PTC PSU/Charger

Model C2194A 8W Power Supply/ Battery Charger

- A Complete solution for small battery-backed dc instrument power systems.
- Supply 12Vdc or 24Vdc systems with continuous power during ac line interruptions without the need for inverters or mains UPS's
- Ideal for Teleterm M2 RTU's, data-loggers, remote field instrumentation, alarm systems, remote access systems etc.

FEATURES

- **Charging characterised for sealed lead-acid cells.**
- **12Vdc or 24Vdc output selectable.**
- **Operates from 85-264Vac universal ac supply**
- **Under-voltage cut-out protects battery from deep discharge.**
- **Over-current detection protects wiring against faults.**
- **AC detect output for mains monitoring.**
- **DIN Rail mounting**
- **Independent battery and load terminals for ease of installation.**

Overview

The PTC is a combined Power Supply and Battery Charger system with integrated standby battery management for small uninterruptible instrument supply applications.

Just connect mains supply, standby battery and load for an industrial grade standby power supply system.

This DIN rail mounted product is ideal for providing dc power to Teleterm M2-series RTU systems where battery backup is necessary to ensure continuous system operation during power failure. Applications include RTU's, data-loggers, remote field instruments, alarm systems and access controllers.

Managing battery-backed systems for optimum backup time and battery life can be tricky and expensive.

This product incorporates many features that make installing such systems simple and foolproof:

Under-voltage Cut-Out

During prolonged power outages, the back-up battery will eventually discharge. If the load remains connected, the battery enters its "deep" discharge phase, which can cause irreparable damage to the battery, and reduce its capacity and life. The PTC incorporates an under-voltage cut-out that disconnects the load when the battery voltage begins to fall, preserving the battery life.

Fault Protection

Batteries are capable of delivering enormous currents under system fault conditions that can damage wiring and equipment. The PTC incorporates an auto-resettable load cut-out, which disconnects the load under over-current fault condition.

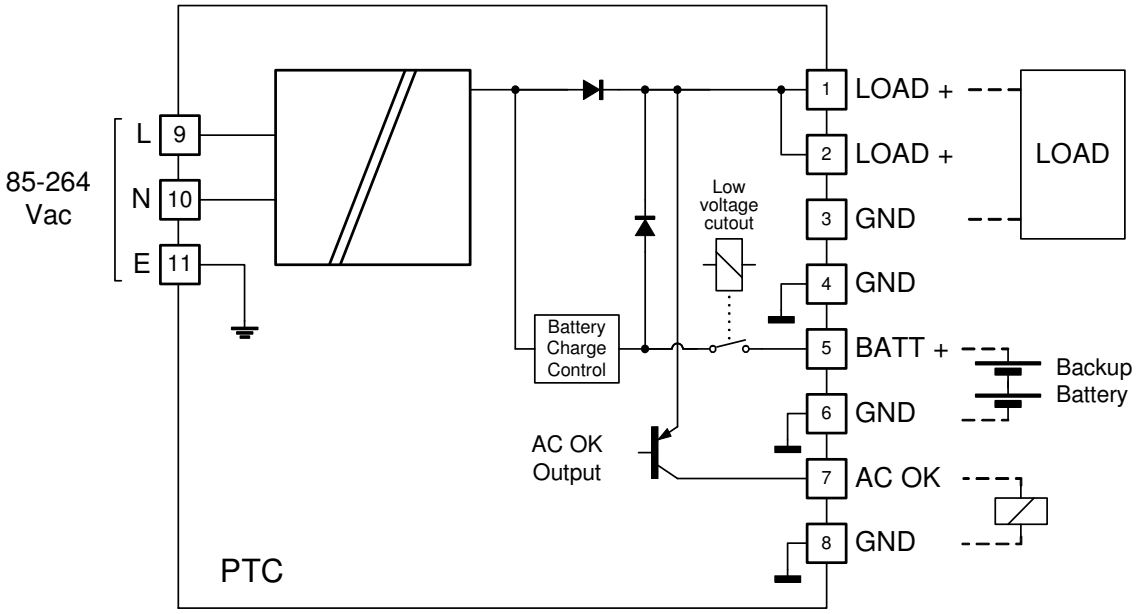
Charge Control

The PTC controls the charging of the battery to ensure optimum life. Batteries can be kept on continuous charge as long without fear of damage through overcharging.

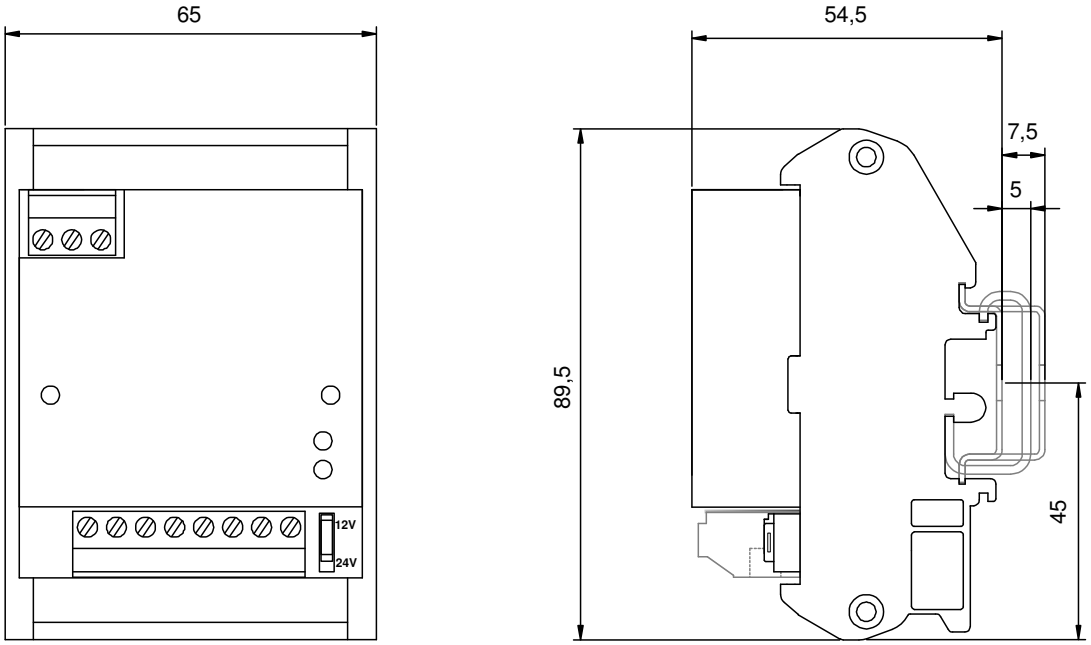
System Monitoring

The PTC provides an AC detect output. When AC is present and the supply is functioning correctly, this output is on. This output can be used to detect AC input or charger failures.

Typical System Connection Diagram



Mechanical Details



SPECIFICATIONS

AC Input

AC input voltage range	85-264Vac
AC input frequency	47-63 Hz
Input current at full load	<0.15A rms at 115Vac <0.1A rms at 230Vac
Switch-on inrush current	2A for <10ms (10A for < 1ms)
Surge withstand	2kV 1.2/50microsecond pulse (line to earth)
Fast Transients	2 kV

Load Output

Output Voltage	13.0V – 14V on 12V switch position 26.0V-28.0V on 24V switch position
Maximum rated load	660mA continuous at 12V setting 330mA continuous at 24V setting
Overload protection	≅ 0.5A
AC line regulation over 85-132Vac/170-264Vac	0.5% max
Load Regulation 10-100%	12% (follows battery state of charge)
Temperature Regulation	0.05%/°C

Battery Charger

Charging method	Constant voltage
Float Voltage (at 20°C)	13.5V – 13.8V on 12V setting 27.0V-27.6V on 24V setting
Maximum Charging Current	0.66 A

Under-voltage cutout

Voltage Selection	12V setting	24V setting
Cut out Voltage	11.2 +- 0.4 Volts	22.4 +-0.6 Volts
Restore Voltage	12.2 +- 0.4 Volts	24.4 +-0.6 Volts

AC Detect Output (OK)

Type	Switch to + Voltage output On when AC power is healthy.
Max. operating voltage	30V dc
Max. operating current	50mA

Environmental

Operating Temperature	-10°C-50°C(+32°F-140°F)at full load Derate 3%/°C up to 65°C
Storage Temperature	-10°C – 70°C (+14°F – 158°F)
Insulation Resistance (100% tested)	100Mohm at 500Vac input to outputs to ground.
Insulation Breakdown (100% tested for > 1second)	1500Vac input/output to Earth

Mechanical

Width	62mm
Height	90mm
Depth	57mm

Weight

Unpacked	160g approx.
Packed	210g approx.

