ABB solar inverter

Quick Installation Guide
REACT-3.6/4.6-TL
(3.6 to 4.6 kW)

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

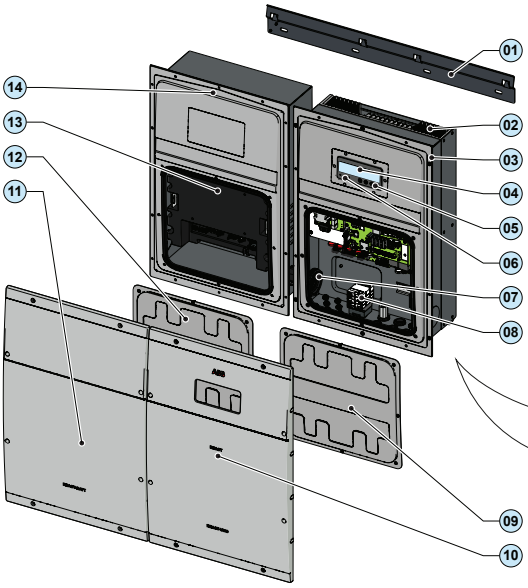
Power and productivity
for a better world™

Quick Installation Guide
REACT-3.6/4.6-TL
(3.6 to 4.6 kW)

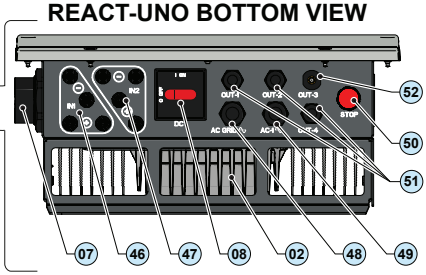
EN

Index

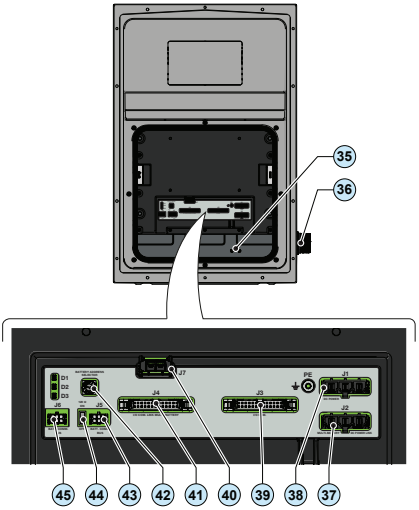
01 wall bracket	31 battery communication and control cable
02 heat sink	32 battery power cable
03 REACT-UNO	33 battery protection fuse
04 display	34 smoke sensor (inverter)
05 keypad	35 ground connection points
06 LED panel	36 cable conduit (male)
07 cable conduit (female)	37 power connector (cable from unit on the left)
08 DC disconnect switch	38 power connector (cable from unit on the right)
09 cover for area of inverter unit connections	39 connector for communication and control (cable from unit on the right)
10 plastic cover for inverter unit	40 smoke sensor (battery)
11 plastic cover for battery unit	41 connector for communication and control (cable from unit on the left)
12 cover for area of battery unit connections	42 Rotary switch (RS485 internal line address)
13 battery pack	43 connector for internal communication line (cable from unit on the right)
14 REACT-BATT-AP1	44 termination switch for internal communication line
15 VSN300 Wi-Fi Logger Card	45 connector for internal communication line (cable from unit on the left)
16 expansion board connector	46 input connectors (MPPT1)
17 RJ45 connectors for serial RS485 PC	47 input connectors (MPPT2)
18 termination switch for PC RS485 line	48 AC cable gland
19 termination switch for METER RS485 line	49 AC cable gland (back-up)
20 termination switch for M-B RS485 line	50 emergency button
21 communication and control signal terminal block	51 service cable glands
22 multifunctional relay terminal block	52 Wi-Fi antenna support
23 Load Manager Box	53 Wi-Fi antenna
24 AC output (back-up) terminal block	54 REACT-MTR-1PH
25 AC output terminal block	55 hole for line cable
26 SD card holder	56 AC power supply terminal block
27 DC connectors (MPPT2)	57 METER RS485 serial terminal block
28 DC connectors (MPPT1)	58 REACT-MTR-3PH
29 input mode selection switch	59 terminal block for three-phase connection
30 battery housing	60 METER RS485 serial terminal block



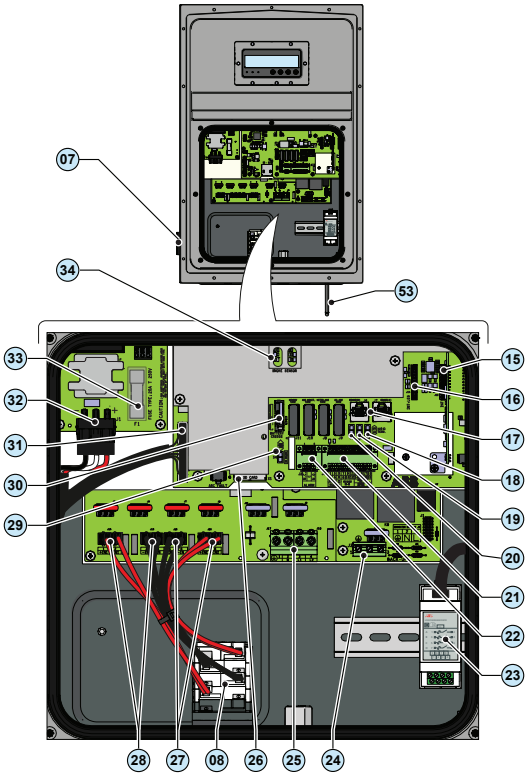
REACT-UNO BOTTOM VIEW



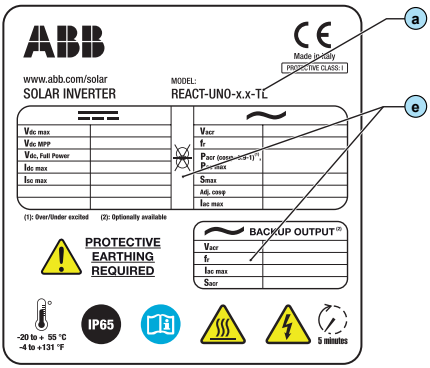
REACT-BATT DETAILS

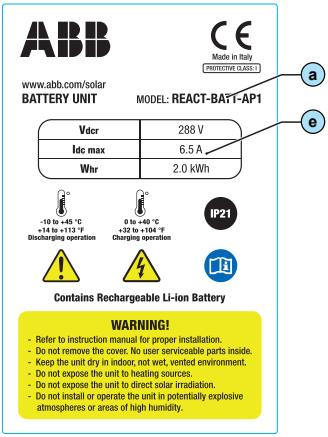


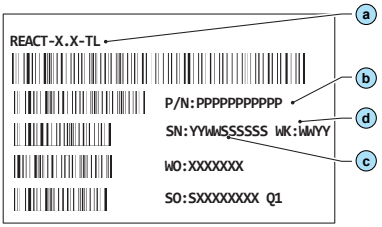
REACT-UNO DETAILS



The labels on the inverter and on battery unit have the Agency marking, main technical data and identification of the equipment and manufacturer







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

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

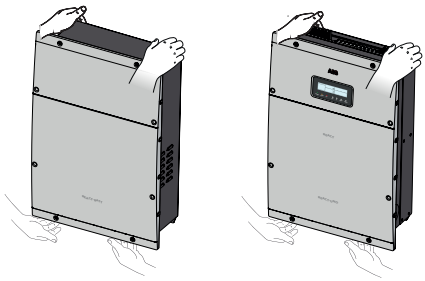
In the manual and/or in some cases on the equipment, the danger or hazard zones are indicated with signs, labels, symbols or icons.

Always refer to instruction manual	General warning - Important safety information	Hazardous voltage
IP65 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	10 minutes Time need to discharge stored energy

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

Lifting
The means used for lifting must be suitable to bear the weight of the equipment.

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
REACT-UNO-3.6/4.6-TL	30kg / 66.1lb	4 (2 people)
REACT-BATT-AP1	37kg / 81.5lb	4 (2 people)

Available components for REACT-UNO	Quantity
Connector for connection of the configurable relay	2
Connector for connecting the communication and control signals	2
Male key TORX TX20	1
Jumper for configuration of the parallel input channels	1
Bracket for wall mounting	1
Plugs, screws and washers for wall mounting	12 + 12 + 12
Two-hole gasket for M25 service cable glands and cover	2 + 2
Two-hole gasket for M20 service cable glands and cover	3 + 3

Available components for REACT-UNO	Quantity
Wi-Fi antenna	1
EMI filter for AC cable gland (back-up)	1
IP65 cover (with fastening ring nut) for individual installation on REACT-UNO	1
Technical documentation	1

Available components for REACT-BATT	Quantity
Cable conduit (male)	1
Technical documentation	1

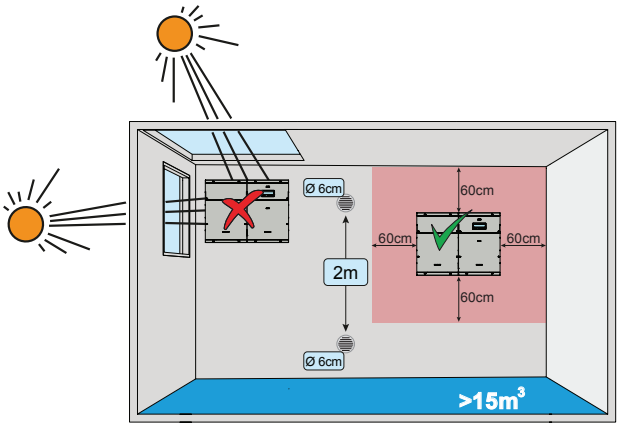
Environmental checks

• The installation location must be easily accessible

• Prevent access to the installation location by children

• The minimum air volume in the installation location must be 15m³ and equipped with two openings with a diameter of 6cm for natural air circulation. If the two openings are located in the same wall they must be made at a minimum distance of 2 metres from each other.

• Installation of the unit in a location exposed to solar rays must be avoided as it may cause:
- power limitation phenomena in the inverter (with a resulting decreased energy production by the system)
- premature wear of the electrical/electromechanical components
- premature wear of the mechanical components (gaskets) and of the user interface (display)
- reduction in performance, lifetime and possible damage of the battery pack



• 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 in locations with a constant presence of water and/or high humidity level.

• Do not install in rooms where people live or where the prolonged presence of people or animals is expected, because of the noise (around 50dB(A) at 1 m) that the inverter produces during operation.

• Avoid electromagnetic interference that can compromise the correct operation of electronic equipment, with the consequent hazards

• The ambient temperature of the installation location must be between 5°C and 35°C to guarantee the optimal operation of the battery unit (REACT-BATT-AP1). Here below are the functions available from the system on the basis of the ambient temperature:
T1 - Optimal operation of the REACT system
T2 - Correct operation of the REACT system with possible reduction in the lifetime of the batteries
T3 - Partial operation of the battery which limits its functioning to discharge only
T4 - Operation limited to the inverter part only. Management of the battery is disabled.

• Consult the technical data to check the required environmental conditions (protection rating, temperature, humidity, altitude, etc.)

Final installation of the REACT system must not compromise access to any externally located disconnection devices.

