DATASHEET - EC4P-221-MRXX1

Compact PLC, 24 V DC, 12DI(of 4AI), 6 DO(R), CAN

Part no.	EC4P-221-MRXX1
Catalog No.	106394
EL-Nummer (Norway)	4519731

EAT·N
Powering Business Worldwide™

Delivery program

		Expandable: Inputs/outputs and bus systems individual laser inscription possible with EC4-COMBINATION-*
Description		easyNet/CANopen® on board
Inputs		
Digital		12
of which can be used as analog		4
Outputs		
Relay 10 A (UL)		6
Supply voltage		24 V DC

Technical data

General

Dimensions (W x H x D)		mm	107.5 x 90 x 72 without/79 with adapter for MCC (6 SU)
Weight		kg	0.3
Mounting			Top-hat rail IEC/EN 60715, 35 mm or screw fixing using 3 fixing brackets ZB4-101-GF1 (accessories)

Terminal capacities

Solid		mm^2	0.2/4 (AWG 22 - 12)
Flexible with ferrule		mm^2	0.2/2.5 (AWG 22 - 12)
Standard screwdriver		mm	0.8 x 3.5
Max. tightening torque		Nm	0.6

Climatic environmental conditions

Operating ambient temperature		°C	-25 to 55, cold as per IEC 60068-2-1, heat as per IEC 60068-2-2
Condensation			Take appropriate measures to prevent condensation
LCD display (clearly legible)		°C	0 - 55
Storage	ϑ	°C	-40 - +70
Relative humidity, non-condensing (IEC/EN 60068-2-30)		%	5 - 95
Air pressure (operation)		hPa	1080 - 1080

Ambient conditions, mechanical

Protection type (IEC/EN 60529, EN50178, VBG 4)			IP20
Vibrations (IEC/EN 60068-2-6)		Hz	
Constant amplitude 0.15 mm		Hz	10 - 57
Constant acceleration 2 g		Hz	57 - 150
Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 15 g/11 ms		Impacts	18
Drop to IEC/EN 60068-2-31	Drop height	mm	50
Free fall, packaged (IEC/EN 60068-2-32)		m	1
Mounting position			Vertical or horizontal

Electromagnetic compatibility (EMC)

Overvoltage category/pollution degree			II/2
Electrostatic discharge (ESD)			
applied standard			IEC/EN 61000-4-2, Level 3
Air discharge		kV	8
Contact discharge		kV	6
Electromagnetic fields (RFI) to IEC EN 61000-4-3		V/m	10
Radio interference suppression			EN 55011 Class B, EN 55022 Class B
Burst		kV	IEC/EN 61000-4-4, level 3
Burst			

Supply cable		kV	2
Signal lines		kV	2
power pulses (Surge)			2 kV (supply cables, symmetrical, EASY...AC) 0.5 kV (supply cables, symmetrical, easy-DC) according to IEC/EN 61000-4-5
Immunity to line-conducted interference to (IEC/EN 61000-4-6)		V	10

Insulation resistance

Clearance in air and creepage distances			EN 50178, UL 508, CSA C22.2, No. 142
Insulation resistance			EN 50178

Back-up of real-time clock

Back-up of real-time clock			
			① Backup time (hours) with fully charged double layer capacitor ② Service life (years)
Accuracy of the real-time clock		s/day	part no. ± 5 (± 0.5 h/Year)

Retentive memory

Write cycles of the retentive memory			10000000000 (10^{10}) (Read-write cycles)

Power supply

Rated operational voltage	U_e	V	24 DC (-15/+20%)
Permissible range	U_e		20.4 - 28.8 V DC
Residual ripple		%	≦ 5
Input current			normally 140 mA at U_e
Voltage dips		ms	≤ 10 (IEC/EN 61131-2)
Heat dissipation	P		Normally 3.4 W

CPU

Processor			Infineon XC161
Memory			
Program code/data		kByte	256/14 segments of 16 KB each
Marker/retentive data		KByte	16/4/4/8
Cycle time for 1 k of instructions (Bit, Byte)		ms	< 0.3

Interfaces

PRG interface RS232			
Data transfer rate		kBit/s	4.8, 9.6, 19.2, 38.4, 57.6, 115.2 (character format: 8 bit data, no parity, 1 stop bit)
Connection types			RJ45-bus
Potential isolation			none
Master mode			
Data transfer rate		kbit/s	0.3, 0.6, 1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 57.6
Character formats			8E1, 8O1, 8N1, 8N2, 7E2, 7O2, 7N2, 7E1
Number of transmission bytes in a block			190 bytes
Number of received bytes in a block			190 bytes
Ethernet			
Data transfer rate		Mbit/s	10 MBit/s, 100 m
Connection types			RJ45
Potential isolation			No
CANopen®			
Data transfer rate			500 kBit/s, 25 m 250 kBit/s, 60m 125 kBit/s, 125 m 50 kBit/s, 300 m 20 kBit/s, 700 m 10 kBit/s, 1000 m
Bus termination (first and last station)			EASY-NT-R plug (incl. bus terminating resistor 120 Ω)
Connection types			2 x RJ45, 8 pole
Master mode			
Number			8
Mode slave			
Stations		Number	max. 126
PDO type			Asynchronous, cyclic, acyclic
Control contact rated current			To DS 301 V4

Digital inputs 24 V DC

Number			12

Inputs can be used as analog inputs			4 (I7, I8, I11, I12)
Status Display			LCD-Display
Potential isolation			from the outputs: yes to network easyNet, easyLink
Rated operational voltage	U_e	V DC	24
Input voltage		V DC	< 5 (I1 - I6, I9 - I10) < 8 (I7, I8, I11, I12) at signal "0" > 15.0 (I1 - I6, I9, I10) > 8.0 (I7, I8, I11, I12) at signal "1"
Input current on 1 signal			
Input current at signal 1		mA	3.3 (I1 to I6) 2.2 (I7, I8) 3.3 (I9, I10) 2.2 (I11, I12)
Deceleration time		ms	normally 0.02 (I1 - I4), normally 0.25 (I5 - I12) (from ''0'' to "1") normally 0.02 (I1 - I4), normally 0.25 (I5 - I12) (from ''0'' to "1")
Cable length		m	100 (unshielded)
Incremental counter			
Number of counter inputs			1 (I1, I2, I3, I4)
Value range			32 Bit
Counter frequency		kHz	≦ 40
Pulse shape			Square
Counter inputs			I1, I2
Reference input			I3
Input for reference switch			I4
Counter inputs I1 and I2, I3 and I4			1
Signal offset			90°
Rapid counter inputs			
Number			2 (I1, I2) at 16 Bit or 1 (I1) at 32 Bit
Value range			16/32 Bit
Cable length		m	≦ 20 (screened)
Counter frequency		kHz	≦ 50
Pulse shape			Square

Analog inputs

Number			4 (I7, I8, I11, I12)
Potential isolation			from the outputs: yes to interface/memory card: no
Input type			DC voltage
Signal range			0-10 V DC
Resolution			0.01 V analog 0.01 V digital 10 Bit (value 0 - 1023)
Input impedance		kΩ	11.2
Accuracy of actual value			
Within a single device		%	± 2, (I7, I8, I11, I12) ± 0.12 V
Conversion time, analog/digital		ms	each CPU cycle
Input current		mA	< 1
Cable length		m	≦ 30, screened

Relay outputs

Outputs in groups of			1
Parallel switching of outputs for increased output			Not permissible
Protection of an output relay			Miniature circuit-breaker B16 or fuse 8 A (slow)
Potential isolation			from power supply: yes From the inputs: yes in groups Safe isolation according to EN 50178: 300 V AC Basic isolation: 600 V AC
Lifespan, mechanical	Operations	x 10⁶	10
Contacts			
Conventional thermal current (10 A UL)		A	8
Recommended for load: 12 V AC/DC		mA	> 500
Short-circuit-proof cos φ = 1, characteristic B16 at 600 A		A	16
Short-circuit-proof cos φ = 0.5 to 0.7, characteristic B16 at 900 A		A	16

