

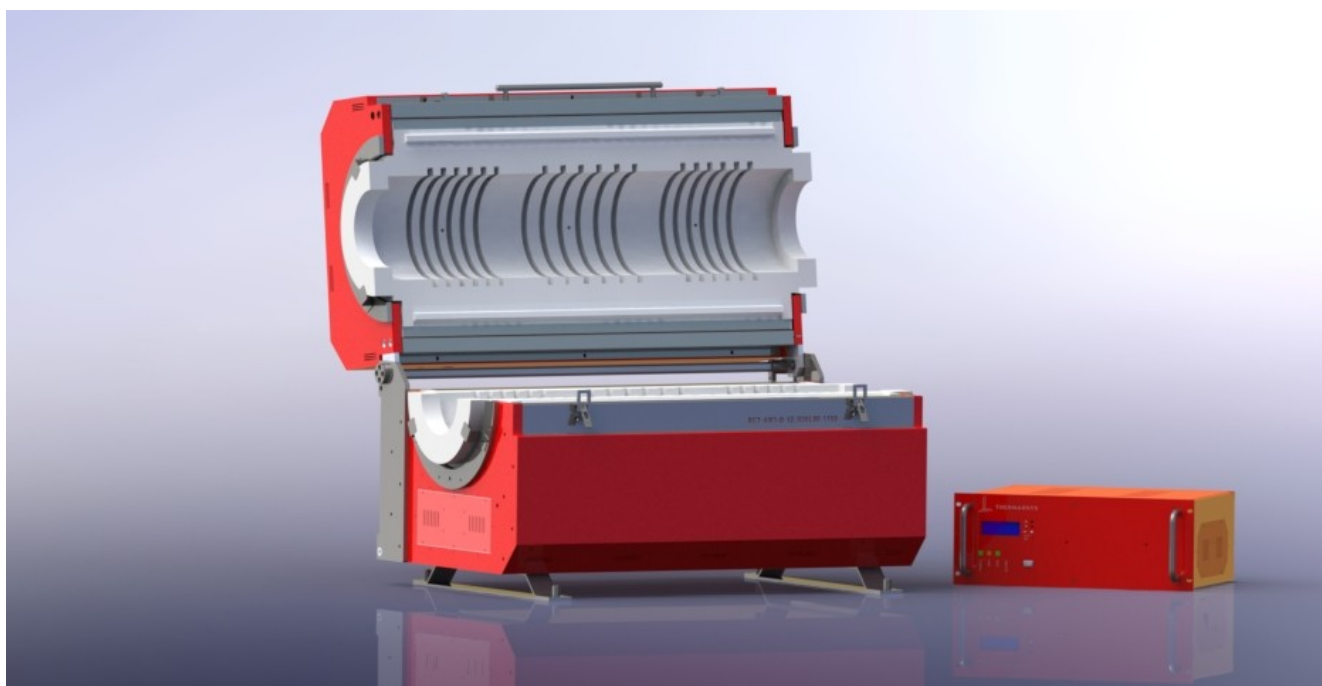
REACTOR TYPE FURNACES

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 1100 °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_D20L80-1150 with PYROMODULAR main controller
Aluminum profile reactor holding arms are standard included.*

Key features.

- Best available quality KANTHAL® spiral shape FeCrAl wire resistors insure furnace long life operation.
- 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 leads to energy savings and insures compliance with EMC (Electro-Magnetic Compatibility) standards.
- Modern double wall construction keeps external surfaces temperature low, emphasizing in operator safety. Internal skin is exclusively made from stainless steel to enhance durability.
- Touch screen computer running the user friendly, PYROLOGISM 2.0 software.
- PID control- accurate and uniform temperature profiles.
- Furnace closure interlock prevents heaters powering, if furnace is opened, through mechanical conductors.
- 3 channel thermocouple inputs software configurable (B, K, R, S type).
- Power and true RMS Current measuring circuits.
- Deterministic over-temperature limiter with manual reset, in accordance with EN 60519-2 to protect the oven and load.
- Hinged - split tube – construction, operation position horizontal or vertical.

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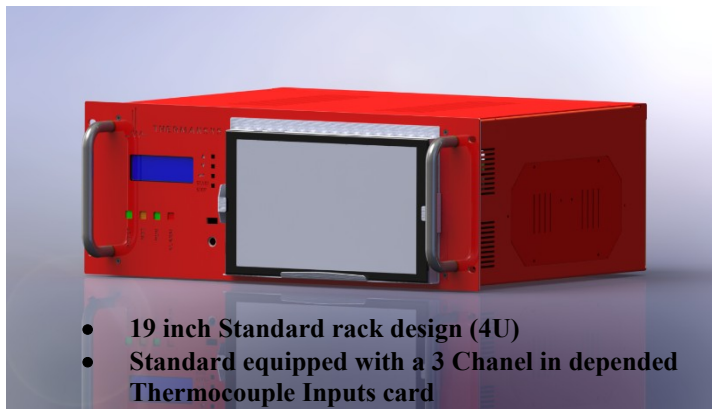
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PYROMODULAR System at a Glance.

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.



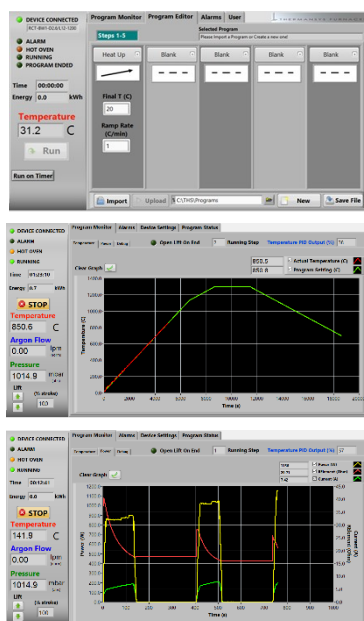
Optionally equipped with a remote, Touch Screen Computer, running the specially designed **PYROLOGISM 2.0** software. Provides a really unique and friendly, windows oriented architecture interface with multiple, advanced features and peripherals.

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 Independent 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 ±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).

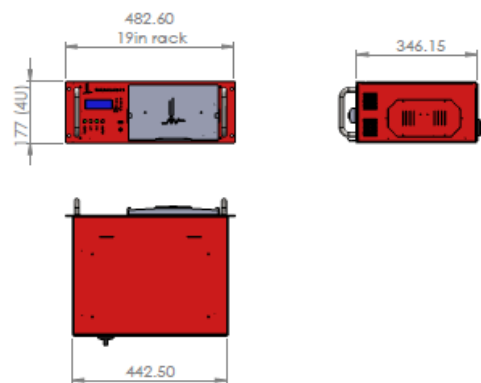
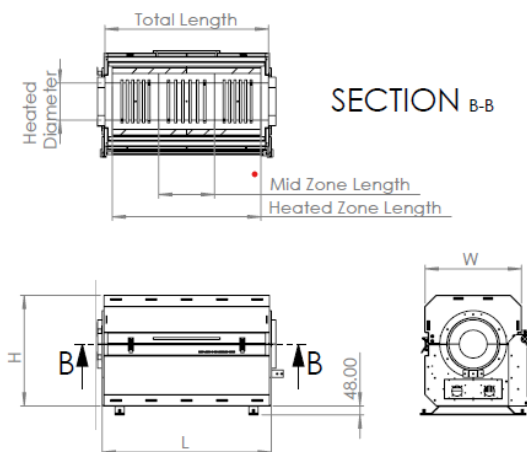
For detailed information and ordering please refer to our corresponding Technical Bulletin "Reactor Type Furnaces Accessories"

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 2. PYRO MODYLAR Main Controller

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

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Specifications and Ordering Information.

- Maximum continuous temperature 1150 °C.
- Operating Power: 220 /400VAC – 50/60Hz.
- K type embedded thermocouples.
- Mounting orientation: Horizontal, and vertical.
- Temperature control accuracy ± 1 °C.
- Semi-exposed resistors type.
- Single zone or three heating zone(s) configuration models.
- Heating/cooling rate 0.1-50 °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. Cont. Temp. °C x Heat up time* min	Furnace I.D. mm x Heated length mm x Total length mm	Uniform Temp. length mm ± 10 °C approx. **	Furnace external dim. WxHxL mm <i>see drawing I</i>	Nominal Max. Power (W)
RCT-AW1-O-1Z...					
<u>D7/L25-1150</u>	1100 x 60	70x250x350	110	340x490x356	900
<u>D7/L50-1150</u>	1100 x 60	70x500x600	360	340x490x606	1800
<u>D10/L30-1150</u>	1100 x 60	100x300x400	150	370x520x406	1500
<u>D10/L60-1150</u>	1100 x 60	100x600x700	400	370x520x706	3000
<u>D15/L30-1150</u>	1100 x 60	150x300x400	140	420x570x406	2300
<u>D15/L60-1150</u>	1100 x 60	150x600x700	380	420x570x706	4600
<u>D20/L50-1150</u>	1100 x 60	200x500x600	260	470x620x606	5000
<u>D20/L80-1150</u>	1100 x 60	200x800x900	560	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 ± 10 °C approx. **	Furnace external dim. WxHxL mm <i>see drawing I</i>	Nominal Max. Power (W)
RCT_AW1_O_3Z...					
<u>D7/L75-1150</u>	1100 x 60	70x750x250x850	600	340x490x856	2700
<u>D7/L100-1150</u>	1100 x 60	70x1000x500x1100	800	340x490x1106	3600
<u>D10/L75-1150</u>	1100 x 60	100x750x250x850	580	370x520x856	3900
<u>D10/L90-1150</u>	1100 x 60	100x900x300x1000	750	370x520x1006	4500
<u>D10/L110-1150</u>	1100 x 60	100x1100x500x1200	950	370x520x1206	5600
<u>D15/L75-1150</u>	1100 x 60	150x750x250x850	560	420x570x856	5400
<u>D15/L80-1150</u>	1100 x 60	150x800x300x850	700	420x570x1006	6200
<u>D15/L90-1150</u>	1100 x 60	150x900x300x1000	740	420x570x1006	6900
<u>D15/L110-1150</u>	1100 x 60	150x1100x500x1200	940	420x570x1206	8400
<u>D20/L80-1150</u>	1100 x 60	200x800x300x900	680	470x620x906	8000
<u>D20/L90-1150</u>	1100 x 60	200x900x300x1000	720	470x620x1006	9000
<u>D20/L110-1150</u>	1100 x 60	200x1100x500x1200	920	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.

RCT-AW1-O_3Z- D7/L75-1150_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-AW1-O-3Z- D7/L75-1150_Single.

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

 HELLENIC PRODUCT.

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