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

Installation position

When choosing the place of installation, observe the following conditions:

• Install on a wall or strong structure capable of bearing the weight of the equipment

• Install in safe, easy to reach locations

• If possible, install at eye-level so that the display and status LEDs can be seen easily

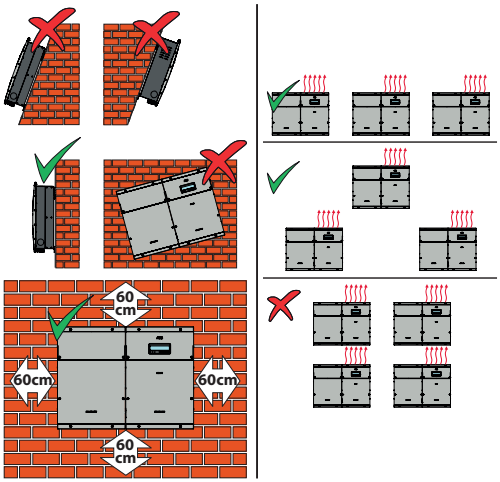
• Install at a height that considers the heaviness of the equipment. Failure to meet this condition could result in problems during servicing, unless suitable means are provided to carry out the operation

• Install vertically with a maximum inclination of 5° (forward or backward). If this condition cannot be met, the inverter could undergo derating due to high temperature because of poor heat dissipation.

• The installation must take account of any electrical devices (e.g. lamps, switches, etc.) which must be at least 60cm from the equipment. These distances must be maintained also to facilitate the circulation of the air needed to cool the unit and to facilitate the operations to install/maintain hardware and software which is done by dismantling the covers placed on the front.

• For a multiple installation, position the inverters side by side.

• If the space available does not allow this arrangement, position the inverters in a staggered arrangement as shown in the figure so that heat dissipation is not affected by other inverters.



Wall installation of the REACT system

STEP A:

• Position the bracket (01) so that it is perfectly level on the wall and use it as a drilling template.
• Make the 4 holes necessary, using a drill with a 10 mm. diameter bit. The depth of the holes must be around 70 mm.
• Install four 10mm diameter wall plugs in the holes and fix the bracket to the wall using 4 screws with washers (A) (supplied).

STEP B:

• Lift and fasten the REACT-UNO (03) to the wall bracket (01) by inserting the springs that are on the bracket itself into the 2 holes on the rear bracket of the REACT-UNO (03).

Risk of injury due to the weight of the equipment.

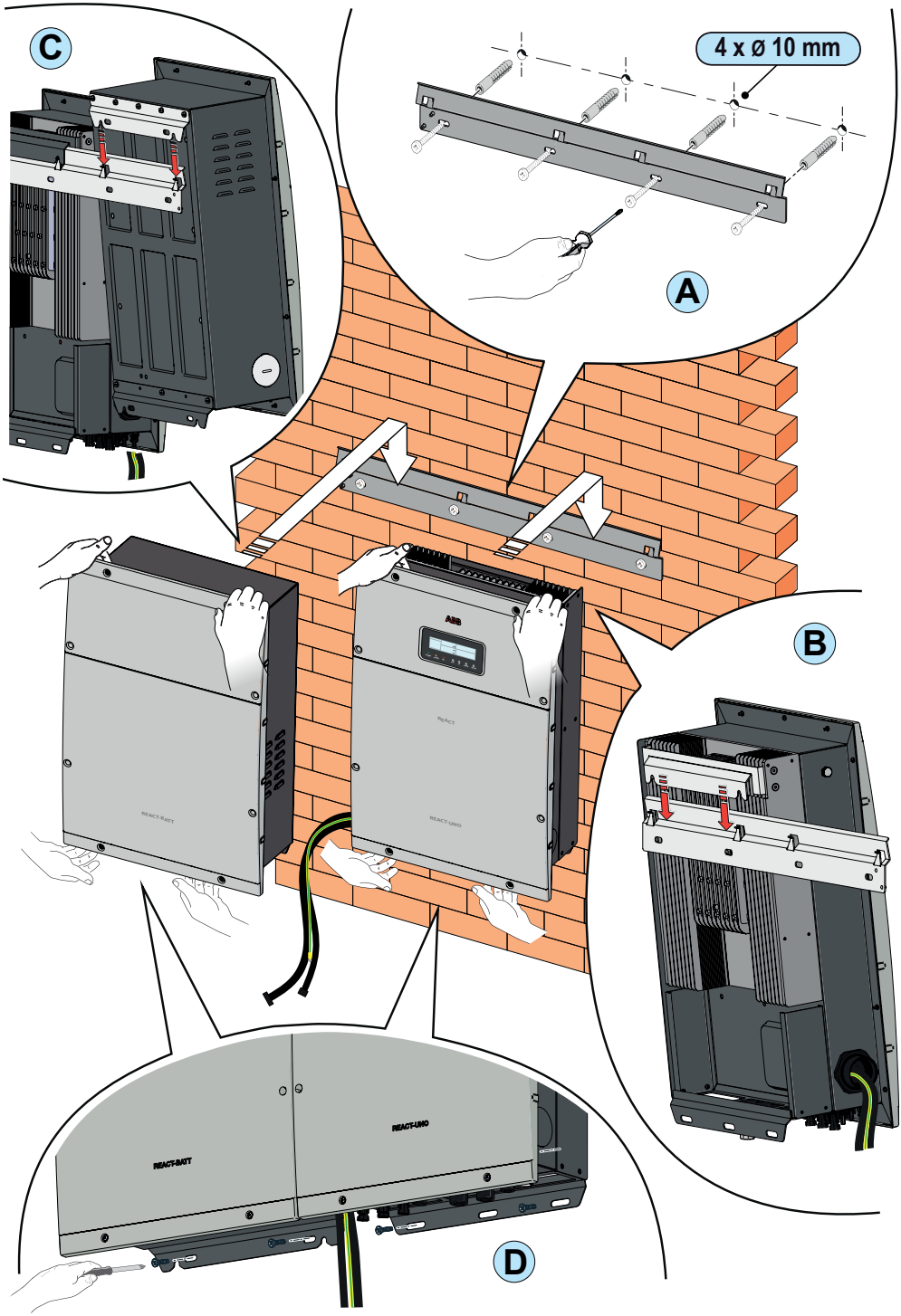
STEP C:

• Lift and fasten the REACT-BATT (14) to the wall bracket (01) by inserting the springs that are on the bracket itself into the 2 holes on the rear bracket of the REACT-BATT (14).

Risk of injury due to the weight of the equipment.

STEP D:

• Anchor the lower part of the REACT to the wall by installing 4 plugs (10 mm. diameter supplied). Then screw in 4 screws with washers into the holes on the lower side of the equipment.


4 x ø 10 mm
A
B
C
D
REACT-BATT
REACT-UNO

Preliminary connections

Warning! Dangerous voltage on the terminals of the power connector. Be careful not to touch the terminals with fingers or with uninsulated equipment. Make the connections using personal protective clothing and/or equipment, such as insulating gloves.

• Remove the plastic covers installed on the REACT-UNO (03) and on the REACT-BATT (14) (16 screws in total). Then remove the metal covers of the compartments for the electric connections (16 screws in total).

STEP A:

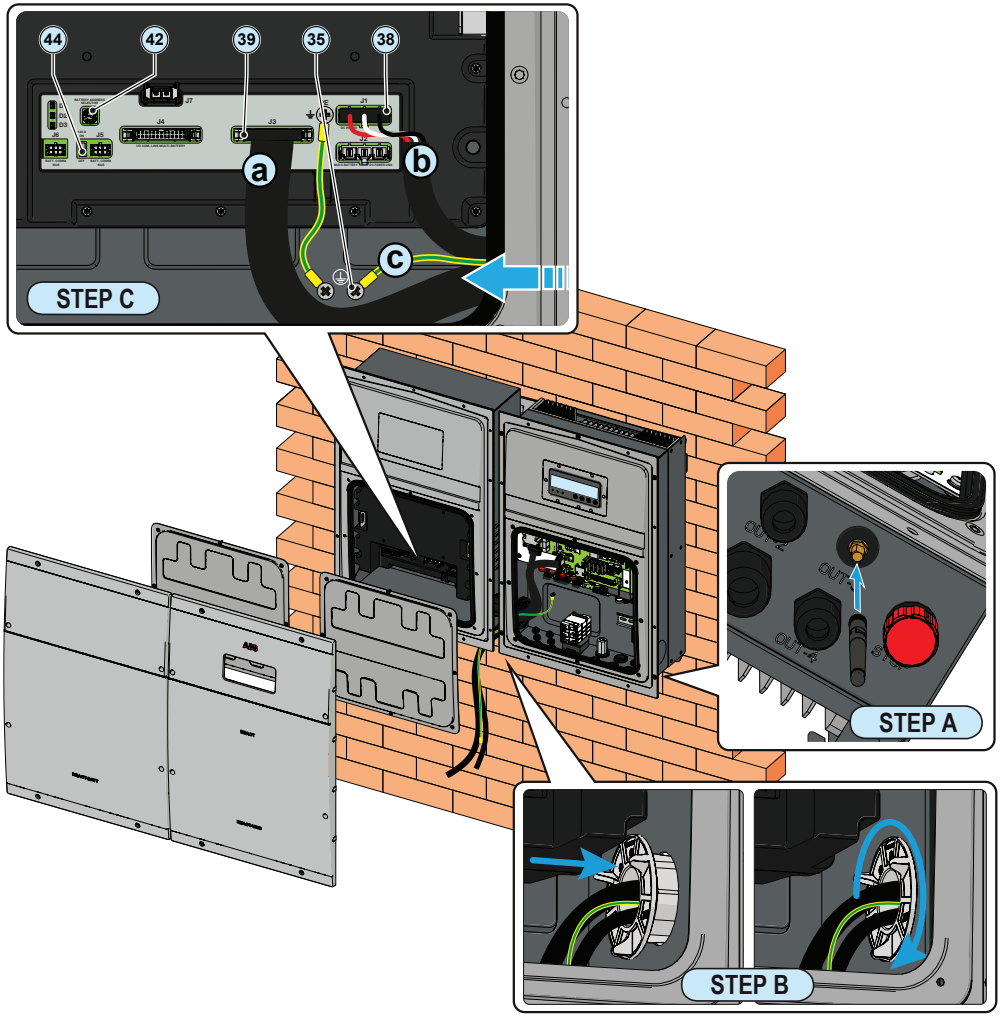
• Remove the protective cover from the support of the Wi-Fi antenna (52) located on the lower part of the REACT-UNO (03) and install the Wi-Fi antennai (53) by screwing it into the specific connector.

