

Chapter 6 Programming Constants

A Group (Initialize):

A1 Group (Initialize)

A1-01: Access level

- Use constant A1-01 to select the user constant access level.
This level determines which user constants can be changed and displayed.

Setting	Function
A1-01=0	This setting allows the “operation” and “initialize” to be changed or displayed. Use this setting to prevent user constant settings from being changed.
A1-01=1 (Initial setting)	This setting allows all user constants to be changed or displayed.

A1-02: Select Language

- Use constant A1-02 to select the language displayed by the SSL series. A value of 0 set English and values of others set other language.
- This user constant is not returned to factory setting when constants are initialized. It must be manually reset to factory setting.

Setting	Function
A1-02=0 (Initial setting)	English language
A1-02=1	Reserved, under development
A1-02=2	Reserved, under development
A1-02=3	Reserved, under development
A1-02=4	Reserved, under development
A1-02=5	Reserved, under development
A1-02=6	Reserved, under development

A1-03: Init Parameters

- Use constant A1-03 to initialize the user constants.
- When initialized, the user constants will return to their factory preset values. You should normally record the setting of any constants that are changed from factory presets.

Setting	Function
A1-03=0 (Initial setting)	Returns to initialize Display without initializing any user constants.
A1-03=1	Initializes the user constants to factory settings.

A1-04: Init Password 1

- This constant is reserved for the factory to test and set the functions.
- Users are not allowed to set this constant.

Lock the constants setting (A1-01=1)

1. Finish setting all the programmable parameters to desired values.
2. Change A1-01=0 (Operation only), factory setting is A1-01=1 (Constants set).
3. Go to A1-04 and press RUN/STOP key and UP key at the same time till A1-05 parameter occurs.
4. Enter the desired password (max. 4 digits)
5. Press UP key to leave A1-05

Above procedure completes locking the constants setting and no more programming selection would appear. A1-01 would only display 0 (Operation only) and would not display 1 (Constants set).

Unlock the constants setting

1. Enter the password in A1-04 to be exactly the same as the one earlier set in A1-05
2. When the password in A1-04 matches the one earlier set in A1-05, the unlocking is completed. A1-01=1 (Constants set) would appear again for programming.

B Group (General):

B1 Group (Output Frequency)

B1-01: Output frequency

- B1-01 is used to set the output frequency at INVERTER AC output

Setting	Function
B1-01=0 (Initial setting)	50Hz at INVERTER AC output
B1-01=1	60Hz at INVERTER AC output

- B2-08: AC IN Frequency Range

Setting	Function
B2-08=0	When B1-01=0: Acceptable AC input frequency is 50Hz \pm 5Hz (45~55Hz)
	When B1-01=1: Acceptable AC input frequency is 60Hz \pm 5Hz (55~65Hz)
B2-08=1 (Initial setting)	Accept wide AC input frequency range between 45~65Hz

B2 Group (Auto Transfer Switch)

B2-01: AC IN Low Disconnect

- Use constant B2-01 to determine the AC IN voltage below which level the ATS (Auto Transfer Switch) will switch off.
- This voltage level will always lie below the AC IN Low Connect (B2-02) level. In fact, changing this level will also change the AC IN Low Connect (B2-02) level.

B2-02: AC IN Low Connect

- This setting forms a pair with AC IN Low Disconnect (B2-01). With this setting, one determines the AC IN low voltage at which level the ATS will switch on. This should lie above AC IN Low Disconnect (B2-01) level to prevent continuous switching off the ATS when the voltage is fluctuating around the level.
- In fact, the parameter which is changed is the difference between AC IN Low Disconnect (B2-01) and AC IN Low Connect (B2-02).
- The result of this is that when changing B2-01 level, this level (B2-02) also changes.
Note: B2-02 can be ignored for a short time when AC IN Waveform Check (B2-06) is

disabled (B2-06=0)

- When the AC IN voltage drops due to the increasing charge current, the AC CHARGER will take care that the voltage does not drop below this level.
- $B2-02=B2-01+\text{offset voltage}$
For example: CP-1500-122, when $B2-01=180V$, $B2-02=187V$, $\text{offset voltage}=7V$ ($187-180$), $B2-02$ will automatically go to $197V(190+7)$ after $B2-01$ is changed to $190V$.

B2-03: AC IN High Connect

- This setting forms a pair with AC IN High Disconnect (B2-04). With this setting, one determines the AC IN high voltage at which level the ATS will switch on. This should lie below the AC IN High Disconnect (B2-04) level to prevent continuous switching of the ATS when the voltage is fluctuating around that level.
- In fact, the parameter which is changed is the difference between AC IN High Disconnect (B2-04) and AC IN High Connect (B2-03).
- The result of this is that when changing B2-04 level, this level (B2-03) also changes.
- $B2-03=B2-04 - \text{offset voltage}$
For example: CP-1500-122, when $B2-03=265V$, $B2-04=270V$, $\text{offset voltage}=5V$ ($270-265$), $B2-03$ will automatically go to $255V(260 - 5)$ after $B2-04$ is changed to $260V$.

