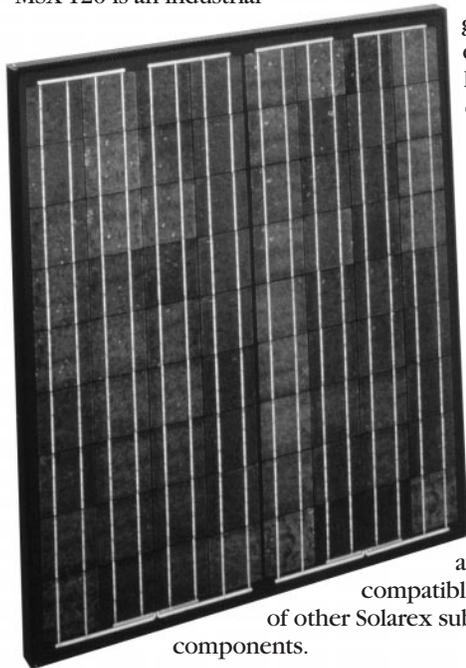


MSX-120 Photovoltaic Module



The MSX-120 is the one of the largest modules in Solarex's Megamodule™ series, and one of the most powerful photovoltaic modules commercially available. It is designed for large-scale applications which can exploit its high output and simplicity of installation. Like all MSX modules, the MSX-120 is an industrial-



grade product, designed for long life in demanding applications and climates.

The MSX-120 is typically used in large arrays powering such applications as utility grid-supplemental systems, telecommunications systems, pumping and irrigation, and remote villages and clinics. It is compatible with a range of other Solarex subsystems and components.

Lower Installation and BOS Cost

An array of MSX-120 modules can save money over an array of smaller modules, particularly when it comes to BOS (Balance of System) cost. Its high power means fewer modules are needed to generate a given power output; as a result, a system's support structure, array assembly, installation, shipping, and handling costs may be lower than when using smaller modules. Its relatively high voltage (24V nominal) means fewer series modules are required to achieve high circuit voltage; this means fewer series connections, higher reliability, and faster installation.

Individually Tested, Labeled and Warranted

As part of Solarex's final inspection procedure, each MSX-120 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 module is covered by our twenty-year limited warranty, which guarantees:

- that no module will generate less than its guaranteed minimum P_{max} when purchased;
- at least 80% of the guaranteed minimum P_{max} for twenty years.

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

Reliable and Versatile

The Megamodule series has proved its reliability at thousands of installations in every climate on Earth. Among the features that contribute to the MSX-120's versatility:

Dual Voltage Capability

These modules consist of 72 polycrystalline silicon solar cells electrically configured as four series strings of 18 cells each. Shipped in 24V configuration, modules may easily be switched to 12V configuration in the field by moving leads in the junction box. 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

The MSX-120 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 connection 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.

Proven Materials and Construction

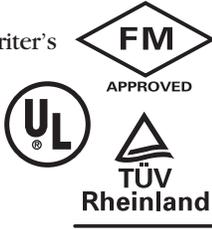
MSX-120 materials reflect Solarex's quarter-century of experience with solar modules and systems installed in virtually every climate on Earth.

- Polycrystalline silicon solar cells: efficient, attractive, stable.
- Modules are rugged and weatherproof: cell strings are laminated between sheets of modified ethylene vinyl acetate (EVA) and tempered glass with a durable Tedlar backsheet.
- Tempered glass superstrate is highly light-transmissive, impact-resistant and filters UV.
- Corrosion-resistant, bronze-anodized extruded aluminum frame is strong, attractive, compatible with Solarex mounting hardware and most 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

The MSX-120 module is 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.



Options

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

Quality certified

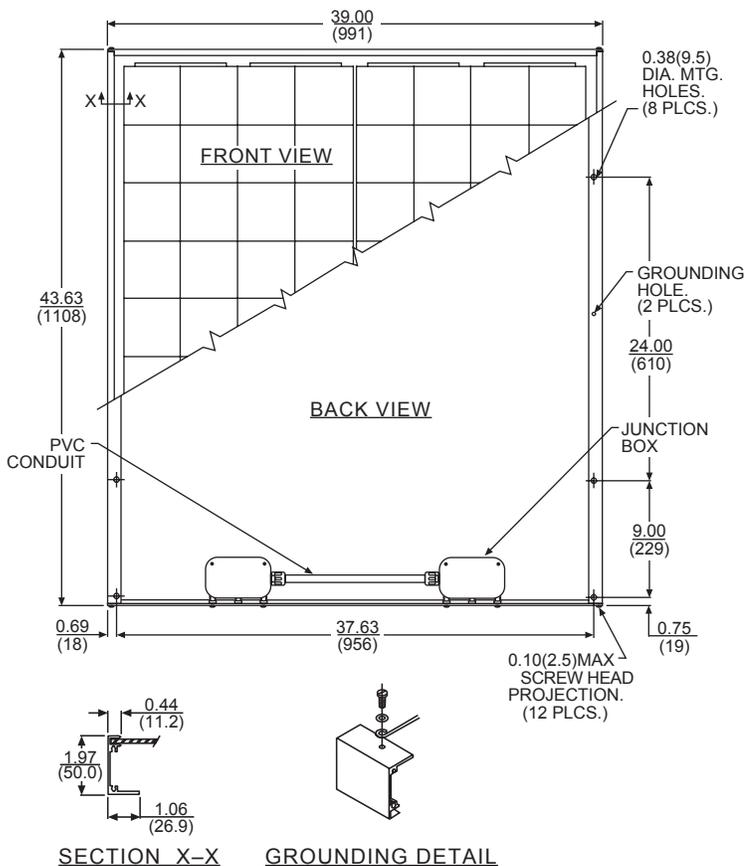
MSX-120 modules are manufactured in our ISO 9001-certified factories to demanding specifications, and comply with IEC 1215, IEEE 1262 and CEC 503 test requirements, including:

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

Mechanical Characteristics

Weight: 30.8 pounds (14.0 kg)

Dimensions: Dimensions in brackets are in millimeters. Unbracketed dimensions are in inches. Overall tolerances ±1/8" (3mm)



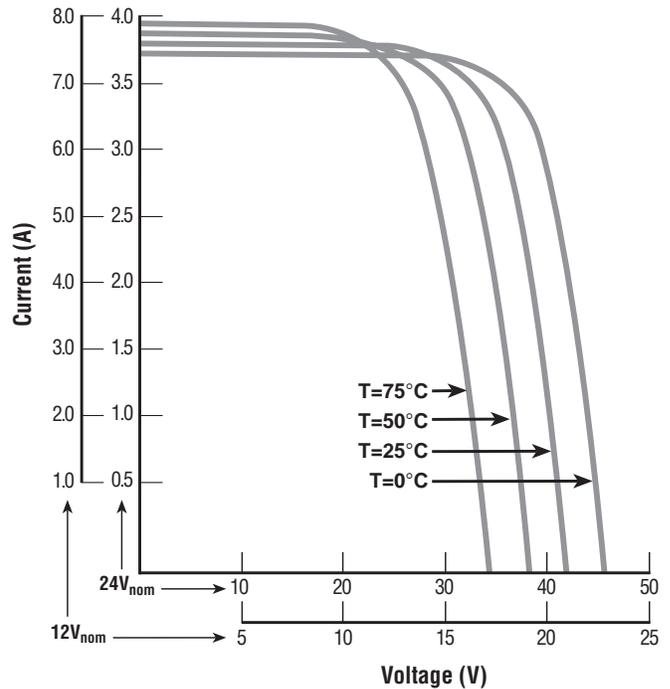
Typical MSX-120 Electrical Characteristics¹

Typical maximum power (P_{max})	120W
Voltage @ P_{max} (V_{mp})	34.2V
Current @ P_{max} (I_{mp})	3.5A
Guaranteed minimum P_{max}	114W
Short-circuit current (I_{sc})	3.8A
Open-circuit voltage (V_{oc})	42.6V
Temperature coefficient of I_{sc}	(0.065±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:

- MSX-120 modules are tested, labeled and shipped in 24V configuration. These data represent the performance of a typical MSX-120, wired in 24V configuration, as measured at its 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/m² (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. Electrical characteristics of MSX-120s 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.
- 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.

I-V Characteristics



For more information, contact: