

G5.Firmware Package Release Notes

Date	Purpose of Revision	Author
01.07.2021	Document creation	MM
18.08.2021	V1.3.1.22	MM
25.10.2021	Bugfix release to V1.3.1.22	MM
18.11.2021	V1.4.1.19	MM
17.02.2022	V1.5.1.14	MM
23.02.2022	V1.5.2.1	MM
05.05.2022	V1.6.1.16	MM
19.05.2022	V1.6.2.1	MM
25.11.2022	V1.7.1.10	MM
15.02.2023	V1.8.0.20	MM
03.05.2023	V1.8.1.6	MM
09.06.2023	V1.9.0.18	MM
08.09.2023	V1.10.0.35 (Package Id 2.588.007.927)	MM
12.09.2023	Bugfix release to V1.10.0.35 (Package Id 3.871.989.572)	MM
29.11.2023	V1.11.0.31 (Package Id 2.249.155.484)	MM
12.12.2023	V1.11.0.31: added info about two more solved bugs (AC phase loss detect; error on repeated voltage-on/off commands)	MM
03.05.2024	V1.12.0.46 (Package Id 2.153.810.537)	MM
08.07.2024	V1.12.1.2 (Package Id 3.724.793.514)	MM
11.09.2024	V1.13.0.59 (Package Id 2.861.56.657)	MM
09.12.2024	V1.13.0.59 (Package Id 2.611.755.448)	MM
24.01.2025	V1.14.0.37 (Package Id 2.695.610.786)	MM
29.08.2025	V1.15.0.42 (Package Id 0.057.602.154)	MM
15.01.2026	V1.15.1.7 (Package Id 1.738.645.702)	MM

Content

General Information	3
Details of Fault Categories	3
Released Versions	4
V1.15.1.7 (Package Id 1.738.645.702)	4
V1.15.0.42 (Package Id 0.057.602.154)	4
V1.14.0.37 (Package Id 2.695.610.786)	5
V1.13.0.59 (*) (Package 2.611.755.448)	5
V1.13.0.59 (Package Id 2.861.56.657)	5
V1.12.1.2 (Package Id 3.724.793.514)	7
V1.12.0.46 (Package Id 2.153.810.537)	7
V1.11.0.31 (Package Id 2.249.155.484)	8
V1.10.0.35 (Package Id 3.871.989.572) (*)	9
V1.10.0.35 (Package Id 2.588.007.927)	9
V1.9.0.18	10
V1.8.1.6	11
V1.8.0.20	11
V1.7.1.10	12
V1.6.2.1	13
V1.6.1.16	13

V1.5.2.1	14
V1.5.1.14	14
V1.4.1.19	15
V1.3.1.22 (*)	16
V1.3.1.22	16
V1.2.23.3	17
V1.1.2.3	17
V1.1.2.0	18
V1.0.35.0 (*)	19
V1.0.35.0	19
V1.0.31.0 (*)	19
V1.0.31.0	20
V1.0.20.0	20
V1.0.15.0	20
V1.0.0.0	20
Known Issues	21

General Information

The G5.Firmware Package contains all firmware needed to operate a G5 power supply.

To install a firmware package use the Windows software G5.Control.

To verify if a specific firmware package is installed on a device compare the installed package id with the package id of the update file. This can be done on the G5.Control firmware update dialog.

The package id is calculated from all firmware versions belonging to the package, so it is also valid if some parts of the firmware have been updated without using the G5.Control whole system update.

The package id is not an ascending number (newer releases can have a lower number and vice versa).

The firmware version referred in this document is the main firmware version of the package. In contrast to the package id this version will always increase in ascending order, so it is easier to find a specific firmware version than to search for a specific package id.

If the package id of the installed firmware and the package id mentioned in this document are equal one can be sure that the installed firmware is the same as delivered with the official firmware package.

Please note that the firmware package does **not** contain:

- Firmware for the G5.HMI (human machine interface with graphical display)
- Firmware for option cards (add-on cards placed in the option card slots of a G5 power supply)

Release date is formatted as "day.month.year".

Details of Fault Categories

The corrected faults are classified into the following categories:

Fault Category	Remark
minor	Faults within this category have <ul style="list-style-type: none">• negligible impact (e.g. typo)• an easy to use workaround
moderate	Faults within this category can <ul style="list-style-type: none">• limit part of the functionality
serious	Faults within this category can <ul style="list-style-type: none">• lead to inconsistent data• affect operation heavily or make operation impossible

Released Versions

V1.15.1.7 (Package Id 1.738.645.702)

Release Date 13.01.2026

Reason for Change	Remark
Serious	Devices with enabled setting "Discharge at voltage-off": Asymmetric output voltage could occur that can lead to device damage if an external active load switches voltage from low to high while output is discharging. Devices with a maximum voltage of 80V or 500V that are not connected in series are not affected.
Moderate	If an error only occurs on the master device during a short time frame of some milliseconds while devices switch from voltage-off to voltage-on state, some devices may remain in the voltage-on state instead of switching off.
Moderate	Changing the AC grid nominal frequency from 50Hz to 60Hz and vice versa was not correctly transferred to slave devices if the master device supported the extended AC grid settings feature while some slave devices did not.
Moderate	Low voltage devices with setting "Measurement At VoltageOff" disabled: When switching from voltage-on to voltage-off state, the error 40.8 (SELV voltage redundancy error against PE) could occur.
Update	Improve PFC behaviour on AC grids with harmonic distortion.

