

# Bảng thông số sản phẩm

Thông số kỹ thuật



## logic controller, Modicon M221, 16 IO, relay, spring

TM221M16RG

### Main

Range of product	Modicon M221
product or component type	Logic controller
[Us] rated supply voltage	24 V DC
Discrete input number	8, discrete input conforming to IEC 61131-2 Type 1
Analogue input number	2 at 0...10 V
Discrete output type	Relay normally open
Discrete output number	8 relay
Discrete output voltage	5...125 V DC 5...250 V AC
Discrete output current	2 A

### Complementary

Discrete I/O number	16
Maximum number of I/O expansion module	7 (local I/O-Architecture) 14 (remote I/O-Architecture)
Supply voltage limits	20.4...28.8 V
Inrush current	35 A
Maximum power consumption in W	22.5 W at 24 V (with max number of I/O expansion module) 3.6 W at 24 V (without I/O expansion module)
Power supply output current	0.52 A 5 V for expansion bus 0.46 A 24 V for expansion bus
Discrete input logic	Sink or source (positive/negative)
Discrete input voltage	24 V
Discrete input voltage type	DC
Analogue input resolution	10 bits
LSB value	10 mV
Conversion time	1 ms per channel + 1 controller cycle time for analogue input analog input
Permitted overload on inputs	+/- 30 V DC for 5 min (maximum) for analog input +/- 13 V DC (permanent) for analog input
Voltage state 1 guaranteed	>= 15 V for input
Voltage state 0 guaranteed	<= 5 V for input
Discrete input current	7 mA for discrete input 5 mA for fast input

<b>Input impedance</b>	100 kOhm for analog input 3.4 kOhm for input 4.9 kOhm for fast input
<b>Response time</b>	35 µs turn-off, I2...I5 terminal(s) for input 10 ms turn-on for output 10 ms turn-off for output 5 µs turn-on, I0, I1, I6, I7 terminal(s) for fast input 35 µs turn-on, other terminals terminal(s) for input 5 µs turn-off, I0, I1, I6, I7 terminal(s) for fast input 100 µs turn-off, other terminals terminal(s) for input
<b>Configurable filtering time</b>	0 ms for input 3 ms for input 12 ms for input
<b>Output voltage limits</b>	125 V DC 277 V AC
<b>Maximum current per output common</b>	7 A
<b>Absolute accuracy error</b>	+/- 1 % of full scale for analog input
<b>Electrical durability</b>	100000 cycles AC-12, 120 V, 240 VA, resistive 100000 cycles AC-12, 240 V, 480 VA, resistive 300000 cycles AC-12, 120 V, 80 VA, resistive 300000 cycles AC-12, 240 V, 160 VA, resistive 100000 cycles AC-15, cos phi = 0.35, 120 V, 60 VA, inductive 100000 cycles AC-15, cos phi = 0.35, 240 V, 120 VA, inductive 300000 cycles AC-15, cos phi = 0.35, 120 V, 18 VA, inductive 300000 cycles AC-15, cos phi = 0.35, 240 V, 36 VA, inductive 100000 cycles AC-14, cos phi = 0.7, 120 V, 120 VA, inductive 100000 cycles AC-14, cos phi = 0.7, 240 V, 240 VA, inductive 300000 cycles AC-14, cos phi = 0.7, 120 V, 36 VA, inductive 300000 cycles AC-14, cos phi = 0.7, 240 V, 72 VA, inductive 100000 cycles DC-12, 24 V, 48 W, resistive 300000 cycles DC-12, 24 V, 16 W, resistive 100000 cycles DC-13, 24 V, 24 W, inductive (L/R = 7 ms) 300000 cycles DC-13, 24 V, 7.2 W, inductive (L/R = 7 ms)
<b>Switching frequency</b>	20 switching operations/minute with maximum load
<b>Mechanical durability</b>	20000000 cycles for relay output
<b>Minimum load</b>	1 mA at 5 V DC for relay output
<b>Protection type</b>	Without protection at 5 A
<b>Reset time</b>	1 s
<b>Memory capacity</b>	256 kB for user application and data RAM with 10000 instructions 256 kB for internal variables RAM
<b>Data backed up</b>	256 kB built-in flash memory for backup of application and data
<b>Data storage equipment</b>	2 GB SD card (optional)
<b>Battery type</b>	BR2032 or CR2032X lithium non-rechargeable
<b>Backup time</b>	1 year at 25 °C (by interruption of power supply)
<b>Execution time for 1 KInstruction</b>	0.3 ms for event and periodic task 0.7 ms for other instruction
<b>Execution time per instruction</b>	0.2 µs Boolean
<b>Exct time for event task</b>	60 µs response time
<b>Application structure</b>	8 interrupt tasks 1 cyclic auxiliary task 1 configurable freewheeling/cyclic master task
<b>Maximum size of object areas</b>	8000 %MW memory words 255 %TM timers 255 %C counters 512 %KW constant words 512 %M memory bits
<b>Realtime clock</b>	With

<b>Clock drift</b>	<= 30 s/month at 25 °C
<b>Regulation loop</b>	Adjustable PID regulator up to 14 simultaneous loops
<b>Counting input number</b>	4 fast input (HSC mode) at 100 kHz 32 bits
<b>counter function</b>	A/B Pulse/direction Single phase
<b>Integrated connection type</b>	USB port with mini B USB 2.0 connector Non isolated serial link serial 1 with RJ45 connector and RS485 interface Non isolated serial link serial 2 with RJ45 connector and RS232/RS485 interface
<b>Supply</b>	(serial 1)serial link supply: 5 V, <200 mA
<b>Transmission rate</b>	1.2...115.2 kbit/s (115.2 kbit/s by default) for bus length of 15 m for RS485 1.2...115.2 kbit/s (115.2 kbit/s by default) for bus length of 3 m for RS232 480 Mbit/s for USB
<b>Communication port protocol</b>	USB port: USB - SoMachine-Network Non isolated serial link: Modbus master/slave - RTU/ASCII or SoMachine-Network
<b>communication service</b>	Modbus slave Modbus master
<b>Local signalling</b>	1 LED (green) for PWR 1 LED (green) for RUN 1 LED (red) for module error (ERR) 1 LED (green) for SD card access (SD) 1 LED (red) for BAT 1 LED (green) for SL1 1 LED (green) for SL2 1 LED per channel (green) for I/O state
<b>Electrical connection</b>	terminal block, 3 terminal(s) for connecting the 24 V DC power supply connector, 4 terminal(s) for analogue inputs Mini B USB 2.0 connector for a programming terminal removable spring terminal block, 10 terminal(s) for inputs removable spring terminal block, 11 terminal(s) for outputs
<b>Maximum cable distance between devices</b>	Shielded cable: <10 m for fast input Unshielded cable: <30 m for output Unshielded cable: <30 m for digital input Unshielded cable: <1 m for analog input
<b>Insulation</b>	Between input and internal logic at 500 V AC Between fast input and internal logic at 500 V AC Non-insulated between inputs Between output and internal logic at 500 V AC Between output groups at 500 V AC Non-insulated between analogue input and internal logic Non-insulated between analogue inputs
<b>marking</b>	CE
<b>Mounting support</b>	Top hat type TH35-15 rail conforming to IEC 60715 Top hat type TH35-7.5 rail conforming to IEC 60715 plate or panel with fixing kit
<b>Height</b>	90 mm
<b>Depth</b>	70 mm
<b>Width</b>	70 mm
<b>net weight</b>	0.264 kg

## Environment

<b>Standards</b>	IEC 61131-2 UL 508 CAN/CSA C22.2 No. 213 IACS E10 ANSI/ISA 12-12-01
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<b>Product certifications</b>	RCM LR EAC cULus DNV-GL ABS CSA CE UKCA cULus HazLoc
<b>Environmental characteristic</b>	Ordinary and hazardous location
<b>Resistance to electrostatic discharge</b>	8 kV in air conforming to IEC 61000-4-2 4 kV on contact conforming to IEC 61000-4-2
<b>Resistance to electromagnetic fields</b>	10 V/m 80 MHz...1 GHz conforming to IEC 61000-4-3 3 V/m 1.4 GHz...2 GHz conforming to IEC 61000-4-3 1 V/m 2...2.7 GHz conforming to IEC 61000-4-3
<b>Resistance to magnetic fields</b>	30 A/m 50/60 Hz conforming to IEC 61000-4-8
<b>Resistance to fast transients</b>	2 kV (power lines) conforming to IEC 61000-4-4 2 kV (relay output) conforming to IEC 61000-4-4 1 kV (I/O) conforming to IEC 61000-4-4 1 kV (Ethernet line) conforming to IEC 61000-4-4 1 kV (serial link) conforming to IEC 61000-4-4
<b>Surge withstand</b>	2 kV power lines (AC) common mode conforming to IEC 61000-4-5 2 kV relay output common mode conforming to IEC 61000-4-5 1 kV I/O common mode conforming to IEC 61000-4-5 1 kV shielded cable common mode conforming to IEC 61000-4-5 0.5 kV power lines (DC) differential mode conforming to IEC 61000-4-5 1 kV power lines (AC) differential mode conforming to IEC 61000-4-5 1 kV relay output differential mode conforming to IEC 61000-4-5 0.5 kV power lines (DC) common mode conforming to IEC 61000-4-5
<b>Resistance to conducted disturbances</b>	10 V 0.15...80 MHz conforming to IEC 61000-4-6 3 V I/O 0.1...80 MHz conforming to Marine specification (LR, ABS, DNV, GL) 10 V spot frequency (2, 3, 4, 6.2, 8.2, 12.6, 16.5, 18.8, 22, 25 MHz) conforming to Marine specification (LR, ABS, DNV, GL)
<b>Electromagnetic emission</b>	Conducted emissions - test level: 79 dB $\mu$ V/m QP/66 dB $\mu$ V/m AV ( power lines (AC)) at 0.15...0.5 MHz conforming to IEC 55011 Conducted emissions - test level: 73 dB $\mu$ V/m QP/60 dB $\mu$ V/m AV ( power lines (AC)) at 0.5...300 MHz conforming to IEC 55011 Conducted emissions - test level: 120...69 dB $\mu$ V/m QP ( power lines) at 10...150 kHz conforming to IEC 55011 Conducted emissions - test level: 63 dB $\mu$ V/m QP ( power lines) at 1.5...30 MHz conforming to IEC 55011 Radiated emissions - test level: 40 dB $\mu$ V/m QP class A ( 10 m) at 30...230 MHz conforming to IEC 55011 Conducted emissions - test level: 79...63 dB $\mu$ V/m QP ( power lines) at 150...1500 kHz conforming to IEC 55011 Radiated emissions - test level: 47 dB $\mu$ V/m QP class A ( 10 m) at 200...1000 MHz conforming to IEC 55011
<b>Immunity to microbreaks</b>	10 ms
<b>Ambient air temperature for operation</b>	-10...55 °C (horizontal installation) -10...35 °C (vertical installation)
<b>Ambient air temperature for storage</b>	-25...70 °C
<b>Relative humidity</b>	10...95 %, without condensation (in operation) 10...95 %, without condensation (in storage)
<b>IP degree of protection</b>	IP20 with protective cover in place
<b>Pollution degree</b>	<= 2
<b>Operating altitude</b>	0...2000 m
<b>Storage altitude</b>	0...3000 m
<b>Vibration resistance</b>	3.5 mm at 5...8.4 Hz on symmetrical rail 3.5 mm at 5...8.4 Hz on panel mounting 1 gn at 8.4...150 Hz on symmetrical rail 1 gn at 8.4...150 Hz on panel mounting

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Shock resistance	98 m/s <sup>2</sup> for 11 ms
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## Packing Units

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Unit Type of Package 1	PCE
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Number of Units in Package 1	1
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Package 1 Height	10.8 cm
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Package 1 Width	10.0 cm
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Package 1 Length	12.6 cm
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Package 1 Weight	440.0 g
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Unit Type of Package 2	S04
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Number of Units in Package 2	24
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Package 2 Height	30 cm
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Package 2 Width	40 cm
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Package 2 Length	60 cm
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Package 2 Weight	10.99 kg
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Unit Type of Package 3	P12
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Number of Units in Package 3	288
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Package 3 Height	105.0 cm
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Package 3 Width	120.0 cm
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Package 3 Length	80.0 cm
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Package 3 Weight	255.122 kg
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## Bền vững

Nhãn **Green Premium™** là cam kết của Schneider Electric trong việc cung cấp sản phẩm với hiệu suất môi trường tốt nhất. Green Premium cam kết tuân thủ các quy định mới nhất, minh bạch về tác động môi trường, cũng như các sản phẩm tuần hoàn và CO<sub>2</sub> thấp.

