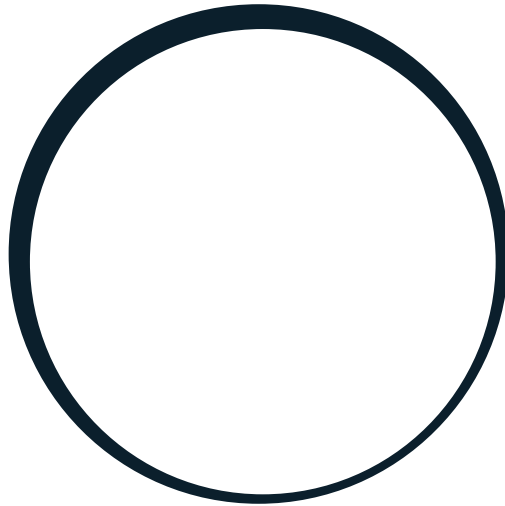




sonnen

energy is yours

Software description | for Electricians
Master Grid Code Interface

IMPORTANT

- ▶ This entire document must be read carefully.
- ▶ This document must be kept for reference purposes.

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1 Carrying out first-time commissioning

First-time commissioning must be carried out when the storage system has been installed, set up and connected for the first time.

1.1 Commissioning assistant



The storage system is only ready for operation if the commissioning assistant is fully completed.

Conditions:

- ✓ Storage system installation is complete.
- ✓ The storage system is switched on (see Switching the storage system on).
- ▶ The commissioning assistant is used to set up the storage system, whereby the following data is recorded and settings configured:
 - Check the installed software version and update if necessary.
 - Record the operator's customer information.
 - Configure the notifications.
 - Select the country code for the inverter.
 - Provide details on the PV system.
 - Select the power measurement concept and configure power measurement.
 - Perform a system test.
 - Confirmation of the information by the installing electrician and the operator. Subsequent sending of a confirmation to the operator by e-mail.



The commissioning assistant does not support changes of the power factor mode. Please contact the service, if this setting needs to be changed.

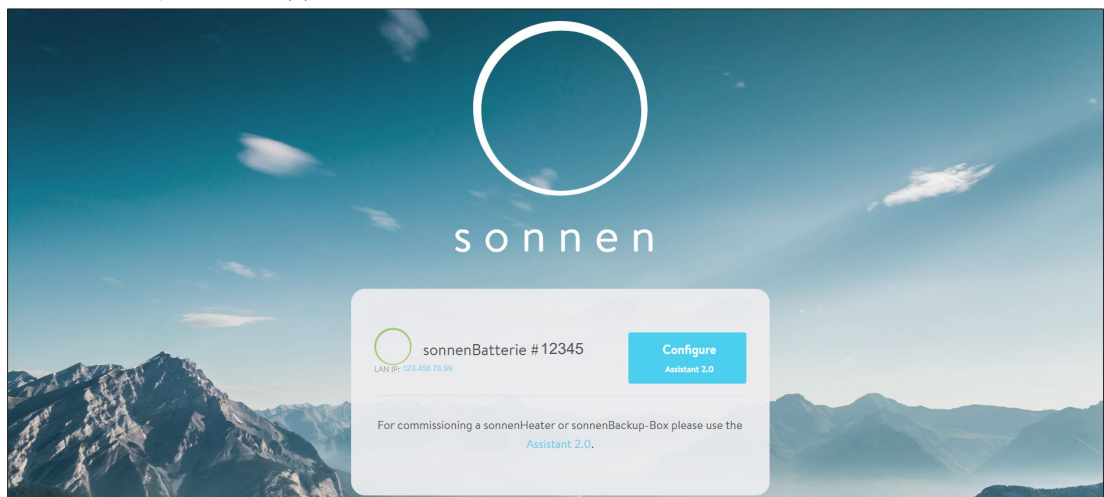
1.1.1 Establishing connection to the storage system

- ▶ Connect your laptop/PC to the router of the home network to which the storage system is also connected.

1.2 Running the commissioning assistant

- ▶ Navigate to the following internet address: <https://find-my.sonnen-batterie.com>

The following window appears:



- ▶ Select the storage system to be configured and click on the **Configure Assistant** button.
- ▶ Log in as the **Installer**.

Use the initial password the first time you log in. This password can be found on the type plate of the storage system.

- ▶ Assign an individual password for the storage system after you have logged in successfully using the initial password.



