

ABB solar inverters

Quick Installation Guide

TRIO-TM-50.0-400    TRIO-TM-60.0-480

(50 to 60 kW)

EN



In addition to the information given below, it is mandatory to read and observe the safety information and installation instructions shown in the installation manual. The technical documentation and the interface and management software for the product are available on the website.

The equipment must be used in accordance with what is described in this Quick Installation Guide.

Otherwise, the safety devices guaranteed by the inverter may be ineffective.



The inverter model should be chosen by a specialized technician who has a good knowledge of the installation conditions, the devices that will be installed externally, and whether it will eventually be integrated into an existing system.

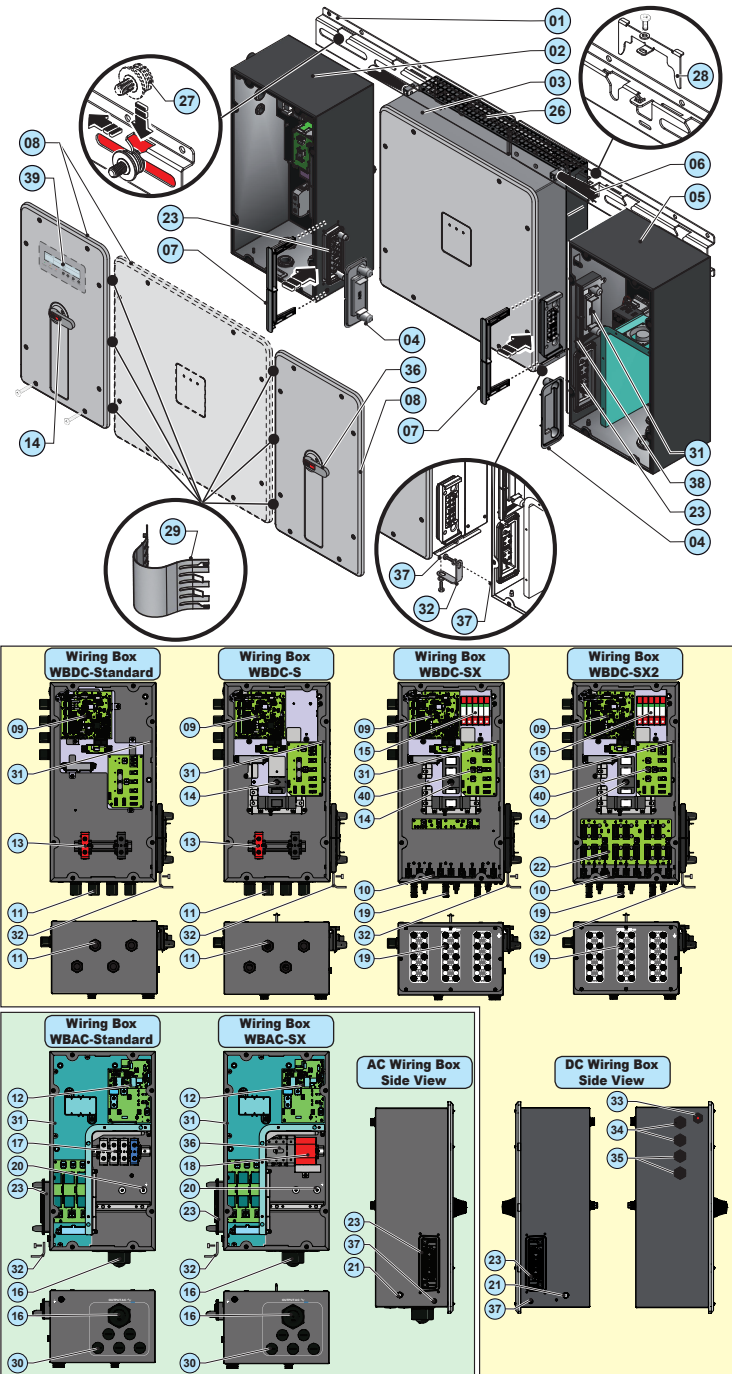
Two models of Power Module are available, depending on their output power:

- TRIO-TM-50.0-400-POWER MODULE: rated output power 50kW - 400Vac
- TRIO-TM-60.0-480-POWER MODULE: rated output power 60kW - 480Vac

The Power Module must be coupled to a DC Wiring Box (WBDC) and an AC Wiring Box (WBAC), available in different models depending on the equipment:

- DC Wiring Box: WBDC-Standard; WBDC-S; WBDC-SX; WBDC-SX2 (-SX and -SX2 models can be equipped with overvoltage dischargers and display as options).
- AC Wiring Box: WBAC-Standard; WBAC-SX (-SX model can be equipped with overvoltage dischargers as an option).

