Product Specification

Product name: Intelligent Battery Charger

Product type: Household Automotive Battery Charger

Product Model: AC38

1. Basic Description:

Purpose	The product is special applied 6V/12V Lead-acid battery (Wet, Gel, MF and AGM) and 12.8V 4-cells $LiFePO_4$. The whole charging procedure is under the control of MCU. Product has Memory function which enables charger to return to last selected mode automatically when power is switched on.
Batteries Types	Lead-acid Battery: 6V/12V Wet, Gel, MF and AGM 12V Small Mode: 1.2Ah-12Ah 6V/12V Normal Mode: 12Ah-120Ah Lithium: 12.8V; 4-cells $LiFePO_4$; 8-50Ah
Mode Select Switch	There are 8 different kinds of charging mode, selecting the switch manually. Pb battery Modes: 6V Normal, 6V Cold/AGM, 12V Normal, 12V Cold/AGM, 12V Small, 12V Small Cold/AGM. Special Modes: Lithium, 12V Recover. 1. MODE key is disabling if Vbat<2.0V. 2. MODE key is disabling at ERROR, Reset after battery removed or AC main power restart. 3. MODE key is enabling at battery connected status or charging status, and full charged status. 4. Press once at Pb battery Modes: If Vbat=2.0-7.0V: 6V Normal →6V Cold/AGM → Stand-by → go to loop If Vbat=7.0-14.0V: 12V Normal →12V Cold/AGM → 12V Small → 12V Small Cold/AGM → Stand-by → go to loop. 5. Long press switch 3 sec.: any Pb battery Modes or Standby mode → Special Modes (12V Recover). 6. Press once at Special Modes: 12V Recover → Lithium → go to Standby. If VBat is out of 2.0-14V, 12V Recover Mode is not available, keep original status or charge mode . If Vbat is out of 11.6-13.8V, Lithium Mode is not available, keep original status or charge mode . 7. If current battery voltage can't meet requirements of the remembered mode, just stay at Stand-by, waiting for manual operation. Go to meet the requirements of the mode by the charger system recommended after user press the MODE key.
Indicator	15pcs LED: Details about the function please see LED function instructions.
Input cable	U plug; 0.75mm2, 180cm length
Output cable	1.8m 1.0mm2 charge cable with alligator clip(Black and Red)
Color	Injection color
Dimensions (L x W x H) mm	211.3*84.4*49
Weight(exclude packaging)	775g
Operation Temperature	0℃ to +40℃
Storage Temperature	-30℃- 60℃
Safety Class	Class II
Certificate	CE
Standards	EN 60335-2-29 and EN 60335-1 EN 55014-1, EN 55014-2, EN 61000-3-2 and EN 61000-3-3
Chemical	Rohs, REACH
Housing Protection Class	IP65 (Dust and Water proof)
Noise Level	<50dB (Tested from a distance of 50cm)

2. Rating:

Input	220-240V~ 50Hz 0.6A
Charge Voltage	Normal: 7.3/14.5V DC, Cold/AGM: 7.4/14.7V DC
Charge Current	Small: 0.9A, Normal: 3.8A

3. Electrical Features:

Items	Index	Description

Input Voltage	220-240V~ 50Hz 0.6A	
Stand- By Power	<1W	
Reverse Current	<5mA	
Voltage Tolerance	±0.2V	
Current Tolerance	±10% for 3.8A/3.0A/2.0A/0.9A ±25% for 0.4A（250-500mA）	
Trickle charge	15-50mA	
Charge Control Type	CC	
Short Circuit Protection	Yes	
Reversed Polarity Protection	Yes >1.5V	
High Battery Voltage Protection	Yes	
Over Temperature Protection	yes	
Safety Time Protection	yes	Timer=40hours go to ERROR.
Memory Function	1. Exclude 12V Recover mode and Lithium mode. 2. If select 12V Recover mode or Lithium mode, Remember Stand-by mode. 3. If current battery voltage can't meet requirements of the remembered mode, Just stay at Stand-by, and remember Stand-by mode before user press the MODE key.	Remember the last charge mode if battery removed or power off.
0V battery enable	yes	

4. Charging data:

Item	Index	Description
0V battery charge enable at Stand-by mode	16.5V 60mA max. Pulse at stand-by mode. Charge=0.5S, Stop=2.5S, Still pulse charge until Vbat>2.0V.	
Connected battery voltage	>2.0V	
6V battery voltage charge enable	2.0-7.0V	
12V battery voltage charge enable	7.0-14V	
12.8V Lithium voltage charge enable	11.6-13.8V	
12V Recover enable	2.0-14V	
High Battery Voltage Protection	1. >14V go to ERROR mode when battery connected at first. 2. >7.5V at 6V any charge status go to stand-by mode (but no charge current). 3. >16V at 12V any charge status go to stand-by mode (but no charge current).	
Soft Start Charge Function (include Small/0.9A and Normal/3.8A)	Just into Soft Start mode: 1. 0.9A charge at first (min. 3sec.), go to next if Vbat is raised [12-V(initial)]/3, go to BULK if >12V. 2. 2.0A charge (min. 3sec.), go to next if Vbat is raised [12-V(initial)]/3. go to BULK if >12V. 3. 3.0A charge (min. 3sec.), go to next if Vbat is raised [12-V(initial)]/3. go to BULK if >12V.	6V battery spec.: [6-V(initial)]/3. >6V go to BULK.

