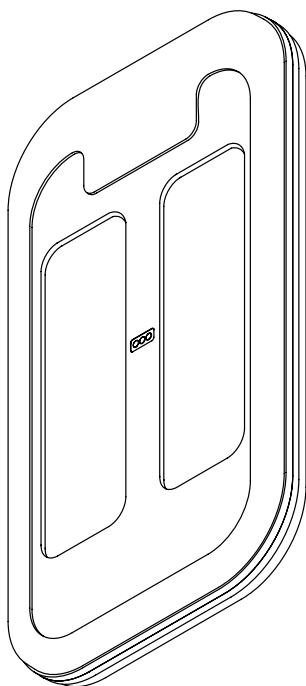


Model 1100/1081  
Long Range Proximity Reader  
Installation Manual



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**Intended use** Use this product only for the purpose it was designed for; refer to the data sheet and user documentation. For the latest product information, contact your local supplier or visit us online at [www.gesecurity.com](http://www.gesecurity.com).

**FCC compliance** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

You are cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Regulatory**



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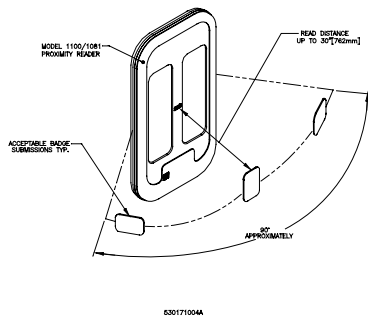
## Introduction

The Model 1100 is designed for use as a parking lot reader mounted on a pole. The Model 1081 is designed for indoor applications (but can be used outdoors) mounted on a non-metallic wall.

These readers have an extended badge read range that provides “hands free” operation. Simply drive (for the Model 1100) or walk (for the Model 1081) close by the reader with your badge and a valid badge will open the gate or door. You do not need to use your hands to present the badge.

The reader transmits a wake-up field extending all around the reader. When a badge is presented, energy from the field powers the electronics inside the badge allowing it to transmit its unique data to the reader. The reader receives, interprets, and checks the data, sending only uncorrupted badge data to the microcontroller. Due to the nature of the wake-up field, the maximum read range will be realized only if the badge is presented to the reader on an imaginary semi-circle centered on the reader, as shown below.

Figure 1. Badge to reader presentation



In the supervised modes, the reader also monitors and reports the status of a normally-closed door contact switch and a normally-open exit request pushbutton.

## Safety

### Radio interference



**WARNING:** This is an FCC Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take adequate measures.

---

### Electrostatic discharge (ESD) precaution



**WARNING:** Circuit board components are vulnerable to damage by electrostatic discharge (ESD). ESD can cause immediate or subtle damage to sensitive electronic parts. An electrostatic charge can build up on the human body and then discharge when you touch a board. A discharge can be produced when walking across a carpet and touching a board, for example. Before handling any board, make sure you dissipate your body's charge by touching ground. This discharges any static electricity build-up.

---

## Product features

The GE Models 1100 and 1081 Long Range Proximity readers offer the following:

- Clear, logical interface with three LEDs and a beeper.
- The ability to read all ProxLite™ and Entrée™ badges.
- Four modes of operation are available: F/2F, Supervised F/2F, Wiegand 4001 (40-bit format), and Wiegand 4002 (40-bit format). In Supervised F/2F mode, a disruption in communications or a tripped tamper switch causes the microcontroller to take the reader offline.
- A reader can be installed up to 1,400 feet from the power supply and still attain maximum read ranges.
- Communication between the reader and microcontroller can be accomplished up to one mile over a standard telephone cable.
- Built-in intelligence for communication with the microcontroller.
- 15V to 30VDC operation.
- Rugged, weatherproof, polyurethane housing construction for outdoor installation.
- Power-on self test.
- Automatic self-tuning is performed at power-up to compensate for site conditions.
- Built-in tamper alarm.
- If 1K resistors are installed, door DI and exit request are supervised. Otherwise, door DI and exit request are unsupervised.

