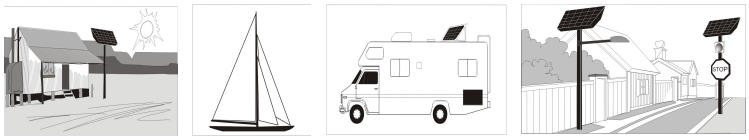
GIOCO SOLUTIONS®

GSR 12/24V

- ***MPPT step-up recharge***
- ***Large tension range on panel entrance V_p = 2.0V –V_{batt}***
- ***Battery tension 36V / 48V with dipswitch sortable***
- ***For Pb and Lithium ions batteries with dipswitch sortable***
- ***Temperature compensated Charge voltage***
- ***Over temperature protection***
- ***Protection for battery polarity inversion***
- ***IP 20 case in ABS.***

GSR 12/24 is a control circuit for photovoltaic (PV) panels to battery charge. GSR 12/24 V implement PV panels step up tension circuit (**Step-up**) it can so work with PV panels having a working voltage inferior to the voltage of the battery. In fig. 1 it is possible to find a complete GSR 12/24 V scheme.
The charging circuit of the battery makes the PV module work in the maximum power point in a voltage range from 2.0V down to a voltage close to the battery voltage . The battery can be both 12V and 24V, and the voltage can be changed using a switch.
The GSR 12/24 can be configured to charge lead-acid batteries (charge - end voltage, temperature compensated) and lithium-ion battery (LiFePo) and in this case applies a constant charge - end voltage with temperature.
There is a LOAD terminal that can be used to control the activation of an external load at the same voltage of the battery with a maximum current of 5A.
The LOAD terminal can be configured using a dip switch to fuction for 24 h/day or it can be set to function only at night (SW3).
The LOAD terminal doesn't function in case of low battery (voltage lower than the low-battery signal- see Tab 3).
Two LEDs on the GSR 12/24 indicate the operational status of the system , a green LED indicates the charging current delivered to the battery , while an amber/red LED indicates a low battery condition or overtemperature (see Tab.2).



Working scheme

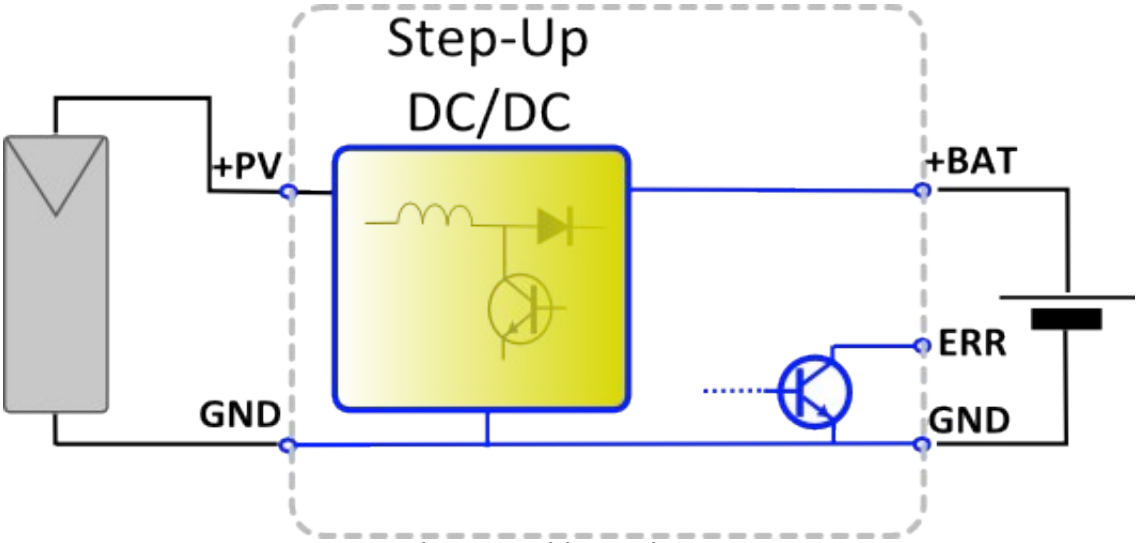


Fig. 1 working scheme

Electrical connection and plugging

1) Set the DIP switch 2 according to the type of battery (Pb or LiFePo) as described in the following table 1 (configuration dip-switch) . If the GSR 12/24 is powered by an incorrect configuration of the dip -switch can ruin the battery or not function properly.

