Fixed-Position Unattended Bar Code Readers

LazerData® 12000 Series
Bar Code Scanner Installation Manual

Part No. 08869 ♦ Rev. A — 10/98

PSC®

When you need to read a bar code

LazerData® 12000 Series Bar Code Scanner

Installation Manual

NOTICES

The quality of the technical information in this publication is the result of a documentation-development process that includes careful research and review. PSC Inc., however, reserves the right to make product-improvement changes, which may not be reflected in this document. PSC Inc. assumes no liability for damages arising out of, or in connection with, the application described herein.

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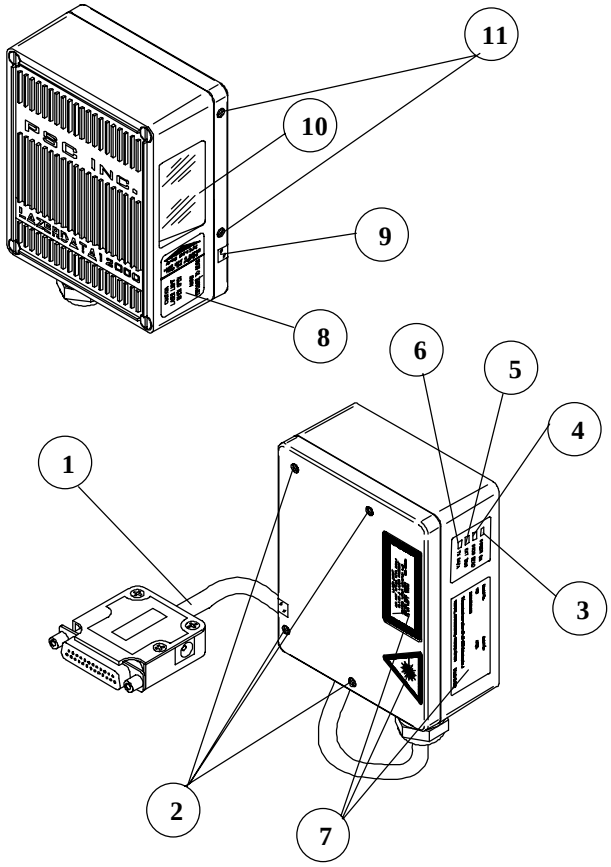
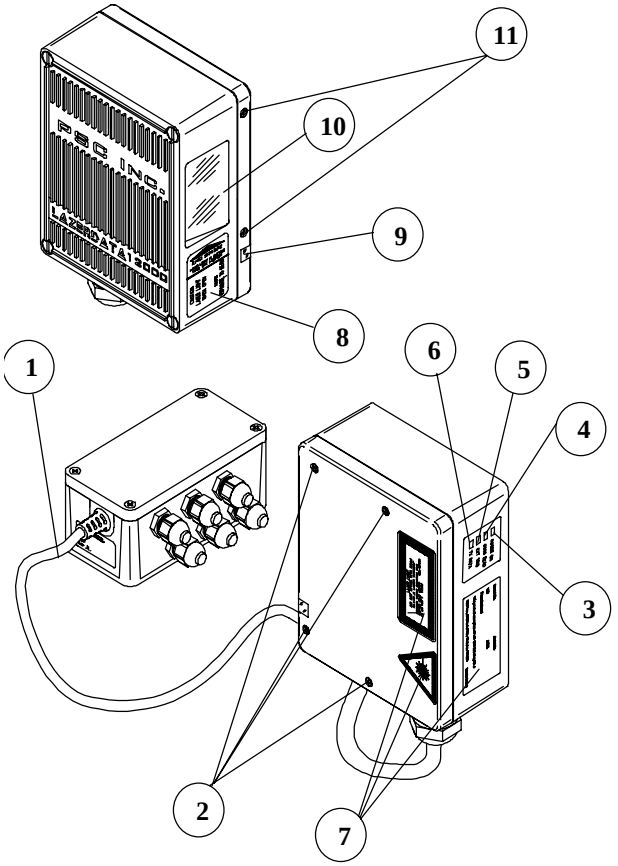
LazerData® 12000 Series Bar Code Scanner



1. Cable with 25-pin connector
2. Mounting holes
3. Power on LED
4. Successful read LED
5. Presence Sensor active LED
6. Data transmission LED
7. Warning and Classification labels
8. Warning label
9. Laser active LED
10. Laser beam output window
11. Accessory mounting holes

Figure A. Scanner with 25-pin connector

LazerData® 12000 Series Bar Code Scanner



① Cable with junction box
② Mounting holes
③ Power on LED
④ Successful read LED
⑤ Presence Sensor active LED
⑥ Data transmission LED
⑦ Warning and Classification labels
⑧ Warning label
⑨ Laser active LED
⑩ Laser beam output window
⑪ Accessory mounting holes

Figure B. Scanner with junction box setup

SAFETY PRECAUTIONS

LASER SAFETY

The following information is provided to comply with the rules imposed by international regulatory agencies and to instruct you on the proper use of the LazerData 12000 Series Bar Code Scanner.

Standard Regulations

This scanner utilizes a low-power laser diode. Although staring directly at the laser beam momentarily causes no known biological damage, avoid staring at the beam as one would with any very strong light source, such as the sun. Prevent the laser beam from hitting the eye of any observer, even if the beam is reflected from surfaces such as mirrors, etc.

This product conforms to the applicable requirements of both IEC 825-1 and CDRH 21 CFR 1040 at the date of manufacture. The scanner is classified as a Class 2 laser product according to IEC 825-1 regulations and as a Class II laser product according to CDRH regulations.

There is a built-in safety device that allows the laser to be switched on *only* if the motor is rotating above the minimum threshold for its correct scanning speed.

The laser beam can also be switched off through a software command (see “Beam Shutter” in the LDHOST Help Online).

WARNING

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

The laser light is visible to the human eye and is emitted from the window on the front of the scanner (Figures A and B, ⑩). Warning labels (Figure C), instructing you to prevent laser light exposure to your eyes and informing you of the laser device classification, are applied to the body of the scanner (Figures A and B, ⑦ and ⑧).

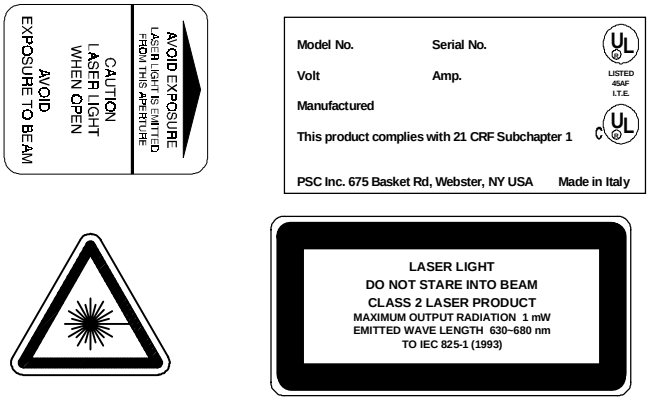


Figure C. Warning and device class labels

Disconnect the power supply when opening the device during maintenance or installation, to avoid exposure to hazardous laser light.

The laser diode used in this device is classified as a class 3B laser product according to IEC 825-1 regulations and as a Class IIIb laser product according to CDRH regulations. As it is not possible to apply a classification label on the laser diode used in this device, the following label (Figure D) is reproduced below.

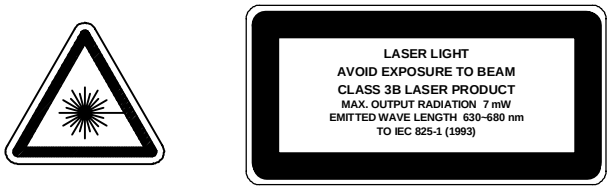


Figure D. Laser diode class label

If you make any changes to the laser diode's optic elements, in particular, you can cause the laser's radiation to increase to its maximum (7 mW at 630 to 680 nm).

POWER SUPPLY

ATTENTION: READ THIS INFORMATION BEFORE INSTALLING THE PRODUCT

- This product is intended to be installed by Qualified Personnel only.

- **Models: LD120X11; LD120X13:**
  This device is intended to be supplied by a UL Listed Direct Plug-in Power Unit marked "Class 2", rated 10-30 V, minimum 0.46 A.

  This device may also be supplied by a UL Listed Power Unit with a "Class 2" or LPS power source which supplies power directly to the scanner via the 25-pin connector.

- **Models: LD120X12; LD120X14:**
  This device is intended to be supplied via the Junction Box by an NEC Class 2 power source, rated 10-30 V, minimum 0.46 A.

See sections 2.6.2 or 2.7.1 for correct power supply connections.

x

1 GENERAL FEATURES

1.1 INTRODUCTION

The LazerData 12000 Scanner is a bar code reader complete with decoder. It is available in 16 standard models that were designed to satisfy the most demanding requirements of high performance scanning.

Standard Application Program

A Standard Application Program is factory-loaded onto the LazerData 12000 Scanner. This program controls bar code reading, serial port interfacing, data formatting, and many other operating and control parameters.

The scanner is completely user-configurable from a host computer using the LDHOST interface utility program provided on diskette with the scanner or using the Host Mode programming procedure – by ESC sequences via the serial interface.

There are four different programmable operating modes to suit various bar code reading system requirements. One is the test mode that is used to verify the reading features and exact positioning of the scanner without the need for external tools.

C Programmability

The LazerData 12000 Scanner belongs to the generation of PSC Automation scanners that operate under the 'C' programming environment, a recognized industry standard.

If your requirements are not met by the Standard Application Program, then Custom Application Programs can be developed by your local PSC Automation, Inc. distributor.

