



Total Energy Management

By Phil Smith
(Energy Solutions)



ENERGY SOLUTIONS

Efficient Sustainable Electrification



- Privately Owned
- Established 1995
- 80+ Staff
- Victron Energy premier distributor
- Engineering Services
- Electrical panel design and build
- Develop Hybrid power and power management systems



Efficient Sustainable Electrification



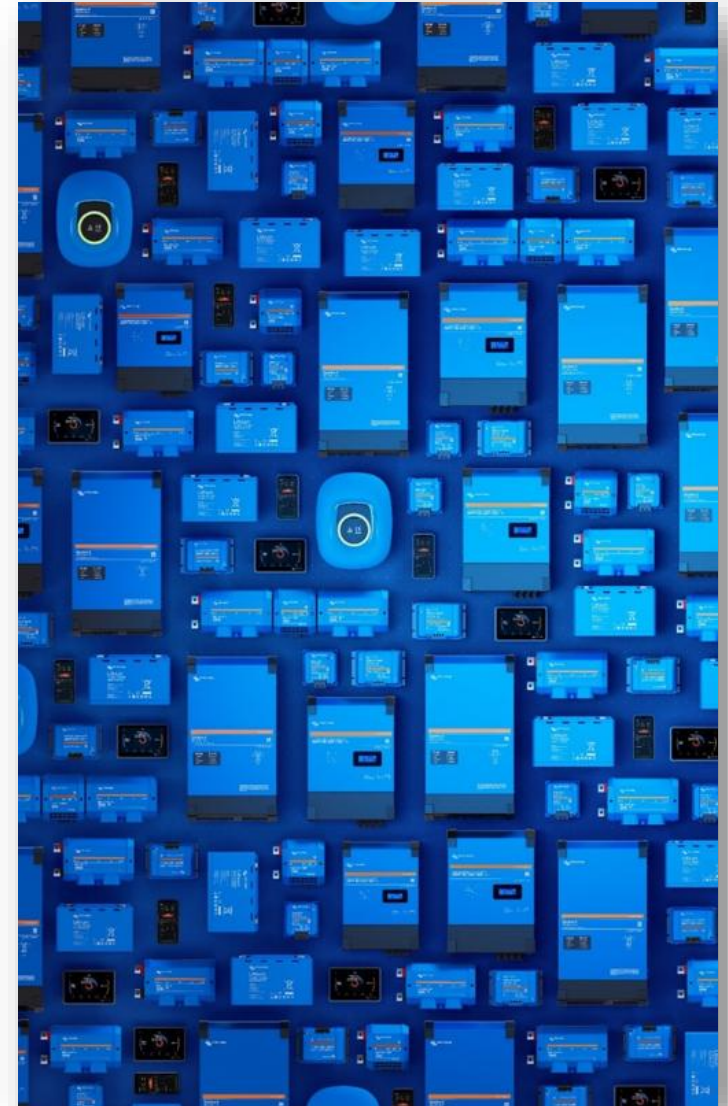


- Consistent product quality
- Diverse and adaptable product range
- Scalability
- Innovative and progressive design
- Strong market presence
- Established and expanding global dealer network



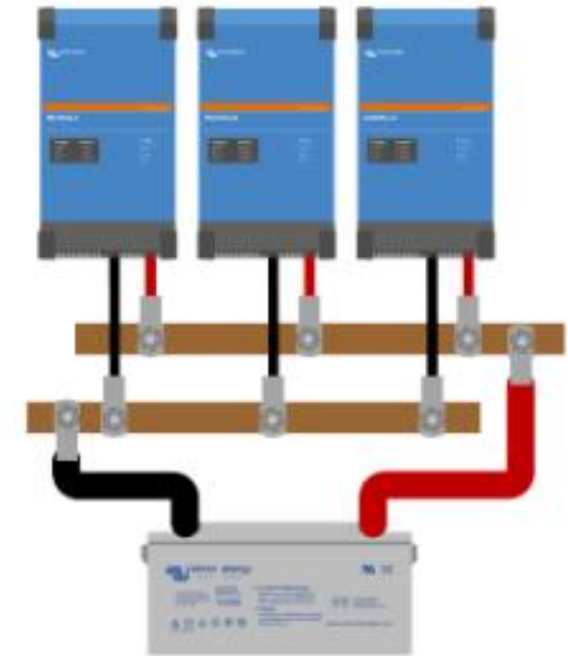
- We have approximately 1200 different products.
- This is because we cater for very small to very large energy systems for a variety of markets
- These systems can have
 - Different battery voltages, ie 12, 24 or 48V.
 - DC and/or AC loads
 - AC and/or DC inputs
- We do not offer a solution in a box, but provide bespoke solutions

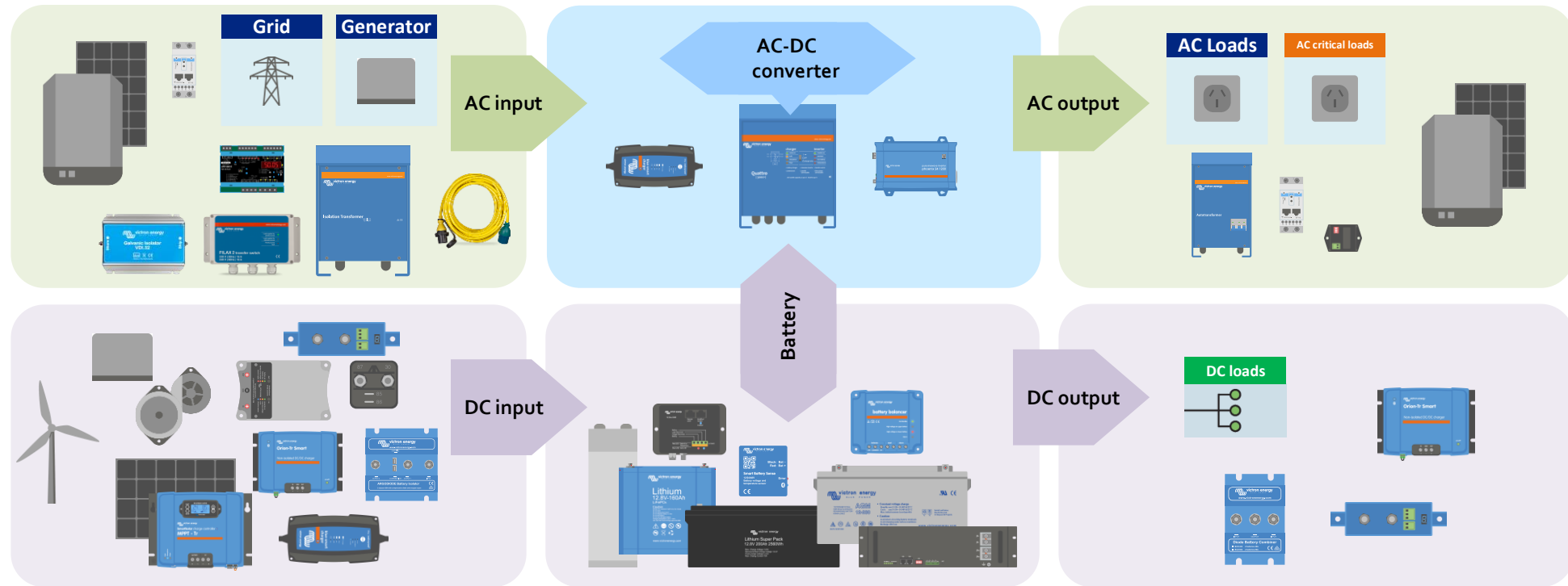
The Victron ECO system!



