



SPECIFICATION

Battery Charger

Model : FSP1800C-1Q01C1

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1. General

The unit is the AC to DC li-ion battery charger with fan cooling. It can operate normally under 58.8Vdc/30A, featuring output current limiting protection, short circuit protection, and reverse polarity protection.

2. Basic characteristics

Input voltage	Output voltage	Charge current	Rated output Power
90~264Vac	58.8V±0.3 V	2A~30A ± 0.6A	1764W

3. Input characteristics:

No	ITEM	SPECIFICATION	REMARK
3.1	Rated Input Voltage:	220Vac ~ 240Vac	
3.2	Input Voltage Range:	90Vac ~ 264Vac	Details in Figure 7-2
3.3	Input Frequency Range:	47Hz to 53Hz	
3.4	Inrush current:	£ 40A	230Vac / 50Hz input, full load, cold start, normal temperature 25 °C
3.5	Input Current:	£ 15A	90Vac, Max load
3.6	Power factor	³ 0.98	Vin=230Vac, Output: V=58.8V/30A

4. Output Characteristics:

No	ITEM	SPECIFICATION	REMARK
4.1	Charging voltage	28V-58.8V±0.3V	

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4.2	Output Ripple & noise	$\leq 200\text{mV}$		0.1uF ceramic capacitor and 47uF electrolytic capacitor paralleled to the output cable and set the oscilloscope bandwidth 20MHz,with battery
4.3	Charge Characteristics	Pre-Charge	Output current: $2.0\text{A} \pm 0.6\text{A}$	Output voltage: $28\text{V} \pm 1\text{V} \sim 41\text{V} \pm 1\text{V}$
		CC-Charge	Output current: $30\text{A} \pm 0.6\text{A}$	Output voltage: $41\text{V} \pm 1\text{V} \sim 53\text{V} \pm 1\text{V}$
		CV-Charge	$58.1\text{V} \pm 0.3\text{V}$	Cut-off current: $2\text{A} \pm 0.6\text{A}$
4.4	Efficiency	$\geq 92\%$		$V_{in}=230\text{Vac}$, Output: $V=58.8\text{V}/30\text{A}$ Remove the loss on the line
4.5	Reverse current	$< 1\text{mA}$		Current from battery into the charger when disconnection AC power
4.6	Recharge Function	$< 53\text{V}$		When battery voltage is below 53V, charger will recharger again.
4.7	Flow chart			Follow CAN command

5. Protection Characteristics

No	ITEM	SPECIFICATION	REMARK
5.1	Over voltage protection (Firmware protection)	$\leq 64\text{V} \pm 1\text{V}$	The charger can protect, stops charging. That will be return to normal state by AC reset.
5.2	Over voltage protection (Hardware protection)	$\leq 67\text{V}$	No output voltage. Power latch. That will be return to normal state by AC reset.
5.3	Output short circuit protection	No fire, no smoke and no safety issue.	An overload or short circuit is applied between V_{o+} and V_{o-} , the power supply shall shut down and enter latch mode.
5.4	Battery reverse polarity protection	No fire, no smoke and no safety issue.	When the battery polarities are connected reversely, stop charging. After the fault is removed, reconnect AC power to resume normal.

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5.5	Charger Thermal protection	No fire, no smoke and no safety issue.	The charger is with an internal over temperature protection to cut-off charger output power to prevent the damage. That will be return to normal state after temperature goes down.
5.6	Primary side over current protection	Fuse open	Mount a fuse of proper characteristics on primary side.
5.7	Timing protection	8hour±10minutes (It can modify for customized Specifications)	28V£Vbat<41V,After the battery start charge, if the charging time is more than 8hour±10minutes, the charger stops charging.
		8hour±10minutes(It can modify for customized Specifications)	41V£Vbat<58.8V, After the battery start charge, if the charging time is more than 8hour±10minutes, the charger stops charging.
5.8	Battery undervoltage protection	£25V	The charger can protect, stops charging. That will be return to normal state by AC reset.

