

FIMER



Solar Inverter

PVS-100/120-TL “B2 Version”

Quick Installation Guide

In addition to what is explained in this quick installation guide, the safety and installation information provided in the product manual must be read and followed. The technical documentation for the product is available at the website.
The device must be used in the manner described in the manual. If this is not the case the safety devices guaranteed by the inverter might be ineffective.

⚠ ATTENTION – IMPORTANT SAFETY INSTRUCTIONS

This document contains important safety instructions that must be followed during the installation and maintenance of the equipment.

⚠ ATTENTION – SAVE THESE INSTRUCTIONS

Keep this document in a safe place near the inverter for easy access during installation, operation and maintenance.

⚠ ATTENTION – The installer must read this document in its entirety before installing or commissioning this equipment. In addition to what is explained below, the safety and installation information provided in the product manual must be read and followed. For more detailed information regarding proper installation and use of this product, refer to the product manual located at www.fimer.com.

⚠ ATTENTION – The product must be used in the manner described in the document. If this is not the case the safety devices guaranteed by the inverter might be ineffective.

⚠ ATTENTION – All pictures and illustrations shown in this document are indicative and must be intended as support for installation instruction only. Actual product may vary due to product enhancement. Specifications subject to change without notice. The latest version of this document is available on the FIMER website.

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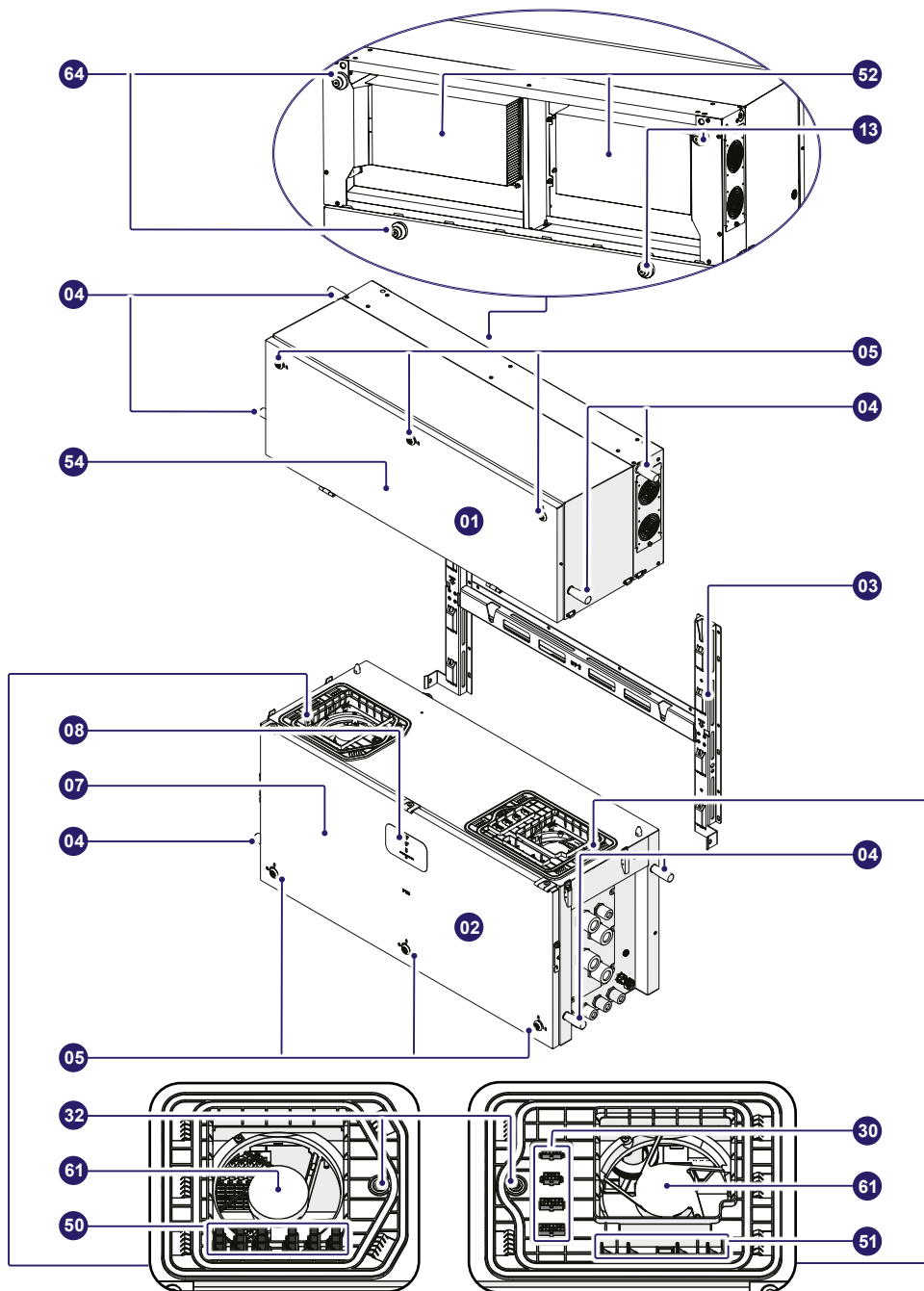
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1. Reference number index

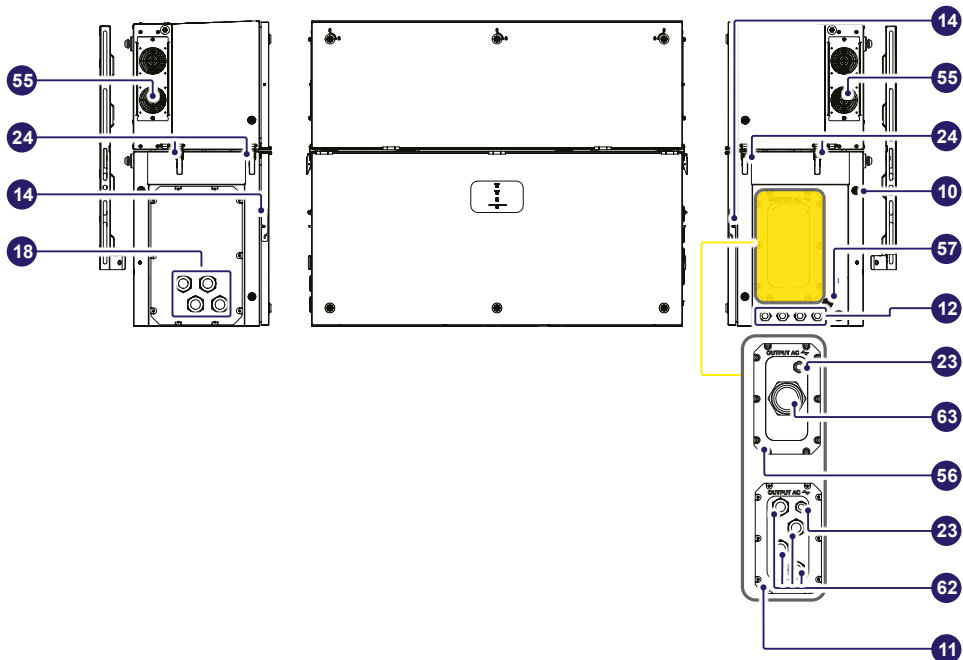
Inverter external view	
01	Power module
02	Wiring box
03	Mounting bracket
04	Handles
05	Cover quarter cam locks
07	Wiring box front cover
08	LEDs panel
09	AC disconnect switch
10	Protective earth point (ext.)
11	Single-core AC panel (default)
12	Signals cable glands
13	Rear pins for bracket assembly
14	Cover support brackets
15	DC disconnect switches
17	DC input connection busbar
18	DC input cable glands
19	Positive string fuses and SPD board
20	Negative string fuses board
21	AC connection busbar
22	AC overvoltage SPD
23	PE cable gland
24	Side latches
25	Protective earth point (int.)
27	AC protective shield
28	Communication board
30	Interface signal cables
31	Parallel MPPT connection points
32	Junction screws

Inverter external view	
33	Multifunction relay connector (ALARM)
34	RS-485 120Ohm resistance switch (service only)
35	RS-485 120Ohm resistance switch
36	RS-485 connector (RJ45) (Service only)
37	Remote ON/OFF terminal block
38	RS-485 line terminal block
39	Ethernet connector 2 (RJ45)
40	Ethernet connector 1 (RJ45)
41	USB connector
42	SD card slot
43	CR2032 coin battery
50	DC interface cables
51	AC interface cables
52	Removable rear panels
53	DC overvoltage surge arresters (board)
54	Power module front cover
55	Fan tray
56	Multi-core AC panel (opt.)
57	RS-485&Rem.ON/OFF connector (Service only)
58	AC interconnection board
59	DC interconnection board
60	DC protective shield
61	Internal fan
62	Single core AC cable gland
63	Multi-core AC cable gland
64	PE interconnection point
65	Interface signal connectors

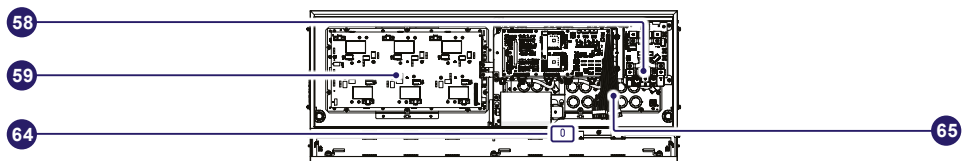
1.1 Inverter external view



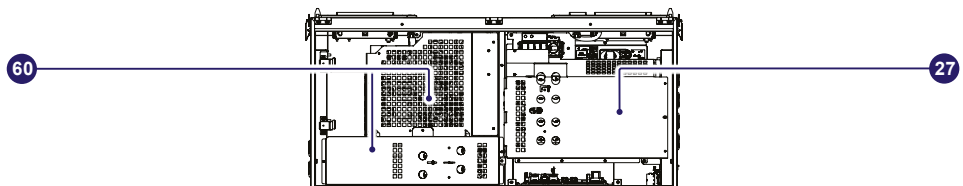
1.2 PVS-100/120-TL ; B2



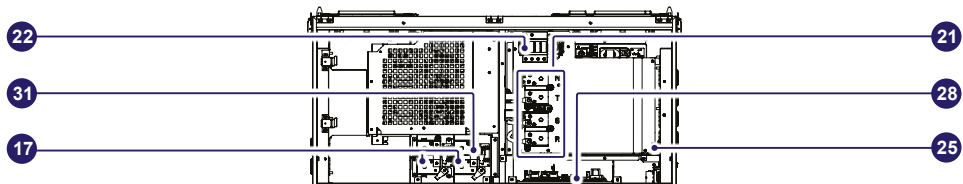
Power module PVS-100/120-TL ; B2



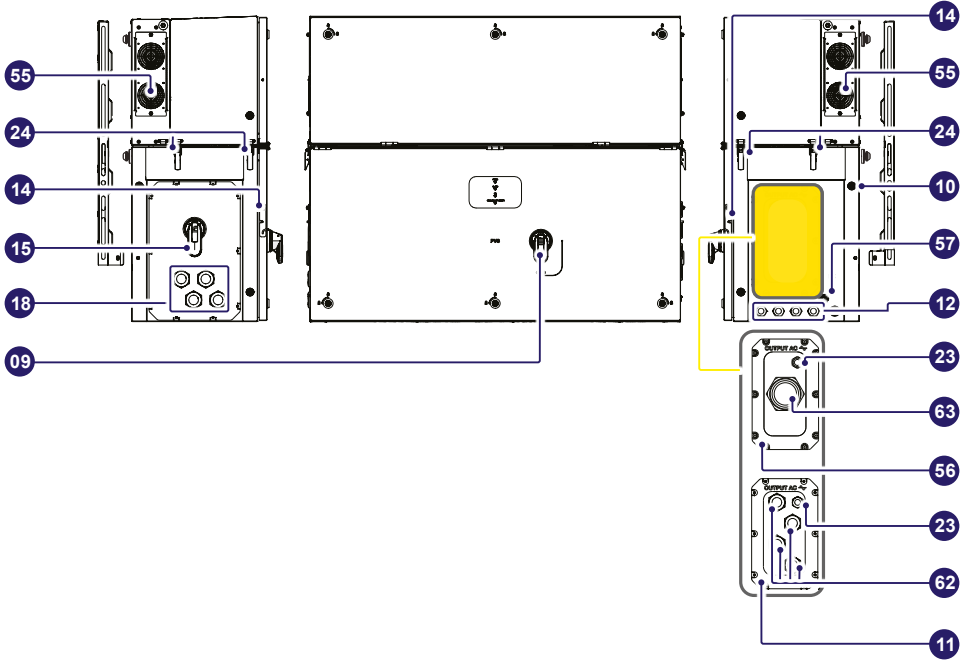
Wiring box with internal cover PVS-100/120-TL ; B2



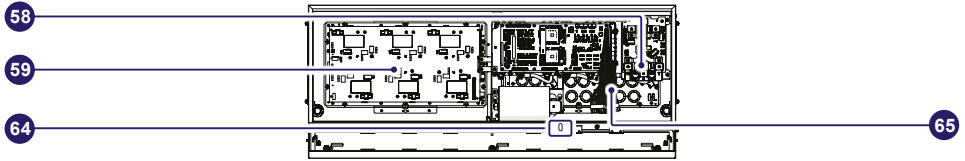
Wiring box without internal cover PVS-100/120-TL ; B2



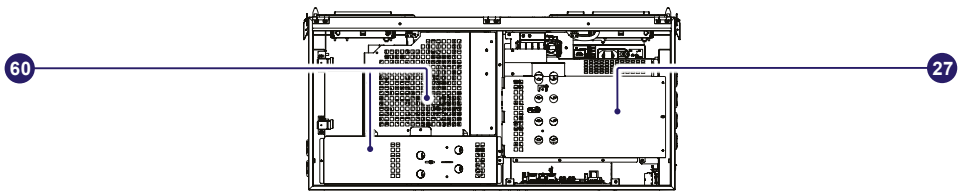
1.3 PVS-100/120-TL ; B2 ; S2



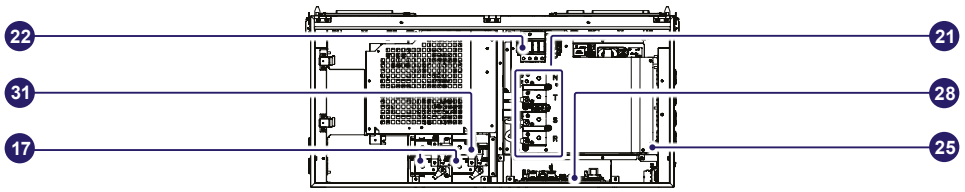
Power module PVS-100/120-TL ; B2 ; S2



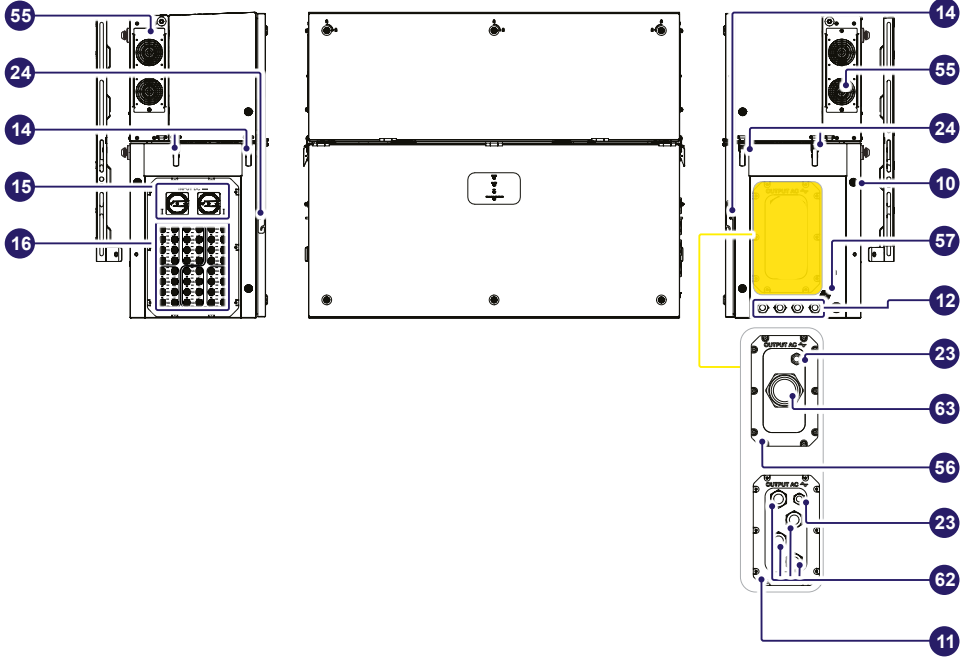
Wiring box with internal cover PVS-100/120-TL ; B2 ; S2



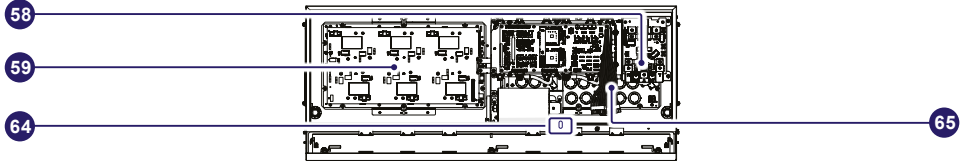
Wiring box without internal cover PVS-100/120-TL ; B2 ; S2



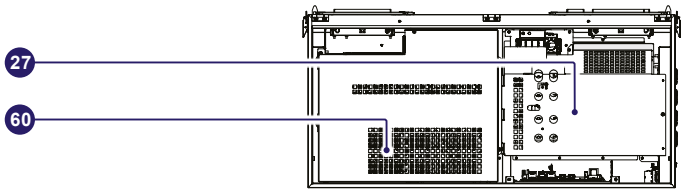
1.4 PVS-100/120-TL ; B2 ; S(X or Y)



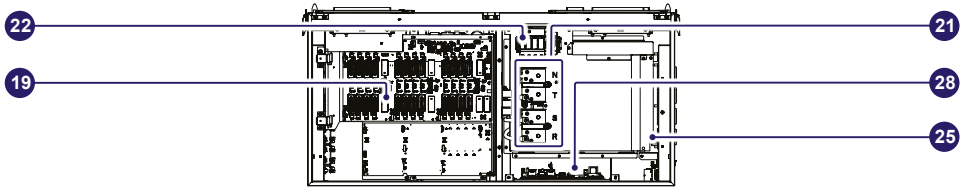
Power module PVS-100/120-TL ; B2 ; S(X or Y)



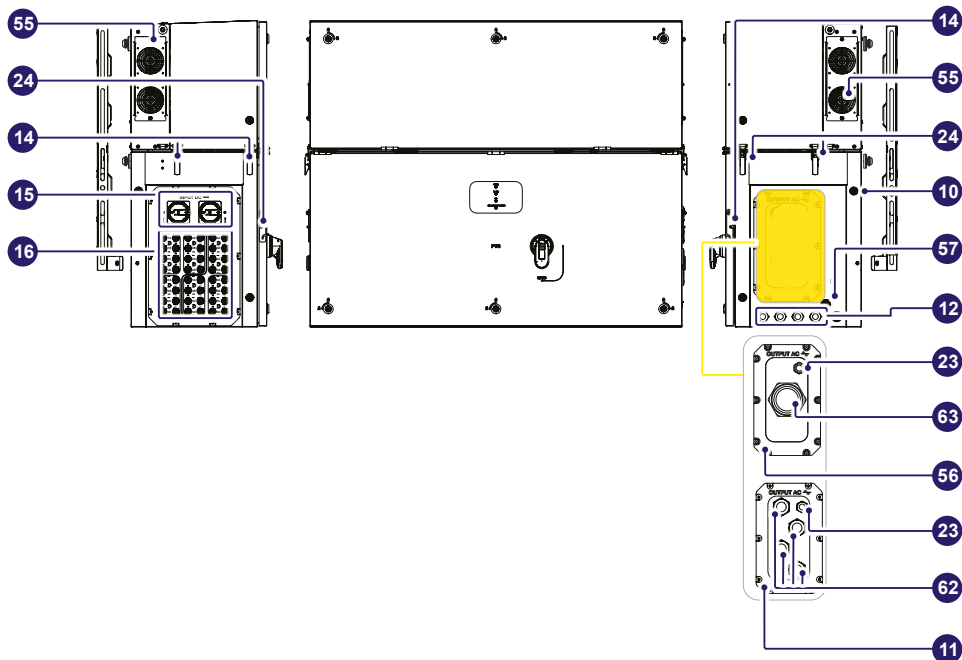
Wiring box with internal cover PVS-100/120-TL ; B2 ; S(X or Y)



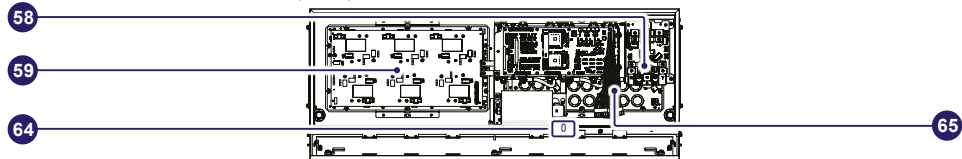
Wiring box without internal cover PVS-100/120-TL ; B2 ; S(X or Y)



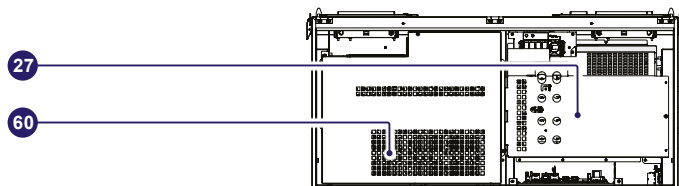
1.5 PVS-100/120-TL ; B2 ; S(X or Y)2



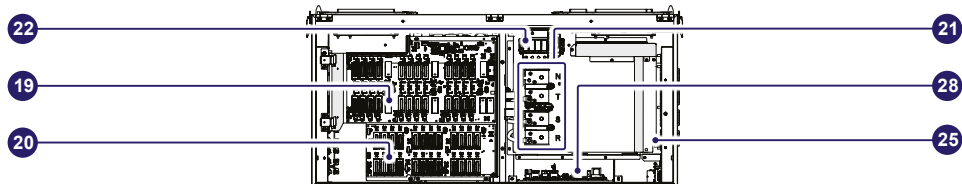
Power module PVS-100/120-TL ; B2 ; S(X or Y)2