Why different battery voltages?

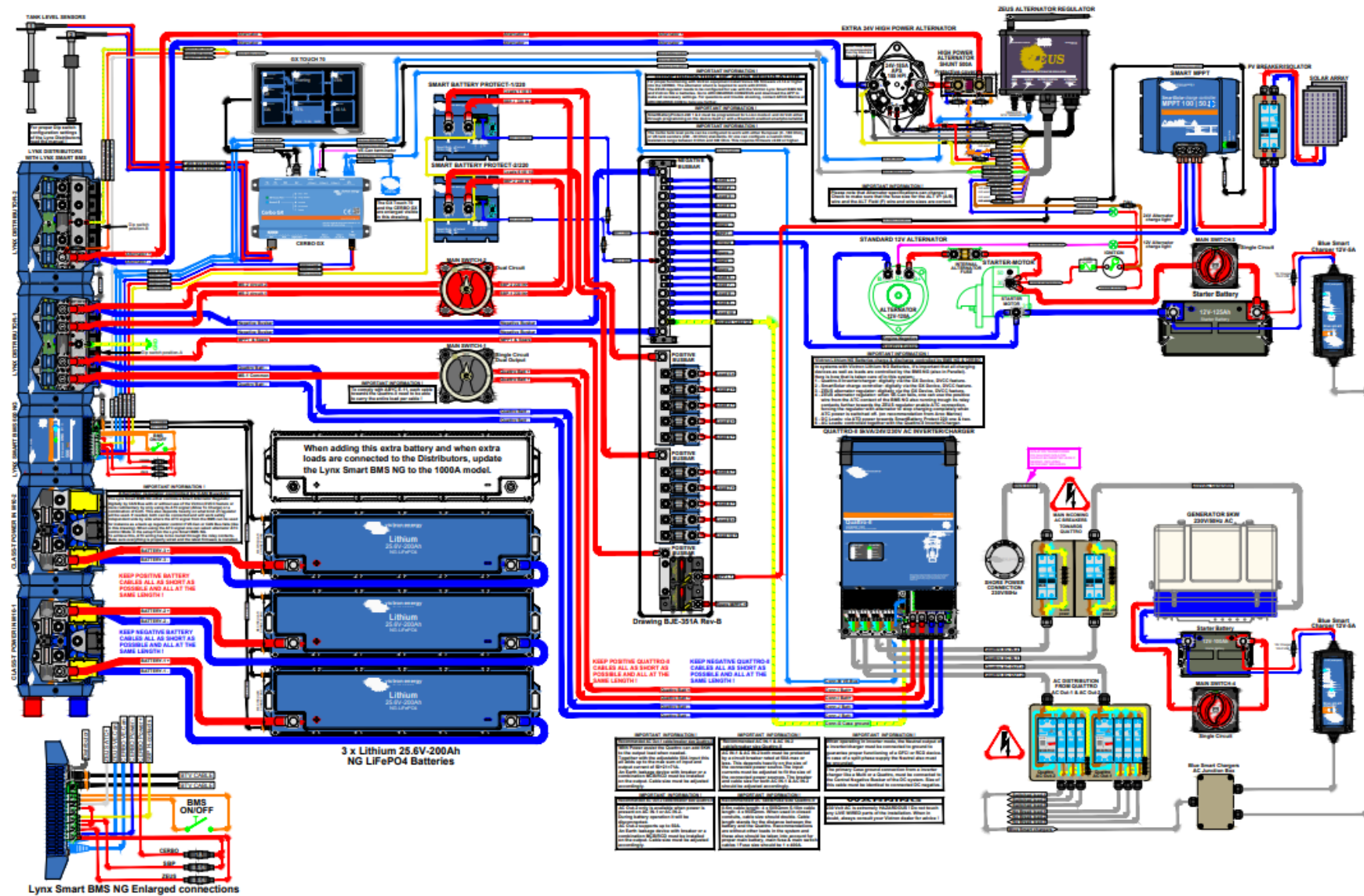
- **Copper is expensive!**
- Higher voltage means lower current
- High current needs very thick, expensive cables
- Larger systems should use higher voltage
- Higher voltage supports larger loads
 - 12 V for small systems (up to about 5000 W)
 - 24 V for medium systems
 - 48 V for large systems (up to about 180 kVA)





The product groups

- Inverters
- Inverter/chargers
- Transfer switches
- Transformers
- AC battery chargers
- Solar chargers
- DC/DC chargers and converters
- Battery Monitors
- Battery Isolators
- Batteries and BMS
- DC distribution and fuses
- Monitoring and control
- Meters and sensors
- Cables, interfaces and others



Lithium NG series

- LFP batteries in 12.8 V, 25.6 V and 51.2 V
- Series, parallel and series-parallel possible
- Max 50 units (12 V, 24 V), max 25 units (48 V)
- Voltage, current and temperature sent to the BMS
- BMS calculates state of charge, warnings and alarms
- Real-time data via BMS in VictronConnect or a GX device
- Low self-discharge, about 2 percent per month
- Brackets for easy and secure installation
- IP65 rating