Contact the sonnen service team if you have forgotten the individually assigned password or need to reset the password for another reason.

- ▶ Run the commissioning assistant until it is fully completed.

Please also refer to the chapter Inverter Setting [P. 5].

If the storage system is not displayed:

- ▶ Follow the instructions in section Troubleshooting in the installation instructions of the storage system.

1.3 Inverter Settings

1.3.1 Inverter Setting - USA / UL 1741 SB

Illustration 1: Inverter Setting - Country Code

- ▶ Select "USA / UL 1741 SB" in the menu item "Inverter Setting" as Country Code to load the inverter settings based on Grid Code UL 1741 SB.

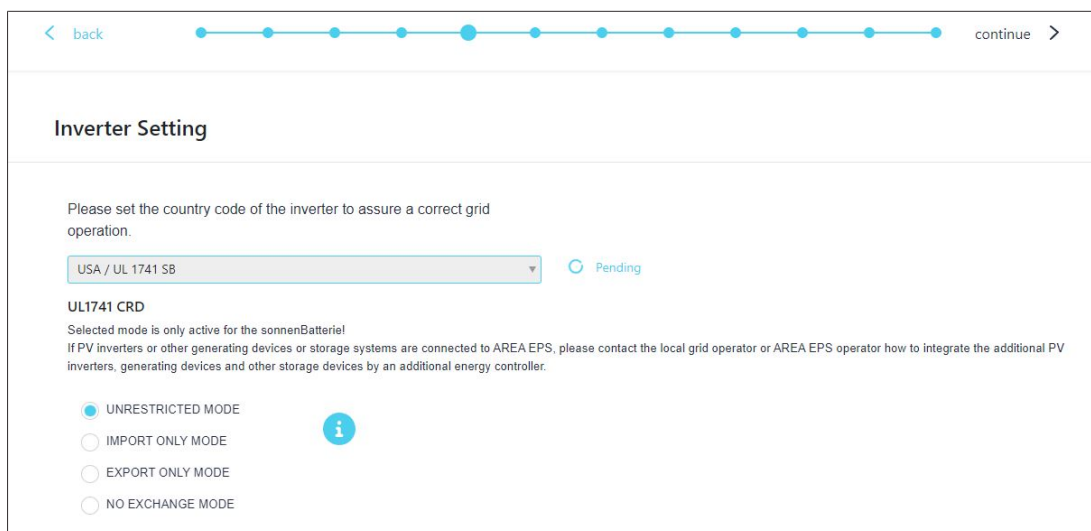
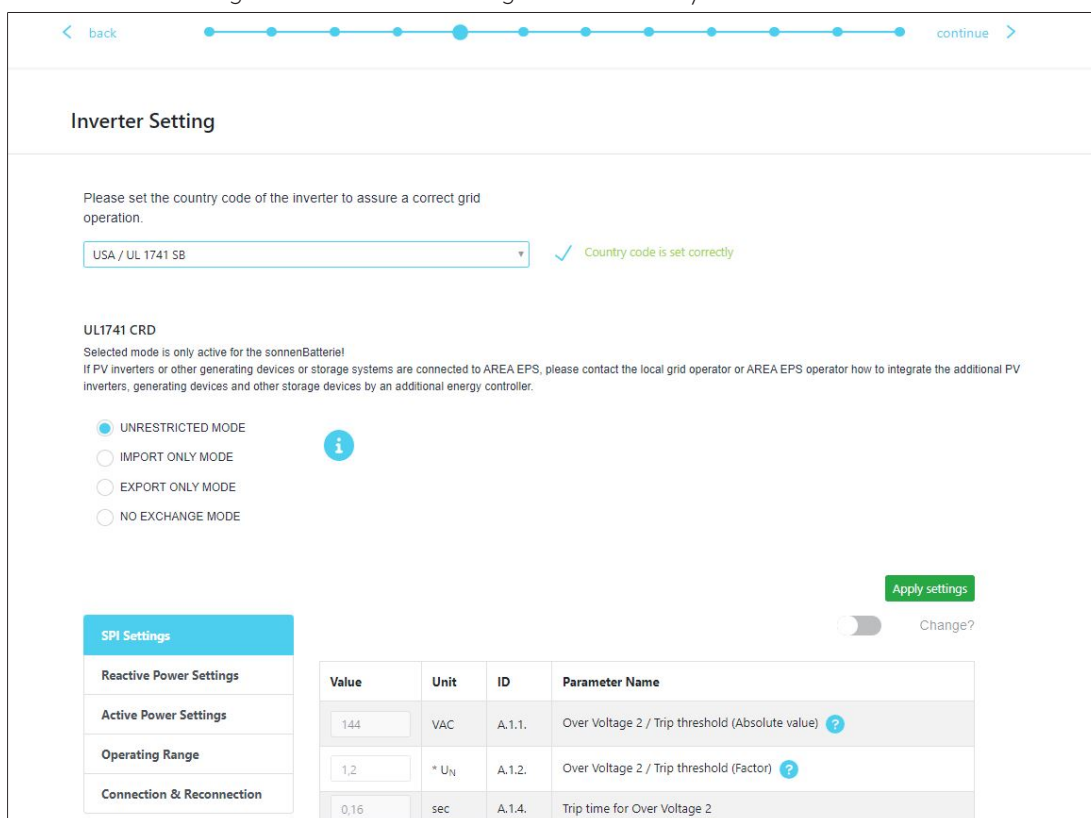


