

LMP1218-PWM

Master Power Unit



Version: A1.3

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5min



WARNING: HIGH VOLTAGE INSIDE

CAUTION: THE DC FUSE MUST HAVE BEEN TURNED OFF BEFORE SERVICING

MADE IN CHINA

Disclaimer

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About this Manual

This manual describes our product features and provides procedure of installations. This manual is for anyone intending to install our equipment.

General Instruction

Thanks for choosing our products and this manual were suitable for LMP1218-PWM Master Power Unit.

This chapter contains important safety and operation instructions. Read and keep this User Guide well for later reference.

The LMP1218-PWM Master Power Unit needs to be installed by professionals and please pay attention to the following points prior to installation:

- 1) Please check the input voltage or voltage of battery is same to the nominal input voltage of this unit.
- 2) Please connect positive terminal “+” of battery to “+” input of this unit.
- 3) Please connect negative terminal “-” of battery to “-” input of this unit.
- 4) Please use the shortest cable to connect and ensure the secure connection.
- 5) While connecting, please secure the connection and avoid short cut between positive terminal and negative terminal of battery, which will cause damage of battery.
- 6) This unit will have high voltage inside. Only authorized electrician can open the case.
- 7) This unit WAS NOT designed to use in any life retaining equipment.

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1. General Safety Instruction

1.1 Safety Instruction

As dangerous voltages and high temperature exist within the LMP1218-PWM Master Power Unit, only qualified and authorized maintenance personnel are permitted to open and repair it. Please make sure the unit is turned off before open and repair it.

This manual contains information concerning the installation and operation of LMP1218-PWM Master Power Unit. All relevant parts of the manual should be read prior to commencing the installation. Please follow the local stipulation meantime.

Any operation against safety requirement or against design, manufacture, safety standard, and are out of the manufacturer warranty.

1.2 General Precaution

- 1) Do not expose to dust, rain, snow or liquids of any type, it is designed for indoor use. DO NOT block off ventilation, otherwise the LMP1218-PWM Master Power Unit would be overheating.
- 2) To avoid fire and electric shock, make sure all cables selected with right gauge and being connected well. Smaller diameter and broken cable are not allowed to use.
- 3) Please do not put any inflammable goods near to this unit.
- 4) Never place this unit directly above batteries, gases from a battery will corrode and damage LMP1218-PWM Master Power Unit.
- 5) Do not place battery over LMP1218-PWM Master Power Unit.

1.3 Precaution regarding battery operation

- 1) Use plenty of fresh water to clean in case battery acid contacts skin, clothing, or eyes and consult with doctor as soon as possible.
- 2) The battery may generate flammable gas during charging. NEVER smoke or allow a spark or flame in vicinity of a battery.
- 3) Do not put the metal tool on the battery, spark and short circuit might lead to explosion.
- 4) REMOVE all personal metal items such as rings, bracelets, necklaces, and watches while working with batteries. Batteries can cause short-circuit current high enough to make metal melt, and could cause severe burns.

2. LMP1218-PWM INTRODUCTION

2.1 Features

- Smart battery charger 12V18A
 - ✧ Active PFC charging
- 16 Fused DC outputs, including water pump and lighting central control.
- Battery charging relay 12V 30A
- Battery Low Voltage Protection
- Built in Main Switch to isolate the battery when in storage
- Support external remote Main switch
- Control one water pump with two tank probes
- Solar charger controller (PMW), 15A

2.2 LED Display

Table 1 LED indication

NO.	LED	Color	Status	Description
1	CHG	Green	ON	Battery charged
			Flashing (flash once every second)	Battery charging
			OFF	Battery discharge
2	Dischg	Orange	ON	Battery discharging
			OFF	Battery charging
4	CHG/ Dischg	Green/Orange	Both ON	Power supply

3. KEY FEATURES AND FUNCTIONS

3.1 Multiple inputs

LMP master power unit may have multiple sources at one time. These sources include the Shore power, Solar panel and Alternator (Motor battery). There is priority among these sources, but LMP allows several sources to charge auxiliary battery at the same time. The priorities are listed below.

Table 2 Energy sources priority

AC Mains	✓	✓	✓		
Solar panel	✓	✓		✓	✓
Alternator (Motor battery)	✓		✓	✓	
Dominating Source	AC mains + Solar panel	AC mains + Solar panel	AC mains	Alternator + Solar panel	Solar panel

3.2 Battery Charger of Auxiliary Battery

The charger automatically starts when the appropriate qualified power is connected, either from grid, generator. With multiple charging stages (soft start-bulk absorption float-recycle), LMP1218-PWM is designed to fully charge battery quickly. To guarantee the optimal charging for batteries of different states, the LMP1218-PWM features Microprocessor-controlled charging algorithm. The Float and Recycle charging programs guarantees the battery being charged properly upon being connected for a longer period.

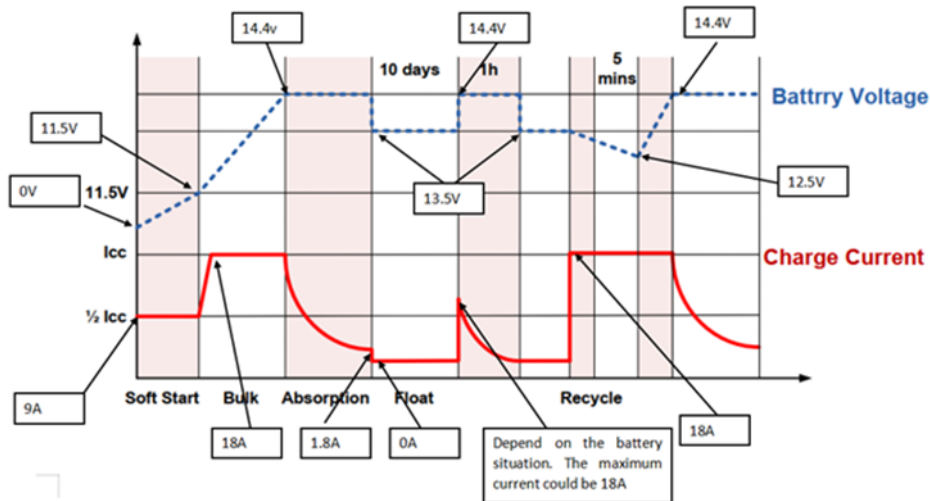


Figure 1 Charging algorithm for lead-acid battery

3.3 Lithium battery charging

The LMP1218-PWM can be configured to charge Lithium battery.

3.4 Power Supply Mode

If no battery is attached to LMP1218-PWM unit, it will work as a power supply automatically with a 12.8VDC output.

3.5 PWM Solar charger controller

LMP has a built-in PWM charger for the service battery.

- ✧ Max open voltage is 30VDC
- ✧ Max supply current is 15A

3.6 Voltage Charging Relay (VCR)

LMP1218-PWM Master Power Unit has a built-in voltage charging relay (VCR), which can get power from alternator to supply the system whilst the engine is running.

Here is the working logic of VCR

Table 3 VCR working logic

		D+ Enabled	D+ Disabled
LFP battery	Disengage	VCR will be disengaged immediately if no D+ is sensed or detected	VCR will be disengaged when alternator/motor battery's voltage is less than 13.5V and charging current is less than 2A for 60S
	Engage	VCR will be engaged when: 1) D+ is sensed or detected; 2) Alternator or motor battery's voltage is greater than 14.0V for 10S	VCR will be engaged when alternator or motor battery's voltage is greater than 14.0V for 10S
AGM/GEL battery	Disengage	VCR will be disengaged immediately if no D+ is sensed or detected	VCR will be disengaged when alternator or motor battery's voltage is less than 12.8V for 60S
	Engage	VCR will be engaged when: 1) D+ is sensed or detected; 2) Alternator or motor battery's voltage is greater than 12.0V for 10S	VCR will be engaged when alternator or motor battery's voltage is greater than 13.4V for 10S

Remarks:

- a. **D+ enabled means the LMP box has sensed or detected D+ once, afterwards LMP box would deem it as D+ enabled**
- b. **D+ disabled means the LMP box has never sensed or detected D+, so LMP box would deem it as D+ disabled**

3.7 Battery Low Voltage Protection (BLVP)

LMP1218-PWM master power unit has a built-in low voltage protection relay. The protection is decided by battery type lithium battery or lead acid battery. Below please find the protection and resume value:

Table 4 Low voltage protection and resume

Protection	Threshold value
Low voltage protection	GEL/WET/AGM: 10.8+/-0.3Vdc
	LFP: 11.2+/-0.3Vdc
Low voltage protection resume	AGM/GEL/WET: 11.8+/-0.3Vdc
	LFP: 12.2+/-0.3Vdc

Remarks:

- a. There will be 60 seconds as time delay before above protection or resume

3.8 DC Distribution

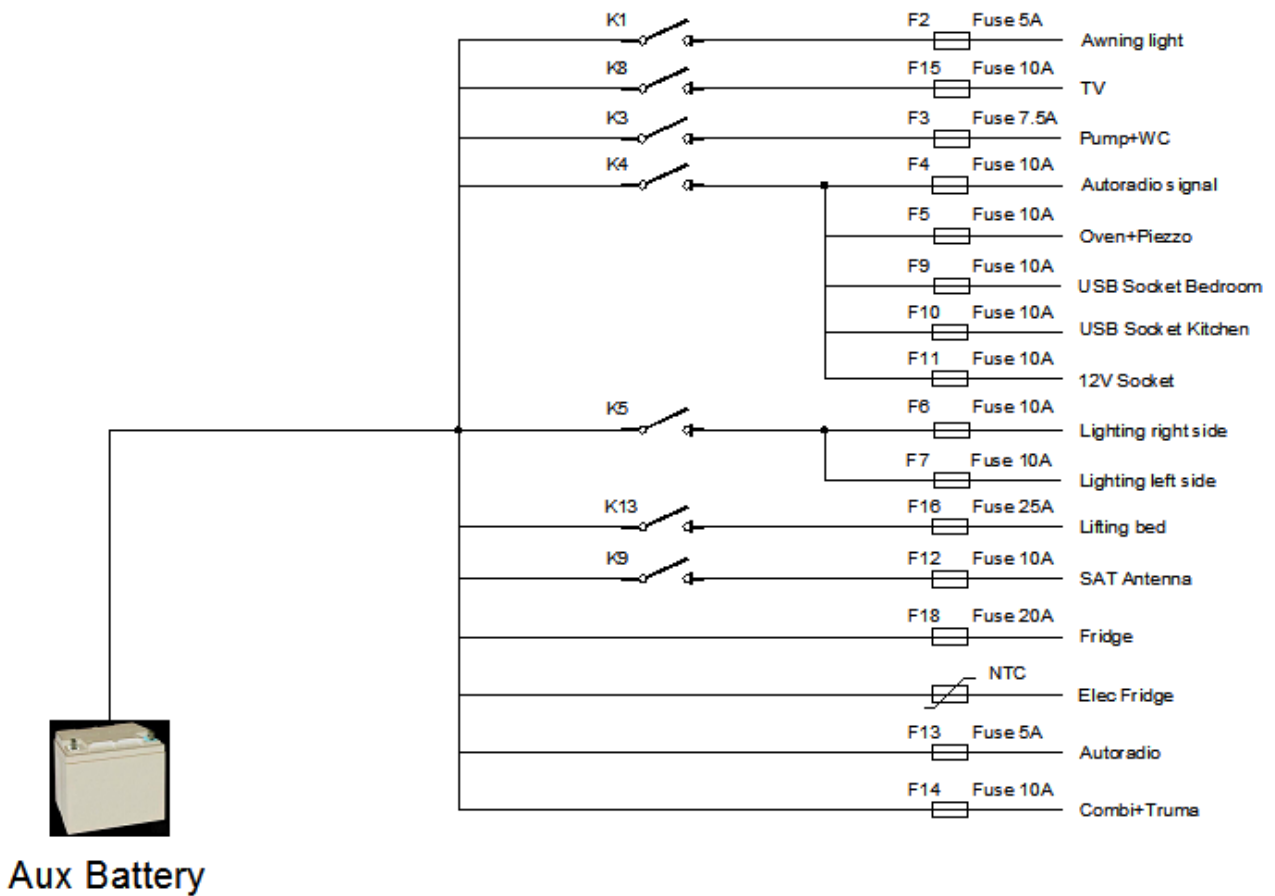


Figure 2 DC distribution schematic diagram

4. STRUCTURE AND INSTALLATION

4.1 LMP1218-PWM Master Power Unit

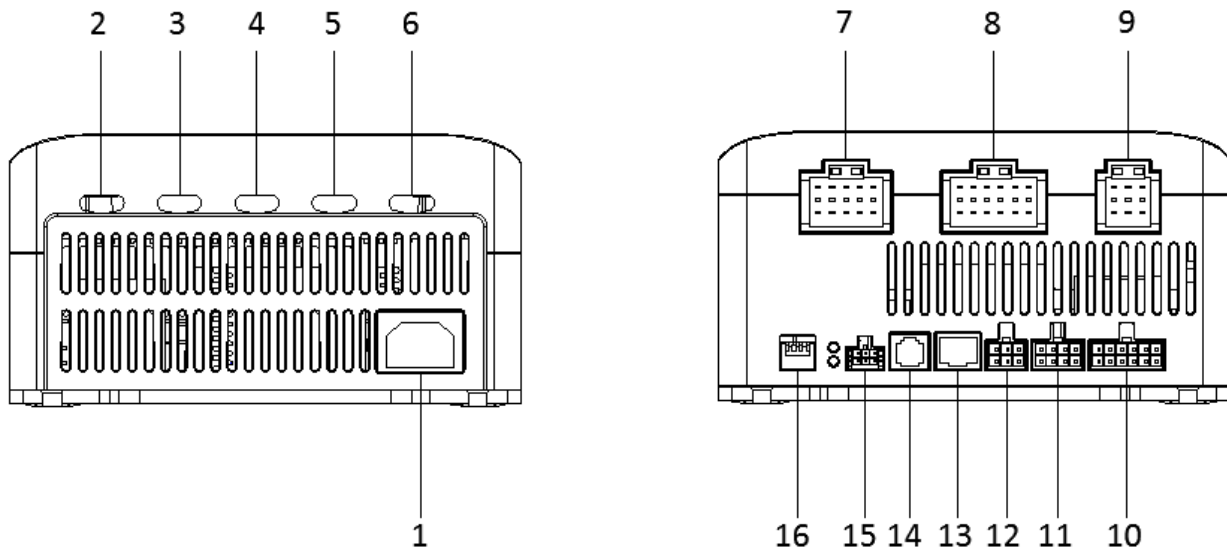


Figure 3 Connectors at front and back

Table 5 Connector description

No.	DEFINITION	LABEL	DESCRIPTION
1	AC input port	/	AC input port
2	/	PV	Connect to PV Panel
3	/	Fridge	Connect to fridge
4	/	Lifting Bed	Connect to lifting bed
5	/	Motor BAT	Connect to Motor BAT
6	/	AUX BAT	Connect to AUX BAT
7	Loads	[1]1	POS : Awning lamp
		[1]2	GND :
		[1]3	POS : Info D+ Frigde
		[1]4	POS : Side lights
		[1]5	GND : Side lights
		[1]6	POS : Info D+ SAT antenna
		[1]7	POS : Pump + WC
		[1]8	GND : Pump + WC
		[1]9	POS : Info D+ Preheating pump
		[1]10	POS : Autoradio Signal
		[1]11	GND :
		[1]12	GND :
		[1]13	POS : Oven + Piezzo
		[1]14	GND : Oven +Piezzo

