MX4000

Installation Manual

DATALOGIC

MX4000

INSTALLATION MANUAL

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MX4000

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CONTENTS

GENERAL VIEW

MX4000

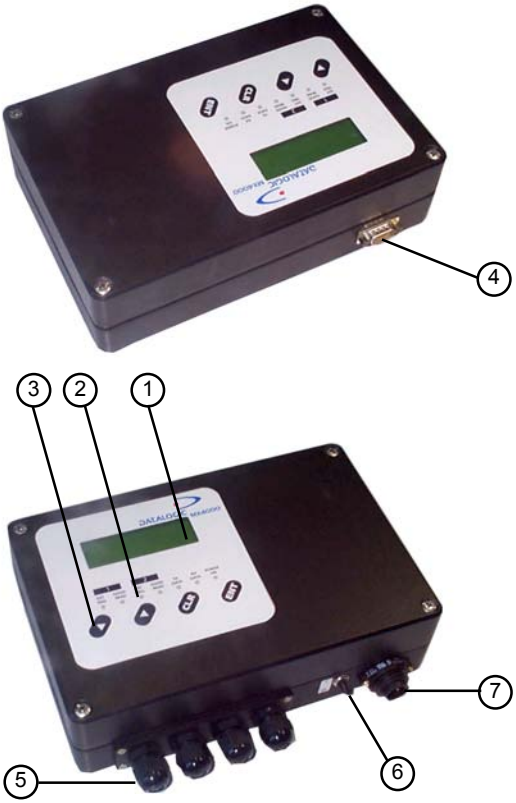


Figure A

1. LDC Display
2. LEDs
3. Keypad
4. AUX port
5. Glands panel
6. On/Off switch
7. Power supply connector

SAFETY PRECAUTIONS

POWER SUPPLY

This unit is intended to be supplied by a UL Listed LPS or Class 2 power source with output rated 10-30 V dc, min. 0.6 A.

FCC COMPLIANCE

This device complies with PART 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference which may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

1 INTRODUCTION

The MX4000 is an industrial multiplexer which can be used to connect a series of data collection peripherals to a network.

The network towards the host can be either a Standard serial interface or one of several different Fieldbus interfaces.

Data collection between the MX4000 and the peripherals is accomplished on an RS485 Multidrop line.

Standard Application Program

A Standard Application Program is factory-loaded onto the MX4000. This program provides communication towards Host and peripheral devices connected to a Multidrop network.

After configuration, a data collection session is started on the Multidrop line and collected data is sent to the Host. This data is non-associated data, that is, independent from one peripheral device to another.

Each data string from each device on the Multidrop line is sent directly to the Host with the configured Data Formatting described in Appendix A.

System configuration can be performed by the WINHOST interface utility program provided on diskette with the MX4000, **or** by using the Keyboard Mode through the keypad and the display, **or** by using the Host Mode programming procedure, sending ESC sequences via the serial interface.

Programmability

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

Some of the main features of the MX4000 are given below:

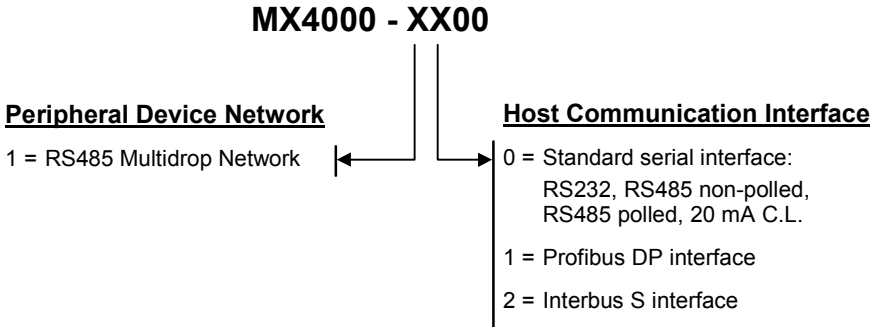
- serial or Profibus communication interfaces towards host
- connections to a PLC using Siemens protocols
- RS485 multidrop interface for data collection from peripherals
- completely configurable from host or auxiliary computer
- optional Fieldbus communication interfaces towards host; DeviceNet™, Modbus Plus, etc.
- input and output signals available for custom application programs

For more details contact to your local Datalogic distributor.

The MX4000 is contained in a rugged aluminum housing; the mechanical dimensions are 240 x 200 x 66 mm and it weighs about Kg 1.915.

1.1 AVAILABLE MODELS

The following models are available for MX4000:



2 GENERAL FEATURES

2.1 DISPLAY

The MX4000 is equipped with a 20 character x 4 line backlighted LCD.

The LCD is used by the Standard Application Program to display programming and error messages and data sent to the host, to view current configuration parameters and user menus.

If data is longer than the available number of characters in the LCD, it is not completely displayed, however it is completely transmitted to the host computer.

2.2 KEYPAD

There are four keys, marked with the symbol Up-arrow, Down-arrow, CLR and ENT; this keypad is mainly used to configure the MX4000 locally when remote configuration via a supervisor computer is not required.

To enter into keyboard programming mode, press the **UP-arrow** and **ENT** keys simultaneously. In the MX4000 Standard Application Program, these particular keys have the following functions:

This key scrolls functions or programmable data UP.

This key scrolls functions or programmable data DOWN.

This key allows you to return to the function of the previous menu.

This key enables the function or selects the value of the data shown on the display.

For further information on the use of these keys refer to the "kmx4000" file provided with the MX4000 diskette.

2.3 LEDS

The 7 colored LEDs on the MX4000 front panel are shown in the following figure:

Figure 1 - MX4000 LEDs

The LEDs indicate:

ETX TRIG1 (yellow) - input IN1 is active (available for Custom application programs).

ETX TRIG2 (yellow) - the input IN2 is active (available for Custom application programs).

TX MDROP (green) - transmission of data or programming running on the multidrop interface. (for RS485 Network models only).

RX MDROP (green) - reception of data or programming running on the multidrop interface. (for RS485 Network models only).

TX MAIN (green) - transmission of data or programming running on the main serial interface (for Standard serial interface models only).

RX MAIN (green) - reception of data or programming running on the main serial interface (for Standard serial interface models only).

POWER ON (red) - the MX4000 is powered.

2.4 REMOVABLE GLANDS PANEL

To make installation and replacement easier, the MX4000 is made up of two parts:

1) the body of the device containing all electronic components and optional boards
2) the removable panel housing the glands for all external communication cables

   This panel houses glands for serial and peripheral interface connections and for Profibus DP models, a 9-pin D-sub bus connector.

2.5 ON/OFF SWITCH

The on/off switch can be used to turn the device off if an emergency on the system occurs. The device can also be turned off for working on the internal cabling or other particular maintenance.

2.6 HOST COMMUNICATION INTERFACES

MX4000 models are available with the following communication interface types:

- Standard serial interface:
- Profibus DP
- InterBus-S

Details regarding use of the interfaces are given in the following paragraphs while connections are given in chapter 3 "Installation".

Alternative commercially available Fieldbus interface boards can be mounted in place of the InterBus-S board. For more details refer to your local Datalogic distributor.

2.6.1 Standard Serial Interface

The MX4000 Standard serial interface models are equipped with the following serial communication types for the Main serial interface:

RS232

RS485 HALF-DUPLEX

RS485 FULL-DUPLEX

20 mA CURRENT LOOP

2.6.2 Profibus DP

The MX4000 Profibus DP interface models allow connection to a **PROFIBUS DP** network **as** a **Slave** Station, communicating with a baud rate up to 3 Mbit/s (see DIN 19245 Part 1, Part 2, Part 3).

For details on the implementation of this interface for MX4000, refer to the document "mx4profi" on the MX4000 diskette.

For additional details concerning PROFIBUS Master station configuration or general PROFIBUS specifications and implementation issues, please refer to the official Siemens PROFIBUS documentation (DIN 19245).

2.6.3 InterBus-S

The MX4000 InterBus-S interface models are equipped with an ANYBUS InterBus module. The InterBus interface is normally used for industrial automation, normally for the control of valves, sensors and I/O units.

The ANYBUS module for InterBus is a remote bus slave. This slave node can be read and written to from an InterBus master. The ANYBUS module for InterBus will not initiate communication to other nodes, it will only respond to incoming commands.

The MX4000 only implements the Process Data Service for the InterBus network. The Process Data is updated every InterBus cycle.

Fieldbus data is accessed through parallel DPRAM.

2.7 AUXILIARY INTERFACE

All MX4000s have an RS232 auxiliary interface which can be connected to another host computer or an external system. This interface is mainly used as a control station or for system configuration using the WinHost utility program. Diagnostics and program downloading can be performed from this interface.

2.8 PERIPHERAL NETWORK COMMUNICATIONS

2.8.1 Multidrop Line

These MX4000 models are supplied with an RS485 Half-Duplex interface for peripheral device connections.

2.9 I/O

Two input signals (NPN, PNP), and three output signals (open emitter, open collector), which are not used in the Standard Application Program, are available for Custom Application Programs. For more details refer to your local Datalogic distributor.

