Model 5560
Low Heat Density Heater
Instruction Manual

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Lo-Temp IR™ Series
Infrared Heaters

July 2000

Another quality product from:

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Printed in the U.S.A.

Dear Customer:

Thank you for purchasing a Model 5560 Lo-TempIR™ Low Density Heater. We believe it is the finest system of its type and are confident you will think so too.

For technical assistance, training, replacement parts and assemblies, or any other problems or questions, contact our Field Service specialists. They will do everything they can to help you or will put you in touch with someone who can.

This instruction manual has been carefully prepared to make sure you get out of your system all the capabilities we designed and built into it. To tell us how we could make the system, our support of it, or this manual even more useful, we invite you to call our product manager with your suggestions and recommendations.

Additional copies of this manual are available at reasonable cost from our Customer Service Department. 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,

Brad Yopp,
President
Research, Inc.

Contents

Section 1

Introduction

DESCRIPTION

The Model 5560 Low Heat Density Infrared Heater is a member of the LoTempIRTM family of heaters. This heater is designed to provide a low, uniform heat flux density (~ 5 to 10 watts/in2) up to 2 feet (0.6 m) away from the heater. The Model 5560 is available in heated lengths of 5, 10, 16, 25, and 38 inches (127, 254, 406, 635, and 965 mm). Each heater uses a standard 'T3-style' quartz halogen lamp readily available from Research Inc. The Model 5560 operates using natural, convection cooling currents and does not require an external cooling source like water or forced air.

Each Model 5560 heater module has a rugged zinc-plated steel frame that mounts easily to nearly any support structure. The heater's reflector is made from lightweight, specular aluminum that can be easily removed for cleaning. Using a combination of different sized heaters allows the user to create a heater array of virtually any size or shape.

TYPICAL APPLICATIONS

The Model 5560 is designed for easy use in many different industrial applications. Some of the more common uses include:

- **Adhesives and Paint**
  Drying or curing adhesives or paint where high intensity heaters may cause damage to substrate materials
- **Boost Heaters**
  Providing a boost heater on an existing oven. The multiple mounting options make the Model 5560 easy to use in retrofit situations.
- **Plastic Processing**
  Heating plastics for bending or forming (thermoforming). Many plastics require an elevated temperature during processing. The Model 5560 can provide a zone of heat at the forming or bending station that can improve the efficiency of the operation.
- **Mobile Heaters**
  Providing the heating element in a mobile paint repair station. The Model 5560 provides the heat density and area that make it an excellent choice for many portable heating equipment applications.
- **Flash Ovens**
  Drying the moisture off dipped metal products (such as auto bodies) in a flash oven. The modular design of the Model 5560 makes it easy to construct and zone an oven that exactly meets the geometric requirements for a pre-heat application.

FEATURES

Configurable for Different Applications

The Model 5560 is available in five different heated lengths allowing for any size or shape heating array to be easily assembled. A number of mounting holes are located on the frame of each unit allowing the heater to be easily mounted to a user-supplied framework.

Convection Cooling

The Model 5560 does not require an external cooling source for normal operation. The heater is designed to dissipate absorbed energy by normal convection cooling.

Easy Cleaning

The aluminum reflector of the Model 5560 can be easily removed form the housing after installation for cleaning. Many processes produce contaminates that eventually coat the reflector surface resulting in diminished efficiency. The reflectors on each Model 5560 can be easily removed, appropriately cleaned, and reinstalled with minimal effort. The reduction in down time and increase in heater efficiency makes the Model 5560 attractive in many applications.

Section 2

Safety

GENERAL

The Model 5560 Heater is designed for safe operation in all installations. However, the installation, maintenance, and operation of the heater can be dangerous if proper installation and operating procedures are not followed. All of the instructions in this manual should be followed to ensure proper heater installation and operation in order to prevent accidental injury to operating personnel and/or surrounding equipment.

INFRARED RADIATION

CAUTION!
Exposure to high intensity infrared radiation will cause severe burns to skin and can be extremely harmful to eyes.

Appropriate protective eyewear must be worn when directly observing powered, radiant energy lamps.

HEATER TEMPERATURES

Certain areas of the Model 5560 heater my exceed 500°F (260°C) while the heater is in operation. Exercise extreme care when working in close proximity to an operating heater.

⚠ **WARNING!**
NEVER place any part of the body under or near any part of the heater while power is applied.

