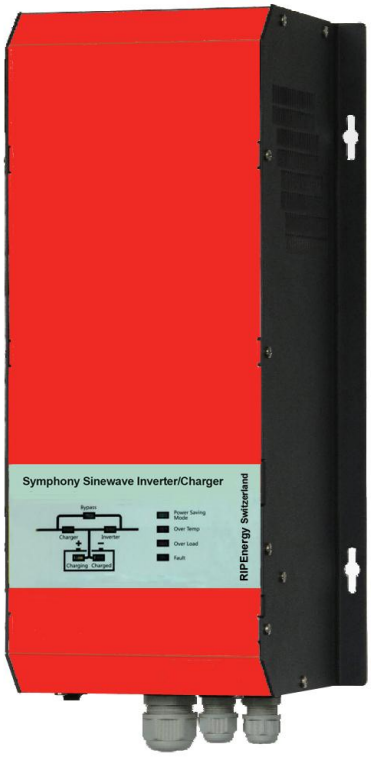
Symphony series

Inverter Charger Combination



USER MANUAL

Version 3.3

Warranty

RIPEnergy is not manufacturer of these units. All technical information's, data's and dimensions rely on information's given by the manufacturer. Therefore RIPEnergy AG is not responsible for the data's provided in this manual. Should work take place, which is not in accordance with guidelines, local rules, instructions or specification's, damage may occur. All of these matters will lead to loss of warranty. RIPEnergy AG cannot accept any liability for damages or costs arising due to the use of these inverters.

Distributor's address

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The power conversion company

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General Information

Thank you for choosing a product supplied by RIPEnergy AG. The product you have bought is manufactured to meet the highest quality standards. Our manufacturers have a very long experience in manufacturing of high end electronic equipment.

Use of this manual

This user's manual contains the information you need to install and operate this inverter correctly. Check that you have the correct manual for your unit.

It is valid for the following units:
SYC600-12-230, SYC1000-12-230, SYC1500-12-230, SYC2000-12-230, SYC3000-12-230

SYC600-24-230, SYC1000-24-230, SYC1500-24-230, SYC2000-24-230, SYC3000-24-230, SYC4000-24-230, SYC5000-24-230

SYC2000-48-230, SYC3000-48-230, SYC4000-48-230, SYC5000-48-230, SYC6000-48-230

Read the manual carefully before installing or operating the inverter. If you do not understand or are uncertain about any operation or information, please contact your dealer. He will be able to help you with an explanation or will demonstrate the operation.

The user must always have access to the user's manual.

These inverters must be only installed by qualified, authorized and trained personnel familiar with the locally applicable standards and taking into consideration all relevant safety guidelines and measures! Never remove the type number plate. Important technical information required for service or delivery of spare parts can be derived from the type number plate.

Modifications without a written permission from RIPEnergy AG means that warranty is lost immediately!
Always contact your dealer first if you have any problems.

Limitation of liability

RIPEnergy AG is not responsible or liable for any loss, damage or costs arising from operating these inverters.

The products supplied by RIPEnergy AG are not for applications in any medical equipment intended for use as a component of any life support system. If products are used in such systems, a specific written agreement between the manufacturer, RIPEnergy AG and the installer/manufacturer of the system is needed. In addition, the manufacturer of the system must agree to indemnify RIPEnergy AG from any claims arising from use of products supplied by RIPEnergy AG in the life support equipment.

Warranty specifications (short form)
The inverters are built for RIPEnergy AG in according to the legally applicable standards. During production, and prior to delivery, all products are tested and inspected. RIPEnergy AG is looking to find the best available products on the market. Good quality parts and the latest technology of the units will ensure a long lasting and trouble free operation of these units.

If any problem occurs during warranty period, please contact your dealer first. He is able to serve you with instructions and explains you how to send the unit to the nearest service center, if necessary.

Warranty can only be guaranteed if you enclose a document (Invoice or delivery documents) to the defective units.

Damage attributable to normal wear and tear, overload or improper handling or installation is not covered by the warranty.

Modifications or breaking the warranty label without a written permission from RIPEnergy AG means that the warranty is lost immediately!

Always return the units in it's original package and completely assembled. A short description of the failure/problem will help us to serve you better.

RIPEnergy AG is not paying for costs arising for transport of the unit or damage that arise during the time the unit is unserviceable. The general terms of delivery and terms of sale of RIPEnergy AG are valid.

Do not return units before authorized by RIPEnergy AG.

RIPEnergy AG will provide instructions and RMA number.

Unpacking

After unpacking, carefully check the inverter for possible damage. If any damage due to transport is visible immediately contact your dealer for further instructions.

Keep the original packing in case you need it to transport the inverter later.

Environmental protection

RIPEnergy AG continually commits a considerable part of its resources towards minimizing the environmental impact of its products. The inverter is manufactured with valuable materials and easy to recycle.

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1. General Safety Instruction

1.1 Safety Instruction

As dangerous voltages and high temperature exist within the Symphony, only qualified and authorized maintenance personnel are permitted to open and repair it.

This manual contains information concerning the installation and operation of the Symphony. 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

1.2.1 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 INVERTER would be overheating.

1.2.2 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.

1.2.3 Please do not put any inflammable goods near to inverter.

1.2.4 Never place unit directly above batteries, gases from a battery will corrode and damage inverter/charger.

1.2.5 Do not place battery over Symphony

1.3 Precaution regarding battery operation

1.3.1. Use plenty of fresh water to clean in case battery acid contacts skin, clothing, or eyes and consult with doctor as soon as possible.

1.3.2. The battery may generate flammable gas during charging. NEVER smoke or allow a spark or flame in vicinity of a battery。

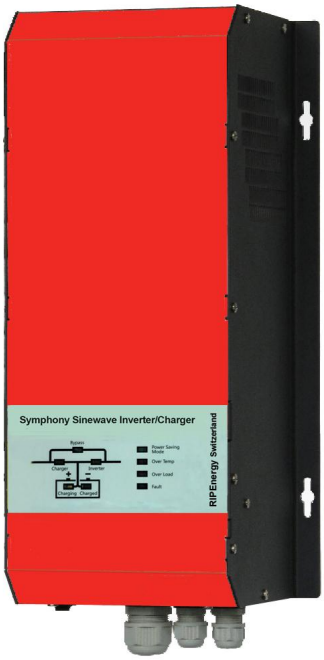
1.3.3. Do not put the metal tool on the battery, spark and short circuit might lead to explosion.

1.3.4. 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.

2.0 Description of main Function

Thanks for choosing Symphony inverter charger combination which is a product with strong function. The product will be delivered with following equipment:

- a Symphony equipment unit
- a BTS (battery temperature sensor)
- a user's manual



2.1 General Description

Symphony is an inverter/chargers combination providing true sine-wave inverter, multi-stage battery charging and a transfer switch. It can be connected to either grid or generator to compose power system for the most demanding mobile, off grid and power backup application.

With AC input available from the grid or generator, power is pass through Symphony combi to operate connected AC load and being covered to DC to charger the battery at the meantime. If AC input power failed or fall out of specification and is no longer qualified as good AC, a quick transfer take place and Symphony combi start converting DC power from battery into AC power to supply connected AC load.

2.2 Inverter

++ Pure Sine Wave

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

++ High surge power

Provided with outstanding surge power capability and low frequency transformer, Symphony is suitable for heavy inductive load like refrigerator, pump, microwave, power tools etc.

++ Low status consumption power

Symphony offers two working modes: Normal (ON at main switch) and Power Save, of which you can set through both switch on equipment front panel or through RC.

In Power Save mode, the no load power consumption will be reduced by approx 70%. Symphony will switch off in case of load less than 40W and will switch on every 10 seconds. If the load exceeded the threshold level of 80W, the inverter will resume output.

++ Low voltage disconnect

Deep discharge of the lead acid battery leads to high losses in capacity and early aging. Symphony continuously supervised and controlled battery condition. For different application, the user intended to have different low voltage disconnection level. For example, for solar application, user intended to have less DOD to prolong the battery cycle life. But for mobile application, user intended to have more DOD to reduce battery capacity and on board weight.

Symphony offer 4levels of user's settable low voltage disconnect through dip switches for user to conveniently to configure its own system. Meantime, through CM module (communication module), Symphony offer a group of dry contact sending signal out upon battery voltage drop to 11.7VDC (12V battery), 23.4VDC (24V battery) or 46.8VDC (48V battery). This will be useful for user to turn off some load in case of battery run low.