		[1]15	GND : Buzzer Footstep
8	Loads	[2]1	POS : Lighting Right side
		[2]2	GND : Lighting Right side
		[2]3	POS : Buzzer Footstep
		[2]4	POS : Lighting Left side
		[2]5	POS : Lighting Left side
		[2]6	GND: In/Out Footstep (COM)
		[2]7	POS : Power Tablet
		[2]8	GND : Power Tablet
		[2]9	Out Footstep (Normally Open)
		[2]10	POS:
		[2]11	GND:
		[2]12	In Footstep (Normally Open)
		[2]13	POS + Plug 12V Kitchen
		[2]14	GND - Plug 12V Kitchen
		[2]15	M1 - Footstep
		[2]16	POS + Plug USB Kitchen/Bedroom
		[2]17	GND - Plug USB Kitchen/Bedroom
		[2]18	M2 -Footstep
9	Loads	[3]1	POS : Permanent Autoradio
		[3]2	GND :
		[3]3	POS : SAT antenna
		[3]4	POS : Combi + TRUMA/ALDE control
		[3]5	GND : Combi + TRUMA/ALDE control
		[3]6	GND : Elec Fridge
		[3]7	POS : TV
		[3]8	GND : TV
		[3]9	POS : Elec Fridge
10	Signal terminal	[7]1	D+ (active high +BAT)
		[7]2	Switch ON/OFF (COM)
		[7]3	D+ (active down GND)
		[7]4	
		[7]5	Sidelights (active high +BAT)
		[7]6	+APC (active high +BAT)
		[7]7	Sidelights (active down GND)
		[7]8	+APC (active down GND)
		[7]9	Switch ON/OFF (NO)
		[7]10	Footboard End of stroke (COM)
		[7]11	Footboard End of stroke (NO)
		[7]12	
11	Grey water tank	[6]1	CW-REF
		[6]2	CW-25%
		[6]3	CW-50%
		[6]4	

		[6]5	CW-75%
		[6]6	CW-100%
		[6]7	
		[6]8	
12	Fresh water tank	[5]1	CW-REF
		[5]2	CW-25%
		[5]3	CW-50%
		[5]4	CW-75%
		[5]5	CW-100%
		[5]6	
13	RS485 port		Connect to RS485 bus(Optional)
14	CI Bus port		Connect to CI bus(Optional)
15	Communication port	[4]1	
		[4]2	GND
		[4]3	GND
		[4]4	+12V
		[4]5	CAN H
		[4]6	CAN L
16	DIP Switch	1 VCR	Set the battery type, VCR and Mode
		2 Mode	
		3 Bat type	
		4 Bat type	

4.2 Installation

For good ventilation, ensure empty space of at least 5 cm on each side of the LMP1218-PWM unit.

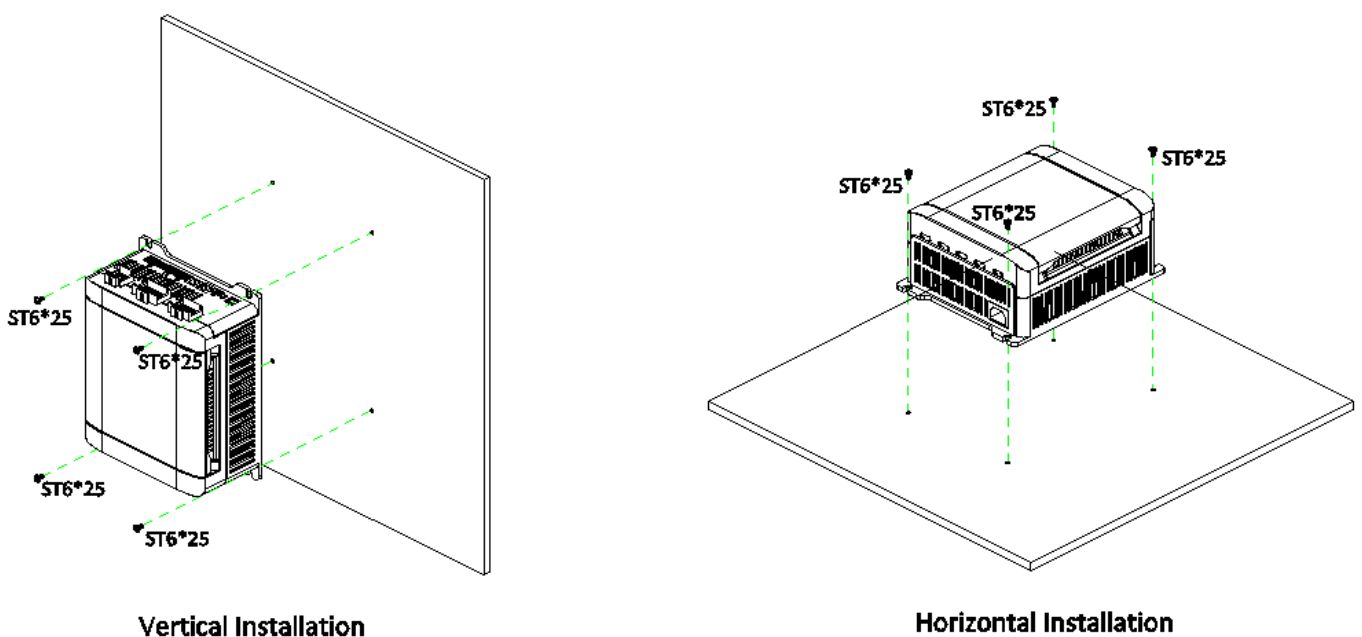


Figure 4 Installation

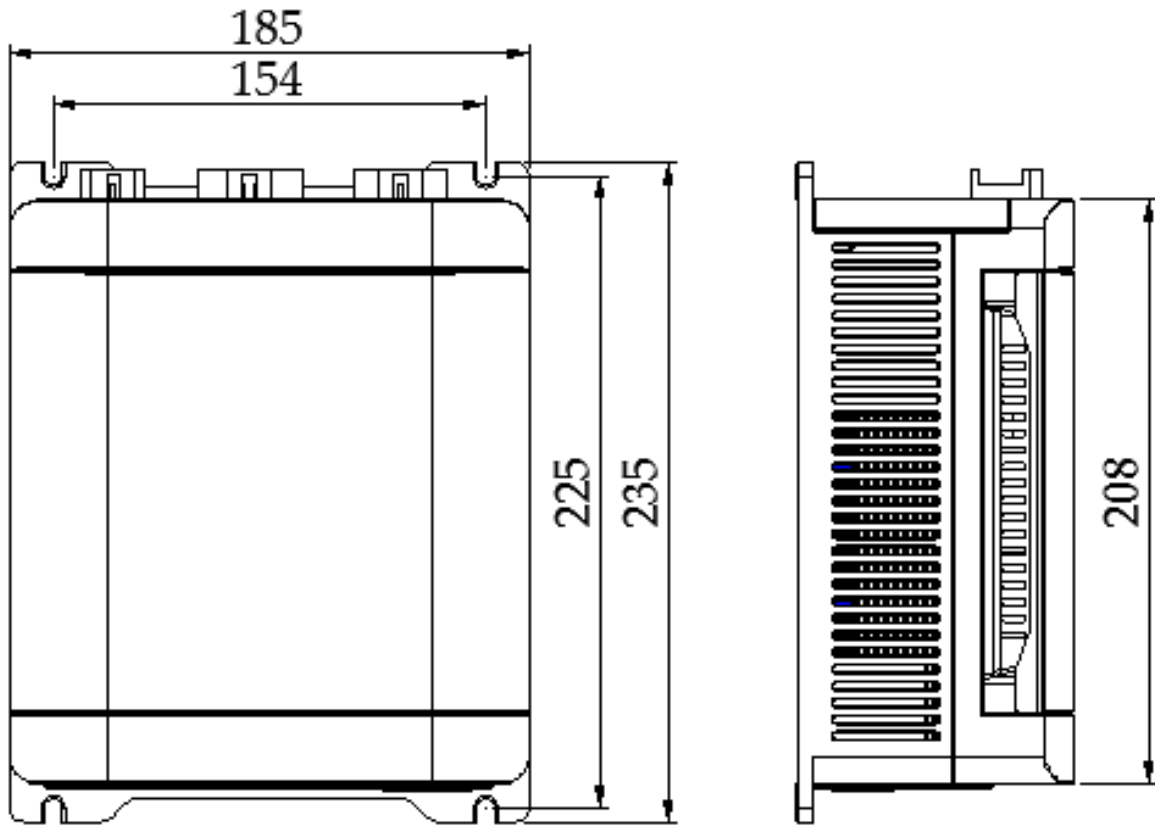


Figure 5 Dimensions of LMP1218-PWM

4.3 Fuse specification

Here is a list for the fuses installed on LMP1218-PWM. Please also take reference of Figure 2.

Table 6 Fuse specification list

Fuse No.	DC loads	Specification
F2	Awning light	5A
F3	Pump	7.5A
F4	Auxiliarie	10A
F5	Oven	10A
F6	Lighting 1	10A
F7	Lighting 2	10A
F9	USB Socket Bedroom	10A
F10	USB Socket Kitchen	10A
F11	12V Socket Kitchen	15A
F12	Permanent SAT Antenna	10A
F13	Permanent Autoradio	5A
F14	Permanent Heating System	10A
F15	Permanent TV-Demodulator	10A
F16	Lifting Bed	25A
F18	Permanent Fridge	20A
F19	Footboard	20A
F20	AUX BAT	50A
F21	Motor BAT	50A
F1	By-pass Pump	25A
F8	By-pass Lighting	25A
F17	By-pass Lifting	25A

5. OPERATION

5.1 Configuration on LMP1218-PWM

You need to set the battery type, VCR and Mode through LMP1218-PWM master power unit.

5.1.1 Dip switch setting

There are dip switches for you to set VCR mode, Working mode and Battery type.

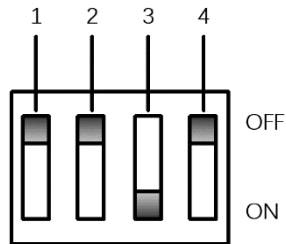


Figure 6 Dip switch (Example of LFP battery)

Table 7 Dip switch definition

DIP SWITCH	1	2	3	4
	VCR mode	Working mode		Battery type

5.1.1.1 Dip switch for VCR mode and Working mode

Table 8 Dip switch for VCR mode and Working mode selection

VCR mode	off	Built-in VCR (Default setting)
	on	Ex-DC/DC
Working mode	off	Charger (Default setting)
	on	Power supply

a) VCR mode

There are two VCR modes for optional:

- Integrated VCR: when this mode is selected, the integrated VCR is activated, i.e. 18A
- Ex-DC / DC: When this mode is selected, the integrated VCR is deactivated; and an IDM NEMO type external DC-DC booster can be connected to replace this integrated VCR

Caution If Booster set the VCR to ON and only for LEP lithium batteries

b) Working mode

There are two working modes for optional:

- Charger: When this mode is selected, the LMP will operate as a charger to charge the auxiliary battery as long as the grid or qualified PV is introduced
- Power supply: when this mode is selected, the LMP will produce a stable voltage of 12.8 Vdc to power the connected DC loads

5.1.1.2 Dip switch for battery setting

Table 9 Dip switch for battery type setting

Battery type		
off	off	AGM
off	on	GEL
on	off	LFP
on	on	WET

5.1.1.3 External Main Switch (Optional)

LMP1218-PWM offers a possibility to connect with an external main switch, which allows user to turn on/off the auxiliary battery output remotely.



