



DX8200

Installation Manual



DX8200

INSTALLATION MANUAL





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DX8200

Ed.: 10/2003

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821000433 (Rev. C)

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GUIDE TO INSTALLATION

SERIAL INTERFACE MODELS

The following can be used as a checklist to verify all the necessary steps for complete installation of the DX8200 scanner.

1. Read all information in the section Safety Precautions at the beginning of this manual.
2. Correctly configure, position and mount the scanner for barcode reading according to the information in paragraphs 2.2 including all applicable sub-paragraphs, 2.3, and 4.4.
3. Provide correct system cabling according to the signals necessary (see all applicable sub-paragraphs under 2.4 and 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 “DX8200 Configuration” in the WinHost Help On Line.
 - Host Mode programming procedure by ESC sequences via the serial interface. For more details refer to the hDX8200 file in the DX8200 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.

BUS INTERFACE MODELS

The following can be used as a checklist to verify all the necessary steps for complete installation of the DX8200 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 3.2, and 4.4.
3. Provide correct system cabling according to the signals necessary (see all applicable sub-paragraphs under 3.3 and 3.4).
4. Configure your DX8200 by means of the SC8000 unit.



NOTE

Fine tuning of the scanner position for barcode reading can be accomplished by performing a test through the SC8000 unit.

The installation is now complete.

GENERAL VIEW

DX8200



Figure A - DX8200 General View

- | | |
|-------------------------------------|-----------------------|
| ① Control Panel (see Figure B or C) | ④ Mounting Rails |
| ② Product Label | ⑤ Laser Warning Label |
| ③ Laser Output Windows | |

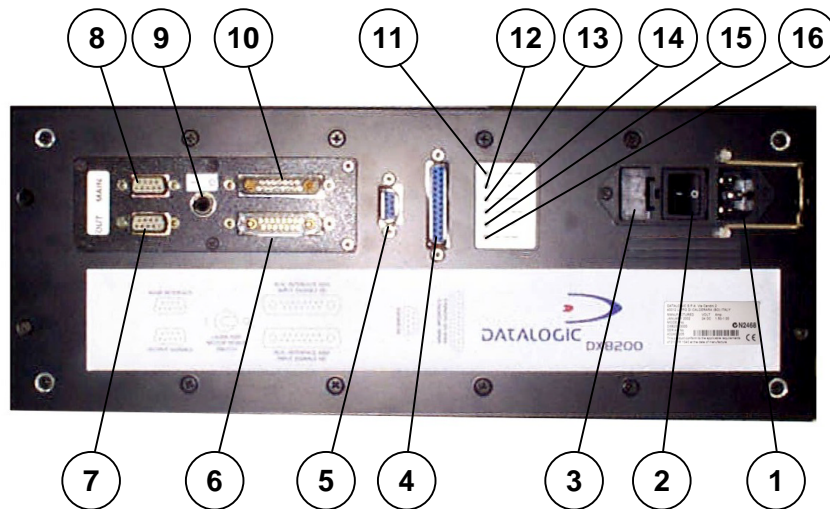


Figure B - DX8200 Serial Interface Control Panel

- | | |
|--|--|
| ① Power Input Connector | ⑨ Laser Beam and Motor Power Switch |
| ② Power ON Switch | ⑩ Aux. Interface/Input Signal Connector B |
| ③ Fuses | ⑪ Power ON LED |
| ④ Main Interface Connector with I/O | ⑫ Presence Sensor LED |
| ⑤ Reserved Connector | ⑬ Encoder LED |
| ⑥ Aux. Interface/Input Signal Connector A | ⑭ Good Read LED |
| ⑦ Output Signal Connector | ⑮ TX Data LED |
| ⑧ Main Interface Connector | ⑯ Not used |

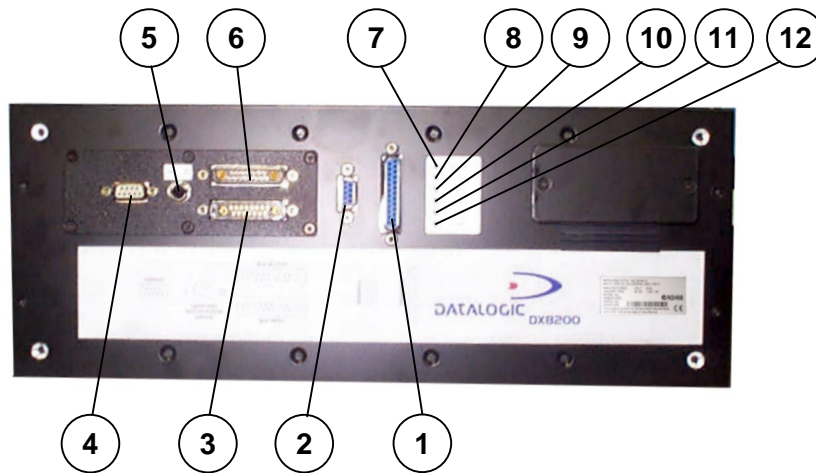


Figure C - DX8200 Bus Interface Control Panel

- | | |
|-------------------------------------|-----------------------|
| ① Input Signal Connector | ⑦ Power ON LED |
| ② Reserved Connector | ⑧ Presence Sensor LED |
| ③ Lonworks Input Connector | ⑨ Encoder LED |
| ④ RS232 Debug Connector | ⑩ Good Read LED |
| ⑤ Laser Beam and Motor Power Switch | ⑪ TX Data LED |
| ⑥ Lonworks Output Connector | ⑫ Network LED |

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.

For AC models, this device must be installed to a power source equipped with on/off switch or breaker within range of the operator as protection against grounding failures.

This device is protected against overloading by correct value fuses. For protection fuse replacement make sure correct value fuses are installed. See the fuse selection table in par. 5.2.

LASER SAFETY

The following information is provided to comply with the rules imposed by international authorities and refers to the correct use of the DX8200 scanner.

Standard Regulations

This scanner utilizes up to 3 low-power laser diodes. Although staring directly at the laser beam momentarily causes no known biological damage, avoid staring at the beam as one would with any very strong light source, such as the sun. Avoid that the laser beam hits the eye of an observer, even through reflective surfaces such as mirrors, etc.

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

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

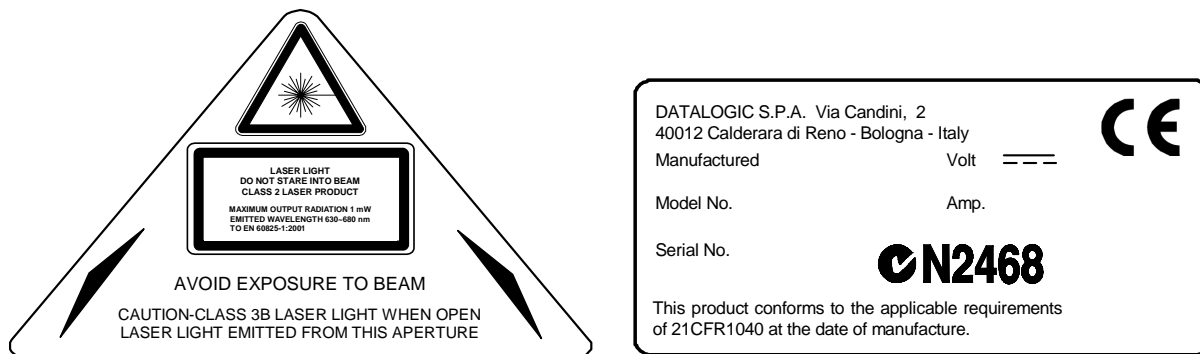


WARNING

Use of controls or adjustments or performance of procedures other than those specified herein may result in exposure to dangerous laser radiation.

The laser light is visible to the human eye and is emitted from the windows on the lower side of the reader (Figure A, 3).

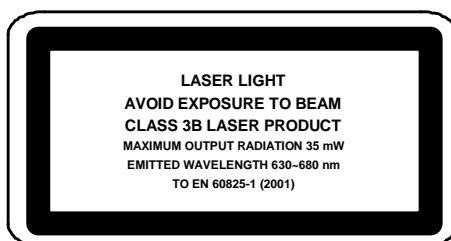
Warning labels indicating exposure to laser light and the device classification are applied onto the body of the scanner (Figure A, 5 and 2):



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 diodes used in this device are classified as Class 3B laser products according to EN 60825-1 regulations and as Class IIIb laser products according to CDRH regulations. As it is not possible to apply a classification label on the laser diodes 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 (35 mW at 630~680 nm).

1 GENERAL FEATURES

1.1 INTRODUCTION

The DX8200 scanner is a high performance omnidirectional barcode reader providing a plug and play approach towards omnidirectional system reading applications by combining the following advanced technologies with Datalogic 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. See par. 4.2 for more details.

ASTRA™

Automatically Switched Reading Area™ is the new Datalogic technology based on a multi-laser architecture and a fixed mounted optic system which concentrates the multiple laser emissions in a single laser beam. As each laser emitter is focused on a specific range of the reading area, a sophisticated electronic controller selects the best focused laser emitter with respect to the code to read. This allows the reading of medium-high density codes in a large reading area on very fast conveyors.

Flexibility

The high frequency laser diode modulation system guarantees complete immunity to ambient light and allows installation of the DX8200 in any working area.

The DX8200 Serial Interface models are easily configurable by means of the Windows-based user-friendly WinHost utility program provided on diskette.

It can also be configured from a Host PC through the Host Mode procedure.

1.2 DESCRIPTION

Some of the main features of DX8200 are listed below:

Serial Interface Models

- scanning speed 500 scans/sec for each scan line (1000 scans/sec total).
- reads all popular codes.
- supply voltage for serial interface models from 85 to 264 Vac with optional conversion for external 24 Vdc power. Bus interface models operate at 24 Vdc.
- 2 serial communication interfaces.
- 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 diodes; the light emitted has a wave length of 630~680 nm. For laser safety precautions refer to the "Safety precautions" section at the beginning of this manual.

Bus Interface Models

- Lonworks high speed network
- scanning speed 500 scans/sec for each scan line (1000 scans/sec. total)
- reads all popular codes
- 24 Vdc operation
- light source: solid state laser diodes; the light emitted has a wave length of 630~680 nm. For laser safety precautions refer to the "Safety precautions" section at the beginning of this manual.

1.2.1 Indicators

The DX8200 has six LEDs on the control panel.

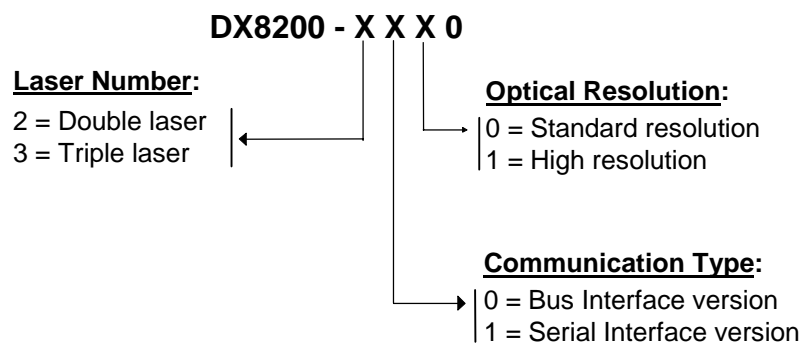
The indicators have the following functions:

- Power ON:** (green). Indicates the scanner is ON. (Figure B,11 or Figure C,7).
- Ext Trig:** (yellow). Indicates the external presence sensor is active. (Figure B,12 or Figure C,8).
- Encoder:** (yellow). Indicates the external encoder signal is active (when provided). (Figure B,13 or Figure C,9).
- Good Read:** (red). Indicates a probable code is present in the reading zone. (Figure B,14 or Figure C,10).
- TX Data:** (green). Indicates data transmission both on the main and on the auxiliary interface. (Figure B,15 or Figure C,11).
- Network:** (red). Indicates data transmission on the Lonworks network. (Figure C,12). Not used for serial interface models.

1.3 AVAILABLE MODELS

The DX8200 scanner is available in the following versions that differ depending on:

- laser number
- communication type
- optical resolution



1.4 ACCESSORIES

The following DX8200 accessories are available on request:

- CAB-8101 1.2 m. DX8200-DX8200 Connection cable
- CAB-8102 2.5 m. DX8200-DX8200 Connection cable
- CAB-8105 5 m. DX8200-DX8200 Connection cable
- CAB-8005 5 m. DX8200-SC8000/Host Connection cable
- CAB-8010 10 m. DX8200-SC8000/Host Connection cable

1.5 APPLICATIONS

The DX8200 barcode reader is specifically designed for industrial applications and for all cases requiring high reading performance such as:

- code reconstruction
- reading of codes covered by plastic film
- 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.

DX8200 is designed for both single-reader layouts and multi-reader layouts. For typical layouts see par. 2.5.

2 INSTALLATION — DX8200 SERIAL INTERFACE

2.1 PACKAGE CONTENTS

Verify that the DX8200 reader and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

- DX8200 reader
- Installation Manual + barcode test chart
- DX8200 configuration disk
- Accessories:
 - power connector
 - jumper (optional 24 Vdc operation)

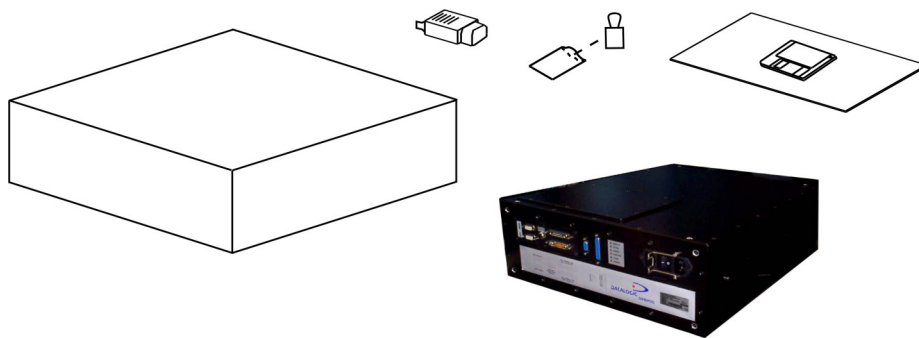


Figure 1



2.2 OPENING THE SCANNER

Before installing the DX8200 Serial Interface model, it may be necessary to open the scanner to select the Main interface type and the Multidrop Address (see par. 2.2.1 and 2.2.2).

Optional conversion for external 24 Vdc supply is described in par. 2.2.3.



WARNING

Before unscrewing the panel of the DX8200, make sure the power supply cable is disconnected to avoid shock or harm to the operator.

The following operation should be performed by qualified personnel only.

Refer to the following instructions when opening the reader:

1. The part of the device to be opened for Main Interface and Multidrop Address selection is the upper panel.
2. Unscrew the screws to open the scanner.
3. Carefully remove the panel as shown in Figure 2.

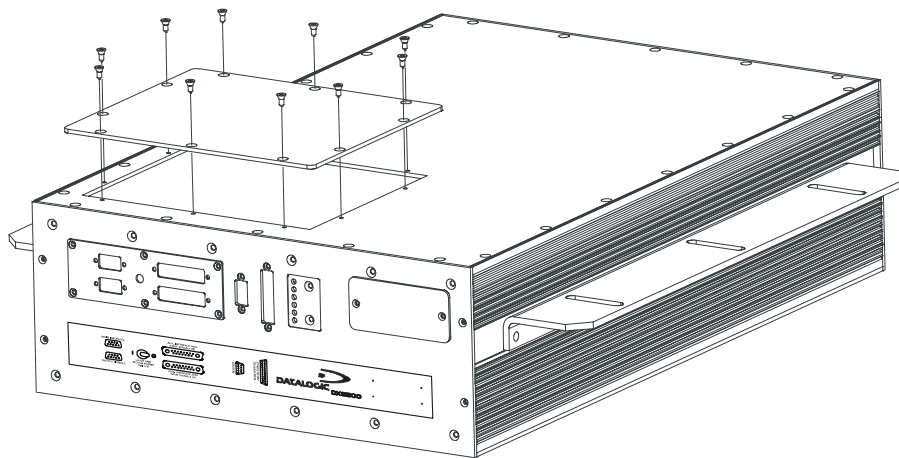


Figure 2 - Opening the DX8200



2.2.1 Main Interface Selection

The main serial interface of the DX8200 offers the following communication types:

- RS232
- RS485 Half-duplex
- RS485 Full-duplex
- 20 mA Current Loop

The RS232 interface is factory set.

To select the interface type:

1. Remove the panel as described in par. 2.2.
2. Position the jumper onto the correct connector as indicated in Figure 3.