1.2 DESCRIPTION

Some of the main features of this scanner are –

- very high scanning speed (800 scans/s)
- raster version availability
- total configurability from host computer
- two serial communication interfaces: one can be set as RS232, RS485, or 20-mA C.L.; the other, an RS232 auxiliary interface
- readability of all popular codes
- supply voltage range from 10 to 30 VDC
- test mode – to verify the reading features and exact positioning of the scanner without the need for external tools.
- configurability in different operating modes – to suit the most varied bar code reading system requirements.
- code verifier
- detection capability for absolute label position in the scan line [for digital signal processing (DSP) models only, see section 1.3]
- Print contrast signal (PCS) verification (for DSP models only, see section 1.3)

The LazerData 12000 Scanner uses a solid-state laser diode as a light source. The light emitted has a wavelength of between 630 and 680 nm. Refer to the section "Safety Precautions" at the beginning of this manual for information on laser safety.

The use of a semiconductor laser has made it possible to develop an extremely compact scanner with low power consumption. The reader is contained in a rugged aluminum housing; the physical dimensions are 101 x 83.5 x 42 mm (4 x 3.3 x 1.7 inches) and it weighs about 800 g (1.8 lbs.).

The protection class of the enclosure is IP65. The reader, therefore, is particularly suitable for industrial environments where protection against harsh external conditions is required.

Electrical connection is provided through a cable on the side of the reader. This cable is terminated with a 25-pin connector (25-pin connector models, see section 1.3, Figure A, ①) or by a junction box (junction box models, see section 1.3, Figure B, ①).

The laser beam output window (Figure A, ⑩) is on the right-hand side of the scanner. A green LED on the same side indicates the laser is active (Figure A, ⑨).

A built-in safety system allows the laser to turn on *only* after the motor has reached the correct rotational speed. The laser beam is therefore generated after a slight delay from scanner power up.

The four LEDs on the left-hand side of the scanner indicate the following:

POWER ON **red** – (Figure A, ③) indicates the reader is connected to the power supply

GOOD READ **red** – (Figure A, ④) is used to signal successful bar code decoding. It is also used in Test mode to signal the decoding percentage (for details refer to the section "Test Mode" in the LDHOST Help Online)

EXT TRIG **yellow** – (Figure A, ⑤) indicates the code presence sensor is active (for details refer to the section "On Line Mode" in the LDHOST Help Online)

TX DATA **green** – (Figure A, ⑥) indicates data transmission on the main serial output line

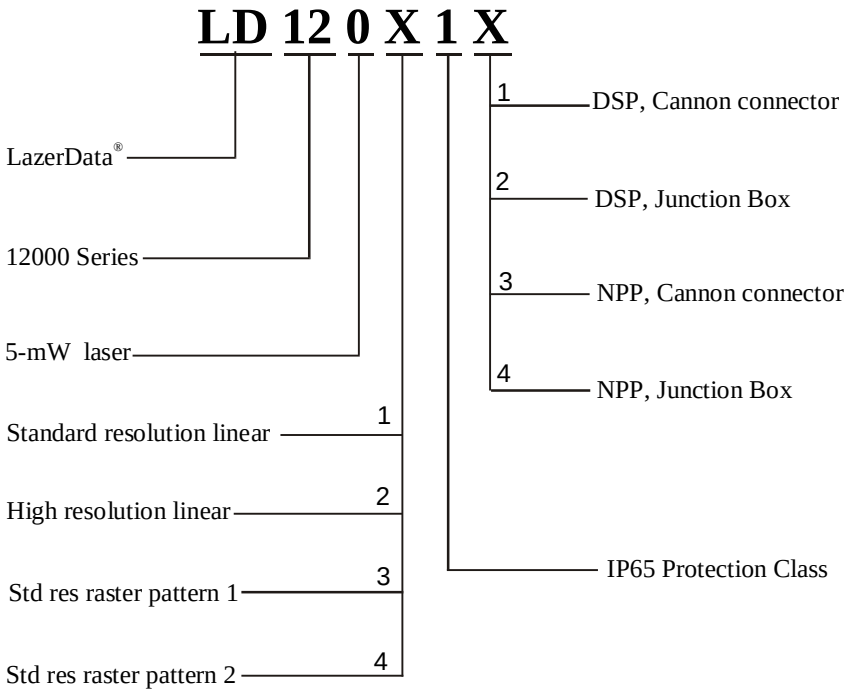
The screw holes (Figure A, ②) on the body of the reader are for physical attachment. The screw holes shown in Figure A, ⑪ are for the attachment of accessories, such as the optional 90° mirror.

1.3 AVAILABLE MODELS

The LazerData 12000 Scanner is available in models with variations in the following features:

- Resolution
- Termination of the cable
- Distance between the scan beams (raster models only)
- DSP (digital signal processor) or NPP (new digital preprocessor)

The following model number key illustrates the diversity of scanners available —



All scanner models perform 800 scans/s.

1.4 ACCESSORIES

The following LazerData 12000 Scanner accessory is available on request:

- 90° deflection mirror LD12-90DEG

2 INSTALLATION

2.1 PACKAGE CONTENTS

When you open the LazerData® 12000 Scanner package, ensure the following parts are included and intact:

1) LazerData® 12000 Scanner with cable
2) This installation manual
3) Bar code test chart
4) LazerData 12000 Scanner communication and utility program disk
5) Mounting kit
   - Mounting screws and washers (4 ea.)
   - Mounting bracket (1)

* Junction box (for junction box models only, see section 1.3)

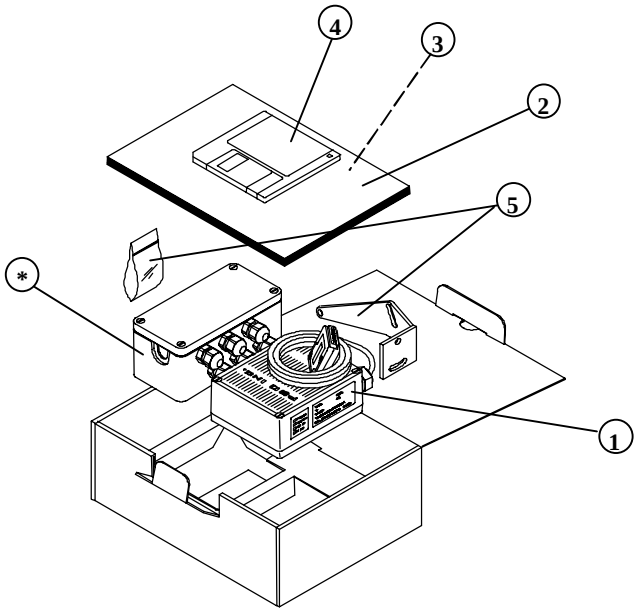


Figure 2.1 - LazerData 12000 package contents

2.2 GUIDE TO INSTALLATION

Use the following checklist to ensure a complete installation of your LazerData 12000 Scanner.

1) Read all information in the section "Safety Precautions" at the beginning of this manual.
2) Open the scanner to select the main serial interface type as required (see sections 2.3 and 2.4).
3) Correctly position and mount the scanner for bar code reading according to the information in sections 2.5, 2.8, and 3.4.
4) Provide correct system cabling according to the signals necessary (see the applicable subsections under sections 2.6 or 2.7).
5) Configure the software parameters from a host computer using either the LDHOST interface utility program provided on diskette, or using the Host Mode programming procedure by ESC sequences via the serial interface.

   For more details about these configuration methods refer to the section "LazerData 12000 Scanner Configuration" in the LDHOST Help Online.

NOTE

Use the Test Mode, as described in LDHOST, to fine-tune the scanner position for optimum bar code reading. For further details, refer to the section "Test Mode" in the LDHOST Help Online.

The installation is now complete.

2.3 OPENING THE DEVICE

Before installing the LazerData 12000 Scanner it may be necessary to open the scanner to select the interface required.

> **WARNING**
>
> The scanner must be disconnected from the power supply during this operation.

Refer to the following instructions and diagram below when opening the reader:

- Unscrew the four screws as shown below to open the scanner for access to the output interface jumper.

- Carefully remove the cover of the scanner. Avoid any contact with the mirrored rotor, the lenses, or other optical components.

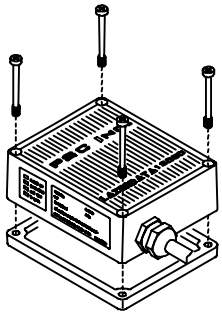


Figure 2.2 - Opening the LazerData 12000 Scanner

2.4 MAIN INTERFACE SELECTION

One of the following interface types can be selected to connect the main interface of the LazerData 12000 Scanner to the host computer.

