



QLM600

INSTALLATION MANUAL

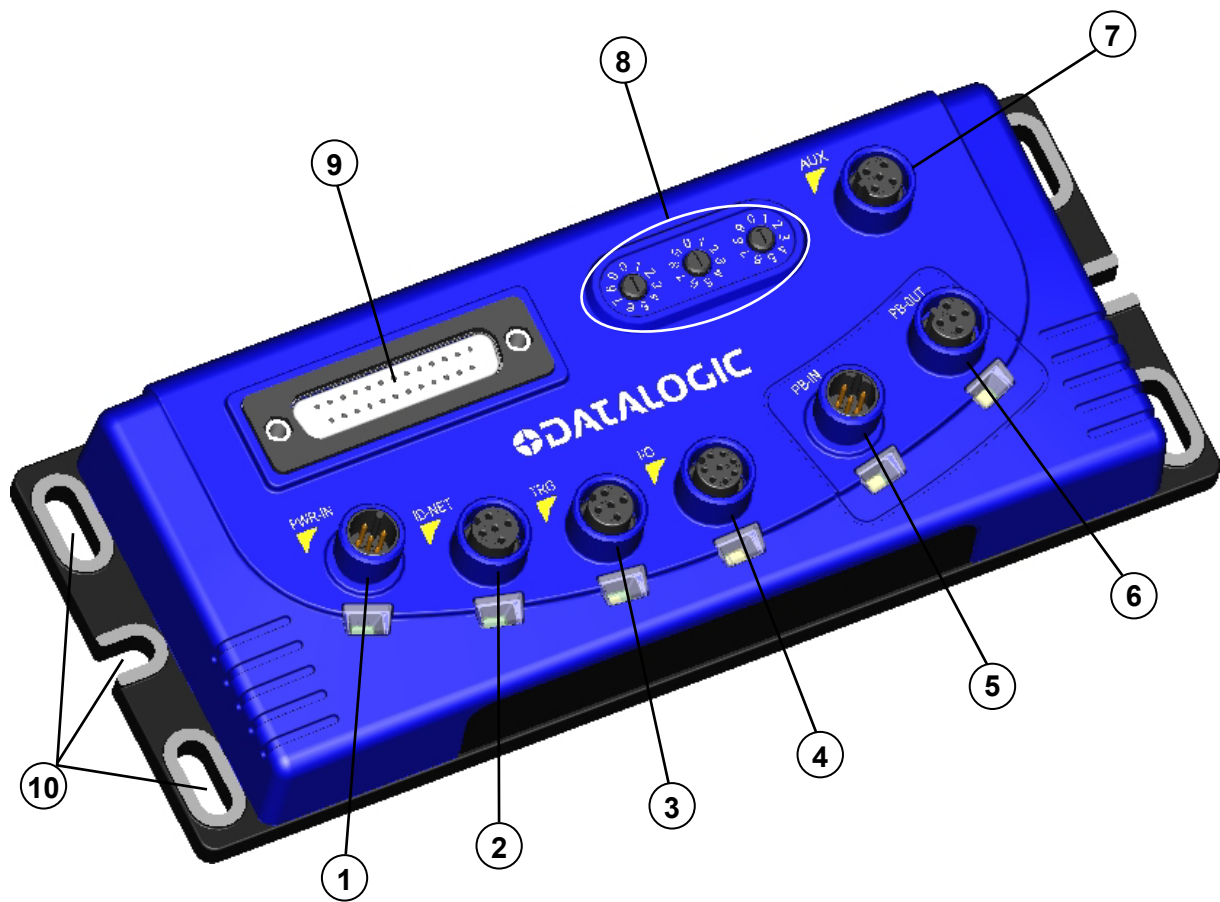


Figure A

- | | | | |
|---|-------------------------------|----|------------------------------------|
| 1 | Power In Connector and LED | 6 | Profibus Out Connector and LED |
| 2 | ID-NET Connector and LED | 7 | Auxiliary Port Connector |
| 3 | Trigger Connector and LED | 8 | Profibus Network Address Selectors |
| 4 | I/O Connector and LED | 9 | Reading Device Connector |
| 5 | Profibus In Connector and LED | 10 | Mounting slots (6) |

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- **Material Return Authorization**

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DESCRIPTION

The QLM600 Profibus Gateway is an active connection module which can be used in Standalone or ID-NET™ Master Multidata, or Master Synchronized layouts. It provides a fast and efficient way to cable both a Profibus DPV1 network and an ID-NET™ network using standard cables.

It provides separate M12 connectors for Power Supply, Profibus Communication, ID-NET™ Network, External Trigger, Digital I/O and Aux RS232 Communication for configuration of the reading device.

