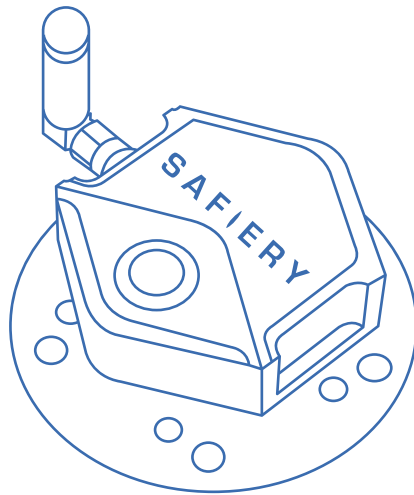




STAR-TANK

USER MANUAL



Tomorrow's Technology, Today

WWW.SAFIERY.COM



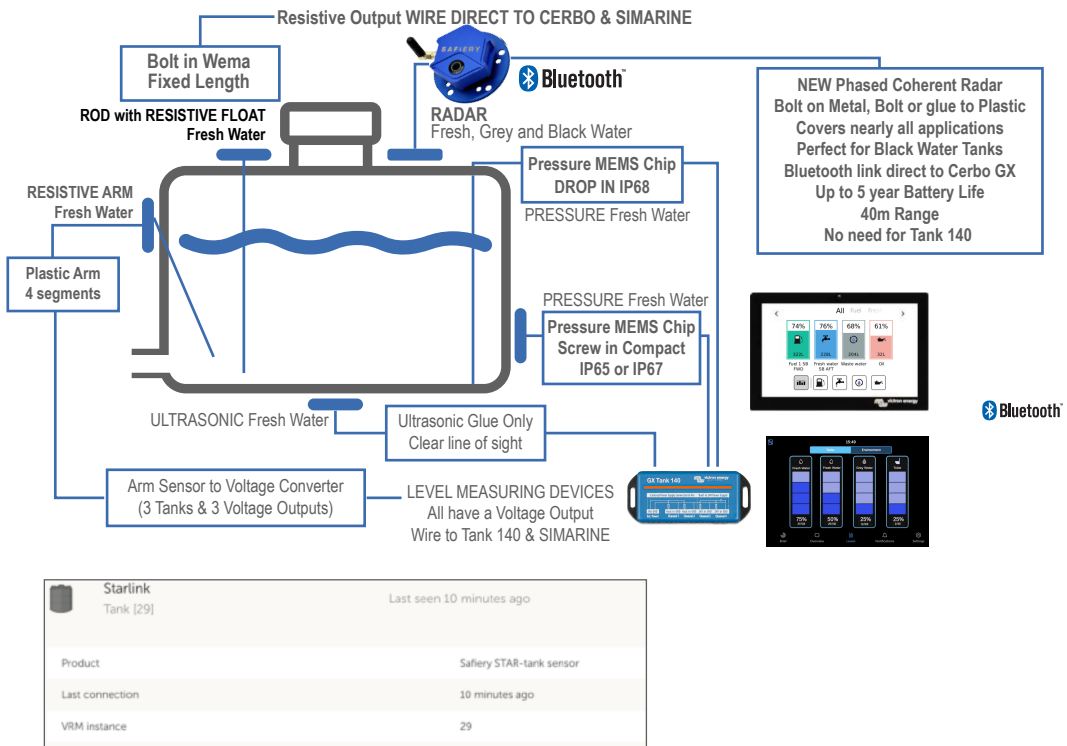
STRA - TRA

is a radar based tank level sensor

that mounts at the top of the tank

- Operates directly through non-metallic tanks - top mounted
- In metal tanks a hole is cut and an SAE 5 bolt pattern used (industry standard)
- Accurate to 1mm
- Operates in Black and Grey Water. It is not affected by foam or gasses
- This model is battery operated with a target 5 year life.
- Unit has "Long Range Bluetooth" that we have tested to 100m line of sight and 40m through metal layers in a typical van build.

