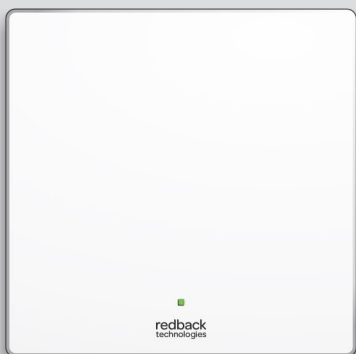


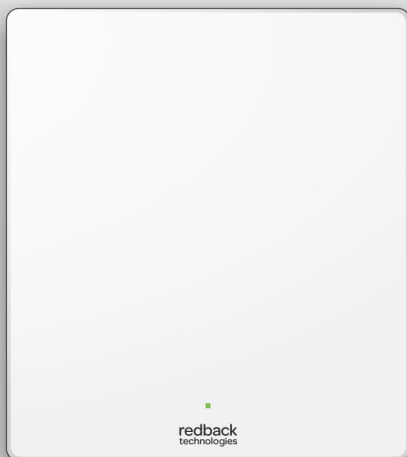
Installation Manual

SI5000/SI6000/SI8000/SI10000 Smart Inverters

V1.4



SI5000/SI6000



SI8000/SI10000

History

Version	Issued	Comments
1.0	15-Oct-21	First release
1.1	07-Jan-22	Updates and additions
1.2	15-Jun-22	P7 Inverter Internet settings flow updated; P13,20,21 Multiple inverters info added; P18 EMS Module installation added; P20-21 Meter/DRED/Interlock cable fabrication drawing added. P20 Meter communication termination resistor check added; P32,33 Earth Fault Alarm info added; P39 Handover checklist relocated to inside back cover; P40 Packing list revised.
1.3	05-Jun-23	P7 Add Smart Load and RCD specification to System overview; P12,15 Correct PV Wire colours; P19 Update Single Line Diagram to v2.1 (PV String grouping corrected); P20 Update DRED connection wire labels; P21 Update Signal grounding; P25 Add introduction to Smart Load Control feature; P34 Add Multiple Inverters interlock behaviour; P37 Add Maximum PV Input Power; Correct Maximum Back Feed Current (was Feedback); P40 Update Packing List.
1.4	10-Jul-23	P37 Update Specifications table: Si8-10k MPPT Operating Voltage (Range): now DC 60-540V (was DC 70 - 540V) Si5-6k Maximum Current (Imp) = DC 15/15A (was DC 13/13A) Si5-6k Short Circuit Current (Isc) = DC 20/20A (was DC 15/15A) Si8-10k Maximum Current (Imp) = DC 30/20A (was DC 26/13A) Si8-10k Short Circuit Current (Isc) = DC 40/20A (was DC 30/15A)

Contact Information

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Privacy notice

Redback will use the personal information provided to us only for warranty purposes. Without this information we will not be able to process your warranty claim. If you require further information about our privacy policy, please visit our website at redbacktech.com.

Start here...

This manual describes the installation and commissioning of a Redback Smart Inverter, hereafter called the “Inverter” or the “System”. There are four inverter models: SI5000, SI6000, SI8000 and SI10000. The differences are in performance, dimensions and weights, and minor variations in the installation procedure.

The Redback Smart Inverter enables the connection of two or three solar array strings and the utility grid. The energy produced by the solar array is automatically directed—for the highest performance and best economic return—to utility grid and or the AC house loads.

The Inverter is supplied as a single, ready-to-install assembly, suitable for new or replacement installations.

Note: This manual does not include installation of the PV arrays or associated hardware. Please refer to PV supplier’s documentation and applicable regulations.

Before you go to site...

Read this manual. The installation manual has all the information you will need for most installation scenarios.

- **Book a support call**

If you think you will require assistance, book Redback Technical Support 2 days before going to site.

This ensures that technical support is reserved for you if you are on-site and need assistance. The Redback Customer Support team is in Brisbane, Australia and is available 8am-4pm (Brisbane time) Monday to Friday. There are three ways to book support:

Web: redback.link/support

SMS: +61 417 632 065

Call from Australia: 1300 240 182

Call from New Zealand: +61 7 3180 2325

- **Register the installation**

Early registration makes it possible to do a functional, testable installation even if some information is not available e.g., installation in a spec home where the owner’s information is not available. You can also pre-assign the installation inspector.

Register the installation at redback.link/register (+Add device).

Need something else?

- **This manual in electronic format**

Download from redback.link/siim

- **Owner’s Guide**

Download from redback.link/sioga

- **Other document? Visit the Redback Document Library**

Installer and Owner documentation is available for our current products. Go to redback.link/docs

- **Contact the Redback Customer Support Team (Monday to Friday, 8am-4pm AEST)**

In Australia: 1300 240 182

In New Zealand: +61 7 3180 2325

Email: customersupport@redbacktech.com

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1. Know your product

1.1 Compatibility and limitations

The Redback Inverter is a non-isolated transformer-less design; all other components of the system must be compatible with this type of Inverter architecture.

The Redback Inverter is not suitable for:

- Off-grid installations, where there is not normally a grid connection.
- Locations without internet access: the system can operate off-line but should normally have internet available – failing to provide the internet connection may result in a delay in being able to process your warranty claim or in Redback’s ability to provide clear support.
- Installation in full-sun locations: the inverter may overheat resulting in reduced efficiency and or automatic shutdown.
- Exposed locations where wind driven rain may penetrate the enclosure.

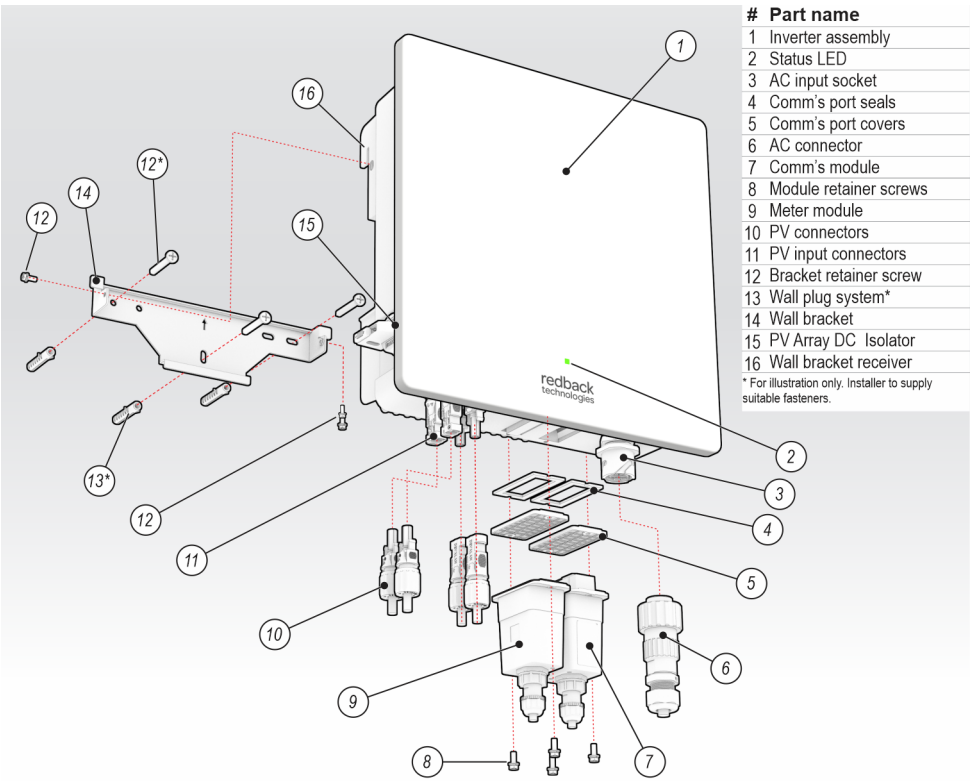


WARNING. This equipment is NOT intended for use with life support equipment or other medical equipment or devices.

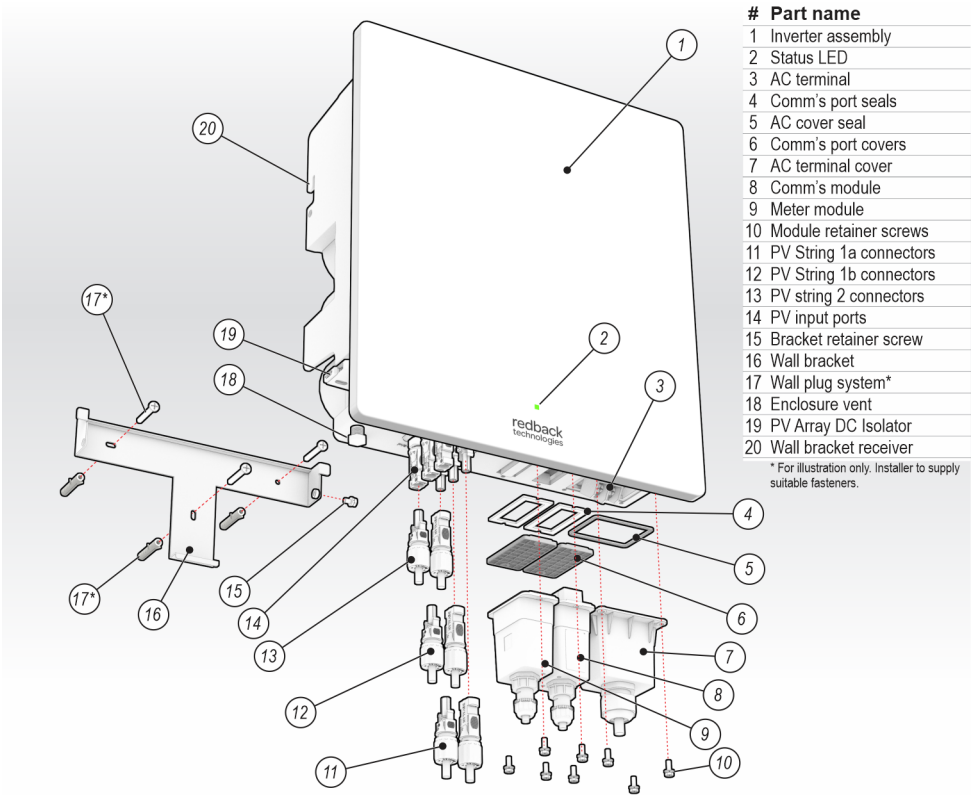


WARNING. Installation in violation of these limitations may void the warranty (refer to the Warranty document).