STEP B:

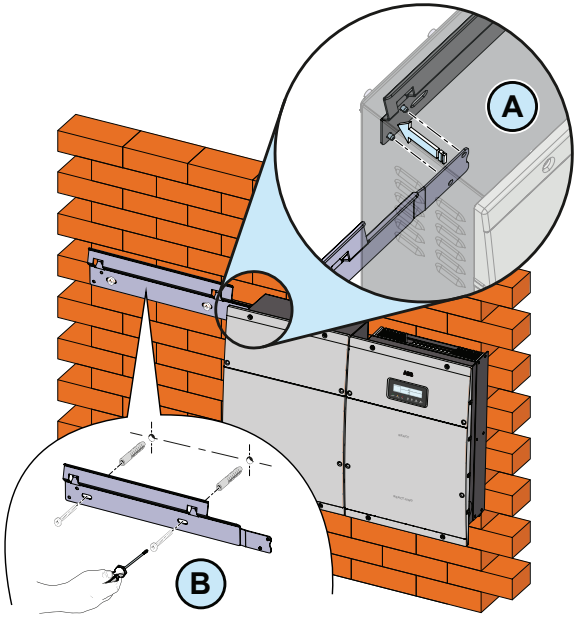
• Insert the battery pack connection cables (which come out of the inverter) into the REACT-BATT (14) using the hole present on the side of the mechanical cover.
• Feed the cables into the cable conduit (male) supplied with the REACT-BATT (14).
• Insert the cable conduit (male) (36) into the REACT-BATT (14) and screw it into its counterpart (cable conduit (female) (07) on REACT-UNO (03).

STEP C:

• Connect the cables to the respective counterparts on the battery pack respecting the positions:
(a) Communication and control cable on the communication and control connector (cable from the unit on the right) (39).
(b) Power cable on the power connector (cable from the unit on the right) (38).
(c) Ground cable on the ground connection points (35).



In the case of insertion of one or more additional batteries (a maximum of 3 units is permitted) it is necessary to use the multi-battery installation kit.



The wall mounting bracket for the REACT system comes already predisposed to fit additional battery units without needing to unfasten or dismount the already installed units.

• Couple the supplementary bracket with the pins already present on the REACT wall mounting bracket (01) (**STEP A**).

• Use the slots and holes on the additional bracket as a drilling template to make the necessary holes. Specific anchors must be used based on the type of wall (**STEP B**).

The anchors must guarantee correct support for the unit. The type of wall will dictate the size and type of anchors to be used. Select a size taking into consideration a total load of more than 4 time that of the inverter (148kg), distributed on at least 2 fixing points on the wall bracket.

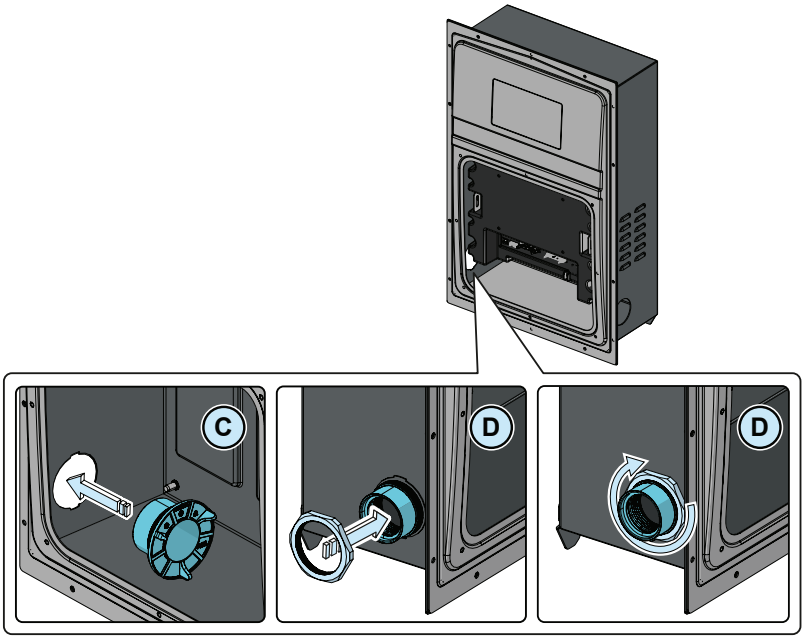
• Drill the required holes and fix the bracket to the wall using the appropriate rawl plugs and screws (**STEP B**).

• Remove the plastic cover from the previously installed REACT-BATT unit (11) (total of 8 screws). Successively remove the metal cover from the electrical connections compartment (12) (total of 8 screws).

• Remove the M63 cap on the left side of the already installed REACT-BATT unit.

• Insert in the hole the gland (female) provided with the multi-battery installation kit (**STEP C**).

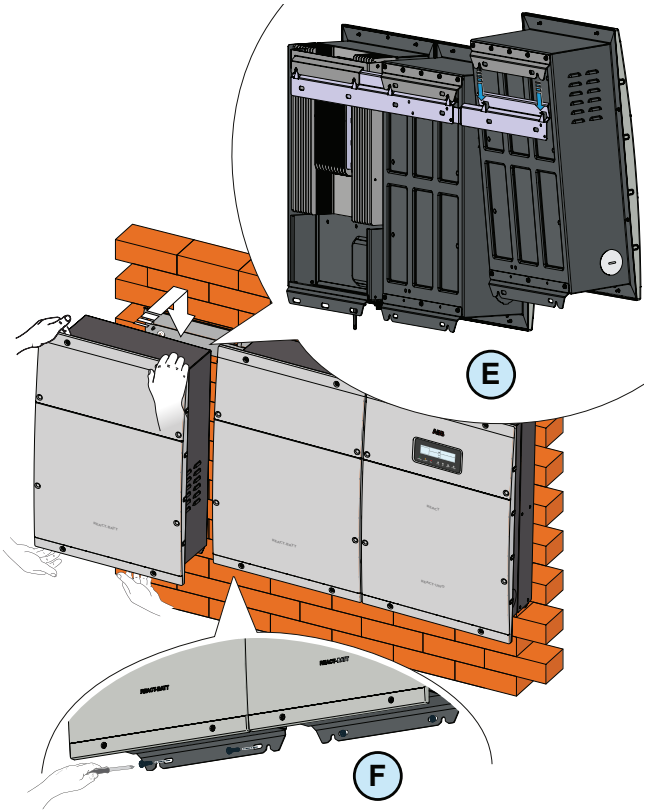
• Proceed with tightening by using the apposite nut (inlcude in the multi-battery system installation KIT) (**STEP D**).



• Lift and fasten the unit to the wall bracket by inserting the springs that are on the bracket itself into the 2 holes on the rear bracket of the REACT-BATT (14) (**STEP E**).

Risk of injury due to the weight of the equipment.

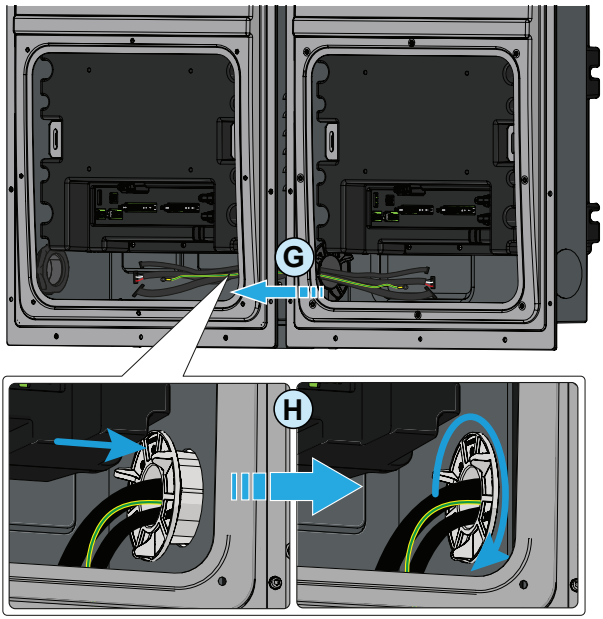
• Anchor the lower part of the additional REACT-BATT unit to the wall by installing 2 plugs (10 mm. diameter supplied). Then screw in 2 screws with washers into the holes on the lower side of the equipment. (**STEP F**).



• Insert the cables to connect the additional REACT-BATT unit (cables are supplied with the installation kit for multi-battery systems) inside the newly installed cable duct and into the new REACT-BATT unit using the hole on the side of the mechanical enclosure (**STEP G**).

• Introduce the cables into the male cable routing duct supplied with the REACT-BATT (**STEP G**).

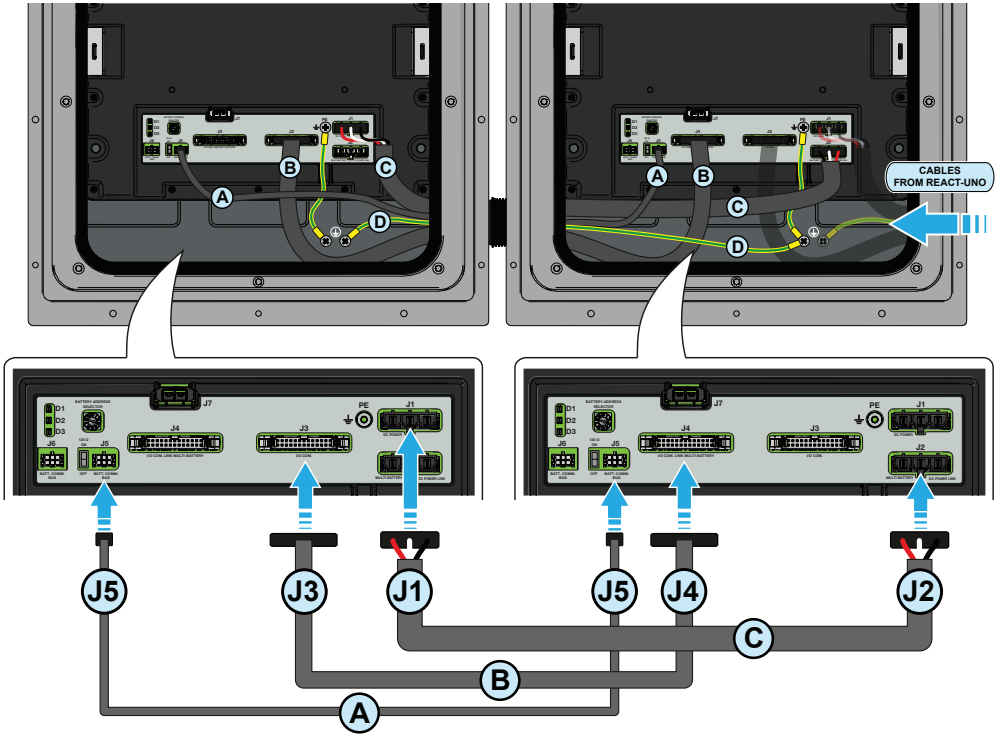
• Insert the male cable routing duct inside the new REACT-BATT unit (14) and screw it into its counter-part (female cable routing duct) installed on the old REACT-BATT unit. (**STEP H**)



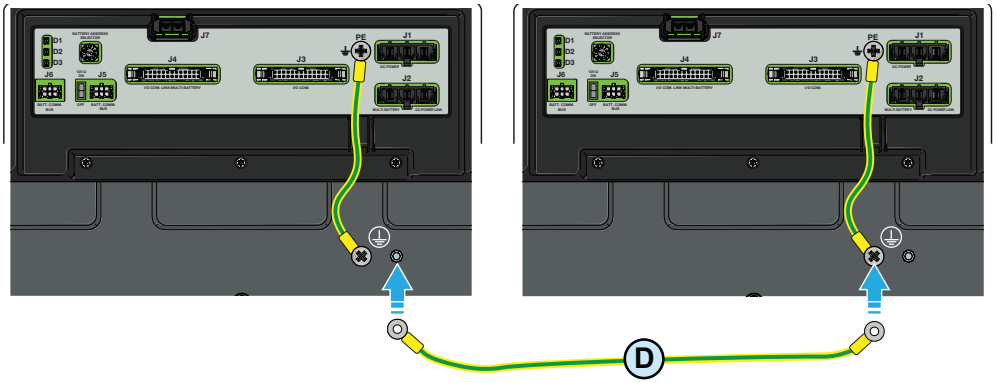
• Connect the cables into their respective counterparts on the battery pack, respecting the following positions:

Cable	New battery unit connector	Old battery unit connectors
Cable A: Battery communication cable	J5 (43)	J5 (43)
Cable B: I/O Communication cable	J3 (39)	J4 (41)
Cable C: Power cable	J1 (38)	J2 (37)

Warning! Dangerous voltage on the terminals of the power connector. Be careful not to touch the terminals with fingers or with uninsulated equipment. Make the connections using personal protective clothing and/or equipment, such as insulating gloves.

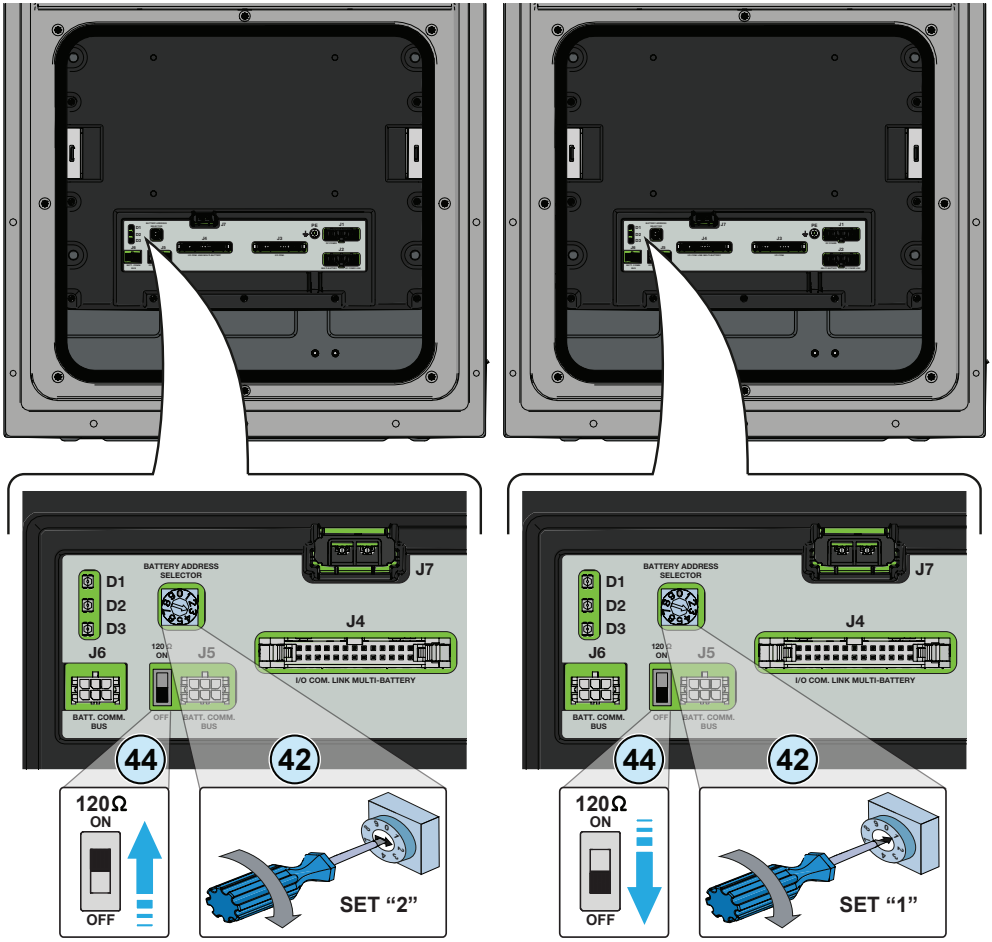


• Connect the ground cable (Cable D) into the corresponding ground connection points (35):



• Set the addresses of the battery units using rotary switch (42): each BATT-REACT unit must have a different address (e.g., unit already installed: 1, new unit: 2)

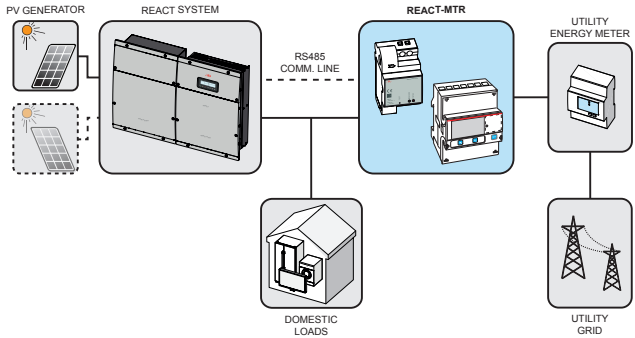
• In the last unit of the chain (the leftmost unit), set the RS485 line termination switch (44) to the “ON” position.



Warning – The meter must always be protected by fuses or circuit breakers on the incoming side. It is recommended that the input voltage sensing is protected by fuses rated 6A (gL–gG type) or by circuit breakers rated 6A (B/C type) installed near the meter.

To avoid risks of electrical shock, all wiring operations must be carried out with the AC disconnect switch (or the supply meter) upstream of the REACT-MTR disconnected.

The indications set out below are necessary to connect the REACT-MTR to the REACT system. Always refer to the specific documentation supplied with the REACT-MTR.



Connection of the REACT-MTR-1PH

• Strip 8/10mm of sheathing from the connection cables of the AC power supply and connect the phase (L) and neutral (N) on the specific terminal block (56) set on the upper side of the meter; each individual terminal of the terminal block takes a cable with a maximum section from 0.5 to 4mm² (tightening torque of 0.5Nm).

• Connect the cables of the serial line (+T, -T and RTN) on the terminal block (57) on the lower part of the REACT-MTR. Each individual terminal of the terminal block takes a cable with a section from 0.14 to 1.5mm² (tightening torque of 0.5Nm).

• Subsequently the cable must be connected inside the REACT-UNO respecting the correspondence between the signals of the serial line.

• Connect the serial RS485 METER line (To connect the serial cable inside the inverter, refer to the section “Connection of RS485 METER serial communication line” in this chapter).

Serial line terminal block of the REACT-MTR (57)	Communication and control signal terminal block (21) of the REACT-UNO
+T	Terminal 16 (+T/R)
-T	Terminal 14 (-T/R)
RTN	Terminal 18 (RTN)

• Install the device on the DIN rail and ensure to trigger the fixing system on it

• Disconnect the phase cable (L) of the electric supply

• Insert the phase cable (L) through the hole (Ø8mm) on the REACT-MTR-1PH (54). The arrow corresponding to the hole for the feeding of the line cable (55), indicates the direction of insertion which must be complied with for correct measurement of the current; in fact the direction of the arrow indicates the supply point of the electric energy (as indicated in the diagram)

• Once the connection stage is finished, the correct installation of the REACT-MTR-1PH must be verified (54):
- Power the REACT-MTR-1PH while keeping the REACT system off
- Action a load (of at least 50W) in the house so that the REACT-MTR records drawing of current from the grid
- Check that the LED MEASURE (red) is permanently on. This condition indicates that a drawing from the grid is recorded and so that the reading of the direction of the current by the REACT-MTR is correct.

Connection of the REACT-MTR-3PH

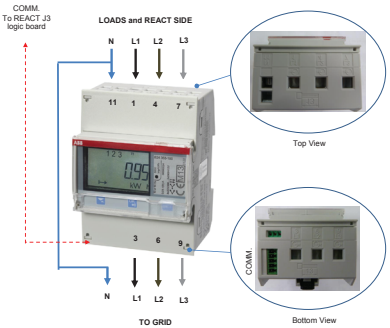
• Disconnect the AC disconnect switch upstream of the REACT-MTR.

• Strip the insulation of the cable for the length which is indicated on the meter (13mm).

• Connect the cables of the three-phase line in accordance with the layout printed on the meter (L1, L2, L3 and N) to the three-phase connection terminal block (59) and tighten the screws (tightening torque 2.0 Nm). Take note of the phase to which the REACT system is connected; this information will be requested when the system is commissioned.

• Connect the serial RS485 METER line (To connect the serial cable inside the inverter, refer to the section “Connection of RS485 METER serial communication line” in this chapter).

Serial line terminal block of the REACT-MTR (60)	Communication and control signal terminal block (21) of the REACT-UNO
36B (+T/R)	Terminal 16 (+T/R)
37A (-T/R)	Terminal 14 (-T/R)
35C (RTN)	Terminal 18 (RTN)



• Install the device on the DIN rail and ensure to trigger the fixing system on it

• Once the phase of mechanical installation of the METER is finished, it is necessary to configure the METER in order to make it compatible with the REACT system. Set the parameters of the meter as set out in the table:

Parameter	Settings
Address	1
Protocol	MODBUS
Baudrate	57600
Parity	EVEN

The settings are made by using the keypad and the display on the meter:

1. Press for two seconds OK to access the setup menu of the meter.

2. Press repeatedly ▼ until the display shows “Set”.
- Press OK to confirm.

3. Press repeatedly ▼ until the display shows “RS-485”.
- Press OK to confirm.

4. Press repeatedly ▼ until the display shows “Protocol”.
- Press OK to access.
- Press SET to enable the change in the value.
- Press repeatedly ▼ until the display shows “Modbus”.
- Press OK to confirm the change.
- Press for two seconds OK to return to the RS485 menu.

5. Press repeatedly ▼ until the display shows “Baud rate”.
- Press OK to access.
- Press SET to enable the change in the value.
- Press repeatedly ▼ and select 57600.
- Press OK to confirm the change.
- Press for two seconds OK to return to the RS485 menu.

6. Press repeatedly ▼ until the display shows “Address”.
- Press OK to access.
- Press SET to enable the change in the value.
- Press repeatedly ▼ and select 1.
- Press OK to confirm the change.
- Press for two seconds OK to return to the RS485 menu.

7. Press repeatedly ▼ until the display shows “Modbus”.
- Press OK to access.
- Press SET to enable the change in the value.
- Press repeatedly ▼ and select even.
- Press OK to confirm the change.

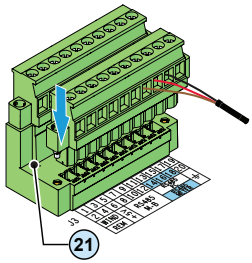
Connection of RS485 METER serial communication line

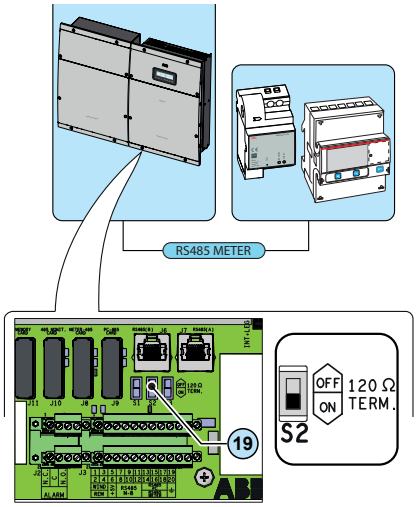
Connection of the REACT-MTR to the RS485 METER (21) communication line must be made respecting corresponding signals and activating the termination resistance of the communication line via the RS485 METER line termination switch (19) (to the ON position)

Do not connect units in a chain following the “daisy-chain” (“in-out”) configuration on the RS485 METER line

• Connect the signals respecting the following positions:

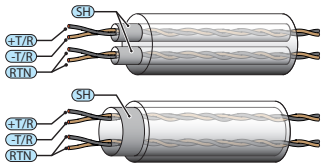
Terminal name	Terminal number	Description
RS485 METER	14	-T/R RS485 METER communication line
	16	+T/R RS485 METER communication line
	18	Reference (RTN) of the RS485 METER communication line





• For long distance connections, it is preferable to use a shielded twisted pair cable with characteristic impedance of Z0=120 Ohm like the one shown in the following table:

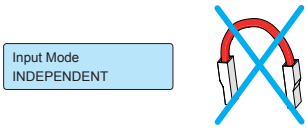
Signal	Symbol
Positive data	+T/R
Negative data	-T/R
Reference	RTN
Shield	SH (⏚)

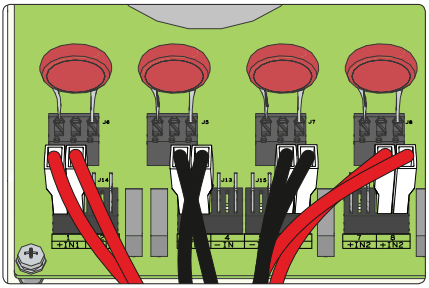


• Shield continuity must be provided along the communication line and must be grounded at a single point using terminal 19 or 20 (⏚).

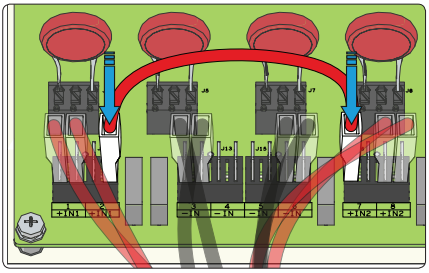
All versions of the inverter are equipped with two input channels (therefore with double maximum power point tracker MPPT) independent of each other, which can however be connected in parallel using a single MPPT.

Independent channel configuration (default configuration)
This configuration uses the two input channels (MPPT) independently.
This means that the jumper (supplied) between the positive poles of the DC (MPPT1) connectors (28) and the DC (MPPT2) connectors (27) must not be installed and that the mode which must be selected during the guided setup for commissioning the system is “INDEPENDENT”.





Parallel channel configuration
This configuration uses the two input channels (MPPT) connected in parallel.
This means that the jumper (supplied) between the positive poles of the DC (MPPT1) connectors (28) and the DC (MPPT2) connectors (27) must be installed and that the mode which must be selected during the guided setup for commissioning the system is “PARALLEL”.

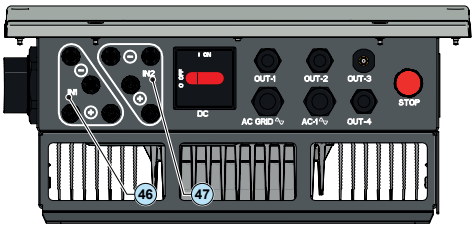


Check for correct polarity in the input strings and absence of any leakage to ground in the PV generator. When exposed to sunlight, the PV panels supply DC direct voltage to the inverter. The inside of the inverter may only be accessed after the equipment has been disconnected from the grid and from the photovoltaic generator.

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

For the string connections it is necessary to use the quick fit connectors (usually Weidmüller PV-Stick or WM4, MultiContact MC4 and Amphenol H4) located on the bottom of the mechanic (46) (47).

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



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

• Connect all the strings included in the design of the system, always checking the tightness of the connectors and checking the input polarity is correct.

Connect directly the individual input strings to the REACT-UNO. Should it be necessary to make parallel strings outside the inverter, the maximum current allowed by the individual quick fit connector must be respected, which is 18A.

• If some of the string inputs should not be used you must proceed to verify the presence of covers on DC input connectors and then install them should they be absent: this operation is necessary for the tightness of the inverter and to avoid damaging the free connector that could be used at a later date.

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 and leakage with the following characteristics:

	REACT-3.6-TL	REACT-4.6-TL
Type	Automatic circuit breaker with differential thermal magnetic protection	
Nominal Voltage	230 Vac	
Nominal Current	25 A	32 A
Magnetic protection characteristic	B/C	
Number of poles	2	
Type of differential protection	A/AC	
Differential sensitivity	300 mA	

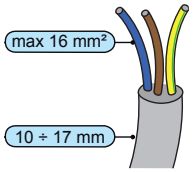
ABB declares that the ABB transformerless inverters, in terms of their construction, do not inject continuous ground fault currents and therefore there is no requirement that the differential protection installed downstream of the inverter be type B in accordance with IEC 60755 / A 2.

Characteristics and sizing of the line cable

Three-pole cable required. 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.

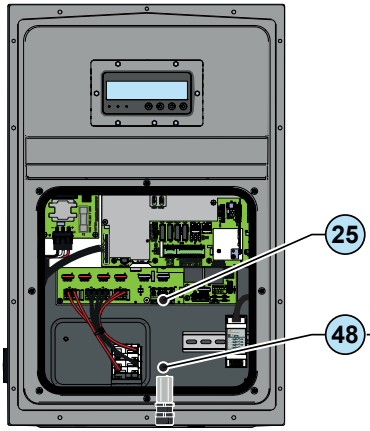
Cross-section of the line conductor (mm²)	Maximum length of the line conductor (mt)	
	REACT-3.6-TL	REACT-4.6-TL
4 mm²	16 m	10 m
6 mm²	24 m	15 m
10 mm²	41 m	25 m
16 mm²	65 m	40 m

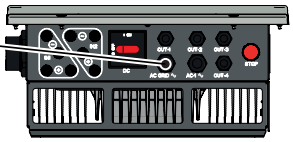
The values are calculated in nominal power conditions, taking into account:
1. a power loss of not more than 1% along the line.
2. copper cable, with HEPR rubber insulation, laid in free air



Warning! Before performing any of the operations described below, ensure the AC line downstream the inverter has been correctly disconnected

Warning! ABB inverters should be earthed (PE) via the terminal with the protective earth label ⏚, using a cable with an appropriate cross-section of the conductor for the maximum ground fault current that the generating system might experience



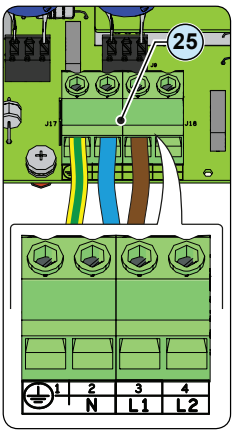


To connect the inverter to the grid you need 3 connections: ground, neutral and phase.

• Insert the grid cable into the inverter using the AC cable gland (48) called AC GRID (M25 equipped with toroid) and make the connections to the AC output terminal block (25).

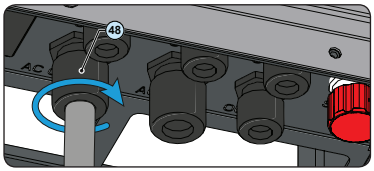
• Use a properly sized tripolar cable and check the tightness of the AC cable gland (48) at the end of the installation.

• Strip 10mm of sheathing from the cables to connect to the AC grid, then insert into the inverter the AC line cable, making it pass through the AC cable gland (48); the maximum diameter of the cable accepted by the cable gland is from 10 to 17 mm².



• Connect on the cable gland (25) the ground cable (yellow-green) to protect against contact marked by the symbol ⏚, the neutral cable (usually blue) to the terminal marked by the letter **N** and the phase cable to the terminal marked by the screen-print **L1**; every individual terminal of the terminal block accepts a cable with maximum section of 16 mm² (It is necessary to fix the AC cables to the terminal block with a tightening torque of at least 1,5 Nm).

• Once the connection to the terminal block has been made, firmly screw the cable gland (7.5 Nm tightening torque) and check the tightness.



Load protection breaker (AC disconnect switch) and backup cable sizing

To protect the AC connection for the the backup output of the inverter, we recommend installing a device for protection against over current and leakage with the following characteristics:

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.

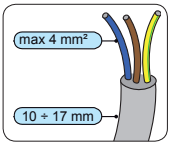
Type	Automatic circuit breaker with differential thermal magnetic protection
Nominal Voltage	230 Vac
Nominal Current	26 A
Magnetic protection characteristic	B/C
Number of poles	2
Type of differential protection	A/AC
Differential sensitivity	300 mA

Characteristics and sizing of the Backup cable

Three-pole cable required. 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.

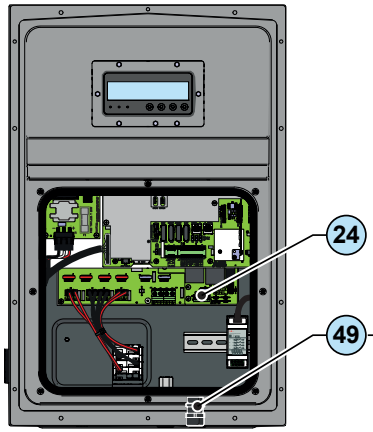
Cross-section of the line conductor (mm²)	Maximum length of the line conductor (mt)
1.5 mm²	6 m
2.5 mm²	11 m
4 mm²	19 m

The values are calculated in nominal power conditions, taking into account:
1. a power loss of not more than 1% along the line.
2. copper cable, with HEPR rubber insulation, laid in free air



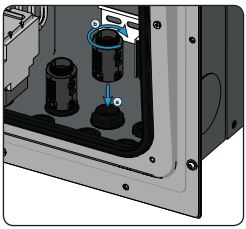
Warning! Before performing any of the operations described below, ensure the AC line downstream the inverter has been correctly disconnected

Warning! ABB inverters should be earthed (PE) via the terminal with the protective earth label ⏚, using a cable with an appropriate cross-section of the conductor for the maximum ground fault current that the generating system might experience



To connect the back-up output of the inverter, you need 3 connections: ground, neutral and phase.

• Install the filter on the AC cable gland (49) (side inside the REACT-UNO). The installation is carried out:
- (a) position the filter on the internal side of the cable gland
- (b) Screw the filter on the thread of the cable gland



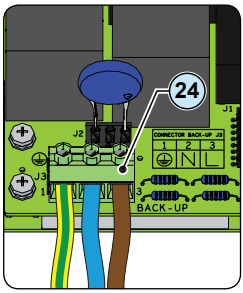
• Insert the grid cable into the inverter using the AC cable gland (49) called AC -1 (M25 equipped with toroid) and make the connections to the AC output terminal block (24).

• Use a properly sized tripolar cable and check the tightness of the AC cable gland (49) at the end of the installation.

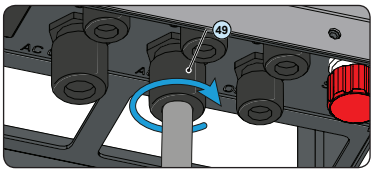
• For all the models the connection is made with the AC output terminal block (24) by passing the cables through the AC cable gland (49).

• Strip 10mm of sheathing from the cables and then insert into the inverter the cable, making it pass through the AC cable gland (49); the maximum diameter of the cable accepted by the cable gland is from 10 to 17 mm².

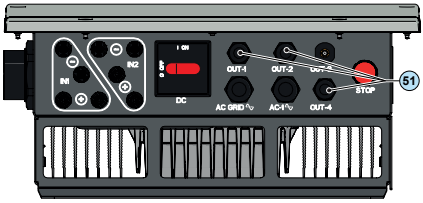
•Connect on the cable gland (24) the ground cable (yellow-green) to protect against contact marked by the symbol ⏚, the neutral cable (usually blue) to the terminal marked by the letter N and the phase cable to the terminal marked by the screen-print L; every individual terminal of the terminal block accepts a cable with maximum section of 4 mm² (It is necessary to fix the AC cables to the terminal block with a tightening torque of at least 1,5 Nm).



• Once the connection to the terminal block has been made, firmly screw the cable gland (7.5 Nm tightening torque) and check the tightness.

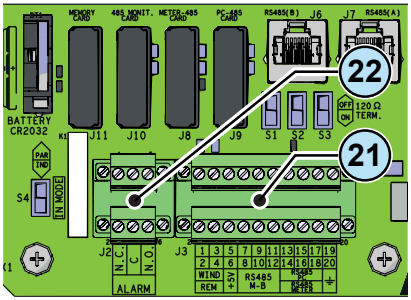


Each communication and control service cable that must be connected inside the REACT-UNO must pass through one of the four service cable glands (51) available, named OUT-1, OUT-2, OUT-3 and OUT-4. They are M20 service cable glands (51) and can take a cable with a diameter of 7 mm to 13 mm. Two-hole gaskets are supplied to be inserted into the cable gland, which allow two separate cables with cross-section of up to 5 mm to pass through.



Warning! To ensure environmental protection IP65 it is necessary to fix the cable glands to the inverter chassis with a minimum tightening torque of 7 Nm

Terminal (21) name	Terminal (21) number	Description
WIND	1, 3	External backup command
REM	2, 4	Remote external ON/OFF command
+5V	5, 6	Auxiliary 5V positive
RS485 M-B	7, 8	-T/R of the RS485 M-B (ModBus) communication line
	9, 10	+T/R of the RS485 M-B (ModBus) communication line
	11, 12	Reference (RTN) of the RS485 M-B (ModBus) communication line
RS485 PC	13	-T/R of the RS485 PC communication line
	15	+T/R of the RS485 PC communication line
	17	Reference (RTN) of the RS485 PC communication line
RS485 METER	14	-T/R of the RS485 METER communication line
	16	+T/R of the RS485 METER communication line
	18	Reference (RTN) of the RS485 METER communication line
⏚	19, 20	Ground terminal



Terminal (22) name	Terminal (22) number	Description
ALARM	N.C.	Normally closed terminal of multifunctional relay
	C	Common terminal of multifunctional relay
	N.O.	Normally open terminal of multifunctional relay

Connection of RS485 PC serial communication line

The RS485 PC serial communication line on the communication and control signal terminal block (21) is reserved for connecting the inverter to advanced configuration software or monitoring devices that communicate with the proprietary "Aurora" communication protocol.

Connection of the REACT to advanced configuration software consists of first connecting all the units in a chain in the "daisy-chain" ("in-out") configuration, respecting corresponding signals of the RS485 PC serial line, and then activating the communication line termination resistance in the last element in the chain by setting the switch for RS485 PC line termination (18) (to the ON position).

Configurable Relay connection (ALARM)

Terminal block (22) connecting to the configurable relay that allows connection of external devices which, according to the mode selected in the menu "SETTINGS > Alarm" can, for example, signal malfunctions.

The ALARM contact can be used only with systems that ensure a safety isolating additional at least (supplementary insulation in relation to the DC input voltage)

Remote control connection (REM)

The REM terminal block (21), if suitably configured, allows the "Remote ON/OFF" function to be used: this function allows remote disconnection of the inverter from the grid.

External backup command connection

The REACT system is equipped with a Backup AC output that can be activated in different operating modes that can be set via a display menu. Some modes ("Manual 1", "Manual 4" and "Auto 1") demand that entry into backup is also subordinate to the state of terminal 1 compared to terminal 3 on the communication and control signal terminal block (21).

+5V output connection

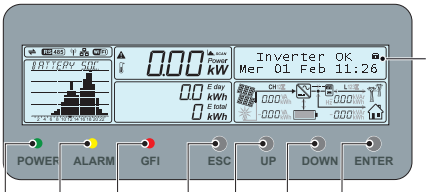
On the communication and control signal terminal block (21) there is auxiliary voltage of +5V.
The maximum absorption permitted from this auxiliary power supply voltage is 100 mA.

Connection of RS485 M-B (Modbus) serial communication line

The RS485 M-B serial communication line on the communication and control signal terminal block (21) is reserved for the connection of the inverter to monitoring devices that communicate with the Modbus public communication protocol.

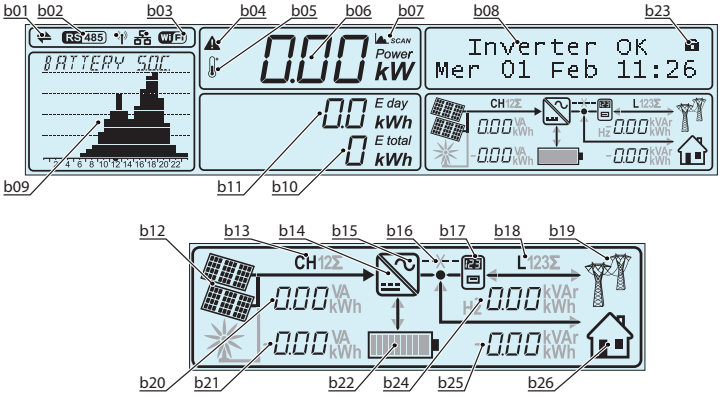
For further information regarding the configuration and use of the communication and control signals terminal block, please see the manual

LEDs and **BUTTONS**, in various combinations, can be used to view the status or carry out actions that are described more fully in the manual.



LED POWER	**GREEN** On if the inverter is working correctly. Flashes when checking the grid or if there is insufficient sunlight.
LED ALARM	**YELLOW** The inverter has detected an anomaly. The anomaly is shown on the display.
LED GFI	**RED** Ground fault on the DC side of the PV generator. The error is shown on the display. May indicate also errors relating to the operation of the battery unit.

ESC	It is used to scroll down the menu options or to shift the numerical scale in descending order
UP	It is used to scroll up the menu options or to shift the numerical scale in ascending order
DOWN	It is used to scroll down the menu options or to shift the numerical scale in descending order
ENTER	It can be used to confirm an action, to access the submenu for the selected option (indicated by the > symbol) or to switch to the next digit to be edited



Ref.	Description
b01	Indicates the transmission and reception of data through the RS485 line.
b02	Indicates the presence of the RS485 communication line.
b03	Indicates the presence and enablement of the Wi-Fi communication line.
b04	Reports an active power derating for out-of-range input voltage or power restrictions set by the grid manager or by the display
b05	Reports a power derating due to high internal temperature
b06	Instantaneous power fed into the grid
b07	MPPT SCAN function active
b08	Text lines to cyclically display the inverter parameters, error codes, and for menu navigation
b09	Area of the display where it is possible to graphically represent one of the parameters monitored by the system
b10	Displays the total energy from the inverter installation
b11	Shows the energy produced throughout the day
b12	Indicates that the PV generator voltage is greater than the inverter Vstart
b13	Indicates the input channel (or the list) for which the data relating to the input parameters are shown in the field b22
b14	Indicates the DC/DC input circuit part (Booster)
b15	Indicates the DC to AC conversion circuit (inverter)
b16	Indicates the serial communication line between the REACT system and the METER. The icon in the form of an X, if lit, indicates the lack of communication between the two devices
b17	Indicates the METER
b18	Indicates the output voltage phase (or the list) for which the data relating to the output parameters are shown in the field b25
b19	Indicates the status of the grid voltage: Icon absent: no grid voltage Flashing icon: grid voltage present but outside the parameters set by the grid standard Icon present: Grid voltage present and within parameters set by the standard grid
b20	Cyclic display of the input parameters
b21	Cyclic display of storage parameters (batteries)
b22	Indicates the status of the battery charge
b23	When the ENTER key is pressed, cyclic display of the parameters can be: blocked (🔒) or cyclic (🔄)
b24	Cyclic display of the output parameters
b25	Cyclic display of the parameters relating to the domestic loads
b26	Representation of domestic loads

The checks to be carried out before commissioning the installation of the REACT system are:

• **Check the DC, AC, and ground connections [para. 12-14]**
Check the correct connection and polarity of the DC inputs, and the correct connection of the AC output and ground cables.

• **Check the connections between REACT-UNO and REACT-BATT [para. 6]**
Check the correct connection of the power and signal cables between REACT-UNO and REACT-BATT

• **Check the emergency stop button**
Check that the stop push-button (50) is released.
If the stop push-button has been pressed, then on power-up the REACT system will display the error “E065 - Stop Button” with a steady yellow LED (this signal only occurs if DC or AC voltage is present, because pressing the stop push-button when only battery power is available will cause the total shutdown of the system).

• **Check the sealing barrier of the cable ducts and quick-fit connectors**
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.

• **Check closure of front lids**
If the front lids or cable ducts of the REACT-UNO and the REACT-BATT are incorrectly installed, the inverter may fail to start and will display the error message “E081 - Internal Error” with a steady red LED.

If the problem has occurred during the installation phase or during the inverter maintenance phase carry out the following operations:

- Disconnect the AC network and the DC input from the inverter, press the stop push-button (50) and check that the front lid and all cable ducts are present, also making sure that they are properly tightened so that the IP65 environmental protection rating is not compromised; reconnect the AC network and the DC input and try turning on the inverter again; if the problem persists, contact Customer Support.

- If the front cover and all cable glands are present, disconnect the AC grid and DC input from the inverter and wait 15 minutes at a safe distance, then open the inverter cover and if no smoke/smell of burning is present, check the integrity of the components or the presence of moisture or other abnormal conditions; reconnect the AC grid and DC input and attempt to switch on the inverter; if the problem persists contact customer assistance.

Before proceeding with commissioning, make sure you have carried out all the checks and verifications indicated in the section on preliminary checks. Also make sure you have installed all the front covers; if this is not so, the REACT system will report an error when launched.

Commissioning is carried out via Wi-Fi connection to the REACT’s internal webserver. Initial setup of the REACT system must therefore be carried out via a tablet, notebook or smartphone with a Wi-Fi connection.
To establish the connection and operate with the REACT, it is necessary to power up the inverter by connecting its input to the DC voltage of the photovoltaic panels or its output to the AC grid.

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

Where the system is powered by the photovoltaic generator (DC) make sure irradiation is stable and adequate for the REACT’s commissioning procedure to be completed.

• Close the (external) AC disconnect switch downstream of the inverter thus applying grid voltage to the inverter

• Once powered, the REACT will automatically create a Wi-Fi network that will be visible as an Access Point from the user devices previously mentioned (tablet, smartphone, etc.) and will show the symbol of a wrench on the display to indicate that initial system setup must be carried out.

