

# › Logic Controller em4 expansion

## EM4EA

### Analog expansion E10A

- › Up to two same or different expansions can be added to the base station to expand up to 46 I/Os
- › 6 digital/analog configurable inputs (0-10 V, 0-20 mA, 4-20 mA) with a good accuracy for industrial sensors
- › 4 outputs (2x Digital/PWM and 2x 0-10 V) allowing controlling analog actuators (controlled valve, controlled pump...)



Analog expansion E10A

Specific characteristics	
Reference	88 982 213
Finish	Glossy black
On front panel color	Black RAL 9011
On terminal block color	Blue RAL 5017
Protection rating (in accordance with IEC/EN 60529)	IP 40 on front panel IP 20 on terminal block
Weight	Without packing: 105 g With packing: 145 g
Dimensions	Without packing: 60.4 x 90 x 60.3 mm / 2.37 x 3.54 x 2.37 inch With packing: 93 x 103 x 65 mm / 3.66 x 4.06 x 2.56 inch
General characteristics	
Products certification	CE, cULus Listed
Conformity with the low voltage directive (in accordance with BT 2006/95/EC)	IEC/EN 61131-2 (Open equipment)
Conformity with the EMC directive (in accordance with 2004/108/EC)	IEC/EN 61000-6-1 (Residential, commercial and light-industrial environments) IEC/EN 61000-6-2 (Industrial) IEC/EN 61000-6-3 (Residential, commercial and light-industrial environments) IEC/EN 61000-6-4 (Industrial)
Earthing	None
Overvoltage category	3 in accordance with IEC/EN 60664-1
Pollution	Degree: 2 in accordance with IEC/EN 61131-2
Maximum utilization altitude	Operation: 2000 m Transport: 3000 m
Mechanical resistance	Immunity to vibrations IEC/EN 60068-2-6, Fc test Immunity to shock IEC/EN 60068-2-27, Ea test
Resistance to electrostatic discharge	Immunity to ESD IEC/EN 61000-4-2, level 3
Resistance to HF interference (Immunity)	Immunity to radiated electrostatic fields IEC/EN 61000-4-3, level 3 Immunity to fast transients (burst immunity) IEC/EN 61000-4-4, level 3 Immunity to shock waves IEC/EN 61000-4-5 Radio frequency in common mode IEC/EN 61000-4-6, level 3
Conducted and radiated emissions (in accordance with EN 55022/11 group 1)	Class B
Operation temperature	-20 °C (-4 °F) → +60 °C (140 °F) (+40 °C (104 °F) in a non-ventilated enclosure)
Storage temperature	-40 °C (-40 °F) → +80 °C (176 °F)
Relative humidity	95% max. (no condensation or dripping water)

Screw terminals connection capacity	Flexible wire with ferrule: 1 conductor: 0.2 to 2.5 mm <sup>2</sup> , AWG 24-14 Flexible wire with ferrule: 2 conductors: 0.2 to 0.75 mm <sup>2</sup> , AWG 24-18 Rigid wire: 1 conductor: 0.2 to 2.5 mm <sup>2</sup> , AWG 24-14 Rigid wire: 2 conductors: 0.2 to 0.75 mm <sup>2</sup> , AWG 24-18 Tightening torque: 0.5 N.m (4.5 lb-in) (tighten using screwdriver diam. 3.5 mm) Stripping length: 6 mm
<b>Supply</b>	
Nominal voltage	Powered by the controller
Max. absorbed power	2.5 W
<b>Inputs</b>	
<b>Digital 24 V<sub>DC</sub> and analog inputs 12 bits / 10 V &amp; 11 bits / 0-20 mA - 6 inputs from I1 to I6</b>	
<b>Input used as digital input (power off state)</b>	
Input voltage	24 V <sub>DC</sub> (-15% / +20%)
Input current	1.5 mA @ 20.4 V 1.7 mA @ 24 V 2.1 mA @ 28.8 V
Input impedance	13.9 kΩ
Logic 1 voltage threshold	≥ 11 V <sub>DC</sub>
Making current at logic state 1	≥ 0.8 mA
Logic 0 voltage threshold	≤ 8 V <sub>DC</sub>
Release current at logic state 0	≤ 0.5 mA
Response time	1 to 2 cycle times
Sensor type	Contact or 3-wire PNP
Conforming to IEC/EN 61131-2	Type 1
Input type	Resistive
Isolation between power supply and inputs	None
Isolation between inputs	None
Protection against polarity inversions	No
Status indicator	On LCD screen
Cable length	≤ 100 m
<b>Input used as 0-10 V analogue input</b>	
Measuring range	0 → 10 V
Input impedance	13.9 kΩ
Maximum value without destruction	28.8 V <sub>DC</sub> max
Input type	Common mode
Resolution	12 bit / 10V
Value of LSB	2.45 mV
Conversion time	Controller cycle time
Maximum error at 25 °C (77 °F)	± 0.8 % of full scale
Maximum error at 55 °C (131 °F)	± 1.2 % of full scale
Repeat accuracy at 55 °C (131 °F)	± 0.5 %
Isolation between analogue channel and power supply	None
Protection against polarity inversions	Yes for voltage ≤ 10 V
Potentiometer control	2.2 kΩ / 0.5 W (recommended), 10 KΩ max.
Cable length	≤ 10 m with shielded twisted cable (sensor not isolated)
<b>Input used as 0-20 mA analogue input</b>	
Measuring range	0 → 20 mA (4 → 20 mA by the application)
Input impedance	245 Ω
Maximum value without destruction	30 mA max
Input type	Common mode
Resolution	11 bit (normalized at 0 - 2000) / 20 mA
Value of LSB	10 μA

Conversion time	Controller cycle time
Maximum error at 25 °C (77 °F)	± 1.2 % of full scale
Maximum error at 55 °C (131 °F)	± 1.7 % of full scale
Repeat accuracy at 55 °C (131 °F)	± 0.5 %
Isolation between analogue channel and power supply	None
Protection against polarity inversions	Yes
Oversvoltage protection	Yes If the input voltage is > 7 V, this one is automatically switched on 0-10V configuration.
Cable length	≤ 30 m with shielded twisted cable (sensor not isolated)

**Outputs**

**Digital / PWM solid state output - 2 solid state outputs from O1 to O2**

**Output used as digital output**

Breaking voltage	10 → 28.8 V <sub>DC</sub>
Nominal voltage	12 / 24 V <sub>DC</sub>
Nominal current	0.5 A on resistive load @ 25 °C (77 °F)
Max. breaking current	0.625 A
Non repetitive overload current	1 A
Maximum breaking current in the common	1 A
Voltage drop	< 1 V for I = 0.5 A
Response time	Make = 1 cycle time + 30 µs typical Release = 1 cycle time + 40 µs typical
Built-in protections	Against overloads and short-circuits: Yes Against over voltages (*): Yes Against inversions of power supply: Yes (* In the absence of a potential free contact between the output of the programmable logic controller and the load
Min. load	1 mA
Galvanic isolation	No
Cable length	≤ 10 m

Truth table of the default		<b>Command</b>	<b>Output</b>	<b>Fault</b>
	Normal condition	0	0	No
		1	1	No
	Overheating	0	0	No
		1	0	Yes
	Underpowered	0	0	X
		1	0	X
	Short circuit (current limit)	0	0	No
		1	0	Yes

**Output used as PWM output**

PWM frequency	14.11 Hz; 56.45 Hz; 112.90 Hz; 225.80 Hz; 451.59 Hz; 1758.24 Hz
PWM cyclic ratio	0 → 100 % 100 steps
PWM Max. error	≤ 2 % (from 10 % → 90 %)
Status indicator	On LCD screen
Cable length	≤ 10 m with shielded twisted cable
Distance between the power source and the static outputs	≤ 30 m

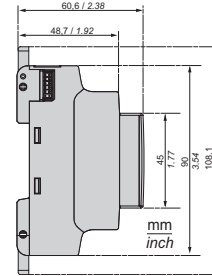
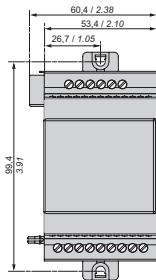
**Analog output - 2 outputs from O3 to O4**

Output range	0 → 10 V <sub>DC</sub>
Load type	Resistive (≥ 1 KΩ)
Load Max.	≤ 10 mA
Non repetitive Max. load	20 mA
Resolution	10 bits (normalized at 0 – 1000)
Valeur du LSB	10 mV
Conversion time	Controller cycle time

Response time	≤ 300 ms
Maximum error at 25 °C (77 °F)	± 1 % of full scale
Maximum error at 55 °C (131 °F)	± 1.5 % of full scale
Built-in protections	Against overloads and short-circuits: Yes Against over voltages (*): Yes Against inversions of power supply: Yes (* In the absence of a volt-free contact between the output of the logic controller and the load
Galvanic isolation	No
Cable length	≤ 10 m with shielded twisted cable

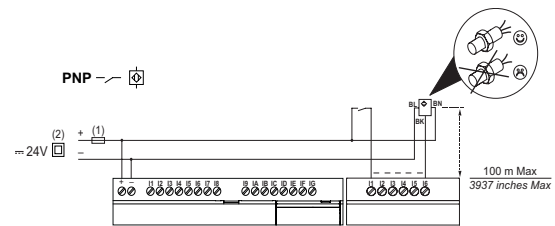
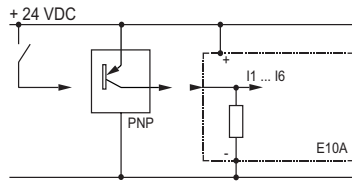
**Schemes**  
**Dimensions**

E10A Glossy

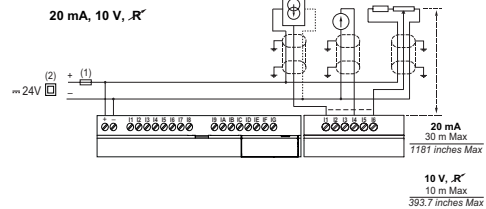
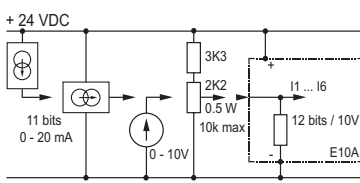


**Connections**  
**INPUTS**

I1 ... I6 0/1



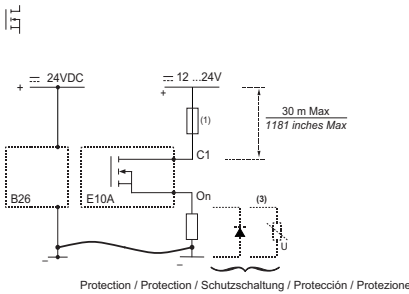
I1 ... I6 U/I



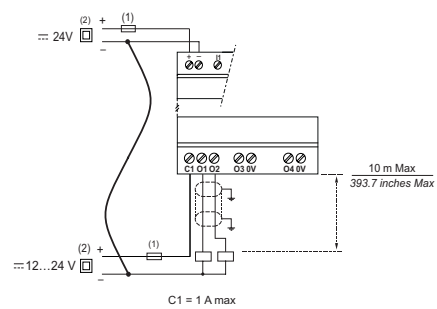
(1)	1 A (UL248) quick-blowing fuse, circuit-breaker or circuit protector (US)
(2)	Isolating source

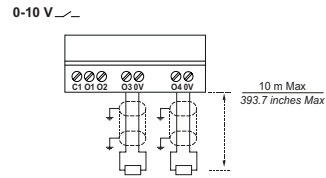
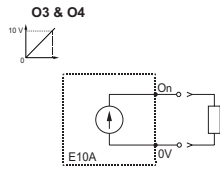
**OUTPUTS**

O1 & O2



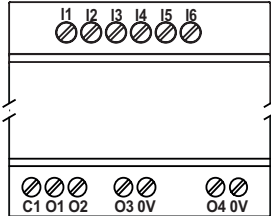
0,5 A





(3) Inductive load

**I/O installations**



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