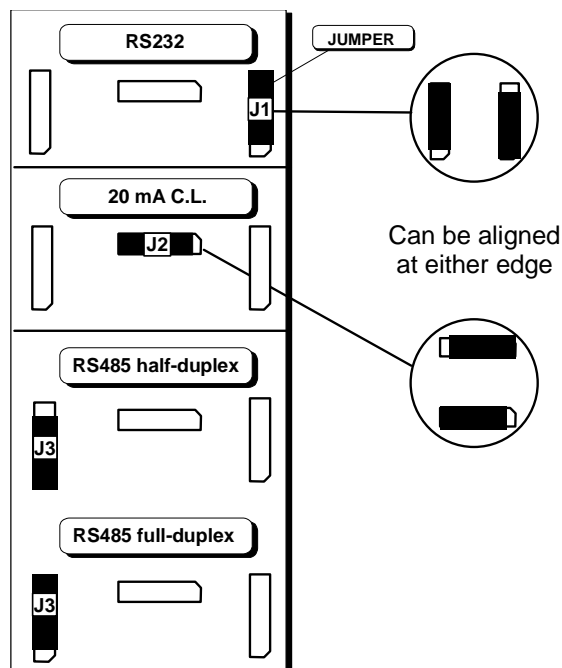
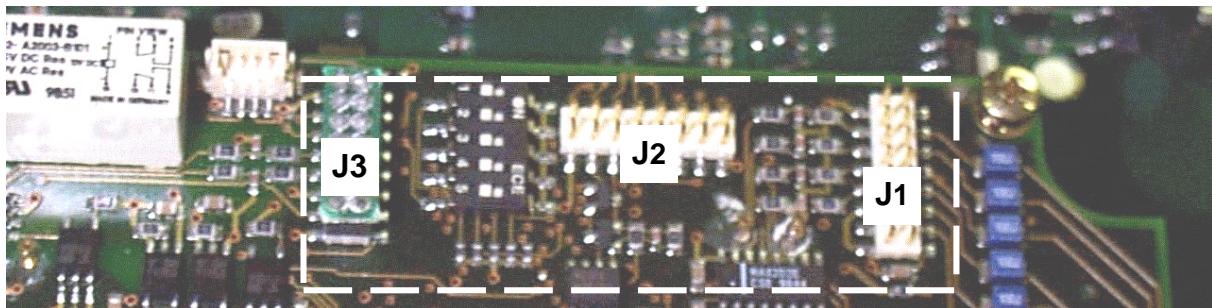


Figure 3 - DX8200 main interface selection



2.2.2 Multidrop Address Selection

When using the RS485 Half-duplex interface, the Multidrop Address must be selected. Proceed as follows:

1. Open the panel as described in par. 2.2.
2. Position the switches as desired, referring to Figure 4.

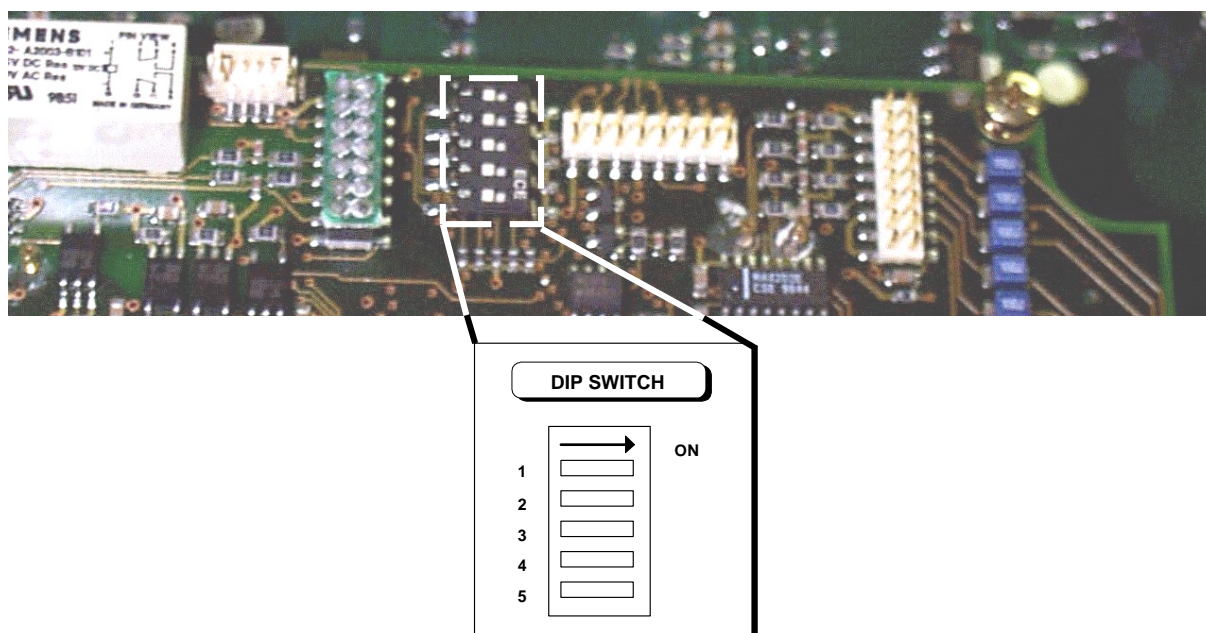


Figure 4 - DX8200 Multidrop Address selection

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



2.2.3 Conversion to External 24 Vdc Supply (Optional)

You can convert AC models to be supplied by an external 24 Vdc source. Proceed as follows:

1. Open the panel as described in par. 2.2.
2. Disconnect the internal 24 Vdc power connector, referring to Figure 5.

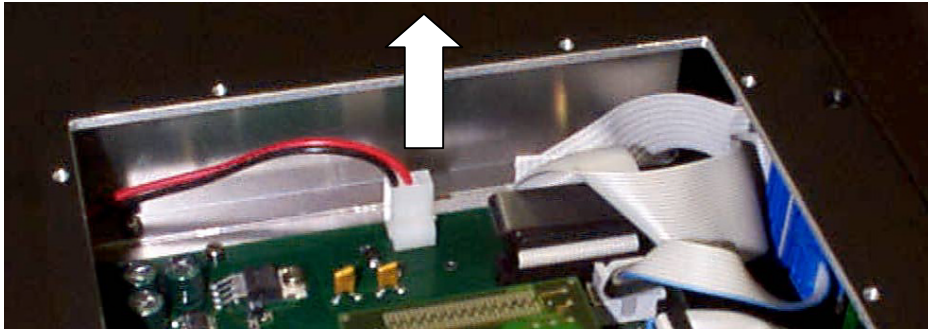


Figure 5 - Disconnecting the 24 Vdc internal power supply connector

3. Connect the external 24 Vdc jumper onto the power connector, referring to Figure 6.

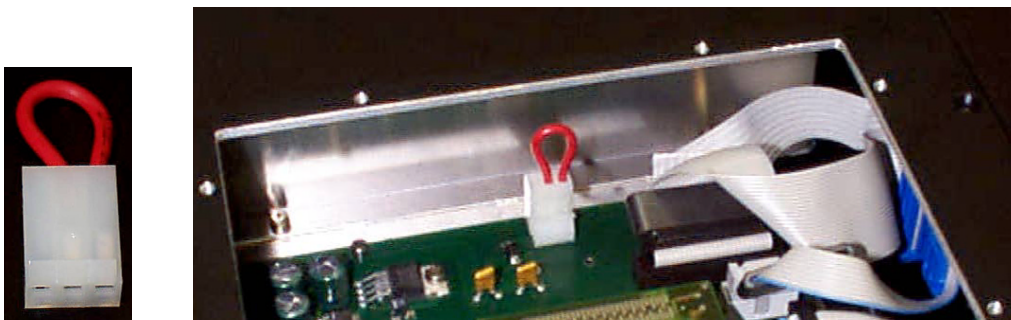


Figure 6 - Connecting the power supply jumper for external 24 Vdc operation

You must supply 24 Vdc power through the 17-pin **connector A** or **B** (Figure B, 6, 10).

2.3 MECHANICAL INSTALLATION

DX8200 can be installed to operate in any position.

The DX8200 has two mounting rails for its installation.

The diagram below gives all the information required for installation; refer to par. 4.4 for correct positioning of the scanner.

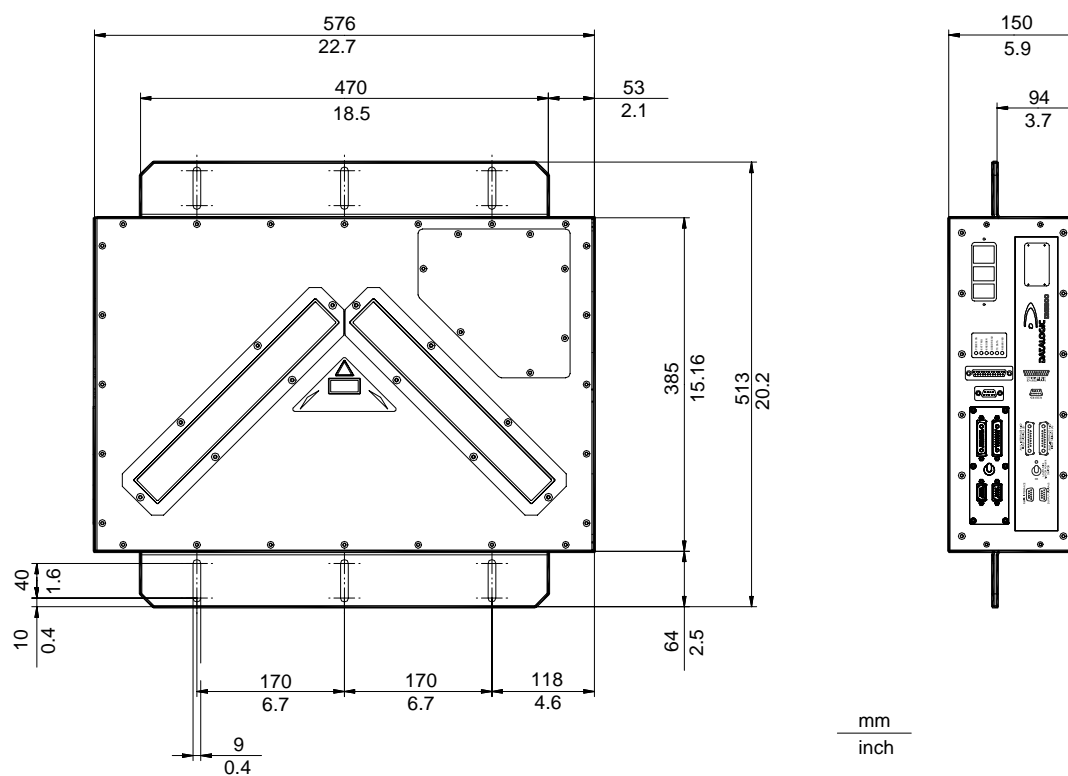


Figure 7 - DX8200 overall dimensions

2.4 ELECTRICAL CONNECTIONS

2.4.1 DX8200 Connectors

The DX8200 is equipped with the following connectors for electrical connections:

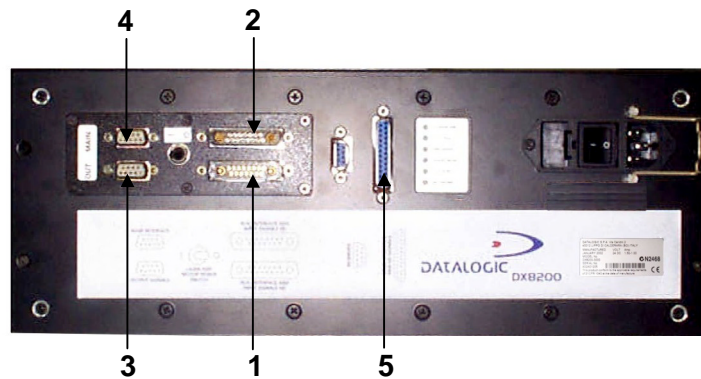


Figure 8 - Serial Interface Control panel

- | | | |
|---|---|-------------------|
| 1 | Aux. Interface/Input Signal connector A | (male, 17 pins) |
| 2 | Aux. Interface/Input Signal connector B | (female, 17 pins) |
| 3 | Output Signal connector | (female, 9 pins) |
| 4 | Main Interface connector | (female, 9 pins) |
| 5 | Main Interface connector with I/O | (female, 25 pins) |

Aux. Interface/Input Signal Connector A

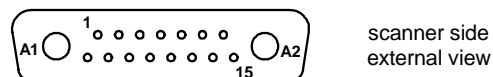


Figure 9 - Aux. Interface/Input Signal connector A (male)

Aux. Interface/Input Signal Connector A pinout		
Pin	Name	Function
A1	GND	24 Vdc ground reference
A2	VS	24 Vdc power output *
1	GND485	RS485 ground reference
2 - 7	NC	not connected
8	RTX485+	RS485 transmit/receive (positive pin)
9	RTX485-	RS485 transmit/receive (negative pin)
10	ENC+	encoder signal (positive pin)
11	ENC-	encoder signal (negative pin)
12	PS2+	presence sensor 2 signal (positive pin)
13	PS2-	presence sensor 2 signal (negative pin)
14	PS1+	presence sensor 1 signal (positive pin)
15	PS1-	presence sensor 1 signal (negative pin)

* **24 Vdc output** when using AC supply voltage. If conversion for external 24Vdc supply is used, this is the **24Vdc input** pin.

Aux. Interface/Input Signal Connector B

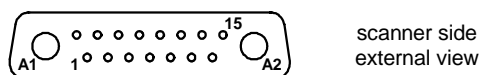


Figure 10 - Aux. Interface/Input Signal connector B (female)

Aux. Interface/Input Signal Connector B pinout		
Pin	Name	Function
A1	GND	24 Vdc ground reference
A2	VS	24 Vdc power output *
1	GND485	RS485 ground reference
2	I.U. (TXDEBUG)	only for service use
3	I.U. (GNDDEBUG)	only for service use
4	I.U. (RXDEBUG)	only for service use
5	GND AUX232	auxiliary RS232 ground reference
6	RXAUX232	auxiliary RS232 receive
7	TXAUX232	auxiliary RS232 transmit
8	RTX485+	positive RS485 transmit/receive
9	RTX485-	negative RS485 transmit/receive
10	ENC+	encoder signal (positive pin)
11	ENC-	encoder signal (negative pin)
12	PS2+	presence sensor 2 signal (positive pin)
13	PS2-	presence sensor 2 signal (negative pin)
14	PS1+	presence sensor 1 signal (positive pin)
15	PS1-	presence sensor 1 signal (negative pin)

* **24 Vdc output** when using AC supply voltage. If conversion for external 24Vdc supply is used, this is the **24Vdc input** pin.

Output Signal Connector

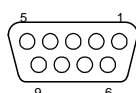
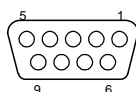


Figure 11 - Output Signal connector

Output Signal Connector pinout		
Pin	Name	Function
1	VS	24 Vdc power output
2	GND	24 Vdc ground reference
3	NO READ+	no read output (positive pin)
4	NO READ-	no read output (negative pin)
5	RIGHT+	right code output (positive pin)
6	RIGHT-	right code output (negative pin)
7	SPS+	slave presence sensor (positive pin)
8	SPS-	slave presence sensor (negative pin)
9		

Main Interface Connector**Figure 12 - Main Interface connector**

Main Interface Connector pinout				
Pin	RS232	RS485 full-duplex	RS485 half-duplex	20 mA C.L.
1				DRVREF
2	TXD	TX485+	RTX485+	CLOUT+
3	RXD	TX485-	RTX485-	CLOUT-
4				DRVIN
5	GND	GNDRS485	GNDRS485	
6			RS485CNTR	
7	CTS	RX485+		CLIN+
8	RTS	RX485-		CLIN-
9				DRVOUT

Main Interface Connector with I/O

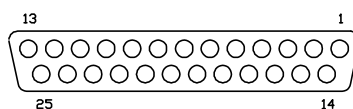


Figure 13 - Main Interface connector with I/O

Main Interface Connector with I/O pinout		
Pin	Name	Function
1	GND	ground reference
13	VS	24 Vdc power output
9	I.U. (TXDEBUG)	only for service use
22	I.U. (RXDEBUG)	only for service use
11	NO READ+	no read output (positive pin)
3	NO READ-	no read output (negative pin)
23	RIGHT+	right code output (positive pin)
16	RIGHT-	right code output (negative pin)
24	ENC+	encoder signal (positive pin)
15	ENC-	encoder signal (negative pin)
25	PS2+	presence sensor 2 signal (positive pin)
14	PS2-	presence sensor 2 signal (negative pin)
12	PS1+	presence sensor 1 signal (positive pin)
2	PS1-	presence sensor 1 signal (negative pin)

Pin	RS232	RS485 full-duplex	RS485 half-duplex	20 mA C.L.
21				DRVREF
17	TXD	TX485+	RTX485+	CLOUT+
5	RXD	TX485-	RTX485-	CLOUT-
20				DRVIN
19	GND	GNDRS485	GNDRS485	
7			RS485CNTR	
18	CTS	RX485+		CLIN+
6	RTS	RX485-		CLIN-
8				DRVOUT

2.4.2 Power Supply

The power supply connector is on the control panel of the DX8200 (Figure B, 1).

For AC models, the supply voltage for correct operation of the scanner must be between 85 and 264 Vac. The max. power consumption is 30 VA.

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 switch (Figure B, 9) on the connector panel turns off power to both the motor and the laser beams.

2.4.3 Main Serial Interface

The main serial interface of the DX8200 is compatible with the following electrical standards:

RS232

RS485 Full-Duplex

RS485 Half-Duplex

20 mA Current Loop

The configuration parameters of the selected interface can be defined using one of the programming methods available.

For this procedure refer to the WinHost Help On Line installed from the diskette.

The connections regarding the interface selected are described in the following sections.



NOTE

The signals relative to the selected interface are only available on the Main Interface connector if the jumper inside the scanner is correctly positioned. Refer to par. 2.2.1 for further details.

RS232

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 Main Interface connectors (Figure B, 4 or 5) are used for RS232 interface connection:

Connector		Name	Function
25-Pin	9-Pin		
17	2	TXD	transmit data
5	3	RXD	receive data
19	5	GND	Ground
18	7	CTS	clear to send
6	8	RTS	request to send

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

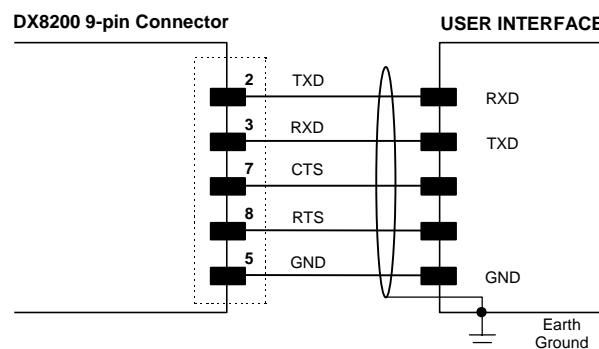


Figure 14 - RS232 connections

The RTS and CTS signals control data transmission and synchronize the connected devices. If the RTS/CTS hardware protocol is enabled, the DX8200 activates the RTS output to indicate a message can be transmitted. The receiving unit must activate the CTS input to enable the transmission.

RS485 Full-Duplex

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

The following pins of the Main Interface connectors (Figure B, 4 or 5) are used for RS485 Full-duplex interface connection:

Connector		Name	Function
25-Pin	9-Pin		
17	2	TX485+	RS485 transmit data +
5	3	TX485-	RS485 transmit data -
19	5	GNDRS485	RS485 ground reference
18	7	RX485+	RS485 receive data +
6	8	RX485-	RS485 receive data -

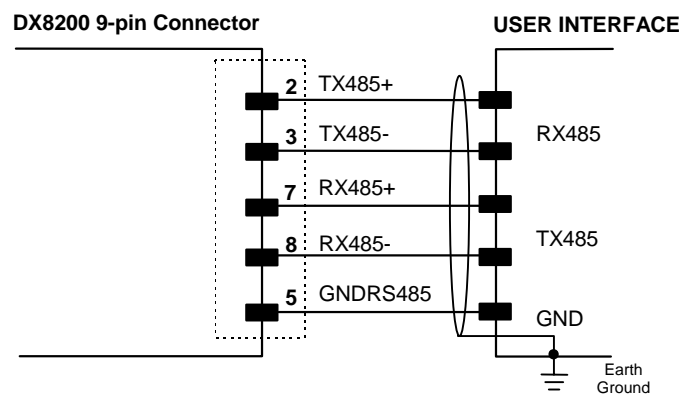


Figure 15 - RS485 full-duplex interface connections

RS485 Half-Duplex

The RS485 half-duplex interface (3 wires + shield) 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. 2.5.3 and 2.5.4).

