ABB solar inverters

Product manual
CDD (concentrator data device)

Power and productivity
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IMPORTANT SAFETY INSTRUCTIONS

This manual contains important safety instructions that must be followed during installation and maintenance of the CDD.

It is required that the CDD be installed with any ABB MICRO inverter in compliance with UL1741, for the purpose of indication and resetting of ground faults.

SAVE THESE INSTRUCTIONS!

Keep this document in a safe place near the inverter for easy access during installation and maintenance.

THE INSTALLER MUST READ THIS DOCUMENT IN ITS ENTIRETY BEFORE INSTALLING OR COMMISSIONING THIS EQUIPMENT.

This operating manual is a valid guide that will enable users to work safely, install the CDD (concentrator data device) and carry out the operations necessary for keeping the equipment in good working order.

Warranty conditions can be found on the product page of the website. NOTE: Any changes or modifications not approved by the responsible party could void the user authority to operate the equipment.

FCC REMARKS

The equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

001CV

Product Manual

CDD - concentrator data device

1 - Introduction and safety

2 - Plan the installation

3 - CDD display operations

4 - Connect and configure the CDD

5 - Acquire the MICRO inverters
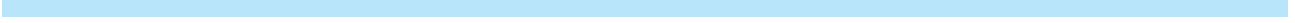
6 - System monitoring

7 - Appendix

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Contents

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Warnings in this document

This is a list of special safety symbols used in this manual that highlight potential safety risks and/or useful information. The symbol usage is described below:

⚠	**CAUTION**	The reader should stop, use caution and fully understand the operations explained before proceeding.
⚡	**DANGEROUS VOLTAGE**	The MICRO inverter product works with high voltages. All work on the inverter must follow the described documentation and must comply with all prevailing codes and regulations associated with high voltages.
℅ᴜˢ	UL60950-1 Safety of Information Technology Equipment – General Requirements: Part 1; CSA 60950-1-07 Safety of Information Technology Equipment – General Requirements: Part 1	

Intended use

This equipment is a device designed to configure and control a network of ABB MICRO inverters, using radio communication and to supply data relating to the system, using a wireless connection or an Ethernet port, to an internet or local portal for monitoring.

• The device cannot be used in environments where there are particular restrictions on the use of radio waves.
• The device used to transmit data to the ABB portal requires a user-supplied router connected to the internet. The cost of connection is to be paid by the end user.

003CH1

Available versions

The CDD described in this manual is available in a single version suitable for all countries of installation. It is required that the CDD be installed with any MICRO inverter in compliance with UL1741, for the purpose of indication and resetting of ground faults.

The device can be associated with the following MICRO inverter equipment from ABB:

0.25 kW models	MICRO-0.25-I-OUTD-US-208/240
0.3 kW models	MICRO-0.3-I-OUTD-US-208/240
	MICRO-0.3HV-I-OUTD-US-208/240

Product label

The sample product label is affixed to the inverter and provides the following information:

CDD Part Number ———— P/N: PPPPPPPPPPP
CDD Serial Number ———— S/N: YYWWSSSSSS
WIFI communication MAC address ———— MAC WIFI: A1:B1:C1:D1:E1:F1
Radio frequency communication MAC address ———— MAC RF: A2:B2:C2:D2:E2:F2:G2:H2
Ethernet MAC address ———— MAC ETH: A3:B3:C3:D3:E3:F3

When registering the CDD on the Easy View portal, the MAC RF (radio frequency) address is used as the product identification code (see System monitoring, Part 6).

Regulatory nameplate

The nameplate shown is affixed to the inverter and provides the following information:

ABB
www.abb.com/solar
CONCENTRATOR DATA DEVICE   MODEL:CDD

INPUT DC ⎓: 5V , 0.5 A

Contains FCC ID: X6W-EMBZ   Contains FCC ID: W70ZG2100-ZG2101
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.
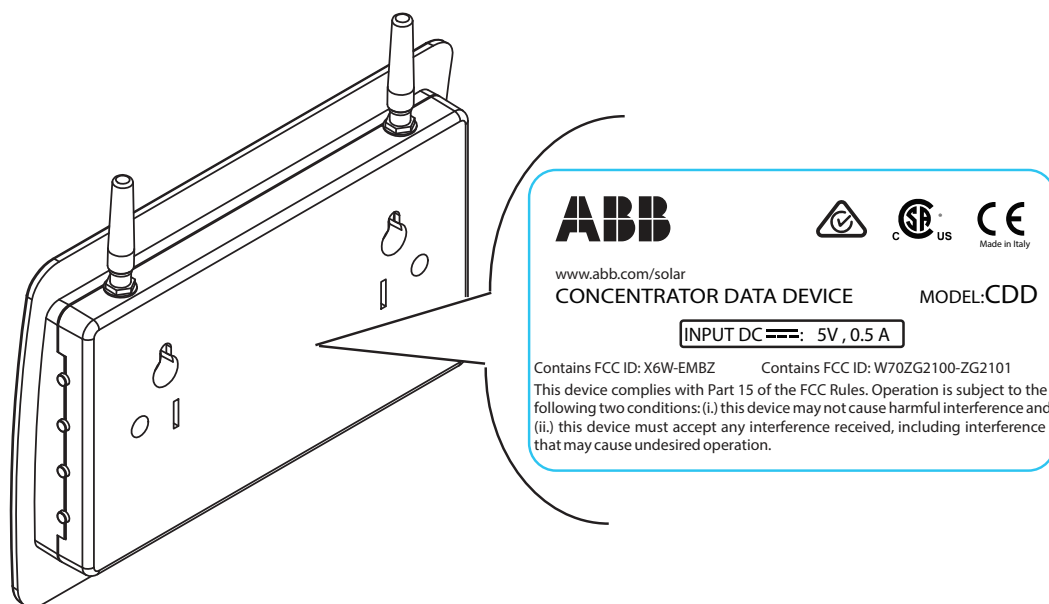
Technical data reported in this manual does not replace the data on the labels affixed to the equipment.

004CC1

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Description of the CDD

The ABB MICRO Inverters associated with the CDD can be monitored using the CDD display, the CDD web server interface, or from the Aurora Vision monitoring portal.

The CDD display allows simultaneous monitoring of all the associated inverters. The following information can be viewed by navigating in the display menu:

- Operating status and statistics of each MICRO inverter
- Operating status of the connection to the internet/local network
- Alarm messages and fault indicators

The menus are navigated by means of buttons on the side of the CDD.

01	Wireless antenna
02	Status LED (not on all models)
03	Radio antenna (MICRO inverter)
04	Display
05	Button pad
06	Ethernet port
07	Power connector
08	Ethernet communication status LED

UP
DOWN
ESC
ENTER

150mm
5.90"

25mm
0.98"

180mm
7.08"

005CH2
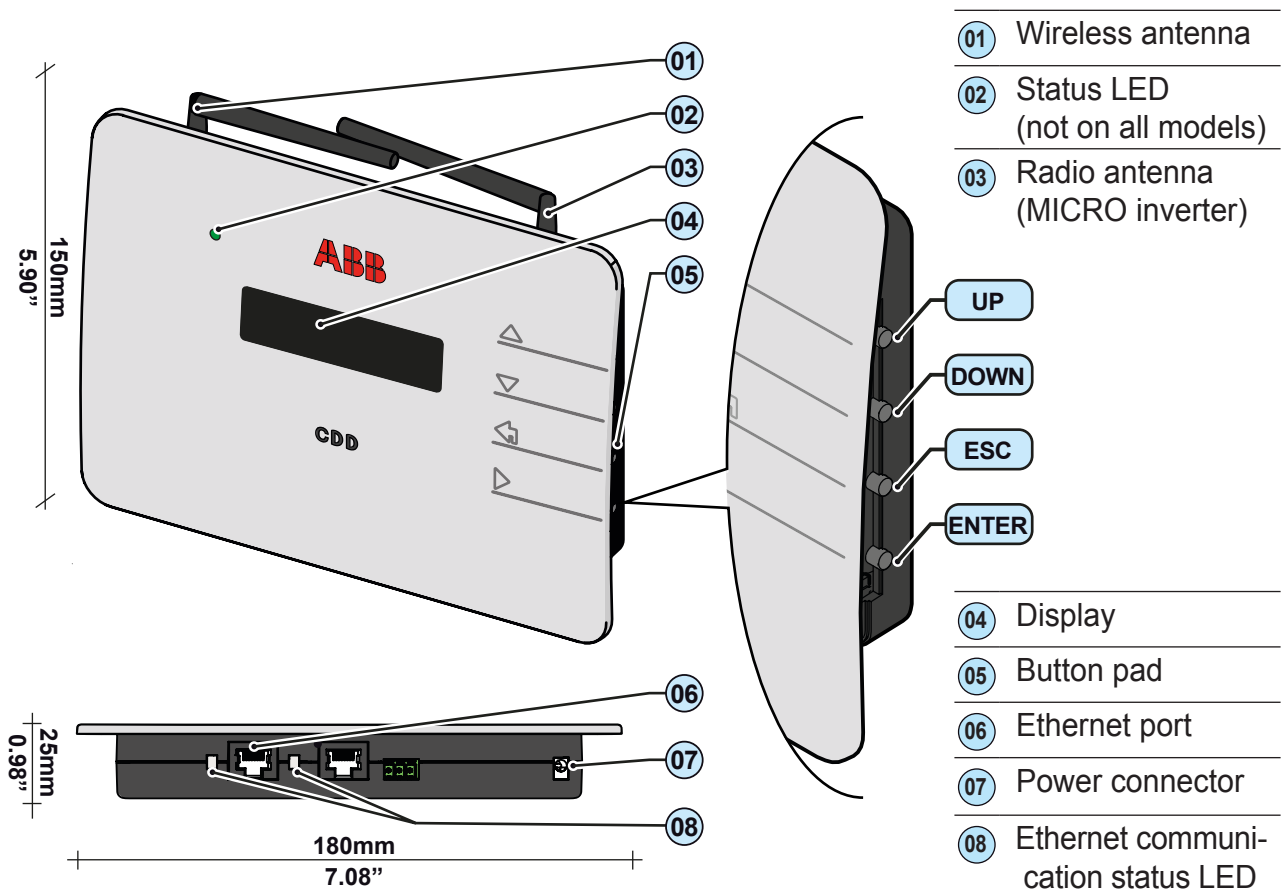
System integration

The diagram below shows several MICRO inverters communicating with a CDD, which in turn connects, by Ethernet or wireless, to a PC or a router connected to the internet. It is also possible to manage and monitor the system using a PC or Smartphone with internet access by registering on the Aurora Vision Plant Viewer.

The CDD device must be configured in order to commission the PV system. The following configurations must be completed on the CDD for proper operation of the system:

•   **Acquisition of MICRO inverters**
•   **Setting geographical parameters**
•   **Setting of grid standard for the country/region of installation**.

These operations can be carried out using the CDD display or the Web Server integrated in the CDD. When configuring using the Web Server it is necessary to connect the CDD to a PC via Ethernet or Wireless (see configuration and connection details in part 4).

Once the configuration has been completed, the device can be registered on the Plant Viewer web portal using an internet connection, which allows remote monitoring of the MICRO inverters making up the PV system.

