



***Allen-Bradley***

***AdaptaScan  
Bar Code  
Readers***

***(Cat. No.  
2755-SN3,-SN5, -SN8)***



# User Manual

## Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. “Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls” (Publication SGI-1.1) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will the Allen-Bradley Company be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, the Allen-Bradley Company cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Allen-Bradley Company with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of the Allen-Bradley Company is prohibited.

Throughout this manual we use notes to make you aware of safety considerations.



**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

---

Attentions help you:

- identify a hazard
- avoid the hazard
- recognize the consequences

**Important:** Identifies information that is especially important for successful application and understanding of the product.

# Table of Contents

---

## Using this Manual

### Preface

Chapter Objectives .....	P-1
Overview of this Manual .....	P-1
Intended Audience .....	P-2
Terminology .....	P-2
CE Directives .....	P-2
Related Publications .....	P-2
Technical Support .....	P-2

## Overview

### Chapter 1

Chapter Objectives .....	1-1
Series B Changes .....	1-1
Typical System .....	1-2
Reader .....	1-3
Scan Window .....	1-3
Configuration Port Connector .....	1-3
LED Indicators .....	1-4
Wiring Base Connector .....	1-4
Operating Environment .....	1-4
Typical Applications .....	1-5
Standalone .....	1-5
Distributed (Master-Slave, DH-485) .....	1-6
Distributed (Peer-to-Peer) .....	1-7
Scanning Modes .....	1-8
Linear Mode .....	1-8
Raster Mode .....	1-8
Wiring Base .....	1-9
DeviceNet/Power Terminal Blocks .....	1-9
RS-232 Terminal Block .....	1-9
RS-422 / RS-485 Terminal Block .....	1-9
Reader Connector .....	1-10
I/O Module Sockets .....	1-10
I/O Module Terminal Blocks .....	1-10
Package Detect Terminal Block .....	1-10
Power – Indicator LED .....	1-10
Termination Switches .....	1-10
Communication Options .....	1-11
DeviceNet Network .....	1-11
RS-422 / RS-485 .....	1-12
RS-232 .....	1-13
Protocols .....	1-13

AdaptaScan Software (Catalog No. 2755-ASN) . . . . .	1-14
Scanning Parameters . . . . .	1-15
Focus Options . . . . .	1-15
Decoding Operations . . . . .	1-16
System Monitoring . . . . .	1-16
Online Adjustments . . . . .	1-16
Safety Labels . . . . .	1-17
Ordering Information . . . . .	1-18

## Installation Considerations

### Chapter 2

Chapter Objectives . . . . .	2-1
Orientation Factors . . . . .	2-1
Reader Scan Beam . . . . .	2-1
Picket Fence or Step Ladder Orientation . . . . .	2-2
Skew, Pitch and Tilt . . . . .	2-3
Recommended Skew Angle . . . . .	2-3
Usable Beam Width . . . . .	2-4
Usable Beam Width (Catalog No. 2755-SN3) . . . . .	2-4
Usable Beam Width (Catalog No. 2755-SN5) . . . . .	2-5
Usable Beam Width (Catalog No. 2755-SN8) . . . . .	2-5
Apparent Element Width . . . . .	2-6
Reader Adjustments . . . . .	2-7
Read Ranges . . . . .	2-8

## Installing the Wiring Base and Power Supply

### Chapter 3

Chapter Objectives . . . . .	3-1
General Mounting Guidelines . . . . .	3-1
Dimensions and Clearances . . . . .	3-2
Reader . . . . .	3-2
Wiring Base . . . . .	3-3
Reader / Base Assembly . . . . .	3-3
Mounting the Wiring Base . . . . .	3-4
Top Mounting . . . . .	3-4
Bottom Mounting . . . . .	3-5
Wiring Base Dust Cover . . . . .	3-5
Conduit and Cable Connections . . . . .	3-6
Cabling . . . . .	3-6
Conduit . . . . .	3-7
Hole Plugs . . . . .	3-7
Mounting Bracket . . . . .	3-8
Installing the Mounting Bracket . . . . .	3-8
Top Post Mounting . . . . .	3-9
Side Post Mounting . . . . .	3-10
Installing the Safety Wire . . . . .	3-11

	Power Requirements . . . . .	3-12
	Power Supplies . . . . .	3-12
	Catalog No. 2755-PW46 Power Supply . . . . .	3-13
	Catalog No. 2755-PW47 Power Supply . . . . .	3-13
	Power Connections . . . . .	3-14
	Single Reader Power Connection . . . . .	3-14
	Multiple Reader Connections using 2755-PW46/-PW47 Supply . . . . .	3-14
	Multiple Reader Connections using Other Power Supply . . . . .	3-15
	DeviceNet Connections . . . . .	3-16
	RS-485/RS-422 Connections . . . . .	3-17
	Network or Point-to-Point . . . . .	3-17
	Line Termination . . . . .	3-17
	RS-232 Connections . . . . .	3-18
	I/O Modules and Wiring . . . . .	3-19
	Output Module Application . . . . .	3-20
	Input Module Application . . . . .	3-21
	Package Detector . . . . .	3-22
<b>Installing /Removing the Reader</b>	<b>Chapter 4</b>	
	Chapter Objectives . . . . .	4-1
	Installation . . . . .	4-1
	Power-up Sequence . . . . .	4-2
	Checking Reader Operation . . . . .	4-2
	Replacing a Reader . . . . .	4-3
<b>Downloading Configurations</b>	<b>Chapter 5</b>	
	Chapter Objectives . . . . .	5-1
	Connecting a Personal Computer . . . . .	5-1
	Downloading Firmware . . . . .	5-2
	Downloading a Configuration . . . . .	5-3
<b>Troubleshooting and Maintenance</b>	<b>Chapter 6</b>	
	Chapter Objectives . . . . .	6-1
	Technical Support . . . . .	6-1
	Equipment Required . . . . .	6-1
	Using the Troubleshooting Chart . . . . .	6-1
	Troubleshooting Chart . . . . .	6-2
	LED Indicators . . . . .	6-3
	Cleaning Scan Window . . . . .	6-5
	Replacing Scan Window . . . . .	6-6

**Specifications**

**Appendix A**

Electrical . . . . .	A-1
Mechanical . . . . .	A-1
Environment . . . . .	A-1
Optical . . . . .	A-2
Output Modules . . . . .	A-2
Input Modules . . . . .	A-2

**DIN Rail Mount  
Terminal Blocks  
European Union Directive  
Compliance**

**Appendix B**

**Appendix C**

**Glossary**

**Index**

## **Using this Manual**

### **Chapter Objectives**

Read this chapter to familiarize yourself with the rest of the manual. You will learn about:

- Contents of this manual
- Intended audience
- Terminology
- CE Directives
- Related publications

### **Overview of this Manual**

The following table describes the contents of each chapter in this manual.

<b>Chapter</b>	<b>Title</b>	<b>Purpose</b>
	Preface	Provides an overview of the manual.
1	Overview	Describes the main features and operating capabilities of the AdaptaScan Reader.
2	Installation Considerations	Describes the factors that determine the optimum placement of the Reader.
3	Installing the Wiring Base and Power Supply	Describes how to mount and wire the Reader wiring base.
4	Installing / Removing the Reader	Describes installation and initial powerup of the Reader. Instructions on how to remove a Reader are also provided.
5	Downloading Configurations	Describes how to download firmware and Reader configurations.
6	Troubleshooting and Maintenance	Provides assistance in identifying and correcting common operating problems. Procedures for routine maintenance items are also provided.

## Intended Audience

Because the AdaptaScan Software runs in the Microsoft Windows environment, you should know how to use a mouse, choose commands, and work with windows and dialogs.

You should also have a basic understanding of PLC and SLC Controllers.

Equipment installers must be familiar with standard wiring techniques and terminology.

## Terminology

This manual contains some terms that may be unfamiliar. Use the glossary at the back of this manual for assistance.

The AdaptaScan Bar Code Readers (Catalog No. 2755-SN3, -SN5, -SN8) are referred to as Readers.

## CE Directives

If the AdaptaScan Reader is installed within the European Union, Appendix C provides the legal requirements.

## Related Publications

The following table lists other publications related to the AdaptaScan Bar Code Reader.

Publication Number	Description
2755-838	AdaptaScan Software User Manual
1485-6.7.1	DeviceNet Cable System Planning and Installation Manual
1770-6.2.2	Data Highway / Data Highway Plus / Data Highway-485 Cable Installation Manual
1787-6.5.3	DeviceNet Manager Software (Catalog No. 1787-MGR) User Manual
1749-6.5.5	DeviceNet Adapter Module (Catalog No. 1749-ADN) User Manual
1747-6.5.2	DeviceNet Scanner (Catalog No. 1747-SDN) Configuration Manual
1771-6.5.118	DeviceNet Scanner (Catalog No. 1771-SDN) Configuration Manual

## Technical Support

If you should require assistance or need additional information on operating the AdaptaScan Reader, Configuration Software, or accessories, contact your local Allen-Bradley Support office or Allen-Bradley Technical Services at **(216) 646-6800**.



## Overview

### Chapter Objectives

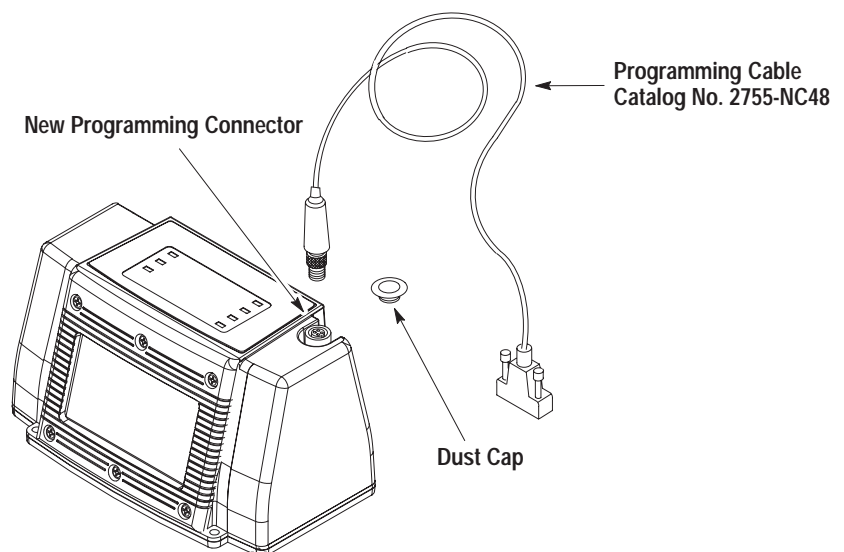
This chapter briefly describes the AdaptaScan Bar Code Reader.

Section	Page
Typical System	1-2
Reader	1-3
Typical Applications	1-5
Scanning Modes	1-8
Wiring Base	1-9
Communication Options	1-11
AdaptaScan Software	1-14
Safety Labels	1-17
Options and Accessories	1-18

### Series B Changes

If you are familiar with the Series A Reader and/or are replacing a Series A Reader, note the following changes in the Series B versions.

- New programming port connector, programming cable and dust cap.
- Soft-start power circuit reduces the current inrush when power is supplied. This allows more Readers to be powered using a single supply. The soft-start circuit also allows the use of current limited power supplies.

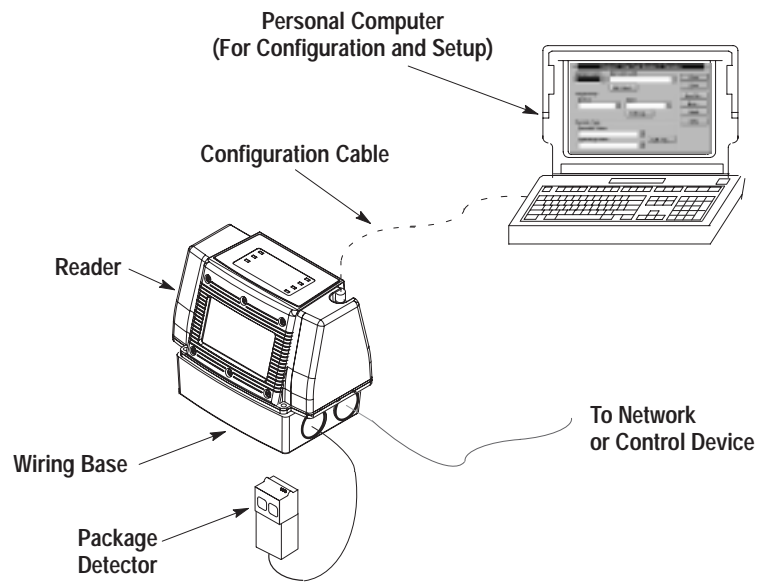


**Important:** The Series A Reader uses the 2755-NC43 programming cable. This cable is not compatible with the Series B Reader.

## Typical System

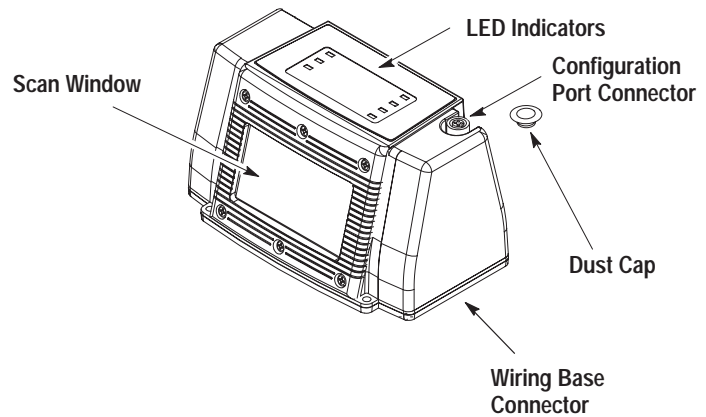
A typical AdaptaScan installation consists of:

- Reader
- Wiring Base
- Package Detector



The Reader is configured using the AdaptaScan Software (Catalog No. 2755-ASN) and configuration cable (Catalog No. 2755-NC48). One software package and configuration cable is required per installation.

## Reader



The Reader scans and decodes bar code symbols. The integral decoder decodes the most common bar code symbologies. The scan and decode functions are configured using software on a personal computer. Three scan speeds are available:

Catalog Number	Scan Rate	Optical Scan Angle <sup>①</sup>	
		Minimum	Maximum
2755-SN3	300	22°	72°
2755-SN5	500	20°	50°
2755-SN8	800	18°	30°

<sup>①</sup> Usable scan angle is 80% of the optical scan angle.

### Scan Window

The replaceable scan window allows laser light to exit the Reader. Light reflects off the bar code symbol, passes back through the scan window and is decoded by the Reader. The scan window can be replaced with a glass or plastic window. See page 1-18 for details on replacement window kits.

### Configuration Port Connector

The RS-232 port allows a personal computer running the AdaptaScan Software (Catalog No. 2755-ASN) to download a configuration to one or more Readers.

The Configuration Port Connector is for temporary use during configuration transfers and system setup.

## LED Indicators

Seven LEDs provide the following indications.

Indicator	Condition	Indicates:
Module	Green	Normal operating state
	Flashing Green	Initialization and/or incorrect (unconfigured) configuration
	Red	Processor fault (nonrecoverable)
	Flashing Red	Minor fault (recoverable). Occurs when downloading firmware.
	Off	No power applied to Reader
Network	Green	Normal DeviceNet operating state
	Flashing Green	Communication link established, but not data transfer.
	Red	Communication fault
	Flashing Red	One or more DeviceNet devices are not responding. Reader may not be able to perform all configured functions.
	Off	DeviceNet communications not established
Laser On	Yellow	Scan beam on
	Off	Scan beam off
On Symbol	Yellow	Scanning and decoding bar code symbol
	Flashing	Bar code symbol read at less than 100% rate
	Off	Not scanning bar code symbol
Trigger / Read	Yellow	Package detected
	Green	Valid read
	Off	No trigger or no valid bar code symbol read
I/O 1	Yellow	Input/Output module 1 active
	Off	Input/Output module 1 not active
I/O 2	Yellow	Input/Output module 2 active
	Off	Input/Output module 2 not active

## Wiring Base Connector

The 24-pin connector on the bottom of the Reader plugs into the socket on the wiring base. No other connections to the Reader are required.

## Operating Environment

The Reader operates under a variety of conditions.

- Cast aluminum enclosure meets NEMA Type 4 requirements when used with the wiring base.
- Operates in environments from 32 to 122°F (0 to 50°C).
- Mounts at any angle.

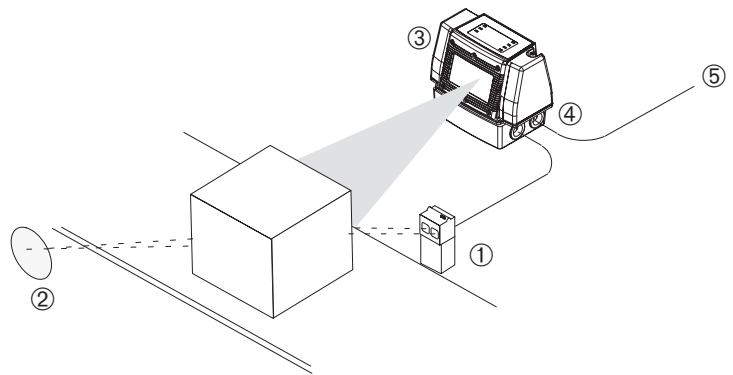
See Appendix A for a complete list of Reader specifications.

## Typical Applications

The flexibility of the Reader allows you to configure it for a variety of applications. This section shows the basic system types.

### Standalone

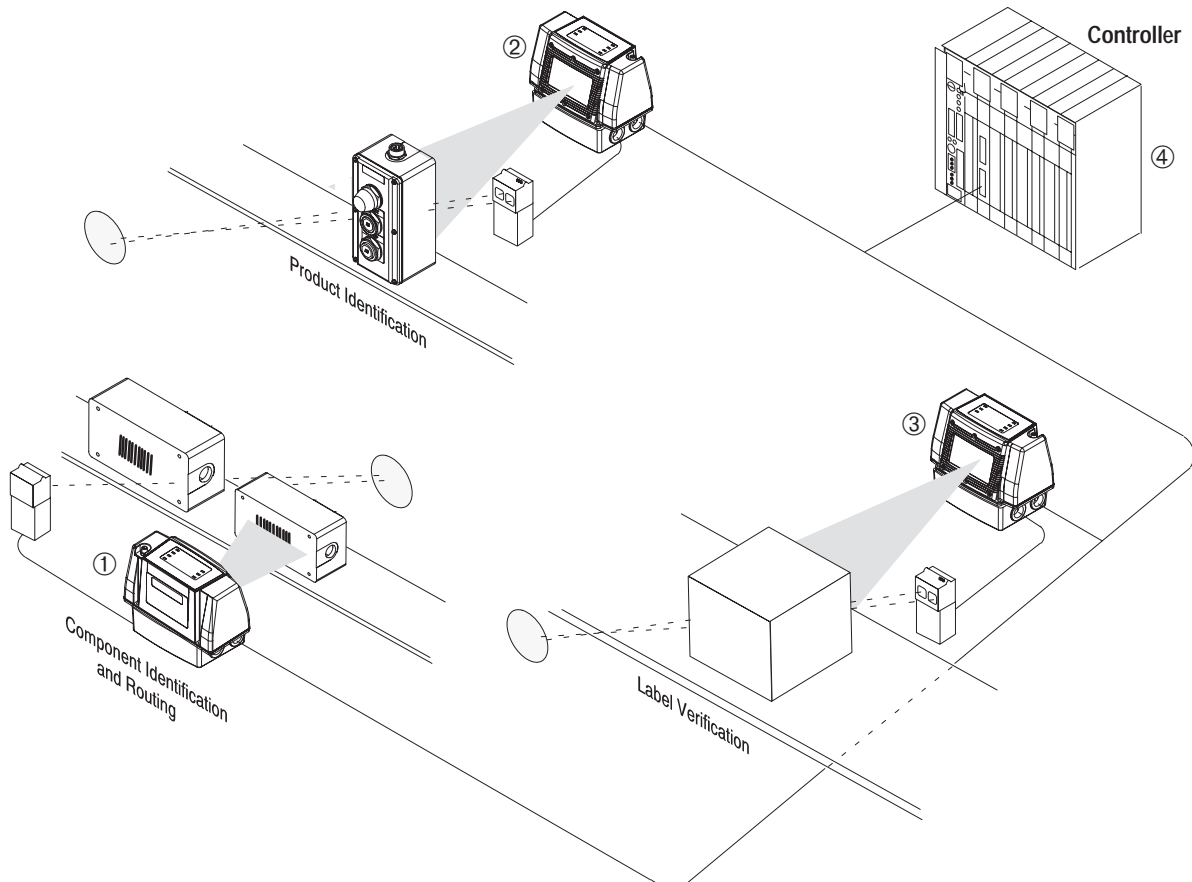
In a typical standalone setup, a single Reader scans bar codes on the side of a package moving down a conveyor.



The package crosses the beam between the package detector ① and reflector ②. The Reader ③ scans and decodes bar code symbols on the package. You can configure the decoder with match table data. When decoded data is matched, the Reader turns on an output module (in wiring base ④) to control the operation of a diverter ⑤ that directs the package to a location.

### Distributed (DeviceNet Master/Slave, DH-485)

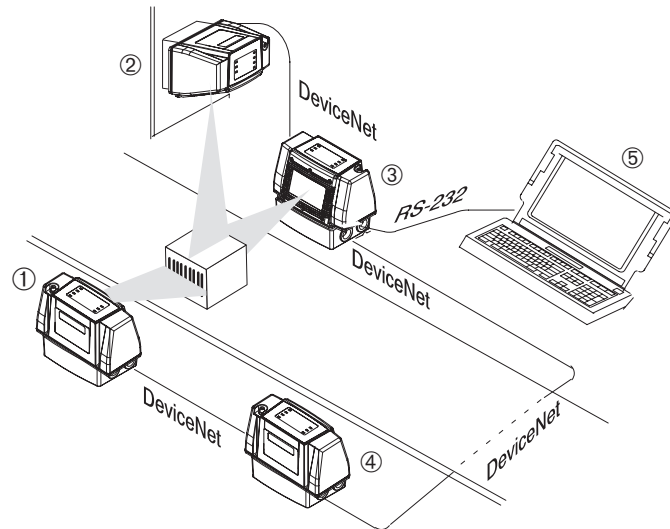
The distributed application below shows three Readers scanning bar codes at different points in an assembly process. Data from any Reader is individually sent to a controller. The discrete I/O on each Reader provide distributed control independent of the PLC monitoring the process.



Reader ① identifies major sub-assemblies for routing to the proper final assembly area. Reader ② verifies the product code on the assembled product being shipped. Reader ③ verifies that the shipping label matches the product code. PLC ④ monitors the process.

## Distributed (DeviceNet Peer-to-Peer)

Peer-to-Peer communications allows a single Reader to gather data from other Readers over a DeviceNet network. The Reader then transfers the collected data to a host, such as a controller, over an RS-232 link.

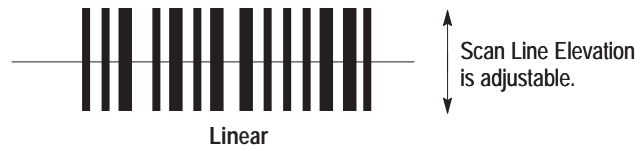


Readers ① through ④ transfer data over a DeviceNet network to Reader ③ which collects the data and then transfers the data over an RS-232 link to the host ⑤.