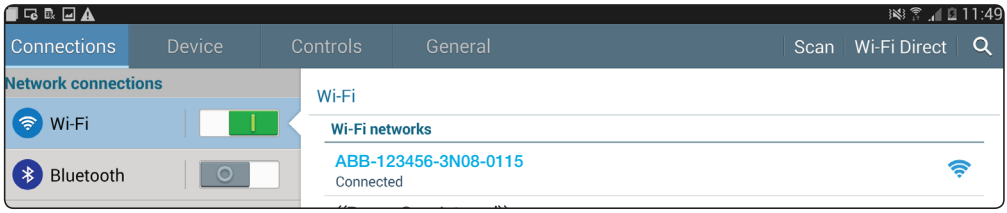
• Enable the Wi-Fi connection on the device which is being used for the board setup (tablet, smartphone or PC) and connect it to the Access Point created by the REACT system approx. 60 seconds after its switch-on.

The name of the Wi-Fi network created by the system (approx. 60 seconds after its switch-on), that the connection should be established with, will be: **ABB-SSSSSS-PPPP-WWYY**

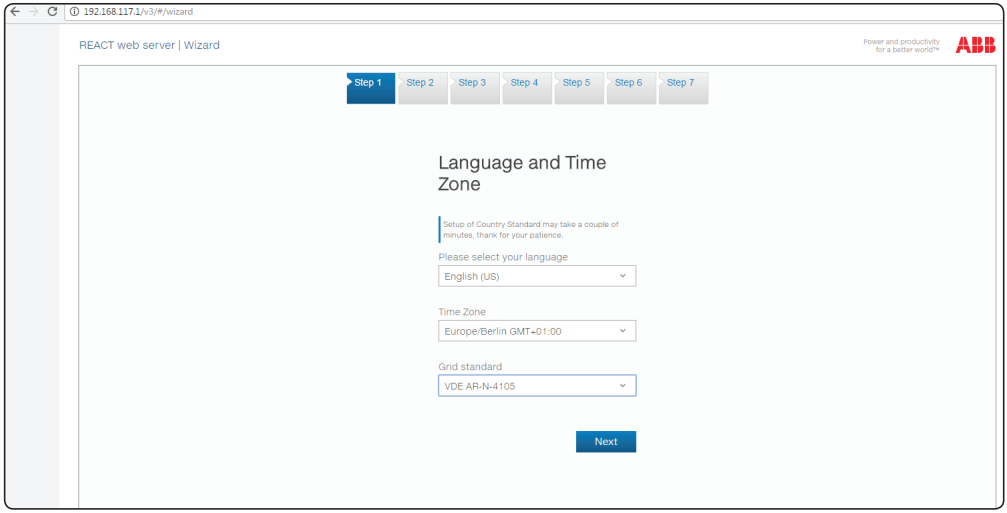
Field	Description
SSSSSS	Serial number
PPPP	Product code
WW	Week of manufacture
YY	Year of manufacture

• Once the network has been created by the inverter, start up the connection and wait for the device to complete the procedure (a password is not required for the Wi-Fi network).

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

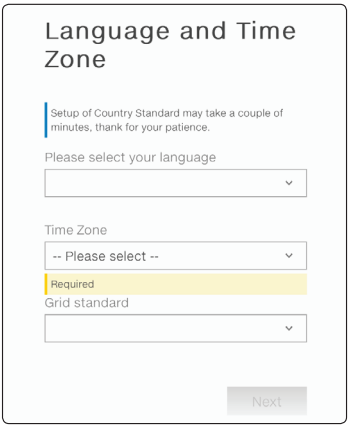


• Open an internet browser and enter the pre-set IP address **192.168.117.1** to access the setup pages (web user interface)
A guided setup procedure will open that will enable you to impose the necessary settings for correct commissioning of the REACT system.



The setup is broken down into 7 steps:

Assisted setup - STEP 1 *[Settings of: menu language, Time zone, Grid standard]*



Setting the language refers to the webserver language, not the language of the display menus on the REACT.
It might take several minutes to save the Grid Standard settings, then the inverter will carry out a restart.

Once the Grid Standard has been set it can be changed during the first 24 hours of operation; after that time it will be necessary to obtain the second-level password to access the "Inverter>Settings>Service> Reset Country S." menu.

• Press "Next" at the end of the settings to move on to setup step 2.

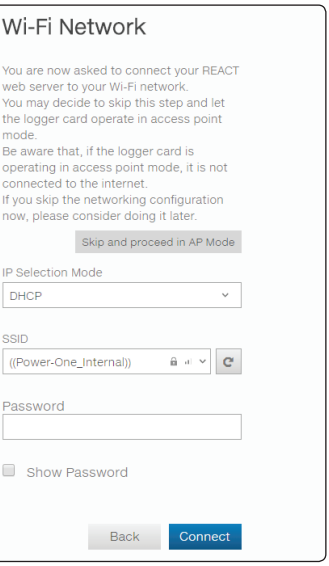
Assisted setup - STEP 2 *[Setting Wi-Fi network]*

This setup stage relates to connecting the REACT system to a Wi-Fi network.
The parameters relating to the home Wi-Fi network (set on the router) that must be known and set during setup are:

- IP address acquisition type: DHCP or Static.
• If you select the DHCP function (default setup) the router will automatically assign an IP address to the REACT whenever it tries to connect to the user network.
With Static, the user can assign a fixed IP address to the system.
the data which has to be entered in order for IP static address assigning to take place will appear. Complete the additional fields at the bottom of the screen (all the fields are mandatory with the exception of the secondary DNS server).

- SSID: name of Wi-Fi network.
• Identify and select your own (home) Wi-Fi network from all those shown in the SSID field (you can carry out a new search of the networks that can be detected with the "Update" button).
• Once the network has been selected, confirm.

- Password: Wi-Fi network password.
• Enter the password for the destination network (if necessary) and start the connection attempt (it will take a few seconds).



If it is not possible to connect the REACT to the Wi-Fi network, or you do not want to do so, select the "Procedi in modalità AP" (Continue in AP mode) button. In this situation, communication between the REACT and the tablet/smartphone/PC will continue to be point to point.

• Once the REACT is associated with the domestic Wi-Fi network, the user must reconnect the tablet/smartphone/PC to the same Wi-Fi network as the REACT system. The key remains locked until this connection is established.

• The message provides the links required for the second stage of the installation procedure (corresponding to the IP address assigned by the home Wi-Fi network router to the REACT system).
Both links can be used each time you want to access the web server inside the board, with the board connected to the home network.

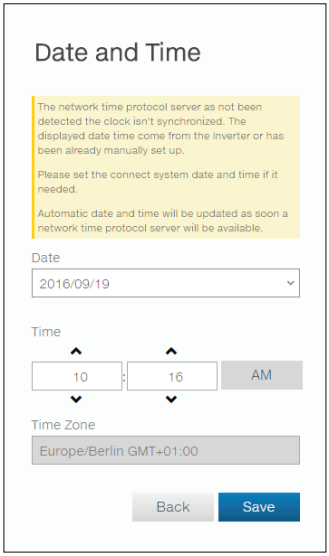
The IP address assigned may vary for reasons connected to the Wi-Fi home router setup (for example, a very brief DHCP lease time). If verification of the address is required, it is usually possible to obtain the client list (and the corresponding IP addresses) from the Wi-Fi router administration panel.

From now on the REACT system is connected to the home Wi-Fi network.

• The Wi-Fi board automatically disables its access point with the name ABB-SSSSSS-PPPP-WWYY (no longer necessary).
• If the REACT system loses the connection with the home Wi-Fi network (and therefore, loses the internet connection), it will once again enable its own access point.

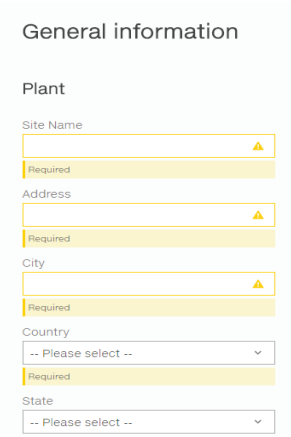
The most common causes of losing connectivity might be: different Wi-Fi network password, faulty or unreachable router, replacement of router (different SSID) without the necessary setting updates.

Assisted setup - STEP 3 *[Setting date and tim]*

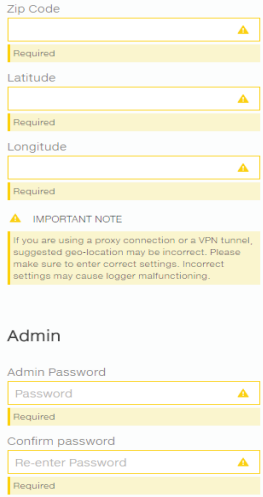


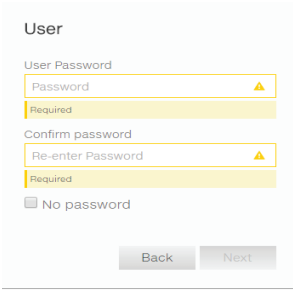
- Fill in the fields relating to date, time and time zone.
- If the inverter is connected to the internet, the settings will be filled in automatically and it will not be possible to edit the fields.

Assisted setup - STEP 4 *[Setting general data relating to the system, the installer and the client]*



System data to monitor (system name, address, town, etc.)



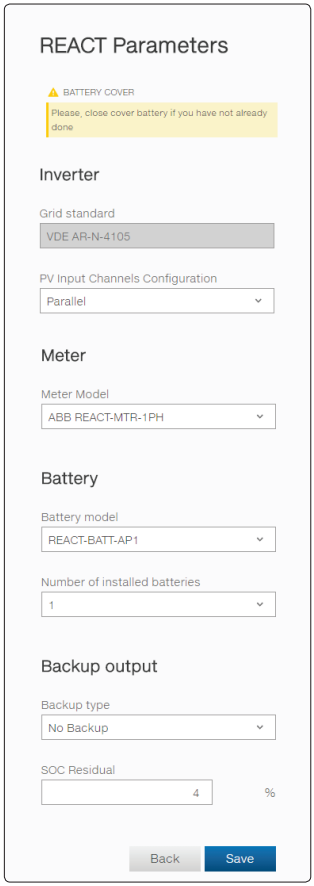


- Administrator password:
Pay particular attention and make a note of the administrator password that will enable you to do advanced system setup.

- User Password:
Pay particular attention and make a note of the user password that will enable you to do basic system setup. The “No Password” box can be selected if you do not want to enter any password to access the user level (recommended)

Latitude and Longitude are fundamental parameters; incorrect values could render it impossible for the system to operate correctly. If the system is connected to the internet, the Longitude and Latitude fields are filled in automatically. Check that they are correct

Assisted setup - STEP 5 *[Setting REACT parameter]*



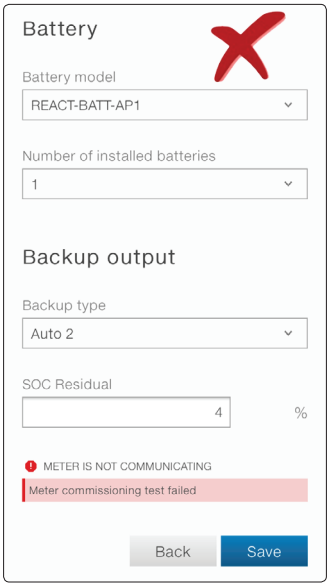
- Input channel configuration:
1. Parallel
2. Indipendent

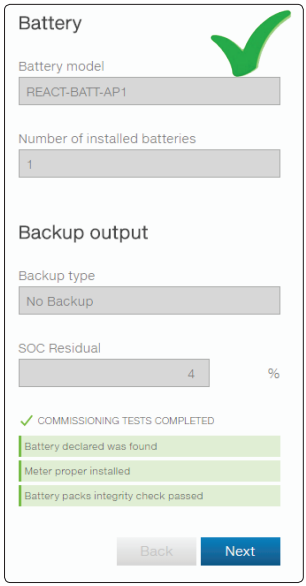
- Type of REACT-MTR:
1. No meter (where system is installed without meter)
2. REACT-MTR-1PH (single-phase)
3. REACT-MTR-3PH (three-phase)

If the METER is three-phase the phase to which the REACT system is connected must be selected.