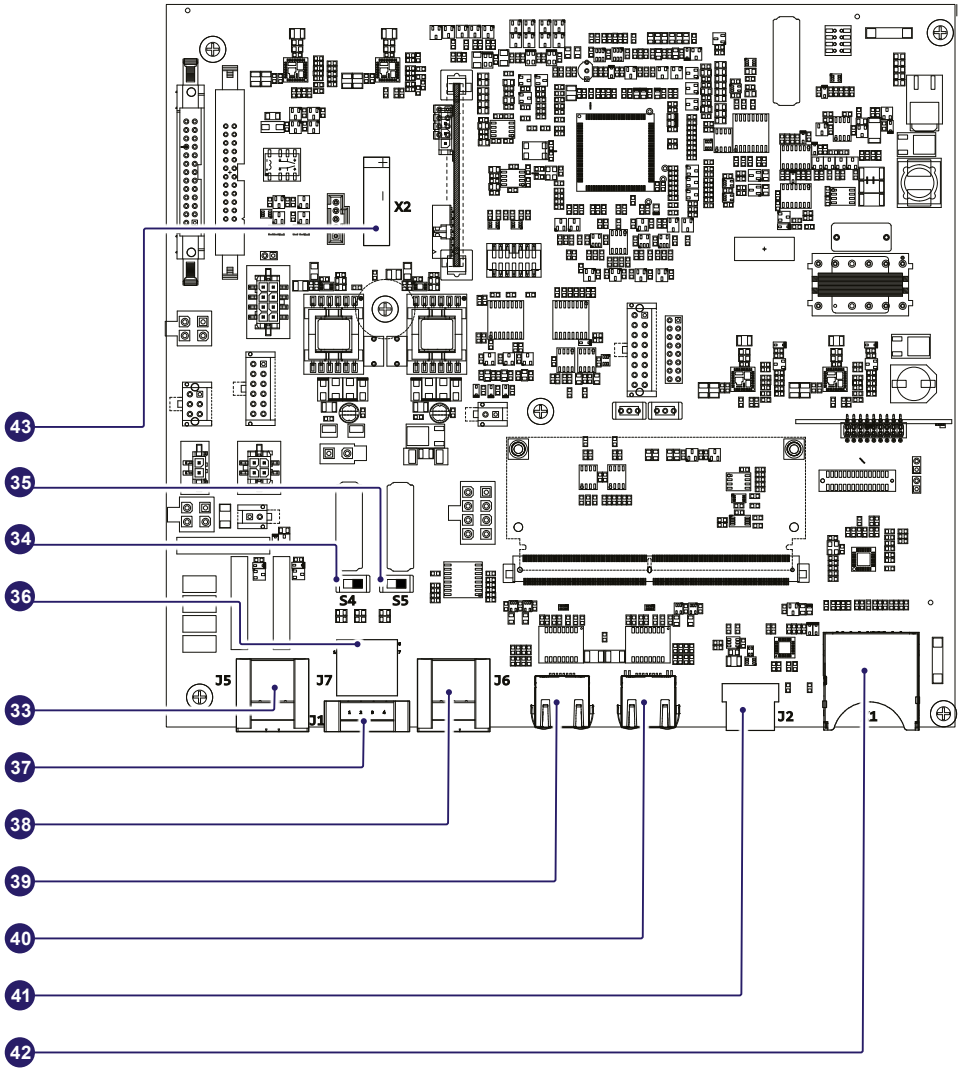
Wiring box with internal cover PVS-100/120-TL ; B2 ; S(X or Y)2



Wiring box without internal cover PVS-100/120-TL ; B2 ; S(X or Y)2



1.6 Communication board



Communication Identification label:

The Communication Identification label (applied on the wiring box) is divided in two separate parts by a dashed line; take the bottom part and apply it on the plant documentation. (FIMER recommend to create a plant map and apply the Communication Identification label on it).



F. WLAN embedded board Serial Number

G. WLAN embedded board Part Number

H. MAC address:

- To be used to obtain the SSID of the wireless access point created by the inverter: ABB-XX-XX-XX-XX-XX-XX (where "X" is a hex digit of the MAC address).

- To be used to obtain the "Host Name": http://ABB-XX-XX-XX-XX-XX-XX.local (where "X" is a hex digit of the MAC address).

I. Product Key:

To be used as wireless access point password, or to be used to access to the Web UI as username and password in case of lost credentials, and to commission inverter using FIMER Installer for Solar Inverters.

J. QR Code:

To be used to commission inverter using FIMER Installer for Solar Inverters for claiming process.

In the manual and/or in some cases on the equipment, the danger or hazard zones are indicated with signs, labels, symbols or icons.

	Always refer to instruction manual
	ATTENTION- Important safety information
	WARNING - Hazardous voltage
	Hot surfaces
	Risk of electric shock. The discharge time (quantified in the figure by the number XX) of the stored energy after de-energizing of the Inverter from both DC side and AC side.
	Positive pole and negative pole of the input voltage (DC)
	Direct and alternating currents, respectively
	Temperature range
	Always use safety clothing and/or personal safety devices
	Without isolation transformer
	Point of connection for grounding protection
	Protection rating of equipment

3. Models and range of equipment

NOTE – The choice of the inverter model must be made by a qualified technician who knows about the installation conditions, the devices that will be installed outside the inverter and possible integration with an existing system.

3.1 Bracket model

Model Number	Description
PVS-100/120-TL-BRACKET	Bracket allowing both vertical and horizontal installation.

3.2 Power Module models (B2 version)

Model Number	Description
PVS-100-TL-POWER MODULE	Inverter section / power module with 100kW output power at 400Vac
PVS-120-TL-POWER MODULE	Inverter section / power module with 120kW output power at 480Vac

3.3 Wiring box models (B2 version)

Wiring Box Model	Description
WB-PVS-100-TL WB-PVS-120-TL	<ul style="list-style-type: none"> • 1 or 2 MPPTs (settable on the field) • 4 DC cable glands (2xM40 cable glands for each MPPTs) • 4 DC connection bus bars (1 pair for each MPPT) • Input current monitoring (MPPT level) • DC SPD type II (monitored) • AC plate with 5 individual AC cable glands: 4 x M40 and 1 x M25 • 4 AC connection bus bars (3 Phases + Neutral) • AC SPD type II (replaceable)
WB-S2-PVS-100-TL WB-S2-PVS-120-TL	<ul style="list-style-type: none"> • 1 or 2 MPPTs (settable on the field) • 4 DC cable glands (2xM40 cable glands for each MPPTs) • 4 DC connection bus bars (1 pair for each MPPT) • Input current monitoring (MPPT level) • DC SPD type II (monitored) • DC disconnect switch • AC plate with 5 individual AC cable glands: 4 x M40 and 1 x M25 • 4 AC connection bus bars (3 Phases + Neutral) • AC SPD type II (replaceable) • AC disconnect switch
WB-SX-PVS-100-TL WB-SX-PVS-120-TL	<ul style="list-style-type: none"> • 6 MPPTs • Input with 24 quick fit connectors pairs (4 each MPPT) • Input current monitoring (MPPT level) • String fuses (positive pole) • DC SPD type II (monitored) • DC disconnect switch • AC plate with 5 individual AC cable glands: 4 x M40 and 1 x M25 • 4 AC connection bus bars (3 Phases + Neutral) • AC SPD type II (replaceable)
WB-SY-PVS-100-TL WB-SY-PVS-120-TL	<ul style="list-style-type: none"> • 6 MPPTs • Input with 24 quick fit connectors pairs (4 each MPPT) • Input current monitoring (MPPT level) • String fuses (positive pole) • DC SPD type I + II (monitored) • DC disconnect switch • AC plate with 5 individual AC cable glands: 4 x M40 and 1 x M25 • 4 AC connection bus bars (3 Phases + Neutral) • AC SPD type II (replaceable)
WB-SX2-PVS-100-TL WB-SX2-PVS-120-TL	<ul style="list-style-type: none"> • 6 MPPTs • Input with 24 quick fit connectors pairs (4 each MPPT) • Input current monitoring (string level) • String fuses (positive and negative pole) • DC SPD type II (monitored) • DC disconnect switch • AC plate with 5 individual AC cable glands: 4 x M40 and 1 x M25 • 4 AC connection bus bars (3 Phases + Neutral) • AC SPD type II (replaceable) • AC disconnect switch

Wiring Box Model	Description
WB-SY2-PVS-100-TL WB-SY2-PVS-120-TL	<ul style="list-style-type: none"> • 6 MPPTs • Input with 24 quick fit connectors pairs (4 each MPPT) • Input current monitoring (string level) • String fuses (positive and negative pole) • DC SPD type I + II (monitored) • DC disconnect switch • AC plate with 5 individual AC cable glands: 4 x M40 and 1 x M25 • 4 AC connection bus bars (3 Phases + Neutral) • AC SPD type II (replaceable) • AC disconnect switch

Option available	Description
AC Plate, Single Core Cables	Plate with 5 individual AC cable glands: 4 x M40 and 1 x M25
AC Plate, Multi Core Cables	AC Plate with 2 individual AC cable glands: 1 x M63 and 1 x M25
PVS-100/120 PRE-CHARGE BOARD KIT	Allows the monitoring of the inverter when DC source is not available and night time operation with restart capability
PVS-100/120 GROUNDING KIT	Allows to connect the negative input pole to ground
PVS-100/120 INSTALLATION KIT	Kit including: M8 handles, Key tool for front cover quarter cam-lock and IP66 protection cover with screws for wiring box AC and DC openings

⚠ WARNING – All inverter models can be equipped with PVS-100/120 GROUNDING KIT and/or PVS-100/120 PRE-CHARGE BOARD KIT. Kits can be installed in the field by qualified installers and/or licensed electricians, with experience in photovoltaic systems. Kits may also be pre-installed in the factory on dedicated P/N's. Refer to instruction provided together with kits for a proper installation and/or configuration.

📄 NOTE – Refer to the "PVS-100_120 GROUNDING KIT" and "PVS-100_120 PRE-CHARGE BOARD KIT" quick installation guide for further information (available at www.fimer.com).

4. Lifting and transport

4.1 Transport and handling

Transportation of the equipment, especially by road, must be carried out using appropriate vehicles and methods to protect the components (particularly electronic components) from violent shocks, humidity, vibration, etc.

4.2 Unpacking and checking

The components of the packaging must be disposed in accordance with the regulations in force in the country of installation. When you open the package, check that the equipment is undamaged and make sure all the components are present. If you find any defects or damage, stop unpacking and consult the carrier, and also promptly inform the Customer Service.

Equipment weight

Device	Weight (kg/lb)	Lifting points	Holes for handles (optional) or Eyebolts UNI2947 (not supplied)
Power module	~ 70 kg / 154 lbs	4	M8. Kit of handles (04) (to be ordered)
Wiring box	~ 55 kg / 121 lbs	4	M8. Kit of handles (04) (to be ordered)

4.3 Lifting

⚠ ATTENTION – Risk of injury due to the heavy weight of the equipment!

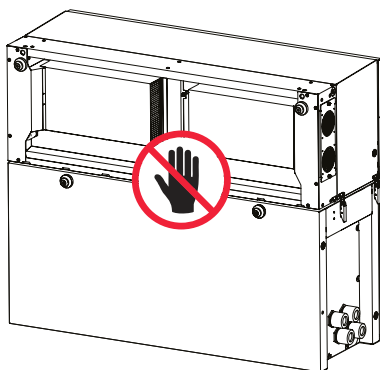
FIMER usually stores and protects individual components by suitable means to make their transport and subsequent handling easier. Nonetheless, as a rule, it is necessary to turn to the experience of specialised staff to take charge of loading and unloading components. The power module and the wiring box must be lifted using the 4 handles (04) or alternatively using suitable lifting equipment. The means used for lifting must be suitable to bear the weight of the equipment.

⚠ ATTENTION – In case of manual lifting the number of required operators necessary to lift the equipment must be in accordance to local regulations relating lifting limits per operator.

The handles (04) must be mounted into the designated holes located on the enclosures; If lifting with ropes, M8 eyebolts must be mounted in the same holes.

⚠ ATTENTION – Handling and installation operations shall be performed only by using the special tools and accessories provided with "PVS Installation Kit" that have to be ordered separately. The use of these equipment are mandatory to safely install the inverter.

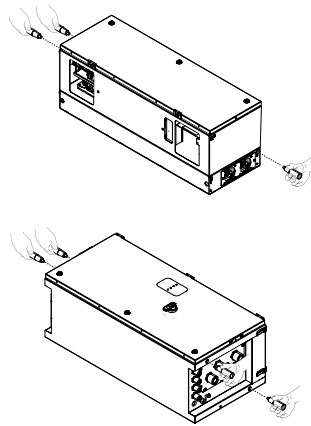
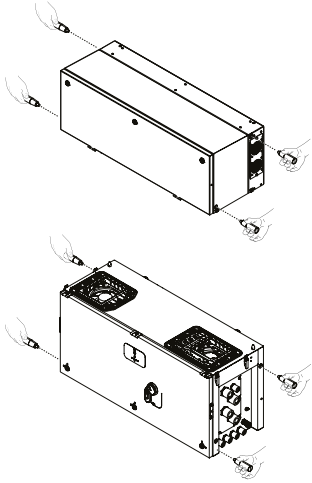
⚠ ATTENTION – DO NOT grab the equipment from the rear flange! Risk of injury due to cutting surfaces and risk of equipment damage. Always use proper lifting equipment!



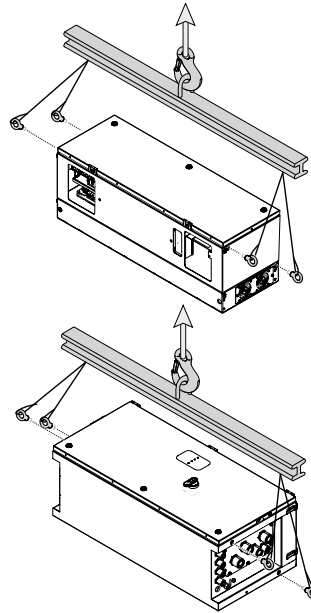
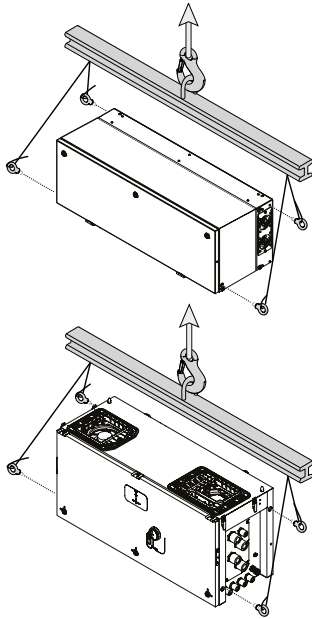
It is required to use one of the following lifting methods to move the equipment during installation or maintenance phases.

⚠ ATTENTION – Pay attention to completely tight the thread of the handles or eye-bolts.

Vertical lifting (handles) **Horizontal lifting (handles)**

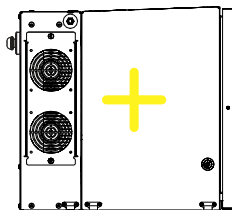
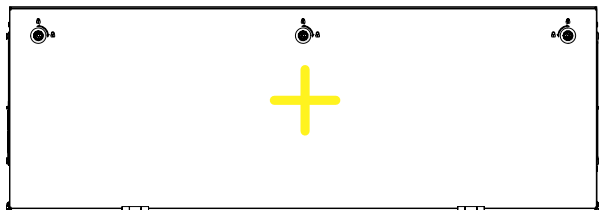


Vertical lifting (eyebolts and lifting balancer) **Horizontal lifting (eyebolts and lifting balancer)**

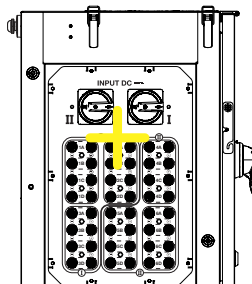
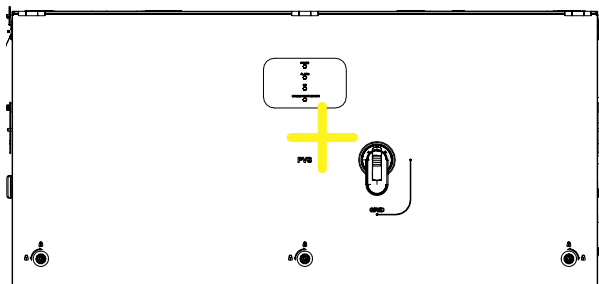


⚠ ATTENTION – Always consider the center of gravity of the enclosures while lifting.

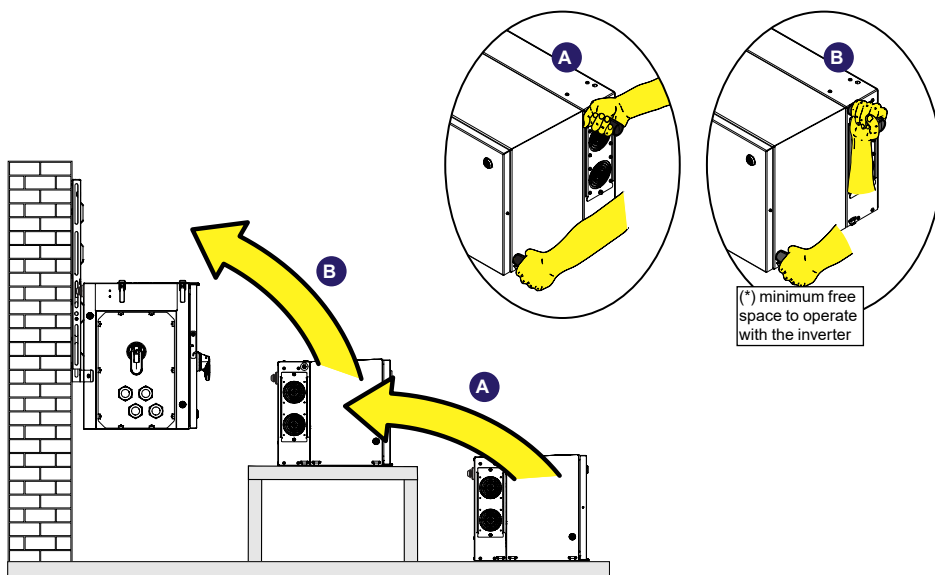
Center of gravity (power module)





















Center of gravity (wiring box)



⚠ ATTENTION – In case of manual lifting it's suggested to use a support plan (e.g. a table) to place the equipment during the lifting operation, to allow the change of hands position.



5. List of supplied components

Available components for wiring box		Q.ty
	ALARM and AUX relay (33) and RS485 (38) connectors (pre-installed on communication and control board (28))	4
	Remote ON/OFF connector (37) pre-installed on communication board (28)	1
	Two-hole gasket for M25 signal cable glands (12) and cap	2 + 2
	Key tool for front covers quarter cam-lock (05)	1
	M8x16 hex bolt + M8 serrated lock washers to clamp the earth cable on the protective earth point (ext.) (10)	1 + 2
	M10 hex nut + M10 serrated lock washers to clamp the earth cable on the protective earth point (int.) (25)	1 + 2
	South africa network standard label	1
	Australia and New Zealand network standard label	1
	Technical documentation	1
Available components for wiring box Standard and -S2 version only		Q.ty
	MPPT input parallel bar	1
	M6 screws with washer to clamp the MPPT input parallel bars	2
Available components for wiring box -SX, -SY, -SX2 and SY2 version only		Q.ty
	Positive string fuses (gPV - 1000Vdc - 20A)	24
	Fuse puller (secure touch)	1
Available components for power module		Q.ty
	M6x20 junction screws (32) between wiring box and power module	2
	M6 self-locking nut to clamp internal AC cables on AC interconnection board (58)	3
	M5 hex nut + M5 serrated lock washers to clamp the internal earth cable on PE interconnection point (64)	1 + 2
Available components for brackets		Q.ty
	M8 bolts with washers for mechanically securing the half-brackets	2
	M6 screws for mechanically securing the wiring box to the bracket	2

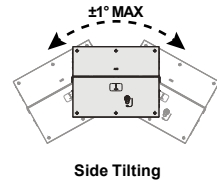
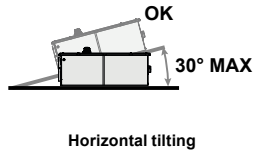
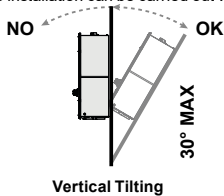
6. Choice of installation location

6.1 General recommendation on installation position

- See characteristics and technical data paragraph to check the required environmental conditions (protection rating, temperature, humidity, altitude, etc.).
- The installation location shall be easily accessible.
- Installation of the unit in a location exposed to direct sunlight is NOT acceptable. (Add awning in case of direct sunlight installation).
- Do not install on floating system or location where the inverter might be exposed to direct water splashes
- Final installation of the device must not compromise access to any disconnection devices that may be located externally.
- Do not install in small closed rooms where air cannot circulate freely.
- Always ensure that the flow of air around the inverter is not blocked so as to prevent overheating.
- Do not install in locations where flammable substances or gases may be present (minimum distance 3 m).
- Do not install on wooden walls or other flammable supports.
- Install on a wall or strong structure suitable to bear the weight.
- Do not install in rooms where people live or where the prolonged presence of people or animals is expected, because of the high noise that the inverter produces during operation. The level of the sound emission is heavily influenced by where the appliance is installed (for example: the type of surface around the inverter, the general properties of the room, etc.) and the quality of the electricity supply.
- Never open the inverter in the case of rain (even light rain), snow or a level of humidity >95%. Always carefully seal all unused openings. In case of opening when the unit is wet, avoid any water infiltration inside the unit, either in VVB or PM.
- All installations over 6500' (2,000 meters) must be assessed by FIMER Technical Sales to determine the proper datasheet derating.
- If the GROUNDING KIT is installed, the inverter must be installed in a closed electrical operating area (behind the fences), with access limited to qualified personnel.

6.2 Tilting admittance

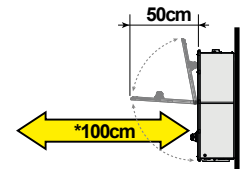
- The installation can be carried out with a maximum inclination as indicated in the figures beside.



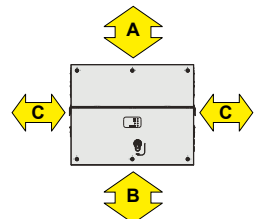
⚠ ATTENTION – In case of horizontal installation in outdoor environment consider an installation with a minimum tilt of 3° to avoid any water stagnation.

6.3 Distances

- Hardware and software maintenance on device entails removing the front cover. Check that the correct installation safety distances are observed in order to allow routine check and maintenance operations.
- Provide sufficient working space in front of the inverter that allows to open the front covers (07)(54) and to make the internal and external connections.
- Install at a height which takes into consideration the weight of the appliance and in a position which is suitable for servicing, unless suitable means are provided to carry out the operation.
- If possible, install at a height that allows to see the status LEDs (08) easily.