12.8 V	25.6 V	51.2 V
100 Ah	100 Ah	100 Ah
150 Ah		
200 Ah	200 Ah	
300 Ah		



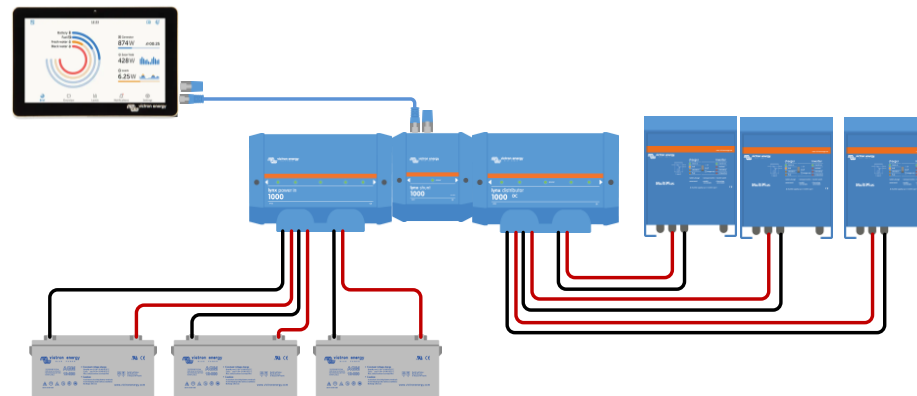
Lynx Smart BMS NG

- BMS for Lithium NG batteries, available in 500 A and 1000 A
- For 12 V, 24 V and 48 V systems
- Up to 50 batteries, max 384 kWh
- Supports series, parallel and mixed banks
- Built-in contactor for safety and remote switching
- Shows state of charge and key battery data
- Pre-alarm for low cell voltage
- Bluetooth for VictronConnect
- Works with GX devices and VRM
- M10 busbar, integrates with Lynx system



Lynx System

- Modular busbar system for DC distribution, rated to 1000 A
 - Lynx Distributor: busbar with connections and MEGA fuses
 - Lynx Class-T: Power In: busbar with connections and Class-T fuses
 - Lynx Power In: busbar with connections
 - Lynx Smart BMS NG: 500A or 100A BMS for Lithium NG batteries
 - Lynx Smart BMS: 500A BMS for Lithium Smart batteries
 - Lynx Shunt VE.Can: Battery monitor and housing for system fuse



SmartSolar MPPT

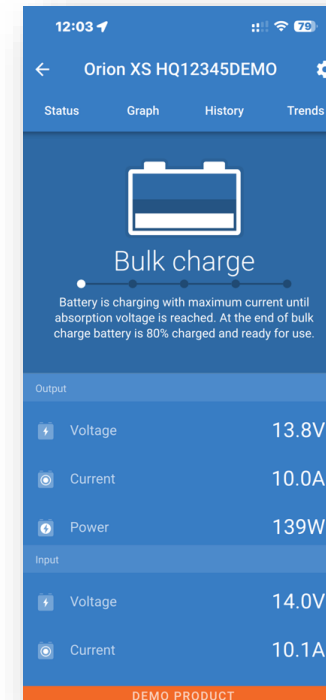
- Ultra fast Maximum Power Point Tracking (MPPT)
- Advanced detection during partial shading conditions
- Outstanding conversion efficiency 98% efficiency
- Automatically adjusts to battery voltage
- VE.Direct port for smaller models
- VE.CAN for larger models



Orin XS DC-DC Charging

- Uses engine power to charge the service battery
- High power in a compact, fan-less design
- Available in 12 V and 12/24 V mixed-voltage models
- Ideal for dual-battery systems
- Can also operate as a DC-DC converter for sensitive electronics
- VE.Direct port for monitoring and control
- Remote on/off terminal

12 V to 12 V	12 or 24V to 12 or 24V
50 A	1400 W
70 A	



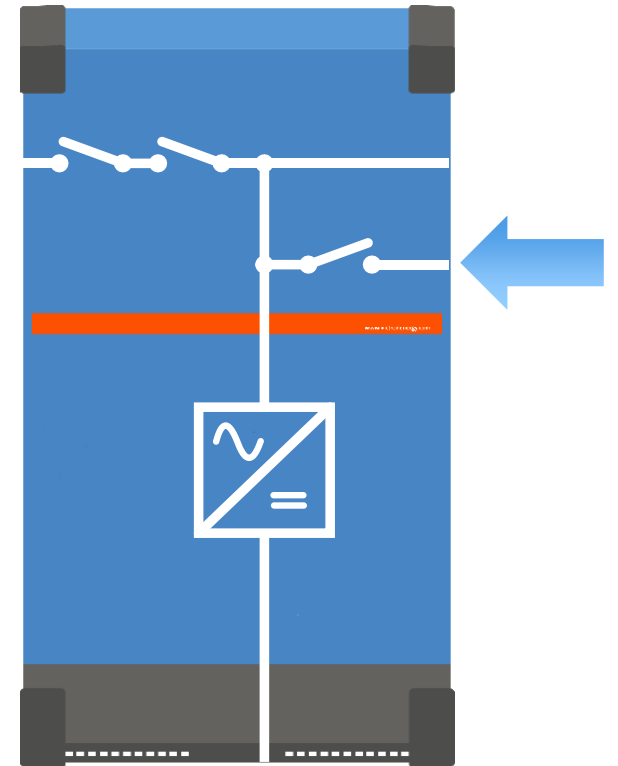
Inverter/Chargers

- Multi-functional
 - Powerful true sine wave inverter
 - Sophisticated adaptive battery charger
 - High-speed AC transfer switch
- Unique PowerControl and PowerAssist feature
- Uninterrupted AC power, UPS functionality
- Multiple units can operate in parallel and/or in 3-phase
- Fully computer configurable
- Intelligent and able to communicate with networks
- Available in 230Vac and limited models also in 110Vac



