

GWL/ Power Group Technology Solutions – Stay Powered for the Future

POW PFC 1,5kW – 8kW CHARGERS SPECIFICATION



Family of **1.5KW** HF/PFC Lithium Battery Chargers



Size (mm) : 348(L) × 180(W) × 140(H)

Lithium Battery Charger	V out Max	I out Max
POW24V40AT	29.2V	40A
POW36V33AT	43.8V	33A
POW48V25AT	58.4V	25A
POW72V16AT	87.6V	16A
POW84V14AT	102.2V	14A
POW96V12AT	116.8V	12A
POW120V10AT	146V	10A
POW144V8AT	175.2V	8A
POW156V8AT	189.8V	8A
POW192V6AT	233.6V	6A
POW240V5AT	292V	5A

Family of **3KW** HF/PFC Lithium Battery Chargers



Size (mm) : 357(L) × 254(W) × 179(H)

Lithium Battery Charger	V out Max	I out Max
POW24V80AT	29.2V	80A
POW36V66AT	43.8V	66A
POW48V50AT	58.4V	50A
POW72V32AT	87.6V	32A
POW84V28AT	102.2V	28A
POW96V24AT	116.8V	24A
POW120V20AT	146V	20A
POW144V16AT	175.2V	16A
POW156V16AT	189.8V	16A
POW192V12AT	233.6V	12A
POW240V10AT	292V	10A

Family of **6KW** HF/PFC Lithium Battery Chargers



Lithium Battery Charger	V out Max	I out Max
POW36V90AT	43.8V	90A
POW48V75AT	58.4V	75A
POW72V54AT	87.6V	54A
POW84V45AT	102.2V	45A
POW96V36AT	116.8V	36A
POW144V30AT	175.2V	30A
POW156V27AT	189.8V	27A
POW192V24AT	233.6V	24A
POW240V22AT	292V	21.6A
POW288V18AT	350.4V	18A
POW312V16AT	379.6V	16,5A

Size (mm) : 546(L) × 356(W) × 137(H)

Family of 8KW HF/PFC Lithium Battery Chargers



Lithium Battery Charger	V out Max	I out Max
POW48V140AT	58.4V	140A
POW72V100AT	87.6V	100A
POW84V84AT	102.2V	84A
POW96V72AT	116.8V	72A
POW144V48AT	175.2V	48A
POW156V44AT	189.8V	44A
POW196V36AT	233.6V	36A
POW240V28AT	292V	28A
POW288V24AT	350.4V	24A
POW312V22AT	379.6V	22A


Size (mm) : 357(L) × 254(W) × 377(H)

The Technical Specifications

1. Input characteristics				
No.	Item	Technical specification	Unit	Remark
1-1	Rated input voltage	230V	Vac	
1-2	Input voltage range	85V – 265V	Vac	
1-3	AC input voltage frequency	45 - 65	Hz	
1-4	Inrush current	< 100 A	A	@ 265Vac start-up in cold condition

2. Output characteristics				
No.	Item	Technical specification	Unit	Remark
2-1	AC Power Factor	≥0.98		
2-2	Power efficiency	≥93%		@ 230Vac

3. Protection characteristics				
No.	Item	Technical specification	Unit	Remark
3-2	Software over voltage protection	The charger software limits the maximum output voltage to a level suitable for the connected battery system		
3-3	Thermal cutback	The internal temperature monitor reduces the charger output power in extreme operational temperature to prevent damage		
3-5	Output short circuit protection	Short circuit protection at the output terminals. Automatic recovery after restoring to normal conditions.		
3-6	Electronic reverse battery protection	The charger is electronically protected against permanent reversed battery connection.		

4. Charge indicator (LED)				
No.	Item	Technical specification	Unit	Remark
4-1	Battery Disconnected	Red-Green flash - one second interval		
4-2	Repair Battery	Red flash - three seconds interval		
4-3	<80% Charge Indicator	Red flash - one second interval		
4-4	>80% Charge Indicator	Yellow flash - one second interval		
4-5	100% Charge Indicator	Green flash - one second interval		

5. Common Faults & Solutions		
No.	LED Flashing Sequence (One Cycle)	Indication
5-1	R G _ _ _ _ _	Wrong Battery
5-2	R G R _ _ _ _	Overcharged
5-3	R G R G _ _ _	Battery Overheated
5-4	R G R G R _ _	Incorrect AC Input Voltage
5-5	R G R G R G _ _	External Thermal Sensor Fault
5-6	R G R G R G R _	Communication Interface Fault
5-7	G R _ _ _ _ _	Charger Overheated
5-8	G R G _ _ _ _	Charger Relay Fault
5-9	G R G R _ _ _	Charger Itself Fault

1. R—red G—green
2. “_” denotes one second pause
3. Above LED flashing sequence is one cycle; the LED will flash repeatedly if the fault has not been removed.

Solutions:

- ▲Wrong Battery: Verify the battery voltage range matching with charger or inspect the battery for damage.
- ▲Overcharged: Confirm the battery capacity and the selected curve are matched or if the battery is defective.
- ▲Battery Overheated: Check the temperature at the external thermal sensor.
- ▲Incorrect AC Input Voltage: Check that the AC input voltage is in accordance with the requirement.
- ▲External Thermal Sensor Fault: Ensure connect the thermal sensor correctly.
- ▲Communication Interface Fault: Make sure the communication have been correctly connected or if it is damaged.
- ▲Charger Overheated: Check if the ambient temperature is too high or the ventilation is smooth.
- ▲Charger Relay Fault: Repair is needed.
- ▲Charger Itself failure: Repair is needed.



6. Environmental test requirements				
No.	Item	Technical specification	Unit	Remark
6-1	High ambient operating temperature	+40 °C	deg C	continuous operation
6-2	Low ambient operating temperature	-10 °C	deg C	continuous operation
6-3	Highest storage temperature	+70 °C	deg C	allow 2 hours to recover to normal temperature
6-4	Lowest storage temperature	-40 °C	deg C	allow 2 hours to recover to normal temperature
6-5	Drop shock	40 g peak		SAEJ1378 Standard

Colors of the cables on the power cords:

