INSTRUCTION MANUAL

CE

„Duo battery" Solar controller with remote monitor, for yachting and caravaning
SDC-20A 12/24V + SDC-MT

1. PRODUCT DESCRITION

High quality controller with very small idle energy dedicaded for yachts, boats, campers and other objects, where solar energy can be used - item is ideal for smart control charge process for 2 batteries with choose of priority. This feature allows user to reduce the risk of a lack of electricity to power eg. emergency lighting, engine starting, radio communications and navigation by providing a separate priority charging of the battery designated to power these devices. Controller provides full information about the state of the system and occurring defects. Remote monitor (IP 65 on the front side) allows for a full review of the parameters and their modifications. It also has a LCD backlight with programmable brightness and time, It can be placed in the most convenient location for observation and operation (10m connection cable included).

2. FEATURES

- The ideal controller for use on boats, campers, in the caravaning, and in other applications. Most often it will be very useful for the possibility of independent charging 2 batteries with prioritized charging, eg. Starter battery and battery for general use, the battery for special purposes and the main battery and others.
- Remote Monitor allows you to see charging parameters and set some parameters; there is also time and the temperature unit setting
- Automatic identification of system voltage (12V or 24V)
- The proportion of each accu charging power can be adjusted according to your needs
- PWM charge controller, precise temperature compensation
- Protection against overload, short circuit, reverse polarity and reverse current in PV panels
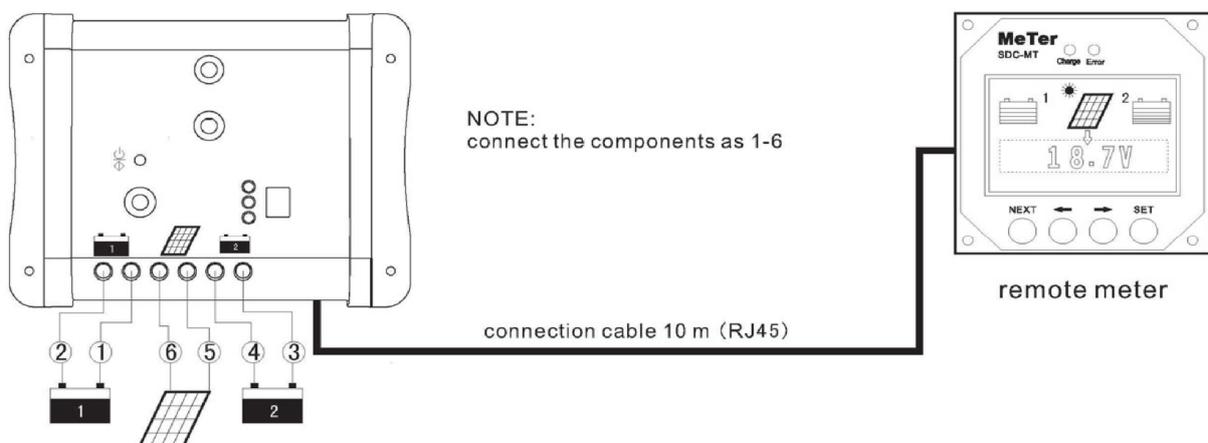
3. CONNECTION AND INSTALLATION

