Operations Manual

Sense RFID Scanner

Model Sense-1820

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Version 70.02 Rev. A

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Chapter 1

Introduction

The Sense-1820 scanner and the Sense 9000 series Radio Frequency (RF) tag developed by SENSE TECHNOLOGY are state-of-the-art data gathering
and inspection systems that combine sophisticated Interactive Identification technology in a compact form factor. This unique synergy allows our system to integrate seamlessly into — and significantly increase productivity for — a wide range of applications and environments.

This system consists of the following components:

A scanner that is capable of writing information to and reading information from Sense 9000 series Radio Frequency (RF) tag using a read/write head (antenna). The scanner conforms to FCC Part 15 specifications and can operate with one to nine externally connected antennas.

Sense-9000 series tags that contain information programmed by the scanner. These tags are designed to store information under extremely harsh environments without requiring a battery, and the read/write Sense-9000 series tags can store a permanent record of multiple events and transactions.

Communications between the scanner and the tags are conducted using a revolutionary two-way technology that provides superior advantages over conventional communication methods. The specific data being communicated, and the amount of interaction you have with the scanner and tag, are determined by your application.

Advantages

Data-gathering systems such as bar code readers use one-way communication: a sensor reads information from a device, without any interaction between the two devices.

Moreover, bar code systems are subject to line-of-sight limitations. As a result, airborne contaminants such as dust, dirt, oil, and mist, as well as label damage and objects residing outside the line of sight, result in inefficient and erroneous results.

The SENSE TECHNOLOGY Interactive Identification System overcomes these restrictions by using state-of-the-art technology. This technology allows the scanner and tag to conduct ongoing two-way communications that are not restricted by line-of-sight constraints.
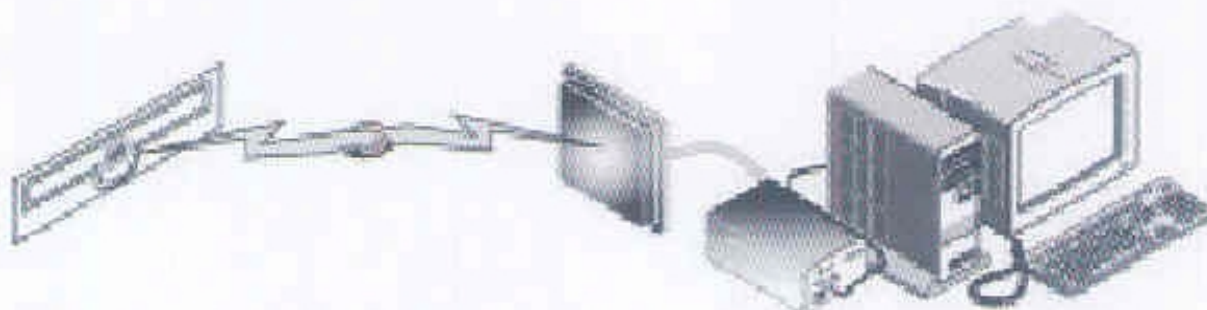
Figure 1. Interactive Identification Technology

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This unique capability allows:

• *Collective or selective data to be read from a single tag.*

• *Collective or selective data to be read from multiple tags without requiring sorting or unpacking.*

• *Classes of tags to be filtered according to user-defined criteria.*

This technology employs a superior interrogation feature that enables applications to uniquely identify all tags in the scan field, without misidentification or identifying the same tag multiple times.

It also uses a robust protocol that maintains a uniform per-tag scan time, regardless of the number of tags in the scan field. The protocol provides a flexible software application interface that can be customized to the specific needs of particular industries and markets.

These unparalleled capabilities make our system an ideal solution for logistics and warehousing, automatic sortation, pallet tracking, and anti-diversion/anti-counterfeiting applications.

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What Else You Need

To complete your system, you need an IBM or compatible personal computer with the following minimum system requirements:

• 486 processor or better

• Compatible screen and keyboard

• 9-pin RS-232 port

• Windows 95 or 98

• 16 MB of RAM (32+ MB recommended)

The applications you use to interface with this system may have additional hardware and software requirements. For more information, consult the manual that came with your applications.

