 REMO-HSE	MMR Series 300W to 750W with PFC Input	Datasheet
	Regulated High Voltage Modules	



Description:

- Regulated high voltage modules designed for OEM applications
- Different maximum voltage ratings up to 120 kV with positive or negative polarity
- 300W to 750W maximum output power
- The output voltage is adjustable between 0% and 100% of the rated output

Features:

- Up to 400W wide range input
- Soft start
- Automatic crossover from constant-voltage to constant-current regulation and vice versa
- Spark sensing and monitoring
- High voltage output 100 % short-circuit proof to ground
- Modules of the same ratings can be parallelized to increase the power range for bigger loads.
- LEDs signal the status of output voltage, load and temperature
- Potential-free relay contacts for status messages
- Adjustable current-voltage characteristic

- MMR-P type: Potentiometers to adjust voltage and current. Three high voltage values can permanently be preset and selected via a sliding switch
- MMR-S type: PLC control and monitoring via analogue interface. Signals are scaled 0 to 10V equals 0 to 100% of full scale
- MMR-SP type: Potentiometer adjustment and PLC control/monitoring selectable via a sliding switch

Options:


- Under-voltage monitoring
- Second high voltage output: E.g., for use in electrostatic filters various modules are available with a second voltage output for the collector.

Typical Applications:

- Electrostatic Filters
- Electrostatic charging and discharging
- Capacitor Charging Systems
- Ion getter pumps
- Etc.

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Technical Specifications

Input and Output (Standard rated output values see model selection table)																			
Input:	P = 115V AC to 230 VAC (-10 %, +10%) with PFC and P2 = 230V AC (-10 %, +10%) with PFC 50 to 60 Hz Maximum power consumption: <table border="1" style="margin-left: 20px; margin-top: 10px;"> <thead> <tr> <th></th> <th>300W</th> <th>400W</th> <th>500W</th> <th>600W</th> <th>750W</th> </tr> </thead> <tbody> <tr> <td>P</td> <td>4.6A</td> <td>5.5A</td> <td>--</td> <td>--</td> <td>--</td> </tr> <tr> <td>P2</td> <td>--</td> <td>--</td> <td>4.0A</td> <td>4.4A</td> <td>5A</td> </tr> </tbody> </table>		300W	400W	500W	600W	750W	P	4.6A	5.5A	--	--	--	P2	--	--	4.0A	4.4A	5A
	300W	400W	500W	600W	750W														
P	4.6A	5.5A	--	--	--														
P2	--	--	4.0A	4.4A	5A														
Output:	Continuous adjustment from 0% to 100% of the rated voltage or current by potentiometer and/or external 0 to 10V signals. Automatic crossover from constant-voltage to constant-current regulation. Accuracy better than 2% of the rated voltage. Available with either positive or negative polarity with respect to chassis ground.																		
Efficiency:	Typically, 88% (230 VAC) or 85% (115 VAC) at rated values. The power factor is better than 98% at full load.																		

Special Features	
Soft Start:	At startup, recovery from sparks or short circuit the modules provide controlled ramp up to prevent dangerous voltage overshooting. At full load the output voltage will rise within approximately 150 ms to the rated voltage (other ramp-up times available on request).
Pre-set output values (MMR-P type)	The high voltage output (U1) can permanently be pre-set by three independent potentiometers and are selectable via a sliding switch.
Adjustable Output Characteristic:	The current-voltage characteristic can be adjusted via potentiometer such that the output voltage decreases with increasing current.
Spark Sensing:	Internal circuitry senses sparks caused by external discharges. In case of a spark the module will turn off for approximately one second and will then ramp up automatically.
Spark Monitoring:	In case of eight (other possible factory settings 10, 20 or 40) sparks per minute a relay is set.

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Environmental Data	
Operating Temperature Range:	0 to +40°C
Storage Temperature Range:	-25 to +70°C
Humidity:	80% maximum relative humidity up to +31°C, reducing linearly to 50% at +45°C Non condensing (ref. EN61010-1)
Altitude:	0 to 2000m

Status Messages	
Yellow/Green LED:	Yellow indicates that the high voltage module is turned on and green indicates the status 'Ready': The actual output voltage is at least as high as 90% of the nominal value
Yellow LED:	Signals, that the actual output current amounts to minimum 90% of the nominal current for approximately five minutes and/or that a spark frequency of eight (further factory settings 10/20/40) sparks per minute was detected
Red LED:	Signals that the allowed operating temperature was exceeded
Potential Free Relay Contact Ready (250V AC, max. 1A):	The actual output voltage is at least as high as 90% of the nominal value (green LED lights up)
Potential Free Relay Contact Load Monitoring (250V AC, max. 1A): (e.g. Filter cleaning)	Monitors the crossover from constant voltage to constant current regulation at 90% of the maximal nominal current (other factory settings possible) and/or the spark frequency of eight (further factory settings 10/20/40) sparks per minute (yellow LED lights up)

Protection
❖ Over-voltage and over-current limitation
❖ Over-voltage, over-current and over-temperature shutdown
❖ High voltage output 100 % short-circuit-proof to ground
❖ In case of a spark the module will turn off for approximately one second and will then ramp up automatically. In case of eight (other possible factory settings 10, 20 or 40) sparks per minute a relay is set.

