NetworX GSM Module Installation Instructions

Introduction

These are the *Alarm.com GSM Module Installation Instructions* for *GE NetworX* panel. The module can be used on NetworX 4V2, 6V2, 8V2, and 8E. The module interfaces with the NetworX panel data bus and is powered by the panel. The Alarm.com GSM bus module for NX is made of two parts: A bus module that connects to the panel via 3 bus wires (This part is called the NX Gateway), and a GSM radio daughter board that plugs onto the NX Gateway board. Note that the NX gateway board is the same board that was used for the older Skytel and Weblink Alarm.com radio. The GSM radio daughter board is the only new part. *Figure 1* and *Table 1* describe the components' function and location.

Figure 1: NX Gateway bus module, with GSM radio daughter board on the right (in gray).

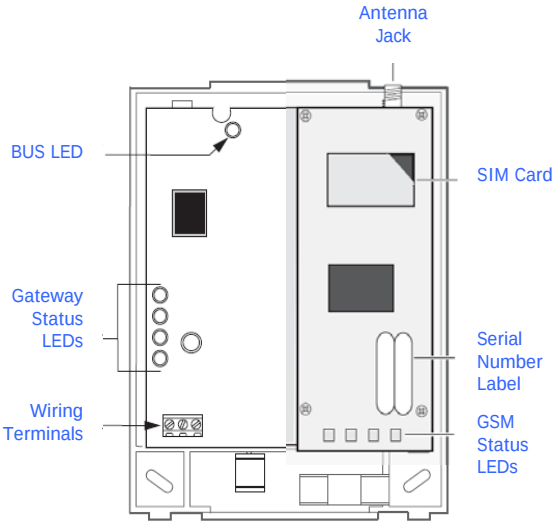


Table 1: Components description

Component	Function
BUS LED	Indicates data bus activity between the panel and the bus module.
Gateway status LEDs	These LEDs are now obsolete on GSM modules. Refer to GSM status LEDS.
Wiring terminals	Provides wiring connection to the panel.
Antenna jack	Antenna connection for wireless data transceiver.
GSM status LEDs	Indicates communication with the GSM network, report errors, and signal strength.
Serial number	A 15-digit number. Only the last 10 digits, starting with 900, 700 or 500, are used for account activation.

NOTE: *You do not need to reference the Status LEDs on the left side of the bus device. Refer instead to the GSM Status LEDs at the bottom of the radio.*

Installation tips

Use the following tips to help guarantee your success with the Alarm.com NetworX GSM Module:

1. Make sure you create the customer account on the Alarm.com dealer website at least 24 hours before installation. See *Account creation* on page 5.
2. Use the GSM Status LEDs on the module to check the signal strength before you permanently mount the module.
3. Do a GSM phone test to initiate communication (see *Power up* on page 3).

GSM status LEDs

Figure 1 shows where the GSM status LEDs are on the module and *Table 2* describes the LED functions. See *GSM status LEDs* on page 3 for more information.

Table 2: GSM status LEDs

LED	Function
LED 1 (L1)	Error LED. 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 GSM radio error.
LED 2 (L2)	Panel communication LED. Flashes every time a data packet is received from the panel.
LED 3 (L3)	GSM communication LED. Flashes every time a data packet is received from the GSM radio.
LED 4 (L3)	GSM signal level LED. Flashes 0 to 5 times, or toggles on/off when communicating with the Alarm.com servers.

Installation

Before you install the system, the module must be activated (see *Account creation* on page 5). The account creation process automatically activates the module within 24 hours. Installation consists of finding a good mounting location for the module to optimize wireless signal strength, mounting the module, wiring the module, and installing a case tamper (if necessary).

Installation guidelines

Use the following installation guidelines:

- 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 your panel documentation).
- Use three-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: Maximum wire length

22 gauge	40 ft. (12.2 m)
18 gauge	90 ft. (27.4 m)

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.
- Three-conductor, 22-gauge or larger stranded wire.
- #6 panhead screws (4 included).
- Wall anchors (4 included).

Module location guidelines

Use the following guidelines to choose a location for the module:

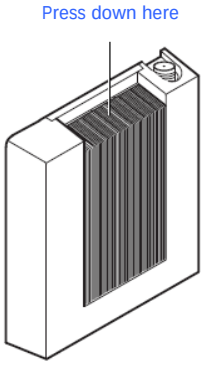
- Check the signal strength before choosing a location. Do a walking signal strength test by powering the module off the battery directly (connect the COM and POS terminals). After two minutes, GSM status LED 4 will flash between one and five times to indicate the GSM signal strength level (where 5 is the strongest signal). Alarm.com recommends a signal level of two or higher for proper operation of the GSM 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.
- Leave 12 to 18 in. (30 to 45 cm) of open space above the module for the antenna.
- For homes or businesses located in canyons or with hills nearby, it is necessary to place the antenna higher in the building.

Mounting

To mount the module, do the following:

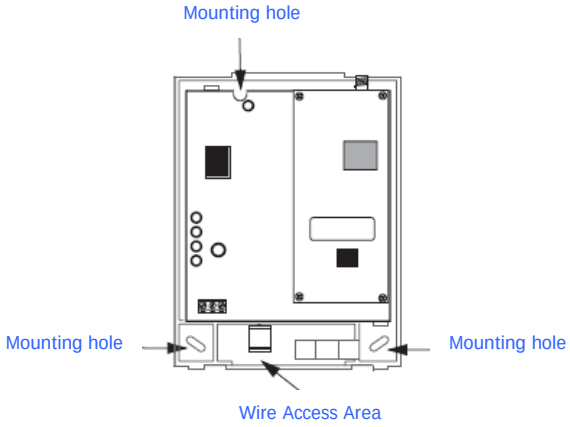
1. Press down on the top of the enclosure cover (*Figure 2*) and set it aside.

Figure 2: Enclosure Cover



2. Screw the antenna onto the antenna jack (*Figure 3*).

Figure 3: Antenna jack 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 3*). Be sure to leave at least 12 to 18 in. (30 to 45 cm) above the back plate for 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.*

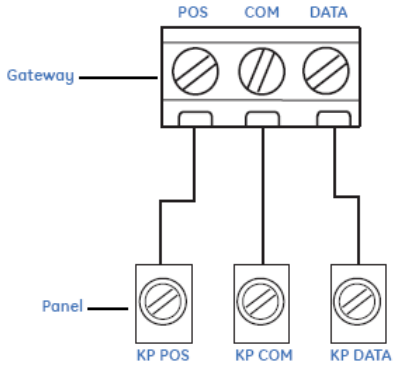
Wiring

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

1. Remove panel AC Power and disconnect the backup battery.

2. Wire the module to the panel POS, COM and DATA terminals (as shown in *Figure 4*).

Figure 4: Wiring Terminals



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 any module is added or changed, you must remove panel power and reapply it for the panel and module to communicate successfully.*

3. Verify that GSM status LED 1 is not flashing any errors (see *GSM status LEDs* on page 3). Also, verify that LED 4 is flashing a GSM signal level of two or higher. Otherwise, relocate the module. If LED 1 and LED 4 are not flashing, and LED 2 and LED 3 are flashing together, the module is in PowerSave mode and the battery needs to be charged.

4. Perform a GSM phone test by pressing ***44** while the system is disarmed **(Make sure that panel's Location 37, Segment 2, Bit 7 is set)**.

> **Note:** *if Location 37, Segment 2, Bit 6 is set, performing the GSM phone test will trigger the local siren. To avoid triggering the siren when performing the GSM test, make sure Bit 6 is OFF.*

The panel will not show any indication that the phone test signal has been sent. You can check the GSM Status LEDs L3 and L4: L4 should be blinking on for 2 seconds and off for 2 seconds. L3 will blink once briefly as soon as you press *44. If the account is reporting to a Central Station, wait for a minute and check with the Central Station to see if the GSM Phone Test signal was received correctly. The GSM Phone Test is also used by Alarm.com to set the module's parameters the first time the module is powered up. It ensures that Alarm.com will receive the sensors list and any other information required for proper signaling.

Enrolling the module

The NetworX control panels have the ability to automatically find and store in memory the presence of all keypads, zone expanders, wireless receivers, output modules, and any other device on the keypad bus. This allows these devices to be supervised by the control panel. To enroll the devices, enter Program Mode using the procedure outlined in the control panel installation manual. When you exit Program Mode, the control panel will automatically enroll the devices. The enrolling process takes about 12 seconds, during which time the "Service" LED will illuminate. User codes will not be accepted during the enrolling process. Once a module is enrolled, if it is not detected by the control, the "Service" LED will illuminate. When initially powering up, the control panel automatically performs the device enrollment process.

No LCD Keypad required

Starting with GSM firmware N120, LCD Keypads are not required in order to install or operate an Alarm.com GSM module for the NX panel. If you do install one or more LCD keypads, at least one of them should be in partitions 1, 2, or 3 (type *94 at the LCD keypad to show its number and partitions).

> **CAUTION:** *If there is no LCD keypad, you must tell the GSM module to not try auto-detecting the LCD keypad. Failure to do so may cause the panel to issue trouble beeps. Follow the procedure below:*

1. Make sure the GSM module is connected to the panel and powered up.

2. Hook up an LCD keypad temporarily (keypad 1 partition 1 if possible). Make sure that the keypad number and partition number don't conflict with another keypad in the system

3. Enroll the LCD keypad by going into and then exiting system programming mode.

4. Press **92* + *installer code* at the LCD keypad. The keypad will prompt you for a "message number".

5. Press *189#* to edit message number 189. By default the message will say "Zone 189".

6. Change the first 5 characters to *NOLCD* (upper case, no spaces)

7. Press *, then #, then *Exit,* to leave programming mode.

8. Wait at least 2 minutes before disconnecting the LCD keypad. Don't forget to go into system programming mode to un-enroll the LCD keypad.

N**ote**: (1) *Before disconnecting the LCD keypad, you can check that the GSM module saw the NOLCD command by repeating steps 4 and 5. The message should now read "ZMAX: …". Repeat step 7 to exit programming.*
(2) Starting in 2009, there will be an AirFx command on the web site to tell the GSM module that there is no LCD keypad to detect.

GSM status LEDs

There are four small GSM status LEDs, located below the serial number label on the module (*Figure 1* on page 1).

> **Note:** *You do not need to refer to the four vertical status LEDs located on the left side of the bus module itself. These lights were used primarily to indicate network status with the old Skytel or Weblink Alarm.com modules. To view system status, and network registration, please refer to the GSM Status LEDS located at the bottom of the radio.*

LED 1 (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 display in series of flashes, one after the other (e.g., two consecutive flashes to indicate error 2, followed by 4 consecutive flashes to indicate error 4). The LED will stay off for at least four seconds between errors. *Table 4* below describes the errors indicated by LED 1.

