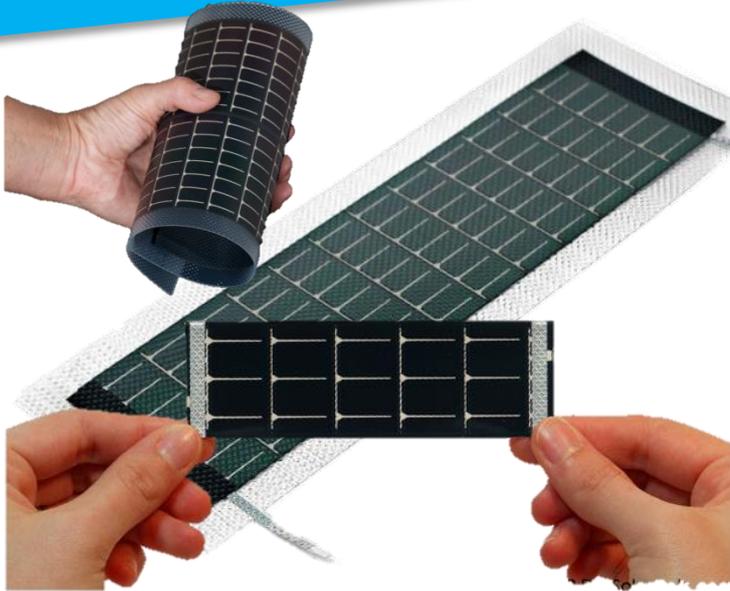


Installation and Application Instructions

PowerFilm modules are lightweight, paper-thin, and durable - easily integrated with electronic devices for solar-recharging or direct power.



Polarity Information

It is extremely important to recognise the correct polarity of the PowerFilm modules! The positive end of the mini solar module is shown in the illustration to the right. The positive end of the module connects to the positive end of the load. The negative end of the module is also shown in the diagram and should be connected to the negative end of the load.

The recommended connector wire size is a minimum size of 24 gauge. As an extra measure, connect the solar module to a digital multimeter for polarity (+,-) identification. On solar modules with copper tape leads, remove a small piece of the clear coating that is on top of the copper tape to ensure a good contact between the alligator clips of the digital multimeter and the copper tape.

A diode (07002EE01 suggested) is recommended to prevent the solar module from draining the battery when the solar module is in the dark. A diode is not required for a battery-free electrical device

Stocked PowerFilm Range

Available in a variety of sizes, shapes, and power output configurations, PowerFilm mini solar modules have been developed to match existing battery-based electrical systems most commonly used today.

Wireless Electronic Series:

SP3-37	3V	22mA
MP3-37	3V	50mA
MPT3.6-150	3.6V	100mA
SP4.2-37	4.2V	22mA
MPT4.8-150	4.8V	100mA
MPT6-150	6V	100mA
MP7.2-150	7.2V	200mA
MPT15-150	15.4V	100mA

RC Aircraft Series:

RC7.2-75 PSA	7.2V	100mA
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WeatherPro-Series:

P7.2-150	7.2V	200mA
PT15-75	15.4V	50mA
PT15-150	15.4V	100mA
PT15-300	15.4V	200mA

Please note there are other products in the range available to order.



WARNING! Do not connect a charged battery backwards or reverse polarity to the solar module, this will destroy the solar module and may cause the battery to explode.

Specifically developed to recharge AA, AAA, 6 volt and 12 volt batteries - For connecting, just solder or crimp.

MODULE SELECTION

Select your mini solar module according to 1) Operating Voltage and Operating Current required, 2) Use Environment and 3) any Specific Application Needs.

1. OPERATING VOLTAGE & OPERATING CURRENT

Identify the operating voltage and operating current that your system requires. For direct powering electronic devices, calculate the requirements of the total system carefully to ensure compatibility.

