

SPECIFICATIONS

| | Model M55 | Model M75 | Model M78 | Model M65 | Model M68 | Model M25 |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
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Electrical Characteristics:

| | | | | | | |
|---------------------------------|-------|-------|-------|-------|-------|-------|
| Rated Power, Watts | 53 Wp | 47 Wp | 38 Wp | 42 Wp | 35 Wp | 22 Wp |
| Open Circuit Voltage, Typical | 21.7 | 19.7 | 19.5 | 18.0 | 17.7 | 18.2 |
| Short Circuit Amperage, Typical | 3.32 | 3.32 | 2.95 | 3.26 | 2.95 | 1.65 |
| Voltage at Load, Typical | 17.4 | 16.0 | 16.0 | 14.5 | 14.5 | 14.6 |
| Amperage at Load, Typical | 3.05 | 2.94 | 2.42 | 2.90 | 2.42 | 1.50 |

NOTES: 1. All electrical specifications are at standard test conditions of: 1000 W/m², 25°C cell temperature, and spectrum of 1.5 air mass.

2. Modules identified with an (X) adjacent to the numeric date code on the module will have different power specifications. Refer to the supplementary information sheet furnished with these modules.

Physical Characteristics:

| | | | | | | |
|-------------------------|----------------------------------|-----------|-------|-----------|-------|-------------------------|
| No. Cells in Series | 36 | 33 | 33 | 30 | 30 | 30 |
| Cell Size | 4.05" (102.9 mm) Sq. | | | | | 1/2 of 4.05" cell |
| Module—Length: | 50.9" | 48" | ..... | 42.6" | ..... | 22.4" |
| —Width: | (1293 mm) | (1219 mm) | ..... | (1083 mm) | ..... | (569 mm) |
| —Depth: | 13" (330 mm) ..... |  |  |  |  | ..... |
| Weight: | 12.6 lb | 11.6 lb | ..... | 10.5 lb | ..... | 5.6 lb |
| | (5.7 kg) | (5.2 kg) | ..... | (4.8 kg) | ..... | (2.5 kg) |
| Mounting Holes: | | | | | | |
| Across Length of Module | 49.8" | 46.9" | ..... | 41.5" | ..... | 21.3" |
| | (1265 mm) | (1191 mm) | ..... | (1054 mm) | ..... | (541 mm) |
| Inner Set | 25.3" | | | | | None |
| | (643 mm) | | | | | |
| Across Width of Module | 11.3" | | | | | |
| | (287 mm) | | | | | |
| Diameter |26" | | | | | |
| | (6.6 mm) | | | | | |
| Wiring provisions: | 2 junction covers | | | | | 18 AWG. 2 |
| | for 14 to 8 AWG wire | | | | | cond. cable attached |

System Design Information:

| | | | | | | |
|---|------------------|------|------|------|------|------|
| —Max Short Circuit Current at 1000 W/m ² & 47°C | 3.51 | 3.49 | 3.46 | 3.49 | 3.46 | 1.76 |
| —Open Circuit Voltage at 0°C | 24V | 22V | 22V | 20V | 20V | 20V |
| Max. System Open Circuit Voltage | 600V | | | | | 20V |
| Factory Installed Bypass Diodes | Yes | Yes | Yes | Yes | Yes | No |
| Max. # Series Modules | 25 | 27 | 27 | 30 | 30 | 1 |
| Max. # Parallel Modules | | | | | | |
| Using: 14 AWG Wire: ★ | 4 | 4 | 4 | 4 | 4 | 8 |
| 12 AWG Wire: | 5 | 5 | 5 | 5 | 5 | 8 |
| 10 AWG Wire: | 8 | 8 | 8 | 8 | 8 | — |
| 8 AWG Wire: | 11 | 11 | 11 | 11 | 11 | — |

★ NOTE: Wire sizes are for module interconnect wiring. Array to load wiring may need to be heavier than interconnect wiring to keep voltage drop to the 5% recommended maximum.

use where self-regulation is needed in systems up to 600 volts (open circuit).

Each of these modules has 30 cells in series. They are self-regulating when used to charge batteries of the proper capacity because their electrical characteristics are an excellent match to the charging requirements of a lead acid battery. For more information, see the section titled 'Self-Regulation.'

Power

The current output for these modules as shown in the specifications are for industry standard conditions. These conditions may not be frequently observed in actual practice. A more common condition, for example, is an irradiance of 800 W/M² and 47C cell temperature.

Under these conditions, a clean module charging a battery can be expected to produce current as follows:

- M55—2.5 Amp
- M75—2.4 Amp
- M78—2.0 Amp
- M65—2.0 Amp
- M68—1.8 Amp
- M25—1.05 Amp

It should be emphasized that the performance of these or any other solar electric module is dependent on local conditions, and even approximate performance estimation requires measurement of solar irradiance and module operating temperature.

WARNINGS

General Module Safety

All instructions should be read and understood before attempting to install, wire, operate and maintain the photovoltaic module. Retain this instruction booklet for future reference. The word "module" used in this booklet refers to one or more photovoltaic modules.

Avoid electrical hazards when installing, wiring, operating and maintaining the module.

- A photovoltaic module generates DC electricity when exposed to sunlight or other light sources.
- Cover module face completely with opaque material to halt the production of electricity when installing or working with module or wiring.
- When modules are connected in series, voltages are additive. When they are connected in parallel, amperages are additive. Consequently, a system assembled from photovoltaic modules can produce high voltages and amperages, which constitute an increased hazard.
- Do not touch terminals while module is exposed to light. Provide suitable guards to prevent contact with 30 VDC or greater. As an added precaution, use properly insulated tools only.
- Contact with electrically active parts of the module such as terminals can result in burns, sparks, and lethal shock whether the module is connected or disconnected.

Follow Permit, Installation and Inspection Requirements

- Before installing module, contact appropriate authorities to determine permit, installation, and inspection requirements which should be followed. This should be done not only for installations in conjunction with buildings, but also for marine and motor vehicle applications, for which additional requirements may apply.
- Ground module frames for all systems of any voltage.

- If not otherwise specified, it is recommended that requirements of U.S. National Electrical Code be followed.
- For roof mounted modules, special designs may be required to help provide a proper installation. Both roof design and module installation design have an effect on the fire resistance of the building. Improper installation may contribute to hazards in the event of fire.

Installation and Operation

- Module installation and operation should be performed by qualified personnel only. Children should not be allowed near the solar electric installation.
- Use module for its intended function only. Follow all module manufacturer's instructions. Do not disassemble the module, or remove any part installed by the manufacturer.
- Do not drop module or allow objects to fall on module. Do not stand or step on module.
- Do not wear jewelry when working with photovoltaic module.
- Do not concentrate sunlight on module.
- **If batteries are used with a module, follow all safety precautions of battery manufacturer.** Some batteries can release flammable hydrogen gas. Do not produce sparks when working in locations where flammable gases or vapors exist. Do not overcharge battery. Do not expose batteries to heat sources such as open flames, lighted matches, and cigarettes. Shield skin and eyes (with goggles) from battery acid. Flush thoroughly with water if eyes, skin or clothing come in contact with acid. Place battery in well-ventilated area and on racks or floors that do not react with acid.
- Since sparks may be produced, do not install module where flammable gases or vapors may exist.