DS6100

Installation Manual

DATALOGIC

Bar Code & More

DS6100

INSTALLATION MANUAL

We

DATALOGIC S.p.A.
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Bologna - Italy

declare under our sole responsibility that the product

DS6100-XXXX, 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
EN 60950, October 1996:	SAFETY OF INFORMATION TECHNOLOGY EQUIPMENT, INCLUDING ELECTRICAL BUSINESS EQUIPMENT
EN 60825, March 1993:	RADIATION SAFETY OF LASER PRODUCTS, EQUIPMENT CLASSIFICATION, REQUIREMENTS AND USER'S GUIDE

Following the provision of the Directive(s):

89/336 CEE *AND SUCCESSIVE AMENDMENTS*, 92/31 CEE; 93/68 CEE; 73/23 CEE

Ruggero Cacioppo

Lippo di Calderara, 23.03.1998

Quality Assurance Supervisor

821000105 (Rev. E)

CONTENTS

GUIDE TO INSTALLATION

The following can be used as a checklist to verify all the necessary steps for complete installation of the DS6100 scanner.

1. Read all information in the section Safety Precautions at the beginning of this manual.

2. Correctly position and mount the scanner for barcode reading according to the information in paragraphs 2.2, 2.3, 2.6, 2.8 and 3.3.

3. Provide correct system cabling according to the signals necessary (see the applicable sub-paragraphs under 2.4 or 2.5).

4. Install the Configuration Disk and configure the software parameters from a host computer using one of the following methods:

   - WINHOST interface utility program. For more details refer to the section “DS6100 Configuration” in the WINHOST Help On Line.

   - Host Mode programming procedure by ESC sequences via the serial interface. For more details refer to the Word document hds6100.doc in the DS6100 directory.

   - Keyboard Mode through the keypad and the display. For more details refer to the Word document kds6100.doc in the DS6100 directory.

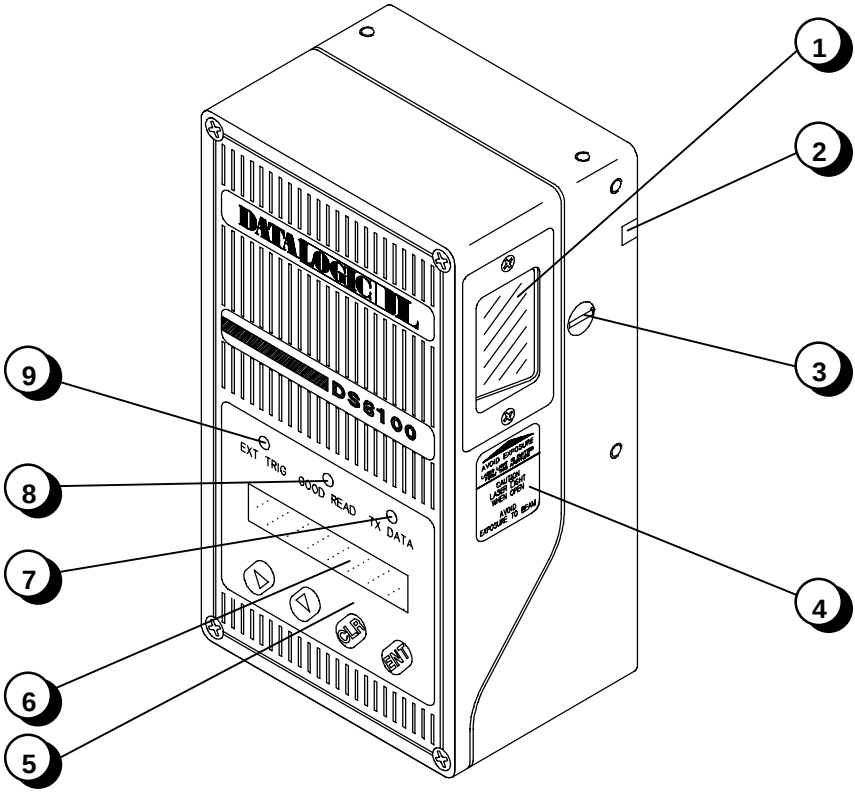
NOTE

Fine tuning of the scanner position for barcode reading can be accomplished using the Test Mode as described in WINHOST.

The installation is now complete.

DS6100

General View

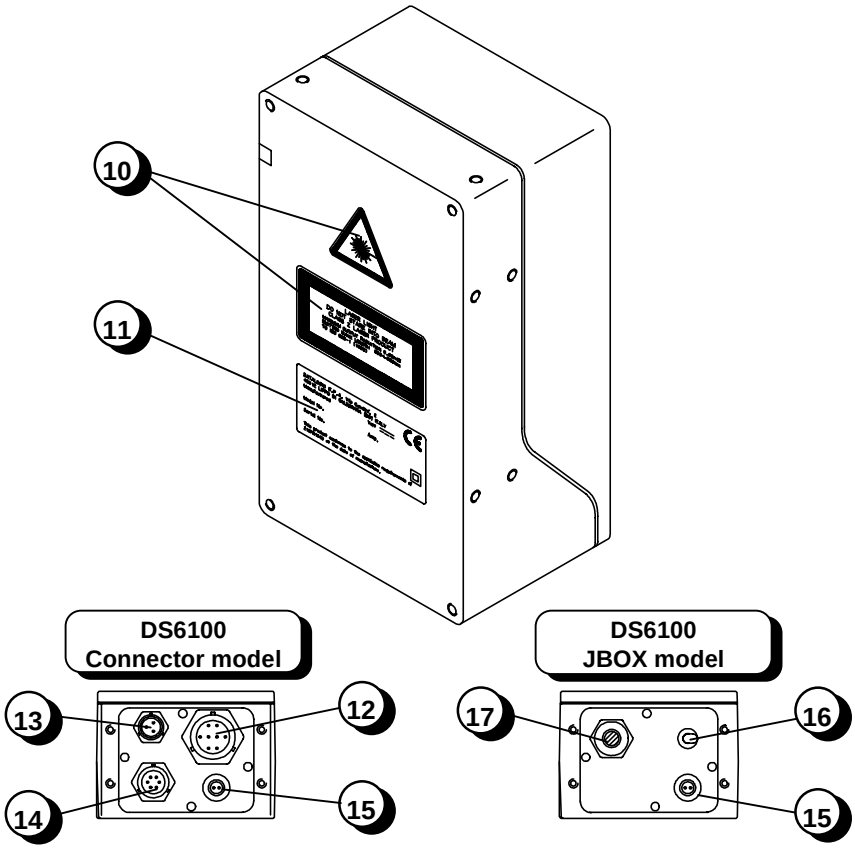


1	Laser beam output window	6	LCD 2x16 characters
2	Laser active LED	7	Data transmission LED
3	Focus regulation cover	8	Code present LED
4	Safety label	9	Presence sensor LED
5	Keypad		

Figure A

DS6100

General View



10	Warning and device class labels	14	Input connector
11	Product label	15	Oscillating mirror connector
12	Output / Serial interface connector	16	Power supply switch
13	Power supply connector	17	Junction box cable

Figure B

SAFETY PRECAUTIONS

ELECTRICAL SAFETY

This product conforms to the applicable requirements contained in the European Standard for electrical safety EN-60950 at the date of manufacture.

This symbol refers to operations that must be performed by qualified personnel only. Example: opening the device.

This symbol refers to operations where there is danger of electrical shock. Before opening the device make sure the power cable is disconnected to avoid electric shock.

LASER SAFETY

The following information is provided to comply with the rules imposed by international authorities and refers to the correct use of the DS6100 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.

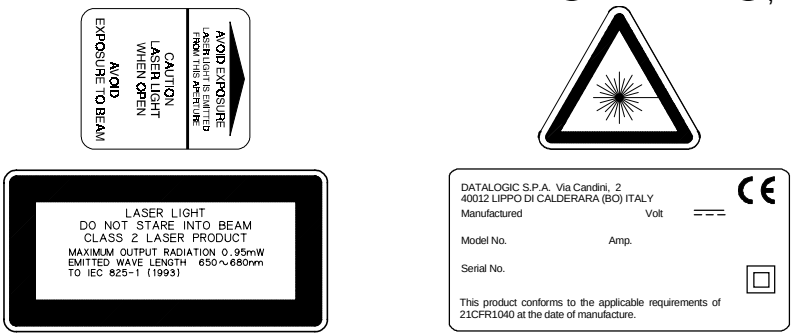
There is a safety device which allows the laser to be switched on only if the motor is rotating above the threshold for its correct scanning speed.

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 side of the reader (Figure A, (1)).

Warning labels indicating exposure to laser light and the device classification are applied onto the body of the scanner (Figure A, (4), Figure B, (10), (11)):



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 (10 mW at 650~680 nm).

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1 GENERAL FEATURES

1.1 INTRODUCTION

The DS6100 scanner is a barcode reader complete with decoder designed to provide an inexpensive solution in omnidirectional reading applications by combining the following advanced technologies with Datalogic's solid experience in the material handling sector.

ACR™

Advanced Code Reconstruction Technology allows the reading of low aspect ratio labels placed anywhere on a parcel and enhances the readability of poorly printed or damaged codes.

CD SQUARE™

CD SQUARE™ provides useful information on label position and object shape elaborated during the barcode reading phase. This innovative technology identifies the area in which the code is located and measures the code distance from the scanner.

PACKTRACK™

PackTrack™ is a Datalogic patented parcel tracking system which improves the reading features in omnidirectional stations. In particular, PackTrack™ manages 6-sided reading systems when it is impossible to detect the real position of the code on the parcel, thus overcoming the need for external accessories essential in traditional tracking systems.

Flexibility

The high frequency laser diode modulation system guarantees complete immunity to ambient light and allows installation of the DS6100 in any working area.

DS6100 is provided with an Adjustable Focus System which enables the user to freely select the most suitable reading field for his application. Focus length can be very easily adjusted by choosing among six different positions of the optical system.

DS6100 is easily configurable by means of the user-friendly Windows based WinHost configuration program provided on a diskette. It is also possible to configure the scanner either through the built-in keypad or by sending ESC sequences from a Host computer.

1.2 DESCRIPTION

Some of the main features of DS6100 are listed below:

- scanning speed 800 scans/sec. for standard models; higher speeds available on request.
- 2 serial communication interfaces.
- reads all popular codes.
- supply voltage from 10 to 30 Vdc.
- electrical connection through connectors or through a junction box.
- test mode to verify the reading features and exact positioning of the scanner without the need for external tools.
- programmable in 5 different operating modes to suit the most various barcode reading system requirements.
- light source: solid state laser diode; the light emitted has a wave length of 650~680 nm. For laser safety precautions refer to the “Safety precautions” section at the beginning of this manual.
- low power consumption.
- IP65 protection class of the enclosure; the reader is therefore suitable for industrial environments where high protection against harsh external conditions is required.

1.2.1 Indicators

The DS6100 has three LEDs and an LCD display on the front panel, one LED on the side panel and an internal beeper.

The indicators have the following functions:

EXT TRIG	(yellow)	Indicates the external presence sensor is active. (Figure A, 9).
GOOD READ	(red)	Indicates a probable code is present in the reading zone. (Figure A, 8).
TX DATA	(green)	Indicates the main serial interface is operating correctly during data transmission. (Figure A, 7).
LASER ACTIVE	(green)	Indicates the laser beam for barcode reading is active. (Figure A, 2).
LCD		The LCD displays messages relative to the DS6100 configuration and to the code read after decoding. It is a 2 x 16 character display. (Figure A, 6).

1.3 AVAILABLE MODELS

The DS6100 scanner is available in the following versions:

DS6100 – 3000: standard resolution, connector,
2nd generation ACR, sw selection of interfaces

DS6100 – 3100: standard resolution, junction box,
2nd generation ACR, sw selection of interfaces

1.4 ACCESSORIES

The following DS6100 accessories are available on request:

PG110/50	Power block (110 Vac)
PG220/50	Power block (220 Vac)
GFC-50	90° reading device
GFC-05	oscillating mirror attachment
US-1	installation support
XMF-05	single cross mounting frame
XBOX-05	connection box single/double cross (for Junction Box models only)
VOY-05	Voyager kit for XBOX-05
US-05	mounting brackets (10 pcs)
INT-26	20 mA C.L. interface module

1.5 APPLICATIONS

The DS6100 barcode reader was specifically designed for industrial applications and for all cases requiring high reading performance such as:

- code reconstruction
- reading of codes with a wide depth of field
- reading of high resolution codes positioned at long distances from the reader
- code reading on fast moving objects

DS6100 is designed for both single-reader layouts and multi-reader layouts. For typical layouts see par. 2.8.

2 INSTALLATION

2.1 PACKAGE CONTENTS

Verify that the DS6100 reader and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

1) DS6100 reader
2) Installation Manual + barcode test chart
3) DS6100 configuration disk
4) Mounting screws

Connector version

5) 3-pin female connector (power supply)
6) 6-pin male connector (inputs)
7) 19-pin male connector (outputs)

Junction Box version

8) JBOX

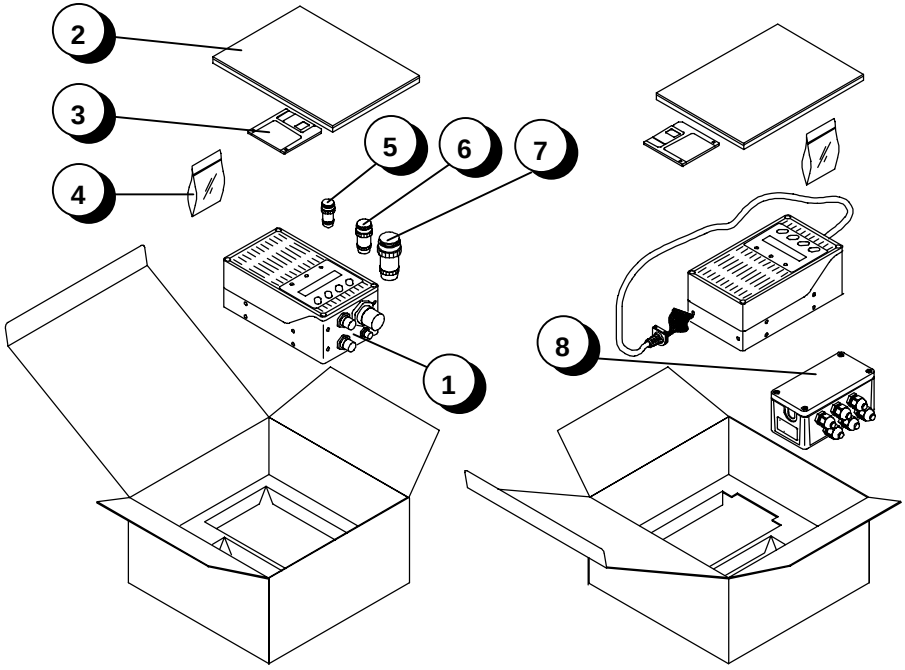


Figure 2.1 - DS6100 package contents

2.2 OPENING THE SCANNER

DS6100 scanners can be completely configured through software using one of the three methods listed in the "Guide to Installation" at the beginning of this manual. The scanner therefore can be installed without the necessity of opening it to configure hardware switches.

To determine if it is necessary to open the scanner for hardware configuration of your application, the default hardware settings are listed below:

- Multidrop address selection = **address 0** (software configurable)
- Inputs = **NPN**

To change the default settings, before installing the DS6100, refer to the procedures in the following paragraphs:

- setting the multidrop address (hardware configuration) see par. 2.2.1
- select the input type see par. 2.2.2

WARNING

Before unscrewing the connector or cable panel of the DS6100, make sure the power supply cable is disconnected to avoid shock or harm to the operator.

Refer to the following instructions and refer to Figure 2.2 when opening the reader:

1. The part of the device to be opened is the connector or cable panel on the side of the scanner.
2. Unscrew the four screws to open the scanner.

3. Carefully remove the panel as shown in Figure 2.2. Pay attention not to stretch the cables between the panel and the scanner.

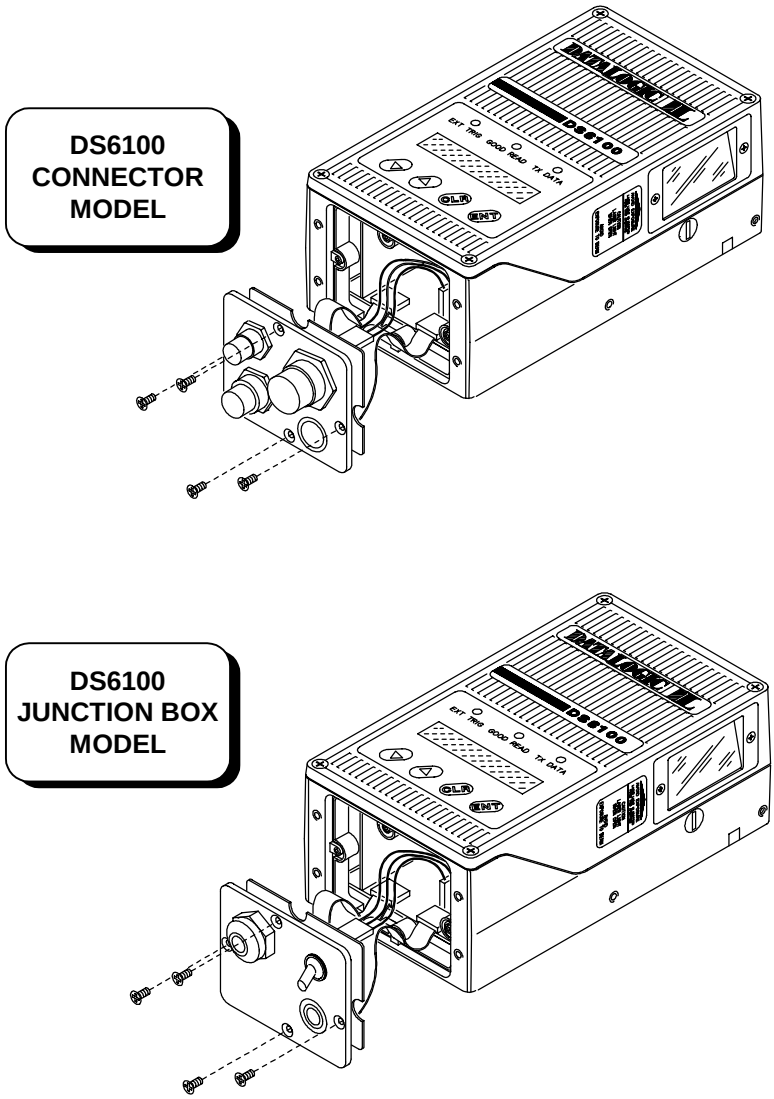


Figure 2.2 - Opening the DS6100

2.2.1 Multidrop Address Selection

When using the RS485 half-duplex interface, the Multidrop address must be selected.

The Multidrop Address can be selected either via software or through the DIP switch. Refer to the WinHost Help On Line for software selection.

To set the Multidrop Address through the DIP switch proceed as follows:

1. Open the panel as described in par. 2.2.

2. Position the switches as desired, referring to Figure 2.3.

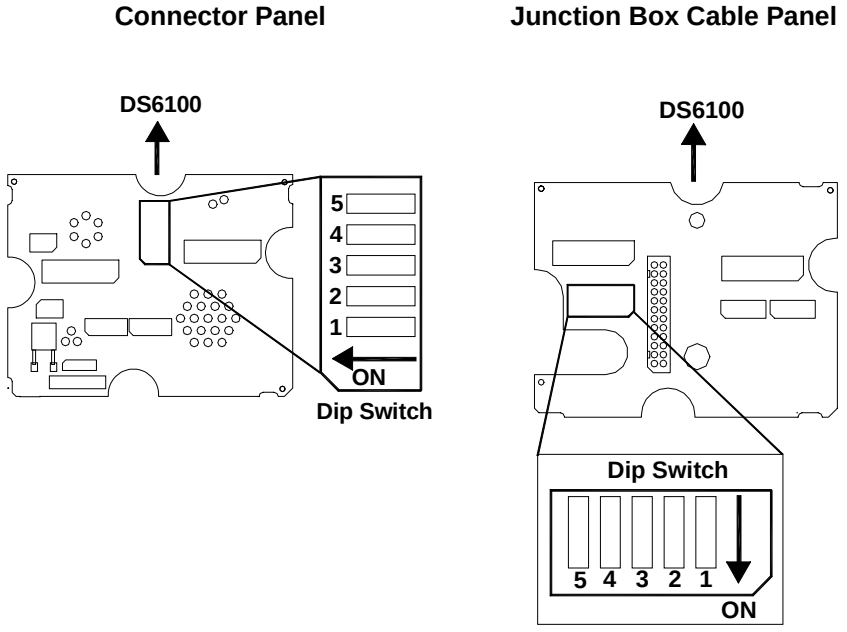


Figure 2.3 – DS6100 Multidrop Address Selection

The following table shows the Multidrop address settings where:

1 = ON 0 = OFF

Position					Address	Position					Address
5	**4**	**3**	**2**	**1**		**5**	**4**	**3**	**2**	**1**	
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

Address 0 is the default which allows software configuration.

2.2.2 Input Selection

Two presence sensor inputs are provided (PS1 and PS2).

They can be selected as both positive inputs (PNP) or as both negative inputs (NPN).

To select the Input type proceed as follows:

1. Open the panel as described in par. 2.2.

2. Position the jumpers as desired, referring to Figure 2.4.

Connector Panel **Junction Box Cable Panel**

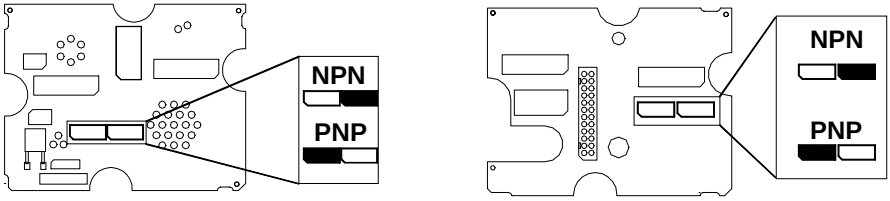


Figure 2.4 – Input selection for DS6100

2.3 MECHANICAL INSTALLATION

DS6100 can be installed to operate in any position.

There are 16 screw holes (M5 X 8) on the sides of the scanner for mounting.

The diagrams below give all the information required for installation; refer to par. 2.6 for correct positioning of the scanner with respect to the code passage zone.

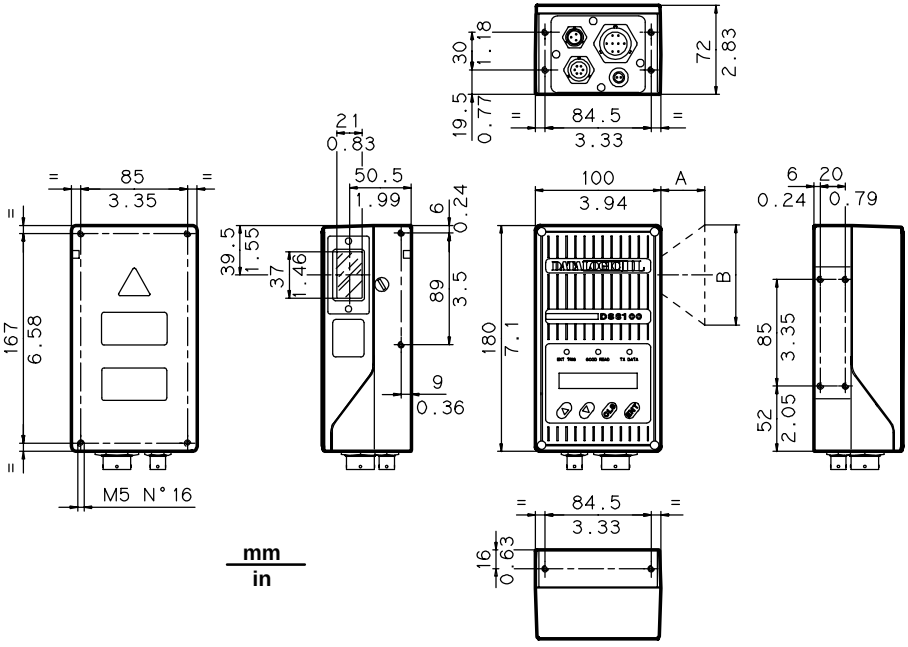


Figure 2.5 - DS6100 overall dimensions - connector model

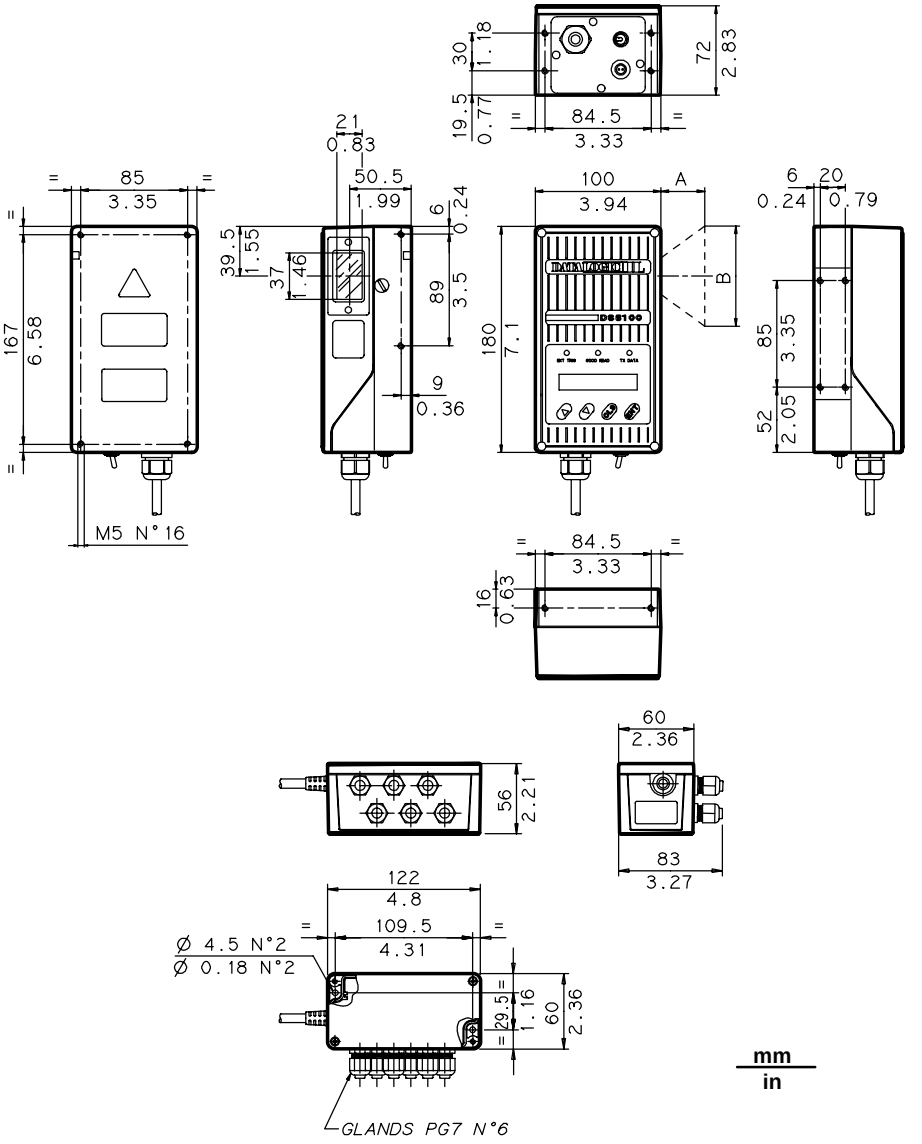


Figure 2.6 - DS6100 overall dimensions - junction box model.

2.4 JUNCTION BOX INSTALLATION

The junction box provides a passive connection between your scanner and the outside world in a fast and practical way. It represents an alternative to other standard connectors provided. Figure 2.7 shows the basic layout of a scanner using the 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.

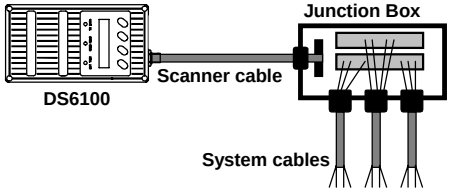


Figure 2.7 - Scanner using junction box

Refer to Figure 2.6 for the overall dimensions of the junction box.

2.4.1 Junction Box Mounting

The 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 2.8).

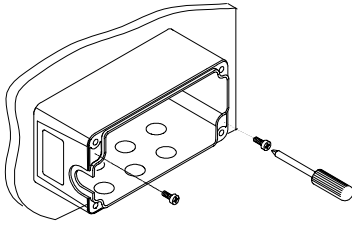


Figure 2.8 - Junction box mounting

2.4.2 Junction Box Electrical Connections

The connection and wiring procedure for the junction box is described as follows:

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

2) Pass all System cables 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 2.9).
- Insert the wire into the clamp and release the lever.

The wire will now be held in the spring clamp.

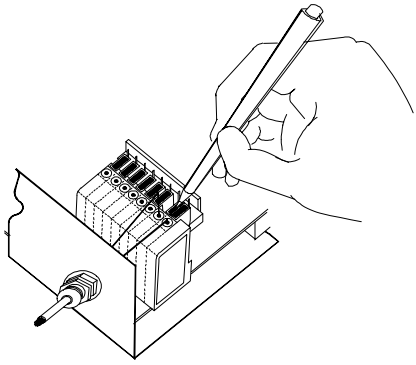


Figure 2.9 - System cable connections to the junction box

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

Positions 1-4:	24 - 16 AWG	0,2 - 1,5 mm^2
Positions 5-39:	26 - 20 AWG	0,14 - 0,5 mm^2

The junction box pinouts are indicated in the following table:

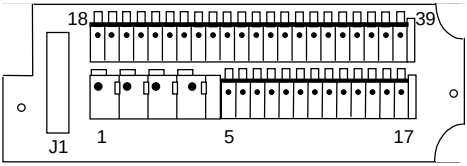


Figure 2.10 - Junction box connector and pinout

J. BOX Pinout for DS6100			
Pin	**Name**	**Pin**	**Name**
01	VS	**21**	RIGHT-
02	GND	**22**	SPS+
03	VS	**23**	SPS-
04	GND	***24**	*Main interface signals see table below*
05	CHASSIS	***25**	
06	VS	***26**	
07	VS	**27**	
08	ENC+	**28**	
09	ENC-	**29**	
10	GND	**30**	
11	GND	**31**	
12	VS	**32**	
13	VS	**33**	
14	PS1+/-	**34**	SGND
15	PS2+/-	**35**	TXA
16	GND	**36**	AUX485+
17	GND	**37**	SGND
18	NOREAD+	**38**	RXA
19	NOREAD-	**39**	AUX485-
20	RIGHT+		

Pin	RS232	RS485 full-duplex	RS485 half-duplex	20 mA C.L. (INT-26 Only)
24,29	TX232	TX485+	RTX485+	CL OUT+
25,30	RTS232	TX485-	RTX485-	CL OUT-
26,31		GNDRS485	GNDRS485	DRVOUT
27			RS485CNTR	DRVIN
28	SGND			CLGND
32	RX232	RX485+		CL IN+
33	CTS232	RX485-		CL IN-

* The signals on pins 24, 25, and 26 are repeated on pins 29, 30, and 31 to facilitate network connections (i.e. Multiplexer 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, place the Scanner cable so that the rubber seal fits into the cutout in the housing of the junction box and plug the 24-pin connector into connector J1 on the PCB inside the junction box as shown in Figure 2.11.