Host communication is provided through the integrated Profibus DPV1 circuitry which connects internally to the reader's Main serial interface (RS232).

ID-NET™ network and power supply signals are provided to the next connected device (ID-NET™ Slave), by means of a dedicated M12 connector. However there is not a second ID-NET™ network connector for bus propagation and therefore the QLM600 cannot be used as an ID-NET™ Slave.

The reading device is connected to the QLM600 through a standard 25-pin D-sub connector.

When correctly connected to a Profibus network, the QLM600 acts as a DPV1 slave. Three rotary switches allow easy manual Profibus Network Addressing selection.

The following accessories make system cabling easy:

- CBL-1487 connector or CS-A2-02-G-xx cable, to build the Power Supply connection.
- FMC600 connector, to build the I/O connections.
- CAB-AUX03 cable, to connect the Gateway to a PC to configure the connected reading device.
- CBL-1480-xx cable, to build the ID-NET network connections.

If necessary, commercial cables are available for trigger connections to a PNP photocell (see TRG Connector paragraph).

QLM600 has integrated on-board backup memory and therefore supports Backup and Restore procedures for the connected device and relative ID-NET™ network (if used). See the device's Backup and Restore procedure in the Help On Line.

For the 2KN-4K Family Scanners, Backup and Restore can also be performed using programming barcodes, see the Setup Procedure Using Programming Barcodes document on the reader's CD-ROM.

**NOTE**

For full compatibility with QLM600, the 2KN-4K Family Scanner must have software package 007 or later. The Matrix Family reader must have software release 6.10 or later.

PACKAGE CONTENTS

Verify that the QLM600 and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

- QLM600 Gateway
- This Installation Manual
- Mounting screws and washers (2)
- M12 protection caps (4) pre-mounted

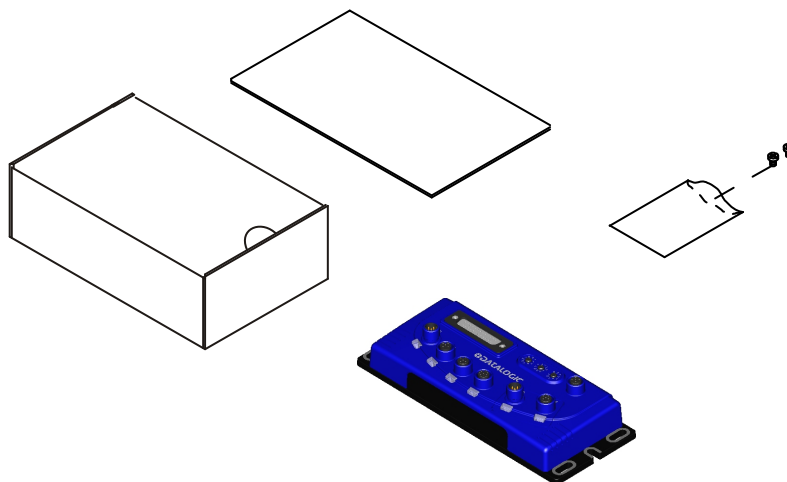


Figure 1 - Package Contents

ACCESSORIES

The following accessories are available on request for the QLM600:

Name	Description	Part Number
Field Mountable Connectors		
CBL-1487	PWR-IN CONNECTOR M12 5P FEMALE A-Coded	93A050045
FMC600	QLM-I/O CONNECTOR M12 8P MALE A-Coded	93ACC0040
Cables		
CS-A2-02-G-03	PWR-IN Cable M12/5P FEMALE 90°/4 WIRES 3M	95A251360
CS-A2-02-G-10	PWR-IN Cable M12/5P FEMALE 90°/4 WIRES 10M	95A251260
CAB-AUX03	SERIAL CABLE M12/3P MALE/DB9 3M	93A051385
CBL-1480-01	ID-NET Out/In M12/5P MALE/FEMALE 1M IDNET	93A050049
CBL-1480-02	ID-NET Out/In M12/5P MALE/FEMALE 2M IDNET	93A050050

SUPPORTED READING DEVICES

The QLM600 can be directly connected to all of the following readers through the 25-pin connector illustrated in Figure A.

