



## RF industrial Lasers

Power grid tubes for CO<sub>2</sub> lasers



### Thales, a long-standing partner to the industry

With over 60 years of experience in the design and manufacture of electron tubes, Thales is recognized throughout the world as an expert for power sources. Grid-controlled triodes and tetrodes are especially suitable for the RF excitation of CO<sub>2</sub> laser systems used in a number of different industrial applications. Reliability and performance are the key selection criteria in these applications and Thales products have been chosen by a number of leading manufacturers, with thousands of machines in service worldwide and tens of thousands of tubes already delivered.

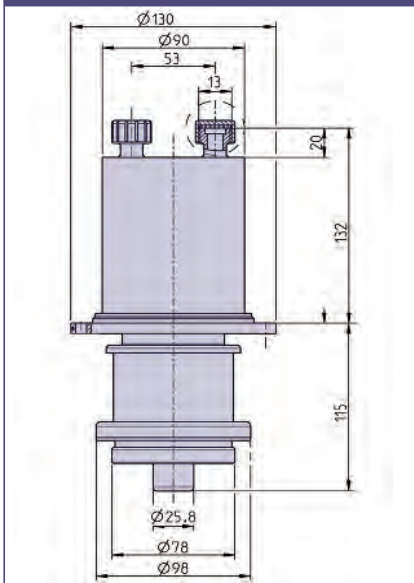
# The world widest range of tubes



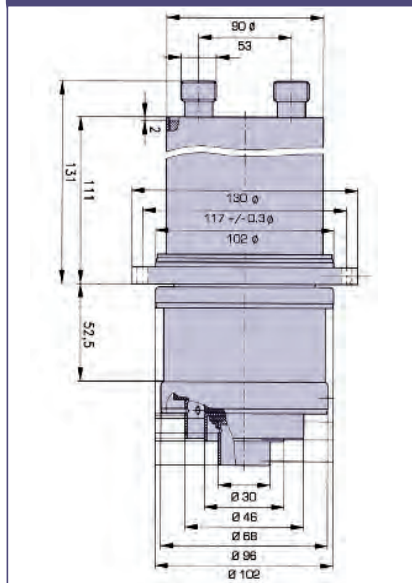
## Laser tube range

Thales laser tubes, the original Siemens references, offer a broad range of innovative, high-quality products that fully meet today's laser market requirements with the longest lifetime on the market and with customer support and technical assistance around the world.

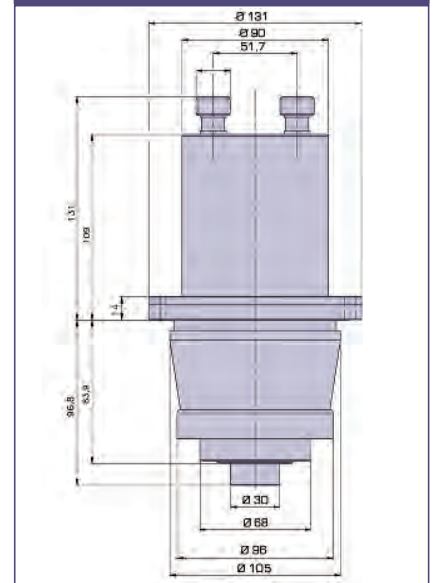
Outline drawing RS 3021CJ



Outline drawing RS 2048CJC



Outline drawing RS 2088CJC



Reference	RS 3021CJ	RS 2048CJC	RS 2088CJC
Tube structure	Triode	Tetrode	Tetrode
Cathode	Thoriated tungsten with direct heating		
Grids	Metallic	Pyrolytic graphite	Pyrolytic graphite
Anode cooling	Water		
Operating frequency	up to 120 MHz	up to 110 MHz	up to 110 MHz
RF power	20 kW	50 kW	50 kW
Anode dissipation	up to 20 kW	30 kW	30 kW
Operating position	Vertical axis, anode down or up		
Weight	4.1 kg	4.4 kg	3.9 kg
Dimensions	130 x 247 mm	130 x 230 mm	131 x 228 mm
Typical Laser Power	1200 to 4000 W	5000 to 7000 W	8000 W
Socket	ROEKG 321 G	ROEKG 248 K	ROEKG 248 K

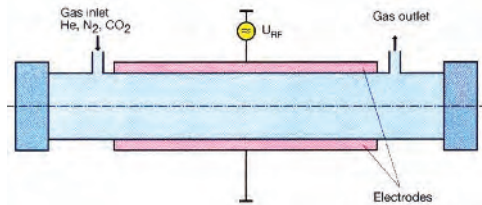
Thales tube sockets are convenient, fast and secure for the end-user, electrically ideal and enable an extremely flat design, since no space is required for screws, tools or moving connections.

# for RF industrial laser applications



## Pyrolytic grids, a major advance in CO<sub>2</sub> laser

In the beginning there were DC-excited lasers with axial or transversal gas flow. Now for light output of 1.5 kW and more there are RF-excited lasers. When the CO<sub>2</sub> laser gas, a mixture of He, N<sub>2</sub> and CO<sub>2</sub>, is exposed to a high-frequency electric field between the poles of a plate capacitor, it creates an ionized gas, also called plasma, DC or RF depending on the type of discharge.



### CO<sub>2</sub> laser process offers key advantages:

- versatility of the process (the wavelength of 10.6 μm is absorbed by all the materials)
- excellent quality of cutting up to 25 mm
- the wavelength of 10.6 μm is typically absorbed by a plastic wall and does not require the set up of heavy and expensive enclosures.

After more than 30 years of proven experience in Radio and Broadcasting tubes, Thales has integrated the **pyrolytic graphite grid technology** into the RS 2048 CJC & RS 2088 CJC, which are used in high power RF excited CO<sub>2</sub> lasers. Based on the crystallization of pyrolytic graphite, it produces a single-piece part without any welding. This structure, coupled with the graphite's intrinsic mechanical properties, gives the grid a number of superior qualities:



- High thermal conductivity
- Very low thermal dilation coefficient, for reduced space between electrodes
- Excellent resistance to thermal shock
- Excellent chemical stability at high temperatures
- Good mechanical resistance, increasing with temperature
- Low and constant electrical resistivity
- Much lower thermal and secondary emission effects than with metallic grids

Tubes equipped with the pyrolytic graphite grid stand up much longer to operating conditions involving high grid current levels. Which means that our **Pyrobloc®** tubes in high-power systems offer **better reliability** and **longer operating life**.



## CO<sub>2</sub> laser: a broad range of industrial applications

Sheet metal fabrication



Since its invention in the mid-60s the CO<sub>2</sub> laser has captured a mass of applications, especially in the processing of materials.

In contrast to the mechanical processing of materials, laser light does not wear out.

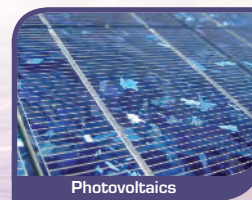


Automotive industry

Today typical applications are cutting, welding, superficial melting of materials, pickling and hardening of surface used for very high precision operations in:



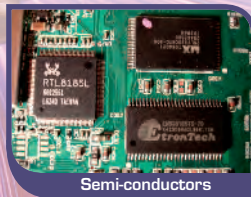
Construction equipment



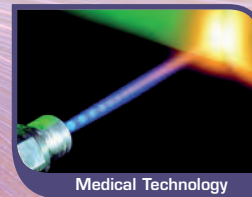
Photovoltaics



Tubes & Profiles



Semi-conductors



Medical Technology



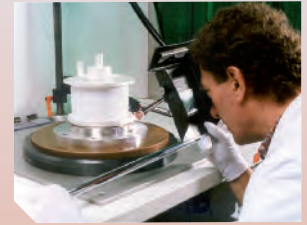
Plastic Processing

## Production facility: focus on innovation

Thales grid tubes are designed, developed and manufactured in the Thales production plant in Thonon, France. Certified to ISO 9001:2000 and ISO 14001, spanning some 25,000 square meters of floorspace, including 200 square meters of clean rooms, Thonon is recognized worldwide as a center of expertise in power sources. R&D teams at Thonon are working on innovative new solutions for industry.

### Thales industrial tubes at a glance

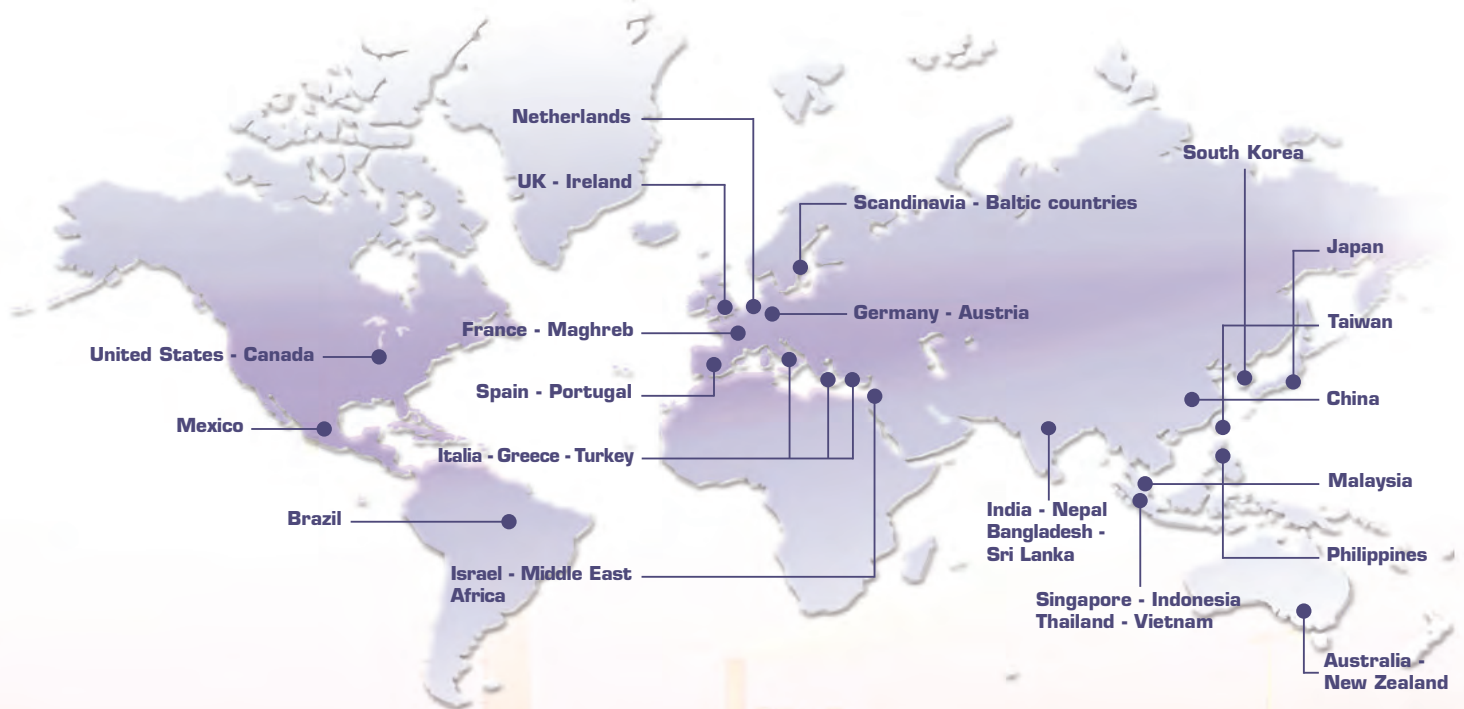
- In service in 40,000 generators worldwide
- 120 million operating hours/year
- 200 different models, for all industrial applications



## Richardson Electronics global support network

Richardson Electronics is the worldwide distributor of Thales industrial products. Richardson has been distributing electron tubes for more than 60 years and has developed the best logistic services in the industry with fast delivery through 45 sales offices and stocking locations around the world.

For more information please contact Richardson Electronics at [www.rellaser.com](http://www.rellaser.com)



### THALES MICROWAVE & IMAGING SUB-SYSTEMS

2, rue Marcel Dassault - BP 23  
78141 Vélizy-Villacoublay Cedex - France

Phone: + 33 (0) 1 30 70 35 00  
Email: [rfms.marketing@thalesgroup.com](mailto:rfms.marketing@thalesgroup.com)

### RICHARDSON ELECTRONICS, Ltd

40W267 Keslinger Road  
LaFox, IL 60147-0393 - USA

Phone: +1 630 208 2200  
Toll free: +1 800-348-5580  
Email: [laser@rell.com](mailto:laser@rell.com)

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