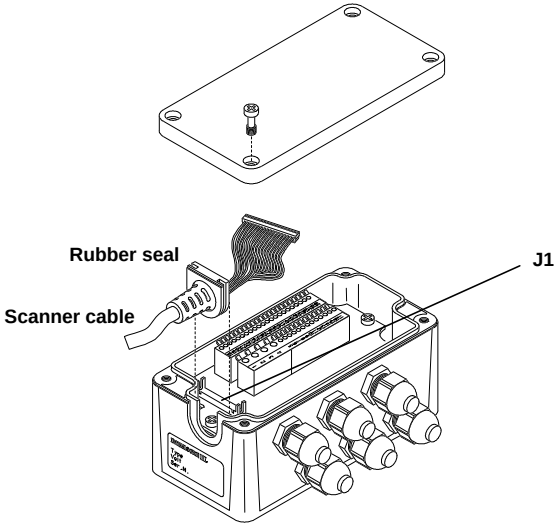


Figure 2.11 - Scanner cable connections to the junction box

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.

2.5 ELECTRICAL CONNECTIONS FOR CONNECTOR MODELS

DS6100 is available with two different electrical connection systems:

DS6100 junction box version

It is equipped with a cable that connects the junction box which houses spring clamp terminal blocks for the connections to the power supply and the input/output signals (refer to par. 2.4).

DS6100 connector version

It is equipped with 4 connectors for the following signals:

- Power supply (male, 3 pins) (Figure B, 13)
- Presence sensors (female, 6 pins) (Figure B, 14)
- Output/Serial interfaces (female, 19 pins) (Figure B, 12)
- Oscillating mirror (female, 2 pins) (Figure B, 15)

Power supply connector

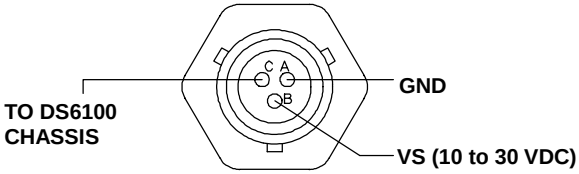


Figure 2.12 - Power supply connector

Power supply pinout		
Pin	**Name**	**Function**
A	GND	Supply voltage -
B	VS	Supply voltage +
C	CHASSIS	Chassis Ground

Input connector

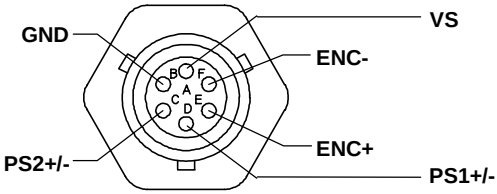


Figure 2.13 - Input connector

Input pinout		
Pin	**Name**	**Function**
A	VS	Power for external devices +
B	GND	Power for external devices -
C	PS2+/-	Presence sensor 2
D	PS1+/-	Presence sensor 1
E	ENC+	Encoder (Positive pin)
F	ENC-	Encoder (Negative pin)

Oscillating mirror connector

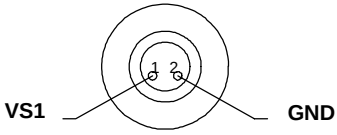


Figure 2.14 - Oscillating mirror connector

Oscillating mirror pinout		
Pin	**Name**	**Function**
1	VS1	Supply voltage (output) +
2	GND	Supply voltage (output) -

This output passes the operating power supply voltage from the scanner to the oscillating mirror. It is physically the same as the input power supplied to the DS6100.

Output/Serial interface connector

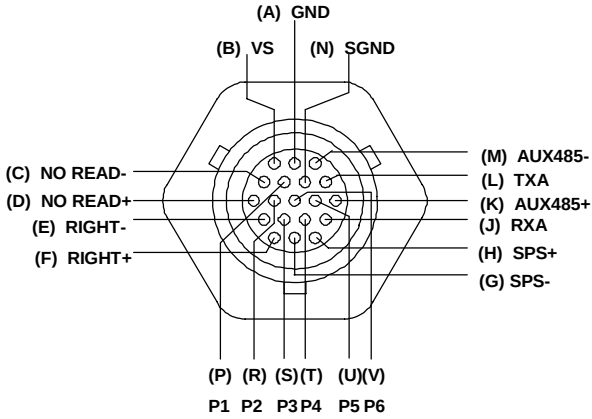


Figure 2.15 - Output/Serial interface connector

Output/Serial interface pinout					
Pin	**Name**	**Function**			
A	GND	supply voltage -			
B	VS	supply voltage +			
C	NO READ-	no read output			
D	NO READ+	no read output			
E	RIGHT-	right code output			
F	RIGHT+	right code output			
G	SPS-	slave presence sensor			
H	SPS+	slave presence sensor			
J	RXA				
K	AUX485+	Auxiliary serial interface			
L	TXA	(see par. 2.6.3)			
M	AUX485-				
		RS232	**RS485 full-duplex**	**RS485 half-duplex**	**20 mA C.L. (INT-26 Only)**
N	Main serial interface (see par. 2.6.2)	SGND			CLGND
P		RTS232	TX485-	RTX485-	CL OUT-
R		TX232	TX485+	RTX485+	CL OUT+
S		CTS232	RX485-		CL IN-
T		RX232	RX485+		CL IN+
U				RS485CNTR	DRVIN
V			GNDRS485	GNDRS485	DRVOUT

2.5.1 Power Supply

The supply voltage for correct operation of the scanner must be between 10 and 30 VDC.

The max. power consumption is 10 W.

The power block (optional), supplies the power necessary for the DS6100 and allows mains power to be used.

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.

2.5.2 Main Serial Interface

The main serial interface is compatible with the following electrical standards:

RS232

RS485 full-duplex

RS485 half-duplex

20 mA current loop

The 20 mA Current Loop interface is available if the optional INT-26 accessory is installed. This accessory interface replaces the RS232/RS485 selections.

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 main 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 configuring the scanner.

The following pins of the 19-pin connector are used for RS232 interface connection:

Pin	Name	Function
R	TX232	transmit data
T	RX232	receive data
P	RTS232	request to send
S	CTS232	clear to send
N	SGND	signal ground

The RTS and CTS signals control data transmission and synchronize the connected devices.

If the RTS/CTS hardware protocol is enabled, the DS6100 activates the RTS output to indicate a message can be transmitted. The receiving unit must activate the CTS input to enable the transmission.

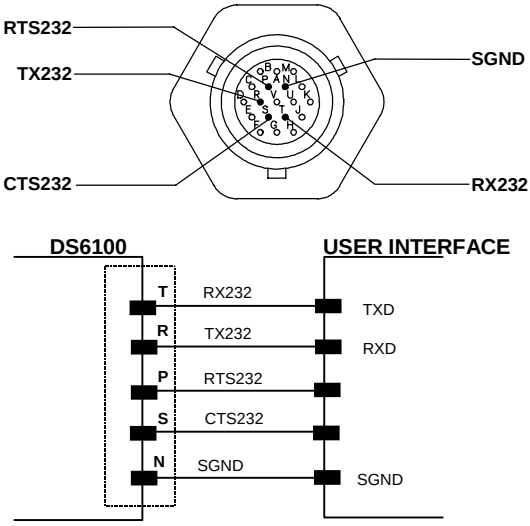


Figure 2.16 - RS232 connections

RS485 Full-Duplex Interface

The RS485 full-duplex interface is used for non-polled communication protocols in point-to-point connections over longer distances than those acceptable for RS232 communications or in electrically noisy environments.

The following pins of the 19-pin connector are used for RS232 interface connection:

Pin	Name	Function
R	TX485+	RS485 transmit data +
P	TX485-	RS485 transmit data -
T	RX485+	RS485 receive data +
S	RX485-	RS485 receive data -
V	GNDRS485	RS485 ground reference

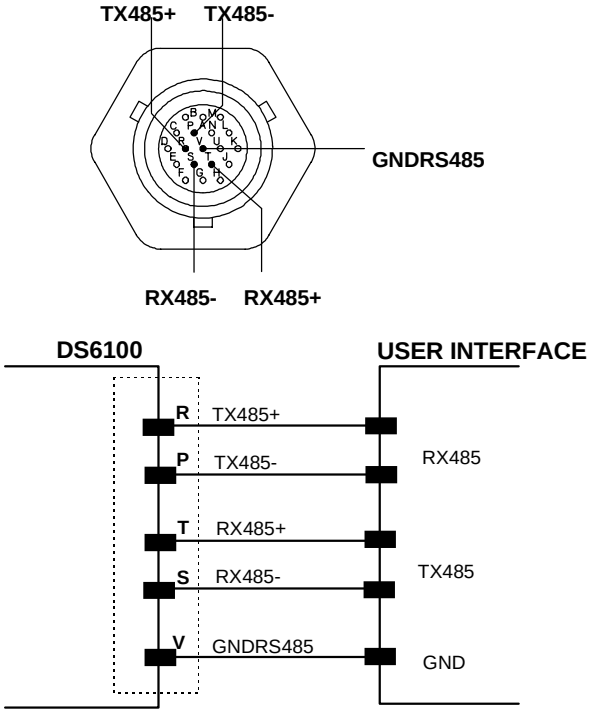


Figure 2.17 - RS485 full-duplex interface connections

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. 2.8.3, 2.8.4 and 2.8.5).

Device connection to the Multidrop line can be controlled externally through the RS485CNTR line. For example, it may be necessary to disconnect a scanner from the line if the device is damaged or the line is overloaded. To do this, apply a voltage from 12 to 30 Vdc to the RS485CNTR signal using GND as a reference.