# System requirements

For UL compliant installation notes, refer to *“UL Listed Installations” on page 24*

Host software	<ul style="list-style-type: none"><li>• Secure Perfect® Edition 3.0 or later</li><li>• Picture Perfect™ 1.7 or later</li></ul>
Microcontrollers	<ul style="list-style-type: none"><li>• Micro/5-PX with 2RP or 8RP</li><li>• Micro/5-PXN with 2RP or 8RP</li><li>• M5PXNplus with 2RP or 8RP</li><li>• Micro/PX-2000</li><li>• Micro/PXN-2000</li><li>• M2000PXNplus</li><li>• M3000PXNplus with 2RP or 8RP</li></ul>
Micro firmware	For Micro/5-PX, Micro/5-PXN, Micro/PX-2000 and Micro/PXN-2000: <ul style="list-style-type: none"><li>• Secure Perfect: 3.1.0.6 or later</li><li>• Picture Perfect: 1.7.0 or later</li></ul>
Badge and keytag formats	<ul style="list-style-type: none"><li>• Magstripe: ABA Track 2 (up to 20 digits)</li><li>• ProxLite</li><li>• ISO ProxLite</li><li>• ProxLite Keytag</li></ul>



# Technical specifications

For UL compliant installation notes, refer to [“UL” on page 24](#)

Operating temperature range		-31 F (-35 C) to +150 F (+66 C)
Relative humidity		Suitable for outdoor use
Physical dimensions (HxWxD)		29" (737 mm) x 16" (406 mm) x 2" (51 mm)
Index of protection		IP55
Weight	Model 1100	10.2 lbs. (4.6 kg)
	Model 1081	13.2 lbs. (6.0 kg)
Input voltage range		<a href="#">See “Input voltage” on page 6.</a>
Power supply		Nominal 15 to 30 VDC 1.5A @ 15 VDC and 0.7A @30 VDCED active)
Heater kit power consumption		400 mA @ 24 VAC
Maximum cabling distance		<a href="#">See “Cable lengths” on page 7.</a>
Read range		ProxLite: up to 30 inches (762mm). This read range is influenced by site conditions and badge variability. See <a href="#">Figure 1</a> on the next page
Color		Light gray
Agency approvals		FCC Class A part 15
		CE
		UL 294

## Input voltage

The Models 1100 and 1081 readers are designed to provide maximum flexibility to the installer.

- The reader may be operated from 15VDC to 30VDC.
- The current required is 750mA at 24VDC.

**Note:** Since the reader includes its own switching regulator, the actual reader current draw will vary with the voltage supplied. The higher the voltage at the reader, the less the current draw. Since the voltage at the reader varies inversely with cable length, the current draw varies directly with cable length.

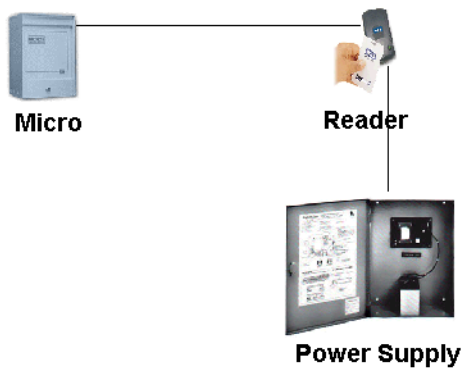
- Multiple readers may use the same supply if it is capable of delivering the total required current. Calculate the total current required by multiplying the number of readers by the current required per reader.
- The voltage at the power supply and the reader will be different depending on the gauge and length of the cable used to provide reader power.



Input voltage, measured at the reader, should never exceed 30VDC.

---

## Cable lengths



### Reader to micro data cable distance

In the Supervised and F/2F modes, the maximum reader-to-microcontroller cabling distance is 5,500 feet (1676 meters) for wire gauges between 18AWG and 22AWG.

### Reader to power supply cable distance

The maximum cable lengths allowed between the reader and power supply vary depending on the voltage. [Table 1, “Maximum power supply cable length”](#) shows the cable lengths allowed.