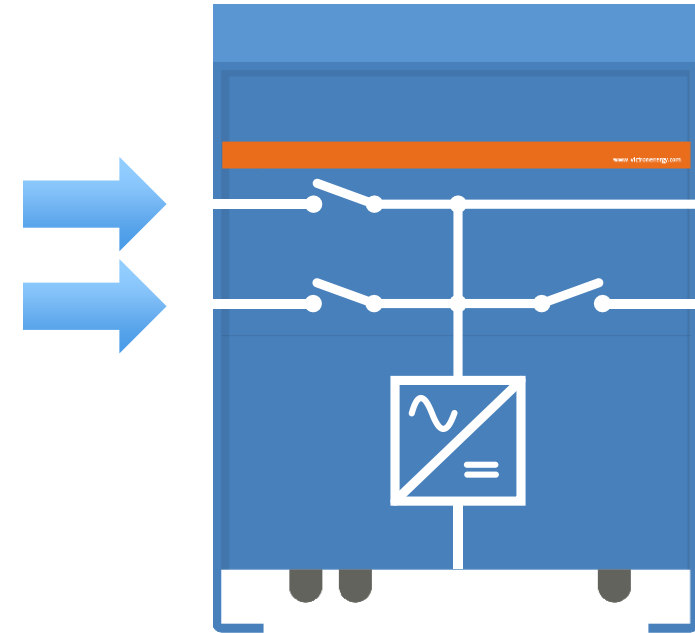
Auxiliary Output

- Most inverter chargers have a second output*, AC Out 2
- It becomes live when AC input is present
- Use it for loads that should not run from the battery, such as heaters or air conditioners
- Can be reprogrammed, for example, to power a dump load when batteries are full



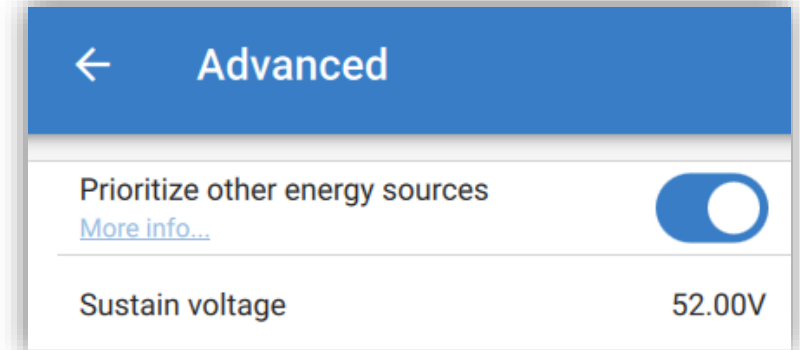
Quattro – 2x AC Inputs

- Two independent AC inputs: typically grid and generator
- Automatic priority: AC Input 1 has higher priority than AC Input 2
- Seamless switching between inputs based on availability
- Separate current limits for each input to prevent overload
- Supports PowerAssist on both inputs
- Ideal for systems needing both grid and generator integration



Wind & Solar priority

- Uses solar and wind energy first to charge the battery
- Shore power is only used to prevent deep discharge
- When enabled, the system enters Sustain mode for seven days
- If sun or wind is insufficient, a full charge to 100 percent will occur to protect battery health
- After seven days the system keeps the battery full and continues to prioritise solar for daytime DC loads such as pumps and alarms





Experience the power of Victron Energy monitoring





VRM – Remote monitoring



Controls:

Quattro
24/5000/120-
2x100 #276

Inverting

Shore current limit: 15 A

3 6 10 13 16 25 32 63

Charge to 100%

Shore power will be used to complete a full battery charge for one time. After the charge is complete, the system will return to normal operation, prioritizing renewable energy.

Charge battery to 100%

Mode

On ☐

Charger only ☐

Inverter only ☒

Off ☐

Venus OS^{v3.70}





Driven by Metstrade

**DAME
DESIGN
AWARDS**

**NOMINEE
2025**

Navigation & Communication

Driven by
Metstrade



GX Boat Page

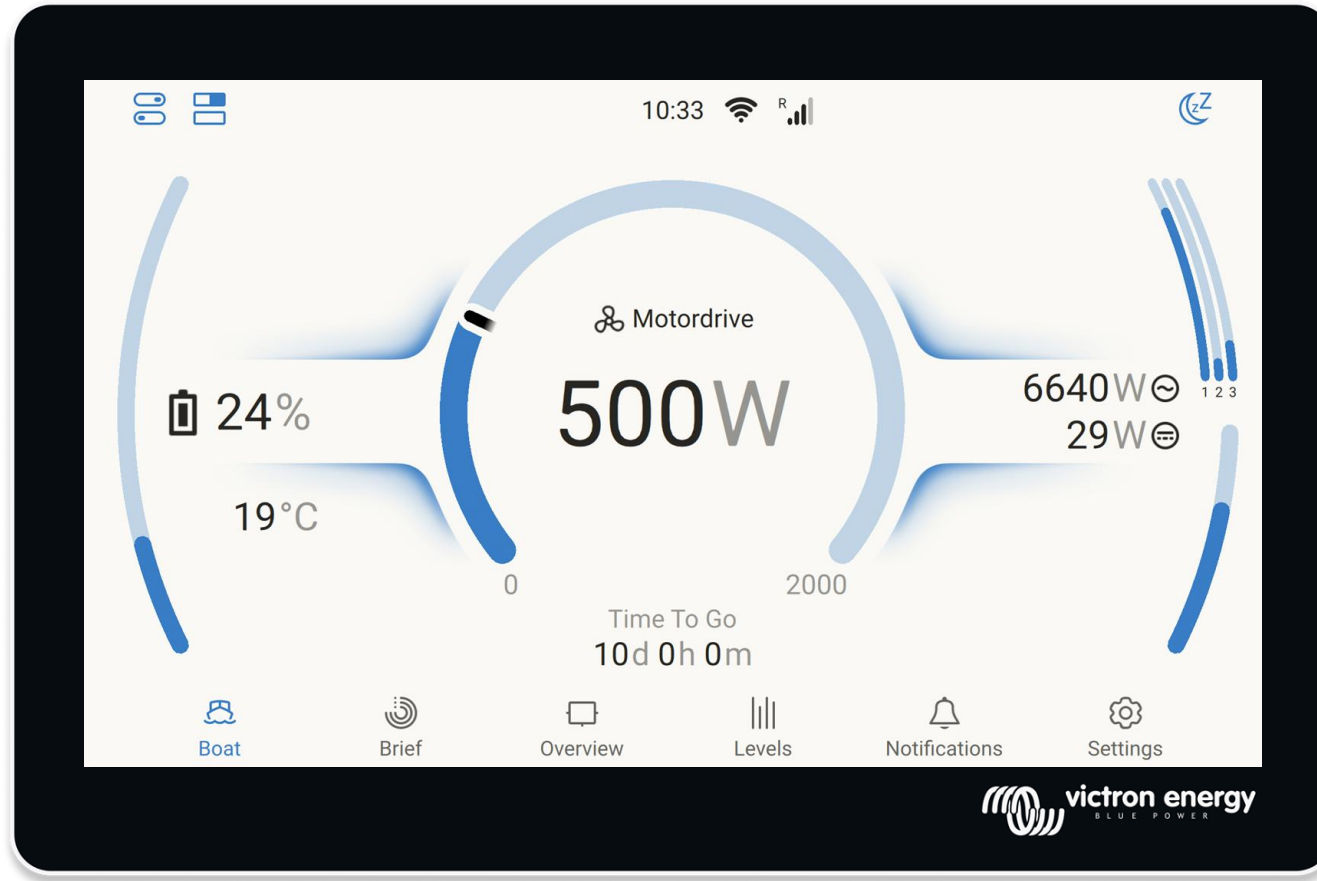
- Dedicated page for electric boats
- Electric propulsion monitoring
- Seamless GPS integration

