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J1-K11-Fx BASE



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1. Informations



Quality in Electronic
Manufacturing

Document:	MIMJ1K11F BASE		
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Approver	Gabriele Bazzi		
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Language:	English		
Document release	Description	Note	Date
01	New manual	Valid for 1K11F-xx.5.5 firmware and subsequent	18/04/2012
02	New manual	Created the "BASE" version of this manual	15/01/2015

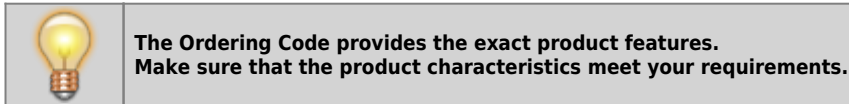
The controller has been designed for industrial environments in conformity to EC directive 2004/108/CE.

- EN 61000-6-4: Electromagnetic compatibility - Generic standard on emission for industrial environments
 - EN55011 Class A: Limits and measurement methods
- EN 61000-6-2: Electromagnetic compatibility - Generic standard on immunity for industrial environments
 - EN 61000-4-2: Electromagnetic compatibility - Electrostatic discharge immunity
 - EN 61000-4-3: Immunity to radiated, radio-frequency electromagnetic field
 - EN 61000-4-4: Electrical fast transients
 - EN 61000-4-5: Surge immunity
 - EN 61000-4-6: Conducted disturbance induced by radio-frequency
- Moreover the product is conform to the following standards:
 - EN 60529: Housing protection rating IP64
 - EN 60068-2-1: Environmental testing: Cold
 - EN 60068-2-2: Environmental testing: Dry heat
 - EN 60068-2-14: Environmental testing: Change of temperature
 - EN 60068-2-30: Environmental testing: Cyclic damp heat
 - EN 60068-2-6: Environmental testing: Sinusoidal vibration
 - EN 60068-2-27: Environmental testing: Shock vibration
 - EN 60068-2-64: Environmental testing: Random vibration

2. Description

J1-K11-F is a integrated controller of Qmove+ series.

2.1 Product identification



2.1.1 Product label



- **a - Ordering Code**
- **b - Week made:** indicates the week and year of manufacture
- **c - Part number:** unique code that identifies an ordering code
- **d - Serial number:** product serial number, different for individual product
- **e - Hardware release:** version of hardware release

2.1.2 Ordering Code

Model				Features				
J1	-	K11	-	FA	-	10	/	TP01
								TP00 = Keypad code (TP00 = panel with resistive, logo and custom function keys); TP01 = panel with resistive touch-screen, logo and QEM standard function keys
						10 = Firmware version (00 = not installed)		
				F = Technology level A = Hardware version				
		K = Extended keyboard 1 = 4,3" LCD graphic display, TFT-256 COLORS-480x272px; front panel dimensions (216x168mm); keypad 38 keys + 18 led; housing to DIN 43700; 1 = Firmware-hardware correspondence						
J1 = "HMI+PLC" Qmove family								

2.1.3 Hardware Versions

These are hardware versions currently available:

		Hardware versions							
		A	B	C	D	E	W	Y	Z
SLOT 2 (Base card)	USER PORT	1	1	1	1	1	1	1	1
	AUX1 PORT (RS232, RS422, RS485)	-	-	-	-	-	-	-	1
	AUX2 PORT (RS485)	-	-	-	-	-	-	-	1
	CAN1 PORT	1	1	1	1	1	1	1	1
	CAN2 PORT ¹⁾	-	-	-	-	-	-	-	-
	ETHERNET PORT	-	-	-	-	1	-	1	1
	USB PORT ²⁾	-	-	-	-	-	-	-	-
SLOT 3 (Expansion cards)	Standard digital inputs	-	16	16	16	16	8	16	16
	Rapid digital inputs ³⁾	-	2	2	2	2	-	2	2
	Analog inputs 12bit	-	2	2	2	2	-	2	2
	Analog inputs 16bit	-	-	-	-	-	-	-	-
	PT100 inputs ⁴⁾	-	-	-	-	-	-	-	-
	Termocouple inputs ⁵⁾	-	-	-	-	-	-	-	-
	Bidirectional counters 20KHz ABZ (24V-PP, 5V-LD)	-	-	-	-	-	-	-	-
	Bidirectional counters 200KHz ABZ (24V-PP, 5V-LD)	-	2	4	2	2	-	4	4
	Protected digital outputs	-	8	8	8	16	8	8	8
	Relay outputs	-	-	-	-	-	-	-	-
	Analog outputs 0-10V-12bit	-	-	-	-	-	-	-	-
	Analog outputs +/-10V-16bit	-	2	4	2	2	-	4	4
	Stepper outputs	-	-	-	2	-	2	4	4
	Connector for remote keyboards ⁶⁾	-	-	-	-	-	-	1	1
Card software code to be reported in the SLOT 3		-	1MG3F	1MG3F	1MG3F	1MG5F	1MG3F	1MG3F	1MG3F

¹⁾ ²⁾ ⁴⁾ ⁵⁾ ⁶⁾ option not currently enabled

³⁾ The fast inputs can be used as frequency meters within the "FREQ" device

2.1.4 Expansion card manuals



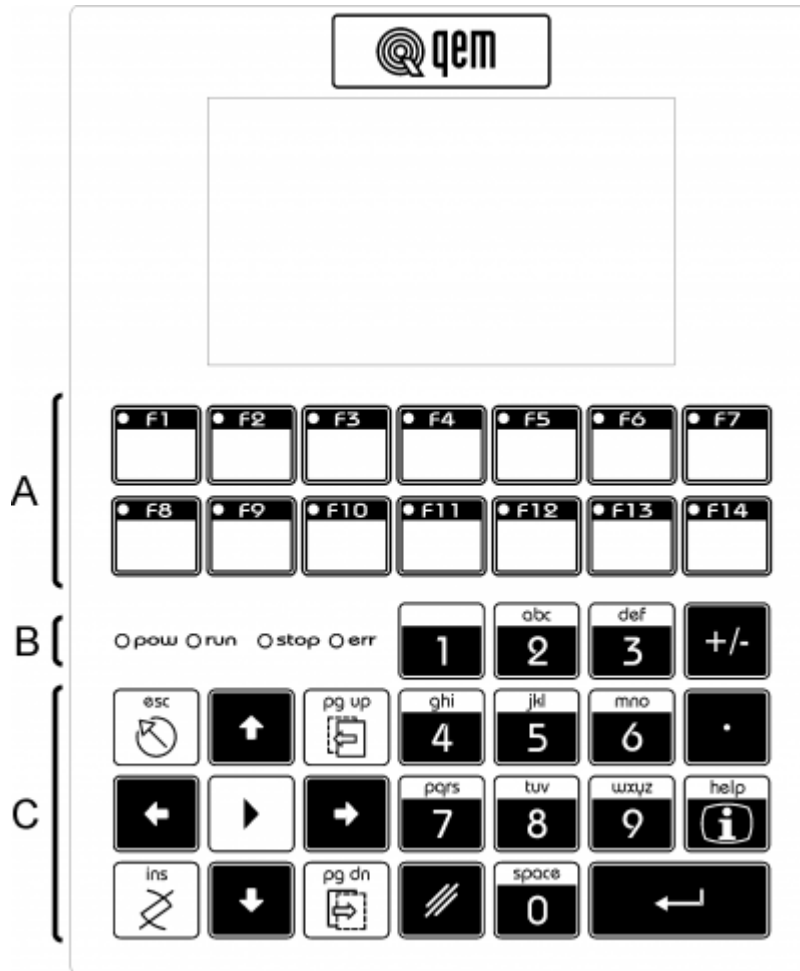
2.1.5 Firmware versions

Version	Description
10	Fully programmable with PLC functions
20	Fully programmable with PLC and Motion control functions
30	Fully programmable with PLC, Motion control, Camming and Interpolation functions

For more details about the firmware, consult [Devices enabled in the controllers](#).

