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# MS-890 Industrial Automation Scanner User Manual



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# About the MS-890 Industrial Automation Scanner

The key features of the MS-890 Industrial Automation Scanner are:

- Wide angle sweeping raster
- Long-distance read range (10" to 120" (254 mm to 3,048 mm))
- EZ Button setup
- Configurable with ESP Software
- 400 to 1,000 decodes per second
- IP65 rated enclosure
- Optional wiring box
- LED performance indicators

## About This Manual

This manual provides complete information on setting up, installing, and configuring the MS-890 Industrial Automation Scanner. The chapters follow the **ESP** menus, which are presented in the order in which a scanner might be set up and made ready for industrial operation. Host serial commands are presented side-by-side with **ESP**.

## Highlighting

Serial commands, highlighted command fields, and default command settings are highlighted in **rust bold**. Cross-references and web links are highlighted in **blue bold**. References to **ESP**, its toolbar headings (**Communications**, **Read Cycle**, **Symbologies**, etc.), menu topics, and other points of emphasis, are highlighted in **Bold Initial Caps**.

## Host Communications

There are four ways to configure and test the MS-890 Industrial Automation Scanner:

- EZ Button.
- Omron Microscan's Windows-based **ESP** (Easy Setup Program), which offers point-and-click ease of use and visual responses to user adjustments.
- Serial commands, such as **<K100,1>**, that can be sent from **ESP's Terminal** or another terminal program, or encoded in Code 128 symbols.
- The tree controls and graphic interfaces in **ESP's App Mode**.

# Statement of Agency Compliance



The MS-890 Industrial Automation Scanner has been tested for compliance with FCC (Federal Communications Commission) regulations and has been found to conform to all applicable FCC Rules and Regulations.

To comply with FCC RF exposure compliance requirements, this device must not be co-located or operate in conjunction with any other antenna or transmitter.

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



The MS-890 Industrial Automation Scanner has been tested for compliance with CE (Conformité Européenne) standards and guidelines, and has been found to conform to applicable CE standards, specifically EN61000-6-3:2001: for Class A products; EN61000-3-2:2000+A2:2005; EN61000-3-3:1995+A1:2001; EN61000-6-2: Immunity.

The MS-890 Industrial Automation Scanner has been tested by an independent electromagnetic compatibility laboratory in accordance with the applicable specifications and instructions.

## ***Approvals***

This equipment is in compliance or approved by the following organizations:

- FCC (Federal Communications Commission)
- CDRH (Center for Devices and Radiological Health)
- CE (Conformité Européenne)
- UL/cUL (Underwriters Laboratories, Inc.; UL Canada)
- BSMI (Bureau of Standards, Metrology and Inspection)

## **Warning and Caution Summary**

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 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.

European models must use a similarly rated Class I or Class II power supply that is certified to comply with standard for safety EN 60950.

*Use of controls, adjustments, or performance of procedures other than those specified herein may result in hazardous laser light radiation exposure.*

*There are no user serviceable parts in the scanner. Opening the scanner voids the Omron Microscan Systems warranty and could expose the user to laser diode power of up to 7mW.*

*The laser beam can be harmful to eyesight. Avoid eye contact with the laser beam. Never point the beam at other people, or in a direction where people may be passing.*

## Statement of RoHS Compliance

All Omron Microscan readers with a 'G' suffix in the FIS number are RoHS-Compliant. All compliant readers were converted prior to March 1, 2007. All standard accessories in the Omron Microscan Product Pricing Catalog are RoHS-Compliant except 20-500013-01 and 98-000039-02. These products meet all the requirements of "Directive 2002/95/EC" European Parliament and the Council of the European Union for RoHS compliance. In accordance with the latest requirements, our RoHS-Compliant products and packaging do not contain intentionally added Deca-BDE, Perfluorooctanes (PFOS) or Perfluorooctanic Acid (PFOA) compounds above the maximum trace levels. To view the document stating these requirements, please visit:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32002L0095:EN:HTML>

and

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:372:0032:0034:EN:PDF>

Please contact your sales manager for a complete list of Omron Microscan's RoHS-Compliant products.

This declaration is based upon information obtained from sources which Omron Microscan believes to be reliable, and from random sample testing; however, the information is provided without any representation of warranty, expressed or implied, regarding accuracy or correctness. Omron Microscan does not specifically run any analysis on our raw materials or end product to measure for these substances.

The information provided in this certification notice is correct to the best of Omron Microscan's knowledge at the date of publication. This notice is not to be considered a warranty or quality specification. Users are responsible for determining the applicability of any RoHS legislation or regulations based on their individual use of the product. In regards to "RoHS Directive 2011\_65\_EU" Omron Microscan produces Monitoring and Control Instruments as well as Industrial Monitoring & Control Instruments as defined within the directive. Omron Microscan has developed and is implementing a RoHS2 compliance plan with the intention of bringing all active products listed in our current marketing literature within full compliance as per the directive deadlines.

Key milestones for the transition plan are as follows:

- Complete internal product audit by July 2014.
- Initial "Monitoring and Control Instruments" RoHS2 compliant products available by December 2014
- Initial "Industrial Monitoring & Control Instruments" RoHS2 compliant products available by July 2015
- All new products introduced in 2015 are expected to be WEEE & RoHS2 compliant.

Omron Microscan will mark the products with the 'CE' marking that complies with the RoHS2 process to acquire 'CE' certification per the example given: Example >> Machinery directive + EMC directive + RoHS2 = Declaration of Conformity.



# 1 Quick Start

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This chapter is designed to get your MS-890 up and running quickly, using the EZ Button or **ESP** (Easy Setup Program). Following these steps will allow you to get a sense of the scanner's capabilities and to test symbol decode performance.

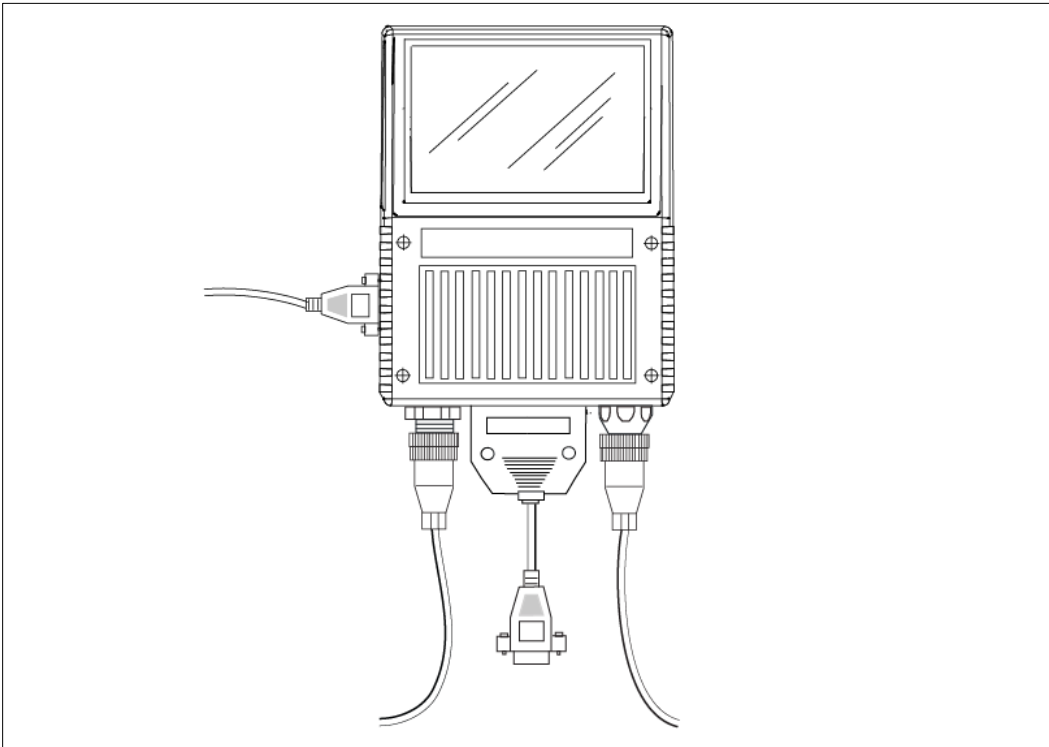
Detailed setup information for installing the scanner into your application can be found in the subsequent chapters.

**Important:** If you are switching from an **MS-880** to an **MS-890** in your application, follow these steps when you open **ESP**:

1. With your MS-890 connected to the host computer, open your most recent MS-880 **.esp** file.
2. Connect to the MS-890 and send all settings.
3. Click the **Switch Model** button at the top of the **ESP** view. When you see the model menu, select the MS-890.
4. Receive settings.

**Note:** After receiving settings, you can delete the previous MS-880 model by opening the **Model** dropdown menu from the menu toolbar, selecting **Remove Model**, and selecting **MS-880**.

## Step 1 — Check Required Hardware



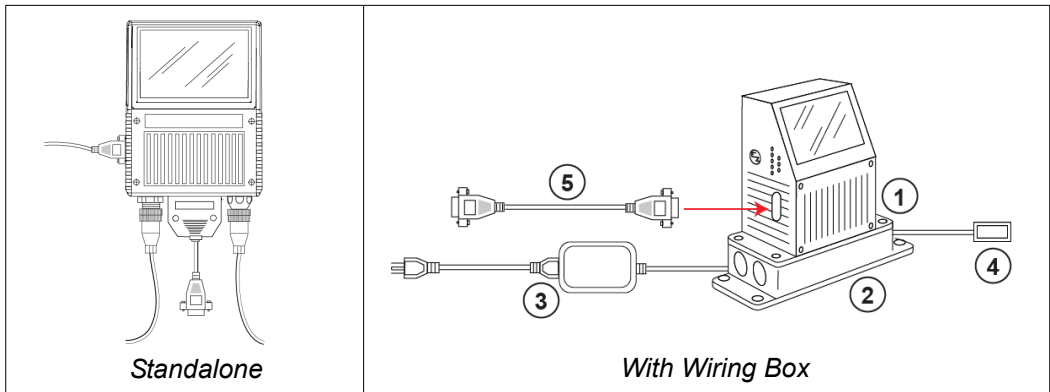
*Hardware Required*

**Caution:** Be sure that all cables are connected **BEFORE** applying power to the system. Always power down **BEFORE** disconnecting any cables.

<i><b>Item</b></i>	<i><b>Description</b></i>	<i><b>Part Number</b></i>
<b>1</b>	MS-890 Industrial Automation Scanner	FIS-0890-0001G, -0002G
<b>2</b>	9-Pin Configuration Cable	61-000010-02
<b>3</b>	Power Supply	97-000012-02
<b>4</b>	Object Detector (optional)	99-000004-01
<b>5</b>	Comm./Serial Cable	61-000034-02

**Note:** Standalone configuration shown above.

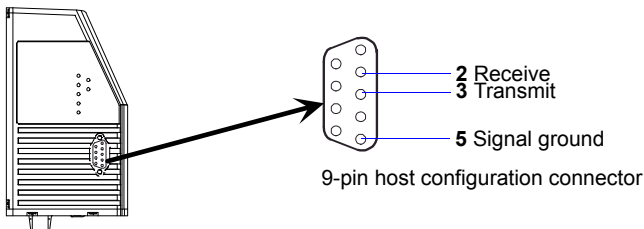
## Step 2 — Connect the System



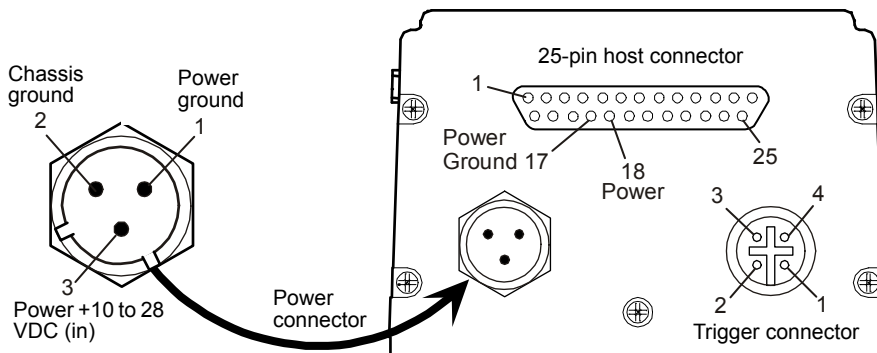
**Caution:** Be sure that all cables are connected **BEFORE** applying power to the system. Always power down **BEFORE** disconnecting any cables.

### Connecting the MS-890 Standalone

1. Attach the configuration cable to either the 9-pin (preferred) or 25-pin connector (on bottom of unit) to configure, test, and default the scanner.



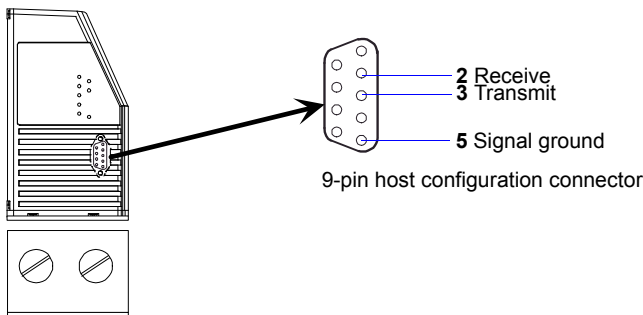
2. Attach the power supply cable to the 3-pin power connector on the bottom of the scanner.



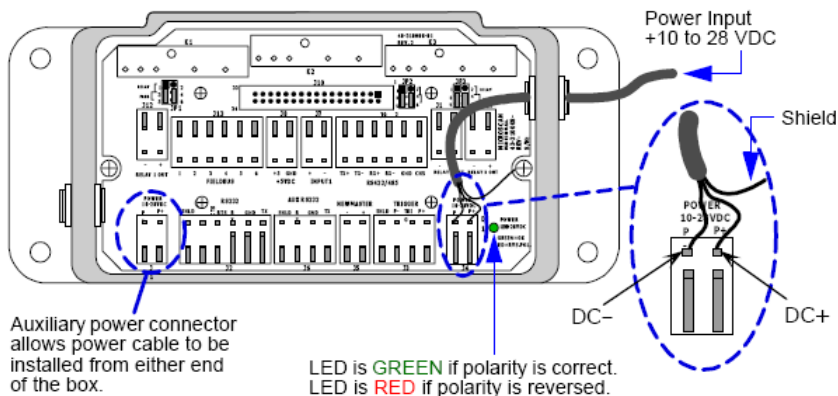


## Connecting the MS-890 with Wiring Box

1. Be sure that the wiring box power cord is not plugged in.
2. Connect the scanner to the host computer.
3. Use the 9-pin configuration connector shown below to connect with your computer. This port is useful for setting up, testing, and defaulting the scanner.



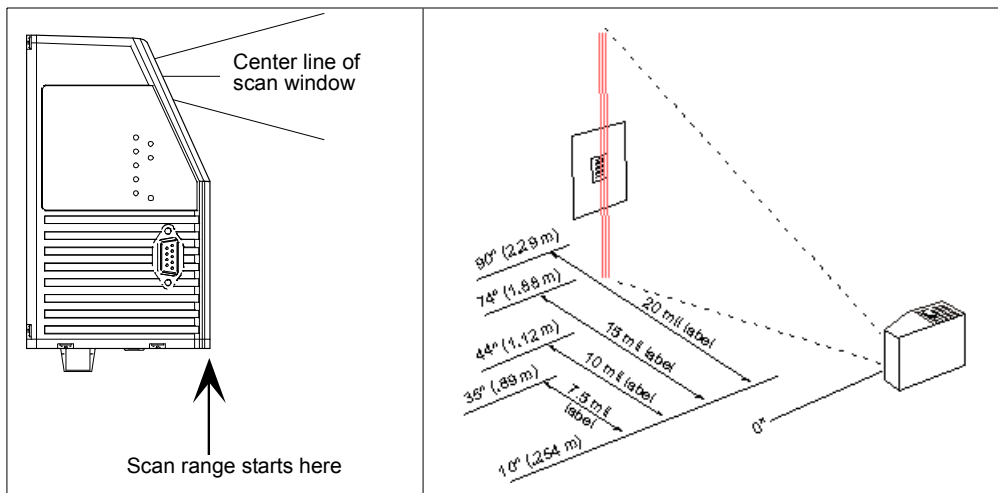
4. Connect power to the wiring box.
5. Apply power to the wiring box and confirm that the LED next to the right side power terminal is green and not red.
6. Disconnect power.



7. Plug the ribbon cable (provided with wiring box) into the bottom of the scanner.
8. Attach the scanner to the wiring box with the 4 screws provided.
9. Power-on the scanner.

## Step 3 — Position Scanner and Symbol

- Set up a symbol at the distance that will be used in your application.



**Note: Code 39** is the default symbology enabled. If you are uncertain as to the symbology type in your application, enable all symbologies by clicking the **Autodiscriminate** button in **EZ Mode**.

**Important:** If using Interleaved 2 of 5 symbols in your application, verify that the number of characters in the symbols being scanned matches the symbol length enabled for the Interleaved 2 of 5 symbology (default is 10 and 6).

## Step 4 — Install ESP

**Easy Setup Program (ESP)** is Omron Microscan's proprietary setup and testing application. The purpose of **ESP** is to provide a quick and easy way to set up and configure Omron Microscan products.

When the MS-890 is connected to a host computer (Windows Vista, XP, or 2000), **ESP** can be used to set up communication with a host, configure various firmware settings, and control verification processes.

**Important:** To migrate MS-880 settings to MS-890 settings in ESP, refer to the beginning of Chapter 2, **Using ESP**.

### If installing from the Omron Microscan Tools Drive:

1. Insert the Omron Microscan Tools Drive into a USB port on your computer.
2. Choose **ESP Software** from the main menu.
3. Select the **Current Version** of **ESP** and follow the file download prompts.

### If downloading from the Omron Microscan website:

1. Go to <http://www.microscan.com/downloadcenter>
2. Create a new "myMicroscan" member account or, if you are already a member, enter your user name and password.
3. Click the **Download Software** link and extract the latest version of **ESP** to a directory of your choice. Note where your ESP.exe file is stored on your hard drive.
4. At the end of the installation process, the following icon will appear on your desktop:



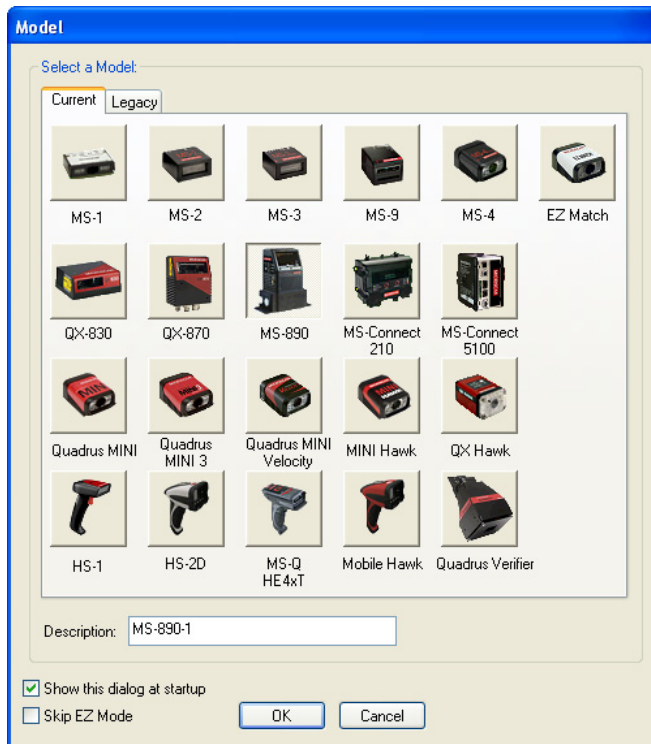
5. Click the **ESP** icon to start the program.