EIA RS232	20 mA CURRENT LOOP
EIA RS485-POLLED	EIA RS485-NONPOLLED

To select the interface type, position the jumper block as indicated in the diagram below:

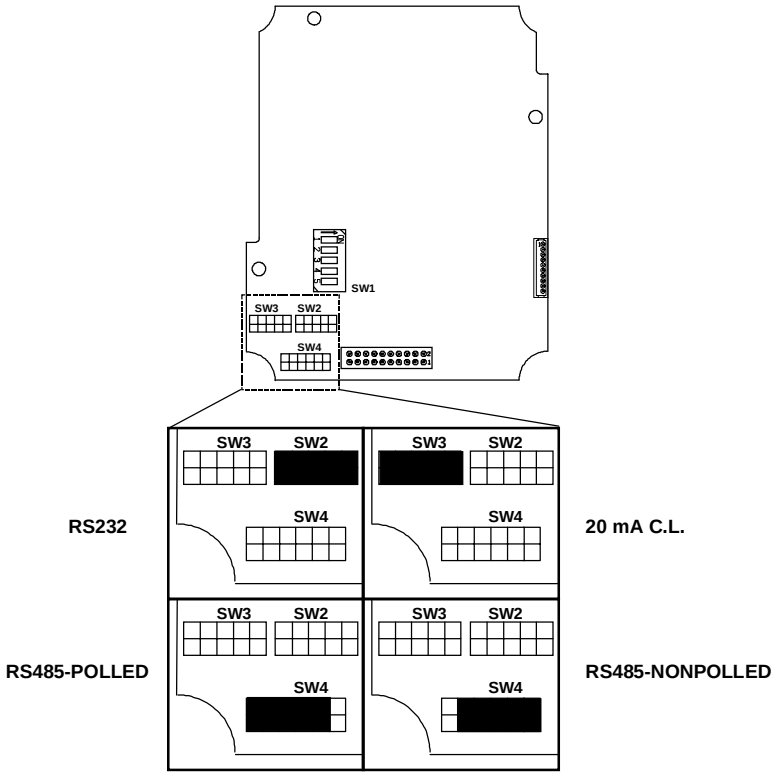


Figure 2.3 - Interface type selection

The RS232 interface type is factory set.

2.5 PHYSICAL INSTALLATION

The LazerData 12000 Scanner can be installed to operate in different positions. The four screw holes (M4 x 5) on the body of the reader are for physical attachment (Figure A, ②). Use the following diagram – that gives the overall dimensions – for scanner installation. Note that the dimensions are given in millimeters and inches.

Refer to section 2.8 for correct positioning.

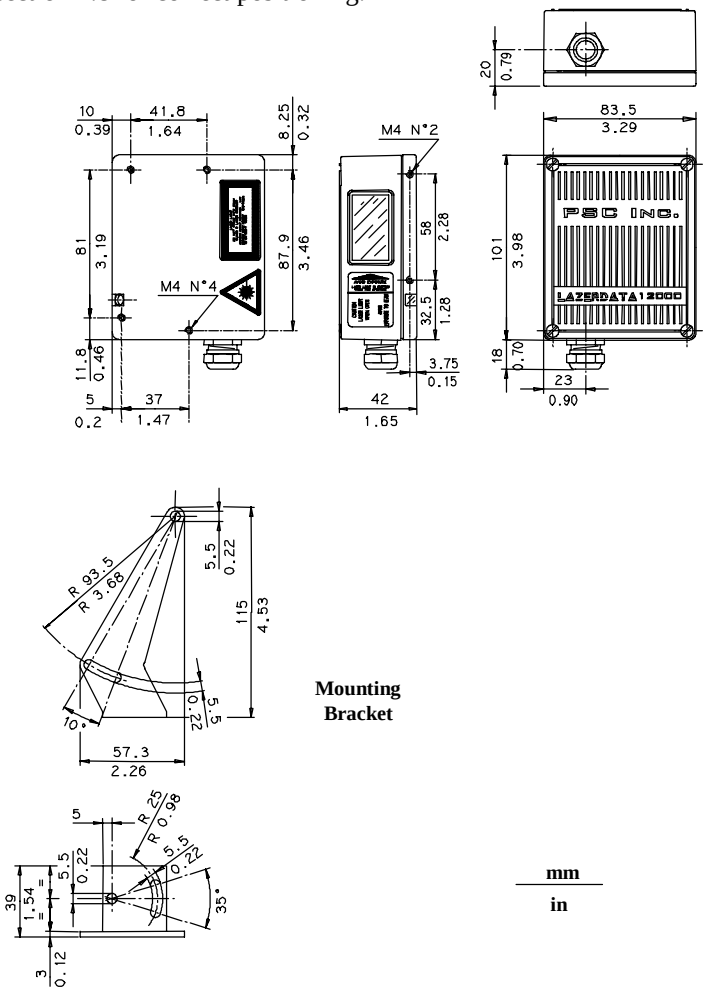


Figure 2.4 - Overall dimensions

2.6 JUNCTION BOX (JBOX) INSTALLATION

The JBOX provides a passive connection between your scanner and outside system communication cables in a fast and practical way. It is an alternative to the 25-pin connector models. Figure 2.5 shows the basic layout of LazerData 12000 Scanner using the JBOX.

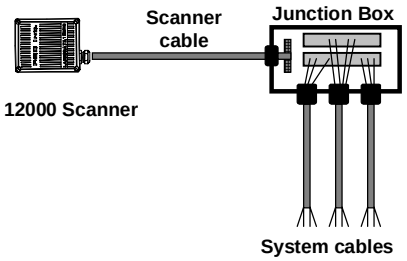


Figure 2.5 - Scanner using JBOX

For JBOX connections, the scanner has a cable that terminates in a 24-pin connector that plugs into the junction box. The system cables pass through six external compression connectors on the JBOX and the individual cable wires connect to internal spring-clamp terminal blocks that provide access to all scanner signals.

2.6.1 Mounting the JBOX

The diagram below shows the JBOX dimensions and mounting hole locations.

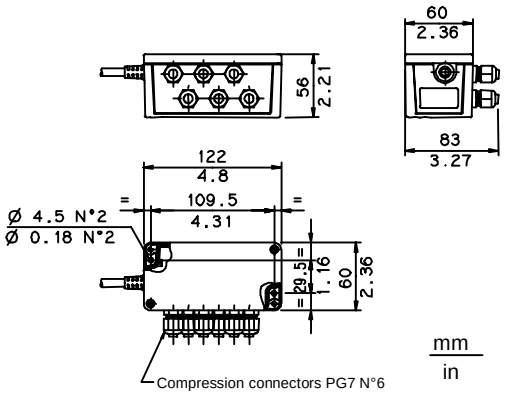


Figure 2.6 - JBOX dimensions

The JBOX is designed to be mounted to a panel (or wall) of metal, plastic or other appropriate material using the mounting screws provided in the package. To mount the JBOX –

1) Open the JBOX by unscrewing the four cover screws.

   If necessary, you can use the JBOX itself as a template through which you can mark the locations for the mounting screws. Once you mark the mounting screw locations, set the JBOX aside and drill two small pilot holes in the panel or wall.

2) Align the JBOX on the panel pilot holes, insert the two self-threading screws with their washers through the JBOX, and screw them into the panel until tight (see Figure 2.7) and the JBOX is securely fastened.

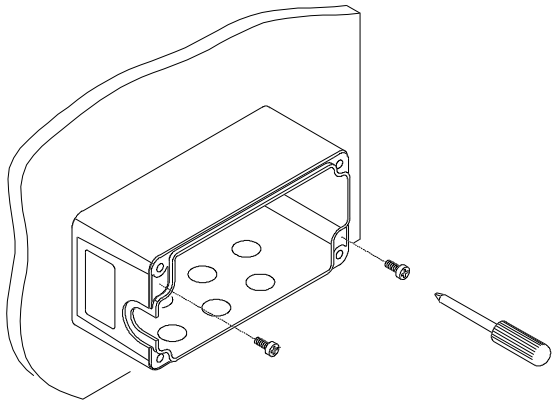


Figure 2.7 - Mounting JBOX

2.6.2 Wiring the JBOX

To electrically wire the JBOX–

1) Open the junction box by unscrewing the four cover screws.

2) Pass all system cables through the compression connectors in the JBOX housing.

3) Connect the power and input/output signals:

   - Prepare the individual wires of the system cables by stripping the insulation back approximately 11 mm (0.43 inch).
   - Using a screwdriver or other tool, push down on the orange lever directly above the clamp (see Figure 2.8).
   - Insert the wire into the clamp and release the lever. The wire will now be held in the spring clamp.

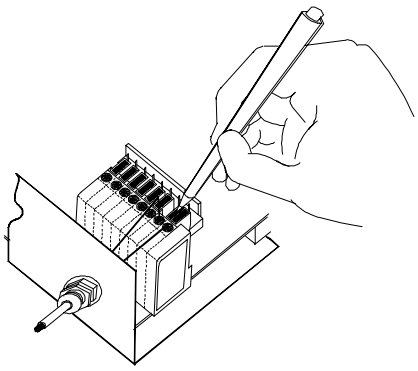


Figure 2.8 - System cable connections to the junction box

The wiring used can be solid or stranded but must meet the following specifications.

Positions 1-4:	24 - 16 AWG	0.2 - 1.5 mm²
Positions 5-39:	26 - 20 AWG	0.14 - 0.5 mm²

The JBOX pinouts are indicated in the following table.

JBOX pinout for LazerData 12000 Scanner	
Pin	**Name**
01	VS
02	SGND
03	VS
04	SGND
05	CHASSIS
06	VS
07	VS
08	PS+
09	PS-
10	SGND
11	SGND
12	VS
13	VS
14	n.c.
15	n.c.
16	SGND
17	SGND
18	NOREAD+
19	NOREAD-
20	RIGHT+
21	RIGHT-
22	WRONG+
23	WRONG-
*24	TX232/TX485+/CLOUT +
*25	RTS232/TX485-/CLOUT-
*26	SGND
27	n.c.
28	SGND
29	TX232/TX485+/CLOUT+
30	RTS232/TX485-/CLOUT-
31	SGND
32	RX232/RX485+/CLIN+
33	CTS232/RX485-/CLIN-
34	SGND
35	TXAUX
36	RTSAUX
37	SGND
38	RXAUX
39	CTSAUX

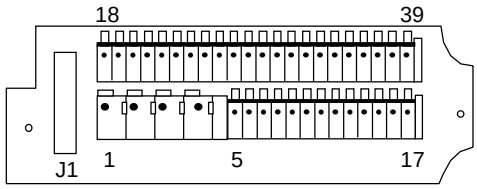


Figure 2.9 - JBOX connector and pinout

To facilitate an NEC Class 2 Power Unit connection, use the correct female plug adapter.