B2-04: AC IN High Disconnect

- Use constant B2-04 to determine the AC IN voltage above which level the ATS will switch off.
- This voltage level will always lie above the AC IN High Connect (B2-03) level. In fact, changing this level will also change the AC IN High Connect (B2-03) level.

B2-05: AC IN Current Limit

- Use constant B2-05 to set the set the specific maximum AC input current. This value is very important for both battery charger and inverter output power assist.
- When using constant B2-05, the values determine the actual AC current limit.

Note: With Power Support enabled, there is a minimum value for the AC input current limit.

Please see the note at Power Support (page 6-9).

B2-06: AC IN Waveform Check

- Use constant B2-06 to enable/disable the fast detection of input voltage wave shape.

Setting	Function
B2-06=0 (Ignore)	<ul style="list-style-type: none"> ● By disabling AC IN waveform check, <u>AC IN Low Disconnect</u> (B2-01) is ignored. When the load current is higher 1.5 times than <u>AC In Current Limit</u> (B2-05), this is used to prevent unnecessary switching to INVERTER due to voltage drop when a high load is connected.
B2-06=1 (Initial setting) (Active)	<ul style="list-style-type: none"> ● This detection checks the wave shape, if it is not sinusoidal within certain limits, the AC input voltage is rejected. ● However, certain generator or very weak mains supply have an ill shaped sinusoidal output especially when the load suddenly changes. The fast detection will detect a failure in such a case. ● This will result in a slightly longer transfer time.

B2-07: Ground Relay

- Used to enable/disable the internal ground relay functionality. The ground relay is useful when an earth-leakage circuit-breaker is part of the installation.
- When ATS (Auto Transfer Switch) is open (INVERTER mode), the Neutral of the inverter is connected to “G” terminal.
- When ATS closes (AC IN is transferred to AC OUT), the Neutral is first disconnected from “G” terminal.

Setting	Function
B2-07=0	The internal ground relay is open with “G” terminal.
B2-07=1 (Initial setting)	The internal ground relay is closed with “G” terminal.

B2-08: AC IN Frequency Range

Refer to page 6-3 (B1-01)

B2-09: AC IN Dynamic Current Limit

- This setting is an expansion of the AC IN Current Limit (B2-05) mechanism.

Setting	Function
B2-09=0 (Initial setting)	<ul style="list-style-type: none"> ● The AC current limit is specified by the <u>AC IN Current Limit</u> (B2-05) setting

B2-09=1	<ul style="list-style-type: none"> ● The effective AC input current limit depends on the load history. When the load is lower than the <u>AC IN Current Limit</u> (B2-05), the effective AC input current limit is also lower but slightly above the load. ● When the load increase, the effective current limit also increases with a delay. The thought behind this is that when a generator is running at a low load, it can't switch to full load immediately and it needs some time to increase the power.
---------	---

An example:

- We have a 2KVA generator.
We adjust the AC IN Current Limit (B2-05) setting to 8A and we enable Power Assist (C1-05=1). We have no load connected and the batteries are fully charged. Therefore, no current from generator is drawn.
- At this moment, we connect a load of 7A to the SSL series with this setting (B2-09) disabled, the SSL series would not react because the load is below the AC IN Current Limit (B2-05) setting. The result is that the full load is connected to generator which will drop in voltage because it can't deliver that current instantly which could result in switching to INVERTER.
- If however we had this setting (Dynamic Current Limit) enabled, the effective AC input current limit would be far lower than 8A because the load was zero. So connecting a load of 7A will result in SSL series starting to power assist and no voltage drop is being examined on the AC OUT. The generator starts to supply the load and the effective AC input current limit will increase to 8A slowly. At the moment, the SSL series will stop Power Assist and the full load is on the generator.
- This is powerful option in combination with Power Assist but even without Power Assist, it can prevent unnecessary switching to INVERTER because the charge current will reduce when AC input current becomes higher than the effective AC input current limit.

B2-14: INV only: Bat Lo?V ATS ON
B2-15: INV only: Bat Lo?S ATS ON
B2-16: INV only: Bat Hi?V ATSOFF
B2-17: INV only: Bat Lo?S ATSOFF

- B2-14~B2-17 are used to set the condition of ATS to be ON/OFF in INVERTER Only mode.
- When SSL series is in INVERTER Only mode, INVERTER mode takes priority to supply voltage to AC OUT for load consumption. When AC IN power is ready, INVERTER is active and battery is about to be exhausted, ATS will be switched on to ensure AC OUT to

continuously supply the load. At the moment, AC OUT will be supplied by AC IN power.

- B2-14 and B2-15 are used to set ATS to be “ON” to supply AC IN power to the AC OUT load when the battery voltage is lower than B2-14 voltage value and longer than the second time set in B2-15 in INVERTER Only mode.
(ATS ON+INVERTER OFF+AC CHARGER OFF)
- B2-16 and B2-17 are used to set ATS to be “OFF” when the battery voltage is higher than B2-16 voltage value and longer than the second time set in B2-17 in INVERTER Only mode.
(INVERTER ON+ATS OFF+ AC CHARGER OFF)

B2-18: AUTO1: ACIN Current Lmt

- Use constant B2-18 to set the specific maximum AC input current in AUTO 1. This value is very important for both battery charger and inverter output power assist.
- When using constant B2-18, the values will be loaded to B2-05 to determine the actual AC current limit in Auto 1 mode.

B2-19: AUTO2: ACIN Current Lmt

- Use constant B2-19 to set the specific maximum AC input current in AUTO 2. This value is very important for both battery charger and inverter output power assist.
- When using constant B2-19, the values will be loaded to B2-05 to determine the actual AC current limit in Auto 2 mode.

B2-20: INV only: ACIN Current Lmt

- Use constant B2-20 to set the set the specific maximum AC input current in INVERTER ONLY. This value is very important for both battery charger and inverter output power assist.
- When using constant B2-20, the values will be loaded to B2-05 to determine the actual AC current limit in Inverter Only mode.

B2-21: CHG only: ACIN Current Lmt

- Use constant B2-21 to set the set the specific maximum AC input current in CHARGER ONLY. This value is very important for both battery charger and inverter output power assist.
- When using constant B2-21, the values will be loaded to B2-05 to determine the actual AC current limit in Charger Only mode.

C Group (INVERTER):
C1 Group (INVERTER)

C1-01: INVERTER Output Voltage

- Use constant C1-01 to change the RMS output voltage of the INVERTER.

C1-02: Bat Low ?V Shut-down

- With this setting, one can determine the battery voltage at which level the INVERTER will switch off. This can be useful to prevent drawing too much current from an exhausted battery.
- This voltage level will always lie below the Bat Low ? V Restart (C1-03) level. In fact, changing this level will also change the Bat Low ? V Restart (C1-03) level.
- $C1-03 = C1-02 + \text{offset voltage}$
For example: PM-1500SSL-122, when $C1-02 = 9.3V$, $C1-03 = 10.9V$, $\text{offset voltage} = 1.6V$ ($10.9 - 9.3$), $C1-03$ will automatically go to $11.6V(10.0 + 1.6)$ after $C1-02$ is changed to $10.0V$.

C1-03: Battery Low ? V Restart

- This setting forms a pair with Bat Low ? V Shut-down (C1-02). With this setting, one determines the battery voltage at which level the INVERTER will switch on.
- In fact, the parameter which is changed is the difference between Bat Low ? V Shut-down (C1-02) and Bat Low ? V Restart (C1-03). The result of this is that when changing the Bat Low ? V Shut-down (C1-02) level, this level also changes.

C1-04: Auto Power Saving

- When there is no load connected, set $C1-04 = 1$ (Initial setting) to active the power saving function by reducing the output voltage to be 144V for 220V model and to be 72 for 110V model.
- Setting $C1-04 = 0$ can disable the auto power saving and the output voltage would be continuously supplied as the same default voltage even when there is no load connected.

C1-05: Power Assist Select

- Using this constant C1-05, the Power Assist feature can be enabled or disabled. Use Power Assist to prevent an external circuit breaker to trip when the load on the SSL series is too high.

- If the load exceeds the AC IN Current Limit (B2-05), the SSL series will start inverting and will provide the extra current needed.

Note: When Power Assist is enabled. C1-05=1 (Initial setting), there is a minimum AC input current limit of approximate 2-3 Amps. Setting a lower limit (B2-05) than this minimum value will result in the minimum limit.

Setting	Function
C1-05=0	Power Assist Function is disabled.
C1-05=1 (Initial setting)	Power Assist Function is enabled.

