BAC150CAN

BATTERY CHARGER

USER MANUAL

郑州众智科技股份有限公司
SMARTGEN(ZHENGZHOU)TECHNOLOGY CO.,LTD.

SmartGen众智Chinese trademark

SmartGenEnglish trademark

SmartGen — make your generator *smart*

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Table 1 Software Version

| Date	Version	Note
2019-03-05	1.0	Original Release
2022-7-04	1.1	Update the format of the manual; Update the logo of SmartGen.

CONTENT

1 OVERVIEW

BAC150CAN is a kind of battery charger with intelligent multi-functions, which is specially designed for genset lead-acid battery to meet the charging characteristics. It is suitable for 12V/24V battery with maximum 5A output current.

2 PERFORMANCE AND CHARACTERISTICS

BAC150CAN has the following characteristics:

1) Switch power supply structure, wide high voltage input, small size, light weight, high efficiency;

2) It can work automatically by the method of two-stage or 3-stage as required. The two methods both are designed according to battery charging characteristics, and can prevent lead-acid battery overcharging, which extremely improves the battery life span;

3) Built-in PFC is designed, so when the output terminal is connected reversely, it shall be AC power supply, which can effectively protect the charger. When the reverse connection is removed, it shall recover the output automatically;

4) Multi-function output port is designed, and it can be configured on PC. Low output level is active.

5) Multi-function input port is designed, and it can be configured on PC. Low input level is active.

6) Temperature sensor port is designed, which can monitor the battery temperature of current time; and it also has temperature compensation function, which can effectively prevent over high battery temperature;

7) Standard RS485 serial communication interface, CAN communication interface, and USB communication interface are designed;

8) LED display: Charging status indicator, and alarm indicator.

3 CHARGING PRINCIPLE
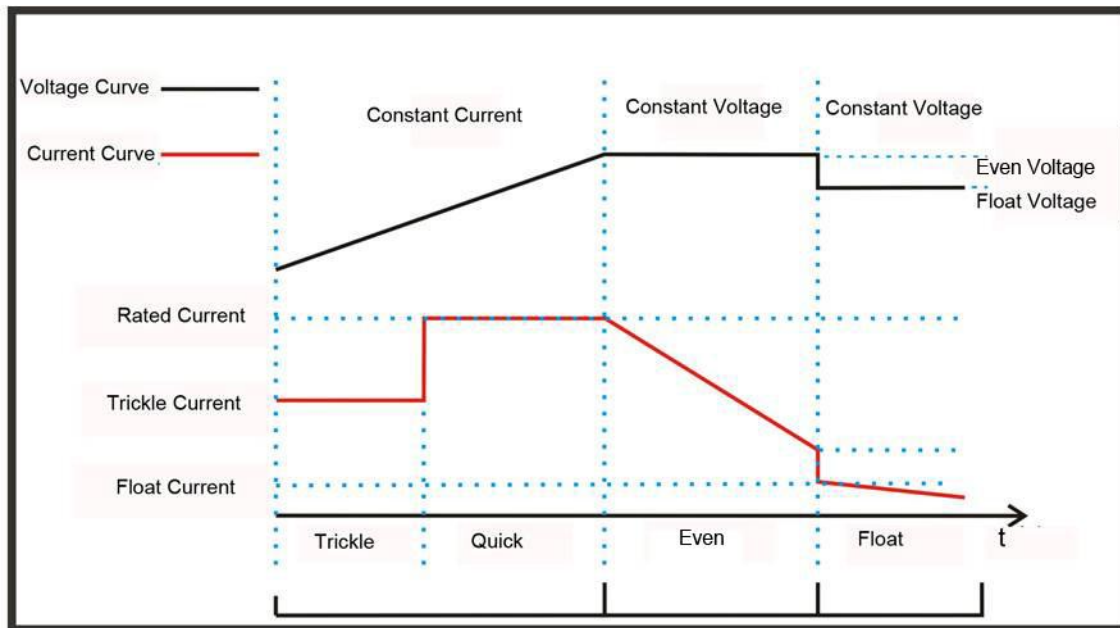
Fig. 1 3-Stage Charging Curve Gragh

Three-stage charging method is applied for the charger to work according to the battery charging characteristics.