Fresh, Grey, Black Water and Fuel



World's First Battery Operated Radar tank Level Sensor - Bluetooth to Victron Cerbo GX

SPECIFICATIONS

This battery powered sensor:

- Bluetooth Connection to Victron GX models ONLY
- Battery Life 3-5 years (longer range and lower level tank, battery life 3 years. Shorter range and tank level typically 50% then 5 year)
- Battery 2744
- Bluetooth 5.3 Adv Output ONLY
- Deadband 30mm
- Max Depth 1200mm pre-set. Can be ordered to 2000mm or 10000mm
- Repeatability 1mm
- Press button on top and reporting changes to 10 sec intervals for 10mins (during commissioning)
- After 10 mins at 10 sec reporting, interval changes to 60 second intervals

MOUNTING

The base of the Sensor has 2 sets of holes:

SAE 5 bolt hole

For Plastic Tanks:

- Glue Sensor to top of tank. The SAE bolt holes form the basis for the bonding.

Cable Length:

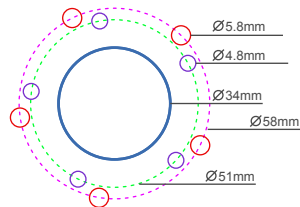
- No Cable. It is Battery powered and Bluetooth.

Connections:

- No Connections

Simple Calibrations:

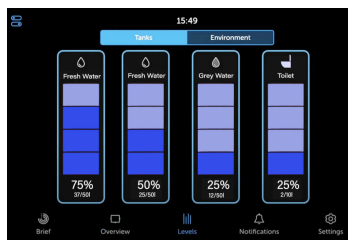
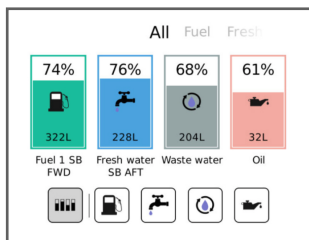
- Calibration needed from Display



ETSI

Safiery declares that this sensor is compliant with the

European commission radio equipment directive 2014/53/EU article 3.1 and 3.2.



Safiery STAR-Tank Radar Bluetooth Sensors

STAR-Tank sensor support has been added to Venus OS. These radar tank level sensors use BLE (Bluetooth Low Energy). This wireless technology allows devices to be networked within a range of about 40 meters (with Bluetooth Adapter added to Cerbo GX, see below), while consuming significantly less power than ordinary Bluetooth technology.

The expected battery life is 5 years with tank measurement averaging 50%. Battery life is less at around 3 years if tanks average 10% level for example. The liquid level, temperature and sensor battery voltage are streamed wirelessly to the GX device.

STAR-Tank sensors feature phased coherent radar sensing for non-pressurized tanks. The tank level range is 2m as standard. This can be extended, consult Safiery. The top 30mm from the base of the sensor is a dead band. If the tank is 12mm thick fiberglass, then the deadband is 18mm below the top of the tank.

The sensors are attached directly on top of any non-metal tank including thick fibreglass tanks. For metal tanks, the sensor needs a clear view of the liquid. To achieve that, a 5 hole SAE pattern adapter is included into the base. To achieve an air tight seal, use “gas sealing tape” (generally pink) and wrap on the thread and screw into the base plate. This prevents gas from the tank passing through STAR-Tank.

For non-metal tanks simply adhere the base plate and after curing, screw the STAR-Tank module onto the base. STAR-Tank suits black water tanks, even with foam above the liquid line.

Pressing the black button on top of STAR-Tank initiates an AI startup routine to select the dominant line-of-sight signal from a cloud of reflected information. The AI routine does this to minimize battery usage. Press and hold that button for approx. ten seconds. During that 10 seconds the LED surrounding the button is a solid red LED. Wait until the Solid Red LED turns to solid Green then remove finger. The AI function is now complete. After the button is released, every 10 seconds for 10 minutes, the LED flashes tank level status: Flashing purple means tank is absolutely full or some object under sensor is blocking it like a baffle. Drain some liquid and repeat the process. Flashing red means the tank is close to full. Flashing green means tank level is 1m or more below the sensor.

Then there are in-between colours of orange to yellow. The purpose of this guide is to give the user confidence in correct operation.

Safiery STAR-Tank On / Off and Approvals

To turn STAR-Tank off, press and hold button. The surrounding LED will be solid green for approx. 10secs. Keep holding until it turns solid red, then release finger and it turns off. When turned back on, follow the guide above to re-initiate the startup routine.

The normal sampling interval for the long battery life is 60 seconds. Pressing the black button for 1-2 seconds only will change the sampling time to 10 seconds for up to 10 minutes. Then the sampling reverts to 60 seconds.

