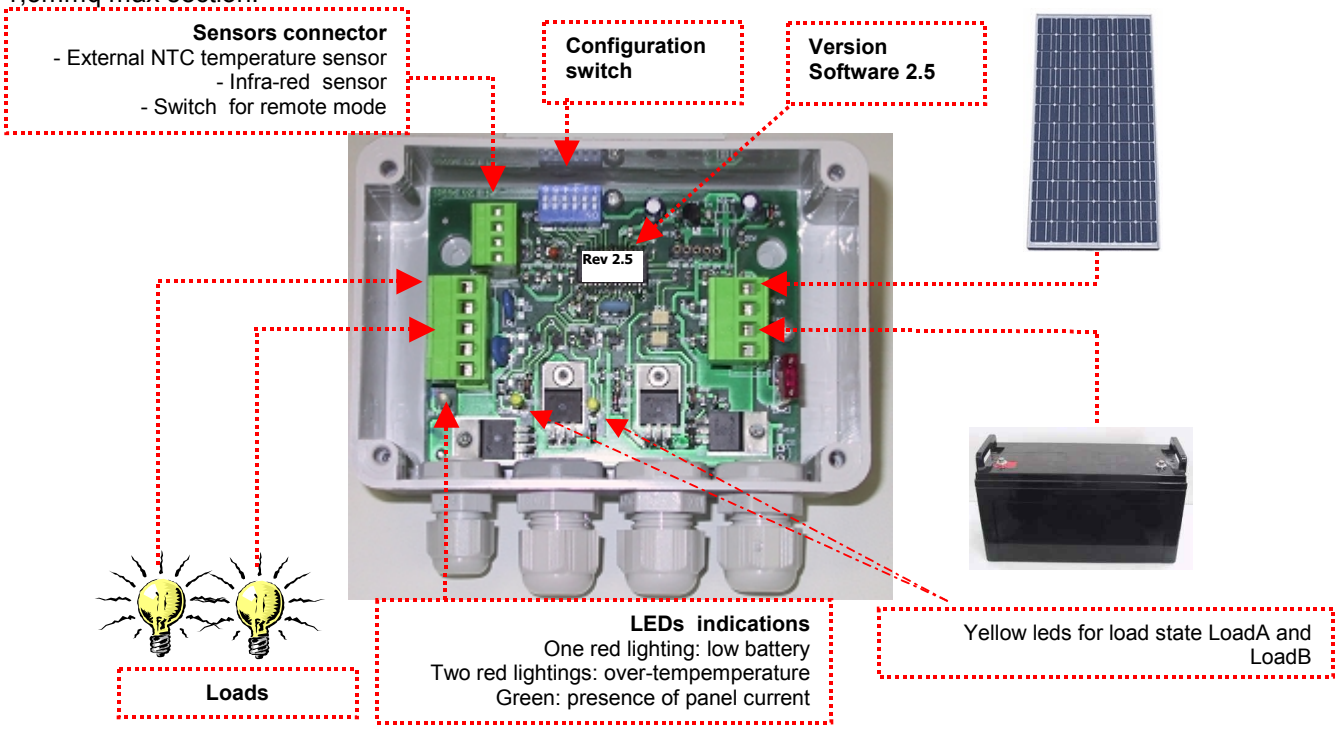
Photovoltaic regulator up to 120W /12V power modules

General Description:

SPC07-P is a charge regulator for 12Vdc PV applications. It is able to manage the recharge of Pb batteries and two different DC loads of max 7A total current, with eleven different configurations. "Light sensor" detection is made by the module.
The recharge algorithm is PWM - Mosfet with voltage compensated in temperature: through an external NTC sensor (optional) or through the sensor inside the circuit which supply also a protection against over-temperature.
SPC07-P includes also a blocking diode to avoid the discharge of battery through the PV modules; at the same time a Low-Battery control save the battery from deep discharges caused by the load consumption.
A bi-coloured LED shows eventual status of error (red colour) and presence of panel current (green colour), two yellow LEDS show the activation of each load.
SPC07-P can simultaneously power two independent 12V DC loads with total current limited to max 7Amp, if only one load is used the maximum current of 7A can be supplied to this one.
The circuit is inside a IP56 compact box which has already got chocks to have an easy connection to PV module and battery.
The regulator is equipped with a connection board with cables up to 2,5mmq for battery and panel, while the connection of sensors can be made using cables of 1,5mmq max section.

Technical Features:

- ***12V sealed Pb batteries***
- ***Max recharge current: 7A***
- ***Max total current on loads: 7A***
- ***Microcontroller design***
- ***Mosfet devices***
- ***PWM system charge***
- ***No. 02 selectable loads***
- ***Integrated blocking diode***
- ***Recharge compensated in temperature with either integrated or remote sensor***
- ***Low battery control***
- ***LED indicators***
- ***Compact box IP56***
- ***Easy wiring***



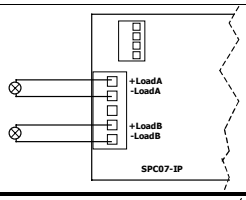
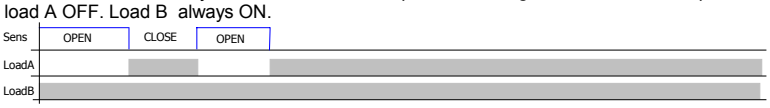
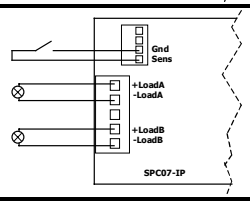
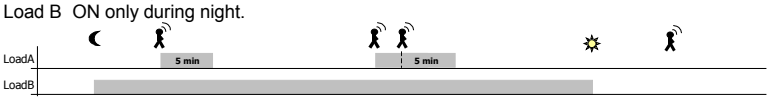
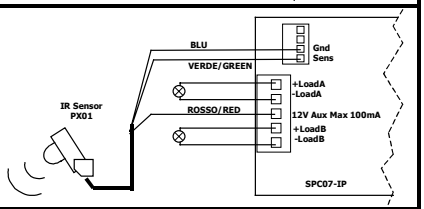
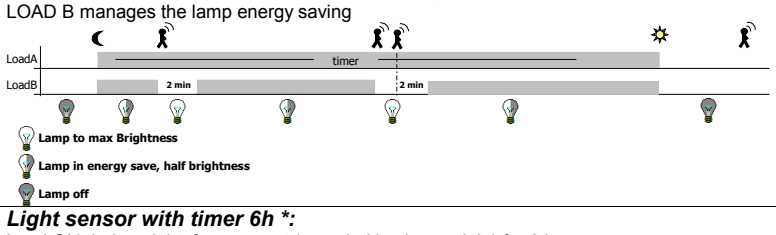
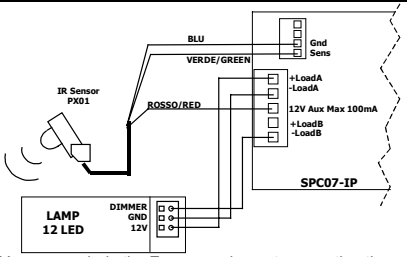
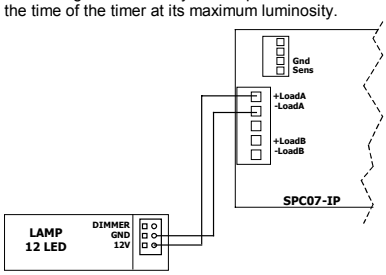
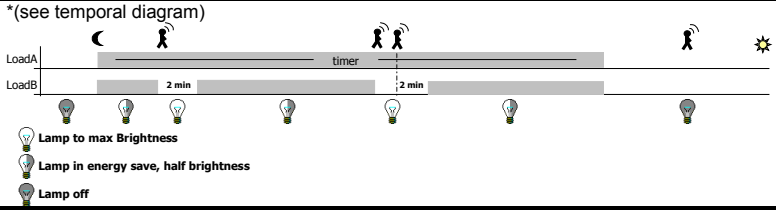
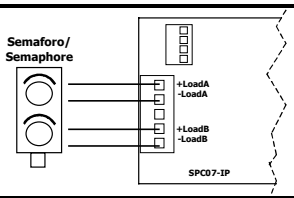
Installation procedure:

