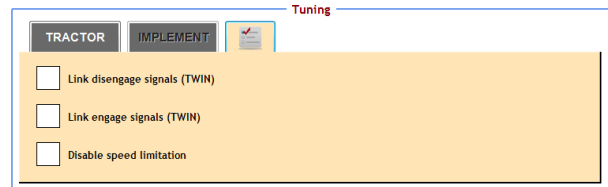


Figure 71 Machine setting options.



Figure 72 Defining offsets.

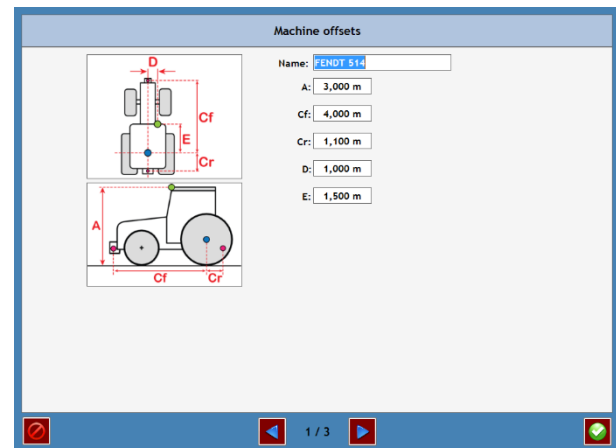


Figure 73 Machine offsets, tractor.

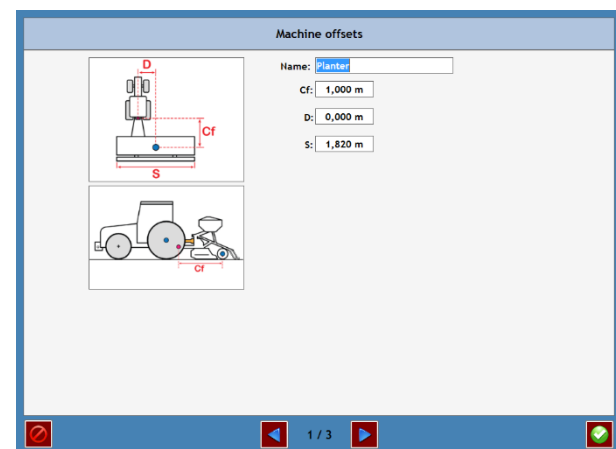


Figure 74 Machine offsets, rear-mounted implement.



Settings

A **headland signal** can be set for front- and rear-mounted implements. The headland signal emanates from the specified reference point on the machine (blue dot on the drawing, Figure 74 and Figure 75).

Tap on the blue right arrow at the bottom of the screen to go to the next step (Figure 76).

Tap on the loudspeaker icon on the **Headland signal** screen to activate or deactivate the signal.

If a negative value is entered at **Offset ON**, the headland signal will sound at the specified distance before the headland line when driving into the field (leaving the headland). The signal will sound before the virtual vehicle crosses the headland line.

If a negative value is entered at **Offset OFF**, the headland signal will sound at the specified distance before the headland line when driving out of the field (entering the headland). The signal will sound before the virtual vehicle crosses the headland line.

i Tip! Any implement switching delays can be compensated by entering a value in **Offset ON** and **Offset OFF**.

Tap on the blue right arrow at the bottom of the screen to go to the next step.

This last step provides more information about the dimensions of the tractor and implement (Figure 77).

Tap on the green checkmark to save changes. Tap on the red "cancel" button to close this screen without saving the changes.

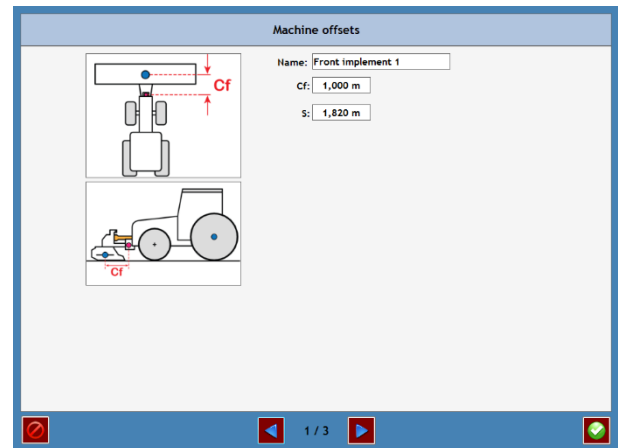


Figure 75 Machine offsets, front-mounted.

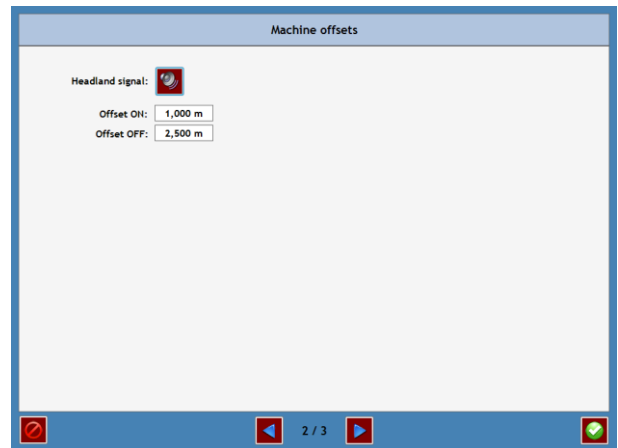


Figure 76 Headland signal.

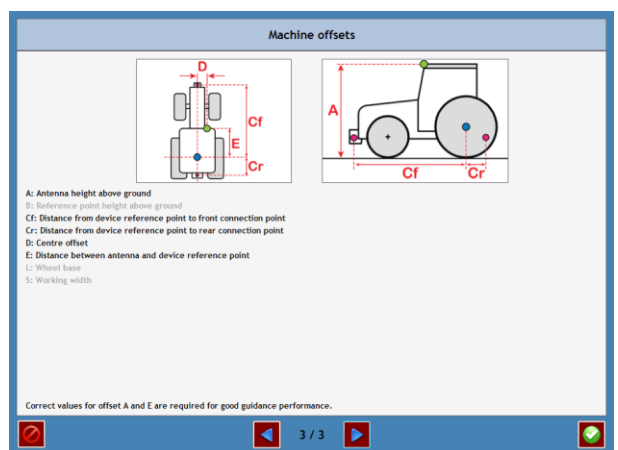


Figure 77 Offset info.




Settings

6.1.2. SBGuidance Side-Shift

SBGuidance Side-Shift uses proportional steering as standard. For heavy implements where the GPS antenna cannot be installed directly above the Side-Shift cylinder, there is an option of using pulse steering. The choice between proportional and pulse steering can only be made by your dealer.

With SBGuidance Side-Shift, only the **IMPLEMENT** tab is active (Figure 78).

The **Centre offset** is the same as for tractor steering (see section 6.1.1).

Tap on the  button to open the calibration menu (Figure 79). In this menu you can activate and calibrate the sensor. Use the buttons (with green arrows) at the bottom to manually move the Side-Shift cylinder to the left or right. Manually move the cylinder all the way to the left, then tap on the "Left" button. Do the same for the maximum adjustment to the right and the midpoint.

The **Auto-Center** function moves the Side-Shift cylinder to a specified midpoint as soon as the automatic steering is deactivated by pressing the GO button. This is only possible if a side-shift position sensor is used and this sensor is activated.

Check the **Invert steering** box if the side-shift cylinder should steer in the opposite direction.

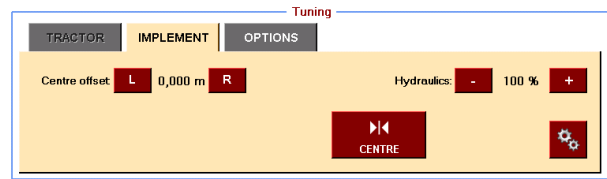


Figure 78 Tuning Side-Shift, proportional steering.

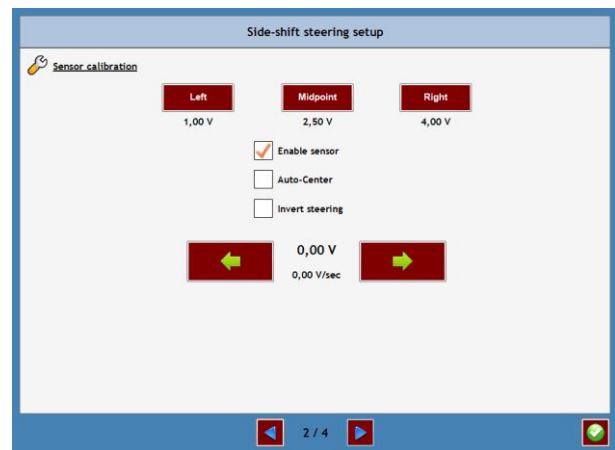


Figure 79 Sensor calibration.



Tuning proportional steering

For optimum steering performance the minimum and maximum steering speeds (Figure 80) must first be set by your dealer. As a user you can make the steering more or less aggressive by changing the **Hydraulic** percentage in the Tuning menu (Figure 78).

The type of steering can be seen in the last page of the calibration wizard (Error messages). It is also possible to change the **Range** of the cylinder. This is the distance from the track at which the side-shift cylinder may steer. The side-shift cylinder stops steering outside this margin.

The **Allow steering when standing still** setting allows the side-shift steering to steer when the machine is stationary.

Offsets

Setting offsets for the SBGuidance Side-Shift is comparable to setting offsets for SBGuidance Auto (see section 6.1.1).

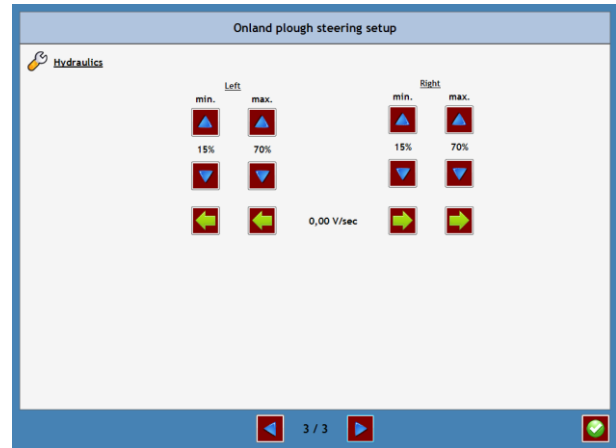


Figure 80 Steering speed calibration.