5. Steps Data:

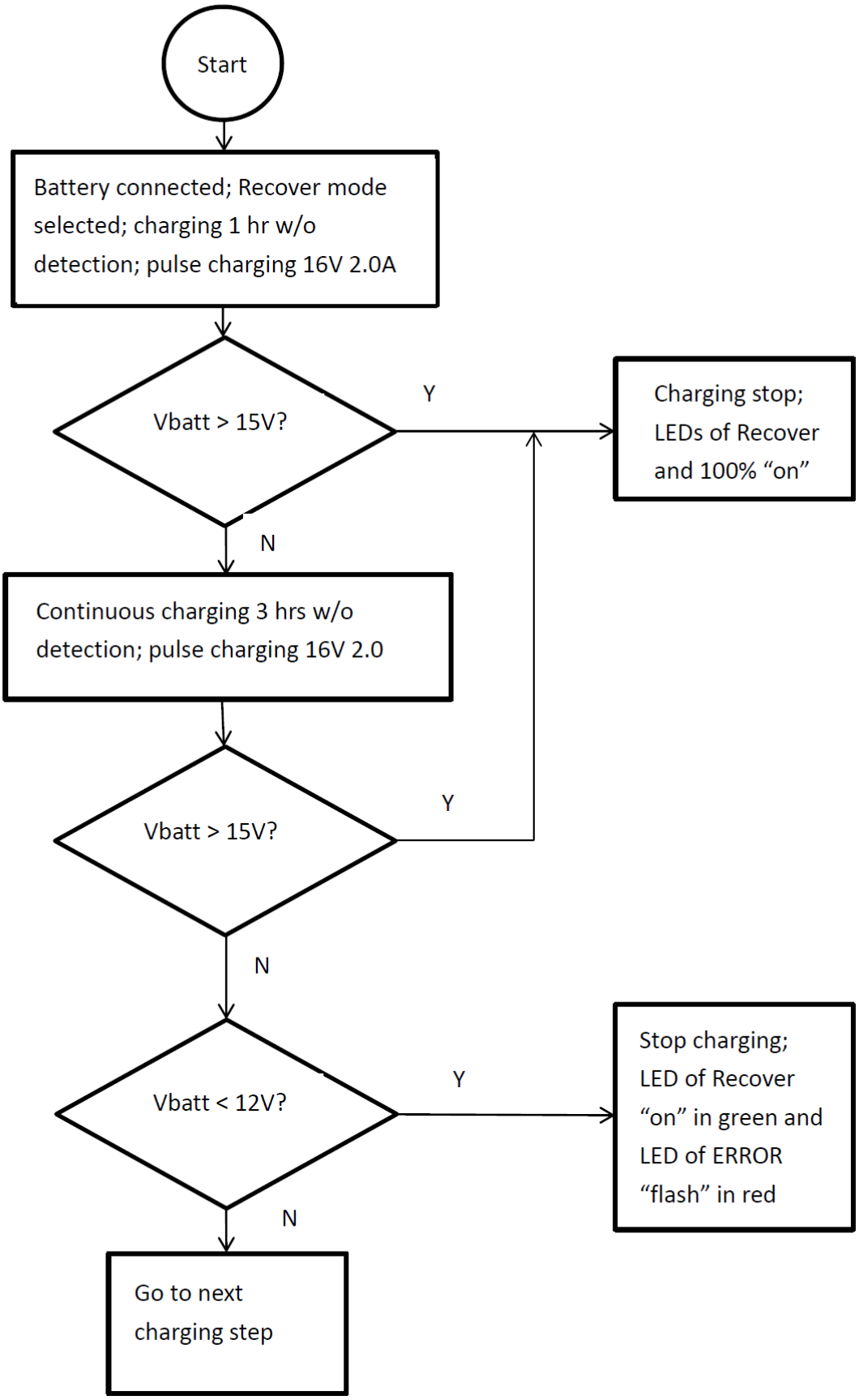
Step	1	2	3	4	5	6	7	8
Name	**Diagnosis**	**Recovery**	**Soft Start**	**Bulk 1**	**Bulk 2**	**Absorption**	**Trickle**	**Maintenance**
Max Time	**3sec.**	**2hours**		**30hours go to next step for Pb 15hours go to ERROR for $LiFePO_4$**		**10hours**	**Break +10hours [Break time: (25-charge hours) if charging hour < 10 hours; otherwise, 6 hours]**	**Depend Voltage**
6V Normal	Check battery If Vbat is 2.0-6V go to next If Vbat is 6-7V jump to step 4, If Vba>7V, this mode is not available	2.0-5.25V 3.0A CC Pulse go to error mode after 2hours. Charge=1.0S Stop=0.5S (charge time min. 3sec.)	5.25-6V See Soft Start charge function.	3.8A CC Voltage rise until 6.9V go to next step	3.0A CC Voltage rise until 7.1V then go to next step,	7.3V 0.9A CC go to next step after 10hours.	After Break time If Vbat drop to 6.5V, then charging with max 50mA until Vbat is 7.4V max. Timer=10hours stop Trickle.	If Vbat drop to 6.4V charging with 0.9A CC until Vbat is 6.8V, then go to trickle charge. If Vbat <6.4V at maintenance, restart charge.
6V Cold/AGM	Same as 6V normal	Same as 6V normal	Same as 6V normal	Same as 6V normal	3.0A CC Voltage rise until 7.1V then go to next step,	7.4V 0.9A CC go to next step after 10hours.	After Break time If Vbat drop to 6.5V, then charging with max 50mA until Vbat is 7.4V max. Timer=10hours stop Trickle.	If Vbat drop to 6.4V, charging with 0.9A CC until Vbat is 6.8V, then go to trickle charge. If Vbat <6.4V at maintenance, restart charge.

