EXN

Access Control System

(EXN)

Installation Instructions
(P/N: 720-100104)

Contents

Introduction

The EXN Access Control System is designed for use as a secondary access control device for gated communities, parking garages, office buildings, apartments, dormitories, hotels/motels, commercial buildings and recreational facilities.

Housed in a locked, rugged stainless steel faced enclosure, the cabinet is secured with a mechanical "tamper" switch.

The four relay outputs can be programmed to control electric door strikes, magnetic locks, door & gate operators, or barrier gates.

Complete access control event logging, access time restriction, access location restriction, and administration functions are also available to manage the installation.

The EXN is network ready. Multiple units can be interconnected through a LAN connection. The EXN can be used in mixed networks with other compatible access control products, the EN-2A4 / EN-2M4, EN-2A7 / EN-2M7, and EN-2A10 / EN-2M10.

Two inputs are available for connection of 26, 30, or 31-bit Wiegand devices (card readers, etc.). Each reader input supports connecting an "in" reader and an "out" reader. One input can be configured for PBUS operation for connection to legacy Linear brand remote access PBUS accessories.

Operation

The EXN can be used with remote receivers, card readers, and exterior keypads can be used with the system.

Block coded MegaCode® transmitters can be used to gain access through an optional radio receiver. Each transmitter can be individually suspended or re-activated.

The system's event log records system activity for future reference.

Programming and Cardholder Maintenance

System programing and maintenance can be performed locally or remotely with via a network LAN connection to the system.

Throughout this manual, multiple-unit networks are referenced. Depending on the programming method used, networks can contain the following model units:

NETWORK MODEL OPTIONS	
EN-2A4 / EN-2M4	4.3" LCD Screen with Keypad
EN-2A7 / EN-2M7	7" LCD Touch Screen with Keypad
EN-2A10 / EN-2M10	10" LCD Touch Screen no Keypad
EXN	Stand-alone Access Node no Screen or Keypad

Hardware Features

- **FOUR FORM "C" (NO & NC) RELAYS**
  Each relay has 3-amp @ 24-volt rating
- **TWO DOOR SWITCH MONITOR (DSM) INPUTS**
  For sensing access controlled door position to detect door-ajar condition and for activating auxiliary output alarm features
- **TWO REQUEST-TO-EXIT (REX) INPUTS**
  Activates access device for exiting using a hardwired switch
- **TWO AUXILIARY INPUTS**
  Activates auxiliary relay outputs
- **TWO WIEGAND INPUTS**
  Two Wiegand format card reader inputs for connection to external Wiegand devices
- **PBUS SUPPORT**
  One Wiegand input supports the PBUS protocol for connection of up to 6 PBUS accessories
- **POWER FAILURE MONITOR**
  If the optional Power Distribution Module is installed, the AC power input is monitored and power outages are recorded in the event log

Software Highlights

- **COMPUTER PROGRAMMABLE**
  No dedicated programmer required, program with a computer and a modem
- **LARGE TRANSMITTER CAPACITY**
  Up to 45,600 block coded and 20,000 individually enrolled transmitters can be used for gaining access
- **TRANSMITTER FACILITY CODE SUPPORT**
  Identifies wireless transmitters by installation
- **LARGE CARD CAPACITY**
  Up to 45,600 block coded and 20,000 individually enrolled cards can be used for gaining access
- **FOUR INDEPENDENT RELAY CHANNELS**
  Each output's action is programmable
- **PROGRAMMABLE TIME SCHEDULED RELAY ACTIVATION**
  Activation for up to four time periods for each of the 31 system time zones
- **PROGRAMMABLE TIME ZONE ACCESS VALIDATION**
  Validation during four time periods for each of the 31 system time zones
- **PROGRAMMABLE VALIDATION DAYS**
  Select days of the week access is allowed
- **PROGRAMMABLE HOLIDAY DAYS**
  Select up to 24 expiring & 24 non-expiring holidays for access restriction
- **EVENT LOG**
  Stores up to 20,000 system events in memory for record keeping
- **DELETED CARDHOLDER DATABASE**
  System logs deleted cardholders for future identification
- **TIMED OR TRUE ANTI-PASSBACK**
  Options to temporarily disable a cardholder's credentials after access for a preset time or depending on the cardholder's access direction

Feature Overview

Relay Outputs

Four 3-amp dry contact Form-C SPDT relay outputs are provided to activate access devices, such as door strikes, magnetic locks, automatic doors, barrier gates, and automatic sliding gates. The relay outputs can also be used as specialty outputs for alarm contact shunting and alarm activation.

Request-to-Exit (REX) Inputs

Each door lock relay channel has a request-to-exit input. These inputs are supplied for hardwire activation of the access devices. Typically a request-to-exit input is wired to a pushbutton inside of the access controlled area. When a person desires to exit, pressing the pushbutton will activate the output relay channel and trigger the access device. A loop detector for automatic gate operation can be connected to a request-to-exit input.

Door Switch Monitor (DSM) Inputs

The door switch monitor inputs connect to door switches that monitor whether the controlled door is open or closed.

Wiegand Reader Support

The two Wiegand inputs (READER "A" & READER "B") can connect to a large variety of 26, 30, and 31-bit Wiegand output accessories. The Wiegand format is a common standard for access control equipment. A typical application would be to add swipe card or proximity readers to the system.

PBUS Device Support

The READER "B" port can be configured to connect to Linear brand PBUS accessories (keypads and proximity readers). A typical application for a remote keypad or reader would be to control additional doors or gates.

Removable Programming Memory

The EXN removable 4GB SD card memory retains all entry codes, transmitter information, card access, and programming.

Power Management

The system is powered with a plug-in power supply using the included Power Distribution Module (PDM). If an AC power failure occurs, the Power Distribution Module will notify the system.

Network Support

Multiple EN-2A4, EN-2A7, EN-2A10, & EXN units can be networked together via an isolated RS-485 network or through a LAN connection allowing information sharing between the units. A common event log is retained for all of the networked units. For redundant system backup, a computer connected through the network can store and retrieve the memory data.

Accessory Overview

EXN
ACCESS CONTROL

KEYLOCK

PBUS
ACCESSORIES

WIEGAND
ACCESSORIES

AM-KPI
INTERIOR
KEYPAD

AM-PR
PROXIMITY
READER

AM-KP
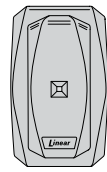EXTERIOR
KEYPAD

GENERIC WIEGAND
CARD READER

AM-RPR
RADIO
PROXIMITY
RECEIVER

WIEGAND
OUTPUT
RECEIVER
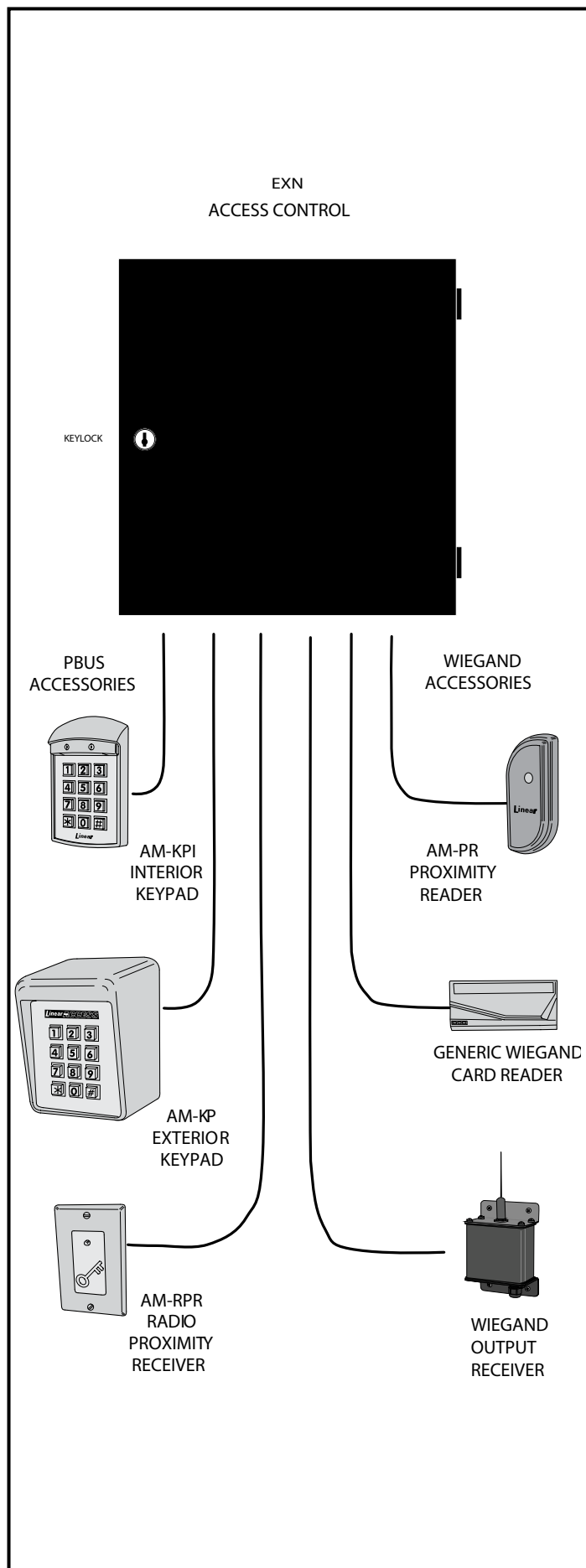
Wiegand Devices

The two WIEGAND format inputs are available to connect WIEGAND devices. Virtually all 26 through 64 bit WIEGAND output devices from other manufacturers can be used with EN Series units.

