TBB POWER

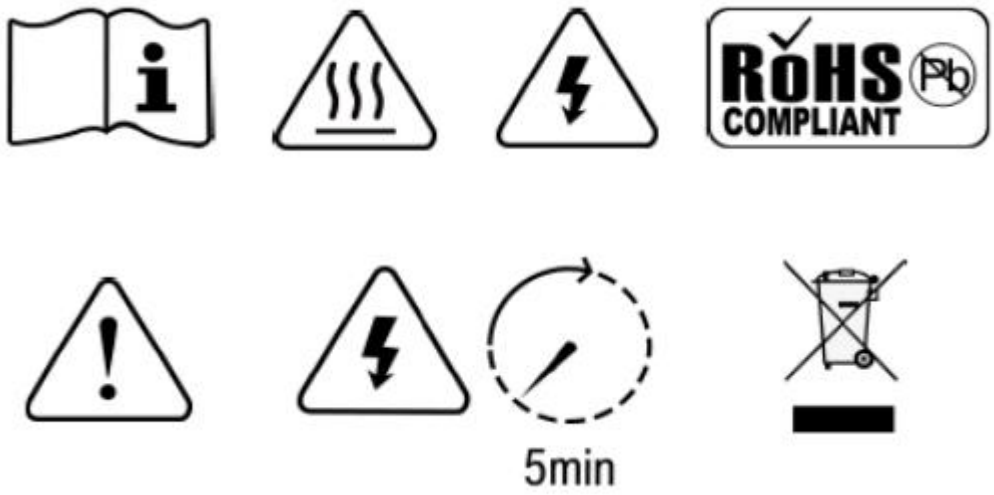
Version: A1.3

USER MANUAL

BI-DIRECTIONAL INVERTER

CM-LV Series

www.tbbpower.com



WARNING: HIGH VOLTAGE INSIDE

CAUTION: THE DC POWER MUST BE REMOVED BEFORE SERVICING

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

WARNING: NEUTRAL FLOATING. Risk of electric shock. Use only Shock SentruTM#GF15V-SP, Leviton Smart Lock #8899-A, ground fault circuit interrupter. Other types may fail to operate properly when connected to this unit.

The power unit is to be installed so that it is not likely to be contacted by people.

CAUTION: Risk of Fire. Do not replace any vehicle fuse with a rating higher than recommended by the vehicle manufacturer. This product is rated to pass through up to 50 amps from a 120 V outlet. Information on the vehicle fuse ratings are typically found in the vehicle operator's manual. If a vehicle fuse opens repeatedly, do not keep on replacing it. The cause of the overload must be found. On no account should fuses be patched up with tin foil or wire as this may cause serious damage elsewhere in the electrical circuit or cause fire.

The AC over current protection device must be a circuit breaker or a fuse/disconnect and be properly sized and branch circuit rated for the wire it is protecting and the appliance being powered.

The Inverter/ Charger is intended to recharge batteries. The battery that is connected to this product is only suitable if it complies with the given battery standard for that battery type and is provided with a battery management system that will monitor and control the electrical and thermal health of the battery during charging. When installing this Inverter/ Charger, the battery is to be verified as in compliance with the applicable battery standard.

Disclaimer

Unless specifically agreed in writing, TBB POWER(XIAMEN) CO., LTD

- TBB makes no guarantee as to the accuracy, sufficiency or suitability of any technical or other information provided in this manual or other documentation.
- Assumes no responsibility or liability for loss or damage, or expense whether direct, indirect, consequential, or incidental which might arise out of the use of such information.
- TBB offers standard warranty with its products, taking no responsibility for direct or indirect loss due to equipment failure.

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 is suitable for CM-LV Inverter. This chapter contains important safety and operation instructions. Read and keep this User Guide for later reference.

The CM Inverter needs to be installed by professionals and please pay attention to the following points prior to installation:

Please check the input voltage or voltage of battery is the same to the nominal input voltage of this inverter.

- Please connect negative terminal “-” of battery to “-” input of the inverter.
- Please connect positive terminal “+” of battery to “+” input of the inverter.
- Please use the shortest cable to connect and ensure the secure connection.
- While connecting, please secure the connection and avoid short-circuiting the positive and negative poles of the battery, which could cause damage to component or battery.
- Inverter will have high voltage inside. Only authorized electrician can open the case.
- The inverter WAS NOT designed to use in any life retaining equipment.

Contents

1. General Safety Instruction

1.1 Safety Instruction

As dangerous voltages and high temperature exists within the CM-LV Inverter, only qualified and authorized maintenance personnel are permitted to open and repair it. Please make sure that CM-LV Inverter is turned off before opening.

This manual contains information concerning the installation and operation of the CM-LV Inverter. All relevant parts of the manual should be read prior to installation. Please follow the local stipulation as well.

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

1.2 General precaution

- DO NOT expose to dust, rain, snow or liquids of any type, it is designed for indoor use. DO NOT block ventilation, otherwise the CM-LV Inverter have the potential to overheat.
- To avoid fire and electric shock, make sure all cables selection conforms to code standards and are properly terminated. Undersized or damaged conductors are not permitted to be used.
- Please do not put any inflammable goods near to inverter.
- NEVER place unit directly above vented batteries; gases from a battery will corrode and damage CM-LV Inverter.
- DO NOT place battery over CM-LV Inverter.

