

## REACTOR TYPE FURNACES

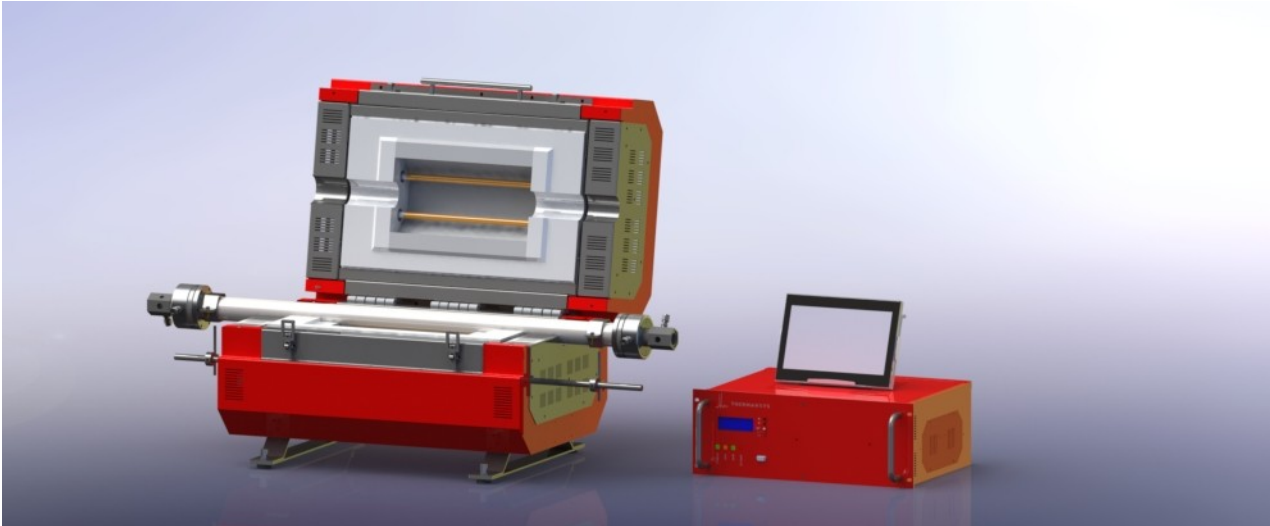
### Universal mounting - Split Tube - Remote Control - SiC Resistors

Model family: **RCT-AS1-O-1500**

#### Description.

**RCT-AS1-O-1500** models family designed to offer a **flexible solution** for the majority of applications involving controlled atmosphere tubular reactors heating, up to **1500°C continuously**. The hinged construction offer convenience to the reactor installation and setting up access and provide a solution in situations where reactor is permanently connected to the processes manifold where furnace could literally wrapped around it.

Utilizing the unique high density Kanthal SiC resistors this furnaces have superior performance in terms or resistance to oxidation highly extending the workable life of your investment. All SiC heating resistors will increase in resistance over time at elevated temperatures. Due to the unique nature of the high density Kanthal SiC resistors this effect is severally suppressed. Moreover, **Thermansys PPC** (Power Consistent Control) platform automatically compensate aging effect enabling direct power control, instead of conventional control strategies, assuring that the furnace performance will remain unchanged without the need of any operator action or periodical check through the entire life of the equipment.



**Based on accurate true rms Volt/Ampere measurements and on the PCC management platform these furnaces have optimum performance in terms of Power Factor and EMC standards compliance. Focusing our control management on the specific resistor properties the workable life of the heater is significantly extended without partially sacrifice the extremely fast heating rates that can provide, using conservative control techniques**

#### Key features.

- Best available quality KANTHAL® helical cut SiC resistors driven by THERMANSYS® PCC control platform insure furnace long life operation.
- Low mass vacuum formed thermal insulation enables high output available for the load and fast heat up rates while significantly contributes to energy savings under daily thermal cycling.
- Control strategy focusing in high power factor for all workable temperature areas insures compliance with EMC (Electro-Magnetic Compatibility) standards.
- Vertical and horizontal mounting flexibility covers different present and future laboratory needs.
- PID control constantly conforms to various load needs.
- Optional Touch screen computer running the user friendly, PYROLOGISM 2.0 software.
- 3 channel thermocouple inputs software configurable (B, K, R, S type).
- Modern double wall construction keeps external surfaces temperature low, emphasizing in operator safety. Internal skin is exclusively made from stainless steel to enhance durability.
- Ergonomic design with no protruding edges, bolts or other features combines stainless steel parts with painted finish parts for an improved aesthetic result.
- Deterministic over-temperature limiter with manual reset, in accordance with EN 60519-2 to protect the oven and load.

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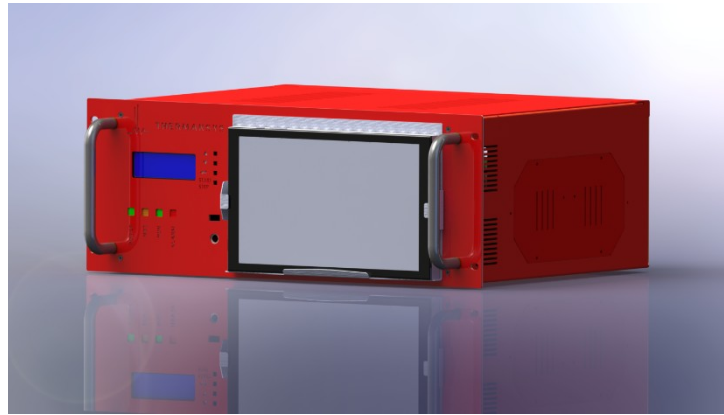
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## PYROMODULAR System at a Glance.

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.



