



Gobius, Water and Fuel Tanks, with Continuous Measuring

Installation Guide

Before you begin

1. Please make sure that no parts are missing. (3 sensors, 1 panel, 1 control unit (091427), 1 3M cleaning towel, 1 Velcro fastening for the control unit, 3 cables, warranty statement and installation instructions on how to attach the sensors.
2. Determine the best places on your tank to place the sensors and where to place the panel.
3. Determine the best way to safely access electricity from your 12/24 Volts battery.

Quick installation

- Attach the sensors to the tank
- Connect all parts
- Start Gobius
- Change the default settings
- Calibrate when the tank is full
- Control the new settings
- Plug in to external instrument, lamp or buzzer
- Test and run Gobius

Installing the panel and connecting the system

1. Decide where to place the Gobius panel. It can for instance be installed in your pantry or near your holding tank. You may increase the length of the panel cable up to 130 ft with a standard PC network Cat 5 cable.
2. We suggest that you make a small rectangular hole where you want to place the cable from the panel to the control unit. The hole should be at least 0,16 x 0,87 inch. Please see the enclosed hole template at page 6.
3. Use the pre-attached adhesive to fasten the panel to the wall.
4. Connect the panel and the sensors to the control unit. Then connect the cables to the battery. **Make sure to connect + and – correctly to the battery** (+ is white/grey and – is black), as also described on the control unit. Please see the illustration at page 9.
5. If you want to connect Gobius to an external display from VDO, Wema, Faria or others, you should use the analogue output on the control unit together with the enclosed cable.




We recommend that you put a layer of vaseline, which prevents oxidation, on the plugs that are connected to the control unit. The electronics of the product are protected from damp. The sensors and the control unit do not resist water. Please contact FM Marin if you want to order waterproof sensors and encapsulation for the control unit. You can also order sensor cables in the lengths of 3, 5 and 10 meters. Furthermore, we recommend that you connect your Gobius via a 500 mA fuse. Most probably you will have a free fuse position on your instrument panel.

Attaching the sensors to the tank

Start by reading through the **green** document before attaching the sensors according to the instructions. Please visit www.gobius.se for latest news. Please keep in mind that the sensors are sensitive to physical shock and therefore must be handled carefully.

Control of sensors and panel before calibrating the tank (and possible change of default settings)


Connect the Control Unit to the power source. Then Gobius will start and all lamps are lit, one after another, once. (If Gobius doesn't start press the  button on the panel). After this a function control of the sensors is carried out and each lamp will flash simultaneously with the red lamp.

Finally the blue, green and yellow lamp will show a steady light which proves that the Gobius installation is ready and only the calibration is remaining.

If there should be a problem with one of the sensors, either with the connection or with the sensor itself, this is illustrated by the responding lamp on the panel showing a steady light together with the red lamp. For further information, please see the "table of lights" at page 7. **You must act on this before proceeding with the installation. For more information, please look at www.fmmarin.se, News.**


Change of default settings


Gobius is made to be optimized for your unique tank and your requirements. There are e.g. adjustment for different tank materials and appropriate interval between measurings. You will find the predefined settings of Gobius on page 8 of this documentation. If these are not in accordance with your requirements you will need to change them.

You change the settings by pressing and holding the  button on the panel. Gobius automatically flicks through the alternatives as presented in the table on page 8. Release the button when your choice is shown. Thereby you have made a new setting. Repeat this until you have made the changes you want.


1. Leave Gobius on.
2. With a pen, make notes in the table on page 8 of the changes you need to do.



3. Press and hold the  button until the chosen rows' colours are shown on the panel.
4. Release the button to make your choice a setting.
5. Repeat this until you have made the changes you want.

By keeping the  button pressed until all alternatives are passed, you may flick through all alternatives without making any change of settings. A wrongly chosen setting is corrected by repeating the procedure and thus correcting the setting.