Fig 1. Diagram of controller and monitor connection

Notes: 1. Connect in turn: 1, 2 - Battery 1; 3,4 - battery 2; 5,6 - PV panel
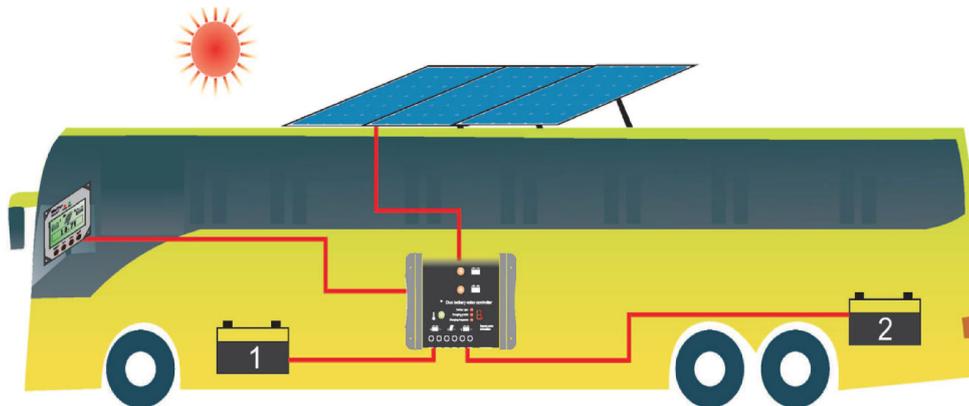2. Connect the monitor cable from the controller

Fig 2. Examples of arrangement of system components in the vehicle

3.1. INSTALLATION
NOTE: Please disconnect the battery and PV panels before installing controller.
Do not touch both the positive and negative polarity terminals of PV panels and batteries. Otherwise user is exposed to risk of electric shock or injury.
(1) Mount the controller on a rigid wall, preferably vertically, leaving a free space of at least 10 cm on each side of the controller to ensure adequate heat dissipation. Fix the controller with 4 pcs. of screws / bolts appropriate for the conditions (see figure below - spacing of the mounting holes).
(2) The controller should be installed in a dry, cool place which is protected from the impact of the sun, aggressive and flammable gases
(3) Check that the rated voltage of the battery and PV panels are within the appropriate limits.
(4) Disconnect the fuse overcurrent protection of PV panels and battery (if any are used – it is recommednded to use them) and / or PV system from the controller
(5) Connect the cables from the battery to the controller and cables from the PV panels in the order shown in the diagram (Fig 1)
NOTE 1: The distance between the controller and batteries should be as small as possible, otherwise process of adjustment of charging / discharging controller may not be accurate due to the voltage drop between the battery and the controller (also cables connecting the battery to the controller should have largest possible cross section)
NOTE 2: After connecting (and switching on fuse, if present) even one battery with a nominal voltage controller should illuminate the corresponding LED.
(5) Connect the controller RJ45 cable with the remote monitor (after installation) and start the tests for operation and modification of settings respectively according to instructions of controller and monitor.
NOTE 3: In order to prevent the penetration of water into the controller along the solar cables, it is important to bend the cables in the form of a "U" before connecting to the controller
NOTE 4: Batteries with different capacities can be applied in system but always with the same voltage and the same type (producer)
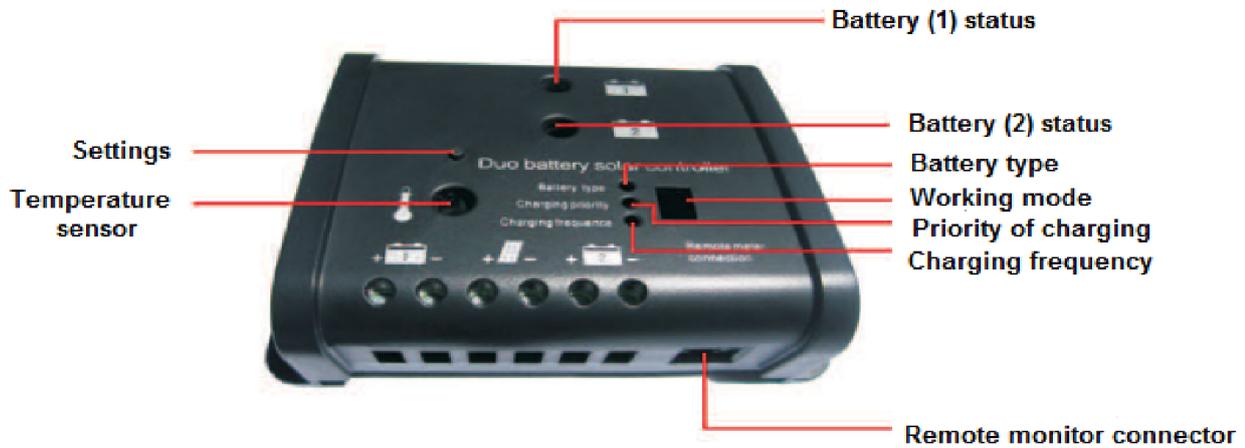
4. DIMENSIONS AND DIAGRAM OF CONTROLLER

