

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

Power and productivity for a better world™



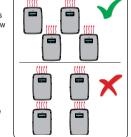
# nstallation position

safety devices guaranteed by the inverter might be ineffective.

- Install on a wall or strong structure suitable for bearing the weight Install at a height that considers the heaviness of the equipment
- Install in safe, easy to reach places
  If possible, install at eye-level so that the display and status LEDs can be seen easily
- Install vertically with a maximum inclination of +/- 5° To carry out maintenance of the hardware and software of the equipment, remove the covers
- on the front. Check that there are the correct safety distances for the installation that will allow the normal control and maintenance operations to be carried out Comply with the indicated minimum distances
- 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
- Final installation of the inverter must not compromise access to any disconnection

devices that may be located externally.

Please refer to the warranty terms and conditions available on the website and evaluate any possible exclusion due to improper installation



is used to access the main menu, to go

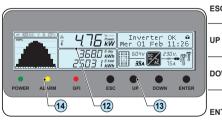
ted by the > symbol) or to switch to the next

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

	checking the grid or if there is insufficient sunlight.	
LED	YELLOW The inverter has detected an anomaly. The anomaly is shown on the display.	

GREEN On if the inverter is

RED Ground fault on the DC side of the PV generator. The error is shown on the display.

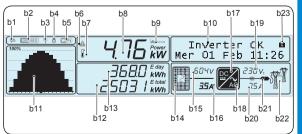


back to the previous menu or to go back to the previous digit to be edited. It is used to scroll up the menu options or to shift the numerical scale in ascending order t is used to scroll down the menu options DOWN or to shift the numerical scale in descending It can be used to conrm an action, to access he submenu for the selected option (indica-

digit to be edited.

The operating parameters of the equipment are displayed through the display (12)

Description of <b>symbols and display fields.</b>				
RS485 data transmission	b13	Daily energy produced		
RS485 line present	b14	PV voltage > Vstart		
Radio line present.	b15	DC voltage value		
Bluetooth line present (*)	b16	DC current value		
WiFi line present (*)	b17	DC/DC circuit part		
Warning	b18	DC/AC circuit part		
Temperature derating	b19	AC voltage value		
Instantaneous power	b20	AC current value		
MPP scan running	b21	Connection to the grid		
Graphic display		Grid status		
Power graph	b23	Cyclic view on/off		
Total energy	(*)	NOT available		
	RS485 data transmission RS485 line present Radio line present. Bluetooth line present (*) WiFi line present (*) Warning Temperature derating Instantaneous power MPP scan running Graphic display Power graph	RS485 data transmission         b13           RS485 line present         b14           Radio line present.         b15           Bluetooth line present (*)         b16           WiFi line present (*)         b17           Warning         b18           Temperature derating         b19           Instantaneous power         b20           MPP scan running         b21           Graphic display         b22           Power graph         b23		



### 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.

5.

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

### Equipment weight

MIOGEI		wass weight	Enting points in
UNO-2.0-I-OUTD UNO-2.0-I-OUTD-S	UNO-2.5-I-OUTD UNO-2.5-I-OUTD-S	17 Kg	2



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

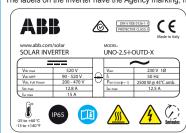


ABB UNO-2.0-I-OUTD-S

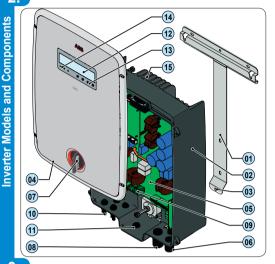
P/N:pppppppppppppp SN:YYWWSSSSSS WK:WWYY WO:XXXXXXX SO:SXXXXXXXX Q1 1 Inverter model

UNO-2.0-I-OUTD-S

@ Inverter Part Number (ii) Inverter Serial Number

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.

	arradi diraror ili oomio odooo or	i ano oqui	princing and darigor or mazara z	01100 010	maioatoa mar oigno, iabolo, oj	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	70110.
	Always refer to instruction manual	$\triangle$	General warning - Important safety information	4	Hazardous voltage		Hot surfaces
P65	Protection rating of equipment	Ů	Temperature range	$\emptyset$	With isolation transformer	₹	Direct and alternating currents, respectively
_	Positive pole and negative pole of the input voltage (DC)		Always use safety clothing and/or personal safety devices	<b>(</b>	Point of connection for grounding protection	A CO	Time need to discharge stored energy



The models of inverter to which this guide refers are available in 2 power ratings: 2 0 kW / 2 5 kW For inverters of equal output power the variant between the various models is the presence or lack thereof, of the DC disconnect switch @.