Table 1. Maximum power supply cable length

Power Supply Voltage	Maximum cable length in feet/meters using...		
	22 AWG	20 AWG	18 AWG
20VDC	50 ft/15 m	100 ft/30 m	150 ft/46 m
24VDC	325 ft/99 m	500 ft/152 m	800 ft/244 m
28VDC	575 ft/175 m	900 ft/274 m	1400 ft/427 m

## Parts list

- Model 1100 reader
- Model 1081 reader
- Hardware kit, pole mounting
- Hardware kit, wall mounting
- Connectors: 6 pos. and 12 pos.
- 1/8 inch hex tamper key

Refer to the GE product catalog for part numbers and ordering information.

## Installation overview

The following steps are general instructions for installing the 1100/1081 reader. Each step is explained in further detail in the sections that follow.

1. Mount the reader backplate.  
*Refer to “Mounting the reader” on page 9.*
2. Configure the reader  
*Refer to “Configuring the reader” on page 13.*
3. Connect the reader.  
*Refer to “Connecting the reader” on page 15.*
4. Test the reader.  
*Refer to “Testing the reader” on page 18.*



NEVER REMOVE THE BOARD FROM THE READER. NO  
USER SERVICEABLE PARTS INSIDE.

---

## Mounting the reader

The Model 1100 reader is mounted on a pole (not provided) using four screws and clamps which are provided. The Model 1081 reader can be mounted on either an internal or external nonmetallic wall using four screws (not provided).

Some electronic equipment, particularly computer monitors, emit radio frequency interference that can cause a significant reduction of the maximum read range of the readers. Follow the guidelines below when mounting the readers.

- DO NOT mount within 12 feet of a computer monitor.
- DO NOT mount on a metal wall or door.
- DO NOT mount within 10 feet of power mains.
- Keep the reader at least one foot from steel beams. Items such as metal wall studs located behind dry wall should not cause a problem, but may reduce the maximum read range.
- If the readers are located within 15 feet of each other, they will exhibit a reduction in range which could typically be as low as 24 inches. For more information, [See “Fixed 125 KHz mode” on page 14.](#)

Table 2. Recommended Mounting Distances from Ground by Vehicle Type

Vehicle type	Distance from ground to bottom of reader
Automobile	30" (762 mm)
Light truck	39" (1 meter)
Commercial truck	63" (1.6 meters)

**Note:** These dimensions are recommended; however, each reader installation should be evaluated for all conditions prior to mounting the reader.

For commercial truck installations, it is recommended that additional support be provided along with 1-1/2" mounting pipe as shown in [Figure 3.](#)

## Mounting diagrams

There are two reader mounting methods:

5. **Wall mounting.** Refer to *Figure 2, “Wall mounting instructions - Model 1081 reader,” on page 11.*
6. **Pole mounting.** Refer to *Figure 3, “Pole mounting instructions - Model 1100 reader,” on page 12.*

Figure 2. Wall mounting instructions - Model 1081 reader

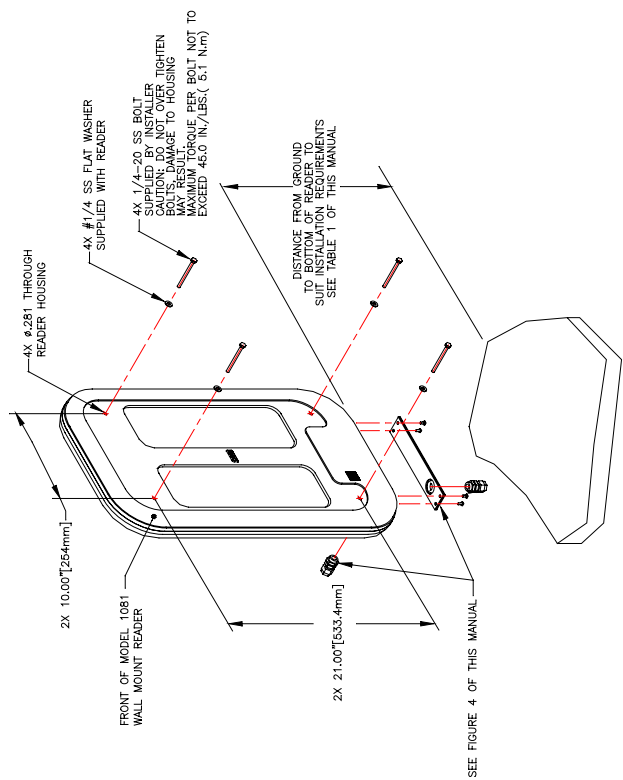
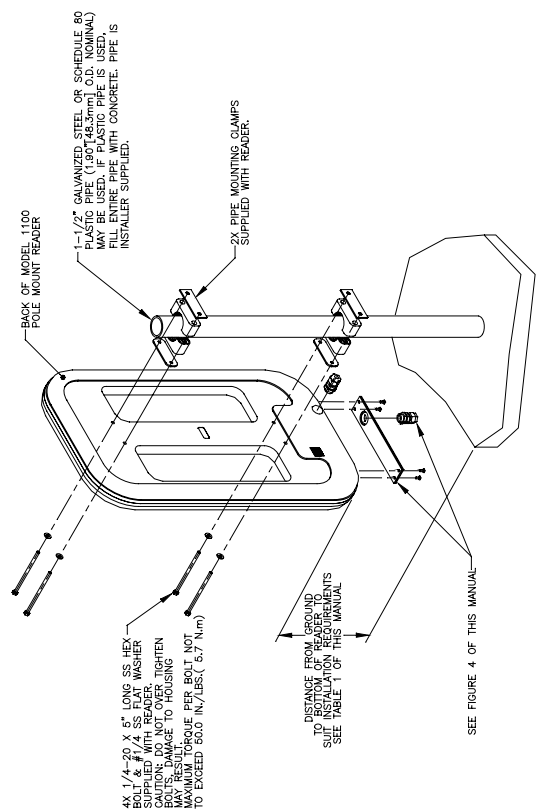


Figure 3. Pole mounting instructions - Model 1100 reader





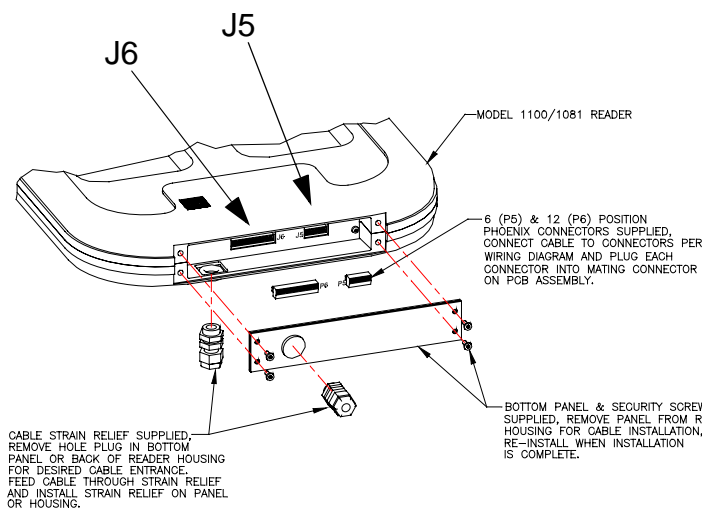
## Configuring the reader

The Model 1100/1081 readers contain two Phoenix connectors. The operation of the reader is controlled by setting the following jumpers:

- J5: Operating mode
- J6: Fixed 125 KHz mode

Refer to [Figure 4](#) for the location of the connectors and the jumpers.

Figure 4. Connector location



## Selecting operating mode

Supervised F/2F is the default operating mode. To use a different operating mode, change the connections of J5 pins 5 and 6 as detailed in the table below.

Table 3. Selection of operating mode

Operating mode	J5
Supervised F/2F	Pin 5-6 Open
F/2F	Pin 5-6 Shorted
Wiegand 4001	Pin 6 to Ground
Wiegand 4002	Pin 6 to <b>J6 Pin 5</b> using a 4.7K ohm resistor

The table below indicates the external pin selection for operation at a fixed 125 KHz. This mode of operation may be desirable in order to reduce interference, if parking lot readers are in close proximity (less than 10 feet) and readers take longer than a second to read a badge. Please note, however, that this selection could result in a significant reduction in read range.

Table 4. Fixed 125 KHz mode

Operating mode	J6
Normal	-
Fixed 125 KHz	Connect 1K ohm resistor from J6-11 to J6-12

## Supervised door and exit request

On power-up, the reader automatically determines if the door DI and exit request are supervised or unsupervised. If door and exit request supervision is desired, 1K ohm resistors need to be installed BEFORE the unit is powered up as illustrated in [Figure 5](#) on page 16.

**Note:** If you are using 4-state supervision of the REX and door status, the reader must be connected to a 2RP, an 8RP, or an M/PX-2000. This configuration is not allowed when the reader is connected to a 2SRP.

# Connecting the reader

## Pinouts

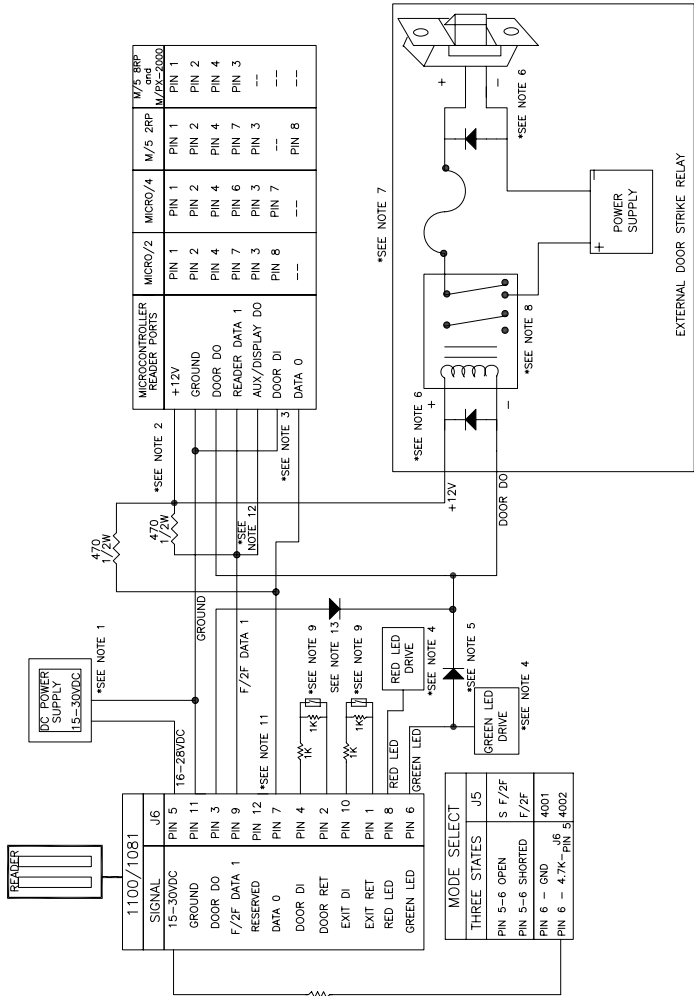
The Model 1100/1081 reader contains two Phoenix connectors. See [Figure 4, "Connector location"](#) for the location of the connectors.

Table 5. Pinouts for connector J6

Pin #	Signal
1	Exit Ret
2	Door Ret
3	Door DO
4	Door DI
5	15 to 30VDC
6	Green LED
7	Wiegand Data 0
8	Red LED
9	F/2F, Wiegand Data 1
10	Exit DI
11	Ground
12	Reserved