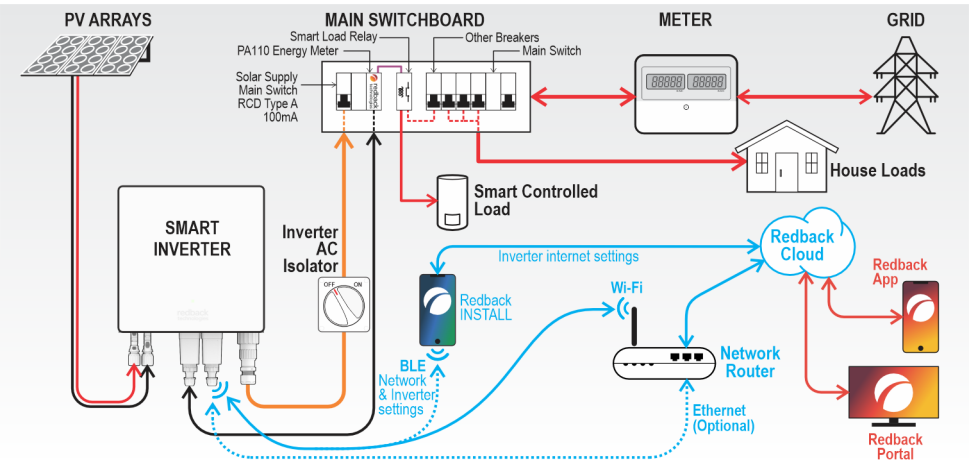
1.2 SI5000 and SI6000 - Major components



1.3 SI8000 and SI10000 - Major Components

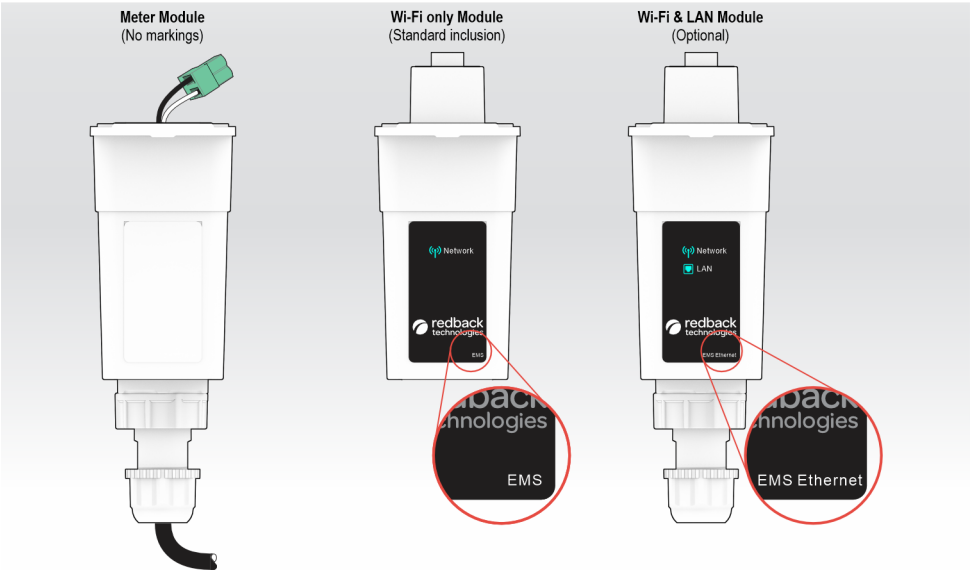


1.4 System overview



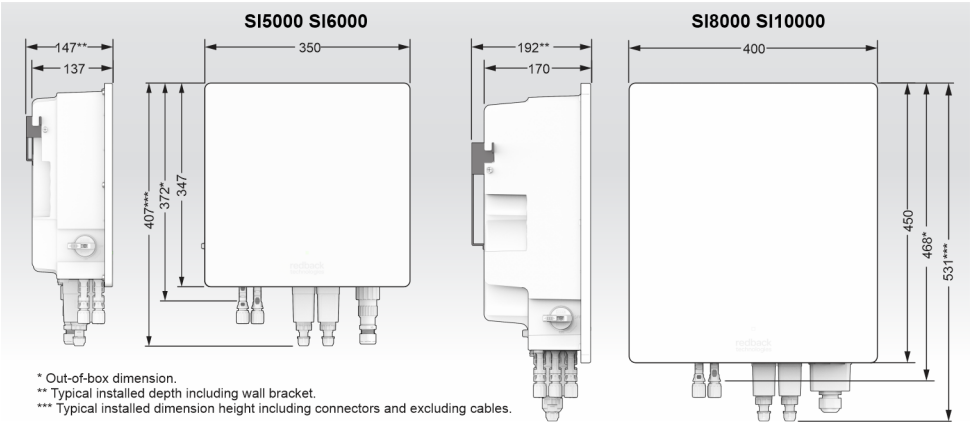
1.5 Plug-in Modules

The modules shown below are available for essential and optional inverter communications.



1.6 Dimensions and weights

Item	SI5000/SI6000	SI8000/SI10000
Dimensions (W x H x D)	350x 372 x 137 mm	400 x 468 x 170mm
Dimensions (W x H x D, installed)	350 x 407 x 147 mm	400 x 531 x 192 mm
Wall space needed with 200mm clear zone	750 x 750 mm	800 x 850 mm
Weight	8.6kg	16.6kg
Shipping weight	10.7kg	20.6kg



2. Installation

Important safety instructions – please read

This document contains important safety instructions. Please read all the instructions and cautionary markings on the product and on any accessories or additional equipment included in the installation. Failure to follow these instructions could result in severe shock or possible electrocution. Always use extreme caution to prevent accidents.

Audience

Installation, maintenance, and connection of Inverters must be performed by qualified personnel, in compliance with local electrical standards, wiring rules and the requirements of local power authorities and/or companies (for example AS/NZS4777 and AS/NZS 3000 in Australia). The Redback Inverter strictly conforms to all related safety rules in design and test.

Safety regulations relevant to the location should be followed during installation, operation, and maintenance. Improper operation may cause electric shock, or damage to property, inverter, or equipment.

These instructions are for use by skilled, qualified personnel who:

- Meet all local and governmental code requirements for licensing and training for the installation of electrical power systems with AC and DC voltages up to 600 volts.
- Hold the required qualifications for installing grid-connected systems.
- Have knowledge of the functional principles and operation of grid-connected systems and knowledge of the installation of electrical devices.
- Understand the risk associated with installing and using electrical devices and can implement appropriate risk management strategies.
- During the preceding year, have completed Redback approved training on the installation of SI Inverters.

Symbols used in this manual

Symbol	Definition	Symbol	Definition	Symbol	Definition
	LETHAL DANGER! Risk of electrocution.		WARNING! Burn hazard		HEAVY LIFT Seek help.
	DANGER! Risk of electrical shock.		CAUTION! Fire hazard.		CAUTION! Risk of injury
	WARNING! Hazard to human life		CAUTION! Hazard to equipment		CAUTION! Risk of explosion
	Information. The information provided is important for the correct installation, operation and or maintenance of the equipment. Failure to follow the recommendations could result in annulment of the equipment warranty.				PPE. Use appropriate personal protective equipment.

Symbols used elsewhere

Symbol	Definition	Symbol	Definition	Symbol	Definition
	HEAVY! Bend knees to lift.		FRAGILE. Handle with care. Do not tip. Do not sling.		DELAY. Wait specified time.
	HEAVY! Two-person lift needed.		This product has recyclable parts. Dispose of correctly.		REFER TO DOCUMENTS.
	PACKAGE MASS. In kilograms.		STACKING LIMIT. E.g., stack packages six high or less.		Do not dispose as household waste.
	THIS SIDE UP. Transport, handle and store the package with the arrows pointing up.		KEEP DRY. Protect the product from excessive humidity. Store under cover.		

General safety

Symbol	Definition
	CAUTION: Equipment damage. Only use components or accessories recommended or sold by Redback Technologies or its authorised agents.
	IMPORTANT. Do not attempt to install this equipment if it appears to be damaged in any way. See the Warranty document for instructions on returning the equipment.

Personal safety

Symbol	Definition
	WARNING: PERSONAL INJURY
	
	
	
	- Use safe lifting techniques. For guidance visit safeworkaustralia.gov.au or contact your local WHS authority. - Use the correct PPE e.g., safety glasses, ear protection, steel-toed safety boots, safety hard hats, etc. - Use standard safety practices when working with electrical equipment e.g., remove all jewellery, use insulated tools, wear cotton clothing etc. - Never work alone when installing or servicing this equipment. Have an assistant nearby. - Do not touch the inverter during operation. The temperature of some parts may exceed 60°C during operation. After shutdown, allow the inverter to cool for at least 5 minutes before touching. - Ensure that children, pets, and other animals are kept away from the inverter and utility grid components. - If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Equipment safety

Symbol	Definition
	WARNING: LETHAL VOLTAGE
	- Review the system to identify all possible sources of energy. Ensure all sources of power are disconnected before performing any installation or maintenance on this equipment. Confirm that the terminals are de-energised using a validated voltmeter (rated for a minimum 1000 VAC and 1000 VDC) to verify the de-energised condition. - Do not perform any servicing other than that specified in the installation instructions unless qualified to do so or have been instructed to do so by Redback Technologies technical support personnel. - To avoid electric shock, disconnect the DC input and AC input of the Inverter at least 5 minutes before performing any installation or maintenance. - Completely disconnect all sources of power prior to maintenance. Do not remove the Inverter Front Cover. - Do not tighten the AC and DC terminals or pull on the AC and DC wiring when the Inverter is running.
	WARNING: BURN HAZARD
	External and internal parts may be hot. Do not remove any cover during operation or touch any internal parts. Be sure to allow enough time for internal parts to cool down before attempting to perform any maintenance.
	WARNING: FIRE HAZARD
	- Do not keep combustible or flammable materials in the same room as the equipment. The Redback Inverter contains relays and switches which are not ignition protected. - Ensure AC, DC and ground cable sizes conform to local codes and are fit for purpose. See product manuals for minimum size requirements. Ensure all conductors are in good condition. Do not operate the unit with damaged or substandard cabling.
	CAUTION: EQUIPMENT DAMAGE
	
	
	
	- Ensure clearance requirements are strictly enforced. Remove all obstructions that may prevent proper air flow around, or through, the unit. - Do not remove the Inverter Front Cover. Apart from performing work at the wiring terminals (as instructed in this manual), touching, or changing components without authorisation may cause injury to people, damage to the Inverter and annulment of the warranty. - Static electricity may damage electronic components. Take proper steps to prevent such damage to the Inverter otherwise the warranty may be annulled.

2.1 Installation overview



Installation by non-approved installers may void the product warranty.

You are approved to install Redback products if you:

- Are a Redback registered and qualified installer, and
- Hold the required qualifications for installing grid-connected inverters, and
- Have a Redback Installer login.



Not sure?

Contact Redback on 1300 240 182 if you are unsure of your approval status



Multi-inverter installations.

