

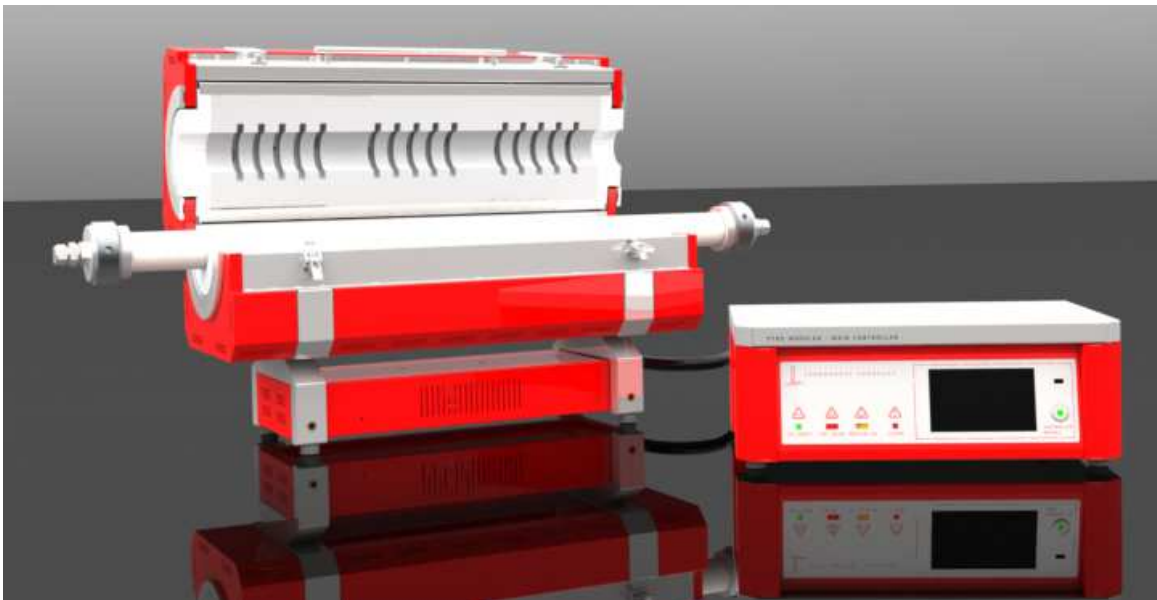
## REACTOR TYPE FURNACES

### Universal mounting - Split Tube - Remote Control – Single or Three Zone

Model family: RCT-AW1-O-1150

#### Description.

**RCT-AW1-O-1150** models family designed to offer a **flexible solution** for the majority of applications involving controlled atmosphere tubular reactors heating, up to 1150 °C. 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. Due to the nature of the insulation material, that can tolerate ultra high temperature gradients, these models provide a reliable solution in processes require fast reactor cooling. The free option of horizontal or vertical positioning in conjunction with the remote control unit maximizes user flexibility and increase the number of the same part potential uses. Equipped with our **PYROMODULAR** controller these furnaces are easily and professionally adapted into fully instrumented scientific instruments.



*Model shown RCT-AW1-O-3Z\_D7L75-1150 with PYROMODULAR main controller and an optional 2.5 in Alumina gas sealed reactor tube.*

#### Key features.

- Best available quality KANTHAL® spiral shape FeCrAl wire resistors insure furnace long life operation up to 1150 °C continuously.
- Extremely 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 leads to energy savings and insures compliance with EMC (Electro-Magnetic Compatibility) standards.
- Hinged - split tube – construction, operation position horizontal or vertical.
- Accurate and uniform temperature profiles.
- 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 esthetic result.
- Furnace closure interlock prevents heaters powering, if furnace is opened, through mechanical conductors.
- Deterministic over-temperature limiter with manual reset, in accordance with EN 60519-2 to protect the oven and load.
- PID control constantly conforms to various load needs.

#### Contact details

Ath. Stagiriti 7- Pilea, Thessaloniki Greece, 55534  
tel. 0030 2310 942346, fax. 0030 2310 942336  
e-mai: info@thermansys.com  
[www.Thermansys.com](http://www.Thermansys.com)

Information and data contained in this document was considered correct at the time of publication. Thermansys® is reserving the right to make modifications as a result of design improvements.

## 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.

Each **RCT-AW1-O-1150** furnace is equipped as a standard with the **PYROMODULAR Main Controller** that enables:

- Touch Screen 7'' Computer embedded running user friendly operator **PYROLOGISM 2.0** software human-machine interface.
- Single or three heating zones models remote closed loop control and power circuits.
- 3 user process thermocouple inputs available (B, E, J, K, N, R, S, T type- software configurable).
- Power and true RMS Current measuring circuits for each heating zone(s).
- Heater failure, open control thermocouple detection alarms and interlocks. Alarms and events front panel led array.
- Stand alone over-temperature limiter (Watchdog) with manual reset in accordance with EN 60519-2 to protect the oven and load for each heat zone(s). Overrides main controller and cut off heater power if user adjustable high limit is reached.
- Alarm event output (dry contact 3A/250V AC/DC).
- USB client B type and RJ45 port for connection to PC.



### PYROMODULAR- Modules Palette

#### PM – Gas Flow and Pressure

*Gas flow control manifold with Mass Flow Meters and 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 refer to our corresponding Technical Bulletin “Pyromodular System”*

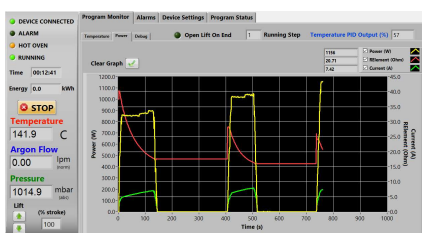
### PYROLOGISM 2.0 control and monitoring software.

Having in mind user’s convenience and daily work facilitation, Thermansys® design and develop a special windows architecture software providing a friendly human machine interface solution with advanced features:

- Quick setting of a single ramp rate to a set point -run on timer function.
- Set-point programming with up to 15 ramp and constant temperature programming steps – graphical inspection of programming.
- Storage and reload of unlimited number of distinct programs.
- Real time chart illustrating control temperature(s), running set point(s) and user process temperatures with dynamic zoom.
- Real time true-RMS Current (A), Voltage (V) and Power (W) measurements.
- Real time actual Power (W) and totalized Energy (kWh) chart.
- Saves all data on local memory and on external USB memory stick.
- Tools for manual PID tuning or auto-tuning.
- Virtual keyboard, alarm and event message tab.
- Watchdog over temperature limiter monitor/configuration.
- Gas flow and pressure, gas analyzers signals, monitoring and control interface pages activated if corresponding PM modules are enabled.
- Versions running at Microsoft® Windows are available for control by a PC through USB port.



Description	Status	Reset
Open Thermocouple	OK	Over Alarm
Open Circuit	OK	
Short Circuit	OK	
LIR CallBack	OK	LIR Alarm Reset
Low Argon Flow	OK	Argon Low Flow Alarm Reset
Vacuum Leak	OK	Vacuum Leak Alarm Reset
Over Temperature Watchdog	OK	Watchdog Alarm Reset



#### Contact details

Ath. Stagiriti 7- Pilea, Thessaloniki Greece, 55534  
tel. 0030 2310 942346, fax. 0030 2310 942336  
e-mai: info@thermansys.com  
[www.Thermansys.com](http://www.Thermansys.com)

Information and data contained in this document was considered correct at the time of publication. Thermansys® is reserving the right to make modifications as a result of design improvements.



Model shown RCT-AW1-O-3Z\_D7L75-1150 with optional mounting stand, Alumina work-tube and inlet/outlet end sealing gas flanges

## 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 either with hydraulic thread port or with Clamp Flange (CF) port for gases inlet/outlet- connection to the tubing network. Cooling fluid recirculation compartment is standard. Also available, flanges assembled with manifolds having ports for instrumentation mounting (e.g thermocouples, pressure sensors), quick-open loading port and quartz sight window.

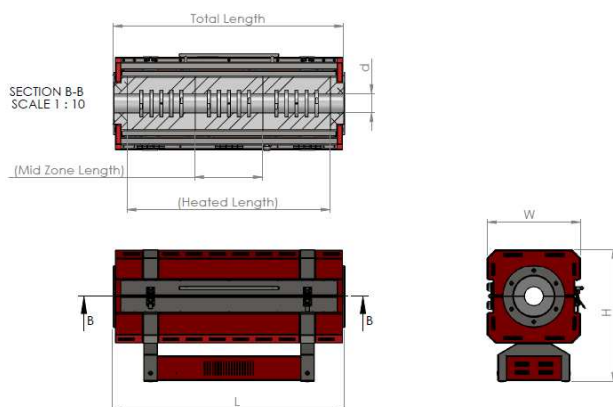
*For detailed information and ordering please refer to our corresponding Technical Bulletin “Reactor Type Furnaces Accessories”*

## 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 2. PYRO MODYLAR Main Controller

Drawing 1. RCT-AW1-O-....-1150 Furnace

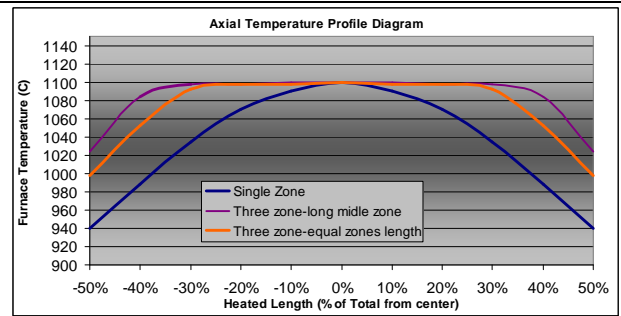
### Contact details

Ath. Stagiriti 7- Pilea, Thessaloniki Greece, 55534  
tel. 0030 2310 942346, fax. 0030 2310 942336  
e-mai: [info@thermansys.com](mailto:info@thermansys.com)  
[www.Thermansys.com](http://www.Thermansys.com)

Information and data contained in this document was considered correct at the time of publication. Thermansys® is reserving the right to make modifications as a result of design improvements.

## Specifications and Ordering Information.

- Maximum continuous temperature 1150 °C.
- Operating Power: 208 /240VAC – 50/60Hz.
- K 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.
- Each zone is equipped with two independent thermocouples for controller and over-temperature limiter feedback.
- Thermocouple inputs:  
3 chan. - B, E, J, K, N, R, S, T 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



Curves presented are simulated indicative data and are 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

**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).  
Produced in **GREECE** following **ISO 9001:2008 quality management system** and **ISO 14001:2004 environmental management system**.

**TABLE1. Single Zone 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 see drawing 1	Nominal Max. Power (W)
RCT-AW1-O-1Z...					
<u>D7/L25-1150</u>	1150 x 60	70x250x350	50	340x490x356	900
<u>D7/L50-1150</u>	1150 x 60	70x500x600	100	340x490x606	1800
<u>D10/L30-1150</u>	1150 x 60	100x300x400	60	370x520x406	1500
<u>D10/L60-1150</u>	1150 x 60	100x600x700	120	370x520x706	3000
<u>D15/L30-1150</u>	1150 x 60	150x300x400	60	420x570x406	2300
<u>D15/L60-1150</u>	1150 x 60	150x600x700	120	420x570x706	4600
<u>D20/L50-1150</u>	1150 x 60	200x500x600	100	470x620x606	5000
<u>D20/L80-1150</u>	1150 x 60	200x800x900	160	470x620x906	8000

**TABLE2. Three Zone Models**

Model Part Number	Max. Cont. Temp. °C x Heat up time* min	Furnace I.D. mm x Heated length mm x Mid. zn. length mm x Total length mm	Uniform Temp. length mm $\pm 10$ °C approx. **	Furnace external dim. WxHxL mm see drawing 1	Nominal Max. Power (W)
RCT_AW1_O_3Z...					
<u>D7/L75-1150</u>	1150 x 60	70x750x250x850	550	340x490x856	2700
<u>D7/L100-1150</u>	1150 x 60	70x1000x500x1100	800	340x490x1106	3600
<u>D10/L90-1150</u>	1150 x 60	100x900x300x1000	660	370x520x1006	4500
<u>D10/L110-1150</u>	1150 x 60	100x1100x500x1200	860	370x520x1206	5600
<u>D15/L90-1150</u>	1150 x 60	150x900x300x1000	660	420x570x1006	6900
<u>D15/L110-1150</u>	1150 x 60	150x1100x500x1200	860	420x570x1206	8400
<u>D20/L90-1150</u>	1150 x 60	200x900x300x1000	660	470x620x1006	9000
<u>D20/L110-1150</u>	1150 x 60	200x1100x500x1200	860	470x620x1206	11000

\* 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-AW1-O\_3Z- D7/L75-1150: This Part Number includes one RCT-AW1-T-1150 family furnace having 3 heating zones, 70mm internal diameter, 250mm mid zone length and one PYROMODULAR Main Controller.

- To order only the furnace add at the end of the part number the suffix "Single", e.g. RCT-AW1-O-3Z- D7/L75-1150 **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.

#### Contact details

Ath. Stagiriti 7- Pilea, Thessaloniki Greece, 55534

tel. 0030 2310 942346, fax. 0030 2310 942336

e-mai: info@thermansys.com

[www.Thermansys.com](http://www.Thermansys.com)

Information and data contained in this document was considered correct at the time of publication. Thermansys® is reserving the right to make modifications as a result of design improvements.