



# CONFIGURATION MANUAL

(English) (Translated version)

*Tractor steering*

## **SBGuidance Auto 4.x.x**

016-8000-100EN Rev. A





**SBGuidance 4.x.x I Rev. A I SBGuidance Auto**

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## Preface

This configuration manual is intended for persons responsible for configuring a SBGuidance Auto set. The manual contains important instructions that should be complied with when commissioning, operating and servicing the SBGuidance system.

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

Any comments or questions can be sent to [service-eu@ravenind.com](mailto:service-eu@ravenind.com)

**SBG Precision Farming nor any of its suppliers will accept no liability for physical or material damage caused whilst using the SBGuidance system.**

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

This user guide uses a number of concepts for extra attention to a few things.



**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.

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## Disclaimer



**Warning!:**

Always switch off the tractor before installing or repairing hydraulic and electrical components of the SBGuidance system.



**Warning!:**

The safety instructions contained in the manuals of the tractor or implements must be complied with at all times.



**Warning!:**

It is strictly prohibited to use the SBGuidance system on public roads.



**Warning!:**

It is strictly prohibited to leave a driving vehicle unattended when the SBGuidance system is switched on. The driver is always responsible for the direction and course of the vehicle.



**Warning!:**

To prevent injury or fire, replace defective fuses only with fuses of the same type and amperage.



**Warning!:**

The SBGuidance the operating system is not able to detect and avoid obstacles. If there is an obstacle in your path, you will always need to take action for it to be avoided.



**Warning!:**

Only allow authorized/qualified persons to operate the system. Authorized/qualified persons are defined as: persons who have read and understood the manual, have been given instructions by a product specialist, and who are both physically and mentally fit and able to operate the system.



**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.



**Warning!**

The system contains moving parts! Make sure the immediate environment is clear of people before operating the system.



**Warning!**

Always wear personal protective equipment when operating/adjusting/repairing the system outside of the tractor cab.



**Caution!**

In order to prevent power surges from occurring, always start the machine first, before initiating the SBGuidance control system.



**Caution!**

Only touch the touch-screen with your finger or by using a special touch-screen stylus/pen. Operating the touch-screen with sharp objects may cause permanent damage to the screen.



**Caution!**

Always consult your supplier as to which products are best suited first before cleaning the touch-screen with chemicals or alcohol.



**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.



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## 1. Introduction

This manual is a general guide and is not intended for any specific make or type. This configuration manual applies specifically to SBGuidance version 4.x.x or newer.

The system must be configured in the tractor in order to correctly set up the operating software for the specific type of tractor used.

This configuration manual contains information and instructions relating to the following subjects:

- Creating machine profiles
- Checking the Configurator system settings
- Checking the Configurator user settings
- Setting the machine settings in the Configurator
- Fine-tuning the steering controller via the CAN-Tool
- Two-point calibration of DynamIQ (ISO)
- Setting up the DynamIQ (ISO) with the CAN tool
- Checking the steering performance




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## 2. Creating Machine Profiles

Once all components are installed, the terminal can be mounted in the tractor and the configuration of the machine can start.

Switch on the terminal and go to the Configurator by pressing "Shift + SBGuidance". In the Configurator go to *Settings > Machine Selector* (or press F8-key). Once pressed the Machine Selector menu will be opened as shown in Figure 1.

Press the  button in the Machine Selector. Enter the name of the new machine profile in the screen that appears (Figure 2).

Then push the  button to add the new machine profile to the list.

Select the machine profile (Figure 3) and press the green checkmark (lower right corner) to be able to configure the settings of this machine profile in the Configurator.

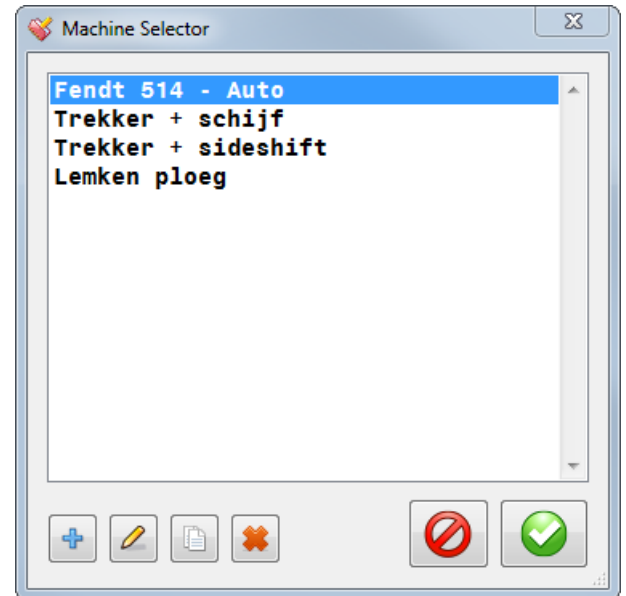


Figure 1 Machine Selector.

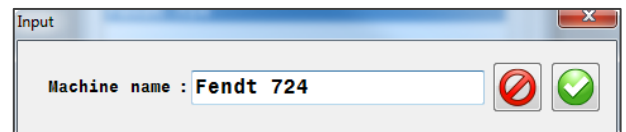


Figure 2 Add machine profile.

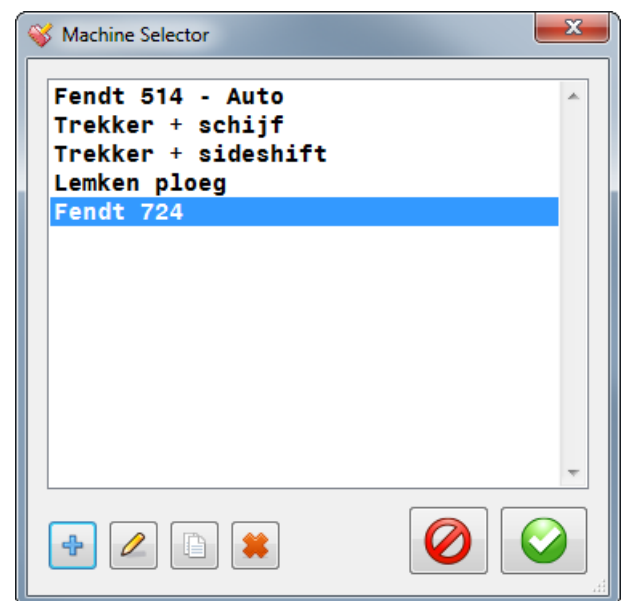


Figure 3 Select new machines profile.



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### 3. Checking the system settings

By default, the system settings are already correctly set upon delivery. In some cases these settings need to be changed according to specific customer wishes. This chapter explains how to check and/or adjust the system settings.

In the Configurator go to "Settings" > "System" or press "F9".

#### 3.1. Terminal

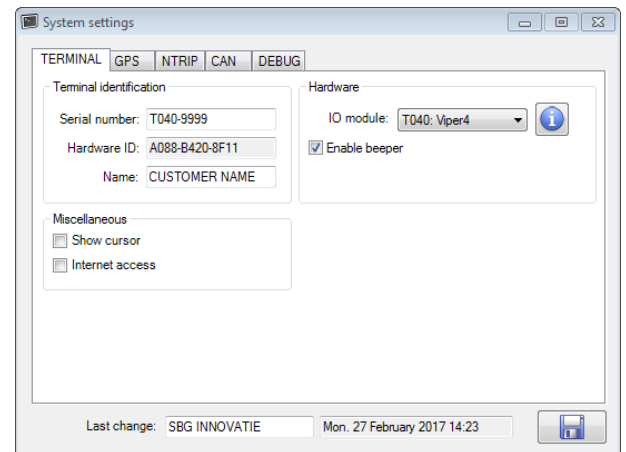
The type of IO module inside the terminal can be selected in the first tab (Figure 4). To determine the type of terminal, refer to the serial number sticker on the terminal.

Type	Terminal	IO Module
T021	GeoSTAR 200	HERCULES2
T022	GeoSTAR 200	ACCESUSB
T023	GeoSTAR 200	ACCESUSB
T025	GeoSTAR 250	BEEPONLY
T040	Viper 4	VIPER 4
T041	Viper 4+	VIPER 4+

Table 1 shows which IO module is required for each type of terminal. The serial number and Hardware ID should **never** be changed! Add a name (for example the customer name) to the "Name" input field.