SINGLE-GANG
MOUNTING WITH
ADAPTER PLATE

2N1 Reader

2N1 Reader

The 2N1 reader is a 125kHz Multi-Protocol Reader with RFID technology. Supports certain HID, AWID & Farpoint 125 kHz proximity protocols. Mullion and Single-Gang (Shown) mounting options.

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PBUS Devices

Several compatible devices are available to connect to the 6-wire PBUS inputs. Up to six PBUS devices can be used with each EXN unit. The following are examples of compatible devices:
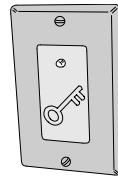
AM-RPR

AM-RPR Radio Proximity Receiver

The Model AM-RPR functions as a remote device that supplies localized radio reception for the EXN. In a typical installation, the AM-RPR would be mounted in a plastic single-gang electrical box next to the controlled opening. When the user requires access, their transmitter must be activated within three inches of the AM-RPR faceplate.

**AM-KP**

AM-KP Exterior Keypad

The Model AM-KP is housed in a rugged cast aluminum enclosure designed for exterior installations. The keypad can be mounted to a pedestal or directly to a wall. A keylock secures the keypad to the mounting backplate.

AM-KPI

AM-KPI Interior Keypad

The Model AM-KPI keypad is housed in a rugged, plastic enclosure designed to be mounted indoors in a standard single-gang electrical box. The keypad is supplied with a satin-chrome bezel and three interchangeable colored bezels (white, ivory, & bronze) to customize the keypad appearance for the installation.
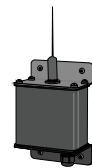
WOR

Wiegand Output Reciever (WOR)

The WOR is used as a wireless access control interface for block coded digital transmitters. It receives signals from transmitters, adds a facility code to the data, and sends the information via a 5-wire connection to a Wiegand input commonly available on most access control panels.

Installation Overview Checklist

The following list outlines the steps required for successfully installing a EXN Access Control System.

- Mount the enclosure
- Connect the outputs and inputs for the access devices
- Connect the Wiegand readers and PBUS devices
- Connect power to the system
- Connect a PC to the Ethernet Port to prepare for configuration
- Obtain IP address and other TCP/IP information from network administrator and configure the network settings for the system
- Connect the LAN port to the local area network (if used)

NOTE: Wiring methods shall be in accordance with the National Electrical Code/ NPFA 70 and all local codes.

Component Locations

KEYLOCK

INPUT/OUTPUT BOARD

PERIPHERAL PORTS (2)

TAMPER LOCK

10/100 ETHERNET

KEYPAD

KEYLOCK

Wiring Diagram

READERS

ENTRY "IN" READER "B"
WIEGAND DEVICE
GND | D1 OUT | D0 OUT | D1 IN | D0 IN | BUZ | LED | 11-13V

EXIT "OUT" READER "B"
WIEGAND DEVICE
GND | D1 OUT | D0 OUT | D1 IN | D0 IN | BUZ | LED | 11-13V

ENTRY "IN" READER "A"
WIEGAND OR PBUS DEVICE
GND | PCLK | DVAL | D1 OUT | D0 OUT | D1 IN | D0 IN | BUZ | LED | 11-13V

EXIT "OUT" READER "A"
WIEGAND OR PBUS DEVICE
GND | PCLK | DVAL | D1 OUT | D0 OUT | D1 IN | D0 IN | BUZ | LED | 11-13V

12V VDC/24W PIP
0-291312RU
POWER SUPPLY

+ −

EARTH GND

INPUT / OUTPUT BOARD

GND | D1 OUT | D0 OUT | D1 IN | D0 IN | BUZ | LED | 12V

GND | PCLK | DVAL | D1 OUT | D0 OUT | D1 IN | D0 IN | BUZ | LED | 12V

12 VDC POWER INPUT

+ −

READER "B"
WIEGAND / PBUS
SELECT JUMPER

POWER FAULT INPUT

CPU BOARD PLUG

PERIPHERAL "A"

PERIPHERAL "B"

DOOR "A"

DOOR "A" POSITION CONTACT

DOOR "A" EXIT REQUEST BUTTON

DOOR "A" AUXILIARY INPUT

GND DSM — DOOR "A" POSITION SWITCH

GND REX — DOOR "A" EXIT REQUEST

GND AUX — DOOR "A" AUX INPUT

GND DSM — DOOR "B" POSITION SWITCH

INPUTS

DOOR "B"

DOOR "B" POSITION CONTACT

DOOR "B" EXIT REQUEST BUTTON

DOOR "B" AUXILIARY INPUT

GND REX — DOOR "B" EXIT REQUEST

GND AUX — DOOR "B" AUX INPUT

DOOR "A" LOCK RELAY — NC | COM | NO

DOOR "A" AUXILIARY RELAY — NC | COM | NO

DOOR "B" LOCK RELAY — NC | COM | NO

DOOR "B" AUXILIARY RELAY — NC | COM | NO

OUTPUTS

DC POWERED DOOR STRIKE

DOOR "A"

+ −
DOOR STRIKE POWER SUPPLY

DC POWERED MAG LOCK
− +

DOOR "B"

+ −
MAG LOCK POWER SUPPLY

**RELAY RATING:
3 AMPS @ 24VOLTS
AC/DC MAXIMUM**

EARTH GROUND GREEN WIRE

CABINET DOOR EARTH GROUND STUD

EARTH GROUND ROD

CPU BOARD

I/O BOARD PLUG

EXTERNAL I/O BOARD PORT

MICRO USB

USB PORT

SD CARD SLOT

LAN PORT

CAT-5
TO LOCAL AREA
NETWORK ROUTER

D0

NETWORK TERMINALS

D1

POSTAL LOCK INPUT

TAMPER SWITCH INPUT

CABINET TAMPER SWITCH

CAMERA POWER
12V GND

Important Mounting Requirements

The EXN Access Control System can be installed for public or private use. The mounting requirements will vary depending on the installation. Review the following information before beginning the installation.

Mounting Environment

Consider the environmental factors at the desired mounting location. The EXN is designed for indoor installations, however, it is preferable to protect the unit from extreme exposure whenever possible.

Follow Building Codes

Check all local building codes and ordinances prior to installing the system. Proper installation of the EXN conforming to the local building codes for access control equipment is a regulatory requirement. The EXN installation is an extremely important and integral part of the overall access control system.
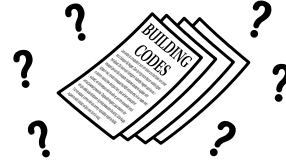
Mounting Location

If the EXN is used to control a door or pedestrian gate, locate the unit as near as practical to the entry point. If the unit is mounted on or in a wall adjacent to the entry point, be sure the wall is sturdy. The repeated shock and vibration from a slamming access door or spring-loaded pedestrian gate must be isolated from the EXN. NEVER MOUNT THE UNIT DIRECTLY TO A MOVING DOOR OR GATE!
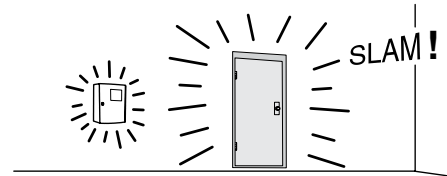
System Mounting

The EXN cabinet is designed to be mounted directly to a wall or flat surface.

Choose a well lit location near the controlled opening. Wiring access for power, network, earth ground, and control outputs must be available to the mounting location. If the optional remote accessories are used, wiring access for these cables must also be available to the mounting location.

Surface Mounting

The cabinet can be mounted on a wall or any suitable flat surface. The four 3/8" mounting holes or the four self-drill locations can be used to attach the cabinet to the surface.

1. For wall mounting, hold the cabinet at the approximate mounting location where the display will be about eye level or slightly above.
2. Mark the four mounting hole centers. Drill as required. Use the appropriate fasteners for the mounting surface to secure the cabinet.

SURFACE MOUNTING

① MARK THE (4) FOUR MOUNTING HOLES

② ATTACH THE CABINET WITH APPROPRIATE HARDWARE FOR THE MOUNTING SURFACE
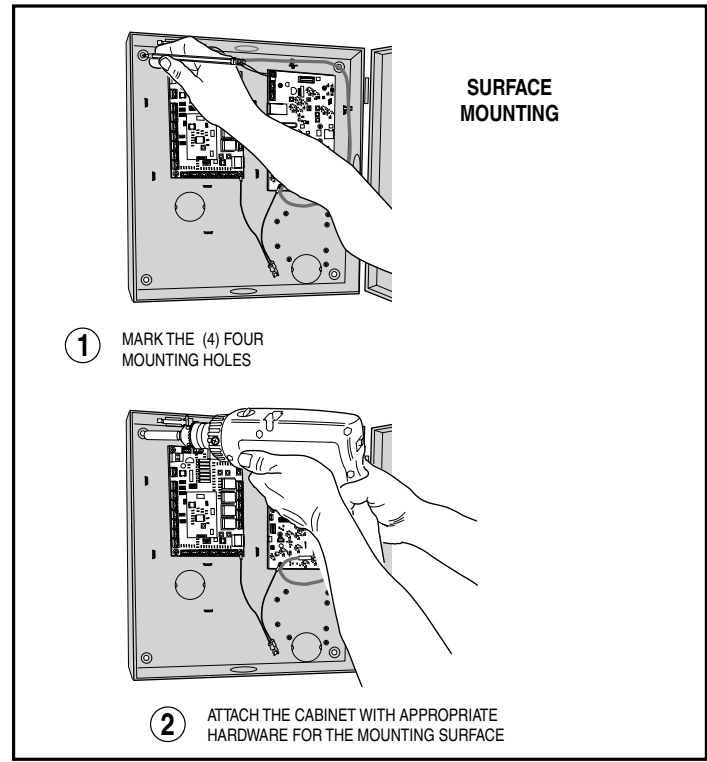
System Maintenance

Test and Maintenance Operations

Prior to installation, ensure that all inside wiring is secure. Each unit should be checked annually for any loose wire connections.

Impaired Operation

EN series units are designed to operate under adverse environmental conditions. Under normal circumstances, they will function properly regardless of outside conditions. However, EN Series units do not have secondary power sources and cannot function without direct continuous power. If a unit is damaged by natural causes or deliberate vandalism, it may not function properly depending on the level of damage.

System Output Overview

The EXN has two door lock relays and two auxiliary output relays that can be activated in response to reader activity, time schedules, or input conditions.

All relays are Form-C SPDT and provide non-powered dry contacts rated for 3 Amps. Power for the relay loads can come from an external power supply or from an optionally installed Power Distribution Module board.

Output Defaults

All outputs are assigned default features that can be configured as needed. The following table shows the default states for each of the two output types:

OUTPUT	DEFAULT STATE	DEFAULT RESPONSE
DOOR LOCK OUTPUTS	NOT ENERGIZED, SINGLE PULSE	3 SECOND UNLOCK TIME IN RESPONSE TO CORRESPONDING READER ACTIVITY READER #1 INPUT ACTIVATES DOOR RELAY "A" READER #2 INPUT ACTIVATES DOOR RELAY "B"
AUXILIARY OUTPUTS	NOT ENERGIZED, SINGLE PULSE	NO DEFAULT RESPONSE MUST BE CONFIGURED VIA PROGRAMMING.

Recommended Wiring Requirements

The power cable must be the proper gauge for the current load and should not be routed in parallel with other wiring especially high voltage or AC wiring. Refer to the table for wiring recommendations:

TOTAL AMPS	VOLTAGE (AC OR DC)	WIRING GAUGES AND DISTANCE				
		14 AWG	16 AWG	18 AWG	20 AWG	22 AWG
.5 AMPS	12 VOLTS	1500 FEET	1000 FEET	600 FEET	375 FEET	225 FEET
	24 VOLTS	2000 FEET	1200 FEET	750 FEET	450 FEET	300 FEET
1.00 AMPS	12 VOLTS	800 FEET	500 FEET	300 FEET	200 FEET	100 FEET
	24 VOLTS	1000 FEET	600 FEET	400 FEET	200 FEET	150 FEET
2.00 AMPS	12 VOLTS	400 FEET	240 FEET	150 FEET	90 FEET	60 FEET
	24 VOLTS	480 FEET	300 FEET	180 FEET	120 FEET	70 FEET

Relay Output Wiring

Door Lock Relays A & B can be used to control electromechanical access devices on doors. The door will unlock when a user is granted access by the system. The door will remain locked if a user is denied access.

The door lock relay outputs can each be configured to operate in fail-secure or fail-safe modes.

- In fail-secure mode, a door lock relay energizes when access is granted.
- In fail-safe mode, a door lock relay de-energizes when access is granted.

Door or Pedestrian Gate Control with a Door Strike

1. Install a low voltage electric door strike as a locking device for the door or pedestrian gate.
2. Install the power supply or transformer for the locking device. DO NOT POWER THE EXN FROM THIS POWER SUPPLY.
3. Connect one wire from the power supply to one wire from the locking device.
4. Route two wires between the locking device and the EXN. Connect one wire to the remaining wire of the locking device. Connect the other wire to the remaining wire of the power supply.
5. Install a protection diode (for DC door strikes) or MOV (for AC door strikes) across the strike to protect the door relay contacts.
6. Connect the wires to the EXN DOOR LOCK RELAY COM & NO terminals for fail secure operation or DOOR LOCK RELAY COM & NC terminals for fail safe operation.

Door or Pedestrian Gate Control with a Mag Lock

1. Install a low voltage electric magnetic lock as a locking device for the door or pedestrian gate.
2. Install the power supply or transformer for the locking device. DO NOT POWER THE EXN FROM THIS POWER SUPPLY.
3. Connect one wire from the power supply to one wire from the locking device.
4. Route two wires between the locking device and the EXN. Connect one wire to the remaining wire of the locking device. Connect the other wire to the remaining wire of the power supply.
5. Install a protection diode (for DC mag locks) or MOV (for AC mag locks) across the mag lock to protect the door relay contacts.
6. Connect the wires to the EXN DOOR LOCK RELAY COM & NC terminals for fail secure operation or DOOR LOCK RELAY COM & NO terminals for fail safe operation.
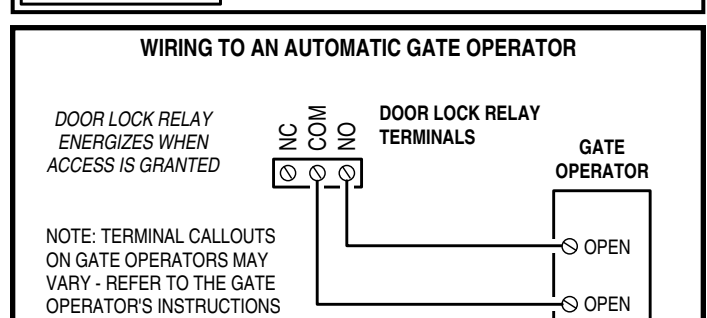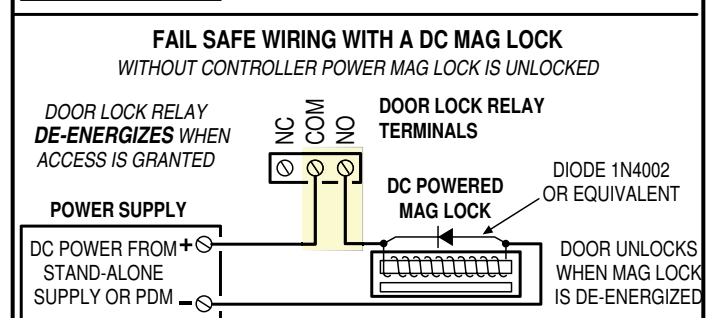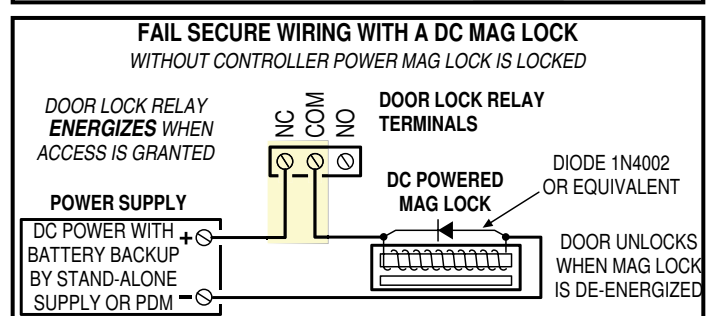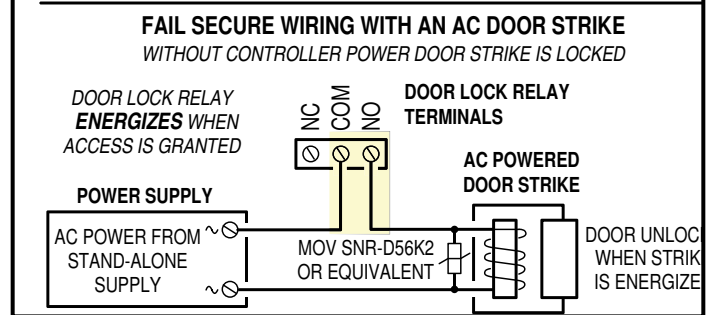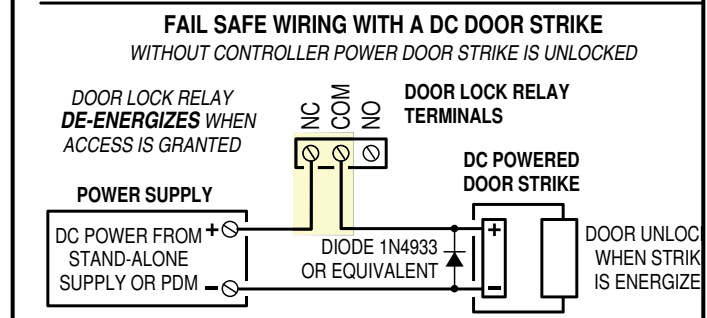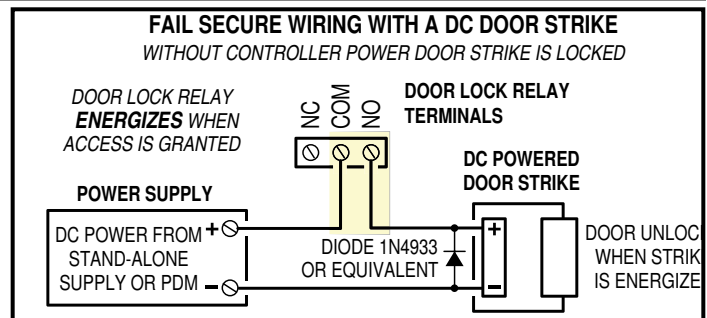
   NOTE: For fail secure operation with a magnetic lock, the lock's power supply must have battery backup to power the lock during a power failure.

