

ABB solar inverter

## Quick Installation Guide

PVS-100/120-TL

(100 to 120 kW)



In addition to what is explained below, the safety and installation information provided in the installation manual must be read and followed. The technical documentation and the interface and management software for the product are 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.



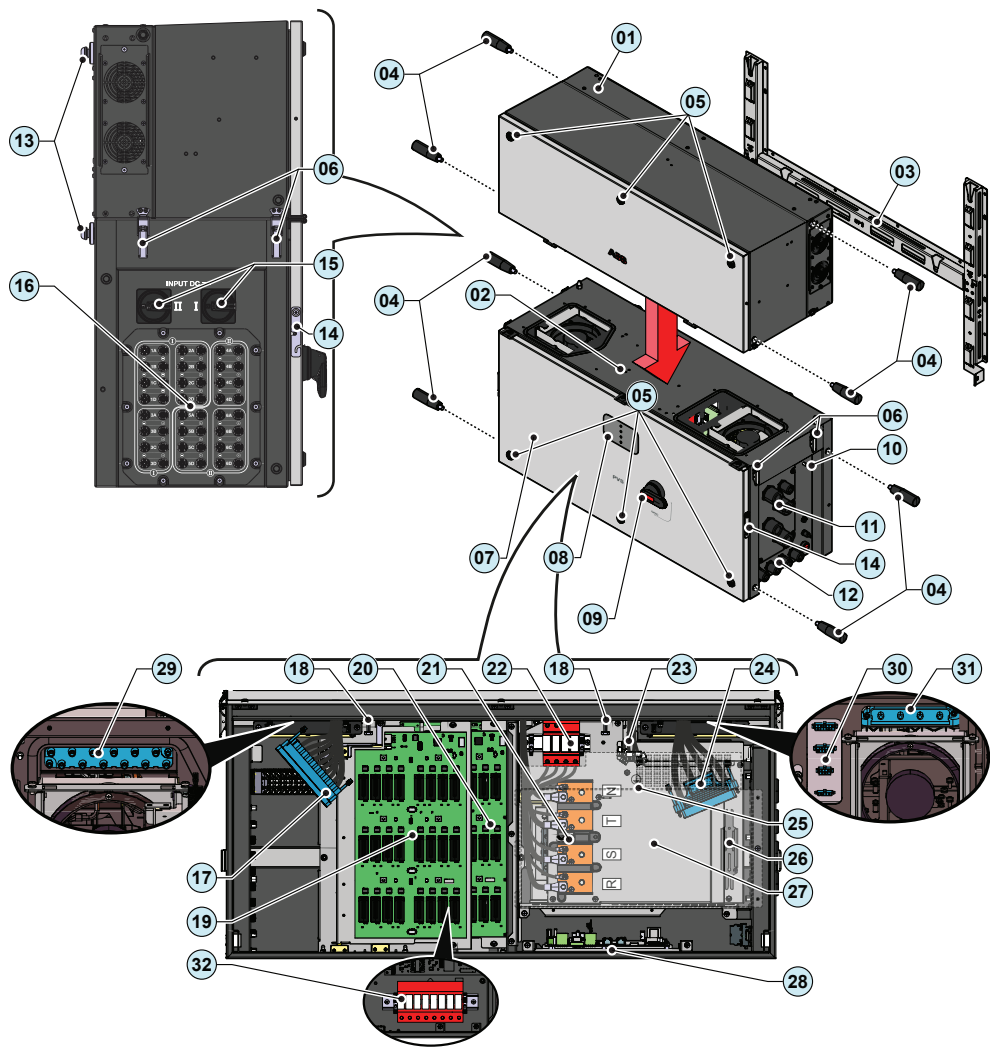


## Index

<b>1. Reference number index</b>	2-3
<b>2. Models and range of equipment</b>	3
<b>3. Labels and Symbols</b>	4
<b>4. Lifting and transport</b>	5
<b>5. List of supplied components</b>	6
<b>6. Choice of installation location</b>	6-7
<b>7. Mounting Instructions</b>	8-14
<b>8. Routing the cable to the inverter</b>	15
<b>9. Characteristics of the protective grounding cable</b>	16
<b>10. Line cable and protection devices</b>	16
<b>11. Grid output connection (AC side)</b>	17-18
<b>12. Checking the correct polarity of the strings and Input connection (DC)</b>	19-20
<b>13. Connection of the communication and control signals</b>	21-22
<b>14. Instruments</b>	23
<b>15. Commissioning</b>	24-28
<b>16. Characteristics and technical data</b>	29-30

### Power module and wiring box

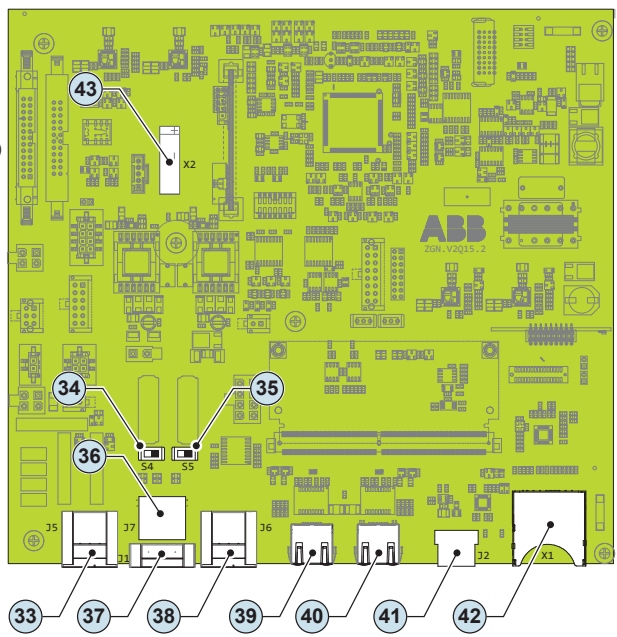
- 01 Power module
- 02 Wiring box
- 03 Mounting bracket
- 04 Handles
- 05 Cover quarter cam locks
- 06 Side latch
- 07 Front wiring box cover
- 08 Status LEDs
- 09 AC disconnect switch (-SX2 only)
- 10 Protective earth point (ext.)
- 11 AC panel
- 12 Service cable glands
- 13 Rear pins for bracket assembly
- 14 Cover support brackets
- 15 DC disconnect switches
- 16 DC input quick fit connectors
- 17 DC interface connector (male)
- 18 Junction screws
- 19 Positive string fuses plate
- 20 Negative string fuses (-SX2 only) plate
- 21 AC connection busbar
- 22 AC overvoltage surge arresters
- 23 Interface signal connectors (male)
- 24 AC interface power connector (male)
- 25 Protective earth point (int.)
- 26 Multi-functional tool
- 27 AC protective shield
- 28 Communication board
- 29 DC interface connector (female)
- 30 Interface signal connectors (female)
- 31 AC interface power connector (female)
- 32 DC overvoltage surge arresters







### Communication board

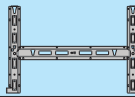
- 33 Alarm terminal block
- 34 RS485 ABB service 120Ohmtermination res. (service only)
- 35 RS485 line 120Ohm termination res.
- 36 ABB RS485 service Ethernetconnector (RJ45) (service only)
- 37 Remote ON/OFF terminal block
- 38 RS485 line terminal block
- 39 Ethernet connector 2 (RJ45)
- 40 Ethernet connector 1 (RJ45)
- 41 USB connector
- 42 SD card slot
- 43 CR2032 Backup battery



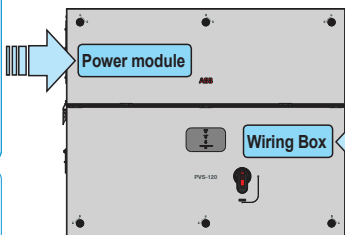
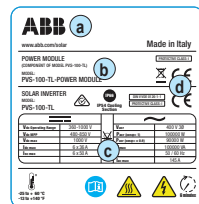
The choice of the inverter model must be made by a qualified technician who knows about the installation conditions, the devices that will be installed outside the inverter and possible integration with an existing system.

"Wiring box" Model Number	
	Description
WB-SX-PVS-100-TL WB-SX-PVS-120-TL	Input with 24 quick fit connectors pairs + String fuses (positive pole) + DC disconnect switches + AC and DC overvoltage surge arresters (Type II) + MPPT level input current monitoring (6 ch.)
WB-SX2-PVS-100-TL WB-SX2-PVS-120-TL	Input with 24 quick fit connectors pairs + String fuses (both positive and negative pole) + DC disconnect switches + AC disconnect switch + AC and DC overvoltage surge arresters (Type II) + individual string monitoring (24 ch.)
WB-SY-PVS-100-TL WB-SY-PVS-120-TL	Input with 24 quick fit connectors pairs + String fuses (positive pole) + DC disconnect switches + AC and DC overvoltage surge arresters (Type II for AC and type I-II for DC) + MPPT level input current monitoring (6 ch.)
WB-SY2-PVS-100-TL WB-SY2-PVS-120-TL	Input with 24 quick fit connectors pairs + String fuses (both positive and negative pole) + DC disconnect switches + AC disconnect switch + AC and DC overvoltage surge arresters (Type II for AC and type I-II for DC) + individual string monitoring (24 ch.)

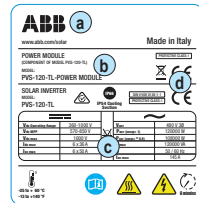
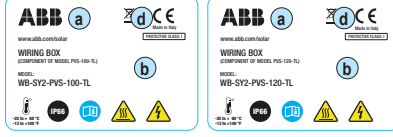
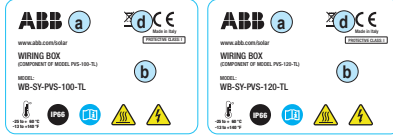
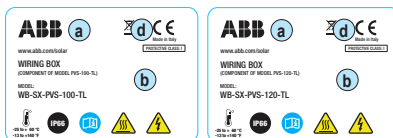
"Power module" Model Number	
	Description
PVS-100-TL-POWER MODULE	Inverter section / power module with 100kW output power at 400Vac
PVS-120-TL-POWER MODULE	Inverter section / power module with 120kW output power at 480Vac

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

The labels on the inverter have the Agency marking, main technical data and identification of the equipment and manufacturer. The labels are NOT to be hidden by foreign objects and parts (rags, boxes, equipment, etc.); they must be regularly cleaned and always kept in sight.



- a) Manufacturer
- b) Power module / wiring box model
- c) Main technical data
- d) Certification marks

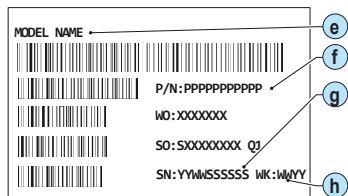


For connection to the network in South Africa. According to NRS097-2-1 requirements, at the end of installation it is mandatory to apply the label at the left (supplied with the inverter) near the power module regulatory label.

WARNING!		
NRS 097-2-1:2017 (South Africa)		
Total (Ω)	0.156	X/R ratio
Reference Impedance		3.9
1. SC [A]	1.475	5. SC [kVA] (three phase)
Fault Level	1475	1018

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

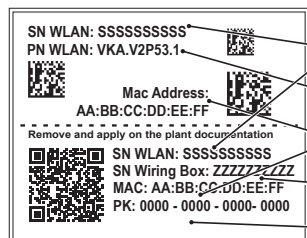
In addition to the label showing the inverter data, there are also additional **identification labels** for the power module and the wiring box.



- e) Power module or wiring box model
- f) Power module or wiring box Part Number
- g) Power module or wiring box Serial Number
  - YY = Year of manufacture
  - WW = Week of manufacture
  - SSSSSS = sequential number
- h) Week/Year of manufacture

The officially required information is located on the approval label. The identification label is an accessory label which shows the information necessary for the identification and characterisation of the inverter by ABB.

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



- i) WLAN board Serial Number
- l) WLAN board Part Number
- m) 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).
  - MAC address it's the only required information to register the inverter with Aurora Vision.
- n) Inverter Serial Number
- o) 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 ABB Installer for Solar Inverters.

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		General warning - Important safety information		Hazardous voltage
	Protection rating of equipment		Temperature range		Without isolation transformer
	Positive pole and negative pole of the input voltage (DC)		Always use safety clothing and/or personal safety devices		Point of connection for grounding protection
	Direct and alternating currents, respectively		Hot surfaces		Time need to discharge stored energy

## 4. Transport and handling

Transport of the equipment, especially by road, must be carried out with suitable ways and means for protecting the components from violent shocks, humidity, vibration, etc.

### Unpacking and checking

The components of the packaging must be disposed of 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 Service ABB.

### Equipment weight

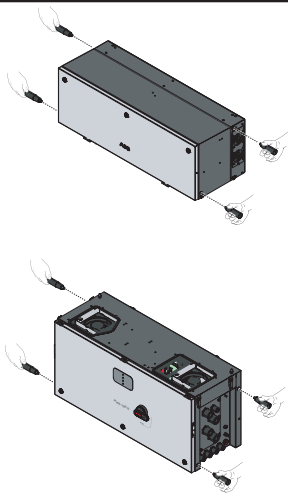
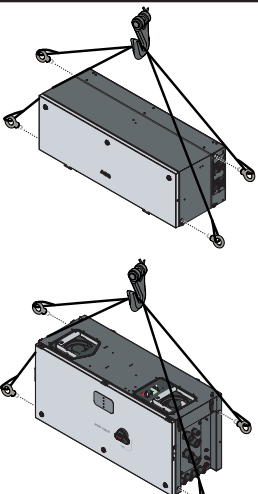
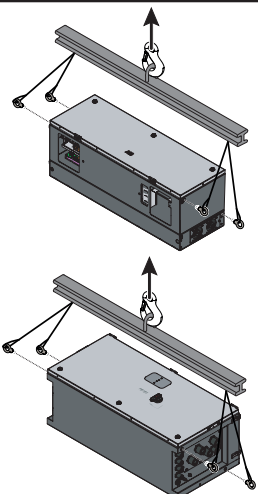
Device	Weight (kg)	Lifting points	Holes or Eyebolts UNI2947
Power module	70 kg	4	M12. Kit of handles (M4) and eyebolts (to be ordered)
Wiring box	~55kg	4	M12. Kit of handles (M4) and eyebolts (to be ordered)


### Lifting

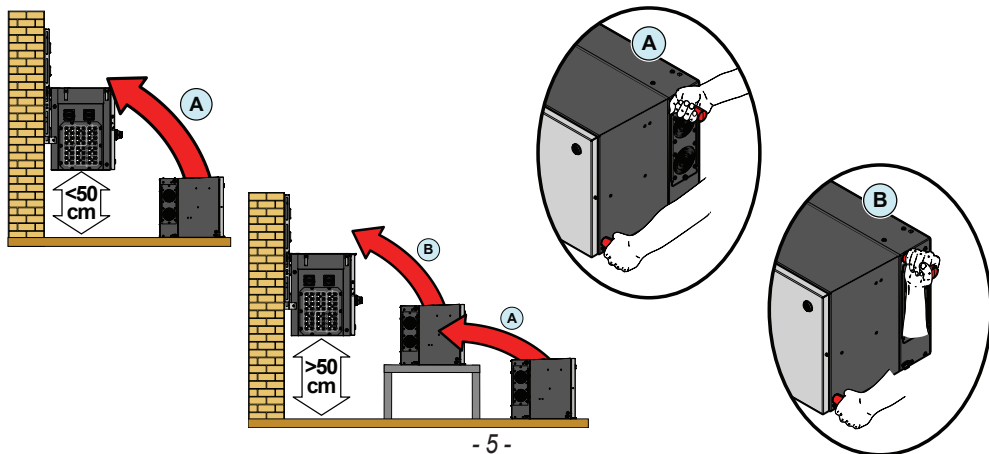
The power module (M1) and the wiring box (M2) must be lifted by minimum 2 operators (the number of required operators necessary to lift the equipment must be in accordance to local regulations relating lifting limits per operator) or alternatively using suitable lifting equipment.

In order to make the power module and wiring box easier to manage, 4 handles (M4) can be fitted into the designated holes.






If lifting with ropes, M12 eyebolts can be fitted in the same holes.



Manual lifting (handles)	Vertical lifting (eyebolts)	Horizontal lifting (eyebolts and lifting balancer)
		 <p><i>*lifting balancer must be 20 cm longer (per side) than the lifted device.</i></p>



 In case of manual lifting, for high height wall installation positions (>50cm floor distance from bottom side of the wiring box): this maximum allowed height value is calculated considering a medium tall height of 170 cm for operator) it's mandatory to use a support plan (e.g. a table) to place the equipment during the lifting operation, to allow the change of hands position. The use of the support plan is suggested also for <50cm height installation.



The following list shows the supplied components required to correctly install and connect the inverter.

Components available in the kit supplied with the wiring box		Q.ty
	Connector for connection of the configurable relay, aux relay and RS485 (pre-installed on communication board (28))	4
	Connector for connecting the Remote ON/OFF signal (pre-installed on communication board (28))	1
	Two-hole gasket for M25 signal cable glands (12) and cap	2 + 2
	Fuse holder for positive string fuses (18)	24
	Positive string fuses (19) (gPV - 1000Vdc - 15A)	24

Components available in the kit supplied with the wiring box		Q.ty
	Key tool for front cover quarter cam-lock	1
	Technical documentation	1

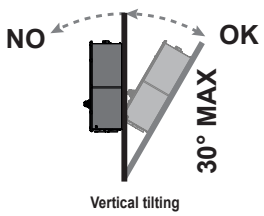
Components available in the kit supplied with the brackets		Q.ty
	M8 screws with washers for mechanically securing the half-brackets	2
	M6 screws for mechanically securing the bracket with the wiring box	2

**Installation site and position**

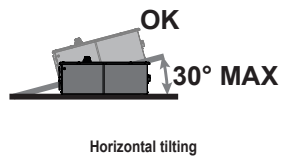
- Consult the technical data to check the required environmental conditions (protection rating, temperature, humidity, altitude, etc.).
- Installation of the unit in a location exposed to direct sunlight NOT acceptable. (Add awning in case of direct sunlight installation).
- Final installation of the 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 near flammable substances (minimum distance 3 m).
- Do not install on wood 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, snow or a level of humidity >95%. Always carefully seal all unused openings.
- All installations over 6500' (2,000 meters) must be assessed by ABB Technical Sales to determine the proper datasheet derating

**Tilting admittance**

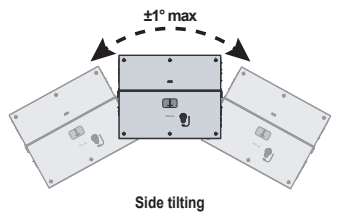
- The installation can be carried out vertically or horizontally, with a maximum inclination as indicated in the figures.



Vertical tilting



Horizontal tilting



Side tilting

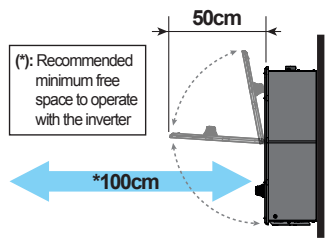


In case of horizontal installation in outdoor environment consider an installation with a minimum tilt of 3° to avoid any water stagnation.

**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.

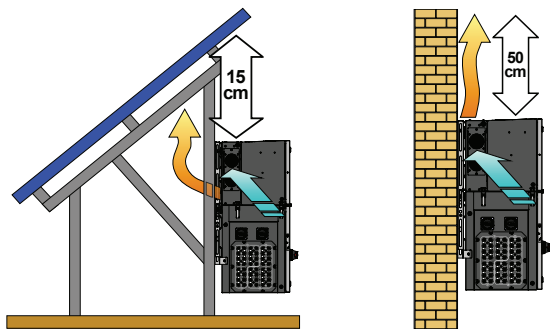
- Provide sufficient working space in front of the inverter that allows to open the cover and to make connections on the wiring box.



(\*): Recommended minimum free space to operate with the inverter

- 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 eye-level so that the status LEDs can be seen easily.
- 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.

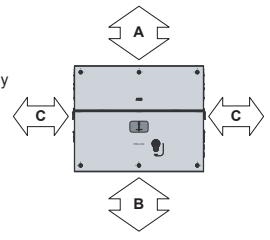


- Possible flooding or grass cutting evenience. It changes the bottom (B) or the rear (D - only in case of horizontal installation) required free space: If the inverter is installed in a place where there are concrete risk of flooding or grass cutting evenience, the bottom (B) or the rear (D - only in 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.

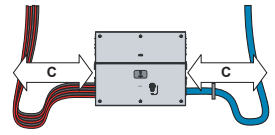
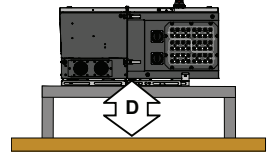
- Cables curvature radius. Sides (C) minimum required free space may depends from cable type (cable dimension, curvature radius, etc.): this evaluation must be done by the installer during the plant design phase (refer to "Cable routing" chapter for more information). In any case minimum required free space for proper ventilation of the unit (near side fans) cannot be under 15 cm.

**!** In case of manual installation (using handles) consider a free side space to lift the inverter of 60cm minimum. In case of installation with lifting equipments (eyebolts and ropes) the side distances (C) could be reduced at the minimum required of 15 cm 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.

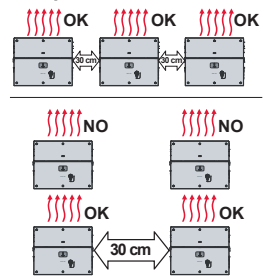
MINIMUM CLEARANCE DISTANCES



MINIMUM CLEARANCE REAR DISTANCE (ONLY FOR HORIZONTAL INSTALLATION)

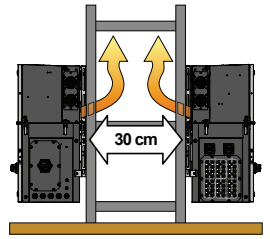


Multiple units installation



• In case of multiple installation of 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.

• The vertical 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.



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 %

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

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

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.

Staff authorised to carry out the installation must be specialised and experienced in this job. They must also have received suitable training on equipment of this type.

The installation must be performed by qualified installers and/or licensed electricians in accordance with the existing regulations in the country of installation.



The removal of the inverter panels/covers allows access to the area dedicated to service personnel (the operator is not authorized to access this area)

Connection of the photovoltaic system to an electric installation connected to the distribution grid must be approved by the electricity provider.

The installation must be carried out with the equipment disconnected from any voltage sources. Refer to "Inverter switch-off" chapter on the user manual to know all the necessary step to safely operate on the inverter.

