



# Powerstart 500 B

- Innovative in energy storage & Power Electronics
- Custom-made solutions
- Complete solution: storage & Power Electronics
- Design and system integration



## Features

- Cold temperature performance
- Improves starting performance
- Low internal resistance, high peak current
- Long life cycle
- Integrated DC/DC converter
- Integrated individual cell balancing
- Compact, rugged, fully enclosed and IP65
- Extension battery life, downsizing battery
- Built in overvoltage switch
- Approved for heavy-duty vehicles shock and vibration norms

## Applications

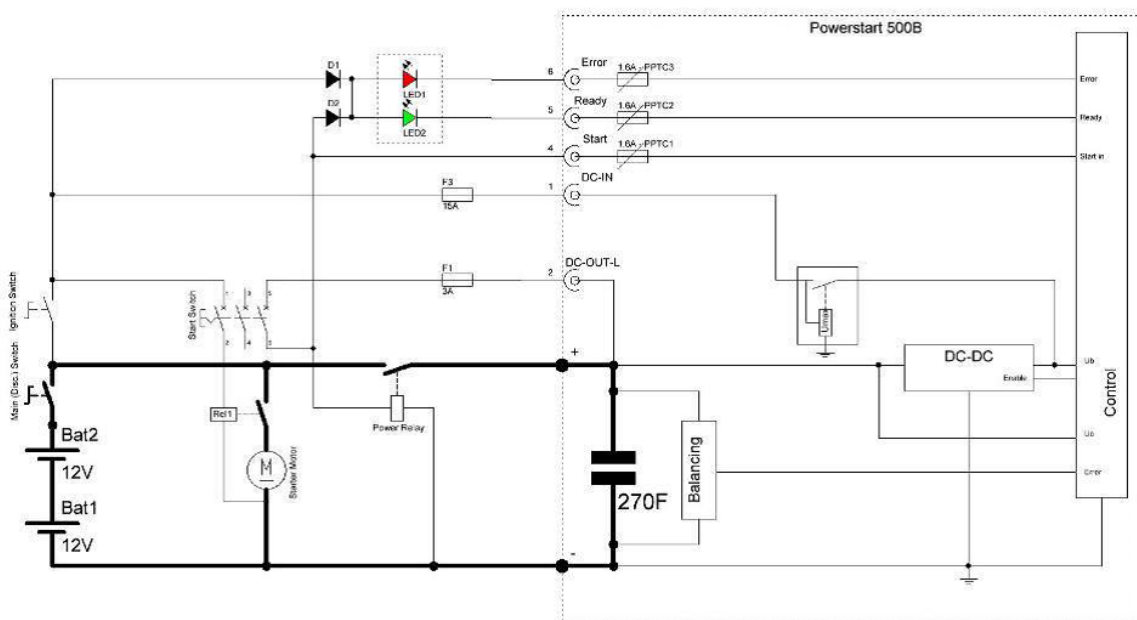
- Diesel engine cranking & board net stabilization
  - (cold climate) transportation
  - Automotive
  - Marine
  - Industrial
  - Railway

## Mechanical Data

Length x Width x Height  
 459 x 259 x 182 mm  
 Approx. 11 kg

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## Overview



This block diagram is showing a typical (parallel) configuration. Configuration may vary per application. A dedicated start configuration is also possible.

## Global Specifications

Symbol	Parameter	Min.	Typ.	Max.	Units	Comment
$T_A$	Ambient air temperature	-40	-	+60 <sup>1</sup>	°C	-
P	Peak power	-	-	50	kW	-
CCA	Max. cold crank amp.	-	-	2000	A <sub>rms</sub>	Power+ t < 1
$U_{nom}$	Rated voltage	-	27.5	-	V DC	Power+ / DC-OUT-L
$U_{TR}$	Transient peak voltage	-	-	150	V DC	Exponentially decreasing to 28V within 4 s
C	Capacity	-	270	-	F	(=100kJ @ 27.5V DC)
$I_L$	Leakage current	-	13.2	-	mA	Per cell including balancing
	Cycle life	1.000.000	-	-	Cycles	-
	Lifetime	-	10	15	Years	-
$I_{CAP}$	Charge current	0.15	-	10 <sup>2</sup>	A <sub>rms</sub>	DC-IN

<sup>1</sup> up to 50°C three recharges 18V to 27V possible. If  $T \geq 60^\circ\text{C}$  charge locked. A temperature over 65°C is critical!

<sup>2</sup> Reducing by temperature over 45°C permitted. Short transients  $t < 2$  s are allowed.



## Power inputs / outputs

I / O	Parameter	Min.	Typ.	Max.	Units	Comment
DC-IN	Input voltage	17	24	35	V <sub>DC</sub>	Transients see section "Global specifications"
	Input current	0.1 <sup>1</sup>	-	10 <sup>1</sup>	A <sub>RMS</sub>	Short transients t < 2 s are possible
DC-OUT-L	Output voltage	-	U <sub>Power+</sub>	-	V	Identical to cap voltages. Charge switch off voltage
	Output current	-	-	15	A	Limited by cable
Power + <sup>2</sup>	Output voltage	-	U <sub>Cap</sub>	-	V	Identical to cap voltages. Charge switch off voltage
Power - <sup>2</sup>	Output current	-	-	2000	A	T < 5 s

<sup>1</sup> I<sub>DC-IN</sub> by CAP voltage (power+ or DC-OUT-L) with about 1 A per 1 V CAP voltage.

<sup>2</sup> Maximum tightening forces 10 ... 15 Nm. Fix lower Nut by removing!

## Signal inputs / outputs

Signal	Direction Converter	Condition / Parameter	Definition
Start <sup>1,2</sup>	Input	Input voltage during start	18...35 V <sup>DC</sup>
		Input voltage without start	Open / U < 5V
		Input current	I < 10mA @ 24 V <sup>DC</sup>
Ready (for Start)	Output <b>Make contact</b> Connected to GND	Ready if: U <sub>Cap</sub> ≥ 24V <b>and</b> DC-IN > 18V	Contact connecting to GND
		Not ready if: U <sub>Cap</sub> ≤ 23V <b>or</b> DC-IN < 18V	Contact open (I < 5 mA @ U ≤ 30 V)
		Max input current to GND	1A / 0,5A recommended
Warning / Error	Output <b>Break contact</b> Connected to GND	Fault condition <sup>3</sup>	Contact connecting to GND (without DC-IN also!)
		Normal condition <sup>4</sup>	Contact open (I < 5 mA @ U ≤ 30 V)
		Max. input current to GND	1A / 0,5A recommended

<sup>1</sup> The start signal must be connected at all times to protect the internal DC converter!

<sup>2</sup> Switch start signal to Power+ or DC-OUT-L, never to another potential!

<sup>3</sup> Fault conditions: U<sub>DC-IN</sub> < 17 V / U<sub>DC-IN</sub> > 35 V / T ≥ 60 °C / cell voltage > 2.65V / cell temperature > 65 °C / error

<sup>4</sup> The first three seconds after power on (DC-IN) is the error light on. It is an error test signal.




## External plugs and fuses

Name	No.	Construction	Color	Width	Length	Direction for ACB	Fuse at vehicle
DC-IN	1	Cable	Black	2.5 mm <sup>2</sup>	0.4 m	Input	15 A
DC OUT-L	2		Brown	1.5 mm <sup>2</sup>		Output	I ≤ 15 A
	3						
Start	4		Grey	1.0 mm <sup>2</sup>		Input / Output	Recommended: 1 A Maximum: 3 A
Ready for start	5		Blue			Output	
Error	6		Orange			Output	
Power + (cap)	+	Female thread M12	-	-	30 mm	Output	-
Power - (cap)	-	Female thread M10	-	-	30 mm	GND	-

Note: Fuse at cable 2 must be installed near the module (attention: CAP potential, high short circuit current)!