12V Normal	Check battery If Vbat is 7.0-12V, go to next step, If Vbat is 12-14V, jump to step 4. If Vbat is 2-7V, battery can't be charged in this mode, use 6V mode first, until Vbat is more than 7V, this mode is available, If Vbat >14V,it is error	7.0-10.5V 3.0A CC Pulse go to error mode after 2hours. Charge=1.0S Stop=0.5S (charge time min. 3sec.)	10.5-12V See Soft Start charge function.	3.8A CC Voltage rise until 13.8V go to next step	3.0A CC Voltage rise until 14.1V then go to next step,	14.5V 0.9A CC go to next step after 10hours.	After Break time If Vbat drop to 13.1V, then charging with max 50mA until Vbat is 14.7V max. Timer=10hours stop Trickle.	If Vbat drop to12.8V, charging with 0.9A CC until Vbat is13.6V, then go to trickle charge. If Vbat <12.8V at maintenance, restart charge.
12V Cold/AGM	Same as 12V normal	Same as 12V normal	Same as 12V normal	3.8A CC Voltage rise until 14.1V go to o next step	3.0A CC Voltage rise until 14.5Vthen go to next step,	14.7V 0.9A CC go to next step after 10hours.	After Break time If Vbat drop to 13.1V, then charging with max 50mA until Vbat is 14.7V max. Timer=10hours stop Trickle.	If Vbat drop to 12.8V, char ing with 0.9A CC until Vbat is 13.6V, then go to trickle charge. If Vbat <12.8V at maintenance, restart charge.
12V Small	Same as 12V normal	7.0-10.5V 0.9A CC Pulse go to error mode after 2hours. Charge=1.0S Stop=0.5S (charge time min. 3sec.)	10.5-12V See Soft Start charge function.	N/A	0.9A CC Voltage rise until 14.1V then go to next step,	14.5V 0.4A CC go to next step after 10hours.	After Break time If Vbat drop to 13.1V, then charging with max 50mA until Vbat is 14.7V max. Timer=10hours stop Trickle.	If Vbat drop to12.8V, charging with 0.4A CC until Vbat is 13.6V, then go to trickle charge. If Vbat <12.8V at maintenance, restart charge.
12V Small Cold	Same as 12V normal	7.0-10.5V 0.9A CC Pulse go to error mode after 2hours. Charge=1.0S Stop=0.5S	10.5-12V See Soft Start charge function.	N/A	0.9A CC Voltage rise until 14.3V hen go to next step,	14.7V 0.4A CC go to next step after 10hours.	After Break time If Vbat drop to 13.1V, then charging with max 50mA until Vbat is 14.7V max. Timer=10hours stop	If Vbat drop to 12.8V, charging with 0.4A CC until Vbat is 13.6V, then go to trickle charge.

		(charge time min. 3sec.)					Trickle	If Vbat <12.8V at maintenance, restart charge
Lithium	0V charge enable, after that, if out of 11.6-13.8V, this mode is not available	N/A	N/A	11.6-13.8V 3.0A Voltage rise until 13.8V go to next step	0.9A CC Voltage rise until 14.1V then go to next step.	14.5V 0.4A CC Full charged after 10hours.	N/A	N/A
12V Recover(+)	Vbat = 2.0-14V at initial: (See Section 6 “Flow chart of 12V Recover mode (Step 1 to 3”)) A. 16V 2.0A Pulse Charge=1.0S Stop=0.5S. B. Charge battery 1 hr without detection. C. Checking the battery voltage; 1. If Vbat>15V, stop charging; LEDs of Recover and “100%” are ‘on’ in green. 2. If Vbat is not >15V, keep charging 3 hrs without detection. D. Checking the battery voltage; 1. If Vbat>15V, go to point C1; 2. If Vbat <12V, stop charging; LED of Recover is “on” in green and LED of ERROR is “on” in red. 3. Otherwise; go to step 4.			3.8A CC Voltage rise until 14.1V go to o next step	3.0A CC Voltage rise until 14.5V then go to next step,	14.7V 0.9A CC go to next step after 10hours.	After Break time If Vbat drop to 13.1V, then charging with max 50mA until Vbat is 14.7Vmax. Timer=10hours stop Trickle	If Vbat drop to12.8V, charging with 0.4A CC until Vbat is 13.6V, then go to trickle charge. If Vbat <12.8V at maintenance, restart charge.

