



## INSTALLATION MANUAL

# SBGuidance Auto

## **Claas ATP Ready**

016-8000-085EN Rev. A







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## Preface

This installation manual is intended for persons responsible for installing a Claas ATP Ready 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 or 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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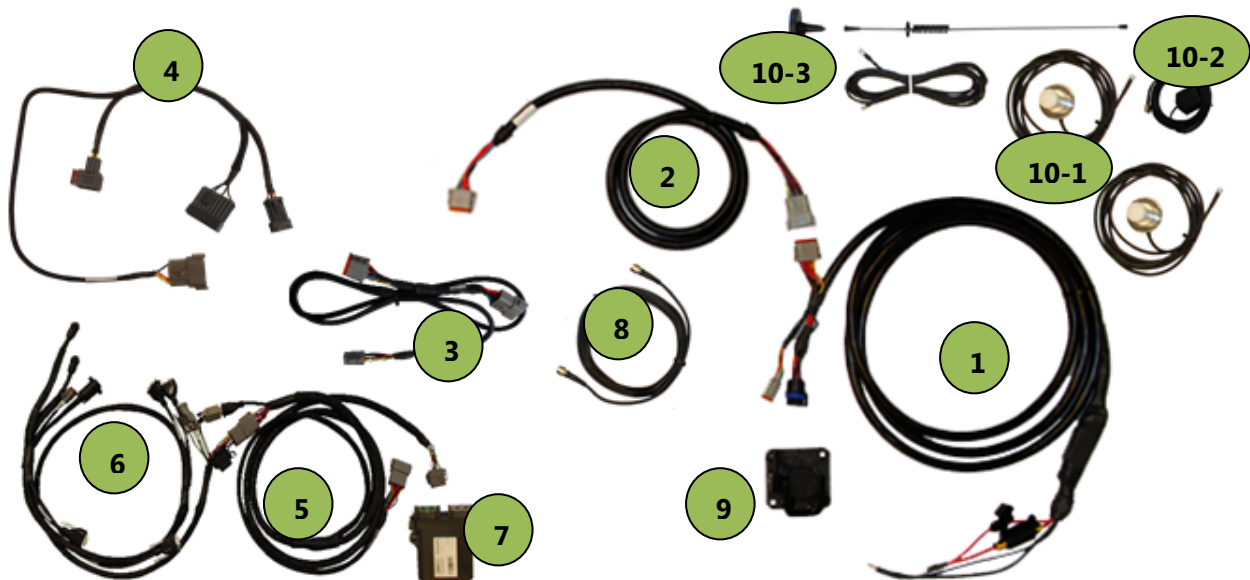


## 1. Instructions for installing the SBGuidance Auto on tractors

This manual is a guide for the Claas ATP Ready tractors. This chapter provides overviews of the components that can be supplied with this tractor sets.

All necessary parts are supplied, including this manual. Verify that all items listed on the packing list are actually present.

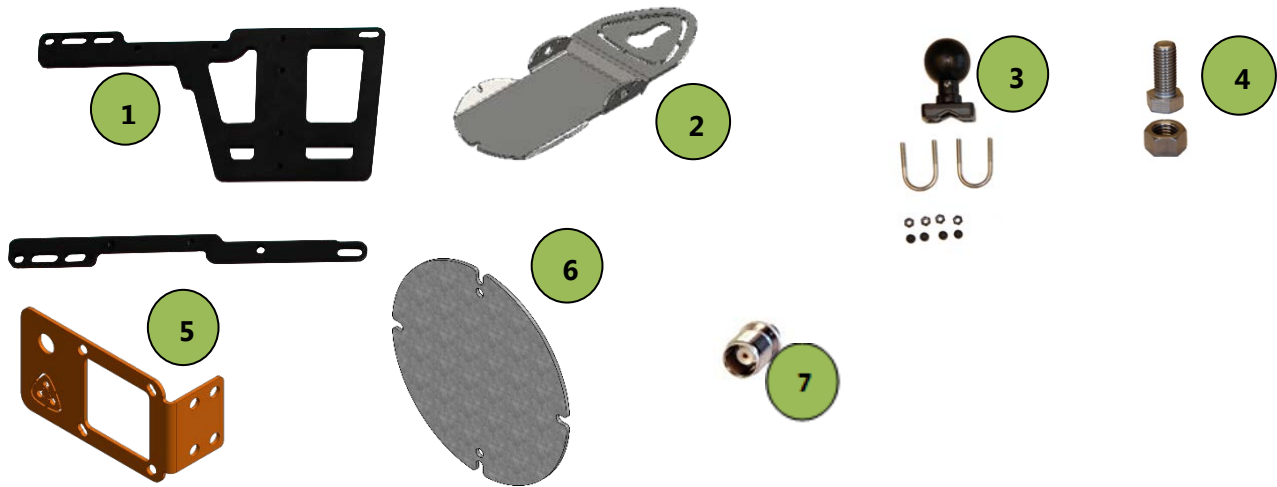
### 1.1. Overview of standard electronic components