3 INSTALLATION

3.1 PACKAGE CONTENTS

Verify that the MX4000 and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

1) MX4000 multiplexer
2) Installation manual
3) MX4000 configuration program disk
4) Terminal blocks, power supply connector, and multidrop line termination resistors

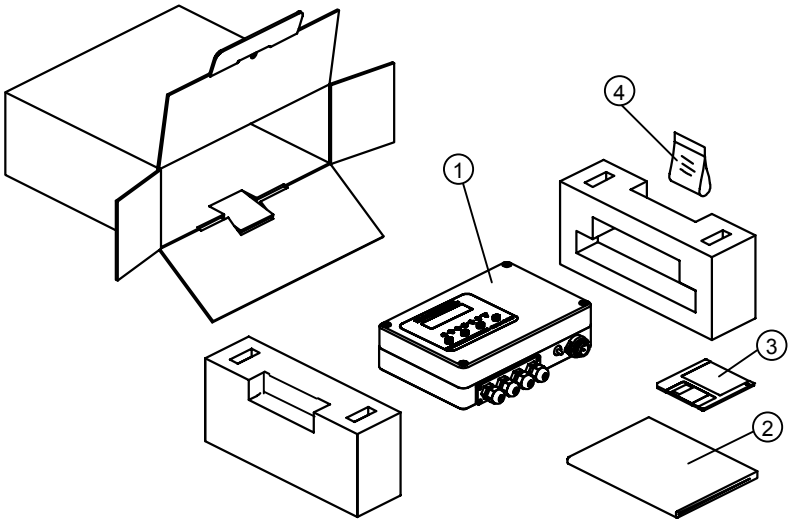


Figure 2 - MX4000 package contents

3.2 GUIDE TO INSTALLATION

The Installation of the MX4000 depends on the model and type of system implemented. The following paragraphs summarize complete installations for different systems and can be used as checklists to verify all of the steps necessary for complete installation.

For all systems, alternatives to software configuration through the WinHost interface utility program is achieved by using the Keyboard Mode through the keypad and the display **or** by using the Host Mode programming procedure, by ESC sequences via the serial interface. For more details about these programming modes refer to the documents on the configuration program disk.

3.2.1 Standard Serial Interface

1) Open and mount the MX4000 according to the information in paragraphs 3.3 and 3.4.

2) Set the **main serial interface type** as required using jumpers JP1-JP3 (see paragraph 3.6.1 under “Main Serial Interface Selection”, figure 3.9).

3) Provide correct system cabling (see paragraph 3.3.1, 3.5, all applicable sub-paragraphs under 3.6.1, paragraphs 3.7.1 and 3.8).

4) Configure the software parameters from a host computer using the Winhost interface utility program as follows:

Host Int.

- Verify that the Interface Configuration is **Serial**.
- In the Serial Configuration select the correct **Protocol type** and line parameters for your application.
- In Options, select the data formatting desired (described in Appendix A).

Device Int.

- Define the **Baud Rate** for the Multidrop line.
- Enable the **Devices**, according to address number, which must correspond to actual devices with those addresses on the network.

The installation is now complete.

3.2.2 Profibus DP Interface

1) Open and mount the MX4000 according to the information in paragraphs 3.3 and 3.4.

2) Set a valid **Profibus DP address** (see paragraph 3.6.2).

3) Provide correct system cabling (see paragraphs 3.3.1, 3.5, 3.6.2, 3.7.1 and 3.8).

4) Configure the software parameters from a host computer using the Winhost interface utility programs follows:

Host Int.

- Verify that the Interface Configuration is **Profibus-DP**.
- Select whether to enable Profibus Flow Control or not.
- In Options, select the data formatting desired (described in Appendix A).

Device Int.

- Define the **Baud Rate** for the Multidrop line.
- Enable the **Devices**, according to address number, which must correspond to actual devices with those addresses on the network.

The installation is now complete.

3.2.3 Interbus-S Interface

1) Open and mount the MX4000 according to the information in paragraphs 3.3 and 3.4.

2) Provide correct system cabling (see paragraphs 3.3.1, 3.5, 3.6.3, 3.7.1 and 3.8).

3) Configure the software parameters from a host computer using the Winhost interface utility programs follows:

Host Int.

- Verify that the Interface Configuration is **Anybus-DT**.
- Select whether to enable Anybus Flow control or not.
- Verify that the Anybus Areas = **6.**
- In Options, select the data formatting desired (described in Appendix A).

Device Int.

- Define the **Baud Rate** for the Multidrop line.
- Enable the **Devices**, according to address number, which must correspond to actual devices with those addresses on the network.

The installation is now complete.

3.3 OPENING THE DEVICE

Before installing the MX4000 it is necessary to open it to perform the following operations:

- Mount the device on a panel or a wall. (par. 3.4)
- Provide system wiring through the glands panel. (par. 3.3.1 and relative connection paragraphs: 3.5, 3.6, 3.7)

You have to remove the top panel to perform these operations; you also have to remove the glands panel to change cable connections. Refer to the following instructions and diagram below when opening the device:

1) Turn the MX4000 off.
2) Disconnect the power supply cable.
3) Unscrew the four screws as shown below to open the device.
4) Carefully remove the cover of the decoder while paying attention to the cable that is connected to the electrical ground; this cable is long enough to allow you to lay the cover to the side while operating inside the device.

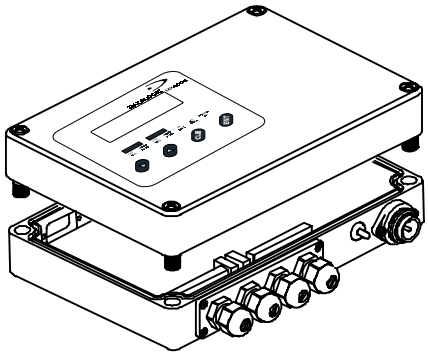


Figure 3 - Opening the MX4000

3.3.1 Removing and Wiring the Glands Panels

After opening the MX4000 you must remove the panel that houses the glands to connect or change the internal cabling.

To connect an external cable to the MX4000, proceed as follows:

1) Turn the MX4000 off.
2) Disconnect the power supply cable.
3) Open the MX4000 as described in paragraph 3.3.
4) Using a screwdriver, unlock the screws that fix the glands panel and remove it from the MX4000 body.
5) Unscrew the glands and pass the cables through them.
6) Cut the insulation of the cable on the MX4000 side by a few centimeters.
7) Strip the individual wires by a few millimeters.
8) Loosen the terminal block connector screw of the selected position, insert the wire and tighten the screw (see Figure 4).
9) After inserting all the wires into the terminal block connectors, pass them through the glands panel hole and insert them into the base again (see Figure 5 and Figure 6).
10) Affix the glands panel to the MX4000 body with the proper screws adjusting the cables to the proper length through each gland and then tightening the glands.

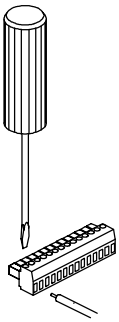


Figure 4 - Inserting the wire

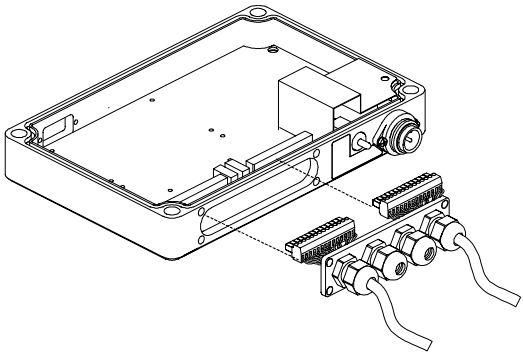


Figure 5 - MX4000 view

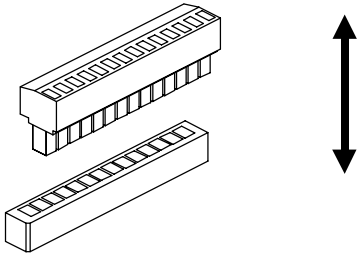


Figure 6 - Terminal block connector and base

3.4 MECHANICAL INSTALLATION

3.4.1 Overall Dimensions

The figure below gives the overall dimensions of the MX4000 and its relative mounting holes and may be used for its installation.

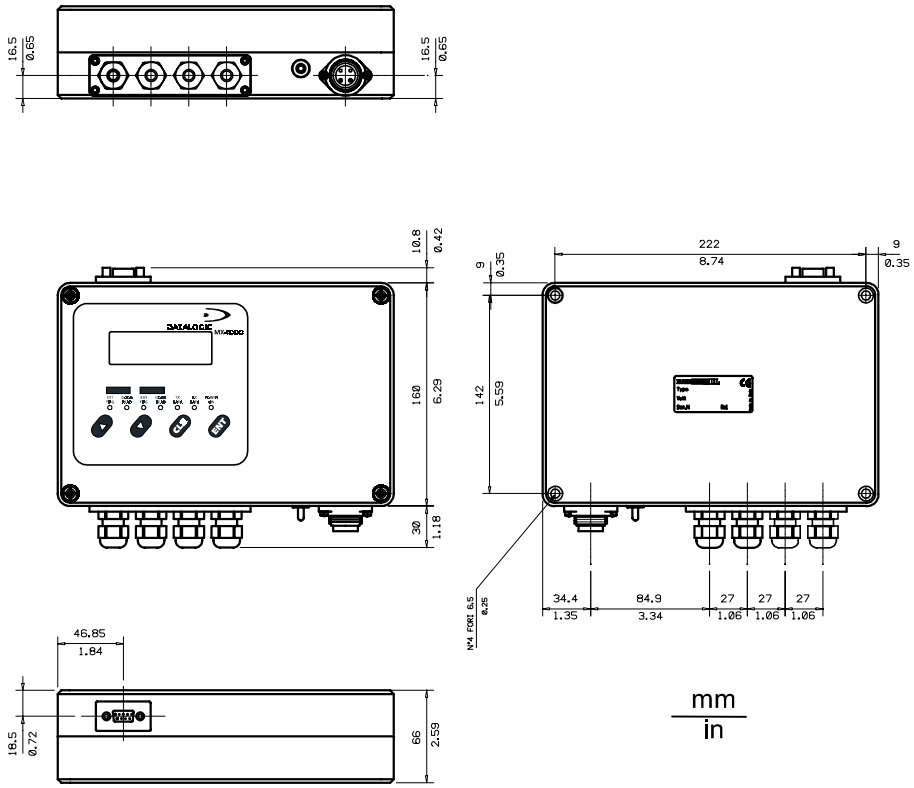


Figure 7 - Overall dimensions

3.4.2 Mounting MX4000

MX4000 can be mounted on a wall or a panel. To do this:

1) Open the device as described in paragraph 3.3.
   If necessary, using the two mounting holes inside the MX4000 as a pattern, mark the panel or the wall with an appropriate object and then drill two pilot holes in the panel or in the wall.

