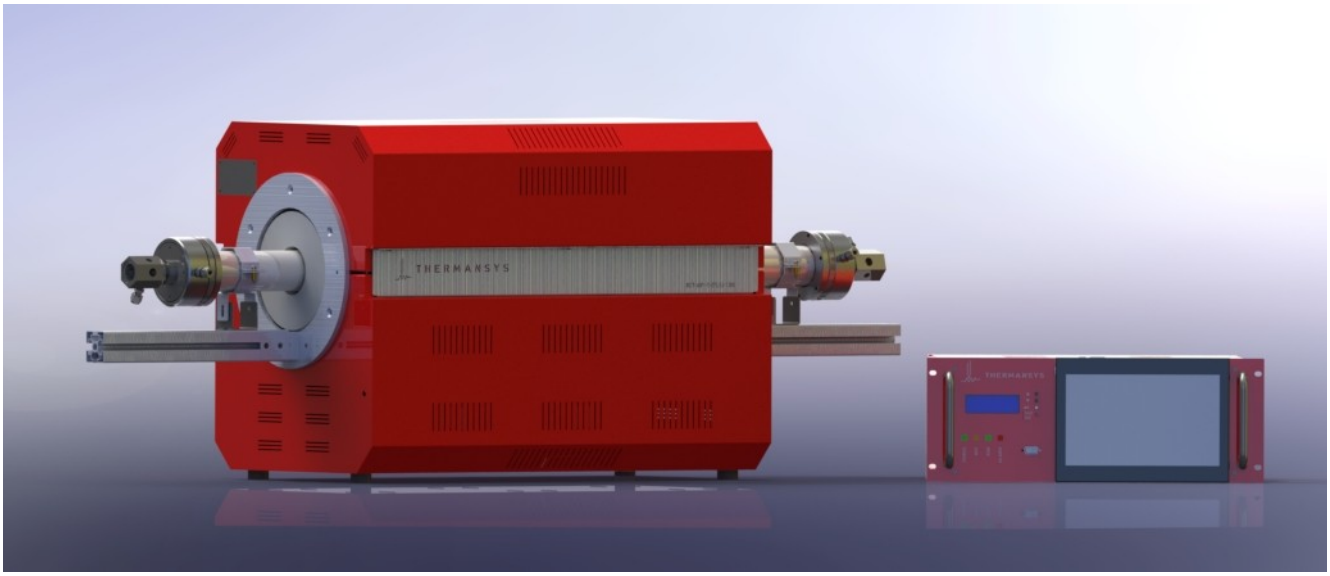
THERMANSYS®

REACTOR TYPE FURNACES
Universal mounting - Remote Control – Single or Three Zone
Model family: RCT-AW1-T-1300

Description.

RCT-AW1-T-1300 model family designed to provide the highest performance that a, wire wound heaters, tube tunnel furnace can have. Thick powerful FeCrAl resisting heaters, capable to withstand high power rates at **1300 ˚C operation** temperature, brink this family close to the very high temperature operation area, retaining however considerable cost effectiveness compared with alternative ceramic resistors models. Rated with very high power density this model is capable to reach fast temperature raise rates. Coil type resistors with minimum pitch provide a very dense heater structure ensuring excellent temperature uniformity. Long end insulation flanges result in narrow axial temperature distribution profiles while three zone models can reach central uniform length (±10 ˚C) of 700mm. 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.



Model shown RCT-AW1-T-3Z_D7L66-1300 with PYROMODULAR main controller and an optional 60mm Alumina gas sealed reactor tube. 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.
- 3 channel thermocouple inputs software configurable (B, K, R, S type).
- Power and true RMS Current measuring circuits.
- Control strategy focusing in high power factor leads to energy savings and insures compliance with EMC (Electro-Magnetic Compatibility) standards.
- Conduits connecting the furnace body with the controller ending in detachable connectors.
- Touch screen computer running the user friendly, PYROLOGISM 2.0 software
- PID control- 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.
- Deterministic over-temperature limiter with manual reset, in accordance with EN 60519-2 to protect the oven and load.
- Vertical and horizontal mounting flexibility covers different possible present and future laboratory needs.

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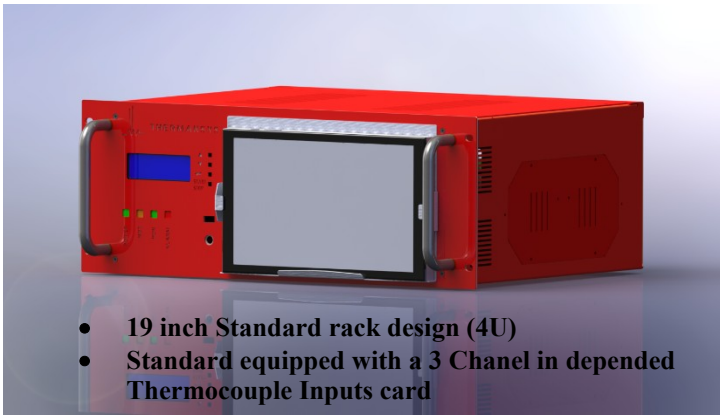
PYROMODULAR System at a Glance.

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 Chanel in depended Thermocouple Inputs card**

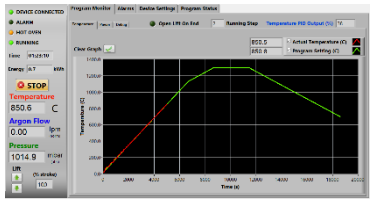
Optionally equipped with a remote, Touch Screen Computer, running the specially designed PYROLOGISM 2.0 software.Provides a really unique and friendly, windows oriented architecture interface with multiple, advanced features and peripherals.

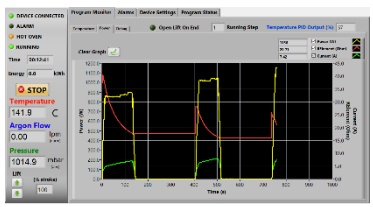
PYROMODULAR- Modules Palette

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^{-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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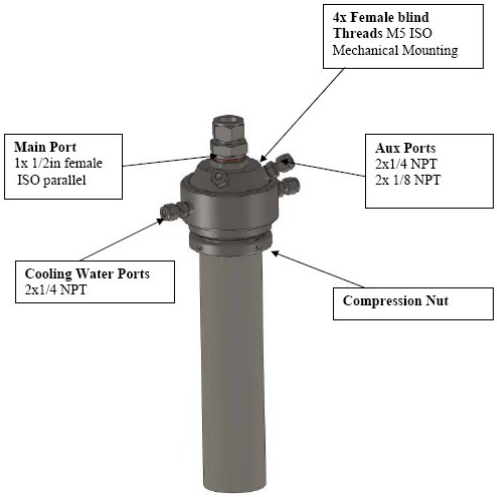


Accessories Available.

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 recirculation compartment is standard and is removable. Up to four peripheral threads are available serving as ports for instrumentation mounting (e.g thermocouples, pressure sensors).

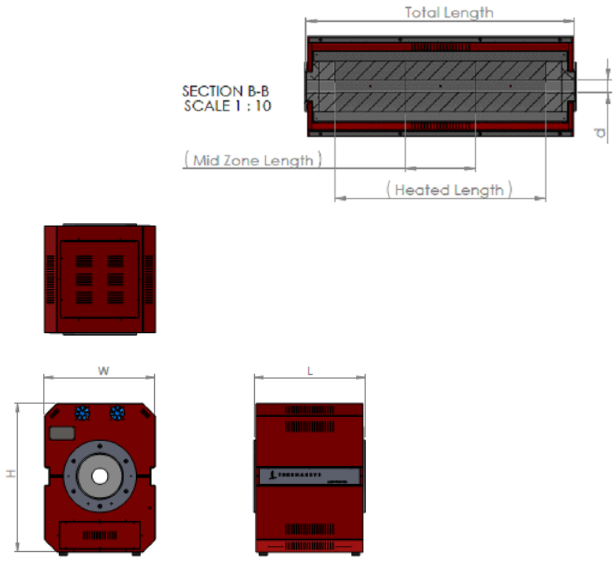
Versions with Clamp Flange (CF) port design provide quick-open loading port and optionally a quartz sight window.

THERMANSYS® End Gas Sealing Flanges are supplied for work tubes diameters from 1΄΄ το 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.

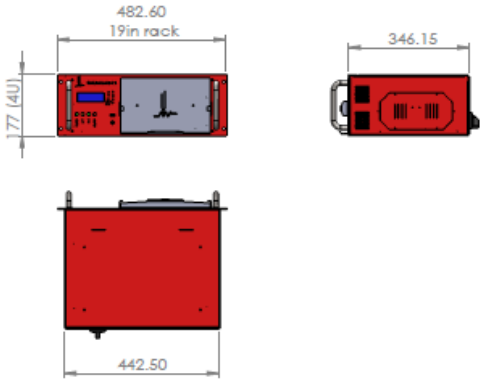
Mounting Stands.

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-AW1-T-....-1300 Furnace



Drawing 2. PYRO MODYLAR Main Controller

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Specifications and Ordering Information.

- Maximum operation temperature 1300 ˚C.
- Operating Power: 220 /400VAC – 50/60Hz.
- S 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 ±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 RCT-AW1-T-1Z…	Max. 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 *see drawing 1*	Nominal Max. Power (W)
_D4/L22-1300	1300 x 40	40x220x400	120	355x540x410	1000
_D4/L44-1300	1300 x 40	40x440x620	320	355x540x630	2000
_D4/L52-1300	1300 x 40	40x520x700	400	355x540x710	2500
_D7/L22-1300	1300 x 40	70x220x400	120	385x570x410	1500
_D7/L52-1300	1300 x 40	70x520x700	400	385x570x710	3800
_D10/L44-1300	1300 x 40	100x440x620	320	415x600x630	4000
_D10/L52-1300	1300 x 40	100x520x700	400	415x600x710	5000
_D15/L52-1300	1300 x 40	150x520x700	400	465x650x710	7000
_D20/L52-1300	1300 x 40	150x520x700	400	515x700x710	9000

TABLE2. Three Zone Models

Model Part Number RCT-AW1-T-3Z…	Max. 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 see drawing 1	Nominal Max. Power (W)
_D4/L66-1300	1300 x 40	40x660x220x840	480	355x540x850	3000
_D4/L88-1300	1300 x 40	40x880x440x1100	700	355x540x1110	4000
_D7/L66-1300	1300 x 40	70x660x220x840	480	385x570x850	4500
_D7/L88-1300	1300 x 40	70x880x440x1100	700	385x570x1110	6000
_D10/L66-1300	1300 x 40	100x660x220x840	480	415x600x850	6000
_D10/L88-1300	1300 x 40	100x880x440x1100	700	415x600x1110	8000
_D15/L66-1300	1300 x 40	150x660x220x840	480	465x650x850	7500
_D15/L88-1300	1300 x 40	150x880x440x1100	700	465x650x1110	9000
_D20/L96-1300	1300 x 40	150x960x520x1180	780	515x700x1190	15000

* *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-T-3Z_D4/L66-1300: This Part Number includes one RCT-AW1-T-1300 family furnace having 3 heating zones, 40mm internal diameter, 220mm mid zone length and one PYROMODULAR Main Controller.
  RCT-AW1-T-3Z-_D4/L66-1300_**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-T-3Z-_D4/L66-1300_**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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