Linear Scanners			2D Readers		
DS2100N	DS2400N	DS4800	Matrix 210™	Matrix 410™	Matrix 450™

MECHANICAL INSTALLATION

QLM600 can be mounted to various surfaces using the two M5x20 screw and washers included in the package:

- The M5x20 screws can be used to mount the QLM600 to metallic/plastic surfaces already prepared with M5 threaded holes.
- QLM600 can also be mounted to a Bosch Frame using the two M5x20 screws included in the package, plus two specific commercial T-nuts (for example the Bosch Rexroth *T-nut 10 M5*, cod. 3 842 530 283).
- Mounting to other surfaces, such as concrete walls or metallic panels, requires appropriate user-supplied parts (screws, screw anchors, nuts, etc).

The diagram below gives the overall dimensions of the QLM600 and shows the mounting through-holes.

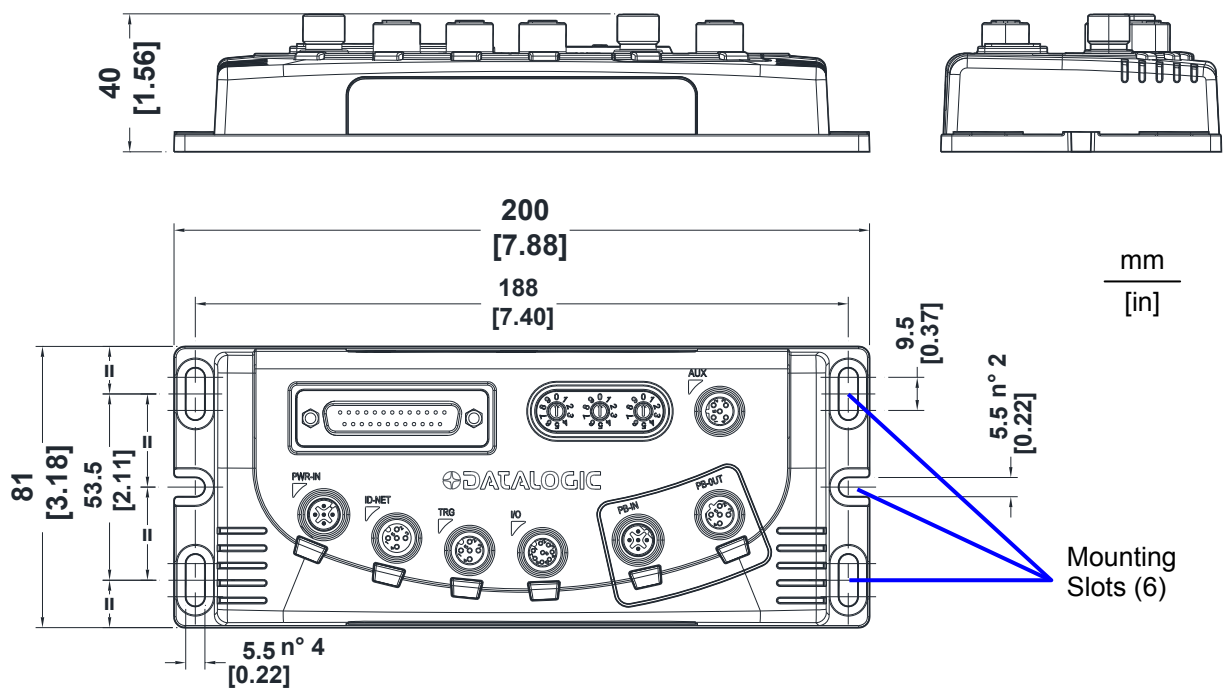


Figure 2 - Overall Dimensions

ELECTRICAL CONNECTIONS

CONNECTORS

PWR-IN (Power In) M12 5P Male (A-coded)			ID-NET (Out) M12 5P Female (A-coded)																										
<table border="1"> <thead> <tr> <th>Pin</th> <th>Function</th> </tr> </thead> <tbody> <tr><td>1</td><td>Vdc</td></tr> <tr><td>2</td><td>nc</td></tr> <tr><td>3</td><td>GND</td></tr> <tr><td>4</td><td>nc</td></tr> <tr><td>5</td><td>nc</td></tr> </tbody> </table>	Pin		Function	1		Vdc	2	nc	3	GND	4	nc	5	nc	<table border="1"> <thead> <tr> <th>Pin</th> <th>Function</th> </tr> </thead> <tbody> <tr><td>1</td><td>Shield</td></tr> <tr><td>2</td><td>Vdc</td></tr> <tr><td>3</td><td>GND</td></tr> <tr><td>4</td><td>ID+</td></tr> <tr><td>5</td><td>ID-</td></tr> </tbody> </table>	Pin	Function	1	Shield	2	Vdc	3	GND	4	ID+	5	ID-		
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PWR-IN

PWR-IN is a 5-pin Male A-Coded M12 connector. Input power must **only** be supplied to the QLM600 at the PWR-IN connector; from there it is internally distributed to the connected reading device, the ID-NET™ network and all the I/O devices.

