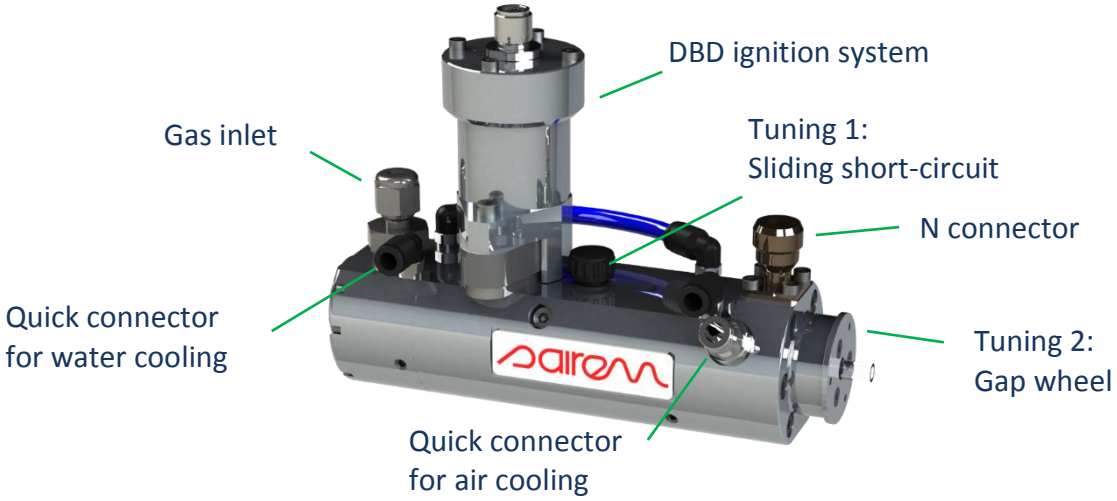
S-WAVE

S-Wave (named after **Surface Wave plasma source**) is a compact plasma torch designed for industrial and laboratory applications that operates in the range of a few 10^{-2} mbar to atmospheric pressure. The plasma is created in a dielectric tube placed inside the source. The microwave electric field propagates longitudinally at the dielectric/plasma interface (plasma behaves as an electrical conductor). Radially the wave is strongly attenuated at skin depth. This principle allows to create and maintain plasma columns with lengths which depend on the operating pressure, microwave power and gas nature. The S-Wave can be efficiently applied to the production of reactive/excited species using dielectric tubes with diameters of 6 or 8 mm.

The S-Wave plasma source is inductively coupled, thus only two tuning adjustments are provided to match the impedance. Generally, nearly 0 % of reflected power is achieved using the integrated tuners. In addition, for given operator-set discharge conditions, the plasma is fully reproducible without any need for retuning at start-up. Quick connectors are integrated for water cooling and for gas connection. An optional **ignition system based on Dielectric Barrier Discharge** could be mounted in order to breakdown easily even at atmospheric pressure.



When used for measurements and analysis, we recommend using Sairem's low ripple solid state microwave generator GMS 200 W or GMS 450 W in order to avoid spurious spectral lines resulting from the perturbations induced by 50/60 Hz mains electricity.

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TECHNICAL SPECIFICATIONS

REF	S-WAVE 6, S-WAVE 8.
Frequency	2450 MHz ± 50 MHz.
Microwave power	Max. 450 W.
Working pressure range	A few 10^{-2} mbar to atmospheric pressure.
Discharge gas	Argon or argon-based gas mixture at atmospheric pressure. **Pure argon for ignition at atm pressure**. All gases at reduced pressure.
Gas flow	At atm pressure: 1 to 30 l/min. Min 5 l/min is recommended to ignite.
Discharge tube external diameter	6 or 8 mm. MUST be specified when ordering. **2 quartz tubes of different lengths are provided.**
Microwave connection	Via coaxial cable, N-type (female).
Cooling connections	Water, quick connectors for 6 mm OD hose. Air, quick connectors for 6 mm OD tubing.
Gas connection	Swagelok 6 mm connector.
Ignition system	On demand – Argon flow should be high enough to allow ignition.
Weight	Approx. 500 g.

OBSERVATIONS

- At atmospheric pressure, air cooling of the tube is strongly recommended to dissipate the heat.
- To move easily the sliding short circuit towards the nozzle, push the runner button and then move. To move towards the gas feeding pull the runner button and then move.
- To reduce the level of external microwave leakage, a small Faraday cage can be attached to the S-Wave via the two M6 bolts situated on the S-Wave's body. The cage should be long enough to enclose not only the plasma column but also the dielectric tube in its full length.

IGNITION AT ATM PRESSURE, RECOMMENDATIONS

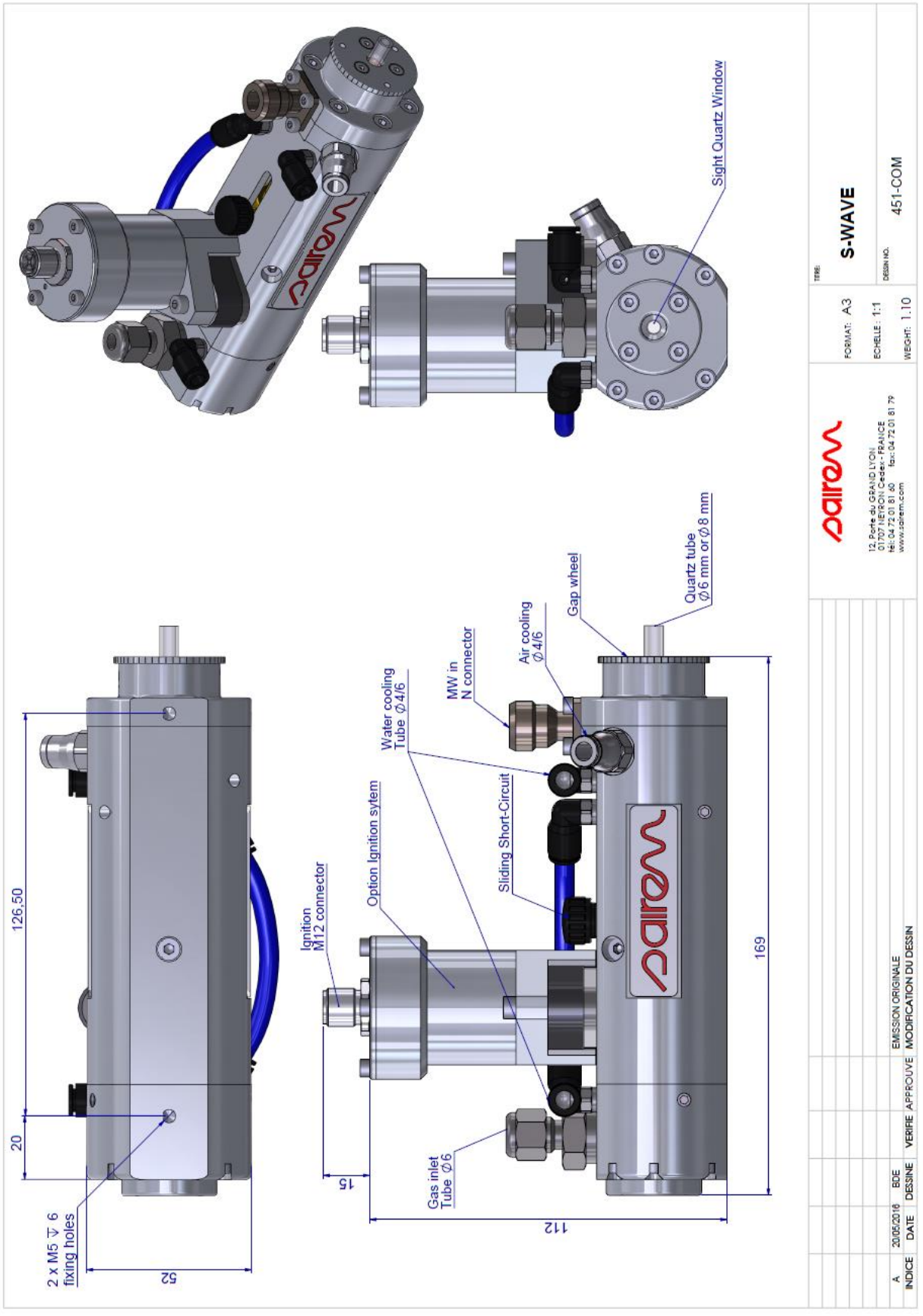
- Use pure Argon (quality 5.0).
- Recommended argon gas flow > 5 l/min (more power requested at lower gas flow).
- Use stainless steel gas feeding tube and max 2 m flexible tube (the shorter the better).
- To ignite at low power (25 W) the sliding short circuit should be positioned on the nozzle side.
- To ignite at high power (> 100 W) the sliding short-circuit should be positioned on the rear side.

COMMON ASSEMBLY

200 W solid state generator

N coaxial cable

S-Wave


Sight Quartz Window
Quartz tube
Ø6 mm or Ø8 mm
Gap wheel
Air cooling
Ø4/6
MW in
N connector
Water cooling
Tube Ø4/6
Option Ignition sytem
Sliding Short-Circuit
Ignition
M12 connector
Gas inlet
Tube Ø6
169
112
15
126,50
20
2 x M5 ↧ 6
fixing holes
52
S-WAVE
451-COM
FORMAT: A3
ECHELLE: 1:1
WEIGHT: 1.10
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