fives celes

# CELES MP 2-12


Induction Heating
- Power from 2 to 12 kW
- Frequency from 20 kHz to 2 MHz

**- Flexible**

**- Compact**

**- High Efficiency**

**- Solid state design**
**- Maximum power over a large impedance range**
**- Wide working frequency**
**- Easy to operate and maintain**
**- High network cosφ**

## → Applications:

- Brazing
- Bonding
- Shrink fitting
- Crucible or cold crucible melting
- Laboratories and research centers
- Cable varnish burning
- Cap sealing
- Hardening and Tempering

Man-Machine Interface with touch screen

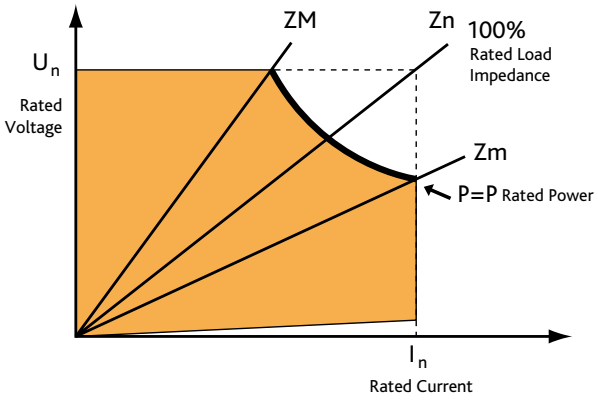
Since 1967, Fives Celes has designed and manufactured a large range of power inverters for induction heating.

CELES MP 2-12 inverters have a parallel oscillating circuit. These solid state inverters are perfect for applications whose frequencies are between 20 kHz and 2000 kHz and whose power are between 2 kW and 12 kW, therefore covering the needs of most low power induction heating applications.

## → Working Flexibility

### Large impedance range

The CELES MP 2-12 inverters delivers their full power over a very wide impedance range. Depending on the inverter's type, it can deliver full power from 50% to 208% of its rated impedance.




Inverter Working range

This flexibility allows the inverter:

- To deliver the same power before and after the Curie point when the material becomes non-magnetic
- To be used for a wide range of applications without having to make any adjustments.

### Wide frequency range

The working frequency range of the inverters covers all frequencies between 25% and 100% of their rated frequency. The power source can therefore heat up a full range of products with the same inductor and without any changes in the capacitor matching station.

Its high versatility enabled CELES MP to become over years one of the preferred inverters of research laboratories, where by nature oscillating circuits and the applications are explorative and incremental.

## → Power Supply Control

### Wide range of control modes

The CELES MP can be remotely controlled by analog inputs and it has several internal control modes :

- Output power set point
- Oscillating circuit voltage set point (option)
- Output power as a function of the heated part translation speed
- Temperature set point with temperature measurement (option)

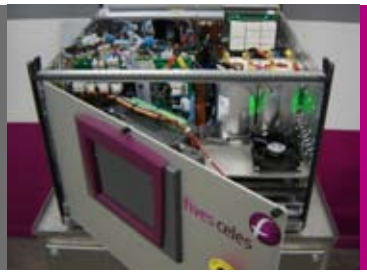
The response times of the power circuits allow impulse heating of a few tenth of a second with levels of power perfectly mastered.

### Friendly Human-Machine Interface (HMI)

- 5.7" Touch screen
- Simultaneous display of power current, voltage, and frequency
- Set point display
- Detailed alarms display
- Programming and operation of recipes
- Adjustment of HMI according to the Operators' needs

### Multiple Numerous Communication Interfaces

- Analog Inputs
- Analog Outputs (current, voltage, power, frequency)
- Digital Inputs Start / Stop,
- Digital Outputs for inverter and fault status (during operation, limitations...)
- Modbus and Ethernet links (option)



Easy maintenance with a pivoting front panel

## → Excellent Operation & Maintenance Conditions

**Protection against operation hazards such as:**

- short circuits on the inductor
- inductor breakages
- current overloads, etc.

The CELES MP 2-12 includes a transformer, which guarantees the electrical insulation between the inductors and the inverters.

