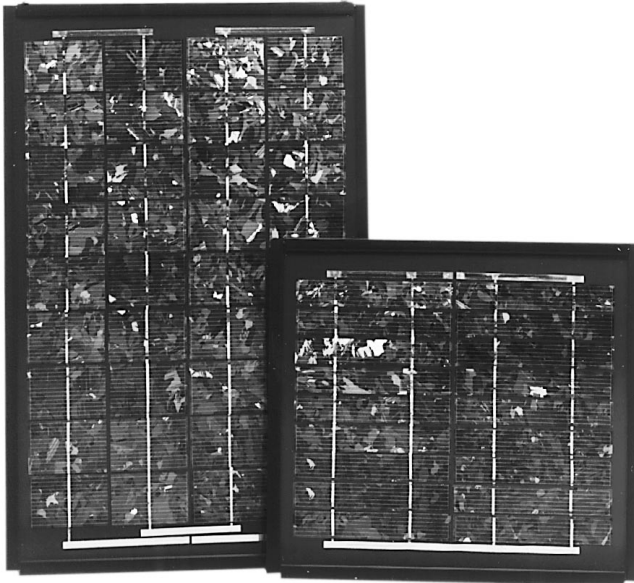


# MSX-5 and MSX-10 Photovoltaic Modules



MSX-5 and MSX-10 photovoltaic modules are designed to operate DC loads with small to moderate energy requirements. Part of Solarex's Megamodule™ series, the MSX-5 and MSX-10 generate 4.5 watts and 10 watts peak power, respectively, at Standard Test Conditions (STC). They generate sufficient voltage to charge 6V or 12V batteries efficiently in virtually any climate.



Typical commercial applications include remote telemetry, instrumentation systems, security sensors and signals. They are also well-suited to small electrical jobs around the home or farm, such as powering radios and portable communications equipment.

These modules are designed primarily for use in single-module systems, but may be interconnected to provide increased current or voltage as required. They are easily mounted to a broad range of surfaces using Solarex mounting kits or user-fabricated supports.

## Individually Tested, Labeled and Warranted

As part of the final inspection procedure, every MSX module is tested in a solar simulator and labeled with its actual output—voltage, current, and power at maximum power point ( $P_{max}$ )—at Standard Test Conditions and Standard Operating Conditions. Furthermore, the MSX-5 and -10 are covered by a limited warranty which guarantees:

- that no module will generate less than its guaranteed minimum  $P_{max}$  when purchased;
- at least 90% of the guaranteed minimum  $P_{max}$  for ten years.

Contact Solarex's Marketing Department for full terms and limitations of the warranty.

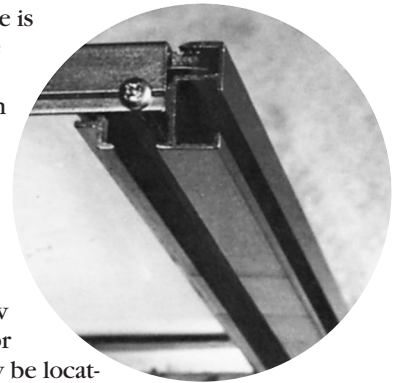
## Complete and Ready For Use

These modules consist of 36 polycrystalline silicon solar cells configured as two series strings of 18 cells each, and are factory-wired to provide output voltages compatible

with, depending on the model ordered, either 6V or 12V systems. Output is via a low-profile junction box with a PVC jacketed output cable. As an option, a blocking diode—to prevent battery discharge under low-light conditions—is prewired to the output cable, allowing the module to be directly connected to a battery in certain types of systems. If the system requires regulation, Solarex's Solarstate™ regulator is recommended.

## Unique Multimount Frame

The Multimount™ frame is the most versatile in the industry and provides tremendous flexibility in mounting approach. Oriented parallel to the edge and the back of the module, its dual channels accept the heads of 5/16 inch or 8 mm hex bolts, and allow the module to be side- or rear-mounted. Bolts may be located anywhere along the channels, (shown here with end caps removed) which prevents them from turning during tightening and allows installation with just one wrench.



## Proven Materials and Construction

The materials used in these modules reflect Solarex's more than two decades of experience with solar modules and systems installed in virtually every climate on Earth.

- Polycrystalline silicon solar cells: efficient, attractive, stable.
- Modules are rugged and weatherproof: cell strings are laminated between sheets of ethylene vinyl acetate (EVA) and tempered glass.
- Tempered glass superstrate: highly transmissive (low iron content), stable, impact-resistant.
- Framed with corrosion-resistant, bronze-anodized extruded aluminum: strong, attractive framing compatible with Solarex mounting hardware and a broad range of other mounting structures.

*More than 20 years ago, Solarex made the first polycrystalline silicon solar cell, advancing photovoltaics beyond the first-generation monocrystalline technology developed for*



*electronics. Developed specifically for photovoltaics, polycrystalline silicon is used in Solarex's Mega™ series to provide a wide range of attractive, efficient modules. They require substantially less energy to manufacture and generate substantially more energy per rated watt than other crystalline silicon modules.*

## Safety Approved

These modules are listed by Underwriter's Laboratories for electrical and fire safety (Class C fire rating), and approved by Factory Mutual Research for application in NEC Class 1, Division 2, Group C & D hazardous locations.



