

Solarstate SRX-12 Regulator



The Solarstate™ SRX-12 is an industrial-quality, temperature-compensated charge regulator for small and midsize photovoltaic power systems. It uses a low-frequency shunting technique to control up to 12 amperes of array current in 12-volt and 24-volt systems. Two SRX-12 units may be installed in parallel if desired, enabling incremental increase in system size.

The SRX-12 is compact, attaching directly to the junction box of Solarex and other photovoltaic modules. Installed in this manner, it is weatherproof and compliant with the requirements of recognized safety rating authorities.

RELIABLE

As a shunt regulator, the SRX-12 is inherently reliable. This reliability is enhanced by Solarex's rigorous product test regimen and over two decades of power system experience. Shunt regulation is often required in critical military equipment for reliability purposes; with no control elements in the series path to the load, the array charges the battery even in case of regulator failure.

EFFICIENT

The SRX-12 is extremely efficient. Its only series circuit element is a low-voltage-drop Schottky diode, which prevents reverse current flow during darkness. An FET controls current flow in the shunt circuit. Quiescent current is 3 mA or less for the 12V unit, 6 mA or less for the 24V unit.

SYSTEM STATUS INDICATION

Dual LEDs provide immediate indication of system status—charging, regulating, or maintaining charge—and battery condition. One LED indicates charging current to the battery; the other indicates that the regulating voltage setpoint has been achieved. As a battery approaches full charge, charging periods shorten while regulating periods lengthen concurrently.

COMPACT, EASILY INSTALLED

The SRX-12 is typically installed directly on the full-size junction box of Solarex MSX or VLX modules. In this

configuration, it takes up almost none of the space inside the junction box, and does not protrude beyond the frame. Its gasketed, threaded male connector attaches to any PG 13.5 (13.5 mm) NPT female fitting, or through any circular opening of diameter 0.804 to 0.9 inches (20 mm to 23 mm).

RF COMPATIBLE

The SRX-12's low switching frequencies make it compatible with virtually all communication systems.

SAFETY APPROVED

The SRX-12 is approved by Factory Mutual Research for application in NEC Class 1, Division 2, Group C and D hazardous locations and is listed by Underwriters Laboratories when installed correctly on a Solarex module junction box.



TEMPERATURE COMPENSATED

The regulation voltage automatically adjusts to match the battery's charging requirements, which vary with temperature. Voltage setpoints and compensation coefficients are shown on the reverse of this sheet.

RUGGED AND WEATHERPROOF

The SRX-12's anodized aluminum case and epoxy resin encapsulation provide tough, water-resistant protection for circuit elements. The regulator is reliable in the most demanding environments; its test regimen includes repetitive thermal cycling from -25°C to 70°C at 85% relative humidity.

PRINCIPLES OF OPERATION

The SRX-12 controls battery charging using an FET, which controls the shunt path (see Figure 1) in response to battery voltage. When battery voltage is below the Regulating Voltage, the FET interrupts the path, causing array power to flow to the battery and lighting the green LED.

When battery voltage rises to the Regulating Voltage (for 12V systems, 14.65V @ 25°C), the FET allows array current to be shunted, interrupting battery charging and lighting the amber LED. Without array input, battery voltage decays; when it reaches the Restoring Voltage (13.35V), array power is reconnected. Thus battery state of charge is indicated by the dual LEDs: the higher the state of charge, the longer the duration of shunt periods (green LED), and the shorter the periods of array connection (amber LED).

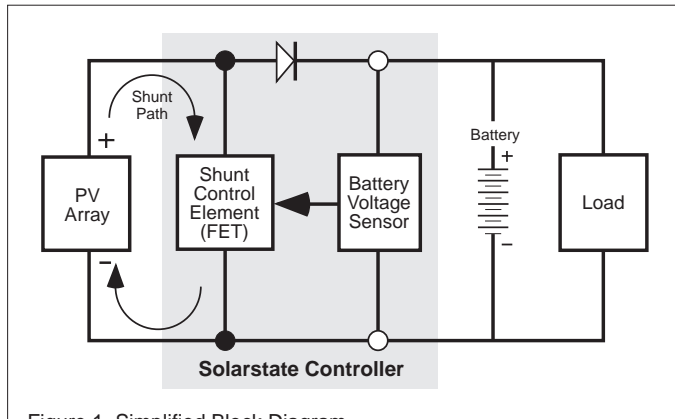


Figure 1. Simplified Block Diagram

WARRANTY

The SRX-12 is covered by a limited one-year warranty, complete terms of which are available from Solarex.

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range: -25°C to 70°C
 Storage temperature range: -40°C to 80°C
 Humidity range: 0 to 100% relative humidity, including condensing situations. Unit is weatherproof.

For more information, contact:

ELECTRICAL SPECIFICATIONS

	<u>SRX-12 (12V)</u>	<u>SRX-12 (24V)</u>
Nominal system voltage	12V	24V
Maximum input current ¹	12A	12A
Input voltage range ²	15V-25V	30V-50V
Quiescent current @ nominal system V (not shunting)	≤ 3 mA	≤ 6 mA
Regulating voltage (V_T) @ 25°C ³	14.65V ± 0.2V	29.3V ± 0.5V
Restoring voltage @ 25°C	($V_T - 1.3V$) ± 0.3V	($V_T - 2.5V$) ± 0.5V
Temperature compensation coefficient	-12.5 mV/°C	-25 mV/°C

Notes to table

- (1) Solarstate controls are optimized for use with Solarex modules. Because module characteristics vary greatly, input ratings may not be valid when used with modules other than Solarex.
- (2) Requires input voltage within range shown. With lower input voltage, regulator will operate, but will not maintain specified output voltage.
- (3) SRX-12 control voltages are compensated for its location right behind a module, a position substantially above ambient temperature.

DIMENSIONS

Weight: 15.7 oz. (445 grams)

Note: Dimensions are in inches (millimeters)