6. LED Indicator:

No	ITEM	SPECIFICATION	REMARK
6.1	Stop AC	LED off	
6.2	Standby mode (No battery)	Green light	
6.3	Full charge		
6.4	Charge mode	Flash Green light	
6.5	Emergency mode	Red and green light	42V 2A for 60sec after AC on, if battery voltage is not detected.
6.6	Error Mode	Flash red light	Input over voltage and under voltage
		Red light	OVP/UVP/OCP /OTP/BAT_ERR BAT_ERR :Battery voltage out of range in initial detect

7. Environmental Characteristics:

No	ITEM	SPECIFICATION	REMARK
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7.1	Electron Static Discharge Refer to IEC61000-4-2	Normal operation shall be continued	Air Discharge: ± 8 KV Contact Discharge: ± 6 KV
7.2	Electrical Fast Transient/Burst Refer to IEC61000-4-4	Normal operation shall be continued	Impulse: 2KV/5KHz/1min , Class B
7.3	Lightning Surge: Refer to IEC61000-4-5	Normal operation shall be continued	AC Line to Line: ± 6 KV AC Line to PE: ± 6 KV 8/20us , Class B
7.4	Conducted Radio Frequency Disturbance Refer to IEC 61000-4-6	Normal operation shall be continued	3V 1KHZ 0.15-230MHZ , Class A
7.5	Voltage Dip & interruptions IEC 61000-4-11	Normal operation shall be continued	
7.6	MTBF	$\geq 300,000$ Hrs	230Vac / Max. load / 25°C (SR-332)
7.7	Burn-in		Rated input voltage, 80%~100% load , 40+/-5°C
7.8	Safety conforming:		IEC/EN 60335-1 IEC/EN 60335-2-29
7.9	EMI		EN55014-1
7.10	Fan noise	ISO7779 bystander sound pressure level noise test	£50 dB
7.11	Protection level	IP65	Except for Fan, Fan is IP55
7.12	Leakage Current:	£ 3.5mA	240Vac / 50Hz
7.13	Dielectric Strength: (Hi-Pot)	≤ 10 mA/test time 1 minute	7.13.1 Between AC input and secondary applied 3000Vac or 4242Vdc 7.13.2 AC input and PE 1500Vac or 2121Vdc 7.13.3 secondary out and signal with PE 500Vac or 707Vdc
7.14	Insulation resistance: (IR)	≥ 100 MW(min.)	DC 500V
7.15	Operating temperature	-25~+65°C	Details in Figure 7-1

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7.16	Storage temperature	-40~+80°C	
7.17	Humidity	10%~90%	
7.18	Altitude	3000£ meters	
7.19	Cooling:	Cooled by fan	Fan IP55
7.20	Drop Test	Weight Drop high < 10kg 0.10m 10~25kg 0.075m 25~50kg 0.05m ≥50kg 0.025m Surface : S1 ; Corner : E1、E3 ; Angel : C1、C2 one drop each	Non-packed

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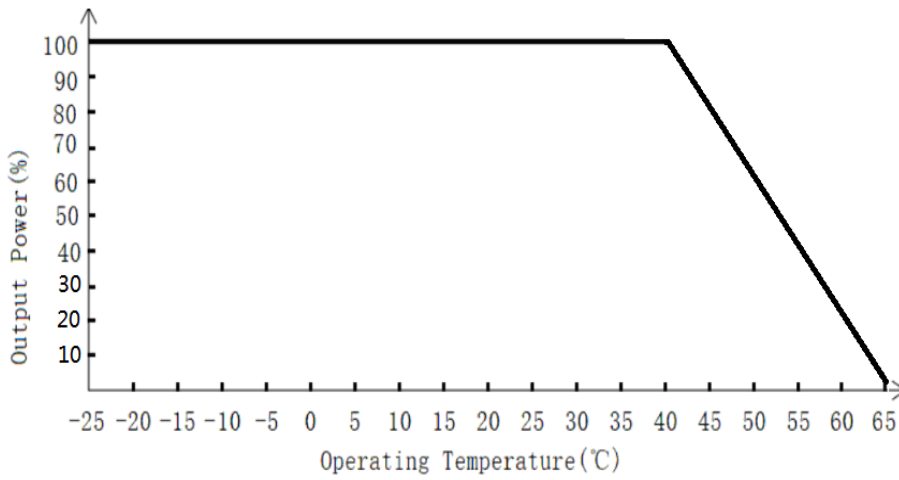