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 20 to 30 Vdc to the RS485CNTR signal using the (A1) GND as a reference.

The following pins of the Main Interface connectors (Figure B, 4 or 5) are used for RS485 half-duplex interface connection:

Connector		Name	Function
25-Pin	9-Pin		
7	6	RS485CNTR	multidrop device disconnect
17	2	RTX485+	RS485 transmit/receive data +
5	3	RTX485-	RS485 transmit/receive data -
19	5	GNDRS485	RS485 ground reference

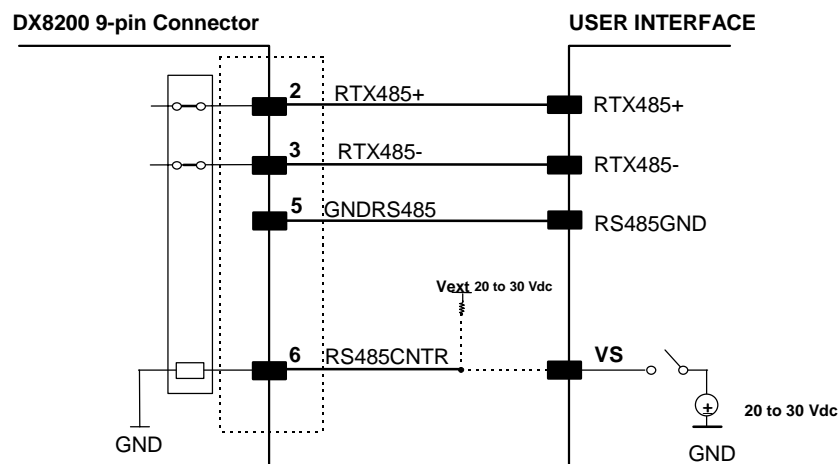


Figure 16 - RS485 half-duplex interface connections

The figure below shows an example of a multidrop configuration between a Multiplexer and DX8200 scanners.

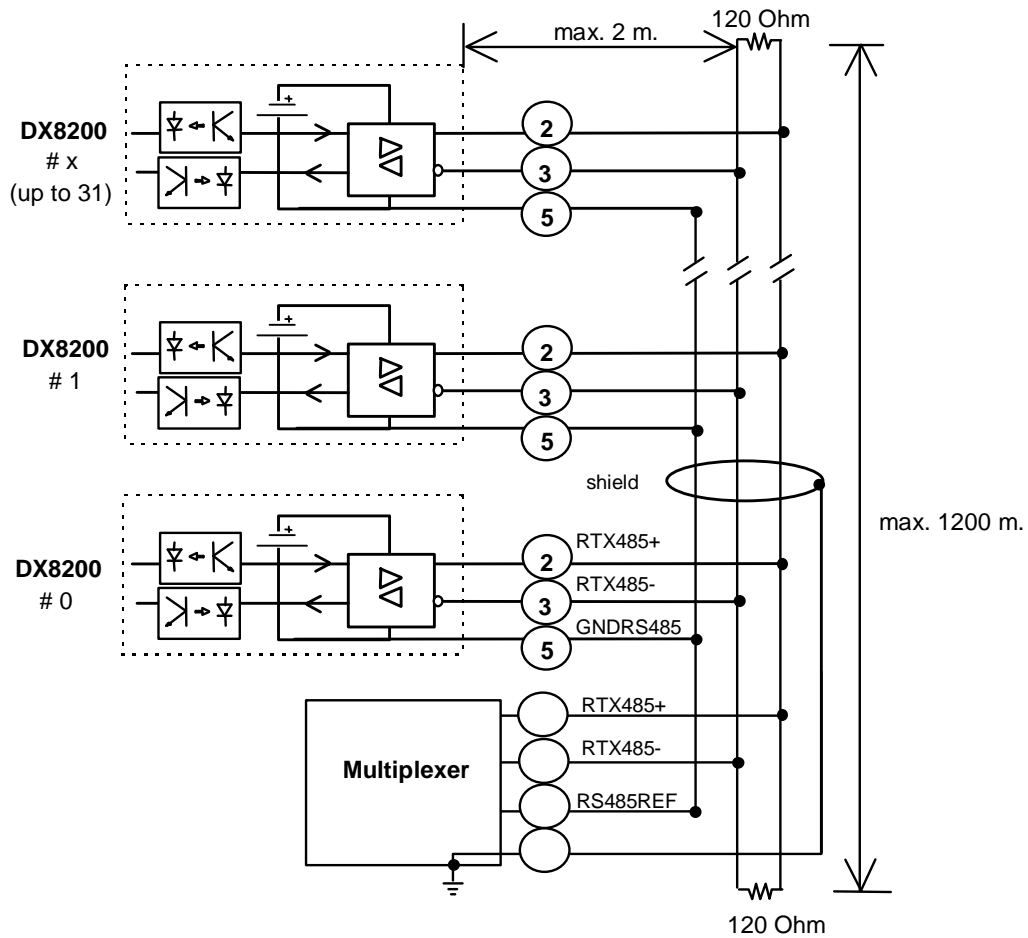


Figure 17 - DX8200 Multidrop connection to a Multiplexer

20 mA Current Loop

The DX8200 has two current generators (one for transmission and one for reception), allowing for both active and passive type connections.

The following pins of the Main Interface connectors (Figure B, 4 or 5) are used for 20 mA C.L. connections:

Connector		Name	Function
25-Pin	9-Pin		
21	1	DRVREF	current generator reference
17	2	CLOUT+	current loop output +
5	3	CLOUT-	current loop output -
20	4	DRVIN	input current generator
18	7	CLIN+	current loop input +
6	8	CLIN-	current loop input -
8	9	DRVOUT	output current generator

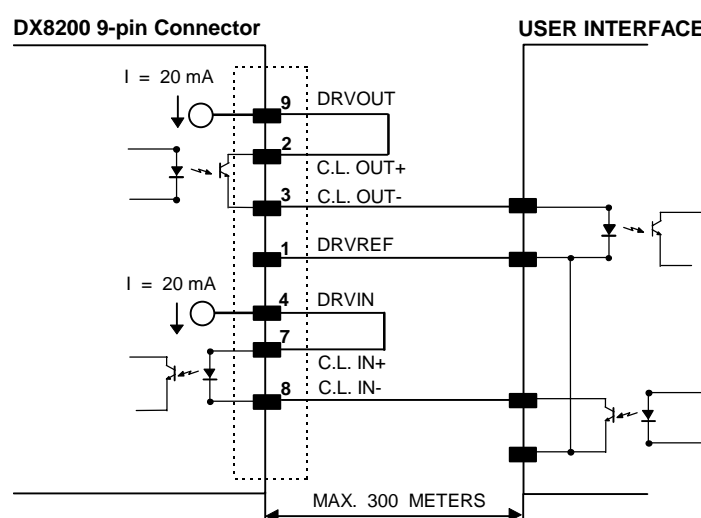


Figure 18 - 20 mA C.L. active connections

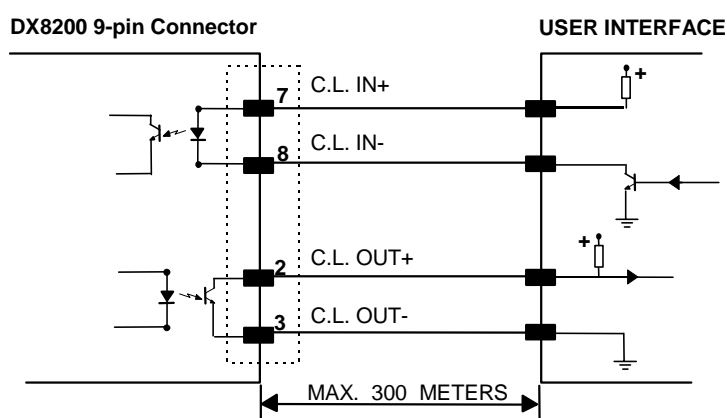


Figure 19 - 20 mA C.L. passive connections

2.4.4 Auxiliary Interface

The auxiliary serial interface of the DX8200 is equipped with both RS232 and RS485 half-duplex interface connections. The signals for the auxiliary interface are available on the **Aux. Interface A** and **B** connectors to simplify the master/slave connections (Figure B, 1 and 2).

RS232 Auxiliary

The following pins of the **Aux. Interface B connector** are used:

Connector	Name	Function
B		
5	GND AUX232	auxiliary RS232 ground
6	RXAUX232	auxiliary receive data
7	TXAUX232	auxiliary transmit data

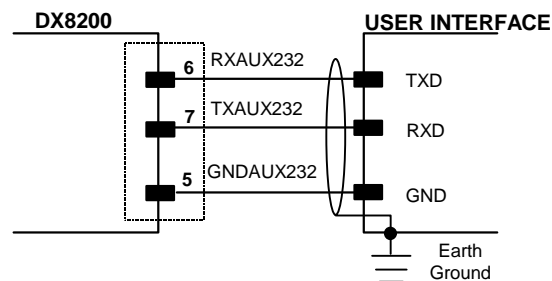


Figure 20 - RS232 Auxiliary interface connections

RS485 Half-Duplex Auxiliary

The following pins of the **Aux. Interface A and B connectors** (Figure B, 1 and 2) are used:

Connector	Name	Function
A and B		
1	GND485	ground
8	RTX485+	transmit/receive +
9	RTX485-	transmit/receive -

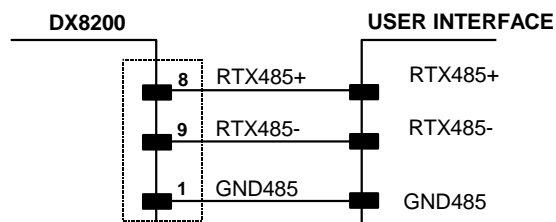


Figure 21 - RS485 Auxiliary interface connections

2.4.5 Inputs

The inputs of the scanner are on the **Input Signal A and B connectors** (Figure B, 1 and 2) and on the **25-pin I/O connector** (Figure B, 5) on the body of the DX8200.

These inputs are called ENC, PS1 and PS2.

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

PS1 is the main presence sensor. The yellow LED (Figure B, 12) 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 μ s for ENC.

Connector		Name	Function
25-Pin	A and B		
25	12	PS2+	presence sensor 2 signal (positive pin)
14	13	PS2-	presence sensor 2 signal (negative pin)
12	14	PS1+	presence sensor 1 signal (positive pin)
2	15	PS1-	presence sensor 1 signal (negative pin)
24	10	ENC+	encoder signal (positive pin)
15	11	ENC-	encoder signal (negative pin)

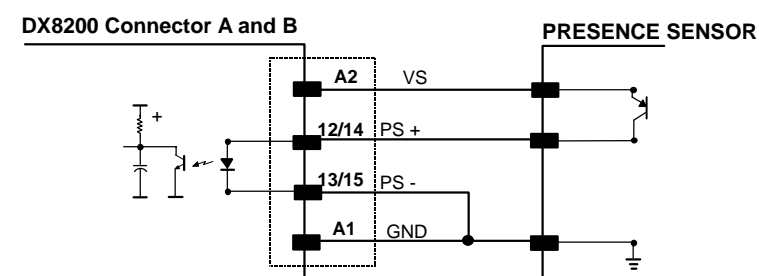


Figure 22 - Presence sensor input PNP command

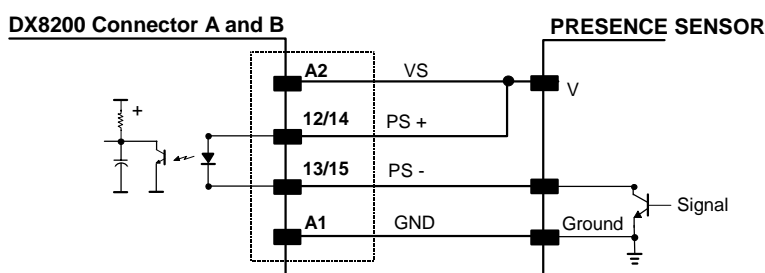


Figure 23 - Presence sensor input NPN command

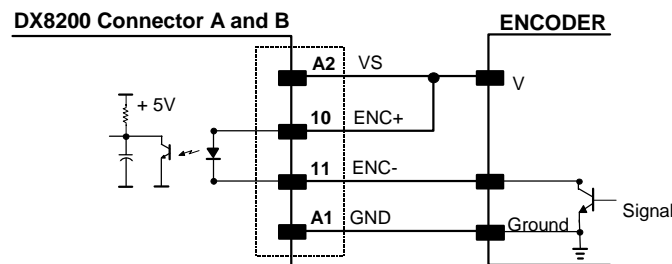


Figure 24 - Encoder NPN input command using DX8200 power

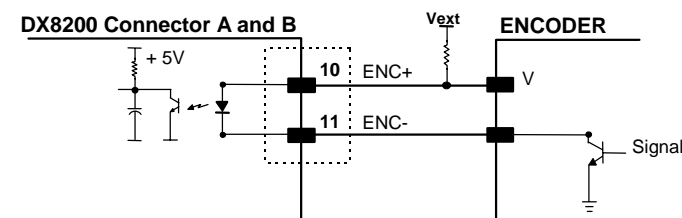


Figure 25 - Encoder NPN input command using external power

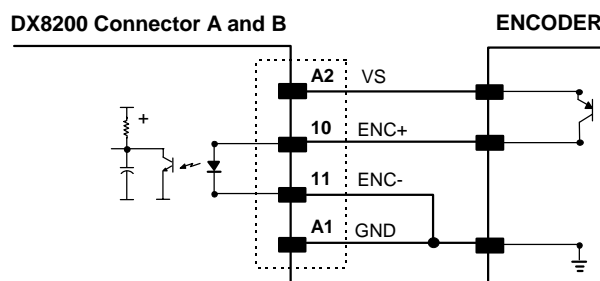


Figure 26 - Encoder PNP input command using DX8200 power

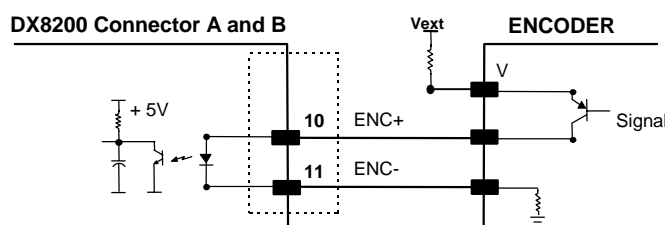


Figure 27 - Encoder PNP input command using external power

Isolation between the command logic and the scanner is maintained by powering the inputs with a different supply voltage (V_{ext}) from that supplied on the **Aux. Interface/Input Signal A and B** connectors (VS).

The driving logic of the input signals may be powered, for convenience, with the voltage supply between pins A2 (VS) and A1 (GND) of the connector. In this case, however, the device is no longer electrically isolated.

The electrical features of these inputs are:

Maximum voltage 30 V

Maximum current 25 mA

2.4.6 Outputs

The relative signals are available on the **Output Signal connector** (Figure B, 3) and on the **25-pin I/O connector** (Figure B, 5).

Connector		Name	Function
25-pin	9-Pin		
13	1	VS	power for external devices (positive pin)
1	2	GND	power for external devices (negative pin)
11	3	NO READ+	no read output +
3	4	NO READ-	no read output -
23	5	RIGHT+	right code output +
16	6	RIGHT-	right code output -
	7	SPS+	slave presence sensor +
	8	SPS-	slave presence sensor -

A 24 Vdc output voltage, is present between VS and GND. 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 signaled 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.

All outputs are 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 (pulsed).
Saturation voltage (VCE)	1 V at 10 mA Max.
Maximum power dissipation	90 mW at 50 °C (Ambient temperature).

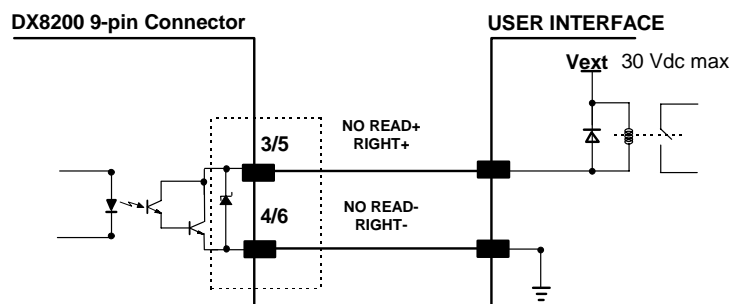


Figure 28 - Output interface

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.

2.5 TYPICAL LAYOUTS

2.5.1 Standard (Point-to-Point)

In this layout, data is transmitted to the Host on the main serial interface. The selectable interface types are RS232, RS485 full-duplex or 20 mA C.L. communications.

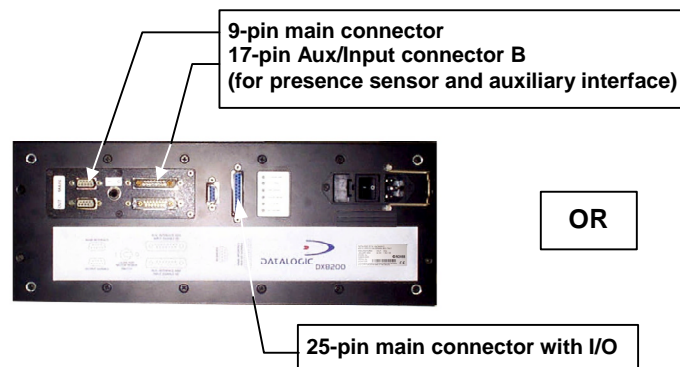
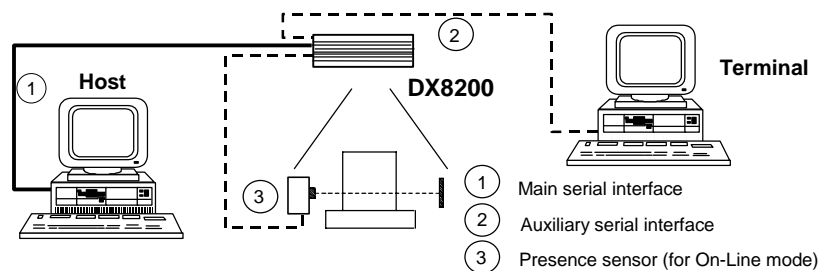


Figure 29 - Standard (point-to-point) layout

When On-Line Operating mode is used, the scanner is activated by a presence sensor when the object enters its reading zone.

