

Ver 1.50.0003

**KCG-2 SWITCH MODE BATTERY CHARGER
USER MANUAL**

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1. Introduction

IGBT, Power CMOSFET and PWM IC controller have been contained in the KCG2 battery chargers. They are automatic high frequency switch mode battery chargers. Please see Diagram 1, block diagram of KCG2. Switch mode technology makes them light, compacted, quiet and have an accurate charge characteristic. 3-stage charging system (constant current, constant voltage and floating, see diagram 2) makes a complete charge and long battery life.

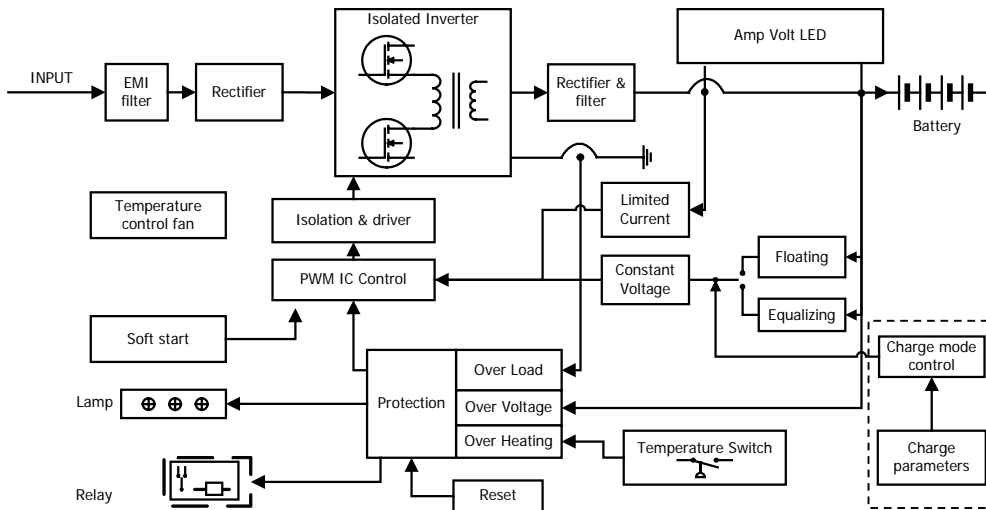


Diagram 1. Block diagram of KCG2

2. Technique Specifications

(1) Power supply:

110VAC, 220VAC, 3 380VAC, 3 440VAC, etc. 50/60HZ

(2) Outputs:

Rated output power = Equalize constant voltage (E. CV) * constant current (CC);

Different battery requires different E. CV, Floating CV (F. CV) and CC values;

Charge voltage (e.g. for 24V battery)

LA battery, we set 28.2V as E. CV and 26.7V as F. CV;

Alkaline battery, we set 31-36V as E. CV and 27.2V as F. CV;

Maximum CC: 20A -- 200A. Depends on battery capacity.

Maximum output power: **10KW**. See Appendix 1 on how to choose voltage and current.

(3) Charge control:

3-stage charge; automatic charge mode control.

A: Constant current

B: Constant Voltage

C: floating

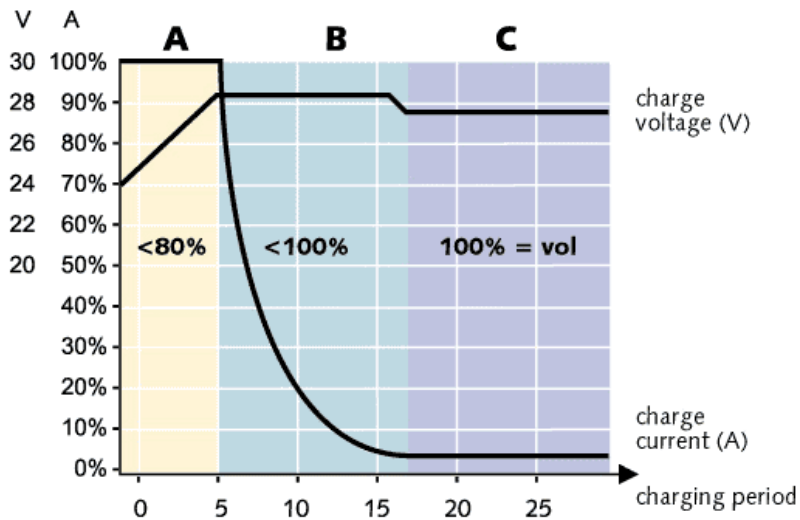


Diagram 2. Recharge voltage/current regulation.

(4) Manual/Automatic* Charge mode control.

*Automatic charge mode control function is optional.

(5) 3-level temperature protection

1. Temperature control fan cooling (about 45)
2. Reduce charge voltage (about 75°C -78°C), resume (about 65°C) *(optional)
3. Over temperature protection (about 80°C -85°C)

(6) Protection:

- over load (manually reset),
- over voltage (manually reset),
- over temperature (auto reset) and
- output short circuit.

- (7) Accuracy:
 - voltage: 0.5%
 - current: 1%
- (8) Low ripple, 0.5% of the charge voltage
- (9) LED digital display:
 - voltage meter display precision: 0.1V
 - amps meter display precision: 0.1A
- (10) Efficiency: higher than 80%
- (11) Operating temperature range: 0~50°C (32~122°F)
- (12) High quality and design for marine.
- (13) Safety class: IP20 or IP44.

3. Operating panel

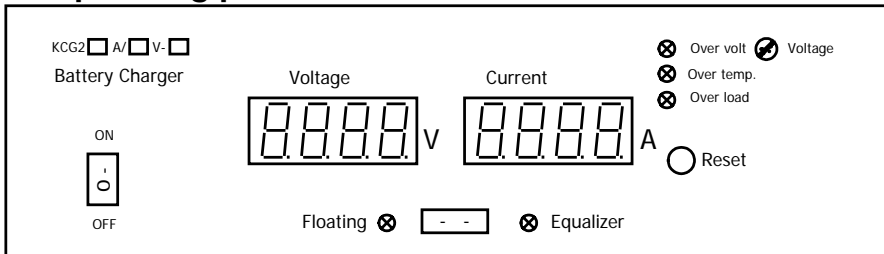


Diagram 3. Front panel outline. (Bench-mounted.)
The ON/OFF switch is on the right hand in the wall-mounted charger.

4. General Information Naming

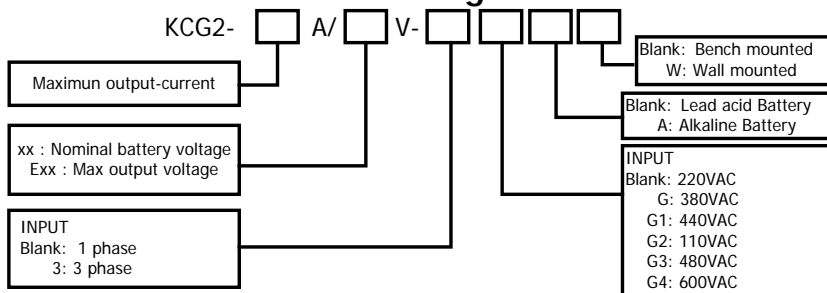


Diagram 4. Naming regulation.

TYPE	Dimensions (L x W x H)	Weight (Kg)
KCG2-100A/80V-3G KCG2-50A/192V-3G	Bench-mounted, 550 x 430 x 160 mm	25-28
KCG2-100A/60V-3G KCG2-100A/48V-3G	Bench-mounted, 520 x 380 x 150 mm	20-22
KCG2-120A/24V-3G	Bench-mounted, 460 x 350 x 128 mm	11-14
KCG2-100A/24V-(3G)		
KCG2-80A/24V-(3G)		
KCG2-60A/24V-(3G)	Bench-mounted, 370 x 310 x 113 mm	8
	Wall-mounted, 350 x 140 x 500 mm	11
KCG2-40A/24V KCG2-40A/12V	Bench-mounted, 350 x 243 x 113 mm	6
	Wall-mounted, 300 x 140 x 400	8

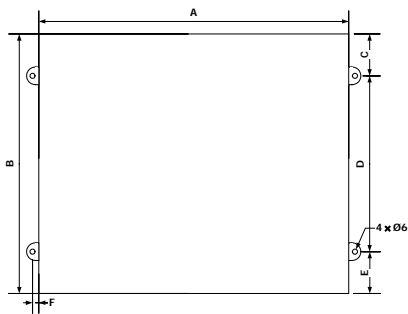


Diagram 6. Installation Figure,
Bench-mounted (Top view)

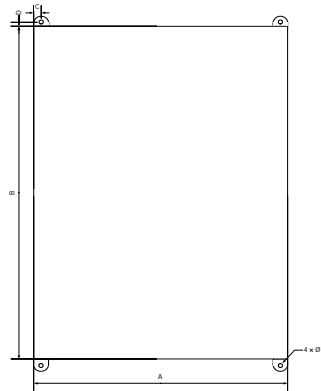


Diagram 7. Installation Figure,
Wall-mounted.

