

Solar Charging Solutions for Switch Control and Communications

Switch automation locations and communication installations cannot always be in the most convenient places. Particularly in transmission applications, a handy power source to charge installation batteries is often not available. Without a local distribution line to tap from, a photovoltaic system may be the best solution to provide charging power to batteries serving remote switch operators and communication nodes.

Cleveland/Price offers a photovoltaic system that provides everything, short of the sun, that is necessary in an effective solar charging system. The package consists of :

- high-capacity solar panel(s)
- rugged panel mounting support
- reliable plug and play wiring system
- long-life supplemental batteries
- solar charging control

There are several factors that determine the number of solar panels required and the necessary battery capacity. The factors include:

- power requirements of the equipment being served
- solar panel output
- the hours of sunlight typically received in a day
- the number of carry-over days desired, based upon consecutive cloudy days

Computations for sizing the solar array and battery pack are provided in Cleveland/Price Instruction Book IB-AA10-054A. Cleveland/Price can also provide personalized engineering assistance to help customers size their solar panel and battery backup requirements.



3-way switch automation site with battery charging via solar panels.

Component Review

Solar Panels

Cleveland/Price provides UL listed, 85 watt solar panels. The panels have four arrays and a 3-rail contact connection. The panels are wired in parallel to provide a 12 V output.



(3) three panel
pole mounted
solar assemblies



The Tyco SOLARLOK system on a two panel solar assembly.

Mounting System

Cleaveland/Price supplies a rugged panel mounting support assembly that can accommodate up to five solar panels. Solar panels are typically mounted at the top or side of a pole. The support assembly can be lagged, bolted, or strapped to the pole. To maximize effectiveness of the solar panels, the panel support has an adjustable angle set position range from 60° to 30° in 5° increments. The support assembly is constructed of 6061-T6 aluminum for high strength and corrosion resistance.

Panel Interconnection

Solar panels are interconnected using the Tyco SOLARLOK wiring system. The panel's junction box is rated IP65 to protect the module from moisture and contamination. Blocking diodes are installed in the junction boxes to prevent current from circulating among the panels. Shading diodes are also installed in the junction boxes to prevent hot spots from developing in the panels.

Wiring is designed for protection against environmental conditions including humidity, UV, and ozone. Wiring contacts are silver-plated and wiring connections are made using an O-ring and compression fitting to seal the connection from contamination. Connectors are color coded and keyed positive and negative to prevent an incorrect connection.



Terminal block for solar connections. Surge protection is included for solar input.

Solar Input

Two 30 ft. long #10 AWG wires are provided from the solar panels to the solar input terminal block in the switch controller or communications enclosure. The solar terminal block is marked for polarity as is the incoming positive wire. The battery charging system can handle up to 25 A. of solar charging current. Solar input components can be easily retrofitted to Cleaveland/Price automation products.

Supplemental Battery Pack

Cleaveland/Price ADMO switch controllers and SPS power supply units for communication are supplied with a 12 V, 33 amp-hour battery. In locations where this battery is insufficient to handle the determined carry-over days, a supplemental battery pack would be supplied. Up to an additional 400 amp-hours of battery capacity can be installed in the battery pack enclosure. Temperature compensating trickle charging of the battery pack is performed through Cleaveland/Price's battery manager. The battery pack is housed in a NEMA 3R enclosure. The enclosure is provided with a mounting channel with keyhole for easy installation on a pole.