2.2 Product Configuration

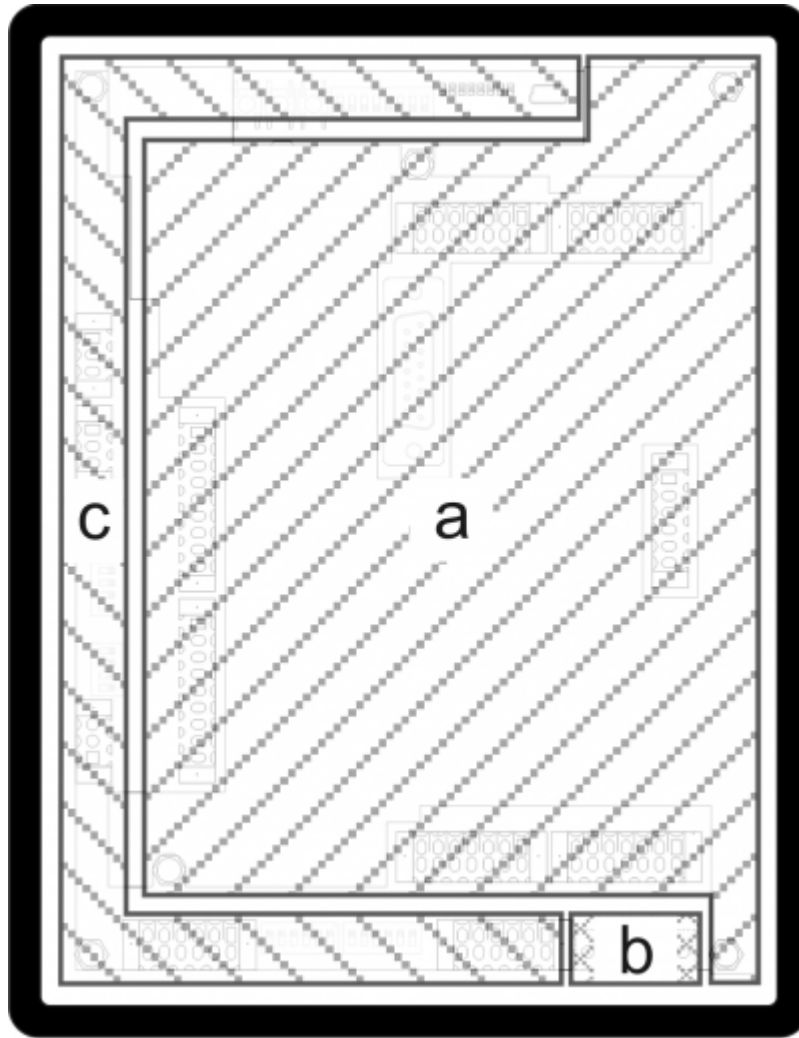
2.2.1 Product Configuration



- A)** Function keys and led's
B) System led's
C) Keyboard

2.2.2 Back terminal blocks

II J1-K11-F composed of a "base" card and an "expansion" card.



- **a** = Expansion card
- **b** = Power connector on the Base card
- **c** = Base card

3. Technical features

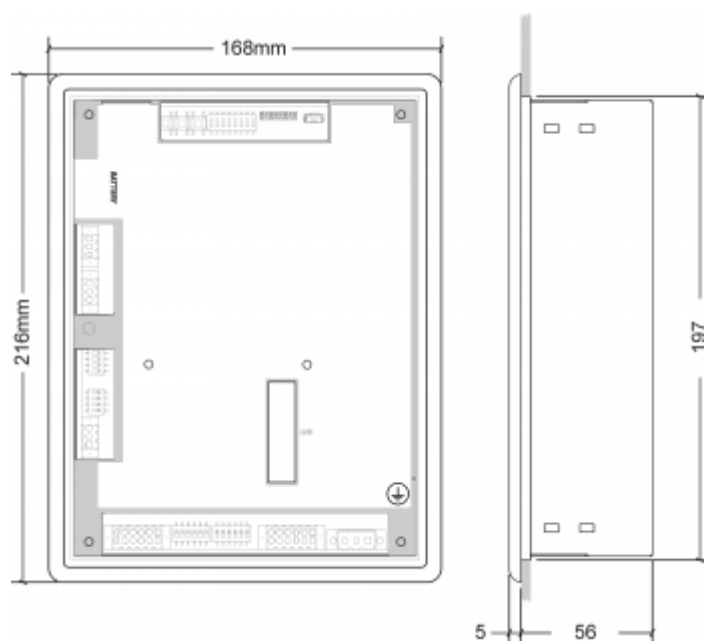
3.1 General features

Weight (full hardware)	1,1Kg
Housing	Sheet metal
Front panel	Alluminium
Outer Frame	Self-extinguishing Noryl
Display	LCD 4,3" TFT 256 colors - 480 x 272px
Touch screen	wire Resistive
Display dimensions	95 x 53,8mm / 4.3"
User led's	14
System led's	8
Function keys	14
System keys	24
Operating temperature	0 ÷ 50°C
Transport and storage temperature	-25 ÷ +70 °C
Relative humidity	90% condensate free
Altitude	0 - 2000m s.l.m.
Front protection rating	IP64

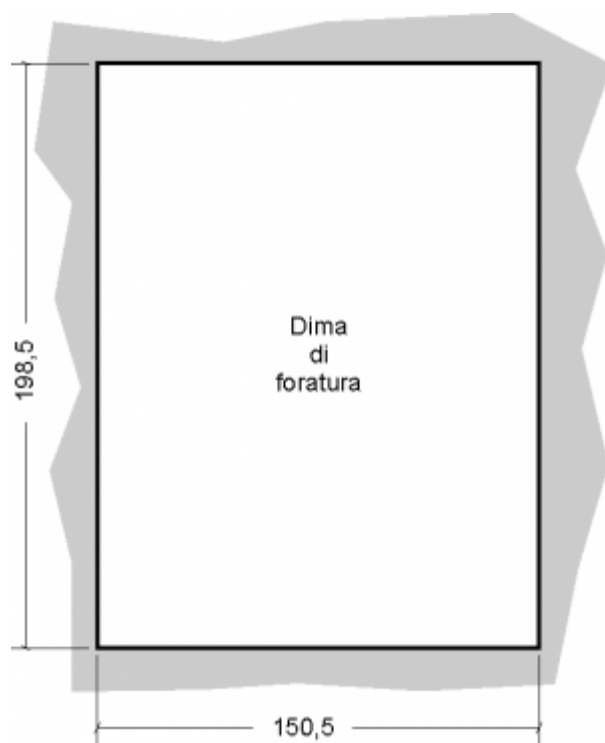
3.2 CPU (F level technology)

RISC microprocessor (32 bit)	
Work frequency	200MHz
RAM	16MB
Flash	8MB

3.3 Dimensions

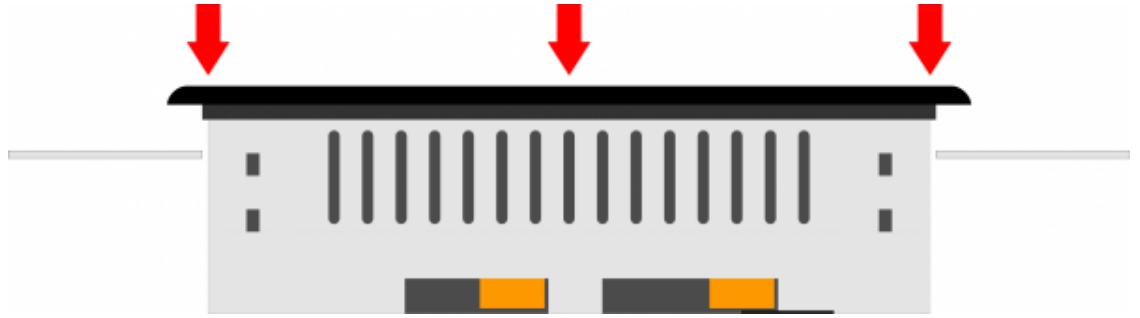


3.4 Hole template



3.5 Installation

Fit the controller in the hole.

