



Compact PLC, 24 V DC, 12DI(of 4AI), 6DO(R), 1AO, CAN, display

Part no. **EC4P-221-MRAD1**
Article no. **106397**



Delivery program

Description		Expandable: Inputs/outputs and bus systems individual laser inscription possible with EC4-COMBINATION-*	
Inputs		easyNet/CANopen® on board	
Digital	12		
of which can be used as analog	4		
Outputs			
Relay 10 A (UL)	6		
Analog	1		
Additional features			
Display & keypad	✓		
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	3.5 x 0.8
Max. tightening torque	Nm	0.6

Climatic environmental conditions

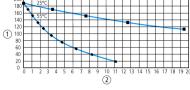
Operating ambient temperature	°C	-25 to 55, cold as per IEC 60068-2-1, heat as per IEC 60068-2-2
Condensation		Take appropriate measures to prevent condensation
LCD display (clearly legible)	°C	0 - 55
Storage	θ	°C
Relative humidity, non-condensing (IEC/EN 60068-2-30)	%	5 - 95
Air pressure (operation)	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
Free fall, packaged (IEC/EN 60068-2-32)		m
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, 801, 8N1, 8N2, 7E2, 702, 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		
Two EASY devices	%	± 3
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
Analog outputs		
Number		1
Output type		DC voltage
Signal range		0-10 V DC
Max. output current	A	0.01
Load resistance		1 kΩ
Overload and short-circuit protection		Yes
Resolution		0.01 V DC analog 10 Bit (value 0 - 1023) digital

Recovery time		μs	100
Accuracy		%	2
-25 °C - 55 °C		%	1
25°C		ms	each CPU cycle
Conversion time, analog/digital			
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	$\times 10^6$	10
Contacts			
Conventional thermal current (10 A UL)		A	8
Recommended for load: 12 V AC/DC		mA	> 500
Short-circuit-proof $\cos \varphi = 1$, characteristic B16 at 600 A		A	16
Short-circuit-proof $\cos \varphi = 0.5$ 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		$\times 10^6$	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 $\cos \varphi = 1$ at B 300	A		5
max. make/break $\cos \varphi \neq$ 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

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.
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 6.0

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

Electric engineering, automation, process control engineering / Control / Programmable logic control (SPS) / PLC device set (ecl@ss8.1-27-24-22-19 [BAA707010])

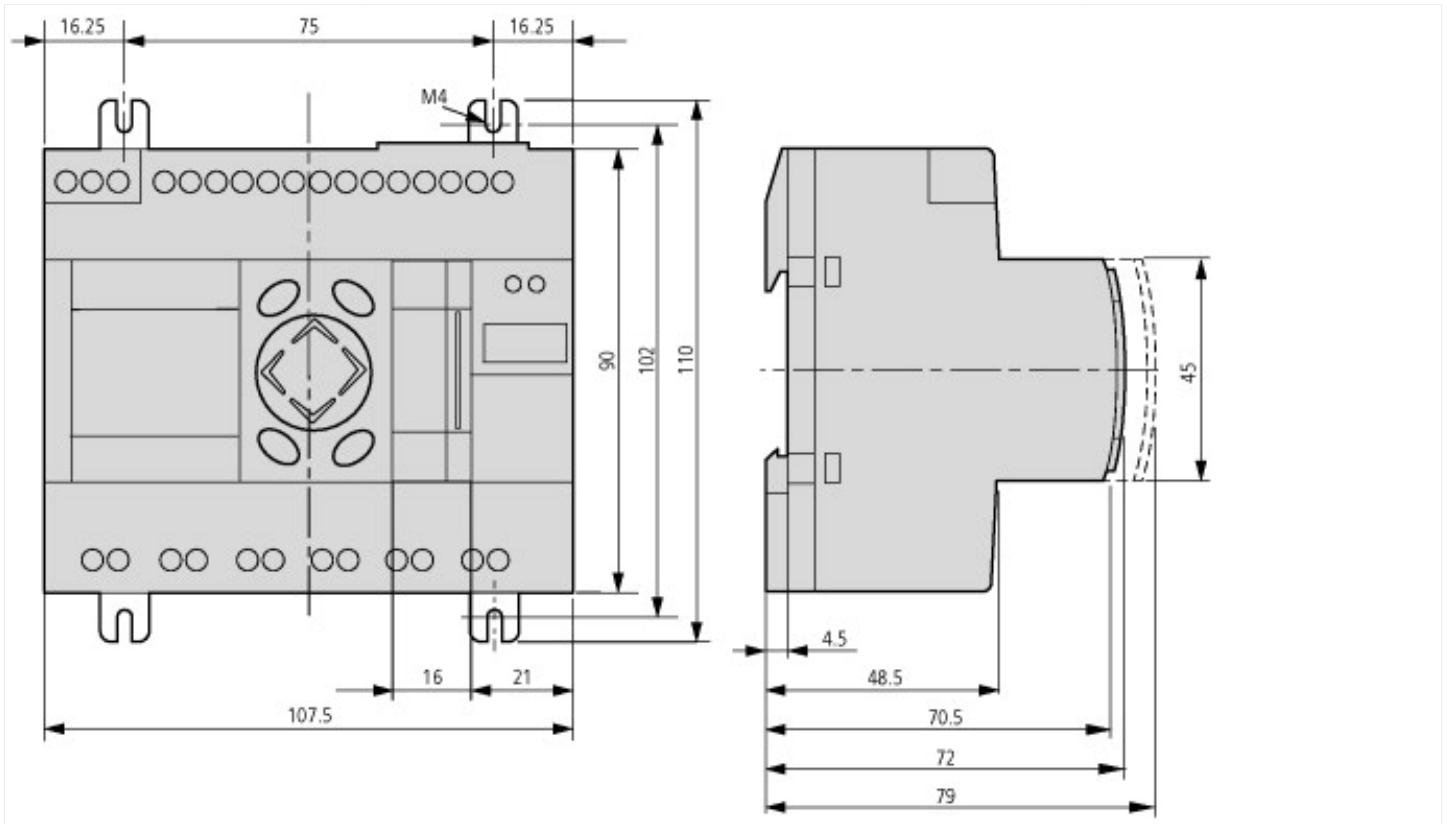
Contains function building blocks	Yes
Contains basic device	Yes
Contains module rack	No
Contains power supply	Yes
Contains analogue input module	Yes
Contains analogue output module	Yes
Contains digital input module	Yes
Contains digital output module	Yes
Contains function module	Yes
Contains technology module	No
Contains communication module	Yes
Contains memory unit	Yes

Contains simulation module	No
Contains connection cable	No
Contains control unit	Yes
Contains monitor	Yes
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)

Instruction leaflet "easyControl: compact PLC" IL05003003Z (AWA2724-2334)

Instruction leaflet "easyControl: compact PLC" ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL05003003Z2010_11.pdf
IL05003003Z (AWA2724-2334)

Instruction leaflet "power supply unit, communication module" IL05013018Z (AWA2528-2175)

Instruction leaflet "power supply unit, communication module" IL05013018Z ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL05013018Z.pdf
(AWA2528-2175)

MN05003003Z Manual easyControl, programmable PLC EC4-200

MN05003003Z Handbuch easyControl, Programmierbare Steuerung EC4-200 - Deutsch	ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN05003003Z_DE.pdf
MN05003003Z Manual easyControl, programmable PLC EC4-200 - English	ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN05003003Z_EN.pdf
From the Control Relay to the Automation System	http://www.moeller.net/binary/ver_techpapers/ms13en_easycontrol.pdf
Labeleditor (Beschriftungssoftware)	http://downloadcenter.moeller.net/de/software.f6023a63-5acb-42c7-a51c-ccf99091cace