#	Type Number:	Description:
<b>1</b>	11158000141	HRNS, POWER, BASIC
<b>1</b>	11158000060	HRNS, POWER, IMPLEMENT READY
<b>2</b>	11158000214	HRNS, CHASSIS, EXTENSION, 2M
<b>3</b>	11158000013	HRNS, IN-CAB, T-EXTENSION
<b>4</b>	11158000215	HRNS, CLAAS ATP
<b>5</b>	11158000063	Harness in-cab SGC
<b>6</b>	11158000008	HRNS, IN-CAB, TERMINAL, VIPER4
<b>7</b>	10630173862	DynamIQ ISO tractor
<b>8</b>	1115800011(0/1/2)	CBL, ANT. 3 / 4.5 / 6M, TNC-N
<b>9</b>	14084002131	Implement socket (IBBC)
<b>10-1</b>	11218000003	ANTENNA, 4G/3G UMTS LAIRD 3.5M
<b>10-2</b>	10638000015	Field hub GPS patch antenna 4,5m
<b>10-3</b>	11178000313	KIT, RADIO ANTENNA TRC, MAGNET



## 1.2. Overview of mechanical components



#	Type Number:	Description:
1	11078000125	BRACKET, DYNAMIQ, V4
2	11078000081	BRACKET, GPS/RADIO ANT GENERIC
3	11030001040	MOUNT, 1" RAIL, RAM D
4	11178000311	KIT, BOLT AND NUT UNC, ANTENNA
5	11078000006	BRACKET, IBBC, IR
6	11078000131	MOUNTINGPLATE, ANTENNA, ROOF
7	14074001024	TNC Dummy
-	11178000341	KIT, MOUNTING, TRACTOR



## 2. Tractor kit installation

It is recommended to accomplish the installation of the tractor in the following order (Figure 1):

1. Mount the entire wire harness from the battery.
2. Mount harness on Claas ATP Ready Controller.
3. Mount GPS antenna and radio/gsm- antenna(s) + cables.
4. Mount ISO Steering Controller in cabin.
5. Mount terminal.



Figure 1 Overview Claas ATP Ready components.



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## 3. Mounting harness

Two options can be chosen, a CAN Basic harness or an Implement Ready (IR) harness.

### 3.1. CAN Basic harness

The Basic harness can only be used for tractor steering. If the tractor is mounted with this harness there is no possibility to use the tractor for implement steering (TWIN, plough).

### 3.2. CAN Implement Ready (IR) harness

The Implement Ready harness ensures that the tractor can be used for tractor and implement steering. Mounting the implement is possible through the IBBC-connector. The harness is mounted from the battery to the IBBC-connector at the back side of the tractor.

### 3.3. Mount harness

The CAN basic harness and the CAN Implement harness are divided in the following harnesses (ranked in order from the battery):

1. Power harness: this harness comes from the battery and goes to the rear axle along the chassis, wrapped in a hard casing. A Basic harness goes from the battery directly to the chassis harness (and not to the rear axle of the tractor). Mount the relays and fuses well nearby the battery. Find a place where they can be fastened firmly and vibration free (Figure 2).
2. Extension harness: extends the power harness to the In-Cab harness. This harness is wrapped in a hard casing. This harness goes inside the cabin.



**Figure 2** Correctly mounted relays and fuses.



3. In-Cab harness (DynamIQ/ISO Steering Controller): this harness comes from the chassis harness and goes inside the cabin, wrapped in a braided sleeve casing. A branch is made to the DynamIQ/ISO Steering Controller.
  
4. Harness In-Cab DT-DT/DTM: composes a branch to the Claas ATP Controller and CAN-BUS. Mount this cable at the right side of the cabin underneath the protection cover next to the seat (Figure 3). Under this cover five modules are mounted. Disconnect the fifth (seen from the front of the cabin) module by unscrewing the cartel nut on this module. On this module a sticker with description ATP2 is mounted (Figure 4). The next step is to connect the Claas ATP Ready harness (11158000215), to connect the SBG CAN-BUS with the Claas ATP Ready CAN-BUS. The following steps should be executed to mount this cable:
  - Disconnect both SAAB connectors from the Claas ATP2 module.
  - Connect the small SAAB connector of the SBG Claas ATP Ready harness with the Claas ATP2 module (Figure 5).
  - Connect both existing SAAB connectors of the Claas tractor to the two connectors of the SBG Claas ATP Ready harness (Figure 5).
  - Connect the grey Deutsch connector of the SBG Claas ATP Ready harness with the DT-DT/DTM harness (Figure 5).

Next step is to mount the Claas ATP Ready Controller back at the original position.



**Figure 3** Claas protection cover next to the seat.



**Figure 4** Position of the Claas ATP2 controller module.



**Figure 5** Cabling connected to the Claas ATP2 module and SBG Claas ATP Ready harness.

**Tip!:**

A schematic overview of the SBG CAN-harness on a Claas ATP Ready tractor is shown in Figure 30.

