

BCN25-1000 Series

3-phase Battery Charger

The BCN25-1000 Series is a 25 kW, liquid cooled battery charger that converts 3-phase AC voltage to DC voltage.

Features include very high efficiency, high reliability and compact dimensions.



FEATURES

- Output power up to 25 kW
- Typical efficiency 92%
- AC 3-phase input 800 - 1100 V (Line-Line)
- DC Output 240 - 430 V, 60 A max. (BCN25-1000-350-8)
DC Output 480 - 860 V, 30 A max. (BCN25-1000-700-8)
- J1939 compliant CAN for control and monitoring
- Over-temperature, output over-voltage and over-current protections
- SAE 1455 complaint environmental standards
- IP65 and IP67 rating (mating connector fitted)
- Designed according to UL 62368-1, IEC 60664-1

APPLICATIONS

- Charging of hybrid and full electric vehicles
- Heavy trucks
- Mining vehicles
- Harsh environment applications

1. MODEL SELECTION

MODEL	DESCRIPTION
BCN25-1000-350-8	3-phase Battery Charger, DC Output 240 - 430 V
BCN25-1000-700-8	3-phase Battery Charger, DC Output 480 – 860 V

2. INPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	NOM	MAX	UNIT
Input Voltage (Line - Line)	Nominal operating range	800		1100	VAC
	Non-operating range	1100		1200	
Input Current				22	ARMS
Input Frequency		47		63	Hz
Input Line Under-voltage		730		770	VAC
Leakage Current	@ 3x 1100 VAC, 63 Hz			10	mA
Inrush Current	Active Limiter Included				
Power Factor	@ Vin = 3x 800 VAC, 60 Hz, Po = 25 kW	0.93			
Line Harmonic Current (THD)	@ Po = 25 kW, UL 2202			35	%
Signal Battery DC Input	VBAT_IN	9		32	V

3. OUTPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	NOM	MAX	UNIT
Output Type	DC current source				
Output Voltage	BCN25-1000-350-8	240	350	430	VDC
	BCN25-1000-700-8	480	700	860	
Output Current	BCN25-1000-350-8, T_coolant ≤ 60°C			60	ADC
	BCN25-1000-700-8, T_coolant ≤ 60°C			30	
Output Power	T_coolant ≤ 60°C			25	kW
Efficiency	@ Vin = 3x 800/1100 VAC, Vonom, Po = 25 kW, T_coolant = 20°C	92			%
Turn-On/Off Delay	Turn-On Delay / Ramping			12	s
	Turn-Off Delay			1	

4. PROTECTION SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	NOM	MAX	UNIT
Output Over-Voltage Protection	BCN25-1000-350-8 CAN adjustable	240		450	VDC
	BCN25-1000-700-8, CAN adjustable	480		900	
Output Under-Voltage Protection	BCN25-1000-350-8 CAN adjustable	200		430	VDC
	BCN25-1000-700-8, CAN adjustable	400		860	
Input Over-Voltage Protection		1100		1150	VAC



5. MONITORING AND CONTROL SIGNALS

PARAMETER	DESCRIPTION / CONDITIONS
KEY_SWITCH_IN	This signal enables internal aux converter and is the wake-up signal. Level High = Enable It is referenced against 24V_RTN.
Control Pilot	SAE J1772 compatible. Duty cycle accuracy +/-2% in range 20 – 96%. Duty cycle accuracy -2/+5% in range 10 – 20%. Control Pilot function can be simulated/replaced (IAC_LIM set to max) by CAN command. Control Pilot is wake-up signal.
Proximity Detection	Function and levels according to SAE J1772 Proximity function can be simulated/replaced by CAN command.
LED_OUT	Current source output for direct LED driving. Function of this signal is programmable over CAN. Supplied from internal 5V.
VBAT_IN	12V/24V battery voltage input. Used to supply internal aux converter. Input shall be protected against reverse connected battery by serial diode.
EVSE_WAKE_OUT	High side output to wake VCU (Vehicle Control Unit) and other vehicle control modules and/or relay coils. Energy is taken from VBAT_IN. Voltage level is approximately 2.5V below connected VBAT_IN. Output signal is able to deliver up to 1.3A. Overtemperature protected. Short circuit protected. EVSE_WAKE_OUT goes high when the Charger goes from sleep to stand-by mode or simulated by CAN command (max delay 100ms) and goes low when CAN command from VCU is received or when it goes into sleep mode.
ADRO_IN, ADR1_IN	Inputs to set addresses of 4 parallel units. Internally pulled-up for logic level H. Connection to 24V_RTN = logic level L.
CAN_BAUD_RATE_IN	This signal is used to set CAN communication speed. It is referenced against 24V_RTN. CAN speed settings: 500 kbit/s – signal not connected / left floating 250 kbit/s – signal grounded; connected to 24V_RTN

6. COOLING SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS
Cooling Type	Liquid cooling
Coolant Medium/Mixture	50/50 Ethylene Glycol/Water
Coolant Flow	Min. 10 LPM
Max. Coolant Pressure	15 psi (1.03 bar)
Max. Pressure Drop	3 psi
Inlet/Outlet Coolant Connection	SAE fittings with outer thread 1-14UNS for internal hose size >=5/8" (e.g. Parker p/n: 10F5OMLOSS)
Material of Fittings	Stainless steel
Fittings provided with inverter charger	2 pcs Parker p/n: 10F5OMLOSS or equivalent

7. ENVIRONMENTAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	MIN	NOM	MAX	UNIT
Operating Temperature *	Liquid cooled:	T_coolant		+60 **	°C
		T_ambient	-25	+70	
Storage Temperature *		-25		+85	°C
Altitude	Operating:			4000	m
	Non-Operating:	18.6 kPa absolute pressure		12200	
Humidity	SAE J1455				
Thermal Shock	SAE J1455, GMW-3172				
Vibration	SAE J1455				
Protection	IP65 and IP67 / with mating connector inserted				

* Minimum operating and storage temperature of the unit itself is certified to -40°C, but the cable temperature is specified to -25°C.

** Max. inlet coolant temperature can be increased up to 70°C, but the output current will be linearly derated to 45 A for BCN25-1000-350 and to 22.5 A for BCN25-1000-700.



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8. SAFETY, REGULATORY AND EMI SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	CLASS / LEVEL / CRITERION	
Radiated Emission	EN 55011	Class A, Group 1	
Conducted Emission *	EN 55011	Class A, Group 1	
Electrostatic Discharge	IEC 61000-4-2	Performance Criterion C	
Radiated Electromagnetic Field	IEC 61000-4-3	Performance Criterion C	
Electrical Fast Transient (EFT) /Burst	IEC 61000-4-4; Level 2 (+/-2 kV, 5 kHz)	Performance Criterion C	
Surge Immunity	IEC 61000-4-5; Level 3 surge (+/-1 kV CM and +/-2 kV DM)	Performance Criterion C	
RF Conducted Immunity	IEC 61000-4-6; Level 3 (10V, 0.15-80 MHz,AM 80%, 1 KHz)	Performance Criterion C	
Electrical Transient Conduction along Supply Lines	ISO 7637-2, ISO 16750-2		
Insulation (factory tested)	Signals to AC Input	Basic	2250 VDC
	Signals to DC Output	Basic	2250 VDC
	AC Input to DC Output	Basic	2250 VDC
	AC Input to PE	Basic	2250 VDC
	DC Output to PE	Basic	2250 VDC

* The charger is intended to be powered from a dedicated power transformer or generator, not from LV overhead power lines for residential environments.

9. CONNECTORS

9.1 AC INPUT CABLE

Platinum Advanced Cable Solutions TY2S3G10 (Power 3x 10 mm² + Pilots 3x 1 mm²)

(Marked as "AC IN" on the chassis)

Cable length: 4.0 m

Marking of power wires:

PHASE	WIRE (SLEEVE)
L1	Blue
L2	White
L3	Red

Marking of pilot wires:

PILOT	LABEL
1	P1
2	P2
3	P3

The pilot wire 1 of the input cable is internally (inside the charger) connected with the pilot wire 1 of the DC output cable. The same requirement is valid for pilot wires 2 and 3. The connection is made by using connector WEIDMULLER 0620320000.