C1-06: Power Assist Level

- This setting is a special setting for power assist mode when the SSL series is charging and due to a sudden load, the AC IN current exceeds the AC IN Current Limit (B2-05), the SSL series will switch to power assist mode (when C1-05=1)
- At that moment, the current need is unknown. The SSL series makes an assumption of the magnitude of this current. This assumption is equal to AC IN Current Limit (B2-05) multiplied by this Power Assist Level (C1-06). The default factor is two.
- This will prevent the circuit breaker from tripping because current provided by the INVERTER minus the current drawn by the load is always lower than the rating of the circuit breaker. This happens, of course, when the AC IN Current Limit (B2-05) is correctly adjusted to the circuit breaker.
- If for instance in a generator application, the circuit breaker has a higher value than the AC IN Current Limit (B2-05)(Normal load of generator is lower than maximum peak load) and one knows that the load which is switched on always draws a certain current, one can consider to increase this factor (C1-06) to achieve better results with sudden load changes.

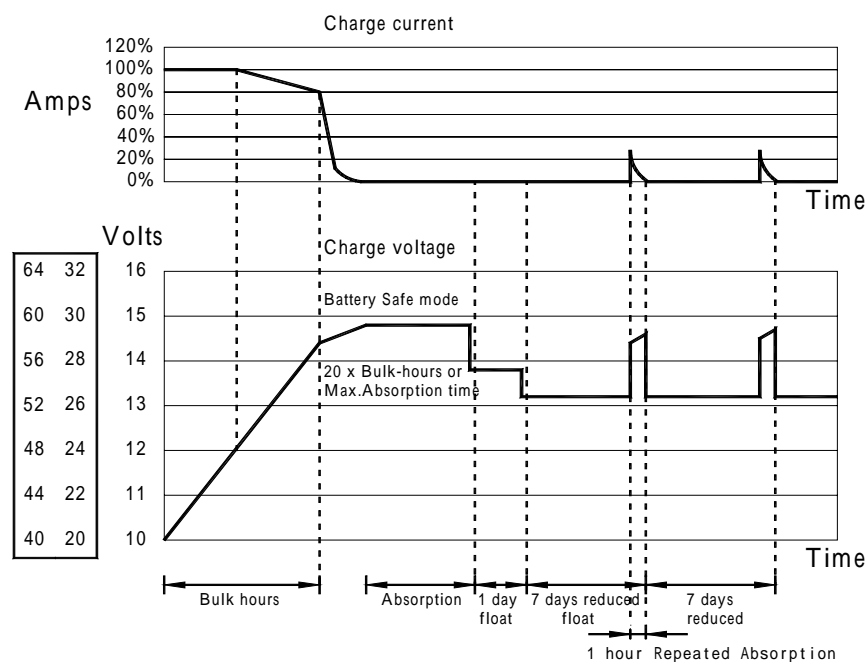
D Group (AC CHARGER):

D1 Group (Charger)

D1-02: Charge Curve

Setting	Function
D1-02=1	Fixed
D1-02=2	Adaptive
D1-02=3 (Initial setting)	Adaptive + Battery safe

- The Fixed (D1-02=1) charge curve will have a fixed Absorption Time (D1-06).
- The Adaptive (D1-02=2) and Adaptive + Battery safe (D1-02=3) curve derive the Absorption time from the Bulk time. The maximum Absorption time of these charge curves is determined by Absorption Time (D1-06) setting.
- The Adaptive + Battery safe (D1-02=3) curve has a special regulation in the absorption phase. The absorption phase will start when the battery voltage reaches 14.4V(for 12V batteries) regardless of the specified Absorption Voltage (D1-03). During the absorption phase, the voltage will increase with a fixed ramp until the voltage reaches the absorption voltage or the calculated absorption time is over in the latter case, the absorption phase will end before the absorption voltage is reached.



D1-03: Absorption Voltage

- Use this setting to specify the absorption voltage.

D1-04: Repeated Absorption Time

- Use this setting to specify the duration of the repeated absorption “pulses”.

D1-05: Repeated Absorption Interval

- Use this setting to specify the interval between repeated absorptions.

D1-06: Maximum Absorption Time

- If the Charge Curve is fixed (D1-02=1), then this setting is used to determine the absorption time.
- In all other cases, this setting determines the maximum absorption time.

D1-07: Float Voltage

- Use this setting to specify the float voltage.

D1-08: Charge Current

- Use this setting to specify the current with which the battery is charged in the bulk phase.
Note: The actual charge current depends on other conditions also. Therefore, under certain circumstances, it is possible that the actual charge current is lower than this setting. This can, among others, be due to:
 - A low AC IN Current Limit (B2-05) in combination with a high load.
 - A high environmental temperature
 - A too high ripple voltage due to improper cabling.

D1-09: Stop After 10Hr Bulk

- This is a safety setting. When the bulk phase lasts more than 10 hours, this can be indication that a battery cell is damaged.
- The absorption voltage (or the 14.4V for battery when Battery Safe (D1-02=3) mode is used) will never be reached in that case and the other cells will be over-charged resulting in the

production of an explosive gas.

