THERMANSYS

REACTOR TYPE FURNACES
Vertocal Operation - Remote Control - Split Tube - Single Zone
Maximum Continuous Operation Temperature 1700 ˚C

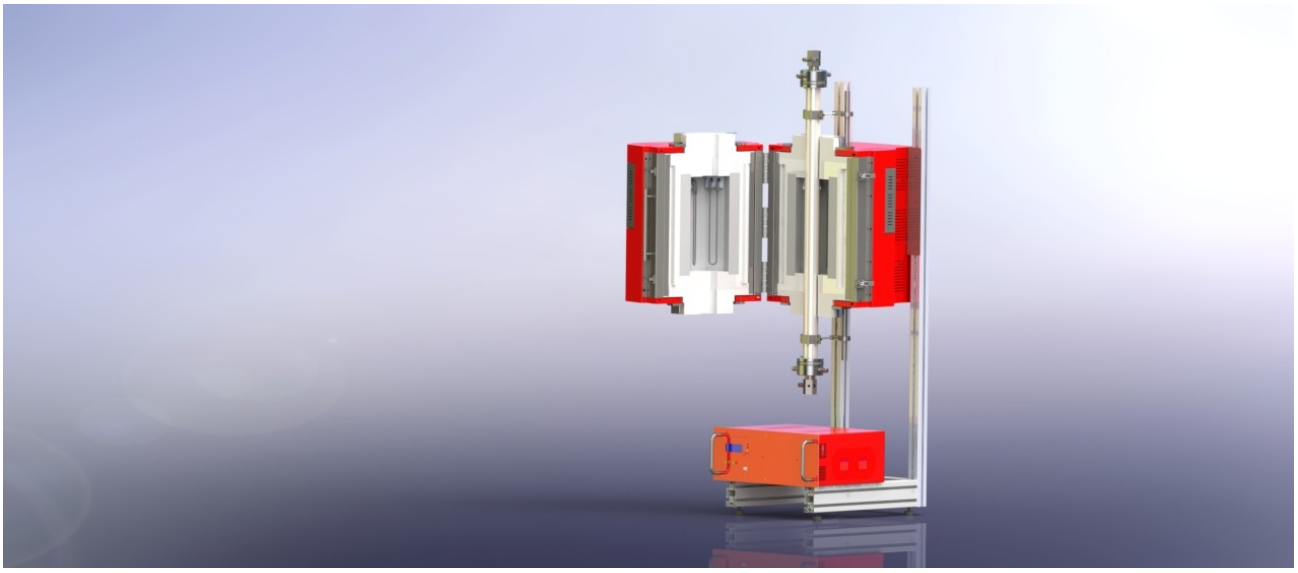
Model families: **RCT-AM2V-O-1700**

Description.

Being able to reach heat up rates as high as **50˚C per minute,** reach operating temperature of **1700 ˚C** and maintain it at **1700 ˚C continuously**, **RCT-AM2V-O-1700** models families represents a truly powerful ultrahigh temperature tubular heating device. 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.

Constructed using lightweight insulation and powered from high quality Molybdenum Disilicide ($MoSi_2$) elements, selected from KANTHAL SUPER® heating systems programs, these families are ideal choices for reliable, very accurate and uniform temperature control processes up to **1700 ˚C continuously**.

Offered as single zone models this series is designed for horizontal operation and can be used continuously or intermittently with no restriction. Molybdenum Disilicide ($MoSi_2$) elements with minimum pitch provide a very dense heater structure ensuring excellent temperature uniformity.



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® Super resistors driven by THERMANSYS® PCC control platform insure furnace long life operation up to 1700˚C continuous 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.
- 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.
- Deterministic over-temperature limiter with manual reset, in accordance with EN 60519-2 to protect the oven and load.

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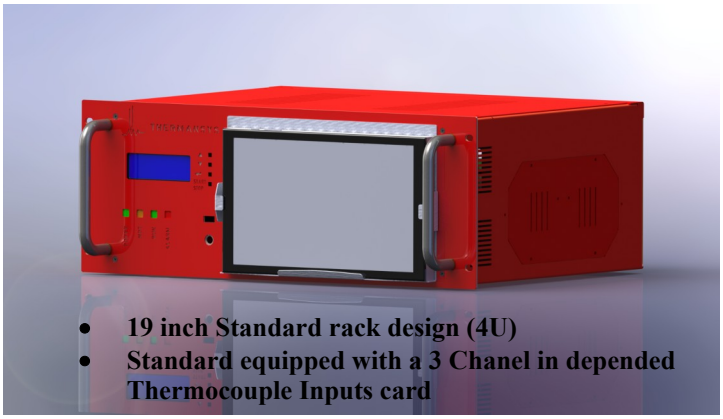
PYROMODULAR System at a Glance.