You can use the CBL-1487 connector and follow the pinout above to build your own Power Supply connector cable.

You can also use one of the CS-A2-02-G-xx cables which terminate in four single stranded wires. **The brown wire corresponds to pin 1 Vdc, the blue wire to pin 3 GND.** The white and black wires are not used.

The LED placed below the PWR-IN connector, signals the presence of input Power. If the polarity is correct, the LED is blue; if the polarity is reversed, the LED is red; if no power is supplied, the LED is off.

 CAUTION	<p><i>The QLM600 and the connected reader are protected from polarity inversion through the PWR-IN connector, but this is not true for the other devices connected to the ID-NET™ Network, TRG and I/O connectors (i.e. external trigger, encoder, etc.). Check the correct Power Supply polarity looking at the PWR-IN LED before connecting other devices to the QLM600.</i></p>
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The power supply must be between 10 and 30 Vdc only.

Voltage Drop and Max Distributed Current Calculations

For correct ID-NET™ network management, the maximum number of readers which can propagate power through the QLs must be calculated so that max distributed current is not exceeded (4.0 A), and so voltage drop doesn't affect reader functioning. This is done according to the following formula:

$$\text{Voltage Drop} = \frac{(\text{Max Reader Current} \times \text{Number of readers}) \times (\text{Resistance per Meter per wire}^* \times \text{Cable length in Meters})}{1}$$

* the resistance calculation must include both wires (Vdc and GND).

Example:

An ID-NET™ network is composed of 4 DS2100N readers. Three 2-meter ID-NET™ cables are used to connect the readers, which have Cable Resistance = 0.058 Ohms per meter per wire. The network power is 24 Vdc.

$$(0.125 \text{ A} \times 4 \text{ readers}) \times [(0.058 \times 2) \times 6 \text{ meters}] = 0.348 \text{ Vdc voltage drop}$$

$$24 \text{ Vdc} - 0.348 = 23.65 \text{ Vdc at reader number 4 (worst case)}$$


Integrate a sufficient number of QL200s to resupply network power.

ID-NET

ID-NET is a 5-pin Female A-Coded M12 connector. It is used to connect the network signals and the power supply for the **ID-NET™ Network** towards ID-NET™ Slaves.

Pins 2 and 3 on the ID-NET connector carry the same power supply lines present on pins 1 and 3 of the PWR-IN connector; however power must only be supplied to the QLM600 through the PWR-IN connector.

In an ID-NET™ network, the reading device connected to the QLM600 **must** be configured as an ID-NET™ Master; to facilitate the network setup, the QLM600 already provides an internal bus termination resistor (the Master is the first device of the chain).


 CAUTION	<p><i>When using QLM600 in an ID-NET™ network application, the network termination cap must be connected to the last device of the chain.</i></p>
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TRG CONNECTOR

TRG is a 4-pin Female A-Coded M12 connector. You can connect a **PNP** photocell to it, which will act as an External Trigger (Input 1) for the connected reading device. Several commercial cables are available to make this connection such as the SAC-4P-M12MS series by Phoenix Contact.

When the Trigger is activated, the LED below the TRG connector is yellow.

See the Technical Features table for electrical specifications.

 NOTE	<p><i>Pins 1 +V (I/O) and 3 -V (I/O) are derived from Vdc and GND and are useful for supplying the external trigger through the QLM600 power source, however pins 1 and 3 of the TRG connector must not be used as power supply inputs to the QLM600.</i></p>
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I/O CONNECTOR

I/O is an 8-pin Female A-Coded M12 connector. It carries the signals for the additional I/O (Input 2 / Secondary Trigger, Output 1 and Output 2) as shown below. If Input 2 is used as a Secondary Trigger, the photocell must be a **PNP** device.


Note that all these signals are relative to the connected reader.


When the Input 2 (Secondary Trigger) is activated, the LED below the I/O connector is yellow.

When the Output 1 signal is activated, the LED below the I/O connector is red.

When the Output 2 signal is activated, the LED below the I/O connector is green.

See the Technical Features table for electrical specifications.

 NOTE	<p><i>Pins 1 +V (I/O) and 2 -V (I/O) are derived from Vdc and GND and are useful for supplying the I/O devices through the QLM600 power source, however pins 1 and 2 of the I/O connector must not be used as power supply inputs to the QLM600.</i></p>
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 NOTE	<p><i>To reduce electromagnetic interference use a shielded cable for I/O connections.</i></p>
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PB-IN CONNECTOR

PB-IN is a 5-pin Male B-Coded M12 connector. It is used to connect the QLM600 to a Profibus network in a Daisy Chain bus topology.