6. Flow chart of 12V Recover mode (Step 1 to 3)

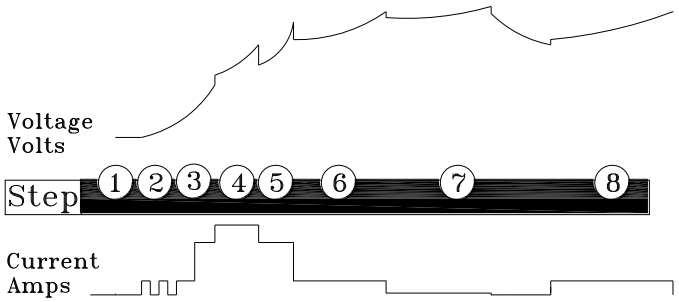
Flowchart of Recover mode



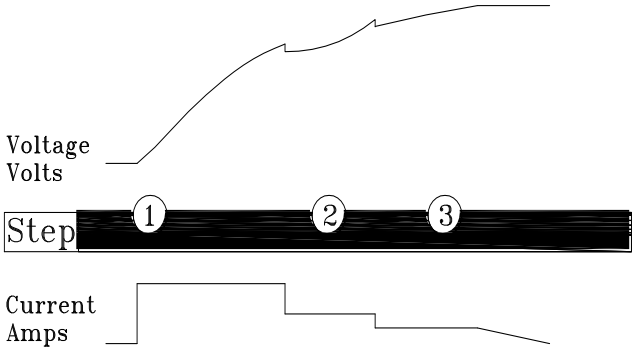
7. LED Indication:

Item	Indication	LED
Power On Reset	All LED flash 2times for self-check.	Flashing: ON=0.5S,OFF=0.5S
Stand-by	ON: no battery at Standby. OFF: Battery Charging.	Color: Pure Green
Error(dual color)	Flashing: 1. Timer>2hours at step2 and step3 Recovery+Soft start charge. (red on) If 12V recover (+) mode <12V after 4hours (red on). 2. Timer>15hours at Lithium Bulk charge. (Green on) 3. Total Timer>40hours at Pb battery modes. (yellow flash) 4. Battery voltage>14V, Vbat=1.0-2.0V (yellow on) 5. Reversed Polarity. (red flash)	Color: Red and Yellow Flashing: ON=0.5S,OFF=0.5S
25%	Flashing: Vbat<6.4/12.8V Steady: Vbat>6.4/12.8V after 3sec. OFF: after full charged	Color: Red Flashing: ON=0.5S,OFF=0.5S
50%	Flashing: 6.4/12.8V<Vbat<6.8/13.6V Steady: Vbat>6.8/13.6V after 3sec. OFF: after full charged	Color: Orange Flashing: ON=0.5S,OFF=0.5S
75%	Flashing: 6.8/13.6V<Vbat<6.95/13.9V Steady: Vbat>6.95/13.9V after 3sec. OFF: after full charged	Color: Yellow Flashing: ON=0.5S,OFF=0.5S
100%	Flashing: 6.95/13.9V<Vbat<full charged Steady: Full charged after 3sec.	Color: Pure Green Flashing: ON=0.5S,OFF=0.5S
6V Normal	Mode selected	Color: Red
6V Cold/AGM	Mode selected	Color: Red
12V Normal	Mode selected	Color: Red
12V Cold/AGM	Mode selected	Color: Red
12V Small	Mode selected	Color: Red
12V Small Cold	Mode selected	Color: Red
Lithium	Mode selected	Color: Red
12V Recover(+)	Steady: Mode selected(3sec.) Flashing: Start charging after Step1 (Diagnosis) started. Steady: after go to 12V Cold charge, timer over 4hours, ERROR and full charged.	Color: Pure Green Flashing: ON=0.5S,OFF=0.5S