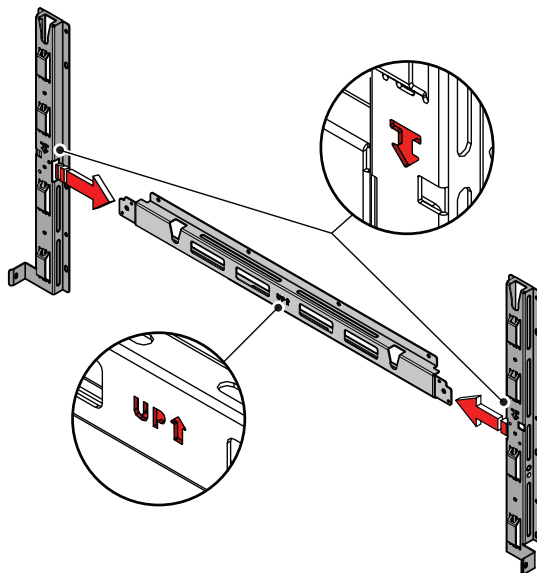
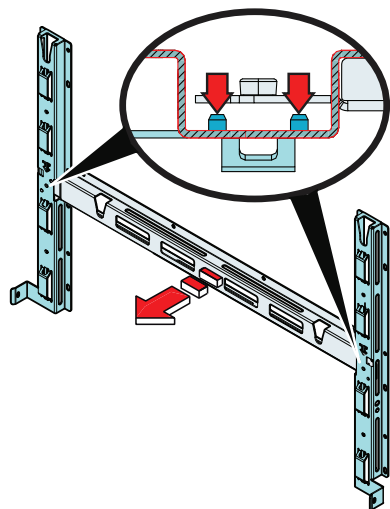
When the photovoltaic panels are exposed to sunlight they provide continuous DC voltage to the inverter.

## Mounting with a support bracket

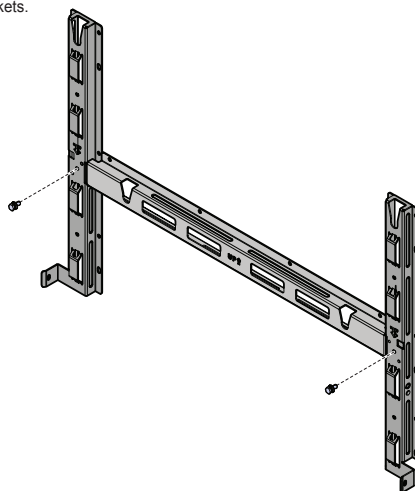
Independently from the mounting on vertical supports (wall, profiles) or horizontal supports the assembly instruction are the same (the differences will be detailed on the procedure steps). The assembly instruction steps below are related to vertical mounting.

### 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.



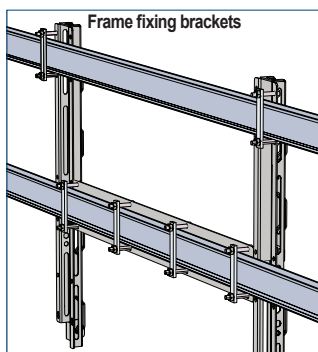
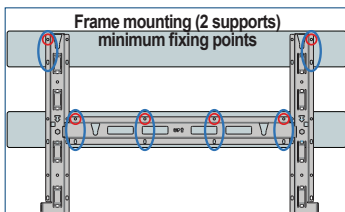
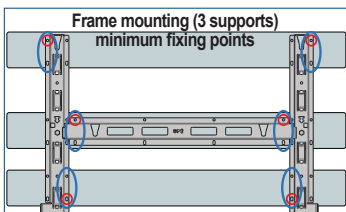
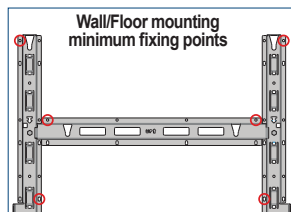
- Slide the central bracket in order to match the two holes with the centering pins of the side brackets.



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

- 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 diameter of holes in the bracket are 9mm). 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=500Kg for all models).

Attach the bracket (03) to the support with at least 6 attachment screws (shown in RED) or at least 6 frame fixing bracket for frame mounting (shown in BLUE). Depending on the type of anchor chosen, drill the required holes to mount the bracket (03). The pictures show the recommended minimum fixing point depending to the type of support.



- Fix the bracket (03) to the support.

**ASSEMBLY THE INVERTER TO THE BRACKET**

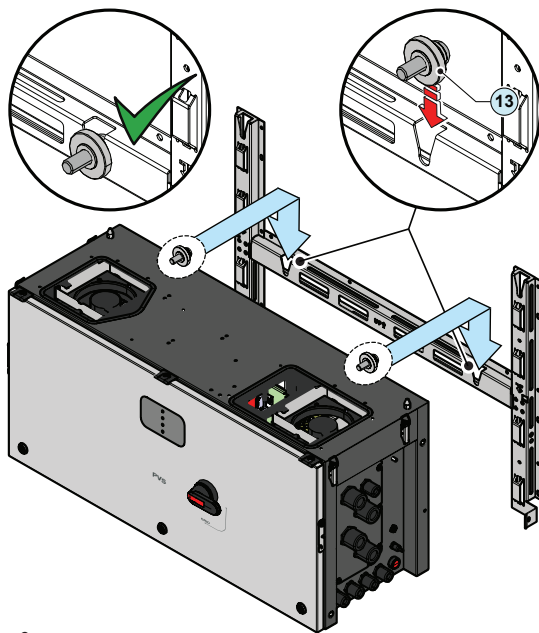
- Lift the wiring box up to the bracket using the (optional) handles (04) or the (optional) M12 eyebolts, or another appropriate lifting device.



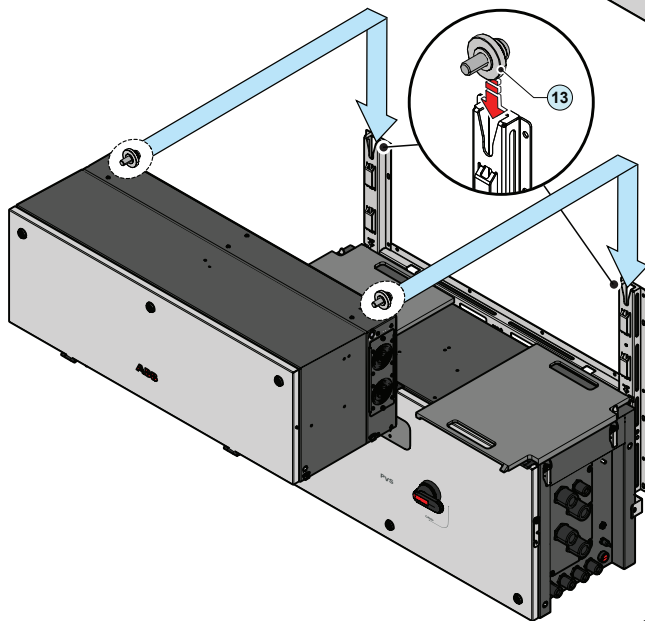
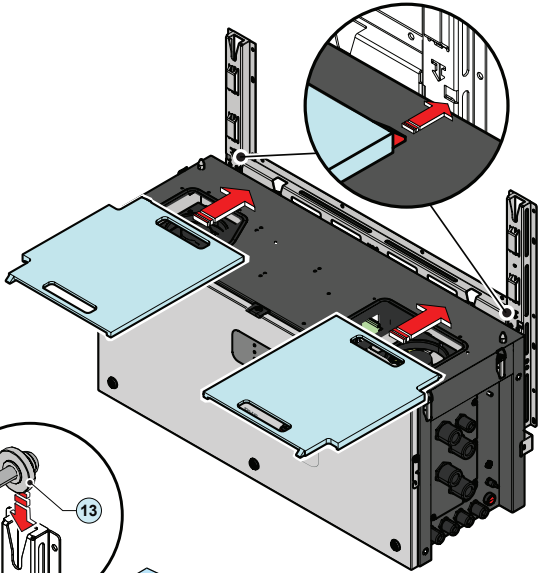
*Risk of injury due to the heavy weight of the equipment.*

- Insert the heads of the two rear attachment pins (13) (placed on the rear part of the wiring box) into the two slots (14) on the bracket. Check that the pins (13) has been correctly inserted in the slots as shown in the picture before releasing the wiring box.

- Remove handle or eye bolts (if used)



- (only for vertical mounting) Insert the two gasket protective covers (optional) sliding the positioning pins (shown in red in the picture) into the proper bracket holes. If the mounting is correct the gasket protective cover will have a locked position.



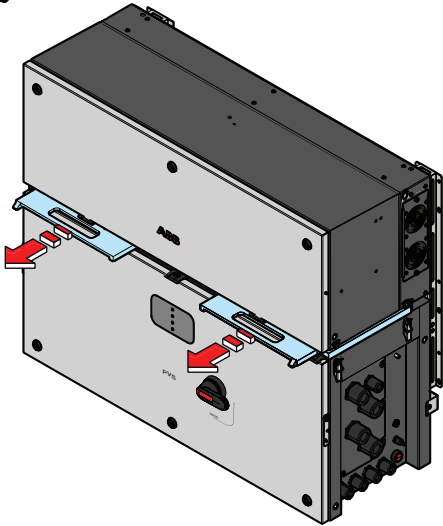
- Lift the power module up to the bracket and over the wiring box, using the (optional) handles (14) or the (optional) M12 eyebolts, or another appropriate lifting device.



**Risk of injury due to the heavy weight of the equipment.**

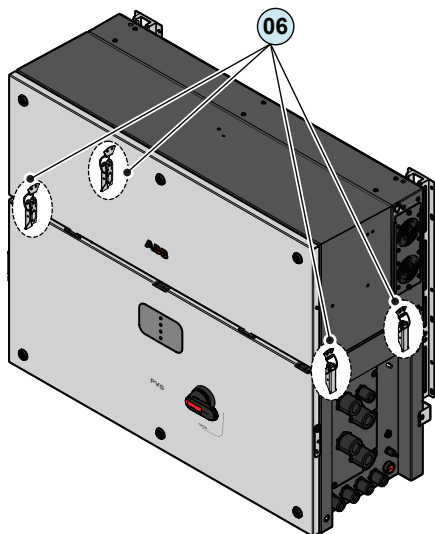
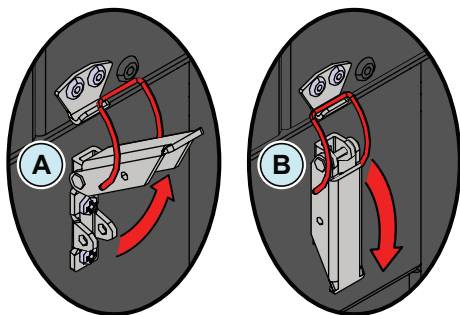
- Insert the heads of two rear attachment pins (13) (placed on the rear part of the power module) into the slots (15) on the bracket. For horizontal mounting, the two markings (16) on the bracket indicate the point where the edge of the power module have to be placed to allow the engagement of the rear attachment pins (13).

- (only for vertical mounting) Remove the previously installed gasket protective covers (optional) from the inverter by sliding it pulling from the handles.

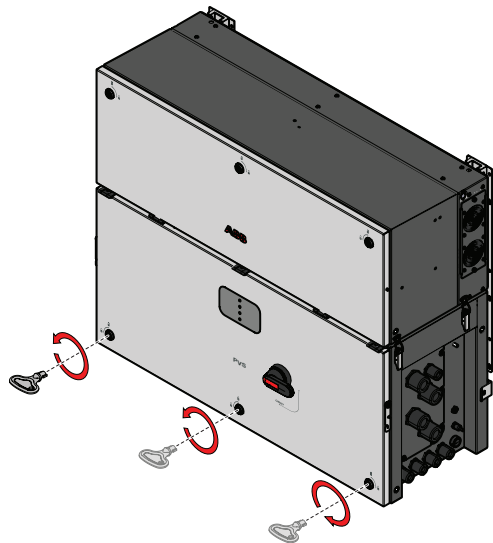




• Fasten all of the four side closures (latches) (06) as shown in the pictures.

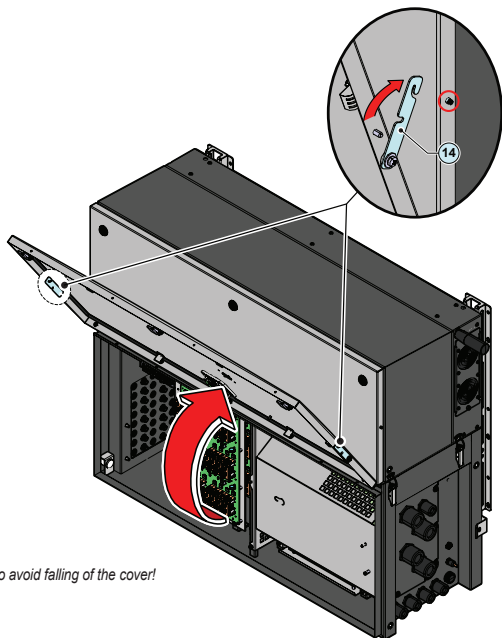


**OPENING THE COVER**



- Using the key tool provided with the inverter installation kit content in the wiring box package, open the three cover quarter cam locks (05) following the proper ways as shown in the related silkscreens on the cover.
- (only for -SX2, -SY2 version) Set the wiring box disconnect switch (09) to OFF position; otherwise it will not be possible to remove the front cover (07).

• Open the cover and use the cover support brackets (14) to lock the cover in open position.



Pay attention to properly secure the cover support brackets (14) in order to avoid falling of the cover!

**FINAL FASTENING OPERATIONS**

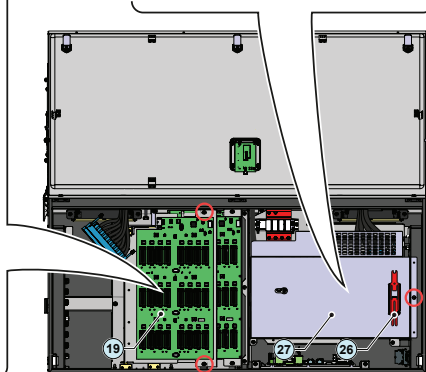
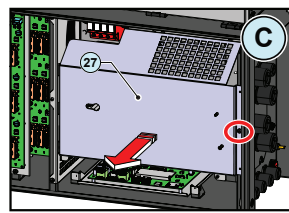
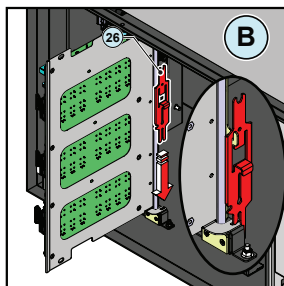
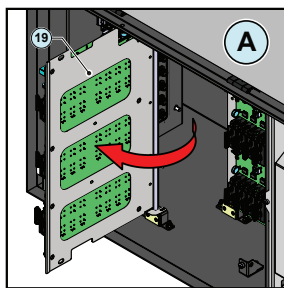
In order to reach the two junction screws (18) and complete the power module and wiring box mating, the positive string fuses plate (19) and the AC protective shield (27) have to be removed as follow:

- Remove the two M5 screws from the positive string fuses plate (19).

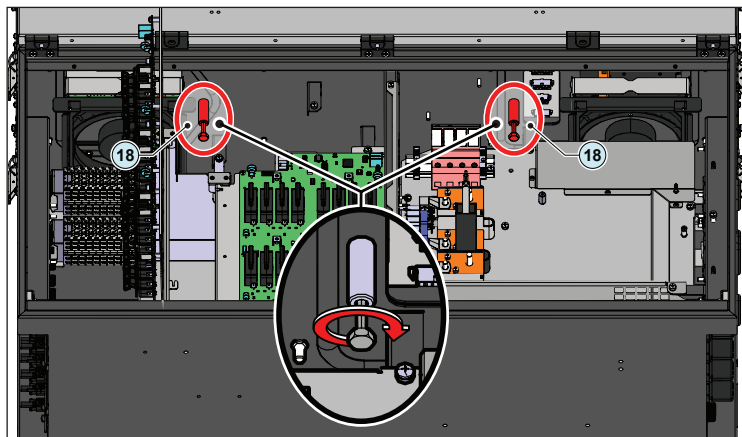
- Tilt the positive string fuses plate (19) as shown in the picture (A).

- Position the multi-functional tool (26) as shown in the picture (B) to lock the open position of the positive string fuses plate (19).

- Remove the M5 screw from the AC protective shield (27) and remove the shield (C).

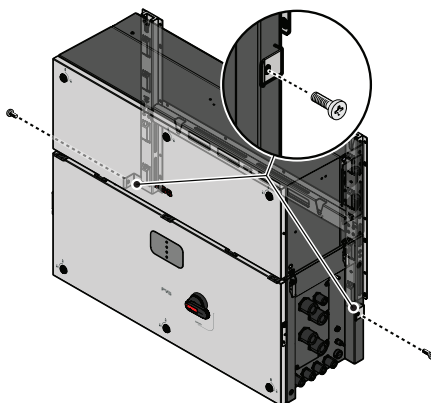


- Tighten the two hexagonal junction screws (18) with a tightening torque of 12 Nm.



- Close the positive string fuses plate (19) using the two M5 screws previously removed.

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

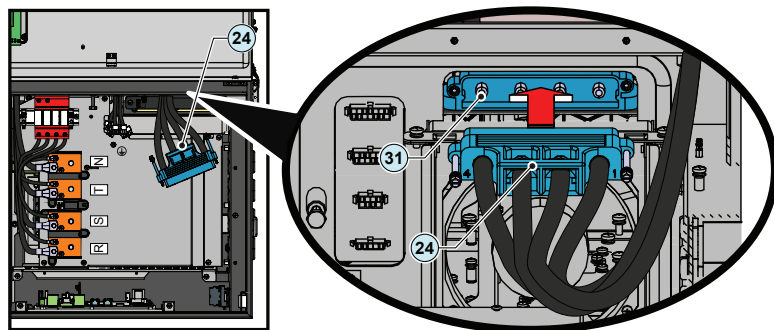


**INTERFACE CONNECTORS CONNECTION**

Last operation before proceed with the wiring and connections of AC and DC sources is to connect the six interface connectors that allow the power connection and the communication connection between the power module (11) and the wiring box (12):

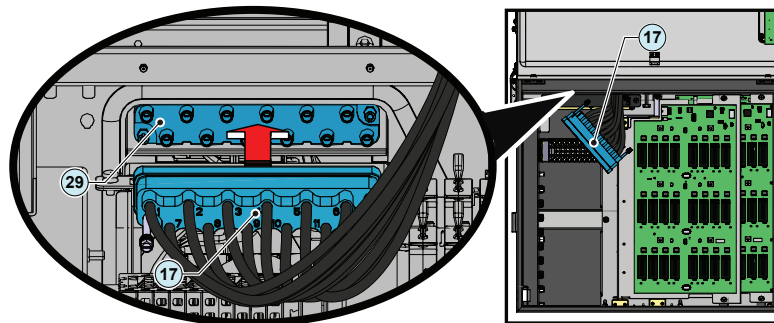
Connection of the AC interface power connector:

- Connect the AC interface power connector (male) (24) with the related AC interface power connector (female) (31).
- Fasten the side screws (alternating both sides in order to avoid any possible damage to the connector) on the AC interface power connector (male) (24) and check the correct mounting with the procedure "Checking the mounting of interface connectors (AC and DC)"



**CONNECTION OF THE DC INTERFACE POWER CONNECTOR**

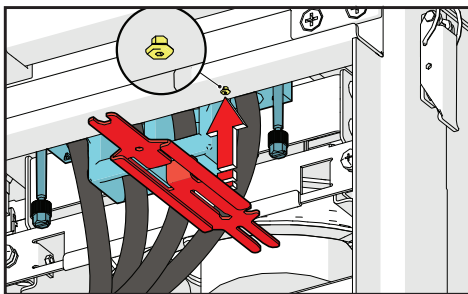
- Connect the DC interface power connector (male) (17) with the related DC interface power connector (female) (29).
- Fasten the side screws (alternating both sides in order to avoid any possible damage to the connector) on the DC interface power connector (male) (17) and check the correct mounting with the procedure "Checking the mounting of interface connectors (AC and DC)"



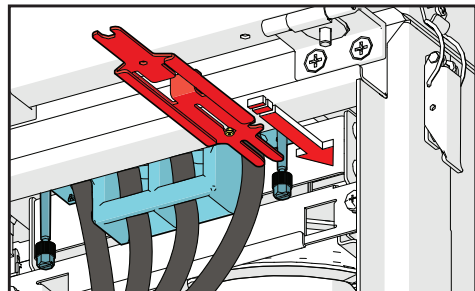
**CHECKING THE MOUNTING OF INTERFACE CONNECTORS (AC AND DC)**

After the connection is made, the side screws on the AC/DC interface power connector (male) (24) / (17) have to be fastened with a tightening torque of 3 Nm. To check if the interface power connector (male) (24) / (17) is correctly installed it's possible to use the Multi-functional tool (26) following the procedure below:

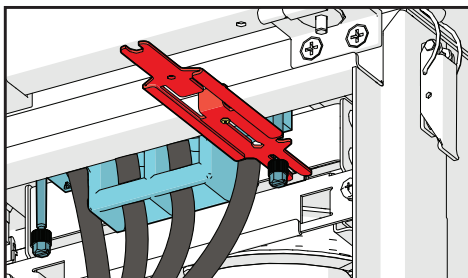
- Position the Multi-functional tool (26) slot into the stud (shown in yellow).



- Slide the Multi-functional tool (26) until it stops.

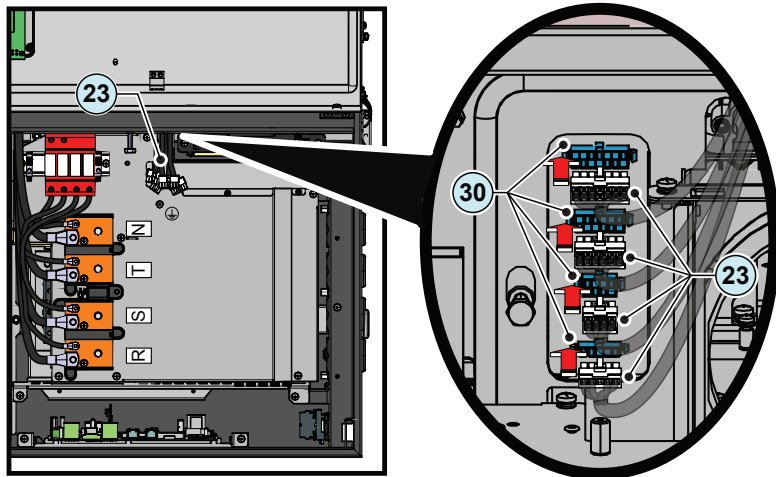


- Check if the fork of the Multi-functional tool (26) fit in the groove of screws of the interface power connector (male) (24) / (17): if it fits, the interface power connector (male) (24) / (17) is correctly assembled.



**CONNECTION OF THE SIGNAL INTERFACE CONNECTORS**

- Connect the signal interface connectors (male) (23) with the related signal interface connectors (female) (30) starting from the last to the first connector.



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
	3.9
1.50 [A]	9.5C [VA] (three phase)
Fault Level	1475
	1016

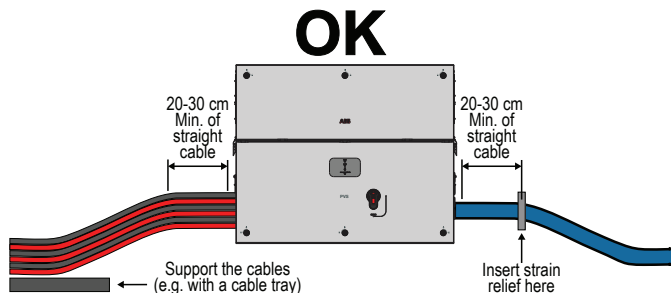
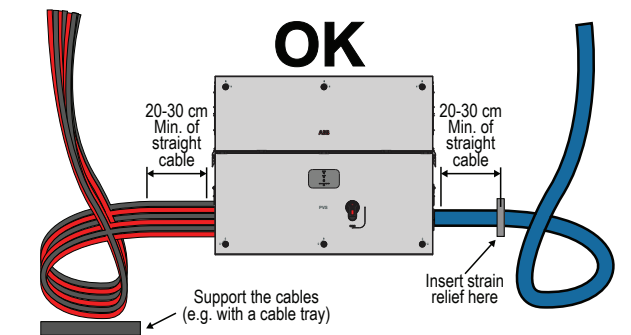
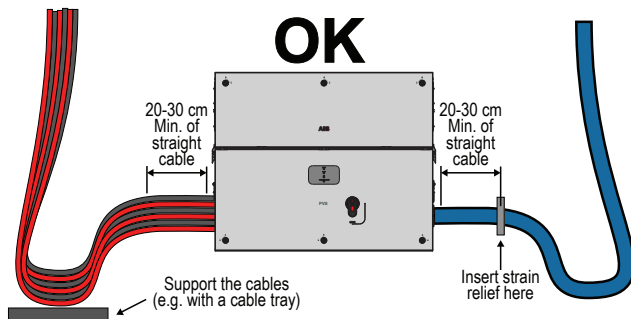
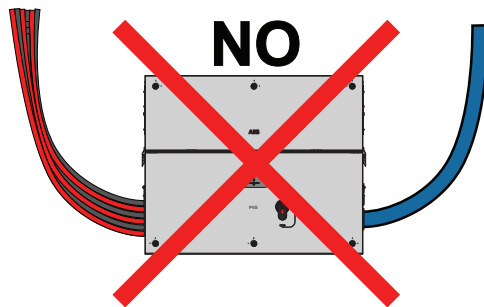
It is not intended to connect this inverter to a network with an higher Network Impedance.

The cable routing have to be done in order to avoid water dripping to the AC panel (11), DC input quick fit connectors (16) or to service cable glands (12).

Especially when comes from the top, the cables must be routed in order to create a "hump" or a loop: in this way the water that flow on the cables will be interrupted.

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

The side pictures shown incorrect and correct cables routing examples.



The previously installation examples shown only vertical installation but same rules have to be followed in case of horizontal installation of the inverter.

ABB 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. In any case the minimum cross section of the ground conductor must be at least 1/2 of phase conductor cross section.

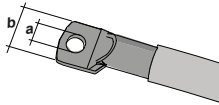


Any failure of the inverter when it is not connected to earth through the appropriate connection point is not covered by the warranty.

The ground 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	-
Max. conductor cross section	95 mm <sup>2</sup>	-
Cable lug dimensioning	for M10 Stud a = 10.5 mm (min) b = 40 mm (max)	for M8 Stud a = 8.4 mm (min) b = all dimension accepted



## Load protection breaker (AC disconnect switch)

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

	PVS-100-TL	PVS-120-TL
Type	Automatic circuit breaker with differential thermal-magnetic protection	
Voltage rating	400 Vac	480 Vac
Current rating	min. 150 A	min. 150 A
Magnetic protection characteristic		B/C
Number of poles		3/4

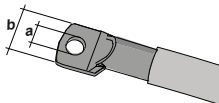
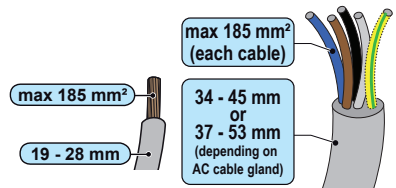
In case of installation of a residual current protection device must meet the following characteristics:

	PVS-100-TL	PVS-120-TL
Type of differential protection		A/AC
Differential sensitivity	1.0 A	1.2 A

**ABB declares that the ABB transformerless inverters, in terms of their construction, do not inject continuous ground fault currents and therefore there is no requirement that the differential protection installed downstream of the inverter be type B in accordance with IEC 60755 / A 2.**

## Characteristics and sizing of the line cable

The cross-section of the AC line conductor cables 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; if the impedance is too high it causes an increase in the AC voltage which, on reaching the limit set by the standards in the country of installation, causes the inverter to switch off.



The AC cables must be connected to AC connection busbar (21) using a cable lug (not supplied) of a suitable size for installation on the M10 screw used for securing the cable.

The AC output cable lugs must meet the following dimensions:

a = 10.5 mm (min)    b = 40 mm (max)



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.

The inverter must be connected to a three-phase system with the center of the star connected to ground. To connect the inverter to the grid is possible to choose between the four-wire connection (3 phases + neutral) and the three-wire connection (3 phases).

**In any case, the inverter's earth connection is mandatory. In any case, the inverter's earth connection is mandatory.**

Depending of the type of the AC panel (11) it's possible to use single conductors cables or a multipolar cable:

- Single-core configuration have 4xM40 cable glands for the "R", "S", "T" phases and for the "N" neutral cable and a M25 cable gland for the grounding cable.
- Multi-core configuration (optional) have a M63 cable gland for the "R", "S", "T" phases and for the "N" neutral cable and a M25 cable gland for the grounding cable.

The connections can also be made with the wiring box (22) detached from the power module (11) which can be connected later for commissioning.



When working with the wiring box (22) detached, (pay particular attention to outdoor installations) always protect the top of wiring box with proper IP66 protection covers (optional accessory content in the PVS Installation KIT, to be ordered separately) on the housing. Refer to the dedicated chapter "Installation of IP66 protection covers for wiring box openings (long term installation)" for further information about the installation procedures.

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 (11) installed on the inverter it will be necessary to route the AC output and ground cables into different ways:

- **Single-core configuration (default):** 4xM40 cable glands for the "R", "S", "T" phases and for the "N" neutral cable and a M25 cable gland for the grounding 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:

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

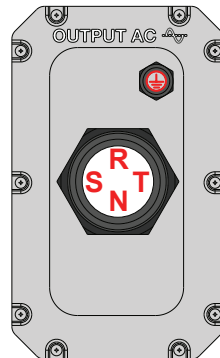
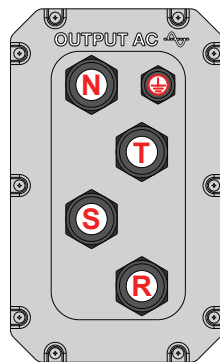
S = Phase S (indicated with a label near the AC connection busbar (21))

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

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

The ground 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).

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



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

This version of the AC panel (11) could be can be ordered separately. Refer to "Kit of recommended spare parts" chapter for further information.

#### FOLLOW THE PROCEDURE BELOW TO ROUTE ALL THE REQUESTED CABLES:

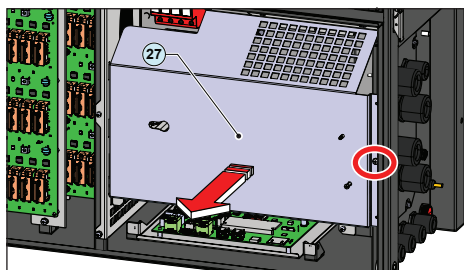


The installation must be performed by qualified installers and/or licensed electricians in accordance with the existing regulations in the country of installation and in accordance of all safety rules for performing electrical works. The customer has civil liability for the qualification and mental or 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.



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.

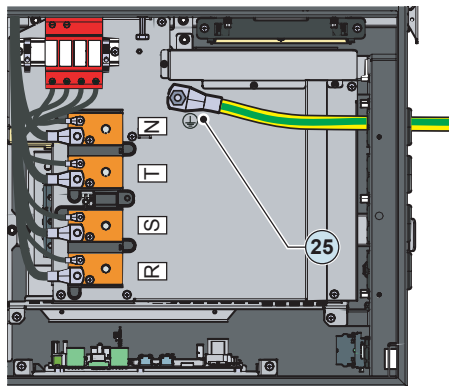
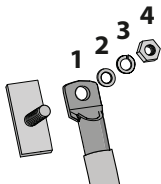


Depending on the ground connection method (internal 25 or external 10) follow the procedures described below:

### INTERNAL GROUND CONNECTION

- Pass the protective earth cable through the proper cable gland on the AC panel 11.
- Fix the protective earth cable lug to the protection earth connection point (int.) 25 using the washers and bolt pre-installed on the M10 stud, as shown in the following diagram:

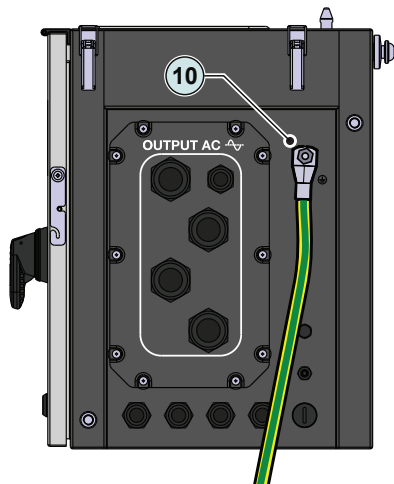
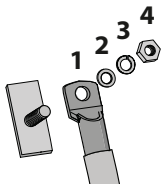
- 1 = cable lug  
2 = flat washer  
3 = spring washer  
4 = M10 nut





### EXTERNAL GROUND CONNECTION

- Fix the protective earth cable lug to the protection earth connection point (ext.) 10 using the washers and bolt pre-installed on the M8 stud, as shown in the following diagram:

- 1 = cable lug  
2 = flat washer  
3 = spring washer  
4 = M8 nut



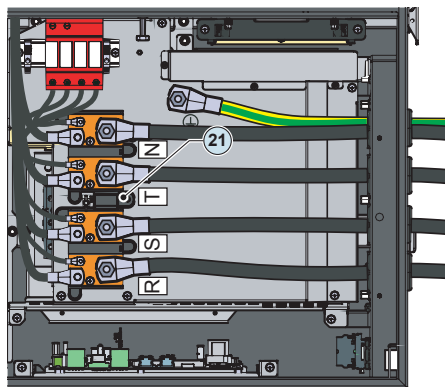
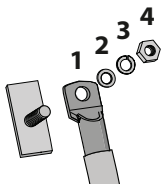
 The cable lug must be installed with a minimum tightening torque of 21Nm.


 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 handes thread 64 on the housing of power module.

- Pass the phases cables through the cable glands on the AC panel 11.

- 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:

- 1 = cable lug  
2 = flat washer  
3 = spring washer  
4 = M10 nut



 The minimum recommended cross section for the phases conductors is 70 mm<sup>2</sup>.  
The cable lugs must be installed with a minimum tightening torque of 25Nm.

- Check the tightness of the AC cable glands at the end of the installation.





Warning! The inverters to which this document relates to are WITHOUT ISOLATION TRANSFORMER (transformer-less). This type involves the use of insulated photovoltaic panels (IEC61730 Class A Rating) and the need to maintain the photovoltaic generator floating with respect to earth: no pole of the generator must be connected to ground.



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



When exposed to sunlight, the PV panels supply DC direct voltage to the inverter. To avoid risks of electrical shock, all wiring operations must be carried out with the DC disconnect switches (15), any DC disconnect switches external to the inverter (if present, applying LOTO procedures on it), AC disconnect switch (16) and any AC disconnect switches external to the inverter (applying LOTO procedures on it) to OFF position. If only the internal DC disconnect switches (15) is present, there will be live parts internal to the inverter with the consequent risk of electrical shock. In this case these activities are only allowed by means of appropriate PPE (overall resistant to electric arc, dielectric helmet with visor, insulating gloves class 0, protective overglove in leather EN420 - EN399, safety shoes).

For the string connections it is necessary to use the quick fit connectors (16) (usually Weidmüller PV-Stick or WM4, MultiContact MC4 and Amphenol H4) located on the left side of the wiring box (22).



Refer to the document "String inverter – Product Manual appendix" available at [www.abb.com/solarinverters](http://www.abb.com/solarinverters) to know the brand and the model of the quick fit connector. Depending on the model of the connector of the own inverter, it is necessary to use the same model and the respective counterpart (check the compliant counterpart on the website of the manufacturer or in ABB)



Using corresponding 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.

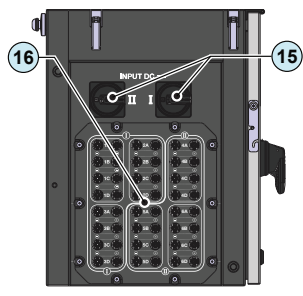
The input connectors are divided into 6 groups (one group for each input channel) consisting of 4 pairs of quick fit connectors.



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.



**STRINGS POLARITY CHECK AND FUSES INSTALLATION**

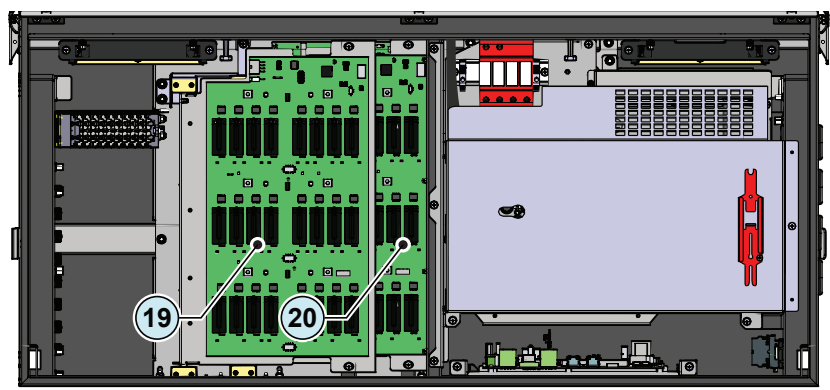


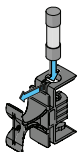
Check for correct polarity in the input strings and absence of any leakage to ground in the PV generator. The inside of the inverter may only be accessed after the equipment has been disconnected from the grid and from the PV generator.



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. These 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). The reverse polarity can cause severe damage.

Depending of the wiring box (22) version installed on the inverter there are one or two boards for the string fuses:  
 - SX, SY version: contains only 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 version: contains 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.



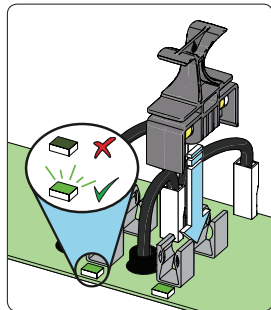


The string fuses are installed inside special safety positioners that allow easy installation/removal, as well as providing protection from involuntary contact while the inverter is being installed.

Each fuses are associated with a green LED that could be used to check the correct polarity of the strings.

#### PROCEDURE FOR CHECKING THE CORRECT POLARITY OF THE STRINGS

- Check for the absence of installed fuses on the positive side string fuses board (19) - if present remove it!
- Turn the DC disconnect switches (15) to OFF.

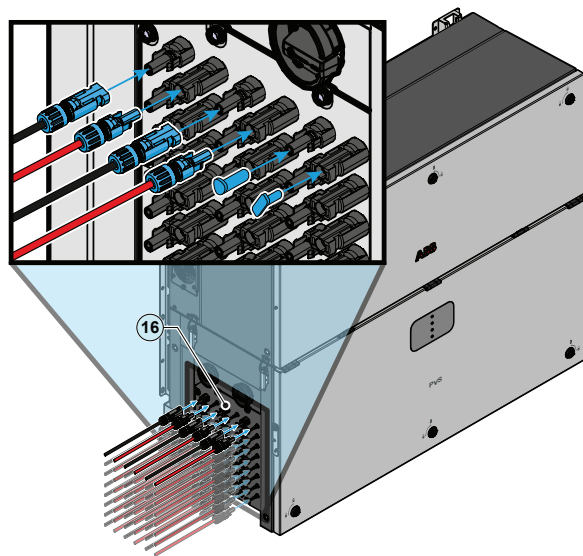


- Connect the strings (refer to "Input connection to PV generator (DC side)" chapter) and check that the GREEN LED corresponding to each positive fuses activates. The string will turn out to be inverted if the green LED is OFF or, in some circumstances, faintly ON. It's recommended to check the strings 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.
- Install the fuses (supplied) on the string fuses board (19) (20) with the supplied fuse holders.

#### INPUT STRINGS CONNECTION

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



If any string inputs are not required, you must ensure that covers are installed to the connectors, and install any which are missing. This is necessary both for the inverter seal, and to avoid damage to the free connector which may be used at a later time.



The connections can also be made with the wiring box (22) detached from the power module (11) that can be connected later for commissioning. When working with the wiring box (22) detached, pay particular attention to:

- presence of ground connection

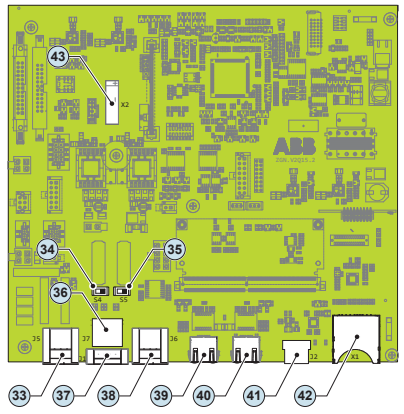
- The top of wiring box must always be protected in outdoor installations with proper IP66 protection covers (optional accessory content in PVS Installation kit, to be ordered separately). Refer to the dedicated chapter "Installation of IP66 protection covers for wiring box openings (long term installation)" for further information about the installation procedures.

**Communication and control board**



The installation must be carried out with the equipment disconnected from any voltage sources. Refer to "Inverter switch-off" chapter on the user manual to know all the necessary step to safely operate on the inverter.

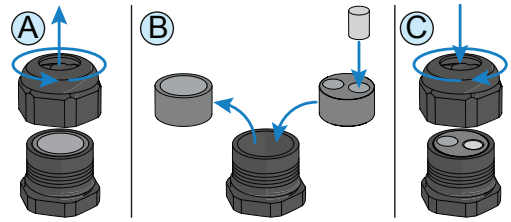
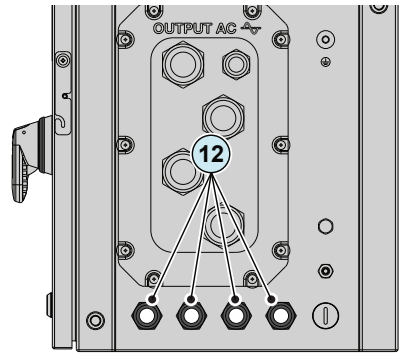
Code	Reference	Description of the communication and control board (39)
J5	33	Connection to the multifunction relay (ALARM terminal block)
S4	34	RS485 ABB service 120Ohm termination resistance selector switch (ABB service only)
S5	35	RS485 line 120Ohm termination resistance selector switch
J7	36	ABB RS485 service Ethernet connector (RJ45) (ABB service only)
J1	37	Remote ON/OFF terminal block
J6	38	RS485 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 Backup battery



The communication and control signals are connected to the communication and control board inside the DC wiring box or directly to the connectors on the external of the inverter. In particular, on the left side of the DC wiring box, there are:  
 - Four M25 cable glands (12) that can be used to reach the terminals / connectors on the communication and control board. Each cable gland accepts a cable (from 10 mm to 17 mm diameter).

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.



If a cable gland will not be used, it will be necessary to leave (or install if removed) the IP66 plastic cap of cable gland.

**ETHERNET CONNECTION**

The ethernet connection allows a direct data transfer to the ABB server for monitoring purpose. When the inverter will be powered on, network parameters are automatically set and the inverter start transmitting telemetry data to the Aurora Vision® CLOUD platform.

The connection of the ethernet communication cable must be made on the specific RJ45 connectors (39) (40) located on the on the Communication and control board (29) inside the wiring box (22). If the inverters of the plant need to be connected in daisy chain use both connectors.

- The cable should be compliant to the following specification:
- Cable type: Patch or Cross type, 100BaseTx, CAT5e (or higher) with shielding STP or FTP.
  - 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

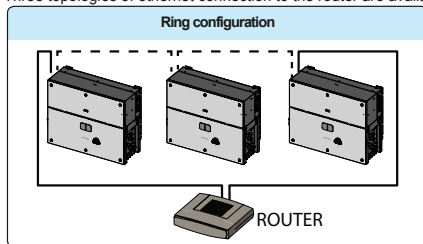


In order to avoid ground loop (that could create communication issues) the shield of any Ethernet cable must be connected to the RJ45 plug in only one side, the other side of the shield should be leaved floating. This could be guaranteed by crimping the shield or the screen of the ethernet cable to the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

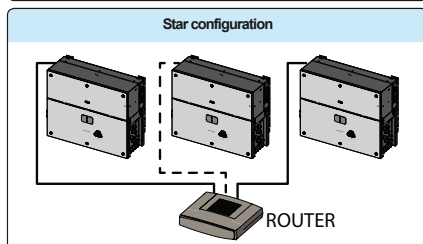
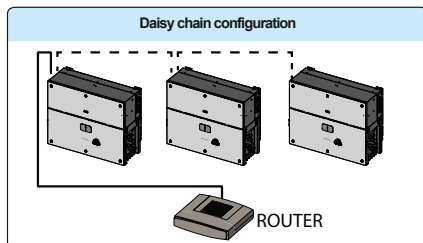
Connection of ethernet cable is made trough the two RJ45 connectors (39) and (40).

The two RJ45 connectors LAN1 and LAN2 are equivalent to each other and can be used interchangeably for the input or for the output of the line in realising the connection of the inverters.

Three topologies of ethernet connection to the router are available:



The ring configuration is the preferable way to connect the units in order to allow reaching inverters in case of single inverter fault. 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).



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



For further information on the Ethernet connection refer to the Local Area Network standard IEEE802.3

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



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

#### **SERIAL COMMUNICATION CONNECTION (RS485 - SLAVE MODE)**

For more information about this feature refer to the PVS-100/120-TL product manual

#### **SERIAL COMMUNICATION CONNECTION (RS485 - MASTER MODE)**

For more information about this feature refer to the PVS-100/120-TL product manual

#### **REMOTE CONTROL CONNECTION**

For more information about this feature refer to the PVS-100/120-TL product manual

#### **DEMAND RESPONSE MODE 0 (AS/NZS 4777.2)**

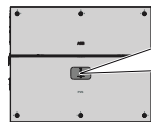
For more information about this feature refer to the PVS-100/120-TL product manual





#### **CONFIGURABLE RELAY CONNECTION (ALARM AND AUX)**

For more information about this feature refer to the PVS-100/120-TL product manual

## Description of the LED function

The LED functions on the inverter are described below.



-  **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 ABB 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.



*The LEDs, in various multiple available combinations, can signal multiple conditions other than the original single condition; see the various descriptions explained in the software manual.*

## User interface

### 1. ABB Installer for Solar Inverters

- Mobile APP improving multi inverter commissioning and system settings with ABB Installer for Solar Inverters APP.
- Compatible with Android devices.
- Updating of the inverter firmware.

### 2. Embedded Web User Interface

- Accessible via Wireless by using any WLAN enabled standard device (PC, smartphone, tablet,.....)
- Enables single inverter commissioning and parameters settings.
- Updating the inverter firmware.

### 3. Aurora Vision Plant Management Platform

Additional to any local user interfaces the inverter comes with capability enabling remote monitoring and managing via Aurora Vision Plant Management Platform cloud. Aurora Vision offer includes:

- Plant Portfolio Manager: web portal for solar professional.
- Plant Viewer: single web page for casual user.
- Plant Viewer for Mobile: mobile application for plant monitoring.
- Kiosk view: single HTML5 page for public visualization of plant data.
- API: web based tool for enabling the sharing of the data with a third party data.

## Commissioning



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.



The commissioning 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.



Before proceeding with commissioning, make sure you have carried out all the checks and verifications indicated in this document. Make sure that front covers are closed. Make sure irradiation is stable and adequate for the inverter commissioning procedure to be completed.

Commissioning could be carried out in two different ways:

• **Via ABB Installer for Solar Inverters APP**

Recommended mobile APP for commissioning single inverter as well as multi inverter solar plant.

• **Via Web UI (access point wireless network)**

Integrated Web User Interface enabling setting parameters and performing commissioning of a single inverter (multi inverter support is not provided).

Recommended as alternative method for performing single inverter commissioning.

### COMMISSIONING VIA ABB INSTALLER FOR SOLAR INVERTERS MOBILE APP

ABB Installer for Solar Inverters APP is the new advanced ABB mobile APP allow to simplify commissioning of large scale solar plant thanks to the capability to set parameters of multi inverter simultaneously.

Even in case of single inverter installation it can be consider the most suitable tool to be used.

ABB 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:

- ABB Installer for Solar Inverters APP installed on mobile device.

- Enabled installer account for ABB 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 consist of indicating which inverters are to be commissioned

Claiming process can be executed by taking pictures of QR codes of single inverter units (content in the Communication identification label)

(recommended); manual insertion both MAC address and related product keys of all the inverters to commission; scanning and selecting of SSIDs associated to the Wireless networks generated by each inverter to commission.

• Close the DC disconnect switches  to supply the inverter with input voltage from the photovoltaic generator.



Make sure irradiation is stable and adequate for the inverter commissioning procedure to be completed.

• Perform the installation wizard steps enabling the transferring the settings to all the claimed inverters.



For more details about the procedure for commissioning with the ABB Installer for Solar Inverters APP refer to dedicated documentation on the ABB solar website.




For any other specific settings of parameters of single inverters please refer to "Description of the Web User Interface" chapter.

After the commissioning via ABB Installer for Solar Inverters APP is completed, the inverter changes the behaviour of the "Power" and "Alarm" LEDs , 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.



The inverter is powered SOLELY by the voltage generated by the photovoltaic generator: the presence of grid voltage alone is NOT SUFFICIENT for the inverter to switch on.

• When the input voltage is sufficient to allow the connection to the grid, close the AC switch downstream of the inverter (and AC disconnect switch  for the -SX2, -SY2 wiring box version) the thus applying the grid voltage to the inverter: the inverter checks the grid voltage, measures 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 ONLY creates a parallel connection with the grid if the grid and isolation resistance parameters fall within the ranges foreseen by current regulations.

• If the outcome of the preliminary checks on the grid parallel is positive, the inverter connects to the grid and starts to export power to the grid. The "Power" LED remains fixed on while the "Alarm" and "GFI" LEDs are OFF.



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.abb.com/solarinverters](http://www.abb.com/solarinverters) or at <https://registration.abb-solarinverters.com> (instructions for registering on the website and updating the firmware are given in this manual).

## COMMISSIONING VIA WEB UI - WIRELESS CONNECTION

### Connection to the inverter - wireless

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.

- Close the DC disconnect switches (19) to supply the inverter with input voltage from the photovoltaic generator.



*Make sure irradiation is stable and adequate for the inverter commissioning procedure to be completed.*

- Once powered, the inverter will automatically create a wireless network (approx. 60 seconds after its switch-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 (MAC address can be found on the "Communication Identification Label" placed on the side of the inverter).



*The screens shown below pertain to a tablet with the Android operating system. Screens on other devices or operating systems may differ.*



- When required digit the PRODUCT KEY (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.



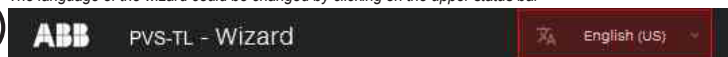
*In case of need, product key can be recovered by Aurora Vision Cloud or by calling ABB technical support.*

### Commissioning procedure - wireless connected

- 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.

Web User interface has easy commissioning wizard to commission the inverter.

*The language of the wizard could be changed by clicking on the upper status bar*



The required informations during the procedure are:

**Administrator account**

Admin

Username   
Required

Password   
Required

Confirm Password   
Re-enter Password  
Required

**User account**

User

Username   
Required

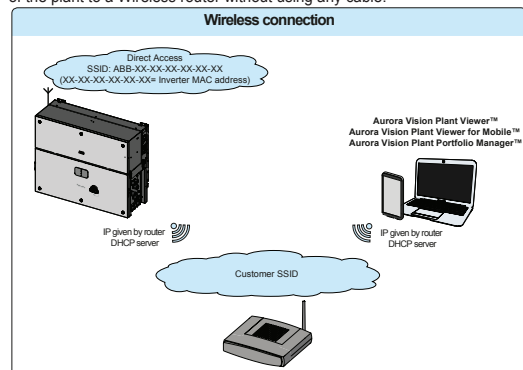
No user password

#### STEP 1 - Administrator/User login credentials

- Set the Administrator account user and password (minimum 8 character for password): Administrator account can open and view the contents of photovoltaic site. Additionally, they can make changes to inverter settings. User and password are CASE SENSITIVE.
- Set the User account user and (optional) password (minimum 8 character for password): User account can only read data. It cannot make any changes. User and password are CASE SENSITIVE.

**STEP 2 (Optional) - Wireless network connection.**

As described on chapter 2 the recommended way to get all the installed inverters to communicate to the internet and Aurora Vision Cloud is creating a cabled Ethernet daisy chain bus. Anyway, in case of a few inverters installation in suitable environment, it is also possible to connect each inverter of the plant to a Wireless router without using any cable.



The AP is still available and the user can connect to the inverter.

In this scenario the Router gives IPs according to its own rules.

Inverter is reachable by IP.

Domain name can be used only if the Router permits multicast.

During the installation wizard of the single inverter, the installer will be asked to connect the inverter to a Wireless router. By selecting connection to Wireless router the inverter will turn on a second Wireless radio channel in order to enable connection to the Wireless router. By selecting "Skip this step" button the other radio channel will be kept off.

Two Wireless radio channels enables simultaneous wireless connection; one static IP address connection between inverter and installer devices and one between inverter and switch/router.

Whatever means is used to connect the inverter to the router (Ethernet cable or Wireless) it will be always possible to access to the embedded web server also by connecting its own device to the same switch/router, and reaching the inverter (via second radio channel in case of Wireless connection with the router) by using the assigned IP address or inverter's host name.



*The IP address assigned to the inverter may vary or may be unknown. Please contact the IT administrator for getting the assigned IP address.*

*Differently from the assigned IP address, the «Host Name» of the inverter is unchangeable over time.*



*In order to use the «Host Name» as an alternative to the assigned IP address, for accessing to the inverters web server from the router the Domain Name System (DNS) service is needed to be available and activated.*

*The Host Name associated to each ABB inverters is structured as indicated below:*

*ABB-logger ID.LOCAL where: logger ID stands for the MAC address indicated on the "Communication identification label" applied on the inverter.*

The parameters relating to the customer wireless network (set on the router) that must be known and set during this step are:

**Wireless Network**

Skip this step

IP Settings

Available Network (SSID)

Required

Password

Show password

- IP Settings: DHCP or Static.

If you select the DHCP function (default setup) the router will automatically assign a dynamic IP address to the inverter whenever it tries to connect to the user network.

With Static, the user can assign a fixed IP address to the system. The data which has to be entered in order for IP static address assigning to take place will appear. Complete the additional fields at the bottom of the screen (all the fields are mandatory with the exception of the secondary DNS server).

- Available networks (SSID):

Identify and select your own (customer) wireless network from all those shown in the SSID field (you can carry out a new search of the networks that can be detected with the Update button ). Once the network has been selected, confirm.

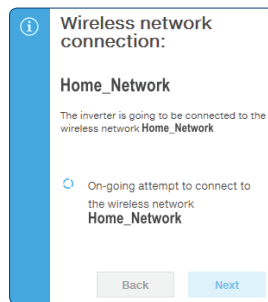
- Password: Wireless network password.

Enter the password for the destination network (if necessary) and start the connection attempt (it will take a few seconds).

Click on "Connect" button to connect the inverter to the home wireless network.



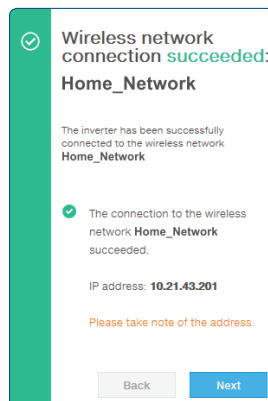
A message will ask for confirmation. Click "Next" to connect the inverter to the customer wireless network.



Once the inverter is connected to the customer wireless network, a new message will confirm that the connection is acquired.

The message provides the IP Address assigned by the home wireless network router to the inverter that can be used each time you want to access the Web User Interface, with the inverter connected to the home wireless network. Take note of it.

Click on "Next" button to proceed to the next stage of the configuration wizard.



*The IP address assigned may vary for reasons connected to the wireless home router setup (for example, a very brief DHCP lease time). If verification of the address is required, it is usually possible to obtain the client list (and the corresponding IP addresses) from the wireless router administration panel.*

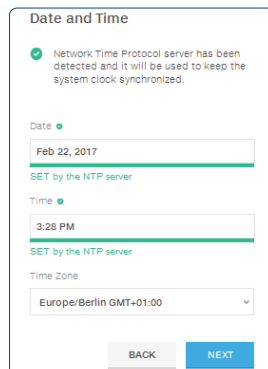
If the inverter loses the connection with the home wireless network (and therefore, loses the internet connection), it will once again enable its own access point.



