

Model 5306 User's Manual



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Section 1 – INTRODUCTION

The Model 5306 StripIR[®] Infrared line heater is designed for use in any application that requires a clean, responsive, non-contact heat source.

Typical applications for the Model 5306 include:

- Drying paint
- Curing adhesive
- Drying ink
- Forming plastic
- Stress relieving metal
- Heat treating



The Model 5306 includes the following major components:

Heater Module – The heater consists of a specular aluminum reflector that directs the infrared energy generated by one ceramic end-seal ‘T-3 style’ quartz halogen lamp factory-installed in the heater. Heated lengths of 2.56, 5, 11, 16, 25, and 38 inches (65, 127, 279, 406, 635, and 965 mm) are offered for the Model 5306. Additional lamps can be ordered separately from the heater.

Water Cooling – Adequate cooling water is required during operation of the Model 5306. Flexible tubing and plumbing fittings are supplied with each heater for easy installation. Required cooling water flow rates are listed in Specifications.

Electrical Cable – The Model 5306 heater is electrically wired from the T3 lamp to intermediate terminal block within the heater. An 8-foot (2.4 m) electrical cable is supplied with each heater.

Optional Quartz Window – A quartz window can be ordered along with each size of the Model 5306. When installed in the heater, the quartz window protects the aluminum reflector and lamp from contaminants released in the heating process, resulting in maximum efficiency of the heater.

Optional Power Control System – The Model 5306 can be ordered with the ‘PC’ option. This configuration consists of the heater, the Model 5620 ControlIR® SCR power controller, and eight feet (2.4 m) 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 5306 with the PC Option

Section 2 – FEATURES & BENEFITS

The design and functionality of the Model 5306 supplies a variety of features and related benefits:

Rapid Response – The quartz halogen lamps heat up and cool down instantly in response to power control signals. They reach 90 percent of full operating temperature within three seconds of a cold start. The radiant energy dissipates to ten percent five seconds after the power supply is disconnected.

Continuous Operation – The formed stainless steel and extruded aluminum construction of the Model 5306, combined with the liquid, allows the heater to withstand continuous high temperature operation.

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 5306 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

Specification	5306-02	5306-05	5306-10	5306-16	5306-25	5306-38
Weight, Pounds (kg)	1.6 (0.60)	2.2 (0.82)	3.1 (1.2)	4.1 (1.5)	5.8 (2.2)	8.1 (3.0)
Lamp Type	QIH120-1000R12	QIH240-1000R12	QIH240-2000R12	QIH240-3000R12	QIH600-5000R12	QIH480-3800R12
Lamp Part Number	106587-001	103390-002	103390-004	103390-012	103390-008	103390-010
Lighted Length, Inches (mm)	2.56 (65)	5.0 (127)	11.0 (279)	16.0 (406)	25.0 (635)	38.0 (965)
Watt Density (W/in)	390	200	182	187	200	100
Rated Voltage	120	240	240	240	600	480
Total Power Dissipated @ Rated Voltage, Watts	1000	1000	2000	3000	5000	3800
Total Current @ Rated Voltage, Amps	8.3	4.2	8.2	12.5	8.3	7.9
Cooling Water Flow ² , GPM (lpm)	0.15 (0.5)	0.15 (0.5)	0.25 (0.9)	0.4 (1.5)	0.6 (2.2)	0.45 (1.7)