V1.15.0.42 (Package Id 0.057.602.154)

Release Date: 13.08.2025

Reason for Change	Remark
Moderate	On rare occasions, using CANmp could trigger an internal access violation error that switches the device to voltage-off state.
Moderate	These problems only affect LV (low voltage) devices: <ul style="list-style-type: none"> The setting "Discharge at voltage-off" could not be disabled If the setting "Measurement at voltage-off" was disabled, a SELV redundancy voltage observation error could occur, preventing the device to switch to voltage-on state.
Moderate	Devices with DDU (DC discharge unit): If a DDU was discharging the output while a voltage-on command was set, the DDU continued to discharge the output also in voltage-on state.
Minor	Reading the actual CANmp configuration was not possible while CANmp was running
Minor	The Scope Signal "Device control mode reference" (Id 46) did not show the actual control mode reference but the configured control mode via the communication interface, which could be different if the control mode was used from a different interface (e.g. X705 or the function generator)
Minor	On devices that do not support bidirectional operation (e.g. G5.RLD or G5.SRC) the quadrant mode could be set to an unsupported mode (e.g. bidirectional). This had no effect on device behaviour.
Minor	Spelling error on SCPI command: Old: [SOURce:][REfERENCE:]EquipmentUnderTestMODE New: [SOURce:][REfERENCE:]EquipmentUnderTestMODE
Minor	Firmware update on a system with more than about 40 devices did not work. For the firmware update the system had to be split to a smaller number of devices.
Update	Support for various AC grid voltage and frequency settings, e.g. according to VDE-AR-N-4105 or IEEE-1547 Cat I, II and III.
Update	New signals for CANmp, EtherCAT and SCPI: <ul style="list-style-type: none"> Read / write of voltage, current and power controller parameters Commands to start, stop, pause and resume the function generator

Reason for Change	Remark
Update	If voltage sensing is enabled, load protect settings are effective on the sense voltage and the sense power. If voltage sensing is disabled, load protect settings are effective on device output voltage and device output power (prior to this update this was the standard behaviour regardless of voltage sensing)
Update	Support for more than 64 devices within a system.

V1.14.0.37 (Package Id 2.695.610.786)

Release Date: 08.01.2025

Package Id 2.695.610.786

Reason for Change	Remark
Moderate	The feature "Discharge output at voltage off" does not discharge the output properly if all these conditions are met: <ul style="list-style-type: none"> • Device is a LV (low voltage) device • Device has no RPP or RPP is disabled • HighCap mode is disabled
Moderate	Occasionally CAN messages may be delayed for many milliseconds.
Upgrade	Support for G5.IND devices
Upgrade	In multi-device operation, RPP can only be enabled if RPP is available on all devices

V1.13.0.59 (*) (Package 2.611.755.448)

Release Date: 09.12.2024

Package Id 2.611.755.448

Reason for Change	Remark
Moderate	Adjusted diagnostic parameters

(*)

No change of the main firmware. Firmware package varies by the DCDC board CPU version.

V1.13.0.59 (Package Id 2.861.56.657)

Release Date: 29.08.2024

Package Id: 2.861.56.657

Reason for Change	Remark
Moderate	Loading a parameter set by using the SCPI commands SYSTem:Bitmask:COMMands or SYSTem:Bitmask:COMMandsCUSTomised1 could lead to a non-responding device.
Moderate	Function generator: Loading a function from internal flash memory could lead to unexpected amplitude scaling of the new curve if both of these conditions were met: <ul style="list-style-type: none"> • the curve present before loading had at least one user defined point • the loaded curve is of type sine, rectified sine, triangle or square

