DELTA ELEKTRONIKA B.V.

SM15K Firmware Revision History

Legend:

B = Bug fix
$ = valuable improvement
N = New feature

Changes from P0120 to P0130   7th of February, 2020

N   Photo Voltaic (PV) Simulation
       A whole new function has been added. Possibility to configure the power supply system as a
       solar panel plant for simulation purposes. Either in stand-alone mode, as well as master/slave
       configuration. Includes MPPT and a built-in graphical visualisation for ease of use without the
       need for external software applications.

$ Current overshoot reduction
       Further improvement on reducing current overshoots after changes in current settings.

N   Master / Slave
       Power-on default setting for Output ON/OFF is possible now.

$ Master / Slave
       Improvement of balancing between units in parallel mode.

N   Instrument
       Instead of only the possibility to disable or enable a measurement instrument (Ah or Wh), two
       extra settings have been added: Suspend and Resume.

N   Regulation Defaults
       It is possible to force all regulation settings back to factory default. The control can be found on
       the web interface under Configuration, Regulation, Miscellaneous.

Changes from P0110 to P0120   26th of November, 2019

$ Current overshoot reduction
       -   Positive and negative current are 'soft started' by ramping up the set points. This to minimize
           overshoots at for example diode based applications.
       -   Improved positive current reaction time to reduce overshoots when the power supply
           switches from CV to CC operation (diodes).
       -   Improved accuracy when switching the output ON. This will reduce initial peak currents at low
           resistance voltage sources (batteries).

$ Voltage overshoot reduction
       Remote sense is blocked while positive and negative current settings are 'soft started'. This to
       prevent run-away of the sense control resulting in voltage overshoots.

N   Protection
       Maximum output voltage setting is 101% of its nominal rating. Overload indication (OL) is set to
       102.5% of the nominal rating but the unit will continue to operate up to its self-protect level which
       is about 105% of the its nominal rating.

If the output voltage exceeds its self-protect level, the output is automatically disabled and remains disabled with the indication "PROT". The user may reset the self-protected state by switching the output to OFF.

Changes from P0109 to P0110

$ <u>Current overshoot</u>
When turning on the output, the unit starts in CC-mode, reducing current overshoots. This is required for e.g. battery and laser applications.

N   <u>Speed control</u>
The control speed of the Voltage regulation can be adjusted via the web interface. This is useful when working with e.g. large capacitive loads.

B   <u>Int Mod Ana calibration</u>
Calibration of the analogue inputs and outputs could get mixed up after saving. In that case, recalibration is required after installing this new package.

B   <u>Updating speed</u>
Updates are processed faster due to a bug fix.

Changes from P0108 to P0109

N   <u>Temperature compensation:</u>
Calibration commands are available for temperature drift compensation to improve current measurements even more.

Changes from P0107 to P0108

N   <u>Firmware version auto synchronization:</u>
Installed interface modules are checked for their firmware version during start-up. If they do not meet the requirements of the unit, the interface modules can be auto-synchronized with it.

N   <u>Functions:</u>
Simulation of Internal resistance (Ri) and Leadless sensing is available now. No extra hardware required.

N   <u>Ethernet logging:</u>
A logging mechanism is available for Ethernet communication. Received commands, queries or both can be logged to a file. The file is available via an Ethernet command, as well as via the web interface.

N   <u>Wh and Ah instrument:</u>
Ethernet commands are implemented to measure Ampere Hour (Ah), Watt Hour (Wh), minimum/maximum output current or power.

N   <u>Time and date:</u>
Ethernet commands are implemented to set and read time and date.

N   <u>Temperature:</u>
An Ethernet command is implemented to read the highest temperature in the power supply.

N   <u>Sequencer advanced mode:</u>
In the web console, an extra button is available to monitor the internal variables and timers of the sequencer. The new feature is very helpful during sequence development or debugging.

$ <u>Master/Slave parallel:</u>
Up to 60 units can be connected in parallel now.

$ <u>Remote sensing:</u>
Stability of the regulation is improved.

$ <u>Improved output ripple:</u>
Very fast ripple rejection, is case of AC grid fluctuations.

B   <u>Master / Slave AC fail recovery:</u>
Smooth restart of output voltage after an AC fail recovery.

Changes from P0106 to P0107

B   <u>Fixing disabled front panel:</u>
After updating it might happen that the front panel is not working anymore. Especially when making a big jump in package version.

Changes from P0105 to P0106

N   <u>INT MOD ANA:</u>
The interface INT MOD ANA can be used in the SM15000 series. Also in combination with Master/Slave operation.
The analog input "Vprogram" is linked to the voltage setting.
"Iprogram" is linked to both the positive and the negative current setting.
Positive and negative power settings cannot be set via this interface. Use Front, Web, Eth, etc instead.

N   <u>Master/Slave operation:</u>
Now available for SM1500-CP-30 as well.

Changes from P0104 to P0105

N   <u>Master/Slave series operation:</u>
Up to 6 pcs SM500-CP-90 can be connected and controlled in series. Please contact factory if one or more units were delivered before Q4 2018.

N   <u>Master/Slave series operation Limitation:</u>
The total system output voltage is limited to 750V when 2 or more SM500-CP-90 are connected in series. This applies if at least one of the units was delivered before Q4 2018. Please contact factory for upgrading to 1000V.

N   <u>INT MOD CON:</u>
The four relay contacts can be linked to system status, like ACF, DCF, Output, etc.
(See page 5-7 of Ethernet+Sequencer manual: 'Relay-Status-Linkage').

Furthermore, the contacts can not only be controlled by Ethernet, but also from the web page.

$ Sequencer:
When the sequencer is linked to a programming source like Front, the front knobs will still be active, and the sequencer can manipulate these settings.
(See page 6-7 of Ethernet+Sequencer manual: 'selecting a programming source')

B   Sequencer:
The command SP is no longer limited, so it can be used for Master/Slave systems up to 300KW.

Changes from P0103 to P0104

N   Master/Slave operation:
Up to 20 pcs SM500-CP-90 can be connected and controlled in parallel.

$ Front / Eth/ Web:
Ready for Master/Slave operation and control of systems up to 300KW.

$ INT MOD SER:
Ready for systems up to 300KW.

N   Interface updating:
Installed interfaces are automatically detected and updated during a unit firmware update.

B   PROG:SEL:LABEL?
When two or more labels exist, only one was replied.

B   Sequencer:
INC and DEC commands didn't work properly on SCN and SPN.
With the commands CJL and CJG, MC and MP didn't work properly on negative values.

Changes from P0102 to P0103   *Important*

$$ Regulation:
Output regulation is significantly improved for capacitive loads.

$ Temperature control:
The regulation of the temperature could lose its smooth behaviour under certain conditions.
Overshoots of the fans speed are suppressed now.

N   Knob A:
The function of Knob A can also be chosen on the web server page.

B   *PUD?:
An empty PUD resulted in two linefeeds when queried by *PUD?. Now it replies with just one terminator.

B   Communication:
A memory leak is repaired in the operating system, which resulted in communication problems after several days of continues operation.

Changes from P0101 to P0102

N   Stepsize:
Via Ethernet commands the digital step size of the voltage and current programming can be queried.

$ Manual:
Content of the manual is updated.

B   Program:catalog?:
Entire list is replied instead of just one entry.