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Summary of Chapters

Besides Chapter 1, this Operations Manual contains the following additional chapters:

- *Chapter 2, Installation _* describes how to install the scanner and tag(s)

- *Chapter 3, RF Communication* - provides information on radio frequency (RF) communications

- *Chapter 4, Troubleshooting _* describes how to identify, resolve, and avoid problems when using the scanner and tag. This chapter also contains Customer Service information and merchandise return instructions

- *Chapter 5, Specifications _* lists scanner specifications

Chapter 2

Installation

This chapter provides instructions for installing theSense-1820 scanner

and tag(s).

I Before installing theSense-1820 Scanner and antennas, the operator should be familiar with the RF exposure precautions as outlined in the RF Exposure guidelines on page 41 of this manual.

Front Panel

The scanner front panel has three LEDs (as shown in Figure 4) indicating power, activity, and transmitter ON/OFF (see Table 1 which describe the meanings of the LEDs).

The scanner front panel has an On/Off switch.

In the Power ON LED, the scanner is turned on. The red Power ON LED should go ON, indicating that the scanner is receiving power.

The front panel also contains four connectors. The left connector is a DC power receptacle. For more information, refer to "Connecting to a DC Source" on page 14.

The middle connector is the 9-pin RS-232 port. The RS-232 serial port connector allows the scanner to communicate with a personal computer

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Scanner Installation Steps

The scanner installation consists of the following steps:

1. Position the scanner — locate near desired antenna locations.

2. Connect external antennas — see page 12.

3. Place the antenna for optimum read/write operation — see page 12.

4. Connect the scanner to PC serial port or RS-232— see page 13.

5. Connecting to a DC source— see page 14.

6. Configure the scanner — see page 15.

7. Align the antenna — see page 18.

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Connecting to a PC Serial Port or RS-232

The scanner has a 9-pin female RS-232 connector that connects to a serial port or RS-232 connector on an IBM or compatible personal computer. The serial port can operate up to 57,600 bps.

To make this connection, you need:

An appropriately configured serial cable.

One of the following adapters, if your computer's serial port does not have a 9-pin connector:

- A 15-pin to 9-pin adapter, if your computer has a 15-pin serial port connector.

- A 7-pin to 7-pin adapter, if your computer has a 7-pin port connector.

These adapters are available from most computer and electronics stores.

Use the following procedure to connect the scanner to your computer's serial port.

1. Attach the male connector on the serial cable to the 9-pin serial connector on the scanner's front panel (see Figure 3).

2. Connect the other end of the cable to your computer's serial port. Use an adapter, if appropriate, to make this connection.

Connecting to a DC Source

The following procedure describes how to connect the scanner to an AC Outlet.

1. Verify that the On/Off switch on the scanner front panel is in the OFF (down) position.

2. Connect a DC power supply to the DC receptacle on the scanner front panel. The DC power supply must provide between 5 VDC at 4 AMPs

Testing the Scanner Setup

The following procedure will verify that the RS-232 link between the scanner and the computer is functioning correctly, and test the full functionality (read, write, multiread) of the scanner in the surrounding environment.

1. Insert the supplied Sense-1820 Development and Demo Tools, Disk 1, into an available floppy disk drive.

2. Open the "My Computer" icon on the desktop.

3. Open the floppy disk drive (typically A:).

4. Run the application "Sense-1820 Demo.exe"

5. Installshield will launch and guide you through the installation of the "Sense-1820 Demo.exe" onto your computer.

6. Turn on the scanner and ensure that the antenna is connected to the scanner.

7. Select the"Sense-1820 Demo.exe" icon in the"Sense-1820 Demo.exe" folder from the start menu.

8. If the scanner is attached to COM1 to COM9、, it will be selected by the icon "com ports" manualy. In the application dialog, you will see the text "found scanner (rev XX.XX) on COMX".

I *If you receive the error message "Can't find scanner on COMX" refer to page 27 for troubleshooting procedures.*

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9. Each Test mode is composed of three commands given to the scanner. If the test is successful, all these tests should say "*****OK" after the test name. The application will ask you to repeat the,　The test is complete when the application successfully detects two tags.

10. The Write Test requires a write - capable tag. Place the tag within 24 inches of the antenna.

11. Click on the Write Test button and observe the results in the Test Results box. If the test passes, you will see:

"Write: OK"

12. If the test fails, follow the instructions given by the application. ensure the tag is directly over the antenna and there are no objects between the antenna and tag.

13. This completes the scanner test.

I *Please refer to the "RF Exposure" section page on 41 for safety precautions.*

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Aligning the Antenna

After verifying that the scanner is operating properly, use the following procedure to align the antenna(s). Aligning the antenna(s) ensures optimal performance.

