

## 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
- Galvanical isolation of the CAN interface
- 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
- Freewheeling diodes for each load output

## Order number

PP-M-PM500-000-0-0-00

## Approvals

Authority	Norm	Voltage ratings
GL	pending	DC 12 V DC 24 V
Lloyd's Register	pending	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 85 mA at 12 V typically 60 mA at 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: $\pm 1$ 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
<b>Interfaces:</b>	
CAN according to	SAE J1939 250kBit/s galvanically isolated
The CAN-terminals at each end of the bus require a termination by a 120 $\Omega$ resistor.	
<b>Inputs</b>	
8 inputs for switches or momentary switches	
digital inputs:	0... 100 $\Omega$ : ON; > 200 $\Omega$ : OFF
4 analogue inputs	0...10 V
analogue input:	$R_{in}$ : 40 k $\Omega$ ; resolution: 10 bit
<b>Outputs</b>	
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 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 60 A at DC 24 V
leakage current in OFF condition:	4 $\mu$ A
wire breakage monitoring in ON and OFF condition of load:	wire breakage thresholds: OFF condition: $R_{Load}$ typically > 5 k $\Omega$ 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	

**Technical data**

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

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 x  $I_N$

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  
 dimmable in 240 steps with 488 Hz  
 PWM

typical voltage drop  $U_{ON}$   
 at rated current (at 25 °C): 70 mV

overload tripping range: ≥ 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

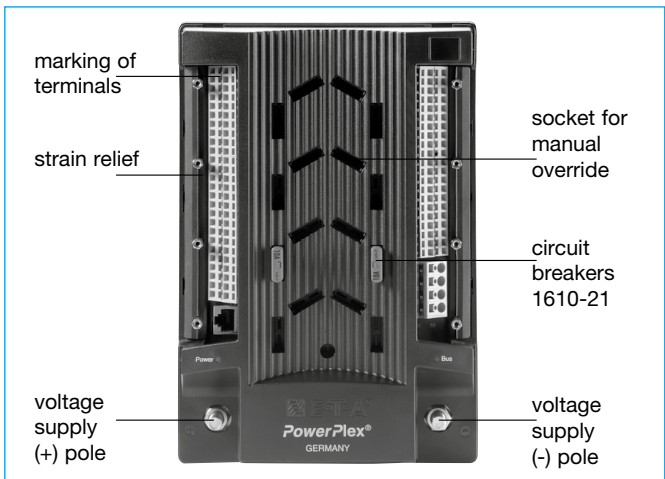
**Signal output**

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 AR	A3 AR A4 AR AR	
not used	GND	TX RX	
parallel CAN bus terminals, galvanically isolated	CL CH CS	CL CH CS	

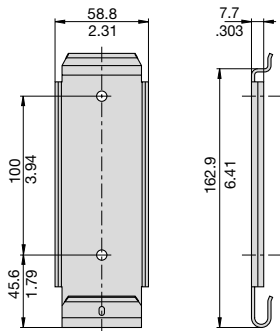
Right side	Top	Bottom	for 1.5 mm²
4 load outputs 1 A, with a return each	13 1R 14 1R	11 1R 12 1R	
6 load outputs 8 A, with a return each		81 8R 82 8R 83 8R 84 8R 85 8R 86 8R	screwless terminals for 4 mm²
2 load outputs 25 A, with a return each		251 25R 252 25R	

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**Dimensions – Version 1**

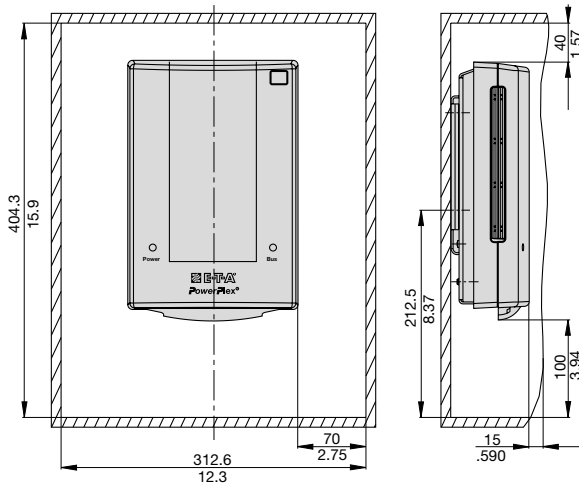
**Mounting**

mounting bracket 1 (included in delivery)

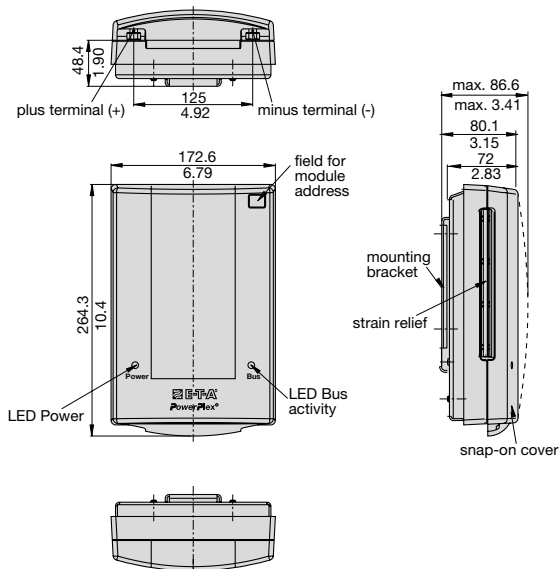


The module is designed for wall mounting by means of the fittings provided

**Installation drawings**



**Dimensions**

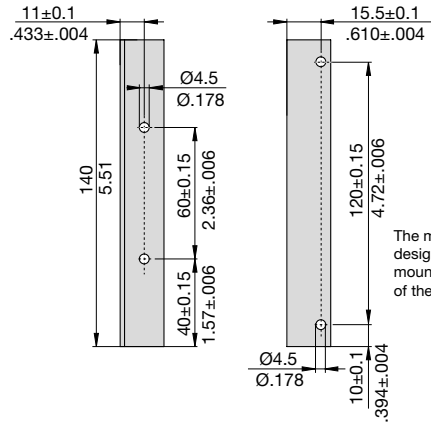


This is a metric design and millimeter dimensions take precedence. Applicable for normal dimensions without direct tolerance indication: DIN ISO 286 ± IT 13. Refer to user manual for installation and safety instructions.

