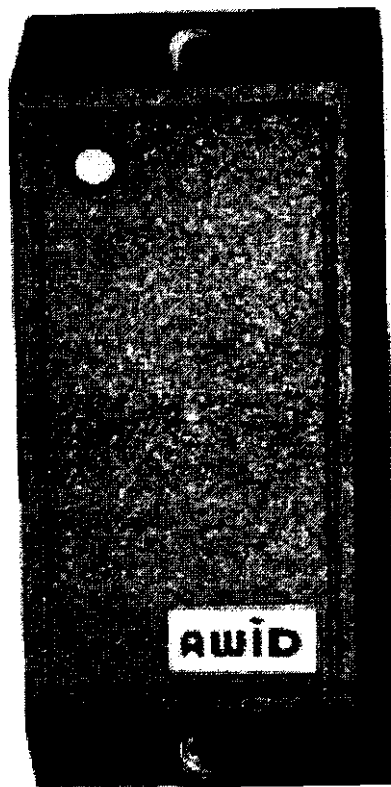


SENTINEL-PROX SR-2400
DOORFRAME PROXIMITY READER

Installation & Operation Manual - 002-98-A



Your best option for Proximity Access Control

Last Update: February 4, 1999



Applied Wireless Identifications Group, Inc.

Table of Contents

1.0 Introduction.....	Page 3
1.1 General Description.....	3
1.2 Special Features.....	3
1.3 Suggested Applications.....	3
2.0 Principal of Operation.....	3
3.0 Specifications.....	4
3.1 Measuring Read Distance.....	4
4.0 Preparation for Installation.....	4
4.1 Site Survey.....	4
4.2 General Good Reader Installation Practice.....	5
4.3 Metal Mounting.....	5
4.4 General Wiring Requirements.....	5
4.5 Power Supply.....	6
4.6 Grounding.....	6
4.7 Wiring Diagrams.....	6
5.0 Installation Procedure.....	6
5.1 Parts List.....	6
5.2 Installation Steps.....	7
5.3 Verification.....	7
5.4 Mounting.....	8
6.0 Warranty.....	8
7.0 Return Material Authorization (RMA).....	8
8.0 Troubleshooting.....	8
9.0 Patents and Approvals.....	9

NOTE: READ AND USE THIS MANUAL.

FAILURE TO DO SO MAY RESULT IN POOR READER PERFORMANCE OR EVEN PERMANENT DAMAGE TO READER, WHICH COULD VOID THE READER WARRANTY.

List of Table

Table 4.4-1: Data Line's Wiring Distance Requirement.....	Page 5
---	--------

List of Figures

Figure 5.2-1: Wiring Diagram for Wiegand Output Format.....	Page 7
---	--------

1.0 INTRODUCTION:

AWID's Sentinel-Prox SR-2400 Reader is one of the best performing Proximity Readers in the industry. This Reader is designed to send out Wiegand format output and is pre-compensated for mounting on metal. Its primary application is for access control.

1.1 General Descriptions:

- ADA compliant design
- Indoor or outdoor installation
- LED visual indicator
- Audible feedback

1.2 Special Features:

- Pre-compensated for mounting on metal with minimum impact on read range
- Slim housing design
- Permanently sealed electronics for outdoor application
- UV stabilized plastic housing

1.3 Suggested Applications

- Access Control
- Asset Management
- Time & Attendance
- RFID

2.0 PRINCIPAL OF OPERATION

This Radio Frequency Identification (RFID) reader or proximity reader uses radio frequency to identify, locate and track people and objects that carry the appropriate transponders. Proximity reader can work in none line-of-sight situations and in darkness, bright sun light or through dirt, grimes and smudges.

A typical proximity system consists of three components – an interrogator or a reader, a transponder or a card and a data processing panel and/or computer combination. Most RFID reader has an internal micro-controller, a transmitter, a receiver and a shared transmit/receive antenna. The card is usually passive (without an internal battery) and consists of an antenna and an RFID ASIC (Application Specific IC). During operation, the transmitter sends out an electromagnetic wave to establish a zone of surveillance. When a card enters this zone, the electromagnetic energy from the reader begins to energize the IC in the tag. Once the IC is energized, it goes through an initialization process and begins to broadcast its identity. This process utilizes a low energy back-scattering technology that selectively reflects or back-scatters the electromagnetic energy back to the reader. The receiving circuits in the reader senses and decodes this back-scattered signal and hence determines the identity of the tag.

3.0 SPECIFICATIONS

- Input voltage.....+5V to +12V
- Input current.....40 to 80 mA typical
- Read range:
 - Prox-Linc-GR.....Up to 4 inches (20 cm)
 - Prox-Linc-CS.....Up to 4 inches (20 cm)
- Transmit frequency.....125KHz (CW)
- Receiver frequency.....125KHz (Amplitude Modulated)
- Operating temperature range.....-30° C to +65° C
- Color.....Dark Gray or Beige
- Output formats available.....Wiegand (Standard)
(Others are available upon request)

3.1 Measuring Read Distance

To measure the read range between Reader and card, grasp the card by the corner or near the slot and move the card slowly toward the Reader, with the card surface parallel to the Reader, until a BEEP occurs. The BEEP indicates that the Reader detects and reads the card. In order to read again, the card must be fully withdrawn from the Reader's read field and then re-approached again. During normal operation, the card can be presented at any angle relative to the Reader, however this will result in slight variation of read range.

Note: Do not "waved" the card in front of the Reader. "Waving" the card in front of the Reader will cause diminishing read range.

NOTE: FAILURE TO FOLLOW THE INSTALLATION GUIDE MAY RESULT IN POOR PERFORMANCE OR EVEN CAUSE PERMANENT DAMAGE TO THE READER. THUS, VOIDING THE PRODUCT WARRANTY.

4.0 PREPARATION FOR INSTALLATION

4.1 Site Survey:

Always conduct a site survey before starting installation, avoid any possible sources of interference. If the Reader is not installed properly, the performance will be degraded or more seriously the Reader may be damaged. The following is a list of installation procedures that should be followed during installation:

- Do not install the Reader in the vicinity where sources of broadband noise may exist. Examples of broadband noise sources are motors, pumps, generators, DC-AC or DC-AC converters, non-interruptible power supplies, AC switching relays, light dimmers, CRT's, induction heater etc.
- Do not let the Reader wiring bundle together in one conduit with the AC power cables, lock power, and other signal wiring.

- Keep all the Reader wiring at least 12 inches (30 cm) away from all other wiring, which include but not limited to, AC power, computer data wiring, telephone wiring and wiring to electrical locking devices.
- Do not install the reader within 12 inches (30 cm) of a computer CRT terminal.

4.2 General Good Reader Installation Practice

- Make sure that the supply voltage of the Reader is within specification. As a rule of thumb, higher supply voltage (not to exceed 12V) results in longer read range but at the expense of higher power consumption.
- Use cables with over-all shield (Screen).
- For best result, run the cable in an individual conduit with at least 12 inches distance away from the AC power, computer data cables and cables for electrical locking devices.
- Use recommended cable. Do not use any un-shielded "Twisted Pair" type cable.
- Use the largest wire gauge possible.
- Use dedicated and linearly regulated power supply, where applicable.
- Use Single Point Grounding (Earthing). No ground loops.

4.3 Metal Mounting

The Reader is pre-compensated for mounting on metal; they can be mounted on any materials, including metals such as aluminum and steel doorframe with minimum loss in performance. However, the Reader should not be framed within or surrounded by metal of any kinds. If the Reader is installed in a metal enclosure, such as a parking station, ensure that the metal stands off at least 2.0 inches (5 cm) on all sides and does not cover up the front face.

4.4 General Wiring Requirements

All the Reader wiring must be continuously shielded. AWID recommends using #22 AWG up to #18 AWG, six or seven-conductor shielded cables. Longer distances and higher current consumption on the power supply line will require larger gauge wires. Refer to Table 4.4-1 and Figure 5.2-1 and Figure 5.2-2 on the following pages to determine your data lines' wiring requirement. Due to system data termination differences, contact your panel manufacturer for their specific requirements.

TABLE 4.4-1: Data Line's Wiring Distance

WIRE SIZE	#22 AWG (0.6mm Dia)	#18 AWG (1.2mm Dia)
WEIGAND	270 ft (85meters)	980ft (300 meters)
RS-232	45 ft (15 meters)	45 ft (15 meters)

NOTE: WHEN USING AN EXTERNAL POWER SUPPLY, ALWAYS USE A LINEAR POWER SUPPLY, DO NOT USE SWITCHING POWER SUPPLY.

4.5 Power Supply

The operating frequency of a typical switching power supply ranges from 15 KHz to 50 KHz. It will usually generate wideband switching noises plus some of its harmonics may fall on or near 125 KHz, the operating frequency of the Reader. Therefore, avoid using a switching power supply at all times. **AVOID** using a single power supply for Reader and the magnetic lock. Doing so will affect the Reader operation and can damage the Reader.

4.6 Grounding

Grounding is critical for proper operation of the Reader. When installing the Reader, it is crucial to assure that the earth ground is the best ground available. If you elect to use the AC main power ground, conduct a test by measuring its resistance relative to a known good ground, such as a cold water pipe or a structural steel that is in direct contact with the ground. The resistance should be less than 50 ohms. If you find that the AC main power does not provide adequate earth ground, try using a solid connection to a cold water pipe.

For multiple Readers installation, it is critical that all Readers are connected to the same grounding system. Using different grounding systems will create secondary current paths or ground loops that can affect the performance and cause damage to the Reader.

4.7 Wiring Diagrams

The Reader is designed for Wiegand and RS-232 standard communication formats; use Figure 5.2-1 for Wiegand format installation and Figure 5.2-2 for RS-232 format installation. If an external power supply is being used, leave the Panel's Ground and Power terminals open and connect the Reader's Ground (Black) and 5-12VDC (Red) terminals to the external power supply.

5.0 INSTALLATION PROCEDURE

Check to verify that every item listed under Section 5.1 of this manual is present before starting the installation.

5.1 Parts List

- | | |
|--|-----------------|
| a. Installation sheet, P/N: 002-97-A | QTY=1 |
| b. Sentinel-Prox SR-2400 Reader, P/N: 002-20-A | QTY=1 |
| c. #6-32x1" Thread-cutting screw, Type 23, P/N: 616PPN23ZP | QTY=2 |
| d. Screw hole plug, P/N: 002-27-A | QTY=3 (1 spare) |

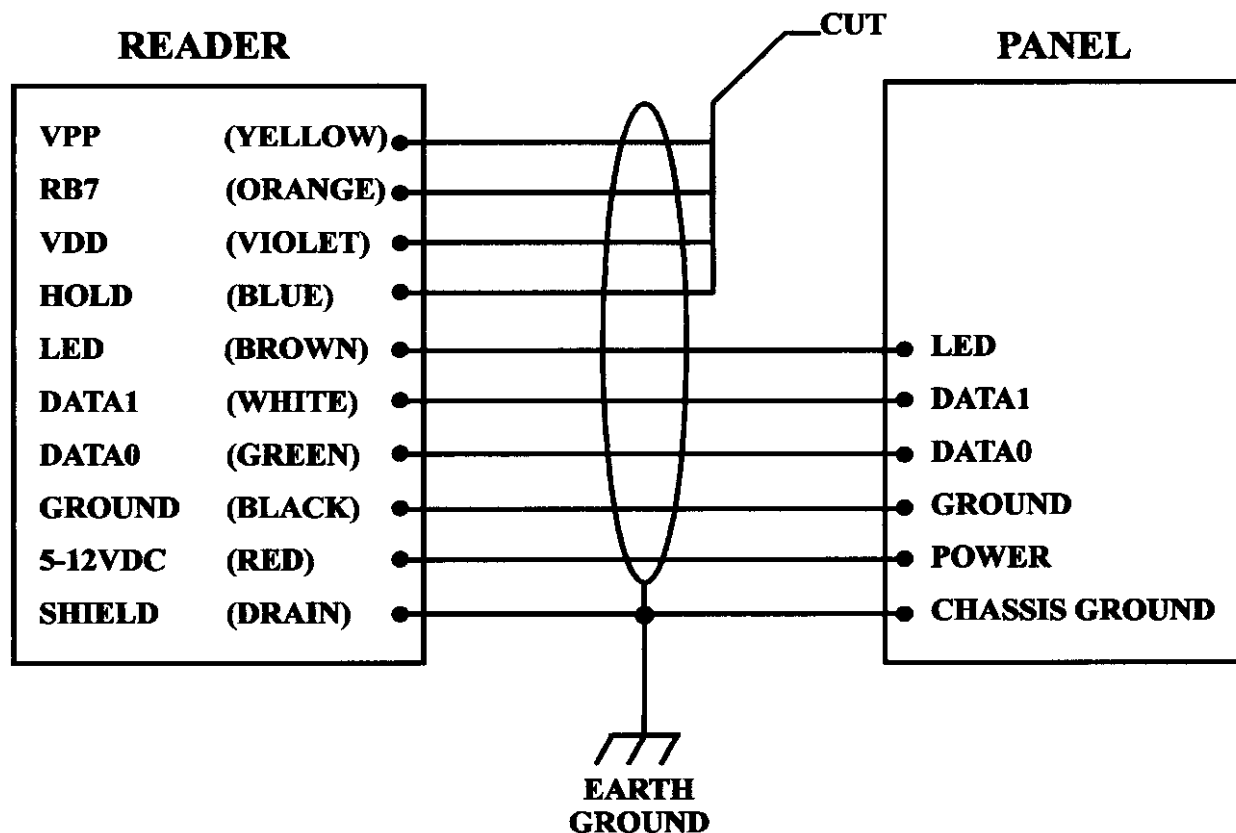
5.2 Installation Steps

- Position the Reader (Item b on Parts List) at the appropriate mounting position
- Use Figure 1 of the Installation sheet (Item a. on Parts List) as template for drilling holes.
- Position the template at the same location as the Reader.
- Drill two 7/64 (0.109)-inch holes as shown on the template.
- Drill one clearance hole for the cable and wiring lugs.
- Install a bushing or grommet to provide a smooth edge around the clearance hole.
- Guide the open end of the Panel's control cable through the clearance hole.
- Connect the Reader and the Panel together according to Figure 5.2-1.

5.3 Verification

- Power up the PANEL, the LED on the Reader should show RED.
- Place a "good" card in front of the Reader. The reader will give out "ONE" audible BEEP and the LED will change from RED to AMBER momentarily and than flashing between RED & GREEN. The reader will stay flashing until the panel sends an acknowledgement or until the card is removed from the reader. You can repeat this action by placing the card in front of the reader after the LED turned RED. If the Panel did not send a logic "HIGH" LED (brown) command to the reader, the reader will "latched" and must be powered off to re initialize.

Fig. 5.2-1 Wiring Diagram for Wiegand Output Format



5.4 Mounting

- a. Mount the Reader to the doorframe with the #6-32x1" Thread-cutting screw, Type 23 (Item c on Parts List).
- b. Insert the Screw hole plug (Item d on Parts List) into the screw clearance holes to conceal the screws.

6.0 WARRANTY

AWID's products are warranted to the original purchaser to be free of defects in material and workmanship for the life of the product. Any tampering or modification to the product will void this product warranty. AWID does not warrant any product as to its merchantability or suitability of use. AWID's sole and complete responsibility under this warranty is expressly limited to repair or replacement of the warranted product.

7.0 RETURN MATERIAL AUTHORIZATION (RMA)

AWID monitors and tracks the life cycle performance of our product through our RMA system. All customers must obtain a RMA number from AWID Customer Service Department prior to returning the merchandise. After the customer provides AWID Customer Service Department with the serial number and a description of the returning item, a RMA number will be issued. **This RMA number must be clearly marked on the outside of the returned package and noted on the paperwork attached to the returned merchandise.**

When obtaining a RMA number for RFID tags, please provide AWID Customer Service Department with the serial numbers, card identification numbers, facility codes and etc. If exact duplicates of returned cards or tags are requested, the customer must provide AWID with the numbers needed. AWID reserves the option to replace or repair returned merchandise.

Items returned to AWID without the proper authorization will be returned to the originators at their own expense.

8.0 TROUBLESHOOTING

This unit, if not installed in strict compliance with AWID's installation instructions, may not function to specifications. Use the checklist below to identify the problem:

- Is the card valid and working? - Try some different cards!
- Is the reader wired correctly? - RED-BLK :5-12V, BWN-BLK: 5V, reader should work
- Is the unit grounded properly? - DRAIN-EARTH: less than 50 Ohms
- Is the card presented correctly? - Card face parallel to reader face
- Is a power supply correct? - No switching power supply please!
- Is reader voltage/current correct? - 5-12V @ 40-100mA typical
- Is the environment free from electromagnetic interference? - Run cable away from other data carrying cables, reader away from electromagnetic interference sources!

When troubleshooting, try to identify the source of the problem to a unit level. "Is the problem from the panel?" or "is the problem originated from the Reader? " Maybe the problem "is the power supply?"

All AWID's readers will need only a power supply and a valid card to work properly. If the reader is only connected with RED (+5-12V) and BLACK (Ground), the reader will BEEP and momentarily turned AMBER, when a valid card is presented. If the Card stays within the reader zone of surveillance, the LED on the reader will become flashing GREEN. When the card is removed, the LED will return to RED, signifying it has returned to stand-by mode. When the reader works according to the tests above, the reader is working properly.

To check the validity of the output data in the absence of a panel, you will need to build a patch cable between the reader and a PC. Call AWID's technical support for details.

If problem persists, consult the system manufacturer. If problem is the reader, consult AWID's Technical Assistance Department. AWID help desk is opened from 8:00 AM to 8:00 PM Eastern Standard Time, and can be reached by dialing 1-800-369-5533.

9.0 PATENTS AND APPROVALS

AWID products are covered by United States patent #5594384.

AWID logo is a registered trademark of Applied Wireless Identifications Group, Inc.

Where required, AWID's products will be approved by the appropriate regulatory agencies:

U. S. Federal Communications Commission:	Part 15
Underwriter Laboratory:	UL 294
Designed to Comply with:	CE, UL, VDE, BZT, DTI & PTT

Information To The User

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.