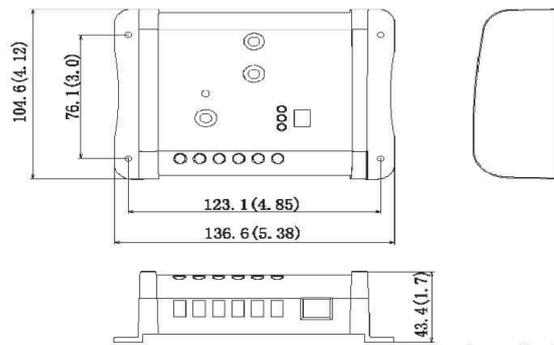Fig 3. Operation and visualization

Fig 4. The size and spacing of the mounting holes

5. SETTINGS

Settings are being indicated by three flashing LEDs, each LED is used for the appropriate settings according to the table. After selecting the appropriate LED, the settings button must be pressed for approx. 5s until the selected LED will flash. While the LED is flashing choose another numer depressing the button on the display corresponding to the selected parameter and leave the setting.
The selected number will be sent as a valid new setting.

6. WORKING PARAMETER SETTINGS

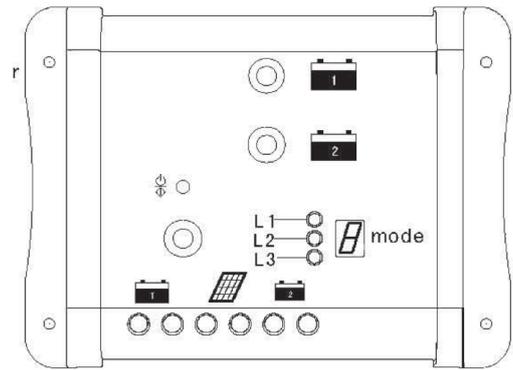| LED	Setting	Mode		
L1	Type of accu	No.	Accu type	
		1	SLD	
		2	GEL	
		3	FLD	
L2	Charging priority Warning: Put "%" only for No 1 battery. The controller automatically calculates the rest of the battery 2	No	Bat 1	Bat 2
		0	0%	100%
		1	10%	90%
		2	20%	80%
		3	30%	70%
		4	40%	60%
		5	50%	50%
		6	60%	40%
		7	70%	30%
		8	80%	20%
		9	90%	10%
L3	Charge current frequentzy	No	PWM - Hz	
		0	25Hz (default)	
		1	50 Hz	
		2	100 HZ	

Fig 6. Battery status

In normal charging mode, the controller will charge the batteries equivalently to set the 100% ~ 0%. First, the battery No 1 is charged to the level of full charge, then excess power is directed to the battery No 2, but if there is even a partial discharge of the battery No 1 the controller returns automatically to recharge battery No 1.

7. BATTERY CHARGE STATUS

2 LEDs shown in the figure 6 above shows the LEDs L4 and L5 indicating status. Data on traffic status and faults are shown in Table below.