The data is also transmitted on the Auxiliary interface (if configured for Standard communication mode), as well as on the Main interface. The auxiliary interface uses RS232 for this layout.

Host Mode programming can be accomplished either through the Main or the Auxiliary interface.

2.5.2 Pass Through

Pass Through Mode allows two or more devices to be connected to a single external serial interface. The DX8200 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. When On-Line Operating mode is used, the scanner is activated by an External Trigger (presence sensor) when the object enters its reading zone.

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

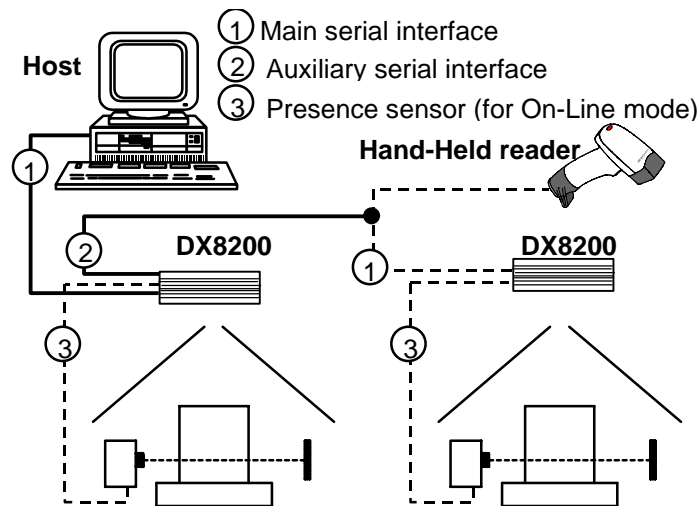


Figure 30 - Pass through layout

2.5.3 RS485 Master/Slave

The RS485 Master/Slave connection is used to collect data from several scanners to build either a multi-sided or extended-width omnidirectional reading system; there can be one Master and up to 2 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 (see “Main Interface Selection” in par. 2.2.1).

For the Slave scanners the Multidrop Address Selection can be made using the DIP switch. The addresses must be consecutive and not include zero for hardware configuration, or be selected in software (in this case the DIP switch address must be zero for each Slave). See par. 2.2.2.



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.

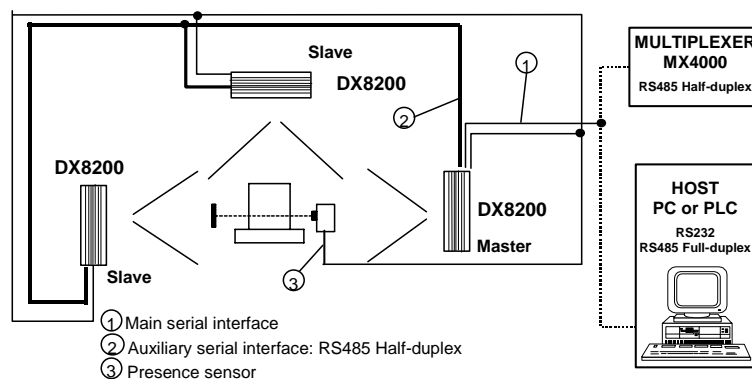


Figure 31 - Master-slave Single P.S. layout

Single P.S. is the Master/Slave layout connection for **PackTrack** operating mode. The cables shown in the figure below can be used for electrical connections.

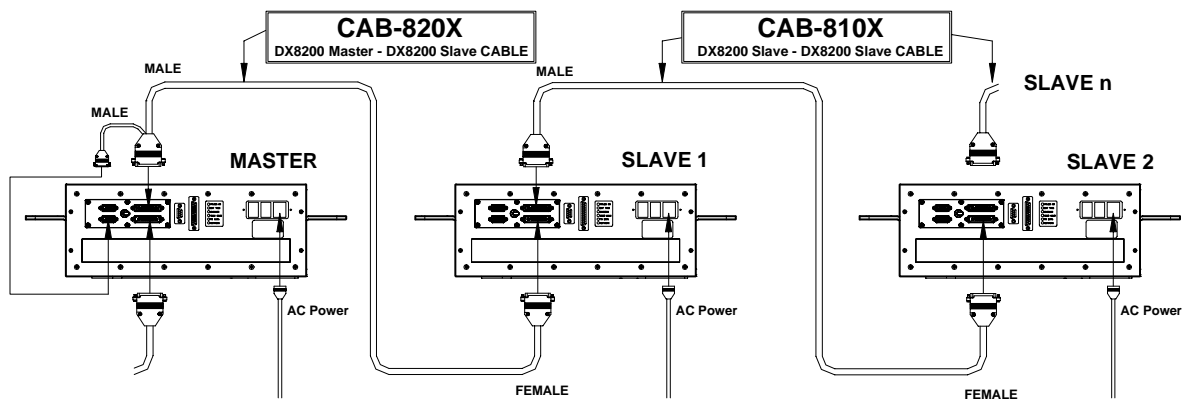


Figure 32 - Single P.S. ready-made cables for PackTrack

Single P.S. can also be used in a Master/Slave layout connection for **On-Line** operating mode but requires CAB-810X between Master and Slave 1 as shown below.

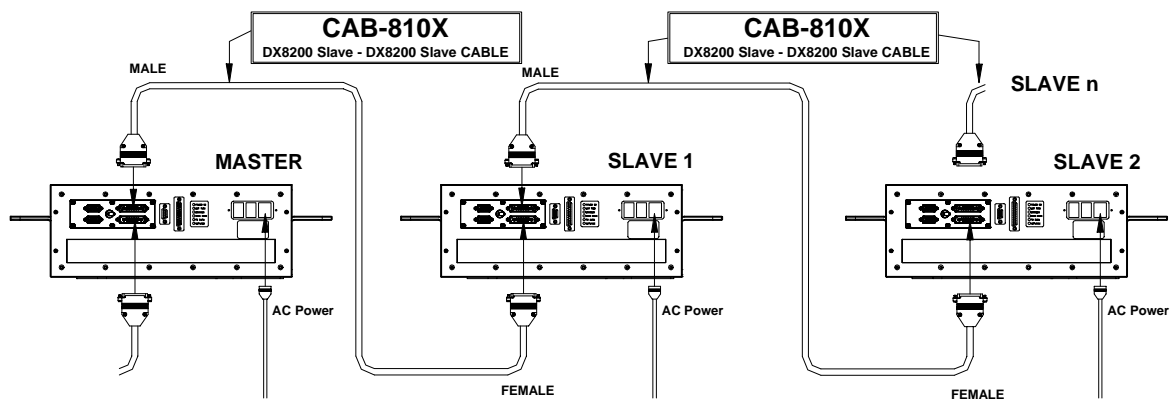


Figure 33 - Single P.S. ready-made cables for On-Line

Multi P.S.

In this layout, each DX8200 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. **On-Line** or **Automatic** operating modes can be used for this layout.

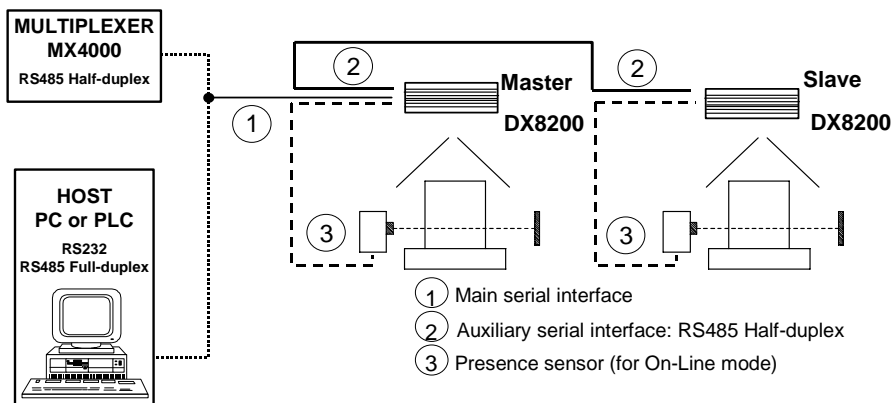


Figure 34 - Multi P.S. layout connections

2.5.4 Multiplexer

Each scanner is connected to an MX4000 with the RS485 half-duplex mode on either the main or the auxiliary interface. The other interface can be used for configuration.

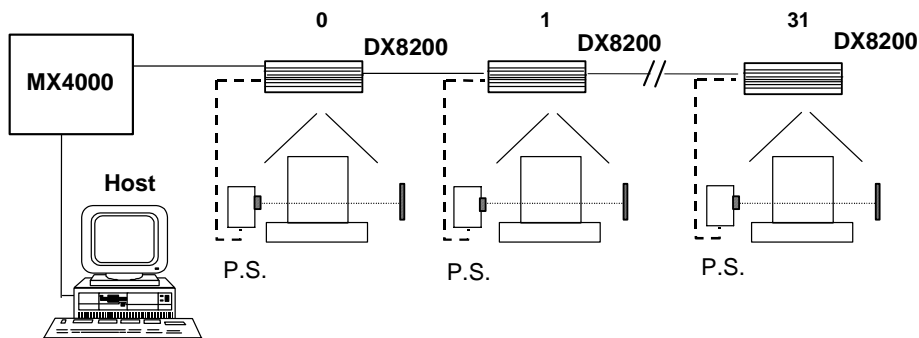


Figure 35 - Multiplexer layout

3 INSTALLATION — DX8200 BUS INTERFACE

3.1 PACKAGE CONTENTS

Verify that the DX8200 reader and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

- DX8200 reader
- Installation Manual + barcode test chart

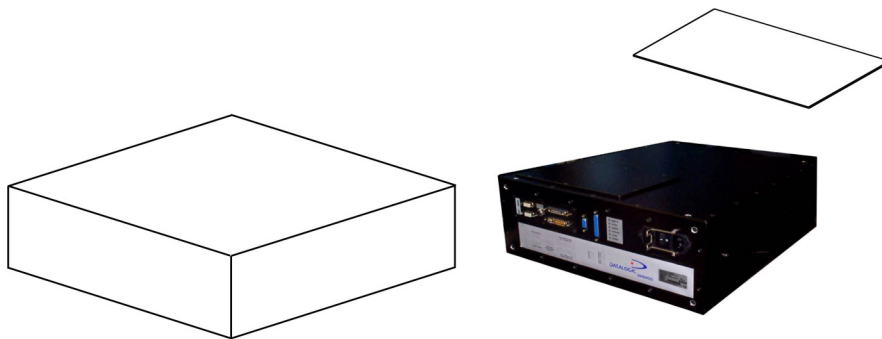


Figure 36

3.2 MECHANICAL INSTALLATION

DX8200 can be installed to operate in any position.

There are 16 screw holes (M6 X 8) on the sides of the scanner for mounting.

The diagram below gives all the information required for installation; refer to par. 4.4 for correct positioning of the scanner with respect to the code passage zone.

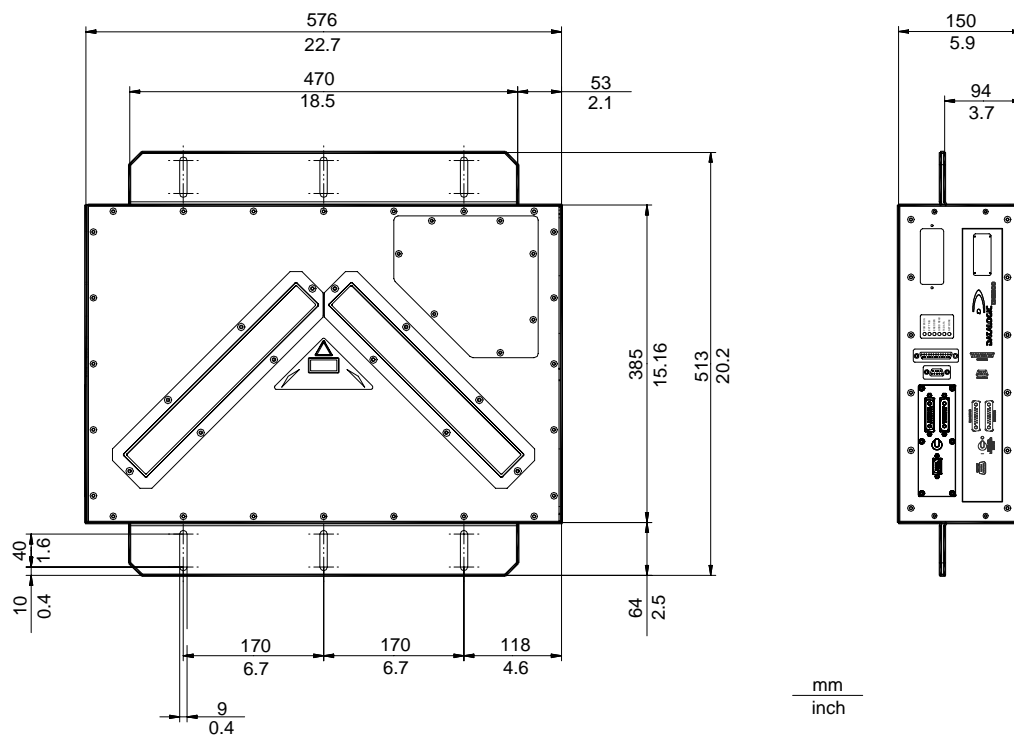


Figure 37 - DX8200 Bus Interface overall dimensions

3.3 ELECTRICAL CONNECTIONS

The DX8200 Bus Interface version employs a Lonworks network used for both input and output connections to build a multi-sided or extended width omni-station system connecting several DX8200 scanners to an SC8000 unit.

This version is equipped with the following connectors:

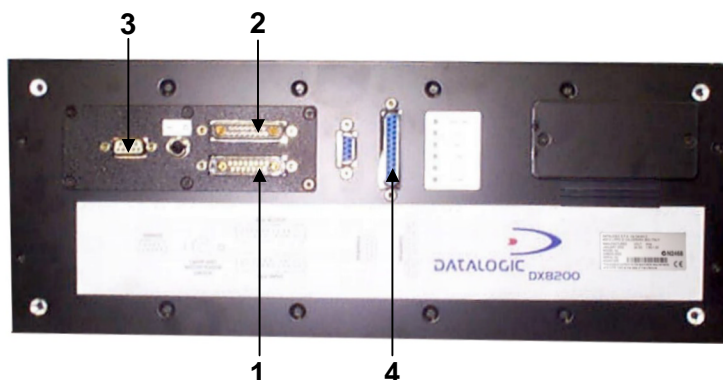


Figure 38 - Bus Interface Control panel

- | | | |
|---|--|-------------------|
| 1 | Lonworks INPUT connector | (male, 17 pins) |
| 2 | Lonworks OUTPUT connector | (female, 17 pins) |
| 3 | RS232 debug connector – for Service only | (female, 9 pins) |
| 4 | Input signal connector | (female, 25 pins) |

Lonworks INPUT/OUTPUT connector

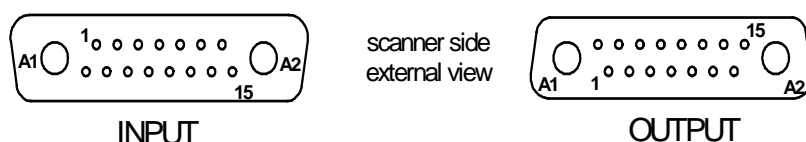


Figure 39 - Lonworks INPUT/OUTPUT connectors

The following pinout is valid for the INPUT connector as well as for the OUTPUT connector.

Lonworks INPUT/OUTPUT pinout		
Pin	Name	Function
A1	GND	supply voltage (negative pin)
A2	VS	supply voltage 20 to 30 Vdc (positive pin)
1	Shield A	lonworks A line (positive pin) lonworks A line (negative pin) lonworks B line (positive pin) lonworks B line (negative pin)
3	Shield B	
8	Lon A+	
9	Lon A-	
10	Lon B+	lonworks B line (positive pin) lonworks B line (negative pin)
11	Lon B-	
12	PS+	presence sensor
13	ENC+	encoder input
14	PSAux+	auxiliary presence sensor
15	Refer-	input reference

RS232 Debug connector

The use of this connector is reserved for Service:

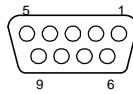


Figure 40 - RS232 debug connector

RS232 Debug connector pinout		
Pin	Name	Function
2	TXD	Transmitted data
3	RXD	Received data
5	GND	Ground

Input Signal Connector

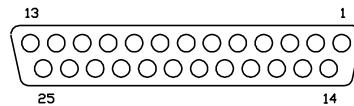


Figure 41 – Input signal connector

Input signal connector pinout		
Pin	Name	Function
1	GND	ground reference
13	VS	24 Vdc power out
9	i. u.	internal use
22	i. u.	internal use
2, 14, 15	Refer-	input reference
12	ENC+	encoder input
24	PSAUX+	auxiliary presence sensor
25	PS+	presence sensor

3.3.1 Power Supply

The input power is supplied to the Lonworks INPUT/OUTPUT connectors (Figure B, 1, 2).

The supply voltage for correct operation of the scanner must be between 20 and 30 VDC. The max. power consumption is 30 W.

The power block (optional), supplies the power necessary for the DX8200 and allows main 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.

The switch (Figure C, 5) on the connector panel turns off power to both the motor and the laser beams.

During power up of the scanner there is a current peak of about 3A caused by the motor startup.

3.3.2 Inputs

The inputs for the DX8200 Bus Interface version are sent to the SC8000 Logic Unit, filtered, elaborated, and then passed onto the scanners. They are called ENC, PS and PSAux.

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

PS 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 C, 8) indicates the PS is active.

PSAux can be used in special applications.

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 PS and PSAux and 500 μ s for ENC.

