

Technical data sheet

LION microPLC



Identification

Type	LION-MICRO-PLC-CAN-16/8/2/1-LUE
Part No.	802201

Product version

Hardware revision	F
Software version	2.0
Datasheet version	11

Use/Application/Properties

Description	Compact logic module for use on rail vehicles. Freely programmable in a comfortable IEC 61131-3 development environment. High-performance field busses CAN, Ethernet, RS232 (RS485, RS422, possible per works settings). Local digital and analogue I/O channels.
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General (Software)

Controller	CPU ARM CORTEX M4 168 MHz 512 kB FLASH as programm Memory 32 kB integrated SRAM as vareiable memory Real-time clock (RTC) optional
Software	Real-time operating system: FreeRTOS™ Soft-SPS ProConOS Software eCLR® Programming languages as per IEC 61131-3: FBD, LD, ST, IL, SFC Programming Interface: Multiprog Express (or Multiprog V5.5 Pro) Visualisation via OPC possible
Performance	100,000 logical operations (Bool, Byte, Int, DInt) in approx. 3.3 ms 100,000 real operations in approx. 94.5 ms

General

Dimensions (w × h × d)	158.0 mm × 160.0 mm × 58.0 mm
Weight/unit	0.71 kg
Housing material	Aluminum
Mounting	DIN rail mounting

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Installation position	Installation position: any position or angle possible Installation space: top: 5 mm (for assembly) bottom: 5 mm (for assembly) side: 0 mm
Installation place	1: closed electrical operating areas 2: driver's cabin and passenger area

Bus interface

Bus system	CAN2.0
Module type	Generic
Connection	X3: SUB-D socket connector, 9-pole, M3 thread
Bus system	Ethernet
Module type	Generic, TCP/IP and UDP/IP communication (server or client)
Connection	X6: M12 jack 4-pin D coded
Bus system	RS232 (RS485, RS422 can be configured ex works)
Module type	Generic
Connection	X4: SUB-D plug connector, 9-pin, M3 thread

Supply module electronic

Rated voltage U_N	DC 24 V
Voltage range, incl. ripple	DC 16.8 – 30 V
Ripple	Max. 10 %
Rated current (at U_N)	90 mA
Connection	X1: Terminal 5-pin Spring terminal: 0.2 – 2.5 mm ² , AWG 24 – 12 Stripping length: 10 mm Screwdriver: 3.5 × 0.6 mm
Protection device	Polarity reversal protection

Diagnostics

Diagnosis indications	Control program in the status RUN LED green Control program in the status STOP LED yellow Control program in the status FEHLER LED red Logic supplyg 3,3 V OK LED green 2 LED freely programmable LED green/yellow CAN status/error – LED green/red Ethernet Act/Link – LED yellow/green Digital-input signal status (16×) LED yellow Digital-output signal status (8×) LED yellow Digital-output power status LED green
Diagnosis Interface	USB No function X5: USB female connector Type-A female connector Ethernet can also be used for data communicationand as a programming, download and debugging interface or for OPC visualization X6: M12 jack 4-pin D coded

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Input (digital)

Number	16 (1 potential)
Input voltage	DC 24 V
Input current	"1" signal at DC 24 V: 3 mA min. 2 mA / max. 15 mA
Signal characteristic curve	"0" Signal: DC 3 V ... 5 V "1" Signal: DC 11 V ... 30 V
Connection	X7 and X8: 2 Terminal clamps 10-pole Spring terminal: max. 1.5 mm ² , AWG 26-16 Screwdriver: 3.0 × 0.5 mm

Inputs (analog)

Number	2
Measuring input	DC 0 ... +10 V
Resolution	12 Bit, 1 LSB = DC 3.00 mV
Accuracy	± 0.5 %
Input voltage	max. DC ±13 V
Protective measure	Overvoltage protection
Connection	X9: Terminal clamp 6-pole Spring terminal: max. 1.5 mm ² , AWG 26-16 Screwdriver: 3.0 × 0.5 mm

Output (digital)

Number	8 (1 Potential)
Output voltage	DC 24 V (16,8 ... 30 V)
Output current	0.5 A at 100 % duty cycle of all channels
Channel type	High-side switching
Protective measure	Reverse voltage protected, short circuit protected
Leak current	max. 5 µA
Connection	X2: Terminal clamp 10-pole Spring terminal: max. 1.5 mm ² , AWG 26-16 Screwdriver: 3.0 × 0.5 mm

Output (analog)

Number	1
Output signal	DC 0 ... +10 V
Output current	max. 2 mA
Resolution	12-bit
Accuracy	± 0.5%
Connection	X9: Terminal clamp 6-pole Spring terminal: max. 1.5 mm ² , AWG 26-16 Screwdriver: 3.0 × 0.5 mm

Environmental service conditions

Altitude	2000 m
Operating temperature class	OT4: -40 °C ... +70 °C

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Switch-on extended Operating temperature class	ST1: OT4 + 15 °C
Temperature variation class	H1:no requirements
Shock/Vibration	Category 1, class B
Class of supply voltage interruption	S2: 10 ms
Supply change-over class	C1: 100 ms @ 0.6 × U _N
Useful life class	L4: 20 years
Degree of pollution	PD2
Over voltage category	OV2
Socket and edge connector	K1: component with plugged micro SD memory card
Protective coating class	PC2: lacquered on both sides
Degree of protection	IP20

Electrical isolation

Potential groups	See diagram "Potential groups"
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Storage temperature range	-40 °C ... +85 °C
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PE connection

PE Connection	X0: Screw M4
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Failure Rate Prediction (MTBF)

Standards	Electronic components – Reliability – Reference conditions for failure rates and stress models for conversion: EN/IEC 61709 Failure Rates of Components – Expected values: SN 29500
Failure rate at +45 °C	4913 fit
Failure rate at +45 °C	203531 h
	1 fit equals one failure per 10 ⁹ component hours
	The indicated temperature is the mean component ambient temperature.
Comments	The results are valid under following conditions: Automotive environment or industrial areas without extreme dust levels and harmful substances Continuous operation 8760 h per year

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Standards/Certifications

Standards

EN 50155:2007: Railway applications – Rolling stock – Electronic equipment
EN 50155:2021: Railway applications – Rolling stock – Electronic equipment – only testing according to chapter 13.3
Withstand voltage test: routine test with 1 s test duration
EN 50121-3-2:2016: Railway applications – Electromagnetic compatibility – Part 3-2: Rolling stock – Apparatus
EN 50124-1:2017: Railway applications – Insulation coordination – Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment
EN 61373:1999: Railway applications – Rolling stock equipment – Shock and vibration tests
EN 61373:2010: Railway applications – Rolling stock equipment – Shock and vibration tests
Regulation No. EMC 06: Technical Rules on Electromagnetic Compatibility - Verification of radio compatibility of rail vehicles with railroad radio services
EN 45545-2:2020: Railway applications – Fire protection on railway vehicles – Part 2: Requirements for fire behaviour of materials and components

Equipment/Spare parts

Accessories

Included in the delivery:

I/O Terminal clamp set (X1), 5-polig with coding elements, part number 800208

I/O Terminal clamp set (X2, X7, X8, X9), part number 800213 consisting of: 1 × terminal clamp, 10-pin, printing 0°, RM3,5 (X2), 2 × terminal clamp, 10-pin, printing 180°, RM3,5 (X7/X8), 1 × terminal clamp, 6-pin, printing 180°, RM3,5 (X9)

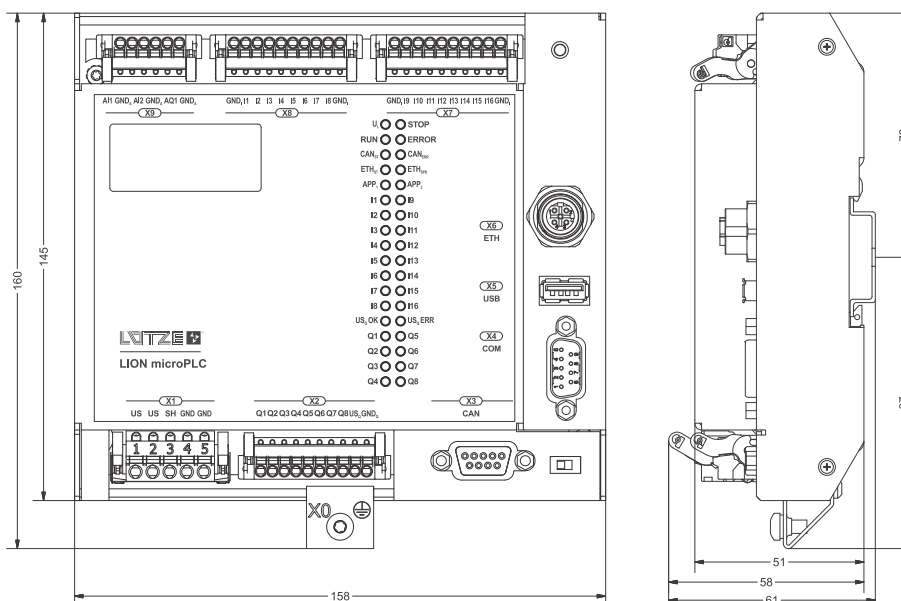
Not included in the delivery:

Ethernet programming cable 1 m, part number 192013.0100

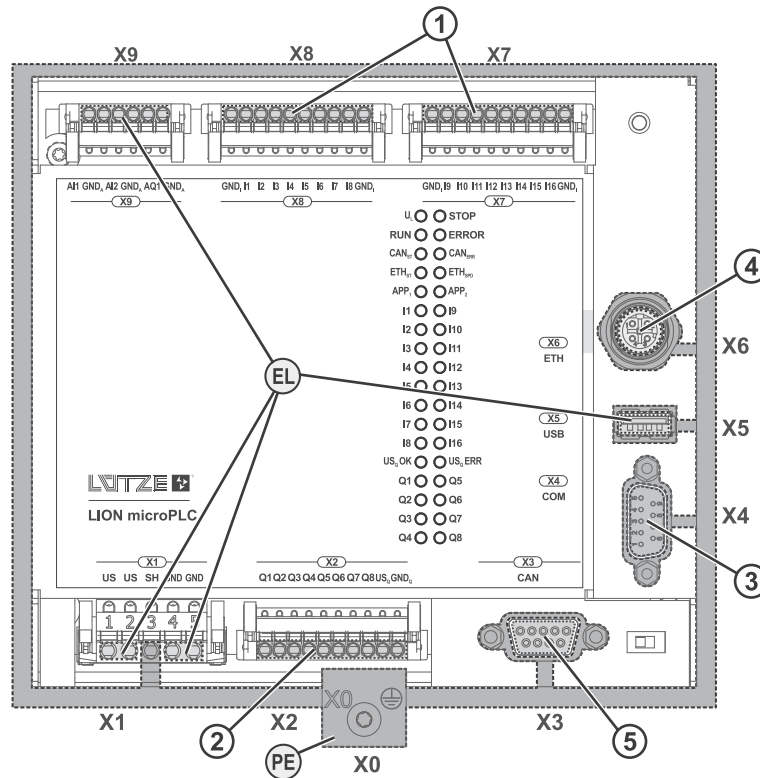
Ethernet programming cable 2 m, part number 192013.0200

Ethernet programming cable 5 m, part number 192013.0500

Dimensions



Potential groups



- | | | | |
|---|--|--|--|
| <p>1.
 DE Potentialgruppen
 EN Potential groups
 FR Groupes de potentiel</p> <p>(PE): PE (X0), SH (1.3), HOUSING,
 Potential PE</p> <p>(EL): SUPPLY, CPU, USB, ANALOG
 INPUTS/ OUTPUTS (X1, X5, X9),
 ELECTRONIC, Potential EL</p> <p>(1): DIGITAL INPUTS (X7, X8)
 Potential C</p> <p>(2): DIGITAL OUTPUTS (X2)
 Potential D</p> <p>(3): RS232, RS422, RS485 (X4)
 Potential E</p> <p>(4): ETHERNET (X6)
 Potential F</p> <p>(5): CAN (X3)
 Potential G</p> | <p>2.
 DE Kapazitive Kopplung
 EN Capacitive coupling
 FR Couplage capacitif</p> <p>ca. 28.2 nF: (PE) ⇔ (EL)
 ca. 9.4 nF: (PE) ⇔ (1)
 ca. 20 nF: (PE) ⇔ (2)
 ca. 4.7 nF: (PE) ⇔ (4)
 ca. 0.47 nF: (EL) ⇔ (3)
 ca. 0.47 nF: (EL) ⇔ (5)</p> | <p>3.
 DE Trennungsspannung/
 EN Isolating voltage/
 FR Tension d'isolement</p> <p>3.1
 Basisisolation/
 Basic insulation/
 Isolation de base</p> <p>AC 500 V:
 (PE) ⇔ (EL)+(1)+(3)+(4)+(5)
 (EL) ⇔ (PE)+(1)+(2)
 (1) ⇔ (PE)+(EL)+(2)+(3)+(4)+(5)
 (2) ⇔ (EL)+(1)+(3)+(4)+(5)
 (3) ⇔ (PE)+(1)+(2)
 (4) ⇔ (PE)+(1)+(2)
 (5) ⇔ (PE)+(1)+(2)</p> | <p>3.2
 Verstärkte Isolation/
 Reinforced insulation/
 Isolation renforcée</p> <p>—</p> <p>3.3
 Funktionsisolation/
 Function insulation/
 Fonction isolation</p> <p>AC 500 V:
 (PE) ⇔ (2)
 (EL) ⇔ (3)+(4)+(5)
 (3) ⇔ (EL)+(4)+(5)
 (4) ⇔ (EL)+(3)+(5)
 (5) ⇔ (EL)+(3)+(4)</p> |
|---|--|--|--|