Illustration 2: Inverter Setting - Pending

The inverter settings are loaded according to the Country Code selection.



Value	Unit	ID	Parameter Name
144	VAC	A.1.1.	Over Voltage 2 / Trip threshold (Absolute value) ?
1,2	* U _N	A.1.2.	Over Voltage 2 / Trip threshold (Factor) ?
0,16	sec	A.1.4.	Trip time for Over Voltage 2

Illustration 3: Inverter Setting - Country Code is set correctly

- Wait until the message "Country code is set correctly" appears.

The inverter settings are now set as listed in chapter Inverter settings for Grid Code UL 1741 SB [P. 10].

After the Country Code "USA / UL 1741 SB" has been set successfully, the parameters of the Grid Code Setting can be changed manually in the "UL 1741 CRD" area in the Grid Parameter Selector.

1.3.2 Inverter Setting - California Rule 21

For compliance with California Rule 21, some parameters of the Grid Code Setting must be changed manually.

- Change all Grid Code Setting parameters listed in chapter Inverter settings for Grid Code California Rule 21 [P. 9].

In the network parameter selector the parameters can be selected.

Value	Unit	ID	Parameter Name
144	VAC	A.1.1.	Over Voltage 2 / Trip threshold (Absolute value) ?
1,2	* U _N	A.1.2.	Over Voltage 2 / Trip threshold (Factor) ?
0,16	sec	A.1.4.	Trip time for Over Voltage 2
132	VAC	A.2.1.	Over Voltage 1 / Trip threshold (Absolute value) ?
1,1	* U _N	A.2.2.	Over Voltage 1 / Trip threshold (Factor) ?
13	sec	A.2.4.	Trip time for Over Voltage 1
105,6	VAC	A.4.1.	Under Voltage 1 / Trip threshold (Absolute value) ?
0,88	* U _N	A.4.2.	Under Voltage 1 / Trip threshold (Factor) ?
21	sec	A.4.4.	Trip time for Under Voltage 1
84	VAC	A.5.1.	Under Voltage 2 / Trip threshold (Absolute value) ?

Illustration 4: Inverter Setting – network parameter selector

On the left side of the network parameter selector you can choose between the areas "SPI Settings", "Reactive Power Settings", "Active Power Settings", "Operating Range" and "Connection & Reconnection".