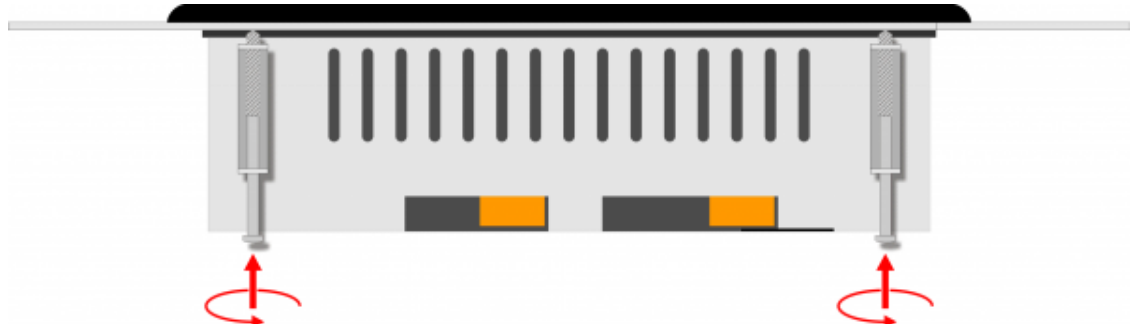


Apply the brackets.



Before fixing the controller, check it is mounted firmly in the hole and the gasket under the frame makes a good seal. No liquids must enter and the frame must not deform.

Screw the controller in place.

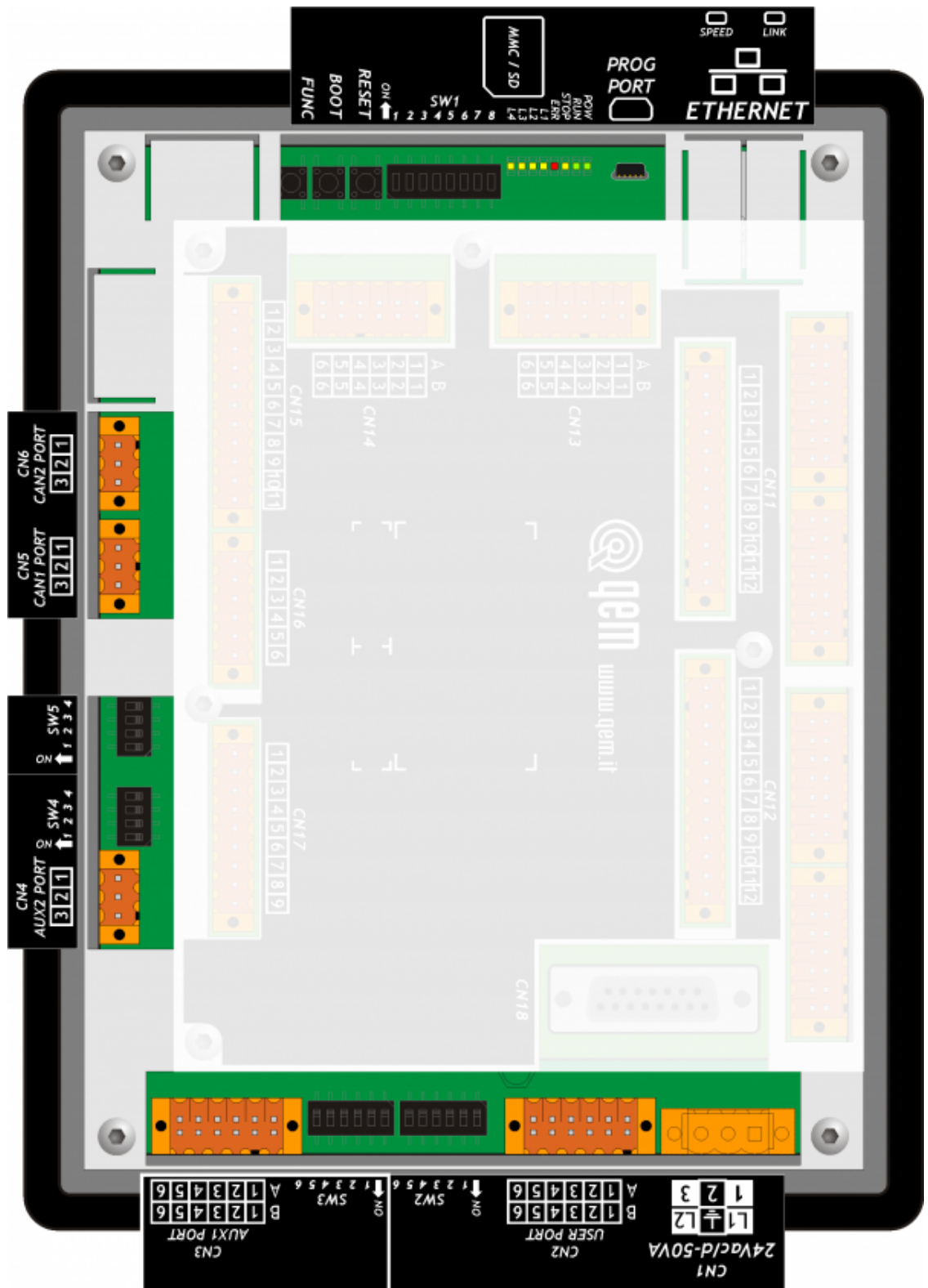


Warning: after putting the pin of fixing, do only half rotation to not tear the frame!

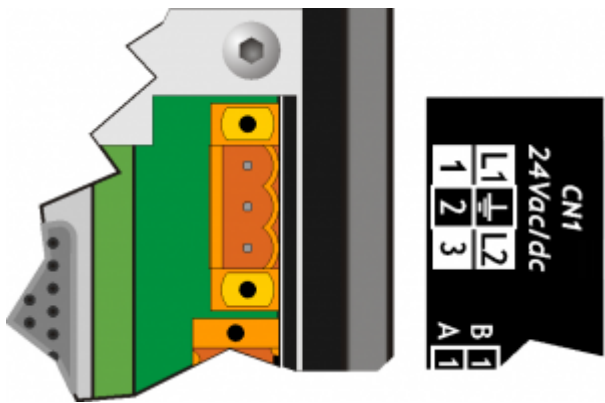
4. Base card wiring



For details about cable sections and connectors, see application note [AN021](#)

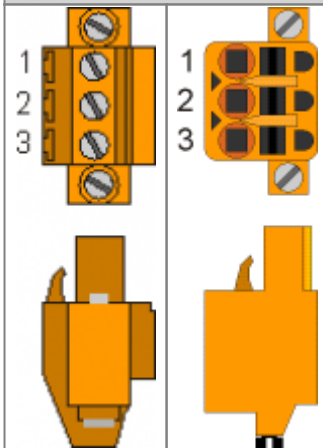


4.1 Power Supply





The cabling must be carried out by specialist personnel and fitted with suitable anti-static precautions.
Before handling the controller, disconnect the power and all parts connected to it.
To guarantee compliance with EC regulations, the power supply must have a galvanic isolation of at least 1500Vac.

Power supply	24 Vdc	
Voltage range	22 - 27 Vdc	
Max. absorption	30W	
CN1		
		
Terminal	Symbol	Description
1	+	DC power positive
2	GROUND	Gnd-PE (signals)
3	-	DC power 0V

Connection examples



Use an isolated power unit with 24Vdc +/-5% output conform to EN60950-1.

