ABB solar inverters

Quick installation guide
UNO-DM-3.3/3.8/4.6/5.0-TL-PLUS-US
(from 3.3 to 5.0 kW)

EN

Before starting installation, download the product manual from www.abb.com/solarinverters. Choose the correct country, string inverters, single phase, choose the product and proceed to the “download” section.
Read and follow all safety and installation instructions to avoid disabling any safety features or making the warranty invalid.

ABB

1. Labels and Symbols

IMPORTANT SAFETY INSTRUCTIONS
SAVE THESE INSTRUCTIONS -- KEEP IN A SAFE PLACE!

The installer must read this document in its entirety before installing or commissioning this equipment.
For more detailed information regarding proper installation and use of this product, refer to the product manual located at www.abb.com/solarinverters. The labels on the inverter have the markings, main technical data and identification of the equipment and manufacturer. The technical data shown in this quick installation guide does not replace that shown on the labels attached to the equipment.

Symbols used in the guide and on the products

	These are nationally recognized test laboratory marks showing certification to UL 1741 and CSA-C22 No. 107.1-01	Ø	Phase
	Hazardous voltage	⎓ ~	Direct and alternating currents, respectively
	General warning - Important safety information	+ -	Positive pole and negative pole of the input voltage (DC)
	Hot surfaces	10 minutes	Stored energy discharge time
	System earth conductor (main grounding protective earth, PE)		Consult product manual
	Equipment Grounding Conductor (EGC)		

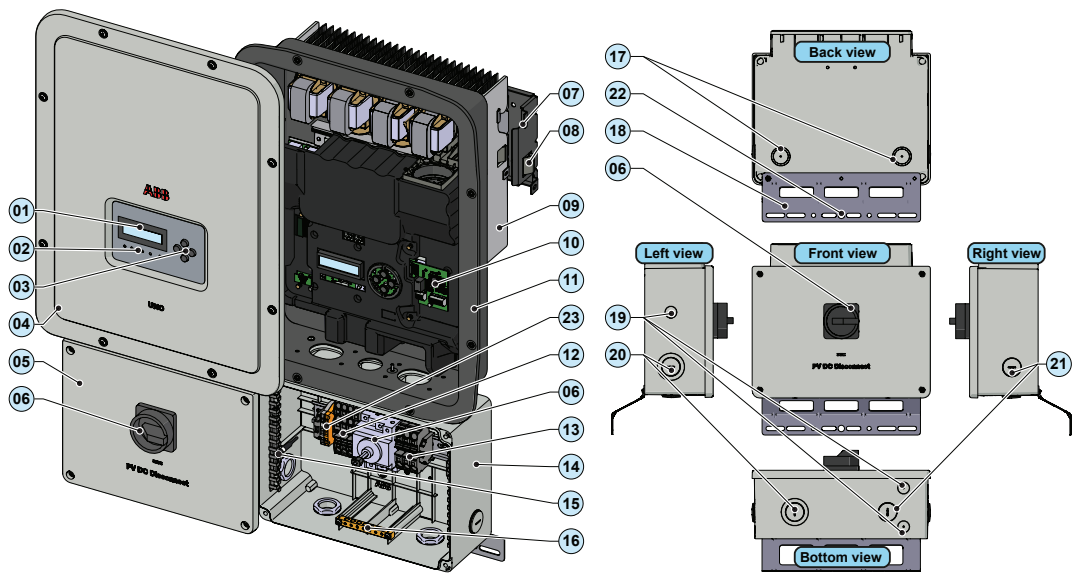
- This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2. Inverter Models and Components

This installation guide covers 4 inverter models of different power levels: 3.3 kW, 3.8 kW, 4.6 kW and 5.0kW.

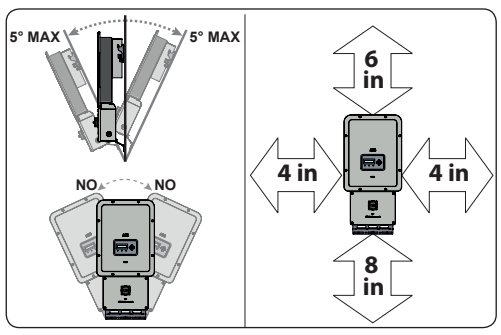
Main components

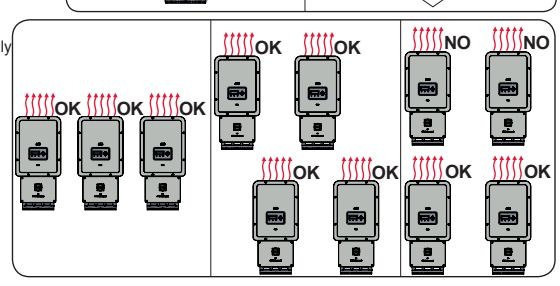
(01) Display	(07) Wall bracket	(13) AC output terminal blocks	(19) 1/2” communication conduit drill out
(02) LED panel	(08) Lock spring	(14) Wiring box	(20) Markings for 3/4” or 1” conduit drill outs
(03) Keypad	(09) Heatsink	(15) Wi-Fi antenna (-B models only)	(21) Opening for 3/4” AC conduit
(04) Inverter front cover	(10) Accessory board (optional)	(16) Protective Earth (PE) connection point	(22) Lock screw position
(05) Wiring box front cover	(11) Inverter	(17) Conduit drill out sizes 3/4”, 1” (drill out markings on back side)	(23) Power supply for rapid shutdown (RSD) terminal blocks
(06) DC disconnect switch	(12) DC input terminal blocks (two MPPT)	(18) lower flange	



