

SINGLE STAGE 20A SOLAR CHARGE REGULATOR

BES12RA-20

The Benbro BES12RA-20 is a single array stage solar charge regulator which is suitable for 12V negative earth systems.

The BES12RA-20 Solar Regulator is a fully automatic microcontroller based product that utilizes a solid state array switching element with very low on-losses

It provides a temperature compensated multi-mode charge regime and is complete with Low Voltage load disconnect capability and alarm output contacts.

The display LEDs provide visual indication of the system status including system Voltage, Charge mode and alarm status.

The regulator is housed in a compact IP65 plastic enclosure and is suitable for cable of up to 6mm.

The Battery Voltage is measured using separate sense cables with reverse polarity protection and all inputs are fitted with transient protection.



SPECIFICATIONS

Nominal Battery Voltage	12V
Operating Supply Range	7V-20V DC
Quiescent Current	40 mA Average
Ambient Temp and Humidity Range	0-55 °C Temperature 5 - 95% Relative Humidity
Max Solar Array Current	20 Amps DC @ 12V
Max Load Current	15 Amps DC @ 12V
Mode of Regulation	Low-frequency series switching, voltage-triggered with hysteresis
Switching Element	2 × parallel low R _{on} N-channel Power MOSFETs (Solid State)
Earthing	Negative
Array Blocking Diodes	Not included (must be fitted to solar panels if required)
Voltage Measurement	Uses separate Battery Volt Sense inputs (avoids V _{drop} error)
Battery Temperature Sensor	External sensor standard (2m cable)
Temperature Compensation	-3mV/°C/Cell (25°C if no temperature sensor connected)
Charge Regime	Three Stage (Boost-Equalise-Float)
Equalisation Period	One-Time Programmable (0-255 seconds or 0-255 mins)
Regulation Status Indication	ON Indicates Float Mode
Green Mode LED	Flashing Indicates Equalisation Mode (if enabled)
	OFF Indicates Boost Mode

Low Voltage Disconnect	15A N/C relay (80-100mA additional supply when energised)
Low Voltage Disconnect Set points ¹	On :1.80 V/cell or 10.8V Off : 2.20 V/cell or 13.2V
High Voltage Alarm Set points ¹	On :2.55 V/cell or 15.3V Off : 2.10 V/cell or 12.6V
Low Voltage Alarm Set points ¹	On :1.90 V/cell or 11.4V Off : 2.20 V/cell or 13.2V
Voltage Out-Of-Range Levels ¹	Under-range: 1.75V/Cell or 10.5V - LEDs scroll down Over-Range: 2.67V/Cell or 16.0V - LEDs scroll up
Low Voltage Disconnect Alarm ¹	Red LED and SPCO clean contact 1A max relay output (Energise on alarm condition)
High Voltage Alarm ¹	Amber LED and SPCO clean contact 1A max relay output (Energise on alarm condition)
Low Voltage Alarm ¹	Red LED and SPCO clean contact 1A max relay output (De-energise on alarm condition)
Temperature Sensor Failure Alarm	Status LEDs run from centre LED in opposite directions <i>LV alarm relay energises, defaults to 25°C temp comp.</i>
Transient Voltage Protection	MOV protection on all input & output power terminals
Overload / Short Circuit Protection	Electronics by PTC-type polyswitch Solar Array Stage FET by HRC-25A fuse
Metering Facility	Battery V displayed as a flashing 5 LED bar-graph for 3 secs every 10secs: >16.0V or Overrange: Flashing LEDs scrolling up LD5 to LD1 14.6 - 15.9V 5 LEDs flashing 13.6 - 14.5V lower 4 LEDs flashing 12.6 - 13.5V lower 3 LEDs flashing 11.6 - 12.5V lower 2 LEDs flashing 10.6 - 11.5V lowest LED flashing <10.5 or Under-range: Flashing LEDs scrolling down LD1to LD5
Self Test Software	User activated commissioning and test software to verify controller operation. Self-test activated by link on PCB.
Voltage Metering Accuracy	+/- 2%
Temperature Metering Accuracy	+/- 6%
Array stage V_{drop} @ 25 °C & I_{rated}	250mV
Type of Enclosure ²	Wall mounted PVC enclosure - cable entries not provided 125(W) x 165(H) x 76(D)
Ingress protection	IP65
Cable Size – Power Cables	maximum 6mm ²
Battery sense & temp sense, alarm	maximum 2.5mm ²
EMC	AS/NZS 2064:1997
Battery Charge Settings ¹	Voltage set-points One-Time Programmable MICRO for either Flooded or VRLA Cells as required