2.3 Battery Charger

The charger automatically starts up when qualified AC power is presented either from grid or generator, featuring:

++ Multi stage charger

Fitted with multi stage charging algorithm (bulk-absorption-float-recycle), the built-in charger of Symphony is designed to charge battery quickly and fully. Microprocessor controlled charging algorithm with variable absorption charging timer guarantee the optimal charging for batteries of different discharged state.

Float charging and Recycle charging program guarantee your battery could get proper maintenance in case of long time connected.

++ Battery temperature compensation

Battery temperature is a key factor in correct charging, the charging formula must be adjusted (automatically and in real time) according to the actual battery temperature to ensure that battery are fully charged but not overcharged or undercharged. All charging voltages recommended by battery manufacture are in fact ONLY applied at 20℃-25℃.

The BTS (battery temperature) supplied with Symphony measures the temperature of battery and automatically makes adjustments at real time to properly charge your batteries at compensation rate of – 4mv/℃/cell.

In case of BTS was not present, the Symphony will use 40℃ as default setting.

++ Charger capacity adjustable

Through the clock switch at central panel, user can choose the capacity of battery you want to charge. According to your choice, Symphony charger will automatically adjust its output power makes it suitable the battery capacity selected. The charging current was set at threshold rate of 15% of battery capacity (I = 0.15C).

++ Multi battery chemical available

Commonly encountered lead acid battery chemicals include AGM, GEL and Flooded. The voltage required for a proper charging of different battery varies. Symphony offer premium charging for above commonly encountered battery categories, of which you can set through the dip switch at central panel.

++ Manual Equalization

Over a period of time, the cells in a flooded battery can develop uneven chemical states. This will result in a weak cell which in turn can reduce the overall capacity of battery. To improve the life and performance of non-sealed flooded battery, Symphony includes a manual equalization program that can be used, if recommended by battery manufacturer, to equalize this battery. For details, please refer to chapter 6.7

This charging program can ONLY being applied to flooded battery. As a protection, the EQ mode will automatically disable if you select either GEL or AGM as battery type.

++ Generator compatible

Symphony offer GEN mode which could be manually set to fit majority of the generator applications. Please refer to Chapter 2.4 for details.

2.4 Transfer

Symphony will transfer load to either AC input (grid or generator) or Inverter upon various situations. You can use either inverter or generator as a backup. To facilitate different applications, Symphony offering two work mode which are settable by user.

++ UPS mode

In case of voltage/frequency/waveform of AC input match the minimum quality, the voltage will be switched directly to AC output and battery charger. The inverter will switch off, battery charger switching on and load being powered by AC input. You will have at the output the same voltage as AC input.

In case of AC input failure or exceeding the minimum requirement. The Symphony will initiate a quick switching to inverter (10ms-15ms), of which will guarantee an undisturbed power for majority of appliance. Upon AC input resume or match the quality, it will switch back again within 15ms. With this mode, the Symphony could be used as UPS.

++ GEN mode

In some applications such as a small generator, the output voltage of which is too unstable and distorted to use this setting. The Symphony won't deliver charge and keep switch to inverter. You can set GEN mode, the Symphony will reduce its requirement for AC input (voltage, frequency and waveform). As a consequence, the transfer time will be prolonged to about 2s. The load will have problem of loss of power in case of transfer.

In some application such as sudden overload in short period such as starting Vacuum cleaner on generator, the output voltage of generator will be decreased dramatically. The switch at this circumstance is not desired. You could also set GEN mode.

2.5 Load Management

The Symphony has a built-in transfer relay that connects the load to inverter output and AC input from the grid or generator. Due to limited capability or instability of either AC source/generator or battery, having the capability to manage various energy source or load is valuable. Symphony provides some features to facilitate such application:

++ PFC charger

The charger is power factor corrected to use AC current efficiently. Minimizing the AC current used by charger means more power is available for your AC loads.

++ Generator starting

Through dry contact at CM module, it could send signal to start generator when battery voltage run low.

++ Load management

In case of battery run low and reach threshold voltage, one group dry contact at CM module can be used to switch off some high power less important load to save battery energy.

++ Dynamic current limiter

Occasionally, AC input sources have low voltage. To avoid loading these weak sources any further, the Symphony will automatically reduce the charger capacity.

2.6 The Control

As optional accessories, RC module (remote control) and CM module (communication module) could be purchased and connected to Symphony. RC could read the Symphony working status and choose ON/OFF/Power Save of the equipment through switch.

CM offer RS232 communication protocol and three groups of dry contacts which can be used to either trigger the alarm, starting generator or switch some of the load.

2.7 Comprehensive Protection

The equipment is being protected against many failures through hardware and software making it a robust and reliable equipment.

++ Overload protection

Both of charger and output are being protected against overload by both circuit breaker and software. Circuit breaker, in case of overload, the button of which will pop out, you can push back the button to resume operation.

On software, in case of the inverter is too long or too heavily overloaded, it will switch off. After 60secs, it will switch on automatically. In case of 3times overload shutdown, it will not switch on automatically. In this case, you need to manually switch on inverter.

++ Overheat protection

In case of too high internal temperature was detected, the Symphony will switch off for overheat protection. After cooling down, the inverter will switch on automatically.

++ Short circuit

The Symphony will shut down and need manually start.

++ Battery over temp protection

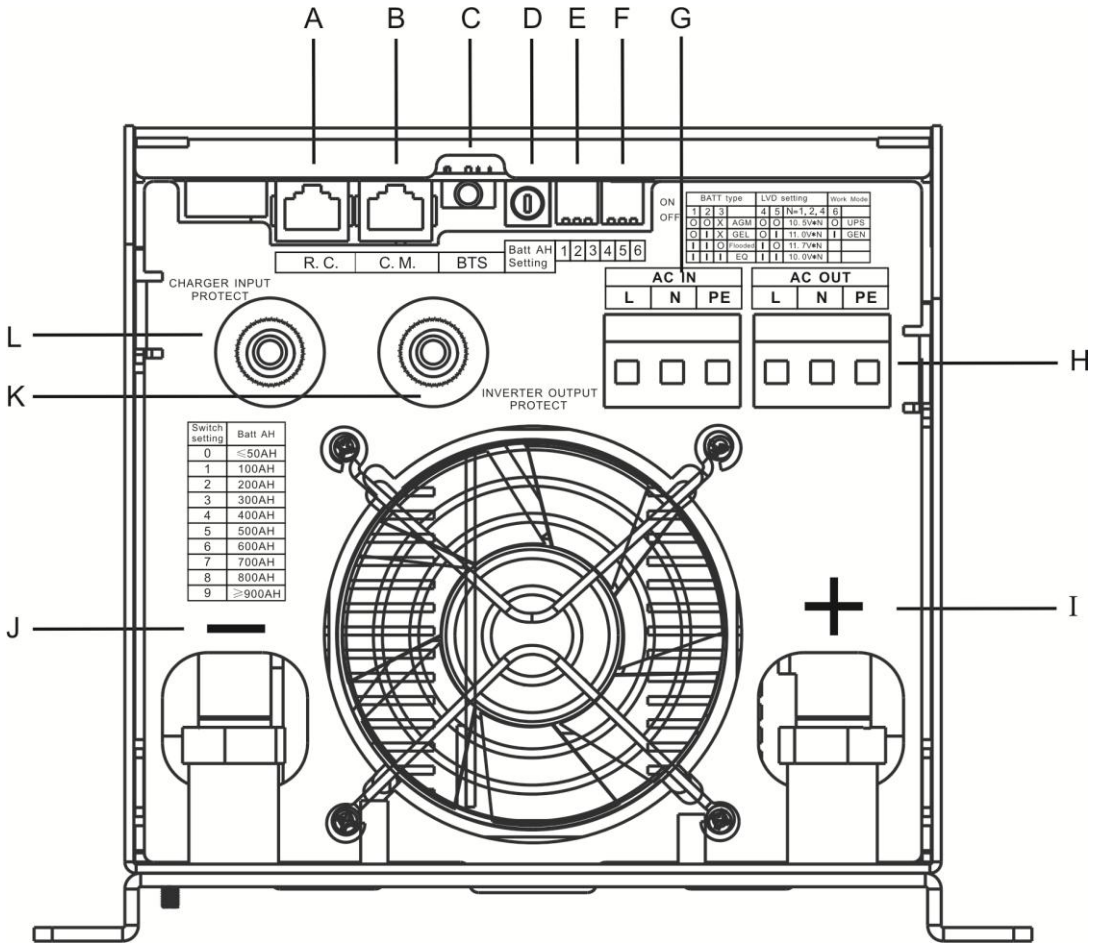
During charging, the Symphony will keep monitoring battery temperature and will reduce charging rate or even shut down upon too high temperature detected. This will help to prevent thermal runaway of battery.