3. Installation location

Installation site and position
- Refer Datasheet/Manual to confirm that the environmental specifications have been met
- Do not install the inverter in full sun. If needed, use a sun shade to minimize solar irradiation, especially for temperatures over 104°F/40°C.
- Do not install in closed spaces where air does not circulate freely
- Always ensure that the flow of air around the inverter is not blocked, so as to prevent overheating.
- Do not install the equipment near flammable substances (minimum distance: 10 ft).
- Do not install the equipment on wooden walls or other flammable substances.
- Do not install in inhabited rooms or where the prolonged presence of people or animals is expected, because of the inverter’s noise level during operation. The sound level is heavily influenced by its location (for example, the surface around the inverter, the environment, etc.) and grid quality.
- Install on a wall or strong structure capable of bearing weight
- Install vertically with a maximum inclination as indicated in the figure
- Maintain minimum clearance from objects blocking air circulation and spacing between inverter as indicated in the figures
- Ensure sufficient working area in front of the inverter for wiring box access
- If possible, install at eye level so that the display and LEDs can be seen easily
- Install at a height that takes account of the weight of the equipment
- Position multiple inverters side-by-side, maintaining minimum clearances (measured from the outermost edge of the inverter)
- Multiple inverters can also be placed in a staggered arrangement. Minimum clearances for staggered arrangements include width of the inverter cover plus additional allowances for inverters arranged above or below
- All installations over 6500’ high (2,000 meters) must be assessed by ABB Technical Sales to determine the proper datasheet derating





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

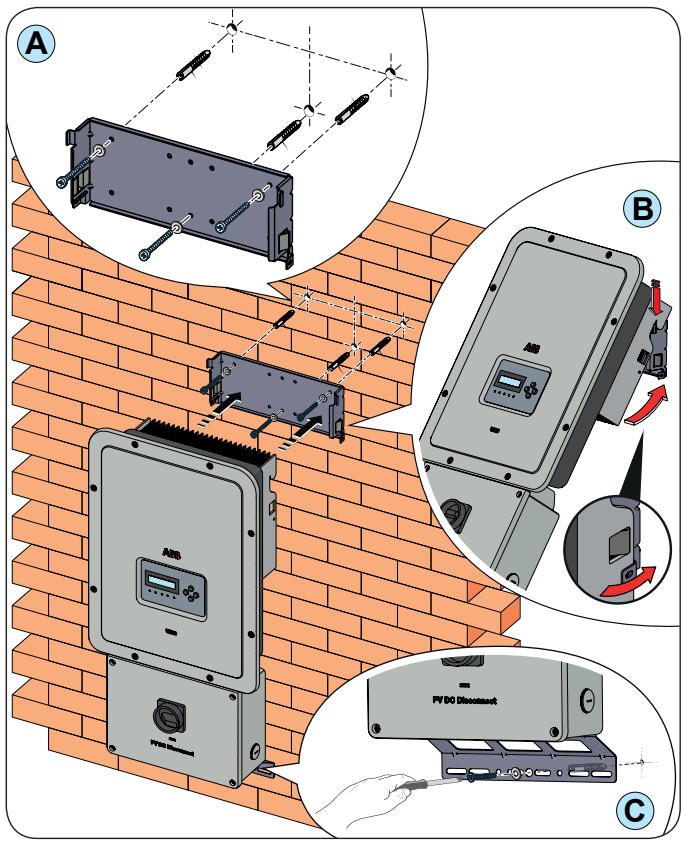
4. Mounting Instructions

Mount the inverter following the step-by-step procedure below.

Do not remove the inverter chassis cover in adverse weather conditions (e.g. rain, snow) or during periods of high humidity (>95%).

Components included in mounting kit	QTY
Wall bracket	1
Jumpers for configuring paralleled inputs.	1 + 1
Quick installation guide (QIG)	1

- Position the bracket (07) so that it is level on the wall or pole
- It is the installer’s responsibility to choose an appropriate number and distribution of attachment points. The choice must be based on the type of wall, frame or other support, the type of anchors to be used, and their ability to support 4 times the inverter’s weight (4x33lbs=132lbs for all models).
Depending on the type and number of attachment points, drill the required holes to mount the bracket (see figure detail Ⓐ)
- Secure the bracket to the wall or frame
- If needed, make conduit cutouts in the wiring box chassis, before the wiring box is put on the wall
- Carefully lift the inverter onto the mounting bracket and hang the inverter by inserting the two tabs on each side the bracket into the two slots on the inverter (see figure detail Ⓑ)
- Then push the lower part of the inverter backwards until the two little clamps on the lower flange secure the inverter in place
- Secure the inverter chassis bottom flange to the mounting surface using another screw (see Figure detail Ⓒ). Note that the bottom flange is not a load-bearing component.