Reason for Change	Remark
Moderate	When switching the control mode while in voltage-on state, output glitches could occur even when the new set/limit values were identical to the actual voltage or current output.
Moderate	SCPI interface: When multiple commands were sent in a fast sequence, the commands could be misinterpreted as one single unknown command, leading to an error without executing the commands.
Moderate	EtherCAT interface: Avoid EtherCAT communication problems after a device restart when EtherCAT is already running. A previous EtherCAT device could already see a physical link on the Ethernet PHY even if the device was not ready for EtherCAT communication.
Minor	CANmp, EtherCAT, SCPI interface: Loading a function generator curve with a function number larger than 511 was not possible. When trying to load function number <n> with $n \geq 512$ then function number $n-512$ (n minus 512) was loaded.
Minor	Scope system trigger could get lost when these conditions are both met: <ul style="list-style-type: none"> The trigger event is placed very near to the end of the recording (some few samples) More than four slaves are present in the system
Update	After a system soft reset, the error 5.30 "Controller board communication error" was reported to the incident history. This error is now avoided.
Update	Devices with RPP: If a negative output voltage between -3V and -5V was present when switching to voltage-on state, an RPP timeout error was reported. Now the reported error is "Output voltage negative" which is more intuitive.
Update	SCPI / EtherCAT interface: The optional communication watchdog is now only reset if a write command was executed successfully. This is now consistent with the behavior on the CANmp interface
Update	EtherCAT interface: Clearing warnings is now also possible on process data (not only on mailbox data).
Update	Additional ethernet ports 2001 to 2004 available for G5.Control / API communication.
Update	Actual values on CANmp, EtherCAT, SCPI and analog output can optionally be lowpass filtered. The filter is disabled by default.
Update	The number of devices in a Multi-Device configuration is now enforced. If less devices are detected than the given number of devices limit, an error is reported.
Update	Included "Range scale max input" settings for analog input modulation to the parameter set configuration.
Update	CANmp, EtherCAT, SCPI interface: Added more bits in command "SetCommand3" allowing to enable/disable the high capacity mode and RPP feature.
Update	EtherCAT interface: Added index 0x70150015 that allows reading the compact serial number. This is now consistent with the CANmp and SCPI interface where reading the compact serial number was already possible.
Update	Added EVSE interface
Update	For the Frequency Sweep Modes "Linear step" and "Exponential step", "Dwell periods per point" can now be entered. "Dwell periods per point" determine the number of periods the frequency sweep waits on each frequency before stepping to the next one.

V1.12.1.2 (Package Id 3.724.793.514)

Release Date: 28.06.2024

Package Id: 3.724.793.514

Reason for Change	Remark
Serious	On some device types internal communication errors could occur. Corrected
Moderate	Gate driver supply is always kept on to prevent undefined voltage levels at the driver. This makes the gate driver more robust, but slightly increases the power losses in standby.
Moderate	<p>The following SCPI commands reported an error when run successfully and vice versa:</p> <ul style="list-style-type: none"> • *RST • *RCL • OUTP:STAT? • PROTection:VOLTAge:ENABle? • PROTection:CURREnt:ENABle? • PROTection:POWeR:ENABle?

V1.12.0.46 (Package Id 2.153.810.537)

Release Date: 30.04.2024

Package Id: 2.153.810.537

Reason for Change	Remark
update	Added active interface feature. Allows to restrict device control to one specific interface.
update	Added SCPI interface over Ethernet connection
update	Front panel status indication: DEVICE led indicates if at voltage-off state residual voltage is present at the device output bars.
update	<p>CANmp:</p> <ul style="list-style-type: none"> • Added signals to configure analog and digital inputs and outputs • Signal "SetCommand3": added bits to configure the EUT mode (equipment under test) • Changed signal "ActCANmpInterfaceVersion" to return new version scheme instead of fixed value 20480 (0x5000)
update	<p>EtherCAT:</p> <ul style="list-style-type: none"> • Added objects to configure analog and digital inputs and outputs • Object 0x70150013: added bits to configure the EUT mode (equipment under test) • New object 0x70350001 to return the EtherCAT interface version
update	Device powerup and voltage-on/off events are logged to the incident history.
Serious	In very rare cases, if the input current measurement is incorrect and the device is switched off and switched on again (< 30s), a high inrush current could damage the device. This fix prevent such inrush currents.
Moderate	Parameter "Range scale max input", used to configure reference value modulation via analog input was not included in the parameter sets. Corrected.

Reason for Change	Remark
Moderate	<p>If any digital input is set to "Enable signal 1/2" the following bugs occurred at device powerup, regardless of the voltage present on the digital input:</p> <ul style="list-style-type: none"> The warning "Enable signal missing" was present for short period of time, which lead to a warning indication in G5.Control, but the detail view did not show any warning. "Enable signal missing" was reported to the incident history <p>Both bugs are corrected.</p>
Moderate	<p>CANmp:</p> <p>If the maximum number of Tx messages was configured, no more Rx messages could be added even if the maximum number of Rx messages was not yet reached. This is corrected.</p>
Moderate	Lower 24V supply drop when fans are started to prevent 24V low error.
Minor	<p>In rare cases an output shunt overtemperature error or warning was reported after device powerup, even when the temperature was below the error or warning limit. The error or warning could be manually cleared. This is corrected.</p>

V1.11.0.31 (Package Id 2.249.155.484)

Release Date: 15.11.2023

Package Id: 2.249.155.484

Reason for Change	Remark
update	New analog input functions for reference value modulation
update	Increased maximum number of CANmp messages from 49 to 100
update	New CANmp signal ActWatchdogRemaining: returns the actual remaining watchdog counter
update	<p>New CANmp signals ActG5ControllerInfo and ActG5SystemState.</p> <p>See device documentation for more info.</p>
Update	CANmp signal ActSystemStateFastChanging: bit 10 returns flag if device operates in Q1 or Q4
moderate	Corrected voltage overshoot when switching to voltage-on state with very small current or power limits.
Moderate	Loss of a single AC phase was not detected in standby (only at voltage-on). Corrected
Moderate	Repeated voltage-on/off commands within a short period of time could lead to a DC bus low error. Corrected
Minor	<p>Corrected powerup LED states:</p> <p>All LEDs are on for 2s, then switching to indicate powerup state (device status green and yellow LEDs are on, others off)</p>
Minor	TCP port scans could trigger warning 46.5. Corrected.