Rated impulse withstand voltage U_{imp} of contact coil		kV	6
Rated operational voltage	U_e	V AC	250
Rated insulation voltage	U_i	V AC	250
Safe isolation according to EN 50178		V AC	300 between coil and contact 300 between two contacts
Making capacity			
AC-–15, 250 V AC, 3 A (600 ops./h)	Operations		300000
DC-13, L/R ≦ 150 ms, 24 V DC, 1 A (500 S/h)	Operations		200000
Breaking capacity			
AC-15, 250 V AC, 3 A (600 Ops./h)	Operations		300000
DC-13, L/R ≦ 150 ms, 24 V DC, 1 A (500 S/h)	Operations		200000
Filament bulb load			
1000 W at 230/240 V AC	Operations		25000
500 W at 115/120 V AC	Operations		25000
Fluorescent lamp load			
Fluorescent lamp load 10 x 58 W at 230/240 V AC			
With upstream electrical device	Operations		25000
Uncompensated	Operations		25000
Fluorescent lamp load 1 x 58 W at 230/240 V AC, conventional, compensated	Operations		25000
Switching frequency			
Mechanical operations		x 10^6	10
Switching frequency		Hz	10
Resistive load/lamp load		Hz	2
Inductive load		Hz	0.5
UL/CSA			
Uninterrupted current at 240 V AC		A	10
Uninterrupted current at 24 V DC		A	8
AC			
Control Circuit Rating Codes (utilization category)			B 300 Light Pilot Duty
Max. rated operational voltage		V AC	300
max. thermal continuous current cos φ = 1 at B 300		A	5
max. make/break cos φ ≠ capacity 1 at B 300		VA	3600/360
DC			
Control Circuit Rating Codes (utilization category)			R 300 Light Pilot Duty
Max. rated operational voltage		V DC	300
Max. thermal uninterrupted current at R 300		A	1
Max. make/break capacity at R 300		VA	28/28

Network easyNet

Bus termination (first and last station)			EASY-NT-R plug (incl. bus terminating resistor 120 Ω)

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I_n	A	0
Heat dissipation per pole, current-dependent	P_{vid}	W	0
Equipment heat dissipation, current-dependent	P_{vid}	W	0
Static heat dissipation, non-current-dependent	P_{vs}	W	3.4
Heat dissipation capacity	P_{diss}	W	0
Operating ambient temperature min.		°C	-25
Operating ambient temperature max.		°C	55
IEC/EN 61439 design verification			
10.2 Strength of materials and parts			
10.2.2 Corrosion resistance			Meets the product standard's requirements.
10.2.3.1 Verification of thermal stability of enclosures			Meets the product standard's requirements.
10.2.3.2 Verification of resistance of insulating materials to normal heat			Meets the product standard's requirements.

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10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects		Meets the product standard's requirements.
10.2.4 Resistance to ultra-violet (UV) radiation		Meets the product standard's requirements.
10.2.5 Lifting		Does not apply, since the entire switchgear needs to be evaluated.
10.2.6 Mechanical impact		Does not apply, since the entire switchgear needs to be evaluated.
10.2.7 Inscriptions		Meets the product standard's requirements.
10.3 Degree of protection of ASSEMBLIES		Meets the product standard's requirements.
10.4 Clearances and creepage distances		Meets the product standard's requirements.
10.5 Protection against electric shock		Does not apply, since the entire switchgear needs to be evaluated.
10.6 Incorporation of switching devices and components		Does not apply, since the entire switchgear needs to be evaluated.
10.7 Internal electrical circuits and connections		Is the panel builder's responsibility.
10.8 Connections for external conductors		Is the panel builder's responsibility.
10.9 Insulation properties		
10.9.2 Power-frequency electric strength		Is the panel builder's responsibility.
10.9.3 Impulse withstand voltage		Is the panel builder's responsibility.
10.9.4 Testing of enclosures made of insulating material		Is the panel builder's responsibility.
10.10 Temperature rise		The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.
10.11 Short-circuit rating		Is the panel builder's responsibility.
10.12 Electromagnetic compatibility		Is the panel builder's responsibility.
10.13 Mechanical function		The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

Technical data ETIM 7.0

PLC's (EG000024) / PLC device set (EC002581)

Electric engineering, automation, process control engineering / Control / Programmable logic control (SPS) / PLC device set (ecl@ss10.0.1-27-24-22-19 [BAA707013])

Contains function building blocks		Yes
Contains basic device		Yes
Contains module rack		No
Contains power supply		Yes
Contains analogue input module		Yes
Contains analogue output module		No
Contains digital input module		Yes
Contains digital output module		Yes
Contains function module		Yes
Contains technology module		No
Contains communication module		Yes
Contains memory unit		Yes
Contains simulation module		No
Contains connection cable		No
Contains control unit		No
Contains monitor		No
Contains programming software		No
Contains engineering software		Yes
Contains visualization		No
Contains libraries		Yes
Contains documentation		Yes
Contains other components		Yes
Software preinstalled		No

Approvals

Product Standards		IEC: see Technical Data; UL508; CSA-C22.2 No. 0-M; CSA-C22.2 No. 142-M; CE marking
UL File No.		E135462
UL Category Control No.		NRAQ
CSA File No.		012528
CSA Class No.		2252-01

