

ADC5000 SERIES

AC/DC Switch Mode Power Supplies and Battery Chargers for Industrial and Telecom Applications

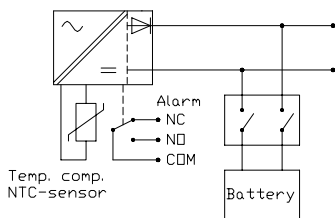


60W, 125W and 250 W

- Input voltage 230/115 VAC • Output voltages 12, 24 or 48 VDC • Statistical MTBF >3 000 000 hours
- Built in output series diode • Temperature compensated battery charging • Wide output adjustment range
- Efficiency 82...90% • Operating temperature -40 °C...+70 °C (see derating) • EMC EN55022B (telecom)

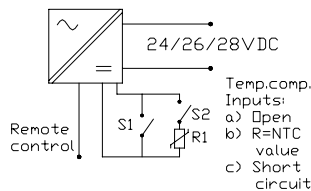
MULTI PURPOSE APPLICATIONS (EXAMPLES)

Battery back-up systems
Temperature compensated charging
Low voltage disconnecting unit

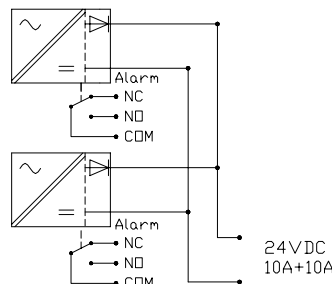


Special features with external control:

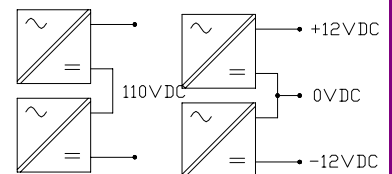
- Boost charging
- Battery test possibility
- Shut down by external 4-15V voltage
- Controllable output voltage



Parallel connection with output series diode and module fail alarm



Series connection
± Outputs



POWERNET



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| POWER SUPPLY MODELS DIN/WALL | | | | | | | | |
|---|---|---------------|----------------|---------------------------|----------------|-------|-----------------------------------|-------------------|
| Type DIN-mounting) <u>y</u> see below | Type Wall-mounting) <u>y</u> see below | Input Voltage | Output Voltage | Output Voltage Adjustment | Output Current | Power | Mechanical Dimensions (W x H x D) | Note see below |
| ADC562y | ADC563y | 90...264 VAC | 12 VDC | 10.5...15 VDC | 5 A | 60 W | 51 x 121 x 81 mm | |
| ADC502y | ADC503y | 230/115 VAC | 12 VDC | 9...15 VDC | 10 A | 120 W | 66 x 148 x 113 mm | |
| ADC532y | ADC533y | 230/115 VAC | 12 VDC | 9...15 VDC | 20/18 A | 240 W | 75 x 173 x 122 mm | **) (***) |
| ADC532yP | ADC533yP | 230/115 VAC | 12 VDC | 9...15 VDC | 20/18 A | 240 W | 75 x 173 x 122 mm | (***) |
| ADC572y | ADC573y | 90...264 VAC | 24 VDC | 21...29 VDC | 2.5 A | 60 W | 51 x 121 x 81 mm | |
| ADC512y | ADC513y | 230/115 VAC | 24 VDC | 21...29 VDC | 5 A | 120 W | 66 x 148 x 113 mm | |
| ADC542y | ADC543y | 230/115 VAC | 24 VDC | 21...29 VDC | 10 A | 240 W | 75 x 173 x 122 mm | **)) |
| ADC542yP | ADC543yP | 230/115 VAC | 24 VDC | 21...29 VDC | 10 A | 240 W | 75 x 173 x 122 mm | |
| ADC582y | ADC583y | 90...264 VAC | 48 VDC | 45...58 VDC | 1.25 A | 60 W | 51 x 121 x 81 mm | |
| ADC522y | ADC523y | 230/115 VAC | 48 VDC | 45...58 VDC | 2.5 A | 120 W | 66 x 148 x 113 mm | |
| ADC552y | ADC553y | 230/115 VAC | 48 VDC | 45...58 VDC | 5 A | 240 W | 75 x 173 x 122 mm | **)) |
| ADC552yP | ADC553yP | 230/115 VAC | 48 VDC | 45...58 VDC | 5 A | 240 W | 75 x 173 x 122 mm | |
| 8750230A | Finger protected power cord for ADC5000-series models | | | | | | | |

