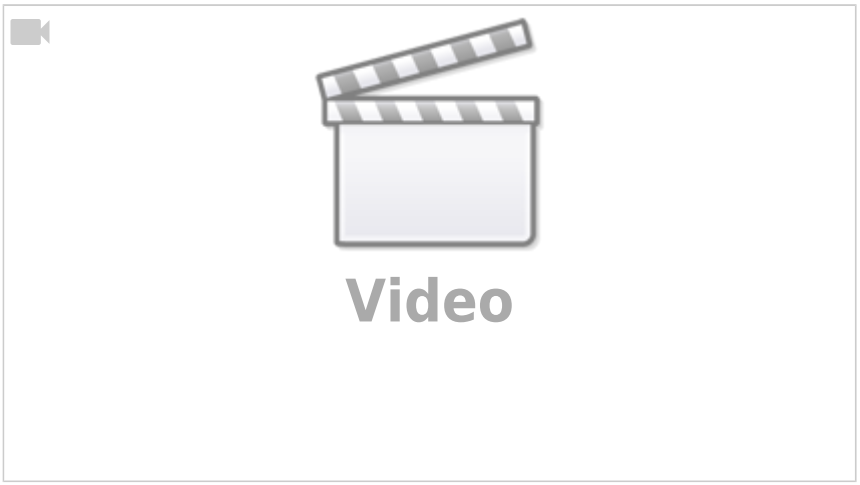
VE.Smart Networking

1. Introduction

A VE.Smart Network is a wireless network which allows a number of Victron products to exchange information. It is a wireless technology using Bluetooth Smart.

Use VE.Smart to add remote voltage, temperature and/or current sensing to your Victron MPPT Solar Chargers. Connect either a BMV battery monitor - or the new Smart Battery Sense, to a Solar Charger. The Solar Charger will receive the available information from the battery , like battery voltage and temperature (depending on the sensor) information, and use that data to optimize its charge parameters. This will improve charging-efficiency and prolong battery life.



Use also now the VE.Smart Networking to synchronise the charger algorithms from Solar Chargers and improve even further the charge-efficiency and battery life. This feature is only available on SmartSolars with firmware version equal or higher then v1.47 (Ve.Direct SmartSolars) and v1.04 (Ve.Can SmartSolars).

2. Voltage, temperature and current sense - further details

The battery voltage data is used to compensate for voltage-drop over the battery cables. This ensures that the battery is charged with the exact voltage as configured in the charger - instead of a lower voltage due to resistance in the wiring.

The battery temperature data is used to adjust the charge voltages. When cold, a lead/acid battery typically needs a higher charge-voltage …and a lower charge-voltage when it's hot.

For lithium batteries the charge-voltages remain the same at all temperatures, as long as it’s not *too* cold. Its better to not charge Ltihium batteries below 5C, to prevent them from being damaged and degraded.

The battery current is used to allow the tail current setting (see the Solar Charger Manual for more details) to be used more precisely as, by having the actual battery current, the Solar Charger can

decide better if absorption phase should stop and go to equalisation/float phase.

3. Specifications

3.1 VE.Smart Networking products compatibility

Product range	Compatible	Function
BMV-700	Yes (requires dongle accessory)⁽²⁾	Transmit voltage-sense and current-sense
BMV-702	Yes (requires dongle accessory)⁽²⁾	Transmit voltage-sense, current-sense, and (optionally) temperature ⁽¹⁾
BMV-712	Yes	Transmit voltage-sense, current-sense, and (optionally) temperature ⁽¹⁾
SmartSolar MPPTs	Yes ⁽²⁾	Uses received sense data to optimize charging and synchronise charging process ⁽³⁾
BlueSolar MPPTs	Yes (requires dongle accessory)⁽²⁾	Uses received sense data to optimize charging
Phoenix Smart IP43 Charger	No	Not yet supported, may be compatible in the future
Orion-Tr Smart DC-DC Charger Isolated	No	Not yet supported, may be compatible in the future
Blue Smart Chargers IP22, IP65 and IP67	No	Not yet supported, may be compatible in the future