	<ul> <li>Number of input channels: 1</li> <li>DC disconnect switch ®: No</li> <li>Input connectors: quick fit connectors (2 pairs)</li> </ul>	Number of input channels: 1     DC disconnect switch @: Yes     Input connectors: quick fit connectors (2 pairs)
	UNO-2.5-I-OUTD	UNO-2.5-I-OUTD-S
	- Number of input channels: 1 - DC disconnect switch @: No - Input connectors: quick fit connectors (2 pairs)	- Number of input channels: 1 - DC disconnect switch  - Input connectors: quick fit connectors (2 pairs)
<b>—01</b>	Main components	
<b>—(02</b> )	Bracket	69 AC output screw terminal block
<u> </u>	Inverter	10 DC input connectors
<b>—(03</b> )	Locking screw	Anticondensation valve
<b>—(05</b> )	Front cover	12 Display
~	65 Main board	13 Keypad
<b>—09</b>	66 Service cable glands	14 LED panel
<b></b>	OD DC disconnect switch	(15) Heat sink

UNO-2.0-I-OUTD

AC cable gland

### Environmental checks

IP

- Consult the technical data to check the environmental parameters to be observed

- Installation of the unit in a location exposed to direct sunlight must be avoided as it may cause:

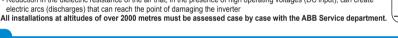
  1. power limitation phenomena in the inverter (with a resulting decreased energy production by the system)
- 2. premature wear of the electrical/electromechanical components
- 3. premature wear of the mechanical components (gaskets) and of the user interface (display)

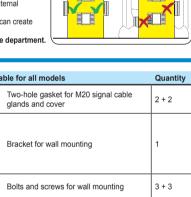
   Do not install in small closed rooms where air cannot circulate freely
- To avoid overheating, always make sure the flow of air around the inverter is not blocked
- Do not install in places where gases or flammable substances may be present
   Do not install in rooms where people live or where the prolonged presence of people or animals is expected, because of the noise (about 50dB(A) at 1 m) that the inverter makes during operation
- Avoid electromagnetic interference that can compromise the correct operation of electronic equipment, with consequent situations of danger.

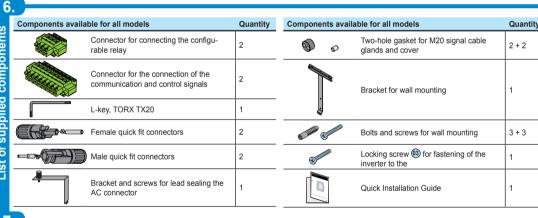
### Installations above 2000 metres

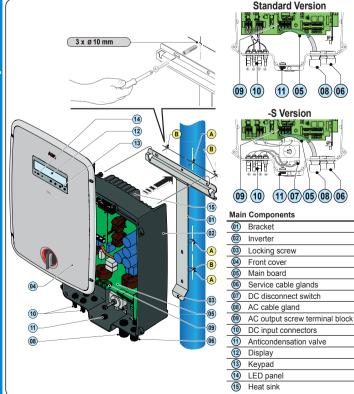
- On account of the rarefaction of the air (at high altitudes), particular conditions may occur:

   Less efficient cooling and therefore a greater likelihood of the device going into derating because of high internal
- Reduction in the dielectric resistance of the air that, in the presence of high operating voltages (DC input), can create









# Wall/Pole mounting

During installation do not place the inverter @ with the front cover @ facing towards the