2) Align the device and insert two appropriate screws (M5 x 35 UNI 6107 or M5 x 40) with their washers and then screw them into the panel or the wall until tight (see Figure 8).

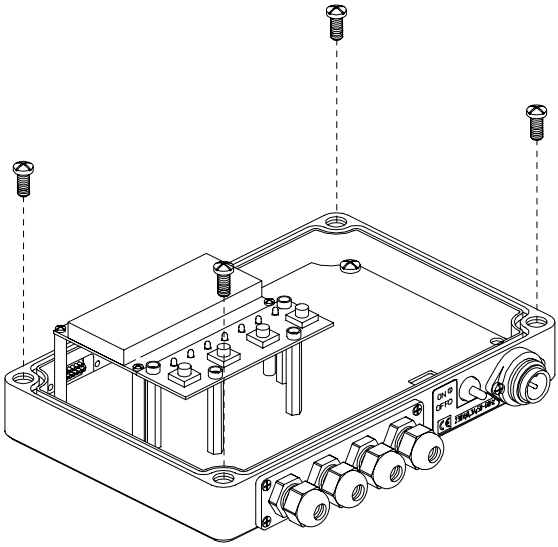


Figure 8 - Mounting MX4000

3.5 CONNECTIONS TO POWER SUPPLY

The MX4000 is powered by a voltage between 10 to 30 VDC. A power cable can be made using the 4-pin male connector provided with the package.

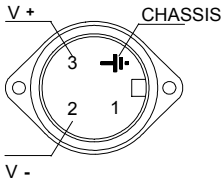


Figure 9 - Power supply connector on MX4000

To maintain conformity with CE directives, you must ground the Chassis pin.

3.6 CONNECTIONS TO HOST

MX4000 offers several different types of system connections to the Host. These are described in the following paragraphs.

3.6.1 Standard Serial Interface - Main

For the MX4000 Standard serial interface models, the following signals are available on the Main serial interface:

RS232	**RS485 HALF-DUPLEX**
20 mA CURRENT LOOP	**RS485 FULL-DUPLEX**

MX4000 automatically recognizes which Main serial interface type is selected at each power on of the device.

The parameters relative to the Main interface (baud rate, data bits, etc.) can be defined using the Winhost utility program **or** Keyboard Mode programming **or** Host Mode programming. For more details refer to the section "Main Interface Menu" in the Help On Line of the WINHOST utility program.

Main Serial Interface Selection

One of the following interface types can be selected to connect the main interface of the MX4000 to the host computer:

RS232	RS485 HALF-DUPLEX
20 mA CURRENT LOOP	RS485 FULL-DUPLEX

To select the interface type, position the jumper block as indicated in the following figure:

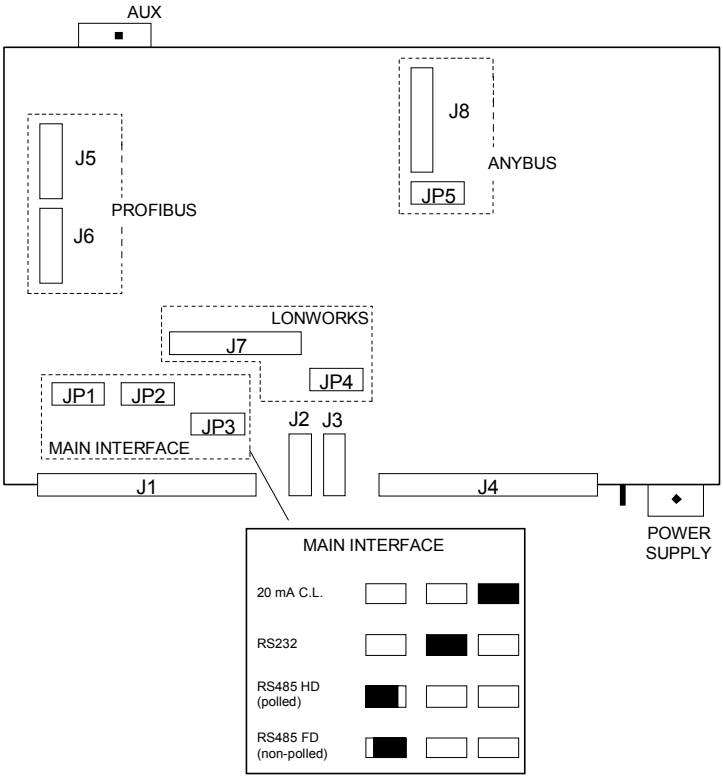


Figure 10 - Interface type selection

Standard Serial Interface Grounding Rules

Shielding the communication cable is an effective way to protect against capacitive conduction and radiated interference, while the effect against noise due to inductive coupling is small. In any case, the shielding effect occurs only if the shield is grounded; otherwise the entire voltage of the shielded material will be floating and will not give protection against electrical noise.

When installing the MX4000 in a large system, remember that a voltage drop may occur between ground connections made at distant points. This could be the undesirable effect of variable electromagnetic fields due, for instance, to the presence of engines, leakage currents, lightning or other sources. For long distances between the devices (about 50 meters, but this length depends widely on the environment), the voltage drop between ground connections can be 100 V or higher.

If you ground the shield in several points the voltage drop across the shield will cause a current, increasing the noise on the signal wires.

Therefore, to avoid damage to the device drivers and loss of system performance in general, the shield should be grounded at most in one point only.

Since the shielding protection is more effective near to the ground connection, it is advisable to ground the shield where electric noise is higher. Typically this is done at the MX4000 device.

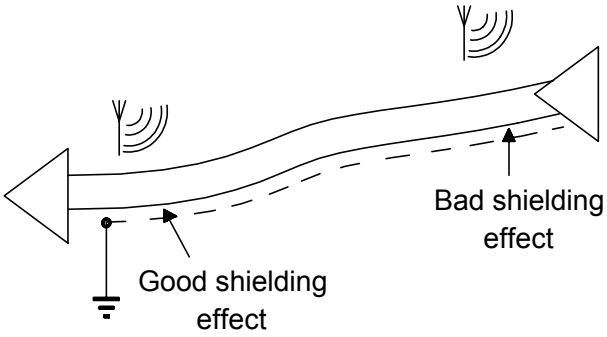


Figure 11 - Shield grounding effect

Pinout

The terminals of the internal connectors are numbered as illustrated in Figure 12:

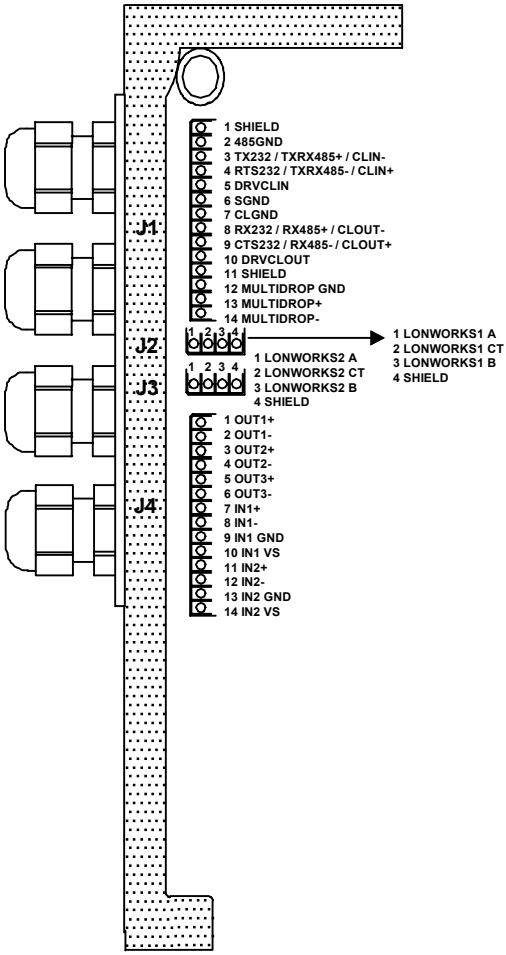


Figure 12 - Standard Serial internal connector pinouts

The shield (J1 Pin 1) is provided to protect system cabling from electrical noise. To avoid ground loop problems, the shield must be connected to ground in one point only.

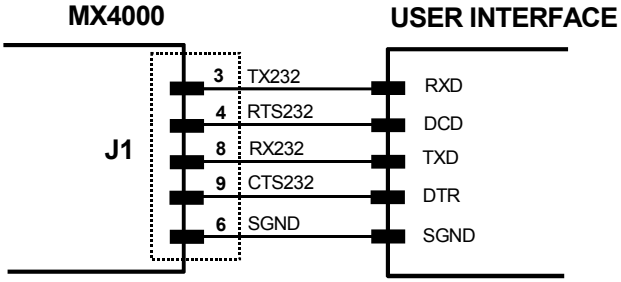
RS232 Interface

The serial interface is used in this case for point to point connections; it handles communication with the host computer and allows both transmission of data and the configuration of the MX4000.

