

AS/NZS 4777.2:2020 Technical Information

STP 12-50, STP 15-50, STP 20-50, STP 25-50

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1 Disclaimer

Every attempt has been made to make this document complete, accurate and up-to-date. Readers are cautioned, however, that changes to local regulations or product improvements may cause SMA Australia to make changes to this document without advance notice. SMA Australia shall not be responsible for any damages, including indirect, incidental or consequential damages, caused by reliance on the material presented, including, but not limited to, omissions, typographical errors, arithmetical errors or listing errors in the content material.

It is therefore recommended that you always check for the latest version prior to following the instructions in this document.

2 Scope

This document is intended to cover the following SMA models:

Inverter model		
STP 12-50		
STP 15-50		
STP 20-50		
STP 25-50		

Table 1: In scope inverters

As of December 18th 2021 all inverters installed in Australia must comply with one of the pre-set region setting sets described in AS/NZS 4777.2:2020.

- 1. Australia A
- 2. Australia B
- 3. Australia C

All three regions contain the default Power Quality, Volt-Watt, Volt-Var, Frequency/Voltage Response and grid protection settings. Should you require advice or changes to protection settings please reach out to the SMA technical support for assistance.

The following inverters have not been tested to AS/NZS 4777.2:2020 for multiple inverter combinations: STP 12-50, STP 15-50, STP 20-50, STP 25-50

3 Connecting to the inverter

3.1.1 Required equipment

- a. Laptop with WiFi and/or Ethernet port with a Web Browser eg. Chrome, Firefox, Edge.
 - i. Due to file size it is recommended to download the firmware prior to site visit.

3.1.2 Connection

- a. Via WiFi connection refer to 3.1.2.1
- b. Via Ethernet refer to 3.1.2.2

3.1.2.1 Connecting via Wi-Fi

- a. Search for the WLAN of the inverter.
 The name will follow the format SMA [serial number].
- b. Use the device specific **WPA2-PSK password**. The WPA2-PSK password can be found on the type label on the side of the inverter.

SUNNY T Solar Inverter mac by SMA Solar Ted Model STP 25-50	e in Germany nology AG
Social Nia	
Genariyo.	186
	Cá.Id
PIC:	RID
WPA2-PSK: TJS	FGMX6YTQJ566

Image 1: Example of WPA password

c. Open a web browser and enter in the IP address **192.168.12.3**.

← C ŵ	192.16 SUNNY	8.12.3 TRIPOWER >	(15		
		Login			
		E-mail addre	ss or user name*		
		Password*			
		Login		Delete admin account?	

Image 2: Wi-Fi Login Menu

3.1.2.2 Connecting via Ethernet

a. Connect your laptop to the inverters ethernet port.



Image 3: Ethernet connection

b. Open a web browser and enter in the IP address 169.254.12.3.

< C ⋒	∉ 169.254.12.3	
SMA	SUNNY TRIPOWER X 15	
	Login	
	E-mail address or user name*	
	Password*	
	Login	Delete admin account?

Image 4: Ethernet Login Menu

4 Commissioning Inverter

NOTE: First production of STP X inverters does not come with minimum firmware required. To update the firmware commissioning of the inverter needs to be completed first.

Commissioning the inverter can be done by:

a. Web Browser on a laptop - Mac and Windows.

DNSP	Country Standard	
Ausgrid		
Ausnet		
Citipower		
Endeavour Energy		
Energex		
Ergon		
Essential Energy	[AU] AS/INZS 4/77.2:2020 Generator Region A	
Evoenergy		
Jemena		
SA Power Networks		
Ausgrid		
PowerCor		
United Energy		
Western Power	[AU] AS/NZS 4777.2:2020 Generator Region B	
Horizon Power		
TasNetworks	[AU] AS/INZS 4///.2:2020 Generator Region C	
New Zealand DNSP	[AU] AS/NZS 4777.2:2020 Generator Region NZ	

Table 2: AS/NZS4777 Standard by DNSP

4.1 Via Web Browser

Please refer to section **3.1.2** for connection via Wi-Fi or Ethernet.

4.1.1 Commissioning Wizard

NOTE: The commissioning wizard is only shown upon first connection, after successful commissioning a factory reset needs to be performed before the wizard will be shown again. Adjustments to parameters etc. do not require a factory reset.