*The most common causes of losing connectivity might be: different wireless network password, faulty or unreachable router, replacement of router (different SSID) without the necessary setting updates.*

### STEP 3 - Date, Time and Time zone

Set the Date, Time and Time zone (The inverter will propose these fields when available).



When it's not possible for the inverter to detect the time protocol, these fields have to be manually entered.

**Date and Time**

Network Time Protocol server has not been detected. Clock isn't synchronized. The displayed date and time come from the inverter or have been manually set up.

Please set the correct system date and time if needed.

Date and time will be automatically updated as soon as NTP server is available.

Date

Time  
 :  AM

Time Zone

Click on "Next" button to proceed to the next stage of the configuration wizard.

#### STEP 4 - Inverter country standard and Input configuration

- Country standard: selection of grid standard:  
Set the grid standard of the country in which the inverter is installed.



*From the moment that the grid standard is set, you have 24 hours to make any changes to the value, after which the "Country Select > Set Std." functionality is blocked, and the remaining time will have to be reset in order to have the 24 hours of operation available again in which to select a new grid standard (follow the procedure "Resetting the remaining time for grid standard variation" described in the relevant section).*

- Input mode:  
Only Independent configuration is available.

Confirm the settings by clicking "END" and the inverter will reboot.

A notification will confirm that the wizard is completed.

**Wizard completed**

Congratulations wizard successfully completed

**Country standard**

Grid Standard

Required

**Input mode**

PV Input Channels Configuration

- After the wizard is completed the inverter changes the behaviour of the "Power" and "Alarm" LEDs 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.



*The inverter is powered SOLELY by the voltage generated by the photovoltaic generator: the presence of grid voltage alone is NOT SUFFICIENT for the inverter to switch on.*

- When the input voltage is sufficient to allow the connection to the grid, close the AC switch downstream of the inverter (and AC disconnect switch for the -SX2, -SY2 wiring box version) the thus applying the grid voltage to the inverter: the inverter checks the grid voltage, measures 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.

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	PVS-100-TL	PVS-120-TL
<b>Input</b>		
Absolute maximum input voltage (V <sub>max,abs</sub> )	1000 V	
Input start-up voltage (V <sub>start</sub> )	420 V (400 - 500 V)	
Input operating interval (V <sub>dcm,...</sub> V <sub>dcm,ax</sub> )	360 - 1000V	
Rated input voltage (V <sub>dcr</sub> )	620 Vdc	720 Vdc
Input nominal power(P <sub>dcr</sub> )	102000 W	123000 W
Number of independent MPPT	6	
MPPT DC voltage range (V <sub>MPPTmin</sub> ... V <sub>MPPTmax</sub> ) to P <sub>acr</sub>	480 - 850 Vdc	570 - 850 Vdc
Maximum DC input power for each MPPT (P <sub>mppt,max</sub> )	17500 W [480V≤V <sub>MPPT</sub> ≤850V]	20500 W [570V≤V <sub>MPPT</sub> ≤850V]
Maximum DC input current for each MPPT (I <sub>dcm,ax</sub> )	36 A	
Maximum short circuit current for each MPPT (I <sub>sc,ax</sub> )	50 A	
Maximum return current (AC side vs DC side)	Negligible in normal operating conditions <sup>(1)</sup>	
Number of DC input pairs for each MPPT	4	
Type of input DC connectors	PV quick fit connector <sup>(2)</sup>	
Type of photovoltaic panels that can be connected at input according to IEC 61730	Class A	
<b>Input protection</b>		
Reverse polarity protection	Yes, from current limited source	
Input over voltage protection for each MPPT - modular surge arrester	Type II with monitoring only for SX and SX2 versions; Type I+II with monitoring only for SY and SY2 versions	
Photovoltaic array isolation control	as per IEC62109	
DC switch rating for each MPPT	50 A / 1000 V <sup>(3)</sup>	
Fuse rating (versions with fuses)	15 A (gPV/1000 Vdc) <sup>(4)</sup>	
String current monitoring	SX2, SY2: Individual string current monitoring (24ch); SX, SY: Input current monitoring per MPPT (6ch)	
<b>Output</b>		
AC Connection to the grid	Three phase 3W+PE or 4W+PE	
Nominal AC Output Power (P <sub>acr @cosφ=1</sub> )	100 000 W	120 000 W
Maximum AC Output Power (P <sub>acmax @cosφ=1</sub> )	100 000 W	120 000 W
Maximum apparent Output power (S <sub>max</sub> )	100 000 VA	120 000 VA
Rated AC Output Voltage (V <sub>acr</sub> )	400 V	480 V
Output voltage range (V <sub>acmin</sub> ...V <sub>acmin</sub> )	320...480 V <sup>(5)</sup>	384...576 V <sup>(5)</sup>
Maximum output current (I <sub>acmax</sub> )	145 A	
Contribution to short-circuit current	155 A	
Rated Output Frequency (fr)	50 Hz / 60 Hz	
Output Frequency Range (f <sub>min</sub> ...f <sub>max</sub> )	45...55 Hz / 55...65 Hz <sup>(6)</sup>	
Nominal power factor and setting interval	> 0.995, 0...1 inductive/capacitive with maximum S <sub>max</sub>	
Total harmonic distortion of current	<3%	
Maximum AC cable section allowed	185 mm <sup>2</sup> copper/aluminum	
AC Connections Type	Busbar for lug connections with M10 bolts (provided); Single core cable gland plate with 5 individual AC cable glands: 4 x M40: Ø 19...28mm (with reduced cable entry 15...23mm), 1 x M25: Ø 10...17mm	
<b>Output protection</b>		
Anti-islanding Protection	Active frequency drift combined with RoCoF techniques as per IEC 62116	
Maximum external AC overcurrent protection	225 A	
Output overvoltage protection - Modular surge arresters	Type 2 with monitoring	
<b>Operating performance</b>		
Maximum Efficiency (η <sub>max</sub> )	98.4%	98.9%
Weighted Efficiency (EURO)	98.2%	98.6%
<b>Communication</b>		
Embedded communication interfaces	1x RS485, 2x Ethernet (RJ45), WLAN (IEEE802.11 b/g/n @ 2.4 GHz)	
User Interface	4 LEDs, Web User Interface, Mobile APP	
Communication protocol	Modbus RTU/TCP (Sunspec compliant)	
Commissioning tool	Web User Interface, Mobile APP	
Remote monitoring services	Aurora Vision <sup>®</sup> monitoring portal	
Advanced features	Embedded logging, direct telemetry data transferring to ABB cloud	
<b>Environmental</b>		
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	
Typical noise emission pressure	68 dB(A) @ 1 m	
Maximum operating altitude	2000 m / 6560 ft	
Environmental pollution degree classification for external environments	3	
Environmental class	Outdoor	
Climatic category according to IEC 60721-3-4	4K4H	

	PVS-100-TL	PVS-120-TL
<b>Physical</b>		
Environmental Protection Rating	IP 66 (IP54 for the cooling section)	
Cooling System	Forced air	
Dimensions (H x W x D)	867x1086x419 mm / 34.2"x42.7"x16.5" for -SX model 867x1086x458 mm / 34.2"x42.7"x18.0" for -SX2 model	
Weight	70kg / 154 lbs for power module ; ~55kg / 121 lbs for Wiring box Overall max ~125 kg / 276 lbs	
Assembly System	Mounting bracket vertical & horizontal support	
Overvoltage rating as per IEC 62109-1	II (DC input) III (AC output)	
<b>Safety</b>		
Safety class	I	
Insulation Level	Transformerless	
Marking	CE <sup>(8)</sup>	
Safety, EMC and Radio Spectrum Standards	IEC/EN 62109-1, IEC/EN 62109-2, EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-3-11, EN 61000-3-12, EN 301 489-1, EN 301 489-17, EN 300 328, EN 62311	
Grid Standards (check the availability with your sales channel)	CEI 0-16, CEI 0-21 <sup>(7)</sup> , IEC 61727, JORDAN IRR-DCC-MV, G59/3, VDE-AR-N 4105 <sup>(7)</sup> , DIN V VDE V 0126-1-1, EN 50438 (including Ireland national requirements), IEC 62116, AS/NZS 4777.2, CLC-TS 50549-1, CLC-TS 50549-2, VFR 2014	
Other Standards	UTE C 15-712-1, IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-14, IEC 60068-2-30, IEC 60068-2-78, IEC 61683, P.O. 12.3, ITC-BT-40	
<b>Accessories</b>		
Assembly accessories	PVS Installation Kit AC multicore cable gland plate (Supports M63 Ø 34...45mm + M25 Ø 10...17mm) AC multicore cable gland plate (Supports M63 Ø 37...53mm + M25 Ø 10...17mm)	

- In the event of a fault, limited by the external protection envisaged on the AC circuit
- Please refer to the document "String inverters – Product manual appendix" available at [www.abb.com/solarinverters](http://www.abb.com/solarinverters) for information on the quick-fit connector brand and model used in the inverter.
- 75A 5 cycles according to standard IEC60947.3 Table D.5
- Maximum fuse size supported 20 A. Additionally two specific string inputs per MPPT supports 30 A fuse sizes for connecting two strings per input
- The output voltage range may vary according to the grid standard of the country of installation
- The output frequency range may vary according to the grid standard of the country of installation
- Only available for PVS-100-TL model.
- Hereby, Power-One Italy S.p.A. (A Member of the ABB Group) declares that the radio equipments, to which this Quick Installation Guide 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.abb.com/solarinverters](http://www.abb.com/solarinverters).

**Note. Features not specifically mentioned in this data sheet are not included in the product**

## Tightening torques

To maintain the IP66 protection of the system and for optimal installation, the following tightening torques must be used:

### Tightening torques

Single core AC cable gland <sup>(11)</sup> M40	5 Nm
Single core PE cable gland <sup>(11)</sup> M25	5 Nm
Multi core AC cable gland <sup>(11)</sup> M63 (type 1)	18 Nm
Multi core AC cable gland <sup>(11)</sup> M63 (type 2)	18 Nm
Service cable gland <sup>(12)</sup> M25	5 Nm
AC connection busbar <sup>(21)</sup> bolts	25 Nm
AC interface power connector (male) <sup>(24)</sup> screws	3 Nm
DC interface connector (male) <sup>(17)</sup> screws	3 Nm
Protective earth point (int.) <sup>(25)</sup> nut	21 Nm
Protective earth point (ext.) <sup>(10)</sup> nut	12 Nm
Junction screws <sup>(18)</sup>	12 Nm
Side bracket screws	5 Nm
Interface signal connector counterparts <sup>(32)</sup> <sup>(34)</sup> <sup>(35)</sup>	0.25 Nm

## Cable gland clamping range

### Cable gland clamping range

Single core AC cable gland <sup>(11)</sup> M40	19...28mm
Single core PE cable gland <sup>(11)</sup> M25	10...17mm
Multi core AC cable gland <sup>(11)</sup> M63 (type 1)	34...45mm
Multi core AC cable gland <sup>(11)</sup> M63 (type 2)	37...53mm
Service cable gland <sup>(12)</sup> M25	10...17mm

## Further information

For more information on ABB solar products and services,  
visit [www.abb.com/solarinverters](http://www.abb.com/solarinverters)

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