

Description

The **PowerPlex®** Power Module has primarily been designed for DC 12 V and DC 24 V on-board electrical systems of leisure boats and work boats. It provides inputs for switches and sensors as well as power outputs. The patented Four Level Protection Concept (FLPC) offers redundant overload protection. In addition the E-T-A circuit breakers integrated in the Power Modules allow manual activation of the 8 A and 25 A outputs.

PowerPlex® is a decentralised power distribution and control system. All **PowerPlex®** modules ensure reliable control and monitoring of the electrical installations on board, either alone or in combination with other **PowerPlex®** components. Besides the protection against overcurrent they allow readout of data of the connected level sensors and temperature sensors as well as of shunts.

All modules of a system communicate and interact via an SAE-J1939-compliant CAN bus. **PowerPlex®** is configured by using the **PowerPlex®** Configuration Software and the configuration is transferred to the modules by means of USB/CAN converters.

US patent number: US 7,633,022 B2

Typical applications

- watercraft, e. g. recreational and work boats
- special vehicles

Features and Benefits

- well-proven CAN technology
- redundant protection - Four Level Protection Concept (FLPC)
- programmable overload protection
- simple configuration
- Windows based configuration software
- integral diagnostic and monitoring functions
- wire break detection
- inputs for analogue sensors
- dimming function

Order number

PP-M-DC024-000-0-0-00

Approvals

Authority	Norm	Voltage ratings
GL	Rules VI, part 7, GL 2012, category C, H, EMC1	DC 12 V DC 24 V
Lloyd's Register	Spec No 1, cat. ENV1, ENV2, ENV3	DC 12 V DC 24 V



Technical data

Voltage rating U_N	DC 12 V / DC 24 V
Operating voltage U_B	9...32 V DC
Current consumption	typically 60 mA at DC 12 V typically 50 mA at DC 24 V
Max. total current per module	102 A
Degree of protection	IP22 in a vertical mounting position with the main power connectors downwards
Operating temperature range	-40...+85 °C (-40...+185 °F)
Storage temperature range	-40...+85 °C (-40...+185 °F)
Humid heat (IEC 60068-2-30, Db)	55 °C / 95 % RH, 24 hours
Vibration sinusoidal (IEC 60068-2-6, Fc)	2 Hz to 13.2 Hz: ± 1 mm 13.2 Hz to 100 Hz: acceleration 0.7 g
Shock (IEC 60068-2-27, Ea)	30 g (11 ms)
EMC	CE marking to EN 61000-6-2, EN 61000-6-3
Mass	approx. 1.630 g
Interfaces:	
CAN according to	SAE J1939 250kBit/s
The CAN-terminals at each end of the bus require a termination by a 120 Ω resistor.	
Inputs	
8 inputs for switches or momentary switches	
digital inputs:	0... 100 Ω : ON; > 200 Ω : OFF
4 analogue inputs	0...10 V
analogue input:	R_{in} : 40 k Ω ; resolution: 10 bit
Outputs	
6 outputs with 8 A max. continuous current	
load output:	Power MOSFET, high side switching
max. current rating:	8 A adjustable from 1 A to 8 A in 1 A steps dimmmable in 10 steps with 100 Hz PWM
typical voltage drop U_{ON} at rated current (at 25 °C):	60 mV
overload tripping range:	1.01...1.30 x I_N
trip time:	adjustable from 100 msec to 6 s
current limitation:	typically 60 A at DC 24 V
leakage current in OFF condition:	4 μ A
wire breakage monitoring in ON and OFF condition of load:	wire breakage thresholds: OFF condition: R_{Load} typically > 5 k Ω ON condition: I_{Load} typically < 200 mA
additional overload protection by means of one E-T-A circuit breaker type 1610-21-10 A per output	

Compliant with IEC 60533 Electrical and electronic installations in Ships – Electromagnetic compatibility

Technical data

2 outputs with 25 A max. continuous current
 load output: Power MOSFET, high side switching
 max. current rating: 25 A
 adjustable from 10 A to 25 A in 2 A steps
 dimmable in 10 steps with 100 Hz PWM

typical voltage drop U_{ON}
 at rated current (at 25 °C): 60 mV
 overload tripping range: $1.01...1.30 \times I_N$
 trip time: adjustable from 100 msec to 6 s
 current limitation: typically 270 A at DC 24 V
 leakage current in OFF condition: 20 µA

wire breakage monitoring in ON and OFF condition of load:
 wire breakage thresholds:
 OFF condition: R_{Load} typically > 5 kΩ
 ON condition: I_{Load} typically < 500 mA
 additional overload protection by means of one E-T-A circuit breaker type 1610-21-30 A per output