8. Charging steps (charging Voltage & charging current)

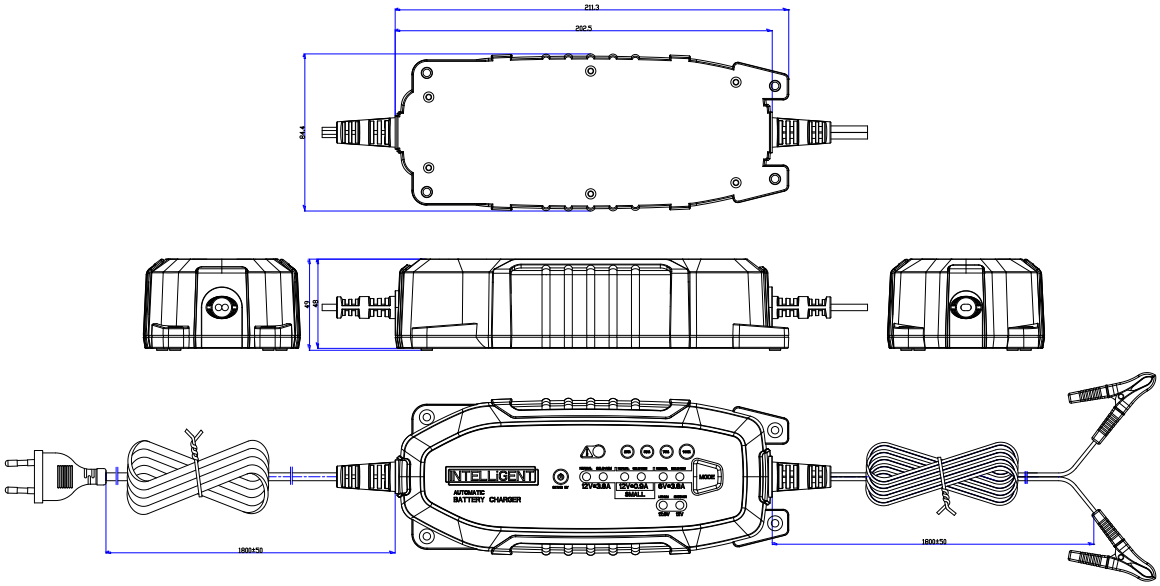


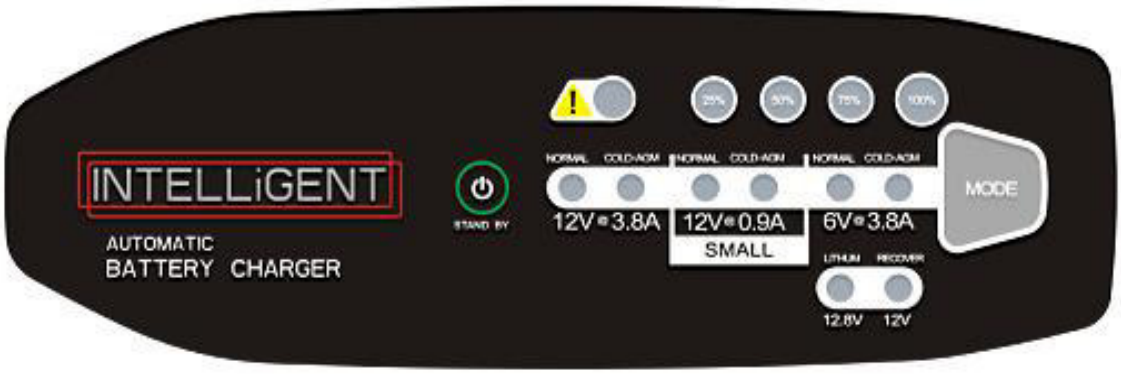
1. Check
2. Rescue
3. Soft start
4. Bulk 1
5. Bulk 2
6. Absorption
7. Trickle
8. Maintaine2



1. Bulk 1
2. Bulk 2
3. Absorption

9. Sketch/photo: Draft




INTELLiGENT
AUTOMATIC
BATTERY CHARGER
STAND BY
NORMAL
COLD-AGM
NORMAL
COLD-AGM
NORMAL
COLD-AGM
MODE
12V 3.8A
12V 0.9A
SMALL
6V 3.8A
LITHIUM
RECOVER
12.8V
12V