LED	Status	Lit LED	Hint
L4	Accu 1	1. flashing 2. Slow flicker 3. steady light 4. Periodic flashing 5. lack of illumination	Check panels and battery connection Full charge Charging status No charge No battery or excessive voltage
L5	Accu 2	1. flashing 2. Slow flicker 3. steady light 4. Periodic flaching 5. lack of illumination	Check panels and battery connection Full charge Charging status No charge No battery or excessive voltage

8. TECHNICAL SPECIFICATION

Model	SDC20		
Max charging current	20A		
System voltage	12/24V auto		
Battery type	SLD (szczelny)	GEL	FLD (zalewowy)
BOOST charge	14,2V; x2(24V)	14,4V; x2(24V)	14,6; x2(24V)
Absorption charge	14,4V; x2(24V)	14,6; x2(24V)	14,8; x2(24V)
Floating charge	13,7V; x2(24V)	13,7V; x2(24V)	13,7V; x2(24V)
Max PV voltage	30(V)		
Battery voltage ranges	1~15V: x2(24V)		
Self consumption	4mA at night, 10mA charge time		
Monitor communication	RJ45		
Input terminals	$6mm^2$		
Ambient temperature	-35°C ~ +55°C		
Enclosure protection	IP 22		
Dimensions (BxGxH) / weight	136,6x43,3x104,6mm / 200g		

9. REMOTE MONITOR SDC-MT
Monitor allows remote reading system parameters in the four loops, setting some parameters, test system and deleting data:
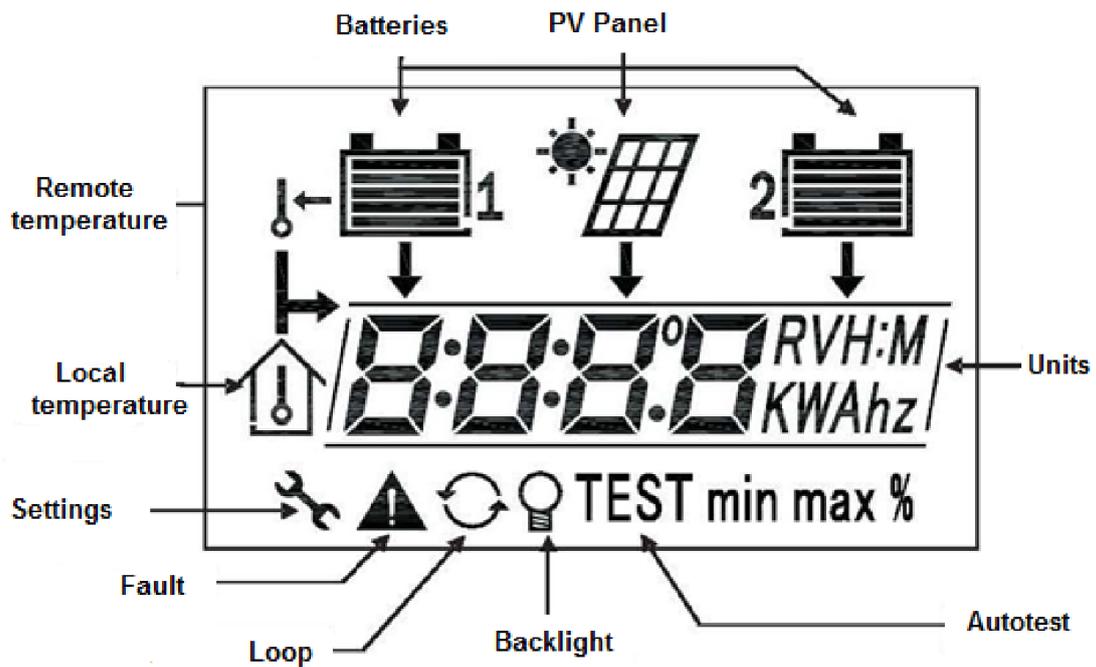- Loop 1: PV voltage, current Charge., Max current Charge., Accumulated energy (Ah), % distribution of energy supplied to the battery 1 and battery 2
- Loop 2 (Battery No 1) voltage, voltage min, max voltage, energy accumulated(Ah)
- Loop 3 (Battery No 2) voltage, voltage min, max voltage, energy accumulated(Ah)
- Loop 4: Temperature, time

