

Model 6020 User's Manual



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Another quality product from:



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Dear Valued Customer:

Thank you for purchasing a Model 6020 DryIR® infrared heater. We believe it is the finest heating system of its type and are confident you will think so also.

This instruction manual has been carefully prepared to ensure you will be able to easily install and operate the Model 6020 heater and to fully realize all its inherent capabilities. We invite your comments as well as any issues you may have regarding this manual or the Model 6020.

Requirement

Appropriate Contact

Additional information regarding application of the Model 6020 heater or other Research Inc. products.

Your local sales representative.

Ordering additional Research Inc. products or Manuals.

Your local sales representative or Research, Inc. Customer Service (952) 949-9009

Technical assistance and training.

Research Inc. Factory Service (952) 949-9009

Once again, let us welcome you to the growing family of Research Inc. customers. We look forward to working with you in the future.

Sincerely,

Terry Nigon
President
Research Inc.

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Section 1 – INTRODUCTION

The Model 6020 DryIR[®] Infrared line heater is designed for drying applications that requires a clean, responsive, non-contact heat source.

Typical applications for the Model 6020 include:

- Water-based drying
- Solvent-based drying
- Adhesive curing



The Model 6020 includes the following major components:

Heater Module – The heater consists of a polished aluminum reflector that directs the infrared energy generated by two 1000-watt medium-wave quartz halogen lamps, that are included with the heater. Heated widths of one-half, one, and two inches (13, 25, and 54 mm) are offered for the Model 6020, with a heated length of 10 inches. Additional lamps can be ordered separately from the heater.

Air Cooling – An integrated fan blows air past the lighted lamps resulting in a heated air impingement on the target product surface. When combined with quartz lamps, the result is immediate evaporation and fast drying rates.

Electrical Cable – The Model 6020 heater is electrically wired from the lamps to an intermediate terminal block within the heater. An 8-foot (2.4 m) electrical cable is supplied with each heater.

Optional Mounting Kit – The Model 6020 can be ordered with an optional mounting kit.

Optional Power Control System – The Model 6020 can be ordered with a Power Control "PC" Option. This configuration consists of the Model 6020 heater, a Model 5620 ControlIR[®] SCR Power Controller, and eight feet (2.4m) of electrical cable connecting the heater to the controller. Please see the Model 5620 ControlIR[®] product data sheet for further detail.



Figure 1-1. Model 6020 with the PC Option

Section 2 – FEATURES & BENEFITS

The design and functionality of the Model 6020 supplies a variety of features and related benefits:

Rapid Response – The medium-wave quartz halogen lamps heat up and cool down instantly in response to power control signals.

Continuous Operation – The aluminum construction of the Model 6020 combined with the air-cooling, allows the heater to withstand continuous high-temperature operation.

Modular Design – The modular design of the heater allows units to be installed in a variety of configurations suitable for many applications.

Electrically Enclosed Heater Module – All electrical connections for the Model 6020 are completely enclosed for safety.

Target Product Sizes – The Model 6020 generates radiant energy and directs it into a band approximately 10 inches (254 mm) long and 0.5, 1.0 or 2.0 inches (13, 25, or 51 mm) wide. See the schematic below for reflector options.