- Position the bracket (1) perfectly level on the wall and use it as a drilling template.
- Drill the 3 holes required using a drill with 10mm bit. The holes must be about 70mm deep.
- On bracket there are 5 fastening holes, but only 3 are used depending on the type of installation: on a pole holes A, on a wall holes B.
- Fix the bracket to the wall with the 3 wall anchors, 10mm in diameter, supplied.
- Hook the inverter to the bracket by inserting the head of the rear screws in the slots as shown in the figure.
- Proceed to anchor the inverter to the bracket by tightening the locking screw (3) located on the
- Unscrew the 4 screws and open the front cover upwards in order to make all the necessary

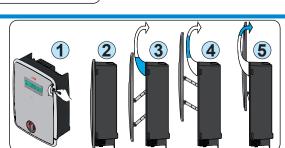
The cover is equipped with fixed hinges and cannot be removed.

- Once the connections have been made proceed to closing the cover by tightening the 4 screws on the front to the torque indicated in the spec-
- Remove the protective film located on the front.

Opening the front cover is assisted by 2 hinges on both the inner sides of the inverter, and it can be carried out with ease following the procedure described below

- Slacken the 4 screws fastening the front cover (4) (step 1)
- Open the cover by pulling it toward you and then pushing it upwards on

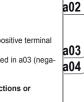




The grounding of the inputs is negative configuration by default.

For the correct operation, some photovoltaic panels require the connection of the potential of the positive terminal to the earth terminal, or to have both of the input poles floating in regards to ground potential. In order to achieve this, it is possible to vary the default configuration, moving the connector installed in a03 (nega-

tive grounding) to a04 (positive grounding) or a02 (floating configuration).



**10**.

11.

**15**.

The configuration of the grounding of the inputs must be done before any connections or testing takes place.

No pole of the array can have earthing connection points located outside the inverter incorrect configuration may cause damage to the system and photovoltaic panels!

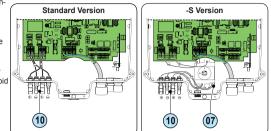
Check for correct polarity in the input strings and absence of any leakage to ground in the PV generator. When exposed to sunlight, the PV panels supply DC direct voltage to the inverter. The inside of the inverter may only be accessed after the equipment has been disconnected from the grid and from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

For the string connections it is necessary to use the quick fit connectors (multicontact or weidmüller) located on the bottom of the mechanic.

The maximum numbers of input strings which can be connected is 2. Connect all the strings included in the design of the system and always check the

If some of the string inputs should not be used you must proceed to verify the presence of covers on DC input connectors (10) 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

The two pairs of DC input connectors (10) are internally related to a single input channel, so there are no preferences on the connectors to be used in the case of installation of a single string.



max 6 mm<sup>2</sup>

10 ÷ 17 mm

⊕ N L GRID

#### 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 character

istics:

	UNO-2.0-I-OUTD	UNO-2.5-I-OUTD	
Туре	Automatic circuit breaker with different	ential thermal magnetic protection	
Voltage/Current rating	230Va	c/16A	
Magnetic protection characteristic	B/0	3	
Number of poles	2		
Type of differential protection	A/A	(C	
fferential sensitivity 30mA			
ABB declares that the ABB high-frequency isolated inverters, in terms of their construction, do not inject continuous ground fault currents and therefore there is			
o 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 (m)			
	UNO-2.0-I-OUTD	UNO-2.5-I-OUTD		
2.5	15m	12m		
4	25m	20m		
6	38m	30m		
ne 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 insulation gum, laid in free air 12.

For the connection to the inverter grid you need 3 connections: ground, neutral and phase

The ground connection to the inverter is obligatory. To prevent electrocution hazards, all the connection operations must be carried out with the disconnect switch downstream of the inverter

(grid side) open and locked. For all models you connect the AC output screw terminal block 📵 by passing the cables through the AC cable gland 📵

The maximum diameter accepted by the cable gland is from 10 to 17 mm while each terminal of the terminal board accepts a cable with cross-section which can vary from 0.6 up to 16 mm² (tightening torque 1.5Nm). Unscrew the AC cable gland (a), remove the cover, insert the cable of suitable cross-section and connect the conductors (Ground, Neutral

and Phase) to the terminals on the AC output screw terminal block @9. Pay special attention and ensure you do not reverse the phase with the neutral!

Once the connection to the terminal board is complete, screw in the cable gland firmly (tightening torque 5.0Nm) and check the tightness.

Before connecting the inverter to the distribution grid it is necessary to set the country standard by manipulating the two rotary switches a09.

## The inverter commissioning procedure is as follows

Turn the AC+DC disconnect switch @ to the ON position

If there are two separate external disconnect switches (one for DC and the other for AC), first close the AC disconnect switch and then the DC disconnect switch. There is no order of priority for opening the disconnect switches

When the inverter has power, the first check performed is the one relating to the input voltage:

1. If the DC input voltage is lower than the Vstart voltage (voltage required to begin the inverter's grid connection) the b14 icon remains off and the "Waiting

sun" message is displayed b10.

2. If the DC input voltage is higher than the Vstart voltage the b14 icon is displayed and the inverter goes to the next stage of the controls

n both cases the voltage levels and input current are displayed in the b15 and b16 fields.

The inverter performs a control of grid parameters. The b22 icon, which represents the grid distribution, can have different statuses: not present, if the mains voltage results as absent.
 flashing, if the mains voltage is present but outside the parameters dictated by the standard of the country of installation

5. turns on, if the mains voltage is present and within the parameters dictated by the standard of the country of installation. In this condition, the inverter starts the sequence of grid connection

If the input voltage and the grid voltage are within the inverter operating intervals, connection to the grid will commence. After the inverter is connected, the icons on the whole line b21 will come on steady.

Once the connection sequence has been completed, the inverter starts to operate and indicates its correct operation by making a sound and by the green LED coming on steady on the LED panel 4.

If the inverter signals any errors/warnings the messages and their codes will be indicated on the display (2). This state will also cause switching of the multi-function relay (set to alarm mode in the menu SETTINGS>Alarm) which activates any external signalling device that may be connected. 16.

The display (12) has a section b10 (graphic display) for moving through the menu using the buttons of the LED panel (18). Section b10 consists of 2 lines with 16 characters per line: Viewing of the GENERAL INFORMATION is cyclic. This information relates to the input and output parameters and the inverter identification parameters

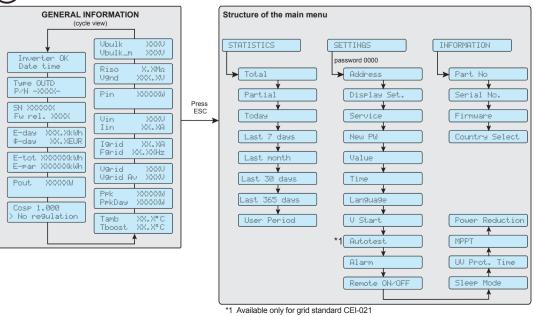
Press ESC to access the three main menus, which have the following functions:

By pressing ENTER it is possible to lock scrolling on a screen to be constantly displayed.

STATISTICS>Displays the statistics; · SETTINGS>Modify the settings of the inverter

INFO>View service messages for the operator

Refer to the manual for details regarding use and functions available in the menu



Before connecting the inverter to the distribution grid it is necessary to set the country standard by manipulating the two rotary switches a09: Table: country standard and language

Switch

5	Switch Country Grid Standard		Display
1	2	(name displayed)	language
0	0	NON-ASSIGNED	ENGLISH
0	1	GERMANY VDE 0126 @ 230V Single Phase (VDE 0126)	GERMAN
0	2	UL1741 @ 208V Single Phase (UL208sing)	ENGLISH
0	3	UL1741 @ 240V Split Phase (UL240spl)	ENGLISH
0	4	UL1741 @ 277V Single Phase (UL277sing)	ENGLISH
0	5	ENEL GUIDA @ 230V Single Phase (ENEL)	ITALIAN
0	6	SPAIN RD 1699 @ 230V (RD 1699)	SPANISH
0	7	UK - G83 @ 230V (UK G83)	ENGLISH
0	9	IRELAND @ 230V (IRELAND)	ENGLISH
0	Α	AUSTRALIA @ 230V (AS 4777)	ENGLISH
0	В	ISRAEL @ 230V (ISRAEL)	ENGLISH
0	D	FRANCE @ 230V (FRANCE)	FRENCH
0	Е	NETHERLANDS @ 230V (NETHERL)	DUTCH
0	F	GREECE @ 230V (GREECE)	ENGLISH
1	0	PORTUGAL @ 230V (PORTUGAL)	ENGLISH
1	1	CORSICA @ 230V (CORSICA)	FRENCH
1	2	HUNGARY @ 230V (HUNGARY)	ENGLISH
1	3	CHINA @ 230V (CHINA)	ENGLISH
1	4	KOREA @ 220V (KOREA)	ENGLISH
1	5	TAIWAN @ 230V (TAIWAN)	ENGLISH
1	6	CHECA Republic @ 230V (CZECH)	CZECH
1	7	GERMANY-VDE AR-N-4105 @230V (VDE 4105)	GERMAN
1	8	ENEL CEI-021 @ 230V INTERNAL Prot. (CEI021 IN)	ITALIAN
6	TI	he settings become fixed after 24 hours of onera	tion of the inve

9	CEI-021 @ 230V EXTERNAL Protection (CEI021 EX)	HALIAN
В	SOUTH AFRICA @ 230V (S.AFRICA)	ENGLISH
E	BELG C10-11 110% @ 230V (C1011 110)	FRENCH
F	BRAZIL @ 220V (BRAZIL)	ENGLISH
	1 2	009

**Country Grid Standard** 

Display



13

the

etting 1

The settings become fixed after 24 hours of operation of the inverter ((the PV generator simply has to be under power)). The standard for the Italian grid which must be set during installation is 1 -9 (CEI-021 @ 400V INTERNAL Protection)

#### Connections of the signals to the main board

Each cable which must be connected to the connectors of the communication and control signals must pass through the two service cable glands (6) (shown in the The available cable glands are two M20s that can take a cable with a diameter of 7 mm to 13 mm. Two-hole gaskets are supplied for insertion in the cable

manual inverter Description

J9 - J10 Input varistors

The signal cables are connected to the main board 65 inside the inverter by means of the terminal connectors supplied.



gland, which allow two separate cables with cross-section of up to 5 mm to go through

Please refer to the manual for details of the connections and functions available on the main board



When you have finished connecting and configuring the inverte you must close the front cover (tightening torque 2.2Nm), inser



	a02	J5	Connector for floating ground of the inputs
	a03	J7	Connector for negative grounding of the inputs
	a04	J8	Connector for positive grounding of the inputs
	a05	F1 - J25	PTC
	a06	J11 - J12	Output varistors
	a07	J4	Inverter data memory card housing
	a08	BT1	Battery housing
	a09	S1 - S2	Rotary switches for setting the standard of the country and the language of the display
_	a10	S3	Switch for setting the termination resistance of the RS485 line
d	a11	J16	RS485 communication card housing
	a12	J13 - J14	Connection of the RS485 line on RJ45 connector
te	r a13	J6 - J15	Radiomodule card slot
rt	a14	J24	Terminal block for connection of: -PC RS485 serial connection (to connect local or remote monitoring systems) - Remote ON/OFF - Tachometer signal (WIND version)
	a15	J23	Terminal block 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 operating modes that can be set are:  -Production -Alarm -Alarm (configurable) -Crepuscolar