**Table 1 IO module of each terminal type**

Type	Terminal	IO Module
T021	GeoSTAR 200	HERCULES2
T022	GeoSTAR 200	ACCESUSB
T023	GeoSTAR 200	ACCESUSB
T025	GeoSTAR 250	BEEPONLY
T040	Viper 4	VIPER 4
T041	Viper 4+	VIPER 4+



**Figure 4 System settings Configurator.**



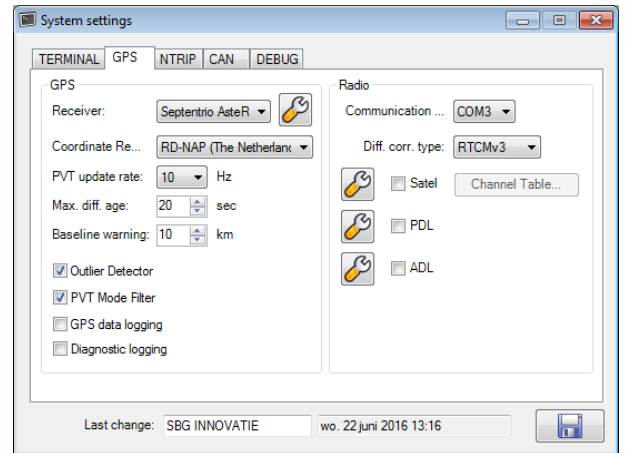
### 3.2. GPS

In the GPS tab (Figure 5), the different types of supported GPS-receivers can be configured. Nearly all GeoSTAR 200 and GeoSTAR 250 terminals have a Septentrio AsteRx2e(H) GPS-receiver. The Viper 4 and Viper 4+ terminals have an integrated Septentrio AsteRx4 receiver.

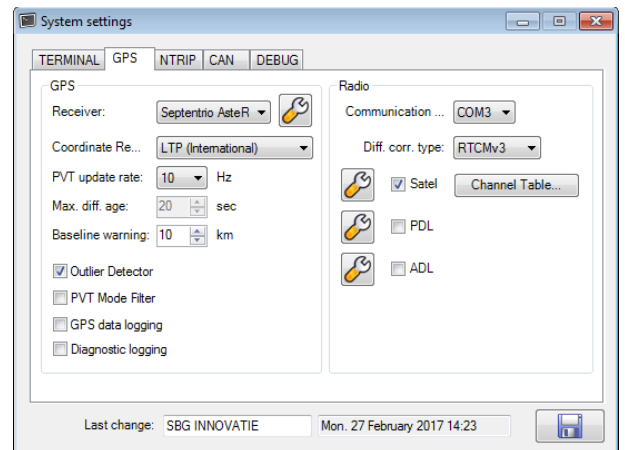
If an integrated or an external radio modem is used a few settings need to be changed. The radio communication should always be set to "COM3". (Figure 6). The type of radio modem can vary depending on the type of terminal.

A Viper 4 terminal with an integrated radio modem is always equipped with a "Satel" radio modem. Therefore, make sure that "Satel" is selected when using a Viper 4 terminal with an integrated radio modem!

GeoSTAR 200/250 terminals can be equipped with either one of the three radio modem options. If a separate "PDL" modem is used next to an integrated radio modem always select the "PDL" –option.



**Figure 5 GPS settings without integrated or external radio modem.**



**Figure 6 GPS settings with integrated or external Satel radio modem.**



### 3.3. NTRIP

In the NTRIP tab the settings for using an internet modem are visualized.

#### 3.3.1. Radio

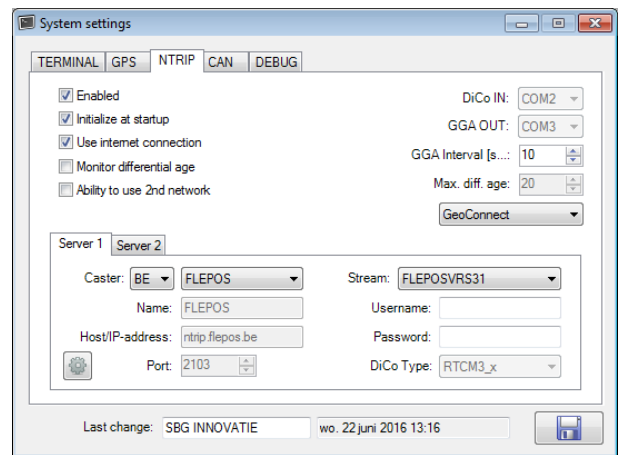
Always select the option **“Enabled”**. Even if the user receives the correction signal through a radio modem. The remaining options do not need to be selected.

#### 3.3.2. Geoconnect

When using a GeoConnect modem select the following options: **“Enabled”**, **“Initialize at startup”** and **“Use internet connection”** (Figure 7).

At the bottom of the wizard the account data (username and password) of the NTRIP network need to be entered. If a customer wants to use a second NTRIP-network the option **Ability to use 2<sup>nd</sup> network** needs to be checked. The account data for the second network can be entered in the **Server 2** tab.

Make sure the modem type is set to **GeoConnect** on the right side of the menu.

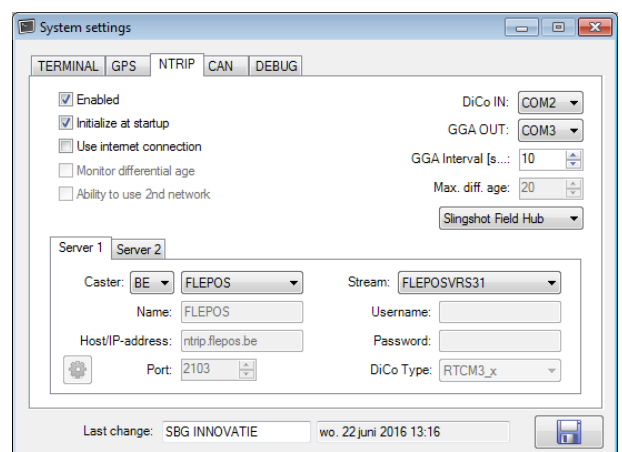


**Figure 7 NTRIP Settings GeoConnect.**

#### 3.3.3. SlingShot Field hub

When using a SlingShot field hub select the **“Enabled”** and **“Initialize at startup”** options. Also select as modem type, at the right side of the menu, **SlingShot Field Hub** (Figure 8).

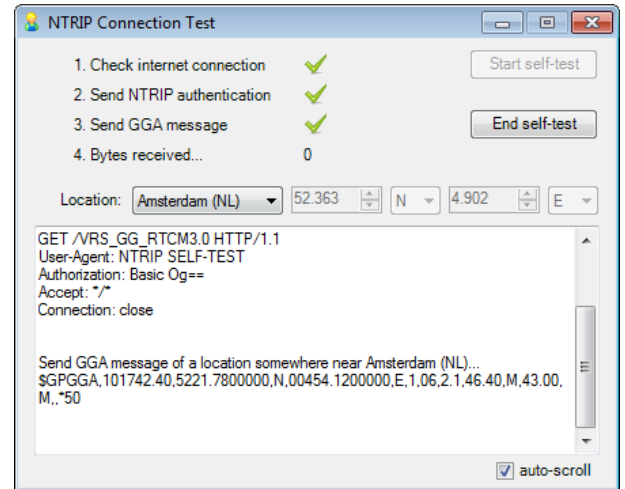
Select the country and provider in Server 1. Don't fill in the username and password in this wizard! This data must be filled in on the SlingShot Portal. To setup the NTRIP data when using a SlingShot Field Hub see the **“Configuration Manual – SlingShot Field Hub”** on the SBG website.



**Figure 8 NRIP settings SlingShot Field Hub.**

**i Tip!:** When using a GeoConnect modem, the connection with the NTRIP-server (MoveRTK, FLEPOS, etc.) can be tested with the “gear”-button (Figure 9).

**i Tip!:** Some providers have the possibility to set up a second server (backup server). Check “Ability to use 2<sup>nd</sup> network” and fill in the account data at the Server 2 tab.



**Figure 9: NTRIP Connection Test.**

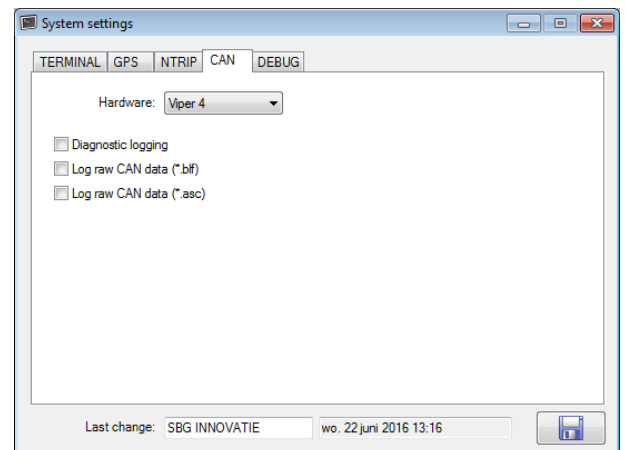
### 3.4. CAN

The CAN tab (Figure 10) is used to define the type of CAN-hardware. See for the correct CAN-hardware per terminal Table 2 Table 1 below.

**Table 2 CAN-hardware.**

Terminal	CAN-hardware
GeoSTAR	SBG
Viper 4	Viper 4
Viper 4+	Viper 4+

Press the diskette icon at the bottom right to save all settings. Close the “System settings” wizard.



**Figure 10 CAN settings.**





## 4. User settings configurator

In the menu bar of the Configurator, go to "Settings" >> "User" or press "F11" to open the User settings as shown in Figure 11.

The user settings can be used to modify the name of the owner, the desired interface language, the desired keyboard type, field sorting and operation sorting.

Enter at least the "**Username**". Language, keyboard type and field/operation sorting can also be changed by the user in SBGuidance.

Press the diskette icon at the bottom right to save all settings. Close the "User settings" wizard.

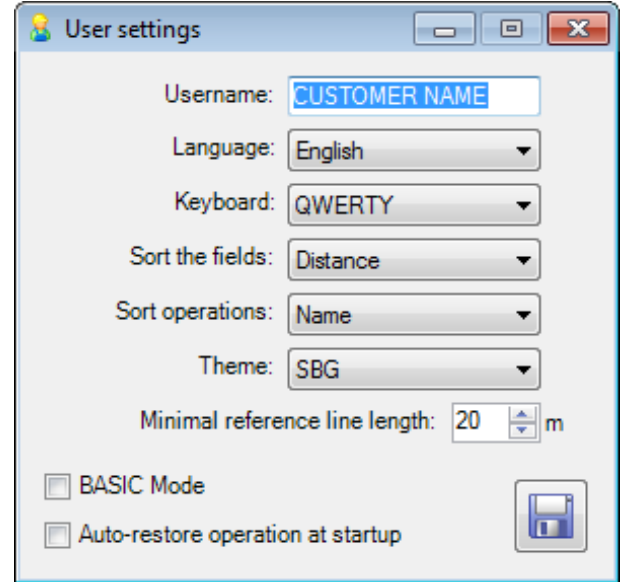



Figure 11 User Settings.




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## 5. Machine settings configurator

In the menu bar of the Configurator, go to "Settings" >> "Machine Selector". Select the correct machine profile (Figure 12). Press the  button.

In the menu bar of the Configurator, go to "Settings" >> Machine or press "F10". The machine settings wizard will open. The name of the loaded machine profile is displayed in the title of the wizard (Figure 13). Always check if the correct profile is loaded. If this is not the correct profile select the correct profile using the Machine Selector.


 **Please note!**  
 Always check if the correct profile is loaded.

### 5.1. General

Set the System type, Guidance type and Terrain compensation type (Figure 14).

**MAIN:** set the guidance settings for the first GPS-antenna. Set the System type to "**CAN**" in case of a tractor steering with a CAN installation kit and the Guidance type to "**SBGuidance Auto**". Select the used type of terrain compensation: if a DynamIQ (ISO) is installed, select "**DynamIQ**".

**AUX:** Only setup when using a TWIN steering system. Setup the guidance settings for the aux (machine) antenna. Guidance type is set to "None" as a default.

 **Please note!**  
 Do not forget to save changes made to these settings before going to another tab in the wizard. Save the settings by pressing the diskette icon on the bottom right corner of the wizard.

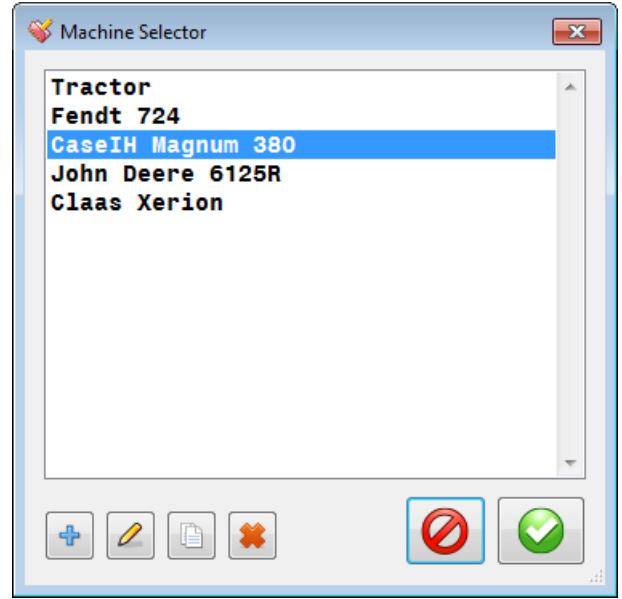


Figure 12 Select machine profile.

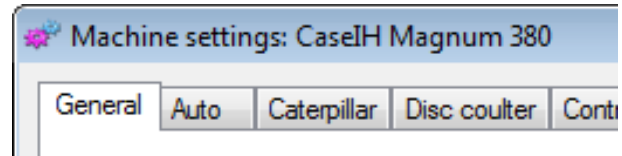


Figure 13 Machine profile name.

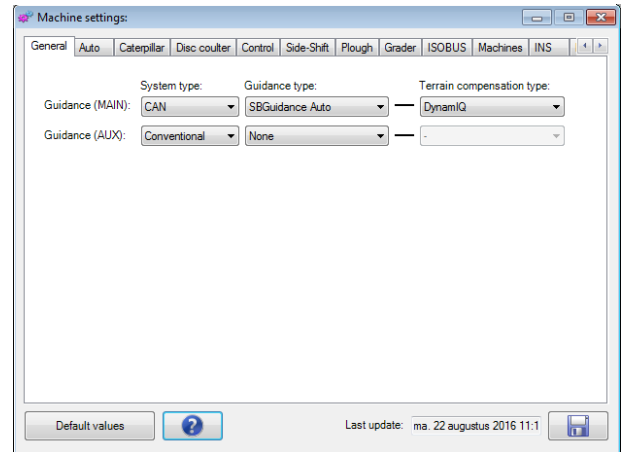
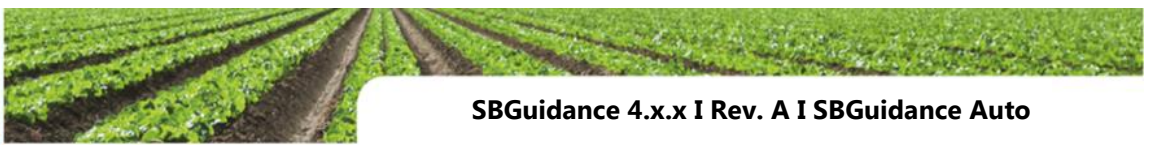


Figure 14 Machine settings - General.



## 5.2. Control

In the control tab (Figure 15) the Steer control Type and the Look Ahead settings need to be set.

The steer control type always needs to be set to **“Advanced”**. Do not change the **“Gain”** or **“Speed”** settings yet; changes to these parameters will be made later in the configuration process. The Look Ahead setting should be set to **“Adaptive”** and use the following values for **“Bias”** (0,0), **“Gain”** (1,0) and **“Maximum”** (25,0).

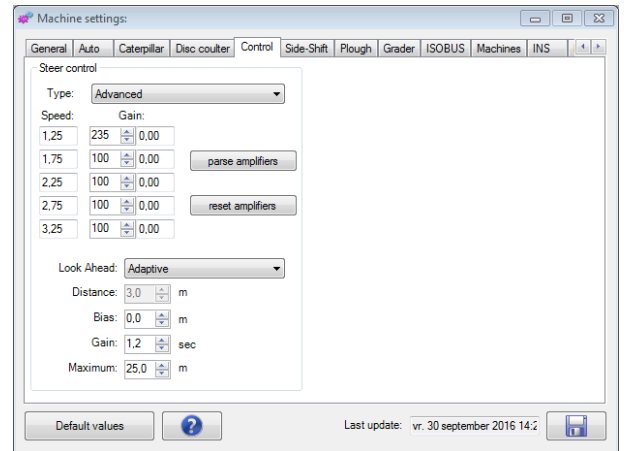


Figure 15 Machine Settings - Control.

The **“Gain”** of the **“Advanced”** controller is scaled throughout the whole speed range from 36 m/h to 20 km/h. By using the gain percentages the user gets the opportunity to set/change the gain for each different speed set (Table 3). The gain determines the aggressiveness of the steering system to a deviation to the line. In SBGuidance the gain value for each speed set can be edited by going to: Setup >> Vehicle >> Tuning.

Table 3 Speed Set SBGuidance.

Speed Set	Speed Range (m/s)	Speed Range (km/s)
1	0 – 1,25	0 – 4,5
2	1,25 – 1,75	4,5 – 6,3
3	1,75 – 2,25	6,3 – 8,1
4	2,25 – 2,75	8,1 – 9,9
5	2,75 and higher	9,9 and higher

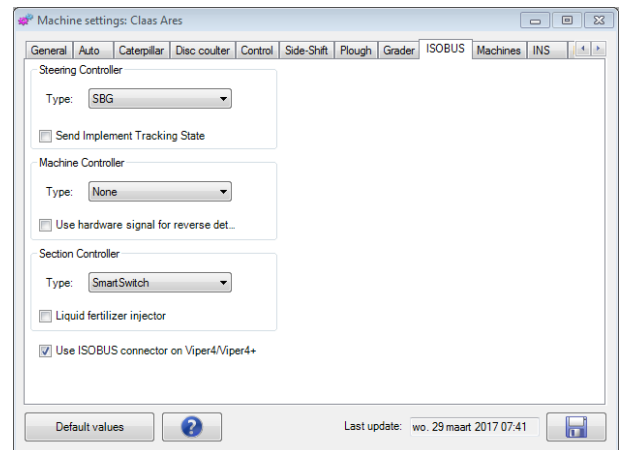


### 5.3. ISOBUS

Set the Steering Controller Type in the ISOBUS tab (Figure 16). Select in case of an SBG CAN tractor kit the type "**SBG**".

The settings Machine Controller and Section Controller on this page need to be set to "**None**".

When using an In-Cab Viper 4 ISO (11158000064) harness, also select "Use ISOBUS connector on Viper 4/Viper 4+". In this case the 7P CAN/ISOBUS connector (Figure 17) is used for the CAN communication. This type of terminal harness is shipped from January 2017 (Figure 17).



**Figure 16 Machine Settings - ISOBUS.**



**Figure 17 CAN connector.**



## 5.4. Machines

In the machines tab (Figure 18) the machine dimensions need to be entered. To guarantee a good steering performance of the steering system, the following dimensions need to be entered correctly:

- A: Antenna height
- E: Distance between GPS-antenna and rear axle
- L: Wheel base (distance in between front and rear axle)

Other dimensions can be entered by the end-user in SBGuidance (Setup >> Vehicle >> Offsets). These dimensions are important when a customer would like to use a headland signal or section control.

On the bottom of the wizard enter the name and type of tractor at "tractor name". When an implement steering is used too, also fill in the name and type of the implement.

Default machine width, as shown in Figure 18, can be left at the default value. The user can edit the default machine width afterwards.

The "Off-track error reference is set to "Antenne" by default. This value sets the reference point at the tractor to which the deviation to the line is determined in SBGuidance.

Press the diskette icon at the bottom right to save all settings. Close the "Machine settings" wizard.

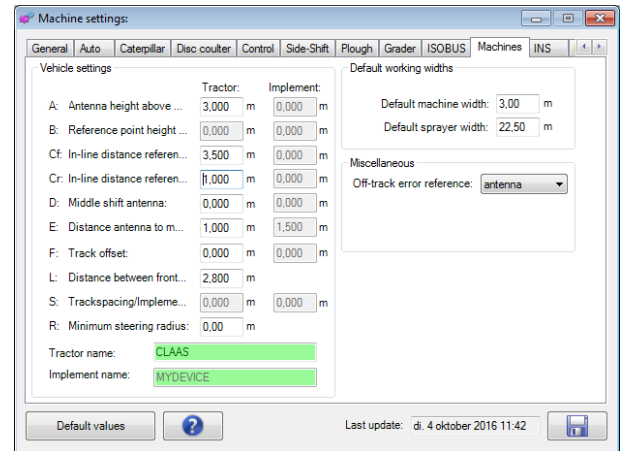


Figure 18 Machine Setting - Machines.



## 6. Setup steering controller via the CAN-Tool

The Steering Controller (STU) is the module that controls the hydraulic valve and reads in the wheel angle sensor value and the pressure sensor value.

Check [www.sbg.nl/en/](http://www.sbg.nl/en/) and go to Dealer >> Software for the most recent CAN-tool and STU firmware.

Use **CAN-tool 2.0.21** or higher.

Use **STU firmware 3.0.38** or higher.

If using a DynamIQ ISO (10630173890 or 10630173862): use **DynamIQ firmware 3.0.17** or higher.

If using a DynamIQ (SBG10911 or SBG10911-01): use **DynamIQ firmware 2.0.6** or higher.

**Please note!**

For updating the Steering Controller and/or the DynamIQ (ISO) check the Configuration manual – CANbus controllers on the SBG Website.

Start the Configurator (by pressing “Shift + SBGuidance” in the SBGuidance Loader). Go to Interfaces > CAN > CANTool to open the CANTool (Figure 19).

Choose the right Hardware manufacturer (Figure 20), and see Table 4 for the correct type per terminal.

Table 4 CAN Hardware manufacturer.

Terminal	Hardware manufacturer
GeoSTAR	SBG
Viper 4	Viper4
Viper 4+	Viper4+

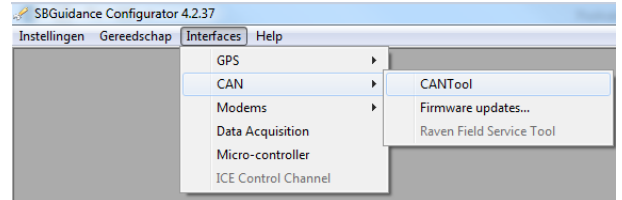


Figure 19 Open CAN-Tool.

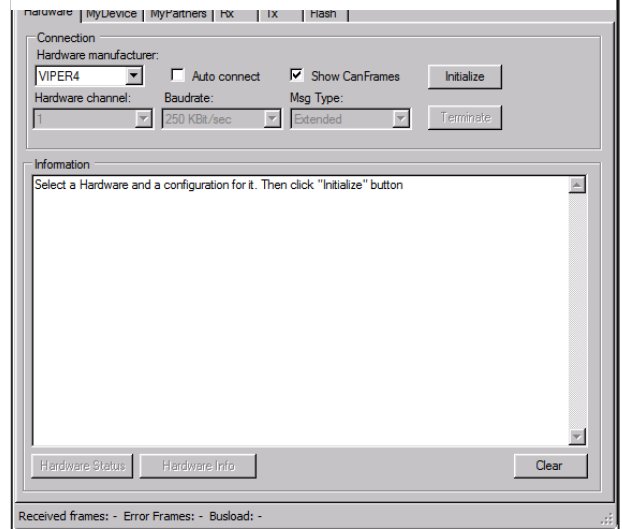


Figure 20 CAN-Tool Hardware.

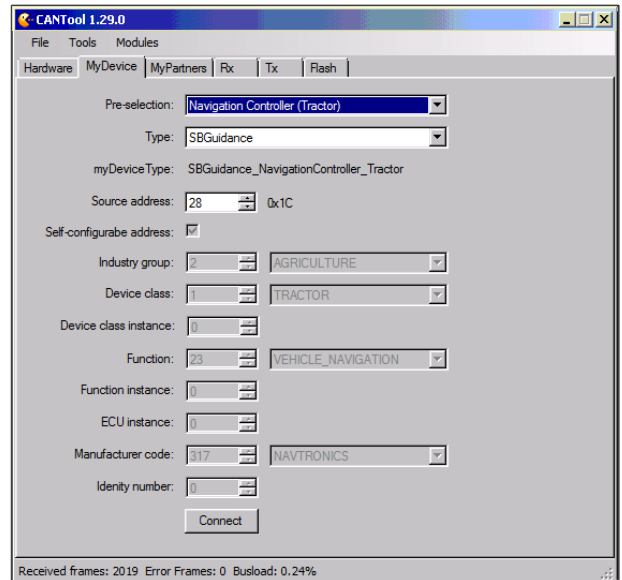


Figure 21 CAN-Tool MyDevice.



Next choose the correct Hardware Channel. When an In-Cab Viper 4 ISO (11158000064) harness is used, hardware channel 2 should be selected. In this case the 7P ISOBUS connector (Figure 17) is also connected to the back of the Viper 4(+). This type of terminal harness is shipped from January 2017. If an In-Cab (Terminal) VPR4 harness (SBG13711-09) without 7P ISOBUS is used, hardware channel 1 should be selected (Figure 20).

Press on "Initialize". After initializing the CAN-bus the busload and received frames will increase. The busload and received frames are visualized at the bottom side of the CAN-Tool. Check the cabling if the busload and received frames do not increase.

Go to tab MyDevice (Figure 21) and select at Pre-selection "**Navigation Controller (tractor)**". Select at Type "**SBGuidance**". Push the Connect button.

Go to tab MyPartners (Figure 22). Select at steering controller "**SBGuidance**" and press *Add*. The Steering Controller wizard opens as shown in Figure 23.

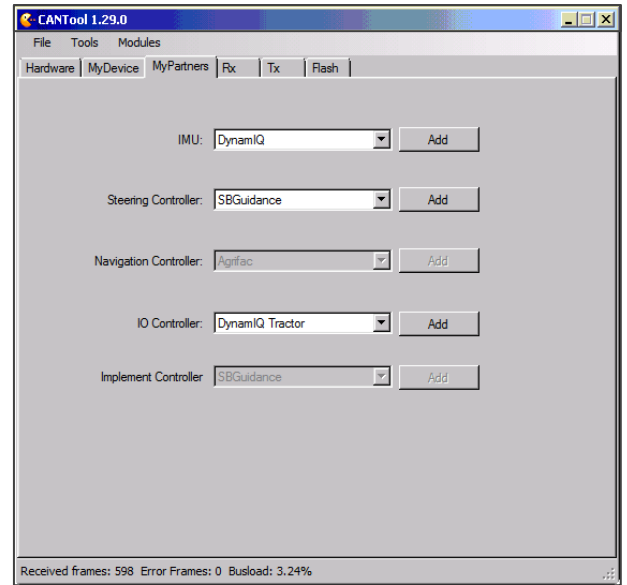


Figure 22 CAN-Tool MyPartners.

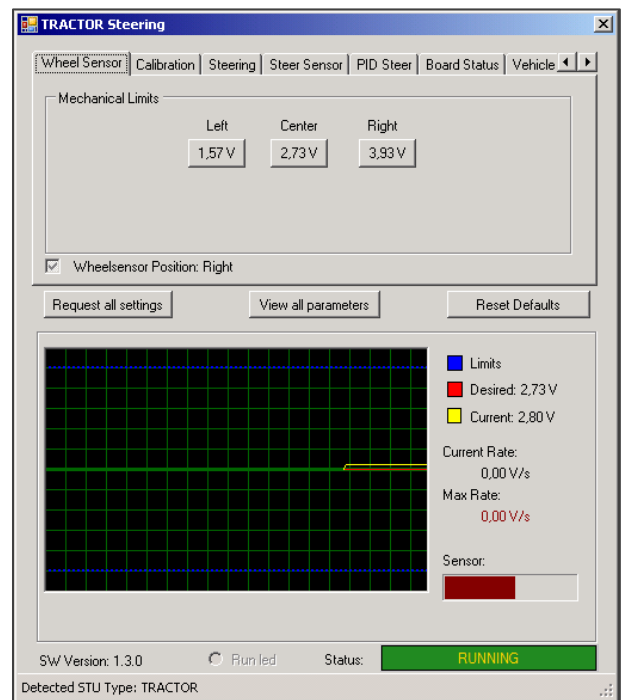


Figure 23 CAN-Tool Steering controller wizard.





### 6.1. Board status

Check the board status before calibrating the Steering controller. To do this, go to tab "Board Status" (Figure 24).

Check the ECU and ACT Power voltages. These voltages should be around 14V (when engine is started). The value for Sensor Power should be around 4,9V.

If one of these values shows 0,00V, do not proceed with the calibration procedure and first fix the underlying issue (check fuses, relays, cabling etc.).

### 6.2. Wheel Sensor

Go to the tab Wheel Sensor (Figure 25). Turn the wheels of the machine completely to the left. Press the button beneath "**Left**", to set the outer left limit of the wheel angle sensor.

Turn the wheels of the machine completely to the right. Press the button beneath "**Right**", to set the outer right limit of the wheel angle sensor.

To set the center value of the wheel angle sensor, first search for a location where it is possible to drive at least a straight line of 100 meters. Choose a fixed point at the end of the line and drive manually, with about 15-20 km/h, towards this point as straight as possible. Check while driving the value of the wheel angle sensor (showed behind Current in Figure 25) and take the average value to set as the center value (normally this average value will be around 2,5V).

Thereafter stop the machine, turn the wheels manually to the average wheel angle sensor position and press the button beneath "**Center**". The center position of the wheel angle sensor is now set. Also indicate the position of the wheel angle sensor to the front axle (left or right).

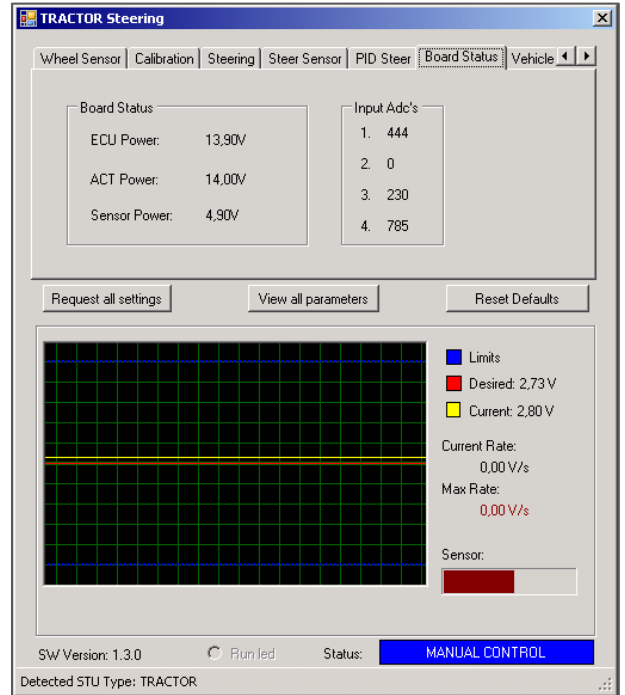


Figure 24 Board Status tab.

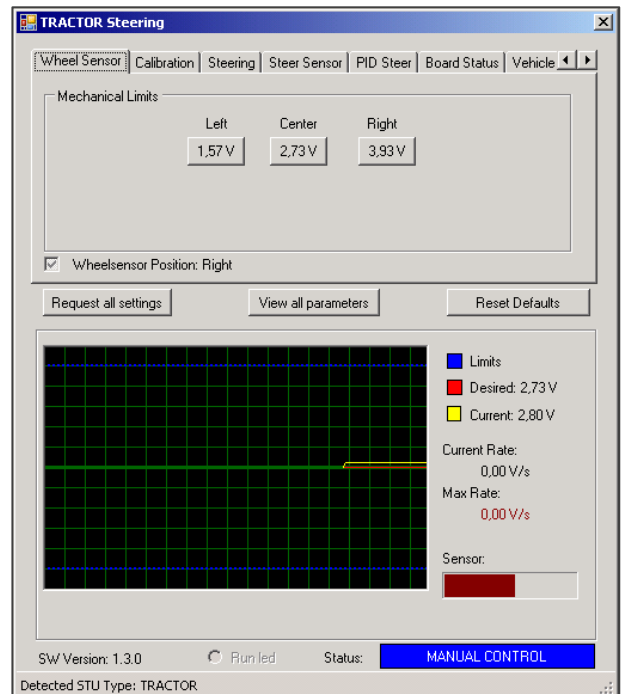


Figure 25 Wheel Sensor tab.

### 6.3. Calibration

To calibrate the minimum steering percentages of the valve, the hydraulic oil should be at operating temperature and the engine should operate with about 1200 to 1300 rpm. Make sure that there is enough free space to calibrate the system, start driving with a speed of about 2km/h and press "Start". The calibration will start and the status of the calibration is visualized on the screen (Figure 26). If the calibration is finished the "Save" button becomes active. Press "Save" to save the calibrated minimum steering percentages.



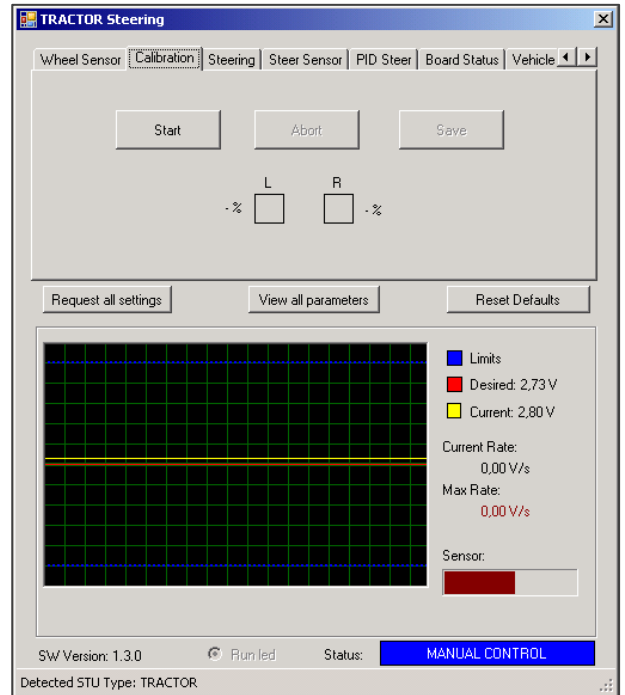
**Please note!**

Make sure there is enough free space, so that the calibration process can be completed without interruptions.



**Please note!**

If steering left and right are reversed, invert the left/right steering on the Steering tab before continuing the calibration procedure (see Chapter 6.4).



**Figure 26 Calibration tab.**



### 6.4. Steering

Check “**L/R Inverted**” (Figure 27) if left and right steering is inverted. Use the “**Test**” buttons on the left side (Min.) to manually check the minimal steering percentages. Check the left and right minimal steering percentages independently and make sure the minimal steering percentages match ca. 0.04 V/sec (visualized under “Current Rate”). Use the “**Test**” buttons on the right side (Max.) to set the maximal steering percentages.

The maximal steering percentages do not need to be changed when the hydraulic valve is installed in a Load Sense (LS) system. When using the hydraulic valve in an Open Center hydraulic system the maximum steering percentages need to be decreased until the maximum steering percentages are exactly equal to the maximum steering speed of the wheels (example: if the wheels turn at the same speed at 55% as they did on 70%, the maximum steering percentages can be decreased even more. If the maximum steering percentage is decreased to 55% and the steering speed becomes lower than at 70%, increase the values again until the wheels turn at the same speed as at 70%).

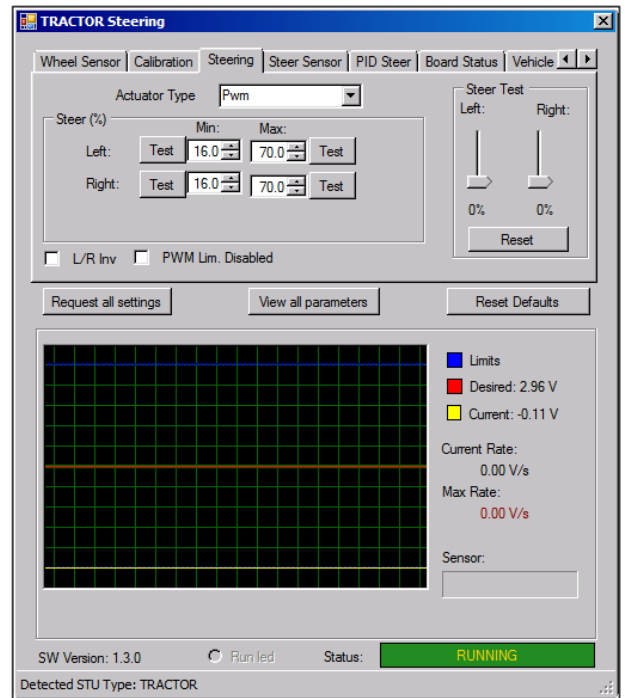
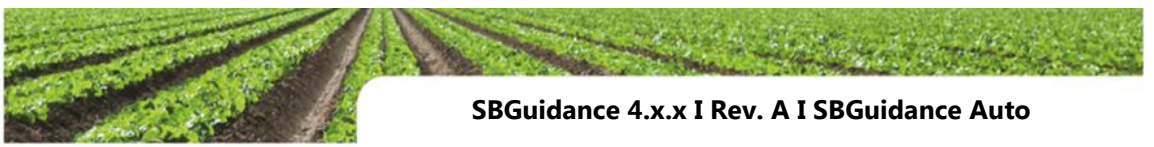


Figure 27 Steering tab.



### 6.5. Steer Sensor and Simulation

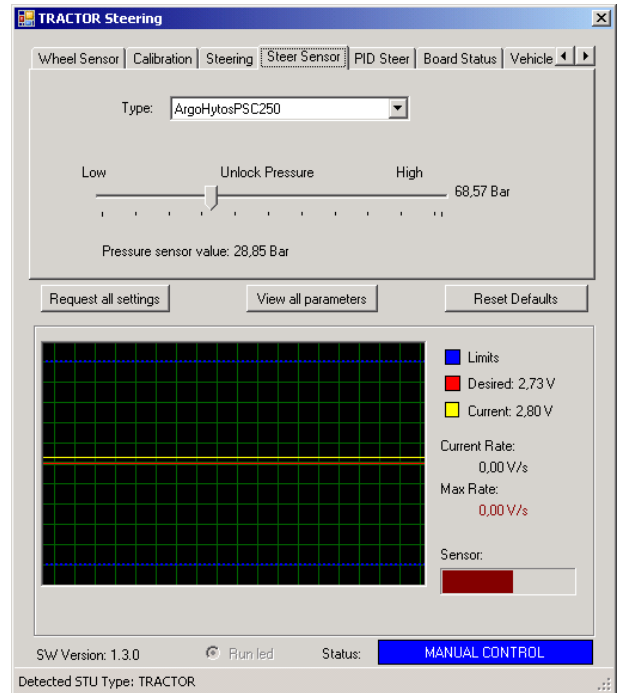
Select the correct pressure sensor type (Figure 28), which is used on the installed manifold. The SBG Manifold (V3) uses an AgroHytos PCS250 pressure sensor.

When using a SBG manifold V2 (on older conventional systems) select AtosMap160. This manifold V2 can be recognized by the two pressure switches mounted next to each other. With this manifold, the override pressure should be manually adjusted on the manifold and not in the software.

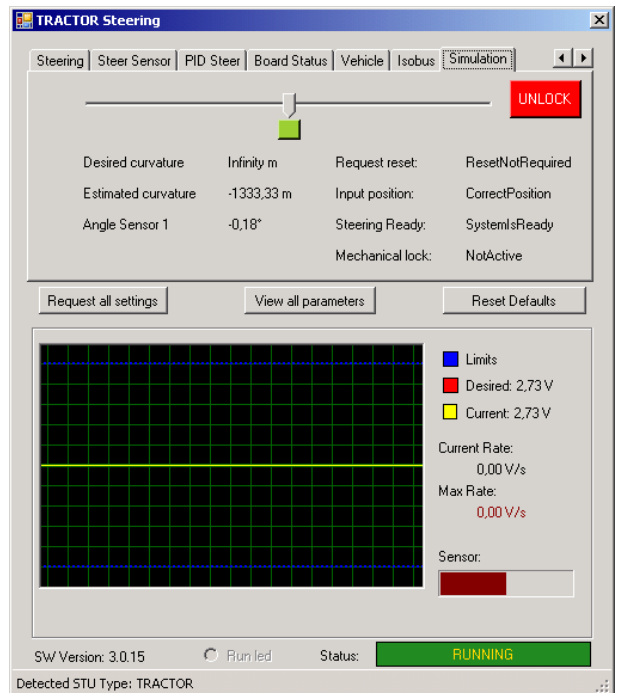
When using the Manifold V3 and an ArgoHytos PCS250 pressure sensor, the override pressure can be set by sliding the slide bar left or right. The current set value is visualized at the right side of the slide bar. By default this value is set to 68 bar. Always check whether this value is suitable for the installed machine.

To check the override pressure go to the Simulation tab (Figure 29) and press the **“UNLOCK”** button (button turns green). Turn the steering wheel manually until the **“UNLOCK”** button becomes red again. If it is not possible to turn the steering wheel the override pressure is set too high. If the **“UNLOCK”** button turns red without feeling any resistance on the steering wheel (or if the unlock button becomes red immediately after pressing this button) the value is set too low.

Changing this value can be done in the SBGuidance user software while test driving or during field operation by the end-user too.



**Figure 28 Steer Sensor tab.**



**Figure 29 Simulation tab.**



### 6.6. Vehicle

Add the wheelbase (in m) of the vehicle. Always set the **“Wheel Angle”** to 30 degrees (Figure 30).

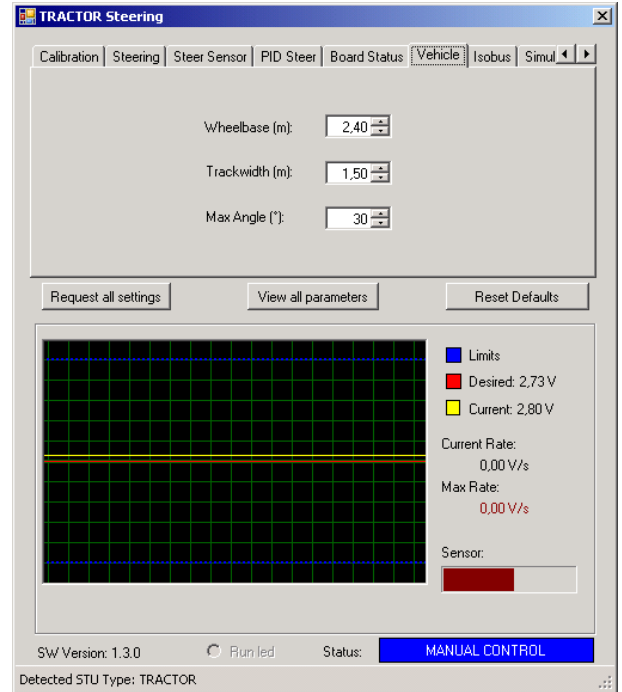


Figure 30 Vehicle tab.

### 6.7. PID Steer

Open the PID Steer tab (Figure 31) to optimize PID controller settings. The settings on this tab influence the aggressiveness of the steering system. Always tune the “Proportional Gain” and leave the “Dealer Gain” at 100%!

1. Start the manual steering as described in Chapter 6.8.
2. Slide the slide bar in the Simulation tab (Figure 32) from the center to  $\frac{3}{4}$  right or left. Judge the performance of the steering system when the wheels move to the desired position. The wheels should reach the desired wheel position without a lot of exceedance, but as quickly as possible.
3. If the wheels wobble several times around the desired wheel position, then decrease the “**Proportional Gain**” by 25%. If the desired wheel position is obtained without overshoot, increase the “**Proportional Gain**” by 25%.
4. Keep increasing or decreasing the “**Proportional Gain**” by 25% until the wheels steer quickly to the desired wheel position and with a little overshoot. See Table 5 for an overview of the P-setting range under normal conditions. The I and D settings are always set to 0.01 and 100, respectively.

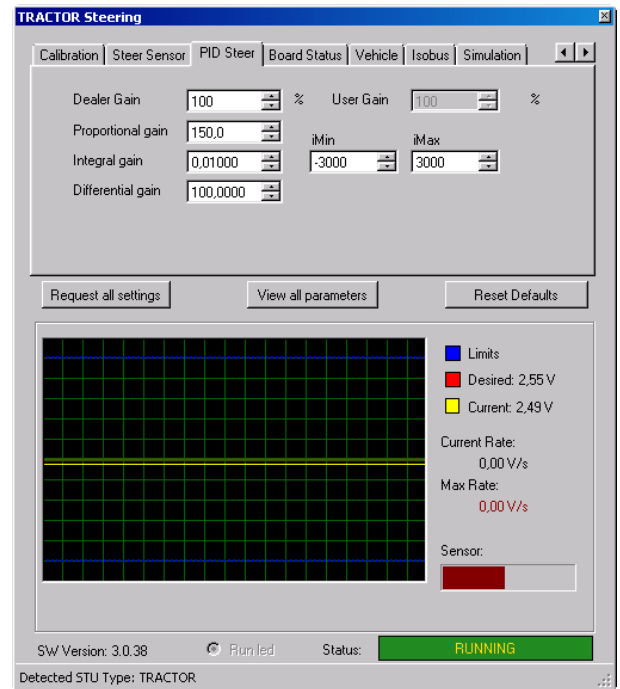


Figure 31 PID Steer tab.

Table 5 PID settings range.

	Standard-Value	Range
<b>Proportional gain</b>	250	150 - 400
<b>Integral gain</b>	0,01	-
<b>Differential gain</b>	100	-



### 6.8. Manual steering

In the graph, shown in Figure 32, the red line indicates the desired position of the wheels which can be altered by sliding the slide bar (see "2" in Figure 32) left/right. The yellow line represents the actual position of the wheels measured by the wheel angle sensor.

Steering the wheels manually for tuning purposes can be done as followed. Press the "UNLOCK"-button [1] Figure 32) to activate the steering system. Slide the slide bar [2] to change the desired wheel position (wheels will start moving). Do this while driving slowly and repeat several times. With the green button [3] the wheels go back to the center position. Judge how the wheels steer to the desired wheel position. The wheels should reach the desired wheel position without a lot of exceedance, but as quickly and smooth as possible. When the desired wheel position is reached the yellow line should exactly be on top of the red line (red line is no longer visible at that point).

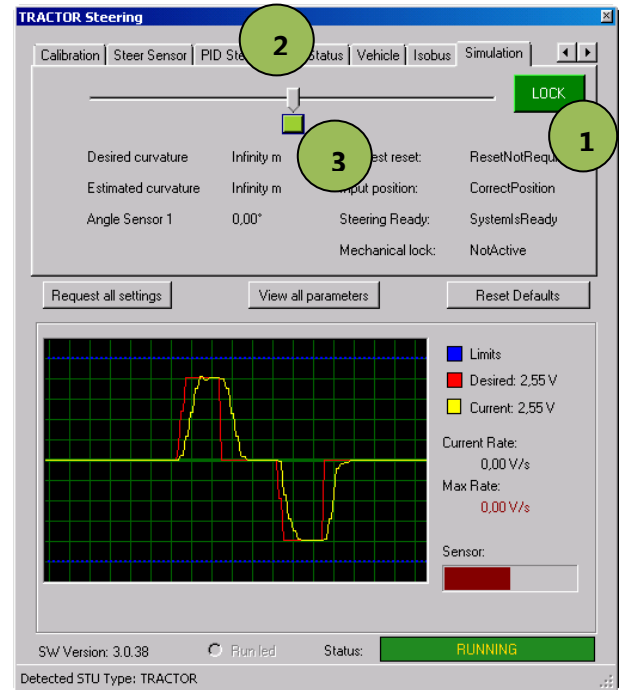


Figure 32 Simulation tab.



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## 7. Loading Machine profile

Once the machine profile is created in the SBGuidance Configurator it should be added to the SBGuidance Loader (Figure 33).

Go to the SBGuidance Loader, press “Ctrl + SBGuidance”. A new screen will appear (Figure 33). Press on *auto-detect*, the new machine profiles will appear. Press on *Save changes* to save, the screen can be closed now (Figure 34). The machine profiles will be visible in the SBGuidance Loader now.

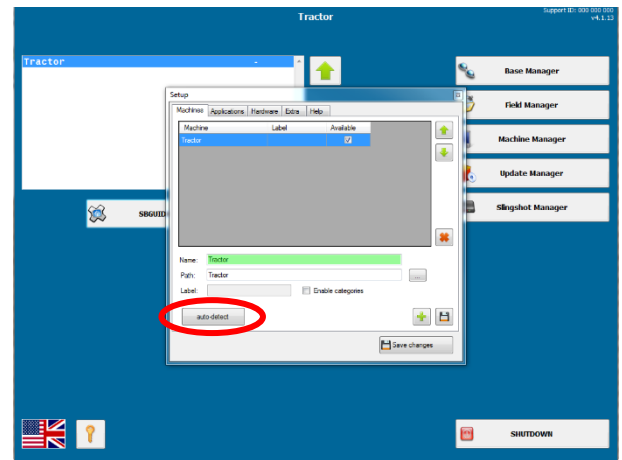


Figure 33 Configuration machine profiles - auto detect.

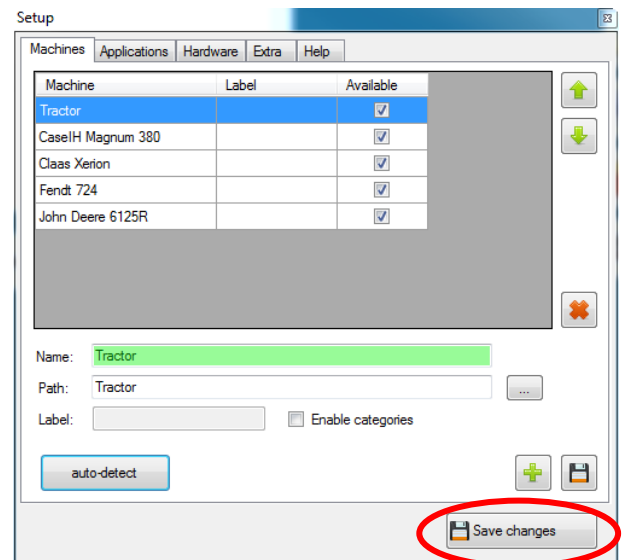


Figure 34 Configure machine profiles.



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## 8. DynamIQ (ISO) orientation and 2-point calibration

As indicated in the SBGuidance Auto installation manual, the DynamIQ (ISO) should preferably be mounted with the connectors pointing to the back of the tractor. If the DynamIQ (ISO) is mounted pointing the connectors to one of the other directions (left, right, front), the orientation of the module must be changed. The change of the orientation and the calibration of the DynamIQ (ISO) can be completed in the SBGuidance software. The DynamIQ calibration procedure is executed to make sure the machine runs exactly in the same track while moving back and forth on the same guidance line.

To calibrate the DynamIQ (ISO) a 2-point calibration must be executed. Start the SBGuidance software, go to INFO >> GPS >> ORENTATION and choose between tractor or implement DynamIQ (Figure 35). Press on the "gear" sign button to open the diagnostics of the DynamIQ and press "calibrate" to open the 2-point calibration procedure wizard (Figure 37). In this window the orientation of the DynamIQ (ISO) can be checked and edited when needed.