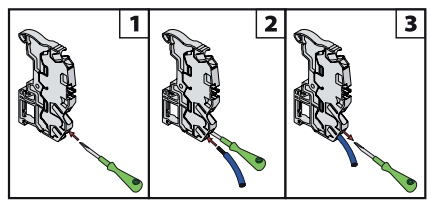


5. Clamps terminal use

All power conductors will be inserter in spring clamp terminals.

The figure shows an example of how to make the wire connection:

1) Insert a small flat screwdriver in the slot and lightly press the screwdriver from top to bottom; insert the screwdriver until the spring opens.
2) Insert the cable in the spring clamp.
3) Remove the screwdriver.
4) When connections are complete, give each wire a pull test



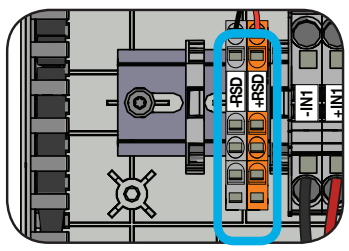
6. Rapid Shutdown

NOTE: If a RSD device was istalled into the plant, it also will needed to connect the AC grid to allow the inverter to power-up!

The installer must use an external rapid shutdown device compliant with the 2014 NEC.
Automatic shutdown occurs at the rooftop box when utility power is lost or when the PV system’s AC disconnect switch is opened. In jurisdictions requiring a dedicated activation switch, install an emergency stop button external to the inverter.
The wiring box has 24Vdc (0.4A max) on a spring-loaded terminal block to the left of the PV input area, which is designed to be used to power a RSD device.

RSD wiring terminals accommodate a wire size range of 26-12 AWG.

- Install RSD device wires in the RSD terminal block;
+24V wire to +RSD terminal; - 24V wire to - RSD terminal



7. Input connection (DC)

Confirm the correct polarity in the input strings.
Confirm there is no ground leakage current in the PV array.
When exposed to sunlight, the PV panels supply DC direct voltage to the inverter.
The inverter’s DC switch disconnects the DC current from the PV panels. In the “OFF” position the inverter will stop producing power, but DOES NOT disconnect the AC from the grid. To prevent electrocution hazards, all the connection operations must be carried out with the external AC disconnect switch, downstream of the inverter (grid side), open and locked out.

The transformerless design requires that the PV array to be floating with respect to ground per NEC 690.35.
DC PV string wire must be listed PV wire per NEC 690.35 rated minimum 600V.
PV output conductors (wiring) must consist of sheathed (jacketed) multi-conductor cables or single insulated conductors (wires) which must be installed in an approved raceway. These conductors must be isolated from the enclosure and system grounding, as required by NEC 690.35. This is the responsibility of the installer.

Confirm that the maximum PV array short circuit current for each DC input channel is within the inverter specification (see table in Section 14). Array equipment grounding must be installed per the requirements of the NEC and is the responsibility of the installer. A configuration program that can help to correctly size the photovoltaic system is available on at http://www.stringsizer.abb.com.

- Turn the DC switch OFF
- Loosen the four captive screws on the wiring box cover (Torx 20) and remove the cover
- Pass the DC wires through the openings dedicated to the DC conduit.

Conduit must be sealed using water-tight fittings to maintain NEMA Type 4X enclosure integrity.
Installer should follow conduit manufacturers’ guidelines and best practices.

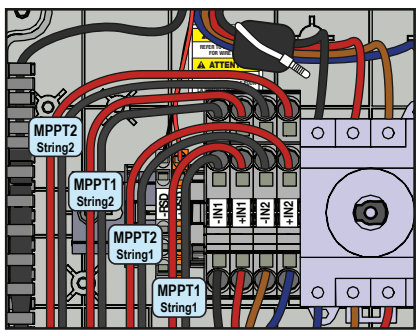
- Connect the DC wiring to DC input terminal blocks (12). DC wiring terminals are spring pressure type and accommodate a wire size range of 20-8 AWG.
Connect the strings in either independent or parallel mode, following the appropriate set of instructions below:

Independent mode configuration

In case of two PV arrays, if each of them has a current rating lower than the maximum current rating for a single inverter channel, they may be connected as “IND” array, each with its own MPPT. In this case, do nothing with the jumper wires which came with the inverters.
- Connect the positive side of the first PV array to +IN1, and its negative side to -IN1.
- Connect the positive side of the second PV array to +IN2 and its negative side to -IN2.

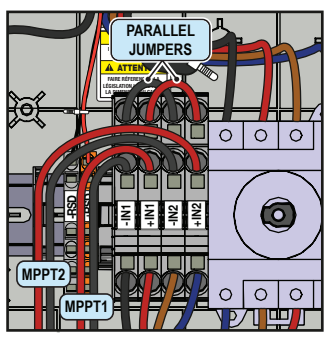
Up to four strings can be connected in independent mode.
- During commissioning, confirm that the input mode is set to IND. The input mode is set using the display menu. Settings>Input Mode>Independent.

If connecting a single array, configure the inverter for parallel input mode.



Parallel mode configuration

If a PV array’s output current is more than the rating for a single inverter channel:
- connect the red jumper wire between the +IN1 and +IN2 terminal block inputs. Then connect the jumper wire black wire between the -IN1 and -IN2 terminals. Remember later to set the input mode to PAR from the display (Settings>Input Mode>Parallel).
- Connect the array to the IN1 (MPPT1) and IN2 (MPPT2) input positions, running separate wires for positive (+) and negative (-) for each array.



8. AC Output connection

To prevent electrocution hazards, open and lock out the external AC disconnect switch before connecting the AC conductors, and any time the AC wiring box cover is to be removed. Proper PPE is required.
AC output overcurrent protection is not provided with the inverter; it is the responsibility of the end user to provide overcurrent protection for the AC output circuit. To reduce the risk of fire, connect only to a circuit provided with an overcurrent protection in accordance with the NEC (ANSI/NFPA 70). The inverter must be connected only to a dedicated branch circuit provided with the maximum branch overcurrent protection device (OCPD) listed in the technical data sheet at the end of this document.
Size conductors per the NEC, Article 310 - use 90°C copper wire only; conductors must be sized according to operating temperature range and continuous current ratings. The AC grid wiring is connected through the inverter switchbox.
AC output wire must be listed PV wire rated minimum 600V.

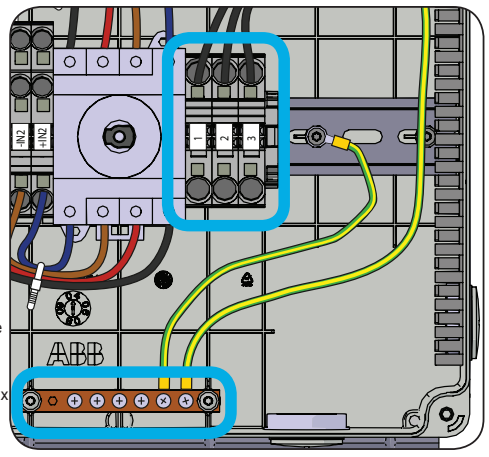
- Run an approved raceway between the inverter and external AC disconnect switch.

- Pass the AC wires throught the openings dedicated to the AC conduit.

When complete, seal conduit with water-tight fittings to maintain the NEMA type 4X enclosure rating.
Installer should follow conduit manufacturers' guidelines and best practices.

- Determine which AC output is applicable for the inverter model being installed. The AC wiring connections based on the AC grid type are shown in the table (also found on a label in the wiring box).

GRID STANDARD TYPE DE RÉSEAU	L1 L3 L2			L1 N L2		
	208V~ 3PH - Δ			240V~ SPLIT-PHASE		
TERMINAL BORNE	1	2	3	1	2	3
WIRE CÂBLE	L1	L2	-	L1	L2	N



- Connect wiring to the numbered terminals based on selected grid type. AC wiring terminals are spring pressure type and accommodate a wire size range of 20-6 AWG.

- Connect the protective earth (PE) cable to wiring box busbar ⑯. Screws the cable (max 4 wires 8AWG to 4AWG, copper) with **2.0Nm (1.5ft-lb)** torque.

The default 240V split-phase connection requires the grid Neutral to be connected to the inverter for proper operation. Before connecting the inverter to the grid, the grid type must be selected during the commissioning phase. If several inverters are installed to a three-phase AC grid, always distribute the inverters between the phases in order to reduce power imbalance between the phases.

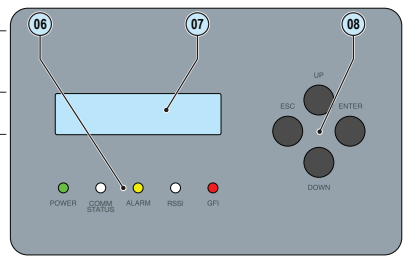
- When all connections are complete, reinstall the front covers and tighten the cover screws with **1.5Nm (13.2 in-lbs)** torque.

9. User Interface

LED and KEYS, in various combinations, may display the status conditions or perform complex actions to be explored by consulting the product manual.

LEDs ⑥

POWER	**Green**	Solid when the inverter is working correctly. Flashes when checking the grid or if there is insufficient sunlight.
COMM STATUS	**Multicolor**	Operation status of wireless communication line: - **Blink Red**: Communication error (no communication available) - **Green**: Communication OK
ALARM	**Yellow**	The inverter has detected an anomaly. The anomaly is shown on the "EVENTS" section of the internal webserver and on the display.
RSSI	**Multicolor**	Communication type and quality of the wireless communication signal (for "Station Mode"): - **Blink Blue**: Wireless board is working in Access Point mode (AP Mode) - **OFF**: No signal - **Blink Red**: Low signal strenght - **Blink Yellow**: Medium signal strenght - **Blink Green**: High signal strenght
GFI	**Red**	Ground fault on the DC side of the PV generator. The error is shown on the "EVENTS" section of the internal webserver and on the display.



The LCD has two visible text lines and the UP and DOWN control keys are used to scroll through the menu items. An arrow on the left side of the display highlights the current selection. Move the arrow UP or DOWN to the desired selection and press ENTER to access the associated submenu. To return to the preceding menu, press the ESC key.
- Press ESC to open the menus. Use the DOWN key to scroll the submenus.
- The default password for Setting menus is 0000.

Keys ⑧

ESC	Used to access the main menu, to go back to the previous menu or to go back to the previous digit to be edited.
UP	Used to scroll upwards the menu options or to shift the numerical scale in ascending order.
DOWN	Used to scroll downwards through the menu options or to shift the numerical scale in descending order.
ENTER	Used to confirm an action, to access the main menu or the submenu for the selected option (indicated by the > symbol) or to switch to the next digit to edit.

10. Commissioning

Before proceeding with commissioning, make sure you have carried out all the operations and checks indicated in the previous sections of this quick installation guides, and verify that the inverter cover ⑤ was properly closed!

Refer to the product manual for further information about the configuration and the use of the functionality of the internal Webserver. Commissioning and configuration of the inverter can also be done with the display ⑦. Consult the product manual for more information.

Commissioning and configuration of the inverter can be made using a wireless capable device such as a smartphone, tablet or laptop.
The steps for commissioning are listed below:

1. Set the inverter's DC disconnect switch ⑯ and any external DC switches to "ON" position: If the input voltage applied to one of the two input channels is greater than the minimum starting voltage, the inverter will start up.

The inverter is powered ONLY by the voltage coming from the photovoltaic generator: the presence of grid voltage alone IS NOT SUFFICIENT to allow the inverter to power up.
If a RSD device was istalled into the plant, it also will needed to connect the AC grid to allow the inverter to power-up!

2. Set the external AC disconnect switch downstream to the inverter to "ON" position.

3. Enable Wireless on the device that is being used for the inverter commissioning (tablet, smartphone or PC) and connect it to the Access Point created by the inverter: a network with the name **ABB-XX-XX-XX-XX-XX-XX** will appear in the list of networks, where "**X**" is a hex digit of the MAC address (MAC address can be found on the "Wireless Identification Label" placed on the side of the inverter or previously applied to this quick installation guide - see cover page).

4. When required enter "**ABBSOLAR**" as network password for the inverter's access point.

After the inverter has been powered up for 24 hours, the access point default password "ABBSOLAR" will be disabled.
Any subsequent access to the internal webserver will be possible only using the PRODUCT KEY printed on the "Wireless identification label" previously applied to this quick installation guide (see cover page) as access point password.

5. Open the internet browser (recommended browser: Chrome versions from v.55, Firefox versions from v.50, Safari versions from v.10.2.1) and enter the preset IP address to access the configuration wizard page: **192.168.117.1**

6. A configuration wizard will open, consisting of a sequence of steps in which all the required fields must be completed correctly (language of the wizard can be selected in the upper status bar). The steps and information required by the configuration wizard are:

STEP 1 - Set the Administrator/User login credentials (minimum 8 character for password). User and password are CASE SENSITIVE.

STEP 2 (OPTIONAL) - Enter the required information (IP selection mode, SSID and Password) to connect the inverter to the residential wireless network with "Station Mode" *(Note: This step can be skipped to continue operating with the point-to-point connection "AP mode")*. Once the inverter is connected to the wireless network it will be necessary switch the tablet/smartphone/PC device to the same wireless network to which the inverter is connected to proceed with the configuration wizard (for any difficulties concerning this step, refer to the "Internal Webserver and wireless troubleshooting" chapter of the product manual). Once the connection is acquired, a new message will provide you the links (corresponding to the IP Address assigned by the router to the inverter and the "Host Name") that can be used each time you want to access the internal webserver. **TAKE NOTE OF THEM.**

STEP 3 - Set the Date, Time and Time zone (The inverter will propose these fields when available).

STEP 4 - Set the inverter country standard, Input channel configuration and Meter configuration (if installed). Clicking the "END" button the wizard will be completed (after confirmation the inverter will reboot).

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

Any inverters installed, or commissioned, in California after September 8, 2017 must be set to the Rule 21 country code USA - RULE21 @ 240 single [R21 240sp] or USA - RULE21 @ 208 single [R21 208si].

Once both AC and DC switches are closed and the wizard commissiong procedure is finished, the inverter starts the grid connection sequence: the inverter performs the grid voltage check, measures the PV array insulation resistance against earth and carries out other self-diagnosis checks.
During the checks before the connection with the grid, the "Power" LED keeps flashing, the "Alarm" and "GFI" LEDs are off. If there is not sufficient sunlight to connect to the grid, the inverter will repeat the connection procedure until all the parameters are within range.

If the preliminary checks for parallel connection to the grid are successful, the inverter connects to the grid and begins to export power to the grid.
The "Power" LED remains fixed on while the "Alarm" and "GFI" LEDs are off.

11. AFD (arc fault detection)

The DC AFD fault circuit interrupter automatically runs a self test every morning when sunlight is sufficient for connection. The inverter display area shows the results of the selftest:

- If the self-test results are OK, the inverter will continue with the AC grid connection.
- If a potential problem on the Arc Fault Detection (AFD) board is detected, the self-test will result in an error.

Test Arc Sensor OK

Press the ESC key to clear the error and start the restart selftest. If self-test results are OK, the inverter will reconnect to the AC grid.

Test Arc Sensor E053

If the DC arc fault is still present, the self test will result in error code E050.
Refer to the product manual which must be downloaded at www.abb.com/solarinverters for troubleshooting suggestions.
- During normal operation, the input current is continually measured and analyzed.
- If a DC arc fault is detected, the inverter is disconnected from the AC grid and error E050 will be displayed.

Test Arc Sensor E050

The AFD self-test can be manually started anytime using the following procedure:
1. Turn off the inverter (switching off both DC and AC switches) and,
2. Turn on both the DC and AC switches and wait for the self-test results on the display.

12. Response to abnormal conditions

Abnormal grid conditions: The inverter is programmed to respond to abnormal grid conditions, as specified in the below table:

Condition	Utility source		Max. time (sec)[2] at 60Hz before cessation of current
	Voltage (V)	Frequency (Hz)	
A	<0.50 Vnom[1]	Rated (60Hz)	Default setting[3] 0.16 (Adj. 0.16 to 1.5)
B	0.50 Vnom[1] ≤ V < 0.70	Rated (60Hz)	Default setting[3] 3 (Adj. 0.16 to 30)
C	0.70 Vnom[1] ≤ V < 0.88	Rated (60Hz)	Default setting[3] 2 (Adj. 0.16 to 30)
C	1.10 Vnom[1] < (*)	Rated (60Hz)	Default setting[3] 1 (Adj. 0.16 to 30)(*)
D	1.20 Vnom[1] ≤ V (*)	Rated (60Hz)	Default setting[3] 0.16 (Adj. 0.001 to 0.16 sec)
E	Rated	Default setting[3] f > 60.5 Hz (Adj. 60.1 to 64.0 Hz)	Default setting[3] 0.16 (Adj. 0.16 to 300 sec)
F	Rated	Default setting[3] f < 59.3 Hz (Adj. 56.0 to 59.9 Hz)	Default setting[3] 0.16 (Adj. 0.16 to 300 sec)
G	Rated	Default setting[3] f < 57.0 Hz (Adj. 50.0 to 56.0 Hz)	0.16 (Fixed)
H	Rated	Default setting[3] f > 63.0 Hz (Adj. 62.0 to 64.0 Hz)	0.16 (Fixed)

1. Vnom is the nominal output voltage rating.
2. Trip limit and trip time accuracy specification is as follows: Voltage: +/-2%, Frequency: +/- 0.10Hz, Time: 2 grid cycles (33ms @ 60Hz).
3. Default settings aligned with IEEE 1547-2003 requirements.

To adjust voltage and frequency and disconnect times to meet local utility requirements, make modifications are made using :
- The inverter embedded web user interface. The Admin password is required to unlock the "installer" functionalities.
- The LCD display. A time-limited service password is required, contact ABB solar inverter technical support 1-877-261-1374.
- Aurora Manager LITE software. Connect the inverter equipped with UNO-DM-COM kit UNO or UNO-DM-PLUS-Ethernet COM kit to a PC through a RS-485/USB adapter. Download the manual at www.abb.com/solarinverters. An User ID and a password is required to unlock the "installer" functionalities of the software, contact ABB solar inverter technical support 1-877-261-1374.

Fault currents and durations: During a grid fault including a short circuit condition, the inverter may inject current into the grid as specified below:

Utility voltage (V)	Fault current RMS (A)		
	1 cycle	3 cycle	5 cycle
208	17.4	15.9	15.8
240	17.1	16.5	16

Output power derating at high ambient temperature: Under high ambient temperatures, the inverter is designed to automatically reduce its output power. Detailed derating curves by model are provided in the product manual found on www.abb.com/solarinverters.

13. Grid support functions

The inverter is equipped with advanced grid support functionality that is useful to support reactive loads and also assist in reliable operation of the utility grid in the presence of a large number of distributed energy generation sources. This section provides an overview of the available grid support functions.
The parameters related to the grid support functions that are in this inverter can be modified by:
- Accessing the embedded Web User Interface.
- Accessing to settings under the Service menu requires a time-limited password, which can be obtained by calling ABB solar inverter technical support at 1-877-261-1374.