Multi-inverter systems can be installed on individual phases, or multiple inverters on a single phase, or both.

The installation of each inverter is identical, except that the Meter/DRED/Interlock wiring varies. The inverters must be interlocked such that all inverters shut down simultaneously.

Contact Redback if you require assistance setting up a multi-inverter installation.

2.1.1 BEFORE YOU GO TO SITE

A few simple preparations will help the installation run smoothly.

1. If you think you will require assistance, book a support call at redback.link/support
2. Register the installation at redback.link/register (+Add device)
3. Gather the required tools
 - Normal electrician's tools including crimping kit and Cat5 cable tools
 - Electric drill/driver with Phillips head screwdriver bit; drill bits suitable for drilling walls
 - Tape measure and spirit level
 - Internet connected device with Redback Install app
4. Gather the following information for use during registration, installation, onboarding, and commissioning.

System serial number:		
Your Redback Installer Login:		Apply at redback.link/apply
Homeowner details (required)	Full name:	
	Installation address:	
	Email:	
	Mobile:	
Homeowner Wi-Fi details	Wi-Fi Name:	
	Wi-Fi Password:	

INSTALLATION CONFIGURATION

Regional Safety Settings	☐ Australia A	☐ New Zealand
	☐ Australia B	
	☐ Australia C	
Soft Export Limit		
Hard Export Limit		
Soft Generation Limit		
Hard Generation Limit		
Compliance Inspector		

2.1.2 AT SITE

Ensure Wi-Fi availability (if to be used)

Measure the home Wi-Fi strength at the proposed installation site. Review installation plan if Wi-Fi strength is less than -70dBm, otherwise ongoing connection problems may occur.

Wi-Fi Strength ¹ :	☐ None ²	☐ Weak (< -70dBm) ³	☐ Good (approx. -70dBm)	☐ Strong (> -70dBm)
-------------------------------	--	--	---	---

1. Test inverter location before installation
2. Mandatory: Request Redback Customer Service to set the inverter to “Off Comms”
3. Find an installation site with Good or better Wi-Fi strength

Review the proposed inverter location.

The inverter must be placed vertically and attached to a wall using installer selected fasteners, and preferably with the LED about 1500mm above the floor.

- Is there 200mm clearance all-round and, for multiple inverter installations, 300mm between adjacent inverters? A typical installation needs the clearances shown.
- Is the site in full sun? Reduce heat load by shading or installing out of full sun: ideally, the installation will be against a south facing external wall, and under eaves.
- Will it be exposed to heavy rain and wind, or is there a drenching risk due to downpipes or gutters?
- Is it a coastal environment? Will it be exposed to salt spray?
- Is the mounting wall structurally sound (to carry the inverter weight)?
- How will cables be routed to the bottom of the inverter?

At site, the following tasks must be completed. Installers may complete hardware and electrical tasks in their order of choice.

Hardware

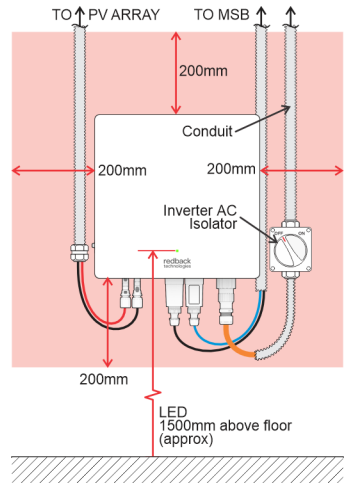
- Install inverter
- Install Inverter AC Isolator

Electrical

- Install PV Array and run DC cables to the inverter site. LHS recommended.
- Run and connect LV cables and conduits from main or sub-board.
- Install EMS module and fabricate ethernet cable, if needed. Run ethernet from home network router to Inverter.
- Fabricate and connect Meter-DRED-interlock cable as required, otherwise run supplied meter cable from Inverter to the PA110.
- Install Redback PA110 Energy Meter in main switchboard.
- Complete connections to Inverter (main switchboard or sub-board)

Commissioning

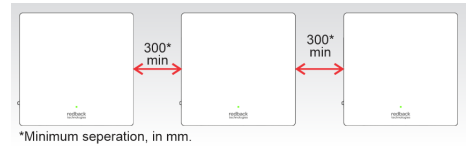
- Test the electrical installation.
- Power ON the Inverter (Solar Supply Main Switch and local Isolator).
- Commission using Redback Install.
- Arrange an installation inspection.
- Clean worksite.
- Document the installation.
- Handover to owner, including instruction on the Portal and the MyRedback app.



2.2 Multiple-Inverter installation notes

Multiple Inverter installations are possible using these guidelines

- Up to one inverter per phase in 3-phase installations
- Up to three inverters per phase 1-phase installations
- Inverters must be spaced at least 300mm apart.
- Installation of each inverter is as for a single inverter installation except all inverters must be interlocked as described in section 2.7.5. If any inverter shuts down as per AS4777.2:2020 requirements, the interlock will cause all inverters to disconnect from grid. The LEDs will show OFF and continuous RED, respectively.
- Observe all local regulations including max. output/phase.



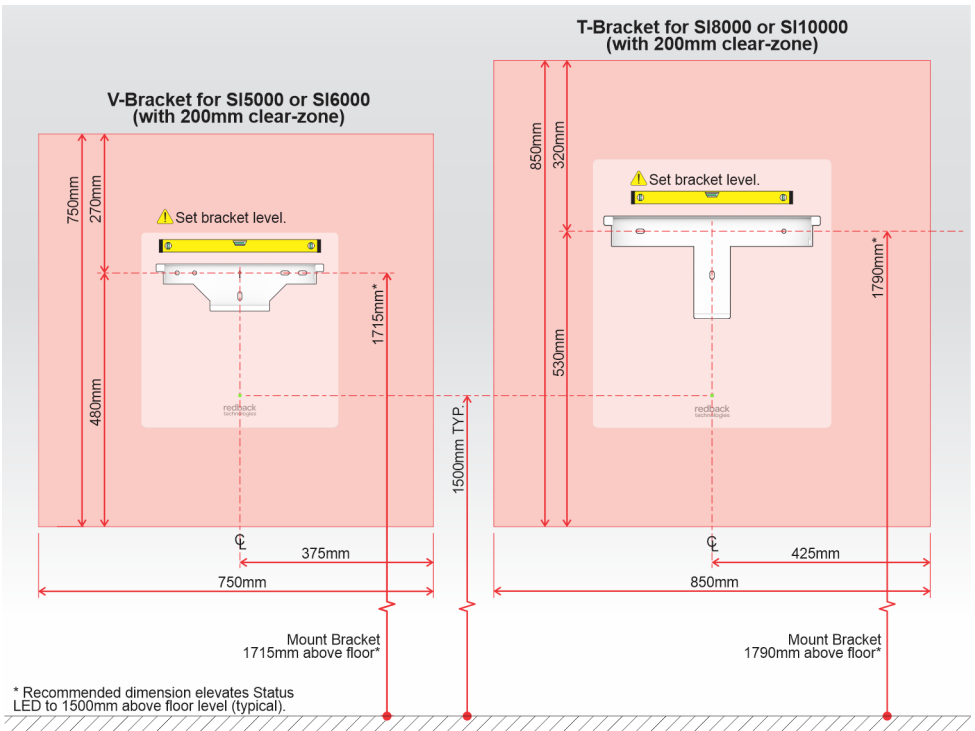
2.3 Install wall bracket

Installation notes

- Where possible, position the inverter for ease of use. The diagram below shows bracket installations that will set the LED and PV isolator at approximately 1500mm above the floor. This height is convenient for most users.
- Fasten the enclosure to a flat, structurally sound wall. Ease of installation may be affected if the wall bracket becomes twisted or damaged. Use spacers if needed.
- Installer to supply suitable wall fasteners, up to $\phi 7\text{mm}$.
- The enclosure is convection cooled. Ensure there is at least 200mm clear space on all sides of the inverter.

Installation process

1. Mark out the position for the wall bracket, using the bracket as a template, and referring to the diagram below. Use a spirit level: there is no adjustment after inverter is hung.
2. If necessary, use spacers as needed to ensure the bracket does not distort when fastened to the wall.
3. Fix the enclosure to the wall using three suitable fasteners.



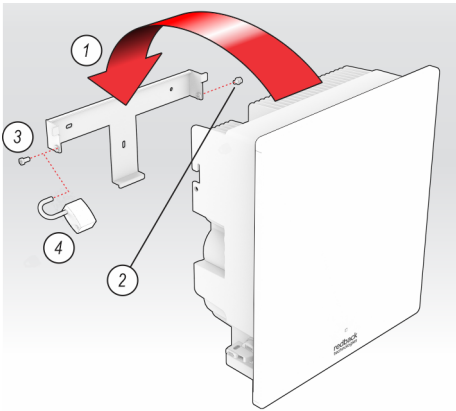
2.4 Mount Inverter Module



The Inverter weighs up to 20kg.
Seek help if needed.

The Inverter is hung from the pre-fitted wall bracket, retained using one screw and optionally secured by a padlock.

1. Lift the inverter onto the wall bracket, ensuring that the inverter side hooks engage the wall bracket wings.
2. Install the retainer screw at the right-hand side of the wall bracket
3. Install the retainer screw at the left-hand side of the wall bracket (SI5000 or SI6000)
4. If required, fit a padlock to the left-hand side of the inverter, as shown (SI8000 or SI10000)



2.5 Run cables



No two installations are the same; variations occur due to age, equipment, technology, local regulations, and work practices. Installing electricians must adapt the information provided in this document to the current installation, adhering to all local regulations and standards, and good electrical practice.

Cables are connected to the inverter using sockets or terminals located on the bottom side of the inverter.

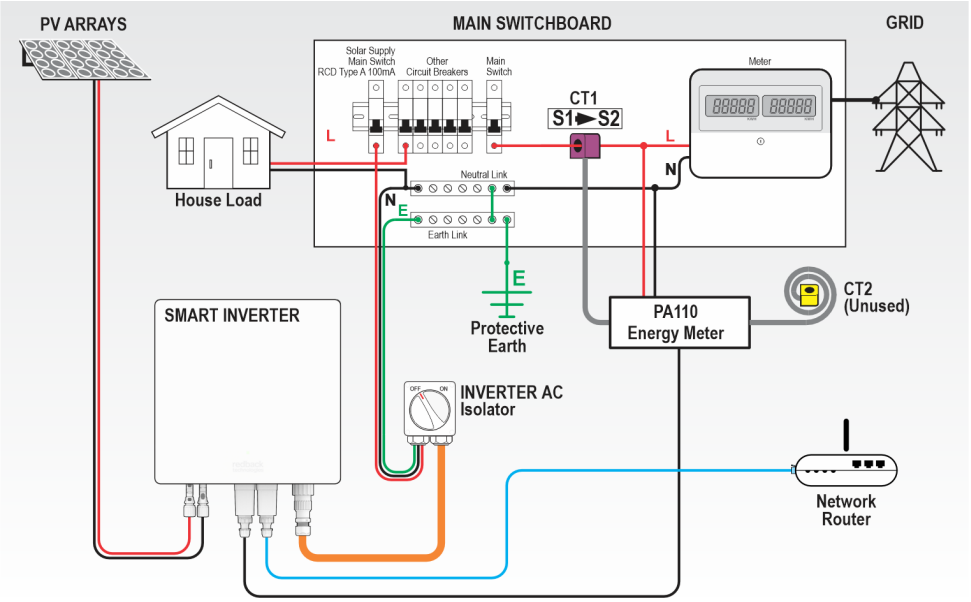
Ensure that the cable tails have generous bend radii, are long enough to reach the Connectors panel, and form effective drip loops.