The following pins of the 19-pin connector are used for RS232 interface connection:

Pin	Name	Function
R	RTX485+	RS485 transmit/receive data +
P	RTX485-	RS485 transmit/receive data -
V	GNDRS485	RS485 ground reference
U	RS485CNTR	multidrop device disconnect

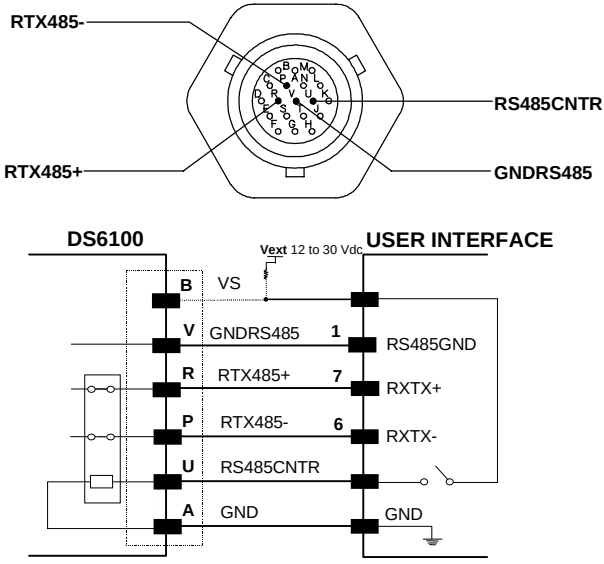


Figure 2.18 - RS485 half-duplex interface connections

The figure below shows a multidrop configuration with DS6100 scanners connected to a Multiplexer.

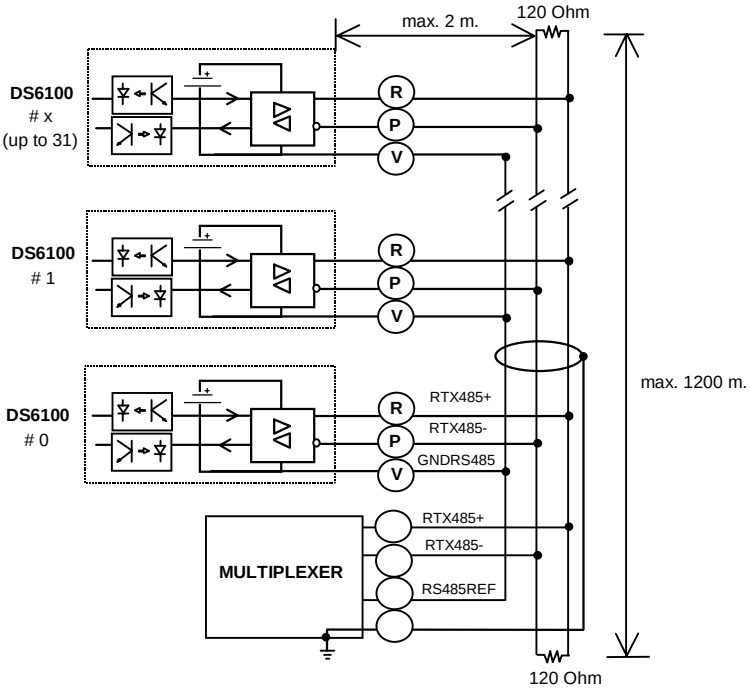


Figure 2.19 - DS6100 Multidrop connection to a Multiplexer

20 mA Current Loop (INT-26 Accessory Only)

When the INT-26 accessory board is installed, the DS6100 is equipped with a 20 mA current loop interface. The INT-26 board supports both active and passive type connections.

The following pins of the 19-pin output connector are used for the connections:

Pin	Name	Function
U	DRVIN	input current generator
V	DRVOUT	output current generator
N	CLGND	generator reference
R	CLOUT+	current Loop output +
P	CLOUT-	current Loop output -
T	CLIN+	current Loop input +
S	CLIN-	current Loop input -

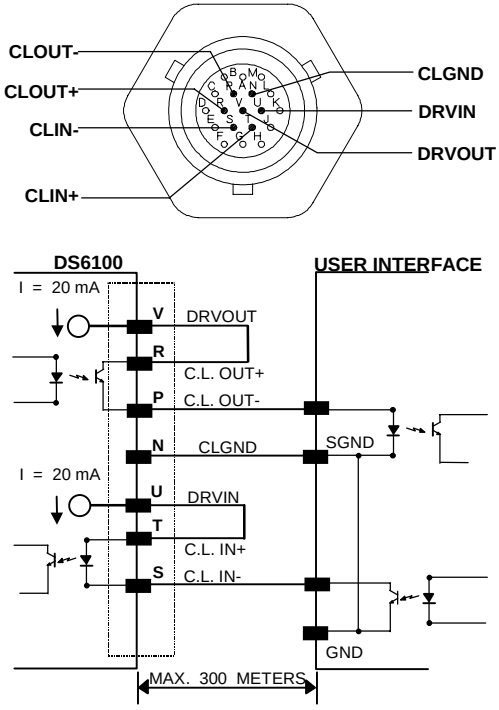


Figure 2.20 - 20 mA C.L. active connections

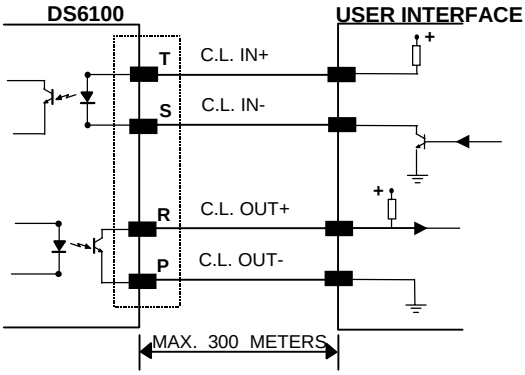


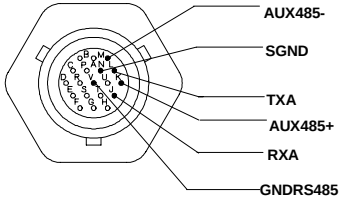
Figure 2.21 - 20 mA C.L. passive connections

2.5.3 Auxiliary Interface

The auxiliary serial interface is equipped with both RS232 and RS485 half-duplex interface connections. The interface type is exclusive and is selectable through the WinHost configuration program.

The following pins of the 19-pin connector are used:

Pin	Name	Function
J	RXA	RS232 receive data
L	TXA	RS232 transmit data
N	SGND	signal ground
K	AUX485 +	RS485 receive/transmit data +
M	AUX485 -	RS485 receive/transmit data -
V	GNDRS485	RS485 ground reference



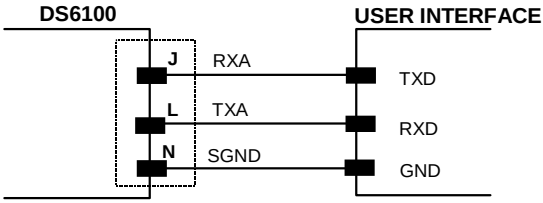


Figure 2.22 - RS232 Auxiliary interface connections

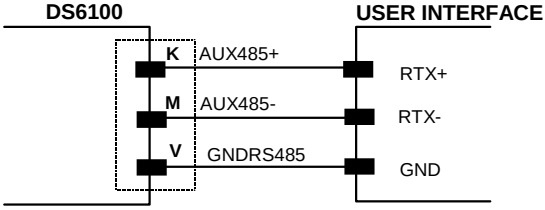


Figure 2.23 - RS485 Auxiliary interface connections

NOTE

The auxiliary RS485 half-duplex interface cannot be selected if the main interface is 20 mA C.L.

2.5.4 Inputs

The inputs of the scanner are on the 6-pin circular connector (Figure B, 14) on the body of the DS6100.

These inputs are called ENC, PS1 and PS2.

ENC is the Encoder input. In PackTrack™ mode, it detects the conveyor speed.

PS1 is the main presence sensor. When active, this input tells the scanner to scan for a code and that decoding can take place. The yellow LED (Figure A, 9) indicates the PS1 is active.

PS2 can be used as the stop signal for the reading phase.

All inputs are optocoupled and driven by a constant current generator; the command signal is filtered through an anti-disturbance circuit which generates a delay of about 5 ms for PS1 and PS2 and 500 µs for ENC.

For PS1 and PS2, the NPN or PNP connection must be made by setting the jumper as shown in par. 2.2.2.

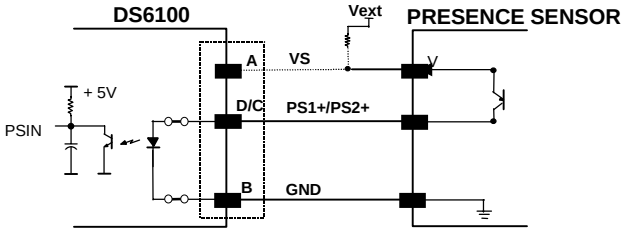


Figure 2.24 - Presence sensor input PNP command

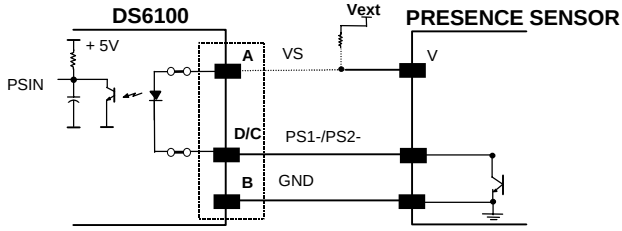


Figure 2.25 - Presence sensor input NPN command

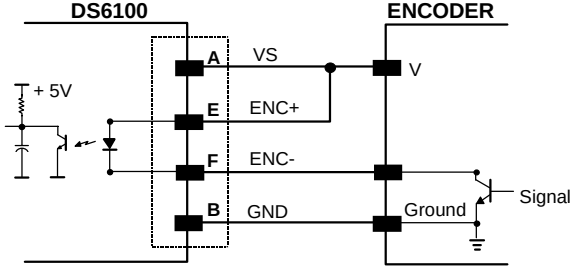


Figure 2.26 - Encoder NPN input command using DS6100 power

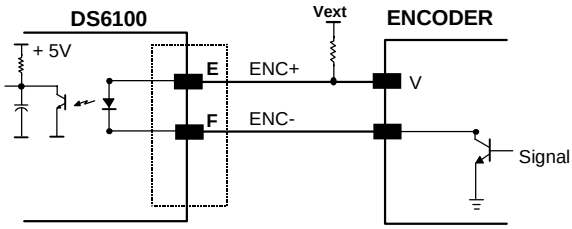


Figure 2.27 - Encoder NPN input command using external power

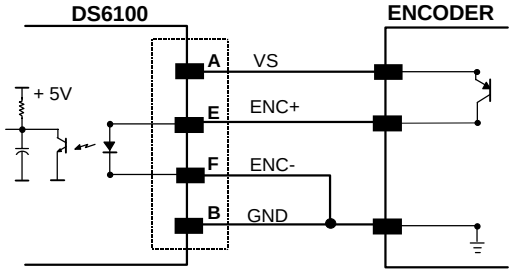


Figure 2.28 - Encoder PNP input command using DS6100 power

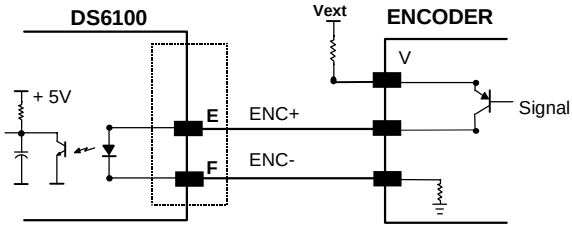


Figure 2.29 - Encoder PNP input command using external power

Isolation between the command logic and the scanner is maintained by powering the inputs with a different supply voltage (Vext) from that supplied on the 6-pin connector (VS).