	Use two separate power units: one for the control circuit and one for the power circuit
	For a single power unit, use two separate lines: one for the control and one for the power
	DO NOT use the same lines for the power circuit and the controller

4.2 Serial Port Connections

4.2.1 PROG PORT

PROG PORT	Description
	Serial port used for the transfer and debugging of the application program in the CPU. Use only with IQ009 or IQ013.

4.2.2 USER PORT

CN2	Terminal	RS232	RS422	RS485	Description
1A	1A	-	-	A	Terminal A - RS485
2A	2A	-	-	B	Terminal B - RS485
3A	3A	0V	0V	0V	USER PORT common
4A	4A	0V	0V	0V USER PORT common	
5A	5A	TX	-	-	Terminal TX - RS232
6A	6A	Terra			
1B	1B	-	RX	-	Terminal RX - RS422
2B	2B	-	RXN	-	Terminal RX N - RS422
3B	3B	-	TX	-	Terminal TX - RS422
4B	4B	-	TXN	-	Terminal TX N - RS422
5B	5B	RX	-	-	Terminal RX - RS232
6B	6B	Ground			

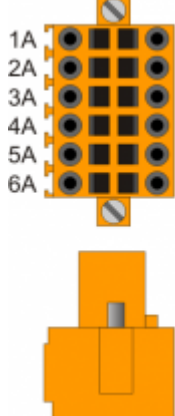
Setup of USER PORT electric standard

SW2	Num. Dip	Name DIP	Setting of DIP			Function
1	1	JP2	ON	X ¹⁾	X ²⁾	Termination RS485
2	2	JP3	ON	X ³⁾	X ⁴⁾	Polarization RS485
3	3	JP1	ON	X ⁵⁾	X ⁶⁾	
4	4		OFF	ON	OFF	Selection of USER PORT electric standard
5	5		ON	OFF	OFF	
6	6		OFF	OFF	ON	
ON ↔ OFF			RS485	RS422	RS232⁷⁾	

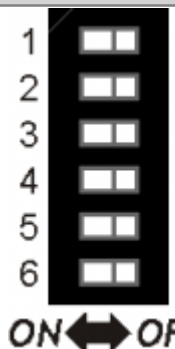
¹⁾ 1, ²⁾ 2, ³⁾ 3, ⁴⁾ 4, ⁵⁾ 5, ⁶⁾ 6 X = setting not significant

⁷⁾ the USER PORT can be used as PROG PORT with RS232 electric standard, setting ON in DIP-8 of [SW1](#) and OFF in DIP-6 of [SW2](#)

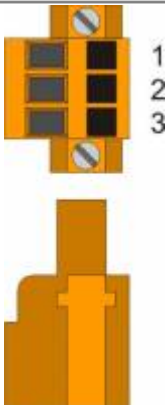
4.2.3 AUX1 PORT

CN3	Terminal	RS232	RS422	RS485	Description
	1A	-	-	A	Terminal A - RS485
	2A	-	-	B	Terminal B - RS485
	3A	0V	0V	0V	USER PORT common
	4A	0V	0V	0V	USER PORT common
	5A	TX	-	-	Terminal TX - RS232
	6A	Ground			
	1B	-	RX	-	Terminal RX - RS422
	2B	-	RXN	-	Terminal RX N - RS422
	3B	-	TX	-	Terminal TX - RS422
	4B	-	TXN	-	Terminal TX N - RS422
	5B	RX	-	-	Terminal RX - RS232
	6B	Ground			

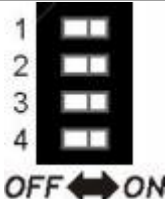
Setup of AUX1 PORT electric standard

SW3	Num. Dip	Name DIP	Setting of DIP			Function
	1	JP2	ON	X ¹⁾	X ²⁾	Termination RS485
	2	JP3	ON	X ³⁾	X ⁴⁾	Polarization RS485
	3	JP1	ON	X ⁵⁾	X ⁶⁾	
	4	-	OFF	ON	OFF	Standard USER PORT settings
	5	-	ON	OFF	OFF	
	6	-	OFF	OFF	ON	
	-	-	RS485	RS422	RS232	

4.2.4 AUX2 PORT

CN4	Terminal	Symbol	Description
	1	0V	RS485 serial common
	2	B	Terminal RS485 B
	3	A	Terminal RS485 A

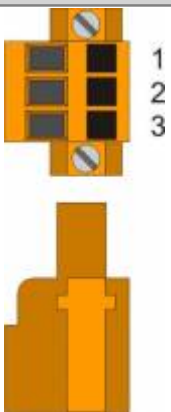
Setup of AUX2 PORT polarisation and termination resistances

SW4	Num. Dip	Name Dip	Setting of DIP	Function
	1	JP3	ON	Polarization RS485
	2	JP2	ON	Termination RS485
	3	JP1	ON	Polarization RS485
	4		X ⁷⁾	None

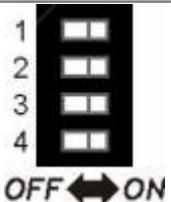
³⁾ 3), 3), 4), 5), 6) X = setting not significant
⁷⁾ X = setting not significant

4.2.5 CANbus PORT

Connectors

CN5-CAN1 PORT CN6-CAN2 PORT	Terminal	Symbol	Description
	1	0V	CAN common
	2	CAN L	Terminal CAN L
	3	CAN H	Terminal CAN H

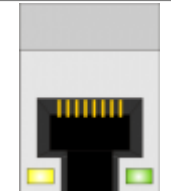
Setup of CAN1 and CAN2 PORT Termination resistances

SW5	Num. Dip	Name Dip	Setting of DIP	Function
	1	JP1	ON	CAN1 Termination
	2	JP2	ON	
	3	JP1	ON	CAN2 Termination
	4	JP2	ON	

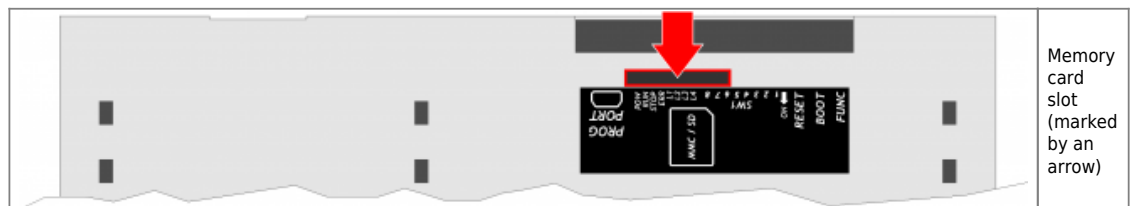


When activating the CAN1 port termination, set dip's JP1 and JP2 to ON.
When activating the CAN2 port termination, set dip's JP1 and JP2 to ON.

4.2.6 Ethernet

ETHERNET PORT	Description
	Connector RJ45. LED: * LINK: green led = cable connected (led on signals the cable is connected to both ends) * DATA: yellow led = data transmission (flashing led signals data transmission)

4.2.6.1 MMC/SD



Memory card slot (marked by an arrow)

5. Electrical features

The electrical characteristics of the hardware are given below.
The maximum and minimum frequencies, and real acquisition times, may depend on eventual additional software filters, for example see the system variable "QMOVE:sys004" at paragraph [System Variables](#).

5.1 PROG PORT

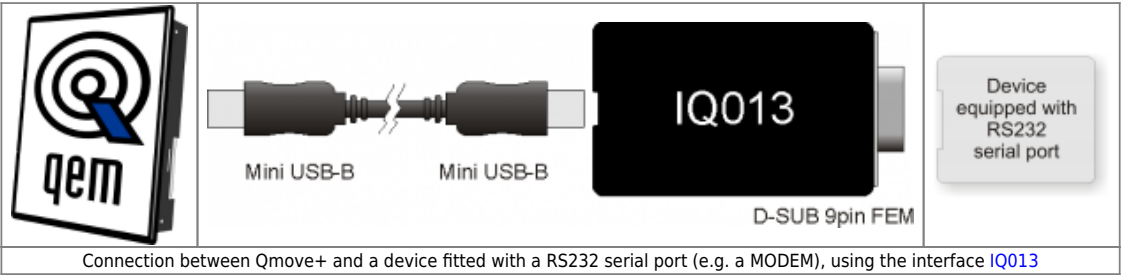
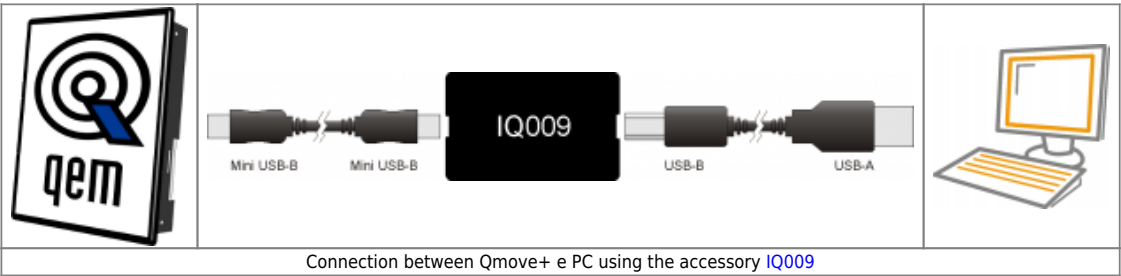
Connector for [IQ009](#) or [IQ013](#)



The USB mini-B connector does not support USB electrical standards, it can only be used with an interface [IQ009](#) or [IQ013](#).

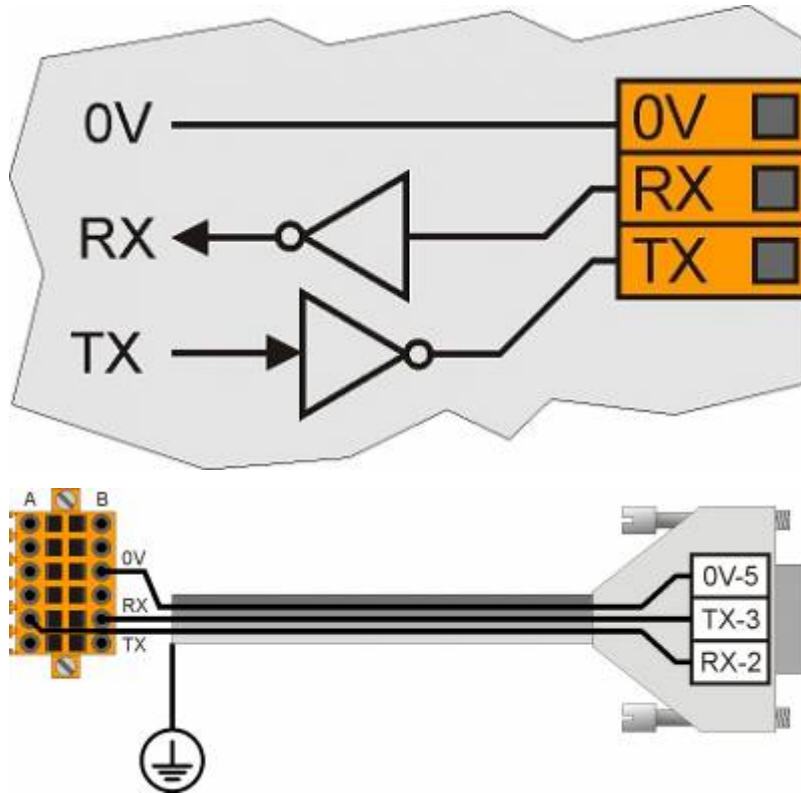
It is used for the transfer and debugging of the application program in the CPU.

Electrical standard	TTL (Use serial interface IQ009 or IQ013)
Communication speed	Min. 9.6 Kbaud - max 115200 Kbaud settable by dip1 and 2 of the switch SW1
Insulation	None



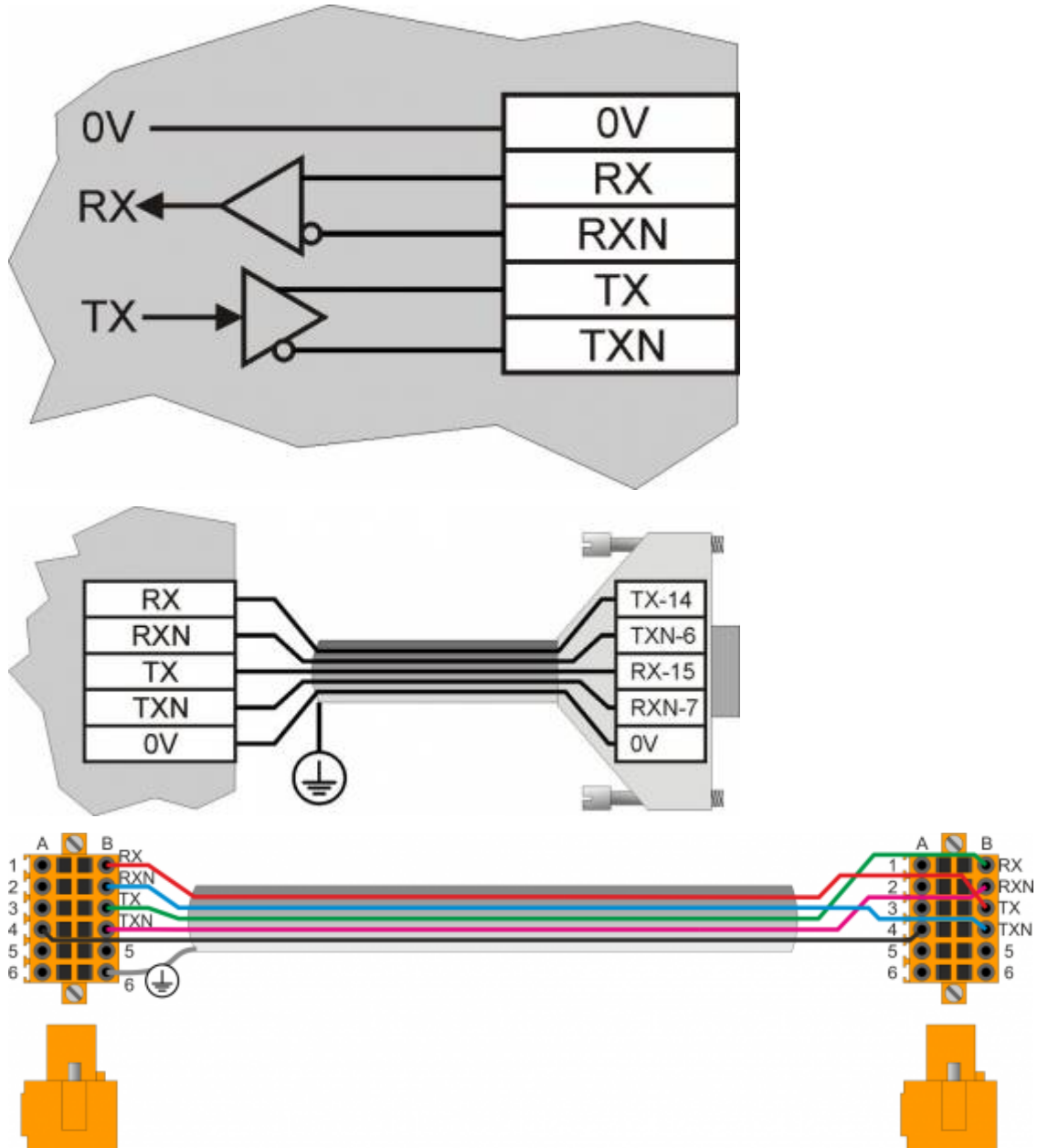
5.2 RS232

Communication speed	4800, 9600, 19200, 38400, 57600, 115200 baud
Communication mode	Full duplex
Operating mode	Referred to 0V
Max. number of devices connected on the line	1
Max. cable length	15 m
Input impedance	$\geq 3 \text{ Kohm}$
Short-circuit current limit	7 mA