Always allow the heater to cool sufficiently (at least 5 minutes with blower operating, longer if the blower is not operating) before servicing any part of the heater, including lamps or adjacent parts.

ELECTRICAL SAFETY

Due to the high voltages present in typical Model 5560 installations there is danger of electrical shock when installing, operating, or servicing the heater. Exercise extreme caution when handling or working with these high voltages.

CAUTION!
All applicable local and national electrical codes should be followed to ensure proper installation and operation of the Model 5560. A safe electrical ground must also be provided and properly installed on the heater before attempting to operate the unit

⚠ WARNING!

Power lines and any other affiliated heater circuitry must be disconnected prior to any servicing issue including lamp installation and change-out.

The Model 5560 heater should never be operated with the end covers of the heater removed.

The presence of open load-to-ground must be verified after lamp installation into the Model 5560 and before system power is applied.

Section 3

Installation

TOOLS REQUIRED

- Screwdriver (blade-type)
- Screwdriver (Phillips-type)
- Metal Punch
- Hammer
- Pliers

MECHANICAL INSTALLATION

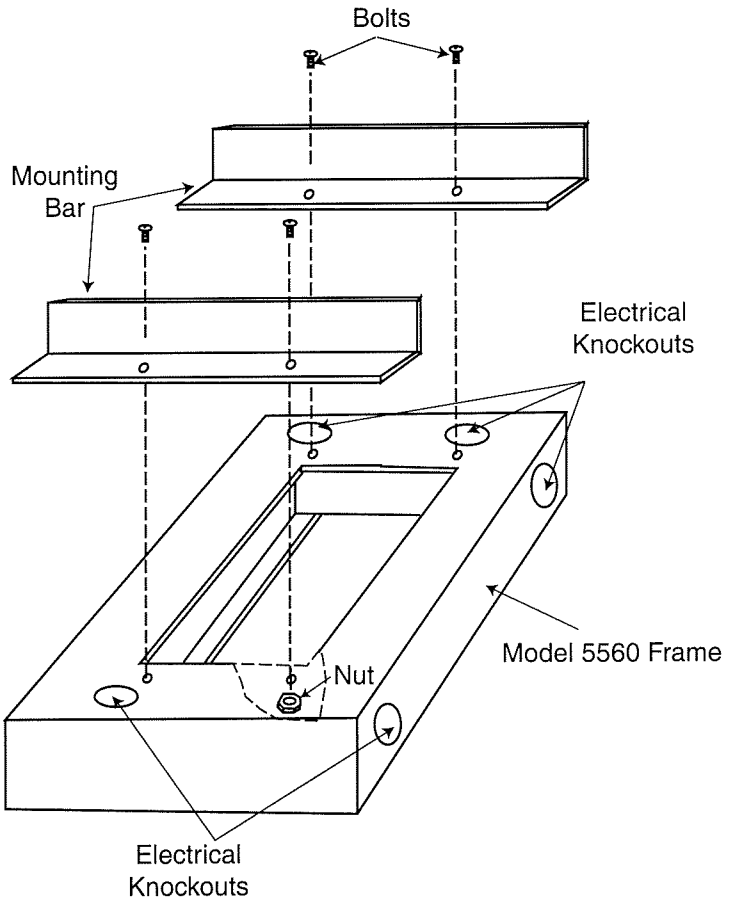
As shown in Figure 3-1, 0.281-inch diameter holes are provided in the frame of the Model 5560 for use in mounting the heater to an appropriate frame or structure. Four of these holes reside on the back of the heater with additional holes along each side of the heater frame. Electrical 'knock-outs' are also formed into the heater frame and are used to bring electrical wiring into the heater body. The location and dimensions of these holes are specified in Section 6, Table 6-1.

Determine how the heater(s) is to be mounted to the mounting structure before physically attaching the heater to the structure. Once the proper mounting location has been determined, remove the appropriate electrical 'knock-out(s)' from the heater frame using the metal punch and hammer (pliers may be necessary to aid in the 'knock-out' material removal. Discard the 'knock-out' material.

Any of the mounting holes, along with appropriate nut and bolt combinations, can be used to sufficiently mount the Model 5560 to an appropriate structure or to one another. The distance between the heater and target should be determined before mounting the heater. The heater should be mounted so that each end cover may easily be removed for lamp installation.

Multiple Model 5560 Lo-TempIR heaters can be mounted side-by-side to form large heating arrays.

Figure 3-1 Typical Model 5560 Heater Installation Drawing



ELECTRICAL INSTALLATION

CAUTION!
Electrical wiring and installation should meet or exceed local electrical standards and codes. Consult with appropriate electricians or electrical specialists before wiring and/or installing the Model 5560 Lo-TempIR heater.

⚠ WARNING!
The electrical power required to operate the Model 5560 Lo-TempIR is extremely dangerous. Make sure all electrical power that is to be provided to the Model 5560 Lo-TempIR is adequately turned off prior to making any electrical connection to the heater.

Prepare heater unit for wiring

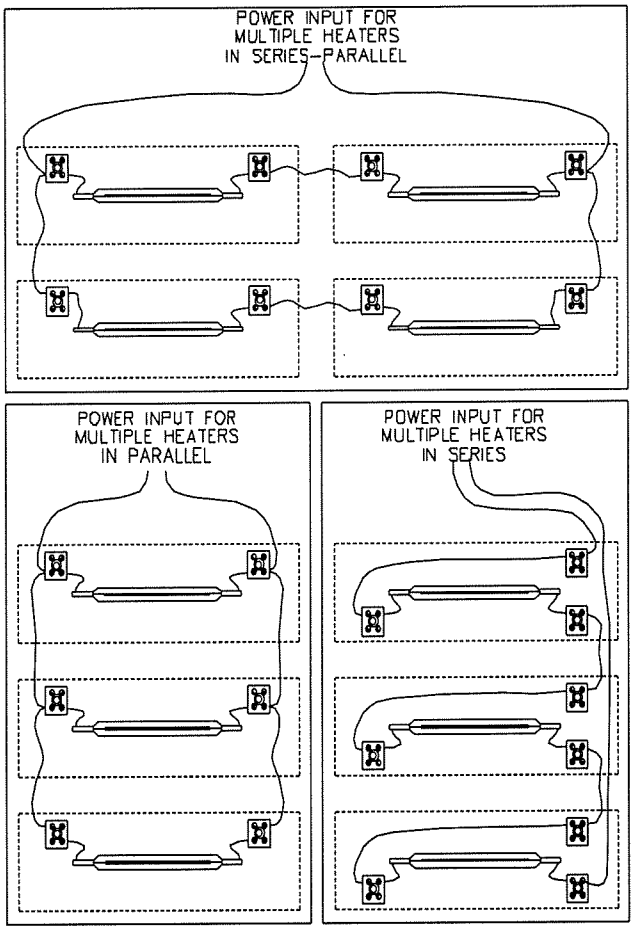
Remove both end covers on the heater by turning out both end cover retaining screws, using the screwdriver, until the end cover slides forward and lifts away from the heater frame. The screws are designed to remain in the heater as the covers are removed. Remove each of the end covers and set them aside.

Install high temperature wire

As shown in Figure 3-2, multiple Model 5560 heaters can be wired in series or in parallel fashion. Tabs are formed into the heater frame and act to hold the wiring from one end of the heater to the other end (as would be found in multiple heaters wired in series).

Install the appropriate length of wire through the electrical 'knock-out(s)' and attach to the appropriate electrical terminal block on each end of the heater. Route the wire out of the heater to the power control system (or to the next heater unit, depending on desired wiring configuration). Take care to appropriately attach the wire to surrounding (non-conductive) support structure from the heater to the power control system.

Figure 3-2 Typical Model 5560 Wiring Schemes



Lamp Installation

CAUTION!
Remove the clear plastic protective sheeting from the Model 5560 reflector and both end covers prior to lamp installation and operation of the heater.

CAUTION!
Wear soft, clean, oil-free flannel or plastic gloves when handling halogen, quartz lamps. Oils and contaminants are readily transmitted to the quartz by unprotected hands and can cause premature lamp failure.

Carefully place lamp into heater frame assembly and push the lamp into the lamp clip on either end of the lamp frame. Loosen one of the terminal block screws to a point that will allow the lamp lead to be inserted. Insert the each lamp wire into the terminal block and tighten the screw so that the lamp wire is held securely. Leave a small amount of 'slack' in the lead so that any expansion of the heater will not cause undue stress to the lamp while in operation. Replace the heater end covers on both ends of the heater and tighten the retaining screws so the covers are both held securely.

Section 4

Maintenance

Periodic inspection for dirt and contaminants on the reflector surface and lamps, and removal of such, will ensure that the Model 5560 Lo-TempIR continues to operate efficiently and will extend lamp life.