1. To measure battery temperature, the BMV series temperature sensor is required.
2. Check the table below to see which models are incompatible with this feature.
3. Synchronised charging is available on the SmartSolar on version v1.47 or higher except for the models listed on the table below

First production batches of SmartSolar MPPTs do not support VE.Smart Networking

All currently shipping SmartSolar MPPTs support VE.Smart Networking. However some older versions of those models do **not** support VE.Smart Networking. Those devices will also not become compatible later with a firmware update: the incompatibility is due to a hardware limitation in those devices. There is a work around: connect a VE.Direct Bluetooth Smart dongle. This **enables** VE.Smart Networking support. Both Voltage and Temperature sense will work. In such scenario the internal Bluetooth interface of the SmartSolar should not be used anymore as communication errors may occur - instead the VE.Direct Bluetooth Smart dongle is to be used when connecting by phone or tablet. This is the list of the older *incompatible* products and part-numbers - together with the part numbers of their compatible successors:

Product	Old Incompatible Part-number	New Compatible Part-number
VE.Direct Bluetooth Smart dongle	ASS030536010	ASS030536011
SmartSolar MPPT 150/85 Tr	SCC010085210	SCC115085211

Product	Old Incompatible Part-number	New Compatible Part-number
SmartSolar MPPT 150/85 MC4	SCC010085310	SCC115085311
SmartSolar MPPT 150/100 Tr	SCC010100210	SCC115110211
SmartSolar MPPT 150/100 MC4	SCC010100310	SCC115110311
SmartSolar MPPT 250/85	SCC125085210 (before s/n HQ1811) SCC125085310 (before s/n HQ1811)	SCC125085210 (after s/n HQ1811) SCC125085310 (after s/n HQ1811)
SmartSolar MPPT 250/100	SCC125110210 (before s/n HQ1811) SCC125110310 (before s/n HQ1811)	SCC125110210 (after s/n HQ1811) SCC125110310 (after s/n HQ1811)

3.2 Limitations

- The maximum number of devices which can be connected on one network is 10.
- VE.Smart Networking is designed for small systems which do not have a GX device - such as a Color Control GX or Venus GX. In systems which have a GX device, do not use VE.Smart Networking - See FAQ 6.
- The transmitter range will be found to be the same as the Bluetooth range - as experienced when connecting a device to *VictronConnect*.
- VE.Smart Networking is not allowed to be created with the charger that already has a CAN network that is also being used to synchronise the charger algorithm with other chargers or if an ESS or an intelligent battery is used on the CAN network or Ve.Direct. Error 68 will be shown when the network is misconfigured. Please see the MPPT error list to find more information about troubleshooting.
- When the same sense information is shared by more than one source on the VE.Smart Networking (e.g. battery temperature being shared by a BMV and a Smart Battery Sense), a priority mechanism is used to decide which one should be used by the charger. The priority mechanism is first based on the type of sensor (e.g. BMV has higher priority than the Smart Battery Sense), and second based on the serial number of the sensor. At the end, only one information will be used by the charger, so having multiple sensors connected to different batteries is not supported and can lead to charging issues as overcharging or heating up the batteries. Always make sure to have your sensors/chargers on the VE.Smart Networking connected to the same battery.

4. Step by step instructions

We recommend you configure the Smart Battery Sense, or BMV first …and *then* add one or more solar chargers to that network. You can read the Smart Battery Sense manual here.

4.1 Setup the Smart Battery Sense or BMV

Open VictronConnect, connect the device, and then navigate to *Settings* and select *VE.Smart Networking*.

