

# MM500 *VarioV* series

Power potentiostats with flexible output ranges for industrial use

## Models available

Volt Model	5 V	10 V	22V	45V	90V
510-V50	N/A	bipolar	bipolar	bipolar	0 V
540-V100	1/0 V(opt)	bipolar	N/A	N/A	bipolar
540-V200	1/0 V(opt)	1/0 V(opt)	N/A	N/A	N/A
560-V500	1/0 V(opt)	1/0 V(opt)	N/A	N/A	N/A

Materials Mates equipment is available in more than 30 countries worldwide through a network of qualified distributors. Ask us for a complete list of reference customers worldwide and talk to our engineers to find the perfect solution for your needs

### MATERIALS MATES ITALIA SRL

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### Features

- Wide power range from 50 to 500 W
- Wide voltage range to 90 V ( and above)
- 15 types available to customize an optimal solution
- Efficiently integrates DC and AC performances
- 1 to 4 quadrants operations
- Optional Impedance Spectroscopy 1mHz -20KHz range
- Optional microhmometer mode with high resolution and thermocouple effect compensation
- Synchronous operation on multichannel configuration
- Built to test electrochemical processes, Batteries, fuel cells and electrolysers at life-size conditions



Materials Mates Italia (MMI) offers complete solutions for electrochemistry , from impedance spectroscopy to high-power multichannel systems for stacks, including standard and customized cells. MMI also integrates in their systems a series of additional ancillary equipment to complete the test setup.

We furthermore supply flexible software drivers to manage the equipment from external programs.

Please feel free to contact us for a free evaluation of your system requirements.

For over 10 years the MMI 500 series potentiostats have been delivering to our customers reliable operations and consistent results with an unbeatable record of MTBF of more than 100 yrs calculated on real data.

The *VarioV* technology gives for the first time independent choice of power and voltage compliance paired with optimized performances and energy efficiency as needed in energy-related studies.

The monolithic construction outperforms the use of boosters without sacrificing the flexibility: single potentiostats can be connected in parallel or in series, or even work in synchronicity for sensitive multi-electrodes or segmented applications.

Optional 1mHz-20KHz EIS and high rate DC sampling in both sustained and burst mode make the choice simple, with no need for options. Conveniently housed in rack enclosures, they can be combined in multichannel systems with no effort.

Ethernet based communication let you run the system locally or by remote control.

The 500 *VarioV* will be your workhorse in the lab as well in the production plant for outstanding QC procedures on batteries, membranes or other products



## 5xx V family common features

<b>Generation</b>	
<b>Voltage control range (pstat mode)</b>	Vmin to Vmax-1 (@ full current output)
<b>Voltage compliance</b>	Vmin to Vmax
<b>Current output</b>	To specified current limits
<b>Voltage resolution</b>	10 uV to 10 V 100uV to 100 V 1 mV to 1000 V (0.1 uV With Opt.)
<b>Output modes</b>	Fully bipolar and 2 quadrant with zero volt up to 100W, 2 quadrant above
<b>Current resolution</b>	1A units to 1 pA/ 5A units to 1 nA / 20A units to 1uA /100A units to 1 mA
<b>Accuracy</b>	0.1 % +/- 0.1% f.s up to 20 A units 0.3 % +/- 0.1% f.s up to 100 A units
<b>Slew rate</b>	>1 V / $\mu$ S rise and fall (Hi speed set)
<b>Potentiostat Bandwidth</b>	Selectable 50 Khz- 1 Khz (Hi speed/Hi stab) on < 250 mV pk
<b>Protection</b>	Hardware Current limiter @ 1,2 Imax + thermal bi-stable cutoff
<b>Measurement</b>	
<b>Current measure</b>	8 ranges to 20A 2 ranges to 100A
<b>Current resolution</b>	1A units to 1 pA/ 20A units to 0.1nA /100A units to 1 mA
<b>Current Measuring accuracy</b>	0.1 % +/- 0.1% f.s up to 20 A units 0.3 % +/- 0.1% f.s up to 100 A units
<b>Voltage measure</b>	+/- 10 -100- 1000 V
<b>Voltage resolution</b>	10 uV to 10 V , 100uV to 100 V, 1 mV to 1000 V
<b>Voltage Measuring accuracy</b>	0.1 % +/- 0.1 % f.s. (RE1-RE2)
<b>Reference Electrodes</b>	
<b>Input impedance</b>	5 x 10 <sup>11</sup> up to +/- 48 V > 10 Mohm other ranges
<b>Biasing current (amp. Only)</b>	< 1 nA @ 25 °C up to +/-48 V
<b>Common mode range</b>	+/- full scale
<b>Common mode rejection</b>	> 60 dB over the full freq. range
<b>Meters and Interfaces</b>	
<b>A/D resolution</b>	22-16 bit
<b>Max sampling rate</b>	1000 sample/sec ( continuous) 800Ksamples/sec (Burst mode)
<b>Synch and triggering interfaces</b>	3-5 V TTL compatible inputs, 3.3 V outputs
<b>EIS module performance</b>	
<b>Measuring frequency range</b>	1mHz- 20 KHz
<b>Accuracy</b>	+/- 0.01% of the desired frequency
<b>Amplitude accuracy</b>	0.1 %
<b>Phase accuracy</b>	+/- 0.05 Deg. +/- 0.001 Deg. /Khz
<b>Operating modes</b>	Standard/fast/low noise/low freq. optimized
<b>Basic Accuracy in impedance</b>	0.1%
<b>Integration time control</b>	Time /n° of sinusoid / mixed (time or n° of sinusoids whatever is the greatest)
<b>General</b>	
<b>Communication Port</b>	Ethernet 10/100 J45

## 510-V50 general purpose potentiostat 50W output power

<b>Generation</b>	
<b>Voltage control range</b>	10 V / 22 V / 45 V / 90 V (modulus , configuration dependent)
<b>Voltage compliance</b>	11 V /23 V /47 V / 94 V
<b>Current output</b>	5 A / 2 A / 1 A / 0.5 A
<b>Voltage resolution</b>	10 uV to 10 V 100uV to 100 V
<b>Current scales</b>	8 scales (6 for the 5 A Unit)
<b>Current resolution</b>	1 pA ( 1 nA 10 V unit)
<b>Accuracy</b>	0.1 % +/- 0.1% f.s
<b>Slew rate</b>	>1 V / $\mu$ S rise and fall (Hi speed set)
<b>Potentiostat Bandwidth</b>	Selectable 50 Khz- 1 Khz (Hi speed/Hi stab) on < 250 mV pk
<b>Dimensions</b>	19" rack 1U 350 mm depth
<b>Weight</b>	4Kg approx
<b>Power supply</b>	100-250 Vac 85 W max

## 540-V100 general purpose potentiostat 100W output power

<b>Generation</b>	
<b>Voltage control range</b>	1V/ 5 V / 10 V / 90 V / (modulus , configuration dependent)
<b>Voltage compliance</b>	5 V /11 V / 94 V
<b>Current output</b>	20 A / 10 A / 1 A
<b>Voltage resolution</b>	10 uV to 10 V 100uV to 100 V ( 0.1 uV with Micrommeter option)
<b>Current scales</b>	3 scales (8 for the 1 A Unit) decade spaced
<b>Current resolution</b>	1nA ( 1 pA 90V unit)
<b>Accuracy</b>	0.1 % +/- 0.1% f.s
<b>Slew rate</b>	>1 V / $\mu$ S rise and fall (Hi speed set)
<b>Potentiostat Bandwidth</b>	Selectable 50 Khz- 1 Khz (Hi speed/Hi stab) on < 250 mV pk
<b>Dimensions</b>	19" rack 2U 450 mm depth
<b>Weight</b>	10Kg approx
<b>Power supply</b>	100-250 Vac 140 W max

## 540-V200 general purpose potentiostat 200W output power

<b>Generation</b>	
<b>Voltage control range</b>	5 V / 10 V (modulus , configuration dependent)
<b>Voltage compliance</b>	5 V /11 V
<b>Current output</b>	40 A / 20 A /
<b>Voltage resolution</b>	10 uV
<b>Current scales</b>	4 scales (2 for the 5 V Unit)
<b>Current resolution</b>	1uA
<b>Accuracy</b>	0.3 % +/- 0.1% f.s
<b>Slew rate</b>	>1 V / $\mu$ S rise and fall (Hi speed set)
<b>Potentiostat Bandwidth</b>	Selectable 50 Khz- 1 Khz (Hi speed/Hi stab) on < 250 mV pk
<b>Dimensions</b>	19" rack 2U 450 mm depth
<b>Weight</b>	12Kg approx
<b>Power supply</b>	100-250 Vac 250 W max

## 560-V500 general purpose potentiostat 500W output power

<b>Generation</b>	
<b>Voltage control range</b>	5 V / 10 V (modulus , configuration dependent)
<b>Voltage compliance</b>	5 V /11 V
<b>Current output</b>	100 A / 50 A /
<b>Voltage resolution</b>	10 uV
<b>Current scales</b>	2 scales
<b>Current resolution</b>	1mA
<b>Accuracy</b>	0.3 % +/- 0.1% f.s
<b>Slew rate</b>	>1 V / $\mu$ S rise and fall (Hi speed set)
<b>Potentiostat Bandwidth</b>	Selectable 50 Khz- 1 Khz (Hi speed/Hi stab) on < 250 mV pk
<b>Dimensions</b>	19" rack 3U 450 mm depth
<b>Weight</b>	15Kg approx
<b>Power supply</b>	100-250 Vac 140 W max