

## REACTOR TYPE FURNACES

### Universal mounting - Remote Control – Single Zone

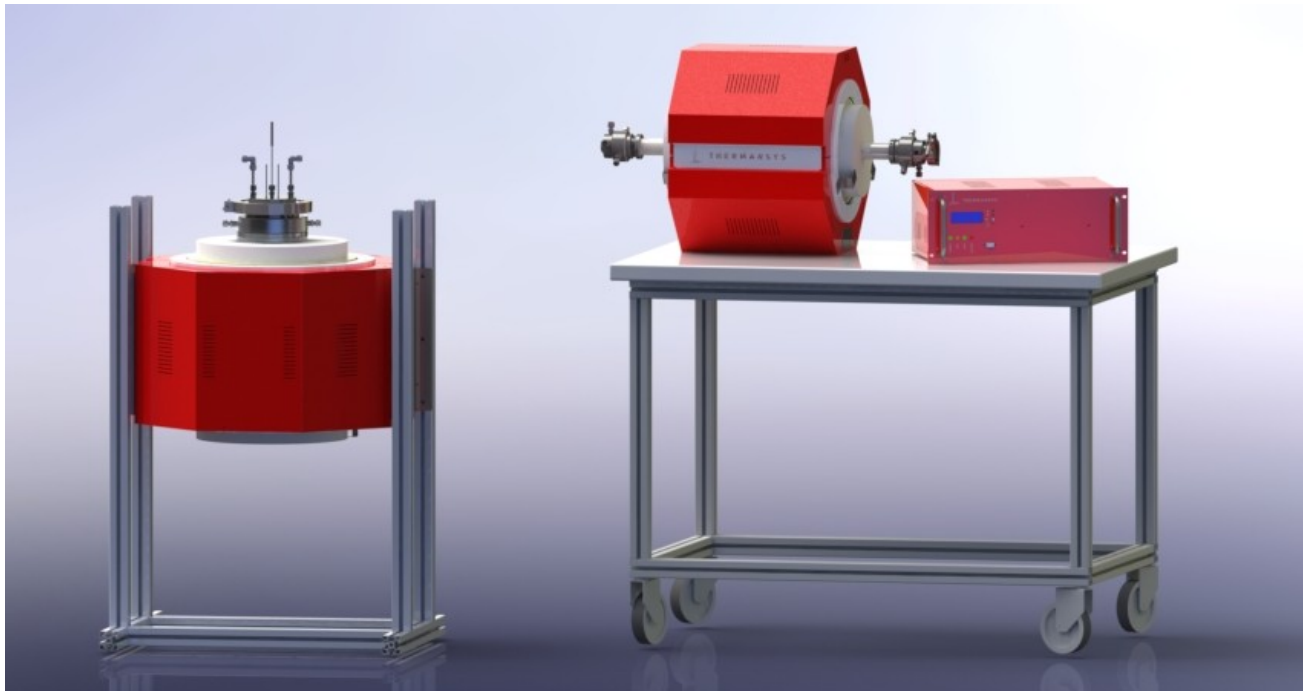
### Model family: RCT-BW2-T-1200

#### Description.

**RCT-BW2-T-1200** furnace family was designed to provide a flexible and functional laboratory solution. This model family is suitable for harsh and demanding thermal processes environment up to 1200 °C. The furnace can operate in a vertical, horizontal or any intermediate angle position with no restriction.

The hot zone is constructed from high resistance, low porosity ceramic materials. The low density fibrous back insulation allows for rapid heat up and cool down rates while, in conjunction with the double wall design, minimizing energy consumption. The semi-exposed dense structure of metallic resistance (FeCrAl) yielding in extremely uniform thermal distribution profiles. Combined with suitable high heat resistant tube this furnace model is an excellent choice for a number of demanding processes, like combustion-incineration, metal melting under inert or hydrogen atmosphere, fluidized or fixed bed reactions, catalyst testing etc.

Remotely controlled and powered by THERMANSYS® state of the art **PYROMODULAR** control system and in combination with a gas sealed tubular reactor this furnace is an ideal solution for several controlled atmosphere processes.



#### Key features.

- Control strategy by Thermansys PCC (Power Consistent Control) insures compliance with EMC standards.
- Modern double wall construction keeps external surfaces temperature low, emphasizing in operator safety.
- Ergonomic design with no protruding edges, combines stainless steel parts with painted finish parts for an improved aesthetic result.
- Conduits connecting the furnace body with the controller ending in detachable connectors.
- PID control- accurate and uniform temperature profiles.
- Vertical and horizontal mounting flexibility covers different possible present and future laboratory needs.
- Touch screen computer running the user friendly, PYROLOGISM 2.0 software.
- 3 channel thermocouple inputs software configurable (B, K, R, S type).
- Power and true RMS Current measuring circuits.
- Stand alone over-temperature limiter (Watchdog) with manual reset in accordance with EN 60519-2 to protect the heater and load.

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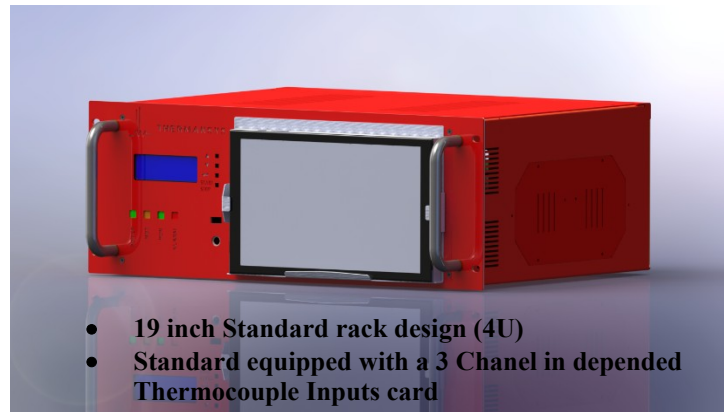
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## PYROMODULAR System at a Glance.

Operated through the specially developed **PYROLOGISM 2.0** software and equipped with a touch screen computer **PYROMODULAR** is a state of the art control, monitoring and data acquisition system. Taking advantage of the optional expanding capabilities of this system the user can not only just control the furnace but create a fully instrumented and totally integrated high temperature reactor system.

### PYROMODULAR Main Controller.

Standard equipped with a Digital LCD display temperature controller providing 15 step programming with 1 program storage.



- 19 inch Standard rack design (4U)
- Standard equipped with a 3 Channel in depended Thermocouple Inputs card

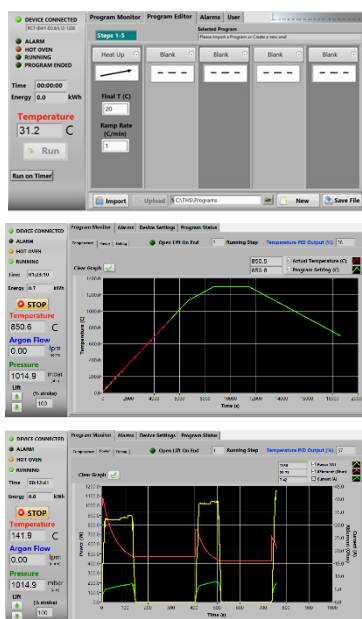
Optionally equipped with a remote, Touch Screen Computer, running the specially designed **PYROLOGISM 2.0** software. Provides a really unique and friendly, windows oriented architecture interface with multiple, advanced features and peripherals.

### PYROMODULAR- Modules Palette

*Each Pyromodular Main Controller can be connected with one or all of the following optional modules:*

- PM – Gas Flow and Pressure *Gas flow control manifold with Mass Flow Controllers for process gas control.*
- PM – Gas Analyzers *In line low cost embedded IR analyzers.*
- PM – Vacuum *Rough (up to  $10^{-3}$  torr) and High (up to  $10^{-6}$  torr) complete vacuum systems.*

*“For detailed information and ordering please contact our sales team.”*



### PYROLOGISM 2.0 control and monitoring software.

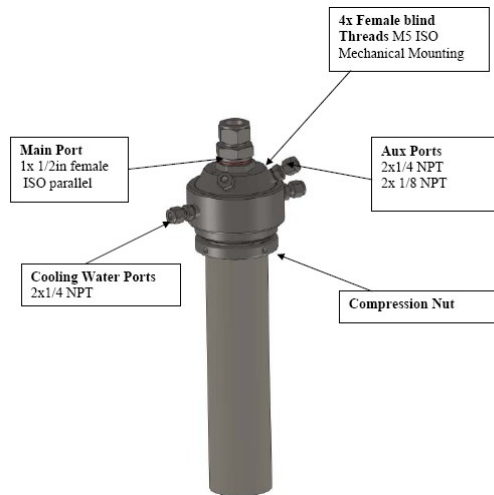
- Programming with up to 15 Temperature programming steps. Graphical inspection.
- Storage and reload of unlimited number of distinct programs.
- Continuous monitoring of control Temperature and In depended thermocouple inputs.
- Real time graphical presentation of executed program data.
- Data file creation for all executed programs. Saves all data on local memory.
- Real time actual Power (W) and totalized Energy (kWh) chart.
- Alarm and event message tab. Overheating Alarm, open Thermocouple Alarm, Heater Alarm.
- Programmable over temperature limiter monitor/configuration.
- Remote control through network connection.
- Gas flow and pressure, gas analyzers signals, monitoring and control interface pages activated if corresponding PM modules are enabled.
- Power Safe, Uninterrupted Power Supply backup configuration. Recovers program after short term power failure.