Wire shields are internally connected with chassis and the other end of this conductor is equipped with cable lug for M8. It is marked with green/yellow shrinkable sleeve.

9.2 DC OUTPUT CABLE

Platinum Advanced Cable Solutions TY2S3G10 (Power 3x 10 mm² + Pilots 3x 1 mm²)

(Marked as "DC IN" on the chassis)

Cable length: 3.0 m

Marking of power wires:

	WIRE (SLEEVE)
Vout+	Red
Vout-	Blue
NA	Cut off on both ends of the DC cable.

Marking of pilot wires:

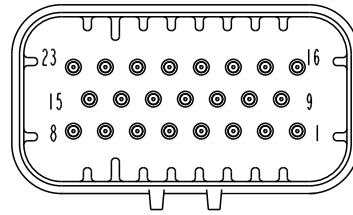
PILOT	LABEL
1	P1
2	P2
3	P3

Wire shields are internally connected with chassis and the other end of this conductor is equipped with cable lug for M8. It is marked with green/yellow shrinkable sleeve.

9.3 SIGNAL CONNECTOR

PSU side: MFG: TE Connectivity; PN: 776087-1
 Mating connector: MFG: TE Connectivity; PN: 770680-1
 Pin: MFG: TE Connectivity; PN: 770854-1

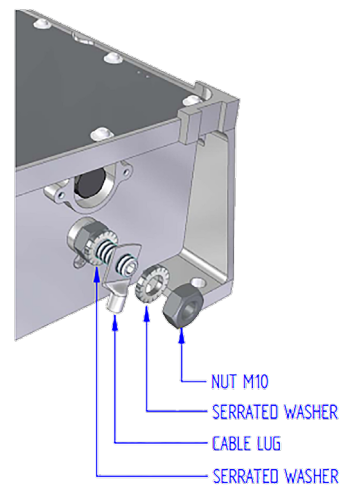
It is recommended to use screened connecting cables.



PIN	NAME	FUNCTION	REFERENCE
1	LED_OUT	Current source output for LED driving	24V_RTN
2	VBAT_IN	12V or 24V VBAT supply (KL30)	24V_RTN
3	CANH_1	CAN bus for customer, internally connected with pin 18	24V_RTN
4	CANL_1	CAN bus for customer, internally connected with pin 19	24V_RTN
5	Do not connect		
6	Do not connect		
7	Control Pilot	SAE J1772 Pilot signal, wake-up input signal	PE
8	Proximity Detection	SAE J1772 Proximity signal	PE
9	24V_RTN	Return (GND) for VBAT_IN and signals	
10	ADR0_IN	CAN bus address input 0 for parallel operation	24V_RTN
11	ADR1_IN	CAN bus address input 1 for parallel operation	24V_RTN
12	EVSE_WAKE_OUT	Wake-up output signal for VCU	24V_RTN
13	KEY_SWITCH_IN	Wake-up input (Level HIGH=enable) (KL15)	24V_RTN
14	CAN_BAUD_RATE_IN	CAN baud rate selection, Open – 500 kbps; Grounded – 250 kbps	24V_RTN
15	Do not connect		
16	Do not connect		
17	Do not connect		
18	CANH_2	CAN bus for customer, internally connected with pin 3	24V_RTN
19	CANL_2	CAN bus for customer, internally connected with pin 4	24V_RTN
20	NA		
21	NA		
22	Do not connect	Factory testing	
23	Do not connect	Factory testing	

9.4 EARTH CONNECTION

Wire of protective earth (PE) screwed to grounding stud (located on the chassis) needs to be 10 mm². Cable lug suitable for M10 needs to be used.



10. MECHANICAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	UNIT
Dimensions	524.0 x 398.5 x 111.0 mm	mm
Weight	35	kg
Enclosure Material	Aluminum alloy	

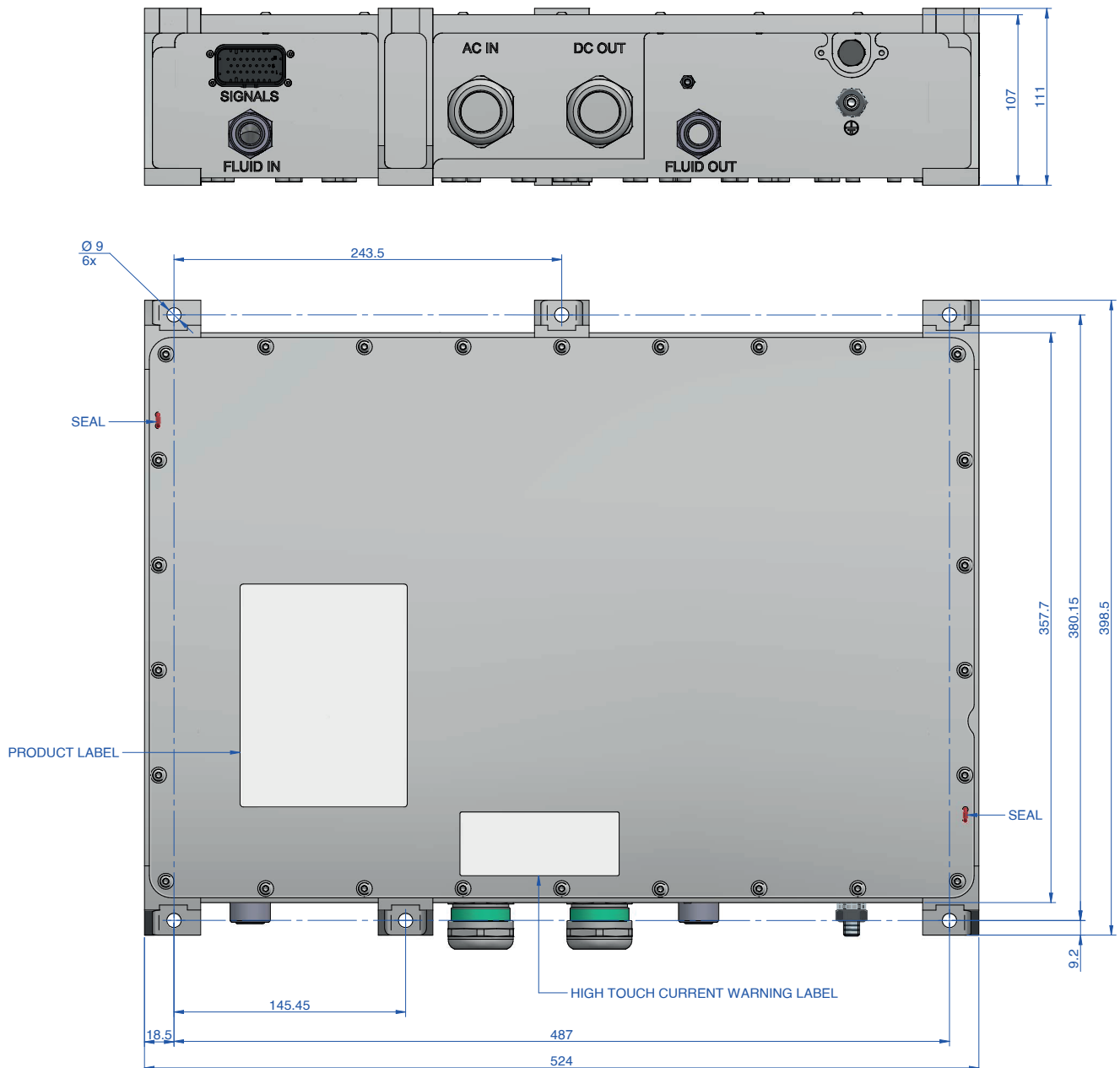


Figure 2. Mechanical Drawing

For more information on these products consult: tech.support@psbel.com

NUCLEAR AND MEDICAL APPLICATIONS - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.

TECHNICAL REVISIONS - The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.