The terminals of the system cable must be connected to the following pins of connector J1 for RS232 interface connection:

RS232 connection

Pin	Name	Function
3	TX232	transmitted data
4	RTS232	request to send
6	SGND	signal ground
8	RX232	received data
9	CTS232	clear to send



MAXIMUM LENGTH: 15 m

RTS/CTS HARDWARE HANDSHAKING ENABLED

Figure 13 - RS232 main interface connections

To select this interface type, follow the instructions in the section "Main Serial Interface Selection" of this paragraph (Figure 10).

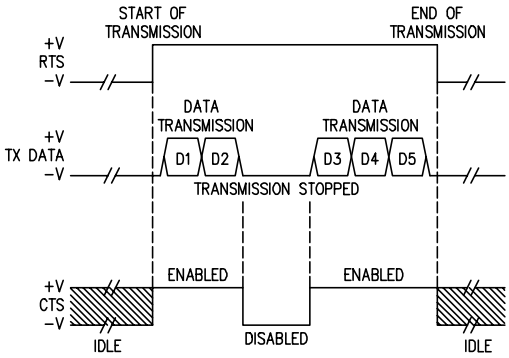


Figure 14 - RS232 control signals

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

If the RTS/CTS handshaking protocol is enabled, the MX4000 activates the RTS232 output to indicate a message is to be transmitted. The receiving unit activates the CTS232 input to enable the transmission.

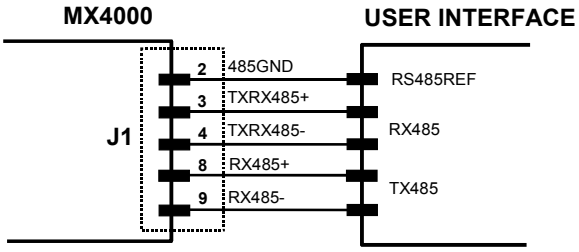
RS485 Full-Duplex Interface

The RS485 full-duplex 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 terminals of the system cable must be connected to the following pins of connector J1 for RS485 non-polled communications:

RS485 full-duplex connection

Pin	Name	Function
2	485GND	RS485 reference ground
3	TXRX485+	RS485 + transmitted data
4	TXRX485-	RS485 - transmitted data
8	RX485+	RS485 + received data
9	RX485-	RS485 - received data



MAXIMUM LENGTH: 1200 m

Figure 15 - RS485 full-duplex connections

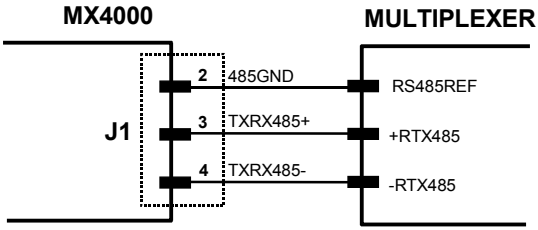
To select this interface type, follow the instructions in the section "Main Serial Interface Selection" of this paragraph (Figure 10).

RS485 Half-Duplex Interface

The terminals of the system cable must be connected to the following pins of connector J1 for RS485 polled communications:

RS485 half-duplex connection

Pin	Name	Function
2	485GND	RS485 reference ground
3	TXRX485+	RS485 + transmitted/received data
4	TXRX485-	RS485 - transmitted/received data



MAXIMUM LENGTH: 1200 m

Figure 16 - RS485 half-duplex connections

To select this interface type, follow the instructions in the section "Main Serial Interface Selection" of this paragraph (Figure 10).

20 mA Current Loop Interface

The MX4000 has two current generators (one for transmission and one for reception), allowing active and passive type connections.

The terminals of the system cable must be connected to the following pins of connector J1 for 20 mA Current Loop communications:

20 mA Current Loop connection

Pin	Name	Function
3	CLIN-	current loop input (-)
4	CLIN+	current loop input (+)
5	DRVCLIN	input current generator
7	CLGND	generator reference
8	CLOUT-	current loop output (-)
9	CLOUT+	current loop output (+)
10	DRVCLOUT	output current generator

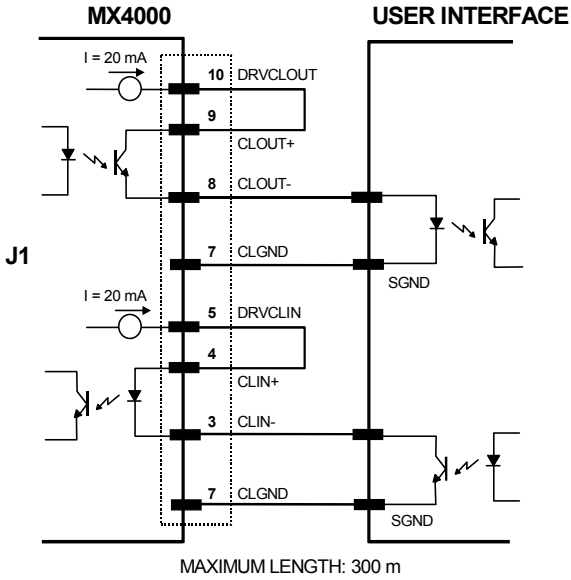


Figure 17 - 20 mA C.L. active connections

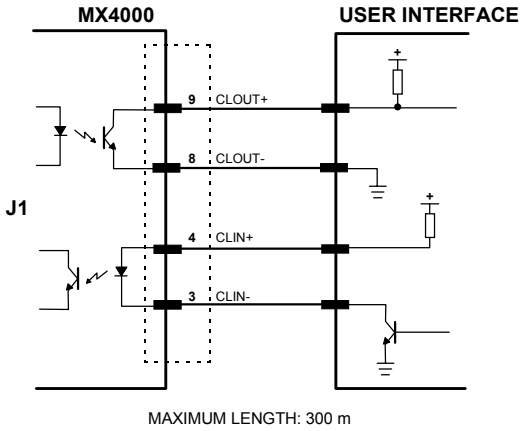


Figure 18 - 20 mA C.L. passive connections

To select this interface type, follow the instructions in the section "Main Serial Interface Selection" of this paragraph (Figure 10).

3.6.2 Profibus Interface

To function correctly you must select a valid Profibus DP address using the DIP switch found on the Profibus DP board. Set the address as a binary number on the DIP switch.

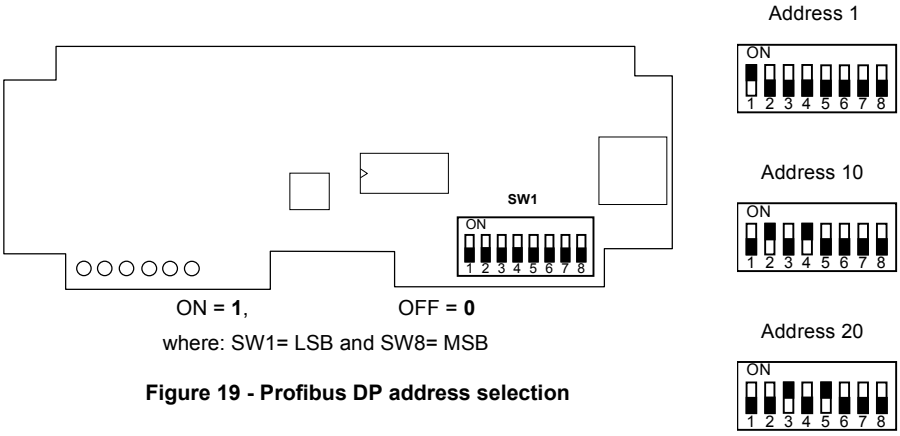


Figure 19 - Profibus DP address selection

Some example Profibus DP address selections are shown in the figure above:

To connect MX4000 as a Profibus DP Slave, use a standard Siemens Profibus cable with a 9-pin male connector (see DIN 19245 part 1) and plug it into the 9-pin female socket on MX4000 front panel. The following table reports a brief description of the implemented Profibus signals:

Pin	Name	Function
1	SHIELD	shield
3	RX/TX +	receive/transmit positive voltage
4	CNTR +	control positive voltage (optional)
5	DGND	data ground
6	VP (*)	supply voltage +5v
8	RX/TX -	receive/transmit negative voltage
9	CNTR -	control negative voltage (optional)

(*) Signal is necessary only for stations at the end of the bus cable for line termination.

Please refer to the Siemens Profibus documentation for specific details.