1.3 Precaution regarding battery operation

- Use plenty of fresh water to clean in case battery acid contacts skin, clothing, or eyes and consult with doctor as soon as possible.
- The battery may generate flammable gas during charging. NEVER smoke or allow a spark or flame in vicinity of battery.
- DO NOT put the metal tool on the battery, spark and short circuit might lead to explosion.
- 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. Instruction

2.1 Brief Instruction

2.1.1 General Description

CM-LV Inverter is a new generation bi-directional inverter designed for various on-board power application such as for RV, Utility Vehicle, Marine etc.

CM-LV Inverter can deliver a high reliability, performance and industry leading efficiency for critical application. Its outstanding surge capability makes it capable to power the most demanding appliances, such as air conditioner, water pump, washing machine, freezer, compressor, power tool etc.

With the function of power assist & power control, it can be used to work with a limited AC source such as generator or grid. CM-LV Inverter can automatically adjust its charging current avoiding generator or grid to be overloaded. In case of temporary peak power usage, it can work as the supplement source to generator or grid.

Two devices can be connected in parallel to increase the total inverter power or a split-phase system. For parallel, split-phase operation, see the Configuration.

2.1.2 Naming Rules

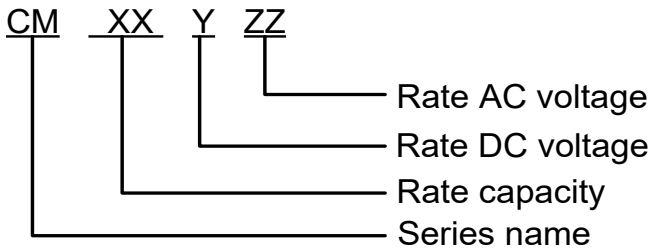


Figure	Explanation	
CM	series name	
2.0	Represent rated capacity	1600W(cont)
3.0		2400W(cont)
3.6		2700W(cont)
4.8		3600W(cont)
L	Represent rated DC voltage	12VDC
S		48VDC
-LV	Represent rated AC voltage	120VAC

Naming example: CM3.0L-LV

CM Inverter

Rated capacity: 2400W(nom)

Rated DC voltage: 12V

Rated AC voltage: 120V

2.2 Structure

2.2.1 Front

Figure 2-1 CM-LV Inverter Structure in Front View

2.2.2 Control panel

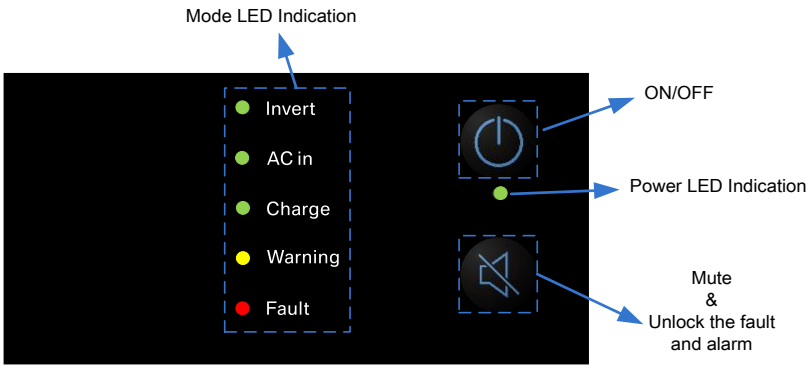


Figure 2-2 CM-LV Inverter Control Buttons

Table 2-1 LED Directive Function

LED	Function
Invert	➢ It will illuminate when CM-LV is inverting.
AC In	➢ It will flash when CM-LV detects any input from grid or generator.
Charge	➢ It will flash when CM-LV is in float charging. ➢ It will illuminate when CM-LV is in bulk or absorption charging.
Warning	➢ It will flash when CM-LV has warning.
Fault	➢ It will flash when CM-LV has error.

2.2.3 Remote Control and Monitor MCK & C4

Apart from above control panel, the user is also allowed to monitor, control and configure CM-LV by a MCK or C4 remote controller. The monitor could be installed at an easy access location for the user.

Figure 2-3 Remote Control and Monitor MCK

Figure 2-4 Remote Control and Monitor C4

More details of the monitors pertaining to installation, connection and operation, please refer to the dedicated user manuals in the respective packaging boxes of MCK and C4.

If the error code and warning code are displayed on the MCK, refer to the FAQ in Section 6.