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## Accessories Available.



### Work-tubes.

Several work tube materials to choose from:

- Dense ceramic Alumina work-tubes for the highest temperature applications.
- Quartz work-tubes for maximum chemical inertia and for aggressive environments to work under vacuum or low pressure conditions up to 1100 °C continuously.
- KANTHAL® APM™/APMT metallic (FeCrAl based) work-tubes to serve under vacuum or pressure up to 1250 °C.

### End Gas Sealing Flanges and Manifolds.

THERMANSYS® is providing work-tube End Gas Sealing Flanges for vacuum or pressure conditions.

These flanges are provided with Main Port either with hydraulic thread port or with Clamp Flange (CF) port for gases inlet/outlet- connection to the tubing network. Cooling fluid re-circulation compartment is standard and is removable. Up to four peripheral threads are available serving as ports for instrumentation mounting (e.g thermocouples, pressure sensors).

Versions with Clamp Flange (CF) port design provide quick-open loading port and optionally a quartz sight window.

THERMANSYS® End Gas Sealing Flanges are supplied for work tubes diameters from 1'' to 3''. Their design allows use with tubes having diameter tolerance  $\pm 10\%$ .

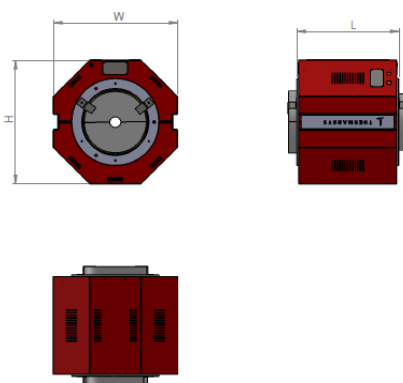
Standard versions material of construction is Stainless Steel ASME 304. Optionally for corrosive applications Stainless Steel ASME 316 is available and Aluminum for a light weight solution (recommended for thin wall Quartz tube reactor).

## Mounting Stands.

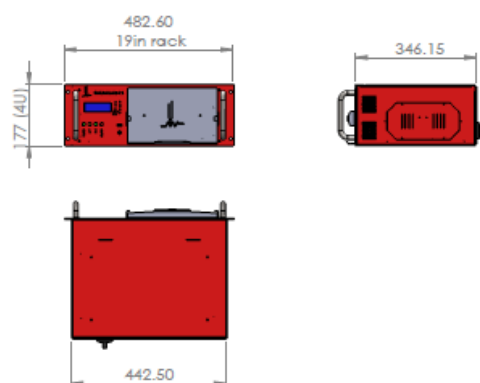
Assembled and constructed using BOSCH-REXROTH® structural profile systems these stands provide the ideal solution for vertical furnace stand alone positioning plus reactor and instrumentation mounting. Using the commercially available accessories, tubing and cable routing is easy and professionally accomplished. Stands with electronically actuated furnace move-up and down provide a solution for heating zone moving along the reactor length.

*For detailed information and ordering please refer to our Technical Bulletin "Reactor Type Furnaces–Mounting Stands"*

## Technical Drawings.



Drawing 1. RCT-BW2-T-....-1200 Furnace



Drawing 2. PYRO MODULAR Main Controller

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## Specifications and Ordering Information.

- Maximum operation temperature 1200 °C.
- Operating Power: 240 /400VAC – 50/60Hz.
- S type embedded thermocouples.
- Mounting orientation: Horizontal, and vertical.
- Temperature control accuracy  $\pm 1$  °C.
- Semi-exposed resistors type.
- Single zone or three heating zone(s) configuration models.
- Heating/cooling rate 0.1-20 °C/min, setting resolution 0.1
- Thermocouple inputs:  
3 chan. - B, K, R, S type -software configurable  
24 bit A/D conversion, 0-45°C cold junction compensated  
Typical accuracy  $\pm 0.2\%$  f.s @ 25 , resolution 0.1 °C

### Optional features:

- Remote, touch screen temperature computer, running the specially designed PYROLOGISM 2.0 software on a 10.0in Tablet PC  
**Add suffix \_TSC**
- Programmable stand-alone over-temperature limiter (Watchdog) with manual reset in accordance with EN 60519-2 to protect the heater and load,  
**Add suffix \_WD**
- UPS (Uninterrupted Power Supply) that will keep system alive for short periods of power failure and restore program after power recovery  
**Add suffix \_UPS**

**CE Certified.** Compliant with **Low Voltage Directive 2006/95/EC** (harmonized referenced standard EN 61010-1: 2001 and EN 61010-2-010:2003) and **EMC Directive 2004/108/EC** (harmonized referenced standard EN 61326-1:2006).