Main Components	
01	Mounting bracket
02	DC Wiring Box
03	Power Module
04	Quick disconnect connector cover
05	AC Wiring Box
06	Handles
07	Metal locking forks
08	Front cover
09	Communication and control board
10	Positive (+) side string fuses
11	DC cable glands
12	AC filter board
13	DC input terminal block
14	DC disconnect switch
15	DC overvoltage dischargers (optional)
16	Single AC cable gland
17	AC output terminal block
18	AC overvoltage discharger (optional)
19	Input connectors
20	Grounding terminal
21	Anti-condensation valve
22	Negative (-) side string fuses
23	Quick disconnect connector
24	Spacers
26	Heatsink
27	Rear pins on inverter's back side
28	Stabilization bracket
29	Conducting springs
30	Single AC cable glands (not included)
31	Cover storage rack
32	Ground brackets
33	WiFi antenna opening plug
34	External Ethernet connector (RJ45)
35	Service cable gland PG21
36	AC Disconnect Switch
37	Ground bracket attachment points
38	Plastic locking forks
39	Display (optional)
40	Paralleled MPPT connection points



**1. Labels and Symbols**

The labels on the inverter show the conformity marking, main technical data and identification of the equipment and manufacturer. The below labels are intended as an example only; in fact, other models of Power Modules and DC/AC Wiring Boxes are available.

**POWER MODULE**

www.abb.com/solar

Made in Italy

POWER MODULE  
COMPONENT OF MODEL TRIO-TM-60.0-480

MODEL:  
TRIO-TM-60.0-480-POWER MODULE

SOLAR INVERTER  
MODEL:  
TRIO-TM-60.0-480

V <sub>in</sub> max	1000 V	V <sub>in</sub> min	480 V 30
V <sub>in</sub> rated	360 - 960 V	P <sub>in</sub> rated	50 / 60 kW
V <sub>in</sub> Full Power	570 - 960 V	P <sub>in</sub> (range 1)	50000 W
I <sub>in</sub> max	108 A	P <sub>in</sub> (range 2)	50000 W
I <sub>in</sub> rated	105 A	I <sub>in</sub> rated	77 A

20 to +60 °C  
4 to +140 °F

IP65 Cooling  
Protection

30 minutes

**POWER MODULE**

**DC WIRING BOX**

www.abb.com/solar

Made in Italy

DC WIRING BOX  
COMPONENT OF MODEL TRIO-TM-60.0-480

MODEL:  
DCWB-TRIO-TM-60.0-480

20 to +60 °C  
4 to +140 °F

IP65 Cooling  
Protection

**DC WIRING BOX**

**Identification label**

MODEL NAME

P/N: P/PPPPPPPPPP

M/0: 000000X

S/0: 500000000X

S/N: YNMMSSSSSS MK:MMYY

**Wireless Identification Label**

SN: 1737123456  
MAC: 0013A2004082CA8  
PK: 4011-0056-0188-0775

**SN:** Wireless Serial Number  
**MAC:** Wireless MAC Address  
- Included in the SSID of the wireless access point created by the inverter: ABB-XX-XX-XX-XX-XX-XX (where "X" is an hexadecimal character of the MAC Address).  
- To use to obtain the "Host Name" http://ABB-XX-XX-XX-XX-XX-XX.local (where "X" is an hexadecimal character of the MAC Address).  
- The MAC Address is the only piece of information required to register the inverter on the Aurora Vision Portal.  
**PK:** Product Key  
Used as password to access the access point after 24 hours from inverter power-on have elapsed (and the default password "ABBSOLAR" has expired) or used as username and password in case of loss of the access credentials for the inverter's internal Web server.

The labels placed on the equipment **MUST NOT** be removed, damaged, dirtied, hidden, etc...

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

Always refer to the manual	General warning – Important safety information	Hazardous voltage	Hot surfaces
Protection rating of equipment	Temperature range	Without insulation transformer	Direct and alternating current, respectively
Positive and negative poles of the input voltage (DC)	Always use safety clothing and/or personal protection equipment	Point of connection for grounding protection	Stored energy discharge time

**2. Installation site**

Installation site and position

- Consult technical data to confirm the environmental specifications will be met.
- Installation of the equipment in a location exposed to direct sunlight is acceptable.
- Do not install in closed spaces where air does not freely circulate.
- Always ensure that the flow of air around the inverter is not blocked, so as to prevent overheating.
- Do not install the equipment near flammable substances (minimum distance: 3 m).
- Do not install the equipment on wooden walls or other flammable surfaces.
- Do not install in inhabited rooms or where a prolonged presence of people or animals is expected, due to the inverter's noise level during operation. The sound level is heavily influenced by the installation location (e.g., the surface around the inverter, the environment, etc.) and the grid quality.
- Install on a wall or structure capable of bearing the weight of the equipment.
- Install vertically or horizontally (i.e., with the inverter on its back), with maximum tilt as indicated in the figure
- In case of multiple inverters, maintain minimum clearance and spacing between inverters as indicated in the figure to prevent limitations on air circulation
- Ensure sufficient working space in front of the inverter for Wiring Box access
- If possible, install at eye-level so that the LEDs can be easily seen
- Install at a height that allows the equipment to be serviced considering its size and weight
- In case of multiple installations, position the inverters side by side, maintaining minimum clearances (measured from the outermost edge of each inverter)
- Multiple inverters can also be placed in a staggered arrangement. Minimum clearances for staggered arrangements include the width of the inverter plus additional allowances for inverters placed above or below
- All installation over 2,000 meters must be assessed by ABB Technical Sales to determine the proper output derating.

Do not block access to the external AC and DC disconnect switches. Please refer to the warranty terms and conditions and avoid voiding the warranty with improper installation.

15cm 50cm 15cm

30cm 50cm 20cm

**Bracket for vertical mounting.**

NO OK

75° MAX

**Bracket for horizontal mounting.**

OK

15° MAX

**3. Inverter Models and Components**

The inverter model should be chosen by a specialized technician who has a good knowledge of the installation conditions, the devices that will be installed externally, and whether it will eventually be integrated into an existing system.

Two models of Power Module are available, depending on their output power:

- TRIO-TM-50.0-400-POWER MODULE: rated output power 50kW - 400Vac
- TRIO-TM-60.0-480-POWER MODULE: rated output power 60kW - 480Vac

The Power Module must be coupled to a DC Wiring Box (WBDC) and an AC Wiring Box (WBAC), available in different models depending on the equipment:

- DC Wiring Box: WBDC-Standard; WBDC-S; WBDC-SX; WBDC-SX2 (-SX and -SX2 models can be equipped with overvoltage dischargers and display as options).
- AC Wiring Box: WBAC-Standard; WBAC-SX (-SX model can be equipped with overvoltage dischargers as an option).

**4. Lifting and Transporting**

**Transport and Handling**

Transport of the equipment, especially by road, must be carried out with suitable means and in suitable ways, so to protect the components from violent shocks, humidity, vibrations, etc.

**Lifting**

The means used for lifting must be suitable for bearing the weight of the equipment. The handling kit (ABB Part Number ABB "TRIO HANDLING KIT") should be used to correctly handle the Power Module.

**Do not pick up the inverter by the cover.**

**Unpacking and Checking**

The packaging components must be removed and disposed of according to all applicable laws and regulations of the country where the equipment is being installed. When you open the package, check that the equipment is not damaged and make sure all components are present. If you notice any defects or damage, stop unpacking and contact the carrier, and also promptly inform the ABB Service department.

**Weight of the Equipment Units**

Model	Weight
Power Module	66 kg
DC Wiring Box	Standard / -S: 13 kg -SX / -SX2: 14 kg
AC Wiring Box	Standard: 14 kg -SX: 15 kg

**5. List of Supplied Components**

Components available in the bracket kit	Quantity (vertical kit)	Quantity (horizontal kit)
Bracket 01 for vertical wall mounting	1	0
Bracket 02 for horizontal mounting	0	1
Countersunk M5x14 hex screws for assembling the attachment bracket	4	10
M6x16 hex screw (4 to clamp grounding brackets and 2 for caged nuts)	6	6
Stabilization bracket to attach the Power Module to the Wiring Box	2	2
Back spacers 24 for wall alignment (vertical mounting)	4	0
Ground brackets 32 for Wiring Box-to-Power Module connection	2	2
M6 flat washer (4 to clamp grounding brackets and 2 for caged nuts)	6	6
M6 serrated washer to clamp the ground connection bracket	4	4
Conducting springs	6	6

Components available for all DC Wiring Box models	Quantity
Configurable relay connectors	2
Control and communications signal connectors	2
Airtight connector for Ethernet cable connection	2
Two-hole gasket for PG 21 signal cable glands 33 and cap	2 + 2
M6 hex nut to clamp the grounding terminal on the AC Wiring Box	1
Serrated lock M6 washer for securing the ground terminal to the AC Wiring Box	2
WiFi antenna	1
Configuration bar for paralleled input channels and M5x12 screws (with plain and split washers)	1 + 3
Technical documentation	