**Ease of maintenance**

The CELES MP 2-12 inverters have been designed for easy maintenance by the user. The front panel rotates and the hood can be removed to provide easy access to inverter and components.

**Intensive Operating Rate**

Fives Celes equipment has been designed to work 24 hours a day at full power in either continuous or sequential industrial conditions.

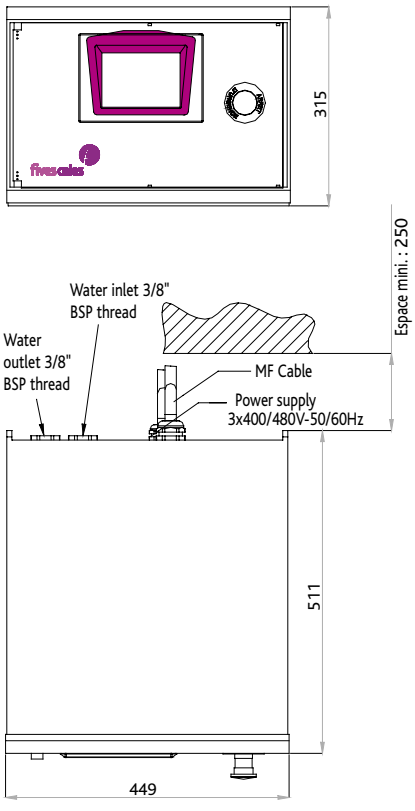
**High Efficiency**

Celes MP power supplies are over 20% more energy efficient than vacuum tube based power supplies. Not only do they decrease operating costs, but their solid state designs also have a longer life span.

**Power supply frequency:** 50/60 Hz +/-10%

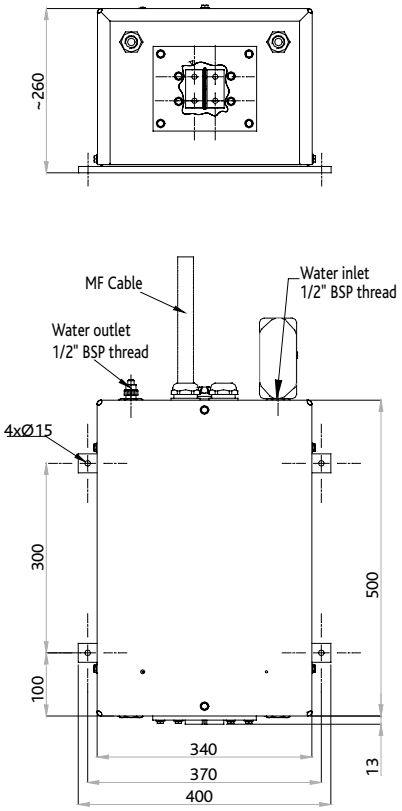
## → Dimensions (mm)

Celes MP 2 to 12kW



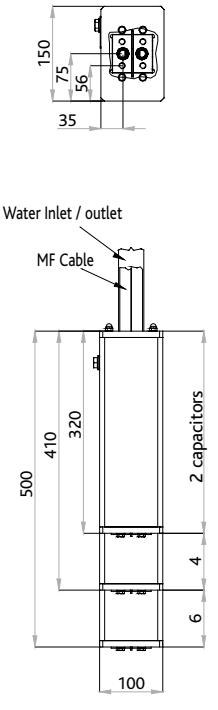

Alu C1

Inductor Connection
Square blocks



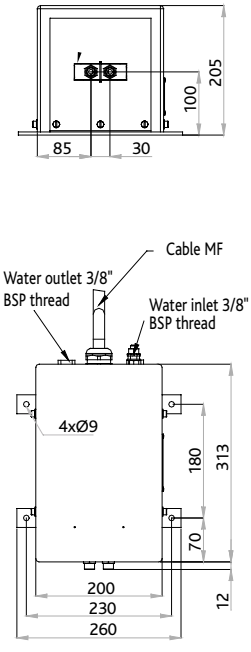

Alu RK

Inductor Connection
Water cooler square blocks




Alu C2

Inductor Connection
Square blocs or conical



Example of gear heating

## Available options

- Mains isolating transformer in an external housing
- Remote control box
- Control Pedal
- Generator serving table
- Tropicalization of the equipment
- Reinforced protection class
- Internal over-pressure
- Stainless steel enclosure
- Hand held transformer
- Fives Celes cooling and refrigerating unit
- Reversing switch for a second workstation (in an external housing)
- Water cooled cables between the matching station and the inductor
- Temperature measurement and control
- Ethernet or modbus network

## Technical characteristics

| INVERTER TYPE | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GTM | | 2/100 | 2/200 | 2/400 | 3/100 | 3/200 | 3/400 | 3/1000 | 3/2000 | 6/100 | 6/200 | 6/400 | 6/1000 | 6/2000 | 12/100 | 12/200 | 12/400 |
| **LOAD** | | | | | | | | | | | | | | | | | |
| Rated output power | kW | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 6 | 6 | 6 | 6 | 6 | 12 | 12 | 12 |
| Minimal output power | kW | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.4 | 0.4 |
| Maximal HF frequency | kHz | 100 | 200 | 400 | 100 | 200 | 400 | 1000 | 2000 | 100 | 200 | 400 | 1000 | 2000 | 80 | 200 | 400 |
| Minimal HF frequency | kHz | 20 | 50 | 100 | 20 | 50 | 100 | 250 | 500 | 20 | 50 | 100 | 250 | 500 | 20 | 50 | 100 |
| Rated load impedance | ohm | 12 | 12 | 12 | 12 | 12 | 12 | 20 | 20 | 20 | 20 | 8.9 | 20 | 20 | 12.5 | 12.5 | 12.5 |
| Rated output voltage | V | 165 | 165 | 165 | 205 | 205 | 205 | 265 | 265 | 375 | 375 | 250 | 375 | 375 | 421 | 421 | 421 |
| **MATCHING CIRCUIT** | | | | | | | | | | | | | | | | | |
| Transformer ratio | | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 3/2 | 1/1 | 1/1 | 1/1 | 1/1 | 3/2 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 |
| HF Capacitors type | µF | 1.2 | 0.66 | 0.33 | 1.2 | 0.66 | 0.33 | 0.11 | 0.11 | 66 | 0.33 | 0.21 | 0.11 | 0.11 | 0.66 | 0.33 | 0.21 |
| Mini/max quantity | | 1 à 4 | 1 à 4 | 1 à 4 | 1 à 4 | 1 à 4 | 1 à 4 | 1 à 4 | 1 à 4 | 1 à 4 | 1 à 4 | 1 à 4 | 1 à 4 | 2 à 4 | 1 à 8 | 1 à 8 | 1 à 8 |
| HF cable number (generator/ capacitors bank connection) | | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Maximum HF cables length | m | 3 | 3 | 3 | 3 | 3 | 3 | 1,5 | 1,5 | 3 | 3 | 3 | 1,5 | 1,5 | 3 | 3 | 3 |
| **SUPPLY** | | | | | | | | | | | | | | | | | |
| Voltage | V | 210/230 | | | 400 / 480 | | | | | | | | | | | | |
| Phase | | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Connected power | kVA | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 8 | 8 | 8 | 8 | 8 | 15 | 15 | 15 |

| GENERATOR ENCLOSURE (for any MP 2-12 Inverter) | | |
|---|---|---|
| Type | Protection class | Weight (Kg) |
| 6/7 Rackable unit - size 19" | IP 31 | 50 |

| COOLING (Including standard matching station) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Type | Minimum water flow rate (l/mm) | Maximum inlet pressure | Minimal pressure difference | Water inlet Temperature °C * | Resistivity (ohm cm²/cm) | Water Quality | Water PH | Pipe connection |
| Water | 6 | 7,5 | 3,5 | 18* to 35 | 2000 to 10 000 | Optically clear without sediment. Concentration less than 5 mgr/l | 7 to 8,5 | Internal pipe diameter 10 mm minimum, 3/8" BSP thread |

*The minimal water temperature has to be assessed according to the site conditions.

Our permanent development efforts may lead us to modify this technical data without notice

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