J21 - J22 AC output terminal board

put	UNO-2.0-I-OUTD	UNO-2.5-I-OUTD	
put psolute Maximum Input Voltage (Vmax,abs)	520	) V	
put Activation Voltage (Vstart)	200 V (adj. 120350 V)		
put operating range (VdcminVdcmax)	0.7 x Vsta		
ated DC Input Power (Pdcr)	2100 Wp	2600 Wp	
umber of Independent MPPTs		1	
aximum Input Power for each MPPT (PMPPTmax)	"2300 W Linear Derating From MAX to Null [470V≤VMPPT≤520V]"	"2900 W Linear Derating From MAX Null[470V≤VMPPT≤520V]"	
PPT Input DC Voltage Range (VMPPTmin,f VMPPTmax,f) at Pacr	200		
aximum DC Input Current (Idcmax) / for each MPPT (IMPPTmax)	12,5 A / 12,5 A	12.8 A / 12.8 A	
aximum Input Short Circuit Current for each MPPT aximum Backfeed current (from AC to DC side)		0 A	
umber of DC Inputs Pairs for each MPPT	Negli		
C Connection Type		nnector WM / MC4	
put protection			
everse Polarity Protection	Yes, from limite	ed current source	
put Overvoltage Protection for each MPPT - Varistor		2	
notovoltaic Array Isolation Control	According to	local standard	
C Switch Rating for each MPPT (-S Version)	16 A	/ 600 V	
utput	Cinal	nhaaa	
C Grid Connection Type ated AC Power (Pacr)	2000 W	phase 2500 W	
aximum AC Output Power (Pacmax)	2000 W (4)	2750 W (5)	
ated AC Grid Voltage (Vac,r)	230		
C Voltage Range		64 V <sup>(1)</sup>	
aximum AC Output Current (lac,max)	10.5 A	12.5 A	
aximum output fault current		is (60mS)	
ated Output Frequency (fr)		60 Hz	
utput Frequency Range (fminfmax)		763 Hz <sup>(2)</sup>	
ominal Power Factor (Cosphiac,r)	> 0.		
etal Harmonic Distortion of Current		2%	
C Connection Type utput protection	Screw ter	minal block	
nti-Islanding Protection	According to	local standard	
aximum AC Overcurrent Protection		0 A	
utput Overvoltage Protection - Varistor		/ L - PE)	
perating performance	2(L-14	7 - 7 - 2)	
aximum Efficiency (nmax)	96	3.3%	
eighted Efficiency (EURO/CEC)	95.1% / -	95.4% / -	
ower Input Treshold	24	.0 W	
and-by Consumption	< 8.	D W (3)	
ommunication	B) # 110B B0000 10F /		
ired Local Monitoring		opt.), PVI-DESKTOP (opt.)	
emote Monitoring ireless Local Monitoring	PVI-AEC-EVU (Opt.), V	SN700 Data Logger (opt.) PVI-RADIOMODULE (opt.)	
ser Interface		c display	
nvironmental	Огарії	Culapidy	
mbient Temperature Range	-25+60°C /-13140°F wit	h derating above 45°C/113°F	
orage Temperature	-4080°C (	-40+176°F)	
elative Humidity		condensing	
nvironmental pollution classification for external environment		3	
pise Emission		(A) @ 1 m	
aximum Operating Altitude without Derating		/ 6560 ft tdoor	
nvironmental Category nvsical		tdoor	
nvironmental Protection Rating	IF	65	
poling		tural	
mension (H x W x D)	518mm x 367mm x 161m	nm / 20.4" x 14.4" x 6.3"	
eight	< 17 kg	/ 37.4 lb	
ounting System		Bracket	
vervoltage Category in accordance with IEC 62109-1	II (DC input)	III (AC output)	
afety	UF trac	oformor	
plation Level afety Class	HF trai	nsformer	
arking	CE/50	Hz only)	
The AC voltage range may vary depending on specific country grid standard	5. Limited to 2500 W	for Germany	
The Frequency range may vary depending on specific country grid standard	<ol><li>Since their applica</li></ol>	bility dates, limited to plant power ≤ 3kW	
Night time consumption < 0.6W Limited to 2000 W for Germany	7. Limited to plant po	wer ≤ 3.68 kVA	



www.abb.com/solarinverters

UNO-2.0\_2.5-TL-OUTD-Quick Installation Guide EN-RevC

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