Hi-Temp IR
INFRARED HEATERS

Infrared Heaters For Controlled Concentrated Heating

Model 5203

FAST. FOCUSED. CONTROLLED.

Infrared Heat. Instantaneous Results.

The Model 5203 Hi-Temp IR is a modular radiant heater. This heater utilizes both liquid and air cooling in order withstand continuous operation in high temperature applications.

Applications

- Aerodynamic heating simulation
- Thermal stress testing
- Heated tensile and fatigue testing
- Semiconductor wafer processing
- Chemical processing
- Stress relieving
- Metal brazing processes

Rev. Oct 2020

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PROVIDING CONTROLLED ENERGY
DRYING ▲ CURING ▲ HEATING

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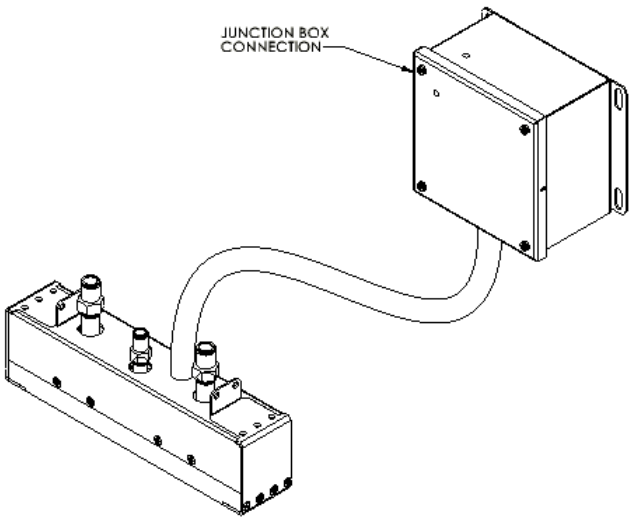
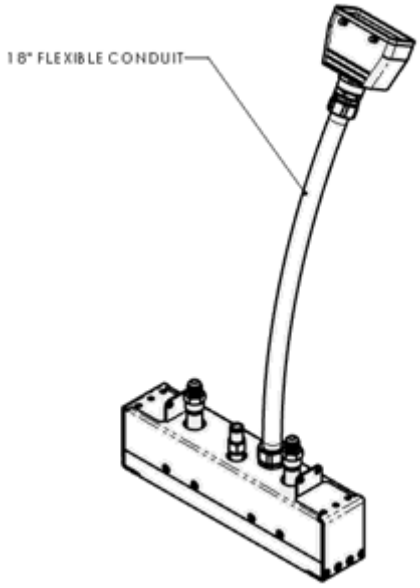
Features and Benefits-Hi-TempIR 5203

- Lamps reach 90 percent of full operating temperature within three seconds of a cold start.
- Localized heat focuses only on the desired area without heating the rest of the product.
- Operation with liquid and air cooling allows the heaters to withstand continuous high temperature operation.
- Non-contact heat source does not come in contact with product being heated.
- The infrared energy emitted from these heaters can be adjusted to match the heating requirements of a variety of applications.
- Repeatable results can be achieved for consistent process outputs.
- Research Inc. manufactures a complete line of process control instruments and SCR power controllers to control the operation of these heaters.
- The Model 5203 is modular in design allowing for multiple units to be installed in various arrays to create large areas of continuous heating output.

Product Drawing-Hi-TempIR 5203





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10397 West 70th Street, Eden Prairie, MN 55344 • USA
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Product Description- Hi-TempIR 5203

Heater Construction

Metal Housing

The Model 5203 uses rugged stainless steel housing to protect electrical components and connections.

Reflector

A computer optimized aluminum reflector backs the heater lamps, and efficiently directs heat towards the target.

Mounting Tabs

The sheet metal housing provides (qty.4) ¼" clearance holes for module mounting.

Heater Construction cont.