006CC2
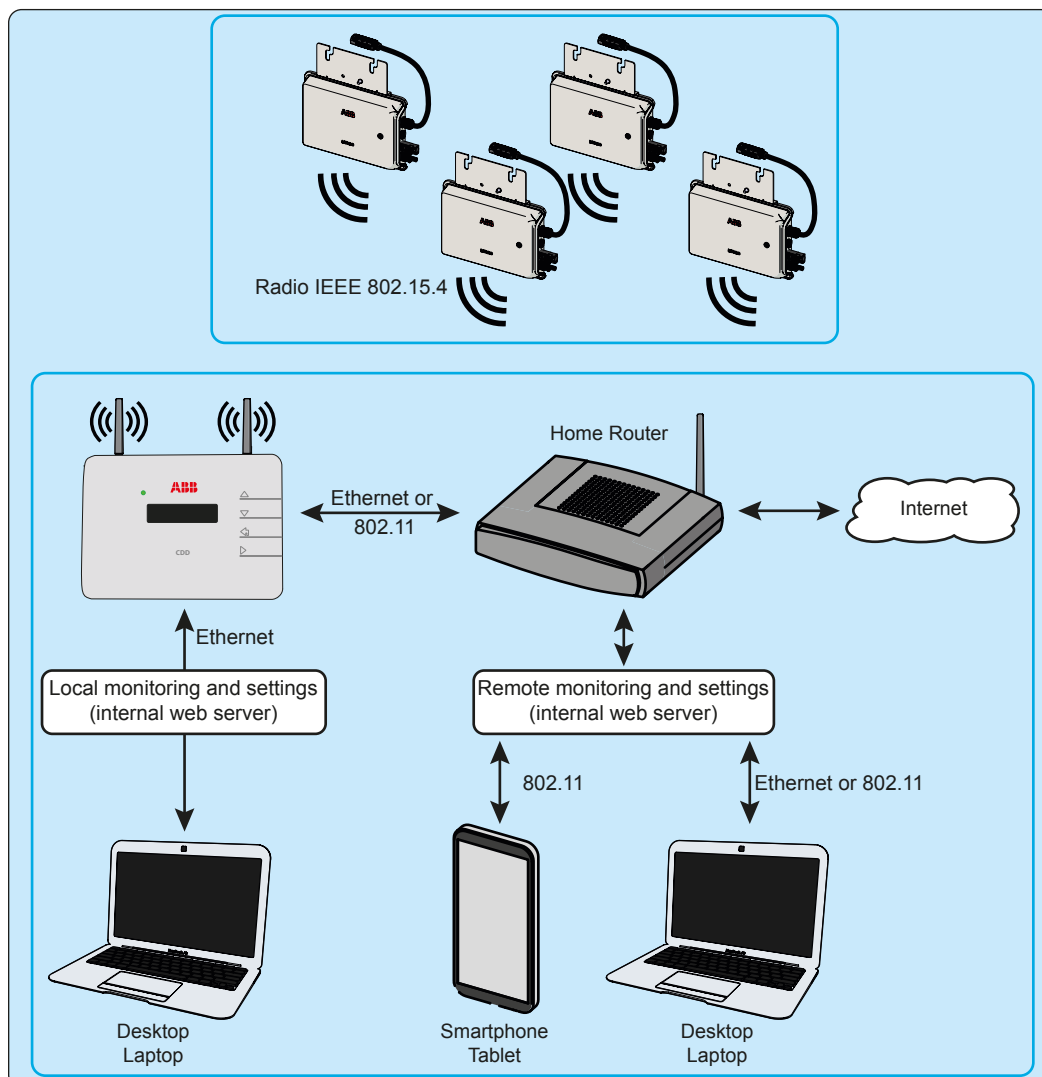
Select the installation location

⚠️ **It is recommended to undertake connection, configuration and acquisition operations before mounting the CDD in a permanent location.**

During acquisition of the inverters in part 5, it can be determined if reception from the inverters and from the wireless router is sufficient, or if the position or location should be changed.

Consider the following before installing the MICRO/CDD system:

- Evaluate possible obstacles that can restrict or nullify the radio communication among MICROs and CDD.

- Analyze the communication quality considering the possibility of having to extend the radio antenna externally (CDD Antenna Extension Cable).

- Each CDD has a capacity to monitor up to 30 MICRO inverters; for more than 30 MICRO inverters, it is necessary to install more than one CDD.

- For wireless (WLess) connection with a router, make sure the router is available on the compatibility list found in the appendix, part 7, and available online at www.abb.com/solarinverters.

- For Ethernet communication, there must be an unused Ethernet port on the router.

- For installations with multiple CDDs, it is recommended to acquire all MICRO inverters before mounting them on the roof, using the "MICRO preinstallation kit" and related guidelines.

- Choose a place close to an electrical outlet where the bottom part of the device, (where connections are present), remains accessible.

- Because the CDD uses radio waves to transmit and receive data, it is important to assess this factor in choosing the installation position.

Walls in *reinforced cement* and surfaces covered in *metal* (doors, shutters, etc.) can markedly reduce the reach of the device as noted below.

| Material	Relative signal range reductions
Open Field	Approximately 100 m
Wood / Glass	0 – 10%
Stone / Pressed cardboard	10 – 40%
Reinforced concrete (reduction increases with amount of reinforcement)	10 – 90%
Metal	Up to 100%

⚠️ *The radio signal level between the CDD and MICRO inverter can be increased in several ways as illustrated below:*

006CC2

Evaluate the installation position

The radio signal can be limited by obstacles and distance.

In order to boost the signal strength, position the antenna of the CDD in a parallel line to the inverters. The antenna has a deadzone at the tip that should not be facing the inverters.
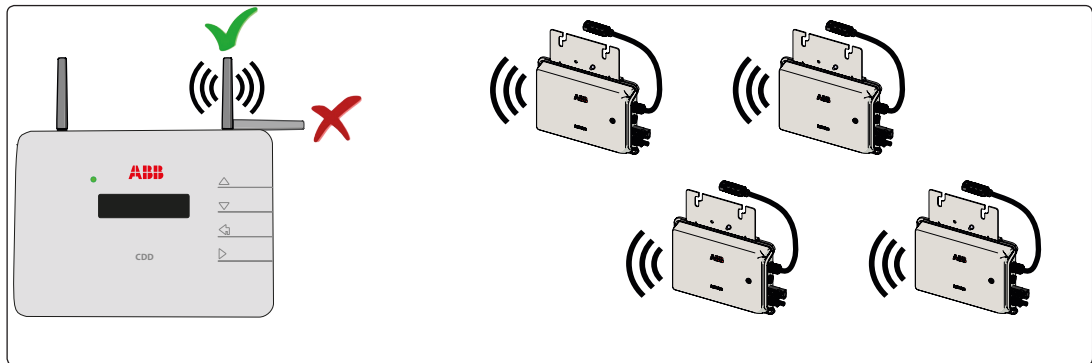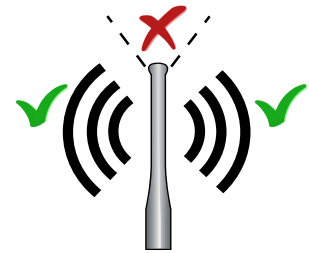
When configuring the CDD and acquiring the inverters in part 4 and 5, it may be necessary to adjust the positioning of the antenna. The RF signal quality is shown in the CDD display (see part 3).

```
Plant quality
  High (65%)
```

An extension cable for the antenna can also be installed. The cable allows the antenna to be installed at a distance from the CDD to go over or around possible obstacles to the radio signal.

The extended antenna can be installed in an outdoor rated plastic box (see technical note online *"Improving CDD Wireless Signal Reception"* for detailed instructions), 15cm/6in above a roof and in line-of-sight of PV panels. The extended antenna could also use the existing conduits of residential electrical systems or TV antennas to bring the CDD antenna outside.

15cm / 6in

Radio Antenna

Antenna ExtensionCable

Radio signal obstacle

006CC2
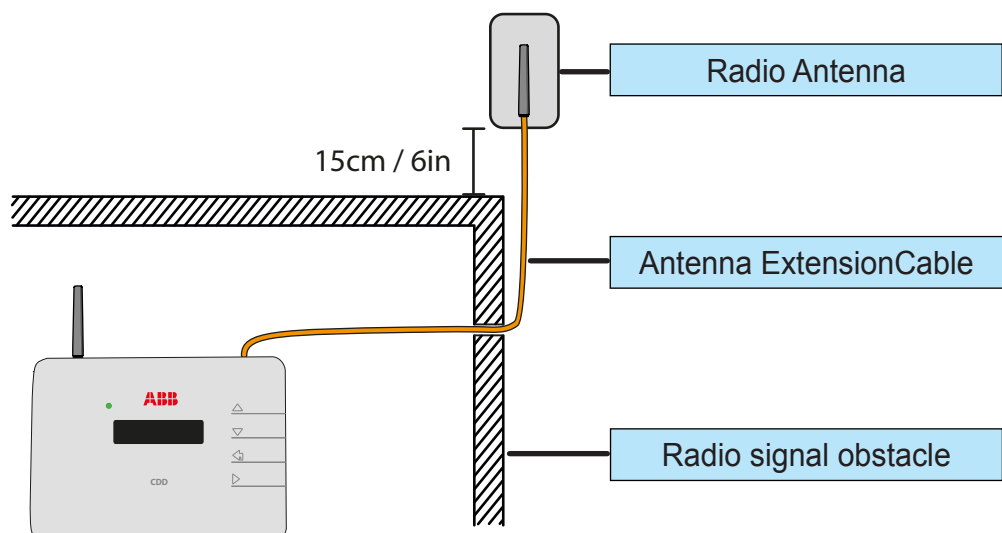
Before permanently mounting the system it is important to consider the possible scenarios shown below and evaluate the right position for the CDD and MICRO inverters.
The distances used in the examples are between the CDD and the <u>closest</u> MICRO inverter available.

1 — Wooden — Distance less than 7.5m/25ft

2 — Wooden — Distance more than 7.5m/25ft — Evaluate the RF signal quality and the possibility to extend the RF antenna externally or to install the CDD on the top floor

3 — Wooden — Distance less than 10m/33ft

4 — Concrete — Evaluate the RF signal quality and the possibility to extend the RF antenna externally

5 — Metal or reinforced concrete

6 — Install the antenna in a plastic box 15cm/ 6in above roof and in line-of-sight of PV panels — Metal or reinforced concrete

7 — Distance less than 30m/100ft — Windows

006CC2

Mount the CDD

⚠ *It is recommended to undertake all the configuration operations in part 4 before mounting the CDD in a permanent location. During acquisition of the inverters in part 5, it can be determined if reception from the inverters and router is sufficient, or if the final position or location of the CDD should be changed.*

- Make the two holes necessary, using a drill with a 5 mm diameter bit.
- The depth of the holes must be around 30 mm.
- Insert plugs in the holes and tighten the countersunk screws supplied.
- Fasten the CDD by putting the head of the screws in the two holes on the back.