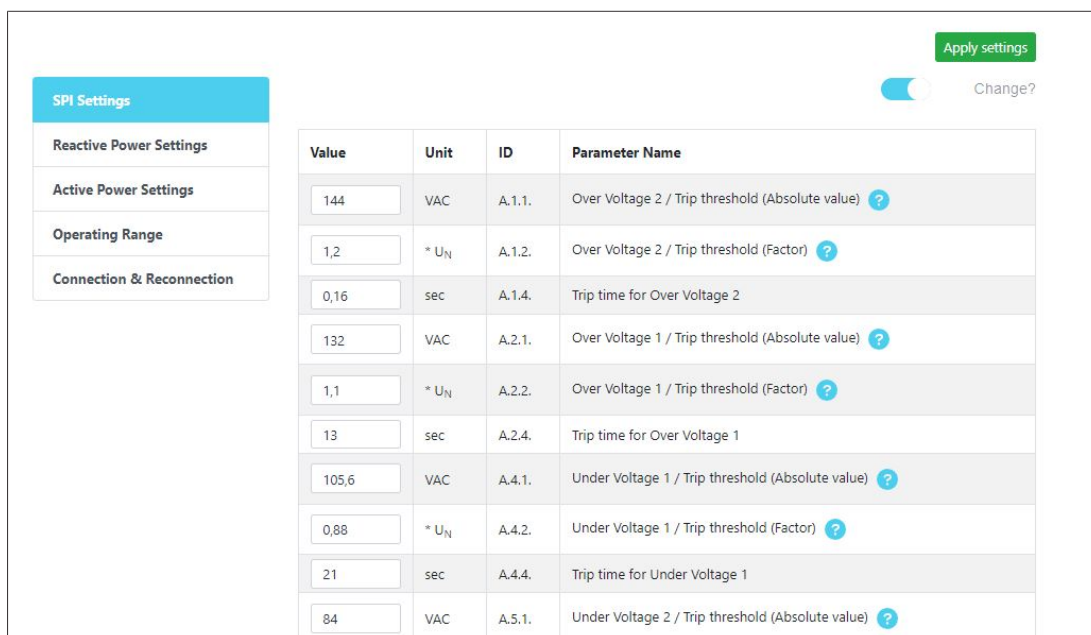
Value	Unit	ID	Parameter Name
50	%Pn	B.5.3.	Q(P) Active power setpoint P3 ?
20	%Pn	B.5.4.	Q(P) Active power setpoint P2 ?
20	%Pn	B.5.5.	Q(P) Active power setpoint P1 ?
50	%Pn	B.5.6.	Q(P) Active power setpoint P'1 ?
100	%Pn	B.5.7.	Q(P) Active power setpoint P'2 ?
44	%Sn	B.5.8.	Q(P) Active power setpoint P'3 ?
		B.5.9.	Q(P) Reactive power setpoint Q3 ?

Illustration 5: Inverter Setting – Menu item „Reactive Power Settings“

The menu item "Reactive Power Settings" consists of the four sub-areas "CosPhi Fix", "Q fix", "Q(U)", "Q(P)", which can be selected via the drop-down list.

Changing the parameters of the Grid Code setting

- ▶ Activate the "Change?" slider.



SPI Settings

- Reactive Power Settings
- Active Power Settings
- Operating Range
- Connection & Reconnection

Value **Unit** **ID** **Parameter Name**

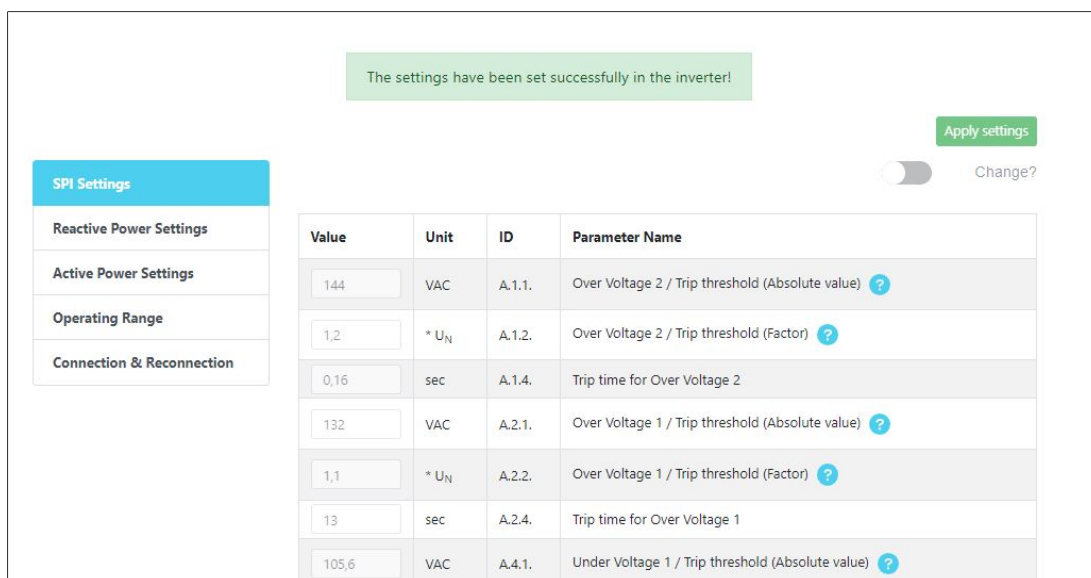
144	VAC	A.1.1.	Over Voltage 2 / Trip threshold (Absolute value) ?
1,2	* U _N	A.1.2.	Over Voltage 2 / Trip threshold (Factor) ?
0,16	sec	A.1.4.	Trip time for Over Voltage 2
132	VAC	A.2.1.	Over Voltage 1 / Trip threshold (Absolute value) ?
1,1	* U _N	A.2.2.	Over Voltage 1 / Trip threshold (Factor) ?
13	sec	A.2.4.	Trip time for Over Voltage 1
105,6	VAC	A.4.1.	Under Voltage 1 / Trip threshold (Absolute value) ?
0,88	* U _N	A.4.2.	Under Voltage 1 / Trip threshold (Factor) ?
21	sec	A.4.4.	Trip time for Under Voltage 1
84	VAC	A.5.1.	Under Voltage 2 / Trip threshold (Absolute value) ?