Press the blue arrow to go to the next page in the wizard (2-point calibration). Drive the machine to a flat surface and park the machine next to a reference point (reference point need to align with the reference point on the tractor which is the mounting position of the DynamIQ (ISO)).

While standing completely still press "step 1" to set the roll angle in the current direction. The "Status" will change form "NORMAL" or "WAITING FOR HEADING" to "CALIBRATING". Wait until the status changes to "WAITING". Now position the machine in the exact opposite direction (turn 180 degrees) next to the reference point.

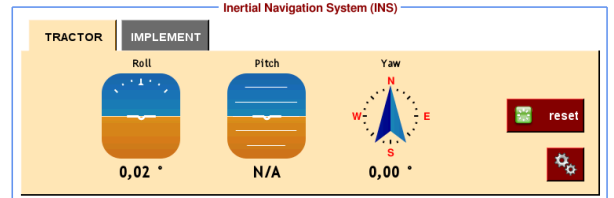


Figure 35 DynamIQ tab in SBGuidance.

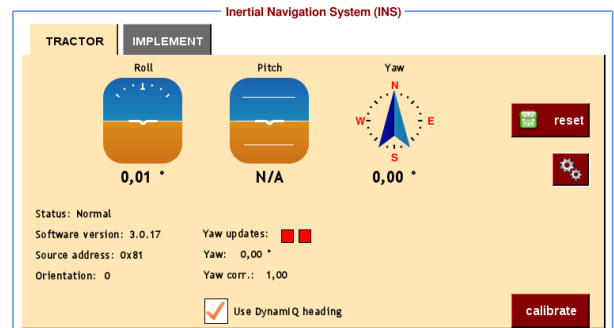


Figure 36 DynamIQ tab in SBGuidance.

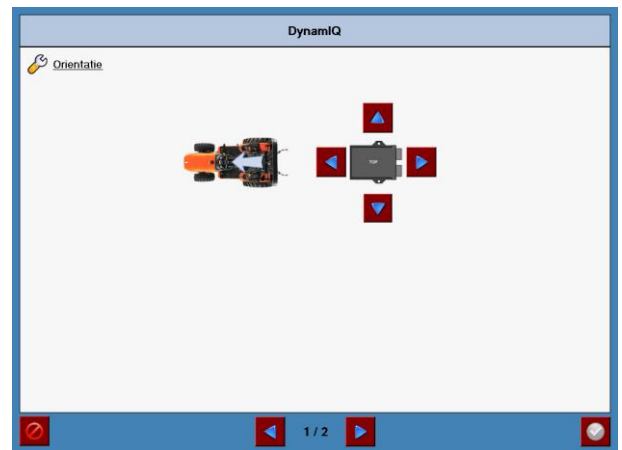


Figure 37 DynamIQ Orientation.

While standing completely still press “step 2” to set the roll angle in this direction. The “Status” will change from “WAITING” to “CALIBRATING”. The roll offset is determined as soon as the status returns to “NORMAL” or “WAITING FOR HEADING”. Leave the calibration wizard by pressing the green check box at the bottom right of the wizard.



**Tip!:**

The firmware version of the DynamIQ (ISO) is displayed on the information page (Figure 36). For updating the DynamIQ or DynamIQ ISO firmware a manual is available on [www.sbg.nl/en](http://www.sbg.nl/en).

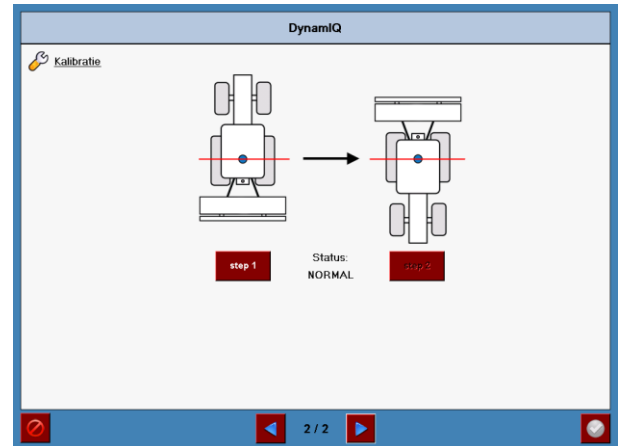


Figure 38 DynamIQ 2-point calibration Step 1.

After the calibration procedure is completed, the mean center offset setting should generally be correct. Check the center offset (for example by driving back and forth in the same guidance line with automatic steering engaged) and tune, if necessary, at SETUP >> VEHICLE >> TUNING (Figure 39).



**Please note!:**

Drive slowly, carefully and far enough to make sure the deviation to the guidance line is 0cm while driving back and forth!



**Please note!:**

The center offset always needs to be corrected with half of the measured error (for example; if the edge of the ridge of the tyre is 3 cm next to the edge of the previous track after driving back through the same guidance line, the mean setting needs to be adjusted by 1.5 cm).

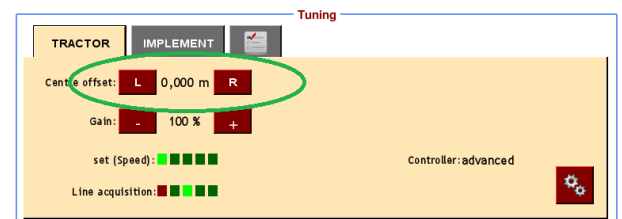


Figure 39 Check center offset.



## 9. Checking steering performance

If the steering percentages and PID-settings were set correctly while using the CAN-tool, the steering performances of the machine should be pretty accurate while using the default values in SBGuidance.

Drive to an open field, where it is possible to drive a straight guidance line without trees. Start SBGuidance and create an A+ or A-B Field.

Check the steering performances at certain driving speeds as shown in Table 6.

Driving speeds as displayed in **Error! Reference source not found.** indicate the center value of each speed set. It is not necessary to drive exactly at that speed, but make sure the speed set does not switch from one to the other while test driving. By checking the performance at 6 speeds a clear view of the steering performances is obtained. Also keep in mind what the main operation speeds for the end-user will be.

Judge the steering performance for both driving towards the line and driving on the line. Go to Field >> EDIT to shift the line by 25 or 50 cm. If the machine, after the line shift, stays too long next to the line, increase the "Gain" value. The gain value influences how aggressive the system reacts to a deviation to the guidance line. Do not forget to also check the performance while driving towards the line after changing a gain value. If the machine starts to wobble around the guidance line after increasing the gain value, it may be increased too much. To edit the "Gain" value go to Setup >> Vehicle >> Tuning in SBGuidance.

**Table 6 Check speeds per speed.**

Driving speed (km/u)	Speed set
3,6	1
5,4	2
7,2	3
9,0	4
12	5
15	5



To get a clear view on the effect of changing gain values, it can be useful to decrease/increase the gain value extremely. This means increasing/decreasing the gain values until the steering system becomes way too aggressive, unstable or too slow. Make sure that the steering system does not become instable when the guidance line is shifted with 25cm, while driving 15km/h. If the steering system keeps stable while doing this, it indicates a sufficient calibration and setup.

Check the steering performances at the six proposed speeds to make sure the performance is optimized for the whole speed range. Optimize the steering performances, if needed, by adjusting the gain values per speed set.

If one or more gain percentages have been edited, it is possible to reconfigure the values in the SBGuidance Configurator, so that the gain values are set to 100% in the user software again. To do this, close the SBGuidance software and open the SBGuidance Configurator (by pressing "SHIFT+ SBGuidance" in the SBGuidance Loader). Go to Settings >> Machine or press "F10". Go to the tab "Control" and press the "**parse amplifiers**"-button (Figure 40) to recalibrate all gains back to 100% for the user.

Press the diskette icon at the bottom right to save all settings. Close the "Machine settings" wizard.

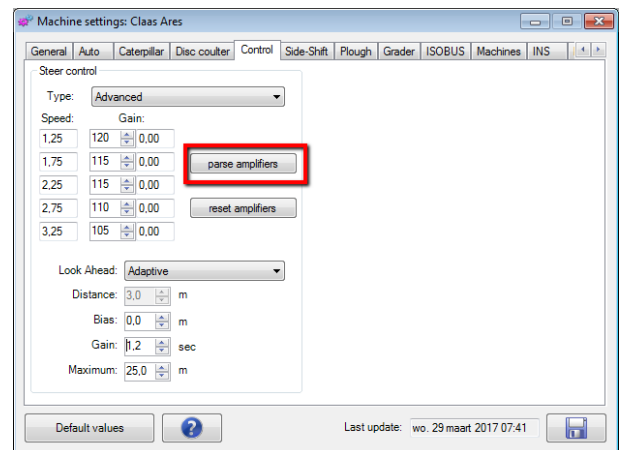


Figure 40 Configurator parse amplifiers.