2 x Ø 5 mm

006CC2
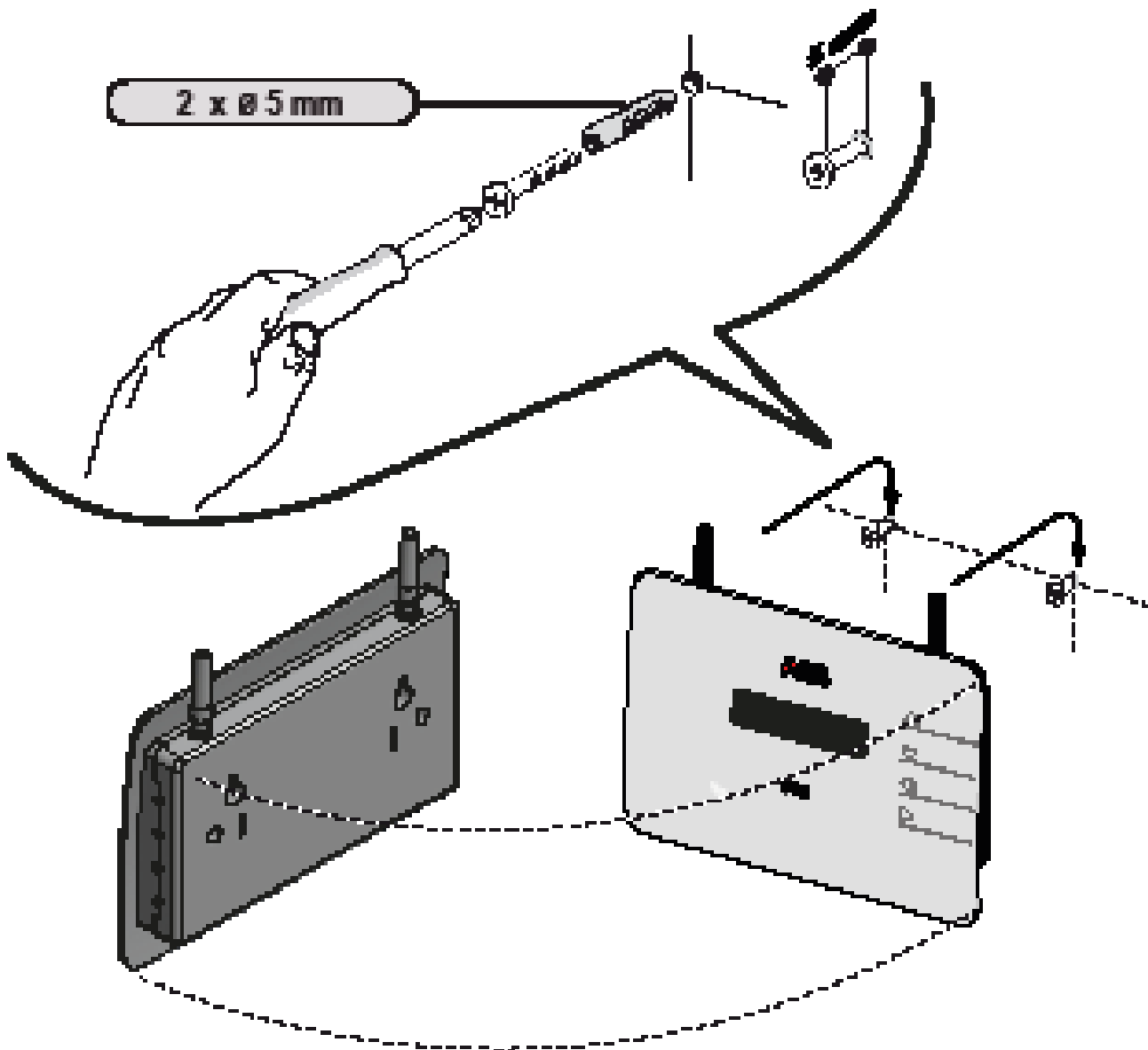
4

Connect the CDD

In order to operate the system, the CDD must be plugged into an electrical outlet and connected to a computer or router. The type of connection can be:

• **Cabled** - The CDD is equipped with an Ethernet port and can be directly connected to a PC or router. A direct connection to a computer should only be used during configuration of the system to access the local web server, not for regular monitoring. A cabled connection to a router can be used during configuration and for data transmission to access CDD internal configuration pages (local web server).

• **Wireless** - The CDD is equipped with a wireless network card that can be connected to a router. This type of connection can be used during configuration of the system to access the CDD internal configuration pages (local web server) and for data transmission to the web portal in order to monitor the system.

The wireless connection of the CDD to the computer requires the use of a wireless router acting as a "bridge" for the transmission of data. The configuration of the wireless network is done on the CDD display using the panel buttons described below.
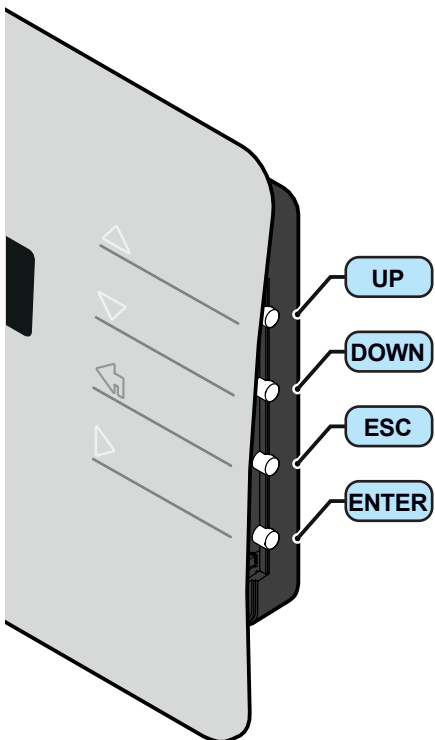
Turn on the CDD by attaching the power supply connector to the bottom of the CDD and plugging into an electrical outlet; wait for the green LED to come ON.

UP

The UP and DOWN buttons are used to move around inside a menu or to scroll through a list of settable values.

DOWN

The UP and DOWN buttons pushed together will open the three main menus.

ESC

The ESC button returns the user to the previous submenu when navigating.

ENTER

The ENTER button is pressed to make a selection or to confirm an entered value/parameter.

007CH3

Wireless connection to the internet

The wireless connection of the CDD is enabled by default and requires a router with IEEE 802.11b communication protocol that will transmit the data to the web portal when there is an internet connection.

Requirements of the router:

- Compatibility with IEEE 802.11 communication protocol*
- Visible SSID
- WPA and WPA-2 security protocols supported.

* Check compatibility list in the appendix and on the website; a standard access point may be utilized to bridge the CDD to an incompatible router.

The process of detecting WiFi networks within range begins as soon as the green LED is diplayed on the CDD.

- [XX] indicates number of networks found
- Open, WPA/WPA2 indicates type of protection; security protected networks require a security/passkey
- [00] indicates signal level/strength of connection, from 1-4 indicated by the number of characters
- Additional steps are required when connecting to networks with MAC address filters (see below).

The continuation of the installation differs depending on the type of protection of the selected network (Open, WPA/WPA2). If no wireless networks are found, it may be necessary to change the DHCP settings, (page 24.)
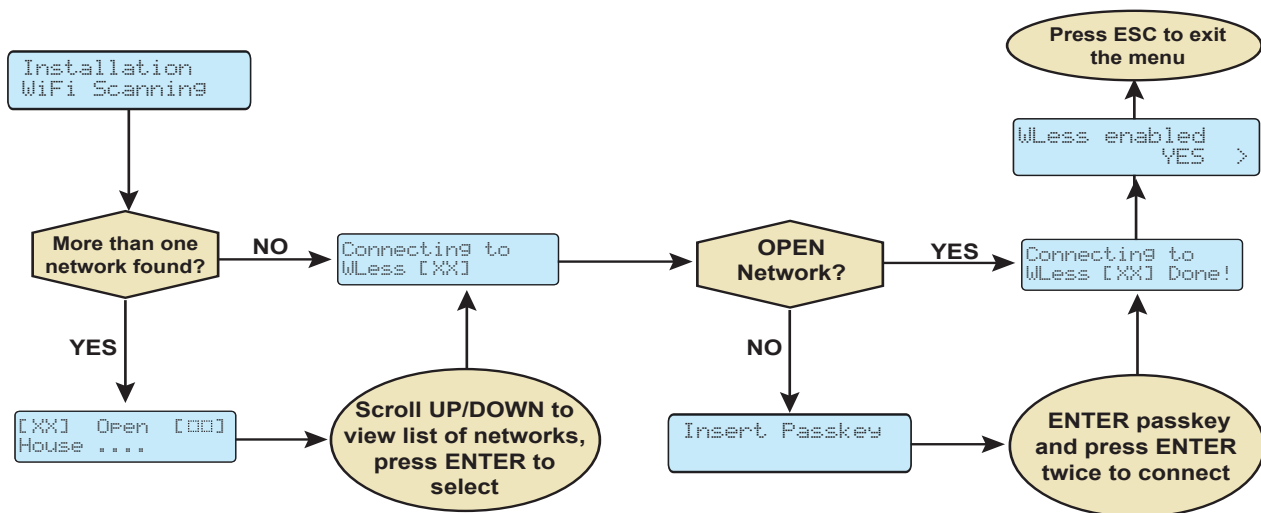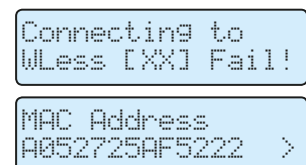

*O*pen networks with a MAC address filter

The MAC address is used to set up the configuration menu of the router which is not supplied by ABB. Refer to documentation from the manufacturer of the router for instructions to add the CDD to the list of enabled MAC addresses on the router.

The MAC address can be found on the CDD product label as illustrated on page 8 and is used to configure the router prior to connection. If the router has not been configured, the MAC address will be displayed during the connection procedure as follows:

- The CDD will start the connection as shown above.
- The connection is refused and a *Fail* message is displayed.
- The WiFi MAC address of the CDD is displayed.

Once the router is configured, power down the CDD to restart the configuration procedure outlined above.

```
Connecting to
WLess [XX] Fail!
```

```
MAC Address
A052725AF5222   >
```

008CC3

Secure networks without a MAC address filter

A security key, or passkey, is required to access the a secure wireless network; enter the passkey as follows:

- Press the UP or DOWN buttons to scroll the list of characters, (0-9, A-F).
- Press ENTER to confirm each character selected, (press ESC to cancel the last character input).
- **Press ENTER again to accept the passkey.**
- **Once the security key is input, press ENTER twice to start the connection attempt.**

```
Insert Passkey
.........
```

> ⚠ **If the key is correct, a completion message appears on the display. If the key input is not correct, the display shows the message "***wrong password***"; verify the key and repeat the procedure.**

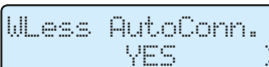# Secure networks with a MAC address filter

- If a MAC address filter is present on the router, first enter the passkey as described above in S*ecure networks without a MAC address filter*.
- Once the passkey is entered correctly, it will be necessary to configure the MAC address filter with the same procedure set out on the previous page for *Open networks with a MAC address filter (Open)*.

Autoconnection configuration

The CDD automatically memorizes the parameters of the last wireless connection made (SSID and network key). The Autoconnect feature enables the CDD to automatically connect to the last wireless network selected. To activate/deactivate the automatic connection function:

- Press any button from the GENERAL INFORMATION display (or press ESC if already in a previous level of the BASIC menu).
- Scroll to *WLess AutoConn* in the BASIC menu.
- Press ENTER to select.
- Scroll to YES/NO to activate/deactivate the function.
- Press ENTER to confirm the selection and ESC to return to the menu.

```
WLess AutoConn.
        YES      >
```

> ⚠ **If the last network that the CDD was configured for is not available, the CDD will not connect to any network.**
>
> **To configure the CDD for a new WLess network, disable the Autoconnection feature and reboot the CDD. This will enable the CDD to search for available wireless networks.**

008CC3

DHCP configuration

If no wireless networks are found, it may be necessary to change the DHCP settings. The wireless setting must first be disabled.

Step 1 - Press any button to display the BASIC information menu relating to the CDD
- Press UP or DOWN until the *WLess enabled YES* screen is displayed.
- Press ENTER to remove the > (arrow) next to YES.
- Press the UP or DOWN button to choose the option NO.
- Press ENTER to confirm.

```
WLess enabled
            NO    >
```

Step 2 – Press and hold the UP and DOWN buttons together in order access the MAIN MENUS; a password is required:
- The first screen will display the message *Set Password.*
- Input the default password (0010) using the UP or DOWN buttons to change the number.
- Press ENTER to confirm each number; and press ENTER when complete (Use ESC to return to the previous character).
- After the password is entered, scroll DOWN to locate the *Change Settings*; menu and press ENTER.
- Scroll DOWN to the *Network* submenu.
- Press ENTER, and scroll to *DHCP Enabled*.
- Press ENTER, and choose to Enable or Disable the DHCP function (YES/NO).
- Press ENTER to confirm.

```
Set Password
          XXXX
```

```
Change
Settings      >
```

```
Network        >
```

```
DHCP Enabled
          NO    >
```

Step 3 - Re-Enable the wireless following Step 1 above.
- Press ENTER to remove the > (arrow) next to NO.
- Use the UP or DOWN button to choose the option YES.
- Press ENTER to confirm.

```
WLess enabled
            NO    >
```

```
WLess enabled
            YES  >
```

⚠ **If the DHCP function is *Disabled*, it is necessary to set up the static IP network address of the CDD to access the CDD Web Server for acquisition of the MICRO inverters in part 4. Find the IP network address in the submenu Web Server IP show below.**

IP address view

With the CDD connected to the network it is possible to view the IP address assigned to the device.