In dirty environments or heating operations the lamps and reflectors may become contaminated by smoke, dust, fingerprints or other foreign matter. When this occurs it is recommended that they be cleaned using the following procedure:

⚠ WARNING
Disconnect all power running to the Model 5560 Lo-TempIR from the power source and allow the heater to cool at least five minutes before continuing.

CAUTION
Wear soft, clean, oil-free flannel or plastic gloves when handling quartz lamps. Skin oils and other contaminants can cause premature lamp failure if they are allowed to reside on the quartz lamp.

Using a soft, dry cloth or tissue, wipe the residue from contaminated lamps and reflectors. A solution of household strength ammonia and water can be used as a solvent.

Section 5

Operating Instructions

Operation of the Model 5560 Lo-TempIR is relatively straight-foreward once installed and (properly) electrically wired to an appropriate power control source.

The intensity of the infrared energy generated by the lamps is directly proportional to the amount of electrical power supplied to the lamps. Determining the amount of electrical power supplied to the lamps in the Model 5560 Lo-TempIR depends on a variety of parameters including (but not limited to):

- Infrared absorptivity of target product (eg. target material properties including: color, surface condition, and temperature)
- Desired product heating rate
- Distance from heater to target product
- Speed of target product moving through the heating area

In general, a limited number of experimental tests to determine the optimal settings (i.e. heater-to-target distance, applied power to the lamps, product target speed through the heating area, etc.) should be performed for any Model 5560 Lo-TempIR installation. Following this approach will yield the best operational settings for a given application.

Depending on the application (and if feasible), a temperature control feed back system may be used to control the energy output of the Model 5560 Lo-TempIR. A typical control system includes power control system, temperature measurement capability(ies), target product tachometer feedback (moving target applications), and alarm/emergency shut down capability(ies). Employing such a system allows for continuous monitoring of the heating process and ensures continuous, steady state infrared energy output from the heater.

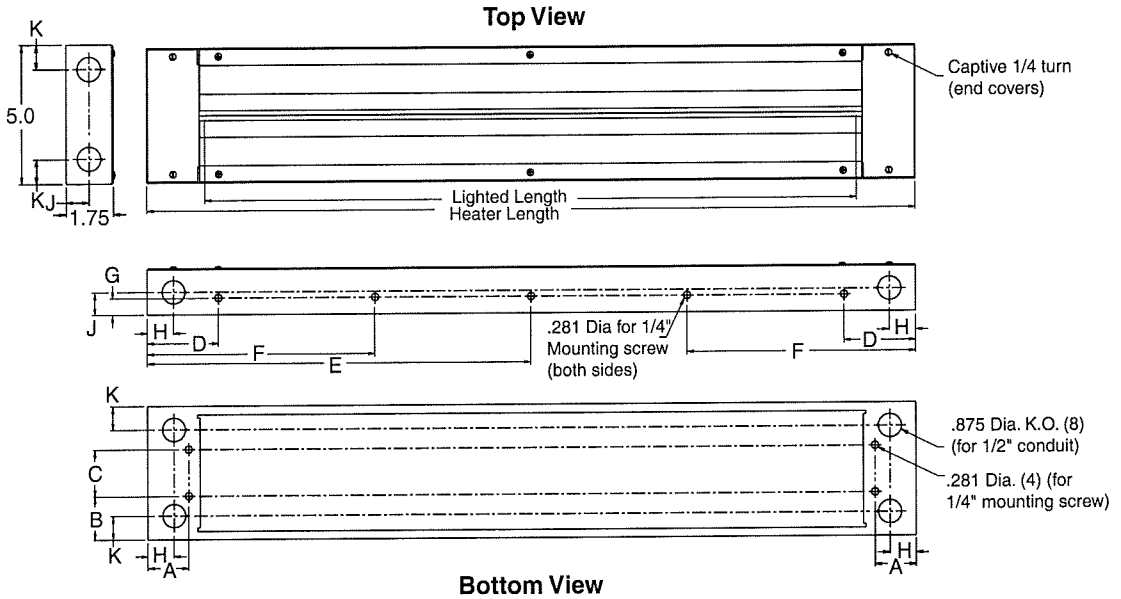
Beyond routine, periodic maintenance (See Section 4 - Maintenance) and following all safety practices (See Section 2 - Safety) the Model 5560 Lo-TempIR requires no additional care or handling for correct, efficient operation.