**TABLE1. Single Zone Models**

| Model Part Number    | Max. Temp. °C<br>x<br>Heat up time* min | Furnace I.D. mm x<br>Heated length mm x<br>Total length mm | Uniform Temp.<br>length mm<br>$\pm 10$ °C<br>approx. ** | Furnace<br>external dim.<br>WxHxL mm<br><i>see drawing 1</i> | Nominal<br>Max. Power<br>(W) |
|----------------------|---|--|---|--|------------------------------|
| <b>RCT-BW2-T...</b>  |   |  |   |  |                              |
| <b>_D10/L20-1200</b> | 1200 x 60                               | 100x200x300  | 100   | 430x430x280  | 3000                         |
| <b>_D10/L30-1200</b> | 1200 x 60                               | 100x300x400  | 200   | 430x430x380  | 3400                         |
| <b>_D10/L40-1200</b> | 1200 x 60                               | 100x400x500  | 300   | 430x430x480  | 4000                         |
| <b>_D10/L50-1200</b> | 1200 x 60                               | 100x500x600  | 400   | 430x430x580  | 4600                         |
| <b>_D15/L20-1200</b> | 1200 x 60                               | 150x200x300  | 100   | 480x480x280  | 3200                         |
| <b>_D15/L30-1200</b> | 1200 x 60                               | 150x300x400  | 200   | 480x480x380  | 3600                         |
| <b>_D15/L40-1200</b> | 1200 x 60                               | 150x400x500  | 300   | 480x480x480  | 4200                         |
| <b>_D15/L50-1200</b> | 1200 x 60                               | 150x500x600  | 400   | 480x480x580  | 4800                         |
| <b>_D20/L20-1200</b> | 1200 x 60                               | 200x200x300  | 100   | 530x530x280  | 3400                         |
| <b>_D20/L30-1200</b> | 1200 x 60                               | 200x300x400  | 200   | 530x530x380  | 3800                         |
| <b>_D20/L40-1200</b> | 1200 x 60                               | 200x400x500  | 300   | 530x530x480  | 4400                         |
| <b>_D20/L50-1200</b> | 1200 x 60                               | 200x500x600  | 400   | 530x530x580  | 5000                         |
| <b>_D30/L20-1200</b> | 1200 x 60                               | 300x200x300  | 100   | 580x580x280  | 3800                         |
| <b>_D30/L30-1200</b> | 1200 x 60                               | 300x300x400  | 200   | 580x580x380  | 4400                         |
| <b>_D30/L40-1200</b> | 1200 x 60                               | 300x400x500  | 300   | 580x580x480  | 5000                         |
| <b>_D30/L50-1200</b> | 1200 x 60                               | 300x500x600  | 400   | 580x580x580  | 5600                         |
| <b>_D30/L60-1200</b> | 1200 x 60                               | 300x600x700  | 500   | 580x580x680  | 6200                         |

\* Furnace working with no load and both ends closed

\*\* Simulated indicative data. Valid for common set-point for all heating zones, dense alumina process reactor fit to furnace diameter and with both ends plugged. Actual performance may vary depending on orientation, load mass and placement, reactor size and process gas flow existence.

### IMPORTANT ORDERING NOTES:

- Models Part Number listed in Table 1 concern complete turn key systems with PYROMODULAR main controller included.

#### Ordering Example:

RCT-BW2-T\_D15/L30-1200: This Part Number includes one RCT-BW2-T-1200 family furnace having, 150mm internal diameter, 300mm heated zone length and one PYROMODULAR Main Controller.

RCT-BW2-T\_D15/L30-1200\_TSC: This Part Number includes the system described above with Remote, touch screen temperature computer, running the specially designed PYROLOGISM 2.0 software on a 10.0in Tablet PC

- To order only the furnace add at the end of the part number the suffix “Single”, e.g. RCT-BW2-T\_D15/L30-1200\_Single.

- Optional furnace accessories or mounding stands are ordered separately according to the respective data sheet ordering information.

- Additional PYROMODULAR Modules are ordered separately according to the respective data sheet ordering information.

 HELLENIC PRODUCT.

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