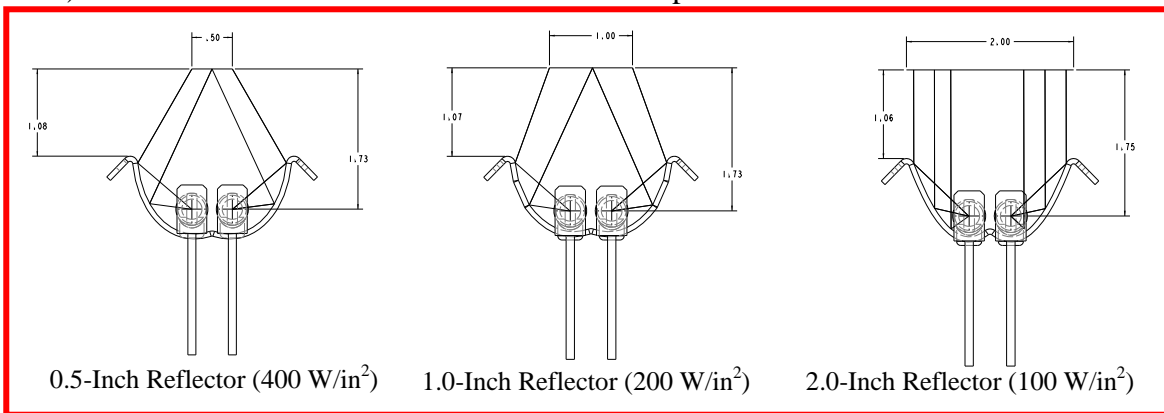


Figure 2-1. Model 6020 Reflector Options

Heat Flux Density – Heat flux densities up to approximately 400 watts per square-inch (62 watts per square-cm) can be achieved with the Model 6020 with the 0.5 inch width, operating at the lamp’s rated voltage. Heat flux density is a product of the lamp type, applied voltage, and distance between the lamp and the target surface. For best results, it is recommended that the Model 6020 be operated at a distance of 1.0 inch from the product.

Controllable Energy Output – The infrared energy emitted from the heater can be adjusted to match the heating requirements of a variety of applications.

The Model 6020 ordered with the ‘PC’ option is a complete heating solution designed with a number of features including heater on/off control switching, potentiometer local control, and a timer.

Section 3 - SPECIFICATIONS

| | 120 Volts | 240 Volts |
|--------------------------|---|---|
| Maximum Drying Width | 0.5, 1.0, or 2.0 inches (13, 25, or 51 mm) | 0.5, 1.0, or 2.0 inches (13, 25, or 51 mm) |
| Overall Length | 14.63 inches (372 mm) | 14.63 inches (372 mm) |
| Heated Length | 10 inches (254mm) | 10 inches (254mm) |
| Lamps (2 Total) | 1000W, 120V Rapido Lamps | 1000W, 240V Rapido Lamps |
| Lamp Orientation | Horizontal Only | Horizontal Only |
| Amps at Applied Voltage | 17 amps | 8.5 amps |
| Power at Applied Voltage | 2.0 kW | 2.0 kW |
| Site Requirements | 120V/25 amp service | 240V/15 amp service |
| | Personnel to position the system in place | |
| Blower Air Volume | 75 CFM (2.1m ³ /min) | |
| Power Connection | Electrical power cord (8-foot (2.5 m) length) | |
| Mounting | 6 mm threaded mounting screw (Mounting Kit available) | |

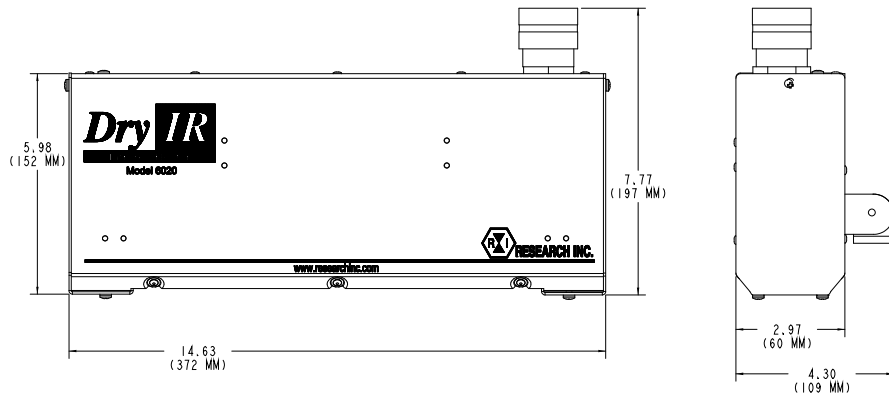


Figure 3-1. Model 6020 DryIR Dimensions - Inches (mm)