5.3 RS422

Communication speed	4800, 9600, 19200, 38400, 57600, 115200 baud
Communication mode	Full duplex
Operating mode	Differential
Max. number of devices connected on the line	1
Max. cable length	1200 m
Input impedance	$\geq 12 \text{ Kohm}$
Short-circuit current limit	35 mA

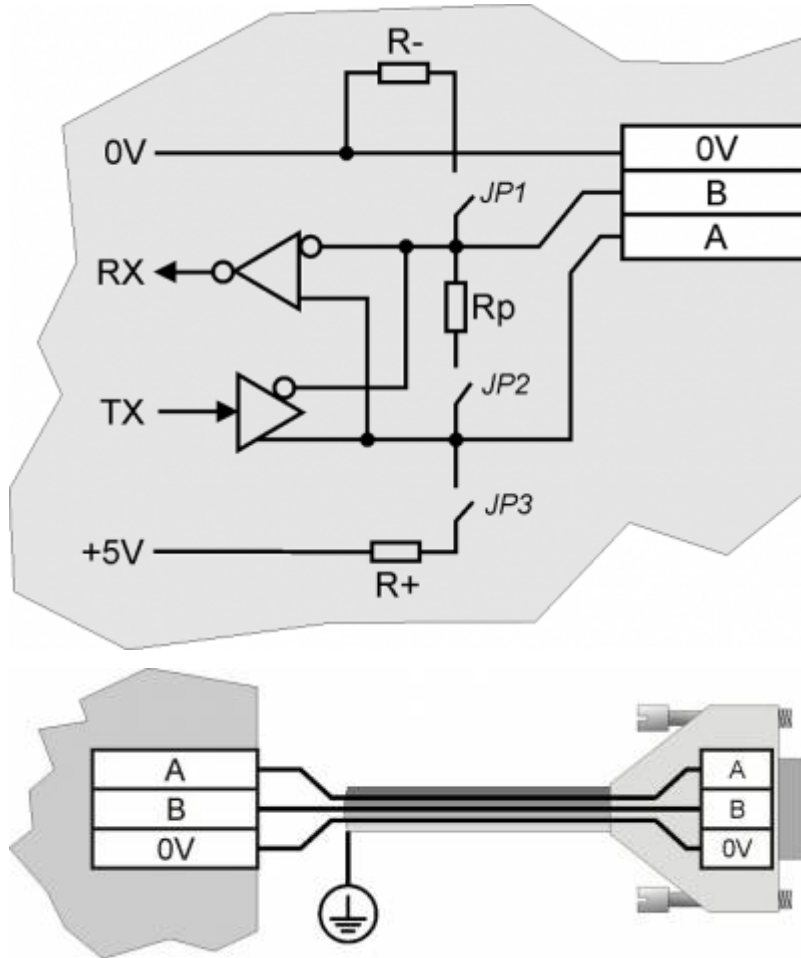


5.4 RS485



To activate the internal termination resistance see paragraph [Setup of USER PORT electric standard](#), [Setup of AUX1 PORT electric standard](#) or [Setup of AUX2 PORT polarization and termination resistances](#)

Communication speed	4800 baud (only if used with SERCOM and/or MODBUS device), 9600 baud, 19200 baud, 38400 baud, 57600 baud
Communication mode	Half duplex
Operating mode	Differential
Max. number of devices connected on the line	32
Max. cable length	1200 m
Input impedance	$\geq 12 \text{ Kohm}$
Short-circuit current limit	35 mA

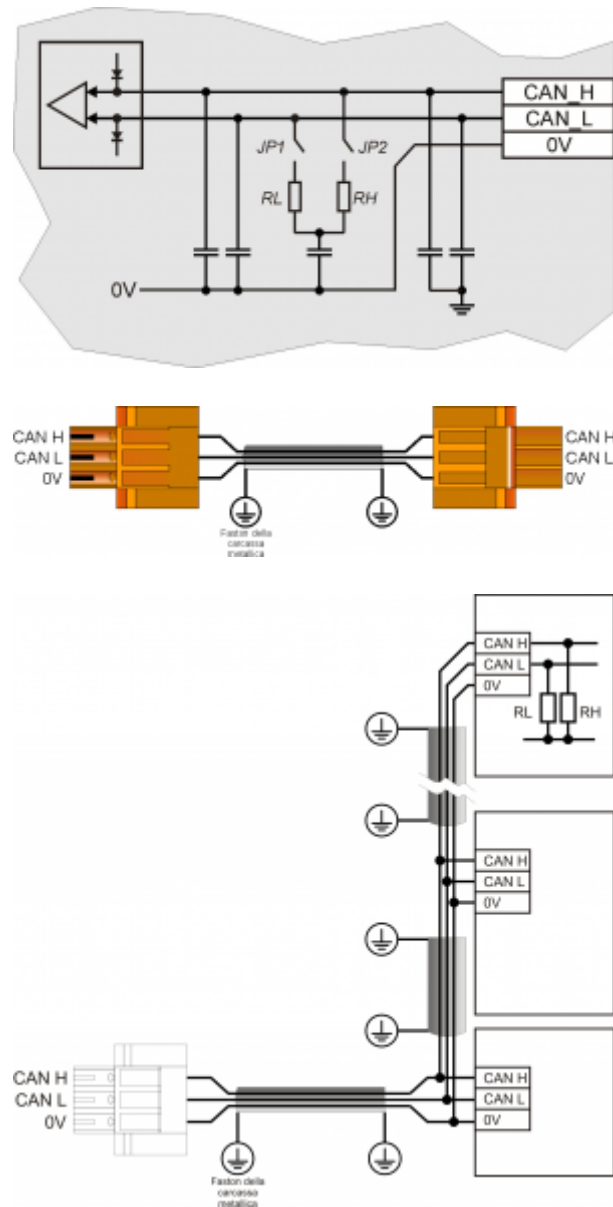


5.5 CANbus



To activate the internal termination resistance see paragraph [Setup Termination resistances](#)

Communication speed	125, 250, 500, 1000 Kbit/s
Max. number of Drivers/Receivers on the line	100
Max. cable lengths	500m @ 125Kbit/s, 250m @ 250Kbit/s, 100m @ 500Kbit/s, 25m @ 1000Kbit/s
Input impedance	>15Kohm
Short-circuit current limit	45mA



CAN BUS connection examples.