The driving logic of the input signals may be powered, for convenience, with the voltage supply between pins A (VS) and B (GND) of the connector. In this case, however, the device is no longer electrically isolated.

The voltage available on the input connector, between pins A and B, is physically the same as used to power the scanner.

The electrical features of these inputs are:

Maximum voltage 30 V

Maximum current 25 mA

2.5.5 Outputs

Apart from the main and auxiliary interface outputs on the 19-pin circular connector (Figure B, 12), there are also indicator and power supply outputs for external devices.

Pin	Name	Function
A	GND	power for external devices -
B	VS	power for external devices +
C	NO READ-	no read output
D	NO READ+	no read output
E	RIGHT-	right code output
F	RIGHT+	right code output
G	SPS-	slave presence sensor
H	SPS+	slave presence sensor

A D.C. output voltage, the same as that powering the DS6100, is present between pins A and B. This may be used to power external devices: electrical isolation between the scanner and external devices is lost in this case.

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

The RIGHT output is used to signal the presence of a right code, thus a good decode condition.

The NO READ and RIGHT outputs are all level or pulse programmable: a 50 ms pulse is generated in the second case. Further programming information is supplied in the WinHost Help File. These outputs are created using optoisolated Darlington drivers and supply both the collector and emitter in output, allowing both loads referenced to ground and to the power supply to be driven.

The electrical features are given below:

Collector-emitter voltage	30 V Max.
Collector current	130 mA Max.
Saturation voltage (VCE)	1 V at 10 mA Max.
Maximum power dissipation	90 mW at 50°C (Ambient temperature).

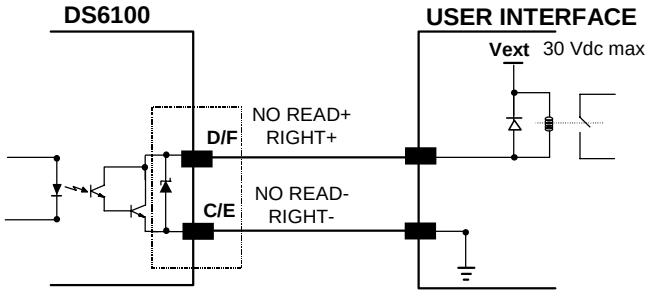


Figure 2.30 - Output interface

When the load is powered by an external power supply, the voltage must be less than 30 V. The limit requested by the maximum power dissipation is more important than that of the maximum collector current: if one of these outputs is continuously driven, the maximum current must not be more than 40 mA although 130 mA may be reached in pulse conditions.

2.6 POSITIONING

The DS6100 scanner is able to decode moving barcode labels at a variety of angles, however significant angular distortion may degrade reading performance.

When mounting the DS6100 take into consideration these three ideal label position angles: **Pitch 0°, Skew 10° to 30° and Tilt 0°**.

Follow the suggestions for the best orientation:

The **Pitch** angle is represented by the value **P** in Figure 2.31. Position the reader in order to **minimize** the **Pitch** angle.

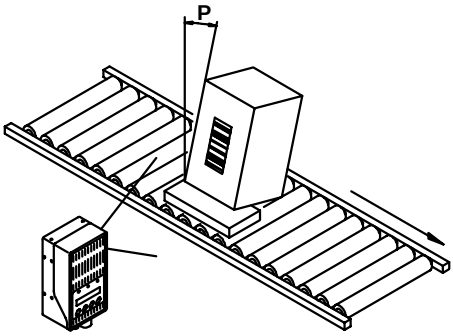


Figure 2.31 - Pitch angle

The **Skew** angle is represented by the value **S** in Figure 2.32. Position the reader to **assure at least 10°** for the **Skew** angle. This avoids the direct reflection of the laser light emitted by the DS6100.

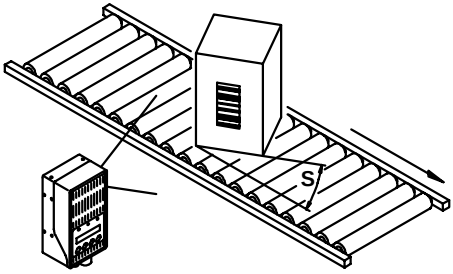


Figure 2.32 - Skew angle

The **Tilt** angle is represented by the value **T** in Figure 2.33. For advanced code reconstruction, see par. 3.1.1.

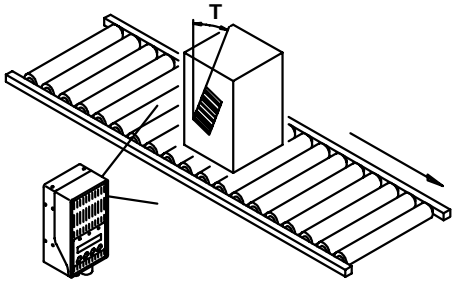


Figure 2.33 - Tilt angle

2.7 FOCUS ADJUSTMENT

Before installing the DS6100, the operator should select a specific reading area by means of the optical system for manual adjustment of the focal length.

The focus adjustment is obtained by rotating a regulation screw which moves the internal lenses and therefore causes the laser beam focusing position to change.

Seven marks, numbered from 0 to 6, are printed on the regulation screw to indicate the different positions of the internal optics. The diagram in par. 3.3 shows the reading performance that can be obtained from DS6100 scanners when operating with different focus positions and barcode label densities.

Even though the screw is marked with seven positions, the focus adjustment is continuous and not by step; this allows an optimum adjustment around the selected position.

WARNING

The scanner must be disconnected from the power supply during this operation to avoid hazardous visible laser light.

Refer to the following instructions when adjusting the focus:

1) Unscrew the focus regulation cover (Figure A, (3)) near the laser output window for access to the focus adjustment screw.

2) Carefully turn the screw counterclockwise until the number 0 is aligned with the notch as shown in the following figure.

3) Now turn the focus adjustment screw clockwise to reach the desired position (refer to the reading diagrams in par. 3.3).

NOTE

The focus adjustment screw is positioned by default at the value 2.

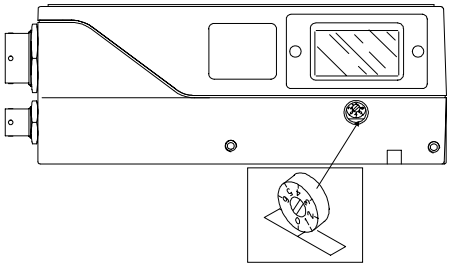


Figure 2.34 - Focus regulation

2.8 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. See the WinHost Help On Line.

2.8.1 Standard (Point-to-Point)

Using a point-to-point layout, the data is transmitted on the Auxiliary interface as well as on the Main interface. The Main interface can be selected for RS232, RS485 full-duplex or if INT-26 is installed, 20 mA C.L. communications. RS485 half-duplex communications cannot be used on either interface in this layout. Programming in Host Mode can be accomplished through the Main interface or Auxiliary interface.

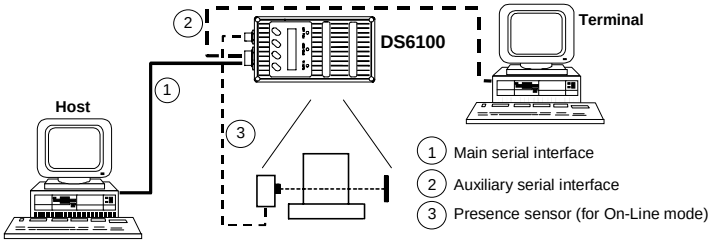


Figure 2.35 - Point-to-Point layout

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

2.8.2 Pass Through

Pass Through mode allows two or more devices to be connected to a single external serial interface. The DS6100 transmits the messages received by its auxiliary interface (RS232 only) onto its main interface.

In this configuration a series of scanners can be connected together using RS232 on the main interface and all messages will be passed through this chain to the host. The reading phase of each scanner is independent from the others in a Pass Through chain.

Applications can be implemented to connect a device such as a hand-held reader to the Auxiliary port for manual code reading capability.

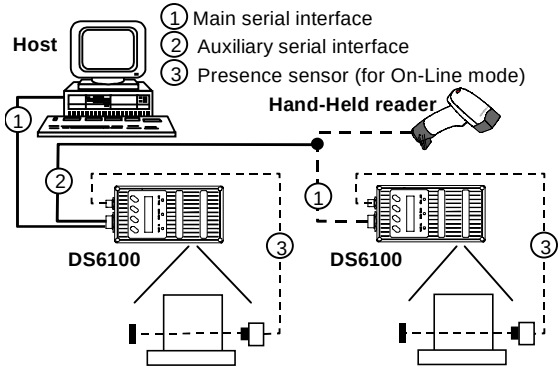


Figure 2.36 - Pass through layout

2.8.3 RS485 Master/Slave

The RS485 Master/Slave connection is used to collect data from several scanners to build either an omni-directional or multi-sided reading system; there can be one Master and up to 8 Slaves connected together.

The Master and Slave scanners are connected together using RS485 half-duplex on the auxiliary serial interface.

The Master scanner is also connected to either a Host or a Multiplexer on the main serial interface. The possible main interface type selections are RS232

or RS485 full-duplex for Host connections or RS485 half-duplex for Multiplexer connections.