1. Connect the scanner to COM1 or COM2 and turn the power on.

2. Run the application icon in the "Sense-1820 Scanner Demo" folder in the start menu.

3. Adjust the antenna until the application indicates it detects a tag. You can find the complete scanning field by moving the tag around. When the application detects a tag, the window will flash with the message "Tags Found". Press the "GO" button again to stop the alignment test.

This completes the Sense-1820® scanner installation procedure.

Panel Antenna

1. Product Number: Sense-G900B/h (Horizontal polar panel antenna)
2. Electrical Specifications:

Frequency Range:	900MHz~928MHz
Polarization:	Horizontal
Horizontal 3dB Beamwidth:	65° ± 5°
Vertical 3dB Beamwidth:	30° ± 2°
Gain:	7.0dBi
VSWR:	<1.3
Front-Back Ratio:	>20dB
Impedance (Ω):	50
Maximum Input Power (w):	500
Connector:	N-F
Lightning Protection:	Direct Ground
Work Temperature Range:	-70℃ ~ +55℃

3. Mechanical Specifications:

Dimensions (L X WX H) (mm):	580x290x120
Weight of Antenna:	4.5kg
Weight of Mounting Kits:	5.3kg
Diameter of Installation Pole:	50mm~110mm
Radome Material:	UPVC

4. Setup Adjust:

Horizontal:	360°
Angle of Pitch:	0°~30°
Rated Wind Velocity:	241km/h

The antenna is fixed and permanently attached, a unique connecting to the RF ID Scanner had considered sufficient. The manufacturer design it so that other antenna cannot be replaced by the user.

Installing Sense-9000 series tagss

Sense-9000 series tags have a diminutive form factor that allows them to be installed in areas that cannot accommodate conventional RF tags. In addition, Sense-9000 series tagss can communicate with the scanner without having to be in the line-of-sight. This unique combination provides tremendous flexibility when determining a location for placing tags.

In textile applications, for example, tags can be inserted into the front tail of a shirt or the waistline of pants using a heat seal patch and a heat press. Because this system does not require line-of-sight scanning, the tag does not have to be visible to the scanner.

When considering locations for installing tags, make sure that the objects with tags attached will be within 84 inches of the scanner antenna for at least 3 milliseconds so data (16-bit word) can be read from the tag. Avoid locations where metal or water is present because radio-frequency communication does not penetrate metal and is absorbed by water.

Reading Information from your Sense-9000 series tagss

Once you have installed your tags, and have set-up your scanner system, you are ready to begin.

1. Run the "Sense-1820 Demo" application in the "Sense-1820 demo. exe" folder in the start menu.

2. The connect dialog box will appear, set COM Port to the port where the scanner is connected, Baud Rate to the highest value supported by your computer and cable length.

3. After a few seconds, the main SENSE Technology Demo dialog will come up. The scanner is in demo mode. As you move a tag into the field in front of the antenna, you will see the ID of that label displayed under Label ID.

4. Try moving additional tags in front of an antenna. You can also reset the display with the Clear button.

5. On the display arer of a tag to bring up detailed information about that tag. This will bring up a tag dialog where you can see the data in each of the memory locations of the label. Additional usage of this dialog is described in the following section.

Writing Information to Your Sense-9000 series tags

Read/write tags can be written to using the scanner. Each bit of memory is write once, read many (WORM). Meaning after you have written to a specific bit, it is permanent and cannot be overwritten or erased. To add more data to the tag you must write to a different bit. Another feature included with each user-writable word of memory is a Write-Protect bit. This bit allows you to protect an entire word (16 bits) after any or all of the bits have been written.

1. Start the Sense-1820 Demo application as described in the previous section.

2. Position an object with a tag within 24 inches of the transmitting antenna and double click on its ID to bring up the tag dialog.

3. In the Write Protect frame, hit "Query All". Any writable memory location will become editable (white), while write protected memory locations will stay gray.

4. Move the mouse cursor over a memory location and click within that location to edit it. Enter a new value and then hit "refresh" or move the cursor to a different memory location and click. The application will attempt to write the value you specified to the tag.

5. The status of the tag will be displayed in the status box at the lower part of the screen. If the write was unsuccessful, the value in the memory location will change back to reflect the value actually stored there.

6. To write protect a memory location, move the cursor to a memory location and click the "Set" button in the Write Protect section. The memory location will change from a white background to a gray background to show that it is now write protected.