### System Requirements for ESP

- 233 MHz Pentium PC
- Windows 8, 7, Vista, or XP operating system (32-bit or 64-bit)
- Internet Explorer 5.0 or higher
- 128 MB RAM or greater; 160 MB free disk space
- 800 x 600 256 color display (1024 x 768 32-bit color recommended)

## Step 5 — Select Model

When you start **ESP**, this menu will appear:



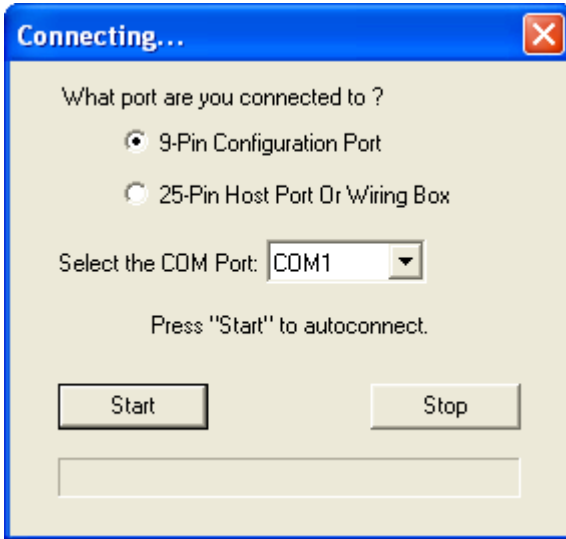
1. Select the MS-890 from the menu and click **OK**. If you do not want to make this selection every time you start **ESP**, uncheck “Show this dialog at startup”.
2. Click **Yes** when the following dialog appears:




**Note:** If you need to select another model later, click the **Switch Model** button near the top of the screen.

## Step 6 — Autoconnect

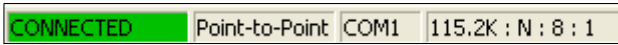
1. Select the appropriate port and click **Start** when the following dialog appears.



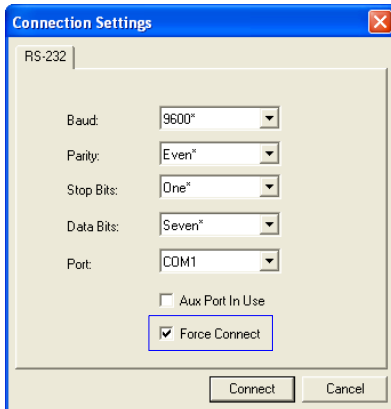
**Note:** If your communications port is not the default **COM1**, use the dropdown menu to change your port.

Once you have chosen the correct port, click **Start** to connect. 

When you are connected, you will see the green connection indicator in the status bar at the bottom right of your screen:



2. If the connection attempt fails, click the **Autoconnect** button, select a different communications port, and try again.

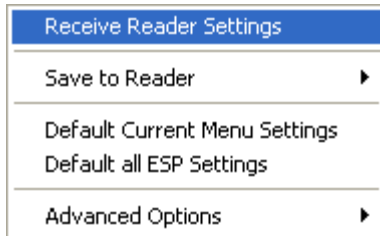


**Note:** If your RS-232 host settings cannot be changed to match the scanner's settings, select **Connect...** from the **Connect** menu in the menu toolbar, and then click the **Force Connect** box when you see the dialog shown at left.

## Step 7 — Receive Settings

To copy the scanner's memory settings into **ESP**, right-click in the configuration window and select **Receive Reader Settings** from the dropdown menu.

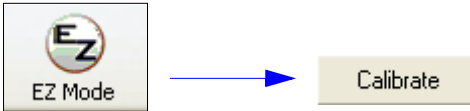
### Receive Reader Settings



When you select **Receive Reader Settings**, the settings from the scanner's memory are sent to **ESP**.

## Step 8 — Calibrate

1. Click the **Calibration** button in **EZ Mode** or in the **Calibration** view.



2. Allow some time for the scanner to cycle through the focus, gain, and tracking settings. Do not move or disturb the scanner or test symbol while calibration is in progress.
3. When calibration is complete, the settings that provided the highest read rate will be selected. You will see one of the following messages: **Calibration Passed**, **Calibration Failed**, or **Original Settings Were Optimal**.

**Note:** To silence the beeper, interrupt scanning by removing or blocking the test symbol, or send a **<K702,0>** command to disable the beeper.

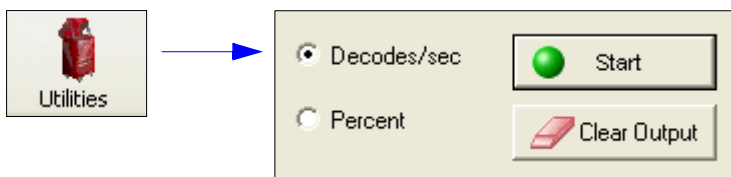
### If calibration fails, try the following:

1. Check the read range for your particular symbol density.
2. Examine symbol quality and try a different sample symbol.
3. Slightly skew or tilt the symbol or scanner to minimize specular reflection.
4. Verify that the correct symbology is enabled.

## Step 9 — Test Read Rate

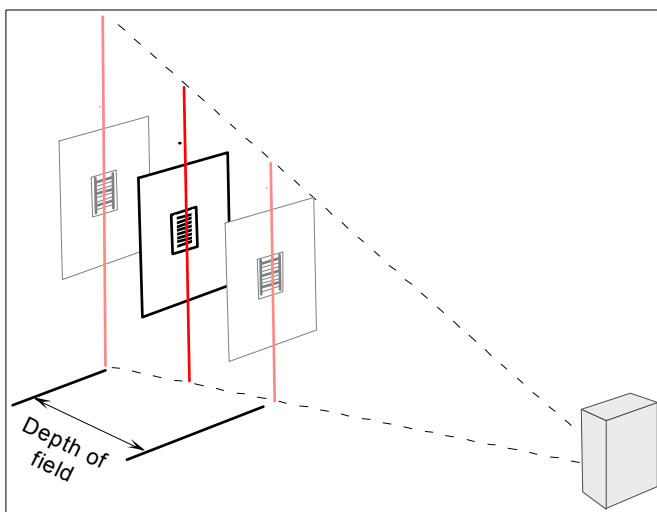
**Important:** To receive symbol data through the 9-pin configuration port, you must enable the port with the following command: **<K146,,1>**.

1. Position the symbol in front of an operational MS-890 scanner.
2. Click the **Utilities** button.
3. Click the **Start** button in the **Read Rate** view.



If calibration has passed, the scanner sends data to the host computer and emits a beep (if the beeper is enabled) for each good read.

Move your symbol toward the scanner and away from the scanner until the decode rates drop off in each direction. This will give you a sense of the depth of field (inner and outer ranges) for your symbol's density and range.



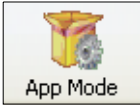
**Note:** If the scanner is in the default **Continuous Read** mode and not in read rate or calibration routine, it will read and beep repeatedly as long as a readable symbol remains in the read range and the read cycle configuration has not changed.

- To end the read rate test, right click **Read Rate** and select the **Stop** button.



## Step 10 — Configure the Scanner in ESP

To make setup changes to the MS-890, click the **App Mode** button.



The following modes are accessible by clicking the buttons in the first row of **App Mode** icons:

- **Test** and **Calibrate** the scanner in **EZ Mode**.
- Establish communications between **ESP** and the scanner by clicking the **Autoconnect** button.
- Send or receive commands by clicking the **Send/Recv** button.
- Switch reader models by clicking the **Switch Model** button.
- Click the **Parameters** button to make changes to tree control settings.
- Click the **Setup** button to adjust and test scanner settings in Calibration, Raster Setup, Laser Framing, Configuration Database, Ordered Output, and Output Format.
- Access the **Terminal**, where you can view symbol data and enter serial commands.
- Review status settings or make changes to operational commands in **Utilities**.

## Step 11 — Save Configuration in ESP

### To make changes to a configuration setting:

1. **Left click** on the **+** to expand the desired tree.
2. **Double click** on the desired parameter and click once in the selection box to view options.
3. Place your cursor in the selection box, scroll down to the setting you want to change, and **click** once on the setting.

Parameters	ESP Values
[-] Communications	
[-] R5232/422 Host Port	
[-] R5232 Auxilliary Port	
[-] Aux/Config System Data	
[-] Preamble	Disabled*
... Preamble Characters	Disabled*
[-] Postamble	Enabled
... Response Timeout	2
... LRC Status	Disabled
... Intercharacter Delay	0

4. **Left click** again on the open screen to complete your selection.
5. **Right click** on the open screen and select **Save to Reader** to implement the command in the scanner.

### Saving Options

- **Send, No Save.** Changes will be lost when power is re-applied to the scanner.
- **Send and Save.** This activates all changes in current memory *and* saves to the scanner for power-on.