PHASE (L) - **Brown**

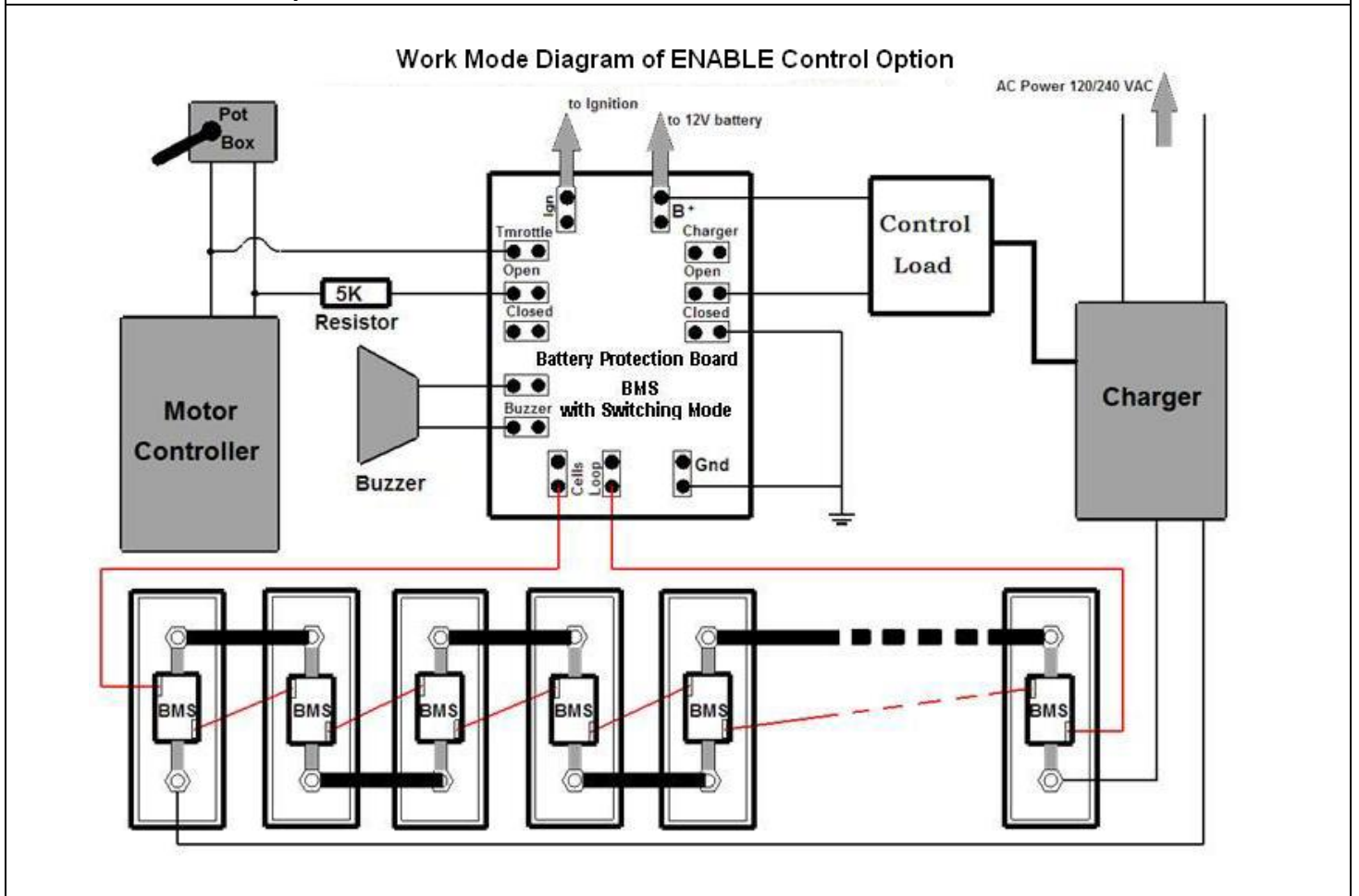
Neutral (N) - **Black**

Ground (GND) - **Blue**

7. Connection Instruction for Control Interface				
No.	Item		Description	Remark
7-1	Charger's Communication Connector	1	ENABLE	 SP1312/S
		2	GND	
		3	+12V internal power supply (Load≤50mA)	
		4	LED - Red	
		5	LED - Green	
		6	RX : Serial Comm. Receiver (for charger)	
		7	TX : Serial Comm. Sender (for charger)	
7-2	Security Tips	1. Do not allow the lead from any PIN to contact the battery positive or negative. 2. Never attempt to connect any two wires from the SP1312 connector that not be connected. 3. Applied power supply or load above 50mA to +12V PIN3 is forbidden. 4. Internal impedance of PIN1 (ENABLE) is 10K with allowable range 0~16V. Please connect a series resistance of 10 K when controlling by an external 24V supply. (Refer to manufacturer first)		

8. Charger's Connection Instruction for Control Interface			
No.	BMS Category	Mode of Connection	Brief Description
8-1	Battery protector board or BMS without CAN communication function	Relay control	Use normally open contacts of relay to control the charging enable wires. Closed=Enable, Open=Disable
		Optocoupler device control	Use optoelectronic coupled devices to control the charging enable wires.
		2-5V control	Use 2-5V (dividing by resistance) controlling the charging enable wires and stop charging and be able to set up the output current from 0% to 100% for the charger.
8-2	Control mode : ENABLE CONTROL 1. Charging process: Constant current (this current is controllable) charging mode is applied first, then constant voltage charging when the battery reaches the specified voltage point. The voltage does not increase in the constant voltage stage and the charge current will gradually reduce. Charging ceases automatically when the current falls to a preset value (generally one tenth of maximum charging current). If ENABLE signal is removed at any time, charging ceases. 2. The ENABLE/+12V wires can be used to control the charger by an ON/OFF signal from a battery management system. 3. Alternatively the voltage between ENABLE and GND can be used to linearly control the charger output current. When it is above 2V, charger commences charging. Applying 2~5V can control the maximum output current. Below 1.5V the charger will cease charging, re-applying above 2V will re-enable charging.		