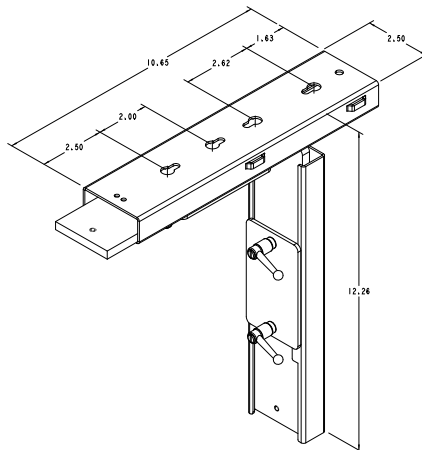


Figure 3-2. Optional Mounting Kit - Inches

Ordering Information – Model 6020

| Model | Product Description |
|--------------|---|
| 6020 | DryIR Infrared Heater (Includes 2 medium-wave lamps) |
| Code | Dryer Length |
| 10 | 10 inches (254 mm) |
| Code | System Voltage |
| 120 | 120 Volts |
| 240 | 240 Volts |
| Code | Drying Width |
| A | 0.5 inches (13 mm) |
| B | 1 inch (25 mm) |
| C | 2 inch (50 mm) |
| Code | Additional Options |
| MK | Mounting Kit |
| PC | Model 6020 supplied with Model 5620 SCR Power Controller and interface wiring |

Ordering Example – Model 6020

| | Model | Dryer Length | System Voltage | Drying Width | Additional Options | Additional Options |
|-----------------------------|--------------|---------------------|-----------------------|---------------------|---------------------------|---------------------------|
| Typical Model Number | 6020 | 10 | 240 | A | MK | PC |

Accessories, Spare & Replacement Parts – Model 6020

| Model | Description |
|--------------|--|
| 106876-001 | Mounting Kit |
| 083502-004 | Replacement Electrical Power Cord (8-foot (2.5 m) length) |
| 106877-003 | Lamp Kit, 120V (includes 2 lamps and connectors) |
| 106877-002 | Lamp Kit, 240V (includes 2 lamps and connectors) |
| M6020 | Additional Model 6020 Operation Manual (one supplied with each heating module) |

Section 4 – SAFETY

GENERAL: The Model 6020 heater is designed for safe operation. Nevertheless, installation, maintenance, and operation of the heater can be dangerous for a careless operator or maintenance person. For your safety and the safety of others, read the instructions in this Instruction Manual and follow these safety practices to help prevent accident or injury.

INFRARED RADIATION - CAUTION! Continuous exposure to high intensity infrared radiation at close proximity could be harmful to eyes or skin. Although infrared lamps emit negligible ultra violet electromagnetic radiation, harmful burns can still result if an operator is in close contact with lamps being operated at high intensity.

Because of the brilliant light emitted by infrared lamps at full intensity, it is recommended that eyes be shielded from the glare if observing the lamps for an extended period of time. Use suitable shaded lenses or dark glasses.

HIGH TEMPERATURES: Parts of the heater may exceed 500°F (260°C). Contact with the lamps, reflector, or metal parts near the lamps may cause severe burns.

WARNING!

NEVER place hands under or in front of the heating elements.

ALWAYS allow heating element to cool at least three minutes before touching the lamps or adjacent parts.

ELECTRICAL SAFETY: There is danger of electrical shock when servicing the heater.

CAUTION! Observe all applicable local and national electrical codes and ensure that a safe electrical ground system is installed before attempting to operate the heater. Refer to the Section 5 for proper installation procedures.

WARNING!

ALWAYS disconnect the external power lines prior to servicing the heater.

ALWAYS disconnect the power lines AND any optional interlock circuits before installing or changing lamps.

NEVER operate the heater with end covers removed.

FIRE SAFETY:

1. Obey the same fire-safety rules you observe when working with hot plates, propane or acetylene torches, soldering irons, and other equipment that operates at extremely high heat.
2. Remove all solids, liquids, and gases that burn easily from the area around the heater.
3. Know where the nearest fire extinguisher is located and how to use it.
4. Know how to put out fire from all the types of material near the heater.

Section 5 – INSTALLATION

5.1 UNPACK AND CHECK FOR DAMAGE: Remove the Model 6020 heater from its shipping container and associated packaging. Check the unit for any potential damage due to shipping. In the unlikely event damage has occurred, keep all shipping containers and materials in order to file a damage claim with the shipping company responsible for shipping the unit.

5.2 MOUNTING THE HEATER: The Model 6020 heater should be mounted to a framework or structure that is designed to support the weight of the heater and provide stability to the unit. If a transport is being used in the application, the heater module should be mounted so it is level with the transport and should be spaced from one inch (25.4 mm) above the transport surface.

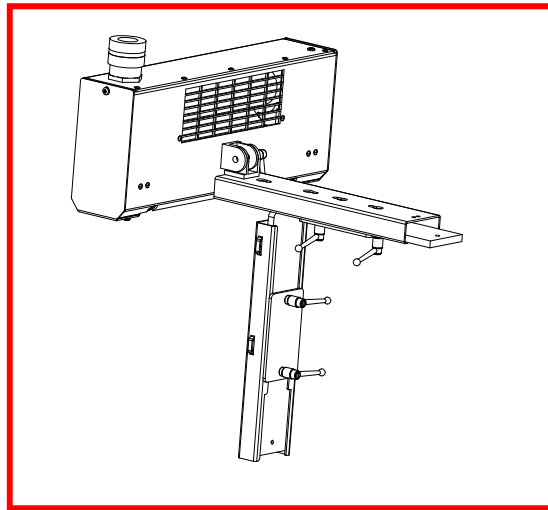


Figure 5-1. Model 6020 Pictured with Optional Mounting Kit

5.3 ELECTRICAL CONNECTIONS: The lamps of the Model 6020 are electrically wired to an intermediate terminal block within the heater. An electrical schematic can be found in the Appendix.

Each heater is supplied with an 8-foot (2.4 m) electrical cable. If ordered with the PC option, this cable is directly hard wired into the Model 5620 power controller.

Section 6 – MAINTENANCE

The repair and maintenance of the Model 6020 includes replacement of the lamps and cleaning of the reflector.

6.1 LAMP REMOVAL/REPLACEMENT/INSTALLATION: The lamps are included with the Model 6020 heater, but are shipped separately to avoid breakage. The following procedure details the process to install or replace the lamps in the Model 6020 (reference Figure 6-1):

Note:

- **Remove all power from the heater BEFORE attempting to install/replace the lamps.**
- **Allow a minimum of 1/2-inch (12 mm) of slack in the lamp lead so that the lead is not taut when inserted into the lamp terminal block.**
- **Always take care to handle all lamps by the ceramic end seals and use clean cotton or latex gloves to prevent contamination of the quartz lamp envelope.**

