



Powerstart 500 HC

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



Features

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

Mechanical Data

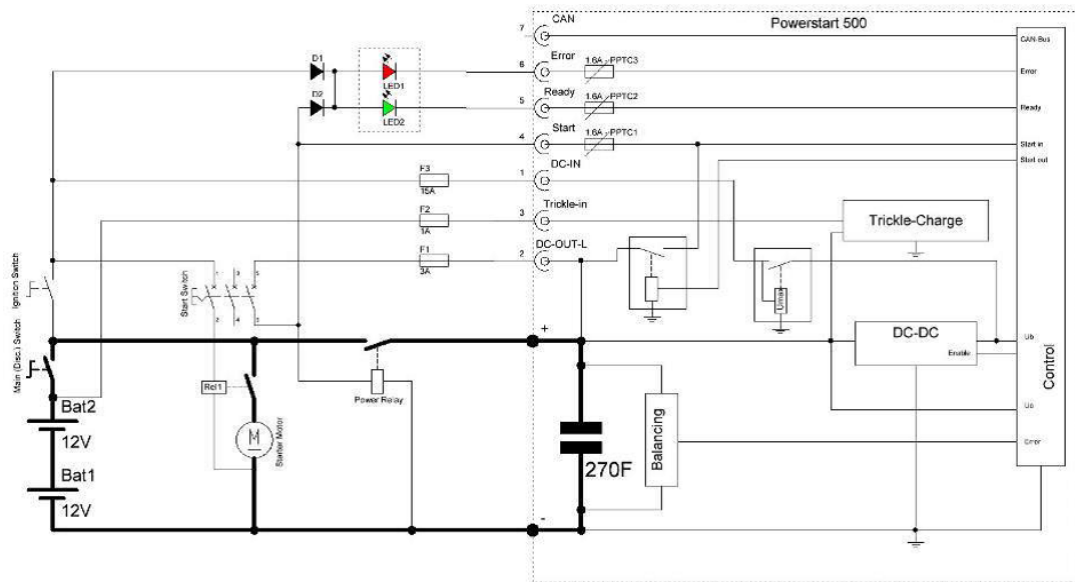
Length x Width x Height
459 x 259 x 182 mm
Approx. 11 kg

Applications

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

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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 ¹	°C	-
P	Peak power	-	-	55	kW	-
CCA	Max. cold crank amp.	-	-	2000	A _{rms}	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	-	310	-	F	(=120kJ @ 27.5V DC)
I_L	Leakage current	-	20	-	mA	Per cell including balancing
	Cycle life	1.000.000	-	-	Cycles	-
	Lifetime	-	10	15	Years	-
t	Time delay for external relay	Programmable			s	Power+ / DC-OUT-L/Start
I_{CAP}	Charge current	0.15	-	10 ²	A _{rms}	DC-IN
I_{tr}	Trickle charge current	1	-	50	mA	Trickle-IN

¹ 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!

² 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 _{DC}	Transients see section "Global specifications"
	Input current	0.1 ¹	-	10 ¹	A _{RMS}	Short transients t < 2 s are possible
Trickle-in	Input voltage	10	24	35	V	-
	Input current	-	50	-	mA	During charge
	Input current	-	1	-	mA	Charge off
	Switching off	-	26	-	V	End of charge
	Min CAP voltage	-	21	-	V	Stop charge then lower
DC-OUT-L	Output voltage	-	U _{Power+}	-	V	Identical to cap voltages. Charge switch off voltage
	Output current	-	-	15	A	Limited by cable
Power + ²	Output voltage	-	U _{Cap}	-	V	Identical to cap voltages. Charge switch off voltage
Power - ²	Output current	-	-	2000	A	T < 5 s

¹ I_{DC-IN} by CAP voltage (power+ or DC-OUT-L) with about 1 A per 1 V CAP voltage.

² Maximum tightening forces 10 ... 15 Nm. Fix lower Nut by removing!

Signal inputs / outputs

Signal	Direction Converter	Condition / Parameter	Definition
Start ^{1,2}	Input	Input voltage during start	18...35 V ^{DC}
		Input voltage without start	Open / U < 5V
		Input current	I < 10mA @ 24 V ^{DC}
	Output (temporary after start)	Output active after start	T = ...s (programmable)
		Output voltage after start	U = U _{Power+} = U _{DC-OUT-L}
		Output current after start	I _{max} < 1 A
Ready (for Start)	Output Make contact Connected to GND	Ready if: U _{Cap} ≥ 24V and DC-IN > 18V	Contact connecting to GND
		Not ready if: U _{Cap} ≤ 23V or DC-IN < 18V	Contact open (I < 5 mA @ U ≤ 30 V)
		Max input current to GND	1A / 0,5A recommended
Warning / Error	Output Break contact Connected to GND	Fault condition ³	Contact connecting to GND (without DC-IN also!)
		Normal condition ⁴	Contact open (I < 5 mA @ U ≤ 30 V)
		Max. input current to GND	1A / 0,5A recommended
Optional	-	CAN-bus	TBD

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

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

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

⁴ 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 ²	0.4 m	Input	15 A
DC OUT-L	2		Brown	1.5 mm ²		Output	I ≤ 15 A
Trickle-in	3		Red	1.0 mm ²		Input	Recommended: 1 A Maximum: 3 A
Start	4		Grey			Input / Output	
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	-
CAN-High	7	Cable	TBD	TBD	TBD	-	-
CAN-Low	8		TBD	TBD	TBD	-	-

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

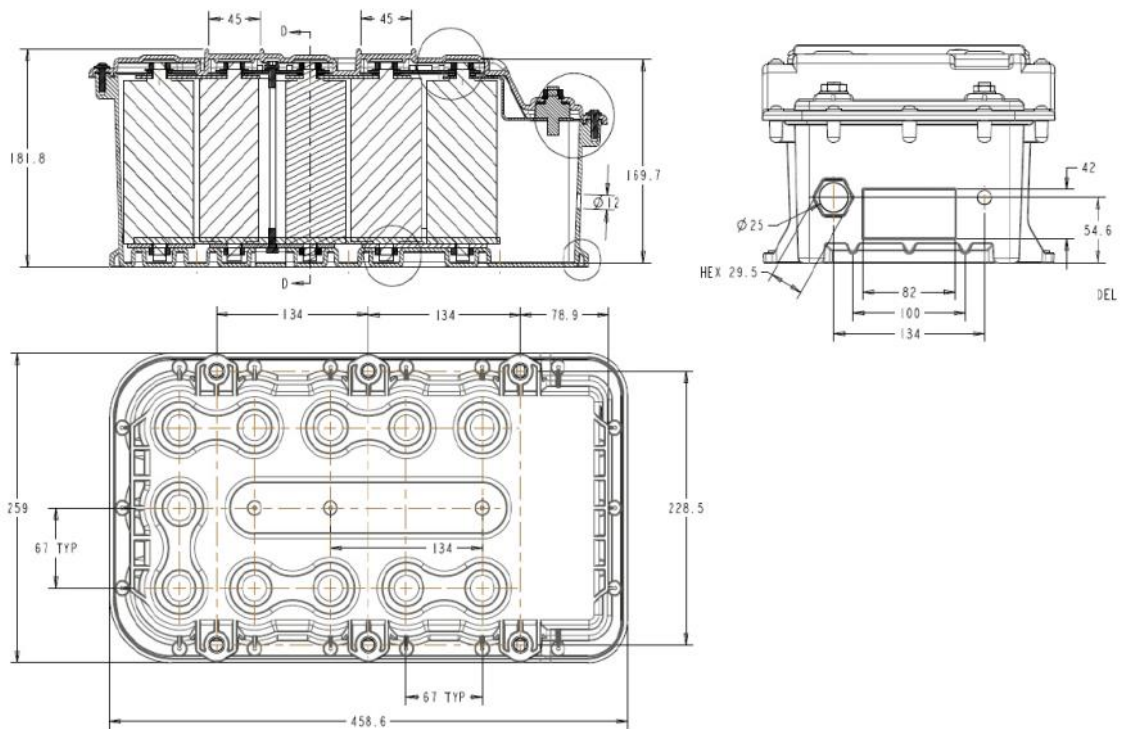
Deutsch Connectors

Connector:	PIN	Deutsch
DC-IN	1	
DC OUT-L	2	
Trickle-in	3	
Start	4	
Ready for start	5	
Error	6	
CAN-High	7	TBD
CAN-Low	8	TBD

Connector:	Quantity	Module side	Quantity	Vehicle side
		Plug Part No. Pin Part No.		Plug Part No. Socket Part No.
Deutsch		1	1	DTHD06-1-12S
		1	1	0462-203-12141
Deutsch		1	1	DT06-6S
		5	5	0462-201-16141
		1	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