Compliance to Standards

Safety Conformance	Conforms to IEC950; EN60950
Emissions	EN 55011 and EN50081-2:1994 Group I, Class A
Immunity – ESD	IEC 61000-4-2:1995, level 3
Immunity – RF Fields	IEC 61000-4-3:1995, level 3
Immunity – Fast Transients	IEC 61000-4-4:1995 2 kV – DC power port 1 kV – input/output lines
Supply Variations	IEC 61000-4-7:1991
Design Life	50 000hours at 50°C full load

Ordering Information

ORDER CODE	DESCRIPTION
C2194A	PTC with 12/24Volt 8Watt output

APPLICATION NOTES

BATTERY SELECTION

The PTC is designed to operate with sealed lead acid type batteries also known as Valve Regulated Lead Acid (VRLA) batteries. This type of battery is sealed except for a valve that opens when the internal gas pressure exceeds the design limits. (That is why it is important not to overcharge VRLA batteries). Generally, these batteries can be used in confined areas and can be mounted in any orientation. (see the specific manufacturer's data for details.)

There are two types of VRLA batteries on the market: Absorbent Glass Mat (AGM) and Gel-Cell. This refers to the method used to immobilise the electrolyte in the battery. Either of these two types of battery may be used with these chargers.

In order to select a battery for your application, follow these simple steps:

1. Calculate the Ampere-hours of standby time required, by multiplying the number of hours of standby required by the average standing load in Amps.
2. To take into account deterioration of battery capacity over the life of the battery (20% over 48 months typical), and residual charge remaining at cutoff (20% remaining) multiply this figure by 1.6 (This figure may vary from application to application)
3. If the battery is required to provide full standby time at temperatures lower than 20°C, then increase this capacity by a further 10% for each 10°C below 20°C.
4. An additional factor of 15% may be added to the battery capacity if the recharge time to required capacity from discharged state is an important factor of the design. (see section on Recharge time).
5. This then gives the minimum Ampere-hour capacity battery required for the application. In general, the larger the battery the better in any given application (size and cost being the compromise).

AC DETECT OUTPUT

A logic output across terminals 7 and 8 is provided to detect the presence/absence of the AC supply and the health of the charger.

This output monitors the charger operation. A High output (output on) confirms that the Power Supply is healthy and that the AC supply is present. The output will go Low when the AC supply or the charger fails.

A green light labelled 'AC' on the front of the PTC is a visual indication of the state of this output and the AC supply. When this light is on, then the AC Supply is present, and the output is on.

It is normal for this output turn off and then on again momentarily during a power failure as the battery takes over from the Power Supply.

LOW VOLTAGE CUTOUT

When the battery voltage drops during discharge to a preset cut-off point, a cut-off circuit in the PTC will disconnect the battery from the load. This prevents the battery from entering into a state of deep-discharge, protecting it from permanent damage.

When the AC supply returns, the cut-out circuit will automatically reconnect the battery to the charger and load only if the battery is above the (lower) restore voltage point. This protects against danger or damage from reverse connected or dead batteries.

A red lamp labelled 'DC' on the front of the PTC when on, indicates that there is DC supply to the load. During battery backup, the Green lamp will be off and the Red lamp will be on. After the battery has been disconnected by the cut-out, both lamps will be off.

CHARGING TIME

The battery is charged in two modes. When the AC power returns after the battery has been on load, and requires recharging, the charger will enter into constant current mode. In this mode the battery will be charged with a rate close to the maximum PSU current capability until the battery reaches its bulk charge voltage. The charger then switches into "float" charge mode, where the battery can remain indefinitely.

The high-current charge mode ensures that the battery reaches 85-95% charge in the shortest possible time. The remaining 5-15% charge is then topped up more slowly during the float charge cycle.

It is wise to over-rate the battery by up to 15%, and to consider the battery fully charged when it reaches this 85-95% capacity.