Real time insights via:

- SmartShunt
- NMEA2000
- CANOpen

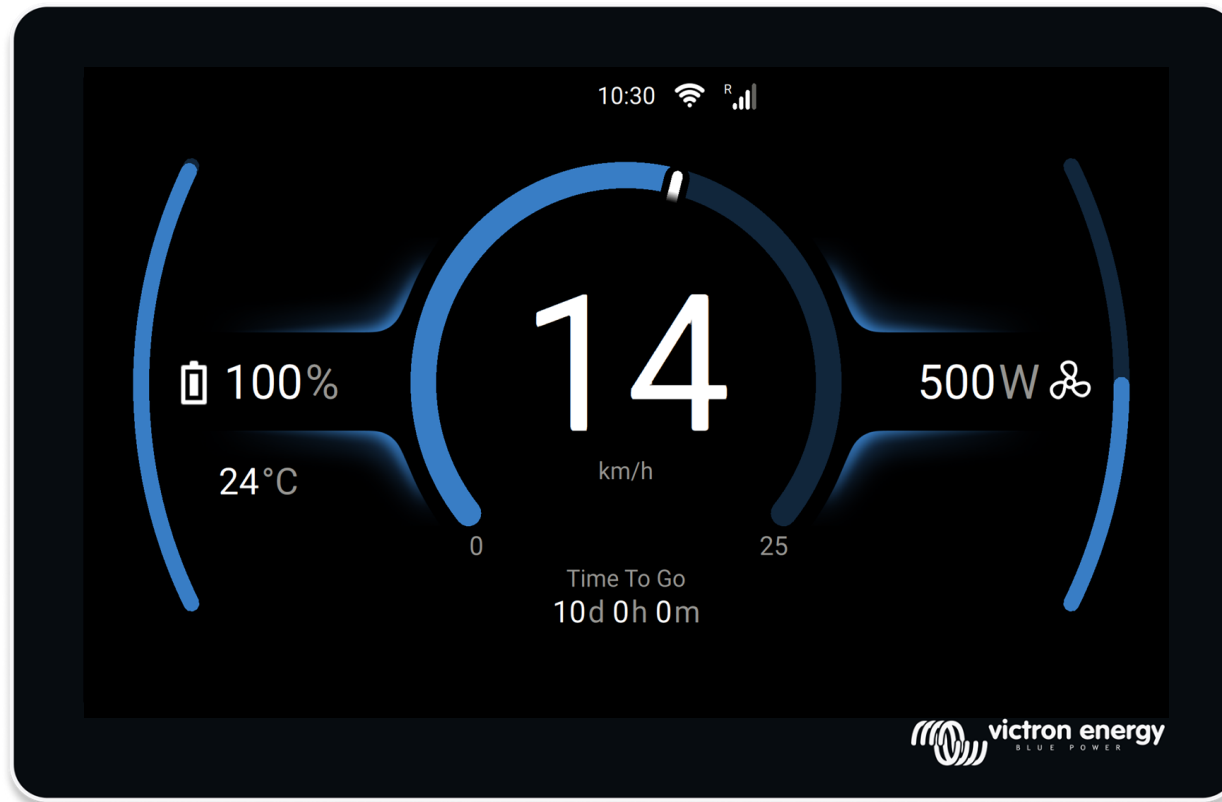


SmartShunt for electric propulsion metering



- Time to Go
- Battery SoC
- E-drive Power
- Total AC power
- Total DC power

SmartShunt with GPS



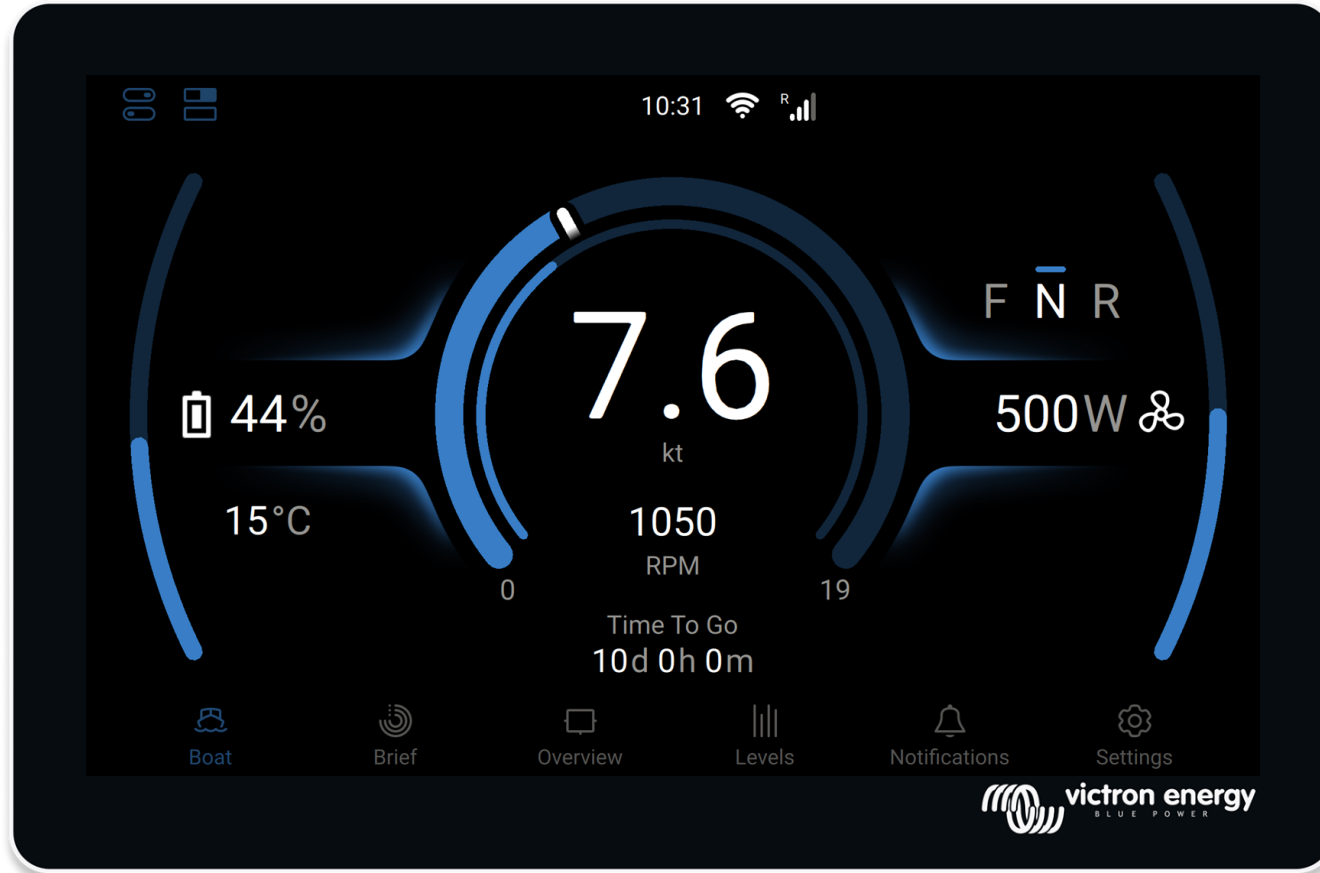
- Time to Go
- Battery SoC
- GPS Speed
- E-drive Power

