Concord 4 HSPA 3G Module
INSTALLATION GUIDE

Introduction

The HSPA 3G Module for Concord 4 & higher enables wireless reporting of all alarms and other system events from the Interlogix Concord 4 control panel using the HSPA 3G wireless network. The module can be used as the primary communication path for all alarm signaling, or as a backup to a telephone line connection to the central monitoring station. The wireless alarm signaling and routing service is operated by Alarm.com. The Concord 4 HSPA 3G Module also features integrated support for Alarm.com's emPower™ solution with built-in Z-Wave capabilities.

The module interfaces with the Concord panel data bus and is powered by the panel battery or an auxiliary 12 VDC power supply. Status LEDs indicate bus and cellular network communications. *Figure 1* and *Table 1* describe the components' function and location.

Figure 1: Main module components

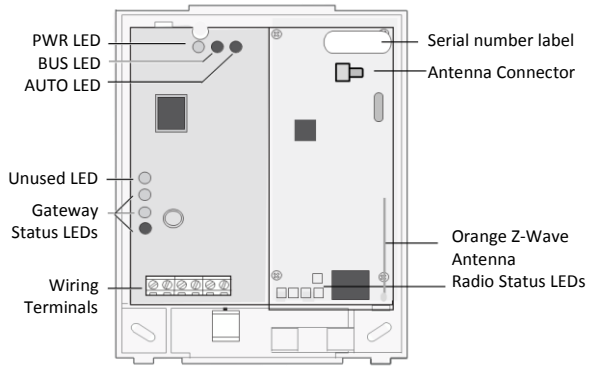
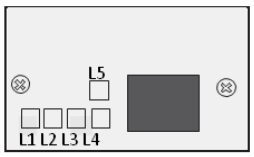


Table 1: Components description

Component	Function
PWR LED	Indicates module power status.
BUS LED	Indicates data bus activity between the panel and module.
AUTO LED	Indicates module/data transceiver communication.
Gateway Status LEDs	Indicates the current signal and status of the wireless gateway module (see *Gateway Status LEDs* on page 3).
Wiring terminals	Provides wiring connection to the panel.
Antenna Connector	Snap-in MMCX antenna connector.
Radio Status LEDs	Indicates communication with the HSPA 3G network, report errors, and signal strength.
Serial number	A 15-digit number. Only the last 10 digits are used for account activation.

Figure 2 shows the HSPA 3G radio status LEDs and *Table 2* describes the LED functions. See *Radio Status LEDs* on page 4 for more information.

Figure 2: HSPA 3G radio status LEDs L1-L5



Bottom of HSPA 3G Module

Table 2: Radio Status LED Functions

LED	Function
L1	Error LED: L1 will flash 1 to 8 times in a four-second interval to indicate specific error conditions such as a network error, panel communication error, or HSPA 3G radio error. See *Table 5* on page 4 for a list of the errors indicated by L1.
L2	Panel communication LED: L2 flashes every time a data packet is received from the panel
L3	HSPA 3G communication LED: L3 flashes every time a data packet is received from the HSPA 3G radio.
L4	HSPA 3G signal level LED: L4 flashes 0 to 5 times indicating the module signal strength, or toggles on/off when communicating with the Alarm.com servers.
L5	Z-Wave Error LED: See *Table 6* on page 4 for more information.

Installation Overview & Guidelines

Before beginning the module installation, familiarize yourself with the following installation guidelines and the location of the module and troubleshooting LEDs and their function as shown in *Figure 1, Table 1,* and *Table 2*, as they are referenced throughout this guide. Using these tips will help guarantee a successful module installation.

1) Create the customer account on the Alarm.com Dealer Site at least 24 hours before installation. See *Account Creation* on page 5.
2) Turn off the "Access Code Lock" feature on the panel. This feature ***must*** be off for the system to communicate with Alarm.com.
3) Installation includes finding a mounting location for optimum wireless signal strength, mounting the module, wiring the module, and installing a case tamper (if necessary). Use the HSPA 3G radio status LEDs on the module to check the signal strength before you permanently mount the module to avoid signaling issues after the installation is complete.
4) Power the module off of the battery, not off of the panel. (See *Wiring* on page 2.)
5) Perform a manual phone test (Comm. Test) to initiate communication (See *Power Up* on page 3.)
6) Observe panel power limitations as stipulated below:

- The module draws a maximum of 65 mA (continuous) in PowerSave mode and 100 mA (continuous) in Idle Mode and Connected Mode from the panel. The module can draw up to 1600 mA (instantaneous peaks) from the panel.
- Do not exceed the panel total output power when using panel power for bus devices and hardwired sensors (refer to panel documentation).
- Use four-conductor, 22 or 18 gauge stranded wire to connect the module to the panel. *Table 3* shows the maximum wire length for each gauge.

Table 3: Components description

Gauge	Maximum Wire Length
22 gauge	40 ft. (12.2 m)
18 gauge	90 ft. (27.4 m)

Module Installation

Tools and Supplies Needed

You will need the following tools and supplies:

- Small blade and Phillips screwdriver
- Drill and bits for screws and/or anchors
- Wire cutter/stripper
- Four-conductor, 22-gauge or larger stranded wire
- #6 panhead screws (4 included)
- Wall anchors (4 included)
- 2 kΩ end-of-line resistor (included)

Module Location Guidelines

Prior to beginning installation, use the following guidelines to choose a location for the module:

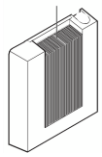
- Check the signal strength before choosing a location. Perform a walking signal strength test by powering the module off the battery directly (connect the GND and +12V terminals). After two minutes, LED L4 will flash between one and five times to indicate the HSPA 3G signal strength level (where 5 is the strongest signal). ***Alarm.com recommends a signal level of two or higher for proper operation of the HSPA 3G Module.***
- Avoid mounting the module in areas with excessive metal or electrical wiring, such as furnace or utility rooms.
- Locate the module near an outside wall, preferably on an upper level.
- Do not mount the module gateway inside of the panel's metal box. Doing so will negatively impact Z-Wave performance.
- For homes or businesses located in canyons or with hills nearby, it is necessary to place the antenna higher in the building.

Mounting the Module and Connecting the Antenna

To mount the module:

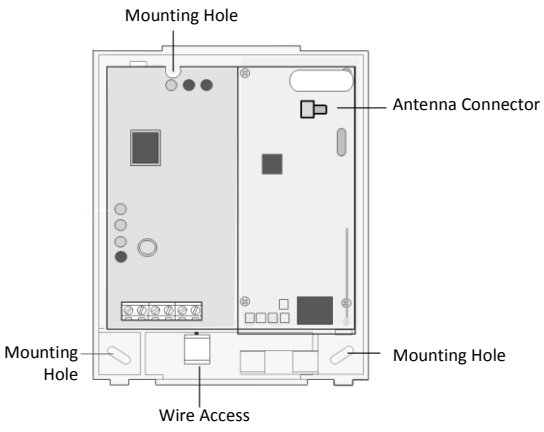
1) Press down on the top of the enclosure cover (see *Figure 3*) and set it aside.

Figure 3: Enclosure Cover



2) If the antenna is not already attached, snap the antenna onto the antenna connector (see *Figure 4).* To connect the antenna, place one of your thumbs or fingers behind the antenna connector. With your other hand, press the end of the micro-miniature coaxial connector into the antenna connector until you head a slight click.

Figure 4: Antenna connector and mounting holes



3) Place the module back plate on the wall at the desired mounting location, check for level, and mark the three mounting holes and the wire access area (*Figure 4*). Be sure to leave room above the back plate to route the antenna.

4) Set the back plate aside and drill holes at the mounting and wire access area locations.

5) Use wall anchors where studs are not present and secure the back plate to the wall with the enclosed screws.