## Scanning Modes

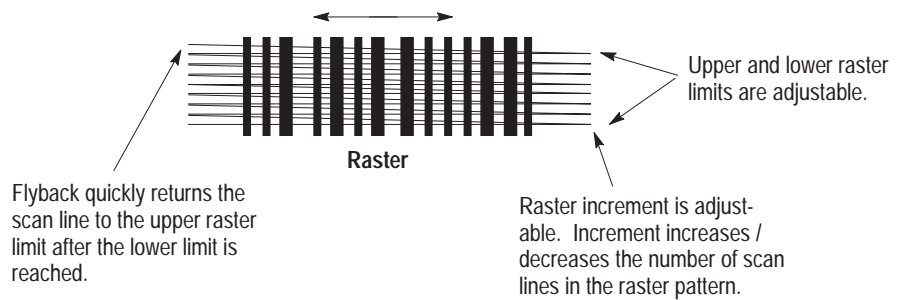
You can configure a Reader as either a linear or raster scanner. The orientation of the bar code label with the scanner usually determines the scanning mode appropriate for the application.

### Linear Mode



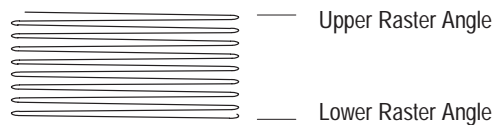
In the linear scan mode, the scan line elevation can be adjusted.

### Raster Mode

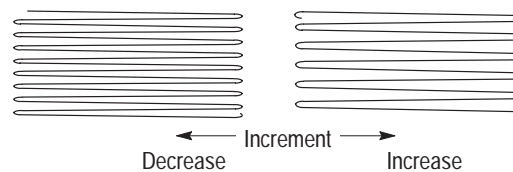


In raster scan mode, you can adjust or select:

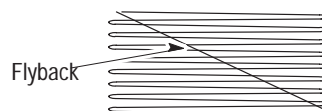
- Upper and lower raster limits



- Raster increment



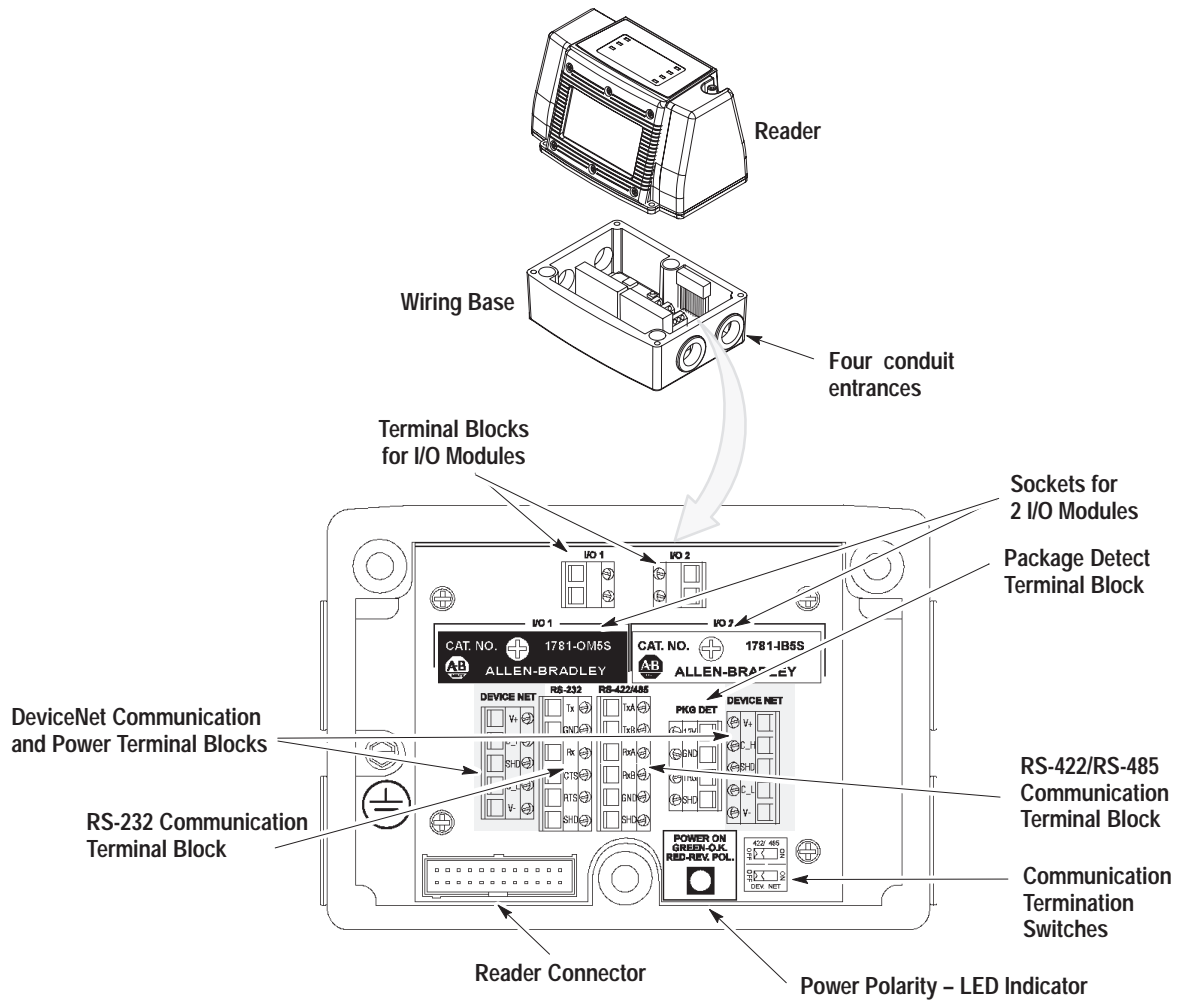
- Flyback enable





## Wiring Base

The Reader plugs into a wiring base. All wiring base connections are made using common electrician tools. Install the Reader after the wiring base is installed to reduce the possibility of damage.



### DeviceNet/Power Terminal Blocks

The wiring base has 2 identical terminal blocks; one for incoming power and communications, one for outgoing power and communications.

### RS-232 Terminal Block

Connections for point-to-point communications with a personal computer or controller RS-232 port.

### RS-422 / RS-485 Terminal Block

Connections for network or point-to-point communications with another RS-422/RS-485 device or network.

## Reader Connector

The Reader plugs into this connector. All power and communications with the Reader occurs through this connector.

## I/O Module Sockets

Two sockets support any combination of the following input and output modules. See specifications in Appendix A.

Description	Catalog Number
DC Output Module – rated at 3 to 60 VDC.	2755-OB5S
AC Output Module – rated at 12 to 140 VAC.	2755-OA5S
AC Output Module – rated at 24 to 280 VAC.	2755-OM5S
DC Input Module – accepts 3.3 to 32 VDC.	2755-IB5S
AC/DC Input Module – accepts 90 to 140 VRMS or VDC	2755-IA5S
AC/DC Input Module – accepts 180 to 280 VRMS or VDC	2755-IM5S

## I/O Module Terminal Blocks

Wiring connections for the optional input or output modules.

## Package Detect Terminal Block

Connects the contacts of a sensor, which detects the presence of a package in the Reader's scan area. The package detect can be either an electronic (current sinking) or a hard contact type device. Most applications use a photo-reflective type sensor. The package detect starts and stops decoding and determines when messages are sent or when outputs are energized.

## Power – Indicator LED

Indicates normal operating and fault conditions.

Condition	Indicates:
Green	Power on.
Red	Polarity of the power connections is reversed. Wiring must be corrected.
Off	No power.

## Termination Switches

Terminates a DeviceNet and RS-422/RS-485 network. Terminate the two devices furthest away from each other on a network by moving the switch to the ON position.

## Communication Options

This section defines the communication options for the Reader.

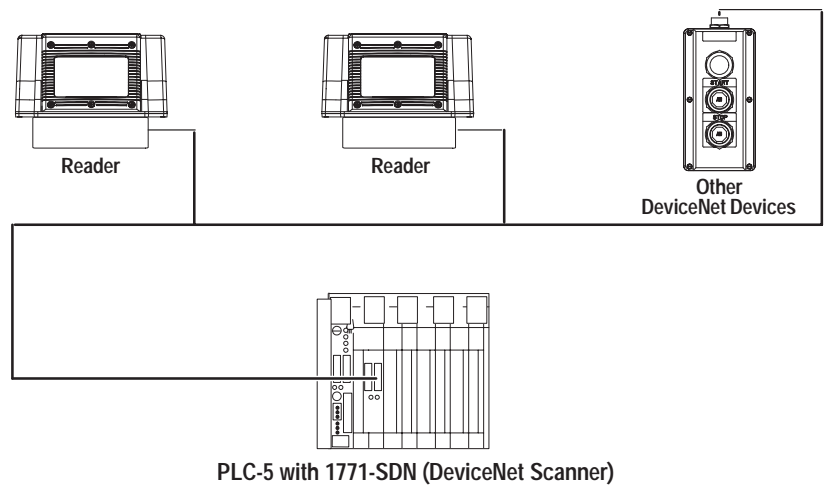
### DeviceNet Network

AdaptaScan Readers support both DeviceNet Master/Slave and Peer-to-Peer protocols.

On a DeviceNet Master/Slave network, Readers and other DeviceNet slave devices communicate with a DeviceNet Scanner (Master). Up to 63 slave devices are allowed on a master/slave network.

On a DeviceNet peer-to-peer network, up to 32 Readers can be connected together. These Readers can:

- work in a coordinated mode to read multiple bar code symbols on different sides of the same package.
- combine data from several Readers to a single Reader that communicates the data to a host.
- pass input and output status information between Readers.

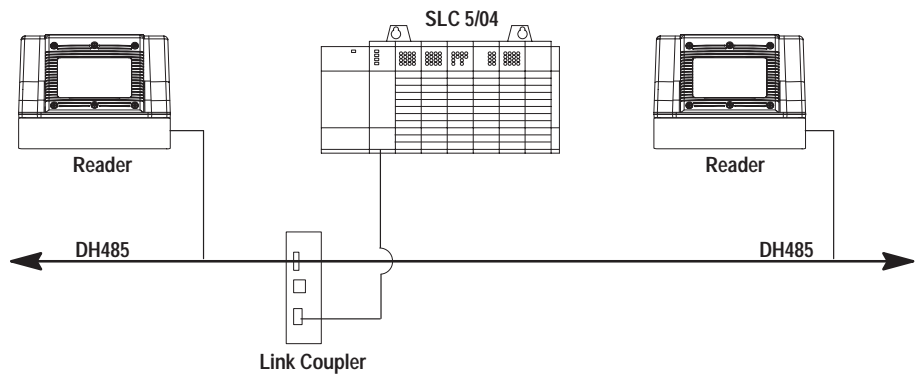


AdaptaScan Bar Code Readers operate on a DeviceNet network at the following baud rates (Kbps = Kilobits per Second):

Baud Rate	Supports Maximum Cable Length of:
125 Kbps	1640 feet (500 meters)
250 Kbps	656 feet (200 meters)
500 Kbps	328 feet (100 meters)

## RS-422 / RS-485

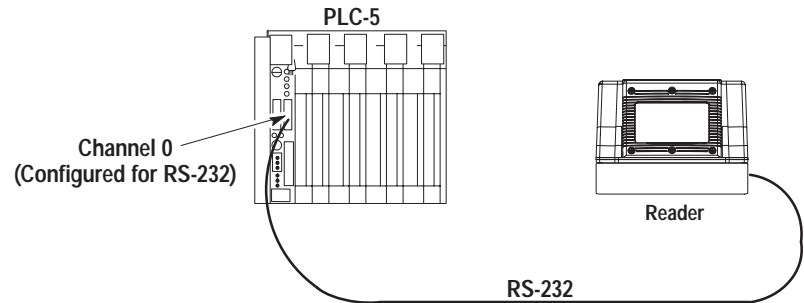
An RS-422 / RS-485 port allows point-to-point communications with a single device. Through the RS-485 port, the AdaptaScan Reader can also communicate with a DH-485 network. Both master and slave modes are supported. As a master device, the Reader sends data directly to an SLC 5/03 or 5/04 processor's data table; no polling is required by the SLC. As a slave device, the Reader connects to the Flexible Interface Module (Catalog No. 2760-RB) for multi-drop communications.



**Note:** You cannot use the RS-422/RS-485 port and the RS-232 port at the same time.

## RS-232

The RS-232 port provides point-to-point communications with a device having an RS-232 port, such as a PLC-5 Channel 0 port or computer.



## Protocols

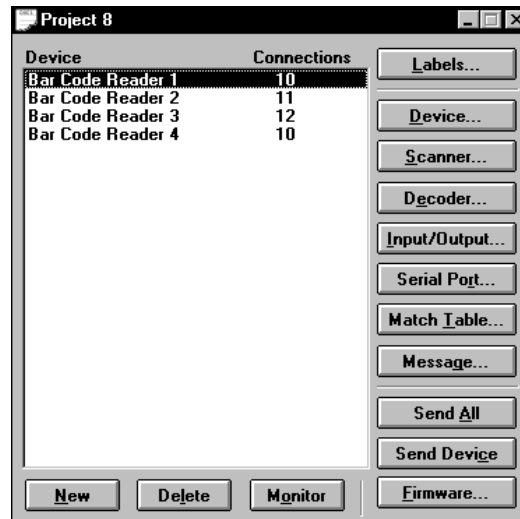
The RS-485/RS-422 and RS-232 serial ports support these protocols.

Protocol	Description
Allen-Bradley DF1	A peer-to-peer protocol that combines features of ANSI X3.28-1976 specification subcategories D1 (data transparency) and F1 (two-way simultaneous transmission with embedded responses).
Allen-Bradley DH485	A network protocol that allows DH485 devices (using the RS-485 standard) to communicate on the Allen-Bradley DH485 link.
Terminal	Provides a simple interface to most serial devices. This is the least secure protocol since it does not confirm the delivery or accuracy of messages. If security is required, we recommend that you use DF1 protocol with Block Check Characters (BCC) and ACK/NAK handshaking.

## AdaptaScan Software (Catalog No. 2755-ASN)

The AdaptaScan Software (Catalog No. 2755-ASN), a Windows™ based package, lets you configure a Reader through a series of menus, tools and dialog boxes. Context sensitive help is available to assist with use of the software.

All Reader functions are configured from the Project dialog shown below, providing a single point of access for all operations.



The Project window has buttons for accessing these operations.

Select:	To:
	Define label setup and symbologies for Reader operation.
	Define a unique name, node address, and description for the Reader.
	Define scanning parameters and access the focus function.
	Define the Reader trigger source for decoding and what symbols are decoded. Also configures the intersymbol timer and performance indicator.
	Define the operation for package detector, discrete inputs, discrete outputs, timer and ASCII trigger commands.
	Define communication parameters (RS-232, RS-422, RS-485) and protocols (ASCII, DH485, DF1) for the Reader's communication ports.
	Define match table, package and counter functions for decoded bar code data.
	Define the format and content of bar code messages sent to the host by the Reader.
	Transfer configurations to all Readers on the same DeviceNet network.
	Transfer a configuration to selected Reader.
	Download new firmware to a Reader.
	View the operation of a Reader.
	Deletes the selected Bar Code Reader configuration from the Project window.
	Creates a new Bar Code Reader configuration (Bar Code Reader 1, Bar Code Reader 2, Bar Code Reader 3, ...) in the Project window.

## Scanning Parameters

You can configure the Reader for linear or raster scanning. Setup dialogs determine when and how the laser scans a bar code symbol.



Raster Setup

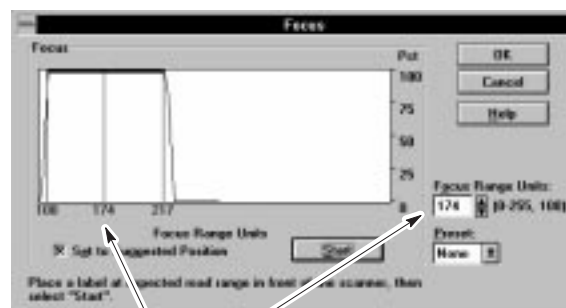


Linear Setup

## Focus Options

The Reader has a variable focus distance. The software supports manual, preset, and focus options.

- Manual**  
 Manual adjustment of the read range allows you to fine-tune the focus setting for a maximum read percentage.
- Preset**  
 Four preset read ranges (A, B, C, C+) correspond approximately to bar code scanners (Catalog No. 2755-LD4, -LD8), allowing for easy replacement of these scanners. See Chapter 2 for read ranges.
- AutoFocus**  
 The Reader scans for a label from the nearest to the farthest focal distance. The number of reads at each distance is determined and the focal distance is set halfway between the nearest and farthest focal distance where 100% valid reads occur. The dialog shows the autofocus function graphically.



Focus Setting

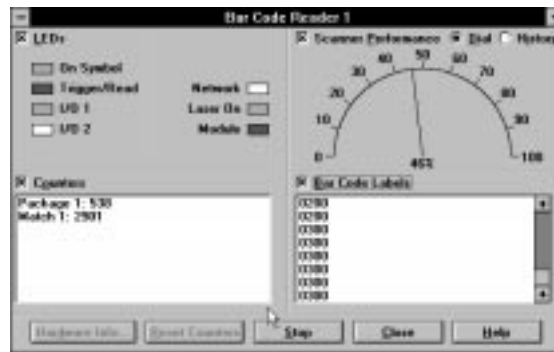
## Decoding Operations

Menus and dialog boxes also define parameters that determine when and how decoding occurs and the destination of the data.



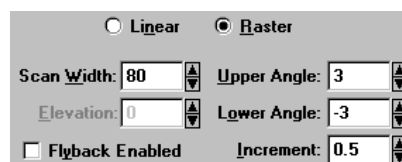
## System Monitoring

The software monitors a Reader on the network. Use this feature for initial setup and adjustment.



## Online Adjustments

Make online adjustments to one or more Readers on a DeviceNet network using the Apply button which is available on specific dialogs. This allows fine tuning of an entire system from a single connection.

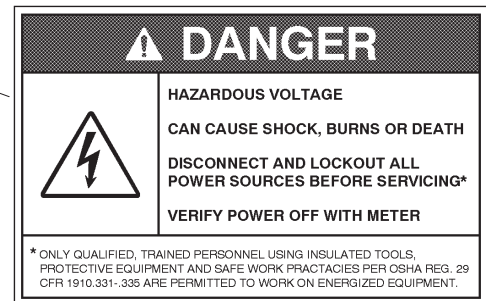
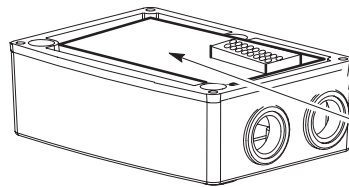
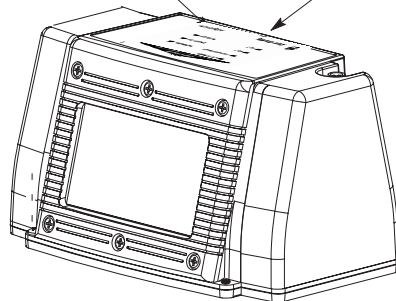
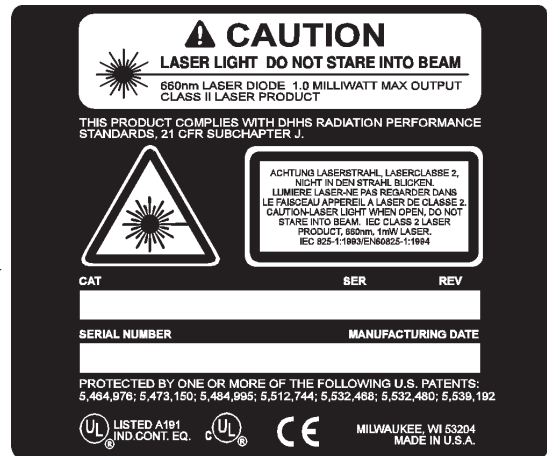
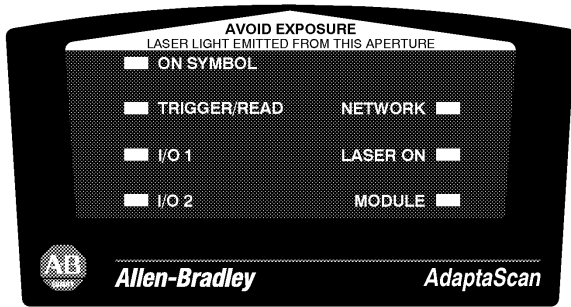




## Safety Labels

The Readers use a visible laser diode. As with any bright light source, such as the sun, you should avoid staring directly into the beam. Momentary exposure to a CDRH Class II laser product is not known to be harmful.

The following shows the location of all safety labels as they appear on the Reader.



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

## Ordering Information

The following Readers are available.

Item	Description	Catalog No.
Reader	300 scans per second, raster/linear scan, VLD, scanner/decoder	2755-SN3 <sup>①</sup>
	500 scans per second, raster/linear scan, VLD, scanner/decoder	2755-SN5
	800 scans per second, raster/linear scan, VLD, scanner/decoder	2755-SN8

<sup>①</sup> Contact Allen-Bradley for availability.

The following items are available. Each installation requires one AdaptaScan Software package (Catalog No. 2755-ASN) and one Communication Cable (Catalog No. 2755-NC48).

Item	Description	Catalog No.
Wiring Bases	Reader wiring base: US version Metric version <b>Each Reader requires one wiring base.</b>	2755-NB40 2755-NB41
AdaptaScan Software	Windows based software used on a personal computer for creating configurations for AdaptaScan Bar Code Readers.	2755-ASN
Window Kits	Replacement scan window kit includes window - bezel - gasket assembly along with mounting screws and instructions. Plastic window kit Glass window kit	2755-NW44 2755-NW45
Power Supplies	24 VDC power supply powers one Reader. 120 VAC Input, 60 Hz (US) – Wall mount 240 VAC input, 50 Hz (European) – Desktop	2755-PW46 2755-PW47
Mounting Bracket Kit	Mounting bracket attaches to the wiring base and provides almost any combination of tilt, pitch and rotational positioning.	2755-NM42
Communication Cable	9 foot, 10 inch (3 meter) cable connects Reader configuration port to a computer. Has a 9-pin D shell connector for the computer's RS-232 serial Com port. <b>Note:</b> The Series A Reader uses the 2755-NC43 programming cable. This cable is not compatible with the Series B Reader.	2755-NC48
I/O Modules	Refer to page 1-10.	

## Installation Considerations

### Chapter Objectives

This chapter describes important factors that affect how the AdaptaScan Bar Code Reader is oriented in respect to package or component labels.

Section	Page
Orientation Factors	2-1
Reader Scan Beam	2-1
Picket Fence or Step Ladder Orientation	2-2
Skew, Pitch, and Tilt	2-3
Usable Beam Width	2-4
Apparent Element Width	2-6
Reader Adjustments	2-7
Read Ranges	2-8
Calculating Scans per Label	2-9

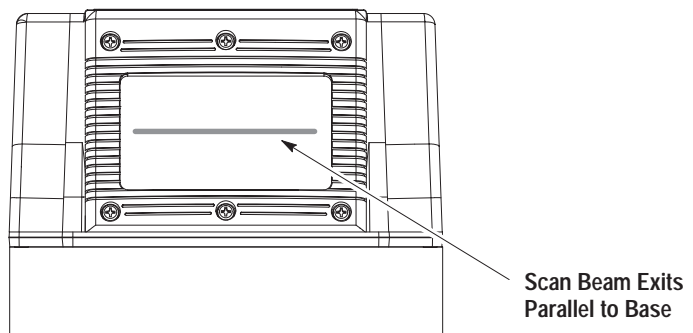
### Orientation Factors

The mounting of the Reader for optimum performance depends on these factors.

- Read range
- Type of scanning
- Skew angle

### Reader Scan Beam

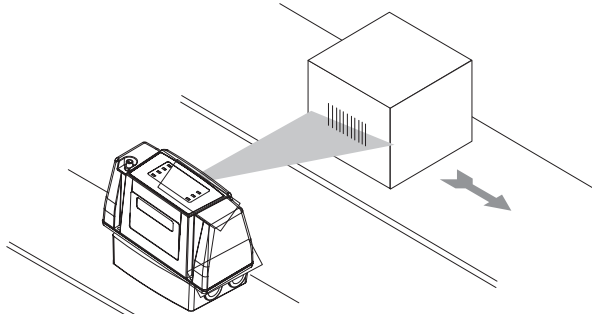
The scan beam exits the scan window parallel to the base.



## Picket Fence or Step Ladder Orientation

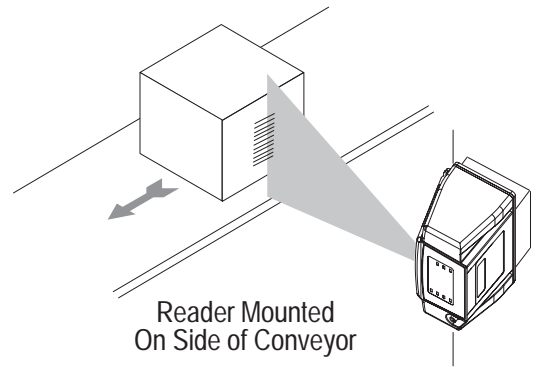
The Reader supports raster and linear scanning. The Reader can be mounted in either a step ladder or picket fence orientation with respect to the bar code label. The type of scanning and the placement of the bar code label usually determines the orientation.

**Picket Fence Orientation**

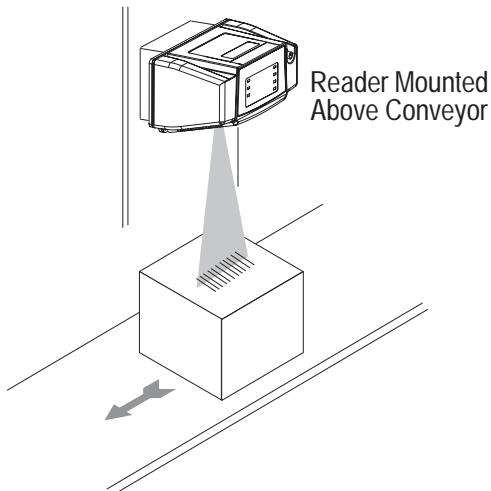


Reader Mounted  
On Side of Conveyor

**Step Ladder Orientation**

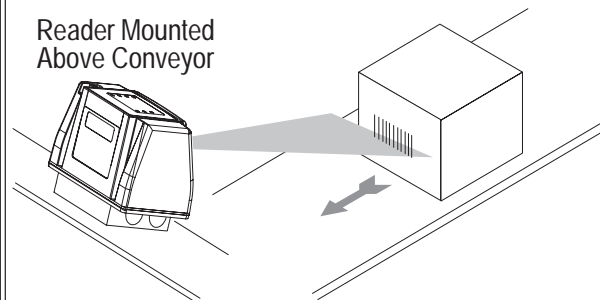


Reader Mounted  
On Side of Conveyor



Reader Mounted  
Above Conveyor

If a linear scanning Reader is aligned parallel with the long axis of a picket fence label, the same strip of label is scanned repeatedly. Because of this, picket fence applications usually use a raster scan.

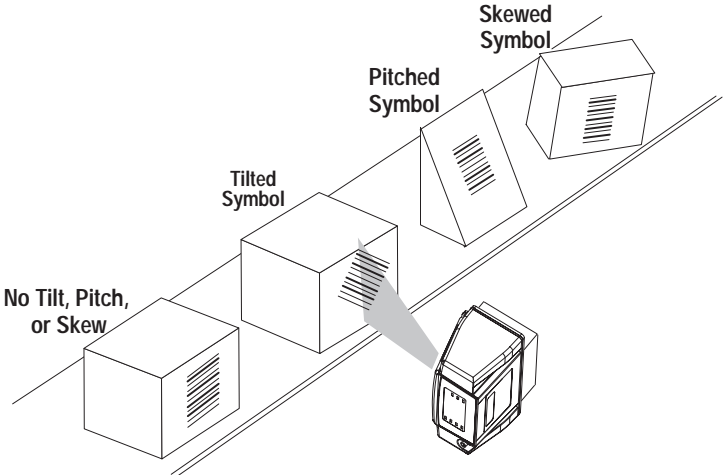


Reader Mounted  
Above Conveyor

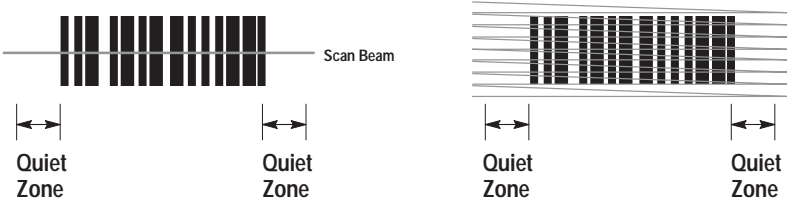
When the labels pass the Reader in a step ladder orientation, a linear scan is preferred. The beam scans the label as it passes. The number of scans per label depends upon the label size, scan rate and the conveyor speed.

### Skew, Pitch and Tilt

The skew, pitch and tilt of a bar code symbol affect its readability. Symbols that are pitched or skewed up to 45° are still readable. Although some skew is needed (see below), it should not exceed 45°. Symbols may be tilted if the scan beam passes through all bars.

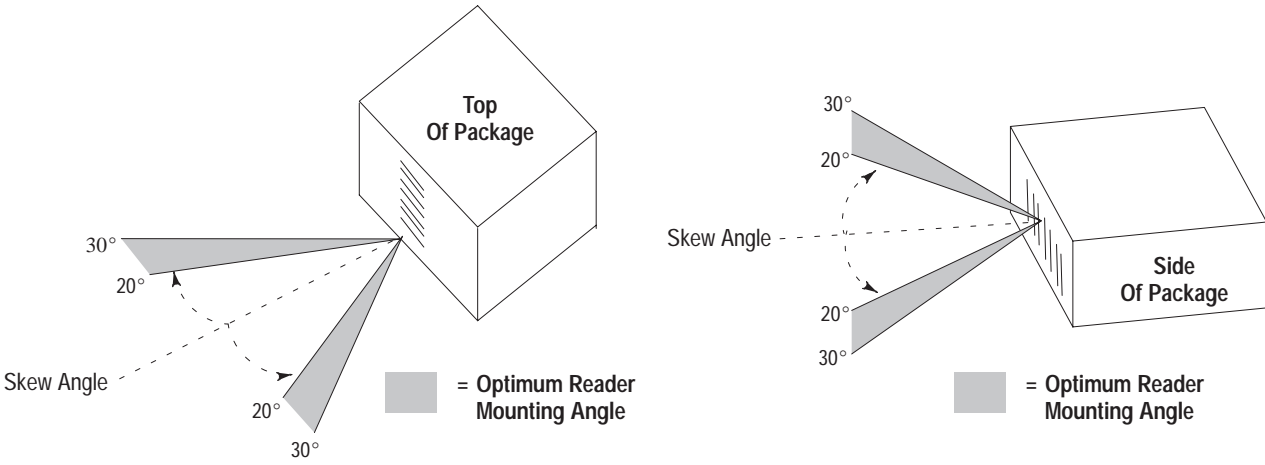


Mount the Reader so that the scan beam is nearly perpendicular to the bars of the symbol and crosses every element and quite zone. With raster scanning, the scan beam should cover the entire area where a label is expected.



### Recommended Skew Angle

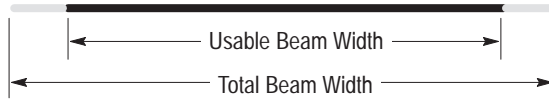
For optimum performance, mount the Reader so it scans the symbol from a skewed position 20 to 30° from perpendicular to the symbol.



## Usable Beam Width

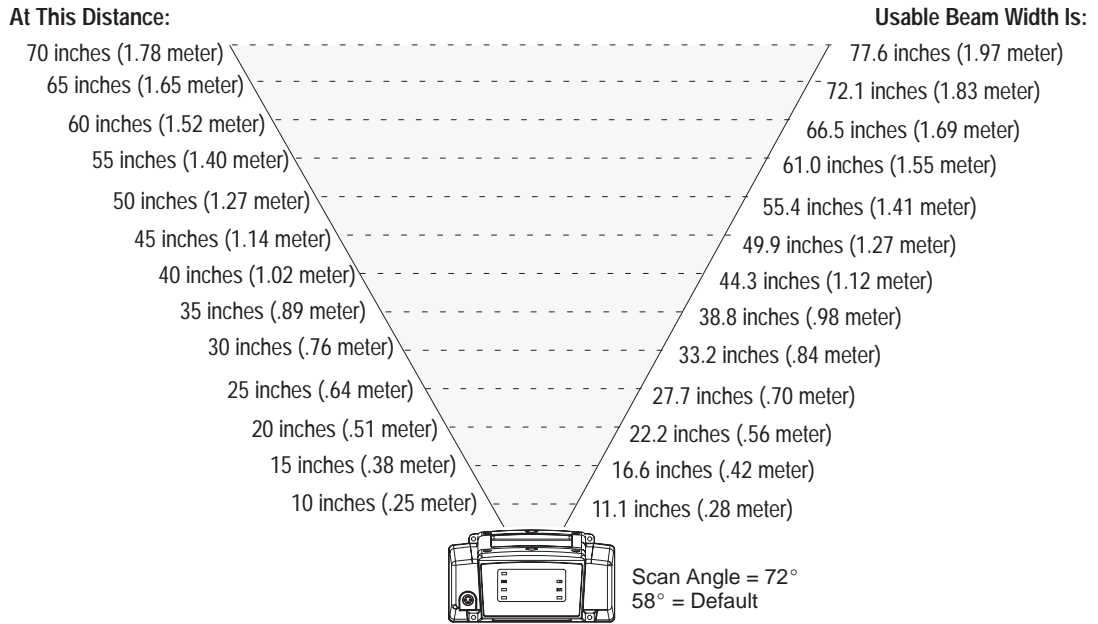
The usable beam width depends on the Reader type, the scan angle and the distance from the bar code symbol. Make sure that the scan beam is wide enough for the area you are scanning. Increasing the scan angle setting (using configuration software) or moving the Reader away from the symbol increases the beam width.

The usable beam width is approximately 80% of the total beam width. The end 10% on either side of the scan beam cannot decode bar code symbols.



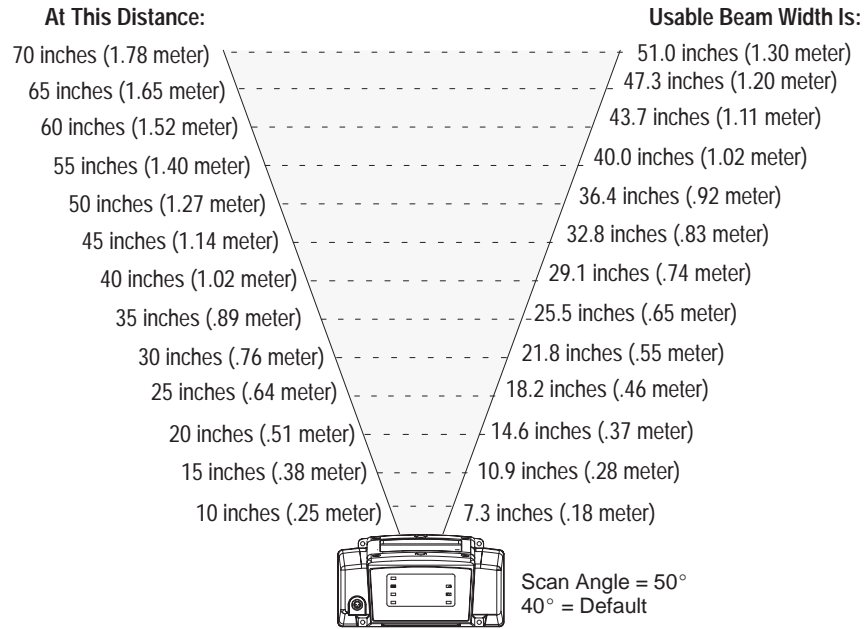
The following charts show the usable beam width for the default scan angle settings. We recommend that you use the default setting to determine the position of the Reader. This allows you to increase or decrease the scan angle after installation.

### Maximum Usable Beam Width (Catalog No. 2755-SN3) ①

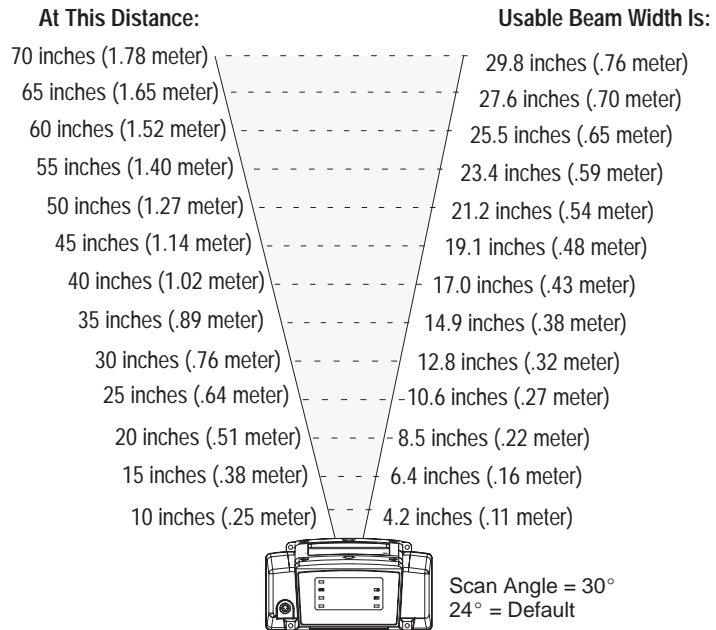


① Contact your Allen-Bradley representative for availability.

### Maximum Usable Beam Width (Catalog No. 2755-SN5)



### Maximum Usable Beam Width (Catalog No. 2755-SN8)



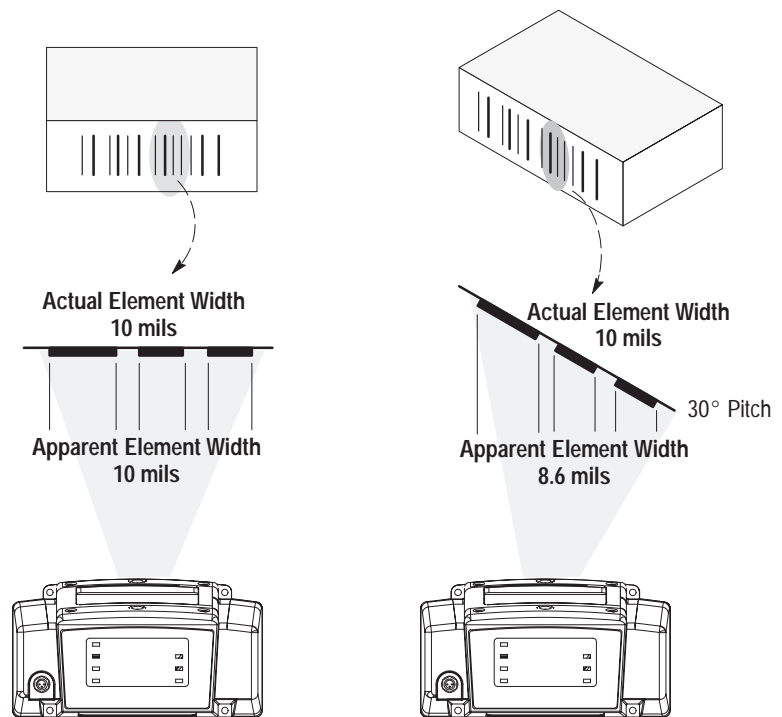
## Apparent Element Width

An element is either a bar or space between bars in a bar code. The maximum read range is determined by the narrowest element. If the bar code symbols are pitched with respect to the Reader, the apparent width of the bar code elements is reduced. This reduction in the element width affects the read range. When using the Read Range charts (page 2-8), use the apparent element width, not the actual element width.

The apparent element width is calculated using:

$$\text{Apparent Element Width} = \text{Actual Element Width} \times \text{Cosine (Pitch Angle)}$$

For example, two boxes are scanned at a 0 and 30° pitch. An enlarged area of 5 elements (3 black, 2 white) are shown as they would appear looking straight down the edge of the label.



The apparent element width above was calculated as follows.

$$\begin{aligned} \text{Apparent Element Width} &= 10 \text{ mil (0.25 mm)} \times \text{Cosine (30}^\circ\text{)} \\ &= 8.6 \text{ mil (0.22mm)} \end{aligned}$$

Element widths are usually described in mil units. A mil is equivalent to  $\frac{1}{1000}$  of an inch (0.0254 mm).



# Reader Adjustments

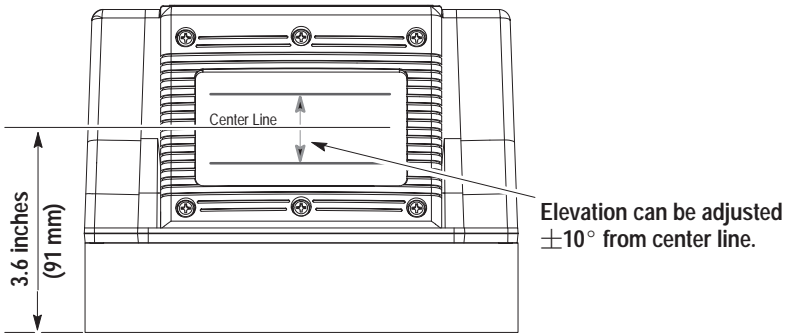
You can adjust the scan beam after the Reader is installed. Online adjustments can affect the width and location of the scan beam. Use these adjustments to fine-tune an application, not to compensate for improper installation. Chapter 6 describes how to make these adjustments.

- **Scan Angle** adjusts the beam width.

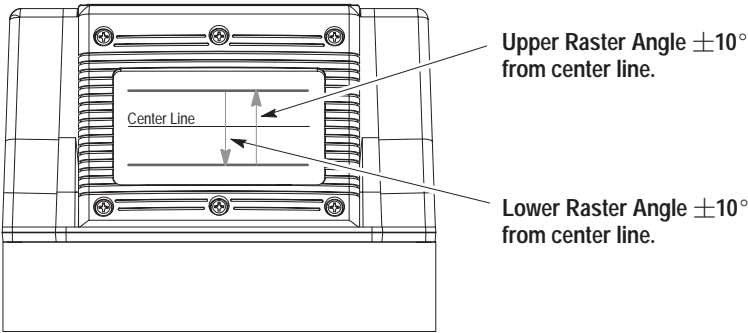
Scanner	Optical Scan Angles <sup>①</sup>
2755-SN3	22° to 72° <sup>②</sup>
2755-SN5	20° to 50°
2755-SN8	18° to 30°

<sup>①</sup> Usable scan angle is 80% of the optical scan angle.  
<sup>②</sup> Contact your Allen-Bradley representative for availability.

- **Elevation** (linear scanning only) adjusts the vertical angle at which the scan beam exits the Reader.

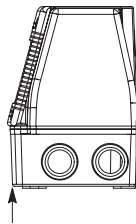


- **Upper and Lower Raster Angles** (raster scanning only) adjusts the highest and lowest raster angles. The range for each angle is 10 to -10°. The lower raster angle must be equal to or less than the upper raster angle.



## Read Ranges

- ① Read ranges based on four character Code 39 labels with a wide to narrow bar ratio of 2.6 to 1 and a print contrast ratio of .75 or better. Read ranges will vary with bar code symbol quality.
- ② When scanning labels at an angle apparent element width is less than the actual element width.
- ③ Read ranges measured from front edge of wiring base. Add .58 inches (.015 meter) for the distance to the scan window.



Read Range  
Measured From This Point

The following tables show tabular read range limits for the three versions of the AdaptaScan Readers.

**Table 2.A**  
Read Ranges, Catalog No. 2755-SN3①

Minimum Apparent Element Width②		Read Range ③	
Mils	mm	Inches	Meters
5	.13	1.9 - 3.6	.048 - .092
6	.15	1.9 - 5.3	.048 - .135
7.5	.19	1.4 - 7.2	.036 - .183
10	.25	1.4 - 10.9	.036 - .277
13	.33	1.4 - 16.2	.036 - .411
15	.38	1.4 - 19.5	.036 - .495
20	.51	1.4 - 28.4	.036 - .721
25	.64	1.4 - 36.8	.036 - .935
30	.75	1.9 - 42.9	.048 - 1.09
35	.89	1.9 - 51.4	.048 - 1.31
40	1.02	1.9 - 59.3	.048 - 1.51
45	1.14	2.4 - 64.4	.061 - 1.64
50	1.27	2.9 - 69.4	.074 - 1.76
55	1.40	3.4 - 74.6	.086 - 1.89

**Table 2.B**  
Read Ranges Catalog No. 2755-SN5①

Minimum Apparent Element Width②		Read Range ③	
Mils	mm	Inches	Meters
5	.13	1.9 - 4.7	.048 - .119
6	.15	1.9 - 7.3	.048 - .185
7.5	.19	1.9 - 8.9	.048 - .226
10	.25	1.4 - 14.0	.036 - .356
13	.33	1.4 - 19.5	.036 - .495
15	.38	1.9 - 21.8	.048 - .554
20	.51	1.9 - 29.7	.048 - .754
25	.64	2.4 - 36.2	.061 - .919
30	.75	2.4 - 42.5	.061 - 1.08
35	.89	2.4 - 51.5	.061 - 1.31
40	1.02	3.4 - 56.9	.086 - 1.44
45	1.14	3.9 - 61.9	.099 - 1.57
50	1.27	4.4 - 67.9	.112 - 1.72
55	1.40	5.4 - 71.6	.137 - 1.82

**Table 2.C**  
Read Ranges Catalog No. 2755-SN8①

Minimum Apparent Element Width ②		Read Range ③	
Mils	mm	Inches	Meters
5	.13	1.4 - 5.7	.036 - .145
6	.15	1.4 - 8.2	.036 - .208
7.5	.19	1.4 - 10.7	.036 - .272
10	.25	1.4 - 16.0	.036 - .406
13	.33	1.4 - 21.0	.036 - .533
15	.38	1.9 - 25.4	.048 - .645
20	.51	2.4 - 34.3	.061 - .871
25	.64	3.4 - 42.2	.086 - .107
30	.75	5.4 - 50.2	.137 - 1.27
35	.89	6.4 - 55.6	.163 - 1.41
40	1.02	7.4 - 62.1	.188 - 1.58
45	1.14	8.4 - 65.4	.213 - 1.66
50	1.27	10.4 - 69.0	.264 - 1.75
55	1.40	11.4 - 72.5	.290 - 1.84

### Calculating Scans per Label

Use the following formulas to calculate the number of scans per label and the minimum number of scans per second needed for an application. The minimum scan speed required is based on five scans per label.

	Formulas	
	Picket Fence Orientation	Step Ladder Orientation
Scans per Label =	$\frac{(X-Y)}{Z} A$	$\frac{A \times H}{Z}$
Minimum Scan Speed Required =	$\frac{Z \times 5}{X-Y}$	$\frac{Z \times 5}{H}$

**Where:**

- A = Derated Scan Rate (Nominal Scan Rate -5%)
  - = 285 SPS for Catalog No. 2755-SN3 Readers
  - = 475 SPS for Catalog No. 2755-SN5 Readers
  - = 760 SPS for Catalog No. 2755-SN8 Readers

H = Height of bars in bar code. In inches ①.

X = Usable beam length at minimum read distance. In inches ①.

Y = Bar code length including quiet zones. Typically in inches ①.

Z = Label speed. In inches per second ①.

MINIMUM SCANS PER LABEL MUST BE > = 5.

① You can use other units of measure, such as meters, as long as all measurements use the same unit.

## Installing the Wiring Base and Power Supply

### Chapter Objectives

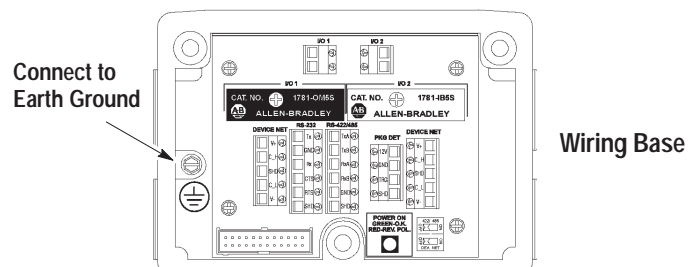
This chapter describes how to install and mount the wiring base.

Section	Page
General Mounting Guidelines	3-1
Dimensions and Clearances	3-2
Mounting the Wiring Base	3-4
Conduit and Cable Connections	3-6
Mounting Bracket	3-8
Power Requirements	3-12
Power Supplies	3-12
Power Connections	3-14
DeviceNet Connections	3-16
RS-485/RS-422 Connections	3-17
RS-232 Connections	3-18
I/O Modules and Wiring	3-19
Package Detector	3-22

### General Mounting Guidelines

Before mounting the wiring base, determine the proper orientation and position as described in Chapter 2.

- Leave adequate clearances for wiring.
- The wiring base has four conduit openings. Seal unused conduit openings with the 3 hole plugs provided with wiring base. Use cord grips with rubber grommets on cables that enter wiring base. Two different size grommets are provided with each cord grip.
- Route wires carefully to reduce or minimize electrical noise. When communication and power wiring must cross, make their intersection perpendicular.
- Proper grounding of the wiring base limits the effects of noise due to Electromagnetic Interference (EMI). The wiring base has a ground screw for connecting cable shields and ground wires. To avoid EMI problems, all cables must be shielded and grounded at one end. Grounding is also an important safety measure.

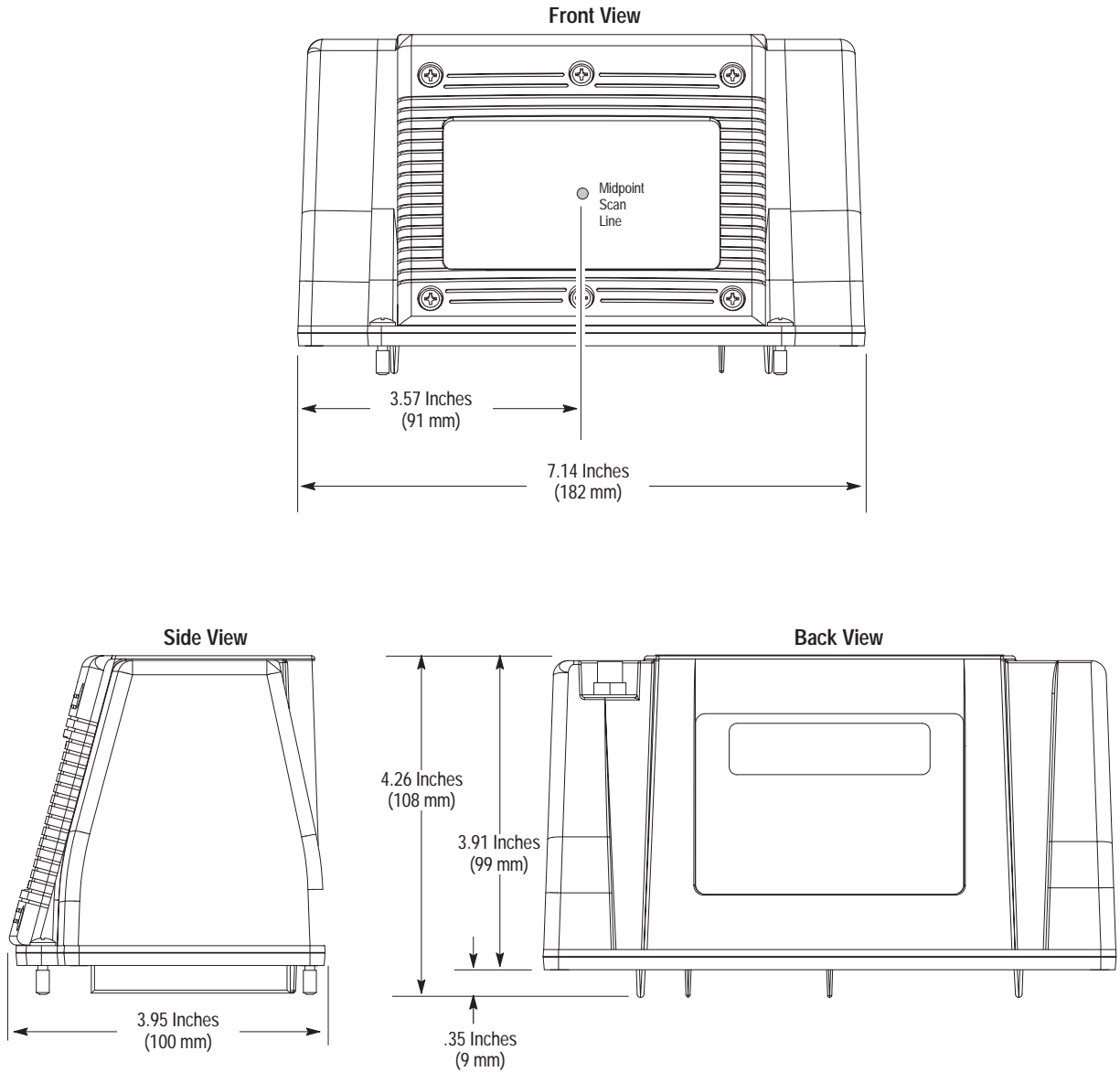


## Dimensions and Clearances

Make sure there is adequate space around the Reader for:

- Mounting and removing the Reader
- Wiring base connections
- Configuration cable

### Reader

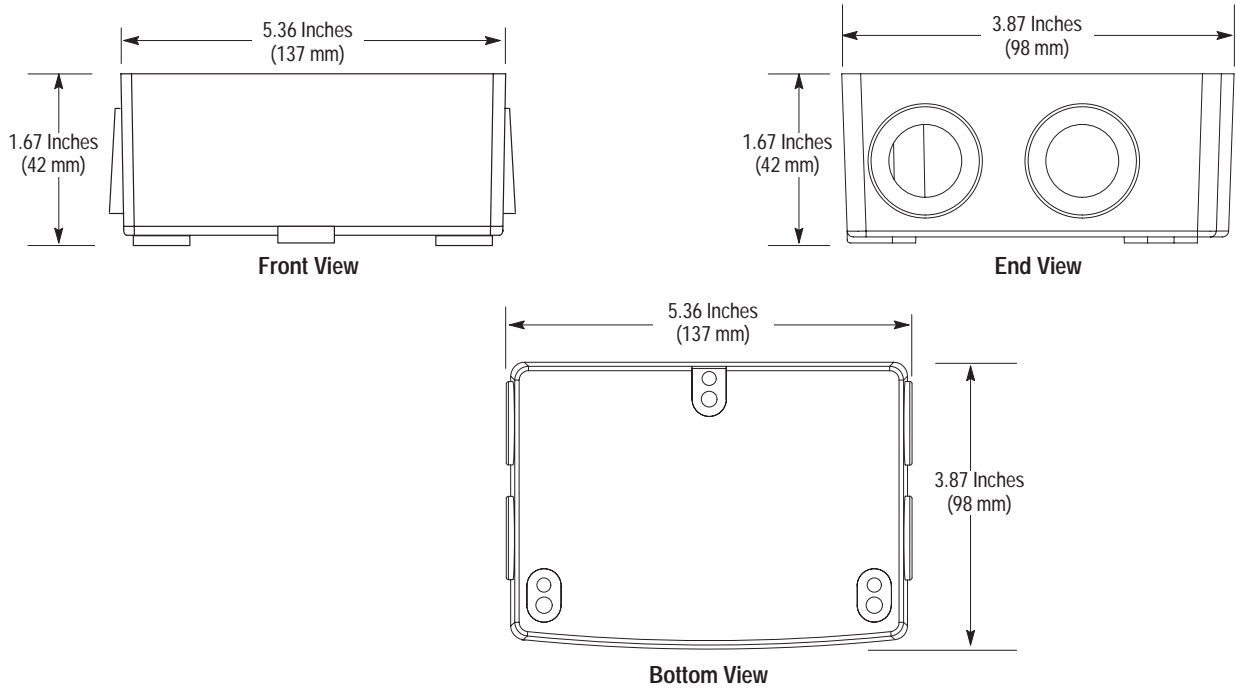


## Wiring Base

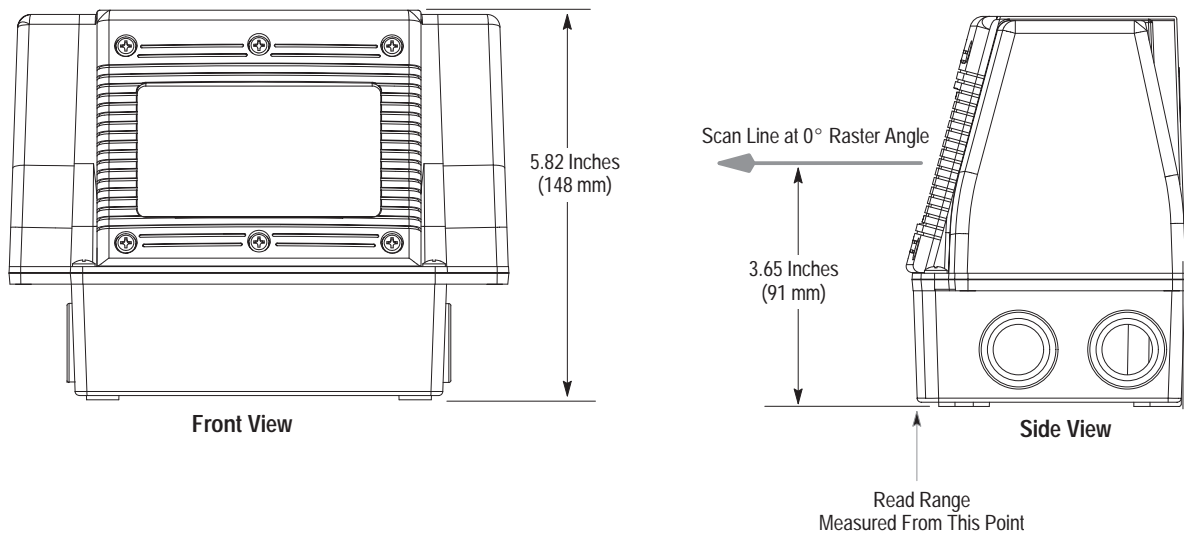
The wiring base is available in two versions:

- U.S. Version (Catalog No. 2755-NB40)
- Metric Version (Catalog No. 2755-NB41)

The dimensions are identical for both versions. Differences are in the thread sizes of the conduit holes and the bottom mounting holes.



## Reader / Base Assembly



## Mounting the Wiring Base

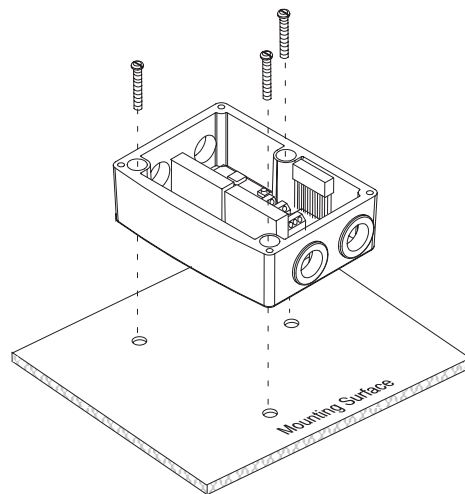
There are 2 options for mounting the wiring base (Catalog No. 2755-NB40 or -NB41):

- **Top Mounting** – Mount the base using 3 screws through the top mounting holes.
- **Bottom Mounting** – Mount the base using 3 screws through the mounting surface into threaded holes on bottom of wiring base.

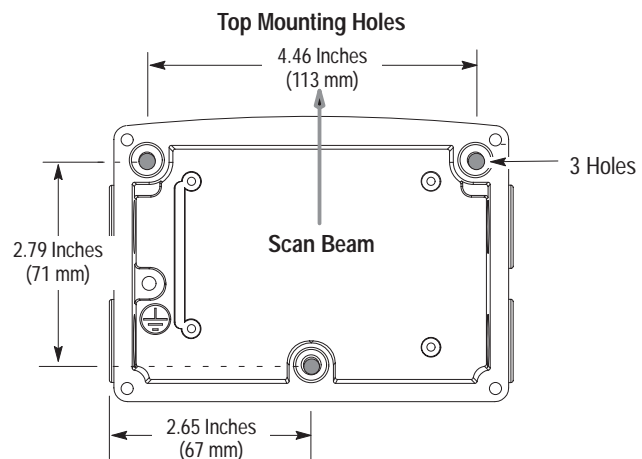
### Top Mounting

The wiring base mounts from the top to any flat surface with three #10 or M5 mounting screws. The screw heads must be less than 3/8 inch in diameter allowing them to fit inside the mounting hole. The length of the mounting screws must be 1/2 inch (12.5 mm) plus the depth the screw penetrates the mounting surface.

**Note:** The 3 screws provided with the wiring base are suitable for use with the mounting bracket (Catalog No. 2755-NM42).

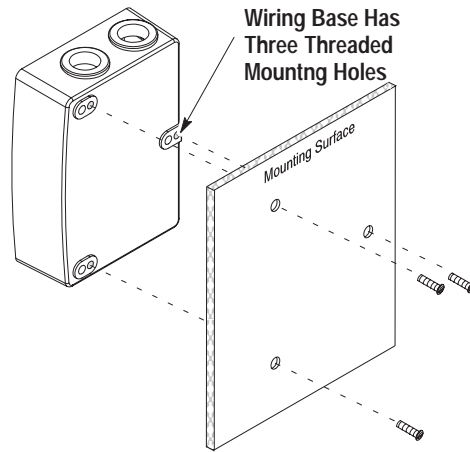


A full size mounting template is provided with the wiring base. Use the following diagram for reference.

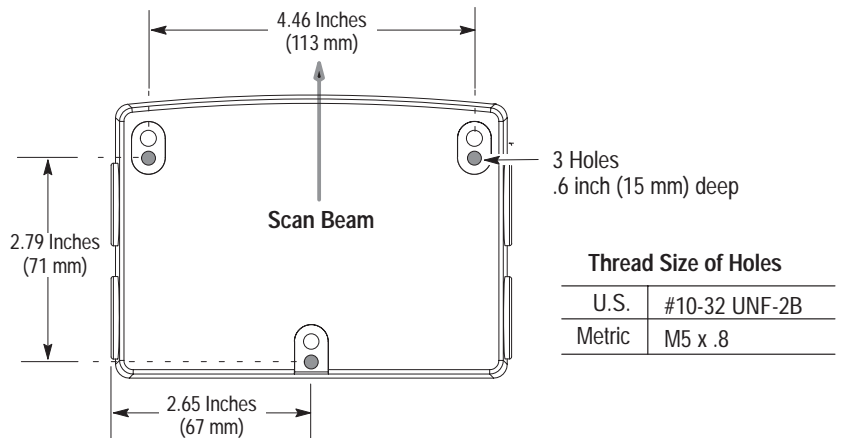


## Bottom Mounting

The wiring base mounts from the bottom to any flat surface with three mounting screws. The holes on the U.S. version have #10-32 UNF-2B threads. The holes on the metric version have M5 x .8 threads. The length of the screws must not be greater than 1/2 inch (12.5 mm) plus the thickness of the mounting surface.



A full size mounting template is provided with the wiring base. Use the following diagram for reference.



## Wiring Base Dust Cover

To prevent debris from entering the wiring base when a Reader is not installed, slip the dust cover over the base. The dust cover is held in place by the stretch fit over the wiring base.



**ATTENTION:** The wiring base dust cover is not for permanent installation. The dust cover temporarily protects the wiring base until the Reader is installed.



## Conduit and Cable Connections

All permanent Reader connections are made to the wiring base. Wiring connections are made with conduit or cables. The conduit openings in the wiring base are different for the U.S. and metric versions. The U.S. version (Catalog No. 2755-NB40) has 1/2-14 NPSC threads, the metric version (Catalog No. 2755-NB41) has PG13.5-18 threads. See the chart below for recommended wire and cable types.

Connection	Recommended
Power ①	Shielded Belden 9316
I/O	Depends upon module rating. Refer to Appendix A
RS-485	Use Belden 9842
RS-422	Use Belden 9830
RS-232	Use Belden 8303 or Alpha 45123
DeviceNet	Use Allen-Bradley Catalog No. 1485C-P1A50, -P1A150 or -P1A300 (50, 150 or 300 meter cable)
Package Detect	#22 AWG minimum

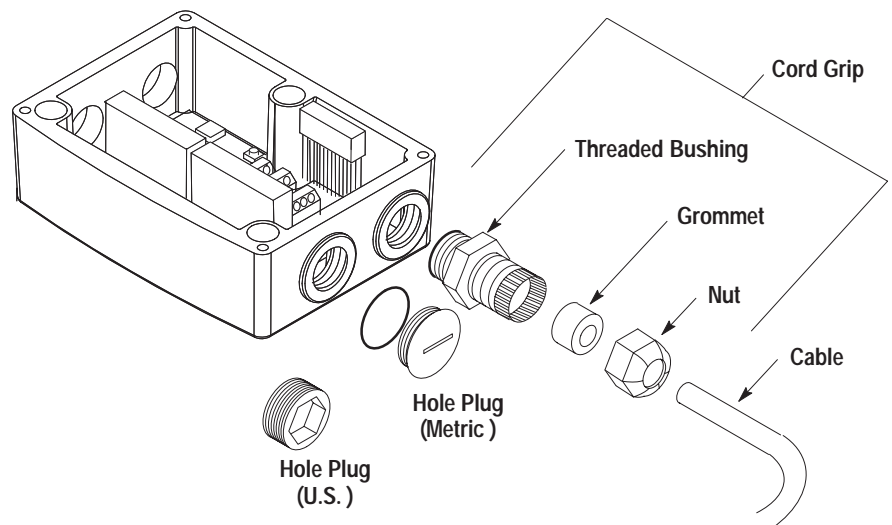
① DeviceNet cable contains wiring for power connections

## Cablings

Where the cable enters the wiring base, use the supplied cord grips with rubber grommets. Each cord grip comes with 2 different size grommets.

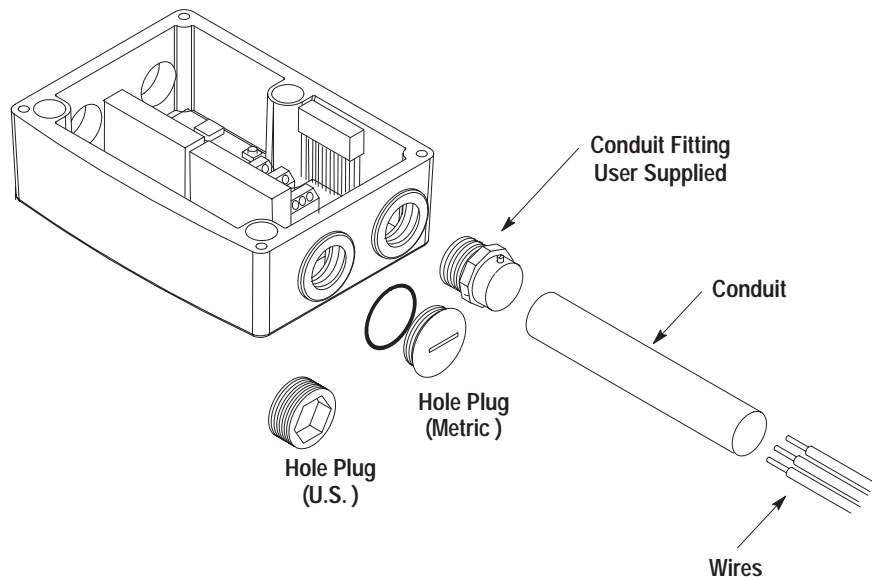
- Cord grips with small diameter grommet accommodate wire diameters 0.191 to 0.354 inches (4.9 to 9.0 mm).
- Cord grips with large diameter grommet accommodates wire diameters 0.236 to 0.472 inches (6.0 to 12.0 mm).

You can obtain additional cord grips from most electrical supply outlets. Make sure you use Teflon tape or other type of thread sealant to maintain a NEMA Type 4 rating.



## Conduit

Use flexible conduit whenever possible. This allows you to adjust the position of the Reader (when mounting bracket is used).



## Hole Plugs

Three hole plugs are supplied with the wiring base. Use these plugs on unused conduit openings to maintain the NEMA Type 4 rating.

### U.S. Wiring Base (Catalog No. 2755-NB40)

The conduit opening for the U.S. wiring base uses a NPSC threaded plug. Use Teflon tape or other thread sealant when inserting the hole plug in the conduit opening to maintain a NEMA Type 4 seal. Tighten hole plug with a 3/8" hex wrench.

### Metric Wiring Base (Catalog No. 2755-NB41)

The conduit opening for the metric version requires an O-ring with the hole plug. Place the O-ring on the hole plug, then insert the hole plug in the conduit opening and tighten with a flat blade screwdriver.

## Mounting Bracket

The mounting bracket kit (Catalog No. 2755-NM42) is suitable for a variety of applications. This bracket allows you to mount the Reader at just about any angle or degree of rotation.