1) The first stage is 'Constant Current' mode. When the terminal voltage is comparatively low, the charging current is small, which effectively prevents the battery from damaging because of high temperature, calling 'low voltage trickle charging'. When the terminal voltage gets high, the charging current changes to rated current, which makes the battery electricity increasing rapidly. This process is 'quick charging'.

2) The second stage is 'Even Charging' mode. After constant current mode, the voltage gets up to the even voltage value, and at this time the charger keeps constant voltage output. The charging current slows down, and the terminal voltage also slowly keeps at the value of even voltage.

3) The third stage is 'Float Charging' mode. After the above two stages, the charging is basically completed and output voltage of the charger switches to float voltage automatically. Charging current also drops to float current. All white LED indicators are illuminated always. Afterwards the charging current only offsets the battery self-discharge and longtime charging is unharmful for the battery.
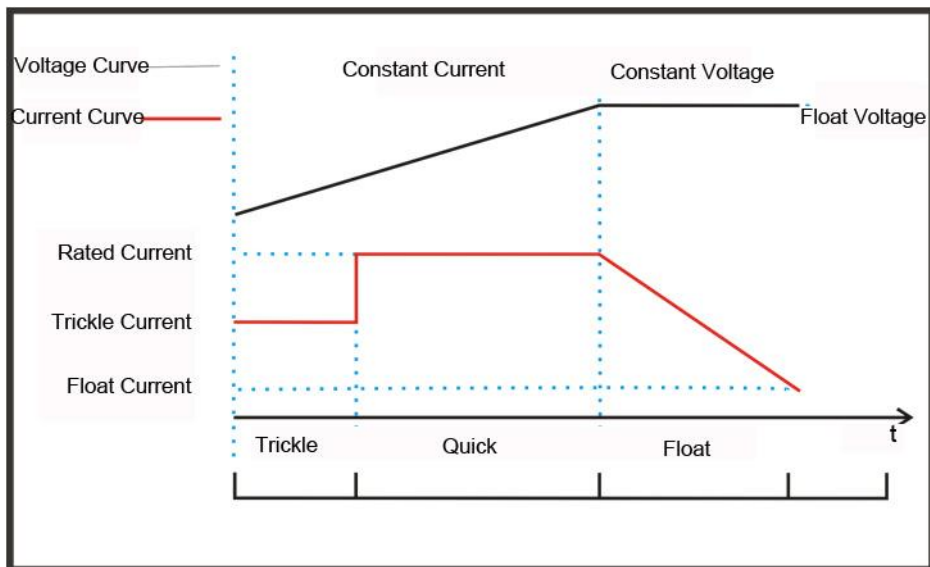
Fig. 2 2-Stage Charging Curve Graph

Two-stage charging method is applied for the charger to work according to the battery charging characteristics.

1) The first stage is 'Constant Current' mode. When the terminal voltage is comparatively low, the charging current is small, which effectively prevents the battery from damaging because of high temperature. This process is called 'low voltage trickle charging'. When the terminal voltage gets high, the charging current changes to rated current, which makes the battery electricity increasing rapidly. This process is 'quick charging'.

2) The second stage is 'Float Charging' mode. As the electricity gets higher and higher, the charging current is getting smaller.   When the current is below 0.5A, the battery is fully charged. Then the charging current offsets the battery self-discharge and longtime charging is unharmful for the battery.

4 PARAMETERS SPECIFICATION

Table 2 Product Parameters

Type	Item	Parameters	
		12V	24V
Input Characteristics	Nominal AC Voltage	AC (100~277)V	
	Max. AC Voltage	AC (90~305)V	
	Max. Current	1.8A	3.5A
	No-load Power Consumption	<3W	
	AC Frequency	50Hz/60Hz	
	Efficiency	85%	
Output Characteristics	No-load Output Voltage	13.5V, Error ±0.2V	27.0V, Error ±0.2V
	Rated Charging Current	5A, Error ±0.2A	
	Max. Power	80W	135W
	Min. Voltage	3.5V	7V
Insulating Property	Insulation Resistance	Between input and output, input and PE, output and PE all are: RL≥500 MΩ	
	Insulation Voltage	Between input and output, input and PE both are: AC3kV 50Hz 1min; leakage current: IL ≦3.5mA Between output and PE is: AC500V 50Hz 1min; leakage current: IL ≦3.5mA	
Working Condition	Working Temperature	(-30~+55)°C	
	Storage Temperature	(-40~+85)°C	
	Working Humidity	20%RH~93%RH(No condensation)	
	Storage Humidity	10%RH~95%RH(No condensation)	
Shape Structure	Weight	0.58kg	
	Dimension	171mm×119.5mm×65.5mm (length*width*height)	