PB-OUT CONNECTOR

PB-OUT is a 5-pin Female B-Coded M12 connector. It is used to connect the QLM600 to a Profibus network in a Daisy Chain bus topology.

You should connect a Profibus bus termination male plug to this connector **only** if the QLM600 is the last slave in the Profibus chain.

AUX CONNECTOR

AUX is a 5-pin Female B-Coded M12 connector. It is used to connect the reading device connected to the QLM600 to a configuration program on a PC.

For example for the DS2100N/2400N/4800 barcode readers you should use the Genius™ configuration tool.

You can use the CAB-AUX 03 accessory cable to easily connect the QLM600 to a PC DB9 serial port.

SYSTEM WIRING/CABLING

The connection and wiring procedure for QLM600 is described as follows:

- 1) Be sure that all the QLM600 M12 connectors are free (not connected).
- 2) Build your power supply cable using the CBL-1487 accessory connector following the pinout shown in the Connectors paragraph (PWR-IN Connector). Use an adequate cable/wire diameter, according to the total current required for the application (QLM600, connected reader, trigger, other I/O devices, ID-NET™ Network components). One of the CS-A2-02-G-xx accessory cables can also be used (see PWR-IN paragraph).
- 3) Connect the power supply cable to the QLM600 (with no other devices connected) and apply power checking that the polarity is correct: the **blue** LEDs below both PWR-IN and ID-NET (out) M12 connectors must be turned on. If instead the red LEDs are turned on, the polarity is incorrect; switch off the power and check the cable. Correct the situation so that the power supply polarity is correct.
- 4) When the connection to the power supply is correct switch off the power.
- 5) Connect the reading device to the 25-pin connector.
- 6) If your application requires it, connect a **PNP** photocell to the TRG connector. Several commercial cables are available (see TRG Connector paragraph).
- 7) If your application involves other I/O devices you can build your I/O cable using the FMC600 accessory and following the pinout shown in the Connectors paragraph (I/O Connector); next connect your cable to the I/O connector.
- 8) If an ID-NET™ network is required in your application, build the network using the proper Datalogic Automation accessory cables, connectors and termination cap. See the Typical Layouts for example.

- 9) Connect the QLM600 to the Profibus Network using proper Profibus cables; if the QLM600 is the last slave of the chain you should put a proper bus terminator, typically in the PB-OUT connector.
- 10) Preset the Node Address of the QLM600, as shown in the Profibus Network Address Selectors paragraph.
- 11) Switch on the power supply; after a while (the system needs some seconds to boot), and if the Profibus Master is ready and has correctly recognized the QLM600 slave, both the green LEDs below both PB-IN and PB-OUT M12 connectors will be turned on.
- 12) If you need to configure the reading device, connect the AUX port through the CAB-AUX03 accessory cable to a PC and run the configuration program (i.e. Genius™).

Now the system is ready to operate.

**NOTE**

To avoid electromagnetic interference connect the QLM600 housing to a good earth ground.

PROFIBUS NETWORK ADDRESS SELECTORS

The QLM600 has three embedded rotary switches allowing easy manual selection of the Profibus Network Node Address.

The valid selection range for the Profibus Node Address is from 000 to 126. Address selections outside of this range are not accepted. Address 126 is a special address which allows the Profibus Master, through software, to set the node address in the range from 000 to 125.

Using a small screwdriver, set the three rotary switches manually to the desired Profibus Node Address (reading from left to right). Figure 3 shows the address **107**.

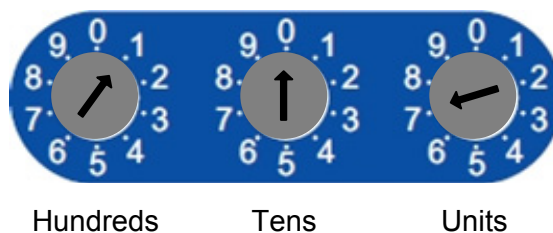


Figure 3 – Profibus Network Address Selectors


INDICATOR LEDES

There are six Indicator LEDs which signal power, I/O and Profibus communication activity and are visible below the M12 connectors (excluding AUX).

PWR-IN / ID-NET

The Power LEDs are **blue** when power is correctly applied to the QLM600.

These LEDs are red if power polarity is incorrect. In this case the QLM600 and the connected reading device are protected.

 CAUTION	<p><i>If external I/O devices are powered through QLM600 (connected to +V I/O and -V I/O), they are not protected from polarity inversion.</i></p>
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TRG

The Trigger LED is yellow and it is on when the Trigger (presence sensor) photocell is activated.

