



13.56 MHz or 27.12 MHz
100 kW 50 Ω RF quartz driven GENERATOR
Ref 13.56 MHz GRP1000 KE & Ref 27.12 MHz GHP 1000 KE

The GRP/GHP family RF generators are 50 Ohms triode RF amplifiers, driven by a semi-conductors quartz-driven source, full water cooling.

They operate in the ISM band (Industrial, Science & Medical), at 13.56 MHz or 27.12 MHz. Their RF output power is 100 kW within 50 Ω matched load.

Their power stability and spectrum quality make them adequate to supply applicators with high overvoltage coefficients (Q), for a wide range of applications such as plasma at atmospheric pressure, or thermal treatment by dielectric losses for research or industry, i.e. drying.

Electric field (RF voltage) on applicator can be regulated.



The GRP / GHP generator is composed of:

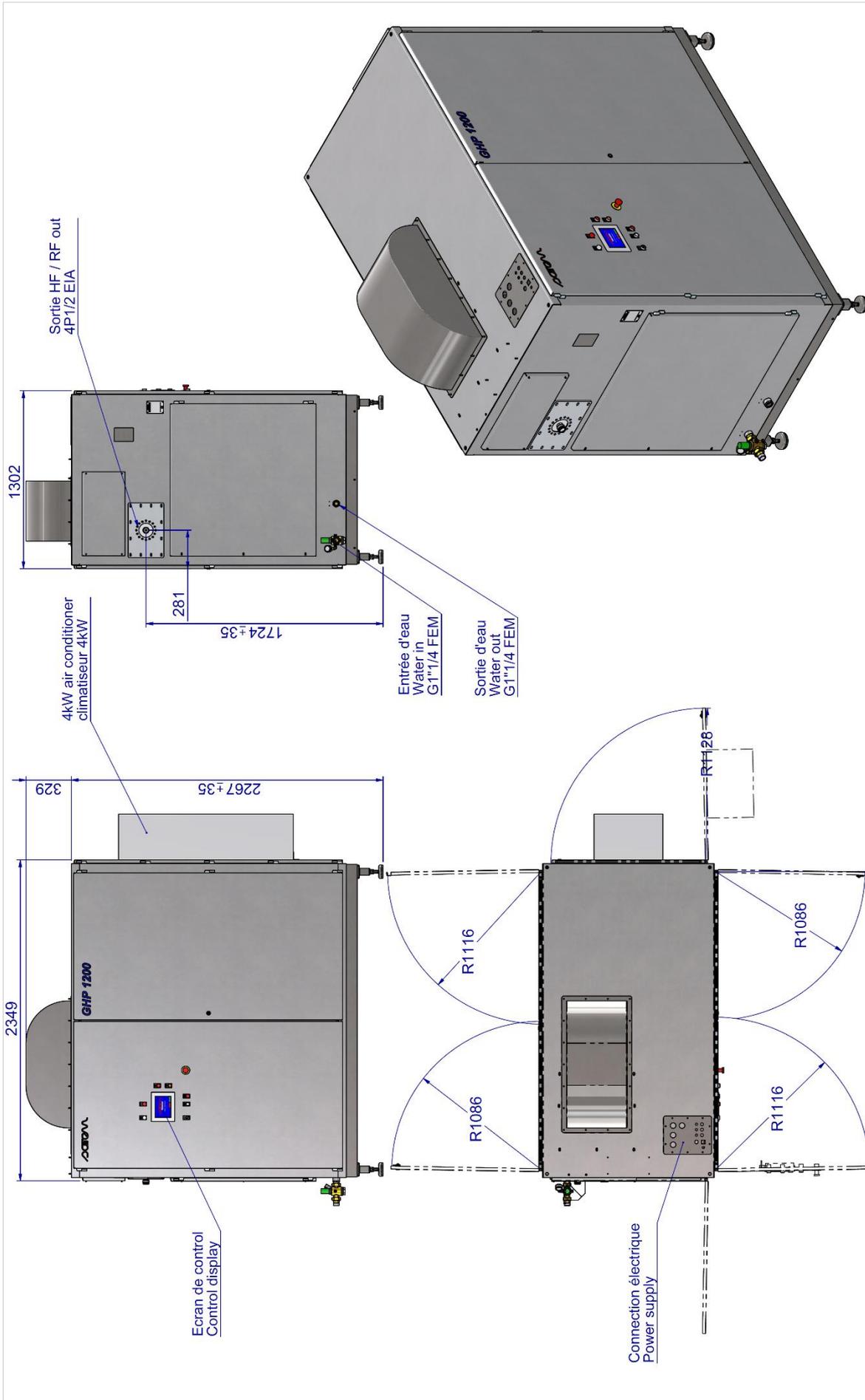
- **Low power (10 kW) driver:** solid state driver (SSD), to drive final stage consisting of a 50 Ω triode generator.
- **High power (final) stage:** the high level power amplifier consisting of a triode associated to an oscillating circuit coil/capacitor which uses a grounded grid montage. Input and output impedance are 50 Ω .

The generator is equipped with a dual directional coupler allowing a linear measuring of forward and reflected output power.

Options available with the generator:

- *SAIREM automatic matching box with 2 vacuum capacitors and a tune/load discriminator; RF parameters depending on the applicator's impedance, controlled via generator HMI;*
- *Closed water cooling circuit model HYFRA-PEDIA designed to meet requirements of site ambient temperature, water hose length etc. For cooling water parameters see below.*

REF.	13.56 MHz GRP 1000 KE / 27.12 MHz GHP 1000 KE
Presentation	Stainless steel cabinet, all components included, HV supply (soft start HV transformer, HV rectifier & filter), grid supply, filament heating regulated supply air/water cooled, and electronic board without any adjustment (easily replaceable). Low level driver is a complete 10 kW generator 50 Ω.
Frequency	13.56 MHz or 27.12 MHz, quartz stability typically 10 ⁻⁶ .
Output RF impedance	50 Ω on 4" 1/8 coaxial line.
RF power FP (forward power) RP (reflected power)	100 kW on 50 Ω dummy load, adjustable from 0 to 100 % (100 W step), power stability 0.5 %, linear FP & RP measure, ripple 2 % RMS maximum at full power, rise & fall time < 3 ms.
Control generator, HMI (human machine interface)	By digital touch control screen, 7.5", 65000 colours, Ethernet & USB user ports, links with internal electronics components i.e. driver & control unit board by Canopen, safety interlock contact input, local or remote control key.
Main functions	Displayed FP & RP, FP set point, RF voltage value on the electrodes of the applicator, matching box: capacitors position set point and reading, manual or automatic matching mode, faults history, triode current & voltage values display, SSD parameters.
RP (reflected power) function	Two possibilities to control/react to reflected power: <ul style="list-style-type: none"> • By forward power (FP) reduction when the reflected power reaches max. set value; max set value adjustable between 0.1 kW and 8 kW. • By HF stop when the reflected power reaches a higher level threshold.
Control circuit functions	For both triodes: RP, anodic overcurrent, grid overcurrent, low grid voltage, regulated filament voltage, cooling water flow & temperature, air temperature, high reflected power to driver or pilot.
Cooling by water/air	<ul style="list-style-type: none"> • With closed loop water chiller, 70 kW to be removed, min. flow 75 L/min. Typical input pressure 4 bar, inlet water temperature 18°C to 22°C. • 30 μS/cm > water conductivity > 150 μS/cm - 7 < pH < 9 - TH < 6. • Air/water heat exchangers built-in the cabinet, air tight cabinet (dust-proof). • A/C system prevents condensation inside the cabinet even when RH is elevated. • Ambient temperature: from 5 °C to 45 °C & RH up to 85 %.
RF output connector	EIA 4" 1/8, horizontal axis - see drawings.
Triode Efficiency	~ 67 % at full RF power with 50 Ω load, with above specified parameters for cooling water.
Mains / consumption	400 V, 3 phases + earth, 50/60 Hz. Consumption: 175 kVA at full power. (Other voltage on demand)
Size, weight	See drawing, 2340 kg.
Designed to comply with norms (CE marking)	Safety EN 61010-10; EMC EN 61000-6-4 and EN 61000-6-2.



		sairem		12. Porte du GRAND LYON 01707 NEYRON Cedex - FRANCE Tél: 04 72 01 81 60 Fax: 04 72 01 81 79 www.sairem.com	
		GHP 80 kW to 120 kW 13.56 MHz / 27.12 MHz / 40.68 MHz		TITRE:	
		FORMAT: A3		ECHELLE: 1:25	
		DESSIN NO.		WEIGHT	
		3395-500A		1650	
A	07/08/15	ML	DESSINE	EMISSION ORIGINALE	
INDEXE	DATE	DESSINE	VERIFIE	APPROUVE	MODIFICATION DU DESSIN