# Wiring diagram

Figure 5. Wiring diagram, Model 1100/1081 reader



**Note:** Unless otherwise specified):

- 1 DC power supply 15 to 30VDC at 1.0 amps minimum (at 24VDC).
- 2 For Micro/2/4/5 and Micro/PX-2000: a 470 ohm, 1/2W pull-up resistor is required between +12VDC and READER DATA 1. The pull-up resistor should be installed at the microcontroller terminal block. Resistors are supplied with the reader.
- 3 Micro/2 and Micro/4 only: If wiring door DI switch through reader (as shown), door DI on reader board must be connected to Ground.
- 4 Switching the external indicator drives to GND activates the indicator. High impedance deactivates the indicators. These drives may also be connected to user supplied, external indicator driving circuitry.
- 5 The installer-supplied blocking diode may be a 1N4002, 1N4148, or similar diode. It should be located in a secured area.
- 6 Protection diodes may be 1N4002, 1N4003, or 1N4004 for the door strike assembly (supplied by the installer) for DC strikes only.
- 7 Fuse, power supply (fused primary) and relay provided by the installer/customer.
- 8 Relay coil resistance must be 300 ohms or greater at 12VDC.
- 9 If supervision of Door DI and Exit Request is desired, install the 1K resistors supplied with unit as shown. Request to exit (REX) terminals on the reader are not to be connected for UL listed installations.
- 10 If using shielded cable, connect the shield at the micro end as shown in "CE/FCC compliance" on page 26. The shield must not be connected at the reader.
- 11 Connect for Wiegand modes (4001 and 4002) only.
- 12 AUX/Display DO connection for F/2F mode only.
- 13 Blocking diode may be type 1N5817 or GE part number 521224001 (included with reader). The diode must be installed in a secure location, not accessible through the reader removal.

## Testing the reader

Perform the following test procedure to verify correct operation of the Models 1100 and 1081 Long Range readers:

1. Check all cabling and electrical connections from reader to microcontroller.
2. Verify that the microcontroller is properly configured (refer to the appropriate GE microcontroller manual).
3. Apply power to the reader and verify that the yellow LED is on.
4. It may be desirable to test the connections with a multimeter. All measurements are done on connector J6. Using ground (pin 11) as a reference, the power (pin 5) and data (pin 7) lines should measure 9 to 14 volts on a 12-volt system. The door DO (pin 3) should measure approximately 12 volts on a 12-volt system.
5. Ensure the proper version of the firmware is installed in the microcontroller.  
Refer to the appropriate microcontroller manual.
6. Verify proper reader operation as follows:
  - a. Select a known good test badge. Be sure that the badge is properly enrolled in the host system.
  - b. Ensure that the door is secure. This is the first step to verify that the reader strike relay is wired properly.
  - c. Pass the card in front of the reader. Observe that the yellow LED blinks and the reader beeps briefly.
  - d. Observe that the green LED turns on and remains on, indicating a valid access has been granted by the host.
  - e. Open the door. This verifies that the reader strike relay operates properly.

## Indicators

A tri-color LED (red, yellow, and green), and a beeper are incorporated into the reader and operate as indicated in the following table

CONDITION	STANDARD INDICATORS
Power-up (first 5 seconds)	Yellow LED on if Exit request switch closed Yellow LED off if Exit request switch open Green LED on if Door DI switch is closed Green LED off if Door DI switch is open
Power-on	Yellow LED on continuously
Reader ready	Yellow LED on continuously
Card read	Yellow LED blinks off briefly, 1 short beep
Valid access	Yellow LED on continuously, Green LED on until door strike is deactivated.
Loss of	Red LED flashes slowly, 3 short beeps every 30 seconds
Tamper (Supervised)	Red LED flashes quickly, 3 short beeps every 30 seconds

## Troubleshooting the reader

If the operation of a component is in doubt, substitute a known good component and retry the system.

Always verify wiring against the wiring diagrams before powering up the system.

Refer to the following Troubleshooting Chart.

Table 6. Troubleshooting

If you see this:	Explanation/action:
None of the LEDs are on.	<p>Swipe a badge through the reader and listen for the beep while watching the yellow LED.</p> <p>If the beeper does not sound and the yellow LED is off, check the power connection to the reader as described in <a href="#">step 4</a> of the Test Procedure on <a href="#">page 18</a>.</p>
Red LED gives three short, rapid blinks every few seconds.	<p>If the reader is in supervised F/2F mode, the reader has lost communications with the microcontroller.</p> <ol style="list-style-type: none"> <li>1 Check reader-to-microcontroller wiring (refer to the appropriate installation drawing in this manual). Verify that the AUX DO is jumpered to the READER IN on the microcontroller. If the cable length is longer than 500 feet, be sure that the correct pull-up resistor is installed on the microcontroller.</li> <li>2 Verify that the microcontroller has the correct selection for a supervised reader (refer to the appropriate microcontroller manual).</li> <li>3 Try the reader on a different reader input of the microcontroller. If this corrects the problem, the problem is probably in the microcontroller.</li> <li>4 Replace the reader with a known good reader. If this corrects the problem, return the defective reader for repair.</li> <li>5 If you have eliminated all of the above possibilities (steps 1 through 4), there may be a significant electrical noise source present in the installation that is interfering with the reader-to-microcontroller communications. If so, the use of shielded wire for the reader-to-microcontroller connections is recommended.</li> </ol>