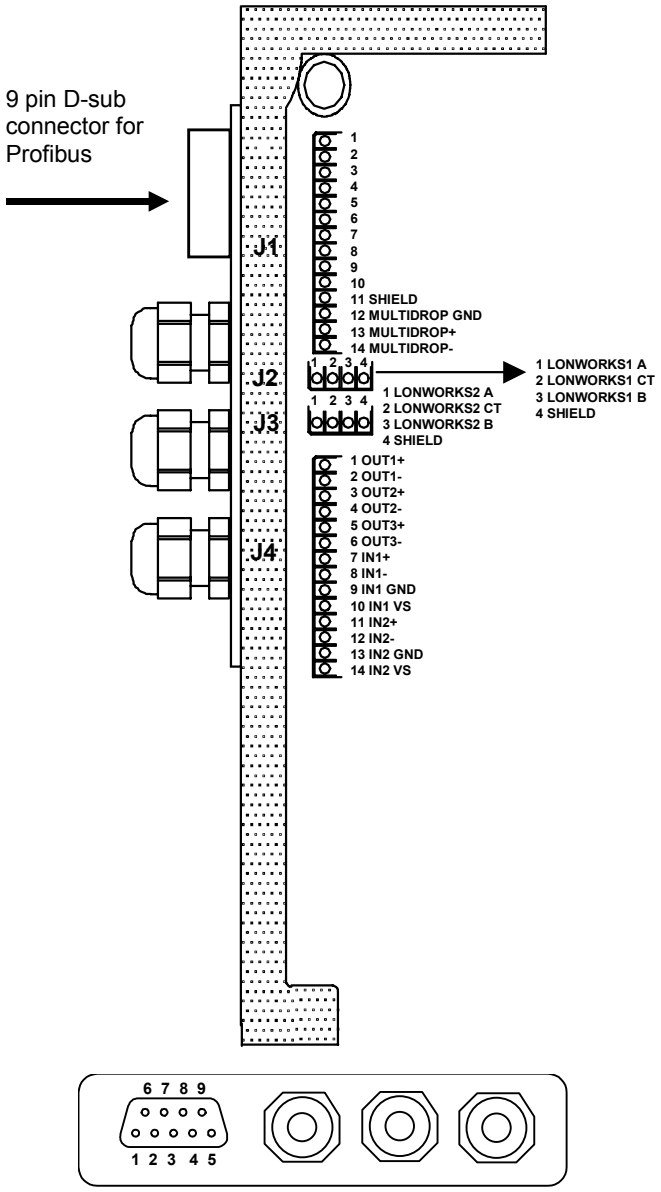


Figure 20 - Profibus pinout

3.6.3 InterBus-S Interface

For the InterBus-S interface to work correctly, jumper JP5 must be installed. See Figure 10.

On the last unit of the InterBus network, connect K/11 to L/12 on the BUS OUT connector.

BUS IN connector	
Screw or crimp	Description
B/1	DO1
A/2	/DO1
D/3	DI1
C/4	/DI1
E/5	GND
-/6	PE

BUS OUT connector	
Screw or crimp	Description
G/7	DO2
F/8	/DO2
J/9	DI2
H/10	/DI2
K/11	GND
L/12	RBST
-/13	PE
-	VCC

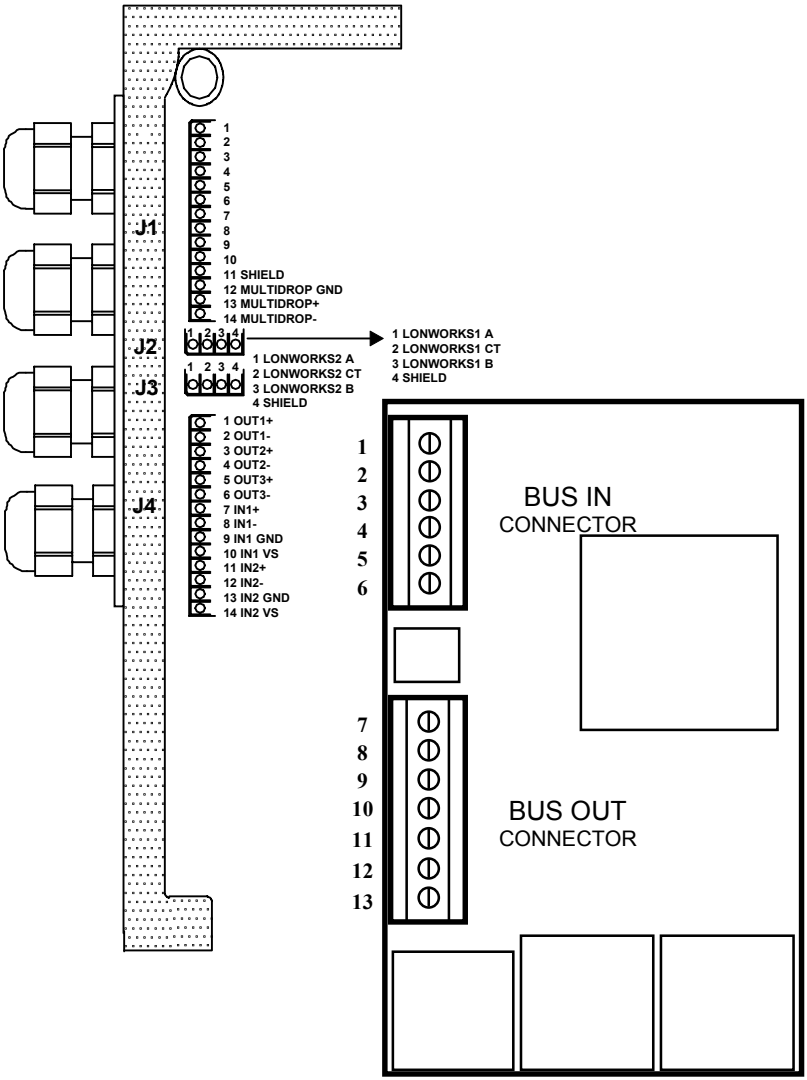


Figure 21- InterBus-S pinout

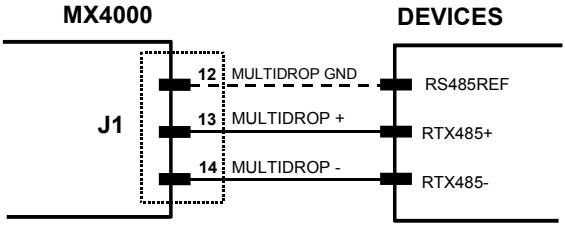
3.7 CONNECTIONS TO PERIPHERAL DEVICES

3.7.1 Multidrop Line

The terminals of the system cable must be connected to the following pins of connector J1:

Multidrop Device Connection

Pin	Name	Function
12	MULTIDROP GND	RS485 reference ground
13	MULTIDROP +	RS485 + transmitted/received data
14	MULTIDROP -	RS485 - transmitted/received data
11	SHIELD	cable shield



MAXIMUM LENGTH: 1200 m

Figure 22 - Multidrop device connections

It is important to remember that the RS485 reference wire (MULTIDROP GND in the figures) must always be connected as shown to avoid communication problems.

The common reference on this line is important because the MULTIDROP interface was designed to withstand on both inputs a voltage ranging from -7 V to +12 V: a higher voltage drop could damage drivers and receivers.

Grounding the Multidrop Line

Several Datalogic scanners have a non-isolated RS485 interfaces. DS2100, DS41, DS4300, DS4600 have no optocoupler on the RS485 driver and the RS485 ground is connected to the general GND (negative power supply) but isolated from chassis-earth.

CAUTION

Different considerations must be made for other devices having RS485 ground connected to GND and also to chassis (DS2200 and DS1100).

The following examples show correct connections to the Multidrop line when the RS485 interface is not isolated.

Single Power Supply Installation

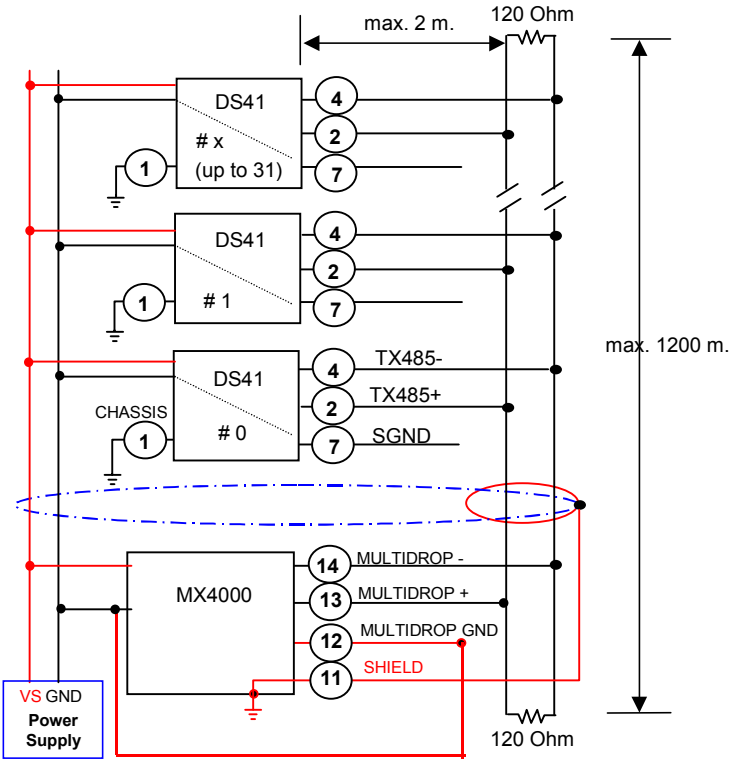


Figure 23 – Single cable (power+multidrop line+shield)

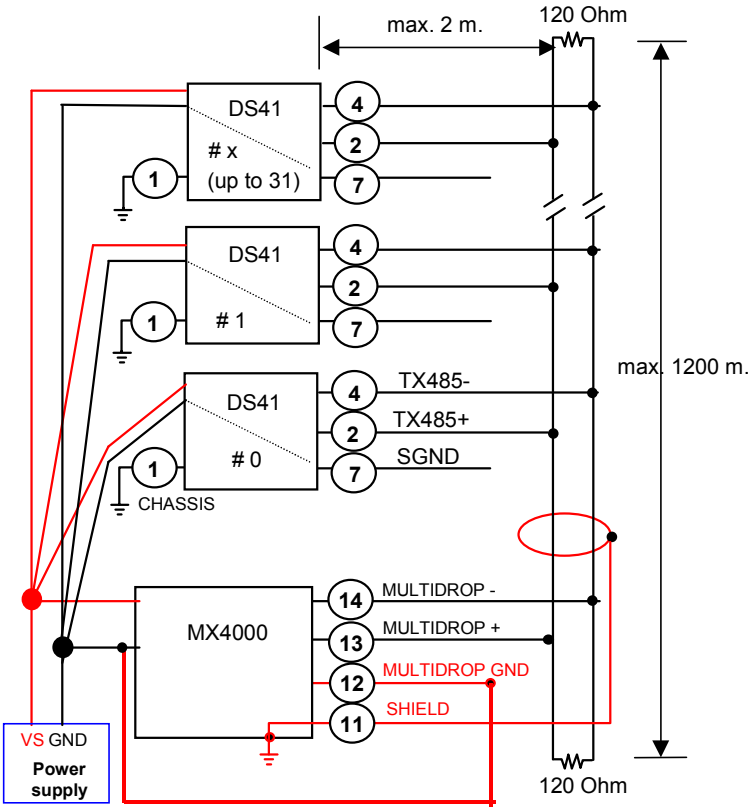


Figure 24 – Separate cables (shielded multidrop cable and power line cable)