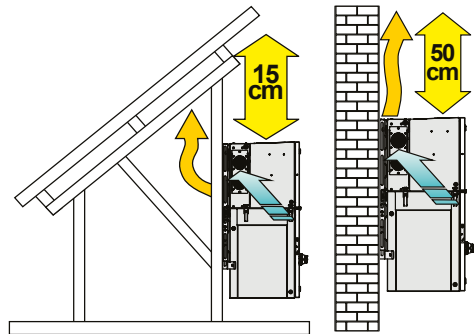


- Respect the minimum distances from objects around the inverter that could prevent the inverter installation and restrict or block the air flow.

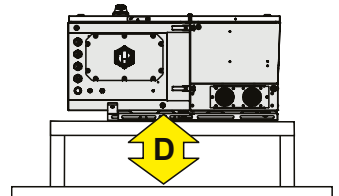


⚠ ATTENTION – Do not install any object (e.g. AC or DC cables) that could be damaged by overheating from outgoing hot air flow from side fan sections ($\Delta T = +15^\circ\text{C}$ compared to ambient temperature). In case of this kind of installation needs, please evaluate the installation of a proper air deflector. Always respect the minimum distances required.

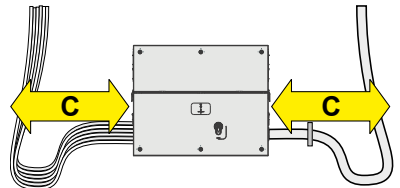
- Respect the minimum distances from objects around the inverter that could prevent the inverter installation and restrict or block the air flow. The minimum clearance distances depends from multiple factor:
 Ventilation flow on the rear side of the inverter. Depending of the support where the inverter is installed it changes the upper (A) required free space: if the inverter is installed on a support without any openings (e.g. a wall), the heat flow will be entirely directed to the top of the inverter; for this reason the upper (A) minimum required free space must be 50 cm.
 Otherwise in case of the inverter is installed on a support with openings (e.g. frame installation) the heat can freely flow on the rear side of the inverter; so the upper (A) minimum required free space can be reduced to 15 cm.



- **Possible flooding or damage during grass cutting.** It changes the bottom (B) or the rear (D - only in case of horizontal installation) required free space: If the inverter is installed in a place where there are concrete risk of flooding or grass cutting evenience, the bottom (B) or the rear (D - only in case of horizontal installation) minimum recommended free space is 50 cm; otherwise in case of the inverter is installed in a place where there aren't risk of flooding or grass cutting evenience, the bottom (B) and rear (D - only for horizontal installation) minimum required free space must be 15 cm.



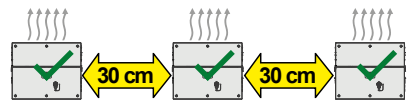
- **Cables bending radius.** Sides (C) minimum required free space may depends from cable type (cable dimension, bending radius, etc.): this evaluation must be done by the installer during the plant design phase. In any case minimum required free space for proper ventilation of the unit (near side fans) cannot be under **15 cm on the right side and 30cm on the left side.**



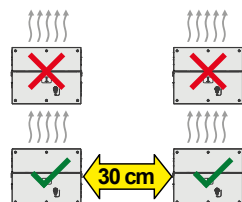
- ⚠ **ATTENTION** – In case of manual installation, using handles (04), consider a free side space to lift the inverter of 60 cm minimum (both sides).
- ⚠ **ATTENTION** – In case of installation with lifting equipments (eyebolts and ropes) the side distances (C) could be reduced at the minimum required but a subsequent manual lifting it will no longer be possible: in this case the lifting equipments must remain available on the field for any subsequent operation.

6.4 Installation of multiple units

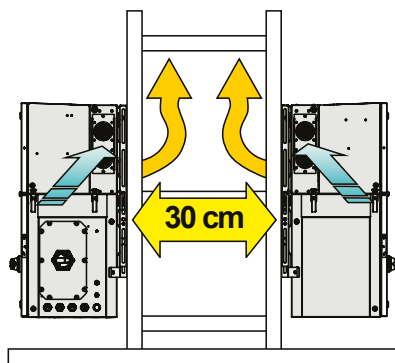
- When installing multiple units position the inverters side by side paying attention to keep the minimum clearance distances (measured from the outer edge of the inverter) for each inverter specified in the following graph.



- ⚠ **ATTENTION** – In case of manual installation, using handles (04), consider a free side space to lift the inverter of 60 cm minimum (both sides).



- The installation of two inverters positioned back to back is also permitted on a structure which must be composed of a 2 or 3 frame supports (refer to "Mounting with a support bracket" chapter). In this case the minimum recommended distance between the units in order to avoid the use of an air deflector is 30cm.



NOTE – Please refer to the warranty terms and conditions to evaluate any possible warranty exclusions due to improper installation.

6.5 Wireless signal environmental checks

The inverter can be commissioned and monitored using the wireless communication channel. The WLAN board of the inverter uses radio waves to transmit and receive data, it is therefore important to find a new position for the router considering the different materials which the radio signal will have to pass through:

Material	Relative signal reduction
Open field	0% (strength of approximately 40 meters)
Wood / Glass	From 0 to 10%
Stone / Plywood	From 10 to 40%
Reinforced concrete	From 60 to 90%
Metal	Up to 100 %

ATTENTION – Final installation of the inverter must not compromise access to any externally located disconnection devices.

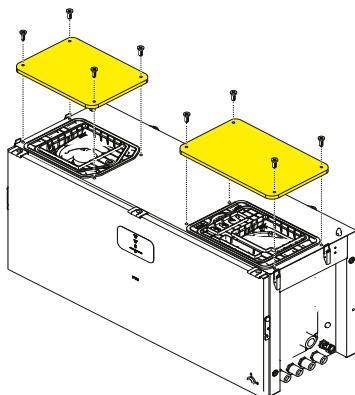
READ THE MANUAL – Please refer to the warranty terms and conditions to evaluate any possible warranty exclusions due to improper installation.

6.6 Installation of IP66 protection covers for wiring box openings

WARNING – Some wiring box parts may be subject to hazardous voltages for the operator. Before performing any work on the inverter, refer to "Inverter total de-energization and safe access" paragraph on the product manual to know all the necessary steps to safely operate on the inverter.

ATTENTION – Never leave the power module (01) or the wiring box (02) disassembled on the field.

In case is necessary to install the wiring box (02) only, protection covers for wiring box openings kit is available as accessory options. To install the protection covers place them over the wiring box openings and fix it using the 8 x M5 screws provided with the accessory kit.



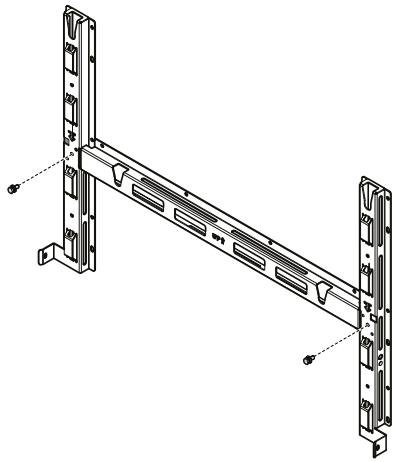
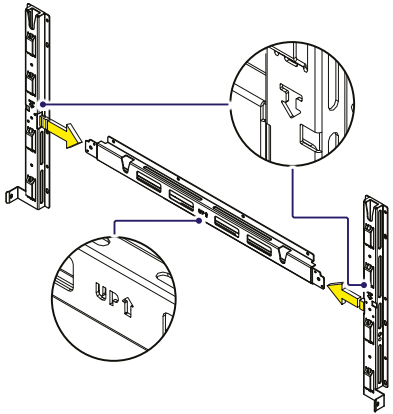
7. Mounting Instructions

- ⚠ **ATTENTION** – The installation operations must be carried out by qualified personnel and it is mandatory to adhere to the indications provided in this manual, the diagrams and the enclosed documentation, paying attention to follow the installation sequence exactly as described in this manual.
- ⚠ **ATTENTION** – Staff authorized to carry out the installation must be specialized and experienced in PV plant installation and specifically PV inverters installation. FIMER can provide training on the product to provide suitable knowledge for the installation.
- ⚠ **ATTENTION** – The installation must be performed by qualified installers and/or licensed electricians in accordance with the existing regulations in the country of installation.
- ⚠ **ATTENTION** – The installation must be carried out with the equipment disconnected from any voltage sources. Refer to "Inverter total de-energization and safe access" chapter on the product manual to know all the necessary step to safely operate on the inverter.

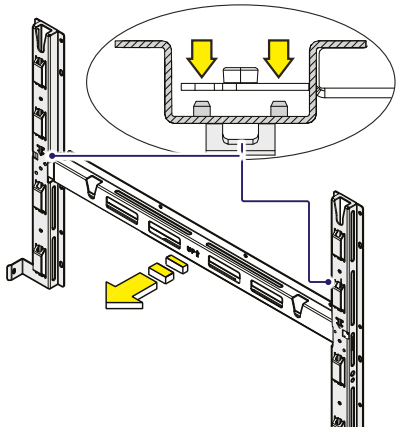
7.1 Bracket assembly

• Assembly the two side bracket pieces together with the central bracket, by sliding it as shown in the picture and paying attention to the orientation of the pieces (refer to arrow and "UP" markings on the brackets): side brackets arrow have to be turned downwards, central bracket have to be turned upwards.

• Use the two M8 screws with flat and spring washers (supplied) to fix the pieces of the bracket together.



Slide the bracket in order to match the two holes with the centering pins of the side brackets.



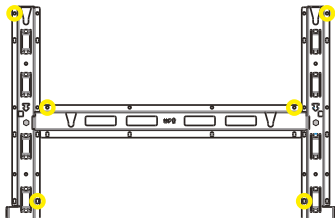
• Position the bracket (03) perfectly level on the support and use it as drilling template (consider the overall dimensions of the power module and the wiring box).

• It is the installer's responsibility to choose an appropriate number and distribution of attachment points. The choice must be based on the type of support (wall, frame or other support), the type of anchors to be used, and their ability to support 4 times the inverter's weight (4x125Kg/276lbs=500Kg/1104lbs for all models).

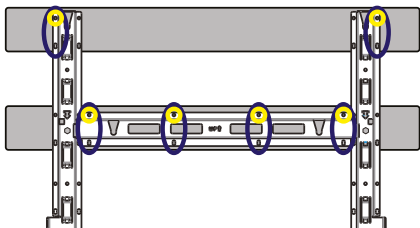
• Depending on the type of anchor chosen, drill the required holes to mount the bracket (03). The pictures shown the recommended minimum fixing point depending to the type of support.

- Attach the bracket (03) to the support with at least 6 attachment screws (shown in **YELLOW**) or at least 6 frame fixing bracket for frame mounting (shown in **BLUE**).

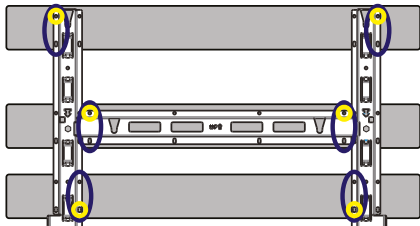
Wall mounting minimum fixing points



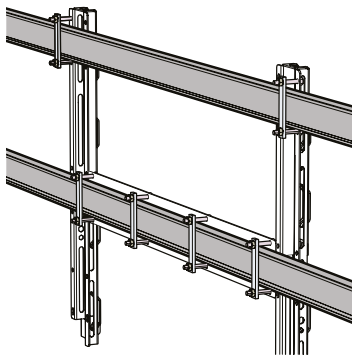
Frame mounting (2 supports) minimum fixing points



Frame mounting (3 supports) minimum fixing points




- In case of use of "frame fixing brackets" (see picture below as example) it will be possible to fix the bracket to the frame structure without drill any additional holes.



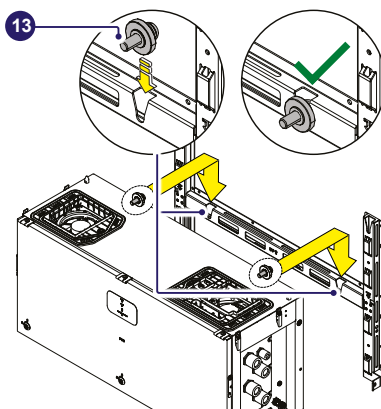
- Fix the bracket (03) to the support.

7.2 Assembly the Inverter to the bracket

⚠ ATTENTION – Handling and installation operations shall be performed only by using the special tools and accessories provided with "PVS Installation Kit" that have to be ordered separately. The use of these equipment are mandatory to safely install the inverter.

- Lift the wiring box up to the bracket (03) (using the handles (04) or M8 eyebolts) and insert the heads of the two rear attachment pins (13) (placed on the rear part of the wiring box) into the two slots  on the bracket (03). Check that the pins (13) has been correctly inserted in the slots as shown in the picture before releasing the wiring box.

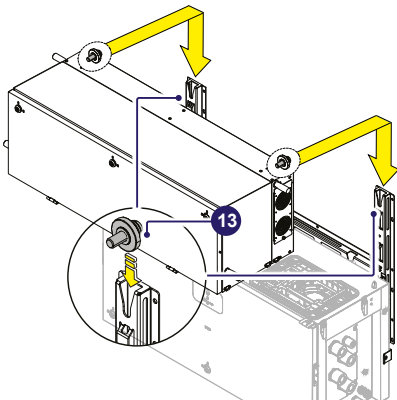
⚠ ATTENTION – Risk of injury due to the heavy weight of the equipment. Always consider the center of gravity of the enclosures while lifting.



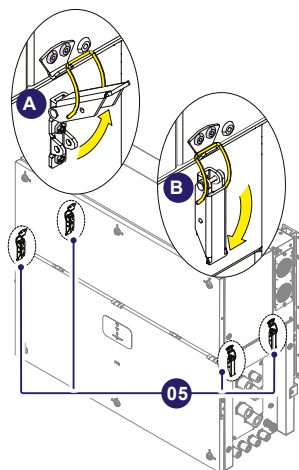
- Remove the handles (04) or eyebolts.

- Lift the power module up to the bracket (03) and over the wiring box (using the handles (04) or M8 eyebolts) and insert the heads of two rear attachment pins (13) (placed on the rear part of the power module) into the slots on the bracket (03).

⚠ ATTENTION – Risk of injury due to the heavy weight of the equipment. Always consider the center of gravity of the enclosures while lifting.



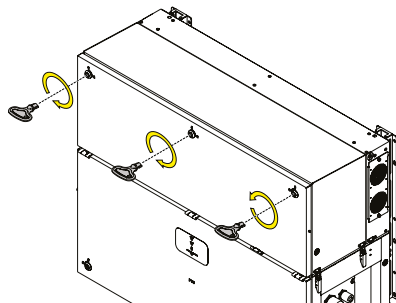
- Fasten all of the four side closures (latches) (24) as shown in the pictures.



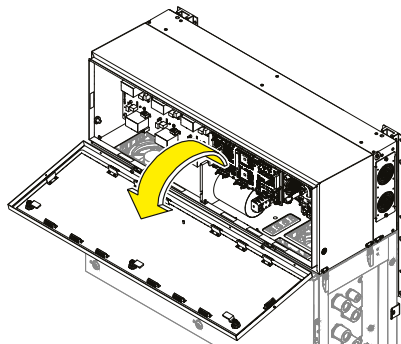
⚠ ATTENTION – Risk of injury due to the high strength of latches (24) Use the proper protection gloves.

7.3 Opening the power module box cover

- Using the key tool provided with the PVS installation kit content in the wiring box package, open the three cover quarter cam locks (54) following the proper ways as shown in the related silkscreens on the cover (54).

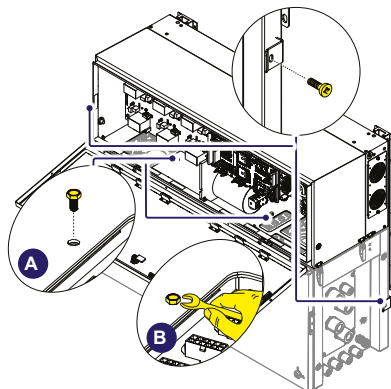


- Open the power module cover (54).



7.4 Final fastening operations

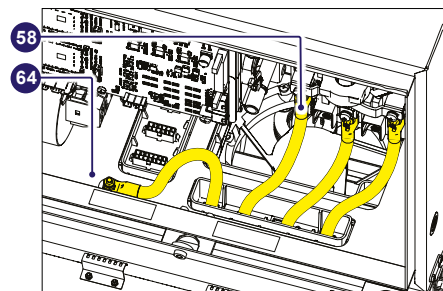
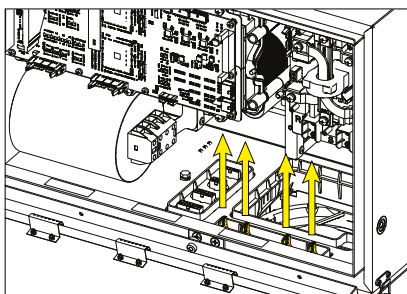
- Tighten the two hexagonal junction screws (32) with a tightening torque of 10 Nm.
- Tighten the two side screws (supplied) with a tightening torque of 5 Nm, to avoid the tilting of the bottom part of the inverter.



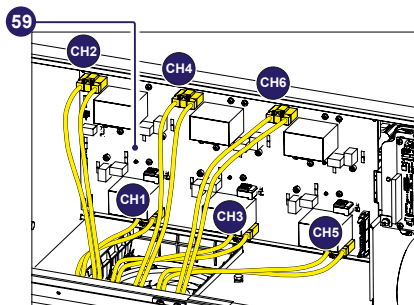
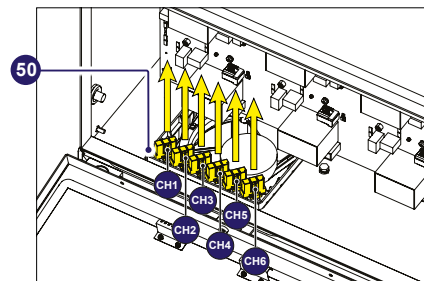
7.5 Interface cables connection

Last operation (before proceed with the wiring and connections of external AC and DC sources) is to connect the interface connectors that allow the power and the communication connection between the power module (01) and the wiring box (02).

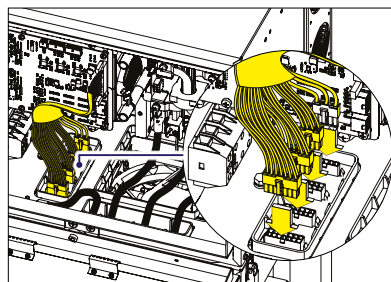
- Connect the AC interface cables (51) coming from the wiring box to the respective anchor points:
 - R, S, T cables should be connected to the AC interconnection board (58) using the nuts supplied with the power module component kit (tightening torque 8Nm).
 - Internal earth cable should be connected to the PE interconnection point (64) using the nut and the two serrated lock washers supplied with the power module component kit (tightening torque 4Nm).



- Connect the 6 DC interface cables (50) coming from the wiring box in the dedicated connectors of the DC interconnection board (59)



- Connect the interface signal cables (30) on the related interface signal connectors (65) starting from the back connector.



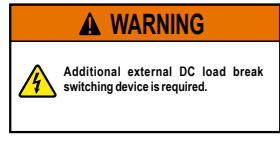
⚠ ATTENTION – For connection to the network in South Africa: according to NRS097-2-1 requirements, at the end of installation it is mandatory to apply the label at the left (supplied with the inverter) near the power module regulatory label.

WARNING!
NRS 097-2-1:2017 (South Africa)

Total [Ω]	X/R ratio
Reference Impedance 0.156	3.0
I _{SC} [A]	S _{SC} [kVA] (three phases)
Fault Level 1475	1018

It is not intended to connect this Inverter to a network with a higher Network Impedance.

⚠ ATTENTION – For connection to the network in Australia and New Zealand: according to AS/NZS 4777.2020 requirements, at the end of installation it is mandatory to apply the label at the left (supplied with the inverter) near the power module regulatory label.



8. Routing the cable to the inverter

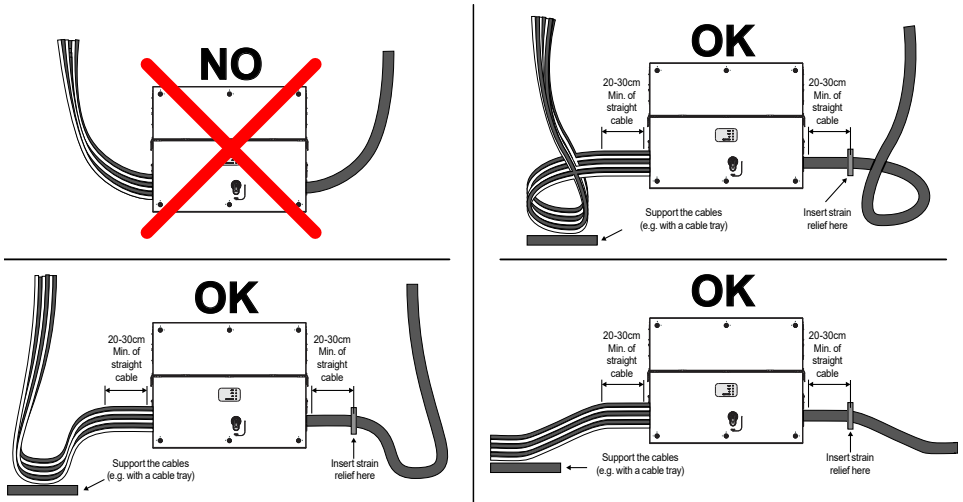
The cable routing have to be done in order to avoid water dripping to the:

- AC panel cable glands (11) (56)
- DC input quick fit connectors (16)
- DC input cable glands (18)
- Signal cable glands (12).

Especially when coming from the top, the cables must be routed in order to create a loop: in this way the water that flows on the cables will be drained.

The AC and DC conductors must be anchored or supported in order to prevent loading and mechanical stress on the cable glands and quick fit connectors causing potential damage on the AC and the DC plates.

The pictures below are showing some example of incorrect and proper cable routing.




⚠ ATTENTION – In case of the AC cable glands (11) was accidentally removed during the cable routing phase, it will needed to assure the correct tightness of the lock nut of the cable gland to the inverter chassis with a tightening torque of 8.0 Nm (for each cable gland).

9. Grid output connection (AC side)

The inverter must be connected to a three-phase TN system with the center of the star connected to ground. To connect the inverter to the grid is necessary to use a 3/4 wires connection (3 phases with or without neutral cable). **In any case, the inverter's earth connection is mandatory.**

⚠ ATTENTION – In case of PVS-100/120 GROUNDING KIT is installed on the inverter, it is mandatory the use of IT system without connection of the center of the star to the ground

9.1 Characteristics and sizing of the protective grounding cable

FIMER inverters must be earthed via the connection points marked with the protective earth symbol  and using a cable with an appropriate conductor cross-section for the maximum ground fault current that the generating system might experience. According to IEC 62109-1: If the external Protective earthing conductor cross-section area is $S/2$, where S is the cross-section of the phase conductor, no further calculation are needed to demonstrate that the cross-section is enough to sustain the fault current. Otherwise the protective earthing conductor cross-section shall be determined by calculation according to IEC 60364-5-54 or have to fulfill the requirement of local standard.

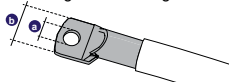
⚠ ATTENTION – Any failure of the inverter when it is not connected to earth through the appropriate connection point is not covered by the warranty.

The earth connection can be made through the Protective earth point (int.) (25), Protective earth point (ext.) (10) or both (this is required by regulations in force in certain countries of installation).

The sizing of the ground cable depend on the choice of the protective earth point (internal (25) or external (10) where it will be connected:

	Protective earth point (int.) (25)	Protective earth point (ext.) (10)
Cable diameter range	10 - 17 mm (M25 cable gland)	-
Conductor cross section	35...95 mm ² (copper)	-

Cable lug dimensioning



for M10 Stud
a = 10,5 mm (min)
b = 40 mm (max)

for M8 Bolt
a = 8.4 mm (min) - 8.5 mm (max)
b = all dimension accepted

9.2 Load protection breaker (AC disconnect switch) and differential protection downstream of the inverter

To protect the AC connection line of the inverter, an overcurrent protection device with the following features must be installed (these are the characteristic of a load protection switch referred to a single inverter installation):

Load protection breaker	PVS-100-TL	PVS-120-TL	PVS-100-TL	PVS-120-TL
Type	Automatic circuit breaker with thermal-magnetic protection		Fuses switch disconnecter	
Voltage/current rating	400Vac min.150A (*)	480Vac min.150A (*)	400Vac 200A (*)	480Vac 200A (*)
Magnetic protection characteristic	Magnetic curve B/C		gG, gS	
Number of poles	3/4		3/4	

(*): please consider thermal and other derating when selecting the current rating of the protection equipment for your application.

In case of installation of a residual current protection, the device shall meet the following characteristics in order to prevent nuisance tripping due to capacitive leakage current of photovoltaic modules:

Residual current protection device requirements	PVS-100-TL	PVS-120-TL
Type	A / AC	
Sensitivity	1.0 A	1.2 A

📄 NOTE – For protection of the AC line, on the basis of the information above with regard to the differential protection integrated in FIMER inverters, it is not necessary to install a type B ground fault switch.

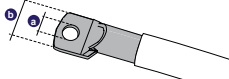
9.3 Characteristics and sizing of the line cable

Depending of the type of the AC panel it's possible to use single conductors cables or a multipolar cable:

- Single-core AC panel (11) configuration have 4xM40 cable glands (62) for the "N" neutral, "R", "S", "T" phases and a M25 cable gland (23) for the earth cable.
- Multi-core AC panel (56) configuration (optional) have a M63 cable gland (63) for the "N" neutral, "R", "S", "T" phases and a M25 cable gland (23) for the earth cable.

The cross-section of the AC line conductor must be sized in order to prevent unwanted disconnections of the inverter from the grid due to high impedance of the line that connects the inverter to the power supply point.

	Single conductor cable	Multipolar cable
Cable diameter range	19 - 28 mm	37 - 53 mm
Conductor cross section	min. 70mm ² ...max 185mm ²	
Cable lug dimensioning	for M10 Stud a = 10.5 mm (min) b = 40 mm (max)	
Conductor material	copper or aluminum	



⚠ ATTENTION – The AC connection busbars (21) are in copper tin-plated; therefore if aluminum cables are used, the correct coupling with the copper bars must be guaranteed by using appropriate bi-metallic cable lug.

9.4 AC output cables connection

⚠ WARNING – Before carrying out any operation, check that any external AC switch downstream to the inverter (grid side) are in OFF position and check for voltage absence on the AC conductors!

Routing of the AC cables inside the inverter must be carried out from the right side of the inverter.

Depending of the version of the AC panel installed on the inverter it will be necessary to route the AC output and ground cables into different ways:

Single-core configuration (11) (default) : 4xM40 cable glands (62) for the "N" neutral, "R", "S", "T" phases and a M25 cable gland (23) for the earth cable.

In this configuration the AC output and ground cables must be inserted into the proper cable glands, trying to follow a logical order based on the position of the internal connections:

N = Neutral (indicated with a label near the AC connection busbar (21))

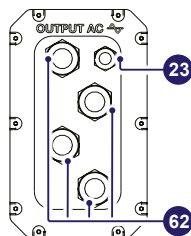
T = Phase T (indicated with a label near the AC connection busbar (21))

S = Phase S (indicated with a label near the AC connection busbar (21))

R = Phase R (indicated with a label near the AC connection busbar (21))

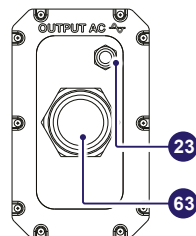
The earth connection can be made using the Protective earth point (int.) (25), Protective earth point (ext.) (10) or both (this is required by regulations in force in certain countries of installation).

⊕ = Earth (indicated with the protective earth symbol ⊕ near the protection earth connection point (int.) (25) or protection earth connection point (ext.) (10)).



Multi-core configuration (56) (optional): one M63 cable gland (63) for the "N" neutral, "R", "S", "T" phases and a M25 cable gland (23) for the earth cable.

This version of the AC panel can be ordered separately.

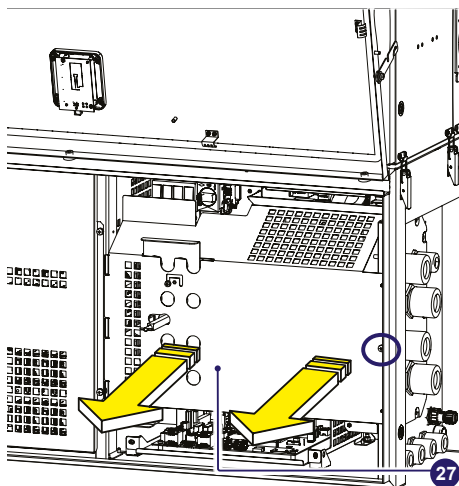


Follow the procedure below to route all the requested cables:

⚠ ATTENTION – The installation must be performed by qualified installers and/or licensed electricians in accordance with the existing regulations in the country of installation and in accordance of all safety rules for performing electrical works. The customer has civil liability for the qualification and mental or physical state of the personnel who interact with the equipment. They must always use the personal protective equipment (PPE) required by the laws of the country of destination and whatever is provided by their employer.

⚠ ATTENTION – Before carrying out any operation, check that any external AC switch downstream to the inverter (grid side) are in OFF position applying LOTO procedure on it.

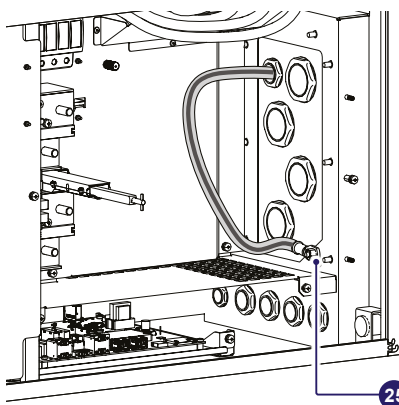
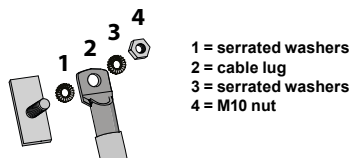
- Open the wiring box front cover (07).
- Remove the AC protective shield (27) by removing the M5 screw.



Depending on the ground connection method (internal (25) or external (10)) follow the procedures described below:

Internal ground connection

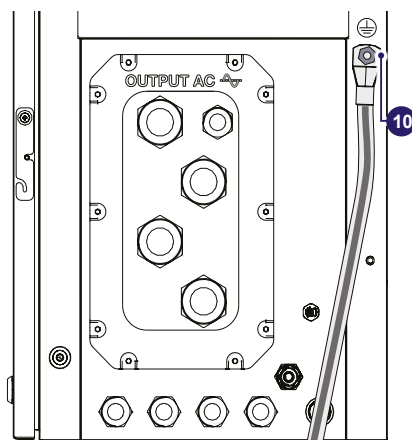
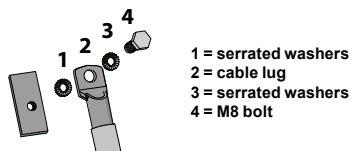
- Pass the protective earth cable through the proper cable gland (23) on the AC panel.
- Fix the protective earth cable lug to the protection earth connection point (int.) (25) using the washers and nut pre-installed on the M10 stud, as shown in the following diagram:



⚠ ATTENTION – The cable lug must be installed with a tightening torque of 21Nm.

External ground connection

- Fix the protective earth cable lug to the protection earth connection point (ext.) (10) (this is the same thread for handles) using the washers and M8 bolt provided in the wiring box component kit, as shown in the following diagram:

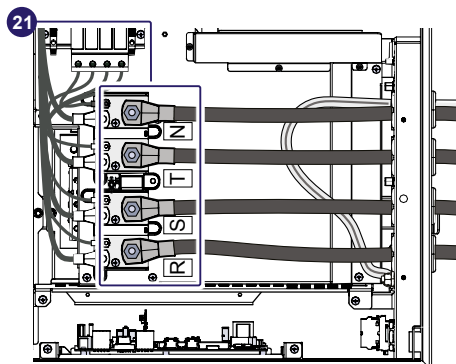
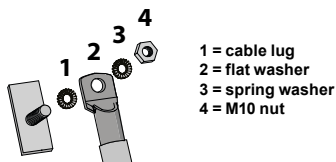


⚠ ATTENTION – The cable lug must be installed with a tightening torque of 15.2 Nm.

⚠ ATTENTION – Before connecting the inverter to AC or DC sources use a suitable multimeter to test the conductivity of the earth connections between the protection earth connection point (ext.) (10) and a handles thread (04) on the housing of power module.

AC line connection

- Pass the AC cables through the single core cable glands (62) or multicore cable gland (63) on the AC panel. The length of phase cables on the internal side of wiring box need to be about 300 mm (cable lug included).
- Fix the phases and neutral (if required) cable lugs to the AC connection busbars (21), paying attention to the correspondence of the phases with the labels, using the washers and the M10 nuts pre-installed on the busbar as shown in the following diagram:



- ⚠ **ATTENTION** – In case of a wrong phase sequence the inverter will not connect to the grid and it will provide an error state.
- ⚠ **ATTENTION** – The cable lugs must be installed with a tightening torque of 25Nm.

- Re-install the AC protective shield (27) by using the M5 screw previously removed with a tightening torque of 3 Nm.
- At the end of installation check the tightness of:
 - AC cable glands
 - 8Nm for single core AC cable gland (62) or 25Nm for multi core AC cable gland (63)
 - Protective earth cable gland (23) (7.5 Nm)

- ⚠ **ATTENTION** – Make sure the cable glands are properly sealed to ensure to keep IP65 protection degree.
- ⚠ **ATTENTION** – In case of the AC cable glands (62) (63) was accidentally removed during the cable routing phase, it will needed to assure the correct tightness of the lock nut of the cable gland to the inverter chassis with a tightening torque of 8.0 Nm (for each cable gland).

10. Input connection (DC)

⚠ WARNING – Check absence of any leakage to ground in the PV generator.

⚠ WARNING – If input strings are paralleled, they must have the same installation conditions (number of panel sets, panel type, orientation and tilt).

⚠ WARNING – When the photovoltaic panels are exposed to sunlight they provide continuous DC voltage to the inverter. To avoid risks of electrical shock, all wiring operations must be carried out with the DC disconnect switches (internal **(15)** and external to the inverter) and AC disconnect switches (internal **(09)** or external to the inverter) OFF.

⚠ WARNING – In case presence of internal DC disconnect switch only, there will be live parts internal to the inverter with a consequent risk of electrical shock. In this case these activity is ONLY allowed with the use of appropriate PPE (overall resistant to electric arc, dielectric helmet with visor, insulating gloves class 0, Protective overglove in leather EN420 – EN388 , Safety shoes).

⚠ WARNING – Warning. The inverters referred to in this document are WITHOUT AN ISOLATION TRANSFORMER (transformerless). This topology implies the use of isolated PV panels (IEC61730 Class A Rating) and the need to keep the PV array floating with respect to ground: no terminal of the PV array must be connected to ground. For a different connection of PV strings, when a negative input grounding kit is installed, the use of an isolation transformer is mandatory. Refer to the "PVS-100/120 GROUNDING KIT" Quick Installation Guide for further information

DC input connections may vary depending on the inverter model.

10.1 Input connection on standard and S2 models (single/double MPPT)

The connection of the DC input cables on the standard and -S2 models is made on the DC input connection busbar **(17)** after that the cables have been passed through the DC cable glands **(18)**.

⚠ ATTENTION – For connection to the network in Australia and New Zealand.

According to AS/NZS 4777.2020 requirements, it is necessary to apply the label and install an external DC Switch on the Standard and S2 inverter models.

External DC isolator shall comply with AS 60947.3 and relevant regulation requirement.

10.1.1 Operations preliminary to the connection of the PV generator

In order to perform safely the preliminary operations before the connection to the PV generator it is needed that the inverter is connected to the ground.

• Checking of leakage to ground of the photovoltaic generator

Measure the voltage present between positive and negative pole of each string with respect to ground.

If a voltage is measured between an input pole and ground, it may be that there is a low isolation resistance of the photovoltaic generator and the installer will have to carry out a check to solve the problem.

⚠ WARNING – Do not connect the strings if a leakage to ground has been detected, as the inverter might not connect to the grid.

• Checking of strings voltage

Measure the voltage present between positive and negative pole of each string.

If the open circuit voltage of the string is near the maximum value accepted by the inverter, consider that low ambient temperatures cause an increase in the string voltage (different according to the photovoltaic module used). In this case it is necessary to carry out a check of the sizing of the system and/or a check on the connections of the modules of the system (e.g.: number of modules in series higher than the design number).

⚠ ATTENTION – Input voltages higher than the maximum value accepted by the inverter (see technical data table) may occur the damage of the inverter.

• Checking the correct polarity of the strings

Before wiring the strings, you must ensure that the voltage of each string complies with the correct polarity using a voltmeter.

10.1.2 Independent or parallel input channels configuration

The inverter standard and -S2 versions have two input channels (thus benefiting from two trackers for MPPT maximum power point tracking) which work independently of one another but can be paralleled by leveraging a single MPPT.

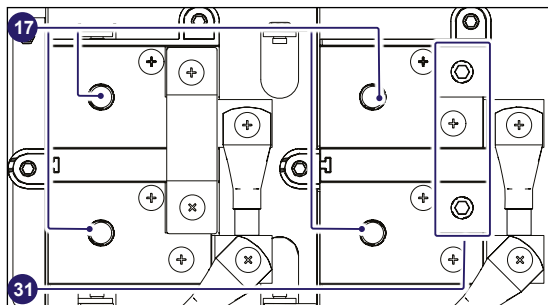
Based on PV system configuration, inputs can be set as 2 independent MPPTs or as a single MPPT with the two paralleled input channels.

⚠ ATTENTION – An incorrect setting of the input channels can lead to loss of energy production.

Independent channel configuration (default configuration)

The independent configuration of the input channels (MPPT) is set by factory. This means that the parallel bar (supplied) must not be installed on the parallel MPPT connection points (31), and that the software setting "Independent channel mode" should be performed on the inverter; this setting can be done by different way:

1. During the commissioning wizard phase (STEP 4)
2. In the dedicated section of the internal webserver "Setup section > Setup DC side > Input mode"

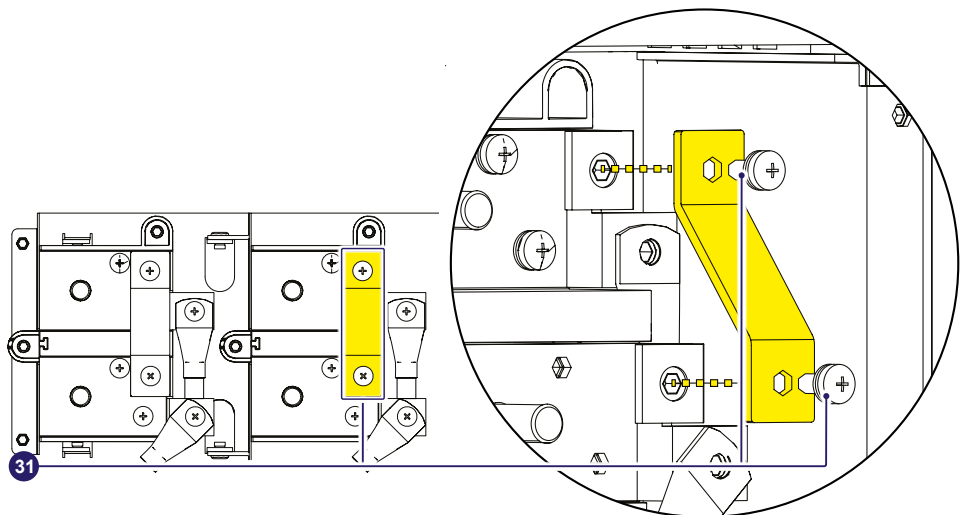


⚠ ATTENTION – Negative paralleling input busbar is pre-installed by factory and shall remain installed.

Parallel channel configuration

The configuration of the input channels (MPPT) can be set in parallel. This means that the parallel bar (supplied) must be installed on the parallel MPPT connection points (31) using the two M6 screws (supplied) with a tightening torque of 8Nm, and that the software setting "parallel channel mode" should be performed on the inverter; this setting can be done by different way:

1. During the commissioning wizard phase (STEP 4)
2. In the dedicated section of the internal webserver "Setup section > Setup DC side > Input mode"

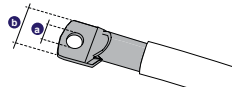


10.1.3 Connection of inputs

To carry out the connections, the cables must be passed through the DC cable glands (18).
Connection of DC cables is made on the DC input connection busbar (17).

The bolts on the DC input connection busbar (17) accept cable lugs as per the following table:

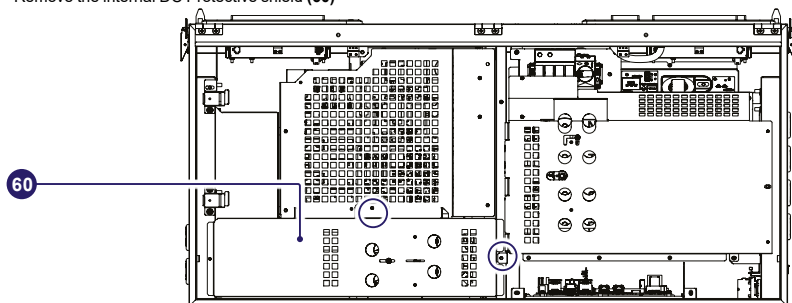
DC input cable	
Cable diameter range	19 - 28 mm
Conductor cross section	min. 50mm ² (in case of 2 couples of DC cables)...max 185mm ² min. 90mm ² (in case of single couple of DC cables)...max 185mm ²
Cable lug dimensioning	for M10 Stud a = 10.5 mm (min) b = 40 mm (max)
Conductor material	copper or aluminum



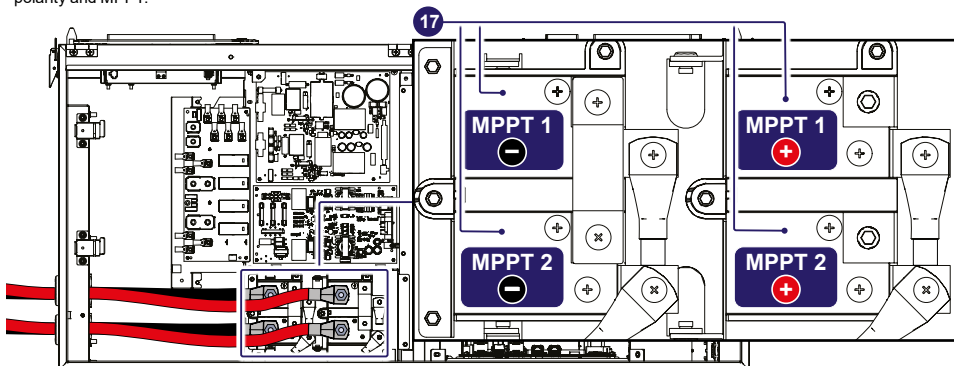
⚠ ATTENTION – The DC input connection busbars (17) are in copper tin-plated; therefore if aluminum cables are used, the correct coupling with the copper bars must be guaranteed by using appropriate bi-metallic cable lug.

In order to connect the DC input cables performs the procedure as follow:

- Open the wiring box front cover (07)
- Remove the internal DC Protective shield (60)



- Unscrew the DC cable glands (18)
- Introduce the cables
- Install the cable lugs on the cables
- Connect the DC cables to the busbars (17) with a tightening torque of 25 Nm. During this operation connect the cables with the right polarity and MPPT.



- Once connection to the DC input connection busbar (17) has been completed, retighten the cable gland firmly (8.0 Nm torque) and check seal.
- Re-install the DC protective shield (60) by using the M5 screws previously removed (torque of 3 Nm).

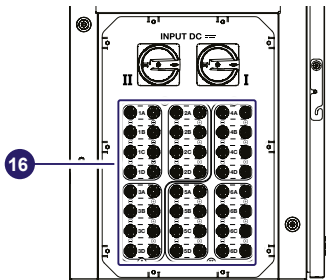
10.2 Input connection on -S(X or Y) and S(X or Y)2 models

⚠ WARNING – Comply with the maximum input current relating to the quick-fit connectors as indicated in the technical data.

⚠ WARNING – The reverse polarity can cause severe damage and electric arc hazards! In case of reverse input strings do not disconnect them while under load and do not turn the DC disconnect switches (15) to OFF position. Wait until input current are below 0.5A (when solar irradiance declines at night) and turn the DC disconnect switches (15) to OFF position, disconnect the DC input quick fit connectors (16) and correct the wrong polarity of the string.

For the string connections on the -S(X or Y) and S(X or Y)2 versions, it is necessary to use the DC input quick fit connectors (16), located on the left side of the wiring box.

The input connectors are divided into 6 groups (one group for each input channel) consisting of 4 pairs of quick fit connectors.