**Dimensions – Version 2**

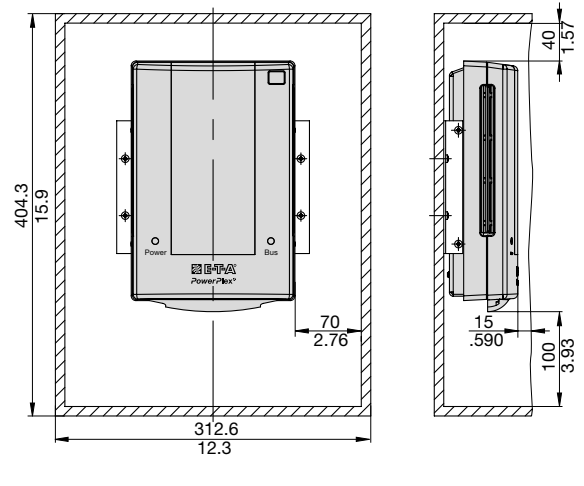
**Mounting**

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

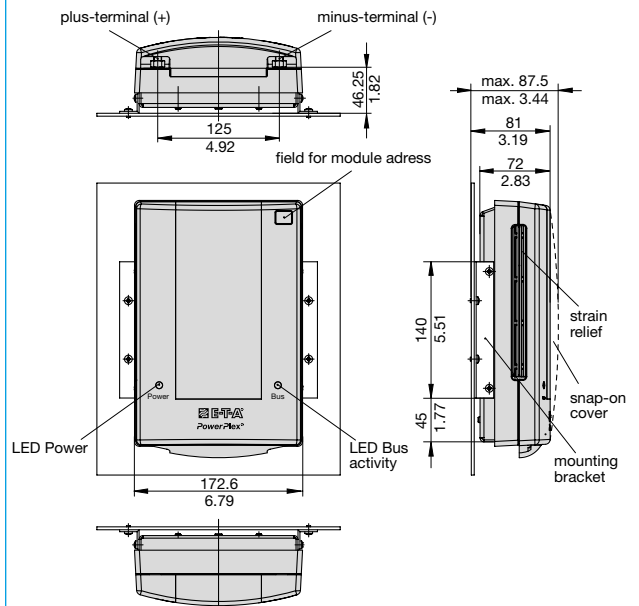


The module is designed for wall mounting by means of the fittings provided

**Installation drawings**

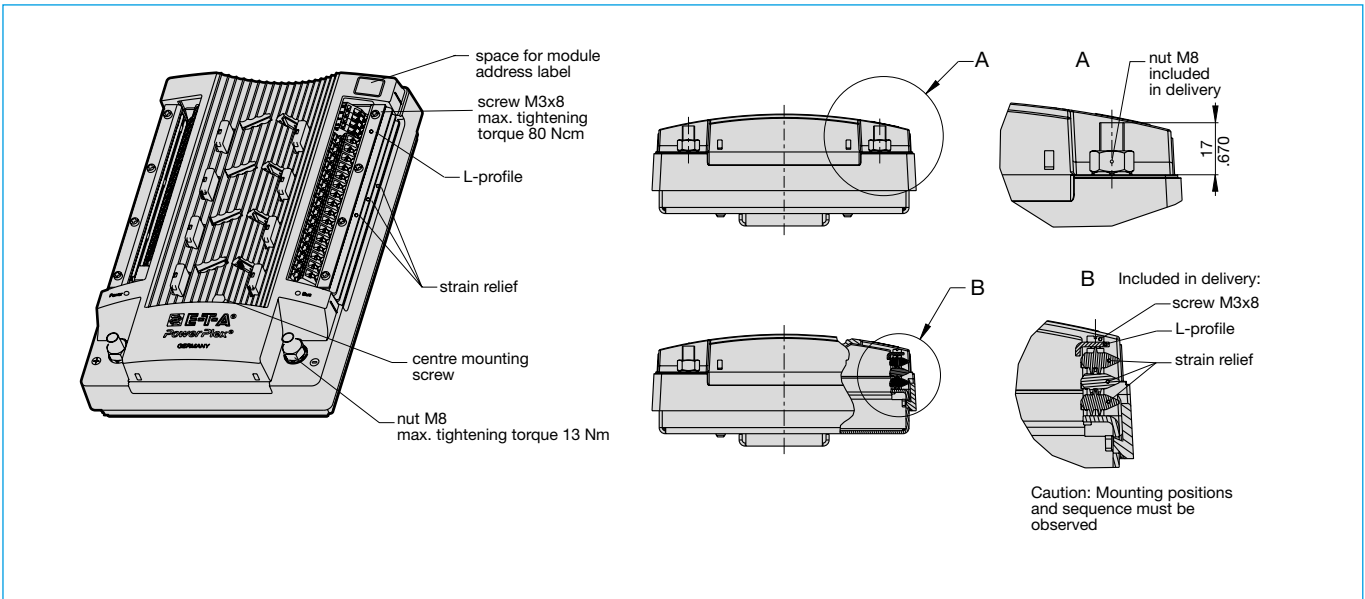


**Dimensions**



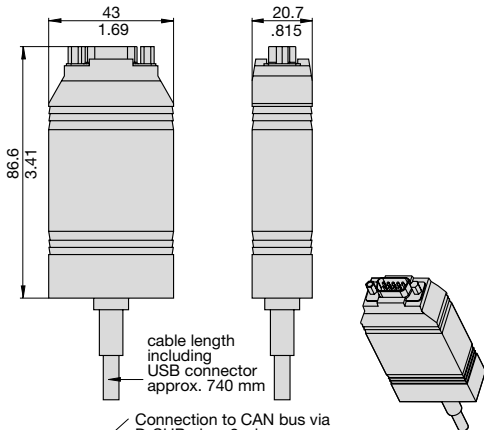
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**Overview (without snap-on cover)**



**Accessories**

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



Connection to CAN bus via D-SUB plug, 9-pin

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