**Hướng dẫn đánh giá tính bền vững của sản phẩm** là tài liệu kỹ thuật phổ thông giúp làm rõ các tiêu chuẩn nhân sinh thái toàn cầu và cách diễn giải việc khai báo môi trường.

[Tìm hiểu thêm về Green Premium >](#)

[Hướng dẫn đánh giá về sự bền vững của sản phẩm >](#)



Minh bạch [RoHS/REACH](#)

## Hiệu suất sức khỏe

Mercury Free

Rohs Exemption Information [Yes](#)

Pvc Free

## Chứng nhận & Tiêu chuẩn

Reach Regulation

[REACH Declaration](#)

Eu Rohs Directive

Pro-active compliance (Product out of EU RoHS legal scope)

China Rohs Regulation

[China RoHS declaration](#)

Environmental Disclosure

[Product Environmental Profile](#)

Weee

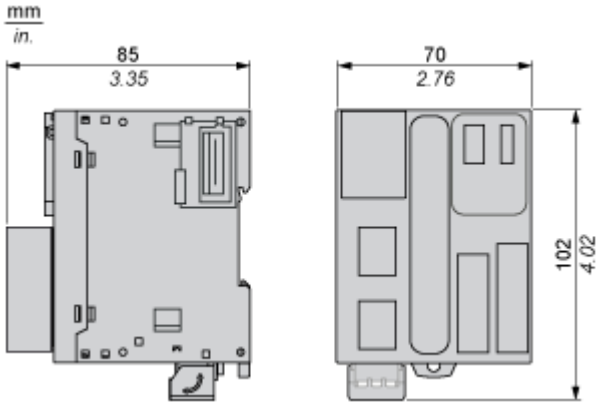
The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins

Circularity Profile

[End of Life Information](#)

**Dimensions**

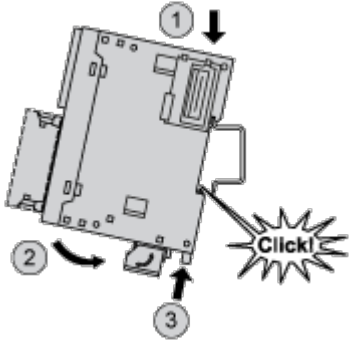
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Mounting and Clearance

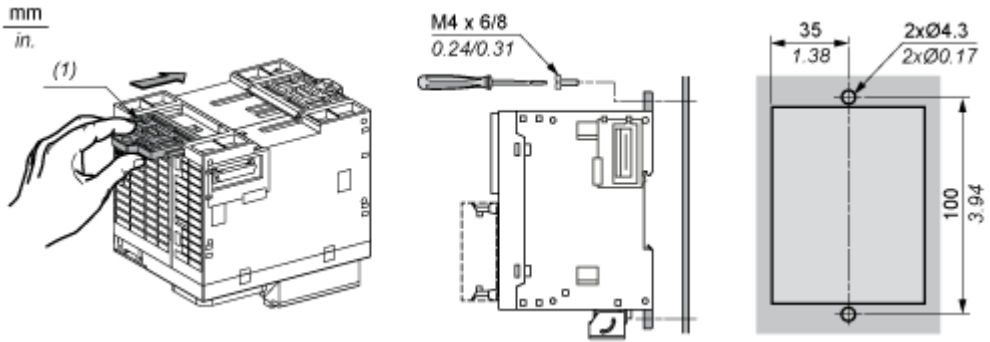
**Mounting on a Rail**

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Direct Mounting on a Panel Surface