### Kit Contents

The mounting bracket kit contains:

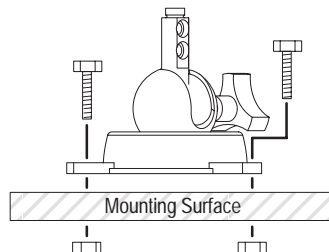
- Adjustable mounting bracket
- Mounting plate
- Safety wire
- Two hex socket screws
- Hex bolt



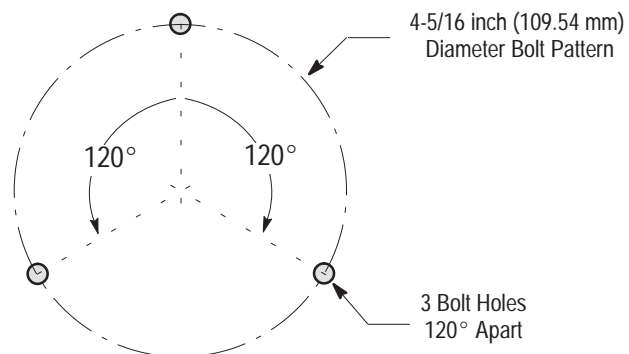
**ATTENTION:** Install the safety wire when the bracket is mounted in an inverted position. If the bracket is mounted inverted and the locking knob is loosened, the Reader could release from the bracket and cause personal injury or damage to the Reader.

### Installing the Mounting Bracket

The mounting bracket is attached to a mounting surface using three screws (1/4 inch or M6).

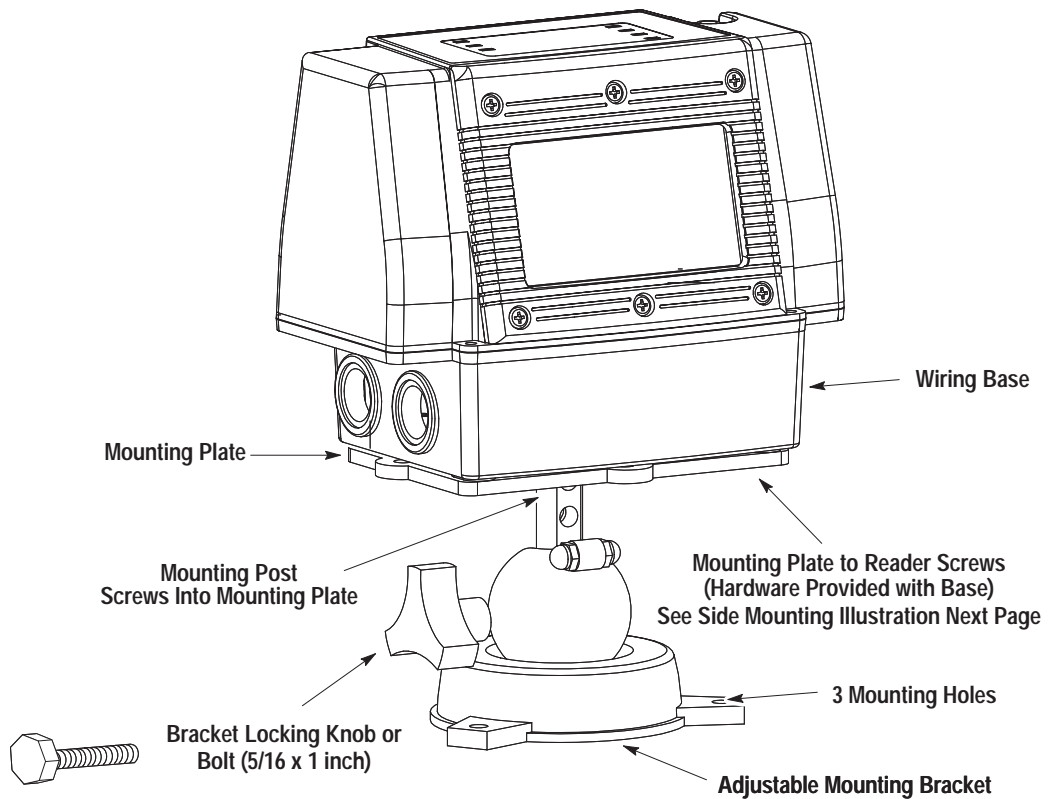


The mounting holes for the bracket consist of 3 holes spaced 120° apart on a 4 5/16 inch (109.54 mm) diameter pattern.



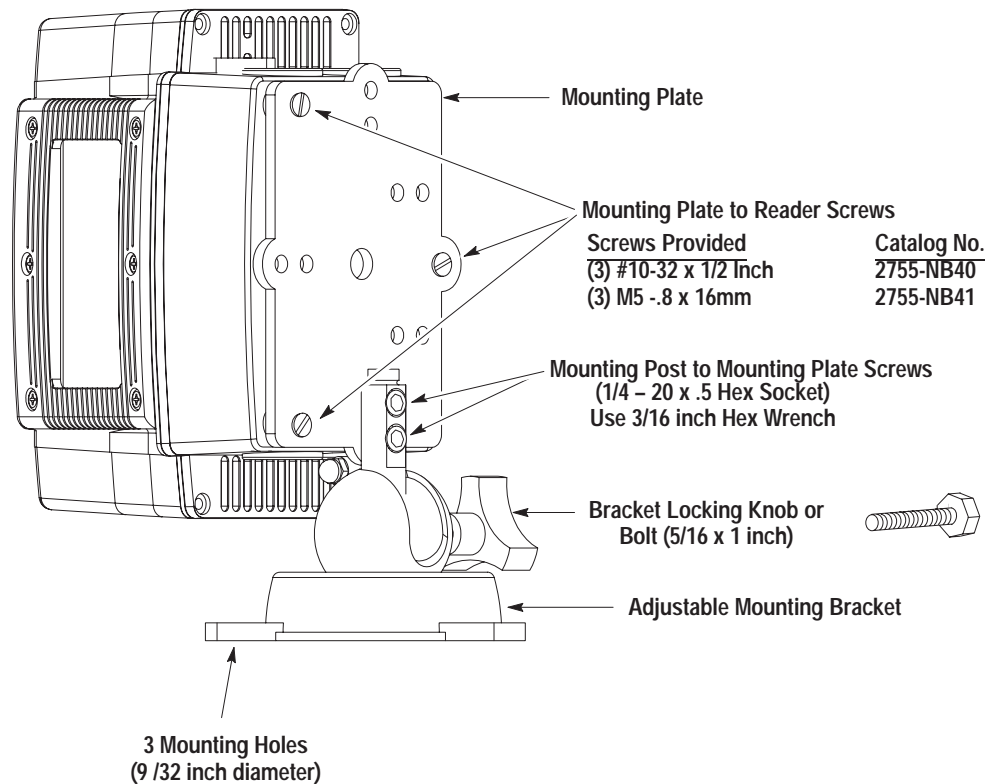
## Top Post Mounting

The mounting plate attaches to the bottom of the wiring base with three screws (see next page). The mounting bracket post is threaded into the hole at the center of the mounting plate. Lock the mounting post in position by tightening the locking knob. For additional security, you can remove the locking knob and replace it with the hex bolt provided. The two hex socket screws are not used in this configuration.



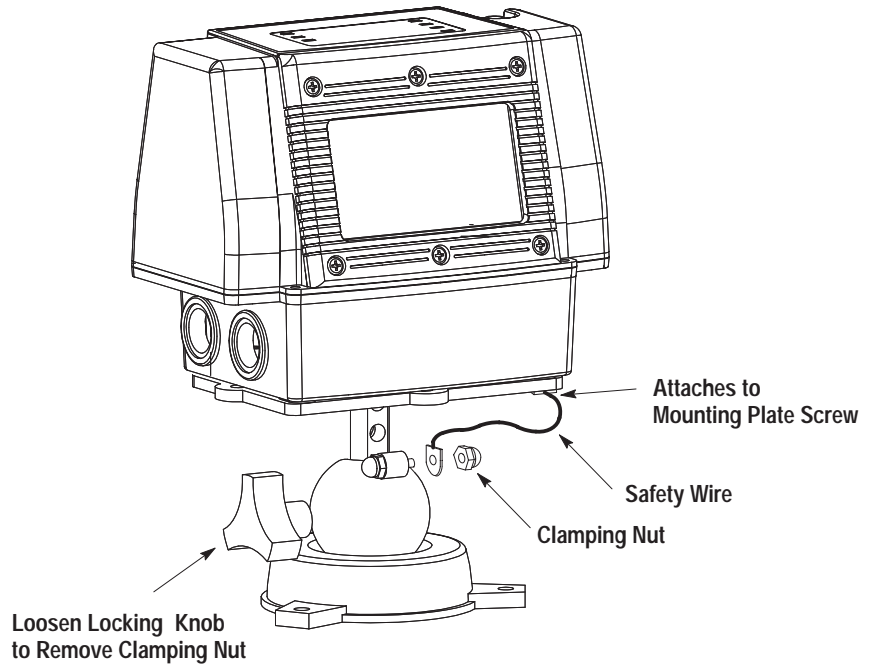
## Side Post Mounting

The mounting plate attaches to the bottom of the wiring base with three screws that are provided with the base. The mounting bracket post (flat side) attaches to the mounting plate with two hex socket screws. Five sets of 2 holes allow the bracket post to attach to the front, back or either side of the mounting plate. Lock the mounting post in position by tightening the locking knob. For additional security, you can remove the locking knob and replace it with the hex bolt provided.



## Installing the Safety Wire

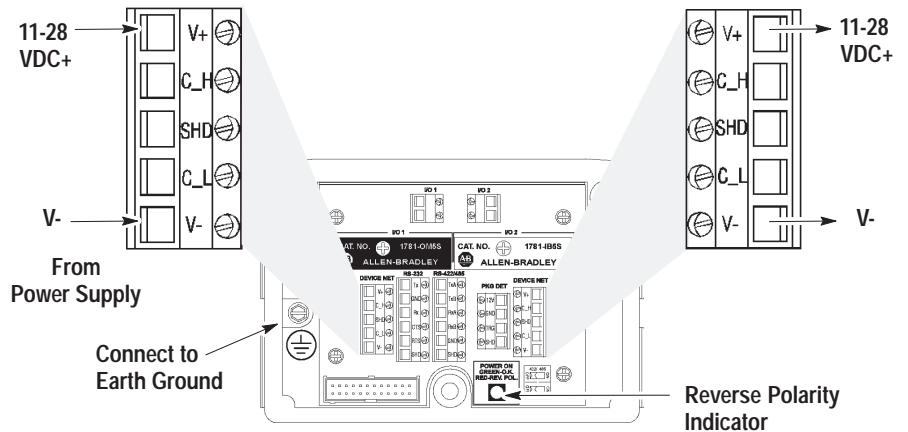
Install the safety wire whenever the mounting bracket is installed in an inverted position. The safety wire prevents the Reader from dropping to the floor when the bracket locking knob is loosened.



Place one end of the safety wire under a mounting bracket clamping nut. With the bracket locking knob loosened, the clamping nut can be removed by hand. The other end of the safety wire is attached to the Reader using one of the screws that secure the mounting plate to Reader wiring base.

## Power Requirements

The Reader requires 14 watts (maximum) of power. The Reader accepts 11 to 28 VDC at either one of the two DeviceNet terminal blocks (terminals 1 & 5), even if DeviceNet is not used.



The reverse polarity LED (top illustration) is Green when power is properly connected. If this LED is Red, the power + and – connections are reversed. You must correct a reverse polarity condition before installing the Reader.

## Power Supplies

Two power supplies are available for the AdaptaScan Reader.

- 120 VAC Power Supply (Catalog No. 2755-PW46 ) plugs directly into a standard wall electrical socket.
- 240 VAC Power Supply (Catalog No. 2755-PW47 ) supplied with an IEC 320 unterminated power cord.

Use one of these power supplies or another 11 to 28 VDC power source when power is not provided by another device on a DeviceNet network.

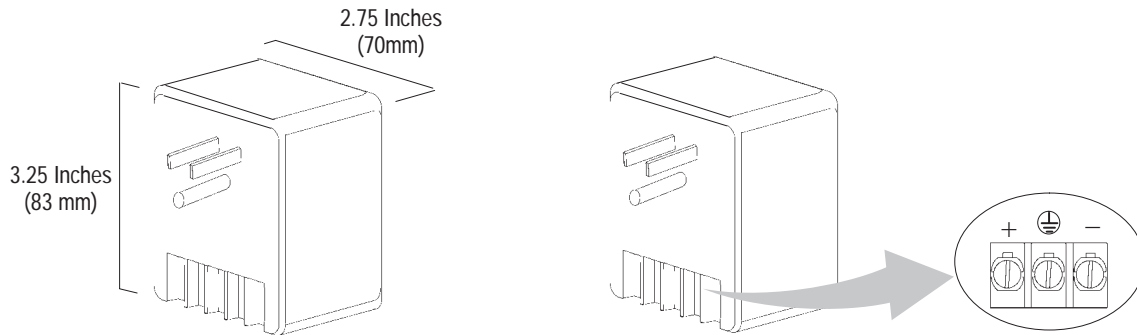


**ATTENTION:** Permanent damage to the Reader can be caused by:

- Connecting the power supply to more than one Reader.
- Connecting power supplies in parallel.
- Shorting out the power supply.

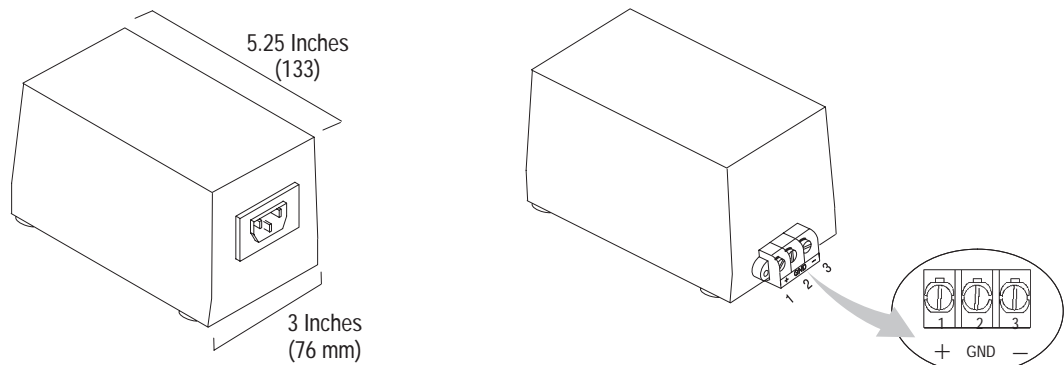
### Catalog No. 2755-PW46 Power Supply

The 120 VAC Power Supply (Catalog No. 2755-PW46) provides power to **one** AdaptaScan Bar Code Reader. It is not rated for industrial environments and must be mounted in a clean, dry location or a suitable enclosure. Connections to the power supply are made at the 3 screw terminals.



### Catalog No. 2755-PW47 Power Supply

The 240 VAC power supply (Catalog No. 2755-PW47) provides power to **one** Reader. Included is a standard IEC 320 unterminated power cord. The PW47 supply is not rated for industrial environments and sets on a flat surface. Connections to the power supply are made at the 3 screw terminals.





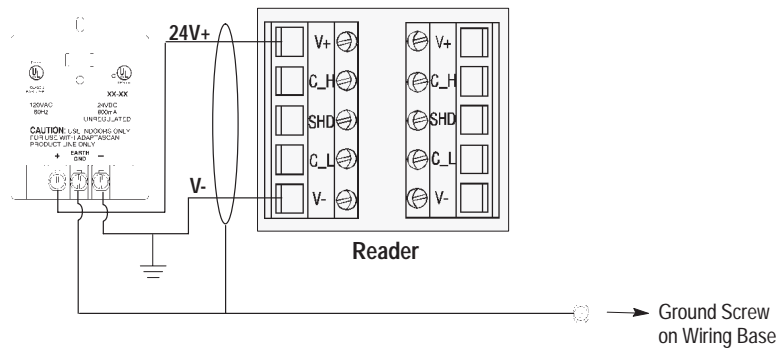
## Power Connections

### Single Reader Power Connection

Below is a single power supply (Catalog No. 2755-PW46, -PW47) providing power to a single Reader. Do not connect other DeviceNet power supplies to the 2755-PW46 or -PW47 supply.

Use a shielded cable (Belden 9316 recommended) when making power connections.

**Note:** You must ground V- to Earth Ground at a single point, preferably as near the power supply as possible.



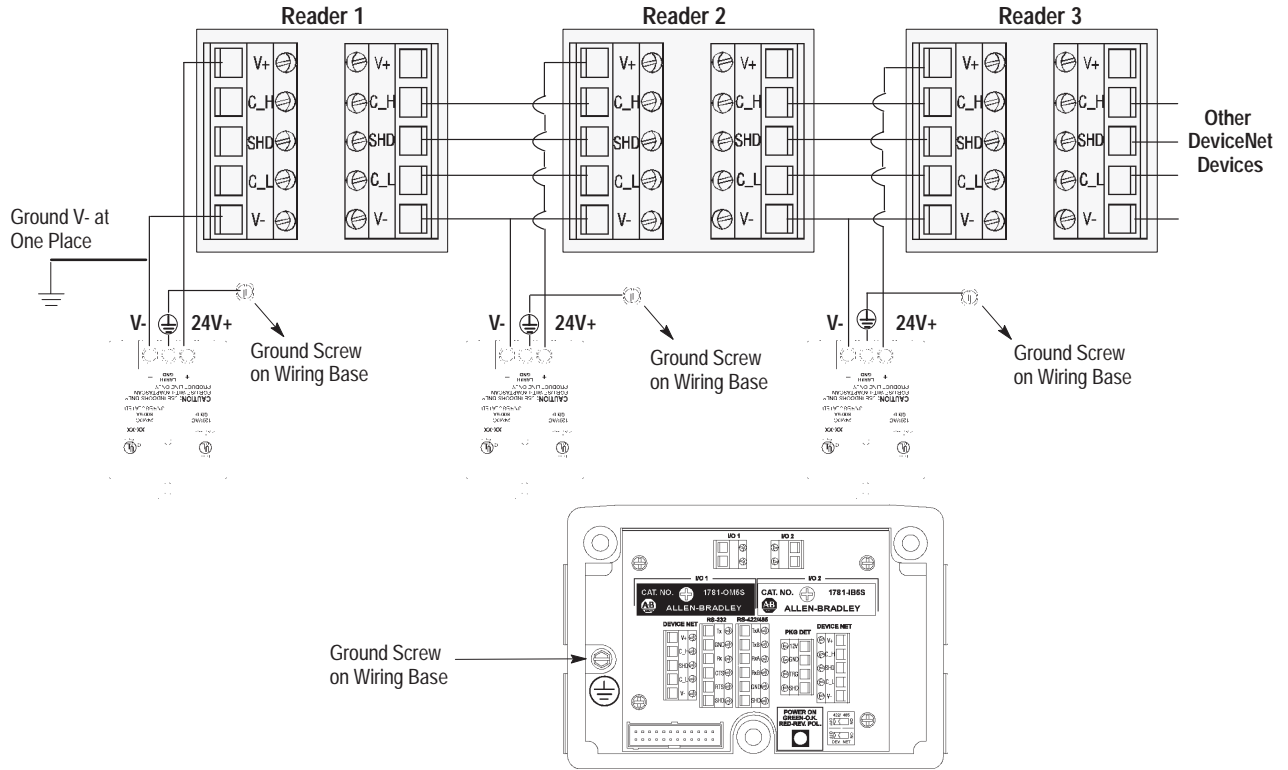
### Multiple Reader Connections using 2755-PW46/-PW47 Supply

In the following illustration, each Reader is powered by a separate Catalog No. 2755-PW46 or -PW47 power supply. The Catalog No. 2755-PW46 is shown. Do not connect power supplies in parallel.

Use a shielded cable (Belden 9316 recommended) when making power connections.

**Note:** You must ground V- to Earth Ground at a single point on the power supply link, preferably as near the power supply as possible.

Ensure that the V+ lines are not connected together and that the V- lines are connected together as shown on top of next page.

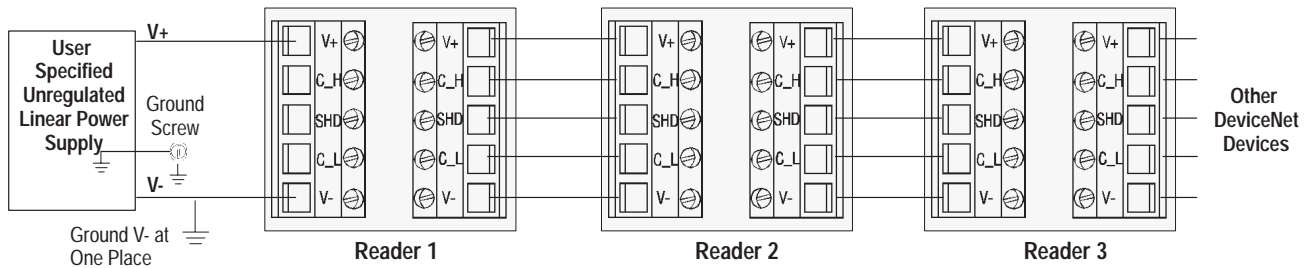


See DeviceNet Cable System Planning and Installation Manual (Publication No. DN-6.7.1) for recommendations and accessories.

### Multiple Reader Connections using Other Power Supply

Below all Readers are powered by another power supply. Use a linear unregulated power supply. The supply must provide 14 watts of power to each reader. Use a shielded cable (Belden 9316 recommended) when making power connections.

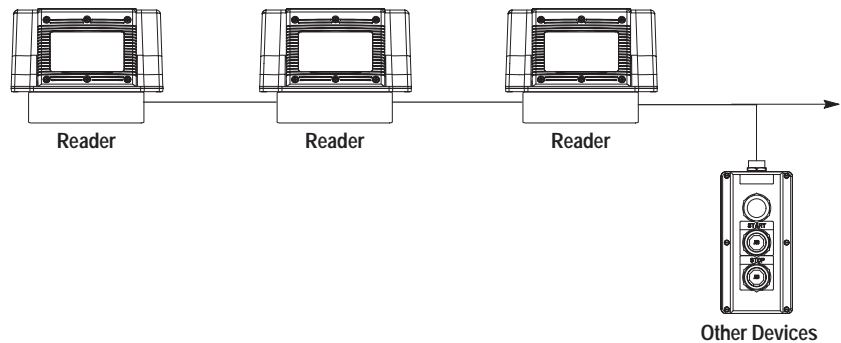
**Note:** You must ground V- to Earth Ground at a single point on the power supply link, preferably as near the power supply as possible.



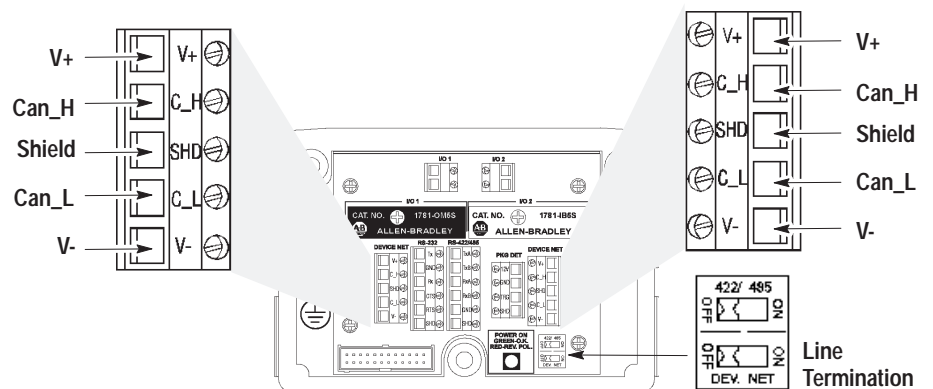
See DeviceNet Cable System Planning and Installation Manual (Publication No. DN-6.7.1) for recommendations and cable accessories.

## DeviceNet Connections

For network wiring, the wiring base has two DeviceNet terminal blocks; one for incoming power and communications, the other for outgoing power and communications. DeviceNet communications requires 3 wires (2 communications, 1 ground) and a shield. You can install the Reader in a single or multiple drop configuration. Up to 63 slave devices can be installed on a single DeviceNet master/slave network. Up to 32 Readers can be installed on a DeviceNet peer-to-peer network.



Both DeviceNet terminal blocks are tied to each other. You can connect the wiring to either terminal block. Use cabling (Catalog No. 1485C-P1A50, -P1A150 or -P1A300) for all DeviceNet connections.



See DeviceNet Cable System Planning and Installation Manual (Publication No. 1485-6.7.1) for recommendations and cable accessories.

### Line Termination

The two devices furthest apart from each other on a DeviceNet network must be terminated. A termination switch is provided. Only the devices at the ends of the network can be terminated.

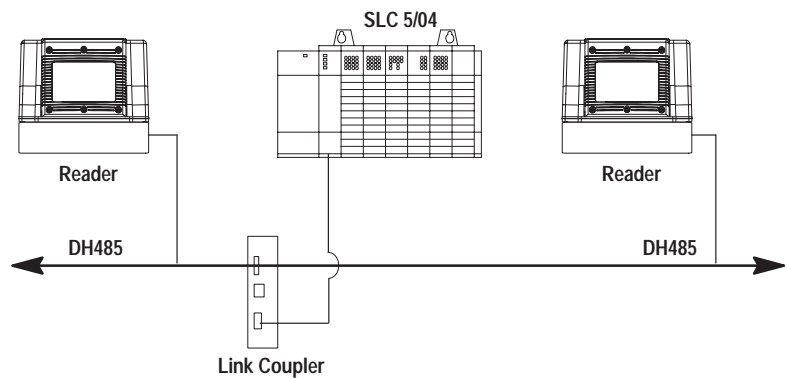
## RS-485 and RS-422 Connections

The wiring base has an RS-485/RS-422 terminal block for point-to-point or network communications. Up to 32 devices can be installed on a single DH485 network.

**Important:** The DH485 network cable requires proper shielding, grounding, and termination. Refer to Data Highway / Data Highway Plus / Data Highway DH485 Cable Installation Manual (Publication No. 1770-6.2.2).

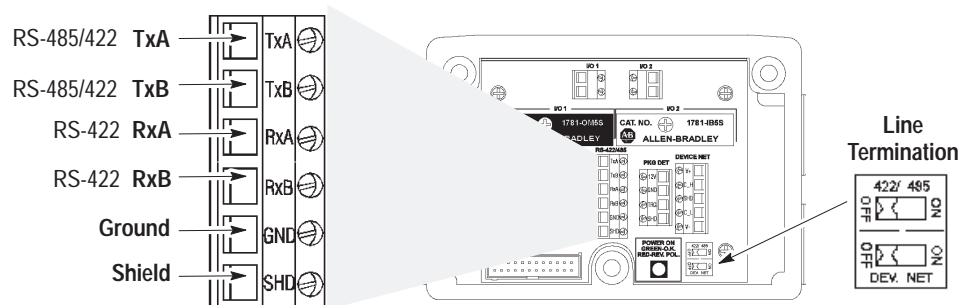
### Network or Point-to-Point

Allen-Bradley offers a variety of devices that support RS-485 or RS-422 communications. One of the more common RS-485 network types is an SLC DH485 network.



Use the link coupler (Catalog No. 1747-AIC) when the distance between the Reader and SLC is greater than 50 feet (15.2 meters).

The Reader can connect directly to another RS-485/RS-422 device. The connections for both network and point-to-point are the same.

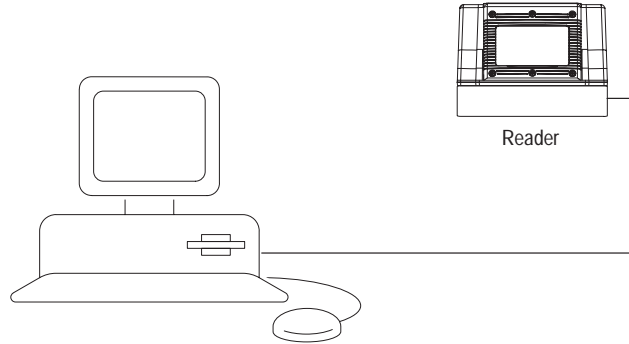


### Line Termination

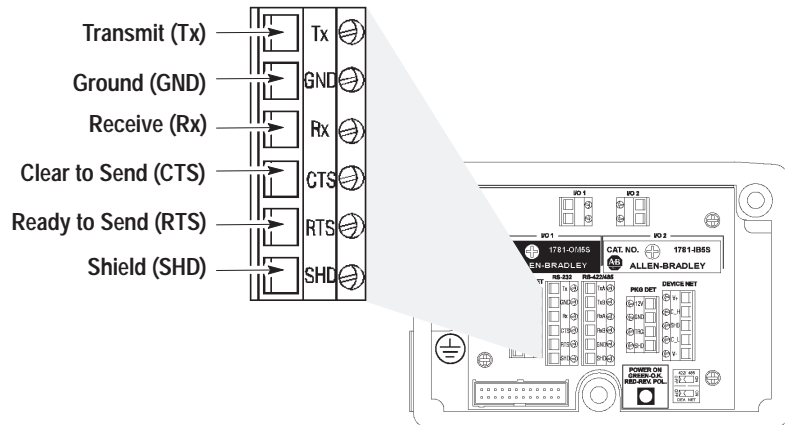
The end devices on an RS-422/RS-485 network must be terminated. A termination switch is provided. Only the end devices, on each end of a network, should be terminated.

## RS-232 Connections

The RS-232 port provides point-to-point communications at distances up to 50 feet (15.2 meters). Use the RS-232 port for a direct connection to a controller, personal computer, or other device that supports one of the protocols (terminal, Allen-Bradley DF1, Allen-Bradley DH485).



RS-232 connections are made to the RS-232 port terminal block.



## I/O Modules and Wiring

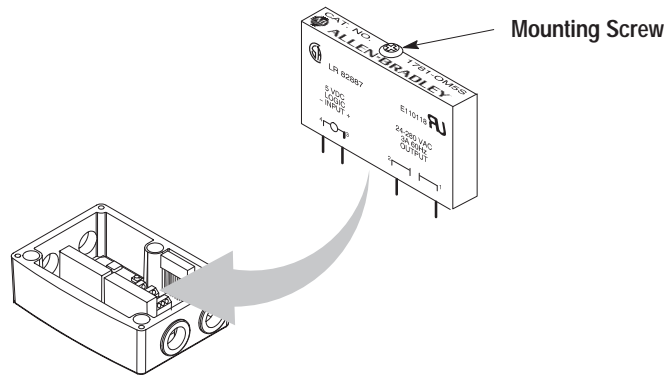
The wiring base supports 2 optional input or output modules. Any of these modules can be used. These modules function like switches, they do not supply a voltage. Refer to Appendix A for specifications.



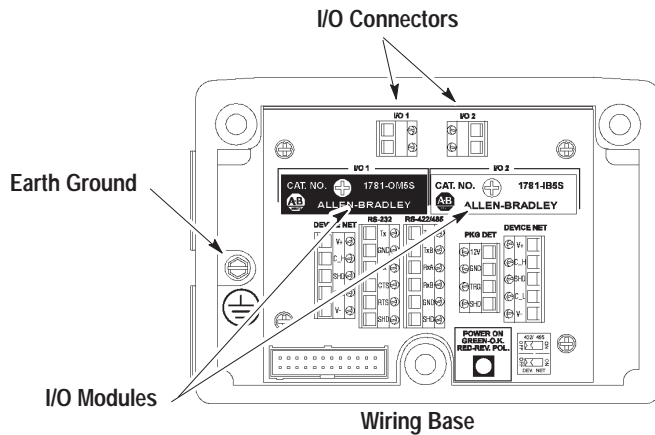
**ATTENTION:** The wiring base contains hazardous voltages which can cause shock, burns or death. Disconnect and lockout all power sources before servicing. Verify power with meter.

Description	Catalog No.
DC Output Module – rated at 3 to 60 VDC.	2755-OB5S
AC Output Module – rated at 12 to 140 VAC.	2755-OA5S
AC Output Module – rated at 24 to 280 VAC.	2755-OM5S
DC Input Module – accepts 3.3 to 32 VDC.	2755-IB5S
AC/DC Input Module – accepts 90 to 140 VRMS or VDC	2755-IA5S
AC/DC Input Module – accepts 180 to 280 VRMS or VDC	2755-IM5S

All of the I/O modules plug into the wiring base and are secured by a screw through the module.

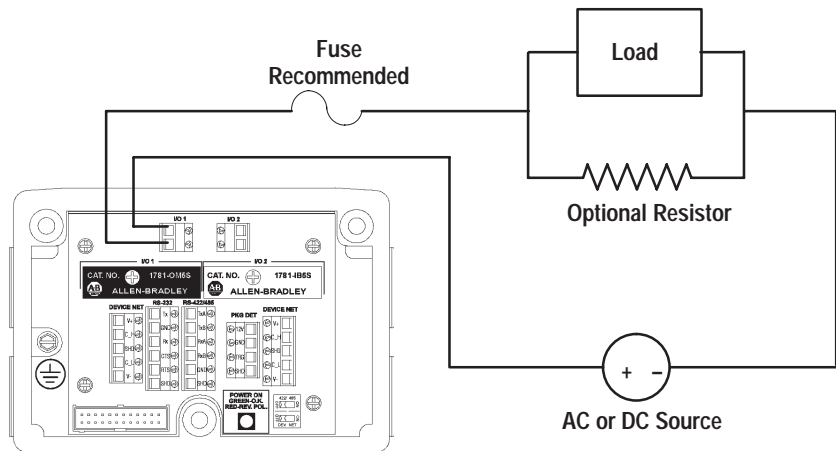


Connect the I/O wiring to the two I/O terminal blocks. When using DC modules, observe the polarity of the connections (shown on circuit board or label on wiring base insulating cover).

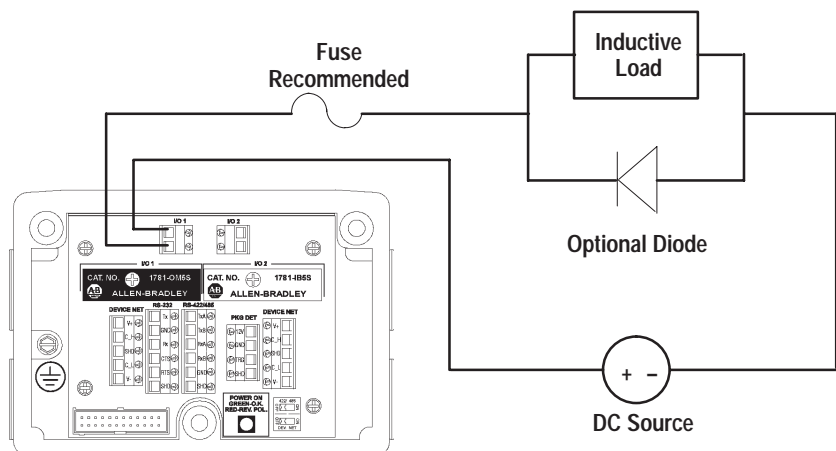


## Output Module Application

Shown below is a typical output module application. When connecting high impedance loads, you may need to add a resistor in parallel with the load. This resistor (typically 300 to 6,000 ohms) provides a continuous minimum current flow (10 mA DC or 50 mA AC) through the output module in the closed state. See Appendix C for available Allen-Bradley fuse, diode and resistor terminal blocks.



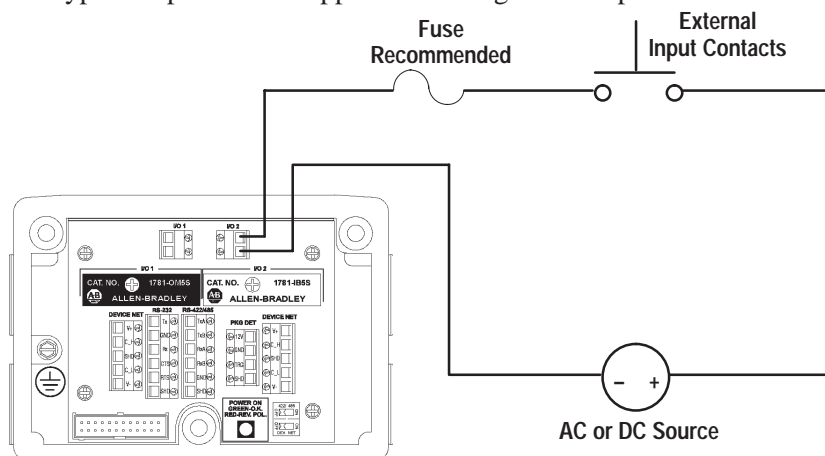
Back Electromotive Force (EMF) is sometimes generated when an inductive load is switched off. Back EMF may damage the output module. A diode in parallel with the inductive device dissipates the back EMF.



## Input Module Application

### External Power Source

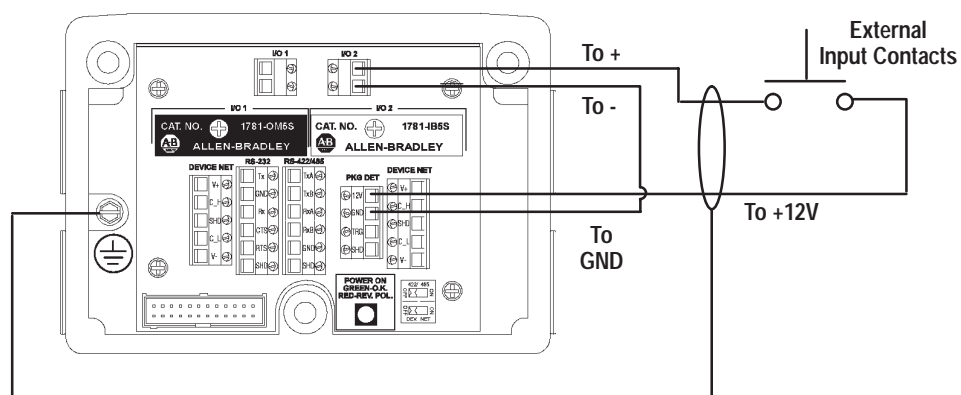
A typical input module application using external power source:



The module and the switch receive power from an external AC or DC source. Although input modules may be used for package detection, use the package detect input (see next page) whenever possible. See Appendix B for available Allen-Bradley fuse, diode and resistor terminal blocks.

### Internal Power Source

A typical input module application using the package detect +12V internal power source and Catalog No. 2755-IB5S input module:



The module and the switch receive power from the package detect +12V source. Only use input module Catalog No. 2755-IB5S for this application.

**Important:** Package detect terminals are not powered until a Reader is installed on the wiring base.

**Note:** The circuit must not draw more than 50mA from the Package Detect terminal block.



## Package Detector

The package detect input accepts **only a current sinking output**. Allen-Bradley Photoswitch® package detectors are recommended. Select a switch from the PhotoSeries 6000 or 9000 product line that best suits your application. Make sure you order a **sinking** (12V DC) type sensor. Mounting brackets and cables are also available.

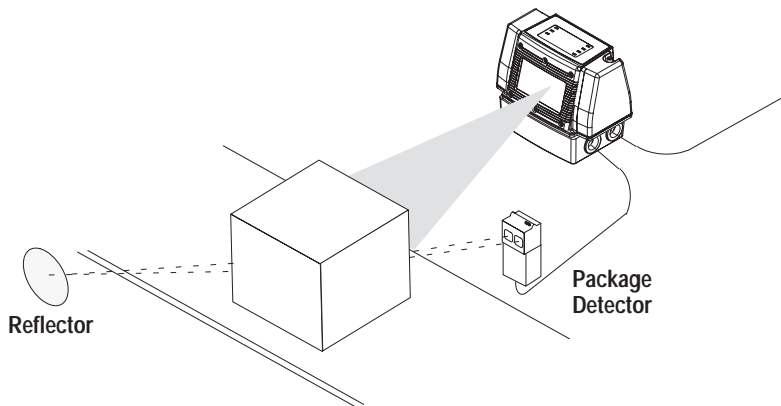
**Important:** Package detect terminals are not powered until a Reader is installed on the wiring base.

The package detector must be able to operate using the +12V DC source (12V) and not draw more than 100mA. The package detect sense line (TRG) must be able to sink 5mA at +12V DC.

Follow these guidelines when installing a package detector.

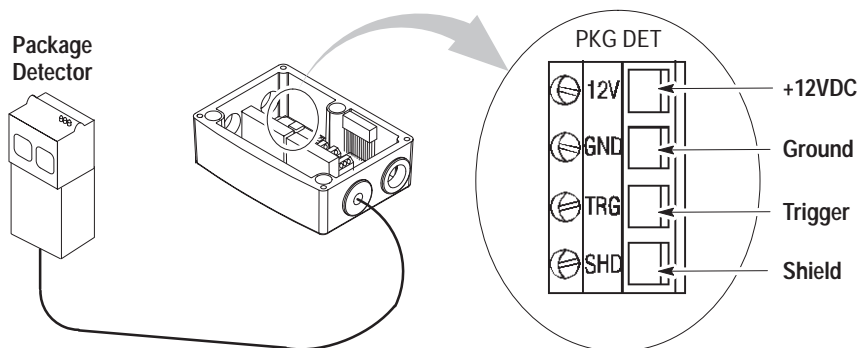
- Mount the package detector and reflector so that the scan beam does not strike either of them.
- Install the reflector within the operating range of the package detector.
- The package detector beam must be broken before the label is in position for scanning. The package detect should remain active while the symbol is being scanned.
- Grounding the trigger (on Package Detect terminals in wiring base) activates the package detect (scanner).

The following is a typical package detector configuration:



Connect the package detect wiring to the wiring base as shown.

**Note:** If you are using a sensor with mechanical contacts, refer to page 3-21 for wiring connections to an input module.



# Installing / Removing the Reader

## Chapter Objectives

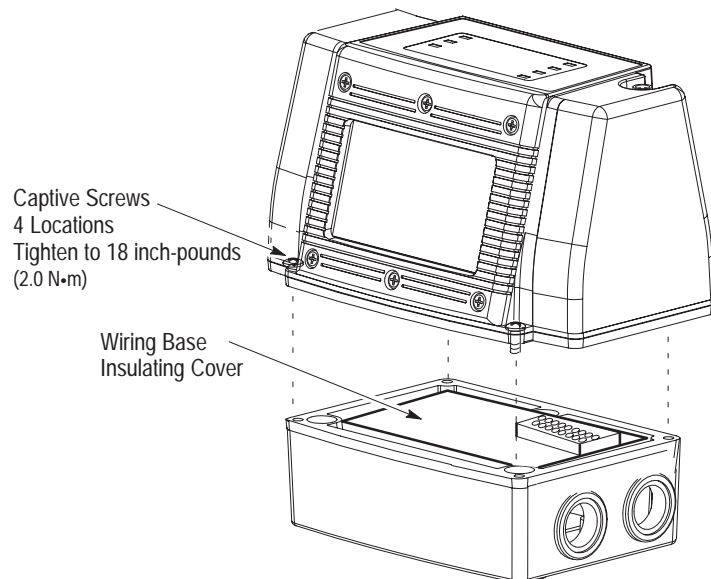
This chapter describes how to install the Reader on the wiring base.

Section	Page
Installation	4-1
Power-up Sequence	4-2
Checking Reader Operation	4-2
Replacing a Reader	4-3

## Installation

The Reader plugs into the connector on the wiring base. Install the Reader with or without the power disconnected from the wiring base.

### To install the Reader:



1. Make sure the insulating cover with warning label attached is in position, so the flap covers the field wiring connections inside the wiring base.
2. Place the Reader over the wiring base and carefully align the connector on the bottom of the Reader with the connector on the wiring base (to avoid bending pins).
3. Press Reader down firmly until it contacts the wiring base.
4. Secure the Reader with four screws. Alternately tighten screws to a torque of 18 inch-pounds (2.0 N•m).

## Power-up Sequence

On initial power-up, the Reader performs a series of self-diagnostic tests and LED tests (all LEDs flash). When the Module LED flashes and turns a steady green the power-up sequence is complete. The complete power-up sequence takes a few seconds.

## Checking Reader Operation

The Reader is shipped from the factory with these defaults:

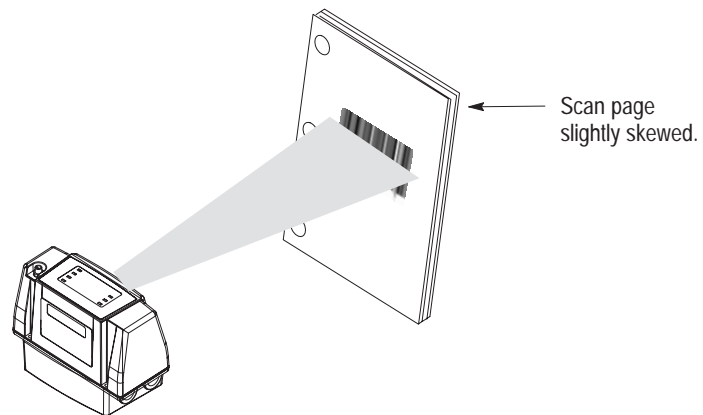
- All symbologies enabled (except Pharma Code).
- Laser Light set to Always On in Scanner dialog.

If the initial Reader configuration has been changed, you must enable the Code 39 symbology and the other parameters above. (Refer to the AdaptaScan Software user manual.)



**To quickly check the operation of a Reader with factory defaults:**

1. Apply power to the Reader.
2. Position the above Code 39 test symbol approximately 12 inches (.3 meter) from the Reader. Skew the page slightly.



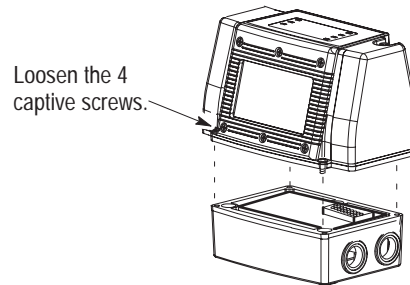
3. The scan beam should be scanning continuously.
4. Observe the Symbol LED. The Symbol LED illuminates when the Reader is scanning the bar code symbol.

## Replacing a Reader

### To replace a Reader:

**Note:** If you are installing more than one Reader on a network, install each Reader one at a time and change the DeviceNet address before installing the next Reader.

1. Loosen the 4 screws that secure the Reader to the wiring base.



2. Pull the Reader straight up from the wiring base. When replacing a Reader, it is not necessary to disconnect the power.
3. Install the Reader by aligning the connector on the Reader with the connector on the wiring base and pressing the the Reader down firmly.
4. Tighten the four screws that secure the Reader to the wiring base to 18 inch-pounds (2.0 N•m).
5. Set a (unique) DeviceNet address for the Reader using the Device dialog of the AdaptaScan Software. The initial default address for a firmware download is 63.

**Note:** When downloading updated firmware to a Reader with existing firmware, you must set the DeviceNet address to the address used by the Reader.

6. Download firmware to the Reader.
7. Download the Reader configuration to the Reader directly through the Configuration Port Connector or from any other Reader on the network.

## Downloading Configurations

### Chapter Objectives

This chapter describes how to download a configuration between the Reader and a personal computer running the AdaptaScan software.

Section	Page
Connecting a Personal Computer	5-1
Downloading Firmware	5-3
Downloading a Configuration	5-4

### Connecting a Personal Computer

AdaptaScan Bar Code Reader configurations and firmware are downloaded:

- directly through the Configuration Port Connector on the Reader
- through any Reader on the same DeviceNet or RS-485 network

Remove the protective cap from the Reader's Configuration Port Connector. Use the Configuration Cable (Catalog No. 2755-NC48) to connect the computer to a Reader. One cable end connects to the Configuration Port Connector on the Reader. Connect the end with the 9-pin D shell connector to the computer's serial port. You may need a 9-to-25 pin adapter if your computer has a 25-pin serial port.

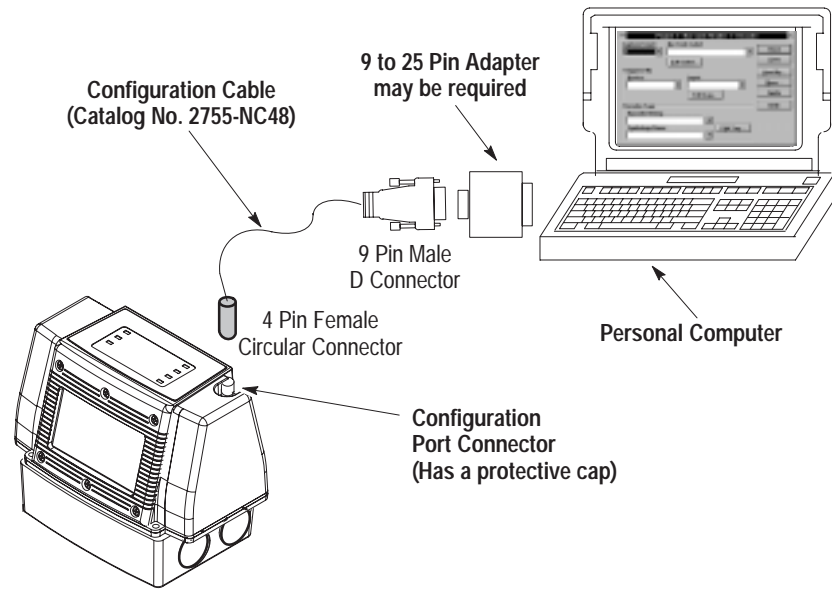
**Note:** The Series A Reader uses the 2755-NC43 programming cable. This cable is not compatible with the Series B Reader.



**ATTENTION:** Do not extend the length of the Configuration Cable (Catalog 2755-NC48). This unshielded cable cannot exceed a length of 3 meters or 9 feet, 10 inches.

**Note:** Configure the computer port and address for download using Preferences dialog in the AdaptaScan Software.

The following figure shows the connections for downloading firmware or a Reader configuration.



**Note:** The Series A Reader uses the 2755-NC43 programming cable. This cable is not compatible with the Series B Reader shown above.



**ATTENTION:** After downloading, replace the protective cap on the Configuration Port Connector to prevent the collection of dirt and moisture in the connector.

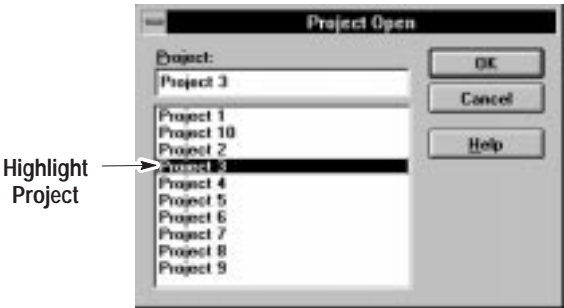
### Downloading Firmware

This section shows the procedure used to download new firmware to the AdaptaScan Bar Code Reader. Each Reader is shipped with factory default firmware. The software will prompt you if you need to download new firmware.

Verify that your computer is connected to a Reader as shown on previous page.

**To download new firmware to a Reader:**

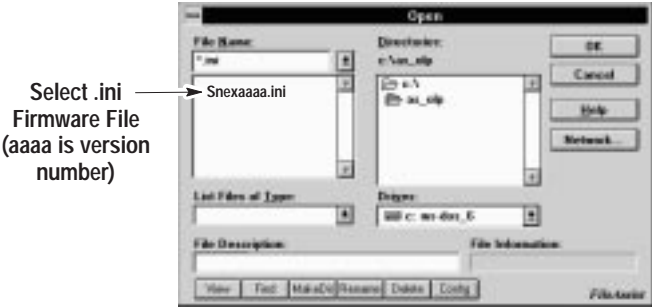
- 1. Run the AdaptaScan software (Catalog No. 2755-ASN).
- 2. From the Project menu, choose Open or New.



- 3. Select and open the project. If creating a new project, add a Bar Code Reader by clicking the New button on the project dialog.

Verify that the DeviceNet address matches the address currently used by the Reader. If downloading firmware to a new Reader, check that the DeviceNet address is set to 63 in the Device dialog.

- 4. From the Project dialog, click the Firmware button. The File Open dialog appears.



- 5. Select the firmware file (shows revision number) to download and click the OK button.

The following message appears as the firmware is downloaded. Download will take several minutes. During this time, the Module LED will flash red.

```
Resetting. Please Wait . . .
Sending. Please Wait . . .
```

- 6. The message disappears when the download is complete.



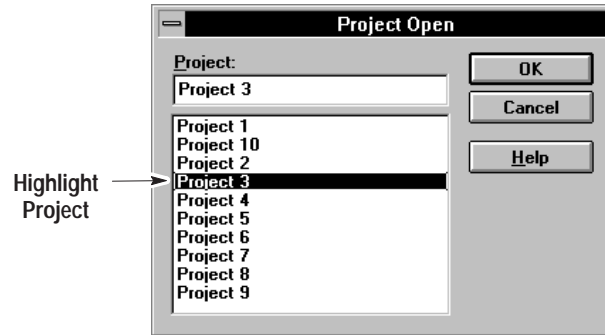
## Downloading a Configuration

This section shows how to download a configuration to one or more Readers. Verify that your computer is connected to a Reader as shown on previous page.

### To download a configuration to a Reader:

1. Run the AdaptaScan software (Catalog No. 2755-ASN).
2. From the Project menu, choose Open.

The Project Open dialog appears.



3. Select and open the project containing the configuration you want to download.
4. Verify that each device within the project has a unique DeviceNet address (even if you are not using DeviceNet communications). With the Reader name highlighted, click the Device button to open the Device dialog and set the address.



5. From the Project dialog, select the Reader or Readers to which you want to download a configuration. To select multiple Readers, hold down the [Ctrl] button while making the selections.
6. Click the Send Device button to download to a selected Reader or the Send All button to download to all Readers on the network.

The following message appears during the download.

Resetting. Please Wait . . .

Sending. Please Wait . . .

When the download is complete, this message disappears.

## Troubleshooting and Maintenance

### Chapter Objectives

This chapter describes how to isolate and correct the most common operating problems and perform routine maintenance tasks.

Section	Page
Using the Troubleshooting Chart	6-1
Technical Support	6-1
Equipment Required	6-1
Troubleshooting Chart	6-2
LED Indicators	6-3
Cleaning the Scan Window	6-5
Replacing the Scan Window	6-6

### Technical Support

If you should require assistance or need additional information on operating the AdaptaScan Reader, Configuration Software, or accessories, contact your local Allen-Bradley support office or Allen-Bradley Technical Support at **(216) 646-6800**.

### Equipment Required

Other than verifying that the correct power source is connected to the wiring base (use a voltmeter), no electronic diagnostic equipment is required for troubleshooting.

### Using the Troubleshooting Chart

Table 6.A is the AdaptaScan troubleshooting chart. This chart lists the most common operating problems, the probable causes, and steps to correct the problem.

## Troubleshooting Chart

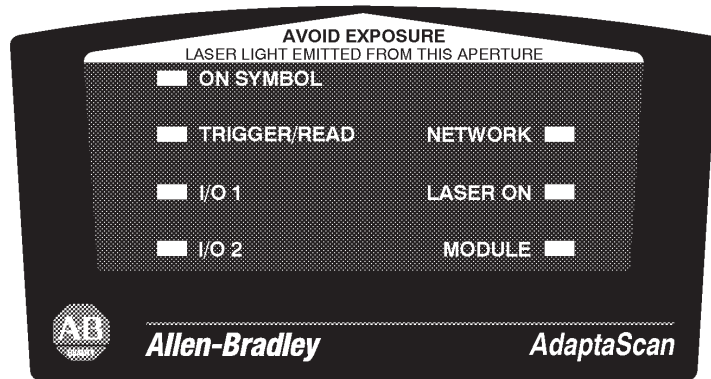
**Table 6.A**  
**Troubleshooting Chart**

Problem	Probable Cause(s)	Corrective Action(s)
Reader does not power up. No LED indicators illuminate.	<ol style="list-style-type: none"> <li>1. Improper connection to power source.</li> <li>2. Power source not providing 12 to 28 VDC.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check power source.</li> <li>2. Check for green LED in wiring base.</li> <li>3. Check the wiring base connector for bent pins.</li> </ol>
No communications with personal computer.	<ol style="list-style-type: none"> <li>1. Communications fault.</li> <li>2. No power supply connection at DeviceNet connector</li> <li>3. Computer fault.</li> <li>4. Broken or bent pins on Configuration Port of Reader</li> </ol>	<ol style="list-style-type: none"> <li>1. Check cable connection.</li> <li>2. Power must be supplied. See Chapter 3.</li> <li>3. Refer to computer user manual.</li> <li>4. Check Configuration Port of Reader for damaged pins. If pins are damaged, return Reader.</li> </ol>
No laser beam emits from scan window.	<ol style="list-style-type: none"> <li>1. No laser light trigger signal.</li> </ol>	<ol style="list-style-type: none"> <li>1. Verify Reader Laser Light trigger source for proper configuration and operation.</li> </ol>
Unable to read a label.	<ol style="list-style-type: none"> <li>1. A label has not been defined.</li> <li>2. Decoding functions not configured correctly.</li> <li>3. Label(s) out of specification.</li> <li>4. Scan line not on the label.</li> <li>5. Reader is at incorrect angle or distance from bar code symbols.</li> </ol>	<ol style="list-style-type: none"> <li>1. Define a label and symbol.</li> <li>2. Check decoder configuration to verify that parameters are set appropriately for your application. After making changes, SEND the configuration and try again.</li> <li>3. Use good quality labels that are within specifications.</li> <li>4. Reposition the scan line.</li> <li>5. Use autofocus to adjust the read range. Use the ON SYMBOL LED to verify that the Reader is scanning a possible bar code symbol.</li> </ol>
No communications with host.	<ol style="list-style-type: none"> <li>1. Baud rates not set properly.</li> <li>2. Loose or incorrect wiring.</li> <li>3. Broken or bent pins on 24-pin Reader connector.</li> <li>4. Reader DeviceNet address or DH485 node and maximum node are not set properly.</li> <li>5. Termination switch not set properly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Verify that Reader and host are set at the same Baud rate.</li> <li>2. Verify cable connections using connection diagrams in Chapter 3.</li> <li>3. Check Reader connector for broken or bent pins.</li> <li>4. Verify DeviceNet Address or DH485 node number settings.</li> <li>5. Check position of termination switch in wiring base. Set to correct position.</li> </ol>
No communications with network.	<ol style="list-style-type: none"> <li>1. Communications fault.</li> <li>2. Loose or incorrect wiring.</li> <li>3. Broken or bent pins on 24-pin Reader connector.</li> <li>4. Reader DeviceNet address or DH485 node and maximum node are not set properly.</li> <li>5. Termination switch not set properly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check status of NETWORK LED, refer to section "LED Indicators".</li> <li>2. Verify cable connections using connection diagrams in Chapter 3.</li> <li>3. Check Reader connector for broken or bent pins.</li> <li>4. Verify DeviceNet Address or DH485 node number settings.</li> <li>5. Check position of termination switch in wiring base. Set to correct position.</li> </ol>

## LED Indicators

Use the 7 LED indicators to isolate operating problems.

Figure 6.1  
LED Indicators



### On Symbol

Condition	Indication
Yellow	Bar code symbol is being scanned and decoded.
Flashing	Bar code symbol is being read at less than 100% rate.
Off	Not reading bar code symbol.

### Trigger/Read

Condition	Indication
Yellow	Decoder trigger is active.
Green	Valid bar code symbol read.
Off	No trigger or valid bar code symbol read.

### I/O 1 and I/O 2

Condition	Indication
Yellow	Corresponding input or output is in an On (closed contact) state.
Off	Corresponding input or output is in Off (open contact) state.

**Network**

Condition	Indication
Green	Normal DeviceNet operating state.
Flashing Green	Communication link established but no data transfer.
Red	DeviceNet communication fault detected.
Flashing Red	One or more DeviceNet devices are not responding. Reader may not be able to perform all configured functions.
Off	No DeviceNet communications established.

**Laser On**

Condition	Indication
Yellow	The scan beam is On (active).
Off	The scan beam is Off (inactive).

**Module**

Condition	Indication
Green	Normal operating condition. Power is applied to the Reader and no faults have been detected.
Flashing Green	Power-up initialization or incorrect configuration.
Red	Processor fault (unrecoverable).
Flashing Red	Minor fault (recoverable). Occurs when downloading firmware.
Off	No power applied to Reader.

---

## Cleaning Scan Window



**ATTENTION:** Other than cleaning the scan window, no user maintenance of the Reader is required. **Do not open the enclosure!**

---

For optimum performance the scan window should be clean.



**ATTENTION:** Only use reagent grade alcohol to clean the window. Do not use organic solvents. Do not use abrasive materials, such as disposable paper wipes to clean the scan window. Disposable wipes usually contain glass fibers which will scratch and cloud the window.

---

### To clean the scan window:

1. Turn the Reader off.



**ATTENTION:** Do not attempt to clean the window while the Reader is turned on. Although momentary exposure to the laser light is not harmful, precautions should be taken to avoid looking into the beam.

---

2. Verify that the Module LED on the Reader is off.
3. Dust off the scan window and adjacent areas with clean air.
4. Clean the window using a reagent grade alcohol or a similar cleaner for precision optics and lint free lens cleaning paper. To avoid smearing and fingerprints, wipe the window in one direction and then discard the tissue. Repeat as required.

**Note:** Clean the window in sections if the entire surface contains contaminants.

5. Apply power to the Reader. The Module LED on the Reader should be on.

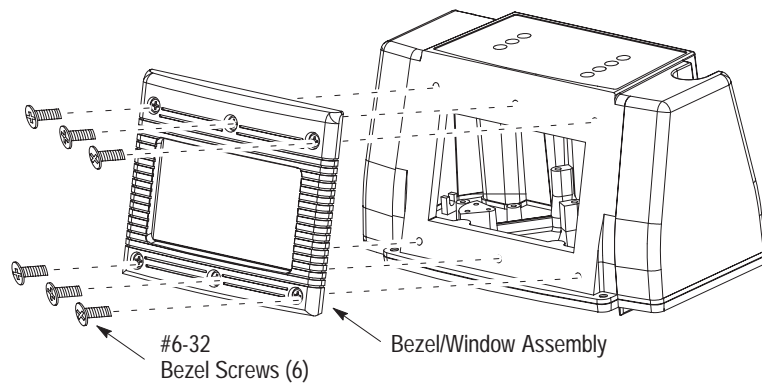
## Replacing Scan Window

The scan window fits into an opening behind the front of the Reader. A bezel and gasket create a NEMA Type 4 seal.

The table below lists numbers for ordering a glass or plastic window kit. Do not substitute other material for a damaged window. The windows have an optical coating necessary to Reader performance.

Window Kits	Description
2755-NW45	Replacement Glass Window Kit Includes bezel/window assembly with anti-reflective, optical glass window.
2755-NW44	Replacement Plastic Window Kit Includes bezel/window assembly with hard coated, anti-reflective, optical quality, plastic window.

**Figure 6.2**  
Scan Window Removal/Replacement



**ATTENTION:** When servicing the Reader, do not touch components inside window. Do not touch the internal mirrors! Fingerprints diffuse the laser beam. The internal mirrors cannot be serviced in the field.

### To remove the scan window:

1. Shut off power to the Reader.



**ATTENTION:** Disconnect power to the Reader before attempting to replace the scan window to avoid potential eye damage from the laser beam.

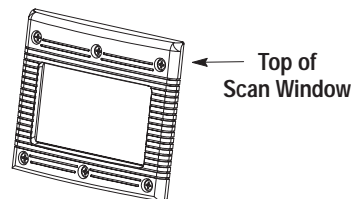


2. Clean area around window bezel.

3. Remove the six #6-32 screws from the bezel/window assembly.
4. Carefully pull bezel/window assembly away from the front of the Reader.
5. Discard the old bezel/window assembly.

**To install the replacement scan window:**

1. Do not smudge the window when removing the bezel/window assembly from package. If necessary, refer to page 6-5 for cleaning instructions.
2. Place the bezel/window assembly against the front of the Reader (with wider side at top of Reader), aligning the 6 screw holes with the 6 holes on the Reader body.



3. Tighten the six #6-32 screws to a torque of 10 inch-pounds (1.1 N•m) in a side-to-side sequence providing even compression of the sealing gasket.
4. Refer earlier chapters in this manual to install, align and verify operation of the Reader before resuming full service of Reader. Observe all warnings and cautions.



## Specifications

### Electrical

Voltage	11 to 28V DC
Power	14 Watts maximum

### Mechanical

Enclosure	NEMA Type 4 (when used with properly sealed wiring base)
LED Indicators	
On Symbol	Yellow
Trigger Read	Yellow/Green
Input / Output #1	Yellow
Input / Output #2	Yellow
Network	Green/Red
Laser On	Yellow
Module	Green/Red
Approximate Weight (Reader and Wiring Base)	4.6 lbs (2.1 kg)
Dimensions	
Inches	5.58 (H) x 7.14 (W) x 3.95 (D)
Millimeters	142 (H) x 182 (W) x 100 (D)
Shock	30G operating, 50G nonoperating
Vibration	2G, 10 to 150Hz (3 axis) operating
Package Detect	External, +12 V DC, @ 100 mA max. 5 mA current sink (minimum)

### Environment

Ambient Temperature	
Operating	0 to 50° C (32 to 122° F)
Storage	-30 to 70° C (-22 to 158° F)
Relative Humidity	5 to 95%, non-condensing

## Optical

Light Source	Visible Laser Diode (TE Cooled)
Wavelength	660 nm
Output Power	1.0 mW maximum
Scan Rate (Nominal)	
Catalog No. 2755-SN3	300 Scans/Second
Catalog No. 2755-SN5	500 Scans/Second
Catalog No. 2755-SN8	800 Scans/Second
Optical Scan Angles	
Catalog No. 2755-SN3	22° to 72°
Catalog No. 2755-SN5	20° to 50°
Catalog No. 2755-SN8	18° to 30°
Maximum Usable Scan Angle	80% of optical scan angle
Read Ranges	See Chapter 2
CDRH Standards	Meets Class II Standards

## Output Modules

Catalog Number	2755-OB5S	2755-OA5S	2755-OM5S
Nominal Line Voltage	--	120 VAC	240 VAC
Maximum Line Voltage	60 VDC	140 VAC	280 VAC
Minimum Line Voltage	3.0 VDC	12 VAC	24 VAC
Maximum Peak Off State Voltage	60 VDC	400 V peak	600 V peak
Maximum Peak Off State Leakage	1.0 mA	2.5 mA RMS	4.5 mA RMS
Static off-state dv/dt	--	200 V/usec	200 V/usec
Maximum On-State Current	0.5 A DC	0.5 A RMS	0.5 A RMS
Minimum On-State Current	10 mA DC	50mA RMS	50mA RMS
Maximum 1 Cycle Surge	--	4 A peak	4 A peak
Maximum 1 Second Surge	1.5 A DC	--	--
Peak On-State Voltage	1.5 V DC	1.6 V peak	1.6 V peak




## Input Modules

Catalog Number	2755-IB5S <sup>①</sup>	2755-IA5S <sup>②</sup>	2755-IM5S <sup>②</sup>
Maximum Input Voltage	32 VDC	140V RMS/ VDC	280 V RMS/ VDC
Minimum Input Voltage	3.3 VDC	90V RMS/VDC	180 V RMS/ VDC
Input Resistance	1 k ohm	-	-
Maximum Input Current	32mA DC@ 32 VDC	10mA RMS@ 140 VRMS	8mA RMS@ 280VRMS
Drop Out Current	1.0 mA DC	2.5 mA RMS	1.5 mA RMS
Allowable Off-State Input Current	1.0 mA DC	3.0 mA RMS	2.0 mA RMS
Allowable Off-State Input Voltage	2.0 VDC	50 VRMS/VDC	120 VRMS/ VDC

<sup>①</sup> Compatible with TTL level voltages.

<sup>②</sup> AC or DC Input Module

## Certifications

UL Listing	 LISTED	UL Listed
	 LISTED	UL Listed to Canadian safety standards
European Union Directive		Electromagnetic Compatibility Directive (89/336/EEC)
		EN 50081-2 Generic Emission Standard - Industrial Environment
		EN 50082-2 Generic Immunity Standard - Industrial Environment

## DIN Rail Mount Terminal Blocks

This appendix lists Allen-Bradley DIN Rail Mount Terminal Blocks (with diodes, fuses and resistors) that are available for use with the input or output module applications described in Chapter 3. Refer to Publication 1492-1.0 for ordering and application information.