Observe the following rules when cabling the peripheral devices:

- Minimum wire size 24AWG
- The power line has to be used only for bar code readers and their accessories (i. e. photocells). Wire dimensioning **must** be selected and checked in order to avoid voltage drops greater than 0.8 Volts.
- MULTIDROP GND **must** be connected only to Power supply GND to avoid excessive 485 common mode voltage (485 driver references are to be connected together to avoid failure). All scanner SGNDs **must** be floating (not connected to MULTIDROP GND) since they are internally connected to GND (if connected ground loop problems can occur).
- Cable Shield connected only to Multiplexer earth.
- We suggest using the single cable layout in Figure 23. If not possible the separate Power Cable (VS-GND) **should** be handled as a signal cable (do not put it together with other power cables) and **should** lie down as near as possible to the multidrop cable (avoiding wide loops between them).
- Scanner's chassis may be connected to earth (it isn't mandatory).
- The maximum distance, end to end, of the multidrop line should not exceed 1200 meters.
- 120 Ohm termination resistance required only for baud rates higher than 19200.

Double Power Supply Installation

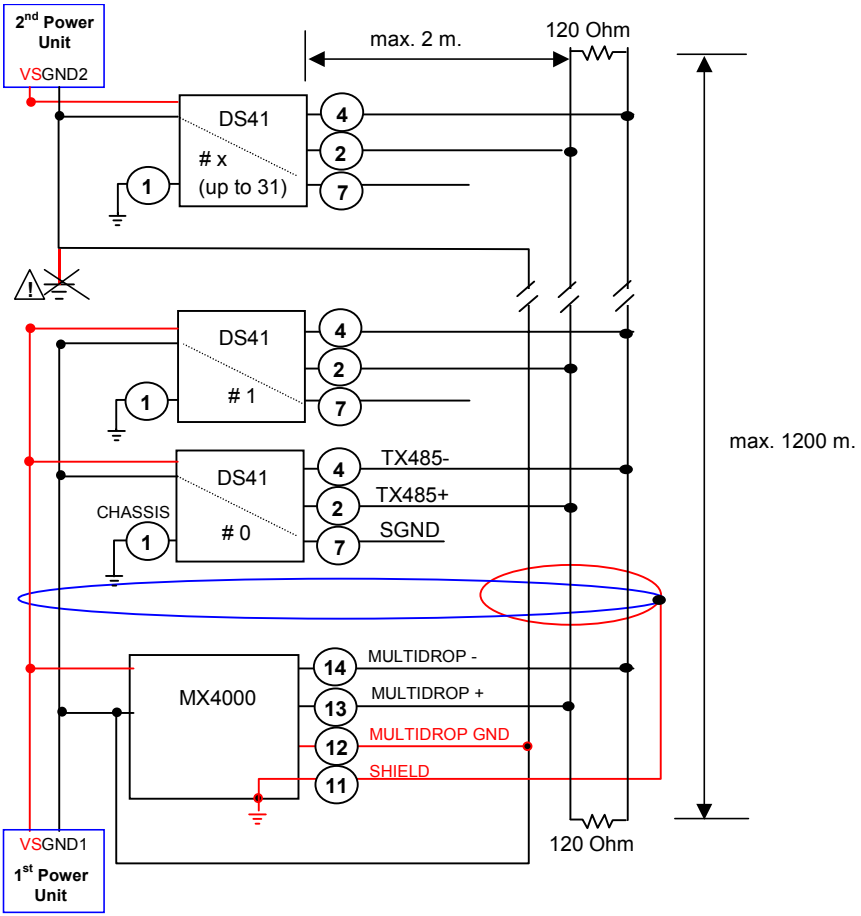


Figure 25 - Double supply single cable (power+multidrop line+shield)

Observe the following rules cabling the peripheral devices:

- Minimum wire size 24AWG
- The power line has to be used only for bar code readers and their accessories (i. e. photocells). Wire dimensioning **must** be selected and checked in order to avoid voltage drops greater than 0.8 Volts.
- MULTIDROP GND is connected to GND1 (1st Power Unit) to avoid excessive 485 common mode voltage (485 driver references are to be connected together to avoid failure). All scanner SGNDs are floating since they are internally connected to GND, (if connected together, ground loop problems can occur). Then GND1 and GND2 (2nd Power Unit) must be connected together with MULTIDROP GND using the third wire inside multidrop cable.
- GND2 **should not be connected** to earth to avoid possible ground loop problems if GND1 is also connected. This situation could result in failure or unreliable multidrop behaviour.
- If GND2 cannot be disconnected from earth, you **must not** wire GND2 to MULTIDROP GND. However this is not completely reliable since the 485 reference for the second group of scanner(s) is connected to the first group only through the earth connection depends on the quality of earth ground.
- Cable Shield connected only to Multiplexer earth.
- We suggest using the single cable layout shown in Figure 25 (multidrop+power). If not possible the separate DC voltage Power Cable (VS-GND) must be handled as a signal cable (do not put it together with other power cables) and must lie down as near as possible to the multidrop cable (avoiding wide loops between them).
- Scanner's chassis may be connected to earth (it isn't mandatory).
- The maximum distance, end to end, of the multidrop line should not exceed 1200 meters.
- 120 Ohm termination resistance required only for baud rates higher than 19200.

Multiple Power Supply Installation

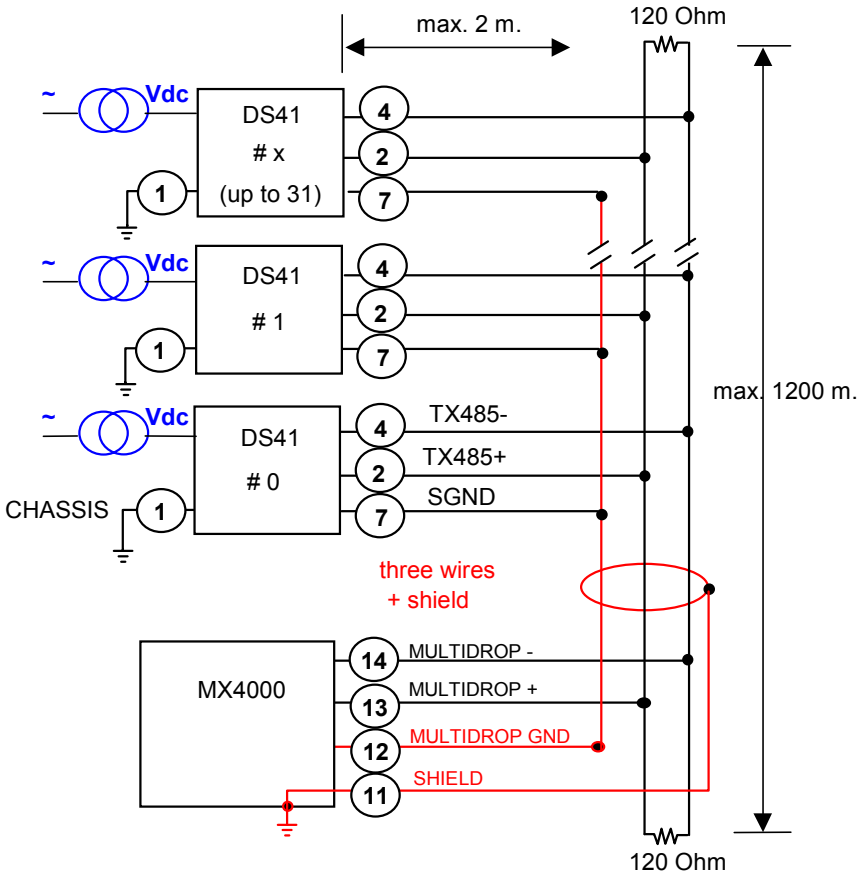


Figure 26 – Three-wire shielded multidrop cable

The multiple power supply installation is valid for both opto-isolated and non-isolated RS485 interfaces.

Observe the following rules when cabling the peripheral devices:

- Minimum wire size 24AWG.
- MULTIDROP GND **must** be connected only to Power supply GND to avoid excessive 485 common mode voltage (485 driver references are to be connected together to avoid failure).
- Cable Shield connected only to Multiplexer earth.
- Scanner's chassis may be connected to earth (it isn't mandatory).
- The maximum distance, end to end, of the multidrop line should not exceed 1200 meters.
- 120 Ohm termination resistance required only for baud rates higher than 19200.

3.8 CONNECTIONS TO AUXILIARY INTERFACE

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

The parameters relative to the auxiliary interface (baud rate, data bits, etc.) can be defined using the Winhost utility program or Keyboard Mode programming or Host Mode programming. For more details refer to the section "Auxiliary Interface Menu" in the Help On Line of the WINHOST utility program.