4 outputs with max. 1 A continuous current
 load output: Power MOSFET, high side switching
 max. current rating: 1 A
 load output 11 & 12 dimmable in 80 steps with 488 Hz PWM

typical voltage drop U_{ON}
 at rated current (at 25 °C): 70 mV
 overload tripping range: $\geq 4 A$
 trip time: typically 2 ms at 10 A
 current limitation: typically 10 A at DC 24 V
 leakage current in OFF condition: 2 µA
 self-resetting

8 status outputs with integral LED driver, 150 Ω / 5 V

Status indications

There are two LEDs on the top side of each module indicating module and system status.

Name	Indication	Meaning
Power	green	flashing frequency refer to manual
Bus	yellow	flashing frequency refer to manual

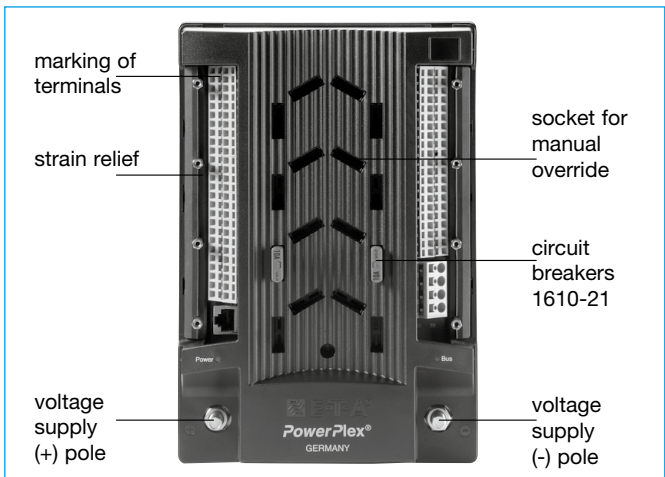
Signal output

Configurable Signal Outputs:
 8 status indicators (LEDs) can be configured to show the status of the load outputs

User	Status LED	
Status indication	load OFF	LED off
	load ON	LED on
	fault, short circuit/overcurrent	flashing quickly
	fault, wire break	flashing slowly

Note:
 Refer to installation manual for installation and safety instructions

Pin assignment



Left side	Bottom	Top	screwless terminals for 1.5 mm²
8 signal outputs, with a return each (L1-L8)	L1 LR L2 LR L3 LR	S1 SR S2 SR S3 SR	
8 inputs, with a return each (S1-S8)	LR L4 LR L5 LR L6 LR L7 LR L8 LR	SR S4 SR S5 SR S6 SR S7 SR S8 SR	
4 analogue inputs, with a return each	A1 AR A2 AR	A3 AR A4 AR	
not used	GND	TX RX	
parallel CAN bus terminals	CL CH CS	CL CH CS	

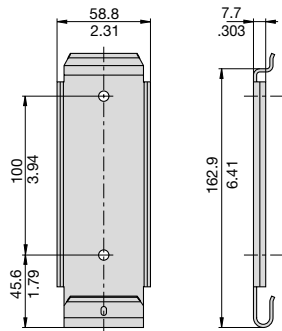
Right side	Top	Bottom	for 1.5 mm²
4 load outputs 1 A, with a return each	13 1R 14 1R	11 1R 12 1R	
6 load outputs 8 A, with a return each		81 8R 82 8R 83 8R 84 8R 85 8R 86 8R	screwless terminals for 4 mm²
2 load outputs 25 A, with a return each		251 25R 252 25R	

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Dimensions – Version 1

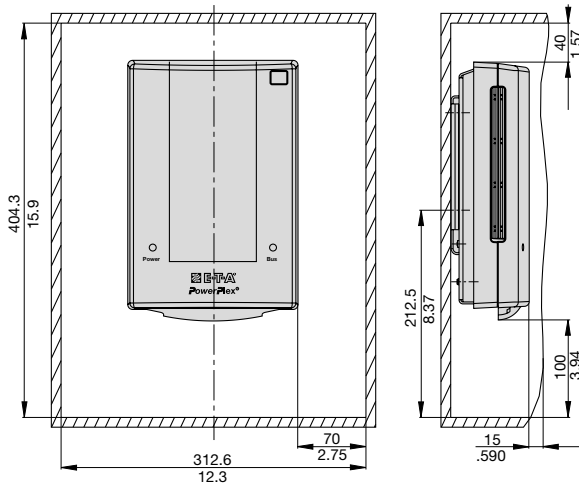
Mounting

mounting bracket 1 (included in delivery)

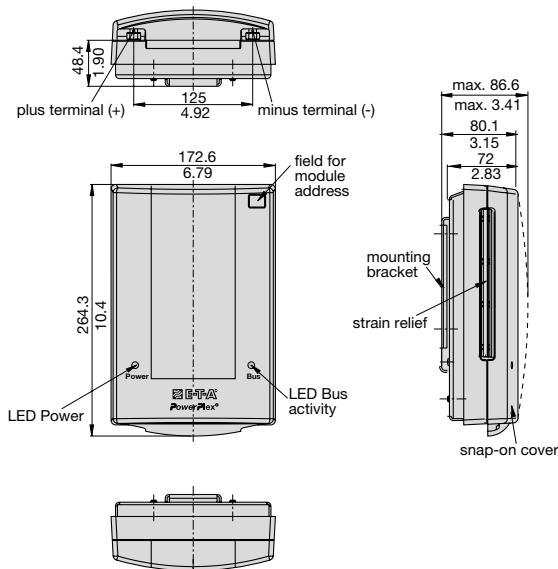


The module is designed for wall mounting by means of the fittings provided

Installation drawings



Dimensions

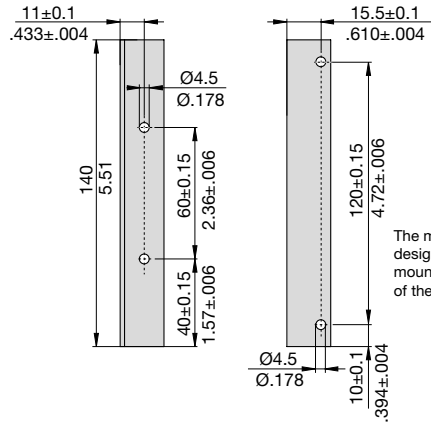


This is a metric design and millimeter dimensions take precedence. Applicable for normal dimensions without direct tolerance indication: DIN ISO 286 ± IT 13. Refer to user manual for installation and safety instructions.

Dimensions – Version 2

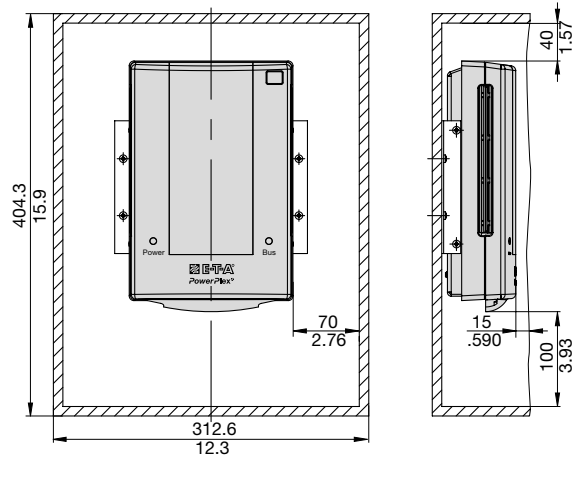
Mounting

mounting bracket 2 (not included in delivery, see accessories)

