

# AS/NZS 4777.2:2020 Technical Information

SB1.5-1VL-40, SB2.5-1VL-40, SB3.0-1AV-41, SB4.0-1AV-41, SB5.0-1AV-41, SB6.0-1AV-41, STP3.0-3AV-40, STP4.0-3AV-40, STP5.0-3AV-40, STP6.0-3AV-40 STP8.0-3AV-40, STP10.0-3AV-40, STP 50-41

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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
SB1.5-1VL-40
SB2.5-1VL-40
SB3.0-1AV-41
SB4.0-1AV-41
SB5.0-1AV-41
SB6.0-1AV-41
STP3.0-3AV-40
STP4.0-3AV-40
STP5.0-3AV-40
STP6.0-3AV-40
STP8.0-3AV-40
STP10.0-3AV-40
STP 50-41

Table 1: In scope inverters

As of December 18<sup>th</sup> 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 phase combinations: SB1.5-1VL-40, SB2.5-1VL-40, SB3.0-1AV-41, SB4.0-1AV-41, SB5.0-1AV-41, SB6.0-1AV-41, STP3.0-3AV-40, STP4.0-3AV-40, STP5.0-3AV-40, STP6.0-3AV-40, STP6.0-3AV-40, STP10.0-3AV-40, STP 50-41

# 3 Firmware update

NOTE: For installations from December 18, 2021 connect the DC supply only when commissioning the inverter until the inverter has the minimum firmware required.

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
SB1.5-1VL-40	3.11.04.R
SB2.5-1VL-40	
SB3.0-1AV-41	4.00.21.R
SB4.0-1AV-41	
SB5.0-1AV-41	
SB6.0-1AV-41	
STP3.0-3AV-40	3.11.02.R
STP4.0-3AV-40	
STP5.0-3AV-40	
STP6.0-3AV-40	
STP8.0-3AV-40	3.11.02.R
STP10.0-3AV-40	
STP 50-41	3.14.05.R

Table 2: Minimum Firmware Requirements

### 3.1 Procedure

#### 3.1.1 Required equipment

- a. Laptop with WiFi and/or Ethernet port with a Web Browser eg. Chrome, Firefox, Edge.
  - i. Internet access onsite is not required if Firmware is downloaded 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 thr type label on the side of the inverter.



Image 1: Example of WPA password

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

- → C ① 🔽 19	92.168.12.3			* 😐 :
SUNNY TRIPO	OWER 4.0			SMA
				0 -
	Login			
	Language	English	~	
	User group		~	
	Password			
	Forgot password?		Login	
	1	mage 2: WiFi Login N	1enu	

d. Refer to **3.1.2.3** to complete the update.

## 3.1.2.2 Connecting via Ethernet

ĺ

- a. Connect your laptop to the inverters ethernet port.
- b. Open a web browser and enter in the IP address 169.254.12.3.

< → C ☆	169.254.12.3				🔹 💿 🖈 😰 E
SUNNY	TRIPOWER 4.0				SMA
					0 -
		Login			
		Language	English	~	
		User group		~	
		Password			
		Forgot password?		Login	

Image 3: Direct Ethernet Login Menu

c. Refer to **3.1.2.3** to complete the update.

#### 3.1.2.3 Updating Firmware

- a. Select Installer as the user group and enter your password.
  - i. If this is the first-time logging into the inverter you will need to setup a User and Installer password.
  - ii. Please set the User password to Sma12345!
- b. Once logged in as the installer navigate to the **Device Configuration** via the top menu.
  - i. Once on the page, click on the setting wheel next to the Device.
  - ii. Select **Update firmware.**

👫 Home	Instantaneous values	C Device	parameters 📒 E	vents 🤸	Device configuration	Data
Devices in t	he system					
	Device name	Device status	Serial number	Firmware v	version installed	Settings
	STP4.0	0		3	.11.1.R	٥
	Meter on Speedwire	0			Change devic Update the fin	e names mware
Devices fou	nd				Adopt the con	ation to a file figuration from a file
	Device name		Serial number		Import proxy o	certificate
	Serial numbers for usable meters					۵

Image 4: Update the Firmware

c. Click on **Browse...** locate the appropriate firmware update on your smart device and click **Update firmware**.

#### 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 the firmware	
You can load the update downloaded from www.SMA-S	olar.com onto your device manually.
Cancel	Update the firmware

Image 5: Firmware Update selection



Image 6: Update completed message

# 4 Commissioning Inverter

Commissioning the inverter can be done by either:

- a. SMA 360 App via QR code available for Android and iOS devices, via respective app stores.
- b. Web browser for all smart devices

DNSP	Country Standard		
Ausgrid			
Ausnet			
Citipower			
Endeavour Energy			
Energex			
Ergon	[ALI] AS /NIZS 4ZZZ 2:2020 Consister Barian A		
Essential Energy	[AU] AS/NZS 4777.2:2020 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	[ALI] AS /NIZS 4ZZZ 2:2020 Consister Barian C		
TasNetworks	[AU] AS/ NZS 4///.2:2020 Generator Region C		
New Zealand DNSPs	[AU] AS/NZS 4777.2:2020 Generator Region NZ		

## 4.1 Via the SMA 360 App

- a. Open the app and login.
  - i. Requires a free SMA Sunny Portal account.
  - ii. Internet access required, if you do not have internet access, please refer to section **3.2** for commissioning.
- b. Follow steps below to complete commissioning.

Select QR code scanner & scan code at the front of the unit	<b>Join</b> SMA network	Login as an <b>Installer</b> , for first time connection refer to section <b>3.1.2.3.a</b>
SMA 360         Professional Support         Planning $\rightarrow$ Operate $\rightarrow$ Service $\rightarrow$ Scan QR code $\checkmark$ Settings $\checkmark$	SMA 360   Professional Support     Planning     Operate   Se   "SMA360" Wants to   Join Wi-Fi Network "   SMA[Serial Number]"?   Cancel   Scat     Settings	Login Language English  ↓ User group Installer  Password  Forgot password? Login

Navigate to installation assistant	Complete <b>Network</b> and <b>Time Setting</b> then move onto <b>Country Standard</b>
Home	Selecting the Country Data Set
A Home	Country standard
⑦ Instantaneous values	Current Country Standard
Cevice parameters	Set country standard
<b>Ξ</b> Events	
✤ Device configuration	[AT] TOR D4 2016 [AT] TOR Generator Type A V1.0:2019 [AU] AS/NZS 4777 2:2020 Generator Region A
🛢 Data	[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
👤 User settings 👻	
Start the installation assistant	[BE] Synergrid C10/11:2019 LV Generators ext. Decoup. Protection Device
Smart Inverter Screen 🗊	[BE] Synergrid C10/11:2019 LV Generators int. Decoup. Protection Device [CZ] PPDS
SMA Grid Guard login	[DE] VDE-AR-N4105 [DE] VDE-AR-N4105-HP
eManual	[DE] VDE-AR-N4105-MP
Logout	[DE] VDE-AR-N4105:2018 Generators > 4.6 kVA [DE] VDE-AR-N4105:2018 Generators up to 4.6 kVA
<ul> <li>∂ Help -</li> </ul>	[DE] VDE0126-1-1 [DK] Dansk Energi DK1:2019 LV [DK] Dansk Energi DK2:2019 LV

- c. If you require Export Limiting refer to Section 6.1.
- d. Otherwise click on continue until you reach the Summary Page.
- e. On the Summary Page make sure the country standard is set correctly, refer to image 7.



Image 7: Country Standard

### 4.2 Via Web Browser

If using a mobile device and not using the SMA 360 app, please refer to section **3.1.2.1** on how to connect to the inverter via Wi-Fi. Then, follow the instructions from "Login as an **Installer**" in section **3.1.b**.

For all other users with a laptop please refer to section 3.1.2 for connection via Wi-Fi or Ethernet.

#### 4.2.1 Installation Assistant

1. To start the installation assistant, navigate to the user settings icon as shown below.

SUNNY TRIPOWER 4.0							MA
🖨 Home	Instantaneous values	Contraction Device parameters	Events	A Device configuration	😂 Data	1	• •
Device s	tatus Fault	Curren	nt power		Yield Today: Yesterday:	Start the installation assistant Smart Inverter Screen <b>1</b> SMA Grid Guard login eManual Logout	kWh kWh
II III		Tor		o w	Total:	201.	0 kWh

Image 8: Installation assistant

- 2. Complete Network and Time settings then move onto Country Standard.
  - a. Select the correct country code from the dropdown list.
  - b. Refer to your grid operator for correct settings.

Set country standard

	~
[AT] TOR D4 2016	
IATI TOR Generator Type A V1.0:2019	
[AU] AS/NZS 4777.2:2020 Generator Region A	
[AU] AS/NZS 4777.2:2020 Generator Region B	
[AU] AS/NZS 4777.2:2020 Generator Region C	
IAUI AS/NZS 4777 2:2020 Generator Region NZ	

Image 9: Available Country Standard

- 3. If you require Export Limiting refer to Section 6.1.
- 4. Otherwise, click on continue until you reach the Summary Page.
- 5. On the Summary Page make sure the country standard is set correctly, refer to image 7.

# 5 Checking of Firmware and Country Settings

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

- a. WebUI of the inverter
  - i. Via SMA 360 App
  - ii. Via Web Browser

### 5.1 Via WebUI

Screenshots shown below are using a mobile device, web interface will look slightly different on a laptop/computer screen.

Login to the inverter WebUI as a <b>User</b>	Checking the Country standard
Refer to section <b>3.1.2</b> for web browser connection options or <b>4.1</b> for 360 App connection.	Navigate to <b>Device Parameters &gt; Grid Mon-</b> itoring > Grid Monitoring > Country stand- ard.
	Home
	# Home
	Instantaneous values     Device parameters
Login	> type Laber
Language	➤ User Rights
English	> DC Side
User group	> AC Side
User 🗸	✓ Grid Monitoring
Password	Grid monitoring
	Country standard [AU] ASINUS 4777 2:2020
Forgot password?	Generator Kegion A
Login	System communication
	External Communication
	> Device Components
	> System and device control
	> Grid connection

#### Checking the Firmware

On the **Home** page scroll to the bottom of the screen to find the current firmware.



Serial number:	User group: User
Firmware version: 3.11.1.R	
Ethernet IP address:	
WLAN IP address:	

# 6 Export Limiting

### 6.1 Export Limit requirements

Refer to Table 3 and Table 4 on what meters are compatible for export limiting as tested to AS/NZS 4777.2:2020 Section 6.

The Data Manager M is also compatible with 3<sup>rd</sup> party meters, some devices with predefined modbus profiles are listed in Table 5.

		Options for Export Control < 63A			
	INVERTER	SMA Energy Meter	Home Manager 2.0	Data Manager M + Energy Meter	
	SB 1.5/2.5 VL-40	Max 1 PV inverter*	Max 12 inverters*	NA	
	SB 3.0 - 6.0 AV-41	Max 1 PV inverter*	Max 12 inverters*	NA	
	STP 3.0 - 6.0 AV-40	Max 1 PV inverter*	Max 12 inverters*	NA	
	STP 8.0 - 10.0 AV-40	Max 1 PV inverter*	Max 12 inverters*	Max 49 inverters*	
*Test Result	s for AS/NZS 4777.2:2020	0 Section 6 will be ave	ilable on Q3 2023.		

Table 3: Export Limit Selection Guide

	Options for Export Control >63A			
INVERTER	Controller	Energy Meter	Max No. of Inverters	
	SMA Data Manager M	Janitza UMG604E*	Max 49 inverters	
CORE1 STP50-41	SMA Data Manager M	Siemens PAC2200*	Max 49 inverters	
	Home Manager 2.0	In-built*	Max 12 inverters	
* Maximum 1 energy meter with class 1 accuracy is com	per system. The meter requires co patible.	ompatible current transformers. A	Any 5A secondary output CT	

Table 4: Export Limit Selection Guide >63A

Meter Brand	Model	Communication Method
Janitza	UMG604E	Modbus TCP/IP
Siemens	PAC2200	Modbus TCP/IP or Modbus RTU depending on meter model.

Table 5: 3rd Party Energy Meter >63A

## 6.2 Setting up Export Limiting.

This section will only go through SMA Energy Meter compliant devices for export limiting. Please refer to supporting documents for Export Limiting via a SMA Home Manager 2.0 or Data Manager M + Energy Meter<sup>1</sup>.

### 6.2.1 Export limiting via 360 App/Mobile device/Web Browser

Make sure you have completed **Section 3.1** prior to continuing.

If working on a laptop the Web Browser will look slightly different, but the parameter names are the same.

Skip RS485 section and move o	nto Detection of EM	Zero Export Example
Configure the energy meter		Grid management service configuration
Energy meter used		Active power mode Reactive power mode
SMA Energy Meter	~	Grid connection point regulation
Selected energy meter Name of the energy meter	Sattings	Nominal PV system power Your inverter Power rating
Serial number <u>Meter on Speedwire</u>	setungs	(0 W 500,000 W) Operating mode of act. power limit. at grid connection pt
Energy Meter SN	÷	Fixed specification in percentages
		Set active power limit at grid connection point 0 %
		(0 % 100 %) Fallback active power limitation as %, reg. to grid connection point
		0 %
		On Off
Make sure that the Serial Numbe	er of the Energy Meter	Summary of parameters:
is shown in the meter on speedwir	re section.	Nominal PV System Power - This is the rating of the in-
		verter, no need to adjust.
		Operating mode of act. Power limit. At grid connec-
		tion point – this is either % or in Watts of the nominal PV system Power
		Set active power limit at arid connection point - This
		is the actual value to set, for our example 0%/0W.
		Fallback active power limitation as % This is in
		case there is a communication issue with the meter. For
		compliance with AS/NZS 4777.2:2020 Soft Export Limit
		Requirements, the Fallback active power limitation for the
		site must be no more than the active power limit at the grid

# 7 DRED / DRM

### 7.1 Connection to a DRED

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

Olivance Powerlink - Olivance



Image 10: DRC connection, image courtesy of Futurepoint

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 Device Parameters > External Communication > Modbus > TCP server > activated > yes

<ul> <li>Ethernet</li> </ul>			
Modbus			
Jnit ID	3		0
-settings at input 2	On	~	
✓ TCP server			
Activated	Yes	~	

Image 11: Enabling Modbus

### 7.2 DRM Modes

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

SB1.5-1VL-40,SB2.5-1VL-40, SB3.0-1AV-41, SB4.0-1AV-41, SB5.0-1AV-41, SB6.0-1AV-41, STP3.0-3AV-40, STP4.0-3AV-40, STP5.0-3AV-40, STP6.0-3AV-40, STP8.0-3AV-40, STP10.0-3AV-40, STP 50-41, STP110-60

## 7.3 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

## 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	
SB1.5-1VL-40	Yes	Yes	Optional via Sunny Portal
SB2.5-1VL-40			
SB3.0-1AV-41	Yes	Yes	Optional via Sunny Portal
SB4.0-1AV-41			
SB5.0-1AV-41			
SB6.0-1AV-41			
STP3.0-3AV-40	Yes	Yes	Optional via Sunny Portal
STP4.0-3AV-40			
STP5.0-3AV-40			
STP6.0-3AV-40			
STP8.0-3AV-40			
STP10.0-3AV-40			
STP50-41	Yes	No	Optional via Sunny Portal

Table 6: 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 - Webconnect Systems in SUNNY PORTAL</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.



Image 12: Sunny Portal Login

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



Image 13: Report Configuration

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.

PV System Selection >	<			
	Report Configuration	Daily info report 1		
System Name		Daily info report 1		
PV System Overview	Activate Report	Daily info report 2 Daily info report 3		
PV System Profile	Recipient	Monthly info report 2 Monthly info report 3		
Current Status	F-mail Address(es):	Event report 1 Event report 2 Event report 3 Event report for errors in accordance with the standard		
Energy Balance				
Annual Comparison	Interval			
PV System Monitoring	Send Report at:	6:00 AM		
PV System Logbook: 0				
Inverter	Contents			
A Configuration	Select Channel(s):	Daily yield: (kWh)		
		Reimbursement today		
PV System Properties		CO2 avoided today (kg)		
PV System Presentation	Send Report as:	HTML formatting		
Device Overview	Portal Page to Be Sent:	Daily report		

Image 14: Event Report Selection

4. Ensure the drop-down menu at the top of the page now reads **Event report for errors in accordance with the standard**. Now click **Edit** at the bottom of the page.

PV System Selection >	<	
System Name	Report Configuration Eve	report for errors in accordance with 🗸
PV System Overview	Activate Report	×
PV System Profile	Recipient	
Current Status	E-mail Address(es):	
Energy Balance		
Annual Comparison	Contents	
PV System Monitoring	Events in accordance with the	AS 5033
PV System Logbook: 0	standard:	
Inverter		In accordance with the standard AS 5033, upon the occurrence of a ground fault, the report with the corresponding events will be sent. A report will be sent every hour for as long as the ground fault exists.
Configuration		Information: No report will be sent if the event has already been confirmed in the PV system log book or if the Inverter is deactivated in Summy Portal.
PV System Properties		
PV System Presentation	Edit	

Image 15: Editing Report function

5. Next to **Active**, tick the box to activate the report. Under the heading **Recipient**, enter in your email address. Under **Contents**, ensure that **AS 5033** is selected from the drop-down menu. At the bottom of the page, click **Save** once all parameters have been changed.

PV System Selection	Report Configuration	
System Name	Report configuration Even	I report for errors in accordance with V
PV System Overview	Activate Report	C Active
PV System Profile	Recipient	
Current Status	E-mail Address(es): *	Enter email address
Energy Balance	* You can enter more then one e-mail	I address separated with comma.
Annual Comparison		
PV System Monitoring	Contents	
PV System Logbook: 0	Events in accordance with the	AS 5033
Inverter	standard:	
Configuration		In accordance with the standard AS 5033, upon the occurrence of a ground fault, the report with the corresponding events will be sent. A report will be sent every hour for as long as the ground fault exists.
PV System Properties		sunny Portal.
PV System Presentation		
Device Overview	Save Cancel	Send Test Report

Image 16: Selecting Earth Fault Alarm

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

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.