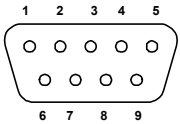
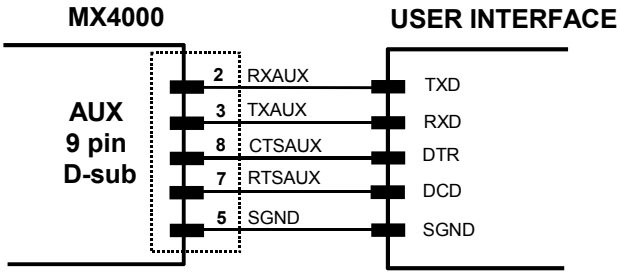


Figure 27 - 9-pin male connector

Connection to the auxiliary interface is provided through the standard RS232 9-pin male connector with the following pinout:

9-pin connector pinout

Pin	Name	Function
1	N.C.	not connected
2	RXAUX	auxiliary input
3	TXAUX	auxiliary output
4	N.C.	not connected
5	SGND	signal ground
6	N.C.	not connected
7	RTSAUX	auxiliary handshake
8	CTSAUX	auxiliary handshake
9	N.C.	not connected



MAXIMUM LENGTH: 15 m

RTS/CTS HARDWARE HANDSHAKING ENABLED

Figure 28 - RS232 auxiliary interface connections

The RTSAUX and CTSAUX signals control data transmission and synchronize the connected devices. If the RTS/CTS handshaking protocol is enabled, the MX4000 activates the RTSAUX output to indicate a message is to be transmitted. The receiving unit activates the CTSAUX input to enable the transmission.

3.9 CONNECTIONS TO I/O

3.9.1 Inputs

The signals relative to these sensors must be connected to the MX4000 via the proper internal connector J4 (see Figure 12), respecting the following connections:

Input signals (J4)

Pin	Name	Function
7	IN1+	input 1 (+)
8	IN1-	input 1 (-)
9	IN1 GND	input 1 signal ground
10	IN1 VS	input 1 operating voltage
11	IN2+	input 2 (+)
12	IN2-	input 2 (-)
13	IN2 GND	input 2 signal ground
14	IN2 VS	input 2 operating voltage

An input signal can be driven by sensors with NPN or PNP output and is optoisolated to assure maximum disturbance immunity.

The electrical features are:

maximum voltage applicable at input: 30 V.

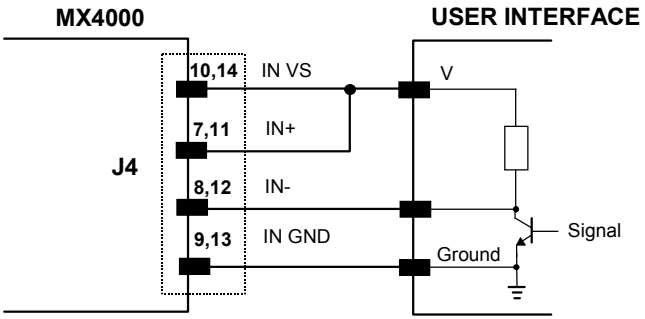
maximum current: 25 mA.

IN1 VS and IN2 VS and their relative ground references (IN1 GND, IN2 GND) supply power to the input signals from the MX4000 with the following characteristics:

typical voltage: 12 V.

maximum current: 50 mA.

A debounce filter is implemented on both inputs: the nominal value of the delay is 5 ms.



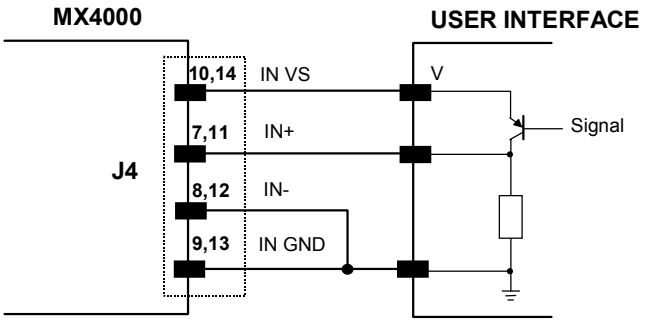
IN VS = IN1 VS or IN2 VS

IN+ = IN1+ or IN2+

IN- = IN1- or IN2-

IN GND = IN1 GND or IN2 GND

Figure 29 - Input connections with NPN input interface



IN VS = IN1 VS or IN2 VS

IN+ = IN1+ or IN2+

IN- = IN1- or IN2-

IN GND = IN1 GND or IN2 GND

Figure 30 - Input connections with PNP user interface

3.9.2 Outputs

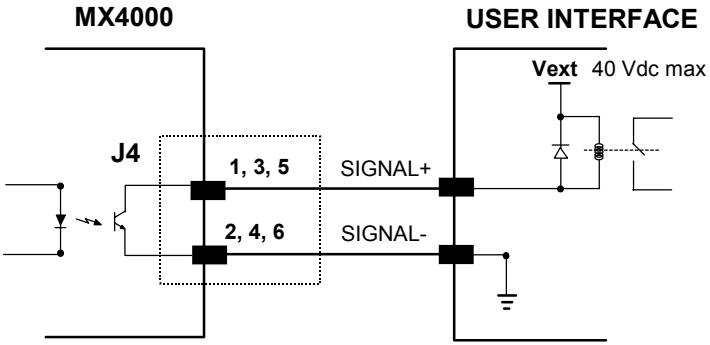
The following pins are present on the connector J4 (see Figure 12) of the MX4000:

Output signals

Pin	Name	Function
1	OUT1+	output1 (+)
2	OUT1-	output1 (-)
3	OUT2+	output2 (+)
4	OUT2-	output2 (-)
5	OUT3+	output3 (+) 1
6	OUT3-	output3 (-)

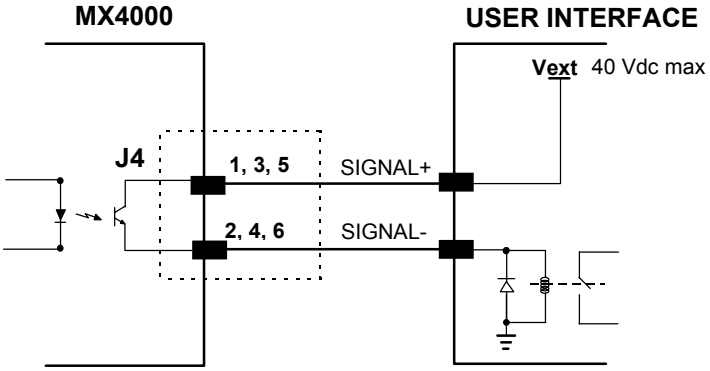
The electrical features are:

VCE max.	40 Vdc
Collector current max.	40 mA continuous; 130 mA pulsed
VCE saturation	1V at 10 mA



SIGNAL+ = OUT1+, OUT2+ or OUT3+
SIGNAL- = OUT1-, OUT2- or OUT3-

Figure 31 - Open collector output connection



SIGNAL+ = OUT1+, OUT2+ or OUT3+
SIGNAL- = OUT1-, OUT2- or OUT3-

Figure 32 - Open emitter output connection

3.10 TYPICAL LAYOUTS

The typical layouts for MX4000 depend on the model and therefore the type of system in which it is installed. There are many possibilities, some of which are shown in the following paragraphs.

3.10.1 MX4000 Standard Serial Interface Layout

The MX4000 is connected to a Host using one of the Standard Serial Interfaces: RS232, RS485 Half-Duplex or Full-Duplex, or 20 mA C.L.

Each scanner or other peripheral device, is connected to the MX4000 using the RS485 Multidrop line.