Infrared Lamps

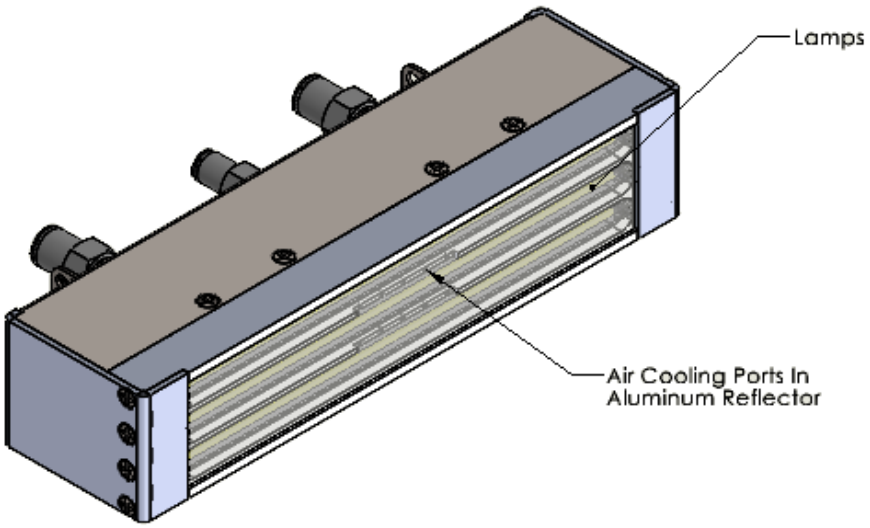
Short Wavelength Lamp

Tungsten filament lamps are generally used in applications where a product is to be heated or cured. These lamps may be operated in horizontal or vertical orientations. Typical short wavelength applications include:

- Heat treating metals
- Annealing metals
- Localized softening plastics for bending or forming

*Limitations

Absorption of short wavelength is affected by product color. Black and dark colors absorb well. Heating lighter colors may be more readily achieved with medium wavelength lamps.



Product Description- Hi-TempIR 5203 Control Options

Controls

The model 5203 heater is designed to be powered by one of the standard Research Inc. control panels. The model of the control panel required depends on (1) the voltage and amperage required to power the panel, (2) the electrical service in the facility, and (3) the type of temperature control required for the process. Custom power control systems are available for processes requiring multiple heater modules.

The 915 series control panels are for single phase power and the 935 series panels are for three phase power. Both series can be specified with circuit breakers from 20 amps to 50 amps and with manual or set point control.

Power Controller Chart for Model 5203

This chart shows the control panels that are available for all sizes of the Model 5203 Hi-Temp heater.

Heater Module	Power Controller		
	120 Volt 1 Phase	120 Volt 3 Phases	480 Volt 3 Phase
Model 5203-02	915-120-32	935-120-16	
Model 5203-10			935-480-32
Model 5203-16			935-480-50

Included Control Functions

All panels have an operator interface that allowed the heater to be controlled in any one of three operator selected modes.

Manual Operation

The digital control is used to directly set the percent output of the lamps from 0 to 100%.

Automatic-Temperature Control

The controller takes the input from a type “K” thermocouple or IR sensor and regulates the lamp output so the product temperature will match the preset value.

Automatic-Line Speed

The controller will take the output from a 0 to 10 VDC line that references line speed and vary the lamp output from 0 to 100% proportionally.

Once you have determined the appropriate Model 5203 Heater, please refer to the Power Controller to select the correct controller for your application.

Hi-Temp IR INFRARED HEATERS

Infrared Heaters For Controlled Concentrated Heating.