9.1. DIMENSIONS AND INSTALLATION OF MONITOR

95(3.74)
84(3.35)
95(3.74)
84(3.35)
24(0.95)
8(0.32)

4 holes. Ø 4.0 (0.16)
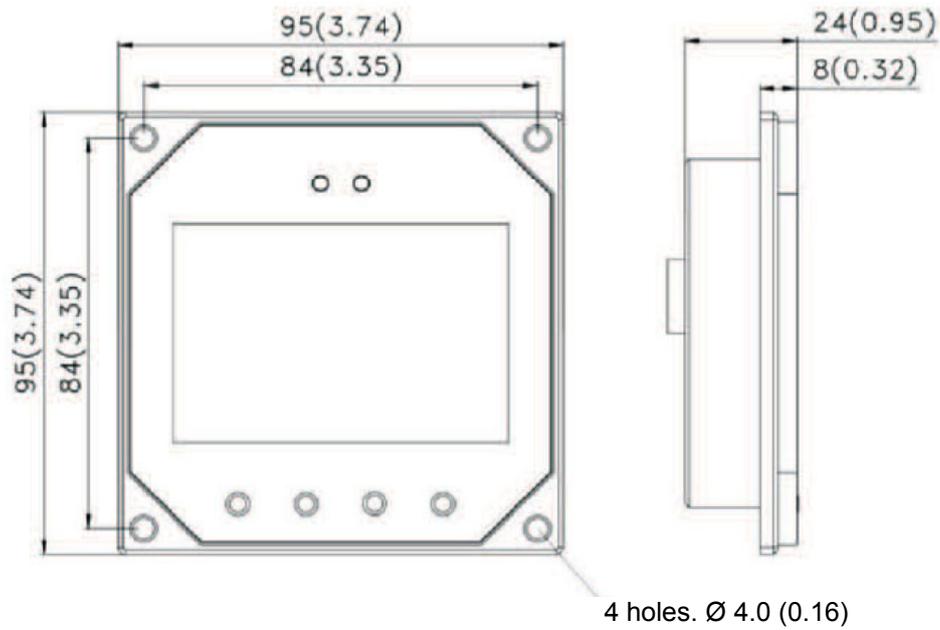
Dimensions in mm (inches)

10. MONITOR DISPLAY

Batteries   PV Panel

Remote temperature

Local temperature

Settings

Fault

Loop

Backlight

Units

Autotest

RVH:M
KWAhz

TEST min max %

Additional 2 LEDs above the display
Charging LED (left) lights green – charging;   Fault LED (right) lights red - fault