The best way to hide the DT-DT/DTM harness is behind the cover on the right side of the cabin (Figure 6).

Furthermore there are some general instructions for mounting an SBG harness:

- Mount the relays fixed and in a dry, clean and accessible spot.
- The red wire is + (12V). The black wire is (ground). Make sure that the first part of the red wire (part in between battery and fuses) cannot damage during operation.
- If necessary the positive and negative wires, in between the battery and the fuses, can be shortened. Be sure to use cable sockets with the correct size for proper connection.
- If a ground switch is used, connect the wiring harness behind the ground switch (not at the battery side of the ground switch!).
- If a main (12V) switch is used in the red wire, connect the wiring harness behind the main switch (not at the battery side of the main switch!).
- If no main switch is used, always connect the wiring harness directly to the battery.
- If the system is connected to a 24 Volt machine, always use a 24V to 12V converter. Never connect between the two batteries of a 24V machine!
- Lead the terminal harness along with the GPS and radio/GSM antenna cables through one pillar of the cab.
- Tie-wrap the wires so they are attached free from vibration and friction.

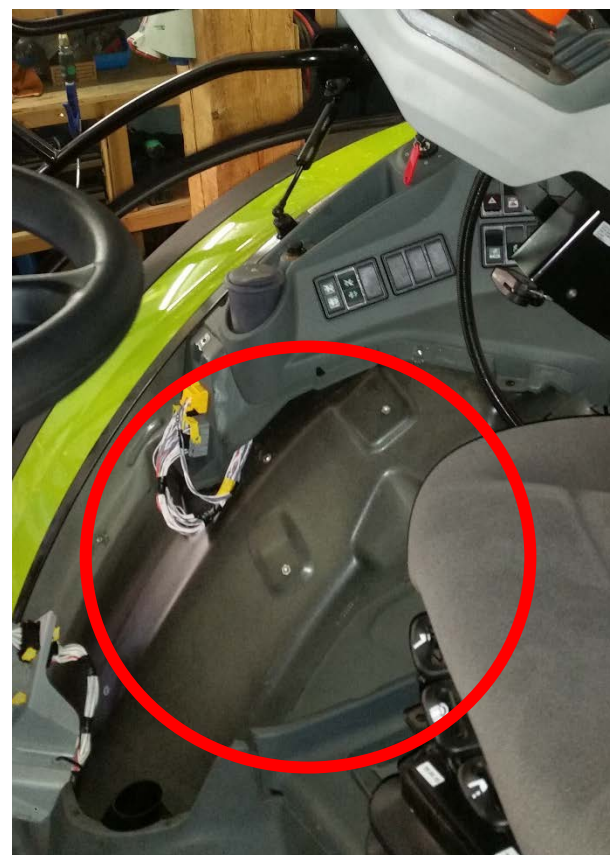


Figure 6 Removed Claas cover.

**Warning!:**

*It is important to ensure that the wiring harness is always connected to the battery AFTER installing all wires and controllers!*

**Warning!:**

*Be sure the cables do not damage during the installation!*

**Please note!:**

*Push all connectors until they snap to be sure the connectors are properly connected!*





## 4. Mounting GPS- and radio/gsm- antenna

A standard GPS bracket can be mounted on a Claas ATP Ready tractor.

### 4.1. Mounting the standard GPS antenna bracket

Figure 7 shows an example of a standard GPS-antenna (with a Laird antenna in this case) mounted on a standard GPS-antenna bracket. A GPS-dummy and a UNC bolt + nut are also mounted. The standard GPS-antenna bracket can be mounted with double sided tape on the cabin roof.

For mounting a GPS-antenna a few general instructions are applicable:

- Mount the GPS-antenna at least 60 cm in front of the rear axle.
- Mount the GPS-antenna in the middle of the tractor.
- Mount the GPS-antenna on the supplied UNC bolt.
- Mount the TNC-dummy on the GPS-antenna bracket (Figure 7).
- Wire the antenna cable connector with the largest connector through to the inside of the cabin.
- Fasten the antenna cable so that it cannot become pinched anywhere and conceal inside the cabin upholstery, together with the GPS patch antenna cable, radio antenna cable or UMTS antenna cable.
- Mount the GPS antenna cables in a way water cannot flow down into the cabin.
- Mount the antenna cable in such a way that no water is allowed to flow along the cable into the cabin.
- Label the antenna cable inside the cabin with label 'GPS1'.



**Figure 7 Standard GPS antenna bracket + UNC bolt and nut mounted on a Claas roof.**



## 4.2. Mounting Raven 600S antenna

Nowadays, it is also possible to use SBGuidance Auto in combination with a Raven 600S antenna (Figure 8).

In this manual the installation of the 600S antenna is explained. For the configuration of this antenna see the English configuration manual: '016-8000-025EN-A - Configuration manual – 600S smart antenna'.

