Multi RS, Inverter RS and MPPT RS firmware changelog

Products:

Model	Part number	Product id
Inverter RS 48/6000 230V Smart Solar	PIN482601000	0xA401
Inverter RS 48/6000 230V Smart	PIN482600000	0xA402
SmartSolar MPPT RS 450/100-Tr	SCC145110410	0xA110
SmartSolar MPPT RS 450/200-Tr	SCC145120410	0xA111
Multi RS Solar 48/6000/100-450/80 (single tracker)	PMR482602000	0xA442
Multi RS Solar 48/6000/100-450/100 (dual tracker)	PMR482602020	0xA443

The units have a VE.Can port, VE.Direct port and an integrated Bluetooth dongle.

How to update?
These products can be updated in three ways:

1. Using our VictronConnect app, via Bluetooth.
2. Using our VictronConnect app with a serial connection. Requires a VE.Direct to USB interface cable.
3. Update remotely over the internet via our VRM Portal. Requires a GX-device, such as a Color Control GX or a Venus GX to be part of the installation.

The VictronConnect app is available for phones, tablets and Windows and macOS laptops. Documentation & download.

Documentation for remote updates via VRM is here.

What firmware version do I currently have?
There are several ways to see the firmware version:

- The LCD display: the firmware version is shown during start-up (3rd line on the right).
- Look with the VictronConnect app.
- Look on your GX Device.
- Look at the System-overview page on the VRM Portal.

How to configure?
Use the VictronConnect app.

Change log:

v1.15 – 6 November 2023

Changes applying to all RS models with a built-in MPPT:

- Update fan and dimming temperature profiles, enable the fan earlier for the MPPT circuit.

v1.14 – 2 November 2023

This release is cancelled.

v1.13 – 18 July 2023

This release is made only for the Multi RS models.

Changes applying to Multi RS only:

- Add support for 3-phase grid connection.
  Note that we currently only support a set of 3 Multi RS units that connect to a 3-phase outlet. Adding additional Multi RS or Inverter RS units in parallel is not supported.
  All three phases must be powered before a connection is made.

Known issues:

- The 'UPS function' is too sensitive in 3 phase operation compared to stand-alone operation. Please disable the 'UPS function' in case the Multi disconnects from the AC input.
- Charge currents are not yet balanced across the 3-phases when the charger is in voltage-controlled mode.

v1.12 – 25 May 2023

This release is made only for the Multi RS and Inverter RS models.

Changes applying to Inverter RS only:

- Add support for AC output parallel and 3-phase operation.

Changes applying to Inverter RS and Multi RS only:

- Fix false-positive over-charge protection (error #29).
- Fix false-positive PV riso protection (errors #41 and #42).
- Remember the operating mode (on/off/inverter only) during a firmware update. Instead of always switching On after a firmware update.
- Fix PV panel power/current readout in case the MPPT converter is off, there can still be current present if the panel voltage is too high.

Changes applying to Multi RS only:
- Add pass-through mode, this closes the AC input relay while the inverter/charger remains off, the MPPT charger remains active. Settable in VictronConnect.
- Add 'External control' support, this allows for self implementation of a control loop by controlling the AC power set-point dynamically.
- Improve inverter PLL to prevent frequency jumps when the AC input is connected or disconnected, this could trigger a PV inverter disconnect.
- Ignore conditional AC disconnect in sustain mode and inverter shutdown due to allow-to-discharge signal.

Changes applying to Multi RS dual-MPPT (PMR482602020) only:
- Fix relay test sequence.
- Remove PE-Neutral monitoring.

Known issues:
- Like all other settings, the Inverter Output voltage setting needs to be synchronized manually to all devices in a parallel/3-phase setup. Changing the setting on the fly seems to have the desired effect, but it is not saved on all devices, so after a restart the voltage might revert back to the old value.

v1.11 – 14 December 2022

Changes applying to all RS products (Inverter RS, Multi RS and MPPT RS):
- Report warnings and alarms on the internal display.
- Remove upper limit from the battery tail current setting. When pairing multiple chargers together this setting can be larger than the units' own maximum current value.

Changes applying to Inverter RS and Multi RS only:
- Improve PV isolation measurement and PV residual current detection test sequence to avoid false positive detections.
- PV residual current sensor self-test failure now reports as error code #202.
- It is now possible to switch off the backlight of the internal display using the latest VictronConnect app.
- Fix low SOC alarm, no longer using the discharge floor and internal non-editable 90% level to generate the alarm. The low SOC alarm only uses the low SOC shutdown settings.
- Fix low battery voltage alarm when powering up the unit by connecting the battery.
- Report the inverter power as Watts instead of VA and add inverter current on the built-in display.