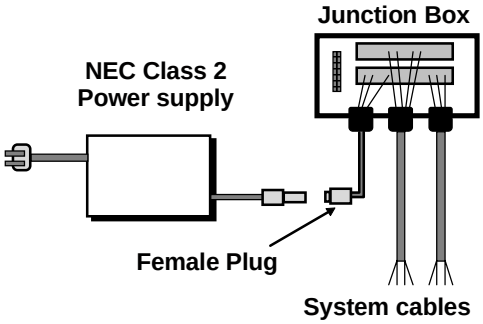


Figure 2.10 - NEC Class 2 Power unit connections

* The signals on pins 24, 25, and 26 are repeated on pins 29, 30, and 31 to facilitate network connections (that is, multiplexer connections using the RS485-polled Interface). In this way the network bus can enter and exit the junction box from different spring clamps but be physically connected together.

4) After wiring the JBOX and while the scanner is unplugged from the power supply (see Figure 2.11) –
   - place the scanner cable so that the rubber seal fits into the cutout in the housing of the junction box, and
   - plug the 24-pin connector into connector J1 on the PCB inside the JBOX.

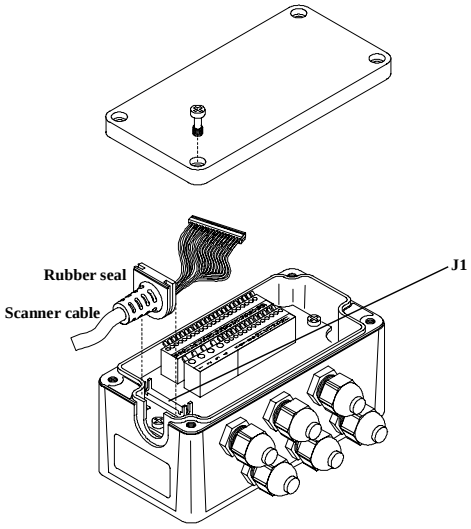


Figure 2.11 - Scanner cable connections to the JBOX

5) Close the JBOX using the four cover screws ensuring the rubber seal is fitted correctly between the parts of the housing.

You have now installed the JBOX and completed the electrical connections for your scanning system.

Should it become necessary to disconnect the scanner from the JBOX, simply reverse the procedure in step 4.

2.7 ELECTRICAL CONNECTIONS FOR 25-PIN MODELS

The 25-pin connector scanner models (see section 1.3) are equipped with a cable terminated by a 25-pin D-sub connector for connection to the power supply and input/output signals. The functions of the connector pins are given in the following table.

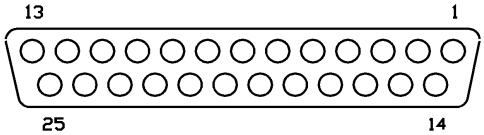


Figure 2.12 - 25-pin D-sub connector

25-pin D-sub connector pinout		
Pin	**Name**	**Function**
13	VS	Power supply input voltage (+)
25	SGND	Power supply input voltage (-)
1	CHASSIS	Chassis Ground
9	VS	Presence sensor supply voltage (+)
18	PS+	Presence sensor (+)
19	PS-	Presence sensor (-)
8	NO READ +	No read output (+)
22	NO READ -	No read output (-)
11	RIGHT +	Right read output (+)
12	RIGHT -	Right read output (-)
14	WRONG +	Wrong read output (+)
15	WRONG -	Wrong read output (-)
2*	TX232/TX485+/CLOUT+	
3*	RX232/RX485+/CLIN+	* Main interface signals
4*	RTS232/TX485-/CLOUT-	(see section 2.7.2)
5*	CTS232/RX485-/CLIN-	
7	SGND	Signal Ground
20	RXAUX	Auxiliary input
21	TXAUX	Auxiliary output
23	CTSAUX	Auxiliary handshake
24	RTSAUX	Auxiliary handshake
6, 10, 16, 17	NC	No Connect

* Pins 2, 3, 4, and 5 of the 25-pin connector have different meanings depending on which interface type is selected. To select the interface type, follow the instructions in sections 2.3 and 2.4.

2.7.1 Power supply

Power can be supplied to the scanner through the pins provided on the 25-pin connector used for communication with the host (Figure 2.13),

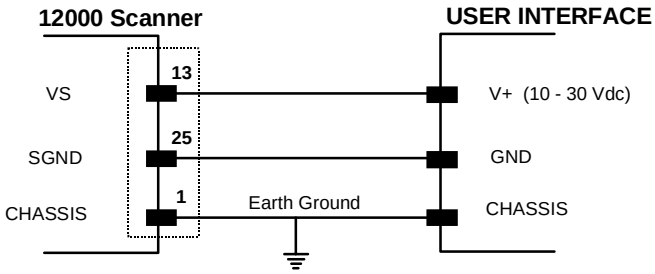


Figure 2.13 - Power supply connections

or through the jack connector on the side of the 25-pin connector for connections to a UL Listed Direct Plug-in Power Unit (Figure 2.14). If the jack input is used to supply power to the LazerData 12000 Scanner, pin 13 is automatically disconnected; the supply voltage for the presence sensor remains on pin 9. The plug connector is not supplied with the LazerData 12000 Scanner.

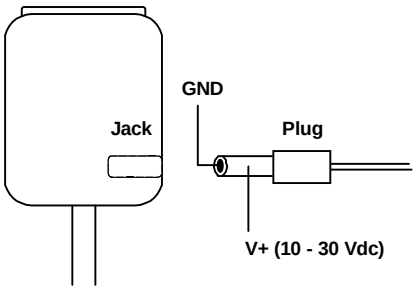


Figure 2.14 - Power supplied using the jack connector

The power must be in the 10- to 30-VDC range only. There is a current peak of about 1A at 10 V caused by the motor starting during power up.

It is recommended to connect pin 1 (CHASSIS) to a common earth ground.

2.7.2 Main serial interface

The signals, relative to the following serial interface types, are available on the input/output connector –

EIA RS232

EIA RS485-NONPOLLED

EIA RS485-POLLED (for connection with PSC Automation multiplexer)

20-mA PASSIVE CURRENT LOOP

The LazerData 12000 Scanner automatically recognizes the type of interface selected at each scanner power up.

If the recognized interface type is not compatible with the current communication handshaking, then the system defaults to the XON/XOFF protocol.

The parameters of the interface selected (baud rate, data bits, etc.) can be configured using the LDHOST utility program or Host Mode programming. For more details refer to the section "Main Interface Menu" in the LDHOST Help Online.

Details regarding the connections and use of the main interface selection are given in the next sections.

RS232 interface

The serial interface is used in this case for point-to-point connections. It handles communication with the host computer and allows both transmission of code data and the configuration of the scanner. This is the default interface.

The following pins of the 25-pin connector are used for RS232 interface connection:

Pin	Name	Function
2	TX232	Transmitted Data
3	RX232	Received Data
4	RTS232	Request To Send
5	CTS232	Clear To Send
7	SGND	Signal Ground

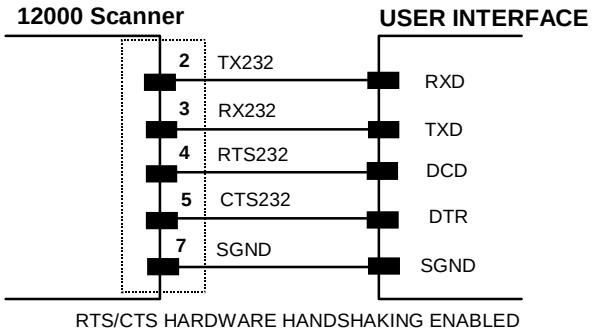


Figure 2.15 - RS232 main interface connections

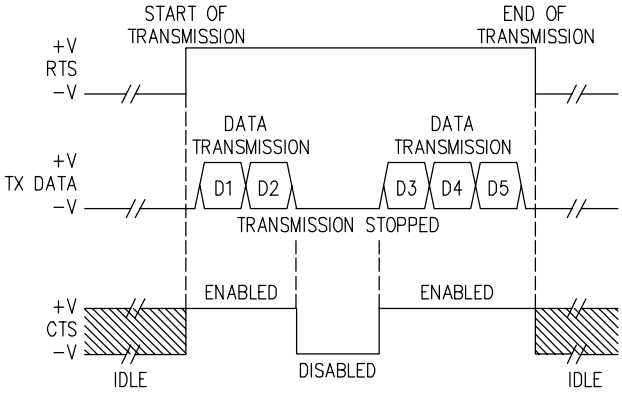


Figure 2.16 - RS232 control signals

The RTS232 and CTS232 signals control data transmission and synchronize the connected devices.

If the RTS/CTS handshaking protocol is enabled, the LazerData 12000 Scanner activates the RTS232 output to indicate a message is to be transmitted. The receiving unit activates the CTS232 input to enable the transmission.

RS485-nonpolled interface

The RS485-nonpolled interface is a Full Duplex interface.

The nonpolled configuration is used for point-to-point connections (over longer distances than those acceptable for RS232 communications) or in electrically noisy environments.