I/O

The I/O LEDs reflect the activity of the supplemental I/O devices connected to the reading device through the QLM600.

The Input 2 LED is yellow and it is on when the supplemental photocell is activated.

The Output 1 LED is red and it is on when the reading device Output 1 is activated.

The Output 2 LED is green and it is on when the reading device Output 2 is activated.

PB-IN

The LED below PB-IN acts as the 'Profibus Network Operation Mode' indicator. It is driven according to the following table.

Operation Mode LED	
Off	Not on-line, No power
Green	On-line, data exchange
Flashing Green	On-line, clear
Flashing Red (1 flash)	Parameterization error
Flashing Red (2 flashes)	Profibus configuration error

PB-OUT

The LED below PB-OUT acts as the 'Module Status' indicator. It is driven according to the following table.

Module Status LED	
Off	No power or not initialized
Green	Initialized
Flashing Green	Initialized, diagnostic event(s) present
Red	Exception error

TYPICAL LAYOUTS

The following figure shows the general system layout.

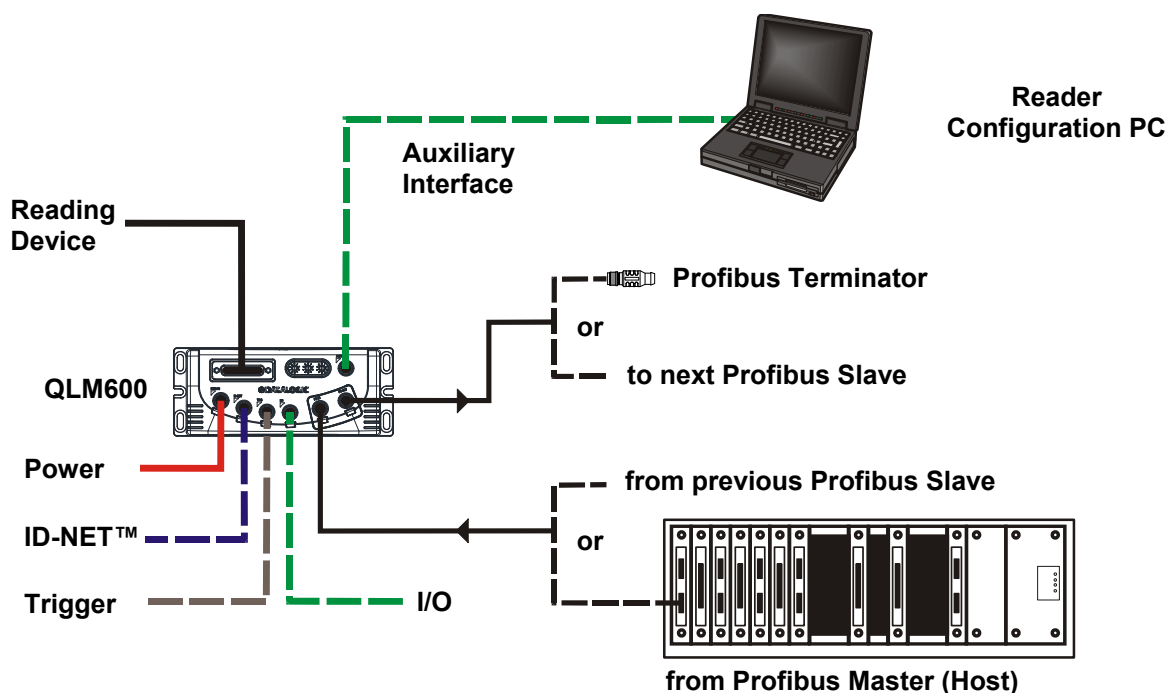


Figure 4 – General System Layout

The dotted lines in the figure refer to optional hardware configurations.

The general system layout allows the QLM600 Profibus Gateway to connect one of the compatible serial reading devices (2KN, 4K Scanner, Matrix 410™, etc.), collect its information and send it to a Profibus Host.