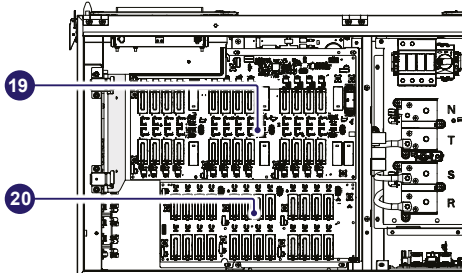
These versions of inverter are equipped with 2 DC disconnect switches (15):

- DC disconnect switches I → Groups 1, 2 and 3 of quick fit connectors
- DC disconnect switches II → Groups 4, 5 and 6 of quick fit connectors

10.2.3.1 Sizing of fuses

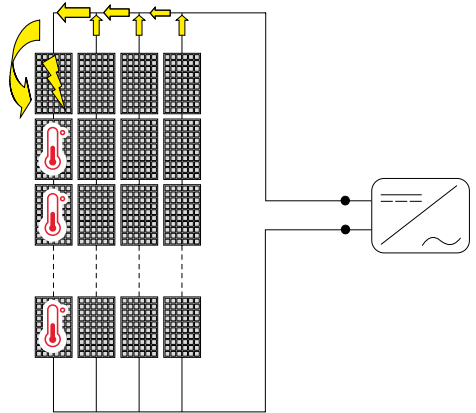
Depending of the wiring box version installed on the inverter there are different configuration of string fuses:

- SX, SY versions: equipped with positive side string fuses board (19) and have 24 string fuses (1 for each strings) that are supplied and have to be installed.
- SX2, SY2 versions: equipped with both positive side string fuses board (19) and negative side string fuses board (20) that totally have 48 string fuses (2 for each strings). Fuses on the negative side string fuses board (20) are already fitted while the fuses on the positive side string fuses board (19) are supplied and have to be installed.



The correct sizing of the (19) positive side and (20) negative side (-SX2, SY2 wiring box model) string fuses to be used to protect from "return currents" is very important because it can considerably limit the risk of fire and damage to the PV generator.

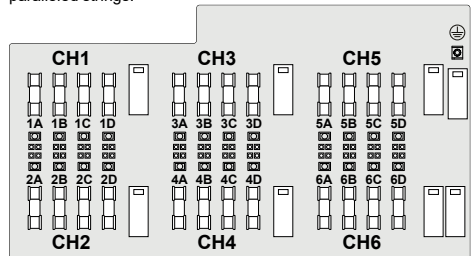
A "return current" can be generated in the event of a fault and relevant short-circuit at the ends of one or more PV modules of the system; this condition can cause all the current supplied by the strings not involved in the fault, but connected to the same input channel, to pass through the faulty string.



For input connectors marked with "A" and "D" you must directly connect the individual strings coming into the inverter (do not make field switchboards for parallel strings). This is because the positive side (19) and negative side (20) string fuses, situated on each input, are not rated to take strings in parallel (array).

This operation could damage the fuses and consequently could cause malfunctioning of the inverter.

The connection in parallel of the strings (array composition) could be made upstream of the input connectors marked with "B" and/ or "C" using a proper Y quick fit connector adapters: in this case the input fuses will have to be replaced with a suitable size for the paralleled strings.



The sizing of the string fuses must be made taking into account the 2 following conditions:

1. The nominal current of the fuse (I_{rated}) must not exceed the maximum rating of the fuse to be used in series on the strings (maximum series fuse rating), indicated in the technical data of the PV modules in compliance with standard EC 61730-2:

$I_{rated} < \text{Maximum series fuse rating}$

2. The fuse rating (I_{rated}) must be determined based on the string current and on the sizing guidelines provided by the manufacturer to avoid untimely tripping. As a general guideline, based on the photovoltaic modules' short circuit current (I_{sc}), it is possible to calculate the rating of the fuse with the following formula:

$$I_{rated} > (1.4 \approx 1.5) \cdot I_{sc}$$

Fuses must be chosen among the standard commercially available ratings, selecting the value that is closest to the obtained result. The fuse selected with the calculation described previously takes into consideration derating factors and corrections such as:

- Increase in the effective irradiation of the installation area
- Increase in the I_{sc} on the basis of the high temperature of the PV module
- Thermal derating of the fuse
- Maximum return current of the PV modules installed

Fimer can supply fuse kits of different values; these kits could be ordered separately.

NOTE – For effective calculation taking real installation conditions into account, refer to the documents supplied by the protection fuse manufacturer.

10.2.3.2 Operations preliminary to the connection of the PV generator

WARNING – In order to safely perform the preliminary operations before the connection to the PV generator, the connection of the ground protection cable (10)/(25) to the wiring box is mandatory.

ATTENTION – The installation must be performed by qualified installers and/or licensed electricians in accordance with the existing regulations in the country of installation and in accordance of all safety rules for performing electrical works. This activity is allowed **ONLY** with the appropriate PPE for carrying out this check (overall resistant to electric arc, dielectric helmet with visor, insulating gloves class 0, Protective overglove in leather EN420 – EN388, Safety shoes).

ATTENTION – The reverse polarity can cause severe damage.

Checking of leakage to ground of the photovoltaic generator: Measure the voltage present between positive and negative pole of each string with respect to ground.

If a voltage is measured between an input pole and ground, it may be that there is a low isolation resistance of the photovoltaic generator and the installer will have to carry out a check to solve the problem.

ATTENTION – Do not connect the strings if a leakage to ground has been detected, as the inverter might not connect to the grid.

Checking of strings voltage:

Measure the voltage present between positive and negative pole of each string.

If the open circuit voltage of the string is near the maximum value accepted by the inverter, consider that low ambient temperatures cause an increase in the string voltage (different according to the photovoltaic module used). In this case it is necessary to carry out a check of the sizing of the system and/or a check on the connections of the modules of the system (e.g.: number of modules in series higher than the design number).

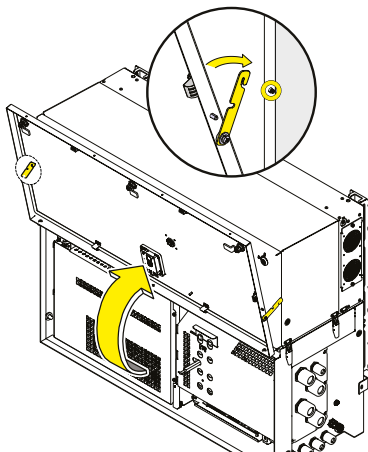
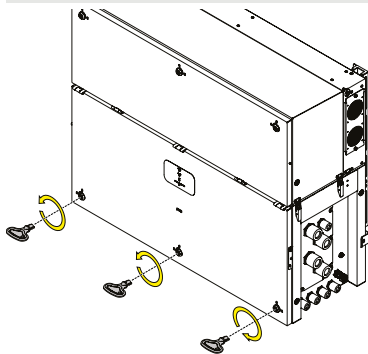
ATTENTION – Verify that the string voltage is the same in all the strings that are connecting to the same input channel. Voltage differences (of the strings connected in parallel) could reduce performance and unwanted opening of the fuses.

ATTENTION – Input voltages higher than the maximum value accepted by the inverter (see technical data table) may occur the damage of the inverter.

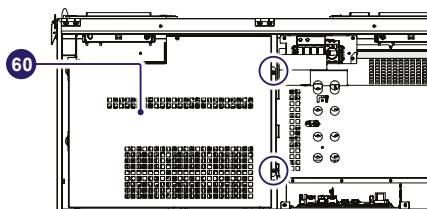
10.2.3.3 Checking the correct polarity of the strings:

- Open the wiring box front cover (07).

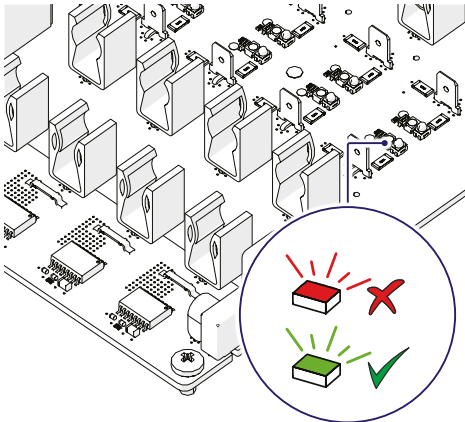
NOTE – Only for -S2, -SX2, SY2 versions: Set the wiring box AC disconnect switch (09) to OFF position; otherwise it will not be possible to open the wiring box cover (07).



- Remove the internal DC Protective shield (60) by removing the two M5 screws.



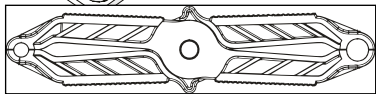
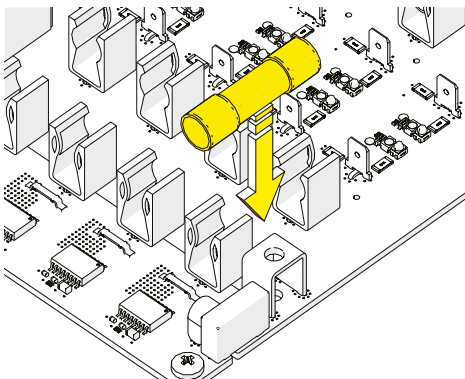
- Turn the DC disconnect switches (15) to OFF.
- Check for the absence of installed fuses on the positive side string fuses board (19) - if present remove it!
- Connect the strings and check that the GREEN LED corresponding to each positive fuses activates. The string will turn out to be inverted if the RED LED is ON. Check the strings one by one so to safely check which strings are inverted.



- After all the input strings have been checked, remove all connected strings and check that all LEDs will switch OFF.

⚠ WARNING – Pay attention to disconnect all connected input strings; otherwise high voltages will be present inside the inverter.

- Install the fuses (supplied) on the string fuses board (19) using the supplied fuse pliers.



- Re-install the DC protective shield (60) by using the M5 screws previously removed (torque of 3 Nm).

10.2.3.4 Installation procedure for quick-fit connectors

In the inverter models, where the quick-fit connectors are used, is possible to find one of the following four types:

- Weidmüller PV-Stick
- Weidmüller WM4
- MultiContact MC4
- Amphenol H4.

The model of connectors installed on your inverter must be matched by the same model of the respective corresponding parts to be used (check the corresponding part on the manufacturer's website or with Fimer).

⚠ WARNING – To avoid damage to the equipment, when crimping cables to the connectors, pay particular attention to polarity.

⚠ ATTENTION – According to IEC 62548 (Photovoltaic (PV) arrays – Design requirements), connectors mated together in a PV system shall be of the same type from the same manufacturer, i.e. a plug from one manufacturer and a socket from another manufacturer or vice versa shall not be used to make a connection. Refer to document "String inverters - Product manual appendix" available on the website to find out the manufacturer and model of quick fit connector used on the inverter.

⚠ ATTENTION – Using mating parts that are not compliant with the quick fit connector models on the inverter could cause serious damage to the unit and lead to invalidation of the warranty.

📄 NOTE – Complete assembly instructions and specification of quick-fit connectors could be found on manufacturer website.

10.2.3.5 Connection of inputs

⚠ ATTENTION – If any string inputs is not required check that protective caps are installed to the relative unused connectors. This is necessary for the inverter seal and to avoid any damage to the unused connectors which may be used at a later time.

⚠ ATTENTION – The quick fit connectors must be properly installed. After the installation make sure the connectors are correctly locked through the clips.

⚠ ATTENTION – The connections can also be made with the wiring box detached from the power module that can be connected later for commissioning. When working with the wiring box detached, pay particular attention to:

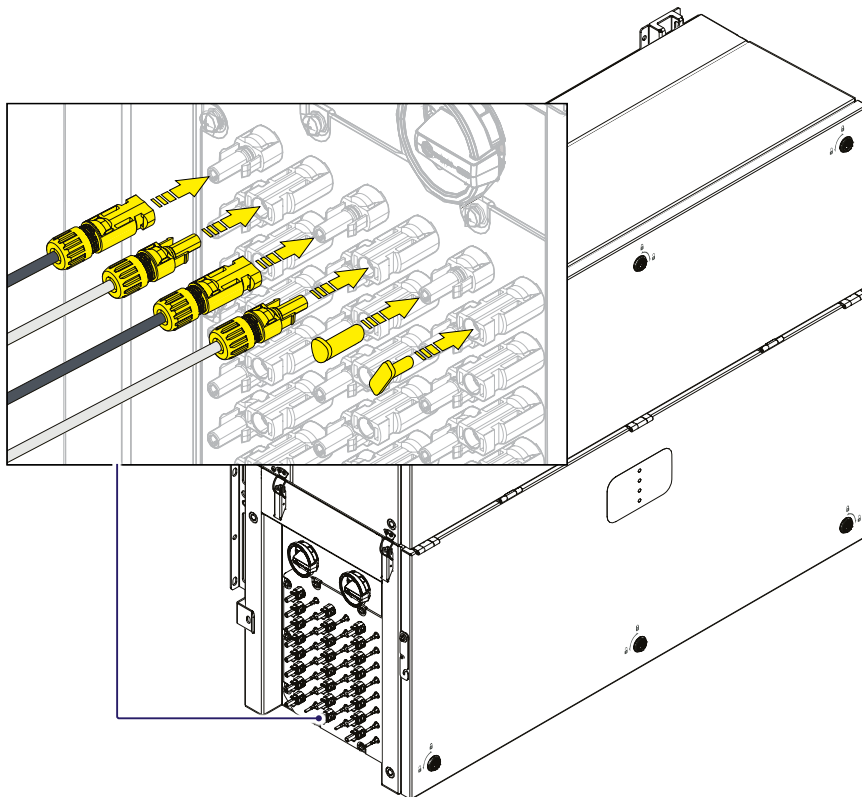
- presence of ground connection (10)/(25)
- the top of wiring box must always be protected in outdoor installations with proper IP66 protection covers (optional accessory content in "PVS Installation Kit", to be ordered separately).

📄 NOTE – Notes on the system sizing - Decisions on how to structure a photovoltaic system depend on a series of factors and considerations, such as the type of panels, the space availability, the future location of the system, energy production goals over the long term, etc. A configuration program that can help to correctly size the photovoltaic system is available on the Fimer website (<http://stringsizer.fimer.com>).

📄 NOTE – When configuring DC input and during the installation it's needed to follow one basic rule to avoid possible output power derating: All MPPTs shall be populated connecting at least TWO string per each and configuration needs to be as much possible homogenous. Considering to connect 20 strings, proceed connecting same number of strings per MPPT and then connect the remaining strings in

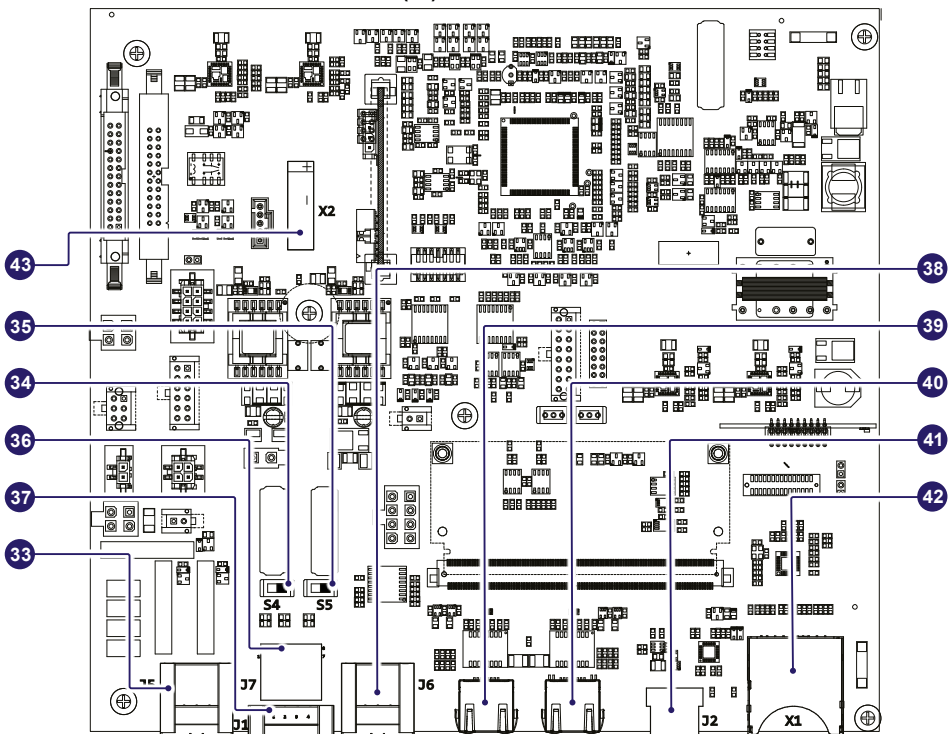
the selected MPPTs (4 MPPTs with 3 strings + 2 MPPT with 4 strings).

Connect all the strings required by the system, always checking the seal of the connectors.



11. Connection of the communication and control signals

11.1 Communication and control board (28) references

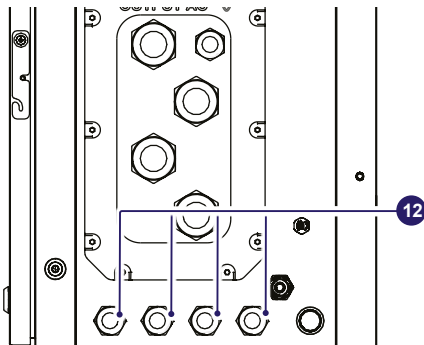


Terminal Name	Terminal Reference	Description
J5	33	Multifunction relay connector (ALARM terminal block)
S4	34	RS-485 FIMER service 120Ohm termination resistance switch (FIMER service only)
S5	35	RS-485 line 120Ohm termination resistance switch
J7	36	RS-485 connector (RJ45) (FIMER Service only) (*)
J1	37	Remote ON/OFF terminal block (*)
J6	38	RS-485 line terminal block
-	39	Ethernet connector 2 (RJ45)
-	40	Ethernet connector 1 (RJ45)
J2	41	USB connector
X1	42	SD card slot
X2	43	CR2032 Coin battery

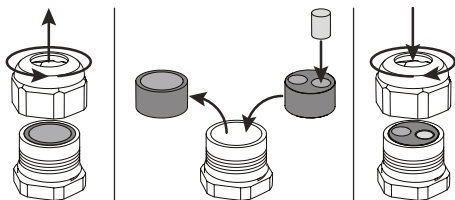
(*) The RS-485 connector (36) and the signal R1 on the Remote ON/OFF terminal block (37) are used to bring the signals on the external connector RS-485&Rem.ON/OFF (57).

11.2 Connections to the communication and control board

The communication and control signals are connected to the communication and control board (28) inside the wiring box. To reach the board, on the right side of the wiring box, there are 4xM25 cable glands (cable range accepted 10-17mm) (12) that can be used to reach the terminals / connectors on the communication and control board (28).



NOTE – As an alternative to each cable gland internal gasket the two-hole gasket (supplied) could be installed: The two-hole gasket accepts two cables with a diameter of 6mm; if a seal hole is not to be used, it is necessary to install a plug (supplied plastic cylinder) to ensure the inverter's sealing.



ATTENTION – Ensure that all unused cable glands (12) are properly sealed by the IP66 plastic cap (pre-installed on cable glands).

Check the tightness of the signal cable glands (12) (tightening torque 7.5Nm) at the end of wiring operations.

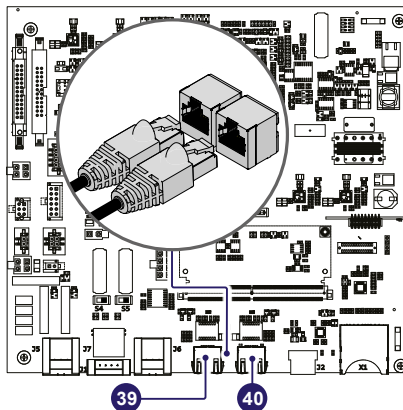
ATTENTION – Make sure the cable glands are properly sealed to ensure to keep IP66 protection degree.

11.3 Ethernet connection

The connection of the ethernet communication cable must be made on the specific connectors (39) (40) located on the Communication and control board (28). The two RJ45 connectors LAN1 and LAN2 are equivalent to each other and can be used for the input or for the output of the line connecting multiple inverters in a daisy-chain.

The cable should be compliant to the following specification:

- Cable type: Patch or Cross type, 100BaseTx, CAT5e (or higher). For outdoor application and/or in presence of strong electromagnetic sources it is advisable to use shielded cables with metallic shielded RJ-45 plug.
- UV-resistant if used outdoors
- Type of plug: metallic shielded RJ45.
- The maximum length that can reach these cables is 100 meters, and it is always advisable not to let them pass by the power cords to avoid interference with data transmission.
- Maximum inverters number connected over one single daisy chain is 40.



ATTENTION – For outdoor application and/or in presence of adverse weather/strong electromagnetic events it is advisable to use additional overvoltage protective devices.

ATTENTION – In order to avoid earth loop (that could create communication issues) the shield of any Ethernet cable must be connected to the RJ45 plug in only one side, the other side of the shield should be left floating. This could be guaranteed by crimping the shield or the screen of the ethernet cable to the RJ45 connectors only at one end of each cables.

Three topologies of ethernet connection to the router are available:

- Ring configuration
- Daisy chain configuration
- Star configuration.

The ring configuration is the preferred method to connect multiple units in order to allow reaching inverters also in case of single unit failures.

NOTE – In case inverters are connected to the networking switch with a ring topology is recommended to enable SPT protocol on the switch (Spanning Tree Protocol SPT (IEEE 802.1D) is enabled by default on inverters.

ATTENTION – On each configuration the maximum length of the cable must be 100m between inverter – inverter and inverter – switch.

ATTENTION – No initial setup is required to start data transmission to Aurora Vision. Internet connection is required to use all the Aurora Vision remote functionalities.

NOTE – Please refer to Aurora Vision documents available on FIMER website for further information how to get an Aurora Vision account for remotely monitoring and managing the installed solar assets.

11.4 Serial communication connection (RS485)

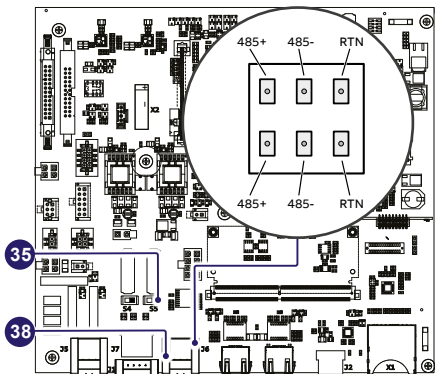
⚠ ATTENTION – Please note that automatic settings of network parameters at turning on, embedded logging capability, automatic logger-free transferring of data to Aurora Vision Cloud and remote firmware update are provided over TCP/IP (Ethernet and/or Wi-fi) bus only.