On the bottom side of the 600S antenna, two magnets are built-in for attaching the antenna to steel surfaces. The new version of the GPS antenna bracket has a slope on both sides, so that the 600S antenna is well centred on the GPS antenna bracket (Figure 8). The GPS antenna bracket has to be mounted on the front of the cabin roof.

An adapter/split cable is supplied with this antenna. The antenna is connected through this adapter cable and the '600S to Viper 4' cable to the terminal harness. The adapter cable should remain to the GPS antenna when it is removed from the tractor.

If also a Slingshot modem is used for RTK corrections, a 'modem to receiver' cable has to be connected. Make sure that the connectors on the roof are provided with protective caps (Figure 10). With these protective caps no dust and water can enter the connectors.

Furthermore, the following guidelines must be observed when installing the GPS antenna:

- Mount the GPS-antenna with the connectors backwards (Figure 9).
- Mount the GPS-antenna at least 60 centimetres in front of the rear axle.

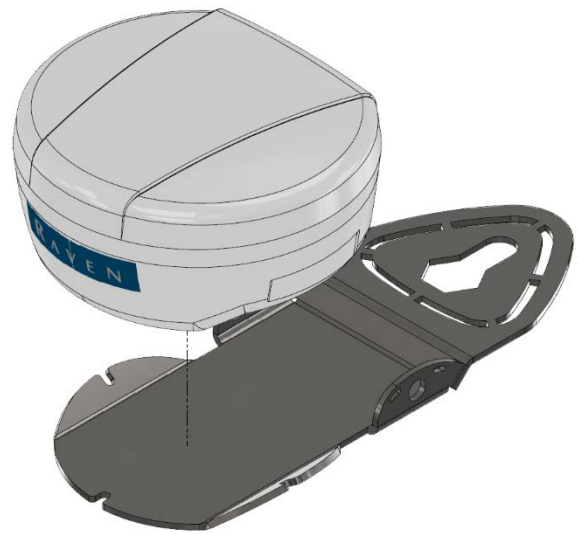


Figure 8 Raven 600S antenne.



Figure 9 Raven 600S antenna on a cabin.



Figure 10 Cables to the Raven 600S antenna.



### 4.3. Mounting the radio antenna

Figure 11 shows the standard radio antenna with magnetic base. Preferably, this standard antenna should be used. The components of this standard antenna are shown in Table 1.

**Table 1 Standard parts for radio antenna**

Symbol	Description
1	Radio antenna
2	Antenna lead
3	Connector to terminal
4	Magnetic base

A number of specific conditions should be met before installing and mounting the radio antenna:

- Preferably mount the radio antenna with the magnetic base on the standard GPS antenna bracket.
- Do not mount the radio antenna next to a steel construction, but above it.
- Mount magnetic base on a sufficiently large steel surface (at least the size of the standard GPS antenna bracket). A larger steel base surface can improve signal strength and prevent problems, especially at greater distances (> 9 km).
- Label the antenna cable inside the cabin with label 'Radio'.



**Figure 11 Radio antenna components.**



#### 4.4. Mounting the GPRS/UMTS antenna

If a SlingShot modem is used, in addition to the GPS-antenna and two GPRS / UMTS antennas, a GPS patch should be mounted.

Mount the GPRS/UMTS antennas at least 1.0 meter from each other. The base of the GPRS/UMTS antennas are magnetic and can be placed in longitudinal (front/rear) or transversal direction (left/right) on the cabin. One of the GPRS/UMTS antenna should preferably be mounted to the GPS antenna bracket (Figure 12). For mounting the second GPRS/UMTS antenna an additional metal plate is supplied in a SlingShot tractor kit (see chapter 1.2 and Figure 15).

The base of the SlingShot GPS patch antenna is also magnetic. Preferably mount the SlingShot GPS patch antenna also on the universal GPS-antenna bracket next to the GPRS/UMTS-antenna. However, another position can be used, as long as the SlingShot GPS patch antenna is mounted on the roof of the tractor with a clear view.

Furthermore, it is important to meet the following conditions at all times:

- The GPRS/UMTS antenna is equipped with a magnetic base and must be placed on top of the cabin.
- The antennas should have a clear reception all round.
- Label the GPRS/UMTS antenna cables inside the cabin with labels 'Cellular' and 'Diversity' (Figure 14).
- Mount a grey SMA grip on both connectors (Figure 14).



Figure 12 GPS antenna bracket with a Laird UMTS antenna.



Figure 13 GPRS/UMTS-antenna and GPS patch antenna on a metal bracket.



#### 4.5. Mounting GPS Patch antenna

When using a SlingShot modem also a GPS Patch antenna should be mounted (Figure 15). The GPS Patch antenna is magnetic. Mount the GPS Patch antenna always on the roof of the cabin. Be careful with mounting the GPS patch antenna; the GPS patch antenna cable is quite thin and fragile. Label the GPS Patch antenna cable inside the cabin with label 'GPS' and mount a blue SMA grip to the connector (Figure 14).



