DATASHEET - EC4P-222-MTXD1

Compact PLC, 24 V DC, 12DI(of 4AI), 8DO(T), ethernet, CAN, display

Part no.	**EC4P-222-MTXD1**
Catalog No.	**106399**
EL-Nummer (Norway)	**4519744**

Powering Business Worldwide™

Delivery program

			Expandable: Inputs/outputs and bus systems individual laser inscription possible with EC4-COMBINATION-*
Description			easyNet/CANopen® and Ethernet on board
Inputs			
Digital			12
of which can be used as analog			4
Outputs			
Transistor			8
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	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)

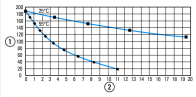
Overvoltage category/pollution degree			II/2
Electrostatic discharge (ESD)			
applied standard			IEC/EN 61000-4-2, Level 3
Air discharge		kV	8
Contact discharge		kV	6
Electromagnetic fields (RFI) to IEC EN 61000-4-3		V/m	10
Radio interference suppression			EN 55011 Class B, EN 55022 Class B

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

Transistor outputs

Number			8
Rated operational voltage	U_e	V DC	24
Permissible range	U_e		20.4 - 28.8 V DC
Residual ripple		%	5
Supply current		mA	Norm./max. 18/32 at signal 0 24/44 at signal 1
Protection against polarity reversal			yes (Caution: A short circuit will result if 0 V or earth is applied to the outputs in the event that the supply voltage is connected to the wrong poles.)
Potential isolation			from power supply, inputs to the memory card: yes From the inputs: yes

Rated operational current at signal „1" DC per channel	I_e	A	Max. 0.5
Lamp load without R_v per channel		W	5
Residual current on 0 signal per channel		mA	< 0.1
Max. output voltage		V	2.5 (signal 0 at external load < 10 MΩ) U = U_e - 1 V (signal 1 at I_e = 0.5 A)
Short-circuit protection			Yes, electronic (Q1 - Q4), thermal (Q5 - Q8), (analysis via diagnostics input I16, I15)
Short-circuit tripping current for R_a ≦ 10 mΩ		A	0.7 ≦ I_e ≦ 2 per output
Total short-circuit current		A	16
Peak short-circuit current		A	32
Thermal cutout			Yes
Max. operating frequency with constant resistive load		Operations/h	40000
Parallel connection of outputs			
With resistive load, inductive load with external suppressor circuit, combination within a group			Group 1: Q1 - Q4 Group 2: Q5 - Q8
Number of outputs	max.		4
Max. total current		A	2 (Caution! Outputs must be actuated simultaneously and for the same length of time.)
Output status indication			LCD-display
Inductive load to EN 60947-5-1			
Without external suppressor circuit			
$T_{0.95}$ = 1 ms, R = 48 Ω, L = 16 mH			
Utilization factor		g	0.25
Duty factor		% DF	100
Max. switching frequency f = 0.5 Hz (max. DF = 50 %)		Operations/h	1500
DC-13, $T_{0.95}$ = 72 ms, R = 48 Ω, L = 1.15 H			
Utilization factor		g	0.25
Duty factor		% DF	100
Max. switching frequency f = 0.5 Hz (max. DF = 50 %)		Operations/h	1500
$T_{0.95}$ = 15 ms, R = 48 Ω, L = 0.24 H			
Utilization factor		g	0.25
Duty factor		% DF	100
Max. switching frequency f = 0.5 Hz (max. DF = 50 %)		Operations/h	1500
With external suppressor circuit			
Utilization factor		g	1
Duty factor		% DF	100
Max. switching frequency, max. duty factor		Operations/h	Depending on the suppressor circuit

Supply voltage U_{Aux}

Protection against polarity reversal			yes (Caution: A short circuit will result if 0 V or earth is applied to the outputs in the event that the supply voltage is connected to the wrong poles.)
Potential isolation			Yes