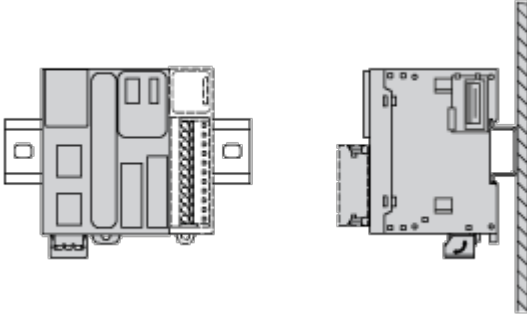


- (1) Install a mounting strip

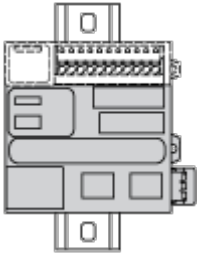
**Mounting**

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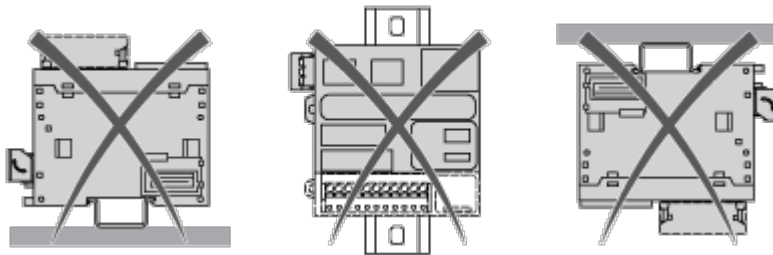
**Correct Mounting Position**



**Acceptable Mounting Position**

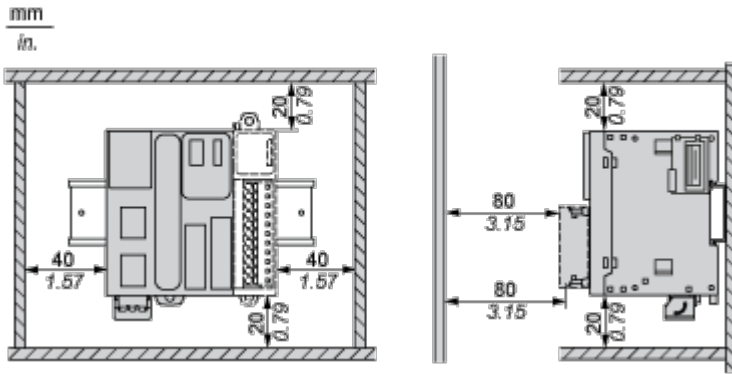


**Incorrect Mounting Position**



Clearance

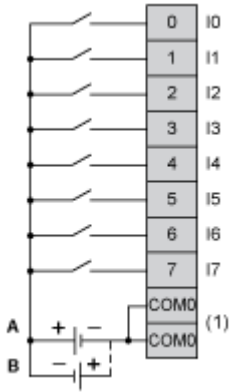
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## Connections and Schema

### Digital Inputs

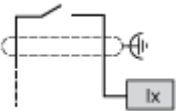
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(1) The COM0 terminals are connected internally.

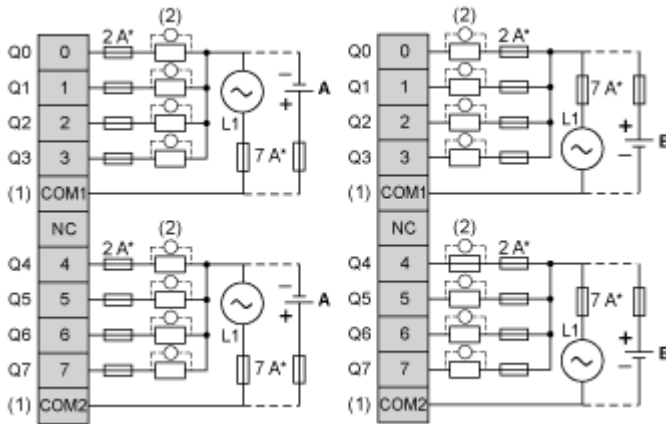
A : Sink wiring (positive logic).

B : Source wiring (negative logic).



Ix I0, I1, I6, I7

## Digital Outputs



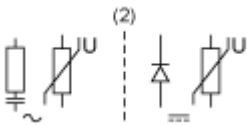
(\*) Type T fuse

(1) The COM1 and COM2 terminals are not connected internally.