2.2.4 Connection Compartments

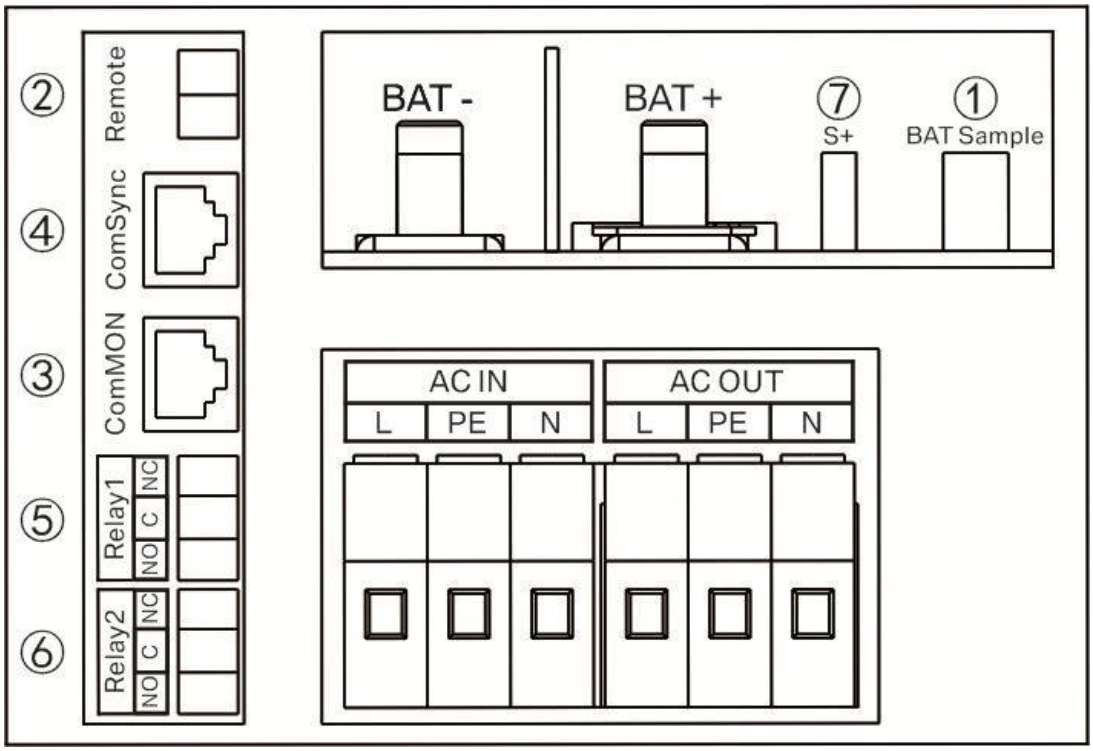


Figure 2-5 Signal Terminal

Table 2-2 Signal Terminal Introduction

No.	Silk-screen	Definition
①	Bat Sample	Battery temperature and voltage sampling.
②	Remote	A dry contact input for inverter remote ON/OFF.
③	ComMON	RS485 port for external monitor such as MCK
④	ComSync	Communication with TBB's M lithium battery to synchronize lithium battery's charging and discharging strategy
⑤	Relay1 (NO, C, NC)	Dry contact output control 1(NO, C, NC)
⑥	Relay2 (NO, C, NC)	Dry contact output control 2(NO, C, NC)
⑦	S+	Slave charger for starter battery

2.2.5 Dimension

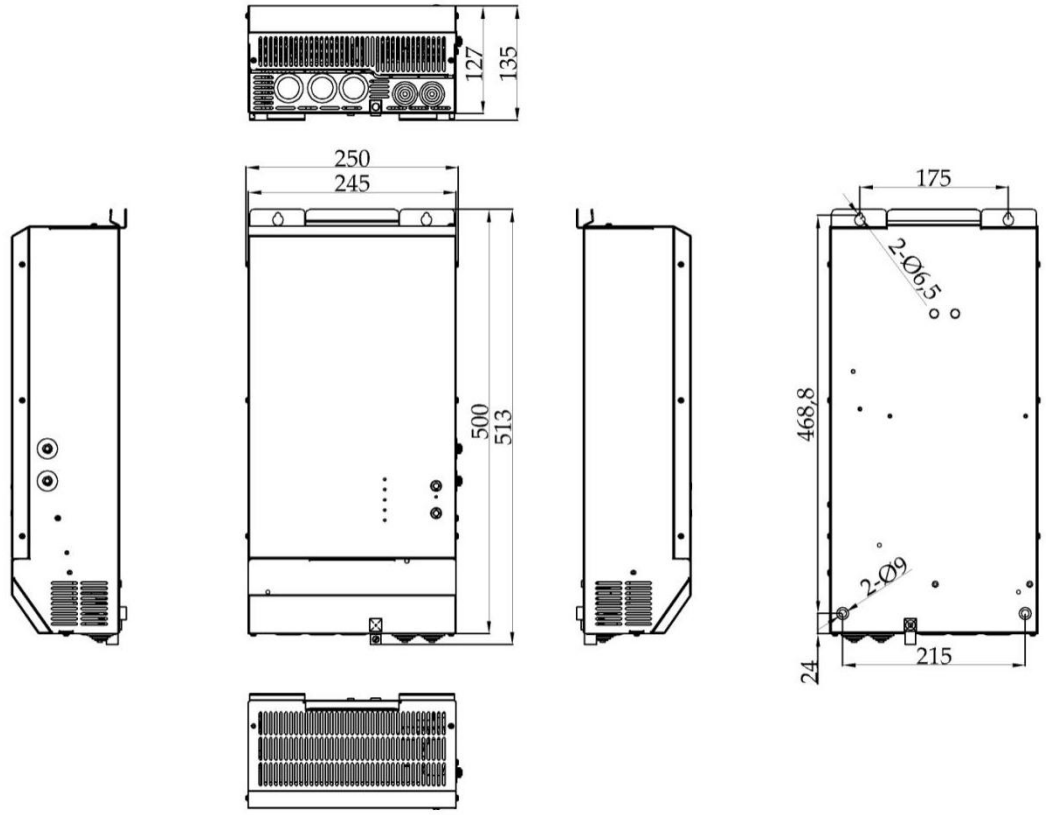


Figure 2-6 Dimension of CM-LV Inverter

2.3 Function

2.3.1 Power Control and Power Assist

CM-LV Inverter offers a unique feature of power control & power assist, which is very useful if you have a limited grid or generator power. CM-LV Inverter will take control of energy flow automatically, using extra power to charge the battery or by inverting as the supplement to the grid or generator. With this feature, you can avoid tripping on shore power breaker or reduce generator capacity.

2.3.2 Powerful and Reliable Inverter

High performance pure sine wave

CM-LV Inverter is a pure sine wave inverter generating a near perfect sinusoidal AC wave power output that is very similar or even better to what you can get from the utility grid. Pure sine wave can guarantee the correct function of sensitive equipment (computer, laser printer, TV etc.). Also, your home appliances will work smoother, cooler and more efficient, such as fridge, microwave and power tools.

High surge power capability

Provided with outstanding surge power capability and low frequency transformer, CM-LV Inverter is suitable for heavy inductive load like fridge, coffee maker, microwave, power tools, air conditioner etc.

Battery low voltage protect

CM-LV Inverter provides configurable battery low voltage protection.

2.3.3 Professional Battery Charger for Lead Acid Battery

Multi stage sophisticated charging algorithm for lead acid battery

Fitted with multistage charging algorithm (bulk-absorption-float-recycle), the built-in charger of CM-LV Inverter is designed to charge the battery quickly. Microprocessor controlled charging algorithm with variable absorption charging timer could guarantee the optimal charging for batteries on different discharged state.

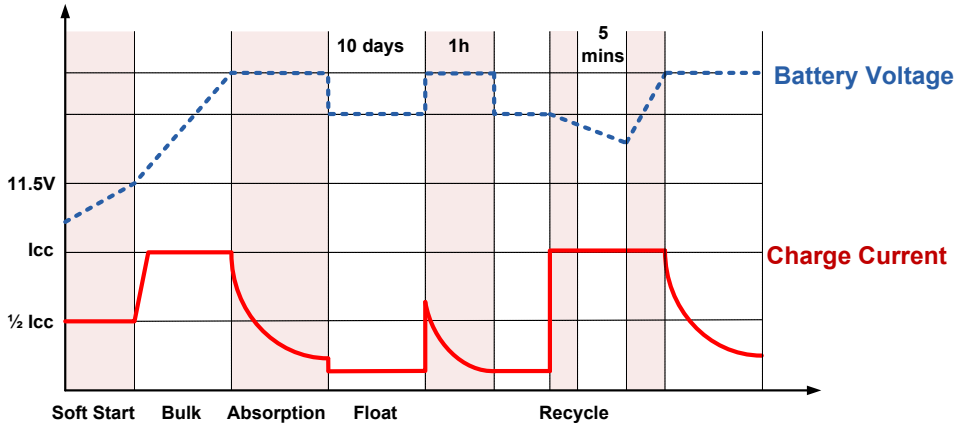


Figure 2-7 Multistage Sophisticated Charging Algorithm for Lead Acid Battery

Float charging and recycle charging program guarantee your battery getting proper maintenance in case of long-time connection and will experience less aging throughout the long-time connected operation.

Battery Sample Cable (Temperature and voltage)

Battery temperature is a key factor in correct charging for lead acid battery. The charging formula must be adjusted in real time (automatically) according to the actual battery temperature to ensure the battery is getting fully charged and avoiding overcharged or undercharged. All charging voltages recommended by battery manufacturer are in fact ONLY applied at the temperature 20℃～25℃.

The Bat sample cable (battery temperature and voltage sensor) supplied with CM-LV Inverter measures the temperature of battery and automatically adjusts in real time to properly charge your batteries at compensation rate -4mV/℃/cell. In case of Bat sample cable is not present, CM-LV Inverter will use 25℃ as default setting. This feature is especially recommended for sealed batteries and/ or when important fluctuations of battery temperature are expected.

Multi battery chemical available

CM-LV Inverter offers premium charging algorithm for commonly encountered lead acid battery chemistries, to include AGM, GEL, Flooded, lead-carbon and Lithium battery, of which you can set through external monitor and TBB Link software.

2.3.4 Lithium Battery Compatible

CM-LV Inverter supports universal LFP charging profile and offered pre-defined LFP charging profile for TBB M lithium battery.

Built in BMS pre-defined LFP charging and communication.

When using a TBB M12 series Lithium battery, according to cell temperature and real time SOC, the BMS will send a command to the battery charger asking for optimum charging voltage and current. This synchronization will prevent overheating or overcharging especially at the end of charging stage, to ensure the lithium battery reaches its target cycle life

In the meantime, instead of using voltage as protection, SOC value is used with more accuracy thus to avoid damage of lithium battery due to discharge over time.

2.3.5 Transfer

Uninterrupted AC power

Once the voltage/ frequency/ waveform of AC input meets the minimum quality requirements, it transfer to AC output directly. CM-LV Inverter will work as a battery charger and load will be powered by AC input. The AC output voltage is same to AC input.

In case of AC input fails or exceeds the configurable maximum AC input current, CM-LV Inverter will switch to “invert mode” to guarantee uninterrupted power. Upon The return of AC input, the inverter will switch back again. Due to its ultra quick transfer design, as quick as 0ms, CM-LV Inverter could be used as an UPS.

Ground Relay

The neutral output of CM-LV Inverter is automatically connected to earth upon no external AC sources is available. Once external AC sources present, the ground relay will open. This feature can be disabled through TBB Link.

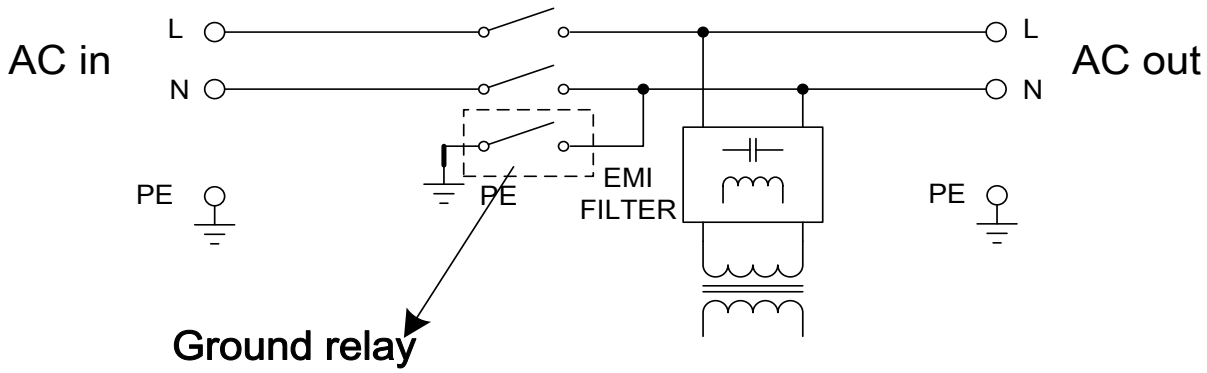


Figure 2-8 Ground Relay Schematic

2.3.6 Protection

The CM-LV Inverter is designed with a series of complete hardware and software protection functions to ensure its stable and reliable operation.

Overload protection

When overload protection is triggered, the CM-LV Inverter will shut down and restart automatically after 60s.

Over temperature protection

When the internal temperature is too high, CM-LV Inverter will trigger the over-temperature protection. After the internal temperature returns to normal, it will automatically resume normal operation.

Short circuit protection

The equipment will shut down automatically when the AC output is short circuited and will require a manual restart.

Battery over temperature protection

During the charging, the equipment will continuously monitor the battery temperature. When the battery temperature is too high, the equipment will automatically reduce the charging current. When the battery is severely heated, the charger will automatically stop charging.

Battery low voltage protection

To prevent the permanent damage caused by the over discharge of battery, the equipment will automatically cut off the output according to the preset low voltage protection value.

2.3.7 Communication

Dry contact input

CM-LV Inverter is designed with a set dry contact input for the remote ON/ OFF.

Dry contact output

CM-LV Inverter is designed with two sets NO/ NC dry contact output in relay type, the user can set specific functions through the TBB Link. Following is the default setting.

- Relay1: The relay is closed when the battery is under-voltage.
- Relya2: The relay is closed when a fault or overload occurs.

RS485

CM-LV Inverter supports a RS485 port.

3. Installation and Wiring

3.1 Pre-installation Inspection

- Check the outer packaging for damage before unpacking, and check if this is the correct model. If there is something wrong, please don't open it and contact your dealer.
- Check the inner contents for any visible damage after unpacking.
- If any item is missing or there is any damage, please contact your dealer.

Table 3-1 Packing list

Packing list	
Description	Quantity
CM-LV Inverter	1
User manual	1
Expansion bolt	4
M6 screw	4

3.2 Select Installation Location

3.2.1 Requirement

- The protection category of CM-LV Inverter is IP20, so it can only be installed indoors.
- During the operation of the inverter, the temperature of the case and the heatsink will be relatively high.
- Do not install it in the place where inflammable and explosive articles are stored.
- Do not install it in the place where children can reach.
- Do not install it on flammable building materials.
- Please make sure the support surface is strong enough to bear the weight of CM-LV Inverter.

Do not install CM-LV Inverter in a sealed compartment containing vented batteries.

3.2.2 Installation Space Requirements

Keep away from fire, avoid direct sunlight and rain; do not store flammable, explosive or corrosive gases or liquids in the working environment. Don't install in a working environment with metal conductive dust.

- Please install the equipment in a dry, clean, cool and well-ventilated place.
- Operating temperature: -20～65℃
- Storage temperature: -40～70℃

- Cooling: Forced air
- Relative humidity in operation: 95% without condensation.

Good ventilation can ensure the normal operation of the equipment. Make sure there is enough space around the CM-LV Inverter when installing.

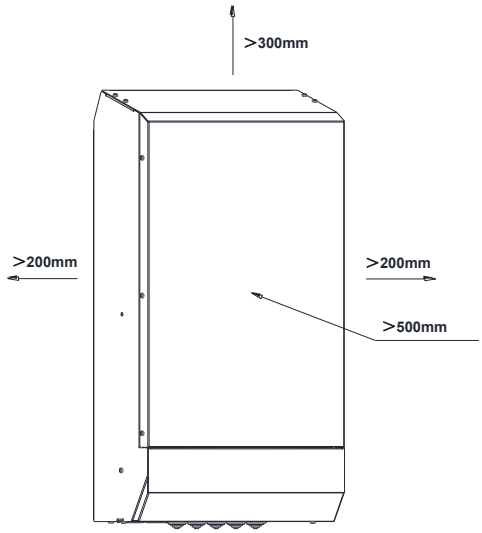


Figure 3-1 Installation space requirements

3.3 Installation

1. The equipment can be installed horizontally or vertically. For optimal cooling, vertical installation is preferred. Do not install upside down.
2. Please refer to Section 2.2.5, and determine the installation surrounding space and mounting holes according to dimension figure in relative product manual. There shall be at least 300 mm of free space around the equipment for cooling purposes. See Figure 3-1.
3. After determining the installation position and mounting holes, fix and tighten the 4 expansion bolts. Then remove the bottom cover and fix the inverter with 4 M6 screws.

Please double check that CM-LV Inverter is securely installed.

3.4 Preparation Before Wiring

3.4.1 Breaker Preparation

- An over current protection device such as DC fuse or DC circuit breaker needs to be installed on positive cable, the rated value is 125% of the nominal rated value.
- The withstand voltage of the DC circuit breaker on the battery side should be greater than the system voltage.
- Circuit breaker requirements are shown in the Table 3-2.

Table 3-2 Breaker Requirement

NO.	Parts	Model	Requirement
1	Battery breaker	CM2.0L-LV	(1) The current requirement should be a maximum of 240A.
		CM3.0L-LV	(1) The current requirement should be a maximum of 400A.
		CM3.6S-LV	(1) The current requirement should be a maximum of 90A.
		CM4.8S-LV	(1) The current requirement should be a maximum of 120A.
2	AC Breaker for AC IN and AC OUT	CM2.0L-LV CM3.0L-LV CM3.6S-LV CM4.8S-LV	(1) The current requirement should be a maximum of 50A.

Note: The selection of the above circuit breakers or fuses must comply with the requirements of local laws and regulations.

3.4.2 Cable Preparation

- It is recommended to install CM-LV Inverter with cables with insulation rating of Class Y (90℃).
- Minimum requirements on the cross-sectional area for the cables are shown in the Table 3-3, Table 3-4.

Table 3-3 Recommended Battery wiring

Model	Recommended Cable Size	
	Length (The total length of the positive and negative cable of the battery)	4m
CM2.0L-LV	Cross-sectional area	70mm²
CM3.0L-LV	Cross-sectional area	70mm²
CM3.6S-LV	Cross-sectional area	25mm²
CM4.8S-LV	Cross-sectional area	35mm²

Table 3-4 Recommended ground and AC wiring

Model	Recommended Cable Size			
		Ground	AC IN	AC OUT
CM2.0L-LV CM3.0L-LV CM3.6S-LV CM4.8S-LV	Cross-sectional area	10 mm²	10 mm²	10 mm²

3.5 Wiring

1. Connect the corresponding battery sampling cable (optional) according to the requirements of CM-LV Inverter.
2. Connect the positive and negative cables of the battery (! Pay attention to the positive and negative polarity of the battery. Make sure that a battery circuit breaker that meets the requirements of 3.4.1 has been installed between CM-LV Inverter and the battery before connecting and the circuit breaker has been turned off.)
3. Connect the AC cables (! Pay attention to the wiring sequence of the cables. Make sure that an AC circuit breaker that meets the requirements of 3.4.1 has been installed between CM-LV Inverter and AC input/output before connecting and the circuit breaker has been turned off.)
4. After all wiring is completed, please fix the bottom cover back to CM-LV Inverter with screws.

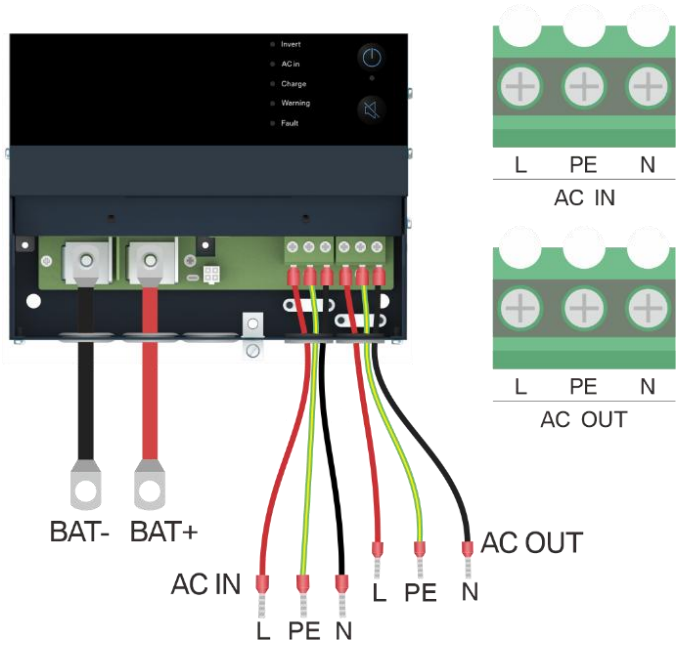


Figure 3-2 Illustration of wiring

4. Operation

4.1 Check before Operation

Please check before Operation according to the following.

- Inverter is installed correctly and securely.
- Reasonable cable layout to meet customer requirements.
- Make sure the grounding is reliable.
- Make sure the ground wire is connected correctly and securely.
- Double check the battery breaker is OFF.
- Make sure the cables are properly connected and secured.
- Reasonable installation space, clean and tidy environment, no construction residue.

4.2 Power ON

Make sure the battery voltage is within the permissible range before turning ON the breaker.

Please follow the following instruction step by step.

- Step 1: Turn on the circuit breaker between the battery and the inverter.
- Step 2: Press the ON/ OFF button to turn on the inverter entering self-diagnostic.
- Step 3: Set the parameters following the setup wizard.
- Step 4: Press the ON/ OFF button Again to turn on the inverter.
- Step 5: Observe the LED light to make sure the inverter is running normally.

  (Refer to Table 2-1 LED directive function)

4.3 Power OFF

After the inverter is powered OFF, there is still residual power and heat in the chassis, which may lead to electric shock or burn.