++ Battery Low voltage

User can set its own preferred low voltage disconnect level. The inverter will shut down upon battery voltage reach the preset level preventing battery to be over-discharged or discharged exceeding desired level.

3.0 Pre-installation Configuration

Before the installation, you need to set total 5 configurations. Loose screws and remove the top panel you will see the central panel where you can finish all the configurations and do connection to accessory control.



A	RC socket - Remote Control
B	CM socket - Communication Module
C	BTS - Battery Temperature Sensor
D	Battery capacity selection
E	Dipswitch 1-3
F	Dipswitch 4-6
G	AC input
H	AC output
I	DC +
J	DC -
K	Output protection
L	Charger input protection

3.1 Battery Capacity

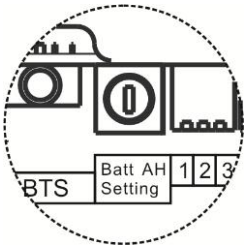
Through the clock switch, you can configure the battery you are going to connected for a premium charging current. The charger capacity in specification was the max charge current the model you selected could supply.

The charging current was set at following terms:

I=0.15C **(15% of the battery capacity you choose)**

Or

Max Charger Capacity of the model you choose



- On the clock switch, we offer total ten battery capacity settable which are <50AH, 100AH, 200AH, 300AH, 400AH, 500AH, 600AH, 700AH, 800AH, >900AH. You can choose according to the battery you want to charge.
- In case you choose <50AH, the charge current was 5A.
- In case you choose >900AH, the charge current was the max charging current.
- The max charging current of the model you are using can only deliver is its max charging current as specified in data no matter how big battery you selected.
- In case you want to charge your battery faster, you could set bank one gear larger to get higher charging current. However, please make sure the current did not exceed 0.2C (20% of battery capacity).

For example, for model Symphony SYC2000-12-230 with battery capacity of 12V400AH

1> If you choose battery capacity at 400AH, you could get charging current of 15%x400AH=60A

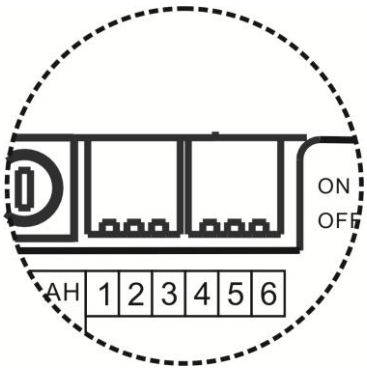
2> If you want to charge faster, you could choose 500AH, you could get charging current 15%x500AH=75A

For example, for model Symphony SYC2000-12-230 with battery capacity of 12V700AH

1> Since the max charging current of this model is 80A, you will get 80A. Not 0.15C, 105A

The default setting was <50AH

3.2 Battery Type



Please select the battery type at the dipswitch 1-2, following please find the list of available battery type and charging voltage.

The reference voltage was for 12V battery. For 24VDC model, the output voltage was 2 times and for 48VDC model the output voltage was 4 times.

SW1	SW2	Battery type	Absorption	Float
off	off	AGM	14.4	13.5
off	On	GEL	14.1	13.7
on	On	Flooded	14.3	13.2
on	off	No-use		

The default setting was AGM

3.3 Equalization

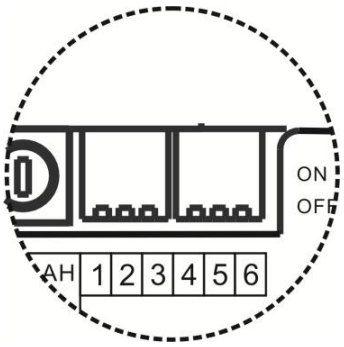
Through set dip switch 3 to ON, you could choose Equalization program for your flooded battery, of which the charger will, after a normal charging cycle (bulk-absorption), raise voltage to 15.5VDC(12V battery), 21VDC(24V battery) or 42VDC(48V battery) and will quit upon either the following condition:

1> with a timer of max 30mins after reaching 15.5VDC/21VDC/42VDC

This program can only be applied on flooded battery. As a protection, if you choose wrong battery type. The Symphony won't delivery equalization charging program and will only deliver the battery type you chose.

Please refer to chapter 6.7 for details of performing equalization charging.

3.4 Low Voltage disconnect



Through the dip switch of 4-5, you can configure the premium low voltage protection level for your system. Following please find data

The following DOD is ONLY estimation. The exact measure of the battery SOC is almost impossible with only electrical parameter. It may vary according to discharge current, battery healthy etc.

SW4	SW5	12VDC model	24VDC model	48VDC model	est DOD	recommendation
off	off	10.5VDC	21.0VDC	42.0VDC	>85%	mobile
off	on	11.0VDC	22.0VDC	44.0VDC	ab. 75%	solar or backup
on	off	11.7VDC	23.4VDC	46.8VDC	ab. 60%	solar or backup
on	on	10.0VDC	20.0VDC	40.0VDC	>90%	mobile

The default setting was 10.5VDC (12V model) / 21VDC (24V model) / 42VDC (48V model)

3.5 GEN-UPS

Through dip switch 6, you could choose either UPS mode or GEN mode. Set dip switch 6 to ON, it will change to GEN mode. For explanation, please refer to chapter 2.3. Under Gen mode, following range will be adjusted

Voltage range : 170VAC-280VAC
Frequency range : 40Hz-70Hz
Waveform : less sensitive
Time delay: 2s

The default setting was UPS mode

This configuration will adjust the minimum quality of AC input which Symphony will qualify and pass through to your AC appliance. Voltage or frequency variation might cause damage for particular load. Before adjusting these setting, refer to electrical rating of connected load. Failure to follow the instruction can cause damage over appliance connected.

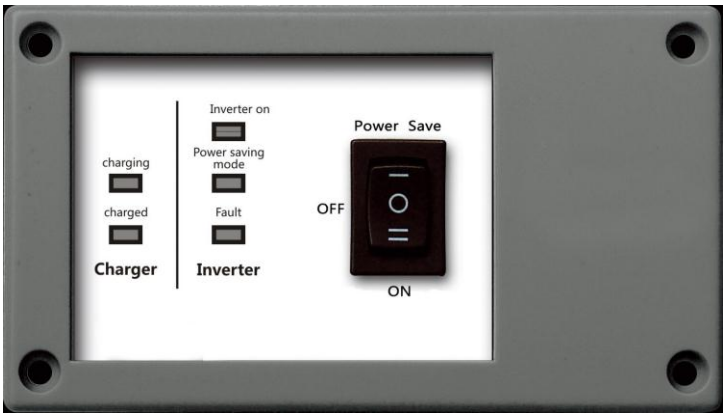
4.0 Control and Communication

Symphony offer both communication port and remote control approaches.

4.1 RC - Remote Control (optional)

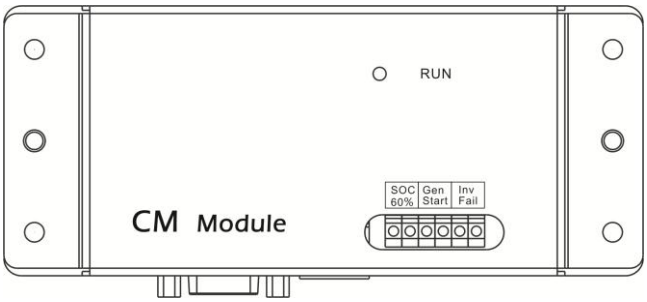
Optional RC – remote control could be purchased and connected to the Symphony on central panel to have following functions:

- set your equipment at ON/OFF/POWER SAVE mode
- know your equipment working status :



4.2 CM – Communication Module

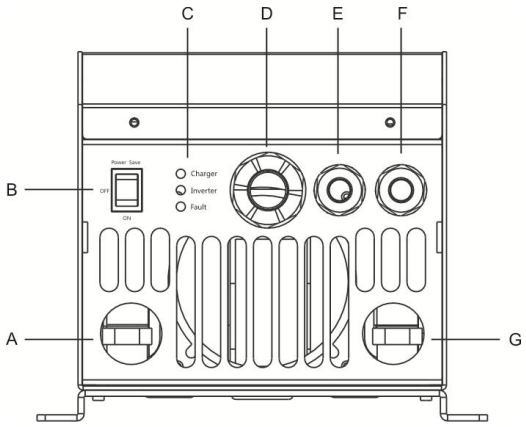
Optional CM module (communication module) could be purchase with communication port and three groups of potential free contact (NO) for further functions. It will activate as soon as the Symphony find itself in the position.



- RS232 communication protocol
- 1x Dry contact when battery voltage reach 11.7Vdc(12V battery), 23.4Vdc(24V battery), 46.8Vdc(48V battery), for user to configure to switch off some load. (LEFT)
- 1x Dry contact to start generator in case of preset battery low voltage alarm level achieved and to stop generator after battery charging finished the bulk stage. (MIDDLE)
- 1x Dry contact to set alarm for inverter failure (RIGHT)

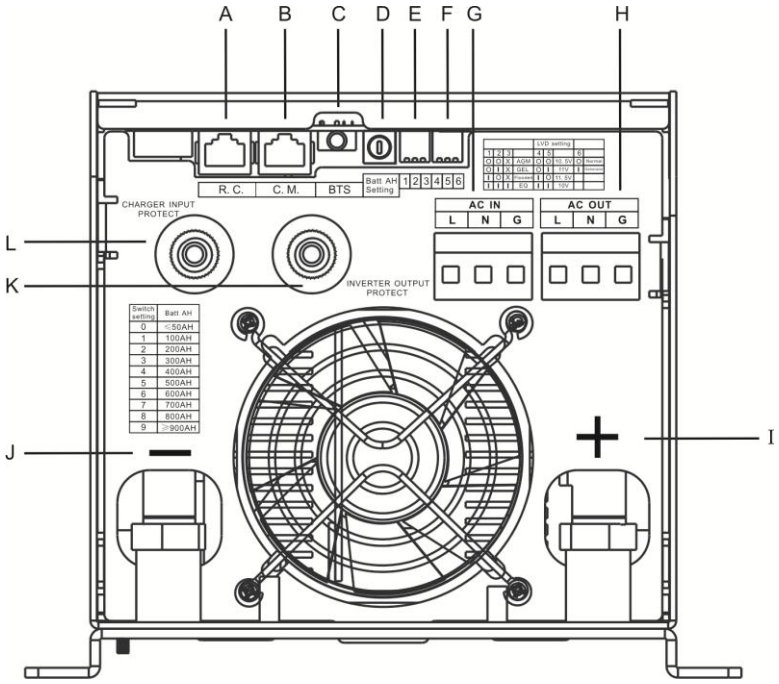
5.0 Installation

Front Panel



A	DC cable through hole
B	Main switch
C	LED
D	Gland for remote control cable
E	Gland for AC input
F	Gland for AC output
G	DC cable through hole

Central Panel



Refer to chapter 3.0 for definition

5.1 Material list

The unit is packed with following materials. Please confirm the series number on inverter is same to that on outer carton

- Equipment
- BTS – battery temperature sensor
- User's manual

5.2 Location

Please install the equipment in a location of Dry, Clean, Cool with good ventilation.

- Working temperature ： -10°C to 40°C
- Storage temperature ： -40°C to 70°C
- Relative Humidity ：0%-95%，non-condensing
- Cooling ： Forced air

5.3 Wiring recommendation

Please find the following minimum wire size. In case of DC cable longer than 1m, please increase the cross section of cable to reduce the loss.

System capacity	AC wiring		DC wiring		
	110VAC	220VAC	48VDC	24DC	12VDC
600W	2.5mm²	2.5mm²	4mm²	10mm²	16mm²
1KW	4mm²	2.5mm²	6mm²	16mm²	25mm²
1.5KW	4mm²	2.5mm²	10mm²	25mm²	35mm²
2KW	6mm²	2.5mm²	16mm²	25mm²	50mm²
3KW	8mm²	4mm²	25mm²	50mm²	70mm²
4KW	10mm²	4mm²	25mm²	50mm²	\
5KW	16mm²	6mm²	35mm²	70mm²	\
6KW	16mm²	6mm²	50mm²	\	\

5.4 General advice

- Ensure that the inverter has the correct DC voltage with your existing battery system
- Install the Symphony as close to the batteries as possible reducing the voltage drop on cable for the better performance of the equipment.

Do not connect the output of this equipment to your AC system at the same time as any other A/C source such as the 230V external mains or a generator.

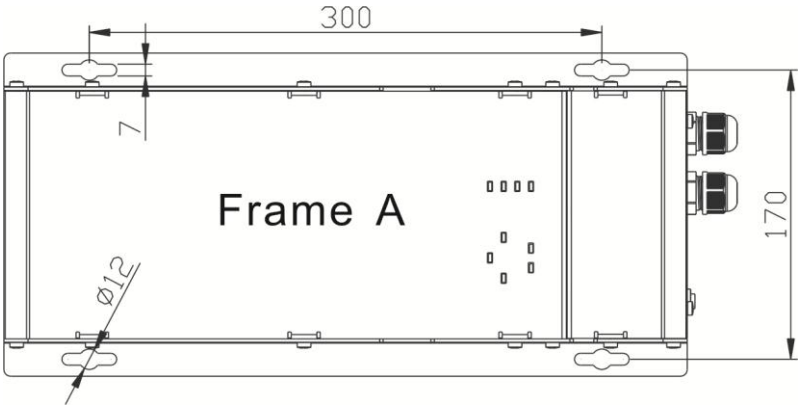
- We recommend connecting a DC fuse corresponding to the conductor between battery and Symphony, which will offer protection to the battery cable.
- On the AC output side, we recommend connecting the output from the inverter to a suitable Residual Current Circuit Breaker and Circuit Breaker.
- The neutral of this equipment is not connected to the earth. If requested, additional devices need to be installed internally. Please contact your installer.

5.5 Installation and Connection

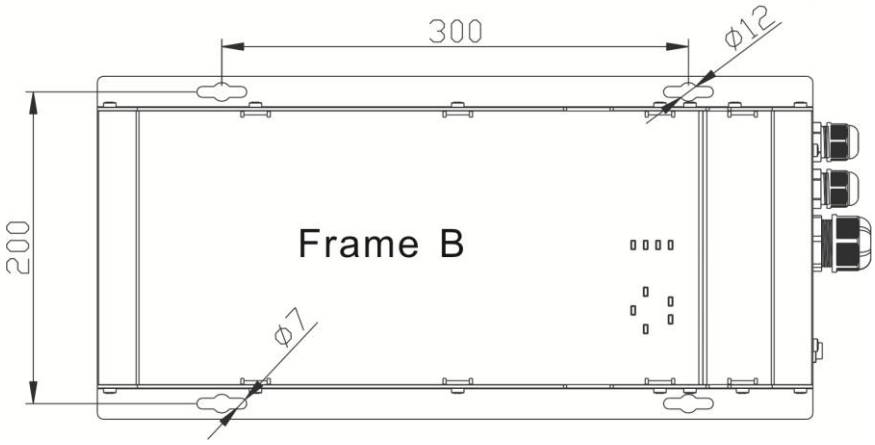
For the user operation safety, cut off the power before installation

5.5.1 Fix the equipment

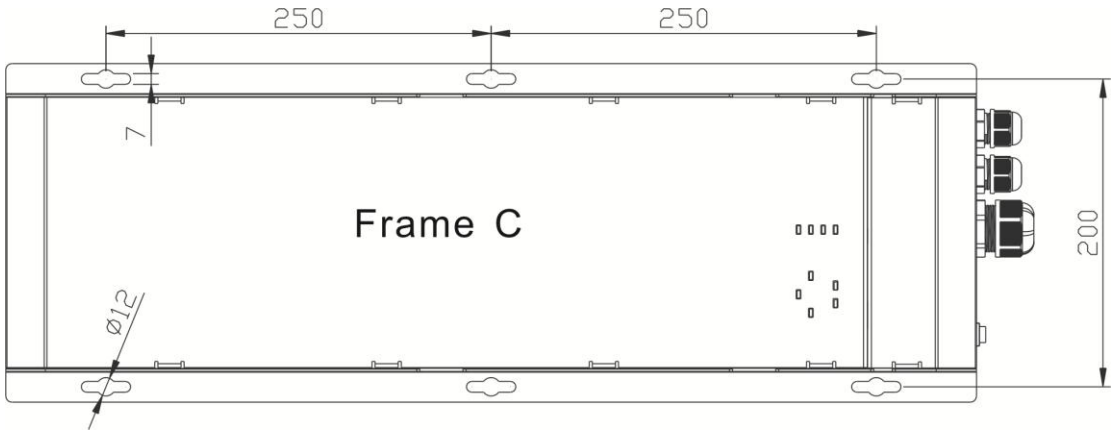
- Basically, Symphony could be installed either vertically on wall or horizontally on floor
- Please choose a flat surface and with 4XM6 to fix the unit securely
- In mobile application, please keep the vibration as small as possible
- Please find following installation dimension.