The following 25-pin connector pins are used for RS485-nonpolled communications:

Pin	Name	Function
2	TX485+	RS485 output (+)
4	TX485-	RS485 output (-)
3	RX485+	RS485 input (+)
5	RX485-	RS485 input (-)
7	SGND	Signal Ground

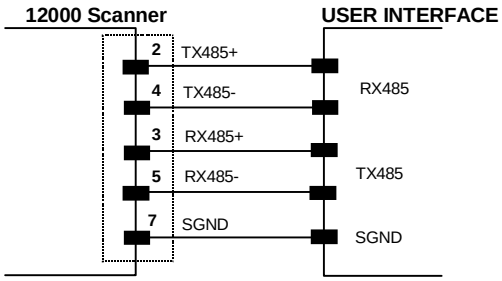


Figure 2.17 - RS485-nonpolled connections

To select this interface type, follow the instructions in sections 2.3 and 2.4.

RS485-polled interface

The RS485-polled interface is a Half Duplex (3 wires + shield) interface. The polled configuration can be used for multidrop connections with a PSC Automation multiplexer or also for a master-slave layout (see section 2.9.1).

The following pins of the 25-pin connector are used for RS485-polled communications:

Pin	Name	Function
2	TX485+	RS485 input/output (+)
4	TX485-	RS485 input/output (-)
7	SGND	Signal Ground

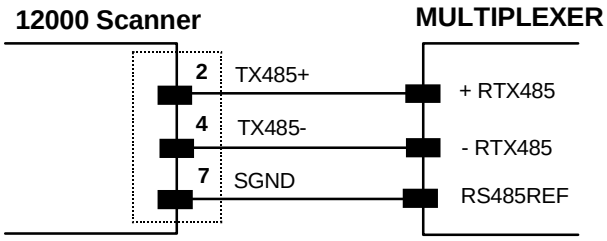


Figure 2.18 - RS485-polled connections

To select this interface type, follow the instructions in sections 2.3 and 2.4.
For this interface type, the multidrop address must also be set on the DIP switch as shown in Fig. 2.19 below. Record this information for further setup of the multidrop line.

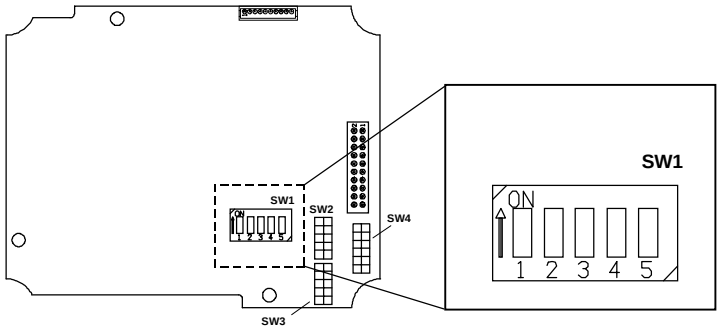


Figure 2.19 - DIP switch for multidrop address selection

The following table shows the address settings where:

Position					Address	Position					Address
1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**	
1	1	1	1	1	31	0	1	1	1	1	15
1	1	1	1	0	30	0	1	1	1	0	14
1	1	1	0	1	29	0	1	1	0	1	13
1	1	1	0	0	28	0	1	1	0	0	12
1	1	0	1	1	27	0	1	0	1	1	11
1	1	0	1	0	26	0	1	0	1	0	10
1	1	0	0	1	25	0	1	0	0	1	9
1	1	0	0	0	24	0	1	0	0	0	8
1	0	1	1	1	23	0	0	1	1	1	7
1	0	1	1	0	22	0	0	1	1	0	6
1	0	1	0	1	21	0	0	1	0	1	5
1	0	1	0	0	20	0	0	1	0	0	4
1	0	0	1	1	19	0	0	0	1	1	3
1	0	0	1	0	18	0	0	0	1	0	2
1	0	0	0	1	17	0	0	0	0	1	1
1	0	0	0	0	16	0	0	0	0	0	0

1 = ON **0 = OFF**

Figure 2.20 below shows a multidrop configuration with LazerData 12000 Scanners connected to a Multiplexer.

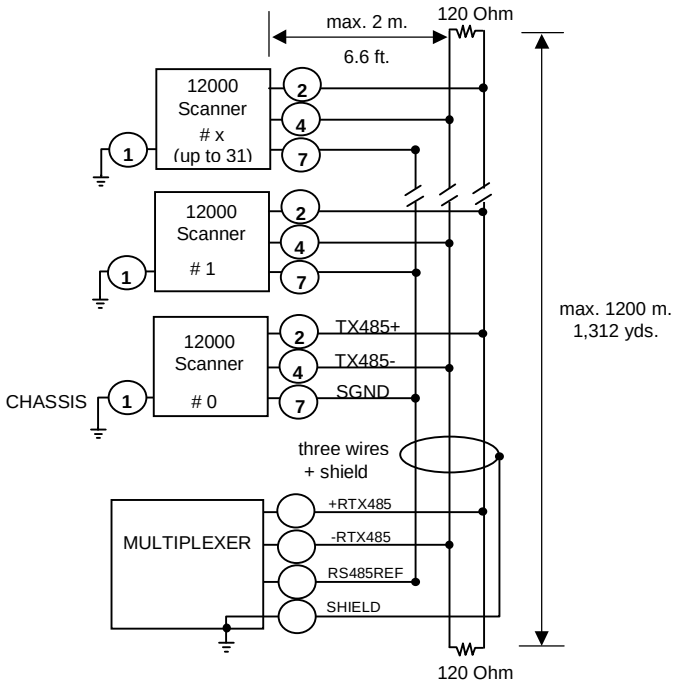


Figure 2.20 - LazerData 12000 Scanner multidrop connection to a multiplexer

20-mA current loop interface

The LazerData 12000 Scanner only supports passive type, current loop connections. The following pins of the 25-pin connector are used:

Pin	Name	Function
5	CLIN-	Current Loop Input (-)
3	CLIN+	Current Loop Input (+)
4	CLOUT-	Current Loop Output (-)
2	CLOUT+	Current Loop Output (+)

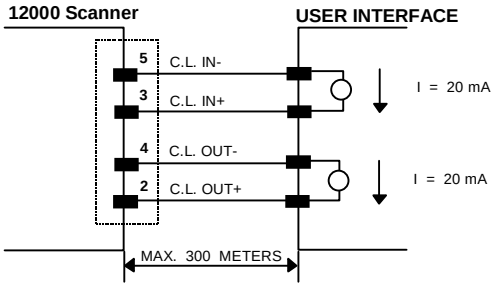


Figure 2.21 – 20-mA C.L. connections

To select this interface type, follow the instructions in sections 2.3 and 2.4.

2.7.3 Auxiliary RS232 interface

The auxiliary serial interface is used exclusively for RS232 point-to-point connections.

The parameters relative to the auxiliary interface (baud rate, data bits, etc.) as well as particular operating modes, such as local echo, can be defined using the LDHOST utility program or Host Mode programming. For more details refer to section 2.9 and to the section "Auxiliary Interface Menu" in the LDHOST Help Online.

The following pins of the 25-pin connector are used to connect the RS232 auxiliary interface:

Pin	Name	Function
20	RXAUX	Auxiliary input
21	TXAUX	Auxiliary output
23	CTSAUX	Auxiliary handshake
24	RTSAUX	Auxiliary handshake
7	SGND	Signal Ground

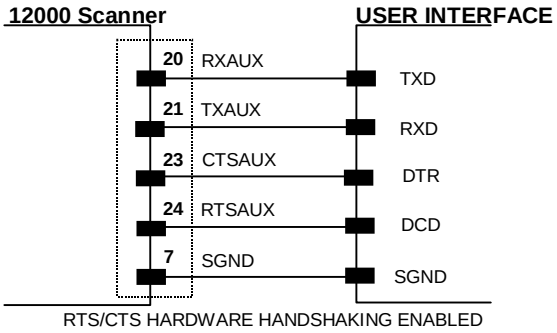


Figure 2.22 - RS232 auxiliary interface connections

The RTSAUX and CTSAUX signals control data transmission and synchronize the connected devices. If the RTS/CTS handshaking protocol is enabled, the LazerData 12000 Scanner activates the RTSAUX output to indicate a message is to be transmitted. The receiving unit activates the CTSAUX input to enable the transmission.

2.7.4 Inputs

The inputs available on the LazerData 12000 Scanner are the pins relative to the code presence sensor, as indicated below:

Pin	Name	Function
18	PS+	Presence sensor (input+)
19	PS-	Presence sensor (input-)

The inputs indicated are always used to connect the code presence sensor which tells the scanner to scan for a code. The yellow LED (Figure A, ⑤) is on during the active phase of the PS signal, indicating that decoding can take place.

