MM580-S

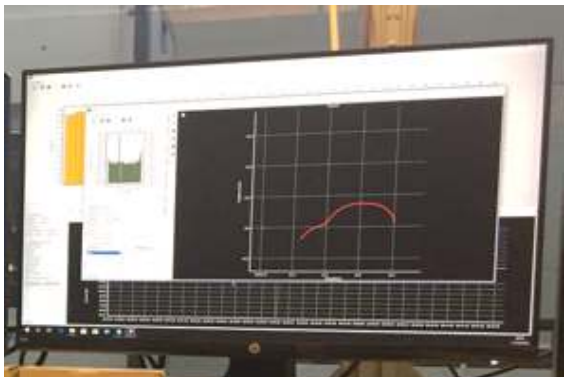
High power multichannel EIS systems

Features

- Modular and fully customizable design
- 150 V 1000 A standard limits (extensible)
- Efficiently integrates DC and AC units
- All-mode operations (Load, zero-volt load, full 4-quadrant potentiostat)
- Synchronous Impedance Spectroscopy up to 128 channels 1mHz -20KHz range
- Electrochemical processes, Batteries, fuel cells and electrolysers run at life-size conditions
- Convenient complete assembled systems on movable racks
- Unique features for in-vivo analysis

More than 10 years ago the MMI 580 system introduced the synchronous simultaneous analysis technique, changing the way EIS measurements were performed on complex systems
Several units worldwide have run for years on various kind of samples, giving leading-edge measurements to research labs in the most advanced fields.
The 580-S pushes the technique to the next level and opens new opportunities.
By increasing the hardware performances with a fully parallel structure, the 580-S is now able to follow with precise EIS measurements transients and time-evolving processes.
A new amplifier section with higher power , broader frequency range and a list of options to optimize performances and flexibility complete the offer
The MM580-S is the only system that connects external power devices, active and passive, in the measuring chain with no influence in the impedance accuracy, making it ideal for in-vivo measurements

Materials Mates Italia (MMI) offers complete high-power solutions, from impedance spectroscopy to 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.



MaterialsM Instruments

581/S. Driving Potentiostat with FRA/transient recorder unit

The 581/S merges the driving potentiostat unit with the new FRA/fast transient module capable of 1 mHz to 20 KHz frequency range to obtain the highest performance in impedance spectroscopy and fast signals analysis.
The DC signal has kept the original core with a high resolution acquisition system at 24-bit extended to 1 Ksamples/sec speed.
The modified lock-in algorithm implemented in the FRA logic exhibits high noise rejection, ultrafast impedance measure for time-resolved EIS and a flexible panel of integration options to perform in noisy environments.
Arbitrary waveform/transient recorder functions up to 1 Msamples/S is managed on a 10 Ksamples buffer.
Powerful data analysis firmware /software let the user implement advanced functions like signal extraction, boxcar integration, time domain parametric measure
The 581/S can come in two versions: 1U 19" rackmount or 3U , 7 or 10 TE module ready to be used in multichannel systems with or without dedicated low power stages.

582-2 FRA/transient recorder 2 channels additional module

This expansion module (must be used in junction with one 581 unit) add two high performance, high common mode voltage range additional channels and can be paralleled to surpass the 50 analysed channels in both frequency response or transient mode.
An external active junction box is provided, with four meter of cable, for the utmost flexibility and signal integrity
The 582/2 comes in two versions: 1U 19" rackmount for two units (four channels) or 3U 7TE module ready to be used in multichannel systems up to 24channels/rack 3U

585/S
The 585 is the new high power unit driven by the 581 module, with parallel operation capabilities and several output options.
The unit can run with air cooling only at reduced capability , or to full specs connecting the liquid cooling hoses, and exhibits high speed and dynamic capabilities.
Four are the output options available and three voltage ranges :

Load	energy absorbing only, one quadrant, minimum output voltage to full specs 2 Volts
Zero Volt load	energy absorbing only, one quadrant, minimum device voltage allowed 0 Volts
Potentiostat	full 4-quadrant output

Asymmetric Potentiostat 2-quadrant (positive/negative current) with zero volt capability

The voltages and currents are tailored to the customers' needs with the limitation of 150 V and 250 A per unit
Note : all outputs currents limited within the power capability; a maximum of 4 units /1000 A maximum can be paralleled
Request a feasibility study and a quote outside these limits

589 series ancillary components

The MaterialsM 580 series can be supplied as a full system, complete with rack trolley, industrial PC, dual screen, power management with panic button and interlock to include in the lab' s safety system.
The 589 option makes it a standalone workstation with your choice of connection cabling, environmental chambers or safety enclosure to cover your test needs.