- Press ESC to access the previous level of the BASIC menu (or press any button from the GENERAL INFORMATION display).
- Scroll to *WebServer IP* from the BASIC menu.

```
Web Server IP
     .........
```

The IP address that is displayed will be used in part 4, to access the CDD Web Server using a computer or tablet.

008CC3

Ethernet connection to the internet

WLess connectivity is enabled by default and will need to be disabled before connecting the Ethernet cable using the following procedure:

- Press any button on the CDD from the GENERAL INFORMATION display to enter the BASIC menus.
- Scroll to *WLess Enabled* and press ENTER
- Use the UP and DOWN keys to change to NO and press ENTER.

```
WLess enabled
          NO    >
```

Once the wireless is disabled the CHANGE SETTINGS menu will be used to modify the *Network* settings.

- Press and hold the UP and DOWN buttons on the CDD display at the same time until the *Set Password* screen is displayed.
- Using the UP or DOWN buttons, enter the password of 0010 by scrolling the list of characters.
- Press ENTER to confirm each character selected; press ESC to cancel the last character input.
- When the password has been entered, scroll to the CHANGE SETTINGS menu and press ENTER.
- Scroll to *Network* and press ENTER to select.
- Scroll to select *Select Network, WLess* and press ENTER.
- Scroll to *Ethernet* and press ENTER to select.
- The CDD will automatically restart to reset the connection settings.

```
Set Password
        XXXX
```
```
Change
Settings      >
```
```
Network        >
```
```
Select Network
        WLess   >
```
```
Select Network
        Ethernet >
```

Connect the Ethernet cable if not already connected. Two possibilities for cabled connection of the CDD to the computer are shown below.

⚠ **The Ethernet port is located on the lower side of the CDD.**
For either connection, be careful not to put the Ethernet cable in the RJ45 connector for RS-485 serial communication.

1. Through a router using an Ethernet cable

This type of connection can be used both during configuration of the system to access the CDD internal configuration pages (local web server) and for data transmission to the web portal in order to monitor the system.

008CC3
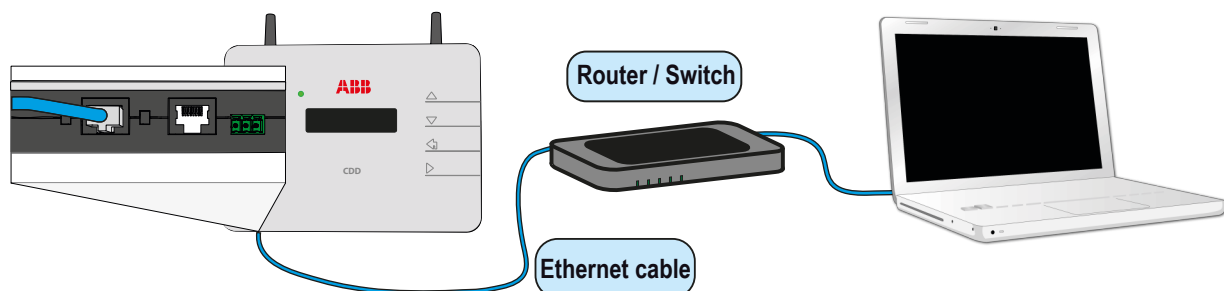
2. Direct to the computer using an Ethernet cable

This type of connection should only be used for configuration of the system to access the CDD internal configuration pages (local web server)

Ethernet cable
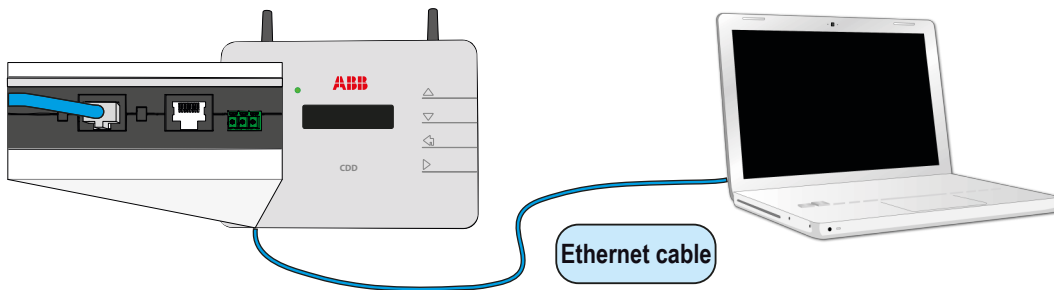
If the computer is directly connected to the CDD without a router, and if the computer is set for an automatic IP address, it is necessary to change the Network settings on the computer following the procedure below:

- Click on the internet icon in the computer system tray and open the *Network and Sharing Center*
- Click *Local Area Connection (LAN)*
- Click *Properties*
- Click *Internet Protocol Version 4 (TCP/IPv4)*
- Click *Get the following IP address* and type a different IP Gateway address from that of the CDD (e.g. if the CDD IP gateway address is 192.168.0.100, type 192.168.0.101) and click OK
- The IP Gateway address of the CDD is shown on the display by pressing any button and scrolling DOWN the basic list.
- Once these parameters are changed, input the IP Gateway address of the (CDD) in the address bar of the Internet Browser to proceed with the acquisition of the plant.
- To reset the wireless connection on the computer, follow the steps in reverse order.

Firmware upgrade

It is recommended to upgrade the CDD firmware when connection to the internet is complete. The firmware upgrade can be done in three different ways:

1. Firmware updgrade using the CDD display menu.

2. Firmware upgrade using the CDD web user interface (with either Ethernet or wireless connection).

See System monitoring, part 6, for instructions to upgrade using method 1 or 2.

2. CDD Firmware update using Aurora Vision®

A firmware update from Aurora Vision will be completed automatically following the procedure for self-registration found in part 6.

008CC3

CDD display operations

3

LED and display operations

⚠️ *The status of the inverter is indicated by the constant or intermittent lighting of the LED located on the front of the CDD above the two line display. The display also shows a message identifying the operation which is being carried out or the alarm/anomaly recorded.*
(See Appendix, part 7 for description of alarm messages and error codes.)

The following table shows the possible combinations of LED activation relating to the operating state of the CDD and MICRO inverters in the installation.

LED status	Operating state	Description
FLASHING GREEN:	No errors or alarms generated	Installation of CDD and MICRO inverters is operational.
STEADY GREEN:	Reporting of radio communication problems between MICRO inverters and CDD or between CDD and Router	A transitional or permanent state caused by the failure to receive data by the CDD or by an absent or bad connection between the CDD and the router.
FLASHING RED:	Minor warnings: Warning (message codes Wxxx) Error (message codes Exxx)	Implies a small generation loss that may be caused by power limiting or by causes external to the MICRO inverter, such as poor sunlight levels.
STEADY RED:	Major system warnings: Warning (message codes Wxxx) Error (message codes Exxx)	Reports a fault on one or multiple MICRO inverters causing interruption to generation of power.

009CH4

Description of the display menus

The CDD display consists of 2 lines with 16 characters per line. The operating status and statistical data of the inverter can be viewed along with service messages for the operator, warning and alarm messages. Inverter settings can also be modified using the display menus.

- The UP and DOWN buttons are used to move around inside a menu or to scroll through a list of settable values.
- The ESC button returns the user to the previous submenu when navigating.
- The ENTER button is pressed to select a submenu or to confirm an entered value/parameter.
- The UP and DOWN buttons pushed together will open the main menus for statistics, data display and default settings.

An outline of the menu structure is shown below. A detailed description of the menu items can be found in the table on page 14.

The CDD cycles through the
GENERAL INFORMATION
display during normal operation

```
Tot output power
.... W
Total Energy
.... KWh
System quality
......
MICRO: X
EXTRA: Y
Alarm status
......
DD/MM/YY
HH/MM/SS
Network
......
```

Press any button on the CDD

Press any button during normal operation for access to set up and view the BASIC menu options of the CDD

```
Web Server IP
..........
MAC Addr. WLess
................
Subnet Mask
..........
IP Gateway
..........
Primary DNS
..........
Secondary DNS
..........
WLess Enabled
Yes          >
WLess AutoConn.
Yes          >
Web Server
Reset Password?
WLess SSID:
......
```
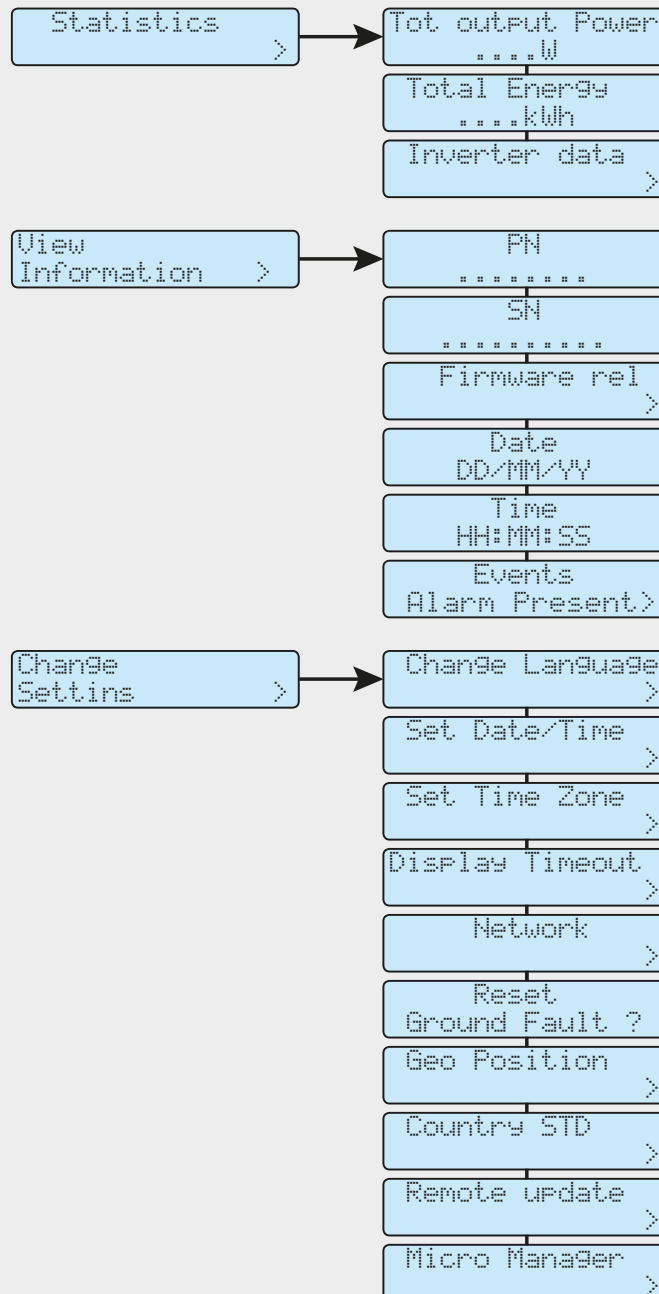
Press and hold the UP/DOWN buttons on the CDD until
Set Password is displayed
Enter password 0010 to access three MAIN menus

010CC4

- Access the three MAIN menus fron the GENERAL INFORMATION display by pressing the UP and DOWN buttons together until the *Set Password* screen is displayed on the CDD.
- Use the UP and DOWN buttons on the CDD to enter the default password 0010, pressing ENTER after each entry.

