



**DS4600A**

**Reference Manual**

**DATALOGIC**



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**REFERENCE MANUAL**



# DATALOGIC

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DS4600A Reference Manual

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# REFERENCES

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## CONVENTIONS

This manual uses the following conventions:

“User” or “Operator” refers to anyone using a DS4600A.

“Device” refers to the DS4600A.

“You” refers to the System Administrator or Technical Support person using this manual to install, mount, operate, maintain or troubleshoot a DS4600A.

## REFERENCE DOCUMENTATION

The documentation related to the DS2100A management is listed below:

- INT-30 20 mA Current Loop Interface Board for C-Box 100
- C-BOX 100 Installation Manual
- C-BOX 300/310 Installation Manual
- C-BOX 400/410 Installation Manual
- WinHost Help On Line

## SERVICES AND SUPPORT

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- **PRODUCTS**

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# SAFETY REGULATIONS

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## LASER SAFETY

The following information is provided to comply with the rules imposed by international authorities and refers to the correct use of the DS4600A 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. Avoid that the laser beam hits the eye of an observer, even through reflective surfaces such as mirrors, etc.

This product conforms to the applicable requirements of both EN 60825-1 and CDRH 21 CFR 1040 at the date of manufacture. The scanner is classified as a Class 2 laser product according to EN 60825-1 regulations and as a Class II laser product according to CDRH regulations.

There is a safety device which allows the laser to be switched on only if the motor is rotating above the threshold for its correct scanning speed.

The laser beam can be switched off through a software command (see also the WinHost Help On Line).



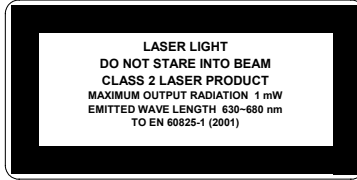
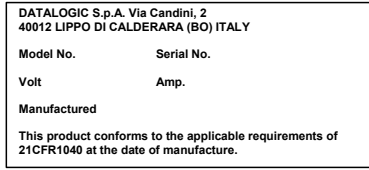
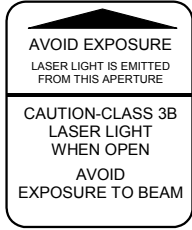
**WARNING**

*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 (Figure A, 2).

Warning labels indicating exposure to laser light and the device classification are applied onto the body of the scanner (Figure A, 4 and 10).

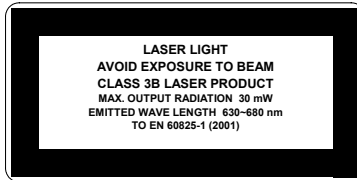




### Warning and Device Class Labels

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 EN 60825-1 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 is reproduced on the right.



### Laser Diode Class Label

Any violation of the optic parts in particular can cause radiation up to the maximum level of the laser diode (30 mW at 630 to 680 nm).

## POWER SUPPLY

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

- **Model DS4600A-XXX0:**

This device is intended to be supplied by a UL Listed Direct Plug-in Power Unit marked "Class 2", rated 10-30 V, minimum 0.60 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.

- **Model DS4600A-2XX5:**

This device is intended to be supplied by a UL Listed Direct Plug-in Power Unit marked "Class 2", rated 24 V, minimum 0.50 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.

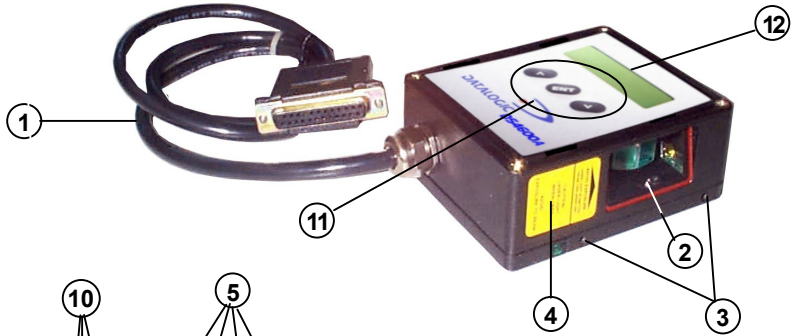
See par. 2.3.1 for correct power supply connections.

## WEEE COMPLIANCE

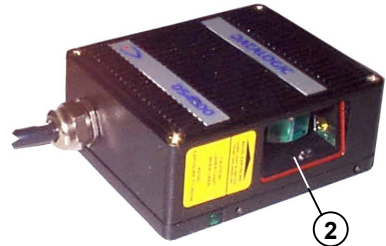
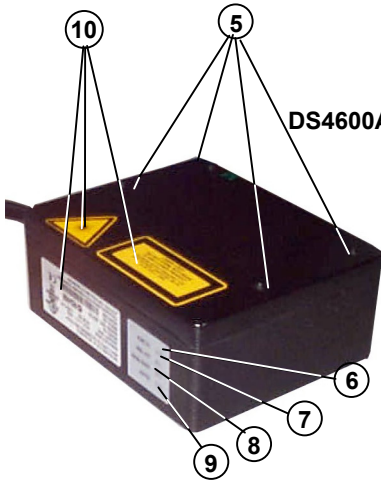


# GENERAL VIEW

## DS4600A



### DS4600A - 2XXX Models



### DS4600A - 3XXX Models

Figure A

- |                               |                                     |
|-------------------------------|-------------------------------------|
| ① Cable with 25-pin Connector | ⑦ External Trigger LED              |
| ② Laser Beam Output Window    | ⑧ Good Read LED                     |
| ③ Accessory Mounting Holes    | ⑨ Ready LED                         |
| ④ Warning Label               | ⑩ Warning and Classification Labels |
| ⑤ Mounting Holes              | ⑪ Keypad                            |
| ⑥ Data TX LED                 | ⑫ Display                           |

# GUIDE TO INSTALLATION

---

The following can be used as a checklist to verify all of the steps necessary for complete installation of the DS4600A scanner.

- 1) Read all information in the section "Safety Precautions" at the beginning of this manual.
- 2) Correctly mount the reader using the bracket provided according to the information in par. 2.2.
- 3) Position the reader at the correct reading distance according to your model as shown in paragraphs 2.4 and 3.4.
- 4) Make electrical connections to your DS4600A scanner by either:
  - a) Connecting the test cable to the DS4600A scanner as described in par. 2.4.
  - b) Providing correct and complete system cabling according to the signals necessary for the layout of your application.
    - Layout: Point-to-point, RS485 Master/Slave, RS232 Master/Slave, Multiplexer. See sub-paragraphs under 2.6 for reference.
    - Cabling: Power, Main Serial Interface, Auxiliary Interface (RS232), Inputs, Outputs, etc. For further details, see all sub-paragraphs under 2.3.
- 5) Configure the DS4600A scanner by installing and running the WinHost configuration program from the CD- ROM provided. The main steps are:
  - Select the codes to be read
  - Set-up the communication parameters
  - Define data formatting parameters
  - Fine tune your DS4600A scanner using the Test Mode as described in WinHost. Specific parameter details are available in the Help On Line. See also the Guide To Rapid Configuration link.
- 6) Exit the configuration program and run your application.

The installation is now complete.

# 1 INTRODUCTION

---

## 1.1 PRODUCT DESCRIPTION

The DS4600A is a compact laser scanner complete with decoder designed and produced to be a flexible and affordable solution for all medium range materials handling applications.

### **Standard Application Program**

A Standard Application Program is factory-loaded onto the DS4600A. This program controls barcode reading, serial port interfacing, data formatting and many other operating and control parameters.

It is completely user configurable from a host computer using the WinHost interface utility program provided on CD 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 barcode reading system requirements. Included in these is a test mode to verify the reading features and exact positioning of the scanner without using external tools.

### **Programmability**

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

Some of the main features of this scanner are given below:

- long-range reading
- scanning speed 800 scans/sec
- completely configurable from host computer
- 2 serial communication interfaces
- reads most popular codes
- supply voltage from 10 to 30 Vdc
- test mode to verify the reading features and exact positioning of the scanner without the need for external tools
- configurable in different operating modes to suit the most various barcode reading system requirements
- code verifier
- possibility to detect the position of the label in the scan line

The DS4600A scanner uses a solid state laser diode as a light source; the light emitted has a wavelength between 630 and 680 nm. Refer to the section "Safety Precautions" at the beginning of this manual for information on laser safety.

The reader is contained in a rugged aluminum housing; the mechanical dimensions are 101 x 83.5 x 42 mm and it weighs about 615 g.

The protection class of the enclosure is IP65, therefore the reader is particularly suitable for industrial environments where high 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 (see Figure A, 1).

The laser beam output window is on the right hand side of the scanner (Figure A, 2).

A security system allows the laser to activate only once the motor has reached the correct rotational speed; consequently the laser beam is generated after a slight delay from the power on of the scanner.

### 1.1.1 Indicators

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

<b>READY</b>	(red), indicates the reader is connected to the power supply and the startup was successful. If the startup is not successful, this LED blinks. (Figure A, 9).
<b>GOOD READ</b>	(red), is used to signal successful barcode decoding. It is also used in Test mode to signal the decoding percentage (for details refer to the WinHost Help On Line). (Figure A, 8).
<b>EXT TRIG</b>	(yellow), indicates external trigger activity (for details refer to par. 2.3.4. (Figure A, 7).
<b>TX DATA</b>	(green), indicates data transmission on the main serial output line. (Figure A, 6).

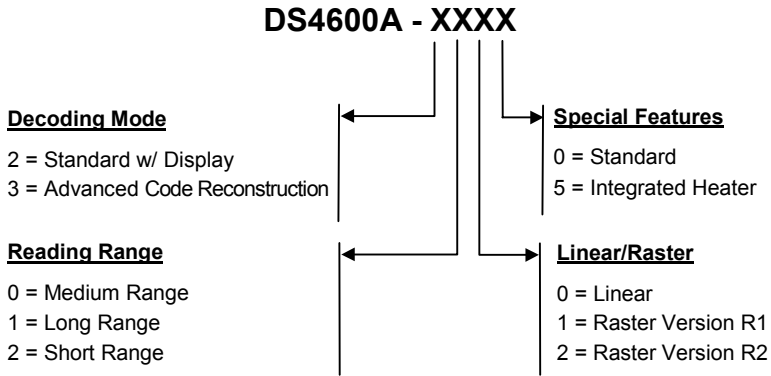
The screw holes on the body of the reader are for mechanical fixture (Figure A, 5); the screw holes shown in Figure A, 3 are to attach accessories such as the optional 90° mirror.

## 1.2 MODEL DESCRIPTION

The DS4600A scanner is available in versions that differ in regard to the following characteristics:

- Decoding Mode
- Reading Range
- Special Features
- Linear or Raster reading

The following models are therefore available:



## 1.3 ACCESSORIES

The following accessories are available on request for the DS4600A:

Name	Description	Part Number
GFC-41	90° deflection mirror	91D081000
C-Box 100/200	Connection Box	93ACC1510, 93ACC1520
C-Box 300/310	Connection Box Profibus	93A301000, 93A301030
C-Box 400/410	Connection Box DeviceNet	93A301010, 93A301040
OM4000	Oscillating mirror	93A251030
INT-30 (for C-Box 100)	20 mA Active Current Loop interface	93A151022
MEP-542/543	Photocell Kit NPN/PNP	93ACC1727, 93ACC1728

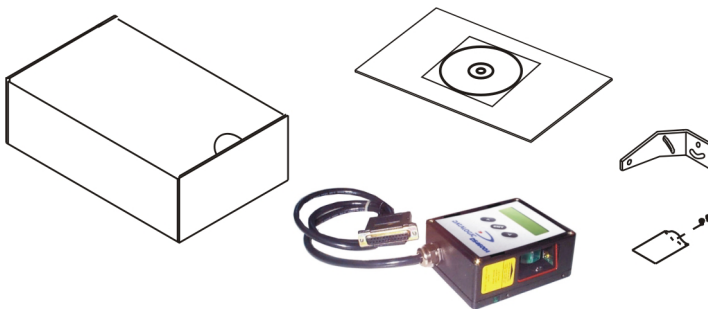
## 2 INSTALLATION

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### 2.1 PACKAGE CONTENTS

Verify that the DS4600A reader and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

- DS4600A reader with cable
- Quick Reference Guide
- Barcode Test Chart
- WinHost CD
- Mounting kit: - Mounting screws and washers (4 ea.)  
- Mounting bracket (1)



**Figure 1 - DS4600A Package Contents**

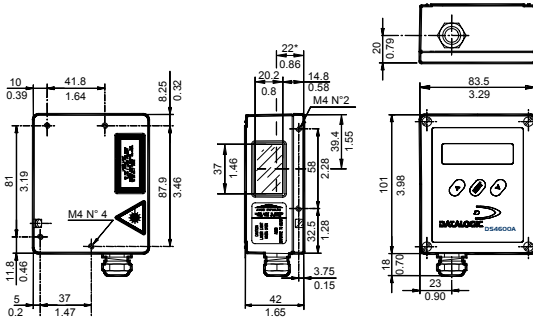


## 2.2 MECHANICAL INSTALLATION

DS4600A can be installed to operate in different positions. The four screw holes (M4 x 5) on the body of the reader are for mechanical fixture (Figure A, 5).

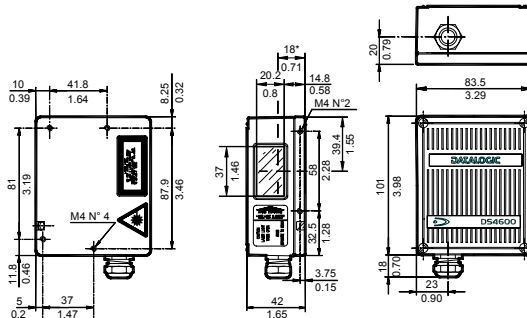
The diagram below gives the overall dimensions of the scanner and may be used for its installation.

Refer to paragraph 2.4 for correct positioning.



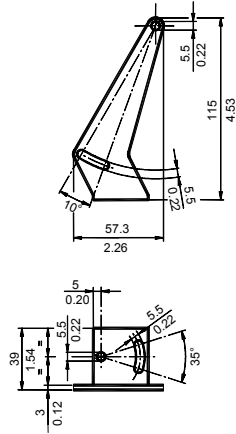
Mounting hole depth M4 X 5 \* The quote refers to the scan line

**Figure 2 - Overall Dimensions for 2XXX Models**



Mounting hole depth M4 X 5 \* The quote refers to the scan line

**Figure 3 - Overall Dimensions for 3XXX Models**




mm

inch

**Figure 4 - Mounting Bracket Dimensions**

### 2.3 ELECTRICAL CONNECTIONS

DS4600A is equipped with a cable terminated by a 25-pin D-sub connector for connection to the power supply and input/output signals. The details of the connector pins are indicated in the following table:



**CAUTION** Do not connect GND and SGNDs (Main or Aux) to different (external) ground references. GND and SGNDs (Main and Aux) are internally connected through filtering circuitry which can be permanently damaged if subjected to voltage drops over 0.8 Vdc.

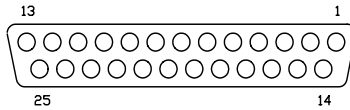


Figure 5 - 25-pin D-sub Connector

25-pin D-sub connector pinout				
Pin	Name	Function		
13	VS	Power supply input voltage +		
25	GND	Power supply input voltage -		
1	CHASSIS	Chassis Ground		
9	VS	External Trigger supply voltage +		
18	EXT TRIG+	External Trigger +		
19	EXT TRIG-	External Trigger -		
6	IN1 +	Input 1 +		
10	IN1 -	Input 1 -		
14	IN2 +	Input 2 +		
15	IN2 -	Input 2 -		
8	OUT1 +	Output 1 +		
22	OUT1 -	Output 1 -		
11	OUT2 +	Output 2 +		
12	OUT2 -	Output 2 -		
20	RXAUX	Auxiliary RS232 input		
21	TXAUX	Auxiliary RS232 output		
23	SGND Aux	Signal Ground Auxiliary interface		
24	GND	Power supply voltage -		
16	Reserved			
17	Reserved			
		<b>RS232</b>	<b>RS485 full-duplex</b>	<b>RS485 half-duplex</b>
2	Main interface (see par. 2.3.2)	TX232	TX485+	RTX485+
3		RX232	RX485+	
4		RTS232	TX485-	RTX485-
5		CTS232	RX485-	
7		SGND Main	SGND Main	SGND Main

### 2.3.1 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 6):

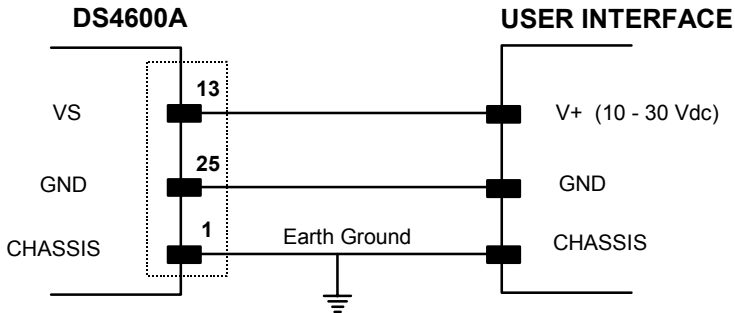


Figure 6 - Power Supply Connections

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 7). If the jack input is used to supply power to the DS4600A, pin 13 is automatically disconnected; the supply voltage for the external trigger remains on pin 9. The plug connector is not supplied with the DS4600A.

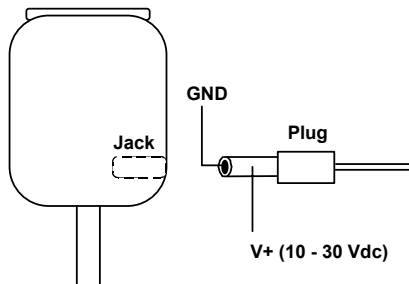


Figure 7 - Power Supplied Using the Jack Connector

For Standard models, the power must be between 10 and 30 Vdc only. There is a current peak of about 1A at 10 V during power on caused by the motor starting.

For Integrated Heater models, the power must be 24Vdc only.

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

### 2.3.2 Main Serial Interface

The signals relative to the following serial interface types are available on the input/output connector of the DS4600A.

**The main serial interface type and its relative parameters (baud rate, data bits, etc.) are selected via software either using the WinHost utility program or Host Mode programming. For more details refer to the section "Main Interface Menu" in the WinHost Help On Line.**

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

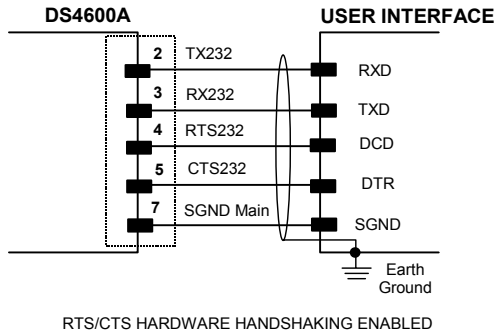
### RS232 Interface

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:

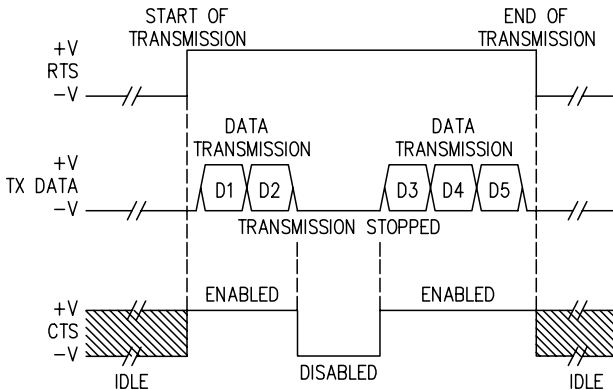
Pin	Name	Function
2	TX232	transmitted data
3	RX232	received data
4	RTS232	request to send
5	CTS232	clear to send
7	SGND Main	signal ground main interface

It is always advisable to use shielded cables. The overall maximum cable length must be less than 15 m (49.2 ft).



**Figure 8 - RS232 Main Interface Connections**

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



**Figure 9 - RS232 Control Signals**

If the RTS/CTS handshaking protocol is enabled, the DS4600A activates the RTS232 output to indicate a message is to be transmitted. The receiving unit activates the CTS232 input to enable the transmission.

## RS485 Full-Duplex Interface

The RS485 full-duplex (5 wires + shield) interface is used for non-pollled communication protocols in point-to-point connections over longer distances (max 1200 m / 3940 ft) than those acceptable for RS232 communications or in electrically noisy environments.

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

Pin	Name	Function
2	TX485+	RS485 transmitted data +
4	TX485-	RS485 transmitted data -
3	RX485+	RS485 received data +
5	RX485-	RS485 received data -
7	SGND Main	signal ground main interface

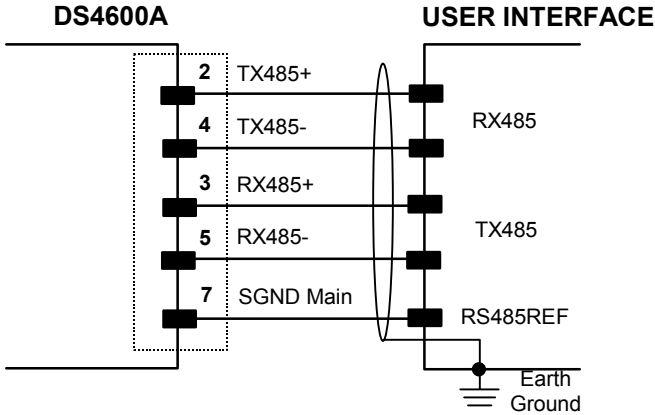


Figure 10 - RS485 Full-Duplex Connections

### RS485 Half-Duplex Interface

The RS485 half-duplex (3 wires + shield) interface is used for polled communication protocols.

It can be used for Multidrop connections in a master/slave layout or with a Datalogic Multiplexer, (see par. 2.6.4 and 2.6.5).

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

Pin	Name	Function
2	RTX485+	RS485 transmitted/received data +
4	RTX485-	RS485 transmitted/received data -
7	SGND Main	signal ground main interface

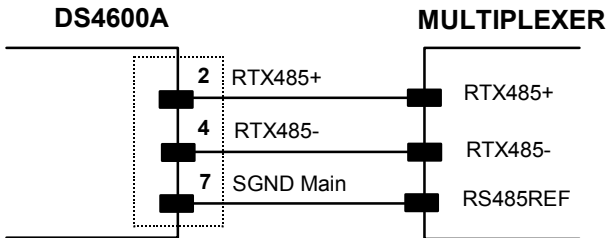


Figure 11 - RS485 Half-Duplex Connections

The figure below shows a multidrop configuration with DS4600A scanners connected to a Multiplexer.

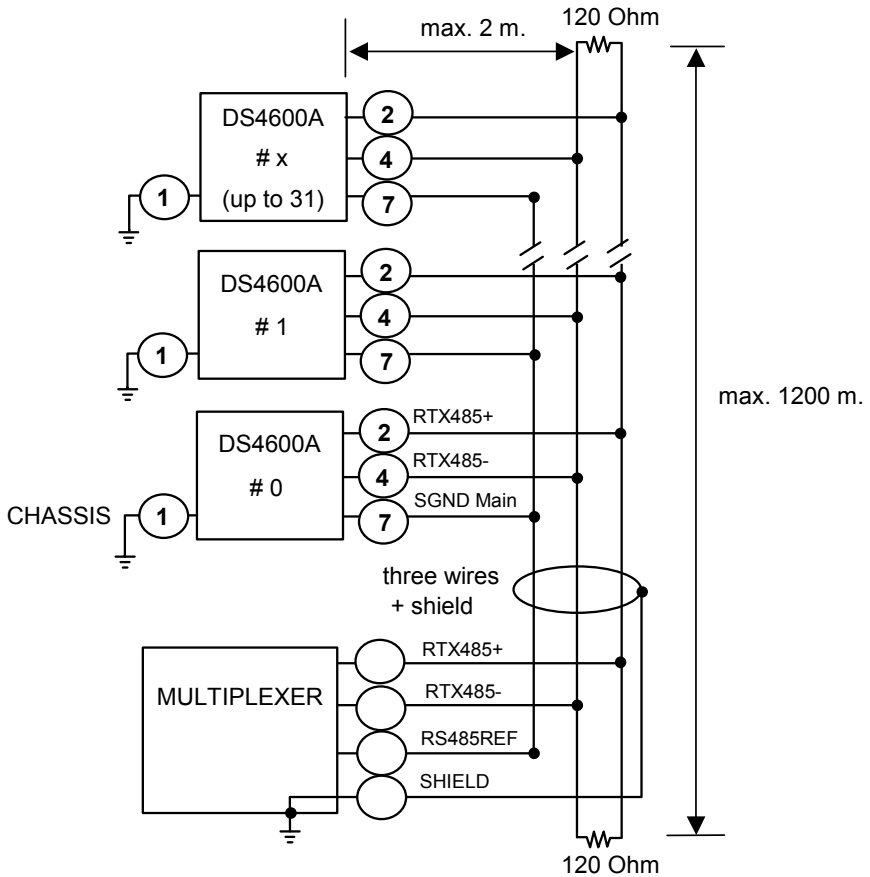


Figure 12 - DS4600A Multidrop Connection to a Multiplexer



## 20 mA Current Loop (C-Box 100 w/INT-30 Accessory Only)

To adapt DS4600A to 20 mA current loop interfaces, it must be connected to a C-BOX 100 equipped with an INT-30 (20 mA current loop adapter accessory board).

The INT-30 converts RS232 communication on the scanner into 20 mA current loop signals to the host. See the C-BOX 100 Installation Manual and the INT-30 instructions.

### 2.3.3 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 communication modes such as Local Echo can be defined using the WinHost utility program or Host Mode programming. For more details refer to paragraph 2.6 and to the section "Auxiliary Interface Menu" in the WinHost Help On Line.

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

Pin	Name	Function
20	RXAUX	auxiliary RS232 received data
21	TXAUX	auxiliary RS232 transmitted data
23	SGND Aux	signal ground auxiliary interface

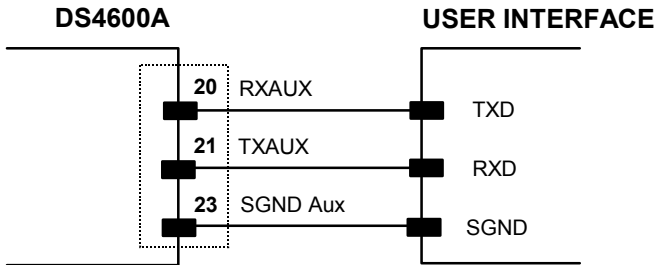


Figure 13 - RS232 Auxiliary Interface Connections

When the auxiliary interface is permanently connected as part of the system cabling, it is recommended to connect the cable shield to earth ground.

### 2.3.4 Inputs

There is an input available on the DS4600A scanner relative to the External Trigger.

There are also 2 general purpose inputs:

IN1 can be used to store the code verifier (see "Store verifier HW" in the WinHost Help On Line).

IN2 can be used as the Reading Field Control signal which determines either the Code Reading Condition or the Code Resolution parameter for each reading phase. Refer to the WinHost Help On Line.

The pinouts are indicated below:

Pin	Name	Function
18	EXT TRIG+	external trigger +
19	EXT TRIG-	external trigger -
6	IN1+	input 1 +
10	IN1-	input 1 -
14	IN2+	input 2 +
15	IN2-	input 2 -

The EXT TRIG inputs are used in the On-Line Operating mode and tells the scanner to scan for a code. The active state of this input is selected in software. Refer to the WinHost Help On Line. The yellow led, (Figure A, 7), is on when the External Trigger signals the active reading phase.

These inputs are optocoupled and can be driven by both an NPN or PNP type command. The connections are indicated in the following diagrams:

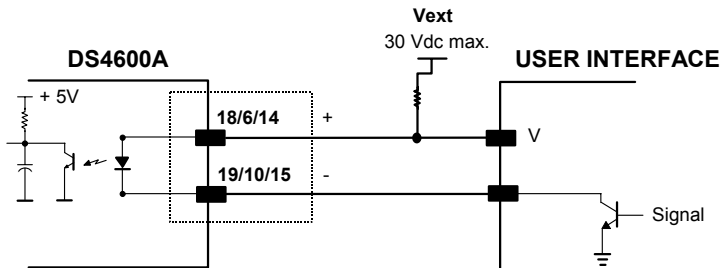


Figure 14 - Input NPN Command Using External Power

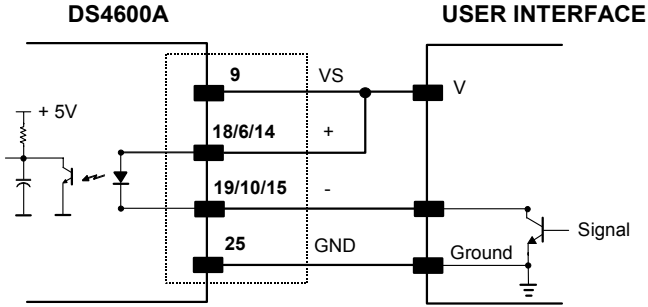


Figure 15 - Input NPN Command Using DS4600A Power

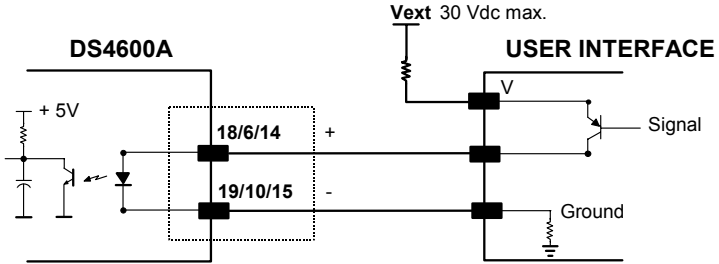


Figure 16 - Input PNP Command Using External Power

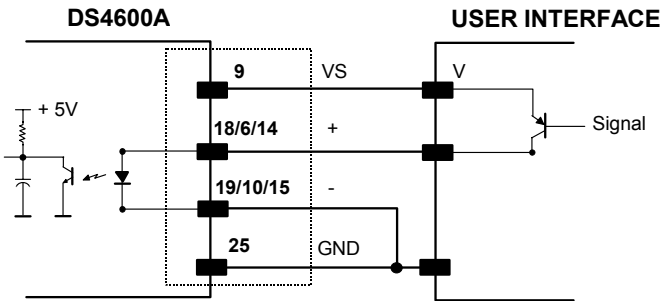


Figure 17 - Input PNP Command Using DS4600A Power

The electrical features of the inputs are:

Maximum voltage = 30 Vdc

Maximum current = 25 mA.

An anti-disturbance hardware filter is implemented on the External Trigger input (< 5 milliseconds delay).

An additional 15 ms (typical) delay can be implemented through a dedicated software parameter (refer to WinHost Help On Line).

### 2.3.5 Outputs

The following pins are present on the 25-pin connector of the scanner:

Pin	Name	Function
8	OUT1+	output 1 +
22	OUT1-	output 1 -
11	OUT2+	output 2 +
12	OUT2-	output 2 -

The meaning of the two outputs OUT1 and OUT2 can be defined by the user (No Read, Right or Wrong). Refer to WinHost Help On Line.

By default, OUT1 is associated with the No Read event, which activates when the code signaled by the External Trigger is not decoded. OUT2 is associated with the Right event, which activates when the code is decoded correctly.

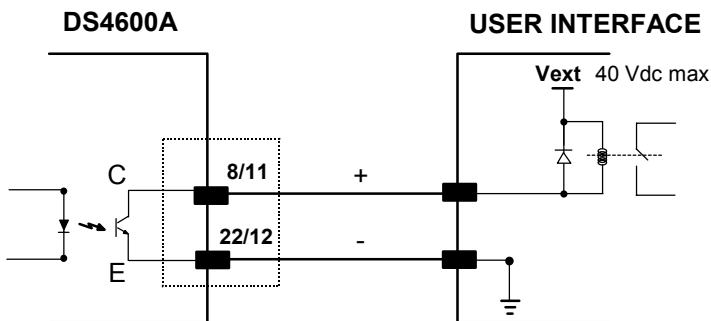
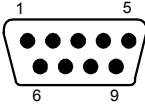
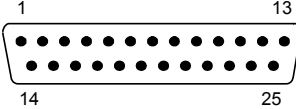


Figure 18 - Open Collector Output Connection

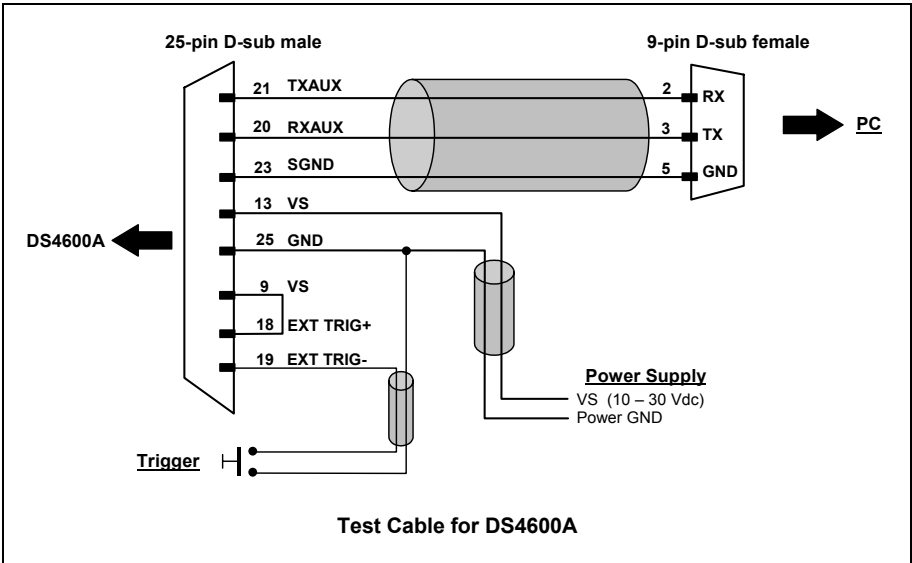
These outputs are both level or pulse configurable.

## 2.4 USER INTERFACE

RS232 PC-side connections			
 <p>9-pin male connector</p>		 <p>25-pin male connector</p>	
Pin	Name	Pin	Name
2	RX	3	RX
3	TX	2	TX
5	GND	7	GND
7	RTS	4	RTS
8	CTS	5	CTS

### How To Build A Simple Interface Test Cable:

The following wiring diagram shows a simple test cable including power, external (push-button) trigger and PC RS232 COM port connections.



## 2.5 POSITIONING

The DS4600A scanner is able to decode moving barcode labels at a variety of angles, however significant angular distortion may degrade reading performance.

When mounting the DS4600A take into consideration these three ideal label position angles: **Pitch 0°**, **Skew 15° to 30°** and **Tilt 0°**.

Follow the suggestions below for the best orientation:

The **Pitch** angle is represented by the value **P** in Figure 19. Position the reader in order to **minimize** the **Pitch** angle.

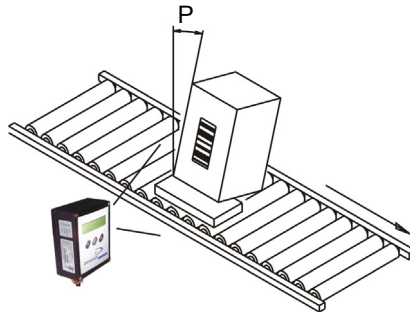


Figure 19 - Pitch Angle

The **Skew** angle is represented by the value **S** in Figure 20. Position the reader to **assure at least 15°** for the **Skew** angle. This avoids the direct reflection of the laser light emitted by the DS4600A.

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.

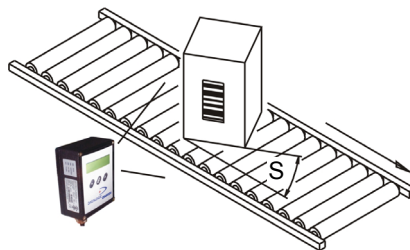


Figure 20 - Skew Angle

The **Tilt** angle is represented by the value **T** in Figure 21. Position the reader in order to **minimize** the **Tilt** angle.

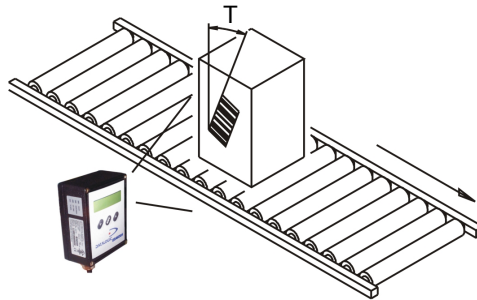


Figure 21 - Tilt Angle

## 2.6 TYPICAL LAYOUTS

The following typical layouts refer to system hardware configurations. Dotted lines in the figures refer to optional hardware configurations within the particular layout.

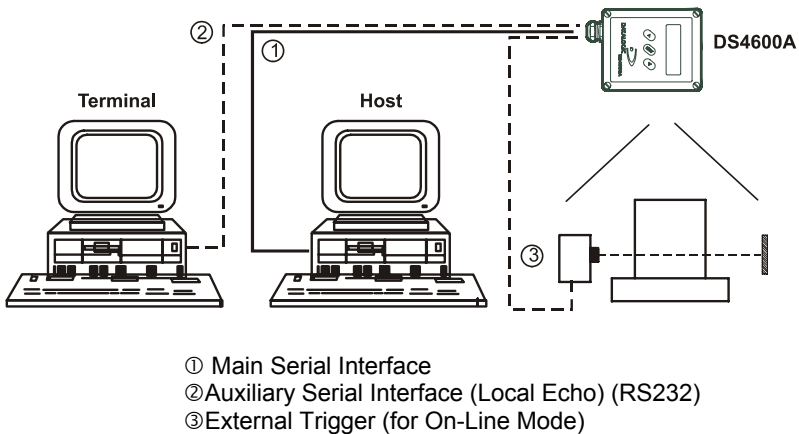
These layouts also require the correct setup of the software configuration parameters. Complete software configuration procedures can be found in the Guide To Rapid Configuration in the WinHost Help On Line.

## 2.6.1 Point-to-Point

In this layout the data is transmitted to the Host on the main serial interface. Host Mode programming can be accomplished either through the main interface or the auxiliary interface.

In Local Echo communication mode, data is transmitted on the RS232 auxiliary interface independently from the main interface selection.

When On-Line Operating mode is used, the scanner is activated by an External Trigger (photoelectric sensor) when the object enters its reading zone.



**Figure 22 - Point-to-Point Layout**



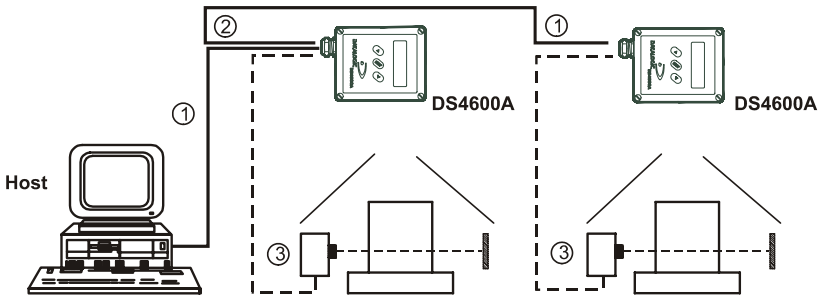
### 2.6.2 Pass Through

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

Each DS4600A transmits the messages received by the auxiliary interface onto the main interface. All messages will be passed through this chain to the host.

When On-Line Operating mode is used, the scanner is activated by an External Trigger (photoelectric sensor) when the object enters its reading zone.

The main and auxiliary ports are connected as shown in the figure below:



- ① Main Serial Interface (RS232)
- ② Auxiliary Serial Interface (RS232)
- ③ External Trigger (for On-Line Mode)

**Figure 23 - Pass Through Layout**

### 2.6.3 RS232 Master/Slave

The RS232 master/slave connection is used to collect data from several scanners to build either a multi-point or a multi-sided reading system; there can be one master and up to 9 slaves connected together.

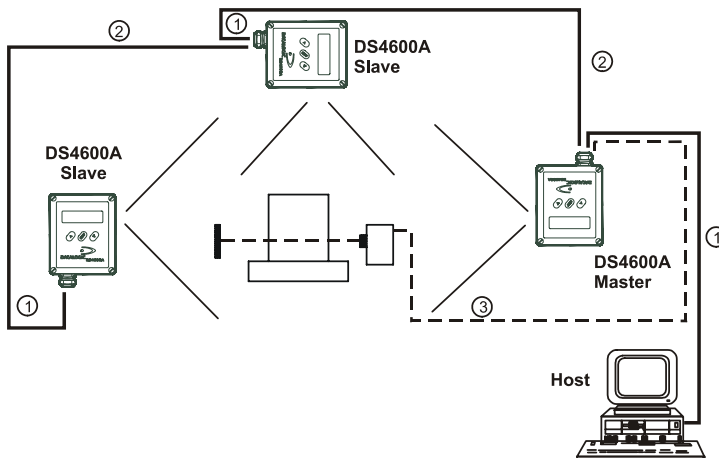
The Slave scanners use RS232 only on the main and auxiliary serial interfaces. Each slave DS4600A transmits the messages received by the auxiliary interface onto the main interface. All messages will be passed through this chain to the master. The Master scanner is connected to the Host on the main serial interface. The possible main interface types for the master scanner are RS232 or RS485. (20 mA C.L. can also be used if the INT-30 with C-Box 100 accessory is installed).

There is a single reading phase and a single message from the master scanner to the Host computer.

Either On-Line or Serial On-Line Operating modes can be used in this layout.

**When On-Line Operating mode is used, the external trigger signal is unique to the system however it is not necessary to bring the external trigger signal to the Slave scanners.**

The main and auxiliary ports are connected as shown in the figure below.



- ① Main Serial Interface (Slaves RS232 only)
- ② Auxiliary Serial Interface (RS232)
- ③ External Trigger (for On-Line Mode)

**Figure 24 - RS232 Master/Slave Layout**

### 2.6.4 RS485 Master/Slave

The RS485 master/slave connection is used to collect data from several scanners to build a multi-point or a multi-sided reading system; there can be one master and up to 5 slaves connected together.

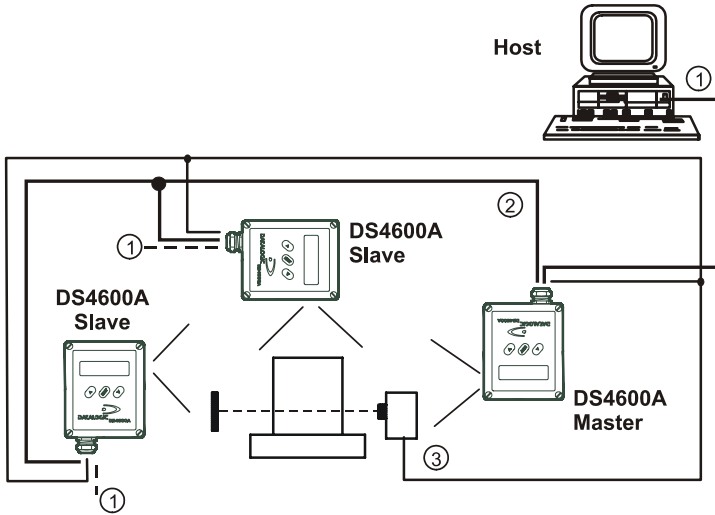
The slave scanners are connected together using RS485 half-duplex on the main serial interface. Every slave scanner must have a multidrop address in the range 0-4.

The master scanner is also connected to the Host on the RS232 auxiliary serial interface.

The External Trigger signal is unique to the system; there is a single reading phase and a single message from the master scanner to the Host computer.

**It is necessary to bring the External Trigger signal to all the scanners.**

The main and auxiliary ports are connected as shown in the figure below.



- ① Auxiliary Serial Interface (RS232)
- ② Main Serial Interface (RS485 Half-Duplex)
- ③ External Trigger

**Figure 25 - RS485 Master/Slave Layout**



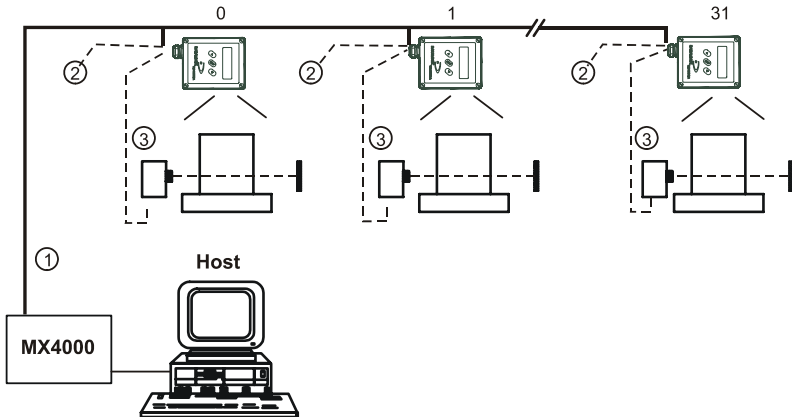
**NOTE**

*The auxiliary serial interface of the slave scanners can be used in Local Echo communication mode to control any single scanner (visualize collected data) or to configure it using the WinHost utility or Host Mode Programming procedure.*

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

## 2.6.5 Multiplexer

Each scanner is connected to a Multiplexer (for example MX4000) with the RS485 half duplex main interface.



- ① Main Serial Interface (RS485 Half-Duplex)
- ② Auxiliary Serial Interface (Local Echo) (RS232)
- ③ External Trigger (for On-Line Mode)

**Figure 26 - Multiplexer Layout**

The auxiliary serial interface of the slave scanners can be used in Local Echo communication mode to control any single scanner (visualize collected data) or to configure it using the WinHost utility or Host Mode Programming procedure.

When On-Line Operating mode is used, the scanner is activated by an External Trigger (photoelectric sensor) when the object enters its reading zone.

## 3 READING FEATURES

### 3.1 ADVANCED CODE RECONSTRUCTION

The traditional way of barcode reading could be called "Linear Reading". In this case, the laser beam crosses the barcode symbol from its beginning to its end as shown in Figure 27.

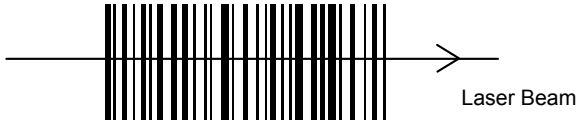


Figure 27 - Linear reading

In "Advanced Code Reconstruction" mode, it is no longer necessary for the laser beam to cross the label from the start to the end. With just a set of partial scans on the label (obtained using the motion of the label itself), the DS4600A is able to "reconstruct" the barcode. A typical set of partial scans is shown in Figure 28.

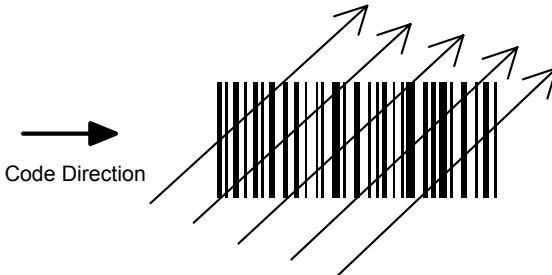


Figure 28 - Partial scans

None of the partial scans contains the whole label. The decoder aligns each partial scan correctly and combines them in order to obtain the entire code.

The alignment is performed by calculating the time difference from one partial scan to another using a reference code element.

### 3.1.1 Tilt Angle for Advanced Code Reconstruction

The most important parameter in Advanced Code Reconstruction is the value of the maximum tilt angle ( $\alpha$  maximum) under which the code reconstruction process is still possible.

We define the Tilt angle as the angle ( $\alpha$ ) between the laser beam and a line parallel to the barcode label, as shown in Figure 29.

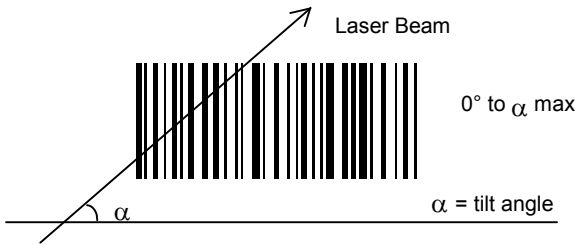


Figure 29 - Tilt angle

The formulas to calculate  $\alpha$  maximum depend on various parameters such as: label height, number of scans per second, code motion speed, etc. To obtain  $\alpha$  maximum for your application, please contact your Datalogic representative.

You must remember that the decoder will be able to read the label with a tilt angle between  $+\alpha$  max and  $-\alpha$  max as shown in Figure 30 (the shaded zones are the NO READ zones).

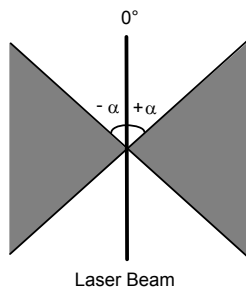


Figure 30 - Reading zones with  $\alpha$  max

## 3.2 DECODING CAPACITY IN LINEAR MODE

When in Linear Reading mode, the number of reads performed by the DS4600A and therefore the decoding capacity, is influenced by the following parameters:

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

At least 5 scans during the code passage should be allowed to ensure a successful read.

### 3.2.1 Step Ladder Mode

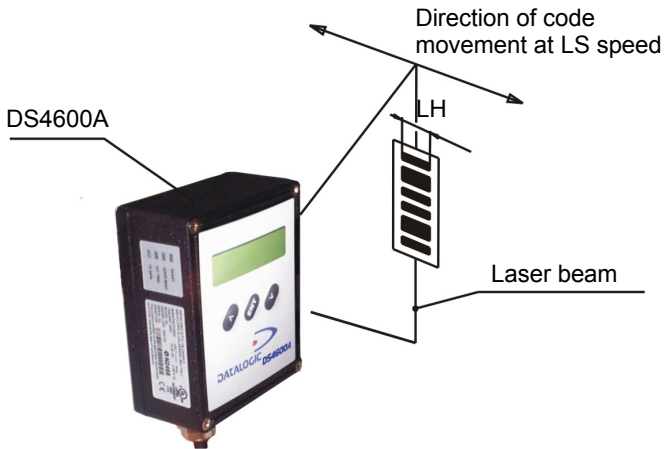


Figure 31 - "Step Ladder" scanning mode

If scanning is perpendicular to the direction of the code movement (Figure 31), the number of effective scans performed by the reader is given by the following formula:

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

These symbols signify:

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

For example, the DS4600A (800 scans/sec.), for a 25 mm high code moving at 1250 mm/s performs:

$$[(25/1250) * 800] - 2 = 14 \text{ effective scans.}$$

### 3.2.2 Picket Fence Mode

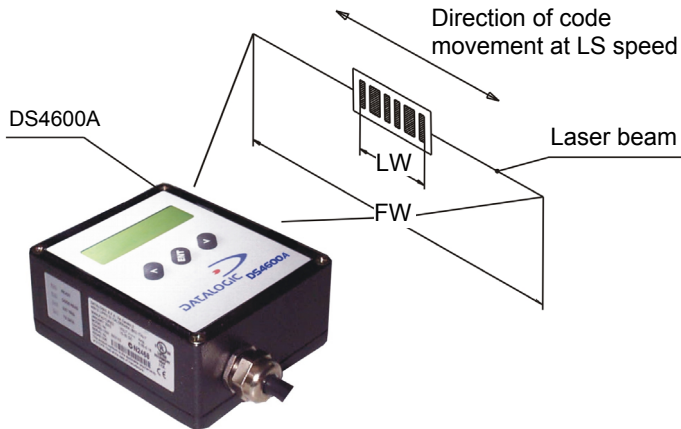


Figure 32 - "Picket Fence" scanning mode



If scanning is parallel to the code movement (Figure 32) the number of effective scans is given by:

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

These symbols signify:

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

For example, for a 100 mm wide code moving in a point where the reading field is 200 mm wide at a 2000 mm/s speed, the DS4600A (800 scans per sec.), performs:

$$[((200-100)/2000) * 800] - 2 = 38 \text{ scans}$$

### 3.3 PERFORMANCE

The DS4600A scanner is available in different versions according to the reading performance.

Version	Max Code Resolution	Speed
	mm (mils)	scans/s
21XX / 31XX	0.50 (20)	800
20XX / 30XX	0.25 (10)	800
220X / 32XX	0.20 (8)	800

Version	Reading Distance
210X	200 mm (8 in) - 980 mm (39 in) on 1.00 mm (40 mils) codes
200X	160 mm (6 in) - 540 mm (21 in) on 0.50 mm (20 mils) codes
220X	50 mm (1.97 in) - 400 mm (15.75 in) on 0.80 mm (31 mils) codes
310X	200 mm (8 in) - 970 mm (38 in) on 1.00 mm (40 mils) codes
300X	160 mm (6 in) - 540 mm (21 in) on 0.50 mm (20 mils) codes
320X	120 mm (4.7 in) - 310 mm (12.2 in) on 0.30 mm (12 mils) codes

The reading characteristics for the raster versions are given in the table below. The distance between the top and bottom scan lines is given at different reading distances measured from the laser beam output window.

Version	Reading Distance		
	150 mm (5.9 in)	500 mm (20 in)	800 mm (31.5 in)
2X1X (R1)	7.5 mm (0.30 in)	24 mm (0.94 in)	37 mm (1.46 in)
2X2X (R2)	16 mm (0.62 in)	45 mm (1.77 in)	71 mm (2.80 in)

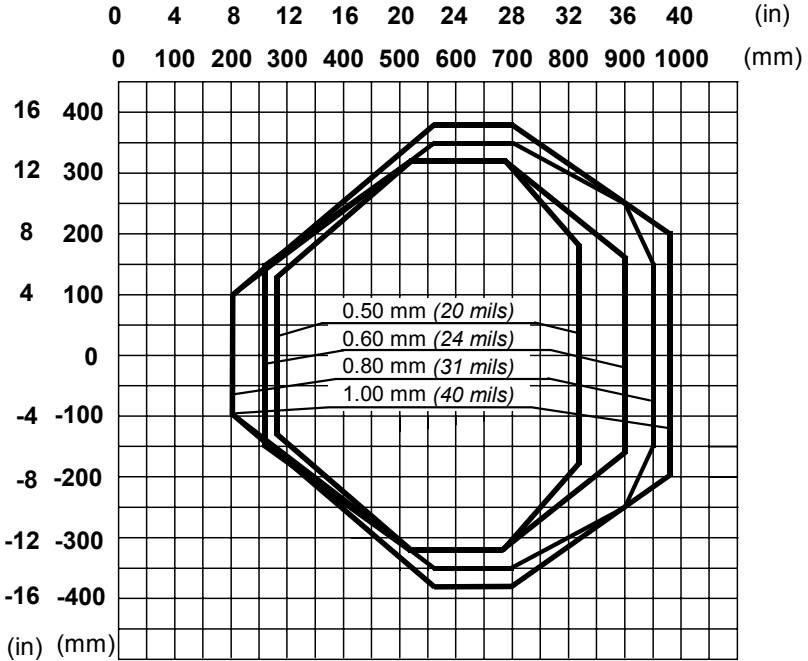
Refer to the diagrams given in paragraph 3.4 for further details on the reading features. These diagrams are taken on various resolution sample codes at a 25 °C ambient temperature, depending on the conditions in the notes under each diagram.

If standard devices do not satisfy specific requirements, contact your nearest Datalogic distributor, supplying code samples, to obtain complete information on the reading possibilities.

### 3.4 READING DIAGRAMS

The following diagrams show the reading distance for barcodes with different densities.

#### DS4600A-210X (Long Range)



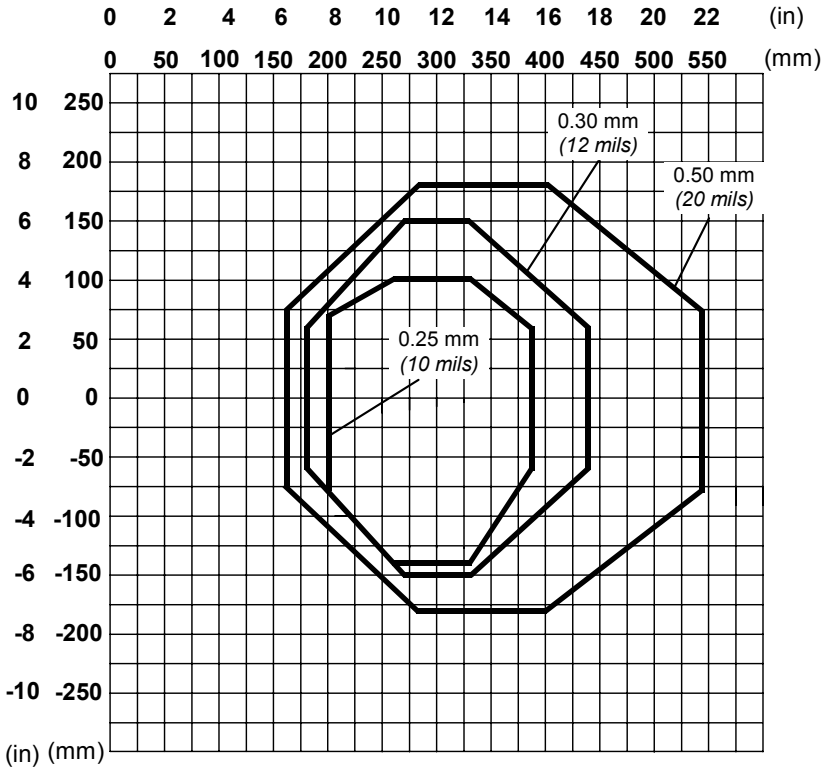
**NOTE:** (0,0) is the center of the laser beam output window

**CONDITIONS:**

- Test Codes used = Interleaved 2/5 and Code 39
- "Pitch" angle = 0°
- "Skew" angle = 15°
- "Tilt" angle = 0°
- Code Resolution\* = Standard for 0.50 mm (20 mils) codes and greater
- Code Reading Cond.\* = Standard

\* Parameter selectable in WinHost

## DS4600A-200X (Medium Range)



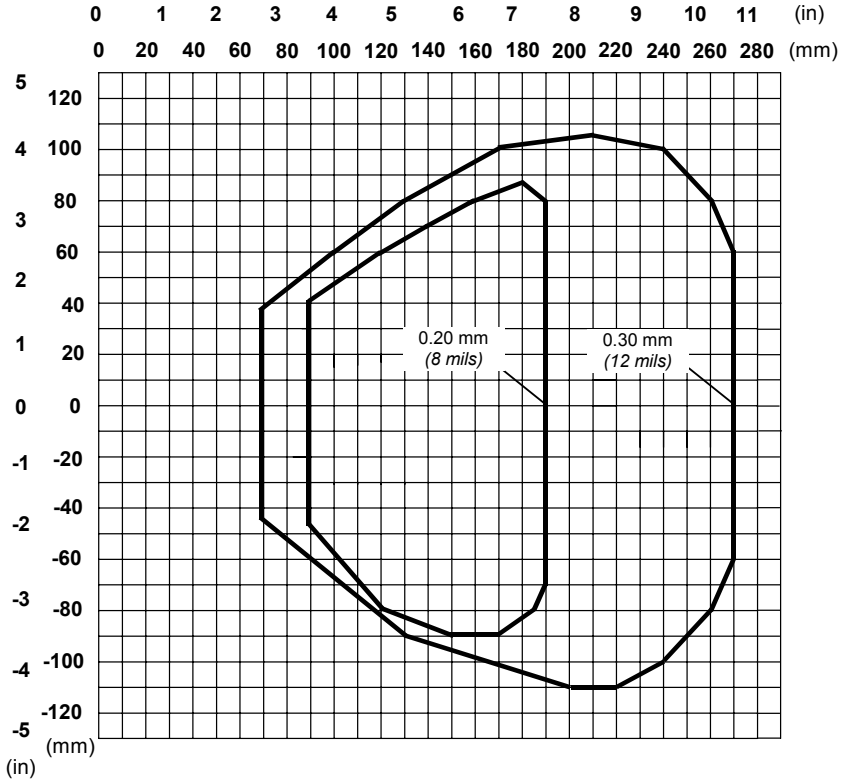
**NOTE:** (0,0) is the center of the laser beam output window

### CONDITIONS:

Test Codes used	=	Interleaved 2/5 and Code 39
"Pitch" angle	=	0°
"Skew" angle	=	15°
"Tilt" angle	=	0°
Code Resolution*	=	High for 0.30 mm (12 mils) codes and smaller Standard for 0.50 mm (20 mils) codes and greater
Code Reading Cond.*	=	Standard

\* Parameter selectable in WinHost

**DS4600A-22XX** (Short Range)



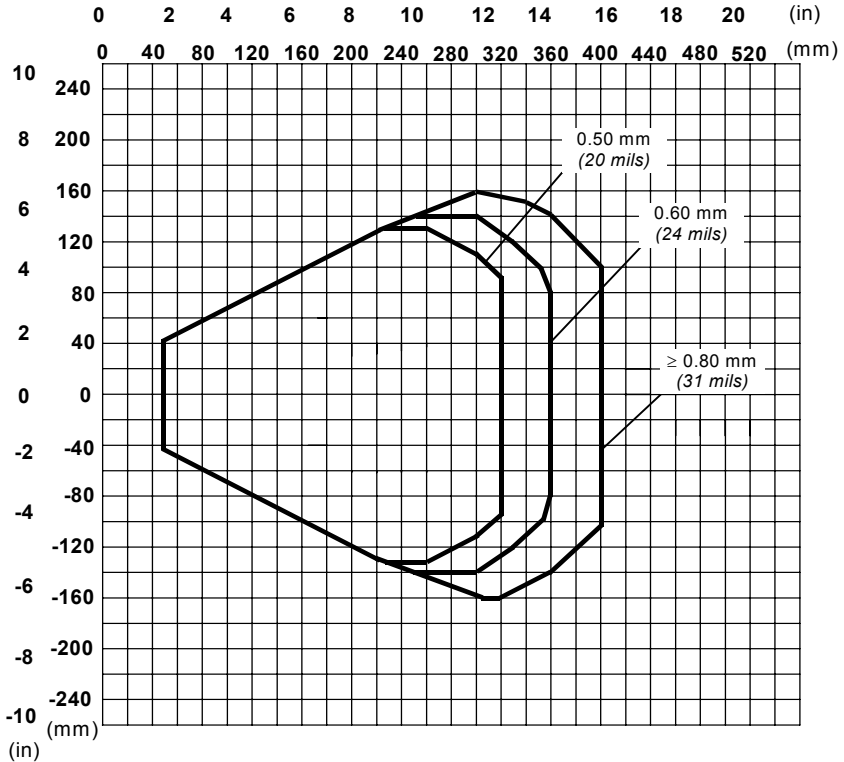
**NOTE:** (0,0) is the center of the laser beam output window

**CONDITIONS**

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

\* Parameter selectable in WinHost

## DS4600A-22XX (Short Range)



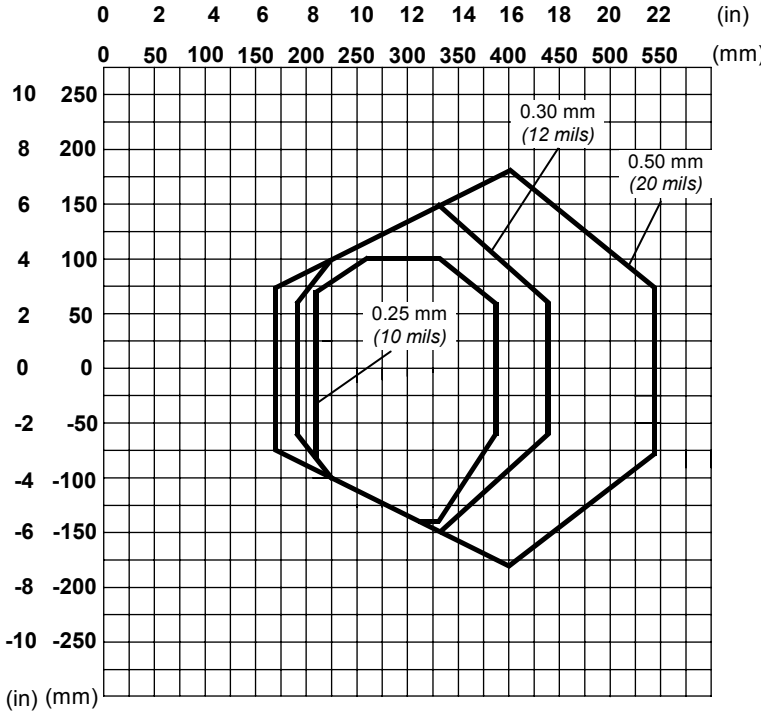
**NOTE:** (0,0) is the center of the laser beam output window

### CONDITIONS

Test Codes used = Interleaved 2/5 and Code 39  
 PCS = 0.90  
 "Pitch" angle = 0°  
 "Skew" angle = 10°  
 "Tilt" angle = 0°  
 \*SW Resolution = Low

\* Parameter selectable in WinHost

**DS4600A-2X1X** (Raster R1)



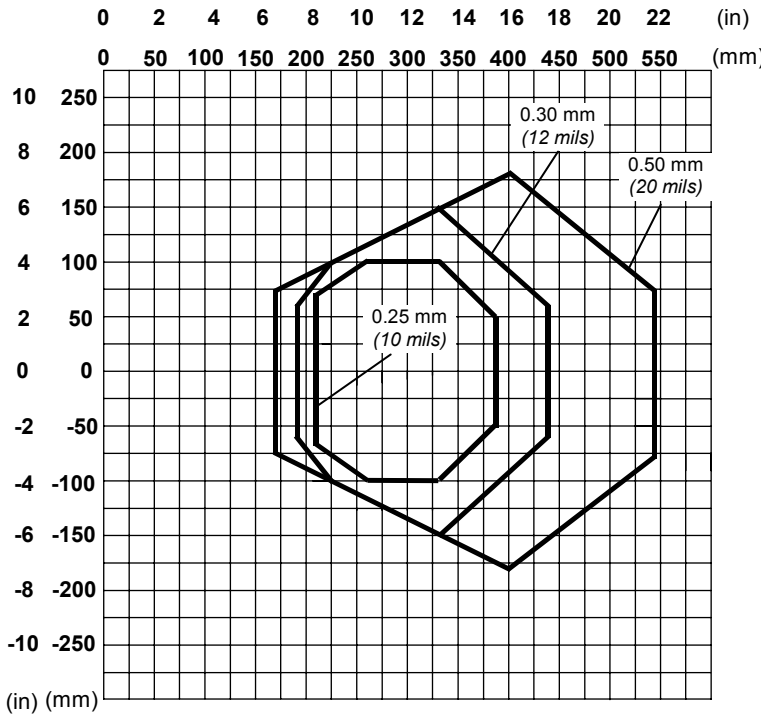
**NOTE:** (0,0) is the center of the laser beam output window

**CONDITIONS:**

- Test Codes used = Interleaved 2/5 and Code 39
- "Pitch" angle = 0°
- "Skew" angle = 18°
- "Tilt" angle = 0°
- Code Resolution\* = High for 0.30 mm (12 mils) codes and smaller  
Standard for 0.50 mm (20 mils) codes and greater
- Code Reading Cond.\* = Standard

\* Parameter selectable in WinHost

## DS4600A-2X2X (Raster R2)



**NOTE:** (0,0) is the center of the laser beam output window

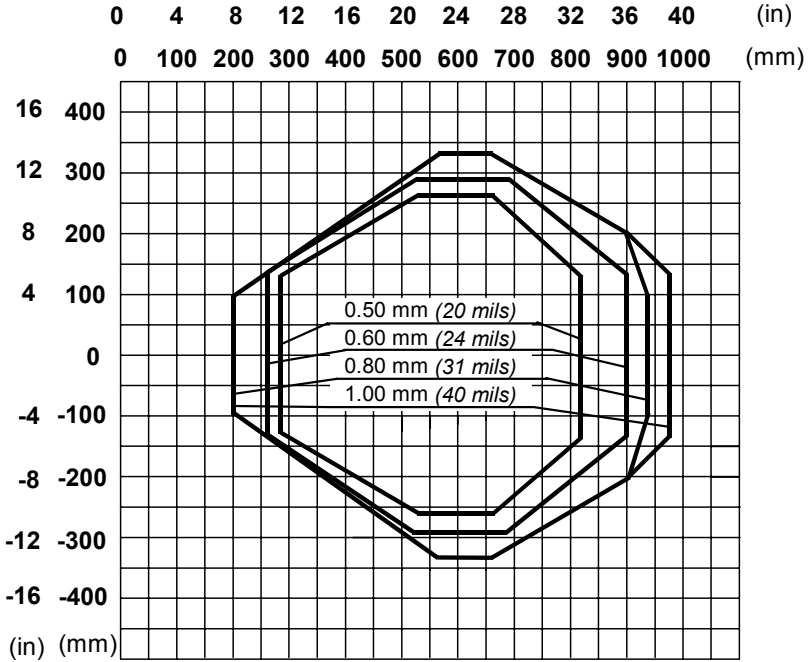
### CONDITIONS:

Test Codes used	=	Interleaved 2/5 and Code 39
"Pitch" angle	=	0°
"Skew" angle	=	18°
"Tilt" angle	=	0°
Code Resolution*	=	High for 0.30 mm (12 mils) codes and smaller Standard for 0.50 mm (20 mils) codes and greater
Code Reading Cond.*	=	Standard

\* Parameter selectable in WinHost



**DS4600A-31XX** (Long Range)



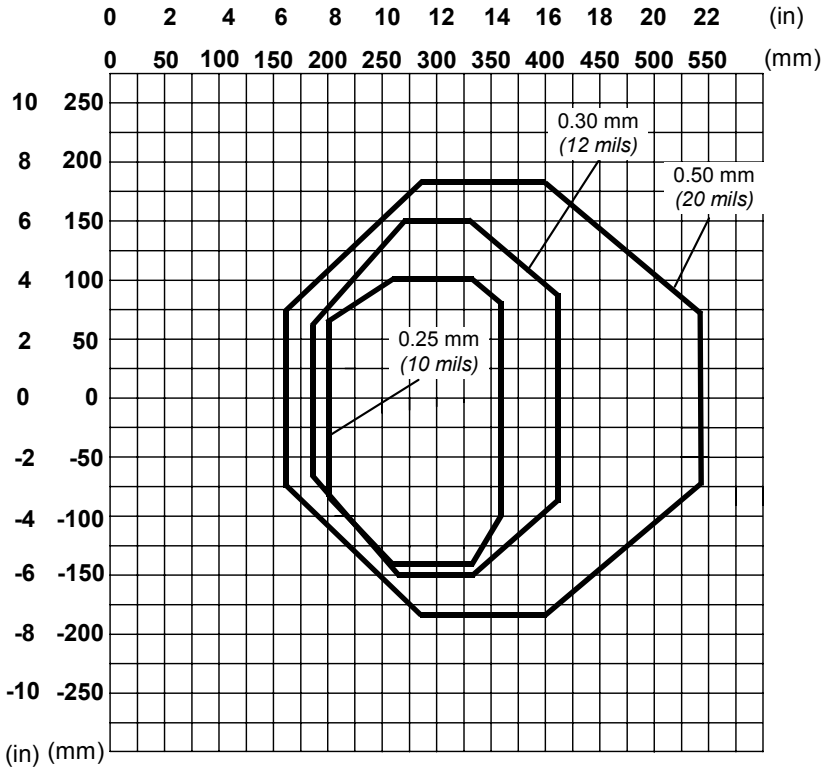
**NOTE:** (0,0) is the center of the laser beam output window

**CONDITIONS:**

- Test Codes used = Interleaved 2/5 and Code 39
- "Pitch" angle = 0°
- "Skew" angle = 15°
- "Tilt" angle = 0°
- Code Resolution\* = Standard for 0.50 mm (20 mils) codes and greater
- Code Reading Cond.\* = Standard

\* Parameter selectable in WinHost

## DS4600A-30XX (Medium Range)



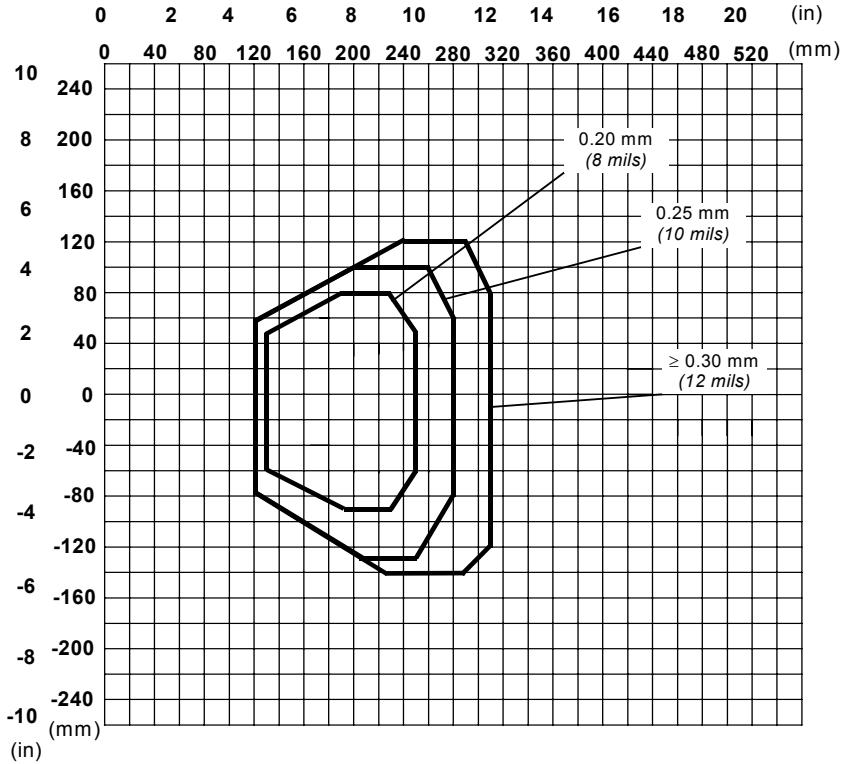
**NOTE:** (0,0) is the center of the laser beam output window

### CONDITIONS:

Test Codes used	=	Interleaved 2/5 and Code 39
"Pitch" angle	=	0°
"Skew" angle	=	15°
"Tilt" angle	=	0°
Code Resolution*	=	High for 0.30 mm (12 mils) codes and smaller Standard for 0.50 mm (20 mils) codes and greater
Code Reading Cond.*	=	Standard

\* Parameter selectable in WinHost

**DS4600A-32XX** (Short Range)



**NOTE:** (0,0) is the center of the laser beam output window

**CONDITIONS**

- Test Codes used = Interleaved 2/5 and Code 39
- PCS = 0.90
- "Pitch" angle = 0°
- "Skew" angle = 15°
- "Tilt" angle = 0°
- \*SW Resolution = High

\* Parameter selectable in WinHost

## 4 MAINTENANCE

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### 4.1 CLEANING

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

Dust, dirt, etc. on the window may alter the reading performance.

Repeat the operation frequently in particularly dirty environments.

Use soft material and alcohol to clean the window and avoid any abrasive substances.



**WARNING**

*Clean the window of the DS4600A when the scanner is turned off or, at least, when the laser beam is deactivated.*

## 5 TROUBLESHOOTING

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### 5.1 GENERAL GUIDELINES

When wiring the device, pay careful attention to the pin number of the signals and whether you are referring to the scanner connector or to the C-BOX 100 spring clamp connectors.

If you need information about a certain reader parameter you can refer to the WinHoş program help files. Either connect the device and select the parameter you're interested in by pressing the F1 key, or select **Help/Contents/DS4600A Configuration** from the command menu.

If you're unable to fix the problem and you're going to contact your local Datalogic office or Datalogic Partner or ARC, we suggest providing (if possible) the Device Configuration files (\*.cfg). Connect through WinHoş and click the **Save icon** from the edit configuration window. Also note the exact Model, Serial Number and Order Number of the device.



<b>TROUBLESHOOTING GUIDE</b>	
<b>Problem</b>	<b>Suggestions</b>
<b>Power On:</b> the "Power On"/"Ready" LED is not lit	Is power connected? If using a power adapter (like PG 220), is it connected to a wall outlet? If using rail power, does rail have power? If using C-Box 100, does it have power (check switch and LED)? Measure voltage either at pin 13 and pin 25 (for 25-pin connector) or at spring clamp 1 and 2 (for C-BOX 100).
<b>On line Mode:</b> EXT TRIGGER LED is not lit (when external trigger activates)	Is sensor connected to EXT TRIG pins (18 and 19 for 25-pin connector)? Is power supplied to photo sensor? Is power supplied to EXT TRIG+ (NPN output)? Is EXT TRIG- grounded (PNP output)? Is the correct polarity observed (current flowing from EXT TRIG+ to EXT TRIG-)? Are the photo sensor LEDS (if any) working correctly? Is the sensor/reflector system aligned?
<b>On line Mode:</b> EXT TRIGGER LED is correctly lit but nothing happens (no reading results)	Is the software configuration consistent with the application condition (operating mode etc.)? In the WinHost program select the OPERATING MODE tab and check for related parameters
<b>Serial On line Mode:</b> the reader is not triggered (no reading results)	In the WinHost program select the OPERATING MODE tab and check if serial on line is enabled as operating mode Are the Start – Stop characters correctly assigned? Is the serial trigger source correctly connected and configured?
<b>On line Mode and Serial On Line:</b> Reader doesn't respond correctly to the expected external signals end	In the WinHost program select the OPERATING MODE tab and check the TIMEOUT parameterization.

<b>TROUBLESHOOTING GUIDE</b>	
<b>Problem</b>	<b>Suggestions</b>
<p><b>Reading:</b> Not possible to read the target barcode (always returns No Read)</p>	<p>Check synchronization of reading pulse with object to read Is the scan line correctly positioned? Place barcode in the center of scan line and run TEST MODE (selectable by WinHost as an Operating Mode). If you still have trouble, check the following:</p> <ul style="list-style-type: none"> <li>• Is the reading distance within that allowed (see reading diagrams)?</li> <li>• Is the Tilt angle too large?</li> <li>• Is the Skew angle less than 10° (direct reflection)?</li> <li>• Choose the CODE tab and enable different code types (except Pharmacode). LENGTH = Variable</li> <li>• Is the Bar Code quality sufficient?</li> </ul> <p>If you had no success, try to perform the test using the BARCODE TEST CHART included with the product.</p>
<p><b>Communication:</b> Device is not transmitting anything to the host</p>	<ul style="list-style-type: none"> <li>• Is the serial cable connected?</li> <li>• Is the correct wiring respected?</li> <li>• Are serial host settings equivalent to the serial device setting?</li> <li>• If using C-BOX 100, be sure the RS485 termination switch is positioned to OFF.</li> </ul>
<p><b>Communication:</b> Data transferred to the host are incorrect, corrupted or incomplete</p>	<ul style="list-style-type: none"> <li>• In the WinHost program select the DATA FORMAT tab and check for values of HEADER, TERMINATOR, SEPARATOR, FILL CHARACTERS</li> <li>• Also check the CODE FIELD LENGTH value</li> <li>• Are the COM port parameters correctly assigned?</li> </ul>
<p><b>Communication:</b> Always returns the Reader Failure Character (&lt;BEL&gt; char as default)</p>	<ul style="list-style-type: none"> <li>• Contact your local Datalogic office or Datalogic Partner or ARC, because either a Motor or Laser failure has occurred.</li> <li>• Note the exact model and Serial Number of the device</li> </ul>
<p><b>How do I obtain my units' serial numbers?</b></p>	<ul style="list-style-type: none"> <li>• The device's serial number is printed on a label that is affixed to the body of the reader.</li> <li>• Serial numbers consist of 9 characters: one letter, 2 numbers, and another letter followed by 5 numbers.</li> </ul>

## 6 TECHNICAL FEATURES

<b>ELECTRICAL FEATURES</b>	<b>DS4600A-XXX0</b>	<b>DS4600A0-2XX5</b>	
<b>Power</b>			
Supply Voltage	10 to 30 Vdc	24 Vdc	
Power Consumption max.	6 W	12W	
<b>Serial Interfaces</b>	RS232, RS485 full-duplex, RS485 half-duplex (20 mA C.L. only with C-Box 100 and INT-30 accessory )		
Main			
Auxiliary			
Baudrates	1200 to 115200		
<b>Inputs</b>	External Trigger, IN1, IN2 (optocoupled NPN or PNP)		
Voltage max.	30 Vdc		
Input Current max.	25 mA		
<b>Outputs</b>	User-defined OUT1 and OUT2 (optocoupled open emitter, open collector)		
$V_{CE}$ 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 (Ambient temp.)		
<b>OPTICAL FEATURES</b>			
Light Source	Semiconductor laser diode		
Wavelength (Note 1)	630 ~ 680 nm		
Safety Class	Class 2 – EN60825-1; CDRH		
<b>READING FEATURES</b> (Note 2)	<b>200X / 300X</b>	<b>210X / 310X</b>	<b>220X / 320X</b>
Aperture Angle	66°	70°	60°
Maximum Resolution	0.25 mm (10 mils)	0.50 mm (20 mils)	0.20 mm (8 mils)
Max. Reading Distance	See reading diagrams		
Scan Rate	800 scans/sec		
<b>USER INTERFACE</b>			
LED Indicators	Ready, Good Read, External Trigger , Data Transmission		



<b>SOFTWARE FEATURES</b>		
<b>READABLE CODE SYMBOLOGIES</b>		
<ul style="list-style-type: none"> <li>• EAN/UPC</li> <li>• 2/5 Interleaved</li> <li>• Code 39</li> <li>• Codabar</li> <li>• Code 93</li> <li>• Code 128</li> <li>• EAN 128</li> <li>• Pharmacode</li> </ul>		
<b>Code Selection</b>	up to six codes during one reading phase	
<b>Decoding Safety</b>	can enable multiple good reads of same code	
<b>Headers and Terminators</b>	up to four headers and four terminators	
<b>Operating Modes</b>	ON LINE, AUTOMATIC, SERIAL ON LINE, TEST	
<b>Configuration Modes</b>	<ul style="list-style-type: none"> <li>• through menus using WinHost utility</li> <li>• receiving commands from one of the serial ports (HOST MODE)</li> </ul>	
<b>Parameter Storage</b>	Non-volatile internal memory	
<b>ENVIRONMENTAL FEATURES</b>		
	<b>DS4600A-2XX0</b>	<b>DS4600A0-2XX5</b>
Operating temperature (Note 3)	0° to +40 °C (+32° to +104 °F)	-30° to +40 °C (-22° to +104 °F)
Storage temperature	-20° to +70 °C (-4° to +158 °F)	
Humidity max.	90% non condensing	
Vibration resistance IEC 68-2-6 test FC	14 mm @ 2 to 10 Hz; 1.5 mm @ 13 to 55 Hz 2 g @ 70 to 200 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	
<b>PHYSICAL FEATURES</b>		
Mechanical dimensions	101 x 83.5 x 42 mm (3.97 x 3.29 x 1.65 in.)	
Weight	about 615 g. (22 oz.)	

**Note 1:** The features given are typical at a 25 °C ambient temperature (if not otherwise indicated).

**Note 2:** Further details given in paragraphs 3.3 and 3.4.

**Note 3:** If the reader is used in high temperature environments (over 35 °C), use of the Beam shutter is advised (for details refer to the WinHost Help On Line).

# GLOSSARY

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## **Advanced Code Reconstruction**

The Advanced Code Reconstruction technology allows reconstructing and reading damaged or very tilted barcodes. See par. 3.1.

## **Aperture**

Term used on the required CDRH warning labels to describe the laser exit window.

## **Barcode**

A pattern of variable-width bars and spaces which represents numeric or alphanumeric data in machine-readable form. The general format of a barcode symbol consists of a leading margin, start character, data or message character, check character (if any), stop character, and trailing margin. Within this framework, each recognizable symbology uses its own unique format.

## **Barcode Label**

A label that carries a barcode and can be affixed to an article.

## **Baud Rate**

A unit used to measure communications speed or data transfer rate.

## **CDRH (Center for Devices and Radiological Health)**

This organization (a service of the Food and Drug Administration) is responsible for the safety regulations governing acceptable limitations on electronic radiation from laser devices. Datalogic devices are in compliance with the CDRH regulations.

## **Code Positioning**

Variation in code placement that affects the ability of a scanner to read a code. The terms Pitch, Skew, and Tilt deal with the angular variations of code positioning in the X, Y and Z axes. See pars. 2.2 and 2.5. Variations in code placement affect the pulse width and therefore the decoding of the code. Pulse width is defined as a change from the leading edge of a bar or space to the trailing edge of a bar or space over time. Pulse width is also referred to as a transition. Tilt, pitch, and skew impact the pulse width of the code.

## **Decode**

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

**Decoder**

As part of a barcode 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. The decoder is normally integrated into the scanner.

**EAN**

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

**EEPROM**

Electrically Erasable Programmable Read-Only Memory. An on-board non-volatile memory chip.

**Full Duplex**

Simultaneous, two-way, independent transmission in both directions.

**Half Duplex**

Transmission in either direction, but not simultaneously.

**Host**

A computer that serves other terminals in a network, providing services such as network control, database access, special programs, supervisory programs, or programming languages.

**Interface**

A shared boundary defined by common physical interconnection characteristics, signal characteristics and meanings of interchanged signals.

**LED (Light Emitting Diode)**

A low power electronic device that can serve as a visible or near infrared light source when voltage is applied continuously or in pulses. It is commonly used as an indicator light and uses less power than an incandescent light bulb but more than a Liquid Crystal Display (LCD). LEDs have extremely long lifetimes when properly operated.

**Multidrop Line**

A single communications circuit that interconnects many stations, each of which contains terminal devices. See RS485.

**Parameter**

A value that you specify to a program. Typically parameters are set to configure a device to have particular operating characteristics.

**Picket-Fence Orientation**

When the barcode's bars are positioned vertically on the product, causing them to appear as a picket fence. The first bar will enter the scan window first. See par. 3.2.2.

**Pitch**

Rotation of a code pattern about the X-axis. The normal distance between center line or adjacent characters. See pars. 2.2 and 2.5.

**Position**

The position of a scanner or light source in relation to the target of a receiving element.

**Protocol**

A formal set of conventions governing the formatting and relative timing of message exchange between two communicating systems.

**Raster**

The process of projecting the laser beam at varied angles spaced evenly from each other. Typically, the mirrored rotor surfaces are angled to create multiple scan lines instead of a single beam.

**Resolution**

The narrowest element dimension which can be distinguished by a particular reading device or printed with a particular device or method.

**RS232**

Interface between data terminal equipment and data communication equipment employing serial binary data interchange.

**RS485**

Interface that specifies the electrical characteristics of generators and receivers for use in balanced digital multipoint systems such as on a Multidrop line.

**Scanner**

A device that examines a printed pattern (barcode) and either passes the uninterpreted data to a decoder or decodes the data and passes it onto the Host system.

**Serial Port**

An I/O port used to connect a scanner to your computer, identifiable by a 9-pin or 25-pin connector.

**Signal**

An impulse or fluctuating electrical quantity (i.e.: a voltage or current) the variations of which represent changes in information.

**Skew**

Rotation about the Y-axis. Rotational deviation from correct horizontal and vertical orientation; may apply to single character, line or entire encoded item. See pars. 2.2 and 2.5.

**Step-Ladder orientation**

When the barcode's bars are positioned horizontally on the product, causing them to appear as a ladder. The ends of all bars will enter the scan window first. See par. 3.2.1.

**Symbol**

A combination of characters including start/stop and checksum characters, as required, that form a complete scannable barcode.

**Tilt**

Rotation around the Z axis. Used to describe the position of the barcode with respect to the laser scan line. See pars. 2.2 and 2.5.

**Trigger Signal**

A signal, typically provided by a photoelectric sensor or proximity switch, which informs the scanner of the presence of an object within its reading zone.

**UPC**

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

**Visible Laser Diode**

A light source used in scanners to illuminate the barcode symbol. Generates visible red light at wavelengths between 630 and 680 nm.

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**DS4600A-XXXX Laser Scanner**

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and all its models  
et tous ses modèles  
und seine modelle  
y todos sus modelos

sono conformi alle Direttive del Consiglio Europeo sottoelencate:  
are in conformity with the requirements of the European Council Directives listed below:  
sont conformes aux spécifications des Directives de l'Union Européenne ci-dessous:  
der nachstehend angeführten Direktiven des Europäischen Rats:  
cumple con los requisitos de las Directivas del Consejo Europeo, según la lista siguiente:

<b>89/336/EEC EMC Directive</b>	e and et und y	<b>92/31/EEC, 93/68/EEC</b>	emendamenti successivi further amendments ses successifs amendements späteren Abänderungen sucesivas enmiendas
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Basate sulle legislazioni degli Stati membri in relazione alla compatibilità elettromagnetica ed alla sicurezza dei prodotti.

On the approximation of the laws of Member States relating to electromagnetic compatibility and product safety.

Basée sur la législation des Etats membres relative à la compatibilité électromagnétique et à la sécurité des produits.

Über die Annäherung der Gesetze der Mitgliedsstaaten in bezug auf elektromagnetische Verträglichkeit und Produktsicherheit entsprechen.

Basado en la aproximación de las leyes de los Países Miembros respecto a la compatibilidad electromagnética y las Medidas de seguridad relativas al producto.

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Questa dichiarazione è basata sulla conformità dei prodotti alle norme seguenti:

This declaration is based upon compliance of the products to the following standards:

Cette déclaration repose sur la conformité des produits aux normes suivantes:

Diese Erklärung basiert darauf, daß das Produkt den folgenden Normen entspricht:

Esta declaración se basa en el cumplimiento de los productos con las siguientes normas:

**EN 55022 (Class A ITE), AUGUST 1994:**  
**AMENDMENT A1 (CLASS A ITE), OCTOBER 2000:**

LIMITS AND METHODS OF MEASUREMENTS OF RADIO  
DISTURBANCE CHARACTERISTICS OF INFORMATION  
TECHNOLOGY EQUIPMENT

**EN 61000-6-2, OCTOBER 2001:**

ELECTROMAGNETIC COMPATIBILITY (EMC)  
PART 6-2: GENERIC STANDARDS - IMMUNITY FOR  
INDUSTRIAL ENVIRONMENTS

Lippo di Calderara, September 8th, 2005

  
Ruggero Cacioppo  
Quality Assurance Supervisor