This radar tank level sensor is approved with FCC for USA and is CE and UKCA approved. The temperature value may be used to trigger the temperature relay function on the GX device with relays to initiate stirrers or heaters in tanks as well as notification of this.

To connect STAR-Tank sensors to the GX device via Bluetooth, the GX device needs Bluetooth functionality. Some GX products already have built-in Bluetooth, all others can easily be retrofitted using a standard USB Bluetooth adapter (see the Victron GX product range overview for GX products that have built-in Bluetooth).

However, an additional USB Bluetooth adapter, also for GX devices with built-in Bluetooth, allows for limited relocation of the Bluetooth radio (via a USB cable extension) close to other supported Bluetooth devices that might not otherwise be reachable.

USB Bluetooth adapter				
Insignia (NS-PCY5BMA2)	Logilink BT0037	TP-Link UB400(UN)	Kinivo BTD-400	Ideapro USB bluetooth adapter 4.0
Ewent EW1085R4	Laird BT820	Laird BT851	-	-

A list of additional adapters that are also being tested, as well as adapters that have been tested and are known not to work, is available here: [Victron Community](#).

Safiery STAR-Tank Radar Bluetooth Sensors

Device List		📶 08:29
AC load	61W	>
Diesel	53W	>
Fresh water tank (34)	23 C 55%	>
LPG tank (35)	15 C 65%	>
MPPT 75/15 rev2 beta	4W	>
MPPT 150/35 rev2 BS	22W	>
📊 Pages		⬆ ⬇ ⬆ Menu

The installation of the STAR-Tank sensor is very simple. First, however, the sensor must be installed according to Safiery's installation instructions.

Then the installation and configuration is done in the GX device as described

- 1 Make sure Bluetooth is enabled in the Bluetooth sensors menu (enabled by default).
- 2 Go to Settings → I/O → Bluetooth sensors menu.
- 3 Move the Enable slider to the right to enable Bluetooth sensors.
- 4 To find your STAR-Tank sensor, scroll down until you see them.
- 5 To activate the sensor, move the slider to the right. It should now appear on the Device List.
- 6 Repeat steps 1..5 for more than one sensor.

GO TO VICTRON CERBO OR EKRANO GX MANUAL FOR SETUP PROCESS.

Comparison of Technologies to Radar used by STAR-Tank

Resistance	Pressure	Ultrasonic	Radar
Passive measurement of resistance as a magnetic ring slides up and down a hollow shaft with resistors embedded	Active measurement of pressure in a tank using a silicon wafer that “bends” under pressure and creates a signal. Resultant signal may be voltage, NMEA, CAN or or Bluetooth data.	Active measurement of distance from under a tank (or above tank for Some) to the air-water interface point. Resultant signal may be voltage, NMEA, CAN or or Bluetooth data.	Active measurement of distance from top of tank to air-liquid interface point. Resultant signal may be voltage, NMEA, CAN or or Bluetooth data.
Above Tank with height access to remove the unit of similar height of tank.	Side of tank as close to bottom as possible. Needs a threaded boss on tank to screw into.	Below tank must use a couplant of grease or glue. Cant have intermediate layer.	Above tank for non-metal tanks can sit directly on top of tank (glue) and for metal tanks, needs hole with SAE 5 bolt pattern.
20-30mm Accuracy	Varies with quality but typically 20mm	Varies with quality but generally average	High accuracy of 1mm is achievable.
No active power. Just 2 wire to resistance	3 wire of power and voltage value and ground.	3 wire of power and voltage value and ground or battery Bluetooth.	Battery operate Bluetooth or CAN/NMEA powered 12/24V.
N/A	N/A	3-5 years battery life	5 years Battery Life Enhanced by AI
Stainless steel components	Stainless steel components	Plastic and embedded sensor	Billet machined Aluminium and embedded liquid proof radar sensor.