Automatic Gate Operator Control

The Door Lock Relays can be used to activate an automatic gate operator when a user is granted access.

1. Route two wires between the gate and the EXN.
2. Connect the gate operator's OPEN terminals to the EXN DOOR LOCK RELAY COM & NO terminals.

   NOTE: For operator wiring specifics, refer to the gate operator's wiring diagram.

FAIL SECURE WIRING WITH A DC DOOR STRIKE
WITHOUT CONTROLLER POWER DOOR STRIKE IS LOCKED

FAIL SAFE WIRING WITH A DC DOOR STRIKE
WITHOUT CONTROLLER POWER DOOR STRIKE IS UNLOCKED

FAIL SECURE WIRING WITH AN AC DOOR STRIKE
WITHOUT CONTROLLER POWER DOOR STRIKE IS LOCKED

FAIL SECURE WIRING WITH A DC MAG LOCK
WITHOUT CONTROLLER POWER MAG LOCK IS LOCKED

FAIL SAFE WIRING WITH A DC MAG LOCK
WITHOUT CONTROLLER POWER MAG LOCK IS UNLOCKED

WIRING TO AN AUTOMATIC GATE OPERATOR

System Input Wiring

Systems have the three types of switch inputs used for monitoring door position (DSM), exit requests (REX), and auxiliary requests.

All inputs are assigned default features that can be configured as needed. The following table shows the default states for each of the inputs:

INPUT	DEFAULT STATE
DOOR SWITCH MONITOR (DSM)	NORMALLY OPEN UNSUPERVISED 8 SECOND HELD OPEN TIME
REQUEST TO EXIT (REX)	NORMALLY OPEN MOMENTARY UNSUPERVISED
AUXILIARY INPUTS	NORMALLY OPEN UNSUPERVISED

Input Options

All inputs may be configured for normally open (factory default) or normally closed contacts with supervision or non-supervision. Use 1k ohm resistors for supervision. Refer to the figure for the acceptable wiring configurations.

Door Switch Monitor (DSM) Inputs

The two DSM inputs for Door Lock Relays A & B can connect to a door switch that monitors whether the controlled door is open or closed. Doors are usually monitored with a magnetic contact or mechanical switch to detect forced entry or door ajar conditions.

1. To use the door switch monitor feature, install a door switch on the door or pedestrian gate and route two wires from the switch to the EXN.
2. Connect the sensing device wires to the associated relay sensing terminal DSM and GND terminals.

Request-to-Exit (REX) Inputs

The two door relay outputs have REX input terminals. Grounding a REX terminal will request activation for the associated relay. Exit request inputs are typically used with push bars, loop sensors, or pushbuttons.
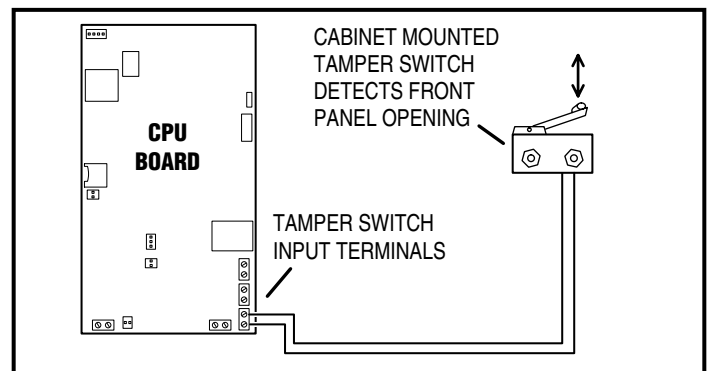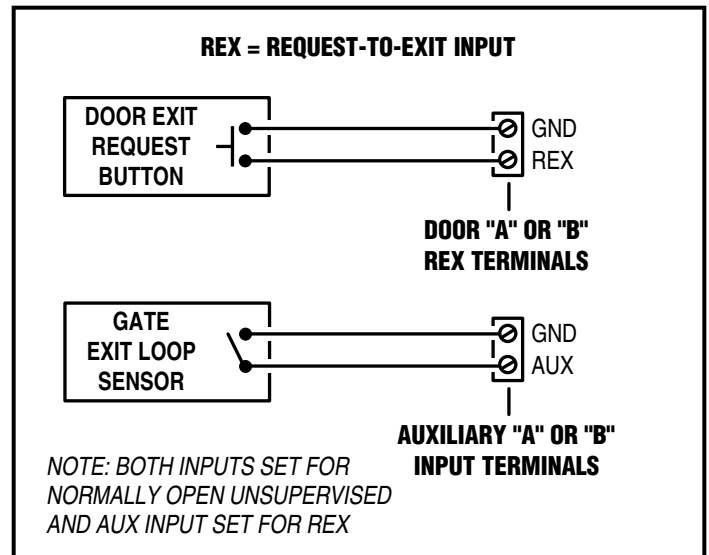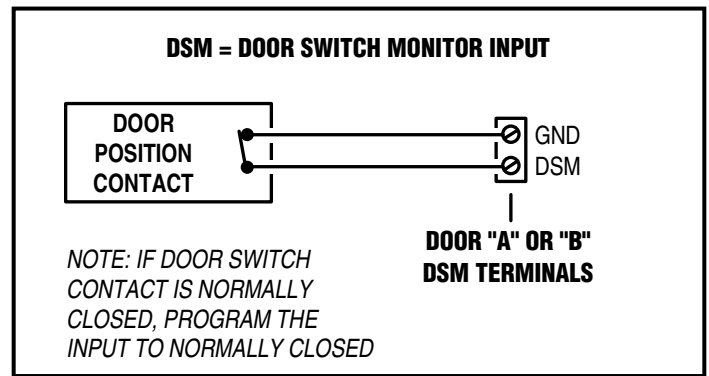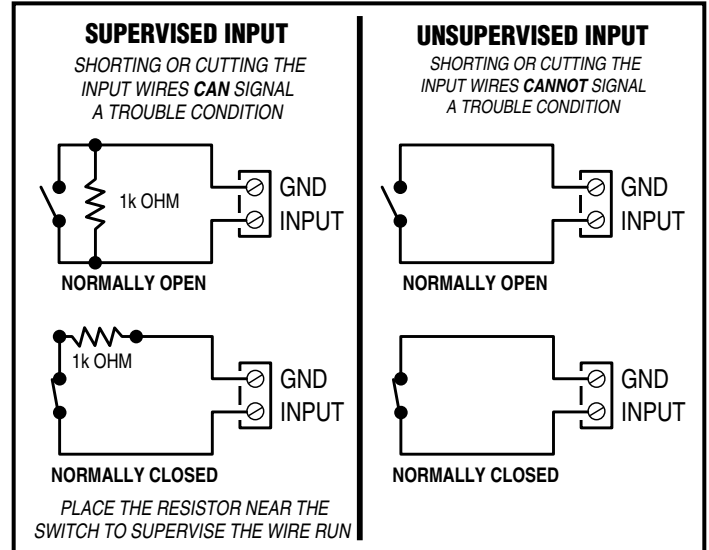
1. Install the pushbutton or device to signal an exit request.
2. Route two wires from the device to the EXN.
3. Connect the device's normally open output to the wires.
4. Connect the two wires to the associated relay's request-to-exit REX terminal and GND terminal.

Auxiliary Inputs

The Auxiliary Inputs are general purpose inputs that can be used with a variety of input devices including REX switches, loop sensors, alarm system integration, etc. These inputs can be configured via programming to trigger a defined action such as to activate an auxiliary relay output.

Tamper Protection

A tamper switch is mounted inside the enclosure and connects to terminals on the CPU board. If the cover or enclosure door is opened for any reason the tamper switch will activate, triggering a condition that can be linked to an event action in programming (e.g., send an e-mail or generate an output).