## 5 PARAMETERS CONFIGURATION

Table 3 Parameter Configuration

Items	Default		Adjustable Range		Description
	12V	24V	12V	24V	
Battery Selection	2		(0~2)		0: 12V 1: 24V 2: Self-adjusted
Charging Method	3		(2~3)		2: Two-stage; 3: Three-stage
Max. Rated Current	5.0A		/		Maximum charging current
Rated Current	100%		(0~100)%		Maximum rated charging current percentage
Even Charging Voltage	14.1V	28.2V	(10~16)V	(20~30)V	The charging voltage of "Constant Voltage"
Even Charging Enable	1		(0~1)		0: Disable; 1: Enable
Even Charging Time Setting	1.0h		(0.1~100)h		The charging time of Constant Voltage
Even Charging Completion Current	1		(0~1)		0: Disable; 1: Enable
Completion Current Setting	0.50A		(0.20~3.00)A		The transition current from Even Charging to Float Chargeing
Float Charge Voltage	13.5V	27.0V	(10~16)V	(20~30)V	The voltage of "Float Charge"
AUTO BOOST Voltage	12V	24V	(10~16)V	(20~30)V	When the charger is in Float Mode, it enters Quick Charge if the battery voltage has fallen below this value.
AUTO BOOST Voltage Delay	20s		(0~3600)s		When the battery voltage is below this value for the delay time, it gets into BOOST status.
Trickle Charge	0		(0~1)		0: Disable; 1: Enable
Trickle Charge Voltage	11.0V	22.0V	(10~16)V	(20~30)V	The voltage of Trickle Charge
Trickle Charge Current	50%		(0~100)%		Maximum rated charging current percentage
Battery Under Voltage Warn	1		(0~1)		0: Disable; 1: Enable
Under Voltage Set Value	11.5V	23.0V	(8~15)V	(16~30)V	Under voltage alarm will be initiated if the battery voltage has fallen below the set value.
Under Voltage Delay	120s		(0~3600)s		Under voltage alarm will be initiated if the battery voltage has fallen below the set value and the delay timer has expired.

Items	Default		Adjustable Range		Description
	12V	24V	12V	24V	
Under Voltage Return Value	12.5V	25.0V	(8~15)V	(16~30)V	The transition voltage from 'under voltage' to 'normal voltage'
Under Voltage Return Delay	10s		(0~3600)s		Under voltage alarm will be removed if the battery voltage has exceeded the return value and the delay time has expired.
Battery Over Voltage Warn	1		(0~1)		0: Disable; 1: Enable
Over Voltage Set Value	16V	32V	(8~16)V	(16~32)V	Over voltage alarm will be initiated if the battery voltage is above the set value.
Over Voltage Delay	2s		(0~3600)s		Over voltage alarm will be initiated if the battery voltage is above the set value and the delay time has expired.
Over Voltage Return Value	15.8V	31.6V	(8~16)V	(16~32)V	The transition voltage from 'over voltage' to 'normal voltage'
Over Voltage Return Delay	10s		(0~3600)s		Over voltage alarm will be removed if the battery voltage is below the return value and the delay time has expired.
Temperature Sensor	1		(0~1)		0: Disable; 1: Enable
Temperature Compensation	1		(0~1)		0: Disable; 1: Enable
Temperature Compensation Set Value	0.018V/℃	0.036V/℃	(0.010~0.030)V/℃	(0.020~0.060)V/℃	The Compensation of every 1℃ change on 20℃ basis.
High Temp. Warn	1		(0~1)		0: Disable; 1: Enable
High Temp. Set Value	55℃		(0~80)℃		High Temp. alarm will be initiated if the battery temperature has exceeded the set value.
High Temp. Delay	0.5s		(0~60.0)s		High Temp. alarm will be initiated if the battery temperature has exceeded the set value and the delay time has expired.
High Temp. Return Value	50℃		(0~80)℃		The transition temperature from High Temp. to Normal Temp.
High Temp. Return Delay	1.0s		(0.0~60.0)s		High Temp. alarm will be removed if the battery temperature has fallen below the return value and the delay time has expired.

Items	Default		Adjustable Range		Description
	12V	24V	12V	24V	
Auxiliary Input Port	3		(0~5)		0: Not Used; 1: Shutdown; The battery charger enters Standby Status if the input is active. 2: Reserved; 3: Manual BOOST: The battery charger enters BOOST if the input is active. 4: Return to Float Mode: The charger enters Float Mode if the input is active. 5: Rated Voltage Output: Charger shall output rated voltage if the input is active.
Auxiliary Input Port Delay	2.0s		(1.0~60.0)s		The corresponding action will be active if the input is active and the delay time has expired.
Auxiliary Output Port Setting	Charging Failure Waring Mains Failure Warning		Multiple choices are available.		Not Used; Output over voltage warning; Output under voltage warning; External temp. sensor short-circuit warning; Charging failure warning'; Mains failure warning;
Auxiliary Output Port Delay	2.0s		(1.0~60.0)s		Output port is active after the delay time.
Communication Address	10		1~254		RS485 communication address
RS485 Baud Rate	0		(0~2)		1: stop bit; 0: 9600bps; 1: 19200bps; 2: 38400bps;
CAN Baud Rate	1		(0~2)		0:125kbps; 1: 250kbps; 2: 500kbps;
Battery Type	0		(0~4)		0: Lead-acid; 1: Li Battery; 2: Calcium-Calcium; 3: Power; 4: Users-defined;

6 OPERATION
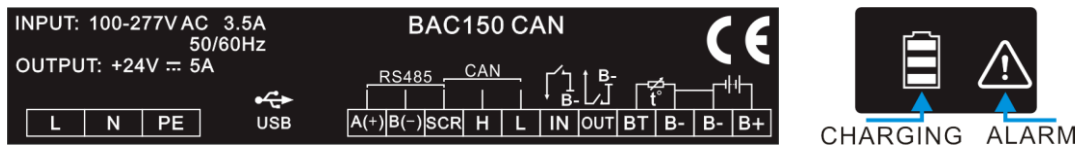
Fig. 3 BAC150CAN Panel Drawing

Table 4 Connection Description

Terminal		Function	Description
AC Input Port	L	AC Terminals	Connect terminals L and N to AC (100~240)V; bigger than BVR 1.5mm^2 multi-strand copper line is recommended.
	N		
	PE	GND Terminal	Connect to the ground.
USB Port	USB	USB communication port	Related parameters can be set on PC via USB.
RS485 Port	A(+)	RS485 communication port	Standard RS485 serial communication port.
	B(-)		
	SCR	Shielding GND Terminal	Connect to B- inside the charger.
CAN Port	H	CAN High	CAN communication port.
	L	CAN Low	
Auxiliary Input/Output Port	IN	Auxiliary Input Port	Active when connect to B- output.
	OUT	Auxiliary Output Port	Output B- voltage when active.
Temp. Sensor Port	BT	Battery Temp. Sensor Port	Connect to PT1000 sensor externally.
DC Output Port	B-	Battery Output Negative	Connect to battery negative; bigger than BVR 2.5mm^2 multi-strand copper line is recommended.
	B-		
	B+	Battery Output Positive	Connect to battery positive; bigger than BVR 2.5mm^2 multi-strand copper line is recommended.
Charging Indicator	White	Charging status indication	When the current is less than 10%, they shall be illuminated all according to charging voltage and current indication charging status.
Alarm Indicator	Red	Alarm status Indication	Over voltage, under voltage, charging failure, temp. sensor short-circuit, mains failure, temp. high alarm, BOOST status warning, battery reverse connection alarm can be configured; indicator status can be flash, or light. Flash status default is charging failure, mains failure, battery reverse connection alarm; light status default is over voltage, under voltage, temp. sensor short-circuit, and temp. high warning.

Terminal		Function	Description
			All indication are extinguished when there are not alarms.

⚠ **NOTES:**

1) Because there are diode and current-limiting circuit inside the charger, it can be used together with charging generator, and it is needless to disconnect the charger when cranking.

2) When this is applied on the genset, as charging current is very large, it shall produce voltage drop in the charging wire. So this is recommended that charging wire shall be separately connected to battery terminal, aiming to avoid disturbance on sampling precision.
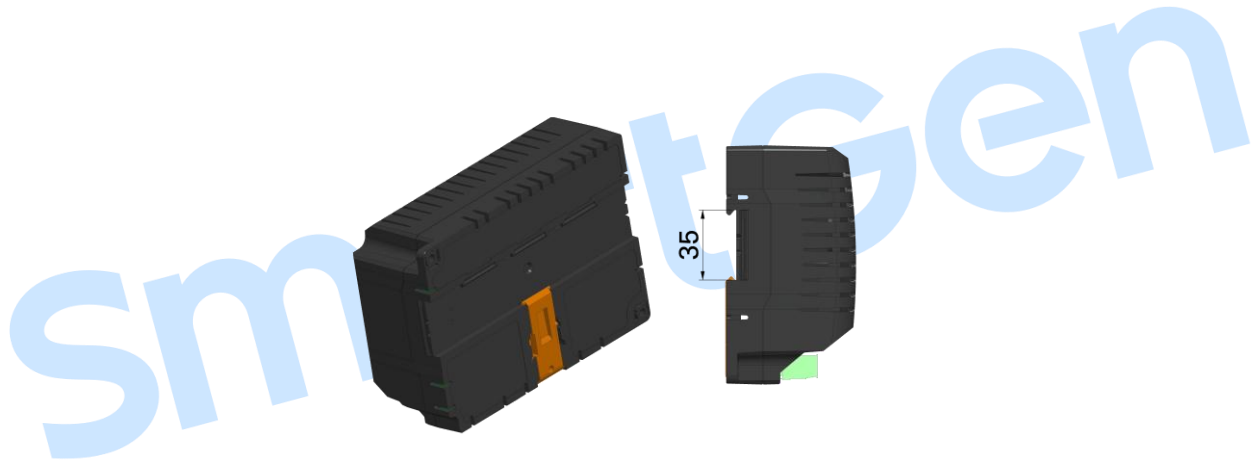
7 CONNECTION
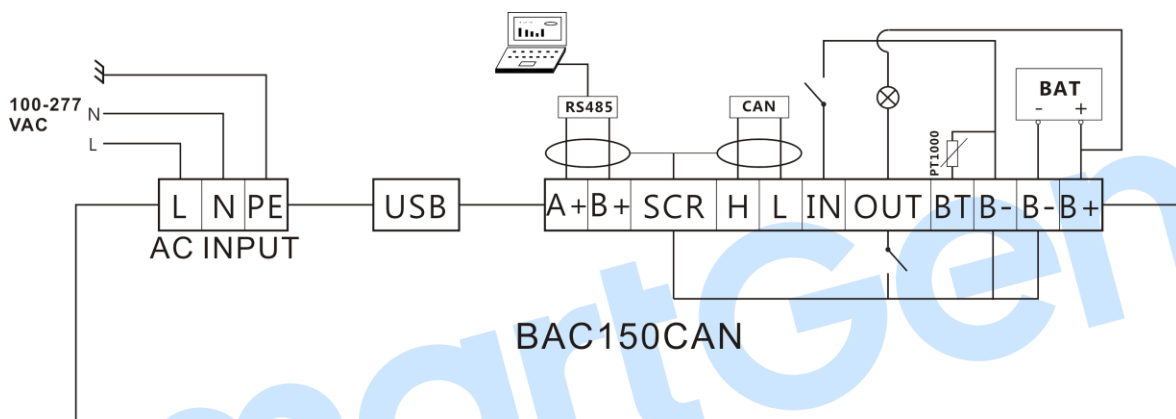
Fig. 4 BAC150CAN Wiring Connection

8   CASE DIMENSIONS

Unit: mm

(a) Bolt Mounting

(b) Guide Rail Mounting

Fig. 5 BAC150CAN Mounting Case Dimension

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