For the Slave scanners the Multidrop Address Selection can be made using the DIP switch. The addresses must be consecutive and different from zero for hardware configuration, or be selected in software, (in this case the DIP switch address must be zero for each Slave). See "Multidrop Address Selection" in par. 2.2.1.

NOTE

The main serial port of the Slave scanners can be used for configuration. The termination resistors of the RS485 bus must not be installed.

Single P.S.

The P.S. signal is unique to the system; there is a single reading phase and a single message from the Master scanner to the Host. *The **On-Line** operating mode is used for this layout.*

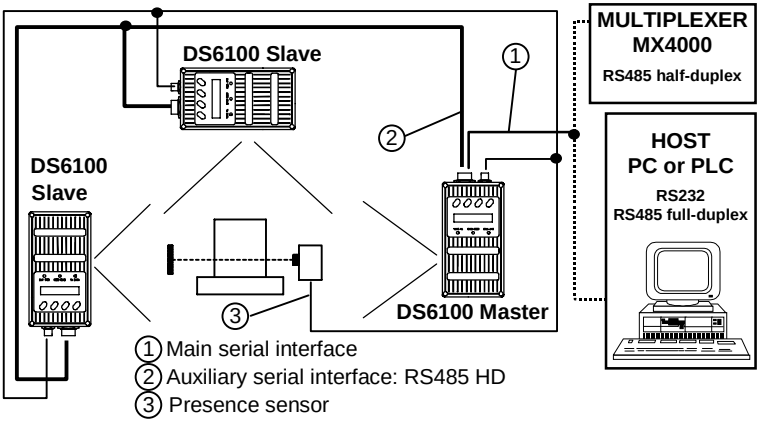


Figure 2.37 - Master-slave Single P.S. layout

Multi P.S.

In this layout, each DS6100 has its own P.S. and therefore multiple reading phases. The master sends the individual messages collected from the multidrop line as well as its own to the Host or Multiplexer. *The **On-Line** or **Automatic** operating modes are used for this layout.*

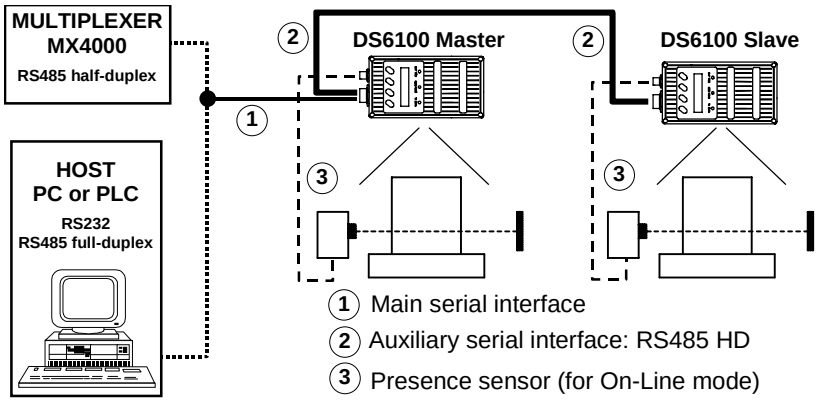


Figure 2.38 - Multi P.S. layout connections

2.8.4 Multiplexer

Each scanner is connected to a multiplexer (MX4000 for example) with the RS485 half-duplex mode on either the main or the auxiliary interface. The other interface is not used.

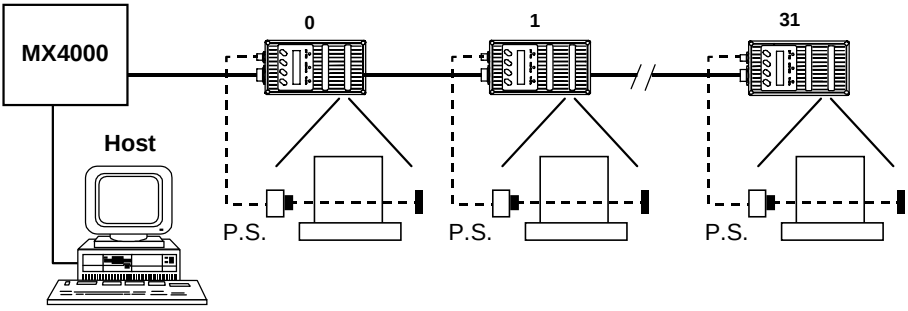


Figure 2.39 - Multiplexer layout

2.8.5 MUX24HS

Each scanner is connected to MUX24HS with the RS485 half-duplex mode on the auxiliary serial interface. The main interface is not used. The GOOD READ output signal of each scanner is wired to a separate input line of the MUX24HS, while the Presence Sensor signal is common to all the scanners and to the P.S. input line of the MUX24HS.

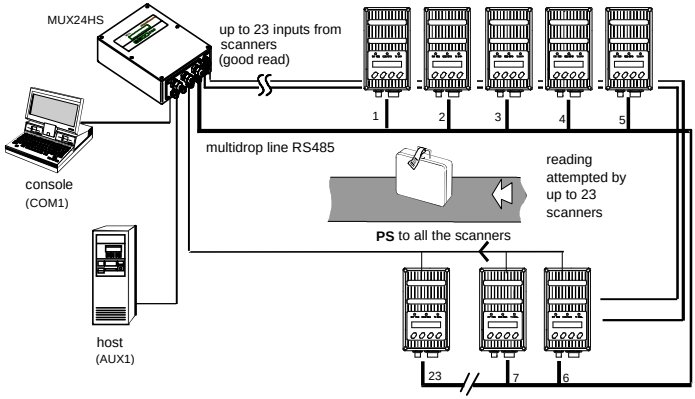


Figure 2.40 - MUX24HS layout

2.8.6 PackTrack Omnidirectional Reading

Two or more DS6100 junction box model scanners are correctly positioned in a Master/Slave Single P.S. type layout using the XBOX-05 connection box to compose an omni-directional reading station*. This is the indicated layout for* ***PackTrack*** *operating mode.*

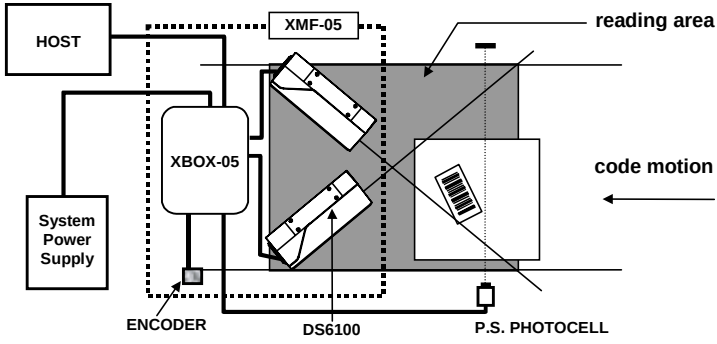


Figure 2.41 - Omnidirectional reading

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 3.1.

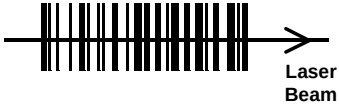


Figure 3.1 - Linear reading

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 DS6100 is able to "reconstruct" the barcode. A typical set of partial scans is shown in Figure 3.2.

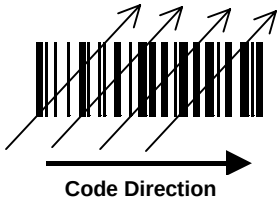


Figure 3.2 - Partial scans

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 (α maximum) under which the code reconstruction process is still possible.

We define the Tilt angle as the angle (α) between the laser beam and a line parallel to the barcode label, as shown in Figure 3.3.

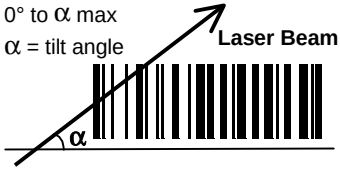


Figure 3.3 - Tilt angle

The formulas to calculate α maximum depend on various parameters such as: label height, number of scans per second, code motion speed, etc. To obtain α 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 + α max and - α max as shown in Figure 3.4 (the shaded zones are the NO READ zones).

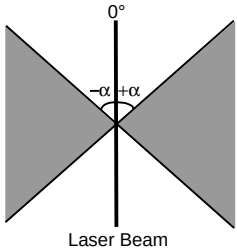


Figure 3.4 - Reading zones with α max

3.2 PERFORMANCE

It is possible to change the focus of the DS6100 in order to reach the reading distance expected. The scan rate is 800 scans / sec.

Refer to the diagrams in par. 3.3 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 listed in Figure 3.5.

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

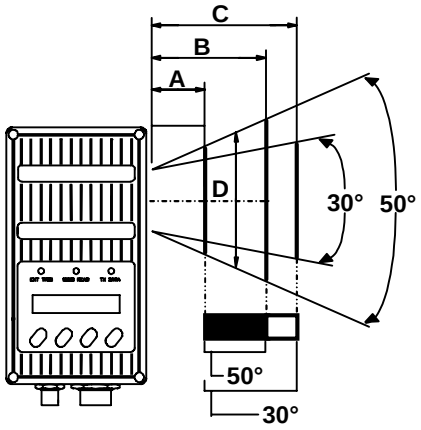
3.3 READING DIAGRAMS

The diagrams on the following pages show the reading distance for barcodes with different densities and refer to two laser beam apertures.

The following table illustrates the convention used for reading diagrams and the operating conditions of the scanners that refer to these measures:

CONDITIONS

Code	=	Interleaved 2/5 and Code 39 according to Datalogic Barcode Test Chart
PCS	=	0.90
"Pitch" angle	=	0°
"Skew" angle	=	10°
"Tilt" angle	=	0°
Operating mode	=	linear



A = minimum reading distance
B = maximum reading distance at 50° aperture
C = maximum reading distance at 30° aperture
D = laser beam aperture

Figure 3.5 - Reading diagram conventions and operating conditions

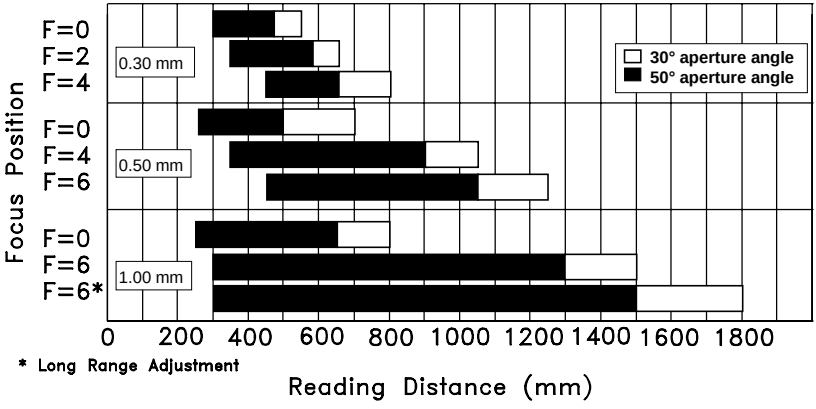


Figure 3.6 - Reading distances for DS6100

Example:

The following figure shows the reading diagram obtained for the DS6100 operating with focus screw set at position 6 and barcode density of 0.50 mm.