SUPERVISED INPUT
SHORTING OR CUTTING THE INPUT WIRES CAN SIGNAL A TROUBLE CONDITION

NORMALLY OPEN

NORMALLY CLOSED

PLACE THE RESISTOR NEAR THE SWITCH TO SUPERVISE THE WIRE RUN

UNSUPERVISED INPUT
SHORTING OR CUTTING THE INPUT WIRES CANNOT SIGNAL A TROUBLE CONDITION

NORMALLY OPEN

NORMALLY CLOSED

DSM = DOOR SWITCH MONITOR INPUT

DOOR POSITION CONTACT — GND / DSM

DOOR "A" OR "B" DSM TERMINALS

NOTE: IF DOOR SWITCH CONTACT IS NORMALLY CLOSED, PROGRAM THE INPUT TO NORMALLY CLOSED

REX = REQUEST-TO-EXIT INPUT

DOOR EXIT REQUEST BUTTON — GND / REX

DOOR "A" OR "B" REX TERMINALS

GATE EXIT LOOP SENSOR — GND / AUX

AUXILIARY "A" OR "B" INPUT TERMINALS

NOTE: BOTH INPUTS SET FOR NORMALLY OPEN UNSUPERVISED AND AUX INPUT SET FOR REX

CPU BOARD

CABINET MOUNTED TAMPER SWITCH DETECTS FRONT PANEL OPENING

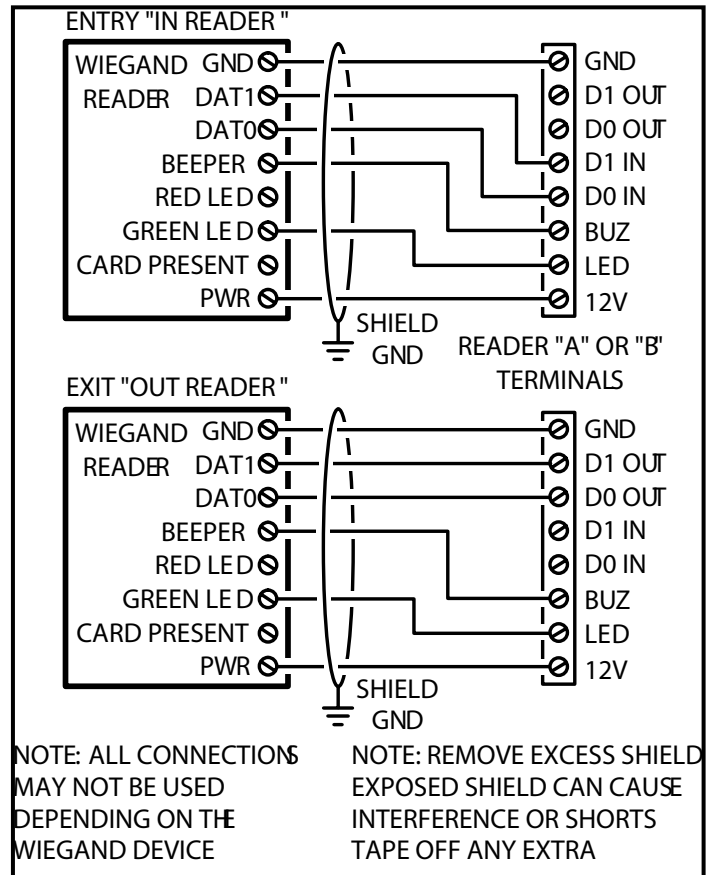TAMPER SWITCH INPUT TERMINALS

Wiegand Accessories

The two EXN Wiegand inputs (READER #1 & READER #2) can connect to a large variety of 26, 30, and 31-bit Wiegand output accessories. The Wiegand format is a common standard for access control equipment. A typical application would be to add swipe card or proximity readers to the system.

Readers can be installed as primary "in readers" (entry) for each door as well as optional secondary "out readers" (exit).

The maximum power available for an individual reader is 750 mA @ 11-13 VDC with a combined maximum of 1.5A for the EXN. Determine the reader's power consumption by referring to the documentation included with the reader. Exceeding the maximum current for individual readers or for the system will damage the protection fuses and void the warranty.

> *NOTE: When using Wiegand devices for Reader "B", the Reader "B" select jumper must be set to the Wiegand position (default).*

1. Mount and install the Wiegand accessory as described in its installation instructions.
2. Route a cable from the EXN to the accessory.
- 24 AWG Belden Type 9931 or equivalent for wire runs up to 300'.
- 20 AWG Weico Type 9405 or equivalent for wire runs up to 500'.
3. Connect the color-coded wires from the reader's wiring harness to the cable.
4. Connect the cable to the appropriate Wiegand READER terminal on the EXN (see Wiegand wiring diagram).
IMPORTANT: Reader shields must be properly grounded per the manufacturers installation requirements.

ENTRY "IN READER"

WIEGAND READER		READER "A" OR "B" TERMINALS
WIEGAND GND	→	GND
DAT1	→	D1 OUT
DAT0	→	D0 OUT
BEEPER	→	D1 IN
RED LED	→	D0 IN
GREEN LED	→	BUZ
CARD PRESENT	→	LED
PWR	→	12V
SHIELD GND		

EXIT "OUT READER"

NOTE: ALL CONNECTIONS MAY NOT BE USED DEPENDING ON THE WIEGAND DEVICE

NOTE: REMOVE EXCESS SHIELD EXPOSED SHIELD CAN CAUSE INTERFERENCE OR SHORTS TAPE OFF ANY EXTRA

PBUS Accessories

Up to six PBUS accessories (keypads and proximity readers) can be connected to the READER "B" terminals. A typical application for a remote keypad would be to control a second door or gate.
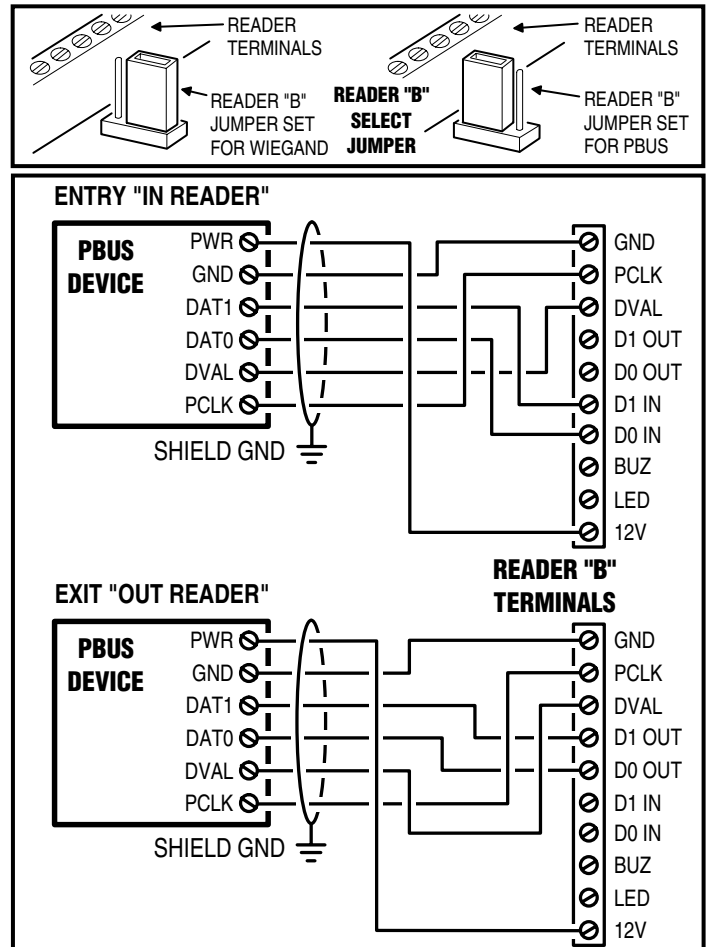
PBUS devices compatible with the EXN are:

- AM-RPR Radio Proximity Receiver
- AM-KP Exterior Keypad
- AM-KPI Interior Keypad
- AM-PR Proximity Receiver

Readers can be installed as primary "in readers" (entry) for each door as well as optional secondary "out readers" (exit).

> *NOTE: When using PBUS devices, the Reader "B" select jumper must be set to the PBUS position.*

1. Mount and install the accessory as described in its instructions.
2. Route cable from the EXN to the accessory. Conventional cable or commonly available Cat-5e cable can be used to connect PBUS remote devices to the EXN. When using Cat-5e cable, note that the PWR and GND connections use two wires each to enhance the current carrying capacity for powering the remote device. Cable choices:
- Cat-5e cable for wire runs up to 500'.
- 24 AWG Belden Type 9931 or equivalent for wire runs up to 300'.
- 20 AWG Weico Type 9405 or equivalent for wire runs up to 500'.
3. Set the DEVICE ADDRESS rotary switch in the PBUS accessory to a unique address number. When programming the system, the device address number will identify each PBUS accessory.
4. Connect the cable to the accessory and the EXN READER "B" terminals (see PBUS wiring diagram).

READER TERMINALS — READER "B" JUMPER SET FOR WIEGAND

READER "B" SELECT JUMPER

READER TERMINALS — READER "B" JUMPER SET FOR PBUS

ENTRY "IN READER"

EXIT "OUT READER"

READER "B" TERMINALS

Network Installation Options and Connections

An access control network allows shared programming and user information between systems. Networks make system programming and facility management much easier in multi-unit installations.

The EN Series Telephone Entry & Access Control System is designed to be compatible with each other when residing in a multi-unit network operating environment.

> *IMPORTANT COMPATIBILITY NOTE: The legacy Linear access control Models AE-1000, AE1000Plus, AE-2000, AE2000Plus, AM3, and AM3Plus are of a different hardware and software design and CANNOT be used in networks mixed with the new generation Models EN-2A4 / EN-2M4, EN-2A7 / EN-2M7, EN-2A10 / EN-2M10 and EXN.*

Local Area Network

In installations where there is an existing Local Area Network used for interconnecting various computers and peripherals to the Internet, the EXN LAN PORT is sufficient for connecting the system. The unit will need to be configured with the correct network settings before connecting to the network (see the Preparing for a Local Network section).

If the EXN is going to be connected to a Local Area Network, it must be located in a trusted network environment where a protected network security system (firewall, etc.) is installed and maintained.

Prepare the system for connection to the Local Area Network by running the Cat-5 cable between the EXN and the network router. Wait until further configuration of the system's network settings (see the Preparing for a Local Network section) before actually plugging in the network cable into the LAN PORT of the EXN.

1. Find the location of the Local Area Network router that will serve the EXN system.
2. Select a Cat-5 cable long enough to run from the Local Area Network router to the EXN system enclosure.
3. Route the Cat-5 cable into the EXN enclosure and bring it close to the LAN PORT jack. DO NOT PLUG THE CABLE IN YET.

> *NOTE: For ETL installations, the maximum Cat-5 cable length allowed is 30m (98.5 FT).*

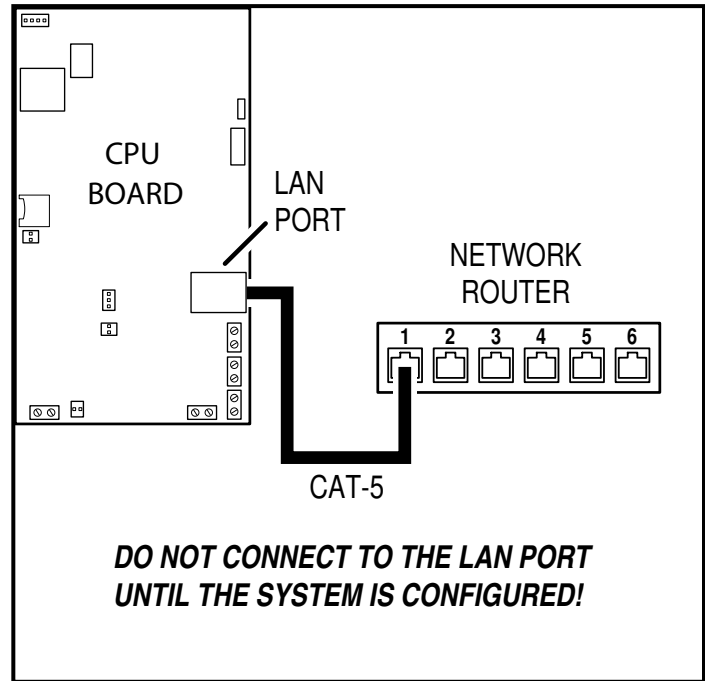**DON'T CONNECT TO THE LAN PORT UNTIL THE SYSTEM IS CONFIGURED!**
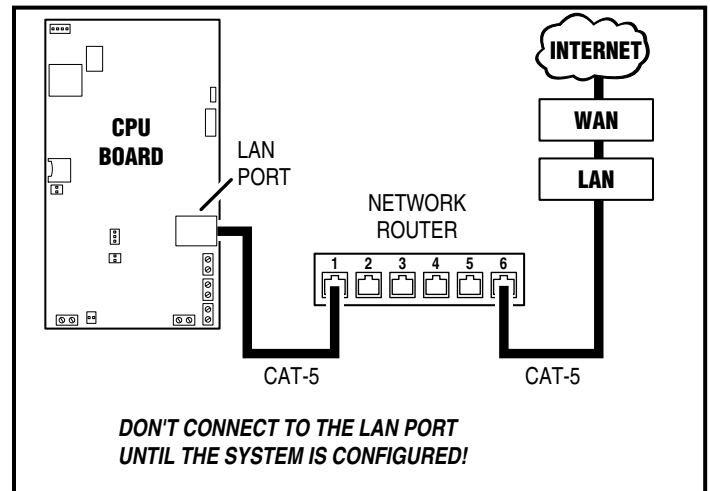
Ethernet LAN Connection

The EN Series Telephone Entry & Access Control System connects to a controlling LAN via an Ethernet connection on the CPU. Previous Telephone Entry Systems utilized the RS-485 cable connection via a "daisy-chain" to connect multiple units. This type of connection is obsolete and current EN Series units do not require linked type connections to communicate with the LAN.

Ethernet Wiring connection with CPU

1. Mount and install the units for the network.
2. Route Ethernet cable through back of unit.
3. Connect Ethernet cable to the LAN connection point on the CPU.

NOTE: Do Not connect Ethernet cable to CPU before System is configurated.

CPU BOARD

LAN PORT

NETWORK ROUTER

1 2 3 4 5 6

CAT-5

DO NOT CONNECT TO THE LAN PORT UNTIL THE SYSTEM IS CONFIGURED!

Power & Ground Wiring

The EXN requires power from a 11-13 volt DC power source.

Power Wiring

> **NOTE:** *DO NOT APPLY POWER UNTIL THE INSTALLATION IS COMPLETE.*

1. Route three-conductor cable between the EXN and the 0-291312RU plug-in power supply. To indicate DC polarity, be sure to use cable with multiple wire colors.
   - For power wire runs up to 100 feet, use 18 AWG, THHN 600-volt insulated wire.
   - For power wire runs up to 200 feet, use 16 AWG, THHN 600-volt insulated wire.
2. Connect two wires to the plug-in power supply's + & - terminals.
3. Connect one wire to the plug-in power supply's **EARTH GROUND** terminals.
4. Connect the + & - power wires from the plug-in power supply to + & - **12 VDC INPUT** terminals.
5. Connect the **EARTH GROUND** wire from the plug-in power supply to the EXN cabinet door **EARTH GROUND** stud.
6. When the installation is complete, plug the power supply into a dedicated AC receptacle that is not controlled by a switch.

Earth Grounding Option

For an NEC compliant earth ground, use size 12 gauge solid wire or larger and clamp it to an 8-foot copper ground rod driven into the ground. Locate the ground rod next to the Intersystem Bonding Termination point (Power and Telephone company ground rods) and bond the rods together with a 6 AWG or larger bonding jumper. Do not disturb the clamps installed by the Power or Telephone Company.

1. Install the ground rod as described above.
2. Connect the wire from the earth ground to the EXN cabinet door EARTH GROUND stud.

EARTH GROUND STUD   INSIDE THE EXN CABINET DOOR   12 AWG OR LARGER SOLID WIRE   EARTH GROUND ROD
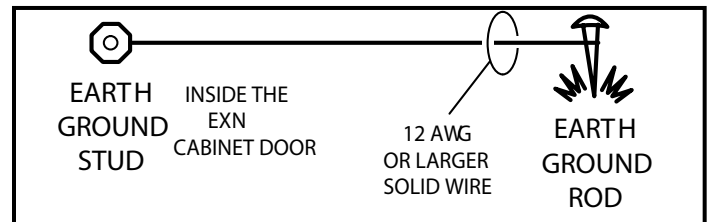
Configuring for a Local Area Network

The EXN must be located in a trusted network environment where a protected network security system (firewall, etc.) is installed and maintained.

> *CAUTION: The system is exposed to potential risks if installed on a network without proper security precautions. Consult the appropriate on-site IT administrator.*

Obtain the following information from your network administrator before configuring the e3 Controller:

- IP address
- Subnet Mask
- Gateway
- DNS 1 and 2

> *NOTE: If a DHCP server is present, IP Addresses are dynamically assigned. A static IP address is strongly recommended for the EXN because a DHCP Server may assign a new IP Address.*

Preparing for the Network

To allow for the system to be recognized on the local network, it is necessary to change the EXN's IP address as follows:

1. Connect your programming computer directly to the LAN port of the EXN. A standard Cat-5 cable is used for the direct connection.
2. Assign a static IP address of 192.168.0.149 to the computer. (For instructions on how to change the static IP address of a Windows computer, please visit: http://technet.microsoft.com/en-us/library/ff710457).
3. After assigning the static IP address for the computer, open a web browser and enter the IP address of the EXN (Default = 192.168.0.250).
4. The EXN presents the login page. To log on, enter the default user ID and password (admin/admin).
5. Select the Network Setting icon, then the IP Address icon to display the page. Enter the static IP address, Subnet Mask, Gateway and DNS server so that it matches the requirements of the local network. (Refer to the EXN Programming Guide for detailed programming information.)
6. Click Save & Reboot and the system will reboot. (Reboot will take approximately 2 minutes.)
   NOTE: The system data will be lost if the EXN is powered down without performing Save & Reboot.
7. Disconnect the programming computer from the EXN. The system is now ready for the local network.
8. Connect the Cat-5 cable from the Local Area Network to the EXN LAN PORT jack. The local computers will then be able to access the system by entering the IP address of the EXN.
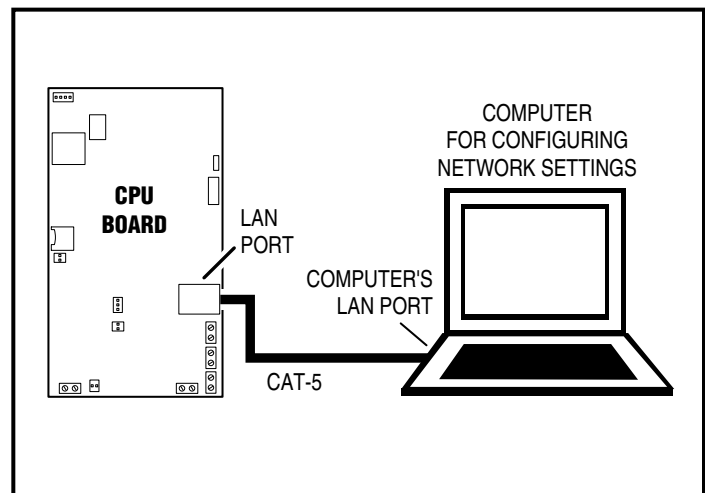
System Diagnostics

LED indicators on the I/O Board and CPU Board are for monitoring the system during operation. When calling for technical assistance, the Technical Services Department may ask the installer to use these indicators to diagnose the system.