581/S. Driving Potentiostat with FRA/transient recorder unit

Generation	
Output stage range (|Vmax|)	Depending from the final unit installed , +/- 200 V max
Maximal power (absorbed or generated)	3 KW (water cooling)1500 W (air) for each power unit connected
Voltage control range (pstat mode)	Vmin to Vmax-1 (@ full current output)
Voltage compliance	Vmin to Vmax
Current output	To 1000 A depending on the configuration
Voltage resolution	1 mV
Current resolution	1 mA (up to 4 units in parallel)
Accuracy	2. % +/- 0.1 % f.s.
Slew rate	>0.1 V /µS rise and fall (Hi speed set)
Potentiostat Bandwidth	Selectable 50 Khz- 1 Khz (Hi speed/Hi stab) on < 250 mV pk
Protection	Hardware Current limiter @ 1,2 Imax + thermal bi-stable cutoff
Measurement	
Current measure	To 1000 A depending on the configuration
Current resolution	1 mA (up to 4 units in parallel)
Current Measuring accuracy	0.2 % +/- 0.1 % f.s.
Voltage measure	+/-100 V
Voltage resolution	1 mV (RE1-RE2) / 1mV (WE-GND)
Voltage Measuring accuracy	0.2 % +/- 0.1 % f.s. (RE1-RE2)
Reference Electrodes	
Input impedance	> 10 Mohm
Biasing current (amp. Only)	< 1 nA @ 25 °C
Common mode range	+/- 120 V
Common mode rejection	> 60 dB over the full freq. range
Meters and Interfaces	
A/D resolution	22-16 bit
Max sampling rate	1000 sample/sec (ontinuous dependend from number of channels)
Communication interface	Ethernet 10/100
EIS module performance	
Measuring frequency range	1mHz- 20 KHz
Accuracy	+/- 0.05% of the desired frequency
Amplitude accuracy	0.1 %
Phase accuracy	+/- 0.05 Deg. +/- 0.001 Deg. /Khz
Operating modes	Standard/fast/low noise/low freq. optimized
Basic Accuracy in impedance	0.1%
Integration time control	Time /n° of sinusoid / mixed (time or n° of sinusoids whatever is the greatest
General	
Communication Port	Ethernet 10/100 connections
Power consumption	15 W max
Power supply	100-250 Vac 50-60 Hz or DC rali (options dependent)
Size & weight	7 TE 3 U plug-in 1,2 Kg approx weight or 19" 1U depth 360 mm 2 Kg

582-S4 FRA/transient recorder 2 additional input channels unit

Input connections	
Input impedance	> 300 Kohm
Biasing current (amp. Only)	< 10nA @ 25 °C
Common mode range	+/- 200 V (on the same board 1KV across boards)
Common mode rejection	> 60 dB over the full freq. range
Voltage full scale	+/-10V to +/- 300 mv in 4 ranges
EIS performance	
Measuring frequency range	1mHz- 20 KHz
Accuracy	+/- 0.05% of the desired frequency
Amplitude accuracy	0.1 %
Phase accuracy	+/- 0.05 Deg. +/- 0.001 Deg. /Khz
Integration time control	Time /n° of sinusoid / mixed (time or n° of sinusoids whatever is the greatest

585-S XXX 3KW UNIT
(one unit, in junction with 581-S driving potentiostat)

Generation	
Output stage range (|Vmax|)	Depending from the final unit installed , +/- 200 V max
Maximal power (absorbed or generated)	3 KW (water cooling)1500 W (air cooling)
Voltage control range (pstat mode)	Vmin to Vmax-1 (@ full current output)
Voltage compliance	Vmin to Vmax
Current output	To 250 A max for each unit
Voltage resolution	1 mV
Current resolution	1 mA (up to 4 units in parallel)
Accuracy	2. % +/- 0.1 % f.s.
Slew rate	>0.1 V /µS rise and fall (Hi speed set)
Protection	Hardware Current limiter @ 1,2 Imax + thermal bi-stable cutoff
Measurement	
Current measure	+/- 30 A
Current resolution	1 mA (up to 4 units in parallel)
Current Measuring accuracy	0.2 % +/- 0.1 % f.s.
Voltage measure	+/-100 V
Voltage resolution	1 mV (RE1-RE2) / 1mV (WE-GND)
Voltage Measuring accuracy	0.2 % +/- 0.1 % f.s. (RE1-RE2)
Reference Electrodes	
Input impedance	> 10 Mohm
Biasing current (amp. Only)	< 1 nA @ 25 °C
Common mode range	+/- 120 V
Common mode rejection	> 60 dB over the full freq. range
Meters and Interfaces	
A/D resolution	22-16 bit
Max sampling rate	100 sample/sec
Communication interface	USB 1.1 / RS-485 full-duplex
Frequency response (EIS module)	
Measuring frequency range	DC- 20 KHz
Potentiostat Bandwidth	Selectable 50 Khz- 1 Khz (Hi speed/Hi stab) on < 250 mV pk
Input/output FRA signals	Mod. In Vout Iout (outputs dc-nulled)
Other features	
Water consumption	Up to 15 lt/min @15 °C cooling water for full power
Digital I/O	1 safety chain IN/OUT, 1 door open IN , 2 aux relays OUT
User interface	20 char-1Line LCD display +3 led lights , 4-keys i/f
Software packs	log data acquisition package
Drivers	DLL drivers on request
Dimensions & Sizes	
Voltage mains	100 / 250 Vac 50-60 Hz no selection
Power consumption	3200 W max
Dimensions	19” x 3 U rackmount x 450 mm - 18 Kg max 585 each power unit
General	
Communication Port	Ethernet 10/100 connections
Power consumption	15 W max
Power supply	DC rails from the rack frame (3U 360 mm depth)
Size & weight	7 TE 3 U plug-in 0.8 Kg. approx