**6. Mounting Instructions**

**Vertical Wall Mounting**

1. The bracket 01 is supplied in two separate parts; assemble them using the four M5x14 countersunk screws. (FIG. 1)

2. Insert the two cage nuts in the 02 attachment points.

3. Position the bracket 01 perfectly level on the wall and use it as a drilling template. (FIG. 1)

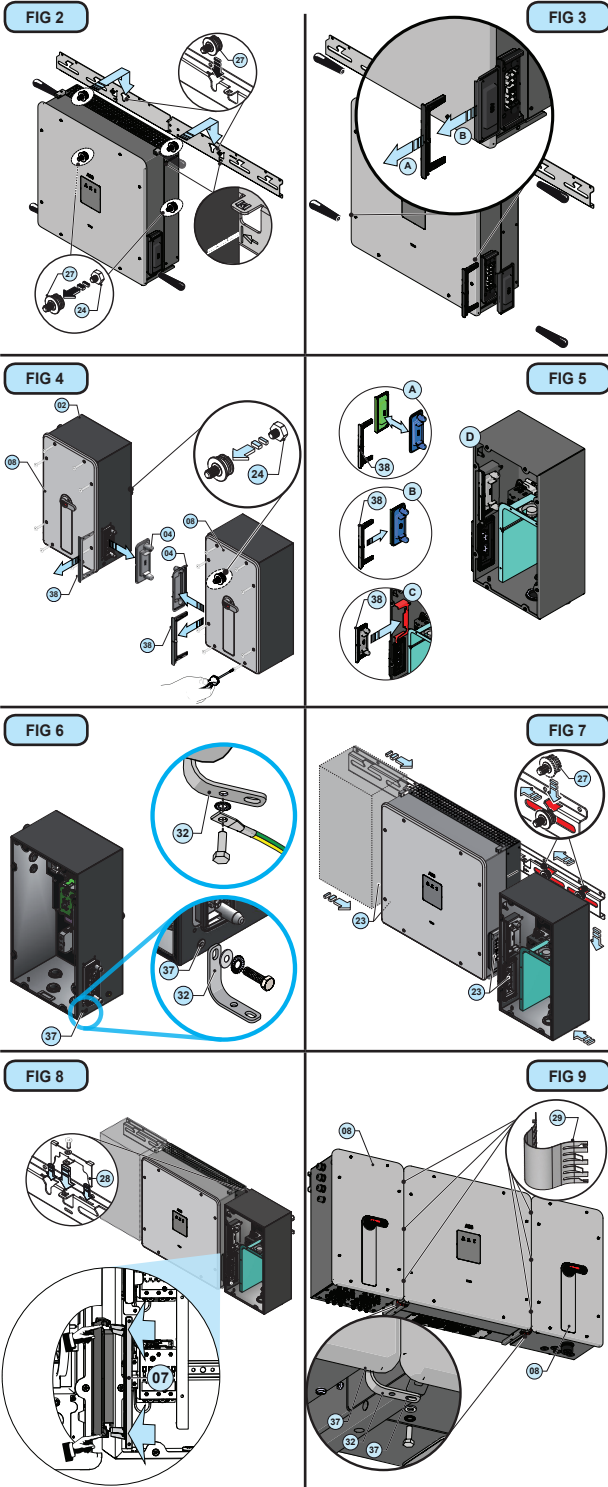
4. It is the installer's responsibility to choose an appropriate number and distribution of attachment points. Their choice must be based on the type of wall, frame or other support, the type of attachment points to be used and their ability to support 4 times the inverter's weight (4 x 95 kg=380 kg for all models). Attach the bracket to the wall with at least 10 mounting screws. Depending on the type of attachment point chosen, drill the required 10 holes A to mount the bracket. Insert at least four screws in the upper side and at least four in the lower side; the remainder (up to 20 in total) can be inserted where needed. (FIG. 1)

5. Attach the bracket to the wall or frame (FIG. 1)

**FIG 1**



6. Install the spacers ② in the two lower rear attachment pins ② of the Power Module. This will prevent backwards tilt when the Power Module is hung on the bracket. (FIG. 2)
7. Lift the Power Module up to the bracket using the (optional) handles ②, the (optional) M12 eyebolts or any other appropriate lifting device. (FIG. 2)
8. Slide the heads of the two upper rear attachment pins ② of the Power Module into the slots ④ on the brackets and confirm that the slots ④ on the bracket are aligned with the line on the sides of the Power Module; this indicates that they have been correctly positioned. (FIG. 2)
9. Remove the handles or eyebolts, if used
10. Remove the quick disconnect connector covers as follows:
- Pull the metal locking forks ⑦ outwards ① (FIG. 3)
  - Pull off the connector cover ⑥ (FIG. 3)
  - Store both parts. They will be needed in a later step.
11. Set the disconnect switches on the Wiring Boxes to "0", otherwise you will not be able to remove the front cover .
12. Unscrew the 8 screws holding the front covers ⑩ of the DC Wiring Box ② and AC Wiring Box ③. (FIG. 4)
13. Install the spacers ② in the two lower rear attachment pins ② of each Wiring Box. This will prevent backwards tilt when the Wiring Box is hung on the bracket. (FIG. 4)
14. Remove the quick disconnect connector covers ⑥ from both Wiring Boxes (see Step 9 of this procedure) (FIG. 4). Caps should be kept in the special slots within each Wiring Box. Proceed as follows:
- ① Couple a connector cap of the Power Module (in green in the figure) with one from the Wiring Box (in blue in the figure.)
  - ② Insert the plastic locking forks ⑤ used to block the Wiring Box cap on the coupled connectors.
  - ③ Insert the two connectors locked by the forks into the dedicated space within each Wiring Box ⑩. Repeat the same operation for the other Wiring Box.
- Do not use the metal locking forks ⑦ to clamp the caps. (FIG. 5)**
15. Attach the ground brackets ③ to the attachment points ② on each Wiring Box using the M6 plain washer, M6 serrated washer, and M6 hex screw supplied with the inverter. Leave the screws loose and not tightened. The bracket is not symmetrical. When you install it in the attachment point ⑦, make sure that the side with the two holes is facing downwards. (FIG. 6)
16. Insert the upper studs ② on top of the first Wiring Box into the bracket slots. Then do the same with the other Wiring Box. This way, the Wiring Boxes will be somewhat detached from the Power Module, so that they will not interfere with the quick disconnect connectors ②. (FIG. 7)
17. Attach the Power Module to the Wiring Boxes, one at a time, by sliding them horizontally onto the bracket ⑦ and make sure that the quick disconnect connectors ② are correctly inserted. (FIG. 7)
18. Once coupling has been completed, the metal locking fork ⑦ must be installed into the appropriate seats on the quick disconnect connectors ②. This way, the Wiring Boxes get mounted to the Power Module. (FIG. 8)
19. Insert the stabilization bracket ③ into the guides and block the screw on the caged nuts previously mounted on the bracket. (FIG. 8)
20. Attach the ground brackets ③ to the mounting points ③ on the lower side of the Power Module using the M6 plain washer, M6 locking washer and M6 hex screw supplied with the inverter (torque to 11Nm). (FIG. 9)
21. Tighten the two screws (one for each Wiring Box) on the two ground brackets ③. (FIG. 9)
22. Install the WiFi antenna (supplied) by attaching it to the appropriate connector ③ located on the side of the DC Wiring Box.
- The inverter can also be installed horizontally using a dedicated bracket. Horizontal installation instructions can be found in the product manual available at [www.abb.com/solarinverters](http://www.abb.com/solarinverters) (select your own country on the Web site).



Description of the LEDs located on the Power Module cover:

POWER LED	GREEN	On, if the inverter operates correctly. Flashes in the network control phase or if the sunlight is not enough.
ALARM LED	YELLOW	The inverter has detected a fault. For inverters with a display, the error/warning message appears on the display.
GFI LED	RED	Ground fault of the PV array, DC side. For inverters with a display, the error message appears on the display.



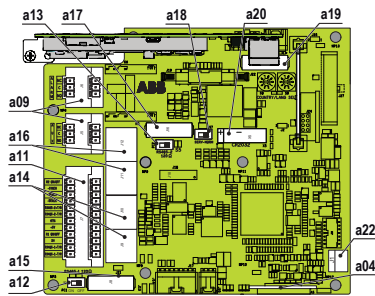
Refer to the product manual for a description of error/warning codes appearing on the display, for inverters with a display.



See the manual for details on the connections and functions available on the communication and control board.

The table shows the main components and connections available on the communication and control board ⑩. Each connection cable reaches the communication board through service cable glands ③.

Board Screen-Printing	Reference	Description
A5	a04	SD CARD housing
J5 - J6	a09	Connection to the multifunction relay (ALARM and AUX)
J7	a11	RS485 serial connection; 5V auxiliary, remote ON/OFF
S6	a12	Switch for setting the termination resistance of the RS485 line (1)
S5	a13	Switch for setting the termination resistance of the RS485 line (2)
J9 - J10	a14	Connection of the RS485 line (1) on RJ45 connector
J8	a15	RS485 communication board slot (1)
J11 - J12	a16	Connection of the RS485 line (2) on RJ45 connector
J16	a17	RS485 communication board slot (2)
S7	a18	Switch for setting the inverter to normal or service mode
J22	a19	Inverter data memory card slot
X5	a20	Battery housing
J1	a22	Grounding Kit housing (optional)



**Before starting the inverter commissioning procedure, ensure that all the checks indicated in the previous sections of this Quick Installation Guide have been correctly performed and also that the front covers ⑩ have been correctly re-installed!**

The inverter can be commissioned and configured from a wireless device, such as a Smartphone, a tablet or a laptop. The commissioning procedure is as follows:

- Put the DC disconnect switch of the inverter ⑭ or any external DC switch in the "ON" position; if the voltage supplied to one of the input channels is greater than the minimum power-up voltage, the inverter will turn on. **The inverter is powered ONLY by the voltage supplied by the PV array; the presence of grid voltage alone is NOT SUFFICIENT to allow the inverter to power up.**
- Enable the wireless functionality on the device you are using for the commissioning of the inverter (tablet, Smartphone or PC) and connect the device to the access point created by the inverter. The list of available networks will show a network named **ABB-XX-XX-XX-XX-XX**, where "X" is an hexadecimal number of the MAC Address (the MAC Address is indicated on the "wireless identification label" on the side of the inverter).
- When prompted, type **"ABBSOLAR"** as the network password to access the inverter's access point.  
**After the inverter has operated for 24 hours, the access point default password, "ABBSOLAR", expires. After that, access to the internal Web server will only be possible by entering as password the access point "PRODUCT KEY" printed on the "wireless identification label" on the side of the inverter.**
- Open your Internet browser (recommended browsers: Chrome from v.55, Firefox from v.50, Safari from V.10.2.1) and enter the default IP Address to access the Configuration Wizard page: **192.168.117.1** (this address will always be active and usable to access, at any time and in any mode of operation of the inverter, the internal Web server).
- This will start the Configuration Wizard, which runs of a number of configuration steps. During these steps, you will be prompted to enter the appropriate information in each relevant field (the language for the Configuration Wizard can be changed on the upper status bar). During the procedure you will be prompted for the following information:
  - STEP 1** - Set the Admin/User access credentials (at least 8 characters for the password). Username and password are CASE SENSITIVE.
  - STEP 2 (OPTIONAL)** - Enter the required information (IP Address selection mode, SSID, and password) to connect the inverter to the wireless network in (Note: This step can be skipped if you do not want to connect the inverter to a router or if the inverter is connected to the router via ethernet connection). Once the connection between the inverter and wireless home network is established, a new message will be displayed showing the IP Address assigned by router to the inverter for ensuring access to the internal Web server. **TAKE NOTE OF THE LINKS** (refer to the product manual for further information on the internal Web server features).
  - STEP 3** - Set the Date, Time and Time Zone (the inverter will display these input fields when available).
  - STEP 4** - Set the inverter grid standard and configure the input channels.By clicking "FINISH" the wizard completes the configuration procedure (after the settings are confirmed, the inverter restarts).

**From the moment the grid standard is selected, there will be 24 hours available to make any changes to the grid standard; after this, the "Country Select" feature is blocked and you can make further changes only by resetting the remaining-time timer. To select a new grid standard, you must reset the remaining time, by logging in to the internal web server with Admin Plus rights. Admin Plus access is done via a unlocked Token calculated at <https://registration.abbsolarinverters.com>.**

6. Put the external AC disconnect switch downstream of the inverter to the "ON" position. Once the AC and DC disconnect switches are closed and the Configuration Wizard has completed the configuration procedure, the inverter starts the grid connection sequence; the inverter measures the grid voltage and the ground insulation resistance of the PV field, and performs other automatic checks. During the preliminary checks in parallel with the grid, the "Power" LED is flashing, while the other LEDs are off. If the sunlight is not sufficient to ensure connection to the grid, the inverter will repeat the connection procedure until all grid connection parameters fall within the expected value range.

If the outcome of the preliminary checks is positive, the inverter will connect to the grid and start exporting power. The "Power" LED remains solid on, while the "Alarm" and "GFI" LEDs are off.



For more information about the configuration and use of the internal Web server, refer to the product manual.

**7. Load Protection Breaker (AC Disconnect Switch) and Line Cable Sizing**

To protect the AC connection line of the inverter, we recommend installing a device for protection against over current with the following characteristics.

	TRIO-TM-50.0-400	TRIO-TM-60.0-480
Type	Automatic circuit breaker with thermal magnetic protection	
Rated Voltage/Current	400 V / 100 A	480 V / 100 A
Magnetic protection characteristic		B/C
Number of poles		3/4

*If differential protection is installed, it must satisfy the following:*

- Type of differential protection: A/AC
- Differential sensitivity: 500mA

**Characteristics and Sizing of the Line Cable**

The AC connection is three-phase (three-wire connection 3W+PE or four wire connection 4W+PE, grounded only WYE system). The cross-section of the AC phase conductor must be appropriately sized in order to prevent unwanted disconnection of the inverter from the distribution network due to high impedance of the line that connects the inverter to the power supply point.

**8. Output connection (AC)**

**If the inverter is being switched off after a period of operation, wait at least 30 minutes (time needed to discharge) before removing the covers**

To prevent electrocution hazards, open and lock out the external AC disconnect switch before connecting to the AC conductors and any time the AC Wiring Box cover needs to be removed. Proper Personal Protection Equipment is required.

**Caution! Connect the ground (protective earth) before starting the grid connections.**

**- AC Wiring Box - Standard Model**

AC conductors (25 to 31 mm diameter, cross-section of up to 95 mm<sup>2</sup>, copper or aluminum, torque to 20Nm) will be connected to the terminal block ⑦ inside the CA Wiring Box.

**- AC Wiring Box - SX Model**

AC conductors (25 to 31 mm diameter, cross-section of up to 70 mm<sup>2</sup>, copper, torque to 6Nm) will be connected to the AC disconnect switch ③ inside the AC Wiring Box. The AC disconnect switch is designed for copper wire. If aluminum wire is used, terminate the aluminum wire with a bi-metallic terminal.

**AC Cable Installation:**

To carry out the connections, pass a sheathed cable through a single AC cable gland ⑩ or separate cables can be passed through single AC cable glands ⑩.

The default solution is to use one single AC cable gland ⑩. If you need to use 5 single AC cable glands ⑩, their size must be M32.

- Unscrew the cable gland(s) and remove the cap.
- Run the cable of suitable cross-section through the cable gland(s).
- Connect the ground cable to the protective earth (PE) connection point ②.
- Connect the grid connectors (R, S, T, Neutral) to the respective terminals on the AC output terminal block ⑦ in the Standard Model or directly on the disconnect switch ③ in the -SX Model. **Observe the order of the output phases (R, S, T) as indicated on the label next to the output connections.**
- Pull each cable to check its tightness.
- Once the connection to the terminal block is complete, screw in the cable gland(s) and check their tightness.

- Set the **S1** switch on the AC filter board ⑫, based on the grid connection configuration. Choose **3WIRES** for WYE connection without N wire (L1 + L2 + L3 + GND) or **4WIRES** for WYE connection with N wire (L1 + L2 + L3 + Neutral + GND).

- When wiring is complete, attach the front cover ⑩ to the AC Wiring Box (8 screws, tightening torque to 2.4Nm).