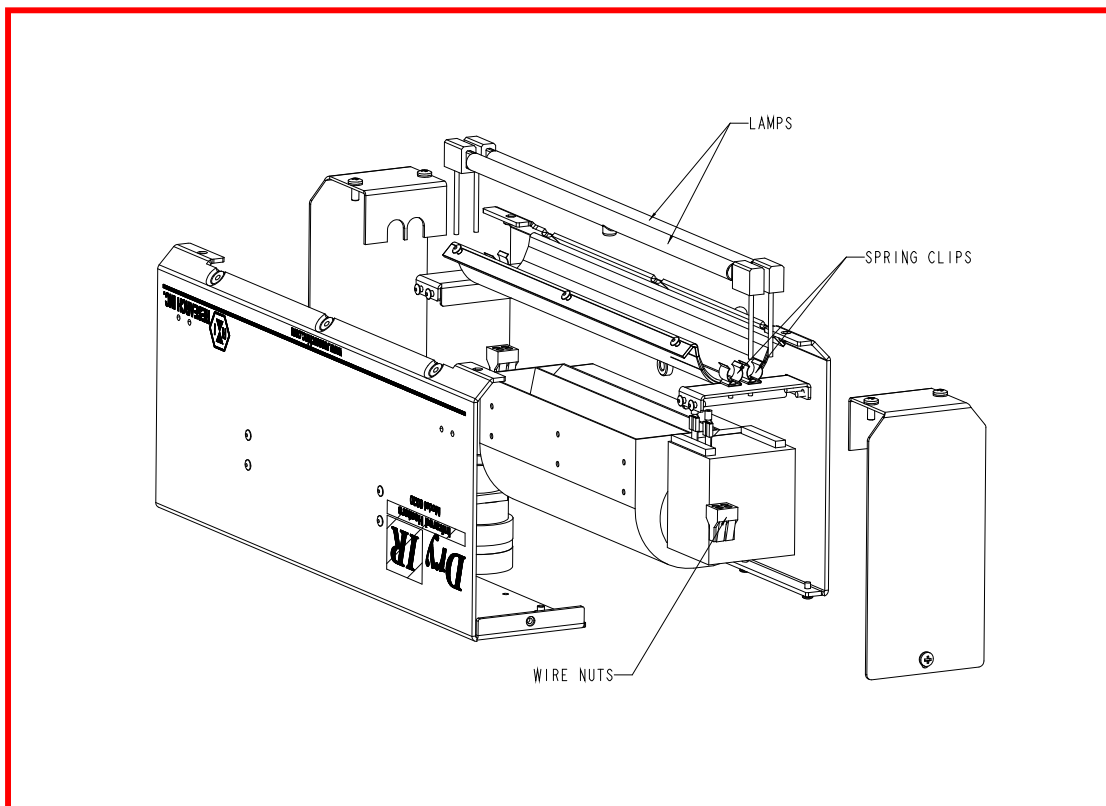


Figure 6-1. Model 6020 Spring Clip and Wire Nut Locations

1. Remove end-cover screws.
2. Remove end covers on both ends of the heater.
3. Pull the lead wires out of the wire nuts. (see Figure 6-1).

4. Gently pull the lamp out of the lamp clips, and set aside for disposal.
5. While holding the replacement lamp by the end seals, place the lamp into the lamp clips located on each end of the heater. Orient the lamp so that the gas fill tip, formed into the quartz tube of the lamp, points out away from the reflector.
6. Insert the bare wire of each insulated lamp lead into the wire nut that previously held the old lamp.
7. Form a loop within each lead along its length. This loop will act as a strain relief within the lead during normal operation of the heater.
8. Reinstall both end covers and secure each to the heater with the end cover screws.

6.2 Cleaning the Reflector: A clean reflector provides the greatest radiant efficiency. If the reflector surface becomes contaminated, it reflects less energy. The energy that is not reflected is absorbed by the reflector, and removed by the cooling water. This energy is lost energy.

The following procedure should be used to clean the Model 6020 reflector:

1. Remove the lamp as described in Section 6.1 – Lamp Removal/Replacement/Installation.
2. Clean the reflector with a mixture of warm water and common household ammonia followed by a thorough wipe-down using a clean, water-dampened flannel cloth.
3. Depending on the type of contamination present on the reflector, a suitable solvent may be required to remove the contamination. The solvent must be selected based on its inability to adversely affect the aluminum reflector.
4. Thoroughly wipe the reflector using the warm water/household ammonia mixture followed by the dampened flannel cloth.
5. Replace the lamps and the heater end covers as outlined in Section 6.1 – Lamp Removal/Replacement/Installation.