NMEA2000 or CANOpen E-drive without GPS



- Time to Go
- Battery SoC
- E-drive Power
- E-drive RPM
- E-drive Direction
- Total AC power
- Total DC power

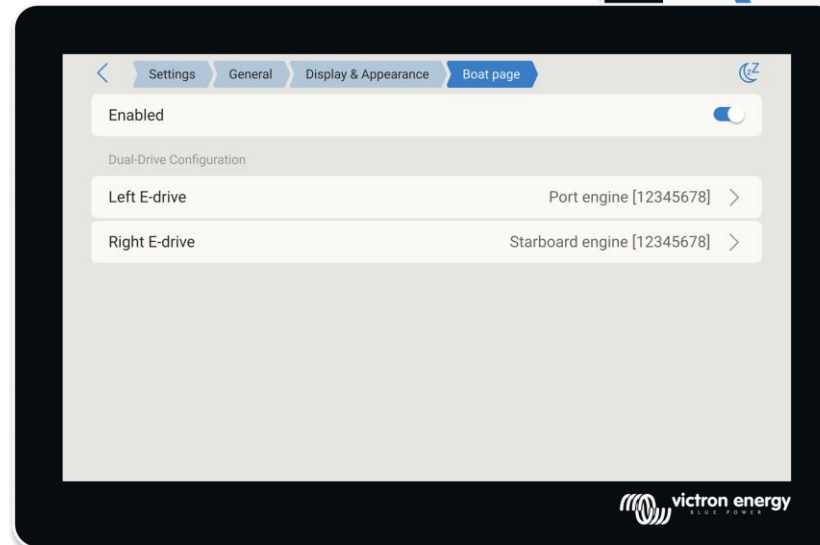
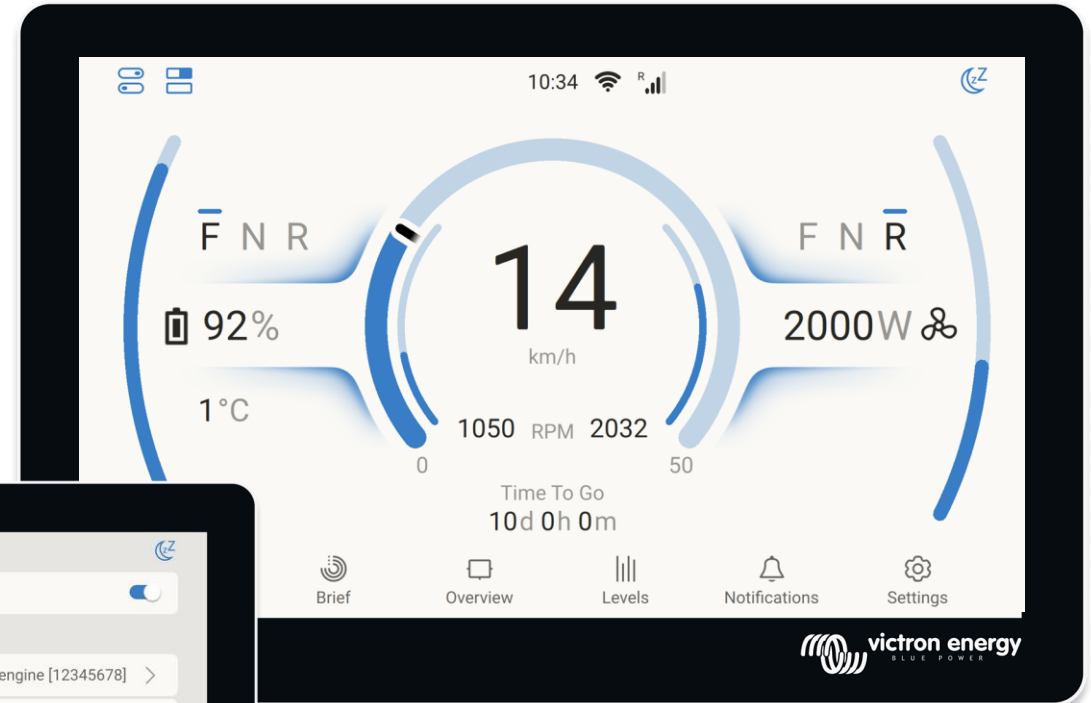
NMEA2000 or CANOpen E-drive with GPS



- Time to Go
- Battery SoC
- GPS Speed
- E-drive RPM
- E-drive Direction
- E-Drive power

Support for multihull / dual engine setups

- Configurable left & right E-drives
- Dual E-drive RPM
- Dual E-drive direction
- Aggregated dual E-drive power