10.1 OPERATING THE MONITOR
Buttons from left to right are marked as K1 (Next), K2 (Left), K3 (Right), K4 (Setting).
The display indications appear to indicate parameteres in the following order (loop from
1 to 4): system, battery No 1, battery No 2, other. We use K2 and K3 to view
parameters in the loop. Button K1 switches to the next loop (Fig. below)
Adjustable parameters are: temperature unit, the display backlight time, the brightness
of the backlight options for the review of the data, the clock (HH: MM). K4 button is
used to activate mode and saving changes, K2 and K3 to modify the parameter.
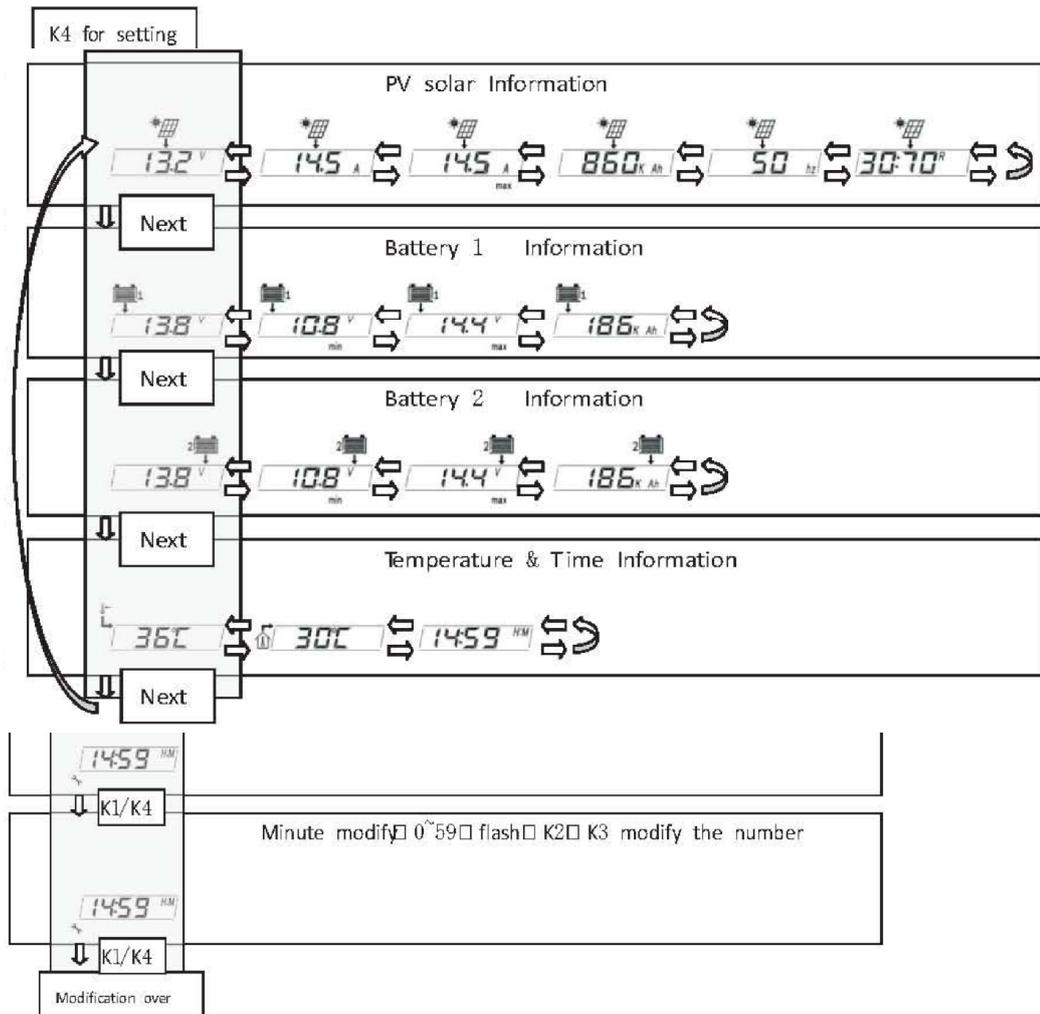

Settings
- Temperature: select ° C (degrees Celsius) or ° F (degrees Fahrenheit)
- Background lighting: any button launches backlight. In order to change time settings of backlight press K4, select the desired time or other highlighted options with K2, K3. The options shown in the diagram above are as follows: "OFF" (always off), "ON" (on all the time), backlight time 30s or 20s or 10s or 5s. Press K1 and proceed to the brightness settings, use can choose "FULL" (high brightness), "HALF" (reduced brightness)
- Sequential reading data: Display data in each of the loops may be held-OPERATE automatically - the choice "AUTO" (changed every 3 seconds or manual change). We use the One Touch K1 to move to the next loop. In the case

of manual changes - Select "OFF" change of readings by use of K2, K3, the step to the next loop K1

- Clock: If minutes (MM) or an hour (HH) flickers, respectively keys K2, K3 are used to change the settings. Save settings and exit the setting mode by pressing K4