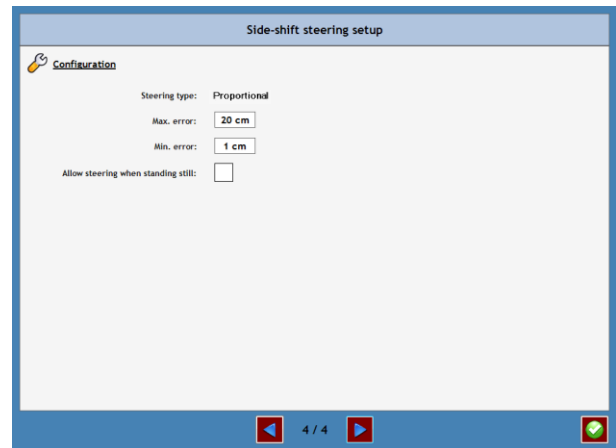
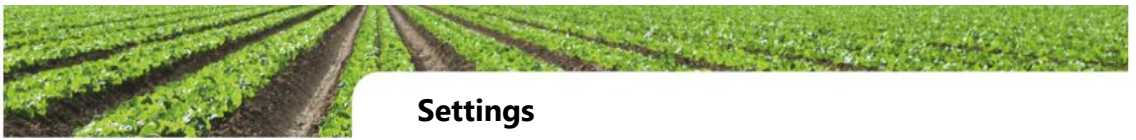


Figure 81 Configuration settings.



6.1.3. **SBGuidance TWIN / Side-Shift**

SBGuidance TWIN with Side-Shift is a combination of SBGuidance Auto and SBGuidance Side-Shift steering. For more information about tuning and setting offsets, see sections 6.1.1 and 6.1.2.

6.1.4. **SBGuidance TWIN / Disc**

Tuning

With SBGuidance TWIN, all the tabs are active (Debug).

Tuning of the tractor and disc steering is the same (see section 6.1.1).

Tap on the gearwheel icon for additional settings.

Activate **Auto-Center** in these additional settings to automatically move the implement steering to the midpoint if the implement steering is deactivated. Activate **Auto-Center (manual control)** to automatically move the implement steering to the midpoint if the implement steering is being operated manually.

On the **OPTIONS** tab you can switch on **Link disengage signals (TWIN)** and **Link engage signals (TWIN)** (Figure 83). With this option, automatic implement steering can be engaged and disengaged at the same time as the tractor steering.

The **Disable speed limitation** function can be used to deactivate the speed restriction for switching on automatic steering.

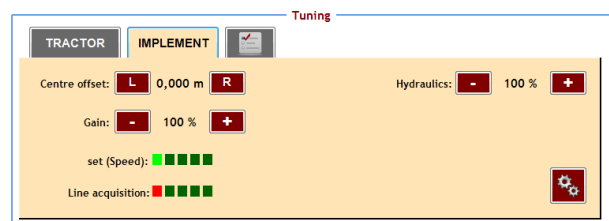


Figure 82 Tuning SBGuidance TWIN.

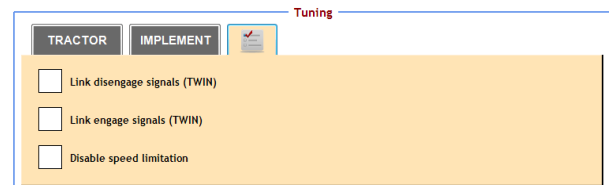


Figure 83 SBGuidance TWIN options.



Warning!

Activating the automatic steering at high forward speeds can result in unexpected steering behaviour, leading to extremely dangerous situations for the operator, bystanders and the machine.



Offsets

Setting offsets for SBGuidance TWIN Disc is the same as for SBGuidance Auto (see section 6.1.1).

6.1.5. SBGuidance Vario ploughs

Tuning

Figure 84 shows the Tuning window for SBGuidance Vario ploughs.

It is possible to centre the plough using the **centre** button. Always adjust the **ploughing direction** so that the illustration corresponds to the actual situation.

Tap on the “gear wheel” icon to change other parameters. The screen shown in Figure 85 will open.

Limit movement of the plough by setting the **Min. width** and **Max. width**. The values entered on this tab are user limits and can be changed at any time.

In **Dead band** enter the deviation from which SBGuidance may start to make corrections. This only works with non-proportional (on/off) steering.

If the first furrow should be wider or narrower than the other furrows, this can be entered in **First furrow correction**. Enter a positive number if the first furrow should be wider. Enter a negative number if the first furrow should be narrower.

The **Auto-Center** function moves the plough to the specified plough width when the automatic steering is deactivated using the GO button.

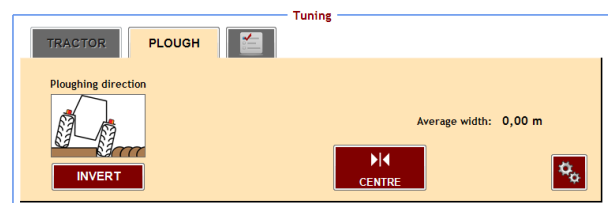


Figure 84 Tuning SBGuidance, Vario ploughs.

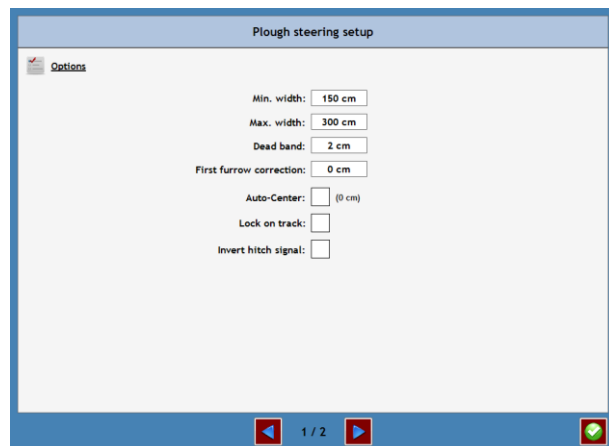


Figure 85 Setting the plough parameters.



Settings

When **Lock on track** is selected, SBGuidance will continue to steer the plough along the same line as long as the "GO" button is active. If this function is not selected, SBGuidance will always steer along the nearest line.

If a hitch sensor signal is used during ploughing to automatically activate and deactivate the steering system, it is possible that this may be inverted. Select **Invert hitch signal** to invert activation and deactivation of the steering system.

Tap on the blue right arrow button at the bottom of the screen to go to the next tab (Figure 86). Sensor values and physical plough limits can be set here.

Warning!

If you change these settings, the plough steering may no longer function correctly.

If the ploughing width on the back and forth pass is different when using a reversible plough, the centre offset can be adjusted in the **Offsets** menu (CAN info).

Offsets

CAN info shows the offsets window for SBGuidance Vario ploughs. For information on setting the tractor offsets, see section 6.1.1.

Tap on the pencil next to **Plough**. The reference point for the headland signal must be in the centre of the plough width. Identify where this reference point lies on the plough and then measure the distance **Cf** to the connecting points on the cross-shaft.

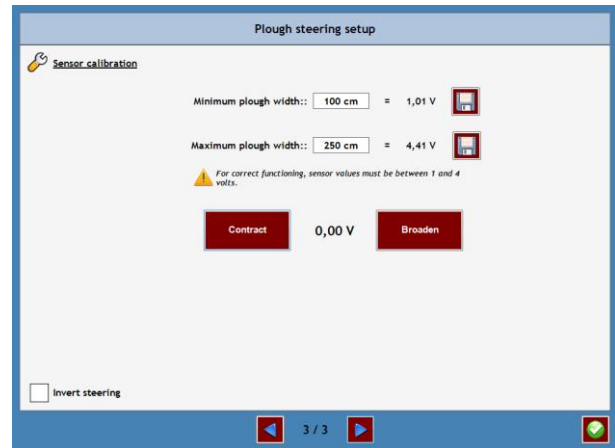


Figure 86 Plough steering settings.



Figure 87 Offsets for SBGuidance Vario ploughs.



6.1.6. SBGuidance Onland ploughing

Tuning

Figure 88 shows the Tuning window for SBGuidance Onland ploughs.

It is possible to centre the plough using the **CENTRE** button. Always adjust the **ploughing direction** so that the illustration corresponds to the actual situation.

Tap on the "gear wheel" icon to change other parameters. The screen shown in Figure 89 will open. Limit movement of the plough by setting the **Min. width** and **Max. width**. The values entered on this tab are user limits and can be changed at any time.

The **Auto-Center** function moves the plough to the specified plough width as soon as the automatic steering is deactivated by pressing the GO button. When **Lock on track** is selected, SBGuidance will continue to steer the plough along the same line as long as the "GO" button is active. If this function is not selected, SBGuidance will always steer along the nearest line.

If a hitch sensor signal is used during ploughing to automatically activate and deactivate the steering system, it is possible that this may be inverted. Select **Invert hitch signal** to invert activation and deactivation of the steering system.

Tap on the blue right arrow button at the bottom of the screen to go to the next tab (Figure 90). Sensor values and plough limits can be set here.

Warning!

If you change these settings, the plough steering may no longer function correctly.

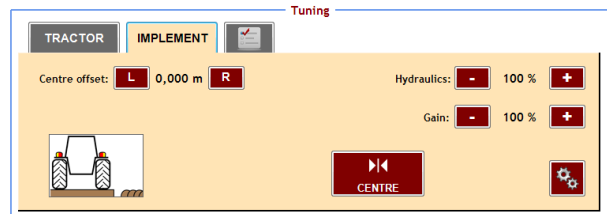


Figure 88 Tuning SBGuidance Vario ploughs.

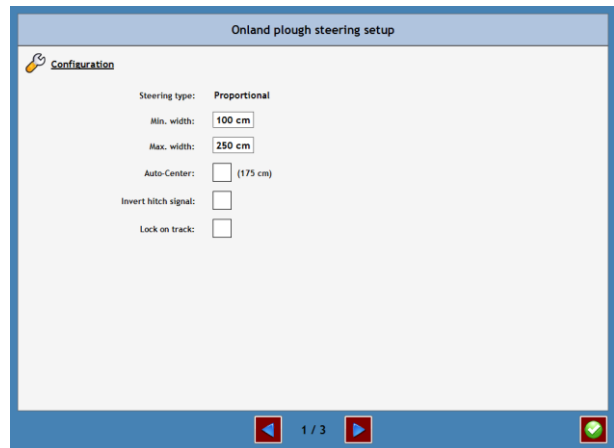


Figure 89 Setting the plough parameters.