Dimensions and Specifications

Dimensions – Model 5560

Model 5560	-05	-10	-16	-25	-38
LL, Lighted Length, in (mm)	5 (127)	10 (254)	16 (406)	25 (635)	38 (965)
A_f, Frontal Area, in² (cm²)	47.5 (306)	72.5 (468)	102.5 (661)	147.5 (952)	212.5 (1371)
Heater Length, in (mm)	9.5 (241.3)	14.5 (306)	20.5 (521)	29.5 (749)	42.5 (1080)
Heater Width, in (mm)	5 (127)	5 (127)	5 (127)	5 (127)	5 (127)
Mounting Hole Locations					
A, in (mm)	1.56 (39.6)	1.56 (39.6)	1.56 (39.6)	1.56 (39.6)	1.56 (39.6)
B, in (mm)	1.63 (41.4)	1.63 (41.4)	1.63 (41.4)	1.63 (41.4)	1.63 (41.4)
C, in (mm)	1.75 (44.5)	1.75 (44.5)	1.75 (44.5)	1.75 (44.5)	1.75 (44.5)
D, in (mm)	2.75 (69.9)	2.75 (69.9)	2.75 (69.9)	2.75 (69.9)	2.75 (69.9)
E, in (mm)	–	–	–	14.75 (374.7)	–
F, in (mm)	–	–	–	–	15.08 (383)
G, in (mm)	0.63 (16)	0.63 (16)	0.63 (16)	0.63 (16)	0.63 (16)
Electrical Knock-out Locations					
H, in (mm)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)	1.0 (25.4)
J, in (mm)	0.85 (21.6)	0.85 (21.6)	0.85 (21.6)	0.85 (21.6)	0.85 (21.6)
K, in (mm)	0.89 (22.6)	0.89 (22.6)	0.89 (22.6)	0.89 (22.6)	0.89 (22.6)

Figure 6-1 Model 5560 Dimensions All Dimensions in Inches (mm)



Specifications – Model 5560

Specification	5560-05	5560-10	5560-16	5560-25	5560-38
Heater Length, in (mm)	9.5 (241.3)	14.5 (306)	20.5 (521)	29.5 (749)	42.5 (1080)
A_f, Frontal Area, in² (cm²)	47.5 (306)	72.5 (468)	102.5 (661)	147.5 (952)	212.5 (1371)
Weight, lbs (kg)	1.3 (0.6)	1.9 (0.9)	2.7 (1.2)	3.9 (1.8)	5.7 (2.6)
Lamp	QIH120-500R12	QIH240-1000R12	QIH240-1600R12	QIH480-2500R12	QIH480-3800R12
Rated Voltage	120	240	240	480	480
Total Power Dissipated at Rated Voltage, kw	0.5	1.0	1.6	2.5	3.8

Ordering Information – Model 5560

Model	Product Description
5560	Low Density Infrared Heater
Code	**Length**
05	5 Inches (127 mm)
10	10 Inches (254 mm)
16	16 Inches (406 mm)
25	25 Inches (635 mm)
38	38 Inches (965 mm)

Ordering Example – Model 5560

	Model	Length
Typical Model Number	**5560**	**16**

Lamps – Model 5560

Model	Heater Length	Watts	Lamp Description
103390-001	5 Inches (127 mm)	500	QIH120-500R12
103390-003	10 Inches (254 mm)	1000	QIH240-1000R12
103390-005	16 Inches (406 mm)	1600	QIH240-1600R12
103390-007	25 Inches (635 mm)	2500	QIH480-2500R12
103390-010	38 Inches (965 mm)	3800	QIH480-3800R12

Spare and Replacement Parts – Model 5560

Model	Product Description
099259-001	End Cover Assembly
100571-001	Electrical Terminal Block
099770-001	Lamp holder
099263-001	Reflector, 5-inch (127 mm) heated length
099263-002	Reflector, 10-inch (254 mm) heated length
099263-003	Reflector, 16-inch (406 mm) heated length
099263-004	Reflector, 25-inch (635 mm) heated length
099263-005	Reflector, 38-inch (965 mm) heated length
099258-001	Heater Housing Assembly, 5-inch (127 mm) heated length
099258-002	Heater Housing Assembly, 10-inch (254 mm) heated length
099258-003	Heater Housing Assembly, 16-inch (406 mm) heated length
099258-004	Heater Housing Assembly, 25-inch (635 mm) heated length
099258-005	Heater Housing Assembly, 38-inch (965 mm) heated length