Conext™ Core XC Series Grid Tie Photovoltaic Inverter, 0G-XC-BB

Operation Manual

990-5737C

August 2017

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Contact Information

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Information About Your System

As soon as you open your product, record the following information and be sure to keep your proof of purchase.

Serial Number _____

Product Number _____

Purchased From _____

Purchase Date _____

Important Safety Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Label Symbols

The following symbols appear on labels on or in the inverter.

Hazardous voltage

Fire hazard

Hot surface

Energy storage hazard timed discharge

Hearing damage, wear hearing protection

Refer to the Installation or Operation instructions

Protective conductive terminal

Frame or chassis ground

Direct current

Alternating current

Audience

This manual is intended for anyone who will operate the Conext Core XC Series Inverter. Operators must be familiar with all the safety regulations pertaining to operating high-voltage equipment as dictated by local code. Operators must also have a complete understanding of this equipment's features and functions.

Installation must be performed by **qualified personnel**. Qualified personnel have training, knowledge, and experience in:

- Installing electrical equipment and PV input systems (up to 1000 V).
- Applying all applicable installation codes.
- Analyzing and reducing the hazards involved in performing electrical work.
- Selecting and using Personal Protective Equipment (PPE).

Configuration, servicing, and maintenance must be performed by **authorized service personnel** only. Authorized service personnel meet the requirements for a qualified installer, and they have received specific training from the manufacturer on servicing the Conext Core XC Series. Do not open doors or covers or attempt any servicing, maintenance, or other corrective actions unless you qualify as authorized service personnel.

This manual does not contain information regarding servicing or de-energization for servicing. Authorized service personnel should refer to the *Conext Core XC Series, 0G-XC-BB, Lock-Out and Tag-Out Procedures and Barrier Removal (document number: SD-XC-081)* and the *Conext Core XC Series, 0G-XC-BB, Commissioning and Configuration Manual (document number SD-XC-082).*

About

Purpose

This manual provides explanations and procedures for operating, maintaining, and troubleshooting the Schneider Electric Conext Core XC Series Grid Tie Photovoltaic Inverters. Installation instructions are available in the Conext Core XC Series Grid Tie Photovoltaic Inverter, 0G-XC-BB, Planning and Installation Manual (document number: 990-5738). Commissioning and Configuration instructions are available to authorized service personnel in the Conext Core XC Series, 0G-XC-BB, Commissioning and Configuration Manual (document number SD-XC-082).

Scope

Several versions of the Conext Core XC Series inverter exist.

This manual belongs only to the BB version of Conext Core XC Series.

⚠ ⚠ WARNING

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

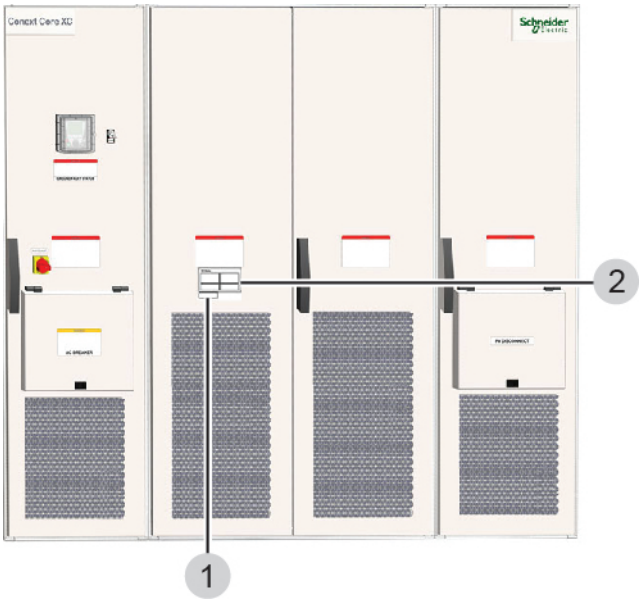
Always verify you are using the correct manual for your product before beginning any installation, operation, maintenance, or servicing work. Contact your Schneider Electric Sales Representative for details.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

To confirm that you have a BB version of Conext Core XC Series:

1. Locate the serial number label, on the left power stage cabinet door, below the ratings label, as shown in *Figure 1*.
2. Confirm that "0G-XC-BB" is written between the two serial numbers on the label.

Figure 1 Serial number label location



1	Serial number label
2	Ratings label

Abbreviations and Acronyms

ASIC	Application specific integrated circuit
BDEW	Bundesverband der Energie- und Wasserwirtschaft German Association of Energy and Water Industries
CE	European Union standards compliance mark
CP	Constant power
EEPROM	Electronically erasable programmable read only memory
GFD	Ground Fault Detection
GFDI	Ground Fault Detector Interrupter
IGBT	Insulated gate bipolar transistor
IMD	Insulation Monitoring Device
LC	Line control
MTHA	ASIC time counter circuit within APP processor
OC	Overcurrent
OCP	Overcurrent protection
OTP	Over-temperature protection
PE	Protective earth (ground)
PPE	Personal Protective Equipment
PV	Photovoltaic
PVO	Photovoltaic option

RISO	Resistance ISOlation measurement
RCD	Residual Current Detector
RTC	Real time clock
VAC	Volts (alternating current)
VDC	Volts (direct current)

Related Information

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Product Safety Information

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

- Read all instructions, cautionary markings, and all other appropriate sections of this manual before operating or troubleshooting the Conext Core XC Series
- This equipment is for use in *closed electrical operating areas*[1] only.
- This equipment must only be installed by qualified personnel, and must only be serviced by authorized service personnel equipped with appropriate personal protective equipment, and following safe electrical work practices.
- Do not open any door[2] or remove any cover before performing these tasks:
  - Consult the system diagram to identify all PV, AC, and external auxiliary AC (if used) sources.
  - De-energize, lock out, and tag out all sources according to the procedure in the *Conext Core XC Series, 0G-XC-BB, Lock-Out and Tag-Out Procedures and Barrier Removal (document number: SD-XC-081)*.
  - Wait at least 10 minutes for internal capacitors to discharge to safe voltages.
  - Confirm circuits are de-energized with a voltage sensing device rated at least 1000 V AC and DC. Switches in or on the inverter remain energized unless sources have been externally disconnected.
- Replace all devices, doors, and covers before turning on power to this equipment.
- Select and install a suitably rated[3] isolation transformer between the inverter output and utility power line connections. The transformer must be selected and installed in accordance with the Conext Core XC Series Grid Tie Photovoltaic Inverter, 0G-XC-BB, Planning and Installation Manual (document number: 990-5738). The transformer must be an isolation type having separate primary and secondary windings.
- This inverter must be mounted on a non-flammable surface, as described in the Conext Core XC Series Grid Tie Photovoltaic Inverter, 0G-XC-BB, Planning and Installation Manual (document number: 990-5738).

Failure to follow these instructions will result in death or serious injury.

[1] Per EN/IEC62109-1 this is defined as a room or location for electrical equipment to which access is restricted to skilled or instructed persons by the opening of a door or the removal of a barrier by the use of a key or tool and which is clearly marked by appropriate warning signs.

[2] The DC cabinet door can be opened without interrupting inverter operation (opening any other doors will interrupt inverter operation). See *Operator Interface Controls on page 18*.

[3] Minimum 540 kVA rated for XC540, minimum 630 kVA rated for XC630, minimum 680 kVA rated for XC680. See Conext Core XC Series Grid Tie Photovoltaic Inverter, 0G-XC-BB, Planning and Installation Manual (document number: 990-5738).

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

Do not open any cabinet doors or covers unless you are either **qualified personnel** or **authorized service personnel** as defined in *Audience on page 4*.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

HAZARD OF EQUIPMENT DAMAGE

Obey the manual's instructions, as well as, all physical, electrical, and environmental specifications shipped with the Conext Core XC Series.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

- This inverter is energized at any time the PV arrays are exposed to light.
- In all installations, the installer must provide external disconnecting means for the PV input, AC output, and external auxiliary AC source input wiring.
- The overcurrent protection devices within the Conext Core XC Series are intended to provide adequate protection for inverter circuitry only.
- The installer is responsible for determining whether additional external overcurrent protection is required for the AC output, PV input, and external auxiliary AC terminals, in accordance with the applicable installation codes.

Failure to follow these instructions can result in death or serious injury.

⚠ WARNING

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

Do not install or attempt to operate the Conext Core XC Series if it has been dropped or has received more than cosmetic damage during transport or shipping. If the Conext Core XC Series is damaged, or suspected to be damaged, contact Schneider Electric customer service.

Failure to follow these instructions can result in death or serious injury.

⚠ WARNING

LIMITATIONS ON USE

Do not use the Conext Core XC Series in connection with life support systems or other medical equipment or devices. The Conext Core XC Series can only be used in grid-interconnected PV systems. It is not suitable for any other application areas.

Failure to follow these instructions can result in death or serious injury.

⚠ WARNING

HAZARD OF CRUSH INJURY AND EQUIPMENT DAMAGE

- Use caution and follow the instructions in the Conext Core XC Series Grid Tie Photovoltaic Inverter, 0G-XC-BB, Planning and Installation Manual (document number: 990-5738) for correct lifting, moving, and mounting of the Conext Core XC Series.
- The Conext Core XC Series can topple over if tipped. You must securely attach the Conext Core XC Series to the mounting surface after positioning.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

- Do not defeat or change the settings of the heater thermostat and dew point controller located inside the Conext Core XC Series as these heaters are installed to help prevent condensation inside the Conext Core XC Series.
- Do not defeat or change the settings of internal protection devices such as circuit breakers, insulation monitor, and current sense relays.
- Do not change the settings on the AC circuit breaker.
- Do not defeat any of the door interlocks. They are an integral part of the Conext Core XC Series protection system.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ CAUTION

HAZARD OF HEARING LOSS

Wear appropriate hearing protection as the Conext Core XC Series can generate noise levels exceeding 80 dBA.

Failure to follow these instructions can result in injury or equipment damage.

⚠ CAUTION

HAZARD OF BURNS

Components become hot during normal operation. Do not touch components inside the Conext Core XC Series until they have had time to cool down after the inverter has been de-energized.

Failure to follow these instructions can result in moderate or minor injury.

NOTICE

HAZARD OF OVERHEATING AND EQUIPMENT DAMAGE

- Keep the supply air and exhaust air areas unobstructed.
- Follow the installation, ventilation, and clearance instructions in the Conext Core XC Series Grid Tie Photovoltaic Inverter, 0G-XC-BB, Planning and Installation Manual (document number: 990-5738).

Failure to follow these instructions can result in equipment damage.

NOTICE

HAZARD OF ELECTROSTATIC DAMAGE

Conext Core XC Series electronics can be destroyed by static charge. Wear static protection gear, and use anti-static tools and procedures when installing the Conext Core XC Series

Failure to follow these instructions can result in equipment damage.

NOTICE

HAZARD OF DUST OR MOISTURE INGRESS

- The service area around the Conext Core XC Series must be dry and free of debris during installation, commissioning, servicing or preventive maintenance.
- If the service area is not dry and free of debris, the installation, commissioning, servicing or preventive maintenance must be postponed until the environmental conditions have cleared.
- Do not open cabinet doors and covers or remove screens and filters when the environmental conditions indicate a possibility of dust, rain, or strong wind entering the cabinets.
- Close the doors when you are not working in the cabinets.

Failure to follow these instructions can result in damage to equipment and can compromise the environmental protection of the Conext Core XC Series.

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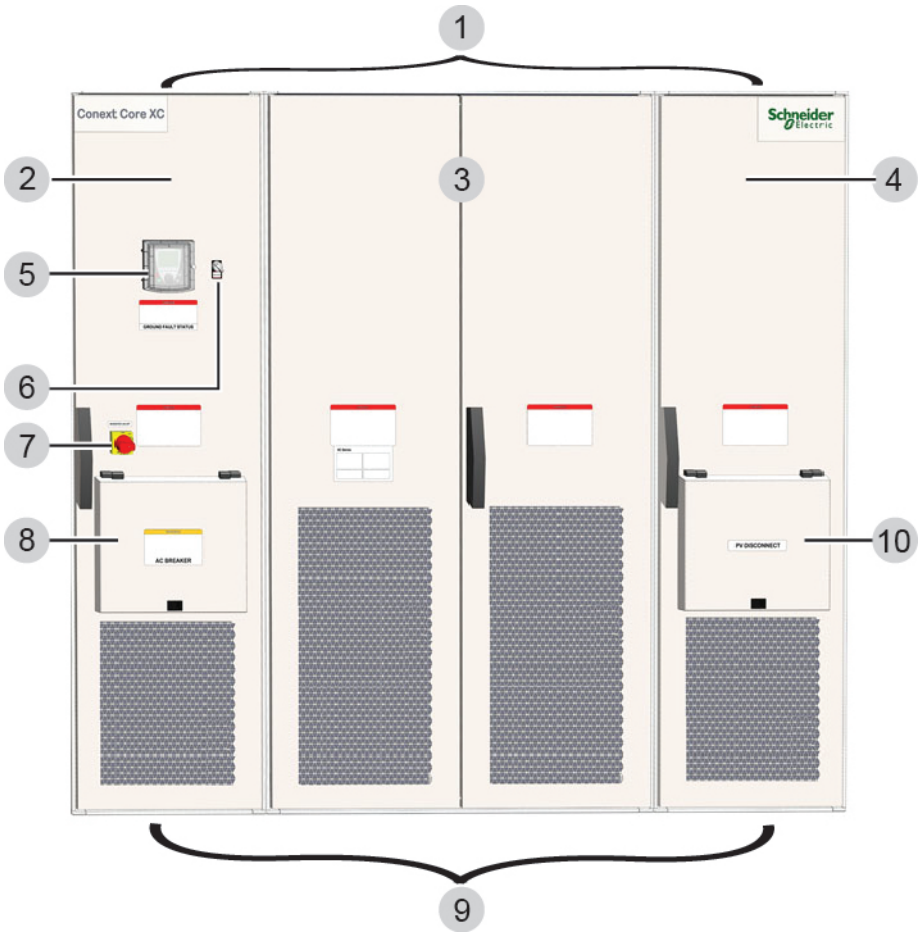
Figure 2 Conext Core XC Series main external components



1	Exhausts
2	AC cabinet
3	Power stage cabinet
4	DC cabinet
5	Front panel user interface
6	ENABLE STATE/DISABLE STATE switch
7	Inverter ON/OFF switch
8	AC circuit breaker
9	Air intakes
10	PV disconnect switch

All Conext Core XC Series cabinet doors must be closed and locked during normal operation. For specific maintenance operations the DC cabinet door can be opened without interrupting Conext Core XC Series operation (opening any other doors will interrupt Conext Core XC Series operation). This feature is only intended to allow visual

inspection of components or monitoring devices located inside the DC compartment while the inverter is running. The door must be closed again immediately after inspection. Check with your country sales organization to determine whether your inverter is equipped with this feature.

ENABLE STATE/DISABLE STATE Switch

The Conext Core XC Series has an ENABLE STATE/DISABLE STATE switch located on the AC cabinet door beside the front panel user interface, see *Figure 3 on page 20*.

Under normal conditions, the ENABLE STATE/DISABLE STATE switch is in the ENABLE STATE position. The main AC circuit breaker and PV disconnect switch will not close unless the switch is in the ENABLE STATE position. The Conext Core XC Series will not operate unless the switch is in the ENABLE STATE position.

To change any grid parameter, the switch must be turned to the DISABLE STATE position. Turning the switch to the DISABLE STATE position initiates an immediate controlled shutdown of the Conext Core XC Series and opens both the main AC circuit breaker and PV disconnect switch within the inverter.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

Turning the switch to the DISABLE STATE position does not de-energize the Conext Core XC Series; it only stops power production. Externally disconnect the PV, AC, and external auxiliary AC sources to de-energize the Conext Core XC Series.

Failure to follow these instructions will result in death or serious injury.

Inverter ON/OFF Switch

The Conext Core XC Series has an inverter ON/OFF switch located on the AC cabinet door, see *Figure 3 on page 20*.

The inverter ON/OFF switch is also the auxiliary power breaker. Under normal conditions, the inverter ON/OFF switch is in the ON position, providing the auxiliary power necessary for power production and for maintenance functions such as viewing and extracting data from the front panel user interface or performing software updates. The main AC circuit breaker and PV disconnect switch cannot be closed unless the switch is in the ON position. The Conext Core XC Series will not restart unless the switch is in the ON position.

To initiate a power cycle, the switch must be turned to the OFF position and then back to the ON position. Turning the switch to the OFF position initiates an immediate controlled shutdown of the Conext Core XC Series and opens both the main AC circuit breaker and PV disconnect switch within the Conext Core XC Series.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

Turning the inverter ON/OFF switch to the OFF position does not de-energize the Conext Core XC Series; it only stops power production. Externally disconnect the PV, AC, and external auxiliary AC sources to de-energize the Conext Core XC Series.

Failure to follow these instructions will result in death or serious injury.

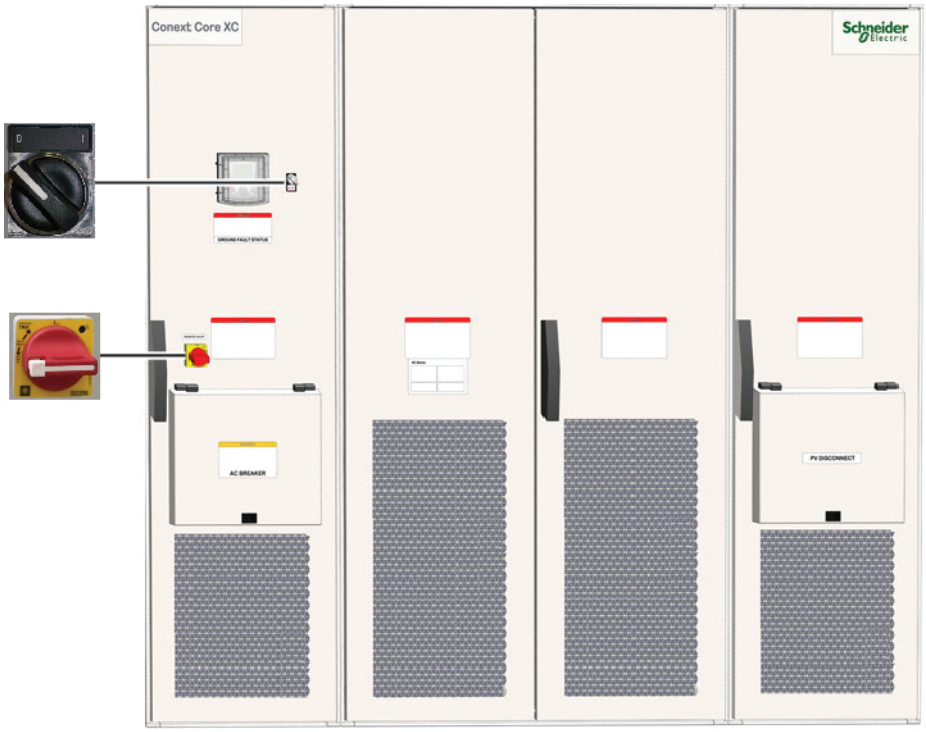
⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

- Turning the inverter ON/OFF switch to the ON position energizes auxiliary and control circuits.
- The upper section of the AC cabinet must be accessed only if wearing PPE appropriate for the hazards presented by the AC auxiliary circuit.
- The DC cabinet must be accessed only if wearing PPE appropriate for the hazards presented by both the DC input circuit and AC auxiliary circuit.

Failure to follow these instructions will result in death or serious injury.

Figure 3 ENABLE STATE/DISABLE STATE switch (top) and inverter ON/OFF switch (bottom)

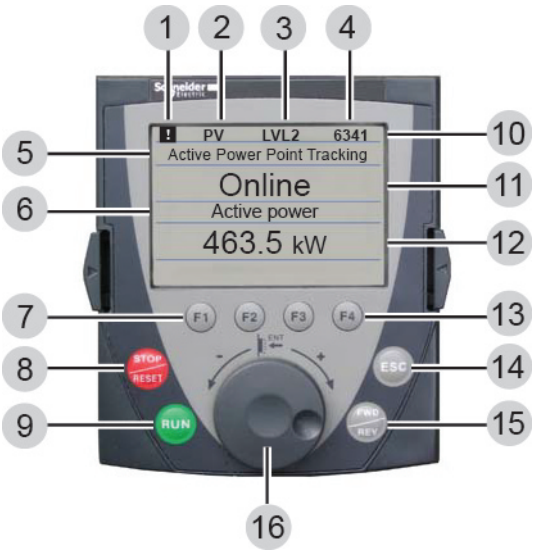


Front Panel User Interface

The front panel user interface on the Conext Core XC Series has a display and keypad with scroll wheel for local monitoring and configuration (see *Figure 4 on page 21*). The front panel user interface is covered by a plastic door.

Extensive status information and Offline state or Service state events are reported to the front panel user interface. Use the scroll wheel to navigate through menu or value options, and press the center of the scroll wheel to select the menu or value. The keypad has four function keys (F1 to F4), RUN (remote enable) and STOP/RESET (remote disable) keys, and an ESC escape key.

Figure 4 Front panel user interface



1	Periodic servicing reminder
2	Inverter operating mode
3	Access level
4	Event ID
5	Inverter activity or state description
6	Display parameter—use scroll wheel to change
7	F1 return to default parameter display
8	Disable via software command
9	Enable via software command
10	Inverter status line
11	Inverter state
12	Parameter value
13	F2, F3, and F4 function keys (context-specific)
14	Exit current menu
15	Unused
16	Scroll wheel

Local vs. Remote Monitoring

The Conext Core XC Series provides information to users about the system's current state and recent events, as described in *Table 1*.

Table 1 Communication features

Information Type	Description	Communication Method[1]
System status	The system states are: ■ Disable ■ Online ■ Offline ■ Service	■ Front panel user interface ■ Optional remote monitoring system
Offline state event	The time and details are stored in non-volatile memory.	■ Front panel user interface: event ID and a brief text description ■ Optional remote monitoring system: event ID and an extensive text description
Service state event	The time and details are stored in non-volatile memory.	■ Front panel user interface: event ID and a brief text description ■ Optional remote monitoring system: event ID and an extensive text description
Data logging		■ Optional remote monitoring system

Setting the Communication Method

The Parameter Control menu on the front panel user interface sets whether the Conext Core XC Series is controlled locally on the front panel user interface or remotely.

To change the communication method:

1. Check that you are at the home screen of the front panel user interface. If not, press Esc multiple times or F4 to return to the home screen.
2. Press the center of the scroll wheel.
3. Scroll to Language, Time, Interface, and then press the center of the scroll wheel.
4. Scroll to Parameter Control Station, and then press the center of the scroll wheel.
5. Scroll to highlight either Panel Control or Modbus, and then press the center of the scroll wheel to apply the change.

[1] Communications performance degradation due to EMI: Exposure to external electromagnetic interference may result in some intermittent loss of communication, however the communications will self-recover to normal operation after the interference subsides.

a. Select Panel Control to use the front panel user interface for communication.

b. Select Modbus to communicate through an optional remote monitoring interface.

6. Press F4 to return to the home screen.

When the parameter control is set to Modbus, you can still access the Parameter Control Station menu on the front panel interface to change back to panel control.

AC Circuit Breaker and PV Disconnect Switch

⚠⚠ DANGER

MULTIPLE SOURCES WITH HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

- Operation of the switches in or on the Conext Core XC Series does not remove all power from the Conext Core XC Series. Switch terminals remain live unless the PV, AC, and external auxiliary AC sources have been disconnected externally.
- All service and maintenance inside the inverter must be performed by authorized service personnel only by following the instructions in Conext Core XC Series, 0G-XC-BB, Lock-Out and Tag-Out Procedures and Barrier Removal (document number: SD-XC-081).

Failure to follow these instructions will result in death or serious injury.

The main AC circuit breaker is located behind a cover on the AC cabinet door and the PV disconnect switch is located behind a cover on the DC cabinet door as shown in *Figure 5 on page 24*. These covers help to protect the circuit breaker and PV disconnect from the external environment. Twist the knob to open the covers. Although the covers are hinged at the top and they fall closed, you must manually twist the knob to latch the covers closed after use.

⚠⚠ WARNING

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

- Do not change the settings on the AC breaker.
- Do not change the settings on the external DC circuit breaker (located in the DC protection box, outside of the inverter).

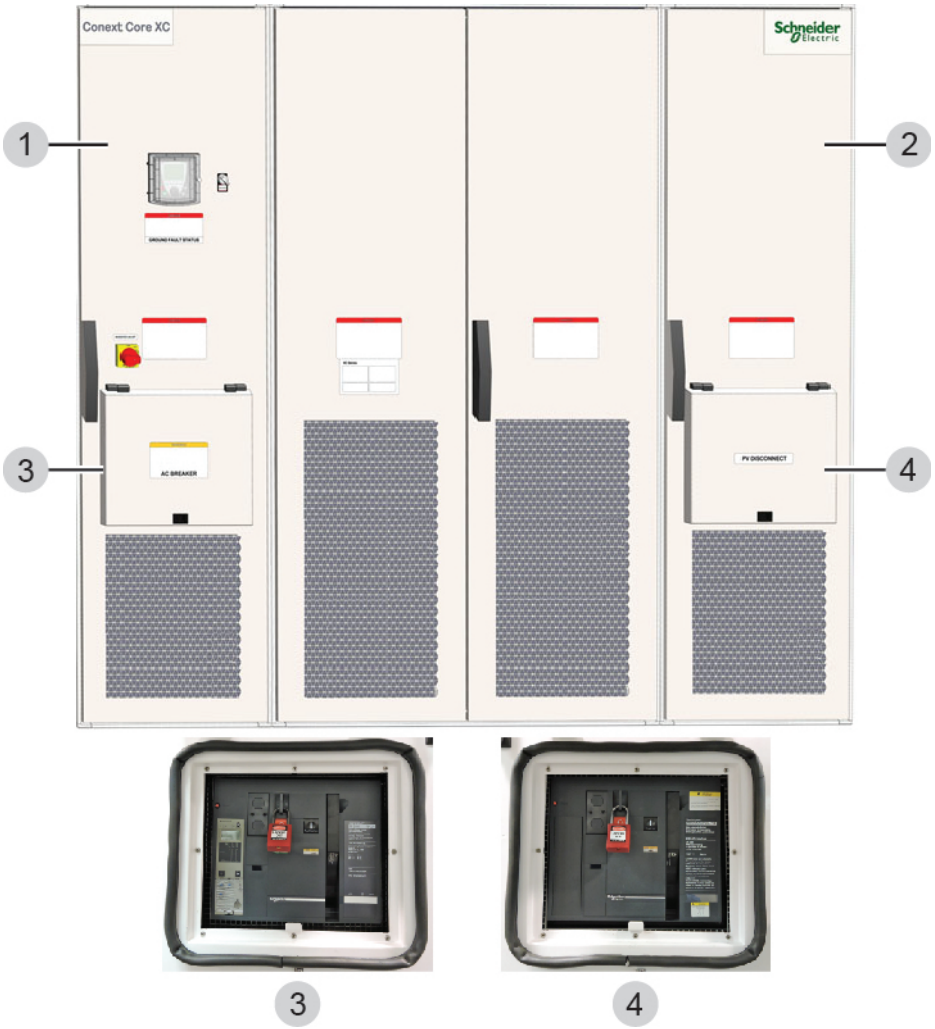
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Additional external AC and PV disconnecting means, capable of being locked out and tagged out, must be provided as part of the installation to help facilitate safe installation of the Conext Core XC Series and for certain service operations.

The main AC circuit breaker and PV disconnect switch are each load-break rated disconnects. During an Offline state or Service state event—or if the Conext Core XC

Series is shut off for any reason—the AC circuit breaker and PV disconnect switch automatically open. Each is capable of breaking its full load current.

Figure 5 AC circuit breaker and PV disconnect switch



1	AC cabinet
2	DC cabinet
3	AC circuit breaker (shown locked out)
4	PV disconnect switch (shown locked out)

2 Operation

What's in This Chapter?

Description of System Operation

The Conext Core XC Series is a fully automated grid-interactive photovoltaic inverter. The control unit within the inverter governs and monitors system startup and shutdown, power conditioning and flow, and system events. Manual intervention is necessary only when a Service state event occurs (see *Service State on page 30*).

Operating Modes

The Conext Core XC Series has the following operating modes:

- PV mode: Standard operating mode
- PVCQ mode: Constant reactive power mode, used when 24-hour reactive power compensation is required
- CP mode: Constant power mode, used only for testing

Operating States

The Conext Core XC Series has the following main operating states:

- *Initialization (transitional state at power-up)*
- Disable
- Enable
    - Offline
    - *Reconnecting (transitional state during offline to online transition)*
    - Online
    - Grid Online (This state only occurs when the Conext Core XC Series is running in PVCQ mode)
- Service

The operating states for a Conext Core XC Series in PV mode are illustrated in *Figure 6 on page 27*. The operating states for a Conext Core XC Series in PVCQ mode are illustrated in *Figure 7 on page 28*. A state machine within the control unit software governs the transitions between operating states.

Initialization

When the inverter is powered up, it will perform a self diagnostic test (initialization). Once initialization is complete, the inverter will be fully operational and will be in the Disabled state. Transitions between the Disable state and the Enable state are described later in this manual.

Figure 6 Conext Core XC Series operational states in PV mode

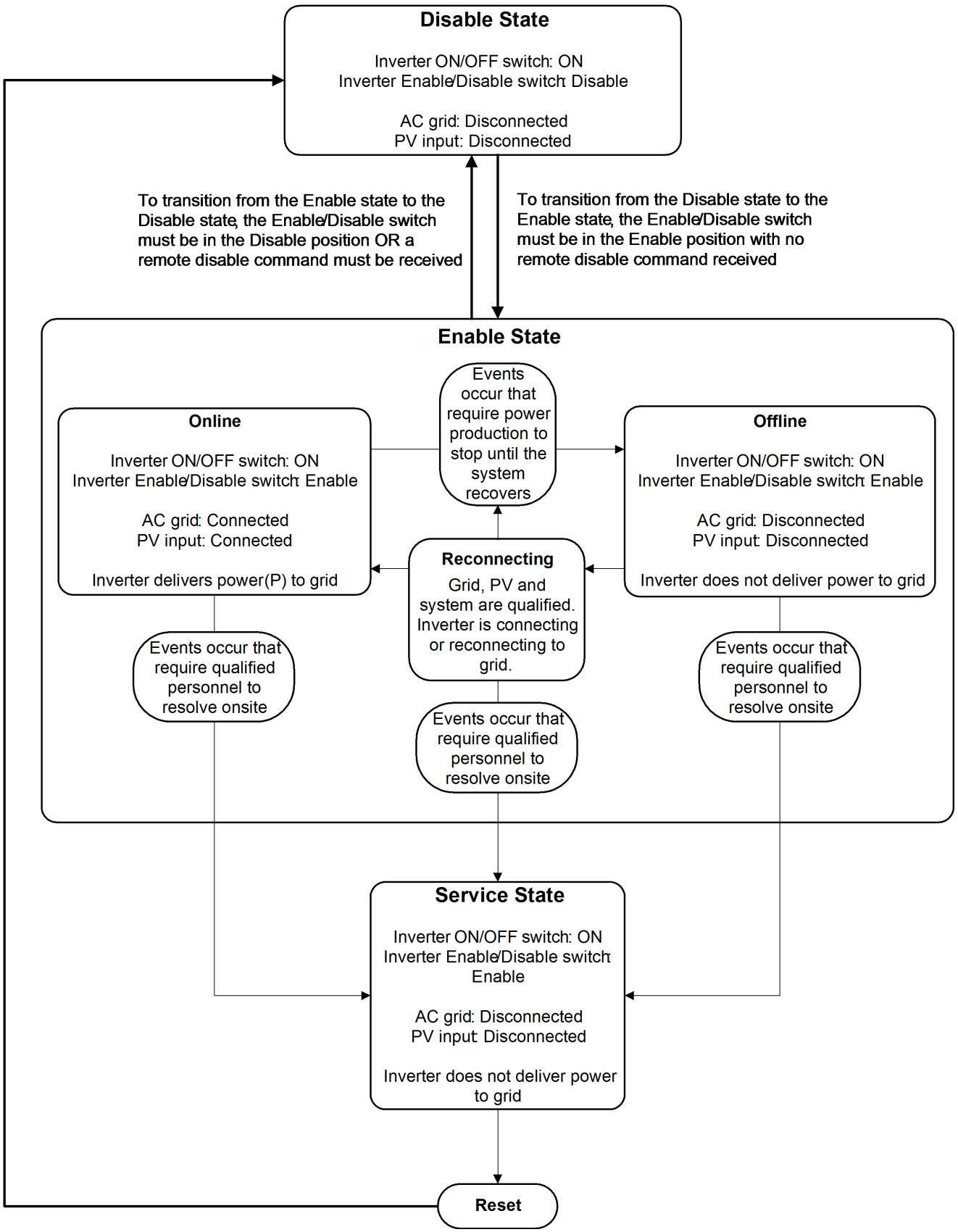
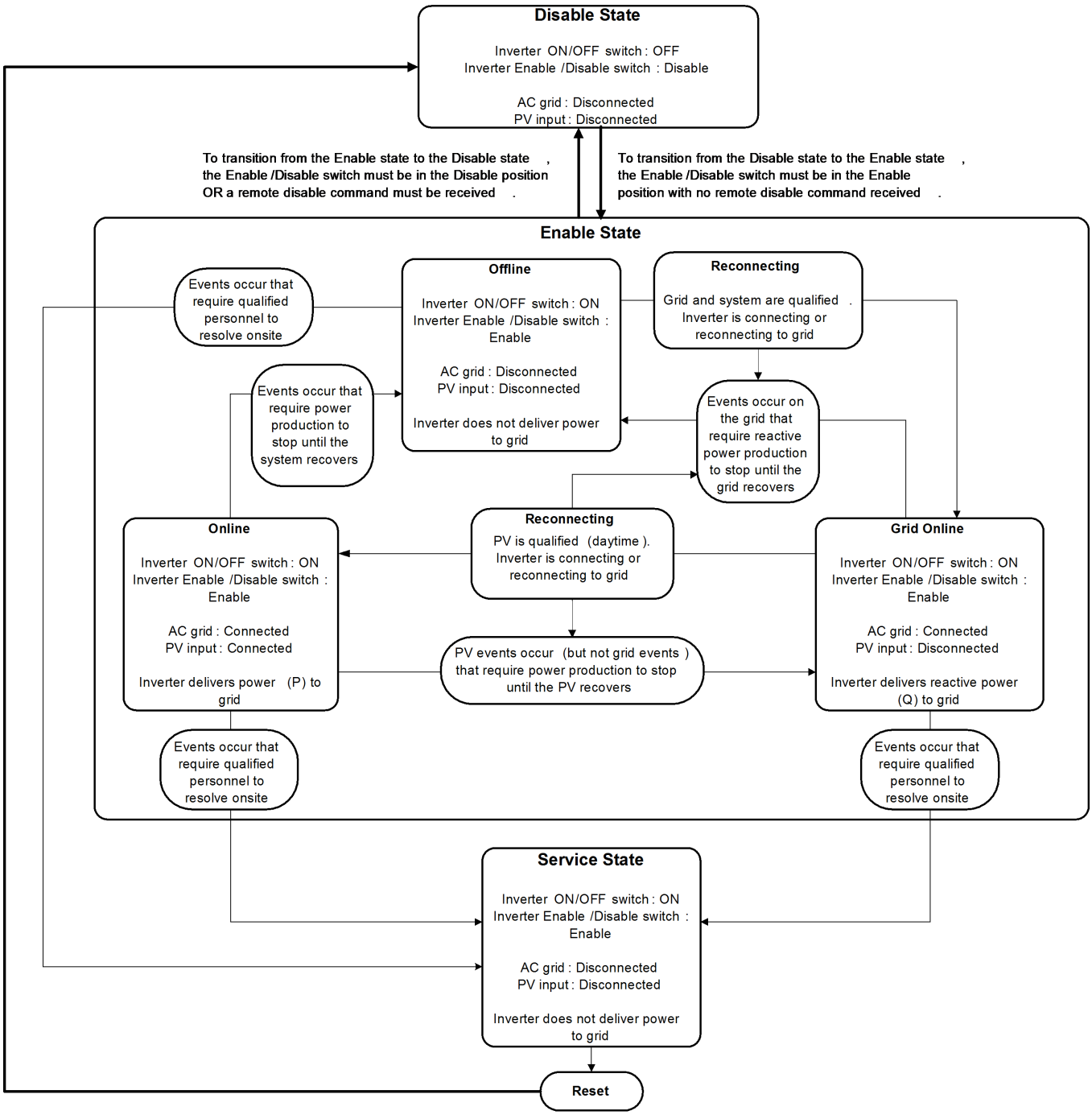


Figure 7 Conext Core XC Series operational states in PVCQ mode



Disable

In the Disable state, the Conext Core XC Series is dormant and does not attempt to connect to the grid. The Conext Core XC Series must be in the Disable state to receive commands and changes to the configuration parameters. To exit the Disable state, both the ENABLE STATE/DISABLE STATE switch and any optional remote monitoring system command must be set to ENABLE.

When the Conext Core XC Series is in the Enable state, it transitions to the Disable state only when the ENABLE STATE/DISABLE STATE switch is set to DISABLE or the DISABLE command is sent from any optional remote monitoring system connection.

Enable

The Enable state is the standard operating state of the Conext Core XC Series. In this state, the Conext Core XC Series maximum power tracker operates the array at maximum power based on the available irradiance. The following conditions must be met for the Enable state:

- Inverter ON/OFF switch, ENABLE STATE/DISABLE STATE switch, and optional remote monitoring system ENABLE/DISABLE command are in the ON or ENABLE position.
- Automatic reconnect has occurred and the AC circuit breaker and PV disconnect switch are both in the ON or closed position.
- Service state events are not present.
- The Conext Core XC Series is in PV mode or PVCQ mode. It cannot be enabled when in CP test mode (see *Operating Modes on page 26*).

Within the Enable state the Conext Core XC Series can either be Offline, Reconnecting, Online, or Grid Online (PVCQ mode only).

Offline

The inverter is in offline state when the PV input is not within the normal operating ranges or a grid disturbance or PV disturbance has been detected. Examples of an Offline state event are disconnection due to variations in grid voltage or frequency, or the loss of PV power at nighttime. During an Offline state event, the Conext Core XC Series stops processing power and stays in the Offline state until the grid or PV array returns to its normal operating range.

All Offline state event conditions that the Conext Core XC Series detects are displayed on the front panel user interface, reported to any optional remote monitoring interface, and recorded in the event log. The front panel user interface displays the state and fault code. For a description of the Offline state event codes, see *Table 12 on page 51*.

Reconnecting

The reconnecting state is a transitional state during the offline to online transition. This state will be initiated when the grid or PV array is within its normal operating range. The inverter will exit the reconnect stage after the "Grid Reconnect Delay" period has expired. The AC circuit breaker will close followed by closing of the DC Switch.The inverter will then be in the online state.

Online

The inverter is in online state when all monitored parameters are within normal operating range and the Conext Core XC Series is processing power as intended. In addition to the conditions for the Enable state, the following conditions must be met for the Online state:

- The utility AC voltage and frequency is stable.
- The PV voltage is present.
- The service state or offline state events are not present.

Grid Online (PVCQ mode only)

The inverter is in online state when the grid is within its normal operating range but the PV array is not within its normal operating range. The Conext Core XC Series is delivering constant reactive power to the grid.

Set the Conext Core XC Series to operate in PVCQ mode when 24-hour reactive power compensation (Var) is required. This can be done by setting "CQ Mode" to "ON" in the Inverter Operating Modes menu.

Service State

Whenever a Conext Core XC Series encounters a Service state event condition, it immediately stops processing power and executes a controlled shutdown that includes opening both the main AC circuit breaker and the PV disconnect switch. For example, a fault signal received from the processor or the number of overcurrent events and switching frequency events exceeded the OCP Max Daily Count.

The Conext Core XC Series remains in the Service state until an authorized service technician remedies the cause and then returns the Conext Core XC Series to normal operation.

Service state events appear on the front panel user interface and if programmed to do so, they also appear on any optional remote monitoring interface (Renconnect or a PC with a Modbus connection). These events are recorded in the event log. The front panel user interface displays the state and event ID code. For a description of the Service state event codes, see *Event Code on page 51*.

Operational Features

Operational features of the inverter include humidity controllers, cold start functionality, anti-islanding, and multiple grounding configurations.

Temperature and Humidity Control

The Conext Core XC Series inverters are equipped with heaters to keep the internal components at operating temperature and free of condensation, even when the inverter is not producing power. The heater thermostats are set to 5 °C (41 °F). Settings on the dew point controller and thermostat must not be changed.

⚠ ⚠ WARNING

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

Do not defeat or change the settings of the heater thermostat and dew point controller located inside the Conext Core XC Series as these heaters are installed to help prevent condensation inside the Conext Core XC Series.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Anti-islanding

Islanding occurs when a distributed generation source continues to energize a portion of the utility grid (the *island*) after the electrical utility has stopped providing power. Distributed generation sources such as the Conext Core XC Series can detect an islanding condition and stop energizing the grid.

The Conext Core XC Series inverter detects grid voltage or frequency instability when the load and generation demand is unbalanced and transitions to the offline state. At times, however, the load and generation demand in the islanded area are balanced, and the self resonance of the grid is at the same frequency as the nominal grid frequency. In this situation, the inverter would continue to supply the islanded area with power if it did not have a special feature known as *grid perturbation* or *active anti-islanding*.

In most medium voltage applications, the Conext Core XC Series inverter is not required to perform grid perturbation because such plants are remotely controlled (dispatched) by the electrical utility. Without grid perturbation, more stable, continuous and accurate delivery of active and reactive power is possible.

Schneider Electric authorized personnel can turn the active anti-islanding function on or off during configuration of the Conext Core XC Series, with the agreement of the local utility.

Grounding Options

The PV input can be ungrounded (floating), positive grounded, or negative grounded, depending on the options ordered.

Options are identified by a label located on the left door of the power stage cabinet, near the ratings label.

Standard Grounding Options

- Negative Grounding
- Positive Grounding

Standard Grounding with Insulation Monitoring Device (IMD) Options

- Negative Ground IMD
- Positive Ground IMD
- Floating DC With IMD

All IMD-enabled grounding options have a factory-installed PV insulation monitoring device (IMD), which measures and detects, against preset threshold levels, the amount of insulation resistance that exists between the PV system and ground.

If the array IMD measures outside of the respective thresholds, the Conext Core XC Series will shut down, open the AC breaker and PV disconnect, and report an event with the appropriate event ID to the front panel user interface and to any optional remote monitoring system.

EN/IEC62109-compliant Grounding Options

The Conext Core XC Series is only EN/IEC62109 compliant when one of the following options are installed:

- Negative Ground EN/IEC62109
- Positive Ground EN/IEC62109
- Floating Array EN/IEC62109

All EN/IEC62109-compliant grounding options have a factory-installed PV insulation monitoring device (IMD), which monitors the array insulation resistance to ground. In addition, positive and negative grounded options have a residual current detector (RCD), which monitors for excessive current flow on conductive parts in the case of an array ground fault (this current flow can create a fire hazard). The Conext Core XC Series does not provide integral shock hazard RCD protection.

If the array IMD or RCD measures outside of their respective thresholds the Conext Core XC Series will shut down, open the AC breaker and PV disconnect, and report an event with the appropriate event ID to the front panel user interface and to any optional remote monitoring system.

All Options

For all positive grounded array or negative grounded array grounding options, the factory-installed PV grounding hardware provides positive or negative grounding of the array, depending on the version ordered. This hardware includes a ground fault detector/interrupter (GFDI) which monitors the array insulation resistance to ground for ground fault currents. The GFDI incorporates a 5 A fuse and, for EN/IEC62109-compliant grounding options only, an RCD. The GFDI, will open the array grounding path to interrupt ground fault currents exceeding the trip levels of the fuse. At the same time, it will shut down the Conext Core XC Series, open the AC breaker and PV disconnect, and report an event with the appropriate event ID to the front panel user interface and to any optional remote monitoring system.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

- Measure voltage before proceeding with any interaction with the Conext Core XC Series. Always assume that messages on the front panel user interface related to the RCD, PV insulation, ground contact, or ground fuse are present due to a ground fault. Normally grounded conductors may be ungrounded and energized, or normally ungrounded conductors may be grounded, when a ground fault is present. Normally grounded DC conductors will become intermittently ungrounded with indication by the front panel user interface when the Conext Core XC Series inverter measures the PV array isolation.
- Do not defeat or modify the GFDI circuit in any way.
- Do not operate the Conext Core XC Series without a functioning GFDI circuit.

Failure to follow these instructions will result in death or serious injury.

Operator Interface

The operator interface communicates critical operational information to and from the Conext Core XC Series. This communication occurs between the operator and the front panel user interface or between the operator and any optional remote monitoring system. Repeated or extended low temperature exposure may reduce the lifetime of the front panel user interface.

NOTICE
HAZARD OF DUST OR MOISTURE INGRESS ■ Do not open the cover over the front panel user interface when the environmental conditions indicate a possibility of dust or precipitation entering the cabinet. ■ Avoid longer than necessary operation with the cover open. **Failure to follow these instructions can result in damage to equipment and can compromise the environmental protection of the Conext Core XC Series.**

Front Panel User Interface

The Conext Core XC Series user interface consists of a display and keypad with a scroll wheel on the front panel for local monitoring and configuration. Use the scroll wheel to navigate through menu or value options, and press the center of the scroll wheel to select the menu or value. See *Figure 4 on page 21*.

To access the main menu:

1. Make sure you are at the home screen.
2. Press the center of the scroll wheel.

Main Menu	1 Access Level
	2 Language, Time, Interface
	3 Grid Settings
	4 Power Tracking Options
	5 Inverter Operating Modes
	6 Inverter Protections
	7 Product Info
	8 Ratings

For details about these menu items, see *Overview on page 38*.

Operator Interface Structure

The operator interface—whether the front panel user interface or an optional remote monitoring interface—contains the following main types of information:

Conext Core XC Series status information

Status information is operational information that the Conext Core XC Series provides *to* you. The status information, which includes the Conext Core XC Series operating mode

and state and all operational values, can be viewed any time the Conext Core XC Series has control power. For more information, see *Conext Core XC Series Status*.

Configuration settings

Configurations settings are operational information that you provide *to* the Conext Core XC Series. For details about configuration settings, see *Overview on page 38*.

Conext Core XC Series Status

Key status information relating to Conext Core XC Series mode and state appears on the main screen of the front panel user interface, as shown in *Figure 4 on page 21* and listed in *Table 2*.

Table 2 Conext Core XC Series Series status information on main screen

Operational Parameter	Description
Periodic servicing reminder	The exclamation point (!) symbol is shown on the front panel user interface when a Service state alert is active or a recommended maintenance service call is required.
Inverter operating mode	Shows the current Conext Core XC Series operating mode: ■ PV (standard operating mode) ■ PVCQ (constant reactive power) ■ CP (constant power - diagnostic only)
Current access level	Shows the current access level enabled for changing write menu parameters.
Event ID	See *Table 12 on page 51* for a detailed list of Event ID codes. If there is more than one Service State event, only the most urgent Event ID code is shown. If there is more than one Offline State event, the Event ID for the first event to occur is shown.
Inverter activity or state description	A more detailed explanation of what the Conext Core XC Series is actively doing, such as Active Power Point Tracking.
Inverter state	Shows the current Conext Core XC Series state: ■ Initialization ■ Disable ■ Enable • Offline • Online • Grid Online (in Enable state,PVCQ mode only) ■ Service

Operational Parameter	Description
Display parameter	Shows the parameter that has been chosen for initial display. ■ Active Power (kW) ■ Reactive Power (kVAr) ■ Apparent Power (kVA) ■ Grid Current Line 1 (A) ■ Grid Current Line 2 (A) ■ Grid Current Line 3 (A) ■ Grid Current (A) ■ Grid Voltage V12 (V) ■ Grid Voltage V23 (V) ■ Grid Voltage V31 (V) ■ Grid Frequency (Hz) ■ DC Voltage (V)[1] ■ PV Voltage (V)[1] ■ PV Current (A) ■ PV Power (kW) ■ MWh Energy Produced (MWh) ■ Temperature PowerBoard (°C) ■ Temperature Heatsink 1 (°C) ■ Temperature Heatsink 2 (°C) ■ Temperature Heatsink 3 (°C) ■ Countdown Use the scroll wheel to view other display parameters, when you reach the end of the menu, the display returns to the beginning of the menu. To change the display parameter, follow the instructions in *Changing the Display Parameter on page 39*.
Parameter value	Shows the value of the parameter currently being viewed.

[1] PV voltage = The voltage measured from PV input. DC voltage = The voltage of DC bus within the Conext Core XC Series.

3 Configuration

What's in This Chapter?

Overview

You can change many of the configuration settings on the Conext Core XC Series to meet your specific requirements. This chapter describes the configurable settings and explains how to change them.

Changing System Setup

The front panel user interface is used to change the date and time, language, display parameter, parameter control, and data logging settings and to clear a service state alert.

Setting the Date and Time

Follow the procedure below to change the date and time using the front panel user interface.

To change the date and time:

1. Ensure you are at the home screen.
2. Press the center of the scroll wheel.
3. Scroll to Language, Time, Interface, and then press the center of the scroll wheel.
4. Scroll to Date and Time, and then press the center of the scroll wheel.
5. Scroll to Year, and then press the center of the scroll wheel. Enter the data:
    a. The display defaults to a single digit. Since the year has several numbers, press F2 (<<) three times to add three more numbers. Each number can be incremented independently. The number with the black background is the number that is currently selected.
    b. Starting from the far left number, scroll to select the correct number (from 0 to 9), and then press F3 (>>) to move to the number to the right.
    c. Repeat until all numbers are correct, and then press the center of the scroll wheel to apply the code.
6. Press Esc on the keypad to return to the Date and Time menu.
7. Repeat steps 5 and 6 to add information for Month, Day, Hour, Minute, Second.
8. Press F4 to return to the home screen.

Language, Time, Interface	**Date and Time**	Date and Time
		Year
		Month
		Day
		Hour
		Minute
		Second

Setting the Language

Follow the procedure below to change the language that the Conext Core XC Series displays, using the front panel user interface.

To change the language:

1. Ensure you are at the home screen.
2. Press the center of the scroll wheel.
3. Scroll to Language, Time, Interface, and then press the center of the scroll wheel.
4. Scroll to Language Selection, and then press the center of the scroll wheel.
5. Scroll to the language that you want to select, and then press the center of the scroll wheel.
6. Press F4 to return to the home screen.

Language, Time, Interface	**Language Selection**	0 English
		1 Deutsch
		2 Español
		3 Français
		4 Italiano
		5 Chinese
		6 Japanese
		7 Custom 2

Changing the Display Parameter

The Conext Core XC Series defaults to showing the active power on the front panel user interface. You can change this displayed parameter.

To change the display parameter:

1. Make sure you are at the home screen.
2. Press the center of the scroll wheel.
3. Scroll to Language, Time, Interface, and then press the center of the scroll wheel.

Language, Time, Interface	**Display Configuration**	**Select Display**	Active Power
			Grid Current
			Grid Voltage V12
			Grid Frequency
			DC Voltage
			PV Voltage
			PV Power
			MWh Energy Produced
			Thermal Loading
			Grid Current Line 1

4. Scroll to Display Configuration, and then press the center of the scroll wheel.
5. Scroll to Select Display, and then press the center of the scroll wheel.
6. Scroll to select the parameter that you want to display as the default on the front panel user interface, and then press the center of the scroll wheel to apply the change.
7. Press F4 to return to the home screen.

Changing Parameter Control

The Parameter Control menu on the front panel user interface sets whether the Conext Core XC Series is controlled remotely by Modbus communication or locally using the front panel user interface (Panel Control in the menu). Even if the parameter control is set to Modbus, you can change it to Panel Control from the front panel user interface. Parameter Control is the only menu that can be modified from the front panel user interface while the Conext Core XC Series is under Modbus control.

Use the Modbus setting for all optional remote monitoring interfaces.

To change the Parameter Control Station:

1. Ensure you are at the home screen.
2. Press the center of the scroll wheel.
3. Scroll to Language, Time, Interface, and then press the center of the scroll wheel.
4. Scroll to Parameter Control Station, and then press the center of the scroll wheel.
5. Scroll to highlight either Panel Control or Modbus, and then press the center of the scroll wheel to apply the change.
6. Press F4 to return to the home screen.

Language, Time, Interface	**Parameter Control Station**	Panel Control
		Modbus

Changing Logging Settings

Before you change any data logging settings, you must change the RTC Mode (real time clock mode) from RTC Log to RTC Config. After you make the changes, you must change it back to RTC Log to continue normal logging behavior.

To change logging settings:

1. Ensure you are at the home screen.
2. Press the center of the scroll wheel.
3. Scroll to Inverter Protections, and then press the center of the scroll wheel.

Inverter Protections	**Diagnosis**	No. of DataLog Records
		No. of EventLog Records
		No. of FaultLog Records
		Day Data Log Rate
		Night Data Log Rate
		1st day hour
		1st night hour
		RTC Mode
		Clear Log

4. Scroll to Diagnosis, and then press the center of the scroll wheel.
5. Scroll to RTC Mode, and then press the center of the scroll wheel.
6. Scroll to Config Mode, and then press the center of the scroll wheel.
7. Press Esc on the keypad to return to the RTC Mode menu, and then press Esc again to return to the Diagnosis menu.
8. Make any changes to Day Data Log Rate, Night Data Log Rate, 1st day hour, or 1st night hour (see *To change settings: on page 43* for instructions on how to change the parameters and for detailed information on the parameters).
9. After the parameters have been changed, press Esc on the keypad to return to the Diagnosis menu.
10. Scroll to RTC Mode, and then press the center of the scroll wheel.
11. Scroll to Log Mode, and then press the center of the scroll wheel.
    The Conext Core XC Series is unable to log information while in Config Mode.
12. Press F4 to return to the home screen.

Clearing the Service State Alert

You can clear the Service state alert, although, if the reason for the alert still exists, the Service state alert will reactivate.

To clear the Service state alert:

1. Power cycle the inverter.
    a. Turn the ENABLE/DISABLE switch to DISABLE.
    b. Turn the ON/OFF switch to OFF
    c. Wait for power production to completely stop.
    d. Turn the ON/OFF switch to ON
2. On the front panel user interface, ensure you are at the home screen.
3. Press the center of the scroll wheel.
4. Scroll to Access Level, and then press the center of the scroll wheel.
5. Scroll to Clear Service Mode, and then press the center of the scroll wheel.
   Enter 1234:
    a. The display defaults to a single digit. Press F2 (<<) to add three more numbers, one number per press. Each number can be incremented independently. The number with the black background is the number that is currently selected.
    b. Starting from the far left number, scroll to select the correct number (from 0 to 9), and then press F3 (>>) to move to the number to the right.
    c. Repeat until all numbers are correct, and then press the center of the scroll wheel to apply the code.
6. Press the center of the scroll wheel again to confirm.
7. Press F4 to return to the home screen.

Access Level	Access Code enter code
	Clear Service Mode enter 1234

Changing Grid, Power Tracking, and Protection Settings

Table 3 through *Table 11* describe all the configurable grid, power tracking, and Conext Core XC Series protection parameters and provides the default values that are shipped from the factory.

Certain settings are password protected and can be changed only by authorized service personnel. For example, a password is required to configure many parameters relating to utility protection.

⚠ WARNING

HAZARD OF ELECTRIC SHOCK AND FIRE

- Password-protected settings must be adjusted only by authorized service personnel (as defined in *Audience*) who are aware of the impact of changing the settings, including the impact on system safety.
- Utility protection parameter settings must be changed only with the agreement of the local authority.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

To change settings:

1. Ensure you are at the home screen.
2. Press the center of the scroll wheel.
3. Scroll to the menu name, and then press the center of the scroll wheel.
4. To modify the value slightly, use the scroll wheel to increase or decrease the value slowly.
5. To modify the value significantly, increment each number independently: The number with the black background is the number that is currently selected. Press F2 (<<) or F3 (>>) to move left and right and use the scroll wheel to increase or decrease the selected number.
6. Press the center of the scroll wheel to apply the value change.

Region-Specific Grid Settings

The tables in this section list the grid settings that you can view using the front panel user interface. The grid thresholds and delays are determined by the standards of the utility region and are defined as follows:

Thresholds

The value that the parameter must be at for the alert to be triggered (*disconnect* threshold) or the value that the parameter must be at for the alert to be cleared (*reconnect* threshold).

Delays

The length of time the parameter must be at the threshold before the alert is triggered (*disconnect* delay) or the length of time the parameter must be at the threshold before the

alert is cleared (*reconnect* delay).

The “very high voltage”, “very high frequency”, “very low voltage”, and “very low frequency” parameters enable you to set a short delay period to quickly disable the Conext Core XC Series when measurement values are out of range.

Utility Regions

Table 3 lists the available utility regions. The Conext Core XC Series is configured with the utility region’s default settings at the factory. Changes must be made by authorized personnel with a password.

Table 3 Utility Regions

Parameter	Description	Units
Utility Region	A set of parameter values that are specific to a region. If you change the Utility Region setting, all Utility Region parameters, including parameters affected by Utility Region settings that were custom configured, revert to the default.	0 = NONE 5 = BDEW-MSRL/FGW TR8[1] 6 = France Arrêté 23 avril 2008[1] 9 = USA MV-DG 10 = IEC61727 (50 Hz)[1] 11 = IEC61727 (60 Hz)[1] 255 = Custom

User Limits and References for Grid Settings

The user limits and references listed in the enable a customer to change the system’s limits and references for grid settings.

Table 4 Default user limits and references

Parameter	Description	Default Value
On the Grid Settings Tab, Under Grid Support Options		
User Reactive Power Reference	Desired reactive power: positive for capacitive reactive power and negative for inductive reactive power. Maximum “User Reactive Power Ref” is limited by the value of “Configured Reactive Power Limit”.	0 kVAr
User Active Power Limit (PV Mode)	User’s desired maximum active power output from the inverter.	540.0 kW 630.0 kW 680.0 kW

[1] For all utility regions, refer to Application Note: Grid Settings by Utility Region for the Conext Core XC Series (document number: AP-XC-014-EN).

Parameter	Description	Default Value
User Apparent Power Limit	User's desired maximum apparent power output from the inverter. Maximum "User Apparent Power Limit" is limited by the value of "Configured Apparent Power Limit".	540.0 kVA 630.0 kVA 680.0 kVA
User Phase Angle Reference	Desired phase angle for reactive power compensation. The inverter responds to this setting only if "User Reactive Power Ref" is set to 0.	0 degrees
User Phase Current Limit	Desired maximum current output (per phase) from the device.	100 %
Max. Daily Online Cycling[2]	Maximum number of Online/Offline cycles.	50

Power Tracking Settings

The tables in this section list the power tracking settings that you can view using the front panel user interface.

PV Gen Qualification

The PV Gen Qualification settings listed in *Table 5* are the parameters for changing the inverter PV status from online to offline and vice versa.

Table 5 Default PV Gen Qualification settings

Parameter	Description	Default Value
PV OC Start Voltage	The PV voltage at which inverter can start to produce power (wake-up voltage).	400 VDC
PV Reconn Delay	Length of time that the inverter must have all PV parameters within normal operating condition before going online.	1200 seconds
PV noP Disconn Threshold	Power threshold at which the inverter goes offline due to inadequate power from the PV array (normally a nighttime event).	1 %
PV noP Disconn Delay	Time delay before inverter goes offline due to inadequate power from the PV array.	3000 seconds
PVnoPDisconnDelay Factor	Multiplier to extend the "PV noP Disconn Delay" when "User PV Voltage Reference" is not zero.	4
Max DC Operating Voltage[3]	Voltage at which, or above which, the inverter can defer reconnection when power ramping is required because of a grid error.	850 VDC
PV OC Recovery Delay	Length of time before the inverter stops power ramping and produces full power. This value must be higher than "Reconnect Power Ramp Time".	15 minutes

[2] Changes must be made by authorized personnel with a password.

[3] Changes must be made by authorized personnel with a password.

Low Power Tracking

The Low Power Tracking settings are the parameters for the low power (LP) threshold and delay, as listed in *Table 6*. All users can change these settings.

Table 6 Default Low Power Tracking settings

Parameter	Description	Default Value
LP PV Voltage Reference	PV voltage reference at low power production.	400 VDC
LP Threshold	Minimum power required before MPPT can be calculated.	5 %
LP Transition Delay	Time delay before inverter moves to low power mode.	300 seconds

MPPT Settings

The MPPT settings listed in *Table 7* are the parameters for tracking maximum power point.

Table 7 Default MPPT settings

Parameter	Description	Default Value
MPPT Type	MPPT method that the inverter will use. Type 0: Standard perturb and observe (P&O) routine. Type 1: P&O routine with prediction of the power change trend.	Type1
Min Tracking Volt	Lower limit of AC voltage at which power point tracking occurs.	400 VDC
Max Tracking Volt	Upper limit of AC voltage at which power point tracking occurs.	800 VDC
Perturb Voltage Step	Size of an MPPT voltage perturbation step (power tracker step).	1 VDC
MPPT Occurrence Factor	Sets the frequency of MPPT voltage perturbation steps (“MPPT Occurrence Factor” X “MPPT Sample Interval”).	5
MPPT Offset Factor	Defines the hysteresis level for determining tracking direction.	2500
MPPT Offset Max.	Defines the maximum MPPT hysteresis, where: MPPT hysteresis = PV power/”MPPT Offset Factor.”	1000 W
MPPT Offset Min.	Defines the minimum MPPT hysteresis, where: MPPT hysteresis = PV power/”MPPT Offset Factor.”	50 W
MPPT Sample Interval	Sampling interval for PV power readback.	500 ms
MPPT Reset Factor	Defines the level used to reset the PV voltage reference during power point shifting, where: Reset increment = “MPPT Reset Factor” x “Perturb Voltage Step.”	0.01

Fast Sweep

The Fast Sweep settings listed in *Table 8* are the parameters for periodic sweeps of the PV array voltage using the Schneider Electric Fast Sweep™ technology.

Table 8 Default Fast Sweep settings

Parameter	Description	Default Value
Sweep Enable	Enables or disables periodic sweeps of the PV voltage to detect if multiple maxima exist.	Disabled
Sweep Occurrence	Time between periodic PV voltage sweeps.	3600 seconds
Sweep Duration	Duration of each PV voltage sweep.	5 seconds
Sweep Start Volt	Voltage at which an MPPT sweep starts.	variable[4]
Sweep Range Volt	Voltage at which an MPPT sweep range starts or stops. If `SweepRangeVoltage=0`, the sweep range is defined by "Sweep Start Volt" and "Sweep Stop Volt." Otherwise, the sweep starts at `presentPVvoltage - Sweep Range Voltage` and the sweep stops at `presentPVvoltage + Sweep Range Voltage`	0 VDC
Sweep Stop Volt	Voltage at which an MPPT sweep stops.	800 VDC

User PV Voltage Reference

The User PV voltage reference setting listed in *Table 9* is the parameter that allows users to set their own PV voltage reference.

Table 9 Default User PV Voltage Reference settings

Parameter	Description	Default Value
User PV Voltage Ref.	Desired PV voltage reference. If you set this reference to zero, or if the PV voltage is zero, the inverter will use the MPPT settings instead.	0 VDC

Ground Fault Protection Settings

The tables in this section list the ground fault detection (GFD) protection settings that you can change using the front panel user interface.

⚠ WARNING

HAZARD OF ELECTRIC SHOCK AND FIRE

Password-protected settings must be adjusted only by authorized service personnel (as defined in *Audience on page 1*) who are aware of the impact of changing the settings, including the impact on system safety.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[4] The default is the low point of the MPP (maximum power point) range for each model, see *Electrical Specifications on page 74*.

Table 10 Default ground fault protection settings

Parameter	Description	Default Value
GFD Reconn Delay (only for PV array grounding type = grounding, with no RISO)	Length of time that the Conext Core XC Series must have all system parameters within normal operating conditions before going online following a ground fault detection.	20 minutes
GFD Max Daily Count (only for PV array grounding type = floating)	Maximum number of ground fault detections (GFDs) in one day before the GFD escalates to a service event.	5

Diagnosis

Refer to *Changing Logging Settings on page 41* as additional steps are required to modify the parameters in the Diagnosis Menu.

⚠ WARNING

HAZARD OF ELECTRIC SHOCK AND FIRE

Password-protected settings must be adjusted only by authorized service personnel (as defined in *Audience on page 1*) who are aware of the impact of changing the settings, including the impact on system safety.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Table 11 Diagnostic parameters

Parameter	Description	Default Value
Day Data Log Rate[5]	Rate at which the data logger stores data during the day (maximum 60 minutes).	5 minutes
1st Day Hour [5]	The hour at which daytime starts (24-hour clock).	6 hours
Night Data Log Rate [5]	Rate at which the data logger stores data at night.	60 minutes
1st Night Hour [5]	The hour at which nighttime starts (24-hour clock).	21 hours
RTC Mode	Sets whether the Conext Core XC Series is logging data (Log Mode) or writing data (Config Mode).	Log Mode
Clear Log	Clears the data log. ■ 1 = 000 Do nothing ■ 2 = 106 Clear Data Log ■ 3 = 206 Clear Event Log ■ 4 = 306 Clear Fault Log	1

[5] Changes must be made by authorized personnel with a password.

4 Troubleshooting

What's in This Chapter?

Offline State and Service State Event Code Descriptions

⚠⚠ DANGER

MULTIPLE SOURCES WITH HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

- All service and maintenance must be performed by authorized service personnel only, as defined in *Audience*, following the lock-out and tag-out procedure in *Conext Core XC Series, 0G-XC-BB, Lock-Out and Tag-Out Procedures and Barrier Removal (document number: SD-XC-081)*.
- Any event resulting in a transition to Service state must be corrected by authorized service personnel. You must call for service.

Failure to follow these instructions will result in death or serious injury.

Table 12 provides a description of all the event conditions that might occur on the Conext Core XC Series. If the Conext Core XC Series is in Service state you must call for service.

For more information about Offline state and Service state events, see *Operating States on page 26*.

Table 12 Event codes

Event Code	Event Condition Name	State	Event Condition Description	Required Action
0000	No Alarm	N/A	N/A	N/A
0006	PV Power Interrupted	Service	The PV disconnect has transitioned from closed to open while the Conext Core XC Series was in Online mode.	Call for service.
0007	AC Power Interrupted	Service	The AC circuit breaker has transitioned from closed to open while the Conext Core XC Series was in Online mode.	Call for service.
0010 see *2010*	AC Switch Response	Service	The number of AC Switch Response events (code 2010) has exceeded the AC Switch Response max Daily Count.	Call for service.
0015 see *2015*	DC Switch Response	Service	The number of DC Switch Response events (code 2015) has exceeded the DC Switch Response max Daily Count.	Call for service.
0020 see *6020*	AC Caps, AC MOV	Service	The AC capacitor fuses have signaled a trip.	Call for service.
0026 see *2026*	ASIC Reset	Service	The number of ASIC Reset events (code 2026) has exceeded the ASIC Max Daily Count.	Call for service.
0027	MTHA (time counter)	Service	The MTHA time counter has signaled an error.	Call for service.
0031	Current Sensor	Service	The AC current sensor has signaled a failure.	Call for service.
0032 see *2032*	Thermal Sensor S/C	Service	The number of short-circuits detected by the thermal sensor (code 2032) has exceeded the maximum daily limit.	Call for service.
0033 see *2033*	Thermal Sensor O/C	Service	The number of open-circuits detected by the thermal sensor (code 2033) has exceeded the maximum daily limit.	Call for service.
0040 see *2040*	PV Voltage Sensor	Service	The number of PV Voltage Sensor events (code 2040) has exceeded the PV V Sns. max Daily Count.	Call for service.
0041 see *2041*	PV Current Sensor	Service	The number of PV Current Sensor events (code 2041) has exceeded the PV I Sns. max Daily Count.	Call for service.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
0050 see *2050*	Phase Imbalance	Service	The number of Single Phase Transient events (code 2050) has exceeded the Single Phase Transient max Daily count. There has been a loss in at least one phase. The sensor might be signalling a fault.	Call for service.
0070	LC EEPROM	Service	The LC EEPROM is corrupted.	Call for service.
0071	Calibration EEPROM Zone	Service	The calibration EEPROM is corrupted.	Call for service.
0072	APP Flash	Service	The APP Flash is corrupted.	Call for service.
0073	APP EEPROM	Service	The APP EEPROM is corrupted.	Call for service.
0076	Power Supply fault	Service	Fault signal received from the power supply.	Call for service.
0078	24 V Aux Power	Service	Fault signal received from the 24 V auxiliary power supply.	Call for service.
0079	CPU	Service	Fault signal received from the processor; this could be related to RAM, Flash, Task, or Stack.	Call for service.
0088	Daily CB cycling service	Service	The Conext Core XC Series has exceeded the value for Max. Daily Online Cycling.	Call for service.
0201	Internal SW	Service	Unexpected logic path detected in the software.	Call for service.
0202	Incompatible Configuration	Service	An incompatible card has been installed.	Call for service.
0203	Invalid FGA Number	Service	Configured FGA number in EEPROM is not recognized by system: XCxxx (f/w version 3.03 and later)	Call for service.
0260	Unidentified LC	Service	Unidentified LC detected.	Call for service.
0261	Incompatible Option Card	Service	An incompatible option card has been installed.	Call for service.
0262	Incompatible Power Rating	Service	The power configuration is mismatched to the hardware.	Call for service.
0263	Incompatible LC	Service	The line control card firmware is mismatched.	Call for service.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
0611 see *2611*	Precharging Timeout	Service	The number of precharging system events (code 2611) has exceeded the Charging Max Daily Count or Voltage Ramp Timeout. Charging Max Daily Count resets automatically at midnight or with a manual Conext Core XC Series reset. Voltage Ramp Timeout resets when the Charging Ramp Disconnection Delay time is within range.	Call for service.
0616 see *2616* see *6616*	Ground Fault or PV MOV	Service	■ Ground fault: The isolation monitor (floating arrays) or the ground fault detector interrupter (grounded arrays) has detected a ground fault condition that did not return to within the thresholds, or the number of ground fault detections has exceed the GFD Max Daily Count setting. ■ MOV: The PV surge arrestor has signalled an end of life condition and is no longer functional.	Call for service.
0620 see *2620*	AC Over Current	Service	The number of overcurrent events (code 2620) and switching frequency events (code 2621) has exceeded the OCP Max Daily Count.	Call for service.
0630 see *2630*	IGBT Response	Service	The number of IGBT Transient events (code 2630) has exceeded the IGBT Max Daily Count. IGBT Max Daily Count resets automatically at midnight or with a manual Conext Core XC Series reset.	Call for service.
0804	Door Interlock	Service	A cabinet door interlock is compromised.	Call for service.
0820 see *2820* see *4820*	RCD Over Current	Service	The number of RCD Over Current events (code 2820) has exceeded the RCD max Daily Count.	Call for service.
0821	GFD Contact Response	Service	Only grounded with RISO on: The GFDI Contactor remains closed during IM400 test or remains open after IM400 test.	Call for service.
0822	Ground Path is Open	Service	The GFDI Contactor is open but the IM400 test is not in progress.	Call for service.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
2010 see *0010*	AC Switch Response	Offline	The AC circuit breaker is in the wrong position or is signalling an error. Once the AC circuit breaker is in the correct position or no longer signalling an error the Conext Core XC Series waits for the Int Error Recon Delay period to pass and then automatically clears this event and resumes normal operation after the Internal Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation or escalate to code 0010.
2015 see *0015*	DC Switch Response	Offline	The PV disconnect is in the wrong position or is signalling an error. Once the PV disconnect is in the correct position or no longer signalling an error the Conext Core XC Series waits for the Int Error Recon Delay period to pass and then automatically clears this event and resumes normal operation after the Internal Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation or escalate to code 0015.
2026 see *0026*	ASIC Reset	Offline	The ASIC is invalid or is signalling an error. Once the ASIC is validated or no longer signalling an error the Conext Core XC Series waits for the Int Error Recon Delay period to pass and then automatically clears this event and resumes normal operation after the Internal Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation or escalate to code 0026.
2032 see *0032*	Thermal Sensor S/C	Offline	The thermal sensor is signalling a short-circuit. Once the thermal sensor is no longer signalling a short-circuit the Conext Core XC Series waits for the Int Error Recon Delay period to pass and then automatically clears this event and resumes normal operation after the Internal Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation or escalate to code 0032.
2033 see *0033*	Thermal Sensor O/C	Offline	The thermal sensor is signalling an open-circuit. Once the thermal sensor is no longer signalling an open-circuit the Conext Core XC Series waits for the Int Error Recon Delay period to pass and then automatically clears this event and resumes normal operation after the Internal Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation or escalate to code 0033.
2035	Reverse PV Voltage	Offline	PV voltage connection is reversed when Vpv < -20V.	Fix PV connection.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
2038	Anlg. P Lim. Out of Range	Offline	The active power reference input is below the AI2 Low Disconnect Threshold or above the AI2 High Disconnect Threshold for longer than the Analog Input Disconnect Delay. Once the analog power reference input rises above the AI2 Low Reconnect Threshold or falls below the AI2 High Reconnect Threshold for longer than the Analog Input Reconnect Delay, the Conext Core XC Seriesqualifies the grid, automatically clears this event, and resumes normal operation after the Internal Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2039	Anlg. Q Ref. Out of Range	Offline	The reactive power reference input is below the AI4 Low Disconnect Threshold or above the AI4 High Disconnect Threshold for longer than the Analog Input Disconnect Delay. Once the reactive power reference input rises above the AI4 Low Reconnect Threshold or falls below the AI4 High Reconnect Threshold for longer than the Analog Input Reconnect Delay, the Conext Core XC Seriesqualifies the grid, automatically clears this event, and resumes normal operation after the Internal Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2040 see *0040*	PV Voltage Sensor Transient	Offline	The difference in measured values between the PV and DC voltage sensors is above the PV V Sns. Disconnect Threshold. Once the difference in measured values between the PV and DC voltage sensors falls below the PV V Sns. Reconnect Threshold, the Conext Core XC Seriesqualifies the grid, automatically clears this event, and resumes normal operation after the Internal Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation or escalate to code 0040.
2041 see *0041*	PV Current Sensor Transient	Offline	The difference in measured values from the PV current sensors is above the PV I Sns. Disconnect Threshold. Once the difference in measured values from the PV current sensors falls below the PV I Sns. Reconnect Threshold, the Conext Core XC Seriesqualifies the grid, automatically clears this event, and resumes normal operation after the Internal Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation or escalate to code 0041.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
2050 see *0050*	Single Phase Transient	Offline	■ The difference between the phase currents is above the Current Imbalance Threshold for longer than the Current Imbalance Delay period. Once the difference between the phase currents falls below the Current Imbalance Threshold for longer than the Current Imbalance Delay period, the Conext Core XC Series waits for the Int Error Recon Delay period to pass and then automatically clears this event and resumes normal operation after the Internal Reconnection Delay period. ■ There has been a loss in at least one phase. ■ The sensor might be signalling a fault.	No action needed. Conext Core XC Series will automatically resume operation or escalate to code 0050.
2077	PVO Aux Power	Offline	One of the PVO internal DC auxiliary power supplies is outside of its normal output voltage range for longer than the threshold delay. Once all of the PVO auxiliary power supplies are inside of the threshold for longer than the threshold delay, the Conext Core XC Series waits for the Int Error Recon Delay period to pass, and then automatically clears this event and resumes normal operation after the Internal Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2080 see *6080*	Thermal Condition (HS)	Offline	The IGBT heatsink temperature is above the heatsink hardware-set over-temperature threshold. Once the IGBT heatsink temperature has recovered to within the acceptable operating range, the Conext Core XC Series resets the hardware latch, waits for the Int Error Recon Delay period to pass, and then automatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	Visually inspect the intake air ducts, exhaust locations,and the external cooling fans for accumulation of dirt and debris. If there is any dirt or debris blocking the air intake or exhaust, clear the debris using a vacuum cleaner or similar tool. Conext Core XC Series will automatically resume operation.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
2081 see *6081*	Thermal Condition (IGBT)	Offline	The IGBT junction temperature is above the IGBT hardware-set over-temperature threshold. Once the IGBT junction temperature has recovered to within the acceptable operating range, the Conext Core XC Series resets the hardware latch, waits for the Int Error Recon Delay period to pass, and then automatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	Visually inspect the intake air ducts, exhaust locations,and the external cooling fans for accumulation of dirt and debris. If there is any dirt or debris blocking the air intake or exhaust, clear the debris using a vacuum cleaner or similar tool. Conext Core XC Series will automatically resume operation.
2082 see *6082*	Thermal Condition (2)	Offline	The APP control card temperature is above the hardware-set over-temperature threshold for longer than the Unit OTP Disconnect Delay period. Once the APP control card temperature recovered to within the acceptable operating range, the Conext Core XC Series resets the hardware latch, waits for the Int Error Recon Delay period to pass, and then automatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	Visually inspect the intake air ducts, exhaust locations,and the external cooling fans for accumulation of dirt and debris. If there is any dirt or debris blocking the air intake or exhaust, clear the debris using a vacuum cleaner or similar tool. Conext Core XC Series will automatically resume operation.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
2090 see *6090*	IGBT Over Temp. Protection	Offline	The temperature of the IGBT heatsink is above the APP hardware-set over-temperature threshold for longer than the IGBT Heatsink Temperature Disconnect Threshold Delay period. Once the temperature of the IGBT heatsink has recovered to within the acceptable operating range, the Conext Core XC Series resets the hardware latch, waits for the Int Error Recon Delay period to pass, and then automatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	Visually inspect the intake air ducts, exhaust locations,and the external cooling fans for accumulation of dirt and debris. If there is any dirt or debris blocking the air intake or exhaust, clear the debris using a vacuum cleaner or similar tool. Conext Core XC Series will automatically resume operation.
2091	Ventilation Sys. Protection	Offline	The temperature of the power board is above the Power Board Temperature Disconnect Threshold for longer than the Power Board Temperature Disconnect Threshold Delay period. Once the temperature of the power board falls below the Power Board Temperature Reconnect Threshold for longer than the Power Board Temperature Reconnect Threshold Delay period, the Conext Core XC Seriesautomatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	Visually inspect the intake air ducts, exhaust locations,and the external cooling fans for accumulation of dirt and debris. If there is any dirt or debris blocking the air intake or exhaust, clear the debris using a vacuum cleaner or similar tool. Conext Core XC Series will automatically resume operation.
2095	ISL Comm.	Offline	An error was detected with the ISL communication. Once the ISL communication is verified, the Conext Core XC Seriesautomatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2096	IO12 Comm.	Offline	An error was detected with the IO communication. Once the IO communication is verified, the Conext Core XC Seriesautomatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
2097	Option Card Comm.	Offline	An error was detected with the option card communication. Once the option card communication is verified, the Conext Core XC Seriesautomatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2098	PVO-APP Comm.	Offline	An error was detected with the PVO to APP communication. Once the PVO to APP communication is verified, the Conext Core XC Seriesautomatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2099	PVO-LC Comm.	Offline	An error was detected with the PVO to LC communication. Once the PVO to LC communication is verified, the Conext Core XC Seriesautomatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2100	Line Control is not Ready	Offline	The Conext Core XC Series detects that the line control is not running or not ready for pre-charging. Once the line control sends an active signal, the Conext Core XC Seriesautomatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2401	AC Freq Low	Offline	The utility grid frequency is below the Disconnect Low or Very Low Frequency Threshold for longer than the Disconnect Low or Very Low Frequency Delay period. For the Conext Core XC Series to clear this event, utility grid voltage and frequency must both be within range for longer than the respective delay periods. The Conext Core XC Series qualifies the grid, automatically clears this event, and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
2402	AC Freq High	Offline	The utility grid frequency is above the Disconnect High Frequency Threshold or the Disconnect Very High Frequency Threshold for longer than the Disconnect High Frequency Delay or Disconnect Very High Frequency Delay period. For the Conext Core XC Series to clear this event, utility grid voltage and frequency must both be within range for longer than the respective delay periods. The Conext Core XC Series qualifies the grid, automatically clears this event, and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2406	AC Voltage Low	Offline	The utility grid voltage is below the Disconnect Low Voltage Threshold or Disconnect Very Low Voltage Threshold for longer than the Disconnect Very Low Voltage Delay or Disconnect Low Voltage Delay period. For the Conext Core XC Series to clear this event, utility grid voltage and frequency must both be within range for longer than the respective delay periods. The Conext Core XC Series qualifies the grid, automatically clears this event, and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2407	AC Voltage High	Offline	The utility grid voltage is above the Disconnect High Voltage Threshold or Disconnect Very High Voltage Threshold for longer than the Disconnect High Voltage Delay or Disconnect Very High Voltage Delay period. For the Conext Core XC Series to clear this event, utility grid voltage and frequency must both be within range for longer than the respective delay periods. The Conext Core XC Series qualifies the grid, automatically clears this event, and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2410	Voltage Envelope High	Offline	The instantaneous amplitude of any phase of the grid is above the Voltage Envelope Threshold for longer than the Voltage Envelope Delay. Once the utility grid voltage has recovered to within the acceptable operating range, the Conext Core XC Series qualifies the grid, automatically clears this event, and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
2601	Hardware DC Over Voltage	Offline	The DC voltage is above the IGBT hardware-set over-voltage threshold. Once the DC voltage has recovered within the acceptable operating range, the Conext Core XC Series resets the hardware latch, waits for the Int Error Recon Delay period to pass, and then automatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2602	Undervoltage DC	Offline	The DC voltage is below the IGBT hardware-set under-voltage threshold. Once the DC voltage has recovered within the acceptable operating range, the Conext Core XC Series resets the hardware latch, waits for the Int Error Recon Delay period to pass, and then automatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2606	PV Voltage High	Offline	■ The Conext Core XC Series is in PV mode and has detected a DC input voltage above the PV High Voltage Disconnect Threshold for greater than the PV High Voltage Disconnect Delay period. Once the DC voltage has recovered to within the acceptable operating range, the Conext Core XC Series qualifies the input, automatically clears this event after the PV High Voltage Reconnect Delay, and resumes normal operation after the Grid Reconnection Delay period. ■ The PV system could be mis-wired or there might have been a lightning strike on or near the PV system wiring.	No action needed. Conext Core XC Series will automatically resume operation.
2607	CP Input Voltage High	Offline	The Conext Core XC Series is in CP mode and has detected a DC input voltage above the CP High Voltage Disconnect Threshold for greater than the CP High Voltage Disconnect Delay period. Once the DC voltage has recovered to within the acceptable operating range, the Conext Core XC Series qualifies the input, automatically clears this event after the CP High Voltage Reconnect Delay, and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
2608	CP Input Voltage Low	Offline	The Conext Core XC Series is in CP mode and has detected a DC input voltage below the CP Low Voltage Disconnect Threshold for greater than the CP Low Voltage Disconnect Delay period. Once the DC voltage has recovered to within the acceptable operating range, the Conext Core XC Series qualifies the input, automatically clears this event after the CP Low Voltage Reconnect Delay, and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2609	DC Over Voltage	Offline	The DC voltage is above the hardware-set Max DC Voltage threshold. Once the DC voltage has recovered within the acceptable operating range, the Conext Core XC Series resets the hardware latch, waits for the Int Error Recon Delay period to pass, and then automatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2611 see *0263*	Precharging Timeout	Offline	The precharging sequence during the Disable to Enable transition takes longer than expected (the DC voltage remains below the DC Under Voltage Threshold during charging). Once the Disable to Enable transition time has recovered to within the acceptable operating range, the Conext Core XC Series waits for the Int Error Recon Delay period to pass, and then automatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation or escalate to code 0263.
2612	Voltage Ramp Timeout	Offline	The charging ramp time is above the Charging Ramp Disconnection Delay. The Conext Core XC Series transitions to Offline and shows Int Error Recon Delay on the front panel user interface. The Conext Core XC Seriesautomatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2616 see *0616* see *6616*	Ground Fault or PV MOV	Offline	Ground fault: The array isolation monitor (floating arrays) has detected a ground fault. If conditions return to within the thresholds, the Conext Core XC Series automatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Inverter will automatically resume operation or escalate to code 0616.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
2620 see *0620*	Overcurrent	Offline	The short circuit current is above the IGBT hardware-set overcurrent threshold. Once the short circuit current has recovered to within the acceptable operating range, the Conext Core XC Series resets the hardware latch, waits for the Int Error Recon Delay period to pass, and then automatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation or escalate to code 0620.
2621	Switching Freq.	Offline	The control frequency is above the hardware-set control frequency threshold. Once the control frequency has recovered to within the acceptable operating range, the Conext Core XC Series resets the hardware latch, waits for the Int Error Recon Delay period to pass, and then automatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2622	PV Neg Current	Offline	The PV current is below the PV current trigger threshold. Once the PV current has recovered to within the acceptable operating range, the Conext Core XC Series waits for the Int Error Recon Delay period to pass, and then automatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation.
2630 see *0630*	IGBT Transient	Offline	The de-sat (desaturation) condition is above the IGBT hardware-set de-sat condition threshold. Once the de-sat condition has recovered to within the acceptable operating range, the Conext Core XC Series resets the hardware latch, waits for the Int Error Recon Delay period to pass, and then automatically clears this event and resumes normal operation after the Grid Reconnection Delay period.	No action needed. Conext Core XC Series will automatically resume operation or escalate to code 0630.
2803	Utility Region is “NONE”	Offline	The utility region is set to None. This is the factory default; utility region must be set during commissioning. Once the utility region is set to a valid region, the Conext Core XC Series qualifies the grid, automatically clears this event, and resumes normal operation after the Grid Reconnection Delay period.	Call for service.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
2804	System is locked	Offline	The Conext Core XC Series is locked. This is the factory default; Conext Core XC Series must be unlocked with a password during commissioning. Once the password is entered to unlock the Conext Core XC Series, the Conext Core XC Series automatically clears this event, qualifies the grid, and resumes normal operation.	An authorized service person must enter the password to unlock the Conext Core XC Series. Once unlocked, the Conext Core XC Series will automatically resume operation.
2807	QS11 Service Switch	Offline	The QS11 PV ground fault fuse service switch has been opened for servicing.	No action needed. Inverter will automatically resume operation once QS11 is closed.
2820 see *0820* see *4820*	RCD Over Current	Offline	The RCD has detected a continuous residual current exceeding the hardware-set overcurrent threshold for longer than the RCD Over Current Disconn Delay.	No action needed. Inverter will automatically resume operation or escalate to code 0820.
4005	Fan Rotation	Online	One of the fans has reported a fan block signal for longer than the Fan Block Delay period. Fan blocked by debris, or fan failure detected. The Conext Core XC Series begins power limiting at 10% of nominal active power.	Call for service.
4036	RTC Service Mode	Online	The RTC has signalled a fault.	Call for service.
4037	RTC Battery Low	Online	The RTC battery is low.	Call for service.
4042	DC Switch Alert	Online	The DC switch is approaching its lifetime number of switching cycles.	Call for service.
4043	AC Switch Alert	Online	The AC switch is approaching its lifetime number of switching cycles.	Call for service.
4044	Operational Info. Eeprom	Online	The operational EEPROM zone has lost data.	Call for service.
4610	DC Capacitor Alert	Online	The DC capacitors might be approaching their published lifetime (accumulative surge timer threshold reached).	Call for service.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
4820 see *0820* see *2820*	RCD Over Current		Only grounded with RISO on and RCD Response set to Do not Disconnect: The RCD has detected a continuous residual current exceeding the hardware-set overcurrent threshold for longer than the RCD Over Current Disconn Delay.	No action needed.
6000	Initialization, please wait	Initializing	Logged event only.	No action needed.
6001	IM400-Wait/Grid-Reconn. Delay	Offline	Logged event only.	No action needed.
6020 see *0020*	AC Caps, AC MOV	Online	The AC capacitor fuses have signaled a trip.	No action needed.
6038	Anlg P Lim. Out of Range	Online	Logged event only.	No action needed.
6039	Anlg Q Lim. Out of Range	Online	Logged event only.	No action needed.
6074	Config 0	Online	The default configuration table 0 is inconsistent.	No action needed.
6075	Config 1	Online	The default configuration table 1 is inconsistent.	No action needed.
6080 see *2080*	Thermal Power Shifting (HS)	Online	The IGBT temperature is above the IGBT hardware-set over-temperature threshold and the Conext Core XC Series is now derating.	Visually inspect the intake air ducts, exhaust locations,and the external cooling fans for accumulation of dirt and debris. If there is any dirt or debris blocking the air intake or exhaust, clear the debris using a vacuum cleaner or similar tool.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
6081 see *2081*	Thermal Power Shifting (IGBT)	Online	The IGBT temperature is above the IGBT hardware-set over-temperature threshold and the Conext Core XC Series is now derating.	Visually inspect the intake air ducts, exhaust locations,and the external cooling fans for accumulation of dirt and debris. If there is any dirt or debris blocking the air intake or exhaust, clear the debris using a vacuum cleaner or similar tool.
6082 see *2082*	Thermal Condition (2)	Online	The APP control card temperature is above the hardware-set over-temperature threshold and the Conext Core XC Series is now derating.	Visually inspect the intake air ducts, exhaust locations,and the external cooling fans for accumulation of dirt and debris. If there is any dirt or debris blocking the air intake or exhaust, clear the debris using a vacuum cleaner or similar tool.
6090 see *2090*	IGBT Over Temp.	Online	The IGBT temperature is above the IGBT hardware-set over-temperature shift threshold and is now derating.	Visually inspect the intake air ducts, exhaust locations,and the external cooling fans for accumulation of dirt and debris. If there is any dirt or debris blocking the air intake or exhaust, clear the debris using a vacuum cleaner or similar tool.
6092	Switch SW2	Online	The remote hardware enable signal is active.	No action needed.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
6094	Cold Start	Offline	The temperature of power board and average of heat sinks is higher than the Cold Offline Threshold (when the Conext Core XC Series is offline) and lower than the Cold Start Reset Threshold. The Conext Core XC Series will begin Cold Start procedure by transitioning the Conext Core XC Series to online state. Once the temperature is higher than the Cold Start Reset Threshold or the Cold Start lasts for the period of the Cold Start Time, the Conext Core XC Series will automatically stop Cold Start procedure and resume the normal online operation.	No action needed.
6421	Line Freq Based Power Control	Online	Logged event only.	No action needed.
6430	Reconnecting	Online	Logged event only.	No action needed.
6616 see *0616* see *2616*	Ground Fault or PV MOV	Online	Logged event only.	No action needed.
6626	no PV Power	Online	Logged event only.	No action needed.
6627	PV OC Voltage Low	Online	Logged event only.	No action needed.
6640	Active Power Point Tracking	Online	Logged event only.	No action needed.
6641	Low Power Tracking Mode	Online	Logged event only.	No action needed.
6642	Power Point Shifting	Online	Logged event only.	No action needed.
6643	User PV Voltage Control	Online	Logged event only.	No action needed.
6644	Current Limit Active	Online	Logged event only.	No action needed.
6645	Power Limit Active	Online	Logged event only.	No action needed.

Event Code	Event Condition Name	State	Event Condition Description	Required Action
6801	Disable via Software Command	Disable	The system was commanded via the front panel user interface or via an optional remote monitoring interface to transition to the Disable state. This event is not indicative of a failure or malfunction, but primarily indicates that the Conext Core XC Series was shut down.	No action needed.
6802	Disable via Local Switch	Disable	The local ENABLE STATE/DISABLE STATE switch is open.	No action needed.
6803	Disable via External Switch	Disable	The remote ENABLE STATE/DISABLE STATE switch is open.	No action needed.
6804	Performing RISO measurement	Offline	Logged event only.	No action needed.
6814	System is Shutting Down…	Online	This is a temporary Event ID that signals the Conext Core XC Series is in a controlled shutdown.	No action needed.

5 Preventive Maintenance

What's in This Chapter?

Maintenance Requirements

Preventive maintenance is required to help provide safe operation and good performance.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE

All service and non-external preventive maintenance not described in this chapter must be performed by authorized service personnel only, as defined in the *Audience on page 1*, following the lock-out and tag-out procedure in *Conext Core XC Series, 0G-XC-BB, Lock-Out and Tag-Out Procedures and Barrier Removal (document number: SD-XC-081)*.

Failure to follow these instructions will result in death or serious injury.

Maintenance in Response to Periodic Servicing Reminder Events

If at any time the periodic servicing reminder activates (a "!" in the top, left corner of the front panel user interface and a corresponding event code sent by the monitoring system), then the specific maintenance that the reminder relates to must be performed promptly.

Longer Maintenance Intervals

Preventive maintenance over time intervals longer than a month is required. This maintenance must always be performed by authorized service personnel. Preventive Maintenance contracts can be arranged with the manufacturer. Contact your local Schneider Electric Front Office to book an appointment with authorized service personnel to perform preventive maintenance tasks on a contract basis or to perform maintenance upon request. For major maintenance events dealing with heavy equipment, it is the customer's responsibility to have a forklift and licensed forklift operator available on site.

Maintenance on a Monthly Interval (or more often if required)

The only maintenance that can be performed by a customer is the *External Cleaning Procedure*. All other maintenance must be performed by authorized service personnel, as defined in the *Audience on page 1*. Customers should follow the monthly interval at a minimum; however, the environmental degree of pollution at the installation could mean that cleaning of dirt and debris needs to be performed more frequently.

External Cleaning Procedure

Accumulation of dirt and debris around and in intake air ducts, exhaust locations, and within the cooling fans will decrease the ability of the Conext Core XC Series to move air which could cause the Conext Core XC Series to enter Service state based upon an over-temperature event. Less cooling will lead to decreased Conext Core XC Series lifetime. Vacuuming of dirt or debris from the outside of the inverter can be done by operators; it does not require authorized service personnel.

⚠ WARNING

HAZARD OF AMPUTATION

- Shut down the inverter before attempting to inspect or clean the external cooling fans.
- Inverter cabinet doors must remain closed at all times, even during debris-clearing.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

To clean the exterior of the Conext Core XC Series:

1. Visually inspect the intake air ducts, exhaust locations, and the external cooling fans for accumulation of dirt and debris.
2. If there is any dirt or debris blocking the air intake or exhaust, clear the debris using a vacuum cleaner or similar tool.

6 Specifications

What's in This Chapter?

System Specifications

⚠ WARNING

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH, AND FIRE
HAZARD OF EQUIPMENT DAMAGE

Unsafe conditions and damage to the Conext Core XC Series can result if the instructions and electrical, physical, and environmental installation specifications in this manual are not obeyed.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The Conext Core XC Series has only been designed for use with photovoltaic power systems that operate within the following specifications.

Electrical Specifications

Table 13 Electrical specifications

Specification	XC540	XC630	XC680
Number of output phases	3	3	3
Nominal phase-to-phase AC voltage (VAC)	300 Vrms	350 Vrms	380 Vrms
Max inverter backfeed current to the array	1370 ADC	1370 ADC	1370 ADC
Overvoltage category (AC mains)	III	III	III
Maximum AC output current	1040 Arms	1040 Arms	1040 Arms
AC inrush current (AC mains)	199 Apk 7 ms	199 Apk 7 ms	199 Apk 7 ms
Max AC output fault current	3800 Apk 157 ms 1125 Arms	3800 Apk 157 ms 1125 Arms	3800 Apk 157 ms 1125 Arms
Max output overcurrent protection	1600 AAC	1600 AAC	1600 AAC
Nominal AC frequency (f)	50 Hz/60 Hz (configurable)		
Power factor settable range (Ppf dispatch)	0.7 to 1.0 (leading and lagging)		
Power factor range (PQ dispatch)	0 to 1 (leading and lagging)		
AC output current distortion	< 3% THD (total harmonic distortion) at rated power		
Output power (S)	± 540 kVA	± 630 kVA	± 680 kVA
Real power (at PF = 1)	540 kW	630 kW	680 kW
Reactive power range (Q)	± 540 kVAr	± 630 kVAr	± 680 kVAr

Specification	XC540	XC630	XC680
Suggested PV array peak power[1]	621 kW	725 kW	782 kW
Maximum open circuit PV voltage	1000 VDC	1000 VDC	1000 VDC
Maximum PV operating current	1280 A	1280 A	1280 A
Maximum array short circuit current at STC (standard test conditions)	1600 A	1600 A	1600 A
Maximum array short circuit current under any condition	2000 A	2000 A	2000 A
MPP (maximum power point) range	440[2] to 800 V	510[2] to 800 V	550[2] to 800 V
PV operating voltage range	440[2] to 885 V	510[2] to 885 V	550[2] to 885 V
External auxiliary AC source voltage	208/230 V_{rms}		
External auxiliary AC source peak inrush current and duration	208 VAC, 50 Hz: 21.44 A_{pk}, 180.13 ms 208 VAC, 60 Hz: 21.68 A_{pk}, 234.41 ms 230 VAC, 50 Hz: 17.09 A_{pk}, 140.35 ms 230 VAC, 60 Hz: 17.79 A_{pk}, 218.86 ms		
External auxiliary AC source maximum steady state current	208 VAC: 10 A 230 VAC: 9 A		
External auxiliary supply power required	2000 VA	2000 VA	2000 VA

Physical and Environmental Specifications

Table 14 shows the physical and environmental specifications for the Conext Core XC Series.

Table 14 Physical and environmental specifications

Specification	Conext Core XC Series
Dimensions	See *Figure 8 on page 80*
Net weight	1495 kg (3296 lbs)
Gross shipping weight (approximate)	1906 kg (4202 lbs)

[1] Higher PV array peak power may be possible, refer to the Conext Core XC and XC-NA Series: DC to AC Over-paneling Application Note (part number: AP-XC-056)

[2] Valid for power factor = 1 (Q = 0). For more information, see Application Note on Power Point Tracking for Conext Core XC and XC-NA Series Inverters (document number: AP-XC-007-EN).

Specification	Conext Core XC Series
Allowable ambient temperature and humidity ranges[3]	Operating: Class 3K3: -10 °C to 55 °C maximum (14 °F to 131 °F)[4] Maximum 95% relative humidity, non-condensing
	Transport: Class 2K2: -25 °C to 55 °C maximum (-13 °F to 131 °F) Maximum 95% relative humidity, non-condensing
	Storage: Class 1K2: -25 °C to 55 °C maximum (-13 °F to 131 °F) Maximum 95% relative humidity, non-condensing
Special climatic conditions[4]	Operating: Class 3Z1 Transport: Class 2Z1 Storage: Class 1Z1
Biological conditions[4]	Operating: Class 3B1 Transport: Class 2B1 Storage: Class 1B1
Chemically active substances[4]	Operating: Class 3C1 Transport: Class 2C1 Storage: Class 1C1
Mechanically active substances[4]	Operating: Class 3S1 Transport: Class 2S1 Storage: Class 1S1
Mechanical conditions[4]	Operating: Class 3M1 Transport: Class 2M1 Storage: Class 1M1
Altitude	1000 m with no deratings[5]
Maximum altitude	2400 m with possible derating
Storage air pressure	700 to 1060 mbar

[3] Environmental range ratings correlate approximately to Classes shown, as defined by EN60721 standard series.

[4] See *Heat Load and Derating on page 1* for more information.

[5] Depending on ambient temperature at altitude, the output power must be derated above 1000 m. See Conext Core XC Series Inverter, 0G-XC-BB: Altitude Derating Application Note (document number: AP-XC-090).

Specification	Conext Core XC Series
Maximum storage time[6]	■ The inverter must be commissioned within 24 months from the date of the Schneider Electric commercial invoice. ■ After commissioning, the inverter may not be shut down or de-energized for a period longer than 24 months.
Protective (safety) class	1
Enclosure ingress protection class	IP20
Environmental category	Indoor, conditioned, as defined in EN/IEC62109-1
Pollution degree	III[7]
AC overvoltage category	III
PV overvoltage category	II
DC overvoltage protection	Type II surge arrestor
Cooling air flow power stage cabinet	3000 m³/h
Cooling air flow AC/DC cabinet	500 m³/h each cabinet
Total cooling air flow	4000 m³/h
Clearance (ventilation and serviceability)	Top: 300 mm (11¾ in.) Front: 1 m (39½ in.) plus local safety standards for door clearance

[6] When de-energized and stored for more than 24 months, the performance of electrolytic capacitors used in the inverter degrades. Restoration of the capacitors by a method known as Reforming is then required prior to use. Failure to do so may res ult in damage to the capacitors and void your warranty. For more information on Reforming, see Capacitor Leakage Test for Conext Core XC Series Grid Tie Photovoltaic Inverters (document number: SD-XC-032).

[7] Minimum Pollution Degree II (when configured with EN/IEC62109-compliant grounding options see *Grounding Options* in the *Conext Core XC Series Grid Tie Photovoltaic Inverter, 0G-XC-BB Operation Manual*).

Regulatory Specifications

Regulatory specifications for the Conext Core XC Series are:

- CE marked for the Low Voltage Directive per:
  - EN50178/IEC62103; and
  - EN/IEC62109-1 and EN/IEC62109-2, when installed in a Pollution Degree II location and when equipped with one of the following configuration options:
    - Floating Array EN/IEC62109
    - Positive Ground EN/IEC62109
    - Negative Ground EN/IEC62109
- CE marked for the EMC Directive per EN/IEC61000-6-4 (emissions) and EN/IEC61000-6-2 (immunity).
- For interconnect and country-specific regulatory compliance information, go to www.schneider-electric.com or speak with your country sales representative.

Bolt Sizes and Torque Requirements

One year after commissioning, the torque on AC and DC terminal connections should be checked using a thermal camera by authorized service personnel, as defined in the *Audience on page 1*.

Table 15 provides acceptable bolt sizes and torque values for AC terminal connections.

Table 15 AC terminal bolt size and torque values

AC Terminal Connections	Number of Terminals	Max # Conductors per Terminal	Bolt (Hardware) Size	Torque Requirements[8]
Grounding (PE)	15	2	M12	61 Nm (45 lb-ft)
AC output/grid (XT1)	3 (AC L1, AC L2, ACL3)	14	M12	61 Nm (45 lb-ft))
External auxiliary AC source (XT4)	3 (AC L1, AC L2 ACL3)	1	Cable cross section 2.5 - 10 mm² (approximately 14-8 AWG) use appropriate ferrules	0.6 – 0.8 Nm (5.3 – 7.1 lb-in)

[8] Draw a single permanent line across the fastener and the mounting surface immediately after the connector is torqued to the correct value.

Table 16 provides acceptable bolt sizes and torque values for PV terminal connections.

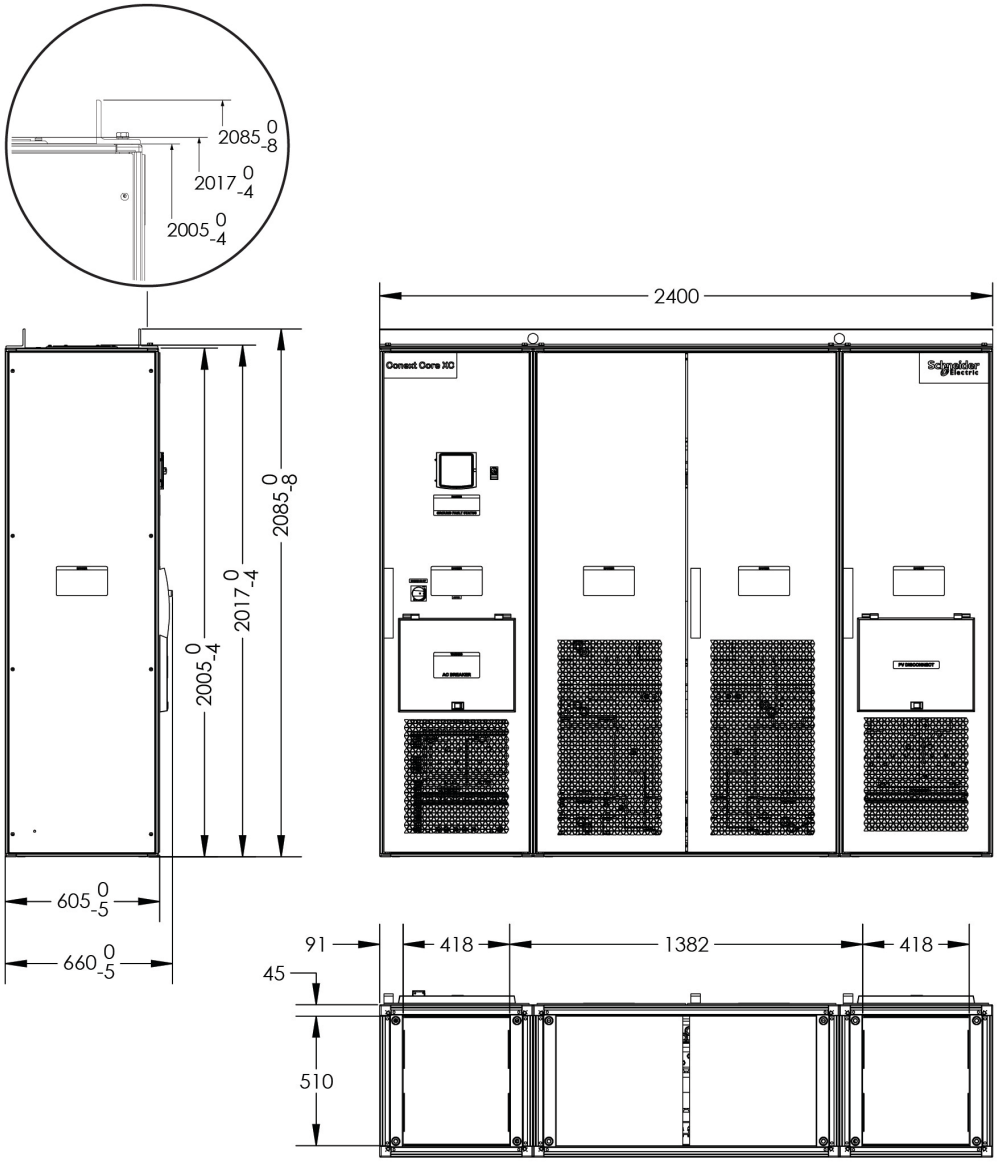
Table 16 PV terminal bolt sizes and torque values

DC Terminal Connections	Number of Terminals	Max # Conductors per Terminal	Bolt (Hardware) Size	Torque Requirements[1]
PV Terminals (XT11)	2 (PV+, PV-)	7	M12	61 Nm (45 lb-ft)

Dimensions

The height of the Conext Core XC Series inverter is 2017 mm (79.41 in.) ± 4 mm (0.2 in.) for fan clearance, without the lifting bars. If the lifting bars are left installed, the height is 2085 mm (82.09 in.).

Figure 8 Conext Core XC Series dimensions



Dimensions in mm (in.)

Schneider Electric

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this publication.

For other country details please contact your local Schneider Electric Sales Representative or visit the Schneider Electric Solar Business website at: solar.schneider-electric.com

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