Figure 7-1

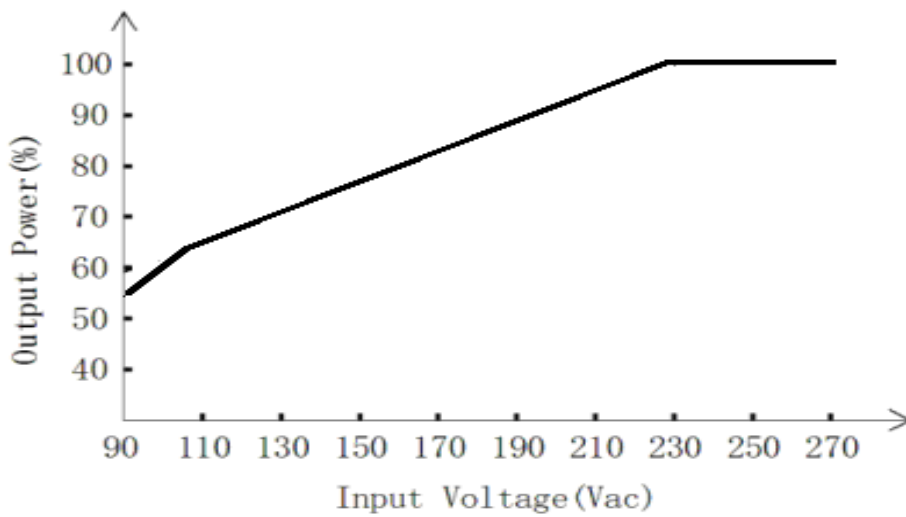


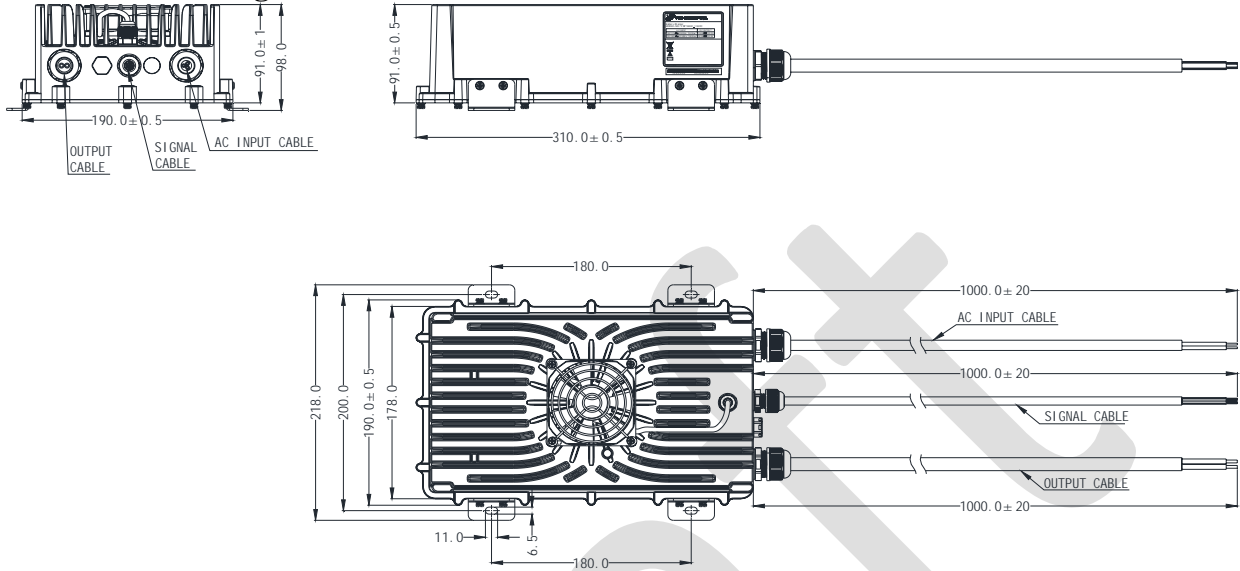
Figure 7-2

8. Mechanical characteristics:

No	ITEM	SPECIFICATION	REMARK
8.1	Dimension (Length x Width x Height):	310mm * 190 mm * 91mm	
8.2	Input AC Type:	Single phase	
8.3	Weight	excluding wire 5KG	
8.4	Mechanical Drawing	Referring as below	

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Mechanical Drawing:



Cable	Definition	Wire Color	REMARK
INPUT Cable	AC Input L	Brown	
	AC Input N	Blue	
	AC Input PE	Yellow/Green	
SIGNAL Cable	COM_GND	Black	The Gnd of Interlock and Vok
	Interlock	Red	High Operation(>3.3V)
	Vok(11.4-12.6Vdc output/0.3A)	Yellow	
	CANH	Green	
	CANL	Gray	
	NC	White	
	NC	Orange	
	NC	Brown	
OUTPUT Cable	DC Output +	Red	
	DC Output -	Black	

9. CAN Protocol

CAN Baud Rate	250K
Charger Receiving CAN ID	0x483
Charger Transmitting CAN ID	0x503

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Communication Specification :

Message1 :

From	To	ID	Cycle(ms)
BMS	CHG	0x483	200
Data			
Position	Data Name		
BYTE1	Max Allowable Charging Terminal Voltage Low Byte	0.1V/bit , Offset : 0 , e.g. : Vset =58.80 , its corresponding 58.8V	
BYTE2	Max Allowable Charging Terminal Voltage High Byte		
BYTE3	Max Allowable Charging Current Low Byte	0.1A/bit , Offset : 0 , e.g : Iset =300 , its corresponding 30A	
BYTE4	Max Allowable Charging Current High Byte		
BYTE5	Control	1 : Enable charger output. 0 : Disable charger output.	
BYTE6	Reserved		
BYTE7	Reserved		
BYTE8	Reserved		