TYPE (Bench-mounted)	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)	F(mm)
KCG2-100A/80V-3G	550	438	100	230	108	8
KCG2-100A/48V-3G	520	388	80	220	88	8
KCG2-120A/24V-3G	460	358	70	210	78	7.5
KCG2-60A/24V	370	318	50	210	58	7.5
KCG2-40A/24V	350	243	50	135	58	7.5

TYPE (Wall-mounted)	A(mm)	B(mm)	C(mm)	D(mm)
KCG2-60A/24V-W	350	500	15	15
KCG2-40A/24V-W	300	400	15	15
KCG2-20A/24V-W				

5. Installation and Operations:

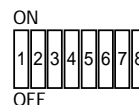
- (1) Ensure a clearance of at least 10 cm around the battery charger to ensure adequate ventilation. The battery charger must not be installed in the vicinity of heat sources or exposed to water. Ventilation slots must not be obstructed.
- (2) The batteries should be connected correctly. Be careful and **DON'T CONNECT REVERSLY**.
- (3) **The input wires and the GND should be connected correctly**. Then input the AC power. The LED digital indicators will light on and show the battery voltage.
- (4) Turn on the **"charge switch"**. The charger is going to work. LED shows charge voltage and current.
You can manually choose **floating** charge or **equalizing** charge by setting the **"charge mode" switch** on the front panel. Two lights indicate the active charge mode.
Note: If the switch position is different from the light, user should turn the switch to the other side, wait 2-3 seconds, and then turn it back to change the charge mode.
- (5) Set the charge stage timer *:

The charger auto-changes the charge mode from **floating** to **equalize** and then to **floating** periodically. Please open the **setup window** on the back (for bench-mounted), and turn the **jumper switches** on or off to set the stage time.

For wall-mounted charger, open the door, the switches are on a little PCB.

Note: The switch index is bench-mounted. The index in parenthesis is wall-mounted.

Switch index->	5(4)	6(3)	7(2)	8(1)
Floating, 7 days	OFF	OFF		
Floating, 10 days	OFF	ON		
Floating, 15 days	ON	OFF		
Floating, 25 days	ON	ON		



Equalizing, 4 hours			OFF	OFF
Equalizing, 6 hours			OFF	ON
Equalizing, 8 hours			ON	OFF
Equalizing, 10 hours			ON	ON

Default setup:
 8-hour equalize charge and
 10-day floating charge:
 5(4): OFF, 6(3): ON,
 7(2): ON, 8(1): OFF

Then the battery will work as follows (See diagram 3):

Constant-current stage: the charge current will be kept at the limitation of the maximum charge-current. While charging, the voltage will go up step by step.

Constant-voltage stage: as soon as it reaches the equalizing voltage, the current will go down step by step with the constant of the voltage. **8 hours** later (including the constant-current stage), the constant voltage changes to floating voltage.

Floating charge stage: this stage lasts **10 days**.

Note: Change charging mode manually will clear the charge stage timer.

(6) Other setup switches *

	1(8)	2(7)	3(6)	4(5)
ON	Reserved	Temperature protection	Timer Test	Enable/disable the auto charge mode control
OFF			Work	

Turn switch 2(7) to **"OFF"** position, the 2nd level temperature protection function (see technique specification 9) will be OPEN. Turn it to **"ON"** position, the function will be closed.

Turn switch 3(6) to **"ON"** position, the charge mode time will decrease to 1/60. For example, if set 8 hours and 10 days timer and set switch 3 to "ON", the timer will be 8 minutes and 4 hours. This will test the timer in a short time.

Turn switch 4(5) to **"ON"** position, the auto charge mode control is enabled; when connect AC power, the charge mode will be at **Equalizing**. Turn it to **"OFF"**, the charge mode can only be changed by turning the "charge mode" switch manually; when connect AC power, the charge mode will be same as the position of the "charge mode" switch.

(7) When protect, over voltage, over temperature or over load, the alarm lamp lights on, the charger stops and the relay picks up *.
 (Normally open: red and green. Normally close: red and black. Relay capacity: 0.3A)

Press the reset button to acknowledge the over-volt and over-load protection and restart the charger. The charger will auto-restart when it is cool, if it over-temperature protects.

(8) **Adjust the constant charge voltage** by the voltage adjuster on the front panel. Turn it clockwise to increase the voltage, counter-clockwise to decrease it.

Warning: the adjustment must be adjusted accurately. **Incorrect charge voltage makes the battery uncompleted charge and short life.**

(9) When connect battery to charger, make sure that **turn off the charge switch to stop charge.**

(10) When connect battery to the output cable, spark will happen. Before connect the battery, turn on the charger without load, and then turn it off. This will eliminate the spark.

(11) Please see your battery document to get more information about how to charge it properly.

*: Optional functions.

Note: Specifications is subject to change without notice.

Appendix 1. Choose charge voltage and current

Voltage: charging voltage per cell × number of cells;

For example, 9 pcs of 12V LA battery in series

Equalize constant voltage, $14.1V \times 9 = 119.7V$,

Floating constant voltage, $13.4V \times 9 = 126.9V$

Current: Battery capacity × charging factor.

If choose 0.1 as the factor, it will take no more than 16 hours to charge the completed discharged battery. If choose 0.2, it will take less than 8 hours to charge the completed discharged battery.

For example, 48V 630Ah battery, Constant current,

$0.1 \times 630 = 63A$. So choose 60A or larger charger;

$0.2 \times 630 = 126A$. Choose 120A or larger charger.