**Figure 14** Antenna cables with labels and SMA-grip set.



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## 5. Mounting DynamIQ ISO/ISO Steering Controller

The following guidelines have been established for mounting the DynamIQ ISO/ISO Steering Controller:

- Preferably, place the DynamIQ ISO/ISO Steering Controller next to and at the right side of the seat. Use the standard DynamIQ ISO/ISO Steering Controller mounting plate (Figure 15).
- If it is not possible to attach the DynamIQ ISO/ISO Steering Controller to the seat bolts, the DynamIQ ISO/ISO Steering Controller should be attached in an appropriate place in the cabin that is free from vibrations.
- A DynamIQ ISO/ISO Steering Controller may only be mounted in a horizontal position (with the sticker side up). The connectors may be orientated in four directions (0, 90, 180, 270 degrees).
- By default, the orientation of the DynamIQ ISO/ISO Steering Controller is set to: horizontal position with connectors pointing towards the rear (as shown in Figure 15). Any other orientation should be set in the software!



**Figure 15 ISO Steering Controller on a mounting plate.**



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## 6. Mounting the terminal

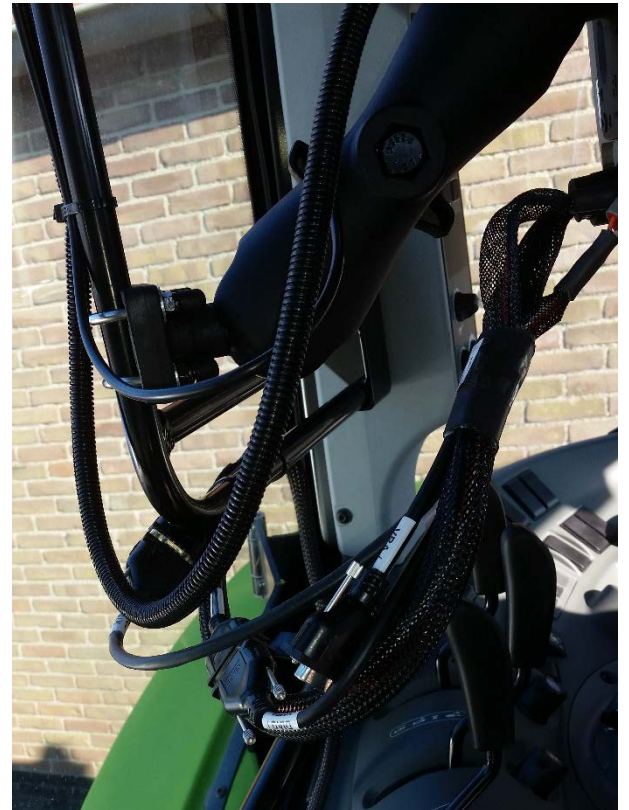
The terminal can be mounted with a supplied RAM-D/ RAM-C pipe bracket on a Claas ATP Ready tractor. (Figure 16).

The following orders are presented for mounting the Terminal:

- Always contact the customer about the terminal position in the cabin.
- Always use a RAM-D or RAM-C ball attachment.
- Mount the terminal free of vibrations with a solid bracket. A variety of mounting brackets are available for this purpose.
- Conceal all cables in one pillar (e.g. A-pillar or B-pillar).
- Mount in such a way that the display is directed straight towards the driver.
- Mount in such a way that driver has a clear view all around

**Tip!:**

*Mount the terminal in such a way that it does not obstruct the view of the driver over the top of the right-hand fender, but also so that the inside of the front wheel on the ground is still clearly visible.*



**Figure 16 Mounted pipe bracket.**



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## 7. Configuration steering system

For configuration of a Claas ATP Ready tractor see general Configuring Manual – SBGuidance Auto – CAN – EN (016-8000-100). However, some settings are different. The different parts of the configuration process of a Claas ATP Ready tractor are described in this chapter.

### 7.1. Starting automatic steering

After starting the SBGuidance software, the steering system should be activated on the Claas tractor. To do this press the button with the steering wheel on the console at the right side of the cab (see red circle in Figure 17). When activated, the button will light up.

### 7.2. SBGuidance Configurator settings

In the SBGuidance Configurator go to the machine settings. Select as the Steering Controller type “Claas ATP Ready” in page ISOBUS of the machine settings in the SBGuidance Configurator (Figure 18).

### 7.3. CANTool

Open the CANTool (use CANTool 2.0.24 or newer).

Depending on the cabling and the terminal, choose the Hardware manufacturer and Hardware channel. Press ‘Initialize’ to get communication with the CANbus (Figure 19).

Make sure there is communication with the CANbus (received frames is running and Busload > 0%); see red rectangles in Figure 19.

Open the tab ‘Modules’ (green circle in Figure 19) and select the Sauer-Danfoss PVED-CL module to get to the programming tool.



Figure 17 Claas GPS activation button.