DIN RAIL MOUNT Terminal Block Type	Catalog Number	Voltage Rating	Current Rating
4 terminal; internal 1N4007 Diode	1492-WD4DF	600V	1.0A
4 terminal; internal 1N4007 Diode (reverse polarity)	1492-WD4DR	600V	1.0A
4 terminal; internal 1N4007 Diode	1492-HM2D	600V	1.0A
4 terminal; internal Carbon fixed resistor 5% Tol., 1/2 Watt	1492-WD4RAxxx	300V	
4 terminal; internal metal film fixed resistor 1% Tol., 1/4 Watt	1492-WD4RBxxx	250V	
4 terminal; internal wire wound fixed resistor 1% Tol., 1/2 Watt	1492-WD4RAxxx	250V	
4 terminal; internal Carbon fixed resistor 5% Tol., 1/2 Watt	1492-HM2RAxxx	300V	
4 terminal; internal metal film fixed resistor 1% Tol., 1/4 Watt	1492-HM2RBxxx	250V	
4 terminal; internal wire wound fixed resistor 1% Tol., 1/2 Watt	1492-HM2RAxxx	250V	
2 terminal; replaceable fuse (5 x 20mm fuseholder)	1492-WFB4		
2 terminal; replaceable fuse (5 x 20mm fuseholder with 24V LED Indicator)	1492-WFB424		
2 terminal; replaceable fuse (5 x 20mm fuseholder with 250V Neon Indicator)	1492-WFB4250		
2 terminal; replaceable fuse (1/4 inch x 1-1/4 inch fuseholder)	1492-H6	300V	12A max
2 terminal; replaceable fuse (1/4 inch x 1-1/4 inch fuseholder with 24V LED Indicator)	1492-H5	300V	12A max
2 terminal; replaceable fuse (1/4 inch x 1-1/4 inch fuseholder with 250V Neon Indicator)	1492-H5	300V	12A max

## European Union Directive Compliance

### Installation Requirements

If this product is installed within the European Union or EFTA regions, the following regulations apply.

### EU Directive Compliance

This apparatus is tested to meet Council Directive 89/336 Electromagnetic Compatibility (EMC):

- EN 50081-2      Class A (Industrial) Emissions
- EN 50082-2      Class A (Industrial) Immunity

### Intended Use

According to these Standards, the factor which determines, for EMC purposes, whether an apparatus is deemed to be “Industrial” or “Residential, commercial and light industrial”, is given in Clause 1 of EN50081-2 as follows:

Apparatus covered by this standard is not intended for connection to a public main network but is intended to be connected to a power network supplied from a high- or medium-voltage transformer dedicated for the supply of an installation feeding a manufacturing or similar plant.

The product described in this manual is intended for use solely in an industrial environment as defined above. When installed in Europe, any other application is in contravention of European Union Directives, and a breach of those laws.

## Declaration of Conformity

### DECLARATION OF CONFORMITY

This Declaration of Conformity is suitable to the European Standard EN 45014, "General criteria for supplier's declaration of conformity." The basis for the criteria has been found in international documentation, particularly in: ISO/IEC Guide 22, 1982, "Information on manufacturer's declaration of conformity with standards or other technical specifications."

Allen-Bradley liability under this declaration is limited to that set forth in the current Allen-Bradley publication 6500, Terms and Conditions of Sale as well as similar publications from Allen-Bradley affiliates doing business in the European Community.

---

**Applied Council Directive(s):**  
**Electromagnetic Compatability Directive (EMC) 89/336/EEC,**  
**Low Voltage Directive 73/23/EEC,**  
**and amending directives 91/263/EEC, 92/31/EEC, 93/68/EEC**

---

<p>We,  <b>Manufacturer:</b> Allen-Bradley Company, Inc.          1201 South 2nd Street          Milwaukee, WI 53204          U.S.A.</p>	<p><b>Authorized Representative in the Community (and location of Responsible Person):</b></p>	<p>Allen-Bradley, subsidiary of          Rockwell International GmbH          Düsselberger Str. 15          D-42781 Haan, Germany</p>
--	--	---

declare under our sole responsibility that the product(s) (name, type/model, batch/serial number):

**AdaptaScan Barcode Scanning System Products identified by the following Allen-Bradley Catalog Number: Bul 2755-SN3, 2755-SN5, 2755-SN8, 2755-NB40, 2755-NB41, 2755-PW47**

---

to which this declaration relates is in conformity with the relevant provisions of the following standard(s) or other normative document(s):

**EN 50082-2 :1995 Generic Immunity Standard - Industrial**  
**EN 50081-2 :1992 Generic Emission Standard - Industrial**  
**(2755-SN3, 2755-SN5, 2755-SN8, 2755-NB40, 2755-NB41, 2755-PW47)**

**Pertinent LVD sections of**  
**EN 61131-2 :1992 Programmable Controllers - Equipment and Test**  
**(2755-SN3, 2755-SN5, 2755-SN8, 2755-NB40, 2755-NB41)**

**EN 60950 :1992+A1:1993+A2:1993**  
**(2755-PW47)**


<p><b>Test Report is maintained at:</b>          Allen-Bradley Company, Inc.          1201 South Second Street          Milwaukee, WI 53204</p>	<p><b>Report No. 3410 &amp; 3448 July 1995</b>  <b>D.L.S. Electronic Systems, Inc</b>  <b>1250 Peterson Drive</b>  <b>Wheeling, IL 60090</b></p>
---	--

**Year of CE Marking (Low Voltage Directive): 1996**

---

We, the undersigned, hereby declare that the product(s) specified above conforms to the listed directive(s) and standard(s).

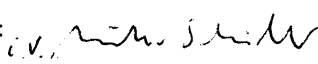
#### Manufacturer

Signature:   


---

Full Name: Robert Gardiner  
 Position: Manager, Quality Engineering  
 Date: 12/19/96

#### Authorized Representative in the Community through its Responsible Person

Signature:   


---

Full Name: Viktor Schiffer  
 Position: Engineering Manager  
 Date: 13 Dec 96

### A

#### **ACK**

An ASCII control character used to acknowledge the reception and acceptance of a transmission block.

#### **address**

1) A character string that uniquely identifies a memory location. 2) A character string that uniquely identifies the physical location of an input or output circuit.

#### **AIM**

Automatic Identification Manufacturers.

#### **alphanumeric**

The character set containing letters, numbers, punctuation marks and symbols.

#### **ANSI**

American National Standard Institute. An organization that develops and publishes voluntary industry standards in the United States.

#### **application**

A use to which something is put, or how it is used.

#### **APM Protocol**

Acronym for Application Protocol Messages. A protocol used by system integrators who want to design system applications without AdaptaScan Software.

#### **ASCII**

American Standards Code for Information Interchange. It is a 7-bit code with an optional parity bit used to represent alphanumerics, punctuation marks, and control-code characters.

#### **autodiscrimination**

The ability of a bar code reader to recognize and correctly decode more than one symbology.

#### **autoload**

The process of automatically transferring scanned character strings and the symbology type into a match entry value.

**B****bar**

The dark element of a printed bar code.

**bar code**

An array of parallel rectangular bars and spaces that together represent data elements or characters in a particular symbology. The bars and spaces are arranged in a predetermined pattern following unambiguous rules defined by the symbology.

**bar code density**

The number of characters which can be represented in a linear inch.

**bar code label**

A label that carries one or more bar code symbols and is suitable to be affixed to an article.

**bar code symbol**

A group of bars that represent a character or group of characters whose width and spacing is determined by a set of rules. In most cases, human readable characters are printed below the bars.

**bar height**

The bar dimension perpendicular to the bar width.

**bidirectional decoding**

A bar code symbology that can be read successfully independent of scanning direction.

**bit**

Binary digit. The smallest unit of information in the binary numbering system. A bit is represented by the digits 0 and 1.

**bridge**

An interface between links in a communication network that routes messages from one link to another when a station on one link addresses a message to a station on another link.

**byte**

A string of 8 bits, operated on as a unit.



---

## C

**capture count**

The number of consecutive identical valid decodes that result in a valid read.

**character**

One symbol of a set of symbols that normally includes both alpha and numeric codes plus punctuation marks and other symbols that may be read, stored, or written.

**character self-checking**

The feature which allows a bar code reader to determine if a scanned group of elements is a valid symbol character. If a symbology is described as character self-checking, a single printed defect (edge error) in any symbol character does not produce a valid character.

**character set**

Those characters available for encodation in a particular automatic identification technology.

**check character**

A character included within a symbol whose value is used for the purpose of performing a mathematical check to ensure the symbol has been decoded.

**check digit**

See check character.

**clear area**

See quiet zone.

**code set**

The specific assignment of data characters to symbol characters.

**configuration**

The arrangement and interconnection of hardware components within a system, and the hardware (switch and jumper) and software selections that determine the operating characteristics of the system.

**configuration file**

The set of attributes which belongs to and defines the operation of a single physical device.

**continuous code**

A bar code symbology where all spaces within the symbol are parts of the characters (Interleaved 2 of 5). There is no interactive gap in a continuous bar code symbology.

**CPI**

Characters per inch. See density.

**D****data character**

See character.

**decode**

The process of translating a bar code into data characters using a specific set of rules for each symbology.

**decoder**

As part of a bar code reading system, the electronic package which receives the signals from the scanner, performs the algorithm to interpret the signals into meaningful data and provides the interface to other devices.

**density**

The number of data characters which can be represented in a linear unit of measure. Bar code density is often expressed in characters per inch (CPI).

**discrete code**

A bar code or symbol where the space between characters, intercharacter gap, are not part of the code as with Code 39. See continuous code.

**E****EAN**

European Article Number System. The international standard bar code for retail food packages.

**element**

A single bar of space.

**element width**

The thickness of an element measured from the edge closest to the symbol start character to the trailing edge of the same element.

**encoded area**

The total linear dimension consisting of all the characters of a code pattern, including start and stop characters and data.

**error**

A discrepancy between a computed, observed or measured value or condition and the true, specified or theoretically correct value or condition.

**F****fault**

Any malfunction that interferes with normal system operation.

**G****guard bars**

1) The bars at the ends and center of a UPC and EAN symbol that ensure a complete scan of the bar code. 2) The optional bars outside the quiet zone of an Interleaved 2 of 5 symbol that ensure a complete scan of the bar code.

**H****hexadecimal**

A base-16 numbering system that uses the symbols 0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F.

**host**

1) A central controlling computer in a network system. 2) Any device on a network system that provides a controlling function to another device on the network. 3) Any intelligent device for which another device is providing a communication interface to a network.

**I****inter-symbol no-read count**

The minimum number of no-reads that must occur between symbols scanned when Self-Triggered (continuous decode) is selected as the decode trigger. Symbols that are not preceded by the minimum number of no-reads are ignored.

**intercharacter gap**

The space between two adjacent bar code characters in a discrete code (spaces between characters in Code 49).

**Interleaved 2 of 5**

A bar code in which characters are paired together using bars to represent the first character and spaces to represent the second.

**M****match**

A condition in which decoded data matches data in the match entry.

**match entry**

An output condition in which decoded data matches and the data in a match entry configuration.

**message**

1) A meaningful combination of alphanumeric characters that establishes the content and format of a report. 2) In a communication network, the unit of exchange at the application layer.

**message buffer**

Storage register for the temporary storage of data that allows decoding to continue while the host is retrieving data from the serial port.

**message buffer warning**

An output condition that occurs when the message buffer has used a defined amount of the message buffer.

**metacharacters**

A set of special purpose characters that perform logical functions. Metacharacters may be entered in the match table rule or message

find and replacement strings. There are both metacharacter search and replacement characters.

**misread**

A condition which occurs when the data output of a reader does not agree with the encoded data presented.

**modulo check digit or character**

A calculated character within a data field used for error detection. The calculated character is determined by a modulus calculation on the sum or the weighted sum of the data field contents.

**MTBF**

Mean Time Between Failure.

**multi-drop link**

1) A link that has more than 2 stations. 2) Contrasted with point-to-point link.

**N****NAK**

Negative acknowledgement. An ASCII control character transmitted by a receiver as a negative response to the sender.

**network**

A series of stations (nodes) connected by some type of communication medium. A network may be made up of a single link or multiple links.

**no-match**

An output condition in which decoded data does not match an entry in the match code table.

**no-read**

An output condition in which bar codes on a package are not read correctly or are incomplete (fields per package count not satisfied).

**node**

The connection point at which media access is provided.

**O****orientation**

The alignment of bars and spaces to the scanner. Often referred to as Picket Fence or Step Ladder.

**output counter**

A counter that is associated with each output condition. The counter increments by 1 each time the condition occurs.

**P****parity bit**

An additional non-data bit attached to a binary word to provide a check of the data integrity by making the sum of the number of ones in a word always even or odd.

**percent good reads**

The number of successful reads per refresh period. This is valid only when the refresh period is set to 0.

**performance indicator**

A bar code decoder function that counts the number of decodes during a trigger period. When the period = 0, the performance indicator provides the number of decodes (up to 100 attempts). Use the performance indicator to provide a general indication of bar code symbol quality or verify proper setup of the scanner.

**performance indicator limit**

A set point that will produce a discrete output if the performance indicator falls below the set point value.

**picket fence code**

A code pattern in which the direction of travel of the symbol is perpendicular to the bars and spaces of the code.

**port**

On a communication link, the logic circuitry or software at a station that determines its communication parameters for a particular communication channel.

**Q****quiet zone**

Spaces preceding the start character of a symbol and following the stop character. Sometimes called the clear area.

**R****read**

A condition in which an entire package is decoded.

**reader**

A device comprised of a scanner and a decoder.

**RS-232C**

An EIA standard that specifies electrical, mechanical, and functional characteristics for serial binary communication circuits in a point-to-point link.

**RS-422**

An EIA standard that specifies electrical characteristics of balanced-voltage digital interface circuits in a point-to-point link.

**RS-485**

An EIA standard that specified electrical characteristics of balanced-voltage digital interface circuits in a multi-point link.

**S****scan**

The search for a symbol or marks which are to be optically recognized.

**scan area**

The area intended to contain a bar code symbol.

**scanner**

An electronic device to acquire and convert reflected light from the bars and spaces of a symbol into electrical signals for processing by the decoder.

**self-checking**

A bar code or symbol using a check algorithm which can be applied to each character to guard against undetected errors. Codes without self-checking may employ a check digit or other redundancy in addition to the data message.

**sensor**

A device that detects or measures something and generates a corresponding electrical signal to an input circuit of a controller.

**space**

The lighter element of a bar code formed by the background between bars.

**spot**

The undesirable presence of an area of low reflectance in a space.

**start and stop characters**

A bar code character that provides the scanner with information about how the code is bounded and its orientation. The start character is normally at the left end of a horizontal code and adjacent to the most significant character. The stop character is normally at the right end of the horizontal code and adjacent to the least significant character.

**step ladder orientation**

A code pattern that moves perpendicular to the scan line.

**string**

A sequence of ASCII characters.

**symbol**

A combination of characters, including start and stop characters, quiet zones, data characters and check characters required by a particular symbology, which forms a complete, scannable entity.

**symbol density**

The number of characters per linear inch.

**symbol length**

The length of the symbol measured from the beginning of the quiet area adjacent to the start character to the end of the quiet area adjacent to the stop character.



**symbology**

The conventions, or rules, which govern the formation of characters and strings of characters in a bar code symbol.

**symbology identifier**

An optional three character code which may prefix transmitted data from a bar code reader indicating the symbology read and any options enabled in the reader or special features of a symbology encountered (presence of FNC 1 in Code 128).

**T****tag**

A collection of information associated with a single variable or I/O point.

**two-width symbology**

A bar code symbology whose bar and spaces are characterized simply as wide or narrow. Codabar, Code 39, and Interleaved 2 of 5 are examples of two-width symbologies.

**U****UPC**

Acronym for Universal Product Code. The standard bar code type for retail food packaging in the United States.

**V****void**

The undesirable presence of an area of high reflectance in a bar.

**W****window**

A display area that the users interacts with to operate a tool.

**word**

A unit of data which contains two bytes (16 bits).

**X****X dimension**

The nominal dimension of the narrow bars and spaces in a bar code symbol.

## A

- accessories, 1–18
- Apparent element width, 2–6
- Applications, 1–5
  - distributed (master–slave), 1–6
  - distributed (peer–to–peer), 1–7
  - standalone, 1–5
- Autofocus, 1–15
  - automatic focus, 1–15
  - manual, 1–15
  - preset, 1–15

## B

- Baud rate, DeviceNet network, 1–11

## C

- Cable lengths, DeviceNet network, 1–11
- Certifications, A–3
- Chapter Descriptions, P–1
- Comm Fault LED, 6–4
- Communications
  - DeviceNet network, 1–11
  - protocols, 1–13
  - RS–232, 1–13
  - RS–485/RS–422, 1–12
- Configuration port connector, 1–3

## D

- DeviceNet / Power terminal block, 1–9
- DeviceNet network
  - baud rate, 1–11
  - cable lengths, 1–11
  - connections, 3–16
  - termination, 3–16
- DH–485 protocol, 1–13
- DH–485 protocol, 1–13
- Dimensions
  - Reader, 3–2
  - wiring base, 3–3
- Downloading
  - a Reader configuration, 5–4
  - configuration cable, 5–1
  - connecting computer, 5–1
  - firmware, 5–3

## E

- European Union Directive Compliance, C–1

## F

- Flyback enabled, 1–8

## H

- Hole plugs, wiring base, 3–7

## I

- I/O LEDs, 6–3
- I/O module sockets, 1–10
- I/O module terminal blocks, 1–10
  - module types, 3–19
  - wiring, 3–19
- Input module application, 3–21
- Input Modules, Specifications, A–2
- Installation, orientation, 2–1

## L

- Laser On LED, 6–4
- LED Indicators, 1–4, A–1
  - Comm Fault, 6–4
  - I/O, 6–3
  - Laser On, 6–4
  - On Symbol, 6–3
  - Power Fault, 6–4
  - Trigger Read, 6–3
- Linear scanning, adjusting scan line elevation, 1–8, 2–7

## M

- Manual Contents, P–1
- Mounting bracket, 3–8
  - installing, 3–8
  - safety wire, 3–11
  - side post mounting, 3–10
  - top post mounting, 3–9

**O**

On Symbol Indicator, 6–3  
Operating environment, 1–4  
Output module application, 3–20  
Output Modules, Specifications, A–2

**P**

Package detect terminal block, 1–10, 3–22  
Picket Fence Orientation, 2–2  
Pitch, 2–3  
Power connections  
    multiple readers (other power supply), 3–15  
    multiple readers (-PW46/PW47 supply), 3–14  
    single reader, 3–14  
Power Fault LED, 6–4  
Power supplies  
    catalog no. 2755–PW46, 3–12  
    catalog no. 2755–PW47, 3–13  
Preset read ranges, 1–15  
Protocols  
    DF1, 1–13  
    DH-485, 1–13  
    terminal, 1–13  
Publications, Related, P–2

**R**

Raster scanning  
    flyback enable, 1–8  
    raster increment, 1–8  
    upper and lower raster limits, 1–8, 2–7  
Read ranges, 2–8  
Reader  
    configuration port connector, 1–3  
    dimensions and clearances, 3–2  
    features, 1–3  
    LED Indicators, 1–4  
    operating environment, 1–4  
    options, 1–18  
    read ranges, 2–8  
    safety labels, 1–17  
    scan beam, 2–1  
    scan speeds, 1–3  
    scan window, 1–3  
    wiring base, 1–9  
    wiring base connector, 1–4  
Reader connector, 1–10  
Related Publications, P–2

RS–232 communications, 1–13, 3–18  
RS–232 terminal block, 1–9  
RS–422 communications, 1–12  
RS–422/RS–485 terminal block, 1–9  
RS–485 communications, 1–12  
    network or point-to-point, 3–17  
    termination, 3–17

**S**

Safety labels, 1–17  
Scan angle, 2–7  
Scan beam, 2–1  
Scan speeds, 1–3  
Scan Window  
    cleaning, 6–5  
    replacing, 6–6  
Scan window, 1–3  
Scanning modes  
    linear, 1–8  
    raster, 1–8  
Skew, 2–3  
Software, 1–14  
    autofocus, 1–15  
    decoding setup, 1–16  
    main operations, 1–14  
    monitoring, 1–16  
    online adjustments, 1–16  
    scanning parameters, 1–15  
Specifications, A–1  
Standalone Setup, 1–5  
Step Ladder Orientation, 2–2  
Support, Technical, P–2, 6–1

**T**

Technical Support, P–2, 6–1  
Terminal Blocks, B–1  
Terminal protocol, 1–13  
Termination switches, 1–10  
Terminology, P–2  
Tilt, 2–3  
Trigger Read LED, 6–3  
Troubleshooting  
    Chart, 6–2  
    chart, 6–1  
    equipment, 6–1

**U**

## Usable beam width

- catalog no. 2755-SN3, 2-4
- catalog no. 2755-SN5, 2-5
- catalog no. 2755-SN8, 2-5

**W**

## Wiring base

- bottom mounting, 3-5
- cabling, 3-6
- conduit, 3-6
- DeviceNet/Power Terminal Block, 1-9
- dimensions, 3-3

- dust cover, 3-5

- hole plugs, 3-7

- I/O module sockets, 1-10

- I/O module terminal blocks, 1-10

- mounting guidelines, 3-1

- Reader connector, 1-10

- package detect terminal block, 1-10

- power connections, 3-12

- RS-232 terminal block, 1-9

- RS-422/RS-485 terminal block, 1-9

- termination switches, 1-10

- top mounting, 3-4

- versions, 3-3

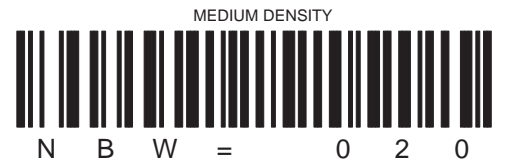
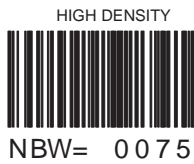
- Wiring base connector, 1-4



### Code 39



### Code 128



### Interleaved 2 of 5



### Universal Product Code



### European Article Number



### Pharma Code



PART NO. (P)	L762EK1	
		
QUANTITY (Q)	100	
		
SUPPLIER (V)	27842	
		
SERIAL (S)	9106	
		

**SHIPPING CONTAINER SYMBOL**



0 0 0      1 2 3 4 5      6 7 8 9 0      5



9 00      38200      11413      8



Rockwell Automation helps its customers receive a superior return on their investment by bringing together leading brands in industrial automation, creating a broad spectrum of easy-to-integrate products. These are supported by local technical resources available worldwide, a global network of system solutions providers, and the advanced technology resources of Rockwell.

## Worldwide representation.



Argentina • Australia • Austria • Bahrain • Belgium • Bolivia • Brazil • Bulgaria • Canada • Chile • China, People's Republic of • Colombia • Costa Rica • Croatia • Cyprus • Czech Republic • Denmark • Dominican Republic • Ecuador • Egypt • El Salvador • Finland • France • Germany • Ghana • Greece • Guatemala • Honduras • Hong Kong • Hungary • Iceland • India • Indonesia • Iran • Ireland • Israel • Italy • Jamaica • Japan • Jordan • Korea • Kuwait • Lebanon • Macau • Malaysia • Malta • Mexico • Morocco • The Netherlands • New Zealand • Nigeria • Norway • Oman • Pakistan • Panama • Peru • Philippines • Poland • Portugal • Puerto Rico • Qatar • Romania • Russia • Saudi Arabia • Singapore • Slovakia • Slovenia • South Africa, Republic of • Spain • Sweden • Switzerland • Taiwan • Thailand • Trinidad • Tunisia • Turkey • United Arab Emirates • United Kingdom • United States • Uruguay • Venezuela

Rockwell Automation Headquarters, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414 382-2000 Fax: (1) 414 382-4444

Rockwell Automation European Headquarters, Avenue Hermann Debroux, 46, 1160 Brussels, Belgium, Tel: (32) 2 663 06 00, Fax: (32) 2 663 06 40

Rockwell Automation Asia Pacific Headquarters, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

World Wide Web: <http://www.ab.com>