Section 7 – SPARE & REPLACEMENT PARTS

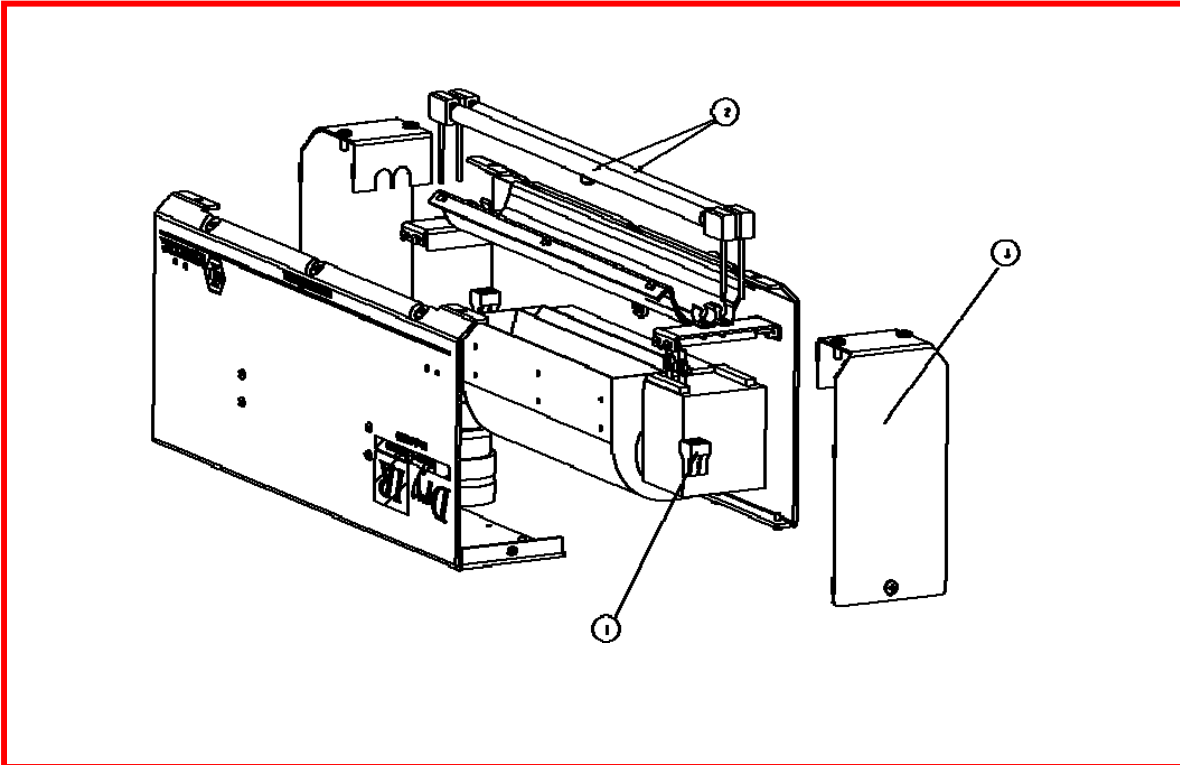


Figure 7-1. Model 6020 Parts Identification

| COMPONENT NO. | QTY | ITEM | DESCRIPTION |
|---------------|-----|----------------|--|
| 055923-001 | 2 | 1 | PUSHWIRE CONN 2-18 AWG 4 POS. |
| 106877-003 | 2 | 2 _A | LAMP KIT - RAPIDO 1000 W. CER. END, 120V |
| 106877-002 | 2 | 2 _B | LAMP KIT - RAPIDO 1000 W. CER. END, 240V |
| 106763-001 | 2 | 3 | FAB - END REFLECTOR, 0.75 PRT |

Table 7-1. Model 6020 Spare & Replacement Parts

APPENDIX