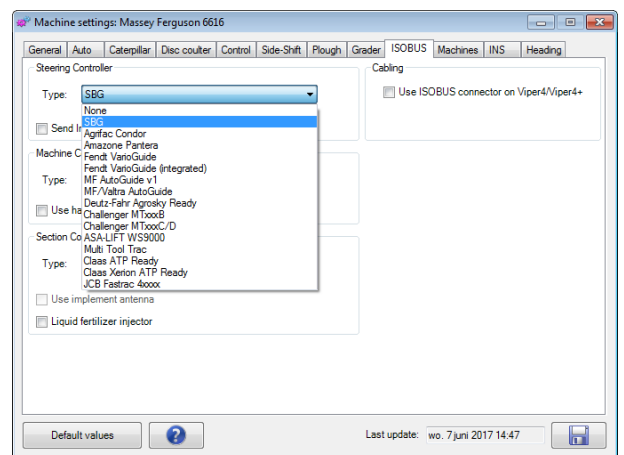


Figure 18 select type in machine settings.

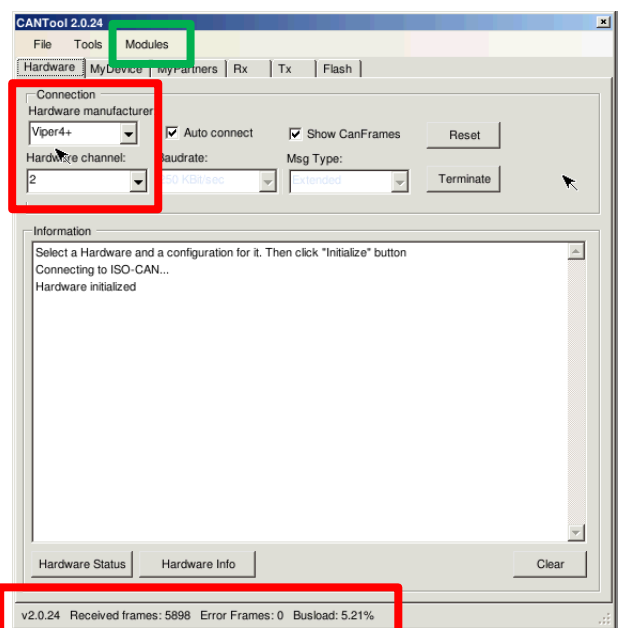


Figure 19 CANTool.



Press 'Connect' to establish communication with the hydraulic valve (Figure 21).

If there is communication, information about the valve will show up in the module (Figure 21).

### 7.3.1. Steer sensor

To make the system work properly the values of the wheel angle sensor has to be checked and possibly changed. Three wheel angle sensor values are necessary; position completely left, right and centre. Open the tab 'Sensor'. Press 'Get parameters', wait 5 seconds and press 'refresh'. After pressing these buttons, all parameters are shown in the tab (Figure 23).

**Left value** = AD1\_1000\_Left

**Centre value** = AD1\_1000\_Neutral

**Right value** = AD1\_1000\_Right

To check these values, open the tab 'Status' and press 'Enable status set no. 1'.

The value which is visible behind 'AD1:' is the value of the steer sensor (see Figure 24).

Turn the wheels completely to the left and read the value. Compare this value with the value in the tab 'Sensor' (AD1\_1000\_Left).

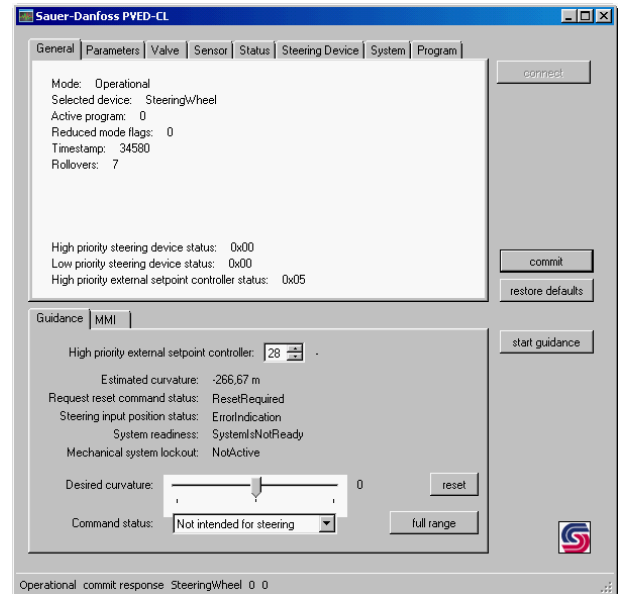


Figure 21 Information about the valve.