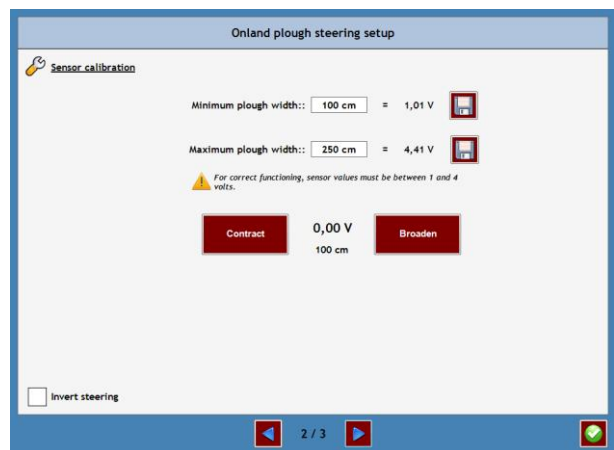


Figure 90 Settings for onland ploughing.



Settings

Offsets

Figure 91 shows the offsets window for SBGuidance Vario ploughs. For information on setting the tractor offsets, see section 6.1.1.

Tap on the pencil next to **Onland Plough**. The reference point for the headland signal must be in the centre of the plough width. Identify where this reference point lies on the plough and then measure the distance **E** from the (plough) antenna to this point.

The centre offset (**D**) of the plough is the distance from the plough antenna to the line from the tractor antenna when the plough is set to the desired working width (see the red arrow in Figure 92). This can be determined in the field by manually setting the plough to the correct working width, ploughing a short distance using just the tractor steering system and looking at the deviation from the line (of the plough antenna). This deviation must be set in the **D** value for the plough.

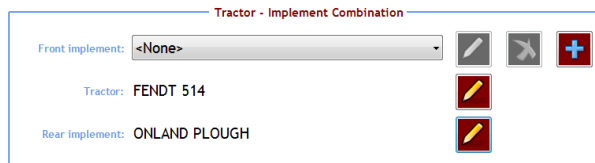


Figure 91 Offsets, SBGuidance Onland ploughing.

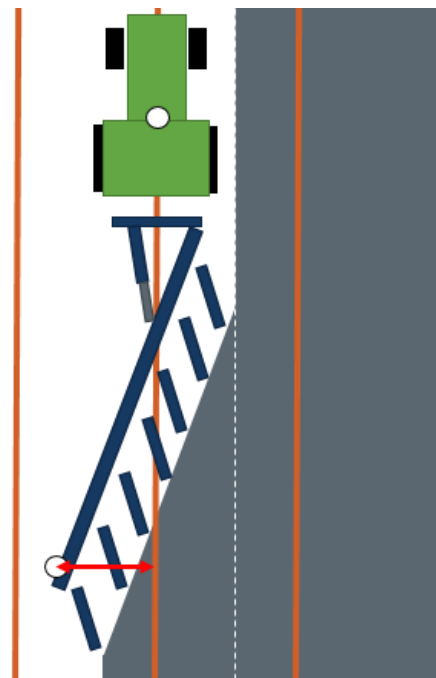


Figure 92 Centre offset for onland ploughing.



Settings

6.1.7. SBGuidance SmartProfiler


Tuning

Figure 93 shows the settings windows for SBGuidance Grader. You can open these settings by selecting **SETTINGS > VEHICLE**.

A height map can be used for automatic steering of the Grader. See section 0 for more information.

Figure 94 shows the current height and the desired height. The difference between these two values is the height difference. When you activate the GO button, the Grader will operate until this height difference is 0 cm.

In Figure 95 you can set a **Reference point**.

by tapping on the flag ().

You can then enter two slopes, both positive and negative.

Please note!

A reference point is always needed before the Grader can be controlled automatically. If no slope is required, this value can be set to 0.000 %.

A roof-shaped profile can be defined by entering the slopes. By entering a number of degrees next to the flag (the reference point), it is possible to change the rotation of the slopes in relation to the reference point. If you change the **Reference height**, the whole profile is moved upwards or downwards.

Positive slope = Upwards from reference point

Negative slope = Downwards from reference point

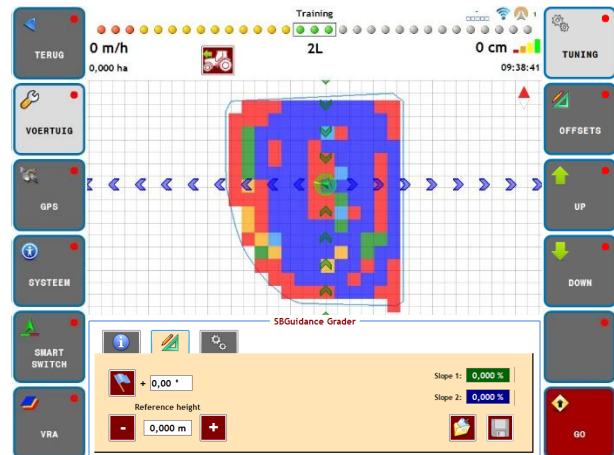


Figure 93 SBGuidance Smartprofiler.

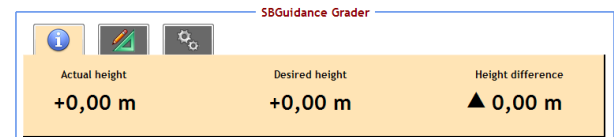


Figure 94 Grader information.

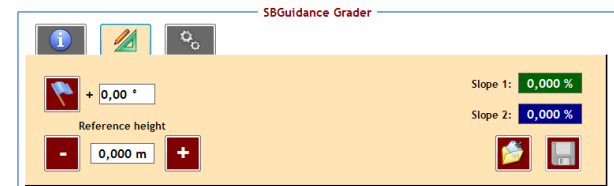


Figure 95 Grader settings.



Settings

The configuration can be saved so that the same configuration can be reloaded after reloading the field. Tap on the **Diskette** button to save the configuration. You can then tap on the **Folder** button to reload the configuration.

On the last tab (Figure 96) under **Allowed height difference** you can change when a control action must take place to make the steering more or less aggressive (in this example, a control action only takes place from a height difference of more than 2 cm). If there are large height differences, in **Steer limitation** you can specify that not more than the pre-set value may be changed for each height difference. For example, 5 cm can be scraped away on each track.

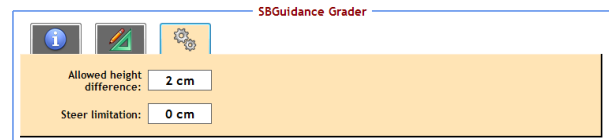
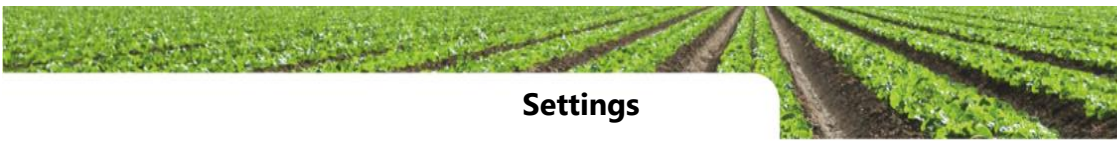


Figure 96 Grader control settings.



6.2. GPS set-up

The **GPS** menu contains all the functions needed to configure the GPS receiver and the radio and/or GSM modem (Figure 97).

6.2.1. Receiver

Tap on **RECEIVER** to change the configuration of the GPS receiver.

The **GPS receiver** menu consists of three tabs. The **GPS** tab is displayed by default (Figure 98).

Tap on **Connect** if the connection with the GPS receiver is interrupted. The connection is interrupted if the clock at top right of the screen is coloured red and/or displays 00:00:00.

The **Reboot** button is used to restart the GPS receiver and must only be used in exceptional circumstances if the GPS receiver hangs and displays three boxes (DGPS) for a long time.

Caution! Never tap on the buttons on the GPS tab without good reason. Frequent initialisation of the GPS receiver can cause damage. Always wait long enough for a signal to be produced after activating these buttons. The system needs time to perform these actions properly.

The **EGNOS** button can be used to activate automatic steering based on just the EGNOS signal during operations which require a low level of accuracy. If you tap this button it will turn green, indicating that the operation can be automatically controlled using EGNOS.

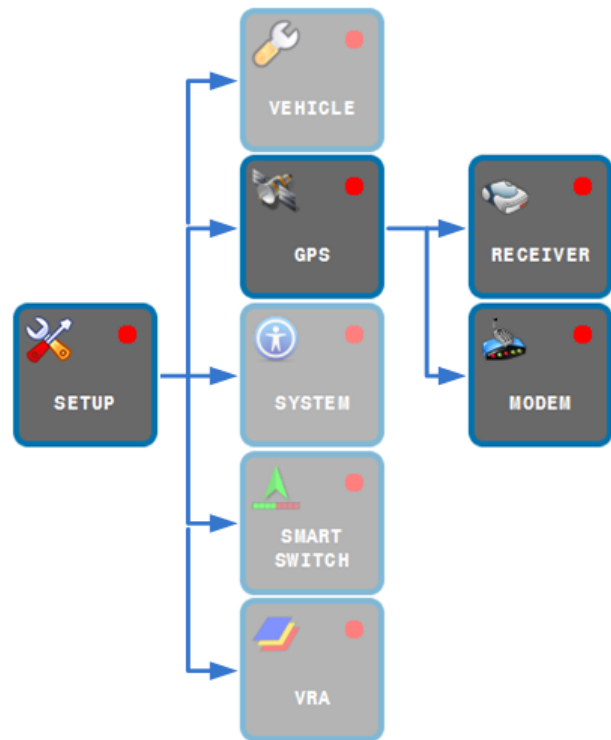
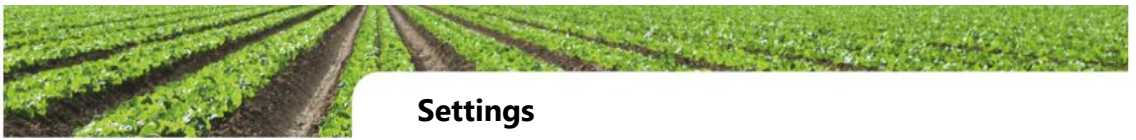


Figure 97 GPS set-up.



Figure 98 Configuring the GPS receiver.



Settings

The **Elevation mask** (default setting = 10°) can be changed in order to influence the number of satellites used. Increasing the elevation mask ensures that fewer satellites are visible but with much better signal quality. Decreasing the elevation mask ensures that more satellites are used but with poorer signal quality. The elevation mask can be increased or decreased in order to improve RTK Fix reception.

Caution! Changing this value may result in poorer GPS reception.

In **Max. diff. age** (default 20 seconds) it is possible to set the time period for which the system may operate without RTK correction data. In **Diff. corr. type** it is possible to set the type of correction messages used.

NMEA messages make it is possible to provide external devices with GPS data such as position, direction and speed.

You can choose between messages directly from the receiver (not roll-compensated), **NMEA 1** or messages which are roll-compensated (taking account of tilt), **NMEA 2**.

Tap on **NMEA 1** to open the NMEA 1-tab (Figure 100). Tap on the buttons to activate the correct messages (green = active) and set the **Baudrate** and **Interval**.

Tap on **NMEA 2** to open the NMEA 2 tab (Figure 99). With NMEA 2 the GPS positions are roll-compensated and under **Reference** you can choose the antenna that the NMEA data comes from (tractor or implement).

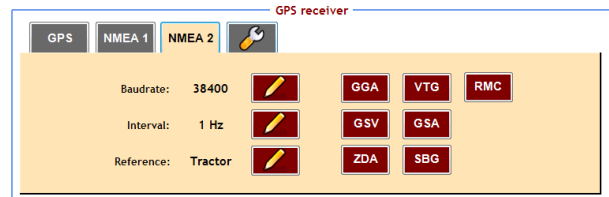


Figure 99 Configuring NMEA 2-data.

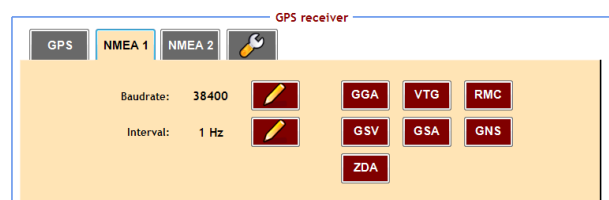
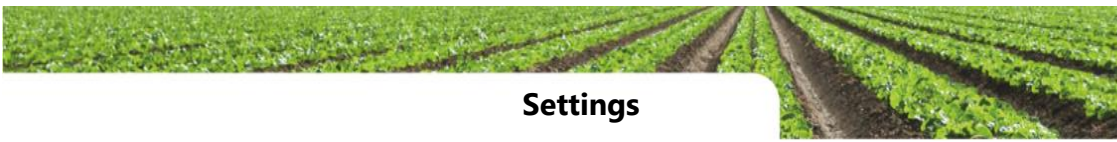


Figure 100 Configuring NMEA 1-data.



NMEA messages are transmitted over an M12 connector (Geostar / Viper 4(+) adapter cable) or a SUB-D9 serial connector (Viper4 / Viper4+) in the wiring harness.

Refer to the manual for the external devices to find the correct settings for NMEA messages.

i Please note!

In order to use NMEA 1 or NMEA 2 data, a different type of connection cable is needed to connect the devices. Contact your SBG dealer for more information.

6.2.2. Modem

The modem used will depend on the type of correction signal. A radio modem (which may or may not be built into the terminal) is used for correction signals over fixed or mobile radio base stations. A GSM modem (the Geoconnect or Slingshot Field Hub) is used for correction signals over an NTRIP network.

Radio

The radio tab only shows a selection option when a Satel radio modem or GSM modem is used in a Viper 4/Viper 4+ (Figure 101). This box must be checked if corrections are received via the radio modem. It does not need to be checked if corrections are received via a GSM modem.

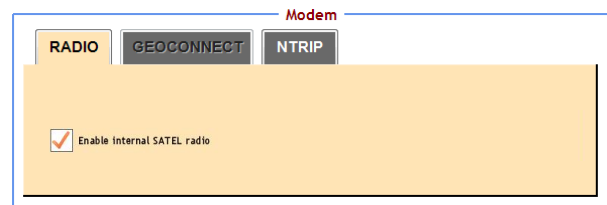


Figure 101 Modem.

The remaining Satel radio modem configurations are entered via the Base Manager in the SBGuidance Loader (section 2.2).

For a comprehensive manual covering the options of the Base Manager, go to:

<http://www.raveneurope.com/en/support/usermanuals>



Settings

Geoconnect GSM modem

In the **GPS** menu, tap on the **GEOCONNECT** button to change the Geoconnect settings (Figure 102).

This tab is only active if a GeoConnect modem is connected. Tap on **Edit settings** to change the settings. Contact your dealer if you have any questions about the settings.

On the **NTRIP** tab you can select the desired NTRIP provider if you are using a Geoconnect (Figure 103). The selected provider will be highlighted in green.

The connection status is shown:

Number of messages received (**Bytes received**)

Number of messages sent (**Bytes sent**) Connection

speed (**Receiving**)

Connection time (**Time online**)

Select **Auto start NTRIP** to automatically establish a connection with the NTRIP provider when starting the GPS system.

Configure the NTRIP networks by tapping on the settings button (gearwheel icon) at bottom left (Figure 104). This is only possible when there are no active connections.

Slingshot GSM modem

If a Slingshot GSM modem is used, the settings can be changed in the Slingshot Manager in the Loader (section 2.2).

For a comprehensive manual covering the options of the SlingShot Manager, go to:

<http://www.raveneurope.com/en/support/usermanuals>

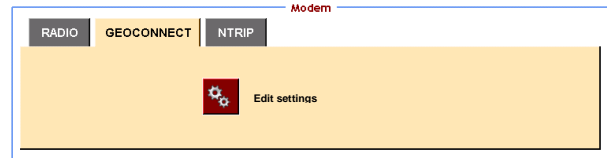


Figure 102 GeoConnect.

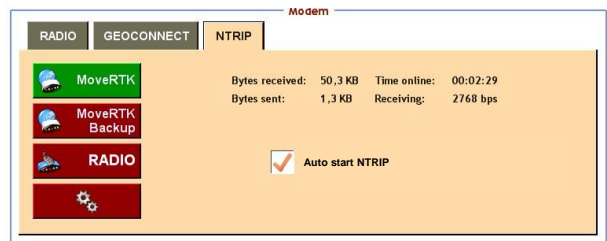


Figure 103 NTRIP provider.

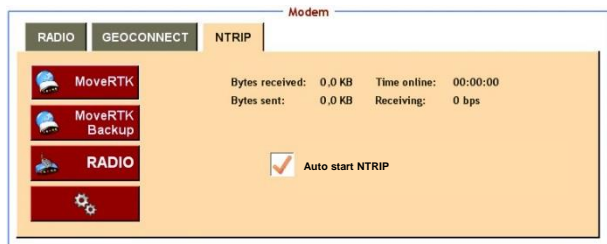
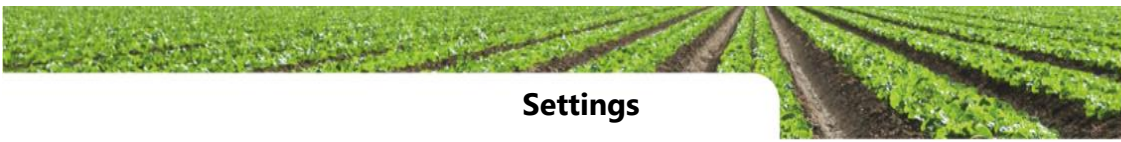


Figure 104 NTRIP configuration.



6.3. System set-up

Go to the **SYSTEM** menu to change the screen and language settings (Figure 105).

The **Display** tab is shown by default (Figure 106).

Select **Head-up Display (HUD)** to display the position of the side-shift cylinder, discs or plough on the main screen when using implement steering.

Tap on **Contrast** to change the background colour of the field display between white (daytime) and black (night-time). On Viper 4(+) terminals, select **Brightness** to adjust the brightness of the screen.

Tap on the loudspeaker tab to activate/deactivate the built-in beeper (Figure 107). With a Viper 4(+) it is possible to adjust the **Volume** of the speaker.

Tap on the globe tab to change the **Language** and **Units** (Figure 108). Use **UTC offset** to switch from summer to winter time.

i Please note!

If the beeper is switched off here, no alarm will sound if full GPS reception (RTK-Fix) is lost.

Use the last tab (Figure 109) to choose the colour scheme. You can choose between blue, orange, red and green.

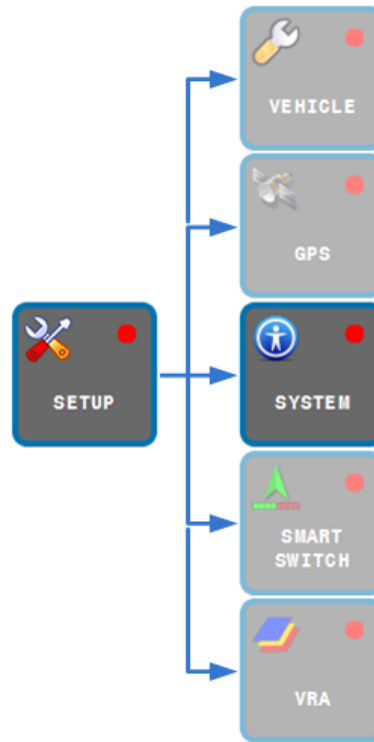


Figure 105 System set-up.

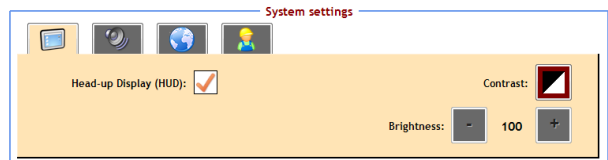


Figure 106 Display.