Apply settings ☒ Change?

Illustration 6: Inverter Settings - Change activated

The parameters are no longer grayed out and can now be changed.

- ▶ Select the parameter to be changed in the network parameter selector.
- ▶ Change the value of the parameter.
- ▶ Click on the "Apply settings" button



The settings have been set successfully in the inverter!

SPI Settings

- Reactive Power Settings
- Active Power Settings
- Operating Range
- Connection & Reconnection

Value **Unit** **ID** **Parameter Name**

144	VAC	A.1.1.	Over Voltage 2 / Trip threshold (Absolute value) ?
1,2	* U _N	A.1.2.	Over Voltage 2 / Trip threshold (Factor) ?
0,16	sec	A.1.4.	Trip time for Over Voltage 2
132	VAC	A.2.1.	Over Voltage 1 / Trip threshold (Absolute value) ?
1,1	* U _N	A.2.2.	Over Voltage 1 / Trip threshold (Factor) ?
13	sec	A.2.4.	Trip time for Over Voltage 1
105,6	VAC	A.4.1.	Under Voltage 1 / Trip threshold (Absolute value) ?

Apply settings ☐ Change?

Illustration 7: Inverter Settings - Settings successful

- ▶ Wait until the message "The settings have been set successfully in the inverter!" appears.

2 Inverter settings for Grid Code California Rule 21

To comply with California Rule 21, some Grid Code settings must be made manually as listed below.

Reactive Power Settings - Q (U)

Value	Unit	ID	Parameter Name
30.0	%Sn	B.3.14.	Q(U) Reactive power setpoint 1 - Q1
97.00	%Vrated	B.3.17.	Q(U) Voltage setpoint 2 - V2
103.00	%Vrated	B.3.21.	Q(U) Voltage setpoint 3 - V3
107.00	%Vrated	B.3.25.	Q(U) Voltage setpoint 4 - V4
30.0	%Sn	B.3.26.	Q(U) Reactive power setpoint 4 - Q4

Active Power Settings

Value	Unit	ID	Parameter Name
5.0	sec	C.2.4.	Open loop response time

Connection & Reconnection

Value	Unit	ID	Parameter Name
254.0	VAC	D.1.1.	OV reconnection L-L / connection (Absolute value)
1.0583	* U _N	D.1.2.	OV reconnection / connection (Factor)
212.00	VAC	D.1.3.	UV reconnection L-L / connection (Absolute value)
0.8833	* U _N	D.1.4.	UV reconnection / connection (Factor)
61.20	Hz	D.1.5.	OF reconnection / connection
58.80	Hz	D.1.6.	UF reconnection / connection
15	sec	D.1.7.	Enter Service delay time / Time before connection or reconnection
OFF	-	D.1.8.1.	Randomized delay time Activation / Deactivation
0	sec	D.1.8.*	Randomized delay setting for enter service
50.00	sec	D.1.10.1.	Enter Service ramp rate - time
2.00	% * P _n / sec	D.1.12.**	Soft ramp / Gradient Value for reconnection

***Note:** For changing this parameter (**D.1.8.**) the parameter **D.1.8.1.** ("Randomized delay time, Activation / Deactivation") needs to be set to "ON".

► Switch it back to "OFF" after changing the D.1.8. parameter.

****Note:** For changing this parameter (**D.1.12.**) the parameter **D.1.11.** ("Soft Ramp, Activation / Deactivation") needs to be set to "ON".