V1.10.0.35 (Package Id 3.871.989.572) (*)

Release Date: 12.09.2023

Package Id: 3.871.989.572

Reason for Change	Remark
moderate	Erroneous detection of a wrong PFC identifier possible, which leads to an error that requires a restart of the device

(*)

No change of the main firmware. The Firmware package varies by the DCDC board firmware CPU version

This firmware package (Id 3.871.989.572): DCDC board firmware CPU V1.8.01.03

Previous firmware package (Id 2.588.007.927): DCDC board firmware CPU V1.8.00.19

V1.10.0.35 (Package Id 2.588.007.927)

Release Date: 05.09.2023

Package Id: 2.588.007.927

Reason for Change	Remark
update	Added frequency- and amplitude-sweep options for the function generator. (sweep license required)
update	Added EtherCAT slave functionality. (EtherCAT slave license required)
update	CANmp signal SetDigitalOutputs can set manual user values to digital outputs and relay outputs, if those outputs are configured to represent manual user values (for configuration use G5.Control I/O Configuration).
update	CANmp signals ActSystemStateSlowChanging and ActSystemStateCustomised1: Bits 4...6 indicate an actually loaded parameter set.
update	CANmp: added signal ActLoadRsystemPhys: Returns the actual measured load resistance.
update	CPU core temperature can now take influence on the fan speed.
moderate	When starting the fans, the internal 24V supply could fall below the under voltage detection limit and trigger a 24V under voltage error. Corrected.
moderate	Running a firmware update in powerup state could result in loading a fallback firmware after device restart. This is corrected. Normally, the powerup state is finished some seconds after device startup. Under normal conditions, only slave devices that are waiting for a master device will remain in the powerup state. Workaround: Perform the update again (after a firmware restart), as the error only occurs each second time.
moderate	Loading a parameter set will fail if parameters would be loaded that require a higher user level, even in such cases where those parameters are not changed to different values. Corrected.
moderate	Function generator: Changing the AAP input filter cut-off frequency only had effect after restarting the function generator. Corrected.

Reason for Change	Remark
moderate	Corrected CANmp signal ActRsystemPhys to restore originally intended behavior and return actual internal resistance instead of actual load resistance. For reading the actual load resistance, use the new signal ActLoadRsystemPhys.
minor	On a device reset / restart, ethernet connections are now properly closed.
minor	The MAC address of the ethernet port depends on whether dual MAC mode is enabled or not. However, the reported MAC address of the ethernet port was always the same and therefore G5.Control showed a wrong MAC address in dual MAC mode. Corrected.
minor	Reported device type place limits for devices with Q+ license are now identical with the limits on the device type plate sticker.

V1.9.0.18

Release Date: 31.5.2023

Package Id: 0.947.625.430

Reason for Change	Remark
update	CANmp: Warnings can now be cleared by bit 15 within CANmp signal "SetCommands"
update	Enhanced SELV option to meet EN62477-1:2018
update	Load characteristics given with the EUT (equipment under test) setting is now also considered for power limitation.
update	Added option to restore factory defaults without overwriting actual adjustment parameters
update	Added more parameters to parameter sets: Parameter sets now also include: <ul style="list-style-type: none"> • Controller and controller observation parameters • Quadrant mode setting • Analog IO settings • Digital I/O user level • Selection if analog inputs shall be used as reference sources for dc output control • Selection if control mode and EUT mode shall be used from digital inputs These new parameters will only be included when creating a new parameter set. Existing parameter sets will not change.
minor	On some devices control/status LED flickering could occur. This is corrected.
minor	If the function generator auto-load feature is enabled and the requested function sequence is not available, a warning is now generated instead of silently ignore the missing function sequence.
minor	I2t load protect: If time parameter was set to 0 or $I_limit_high \leq I_limit_continuous$ an i2t error or warning was issued, regardless of actual output current.
moderate	Ethernet connection: Improved auto-negotiation reliability. With some ethernet remote partners the auto-negotiation could fail if the remote partner is using timings near the ethernet specification limits.
moderate	Ethernet connection: If auto-negotiation was disabled (default is enabled), no ethernet connection could be made to the device again, once the connection was lost (e.g. by disconnecting the cable). A device restart was needed to resolve this. Alternatively connect by USB.
moderate	CANmp: Loading a parameter set with signal "SetCommands" now works.

Reason for Change	Remark
moderate	CANmp: Messages could get lost if average number of messages sent to the device was more than 1000 messages per second. This is Corrected.
moderate	Power reference values were internally limited to 0.6% of device power limit. E.g. for a 54kW device: Positive power reference values could only be set between 324W and 54kW Negative power reference values could only be set between -324W and -54kW This is solved and power reference values below 0.6% can be used.
moderate	Power limitation in constant voltage control mode did not work correctly on a battery load or other loads with similar characteristics. In order for this to work, the EUT (equipment under test) mode must be set correctly (to "constant voltage" for a battery load).
moderate	Loading a parameter set was not possible anymore if actual device settings for analog I/O or digital I/O had a required user level higher than "Standard" user. Loading was not possible regardless of actual user level. Now with the appropriate user level loading is possible again.
moderate	Length check of a few device read accesses was not done correctly which could lead to an internal buffer overflow when requesting less data than expected.