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Additional Information	
Recovery Time:	Approximately 15 seconds following a disconnection of mains supply
Power Factor:	Better than 98% at full load
EMC:	This high voltage module is intended for installation as part of a system. Basic EMC filtering is provided.

Mechanical Data	
Housing:	Aluminum case
Dimensions(approx):	Up to 60kV output voltage: 130 mm wide, 120 mm high (without fixing points), 300 mm deep Up to 120kV output voltage: 130 mm wide, 150 mm high (without fixing points), 300 mm deep
Weight:	Approx. 3.4 to 6.5kg (depending on output voltage)
Classification:	IP 20
Ventilation:	Internal fan

Options	
❖	Some modules are also available with a second high voltage output (fixed ratio as compared to first high voltage output e.g. 50% or 75%)
❖	Under-voltage monitoring of the high voltage output: If the output voltage drops below 20% (other factory setting possible) of the maximum output voltage in constant-current operation (overload) the module will turn off for approximately one second and will then ramp up automatically.
❖	In case of eight (other possible factory settings 10, 20 or 40) sparks per minute not only a relay is set but also the module turns off

MMR-P Type: Potentiometer Adjustments	
❖	Continuous adjustment of voltage and current via potentiometer
❖	The high voltage output (U1) can permanently be pre-set by three independent potentiometers and are selectable via a sliding switch.
❖	In case of over-voltage, over-current or over-temperature the module shuts down and must be disconnected from mains supply before resetting.

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MMR-S Type: PLC Controls and Monitors via Analogue Interface

- ❖ High voltage On/Off switch via analogue interface
High Voltage On / Off: 10 to 30 V active high
- ❖ Continuous adjustment of voltage and current via analogue interface
Voltage Demand: 0 to 10 V DC demands 0 to rated output voltage
Current Demand: 0 to 10 VDC demands 0 to rated output current
- ❖ Continuous monitoring of voltage and current via analogue interface (output current: max. 1mA)
Actual Voltage: 0 to 10VDC for 0 to rated voltage
Actual Current: 0 to 10 VDC for 0 to rated current
Characteristic Adjustment: 0 to 10 VDC for 0 to rated voltage;
displays the modified nominal voltage due to the adjustment of the current- voltage characteristic via the corresponding potentiometer
- ❖ Status Messages: Ready (green LED), Load (yellow LED) and Temp. (red LED)
Sparks / Flashovers A "high signal" is output for the duration of the module's timeout (typically one second).
Ready In analogy to the green-yellow 'Ready' LED, a "high signal" is output.
Load In analogy to the yellow 'Load' LED, a "high signal" is output
Temp. In analogy to the red LED 'Temp.', a "high signal" is output
- ❖ If the module shuts down due to over-voltage or over-current the high voltage must be switched off before resetting (the module must not be disconnected from mains supply).

MMR-SP Type: Potentiometers and Analogue Interface

- ❖ Control and monitor functions of the MMR-P type and MMR-S (see above) combined into one module
- ❖ With a sliding switch one can switch over from potentiometer adjustments to PLC control/monitoring and vice versa.
- ❖ The actual nominal values set by potentiometer are output via the analogue interface.
- ❖ On/Off control via the analogue interface, only.