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 7.0

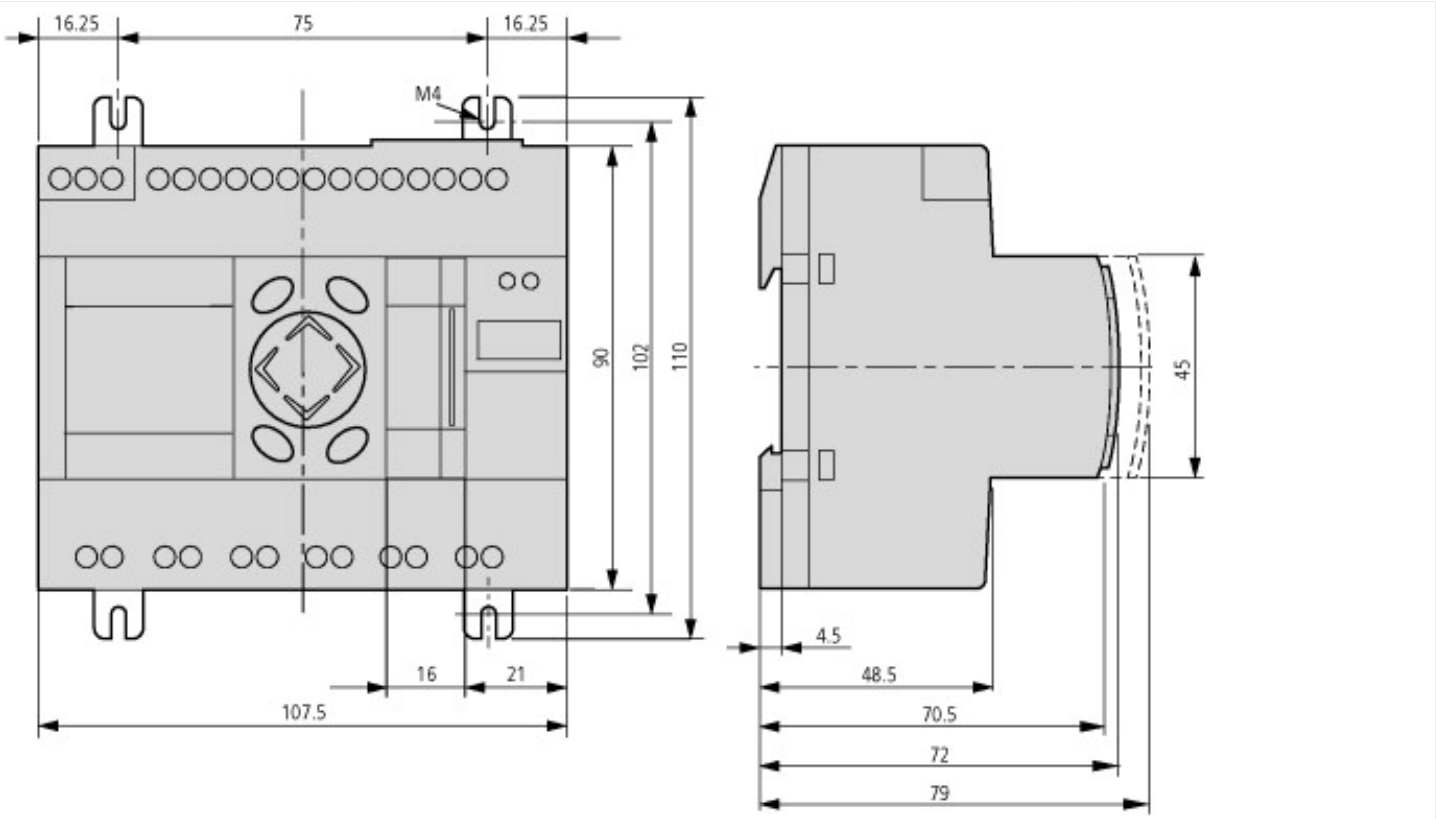
PLC's (EG000024) / PLC device set (EC002581)	
Electric engineering, automation, process control engineering / Control / Programmable logic control (SPS) / PLC device set (ecl@ss10.0.1-27-24-22-19 [BAA707013])	
Contains function building blocks	Yes
Contains basic device	Yes
Contains module rack	No
Contains power supply	Yes
Contains analogue input module	Yes
Contains analogue output module	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" IL05003003Z (AWA2724-2334)	https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL05003003Z2018_02.pdf
Instruction leaflet "power supply unit, communication module" IL05013018Z (AWA2528-2175)	
Instruction leaflet "power supply unit, communication module" IL05013018Z (AWA2528-2175)	https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL05013018Z2018_02.pdf
MN05003003Z Manual easyControl, programmable PLC EC4-200	
MN05003003Z Handbuch easyControl, SPS EC4-200 - Deutsch	https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN05003003Z_DE.pdf
MN05003003Z Manual easyControl, programmable PLC EC4-200 - English	https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN05003003Z_EN.pdf
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