HEATER SPECIFICATIONS – Hi-TempIR 5203

Description	5203-02	5203-10	5203-16
Lamp part number	106587-001 (3 each included)	057541-112 (3 each included)	057541-050 (3 each included)
Quartz window p/n		0560-203 (1 each included)	
Coolant flow (min.)	.2gpm w/ 31°F temp rise. .75l/m w/ 17.3°C temp rise.	1.1gpm w/ 31°F temp rise. 4.2l/m w/ 17.3°C temp rise.	1.9gpm w/ 31°F temp rise. 7.2l/m w/ 17.3°C temp rise.
Volume air flow rate	4 SCFM. 113 liter/min. Lamp end seal and window cooling	4 SCFM. 113 liter/min. Lamp end seal and window cooling	4 SCFM. 113 liter/min. Lamp end seal and window cooling
Heater efficiency	72%	72%	72%
Power	3 kW, 120V, 1 phase, 25A	18kW, 480V, 1 phase, 37.5A	30kW, 480V, 1 phase, 62.5A
	NOTE: Specify if Single or Three phase wiring required when ordering heating system		
Interconnect wiring	6 pin latching connector pair with 18" flexible conduit.		
**Dissipated heat flux density	440W/in2 (680kW/m2)	520W/in2 (800kW/m2)	540W/in2 (835kW/m2)
Dimensions (L x W x H)	4.25" x 2.5" x 5.0" (10.8cm x 6.4cm x 12.7cm)	12.4" x 2.5" x 5.0" (31.4cm x 6.4cm x 12.7cm)	18.6" x 2.5" x 5.0" (47.2cm x 6.4cm x 12.7cm)
Weight	4.0lb (1.8kg)	7.0lb (3.2kg)	9.8lb (4.5kg)

**Orienting heaters in various geometric arrays can result in higher heat flux densities reaching the target.

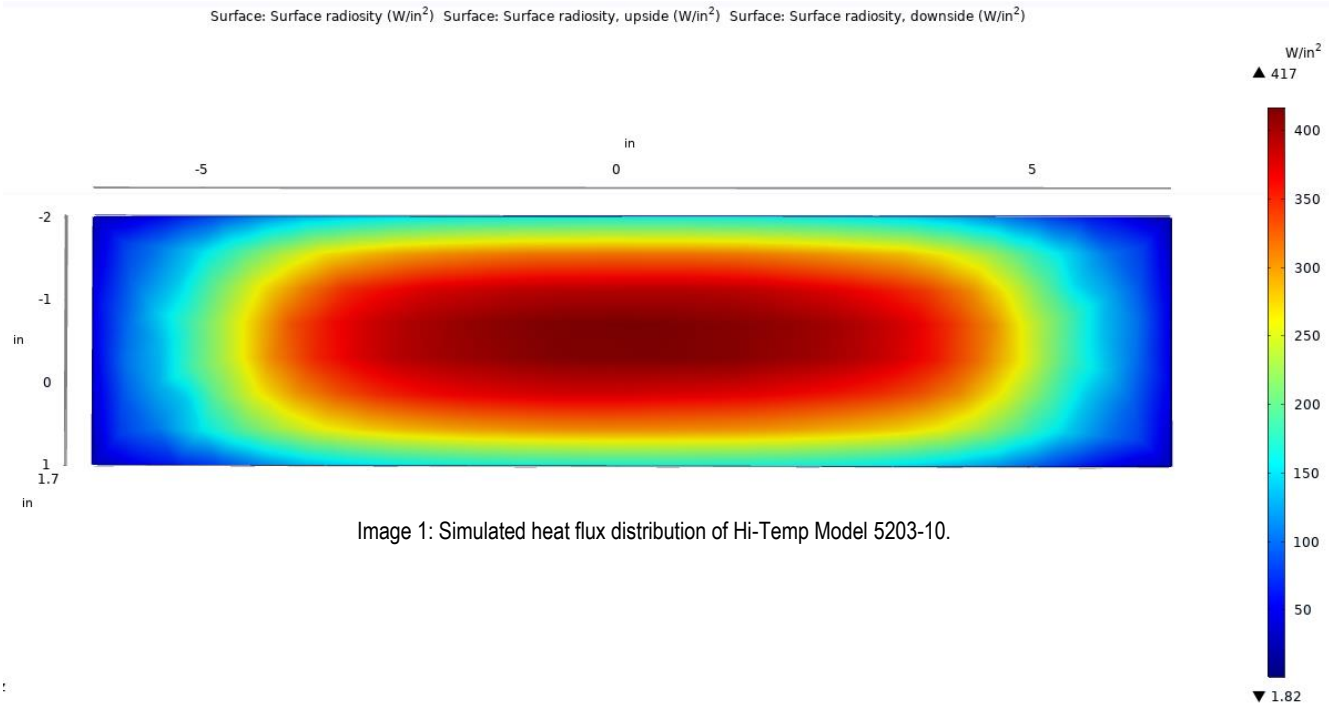


Image 1: Simulated heat flux distribution of Hi-Temp Model 5203-10.