I/O Board Indicators

33 LED indicators are on the I/O Board. Refer to the figure for the location of each indicator.

- READER POWER lights showing power is being supplied to Reader #1 or Reader #2.
- INVALID CARD lights when a credential's data read is not a valid data string.
- ACCESS GRANTED lights when a credential has been successfully decoded and the Cardholder has been granted access.
- ACCESS DENIED lights when a credential has been successfully decoded and the Cardholder has been denied access.
- DOOR "A" DSM lights when Door Relay "A" Door Switch Monitor input is activated.
- DOOR "A" REX lights when Door "A" Request-to-Exit input is activated.
- DOOR "A" AUX lights when Door "A" auxiliary input is activated.
- DOOR "B" DSM lights when Door Relay "B" Door Switch Monitor input is activated.
- DOOR "B" REX lights when Door "B" Request-to-Exit input is activated.
- DOOR "B" AUX lights when Door "B" auxiliary input is activated.
- PBUS light will be on when jumper is in PBUS mode.
- RS-422 TX STATUS light will blink on any RS422 TX activity.
- RS-422 RX STATUS light will blink on any RS422 RX activity.

- DOOR "A" LOCK RELAY lights when Door Lock Relay "A" is energized.
- DOOR "A" AUX RELAY lights when Door Auxiliary Relay "A" is energized.
- DOOR "B" LOCK RELAY lights when Door Lock Relay "B" is energized.
- DOOR "B" AUX RELAY lights when Door Auxiliary Relay "B" is energized.
- COMMUNICATIONS ERROR lights when there is network error.
- RELAY MANUAL lights when a relay has been activated manually.
- MODEM POWER lights when the telephone modem has power.
- USB ENABLED lights when the USB Port has been enabled.
- RS-422 ENABLED lights when RS-422 protocol has been enabled.
- HEARTBEAT lights when the system is live and running.
- POWER GOOD lights when system power is within specification.
- POWER ON lights when the system is receiving power.
- BOOT lights during system reboot.
- RESET lights during system reboot.
- PERIPHERAL "A" POWER lights during Peripheral "A" power.
- PERIPHERAL "B" POWER lights during Peripheral "B" power.
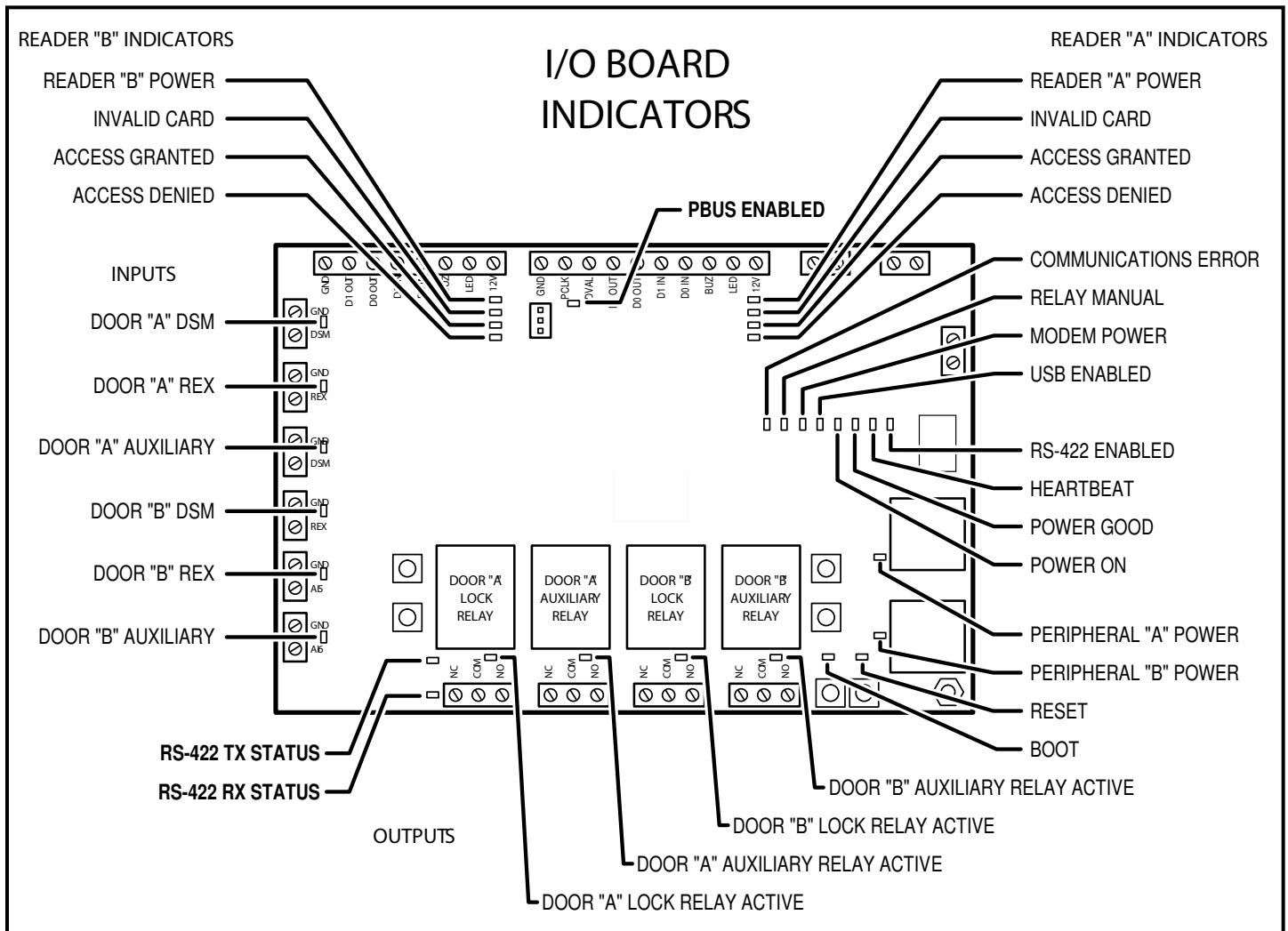
CPU Board Indicators

Six LED indicators are on the CPU Board. Refer to the figure for the location of each indicator.

- RECEIVE DATA lights when data is received from an external I/O board.
- RESET lights an external I/O board reset.
- TRANSMIT DATA lights when data is sent to an external I/O board.
- BOOT lights during an external I/O board boot sequence.
- I/O BUS POWER lights when power on the I/O bus is on.
- NETWORK ACTIVITY & SPEED two LEDs on end of the LAN connector light for network activity and connection speed.
- CPU BOARD POWER lights when power to the CPU board is on.

CPU BOARD INDICATORS

EXTERNAL I/O BOARD INDICATORS

RECEIVE DATA
RESET
TRANSMIT DATA
BOOT
I/O BUS POWER
NETWORK ACTIVITY & SPEED
CPU BOARD POWER
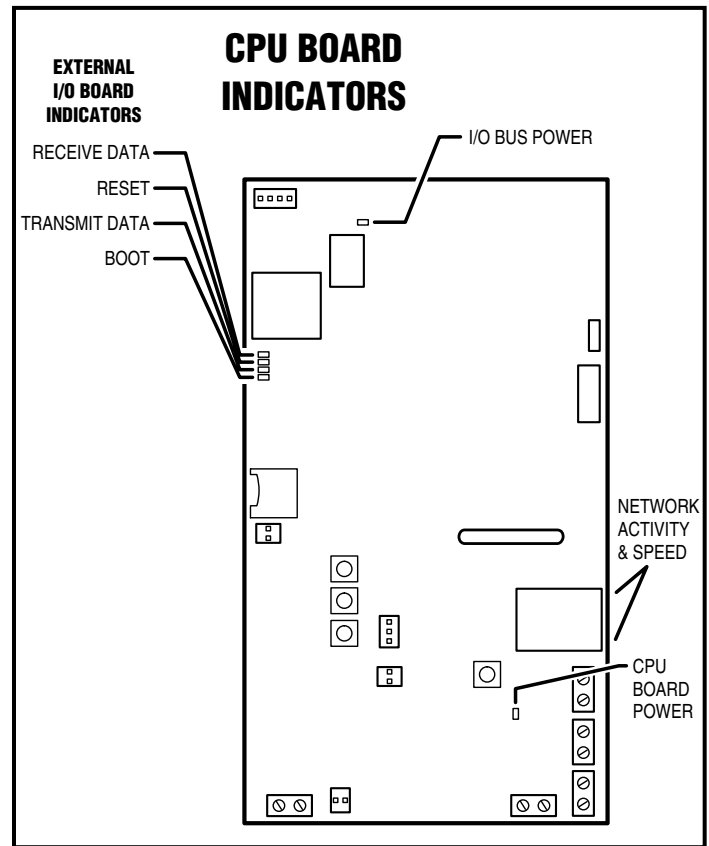
Internal Controls

Several pushbuttons are available in the system to preform resets and restarts, and to manually activate the output relays.