CAUTION: *You must be free of static electricity before handling electronic components. Touch a grounded metal surface before touching the circuit board.*

Wiring

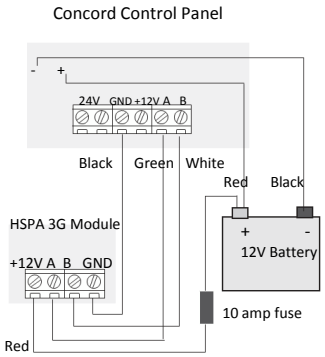
To wire the module to the panel, do the following:

1) Remove panel AC Power and disconnect the backup battery. This is necessary to prevent damaging the panel or module while making wiring connections.

2) Wire the module to the panel bus and to the battery terminals for power as shown in *Figure 6*.

Note*: The module can also be powered off the SuperBus2000 two amp power supply (600-1019), but should not be powered directly off the panel.*

Figure 6: Wiring Terminals



3) If required, connect an input device to the module Z1 and ZCOM terminals.

Case Tamper Switch Installation (Optional)

If the module is easily accessible, you can add case tamper detection to activate an alarm or trouble (depending on panel programming) when the cover is removed.

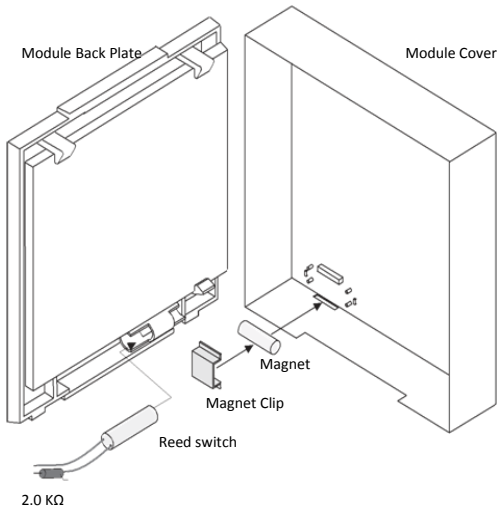
To install the tamper switch, see *Figure 7* and do the following:

(1) Slide the reed switch into the plastic holder on the module back plate.

(2) Connect a UL Listed reed switch (with 2 KΩ end-of-line resistor 01-022) to the module zone input or to any unused hardwired input on the panel.

(3) Insert the magnet into the nibs on the top cover and press the magnet clip down over the magnet until it clicks into place into the cover.

Figure 7: Case tamper switch installation



Power Up

To power up the module and panel and start communication between them, do the following:

1) Verify that all wiring between the panel and module is correct.

2) Connect the backup battery and restore AC power to the panel.

Note: *Whenever the module is added or changed, you must remove panel power and reapply it for the panel and module to communicate*

successfully.

3) Enter installer program mode and turn off the "Access Code Lock" feature (Security menu). This ***must*** be set to off for the system to communicate with Alarm.com. The module PWR LED should turn on. After a few seconds, the module BUS and AUTO LEDs should flash to indicate successful communication with the panel.
4) Verify that HSPA 3G radio status LED L1 is not flashing any errors (see *Radio Status LEDs* on page 4). Also, verify that LED L4 is flashing an HSPA 3G signal level of two or higher. Otherwise, relocate the module. If LED L1 and LED L4 are not flashing, and LED L2 and LED L3 are flashing together, the module is in PowerSave mode and the battery needs to be charged.
5) Perform an installer HSPA 3G manual phone test.
   At a system touchpad,
   - Enter "**8**" + [**installer code]** + "**3"**
   - Disarm the panel by entering "**1**" + **[installer code]** within 10 seconds of starting the phone test. Before doing the manual phone test, the bottom red status LED should be on and the yellow status LED should be flashing. The yellow LED will stay on solid once the manual phone test is completed.

   Note: *Do not press any system touchpad buttons during the five to eight minutes or the time will not set. During this time, the keypad will go in and out of programming mode and will beep several times.*

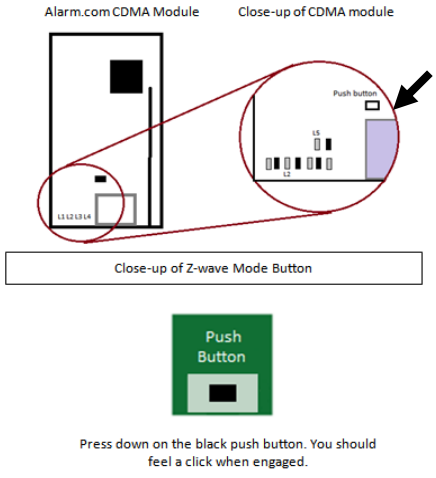
emPower Z-Wave Device Installation

The Concord 4 HSPA 3G Module features integrated support for Alarm.com's emPower™ solution with built-in Z-Wave capabilities. Z-Wave devices can be enrolled into the system using a push button on the top of the module. LED L2 and L5 are used to indicate Z-Wave statuses and errors. See the *Radio Status LEDs* section on page 4 and the Z-Wave LED status and error patterns in *Table 6* on page 4 for more information.

To enroll a Z-Wave device, enter Z-Wave add mode by pressing and holding the push button on the module until LED L2 begins flashing in a 4-blink pattern. (See *Figure 8* for the location of the push button.) Once in add mode, trigger the Z-Wave device to enroll it. (Refer to the device-specific instructions for information on tripping device.)

To remove a Z-Wave device, you must first enter add mode using the instructions above. Once LED L2 begins flashing in a 4-blink pattern, release the push button. To enter delete mode, press and hold the push button again until LED L2 begins flashing in a 2-blink pattern. Trigger the Z-Wave device to remove it.

Figure 8: Location of Z-Wave Push Button on Concord HSPA 3G Module



For additional information on enrolling and troubleshooting Z-Wave devices, refer to the full emPower installation instructions and documentation available on the Alarm.com Dealer Site (www.alarm.com/dealer).

Gateway Status LEDs

The status LEDs, located on the left side of the module (*Figure 1* on page 1), indicate the current signal and status of the Wireless Gateway Module. The bottom red LED indicates if the module is in range and if it is registered. The yellow and green LEDs indicate the message status. The top LED is not used.

Red LED

On: The module is in range and registered with the network.
Off: The module is out of range and not registered with the network.
Blinks: The module is registered with the network, but out of range.

Yellow LED

On: LED on after the first message has been sent by the module and received by Alarm.com.
Off: LED off until a message has been sent by the module.
Blinks: The first message is being sent by the module.

Green LED

Off: The LED is off as soon as Alarm.com receives a message from the module (off most of the time).
Blinks: A message is being sent by the module.

Table 4: Gateway LED Status

Condition Number	Red LED	Yellow LED	Green LED	Condition
1	Off	Off	Off	Module not powered up/not working
2	On	Off	Off	Module in range, first message not sent, not currently sending message.
3	On	On	Off	Module in range, first message sent, not currently sending message.
4	On	On	Blinks	Module in range, first message sent, currently sending message.
5	On	Blinks	Blinks	Module in range, sending first message, currently sending message.
6	Blinks	On	Blinks	Module out of range, first message sent, currently sending message.
7	Blinks	On	Off	Module out of range, first message sent, not currently sending message.
8	Blinks	Blinks	Blinks	Module out of range, sending first message, currently sending message.

Radio Status LEDs

There are five small HSPA 3G radio status LEDs, located at the bottom of the module (*Figure 1* on page 1).

LED L1 (red)

LED 1 flashes when an error is encountered. The number of flashes is the error number. If there are two or more errors at the same time, the errors will be flashes one after the other. The LED will stay off for at least four seconds between errors. *Table 5* describes the errors indicated by LED L1.

Table 5: LED 1 Error Descriptions

Number of Flashes	Error and Solution
1	Module cannot communicate with the panel. Perform a power cycle on the panel. If the error persists lift the module out of the panel and re-insert it. If the error is still observed try a different module. Finally, if that does not fix the problem try a different panel.
2	The SIM card is missing. The SIM card holder can be found on the module. Verify that the SIM card holder is closed securely and that there is a SIM card in the holder.
3	The module is trying to register on the HSPA 3G network. If it persists for more than a few minutes, the module is having problems registering. Check L4 for signal level. If signal level is lower than 2 bars, change the panel's location or use a remote antenna option.

4	The module is registered on the HSPA 3G network but could not connect with Alarm.com. Contact Alarm.com Technical Support.
5	Radio portion of the module is not working correctly. If this persists for more than a few minutes the module may need to be replaced. This error is extremely rare so verify that the module is flashing 5 times.
6	This is an error only if it persists for more than a minute. Otherwise, it's an indication that the module is fixing an unusual condition regarding communication with the HSPA 3G network.
7	Access Code Lock On: This option *must* be turned off at the panel (System Programming - 0003) for module to communicate.
8	If it persists, the account may have been set up incorrectly. Contact Alarm.com Technical Support. You will be asked to check the serial number of the module.

LED L2 (yellow)

L2 flashes with every communication between the module and the panel. Normal pattern calls for a series of quick flashes every two seconds in Idle Mode or four seconds in PowerSave Mode.

It also occasionally flashes in patterns to indicate Z-Wave status. See *Table 6* for a description of various possibilities.

LED L3 (green or yellow)

L3 flashes with every communication between the module and its radio unit in Idle mode, and with every communication with Alarm.com in Connected Mode. In PowerSave mode, this LED flashes in unison with LED L2.

LED L4 (green or yellow)

L4 indicates the HSPA 3G signal level as a number of flashes (0 to 5 bars). The number of bars may not correspond to the bars shown on your cell phone. A level of 5 bars is obtained only in the strongest signal conditions. Signal level is updated every ten seconds if it fluctuates, or every 30 seconds if it is fairly stable.

If LED L4 is continuously flashing, the module provisioning process is in progress. The signal level indication will resume after the process completes.

If L4 is not flashing it indicates one of the following states:

- The module is in power save mode;
- The module just powered up;
- There is no HSPA 3G coverage in the area. ***Alarm.com recommends a steady signal level of 2 or higher for proper operation of the module***.

In connected mode, the LED toggles on and off.

LED L5 (yellow)

L5 indicates Z-Wave errors. The possible signals and what they indicate is shown in *Table 6* .

Table 6: LED 5 Z-Wave Status & Error Descriptions

LED L2	LED L5	Device Status or Error	Description
4-blink		Add mode (lasts 120 seconds or until a device is added)	In this mode you can add a device to the local Z-Wave network. Devices cannot be added to a network if they are already a part of a network.
2-blink		Delete mode (lasts 120 seconds or until a device is deleted)	In this mode you can delete a device from a Z-Wave network. A device can only be in one network at a time, and must receive a "delete" command before it can be learned into a new network.
Solid		Successful add node/remove node/ replication	After receiving this signal leave all devices by the HSPA 3G Module for 1 minute. Locks must be left next to the module for 4 minutes.
Solid with one blink		Add node attempt failed because node already in network (lasts 60 seconds)	The device you attempted to add to a network is already in a network, and must be "deleted" before it can join a new network.
	2-blink	No other nodes are in the network (lasts until a device is added to the network)	No devices have been added that can be controlled by the HSPA 3G Module. See above for instructions on how to add devices.
	5-blink	Learn mode error (lasts 60 seconds)	The device you attempted to add into a Z-Wave network was not successfully added.
	6-blink	No Home ID present (lasts until the module connects to Alarm.com and is configured)	When the HSPA 3G Module first connects to Alarm.com it is configured with a necessary unique network ID.

Module States (modes)

There are three module states (modes).

Idle

In Idle mode, the AC power is up, the battery level is greater than 11.5 volts, and the module is not currently connected to the Alarm.com servers. This is normal for the module and the most common state.