Cables to run include:

Grid connection from main or sub-board	The RCD used on the main solar supply circuit should be Type A 100mA. This and all associated wiring must be installed per AS/NZS 3000 and AS/NZS 4777.1 AC isolator to be fitted in-line and adjacent to the inverter. RHS recommended for neatest installation. Installer to calculate cable size per AS3008. UV resistant orange circular cable preferred for best water proofing.				
	Minimum specifications	SI5000	SI6000	SI8000	SI1000
	Minimum AC Isolator Rating	25A	32A	40A	50A
	Minimum Cable Size*	4mm ²	6mm ²	6mm ²	10mm ²
DC cables from PV arrays	LHS recommended for neatest installation.				
Power meter cable	Installer to use supplied 10m 2-core cable and shorten as required or supply own cable over 10m. Route to RHS for neatest installation.				
DRED cable	Installer to discard supplied 2-core cable and fabricate a new 4-core shared cable as described in section Error! Reference source not found. Cable is shared with power meter. Route to RHS for neatest installation.				
Ethernet cable (recommended)	Connects to home network; Installer to supply and terminate CAT5/RJ45; configure as straight-through. Route to RHS for neatest installation.				

*Installer to calculate required cable size per applicable standards.

2.6 Connection overview



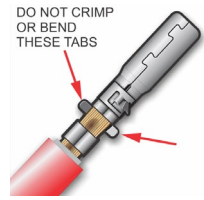
2.6.1 NOTES ON AC CABLE SIZES

- Calculate cable size per AS3008.
- If larger cables are required to combat voltage drops, the short cable run from Inverter AC isolator to GRID AC plug must not exceed the sizes shown right.
- All AC wiring must be installed per AS/NZS 3000 and AS/NZS 4777.1.
- UV resistant Orange circular cable preferred.

Model	Wire	Cable size mm ²	
		Minimum	Maximum
SI5000	Conductor	6	6
SI6000	Earth	2.5	6
SI8000	Conductor	6	10
	Earth	2.5	4
SI10000	Conductor	10	10
	Earth	4	4

2.6.2 PV ARRAY CONNECTIONS

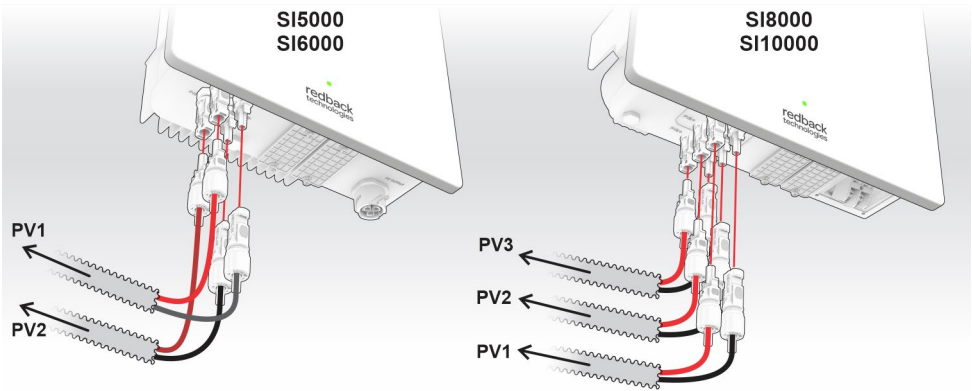
	ONLY USE THE SUPPLIED PV CONNECTORS. AS5033 prohibits mixing of PV connector types and brands.
	WARNING: SHOCK HAZARD. Solar arrays generate energy even in very low light. Handle cables and connectors carefully to avoid shock or arcing.
	CAUTION: LIGHTNING PROTECTION. The PV arrays in this system must be protected by a Lightning Protection System compliant with AS/NZS5033:2014.
	WARNING: ELECTRICAL DAMAGE RISK. Solar arrays must be electrically isolated from each other: Do not bridge arrays, connect in parallel or serial, or share isolator switches. Do not connect or disconnect PV while the inverter is ON.
	WARNING: ELECTRICAL DAMAGE RISK. CRIMP WITH CARE! The connectors used in this product are similar but not identical to MC1-style connectors. Use the correct Crimping tool. The connectors have small “barbs” that are required to ensure correct alignment and penetration of the connectors within the plastic housing. DO NOT crimp, bend or modify these barbs in any way otherwise severe inverter damage may result. Damaged connectors must be discarded.



The SI5000 and SI6000 accept power from one or two PV arrays, using two pairs of connectors on the base of the unit.

The SI8000 and SI10000 accept one or two or three PV arrays, using three pairs of connectors. Inputs PV1 and PV2 are combined inside the inverter.

- Install suitable DC Isolator(s) close to the inverter.
- Run the PV cables from the PV array to the associated isolator.
- Run the PV cables from the Isolator(s) to the inverter. Shorten the cables to form drip loops.
- Terminate the cables using the supplied connectors. Note polarity assignments: Red is positive; Black is negative.
- Plug the cables into the PV1, PV2, and PV3 sockets, ensuring that cables remain paired, and observing polarity.



2.7 Terminate and attach cables

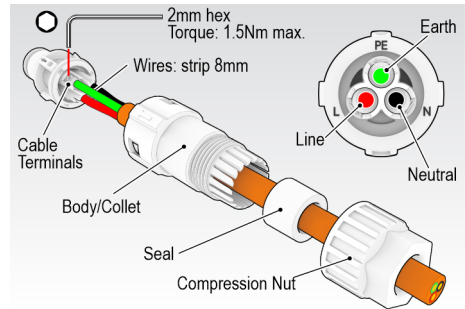
2.7.1 AC CABLE SI5000 AND SI6000

AC to/from the main switchboard is connected using a 3-pin plug-in connector, retained by a single bayonet, as described below.

1. Terminate the AC cable using the supplied female connector, as shown.
2. Insert the assembled plug into the socket on the bottom side of the inverter. Push up until there is a tactile or audible click.

Notes:

- Wire stripping length: 8 mm.
- Clamp screw torque: 1.5Nm max.
- Wire size: 6mm² max.
- Assemble components in the order shown and observe polarity.

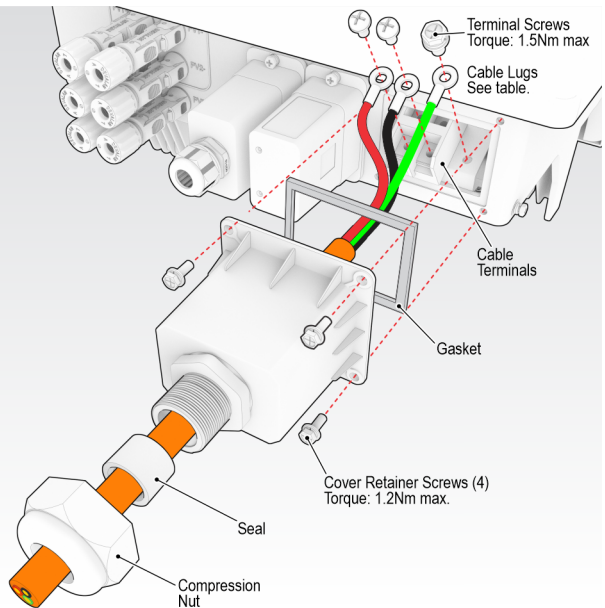
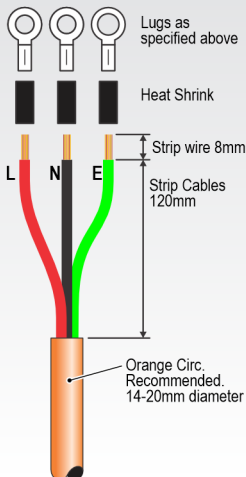


2.7.2 AC CABLE SI8000 AND SI10000

The AC cable is connected to terminals located at an opening in the bottom of the inverter. The terminals are protected by the supplied cover and cable gland.

1. At the bottom of the inverter remove the terminal shipping cover.
2. Disassemble the Terminal Cover Gland and pass the AC cable through the gland and cover.
3. Strip and terminate the cables using lugs, as shown below.
4. Connect the cables/lugs to the terminals as shown. Torque screws to 1.5Nm.
5. Fit the terminal cover and screws. Torque screws to 1.2Nm.
6. Tighten the gland.

# LUG SIZES (SUPPLIED)			
Model	L	N	E
SI8000	6M5	6M5	2.5M6



2.7.3 INSTALL EMS COMMUNICATIONS MODULE

Redback offers three types of communications modules for SI-series Smart Inverters, available as standard inclusion, upgrade, or replacement parts.

Installation of all modules is similar, except that EMS-Ethernet requires fabrication and connection of an ethernet cable.

The EMS modules house the identity of the inverter: replacement requires the recommissioning of the inverter (section 4).

Model name	Internet Comm's Solution	Comments
EMS	Wi-Fi connection to local network	Standard inclusion
EMS-Ethernet	Ethernet connection to local network	Optional. Requires fabrication and routing of ethernet cable.