- Therefore, the charger is disabled if the bulk phase lasts more than 10 hours.
- This setting can be disabled because it does not always indicate a problem when the bulk phase lasts very long. The charge current can be very low due to limited AC input current and/or AC loads. Also, DC loads can “steal away” part of the charge current. In that case, the bulk phase will need more time to complete and this setting must be disabled.

Note: When this setting is disabled, there is no safety check against over-charging.

Setting	Function
D1-09=0	<u>Stop After 10Hr Bulk</u> setting is disabled
D1-09=1 (Initial setting)	<u>Stop After 10Hr Bulk</u> setting is enabled

D1-10: Equalize Mode Select (Storage Mode Select)

- This setting is used for enabling/disabling the Equalize Mode.
- In this mode, the voltage setpoint is 13.2V (for 12V battery). If Equalize mode is disabled, then the normal float voltage will be used.

Setting	Function
D1-10=0	Equalize mode is disabled
D1-10=1 (Initial setting)	Equalize mode is enabled

E Group (Auxiliary Relay):

E1 Group (Setting Aux-Relay 1 ON Condition)

E1-01: LOAD Higher than ? Amps

E1-02: LOAD Higher for ? sec

- Use these settings to switch the Aux-Relay 1 ON. When the actual AC OUT load is above a certain value (E1-01) for a certain time (E1-02).
- The corresponding Aux-Relay 1 OFF condition is
E2-01: Load Lower than ? Amps and
E2-02: Load Lower for ? sec.

Note: If setting E1-02=0 sec (Initial setting). Then the E1-01 is ignored.

Note: If setting E2-02=0 sec (Initial setting). Then the E2-01 is ignored.

E1-03: Udc Lower than ? Voltage

E1-04: Udc Lower for ? sec

- Use these settings to switch the Aux-Relay 1 ON. When battery voltage becomes lower than a certain limit (E1-03) for a certain time (E1-04).

Note: If E1-04=0 sec (Initial setting), then E1-03 is ignored.

E1-05: Udc Higher than ? Voltage

E1-06: Udc Higher for ? sec

- Use these settings to switch the Aux-Relay 1 ON when battery voltage becomes higher than a certain limit (E1-05) for a certain time (E1-06).

Note: If E1-06=0 sec (Initial setting), then E1-05 is ignored.

E1-07: Not Charge for ? sec

- Use this setting to switch on the Aux-Relay 1 when the AC CHARGER is not charging for a certain time (E1-07).
- Normally used for generating an alarm situation.

E1-08: Fan ON for ? sec

- This will switch the Aux-Relay 1 ON when the internal fan switches on. This can be used together with the E2-08: Fan OFF for ? sec setting to drive an external fan.

E1-09: When bulk protection is activated.

- This will set the Aux-Relay1 ON when the “bulk protection” (D1-09=1) is activated. This condition will remain valid as long as the AC CHARGER is disabled due to that safety mechanism. One can use this setting to generate an alarm.

E1-10: System Fault Occurs

- This will switch on the Aux-Relay 1 when the SSL series switches off due to an internal alarm situation.

E1-11: Temp. Alarm Select (When E1-12=0, ignore this setting)**E1-12: Temp. Alarm for ? sec**

- If you want to switch on the Aux-Relay 1 when there is a over temperature alarm, this setting (E1-11) can be used to choose between pre-alarm or normal alarm.
- As with other Aux-Relay 1 settings, a delay value (E1-12) must be specified also. This can be done with Delay value for set Aux-Relay 1 ON when over temperature alarm (E1-12) setting.

E1-13: Low Batt. Alarm Select (When E1-14=0, ignore this setting)**E1-14: Low Batt. Alarm for ? sec**

- If you want to switch on the Aux-Relay 1 when there is a low battery alarm, this setting (E1-13) can be used to choose between pre-alarm or normal alarm.
- As with other Aux-Relay 1 settings, a delay value (E1-14) must be specified also. This can be done with Delay value for set Aux-relay 1 ON when low battery alarm (E1-14) setting.

E1-15: OverLoad Alarm Select (When E1-16=0, ignore this setting)**E1-16: OverLoad Alarm for ? sec**

- If you want to switch on the Aux-Relay 1 when there is a overLoad alarm, this setting (E1-15) can be used to choose between pre-alarm or normal alarm.
- As with other Aux-Relay 1 setting, a delay value (E1-16) must be specified also. This can be done with Delay value for set Aux-Relay 1 ON when overload alarm (E1-16) setting.