Avoid direct exposure to sunrays (caution: over-heating), avoid water and humid environments.
PAY ATTENTION TO POLARITIES AND AVOID SHORT-CIRCUITS*; they are destructive and cancel warranty.*
Connect the battery cables only after having connected all the others; do not insert a further blocking diode: you would annul the "light sensor" detection. Put the battery in the chosen place, connecting in the proper way the cables and reducing the distance from the charge regulator more that you can.
We advise the external NTC temperature sensor (optional) in case of big differences in temperature between regulator and batteries. Connect to the proper connector the external NTC temperature sensor and, if requested by the chosen configuration, connect also either the infrared sensor (PX01) or the switch for remote habilitation. On starting the LED must effect a green and red lightning to indicate a correct power on.
To test if the installation of the regulator has been made in the right way it is necessary to verify that at sunset the load switches on according to the configuration that has been set by the Switches (ser the following page).
To simulate SUNSET we advise to cover carefully the PV module using a quite thick cardboard; it could be necessary to cover even the rear side of the PV module. We saw that if you connect to the regulator SPC07IP some kind of PV modules the regulator is not able to detect the night. If you are in such conditions, please contact Western Co. Service Center.

Configurations:

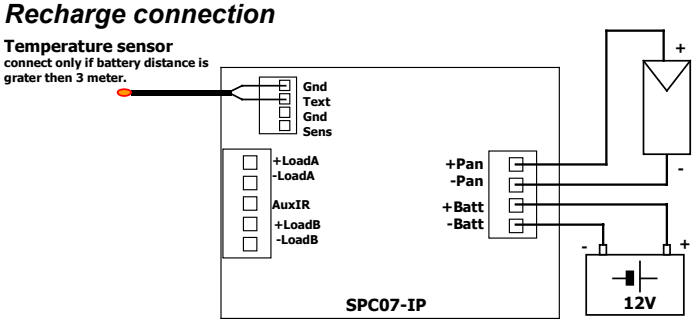
In all configurations the following processes are guaranteed:

- *The regulation of the battery's charge voltage, compensated in temperature, by external or internal NTC.*
- *Load deactivation at reaching Low-Battery threshold (a red ligthning), selectable to 11V (dip switch 6 ON) or 12 V (dip switch 6 OFF).*
- *System inhibition at reaching Overtemperature threshold (two red ligthnings of the LED).*
- *It is possible to exit from a low battery condition only during daylight.*

Switchs	Description	Scheme of load connection
1 ON	***Standard battery charger*:** Loads A and B always on.	
1 ON	***Complete "light sensor" with complementary outputs*:** Load A ON only during day. Load B ON only during night.	
1 ON	***Remote load *:*** The load is controlled by the contact on *Sens* input; closed to *gnd* => load A ON, opened => load A OFF. Load B always ON. 	
1 ON	***Light sensor with IR *:*** Load A ON during night ("light sensor" by the panel) for 5 minutes every time the IR sensor notices the passage of a person. Load B ON only during night. 	
1 ON	**Lamp ON for all night long*:** Load activated during night, from sunset (detected by the PV module) until sunset. LOAD B manages the lamp energy saving 	 You can exclude the Energy saving not connecting the dimmer signal. In this way the lamp will remain ON for all the time of the timer at its maximum luminosity.
1 ON	***Light sensor with timer 6h *:*** Load ON during night, from sunset (revealed by the module) for 6 hours. Load B manages the lamp energy saving (see * temporal diagram)	
1 ON	***Light sensor with timer 8h *:*** Load ON during night, from sunset (revealed by the module) for 8 hours. Load B manages the lamp energy saving (see * temporal diagram)	
1 ON	***Light sensor with timer 8h delay 1h *8*** Load ON during night, one hour after sunset (revealed by the module) for 3 hours. Load B manages the lamp energy saving (see * temporal diagram)	
1 ON	***Light sensor with timer 10h *:*** Load ON during night, from sunset (revealed by the module) for 10 hours. Load B manages the lamp energy saving (see * temporal diagram)	
	*(see temporal diagram) 	
1 ON	***Road flashing indicator - alternated 50% *:*** Lightning loads at 50% (0,5s A on and B off, 0,5s A off and B on). From twilight ("light sensor" by the panel) and for the whole period of darkness, the power supplied to loads is reduced to a half.	
1 ON	***Road flashing indicator - alternated flash *:*** Alternating lighting loads with a flash of 20ms for each second. From twilight ("light sensor" by the panel)and for the whole period of darkness, the power supplied to loads is reduced.	