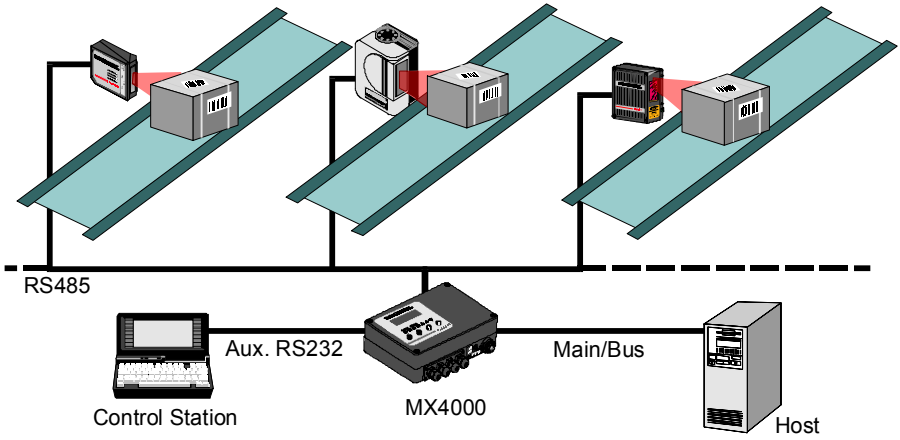


Figure 33 - MX4000 standard serial interface multistation layout

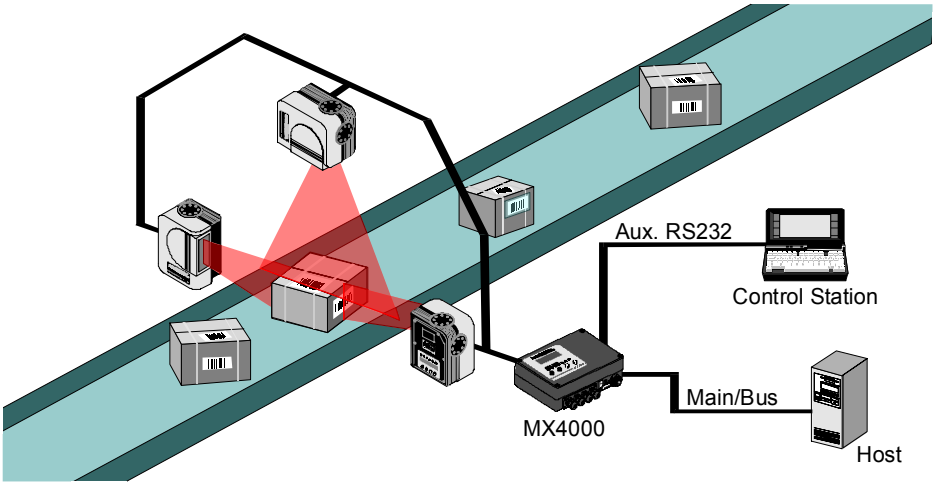


Figure 34 - MX4000 standard serial interface multi-sided layout

3.10.2 MX4000 Profibus DP Layout

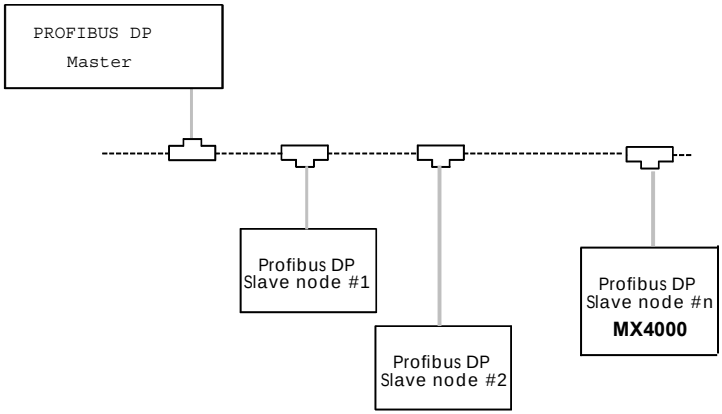


Figure 35 - MX4000 Profibus DP layout

3.10.3 MX4000 InterBus-S Layout

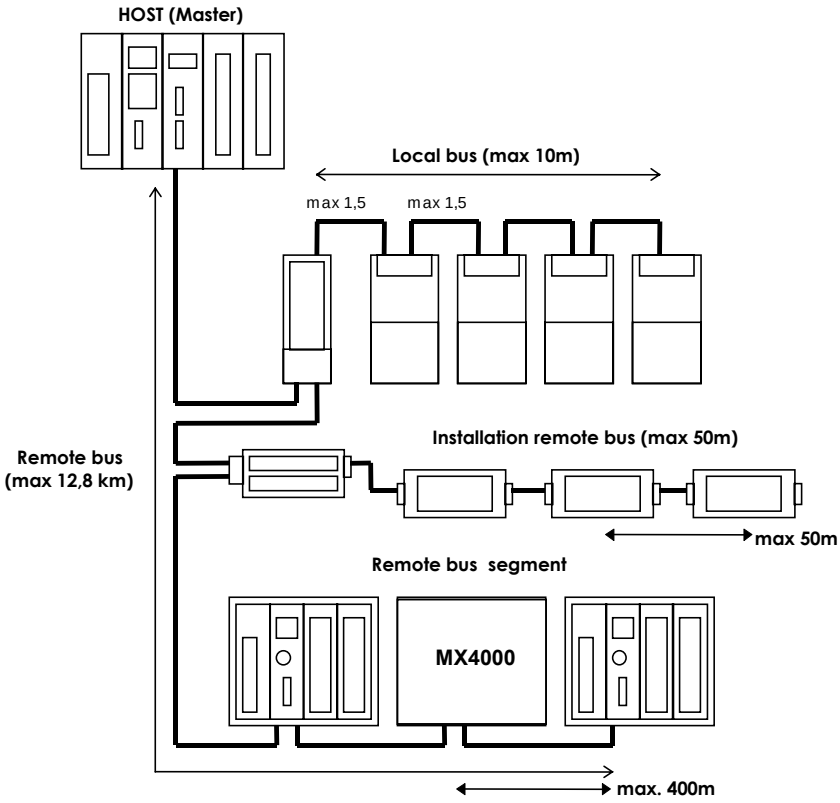


Figure 36 - MX4000 InterBus-S layout

4 TECHNICAL FEATURES

ELECTRICAL FEATURES	
INPUT POWER	
Supply voltage	10 - 30 Vdc
Power consumption max.	6W
SERIAL INTERFACES	
MAIN	RS232 RS485 Full-Duplex RS485 Half-Duplex 20 mA C. L.
AUXILIARY	RS232
BAUD RATES	
Main	1200 to 115200
Auxiliary	1200 to 19200
Multidrop	1200 to 57600
CONTROL INPUTS	
IN1	(optocoupled NPN or PNP)
IN2	(optocoupled NPN or PNP)
Voltage max.	30 Vdc
Input current max.	25 mA
CONTROL OUTPUTS	
OUT1, OUT2, OUT3	(open emitter, open collector)
VCE max.	40 Vdc
Collector current max.	40 mA continuous; 130 mA pulsed
VCE saturation	1V at 10 mA
USER INTERFACE	
LED indicators	power on; data reception - mdrop, main; data transmission - mdrop, main; inputs - Ext trig1, Ext trig2

SOFTWARE FEATURES	
CONFIGURATION MODES	• through menus using WINHOST utility • through KEYBOARD MODE • receiving commands from one of the serial ports (HOST MODE)
PARAMETER STORAGE	Non-volatile internal EEPROM
ENVIRONMENTAL FEATURES	
Operating temperature (see Note)	0 to 55 °C
Storage temperature	-20 to 70 °C
Humidity max.	90% non condensing
Vibration resistance	IEC 68-2-6 test FC 1.5 mm; 10 to 55 Hz; 2 hours on each axis
Shock resistance	IEC 68-2-27 test EA 30G; 11 ms; 3 shocks up and down on each axis
PHYSICAL FEATURES	
Mechanical dimensions	240 x 200 x 66 mm
Weight	approx. 1.915 Kg. (with Profibus board)

APPENDIX A DATA FORMATTING

In the Standard Application Program, MX4000 collects data from a series of scanners and sends them to the Host. This appendix describes how these data are formatted towards the Host and on the MX4000 display.

DATA FORMATTING TOWARDS THE HOST

Time Info Disabled

When the "Time Info" option is disabled, the address of the scanner (an ASCII number from 0 to 31) and the ASCII space character (20H) are added to the data from the scanner.

The data format is as follows:

<scanner address> <(20H)> <scanner data>

or in the case of a fragmented data string from the scanner:

<scanner address> <&> <scanner data>...<scanner address> <(20H)> <scanner data>

In the **Standard Serial Interface** case, the scanner address is represented by two decimal numbers:

Example: From scanner 27 the data string "ABCD" is collected.

MX4000 sends the following string to the Host:

0x32 0x37 0x20 0x41 0x42 0x43 0x44

In the **AnyBus or Profibus** cases, the scanner address is represented by a unique binary byte:

From the example above the MX4000 sends the following string to the Host:

0x1B 0x20 0x41 0x42 0x43 0x44

Time Info Enabled

When the “Time Info” option is enabled, in addition to the formatting previously described, the elapsed time from the last power-up or reset is added to the data string.

The data format is as follows:

<scanner address> <Time Info> <(20H)> <scanner data>

In the case of a fragmented data string from the scanner:

<scanner address> <Time Info> <&> <scanner data>...
<scanner address> <Time Info> <(20H)> <scanner data>

The “Time Info” is formatted as follows:

+hhmmss

where *hh*, *mm*, and *ss* are respectively the hours, minutes and seconds elapsed.

The scanner address is represented as before depending on the interface used. The following example refers to the Standard Serial Interface.

Example: From scanner 27 the data string “ABCD” is collected 1:20:45 from the last power-up.

MX4000 sends the following string to the Host:

0x32 0x37 0x2B 0x30 0x31 0x32 0x30 0x34 0x35 0x20 0x41 0x42 0x43 0x44

Header-Terminator Selection

For **Standard Serial Interface** cases only, a “Header-Terminator” option can be selected. The format is as follows:

<header> <scanner address> <(20H)> <scanner data> <terminator>

	Header	Terminator
None	-	-
STX-ETX	STX	ETX
CR-LF	-	CR/LF
CR	-	CR

DATA FORMATTING ON THE MX4000 DISPLAY

To display the collected data on the MX4000 LCD, the “Echo On Display” option must be enabled; otherwise the display shows a fixed message of the software version.

The data displayed on the MX4000 LCD is similar to that sent to the Host with 2 important differences:

- The scanner address is always displayed as an ASCII number independently from the type of interface being used, i.e. Standard Serial, AnyBus, etc.
- The non-printable ASCII characters (i.e. 00H to 1FH) collected from the scanners are not displayed.

Example: From scanner 27 the data string “0x02 0x41 0x42 0x43 0x44” is collected, (Time Info disabled).

MX4000 sends the following string to the display:

“27 ABCD”

In this case, 0x02 corresponds to the non-printable ASCII character represented by STX and is not displayed on the MX4000.

MX4000 Header-Terminator formatting is not displayed.

We

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

declare under our sole responsibility that the product(s)

MX4000-XXXX, Multiplexer Data Collection

to which this declaration relates is in conformity with the following standards or other normative documents

EN 55022, August 1994: LIMITS AND METHODS OF MEASUREMENTS OF RADIO DISTURBANCE CHARACTERISTICS OF INFORMATION TECHNOLOGY EQUIPMENT (ITE)

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

Following the provision of the Directive(s):

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

Lippo di Calderara, 02.06.1998

Ruggero Cacioppo

Quality Assurance Supervisor