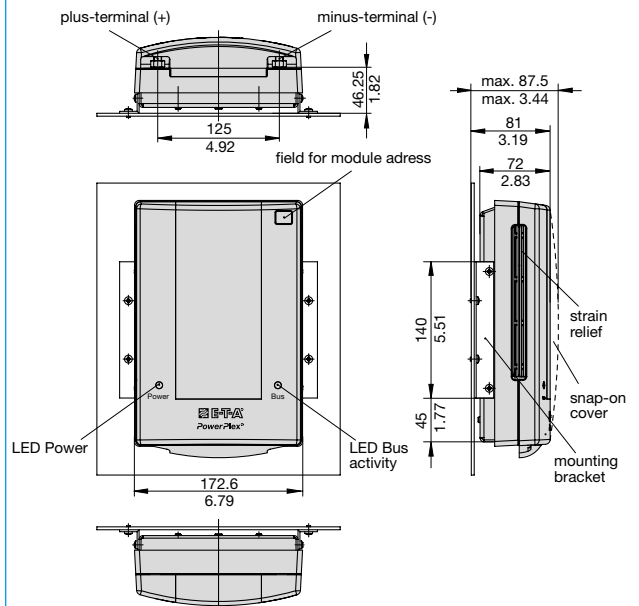


The module is designed for wall mounting by means of the fittings provided

Installation drawings

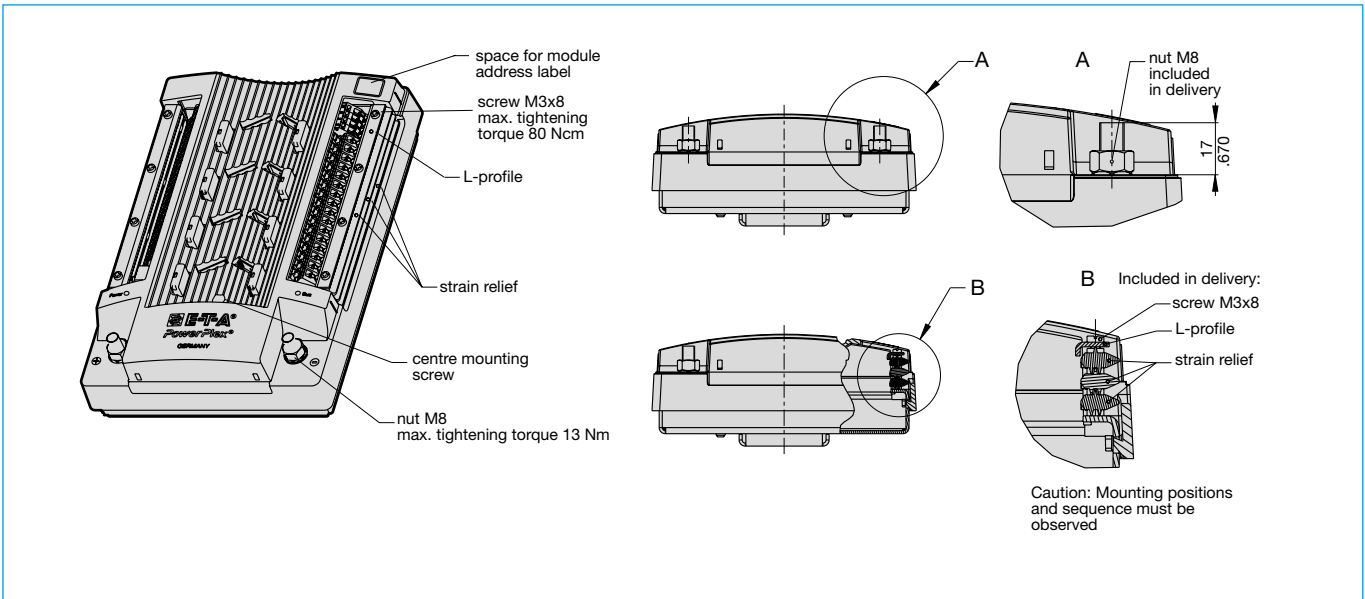


Dimensions



This is a metric design and millimeter dimensions take precedence. Applicable for normal dimensions without direct tolerance indication: DIN ISO 286 ± IT 13. Refer to user manual for installation and safety instructions.

Overview (without snap-on cover)



Accessories

USB/CAN converter: X PP-USBC0
X PP-USBC1 (opto-decoupled)

Pin assignment D-SUB output plug

PIN	assignment
2	CAN-L
7	CAN-H

This is a metric design and millimeter dimensions take precedence. Applicable for nominal dimensions without direct tolerance indication: DIN ISO 286 ± IT 13. Refer to product datasheet for installation and safety instructions.

PowerPlex® Configuration Software

Mounting bracket 2:
Y 310 292 01

Circuit breakers for replacement 1610-21:
1610-21-10 A
1610-21-30 A