Changes applying to Multi RS only:
- Add support for generators:
    - The inverter has an increased tolerance for irregularities on the ac input like fast frequency changes or voltage changes. For robust generator control enable 'moderate generator load changes' and switch off the 'UPS function'.
    - Add 'moderate generator load changes' setting, enabling this lets the inverter absorb sudden load changes and slowly transfer them to the generator. This prevents speed variations in the generator.
- Add 'UPS function', this realizes a faster transfer to inverter mode when the mains stops. This function is enabled by default.
- Reduce charge current at higher battery voltages and/or lower AC input voltages. At 230V, the maximum charge current at 57.6V is now approximately 88A unless derated due to ambient/internal temperature. The maximum achievable charge current was higher, approximately 95A under the same conditions.
- Update Battery Life state if the minimum discharge soc setting is lowered externally during operation.
- Fix low SOC shutdown behavior, it did not take the AC input into account.
- Add conditional AC input disconnect feature.
- Clear PE-Neutral error condition when disconnecting from the grid, this allows for easy mains plug reversal to fix this issue.
- BMS discharge current limit 0 shuts down the unit when it operates in inverter (island) mode, any other value resumes normal operation.
- Setting the on/off mode to 'Inverter only' now disconnects from the grid, in line with the VE.Bus Inverter/chargers.
- Change behavior of the battery state 'sustain' (=battery discharged). In ESS mode 'optimized' the unit switches to trickle charge mode where previously it would charge the battery at full power from the grid.
- Improve mains plug disconnect detection reliability for systems that are not allowed to feed energy to the grid. This is realized by always drawing a small current from the grid, so we can reliably detect grid absence.
- Improve remove on/off pass-through when using the SmallBMS. Before the system would also flag that the battery is discharged.

v1.10 – 7 July 2022

Changes applying to all RS products (Inverter RS, Multi RS and MPPT RS):
- Reset all protections when using the power switch, remote off input or device mode off command so the device can be restarted remotely.
- Repeated absorption interval parameter can now be set to 0 to disable this functionality as required by some batteries.
- Allow fan operation during and immediately after firmware updates, to prevent a temperature warning/alarm when updating a unit that is running hot.
- Add under-voltage lockout on the DC bus voltage so the internal supply keeps working under all conditions.

Changes applying to Inverter RS and Multi RS only:
- Shutdown the inverter when the connection to the BMS is lost after 3 minutes.
- Improve AC coupled PV inverter control mechanism in combination with managed batteries.
- All inverter AC voltages report RMS values.
- Improve inverter protection reporting if the cause is an empty battery.
- Increase detection time for error #201, switching on a huge load could cause a false positive trigger.

- Improve inverter dynamic cut-off behavior by using the actual battery current when available from a BMS or BMV.
- Fix device sleep/wakeup behavior when dynamic cut-off is enabled or when using the low SOC shutdown function.

Changes applying to Multi RS only:
- Fix charge sequence, charging from the AC input is not possible if the AC input cannot be used e.g. due to an AUX input rule.
- Fix repeated absorption interval behavior in ESS mode, it tries to charge from solar power first, if this is not successful it will charge from the grid after a day.
- Speed-up AC input relay open sequence by switching off both poles of the contactor coil at the same time.
- Add bulk protection mechanism when charging from the grid.
- Fix ESS control flag "DisableCharge".
- Fix inverter protections: an active inverter alarm caused the unit to shut-down.
- Fix AC incoming solar power on the display when connected to the grid.

Bluetooth interface:
- Add support for live data advertisement, use VictronConnect v5.70beta5 or newer. Keep in mind that this functionality needs to be enabled explicitly.

NMEA2000/VE.CAN:
- Update PGN 126464 Received and transmit group function content.

v1.09 – 28 March 2022

Changes applying to all RS products (Inverter RS, Multi RS and MPPT RS):
- New derating function: the maximum output current is reduced on a linear basis from full current at 60V to 5A at 62V. Note that this relates to the output voltage at the battery terminals, and not to the voltage the battery itself, measured with voltage sense.
- The maximum configurable charge voltage will be reduced from 62V to 60V. The actual charge voltage can be higher, due to temperature compensation as well as voltage drop over the cables in combination with Voltage sense. The reason to reduce the maximum configurable charge voltage is that specifying it at 62V is misleading, in combination with the derating. The equalization voltage upper limit is still 62V.
- Fix user relay battery low/high voltage settings range for VictronConnect.
- Make over-charge protection error #29 less trigger happy when using external voltage control.