*See section 1.5 for module illustrations

Installation Procedure

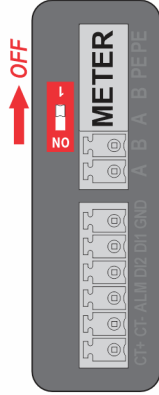
EMS MODULES	EMS-ETHERNET MODULE
1. Remove the cover from the COM1 port. 2. Align the module to COM1 ensuring that the D-Plug and socket align, and label is visible (facing out). 3. Engage the plug and socket and firmly push in until the module touches the gasket. 4. Tighten the captive screws to 1.2Nm. 5. Module installation is complete. Screws: Torque to 1.2Nm Note: For clarity, captive screws are shown removed.	1. Remove the cover from the COM1 port. 2. Align the module to COM1 ensuring that the D-Plug and socket align, and label is visible (facing out). 3. Engage the plug and socket and firmly push in until the module touches the gasket. 4. Tighten the captive screws to 1.2Nm. 5. Plug in the ethernet cable and tighten the plug nut. 6. Ensure the gland nut is tight. 7. Module installation is complete. Screws: Torque to 1.2Nm Note: For clarity, captive screws are shown removed. Terminate: RJ45 Straight-thru Std: ANSI/TIA-568A/B To LAN or Router

2.7.4 PREPARE ETHERNET CABLE (IF REQUIRED)

1. Run the ethernet cable from the LAN port or router to the inverter.
2. Terminate the LAN/Router end as RJ45 Straight-thru as shown above. Plug into the LAN or Router port.
3. Terminate the inverter end RJ45 Straight-thru. Use the supplied Devlan gland, as shown above.
4. Plug the ethernet cable into the EMS module and tighten the plug and gland nuts.

2.7.5 Set Meter Dip Switch OFF

1. Remove the COM2 port cover and discard. The gasket will probably stay in place.
2. Set the red dip switch located inside COM2 port to position "1" (Off) to prevent meter communication issues.



2.7.6 Meter/DRED/Interlock Cable Fabrication

Fabrication procedure

1. Retrieve the 6-pin connector from the accessories pack.
2. Locate the Meter Module and cable assembly. Remove the 2-pin connector. Keep for re-use.
3. Loosen the Gland Nut. Discard the 2-wire cable.
4. Run a new 2- or 3-pair cable from inverter to MSB.
5. At the inverter end, apply 300mm UV-resistant sheath to the cable.
6. Pass the cable through the Meter module and terminate as shown.
7. Plug the cables into the COM2 sockets.
8. Slip the Meter module along the cable and fasten to the inverter using the captive screws. Ensure the gasket is correctly seated.
9. Tighten the Gland Nut.
10. At MSB, connect wires as shown below.
11. Repeat 1-10 for each inverter.

2. To add Interlock or DRED

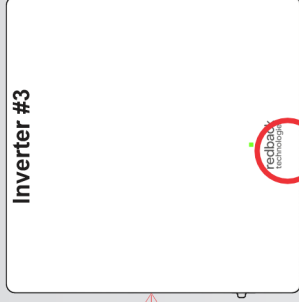
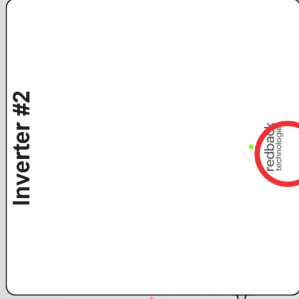
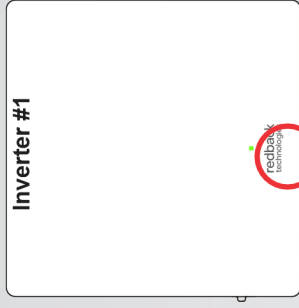
A new 2-pair 1.5mm² instrument cable is required. Installer to fabricate.

3. To add Interlock and DRED

A new 3-pair 1.5mm² instrument cable is required. Installer to fabricate.

To add DRED and or Interlock

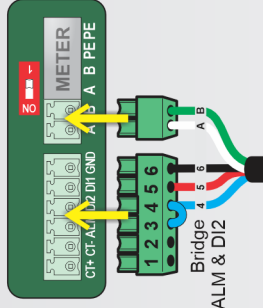
- Installation notes:
- a. Interlock is required only for multi-SI Inverter installations
 - b. For Interlock, pin-bridging is required.
 - c. GND_S wire is shared by DRED and Interlock.



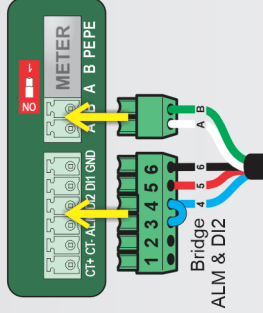
300mm Min.

300mm Min.

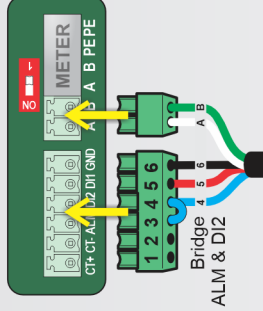
Inverter #1 COM2 Port

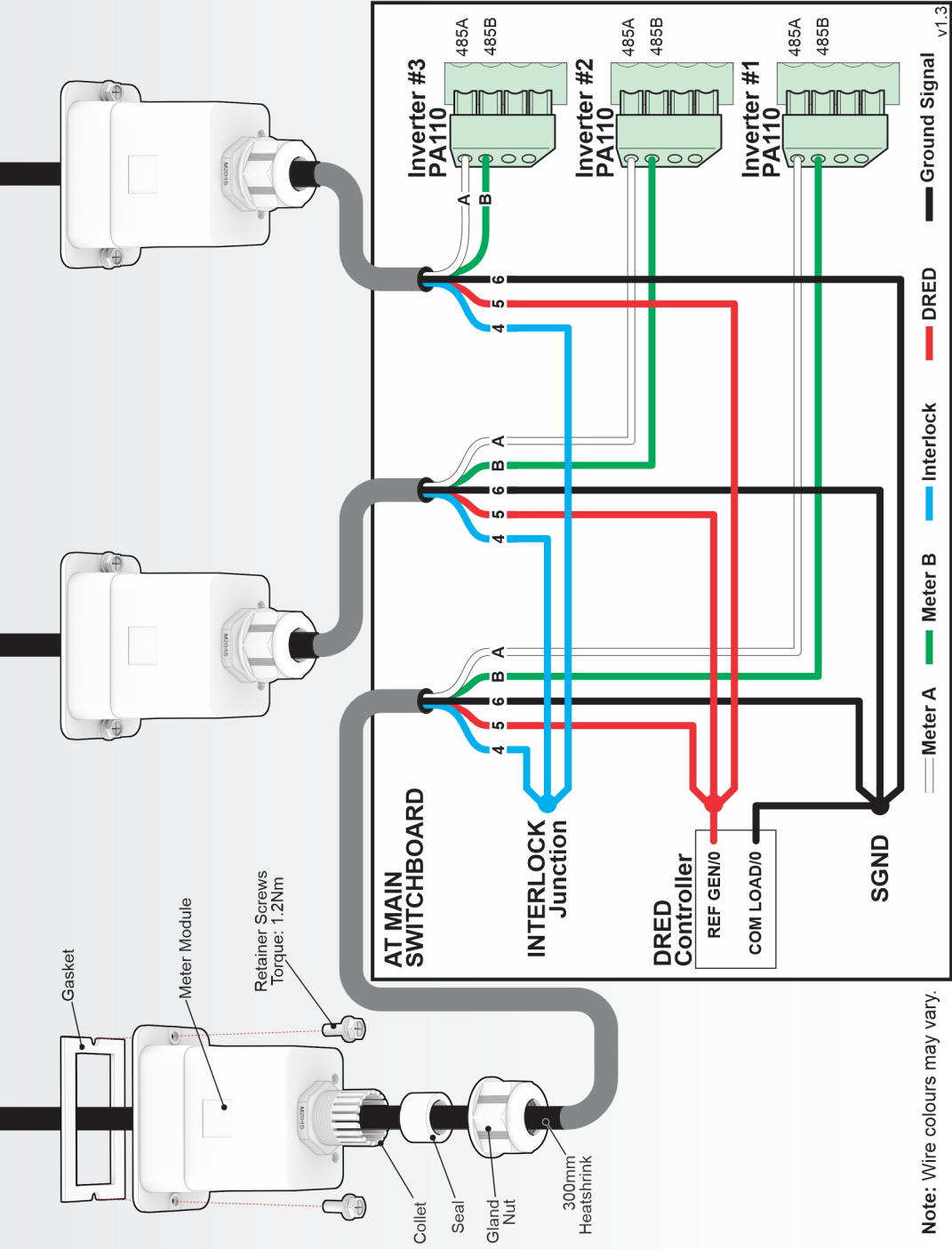


Inverter #2 COM2 Port

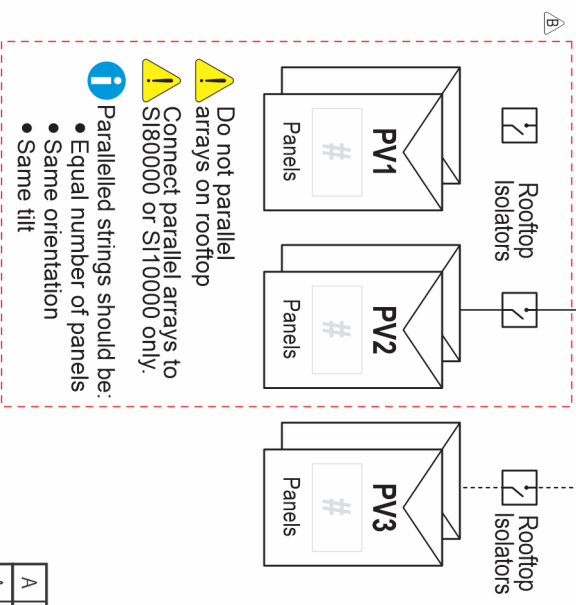
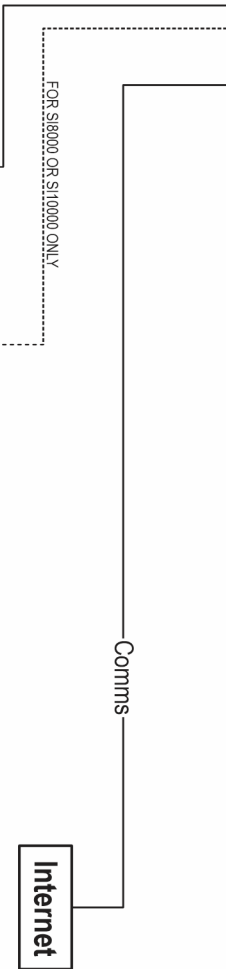


Inverter #3 COM2 Port





Note: Wire colours may vary.



A	Parallel strings corrected (Now PV1+PV2 was PV2+PV3)	AS	AK	19DEC22
A	PV ARRAY DC ISOLATOR SPEC. UPDATED	AS	AK	19DEC21
ITEM CHANGE DETAILS				
DESCRIPTION		DRAWN BY		
REDBACK SMART INVERTER		APPROVED		DATE
SINGLE LINE DRAWING				
INDEPENDENT INSTALLATIONS				

SCALE		MATERIAL		DESCRIPTION		
NA				REDBACK SMART INVERTER SINGLE LINE DRAWING INDEPENDENT INSTALLATIONS		
DRAWN	AS	DATE	19Dec2022			
CHKD		DATE				
APPD	AK	DATE	19Dec2021			
FINISH						
PART NUMBER				DRAWING NUMBER		
				SI Series Single Line Diagram v2.1 des		
				VERSION	2.1	SHEET
						1 OF 1
						A4
						
				Building 1015, 80 Meiers Rd, Indooroopilly, QLD 4068 Australia 1300 240 182 www.redbacktech.com		

2.8 PA110 Energy Meter installation



WARNING. Connect the PA110 as shown below. Ensure that Current Transformer (CT) and corresponding supply cable are connected to the same phase. Incorrect connection will cause incorrect data and may damage the meter.

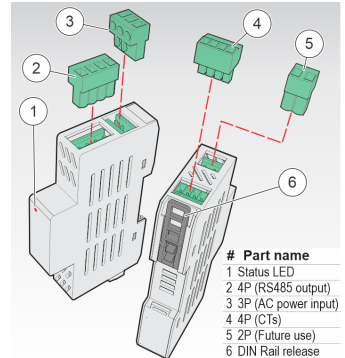
2.8.1 OVERVIEW

The Inverter includes one Redback PA110 energy meter to measure the instantaneous voltage, current, power and energy of a single-phase grid supply. The data is transmitted to the inverter and used to manage inverter output.

The PA110 uses a non-intrusive, clip-on, “split core” type current transformer (CT).

The installation process is:

1. Run the communication cable from inverter site to the main switchboard.
2. Install the energy meter in the meter box or suitable enclosure.
3. Attach CT and connect AC supply.



2.8.2 INSTALLATION NOTES

- The PA110 is not waterproof and must be mounted in a weatherproof location, preferably inside a meter box or dedicated enclosure.
- The PA110 is DIN rail mounted, occupying 1x MCB space (18.5mm or 1-pole or 1-DIN slot).
- The PA110 must be installed such that all terminals are protected from accidental contact.
- The CT has a 1m cable. Cable may be shortened or coiled, as necessary. Bootlace crimping is recommended. Ensure shortened cables are reconnected to the same positions on the plug.
- All plugs to the PA110 are non-interchangeable Phoenix-style connectors. All required plugs are supplied.
- The PA110 and CT are a factory-calibrated assembly. Do not swap the CT with other products.

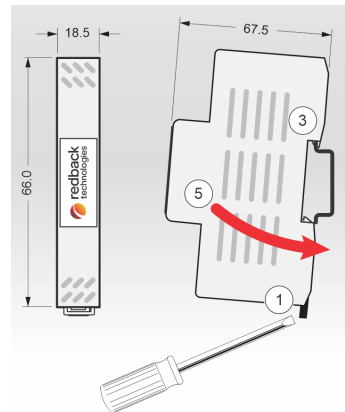
2.8.3 INSTALLATION PROCESS

Inspect the installation location. Identify mounting point for PA110, supply power take-off points, and CT attachment point.

Mount the Power Analyzer to an available DIN Rail location. The PA may be mounted adjacent to other devices.

To mount the energy meter on a DIN rail:

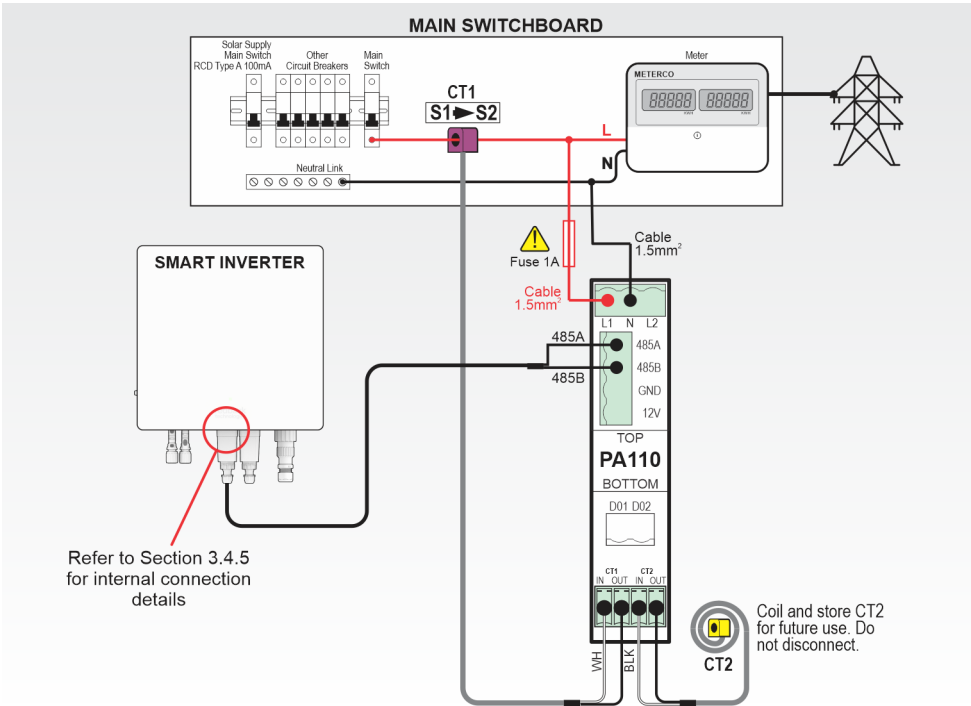
1. Press the unlock lever.
2. Release the clip.
3. Hook meter onto DIN rail
4. Rotate so that the body is flush against the rail.
5. Push clip up until there is a “Click!”.



2.8.4 PA110 AND CT CONNECTIONS

Connect to the meter as shown below.

1. To ensure correct readings, ensure CT1 is clipped onto L as shown below.
2. Terminal screw torque: 0.2Nm maximum.



2.9 Smart Load Control

Download the complete Smart Load Control Installation Guide at redback.link/sislc

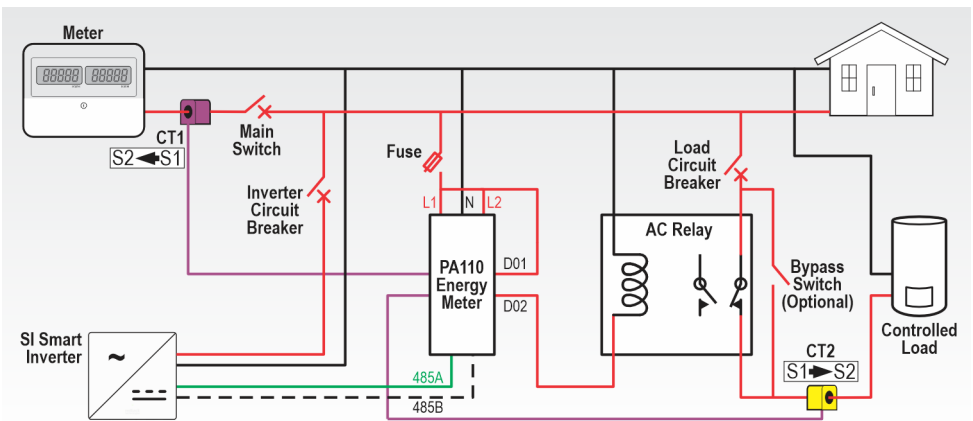
2.9.1 OVERVIEW

Redback's Smart Load Control feature enables homeowners to make the most of their generated energy by only operating their large loads (such as a pool pump or hot water system) when there is excess solar energy available.

Smart Load Control aims to:

- Run the load using only excess PV energy.
- Avoid switching the load excessively (e.g., when a small cloud passes in front of the sun).
- Optionally, the system will ensure that the load runs for a nominated number of hours each day. This is useful for equipment like pool pumps or hot water systems which require a minimum daily run-time.

The Smart Load Control feature is available on all Redback SI-series Smart Inverters and requires that a relay is wired into the existing SI inverter energy meter.



2.9.2 REQUIREMENTS

Smart Load Control requires:

- A Redback SI-series Smart Inverter
- A Redback PA110 Energy Meter installed in the main switch board (supplied with the inverter)
- A relay or contactor rated to switch the desired load (supplied by installer)
- The SI inverter's Energy Management System module (EMS) must be running firmware 3.2 or greater. Contact the Redback Customer Support team to perform this upgrade.

3. Commissioning

3.1 Commissioning the Inverter

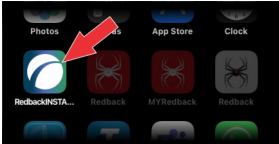
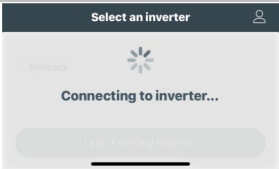
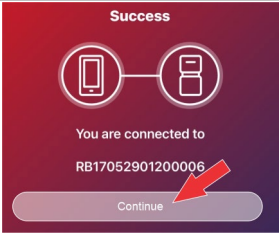
3.1.1 START THE INVERTER

Start-up notes

#	Procedure	Illustration
1	At the main switchboard switch the SOLAR SUPPLY MAIN SWITCH ON.	Solar Supply Main Switch 
2	At the inverter turn the AC Isolator ON	
3	On the inverter turn the PV ARRAY DC Isolator ON (Clockwise).	
4	Wait for the Inverter status LED to begin flashing blue (about 30 seconds). The inverter is now advertising Bluetooth and is ready for connection to the Redback Install app. <i>Note: Ethernet connected systems will automatically connect to the LAN and the internet, indicated by the Comms module LAN LED ON (White).</i>	

3.1.2 CONNECT REDBACK INSTALL TO THE INVERTER

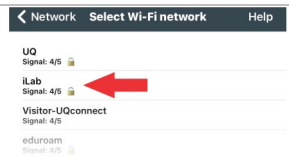
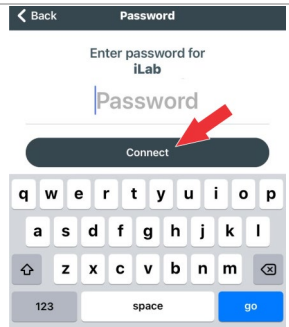
The Redback Install app is very user friendly: it requires little guidance, and there is in-app information available.

#	Procedure	Illustration
1.	Ensure the Inverter LED and the Comms Module LEDs are flashing blue, indicating Bluetooth is advertising. If ON and not flashing, restart the system: • Turn the INVERTER AC isolator OFF • Turn the PV ARRAY DC isolator OFF • Wait 30 seconds for capacitors to discharge. • Turn PV ARRAY DC isolator ON • Turn INVERTER AC isolator ON If either LED is OFF a problem exists- see troubleshooting (section 4).	
2.	Open Redback Install and login. Redback Install will scan for products advertising Bluetooth. Wait up to 30 seconds or until a “RB” serial number appears. Touch the serial number and continue to step 3.	  If a serial number appears that does not begin with “RB” then an error has occurred. Contact Redback for help. Select an inverter Pull down to refresh... EM1002110080090 I can't see my inverter Select an inverter Pull down to refresh... RB99210917000001 I can't see my inverter
3.	Wait up to 30 seconds.	
4.	A success message will appear. Tap Continue to begin onboarding.	

3.2 Onboarding (Connect to the local network)

Redback Install will advance to this stage after establishing a Bluetooth connection to the Smart Inverter.

Note: if a local network is not available it is possible to temporarily connect the System to a Wi-Fi hotspot, such as your phone. This is useful for configuration but is not an acceptable long-term solution.

#	Procedure	Illustration
1.	Select the preferred method to connect to the local network and internet. Options are: - None - LAN (must be hardwired, will connect automatically) - Wi-Fi (usually requires network name and password)	
2.	Select the required network or swipe down to refresh the list.	
3.	Enter the password. Tap Connect to continue.	
4.	A Success message will appear. Tap Continue to go to the Smart Inverter configuration page.	

3.3 Notes on Regional Safety Settings

Regional Safety Setting is a mandatory choice when configuring the system—the system will not operate if it is not selected.

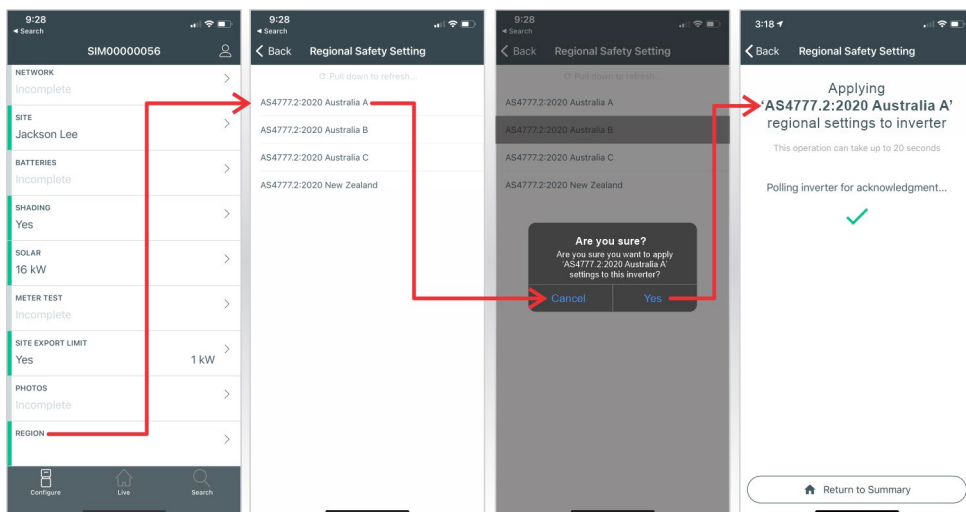
You may be prompted to update the inverter software. Do this if asked.

For convenience the Regional Safety Settings are set by selecting the Region from the list provided in the Redback Install app. The list is maintained with the latest settings required by AS4777.2:2020. Selection of a region automatically selects Power Quality Response Mode settings, including:

- Voltage balance mode (where available)
- Voltage and frequency limits
- Sustained operation for frequency variations.
- Grid Protection
- Power Rate Limits
- Frequency Response Limits
- Voltage Disturbance Withstand
- Volt-Var response
- Volt-Watt response
- Fixed Power Factor Mode
- Reactive Power mode



INFORMATION. The local grid operator may request a non-standard safety setting for an installation. To adjust power quality response mode setpoints from default values please contact Redback Technical Support.



3.4 Redback product firmware version

Redback Smart Inverter firmware version is 120001 or newer.

3.4.1 IDENTIFY USING REDBACKINSTALL

#	Procedure	Illustration
1.	Ensure the EMS Bluetooth LED is flashing, indicating that Bluetooth is available. If not flashing, restart the EMS: - Turn the INVERTER AC isolator OFF - Wait 10 seconds. - Turn INVERTER AC isolator ON	
2.	Wait for the Bluetooth LED to begin flashing steadily.	
3.	If not already open, start RedbackINSTALL and sign in.	
4.	The app will display a list of nearby Redback products that are advertising Bluetooth. Select the required Redback product from the list. Settings page will open.	
5.	Touch SYSTEM INFORMATION to view the firmware version.	

3.4.2 IDENTIFY USING THE REDBACK PORTAL

#	Procedure	Illustration
1.	On the internet go to portal.redbacktech.com and login. The Inverters list will open (showing accessible inverters). Note: You will be unable to view the firmware of offline or unregistered inverters.	
2.	Find the target inverter and select MANAGE. The Analysis page will display.	
3.	Select SYSTEM DETAILS.	
4.	Select DETAILED VIEW as shown.	
5.	Scroll to the Firmware version or find using your browser's search function.	

3.5 Compliance inspections

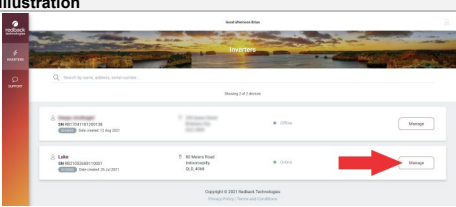
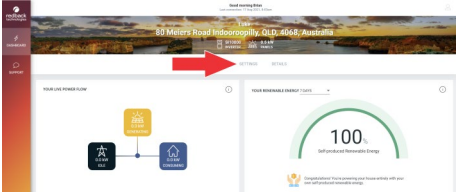
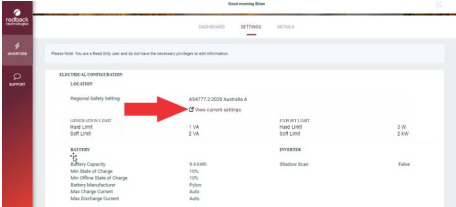
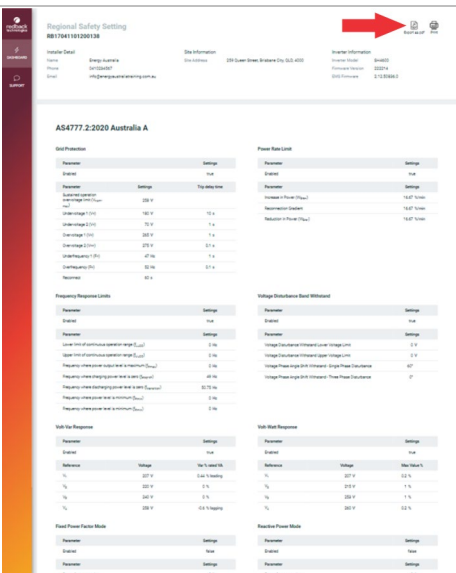
3.5.1 ASSIGNING AN INSPECTOR

Installers may assign a Compliance Inspector to each new product installation. Assignment is completed on the Redback Portal. Products must be registered in the installer's fleet prior to assigning an inspector.

#	Procedure	Illustration
1.	Login to the Redback portal at portal.redbacktech.com Search for the required product serial number from the list. Click the required product to open the product properties.	
2.	Click Dashboard .	
3.	Navigate to the Inverters tab and select User Access .	
4.	Add a new user. - Enter Inspector's email and name. - Select Inspector from the drop-down list. - Select Invite to save. Notification emails will be sent to the email address provided.	
5.	The Inspector will now appear in the list of users of this inverter.	

3.5.2 COMPLIANCE INSPECTION

Nominated Compliance Inspectors receive notifications when added as a product user. Their first notification will include a link to complete their user registration.

#	Procedure	Illustration
1.	Login to the Redback portal at portal.redbacktech.com If necessary, search for the required product serial number. Select Manage to open the product dashboard. <i>Note: the first login will require acceptance of the Redback T&Cs.</i>	
2.	Select SETTINGS to open the products general settings.	
3.	Select View current settings to see the Detailed Regional Safety Settings.	
4.	The Detailed Regional Safety Settings are read only. Scroll the page to see all settings. The settings may be Printed or Exported to PDF for record keeping.	

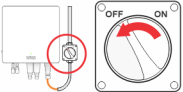
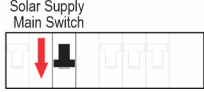
4. Troubleshooting

4.1 Most frequent symptoms

Symptom	Probable cause	Solution
No LEDs are illuminated	No Grid Power	Near inverter, turn INVERTER AC isolator ON At main switchboard, turn SOLAR SUPPLY MAIN Switch ON
No solar generation	No Grid Power	As above.
	PV turned is OFF	At the inverter, turn the PV ARRAY DC isolator ON
	Insufficient sunlight	Wait for weather to improve
Lower solar generation than expected	PV Shading	Review panel installation
	Inverter overheating	Review installation. Is the inverter site well ventilated? Review installation: Is the inverter subject to excessive heat load? Use shading if needed.
Inverter operating abnormally	Unknown	Shutdown inverter as described below. Wait 10 minutes then restart the inverter. Contact Redback if inverter still does not operate correctly.
Red Inverter Status LED	Error state exists	Contact Redback
	Earth fault exists	Installer to investigate. An email will be sent to Redback customer service, the registered installer, and the system owner. An email is also sent when the alarm is cleared.
Purple Flashing EMS Network LED	Error state exists	Contact Redback

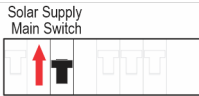
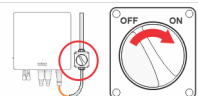
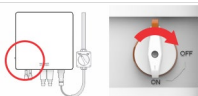
4.2 Shutdown procedure

Occasionally, it may be necessary to shut down the Inverter interrupting all functions Note: the PV and grid supplies remain energised to the isolators. Shut down using the following procedure:

STEP 1	STEP 2	STEP 3	STEP 4
Near the inverter switch the AC isolator OFF	At the inverter, turn the PV ARRAY DC isolator OFF	At the main switchboard, switch the SOLAR MAIN SUPPLY isolator OFF	Wait 5 minutes for the system to de-energize.
			

4.3 Restart procedure

Restart the Inverter as shown below.

STEP 1	STEP 2	STEP 3	STEP 4
At the main switchboard, switch the SOLAR MAIN SUPPLY isolator ON	Near the inverter switch the AC isolator ON	At the inverter, turn the PV ARRAY DC isolator ON	Wait for the Status LED to begin flashing blue, indicating BLE is available. If required, connect using Redback Install.
			

4.4 Inverter LEDs

The Inverter is equipped with a status LED on the front panel, and a Network status LED on the communications module. The optional EMS Ethernet module also has an Ethernet status LED. The table below lists LED indications, probable cause, and rectification steps.

4.4.1 INVERTER STATUS LED

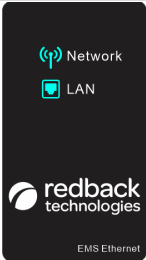
LED	Colour & Pattern	Meaning	Solution(s)
		OK. Inverter is operating normally.	No action needed.
		Inverter is in Night Mode.	OK. No action needed. Night mode is de-activated automatically.
		Preparing to connect to grid	OK. Self-testing in progress. No action needed.
		Inverter is starting up.	Wait for start up to complete (about one minute).
		Inverter is advertising BLE	Use Redback Install app to connect to the inverter.
		Network communications lost.	Use Redback Install app to reconnect to the inverter.
		Inverter is connected to Redback Install by BLE	Use Redback Install app to complete setup
		A fault exists. Earth fault exists	Restart system. If fault persists, contact Redback. Installer to investigate. Emails sent to Redback customer service, the registered installer, and the system owner. Email is also sent when the alarm is cleared.
		Grid failure No Power to Inverter Internal failure	Wait for power to be restored Enable Grid Supply to Inverter Contact Redback

4.4.2 INVERTER STATUS LED (MULTIPLE-INVERTER INSTALLATIONS)

Multiple SI-series inverter installations are interlocked to ensure a fault on any inverter causes the other inverters to shut down until the triggering fault is rectified, or the faulting inverter is isolated from all energy sources. Outside of a fault event, each inverter will run independently.

LED	Colour & Pattern		Meaning	Solution(s)
	One inverter	Other inverters		
			Unknown fault on one inverter and grid-disconnect on other inverters	Restart the faulting inverter. If it restarts, the other inverters will automatically reconnect to the grid. If the faulting inverter does not restart, isolate the inverter (PV ARRAY DC isolator OFF and Grid AC isolator OFF). The other inverters will reconnect to the grid.

4.4.3 COMMS MODULE LEDS

Indication	Colour & Pattern	Meaning	Solution(s)
		Advertising BLE	Use Redback Install app to connect to the inverter.
		BLE Connected	Use Redback Install app to complete setup.
		Connected to Cloud via Wi-Fi or Ethernet	OK. No action needed.
		No connection to cloud	Wi-Fi: Complete onboarding Ethernet: Check connection to local network.
		Purple Flashing. Error state exists.	Contact Redback
		White ON. Physical ethernet connection to a local network.	No action needed. Ethernet connection to LAN is automatic when available.
		OFF. No ethernet connected	Connect if needed.
		No Power to inverter	Enable Grid Supply to Inverter
		No power to module	Check module is correctly installed
		Module faulty	Contact Redback

4.5 PA110 Smart Meter LEDs

The Redback PA110 Energy Meter is usually found at the main switchboard. It detects grid energy traffic and sends information to the Smart Inverter. This information informs inverter operation.

To function correctly, your system requires a working PA110. Contact your installer immediately if you suspect the PA110 is not working correctly.

LED	COLOUR & PATTERN	MEANING	SOLUTION(S)
	 OFF	No power to PA	During a blackout, this is normal. If the Grid is active and the house Main Switch is ON contact your installer.
	 Flashing	Device is communicating with the inverter.	OK. No action required.
	 ON Continuously	Communications failure	Contact your installer.

5. Maintenance



WARNING: ELECTROCUTION HAZARD. Lethal voltages may be present. Isolate all sources of power and test before removing covers.

The Redback Inverter is a low maintenance product. Annual maintenance is needed.

Note: Heatsink fins may require more frequent cleaning in dusty conditions.

Item	Name	Reason	Procedure	By Service Person	By Owner
1.	Inverter Enclosure	Enclosure may become soiled	Wipe down outside of enclosure with a just-damp cloth. Immediately wipe dry with a microfibre cloth. Do not use cleaning agents as they may damage the finish.	✓	✓
2.	Operate all Isolators	Ensures Isolators are still operable	Shut down and restart the inverter as described in sections 5.1 and 5.2.	✓	✓
3.	Inverter heatsink fins	Cooling efficiency is reduced when dust, dirt or debris accumulate on the heatsink.	Clean the heatsink fins using a small brush or compressed air.	✓	✗

6. Specifications

PRODUCT MODEL	SI5000	SI6000	SI8000	SI10000
PV PORT				
Number of MPPTs	2		2	
Strings per MPPT Input	1/1		2/1	
MPPT Operating Voltage (range)	DC 70 - 540V		DC 60 - 540V	
Maximum Input Voltage (Vmax)	DC 550V		DC 550V	
Maximum Current (Imp) ¹	DC 15/15A		DC 30/20A	
Short Circuit Current (Isc) ²	DC 20/20A		DC 40/20A	
Maximum Back Feed Current	0A		0A	
Decisive Voltage Class (DVC)	DVC-C		DVC-C	
Maximum PV Input Power ³	7500Wp	9000Wp	12000Wp	15000Wp
¹ With firmware 120602 or newer ² Manufacturer's declared and tested Max Short Circuit Current (Isc Max) ³ Over-panelling benefits vary with location.				
GRID INTERACTIVE PORT	SI5000	SI6000	SI8000	SI10000
Nominal Output Voltage	AC 230V		AC 230V	
Nominal Output Frequency	50Hz		50Hz	
Rated Output Current	AC 21.7A	AC 26.1A	AC 34.8A	AC 43.5A
Max. Output Current	AC 25A	AC 27.3A	AC 40A	AC 45.5A
Rated Output Active Power	AC 5000W	AC 6000W	AC 8000W	AC 10000W
Rated Output Apparent Power	5000VA	6000VA	8000VA	10000VA
Peak Output Apparent Power	5500VA	6000VA	8800VA	10000VA
Power Factor (range)	0.8 lagging to 0.8 leading		0.8 lagging to 0.8 leading	
Output Voltage THD	<3%		<3%	
Inrush Current	AC 52.92A/0.2ms		AC 95A/0.2ms	
Maximum Output Fault Current	AC 79.38A/0.5ms		AC 142.5A/0.5ms	
Maximum Output Overcurrent Protection	AC 52.92A		AC 95A	
Decisive Voltage Class (DVC)	DVC-C		DVC-C	
EFFICIENCY				
Maximum Efficiency	97.3%		97.5%	
European Efficiency	96.5%		96.8%	
PHYSICAL DATA				
Installed weight	8.6kg		16.6kg	
Shipping weight	10.7kg		20.6kg	
Dimensions (W x D x H)	350 x 137 x 372mm		400 x 170 x 468mm	
Dimensions Installed (W x D x H exc. cables)	350 x 147 x 407mm		400 x 192 x 531mm	
Dimensions – Shipping carton (W x D x H)	445 x 428 x 240mm		600 x 480 x 300mm	
Material	Aluminium		Aluminium	
Finish	Sealed and powder coated		Sealed and powder coated	
PV PORT ISOLATOR				
Manufacturer Part Number	PEDS150-HM55R-4		NDG3V-50	
Rated Insulation Voltage	1500V		1500V	
Rated Impulse Withstand Voltage	8kV		8kV	
Suitability for Isolation	C		C	
Rated Operational Current (Ie)(Ue=1000V)	32A		40A	
Utilization Category	DC-PV2		DC-PV2	
Rated Short-time Withstand Current (Icw)	780A		760A	
Rated Short-circuit Making Capacity (Icm)	1200A		1400A	
Rated Breaking Capacity	4x Ie		4x Ie	

COMMUNICATION PORTS AND PROTOCOLS

Ethernet	RJ45; Straight-thru (optional)
DRED	Direct IO; DRED
Relays	Direct IO; on kWh Meter
kWh Meter	Direct IO; RS485 MODBUS
RS485	NA
Wi-Fi	802.11b/g/n; 2.4GHz
Interlock	Direct IO

USER INTERFACE

Front panel display	Coded, coloured LED
Communications	Bluetooth for commissioning. Wi-Fi for remote access. Ethernet (Optional) NFC
Remote access	Web Portal; MyRedback app
Remote Firmware Updates	Supported
Power/energy monitoring	Includes 1 x utility grade energy meter (class 1)

GENERAL INFORMATION

Operating Temperature	-25°C to 60°C
Operating Relative Humidity	0 – 100%
Operating Altitude	0-4000m
Protective Class	I
Ingress Protection Rating	IP65
AC Overvoltage Category	OVC III
DC Overvoltage Category	OVC II
Active Anti-islanding Method	Active Frequency Drift
Moisture Location Category	4K4H
External Environment Pollution Degree	Grade 1, 2 and 3
Inverter Topology	Non-isolated
Country of origin	China
Demand Response Modes	DRM 0
Standby Self-Consumption	<6W
Noise Emissions	<30 dBm
Warranty	10 Years

CERTIFICATIONS, STANDARDS AND APPROVALS

AS/NZS 4777.2:2020	IEC 62109-2: 2011	IEC 60529	CE Mark (LVD, EMC, RoHS)
IEC 62109-1: 2010	IEC 62116:2014	EN 61000	RCM Approval

DESIGNED WITH INSTALLATION STANDARDS CONSIDERED

AS/NZS3000:2018	AS/NZS 5033:2021
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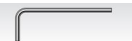
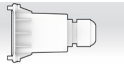
7. Handover

Complete this checklist with the Redback Owner, to get them started with their new system.

Item	Description	Completed
1.	Walk through the installation, ensuring the homeowner understands what has been installed (and where).	
2.	Explain the limitations of the system, even when the grid is connected.	
4.	Demonstrate how to shut down and restart the inverter, as shown in sections 4.2 and 4.3.	
5.	Help owner to download the app, demonstrate features and answer questions.	
6.	Assist owner to log on to the portal and demonstrate, including how to: • Download Owner's Guide • Review performance • Raise an on-line support request	
7.	Handover documentation to the homeowner, including: • Owner's Guide • Warranty Booklet • Installation Manual (optional)	

8. Packing List

Check all parts. Contact Redback if any parts are damaged or missing.

PART		SI5000	SI6000	SI8000	SI10000
Inverter module		1		1	
V-bracket		1		-	
T-bracket		-		1	
Bracket screw		2x M4*12		1x M6*12	
PV connector kit MC4 style (pair)		2		3	
PV Connector Release Tool 12*50		1		1	
Redback PA110 Energy Meter kit		1		1	
Fuse 1A and Fuse Holder		1		1	
AC connector plug kit (Plug)		1		-	
AC connector dis-assembly tool		1		-	
2mm Allen Key		1		-	
6P DRED Port Connector		1		1	
AC connector cover/gland		-		1	
RS485 module (including plug; cover; gland; 10m cable)		1	1	1	1
EMS module BLE + Wi-Fi		1	1	1	1
EMS ETHERNET module BLE + Wi-Fi + Ethernet		Supplied separately	Supplied separately	Supplied separately	Supplied separately
Installation Manual		1		1	
Owner's Guide		1		1	
Warranty Card		1		1	
ATE Test Report		1		1	
Quality Certificate		1		1	