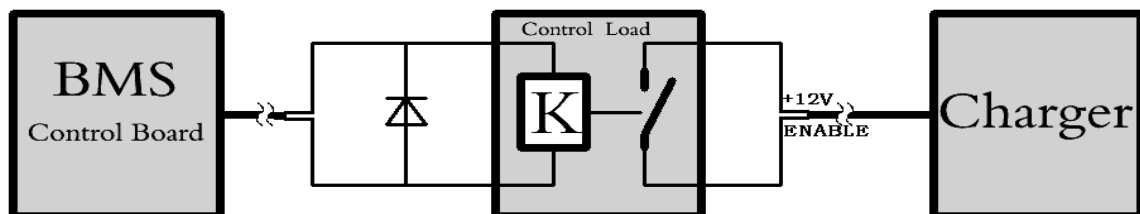
9. Schematic for example



10. Three methods of ENABLE CONTROL

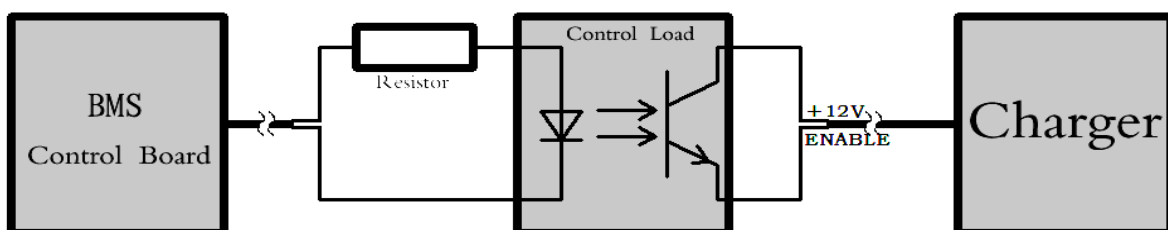
ENABLE CONTROL method 1: - USING RELAY CONTROL

The charger provides +12V (red) and ENABLE (black) from 7-PIN connector. A relay can be connected with BMS according to the Schematic below. Charging is controlled by connecting or disconnecting +12V and ENABLE. If ENABLE is disconnected, charging will cease. Upon re-connection, the charger will recommence charging.



ENABLE CONTROL method 2: - Optical-couple Control

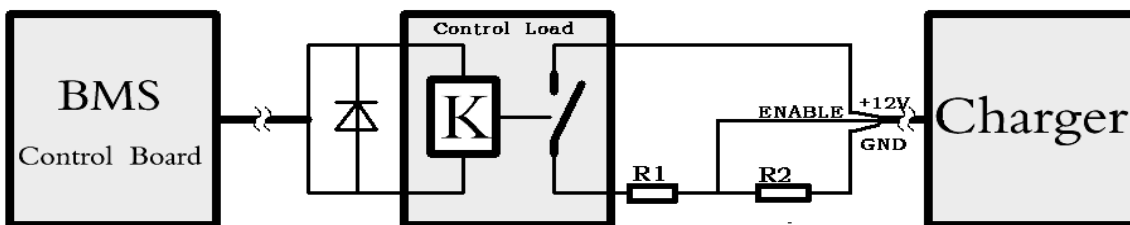
Alternatively an Optical-coupling device can be connected with the BMS according to the Schematic below. Charging is controlled by connecting or disconnecting +12V and ENABLE. If ENABLE is disconnected, charging will cease. Upon re-connection, the charger will recommence charging.



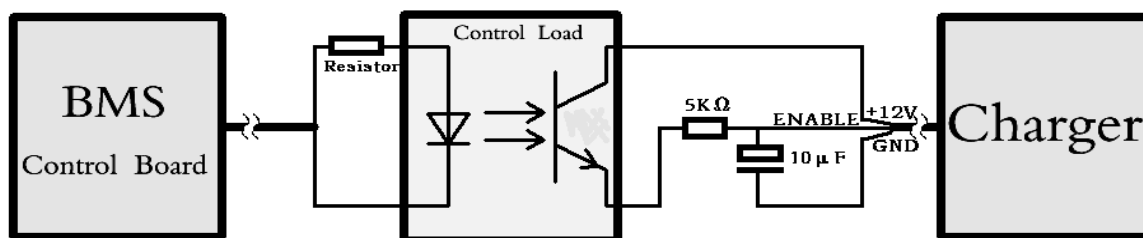
ENABLE CONTROL method 3: - USING 2-5V CONTROL

a. Control of charging current and stop charging can be controlled by altering the DC voltage on ENABLE (PIN 1). It is possible to control the maximum output current from 0% to 100% of the charger maximum capability. During the stop mode (<1.5V) if the voltage rises above 2V between ENABLE (PIN 1) and GND (PIN2) charger will enter into working mode. In this working mode, when the control voltage is reduced under 1.5V the charger returns to the stop mode. 2V~5V on ENABLE corresponds linearly to output current from 0% to 100%. For example, When it is 2V between PIN 1 and PIN 2, maximum output current of the charger is 0; When 3V between them, it is 33% of the maximum output current; When 4V between them, it's 66% of it; When above 5V between them, it's 100%.

b. If control only of the maximum charging current is required, use two resistors (R1, R2) to divide voltage and get a fixed DC voltage to ENABLE and the charger operates at the corresponding current. Output current is determined by the voltage that divided by resistors. It's also possible to use the external relay control or optical-couple control. The output capacity of optical-couple should be more than 10mA and total value of two resistors should not be less than 1500 Ohms.



c. If the maximum charging current need to be altered at any time, it can be accomplished by changing the voltage between ENABLE and GND. Generally, use PWM to drive the optical-couple. The output of optical-couple goes through RC filter and then connect to ENABLE. The Schematic below shows another way of altering the voltage between ENABLE and GND using PWM output from the BMS.



11. Connector description

No.	PIN	Definition	Schematics	Visual
11-1	1	ENABLE INPUT		<p>SP1310 / P</p>
	2	GND		
	3	+12V internal power supply (Load≤50mA)		
	4	-		
	5	-		
	6	-		
	7	-		

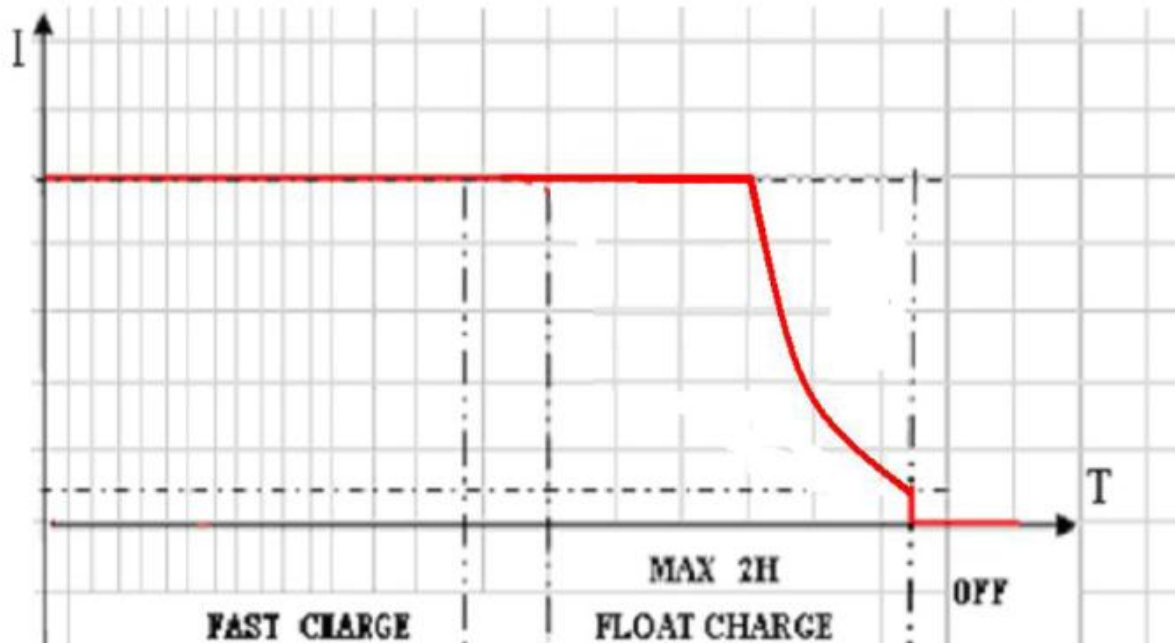
11-2 Select PINs (1, 2, 3) , when using 2-5V to control.