Changes applying to Inverter RS and Multi RS only:
- Suppress frequency information when there is no voltage present, on the GX device you could still see 50Hz or 60Hz while the AC voltage was absent.
- Battery over-current error #18 now reports as an overload alarm condition.

Changes applying to Multi RS only:
- Prevent battery current overload at low battery voltage when the inverter load jumps.
- Fix Grid disconnect log: conditions causing the inverter to switch off are now also logged.
- Increase PE-N voltage limit to 42V when using the AC input, the PE-N voltage limit for the internal relay remains at 8V. The higher PE-N voltage limit is also used during the relay test sequence. The 42V limit is chosen as this voltage is still considered to be safe to touch.
- Various fixes in ESS modes that are still in beta test stage.

NMEA2000/VE.CAN:
- Fix writing/changing the installation description using Unicode characters (PGN 126998).
- Fix query acknowledge response code on a write-only register.

v1.08 – 31 January 2022

Changes applying to all RS products (Inverter RS, Multi RS and MPPT RS):
- Fix false-positive error #201 the detection levels were too strict and could be triggered falsely during MPPT start-up in the morning and MPPT shutdown in the evening.
- Fix false-positive error #35 in the MPPT when the irradiance jumps to a higher level (on a partly cloudy day).
- Fix false-positive error #27 in the battery short circuit detection.
- Change fan high temperature set-point from 65°C to 57°C.
- Fix battery state reporting as "external control" in case DVCC current limiting is active.
- Make it easier to retry a failed update attempt. VictronConnect will now automatically prompt to update the unit in case the previous attempt got interrupted.

Changes applying to Inverter RS and Multi RS only:
- Fix remote discharge current limit behavior in inverter mode.

Changes applying to Multi RS only:
- Fix start-up from the ac input without battery (e.g. manually disconnected or contactor open), the system can now handle voltage shapes with a flat top.
- The inverter power stage switches off when it is not needed, this saves energy and produces less harmonics at zero load.
- AC input current control is done using the effective power. especially when the target value is zero this ensures the device doesn't supply a small current into the grid or charge a small current into the battery when it shouldn't.

NMEA2000/VE.CAN:
- Fix remote discharge current limit scale (0.1A).

v1.07 – 17 January 2022

This release is made only for the Multi RS. The release of this version for the MPPT RS, and Inverter RS, will follow after more (field-)testing.

Bugfixes applying to all RS products (Inverter RS, Multi RS and MPPT RS):
- Fix false-positive error #35 in the MPPT when the irradiance jumps to a higher level (cloudy day)
- Fix battery over-current protection, this reported also as error #35 now it reports as error #18.
- Fix auto zero calibration of the panel current measurement, in very rare conditions an offset was present on the panel current measurement resulting in a wrong power indication.
- Fix false-positive error #201 detection on (sustained) low battery voltages: battery is connected, but voltage below 40VDC. This was seen on a FzSonick Salt battery. It is unlikely for this bug to affect systems featuring lead or lithium batteries, unless deeply discharged.

Bugfixes applying to Inverter RS and Multi RS only:
- Fix continuous device wake-ups in case the allow-to-discharge BMS input is inactive.
- Add off reason indication when the inverter shuts down due to BMS signals.
- Change fan high temperature set-point from 65°C to 57°C this results in more power headroom for the inverter, useful in conditions where both the Inverter and MPPT are active at the same time.

Bugfixes applying to Multi RS only:
- Fix BMS missing condition when charging from the grid.
- Fix charger-only mode.
- Improve ac input disconnect detection.
- Give priority to MPPT power in 'keep batteries charged' mode.
- Replace the battery presence detection with a simpler mechanism that prevents fast cycling between RECHARGE and SELF-CONSUMPTION when the battery is disconnected.
- Various fixes when starting / updating the unit while connected to the ac input.

NMEA2000/VE.CAN:
- Update ac connection instance numbers: ac output = 0, ac input = 1 (Multi RS only).
- Add support for MG Energy Systems devices, relevant for systems without a GX device.
- Clear configuration error issue in case the device instance is modified.

v1.06 – 9 November 2021
First release for the Multi RS

v1.05 – 12 August 2021

Features:
- Add TEXT protocol on the ve.direct interface (Inverter RS).