This input is optocoupled and can be driven by both an NPN- or PNP-type command. The connections are indicated in the following diagrams:

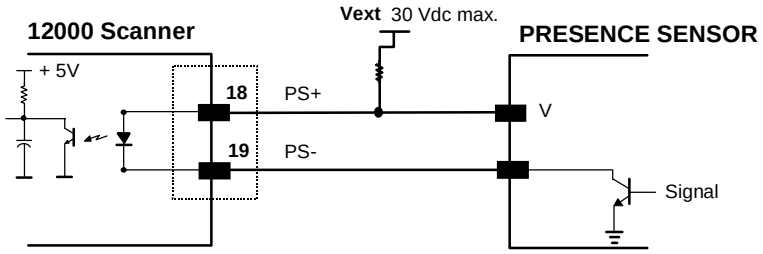


Figure 2.23 - Input NPN command using external power

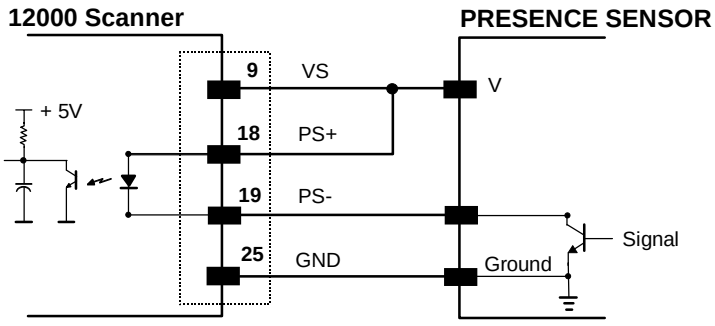


Figure 2.24 - Input NPN command using LazerData 12000 power

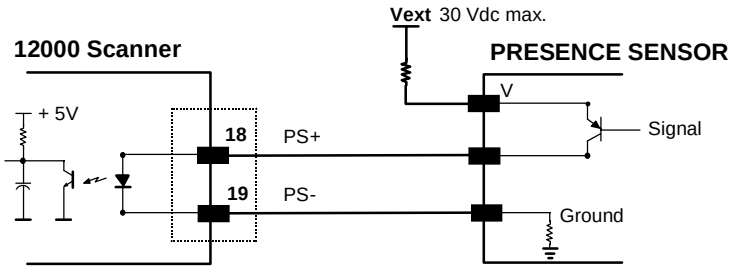


Figure 2.25 - Input PNP command using external power

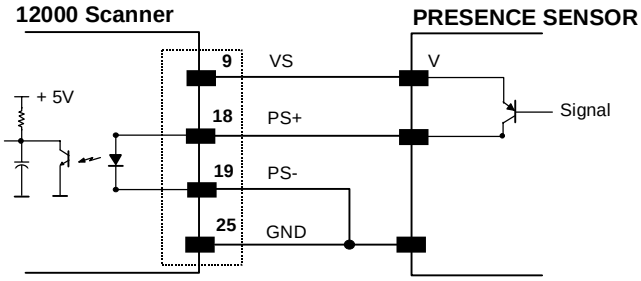


Figure 2.26 - Input PNP command using LazerData 12000 power

The electrical features are given below:

Maximum voltage	30 VDC
Maximum current	25 mA

An anti-disturbance filter is implemented on the presence sensor input with a nominal delay of about 5 milliseconds.

2.7.5 Outputs

In addition to the pins relative to the communication interfaces as described in previous sections, the following pins are present on the scanner's 25-pin connector:

Pin	Name	Function
8	NO READ+	No read output (+)
22	NO READ-	No read output (-)
11	RIGHT+	Right read output (+)
12	RIGHT-	Right read output (-)
14	WRONG+	Wrong read output (+)
15	WRONG-	Wrong read output (-)

The NO READ output activates when the code signaled by the presence sensor is not decoded.

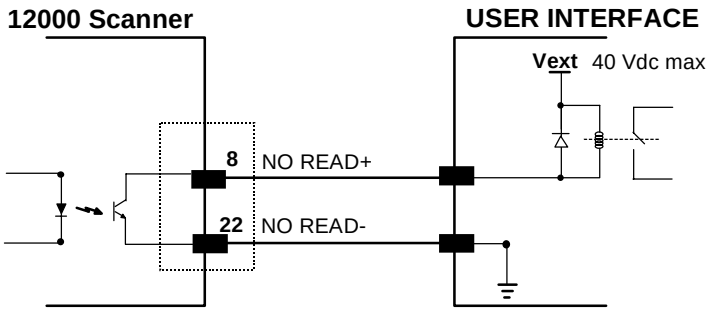


Figure 2.27 - NO READ output connection

The RIGHT output activates when the code is decoded correctly.

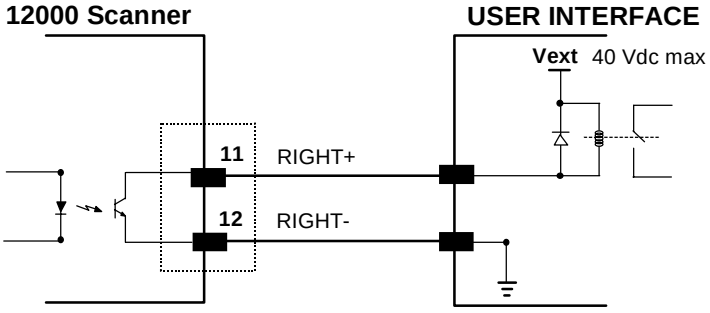


Figure 2.28 - RIGHT code output connection

The WRONG output is used either for "Verifier" mode or for PCS control (PCS control is available for DSP models only, see section 1.3). For Verifier this output activates when the decoded code does not correspond to the one set in the configuration. For PCS this output activates when the PCS level is below the threshold value.

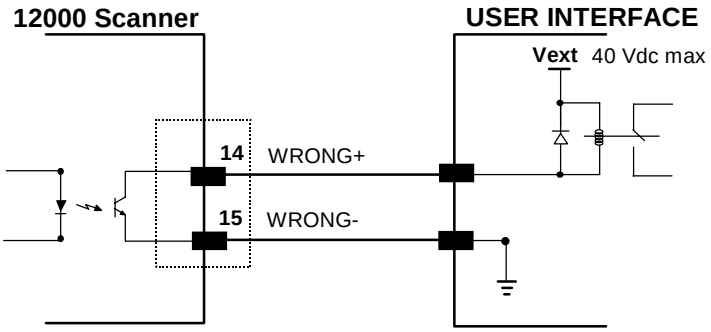


Figure 2.29 - WRONG code output connection

These outputs are all level or pulse-programmable: a 50-ms pulse is generated in the second case. Further programming information is supplied in the section "Output Lines" in the LDHOST Help Online.

2.8 POSITIONING

The LazerData 12000 Scanner is able to decode moving bar code labels at a variety of angles, however significant angular distortion may degrade reading performance.

When mounting the LazerData 12000 Scanner, take into consideration these three ideal label position angles: **Pitch 0° , Skew 10° to 30° and Tilt 0°**.

Follow the suggestions below for the best orientation:

The **Pitch** angle is represented by the value **P** in Figure 2.30. Position the reader in order to **minimize** the **Pitch** angle.

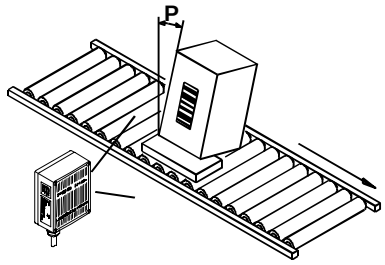


Figure 2.30 - Pitch angle

The **Skew** angle is represented by the value **S** in Figure 2.31. Position the reader to **assure at least 10°** for the **Skew** angle. This avoids the direct reflection of the laser light emitted by the LazerData 12000 Scanner.

For raster models, this angle refers to the most inclined or external raster line, so that all other raster lines assure **more** than 10° Skew.

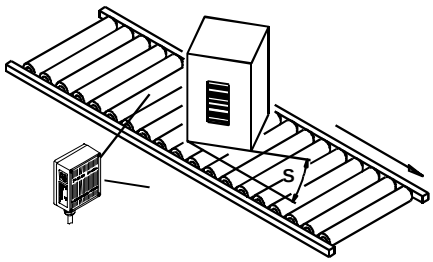


Figure 2.31 - Skew Angle

The **Tilt** angle is represented by the value **T** in Figure 2.32. Position the reader in order to **minimize** the **Tilt** angle.

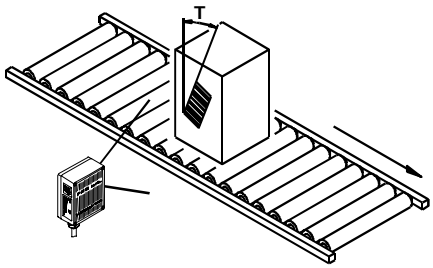


Figure 2.32 - Tilt angle

2.9 TYPICAL LAYOUTS

The LazerData 12000 Bar Code Scanner was specifically designed for industrial applications. A typical use is real-time identification of moving objects on conveyor belts.

A photoelectric sensor, used as a code presence sensor, signals when an object enters the scanner reading zone (see Figure 2.33).

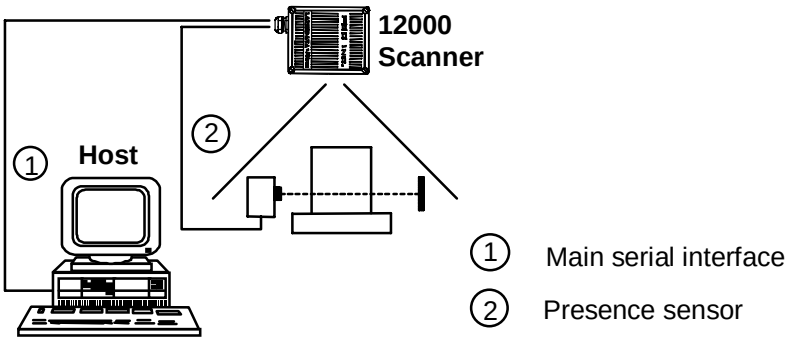


Figure 2.33 - LazerData 12000 typical layout

The LazerData 12000 Scanner can be mounted vertically or horizontally to read labels in the two standard positions – 'picket fence' or 'step ladder.' A system can be configured to read labels in any orientation using several scanners positioned at different angles.

Allow for at least five effective scans on each bar code symbol. The number of effective scans is directly affected by the length of the scan line, scan speed, height of the bars, and code motion speed with respect to the scanner (see Section 3, “Reading Features,” for formulas you can use to compute the effective scans for your application).

The possibility of using raster models allows a greater surface area of the code to be scanned, increasing the probability of correct reads even if the code printing quality is poor or the code is positioned incorrectly.

