

MSX-110 and MSX-120 Photovoltaic Modules



The MSX-110 and -120 are large industrial-grade photovoltaic modules, proven to deliver power reliably in virtually any climate. They are designed for large-scale applications which can exploit their high output, precise testing and labeling, and attractive appearance. Typical applications include utility grid-supplemental systems, telecommunications systems, pumping and irrigation, and remote villages and clinics. They are compatible with a range of Solarex subsystems and components.

Individually Tested, Labeled and Warranted

As part of Solarex's final inspection procedure, each of these modules 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, each MSX-110 and -120 module is covered by a Limited Warranty which warrants freedom from defects in materials and workmanship for 5 years; and by Limited Warranties of power output, which warrant:

- at least 90% of the specified minimum P_{max} for twelve years;
- at least 80% of the specified minimum P_{max} for twenty-five years.

Contact Solarex's Marketing Department or your Solarex representative for full terms of these warranties.

Versatile in Application

The MSX-110/120 design provides great versatility:

Dual Voltage Capability

These modules consist of 72 polycrystalline silicon solar cells electrically configured as four series strings of 18 cells each. They may be ordered in either 12V or 24V configuration, and may easily be switched between configurations in the field by moving leads in the junction boxes. This design also allows installation of bypass diodes on 18-cell strings, which can improve reliability and performance in systems with nominal voltage 24V and above.

Large Versatile Junction Box

These modules includes dual raintight (IP54-rated) junction boxes which accept conduit or cable via 1/2" nominal or PG13.5 metric fittings. They have sufficient space (25 cubic inches/ 411 cc each) not only to connect the module into a system, but to enclose array series/parallel connections and diodes. The standard six-terminal con-

nection block accepts wire as large as AWG #10 (6mm²); an optional terminal block accepts wire up to AWG #4 (25mm²). Both blocks accept bare wire or preformed terminations.

Attractive, Proven Rugged

MSX modules are both attractive and rugged, having proved their reliability over decades of use at thousands of installations in every climate on Earth.

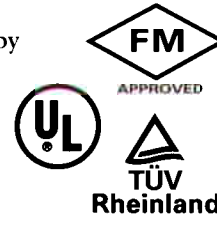
- Polycrystalline silicon solar cells are efficient and attractive, with cut crystal facets providing visual texture. For consistent appearance, they are set in a blue backsheet which closely matches cell color.
- The architectural-grade bronze-anodized extruded aluminum frame is corrosion-resistant, strong, compatible with Solarex mounting hardware and most other mounting structures.
- Cell strings are laminated between sheets of modified ethylene vinyl acetate (EVA) and tempered glass with a durable Tedlar backsheet for long-term weather-resistance.
- Tempered glass superstrate filters UV and is highly light-transmissive and impact-resistant.

Lower Balance of System Costs

With these modules' higher power, fewer modules are needed to serve an application, and many balance-of-system (BOS) costs are reduced accordingly. These include support structures, wiring, and labor-related costs such as assembly, installation, shipping and handling.

Safety Approved

MSX-110 and -120 modules are listed by Underwriter's Laboratories for electrical and fire safety (Class C fire rating), certified by TÜV Rheinland as Class II equipment, and approved by Factory Mutual Research for application in NEC Class 1, Division 2, Group C & D hazardous locations.



Quality certified

MSX-110 and -120 modules are manufactured in our ISO 9001-certified factories to demanding specifications, and comply with the tests and requirements of IEC 61215, (formerly CEC 503) and IEEE 1262, including:

- repetitive cycling between -40°C and 90°C;
- repetitive cycling between -40°C and 85°C at 85% relative humidity;
- simulated impact of one-inch (25 mm) hail at terminal velocity;
- 2700 VDC frame/cell string isolation test;
- performance at low light levels;



- 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);
- resistance to UV degradation;
- robustness of electrical terminations;
- static loading, front and back, of 50 psf (2400 pascals); front loading (e.g. snow) of 113 psf (5400 pascals).

Options

- Blocking and bypass diodes
- Frameless laminate
- Integral Solarstate regulator

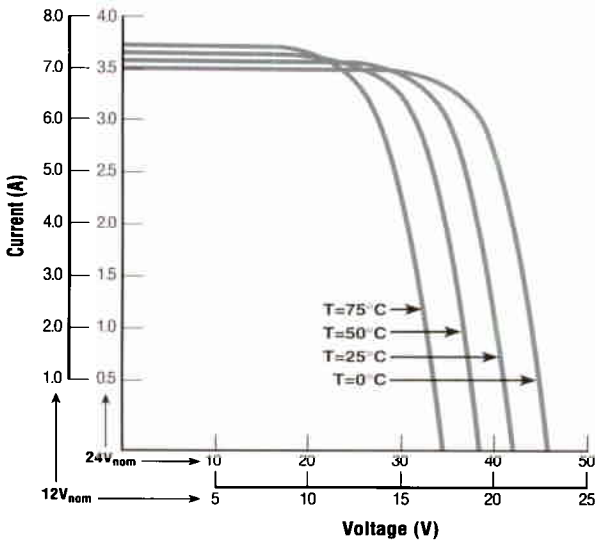
Typical Electrical Characteristics¹

	MSX-110	MSX-120
Typical maximum power (P_{max})	110W	120W
Voltage @ P_{max} (V_{mp})	32.9V	33.7V
Current @ P_{max} (I_{mp})	3.34A	3.56A
Specified minimum P_{max}	105W	114W
Short-circuit current (I_{sc})	3.69A	3.87A
Open-circuit voltage (V_{oc})	41.2V	42.1V
Temperature coefficient of I_{sc}	(0.055±0.015)%/°C	
Temperature coefficient of V_{oc}	-(160±20)mV/°C	
Temperature coefficient of power	-(0.5±0.05)%/°C	
NOCT ²	47±2°C	