The three MAIN menus are used to:
- Display statistics of the system and each inverter
- View a read only display of data related to the CDD and the list of errors/warnings
- Modify CDD settings

Statistics >	→	Tot output Power ....W
		Total Energy ....kWh
		Inverter data >

View Information >	→	PN ....
		SN ....
		Firmware rel >
		Date DD/MM/YY
		Time HH:MM:SS
		Events Alarm Present>

Change Settins >	→	Change Language >
		Set Date/Time >
		Set Time Zone >
		Display Timeout >
		Network >
		Reset Ground Fault ?
		Geo Position >
		Country STD >
		Remote update >
		Micro Manager >

010CC4

GENERAL INFORMATION cyclical display

Total output power level of the MICRO Inverters that make up the plant
Total energy produced by the plant from the time it is put into operation
Plant quality expressed as a percentage and labeled Low, Medium, or High
MICRO: X = number of inverters in the plant
EXTRA: Y = number of inverters over limit of 30
Alarm status displays presence or absence of alarms, see section 7 for alarm codes
Date and time set on the CDD, use CHANGE SETTINGS menu to modify values
WLess strength of network connection, represented by 1 to 4 symbols

Press any button while in the GENERAL INFORMATION display to view the BASIC information described below. Use the UP and DOWN buttons to scroll through the list.

BASIC information and options

Web Server IP address used to access the local web server of the CDD
MAC Addr. WLess address relating to the CDD
Subnet Mask address relating to internet
IP Gateway address used to send data of the monitored plant
Primary DNS primary address of internet domain name server
Secondary DNS secondary address of internet domain name server
Wless Enabled, Yes > wireless connectivity is enabled by default
  Press ENTER to remove arrow >, press DOWN to scroll to NO, press
  ENTER to select NO and disable wireless connectivity
Wless AutoConn., Yes > auto connection to last network connected is
  recommended and enabled by default; press ENTER to remove arrow >,
  press DOWN to scroll to NO, press ENTER to select NO and disable
Web Server, Reset Password? default password (admin) of the local web
  server can be reset, press ENTER to reset, ENTER to confirm
Wless SSID: name of connected wireless network

To access the MAIN menus described below and continued on next page, press and hold the UP and DOWN buttons until the Set Password screen appears; default password is 0010. Scroll UP or DOWN to select a number and press ENTER to accept each digit.

MAIN menus

Statistics of the system and each inverter
  Tot output power level of the inverters that make up the plant
  Total Energy produced by the plant from the time it is put into operation
  Inverter data > press ENTER to view
    # microinverter displays the total number of inverters in the plant
    SN xxxxxx > lists each inverter by serial number; scroll DOWN list
      of inverters, press ENTER to select inverter and view following data:
        Total Energy
        Input Voltage
        Output Power
        DSP Release
        Micro Release
        Model ID
        MAC Address
        Output Current
        Input Current
        Output Voltage
        Frequency
        Temperature

010CC4

MAIN menus

    Statistics of the system and each inverter
    View Information read only display
        PN of the CDD
        SN of the CDD
        Firmware Rel. > press ENTER to view
            Application FW
            Bootloader FW
            Wless Firmware
            RF Firmware
        Date
        Time
        Events, Alarms Present >
        or NO alarms >press ENTER to view log of alarm codes listed by date
        and time, identified as CDD or MIC (inverter) serial number
    Change Settings modify CDD settings and acquire inverters
        Change Language > of the CDD, press ENTER and select language from the list
        Set Date/Time > of the CDD, press ENTER to change
            Automatic: Yes scroll to NO and press ENTER to change
                DST: NO scroll to YES to select daylight savings time if applicable
                Enter date/time using UP/DOWN, press ENTER to accept change
        Set Time Zone > of the CDD, press ENTER to change
            Set Time Zone scroll UP/DOWN, press ENTER to select
            GMT: +/- XX.XX scroll UP/DOWN, press ENTER to select
        Display Timeout > press ENTER to change display timeout, 1 to 10 minutes or Off
        Network, Change locked! Wireless network is enabled by default and locked.
            To change to Ethernet, wireless must first be disabled from BASIC menu
            Network > once wireless is disabled, press ENTER to change to Ethernet
        Reset Ground Fault ?
            Reset, Are you sure? press ENTER to reset
        Geo Position > of the plant, press ENTER to change, use UP/DOWN to enter
            latitude and longitude, press ENTER to accept change
            Lat:/Long: N/S xx.xx, E/W xx.xx
        Country STD > grid/country standard of the inverters, press ENTER and scroll
            through the list of available grid standards, press ENTER to select
        Remote update > press Enter to check for available updates
            No Update Avail., Check Now? >
                Check for update, waiting . . . . .
        Micro Manager
            [Add] Inverters > press ENTER to acquire inverters, GEO position and
            timezone will display and always need to be entered for acquisition to start
                Lat:/Long: > use UP/DOWN to enter coordinates, ENTER to accept
                Set Timezone > use UP/DOWN to enter timezone, ENTER to accept
                Scanning …. for inverters will begin after GEO position and timezone
                are entered (see acquisition process in part 5)
            [ST] Inverters > scroll DOWN list of inverters, press ENTER to view status
            [Kll] Inverters > to remove individual inverters from the CDD, press DOWN
            to scroll inverters identified by number, MAC and serial number
                [03]MAC: XXXXXXXX, SN:XXXXXX press ENTER to select inverter
                  *** Kill > press ENTER to remove inverter from CDD

010CC4
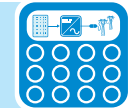
Acquire the MICRO inverters

5

Acquisition process

The acquisition of the MICRO Inverters by the CDD can be performed directly from the CDD display or with a PC or Tablet connected via a Wireless network or Ethernet cable using the CDD "web user interface".

In order to improve the acquisition process it is strongly recommended to pre-acquire all MICROs before mounting them on the roof using the "MICRO Pre-installation Kit" and related guidelines (visit the website or contact tech support to obtain information about this).
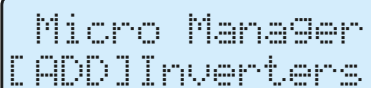
Acquire the MICRO inverters using the CDD display menu

System coordinates* and time zone must be input (or confirmed if previously entered) before acquisition of the MICRO inverters can begin. This step is will initiate the acquisition of the inverters.

- From the GENERAL INFORMATION display, press and hold the UP and DOWN buttons together until the *Set Password* screen appears. Enter the default password (0010) to access the menus.
- Use the UP and DOWN buttons to navigate to the CHANGE SETTINGS menu.
- Press ENTER and scroll to DOWN to *Micro Manager >*
- The *MicroManager, [ADD] Inverter >* screen opens.
- Press ENTER and the *Lat/Long* screen opens.
- Use the UP and DOWN keys to enter the latitude and longitude of the system*
- Press ENTER to confirm and the *Set Timezone* screen opens.
- Use the UP and DOWN keys to select the applicable time zone.
- Press ENTER to confirm and the CDD will immediately begin scanning for inverters to acquire.

```
Micro Manager
                    >
```

```
Micro Manager
[ADD]Inverters  >
```

```
Lat:  N00.00
Long:E000.00
```

```
Set  Timezone
GMT:  +00.00     >
```

⚠ ***To determine latitude/longitude, go to Maps.Google.com and enter an address. When the map opens, right-click on the pointer and select "*What's here*" from the dropdown menu. Latitude/longitude will appear in the address bar and also under the green arrow on the map. If a negative sign (-) is given, enter it along with Lat and/or Long.**

Scanning for inverters to acquire begins after the Geo position and Timezone have been entered as shown on the previous page.

- Scanning displays number [XX] of inverters found.

- Press ENTER to *Stop* the acquisition process when the correct number of inverters [XX] are found.

The CDD will continue scanning and the process must be manually stopped by the user.

- MAC of the first inverter [01] found will be displayed.

Signal strength for the specific inverter is shown as *; number of stars indicates signal strength, four stars the maximum.

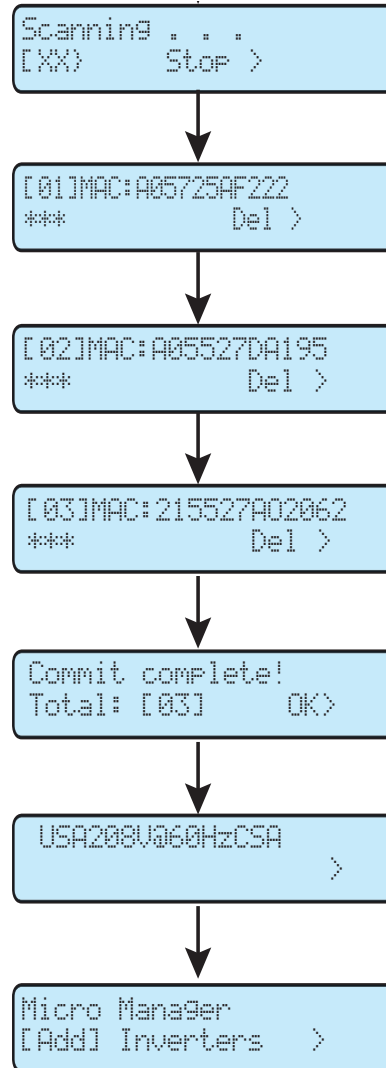- Press DOWN to select and commit each inverter and move to the next.

To delete (exclude) a single inverter press ENTER to select Del > (instead of pressing DOWN to commit) and move to the next inverter.

- When all scanned inverters have been selected or deleted, the total number of acquired inverters is displayed. Press ENTER to confirm completion (OK>).

- *Country Standard* screen opens and displays the first grid/country standard in the list Press ENTER to remove the arrow > and scroll DOWN the list of available country/grid standards.

- Press ENTER to select the applicable standard to be passed to the acquired inverters.

When complete, the CDD returns to the MicroManager [Add] Inverters screen. Press ESC to exit the MAIN menus.

```
Scanning . . .
[XX]     Stop >
```

```
[01]MAC:A05725AF222
***           Del >
```

```
[02]MAC:A05527DA195
***           Del >
```

```
[03]MAC:215527A02062
***           Del >
```

```
Commit complete!
Total: [03]      OK>
```

```
USA208V060HzCSA
                   >
```

```
Micro Manager
[Add] Inverters    >
```

Acquire the MICRO inverters using a computer and the integrated web server

On completing the connection and configuration phase in part 4, the CDD will be connected to a computer. A browser with active Javascript must be used to view the Local Web Portal pages properly. To access the local web portal, enter the IP address of the Web Portal (page 24) in the URL address bar of a browser.

```
ABB http://10.123.27.81/            🔍 ▾ 📄 🗘 ✕   ABB ..::: CDD WebServer ::.. ✕
```
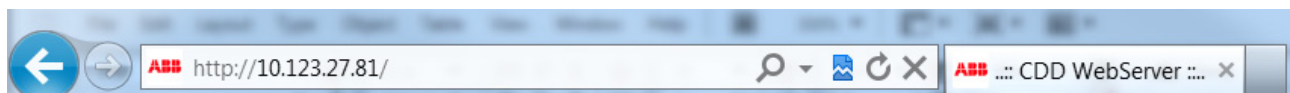
Follow the steps below when the Home page of the web portal is displayed.

011CC5

HOME | VIEW | CONFIG | EVENTS | UPGRADE | REGISTRATION | ?   Ita | Eng

View as: table | **panel**

Plant
Network
Micro Manager
Date/Time
CDD
CS Pa
Ground fault Energy
Change Pass

Total Output Pow
0.0000 kW

Total Energy
0.000 kWh

CO2 Saved
0.00 t

Plant Status
OK

US/Arizona-GMT-7
09-04-14 13:27
DST not active

Micro # 3

Plant quality signal: Low (0 %)

SN 793661   SN 793546   SN 793559

0W

0%

Select MicroManager from the drop-down CONFIG menu on the Home page

Windows Security

The server 10.123.27.81 at Protected requires a username and password.

Warning: This server is requesting that your username and password be sent in an insecure manner (basic authentication without a secure connection).

admin
•••••

☐ Remember my credentials

OK   Cancel

Authentication is required
Enter the default access credentials
Username: admin - Password: admin
Press OK

HOME | VIEW | CONFIG | EVENTS | UPGRADE | REGISTRATION | ?   Ita | Eng

Plant
Network
Micro Manager
Date/Time
ODD clone
CS Param
GroundFault/Energy
Change Pass

Total Output Pow
0.3457 kW

Total Energy
1.823 kWh

CO2 Saved
0.16 t

Plant Status
OK

Generic-GMT-7
14-04-14 16:01
DST not active

Micro # 3

Plant Configuration

Plant name:	Test	(ex: PowerOne Plant)
Location:	Phoenix, AZ, USA	(ex: Terranuova B.ni- Italy)
Address:	3201 E. Harbour Dr.	(ex: via S. Giorgio, 642)
Latitude:	N33.24	(ex: N43.55 or S43.55)
Longitude:	W110.00	(ex: E11.58 or W11.58)
Time zone:	Generic-GMT-7 [Change]	

Send CS ☑
Country Standard: USA208V@60HzCSA ▼

[Confirm]

Click to view a drop down list of timezones

Use the drop-down list to view grid/country standards

Click confirm to make changes

011CC5

Micro Manager

STEP 1 OF 5

INITIALIZATION

Press button to start acquisition procedure (may require 10 mins).

START ACQUISITION

Click START ACQUISITION to begin scanning

Press button to remove Micro-Inverters.

REMOVE MICRO

Note: Please don't press any button on the menu during the process!

Total Output Power
0.0000 kW

Total Energy
0.000 kWh

CO2 Saved
0.00 t

Plant Status
OK

US/Arizona-GMT-7
09-04-14 14:59
DST not active

Micro # 3

Micro Manager

STEP 1 | STEP 2 OF 5

RUNNING

Inverters are identified by MAC address (MACRF) and/or serial number (SN)

You can stop acquisition if your microinverters are acquired.

Micro#	MACRF	SN	RF Signal	Confirm
1	00:12:4B:00:02:CE:24:E2	793551	0%	
2	00:12:4B:00:02:CE:20:BB	793545	0%	
3	00:12:4B:00:02:7C:D9:3D	793559	0%	

There is no timeout for the acquisition procedure. Click on STOP ACQUISITION to manually terminate the procdure once all the inverters are displayed.

STOP ACQUISITION

Micro Manager

STEP 1 | STEP 2 | STEP 3 OF 5

MICROINVERTER LIST

Select Microinverter for acquisition or deselect to remove.

Micro#	MACRF	SN	RF Signal	Confirm
1	00:12:4B:00:02:CE:24:E2	793551	0%	☑
2	00:12:4B:00:02:CE:20:BB	793545	0%	☑
3	00:12:4B:00:02:7C:D9:3D	793559	0%	☑

CONFIRM

Use check box to select inverters for acquisition Press CONFIRM to complete

Total Output Power
0.0000 kW

Total Energy
0.000 kWh

CO2 Saved
0.00 t

Plant Status
OK

US/Arizona-GMT-7
09-04-14 15:01
DST not active

Micro # 3

011CC5

Micro Manager

| STEP 1 | STEP 2 | STEP 3 | STEP 4 OF 5 |

COUNTRY STANDARD SELECTION

Please select a country standard in the list below.

Country Standard USA240V@60HzSplitPhCSA

Custom
USA240V@60HzSplitPhCSA
USA208V@60HzCSA
HAWAII240V@60HzSplitPhCSA
HAWAII208V@60HzCSA
CEI 0.21
VDE-AR-N 4105
VDE0126
AS_4777
UK_G83-2
Spanish_Cstd
Benelux_GridStd

Total Output Power

0.0000 kW

Total Energy

0.000 kWh

CO2 Saved

0.00 t

US/Arizona-GMT-7
09-04-14 15:50
DST not active

Micro # 3

Select Country Standard from the drop-down menu Press CONFIRM

IRM

Micro Manager

| STEP 1 | STEP 2 | STEP 3 | STEP 4 | STEP 5 OF 5 |

CDD REGISTRATION

CDD Registration to Portal

Please check your internet connection and click on the link below in order to register the CDD on the Portal.

Select this link to register the CDD on the web portal

>> CLICK HERE TO REGISTER YOUR CDD 00:12:4B:00:02:61:78:F5

Click here to complete the acquisition and register later

PLEASE CLICK HERE TO COMPLETE

- If the link to register the CDD has been selected *("CLICK HERE TO REGISTER....")*, the registration welcome page will open. The registration procedure is described in part 6, System monitoring.

- If the the registation has been bypassed until later, the Home page will be displayed. Click on HOME in the menu to exit Micro Manager.

- Upon successful completion of the configuration procedures, the CDD can be mounted to the wall as described in section 2.

6

Remote monitoring on the Easy View web portal

When the acquisition of the MICRO Inverters is complete, it is possible to configure the remote monitoring of the plant on the Aurora Vision web portal using the self-registration procedure described below.

Self-registration procedure

To start the self-registration process go to https://register.auroravision.net/cdd?mac=AA:
BB:CC:DD:EE:FF:GG:II (The page will automatically open at the end of the acquisistion process for the MICRO inverter when "CLICK HERE TO REGISTER YOUR CDD
XX:XX:XX:XX:XX:XX:XX:XX") is selected.)

Update! Please click here for instructions on how to install large sites.

Welcome

If you are an installer and already have an account, Log In to register your new CDD with your account.

OR

Please follow the following steps to register and monitor your devices and Personal Power Plant! This will take approximately 10 minutes. The registration process should be done after you've completed your installation and have confirmed that your router is connected to the internet. You can confirm your router's internet connection by launching this screen from the link 'Click Here to Register your CDD' in the last step of the CDD installation process.

Instructions

There are three steps to registering your hardware and home solar power system.

1. Provide your personal information. This information will be used to register your equipment and plant and will not be shared with companies outside .

2. Provide details about your home solar power system. We'll use this information to create a web page to monitor your system.

3. Register devices attached to your home solar power system.

To continue the registration process click Next

> **Read through the overview to understand the steps click Next to register**

[Next]   [Cancel]

012C6

The registration process is completed in three steps:

Step 1.

- Enter personal contact information.
- Enter an email account.
- An email with a validation will be sent to the registered account.
- Open the e-mail and click on the link to continue the registration.

Account validation must occur within 3 days of receipt of the email; if not the process will have to be re-started.

Step 2

- Enter details about the solar power site/home.
- Provide the installer's name and contact information to help direct current and future homeowners to the installer for any future project and service needs.
- Site information defaults to the homeowner address but can updated to a different address for alternate locations such as a second home.

Step 3

- Link and validate the CDD to the solar power site.
- Make sure the CDD is connected to the internet.
- Enter the CDD's RF MAC address (MAC RF) in the 8 display fields.
- Click on the Validate button.
- When validated, the logger and all configured inverters will be displayed
- Click *I'm Done* to complete the registration process.
- An e-mail will be sent confirming that the registration has been successfully completed.

012C6

Aurora vision plant viewer

Aurora Vision Plant Viewer is a free software that offers remote plant monitoring through the internet.

The portal is divided 3 main sections:
The upper section contains general information about the system
In the middle is the graph of total production of energy for a period which can be set (from a single day up to 365) and the output power of each MICRO inverter
On the bottom are the Environmental Benefits based on the total energy produced by the plant.

In addition to monitoring, the portal offers automatic upgrade of the firmware installed in the MICRO inverters and the CDD. When new firmware is available, an e-mail is sent to the registered email address to alert the need for an upgrade.
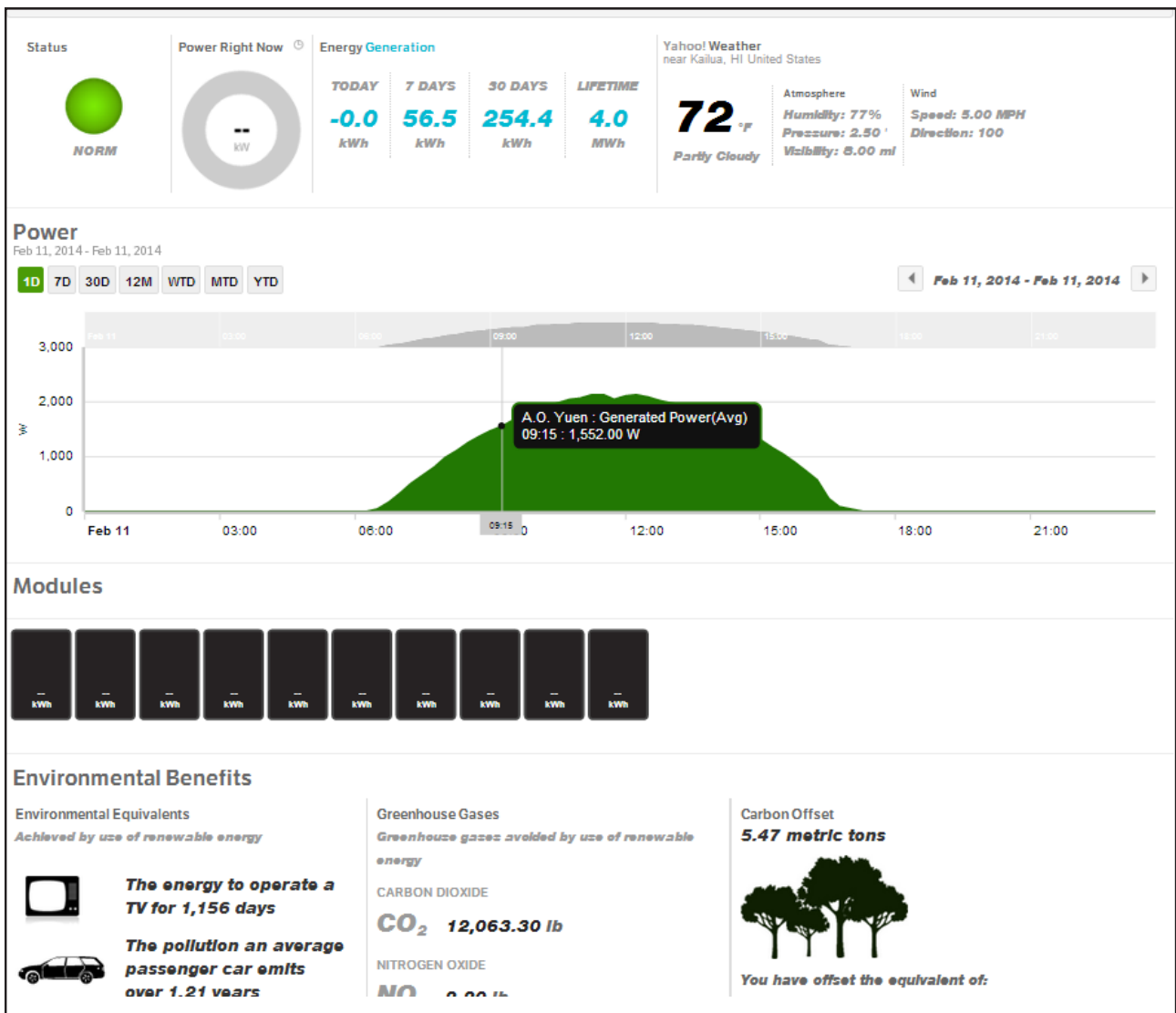
Local monitoring using the CDD web server

In order to access the CDD local web server, a PC or tablet must be connected to the same local network, i.e. through the same Ethernet or Wireless router, or connected directly to the CDD using an Ethernet cable. Enter the IP address (page 24) and wait until the Home page is displayed.

HOME page

Click on the serial number to open a pop-up window with individual inverter information

The following information is displayed in the pop-up window:

MAC RF: Radio frequency MAC address	*ALARM STAT:* number of alarms on individual inverter
TIME STAMP: Date and time of the display	*INV STAT:* allows 3 states, RUN (booster generating power), START UP (inverter awakening) and PROT (inverter into protection)
Fw RF: Radio frequency firmware version	
uP: inverter firmware version	*VOUT:* Output voltage
IDs:	*IOUT:* Output current
DSP: DSP firmware version	*FREQ*: Frequency
IDi:	*VIN*: Input voltage
PN: part number	*POUT*: Output power
MODEL DESC: inverter model	*EN TOT*: Total energy produced
SIGNAL: strength of radio communication signal between the CDD and inverter	*TEMP DSP*: Internal DSP temperature
BOOST STAT: allows 3 states, RUN (booster operational), START UP (booster awakening) and PROT (booster into protection)	*TEMP MOSF*: Mosfet temperature

012C6

VIEW menu

<u>View > Info:</u> displays information for plant, system, date/time and network.

<u>View > RF Signal:</u> Msg and Average plant signal index are refreshed every 15 minutes.

* Each MICRO Inverter sends a package of data to the CDD once a minute.

⚠ *In order to accurately evaluate a CDD positioning, wait 15 minutes from the power-on of the device.*

012C6

CONFIG menu

Selecting Config on the menu bar gives access to eight drop-down menus.

Config > Plant: used to modify plant information including plant and location name, address, latitude, longitude, time zone, and country standard.

Config > Network: provides basic information of the connected network.
Config > Date/Time: used to adjust date and time.
Config > CDD clone: allows configuration of a new CDD with the same settings as a previous CDD by using the last 4 pairs of digits of the old CDD's MAC address.

012C6

<u>Config > CS param:</u> modification of country standard

Country Standard Parameters Editor

Par	Name	Min	Max	Value	Rules
29	FgridRideThroughMinTh [Hz]	57.0	59.8	59.3	Value <= 59.4 [Par5] Value >= 57.0 [Par7]
50	FgridRideThoughTout [s]	0.1	300.0	0.1	

[Confirm]   [Reset]

Total Output Power
0.3457 kW

Total Energy
1.823 kWh

CO2 Saved
0.16 t

Plant Status
OK

Generic-GMT-7
14-04-14 16:23
DST not active

Micro # 3

<u>Config > Ground/Fault/Energy:</u> options to reset ground fault and/or reset energy history for statistical views

<u>Config > Change Pass:</u> use to change the default password (admin)

HOME | VIEW | CONFIG | EVENTS | UPGRADE | REGISTRATION | ?   Ita | Eng

Plant
Network
Micro Manager
Date/Time
CDD clone
CS Param
GroundFault/Energy
Change Pass

Change Password

Please insert your old and new password below and then confirm.

Old password: •••••

New password:

Retype password:

[Confirm]

Enter default password enter and retype new password and click Confirm to change

Total Output Po
0.3457 kW

Total Energy
1.823 kWh

CO2 Saved
0.16 t

Plant Status
OK

Generic-GMT-7
15-04-14 08:09
DST not active

Micro # 3

012C6

EVENTS menu

A log of system events relating CDD and inverters is displayed in the Events menu. This includes errors (Exxx) and alarms (Wxxx)codes; see Appendix, Part 5, for a complete description of these events.

Total Output Power
0.3457 kW

Total Energy
1.823 kWh

CO2 Saved
0.16 t

Plant Status
OK

Generic-GMT-7
15-04-14 08:23
DST not active

Micro # 3

EVENTS

SN	Device	Event Time	Code	Description	Duration	Status
023842	Cdd	15-04-14 07:58:45	I005	CDD Wake Up	00:24:56	Active

UPGRADE menu

The Upgrade menu can be used to upgrade firmware of the CDD and MICRO inverter and load an updated country standard list.

CDD Remote Upgr.:

Total Output Power
0.3457 kW

Total Energy
1.823 kWh

CO2 Saved
0.16 t

Plant Status
OK

Generic-GMT-7
15-04-14 08:24
DST not active

Micro # 3

Remote Upgrade CDD Firmware

Please press button CHECK UPGRADE to verify the availability of a new firmware version.

(Check "Fw and Clock Updates" option is enabled here)

CHECK UPGRADE

Updates must be enabled on the Config > Network menu to be available for upgrade

012C6

CDD Local Upgr.:

The CDD firmware is available on the web site https://registration.ABBsolarinverters.com or by contacting customer service. Download the files and save them on a computer to perform a local updgrade. There will be two separate files for Ethernet and wireless firmwares.

HOME | VIEW | CONFIG | EVENTS | UPGRADE | REGISTRATION | ?   Ita | Eng

Total Output Power
0.3457 kW

Total Energy
1.823 kWh

CO2 Saved
0.16 t

Plant Status
OK

Generic-GMT-7
15-04-14 08:31
DST not active

Micro # 3

Local Upgrade CDD Firmware

STEP 1 OF 3

Step 1
Load Ethernet firmware

Load Ethernet Firmware

Select a file (*.ben): [   ] Browse... Upload

Browse to location on computer where firmware files have been downloaded and saved
Open file and select Upload

STEP 1 | STEP 2 OF 3

Step 2
Load wireless firmware

Firmware Ethernet correctly uploaded: 2.3.3.a

Load WLess Firmware

Select a file (*.ben): [   ] Browse... Upload

Browse to location on computer where firmware files have been downloaded and saved
Open file and select Upload

File correctly uploaded!

Step 3 (final)
Reboot CDD

Ethernet Firmware loaded: 2.3.3.a
WLess Firmware loaded: 2.3.3.a

In order to apply a CDD update, the CDD needs to be rebooted.

Click here to reboot the CDD and make the update effective
WARNING: this operation needs about 30 seconds. While rebooting, take a look at CDD's display.

As soon as the CDD is restarted, close browser's window.

Select "click here" link to reboot CDD and apply update, confirm firmware revision from View > Info menu or the CDD display

012C6

uP MICROinv Fw: used to update the microproccesor firmware of the CDD. The firmware must first be downloaded and saved on a computer in order to browse and select the files for upload, see CDD Local upgrade above.

CS Local Upgr.: used to load an updated list of available grid/country standards. The firmware must first be downloaded and saved on a computer in order to browse and select the files for upload, see CDD Local upgrade above.

REGISTRATION menu

This menu will launch the Aurora Vision welcome page. See Remote monitoring > Self Registation on page 33 for instructions to complete the process.

HELP menu

| HOME | | VIEW | | CONFIG | | EVENTS | | UPGRADE | | REGISTRATION | | ? |

Identified by a question mark ? on the menu bar, the help menu contains the address, email, and telephone number of ABB customer service and technical support in various countries.

012C6

The MICRO inverter system

This system is composed of a group of MICRO Inverters that convert direct electric current from a photovoltaic module into alternating electric current and feed it into the utility grid.

Photovoltaic modules transform energy from the sun into direct current (DC) electrical energy (through a photovoltaic field, also called photovoltaic module). In order to use it, it is necessary to transform the type of current into alternating "AC". This conversion, known as DC to AC inversion, is made efficiently without using rotating parts and only through static electronic devices.

In order to allow inverter operation in safe thermal and electrical conditions, in the event of adverse environmental conditions or unsuitable input voltage values, the unit automatically reduces the value of the power fed into the grid. This way the solar energy system compensates for the energy drawn from the utilities connected to the grid to which it is linked. The solar energy system then powers all connected electrical devices, from lighting to household appliances, etc.

When the photovoltaic system is not supplying sufficient power, the power needed to ensure normal operation of the connected electrical devices is drawn from the utility grid. If, on the other hand, excess power is produced, this is fed directly into the grid, becoming available to other consumers.

In accordance with local and national regulations, the power produced can be sold to the grid or credited towards future consumption. Each inverter will work independently of the others and will supply the grid with the maximum power available from its photovoltaic panel.

Characteristics of MICRO inverters

Unlike systems subdivided into strings controlled by one or several inverters, systems of this sort are built for the incorporation of a MICRO Inverter for each photovoltaic module.

Each MICRO Inverter works independently of the others, thus its own photovoltaic module supplies the maximum power available to the grid. This setup enables a direct control over the production of a single photovoltaic module, consequently optimizing production as much as possible.

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Description of the CDD

The Power-One MICRO Inverters associated with the CDD are monitored using CDD display, the CDD web server interface, or from the Aurora Vision monitoring portal.

The display for the CDD permits simultaneous monitoring of the associated inverters. The following information can be viewed by navigating in the menu:
- Operating status and statistics of each MICRO Inverter
- Operating status of the connection to the Internet/local network
- Alarm messages and fault indicators.

The display offers user friendly and intuitive use with the capability of navigating through the various menus by means of buttons on the side of the CDD.

Alarm messages and codes

The MICRO Inverter is capable of communicating errors/warnings via radio to the associated CDD. The table below provides a description of the alarm messages and error codes displayed on the CDD.

Display code LED status Message	Cause	Solution
E001 blinking red Input OC	The error appears when the inverter input current exceeds the set overcurrent threshold. This may be caused by: a) sudden sunlight changes that may generate input current surges into the MICRO inverter b) PV module incompatible with the MICRO inverter input characteristics c) Faulty MICRO inverter	a) The error occurs sporadically and no action is required as the MICRO inverter will automatically reset to normal operation b) It is necessary to verify that the photovoltaic module specifications are compatible with the inverter. c) If conditions a) and b) have been verified and the error persists, the malfunction may be caused by an internal inverter fault.
E004 blinking red Vbulk OV	The error is generated when the voltage at the ends of the bulk capacitors exceeds the Over Voltage threshold. This may be caused by: a) Grid voltage too high b) Internal inverter fault	a) Check that the grid voltage is compatible with the MICRO inverter specifications. In the event of highly abnormal grid voltage, please contact your grid operator to address the problem. b) If no problems are found when checking the grid voltage, the alarm may be caused by internal inverter faults.

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Display code LED status Message	Cause	Solution
E006 blinking red Output OC	The error appears when the inverter output current exceeds the internal inverter alarm threshold. This may be caused by: a) High impedance grid with significant voltage variations, even with small loads. b) Internal inverter fault	a) Check that the grid voltage is stable, mainly upon: - loading with high current peak loads. - maximum power generation of the PV system If the grid voltage is unstable, verify the appropriate sizing of the line cable/s, and, if correct, please contact your grid operator to address the problem. b) If no problems are found when checking the grid voltage, the alarm may be caused by internal inverter faults.
E014 blinking green OverTemp	High internal temperature recorded by the inverter. This parameter depends in part on the power that the inverter must supply, as the internal inverter temperature is affected by the heat dissipated internally by its components. This may be caused by: a) Failure to observe the installation conditions b) Internal inverter fault	a) Verify the installation conditions (exposure to sunlight) and check that air flow to the MICRO inverter is not obstructed, so as to permit cooling of the device. Check that the ambient temperature measured around the MICRO inverter does not exceed the limits set in the technical data. b) Verify the MICRO inverter temperature readings (see the Internal Web Server section in the CDD manual). If one of the temperatures remains at a value which is not compatible with the environmental conditions (e.g. -40°C internal temp. reading with 20°C effective ambient temperature), the alarm may be due to internal inverter causes.

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Display code LED status Message	Cause	Solution
E018 blinking green Ground fault	The error is generated when a ground leakage current is detected in the DC section of the system. This may be caused by: a) PV module ground leakage b) Internal inverter fault	See the "Verification of ground leakage" and "Measuring the insulation resistance" sections for information on how to perform checks and measurements. a) If the measured insulation resistance value is less than 1KΩ, the PV module has a ground leakage that prevents the grid connection of the inverter. In this case the PV module must be replaced. b) If the measured value exceeds 1KΩ, try connecting the MICRO inverter to a different PV module. If the error persists, the alarm may be caused by internal inverter faults. To perform this test, the MICRO inverter Ground Fault condition must be reset via the Web Server.
E023 Blinking green DC Injection	The error is generated if the DC component of the current supplied to the grid exceeds the threshold set by the country of installation's applicable regulation. In any case, the inverter will automatically try to reconnect to the grid. This may be caused by: a) Sporadic recurrence of this error is a sign of large grid distortions or sudden changes in irradiance. b) Systematic recurrence of this error may be due to an inverter fault.	a) Verify the grid parameters and, if the grid voltage is strongly distorted, please contact your grid operator to address the problem If the grid voltage is stable, the error may also be due to sudden irradiance variations. In this case, the inverter will automatically try to reconnect to the grid and no actions are required to solve the problem. b) If the grid voltage is stable, yet the error systematically persists, the malfunction may be caused by an internal inverter fault
E024 Blinking red Internal Error	a) The alarm may occur during inverter initialization and is caused by the initialization of communication between the CDD and the MICRO inverters. b) Systematic occurrence of this error may be due to an inverter fault.	a) The alarm will automatically reset upon connection of the inverter to the grid, and no actions are required to solve the problem. b) If the error systematically persists, the malfunction may be caused by an internal inverter fault

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Display code LED status Message	Cause	Solution
E051 Solid red Country Not Comp	The set grid standard is not compatible with the firmware installed on the MICRO inverter. This condition may be generated if a MICRO inverter is replaced.	The firmware in the MICRO inverter/s in the installation must be updated to a compatible version. Firmware updates are performed via the Internal Web Server (see the CDD manual), with the software package obtained from customer service.
E052 Solid red Country mismatch	The alarm is generated when the grid standard (selected on the CDD during installation) has not been correctly set on the MICRO inverters. This may be caused by: a) communication problems while setting the grid standard for the MICRO inverter from the CDD: b) poor irradiance while setting the grid standard for the MICRO inverter from the CDD: MICRO inverters are directly supplied by the voltage generated at the panel, and poor irradiance may cause inverter shut downs	a) Verify on the Internal Web Server (as described in the CDD manual), the radio communication quality on each MICRO inverter (values above 60% indicate good reception). If the quality of the received signal is good re-configure the installation, otherwise consider installing the CDD device in a different position to ensure better radio signal quality. b) System configuration must be carried out in good irradiance conditions, in order to guarantee the correct operation of the MICRO inverter and to prevent the risk of shut-downs due to insufficient input voltage generated by the PV module.
E501 Blinking green Communication fault	The alarm is generated when the CDD device does not receive messages from the MICRO-inverter for more than 15 minutes. This may be caused by non-optimal positioning of the CDD.	Consider a new installation position that ensures better communication between the CDD device and the MICRO-inverters. Use the CDD Internal Web Server to verify the signal quality (refer to the CDD manual for information on the Internal Web Server)
W001 Blinking green Vpanel Problem	This alarm is displayed when the input voltage generated at the PV generator is outside the allowed range given in the technical data. This may be caused by: a) Poor sunlight b) Possible shadows that may darken the module during part of the day. b) PV module incompatible with the MICRO inverter input parameters d) Internal inverter fault	a) Wait for appropriate sunlight to guarantee correct operation of the inverter b) Verify that no shadows are present on the PV module when the error is generated c) Verify that the PV module voltage characteristics are compatible with the inverter input specifications. d) If the above checks have yielded positive results, yet the error persists, the malfunction may be caused by the MICRO inverter.

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Display code LED status Message	Cause	Solution
W003 Blinking green Grid Fail W004 Blinking green VAC OV W005 Blinking green VAC UV	This alarm is generated when one or more grid parameters lie outside the permitted range set by the country of installation's grid standard. The error code will be followed by a suffix in brackets indicating the grid parameter out of range: (UV) Grid voltage below the set lower limit (OV) Grid voltage above the set upper limit (UF) Grid frequency below the set lower limit (OF) Grid frequency above the set upper limit	If the error is generated only on one of the installation MICRO inverters, this may be due to an inverter fault. If the alarm is generated at multiple inverters in the installation, check the grid voltage for instabilities in any of the 4 parameters monitored by the inverter. If anomalous values are detected, verify the sizing of the AC line conductors. In case of correct sizing, please contact your grid operator to address the problem.
W011 Solid red Vbulk UV	Internal fault of the booster circuit inverter	Contact customer service.
W032 Blinking green Pgrid limitation	MICRO is limiting AC power due to an external condition; not an error but a certain working condition	If problem persists check grid connection condition.
W033 Blinking green Pgrid Fgrid limitation	MICRO is limiting AC power due standard frequency regulation.	If problem persists check grid frequency condition.
W034 Blinking green Pgrid VAC high limitation	MICRO is limiting AC power due to a standard voltage regulation.	If problem persists check grid voltage condition.
W035 Blinking green	Fgrid problem	(UF) grid frequency below the set lower limit (OF) grid frequency above the upper limit

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Making a service call

Call technical support at 877-261-1374 and provide the following information to initiate a call:
- Model number
- Serial number
- Status of LED light(s)
- Steady or flashing
- Error message or code

Routine maintenance

The CDD has no user-serviceable part and needs no maintenance interventions.

⚠️ **Do not attempt to dismantle the equipment or make any internal repairs!. Any attempt to open the equipment could comprise the integrity of the casing's insulation and violate the integrity of the NEMA 1 rating and/or create a hazard.**

When cleaning, DO NOT use rags made of filamentary material or corrosive products that may damage parts of the equipment or generate electrostatic charges.

Technical data and types

Type code	CDD
Communication to inverter	
Type	Radio IEEE 802.15.4
Sample rate	1 min.
Max. distance (free space)	164ft (50m[1])
Max. number of devices	30
Communication to modem/PC	
Wireless communication	Radio IEEE 802.11/b - 2.4GHz/10Mbps
Wired communication	Ethernet RJ45 10/100Mbps
Connectivity	
Wired ports	1x RJ45 Ethernet
Features	
Operation	Integrated web server
Power supply	
Type	External plug-in adapter
Adaptor input	100 to 240Vac : 50/60Hz
Adaptor output	5Vdc -1A
Power consumption	typ. 2.5W/max. 5W
Environmental	
IP degree	IP20/NEMA 1
Ambient temperature	-4°F to 131°F (-20°C to +55°C)
Relative humidity	< 90% non condensing
Physical	
Dimensions (H x W x D)	5.9 x 7 x 1in (150 x 180 x 25mm)
Weight	1.32lbs (0.6kg)
Mounting	Wall mounting (screws provided)
Interface	
Display	16 characters x 2 lines OLED
Display language	EN-ES-IT-DE-FR
LED	Bicolor (red and green)
Safety	
Marking	CE, cCSAus, FCC
Safety and EMC standard	EN 62311, EN60950-1, EN 301489-1 V1.8 1, EN 301489-17 V2.1.1, EN 55022, EN 55024 Class B/ Class C, RTTE 1999/5/EC
Accessories	
Antenna extension cable	Optional
Plug-in power adaptor	Included

1. Actual distance is function of environmental condition. Please refer to dedicated technical note for further information
Remark: features not speciality listed in the present datasheet are not included in the product.

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Wireless routers compatible with CDD

Below is the list of wireless routers tested for compatibility with CDD firmware 2.1.3 or later. The CDD device is associated with the MICRO-0.25-0.3-0.3HV-I-OUTD-US-208/240..

Vendor	Model	FW Version
2Wire	2701HG-B	5.29.109.11
ActionTec	GT704-WG	3.20.3.3.5.0.9.2.10
Apple	Airport Express	7.5.2
Apple	Airport Extreme	7.6
Apple	Time Capsule	7.6.1
Asus	RT-N16	1.0.1.6
Asus	WL530g	1.9.4.6
Belkin	F7D1301 v1	1.00.16 (Jan 8 2010 18:43:50)
Belkin	F7D3302 v1	1.00.13 (Jan 29 2010)
Belkin	F7D5301v1(01A)	1.00.22 (Aug 31, 2010 14:36:01)
Belkin	Surf N300	1.00.17 (Aug 11 2010 10:02:09)
Belkin	F5D8231-4	1.01.15
Buffalo	WHR-G125	Ver.1.46 (1.0.37-1.18-1.05)
Buffalo	WHR-HP-G54	1.40(1.0.37-1.08-1.04)
Buffalo	WHR-HP-GN	DD-WRT v24SP2-EU-US (08/19/10) std
Cisco	E1000	2.0.00 build 14 May 13, 2010
Cisco	E3000	1.0.03 build 2 Sep 7, 2010
Cisco	E4200	1.0.02 build 13 May 24, 2011
Cisco	M20	v1.0.01 build 7 Apr 15, 2010
Cisco	Vallet M10	v1.0.00 build 018 Jan 26, 2010
Corega	CG-WLBARGO	1.05
D-Link	DI-524	3.23 , Wed, 28 Jun 2006
D-Link	DIR615	5.00NA
D-Link	DIR-615	3.10NA
D-Link	DIR655	1.02
D-Link	DIR-665	HW Ver: A1, FW Ver: 1.00NA 12 Feb 2010
D-Link	DIR-825	2.02NA , Thu, 4, Jun, 2009
D-Link	DIR855	1.23NA
D-Link	DIR-855	1.23NA
D-Link	DIR-855	1.23EU
D-Link	WBR-1310	2
D-Link	WBR-2310	2
DYNEX	DX-WGRTR G	DX-WGRTR_US_1.01.08
DYNEX	DX-WGRTR v1000	DX-WGRTR_US_1.01.08
Linksys	WRT150N	v1.01.9 Jun 23 2007
Linksys	WRT310N	v1.00.4 Jan 3, 2008
Linksys	WRT54G2	1.5.01
Linksys	WRT54G2	1.0.02 build 013, Jan 7, 2009
Linksys	WRT54G v8	DD-WRT v24-sp2 (01/16/10) micro

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Vendor	Model	FW Version
NetGear	WG103	WG103_V2.0.25
NetGear	WGR614v9	V1.0.9_1.0.1NA
NetGear	WGT624	v3
NetGear	WGT624v2	V2.0.16_1.0.1NA
NetGear	WN2000RPT	V1.0.0.2NA
NetGear	WN802T v2	WN802Tv2_2.0.2
NetGear	WNDR3300	V1.0.14_1.0.14NA
NetGear	WNDR3700	V1.0.0.6
NetGear	WNR1000v2	V1.0.0.5NA
NetGear	WNR1000v3	V1.0.2.18_2.1.5.1
NetGear	WNR200v3	V1.0.1.26
NetGear	WNR854T	1.4.34NA
PCI	MZK-W04NU	1.00.03 Wed Nov 28 21:03:53 JST 2007
SMC	SMCWBR14S-N4	V0.0.4.4 (Dec 8 2009)
SMC	SMCWBR14T-G	V2.02 (May 16, 2005 `5:09:36)
TP-Link	TL-WR340G	4.7.11 Build 101102 Rel.60376n
TP-Link	TL-WR541G/TL-WR542G	4.0.1 Build 08 1021 Rel 48660n
TP-Link	TL-WR740N	3.12.4 Build 100910 Rel.57694n
TP-Link	TL-WR741ND	3.12.4 Build 100910 Rel.57694n
TP-Link	TL-WR841ND	3.12.5 Build 100929 Rel 57776n, HW Ver: WR841N v6n7 00000000
TP-Link	TL-WR941N/D	3.12.5 Build 100929 Rel 57776m
Westell	B90-327W15-06	VER:03.02.00a
ZyXel	P-330W	V1.90(BFI.1)D0
ZyXel	X550N	V3.60(BFD.2)/03/03/11/2009

Further information

For more information on ABB products and services for solar applications, navigate to www.abb.com/solarinverters

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