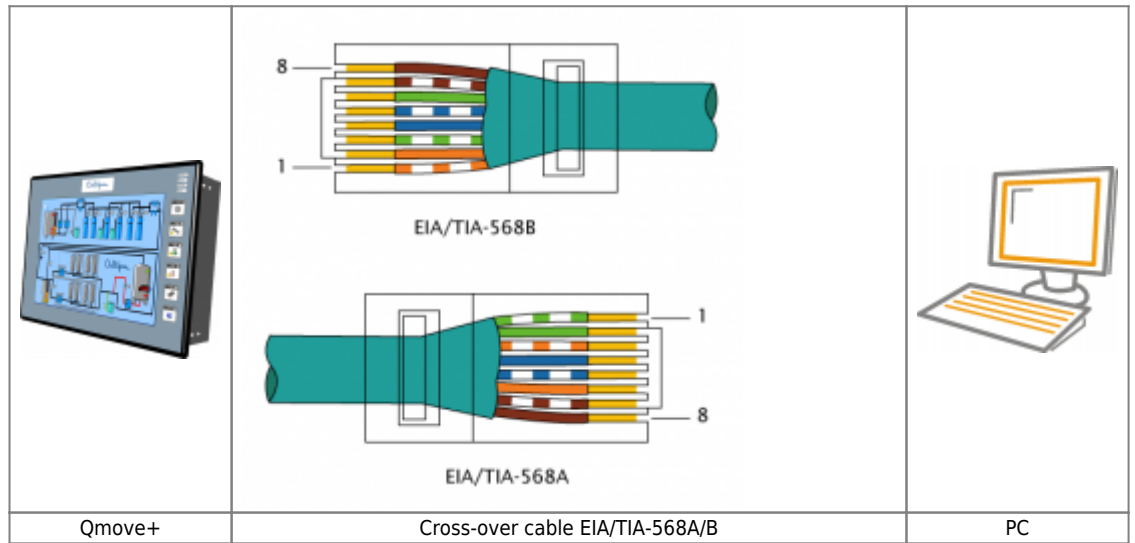


Caution:
Close DIP's JP1 and JP2 and insert the termination resistances (RL, RH) on the last device of the chain.

5.6 Ethernet

Ethernet Interface 10/100 Base T (IEEE 802.3) on RJ45 connector.

Connection between Qmove + and PC:



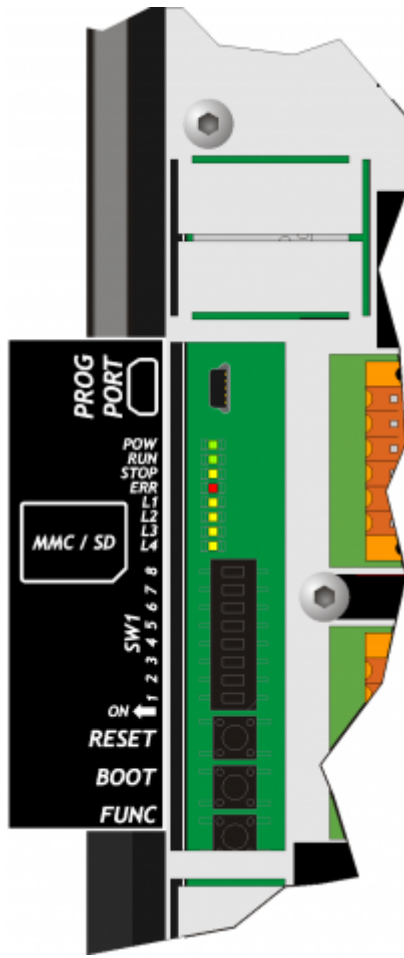
5.7 MMC/SD

Type of Memory Card to use	MMC, SD and SDHC up to 8GB For proper operation it is necessary that the device conforms to the standards set by "SD Association" (www.sdcard.org) or "Multi Media Card Association" (www.mmca.org).
----------------------------	---



To use the Memory Cards they must first be formatted with FAT16 or FAT32 file system.

6. Settings, procedures and signals



6.1 PROG PORT and USER PORT Baud-rate selector

SW1		Dip	DIP settings				Function
1 2 3 4 5 6 7 8 OFF↔ON	1	OFF	OFF	ON	ON	Select PROG PORT transmission speed	
	2	OFF	ON	OFF	ON		
		Baud-rate 38400	Baud-rate 115200	Baud-rate 19200	Baud-rate 57600		
	3	OFF	OFF	ON	ON	Select USER PORT transmission speed	
	4	OFF	ON	OFF	ON		
		Baud-rate 38400	Baud-rate 115200	Baud-rate 19200	Baud-rate 57600		
	5	CANbus baud-rate selector. See paragraph CANbus baud-rate selector					
	6	OFF		ON		Select PROG PORT functioning mode	
		PROG PORT can also be used by SERCOM and MODBUS devices		PROG PORT cannot be used by SERCOM and MODBUS devices			
	7	CANbus baud-rate selector. See paragraph CANbus baud-rate selector					
	8	OFF		ON		Select the USER PORT as PROG PORT ¹⁾	
		PROG PORT normal		PROG PORT on USER PORT connector			

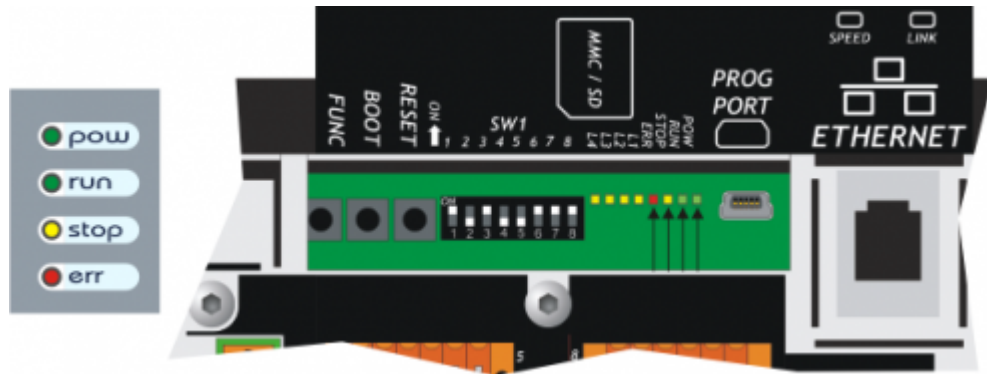
¹⁾ It is possible to use the USER PORT connector as PROG PORT with RS232 electric standard, doing this the mini-USB connector of the PROG PORT is disconnected (Setting USER PORT electric standard). **For this function mode also set dip 6 of SW2 to OFF.**

6.2 CANbus baud-rate selector

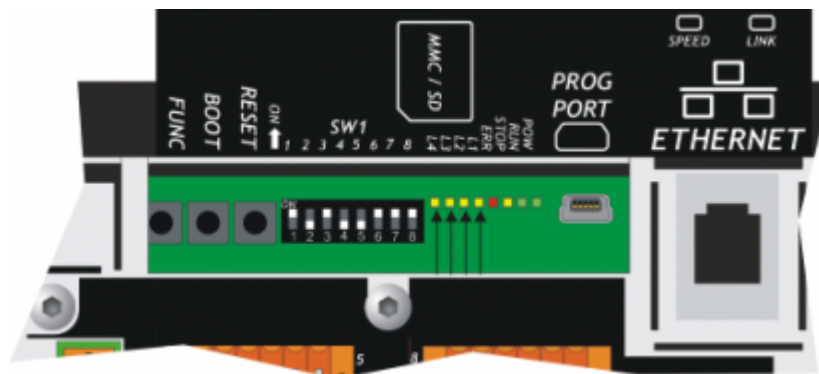
SW1		Dip	DIP settings				Function
1 2 3 4 5 6 7 8 OFF↔ON		1	-				-
		2	-				-
		3	-				-
		4	-				-
		5	OFF	ON	OFF	ON	Select speed of CANbus transmission
		7	OFF	OFF	ON	ON	
			Baud-rate 125KB/S	Baud-rate 250KB/S	Baud-rate 500KB/S	Baud-rate 1MB/S	
		6	-				-
		8	-				-

6.3 Led

The system leds **“pow, run, stop, err”** are found on the front panel and on the rear of controllers with display and only on the top of controllers without display.