1. Check the firmware version, internet connection and continue.

SUNNY TRIPOWER X 15		
Commissioning Welcome		
	Welcome to the SUNNY TRIPOWER X 15 The installation assistant guides you s configuration process. Current status: Serial number Firmware version IP address Device time Connection to time server Connection to Sunny Portal Device restoration	tep-by-step through the 3015004487 03.02.05.R 192.168.2.24 Change the network configuration 05/22/2023 03.07 PM Time is synchronized Connected Start restoration
		Continue

Image 5: Commissioning Wizard Step 1

2. Setup a user account, make note of the username and password as this cannot be reset without performing a user account factory reset.



Administrator registration ⁽¹⁾

Language English US	
Salutation*	
First name*	Last name*
User name*	
Password*	Password guidelines (i)
Repeat password*	 At least 1 lower-case letter At least 1 upper-case letter At least 1 number
	 At least 1 special character 10-50 characters Only permitted symbols

Image 6: Admin account

3. Create a device name and select system manager, then continue.

	SUNNY TRIPOWER X 15	
("	S Commissioning Device configuration	
D	evice configuration	
Ente	r a device name.	
De	evice name"	
	, <u> </u>	
Who	at is the intended purpose of the communication device in your system?	
0	SMA inverters as system managers	
	In conjunction with an energy meter, the inverter takes over the control at the point of	
	In conjunction with an energy meter, the inverter takes over the control at the point of interconnection and can receive control signals. The inverter can control other subordinate devices,	
	In conjunction with an energy meter, the inverter takes over the control at the point of interconnection and can receive control signals. The inverter can control other subordinate devices, takes over the monitoring of the system and the communication to the Sunny Portal powered by ennexOS.	
0	In conjunction with an energy meter, the inverter takes over the control at the point of interconnection and can receive control signals. The inverter can control other subordinate devices, takes over the monitoring of the system and the communication to the Sunny Portal powered by ennexOS. Subordinate inverter	
0	In conjunction with an energy meter, the inverter takes over the control at the point of interconnection and can receive control signals. The inverter can control other subordinate devices, takes over the monitoring of the system and the communication to the Sunny Portal powered by ennexOS. Subordinate inverter The inverter does not perform any closed-loop or open-loop control. The inverter can receive and	

Image 7: Device config

4. Tick all boxes and continue.

SUNNY TRIPOWER X 15
Commissioning Device configuration
Product settings [®]
Automatic update and synchronization with Sunny Portal
Yes, I agree that the product receives automatic security and feature updates.*
Yes, I agree that the product is synchronized with Sunny Portal and I gain access to the system via the Internet.*
Automatic update of SMA products
Yes, I agree that the product performs automatic update downloads in this system for all updateable SMA products. To ensure that the communication device is updated by SMA, enable external parameterization.
Continue

Image 8: Automatic updates

- 5. For this technical document addition of 3rd party, extra devices will not be covered.
- 6. If firmware is up to date as per table 3, then select the right country standard from the list.

Country data set ©

Would you like to set a country data set for your devices? Yes No	
[AU] AS/NZS 4777.2:2020 Generator Region A	1
[AU] AS/NZS 4777.2:2020 Generator Region B	
[AU] AS/NZS 4777.2:2020 Generator Region C	
[AU] AS/NZS 4777.2:2020 Generator Region NZ	
[BE] Synergrid C10/11:2019 LV Generators ext. Deco	up. Protection Device 👻
	Continue

Image 9: Selection of Country Standard

- 7. After step 6, the remaining steps are only for export limiting which is not covered in this document.
- 8. Once the initial setup is complete, and the firmware is not up to date then you can continue to section 5 to perform the firmware update.



Configuration has been completed successfully

Your Sunny Tripower X 15 was successfully configured. In order to be able to make full use of your Data Manager's functions, create your system in Sunny Portal powered by ennexOS.

Tip: As soon as all devices are in operation and your system is optimally configured, SMA recommends creating a backup file. If you replace your communication device or reset your existing communication device to default settings, the backup file is used to transfer configuration information. The backup file includes system and device configuration data of your communication device (see manual of communication device).

Go to system

Image 10: Commissioning Complete

4.1.2 Changing grid protection & power quality response modes

To change the settings associated with power quality and grid protection, please reach out to the service team on +61 2 9491 4200 between 8am to 6pm Monday to Friday AEDT or via email on service@sma-australia.com.au.