Settings control

Each and every time you turn off Gobius using the  button, your settings are presented by colour combinations on the panel according to the table on pages 8 and 9. You will also get information on whether Gobius has done the automatic step 2 of the calibration or only step 1. This will not happen when you turn off Gobius from an external source.

Calibration – Step 1


No tanks are the same; there are always differences in e.g. size, thickness, construction and age. In order to compensate for these differences you have to calibrate the system before you start to use your Gobius. It is also important that the boat is still and the engine is turned off when calibrating the system. It is fundamental for the function of the system that the correct settings are made before calibrating the system. Please also look at the illustrations in appendix 1 in the **green** document.

Calibration during installation (full tank)

1. Start by filling the tank (the level should be above the uppermost sensor).
2. Start Gobius and wait for the blue, green and yellow lights.
3. Press and hold the  button until all lights are on.
4. Release the button as soon as the lights are on.
5. The calibration starts automatically and takes around 60 seconds (blue, green and yellow lights are blinking during the calibration).
6. When the blue light is on the calibration is done.

Calibration at a later date

First, check whether Gobius is set for calibration with full or empty tank. This is shown when you turn off Gobius via the panel.

1. Start by filling the tank (the level should be above the uppermost sensor).
2. When Gobius is on, press the  button.
3. Wait until all lights are on.
4. Once the lights are on, release the button.



5. The calibration starts automatically and takes around 60 seconds (Blue, green and yellow lights are blinking during calibration).
6. When the blue light is on the calibration is done.

Calibration – Step 2 for continuous measurement (automatic)

Gobius has its own intelligence which learns continuous measurement. This is done automatically. The only necessity is that the liquid level needs to pass all sensors at least once. This may happen at any point in time and does not necessarily need to happen in connection to the installation. Gobius may even be disconnected in between these events.

The liquid needs to pass below the middle sensor in order to learn the upper “half tank”. To learn the lower “half” the liquid level needs to pass below the lower sensor. Thereafter Gobius has learned show the liquid level from 0-100%.

You will find illustrations on page 10 which describes this process. Please note that the continuous measurement is done between the lower and the uppermost sensor.

Continuous level indication on an analogue gauge

You may plug in an analogue instrument in parallel to the Gobius panel in order to show the tank level continuously. In the table on page 6 you will find three alternatives to choose between depending on product and standard.

On page 9 you will find an illustration showing how to plug in the instrument to Gobius’ control unit. The extra cable, which is enclosed in the delivery, is intended for this purpose. We assume that you have an instrument with cables already installed in your vessel and that you wish to use this with Gobius.

Extra lamp/buzzer

In addition to the Gobius panel you may want to plug in a lamp or buzzer to give a warning when the tank is full (blue light on the panel). You may also want to know when the level passes below the lower sensor (red light on the panel).

The illustration on page 9 shows how to plug in these additional surveillances.

Measurement interval

Gobius measures with regular intervals (1, 5, 10 minutes or every 10 seconds).

When you switch on Gobius and the tank is below full (the liquid is below the uppermost sensor) measurement is done every 10 seconds for 5 minutes. If the level passes a sensor during this time, a renewed 10 seconds interval measurement starts for another 5 minutes. If no change in the liquid level is detected within these 5 minutes, Gobius resumes to its ordinary measurement interval (1, 5, 10 minutes or every 10 seconds).


Finally

If possible, please finalize the installation by emptying and refilling the




tank with liquid to verify that Gobius works according to your requirements.

2 different ways of turning Gobius on and off Gobius

You start Gobius by a quick push on the panel's  button or by switching on the current from an external source. A function control on lamps and sensors is immediately performed. When the control is done the level is measured and the correct lamp is lit.

During the measuring you may hear a soft whistling sound from each of the sensors. Thereafter a calculation is performed in the control unit and the result is immediately presented by the lighting of the lamp corresponding to the right level.

You turn off Gobius by a quick push on the  button or by switching off the current from an external source. When Gobius is turned off it will memorize all settings and the calibration. I.e. you will not need to redo the calibration due to the current being turned off for a lengthy period of time.

Gobius technology (patented)

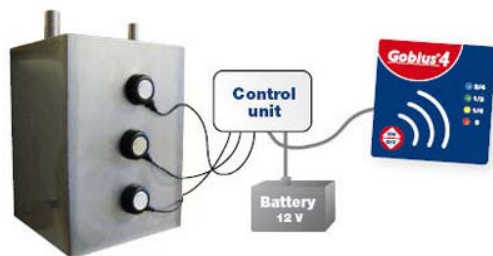
Each sensor consists of two active parts; a shaker and an accelerator. When the shaker creates a vibration in the tank wall, the accelerator measures the size of the vibration and passes the data on to the control unit. The control unit then starts to calculate in order to give an exact estimate of whether the liquid level has passed the sensor or not.

Gobius requires no extra maintenance

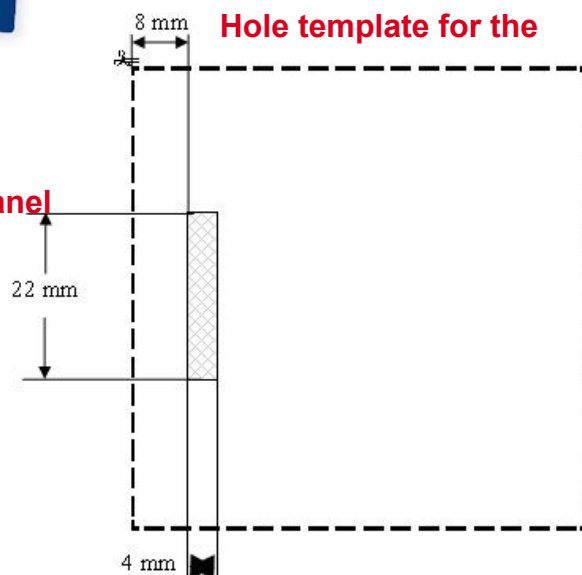
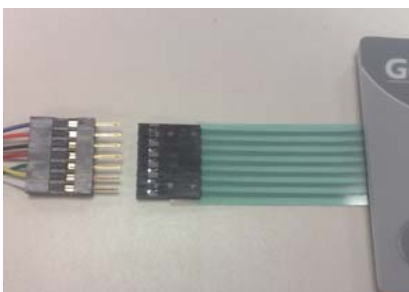
The construction of Gobius has many advantages. For instance, since the sensors never are in direct contact with liquid inside the tank, they will not wear out. Another positive aspect of Gobius is its low electricity consumption, which is less than 40 mA (12 Volts).

Gobius does not require any extra maintenance. We recommend that you calibrate the tank 1 - 2 times/year. But it isn't necessary.

System Illustration



Plug from control unit to the panel





If you connect the wrong way the blue lamp on the panel will light. It will not damage the product.)

Output current/resistance to gauge, not continuous measurement

Level	Industrial standard 4-20 mA current loop	European standard 10 – 180 Ω	US standard 240 – 33 Ω
0	6 mA	23 Ω	214 Ω
1/4	10 mA	68 Ω	161 Ω
1/2	14 mA	112 Ω	109 Ω
3/4	18 mA	158 Ω	56 Ω

Technical specification

Supply Voltage:	10 ~ 29 V DC
Supply Current:	200 mA maximum (Operating)
	40 mA maximum (Idle)
Lamp driver outputs:	12/24 V
Max. voltage:	29 V DC
Max. current:	200 mA
Analogue Instrument (Gauge) Outputs:	Industrial standard, 4-20 mA current loop European standard 10-180 Ω US standard 240-33 Ω
Max. voltage:	29V DC
Temperature interval:	-10 min, +60 max Celsius - +14 min, +140 max Fahrenheit
Accuracy continuous measuring:	+/- 10%



Table of lights – what the lamps on the panel show

Lamp Blue	Lamp Green	Lamp Yellow	Lamp Red	Explanation
○	○	☼	☼	When starting Test of the 1/4-sensor
○	☼	○	☼	Test of the 1/2-sensor
☼	○	○	☼	Test of the 3/4-sensor
○	○	●	●	Sensor errors Sensor test ready, 1/4-sensor not functioning
○	●	○	●	Sensor test ready, 1/2-sensor not functioning
●	○	○	●	Sensor test ready, 3/4-sensor not functioning
○	●	●	●	Sensor test ready, 1/4-sensor and 1/2-sensor not functioning
●	○	●	●	Sensor test ready, 1/4-sensor and 3/4-sensor not functioning
●	●	○	●	Sensor test ready, 1/2-sensor and 3/4-sensor not functioning
●	●	●	●	Sensor test ready, no sensor functioning
○	○	○	●	Measuring results Tank is empty
○	○	●	○	Tank level 1/4
○	●	○	○	Tank level 1/2
●	○	○	○	Tank level 3/4
○	○	○	☼	When measuring Tank is empty, Gobius is measuring
○	○	☼	○	Tank level 1/4, Gobius is measuring
○	☼	○	○	Tank level 1/2, Gobius is measuring
☼	○	○	○	Tank level 3/4, Gobius is measuring
●	●	●	○	At delivery Gobius is not yet calibrated
☼	☼	☼	○	When calibrating Gobius is calibrating

● = light ○ = no light ☼ = flashing light



Indicators in Set-up Mode

Mark your choice	Lamp Blue	Lamp Green	Lamp Yellow	Lamp Red	Duration	Description
	●	●	●	●	5 s	Calibration
	○	●	○	○	5 s	Measurement period 1 minute
D	○	●	○	●	5 s	Measurement period 5 minutes
	○	●	●	○	5 s	Measurement period 10 minutes
	○	●	●	●	5 s	Measurement period 10 seconds
	●	○	○	○	5 s	Gauge 4 – 20 mA, Industrial std
D	●	○	○	●	5 s	Gauge 10 – 180 Ω, European Std
	●	○	●	○	5 s	Gauge 240 – 33 Ω, US std
	●	●	○	○	5 s	Tank in plastic 10 – 12 mm
	●	●	○	●	5 s	Tank in plastic 2 -> 10 mm, fibre glass 6-8 mm
D	●	●	●	○	5 s	Tank in stainless steel 1,25 -> 2 mm
	●	●	●	●	5 s	Tank in aluminum 3 - 5 mm, stainless steel 2 - 3 mm, steel 2 - 3 mm
D	○	○	○	●	5 s	Calibration with full tank
	○	○	●	○	5 s	Calibration with empty tank
	○	○	○	○		The set-up mode will be exited without changing any parameters.