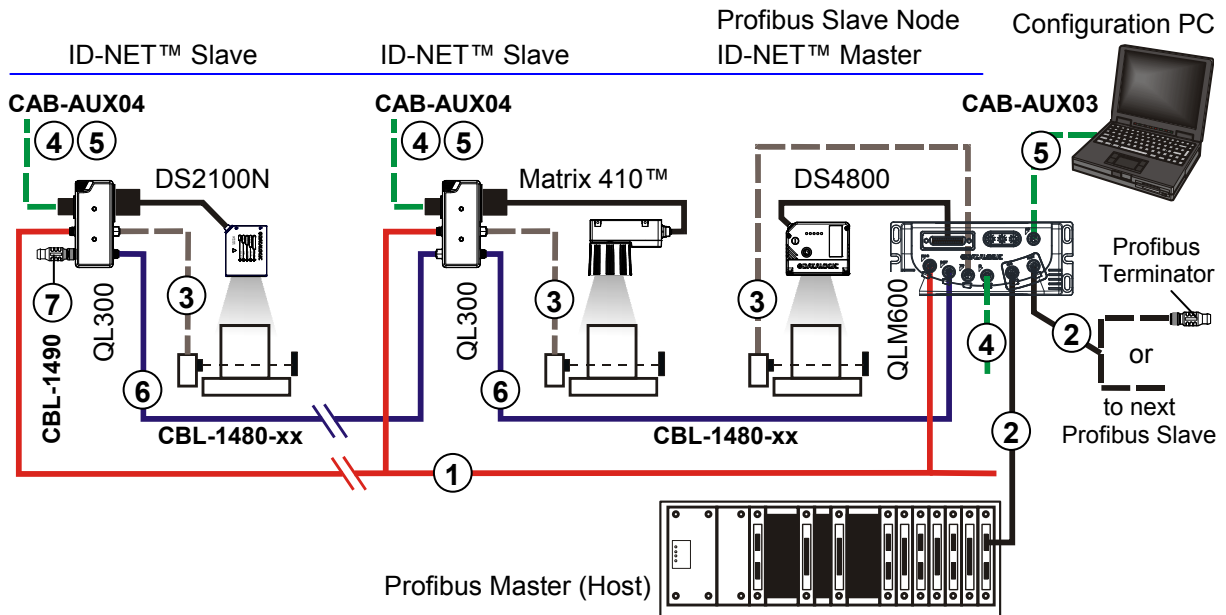
The Profibus network from the Host is connected to the QLM600 PB-IN interface. PB-OUT connects either to the next Profibus Slave node or, if the last node in the chain, to a Profibus terminator.

The reading device connects to the 25-pin connector.

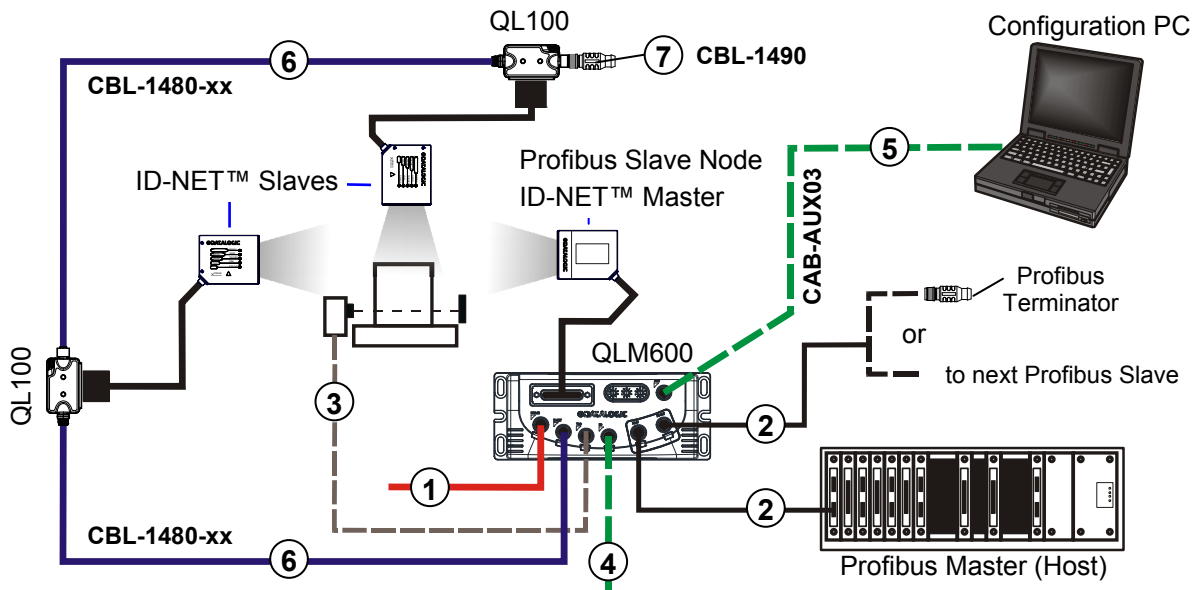
The ID-NET™ interface allows a network of ID-NET™ Slaves to be connected to the QLM600's reading device which acts as the ID-NET™ Master.