5 Firmware update

Please refer to **Table 1** for applicable devices and minimum firmware versions. We recommend using the latest firmware from the website if it is newer than the one listed below.

Inverter model	Minimum firmware
STP 12-50	
STP 15-50	2.06.04.R
STP 20-50	
STP 25-50	

Table 3: Minimum Firmware Requirements

5.1 Procedure

5.1.1 Required equipment

- a. Laptop with WiFi and/or Ethernet port with a Web Browser eg. Chrome, Firefox, Edge.
 - i. Due to file size it is recommended to download the firmware prior to site visit.

5.1.2 Connection

- a. Via WiFi connection refer to 3.1.2.1
- b. Via Ethernet refer to 3.1.2.2

5.1.2.1 Updating Firmware

- a. Enter the Username as configured during initial commissioning.
- b. Once logged in navigate to the **Configuration > Update and backup** via the menu.

SMA	SUNNY TRIPOWER X 15	
Â	My plant Define the matrix of the m	
⊞	CONFIGURATION	
Dashboard	My device Device	Wy plant System
Monitoring		System properties
鐐	Device properties	Device administration
Configuration	Parameter External communication	Parameter Device parameter adjustment
	Network configuration	Grid management service
	Update and backup Change system password	Meter configuration

Image 11: Update the Firmware

c. Click on **Select the file...** locate the appropriate firmware update on your device and click **Start Update**.

Note:

Depending on the firmware, the update process will take some time to complete. During this time, the file will be uploaded from your smart device to the inverter. Once this upload process reaches 100%, the inverter will install the new firmware. During which, you will lose connection between your smart device and the inverter. Wait 5 minutes after losing connection, before reconnecting to the inverter's WebUI.

When the update is complete, you will be able to verify this by navigating to **Events** and finding an entry **Update completed**.

Update and backup

Automatic updates



Enable function and security updates for all updateable SMA products of the system via this communication device

Backup

Here you can create and save a backup file of your device. The backup file can be used to restore important configurations.



Image 12: Firmware Update selection

6 Checking of Parameters

To verify that the Firmware and Country Standard are correct, it can be done via the following method.

a. WebUI of the inverter

6.1 Country Standard & Firmware

- 1. Login to the inverter via methods in section 3.1.2.
- 2. Select the inverter name or SN in the webUI.

Dashboard My plant





3. Click on Configuration > Parameters.



Image 14: Parameter adjustment

4. Enter in the search term "grid monitoring".

Parameter

۹ grid monitoring		
Group	Name	Value
Grid Monitoring	Country standard set	[AU] AS/NZS 4777.2:2020 Generator Region A

Image 15: Country Standard

5. To check firmware, under the same menu type in "firmware".

Parameter

٩	firmware			
	Group	Name	Value	Channel
	Device Components	Firmware version of the communication assembly	1.6.5.R	Parameter.Nameplate.CmpCom.SwRev
	Device Components	Firmware version of the main processor	02.16.03.R	Parameter.Nameplate.CmpMain.SwRev
	Device Components	Firmware version of the operating system	1.2.0.R	Parameter.Nameplate.CmpOS.SwRev
	Type Label	Firmware version	03.02.05.R	Parameter.Nameplate.PkgRev



6.2 Grid Protection and Power Quality Settings

6.2.1 Volt-Watt

To verify Volt-Watt settings search for **P(V)** and click on download as shown in image 17. The downloaded settings will be in a CSV format.

6.2.2 Volt-Var

To verify Volt-Var settings search for **Q(V)** and click on download as shown in image 17. The downloaded settings will be in a CSV format.

6.2.3 Frequency Protection

To verify Frequency Protection settings search for **Frequency Monitoring** and click on download as shown in image 17. The downloaded settings will be in a CSV format.

6.2.4 Voltage Protection

To verify Voltage Protection settings search for **Voltage Monitoring** and click on download as shown in image 17. The downloaded settings will be in a CSV format.

6.2.5 Over/Under Frequency

To verify Over/Under Frequency Protection settings search for **P(F)** and click on download as shown in image 17. The downloaded settings will be in a CSV format.