2) Set the DIP switch 3 according to the type of LOAD expected, 24 h or at night.

3) Install the GSR 12/24 in a dry place , not exposed to rain and adequately ventilated. During its operation the GSR 12/24 generate more heat and keep warm , to prevent entry into operation its overtemperature protection you need to keep a clear space around it so that it can circulate air that helps cooling.

4) Make the electrical connections as shown in Fig. 2,
First of all connect the Load, then the battery and last the PV module. If this sequence is respected the GSR may signal a battery error(red led stable).
be sure to use the electric cables to the appropriate section of current that must flow . As soon as the battery is connected both LEDs light up for a second to report good start to the charge controller.

5) Test the installation just connected by verifying that the system charges the battery. With the PV module exposed to good light , verify that the green LED is flashing, it indicates that charging current is flowing into the battery. For a closer examination of the proper functioning of the regulator is recommended to check with a voltmeter while charging the battery voltage measured at the terminals of the PV module PV + and GND is close to the maximum output voltage of the photovoltaic module in use (see the datasheet module to locate the voltage of maximum power typically referred to as Vmp . During this test, make sure the battery has a voltage lower than the voltage - end load set.

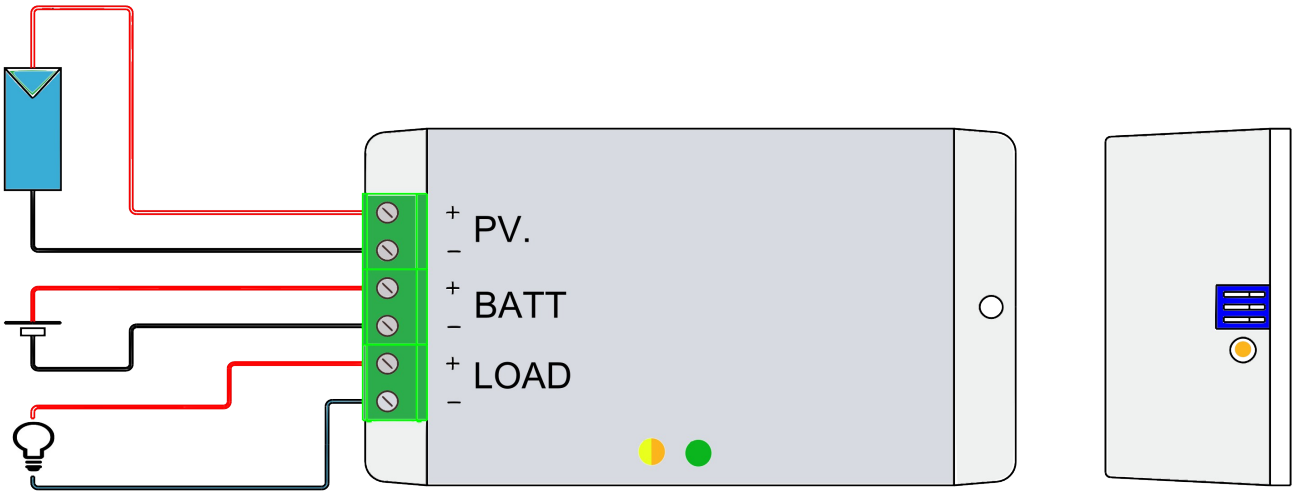
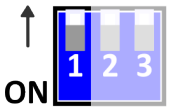
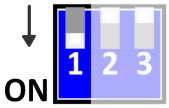
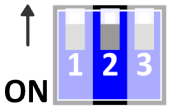
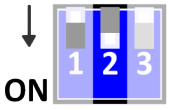
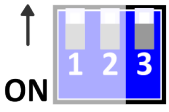
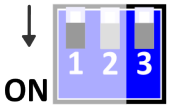


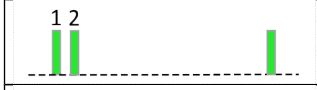
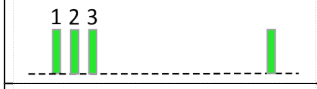
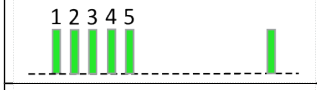
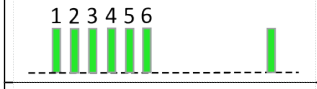
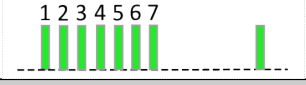
Fig. 2 Connection scheme