The reading device auxiliary interface signals are available on the AUX connector which can be quickly connected to a portable PC for reader configuration.

The following diagrams are examples showing layout connections and are not intended to represent power limits, which instead, depend on each specific application. See "Voltage Drop and Max Distributed Current Calculations".



ID-NET™ Multidata Network - DS4800 Master with QLM600 + mixed Slaves with QL300s



ID-NET™ Synchronized Network - DS2100N Master with QLM600 + DS2100N Slaves with QL100s

- ① Input Power
- ② Profibus Interface
- ③ External Trigger (for On-Line Mode)
- ④ External Digital I/O Devices
- ⑤ Aux port for Reader Configuration
- ⑥ ID-NET™ Network
- ⑦ ID-NET™ Terminator

NOTE The ID-NET™ network must be terminated inserting an ID-NET™ terminator into the last QL in the network. ID-NET™ on the QLM600 is internally terminated.

TECHNICAL FEATURES

ELECTRICAL FEATURES	
Supply Voltage	10 to 30 Vdc
Consumption	0.3 - 0.2 A
Maximum Distributed Current Allowed • ID-NET	4.0 A max
Limited Current Consumption • QLM600 + reading device • Trigger + I/O device (see related device manuals)	1.85 A max 0.75 A max
Inputs: Input1 (TRG), Input 2 Voltage Current Consumption	Optocoupled 30 Vdc max. 12 mA max.
Outputs: Output 1, Output 2 V_{CE} Collector Current V_{CE} Saturation Power Dissipation	Optocoupled 30 Vdc max. 40 mA continuous max.; 130 mA pulsed max. 1V max. @ 10 mA 80 mW max. @ 45 °C (ambient temperature)
COMMUNICATION INTERFACES	
Host Interface Auxiliary ID-NET™	Profibus DPV1 (up to 12 Mbit/s) RS232 up to 115.2 kbit/s RS485 Half Duplex up to 1 Mbit/s
Communication Protocols	Datalogic Application Driver (DAD Driver)
USER INTERFACE	
LED Indicators	Power On/Polarity Error (blue/red), Trigger (yellow), IN2 (yellow), OUT1 (red), OUT2 (green), Profibus Network Op. Mode (green/red), Profibus Module Status (green/red)
PHYSICAL FEATURES	
Mechanical Dimensions	200 x 81 x 40 mm (7.9 x 3.2 x 1.6 in.)
Weight	520 g. (18.34 oz.)
ENVIRONMENTAL FEATURES	
Operating Temperature	0° to 50 °C (+32° to 122 °F)
Storage Temperature	-20° to 70 °C (-4° to 158 °F)
Humidity max.	90% non condensing
Vibration Resistance EN 60068-2-6	14 mm @ 2 to 10 Hz; 1.5 mm @ 13 to 55 Hz; 2 g @ 70 to 200 Hz; 2 hours on each axis
Bump Resistance EN 60068-2-29	30 g; 6 ms; 5000 shocks on each axis
Protection Class EN 60529	IP65 *

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


* when all the M12 connectors, terminator and reading device are correctly connected (or closed with a proper protection cap).

COMPLIANCE

POWER SUPPLY

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

This device is intended to be supplied by a UL Listed or CSA Certified Power Unit with Class 2 or LPS power source.

 CAUTION	<i>Total power consumption is given by adding the QLM600 power consumption to that of all the devices powered through the QLM600 (reading device, P.S., I/O). Refer to the manual of the connected devices for details about minimum/maximum supply voltage and power consumption.</i>
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CE COMPLIANCE

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC COMPLIANCE

Modifications or changes to this equipment without the expressed written approval of Datalogic could void the authority to use the equipment.

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.

**Datalogic Automation S.r.l.**

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www.automation.datalogic.com*declares that the***QLxxx and QLMxxx; Connection module***and all its models**are in conformity with the requirements of the European Council Directives listed below:***2004 / 108 / EC EMC Directive***This Declaration is based upon compliance of the products to the following standards:***EN 55022 (CLASS A ITE), DECEMBER 2010:***INFORMATION TECHNOLOGY EQUIPMENT
RADIO DISTURBANCE CHARACTERISTICS
LIMITS AND METHODS OF MEASUREMENTS***EN 61000-6-2, SEPTEMBER 2005:***ELECTROMAGNETIC COMPATIBILITY (EMC)
PART 6-2: GENERIC STANDARDS - IMMUNITY FOR INDUSTRIAL
ENVIRONMENTS*

Monte San Pietro, January 20th , 2012

Paolo Morselli
Quality Manager