E1-17: Udc Ripple Alarm Select (When E1-18=0, ignore this setting)**E1-18: Udc Ripple Alarm for ? sec**

- If you want to switch on the Aux-Relay 1 when there is a battery voltage ripple alarm. This setting (E1-17) can be used to choose between pre-alarm or normal alarm.
- As with other Aux-Relay 2, setting a delay value (E1-18) must be specified also. This can be done with Delay value for set Aux-Relay 1 ON when battery voltage ripple alarm (E1-18) setting.

E2 Group (Setting Aux-Relay 1 OFF Condition)

E2-01: Load Lower than ? Amps

E2-02: Load Lower for ? sec

- Use these settings to switch Aux-Relay 1 OFF. When the actual AC OUT Load is below a certain value (E2-01) for a certain time (E2-02).
- The corresponding Aux-Relay ON condition is
E1-01: Load Higher than ? Amps and
E1-02: Load Higher for ? sec.

Note: If setting E2-02 (E1-02)=0 sec (Initial setting), then the E2-01 (E1-01) is ignored.

E2-03: Udc Lower than ? Voltage

E2-04: Udc Lower for ? sec

- Use these settings to switch off the Aux-Relay 1 when battery voltage becomes lower than a certain limit (E2-03) for a certain time (E2-04)

Note: If E2-04=0 sec (Initial Setting), then E2-03 is ignored.

E2-05: Udc Higher than ? Voltage

E2-06: Udc Higher for ? sec

- Use these settings to switch off the Aux-Relay 1 when battery voltage becomes higher than a certain limit (E2-05) for a certain time (E2-06)

Note: If E2-06=0 sec (Initial setting), then E2-05 is ignored.

E2-07: Charging for ? sec

- This setting switches the Aux-Relay 1 OFF when the AC CHARGER started for a certain time (E2-07). This can be useful when the Aux-Relay 1 is for instance used a low battery alarm.
- Use the Set Udc Lower than ? Voltage (E1-03) setting to start the alarm and use this setting (E2-07) to stop it.

Note: As long as the battery voltage is lower than the specified limit (E1-03), the alarm will be active.

E2-08: Fan OFF for ? sec

- This will switch the Aux-Relay 1 OFF when the internal fan switches off. This can be used together with the E1-08: Fan ON for ? sec setting to drive an external fan.

E2-09: Charge finished for ? Min (When E2-09=0, ignore this setting)

- This condition becomes active when the charge bulk phase is finished for a certain time (E2-09).
- For the charge curve, take a look at for instance the Charge Current (D1-08) setting.
- This is useful when the Aux-Relay 1 is used to start a generator. Once started, one might want to keep the generator on until the batteries are more or less charged.

E2-10: Aux-Relay 1 not ON for ? minutes (When E2-10=0, ignore this setting)

- If one does not need special off condition, one can use this setting and the Aux-Relay 1 will switch off automatically when there has been no ON condition for a certain time (E2-10).

E2-11: AC IN loss for ? sec (When E2-11=0, ignore this setting)

- This setting will switch off Aux-Relay1 if the RMS value of AC IN voltage is too low for a certain time (E2-11).
- This AC level is determined by the AC IN Low Disconnect (B2-01) setting.
- Use this setting (E2-11) to disable re-starting of a generator which is switched off by hand when the Aux-Relay 1 is used to generate a start signal for that generator.

E2-12: No Temp. Alarm Select (When E2-13=0, ignore this setting)

E2-13: No Temp. Alarm for ? sec

- If you want to switch off the Aux-Relay 1 when there is no over temperature alarm, this setting (E2-12) can be used to choose between pre-alarm or normal alarm.
- As with other Aux-Relay 1 setting, a delay value must be specified also. This can be done with the Delay value for set Aux-Relay 1 OFF when No Overtemperature Alarm (E2-13) setting.

E2-14: No Low Batt. Alarm Select (When E2-15=0, ignore this setting)

E2-15: No Low Batt Alarm for ? sec

- If you want to switch off the Aux-Relay 1 when there is no low battery alarm, this setting (E2-14) can be used to choose between pre-alarm or normal alarm.
- As with other Aux-Relay 1 setting, a delay must be specified also. This can be done with the Delay value for set Aux-Relay 1 OFF when No Low Battery Alarm (E2-15) setting.

E2-16: No OverLoad Alarm Select (When E2-17=0, ignore this setting)

E2-17: No OverLoad Alarm for ? sec

- If you want to switch off the Aux-Relay 1 when there is no OverLoad alarm, this setting (E2-16) can be used to choose between pre-alarm or normal alarm.
- As with other Aux-Relay 1 setting, a delay must be specified also. This can be done with the Delay value for set Aux-Relay 1 OFF when No OverLoad Alarm (E2-17) setting.