1. Voltage ride-through
This inverter provides parameters to respond to undervoltage and overvoltage events. The inverter is designed to operate normally within the specified operating range. If voltage excursions occur, the inverter is designed to continue operating normally or cease to export power for a specified delay. After this programmed delay, the inverter disconnects from the grid if the voltage is still out of its normal range. The voltage ride-through parameters can be adjusted.

2. Frequency ride-through
This inverter provides parameters to respond to underfrequency and overfrequency events. If frequency excursions occur, the inverter is designed to continue operating normally for a specified delay. Beyond this programmed delay, the inverter disconnects from the grid in the event of an abnormal voltage condition. The frequency ride-through parameters can be adjusted.

3. Reactive power modes
This inverter is designed to export active as well as reactive power into the utility grid. The inverter provides several modes of operation for reactive power control and are described below:
- Disable: This is the default setting. Under this setting, the inverter exports with a power factor of 1.0.
- Fixed power factor control (Fixed cos-phi): In this mode, the operator can set the output power factor to a fixed value. When enabled, Set percentage will appear on the display, allowing the setting of the value of Cos-Phi as a percentage from 0.1 to 100.
- Power factor as function of output power (Std cosphi 0.9): In this mode, the inverter reduces the output power as a function of the output power at a given operating point.
- Dynamic Volt/VAR control (Std Q(U)): In this mode, the level of reactive power exported by the inverter is a function of the operating grid voltage, also known as a Volt/VAR curve.

4. Power reduction
This inverter has two modes for active power reduction:
- Power limitation: When enabled, this mode limits the active power that the inverter can export to the grid. The setting is specified as a percentage of the rated power of the inverter, from 0% to 100% in steps of 1%.
- Frequency/Watt function (Set F Derating): In this mode, the inverter limits the active power as a function of the grid frequency. The default frequency/watt can be adjusted.

5. Ramp controls
The inverter is designed to control the rate at which output power is increased, either at startup, or after a temporary low power condition on the PV array (such as fast shading). The following ramp controls are provided on this inverter.
- Normal ramp: The normal ramp defines the maximum rate at which the inverter can increase the output power under normal operation. The normal ramp control limits the dramatic fluctuations in the output power in order to prevent instabilities on the utility grid. The normal ramp rate can be adjusted.
- Slow ramp: The soft-start ramp defines the maximum rate at which the inverter can increase the output power when the inverter is first starting up. This startup may occur on a daily basis or when the inverter restarts after an abnormal grid event has ended.

Refer to the dedicaterd application note in the ABB Solar website for more details about the grid support functions.

