



# Tigo Energy® Module Maximizer™ -ES (MM-ES) Data Sheet



For residential, commercial and utility scale photovoltaic solar arrays, the Tigo Energy® Maximizer™ system optimizes the power output of each module (solar panel); delivers module-level data for operational management and performance monitoring; and provides the ability to deactivate the high voltage DC bus for safer installation, maintenance or fire fighting. Tigo Energy Module Maximizers are key components of the system which reside at each module (one per solar module). The Module Maximizer provides data acquisition, communication to the Tigo Energy® Maximizer™ Management Unit, and energy harvesting control. The very small electronics footprint has been designed to minimize cost and maximize reliability. Tigo Energy Maximizer MM-ES is ideal for the European market and retrofit around the world.

The Tigo Energy output optimization starts with dynamic module balancing – a Module Maximizer (patented) attached to each module manages the energy harvest and sends information to the Maximizer Management Unit for reporting and control. The Tigo Energy Serial Module Maximizer (MM-ES) connects in a series topology. MM-ES maintains best-in-class system conversion efficiencies.

The Tigo Energy Module Maximizer includes a unique technology (patented) which greatly enhances the safety of a PV solar installation. As part of the Tigo Energy Maximizer system, this function can be activated with a safety button or via a remote management console. The system can be installed, maintained or approached by fire personnel without the exposure to voltage levels typically in excess of 400 volts.

The Tigo Energy Module Maximizer is packaged in a NEMA3R enclosure (water and weather resistant), conforms to UL and IEEE safety standards. There are Module Maximizer options to fit any PV module, crystalline silicon or thin-film, regardless of output voltage or nominal power rating.



Ask your PV Solar distribution partner for the Tigo Energy Module Maximizer pre-installed on many of their most popular framed solar panels for simple on-site system installation for your new or existing PV system. Also watch for modules that include the Tigo Energy technology fully integrated into the junction-box – available soon from leading PV module manufacturers.

## Module Maximizer-ES Technical Specifications


Input data	MM-ES60**	MM-ES110	MM-ES170
Maximum power	300W	300W	300W
Maximum input DC voltage (Voc)	52V	110V	170V
Vmp range *	24-48V	30-89V	30-140V
Maximum continuous current (Imp)	7.5A	4.7A	2.6A
Maximum input current (Isc)	8.5A	5A	3A

\* Vmp = Voltage at maximum power = Maximum power voltage

\*\* Discontinued and replaced with MM-ES50 and MM-ES75 to support a wider range of solar modules.

Output Data (DC)	MM-ES60**	MM-ES110	MM-ES170
Maximum output power	300W	300W	300W
Maximum continuous current	7.5A	4.7 A	2.6A
Nominal Voltage/range	variable	variable	variable

Mechanical Data	MM-ES60**	MM-ES110	MM-ES170
Operating temperature range	-30°C +70°C		
Cooling	Natural Convection		
Enclosure environmental rating	IP-65, NEMA3R		

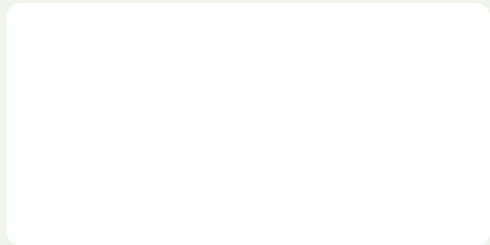
Features	MM-ES60**	MM-ES110	MM-ES170
Compliance			
	per UL1741 IEEE 1547.1 FCC part 15, class B EN 61000		
Panel connector	NEC 2008 compliant MC4 compatible (for retrofit) MC3 connectors		
Bus connector	NEC 2008 compliant 40AMP		

### Optimize the energy harvest of your PV system using the Tigo Energy Maximizer to:

- accelerate system payback
- maximize the power output of individual modules
- reconsider previously rejected projects because of unfavorable shade or orientation
- maintain best-in-class conversion efficiency
- manage the system with module-level data to minimize operational costs and keep the system at peak performance throughout its lifetime
- introduce an unprecedented level of safety for new and existing PV solar installations (patented)
- simplify the balance-of-system design, especially for high Voc or thin-film modules



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