Bugfixes:
- Add internal DC voltage measurement safeguard. In case the measurement is not ok the unit stops working, showing error code 201. This prevents over-charging a battery or damage to the internal circuitry.
- Fix MPPT start-up sequence: bench testing the MPPT using a power supply could damage the internal circuitry (using firmware v1.04).
- Fix 30-day MPPT history readout.
- Fix bug when disabling temperature compensation. It was not fully disabled when battery temperature was above 50°C.
- Fix bug for DVCC's limit charge current when having only one charger connected on the VE.CAN bus.
- Improve control loop stability of the built-in MPPT.
- Fix internal charger group id (PIN482600000 Inverter RS without built-in MPPT).

v1.04 – 10 June 2021

Features:
- Further increase operational temperature range so the unit can be used up to 65°C ambient temperature.
- Derate the MPPT charge power if needed to keep the inverter operational at higher temperatures (Inverter RS).
- Add support for discharge current and voltage limit to remotely switch off the inverter, this enables future integration with managed batteries using a Venus GX device (Inverter RS).
- Panel isolation / residual current detection issues only stops the inverter, the inverter restarts automatically once these issues are resolved.
- Add internal energy counters for data logging to our VRM site (Inverter RS).
- Change/Reset the pin code for the Bluetooth connection is now supported over a wired connection.

Bugfixes:
- Fix error 35 (over-power): Speed-up MPPT voltage control to avoid a battery voltage overshoot in case the battery is disconnected during charging or PV power jump while the unit is charging.
- Fix error 27 (short circuit): Improve start-up at low battery voltages, e.g. when a contactor connects the battery.
- Fix start-up on shorted battery terminals to make the unit short-circuit proof.
- Fix internal supply start-up (applies to Inverter RS units produced before 2020 week 30).
- Fix error 14 (battery temperature low) and error 120 (voltage reference) when disconnecting the battery.
- Make the over-voltage protection less trigger happy, also do not report error 53 (inverter internal dc voltage too low) if this protection is activated.
- Residual panel current detection implementation updated according NEN-IEC 62109-2:2011, the previous implementation was stricter than required.
- Fix user relay setting on the MPPT RS models.
- Fix 30-day history on systems that only use an external AC coupled PV inverter.
- BMS missing condition uses a voltage set-point based on the battery settings (float/storage).

- Disable internal state-of-charge mechanism in case it is managed externally.
- Disable voltage alarms on the GX Device (MPPT RS)

Known issues:
- Bench testing the MPPT using a power supply is not recommended, fixed in firmware v1.05.

v1.03 – 7 December 2020

Features:
- Add option in VictronConnect to set the battery state-of-charge to 100% (Inverter RS).
- Show a warning (#14) on the display if a LiFePO4 battery is not charged due to low temperature.
- Show a hint on the display why the unit does not start (no PV power, remote input off, etc.).
- Turn off the display backlight if there is no PV power (MPPT RS), this behavior can be changed in VictronConnect.
- Add PV isolation resistance measurement, shut down below 100kΩ (MPPT RS).
- Update operational temperature range so the unit can be used up to 60°C ambient temperature.

Bugfixes:
- Improve firmware update mechanism.
- Fix issue that caused a loop "Fetching data..." and "Reconnect" when connecting to a unit using Bluetooth.
- Fix battery low/high warnings during standby/off.
- Fix battery current readout during standby.
- Fix history data: the previous firmware can lose data when restarting/updating firmware.
- Clear history data no longer resets the battery state-of-charge.
- Improve internal power distribution over multiple trackers (MPPT RS).
- Clear manual equalization active when a re-bulk event occurs.
- Low battery/overload conditions are no longer reported as errors as these are normal operating conditions.
- Shutdown communication interfaces when the power switch is in the off position.

NMEA2000/VE.CAN:
- Remove J1939 utility messages (Inverter RS).
- Fix invalid PV panel current value in PGN 127751 at start-up.

Known issues:
- Changing the pin code for the Bluetooth connection is not yet supported over a wired connection, added in firmware v1.04.

v1.02 – 24 August 2020

Features:
- Add support for synchronized charging / remote control by Venus GX (MPPT charger).

Bugfixes:
- Improve firmware update mechanism.
- Fix low-power standby behavior (low battery condition).
- Fix Inverter consumed energy in the daily history data log (was too high by a factor of 2).
- Improve internal ground relay monitoring.
- Fix battery current in standby mode (reported current was too high).
- Cosmetic changes to the content of the built-in LCD display.
- Fix battery state-of-charge jumping to 0% if the smallBMS remote input was set to off.
- Improve battery state-of-charge calculation (did not work properly at high current).
- Add limits to the Inverter low battery shutdown and restart settings.

NMEA2000/VE.CAN:
- Fix VE.CAN 11-bit message handling.
- Fix NMEA2000 PGN 127744 AC RMS Current field.

v1.01 – This version is skipped

v1.00 – 20 March 2020
First approved version for mass production.