From figure 3.5 you will get the following reading distances:

Minimum	= 450 mm
Maximum at 50° of laser beam aperture	= 1050 mm
Maximum at 30° of laser beam aperture	= 1250 mm

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

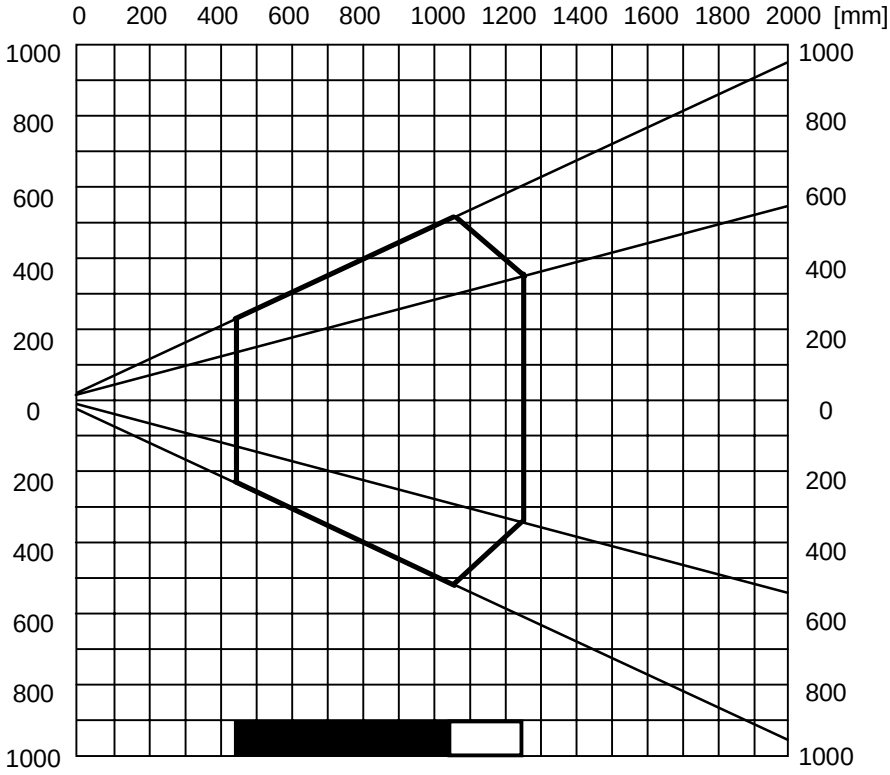


Figure 3.7 - Example of reading diagram for DS6100

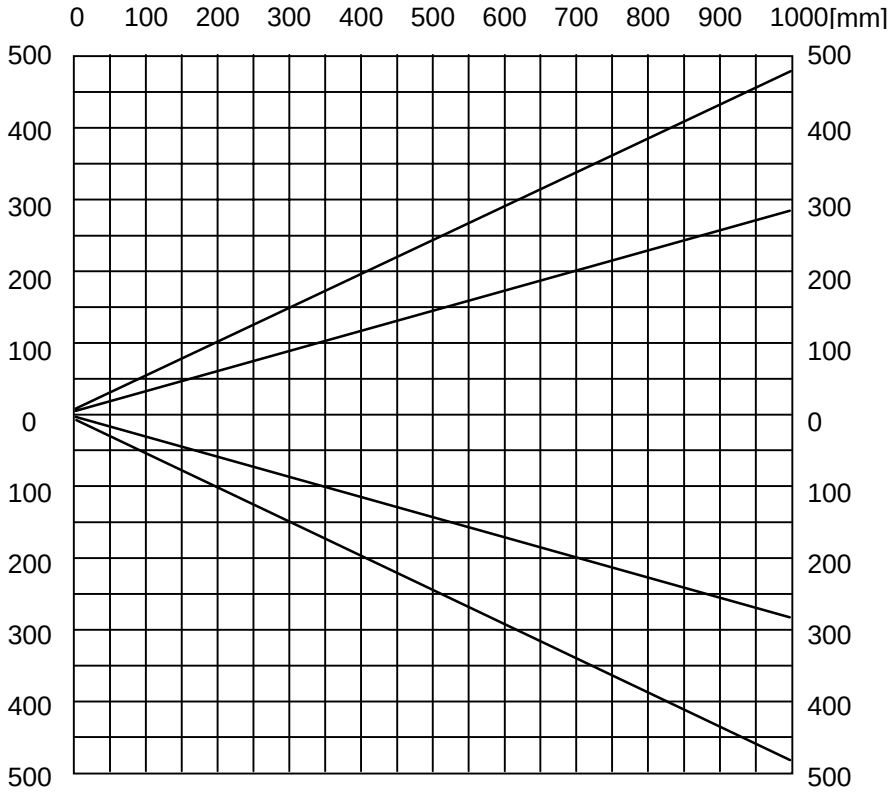


Figure 3.8 - Empty grid for DS6100: reading distance from 0 to 1000 mm

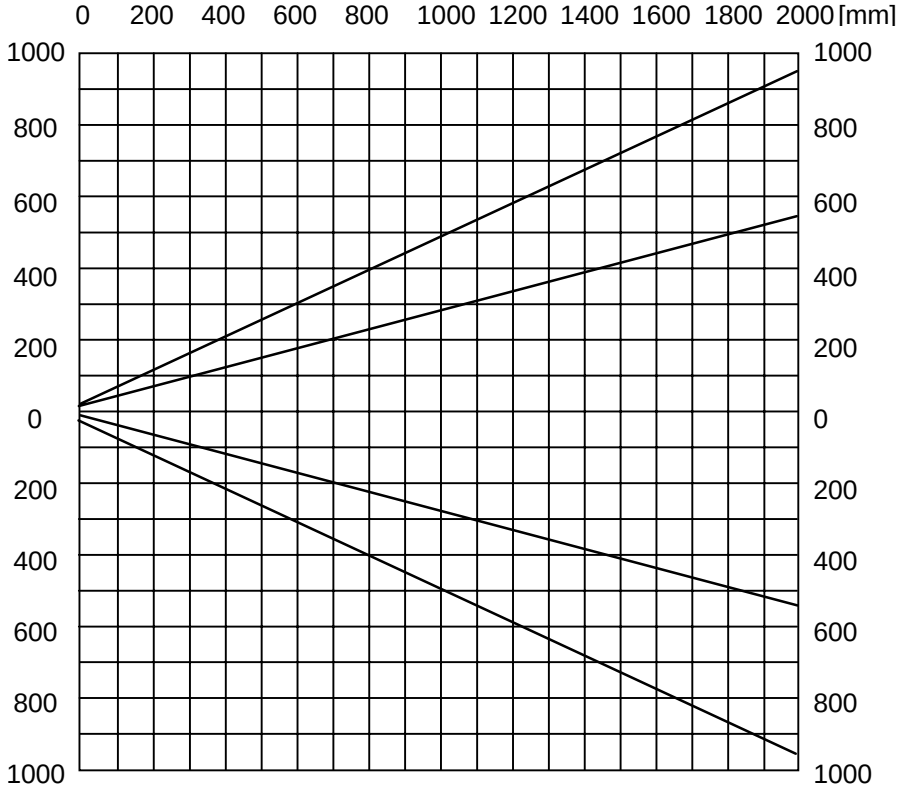


Figure 3.9 - Empty grid for DS6100 reading distance from 0 to 2000 mm

4 MAINTENANCE

4.1 CLEANING

Clean the laser beam output window (Figure A, (1)) periodically for 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 DS6100 when the scanner is turned off or at least when the laser beam is not active.

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5 TECHNICAL FEATURES

ELECTRICAL FEATURES (see note 1)	
Supply voltage Power consumption	10 to 30 V 10 W max.
INPUTS/OUTPUTS	
Serial interfaces Main Auxiliary	 RS232 RS485 full-duplex, RS485 half-duplex 20 mA C.L. (only with INT-26 accessory) RS232, RS485 half-duplex
Baud Rates	1200 to 57600
Command inputs (NPN or PNP)	Presence sensor 1 (optocoupled) Presence sensor 2 (optocoupled) Encoder input (optocoupled)
Outputs (open emitter or collector)	NO READ (optocoupled) RIGHT CODE (optocoupled)
OPTICAL FEATURES (see note 1)	
Light source Wave length Safety class Light receiver	semiconductor laser diode 650 to 680 nm Class 2 - IEC 825-1; Class II - CDRH Avalanche photodiode
READING FEATURES	
Scan rate	800 scans/s
Maximum resolution Max. reading distance Max. reading width Max. depth of field Aperture angle	 (see reading diagrams)
USER INTERFACE	
LCD Display	2 lines, 16 characters
4 key keypad	
Beeper	
LED indicators	laser beam active reading phase active barcode label presence data transmit

SOFTWARE FEATURES	
Readable code families	Interleaved 2/5 Code 39 Code 128 EAN128 EAN/UPC Codabar Code 93
Code selection	Up to 5 codes during one reading phase
Decoding safety	Several good reads of the same code can be enabled separately for each code
Headers and Terminators	Transmitted messages can be personalized using up to 4 headers and 4 terminators
Operating modes	ON LINE SERIAL ON LINE AUTOMATIC TEST PACK TRACK™
Configuration modes WinHost utility program KEYBOARD MODE HOST MODE	 using the built-in keypad receiving commands from the serial port
Parameter storage	Non-volatile internal EEPROM
ENVIRONMENTAL FEATURES	
Operating temperature (see note 2) Storage temperature Humidity	0 to 40 °C -20 to 70 °C 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 30 G; 11 ms; 3 shocks on each axis
Protection class	IP-65
PHYSICAL FEATURES	
Mechanical dimensions Weight	100 x 180 x 72 mm 1,250 gr.

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

Note 2: If the reader is used in high temperature environments (over 35 °C), use of the Beam Shutter is advised (for details refer to the information in the Winhost Help On Line provided on diskette).