L1 - Flashes errors, if any.
L2 - Communication with panel
L3 - Communication with radio unit
L4 - Signal level (0 to 5 bars)
L5 – Flashes errors, if any

PowerSave mode

In PowerSave mode, the module just powered up, AC power is down, or battery level is less than 11.5 volts. The radio part of the module draws 10 mA in PowerSave mode. It is fully functional and will go into Connected mode as soon as a signal needs to be sent. Performing a manual phone test will switch the module into Idle mode and update the signal level reading.

L1 - Inactive
L2 - Communication with panel
L3 - Same flashing pattern as L2
L4 - Inactive
L5 – Inactive

Connected mode

In Connected mode, the module is connected to the Alarm.com servers and reported an alarm or other condition. The module stays in Connected mode for at least six minutes after the last message is exchanged. Entering Installer Programming mode will cause the module to go into Idle mode.

L1 - Flashes errors, if any
L2 - Communication with panel
L3 - Communication with Alarm.com
L4 - Alternates two seconds on, then two seconds off
L5 - Inactive

Troubleshooting/Testing

Tips

- Check HSPA 3G radio status LED L1 to see if it is flashing any errors. See *Table 5* on page 4 for descriptions of the errors indicated.
- If the power LEDs (the green LED at the top of the module in *Figure 1* on page 1) is not on, turn off the panel power and verify that all wiring is correct.
- If the radio status LEDs (on the left side of the module in *Figure 1* on page 1) do not turn on immediately after initial power up, be sure you have given enough time for the module to initiate communication with Alarm.com. You must wait 5 to 8 minutes after power up for the module to communicate with Alarm.com. Verify that the "Access Code Lock" feature (in panel memory) is turned off. "Access Code Lock" ***must*** be turned off for correct operation.

Sensors 94, 95, 96

If sensors 94, 95, and 96 are not learned in, after doing a manual phone test, the text for these sensors will display important information for troubleshooting purposes. Alarm.com Technical Support staff may request this information during service calls.

- **Sensor 94 text:** IMSI number.
- **Sensor 95 text:** Type of central station reports enabled. See *Table 7* for a reference of the codes displayed.
- **Sensor 96 text:** Module serial number.

Table 7: Central Station Reporting Bits

B	Phone Test	**M**	Panel programming
E	Alarms	**N**	Tamper
F	System trouble	**O**	Cancels
G	Sensor trouble	**P**	Normal activity
H	Arming/disarming	**Q**	Modem on line
J	Sensor bypass	**R**	Pings
K	AC power failure	**V**	Panel low battery
L	Phone failure (phone failure will always be reported for alarms and cancels)		

Account Creation

Before installing the Alarm.com HSPA 3G Module in a Concord system, a new customer account needs to be created with Alarm.com. We recommend creating the account at least 24 hours in advance of installation to ensure that the radio is activated prior to installation.

To activate an account go to www.alarm.com/dealer and login. Under the "Customers" heading at the top left of the page click on "Create New Customer". You will need the following customer information to create the account:

- Customer Name
- Customer Address
- Customer Phone Number
- Customer E-mail
- Preferred login name for the customer
- Alarm.com Module Serial Number

At the end of the account creation process you will be able to print a Welcome Letter for the customer that has their login information and temporary password for the Alarm.com website.

FCC Compliance

Changes or modifications not expressly approved by Alarm.com can void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

FCC ID: YL6-143200H5V4, IC: 9111A-143200H5V4

Specifications

Compatibility	Concord panels with software versions 4.0 and higher
Power requirements	12 V nominal, 65 mA (continuous) 1600 mA (instantaneous peaks) maximum (from panel or auxiliary power supply)
Cellular network	HSPA 3G
Power/data bus	One 4-wire SuperBus 2000 auto addressing power communication data bus
Indicators	One module/panel communication status LED, one module power LED, one automation LED, three wireless communication status LEDs
Operating Temperature	32 to 120°F (0 to 49°C)
Storage Temperature	-30 to 140°F (-34 to 60°C)
Humidity	90% relative humidity non-condensing
Case color	Belgian gray
Case material	High-impact, ABS plastic