* ***WARNING*** : The configurations in the table are valid for regulators with software versions from 2.5 onwards (see image in the previous page to understand the version of your SPC07IP). To have technical documentation concerning previous versions, call Western Co. service center.

Recharge connection



After having connected battery and module as you can see in the scheme on the left side, verify that the signaling green LED in ON when the PV module is exposed to sunlight; this shows that the PV module is supplying current to the battery.

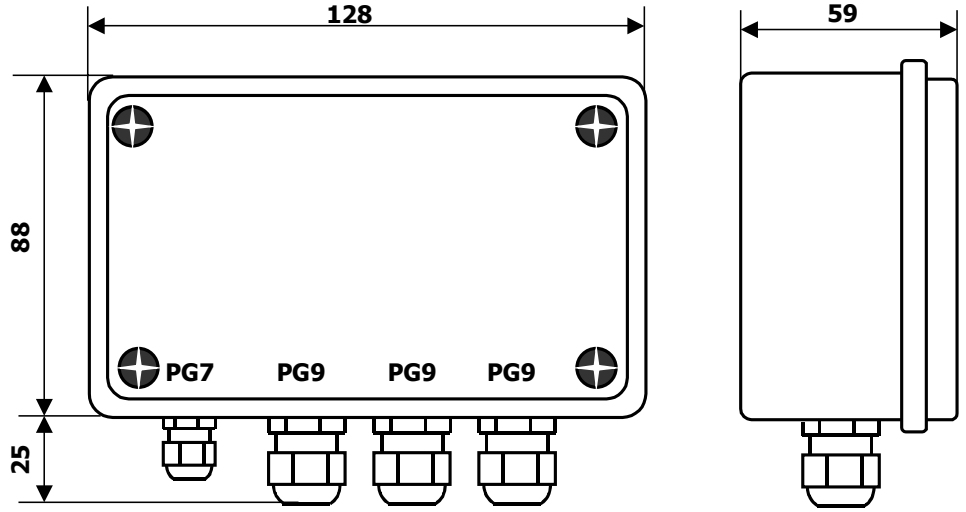
Terminals description:

+Pan / -Pan	PV module input
+Batt / -Batt	Battery input
+LoadA / -LoadA	Load A output
+LoadB / -LoadB	Load B output
Text	Temperature sensor input
Sens	Input of IR command / remote load
AuxIR	Auxiliary output - 12V Max 100mA power supplying IR sensor

Electric Features:

FEATURES	SYM	CONDITION	MIN	TIP	MAX	UNIT
Power supply Pb Battery ; Working voltage	VDD	12V	5	12	15	V
Working current	IDD	no load, no panels, VDD=13V	6	6.3	6,5	mA
	IDLB	no load, no panel, discharged battery VDD=12V	4,5	5	5,5	mA
		no load, no panels, discharged battery VDD=10V	5	5,2	5,4	mA
Panels voltage	VPAN		0	17,2	22	V
Panels current	IPAN	T=25°C	0	7	-	A
Low-battery voltage threshold	VLB	Voltage present for at least 5sec. 30% of discharge	<11,9	<12	<12,1	V
		Voltage present for at least 5sec. 70% of discharge	<10,9	<11	<11,1	V
Voltage threshold end low battery	VELB	Temperature 25°C	>13,7	>13,8	>13,9	V
Total current load	VLD	Continuous power supply	0	6	7	A
Peak current load	VPL	max. time 120ms.; Tcase=25°C	-	-	70	A
End recharge voltage	VECH	Battery temperature 25°C ±2°C	13,8	14,1	14,4	V
Temperature coefficent for recharge voltage	VTadj	TBATT>=-8°C<=60°C	-	-20	-	mV/°C
Volt treshold on pannel for twilight ON	VTD		<3,2	<3,4	<3,6	V
Volt treshold on pannel for twilight OFF	VTL		>6,5	>6,7	>6,9	V
Working environment temperature	TA		-10	-	60	°C
Section of power conductors	-		-	2,5	-	mm^2
Weight			-	300	-	g

Mechanic dimensions:



Address:
WESTERN CO. snc Via Pasubio 1 63039 San Benedetto del Tronto (AP) - Italy
Tel. +39 0735 751248 Fax +39 0735 751254
e-mail: info@western.it
web: www.western.it