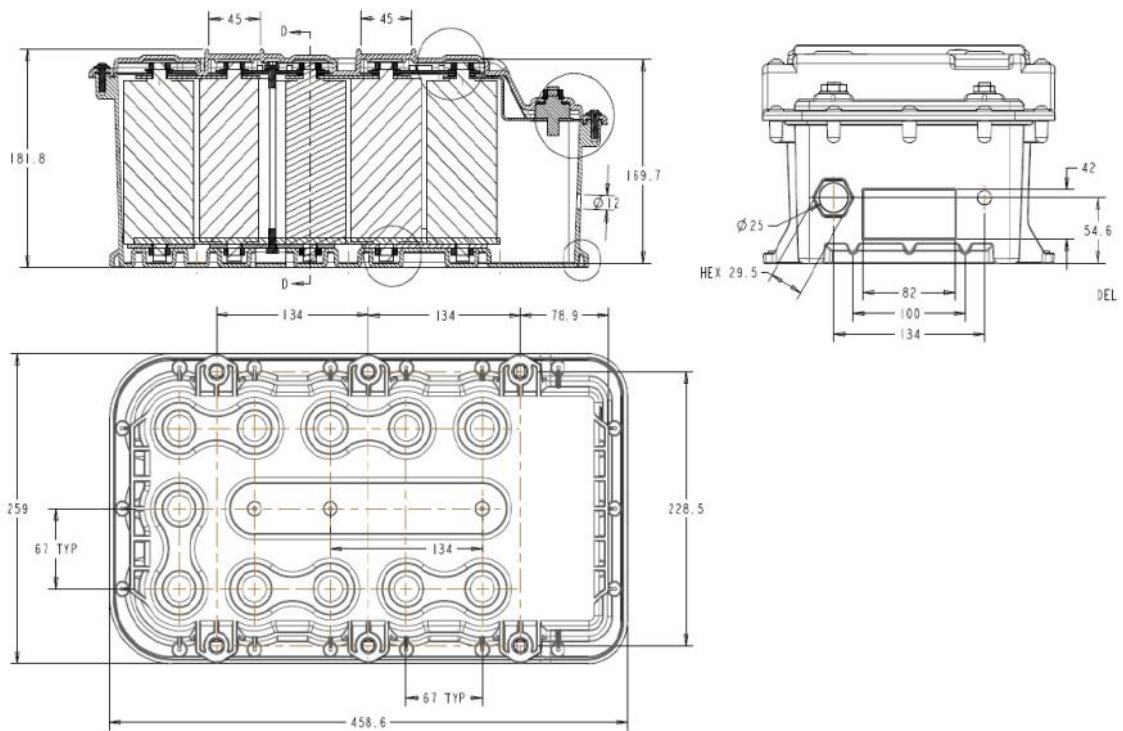
## Deutsch Connectors

Connector:	PIN	Deutsch
DC-IN	1	
DC OUT-L	2	
Start	4	
Ready for start	5	
Error	6	

Connector:		Quantity	Module side Plug Part No. Pin Part No.	Quantity	Vehicle side Plug Part No. Socket Part No.
Deutsch		1	DTHD04-1-12PA	1	DTHD06-1-12S
		1	0460-202-16141	1	0462-203-12141
Deutsch		1	DT04-6P-CE02	1	DT06-6S
		4	0460-204-12141	4	0462-201-16141
		1	W6P	1	W6S

## Mechanical data

Length x Width x Height: 459 x 259 x 182 mm or 18 x 10 x 7 inch  
 Weight: Approx. 11 kg or 24 lbs  
 Enclosure: IP65



## Certifying Tests

Description / Conditions	
J1455 AUG2012	Shock and Vibration according to recommended environmental practices for Electronic Equipment Design in Heavy-Duty Vehicle Applications
72/245/EEC	Radio interference (electromagnetic compatibility) of vehicles