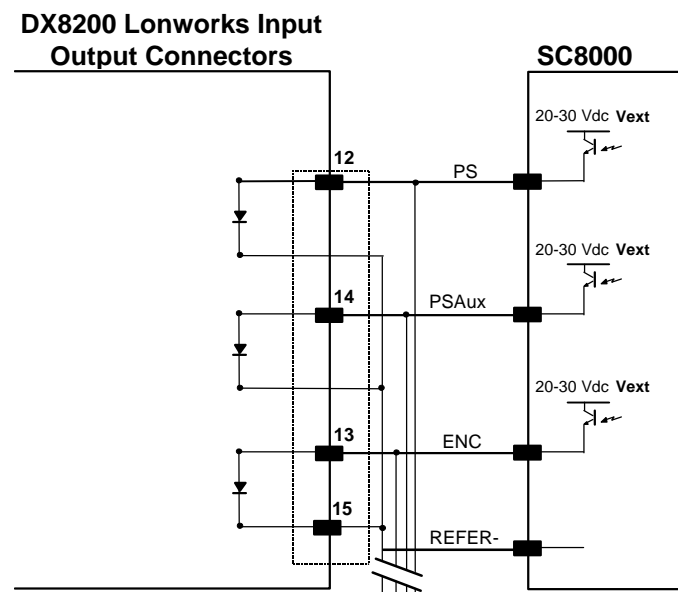


Figure 42 - DX8200 Bus Interface inputs

3.4 LAYOUTS

DX8200 Bus Interface models are connected to an SC8000 Logic Unit, the core of the reading system, whose duty is to interpret data from each scanner and to perform the correct barcode assignment to the parcel using the PackTrack™ operating mode.

The SC8000 controller collects data from each barcode scanner, calculating the correct parcel to which the barcode must be assigned (if more than one parcel is in the reading area).

The Host computer is connected to a configurable serial port of the SC8000.

External devices such as a presence sensor, an encoder and the supply unit are all connected to the SC8000, which collects all signals driving them to all scanners.

The SC8000 is also connected to a Host PC.

The following figure shows a possible layout for the DX8200 Bus Interface.

A single SC8000 provides up to 8 Lonworks communication lines (branches) having up to 4 scanners each. The last scanner of each branch requires a Termination connector. The maximum allowable length for the entire bus cabling is 65 m.

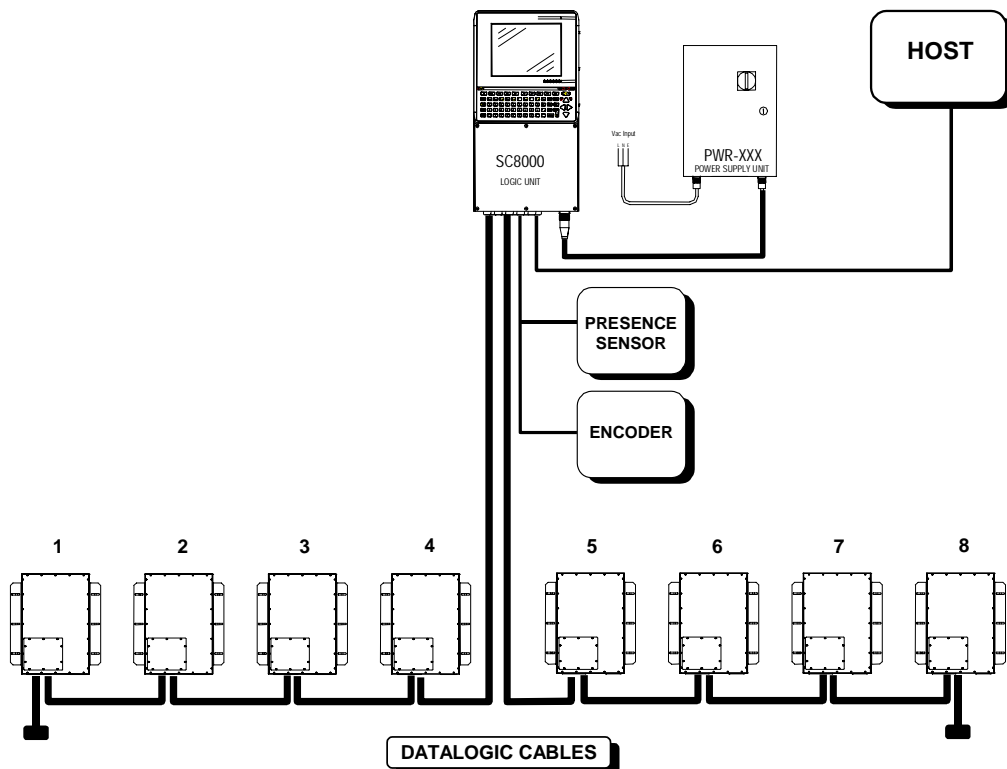


Figure 43 - DX8200 Bus Interface Layout

4 READING FEATURES

4.1 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 44.



Figure 44 - 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 DX8200 is able to "reconstruct" the barcode. A typical set of partial scans is shown in Figure 45.

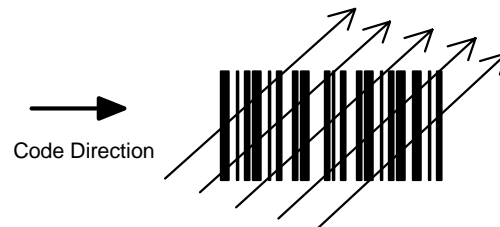


Figure 45 - Partial scans

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.

4.2 PACKTRACK™

PackTrack™ is a patented operating mode for DATALOGIC Omnidirectional Reading Stations used to read and correctly assign codes read on parcels when placed in the scanner Reading Area at the same time.

In fact, in the example below, the codes of two or more consecutive parcels are found at the same time in the scanner reading area. Therefore the condition occurs where, in the sequence of the two parcels, the code of the second parcel is read first, just before the code of the previous parcel. A system without PackTrack™ would assign the code of the second parcel to the first parcel and viceversa, thus causing a gross error in the sortation.

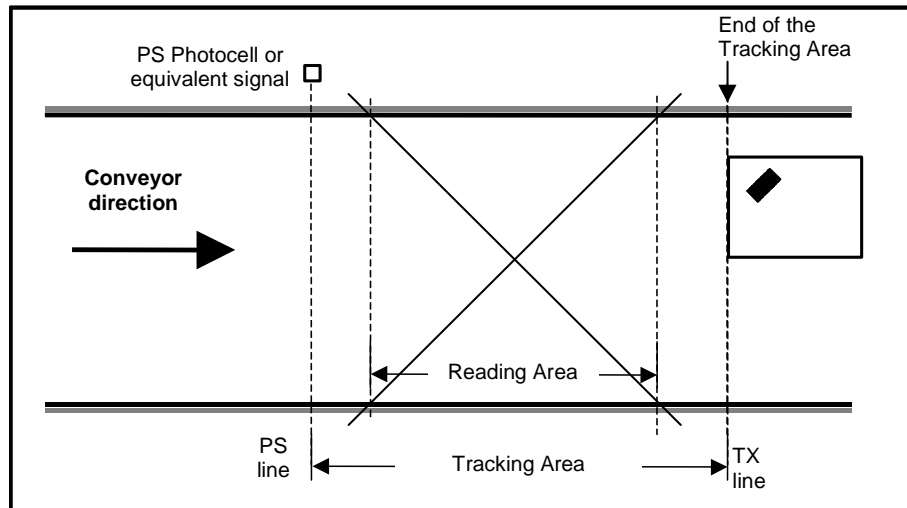
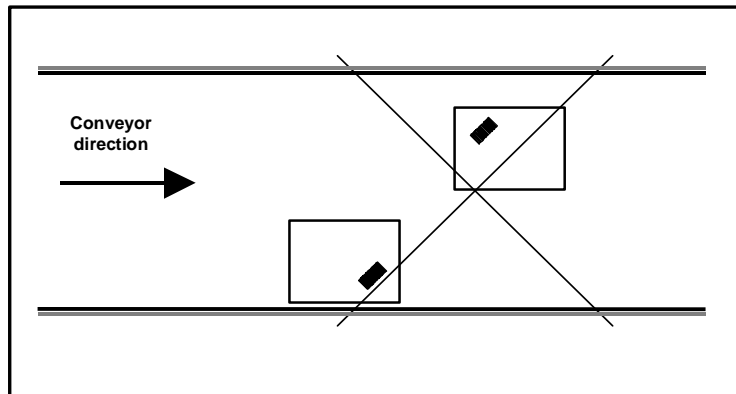


Figure 46 - PackTrack conditions

4.3 PERFORMANCE

The scan rate is 500 scans/sec for each scan line (1000 total).

Refer to the diagrams in par. 4.4 for further details on the reading features.

These diagrams are taken on various resolution sample codes at a 25 °C ambient temperature depending on the conditions listed under each diagram.

4.3.1 Reading Conditions

- ANSI Grade B minimum

The following tables describe the requirements for standard applications. Please contact Datalogic for specific advice on maximizing the reading performance possibilities to obtain the best possible performance for your application.

Minimum Code Height for Omnidirectional Reading (mm)							
Conveyor Speed (m/s)		0.5	1	1.5	2	2.5	3
2/5 Interleaved Code Resolution (mm)	0.25	10	12	14	17	19	21
	0.30	12	14	16	18	20	22
	0.33	13	14	17	19	21	23
	0.38	14	16	18	20	22	24
	0.50	18	19	21	23	25	27
	0.60	21	22	24	26	28	30
	1.00	34	35	36	37	39	41

Table 1

Minimum Code Height for Omnidirectional Reading (mm)							
Conveyor Speed (m/s)		0.5	1	1.5	2	2.5	3
Code 39 Code Resolution (mm)	0.25	9	10	12	15	17	19
	0.30	10	11	13	16	18	20
	0.33	11	12	14	16	18	20
	0.38	12	13	15	17	19	21
	0.50	15	16	17	19	21	24
	0.60	18	19	20	21	23	26
	1.00	28	29	30	31	32	34

Table 2

Minimum Code Height for Omnidirectional Reading (mm)							
Conveyor Speed (m/s)		0.5	1	1.5	2	2.5	3
Code 128 – Ean 128 Code Resolution (mm)	0.25	7	9	12	14	16	18
	0.30	8	10	12	15	17	19
	0.33	9	11	13	15	17	19
	0.38	10	12	14	16	18	20
	0.50	12	13	16	18	20	22
	0.60	14	15	17	19	21	24
	1.00	22	23	24	26	28	30

Table 3

Minimum Code Height for Omnidirectional Reading (mm)							
Conveyor Speed (m/s)		0.5	1	1.5	2	2.5	3
Codabar Code Resolution (mm)	0.25	12	14	16	18	20	22
	0.30	13	15	17	20	22	24
	0.33	14	16	18	20	23	25
	0.38	16	18	20	22	24	26
	0.50	20	22	24	26	28	30
	0.60	23	25	27	29	31	34
	1.00	36	38	40	42	44	47

Table 4

Minimum Code Height for Omnidirectional Reading (mm)							
Conveyor Speed (m/s)		0.5	1	1.5	2	2.5	3
EAN 8-13, UPC-A Code Resolution (mm)	0.25	8	9	11	13	15	17
	0.30	9	10	11	14	16	18
	0.33	9	10	12	14	16	18
	0.38	11	12	13	15	17	19
	0.50	13	14	15	16	18	20
	0.60	15	16	17	18	19	22
	1.00	24	25	26	27	28	29

Table 5

4.4 READING DIAGRAMS

Single Configuration DX8200-2X10

0.25 mm codes

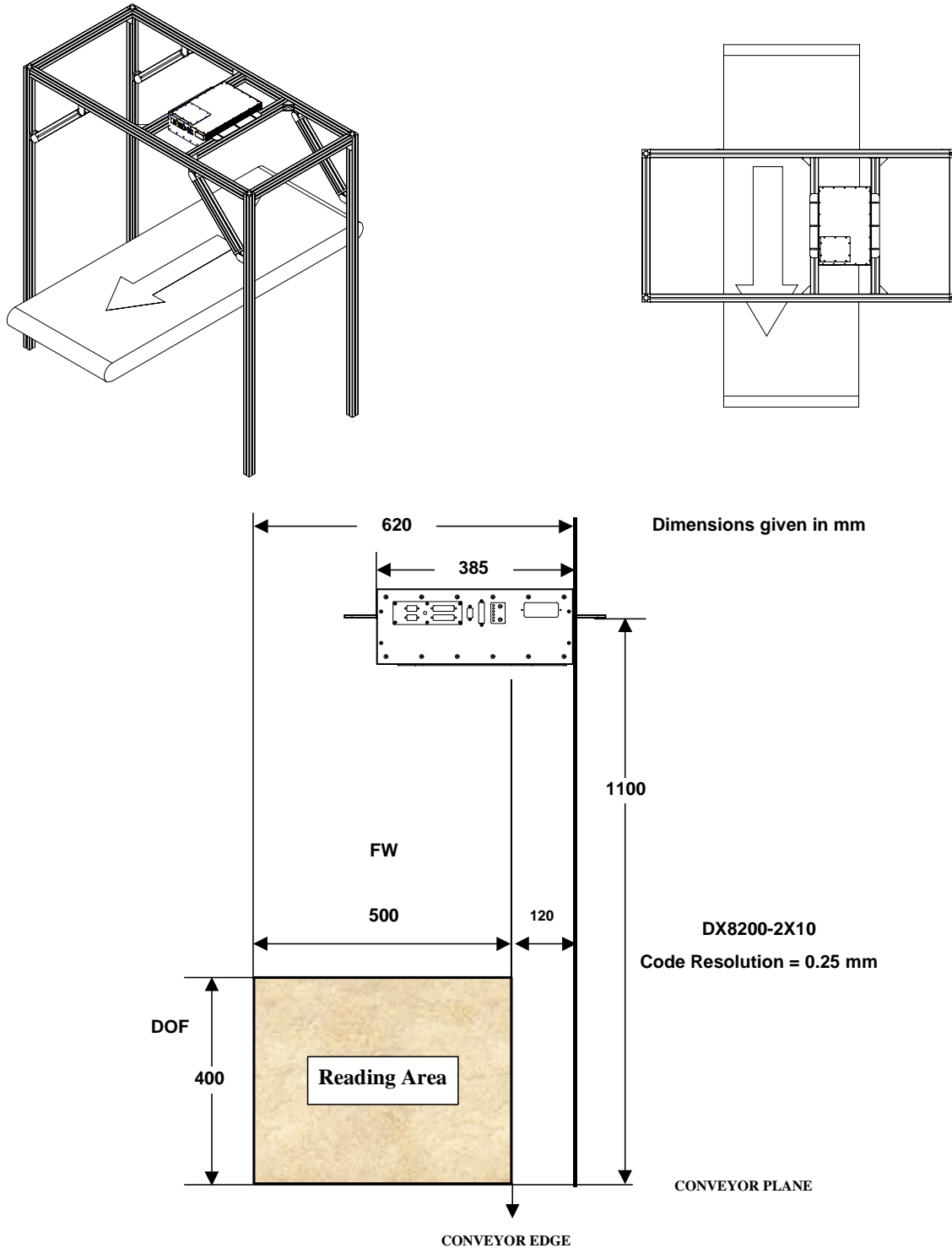


Figure 47 - Reading diagram for double-diode high resolution model

Single Configuration DX8200-2X00

0.30 mm codes

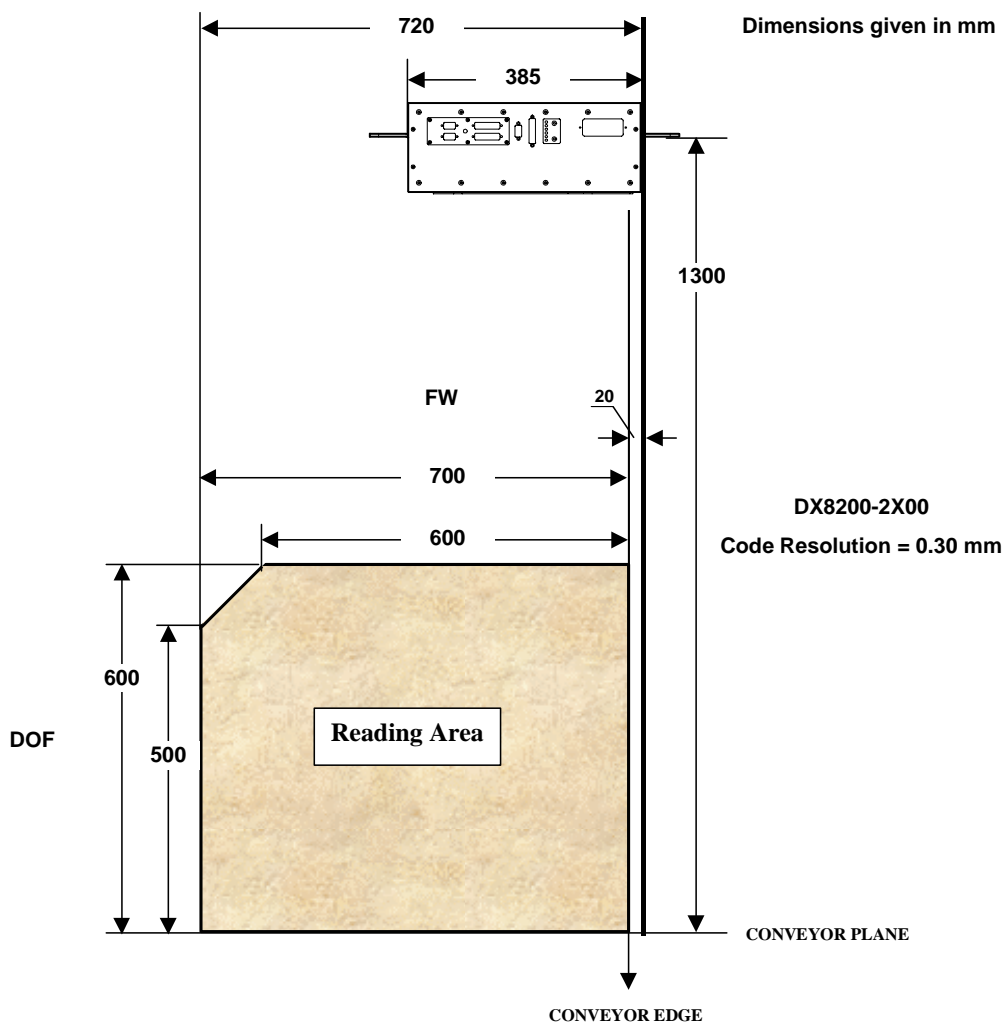
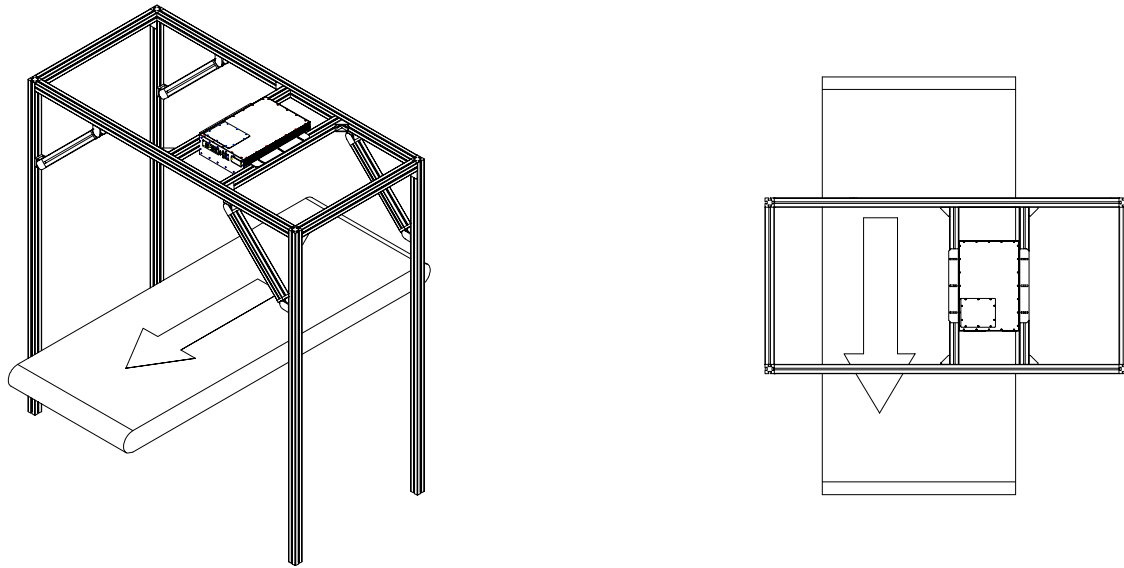