D = Default setting ● = light ○ = no light

Current settings

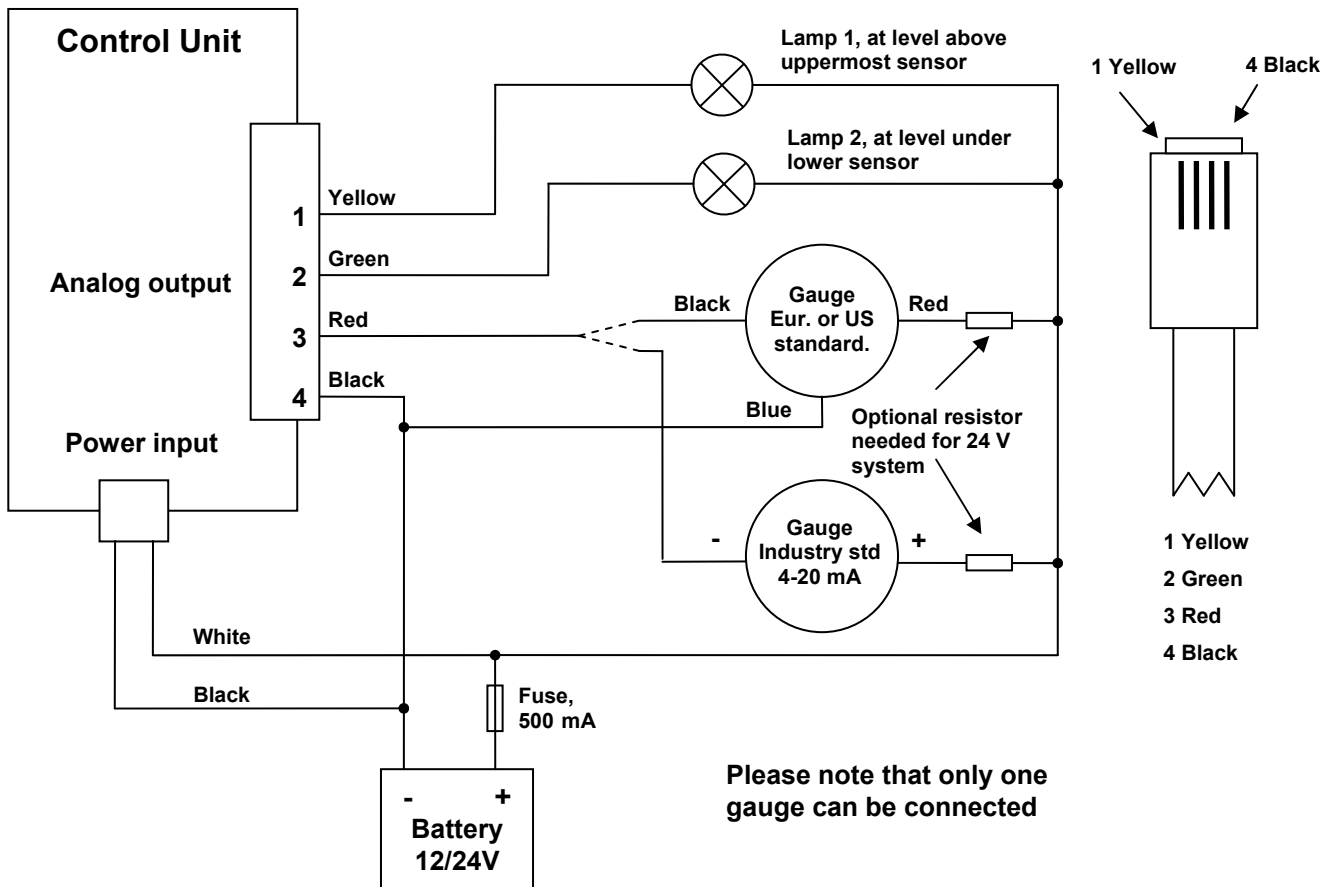
(Shown on the panel when Gobius is turned off)

Lamp Blue	Lamp Green	Lamp Yellow	Lamp Red	Duration	Description
○	●	○	○	3 s	Measurement period 1 minute
○	●	○	●	3 s	Measurement period 5 minutes
○	●	●	○	3 s	Measurement period 10 minutes
○	●	●	●	3 s	Measurement period 10 seconds
●	○	○	○	3 s	Gauge 4 – 20 mA, Industrial std