## Quality certified

MSX-5 and -10 modules are manufactured in our ISO 9001-certified factories to demanding specifications, and are designed to comply with IEC 1215, IEEE 1262 and CEC 503 test requirements, including:

- repetitive cycling between -40°C and 85°C at 85% relative humidity;
- simulated impact of one-inch (25 mm) hail at terminal velocity;
- a "damp heat" test, consisting of 1000 hours of exposure to 85°C and 85% relative humidity;
- a "hot-spot" test, which determines a module's ability to tolerate localized shadowing (which can cause reverse-biased operation and localized heating);
- simulated wind loading of 125 mph (200 kph).

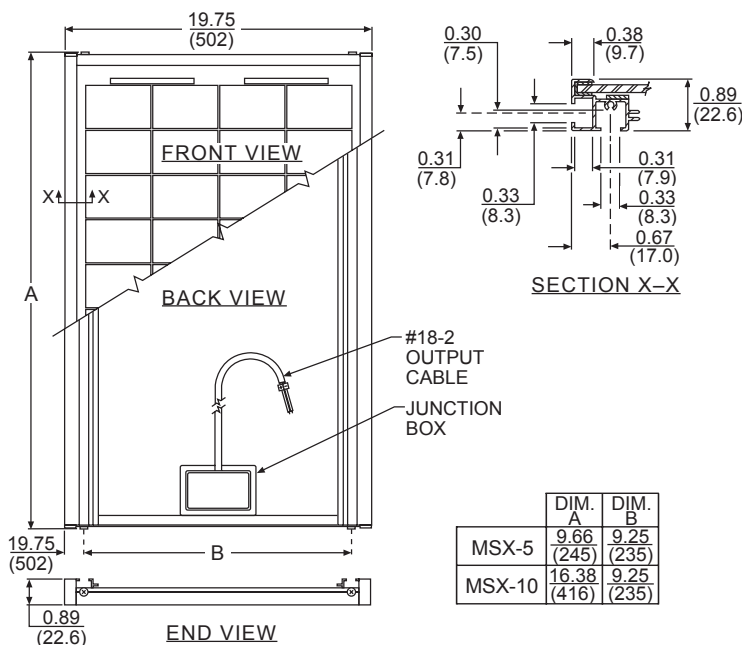
## Options

- Blocking diode
- Bypass diode (MSX-10 only)
- High capacity multifunction junction box, qualifying module (MSX-10 only) for Certification by TUV Rheinland as Class II equipment.

## Mechanical Characteristics

**Weight:** MSX-10 3.3 pounds (1.5 kg)  
MSX-5 1.7 pounds (0.77 kg)

**Dimensions:** Dimensions in brackets are in millimeters  
Unbracketed dimensions are in inches  
Overall tolerances  $\pm 1/8"$  (3mm)



## Typical Electrical Characteristics<sup>1</sup>

	MSX-5	MSX-10
Maximum power ( $P_{max}$ )	4.5W	10W
Voltage @ $P_{max}$ ( $V_{mp}$ )	16.8V	17.1V
Current @ $P_{max}$ ( $I_{mp}$ )	0.27A	0.58A
Guaranteed minimum $P_{max}$	4W	9W
Short-circuit current ( $I_{sc}$ )	0.29A	0.6A
Open-circuit voltage ( $V_{oc}$ )	20.6V	21.1V
Temperature coefficient of $V_{oc}$	$-(80 \pm 10) \text{ mV}/^\circ\text{C}$	
Temperature coefficient of $I_{sc}$	$(0.065 \pm 0.015) \% / ^\circ\text{C}$	
Temperature coefficient of power	$-(0.5 \pm 0.05) \% / ^\circ\text{C}$	
NOCT <sup>2</sup>	$47 \pm 2^\circ\text{C}$	

### Notes

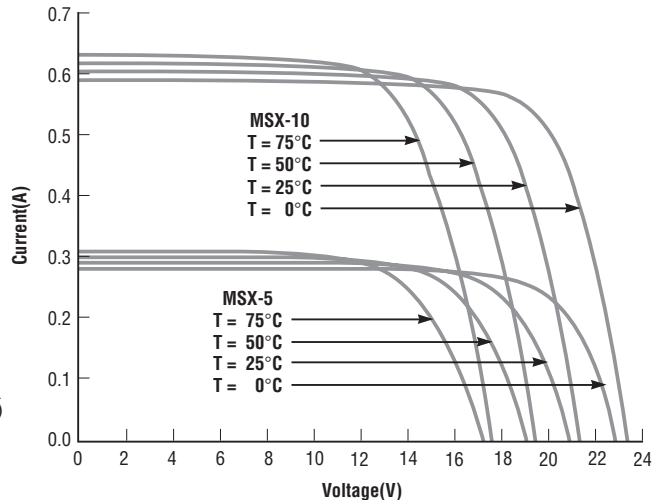
(1) These data represent the performance of typical 12V modules as measured at their output terminals, and do not include the effect of such additional equipment as diodes and cabling. The data are based on measurements made in a solar simulator at Standard Test Conditions (STC), which are:

- illumination of 1 kW/m<sup>2</sup> (1 sun) at spectral distribution of AM 1.5;
- cell temperature of 25°C or as otherwise specified (on curves).

Operating characteristics in sunlight may differ slightly. For characteristics of modules in 6V configuration, divide the 12V voltage characteristics by 2 and multiply current characteristics by 2. Power values are unchanged.

(2) Under most climatic conditions, the cells in a module operate hotter than the ambient temperature. NOCT (Nominal Operating Cell Temperature) is an indicator of this temperature differential, and is the cell temperature under Standard Operating Conditions: ambient temperature of 20°C, solar irradiation of 0.8 kW/m<sup>2</sup>, and wind speed of 1 m/s.

IV Characteristics



For more information, contact: