



1996 MINI-MAXIMIZER™ MINIATURE, ULTRA LIGHTWEIGHT (350gm) MAXIMUM POWER POINT TRACKERS FOR SOLAR RACING CARS, WITH PLUG-IN REMOTE LCD DIGITAL METERING OPTION.

The race-proven AERL MAXIMIZER™ (M.P.P.T.) developed over the last 8 years and now patented around the world, has now been used in more than 150 solar racing cars from all parts of the world. Eight of the first 11 solar cars in the 1990 World Solar Challenge & half of the 55 teams in the 1993 W.S.C. have used the AERL MAXIMIZER™. In response to the continued customer demand, for 1995 AERL added a LCD digital metering module option to its standard range of nine race-proven MINI-MAXIMIZERS™. Typical efficiencies on all units are above 99% and available PV power ranges are 200W, 300W, 400W, 500W & 600Watts.

WHY RACE WITH A MAXIMIZER™

The PV output voltage at which maximum electrical power can be delivered from Photovoltaic Solar Panels used in solar racing car applications varies widely with changing sunlight intensities, incident sunlight angles and PV cell temperature levels. The PV cell temperature is greatly affected by the vehicle speed and typically varies over a 25-35 degree celcius range, between a standing and a moving vehicle. This results in a 10%-15% shifting of the PV voltage at which maximum power is delivered.

The battery voltage in solar race cars varies over a wide range also, with the differing charge and discharge levels. For lead-acid batteries, a 25-30% movement between the flat and full voltages is typical. For silver-zinc batteries it is typically 30-35% or greater. With these large variations in PV maximum power output voltage and even larger variations in the battery voltage, if the PV panel and battery are directly connected, the PV panel may unavoidably operate at a voltage (dictated by the battery voltage), that may be up to 25% above or below the ideal PV maximum power voltage. This will result in greatly reduced PV panel power output. To operate the PV panel at its highest instantaneous output power, it is essential to electronically decouple the panel voltage movement from that of the battery voltage movement, with a MAXIMIZER.

The MAXIMIZER™ employs an ultra-high efficiency DC-DC step-down, MOSFET converter and patented control methods to automatically hold the PV panel at its maximum power point voltage, while delivering the resulting maximum PV power to the battery bank at the ever-changing voltage required by the battery.

1996 MINI-MAXIMIZER™ FEATURES

1. All of the control electronics are contained in an epoxy sealed, computer tested, plug-in micro-electronic control hybrid.
2. Ultra-high efficiency: Typically 98.3%-99.3%. On the MINI-MAXIMIZER units, the 25mA operating current, which is normally supplied via a linear regulator from the PV array input voltage, is now supplied from an auxiliary H.F. transformer supply whenever the unit is actually delivering power to the battery.

Instead of consuming 5 watts at 200V input, for example, to run the control electronics, it now consumes less than 1 watt, greatly reducing total operating losses at desirable higher PV voltages.

3. Optional plug-in LCD Digital metering module for remote dashboard monitoring of PV input amps & volts and output battery charging amps & battery volts. The metering module also includes LED indication of when the battery has entered the fully charged 100% Final Float Mode as well as when it has discharged below 10%-20% state-of-charge, (approximately 1.8-1.9V/cell for lead-acid batteries). This low battery LED remains lit until a full 110% equalise charge cycle has been completed following the previous low battery condition.

4. Electronic current limiting and thermal over-load protection provide a high degree of over-load and short-circuit protection.

5. 600A crow-bar diode and fused reverse polarity and input/output short-circuit protection.

6. Two-wire remote ON/OFF control terminals provided.

7. Plug-in, quick-release terminal block for rapid change-over.

8. Any number of units can be operated with outputs paralleled. (Only Mini-Maximizer outputs, not inputs can be paralleled.)

9. Tiny size: 145 x 115 x 65 mm. (Light-weight: < 350 grams)

10. All MINI-MAXIMIZERS™ can charge a wide selection of battery voltages up to a nominal 180V (on HV units), with DIP-SWITCH selection and TRIM-POT float level adjustment.

BATTERY "FINAL FLOAT" VOLTAGE RANGES FOR POSITIONS # 1 to # 10 ON THE SELECTION DIP-SWITCH :

"NORMAL" Mini-Maximizers: 200B, 300B, 400B, 500B models

# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10
OFF	13-15		39-43		62-71		87-99		111-128
		26-29		52-57		75-85		99-114	

"HV" Mini-Maximizers: 200BHV through to 600BHV models

# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10
OFF	22-27		67-78		110-129		154-179		--
		45-53		88-103		132-155		--	

11. **AUTO-EQUALISATION.** On each charge cycle, the battery will charge to a level 8-10% above the "Final Float" voltage. This will equalise the charge of each cell and then continue to float charge at the precise, 100%, user selected, "Final Float" voltage.

RACE-TRIM MINI-MAXIMIZER MODELS

UNITS ARE: NON-ISOLATED, COMMON POSITIVE, DC-DC, STEP-DOWN, HF SWITCHING POWER CONVERTERS.

Input open-circuit voltage ranges: 60-170 Vo/c ("NORMAL")
(25 C. "cold cell" temperature) 99-250 Vo/c ("HV")
Nominal battery voltage ranges: Up to 108V ("NORMAL")
(refer to the tables above) Up to 180V ("HV")

Model numbers designate the maximum rated design power:

"NORMAL ":	200B	300B	400B	500B	
"HV ":	200BHV	300BHV	400BHV	500BHV	600BHV
I/P AMPS :	0-2.5A	0-3A	0-3.5A	0-4A	0-5A
O/P AMPS :	0-2.5A	0-3A	0-3.5A	0-4A	0-5A
Typ. Loss :	2-3W	2-3W	3-4W	3-5W	3-6W
Price US\$:	\$490	\$520	\$550	\$590	\$640

LCD DIGITAL METER MODULE OPTION: Add US\$190

**** Please specify length of ribbon cable required for meter. ****

SHIPPING: Please add US\$20 per unit for air-express delivery.

TERMS: Pre-payment only. Please allow 8-12 days delivery.