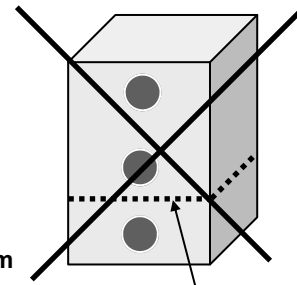
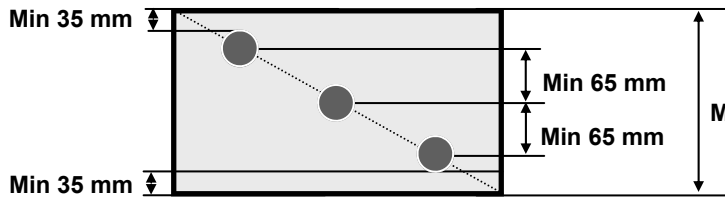
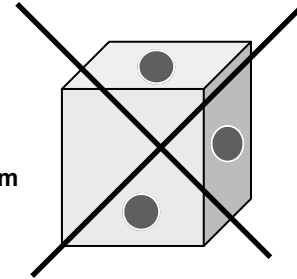
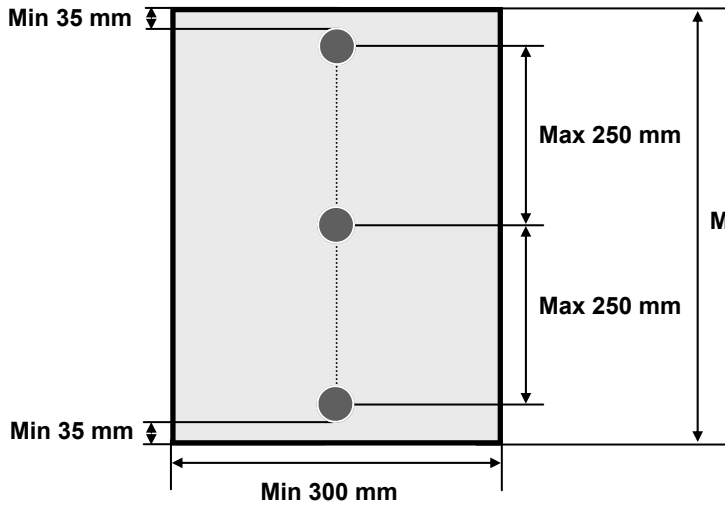
Lamp Blue	Lamp Green	Lamp Yellow	Lamp Red	Duration	Description
●	○	○	●	3 s	Gauge 10 – 180 Ω, European Std
●	○	●	○	3 s	Gauge 240 – 33 Ω, US std
●	●	○	○	3 s	Tank in plastic 10 – 12 mm
●	●	○	●	3 s	Tank in plastic 2 -> 10 mm, fibre glass 6-8 mm
●	●	●	○	3 s	Tank in stainless steel 1,25 -> 2 mm
●	●	●	●	3 s	Tank in aluminum 3 - 5 mm, stainless steel 2 - 3 mm, steel 2 - 3 mm
○	○	○	●	3 s	Calibration with full tank
○	○	●	○	3 s	Calibration with empty tank
○	●	○	●	3 s	Not in Continuous Mode, only 4 levels
○	●	●	○	3 s	Partially calibrated for continuous measuring, only 50-100% (full)
○	●	●	●	3 s	Fully calibrated for continuous measuring, 0-100%

Wiring diagram for external instrument, lamp/summer

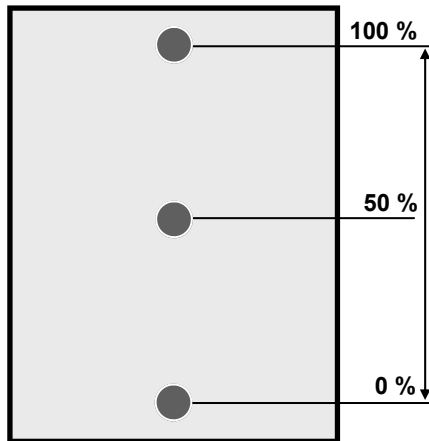


Gobius Continuous Level Measurement System

Tank dimensions, placement of sensors and level presentations



Avoid inner walls



0 - 100 % with 3 sensors



Supports gauges with

- 10-180 Ohm
- 240-33 Ohm
- 4-20 mA

4 levels with 3 sensors

