

Installation and operating instructions

GPS TILT-Module



Version: V5.20191001



30302495-02-EN

Read and follow these instructions. Keep these instructions in a safe place for later reference. Please note that there might be a more recent version of these instructions on the homepage.

Company details

Document	Installation and operating instructions Product: GPS TILT-Module Document number: 30302495-02-EN Original instructions Original language: German
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1 For your safety

1.1 Basic safety instructions



Please read the following safety instructions carefully before using the product for the first time.

- GPS TILT-Module is not waterproof. Install it in the tractor's cab in a place that is protected from water.
- The GPS TILT-Module contains very sensitive sensors. Protect it from impacts.

1.2 Compatible accessories

The GPS TILT module can be used with the following devices:

- GPS receivers from Müller-Elektronik
- Terminals from Müller-Elektronik
- Original cables from Müller-Elektronik

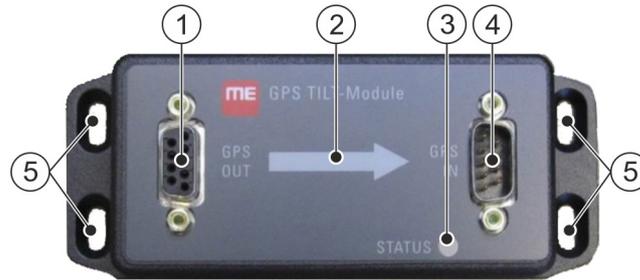
1.3 Disposal



When it has reached the end of its service life, please dispose of this product as electronic scrap in accordance with all applicable waste management laws.

2 Product description

The following image shows the front view of the GPS TILT module.



①	GPS output Cable to terminal	④	GPS input Cable from the GPS receiver
②	Direction arrow Points forward in the direction of travel	⑤	Openings for screws To fasten the GPS TILT-Module
③	Status LED		

2.1

Scope of delivery

The following items are included in delivery:

- 1x GPS TILT-Module
- 1 extension cable RS 232
- 4 screws
- 1 Installation and operating instructions

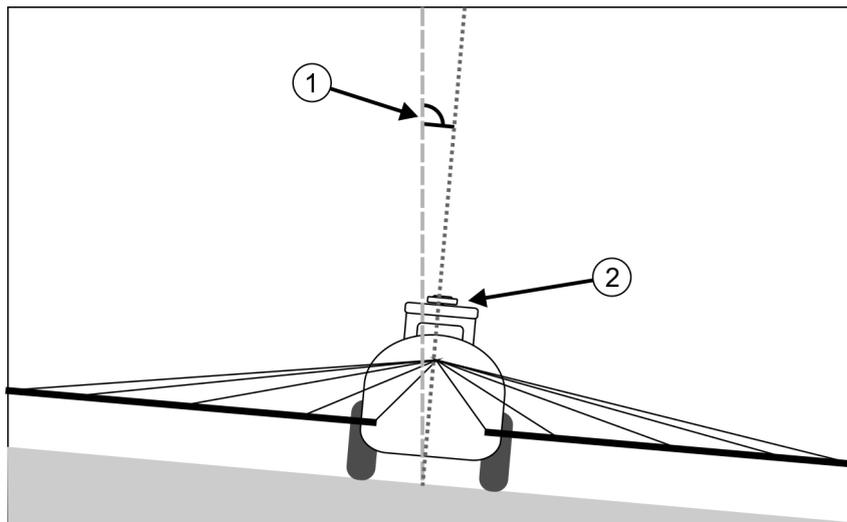
2.2

How does the GPS TILT module work?

Issue

GPS receivers collect and dispatch information about the position of the machine. The current position depends on the place where the GPS receiver has been mounted.

On agricultural machinery, the GPS receiver is often mounted on the machine's highest point. For that reason ground inclinations play a major role in calculating the machine's current position.



Deviation from the displayed position when a tilt is present.

①	Current deviation	②	GPS receiver
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When the machine is on horizontal ground, the GPS receiver shows the position of the machine correctly.

If the machine is on an uneven ground, the position shown deviates from the actual position by a few degrees. The higher the position of the GPS receiver, the greater the deviation.