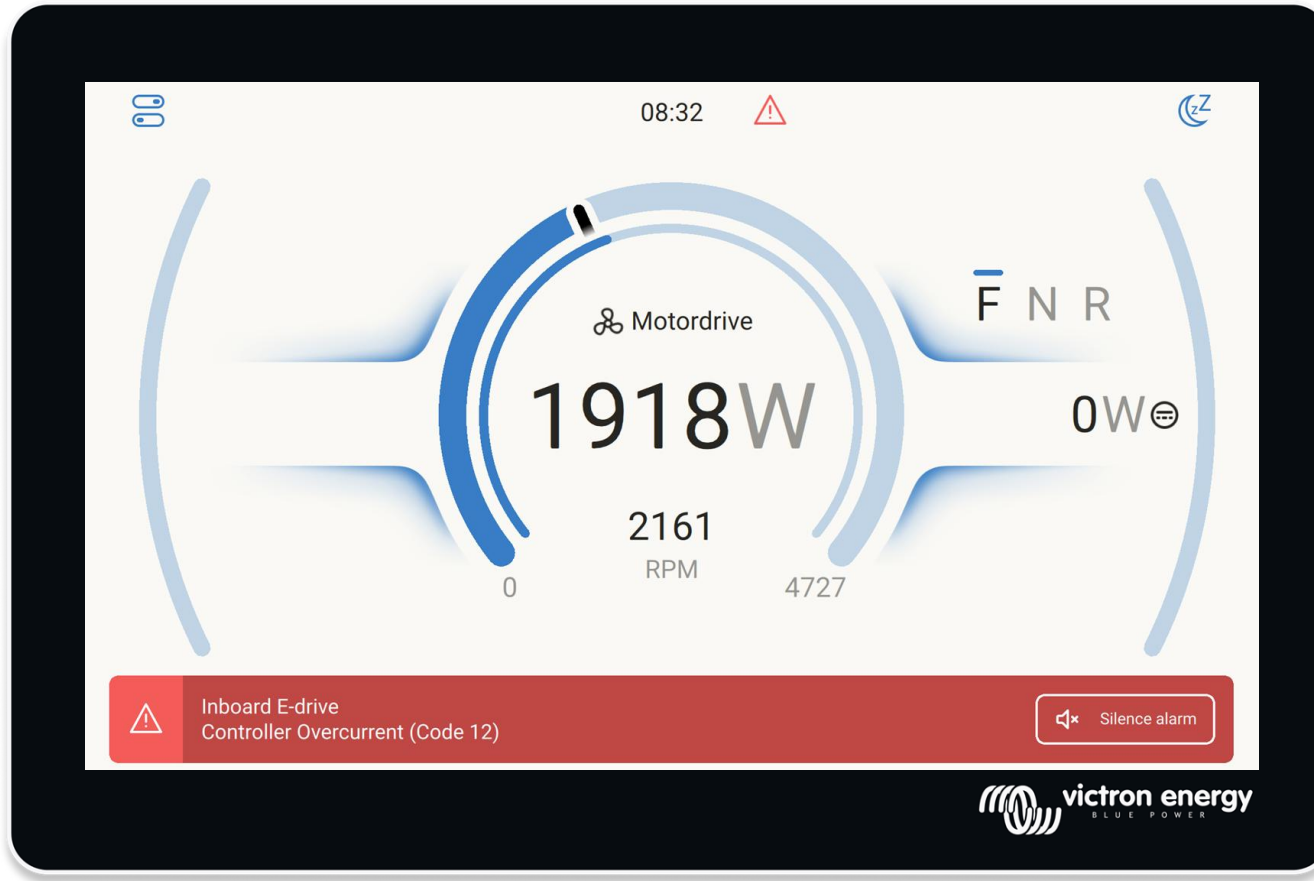


Regeneration



- Energy generation by the E-drive (charging battery or supplying loads) is displayed in green

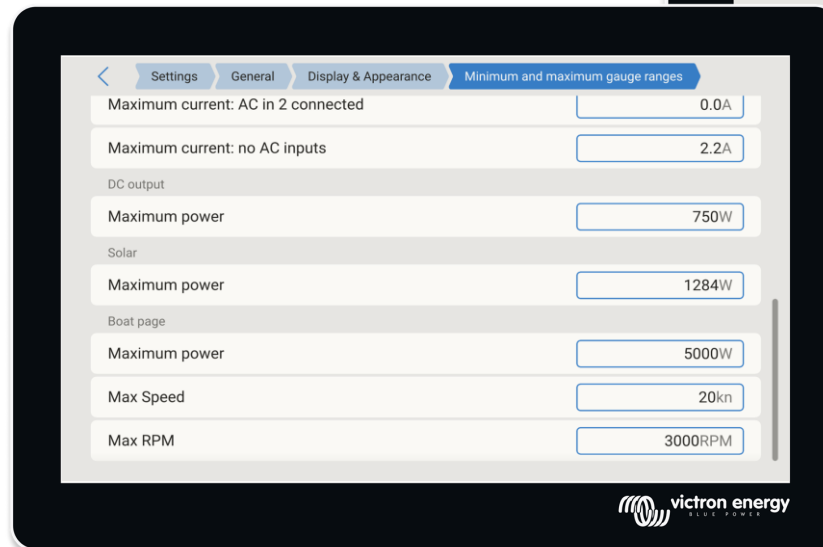
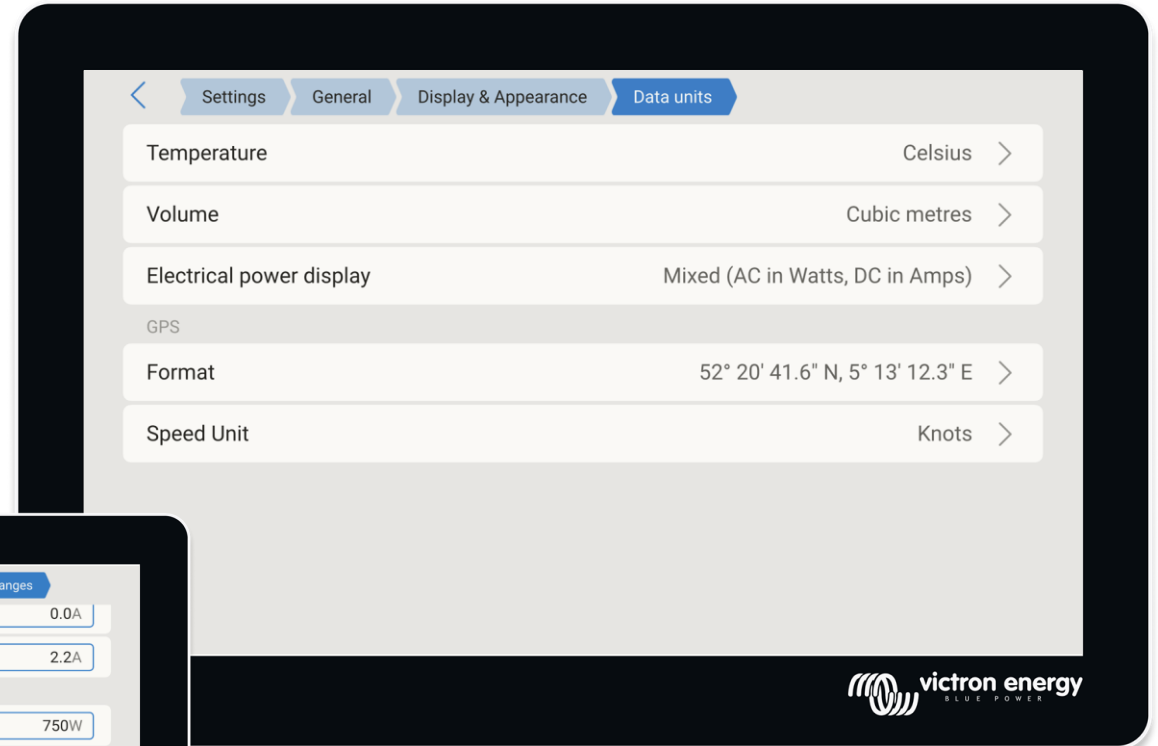
CANopen emergency messages