3 Inverter settings for Grid Code UL 1741 SB

These inverter settings are loaded by default based on Grid Code UL 1741 SB. They do not need to be set to complete the Rule 21 Inverter Settings change procedure.

SPI Settings

Value	Unit	ID	Parameter Name
144	VAC	A.1.1.	Over Voltage 2 / Trip threshold (Absolute value)
1.2	* U _N	A.1.2.	Over Voltage 2 / Trip threshold (Factor)
0.16	sec	A.1.4.	Trip time for Over Voltage 2
132	VAC	A.2.1.	Over Voltage 1 / Trip threshold (Absolute value)
1.1	* U _N	A.2.2.	Over Voltage 1 / Trip threshold (Factor)
13	sec	A.2.4.	Trip time for Over Voltage 1
105.6	VAC	A.4.1.	Under Voltage 1 / Trip threshold (Absolute value)
0.88	* U _N	A.4.2.	Under Voltage 1 / Trip threshold (Factor)
21	sec	A.4.4.	Trip time for Under Voltage 1
84	VAC	A.5.1.	Under Voltage 2 / Trip threshold (Absolute value)
0.7	* U _N	A.5.2.	Under Voltage 2 / Trip threshold (Factor)
21	sec	A.5.4.	Trip time for Under Voltage 2
60	VAC	A.10.1.	Under Voltage 3 / Trip threshold (Absolute value)
0.5	* U _N	A.10.2.	Under Voltage 3 / Trip threshold (Factor)
2	sec	A.10.4.	Trip time for Under Voltage 3
61.2	Hz	A.6.1.	Over Frequency 1 / Trip threshold
300	sec	A.6.3.	Trip time for Over Frequency 1
62	Hz	A.7.1.	Over Frequency 2 / Trip threshold
0.16	sec	A.7.3.	Trip time for Over Frequency 2
58.5	Hz	A.8.1.	Under Frequency 1 / Trip threshold
300	sec	A.8.3.	Trip time for Under Frequency 1
56.5	Hz	A.9.1.	Under Frequency 2 / Trip threshold
0.16	sec	A.9.3.	Trip time for Under Frequency 2

Reactive Power Settings - CosPhi Fix

Value	Unit	ID	Parameter Name
1.00	-	B.1.2.	Constant Power Factor setpoint
-	-	B.1.3.	Constant Power Factor type

Reactive Power Settings - Q fix

Value	Unit	ID	Parameter Name
0	%Sn	B.2.2.	Constant reactive power setpoint as a percentage of nominal apparent power
-	-	B.2.3.	Constant reactive power direction - type

Reactive Power Settings - Q(U)

Value	Unit	ID	Parameter Name
5	sec	B.3.3.	Q(U) Response completion time - open loop time
92	%Vrated	B.3.13.	Q(U) Voltage setpoint 1 - V1
44	%Sn	B.3.14.	Q(U) Reactive power setpoint 1 - Q1
leading	-	B.3.15.	Q(U) type
98	%Vrated	B.3.17.	Q(U) Voltage setpoint 2 - V2
0	%Sn	B.3.18.	Q(U) Reactive power setpoint 2 - Q2
-	-	B.3.19.	Q(U) type
102	%Vrated	B.3.21.	Q(U) Voltage setpoint 3 - V3
0	%Sn	B.3.22.	Q(U) Reactive power setpoint 3 - Q3
-	-	B.3.23.	Q(U) type
108	%Vrated	B.3.25.	Q(U) Voltage setpoint 4 - V4
44	%Sn	B.3.26.	Q(U) Reactive power setpoint 4 - Q4
lagging	-	B.3.27.	Q(U) type
Off	-	B.3.28.	On/Off of Vref - autonomously adjusting
100	%Vrated	B.3.29.	Vref
300	s	B.3.30.	Tref

Reactive Power Settings – Q(P)