The following table shows some examples of how high the potential deviation can be with a tilt angle of 5°:

Distance between GPS receiver and the ground	Potential deviation
150 cm	13 cm
240 cm	21 cm
300 cm	26 cm

Solution

The GPS TILT module compensates for all deviations resulting from the height of the GPS receiver and the tilt of the machine.

Mode of operation

1. The tilt module receives signals from the GPS receiver that are relevant for determining the position.
2. The tilt module measures the tilt of the vehicle.
3. The tilt module corrects the signals taking the vehicle tilt into account.
4. The tilt module transmits the corrected signals to the Müller-Elektronik terminal.

3 Mounting and installation

3.1 Mounting the GPS TILT-Module in the tractor cab

You must take note of the following when mounting the GPS TILT-Module:

- The GPS TILT module must be mounted on an even surface.
- The GPS TILT module must be mounted in a place where it will not be bumped into or moved.
- If the GPS receiver is mounted in a suspended cab, the GPS TILT module must also be mounted in this cab.
- The connections must point upwards.
- The GPS TILT module must lie parallel to the ground.
- The arrow must point forward in the direction of travel.

Procedure

1. Find a suitable spot for mounting.
2. **CAUTION! Before you drill a hole, make sure that you do not damage any hidden oil lines or live cables.**
3. Drill hole for the screws at the marked positions.
4. Mount the GPS TILT module in a correct position.
5. Fasten the GPS TILT module with the screws.

3.2 Connecting the cable

	 CAUTION
	<p>Mislaid cables Danger of tripping</p> <ul style="list-style-type: none"> ◦ Lay the cable in places where no one can trip over the cable!

	 CAUTION
	<p>Damage to the equipment caused by short circuit Pin 4 of port C is live. The voltage is dependent on the operating voltage of the terminal.</p> <ul style="list-style-type: none"> ◦ Switch the terminal off before you connect anything to port C.

NOTICE

Cable with inappropriate pin assignment

Risk of damage

- Only use original Müller Elektronik accessories.

Procedure

- ☑ The connections must be aligned upwards.
- ☑ The terminal must be switched off.
 1. Connect the supplied cable to port C of the terminal.
 2. Connect the other end of the supplied cable to the GPS OUT port of the GPS TILT module.
 3. Connect the receiver cable to the GPS IN port of the GPS TILT module.
 - ⇒ When the terminal is switched on, the red status LED on the GPS TILT module lights up.

3.3

Configuring the GPS TILT-Module

You must configure the GPS TILT-Module, so that it can function correctly.

The type of configuration depends on which terminal the module will be connected to. Read the terminal's operating instructions to find out how to configure the tilt module.

In the table of contents find the section: "Configuring the "GPS TILT-Module" tilt module"

4 Interpreting status LED signals correctly

The status LED display informs you of the status of the device.

Every status indication consists of a number of light signals, followed by a longer pause.

When the status LED flashes, an error has occurred. When the status LED is lit continuously, no error has occurred, the tilt correction works flawlessly.

The following table shows the meaning of the status indicators.

How often does the status LED flash?	What does it mean?	Has the tilt correction worked?	What you need to do to fix an error
0 (lit continuously)	Normal state	Yes	No error.
1	The speed is too low.	No	Increase speed. The speed must be greater than 3.5 km/h.
2	No GPS/GGA signal received.	No	Check whether the GPS receiver is sending valid GGA signals. Ensure that a serial cable is connected to the GPS input. Check whether the baud rate of the GPS antenna is set to between 9600 and 57600.
3	No GPS/VTG signal received.	No	Check whether the GPS receiver is sending VTG signals. Ensure that a serial cable is connected. Check whether the baud rate of the GPS antenna is set to between 9600 and 57600.

How often does the status LED flash?	What does it mean?	Has the tilt correction worked?	What you need to do to fix an error
4	EEPROM is not working.	No	Switch device on and off several times.
5	Permitted range is exceeded.	No	Switch device on and off several times. Calibrate the tilt zero point.
6	Bypass	No	Switch device on and off several times.