- Method 1: Press the ON/ OFF button for 2 secs to cutoff the output (into the standby mode). Afterwards, press and hold the ON/ OFF 5secs until hearing consecutive beep, the inverter is shut down totally.

- Method 2: Press and hold the ON/ OFF 5 secs until hearing consecutive beep, the inverter is shut down directly.

5. Configuration

Settings may only be changed by a qualified electrical engineer.
Read the instructions thoroughly before implementing changes.
During setting of the charger, the AC input must be cut off.

5.1 Default Setting

Table 5-1 Factory settings

System	Rate AC Voltage	120VAC
	Rate AC Frequency	60Hz
	Parallel Mode	Stand Alone
Battery	Battery Type	AGM
	Battery AH	200AH
	Max Charge Current	100% of the Max charge current
	Absorption Voltage	14.4V (single battery voltage)
	Float Voltage	13.5V (single battery voltage)
	Undervoltage Protect Recover	13.0V (single battery voltage)
	Undervoltage Warning	11.0V (single battery voltage)
	Undervoltage Protect	10.5V (single battery voltage)
	Deep Undervoltage Protect	9.9V (single battery voltage)
AC Input	Power Assist Cur	32

5.2 Configuration

5.2.1 TBB Interface

The TBB Interface is a RS485 to USB communication module.

Connect the inverter to the computer requires a TBB Interface, which goes between the ComMON port on the inverter, and a USB port on the computer.

Figure 5-1 TBB Interface

5.2.2 TBB Link Mobile

The TBB Link Mobile is a powerful tool for CM-LV series inverter Configuration. The TBB Link Mobile can be installed on the computer, open the TBB Link Mobile and turn on the inverter, the inverter can be configured.

Figure 5-2 TBB-Link Mobile

6. FAQ

6.1 Error Code

6.1.1 Inverter Error

No.	Error Code	Description	Solution
101	U_Bus_OV	DC bus is over voltage	Check the battery voltage.
102	U_Bus_LV	DC bus is under voltage	Check the battery connection and voltage.
103	U_Bus_HW_Pro	Hardware protection to prevent DC bus over voltage	Check the battery voltage and charger output voltage
104	PSU_Fault	Auxiliary power supply is abnormal	Internal failure. If it occurs repeatedly, please contact the after-sales service for replacement or maintenance
105	T_HS_OT	Heat sink's temperature is too high	Check the installation place of the charger and its ventilation conditions and ambient temperature.
106	T_TX_OT	Transformer's temperature is too high	
107	Sam_HD_Fault	Sampling is abnormal	Internal failure. If it occurs repeatedly, please contact the after-sales service for replacement or maintenance
108	EEPROM_Fail	ROM is abnormal	
109	Output_ShortCut	Output short circuit	Check if there is short circuit at loads.
110	Output_OverLoad	Output over load	Reduce the load.
111	CoolSys_Err	Cooling system is abnormal	Check if the fan is working properly.

112	U_BAT_Low_Deep	Battery is severely under voltage	Connect to a valid grid or generator. Restart the inverter and charge the battery.
114	Instant_OC_Soft	Instantaneous over current	Check if there is a short circuit at loads.
115	EPO	Emergency stop	Check the EPO Dry Input.
116	Rly_Err	Relay is abnormal	Restart the inverter. If it occurs repeatedly, please contact the after-sales service for replacement or maintenance.
117	Comm Err Timeout		Internal failure. If it occurs repeatedly, please contact the after-sales service for replacement or maintenance

6.1.2 BMS Error

No.	Error Code	Description
040	Module_OV	Lithium module is under the over voltage protection.
041	Module_UV	Lithium module is under voltage protection.
042	Module_OT	Lithium module's temperature is too high.
043	Module_UT	Lithium module's temperature is too low.
044	Discharge_OC	Lithium module's discharge current is over normal value.
045	Charge_OC	Lithium module's charge current is over normal value.
046	Module_INT_Err	Lithium Battery Module fails.

6.2 Warning Code

6.2.1 Inverter Warning

No.	Warning Code	Description	Solution
001	U_BAT_OV	Battery is over voltage	Check the battery voltage.
002	U_BAT_LV	Battery is under voltage	Check the battery voltage.
003	U_BAT_LV_Fault	Battery is under voltage protection	Check the battery voltage.
004	Overload	Overload warning	Reduce the load.
005	NTC_HS_Fault	Heat sink NTC fails	Power off the inverter and check the internal NTC connection. Contact the installer if the fault still exists.
006	NTC_TX_Fault	Transformer NTC fail	
007	T_BAT_OT	Battery temperature is too high	Check battery sensor connection; check battery temperature; check battery connection
008	Fan_Fault	Fan is abnormal	1.Check whether the fan is blocked.
			2.Open the case, check the fan connection. If it occurs repeatedly, please contact the after-sales service for replacement or maintenance
009	ParConnect_Err	Parallel connect is abnormal	Check the connection of the parallel communication cable.
010	ParComm_Err	CAN communication is abnormal	Check the parallel parameter setting.
011	Par_ID_Conflict	Parallel address conflict	Check the parallel parameter setting (ID address)