V1.8.1.6

Release Date: 20.4.2023

Package Id: 1.013.791.984

Reason for Change	Remark
serious	Temperature thresholds for shunt temperature and buck temperature observation where set too low for LV devices, which would lead to erroneous temperature errors.
serious	Improved over current observation to prevent hardware damage in specific scenarios.
serious	Increased discharge current for LV devices to prevent possible over voltage when discharging the output.

V1.8.0.20

Release Date: 15.2.2023

Package Id: 0.998.229.425

Reason for Change	Remark
update	CANmp: Added signals for multi-device configuration. Allow CANmp communication on slave devices while in powerup state.
update	Series operation of LV devices with SELV option was not allowed so far. Now if series operation is detected on LV devices with SELV option, SELV will be disabled and a warning will be issued that SELV has been disabled.
update	Added temperature observation for output current shunt, controller board and HMI
update	Decreased discharge voltage so that output gets discharged to a lower voltage when switching to VoltageOff state and discharging is enabled.
update	Support for thermal compensation of output current measurement.
update	Improved gain/offset adjustment of analog inputs.
update	DcDc modules report VoltageOn and VoltageOff events to the incident history.
minor	Minor adjustments for reported device output capacity values on LV devices.

Reason for Change	Remark
moderate	G5.SRC: Corrected a bug where the output current was not correctly limited to small values.
moderate	CANmp: Store settings command to save settings non-volatile had no effect. Corrected.
moderate	When a digital IO on the X705 interface was configured as output and the output value was high, the output remained high after setting the direction to "input" because the output driver was not disabled. This is corrected.
moderate	Function generator: Loading AAP or SAS curves from internal memory does not require a TFE license anymore (AAP or SAS license is sufficient).

V1.7.1.10

Release Date: 21.11.2022

Package Id: 2.83.102.402

Reason for Change	Remark
update	I2t load protect settings can be read and written by CANmp interface.
update	Added support for built-in scope variables. This helps customers to use basic scope functionality without the need of additional var files.
update	Added support to allow connecting an RCU (remote control unit).
update	Added support for a user defined device name.
serious	If an error occurred during a firmware update on a DCDC board from DCDC board version V1.2.x or older to V1.3.x or newer this could lead to a non-functional device that cannot be solved by customers. This bug is corrected.
serious	Corrected bug that the CANmp communication may lead to an unresponsive device (restart required).
moderate	Corrected bug where multiple (about more than 30 times) starting and stopping of the CANmp communication leads to an unresponsive device (restart required).
moderate	Corrected bug where reading the CANmp signal <i>ActWatchdog</i> always returns 0.
moderate	Corrected bug where the CANmp signal <i>SetRefSlopesEnable</i> could enable more slopes than specified by the written value.
moderate	Corrected bug where the CANmp signal <i>ActSystemIncidents</i> returned wrong incident group numbers.
moderate	Corrected bug that in the CANmp signal <i>ActDigitalInputs</i> the bits for digital inputs 5 and 6 were interchanged.
moderate	Added possibility to disable auto negotiation on user Ethernet interface. Speed is then limited to 100Mbit/s. This can improve connection stability when disconnects occur at 1Gbit/s.
moderate	Corrected bug where on rare occasions a communication timeout on the user interface was erroneously detected.
moderate	Corrected bug where on rare occasions the DCDC boards were not correctly detected. This led to non-clearable errors until the device was restarted.
moderate	Corrected a bug where reading crash recorder entries could lead to an error and reading was aborted.
minor	Setting the EUT mode (equipment under test) may accidentally be disabled (no change possible by the API or G5.Control) if a digital input is set to the function "EUT current controlled" and then the direction is changed to "output". This is corrected.

V1.6.2.1

Release Date: 19.05.2022

Package Id: 3.785.436.792

Reason for Change	Remark
moderate	For devices with nominal power of 27kW or more, operating hours may fail to write at power down. If operating hours have never been written before this will result in the warning 45.4. «Error on operating hours file access» at next power-up. This is solved and operating hours are correctly written.

