

Solarstate SRX-6 Regulator



The Solarstate™ SRX-6 voltage regulator is an industrial-quality shunt regulator which controls battery charging in small and midsize photovoltaic power systems. It is extremely efficient, compact, reliable, economical, weatherproof, and meets nationally recognized safety standards. Its solid-state circuitry uses a low-frequency switching shunt technique to control battery voltage.

The SRX-6 can be installed in the junction box of most Solarex modules. It is capable of controlling Solarex modules with current output up to 5.5 amperes, and is available for 12V and 24V systems. As many as six SRX-6s may be operated in parallel, enabling control of arrays with up to 33 amperes of current. This is a very cost-effective means of regulating midsize arrays efficiently, and enables incremental expansion of small arrays.

Economical

The Solarstate SRX-6 is economical and easily installed. A single SRX-6 can regulate the output of multiple modules, up to its maximum power rating. Most Solarex modules may be ordered with the SRX-6 factory-installed in the module junction box.

Reliable

The SRX-6 is extremely reliable, a characteristic which is intrinsic in its design and proven in use. The shunt regulation technique is inherently reliable since, as shown in Figure 1, there are no active components (and therefore little probability of failure) in the circuit between the array and the battery.

Solarstate circuitry has proven its reliability in more than a decade of demanding service in thousands of field installations.

Status Monitoring

The SRX-6 LEDs—one charge indicator and one shunt indicator—make it easy to monitor system status. The charge indicator lights when the PV array charges the battery. When the current from the PV array is directed away from the battery, the shunt indicator lights, signaling a full state-of charge.

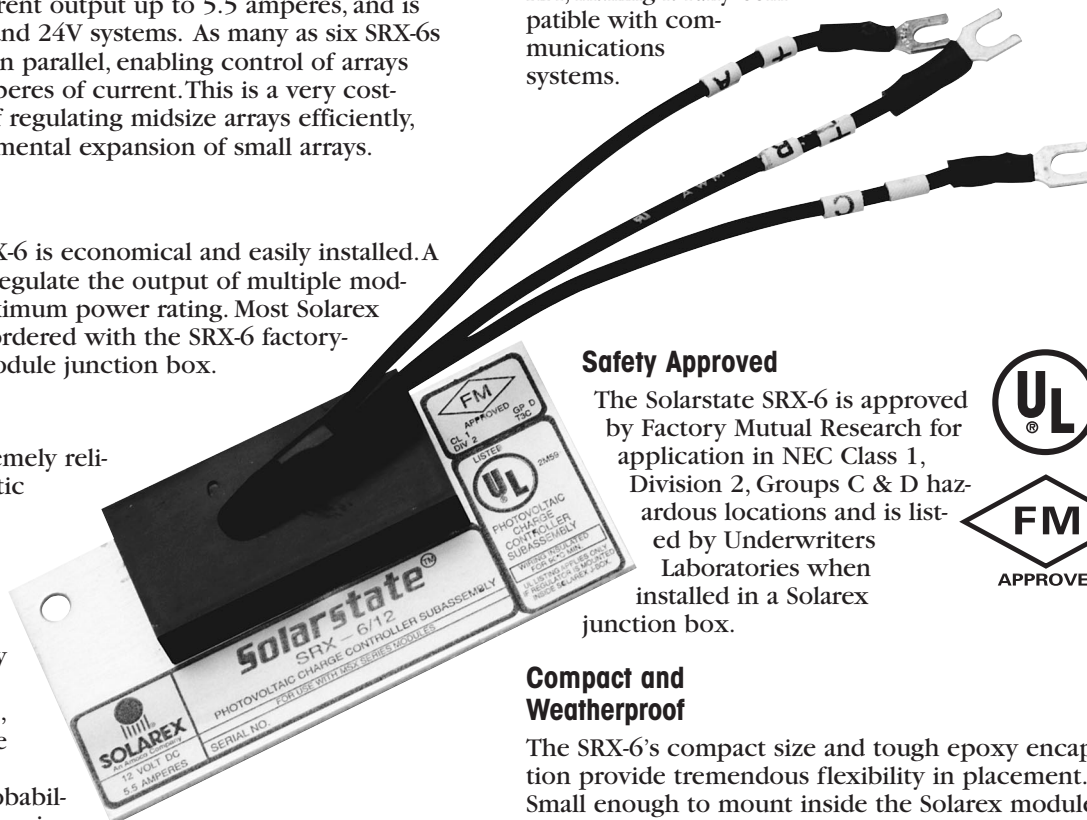
Efficient

The SRX-6's shunt design, with no regulating element in the power path, is inherently efficient. The only element in series with the array is the Schottky blocking diode,

which prevents the battery from discharging through the array during darkness.

No RF Interference

Many small-system regulators use switching frequencies which, either directly or through harmonics, cause RF interference. The SRX-6 uses a unique low-frequency switching technique (2 to 100 Hz, depending on battery condition) which does not generate RFI, making it fully compatible with communications systems.



Safety Approved

The Solarstate SRX-6 is approved by Factory Mutual Research for application in NEC Class 1, Division 2, Groups C & D hazardous locations and is listed by Underwriters Laboratories when installed in a Solarex junction box.



Compact and Weatherproof

The SRX-6's compact size and tough epoxy encapsulation provide tremendous flexibility in placement. Small enough to mount inside the Solarex module junction box, the SRX-6 may be ordered factory-installed in most Solarex modules. However, its weatherproof design means it may also be mounted without protection from the elements.

Warranty

Solarstate regulators are covered by a limited one-year warranty, complete terms of which are available from Solarex.

Principles of Operation

The Solarstate SRX-6 controls current to the battery by switching a Shunt Control Element (SCE) on and off. The SCE controls current flow through a shunt path (see Figure 1). Switching the SCE on allows current to flow through the shunt path, placing the array in a loop that directs current back to the array instead of the battery. The SCE is on whenever the battery is fully charged. As the battery is depleted, voltage drops,

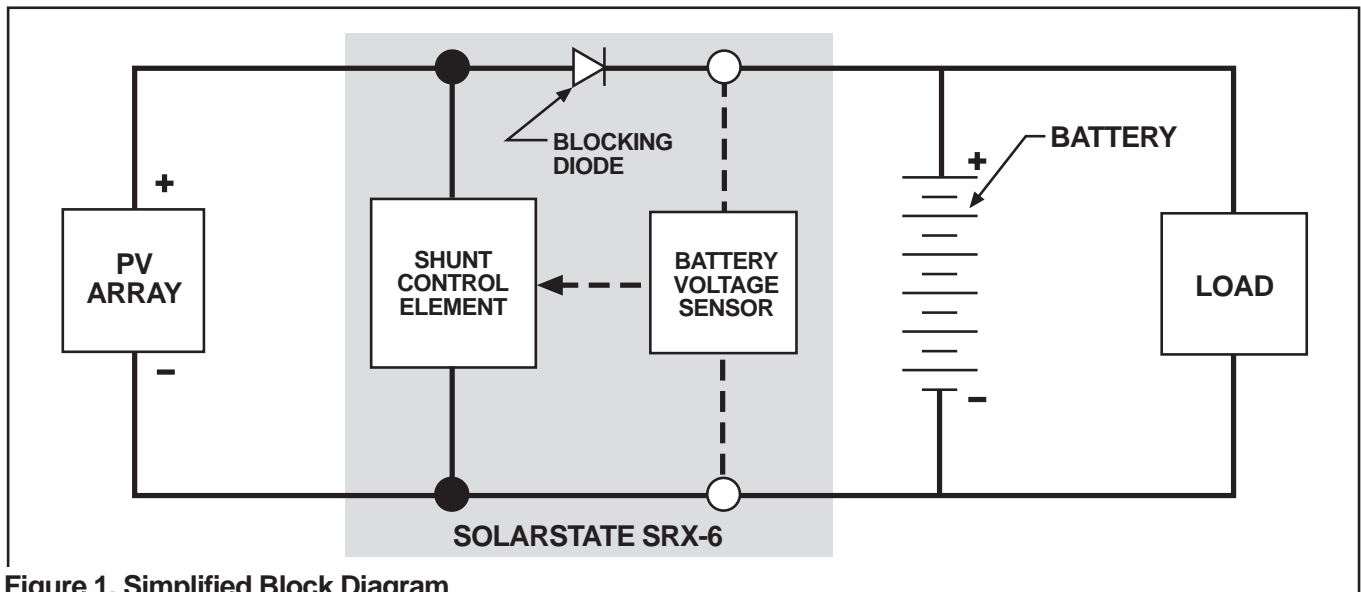


Figure 1. Simplified Block Diagram

When voltage reaches the SRX-6's low setpoint — indicating that the battery needs charging — the SCE is switched off, blocking the shunt path. Current then flows to the battery, charging it. As the battery charges, voltage increases. When voltage reaches the high setpoint (14.6V), the SRX-6 switches the SCE on, allowing current to flow back into the shunt path, and battery charging stops.

Temperature Compensated

The SRX-6's output voltage is temperature-compensated to match the temperature-dependent charging characteristics of lead-acid batteries. As ambient temperature increases, an internal temperature compensation circuit lowers the shunting voltage; as ambient temperature decreases, shunting voltage is raised.

Mechanical Characteristics

Weight: 1.4 oz. (40 grams)

Dimensions: Dimensions in brackets are in millimeters
Unbracketed dimensions are in inches

Environmental Specifications

Operating temperature range: -40°C to 55°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-6/12</u>	<u>SRX-6/24</u>
Nominal system V	12V	24V
Maximum input current	5.5A	5.5A
Input V range	15V - 25V	30V - 50V
Shunting V @ 25°C	14.6 ± 0.2V	29.2 ± 0.5V
Voltage/temperature compensation coefficient	-12.5 mV/°C	-25 mV/°C
Quiescent current @ nominal system V (not shunting)	≤ 2 mA	≤ 3mA

Notes:

- (1) Solarstate controls are optimized for use with Solarex modules. Because module characteristics vary greatly, power 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.