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Message2 :

From	To	ID	Cycle(ms)
CHG	BCA (Broadcast)	0x503	1000
Data			
Position	Data Name		
BYTE1	Output Voltage Low Byte	0.1V/bit , Offset : 0 , e.g. : Vget =58.80 , its corresponding 58.8V	
BYTE2	Output Voltage High Byte		
BYTE3	Output Current Low Byte	0.1A/bit , Offset : 0 , e.g : Iget =300 , its corresponding 30A	
BYTE4	Output Current High Byte		
BYTE5	STATUS Flags		
BYTE6	Reserved		
BYTE7	Reserved		
BYTE8	Reserved		

STATUS	Flag	Description	
Bit0	Input voltage protection(under or over)	0 : Normal	1 : Fault
Bit1	Over temperature protection	0 : Normal	1 : Fault
Bit2	Output over current protection	0 : Normal	1 : Fault
Bit3	Output over voltage protection	0 : Normal	1 : Fault
Bit4	Output under voltage protection	0 : Normal	1 : Fault
Bit5	Reserved	0 : Normal	1 : Fault
Bit6	Communication failure	0 : Normal	1 : Fault
Bit7	Battery error	0 : Normal	1 : Fault
		Battery voltage out of range in initial detect	

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Note :

1. BMS send operating message (Message 1) at fixed interval 200ms. After receiving message, charger will work under the voltage and current in the Message 1. If the message was not received within 5s charger will enter into communication failure. During the 120s without BMS message charger will follow the last valid message. Turn off output after 120s.
2. If the charger does not receive the BMS command in 5s after AC on, charger will follow 4.3 Process Definition.

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