V1.6.1.16

Release Date: 05.05.2022

Package Id: 2.447.184.658

Reason for Change	Remark
upgrade	Support for parallel mode operation of devices with different power limits. E.g. master with 36kW and slave with 9kW
upgrade	Support for LV (low voltage) devices
upgrade	Support for SELV functionality (over voltage protect, voltage measurement redundancy check)
upgrade	Improved behaviour when the device is connected to a weak AC grid.
upgrade	Added a reactive power compensation for the AC grid input filter.
upgrade	Optional setting of the internal HMI ethernet connection to a fixed speed instead of auto negotiation
upgrade	Support to query all HMI / RCU connected to a device (needs HMI / RCU version 1.5.xx or higher)
upgrade	New digital output functions to provide info on operating mode (single device, parallel, series, matrix)
upgrade	New analog output function: actual system sense power (actual power at load when voltage-sensing is enabled and connected to the load)
upgrade	Available digital and analog IO functions can now be queried
upgrade	Support for simplified switching controller reference values between analog input and G5.Control / API. (Needs G5.Control V0.7.xx)
upgrade	Simplified digital input use for voltage-on enable signal and parameter set select (no additional parameters have to be configured anymore)
upgrade	Bipolar simulation of analog input value if input range is unipolar (if the selected input function is bipolar, half input value is considered as zero input)
upgrade	Load resistance min/max reference range is limited to 2x Umax / Imax instead of 1'000'000. This allows better resolution when using analog input as load resistance reference.
upgrade	Unified min/max reference range for internal resistance simulation and internal conductance simulation, so that these limits are the same for analog inputs and G5.Control / API.
upgrade	Control mode indicator LED switch to orange (instead of staying green) when any upper or lower limit is reached.
upgrade	Allow SASControl to set a user defined cell technology parameter
upgrade	Provide information whether the connection watch dog is active or not
upgrade	New DDU options "One DDU per device" and "Resistance per device"
moderate	Load protect power limit can now be set to more than 1MW

Reason for Change	Remark
moderate	Prevent unintended loading a parameter set when changing digital inputs to function "parameter set". Parameter set loading is now edge triggered and only loads if the user changes the digital input. Exception: at firmware start a parameter set is loaded according to the actual digital input; in this case no input change is required.
minor	Prevent disconnecting G5.Control / API when the internal HMI performs a reset.
minor	Fixed control mode indicator LED flickering in some operating conditions

V1.5.2.1

Release Date: 18.02.2022

Package Id: 0.305.601.480

Reason for Change	Remark
moderate	Avoid configuration errors with slave devices when the DDU (dc discharge unit) is enabled but only the system DDU on the master device is used.

V1.5.1.14

Release Date: 16.02.2022

Package Id: 1.918.839.58

Reason for Change	Remark
upgrade	CANmp: Added optional connection watchdog
upgrade	Added optional connection watchdog for ethernet and USB connections.
upgrade	Operating hours counters added to main controller board
upgrade	Parameter set management: Multiple parameter sets can be stored.
upgrade	RPP relay may be disabled (relay will not open any more once as has been closed)
upgrade	Allow restoring to factory settings:
serious	Under very specific conditions, an error could occur during the soft reset that damaged the hardware, corrected
moderate	Changing the analog output range from 5V or 10V to 10.8V the analog output voltage is too high (e.g. 10.8V instead of 10.0V) Changing the analog output range from 10.8V to 10V or 5V the analog output voltage is too low (e.g. 9.26V instead of 10.0V)
moderate	Function generator: On systems without source operating mode (quadrant mode Q1) the amplitude value was limited 0 or 2% of system type plate value (depending on whether Q+ license is installed or not).
moderate	Function generator: Ramps occasionally not executed
moderate	Stopping and starting CANmp communication will lead to unresponsive firmware. As the CANmp Config Tool does not use such a command (valid for V2.0.4), customers should not be affected.
minor	Occasionally a single master device (without slave connection, or slaves switched off) may detect a random number of devices, resulting in a power-up error. Workaround: restart the master device.
minor	Reading the value "analog output manual user value" returns random values.
minor	Possible flicker on control mode indicator LEDs in power limit.

Reason for Change	Remark
minor	Incidents not updated in power up state. This should only be relevant on slave devices waiting for a master.
minor	Data collector: Channels for analog inputs: <ul style="list-style-type: none"> - are always updated, not only if the corresponding analog input was chosen as controller reference input. - are now shown in volts, independent of the chosen input function

V1.4.1.19

Release Date: 17.11.2021

Package Id: 1.866.513.453

Reason for Change	Remark
upgrade	Added user configurable I ² t observation for load protection
upgrade	Added data collector (used by SASControl)
upgrade	Added parameter sets
upgrade	Improved digital IO: <ul style="list-style-type: none"> - Unified function outputs for digital outputs and relay outputs Attention: Digital output function numbers have changed. Per firmware default no digital output was used. If digital outputs have been configured by customers, please check with support. - Added more functions (EUT mode, function generator stop/pause, ...)
upgrade	Improved analog IO: <ul style="list-style-type: none"> - Added user defined output - Added more functions
upgrade	Improved controller stability on some loads
upgrade	Support for LV (low voltage) devices.
upgrade	CANmp: added signals for energy and charge measurements
upgrade	Changed LED control mode indicator color from blue to green, for better visibility
Moderate	CANmp: Scaling/conversion of float32 to int16 is now correct
Moderate	Connecting to USB may fail, corrected
Moderate	Firmware update with many (about >25) slaves may fail: corrected
Moderate	DC output behavior with either "no Q4 license" or "quadrant mode = Q1" is now the same.
Moderate	Function generator: <ul style="list-style-type: none"> - long ramp times (more than about 60s) may result in inaccurate ramps, corrected - Corrected behavior between repetitions of sequences and at the end of a sequence
Minor	Corrected low prio scheduler warning while firmware update was running.
Minor	Report a warning if the master device does not support all quadrant modes (Q1 / Q4) of the slaves as then that quadrant mode will not be available.

V1.3.1.22 (*)

Release Date: 13.10.2021

Package Id: 0.983.177.255

Reason for Change	Remark
serious	Affects only devices without internal RPP relay. At firmware startup there is a short period of time (~10ms) where the dc outputs are shortened.

(*)

No change of the main firmware. Firmware package varies by the DCDC board FPGA version.

V1.3.1.22

Release Date: 06.08.2021

Package Id: 2.256.79.904

Reason for Change	Remark
upgrade	Improved PFC controller on weak AC grid
upgrade	Report a warning if the master device quadrant mode is more restricted than the quadrant mode of at least one slave. In this case it would be advantageous to exchange the master device with that slave to have both quadrant modes.
moderate	Reworked system values calculation to use less CPU resources in a system with many slaves. Prevents timing warnings.
moderate	Corrected analog input and output so that 0V analog voltage always corresponds to device output values 0V, 0A, 0kW regardless of range selection (bipolar / unipolar).
moderate	CANmp: Customer could not configure CAN ID 0x000
moderate	Permanent loss of connection after trying to read the incident history while the device is in powerup state.
moderate	Chance of permanent loss of connection when trying to read CANmp configuration data while CANmp is not in the state "configuring".
minor	Temporary (20..30s) loss of HMI connection to the device after removing the ethernet cable from the device rear panel.
minor	Function generator: Under certain circumstances the setting "Behaviour when sequence finished" could not be changed anymore
minor	Corrected function generator behavior at the end of a sequence and between consecutive repetitions (last point had small deviation from zero)
minor	Corrected reported output capacity to match with data sheet
minor	CTR board hardware ID was always zero after a system hardware reset. As the hardware ID is not yet evaluated this had no consequences.

V1.2.23.3

Release Date: 21.06.2021

Package Id: 0.214.140.354

Reason for Change	Remark
upgrade	COM port baud rate set to 921600 baud by default
upgrade	Support for synchronous multi-unit reference values for more than 10 devices
upgrade	Support for device package id and system package id to check if device and system firmware (all devices in multi-unit) have a consistent firmware status.
upgrade	Added charge counter for BatSim / BatControl support
upgrade	If the number of devices in multi-unit configuration is limited it is now accepted (no error) if less devices than this limit are detected.
upgrade	Easier power-up of a multi-unit system because now slaves are waiting for the master device forever (no timeout anymore).
upgrade	Support for various licensed options.
upgrade	Constant resistance mode is now indicated
serious	When increasing the maximum voltage, current or power limit this may also result in increasing the reference value if the reference value was internally set higher but has been limited by the maximum limit before. This can lead to unintended increase of output voltage, current or power, depending on actual control mode.
serious	Bootloader improvements: Make sure that the bootloader loads the backup firmware if an error on loading the firmware image was detected. If this happened the device would not be functional and an SD card with a valid firmware image would be required to solve the problem.
moderate	Function generator: At the end of a non-continuous sine, square or triangle curve the output value is not exactly equal to the offset parameter (zero by default). The deviation from the expected output is higher when using higher frequencies (the curve may be stopped up to 20.8µs before the correct end)
minor	Function generator: enabling a specific function (voltage, current or power) occasionally does not work. As a result the function is not active and enabling to has to be repeated,
minor	CANmp: Customer could not configure CAN ID 0x000
minor	Firmware update abort at 99% if firmware with a special length is programmed. As such firmware has not been released by now, customers should not be affected by this bug.

V1.1.2.3

Release Date: 29.04.2021

Package Id: 1.76.680.364

Reason for Change	Remark
moderate	Corrected DDU bugs: <ul style="list-style-type: none"> - The warning "DDU not ready" could be manually cleared without waiting until the cool-down time has elapsed - If the digital input for the DDU trigger was active when the cool-down time elapsed the DDU would not turn off anymore
moderate	No IPv6 access when DHCP mode was enabled but no DHCP server was available (this has already been solved in V1.0.31.0 but has re-occurred in the previous release)

Reason for Change	Remark
minor	If the device was not connected to the ethernet interface for more than about 20 minutes the connection fails two times before the connection is accepted.

V1.1.2.0

Release Date: 01.04.2021

Package Id: 1.115.979.156

Reason for Change	Remark
update	New incidents with group numbers 32 and upwards are now stored in the incident history.
update	Increased USB communication timeout to 5s (same as ethernet timeout)
update	Preparations for SAS support
update	Added new CANmp signals
update	Added relay output functions.
update	Added digital IO input functions (clear error/warnings, voltage-on/off, funcgen trigger, control mode select, enable signal)
update	Added DDU functionality
update	Set battery low warning if internal RTC battery needs to be replaced.
update	Support new COM port speed 921600 baud (default still remains at 230400 baud)
update	Added device protection against high voltage. If high voltage is detected the output measurement will be disconnected. Automatic reconnect after a recovery time to check if overvoltage condition is still present.
update	Added checks to limit the number of allowed devices in series connection to make sure the maximum allowed voltage against PE (protecting earth) is not exceeded. Provided that customers have grounded a system mid-point if the total system voltage exceeds the maximum voltage against PE (depending on device type, see user manual)
serious	AC frequency settings could not be changed. This would be required to operate the device on different AC frequency than standard.
moderate	Possible observation errors with enabled sensing mode.
moderate	Improved multi-unit stability
moderate	Single master operation with active multi-unit matrix configuration can lead to less output voltage and/or current than expected.
moderate	Firmware update on slave devices occasionally fails. If it happens: just retry. The existing firmware will always be available as backup.
moderate	Avoid current spikes on output discharge at voltage-on to voltage-off transition if discharge at voltage-off is enabled
minor	Storing a CANmp Configuration under the same reference (file name) can cause problems when the newly written file is smaller than the original. Workaround: delete the old file manually or use a different file name.
minor	On a master device with HMI no ethernet connection was possible after a software reset command has been executed (workaround: power down/up cycle instead of a reset command).
minor	Control mode LEDs show wrong control mode on slave devices
minor	Changing IP address and/or sub net mask could not be done on the fly but required a system restart to become active.
minor	Active control mode not shown correctly if upper voltage limit is reached when internal resistance simulation is active (i.e. not zero)
minor	If more than five incidents with group number 31 or below are generated in a short period of time some incidents may not be written to the incident history

V1.0.35.0 (*)

Release Date: 10.02.2021

Package Id: 1.688.554.987

Reason for Change	Remark
update	Package id is available since this release.
moderate	Improved start-up behaviour (prevent current spike)
Minor	Firmware update of DCDC board CPU1 was not possible anymore through internal UART interface. Customers should not be affected by this

(*)

No change of the main firmware. Firmware package varies by the DCDC board firmware version

This firmware package: DCDC board firmware V0.0.40.69

Previous firmware package (release date 02.02.2021): V0.0.40.65

V1.0.35.0

Release Date: 02.02.2021

Package Id: not yet available

Reason for Change	Remark
update	Changed internal storage format of function generator curves for easier maintenance in the future. Attention: This means that function generator curves that have been stored with a previous firmware version cannot be loaded anymore.
serious	Loading/storing a function generator curve with user defined points from/to internal memory would occasionally return/store wrong user data points
serious	Corrected "FPGA malfunction" bug which could only be reset by a complete system power-down/up cycle
moderate	Corrected further function generator bugs
moderate	Improved PFC behaviour
minor	Indicate constant resistance mode on front panel LED.

V1.0.31.0 (*)

Release Date: 06.01.2021

Package Id: not yet available

Reason for Change	Remark
moderate	Corrected bug where dynamic performance has deteriorated compared to the previous version.

(*)

No change of the main firmware. Firmware package varies by the DCDC board FPGA version.

For this package the FPGA version has been downgraded to the previous correct version.

This firmware package: DCDC board FPGA version V1.0.1.77

Previous firmware package (release date 23.12.2020): 1.0.1.80 (version with bug)

V1.0.31.0

Release Date: 23.12.2020

Package Id: not yet available

Reason for Change	Remark
moderate	Improved multi-unit device detection
moderate	Improved device access when internal communication problems exist
moderate	Corrected function generator bugs
moderate	No IPv6 access when DHCP mode was enabled but no DHCP server was available

V1.0.20.0

Release Date: 03.12.2020

Package Id: not yet available

Reason for Change	Remark
update	Added CANmp functionality
moderate	Prevent load protect minimum voltage error when output voltage is near zero
moderate	Improved controller start-up
moderate	No IPv6 access when DHCP mode was disabled
moderate	Corrected function generator bugs

V1.0.15.0

Release Date: 24.11.2020

Package Id: not yet available

Reason for Change	Remark
moderate	Improved multi-unit stability
moderate	Corrected function generator bugs
moderate	Improved controller start-up and run-time stability

V1.0.0.0

Release Date: 03.11.2020

Package Id: not yet available

Reason for Change	Remark
Creation	Initial version

Known Issues

Severity	Remark
Moderate	<p>The firmware update (Whole system, All Devices) with many slaves (about > 25) may fail. Failure is more likely the more slaves are present. Workaround: Split the system to use less slaves (20 or less) for the update process or update each slave individually. Since firmware V1.4.1.xx this issue is solved.</p> <p>If the bootloader update fails and the device is powered down / reset there is a high risk that the device will not startup anymore. In this case the only possibility to start the device again is to use an appropriate SD card with the firmware If the bootloader update fails, it is highly recommended to not power down / reset the device and instead retry the update, preferably as single device update.</p> <p>For all other firmware parts (except bootloader) there is no problem when the update fails. Then the firmware remains unchanged.</p> <p>Beginning from main firmware version 1.2.23.3 and G5.Control V0.4.0.xxxx when performing a "whole system update" (default) only those firmware parts are updated that differ from the installed versions. As the bootloader normally has no changes the risk of a failed bootloader update is highly reduced. So it is recommended to update the firmware to the firmware package V1.2.23.3 and to use G5.Control V0.4.0.xxxx or later.</p>