Configurazione dip-switch

Dip switch 1	Posizione	Configura tensione nominale batteria
	SW1 **OFF**	No effect (Automatic selection of the battery voltage)
	SW1 **ON**	No effect
Dip switch 2	**Posizione**	**Configura tipo di batteria**
	SW2 **OFF**	Select lead acid battery with compensation of end of charge voltage in temperature as shown in fig.3.
	SW2 **ON**	Select li-ion battery with end of charge voltage of 14,4V for 12V systems and 28,8V for 24V systems.
Dip switch 3	**Posizione**	**Configura accensione carico LOAD**
	SW3 **OFF**	Load terminal working 24 h/day
	SW3 **ON**	Load terminal working only at night

Tab. 1 Dip-switch configuration

LED Signals

Led PV Green	Functionality	The number of flashes indicates the charging current of the battery.
Charging Current		1 flash every 8 sec.: 0,1 < current< 0.5A
		2 flashes every 8 sec.: 0.5A < current< 1.0A
		3 flashes every 8 sec.: 1.0A < current < 1.5A
		4 flashes every 8 sec.: 1.5A < current < 2.0A
		5 flashes every 8 sec.: 2.0A < current < 2.5A
		6 flashes every 8 sec.: 2.5A < current < 3.0A
		7 flashes every 8 sec.: current > 3.0A
Led Status Amber	Functionality	Indicates the state of the system
STATUS		Led color amber indicates the activation of the load terminal.
		1 flash red every 8 seconds signals Low-Battery; In these conditions the load terminal is unactive.
		Led color red indicates error of battery.

Tab. 2 Led Signals

End of charge current depending on temperature

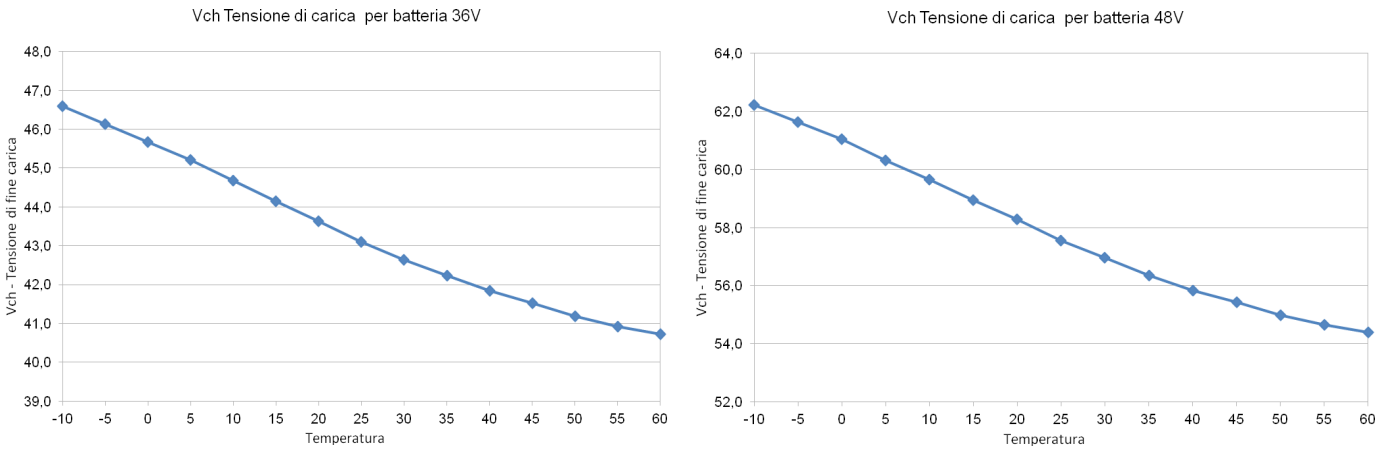


Fig.3 End of charge current for lead acid batteries.