Select PINs (1, 3) , when using Relay and optocoupler to control.

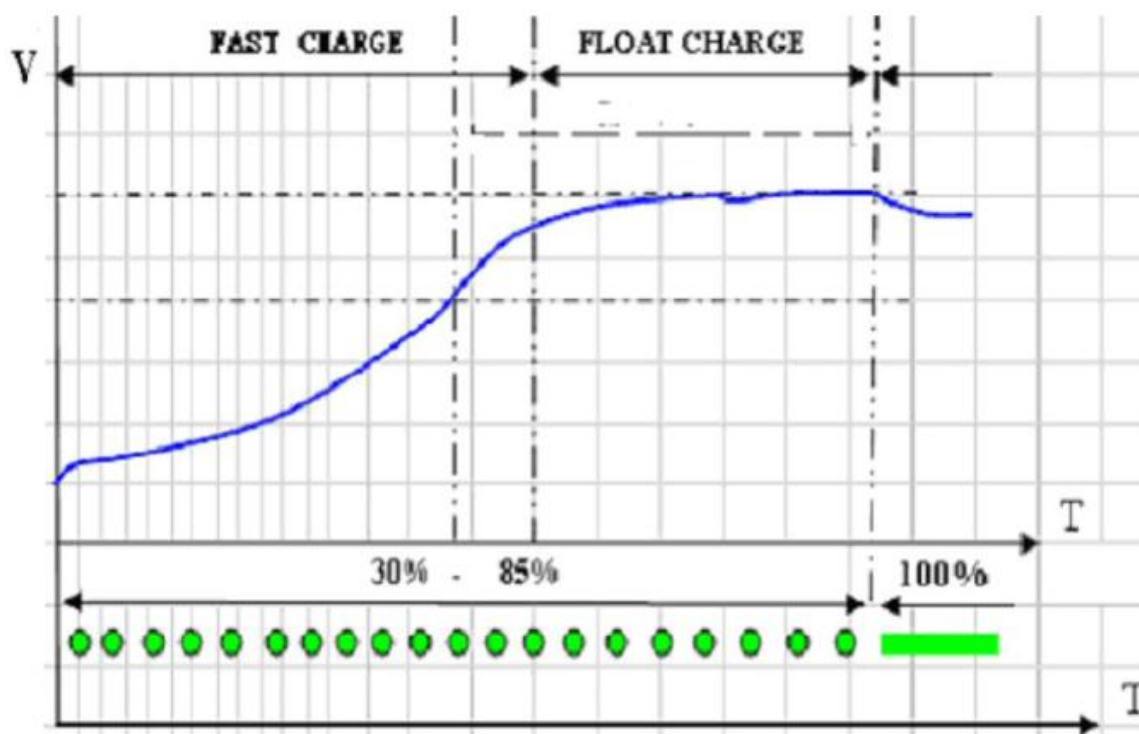
PIN 1: Black PIN 2: Green PIN3: Red



12. Charging curve (current A)



13. Charging curve (voltage V)



<http://www.ev-power.eu>

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