DS4I

Installation Manual

DATALOGIC

DS41

INSTALLATION MANUAL

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DS41

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CONTENTS

GUIDE TO INSTALLATION

The following can be used as a checklist to verify all of the steps necessary for complete installation of the DS41 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 paragraphs 2.2 and 2.3).

3) Correctly position and mount the scanner for barcode reading according to the information in paragraphs 2.4, 2.7 and 3.4.

4) Provide correct system cabling according to the signals necessary (see the applicable sub-paragraphs under 2.5 or 2.6).

5) Configure the software parameters from a host computer using either the WinHost 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 "DS41 Configuration" in the WinHost Help On Line.

NOTE	*Fine tuning of the scanner position for barcode reading can be accomplished using the Test Mode. For further details refer to the section "Test Mode" in the WinHost Help On Line.*

The installation is now complete.

GENERAL VIEW

DS41
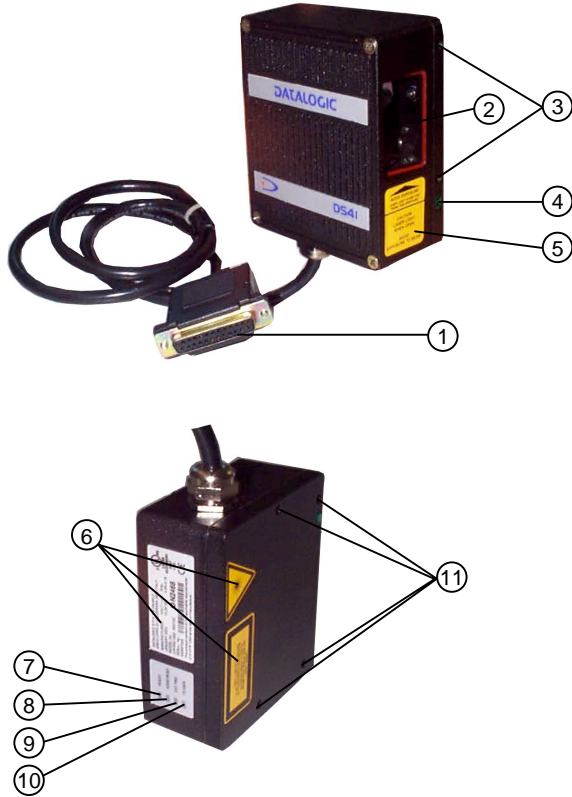
Figure A

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

SAFETY PRECAUTIONS

LASER SAFETY

The following information is provided to comply with the rules imposed by international authorities and refers to the correct use of the DS41 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 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 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 "Beam Shutter" in 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, 5 and 6).
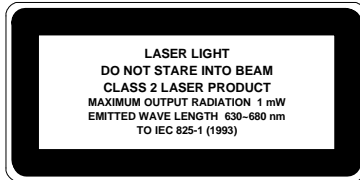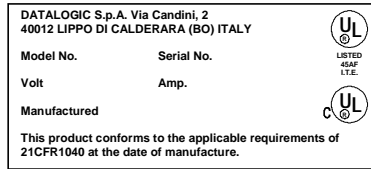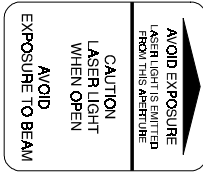
Warning and device class labels

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 is reproduced here:
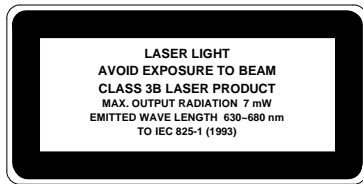
Laser diode class label

Any violation of the optic parts in particular can cause radiation up to the maximum level of the laser diode (7 mW at 630 to 680 nm).

POWER SUPPLY

Read this information before installing the product.

WARNING

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

- **Model DS41-X0:**
  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.

- **Model DS41-X1:**
  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 par. 2.5.2 or 2.6.1 for correct power supply connections.

1   GENERAL FEATURES

1.1   INTRODUCTION

The DS41 scanner is a barcode reader complete with decoder, available in several standard models. These were designed to satisfy the most demanding requirements associated with high performance scanning.

Standard Application Program

A Standard Application Program is factory-loaded onto the DS41. 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 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 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.

C Programmability

The DS41 belongs to the generation of Datalogic scanners that operate under the 'C' programming environment which is a recognized industry standard.

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

1.2 DESCRIPTION

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

- high scanning speed (800 scans/sec).

- raster versions available.

- completely configurable from host computer.

- 2 serial communication interfaces; one can be set as RS232, RS485, or 20 mA C.L., and the other is an RS232 auxiliary interface.

- reads all 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 absolute position of the label in the scan line.

- PCS verification.

The DS41 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 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 mechanical dimensions are 101 x 83.5 x 42 mm and it weighs about 800 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 (25-pin connector models, see paragraph 1.3, Figure A, 1) or by a junction box (junction box models).

The laser beam output window is on the right hand side of the scanner (Figure A, 2). A green LED on the same side indicates the laser is active (Figure A, 4).

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.

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

POWER ON   LED (red) (Figure A, 7) indicates the reader is connected to the power supply.

GOOD READ   LED (red) (Figure A, 8) is used to signal successful barcode decoding. It is also used in Test mode to signal the decoding percentage (for details refer to the section "Test Mode" in the WinHost Help On Line).

EXT TRIG   LED (yellow) (Figure A, 9) indicates the External Trigger is active (for details refer to the section "On Line Mode" in the WinHost Help On Line).

TX DATA   LED (green) (Figure A, 10) indicates data transmission on the main serial output line.

The screw holes on the body of the reader are for mechanical fixture (Figure A, 11); the screw holes shown in Figure A, 3 are to attach accessories such as the optional 90° mirror.

1.3   AVAILABLE MODELS

The DS41 scanner is available in versions that differ in regard to the following parameters:

- Optical resolution

- Cable termination

- Distance between the scan beams (raster models only)

The following models are therefore available:

DS41 - X X

Cable Termination

0 = 25-pin connector
1 = junction box

Optical Resolution

1 =   Standard Resolution
2 =   Very High Resolution
3 =   Raster Version R2
4 =   Raster Version R1
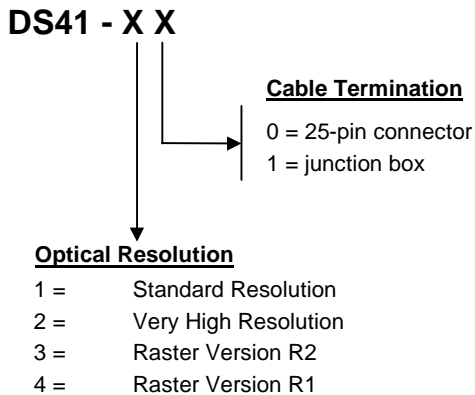
All models perform 800 scans/sec.

1.4   ACCESSORIES

The following accessories are available on request for the DS41:

90° deflection mirror   GFC-41

2   INSTALLATION

2.1   PACKAGE CONTENTS

Verify that the DS41 reader and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

- DS41 reader with cable

- Installation manual

- Barcode test chart(s)

- DS41 communication and utility program disk

- Mounting kit: - Mounting screws and washers (4 ea.)

                            - Mounting bracket (1)
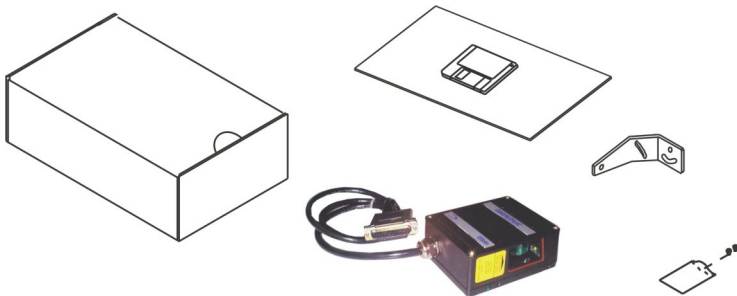
Figure 1 - DS41 package contents

2.2 OPENING THE DEVICE

Before installing the DS41 it may be necessary to open the scanner to select the interface required (par. 2.3) and/or the multidrop address (par. 2.6.2 under RS485 Half Duplex).

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

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

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

2) Carefully remove the cover of the scanner. Avoid any contact with the mirrored rotor, the lenses, or other optical components.
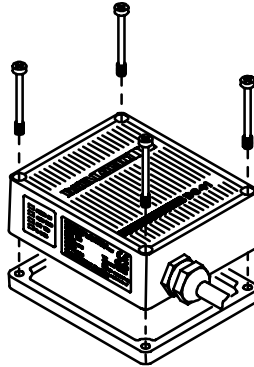
Figure 2 - Opening the DS41

2.3   MAIN INTERFACE SELECTION

One of the following interface types can be selected to connect the main interface of the DS41 to the host computer.

RS232   20 mA CURRENT LOOP

RS485 HALF DUPLEX   RS485 FULL DUPLEX

To select the interface type, position the jumper block as indicated in the diagram below:
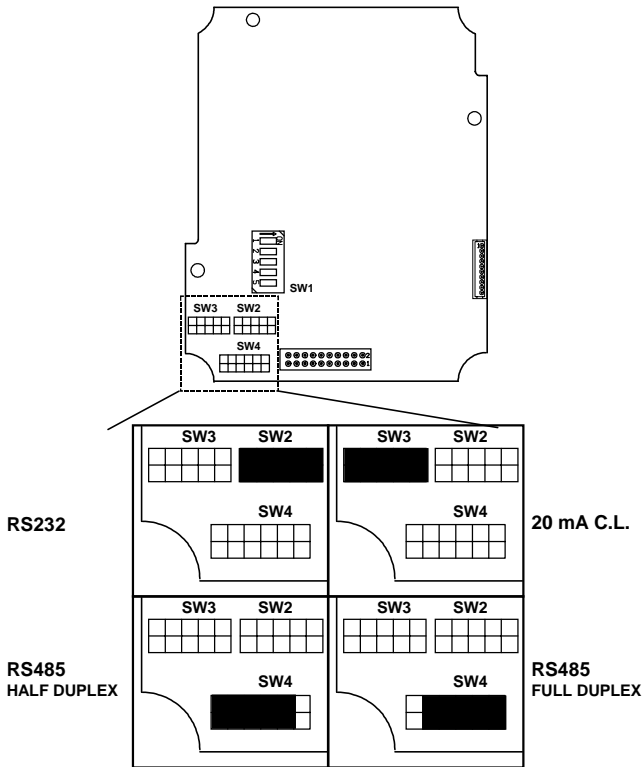
Figure 3 - Interface type selection

The RS232 interface type is factory set.

2.4 MECHANICAL INSTALLATION

DS41 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, 11).

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

Refer to paragraph 2.7 for correct positioning.
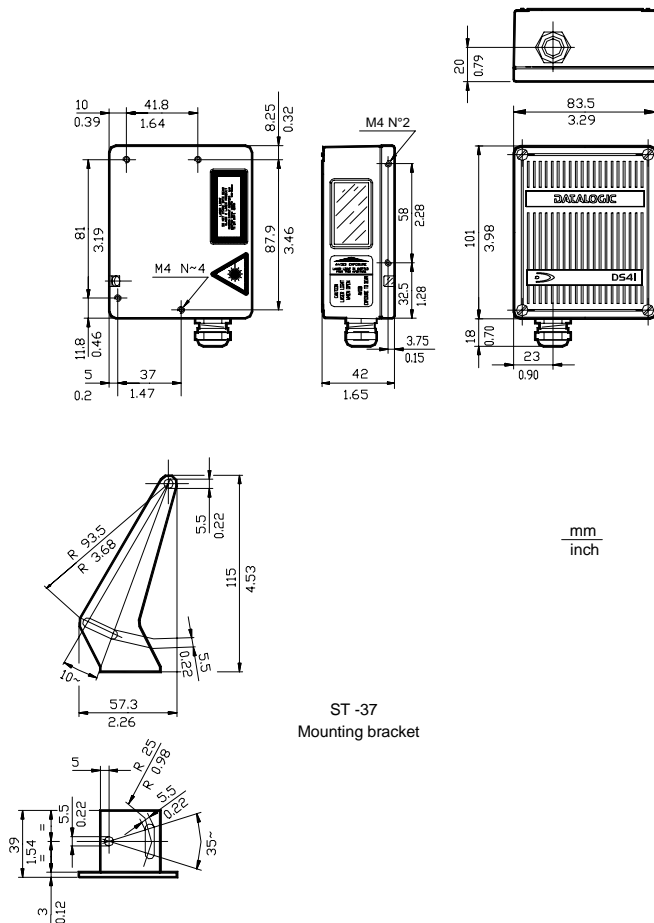
Figure 4 - Overall dimensions

2.5 JUNCTION BOX INSTALLATION

Junction Box provides a passive connection between your scanner and the outside world in a fast and practical way. It represents an alternative to the 25-pin connector models. Figure 5 shows the basic layout of DS41 using the junction box.
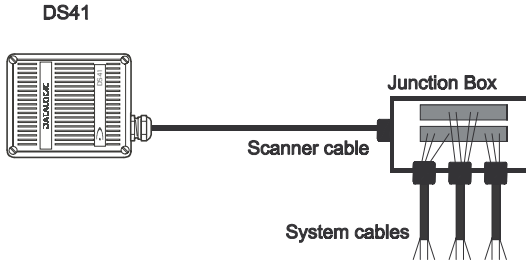
Figure 5 - Scanner using Junction Box

For Junction Box connections, the scanner has a cable that terminates in a 24-pin connector that plugs into the junction box. The system cables pass through 6 glands in the side of the Junction Box and the individual wires connect to spring clamp terminal blocks inside which provide access to all scanner signals.

2.5.1   Junction Box Mounting

The diagram below shows the dimensions of the junction box and its relative mounting holes.
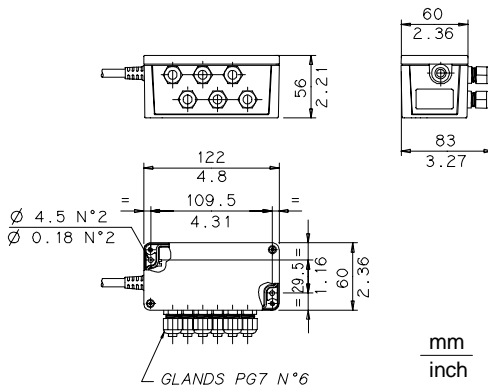
Figure 6 – Junction Box dimensions

Junction Box is designed to be mounted to a panel of metal, plastic or other appropriate material using the mounting screws provided in the package. To do this:

1) Open the junction box by unscrewing the 4 cover screws.

   If necessary, using the two mounting holes inside the junction box as a pattern, mark the panel with an appropriate object and then drill two small pilot holes in the panel.

2) Align the junction box and insert the two self-threading screws with their washers and screw them into the panel until tight (see Figure 7).
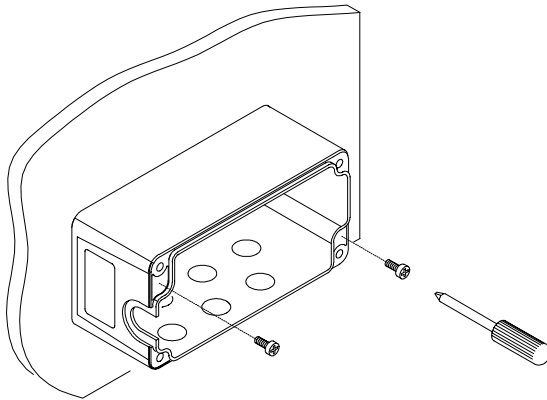
Figure 7 - Mounting Junction Box

2.5.2   Electrical Connections for Junction Box

The connection and wiring procedure for Junction Box is described as follows:

1) Open the junction box by unscrewing the 4 cover screws.

2) Pass all <u>System cables</u> through the glands in the junction box housing.

3) To connect the power and input/output signals:

   - Prepare the individual wires of the system cables by stripping the insulation back approximately 11 mm.

   - Using a device such as a screwdriver, push down on the orange lever directly above the clamp (see Figure 8).

   - Insert the wire into the clamp and release the lever.

The wire will now be held in the spring clamp.
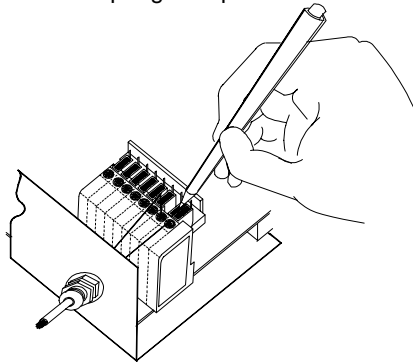
Figure 8 - System cable connections to the junction box

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 junction box pinouts are indicated in the following table:

Junction Box pinout for DS41	
Pin	**Name**
01	VS
02	GND
03	VS
04	GND
05	CHASSIS
06	VS
07	VS
08	EXT TRIG+
09	EXT TRIG-
10	GND
11	GND
12	VS
13	VS
14	n.c.
15	n.c.
16	GND
17	GND
18	NOREAD+
19	NOREAD-
20	RIGHT+
21	RIGHT-
22	WRONG+
23	WRONG-
27	n.c.
28	GND
34	GND
35	TXAUX
36	RTSAUX
37	GND
38	RXAUX
39	CTSAUX
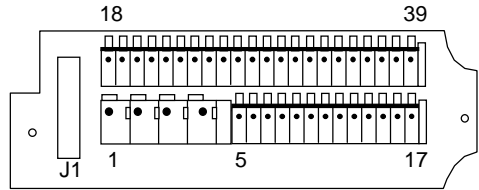
Figure 9 – Junction Box connector and pinout

To allow connection of an NEC Class 2 Power Unit, use a correct female plug adapter.

Figure 10 - NEC Class 2 Power unit connections

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

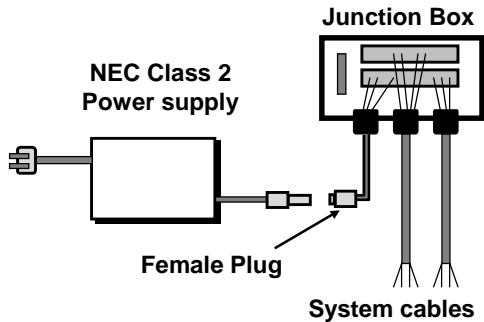| Pin	RS232	RS485 full-duplex	RS845 half-duplex	20 mA CL
24*, 29	TX232	TX485+	RTX485+	CLOUT+
25*, 30	RTS232	TX485-	RTX485-	CLOUT-
26*, 31	SGND	SGND	SGND	
32	RX232	RX485+		CLIN+
33	CTS232	RX485-		CLIN-

* The signals on pins 24, 25, and 26 are repeated on pins 29, 30, and 31 to facilitate network connections (i.e. Multiplexer connections using the RS485 half duplex 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 junction box and while the scanner is unplugged from the power supply, place the <u>Scanner cable</u> 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 junction box as shown in Figure 11.

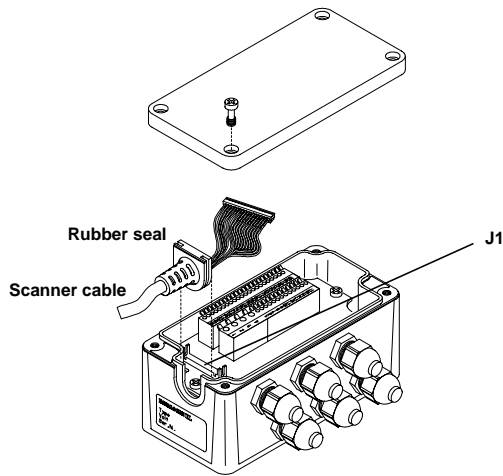**Figure 11 - Scanner cable connections to the junction box**

5) Close the junction box using the 4 cover screws making sure the rubber seal is fitted correctly between the parts of the housing.

The junction box is now installed which completes the electrical connections for your scanning system.

If it ever becomes necessary to disconnect the scanner from the Junction Box, simply reverse the procedure in step 4.

2.6 ELECTRICAL CONNECTIONS FOR 25-PIN MODELS

DS41 25-pin connector models (see paragraph 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 details of the connector pins are indicated in the following table:

⚠️ **CAUTION**	*Do not connect GND and SGND to different (external) ground references. GND and SGND are internally connected through filtering circuitry which can be permanently damaged if subjected to voltage drops over 0.8 Vdc.*
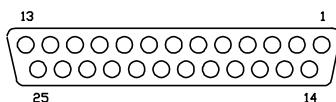
Figure 12 - 25-pin D-sub connector

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 (-)
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 (-)
20	RXAUX	Auxiliary input
21	TXAUX	Auxiliary output
23	CTSAUX	Auxiliary handshake
24	RTSAUX	Auxiliary handshake
6, 10, 16, 17	NC	No Connect

		RS232	**RS485 full-duplex**	**RS485 half-duplex**	**20 mA CL**
2* 3* 4* 5* 7	See par. 2.3 and 2.4.	TX232 RX232 RTS232 CTS232 SGND	TX485+ RX485- TX485- RX485- SGND	RTX485+ RTX485- SGND	CLOUT+ CLIN+ CLOUT- CLIN-

* 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 paragraphs 2.2 and 2.3.

2.6.1 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 13):

DS41

USER INTERFACE

VS	**13**	V+ (10 - 30 Vdc)
GND	**25**	GND
CHASSIS	**1**	CHASSIS

Earth Ground
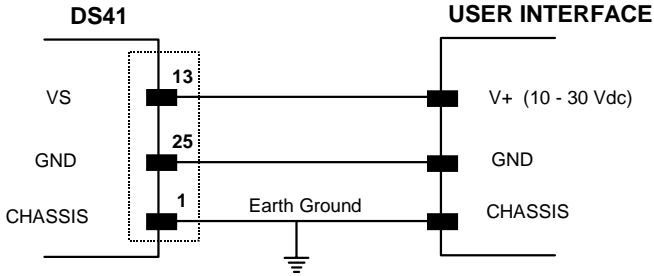
Figure 13 - Power supply connections

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 14). If the jack input is used to supply power to the DS41, pin 13 is automatically disconnected; the supply voltage for the External Trigger remains on pin 9. The plug connector is not supplied with the DS41.

GND

Plug

Jack

V+ (10 - 30 Vdc)

Figure 14 - Power supplied using the jack connector

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.

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

2.6.2   Main Serial Interface

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

RS232

RS485 FULL DUPLEX

RS485 HALF DUPLEX
(for connection with a Datalogic multiplexer)

20 mA PASSIVE CURRENT LOOP

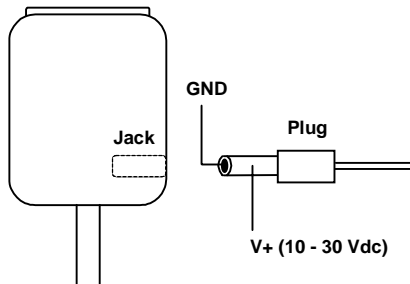DS41 automatically recognizes the type of interface selected at each power on of the scanner.

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

The parameters relative to the interface selected (baud rate, data bits, etc.) can be configured 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	Signal ground

DS41 **USER INTERFACE**

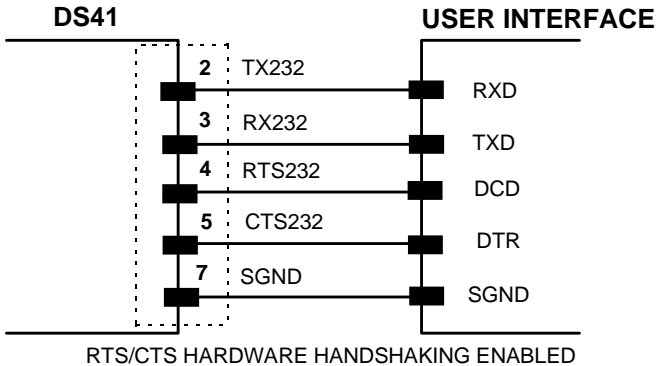|		
2	TX232	RXD
3	RX232	TXD
4	RTS232	DCD
5	CTS232	DTR
7	SGND	SGND

RTS/CTS HARDWARE HANDSHAKING ENABLED

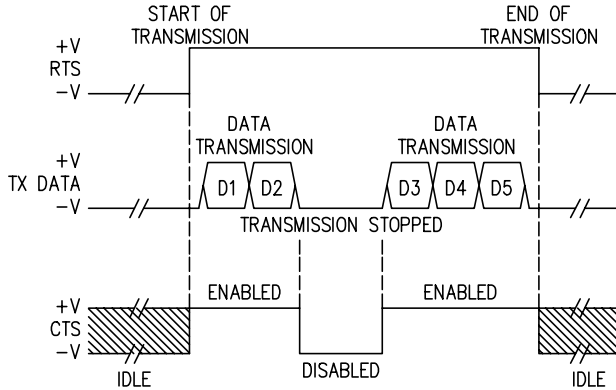**Figure 15 - RS232 main interface connections**

Figure 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 DS41 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 Full Duplex configuration is used for point-to-point connections over longer distances 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 output (+)
4	TX485-	RS485 output (-)
3	RX485+	RS485 input (+)
5	RX485-	RS485 input (-)
7	SGND	Signal Ground

DS41   **USER INTERFACE**

2 TX485+

4 TX485-   RX485

3 RX485+

5 RX485-   TX485
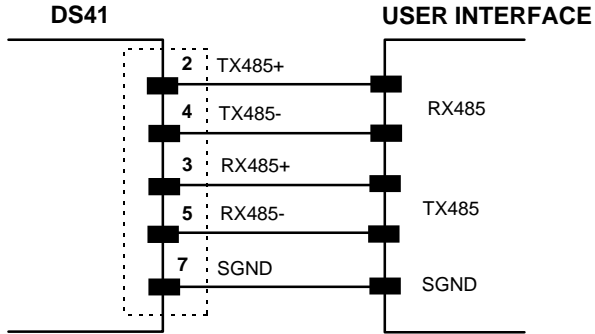
7 SGND

SGND

Figure 17 - RS485 Full Duplex connections

To select this interface type, follow the instructions in paragraphs 2.2 and 2.3.

RS485 Half Duplex Interface

The Half Duplex configuration can be used for multidrop connections with a Datalogic multiplexer or it can also be used for a master-slave layout (see paragraph 2.8.1).
The following pins of the 25-pin connector are used for RS485 Half Duplex communications:

Pin	Name	Function
2	RTX485+	RS485 input/output (+)
4	RTX485-	RS485 input/output (-)
7	SGND	Signal ground

DS41   **MULTIPLEXER**

2 RTX485+

RTX485+

4 RTX485-

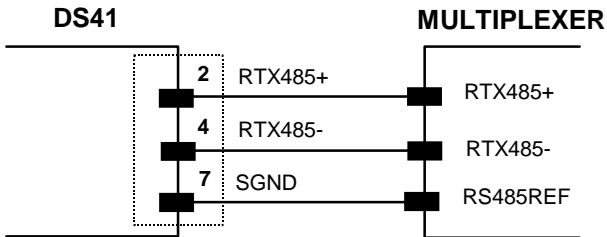RTX485-

7 SGND

RS485REF

Figure 18 - RS485 Half Duplex connections

To select this interface type, follow the instructions in paragraphs 2.2 and 2.3.

For this interface type, the multidrop address must also be set on the DIP switch as shown in the figure below. Record this information for further setup of the multidrop line.
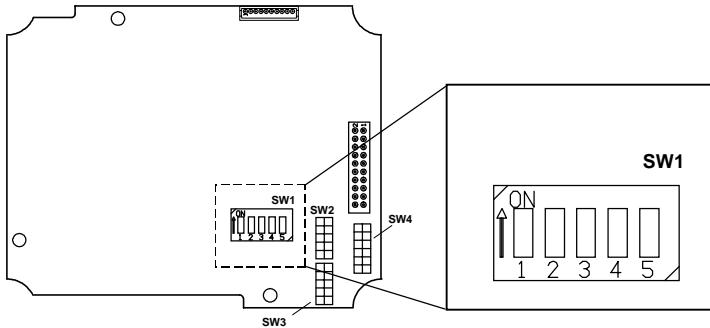

Figure 19 - DIP switch for multidrop address selection

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**

The figure below shows a multidrop configuration with DS41 scanners connected to a Multiplexer.
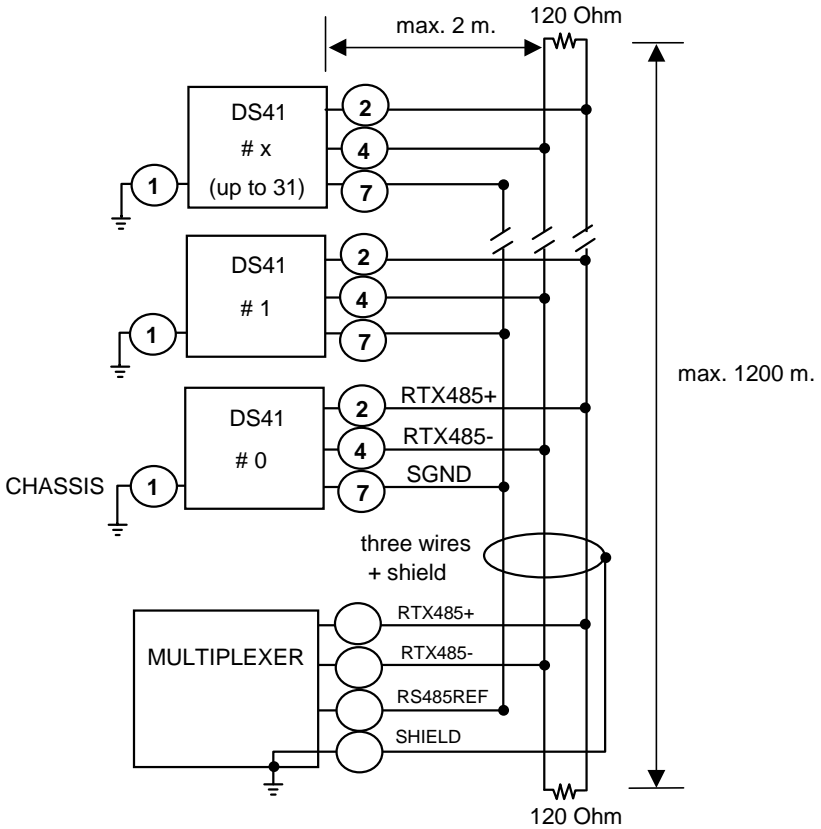

Figure 20 - DS41 multidrop connection to a Multiplexer

20 mA Current Loop Interface

The DS41 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 (+)

DS41   **USER INTERFACE**

| 5 | C.L. IN- |
| 3 | C.L. IN+ | I = 20 mA
| 4 | C.L. OUT- |
| 2 | C.L. OUT+ | I = 20 mA
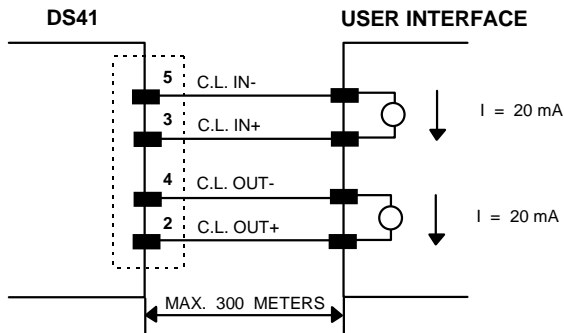
MAX. 300 METERS

Figure 21 - 20 mA C.L. connections

To select this interface type, follow the instructions in paragraphs 2.2 and 2.3.

2.6.3   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 WinHost utility program or Host Mode programming. For more details refer to paragraph 2.8 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:

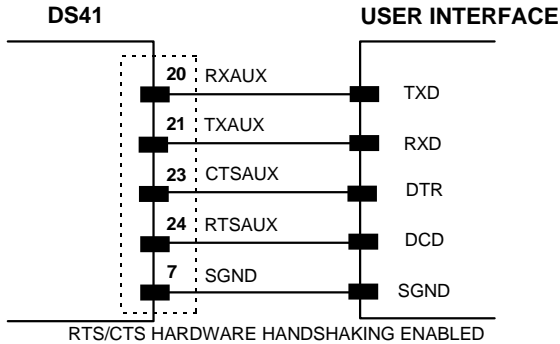| Pin	Name	Function
20	RXAUX	Auxiliary input
21	TXAUX	Auxiliary output
23	CTSAUX	Auxiliary handshake
24	RTSAUX	Auxiliary handshake
7	SGND	Signal Ground

Figure 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 DS41 activates the RTSAUX output to indicate a message is to be transmitted. The receiving unit activates the CTSAUX input to enable the transmission.

Code Verifier

If the DS41 is used as a Code Identifier, it is possible to indicate to the scanner what code to store as the verifier code by means of an external hardware input.

The Code Verifier parameter must be enabled and the configuration parameters to allow correct Code Type reading must be saved to the scanner in order to read the code verifier.

To activate the input, connect together pins 23 and 24 (CTSAUX and RTSAUX) of the 25-pin connector (for example with a push-button), before the active edge of the External Trigger input (or before the code passes under the laser beam for the Automatic operating mode). The next read code will be stored as the verifier code in the scanner's RAM and NON-VOLATILE (EEPROM) memory by default.
Then, the two pins must be disconnected.

Since it uses part of the RS232 auxiliary serial interface, this interface is limited when using this option and the Handshake selection must not be set to RTS/CTS.

2.6.4   Inputs

The inputs available on the DS41 scanner are the pins relative to the External Trigger, as indicated below:

Pin	Name	Function
18	EXT TRIG+	External Trigger (input+)
19	EXT TRIG-	External Trigger (input-)

The inputs indicated are always used to connect the External Trigger which tells the scanner to scan for a code. The yellow led (Figure A, 9) is on during the active phase of the External Trigger 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:
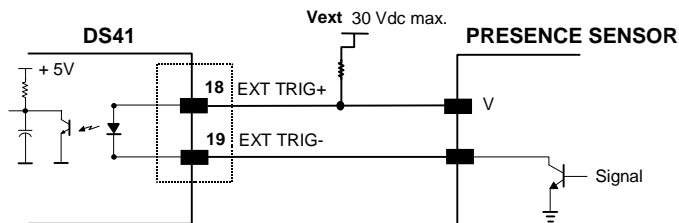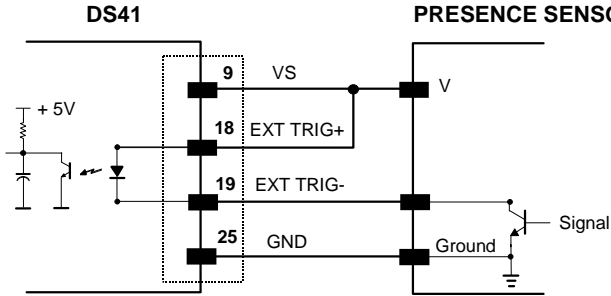

Figure 23 - Input NPN command using external power

DS41   **PRESENCE SENSOR**

Figure 24 - Input NPN command using DS41 power

DS41   **PRESENCE SENSOR**
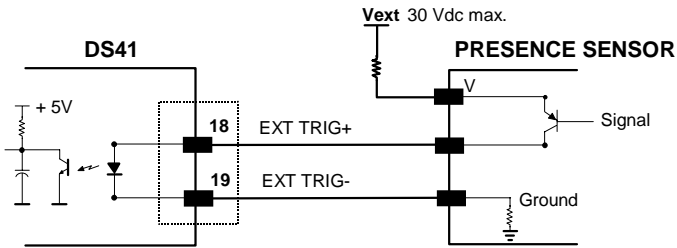
Figure 25 - Input PNP command using external power

DS41   **PRESENCE SENSOR**
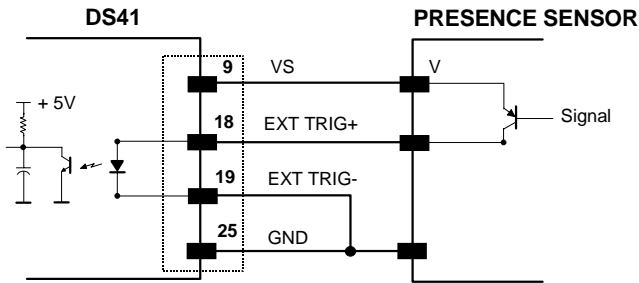
Figure 26 - Input PNP command using DS41 power

The electrical features are given below:

Maximum voltage	30 Vdc
Maximum current	25 mA

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

2.6.5   Outputs

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

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 (-)

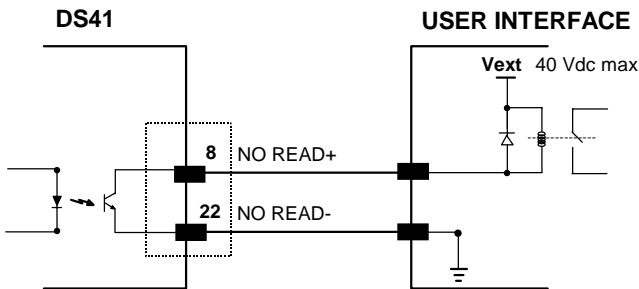The NO READ output activates when the code signaled by the External Trigger is not decoded.

Figure 27 - NO READ output connection

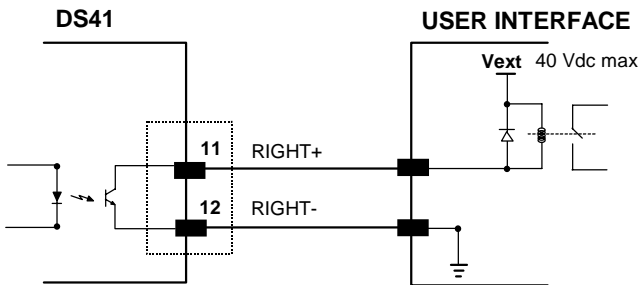The RIGHT output activates when the code is decoded correctly.

Figure 28 - RIGHT code output connection

The WRONG output is used either for "Verifier" mode or for PCS control. 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.
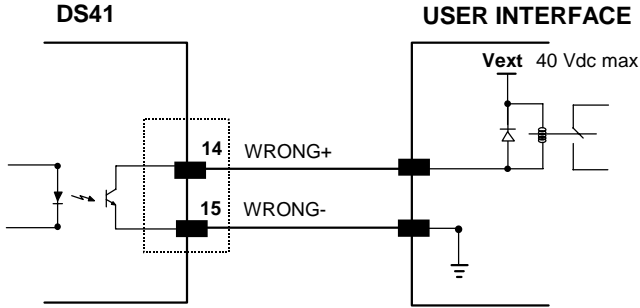
DS41   **USER INTERFACE**

Vext 40 Vdc max

14 WRONG+

15 WRONG-

Figure 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 WinHost Help On Line.

2.7   POSITIONING

The DS41 scanner is able to decode moving barcode labels at a variety of angles, however significant angular distortion may degrade reading performance.

When mounting the DS41 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 30. Position the reader in order to **minimize** the **Pitch** angle.
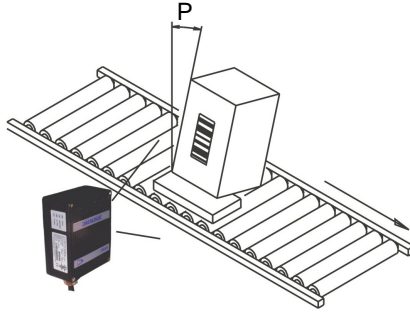
Figure 30 - Pitch angle

The **Skew** angle is represented by the value **S** in Figure 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 DS41.

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.
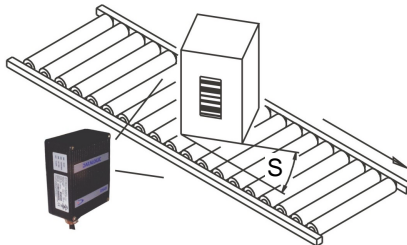

Figure 31 - Skew Angle

The **Tilt** angle is represented by the value **T** in Figure 32. Position the reader in order to **minimize** the **Tilt** angle.
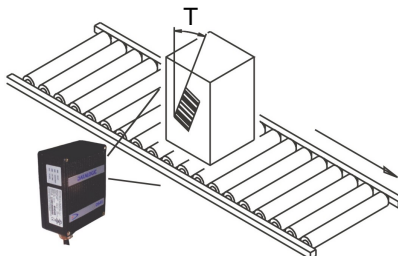

Figure 32 - Tilt angle

2.8   TYPICAL LAYOUTS

The DS41 barcode reader was specifically designed for industrial applications. A typical use is real time identification of moving objects on conveyor belts.

A photoelectric sensor used as External Trigger signals when an object enters the scanner reading zone (see Figure 33).
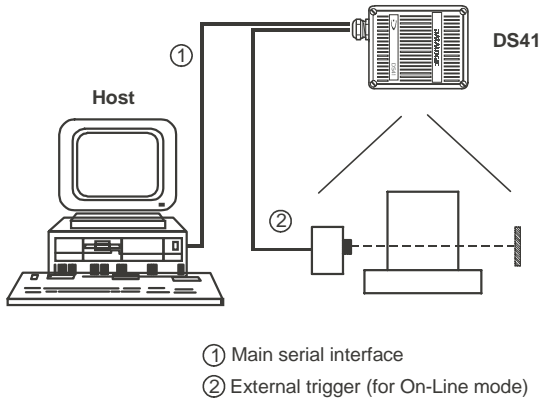

① Main serial interface
② External trigger (for On-Line mode)

Figure 33 - DS41 typical layout

DS41 can be mounted vertically or horizontally to read labels in the two standard 'picket fence' or 'step ladder' positions. A system can be configured to read labels in any orientation using several scanners positioned at different angles.

For each application it is advised that the length of the scan line, the scan speed, the height of the bars and the code motion speed with respect to the scanner, allow at least five scans on the code.

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.

2.8.1 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 in RS485 Half Duplex on the main serial interface.

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

In every scanner the jumper block for the selection of the main serial interface type must be set for RS485 Half Duplex (see paragraph 2.3).

In every slave scanner the multidrop address selection must be set within the range from 0 to 4 max (see paragraph 2.6.2 under "RS485 Half Duplex interface").

The DIP switch selections in the master scanner are ignored.

① Auxiliary serial interface
② Main serial interface
③ External trigger (for On-Line mode)

Host

DS41 Slave

DS41 Slave

DS41 Master
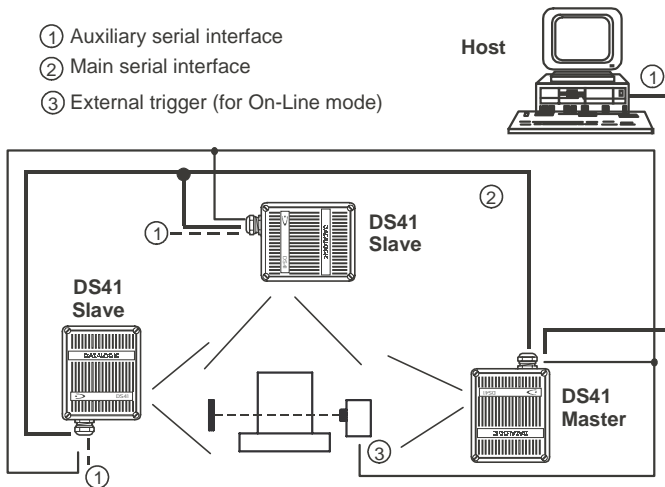
Figure 34 - Master-slave layout

	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.

2.8.2   Local Echo

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

Host Mode programming can be accomplished either through the main interface or the auxiliary interface in Local Echo mode.
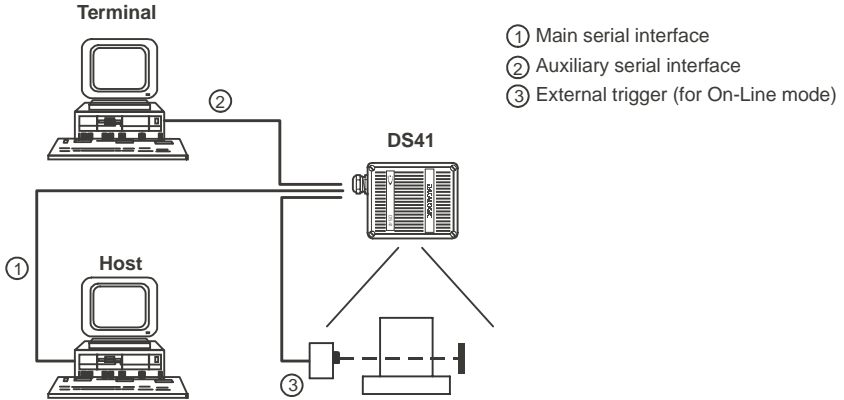

Figure 35 - Local echo layout

2.8.3   Pass Through

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

Each DS41 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.

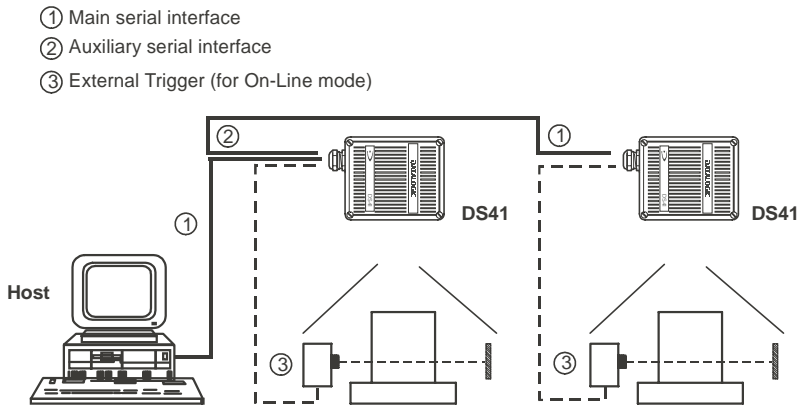The main and auxiliary ports are connected as shown in the figure below:

① Main serial interface
② Auxiliary serial interface
③ External Trigger (for On-Line mode)

Figure 36 - Pass through layout

2.8.4 Multiplexer

Each scanner is connected to an MX4000 with the RS485 half duplex mode on the main interface.

Figure 37 – Multiplexer layout
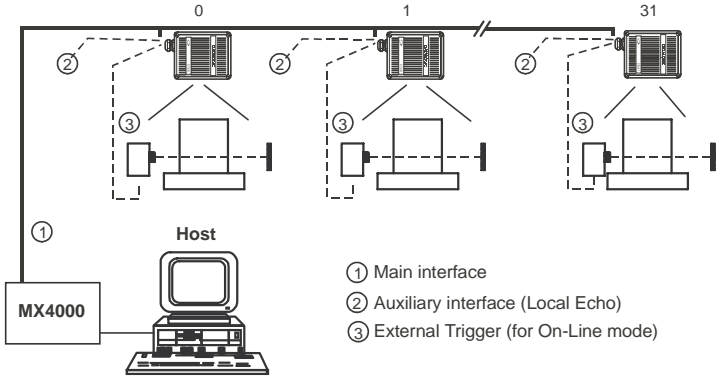
The auxiliary serial interface of the slave scanners can be used in Local Echo communication mode to control any single scanner (visualize collected data) or to configure it using the WinHost utility or Host Mode Programming procedure.

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

The number of reads performed by the DS41 and therefore the decoding capacity, is influenced by the following parameters:

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

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

3.1   STEP LADDER MODE
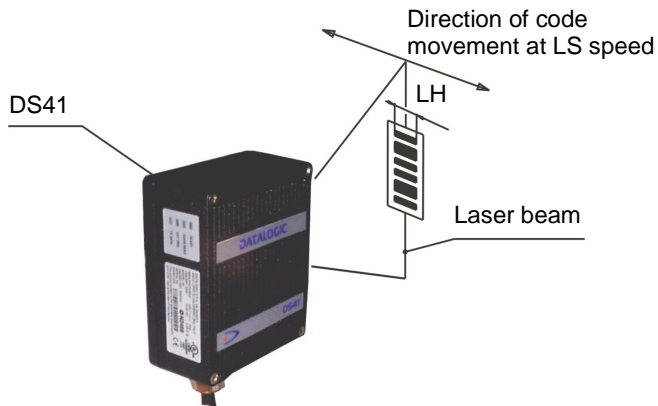

Figure 38 - "Step Ladder" scanning mode

If scanning is perpendicular to the direction of code movement (Figure 38), 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 DS41 (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 PICKET FENCE MODE
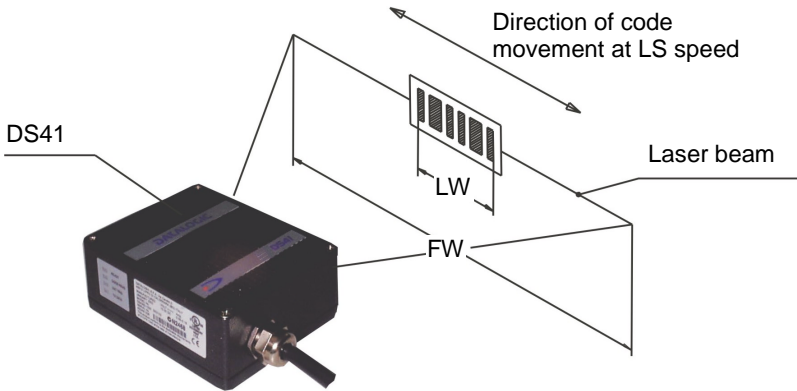
Figure 39 - "Picket Fence" scanning mode

If scanning is parallel to the code movement, (Figure 39), 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 50 mm wide code moving in a point where the reading field is 250 mm wide at a 1500 mm/s speed, the DS41 (800 scans per sec.), performs:

$[((250-50)/1500) * 800] - 2 = 104 \text{ scans}$

3.3 PERFORMANCE

The DS41 scanner is available in four standard versions according to the optical resolution characteristics (see paragraph 1.3).

The Standard resolution version is a general purpose model whose optical resolution allows code reading from 0.20 mm (8 mils) to 1.00 mm (40 mils) narrow bars in the zone between 50 mm (1.9 in) and 400 mm (15.7 in) from the emission window.

This version can distinguish between high density codes in the range between 0.20 mm (8mils) and 0.30 mm (12 mils) and low density codes above 0.33 mm (13 mils) by programming the software resolution parameter (see the section "Scanner Resolution" in the WinHost Help On Line).

The Very High resolution version has an optical resolution that allows reading very high density codes (typical values from 0.10 mm (4 mils) to 0.20 mm (8 mils) narrow bars) in the zone from 55 mm (2.2 in) to 125 mm (4.9 in) from the emission window. The software resolution parameter for this version should be set to high (see the section "Scanner Resolution" in the WinHost Help On Line).

The Raster version R1 is a raster model used to read codes from 0.20 mm (8 mils) to 1.00 mm (40 mils) narrow bars with a raster aperture of about 12 mm (0.5 in) at a 200 mm (7.9 in) distance.

The Raster version R2 is a raster model used to read codes from 0.20 mm (8 mils) to 1.00 mm (40 mils) narrow bars with a raster aperture of about 40 mm (1.6 in) at a 200 mm (7.9 in) 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 versions and 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

DS41-1x (Standard Resolution, 800 scans/s)
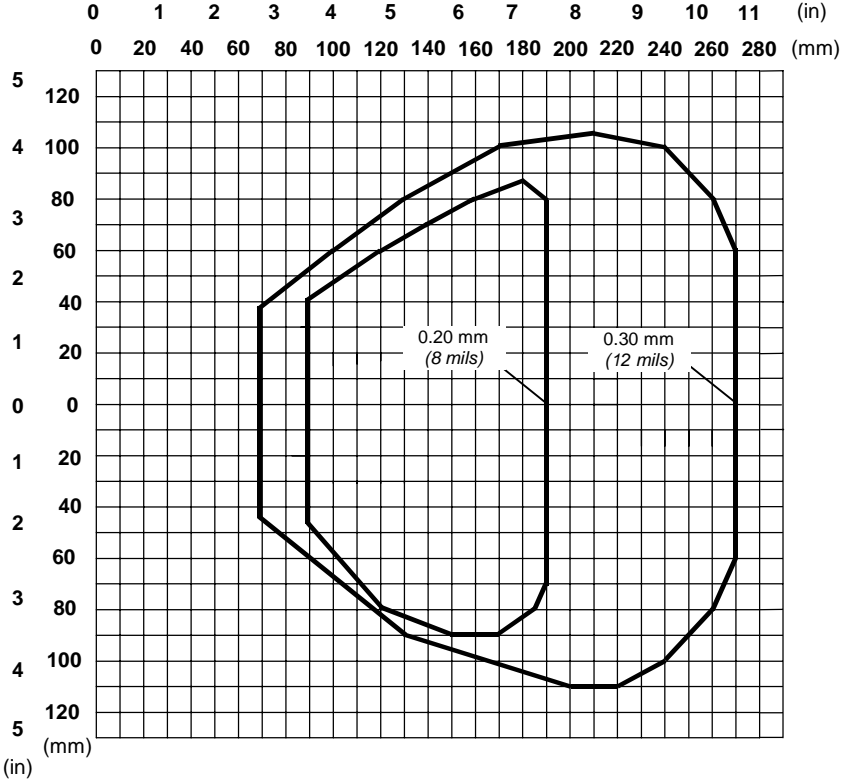
Note: (0,0) is the center of the laser beam output window.

CONDITIONS

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

DS41-1x (Standard Resolution, 800 scans/s)
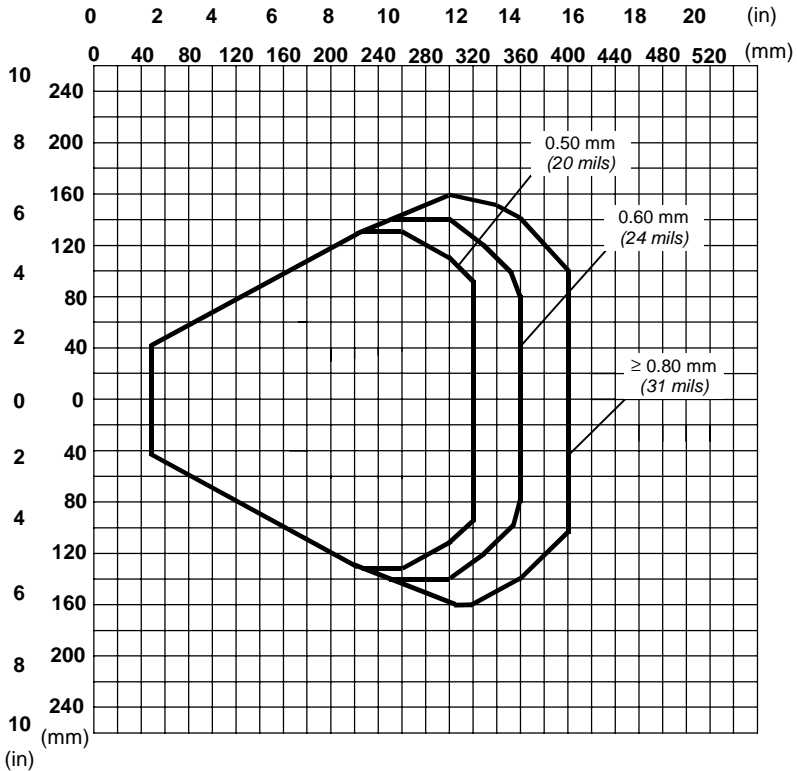
Note: (0,0) is the center of the laser beam output window.

CONDITIONS

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

DS41-2x (Very High resolution, 800 scans/s)
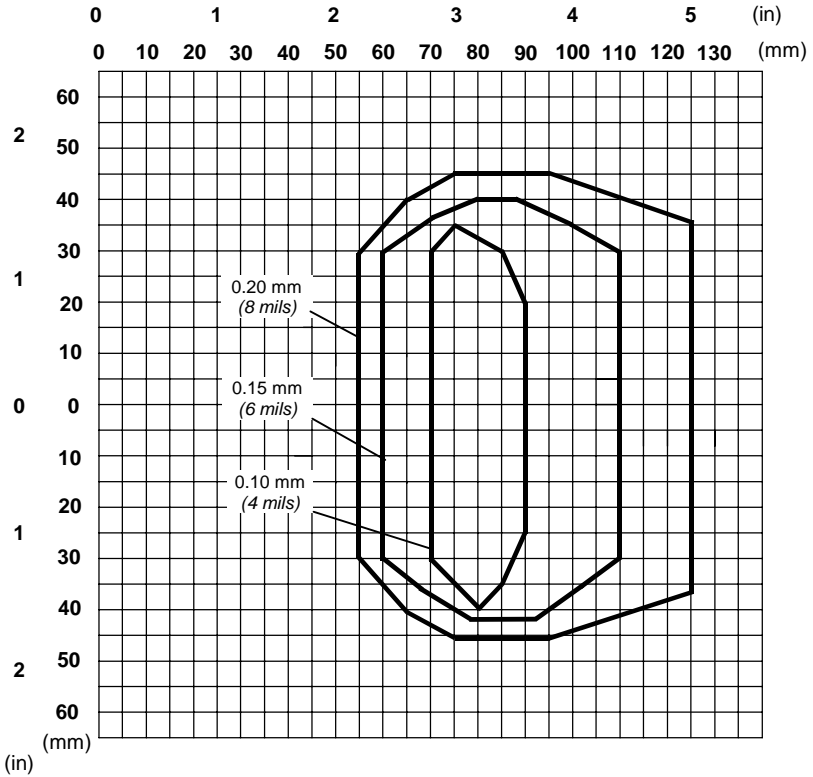
0.20 mm
(8 mils)

0.15 mm
(6 mils)

0.10 mm
(4 mils)

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 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 DS41 when the scanner is turned off or, at least when the laser beam is deactivated.*

5   TECHNICAL FEATURES

ELECTRICAL FEATURES	
Power Supply voltage Power consumption max.	10 to 30 Vdc 5 W
Serial Interfaces Main Auxiliary Baud rates	RS232, RS485 Full Duplex, RS485 Half Duplex, 20 mA Passive C. L. RS232 150 to 19200
Inputs External Trigger Voltage max. Input current max.	(optocoupled NPN or PNP) 30 Vdc 25 mA
Outputs No Read, Right Read, Wrong Read V_{CE} max. Collector current max. V_{CE} saturation Power dissipation max.	(optocoupled) 40 Vdc 40 mA continuous; 130 mA pulsed 1V at 10 mA max. 90 mW at 40 °C (Ambient temp.)
OPTICAL FEATURES	
Light source Wave length (Note 1) Safety class	Semiconductor laser diode 630 ~ 680 nm Class 2
READING FEATURES (Note 2)	
Scan rate Reading distance Maximum resolution Aperture angle	800 scans/second 50 to 400 mm 0.1 mm 60 degrees
USER INTERFACE	
LED indicators	Power, Laser Beam Active, Barcode Decoded, External Trigger Active, Data Tx

SOFTWARE FEATURES	
READABLE CODE SYMBOLOGIES	
• 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
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 WinHost utility • receiving commands from one of the serial ports (HOST MODE)
PARAMETER STORAGE	Non-volatile internal EEPROM
ENVIRONMENTAL FEATURES	
Operating temperature (Note 3)	0° to 40 °C (32° 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 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	
Mechanical dimensions	101 x 83.5 x 42 mm (3.98 x 3.29 x 1.65 in)
Weight	800 g. (28.2 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).

We

DATALOGIC S.p.A.
Via Candini, 2
40012 - Lippo di Calderara
Bologna - Italy

declare under our sole responsibility that the product

DS41-XX, Laser Scanner and all its models

to which this declaration relates is in conformity with the following standards or other normative documents
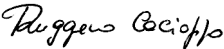
EN 55022, August 1994: LIMITS AND METHODS OF MEASUREMENTS OF RADIO DISTURBANCE CHARACTERISTICS OF INFORMATION TECHNOLOGY EQUIPMENT (ITE)

EN 50082-2, March 1995: ELECTROMAGNETIC COMPATIBILITY. GENERIC IMMUNITY STANDARD. PART 2: INDUSTRIAL ENVIRONMENT

Following the provision of the Directive(s):

89/336 CEE *AND SUCCESSIVE AMENDMENTS*, **92/31 CEE; 93/68 CEE**

Lippo di Calderara, 23.03.1998

Ruggero Cacioppo

Quality Assurance Supervisor