- Mount the 3 conducting springs ② between the Power Module cover ⑩ and the AC Wiring Box cover, in the unpainted areas. (Paragraph 6 - FIG. 9)

**9. Input connection (DC)**

**If the inverter is being switched off after a period of operation, wait at least 30 minutes (time needed to discharge) before removing the covers**

Confirm the PV array's input polarity is correct and the PV array has no ground leakage current.

When exposed to sunlight, the PV panels supply direct voltage (DC) to the inverter.

When in "OFF" position, the DC disconnect switch disconnects the DC current from the PV panels. The inverter stops producing power but DOES NOT disconnect the AC from the grid. To prevent electrocution hazards, all connections must be carried out with the external AC disconnect switch (grid side) of the inverter open and locked out.

**Warning.** The inverters referred to in this document are WITHOUT AN ISOLATION TRANSFORMER (transformerless). This topology implies the use of isolated PV panels (IEC61730 Class A Rating) and the need to keep the PV array floating with respect to ground: no terminal of the PV array must be connected to ground. For a different connection of PV strings, when a negative input grounding kit is installed, the use of an isolation transformer in mandatory. Refer to the "TRIO-50.0/60.0-GROUNDING KIT" Quick Installation Guide for further information

If input strings are paralleled, they must have the same installation conditions (number of panel sets, panel type, orientation and tilt). Be sure to comply with maximum input current for quick fit connectors.

DC-side connections may vary depending on the Wiring Box model.

**- Standard / -S Models**

In these DC Wiring Box models, the PV array is connected to the inverter through the DC input terminal block ⑬ by passing the cable through the DC cable glands ⑪.

- Confirm the DC cables have a 13 - 21mm diameter, a cross-section of 95mm<sup>2</sup> and are made of copper or aluminum.
- Unscrew the cable gland and remove the cap
- Run the cable through the cable gland ⑪
- Connect the PV array (+ and -) to the DC input terminal block ⑬ (tightening torque 20 Nm)
- When finished, confirm the polarity is correct for each string.
- Pull each cable to check its tightness.

**- SX / -SX2 Models**

In the DC Wiring Box models, the PV array is connected to the inverter through quick fit input connectors (MPTT) ⑭ located at the bottom of the mechanics.

- Based on PV system configuration, inputs can be set as 3 independent MPPTs or as a single MPPT with the three paralleled input channels. Paralleled inputs can be obtained by installing the bar (provided) on the paralleled MPPT connection points ⑭ using the 3 M5x12 screws (tightening torque 4.0Nm)
- Quick fit connectors are divided into 3 groups (a group for each input MPPT), each composed of 5 couples of quick fit connectors. Refer to document "String inverters – Product manual appendix" available on ABB website [www.abb.com/solarinverters](http://www.abb.com/solarinverters) to find out the make and model of the quick fit connector used on the inverter. Depending on the type of quick fit connectors installed on your inverter, you will have to use the same type for the corresponding counterparts (after checking for compliant counterpart on the manufacturer's website or with ABB).

**The use of non-matching counterparts for the quick fit connectors installed on the inverter may seriously damage the inverter and invalidates the product warranty.**

- Connect all strings to the appropriate quick fit connectors (+ and -) following the site wiring diagrams e check the tightness of each single connection.

If some string inputs are not used, ensure that caps are installed on the connectors; install them if missing. This operation is necessary for the tightness of the inverter and to avoid damaging the free connector that may be used at a later date.

- When wiring is complete, attach the front cover ⑩ to the DC Wiring Box (8 screws, tightening torque 2.4Nm).

- Mount the 3 conducting springs ② between the Power Module cover ⑩ and the DC Wiring Box cover, in the unpainted areas. (Paragraph 6 - FIG. 9)

**13. Features and Technical Data**

	TRIO-TM-50.0-400	TRIO-TM-60.0-480
<b>Input</b>		
Maximum absolute input voltage (Vmax,abs)	1000 V	
Input activation voltage (Vstart)	420...700 V (default 420 V)	420...700 V (default 500 V)
Operating DC input voltage range (Vdcmín...Vdcmax)	0.7xVstart...950 V (min 300 V)	0.7xVstart...950 V (min 360 V)
Rated DC input voltage (Vdcr)	610 V	720 V
Rated DC input power (Pdcr)	52000 W	61800 W
No. of independent MPPTs	3 (-SX and -SX2 versions) / 1 (standard and -S versions)	
Maximum input power for each MPPT (PMPPT,max)	17500 W	21000 W
MPPT DC voltage range (VMPPT min ... VMPPT max) at Pacr	480...800 V	570...800 V
Maximum DC input current (Idc max) for each MPPT		36 A
Maximum input current short circuit current (Idc max) for each MPPT		55A (165A for paralleled MPPTs)
Maximum backfeed current (AC side vs DC side)		Negligible in normal operating conditions <sup>(3)</sup>
No. of DC input pairs for each MPPT		5 (-SX and -SX2 versions)
DC connection type	Screw terminal block (standard and -S models) / PV quick fit connector <sup>(4)</sup> (-SX and -SX2 models)	
Types of PV panels that can be connected as input according to IEC 61730		Class A
<b>Input Protection</b>		
Reverse polarity protection	Yes, from a limited current source	
Input overvoltage protection for each MPPT - Varistors	Yes, 1 for each MPPT	
Input overvoltage protection for each MPPT - Modular overvoltage dischargers	Class II (optional) with monitoring (-SX and -SX2 versions)	
Isolation control	According to local standards	
Characteristics of the DC disconnect switch for each MPPT (models with DC disconnect switch)	1000 V / 60 A for each MPPT (180 A for paralleled MPPTs)	
String fuses (models with fuses)	15 A / 1000 V / gPV	
<b>Output</b>		
AC connection to the grid	3Ø, grounded WYE system only, 3W + GND (w/o N wire) or 4W + GND (with N wire)	
Rated AC output power (Pacr@cosφ=1)	50000 W	60000 W
Maximum AC output power (Pac max@cosφ=1)	50000 W	60000 W
Maximum apparent power (Smax)	50000 VA	60000 VA
Rated AC grid voltage (Vacr)	400 Vac	480 Vac
AC output voltage range (Vacmin...Vacmax)	320...480 Vac <sup>(1)</sup>	384...571 Vac <sup>(1)</sup>
Maximum AC output current (Iac max)		77 A
Contributory fault current		92 A
Rated output frequency (fr)		50 / 60 Hz
Output frequency range (fmin...fmax)		47...53 / 57...63 Hz <sup>(2)</sup>
Rated power factor and adjustable range		> 0.995, 0...1 inductive/capacitive with max Smax
Total current harmonic distortion		< 3%
Maximum AC cable cross-section allowed	95 mm <sup>2</sup> copper (150 mm <sup>2</sup> copper/aluminum with TRIO-AC-WIRING KIT)	
AC connection type	Screw terminal block, cable gland PG42 <sup>(7)</sup> (factory installed) or 5 individual M32 cable glands (not supplied)	
<b>Output Protection</b>		
Anti-islanding protection	According to local standard (Active Frequency Drift combined with RoCoF techniques)	
Maximum external AC overcurrent protection	100 A	
Output overvoltage protection - Varistor	Yes	
Output overvoltage protection - Modular overvoltage discharger (-SX model)	Class II (optional)	
<b>Operating Performance</b>		
Maximum efficiency (ηmax)	98.3%	98.5%
Weighted Efficiency (EURO/CEC)		98% / -
<b>Communication</b>		
Integrated communication interface	2x RS485, 2x Ethernet (RJ45), WLAN (IEEE802.11 b/g/n @ 2,4 GHz)	
Communication protocol:	Modbus RTU / TCP (Sunspec compliant); Aurora Protocol	
Remote monitoring services	Standard access level to Aurora Vision's monitoring portal	
Advanced features	Integrated Web User Interface; Display (optional); Registration and direct data transfer to the Cloud	
<b>Environment</b>		
Ambient temperature	-25...+60°C / -13...140°F with derating over 45°C / 113°F	
Storage temperature	-40°C...+85°C / -40°F...185°F	
Relative humidity	4...100% condensing	
Sound pressure level, typical	75 dB(A) @ 1 m	
Maximum operating altitude without derating	2000 m / 6561 ft	
Classification of the degree of environmental pollution for the external environment	3	
Environmental category	Outdoor	
<b>Physical Specs</b>		
Environmental protection rating	IP 65 (IP54 for cooling section)	
Cooling System	Forced air	
Dimensions (H x W x D)	725 mm x 1491 mm x 315 mm / 28.5" x 58.7" x 12.4"	
Weight	95 kg / 209 lb overall, 66 kg / 145 lb m electronic compartment, 15 kg / 33 lb AC Wiring Box (full optional), 14kg / 31 lb DC Wiring Box (full optional)	
<b>Mounting system</b>	Wall bracket, horizontal support	
Overvoltage category according to IEC 62109-1	II (DC input) III (AC output)	
<b>Safety</b>		
Isolation level	Transformerless	
Marking	CE <sup>(5)</sup>	
Safety class	I	

1. The output voltage range may vary depending on the specific grid standards of each country  
2. The output frequency range may vary depending on the specific grid standards of each country  
3. In case of failure, it is limited by the external protection device on the AC circuit  
4. Refer to document "String inverters – Product manual appendix" available on ABB website [www.abb.com/solarinverters](http://www.abb.com/solarinverters) to find out the make and model of the quick fit connector used on the inverter.  
**Note. The features that are not specifically mentioned in this data sheet are not included in the product.**

5. Only 50Hz  
6. Max. installable size 20A  
7. PG42 reduced cable entry from 25 to 31mm

**Contact us**

[www.abb.com/solarinverters](http://www.abb.com/solarinverters)

TRIO-TM-50.0\_60.0-Quick Installation Guide EN-RevB  
EFFECTIVE 18/09/2017  
© Copyright 2017 ABB. All rights reserved.  
Specifications are subject to change without notice.

**ABB**