Figure 48 - Reading diagram for double-diode standard resolution model

Single Configuration DX8200-2X00

0.50 mm codes

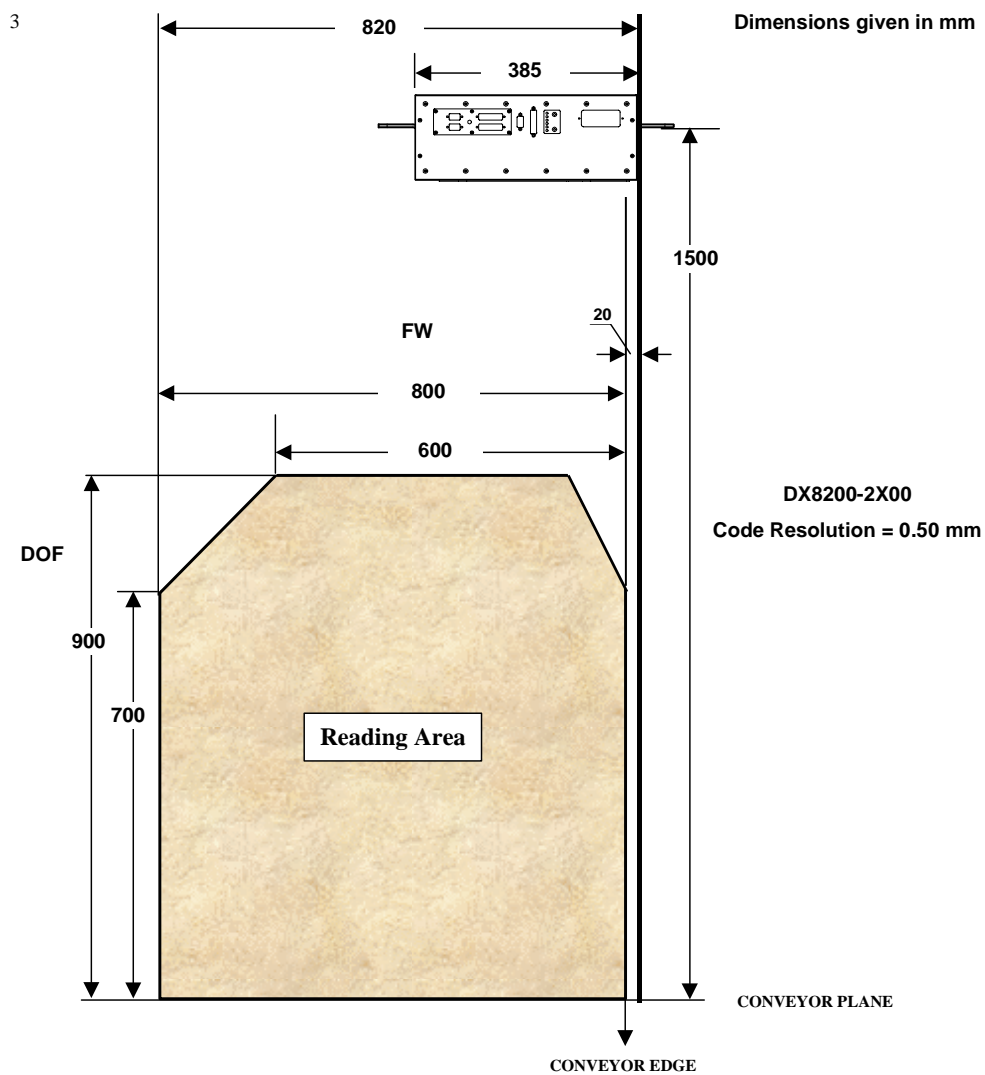
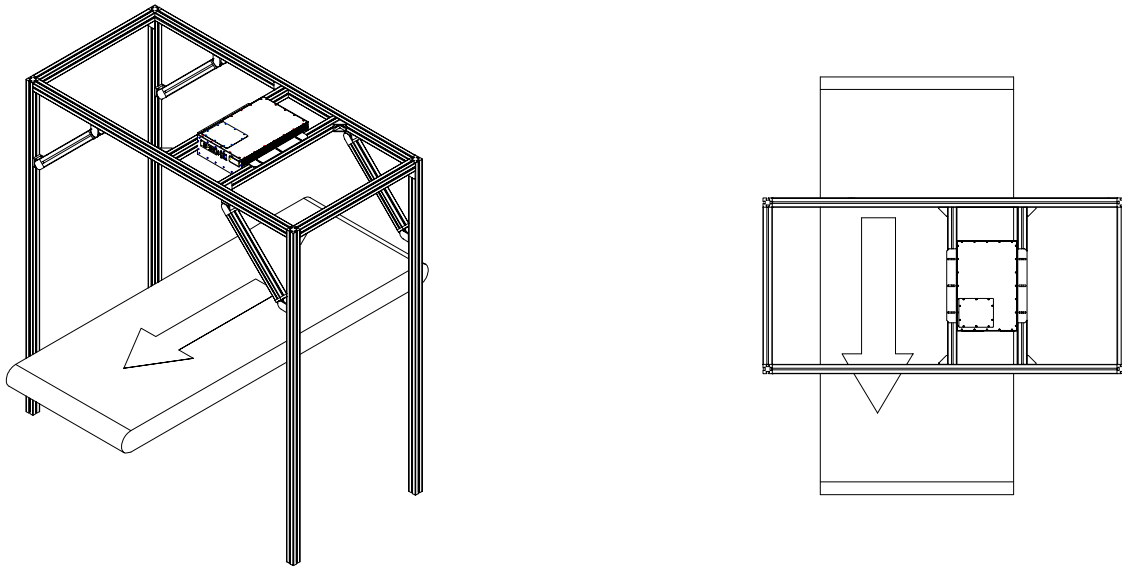


Figure 49 - Reading diagram for double-diode standard resolution model

Single Configuration DX8200-3X10

0.25 mm codes

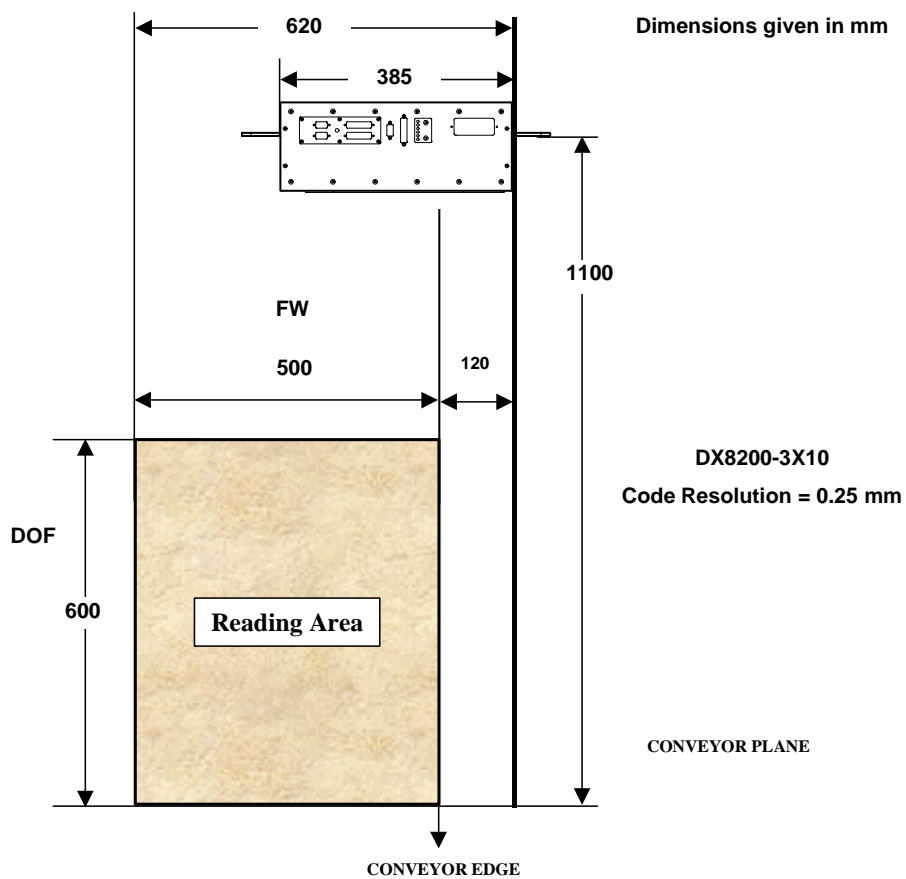
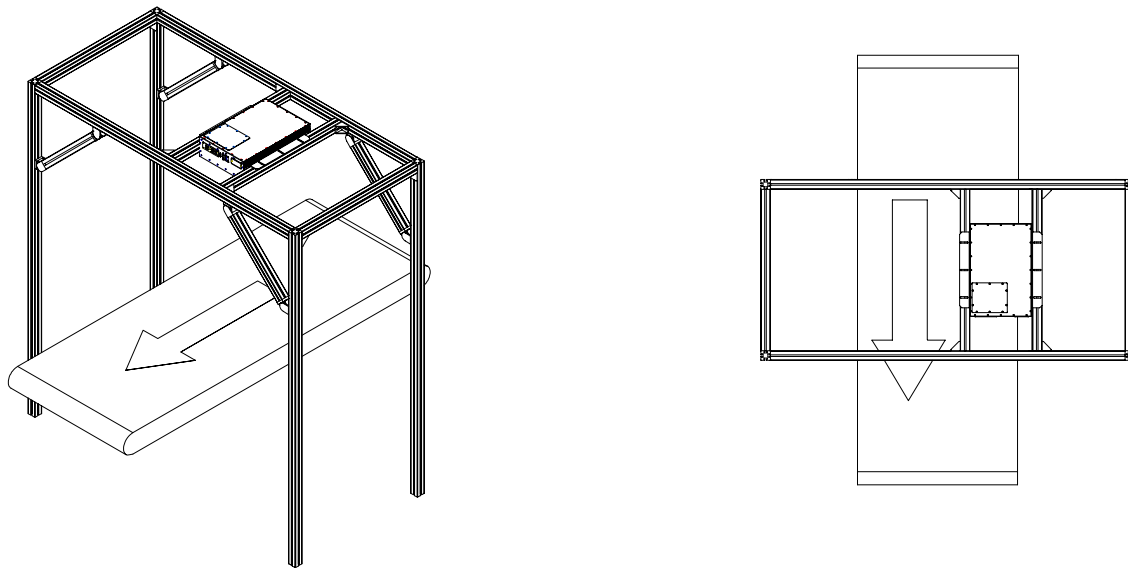