I/O board Pushbuttons

Six pushbuttons are on the I/O Board. Refer to the figure for the location of each pushbutton.

- DOOR "A" LOCK RELAY button manually activates the Door "A" Lock Relay.
- DOOR "A" AUX RELAY button manually activates the Door "A" Auxiliary Relay.
- DOOR "B" LOCK RELAY button manually activates the Door "B" Lock Relay.
- DOOR "B" AUX RELAY button manually activates the Door "B" Auxiliary Relay.
- SYSTEM BOOT button reboots the entire system.
- SYSTEM RESET button reboots the entire system.

CPU board Pushbuttons

Four pushbuttons are on the CPU Board. Refer to the figure for the location of each pushbutton.

- FACTORY RESET button resets the system to the factory defaults. PRESSING FACTORY RESET WILL DELETE ALL PROGRAMMING AND CARDHOLDER INFORMATION.
- NETWORK RESET button resets and restarts the system network.
- ADMIN RESET button resets the unit's admin code.
- CPU RESET button resets and restarts the system CPU.

I/O BOARD PUSHBUTTONS

DOOR "A" LOCK RELAY
DOOR "A" AUX RELAY
DOOR "B" LOCK RELAY
DOOR "B" AUX RELAY
SYSTEM BOOT
SYSTEM RESET

CPU BOARD PUSHBUTTONS

FACTORY RESET
NETWORK RESET
ADMIN RESET
CPU RESET
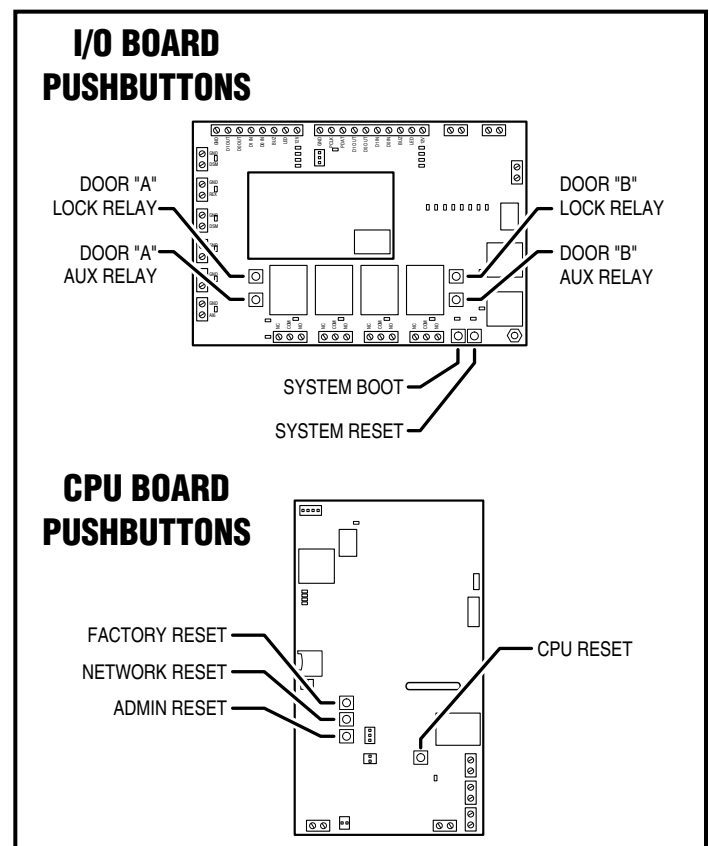
Specifications

MECHANICAL
Case dimensions: 13" W x 14" H x 3-1/2" D
ELECTRICAL
Voltage: 11-13 Volts DC
Current: 750 mA
Outputs: Four Relays
Form "C" 3 Amps @ 24 Volts maximum
Inputs: Two DSM door position inputs
Two REX exit request inputs
Two AUX auxiliary inputs
Four WIEGAND reader inputs (two IN, two OUT)
One PBUS input (supports up to six PBUS devices)
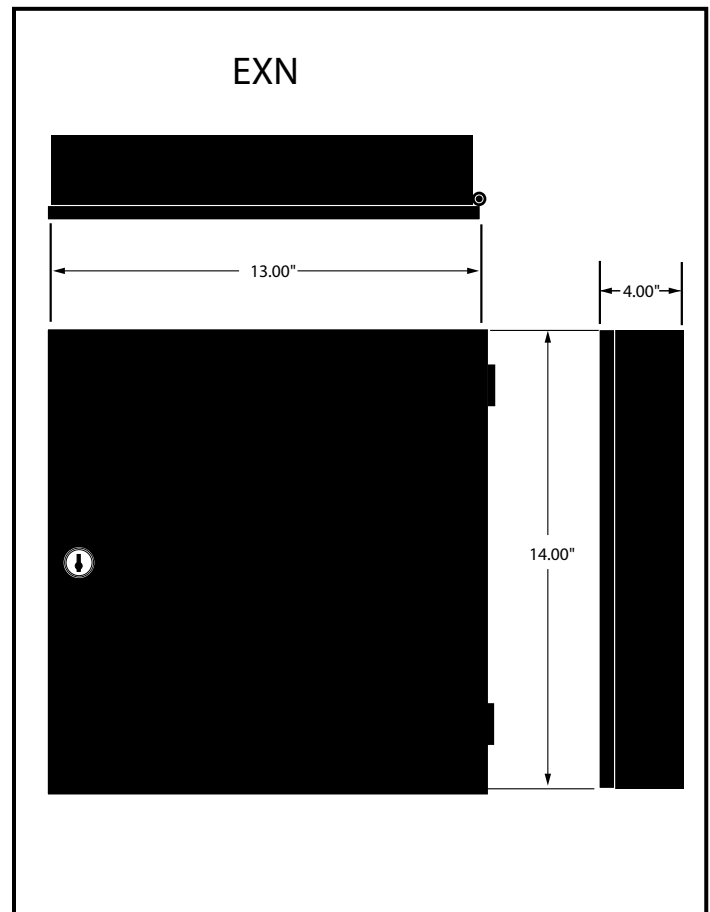Network: LAN or RS-485 network
ENVIRONMENTAL
Temperature: -22°F to 149°F (-30°C to 65°C)
Humidity: 5% to 95% non-condensing

NOTE: EXN is for indoor use only. DO NOT mount outside.

Feature Levels	
Destructive Attack	Level I
Ethernet Line Security	Level II
Endurance	Level IV
Standby Power	Level I

Dimension Drawing

EXN

13.00"

4.00"

14.00"

Troubleshooting

System completely dead
1. No power from power supply. Check voltage at power supply terminals.
2. Check voltage at I/O Board power terminals.

Entry code will not activate relay
1. Entry code not assigned.
2. Entry code not set up for proper relay.
3. Keypad is in lockout.

Remote Wiegand device does not work
1. Check remote device for power.
2. Assure device is wired correctly.
3. Check the position of the Reader #1 select jumper.

Remote PBUS device does not work
1. Check remote device address switch setting.
2. Check remote device for power.
3. Assure device is wired correctly.
4. Check the position of the Reader #1 select jumper.

Remote keypad will not activate a relay
1. Entry code is not assigned.
2. Keypad may be in lockout from too many incorrect attempts. Wait one minute for lockout to clear and try again.
3. Remote keypad wiring incorrect.

Transmitter does not activate relay
1. Transmitter button setting programmed to "no relay" (would effect all transmitters).
2. Transmitter not enrolled.
3. Specific transmitter is deactivated in the system.

Limited Warranty

This Nortek Security & Control LLC product is warranted against defects in material and workmanship for twenty-four (24) months. This warranty extends only to wholesale customers who buy direct from Nortek or through Nortek's normal distribution channels. Nortek Security & Control LLC does not warrant this product to consumers. Consumers should inquire from their selling dealer as to the nature of the dealer's warranty, if any. There are no obligations or liabilities on the part of Nortek Security & Control LLC for consequential damages arising out of or in connection with use or performance of this product or other indirect damages with respect to loss of property, revenue, or profit, or cost of removal, installation, or reinstallation. All implied warranties, including implied warranties for merchantability and implied warranties for fitness, are valid only until the warranty expires. This Nortek Security & Control LLC Warranty is in lieu of all other warranties express or implied.

All products returned for warranty service require a Return Authorization Number (RA#). Contact Nortek Security & Control Returns at 1-855-546-3351 for an RA# and other important details.

FCC Notice

Changes or modifications not expressly described in this manual or approved by the manufacturer could 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 into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.