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Example Test Case – Hi-TempIR 5203

Test Set-Up

A single 18kW 5203-10 heater is placed 1" above a 2"x8"x.25" piece of mild steel, weighing 1.65lbs. The mild steel is painted black in order to increase the absorptivity of the test sample. A thermocouple was placed on the bottom center of the test sample to monitor temperature. The 5203-10 is turned on to 100% output and temperature data is taken until steady state is achieved.

Image 2: Test set up

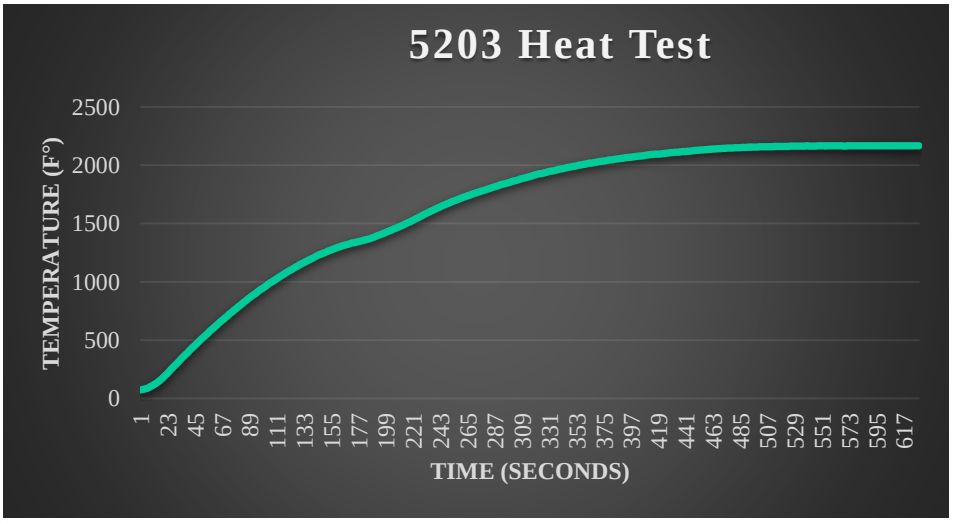
Test Results Summary

Time to 500°F = 48 seconds

Time to 1000°F = 1 minute 46 seconds

Time to 1500°F = 3 minute 35 seconds

Time to Steady State (2150°F) ≈ 8 minutes 3 seconds



Example Test Case – Hi-TempIR 5203

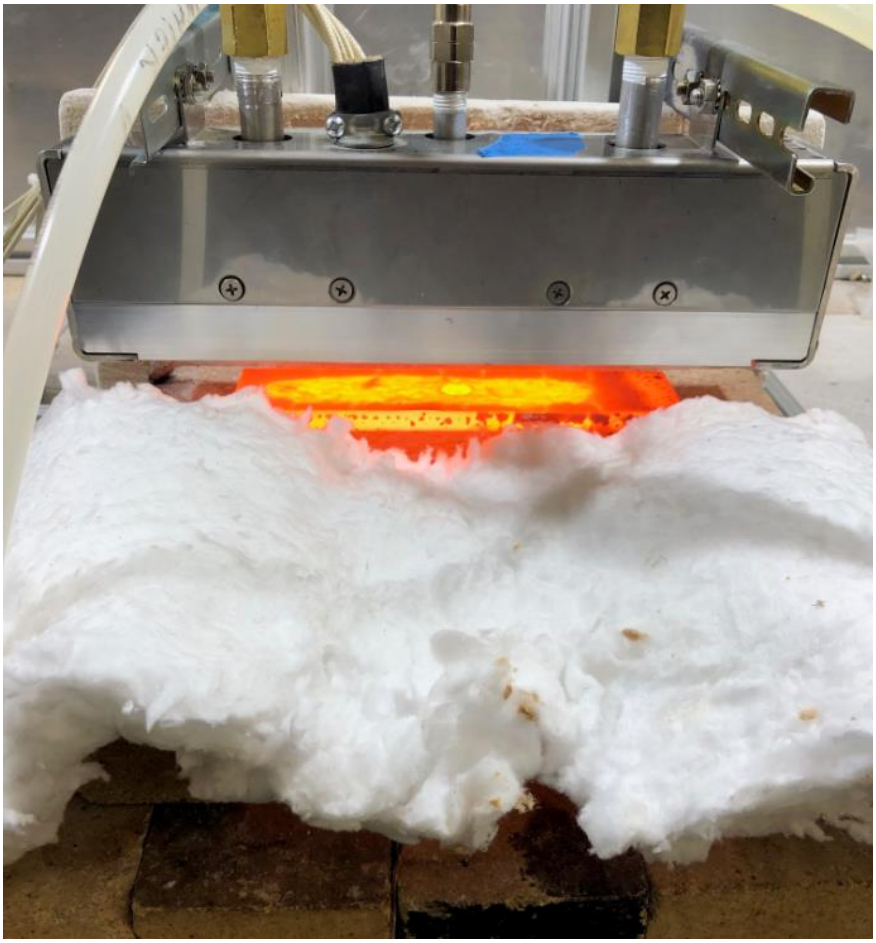
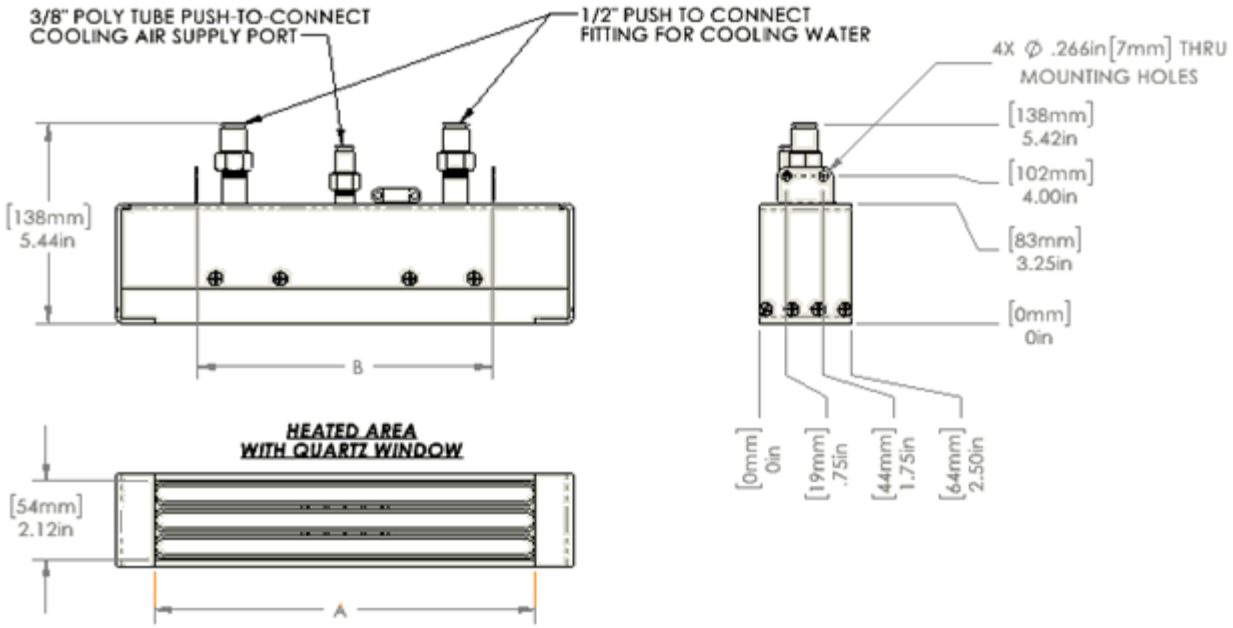