Value	Unit	ID	Parameter Name
100	%Pn	B.5.3.	Q(P) Active power setpoint P3
50	%Pn	B.5.4.	Q(P) Active power setpoint P2
20	%Pn	B.5.5.	Q(P) Active power setpoint P1
20	%Pn	B.5.6.	Q(P) Active power setpoint P'1
50	%Pn	B.5.7.	Q(P) Active power setpoint P'2
100	%Pn	B.5.8.	Q(P) Active power setpoint P'3
44	%Sn	B.5.9.	Q(P) Reactive power setpoint Q3
lagging	-	B.5.10.	Reactive power direction
0	%Sn	B.5.11.	Q(P) Reactive power setpoint Q2
-		B.5.12.	Reactive power direction
0	%Sn	B.5.13.	Q(P) Reactive power setpoint Q1
-	-	B.5.14.	Reactive power direction
0	%Sn	B.5.15.	Q(P) Reactive power setpoint Q'1
-	-	B.5.16.	Reactive power direction
0	%Sn	B.5.17.	Q(P) Reactive power setpoint Q'2
-	-	B.5.18.	Reactive power direction
44	%Sn	B.5.19.	Q(P) Reactive power setpoint Q'3
leading	-	B.5.20.	Reactive power direction

Active Power Settings

Value	Unit	ID	Parameter Name
Active power limitation for frequency transients originating in the transmission system (LFSM-U, LFSM-O)			
On	-	C.1.0.	Frequency-droop -- P(f) -- Activation / Deactivation
0.036	Hz	C.1.20.	dbOF - deadband value for high frequency
0.05	-	C.1.21.	kOF
0.036	Hz	C.1.22.	dbUF - deadband value for low frequency
0.05	-	C.1.23.	kUF
5	sec	C.1.24.	Open Loop Tresponse - time
100	%Pn	C.1.25.	Pmin
Automatic active power limitation for voltage values close to 110 % of Un P(U)			
ON	-	C.2.1.	Voltage-active power -- P(U) -- Activation / Deactivation
Rated power	-	C.2.2.	P(U) Reference value (Rated Power)
10	sec	C.2.4.	Open loop response time
127.2	VAC	C.2.12. ¹	P(U) Setpoint V1 - Overvoltage (Absolute value) L-N
1.06	* UN	C.2.13. ²	P(U) Setpoint V1 - Overvoltage (Factor)
100	% Pn	C.2.14	P(U) Setpoint P1 - active power
132	VAC	C.2.15. ³	P(U) Setpoint V2 - Overvoltage (Absolute value) L-N
1.1	* UN	C.2.16. ⁴	P(U) Setpoint V2 - Overvoltage (Factor)
0	% Pn	C.2.17.	P(U) Setpoint P2 - active power

Operating Range & Power Range

Value	Unit	ID	Parameter Name
120	VAC L-N	F.1.1.	Nominal Voltage Un (Absolute value)
60	Hz	F.1.3.	Nominal Frequency fn
100	%Pn	F.1.13.	Limit active power setting
4800/6000	W	F.1.14.	Nominal active power
7191	Var	F.1.15.	Maximum reactive power
7200	VA	F.1.16.	Max nominal apparent power

Connection & Reconnection

Value	Unit	ID	Parameter Name
252	VAC	D.1.1.	OV reconnection L-L / connection (Absolute value)
1.05	* U _N	D.1.2.	OV reconnection / connection (Factor)
220.08	VAC	D.1.3.	UV reconnection L-L / connection (Absolute value)
0.917	* U _N	D.1.4.	UV reconnection / connection (Factor)
60.1	Hz	D.1.5.	OF reconnection / connection
59.5	Hz	D.1.6.	UF reconnection / connection

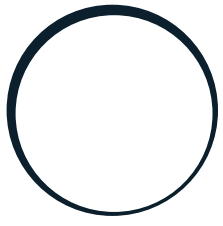
¹ Overvoltage (Absolute value): V1 must be less than V2

² Overvoltage (Factor): V1 must be less than V2

³ Overvoltage (Absolute value): V1 must be less than V2

⁴ Overvoltage (Factor): V1 must be less than V2

Value	Unit	ID	Parameter Name
300	sec	D.1.7.	Enter Service delay time / Time before connection or re-connection
ON	-	D.1.8.1.	Randomized delay time - Activation / Deactivation
300	sec	D.1.8.	Randomized delay setting for enter service
ON	-	D.1.9.	Enter Service ramp Activation / Deactivation
300.00	sec	D.1.10.1.	Enter Service ramp rate - time
ON	-	D.1.11.	Soft ramp Activation / Deactivation
0.3333	% * Pn / sec	D.1.12.	Soft ramp / Gradient Value for reconnection
ON	-	D.1.13.	Normal ramp for new setpoint Activation / Deactivation
100	% * Pn / sec	D.1.14.	Normal Ramp / Gradient Value for new setpoint
ON	-	D.1.15.	Permit service - able to enter or stay in service



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