For SYC600-12-230, SYC1000-12-230, SYC600-24-230, SYC1000-24-230



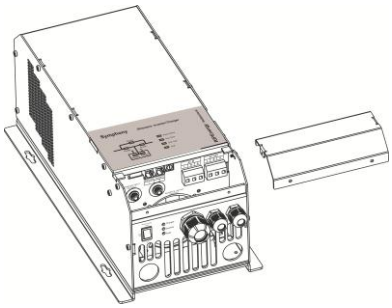
For SYC1500-12-230, SYC2000-12-230, SYC1500-24-230, SYC2000-24-230, SYC3000-24-230, SYC2000-48-230, SYC3000-48-230



For SYC3000-12-230, SYC4000-24-230, SYC5000-24-230, SYC4000-48-230, SYC5000-48-230, SYC6000-48-230

5.5.2 Connecting the cable

Please make sure the Symphony is turned off before connection. Otherwise, high voltage could be present.



- Loose the screw and remove the top panel
- (if necessary) There is cable connecting the LED/switch of front panel to equipment, please plug out the connector at front panel. Then, loose the screw and remove the front panel

Connecting DC cable

Please double check battery voltage match the model you are going to installed, the wrong battery could destroy equipment and is out of warranty.

Please double confirm the polarity of DC input. Reverse polarity could cause permanent damage on equipment and it is out of warranty.

- Choose the right cable size (refer to 5.3) and follow polarity guide marked on the panel
- Pull through the DC cables through the holes at front panel, clamping the cable terminal on cable.
- Secure the battery cable on DC+ and DC- terminals respectively making sure it is tightly screwed

Connecting the AC cable

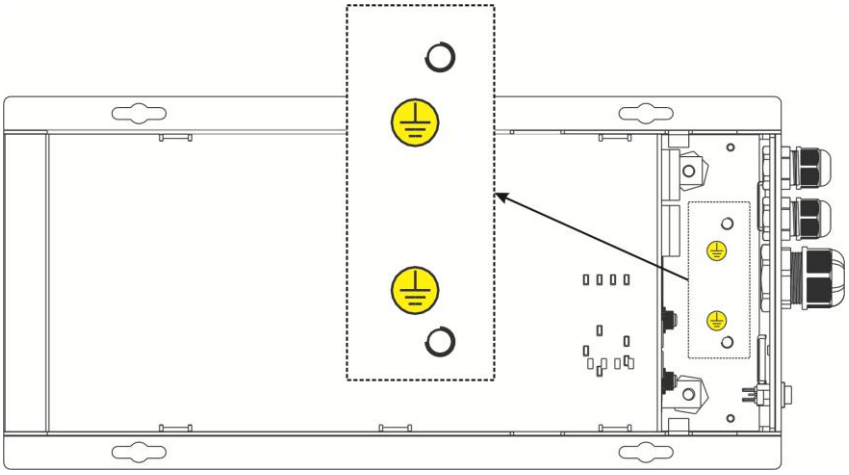
- AC input cable: choose the right cable size (refer to 5.3), pull through the AC input cable through Gland and connect it on AC input block. Connectors are marked as “L”-line, “N”-neutral and “PE”-earth. Making sure it is tightly screwed.
- AC output cable: choose the right cable size (refer to 5.3), pull through the AC output cable through Gland and connect it on AC output block. Connectors are marked as “L”-line, “N”-neutral and “PE”-earth. Making sure it is tightly screwed.

Please double check the AC input and AC output was right after connection.
Wrong connection will cause permanent damage of equipment and it is out of warranty.

Connecting the accessory cable

- Pull through the BTS cable through gland and connect it on socket marked BTS
- Pull through the RC cable through gland and connect it on socket marked RC.
- Pull through the CM cable through gland and connect it on socket marked CM

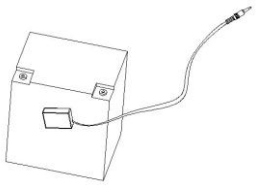
Connecting the earth



- At the bottom of the connection cabinet showed as above, there are two ground terminals.
- Please connect it with EARTH or vehicle chassis by a proper gauge wire.

5.5.3 Install the temperature sensor

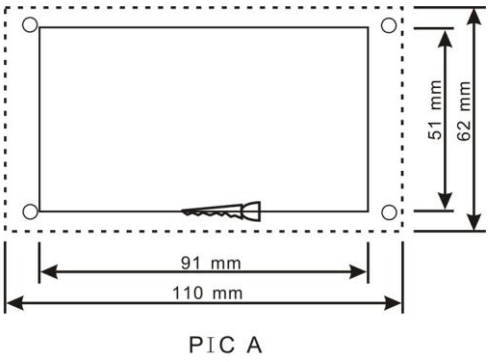
Please glue the temperature sensor, which was plugged into BTS socket at central panel, on the SIDE of battery and secure the attachment.



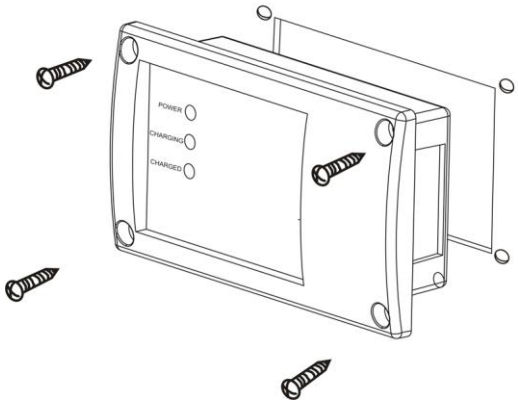
Please notice the cable supplied is around 300cm. Do not pull cable too hard avoid loose contact loose.

5.5.4 Install the RC - remote controller

The RC was dash mounting design. Please cut the hole according to following size and screw the remote controller securely through four screws at corners and connected the cables.



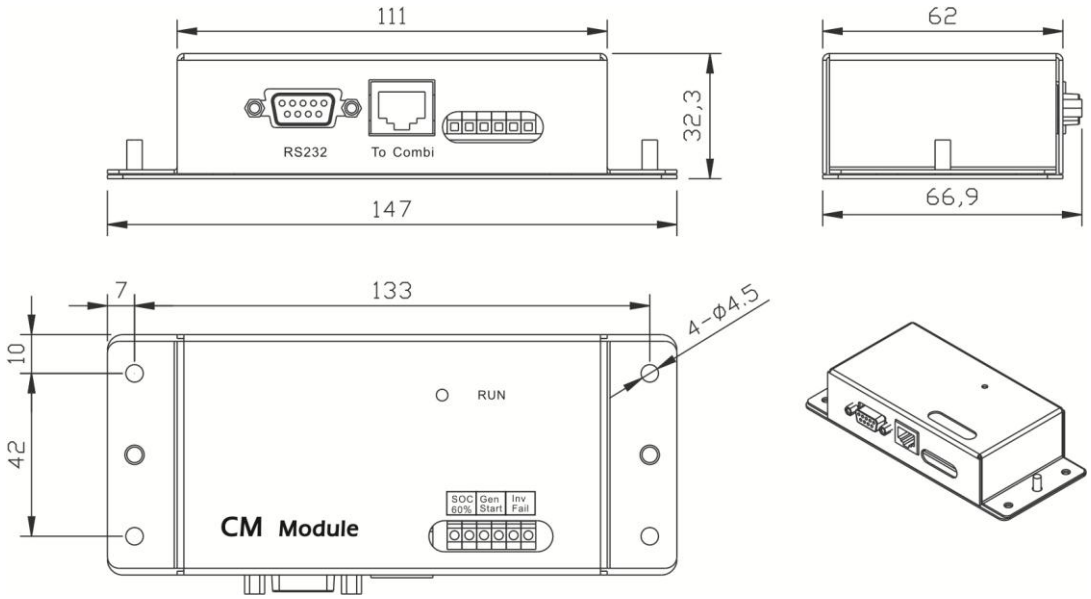
PIC A



On RC, you could read out equipment working status and switch ON/OFF or set Power Save for your equipment.

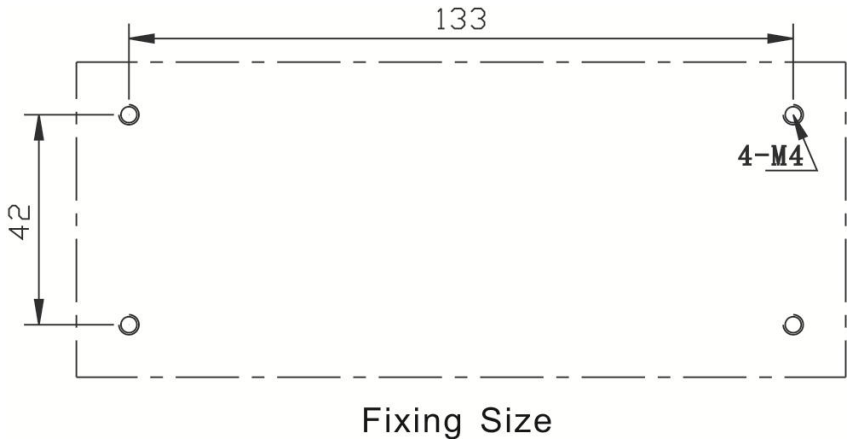
5.5.5 Install the CM – communication module

CM module (communication module) supply communication port and three groups of potential free contact (NO) for further functions.



- RS232 communication protocol – (RS485 available upon request)
- 1x Dry contact to start/stop AC generator –
  - Upon voltage drop to the LVR preset, it will send signal to start Generator.
  - Upon charger come into absorption stage, it will send signal out to stop generator.
- 1x Dry contact to set alarm for inverter failure due to overtemp, overload etc.
- 1x Dry contact when battery voltage reach 11.7Vdc (12V battery), 23.4Vdc (24V battery), 46.8Vdc (48V battery), for user to configure switching off some loads.

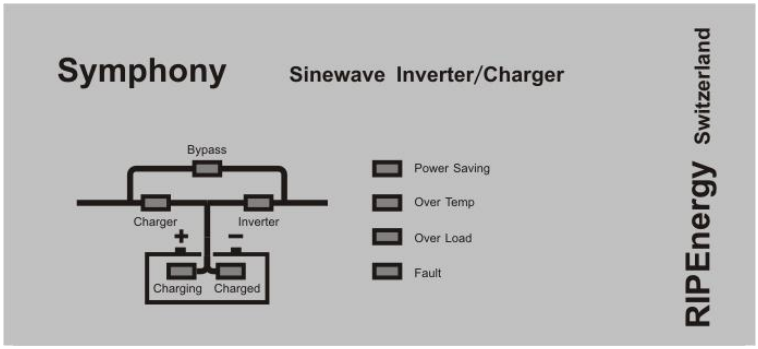
The maximum contact load is:
230Vac : 2A
12Vdc/24Vdc/36Vdc : 3A



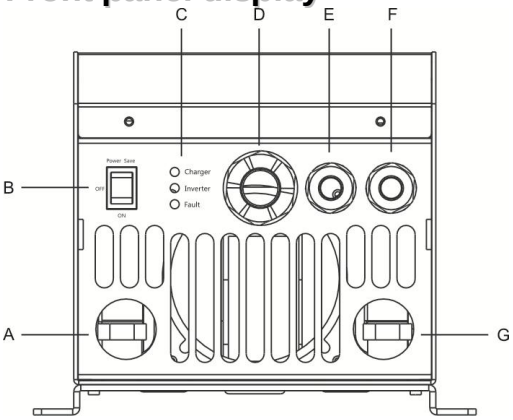
Fixing Size

6.0 Operation

Top panel display



Front panel display



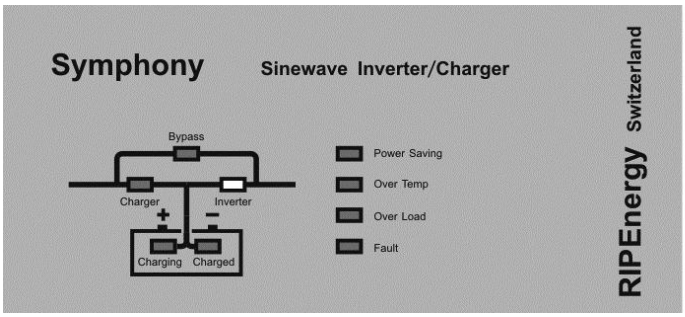
Three LED indicating working mode and fault.

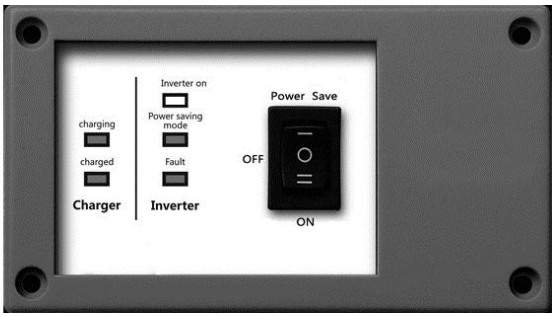
6.1 Double Checking

- Check the DC input voltage of this inverter is same to your battery nominal voltage. NEVER try to connect different DC input to inverter.
- Inspect the right polarity of DC input, otherwise unit can not power ON.
- Inspect AC input and AC output is correct, make sure unit is no short cut.

6.2 Switch on the inverter

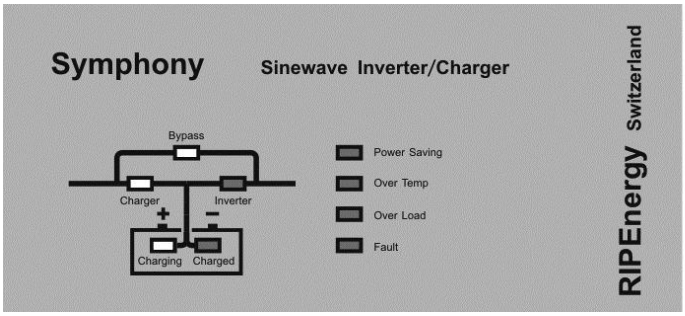
- Disconnect the AC input power, switching on the unit, the LED will all illuminate for analysis then there should be AC available at inverter output. The inverter LED will illuminate. You could switch on the load which will be powered by inverter.

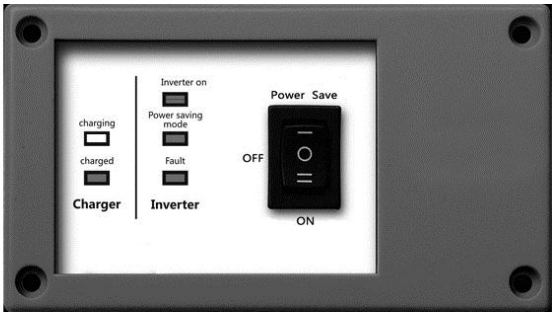




6.3 Switch on Charger

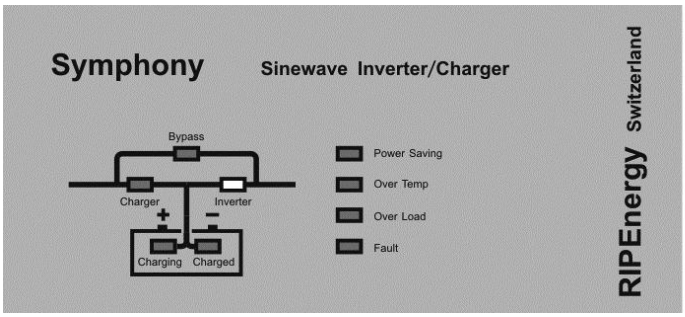
- Then switch on the AC input power, the Symphony should go on bypass mode feeding the power to load and meantime battery charger will start work. The bypass LED and charger LED will illuminate.
- While connecting to a generator, in case you could not get charging after connecting in, you need to switch off the inverter and change the work mode and repeat 6.2.

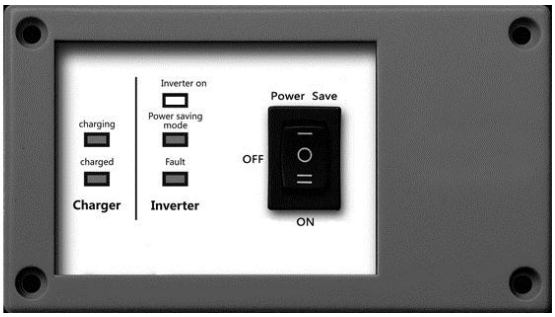




6.4 Switch off AC input

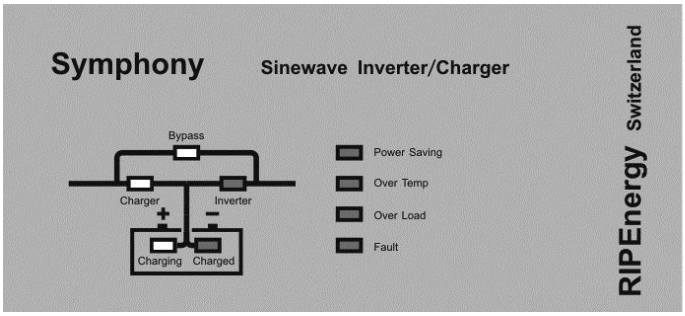
- Remove the AC input power, the Symphony will transfer to inverter mode quickly and load should continue work without interruption (in UPS mode only). Inverter ON LED will illuminate

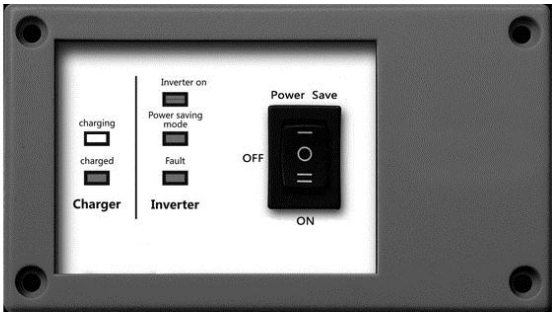




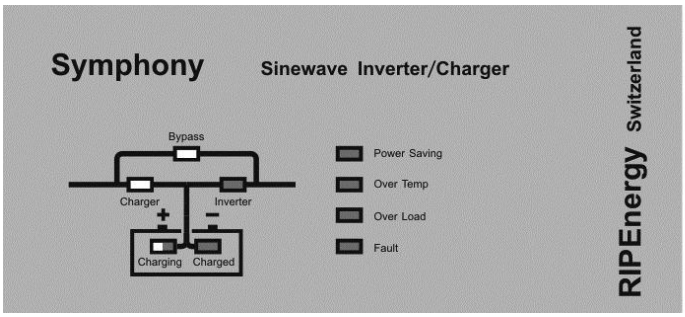
6.5 Battery Charging

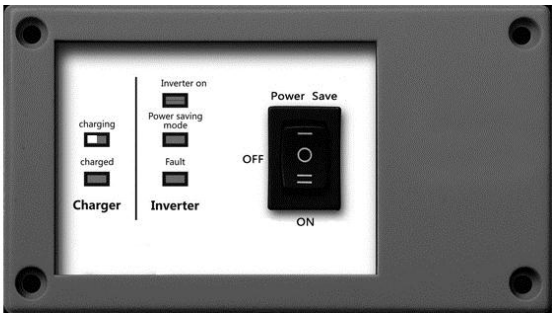
- Upon your AC input meet the minimum quality, the Symphony will perform charging. Both LED charger and LED charging will illuminate.
- During bulk charging, the CHARGING LED will illuminate





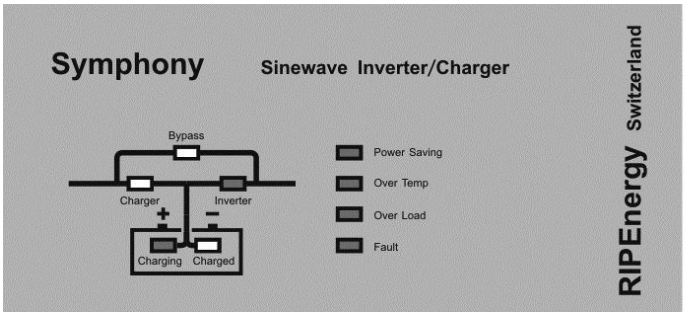
- During absorption charging stage, the CHARGING LED will flash

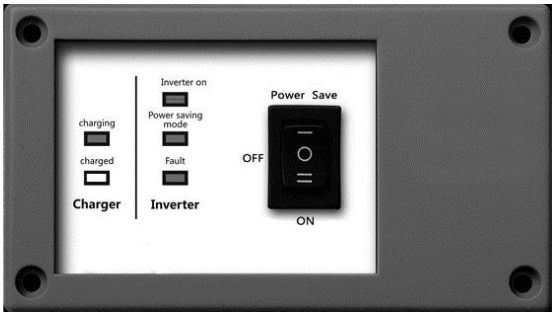




6.6 Battery Charged

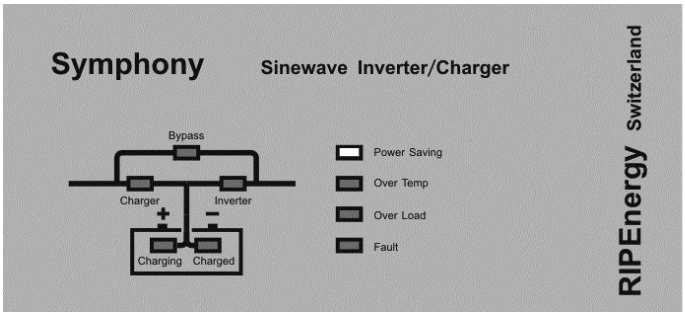
- After coming into floating, the Battery Charged LED will illuminate. You now have your battery 100% charged.

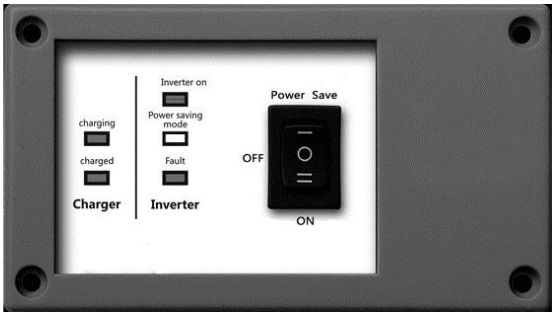




6.7 Power Saving mode

- In case connected load has all been turned off, you could choose the equipment entering into power saving mode through press the switch either on front panel or remote controller. After entering into power saving mode, the equipment status power consumption will be dramatically reduced.





6.8 Performing Desulphation Charging

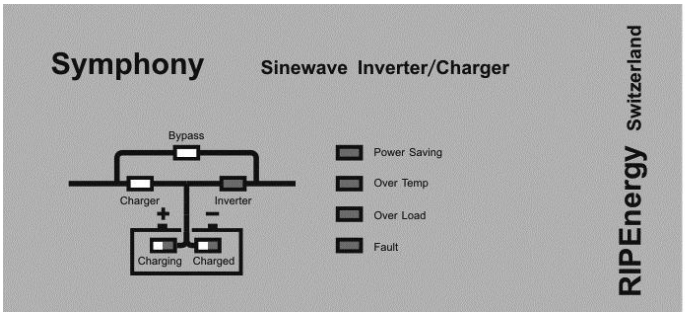
It is strongly recommended to read this section carefully before you set the de-sulphation charging and DO NOT leave battery unattended while performing de-sulphation.

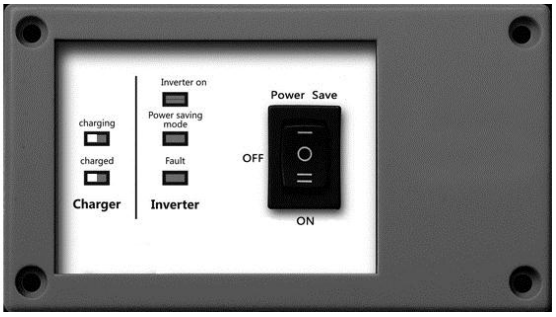
Always check if your battery supplier recommended desulphation charging. Only start when it is suitable.

Over a period of time, the cells in a flooded battery can develop uneven chemical states. This will result in a weak cell which in turn can reduce the overall capacity of battery. To improve the life and performance of non-sealed flooded battery, Symphony combi include a manual equalization program that can be used, if recommended by battery manufacturer.

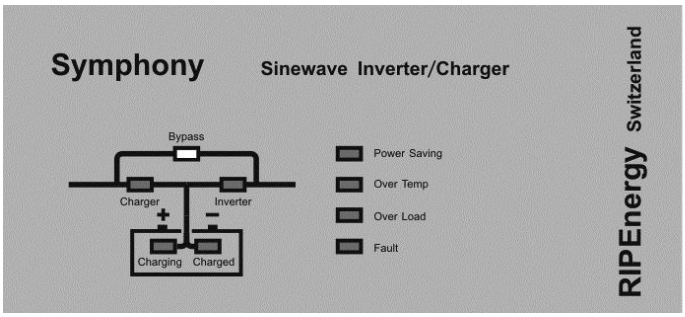
Through the dipswitch at central panel, you can initiate the desulphation program manually.

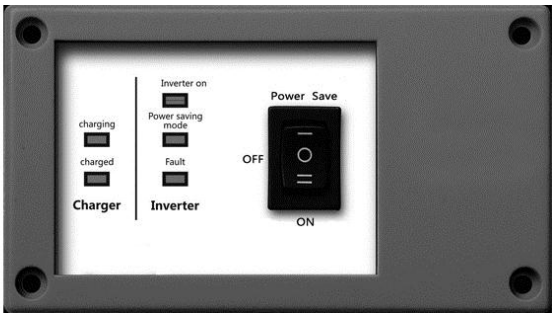
- After you choose this program, the charger will start an ordinary charging cycle, afterwards of which it will raise the voltage to 15.5V/21V/42V on purpose. Both of the CHARGING and CHARGED will flash.





- After 30mins, it will quit and stop charging.





- Check electrolyte level and refill battery with distilled water if necessary.
- If you want to come to normal charging. You need switch off the Symphony, change the setting back to normal.
- Switch on the Symphony again, then you will have your equipment back to normal charging.

During equalization, the battery generates potentially flammable gases. Follow all the battery safety precautions listed in this guide. Ventilate the area around the battery thoroughly and ensure that there are no sources of flame or sparks in the vicinity

Turn off or disconnect all loads on the battery during equalization. The voltage applied to the battery during equalization may be above the safe levels for some loads.

Frequency: Maximum once a month, for heavily used flooded battery, you may wish to equalize your battery. For flooded battery with light service only need to be equalized every 2-3monthes.

Important: Equalization can damage your batteries if it is not performed properly. Always check battery fluid before and after equalization. Fill batteries only with distilled water.

Always check the equalization switch is set back to OFF after each time's equalization.

Battery manufactures' recommendations on equalization vary. Always follow the battery manufacturer's instructions so batteries are properly equalized. As a guide, a heavily used battery may require equalization once a month while a battery in light duty service, only needs equalizing once every 2 to 4 months.

Battery type ONLY perform equalization to flooded lead-acid batteries. Do not equalize Gel, AGM batteries.

7.0 Trouble Shooting

7.1 LED indicator and audible alarm

√ : ON

x : OFF

Status	Function	LED on front panel									Audible alarm
		Bypass	Charger	Inverter	Charging	Charged	Power saving mode	Over temp	Over load	Fault	
Charge Function	Constant current	√	√	×	√	×	×	×	×	×	×
	Constant voltage	√	√	×	flash	×	×	×	×	×	×
	Float	√	√	×	×	√	×	×	×	×	×
	EQ	√	√	×	flash	flash	×	×	×	×	×
Inverter	Inverter ON	×	×	√	×	×	×	×	×	×	×
	Power Save mode	×	×	×	×	×	√	×	×	×	×
Alarm Mode	Battery low voltage	×	×	√	×	×	×	×	×	√	beep 0.5s every 5s
	Battery overvoltage	×	×	√	×	×	×	×	×	√	beep 0.5s every 1s
	Inverter overload	×	×	√	×	×	×	×	√	√	beep 0.5s every 1s
	Inverter overtemp	×	×	√	×	×	×	√	×	√	Beep 0.5s every 1s
	Bypass overtemp	√	√	×	√	×	×	√	×	√	beep 0.5s every 1s
Protection mode	Fan block	×	×	×	×	×	×	×	×	×	beep continuously
	Battery overvoltage	×	×	√	×	×	×	×	×	×	beep continuously
	Battery low voltage	×	×	×	×	×	×	×	×	×	
	Inverter overload	×	×	×	×	×	×	×	√	×	beep continuously
	overtemp	×	×	×	×	×	×	√	×	×	beep continuously
	Charger fault	×	√	×	√	×	×	×	×	×	beep continuously
	Shortcut	×	×	×	×	×	×	×	×	×	beep continuously

8.0 Specification *(Specifications Subject to Change Without Notice)*

Model	SYC600-12-230	SYC1000-12-230	SYC1500-12-230	SYC2000-12-230	SYC3000-12-230
Nominal DC voltage	12VDC				
Inverter continuous power (W at 25°C)	600	1000	1500	2000	3000
Max charger output (A)	25	40	60	80	120
De-sulphation	15.5V for 30mins				
CB - charger (A)	5	10	10	15	30
CB - output (A)	5	10	10	15	30
Size	400x190x135		460x220x180		630x220x180
Weight (kgs)	9.5	14	16	18.5	28

Model	SYC600-24-230	SYC1000-24-230	SYC1500-24-230	SYC2000-24-230	SYC3000-24-230	SYC4000-24-230	SYC5000-24-230
Nominal DC input voltage	24VDC						
Inverter continuous power (W at 25°C)	600	1000	1500	2000	3000	4000	5000
Max charger output (A)	15	20	30	40	60	80	100
De-sulphation	31V for 30mins						
CB - charger (A)	5	10	10	15	30	30	30
CB - output (A)	5	10	10	15	30	30	30
Size	400x190x135		460x220x180			630x220x180	
Weight (kgs)	9.5	14	16	18.5	22.5	34.5	38

Model	SYC2000-48-230	SYC3000-48-230	SYC4000-48-230	SYC5000-48-230	SYC6000-48-230
Nominal DC input voltage	48VDC				
Inverter continuous power (W at 25°C)	2000	3000	4000	5000	6000
Max charger output (A)	20	30	40	50	60
De-sulphation	62V for 30mins				
CB - charger (A)	15	30	30	30	40
CB - output (A)	15	30	30	30	40
Size	460x220x180		630x220x180		
Weight (kgs)	18.5	22.5	34.5	38	42

Inverter	
Norminal Voltage	12VDC / 24VDC / 48VDC
Cont. output power at 25°C (W)	12VDC: 600W-3000W
	24VDC: 600W-5000W
	48VDC: 600W-6000W
Output voltage	230VAC or 110VAC
Output voltage variation	Max ± 2%
Output frequency	50/60Hz ± 0.1%
Efficiency	max 88%
Surge	300%
Overload (600W-2000W model)	>150% 20s
	>125% 1min
	>110% 15mins
Overload (>2000W model)	>150% 20s
	>125% 1min
	>110% 15min
Crest factor	3:1
THD	<3%
Zero load power	<5W
Low voltage disconnect (VDC) - settable	12VDC: 10.0 - 11.7
	24VDC: 20.0 - 23.4
	48VDC: 40.0 - 46.8
Overload and overheat protection	auto disconnect with 3 times restart attempt
shortcut protection	auto disconnect

(Specifications Subject to Change Without Notice)

Charger	
AC Input voltage max	270VAC - UPS mode
	280VAC - GEN mode
AC Input voltage min	194VAC - UPS mode
	185VAC - GEN mode
Input frequency	45Hz-65Hz - UPS mode
	40Hz-70Hz - GEN mode
Battery types	AGM/GEL/Flooded
Nominal output	12VDC / 24VDC / 48VDC
Output voltage	refer to manual
Max output current	refer to other spec
Absorbtion time	variable
De-sulphation	15.5V / 31V / 62V
Temperature compensation	4mV/°C/cell

Other Data	
Transfer time	10ms-15ms (UPS mode)
	2s (GEN mode)
Dry contact	x 3 (CM module)
Enclosure	Aluminum
Cooling	Forced fan
Protection	IP21
Operating Temperature	-10° to +50°C Derating Linearly 4% per °C from 40°C
Battery connector	M6 x 2
AC connector	Terminal block (M3 screw)
Safety	EN60950-1
Emmission / Immunity	EN55022