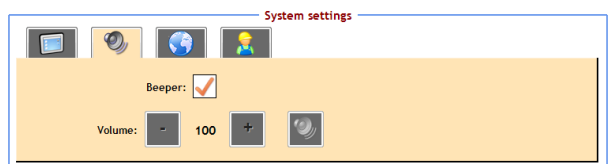


Figure 107 Beeper.

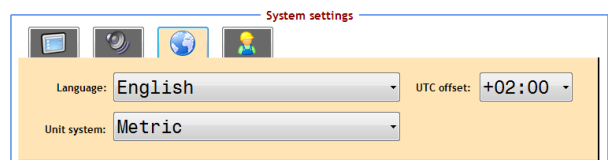


Figure 108 Language, units and time.

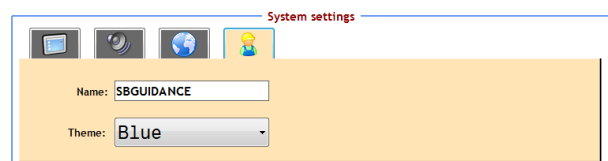


Figure 109 Language, units and time.



6.4. SmartSwitch (Section Controller)

i Please note!
This application requires a licence.

The **SMARTSWITCH** button (Figure 110), if shown, can be used to configure the SmartSwitch section control system.

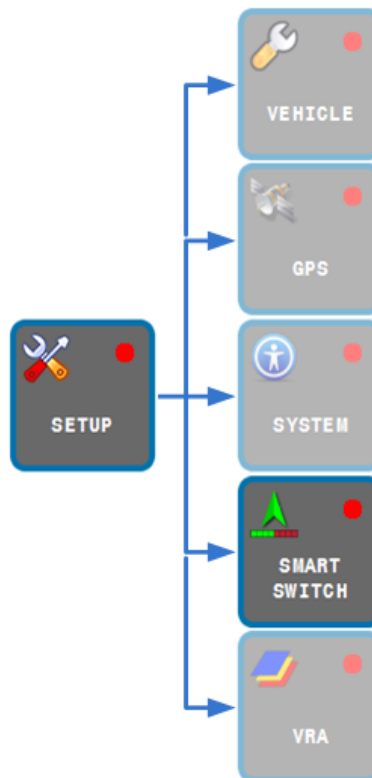


Figure 110 Smartswitch.

Section control is used to switch sections automatically, for example on sprayers (Figure 111), seeders and planters.

For a comprehensive manual covering the use and operation of section control, see:

<http://www.raveneurope.com/en/support/usermanuals/>

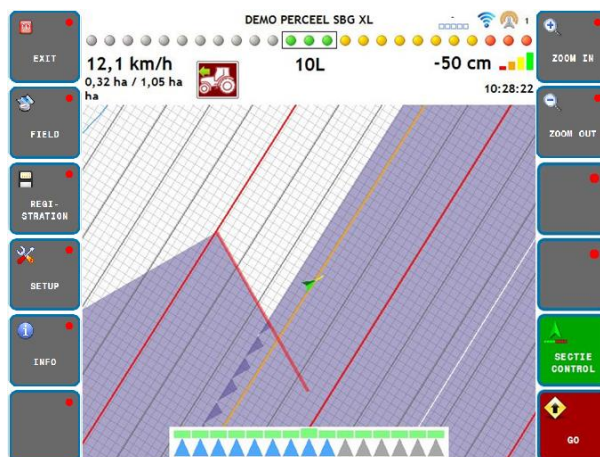


Figure 111 Example of SmartSwitch.



6.5. VRA (Variable Rate Application)

i Please note!

This application requires a licence.

When automatic control is activated, SBGuidance can implement site-specific control of up to four external devices simultaneously, for example, for variable application of inputs. Tap on the **VRA** button (Figure 112) to open the application.

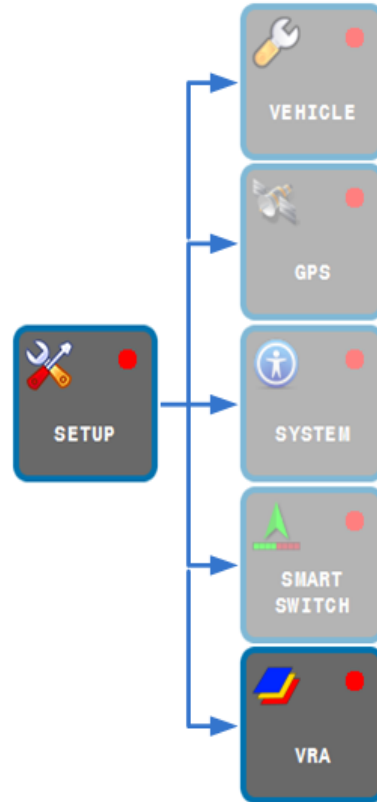


Figure 112 VRA.

You can change the settings for the various devices by scrolling through the available tabs (the number depends on the number of connected devices). A specific connection cable is required to do this. VRA allows site-specific control of the amount of product applied, based on a task map (Figure 113).

For more information about using the VRA application in SBGuidance, please refer to the manual. This manual can be found at:

<http://www.raveneurope.com/en/support/usermanuals/>

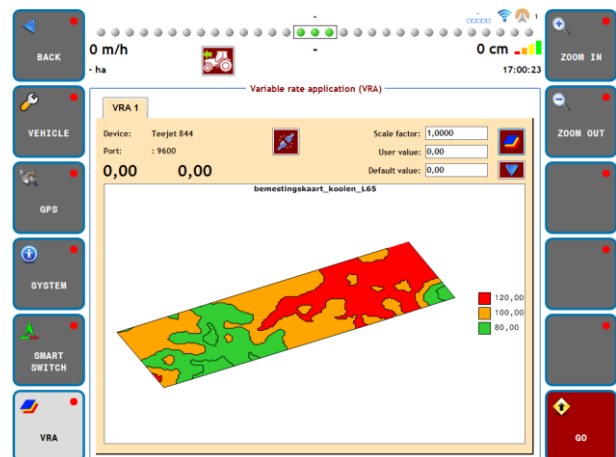


Figure 113 Example of VRA in SBGuidance.



Settings

Intentionally left blank.

7. Info

Figure 114 shows the functions that can be invoked by pressing the **INFO** button.

It is possible to exit a specific application and return to the main menu at any time by tapping on **BACK** at top left of the screen.

7.1. GPS info

The **GPS** button is used to display information relating to the position or orientation. Tap on this button to display the **POSITION** or **ORIENTATION** data at top right of the screen (Figure 115).

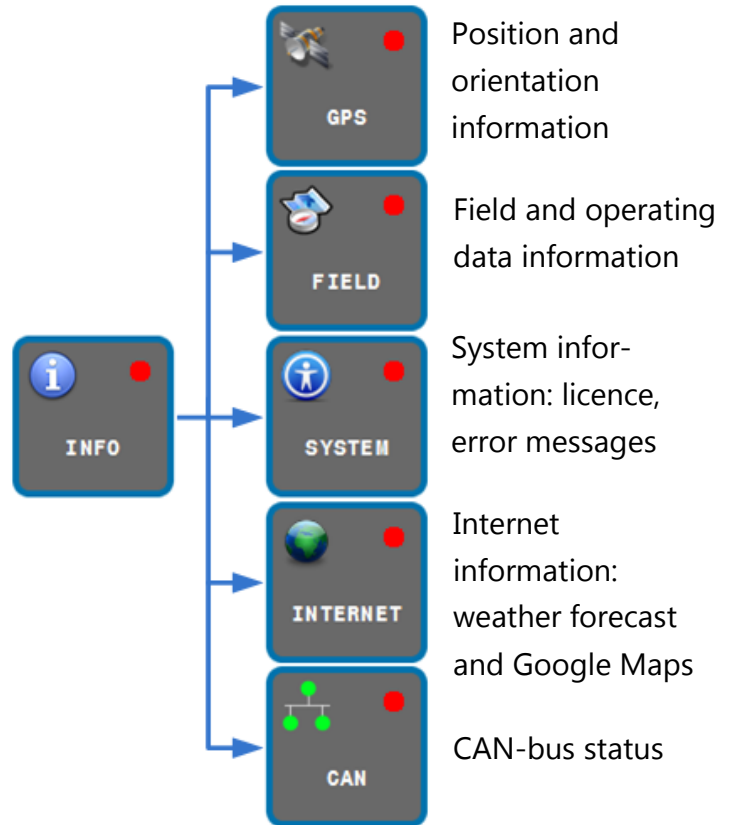


Figure 114 Info menu.

7.1.1. Position

Tap on **POSITION** to request information about the GPS position. The information is then divided into six tabs, as follows: **GPS 1**, **GPS 2**, **BASE**, **INFO**, **L-Band**, **GEOCONNECT**.

The **GPS 1** (Figure 116) tab displays information relating to the main GPS antenna. This is the antenna mounted on the tractor.

i Please note!

The GPS 1 is the antenna on the tractor. Always connect this antenna to the GPS 1 connector on the terminal.

Latitude, **Longitude** and **X, Y, Z** display the coordinates of the current position. **Height** displays the GPS elevation. The **Satellites** field shows the

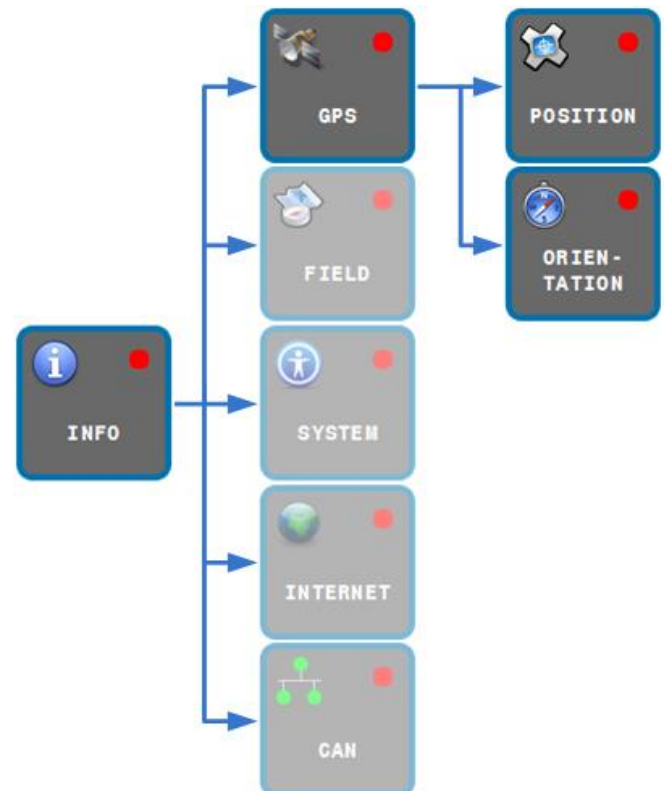


Figure 115 GPS info.



Info

number of visible and active satellites available to the system:

- Light green: number of GPS satellites in use.
- Dark green: number of GPS satellites visible, but not in use.
- Yellow: number of GLONASS satellites in use.
- Brown: number of GLONASS satellites visible, but not in use.

GPS mode indicates the signal quality: **No solution**, **Stand-Alone GPS**, **SBAS**, **DGPS** or **RTK Fixed**. Any reception problems are displayed next to **Error message**. Tap on the **Reset** button to reset the RTK filter of the GPS receiver.

The **GPS 2** (Figure 117) tab displays information about the implement antenna (GPS 2), if present.

The **BASE** tab (antenna icon) displays information about the correction signal (Figure 118). **Distance** displays the distance in metres from the base station. **Received** displays the number of messages received from the base station. **Diff. age** displays the amount of time that has elapsed since the last correction message was received.

The **INFO** tab (I icon) (Figure 119) displays data relating to the connection with the GPS receiver. This data can be used by a specialist for diagnostic purposes in the event of an issue.

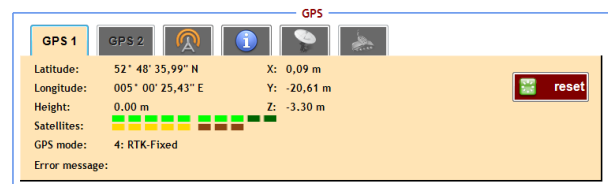


Figure 116 GPS1 info.

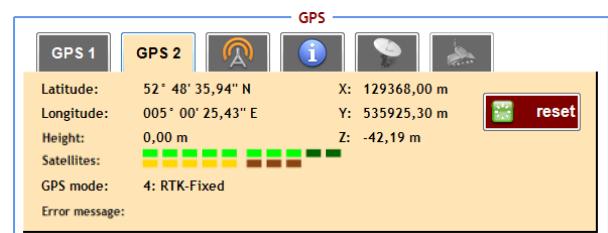


Figure 117 GPS2 info.

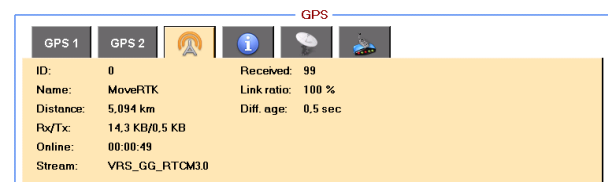


Figure 118 Base station info.



Figure 119 Info.

The tab with the **satellite** (Figure 120) provides additional information about the satellite signals used for specific GPS receivers.

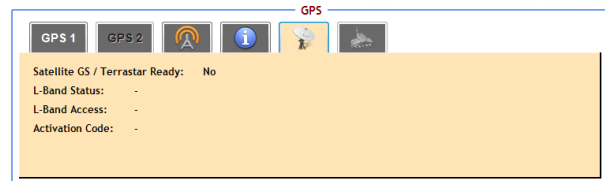


Figure 120 Satellite signal info.

The **GEOCONNECT** tab (modem icon) (Figure 121) displays information about the internet connection (if a Geoconnect is used).

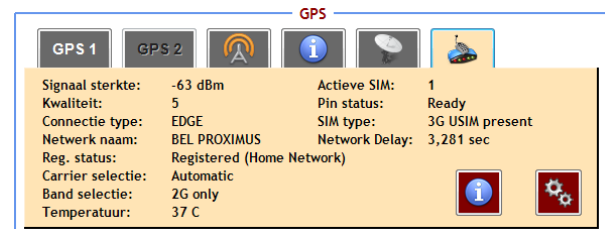


Figure 121 GeoConnect info.

7.1.2. Orientation

Tap on **ORIENTATION** to view the vehicle orientation.

The **TRACTOR** (Figure 122) tab displays the **Roll**, **Pitch** and **Yaw** (direction) of the tractor. Use the **Reset** button to re-initialise the terrain compensation module (DynamIQ). This tab is active with the SBGuidance AUTO and SBGuidance TWIN steering systems.

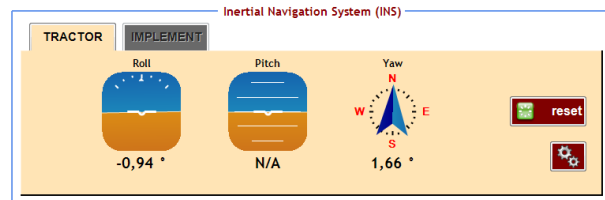


Figure 122 Tractor orientation.

The **IMPLEMENT** (Figure 123) tab displays the **Roll**, **Pitch** and **Yaw** (direction) of the implement (if implement steering is installed). Use the **Reset** button to re-initialise the terrain compensation module (DynamIQ). This tab is active with the SBGuidance TWIN and SBGuidance Side-Shift steering systems.

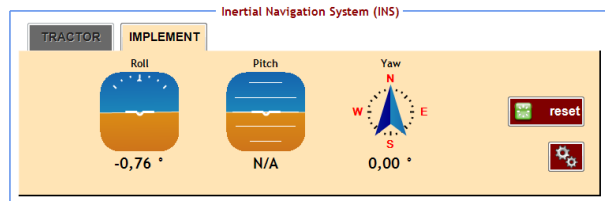


Figure 123 Implement orientation

Tap on the "gear wheel" icon at the bottom of the tractor or implement tab to see information about the corresponding DynamIQ (Figure 124). **Use DynamIQ Heading** is selected by default and ensures that the direction (**Yaw**) is determined by DynamIQ. If this setting is not selected, the direction will be determined on the basis of GPS positions.

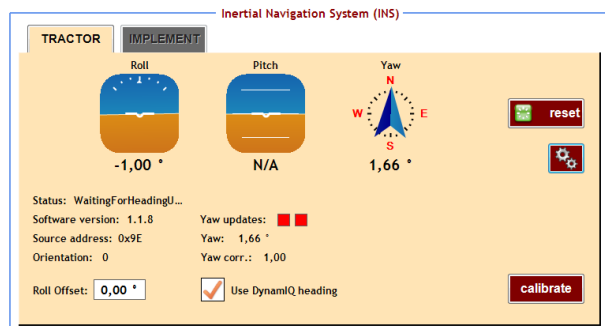


Figure 124 DynamIQ information.



Info

Tap on the **calibrate** button to carry out a two-point calibration. This procedure determines the level and therefore the centre of the tractor. This ensures that the tractor drives back and forth along the same track and that the operations performed join up correctly.

First specify the DynamIQ installation method. The DynamIQ must be installed level (with the sticker at the top) and the connector direction must be specified here (Figure 125). Drive to a uniform and level surface (e.g. the farmyard). Position the tractor next to a reference point. Tap on **step 1** (Figure 126) to define the roll angle in this direction. The **Status** will change from **NORMAL** or **Waiting for Heading** to **CALIBRATING**. Wait until the status changes to **WAITING**. Then position the tractor in exactly the opposite direction (turn through 180 degrees) next to the reference point. Tap on **Step 2** to define the roll angle in this direction. The status will change from **WAITING** to **CALIBRATING**. The level position is determined as soon as the status returns to **NORMAL** or **Waiting for Heading**. Exit the window by tapping on the green checkmark at the bottom right.

The centre offset should now be correct. Check the centre offset (e.g. by driving back and forth along the same track with automatic steering enabled) and make any necessary adjustments in SBGuidance under **SETTINGS > VEHICLE > TUNING**. See section 6.1.1 for more information about the centre offset. When carrying out this check: drive carefully and far enough so that the deviation to the guidance line, when driving back and forth, is 0 cm!

i Please note!
The centre offset must be corrected by half the connection error.

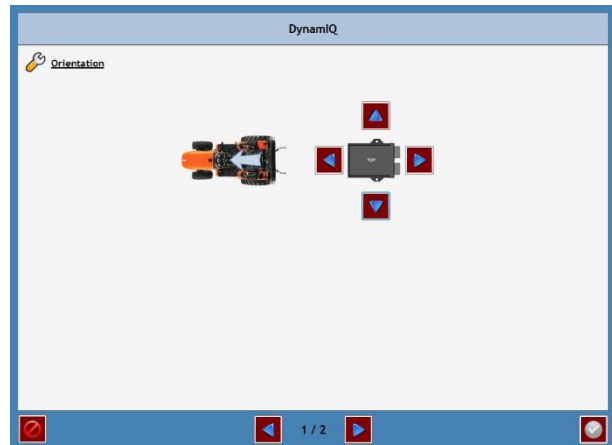


Figure 125 Specifying the installation method.

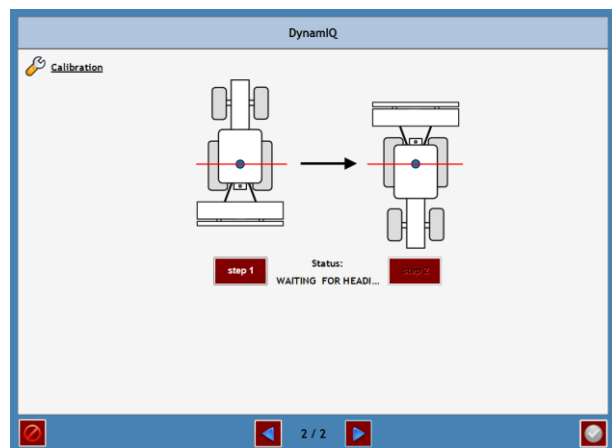


Figure 126 DynamIQ calibration.

7.2. Field info

Tap on **FIELD**. Four menus are now displayed at top right of the screen (Figure 127).

7.2.1. Details

Tap on **DETAILS** to display data relating to the field and operation (Figure 128).

7.2.2. Work data

The **WORK DATA** menu records a range of information (Figure 129). Three tabs are available: **Field (1)**, **Field (2)** and **Total**.

The **Field (1)** and **Field (2)** tabs are linked to the active field. This means that two different records can be generated simultaneously for one field. Both counters run for this field until they are individually reset using the **Reset** button (counter icon). The area shown on the **Field (1)** tab is linked to the area displayed in the top bar on the main screen. If the overlap is deleted, the hectare counter will also be reset.

The counters on the **Total** tab generate a total record of all operations. They are independent of a field and keep running until they are reset using the **Reset** button (counter icon) on the tab itself. This enables the total work performed on different fields to be recorded. The button next to the **Reset** button can be used to switch between active distance and active area within the tab.

The active time will run when overlap date is shown (automatic steering activated / external sensor switched on) and the speed is displayed. If one of these parameters is not satisfied, the time will count as inactive.

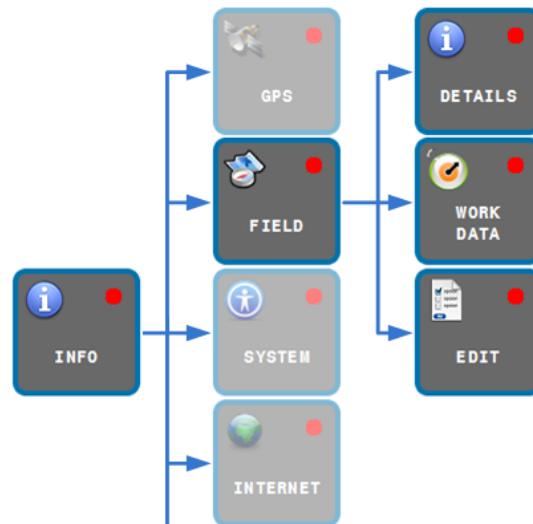


Figure 127 Field info.

Field		Operation	
Name:	SBG Field	Name:	5m
Creator:	SBGUIDANCE	Creator:	SBGUIDANCE
Date:	18 Jul. 2017 - 15:44	Date:	31 Jul. 2017 - 10:15
AB-lines:	1	Mode:	Straight
Curves:	0	Offset:	0,003 m
Contour:	No	Working width:	5,000 m
Area:	-	Spray width:	-
Direction:	0,000 °	Spray path:	-
		Headlands:	0

Figure 128 Details of field and operation.

Work Data			
Total time:	00:26:54	Capacity:	0,00 ha/h
Active time:	00:05:25	Area:	0,057 ha
Inactive period:	00:21:29	Efficiency:	20,1 %

Figure 129 Work recording.



7.2.3. Map

The **MAP** menu displays information which is linked to the overlap of the loaded field. Figure 130 shows the speed maintained while working this field.

In addition to speed, five other values are recorded continuously during colouring of the overlap. In the 'Speed' options menu you can choose between these values, namely:

- Height
- Speed
- Diff. Age
- Autosteer
- Operation mode
- GPS mode

If the overlap is deleted or the hectare counter is reset, this information is also deleted.

This information can be exported using the Field Manager before the overlap is deleted. It can then be imported into the Office Manager. For more information about the Field Manager and Office Manager, see:

<http://www.raveneurope.com/en/support/usermanuals/>

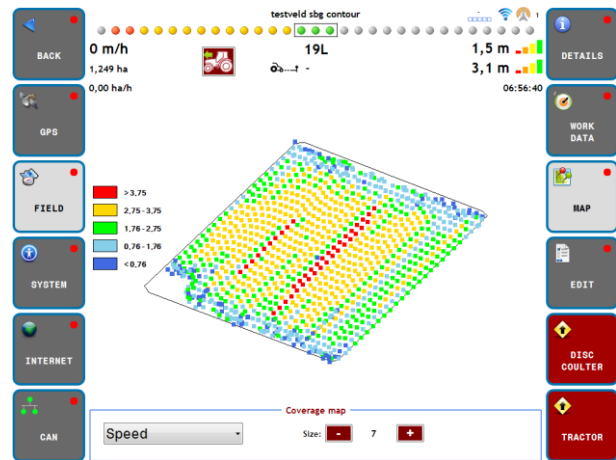


Figure 130 Map menu.

7.2.4. Edit

The **EDIT** button can be used to change the parameters of the selected operation. This button is the same as the **EDIT** button accessed from the **FIELD** button on the main screen (for more information, see section 4.6).

7.3. System info

The **SYSTEM** button can be used to display a range of system information (Figure 131).

7.3.1. Error messages

Under **ERROR MESSAGES** you can scroll through the list of (historical) error messages. If an error message is generated, this is indicated by a warning triangle on the main screen (Figure 132).

Tap on the warning triangle to open the error messages menu.

Error messages can be deleted individually by pressing the **REMOVE** button (Figure 133).

Please note!

Never delete error messages without noting them down. These error messages can help product specialists to trace the cause of a problem quickly in the event of an issue.

7.3.2. Version

When you tap **VERSION**, the **System information** menu opens at the bottom of the screen (Figure 134). This menu shows the **Software ID**, **Support ID**, **Terminal ID** and **Hardware ID**.

Tip:

Ensure that you have the Terminal ID and Hardware ID to hand when you order a licence to activate a new SBGuidance application.

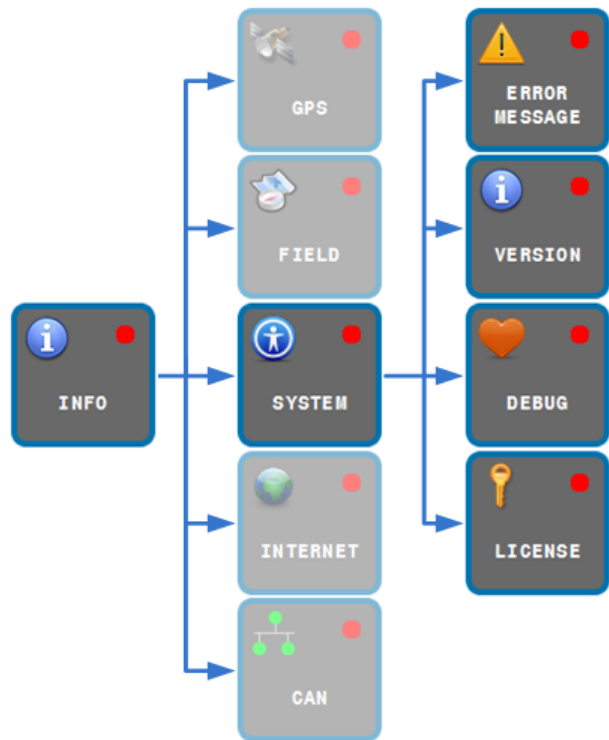


Figure 131 System info.



Figure 132 Warning triangle position.

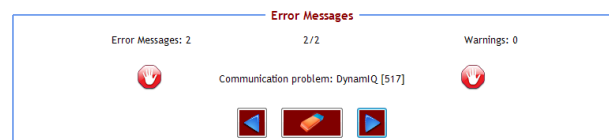


Figure 133 System error messages.

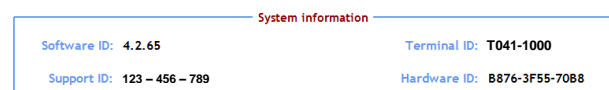


Figure 134 System information.



7.3.3. **Debug**

The **DEBUG** button enables product specialists to trace the cause or origin of a problem in the event of an issue. The **System Diagnostics** menu has four tabs.

i Please note!

Do not make any changes in this menu without the approval of the dealer or manufacturer.

The first tab (Figure 135) is loaded as the default when you tap on the **DEBUG** button. This tab shows the load on the computer, RAM and DISK memory.

The second tab (Figure 136) can be used to view the signal strengths of the sensors in the system (if present).

The third tab (Figure 137) can be used to set and remove log options. NB: Only do this with the approval of the SBG dealer! The log files created can also be deleted here or copied to a USB stick.

Figure 138 shows the fourth tab. When using a Viper 4+, this tab can be used to generate a code to allow remote servicing. A product specialist will ask for this number, which can be used to log in remotely.

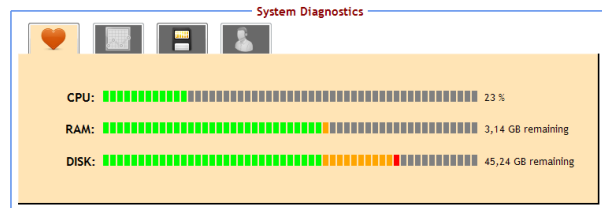


Figure 135 System GPS data.

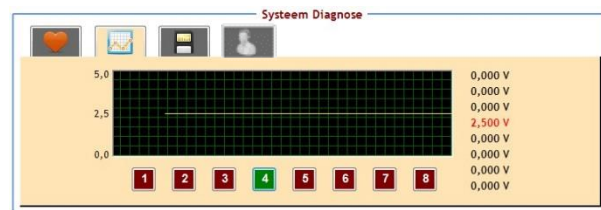


Figure 136 System diagnostics, signals.

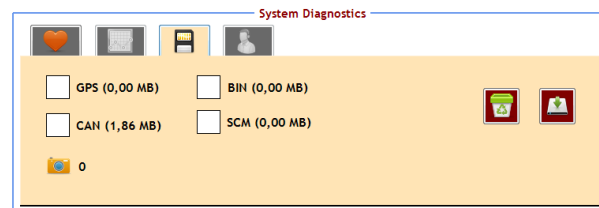


Figure 137 System diagnostics, log files.

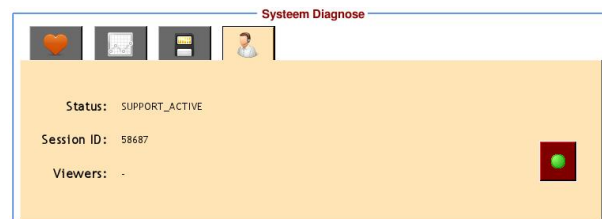


Figure 138 Remote servicing.

7.3.4. Licence

Tap on the **LICENCE** button to display information about the licences. It is also possible to install new or temporary licences on the terminal.

The **Licence information** menu displays detailed information about (temporary) licences.

Loading a new licence

A new licence file is needed if the user wants to install steering types or modules which were not requested when the system was first purchased. Consult an SBG dealer to request new licences.