Dimensions

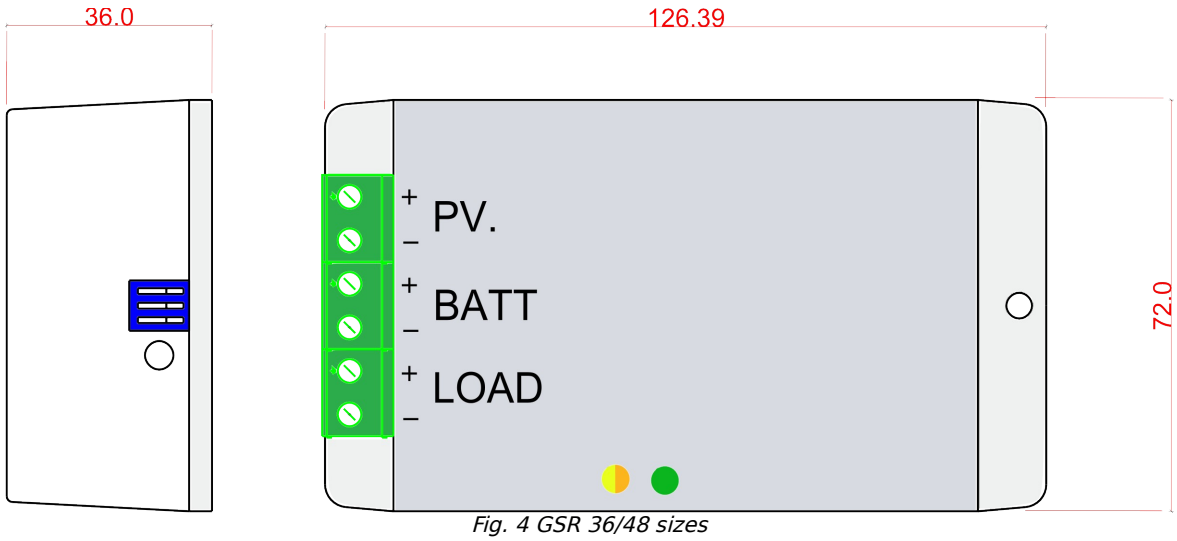


Fig. 4 GSR 36/48 sizes

Electric characteristics

		Nominal voltage battery 36V			***Nominal voltage battery 48V***		
		Min	***Tip***	***Max***	***Min***	***Tip***	***Max***
Battery Voltage	**Vbatt**	2.0V	-	Vbatt	2.0V	-	Vbatt
Open-circuit voltage of panel	**Vpan**	-	-	12.0A	-	-	12.0A
Panel current	**Ipan**	-	-	95W	-	-	190W
Maximum power of panel	**Pmax**	-	-	6.5A	-	-	6.5A
Maximum charge current	**Ich-max**		14.4V			28.8V	
End-charge voltage at 25 ° C program Pb SW2 OFF (default)	**Vch_Pb**	-	-24mV/°C	-	-	-48mV/°C	-
Compensation Vch function of the temperature of the battery (Tbatt)	**Vtadj**	-	14.4	-	-	28.8V	-
End-charge voltage at 25 ° C program Lithium SW2 ON	**Vch_Li**	-	11.1V	-	-	22.2V	-
Low battery voltage warning	**Vlb_Pb**	-	Vch_Pb-0.4V	-	-	Vch_Pb-0.8V	-
Voltage output signal low battery	**Vout_lb_Pb**	-	12.5V	-	-	25.0V	-
Self consumption	**Vlb-Li**	-	Vch_li-0.4V	-	-	Vch_li-0.4V	-
Operating Temperature	**Vout_lb-Li**		-	5A	-	-	5A
Power dissipation	**Iload**	-	Vbatt	-	-	Vbatt	-
Section terminals	**VLoad**	-	-	15mA	-	-	10mA
Degree of protection	**Isleep**	-10°C		50°C	-10°C		50°C
Body material	**Tamb**	97%	-	-	97%	-	-
Weight	**Pdiss**	1mm^2		2.5mm^2	1mm^2		2.5mm^2
Battery Voltage	**η**		IP20			IP20	
Open-circuit voltage of panel		ABS	ABS	ABS	ABS	ABS	ABS
Panel current		-	185 g	-	-	185 g	-
Maximum power of panel		2.0V					
Maximum charge current		-	-	12.0A	-	-	12.0A

Tab. 3 Electric characteristics

Waste disposal

Giocosolutions as a producer of electrical equipment described in this manual, and in accordance with Decree 25/07/05 No. 151, informs the consumer that this product, when disposed of, must be delivered to an authorized collection center or, in case of purchase of equivalent equipment can be returned free of charge to the distributor of the new equipment.
The penalties for those who illegally gets rid of electronic waste will be applied by the individual municipalities.

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