📖 NOTE – The use of the inverters over the RS485 line is recommended in case of monitoring and controlling by using third party RS485 control systems.

The RS-485 serial communication line is reserved for the connection of the inverter to monitoring devices that communicate with the Modbus communication protocol (Modbus/RTU SUNSPEC compliant).

The RS-485 serial communication line is available on the communication and control board (28) with two terminal blocks (38) for each serial line signal (+T/R, -T/R and RTN) so as to be able to make a daisy-chain connection ("in-out") of multiple inverters.

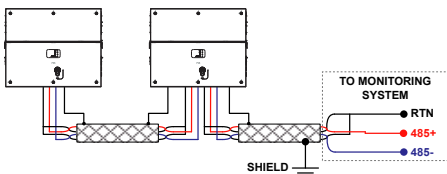
Connection of the R485 communication line conductors is made using the terminal block connectors (38) (485+, 485-, RTN and SHIELD).



⚠ WARNING – For further information regarding the configuration and use of the RS-485 serial communication line, please refer to the product manual.

11.4.1 Slave mode

By default the RS485 port is set as Slave mode. In case the port was set as "Master mode" it must be configured through the integrated Web User Interface (refer to chapter "Web User Interface") to use the RS485 as a serial communication line.



The RS-485 port can be used to set up a line of communication which, when connected to a monitoring device, enables the operation of the photovoltaic system to be kept under control.

Depending on the device used monitoring can be local or remote.

RS485 line supports Modbus/RTU SUNSPEC compliant Modbus protocol.

•When connecting a single inverter to the monitoring system, activate the communication line resistance terminal by setting the switch (35) (to the ON position). In case of multiple installation set the switch only on the last inverter of the chain.

11.4.2 Master mode

The RS485 port can either be used for connecting supported accessories (like weather station): in this case data from accessories will be logged and transferred to the cloud by inverter itself (master mode).

This will allow the inverter to serve as a logger for FIMER accessories.

•When an accessory is connected set the switch of the termination resistance (35) to "ON" position.

•When an accessory is connected it must be added and configured into the "Monitored device" list on the integrated Web User Interface.

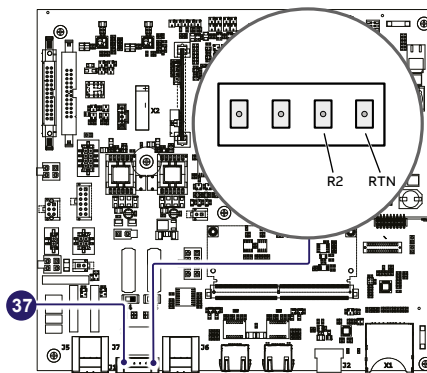
📖 NOTE – For more information on connecting the accessories to the RS485 terminal block, refer to the accessory product manual or contact FIMER customer support.

📖 READ THE MANUAL – For further information regarding the configuration and use of the RS-485 serial communication line, please refer to the user manual.

11.5 Remote control connection

The connection and disconnection of the inverter to and from the grid can be controlled through an external control.

The function must be enabled via web server user interface. If the remote control function is disabled, the switching on of the inverter is dictated by the presence of the normal parameters that allow the inverter to connect to the grid.



If the remote control function is on, besides being dictated by the presence of the normal parameters that allow the inverter to connect to the grid, switching on the inverter also depends on the state of the R2 terminal compared to the RTN terminal present on the connector of the terminal block (37) of the communication and control board (28).

When the R2 signal is brought to the same potential as the RTN signal (i.e. by making a short circuit between the two terminals of the connector), this causes the inverter to disconnect from the grid.

Since this is a digital input, there are no requirements to be observed as regards cable cross-section (it only needs to comply with the sizing requirement for passing cables through the cable glands and the terminal connector).

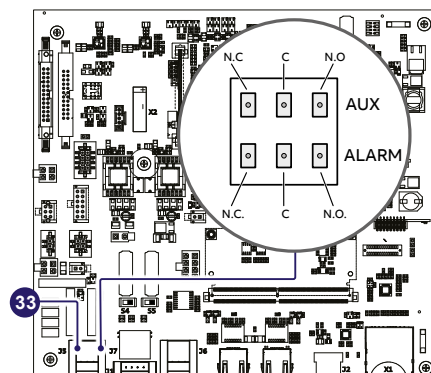
The external switch used for Remote ON/OFF should be rated for DC low voltage, low current application (the minimum switching current capability should be 1mA or lower).

READ THE MANUAL – For further information regarding the configuration and use of the Remote control terminal block, please refer to the user manual.

11.6 Multifunction Relay connection (ALARM and AUX)

The inverter is equipped with 2 multifunction relays terminal blocks (33) with configurable activation.

It can be connected with normally open contact (being connected between the NO terminal and the common contact C) and with normally closed contact (being connected between the NC terminal and the common contact C).



Different types of devices (light, sound, etc.) can be connected to the relay, provided they comply with the following requirements:

Alarm terminal block requirements

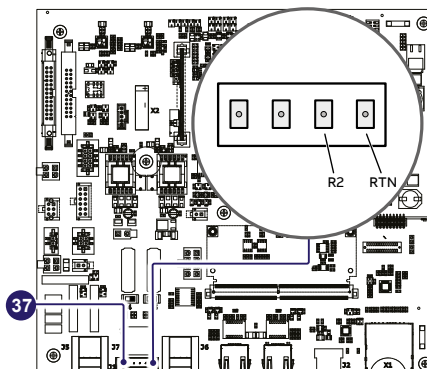
Alternating current	Maximum Voltage: 160 Vac / Maximum Current: 6 A
Direct current	Maximum Voltage: 30 Vdc / Maximum Current: 3 A
Cable requirements	Conductor cross-section: from 0.08 to 1.3 mm ²

READ THE MANUAL – For further information regarding the configuration and use of the multifunction relay terminal blocks, please refer to the user manual.

11.7 Demand Response Mode 0 (AS/NZS 4777.2)

Where requested by the AS/NZS 4777.2 standard, it's possible to use the Remote terminal block (37) for the Demand Response Mode 0 (DRM0) functionality.

The terminals to be used to connect the inverter to the distribution grid are R2 and RTN.



NOTE – AS4777: If DRM0 support is specified, the inverter may only be used in conjunction with a the FIMER DRM0 Interface.

NOTE – Visit <http://solar.fimer.com> for more information on the DRM0 interface.

ATTENTION – In case of the DRM0 function is activated without the proper wiring of the Remote terminal block (37), the inverter will no longer be able to connect to the grid. For further information regarding the DRM0 function refer to the AS/NZS 4777 standard.

12. Description of LED panel
























- POWER**
 Indicates that the inverter is functioning correctly.
 When the unit is commissioned, while the grid is checked, this LED blinks. If a valid grid voltage is detected, the LED remains continuously lit, as long as there is sufficient sunlight to activate the unit. Otherwise, the LED will continue to blink until the sunlight is sufficient for activation.
- ALARM**
 Indicates that the inverter has detected an anomaly. This type of problem is highlighted in the Web User Interface and FIMER Installer for Solar Inverters APP.
- GFI**
 The "GFI" (ground fault) LED indicates that the inverter has detected a ground fault in the DC side photovoltaic generator. When this fault is detected, the inverter immediately disconnects from the grid.
- WLAN/LAN**
 Indicates the status of the Wireless or Ethernet communication lines.

All possible LED activation combinations are shown in the following table. In particular, each LED could behave in one of the following ways:





- = LED on
- ⊗ = LED flashing slow (2 seconds on / 2 seconds off)
- ⊗ = LED flashing fast (0.2 seconds on / 0.2 seconds off)
- = LED off
- ⊗ = Any one of the conditions described above

The following table shows all the possible activation combinations of "Power" "Alarm" and "GFI" LEDs on the LED panel (08) according to the operating status of the inverter.

Led Status	Operating state
green: ⊗ yellow: ⊗ red: ⊗	Firmware programming The inverter firmware is being programmed (never turn off the inverter during this phase).
green: ○ yellow: ○ red: ○	Night mode (inverter automatically switches off) The inverter is in night time switch-off mode (input voltage less than 70% of the set start-up voltage and AC grid is missing).
green: ⊗ yellow: ○ red: ○	Inverter initialization / Waiting Sun This is a transitional state due to verification of the operating conditions. During this stage the inverter checks that the conditions for connecting to the grid are met.
green: ● yellow: ○ red: ○	The inverter is connected and is feeding power into the grid Normal operation. During this stage, the inverter automatically tracks and analyses the photovoltaic generator's maximum power point (MPP).
green: ⊗ yellow: ● red: ○	Missing grid Indicates lack of grid voltage. This condition does not allow the inverter to connect to the grid.
green: ⊗ yellow: ● red: ○	Warning indication: (W message codes) or Error: (E message codes) Indicates that the inverter control system has detected a warning (W) or error (E). It is possible to identify the type of problem generated in the dedicated section of integrated Web User Interface ("Inverter Log" section).
green: ○ yellow: ● red: ○	Temperature protection trip Indicates that the trip relating to internal temperatures (insufficient or excessive temperature) may have been activated.

Led Status	Operating state
	Ventilation anomaly Indicates an anomaly in the operation of the internal ventilation system that could limit output power at high ambient temperatures.
green: 	Overvoltage surge arresters triggered (where fitted)
yellow: 	Indicates that any class II overvoltage surge arresters installed on the AC or DC side have been triggered
red: 	Internal statistics memory anomaly Indicates an operating anomaly in the internal memory on which the inverter statistics are stored
	Buffer battery discharged The buffer battery is low and the inverter does not maintain the time setting
	Pre-commissioning phase (first start-up of inverter) The commissioning of the inverter must be completed through the Installation wizard steps (Web User Interface) or using the FIMER Installer for Solar Inverters mobile APP
	Initial configuration failure The inverter is in locked state due to a failure in the initial configuration of the equipment, such as the standard network setting for the country of installation
green: 	Self-test not carried out (for Italian grid standards only)
yellow: 	Self-test operation failure
red: 	Incompatibility of the device firmware versions The firmware versions of the various devices comprising the equipment are incompatible and are being updated (this is an automatic operation)
	Temperature sensor anomaly detected
green: 	Updating the firmware from SD card
yellow: 	The equipment firmware is being updated from an SD card
red: 	
green: 	Updating the firmware from SD card has failed
yellow: 	The equipment firmware update from an SD card has failed
red: 	
green: 	Updating the firmware from SD card completed
yellow: 	The equipment firmware has successfully updated from an SD card
red: 	
green: 	Remote OFF activated
yellow: 	The Remote Off command has been activated.
red: 	The unit will not connect to the network until the remote ON command has been activated
green: 	Anomaly in the insulation system of the photovoltaic generator
yellow: 	Indicates that a leakage to earth from the PV generator has been detected, causing the inverter to disconnect from the grid.
red: 	

The following table shows all the possible status of "WLAN/LAN" LED on the LED panel (08) according to the operating status of the wireless or ethernet communication lines.

Led Status	Operating state
Blue: 	Wireless not configured or/and ethernet cable not connected.
Blue: 	Scanning for available wireless networks.
Blue: 	Trying to connect to a wireless network.
Blue: 	Wireless or ethernet network is connected to the inverter and IP address is obtained.

13. Commissioning

- ⚠ **ATTENTION** – Do not place objects of any kind on the inverter during operation! Do not touch the heat sink while the inverter is operating! Some parts may be very hot and could cause burns.
- ⚠ **ATTENTION** – This inverter can be powered both with DC or AC (if PVS-100/120 PRE-CHARGE BOARD KIT is installed) sources. In case of DC source is used, make sure that irradiation is stable and adequate for the inverter commissioning procedure to be completed.
- ⚠ **WARNING** – If the PRE-CHARGE BOARD KIT is installed, hazardous DC voltages are supplied to the photovoltaic array during the night.
- ⚠ **WARNING** – In case PVS-100/120 PRE-CHARGE BOARD KIT is installed on the inverter, it is important to remark the presence of auxiliary power supply connected to the AC grid. In this case the inverter is supplied either by DC and AC power, so hazardous internal voltages are present even in case the DC switches are open.
- ⚠ **WARNING** – If the GROUNDING KIT is installed, the inverter must be installed and operated in restricted areas. Access is limited to qualified personnel.
- ⚠ **ATTENTION** – At the first activation of the inverter the firmware version could synchronized between power module and wiring box. During this phase the LEDs "Power" "Alarm" and "GFI" blinks together every 1 second. This process is absolutely normal (it can take some minutes) and must be completed without interruption. A switch-off of the system during this process could cause serious damage to the inverter.

Before proceeding with commissioning, make sure you have carried out all the following checks:

- Ensure that the front covers have been correctly closed.
- Check the correct connection and polarity of the DC inputs, and the correct connection of the AC output and earth cables.
- Check the sealing of the cable glands and installed quick-fit connectors to prevent accidental disconnections and/or avoid compromising the IP environmental protection rating.

Commissioning could be carried out in two different ways:

- **Via FIMER Installer for Solar Inverters APP** (mobile APP for commissioning a single inverter as well as a multi-inverter solar plant)
- **Via Web UI** (Integrated Web User Interface enabling setting parameters and performing commissioning of a single inverter).

NOTE – FIMER Installer for Solar Inverters APP is the recommended method to commission the inverters.

READ THE MANUAL – To address any problems that may occur during the initial stages of operation of the system and to ensure the inverter remains fully functional, you are advised to check for any firmware updates in the download area of the website www.fimer.com or at <https://registration.solar.fimer.com> (instructions for registering on the website and updating the firmware are given on the user manual).

13.1 Commissioning via FIMER Installer for Solar Inverters mobile APP

FIMER Installer for Solar Inverters APP is available for Android mobile devices with an Android version of 6.0.1 or greater (for iOS mobile devices will be implemented soon) and could be downloaded and installed from Play Store.

The requirements to complete the procedures are listed below:

- FIMER Installer for Solar Inverters APP installed on mobile device.
- Enabled installer account for FIMER Installer for Solar Inverters APP (The account could be created in the mobile app directly following the dedicated wizard procedure).
- Manual claiming of the inverters to be commissioned.



The claiming process consists of indicating which inverters are to be commissioned.

- Claiming process can be performed by:
 - taking pictures of the QR codes (J) of single inverter units (printed on the Communication identification label) (recommended).
 - manual insertion of the MAC address (H) and related product keys (I) (printed on the Communication identification label) of all the inverters that shall be commissioned.
 - scanning and selecting of SSIDs associated to the Wi-Fi networks generated by each inverter to commission.

Follow the procedure below to commission the inverter:

- Supply the DC input voltage to the inverter.
- Put the DC disconnect switch of the inverter (15) (if present) and any external DC switch (if present) in the "ON" position; if the voltage supplied to one of the input channels is greater than the minimum power-up voltage, the inverter will turn on.
- Perform the installation wizard steps with FIMER Installer for Solar Inverters APP enabling the transferring the settings to all the claimed inverters.
- After the commissioning via FIMER Installer for Solar Inverters APP is completed, the inverter changes the behaviour of the "Power" and "Alarm" LEDs (08), in relation of the input voltage value:

Input voltage	LED Status	Description
Vin < Vstart	Power = Flashing Alarm = OFF	The input voltage is not sufficient to enable connection to the grid.
Vin > Vstart	Power = Flashing Alarm = ON	The input voltage is sufficient to enable connection to the grid: the inverter waits for the grid voltage to be present to make the connection to the grid.

- Supply the AC grid voltage to the inverter.
Put the AC disconnect switch of the inverter (**09**) (if present) and any external AC switch (if present) in the "ON" position.

⚠ ATTENTION – The AC switch could be outside or onboard the inverter or both.

- When the input voltage is sufficient to allow the connection to the grid, the inverter will check the grid voltage, measure the isolation resistance of the photovoltaic field with respect to ground and performs other auto-diagnostic checks. During the preliminary checks on the parallel connection with the grid, the "Power" LED keeps flashing, the "Alarm" and "GFI" LEDs are OFF. The inverter will ONLY connect to the grid if all parameters fall within the ranges foreseen by current regulations.
- If the outcome of the preliminary checks to grid synchronization are positive, the inverter connects and starts to export power to the grid. The "Power" LED remains fixed on while the "Alarm" and "GFI" LEDs are OFF.

📖 NOTE – To address any problems that may occur during the initial stages of operation of the system and to ensure the inverter remains fully functional, you are advised to check for any firmware updates in the download area of the website at <https://registration.solar.fimer.com> (instructions for registering on the website and updating the firmware are given on the product manual).

13.2 Commissioning via Web User Interface

Commissioning could be carried out via wireless connection to the inverter's Web User Interface. Initial setup of the system must therefore be carried out via a tablet, notebook or smartphone with a wireless connection.

- Supply the DC input voltage to the inverter.
Put the DC disconnect switch of the inverter (**15**) (if present) and any external DC switch (if present) in the "ON" position; if the voltage supplied to one of the input channels is greater than the minimum power-up voltage, the inverter will turn on.
- Once powered, the inverter will automatically create a wireless network (approx. 60 seconds after switching-on).



- Enable the wireless connection on the device which is being used for the board setup (tablet, smartphone or PC) and connect it to the Access Point created by the inverter system: the name of the wireless network created by the system that the connection should be established with, will be: ABB-XX-XX-XX-XX-XX-XX where "X" is a hex digit of the wireless MAC address (**H**) (MAC address can be found on the "Communication Identification Label" placed on the side of the inverter).
- When required enter the PRODUCT KEY (**I**) (printed on the "Communication Identification label" and applied during the commissioning phase to the plant documentation) as access point password (Note that it's required to digit also the dash "-" characters of the Product Key in the password field).

- Open an internet browser (recommended browser: Chrome versions from v.55, Firefox versions from v.50) and enter the pre-set IP address 192.168.117.1 to access the Web User Interface.
- Follow the step-by-step commissioning wizard to complete the commission of the inverter.
After the settings are confirmed, the inverter restarts.

⚠ ATTENTION – From the moment the grid standard is selected, there will be 24 hours available to make any changes to the grid standard; after this, the "Country Select" feature is blocked and you can make further changes only by resetting the remaining-time timer.

📖 READ THE MANUAL – For further information regarding the commissioning procedure via Web User Interface, please refer to the product manual.

- After the wizard procedure is completed, the inverter changes the behaviour of the "Power" and "Alarm" LEDs (**08**), in relation of the input voltage value:

Input voltage	LED Status	Description
$V_{in} < V_{start}$	Power = Flashing Alarm = OFF	The input voltage is not sufficient to enable connection to the grid.
$V_{in} > V_{start}$	Power = Flashing Alarm = ON	The input voltage is sufficient to enable connection to the grid: the inverter waits for the grid voltage to be present to make the connection to the grid.

- Supply the AC grid voltage to the inverter.
Put the AC disconnect switch of the inverter (**09**) (if present) and any external AC switch (if present) in the "ON" position.

⚠ ATTENTION – The AC switch could be outside or onboard the inverter or both.


- When the input voltage is sufficient to allow the connection to the grid, the inverter will check the grid voltage, measure the isolation resistance of the photovoltaic field with respect to ground and performs other auto-diagnostic checks. During the preliminary checks on the parallel connection with the grid, the "Power" LED keeps flashing, the "Alarm" and "GFI" LEDs are OFF. The inverter will ONLY connect to the grid if all parameters fall within the ranges foreseen by current regulations.
- If the outcome of the preliminary checks to grid synchronization are positive, the inverter connects and starts to export power to the grid. The "Power" LED remains fixed on while the "Alarm" and "GFI" LEDs are OFF.

📖 NOTE – To address any problems that may occur during the initial stages of operation of the system and to ensure the inverter remains fully functional, you are advised to check for any firmware updates in the download area of the website <https://registration.solar.fimer.com> (instructions for registering on the website and updating the firmware are given on the product manual).

14. Technical data

14.1 Technical data table PVS-100-TL (Standard, S2)

PVS-100	
Wiring Box version	Standard, S2
Input side	
Absolute maximum input voltage ($V_{max,abs}$)	1000 V
Start-up input voltage (V_{start})	420 V (400...500 V)
Operating input voltage range ($V_{dcmmin}...V_{dcmmax}$)	360...1000 V
Rated input voltage (V_{dcr})	620 V
Rated input power (P_{dcr})	102000 W
Number of independent MPPT	2 (Parallelable)
MPPT voltage range ($V_{MPP Tmin} ... V_{MPP Tmax}$) to P_{acr}	480...850 V (symmetrical load)
Maximum input power for each MPPT ($P_{mppt,max}$)	63000 W [585 V ≤ $V_{MPP} \leq 850$ V]
Maximum input current for each MPPT ($I_{dcm,max}$)	108 A
Maximum short circuit current for each MPPT ($I_{sc,max}$) ⁽¹⁾	150 A
Maximum return current (AC side vs DC side)	Negligible in normal operating conditions ⁽⁶⁾
Number of input pairs for each MPPT	1
Type of input connectors	4 x M40 cable glands with M10 Cable lugs
Type of photovoltaic panels that can be connected at input according to IEC 61730	Class A
Input protection	
Reverse polarity protection	Yes, from current limited source
Input over voltage protection for each MPPT-surge arrester (with monitoring)	Type II
Photovoltaic array isolation control	Yes, according to IEC 62109-2
Residual current monitoring Unit (leakage current protection)	Yes, according to IEC 62109-2
DC switch rating for each MPPT ⁽¹⁾ (not available in standard version)	150A - 1000V
Input current monitoring	MPPT level: Standard, S2
Output side	
AC Grid connection type	Three phase 3W+PE or 4W+PE (TN system)
Rated Output Power ($P_{acr} @ \cos\phi=1$)	100000 W
Maximum Output Power ($P_{acmax} @ \cos\phi=1$)	100000 W
Maximum apparent Output power (S_{max})	100000 VA
Rated grid Voltage (V_{acr})	400 V
Grid voltage range	320...480 V ⁽⁴⁾
Maximum output current ($I_{ac,max}$)	145 A
Rated Output Frequency (f_r)	50 Hz / 60 Hz
Output Frequency Range ($f_{min}...f_{max}$)	45...55 Hz / 55...65 Hz ⁽⁵⁾
Nominal power factor and adjustable range	> 0.995, 0...1 inductive/capacitive with maximum S_{max}
Total harmonic distortion of current	<3%
Max DC Current Injection (% of I_n)	< 0.5%* I_n
Maximum AC cable	185mm ² Aluminum and copper
AC connection type	Provided bar for lug connections M10 Single core cable glands 4xM40 and 25 or Multi core cable gland M63 as option
Output protection	
Anti-islanding Protection	According to local standard
Maximum external AC overcurrent protection	225 A
Output overvoltage protection - replaceable surge protection device	Type 2 with monitoring
Operating performance	
Maximum Efficiency (η_{max})	98.4%
Weighted Efficiency (EURO)	98.2%
Communication	
Embedded communication interfaces	1x RS485, 2x Ethernet (RJ45), WLAN (IEEE802.11 b/g/n @ 2,4 GHz)
User Interface	4 LEDs, Web User Interface

PVS-100	
Wiring Box version	Standard, S2
Communication protocol	Modbus RTU/TCP (Sunspec compliant)
Commissioning tool	Web User Interface, Mobile APP/APP for plant level
Remote monitoring services	Aurora Vision® monitoring portal
Advanced features	Embedded logging, direct telemetry data transferring to FIMER cloud
Environmental	
Operating ambient temperature range	-25...+60°C/-13...140°F with derating above 40°C/ 104°F
Storage temperature	-40°C...+85°C / -40°F...185°F
Relative Humidity	4...100 % with condensation
Sound pressure level, typical	68dB(A)@ 1m
Maximum operating altitude without derating	2000 m / 6560 ft
Environmental pollution degree classification for external environments	3
Environmental class	Outdoor
Climatic category according to IEC 60721-3-4	4K4H
Physical	
Environmental Protection Rating	IP 66 (IP54 for the cooling section)
Cooling System	Forced air
Dimensions (H x W x D)	869x1086x419 mm / 34.2" x 42.7" x 16.5"
Weight	70kg / 154 lbs for power module ; ~55kg / 121 lbs for wiring box; Overall max 125 kg / 276 lbs
Mounting system	Mounting bracket vertical & horizontal support
Overvoltage rating as per IEC 62109-1	II (DC input) III (AC output)
Safety	
Safety class	I
Insulation Level	Transformerless
Marking	CE ⁽⁶⁾
Safety, EMC and Radio Spectrum Standards	IEC/EN 62109-1, IEC/EN 62109-2, EN 61000-6-2, EN 61000-6-4, EN55011:2017 CEI 0-16, CEI 0-21, IEC 61727, IEC 62116, IEC 60068, IEC 61683, JORDAN IRR-DCC-MV, DRRG/DEWA, Chile LV/MV, BDEW, Belg C10-C11, EN50438 Generic +Ireland, EN50549-1/2, CLC-TS50549-1/2, AS/NZS4777.2, UK G59/3, EREC G99-1, MEA, PEA, ISO-IEC Guide 67 (system 5), NRS 097-2-1, P.O. 12.3, ITC-BT-40, UNE 206006 IN, VDE-AR-N 4105, VDE-AR-N 4110, VDE-AR-N 4120, VDE V 0-126-1-1, VFR 2019, UTE C15-712-1, Taiwan
Grid standard (check the availability with your sales channel)	
Accessories	
Assembly accessories	PVS Installation Kit
AC Plate, Single Core Cables	Plate with 5 individual AC cable glands: 4 x M40: Ø 19...28mm, 1 x M25: Ø 10...17mm
AC Plate, Multi Core Cables	Plate with 2 individual AC cable glands: 1 x M63: Ø 37...53mm, 1 x M25: Ø 10...17mm
PVS-100/120 PRE-CHARGE BOARD KIT	Allow the monitoring of the inverter when DC source is not available and night time operation with restart capability ⁽¹⁰⁾
PVS-100/120 GROUNDING KIT	Allow to connect the negative input pole to ground ⁽⁷⁾
<ol style="list-style-type: none"> Maximum number of opening 5 under overloading The AC voltage range may vary depending on specific country grid standard Frequency range may vary depending on specific country grid standard In the event of a fault, limited by the external protection envisaged on the AC circuit Only in IT-system (an AC SPD reconfiguration is needed) Hereby, Power-One Italy S.p.A. (A Member of the FIMER Group) declares that the radio equipments (radio module combined with the inverter), to which this user manual refers, are in compliance with the Directive 2014/53/EU. The full text of the EU Declaration of Conformity is available at the following internet address: www.fimer.com When PVS-100/120 GROUNDING KIT is installed, Residual Current Monitoring do not fully operate. Inverter must be installed and operate in "restricted areas (access limited to qualified personnel)" according to IEC 62109-2 In case PVS-100/120 PRE-CHARGE BOARD KIT is installed on the inverter, it is important to remark the presence of auxiliary power supply connected to the AC grid. In this case the inverter is supplied either by DC and AC power, so hazardous internal voltages are present even in case the DC switches are open. For connection to the network in Australia and New Zealand. According to AS/NZS 4777.2020 requirements, it is necessary to apply the label and install an external DC Switch on the Standard and S2 inverter models. 	
 NOTE – Features not specifically mentioned in this data sheet are not included in the product.	

14.2 Technical data table PVS-100-TL (SX, SX2, SY, SY2 Models)

PVS-100	
Wiring Box version	SX, SX2, SY, SY2
Input side	
Absolute maximum input voltage (V _{max,abs})	1000 V
Start-up input voltage (V _{start})	420 V (400...500 V)
Operating input voltage range (V _{dcmín...V_{dc}max})	360...1000 V
Rated input voltage (V _{dcr})	620 V
Rated input power (P _{dcr})	102000 W
Number of independent MPPT	6
MPPT voltage range (V _{MPPT} min ... V _{MPPT} max) to P _{acr}	480...850 V (symmetrical load)
Maximum input power for each MPPT (P _{mppt,max})	21000 W [585 V≤V _{MPPT} ≤850 V]
Maximum input current for each MPPT (I _{dcmáx})	36 A
Maximum short circuit current for each MPPT (I _{scmax}) ⁽¹⁾	50 A
Maximum return current (AC side vs DC side)	Negligible in normal operating conditions ⁽⁶⁾
Number of input pairs for each MPPT	4
Type of input connectors	PV quick fit connector ⁽²⁾
Type of photovoltaic panels that can be connected at input according to IEC 61730	Class A
Input protection	
Reverse polarity protection	Yes, from current limited source
Input over voltage protection for each MPPT-surge arrester (with monitoring)	Type II (SX, SX2 versions) Type I-II (SY, SY2 versions)
Photovoltaic array isolation control	Yes, according to IEC 62109-2
Residual current monitoring Unit (leakage current protection)	Yes, according to IEC 62109-2
DC switch rating for each MPPT (not available in standard version)	50A - 1000V
Fuse rating	20A / 1000V ⁽³⁾
Input current monitoring	Single string level (24ch.): SX2, SY2 models MPPT level: SX, SY models
Output side	
AC Grid connection type	Three phase 3W+PE or 4W+PE (TN system)
Rated Output Power (P _{acr @cosφ=1})	100000 W
Maximum Output Power (P _{acmax @cosφ=1})	100000 W
Maximum apparent Output power (S _{max})	100000 VA
Rated grid Voltage (V _{acr})	400 V
Grid voltage range	320...480 V ⁽⁴⁾
Maximum output current (I _{ac,max})	145 A
Rated Output Frequency (f _r)	50 Hz / 60 Hz
Output Frequency Range (f _{min...f_{max}})	45...55 Hz / 55...65 Hz ⁽⁵⁾
Nominal power factor and adjustable range	> 0.995, 0...1 inductive/capacitive with maximum S _{max}
Total harmonic distortion of current	<3%
Max DC Current Injection (% of I _n)	< 0.5% I _n
Maximum AC cable	185mm ² Aluminum and copper
AC connection type	Provided bar for lug connections M10 Single core cable glands 4xM40 and 25 or Multi core cable gland M63 as option
Output protection	
Anti-islanding Protection	According to local standard
Maximum external AC overcurrent protection	225 A
Output overvoltage protection - replaceable surge protection device	Type 2 with monitoring
Operating performance	
Maximum Efficiency (η _{max})	98.4%
Weighted Efficiency (EURO)	98.2%
Communication	
Embedded communication interfaces	1x RS485, 2x Ethernet (RJ45), WLAN (IEEE802.11 b/g/n @ 2,4 GHz)
User Interface	4 LEDs, Web User Interface
Communication protocol	Modbus RTU/TCP (Sunspec compliant)
Commissioning tool	Web User Interface, Mobile APP/APP for plant level
Remote monitoring services	Aurora Vision® monitoring portal

PVS-100	
Wiring Box version	SX, SX2, SY, SY2
Advanced features	Embedded logging, direct telemetry data transferring to FIMER cloud
Environmental	
Operating ambient temperature range	-25...+60°C/-13...140°F with derating above 40°C/ 104°F
Storage temperature	-40°C...+85°C / -40°F...185°F
Relative Humidity	4...100 % with condensation
Sound pressure level, typical	68dB(A)@ 1m
Maximum operating altitude without derating	2000 m / 6560 ft
Environmental pollution degree classification for external environments	3
Environmental class	Outdoor
Climatic category according to IEC 60721-3-4	4K4H
Physical	
Environmental Protection Rating	IP 66 (IP54 for the cooling section)
Cooling System	Forced air
Dimensions (H x W x D)	869x1086x419 mm / 34.2" x 42.7" x 16.5"
Weight	70kg / 154 lbs for power module ; ~55kg / 121 lbs for wiring box; Overall max 125 kg / 276 lbs
Mounting system	Mounting bracket vertical & horizontal support
Overvoltage rating as per IEC 62109-1	II (DC input) III (AC output)
Safety	
Safety class	I
Insulation Level	Transformerless
Marking	CE ⁽⁶⁾
Safety, EMC and Radio Spectrum Standards	IEC/EN 62109-1, IEC/EN 62109-2, EN 61000-6-2, EN 61000-6-4, EN55011:2017 CEI 0-16, CEI 0-21, IEC 61727, IEC 62116, IEC 60068, IEC 61683, JORDAN IRR-DCC-MV, DRRG/DEWA, Chile LV/MV, BDEW, Belg C10-C11, EN50438 Generic +Ireland, EN50549-1/2, CLC-TS50549-1/2, AS/NZS4777.2, UK G59/3, EREC G99-1, MEA, PEA, ISO-IEC Guide 67 (system 5), NRS 097-2-1, P.O. 12.3, ITC-BT-40, UNE 206006 IN, VDE-AR-N 4105, VDE-AR-N 4110, VDE-AR-N 4120, VDE V 0-126-1-1, VFR 2019, UTE C15-712-1, Taiwan
Grid standard (check the availability with your sales channel)	
Accessories	
Assembly accessories	PVS Installation Kit
AC Plate, Single Core Cables	Plate with 5 individual AC cable glands: 4 x M40: Ø 19...28mm, 1 x M25: Ø 10...17mm
AC Plate, Multi Core Cables	Plate with 2 individual AC cable glands: 1 x M63: Ø 37...53mm, 1 x M25: Ø 10...17mm
PVS-100/120 PRE-CHARGE BOARD KIT	Allow the monitoring of the inverter when DC source is not available and night time operation with restart capability ⁽¹⁰⁾
PVS-100/120 GROUNDING KIT ⁽⁹⁾	Allow to connect the negative input pole to ground ⁽⁷⁾

- Maximum number of opening 5 under overloading
- Please refer to the document "String inverters – Product manual appendix" available at www.fimer.com for information on the quick-fit connector brand and model used in the inverter
- Maximum fuse size supported 20A. Additionally two strings input per MPPT supports 30A fuse size for connecting two strings per input.
- The AC voltage range may vary depending on specific country grid standard
- Frequency range may vary depending on specific country grid standard
- In the event of a fault, limited by the external protection envisaged on the AC circuit
- Only in IT-system (an AC SPD reconfiguration is needed)
- Hereby, Power-One Italy S.p.A. (A Member of the FIMER Group) declares that the radio equipments (radio module combined with the inverter), to which this user manual refers, are in compliance with the Directive 2014/53/EU. The full text of the EU Declaration of Conformity is available at the following internet address: www.fimer.com
- When PVS-100/120 GROUNDING KIT is installed, Residual Current Monitoring do not fully operate. Inverter must be installed and operate in "restricted areas (access limited to qualified personnel)" according to IEC 62109-2
- In case PVS-100/120 PRE-CHARGE BOARD KIT is installed on the inverter, it is important to remark the presence of auxiliary power supply connected to the AC grid. In this case the inverter is supplied either by DC and AC power, so hazardous internal voltages are present even in case the DC switches are open.

NOTE – Features not specifically mentioned in this data sheet are not included in the product.

14.3 Technical data table PVS-120-TL (Standard, S2)

PVS-120	
Wiring Box version	Standard, S2
Input side	
Absolute maximum input voltage (V _{max,abs})	1000 V
Start-up input voltage (V _{start})	420 V (400...500 V)
Operating input voltage range (V _{dcmín...V_{dc}max})	360...1000 V
Rated input voltage (V _{dcr})	720 V
Rated input power (P _{dcr})	123000 W
Number of independent MPPT	2 (Parallelable)
MPPT voltage range (V _{MPPTmin} ... V _{MPPTmax}) to P _{acr}	570...850 V (symmetrical load)
Maximum input power for each MPPT (P _{mppt,max})	75000 W [685 V ≤ V _{MPPT} ≤ 850 V]
Maximum input current for each MPPT (I _{dc,max})	108 A
Maximum short circuit current for each MPPT (I _{sc,max}) ⁽¹⁾	150 A
Maximum return current (AC side vs DC side)	Negligible in normal operating conditions ⁽⁶⁾
Number of input pairs for each MPPT	1
Type of input connectors	4 x M40 cable glands with M10 Cable lugs
Type of photovoltaic panels that can be connected at input according to IEC 61730	Class A
Input protection	
Reverse polarity protection	Yes, from current limited source
Input over voltage protection for each MPPT-surge arrester (with monitoring)	Type II
Photovoltaic array isolation control	Yes, according to IEC 62109-2
Residual current monitoring Unit (leakage current protection)	Yes, according to IEC 62109-2
DC switch rating for each MPPT ⁽¹⁾ (not available in standard version)	150A - 1000V
Input current monitoring	MPPT level: Standard, S2
Output side	
AC Grid connection type	Three phase 3W+PE or 4W+PE (TN system)
Rated Output Power (P _{acr @cosφ=1})	120000 W
Maximum Output Power (P _{acmax @cosφ=1})	120000 W
Maximum apparent Output power (S _{max})	120000 VA
Rated grid Voltage (V _{acr})	480 V
Grid voltage range	384...576 V ⁽⁴⁾
Maximum output current (I _{ac,max})	145 A
Rated Output Frequency (f _r)	50 Hz / 60 Hz
Output Frequency Range (f _{min...f_{max}})	45...55 Hz / 55...65 Hz ⁽⁶⁾
Nominal power factor and adjustable range	> 0.995, 0...1 inductive/capacitive with maximum S _{max}
Total harmonic distortion of current	<3%
Max DC Current Injection (% of I _n)	< 0.5%*I _n
Maximum AC cable	185mm ² Aluminum and copper Provided bar for lug connections M10
AC connection type	Single core cable glands 4xM40 and 25 Multi core cable gland M63 as option
Output protection	
Anti-islanding Protection	According to local standard
Maximum external AC overcurrent protection	225 A
Output overvoltage protection - replaceable surge protection device	Type 2 with monitoring
Operating performance	
Maximum Efficiency (η _{max})	98.9%
Weighted Efficiency (EURO)	98.6%
Communication	
Embedded communication interfaces	1x RS485, 2x Ethernet (RJ45), WLAN (IEEE802.11 b/g/n @ 2.4 GHz)
User Interface	4 LEDs, Web User Interface

PVS-120	
Wiring Box version	Standard, S2
Communication protocol	Modbus RTU/TCP (Sunspec compliant)
Commissioning tool	Web User Interface, Mobile APP/APP for plant level
Remote monitoring services	Aurora Vision® monitoring portal
Advanced features	Embedded logging, direct telemetry data transferring to FIMER cloud
Environmental	
Operating ambient temperature range	-25...+60°C/-13...140°F with derating above 40°C/ 104°F
Storage temperature	-40°C...+85°C / -40°F...185°F
Relative Humidity	4...100 % with condensation
Sound pressure level, typical	68dB(A)@ 1m
Maximum operating altitude without derating	2000 m / 6560 ft
Environmental pollution degree classification for external environments	3
Environmental class	Outdoor
Climatic category according to IEC 60721-3-4	4K4H
Physical	
Environmental Protection Rating	IP 66 (IP54 for the cooling section)
Cooling System	Forced air
Dimensions (H x W x D)	869x1086x419 mm / 34.2" x 42.7" x 16.5"
Weight	70kg / 154 lbs for power module ; ~55kg / 121 lbs for wiring box; Overall max 125 kg / 276 lbs
Mounting system	Mounting bracket vertical & horizontal support
Overvoltage rating as per IEC 62109-1	II (DC input) III (AC output)
Safety	
Safety class	I
Insulation Level	Transformerless
Marking	CE
Safety, EMC and Radio Spectrum Standards	IEC/EN 62109-1, IEC/EN 62109-2, EN 61000-6-2, EN 61000-6-4, EN55011:2017 CEI 0-16, IEC 61727, IEC 62116, IEC 60068, IEC 61683, JORDAN IRR-DCC-MV, DRRG/DEWA, Chile MV, BDEW, Belg C10-C11, EN50438 Generic +Ireland, EN50549-2, CLC-TS50549-2, UK G59/3, EREC G99-1, PEA, ISO-IEC Guide 67 (system 5), NRS 097-2-1, P.O. 12.3, ITC-BT-40, UNE 206006 IN, VDE-AR-N 4110, VDE-AR-N 4120, VDE V 0-126-1-1, VFR 2019, UTE C15-712-1, Taiwan
Grid standard (check the availability with your sales channel)	
Accessories	
Assembly accessories	PVS Installation Kit
AC Plate, Single Core Cables	Plate with 5 individual AC cable glands: 4 x M40: Ø 19...28mm, 1 x M25: Ø 10...17mm
AC Plate, Multi Core Cables	Plate with 2 individual AC cable glands: 1 x M63: Ø 37...53mm, 1 x M25: Ø 10...17mm
PVS-100/120 PRE-CHARGE BOARD KIT	Allow the monitoring of the inverter when DC source is not available and night time operation with restart capability ⁽¹⁰⁾
PVS-100/120 GROUNDING KIT	Allow to connect the negative input pole to ground ⁽¹¹⁾

- Maximum number of opening 5 under overloading
- The AC voltage range may vary depending on specific country grid standard
- Frequency range may vary depending on specific country grid standard
- In the event of a fault, limited by the external protection envisaged on the AC circuit
- Only in IT-system (an AC SPD reconfiguration is needed)
- Hereby, Power-One Italy S.p.A. (A Member of the FIMER Group) declares that the radio equipments (radio module combined with the inverter), to which this user manual refers, are in compliance with the Directive 2014/53/EU. The full text of the EU Declaration of Conformity is available at the following internet address: www.fimer.com
- When PVS-100/120 GROUNDING KIT is installed, Residual Current Monitoring do not fully operate. Inverter must be installed and operate in "restricted areas (access limited to qualified personnel)" according to IEC 62109-2
- In case PVS-100/120 PRE-CHARGE BOARD KIT is installed on the inverter, it is important to remark the presence of auxiliary power supply connected to the AC grid. In this case the inverter is supplied either by DC and AC power, so hazardous internal voltages are present even in case the DC switches are open.
- For connection to the network in Australia and New Zealand. According to AS/NZS 4777.2020 requirements, it is necessary to apply the label and install an external DC Switch on the Standard and S2 inverter models.

NOTE – Features not specifically mentioned in this data sheet are not included in the product.

14.4 Technical data table PVS-120-TL (SX, SX2, SY, SY2 Models)

PVS-120	
Wiring Box version	SX, SX2, SY, SY2
Input side	
Absolute maximum input voltage (V _{max,abs})	1000 V
Start-up input voltage (V _{start})	420 V (400...500 V)
Operating input voltage range (V _{dcmín...V_{dc}max})	360...1000 V
Rated input voltage (V _{dcr})	720 V
Rated input power (P _{dcr})	123000 W
Number of independent MPPT	6
MPPT voltage range (V _{MPPT} min... V _{MPPT} max) to P _{acr}	570...850 V (symmetrical load)
Maximum input power for each MPPT (P _{mppt,max})	25000 W [695 V≤V _{MPPT} ≤850 V]
Maximum input current for each MPPT (I _{dcmáx})	36 A
Maximum short circuit current for each MPPT (I _{scmáx}) ⁽⁴⁾	50 A
Maximum return current (AC side vs DC side)	Negligible in normal operating conditions ⁽⁵⁾
Number of input pairs for each MPPT	4
Type of input connectors	PV quick fit connector ⁽²⁾
Type of photovoltaic panels that can be connected at input according to IEC 61730	Class A
Input protection	
Reverse polarity protection	Yes, from current limited source
Input over voltage protection for each MPPT-surge arrester (with monitoring)	Type II (SX, SX2 versions) Type I+II (SY, SY2 versions)
Photovoltaic array isolation control	Yes, according to IEC 62109-2
Residual current monitoring Unit (leakage current protection)	Yes, according to IEC 62109-2
DC switch rating for each MPPT (not available in standard version)	50A / 1000V
Fuse rating	20A / 1000V ⁽³⁾
Input current monitoring	Single string level (24ch.): SX2, SY2 models MPPT level: SX, SY models
Output side	
AC Grid connection type	Three phase 3W+PE or 4W+PE (TN system)
Rated Output Power (P _{acr} @cosφ=1)	120000 W
Maximum Output Power (P _{acmáx} @cosφ=1)	120000 W
Maximum apparent Output power (S _{máx})	120000 VA
Rated grid Voltage (V _{acr})	480 V
Grid voltage range	384...576 V ⁽⁴⁾
Maximum output current (I _{ac,max})	145 A
Rated Output Frequency (f _r)	50 Hz / 60 Hz
Output Frequency Range (f _{min} ...f _{max})	45...55 Hz / 55...65 Hz ⁽⁵⁾
Nominal power factor and adjustable range	> 0.995, 0...1 inductive/capacitive with maximum S _{máx}
Total harmonic distortion of current	<3%
Max DC Current Injection (% of I _n)	< 0.5%I _n
Maximum AC cable	185mm ² Aluminum and copper Provided bar for lug connections M10
AC connection type	Single core cable glands 4xM40 and 25 Multi core cable gland M63 as option
Output protection	
Anti-islanding Protection	According to local standard
Maximum external AC overcurrent protection	225 A
Output overvoltage protection - replaceable surge protection device	Type 2 with monitoring
Operating performance	
Maximum Efficiency (η _{max})	98.9%
Weighted Efficiency (EURO)	98.6%
Communication	
Embedded communication interfaces	1x RS485, 2x Ethernet (RJ45), WLAN (IEEE802.11 b/g/n @ 2,4 GHz)
User Interface	4 LEDs, Web User Interface
Communication protocol	Modbus RTU/TCP (Sunspec compliant)
Commissioning tool	Web User Interface, Mobile APP/APP for plant level

PVS-120	
Wiring Box version	SX, SX2, SY, SY2
Remote monitoring services	Aurora Vision® monitoring portal
Advanced features	Embedded logging, direct telemetry data transferring to FIMER cloud
Environmental	
Operating ambient temperature range	-25...+60°C/-13...140°F with derating above 40°C/ 104°F
Storage temperature	-40°C...+85°C / -40°F...185°F
Relative Humidity	4...100 % with condensation
Sound pressure level, typical	68dB(A)@ 1m
Maximum operating altitude without derating	2000 m / 6560 ft
Environmental pollution degree classification for external environments	3
Environmental class	Outdoor
Climatic category according to IEC 60721-3-4	4K4H
Physical	
Environmental Protection Rating	IP 66 (IP54 for the cooling section)
Cooling System	Forced air
Dimensions (H x W x D)	869x1086x419 mm / 34.2" x 42.7" x 16.5"
Weight	70kg / 154 lbs for power module ; ~55kg / 121 lbs for wiring box; Overall max 125 kg / 276 lbs
Mounting system	Mounting bracket vertical & horizontal support
Overvoltage rating as per IEC 62109-1	II (DC input) III (AC output)
Safety	
Safety class	I
Insulation Level	Transformerless
Marking	CE ⁽⁶⁾
Safety, EMC and Radio Spectrum Standards	IEC/EN 62109-1, IEC/EN 62109-2, EN 61000-6-2, EN 61000-6-4, EN55011:2017 CEI 0-16, IEC 61727, IEC 62116, IEC 60068, IEC 61683, JORDAN IRR-DCC-MV, DRRG/DEWA, Chile MV, BDEW, Belg C10-C11, EN50438 Generic +Ireland, EN50549-2, CLC-TS0549-2, UK G59/3, EREC G99-1, PEA, ISO-IEC Guide 67 (system 5), NRS 097-2-1, P.O. 12.3, ITC-BT-40, UNE 206006 IN, VDE-AR-N 4110, VDE-AR-N 4120, VDE V 0-126-1-1, VFR 2019, UTE C15-712-1, Taiwan
Grid standard (check the availability with your sales channel)	
Accessories	
Assembly accessories	PVS Installation Kit
AC Plate, Single Core Cables	Plate with 5 individual AC cable glands: 4 x M40: Ø 19...28mm, 1 x M25: Ø 10...17mm
AC Plate, Multi Core Cables	Plate with 2 individual AC cable glands: 1 x M63: Ø 37...53mm, 1 x M25: Ø 10...17mm
PVS-100/120 PRE-CHARGE BOARD KIT	Allow the monitoring of the inverter when DC source is not available and night time operation with restart capability ⁽¹⁰⁾
PVS-100/120 GROUNDING KIT ⁽⁹⁾	Allow to connect the negative input pole to ground ⁽⁷⁾

- Maximum number of opening 5 under overloading
- Please refer to the document "String inverters – Product manual appendix" available at www.fimer.com for information on the quick-fit connector brand and model used in the inverter
- Maximum fuse size supported 20A. Additionally two strings input per MPPT supports 30A fuse size for connecting two strings per input.
- The AC voltage range may vary depending on specific country grid standard
- Frequency range may vary depending on specific country grid standard
- In the event of a fault, limited by the external protection envisaged on the AC circuit
- Only in IT-system (an AC SPD reconfiguration is needed)
- Hereby, Power-One Italy S.p.A. (A Member of the FIMER Group) declares that the radio equipments (radio module combined with the inverter), to which this user manual refers, are in compliance with the Directive 2014/53/EU. The full text of the EU Declaration of Conformity is available at the following internet address: www.fimer.com
- When PVS-100/120 GROUNDING KIT is installed, Residual Current Monitoring do not fully operate. Inverter must be installed and operate in "restricted areas (access limited to qualified personnel)" according to IEC 62109-2
- In case PVS-100/120 PRE-CHARGE BOARD KIT is installed on the inverter, it is important to remark the presence of auxiliary power supply connected to the AC grid. In this case the inverter is supplied either by DC and AC power, so hazardous internal voltages are present even in case the DC switches are open.

NOTE – Features not specifically mentioned in this data sheet are not included in the product.

14.5 Tightening torques

Component	Nm
Single core AC cable gland (62) M40	8 Nm
Multi core AC cable gland (63) M63	100 Nm
PE cable gland (23) M25	7.5 Nm
Signal cable gland (12) M25	7.5 Nm
AC connection busbar (21) M10 bolts	25 Nm
DC input connection busbar (17) M10 bolts	25 Nm
Parallel MPPT connection points (31)	8 Nm
Protective earth point (int.) (25) M10 nut	21 Nm
Protective earth point (ext.) (10) M8 bolt	15.2 Nm
Junction screws (32)	10 Nm
Side bracket screws	5 Nm
R, S, T cables nuts on to the AC interconnection board (58)	8 Nm
Interface protective earth point M5 nut (36)	4 Nm
DC protective shield M5 screws (60)	3 Nm
AC protective shield M5 screw (27)	3 Nm
Communication connector counterparts (33) (37) (38)	0.25 Nm

14.6 Cable gland clamping rang

Component	mm
Single core AC cable gland (62) M40	19...28 mm
Multi core AC cable gland (63) M63	37...53 mm
DC input cable glands (18) M40	19...28 mm
PE cable gland (23) M25	10...17 mm
Signal cable glands (12) M25	10...17 mm

ENGLISH



The symbol of the crossed-out wheeled bin identifies electrical and electronic equipment (EEE) placed on the market after 13 August 2005 which should be separately collected in accordance with the Directive 2012/19/EU of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE).

Users of EEE from private households (consumers) within each European Union country:

Electrical and electronic equipment should be disposed of in appropriate collection facilities as set up by the competent authorities within each Member State or in accordance with that Member State's national regulations regarding WEEE collection and disposal.

Professional users (Companies - Enterprises) within each European Union country: Electrical and electronic equipment should be disposed of in accordance with the Member State's national regulations regarding WEEE collection and disposal. Further information should be obtained from the reseller or local vendor.

Both Private and Professional Users from EEEs outside the European Union: Electrical and electronic equipment should be disposed of in accordance with the Member State's national regulations regarding WEEE collection and disposal. Inappropriate EEE disposal could have a negative environmental impact and hamper human health. Cooperating in the appropriate disposal of this product contributes to product reuse and recycling, while protecting our environment.

ITALIANO



Il simbolo del contenitore di spazzatura su ruote barrato, accompagnato da una barra piena orizzontale, identifica le apparecchiature elettriche ed elettroniche, immesse sul mercato dopo il 13 agosto 2005, oggetto di raccolta separata in conformità alla Direttiva Europea 2012/19/UE (WEEE Directive).

Utenti domestici (privati cittadini) della Comunità Europea:

Lo smaltimento di questa apparecchiatura elettrica ed elettronica deve avvenire presso le isole ecologiche messe a disposizione dagli enti locali o comunque seguendo le indicazioni delle autorità locali per la raccolta differenziata dei rifiuti elettronici.

Utenti professionali (Aziende-Imprese) della Comunità Europea: Lo smaltimento di questa apparecchiatura elettrica ed elettronica deve avvenire in conformità alle legislazioni locali. Contattare il rivenditore o il fornitore locale per ulteriori informazioni.

Utenti domestici e professionali in altri paesi fuori dalla Comunità Europea:

Lo smaltimento di questa apparecchiatura elettrica ed elettronica deve avvenire in conformità alla legislazione locale. Contattare il rivenditore o il fornitore locale per ulteriori informazioni. Collaborando allo smaltimento corretto di questo prodotto, si contribuisce al riutilizzo, al riciclaggio e al recupero del prodotto, e alla protezione del nostro ambiente.

Il simbolo del contenitore di spazzatura su ruote barrato, accompagnato da una barra piena orizzontale, identifica le apparecchiature elettriche ed elettroniche, immesse sul mercato dopo il 13 agosto 2005, che devono essere raccolte separatamente in conformità con la Direttiva 2012/19/UE del Parlamento Europeo e del Consiglio sulle rifiuti di apparecchiature elettriche ed elettroniche (WEEE).

Utilizadores de EEE de ambientes domésticos privados (consumidores) dentro de cada país da União Europeia: Os equipamentos elétricos e eletrônicos deverão ser eliminados em instalações de recolha adequadas, conforme estabelecido pelas autoridades competentes dentro de cada Estado Membro, ou de acordo com os regulamentos nacionais desse Estado Membro sobre a recolha e eliminação de WEEE.

NEDERLANDS



Het symbool van de doorkruiste afvalbak identificeert elektrische en elektronische apparatuur (EEA) op de markt gebracht na 13 augustus 2005, die apart moet worden verzameld in overeenstemming met de Richtlijn 2012/19/UE van het Europees Parlement en de Raad betreffende afgedankte elektrische en elektronische apparatuur (WEEE).

Gebruikers van EEA uit particuliere huishoudens (consumenten) in elk land van de Europese Unie:

Elektrische en elektronische apparatuur moet worden weggegooid via de daarvoor bestemde voorzieningen zoals opgezet door de bevoegde autoriteiten in elke lidstaat met in overeenstemming met de nationale regelgeving van die lidstaat met betrekking tot de inzameling en verwijdering van AEEA.

Professionele gebruikers (Bedrijven - Ondernemingen) in elk land van de Europese Unie:

Elektrische en elektronische apparatuur dient te worden vernietigd in overeenstemming met de nationale voorschriften van de lidstaat met betrekking tot de inzameling en verwijdering van AEEA. Nadere informatie moet worden verkregen van de verkoper of lokale leverancier.

Zowel particuliere als professionele gebruikers uit landen buiten de Europese Unie:

Elektrische en elektronische apparatuur dient te worden vernietigd in overeenstemming met de nationale voorschriften van de lidstaat met betrekking tot de inzameling en verwijdering van AEEA. Onjuiste verwijdering van EEA kan een negatieve invloed op het milieu hebben en de menselijke gezondheid schaden. Samenwerking bij de correcte verwijdering van dit product draagt bij aan hergebruik en recycling en beschermt ons milieu.

DEUTSCH



Mit dem Symbol der ausgekreuzten Mülltonne werden Elektro- und Elektronikgeräte gekennzeichnet, die nach dem 13. August 2005 auf den Markt gebracht wurden und in Einklang mit der Richtlinie 2012/19/EU des Europäischen Parlaments über Elektro- und Elektronik-Abfälle (WEEE) getrennt zu sammeln sind.

Benutzer von Elektro- und Elektronikgeräten aus privaten Haushalten (Konsumenten) in den Mitgliedstaaten der Europäischen Union: Elektro- und Elektronikgeräte sind bei einer hierfür von den zuständigen Behörden eingerichteten geeigneten Annahmestelle im jeweiligen Mitgliedstaat abzugeben oder in Einklang mit den nationalen Bestimmungen des Mitgliedstaats hinsichtlich der Sammlung und Entsorgung von Elektro- und Elektronikgeräten gemäß der WEEE-Richtlinie zu entsorgen.

Professionelle Benutzer (Unternehmen) in den Mitgliedstaaten der Europäischen Union: Elektro- und Elektronikgeräte sind in Einklang mit den nationalen Bestimmungen des Mitgliedstaats hinsichtlich der Sammlung und Entsorgung von Elektro- und Elektronikgeräten gemäß der WEEE-Richtlinie zu entsorgen. Für nähere Informationen wenden Sie sich bitte an den Wiederverkäufer oder Ihren Händler vor Ort.

Sowohl private als auch professionelle Benutzer in den Mitgliedstaaten der Europäischen Union: Elektro- und Elektronikgeräte sind in Einklang mit den nationalen Bestimmungen des Mitgliedstaats hinsichtlich der Sammlung und Entsorgung von Elektro- und Elektronikgeräten gemäß der WEEE-Richtlinie zu entsorgen. Bei unsachgemäßer Entsorgung besteht das Risiko nachteiliger Auswirkungen auf Umwelt und Gesundheit. Durch Ihre Kooperation zur ordnungsgemäßen Entsorgung fördern Sie das Wiederverwendung und die Recycling des Produkts und tragen zum Umweltschutz bei.

Utilizadores de EEE de ambientes domésticos privados (consumidores) en varje land inom Europeiska unionen: Elektrisk och elektronisk utrustning ska bortskaffas på lämpliga uppsamlingsanläggningar som inrättats av behöriga myndigheter i varje medlemsstat eller i enlighet med den medlemsstatens nationella bestämmelser gällande uppsamling och bortskaffande av WEEE.

SVENSKA



Symbolen med en överkryssad sopkoppa på hjul identifierar elektrisk och elektronisk utrustning (EEE), der är markerad efter d. 13 augusti 2005, skall indamas särskilt i henhold til Europa-Parlamentets og Rådets direktiv 2012/19/EU om affald som udgør av eller ineholder elektrisk eller elektronisk produkt (WEEE).

Användare av EEE i privatkvarteren (konsumenter) i varje land inom Europeiska unionen:

Elektrisk och elektronisk utrustning ska bortskaffas på lämpliga uppsamlingsanläggningar som inrättats av behöriga myndigheter i varje medlemsstat eller i enlighet med den medlemsstatens nationella bestämmelser gällande uppsamling och bortskaffande av WEEE.

Yrkesmässiga användare (bolag – företag) i varje land inom Europeiska unionen: Elektrisk och elektronisk utrustning ska bortskaffas i enlighet med medlemsstatens nationella bestämmelser gällande uppsamling och bortskaffande av WEEE. Ytterligare information ska erhållas från återförsäljaren eller den lokala säljaren.

Både privata och yrkesmässiga användare från länder utanför Europeiska unionen: Elektrisk och elektronisk utrustning ska bortskaffas i enlighet med medlemsstatens nationella bestämmelser gällande uppsamling och bortskaffande av WEEE. Ötillräcklig information om EEE kan ha en negativ miljöpåverkan och skada människors hälsa i och med att du samarbetar i fråga om att bortskaffa den här produkten på ett lämpligt sätt, bidra till att produkten kan återanvändas och återvinnas, samtidigt som du hjälper till att skydda miljön.

ESPAÑOL



El símbolo del contenedor de basura tachado con un asa identifica aquellos aparatos eléctricos y electrónicos (AEE, EEE por sus siglas en inglés) lanzados al mercado después del 13 de agosto de 2005 que deben recogerse de forma separada de acuerdo con la Directiva 2012/19/UE del Parlamento Europeo y el Consejo Europeo sobre residuos de aparatos eléctricos y electrónicos (RAEE).

Usuarios particulares de AEE (consumidores) en cada uno de los países de la Unión Europea: Los aparatos eléctricos y electrónicos deben eliminarse en los puntos de recolección adecuados establecidos por las autoridades competentes de cada Estado miembro de acuerdo con las normativas nacionales de dicho Estado miembro sobre la recolección y eliminación de RAEE.

Usuarios profesionales (Empresas e Instituciones) en cada uno de los países de la Unión Europea: Los aparatos eléctricos y electrónicos deben eliminarse de acuerdo con las normativas nacionales sobre la recolección y eliminación de RAEE. Puede obtener más información en su distribuidor o proveedor local.

Usuarios particulares y profesionales de países no pertenecientes a la Unión Europea: Los aparatos eléctricos y electrónicos deben eliminarse de acuerdo con las normativas nacionales sobre la recolección y eliminación de RAEE. La eliminación inadecuada de un AEE puede tener un impacto negativo en el medio ambiente y perjudicar la salud humana. Su cooperación en la eliminación adecuada de este producto contribuye a su reutilización y reciclado a la vez que protege el medio ambiente.

Brugere af EEE af private husholdninger (forbrugere) inden for hvert EU-medlemsland: Elektrisk og elektronisk udstyr skal bortskaffes via passende indsamlingsfaciliteter, der er etableret af de ansvarlige myndigheder i hver medlemsstat, eller i henhold til den pågældende medlemsstats nationale lovgivning vedrørende indsamling og bortskaffelse af WEEE.

Professionelle brugere (virksomheder – firmaer) inden for hvert EU-medlemsland: Elektrisk og elektronisk udstyr skal bortskaffes i henhold til den pågældende medlemsstats nationale lovgivning vedrørende indsamling og bortskaffelse af WEEE. Yderligere oplysninger kan rekrutteres fra forhandleren eller den lokale leverandør.

Både private og professionelle brugere fra lande uden for den Europæiske Union: Elektrisk og elektronisk udstyr skal bortskaffes i henhold til den pågældende medlemsstats nationale lovgivning vedrørende indsamling og bortskaffelse af WEEE. Urettidig information om EEE kan have en negativ virkning på miljøet og på menneskers sundhed. Samarbejde i forbindelse med korrekt bortskaffelse af disse produkter bidrager til at genbruges og genindvendes, samtidig med at miljøet beskyttes.

FRANÇAIS



Le symbole de poubelle interdite identifie les équipements électriques et électroniques (EEE) mis sur le marché après le 13 août 2005 qui doivent être collectés séparément conformément à la Directive 2012/19/UE du Parlement européen et du Conseil relative aux déchets d'équipements électriques et électroniques (DEEE).

Ménages utilisateurs d'EEE (consommateurs) dans chaque pays de l'Union européenne: Les équipements électriques et électroniques doivent être mis au rebut conformément aux réglementations nationales de cet Etat membre relatives à la collecte et à la mise au rebut des EEE.

Utilisateurs professionnels (sociétés - entreprises) au sein de chaque pays de l'Union européenne: Les équipements électriques et électroniques doivent être mis au rebut conformément aux réglementations nationales de l'Etat membre relatives à la mise au rebut des EEE. Pour plus d'informations, contactez le revendeur ou le fournisseur local.

Utilisateurs privés et professionnels des pays hors Union européenne: Les équipements électriques et électroniques doivent être mis au rebut conformément aux réglementations nationales de l'Etat membre relatives à la mise au rebut des EEE. Une mise au rebut inappropriée des EEE peut avoir un effet néfaste sur l'environnement et sur la santé humaine. En participant à la mise au rebut appropriée de ce produit, vous contribuez à sa réutilisation et à son recyclage tout en protégeant notre environnement.

PORTUGUÊS



O símbolo do contendor com uma cruz sobreposta identifica equipamentos elétricos e eletrônicos (EEE) colocados no mercado após 13 de agosto de 2005, que devem ser recolhidos separadamente de acordo com a Diretiva 2012/19/UE do Parlamento Europeu e do Conselho sobre resíduos de equipamentos elétricos e eletrônicos (WEEE).

Utilizadores de EEE de ambientes domésticos privados (consumidores) dentro de cada país da União Europeia:

Os equipamentos elétricos e eletrônicos deverão ser eliminados em instalações de recolha adequadas, conforme estabelecido pelas autoridades competentes dentro de cada Estado Membro, ou de acordo com os regulamentos nacionais desse Estado Membro sobre a recolha e eliminação de WEEE.

Utilizadores profissionais (Companhias - Empresas) dentro de cada país da União Europeia:

Os equipamentos elétricos e eletrônicos deverão ser eliminados de acordo com os regulamentos nacionais dos Estados Membros sobre a recolha e eliminação de WEEE. Informações adicionais deverão ser obtidas junto do revendedor ou do fornecedor local.

Utilizadores privados e profissionais dos países fora da União Europeia:

Os equipamentos elétricos e eletrônicos deverão ser eliminados de acordo com os regulamentos nacionais dos Estados Membros sobre a recolha e eliminação de WEEE. A eliminação inadequada de EEE poderá ter um impacto ambiental negativo e afetar a saúde humana, cooperando com a eliminação adequada destes produtos contribui para a reutilização e reciclagem dos mesmos, protegendo simultaneamente o nosso ambiente.

SUOMI



Merkitä, jossa on yli ristitetty pyöreällä jätteella, viittaa 13.8.2005 jälkeen markkinoille tuotuihin sähkö- ja elektroniikkalaitteisiin, jotka Euroopan parlamentin ja neuvoston sähkö- ja elektroniikkalaiteromusta annetun direktiivin 2012/19/UE (WEEE) mukaisesti on kerättävä erikseen.

Yksityisten kotitalouksien sähkö- ja elektroniikkalaitteiden (kuultajat) kussakin Euroopan unionin maassa: Sähkö- ja elektroniikkalaitteet on hävitettävä kunkin jäsenvaltion toimivaltuissa viranomaisissa järjestämien keräyspöydien kautta tai kysyen jäsenvaltion kansallisten sähkö- ja elektroniikkalaiteromun keräystä ja hävittämistä koskevien määräysten mukaisesti. Lisätietoja on voitava saada jälleenykäytöstä tai paikalliselta toimittajalta.

Ammattikäyttäjät (yritykset) kussakin Euroopan unionin maassa: Sähkö- ja elektroniikkalaitteet on hävitettävä jäsenvaltion kansallisten sähkö- ja elektroniikkalaiteromun keräystä ja hävittämistä koskevien määräysten mukaisesti.

Yksityisten kotitalouksien sähkö- ja elektroniikkalaitteiden (kuultajat) kussakin Euroopan unionin maassa: Sähkö- ja elektroniikkalaitteet on hävitettävä jäsenvaltion kansallisten sähkö- ja elektroniikkalaiteromun keräystä ja hävittämistä koskevien määräysten mukaisesti. Lisätietoja on voitava saada jälleenykäytöstä tai paikalliselta toimittajalta.

Professionelle brukere (virksomheder – firmaer) inden for hvert EU-medlemsland: Elektrisk og elektronisk udstyr skal bortskaffes i henhold til den pågældende medlemsstats nationale lovgivning vedrørende indsamling og bortskaffelse af WEEE.

Yrkesmässiga användare (bolag – företag) inom Europeiska unionen: Elektrisk och elektronisk utrustning ska bortskaffas i enlighet med medlemsstatens nationella bestämmelser gällande uppsamling och bortskaffande av WEEE.

Yksityisten kotitalouksien sähkö- ja elektroniikkalaitteiden (kuultajat) kussakin Euroopan unionin maassa: Sähkö- ja elektroniikkalaitteiden hävittäminen jäsenvaltion kansallisten sähkö- ja elektroniikkalaiteromun keräystä ja hävittämistä koskevien määräysten mukaisesti. Lisätietoja on voitava saada jälleenykäytöstä tai paikalliselta toimittajalta.

Professionelle brukere (virksomheder – firmaer) inden for hvert EU-medlemsland: Elektrisk og elektronisk udstyr skal bortskaffes i henhold til den pågældende medlemsstats nationale lovgivning vedrørende indsamling og bortskaffelse af WEEE.

Yrkesmässiga användare (bolag – företag) inom Europeiska unionen: Elektrisk och elektronisk utrustning ska bortskaffas i enlighet med medlemsstatens nationella bestämmelser gällande uppsamling och bortskaffande av WEEE.



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