14. Technical Data

	UNO-DM-3.3	UNO-DM-3.8	UNO-DM-4.6	UNO-DM-5.0
Input				
Absolute maximum input voltage ($V_{max,abs}$)	600 V			
Start-up voltage (V_{start})	default 200 V (120...350 V)			
Operating MPPT voltage range (V_{dcmin}...V_{dcmax})	0.7xV_{start}...580 V (≥ 90V)			
Maximum usable power ($P_{acr@MPPT}$) - each channel	2000 W	3000 W	3000 W	3500 W
Number of Independent MPPT	2			
Full power MPPT voltage range ($V_{MPPT\,min}$ ... $V_{MPPT\,max}$) with parallel MPPT configuration a P_{acr}	160...530 V (208 Vac) 170...530 V (240 Vac)	120...530 V (208 Vac) 140...530 V (240 Vac)	140...530 V (208 Vac) 150...530 V (240 Vac)	130...530 V (208 Vac) 145...530 V (240 Vac)
Maximum usable current ($I_{dc\,max}$) - each channel	10.0 A	16.0 A	16.0 A	19.0 A
Maximum current ($I_{dc\,max}$)	20.0 A	32.0 A	32.0 A	38.0 A
Maximum short circuit current ($I_{sc\,max}$) - each channel	12.5 A	20.0 A	20.0 A	22.0 A
Number of wire landing terminals	2 pairs, capable of connecting two parallel strings			
Array wiring termination	Terminal block, pressure clamp, AWG20-8			
Input protection				
Reverse Polarity Protection	Yes, from current limited source			
Over-voltage protection type	Varistor			
PV array ground fault detection	Pre start-up RISO and dynamic GFDI			
DC switch rating (per contact)	600 V / 23A@600V, 38A@500V and 45A@350V			
Output				
AC grid connection type	1Φ/2W or Split-Φ/3W			
Nameplate Apparent Power (S_{max})	3300 VA (208 Vac) 3300 VA (240 Vac)	4200 VA (208 Vac) 4200 VA (240 Vac)	4600 VA (208 Vac) 4600 VA (240 Vac)	5000 VA (208 Vac) 5000 VA (240 Vac)
Nameplate Output Active Power ($P_{acr@cosφ=1}$)	3300 W (208 Vac) 3300 W (240 Vac)	4200 W (208 Vac) 4200 W (240 Vac)	4600 W (208 Vac) 4600 W (240 Vac)	5000 W (208 Vac) 5000 W (240 Vac)
Output Active Power @V_{acr} and cosφ=±0,9 (P_{Rated})	2700 W (208 Vac) 3000 W (240 Vac)	3000 W (208 Vac) 3450 W (240 Vac)	3780 W (208 Vac) 4140 W (240 Vac)	4118 W (208 Vac) 4500 W (240 Vac)
Nominal AC output voltage (V_{acr})	208Vac (1Φ/2W) or 240Vac (Split-Φ/3W)			
Output AC voltage range (V_{acmin}...V_{acmax})	183...228Vac (1Φ/2W) or 211...264Vac (Split-Φ/3W)			
Maximum current ($I_{ac\,max}$)	14.5 A	16.0 A	20.0 A	22.0 A
Contributory fault current	16.0 A	19.0 A	22.0 A	24.0 A
Nominal output frequency (f_r)	60 Hz			
Adjustable grid frequency range (f_{min}...f_{max})	50...64 Hz			
Power factor and adjustability range	>0.995, adj. +/-0.8			
Total harmonic distortion at rated power	<2%			
Grid wiring termination type	Terminal block, pressure clamp, AWG20-6			
Output Protection				
Anti-islanding protection	Meets UL1741 / IEEE1547 requirements			
Over-voltage protection type	Varistor, 2 (L1 - L2 / L1 - G)			
Maximum AC OCPD rating	20.0 A	20.0 A	25.0 A	30.0 A
Operating Performance				
Maximum efficiency (η_{max})	97.0%	97.0%	97.0%	97.4%
CEC efficiency	96.5% (208 Vac) 96.5% (240 Vac)	96.0% (208 Vac) 96.5% (240 Vac)	96.0% (208 Vac) 96.5% (240 Vac)	96.5% (208 Vac) 97.0% (240 Vac)
Stand-by consumption	< 8.0 Wrms			
Night-time consumption	< 0.6 Wrms			
Auxiliary Output				
Isolated Auxiliary Power Supply (1)	24Vdc, 0.4A max			
Communication				
Embedded Communication interface	Wireless (2)			
Embedded Communication Protocol	ModBus TCP (SunSpec)			
Commissioning Tool	Web User interface, Display, Aurora Manger Lite			
Monitoring	Plant Portfolio Manager, Plant Viewer, Plant Viewer for Mobile			
Optional board UNO-DM-COM Kit				
Optional Communication Interface	RS485, Alarm/Load manager relay, Remote ON/OFF			
Optional Communication Protocol	ModBus RTU (SunSpec), Aurora Protocol			
Optional board UNO-DM-PLUS-Ethernet COM Kit				
Optional Communication Interface	Ethernet, RS485, Alarm/Load manager relay, Remote ON/OFF			
Optional Communication Protocol	ModBus TCP (SunSpec), ModBus RTU (SunSpec), Aurora Protocol			
Environmental				
Ambient air operating temperature range	-13°F to +140°F (-25°C to +60°C) with automatic power reduction above 122°F (50°C)		-13°F to +140°F (-25°C to +60°C) with automatic power reduction above 113°F (45°C)	
Relative Humidity	0-100% RH condensing			
Acoustic noise emission level	< 50 db (A) @1m			
Maximum operating altitude without derating	6560ft (2000m)			
Environmental class	Outdoor			
Mechanical specifications				
Enclosure rating	Certified to NEMA Type 4X			
Cooling system	Natural convection			
Dimensions (H x W x D)	34.0 x 16.4 x 6.9in (863 x 418 x 175mm) (3)			
Weight	33lb (15kg) (3)			
Shipping weight	46lb (20,7kg) (3)			
Mounting system	Wall bracket			
Conduit connections (2)	Bottom: Markings for (2) concentric KOs 1", 3/4" and (2) KOs 1/2"		Sides: Markings for concentric KOs 1", 3/4"	
Safety				
Insulation level	Transformerless (floating array)			
Safety and EMC standard	UL1741, IEEE1547.1, CSA-C22.2 N. 107.1-01, UL1998 UL 1699B, FCC Part 15 Class B			
Grid standard	UL 1741 SA, IEEE 1547, Rule 21, Rule 14 (HI)			
Safety approval	cTUVus			
Available models	UNO-DM-3.3-TL-PLUS-US-SB-RA	UNO-DM-3.8-TL-PLUS-US-SB-RA	UNO-DM-4.6-TL-PLUS-US-SB-RA	UNO-DM-5.0-TL-PLUS-US-SB-RA
Model with DC switch, wiring box, AFD, RSD supply output				

1. The auxiliary output is used to supply the RSD contactors when required. 2. WLAN IEEE 802.11 b/g/n @2,4GHz 3. When equipped with DC switch and wiring box
Note. Features not specifically mentioned in this data sheet are not included in the product

Contact us

www.abb.com/solarinverters

UNO-DM-3.3_3.8_4.6_5.0-TL-PLUS-US-Quick Installation Guide EN-RevD
EFFECTIVE 2017-09-06