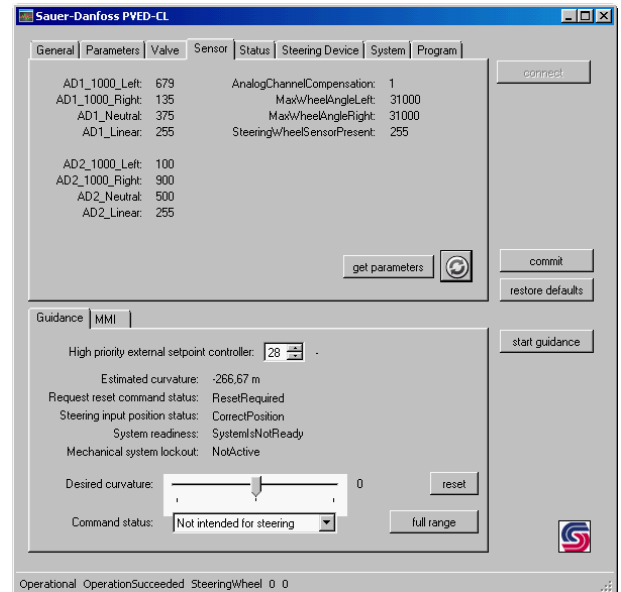


Figure 23 Values steer sensor.

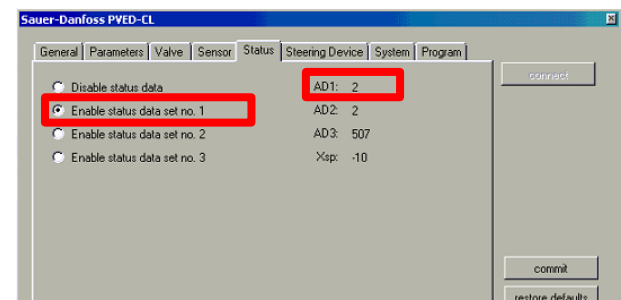


Figure 24 Steering sensor value.



If the value is not correct, open the tab 'Parameters' (Figure 25) to change the value. Search the value, double-click on it and it will be shown in the bar (see red rectangle in Figure 25). Overwrite the old value with the correct value and press 'Set'.

Do the same for the centre- and right value. After changing any of these values press 'Commit'.

**i Please note!**  
*If any value has changed, press 'Commit' before proceed further.*

### 7.3.2. Calibration mode

The hydraulic valve has two modes, the Operation mode and the Calibration mode. In calibration mode it is possible to calibrate these values. Open the tab 'MMI' (Figure 26) and press the button 'enter calibration mode'. To get in the calibration mode, the Valve needs to be powered off and on again. To switch the valve off and on use the switch which is visualized in Figure 17. Follow the steps to get in the Calibration mode. In the lower left corner, the mode is shown (Figure 26).

When the valve is in Calibration mode, press 'Start valve auto-cal.'. Do not touch the steering wheel while calibrating! At "Status" the progress will be shown. Sometimes you have to press multiple times on "start valve auto-cal." Once the calibration has started wait until "Auto-calibration completed" is shown behind Status. Some parameters won't be saved when the valve auto calibration is not executed.

**i Please note!**  
*If you want to edit the minimum or maximum steering percentage parameters you have to do*

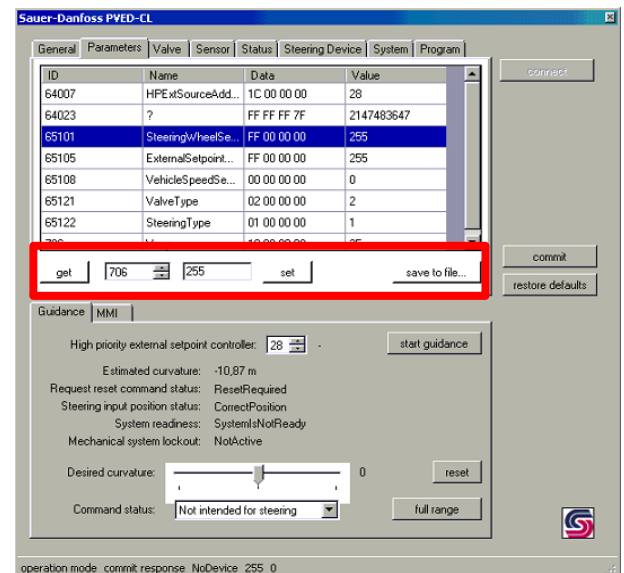


Figure 25 Tab parameters.

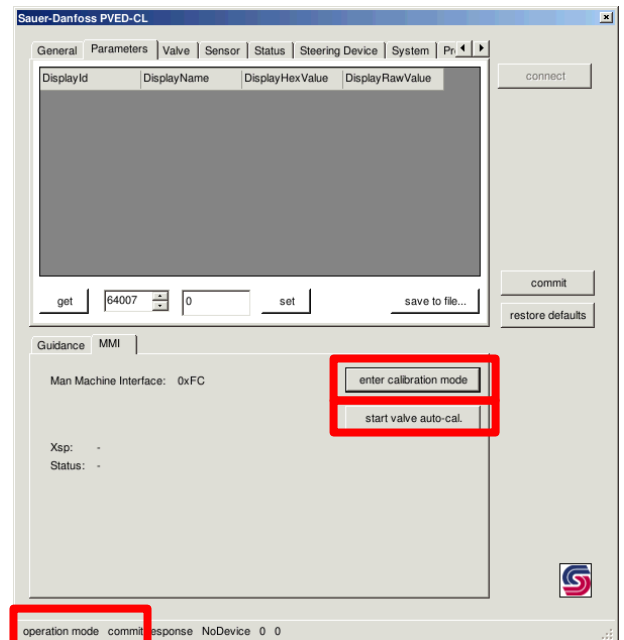


Figure 26 Calibration mode.