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**

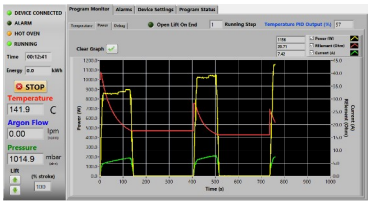
Optionally equipped with a remote, Touch Screen Computer, running the specially designed PYROLOGISM 2.0 software. Provides a really unique and friendly, windows oriented architecture interface with multiple, advanced features and peripherals.

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.

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 reactors).

Work-tubes.

Several work tube materials to choose from:

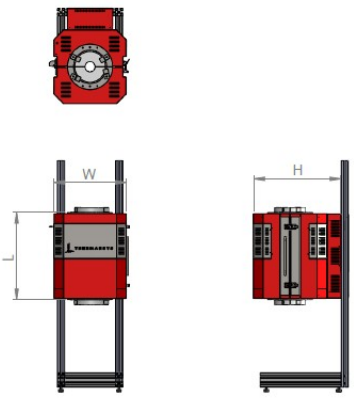
- Dense ceramic Alumina work-tubes for the highest temperature applications.
- Quartz work-tubes for maximum chemical inertia and for aggressive environments to work under vacuum or low pressure conditions up to 1100 ˚C continuously.
- KANTHAL® APM™/APMT metallic (FeCrAl based) work-tubes to serve under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

Mounting Stands.

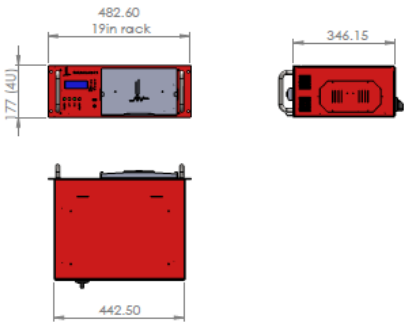
Assembled and constructed using BOSCH-REXROTH® structural profile systems these stands provide the ideal solution for vertical furnace stand alone positioning plus reactor and instrumentation mounting. Using the commercially available accessories, tubing and cable routing is easy and professionally accomplished. 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-AM2V-O-....-1700Model



rawing 2. PYRO MODYLAR Main Controller

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Specifications and Ordering Information.

- Maximum continuous temperature 1700˚C.
- Operating Power: 220 /400VAC – 50/60Hz.
- B type embedded thermocouples. Two in depended thermocouples for controller and over-temperature limiter
- Operation mounting orientation: Vertical
- Split tube design
- Temperature control accuracy ±1 ˚C.
- Heating/cooling rate 0.1-50 ˚C/min, setting resolution 0.1
- Exposed resistors type.
- Single zone models.
- In depended Thermocouple inputs: 3 chan. - B, K, R, S type -software configurable.

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-AM2V-O-1700 Models

Model Part Number RCT-AM2V-O_…	Max. Cont. Temp. ˚C x Heat up time* min	Furnace I.D. mm x Heated length mm	Uniform Temp. length mm ± 10 ˚C approx. **	Furnace external dim. WxHxL mm *see drawing 1*	Nominal Max. Power (W)
_D4/L12-1700	1700 x 120	40x120	80	430x560x380	1600
_D4/L20-1700	1700 x 120	40x200	160	430x560x460	2000
_D4/L28-1700	1700 x 120	40x280	240	430x560x540	2200
_D6/L20-1700	1700 x 120	60x200	160	450x590x460	2600
_D6/L28-1700	1700 x 120	60x280	240	450x590x540	3800
_D6/L32-1700	1700 x 120	60x280	280	450x590x580	4600
_D9/L28-1700	1700 x 120	90x280	220	480x620x540	5400
_D9/L32-1700	1700 x 120	90x320	260	480x620x580	6400

* *Furnace working with no load and both ends closed*
** *Simulated indicative data. Valid for 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-AM2V-O_D6/L20-1700: This Part Number includes one single zone furnace having 60mm internal diameter, 200mm heated length and one PYROMODULAR Main Controller.
  RCT-AM2V-O_D6/L60-1700_TSC: This Part Number includes one single zone furnace having 60mm internal diameter, 200mm heated length, one PYROMODULAR Main Controller plus the optional 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-AM2V-O_ D6/L20-1700**_Single.**
- Optional furnace accessories or mounding stands are ordered separately according to the respective data sheet ordering information.

HELLENIC PRODUCT.

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