- Type of battery unit (REACT-BATT) installed:
1. No battery (when the REACT system is used without a battery). Select the number of battery units installed.
2. REACT-BATT-AP1

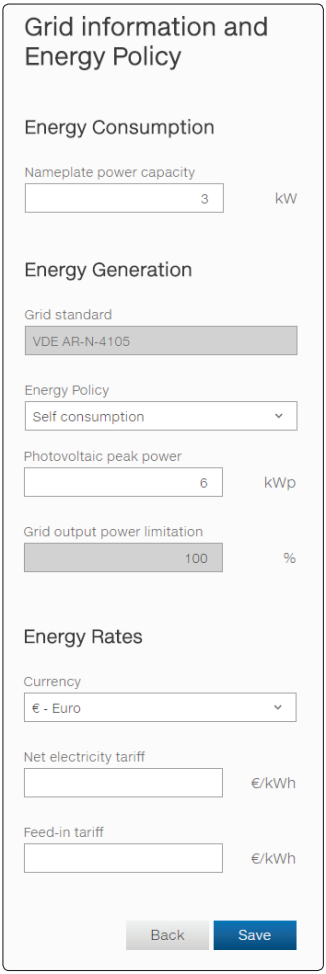
• Once the type of meter (REACT-MTR) and number of battery units (REACT-BATT) are selected, the system will check the settings entered, giving confirmation or an error message if the setup was incorrect:





The guided system setup can be continued only if no errors are detected in the settings made.

Assisted setup - STEP 6 *[Settings related to energy management]*



Energy consumption
- *Power committed*: setting related to the power of the electrical energy supply expressed in kW.

Energy management policy
- *Grid standard:* set the grid standard of the country in which the REACT is installed.
- *Energy management policy:* Energy management policy: set the way in which you want to manage the energy produced by the PV plant, choosing from the following:

Management mode	Description
Maximisation of self-consumption	The REACT system automatically manages power flows in order to maximise self-consumption. Priority: Domestic loads, temporary storage in battery, and lastly, power fed into grid.
Zero injection	The REACT system automatically manages power flows in order to avoid the injection of energy to the grid. If the meter is disconnected or not working the REACT's output power is restricted to zero in order to avoid accidental input to the grid.
Adjustable	The REACT system automatically manages power flows in order to avoid feeding the grid with power greater than: $P_{DC} \times P_{lim}$ where P_{DC} is the power of the photovoltaic generator (W) and P_{lim} is the output power limit with respect to P_{DC}(%). The two variables can be set during the REACT commissioning stage.
KfW	The REACT system automatically manages power flows in order to fulfil the requirements of the KfW incentive programme available in Germany.

- *Photovoltaic power P_{DC}:* insert the power value of the photovoltaic system (kWp) installed
- *Output power restriction compared to P_{DC}:* percentage AC power restriction with reference to power installed

Electrical energy tariffs
- *Currency:* select the currency of the country in which the system is installed
- *Average energy cost (€/kWh):* enter an average value for the energy cost that is shown on the bill
- *Input incentive (€/kWh):* enter the value of the incentive (if applicable) for energy fed into the grid.

Assisted setup - STEP 7 *[Registration on the Aurora Vision® website]*

• The commissioning procedure is concluded. Click on "End" to enter in the REACT web interface and start to use and monitor the system.

• If the user wants to monitor the system remotely and to know the status of his system at any time, the REACT can be registered with the Aurora Vision® platform which will allow the system owner to consult the system data by using the web portal and the special mobile app.

• To register the system on Aurora Vision® click on the link shown in the figure (the REACT must be connected to the internet).

Photovoltaic inverter with integrated charger	REACT-UNO-3.6-TL	REACT-UNO-4.6-TL
Input		
Absolute maximum DC voltage (Vdc, max)	600V	
DC start-up voltage (Vstart)	200 V (adj. 120...350 V)	
Operating DC voltage range (Vdc MPP)	0.7 x Vstart ...580 V (min 90 V)	
DC nominal voltage (Vdcr)	360 V	
DC nominal power (Pdcr)	5000 W	6000 W
Number of Independent MPPTs	2	
Maximum DC power for each MPPT (PMPPTmax)	2500W Linear derating [520V ≤ VMPPT≤ 580V]	3000W Linear derating [520V ≤ VMPPT≤ 580V]
Input DC voltage range with MPPT configuration in parallel to Pacr, without battery (Vdc FULL POWER)	160...520 V	180...520 V
Maximum DC current (Idcmax) / for each MPPT	24 A / 12 A	27 A / 13.5 A
Maximum short-circuit current for each MPPT (Iscmax)	15 A	
Number of DC input connection pairs for each MPPT	2	
DC connection type	Quick-fit PV connector [5]	
Input protection		
Reverse polarity protection	Yes, from current limited source	
Input overvoltage protection for each MPPT - varistor	Yes	
Insulation check	Complying with the local regulations	
Characteristics of DC disconnect switch for each MPPT	25 A / 660 V	
Battery charger		
Maximum charge power (with minimum of 3 x REACT-BATT-AP1)	3000 W	
Maximum discharge power (with minimum of 2 x REACT-BATT-AP1)	3000 W	
Output		
AC grid connection type	Single phase	
Nominal AC power (Pacr @ cosφ = 0.9 – 1, over/under excited)	3600 W	4600 W
Maximum AC power (Pacmax)	3600 W	4600 W
Maximum apparent power (Smax)	4000 VA	5100 VA [1]
Nominal AC voltage (Vac,r)	230 V	
AC voltage range	180...264 V [2]	
Maximum AC current (Iac,max)	19 A	24 A
Contribution to short-circuit current	23A	29A
Nominal frequency (fr)	50 Hz	
Frequency range (fmin...fmax)	47...53 Hz [3]	
Adjustable Cosφ	0.1 - 1 (over/under excited)	
Total current harmonic distortion	<2%	
AC connections type	Screw terminal block, M25 cable gland	
Output protection		
Anti-islanding protection	Complying with the local regulations	
Maximum AC overcurrent protection	25 A	32 A
Output overvoltage protection - varistor	2 (L - N / L - PE)	
Back-up output [6]		
AC connection type	Single phase	
Nominal apparent power (Sacr)	3000 VA	
Nominal AC voltage (Vac,r)	230 V	
Maximum AC current (Iac,max)	13 A	
Contribution to short-circuit current	27 Arms (60 ms)	
Nominal frequency (fr)	50 Hz	
AC connections type	Screw terminal block, M25 cable gland	
Back-up output protection		
Maximum AC overcurrent protection	16 A	
Operating performance		
Maximum efficiency (ηmax)	97.1%	
Weighted efficiency (EURO/CEC)	96.6% / -	
Typical battery efficiency (full cycle)	94.0%	
Communication		
Remote monitoring	Integrated Wi-Fi datalogger	
Wireless local monitoring	Wi-Fi with UI webserver, mobile APP	
User interface	Mobile APP, UI Webserver, Graphic display	
Wired local monitoring	PVI-USB-RS232_485 (opt.)	
Environmental		
Ambient temperature	-20...+55°C	
Optimal operating temperature for battery	+5...+35°C	
Operating temperature for battery - charge	0...+40°C	
Operating temperature for battery - discharge	-10...+45°C	
Relative humidity	5…95% without condensation (when used without battery 4…100% condensing)	
Noise emission pressure, typical	50dB @ 1m	
Maximum operating altitude without derating	2000 m / 6560 ft	
Recommended location	Internal with ventilation	

Photovoltaic inverter with integrated charger	REACT-UNO-3.6-TL	REACT-UNO-4.6-TL
Physical		
Degree of environmental protection	IP65 (REACT-UNO), IP21 (REACT-BATT-AP1) (4)	
Cooling system	Natural	
Size (H x W x D), equipped with 1 REACT-BATT-AP1	740 mm x 985 mm x 231 mm	
Weight (REACT-UNO and REACT-BATT-AP1)	< 67 kg	
Assembly system	Wall bracket	
Safety		
Insulation level	Transformerless	
Marking	CE	
Safety and EMC Standards	IEC/EN62109-1, IEC/EN62109-2, EN61000-6-2, EN61000-6-3, EN61000-3-2, EN61000-3-3, EN61000-3-11, EN61000-3-12	
Grid Standard (check availability through the sales channel)	CEI 0-21, DIN V VDE V 0126-1-1, VDE-AR-N 4105, G83/2, G59/3, VFR2014, 4777.2:2015, C10/11	
Other characteristics		
Load management	Yes, through load manager box	
AC back-up output, off grid	Yes, automatic or manual restart in the case of no grid	
Grid support	Yes, where required by the regulations	

1) Limited to 5000 VA when “Belgium” country standard is selected.

2) The output voltage range may vary according to the grid standard of the country of installation

3) The output frequency range may vary according to the grid standard of the country of installation

4) The IP65 protection level is guaranteed by complying with the indications set out in this manual and listed here below:

• in regard to covers, by complying with the prescribed tightening torques;

• in regard to connectors (46), (47), (52), through use of the available counterparts;

• in regard to the cable glands (48), (49), (51), following the prescriptions indicated in this manual during installation.

The connectors to the battery unit are excluded from the assessment of the IP65 protection level ((39), (35), (38)), for which external protection of a minimum of IP21 is required.

In regard to the connectors to the battery unit, the IP protection is provided by the battery unit box itself. Using the RECAT-BATT-AP1 battery unit with the IP21 protection level, the protection level of the whole system becomes IP21.

5) Please refer to the document “String inverters – Product manual appendix” available at www.abb.com/solarinverters for information on the quick-fit connector brand and model used in the inverter.

6) Optional

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

Battery Unit	REACT-BATT-AP1
Manufacturer	Panasonic
Type	Li-Ion
Typical/maximum discharge power	1.5 kW / 1.8 kW.
Maximum charge power	1.1 kW
Rated capacity	2 kWh (6 kWh, with 3x REACT-BATT-AP1)
Useful life	>4500 cycles
Useful life in years, typical	10 years (maximum 9MWh discharged)
Relative humidity	5…95% without condensation
Degree of environmental protection	IP21
Size REACT-BATT-AP1 (H x W x D)	740 mm x 492 mm x 231 mm
Weight	< 37 kg
Safety and EMC	EN62109-1, EN62109-2, compliant with the applicable requirements of EN60950-1, EN61000-6-2, EN61000-6-3, UN38.3, UN3480

Further information

For more information on ABB solar products and services, visit www.abb.com/solarinverters

Contact us

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