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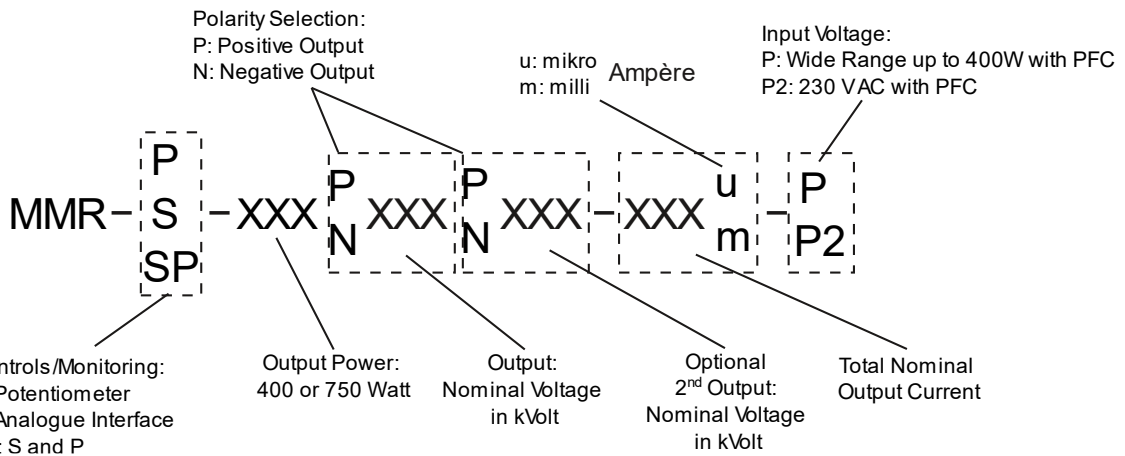
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Model Key



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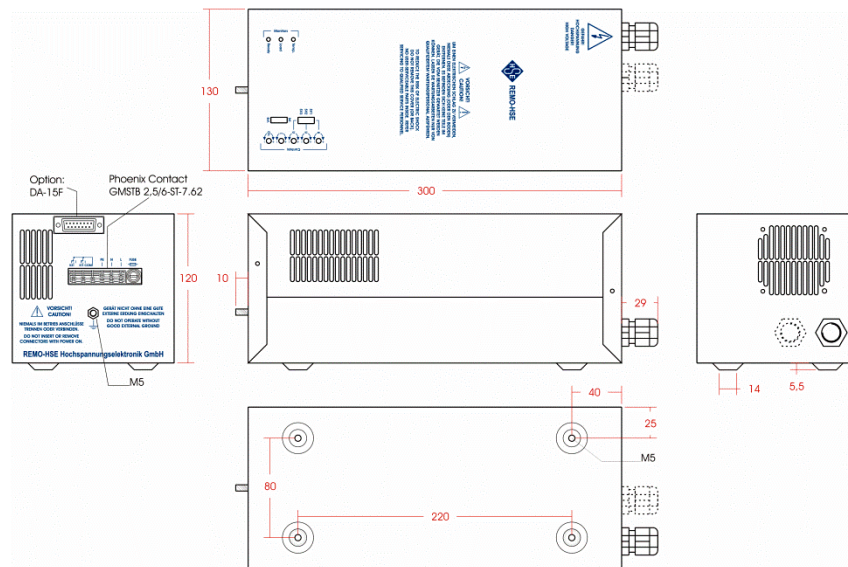
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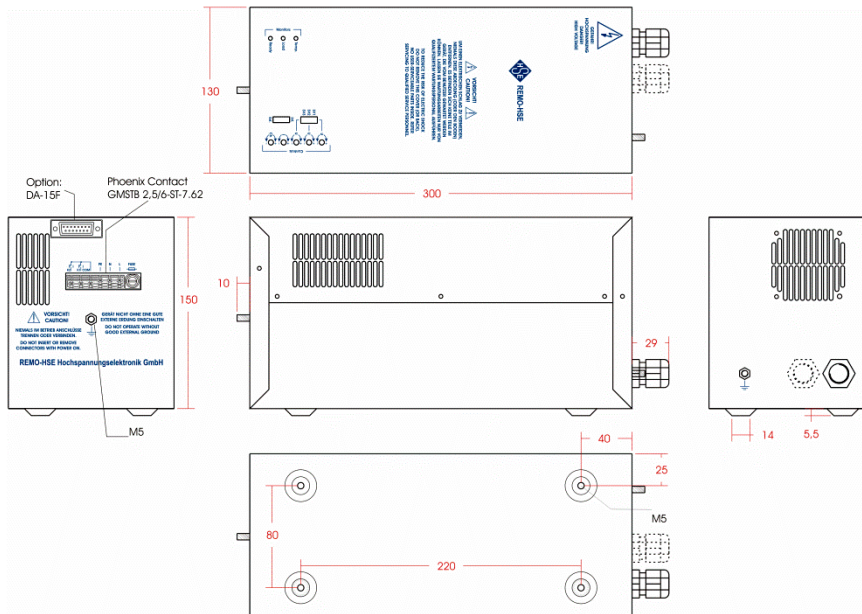
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Mechanical Drawings:



Output Voltage up to 60kV: Dimensions: +/- 0,5mm



Output Voltage above 60kV up to 120kV: Dimensions: +/- 0,5mm