Figure 50 - Reading diagram for triple-diode high resolution model

0.30 mm codes

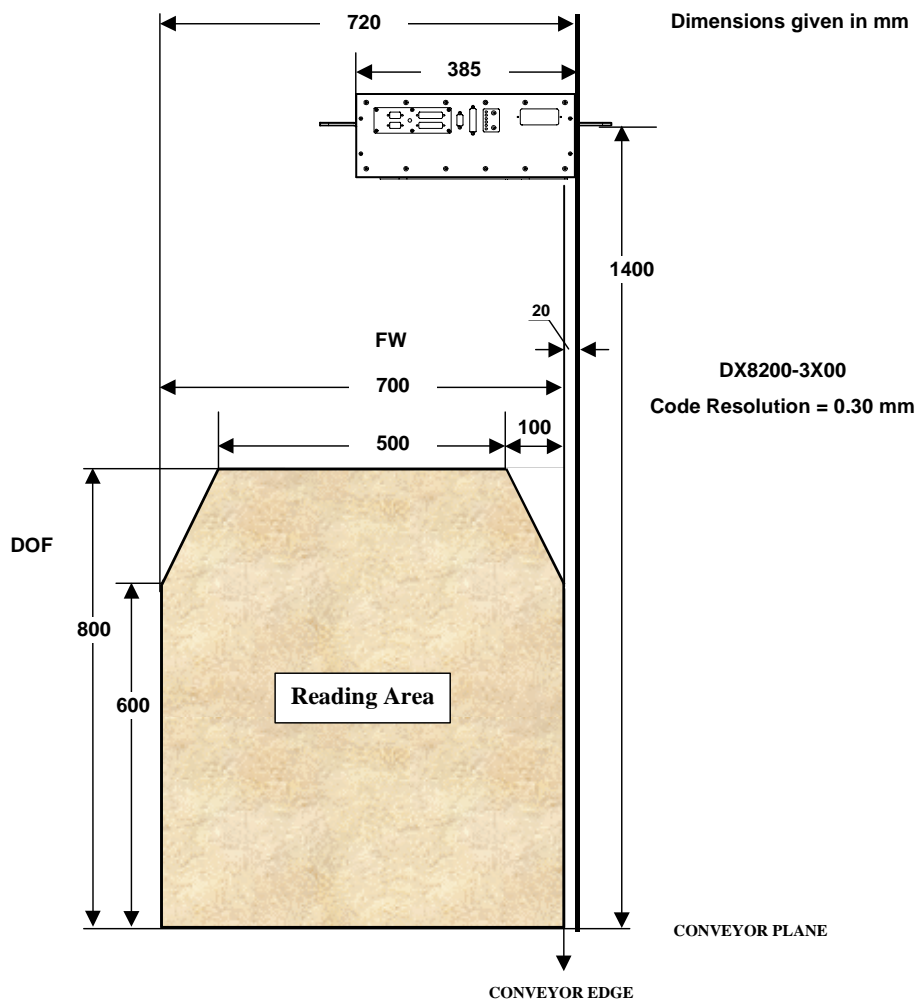


Figure 51 - Reading diagram for triple-diode standard resolution model

Single Configuration DX8200-3X00

0.50 mm codes

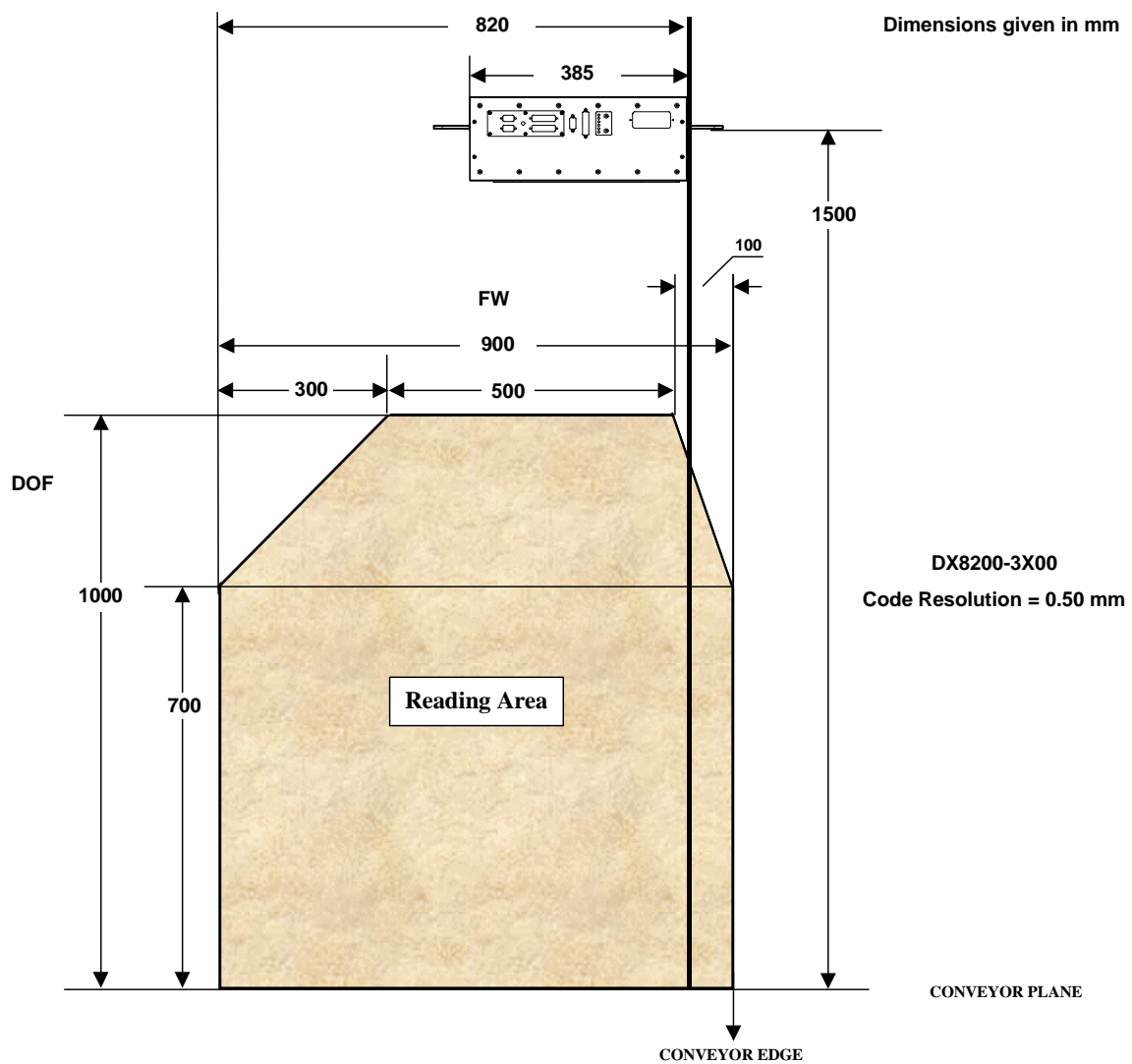
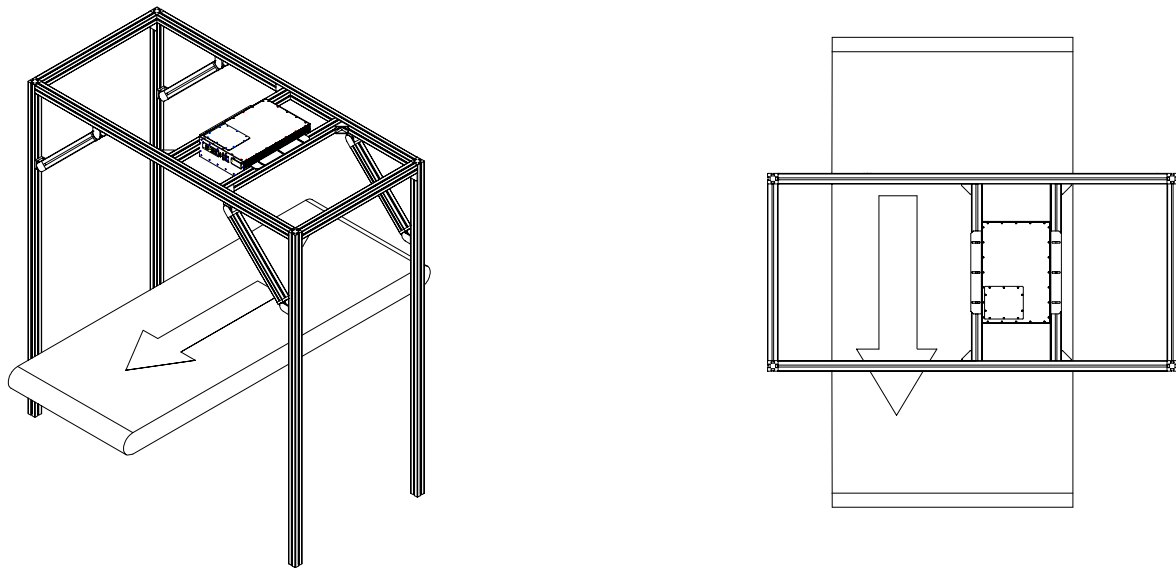


Figure 52 - Reading diagram for triple-diode standard resolution model

Side-by-Side Configuration DX8200-2X10

0.25 mm codes

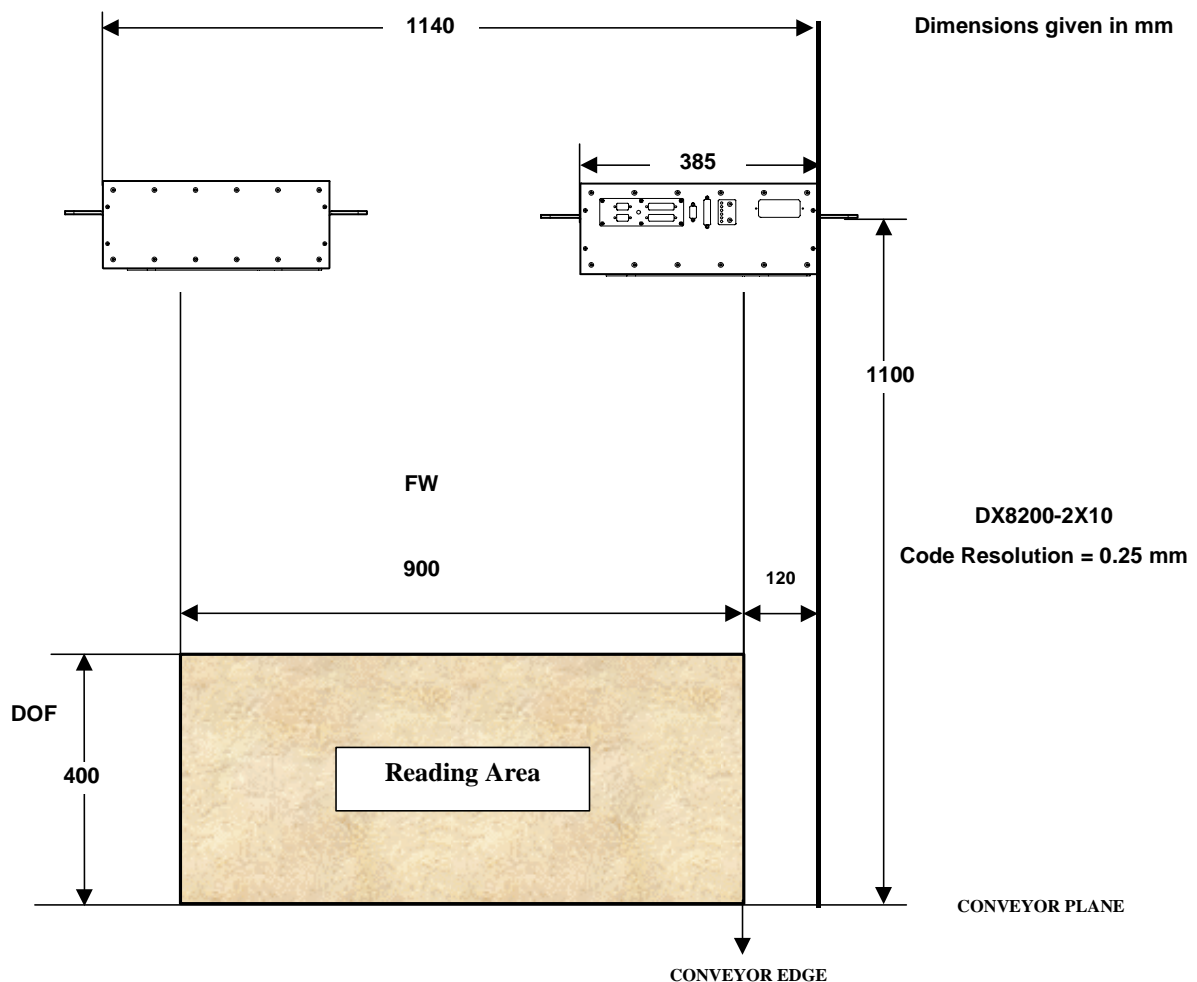
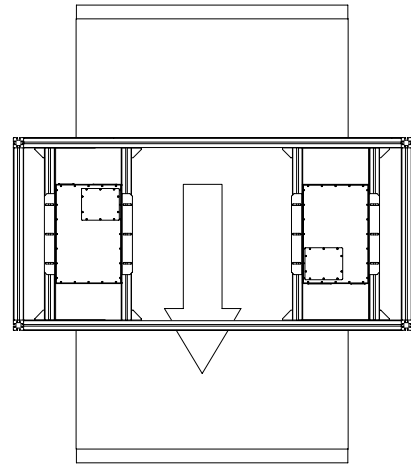
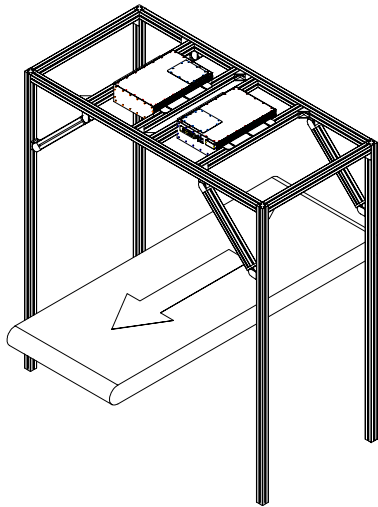


Figure 53 - Reading diagram for side-by-side double-diode high resolution model

Side-by-side configurations are shown with the minimum overlap. You should adapt the distance between the scanners and therefore the field width according to your application.

Side-by-Side Configuration DX8200-2X00

0.30 mm codes

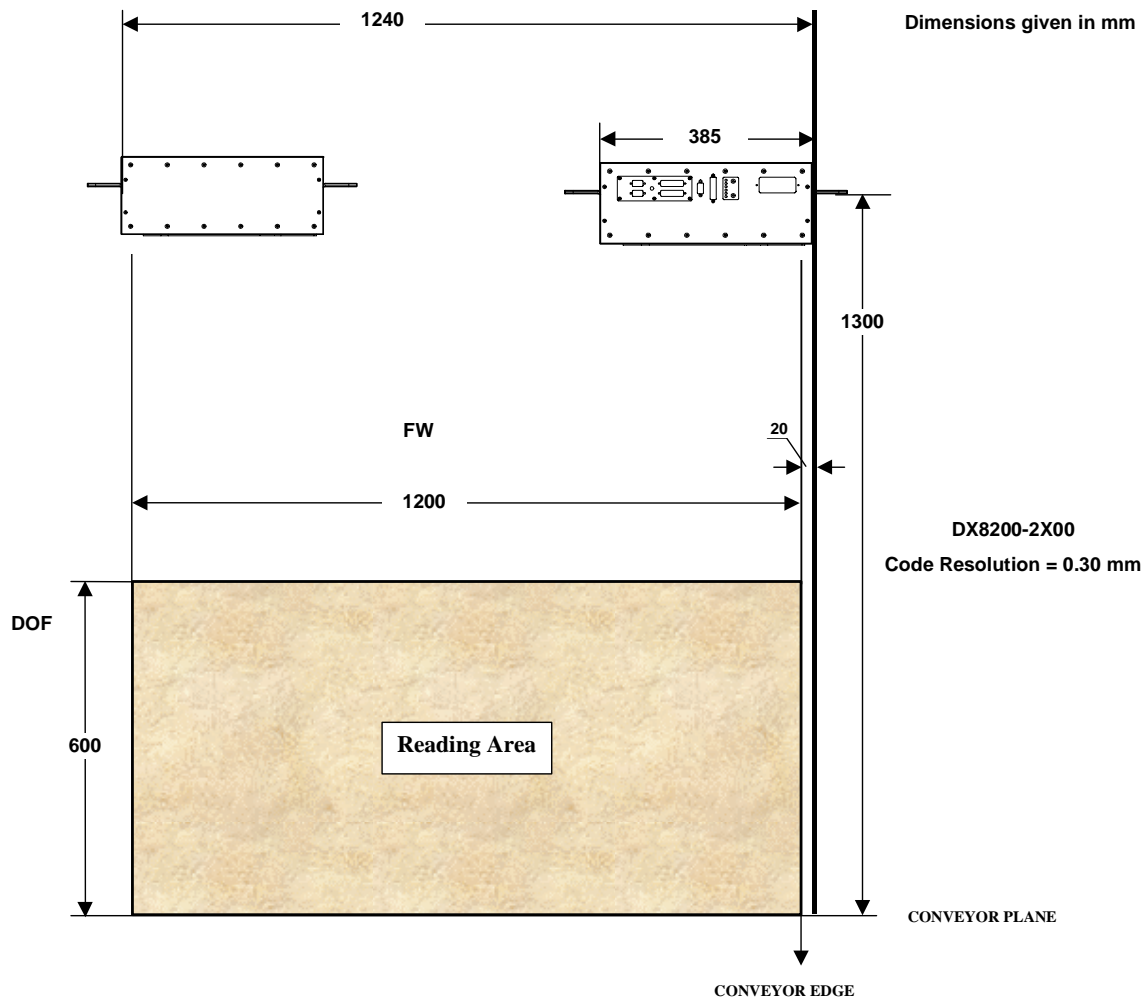
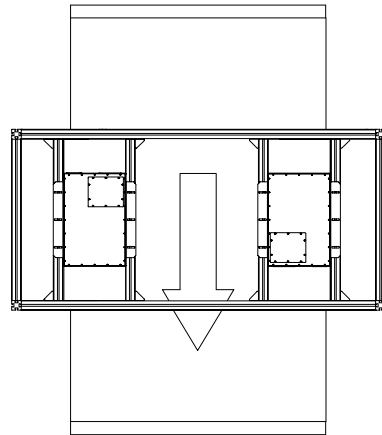
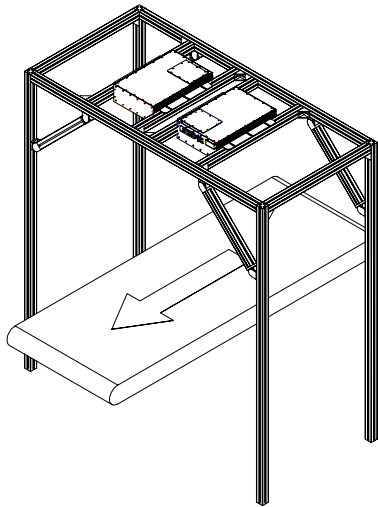


Figure 54 - Reading diagram for side-by-side double-diode standard resolution model

Side-by-side configurations are shown with the minimum overlap. You should adapt the distance between the scanners and therefore the field width according to your application.

Side-by-Side Configuration DX8200-2X00

0.50 mm codes

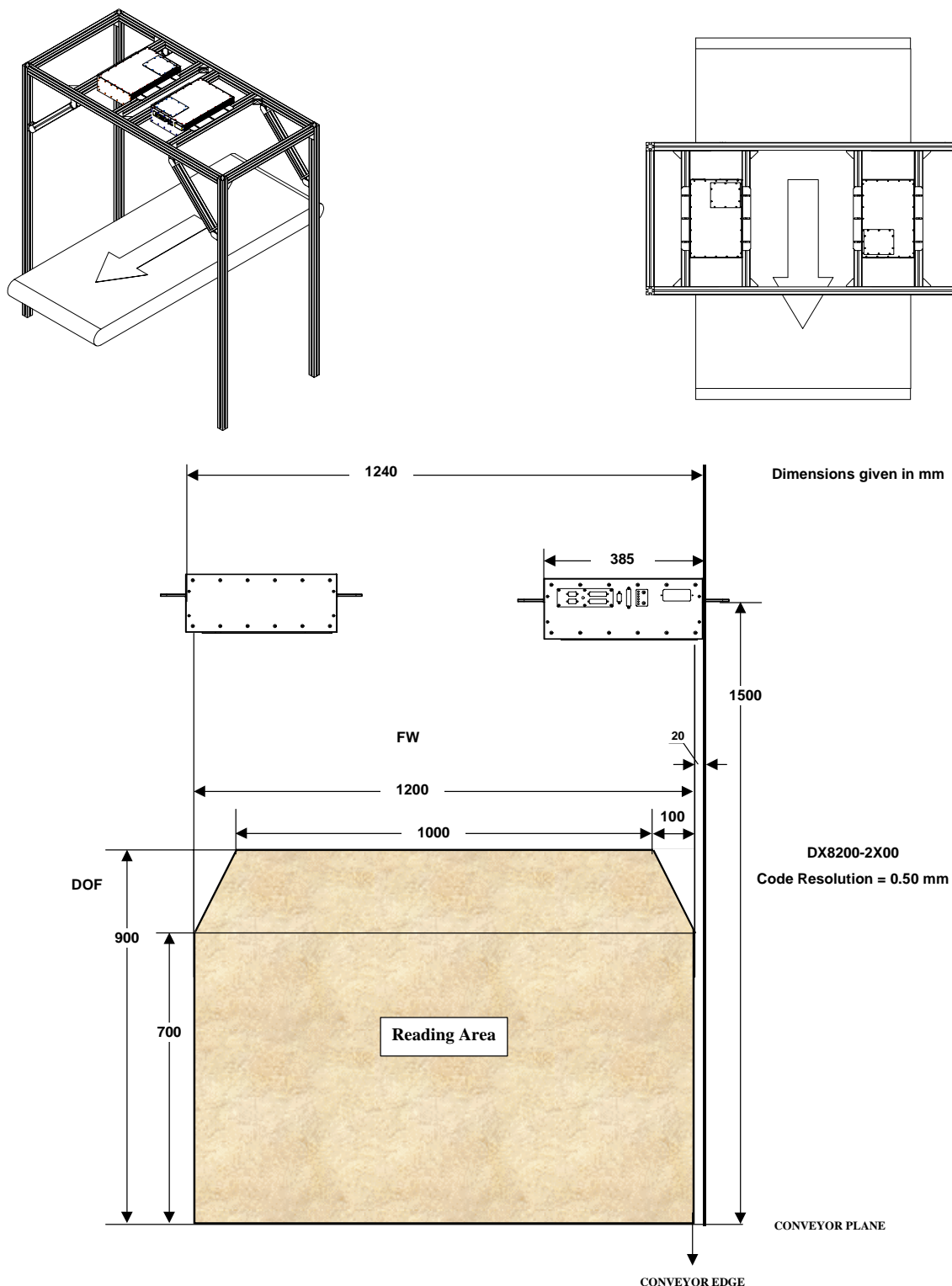


Figure 55 - Reading diagram for side-by-side double-diode standard resolution model

Side-by-side configurations are shown with the minimum overlap. You should adapt the distance between the scanners and therefore the field width according to your application.