Figure 7 Main switch

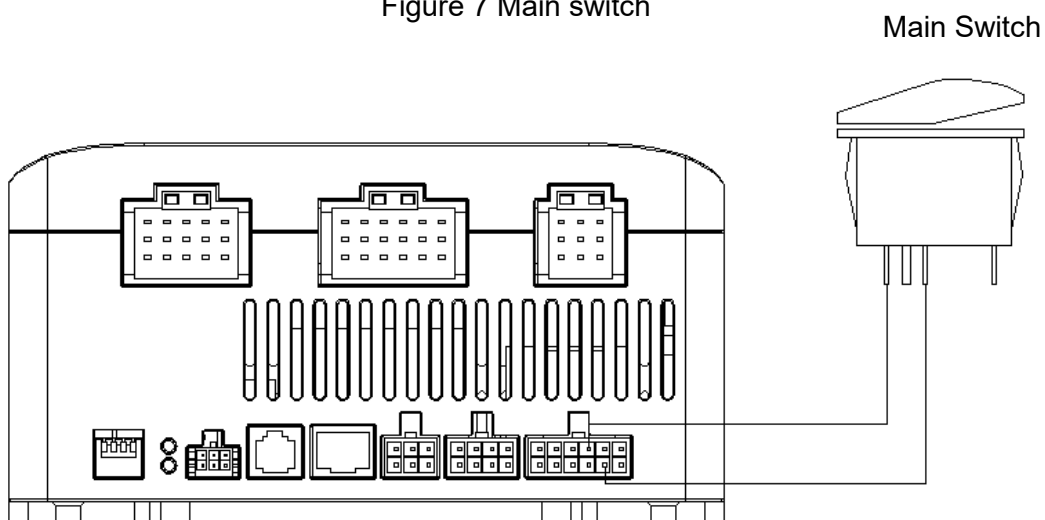


Figure 8 Wiring diagram of main switch

5.2 Daily Maintenance

- Check and insure the nominal battery voltage is 12Vdc.
- When replacing the existing battery with a new one, please have the new battery fully charged by Grid for the first time.

6. Trouble shooting

6.1 LED display on LMP

Table 10 Error LED indicator of LMP

NO.	LED	Color	Status	Description
1	CHG / DISCHG	Green / Orange	Flash once per cycle	Service battery voltage low
2			Flash twice per cycle	Service battery voltage high
3			Flash 3 times per cycle	LMP unit Over temp
4			Flash 4 times per cycle	Bulk charge timeout

7.Specification

Table 11 Specification of LMP

Model		LMP1218-PWM
Electrical Specifications		
Grid	Nominal input voltage (V)	230±10%VAC 50/60Hz
	Power factor	0.98
	Input current at full load	1.3A
Battery	Starter battery	12Vdc
	Starter battery voltage range	12.8-14.8Vdc
	Service battery	12Vdc
	Service battery voltage range	10.8-16.2Vdc
PV	Charger type	PWM
	Open circuit voltage	30Vdc
	Max supply current	15A
VCR	Relay specification	12Vdc 30A continuous, peak current 50A
	Connect voltage	13.4V
	Connect delay time	10sec
	Disconnect voltage	12.8V
	Disconnect delay time	60sec
	High voltage limit	14.8Vdc
Charger mode	Charge Algorithms	TBB premium II - 5steps
	Battery type	AGM/GEL/LFP/WET
	Bulk current	18A(Max)
	Absorption voltage	(14.4/14.1/14.4/14.7)±0.2Vdc
	Float voltage	(13.5/13.5/13.5/13.7)±0.2Vdc
Power supply mode	Nominal output voltage	12.8±0.2Vdc
	Rated output current	18A(Continuous)
Efficiency(Max)		88%
Working temperature		-20℃~+40℃

Others			
Battery Disconnect (LVD)	Disconnect voltage	AGM/GEL/WET	10.8±0.3 Vdc
		LFP	11.2±0.3 Vdc
	Delay off time	60s	
	Reconnect voltage	AGM/GEL/WET	11.8±0.3 Vdc
		LFP	12.2±0.3 Vdc
Protection	Short circuit on output	Fuse blown	
	Reverse Polarity	Fuse blown	
	Overload protection	Derate the output until overload is removed	
	Battery charger over temperature	Shut down LMP	
	Battery over voltage limits	Battery charger disconnect, loads disconnect	
Physical Specifications			
Dimensions (L*W*H)		235 × 185 × 98.5 mm	
Weight (kg)		2kg	
Enclosure		Plastic case	
Cooling		By nature	
Protection category		IP20	
Certification			
E-mark		ECE R10	

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