(2) To improve the life time of the contacts, and to protect from potential inductive load damage, you must connect a free wheeling diode in parallel to each inductive DC load or an RC snubber in parallel of each inductive AC load

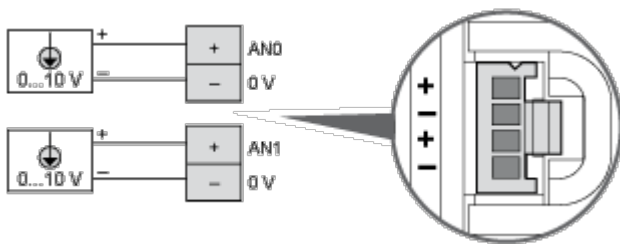
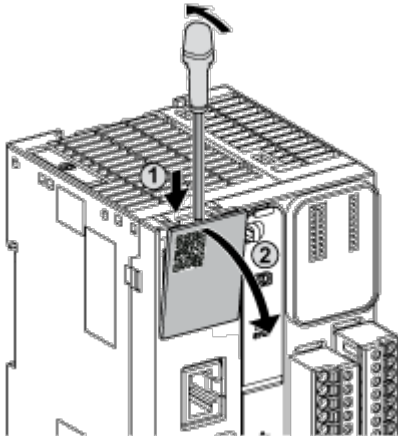
A : Source wiring (negative logic).

B : Sink wiring (positive logic).



Analog Inputs

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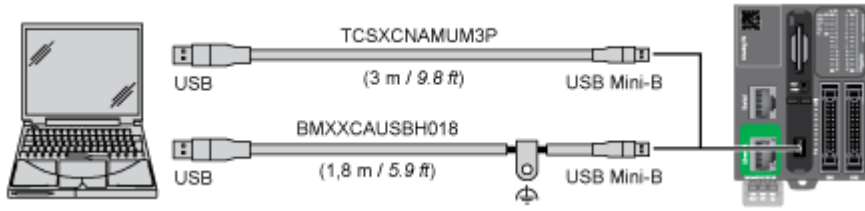


The (-) poles are connected internally.

Pin	Wire Color
AN0 / AN1	Red
0 V	Black

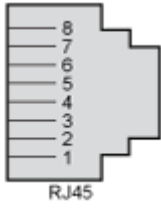
USB Mini-B Connection

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## SL1 Connection

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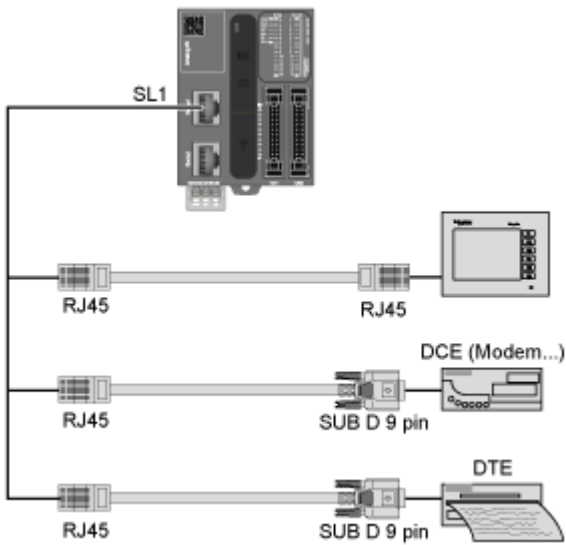


SL1

N °	RS 232	RS 485
1	RxD	N.C.
2	TxD	N.C.
3	RTS	N.C.
4	N.C.	D1
5	N.C.	D0
6	CTS	N.C.
7	N.C.*	5 Vdc
8	Common	Common

N.C.: not connected

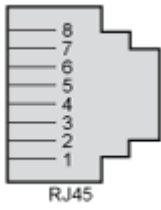
\* : 5 Vdc delivered by the controller. Do not connect.





**SL2 Connection**

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N °	RS 485
1	N.C.
2	N.C.
3	N.C.
4	D1
5	D0
6	N.C.
7	N.C.
8	Common

N.C.: not connected