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

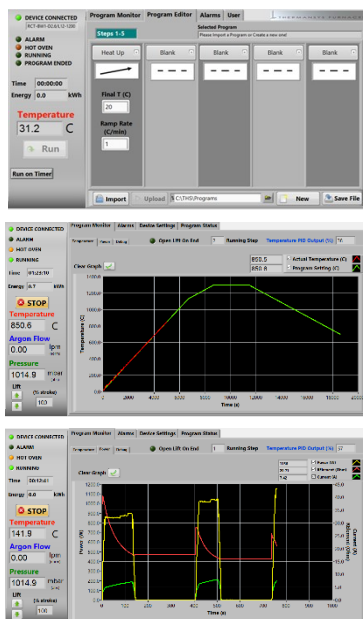
*Each Pyromodular Main Controller can be connected with one or all of the following optional modules:*

**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  $10^{-7}$  torr) complete vacuum systems.

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



### PYROLOGISM 2.0 control and monitoring software.

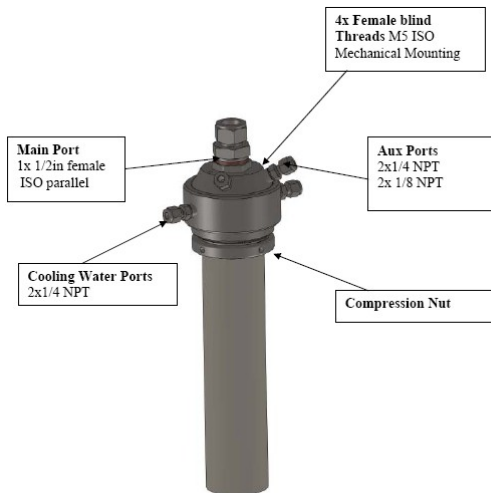
- Programming with up to 15 Temperature programming steps. Graphical inspection.
- Storage and reload of unlimited number of distinct programs.
- Continuous monitoring of control Temperature and In depended thermocouple inputs.
- Real time graphical presentation of executed program data.
- Data file 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).

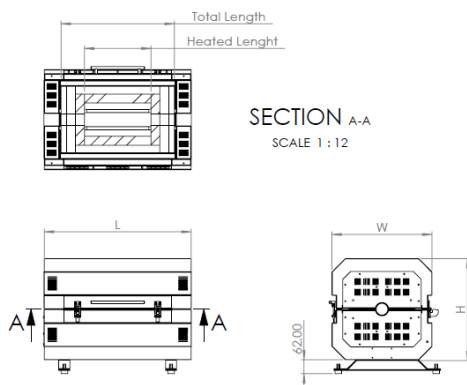
*For detailed information and ordering please refer to our corresponding Technical Bulletin "Reactor Type Furnaces Accessories"*

### Mounting Stands.

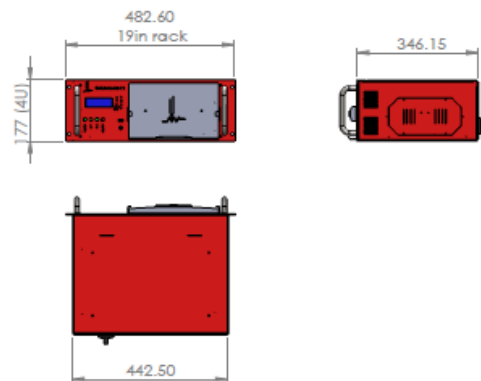
Assembled and constructed using BOSCH-REXROTH® structural profile systems these stands provide the ideal solution for vertical furnace stand alone positioning plus reactor and instrumentation mounting. Using the commercially available accessories, tubing and cable routing is easy and professionally accomplished. 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-AS1-O-....-1500 Furnace



Drawing 2. PYRO MODYLAR Main Controller

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## Specifications and Ordering Information.

- Maximum continuous temperature 1500 °C.
- Operating Power: 220 /400VAC – 50/60Hz.
- S type embedded thermocouples.
- Mounting orientation: Horizontal, and vertical.
- Temperature control accuracy  $\pm 1$  °C.
- Exposed resistors type.
- Single heating zone configuration models.
- Each zone is equipped with two independent thermocouples for controller and over-temperature limiter feedback.
- 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. RCT-AS1-O-1500 Models**

Model Part Number	Max. Cont. Temp. °C x Heat up time* min	Furnace I.D. mm x Heated length mm x Total length mm	Uniform Temp. length mm $\pm 10$ °C approx. **	Furnace external dim. WxHxL mm <i>see drawing 1</i>	Nominal Max. Power (W)
<b>RCT-AS1-O- ...</b>					
<b>_D5/L20-1500</b>	1500 x 65	50x200x420	100	450x450x560	2200
<b>_D5/L30-1500</b>	1500 x 65	50x300x520	150	450x450x660	2800
<b>_D5/L40-1500</b>	1500 x 65	50x400x620	250	450x450x760	3200
<b>_D5/L60-1500</b>	1500 x 65	50x600x820	300	450x450x960	4800
<b>_D8/L40-1500</b>	1500 x 65	80x400x620	200	480x480x760	5000
<b>_D8/L60-1500</b>	1500 x 65	80x600x820	400	480x480x960	7000
<b>_D10/L60-1500</b>	1500 x 65	100x600x820	400	510x510x960	8000
<b>_D10/L80-1500</b>	1500 x 65	100x800x1020	600	510x510x1160	9600

\* 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 Tables 1 and 2 concern complete turn key systems with PYROMODULAR main controller included.

#### Ordering Example:

RCT-AS1-O\_D5/L20-1500: This Part Number includes one RCT-AS1-O-1500 family furnace having 50mm internal diameter, 200mm heated zone length and one PYROMODULAR Main Controller.

RCT-AS1-O\_D5/L20-1500\_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-AS1-O\_D5/L20-1500\_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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