| BATTERY CHARGER MODELS DIN/WALL | | | | | | | | |
|---|---|---------------|----------------|---------------------------|----------------|-------|-----------------------------------|-------------------|
| Type DIN-mounting) <u>y</u> see below | Type Wall-mounting) <u>y</u> see below | Input Voltage | Output Voltage | Output Voltage Adjustment | Output Current | Power | Mechanical Dimensions (W x H x D) | Note see below |
| ADC568y | ADC569y | 90...264 VAC | 13.7 VDC | 10.5...15 VDC | 4.4 A | 60 W | 51 x 121 x 81 mm | |
| ADC508y | ADC509y | 230/115 VAC | 13.7 VDC | 9...15 VDC | 10 A | 137 W | 66 x 148 x 113 mm | |
| ADC538y | ADC539y | 230/115 VAC | 13.7 VDC | 9...15 VDC | 20/18 A | 274 W | 75 x 173 x 122 mm | **) (***) |
| ADC538yP | ADC539yP | 230/115 VAC | 13.7 VDC | 9...15 VDC | 20/18 A | 274 W | 75 x 173 x 122 mm | (***) |
| ADC578y | ADC579y | 90...264 VAC | 27.4 VDC | 21...29 VDC | 2.2 A | 60 W | 51 x 121 x 81 mm | |
| ADC518y | ADC519y | 230/115 VAC | 27.4 VDC | 21...29 VDC | 5 A | 137 W | 66 x 148 x 113 mm | |
| ADC548y | ADC549y | 230/115 VAC | 27.4 VDC | 21...29 VDC | 10 A | 274 W | 75 x 173 x 122 mm | **)) |
| ADC548yP | ADC549yP | 230/115 VAC | 27.4 VDC | 21...29 VDC | 10 A | 274 W | 75 x 173 x 122 mm | |
| ADC588y | ADC589y | 90...264 VAC | 54.8 VDC | 45...58 VDC | 1.1 A | 60 W | 50 x 120 x 80 mm | |
| ADC528y | ADC529y | 230/115 VAC | 54.8 VDC | 45...58 VDC | 2.5 A | 137 W | 51 x 121 x 81 mm | |
| ADC558y | ADC559y | 230/115 VAC | 54.8 VDC | 45...58 VDC | 5 A | 274 W | 75 x 173 x 122 mm | **)) |
| ADC558yP | ADC559yP | 230/115 VAC | 54.8 VDC | 45...58 VDC | 5 A | 274 W | 75 x 173 x 122 mm | |
| 8750230A | Finger protected power cord for ADC5000-series models | | | | | | | |

| BENCH MODELS WITH POWER CORD, PSU AND BATTERY CHARGER MODELS | | | | | | | | |
|--|--|---------------|------------------------|---------------------------|----------------|-------|-----------------------------------|-------------------------|
| Type Power Supply) <u>y</u> see below | Type Battery Charger) <u>y</u> see below | Input Voltage | Nominal Output Voltage | Output Voltage Adjustment | Output Current | Power | Mechanical Dimensions (W x H x D) | Note (PFC) see below |
| ADC535y | ADC537y | 230/115 VAC | 12 VDC | 9...15 VDC | 20/18 A | 250 W | 75 x 173 x 122 mm | **) (***) |
| ADC535yP | ADC537yP | 230/115 VAC | 12 VDC | 9...15 VDC | 20/18 A | 250 W | 75 x 173 x 122 mm | (***) |
| ADC545y | ADC547y | 230/115 VAC | 24 VDC | 9...15 VDC | 10 A | 250 W | 75 x 173 x 122 mm | **) (***) |
| ADC545yP | ADC547yP | 230/115 VAC | 24 VDC | 9...15 VDC | 10 A | 250 W | 75 x 173 x 122 mm | (***) |
| ADC555y | ADC557y | 230/115 VAC | 48 VDC | 9...15 VDC | 5 A | 250 W | 75 x 173 x 122 mm | **) (***) |
| ADC555yP | ADC557yP | 230/115 VAC | 48 VDC | 9...15 VDC | 5 A | 250 W | 75 x 173 x 122 mm | (***) |

*) y selection code: Standard features:

60W models

125/250W models

125/250W models

1 = Module fail alarm relay 3 = Alarm relay + Output series diode

1 = Module fail alarm relay + Output over voltage protection (OVP)

3 = Output series diode + Module fail alarm relay + Output OVP

Optional features:

60W models

125/250W models

125/250W chargers

0 = Shut down, 2 = Output series diode + Shut down, (No alarm relay, no OVP)

0 = Alarm relay + Shut down, 2 = Output series diode + Alarm relay + Shut down, (No OVP)

4 = Output remote control for battery test + alarm relay + Output OVP

5 = Output remote control for battery test + alarm relay + Output OVP + Output series diode

Letter P models include passive power factor correction coil

**) Marked model does not comply with EN61000-3-2 harmonics standard.

These can be used in following applications: the unit is not directly connected to the public mains network, or if the unit is installed in a professional equipment with a total rated power greater than 1kW, or if the input current of the equipment is greater than 16A per phase

**) Marked models are not UL listed, 12V/ 20A model max current with series diode 18A

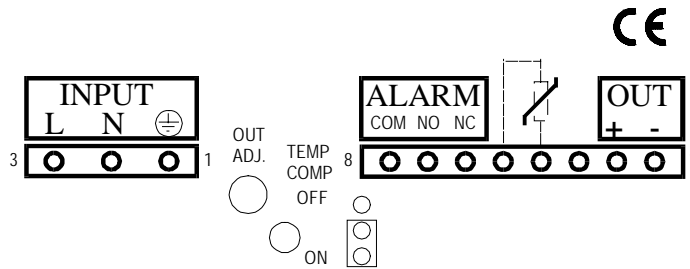
Optional: *ADC5000 R-versions for rugged environment, Type number for example ADC5631R*



SPECIFICATION

| | 60W | | | 125W | | | 250W | | |
|--|---|----------------------|----------------------|--|----------------------|----------------------|-------------------------------|----------------------|----------------------|
| | 12V | 24V | 48V | 12V | 24V | 48V | 12V | 24V | 48V |
| INPUT | | | | | | | | | |
| Input voltage | 90...264 VAC wide input range 85...200 VDC | | | 94...132 VAC or 184...264 VAC selectable by switch | | | | | |
| Frequency | 45...65Hz | | | | | | | | |
| Input current, 100% load, 230VAC | 0.7A | | | 1.3A | | | ADC5xxx 2.5A, ADC5xxxP 1.9A | | |
| Input current, 100% load, 115VAC | 1.2A | | | 2.2A | | | ADC5xxx 4.2A, ADC5xxxP 3.5A | | |
| Efficiency, typical (230 VAC, 100% load) | >82% | >83% | >84% | >85% | >88% | >89% | >85% | >89% | >90% |
| Isolation | Input / ground 1500 VAC RMS 50Hz, 1min Input / output 3000 VAC RMS 50Hz, 1min Output / ground 500 VDC | | | | | | | | |
| Inrush current (25°C), 230VAC | <25A <5ms | | | <45A <5ms | | | <35A <5ms | | |
| Inrush current (25°C), 115VAC | <12A <10ms | | | <22A <10ms | | | <17A <10ms | | |
| Input fuse | T2A, high breaking | | | T4A, high breaking | | | T6.3A, High breaking | | |
| Overvoltage transient protection | VDR 275VAC 72J | | | | | | | | |
| OUTPUT | | | | | | | | | |
| Output voltage, PSU models (50% load) | 12V | 24V | 48V | 12V | 24V | 48V | 12V | 24V | 48V |
| Output voltage, chargers (50% load) | 13.7V | 27.4V | 54.8V | 13.7V | 27.4V | 54.8V | 13.7V | 27.4V | 54.8V |
| Output adjustment (typical) | 10,5...15V | 21...29V | 45...58V | 9...15V | 21...29V | 45...58V | 9...15V | 21...29V | 45...58V |
| Ripple voltage (20Hz...300kHz, 25°C) | <10mV _{rms} | <10mV _{rms} | <10mV _{rms} | <15mV _{rms} | <10mV _{rms} | <10mV _{rms} | <15mV _{rms} | <10mV _{rms} | <10mV _{rms} |
| Load regulation (without series diode) | <1.0 % | <0.5 % | <0.5 % | <1.0 % | <0.5 % | <0.5 % | <1.0 % | <0.5 % | <0.5 % |
| Line regulation | < 0.15 %, U _{inmin} ...U _{inmax} | | | | | | | | |
| Temperature coefficient | < 0.02 % / °C | | | | | | | | |
| Current limit (refer curve page 5) | <8A | <4A | <2A | <11A | <6A | <3A | <22/20A | <11A | <6A |
| Short circuit current (refer curve page 5) | <14A | <9A | <6A | <16A | <10A | <6A | <27A | <14A | <7A |
| Hold-up time (230V, 100% load) | >50ms | >50ms | 50ms | >20ms | >20ms | >20ms | >20ms | >20ms | >20ms |
| ALARMS AND INDICATIONS | | | | | | | | | |
| Output OK | Green LED | | | | | | | | |
| Power Fail relay alarm | Relay contacts Normally Open and Closed, Activated at AC fail and module fail cases Relay contact rating: 24VDC/0.3A or 30VAC/0.5A | | | | | | | | |
| Undervoltage alarm threshold level | 10.2V ±0.5V | 20V ±1V | 41V ±2V | 8.3V ±0.5V | 19V ±1V | 39V ±2V | 8.3V ±0.5V | 19V ±1V | 39V ±2V |
| Output overvoltage protection level | 16V | 31V | 61V | 16V | 31V | 60V | 16V | 31V | 60V |
| Series diode at output | Output can be equipped with internal series diode, diode in 125/250W models, 60 FET circuit in 60W models | | | | | | | | |
| Optional Shutdown | Shutdown by external voltage 4...15VDC to RC pin | | | | | | | | |
| Optional battery test control | Float charge voltage can be reduced by external 4...15VDC control to allow battery test by using external measurement circuit | | | | | | | | |
| Temperature compensation (chargers) | By external NTC resistor 2.2 kohm | | | | | | | | |
| MECHANICAL | | | | | | | | | |
| Dimensions (w x h x d) | 51 x 121 x 81 mm | | | 66 x 148 x 113 mm | | | 75 x 173 x 122 mm | | |
| | Can be installed both horizontally and vertically (3 different installation choices) | | | | | | | | |
| Weight | 360 g | | | 840 g | | | ADC5xxx 1.3kg, ADC5xxxP 1.5kg | | |
| Enclosure | Steel / aluminium enclosure IP20 | | | | | | | | |
| Connectors | Removable 2.5 mm ² screw terminals | | | | | | | | |
| ENVIRONMENTAL | | | | | | | | | |
| Storage temperature | -40°C...+85°C | | | | | | | | |
| Operation temperature | -40°C...+70°C, full power up to +55C (expect 250W/12VDC models), See derating curves | | | | | | | | |
| Cooling | Natural convection | | | | | | | | |
| Humidity | 85% RH IEC68-2-30, coated PCBs in R-versions | | | | | | | | |
| Shock and vibration | ETS 300 019-2-4, class 4M5, Vibration, sin, IEC60068-2-6, 2g _n 9-200m/s ² , Vibration, broad-band random, IEC60068-2-64 | | | | | | | | |
| STANDARDS, APPROVALS | | | | | | | | | |
| Safety | EN 60950-1 class 1, UL508 | | | | | | | | |
| EMC emissions EN61000-6-3 | EN 55022 class B conducted emissions EN 55022 class B radiated emissions EN61000-3-2 harmonics EN61000-3-3 Flickering | | | | | | | | |
| EMC Immunity EN61000-6-2 | EN 61000-4-2 Electrostatic Discharge EN 61000-4-3 Radiated Immunity EN 61000-4-4 Fast Transients EN 61000-4-5 Surge EN 61000-4-6 Conducted Immunity EN 61000-4-8 Power frequency magnetic field immunity EN 61000-4-11 Voltage dips and interruptions, immunity | | | | | | | | |
| Approvals | CE-marking, UL508 cUL listing (expect 12V/20A models), EN60950-1 safety report | | | | | | | | |

PIN CONFIGURATION 60W MODELS



INPUT CONNECTOR

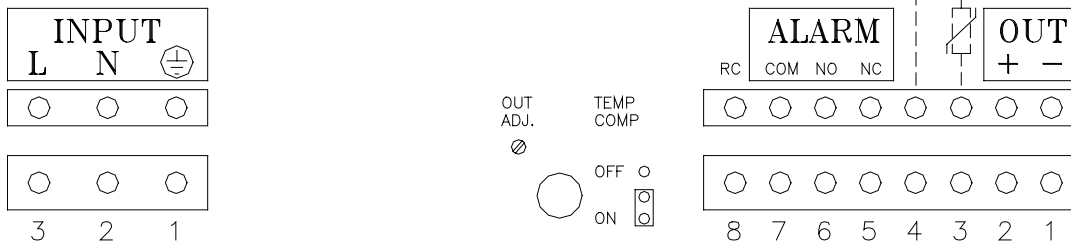
- 1: Protective Earth
- 2: N (+ if used at DC network)
- 3: L (- if used at DC network)

OUTPUT CONNECTOR

- 1: Output -
- 2: Output +
- 3: Not in use or remote control input in shut down
- 4,5: Temperature compensation NTC sensor
- 6: Alarm relay, normally closed (relay not energized)
- 7: Alarm relay, normally open (relay not energized)
- 8: Alarm relay, common

Use 60/70 or 75°C copper (CU) wire only. The recommended terminal tightening torque is 0.5Nm.

PIN CONFIGURATION 125W MODELS



INPUT CONNECTOR

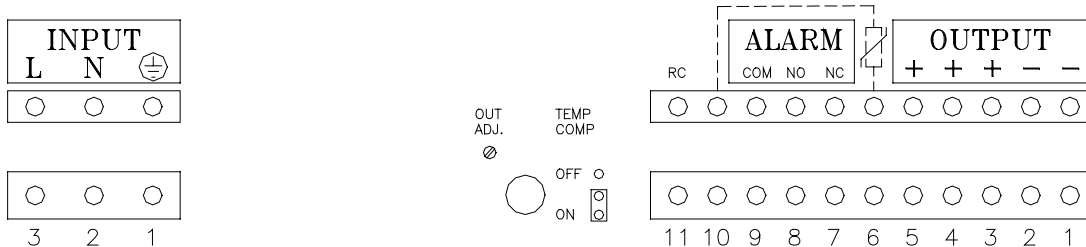
- 1: Protective Earth
- 2: N (+ if used at DC network)
- 3: L (- if used at DC network)

OUTPUT CONNECTOR

- 1: Output -
- 2: Output +
- 3,4: Temperature compensation NTC sensor
- 5: Alarm relay, normally closed (relay not energized)
- 6: Alarm relay, normally open (relay not energized)
- 7: Alarm relay, common
- 8: Not in use or remote control input in shut down or battery test models

Use 60/70 or 75°C copper (CU) wire only. The recommended terminal tightening torque is 0.5Nm.

PIN CONFIGURATION 250W MODELS



INPUT CONNECTOR

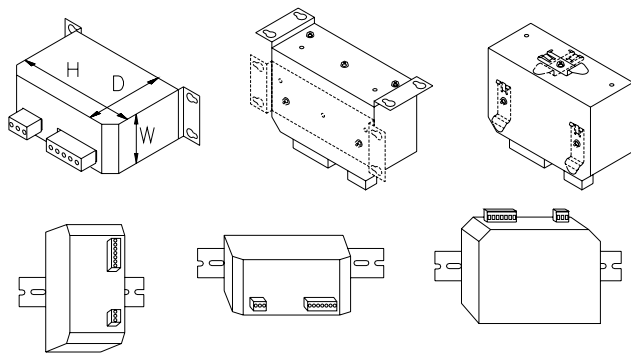
1. Protective Earth
- 2: N (+ if used at DC network)
- 3: L (- if used at DC network)

OUTPUT CONNECTOR

- 1, 2: Output - Note: Rated current 12A / pin
- 3, 4, 5: Output + Note: Rated current 12A / pin
- 6: Temperature compensation NTC sensor
- 7: Alarm relay, normally closed (relay not energized)
- 8: Alarm relay, normally open (relay not energized)
- 9: Alarm relay, common
- 10: Temperature compensation NTC sensor
- 11: Not in use or remote control input in shut down or battery test models

Use 60/70 or 75°C copper (CU) wire only. The recommended terminal tightening torque is 0.5Nm.

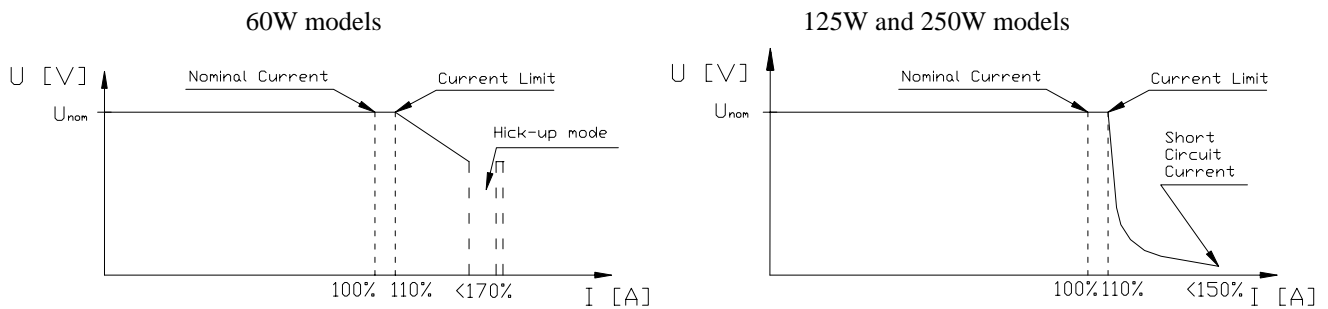
DIMENSIONS



| | 60W | 125W | 250W |
|---|--------|--------|--------|
| W | 51 mm | 66 mm | 75 mm |
| H | 121 mm | 148 mm | 173 mm |
| D | 81 mm | 113 mm | 122 mm |

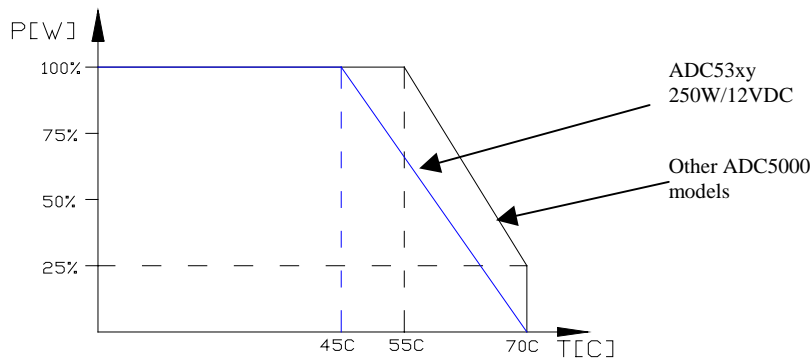
FREE INSTALLATION CHOICE
 Due to movable DIN –rail connectors 5000-series modules can be flexibly installed to the available space

CURRENT LIMITING CURVES

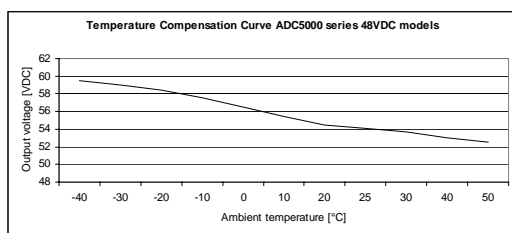
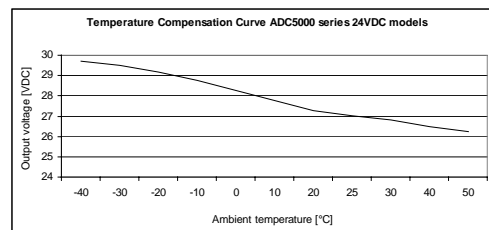
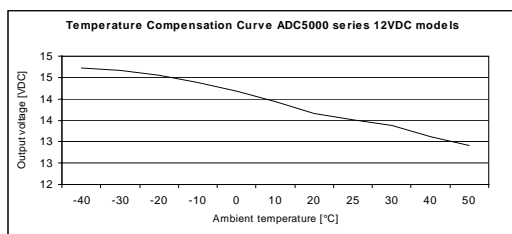


Please note that curves are presenting the current limiting principle only. Exact values and shape of curves varies between different models

POWER DERATING CURVES



TEMPERATURE COMPENSATION EFFECT TO FLOAT CHARGE VOLTAGE



115/230V INPUT VOLTAGE SELECTION125/250W models:

The unit is factory set to operate with a 230V nominal input voltage. The nominal input voltage can be selected via the internal 115/230 voltage selector on the PCB. Access to the selector is through the ventilation holes of the unit cover. **Always disconnect power before selecting.**

60W models:

The unit is wide input type and will work without modification from 90VAC to 264VAC.

USING UNIT WITH DC INPUT

60W units can be operated also by DC input voltage. See voltage range from specification and connection from pin configuration.

OUTPUT VOLTAGE ADJUSTMENT

The output voltage of the module can be adjusted with the multi-turn potentiometer located on the front panel. All models can be used either as a power supply or a charger by correct adjustment.

125W and 250W models: Maximum output current is available within the full voltage adjustment range.

60W models: Maximum output power is available within the full voltage adjustment range

ALARM RELAY

The potential free alarm output indicates if the output of the unit is healthy. Alarm relay contacts, both normally open and normally closed, are presented on the unit connector. If the output is healthy, the NO and COM pins are short circuited. If the unit fails the relay contacts will changeover and NC and COM pins will be short circuited. Word "normal" in relay pins means that mode when relay is not energized.

SERIES / PARALLEL CONNECTION

Reserve 2cm space on both sides for proper cooling.

Parallel operation: Do not chain the outputs, rated current 12A / pin. Recommended cable size: 2.5mm², length > 0.5m for optimum load sharing.

Series operation: Up to 500V total voltage.

TEMPERATURE COMPENSATION

Temperature compensated charging provides the optimum float charge voltage when batteries are being used. To utilize this feature it is necessary to install a NTC sensor across the temperature compensation pins on the output connector. It is also necessary to set the jumper on the front panel to ON position. The output voltage should be adjusted when the jumper is in the OFF position. This will simulate room temperature and ensure accuracy.

The recommended sensor type is a 2.2k ohm NTC resistor, e.g. Epcos B57164-K222-K. The sensor should be installed local to the batteries. The sensor is galvanically connected to the + output.

LED

A green LED indicates that the output of the module is healthy.

OUTPUT OVERCURRENT PROTECTION

Automatic, self-resetting electronic current limiting is included and the output is short circuit proof.

OUTPUT OVER VOLTAGE PROTECTION (OPTION)

Output of the unit will shut down if the output voltage rises above protection level. (16Volts/12V models, 31Volts/24V models and 58 Volts/48V models). Protection must be manually resetted by disconnecting the AC main voltage.

OUTPUT VOLTAGE REMOTE SHUT DOWN AND BATTERY TEST OPTIONAL MODELS

Output of the unit will shut down, when a +4...15VDC signal is applied to the remote control input (RC) with reference to negative output.

In battery test models output voltage drops 15-25% , when a +4...15VDC signal is applied to the RC pins as above.

The output voltage will return to the original level, when +4...15VDC signal is removed from RC pins.

INTERNAL OUTPUT SERIES DIODE (OPTION)

The internal diode is placed in series with the positive output. The benefits of having the diode fitted are:

- Improved redundancy if the modules are connected in parallel (not for 60W models)
- Power OK signal and LED work independently regardless battery or parallel connections
- The parallel connected modules can be Hot Plug replaced without the system output power interruption
- The reverse current bleed is low if a battery is connected to the output of the charger

The disadvantages of having the diode fitted are lower efficiency, deration to the output voltage regulation and load sharing.

Note: The output series diode does not protect against reverse polarity connection of the battery.

WARNING!

Dangerous voltages, capable of causing death, are present in this equipment. Do not remove the cover. No operator serviceable parts inside. Refer servicing to qualified service personnel.