Comparison of Ultrasonic and radar tank Sensors to STAR-Tank

	Mopeka	Gobus C	STAR-Tank
TECHNOLOGY	Sonar (ultrasonic)	Radar	Radar
PLACEMENT	Below tank Flat 12mm	Above tank 65mm required	Above tank 30mm required
ACCURACY	Affected by foam and temperature	High	High
POWER	Battery	12/24V	Battery
CALCULATED BATTERY LIFE	3-5 years	N/A	5 years Enhanced by AI
WARRANTY	1 year	Not listed	5 years excluding battery for above non-metallic tanks. 1 year for application in metal tank with SAE 5 bolt hole.
VICTRON INTEGRATION	Bluetooth ADV	Voltage/Resistance	Bluetooth ADV
PRICE POINT IN EUROS Subject to change	Euro 65	Euro 350	Euro 165
AVAILABLE NOW	Available now	Available now	Available Sept. 2024

Functionality of STARSHIP - What it does

Devices connected in a marine world have defined protocols such as NMEA 2000 for wired connectivity. However, for non-essential, comfort and convenience devices like lighting, air-conditioning, fans, and appliances there is now a connectivity alternative with wireless digital switching.

This alternative Wireless connectivity can be in parallel with the wired system. STARSHIP offers two layers of wireless communication, both with Open Protocols as well as preserving NMEA 2000.

More and more devices and appliances have inbuilt wireless connectivity, because more advanced functions can be selected using wireless connectivity to purposeful Apps. However, it isn't practical nor customer focused to require a collection of Apps to fully operate these devices.

So sometime in 2019, Apple, Google, Amazon, and Samsung agreed to commit to a common standard for IOT devices and appliances that any of their platforms would connect with using one native app on the smartphone or tablet. The Standard was published in December 2022 and is called "Matter".

Matter is a published open protocol with IPv6 endpoints. Once provisioned, it does not require the internet. It has a high encrypted security feature and uses conventional WiFi and/or ethernet between devices.

STARSHIP is compliant with Matter but with a significant difference: It also has integration of both Wired NMEA2000 and Long Range Bluetooth (uses 802.15.4 transport layer). This means a light can be turned on and colour changed from an MFD display then turned off or the colour changed using wireless STAR-Switches in a cabin.

However, the really important functionality is the automation. Apart from convenience of one "Home Control" app for multiple devices (currently over 2,000), there is the Energy Management Automation that is particularly useful. Matter includes this as well as battery monitoring such that load shedding of devices can be done when energy needs to be conserved. Simply departing a boat can trigger automation that turns off all non-essential devices.

STARSHIP is the only DC powered Matter compliant device available. Layer on to that the 2 other communication methods. We envision a future where most appliances and lighting will be available under the WiFi standard protocol.

DUAL Layers of Wireless Control

Plus one Layer NMEA Wired Control

THREE LAYERS of COMMUNICATION with CONTROLLERS



3

Each Layer Operates independently

WiFi using Matter Open Protocol

- No Internet Required
- Compatible with:
 - Apple, Google, Amazon, Samsung
- Uses their native Home Control app
- Over 2,000 Compliant Devices to Connect
- Automation on Smart Phone - arrive / depart
- Energy Management with Load Shedding



2

Long Range Bluetooth

- 40m + typical range
- Battery operated Switches
- 4-6 year life
- Up to 6 switches control one device
- Easy configuration of Master/ Sub-master
- Double press feature for alternate colour
- Inexpensive and simple to deploy.



1

CAN / NMEA

- Wired Connection
- MFD Control



The Bluetooth connectivity uses the new long-range 802.15.4 transport layer. Results are 100m range line of sight and 40m through metal skins. This is used for the wireless physical switches and the Radar Tank Monitoring. They operate independently of the other communication methods with high encrypted security. They are battery operated with a minimum of 4 year life.

Simplified Interoperability with any Smartphone's Native Home Control

Amazon, Apple, Google, and Samsung committed to a common standard for interoperability in 2022 called "Matter". It works seamlessly with over 2,000 devices including fridges, air conditioners, fans, lights, and more, all from a single app on any of these smartphones.

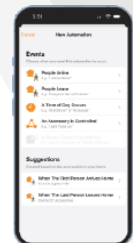
STARSHIP™ is a Matter compliant system designed specifically for 12V DC devices in a marine environment. The clever part by Safiery was integrating CAN/NMEA functionality and long-range Bluetooth devices into one system.

Simplified Smart Automation and Convenience

STARSHIP™ automation capabilities simply follows the home control automation available on your Smartphone.

As you approach your boat, lights can automatically adjust based on the time of day, and non-essential systems can shut down when you leave. With AI integration, your system becomes even smarter, offering voice control and real-time language translation based on your smartphone's settings.

The Smartphone does the "programming" previously programmed by engineers into digital control systems. Time and cost is avoided and user flexibility is at new heights.



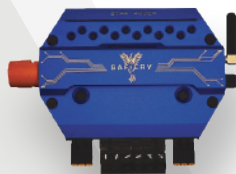
Combines Old with the New

Wired and Wireless to Reduce Cost

The user benefit of this architecture: a system can be completely delivered with NMEA & wireless switching. When the user wishes to add automation, Smartphone App control or remote cloud monitoring, they simply install Matter as an overlay network. The user can redefine switch modes, and scene automation without programming by others. This enhances utility at reduced overall cost.

The commercial benefit to the boat builder is a significant reduction in installation complexity:

Installation time, cabling cost and weight, commissioning time and troubleshooting time are all at an absolute minimum. Simplicity of use allows for end user changes at minimum cost.



STAR-POWER

(IP54)
150A
6 x 30A
6 x 10A Dimmable
2 Control Inputs
CAN / NMEA / RVC



STAR-LIGHT

(IP 54)
40A
12 x 10A Dimmable
H-Bridge Capability
2 x RGBW Colour Capability
CAN / NMEA / RVC



STAR-ROVER 4

(IP68)
40A
4 x 10A Dimmable
H-Bridge Capability
1 x RGBW Colour Capability
CAN / NMEA
70mm x 50mm x 22mm



STAR-ROVER 2

(IP68)
20A
2 x 10A Dimmable
H-Bridge Capability
CAN / NMEA
55mm x 32mm x 15mm



STAR-SWITCH

(IP22)
Secure Wireless
4 buttons
Can be custom engraved
Panel and Surface Mount
5 year battery life



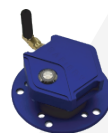
STAR-SWITCH WALL

(IP22)
Secure Wireless
4 buttons
Wall Surface Mount
4 year battery life



STAR-SWITCH CUSTOM

(IP22)
Secure Wireless
4 image button
User Defined e-Tiles
Wall Surface Mount
4 year battery life



STAR-TANK

(IP66)
Phased radar liquids level
Fresh / Black / Grey / Fuel
Long Range Bluetooth
AI Auto-aligns Tank-Radar Filter
Connects to Victron Cerbo
5 year battery life



STAR-SWITCH SP8

(IP67)
NMEA 2000
8 buttons
Rubberised Tactile Buttons
Will be Wireless 2025 - 20yr life



STAR-TOUCH

(IP22) 7 in Touch Screen
Secure Wireless
• Digital Switching
• Victron System (WiFi)
• STAR-Tank

80
Millionths / Sec

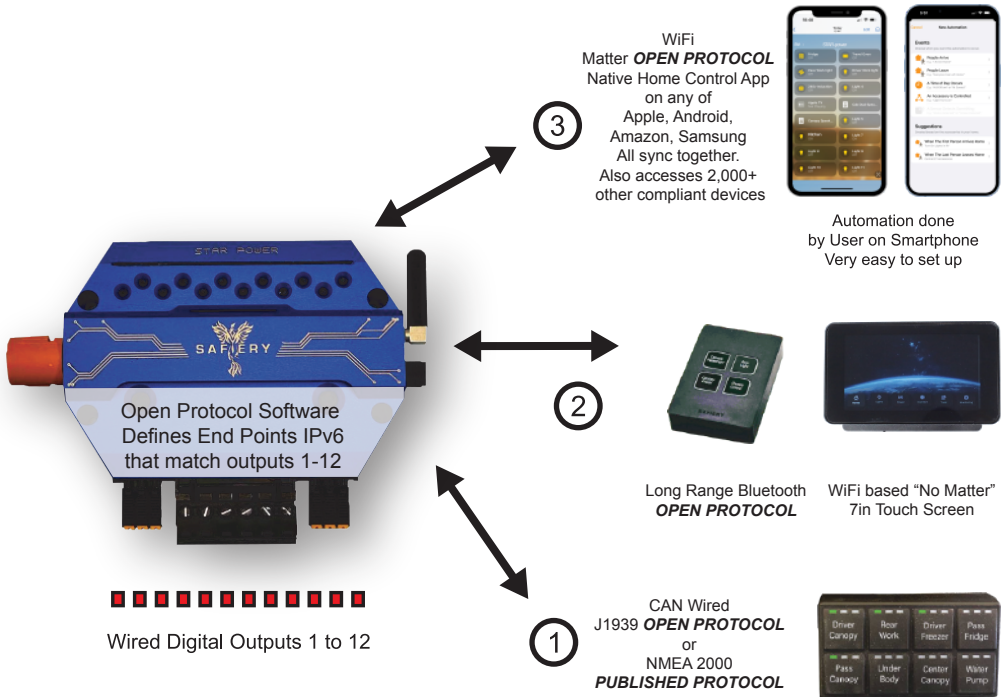
ADVANCED FUSELESS

All STARSHIP™ Controllers
Short Circuit Protect in 80 us
European sourced MOSFETS
Integrated Intelligent Design

victron energy
BLUE POWER



Functionality of STARSHIP - Why it is so innovative



Three communication channels can occur in Harmony

Each switch button source points directly
to the IPv6 end point which is wired output

There is ZERO middleware

Absolute simplicity

Reduces Cost

Typical Cabin Configuration

Using STAR-Light Wireless

From DC Switchboard

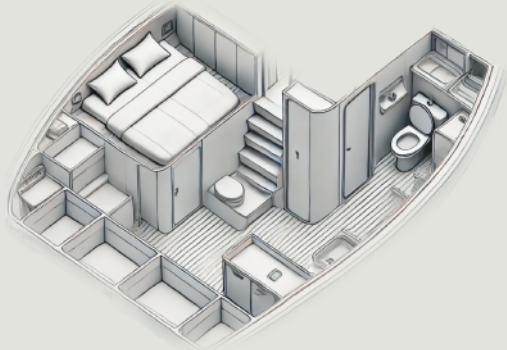
- 8mm² Positive
- 8mm² Negative
- Max current 40A
- Breaker at Switchboard "Main Cabin"



From STAR-Light (12 x 10A)

1. Under cupboard floor light White
2. Under cupboard floor light Blue (LED Strip is integrated white/blue)
3. Reading Spot White His side
4. Reading Spot White Her side
5. 12V Fan
6. USB Outlets both sides
7. TV raise/lower using H Bridge 1
8. TV raise/lower using H Bridge 2
9. Overhead light (s)
10. Head Overhead light
11. Vanity Sink Light
12. Spare

Affordable: Switches Euro 48 / STAR-Light 330
Durable: Anodized Aluminium Controllers



Simplicity and Savings

NO Fuses from STAR-Light to all circuits out

NO Breakers in Cabin

Only one cable pair to cabin

LED's can be Switch/Dim positive or negative

Has 2 x RGBW Colour Capability

Switches are all battery wall mounted /portable

Switches can be Engraved

Switches can switch any devices elsewhere on boat

7 in Wireless Display show batteries and all devices



Wireless

STAR-SWITCH

either side of bed

- Floor Light (one press White, double press Blue)
- Reading Lights "His" On Second switch "Hers"
- Underwater Lights
- Bathroom Light



Wireless

STAR-SWITCH

bathroom

- Overhead Lights
- Vanity sink Lights (one press white, double press Natural, Tripple press warm white) Popular for ladies skin tone with makeup
- Rear Deck Aft light



Wireless

STAR-SWITCH

portable

- TV Raise
- TV Close
- Fan
- Any other

CONTACT / SUPPORT

GET IN TOUCH

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service@safiery.com

SOCIALS

[Instagram.com/safiery.global](https://www.instagram.com/safiery.global)

[youtube.com/@Safiery](https://www.youtube.com/@Safiery)

THE 3 MOST COMMON CALLS ARE:

1. Flattened our batteries - use solar to recover to minimum voltage. Only use 240V AC power after reaching minimum voltage.
2. AC Inverter/Charger will not charge. Usually because the AC In line has an earth fault on the supply side and Safiery systems will not charge unless there is a properly connected earth AND the Active power in is wired correctly at the power supply. Common on farm stays.
3. Inverter not working. Usually because it is switched to "Charge Only" and it will not operate as inverter. Simply switch to "on" position.