*the valve auto calibration first, otherwise the settings won't be saved!*

**Please note!**

*If any value has changed, press 'Commit' before continuing the calibration process.*

### 7.3.3. Proportional gain

There are two values in the PVED-CL which are about equal to the Proportional Gain when using the SBG system. These are the Kp and the Vcap. In which the Kp value will be the one with the most result. Increasing this values will result in more aggressive steering, decreasing this value will result in a less aggressive (less 'nervous') steering system.

To change the Kp, open the tab 'Steering device'. Press 'Get parameters', wait 5 seconds and press 'refresh' (sometimes it's needed to press these buttons multiple times). After pressing these buttons, all parameters are shown in the tab (Figure 28).

If changing the Kp value does not result in an accurate steering system, the Vcap value can also be adjusted.

To change the Vcap, open the tab 'Valve'. Press 'Get parameters', wait 5 seconds and press 'refresh' (sometimes it's needed to press these buttons multiple times). After pressing these buttons, all parameters are shown in the tab. Go to the tab 'Parameters' and the Vcap should also be shown here. Double click the parameter and change the value (Figure 29).



**Please note!**

*If any value has changed, press 'Commit' before continuing the calibration process.*

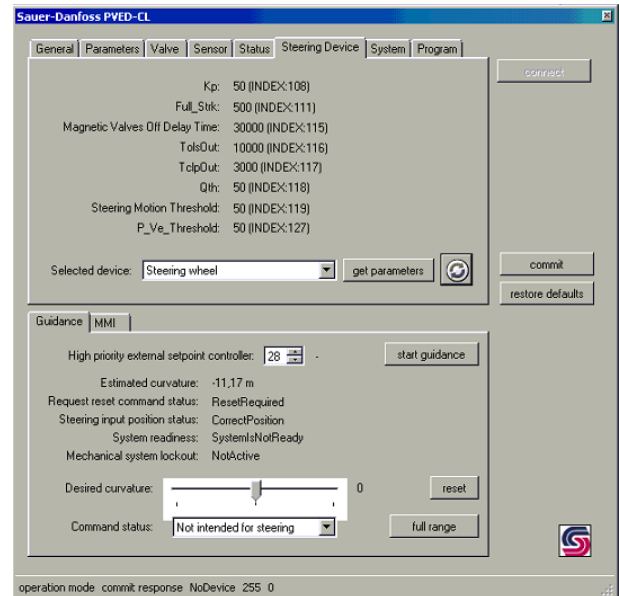


Figure 28 Get Kp value.

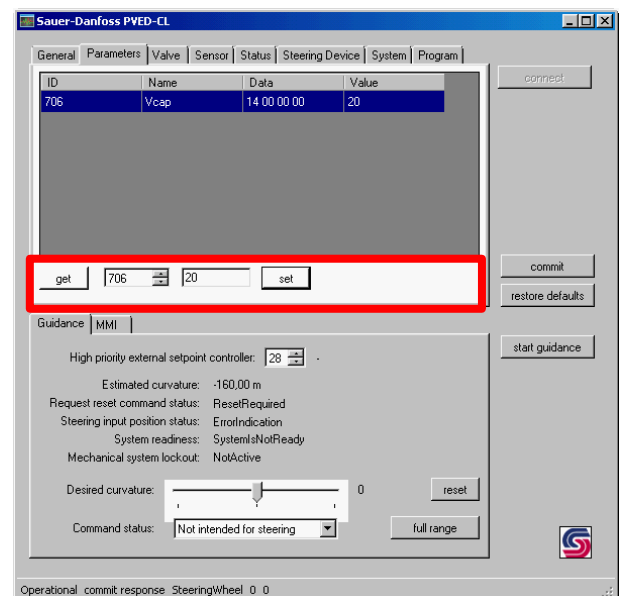


Figure 29 Change Vcap value.



### 7.3.4. Parameters

For Claas ATP Ready tractors we made a list of valve parameters based on earlier experience (Table 2). To set these settings, go to the tab 'Parameters', fill in the parameter ID (in the text box behind the button 'Get') and press 'Get'. Change the value and press 'Set' and 'Commit' to save the new set value.

**Table 2 Overview Claas ATP Ready controller parameters**

Parameter	Name	Value
64007	HPExtSourceAddress	30
65101	SteeringWheelSensorPresent	255
706	Vcap (aggressiveness)	20
729		-610
747		610
737	Minimum steering value	-130
738	Minimum steering value	130
508	KP (aggressiveness)	45
518		0
5002		255
5027		1000
5009		1
64023	StwActivationTimeout	1000000
65105	EsternalSetpointControllerPresent	255
65108	VehicleSpeedSensorPresent	0
65121	ValveType	2
65122	SteeringType	1



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