North America Certification	UL listed, CSA certified
Specially designed for North America	No
Current Limiting Circuit-Breaker	No
Degree of Protection	IEC: IP20, UL/CSA Type: -

Dimensions
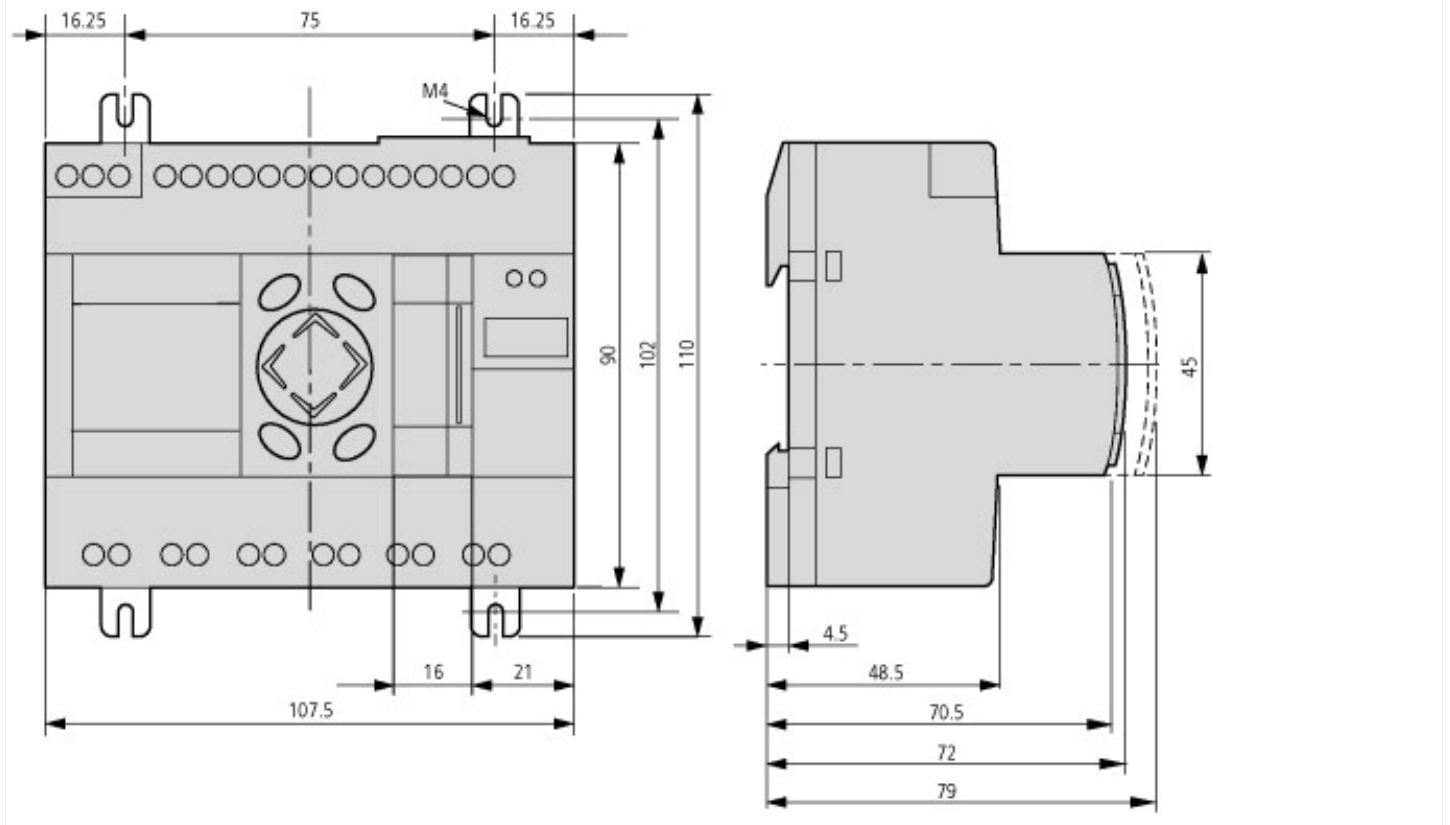
Additional product information (links)

From the Control Relay to the Automation System	http://www.moeller.net/binary/ver_techpapers/ms13en_easycontrol.pdf
f1=1454&f2=1179;Labeleditor	http://applications.eaton.eu/sdlc?LX=11&amp
Product overview (WEB)	http://www.eaton.eu/ec4p