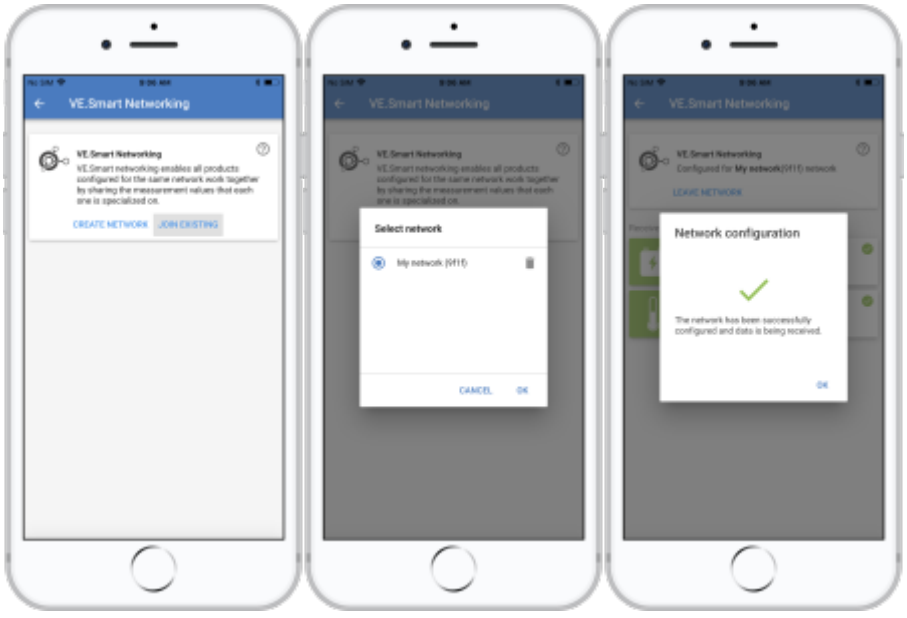
Click *Create Network*, enter a name. Click *Save* and wait for the 'OK' to show up.



4.2 Join the Solar Chargers to the network

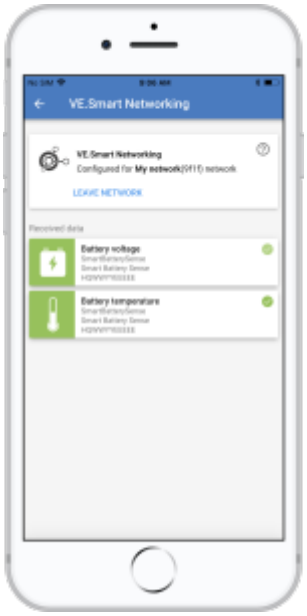
Go back and navigate to the *Solar charger*, then click *Settings* followed by *VE.Smart Networking* followed by *Join Existing*. Now select the network which you created at the previous step.

Wait for the 'OK' to show.



4.3 Verify operation

When everything is working OK, you will be able to see that the VE.Smart Networking page of the Solar Charger is receiving data:



Also the network icon will be shown on the main page:



Clicking on that icon will show the network status.

5. FAQ

Q1: Can several MPPTs be paired to one Smart Battery Sense or BMV?

Yes. If SmartSolars are connected to the same network, they will also synchronize their charger algorithms.

Q2: Is VE.Smart Networking disrupted if I connect a smartphone to it at the same time?

Not at all. It is possible to connect with a smart phone, computer or tablet, at the same time.

Q3: Will you add the same functionality to the BlueSmart Charger product range?

Yes we will - though the exact functionality, and the models to be included has yet to be determined.

Q4: Can Smart Battery Sense be used as a standalone product?

Yes. In this instance it will simply act as a voltage- and temperature-measuring device. Note that the functionality is limited in that it does not (yet) show the graphs or other data which would normally be generated from these measurements.

Q5: Can I use Smart Battery Sense in systems already controlled by a GX device (eg CCGX/VenusGX)?

No. The GX device already has voltage sensing (soon they will have temperature sensing too). Adding Smart Battery Sense to the installation will confuse the voltage-sensing data. For further information please see: CCGX/Distributed Voltage and Current Control.

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