SOLAR INVERTERS

Quick Installation Guide

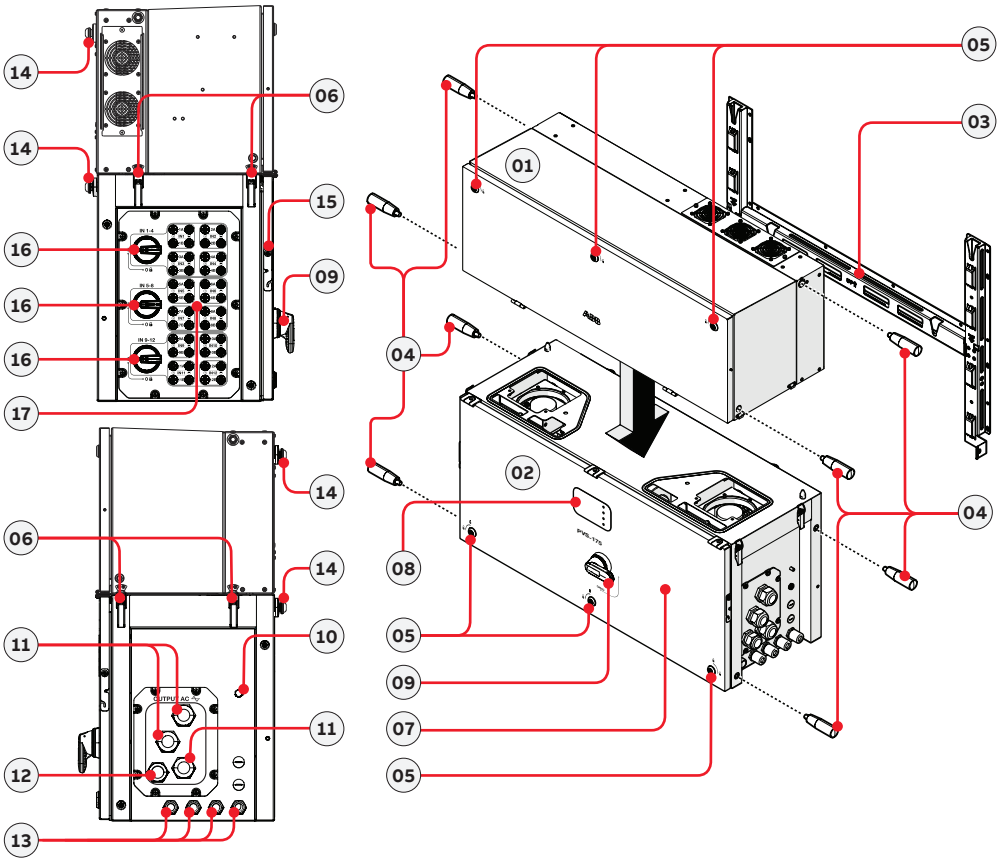
PVS-175-TL (175.0 kW)

Table of contents

Reference number index

01	Power module	**16**	DC disconnect switches	**31**	Interface signal connector (female)
02	Wiring box	**17**	DC input quick fit connectors	**32**	AC interface power connector (female)
03	Mounting bracket	**18**	DC interface connectors (male)	**33**	Alarm terminal block
04	Handles	**19**	Logic interface connector (male)	**34**	RS485 ABB service 120Ohm termination res. (service only)
05	Cover quarter cam locks	**20**	Junction screws	**35**	DRM0 activation switch
06	Side latch	**21**	DC surge arrester plate	**36**	RS485 line 120Ohm termination res.
07	Front wiring box cover	**22**	AC connection busbar	**37**	ABB RS485 service Ethernet connector (RJ45) (service only).
08	Status LEDs	**23**	AC overvoltage surge arresters	**38**	Remote ON/OFF terminal block
09	AC disconnect switch (-SX2, -S2 only)	**24**	Interface signal connector (male)	**39**	RS485 line terminal block
10	Protective earth point (ext.)	**25**	AC interface power connector (male)	**40**	Ethernet connector 2 (RJ45)
11	Phases cable glands	**26**	Protective earth point (int.)	**41**	Ethernet connector 1 (RJ45)
12	Protective earth cable gland	**27**	AC protective shield	**42**	USB connector
13	Service cable gland	**28**	Communication and control board	**43**	SD card slot
14	Rear pins for bracket assembly	**29**	DC interface connectors (female)	**44**	CR2032 Backup battery
15	Cover support brackets	**30**	Logic interface connector (female)		

PVS/175-TL (external view)



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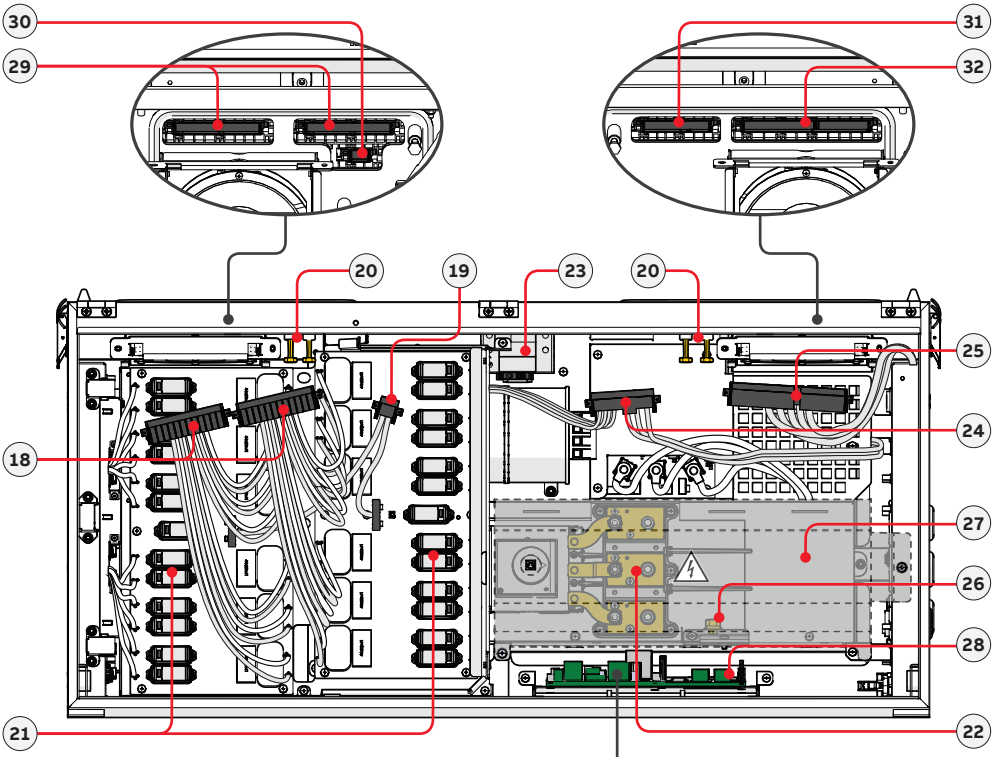
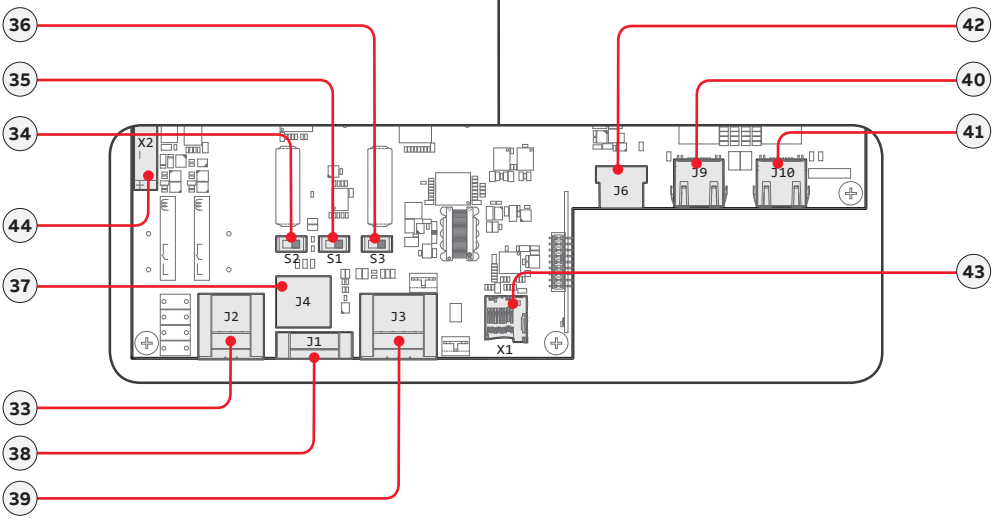
Wiring Box (internal view)



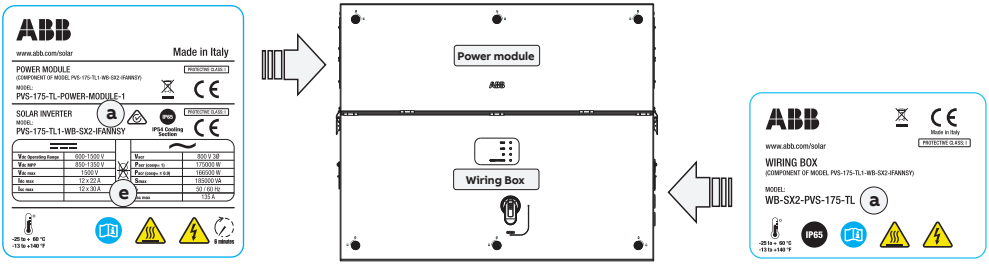
Communication Board

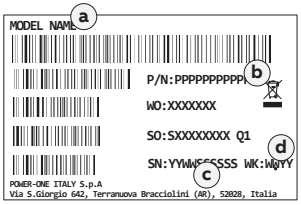


Labels and Symbols

The labels on the inverter and on wiring box have the Agency marking, main technical data and identification of the equipment and manufacture

The labels shown below have to be intended as example only.

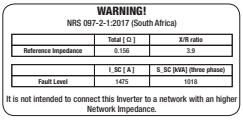




a	Inverter/wiring box model
b	Inverter/wiring box Part Number
c	Inverter/wiring box Serial Number
d	Week/Year of manufacture
e	Main technical data

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).

f	WLAN embedded board Serial Number
g	WLAN embedded board Part Number
h	MAC address - To be used to obtain the SSID of the wireless access point created by the inverter: ABB-XX-XX-XX-XX-XX-XX(where "X" is a hex digit of the MAC address). - To be used to obtain the "Host Name": http://ABB-XX-XX-XX-XX-XX-XX.local (where "X" is a hex digit of the MAC address). - MAC address it's the only required information to register the inverter with Aurora Vision.
i	Product Key To be used as wireless access point password, or to be used to access to the Web UI as username and password in case of lost credentials, and to commission inverter using ABB Installer for Solar Inverters.



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.

The labels attached to the equipment must NOT be removed, damaged, dirtied, hidden,etc...
If the Admin Plus password is requested, the field to be used is the power module serial number -SN: YYWWSSSSSS-

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
IP 65	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

Models and range of equipment

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-S-PVS-175-TL	Input with 24 quick fit connectors pairs (2 each MPPT) **(17)** + DC side varistor **(21)** + DC disconnect switches **(16)**
WB-S2-PVS-175-TL	Input with 24 quick fit connectors pairs (2 each MPPT) **(17)** + DC side varistor **(21)** + DC disconnect switches **(16)** + AC disconnect switch **(09)**
WB-SX-PVS-175-TL	Input with 24 quick fit connectors pairs (2 each MPPT) **(17)** + SPD Type 2 Pluggable Cartridges (DC & AC) **(21) (23)** + DC disconnect switches **(16)**
WB-SX2-PVS-175-TL	Input with 24 quick fit connectors pairs (2 each MPPT) **(17)** + SPD Type 2 Pluggable Cartridges (DC & AC) **(21) (23)** + DC disconnect switches **(16)** + AC disconnect switch **(09)**

Power Module

Model Number	Description
PVS-175-TL-POWER-MODULE-1	Inverter section / power module with precharge
PVS-175-TL-POWER-MODULE-2	Inverter section / power module without precharge

Lifting and transport

Transport and handling

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

Unpacking and checking

The components of the packaging must be disposed on 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/lb)	Lifting points	Holes or Eyebolts UNI2947
Power module	76 kg	4	M12. Kit of handles **(04)** and eyebolts (to be ordered)
Wiring box	~ 77 kg	4	M12. Kit of handles **(04)** and eyebolts (to be ordered)

Lifting

Risk of injury due to the heavy weight of the equipment!

ABB usually stores and protects individual components by suitable means to make their transport and subsequent handling easier. Nonetheless, as a rule, it is necessary to turn to the experience of specialised staff to take charge of loading and unloading components.

The power module and the wiring box must be lifted using the 4 handles **(04)** or alternatively using suitable lifting equipment. The means used for lifting must be suitable to bear the weight of the equipment.

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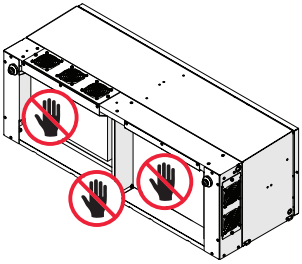
In case of manual lifting the number of required operators necessary to lift the equipment must be in accordance to local regulations relating lifting limits per operator

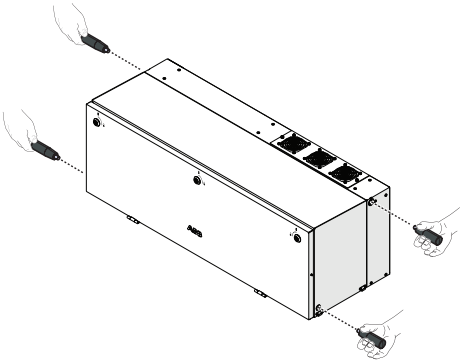
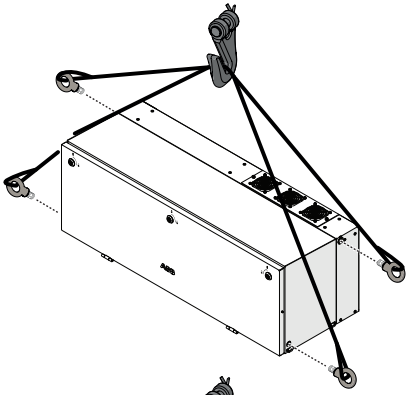
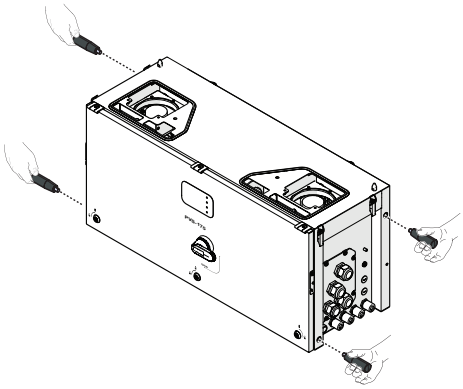
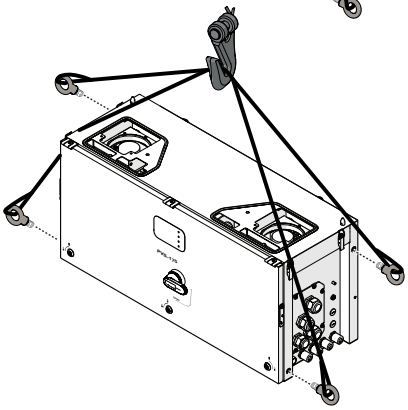
The handles **(04)** must be mounted into the designated holes located on the enclosures; If lifting with ropes, M12 eyebolts must be mounted in the same holes.

Handling and installation operations shall be performed only by using the special tools and accessories provided with "PVS-175 Installation Kit" that have to be ordered separately. The use of these equipment are mandatory to safely install the inverter. Refer to "Kit of recommended spare parts" chapter content in the user manual for further information.

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



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

Manual lifting (handles)	Ropes lifting (eyebolts)
	
	

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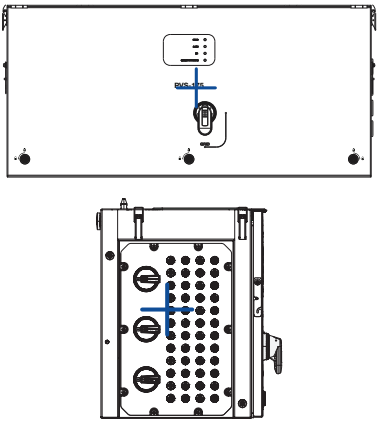
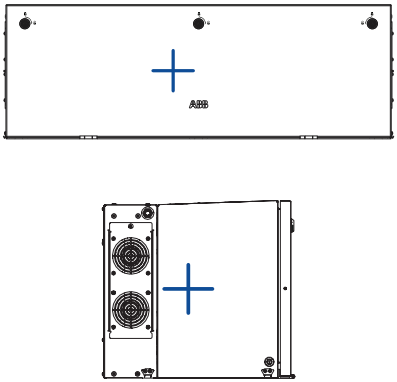
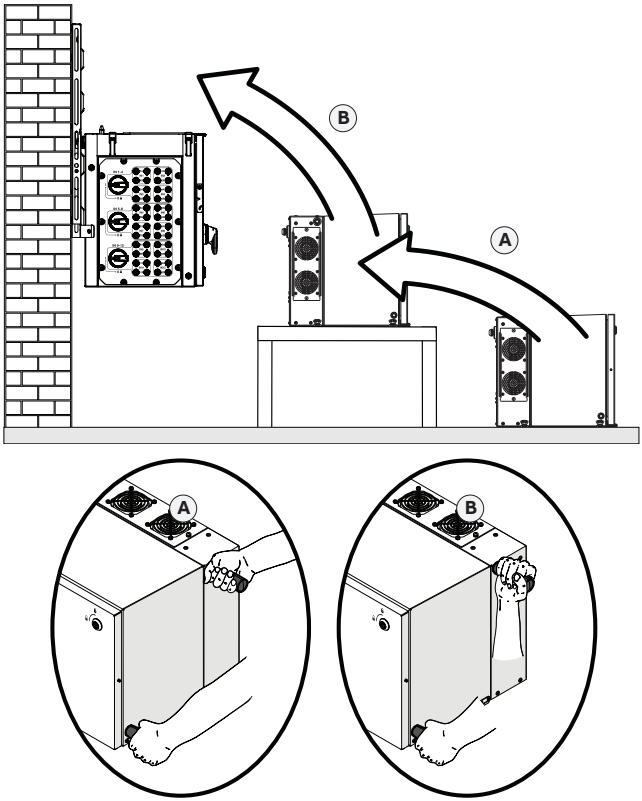
Always consider the center of gravity of the enclosures while lifting.

Center of gravity (wiring box)	Center of gravity (power module)
	

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



List of supplied components

Available components for wiring box		Quantity
	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)**)	3
	Two-hole gasket for M25 signal cable glands **(13)** and cap	4 + 4

Available components for wiring box		Quantity
	Key tool for front cover quarter cam-lock **(05)**	1
	Technical documentation	-

Available components for bracket		Quantity
	M8 screws with washers for mechanically securing the half-brackets	2
	M6 screws for mechanically securing the wiring box to the bracket	2

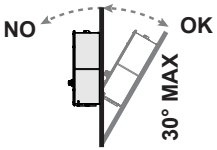
Choice of installation location

General recommendation on installation position

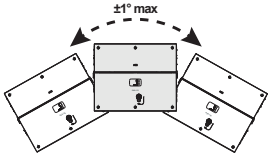
- See characteristics and technical data paragraph to check the required environmental conditions (protection rating, temperature, humidity, altitude, etc.).
- The installation location shall be easily accessible.
- Installation of the unit in a location exposed to direct sunlight NOT acceptable. (Add 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 in locations where flammable substances or gases may be present.
- Do not install on wooden walls or other flammable supports.
- Install on a wall or strong structure suitable to bear the weight.
- Do not install in rooms where people live or where the prolonged presence of people or animals is expected, because of the high noise that the inverter produces during operation. The level of the sound emission is heavily influenced by where the appliance is installed (for example: the type of surface around the inverter, the general properties of the room, etc.) and the quality of the electricity supply.
- 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 with a maximum inclination as indicated in the figures beside.



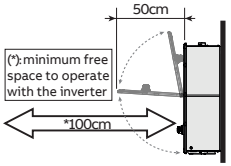
Vertical Tilting



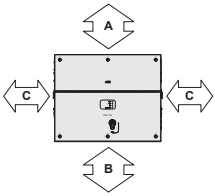
Side Tilting

Distances

- Hardware and software maintenance on device entails removing the front cover. Check that the correct installation safety distances are observed in order to allow routine check and maintenance operations.
- Provide sufficient working space in front of the inverter that allows to open the front cover **(07)** and to make connections on the wiring box.
- 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 **(08)** 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.



MINIMUM CLEARANCE DISTANCES

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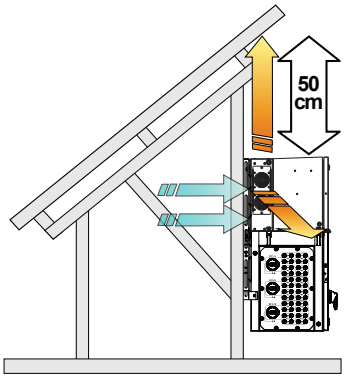
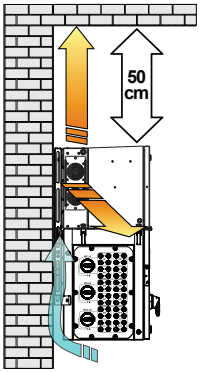
The minimum clearance distances depends from multiple factor:

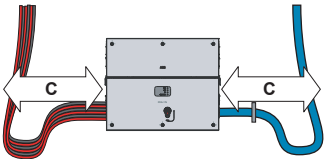
- **Ventilation flow on the top side of the inverter.** The upper **(A)** minimum required free space must be 50 cm.





- **Possible flooding or damage during grass cutting.** It changes the bottom **(B)** required free space: If the inverter is installed in a place where there are risks of flooding or there is need to cut the grass growing underneath the unit, the bottom **(B)** minimum recommended free space is 50 cm; otherwise in case the inverter is installed in a place where there's no risks of flooding or grass cutting evenience, the bottom **(B)** minimum required free space can be reduced to 15 cm.

- **Cables bending radius.** Sides **(C)** minimum required free space may depends from cable type (cable dimension, bending radius, etc..): this evaluation must be done by the installer during the plant design phase (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 on the right side and 30cm on the left side.

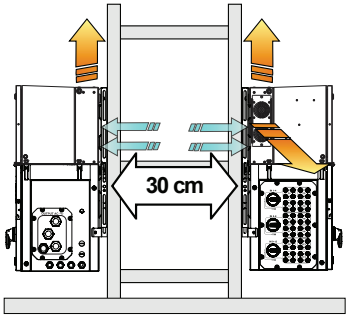


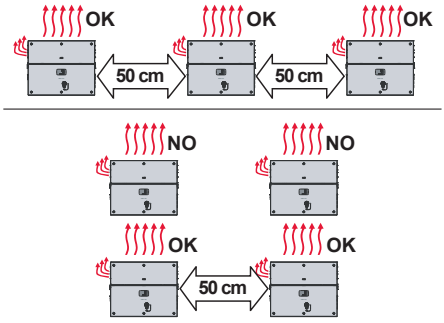
In case of manual installation (using handles (04)) consider a free side space to lift the inverter of 60 cm minimum.

In case of installation with lifting equipments (eyebolts and ropes) the side distances (C) could be reduced at the minimum required but a subsequent manual lifting it will no longer be possible: in this case the lifting equipments must remain available on the field for any subsequent operation.

Installation of multiple units

- When installing multiple units position the inverters side by side paying attention to keep the minimum clearance distances (measured from the outer edge of the inverter) for each inverter specified in the following graph.
- The installation of two inverters positioned back to back is also permitted on a structure which must be composed of a 2 or 3 frame supports (refer to "Mounting with a support bracket" chapter). In this case the minimum recommended distance between the units in order to avoid the use of an air deflector is 30cm.



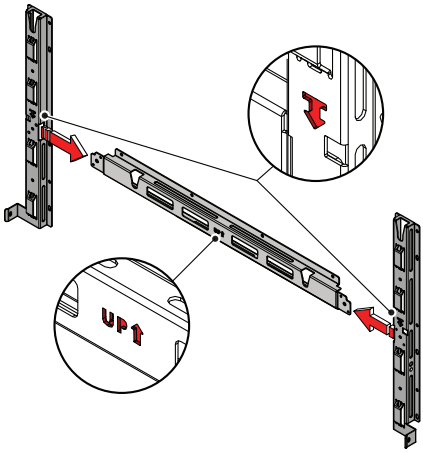


Please refer to the warranty terms and conditions to evaluate any possible warranty exclusions due to improper installation.

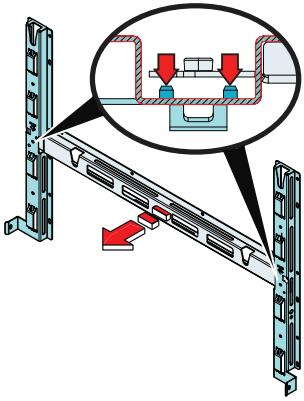
Mounting Instructions

Bracket assembly

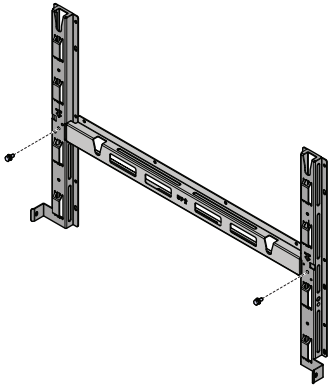
- Assembly the two side bracket pieces together with the central bracket, by sliding it as shown in the picture and paying attention to the orientation of the pieces (refer to arrow and “UP” markings on the brackets): side brackets arrow have to be turned downwards, central bracket have to be turned 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 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 (4x153Kg=612Kg for all models).



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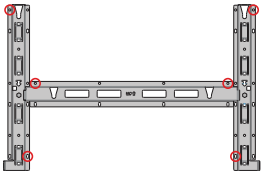
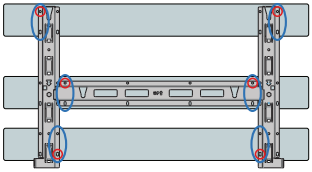
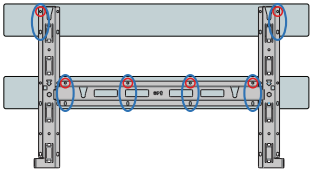
- Attach the bracket **(03)** to the support with at least 6 attachment screws (shown in RED) or at least 6 frame fixing bracket for frame mounting (shown in BLUE).
- Depending on the type of anchor chosen, drill the required holes to mount the bracket **(03)**. The pictures shown the recommended minimum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



Wall/Floor mounting
minimum fixing points

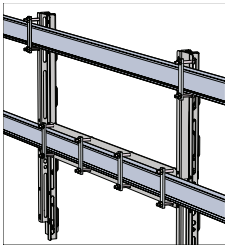


Frame mounting (3 supports)
minimum fixing points



Frame mounting (2 supports)
minimum fixing points

- In case of use of “frame fixing brackets” (see beside picture as example) it will be possible to fix the bracket **(03)** to the frame structure without drill any additional holes.



Frame fixing brackets

- Fix the bracket **(03)** to the support.

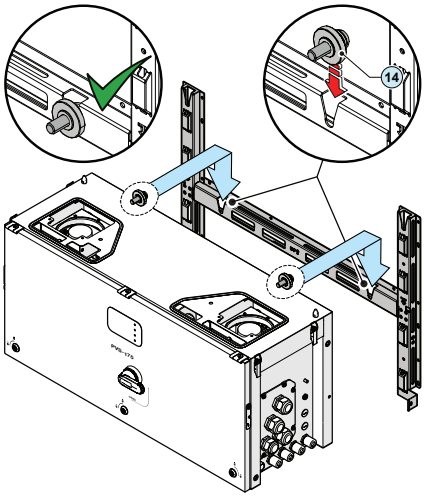
Assembly the Inverter to the bracket

Handling and installation operations shall be performed only by using the special tools and accessories provided with “PVS-175 Installation Kit” that have to be ordered separately. The use of these equipment are mandatory to safely install the inverter. Refer to “Kit of recommended spare parts” chapter content in the user manual for further information.

- Lift the wiring box up to the bracket **(03)** using the handles **(04)** or the M12 eyebolts.

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

- Insert the heads of the two rear attachment pins **(14)** (placed on the rear part of the wiring box) into the two slots on the bracket **(03)**. Check that the pins **(14)** has been correctly inserted in the slots as shown in the picture before releasing the wiring box.
- Remove the handles **(04)** or eye bolts.



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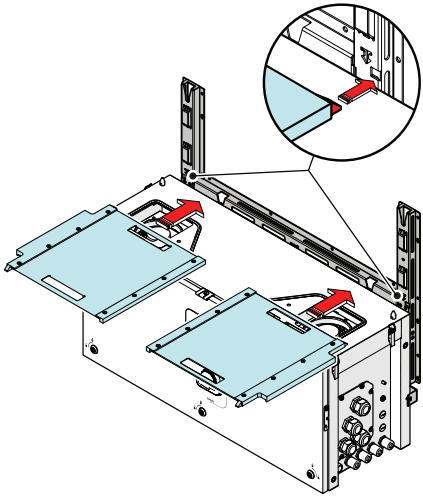
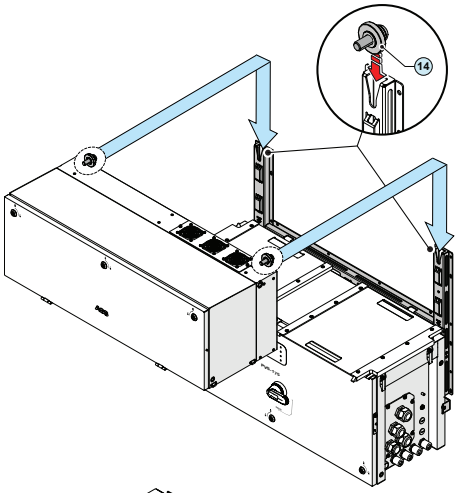
- Insert the two gasket protective covers sliding the positioning pins (shown in red in the picture) into the proper bracket **(03)** holes. If the mounting is correct the gasket protective cover will have a locked position.



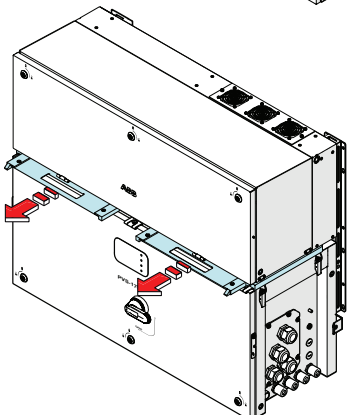
- Lift the power module up to the bracket **(03)** and over the wiring box, using the handles **(04)** or the M12 eyebolts.

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

- Insert the heads of two rear attachment pins **(14)** (placed on the rear part of the power module) into the slots on the bracket **(03)**.



- Remove the previously installed gasket protective covers from the inverter by slinding it pulling from the handles.



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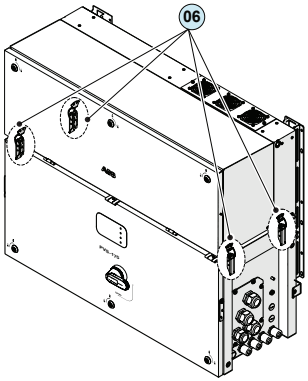
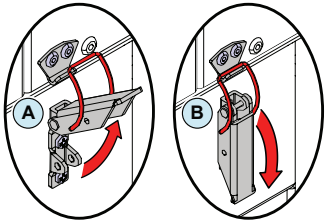
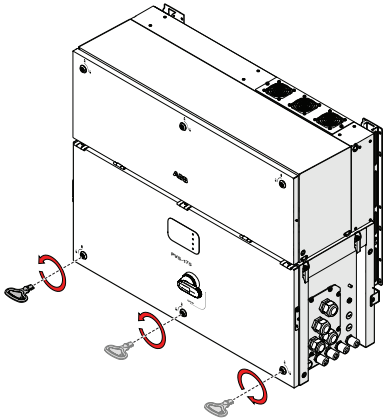


- Fasten all of the four side closures (latches) **(06)** as shown it the pictures.

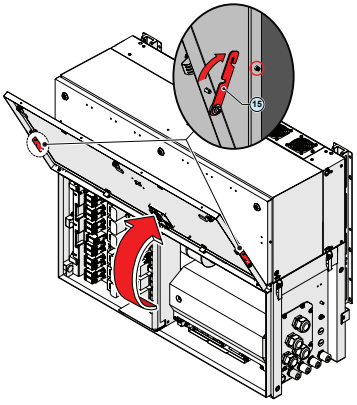
Risk of injury due to the heavy weight of the equipment. Always consider the center of gravity of the enclosures while lifting.



Opening the cover



- Using the key tool provided with the 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 **(07)**.
- (only for -S2, -SX2 version) Set the wiring box AC disconnect switch **(09)** to OFF position; otherwise it will not be possible to open the front cover **(07)**.



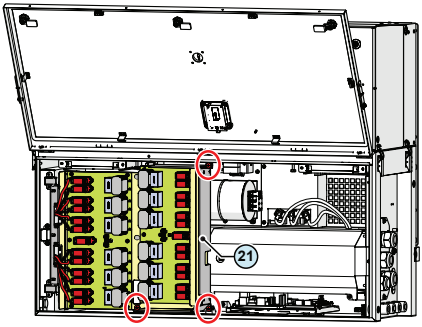
- Open the cover **(07)** and use the cover support brackets **(15)** to lock the cover **(07)** in open position.

Pay attention to properly secure the cover support brackets (15) in order to avoid falling of the cover

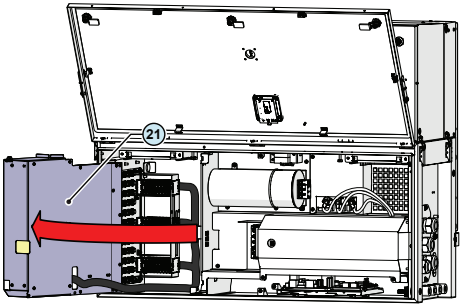
(Continue to next page)

Final fastening operations

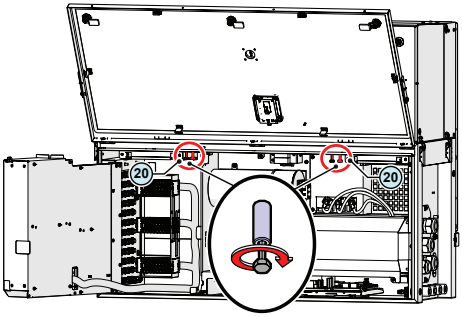
In order to reach the four junction screws **(20)** and complete the power module and wiring box mating, the DC surge arrester plate **(21)** have to be opened as follow:



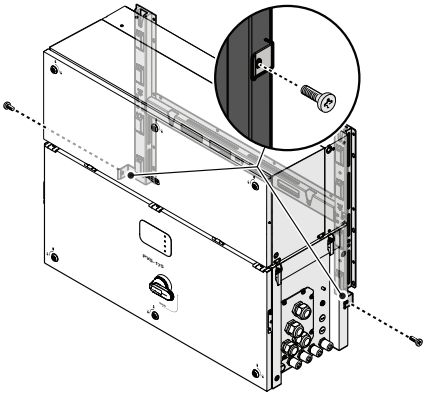
- Remove the three M5 screws from the DC surge arrester plate **(21)**.



- Rotate the DC surge arrester plate **(21)** as shown in the picture below.



- Tighteen the four hexagonal junction screws **(20)** with a tightening torque of 12 Nm.
- Close the DC surge arrester plate **(21)** using the three M5 screws previously removed.



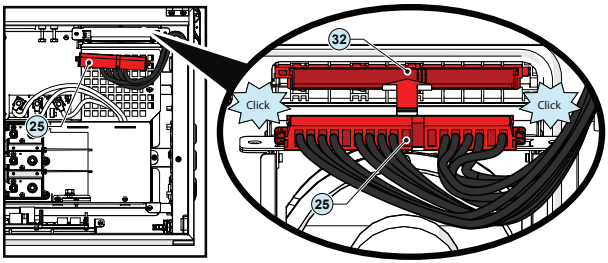
- Tighteen the two side screws (supplied) with a tightening torque of 5 Nm, to avoid the tilting of the bottom part of the inverter.

(Continue to next page)

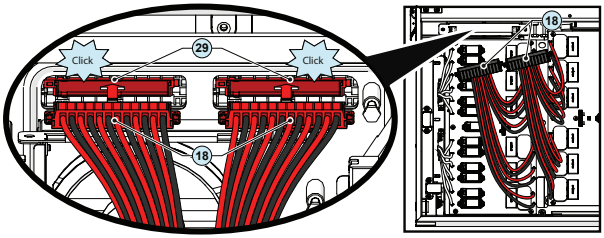
Connection of the interface connectors

Last operation before proceeding with the wiring and connections of AC and DC sources is to connect the five interface connectors that allow the power and communication connection between the power module and the wiring box:

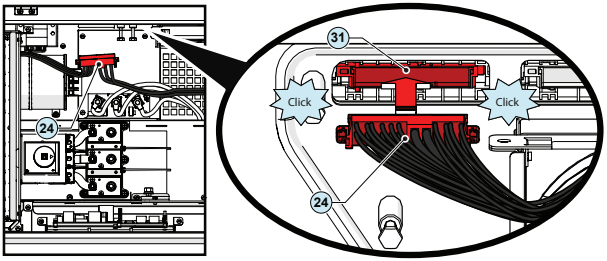
- Connect the AC interface power connector (male) **(25)** with the related AC interface power connector (female) **(32)** (push the connector until you hear a locking “click”).



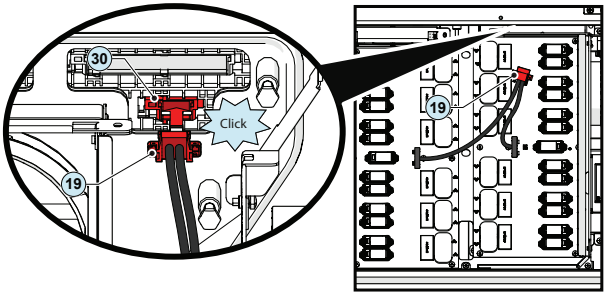
- Connect the DC interface power connectors (male) **(18)** with the related DC interface power connectors (female) **(29)** (push the connector until you hear a locking “click”).



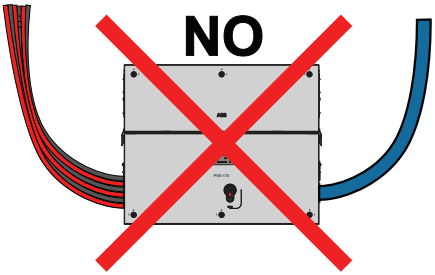
- Connect the signal interface connector (male) **(24)** with the related signal interface connector (female) **(31)** (push the connector until you hear a locking “click”).



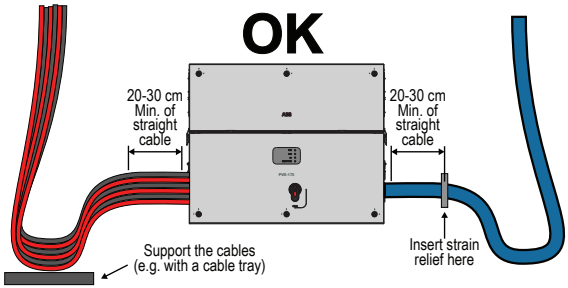
- Connect the logic interface connector (male) **(19)** with the related logic interface connector (female) **(30)** (push the connector until you hear a locking “click”).



Routing the cable to the inverter

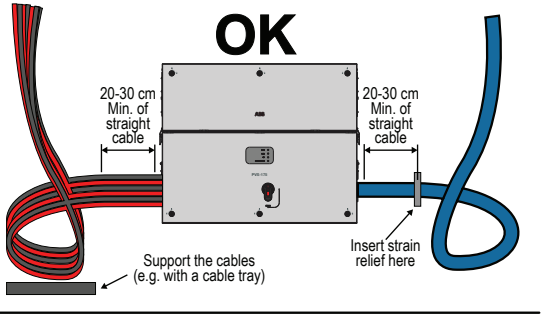


The cable routing have to be done in order to avoid water dripping to the AC panel cable glands **(11)** **(12)**, DC input quick fit connectors **(17)** or to service cable glands **(13)**.

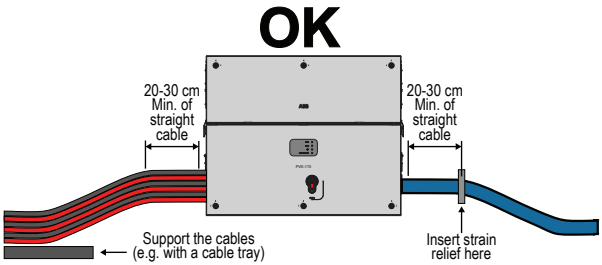


Expecially when coming from the top, the cables must be routed in order to create a loop: in this way the water that flows on the cables will be drained.

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



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

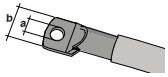


Characteristics of the protective grounding cable

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 sectional area of the protective earthing conductor must be at least 1/2 of phase conductors cross sectional area.**

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.) **(26)**, 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 **(26)** or external **(10)**) where it will be connected:

	Protective earth point (int.) (26)	Protective earth point (ext.) (10)
Cable diameter range	18 - 25 mm	-
Max. conductor cross section	185 mm² copper / 240 mm² aluminium	-
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

Line cable and protection devices

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

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

	Load protection breaker requirements	
Type	Automatic circuit breaker with thermal-magnetic protection	Fuses switch disconnector
Nominal Voltage	800 V / 150 A (*)	800 V / 200 A (*)
Magnetic protection characteristic	Magnetic curve B/C	gG, gS
Number of poles	3	3

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

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

	residual current protection device requirements
Type	A / AC
Sensitivity	2.0 A

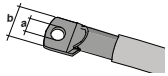
ABB declares that the ABB transformerless inverters, in terms of their construction, do not inject continuous ground fault currents and therefore there is no requirement that the differential protection installed downstream of the inverter be type B in accordance with IEC 60755 / A 2.

Characteristics and sizing of the line cable

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

- Single-core configuration have 3xM40 cable glands for the "R", "S", "T" phases and a M32 cable gland **(12)** for the grounding cable.
- Multi-core configuration (optional) have a M63 cable gland **(11)** for the "R", "S", "T" phases and a M32 cable gland **(12)** for the grounding cable.

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

	Single conductor cable	Multipolar cable
Cable diameter range	22 - 32 mm	37 - 53 mm
Min. conductor cross section	50 mm²	
Cable lug dimensioning 	for M10 Stud a = 10.5 mm (min) b = 40 mm (max)	

The AC connection busbars (22) 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.

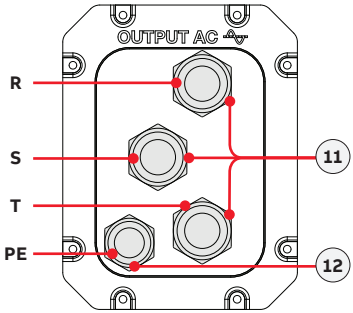
Output connection (AC)

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

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

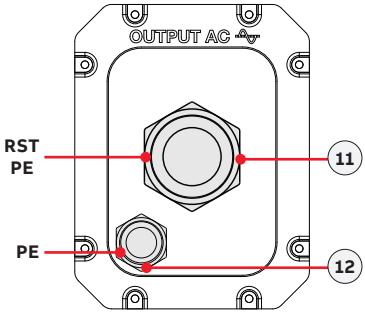
Routing of the AC cables inside the inverter must be carried out from the right side of the inverter.
Depending of the version of the AC panel installed on the inverter it will be necessary to route the AC output and ground cables into different ways:

- **Single-core configuration (default):** 3xM40 cable glands **(11)** for the "R", "S", "T" phases and a M32 cable gland **(12)** 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 **(22)**)
  S = Phase S (indicated with a label near the AC connection busbar **(22)**)
  T = Phase T (indicated with a label near the AC connection busbar **(22)**)

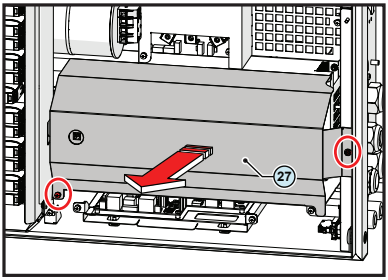


The ground connection can be made using the Protective earth point (int.) **(26)**, Protective earth point (ext.) **(10)** or both (this is required by regulations in force in certain countries of installation).
⏚ = Ground (indicated with the protective earth symbol ⏚ near the protection earth connection point (int.) **(26)** or protection earth connection point (ext.) **(10)**).

- **Multi-core configuration (optional):** one M63 cable gland **(11)** for the "R", "S", "T" phases and a M32 cable gland **(12)** for the grounding cable.
  This version of the AC panel can be ordered separately. Refer to "Kit of recommended spare parts" chapter on user manual for further information.



Follow the procedure below to route all the cables:
• Open the wiring box front cover **(07)**.
• Remove the AC protective shield **(27)** by removing the M5 screw.



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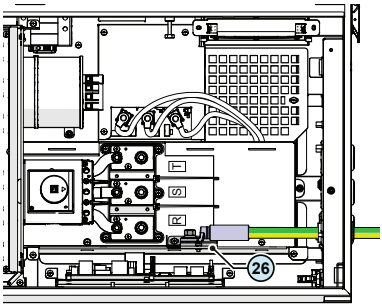
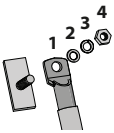
Depending on the ground connection method (internal **(26)** or external **(10)**) follow the procedures described below:

- Internal ground connection:
  - Pass the protective earth cable trought the proper cable gland **(12)** on the AC panel.
  - Fix the protective earth cable lug to the protection earth connection point (int.) **(26)** using the washers and bolt pre-installed on the M10 stud, as shown in the following installation sequence:

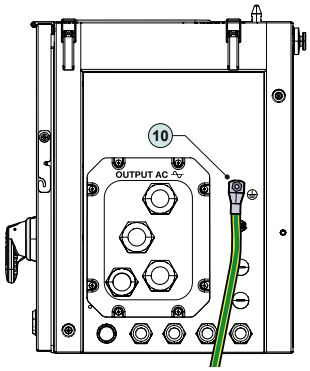


Installation sequence:
1 cable lug
2 flat washer
3 spring washer
4 M10 nut

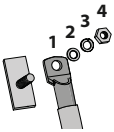


The cable lug must be installed with a minimum tightening torque of 21Nm.

- 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 installation sequence:



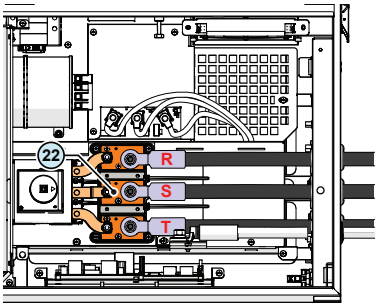
Installation sequence:
1 cable lug
2 flat washer
3 spring washer
4 M8 nut



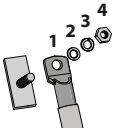
The cable lug must be installed with a minimum tightening torque of 21Nm.

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 handles thread (04) on the housing of power module.

- Pass the AC cables trought the cable glands **(11)** on the AC panel.
- Fix the R, S and T cable lugs to the AC connection busbars **(22)**, 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 installation sequence:



Installation sequence:
1 cable lug
2 flat washer
3 spring washer
4 M10 nut



The cable lugs must be installed with a minimum tightening torque of 25Nm.

In case of a wrong phase sequence the inverter will not connect to the grid and it will provide an error state.

- Check the tightness of the AC cable glands **(11)** and protective earth calble gland **(12)** (if used) at the end of the installation.

Input connection (DC)

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

The reverse polarity can cause severe damage and electric arc hazards! In case of reverse input strings do not disconnect them while under load and do not turn the DC disconnect switches (16) to OFF position. Wait until input current are below 0.5A (when solar irradiance declines at night) and turn the DC disconnect switches (16) to OFF position, disconnect the DC input quick fit connectors (17) and correct the wrong polarity of the string.

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

When the photovoltaic panels are exposed to sunlight they provide continuous DC voltage to the inverter. To avoid risks of electrical shock, all wiring operations must be carried out with the DC disconnect switches (internal (16) and external to the inverter) and AC disconnect switches (internal (09) or external to the inverter) OFF.

The inverters referred to in this document are TRANSFORMERLESS. This type requires the use of insulated photovoltaic panels (IEC61730 Class A Rating) and the need to keep the photovoltaic generator floating with respect to ground: no terminal of the generator must be connected to ground.

For the string connections it is necessary to use the quick fit connectors **(17)** located on the left side of the wiring box **(02)**.
The models of the counterpart for quick fit connectors to be used to connect the input strings are shown in the table below:

Type	Manufacturer	Model	P/N	Conductor cross section	Ø cable gland
Male	Stäubli	PV-KBT4-EVO 2	32.0087P0001-UR	4 - 6 mm²	4.7 - 6.4 mm
			32.0089P0001-UR	4 - 6 mm²	6.4 - 8.4 mm
			32.0093P0001-UR	10 mm²	6.4 - 8.4 mm
Female	Stäubli	PV-KST4-EVO 2	32.0086P0001-UR	4 - 6 mm²	4.7 - 6.4 mm
			32.0088P0001-UR	4 - 6 mm²	6.4 - 8.4 mm
			32.0092P0001-UR	10 mm²	6.4 - 8.4 mm

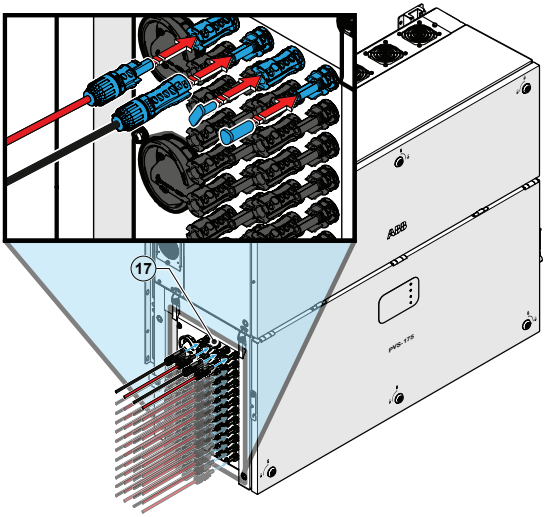
According to IEC 62548 (Photovoltaic (PV) arrays – Design requirements), connectors mated together in a PV system shall be of the same type from the same manufacturer, i.e. a plug from one manufacturer and a socket from another manufacturer or vice versa shall not be used to make a connection.

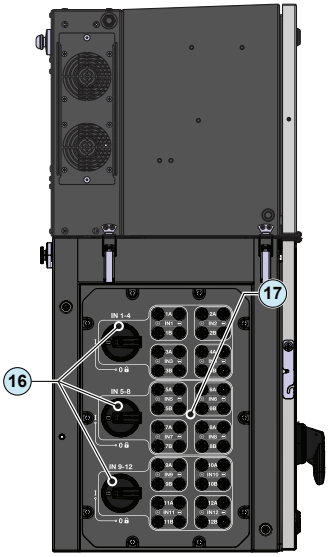
Using mating parts of different type or brand than those specified above could cause serious damage to the unit and will lead to the invalidation of the warranty.

The input connectors are divided into 12 MPPTs (one MPPTs for each input channel) consisting of 2 pairs of quick fit connectors.

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

Make sure to connect at least one string per MPPTs to prevent unbalancing between input channels.





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

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Notes on the system sizing

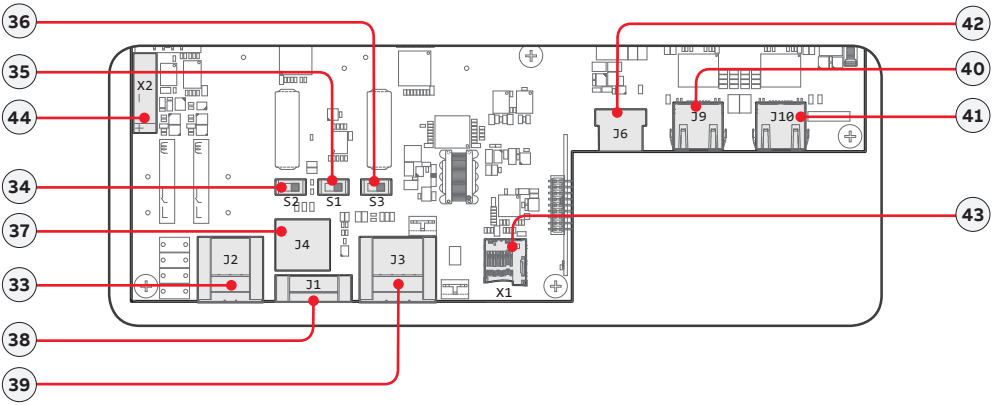
Decisions on how to structure a photovoltaic system depend on a series of factors and considerations, such as the type of panels, the space availability, the future location of the system, energy production goals over the long term, etc.

A configuration program that can help to correctly size the photovoltaic system is available on the ABB website (http://stringsizer.abb.com).

When configuring DC input and during the installation it's needed to follow one basic rule to avoid possible output power derating: All MPPTs shall be populated connecting at least one string. Considering to connect 20 strings, proceed connecting one string per MPPT and then connect the remaining strings in the selected MPPTs where you want to use 2 strings.

Connection of the communication and control signals

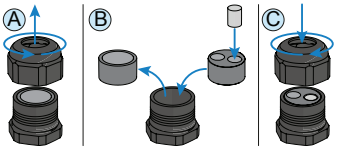
Communication and control board references



Terminal name	Terminal reference	Description of communication and control board (28)
J2	33	Connection to the multifunction relay (ALARM terminal block)
S2	34	RS485 ABB service 120Ohm termination resistance selector switch (ABB service only)
S1	35	DRM0 activation switch
S3	36	RS485 line 120Ohm termination resistance selector switch
J4	37	ABB RS485 service Ethernet connector (RJ45) (ABB service only)
J1	38	Remote ON/OFF terminal block
J3	39	RS485 line terminal block
J9	40	Ethernet connector 2 (RJ45)
J10	41	Ethernet connector 1 (RJ45)
J6	42	USB connector
X1	43	SD card slot
X2	44	CR2032 Backup battery

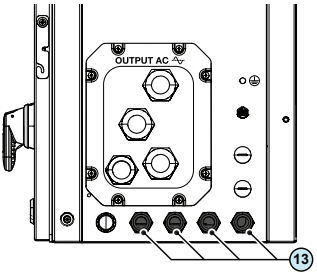
Connections to the communication and control board

The communication and control signals are connected to the communication and control board **(28)** inside the wiring box. On the right side of the wiring box, there are four M25 cable glands **(13)** that can be used to reach the terminals / connectors on the communication and control board **(28)**. Each cable glands accepts a single cable from 10 mm to 17 mm external diameter.



As an alternative the standard gasket of the cable gland can be replaced with the two-hole gasket. 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.

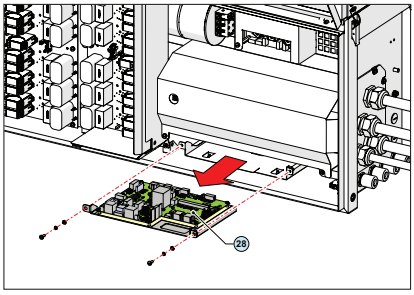
Please ensure that all unused cable glands **(13)** are properly sealed by the IP65 plastic cap.



To connect the signal and communication wirings, the communication and control board (28) have to be extracted by removing the two M5 screws, as shown in the picture beside:

After the connections has been made, re-insert the communication and control board (28) in the own board tray and fasten the two M5 screws previosly removed.

Check the tightness of the signal cable glands (13) at the end of wiring operations.



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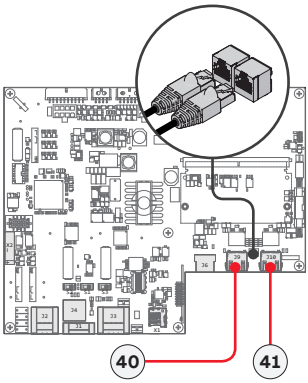
Ethernet connection

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 starts transmissing telemetry data to the Aurora Vision® CLOUD platform.

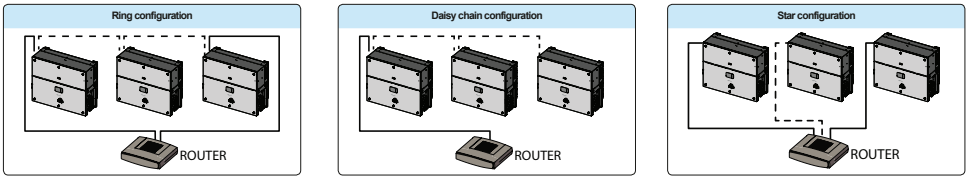
The connection of the ethernet communication cable must be made on the specific connectors **(40)(41)** located on the communication and control board **(28)** inside the wiring box.
If the inverters of the plant need to be connected in daisy chain or ring configuration use both connectors.
The cable should be compliant to the following specification:

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



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

Three topologies of ethernet connection to the router are available:



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

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

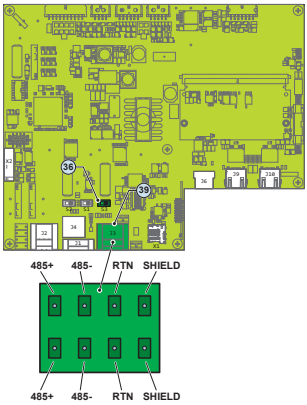
Please refer to Aurora Vision documents available on ABB website for further information how to get an Aurora Vision account for remotely monitoring and managing the installed solar assets.

Connection of RS485 serial communication line

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

The RS485 serial communication line is reserved for the connection of the inverter to monitoring devices that communicate with the Modbus communication protocol (Modbus/RTU SUNSPEC compliant). The RS485 serial communication line is available on the communication and control board **(28)** with two terminal blocks **(39)** for each serial line signal (+T/R, -T/R and RTN) so as to be able to make a daisy-chain connection ("in-out") of multiple inverters.

The RS485 port **(39)** can either be used for connecting supported accessories (like weather station): in this case data from accessories will be logged and transferred to the cloud by inverter itself (master mode). This allow to use the inverter as logger also for ABB accessories.



For further information regarding the configuration and use of the RS485 serial communication line, please refer to the user manual.

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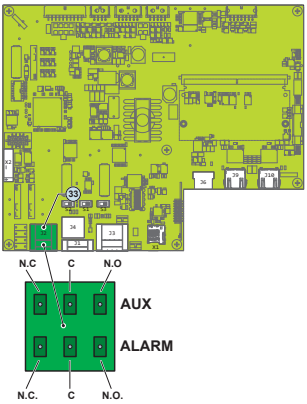
Configurable Relay connection (ALARM and AUX)

The inverter is equipped with 2 multifunction relays terminal blocks **(39)** with configurable activation. It can be connected with normally open contact (being connected between the NO terminal and the common contact C) and with normally closed contact (being connected between the NC terminal and the common contact C). This multifunction relays can be used in different operating configurations that can be selected by accessing the web server user interface.
Different types of devices (light, sound, etc.) can be connected to the relay, provided they comply with the following requirements:

	Alarm terminal block requirements
Alternating current	Maximum Voltage: 160 Vac / Maximum Current: 6 A
Direct current	Maximum Voltage: 30 Vdc / Maximum Current: 3 A
Cable requirements	Conductor cross-section: from 0.08 to 1.3 mm²



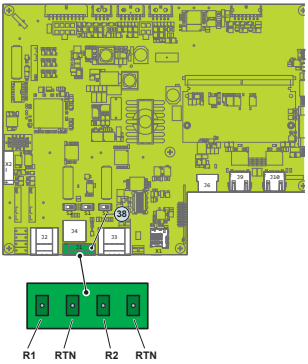
For further information regarding the configuration and use of the configurable relay terminal blocks, please refer to the user manual.

Remote control connection

The connection and disconnection of the inverter to and from the grid can be controlled through an external control.
The function must be enabled via web server user interface. If the remote control function is disabled, the switching on of the inverter is dictated by the presence of the normal parameters that allow the inverter to connect to the grid.
If the remote control function is on, besides being dictated by the presence of the normal parameters that allow the inverter to connect to the grid, switching on the inverter also depends on the state of the R1 and R2 terminals compared to the RTN terminal present on the **(38)** terminal block of the communication and control board **(28)**.
When one of the R1 or R2 signals is brought to the same potential as the RTN signal (i.e. by making a short circuit between the two terminals of the connector), this causes the inverter to disconnect from the grid.

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

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



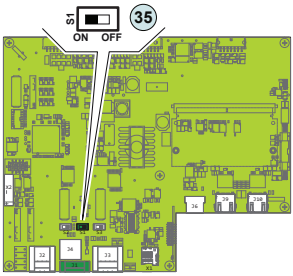
For further information regarding the configuration and use of the Remote control terminal block, please refer to the user manual.

Demand Response Mode 0 (AS/NZS 4777.2)

Where requested by the AS/NZS 4777.2 standard, it's possible to use the Remote terminal block **(38)** for the Demand Response Mode 0 (DRM0) functionality.

The function could be activated by setting the DRM0 activation switch **(35)** to "ON" position.

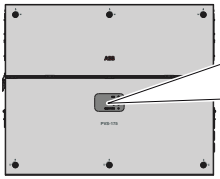
The terminal to be used to connect the inverter to the distribution grid are R2 and RTN.



In case of the DRM0 function is activated without the proper wiring of the Remote terminal block (38), the inverter will no longer be able to connect to the grid. For further information regarding the DRM0 function refer to the AS/NZS 4777 standard.

Description of LED panel

Description of the LED function



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.

All possible LED activation combinations are shown in the following table. In particular, each LED could behave in one of the following ways:
● = LED on
⊗ = LED flashing slow (2 seconds on / 2 seconds off)
✱ = LED flashing fast (0.2 seconds on / 0.2 seconds off)
○ = LED off
✱ = Any one of the conditions described above

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

LED status	Operating state
green: ⊗ yellow: ⊗ red: ⊗	**Firmware programming** The inverter firmware is being programmed.
green: ○ yellow: ○ red: ○	**Night mode (inverter automatically switches off)** The inverter is in night time switch-off mode (input voltage less than 70% of the set start-up voltage and AC grid is missing).
green: ⊗ yellow: ○ red: ○	**Inverter initialization / Waiting Sun** This is a transitional state due to verification of the operating conditions. During this stage the inverter checks that the conditions for connecting to the grid are met.
green: ● yellow: ○ red: ○	**The inverter is connected and is feeding power into the grid** Normal operation. During this stage, the inverter automatically tracks and analyses the photovoltaic generator's maximum power point (MPP).
green: ⊗ yellow: ● red: ○	**Missing grid** Indicates lack of grid voltage. This condition does not allow the inverter to connect to the grid.
green: ✱ yellow: ● red: ○	**Warning indication: (W message codes) or Error: (E message codes)** - Indicates that the inverter control system has detected a warning (W) or error (E). It is possible to identify the type of problem generated in the dedicated section of integrated Web User Interface ("Inverter Log" section).
green: ○ yellow: ● red: ○	**Temperature protection trip** Indicates that the trip relating to internal temperatures (insufficient or excessive temperature) may have been activated.

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

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

LED status	Operating state
Blue: ○	**Wireless not configured or/and ethernet cable not connected.**
Blue: ⊗	**Scanning for available wireless networks.**
Blue: ⊛	**Trying to connect to a wireless network.**
Blue: ●	**Wireless or ethernet network is connected to the inverter and IP address is obtained.**

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.

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

- **Check the correct connection and polarity of the DC inputs, and the correct connection of the AC output and ground cables.**
- **Check the sealing barrier of the cable ducts and installed quick-fit connectors to prevent accidental disconnections and/or avoid compromising the IP65 environmental protection rating.**

This inverter can be powered both with AC or DC sources. In case of DC source is used, make sure that irradiation is stable and adequate for the inverter commissioning procedure to be completed.

At the first activation of the inverter the firmware version could syncronized between power module and wiring box. During this phase the LEDs "Power" "Alarm" and "GFI" blinks together every 1 second. This process is absolutely normal and must be completed without interruption. A switch-off of the system during this process could cause serious damage to the inverter.

Commissioning could be carried out in two different ways: Via **ABB Installer for Solar Inverters APP** (mobile APP for commissioning a single inverter as well as a multi-inverter solar plant) or Via Web UI (Integrated Web User Interface enabling setting parameters and performing commissioning of a single inverter).

ABB Installer for Solar Inverters APP is the recommended method to commission the inverters.

Commissioning via ABB Installer for Solar Inverters mobile APP

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

Follow the procedure below to commission the inverter:
- Close the DC disconnect switches **(16)** to supply the inverter with input voltage from the photovoltaic generator or close the AC switch downstream of the inverter (and AC disconnect switch **(09)** for the -S2, -SX2 wiring box version) to supply the inverter with AC grid voltage. In the pre-commissioning phase the "Alarm" LED keeps quickly flashing, "Power" and "GFI" LEDs are OFF.
- Perform the installation wizard steps with ABB Installer for Solar Inverters APP enabling the transfering the settings to all the claimed inverters.
- After the commissioning via ABB Installer for Solar Inverters APP is completed, the inverter changes the behaviour of the "Power" and "Alarm" LEDs **(08)**, in relation of the input voltage value:

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

- Depending of the supply source used to complete the installation wizard steps, close the disconnect switch of missing voltage sources: In case of missing AC source close the AC switch downstream of the inverter (and AC disconnect switch **(09)** for the -S2, -SX2 wiring box version); In case of missing DC source close the DC disconnect switches **(16)**.
- When the input voltage is sufficient to allow the connection to the grid, the inverter will check the grid voltage, measure the isolation resistance of the photovoltaic field with respect to ground and performs other auto-diagnostic checks. During the preliminary checks on the parallel connection with the grid, the "Power" LED keeps flashing, the "Alarm" and "GFI" LEDs are OFF. The inverter will ONLY connect to the grid if all parameters fall within the ranges foreseen by current regulations.
- If the outcome of the preliminary checks to grid synchronization are positive, the inverter connects and starts to export power to the grid. The "Power" LED remains fixed on while the "Alarm" and "GFI" LEDs are OFF.

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 or at https://registration.abbsolarinverters.com (instructions for registering on the website and updating the firmware are given on the user manual).

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Commissioning via Web User Interface

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

- Close the DC disconnect switches **(16)** to supply the inverter with input voltage from the photovoltaic generator or close the AC switch downstream of the inverter (and AC disconnect switch **(09)** for the -S2, -SX2 wiring box version) to supply the inverter with AC grid voltage. In the pre-commissioning phase the "Alarm" LED keeps quickly flashing, "Power" and "GFI" LEDs are OFF.
- Once powered, the inverter will automatically create a wireless network (approx. 60 seconds after switching-on).
- Enable the wireless connection on the device which is being used for the board setup (tablet, smartphone or PC) and connect it to the Access Point created by the inverter system: the name of the wireless network created by the system that the connection should be established with, will be: ABB-XX-XX-XX-XX-XX-XX
  where "X" is a hex digit of the wireless MAC address **(B)** (MAC address can be found on the "Communication Identification Label" placed on the side of the inverter).
- When required enter the PRODUCT KEY **(C)** (printed on the "Communication Identification label" and applied during the commissioning phase to the plant documentation) as access point password (Note that it's required to digit also the dash "-" characters of the Product Key in the password field).

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

For further information regarding the commissioning procedure via Web User Interface, please refer to the user manual.

- After the commissioning via Web User Interface is completed, the inverter changes the behaviour of the "Power" and "Alarm" LEDs **(08)**, in relation of the input voltage value:

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

- Depending of the supply source used to complete the installation wizard steps, close the disconnect switch of missing voltage sources: In case of missing AC source close the AC switch downstream of the inverter (and AC disconnect switch **(09)** for the -S2, -SX2 wiring box version); In case of missing DC source close the DC disconnect switches **(16)**.
- When the input voltage is sufficient to allow the connection to the grid, the inverter will check the grid voltage, measure the isolation resistance of the photovoltaic field with respect to ground and performs other auto-diagnostic checks. During the preliminary checks on the parallel connection with the grid, the "Power" LED keeps flashing, the "Alarm" and "GFI" LEDs are OFF. The inverter will ONLY connect to the grid if all parameters fall within the ranges foreseen by current regulations.
- If the outcome of the preliminary checks to grid synchronization are positive, the inverter connects and starts to export power to the grid. The "Power" LED remains fixed on while the "Alarm" and "GFI" LEDs are OFF.

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 or at https://registration.abbsolarinverters.com (instructions for registering on the website and updating the firmware are given on the user manual).

Characteristics and technical data

	PVS-175-TL
Input	
Absolute maximum DC input voltage (Vdc, max)	1500 V
Start-up DC input voltage (Vstart)	750 V (650...1000 V)
Operating DC input voltage range (Vdcmin...Vdcmax)	600 - 1500 V
Rated DC input voltage (Vdcr)	1100 V
Rated DC input power (Pdcr)	188000 W @ 30°C - 177000 W @ 40°C
Number of Independent MPPT	12
Maximum DC input power for each MPPT (PMPPTmax)	20000 W [850V≤VMPPT≤1350V]
MPPT DC voltage range (VMPPTmin ... VMPPTmax) to Pacr	850 - 1350 Vdc
Maximum DC input current for each MPPT (Idc max)	22 A
Maximum input short circuit current for each MPPT (Iscmax)	30 A
Maximum Return current (AC side vs DC side)	Negligible in normal operating conditions (1)
Number of DC input connection pairs for each MPPT	2
DC connection type	Quick-fit PV connector (1)
Type of photovoltaic panels that can be connected at input according to IEC 61730	Class A
Input protection	
Reverse polarity protection	Yes, from current limited source
Input overvoltage protection for each MPPT - varistor (-S / -S2 models)	2
Input overvoltage protection for each MPPT - plug in modular surge arrester (-SX / -SX2 models)	2 (Type 2)
Photovoltaic array isolation control	Yes, according to IEC 62109-2
Residual current monitoring device	Yes, according to IEC 62109-2
DC switch rating for each MPPT	20 A/1500 V - 35 A/1250 V - 50 A/1000 V (2)
String current monitoring	Input current monitoring per MPPT (12ch)
Arc fault protection	Optional
Output	
AC grid connection type	Three phase 3W+PE (TN system)
Rated AC power (Pacr @cosϕ=1)	175 000 W @ 40 °C
Maximum AC output power (Pacmax @cosϕ=1)	185 000 W @ 30 °C
Maximum apparent power (Smax)	185 000 VA
Rated AC grid voltage (Vac,r)	800 V
AC voltage range	552...960 V (3)
Maximum AC output current (Iac,max)	134 A
Contributory fault current	140 A
Rated output frequency (fr)	50 Hz / 60 Hz
Output frequency range (fmin...fmax)	45...55 Hz / 55...65 Hz (3)
Nominal power factor and adjustable range	> 0.995, 0...1 inductive/capacitive with maximum Smax
Total current harmonic distortion	<3%
Maximum AC Cable outer diameter / multi core	1 x 53 mm (1 x M63 cable gland)
Maximum AC Cable outer diameter / single core	3 x 32 mm (3 x M40 cable gland)
AC Connections Type	Busbar for lug connections with M10 bolts (included); Single core cable gland plate with 4 individual AC cable glands: 3 x M40: Ø 22...32mm, 1 x M32: Ø 18...25mm Multi core cable gland plate (optional) with 2 individual AC cable glands: 1 x M63: Ø 37...53mm, 1x M32 Ø 18...25mm)
Output protection	
Anti-islanding protection	According to local standard
Maximum external AC overcurrent protection	200 A
Output overvoltage protection - Varistor (-S / -S2 models)	Yes
Output overvoltage protection - Modular surge arresters (-SX / -SX2 models)	Type 2

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	PVS-175-TL
Operating performance	
Maximum efficiency (ηmax)	98.7%
Weighted efficiency (EURO)	98.4%
Embedded communication	
Embedded physical interface	1x RS485, 2x Ethernet (RJ45), WLAN (IEEE802.11 b/g/n @ 2,4 GHz)
User Interface	4 LEDs, Web User Interface, Mobile APP
Embedded communication protocols	Modbus RTU/TCP (SunSpec compliant)
Commissioning tool	Web User Interface, Mobile APP
Remote monitoring services	Aurora Vision® monitoring portal
Advanced features	Embedded logging, direct telemetry data transferring to ABB cloud
Environmental	
Ambient temperature range	-25...+60°C /-13...140°F with derating above 40°C / 104 °F
Relative humidity	4…100 % condensing
Acoustic noise emission level	65 dB(A) @ 1 m
Maximum operating altitude without derating	2000 m / 6560 ft
Environmental pollution degree classification for external environments	3
Environmental class	Outdoor
Climatic category according to IEC 60721-3-4	4K4H
Physical	
Environmental protection rating	IP 65 (IP54 for the cooling section)
Cooling	Forced air
Dimension (H x W x D)	867x1086x419 mm / 34.2”x42.7”x16.5” for -S, -SX model 867x1086x458 mm / 34.2”x42.7”x18.0” for -S2, SX2 model
Weight	~76 kg / 167,5 lbs for power module ; ~77 kg / 169,7 lbs for Wiring box Overall max ~153 kg / 337,2 lbs
Mounting system	Mounting bracket support
Overvoltage rating as per IEC 62109-1	II (DC input) III (AC output)
Safety	
Safety class	I
Insulation level	Transformerless
Marking	CE
Safety and EMC Standards	IEC/EN 62109-1, IEC/EN 62109-2, EN 61000-6-2, 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 standard (check your sales channel for availability)	CEI 0-16, UTE C 15 712-1, JORDAN IRR-DCC-MV and IRR-TIC, BDEW, VDE-AR-N 4110, VDE-AR-N 4120, P.O. 12.3, DRRG D.4
Accessories	
Assembly accessories	PVS-175 Installation Kit AC multicore cable gland plate (Supports M63 Ø 37…53mm + M32 Ø 18...25mm)
DC Series Arc Fault Circuit Interrupter	Type I acc. to UL 1699B[4] with single-MPPT sensing capability
DC link recharge circuit	Night time operation with restart capability
Anti-PID[5]	Based on night time polarization of the array

1) In the event of a fault, limited by the external protection envisaged on the AC circuit.
2) According to standard IEC60947.3 Table D.5.
3) The AC voltage and frequency range may vary depending on specific country grid standard
4) Performance in line with the relevant requirements of the Draft IEC 63027 standard
5) Cannot operate simultaneously when installed in conjunction with the DC link recharge circuit

Remark. Features not specifically listed in the present data sheet are not included in the product

Tightening torques	
Single core AC cable gland **(11)** M40	5 Nm
Single core PE cable gland **(12)** M32	5 Nm
Multi core AC cable gland **(11)** M63	18 Nm
Service cable gland **(13)** M25	5 Nm
AC connection busbar **(22)** bolts	25 Nm
Protective earth point (int.) **(26)** nut	21 Nm
Protective earth point (ext.) **(10)** nut	12 Nm
Junction screws **(20)**	12 Nm
Side bracket screws	5 Nm
Communication connector counterparts **(33)(38)(39)**	0.25 Nm

Cable gland clamping range	
Single core AC cable gland **(11)** M40	22...32mm
Single core PE cable gland **(12)** M32	18...25mm
Multi core AC cable gland **(11)** M63	37...53mm
Service cable gland **(13)** M25	10...17mm

For further information

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