Side-by-Side Configuration DX8200-3X10

0.25 mm codes

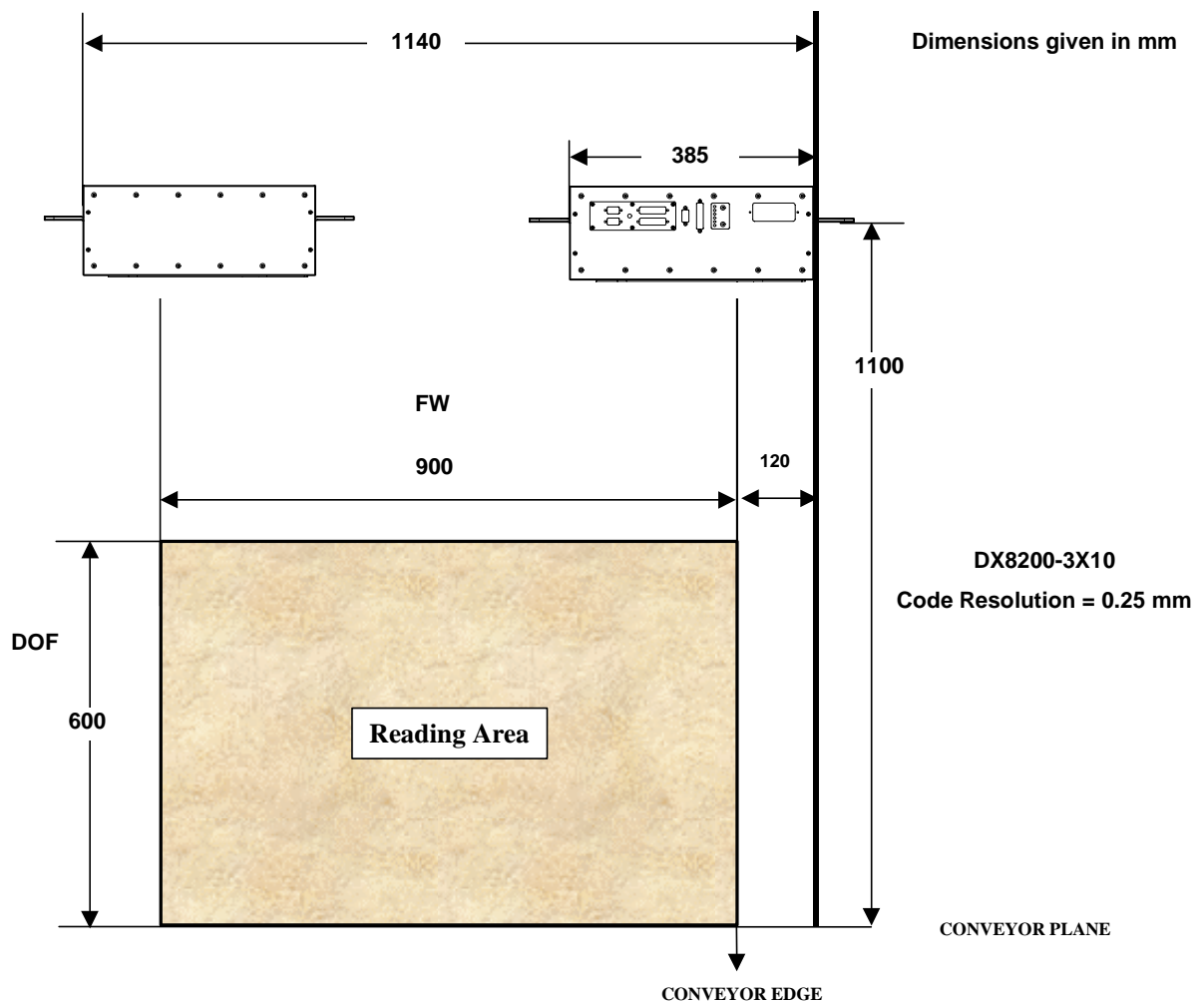
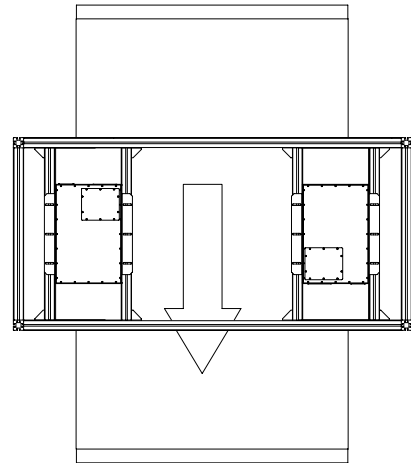
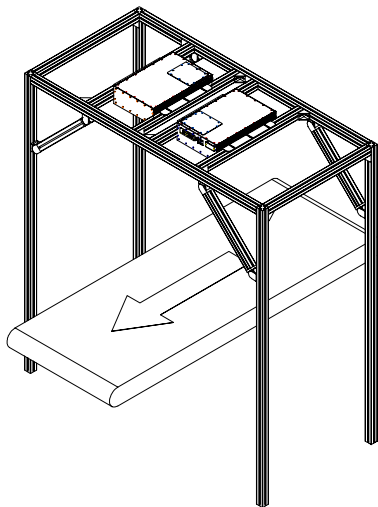


Figure 56 - Reading diagram for side-by-side triple-diode high resolution model

Side-by-side configurations are shown with the minimum overlap. You should adapt the distance between the scanners and therefore the field width according to your application.

Side-by-Side Configuration DX8200-3X00

0.30 mm codes

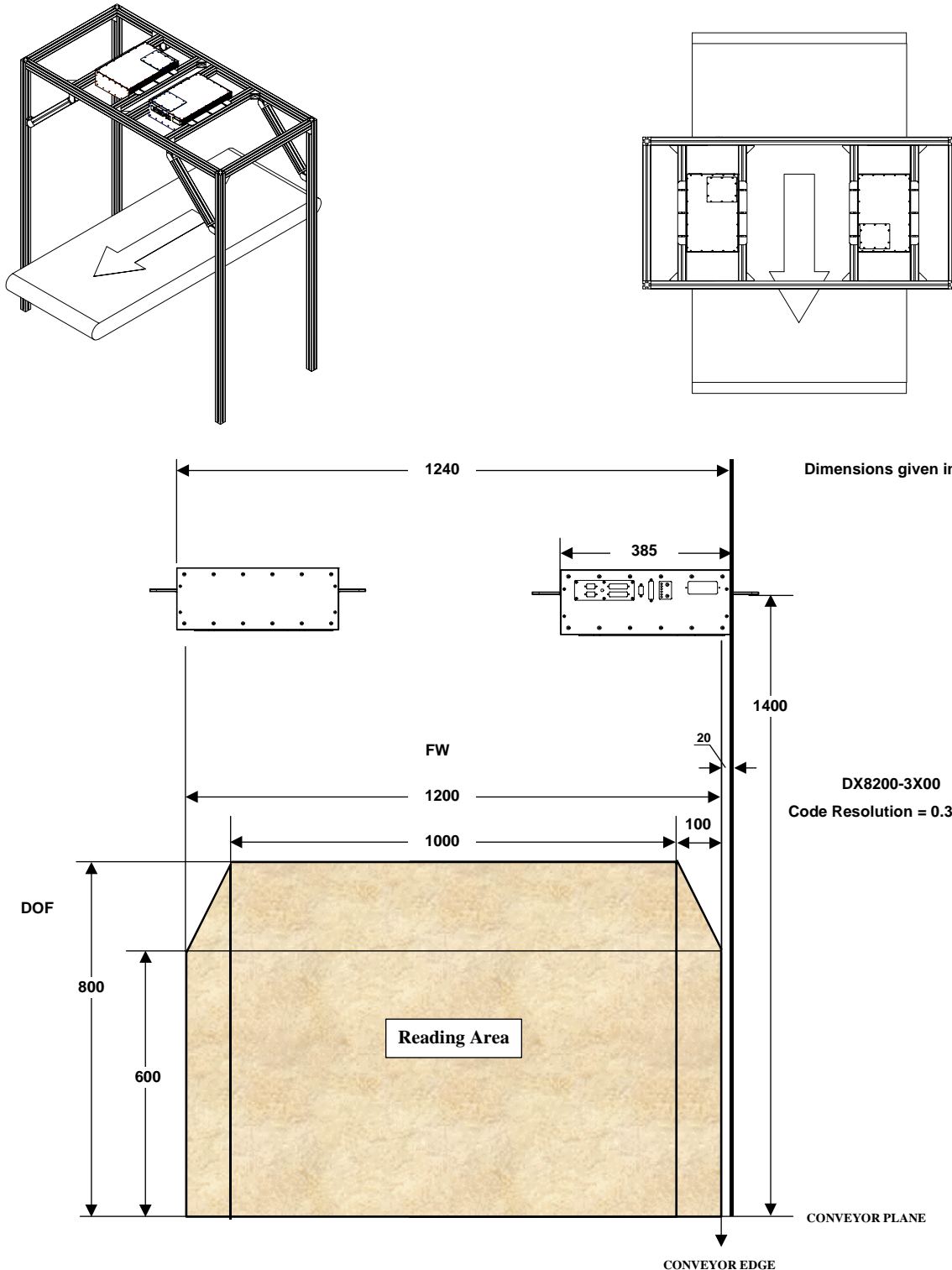


Figure 57 - Reading diagram for side-by-side triple-diode standard resolution model

Side-by-side configurations are shown with the minimum overlap. You should adapt the distance between the scanners and therefore the field width according to your application.

Side-by-Side Configuration DX8200-3X00

0.50 mm codes

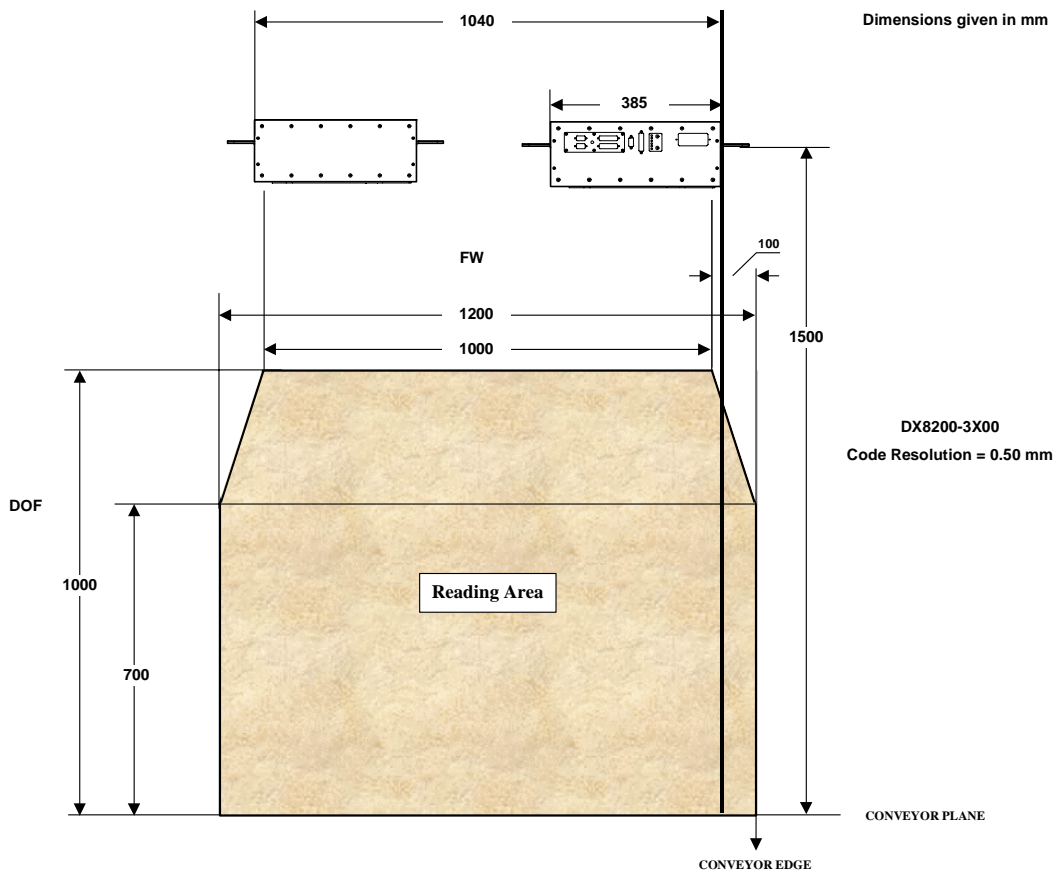
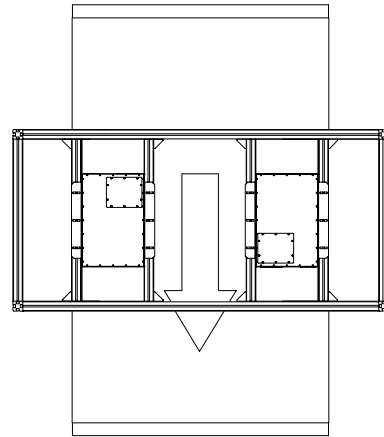
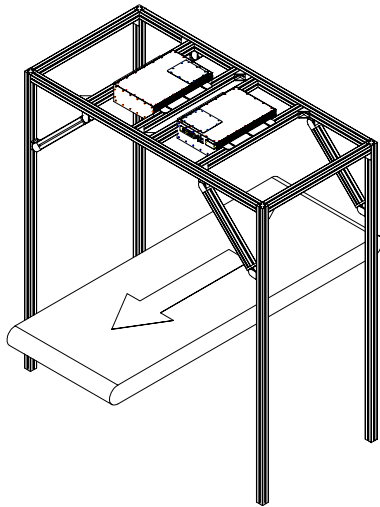


Figure 58 - Reading diagram for side-by-side triple-diode standard resolution model

Side-by-side configurations are shown with the minimum overlap. You should adapt the distance between the scanners and therefore the field width according to your application.

5 MAINTENANCE

5.1 CLEANING

Clean the laser beam output windows (Figure A, 3) 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 windows and avoid any abrasive substances.



WARNING

Clean the windows of the DX8200 when the scanner is turned off or at least when the laser beam is not active.

5.2 REPLACING THE PROTECTION FUSES (FOR AC MODELS)



WARNING

The device must be opened by qualified personnel only.



WARNING

Before removing the fuses from DX8200, make sure the power supply cable is disconnected to avoid shock or harm to the operator.

Two protection fuses are located next to the on/off switch (Figure B ,3).

To replace them, turn the device off and disconnect the power supply cable; then, with a screwdriver remove the fuses and replace them with new ones of the correct value (see the following fuse selection table).

Connect the power supply cable and turn the device on again to verify the success of the operation.

Version	Fuse	Type
110 - 230 Vac	3.15 A	F

6 TECHNICAL FEATURES

	DX8200	
	Serial Interface	Bus Interface
ELECTRICAL FEATURES (see note 1)		
Input voltage	85 to 264 Vac	20 to 30 Vdc
Power consumption	30 VA	30W
Serial interfaces		
Main	RS232, RS485 full-duplex, half-duplex 20 mA C.L.	Lonworks network
Auxiliary	RS232, RS485 half-duplex	
Baud Rates	1200 to 57600	1.25 Mbaud
Inputs (optocoupled, NPN or PNP)	Encoder Presence Sensor 1 Presence Sensor 2	Encoder Presence Sensor 1 Presence Sensor Aux
Outputs (optocoupled, open emitter or collector)	No Read Right Code	
OPTICAL FEATURES (see note 1)		
Light source	up to 3 semiconductor laser diodes	
Wavelength	630 to 680 nm	
Safety class	Class 2 - EN 60825-1; Class II - CDRH	
Light receiver	Avalanche photodiode	
READING FEATURES		
Scan rate	500 scans/s for each scan line (1000 total)	
USER INTERFACE		
LED indicators	Power ON, Ext Trig, Encoder, Good Read, TX Data, Network	

DX8200	
SOFTWARE FEATURES	
READABLE CODE SYMBOLOGIES <ul style="list-style-type: none"> • Interleaved 2/5 • Code 39 Standard • EAN/UPC • Code 128 • EAN128 	
Code Selection	Up to 5 code symbologies 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, PackTrack™
Configuration Modes	WinHost utility program <u>Host Mode</u> : receiving commands from the serial port
Parameter Storage	Non-volatile internal EEPROM
ENVIRONMENTAL FEATURES	
Operating temperature	0° to +45 °C (+32° to +113 °F)
Storage temperature	-20° to +70 °C (-4° to +158 °F)
Humidity	90% non condensing
Vibration resistance	EN 60068-2-6 test FC 1.5 mm @ 5 to 9.1 Hz; 0.5 G @ 9.1 to 150 Hz; 2 hours on each axis
Shock resistance	EN 60068-2-27 test EA 15 G; 11 ms; 3 shocks on each axis in each direction
Protection class	IP54
PHYSICAL FEATURES	
Mechanical dimensions	576 x 513 x 150 mm (22.7 x 20.2 x 5.9 in)
Weight	about 22 Kg (48.5 lbs.)

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

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DX8200-XXXX, Laser Scanner

and all its models
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und seine modelle
y todos sus modelos

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

89/336/EEC EMC Directive	e	92/31/EEC, 93/68/EEC	emendamenti successivi
	and		further amendments
	et		ses successifs amendements
	und		späteren Abänderungen
	y		sucesivas enmiendas

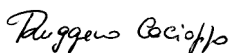
73/23/EEC Low Voltage Directive

Basate sulle legislazioni degli Stati membri in relazione alla compatibilità elettromagnetica ed alla sicurezza dei prodotti.
On the approximation of the laws of Member States relating to electromagnetic compatibility and product safety.
Basée sur la législation des Etats membres relative à la compatibilité électromagnétique et à la sécurité des produits.
Über die Annäherung der Gesetze der Mitgliedsstaaten in bezug auf elektromagnetische Verträglichkeit und Produktsicherheit entsprechen.
Basado en la aproximación de las leyes de los Países Miembros respecto a la compatibilidad electromagnética y las Medidas de seguridad relativas al producto.

Questa dichiarazione è basata sulla conformità dei prodotti alle norme seguenti:
This declaration is based upon compliance of the products to the following standards:
Cette déclaration repose sur la conformité des produits aux normes suivantes:
Diese Erklärung basiert darauf, daß das Produkt den folgenden Normen entspricht:
Esta declaración se basa en el cumplimiento de los productos con la siguientes normas:

EN 55022, August 1994:	LIMITS AND METHODS OF MEASUREMENTS OF RADIO DISTURBANCE CHARACTERISTICS OF INFORMATION TECHNOLOGY EQUIPMENT (ITE)
EN 61000-6-2, April 1999:	ELECTROMAGNETIC COMPATIBILITY (EMC). PART 6-2: GENERIC STANDARDS - IMMUNITY FOR INDUSTRIAL ENVIRONMENTS
EN 60950-1, December 2001:	INFORMATION TECHNOLOGY EQUIPMENT - SAFETY, PART 1: GENERAL REQUIREMENTS
EN 60825-1, June 1994: AMENDMENTS A11 (1996), A2 (2001)	SAFETY OF LASER PRODUCTS – PART 1: EQUIPMENT CLASSIFICATION, REQUIREMENTS AND USER'S GUIDE

Lippo di Calderara, 08.10.2003


Ruggero Cacioppo
Quality Assurance Laboratory Manager