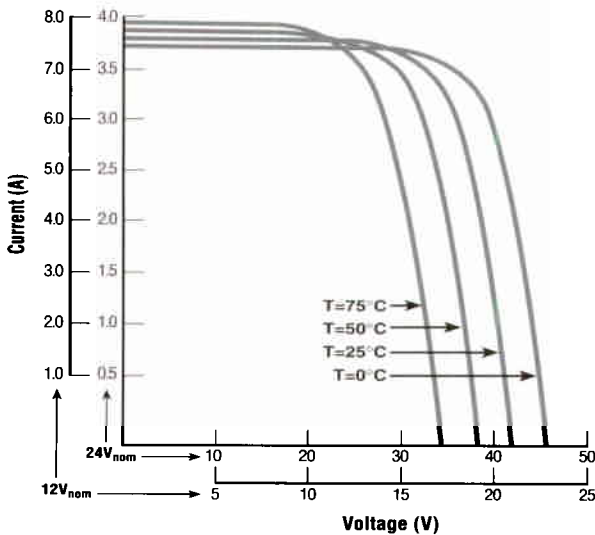
Notes:

- (1) These data represent the performance of typical modules, wired in 24V configuration, 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 at Standard Test Conditions (STC), which are:
 - Illumination of 1 kW/m² (1 sun) at spectral distribution of AM 1.5
 - Cell temperature of 25°C or as otherwise specified (on curves).
 Electrical characteristics of modules wired in 12V configuration may be found on the 12V I-V curve scales, or by doubling 24V current data and halving 24V voltage data.
- (2) Under most operating conditions, the cells in a module operate hotter than the ambient temperature. NOCT (Nominal Operating Cell Temperature) is an indication of this temperature rise, and is the cell temperature under Standard Operating Conditions (SOC), which are:
 - 20° ambient temperature
 - solar irradiation of 0.8 kW/m²
 - average windspeed of 1 m/s with the wind oriented parallel to the plane of the array, and all sides of the array fully exposed to the wind.
- (3) During the stabilization process which occurs during the first few months of deployment, module power may decrease approximately 3% from typical P_{max} .

MSX-110 I-V Characteristics

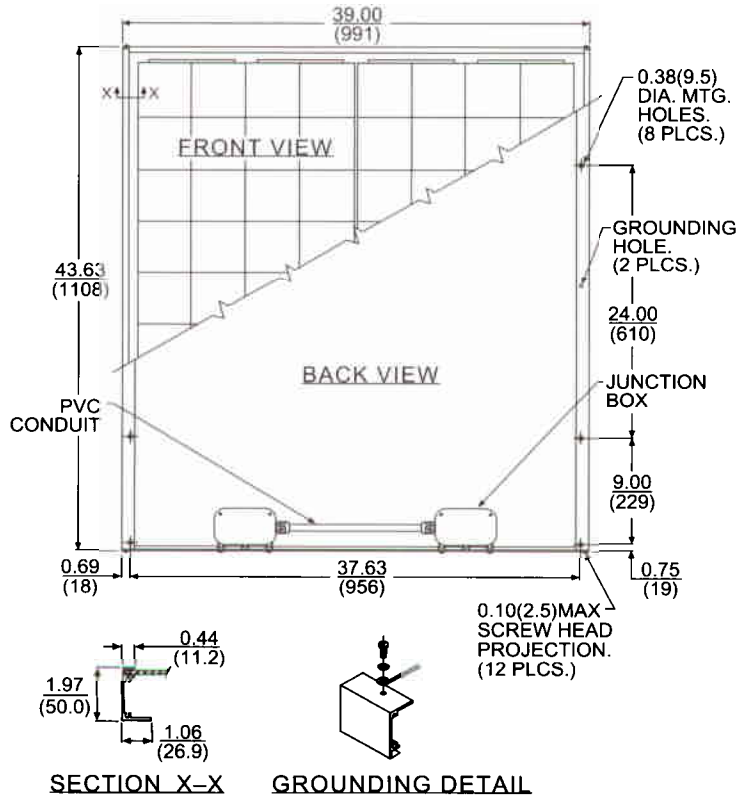


MSX-120 I-V Characteristics



Mechanical Characteristics

- Weight** 28.6 pounds (13.0 kg)
- Dimensions** Dimensions in brackets are in millimeters
Unbracketed dimensions are in inches
Overall tolerances ± 1/8" (3mm)



For more information, contact: