

ABB Solar inverters
Quick installation guide
MICRO-0.25/0.3/0.3HV-I-OUTD-230

EN



In addition to what is explained in this guide, the safety and installation information provided in the technical 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™ **ABB**

1. Labels and Symbols

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

This label is just an example (MICRO-0.25-I-OUTD-230). Parameters change depending on the model of the MICRO inverter. The technical data shown in this quick installation guide does not replace those shown on the labels attached to the equipment.

Main symbols used in the guide and on the products

Always refer to instruction manual	General warning - Important safety information	Hazardous voltage	Hot surfaces
Protection rating of equipment	Temperature range	Insulation transformer	Direct and alternating currents, respectively

2. System components

Main system components

- MICRO inverter
- The CDD device necessary for monitoring and collecting data from the MICRO inverters
- The free "AV Plant Viewer" web portal that provides remote system monitoring via Internet

The LED on the front panel is present only in the -HV version

The AC-TRUNK-BUS cable (and relevant accessories) available in 3 configurations, depending on the type of installation and PV panel used

3. List of accessories

Main system accessories

- AC-TRUNK-BUS-1,05m**
AC cable with 3 conductors (4 mm²); distance between connectors 1.05m/41"
- AC-TRUNK-BUS-1,70m**
AC cable with 3 conductors (4 mm²); distance between connectors 1.70m/67"
- AC-TRUNK-BUS-2,05m**
AC cable with 3 conductors (4 mm²); distance between connectors 2.05m/81"

MALE EXTENSION Male connector for AC bus cable extension (ø 9mm...12mm / ø 0.35"...0.47")	MALE EXTENSION CAP Insulated cap for connectors MALE EXTENSION
FEMALE EXTENSION Female connector for AC bus cable extension (ø 9mm...12mm / ø 0.35"...0.47")	FEMALE EXTENSION CAP Insulated cap for connectors FEMALE EXTENSION
Tool for releasing connectors AC bus cable extension	
PLUG CAP Insulated cap for AC-TRUNK-BUS cable connectors (female)	UNLOCK TOOL Tool for releasing MICRO inverters AC connectors

4. Choice of installation location

Environmental checks

- Consult the technical data to check the environmental parameters to be observed (degree of protection, temperature, humidity, altitude, etc.)
- Do not expose to direct sunlight to avoid unwanted power derating due to an increase in the internal temperature of the inverter
- To avoid overheating, always make sure the airflow around the inverter is not blocked.
- Do not install in places where gases or flammable substances may be present
- Avoid electromagnetic interference that can compromise the correct operation of electronic equipment and introduce dangerous conditions

Installations above 2000 metres

On account of the thinner air at higher elevations, conditions may occur that should be considered when choosing the place of installation:

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

All installations at altitudes of over 2000 metres must be assessed case by case considering the aforesaid conditions.

Installation position

When choosing the place of installation, comply with the following conditions:

- Install only on structures specifically designed for photovoltaic modules
- Install MICRO inverter underneath the photovoltaic modules so that it works in the shade. If this condition cannot be met, the inverter could likely undergo derating
- Any maintenance or replacement of the device could require the technician to remove the photovoltaic module mounted on top of the MICRO inverter. This condition must be accounted for during installation, ensuring that the safety distances are correct for normal check and maintenance operations
- The distance between MICRO inverters installed in the same system array depends on the type of photovoltaic modules and their orientation (Landscape or Portrait). Choose the best configuration to employ during the project planning stage, bearing in mind that the selected orientation will influence the correct type of AC cable (distance between connectors)

7. Assembly instruction

The PV panels supply DC input voltage to the inverter when they are exposed to light. The installation must be carried out with the equipment disconnected from the grid and with the photovoltaic panels shaded or isolated. The IP65 environmental protection rating is not guaranteed if the AC and DC connectors are disconnected and left without the insulated caps. It is recommended that the AC-TRUNK-BUS cable be installed with the male plug facing the junction box

1. Run the AC cable along the frame structure provided for installing the photovoltaic modules.

2. Secure the MICRO inverter to the photovoltaic module frame with the logo side facing downwards.

Legislation in force in the country of installation and the installed power will determine the maximum number of MICRO inverters permitted for installation in each AC cable section. Do NOT exceed the maximum number of MICRO inverters permitted for installation!

In order to facilitate positioning, it could be useful to mark the approximate centre of each photovoltaic module on the frame.

5. Choice of Protection Devices

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

The line cable is laid between the junction box (next to the PV panels) and the AC panel (where the protection devices will be installed).

Protection breaker rating (A)	6				10				16				20			
number of MICRO-0.25 which may be installed	4				7				12				12			
number of MICRO-0.3 which may be installed	4				6				10				12			

AC line cross section (mm ² / inches ²)	2.5				4				6				10			
	0.004	0.006	0.009	0.016	0.004	0.006	0.009	0.016	0.004	0.006	0.009	0.016	0.004	0.006	0.009	0.016
Line maximum length	30m	48m	72m	120m	20m	32m	48m	80m	11m	18m	27m	45m	9m	15m	22m	36m
Allowable voltage loss (<1.5%)	98ft	157ft	236ft	394ft	66ft	105ft	157ft	262ft	36ft	59ft	89ft	148ft	30ft	49ft	72ft	118ft
Line maximum length	20m	33m	50m	80m	13m	21m	32m	53m	7m	12m	18m	30m	6m	10m	15m	25m
Allowable power loss (<1%)	66ft	108ft	164ft	262ft	43ft	69ft	105ft	174ft	23ft	39ft	59ft	98ft	20ft	33ft	49ft	82ft

Differential protection downstream of the inverter

The high-frequency isolated 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. ABB recommends the use of a switch with type A or AC differential magnetothermal protection with Δn=30mA sensitivity.

Interface protection system and device downstream of the inverter

The inverter does not include any electromechanical devices (relays, contactors, etc.) for automatic disconnection from the power grid. The system must therefore be provided with external protection for the physical disconnection of the MICRO inverters from the grid, in compliance with the applicable regulations and with the requirements of the installation country's power distributor. Such protection is typically composed of an interface protection system that analyzes and controls the grid parameters and, if necessary, sends commands to the interface device that physically disconnects the AC line coming from MICRO inverters.

3. The inverter and photovoltaic panels must be connected to an equipment grounding conductor.

The inverter can be earthed using the correct clamp secured to the chassis and an adequately-sized conductor.

4. Fasten the AC cable to the frame with cable ties.

Be aware to keep the connectors in a position accessible to the AC cable coming from the MICRO inverter.

6. AC output connection

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 out.

When connecting to the grid, all the AC cables coming from MICRO inverters must be joined inside a insulated junction box (IP65). From the junction box must exit the line cable (or more than one) connected to the load distribution panel (containing protection devices) which is connected to the distribution grid. Be sure about sizing of the line cable (not supplied from ABB).

All the external connections to the insulated junction box (caps, adapters, etc.) must be made with securely-sealed ABB components.

AC cables from the MICRO inverters have 3 conductors with different colors to identify the function of each conductor.

Pay special attention and ensure you do not reverse the phase with the neutral!

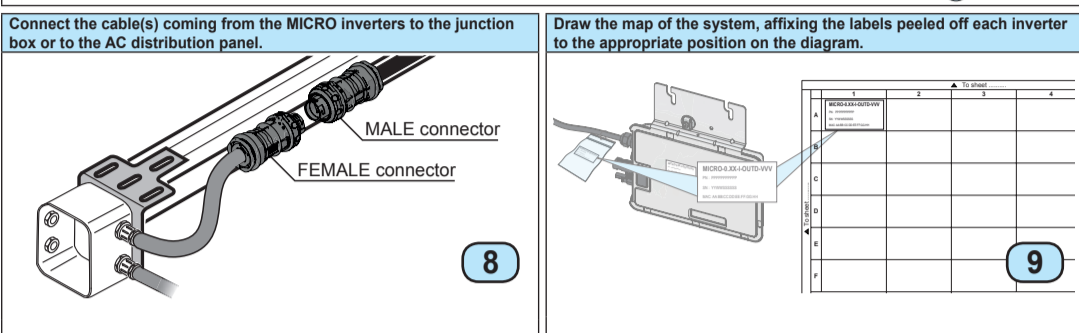
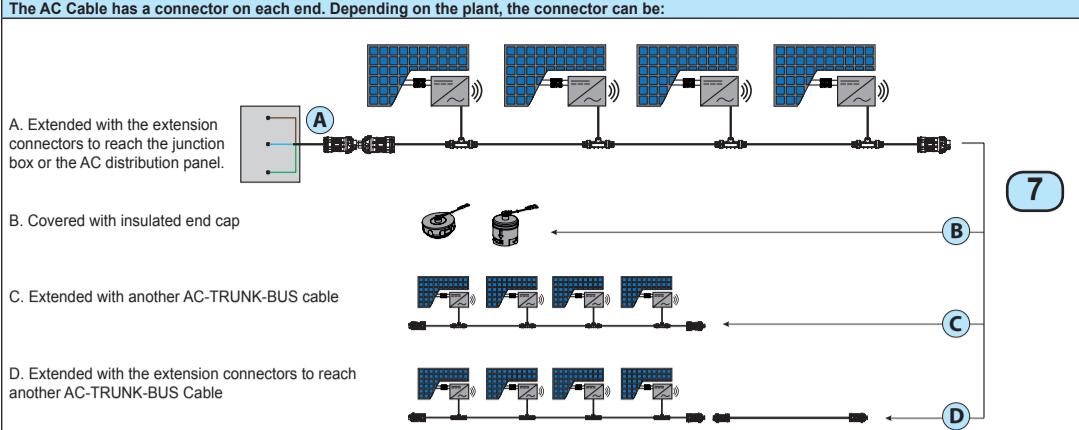
Phase	- brown
Neutral	- blue
Ground	- yellow/green

5. Remove the temporary cap from AC cable connectors and then connect the MICRO inverters.

The connectors are coupled correctly when two clicks are heard

6. Protect any unused connectors by fitting the appropriate protective caps on them to keep them watertight.

The temporary caps are only fitted for shipping and provide no seal whatsoever!



Plug the DC cables into the corresponding inputs on the microinverters and install the photovoltaic modules.

Status	Description	DC	Grid	Duration	Green LED	Red LED
1	Start-up MICRO virgin	ON	OFF	10 Sec.	Blinking LED 1Sec ON/1Sec OFF	OFF
2	Start-up MICRO acquired	ON	OFF	10 Sec.	Solid green	OFF
3	Off	No DC on	OFF	OFF	Continuos	OFF
4	Alarm	Boot issue	ON	OFF	Continuos	Blinking LED 0.5Sec ON/0.5Sec OFF
5	Alarm	Ground Fault	ON	OFF	Continuos	Solid red
6	Alarm	Country standard issue	ON	OFF	Continuos	Blinking LED 1Sec ON/1Sec OFF
7	Alarm	Generic alarm	ON	OFF	Continuos	Blinking LED 1Sec ON/1Sec OFF
8	Normal	No alarm, no Grid connected	ON	OFF	Continuos	Blinking LED 1Sec ON/1Sec OFF
9	Normal	No alarm, Grid connected	ON	ON	Continuos	Blinking LED 1Sec ON/1Sec OFF

For MICRO inverters with an LED on the front panel (-HV version), see table at right for description of the LED behavior. In the table, the Start-up phase happens in the first ten seconds and includes steps 1 and 2, followed by Steps 3-9, which are part of the Static phase.

Acquire and configure the MICRO inverters of the system using the CDD device.

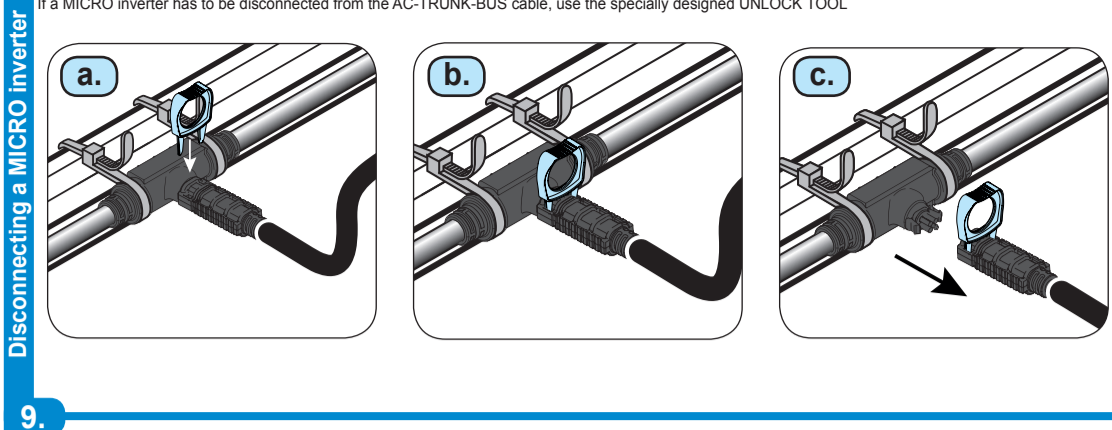
The inverter will not begin to feed energy into the distribution grid until the association procedure by the CDD has been completed. It is required that a CDD (Concentrator Data Device) be installed with any MICRO inverter.

Refer to the CDD Instruction Manual or CDD Quick Installation Guide to perform the system commissioning operations. Status of the commissioning will be reported on the CDD display.

Map of MICRO inverter installed

The purpose of the system map is to associate the Serial Numbers of the MICRO inverters with their positions on the system. The map is helpful for identifying the position of a given MICRO inverter installed beneath its respective PV panel since the CDD device will indicate the production and any malfunctions based on the serial number.

Page of	To sheet	To sheet	To sheet	To sheet	To sheet
4	Tilt.....	Tilt.....	Tilt.....	Tilt.....	Tilt.....
	Azimuth.....	Azimuth.....	Azimuth.....	Azimuth.....	Azimuth.....
3	Tilt.....	Tilt.....	Tilt.....	Tilt.....	Tilt.....
	Azimuth.....	Azimuth.....	Azimuth.....	Azimuth.....	Azimuth.....
2	Tilt.....	Tilt.....	Tilt.....	Tilt.....	Tilt.....
	Azimuth.....	Azimuth.....	Azimuth.....	Azimuth.....	Azimuth.....
1	Tilt.....	Tilt.....	Tilt.....	Tilt.....	Tilt.....
	Azimuth.....	Azimuth.....	Azimuth.....	Azimuth.....	Azimuth.....
	A	B	C	D	E
	Affix the detachable label to each field on the map bearing the serial number of the MICRO inverter				
	To sheet				



- 9. Commissioning**
- Preliminary checks**
- When conducting the checks, ensure that the main AC disconnecter switch (downstream from the system) and any other possible isolation switches are disarmed
 - Ensure that all conductors and protective grounding points are connected
 - Check the position of all connection cables and the tightness of all nuts and terminals
 - Ensure that all electrical safeguards have been correctly installed
- Sequence of operations**
- Arm the main AC disconnecter switch (downstream from the system) and any other possible isolation switches
 - Choose the CDD installation site from which carrying out 802.11 network configuration and MICRO inverter acquisition. At this stage, we recommend not securing the CDD to the wall because the final installation position might need to be reevaluated based on the strength of the signal
 - Configuration of the wireless connection for the CDD device (through the display on the CDD). Alternatively, connect the CDD to a computer using the ethernet port
 - Association of the installed MICRO inverters with the CDD device and selection of the grid standard of the country where they are installed (using the guided procedure on the CDD display or on the CDD web user interface inside the CDD device)

- Registering at the web portal "AV Plant Viewer"

- Mounting the CDD device onto the wall

- Refer to the CDD manual to perform the system commissioning operations. Any malfunctions will be reported on the CDD device display