Test system

At any time we can test correct working of the system by pressing keys K2 + K3. Details of the diagram are below. If the LCD screen is not displayed, it means that there is no connective-components between the controller and the monitor. If it is properly connected, the appropriate data will be displayed. If the remote temperature sensor is not connected monitor displays a thermometer symbol and the message "NO". Detected monitor data/parameter are displayed. "OPEN" means there is no battery or excessive voltage value. Given messages and data parameters are displayed in sequence at 0.5s (diagram below)
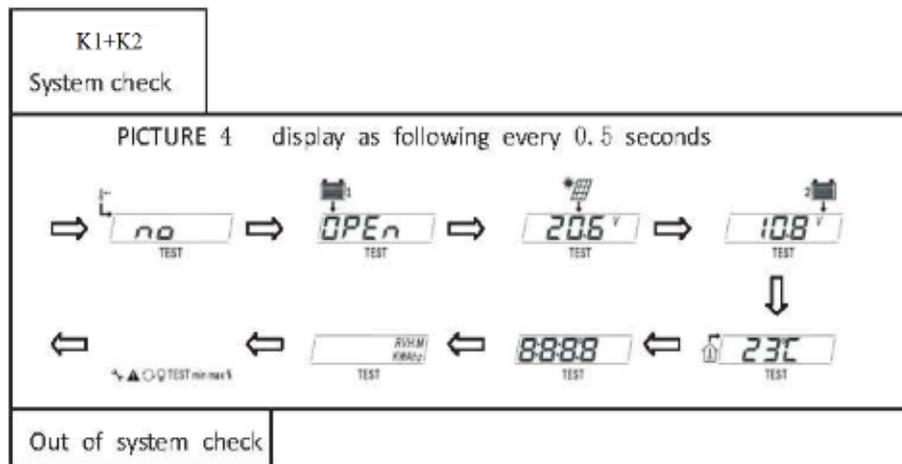
Deleting parameters

When installing a new system, at any time of installation erasing of stored in the system memory data can be done.

Parameters that will be erased are:max, min, Ah. After a while you press K3 + K4 replace data reset.

At the same time start of a new aggregation Ah and registration max and min will start.

10.2 Technical specifications

Rated voltage: 12V, minimum voltage 8V
Power consumption at 100% backlight: <23mA
Power consumption at reduced backlight: <20mA
Backlight and LED off: <17mA
Ambient temperature: -40°C~+60°
Operation on LCD: -10°C~+40°C
RH: up 100% (without condesation)
Communication cable   RJ45 (10m)
Front enclosure protection: IP 68

10.3 General remarks

If the symbol ⚠ is displayed please check:
1. If the battery is disconnected, if there is no break in the circuit or if there is too high voltage
2. If gharging current is not exceeded
4. If there is no short circuit in the PV panel
If the fault is repaired a symbol automatically stops to show

10.4 Communication Port: if the monitor is running on battery power or own supply and there is a break in communication, display will show "OFF". After pressing any button there is no answer. If communication returns then automatically monitor returns to the display.

Battery status: Each displayed "bar" bar graph corresponds to 20% of full charge state charging battery. On the other hand, any flashing beam corresponds to the volume 1~19%. This means that when the first bar lights and the next flashing it is the capacity of battery 21 ~ 39%. You have to remember that this calculation is simplified because it is based on battery voltage and not its real capacity. 100% corresponds to voltage of full charge, and 0% over-voltage discharge.The energy accumulated (Ah) corresponds to the charge accumulation and is calculated every 1 min. The calculation results are not very accurate when loading runs with a low current. The minimum indication is 1 Ah witch means charging 1A current for 1 hour.

11. ENVIRONMENTAL PROTECTION

The device is subject to the WEEE Directive 2002/96/EC. This symbol indicates that the product must be disposed of separately and should be delivered to the appropriate point collector. It should not be disposed of with household waste. For more information, please contact your company or local authorities responsible for waste management.