After you have obtained the licence file, follow the steps below:

1. Copy the licence file provided to an USB drive and insert it into the terminal.
2. Go to the **Licence information** menu (Figure 139) and tap on the button with the folder symbol on the right-hand side of the menu. This will open a new window (Figure 140),
3. At the bottom of the screen, in the **USB** field, select the correct disk drive (licence files on the USB stick are displayed automatically).
4. Tap on the correct file to select it. The selection is highlighted in blue.
5. Confirm you selection by tapping on the confirm icon (green checkmark) at bottom right.

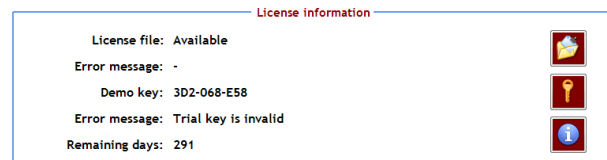


Figure 139 Licence information.

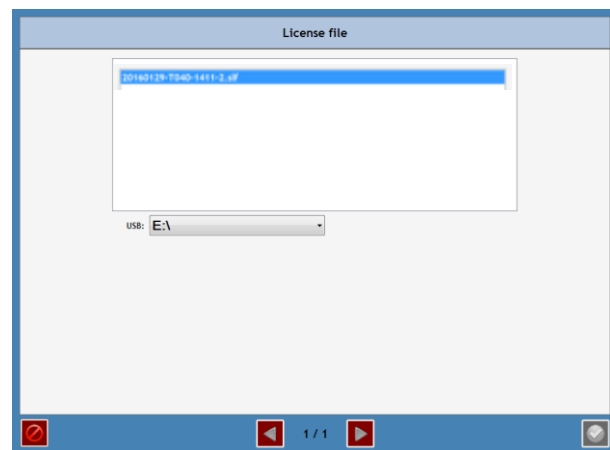


Figure 140 Selecting a licence file.



Tip!:

Before confirming, check that the serial number of the terminal appears in the name of the licence file required (in the example: T040-XXXX). The serial number of the terminal can be found on the sticker on the rear or left-hand side of the terminal and is in the following format: T0XX-XXXX.

Entering the demo key

A **Demo key** is a code which will temporarily activate certain steering systems or modules. Please contact your SBG dealer to request a demo key.

To enter the **Demo key**, go to the **Licence information** menu (Figure 139) and tap on the button with the key icon. This will open a new screen (Figure 141). Enter the licence code. After entering the code, tap on the confirm symbol. The **Licence information** menu will then indicate whether the code is valid or invalid (Figure 139).

Displaying current licences

In the **Licence information** menu (Figure 139) tap on the **I** button at bottom right to check which steering types and modules are activated (Figure 142).



Please note!

A licence file applies to one terminal only. Each terminal requires its own licence file.

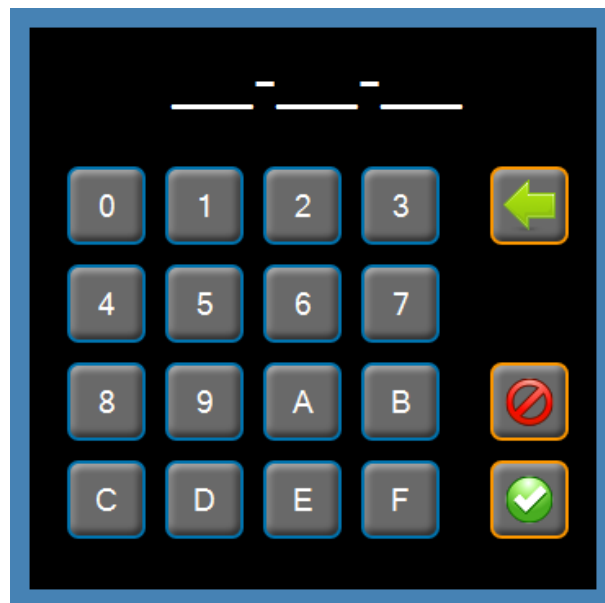


Figure 141 Entering the demo key.

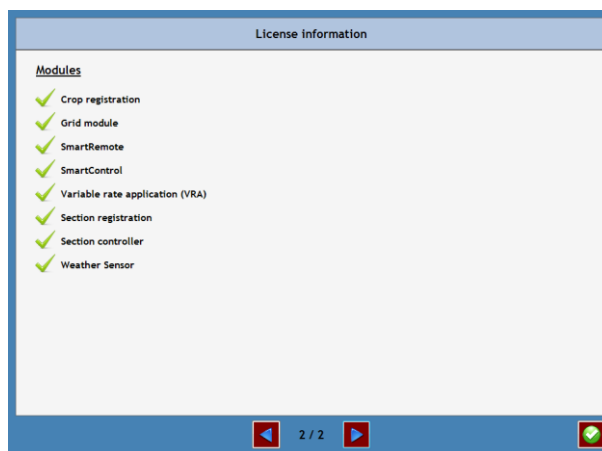
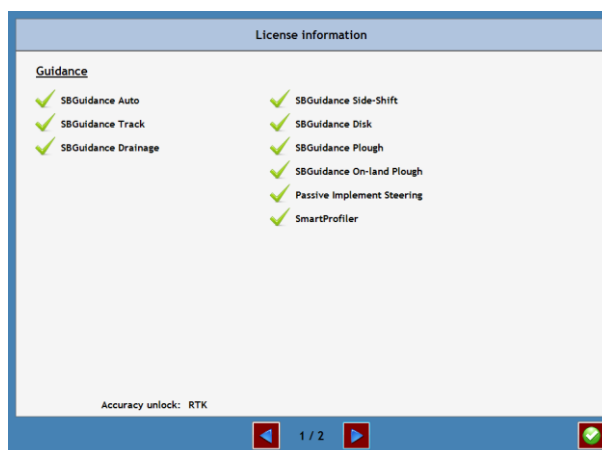


Figure 142 Licence information for steering systems and modules.

7.4. Internet info

The **INTERNET** button (Figure 143) can be used to view information on the internet.

Tap on the **WEATHER** tab to display the weather forecast.

Tap on the **MAPS** tab to display the current position on Google Maps (Figure 144). The closest address will be displayed at the bottom of the screen. The map on the screen can be updated by tapping on the refresh button. Use the – and + buttons to zoom in and out. Use the map button to switch between the road map and the satellite display. If a contour field is loaded, the field boundary is also shown (Figure 144).

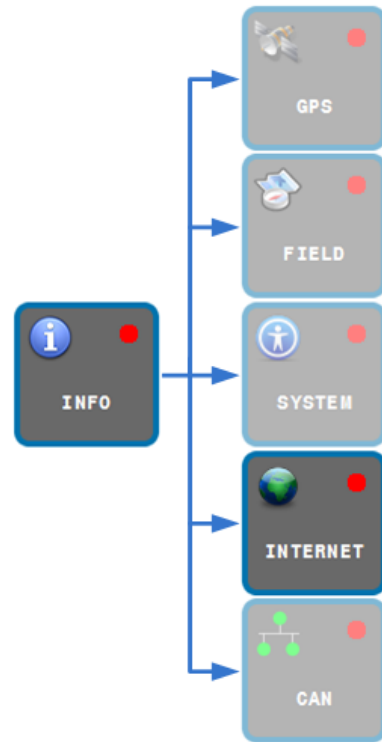


Figure 143 Internet info.

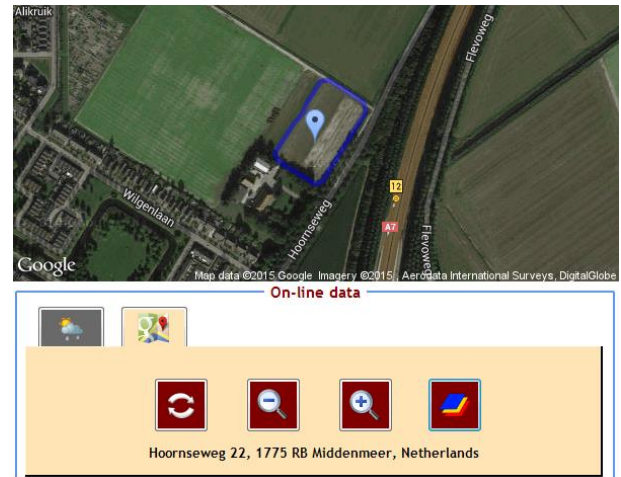


Figure 144 Online data, maps.



7.5. CAN info

Tap on the **CAN** button (Figure 145) to display information about CAN-bus communication (Figure 146).

The **CAN** button enables product specialists to trace the cause or origin of a problem in the event of an issue.

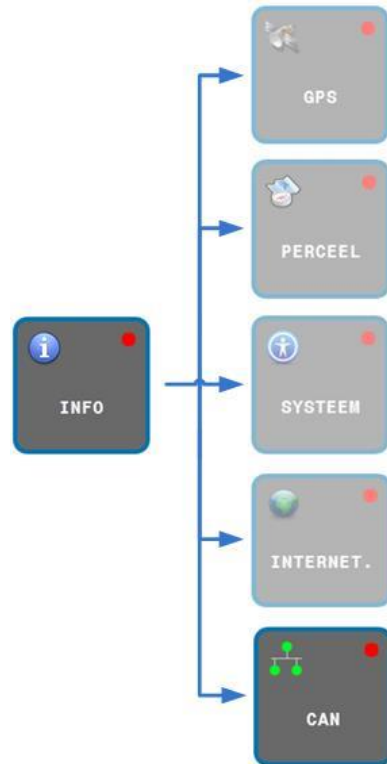


Figure 145 CAN menu.

CAN Diagnostics			
Online:	00:10:57	RxCount:	30384
Busload:	3,60 %	TxCount:	8925
		Errors:	4704
		Hardware:	SBGCAN
		Status:	5
		Info:	HW:1 FW:1.0.3

Figure 146 CAN tab.



Info



Intentionally left blank.



SBG

PRECISION FARMING

Powered by **RAVEN**



SBG precision farming

Hoornseweg 22

1775 RB Middenmeer

The Netherlands

E-mail: service-eu@ravenind.com

Web: www.raveneurope.com

Tel: +31 (0)227 54 93 00

Performing perfection.