Charging batteries: Voltage

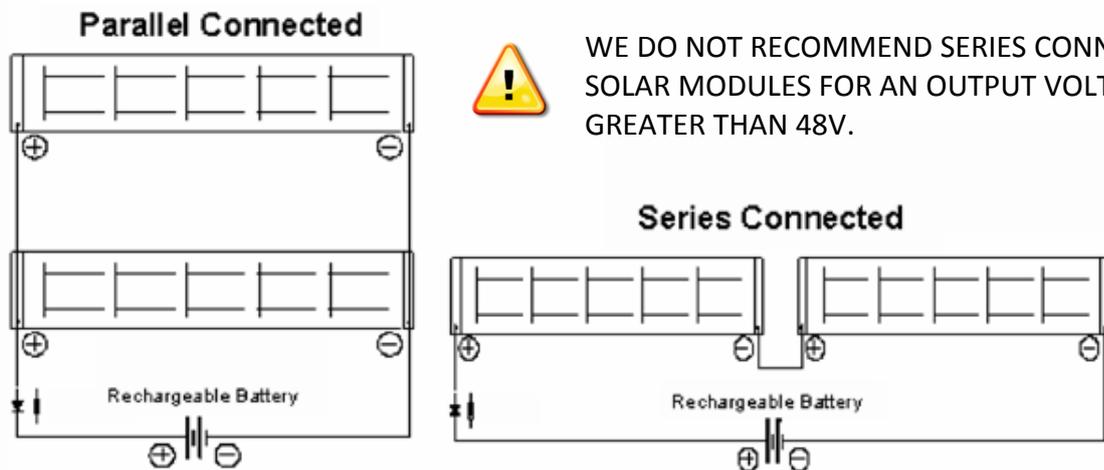
First, select the required Operating Voltage of the solar module for your load. As a general rule of thumb, a solar module with an Operating Voltage of 3 to 3.6 volts will charge 2 x AA rechargeable 1.2 volt batteries. A solar module with an Operating Voltage of 7.2 volts will charge 5 x AA rechargeable 1.2 volt batteries, or a 6 volt gel or lead acid battery. A solar module with an Operating Voltage of 15.4 volts will charge a 12 volt gel or lead acid battery.

Charging Batteries: Current

Second, select the appropriate Operating Current of the solar module to charge your load. As a general rule, do not charge a rechargeable battery with more current than 10% of its rated capacity. For example, a 700mA-hour battery can be safely charged with a solar module that delivers an operating Current up to 70mA.

Connecting Modules for Higher Operating Voltage and Current

You can parallel and series connect solar modules to achieve higher voltage (series connected) or higher current (parallel connected). However, only put like modules together: for example, two MP3-37s or two MP7.2-75s, but do not mix them. Parallel connecting two similar modules will double the output current and series connecting three identical modules will triple the output voltage - Please see diagram below.



2. USE ENVIRONMENT

If the use environment is a permanent outdoor direct exposure environment, it is essential that the solar modules be UV-stabilized and protected from moisture. Solar modules in the PowerFilm® WeatherPro™ Series are specifically designed for permanent outdoor direct exposure environments. Other use environments are generally less demanding and do not require the added protection offered by the PowerFilm® WeatherPro™ Series. Use environments and usage patterns vary significantly. Always test the selected solar module in its specific use environment and according to the usage pattern to confirm it meets those aspects of the specific application needs.

3. SPECIFIC APPLICATION NEEDS

Some applications have specific needs. Examples include: ultra-thin profile, specific footprint, ability to connect the solar module to the load from the back side of the module, pressure sensitive adhesive, etc. To meet specification needs we have developed several PowerFilm® Series see below.

SERIES DESCRIPTIONS & INSTALLATION

A. WIRELESS ELETRONIC SERIES

Modules in the PowerFilm® Wireless Electronics Series offer a new opportunity to solve the old problem of limited power for wireless electronics for portable and remote applications. PowerFilm® Wireless Electronics modules are lightweight, paper thin, and durable. Their ultrathin profile enables them to be easily integrated with devices for solar recharging or direct powering. Modules have been specifically developed to recharge AA, AAA and 6V or 12V batteries. These modules do not have a UV-stabilised surface. For connection, just solder or crimp to the copper tape.

Leads & Testing

The leads on the modules in the Wireless Electronics Series are the copper tape strips located at each end of the solar module. Remember to check the Polarity! To test the module using alligator clips for the connection to the tester, ensure the clips make direct contact with the copper tape. The coating over the copper tape will likely need to be scraped away to ensure direct contact.

Connecting to a Load

Connection methods include soldering, crimping or using alligator clips. Please remember to check the Polarity! See illustration to the front of this leaflet.

Soldering

The solar modules should be soldered to from the front face. The positive copper contact is on one end and the negative is on the other end. Use the hot tip of the soldering iron to melt through the clean coating of the copper tape, being careful not to burn through more than just the thin clear coating. Burning too deeply can damage the solar module. Although not necessary, it is possible to remove a small piece of the clear coating with a sharp knife prior to soldering to the copper tape.

Good contact can be made by melting and depositing a dot of solder to the exposed copper tape. Use a low temperature soldering iron adjusted to about 600 to 650 degrees (F). It is also acceptable to solder directly to the copper tape, without using a solder dot.

Crimping

A pressure method of mechanically securing a terminal, splice or contact to the copper strips may be used. There are many sources of crimp connectors, such as AMP (www.amp.com).

Alligator Clips

Although not the most secure connection option, alligator clips may be used.

Attaching the PowerFilm Module

The PowerFilm® module may be fastened in several ways, including with adhesives; Choose an adhesive based on the material to which PowerFilm® is being attached which could include types such as epoxy, silicon, super-glue, 3M super 77 spray, double-sided acetic tape, etc.

Be careful not to get any adhesive on the front side (dark side) of the module since it will degrade overall performance.

B. RC AIRCRAFT SERIES

The RC Aircraft Series modules are designed to be easily integrated with RC Aircraft. These modules are very lightweight, can be soldered to the back of the module via the extended copper tape and have an extra edge seal for protection from fuel contamination and weather. Modules are available with a strong pressure sensitive adhesive for simple bonding. These modules do not have a UV-stabilised surface. For connection, just solder to the copper tape.

Leads & Testing

See 'A' above. Noting that in this series the copper tape is specially folded around the back of the solar modules so it is possible to solder to the backside of the module.

Connecting to a Load

See 'A' above.

Soldering

See 'A' above. Noting that modules in this series with Pressure Sensitive Adhesive (PSA) on the back require the release liner to be removed before the solder dot is placed. Once the solder dot is formed a wire can be attached.

Attaching the PowerFilm Module

Modules with the Pressure Sensitive Adhesive (PSA) - The release line on the PSA modules is clear, carefully pick at the back (silver side) corner of the module until the release liner starts to exfoliate. Once the module with PSA is mounted it cannot be removed since the PSA adhesive is permanent!

C. WEATHERPRO SERIES

The WeatherPro™ Series is for permanent outdoor applications that are directly exposed to the elements. The especially rugged construction of these modules includes a UV-stabilised surface, extra edge seal for weather protection and tin-coated copper leads that extend from the module. Coating the leads with an RTV silicon compound can provide a tightly sealed package.

Leads & Testing

The leads on the WeatherPro™ Series are the tin-coated copper leads extending from the module. Remember to check the Polarity! To test the module using alligator clips, ensure the clips make direct contact with the copper tape. The coating over the copper tape will likely need to be scraped away to ensure direct contact.

Connecting to a Load

See 'A' above.

Soldering

See 'A' above. Noting that with the WeatherPro™ Series the tin-coated copper leads extend from each end of the solar module.

Crimping

See 'A' above.

Attaching the PowerFilm Module

Adhesives will NOT work since coating is a material from the Teflon family. Thus mechanical fasteners should be used, by utilising the weather seal (extra material around edges of solar module). Stay 7mm away from the active aperture area if using a fastener Grommet with screws or bolts; ensure no damage to weather seal. Alternatives include 'Tube Clamp' or 'Framed Enclosure'.