11. Characteristics and technical data

	MICRO-0.25-I-OUTD	MICRO-0.3-I-OUTD	MICRO-0.3HV-I-OUTD
Input Side			
Maximum DC Input Power (Pdcmax)	265 Wp	320 Wp	320 Wp
Operating DC Input Voltage Range (Vdcmín...Vdcmax)	12 ... 60V	12 ... 60V	19...75V
MPPT Input DC Voltage Range (VMPPTmin... VMPPTmax)	25 ... 50V	30 ... 50V	30...75V
Absolute Maximum DC Input Voltage (Vmax,abs)	65 V	65 V	78
Maximum DC Input Current (Idcmax)		10.5 A	
Maximum Backfeed current (from AC to DC side)		Negligible	
Number of DC Inputs Pairs for each MPPT		1	
DC Connection Type		PV Connector genuine MC4 (cover cap assembled at shipment)	
Start-up DC Input Voltage (Vstart)		25V	
Grounded input pole		Positive (4)	
Maximum Input short circuit Current (Isc)		12.5 A	
Output Side			
AC Grid Connection Type		Single phase (5)(6)	
Rated AC Power (Pac,r)	250 W	300 W	300 W
Maximum Apparent Power (Smax)	250 VA (8)	300 VA (8)	300 VA (8)
Rated AC Grid Voltage (Vac,r)		230 V	
AC Voltage Range (Vacmin...Vacmax)		180...264 V (1)	
Rated AC Output Current (Iac,r)	1.09 A	1.31 A	1.31 A
Maximum AC Output Current (Iac,max)	1.3 A	1.5 A	1.5 A
Contributory fault current		3A	
Inrush Current		8 A (max 150ms)	
Maximum output fault current		6.3Arms	
Rated Output Frequency (fr)		50 / 60 Hz (2)(10)	
Output Frequency Range (fmin...fmax)		47 ... 62 Hz (2)(10)	
Nominal Power Factor (Cosphiac,r) and adjustable range		> 0.995 (7)	
Leakage current of a single MICRO inverter		0.65mA	
Maximum number of units per breaker		17 (3)	
Output Protection			
Anti-Islanding Protection		According to local standard	
Output Overcurrent Protection		3A	
Output Overvoltage Protection - Varistor		Yes	
Operating Performance			
Maximum Efficiency		96.5%	
CEC Efficiency	95.4%	95.5%	96%
Stand-by Consumption		< 50mW	
Communication			
Monitoring System		Wireless and Web-Based Monitoring through CDD	
Environmental			
Ambient Temperature Range		-40...+75°C / -40...167°F with Derating above 65°C (149°F)	
Relative Humidity		0...100 % condensing	
Environmental Category		Outdoor	
Environmental pollution degree for external environment		3	
Noise Emission		< 30 db(A) @ 1 m	
Maximum Operating Altitude without Derating		2000 m / 6560 ft	
Physical			
Environmental Protection Rating		IP 65	
Cooling		Natural	
Dimension (H x W x D)		266mm x 246mm x 35mm / 10.5" x 9.7" x 1.37"	
Weight		< 1.65 kg / 3.5 lb	
Mounting System		Rack mounting with M8, 1/4" or 5/16" bolt	
Overvoltage Category according to IEC62109-1		II (input DC) III (output AC)	
Safety			
Isolation Level		HF Transformer (Basic Insulation)	
Safety class		I	
Marking		CE (9)	

1. The AC Voltage range may vary depending on specific country standard
 2. The Frequency range may vary depending on the specific country standard
 3. The number of inverters which can be installed must be according to the applicable local code regulations
 4. With the plug-in of the DC connectors, the positive input pole of the PV panel will be referred to ground through the MICRO Inverter PCB
 5. In case multiple inverters are installed in parallel on a three-phase system, the MICRO Inverter is not able to prevent unbalance, as each Micro Inverter will work independently of the others and supply the maximum power available from its own section of the PV generator to the grid
 6. Particular requirement to Benelux: the product MICRO-0.25 (0.3)-I-OUTD-230 is applicable in systems connected to the distribution grid in low voltage
 7. The unit does not have reactive power capability
 8. The unit does not have an internal disconnection device
 9. Take care that an external device (i.e. CDD) shall be used in the system to indicate fault
 10. Compliance to the essential requirements of Directive 1999/5/EC (R&TTE Directive) has been verified to operate both at 50Hz and at 60Hz nominal operating frequency
Note. Features not specifically mentioned in this data sheet are not included in the product

Contact us
www.abb.com/solarinverters

MICRO-0.25-0.3-0.3HV-I-OUTD-Quick Installation Guide EN-Rev C
 EFFECTIVE 2013-12-19
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