6.2.6 Fixed Power Factor

To verify Fixed Power Factor settings search for **Manual cos φ setting** and click on download as shown in image 17. The downloaded settings will be in a CSV format.

6.2.7 Fixed Reactive Power

To verify Fixed Reactive Power settings search for **Manual reactive power** and click on download as shown in image 17. The downloaded settings will be in a CSV format.

6.2.8 Ramp Rate

To verify Ramp Rate settings search for **WGra** and click on download as shown in image 17. The downloaded settings will be in a CSV format.

Parameter

٩	p(v)	👲 Download

Image 17: Grid quality settings download

Group	Name	Value	Translated	Unit	Channel
System and device control	P(V), tripping delay	0	0	S	Parameter.Inverter.WModCfg.WCtIVolCfg.ActTms
System and device control	P(V), number of points used	2	2		Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.NumPt
System and device control	P(V), max. number of support points	8	8		Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.NumPtMax
System and device control	P(V), voltage value	1.1	1.1	p.u.	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.XVal[0]
System and device control	P(V), voltage value	1.13	1.13	p.u.	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.XVal[1]
System and device control	P(V), voltage value	2	2	p.u.	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.XVal[2]
System and device control	P(V), voltage value	2	2	p.u.	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.XVal[3]
System and device control	P(V), voltage value	2	2	p.u.	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.XVal[4]
System and device control	P(V), voltage value	2	2	p.u.	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.XVal[5]
System and device control	P(V), voltage value	2	2	p.u.	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.XVal[6]
System and device control	P(V), voltage value	2	2	p.u.	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.XVal[7]
System and device control	P(V), active power value	100	100	%	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.YVal[0]
System and device control	P(V), active power value	20	20	%	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.YVal[1]
System and device control	P(V), active power value	0	0	%	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.YVal[2]
System and device control	P(V), active power value	0	0	%	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.YVal[3]
System and device control	P(V), active power value	0	0	%	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.YVal[4]
System and device control	P(V), active power value	0	0	%	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.YVal[5]
System and device control	P(V), active power value	0	0	%	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.YVal[6]
System and device control	P(V), active power value	0	0	%	Parameter.Inverter.WModCfg.WCtIVolCfg.Crv.YVal[7]
System and device control	P(V), activation	308	On		Parameter.Inverter.WModCfg.WCtIVolCfg.Ena
System and device control	P(V), type of reference voltage	4520	Mean valu	e of phase v	Parameter.Inverter.WModCfg.WCtIVolCfg.VRefMod
System and device control	P(V), limitation of change rate	303	Off		Parameter.Inverter.WModCfg.WCtIVolCfg.WGraEna
System and device control	P(V), decrease rate	20	20	%/s	Parameter.Inverter.WModCfg.WCtIVolCfg.WGraNeg
System and device control	P(V), increase rate	20	20	%/s	Parameter.Inverter.WModCfg.WCtIVolCfg.WGraPos
System and device control	P(V), type of reference active power	4405	Maximum	active powe	Parameter.Inverter.WModCfg.WCtIVolCfg.WRefMod
System and device control	P(V), nominal value filter	308	On		Parameter.Inverter.WModCfg.WCtIVolCfg.WTmEna
System and device control	P(V) setting time nominal value filter	3	3	s	Parameter Inverter WModCfg WCtlVolCfg WTms

Image 18: P(V) settings CSV

7 Export Limiting

The STP X currently does not support Export limiting as per AS/NZS4777.2:2020, this section will be updated in the future when this is tested.

8 Earth Fault Alarm

The inverter detects earth faults by the measurement of insulation resistance between the DC side and ground prior to operation, and residual current during operation. Earth faults (and other faults) trigger the inverter's earth fault alarm. The following is a summary of these alarms.

Inverter model	Visual LED	Audible	Remote Alarm
	on Inverter	alarm	
STP 12-50	Yes	No	Optional via Sunny Portal
STP 15-50			
STP 20-50			
STP 25-50			

Table 4: Earth Fault Alarm

8.1 Sunny Portal Remote Alarm Setup

The inverter's Earth Fault Alarm can be configured once the plant is registered in Sunny Portal. In the event of an earth fault, a report with the corresponding events will be emailed to nominated addresses. A report will then be sent every hour until the earth fault is acknowledged in Sunny Portal or cleared.

For instructions on how to register your plant in Sunny Portal, please refer to the respective Sunny Portal User Manual for your plant:

- Webconnect (no communication devices): <u>User Manual - SUNNY PORTAL powered by ennexOS</u> (sma.de) Once your plant is registered in Sunny Portal, continue to set up the Earth Fault Alarm using the following instructions:

1. Login to your Sunny Portal account on <u>ennexos.sunnyportal.com</u>.

SUNNY PORTAL		
		()
	Welcome to Sunny Portal powered by ennexOS	
	Login or Sign up.	
	E-mail address or user name*	
	Password*	
	Forgot your password?	

Image 19: EnnexOS Login

2. Expand the **Configuration** tab and select **Notifications**.



Image 20: Notification

3. Expand the drop-down menu at the top of the page and select the option **Event report for errors** in accordance with the standard.

Active
Active power limitation alarm
Alarm AS 5033
Alarm communication monitoring
Alarm IEC 62109-2
Detailed report
Event report
Grid management services alarm
Info report
Inverter comparison alarm
Performance ratio alarm

Image 21: Event Report Selection

4. Once selected the report is automatically created with the email used to login to Sunny Portal as the default address.

Notifications

🔍 vour email					
Alorm AS 5033	Alam AS 5033	2	your email Immediately	۵	Î

Image 22: Earth Fault alarm

5. You have now set up the Earth Fault Alarm for your inverter.

9 DRED / DRM

9.1 Connection to a DRED

Inverter connection to a demand response enable device (DRED) is possible with an approved modbus Demand Response controller (DRC) such as provided by Olivance:



The modbus TCP parameter must be enabled on the inverter.

- 1. Login to the inverter's WebUI as an installer, refer to section **3.1.2** or **4.1** depending on different connection methods.
- Navigate to Configuration > External Communication > Carry out initial configuration and check Enable Modbus server.



Image 23: External Communication External communication

Modbus server

The Modbus protocol is an industrial data communication protocol for use in the PV system communication, for example.



The FTP Push function can be used to upload collected system data cyclically to a freely selectable external FTP server. Here, the system data is exported in an unchangeable XML format.

Carry out initial configuration

Image 24: Modbus Configuration

Modbus server

The Modbus protocol is an industrial data communication protocol for use in the PV system communication, for example.

☑ Enable Modbus se	erver			
A Information Activate the N against unaut	1odbus server only if it is u horized access.	ised by other devices or applications.	Secure your network	
You can change the s	tandard port address of th	e Modbus server if required. Only use	e free ports.	
Port* 502				
Sensor assignme Here you may assign Read more	ent the sensors provided by th	ne Modbus server to your system.		
Function	Device	Input		Ð
			Cancel	Save

Image 25: Enabling Modbus

9.2 DRM Modes

Currently DRMO is the only DRM mode available for the following inverter models:

STP 12-50, STP 15-50, STP 20-50, STP 25-50

9.3 DRM Labelling

The DRC must be labelled with the DRM mode and the RJ45 with the DRM Port.





Example DRM Model Label

Example DRM Port Label

10 Startup and Shut Down Procedure

Incorrect startup/shut down procedure can damage the inverter, make sure to follow the instructions below.

Please consult with a qualified person before performing the below steps.

10.1 Startup Procedure

- 1. If the DC load-break switch has been protected with a padlock, open and remove the padlock on the DC load-break switch.
- 2. Switch on the **DC load-break switch**.



Image 26: DC isolator on

- 3. Switch on the Main Switch Inverter Supply, marked in the switchboard.
- 4. Inverter LEDs should all turn on during initial startup, wait 60 seconds before checking.
- 5. If the green LED is still flashing, the conditions for activating feed-in operation are not yet met. As soon as the conditions for feed-in operation are met, the inverter starts with feed-in operation and, depending on the available power, the green LED will light up continuously or it will pulse.

10.2 Shut Down Procedure

- 1. Switch off the Main Switch Inverter Supply, marked in the switchboard.
- 2. Switch off the **DC load-break switch**.



Image 27: DC isolator off

3. When required lock the **DC load-break switch**.



Image 28: Locking DC isolator

This concludes the document, if you have any questions you can reach out to <u>Solaracademy@sma-australia.com.au</u> for pre-sales/installation questions or <u>service@sma-australia.com.au</u> for after sales support.