Table 6. Troubleshooting (continued)

If you see this:	Explanation/action:
Reader beeps three short, rapid beeps per second and red LED flashes at the same rate.	Indicates a tamper violation. Verify that the circuit board is properly secured to the reader housing. If this does not correct the problem, return the reader for repair.
Beeper is always on.	<ul style="list-style-type: none"> <li>• In the supervised mode, the microcontroller may command the reader to turn on the beeper. If the beeper is always on, verify that the system has not told the reader to turn on the beeper. Refer to the appropriate system manual for details.</li> <li>• Replace the reader with a known good reader. If this corrects the problem, return the defective reader for repair.</li> </ul>
Yellow LED does not blink and/or beeper does not turn on briefly when a badge is swiped.	<p>The yellow LED blinks and the beeper turns on briefly to indicate a valid badge read. Perform the following tests using a known good badge:</p> <ol style="list-style-type: none"> <li>1 Present a known good badge to the reader. If the yellow LED does not blink and the beeper does not turn on briefly, replace the reader with a known good reader. If the replacement reader works correctly, return the defective unit for repair.</li> <li>2 If the yellow LED blinks and the beeper does not turn on briefly on the replacement reader, the badge is probably defective.</li> </ol>

Table 6. Troubleshooting (continued)

If you see this:	Explanation/action:
Green LED turns on but the door does not unlock properly OR Green LED does not turn on and door does not open with a valid badge.	<p>The green LED is turned on by an external source. When the green LED is on, the door strike relay is on.</p> <ol style="list-style-type: none"><li>1 Verify that the door strike is wired correctly.</li><li>2 Remove the wire from J6 pin 9 and place a jumper wire from J6 pin 9 to ground (J6 pin 1). Verify that the green LED is now on. If the door is unlocked, the reader and door strike are operating correctly. If the door does not unlock, reconnect the wire on J6 pin 9 and proceed to step 3.</li><li>3 Remove the wires from J6 pin 6 and J6 pin 4. This disconnects the door strike from the reader. If a fail-safe door strike was used, the door should now be open. If a fail-secure door strike was used, the door should now be locked. Take the two wires that were removed from J6 pin 6 and J6 pin 4 and short them together. Note that the status of the strike has reversed; a fail-secure strike is now unlocked and a fail-safe strike is now locked. If the door strike is working as described above, the reader is defective and should be returned for repair. If the door strike is not working, reconnect the wires and return to step 1.</li></ol>

Table 6. Troubleshooting (continued)

If you see this:	Explanation/action:
<p>Reader beeps more than once when a valid badge is presented.</p> <p><b>Note: Applies to supervised mode only.</b></p>	<p>Be sure that you did not leave the badge in the reader's wake-up field for more than 2 seconds or the badge will be read again.</p> <p>In normal operation, the reader beeps and the yellow LED lights briefly each time badge data is sent to the microcontroller. When a badge is presented, the reader reads the badge and tests to see if the badge was read correctly. If the badge was read correctly, the reader sends the data to the microcontroller and waits approximately 1/3 second for the microcontroller to acknowledge receipt of the badge data. If the microcontroller does not acknowledge receipt of the data, the reader sends the data again until it is acknowledged by the microcontroller. Each time the data is sent, the reader beeps briefly. After the reader has sent the badge data unsuccessfully three times, it will stop trying and sound an error signal (three short beeps). This feature is useful in troubleshooting marginal installations. A high level of electrical interference may cause the reader to make multiple attempts at communications with the microcontroller.</p> <p>If multiple beeps occur regularly, refer to the installation diagrams to verify that the correct pull-up resistor has been added to the microcontroller. In the presence of high electrical noise levels, this pull-up resistor should improve communications, even on short cable runs. If the problem persists, the use of shielded cable is recommended.</p>