Table 4: Error descriptions

Flashes	Error Description
1	Module cannot communicate with the panel. Check wiring between the panel and the module. Make sure the bus wires are not swapped.
2	The SIM card is missing. The SIM card holder can be found in the gateway just below the antenna (*Figure 1* on page 1).
3	This is a common error if the module takes more than ten seconds to register with the GSM network. It is normal for this error to show up for approximately 30 seconds while the module registers with the GSM network (at power up, for example). If it persists, then the module is unable to register with the GSM network. Check LED 4 for the signal level. If the signal is too low, change the module's location or use a higher gain antenna. If the signal is good, the module may be roaming on a GSM network that doesn't partner with ATT-Cingular. If the module had been communicating in the past, there may be new interference from some other device or building.
4	The module is registered on the GSM network, but cannot connect with Alarm.com. Contact Alarm.com Technical Support.
5	The radio portion of the module is not working correctly.
6	This is an error only if it persists for more than a minute. Otherwise, it is an indication that the module is fixing an unusual condition regarding the communication with the GSM network.
7	There are bit sets in Location 21 that prevent Alarm.com from getting the sensor list from the panel. In Location 21, segment 1 if bits 5 and 6 are set the module can not retrieve the sensor list. Note that bit 7 will prevent location 21 from being displayed at the keypad. Bits 5, 6 and 7 can only be set via the Downloader program.
8	Contact Alarm.com Technical Support.

LED 2 (yellow)

LED 2 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.

LED 3 (green or yellow)

LED 3 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 2.

LED 4 (green or yellow)

LED 4 indicates the GSM signal level as a number of flashes (1 to 5). The signal level is updated every eight seconds. No flashes indicate one of the following:

- The module is in PowerSave mode or in Connected mode.
- The module is powered up or has just exited PowerSave mode.
- There is no GSM tower coverage in the area.

In Connected mode, the LED toggles on and off.

Module states (modes)

There are three module states (modes).

Idle mode

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.

LED 1. Flashes errors, if any.
LED 2. Indicates communication with the panel.
LED 3. Indicates communication with the radio unit.
LED 4. Indicates the signal level (1 to 5 bars).

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. Doing a manual phone test will switch the module into Idle mode and update the signal level reading.

LED 1. Inactive.
LED 2. Indicates communication with the panel.
LED 3. Same flashing pattern as LED 2.
LED 4. 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.

LED 1. Flashes errors, if any.
LED 2. Indicates communication with the panel.
LED 3. Indicates communication with Alarm.com.
LED 4. Alternates two seconds on, then two seconds off.

Module Troubleshooting Information

During account creation and other troubleshooting it may be necessary to know the GSM module's serial number, the SIM card number, or the types of reports that the GSM module is allowed to transmit. These can be found using the following procedure on an LCD keypad (Skip this section if there is no LCD keypad connected to the panel):

Note: *Starting with GSM version N120, LCD Keypads are not required in order to install or operate an Alarm.com GSM module for the NX panel, but they can help with troubleshooting. Note that if you do not have an LCD keypad, you will not be able to name your sensors via the keypad and have those names communicated to the Alarm.com website via the GSM module. You will have to*

*name the sensors directly from the Alarm.com website. If you install one or more LCD keypads, at least one of them should be in partitions 1, 2, or 3 (type *94 at the LCD keypad to show its number and partitions).*

The GSM module will display its serial number, SIM card number, or list of allowed reports into the name fields of zones 190, 191, and 192 of the LCD keypad. These zone names can be viewed on any LCD keypad, even if the panel doesn't support 192 zones. To access these zone names, Type *92 + installer code to enter Zone Name Programming Mode. Then enter 192# for the module serial number, 191# for the SIM number, or 190# for the reports list.

By default, the keypad shows "Zone 190", "Zone 191", or "Zone 192". To tell the GSM module to show its information in place of these zone names, add a space in front of the zone names by pressing the Stay button, followed by * (star button) and # (pound button) to validate the entry. When you are done with all 3 zones, press Exit to leave programming mode.

Within 1 to 2 minutes, the module will update the zone names that start with a space with the required information. Zone 192 will show the updated serial number, zone 191 will show the updated SIM card number, and zone 190 will show the updated list of allowed reports. You can tell that the module updated the fields by the fact that the leading space will have been removed.

Table 5 describes the reporting bits as indicated in the text field for zone #190:

Table 5: 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

Alarm.com recommends creating the customer account 24 hours prior to installation to ensure that the GSM radio is activated. To create a new account, follow these steps:

1. Open a web browser and enter the Alarm.com dealer website URL: *https://www.alarm.com/dealer*

2. Enter your dealer login and password and press GO.

3. Go to the Check Coverage page to check GSM coverage at the install location. If the location has full coverage, proceed with the next steps. If coverage is uncertain, you may contact Alarm.com for more details.

4. Click the Customers link on the menu bar. Then click Create Customer.

5. *Step 1: Customer Information.* Provide the customer's information, ensure that the customer's e-mail address is entered correctly since this is used for communication between Alarm.com and the customer. Click Next.

6. *Step 2: Create Customer's Login.* Follow the directions as stated. You may click on Automatically Generate Login to have a login assigned to you. Click Next.

7. *Step 3: System Location.* If the system is installed at the address provided during Step 1: Customer Information, click Yes. If the system is installed at an address different from the one provided in Step One Customer Information, click No and enter the correct address and time zone where the system is to be installed. It's important that you enter the correct system location address at this step. Click Next.

8. *Step 4: Panel Information.* Select NX from the drop down menu. The Master User Code that you choose will be programmed into the panel automatically once the module is installed. In the Modem Serial # dialog box, enter the 10-character serial number found on the gateway you purchased. If you are unable to proceed with the modem serial number, contact Alarm.com. Click Next.

> **CAUTION:** *The website will issue a warning about the number of zones attached to the panel. Unlike Concord and Simon, the Alarm.com gateway cannot learn the number of zones from the panel. By default, the gateway will assume that eight zones are installed. If the number of zones is different, you will have to send a command to the panel later via the Customer Support page of the Dealer website. See the last paragraph of this section for more details.*

10. *Step 5: Choose a Service Plan.* Select the service plan for the customer. You can compare the features and prices of the service plans on this page.

11. *Step 6: Central Station Forwarding.* Select the settings you want for sending signals to the central station. When choosing "Only if Phone Line Fails" from the drop down menu be aware that Alarm.com will not forward signals to the central station unless it receives a phone line failure from the panel. Click Next when all of the information is complete.

12. Confirmation Screen. Review the customer information. If you need to change any of the information, click the Edit link next to the field you want to update. Click Done.

13. The Account Creation Successful screen will appear. Click on View and Print Welcome Letter. Print two copies of the welcome letter; one for the customer and one for your records. The letter includes the customer's login, temporary password, and instructions on how to get started.
Also, a confirmation message is sent via e-mail to the address entered in Step One: Customer Information. The message contains a user confirmation number to be entered during initial log on to the Alarm.com website.

> **Note:** *If you leave the Account Creation Successful screen without printing a welcome letter, you must click on the Customer Tab, choose the Customer Support tab, and search for and click on the customer that needs a New Welcome Letter. On the customer information page that appears, select the New Welcome Letter tab in the Customer Support Option panel on the left-hand side.*

If the customer does not receive the confirmation e-mail, you may send a new confirmation e-mail by selecting Resend Confirmation Number in the Customer Support Options panel.

> **Note:** *If you leave the* Account Creation Successful *screen without printing the welcome letter, you must click* ***Search customer data*** *and then select the customer support option* New Welcome Letter.

Equipment List and Zones

On NX, the Alarm.com module cannot automatically determine how many zones are installed. The module assumes that the first 8 zones are installed by default. The module needs to know the highest numbered zone installed in order to send an accurate equipment list to Alarm.com. The equipment list is used for alarm reporting to the Central Station and is displayed on the Alarm.com websites.

The number of zones can be changed via one of these 4 methods:

- Trip the highest zone installed (put the zone in alarm or do the Walk-Test procedure). This method can only increase the number of zones. To decrease the number of zones, use one of the alternative options below.
- Send the Max Zone Number command from the Dealer Web Site.
- Enter the max zone number in location 189 of the main LCD keypad (see procedure below)
- Zones that are not installed should be skipped by setting their partition to 0 (locations 26, 28, 32...) or else they will be listed in the equipment list on the web site.

NX-8E supports up to 192 Zones. Alarm.com can monitor any of the first 120 zones for Normal Activity (non-alarm sensor activity - subject to the limitations of the Alarm.com service plan). All 192 zones are monitored for Alarms and troubles.

Procedure for displaying or for changing the number of zones via location 189 of an LCD keypad:

Note: *Starting with GSM version N120, LCD Keypads are not required in order to install or operate an Alarm.com GSM module for the NX panel, but they can help with troubleshooting. Note that if you do not have an LCD keypad, you will not be able to name your sensors via the keypad and have those names communicated to the Alarm.com website via the GSM module. You will have to name the sensors directly from the Alarm.com website. If you install one or more LCD keypads, at least one of them should be in partitions 1, 2, or 3 (type *94 at the LCD keypad to show its number and partitions).*

1. Type *92 + installer code to enter Zone Name Programming Mode.
2. Enter 189#.
3. Press the STAY button to add a space at the beginning of the zone name.
4. Press * to validate the space.
5. Press # and EXIT to exit Zone Name Programming Mode.

Wait one minute and then repeat the steps above. You should see "ZMAX:xxx", with no space at the beginning, and with xxx being the highest zone number that the GSM module is going to list in the equipment list. To change this number of zones, do the following:

1. Press the STAY button to add a space at the beginning of the zone name.
2. Press * to move over the ":".
3. Press "Chime" to remove the ":"
4. Press * to move over the digit you want to change.
5. Press the up or down arrow to change the digit.
6. Press * to validate the new digit.
7. Repeat steps 4, 5, 6 with the other digits.
8. Press # and EXIT to exit Zone Name Programming Mode.

Within one minute, the GSM module will update its equipment list according to the number of zones you specified. This equipment list will be sent with the next phone test or alarm.

Local Zones

Bit 8, segment 1 of the Zone Type Characteristic Select locations determines whether the GSM module will report alarms for this sensor type (See locations 111, 113, ..., 169).

If bit 8 is set, the panel and the module consider this sensor type as "local" and will not report an alarm (The alarm will be "reported" locally via the siren if so programmed).

Bypassed Zones

The GSM module will report bypass on a zone only when the zone is in an "armed" state. The arming level of a zone is determined by 4 bits of segment 1 of the Zone Type Characteristic Select locations:

Bit 1: Fire zone – Bypass is sent regardless of panel arming state

Bit 2: 24 Hour zone – Bypass is sent regardless of panel arming state

Bit 7: Interior zone – Bypass is sent only when panel is armed away

Bit 8: Local zone – Bypass is never sent

Troubleshooting/testing

Check GSM status LED 1 to see if it is flashing any errors. See *Table 4* on page 3 for descriptions of the errors indicated.

Check GSM Status LED 4 for signal strength (if it is toggling on and off it is connected). If signal strength is less than 2 do a walking signal strength test (see *Module location guidelines* on page 2).

If touchpads/sirens are beeping even though the system is not armed, press * 2 to display the trouble condition. Refer to specific touchpad manual for more details.

FCC compliance

This device complies with part 15 of the FCC rules. Operation is subject to the following conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Specifications

Compatibility	NetworX 4,6, 8 and 8E. (Note: certain older V1 NX4, 6 and 8 may not be fully supported).
Power requirements	5 to 15 VDC, 12 V nominal, 65 mA (continuous) 1600 mA (instantaneous peaks) maximum (from panel or auxiliary power supply)
Cellular network	Quad Band GSM/GPRS
Power/data bus	One three-wire NetworX power/communication data bus
Indicators	One module/panel communication status LED, one module power LED, one automation LED, three wireless communication status LEDs, and 4 GSM 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 noncondensing
Case color	Belgian gray
Case material	High-impact, ABS plastic
Dimensions	5.25 x 4.125 x 1 in. (H x W x D).
Installation	Wall Mount