2.9.1 Master-slave

The master-slave layout is used to collect data from several scanners to build a multi-sided reading system; there can be one master and up to 5 slaves connected with the RS485-polled mode on the main serial interface.

The master scanner is also connected to a host computer with the RS232 auxiliary interface.

The P.S. signal is unique to the system; there is a single reading phase and a single message from the master scanner to the host computer.

In every scanner the jumper block for the selection of the main serial interface type must be set for RS485-polled (see section 2.4).

In every slave scanner the multidrop address selection must be set within the range from 0 to 4 max (see section 2.7.2 under "RS485-polled interface").

The DIP switch selections in the master scanner are ignored.

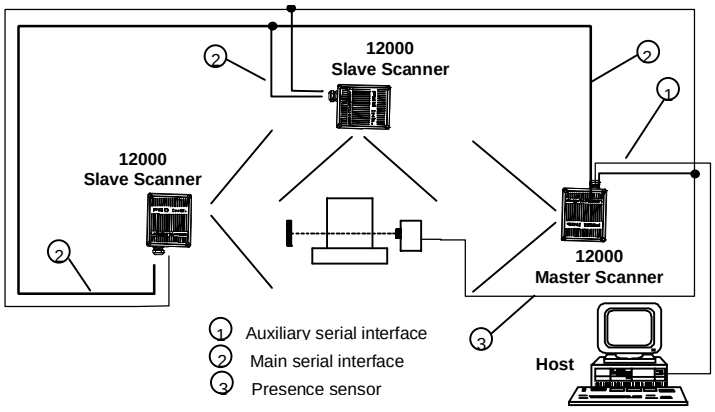


Figure 2.34 - Master-slave layout

NOTE

The auxiliary serial port of the slave scanners is only used for configuration.

The termination resistors of the RS485 bus must not be installed.

2.9.2 Local echo

In local echo mode, data is transmitted on the auxiliary interface as well as on the main interface. Host Mode programming can be accomplished either through the main interface or the auxiliary interface in local echo mode.

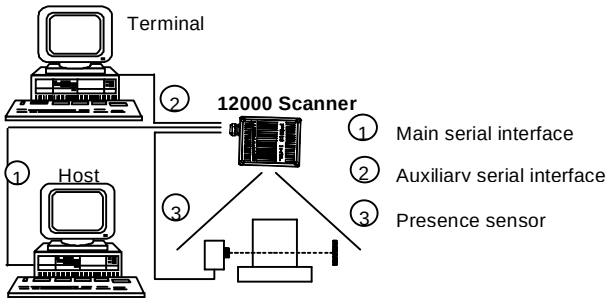


Figure 2.35 - Local echo layout

2.9.3 Pass through

Pass through mode allows two or more devices to be connected to a single external serial interface.

Each LazerData 12000 Scanner transmits the messages received by the auxiliary interface onto the main interface.

All messages will be passed through this chain to the host. The main and auxiliary ports are connected as shown in the figure below:

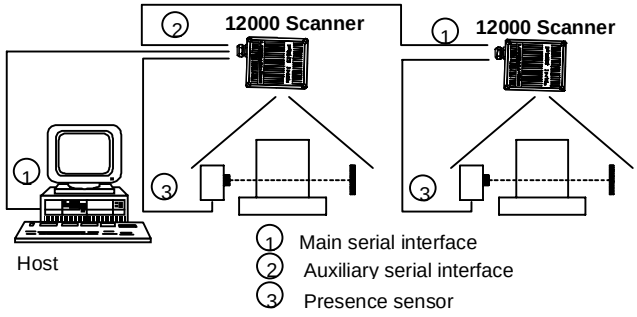


Figure 2.36 - Pass through layout

3 READING FEATURES

The number of reads performed by the LazerData 12000 Scanner and, therefore, the decoding capacity, is directly affected by the following factors:

- scans per second
- code motion speed
- label dimensions
- scan direction with respect to code motion

At least five scans should be made of each bar code symbol, as it passes the scanner, to ensure a successful read.

3.1 STEP LADDER MODE

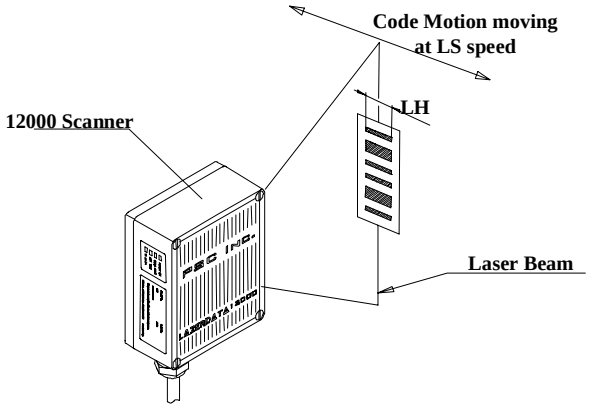


Figure 3.1 - "Step Ladder" scanning mode

If scanning is perpendicular to the code motion direction (Figure 3.1 - "step ladder" mode), the number of effective scans performed by the reader is given by the following formula

$$SN = [(LH/LS) * SS] - 2$$

where,

SN = number of effective scans
LH = label height (in mm or inches)
LS = label movement speed (in mm/s or inches/s)
SS = number of scans per second

For example, the LazerData 12000 Scanner (800 scans/sec.), for a 25-mm high code moving at 1250 mm/s performs:

SN = [(25/1250) ∗ 800] - 2 = **14 effective scans**

3.2 PICKET FENCE MODE

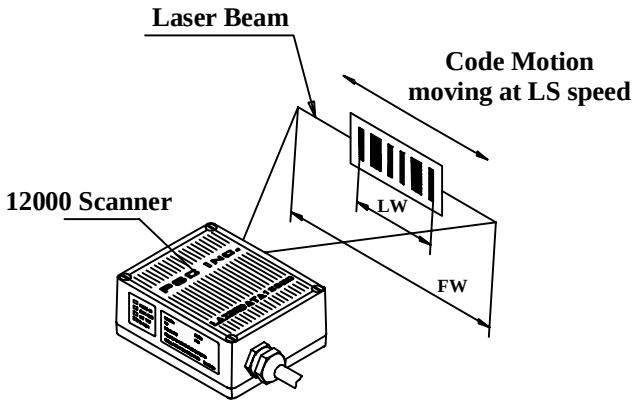


Figure 3.2 - "Picket Fence" scanning mode

If scanning is parallel to the code motion, (Figure 3.2 - "picket fence" mode), the number of effective scans is given by

SN = {[(FW-LW)/LS] ∗ SS} - 2

where,

SN = number of effective scans
FW = reading field width (in mm or inches)
LW = label width (in mm or inches)
LS = label movement speed (in mm/s or inches/s)
SS = scans per second

For example, for a 50-mm wide code moving in a point where the reading field is 250 mm wide at a 1500 mm/s speed, the LazerData 12000 Scanner (800 scans/s), performs:

SN = [((250-50)/1500) ∗ 800] - 2 = **104 effective scans**

3.3 PERFORMANCE

The LazerData 12000 Scanner is available in four standard models varied by optical resolution characteristics (see section 1.3).

The **standard resolution model** is a general-purpose model whose optical resolution allows code reading from 0.20- to 1.00-mm (8- to 39-mil) narrow bars in the zone between 50 and 400 mm (2.0 to 15.8 inches) from the emission window. This model can distinguish between high density codes (between 0.20 mm and 0.30 mm, or between 8 and 12 mil) and low density codes (above 0.33 mm or 13 mil) by programming the software resolution parameter (see the section "Scanner Resolution" in the LDHOST Help Online).

The **very high resolution model** has an optical resolution that allows reading very high density codes (typical values from 0.10- to 0.20-mm, or from 4- to 8-mil, narrow bars) in the zone from 55 to 125 mm (2.2 to 4.9 inches) from the emission window. The software resolution parameter for this model should be set to *high* (see the section "Scanner Resolution" in the LDHOST Help Online).

The **Raster model R1** is a raster model used to read codes from 0.20- to 1.00-mm (8- to 39-mil) narrow bars with a raster aperture of about 12 mm (0.47 inch) at a 200-mm (7.9-inch) distance.

The **Raster model R2** is a raster model used to read codes from 0.20- to 1.00-mm (8- to 39-mil) narrow bars with a raster aperture of about 40 mm (1.6 inches) at a 200-mm (7.9-inch) distance.

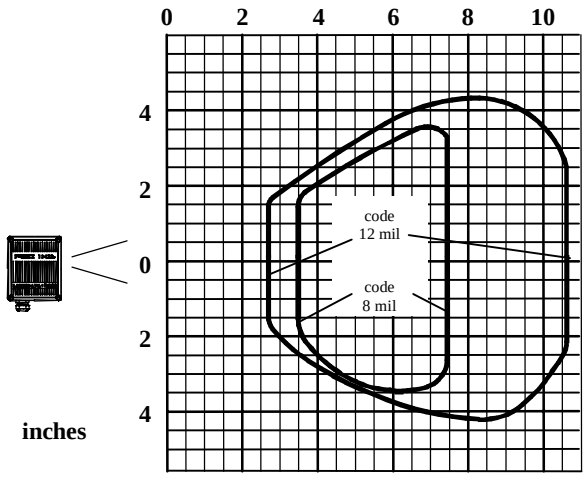
Refer to the diagrams given in paragraph 3.4 for further details on the reading features. These diagrams refer to the two standard optical models and are taken on various resolution sample codes at a 25ºC (77ºF) ambient temperature, depending on the conditions given in the notes under each diagram.

