

# SOLID STATE GENERATOR SUB-SYSTEM

## 200 W AT 2450 MHz

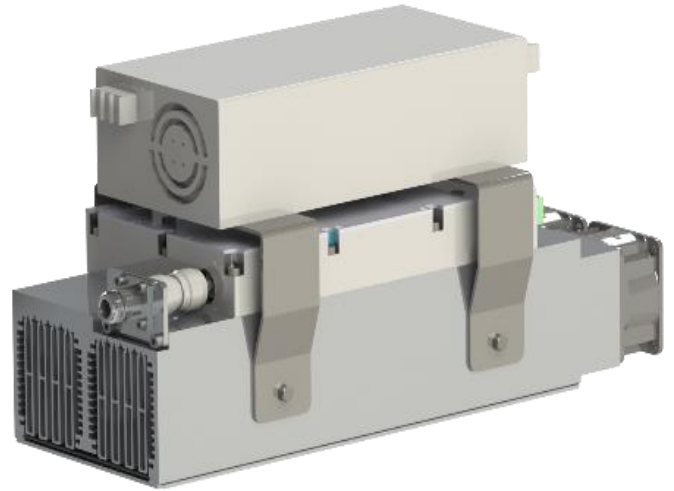
SAIREM's KMS200 AIR is a **high-power solid-state generator sub-system**, to be integrated into **your system**. Its power is adjustable from **0 to 200 W** at frequencies ranging between **2400 and 2500 MHz**.

### Pinpoint Power and Frequency control:

- Flexibility for your process
- Possibility to use a compact plasma source

This generator is designed **for scientific and industrial applications**, to be used with one or multiple MW applicators, to ensure high reliability and small footprint. A built-in isolator measures reflected power and protect against high reflected power.

You can use the Modbus RS232 interface to control the generator using LabVIEW® or use the CANopen interface to control the generator with an industrial PLC.



## MAIN APPLICATIONS

### PLASMA APPLICATIONS

Plasma generation with compact plasma sources:

- **S-Wave** for atmospheric and low-pressure plasmas for radical creation, debacterization, ALD, medicine (treatment of chronic wounds), decapsulation (semi-conductor process), elementary analysis, etc...
- **Aura-Wave** and **Hi-Wave** for low pressure plasmas for large surface treatment

### MEDICAL APPLICATIONS

- Tumor ablation by microwave heating

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### KEY BENEFITS

#### DESIGN

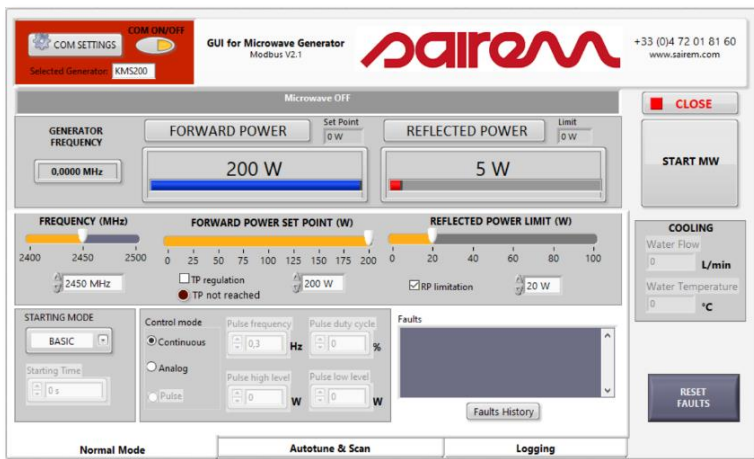
- Compact, **ready to integrate design**
- Microwave energy **transmitted by coaxial cable**
- **Power adjustable** by 1 W steps (or increments)
- **Frequency adjustable** by 100 kHz step to optimize power transfer

#### TECHNOLOGY

- **Semiconductor technology:** no magnetron and therefore longer lifetime and no high voltage
- **Excellent frequency spectrum** even at low power
- **Built-in internal protection** against mismatching and reflected power in any phase
- **Built-in isolator** with automatic power reduction or switch off in case of high reflected power
- **True RMS detector** with linear measurement of reflected and forward power
- Very low ripple < 0,2 % RMS
- Manual or **automatic microwave frequency adjustment**
- **SAIREM Auto-tune algorithm<sup>1</sup>** (automatic load-tuning): controls the frequency automatically in order to minimize reflected power



#### CONTROLS



- **LabVIEW™** software provided (no license required) for all operating parameters and control status
- Alarm information, forward power and reflected power readings

<sup>1</sup> Patent WO/2012/146870

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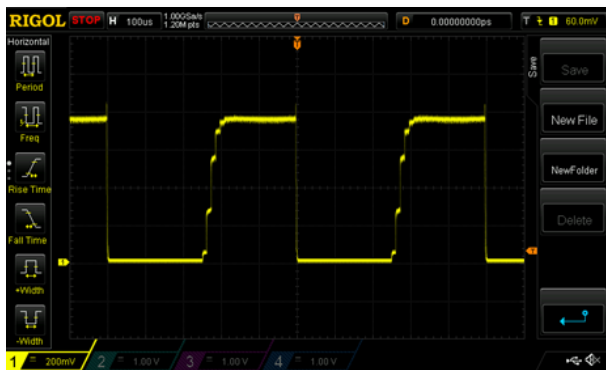
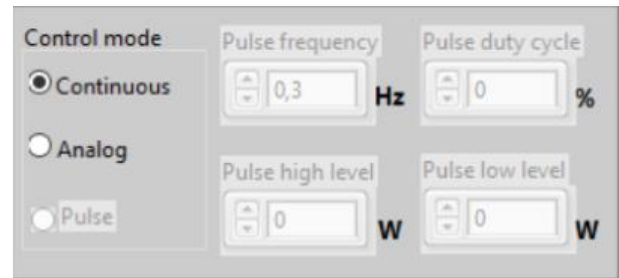
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### INTERNAL PULSE Version (KMS200 IP)

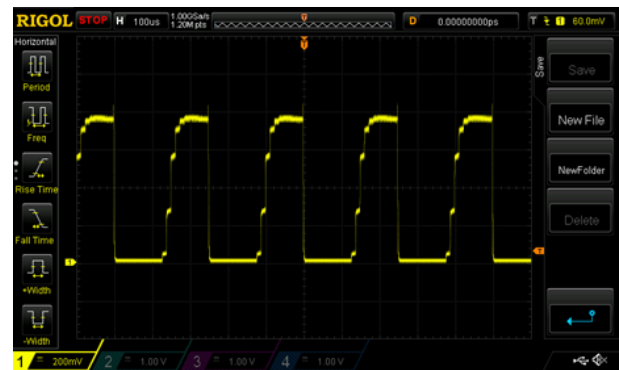
The internal pulse mode integrated with the IP generator can be set up via **LabVIEW™** software or by remote control (Modbus RS2332 or CANopen).

All operating pulse parameters are displayed on the software screen as follows:

- Pulse high level and pulse low level
- Pulse duty cycle and pulse frequency



Corresponding microwave output measurement at 200W and 2kHz



Corresponding microwave output measurement at 200W and 4kHz

### MAIN PULSE PARAMETERS

- Frequency: from 0.2 to 5000 Hz
- Duty cycle range:
  - 1 - 99% (0.2 Hz to 100 Hz)
  - 10% - 99% (101 to 1000 Hz)
  - 50% - 99% (1001 to 5000 Hz)
- Rise and fall time: < 50 µs
- Minimum pulse duration: 100 µs



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### KEY SPECIFICATIONS

Reference	KMS200 AIR / IP
Output power	<ul style="list-style-type: none"><li>0 to 200 W (adjustable with 1 W steps<sup>2</sup>) +/- 2 %</li></ul>
Frequency range	<ul style="list-style-type: none"><li>2450 MHz <math>\pm</math> 50 MHz</li></ul>
Frequency resolution	<ul style="list-style-type: none"><li>100 kHz</li></ul>
Forward and Reflected power measurement	<ul style="list-style-type: none"><li>Coupler with true RMS detector – linear measurement allowing accurate read out (value is directly in Watts).</li></ul>
Pulse capability (optional)	<ul style="list-style-type: none"><li>Refer to KMS200WIP version. Integrated square pulse generator (up to 5 kHz at 50% duty cycle) – adjustable duty cycle, frequency or Ton Toff mode.</li></ul>
Ripple (RMS)	<ul style="list-style-type: none"><li>&lt; 0.2 % RMS</li></ul>
Reflected power	<ul style="list-style-type: none"><li>Threshold adjustable from 1 W to 100 W – automatic power reduction and stop mode available</li></ul>
Protection functions	<ul style="list-style-type: none"><li>VSWR (built-in isolator with automatic power reduction), excess temperature (overheating interlock)</li></ul>
Remote control	<ul style="list-style-type: none"><li>Modbus RS232 or CANopen</li><li>ON/OFF control / output power set point with 1W steps</li><li>Frequency set point: 100 kHz step (e.g. 2449.9 MHz)</li><li>Forward and reflected power reading in Watt</li><li>Autotune and scan SAIREM algorithms to minimize reflected power by adjusting the frequency. Safety Interlock (hardware &amp; software)</li></ul>
Microwave output	<ul style="list-style-type: none"><li>Coaxial cable female N plug, 50 ohms</li><li>Output equipped with a replaceable connector</li></ul>
Supply voltage	<ul style="list-style-type: none"><li>110 VAC / 5 A - 240 VAC / 2.5 A (50 Hz – 60 Hz) PFC included</li><li>24V DC – 1 A for cooling fan. Small power supply is supplied in the sub-system (in case 24V DC is not available in customer's system)</li></ul>
Cooling	<ul style="list-style-type: none"><li>Air cooling by fans, ambient 18 to 35°C</li></ul>
Mean time between failure	<ul style="list-style-type: none"><li>100 000 hours for the solid state module</li></ul>
Dimensions	<ul style="list-style-type: none"><li>Aluminium case - 381 <math>\times</math> 145 <math>\times</math> 182 mm (H x W x D)</li></ul>
Weight	<ul style="list-style-type: none"><li>7.5 kg</li></ul>
Safety Regulations	<ul style="list-style-type: none"><li>Must be certified by customer as part of the complete system</li></ul>

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### MAIN DIMENSIONS