Image 3: Test sample immediately following test completion

HEATER SPECIFICATIONS – Hi-TempIR 5203

MODEL	Lighted Length	Dimension A	Dimension B
Model 5203-02	2 (50)	2.35	1.07
Model 5203-10	10 (254)	10.35	7.97
Model 5203-16	16 (406)	16.60	14.27

Dimensions – Hi-TempIR 5203



Hi-TempIR INFRARED HEATERS **Infrared Heaters For Controlled Concentrated Heating.**

How to Order – Hi-TempIR 5203

1. First Specify the heater Module

PRODUCT DESCRIPTIONS Hi-TempIR Model 5203	
Model	**Description**
5203	High Watt Density Heater Module
Code	Length (Lighted)
02 10 16	2 inches (50 mm) 10 inches (254 mm) 16 Inches (406 mm)
Code	Custom Options
00	None

*** Example: 5203-02-00**

2. Second – Specify the Power Controller

Heater Module	Power Controller		
	120 Volt 1 Phase	120 Volt 3 Phases	480 Volt 3 Phase
Model 5203-02	915-120-32	935-120-16	
Model 5203-10			935-480-32
Model 5203-16			935-480-50

3. Third – Order the Heater Module and Control Panel

*** Example: Model 5203-10-00 Hi-TempIR and Model 925-480-30 Power Controller**

Products Available from

Research, Inc.

Research, Inc. is the industry leader in the design, development and manufacture of electric infrared heating components and integrated heating systems. Our products are designed to meet a wide variety of process requirements including the drying, heating, curing, soldering, bonding and annealing of many different materials.

Whether it's one of our standard products or a custom heating system, we are committed to providing solutions to meet our customer's most demanding heating needs. The following types of heaters are available:

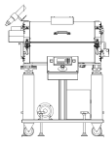
ControlIR® Infrared Heaters

All Model 5420 ControlIR®s have a power cable and plug to connect to a wall receptacle and a terminal block to terminate the wires coming from the heater. They all use a phase angle fired SCR to control voltage.

DryIR® Infrared Heaters

An aluminum reflector and either medium or short-wave lamps provide a band of heat from .5" - 4" wide. Can be used for water-based drying, solvent-based drying and adhesive curing.

ExtrudeIR® Infrared Heaters

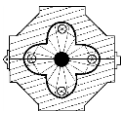


The Model 4069E ExtrudeIR curing System uses high intensity infrared lamps and polished aluminum reflectors to deliver heat precisely where it is needed for many curing and drying applications on extrusion lines.

LampIR® Infrared Heaters

Research Inc. specifies tungsten filament halogen lamps in most of its heaters. Halogen gas is added to the inert lamp gas to increase the life of the lamp. As the heater operates, tungsten slowly evaporates from the filament and is combined with the halogen to create a tungsten halide.

ChamberIR® Infrared Heaters

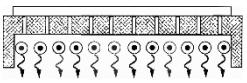


The Research, Inc. chamber heater can be ordered in many different sizes for your specific application.

LineIR® Infrared Heaters

A lamp and formed reflector that concentrates heat precisely on a .25" wide line. Excellent for forming plastic, local heat treating and drying ink

PanelIR® Infrared Heaters



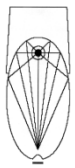
Designed with either ceramic or aluminum reflectors, the heater can provide consistent heat over a large area. Used for most drying and curing applications.

ProfileIR® Infrared Heaters

The Model 4069 ProfileIR® curing system uses high intensity infrared lamps and polished aluminum reflectors to deliver heat precisely where it is needed to cure irregularly shaped profiles.

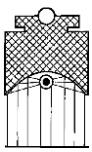
It can instantaneously give a surface cure that eliminates marks that occur when uncured rubber rubs on a conveyor.

SpotIR® Infrared Heaters



A single lamp and reflector heating system that focuses energy on a small (.25") target. Instant on/instant off capability makes it ideal for applications such as soldering, localized heat treating, and stress relieving.

StripIR® Infrared Heaters



A lamp and formed reflector that provides even heat distribution across a 1.7" wide strip. Can be used for curing, drying and precise heating.

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