E2-18: No Udc Ripple Alarm Select (When E2-19=0, ignore this setting)

E2-19: No Udc Ripple Alarm for ? sec

- If you want to switch off the Aux-Relay 1 when there is no battery voltage ripple alarm, this setting (E2-18) can be used to choose between pre-alarm or normal alarm.
- As with other Aux-Relay 1 setting, a delay must be specified also. This can be done with the Delay value for set Aux-Relay 1 OFF when No Battery voltage Ripple Alarm (E2-19) setting.

E3 Group (Setting Aux-Relay 2 ON Condition)

E4 Group (Setting Aux-Relay 2 OFF Condition)

E5 Group (Setting Aux-Relay 3 ON Condition)

E6 Group (Setting Aux-Relay 3 OFF Condition)

Note: The functions and the settings of E3, E4, E5 and E6 Groups are exactly the same as those of E1 and E2 Group so please refer to above E1 and E2 Group description and setting for E3, E4, E5 and E6 Groups.

E7 Group (Aux-Relay 1 Option)

E7-01: Aux-Relay 1 Usage Select

Setting	Function
E7-01=0 (Initial setting)	Auxiliary Relay 1 is not allowed to be active (Idle).
E7-01=1	Auxiliary Relay 1 is allowed to be active.

E7-02: Aux-Relay 1 Invert Select

Setting	Function
E7-02=0 (Initial setting)	Auxiliary Relay 1 is normal.
E7-02=1	Auxiliary Relay 1 is Invert switch and that is ON becomes off and OFF becomes ON.

- This is used to invert the Aux-Relay 1 So ON becomes OFF and OFF becomes ON. In the program, the labels are adapted to reflect this inversion.

E7-03: Aux1 not Switch Off Time (Aux-Relay 1 do not switch off with certain period)

- Use constant E7-03 to determine the minimum ON time.
- The Aux-Relay 1 will not be switched off within the time specified here measured from the moment that all on condition are inactive.

Note: OFF conditions with a delay of 0 minute, ignore this setting.

E8 Group (Aux-Relay 2 Option)

E9 Group (Aux-Relay 3 Option)

The functions and the settings of E8 and E9 Groups are exactly the same as those of E7 Group so please refer to above E7 Group description and setting for E8 and E9 Groups.

O Group (Operator):

O1 Group (Monitor Select)

O1-01: Power ON LCD Monitor Select

- After power of the SSL series is on, the monitor selections will be showed on LCD Display, U1-05 Battery Voltage is the initial display shown.
- All the constants in U1 Group (U1-01~U1-14) can be monitored.

O1-02: Key Idle Detect Time

- Use constant O1-02 to set the idle time when the keyboard is not operated and once any key is pressed, the display will return to the LCD monitor selection value set in constant O1-01.
- Initial Setting=180 sec, setting range: 10~600 sec.

O2 Group (Key Selections)

O2-01: Key Pressed Beep Select

Setting	Function
O2-01=0	When keys are pressed, beep sound will not be heard.
O2-01=1 (Initial setting)	When keys are pressed, beep sound will be heard.

O2-02: Elapsed Time Reset

- Use constant O2-02 to reset elapsed time.

O2-03: Elapsed Time Select

Setting	Function
O2-03=0 (Initial setting)	The elapsed time started to be counted after power is on.
O2-03=1	The elapsed time started to be counted after RUN.

O2-04: SSL series Model

- This is the model number to be displayed.

O2-06: MODE Key Hold Time

- Use constant O2-06 to set the time it takes to press MODE key to transfer from one of four modes to another mode. (This has to be done in STOP mode)
- Initial setting=5 sec, setting range: 2~10 sec.

O2-07: RUN/STOP Key Hold Time

- Use constant O2-07 to set the time it takes to press RUN/STOP key to activate its function.
- Initial setting=2 sec, setting range: 2~10 sec.

O2-08: Power ON Auto Run Select

- Use constant O2-08 to select to auto run manually or automatically.

Setting	Function
O2-08=0	Auto Run is active when pressing Run/STOP key
O2-08=1 (Initial setting)	Auto Run is active when the power is on.

O2-09: LCD Display Idle Time Set

- When O2-09=0, Display Idle Function is disabled.
- Use constant O2-09 to set the idle time when the keypad is not operated and all the LCD Display and LED Indicators of the SSL series entering the idle mode which only RUN/STOP indicator is active.
- Once any key on the panel is pressed, it will return to the display before Idle status.
- Initial setting=10 min, setting range: 0~60 min.

U Group (Monitor):
U1 Group (Monitor)

U1-01: AC IN Voltage

- Use U1-01 to monitor the current voltage value of AC IN power in unit of 0.1V.