012	Para_Conflict	Parameters do not match	Check the parameter setting or trigger the Parameter Sync.
013	Par_SyncTimeOut	synchronization overtime	
014	ModeSet_Mismatch	The system mode and parameter setting do not match	Check the parameter setting (Lithium battery, AC Couple).
015	Out_Circuit_Err	Parallel system or three system's AC output is abnormal	Check the output wire connection.
016	Comm_HMI_Err	Internal communication of LCD is abnormal	Open the case, and check the LCD wire connection. If it occurs repeatedly, please contact the after-sales service for replacement or maintenance.
020	ACin_OV	AC input is over voltage	Check the AC input voltage and the connection.
021	ACin_LV	AC input is under voltage	
022	ACin_OF	AC input is over frequency	
023	ACin_LF	AC input is under frequency	
024	ACin_PhaseErr	AC input phase sequence is abnormal	
025	U_NEU_2_GND_Err	The voltage between N and GND is abnormal	1.Check the ACin L-N connection. 2.Check the GND connection.
030	Comm_Inner_Err	Communication between the inverter and the LCD is abnormal	Open the case, and check the LCD wire connection. If it occurs repeatedly, please contact the after-sales service for replacement or maintenance.

031	Model_Detect_Err	Software and hardware matching error	Restart the inverter. If it occurs repeatedly, please contact the after-sales service for replacement or maintenance.

6.2.2 BMS Warning

No.	Warning Code	Description
050	Module_HV	Lithium module is over voltage.
051	Module_LV	Lithium module is under voltage.
052	Module_HT	Lithium module's temperature is too high.
053	Module_LT	Lithium module's temperature is too low.
054	Discharge_HC	Lithium module's discharge current is over normal value.
055	Charge_HC	Lithium module's charge current is over normal value.
056	INT_Comm Fail	Communication among Lithium modules is abnormal.
057	EXT_Comm Fail	Communication with the inverter is abnormal.
058	SOC_Low	Lithium module's SOC is too low.

7. Specification

Model	CM2.0L-LV	CM3.0L-LV
Power Assist	Yes	
AC inputs	Input voltage range:85~140 VAC, Input frequency:55~65Hz	
AC input Current	50A (transfer switch)	
Inverter		
Nominal battery voltage	12VDC	
Input voltage range	10.5~17VDC	
Output	Voltage: 110/115/120 VAC ± 2%, Frequency: 60 Hz ± 0.1%	
Harmonic distortion	<2%	
Power factor	1.0	
Cont. output power at 25°C	1600W	2400W
Output power (90min) at 25°C	2000W	3000W
Peak power	4000W	6000W
Cont. output power at 40°C	1500W	2200W
Maximum efficiency	93%	
Zero load power	12W	16W
Charger		
Charge voltage 'absorption'	14.4VDC	
Charge voltage 'float'	13.5VDC	
Battery types	AGM / GEL / OPZV / Lead-Carbon / Li-ion / Flooded	
Battery Charge current	100A	150A
Temperature compensation	Yes	
General data		
AC Out Current	50A	
Transfer time	<4ms (<15ms when Weak Grid Mode)	
Remote on-off	Yes	
Programmable relay	2x	
Protection	a) output short circuit, b) overload, c) battery voltage over voltage d) battery voltage under voltage, e) over temperature, f) Fan block g) input voltage out of range, h) input voltage ripple too high	
General purpose com. Port	RS485	
Operating temperature range	-20 to +65˚C	
Storage temperature range	-40 to +70˚C	
Relative humidity in operation	95% without condensation	
Altitude	2000m/ 6562'	
Mechanical Data		
Dimension	510*245*135mm/ 20.1*9.6*5.3''	
Net Weight	15kg/ 33lb	20kg/ 44lb
Cooling	Forced fan	
Protection index	IP20	
Standards		
Safety	UL458 & CSA107.1	
EMC	FCC Part 15 Class B	

Model	CM3.6S-LV	CM4.8S-LV
Power Assist	Yes	
AC inputs	Input voltage range:85~140 VAC, Input frequency:55~65Hz	
AC input Current	50A (transfer switch)	
Inverter		
Nominal battery voltage	48VDC	
Input voltage range	42~68VDC	
Output	Voltage: 110/115/120 VAC ± 2%, Frequency: 60 Hz ± 0.1%	
Harmonic distortion	<2%	
Power factor	1.0	
Cont. output power at 25°C	2700W	3600W
Output power (30min) at 25°C	3600W	4800W
Peak power	6000W	8000W
Cont. output power at 40°C	2400W	3200W
Maximum efficiency	95%	
Zero load power	14W	16W
Charger		
Charge voltage 'absorption'	57.6VDC	
Charge voltage 'float'	54VDC	
Battery types	AGM / GEL / OPZV / Lead-Carbon / Li-ion / Flooded	
Battery Charge current	45A	60A
Temperature compensation	Yes	
General data		
AC Out Current	50A	
Transfer time	<4ms (<15ms when Weak Grid Mode)	
Remote on-off	Yes	
Programmable relay	2x	
Protection	a) output short circuit, b) overload, c) battery voltage over voltage d) battery voltage under voltage, e) over temperature, f) Fan block g) input voltage out of range, h) input voltage ripple too high	
General purpose com. Port	RS485	
Operating temperature range	-20 to +65˚C	
Storage temperature range	-40 to +70˚C	
Relative humidity in operation	95% without condensation	
Altitude	2000m/ 6562'	
Mechanical Data		
Dimension	510*245*135mm/ 20.1*9.6*5.3''	
Net Weight	20kg/ 44lb	22kg/ 48.5lb
Cooling	Forced fan	
Protection index	IP20	
Standards		
Safety	UL458 & CSA107.1	
EMC	FCC Part 15 Class B	

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