

Specifications



Eaton 106397

Eaton EC4P Compact PLC, 24 V DC, 12DI(of 4AI), 6DO(R), 1AO, CAN, display

General specifications

PRODUCT NAME	Eaton EC4P Compact PLC
CATALOG NUMBER	106397
MODEL CODE	EC4P-221-MRAD1
EAN	4015081061679
PRODUCT LENGTH/DEPTH	72 mm
PRODUCT HEIGHT	90 mm
PRODUCT WIDTH	107.5 mm
PRODUCT WEIGHT	0.374 kg
CERTIFICATIONS	UL File No.: E135462 CSA File No.: 012528 CSA-C22.2 No. 0-M UL IEC/EN 61000-4-2, Level 3 UL Category Control No.: NRAQ CE CSA CSA Class No.: 2252-01 UL508 CSA-C22.2 No. 142-M
CATALOG NOTES	Expandable: Inputs/outputs and bus systems

Ambient conditions, mechanical

CONSTANT ACCELERATION	2 g, 57 - 150 Hz, according to IEC/EN 60068-2-6, Vibrations
CONSTANT AMPLITUDE	0,15 mm, 10 - 57 Hz, according to IEC/EN 60068-2-6, Vibrations
DROP AND TOPPLE	50 mm Drop height, Drop to IEC/EN 60068-2-31
HEIGHT OF FALL (IEC/EN 60068-2-32) - MAX	1 m
MOUNTING POSITION	Vertical Horizontal
SHOCK RESISTANCE	15 g, Mechanical, according to IEC/EN 60068-2-27, Half-sinusoidal shock 11 ms, 18 Impacts

Climatic environmental conditions

AIR PRESSURE	1080 hPa (operation)
AMBIENT OPERATING TEMPERATURE - MAX	55 °C
AMBIENT STORAGE TEMPERATURE - MAX	70 °C
AMBIENT OPERATING TEMPERATURE - MIN	-25 °C
AMBIENT STORAGE TEMPERATURE - MIN	-40 °C
ENVIRONMENTAL CONDITIONS	Condensation: prevent with appropriate measures Clearance in air and creepage distances according to EN 50178, UL 508, CSA C22.2, No. 142
RELATIVE HUMIDITY	5 - 95 % (non-condensing)

Communication

BUS TERMINATION	EASY-NT-R plug (incl. bus terminating resistor 120 Ω), first and last station, CANopen®
CHARACTER FORMATS	8E1, 8O1, 8N1, 8N2, 7E2, 7O2, 7N2, 7E1, PRG interface RS232, Master mode
CONNECTION TYPE	RJ45, Ethernet 2 x RJ45, 8 pole, CANopen® RJ45, PRG Interface RS232
CYCLE TIME	< 0.3 ms, for 1 k of instructions (Bit, Byte), CPU
DATA TRANSFER RATE	2.4 kBit/s, PRG interface RS232, Master mode 4.8 kBit/s, PRG interface RS232, Master mode 9.6 kBit/s, PRG interface RS232, Master mode 0.6 kBit/s, PRG interface RS232, Master mode 500 kBit/s at 25 m, CANopen® 10 MBit/s, 100 m, Ethernet
	250 kBit/s at 60 m, CANopen® 0.3 kBit/s, PRG interface RS232, Master mode 125 kBit/s at 125 m, CANopen® 1.2 kBit/s, PRG interface RS232, Master mode 50 kBit/s at 300 m, CANopen® 19.2 kBit/s, PRG interface RS232, Master mode 38.4 kBit/s, PRG interface RS232, Master mode 57.6 kBit/s, PRG interface RS232, Master mode 20 kBit/s at 700 m, CANopen® 10 kBit/s at 1000 m, CANopen®
MEMORY	4 kByte Input Memory 14 segments of 16 kByte Program memory data 4 kByte Output Memory 8 kByte Retain Memory 256 kByte Program memory code 16 kByte Marker Memory

Design verification

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.
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 RESIST. OF INSUL. MAT. TO ABNORMAL HEAT/FIRE BY INTERNAL ELECT. 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	Does not apply, since the entire switchgear needs to

NUMBER OF BYTES	190 transmission bytes (in a block)
NUMBER OF MODULES	Max. 126 (slaves)
STATION	To DS 301 V4, Control contact rated current, Mode slave, Interfaces
WRITE CYCLES OF THE RETENTIVE MEMORY	10,000,000,000 read-write cycles

COMPONENTS	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.
10.9.2 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.
EQUIPMENT HEAT DISSIPATION, CURRENT-DEPENDENT PVID	0 W
HEAT DISSIPATION CAPACITY PDISS	0 W
HEAT DISSIPATION PER POLE, CURRENT-DEPENDENT PVID	0 W
RATED OPERATIONAL CURRENT FOR SPECIFIED HEAT DISSIPATION (IN)	0 A
STATIC HEAT DISSIPATION, NON-CURRENT-DEPENDENT PVS	3.4 W

Electro magnetic compatibility

AIR DISCHARGE	8 kV
BURST IMPULSE	According to IEC/EN 61000-4-4, level 3 2 kV, Signal cable 2 kV, Supply cable
CONTACT DISCHARGE	6 kV, Electrostatic discharge (ESD)
ELECTROMAGNETIC FIELDS	10 V/m (according to IEC EN 61000-4-3)
IMMUNITY TO LINE-CONDUCTED INTERFERENCE	10 V (according to IEC/EN 61000-4-6)
RADIO INTERFERENCE CLASS	Class B (EN 55022) Class B (EN 55011)
SURGE RATING	2 kV, Supply cables, symmetrical, EASY...AC, power pulses (Surge), EMC
	0.5 kV, Supply cables, symmetrical, EASY...DC, power pulses (Surge), EMC
	According to IEC/EN 61000-4-5, power pulses (Surge), EMC

Features & functions

FEATURES	Asynchronous, cyclic, acyclic PDO types (operating modes of the slave) Overload and short-circuit protection 190 received bytes in a block (PRG interface RS232, Master mode)
FITTED WITH:	Display Analog output module Engineering software Keypad Control unit Power supply Monitor Memory unit Libraries Documentation Basic device Digital input module Communication module Other components easyNet/CANopen® on board Analog input module Digital output module Function module
FUNCTIONS	Building blocks
INSCRIPTION	Individual inscription possible with EC4-COMBINATION-*
PROCESSOR	Infineon XC161

General information

CABLE LENGTH	30 m, screened, Analog inputs 100 m, unshielded, Digital inputs 24 V DC
DEGREE OF PROTECTION	IP20
DISPLAY TEMPERATURE - MAX	55 °C
DISPLAY TEMPERATURE - MIN	0 °C
LIFESPAN, ELECTRICAL	25,000 Operations (Filament bulb load at 500 W, 115/120 V AC) 25,000 Operations (Fluorescent lamp load 10 x 58 W at 230/240 V AC, uncompensated) 25,000 Operations (Fluorescent lamp load 1 x 58 W at 230/240 V AC, conventional, compensated) 25,000 Operations (Fluorescent lamp load 10 x 58 W at 230/240 V AC, with upstream electrical device) 25,000 Operations (Filament bulb load at 1000 W, 230/240 V AC)
LIFESPAN, MECHANICAL	10,000,000 Operations (Relay outputs) 10,000,000 Operations
MOUNTING METHOD	Top-hat rail fixing (according to IEC/EN 60715, 35 mm) Screw fixing using fixing brackets ZB4-101-GF1 (accessories)
OVERVOLTAGE CATEGORY	II
POLLUTION DEGREE	2
RATED IMPULSE WITHSTAND VOLTAGE (UIMP)	Relay outputs: 6 kV (contact-coil)
RATED INSULATION VOLTAGE (UI)	250 V
RATED OPERATIONAL VOLTAGE	20.4 - 28.8 V DC 24 V DC (-15 %/+ 20 % - power supply)
RATED OPERATIONAL VOLTAGE (UE) AT AC - MAX	300 V

Input/Output

ACCURACY	± 2, (I7, I8, I11, I12) ± 0.12 V, of actual value, within a single device (Analog Inputs) 2 %, Analog outputs at -25 °C - 55 °C ± 5 s/day (± 0.5 h/year), Real-time clock, normally ± 3 %, of actual value, two devices (Analog Inputs) 1 %, Analog outputs at 25 °C
CONVERSIONS	Each CPU cycle for Analog inputs Each CPU cycle, Analog outputs
DELAY TIME	0.25 ms typ., Digital inputs 24 DC (I5 - I12), Delay time from 0 to 1 0.02 ms typ., Digital inputs 24 DC (I1 - I4), Delay time from 0 to 1
INCREMENTAL COUNTER	Counter frequency: ≤ 40 kHz Signal offset: 90° Counter inputs: I1, I2 Reference input: I3 Pulse shape: Square Value range: 32 Bit Input for reference switch: I4 Number of counter inputs: 1 (I1, I2, I3, I4)
INDICATION	LCD-display used as status indication of Digital inputs 24 V DC
INPUT	Voltage (DC)
INPUT CURRENT	3.3 mA (I9 - I10, at 24 V DC, at signal 1) 2.2 mA (I11 - I12, at 24 V DC, at signal 1) 1 mA (Analog inputs) 140 mA 3.3 mA (I1 - I6, at 24 V DC, at signal 1) 2.2 mA (I7 - I8, at 24 V DC, at signal 1)
INPUT IMPEDANCE	11.2 kΩ
INSULATION RESISTANCE	According to EN 50178
LOAD RESISTANCE	1 kΩ
MAKING/BREAKING CAPACITY	3600/360 VA (AC, at B 300) 28/28 VA (DC, at R 300)

RECOVERY TIME	100 μ s
RESOLUTION	• 0.01 V analog (Analog inputs) • 0.01 V DC analog (Analog outputs) • 0.01 V digital (Analog inputs) • 10 Bit (value 0 - 1023, Analog inputs) • 10 Bit (value 0 - 1023, digital, Analog outputs)
SHORT-CIRCUIT PROTECTION	16 A, Short-circuit-proof $\cos \phi = 0.5$ to 0.7, characteristic B16 at 900 A, Contacts, Relay outputs 16 A, Short-circuit-proof $\cos \phi = 1$, characteristic B16 at 600 A, Contacts, Relay outputs
UTILIZATION CATEGORY	B 300 Light Pilot Duty, UL/CSA Control Circuit Rating Codes AC R 300 Light Pilot Duty, UL/CSA Control Circuit Rating Codes DC

NUMBER OF INPUTS (ANALOG)	4 (I7, I8, I11, I12)
NUMBER OF INPUTS (DIGITAL)	12 (24 V DC) 4 (I7, I8, I11, I12, can also be used as analog inputs) 12 4 (can also be used as analog inputs)
NUMBER OF OUTPUTS	6 (relay outputs) 8 Transistor Outputs Relay outputs in groups of 1
NUMBER OF OUTPUTS (ANALOG)	1
OUTPUT	Voltage (DC)
OUTPUT CURRENT (MA) - MAX	100 mA
PARALLEL SWITCHING	Not permitted
RAPID COUNTER INPUTS	Cable length: ≤ 20 m (shielded) 50 kHz, Counter frequency 2 (I1, I2) at 16 Bit or 1 (I1) at 32 Bit 16/32 Bit (value range) Pulse shape: Square
RATED BREAKING CAPACITY	300000 Operations at AC-15, 250 V AC, 3 A (600 Ops./h) 200000 Operations at DC-13, 24 V DC, 1 A (500 Ops./h)
RATED OPERATIONAL VOLTAGE (UE) AT DC - MAX	300 V
RELAY OUTPUT	> 500 mA (Recommended for load: 12 V AC/DC)
SIGNAL RANGE	0 - 10 V DC, Analog inputs 0 - 10 V DC, Analog outputs
SWITCHING FREQUENCY	10 Hz, Relay outputs 0.5 Hz, Inductive load, Relay outputs 2 Hz, Resistive load/lamp load, Relay outputs
UNINTERRUPTED CURRENT	10 A AC, at 240 V AC (UL/CSA) 5 A AC, max. thermal continuous current $\cos \phi = 1$ at B 300 (UL/CSA) 1 A DC, at R 300 (UL/CSA) 8 A DC, at 24 V DC (UL/CSA)

Power supply

HEAT DISSIPATION	3.4 W
INPUT VOLTAGE	Signal 1: > 15 V DC (I1 - I6, I9 - I10, Digital inputs, 24 V DC) Signal 1: > 8 V DC (I7 - I8, I11 - I12, Digital inputs, 24 V DC) Signal 0: < 8 V DC (I7 - I8, I11 - I12, Digital inputs, 24 V DC) Signal 0: < 5 V DC (I1 - I6, I9 - I10, Digital inputs, 24 V DC)
RESIDUAL RIPPLE	≤ 5 %
SUPPLY VOLTAGE AT DC - MAX	24 VDC
VOLTAGE DIPS	According to EN 61131-2 ≤ 10 ms

Terminal capacities

SCREWDRIVER SIZE	3.5 x 0.8 mm, Terminal screw
TERMINAL CAPACITY (FLEXIBLE WITH FERRULE AWG)	22 - 12
TERMINAL CAPACITY (FLEXIBLE WITH FERRULE)	0.2/2.5 mm ²
TERMINAL CAPACITY (SOLID AWG)	22 - 12
TERMINAL CAPACITY (SOLID)	0.2/4 mm ²
TIGHTENING TORQUE	0.6 Nm

Safety

POTENTIAL ISOLATION	Basic isolation: 600 V AC (Relay outputs) Between Digital inputs 24 V DC and network easyNet, easyLink In groups (Relay outputs) Between Relay outputs and Power supply: yes Between Analog inputs and Interface/memory card: no Safe isolation according to EN 50178: 300 V AC (Relay outputs) Between Analog inputs and Outputs: yes Between Relay outputs and Inputs: yes Between Digital inputs 24 V DC and Outputs: yes
PROTECTION OF AN OUTPUT RELAY	Miniature circuit-breaker B16 or fuse 8 A (slow)
SAFE ISOLATION	300 V AC, Between coil and contact, According to EN 50178 300 V AC, Between two contacts, According to EN 50178

Resources

CATALOGUES	eaton-product-overview-for-machinery-catalogue-ca08103003zen-en-us.pdf
CHARACTERISTIC CURVE	eaton-electrical-timers-easy-control-relays-characteristic-curve.eps
DRAWINGS	eaton-modular-plc-easy-module-ec4p-compact-plc-dimensions.eps eaton-general-approval-easy-control-relays-standards.jpg eaton-general-m22-standards.eps
ECAD MODEL	ETN.EC4P-221-MRAD1
INSTALLATION INSTRUCTIONS	IL05003003Z
MANUALS AND USER GUIDES	MN05003003Z_EN
MCAD MODEL	eaton-compact-plc-mcad-drawings-easy800.dwg

[DA-CS-easy800](#)

SALES NOTES

[eaton-control-relay-easye4-flyer-fl050007en-en-us.pdf](#)

PROJECT NAME:

PROJECT NUMBER:

PREPARED BY:

DATE:



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