U1-02: AC IN Current

- Use U1-02 to monitor the current value of AC IN power in unit of 0.1A.

U1-03: AC OUT Voltage

- Use constant U1-03 to monitor AC OUT voltage value in unit of 0.1V.

U1-04: AC OUT Current

- Use constant U1-04 to monitor AC OUT current value in unit of 0.1A.

U1-05: Battery Voltage

- Use constant U1-05 to monitor the battery voltage in unit of 0.1V.

U1-06: Battery Ripple Voltage

- Use constant U1-06 to monitor the battery ripple voltage in unit of 0.1V.

U1-07: Battery Current

- Use constant U1-07 to monitor battery current value in unit of 0.1A.

U1-08: Control Mode

- Use constant U1-08 to monitor the current control mode (AUTO 1, AUTO 2, Inverter Only or Charger Only)

U1-09: Operation Status

- There are 12 digits to account for each operation status. Please see NOTE 1 in Chapter 5.

U1-10: Aux-Relay Status

- Use constant U1-10 to monitor the ON/OFF status of 3 sets of Aux-Relay (RY1, RY2, RY3). Please see NOTE 2 in Chapter 5.

U1-11: Elapsed Time

- Use constant U1-11 to monitor the elapsed time after power ON (O2-03=0) or after RUN (O2-03=1) in unit of 1 hour.

U1-12: Battery Temperature Sensor

- Use constant U1-12 to monitor the temperature that has been detected by Battery Temperature Sensor (BTS-3) in unit of 1 .

U1-13: CPU ID1

- Use constant U1-13 to check the software version 1.

U1-14: CPU ID2

- Use constant U1-14 to check the software version 2.

U2 Group (Fault Trace)

U2-01: Current Fault

- Use constant U2-01 to monitor the current fault that results in “SSL series” stopping operating.

U2-02: Last Fault

- Use constant U2-02 to monitor the last fault that has been recorded.

U2-03: AC IN Voltage

- Use constant U2-03 to monitor the AC input voltage value in unit of 0.1V when the current fault occurs.

U2-04: AC IN Current

- Use constant U2-04 to monitor the AC input current value in unit of 0.1A when the current fault occurs.

U2-05: AC OUT Voltage

- Use constant U2-05 to monitor the AC output voltage value in unit of 0.1V when the current fault occurs.

U2-06: AC OUT Current

- Use constant U2-06 to monitor the AC output current value in unit of 0.1A when the current fault occurs.

U2-07: Battery Voltage

- Use constant U2-07 to monitor the battery voltage value in unit of 0.1V when the current fault occurs.

U2-08: Battery Ripple Volt

- Use constant U2-08 to monitor the battery ripple voltage in unit of 0.1V when the current fault occurs.

U2-09: Battery Current

- Use constant U2-09 to monitor the battery current value in unit of 0.1A when the current fault occurs.

U2-10: Control Mode

- Use constant U2-10 to monitor what the control mode (AUTO 1, AUTO 2, Inverter Only or Charger Only) is when the current fault occurs.

U2-11: Operation Status

- Use constant U2-11 to monitor 12 digits which account for each operation status when the current fault occurs. Please see NOTE 1 in Chapter 5.

U2-12: Aux-Relay Status

- Use constant U2-12 to monitor the ON/OFF status of 3 sets of Aux-Relay (RY1, RY2, RY3) when the current fault occurs. Please see NOTE 2 in Chapter 5.

U2-13: Elapsed Time

- Use constant U2-13 to monitor the elapsed time after power ON (O2-03=0) or after RUN (O2-03=1) in unit of 1 hour when the current fault occurs.

U2-26: Battery Temperature Sensor

- Use constant U2-26 to monitor the current temperature that has been detected by Battery Temperature Sensor (BTS-3) in unit of 1 when the current fault occurs.

U3 Group (Fault History)

U3-01: Last Fault

- Use constant U3-01 to monitor the latest fault stored in the software.

U3-02: Fault Message 2

- Use constant U3-02 to monitor the most recent second fault stored in the software.

U3-03: Fault Message 3

- Use constant U3-03 to monitor the most recent third fault stored in the software.

U3-04: Fault Message 4

- Use constant U3-04 to monitor the most recent fourth fault stored in the software.

U3-05: Elapsed Time 1

- Use constant U3-05 to monitor the elapsed time before the latest fault occurs.

U3-06: Elapsed Time 2

- Use constant U3-06 to monitor the elapsed time before the most recent second fault occurs.

U3-07: Elapsed Time 3

- Use constant U3-07 to monitor the elapsed time before the most recent third fault occurs.

U3-08: Elapsed Time 4

- Use constant U3-08 to monitor the elapsed time before the most recent fourth fault occurs.