- Receive notifications for errors coming from our CANopen compatible systems and controllers

Configure preferred data units

- Configure your preferred data units:
 - **Watts, Amps or Mixed**
 - **km/h, mph or knots**
- Scaling of power, speed and RPM gauges gets configured automatically – or can be set manually if preferred

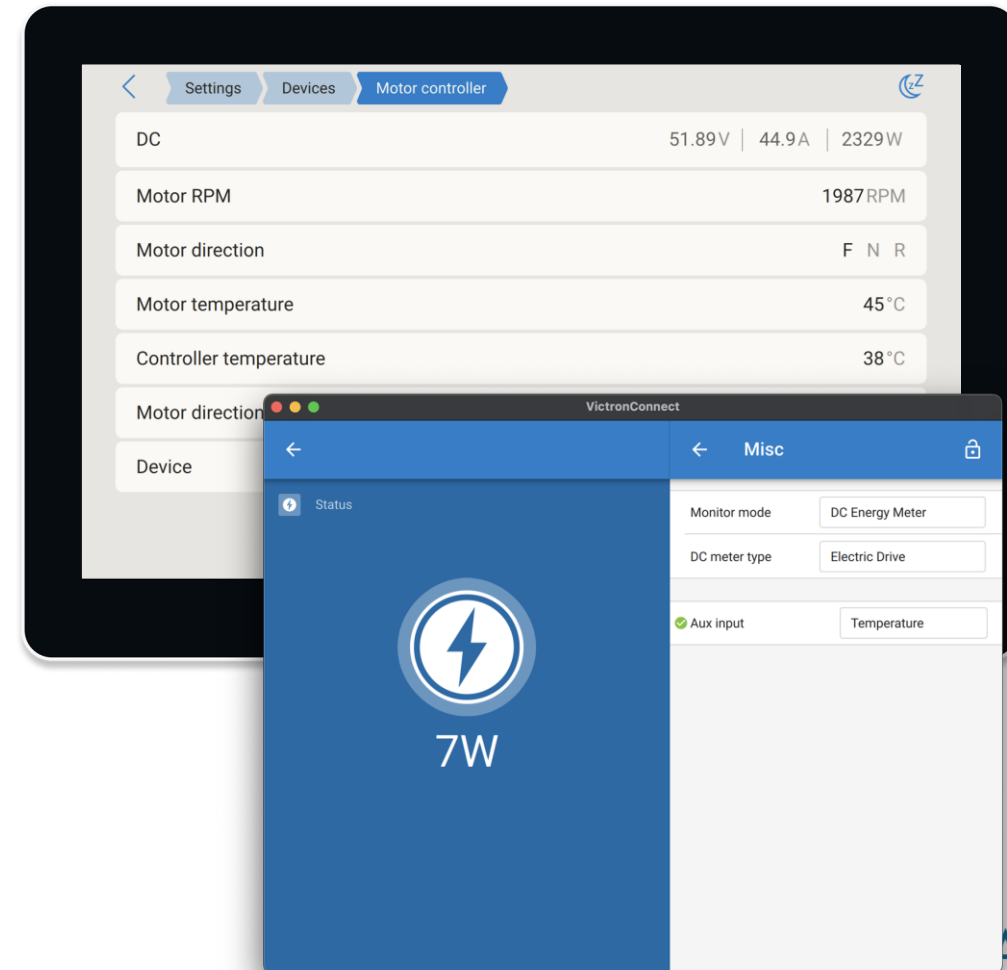




How to integrate

There are multiple ways:

- E-drive integration
 - Victron Energy **SmartShunt**, configured to *DC Energy Meter – Electric Drive*
 - **NMEA2000**-enabled E-drive systems
 - **CANOpen** integration
 - Custom **Node-RED** integration
- GPS
 - Victron Energy **GX GSM/LTE** with GPS antenna
 - GPS via **NMEA2000**
 - GPS mouse via **USB**
 - Custom **Node-RED** integration



NMEA2000: Compatible systems

Venus OS v3.70 adds compatibility with more brands

Oceanvolt

- Available for upcoming products

Combi

- Via their *Can 2 N2K converter*

FischerPanda

- Via *Fischer Panda Communication Interface Electric Drive - NMEA 2000*

WaterWorld

- Via *WaterWorld NMEA-Connect*

Vetus

- Via *Vetus CANverter*



CANopen: Compatible systems and controllers

Compatible E-drive systems:

- Oceanvolt
- Kräutler
- Törkmar
- Combi

Compatible motor controllers:

- Sevcon Gen4 AC
- Curtis F series
- Curtis 123X E/ES series