If standard models do not satisfy your specific requirements, send a representative code sample of your labels to the nearest PSC Automation, Inc. distributor, who will in turn supply you with complete information on reading possibilities.

3.4 READING DIAGRAMS

LD12011X Scanner
(Standard Resolution, 800 scans/s)

NOTE: (0,0) IS THE CENTER OF THE LASER BEAM OUTPUT WINDOW

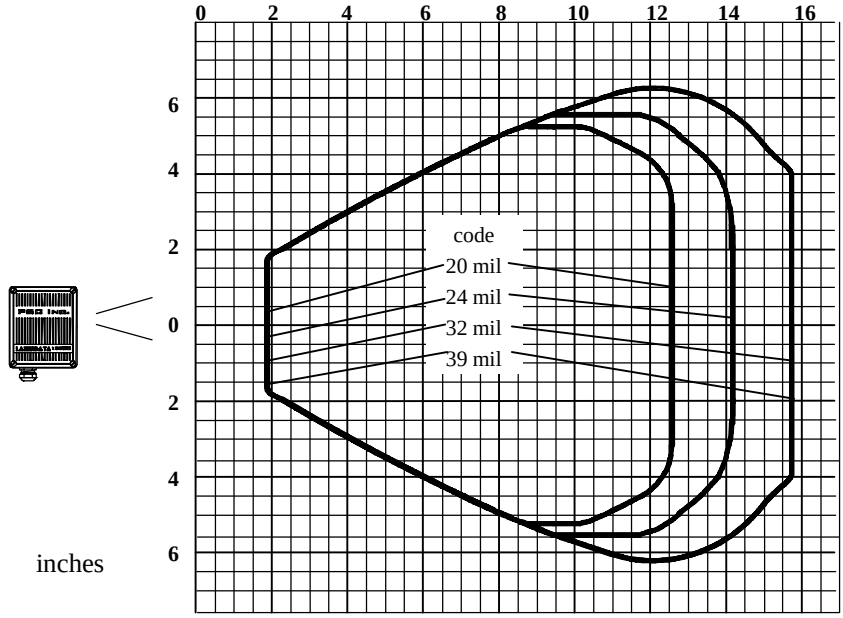


CONDITIONS:

Code	=	Interleaved 2/5 or Code 39
PCS	=	0.90
"Pitch" angle	=	0°
"Skew" angle	=	10°
"Tilt" angle	=	0°
SW Resolution	=	High

LD12011X Scanner
(Standard Resolution, 800 scans/s)

NOTE: (0,0) IS THE CENTER OF THE LASER BEAM OUTPUT WINDOW

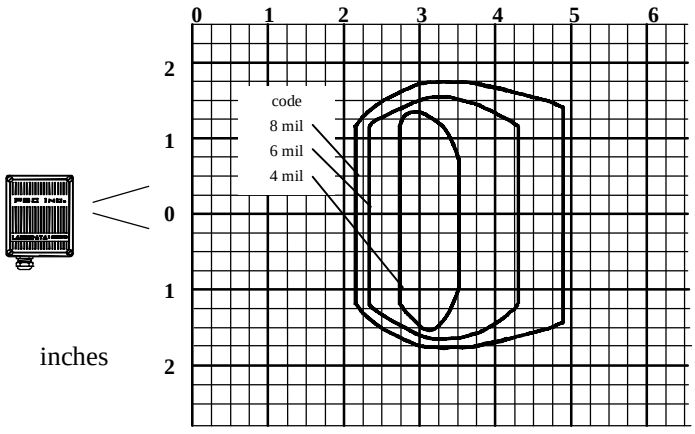


CONDITIONS:

Code	=	Interleaved 2/5 or Code 39
PCS	=	0.90
"Pitch" angle	=	0°
"Skew" angle	=	10°
"Tilt" angle	=	0°
SW Resolution	=	Low

LD12021X Scanner
(Very High resolution, 800 scans/s)

NOTE: (0,0) IS THE CENTER OF THE LASER BEAM OUTPUT WINDOW



CONDITIONS:

Code	=	Interleaved 2/5 or Code 39
PCS	=	0.90
"Pitch" angle	=	0°
"Skew" angle	=	10°
"Tilt" angle	=	0°
SW Resolution	=	High

4 MAINTENANCE

4.1 CLEANING

Clean the laser beam output window periodically for continued optimum operation of the reader.

Dust, dirt, etc. on the window can affect reading performance.

Repeat the operation frequently in particularly dirty environments.

Use soft, cloth material and alcohol to clean the window. Avoid any abrasive substances.

WARNING

Clean the window of the LazerData 12000 Scanner when the scanner is turned off or, minimally, when the laser beam is deactivated.

5 SERVICE AND WARRANTY

PSC Inc. warrants that the LazerData® 12000 Series Bar Code Scanner and component parts will be free from defects in material and workmanship for a period of twelve months from the date of purchase. Scanners not performing to specification must be shipped to the PSC Repair Depot for service. Unless otherwise stated, warranty for products not manufactured by PSC Inc. is limited to the manufacturer's warranty.

EQUIPMENT OR COMPONENT FAILURES DUE TO MISUSE, ABUSE, OR NEGLECT ON THE PART OF THE USER OR THE USER'S AGENTS, ARE NOT COVERED IN THIS WARRANTY.

Service requests due to abuse, neglect, changes in original specifications, or service calls not related to the PSC equipment, will be charged at the current service rate and will include all travel-related expenses. Warranty coverage lasts for 12 months. If the device or part of the device is replaced, the warranty coverage does not start over; however, the replacement part or unit (no charge) is covered under warranty for the remainder of the one-year period, with a minimum time period of 90 days.

PSC Inc. also offers Optional Extended Warranty Programs to augment the standard product warranty. Through these plans, equipment maintenance and repair are offered with fixed cost and fast turnaround for unexpected repairs. Additional details on the coverage, support, and services available for your bar code scanning system, are available from —

PSC Automation, Inc.
675 Basket Road
Webster, New York 14580-9787
Tel: (716) 265-1600
(800) 828-6489
Fax: (716) 265-6400

6 TECHNICAL FEATURES

	DSP MODELS (Note 1)	**NPP MODELS** (Note 1)
ELECTRICAL FEATURES		
INPUT POWER		
Supply voltage	10 to 30 VDC	
Power consumption max.	5 W	4 W
SERIAL INTERFACES		
MAIN	RS232, RS485-Nonpolled, RS485-Polled, 20 mA Passive C. L.	
AUXILIARY	RS232	
BAUD RATES		
All Interfaces	150 to 19200	
CONTROL INPUTS		
PRESENCE SENSOR	(optocoupled NPN or PNP)	
Voltage max.	30 VDC	
Input current max.	25 mA	
CONTROL OUTPUTS		
NO READ, RIGHT READ, WRONG READ	(optocoupled)	
V_{CE} max.	40 VDC	
Collector current max.	40 mA continuous; 130 mA pulsed	
V_{CE} saturation	1V at 10 mA max.	
Power dissipation max.	90 mW at 40 °C / 104ºF (ambient temp.)	
OPTICAL FEATURES		
Light source	Semiconductor laser diode	
Wave length (Note 2)	630 ~ 680 nm	
Safety class	Class 2	
READING FEATURES (Note 3)		
Scan rate	800 scans/s	
Reading distance	50 to 400 mm (2.0 to 15.7 inches)	
Maximum resolution	0.1 mm (3.9 mil)	
Aperture angle	60 degrees	
USER INTERFACE		
LED indicators	power, laser beam active, bar code decoded, presence sensor active, data transmission	

	DSP MODELS (Note 1)	**NPP MODELS** (Note 1)
SOFTWARE FEATURES		
READABLE CODE SYMBOLOGIES	Up to 22 readable symbologies including:	
Code 93 (Standard and Full ASCII)	•	•
EAN/UPC (including Add-on 2 and Add-on 5)	•	•
Code 39 (Standard and Full ASCII)	•	•
2/5 Interleaved	•	•
Codabar	•	•
Code 128	•	•
EAN 128	•	•
Plessey	–	•
CODE SELECTION	up to six codes during one reading phase	
CODE POSITON	can be verified and displayed	cannot be verified and displayed
DECODING SAFETY	can enable multiple good reads of same code	
HEADERS AND TERMINATORS	up to four headers and four terminators	
OPERATING MODES	ON LINE, AUTOMATIC, SERIAL ON LINE, TEST	
CONFIGURATION MODES	• through menus using LDHOST utility • receiving commands from one of the serial ports (HOST MODE)	
PARAMETER STORAGE	Non-volatile internal EEPROM	
ENVIRONMENTAL FEATURES		
Operating temperature (Note 4)	0º to 40°C (32º to 104ºF)	
Storage temperature	-20º to 70°C (-4º to 158ºF)	
Humidity max.	90% noncondensing	
Vibration resistance	IEC 68-2-6 test FC 1.5 mm; 10 to 55 Hz; 2 hours on each axis	
Shock resistance	IEC 68-2-27 test EA 30G; 11 ms; 3 shocks on each axis	
Protection class	IP65	
PHYSICAL FEATURES		
Physical dimensions	101 x 83.5 x 42 mm (4 x 3.3 x 1.7 inches)	
Weight	800 g. (1.8 lbs.)	

Note 1: Refer to section 1.3 for model descriptions.

Note 2: Features given are typical at a 25°C / 77ºF ambient temperature (if not otherwise indicated).

Note 3: Further details given in sections 3.3 and 3.4.

Note 4: If the reader is used in high-temperature environments (over 35 °C / 95ºF), use of the Beam shutter is advised (for details refer to the section "Beam shutter" in the Help Online of the LDHOST utility program provided with the LazerData 12000 Scanner program disk.

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