## Regulatory approvals

### UL



### UL Listed Installations

The following are the results of the UL evaluation of the Model 1100/1081 readers:

- Operating temperature range: +32 F (+0 C) to +120 F (+49 C)
- Relative humidity: 85%
- The Model 1100/1081 readers were evaluated by UL for indoor use only.
- Request to exit (REX) terminals on the reader are not to be connected for UL listed installations.

CE



Manufacturers  
Declaration of Conformity  
For



**Product Identification:** 430133001  
430133002

**Model/type:** Model 1100 Extended Read Range Reader-Wall BOM revision level: F  
Model 1081 Extended Read Range Reader-Pole BOM revision level: F

**Category (description):** Long Range Reader


**Brand:** GE Security

**Manufacturer:** GE Security  
Suite 100  
791 Park of Commerce Blvd.  
Boca Raton, Florida 33487  
USA

**EU Representative:** GE Security B.V.  
Kelvinstraat 7  
6003 DH Weert  
The Netherlands

Concerning	R&TTE		
	EMC	Safety	Radio
A sample of the product has been tested by:	PSE 12955 Bellamy Brothers Blvd. Dade City, FL 33525	PSE 12955 Bellamy Brothers Blvd. Dade City, FL 33525	PSE 12955 Bellamy Brothers Blvd. Dade City, FL 33525
Test report reference	02F237I	02P237	02F237C
Applied standards	EN301 489 (2000)	EN60950 (2000)	EN300 330 v.1.3.1(04-2001)

Equipment class identifier (RF products falling under the scope of R&TTE)

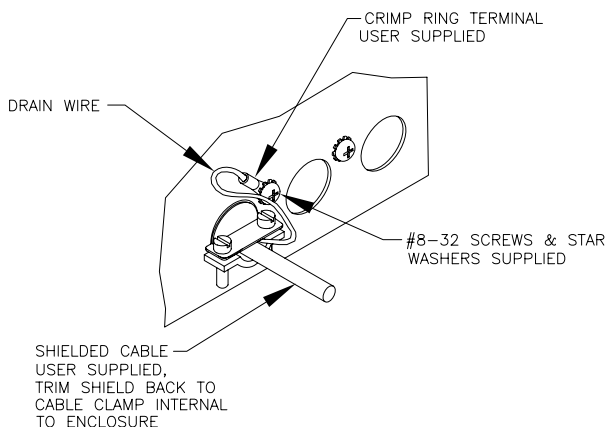
☐ Not Applicable      ☒ None (class 1 product)      ☐  (class 2 product)

**Means of Conformity:**  
We declare under our sole responsibility that this product is in conformity with Directive 93/68/EEC (Marking) and/or complies with the essential requirements and all other relevant provisions of the 1999/5/EC (R&TTE) based on test results using harmonized standards in accordance with the Directives mentioned.

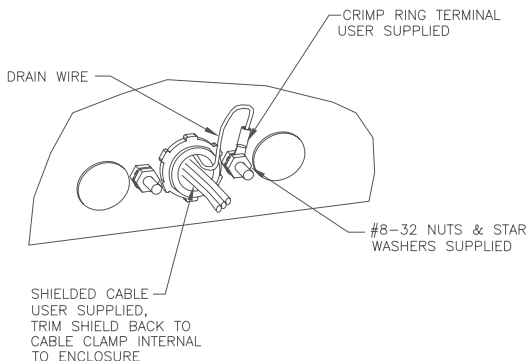
## CE/FCC compliance

To make the Model 1100/1081 reader installation CE and FCC compliant, the cable connecting the reader to the micro must have its shield grounded at the micro, according to one of the methods specified in the figures below.

*Figure 6. Typical installation (Internal to the micro)*



*Figure 7. Typical installation (External to the micro)*



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