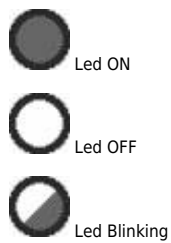


The user leds **“L1, L2, L3 e L4”** are found on the rear:



“System Leds” Signals

Legend:



Led	Colour	Status	Description
pow	Green		Power on
			Only this led on, signals the CPU reset status
run	Green		CPU in RUN status
			CPU in READY status
stop	Yellow		With pow on, signals the STOP status of the CPU With pow off, signals the BOOT status of the CPU
err	Red		With pow off, signals a hardware error. See paragraph Hardware Error codes With pow blinking, the flash rate gives the type of error. See paragraph err led signals

Err led signals

N. flashes	Error	Description	Recommended action
1	Bus error	Bus configuration different to application software.	Check the correspondence between the QMOVE application (BUS section of configuration unit) and the product configurations (cards mounted in BUS).
2	Checksum Error	Negative outcome on the integrity control of retentive variables . (see Reset Error Checksum)	Restore the machine data from a backup (.DAT file) or cancel the error with in system functions and enter the values manually.
3	Index Out of Bound	An array index is pointing on an inexistent element	Open a unit editor in Qview development environment and use the "Edit→Go to PC" command to find the program line that is cause of the error. In general the index value has a value <1 or >array dimension.
4	Program Over Range	The program selection index in the DATAGROUP has attempted to access an inexistent program.	With the Qview development environment open the editor of a unit and user the "Edit→Go to PC" command to highlight the program line that has caused the error. In general the value used as index is lower than 1 or over the array dimension.
5	Step Over Range	The step selection index in the DATAGROUP has attempted to access an inexistent step.	With the Qview development environment open the editor of a unit and user the "Edit→Go to PC" command to highlight the program line that has caused the error. In general the value used as index is lower than 1 or over the array dimension.
6	Division By Zero	The denominator of a division operation of the application program has a zero value.	With the Qview development environment open the editor of a unit and user the "Edit→Go to PC" command to highlight the program line that has caused the error.
7	Syntax Error	The application program has an invalid instruction	This error may appear because the program counter has met the QCL END instruction.
8	Watch Dog Error	A CAN module does not function correctly, or a specialist card has a hardware problem	With the Qview development environment open the "Monitor→Bus" panel and the righthand column called "Watchdog Bus" indicates the card that caused the problem.
9	Stack Error	The application program has used all permitted levels of calls to subroutines	With the Qview software environment open the editor of a unit and use the "Edit→Go to PC" command to highlight the program line that caused the error. Analyse the unit execution flow, the call to subroutines nestings have a limit, over which this error is generated.

Hardware error codes

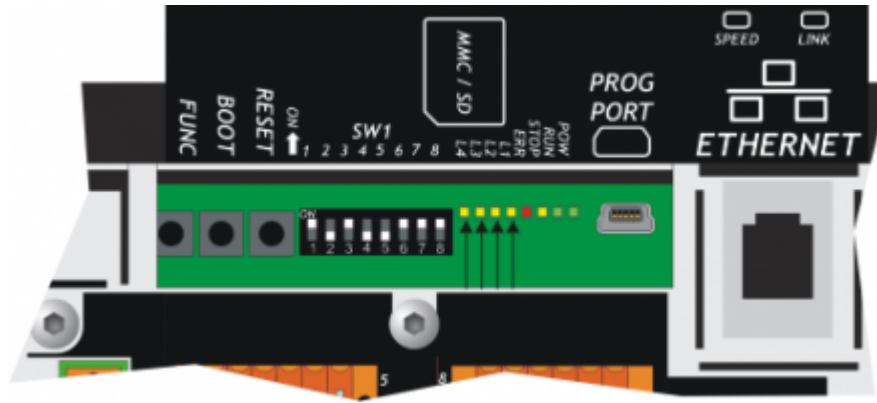
During the startup sequence, if a malfunction of any peripheral is detected, the system blocks and the error is signaled by the flashing led  err while the other system led's remain off.

The number of flashes indicates the type of error according to the following table :

Number of flashes	Error
1	Display
2	FPGA
3	Media
4	Bootloader
5	FW
6	Bus
7	<i>Signal not active</i>
8	<i>Signal not active</i>
9	Exception

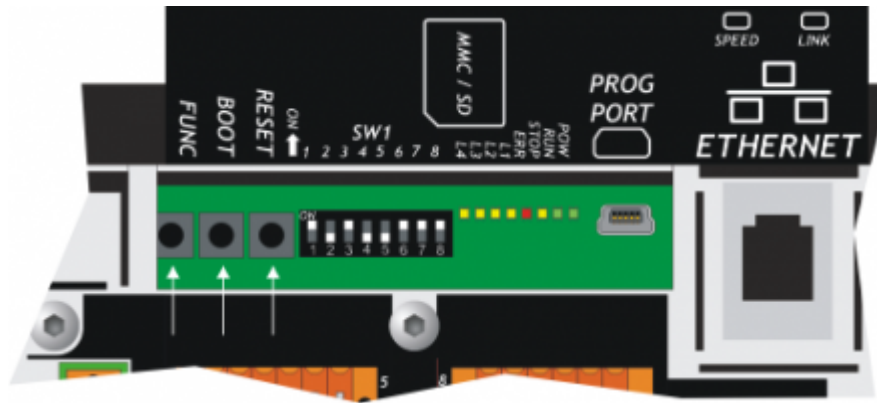


Each of these signals indicates a serious error situation. The product must be sent to the QEM aftersales service.

“User Led” signal

Led	Colour	Description
 L1	Yellow	Programmable in the application program by the QMOVE system variable:sys003 and used by the system functions
 L2		
 L3		
 L4		

6.4 Buttons



Name	Description
 FUNC	Press on startup of the controller to access the System functions
 BOOT	Press on startup of the controller to set the CPU in Boot status and then access the firmware update functions
 RESET	Reset CPU. the system is restarted restoring the initial conditions (after a startup)

7. System functions



IMPORTANT: The use of these procedures could represent a risk (e.g. see deletion of application), therefore it is highly recommended that they are performed by qualified experts.

The system functions are specific procedures that allow the user to perform various operations, e.g. the configuration/calibration of peripherals, data and application save/restore on/from removable mass memory, deletion of the application and management of the mass storage. Controllers with display have some system functions that are only accessible by password and if access attempts are made the **"Function is locked"** message is given.

7.1 System functions list

All the system functions are listed below.

If the **"PWD"** column shows **'Y'**, this means that the function requires a system password (default: "123").

System Functions

n.	Led ON	System Function	PWD	Description
1	 L1	01 - Reset Error Checksum	-	Reset error checksum. N.B.: if the checksum error is present, the led  L1 flashes.
2	 L2	02 - Copy all files MMC/SD → NAND	-	Copy all files from MMC/SD to NAND Flash memory.
3	  L2	03 - Copy all files NAND → MMC/SD	-	Copy all files from NAND Flash memory to MMC/SD.
4	 L3	04 - Application delete	Y	Delete the application.
5	  L3	05 - Application upload from MMC/SD	Y	Upload the application from MMC/SD.
6	  L3	06 - Set Date & Time	-	Adjust the system clock
7	   L3	07 - Downl. retentive data to MMC/SD	-	Save the retentive data on MMC/SD.
8	 L4	08 - Set NEW Password	Y	Set a new password to access the "locked" system functions
9	  L4	09 - Remove all files from NAND Flash	Y	Cancel all files stored on the NAND Flash memory.
10	  L4	10 - Show NAND Flash files	-	List the files stored on the NAND Flash memory
11	   L4	11 - Touch Calibration	-	Run the calibration procedure of the Touch Screen, if present.
12	  L4	12 - Set Ethernet communic. parameter	-	Run the setup procedure for the Ethernet communication parameters (IP address,..., etc.)
13	   L4	13 - Backup to NAND	-	Run the backup of the QCL application, data and HMI application on NAND memory.
14	   L4	14 - Restore from NAND	Y	Run the restore of the QCL application, data and HMI application from NAND memory.

NB: To exit system functions press the keep the **F1** key or **FUNC** button for at least two seconds.

8. Available accessories

- [IQ009](#)
- [IQ013](#)
- [IQ011](#)
- [IQ016](#)
- [Connectors polarization Kit](#)
- [Front panel customization kit](#)

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