2. Cooling water must be used on all Model 5306 heaters while in operation.

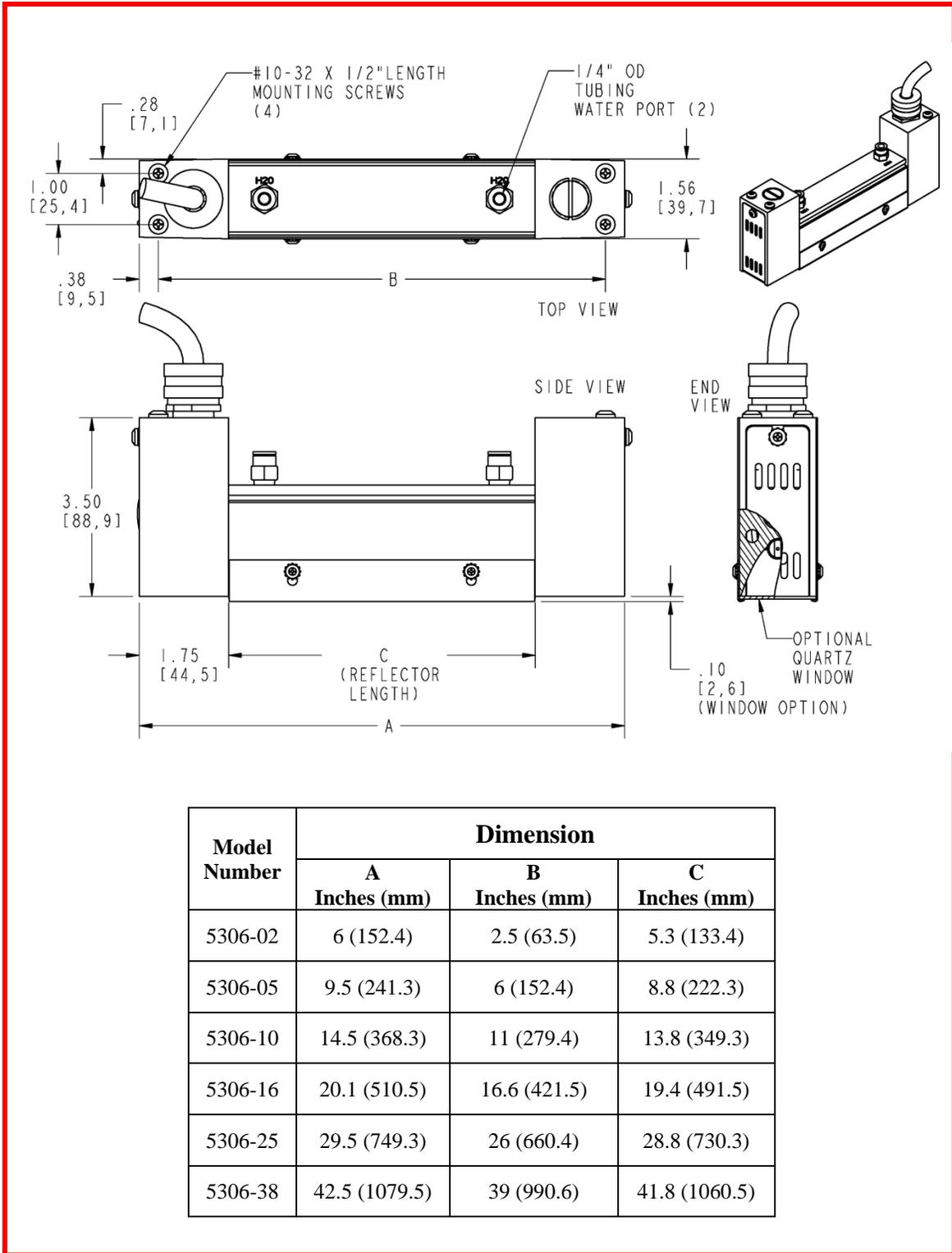


Figure 3-1. Model 5306 Dimensions

Ordering Information – Model 5306

Model	Product Description			
5306	Infrared Strip Heater (Installed lamp included)			
Code	Length	Lighted Lamp Length	Reflector Length	Overall Heater Length
02	2 in (51 mm)	2.56 in (65 mm)	5.3 in (133 mm)	6 in (152 mm)
05	5 in (127 mm)	5 in (127 mm)	8.8 in (222 mm)	9.5 in (241 mm)
10	10 in (254 mm)	11 in (279 mm)	13.8 in (349 mm)	14.5 in (368 mm)
16	16 in (406 mm)	16 in (406 mm)	19.4 in (492 mm)	20.1 in (511 mm)
25	25 in (635 mm)	25 in (635 mm)	28.8 in (730 mm)	29.5 in (749 mm)
38	38 in (965 mm)	38 in (965 mm)	41.8 in (1061 mm)	42.5 in (1080 mm)
Code	Optional Equipment			
PC	Model 5306 Heater Supplied with Model 5620 SCR Power Controller and interface wiring.			

Ordering Example – Model 5306

	Model	Heating Chamber Length	Optional Equipment
Typical Model Number:	5306	16	PC

Accessories, Spare & Replacement Parts – Model 5306

Model	Description
	Quartz Window Kit for:
087851-011	2 Inch (51 mm) length
087851-001	5 Inch (127 mm) length
087851-003	10 Inch (254 mm) length
087851-005	16 Inch (406 mm) length
087851-007	25 Inch (635 mm) length
087851-009	38 Inch (965 mm) length
	Quartz Halogen, Ceramic End-Seal, Infrared Lamp for:
106587-001	Model 5194-02 (1000-watts, 120-volts)
103390-002	Model 5194-05 (1000-watts, 240-volts)
103390-004	Model 5194-10 (2000-watts, 240-volts)
103390-012	Model 5194-16 (3000-watts, 240-volts)
103390-008	Model 5194-25 (5000-watts, 600-volts)
103390-010	Model 5194-38 (3800-watts, 480-volts)
	Other Available Lamps:
103390-001	Model 5194-05 (500-watts, 120-volts)
103390-003	Model 5194-10 (1000-watts, 240-volts)
103390-005	Model 5194-16 (1600-watts, 240-volts)
103390-007	Model 5194-25 (2500-watts, 480-volts)
103390-009	Model 5194-38 (3800-watts, 570-volts)
	Accessories:
106684-001	Electrical Power Cable, 8-foot (2.4 m) length
106685-001	Water-Cooling Supply Kit
M5306	Additional Operation Manual

Section 4 – SAFETY

GENERAL: The Model 5306 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 5306 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 5306 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. Four #10-32 threaded holes are located on the top surface of the heater and are designed for mounting the heater (see Figure 3-2).

Note: Vertical burn lamps are recommended when operating the Model 5306 in a vertical orientation. All Research Inc. lamps associated with the Model 5306 heater are designed for vertical operation, except for the lamps used in the 5306-02.

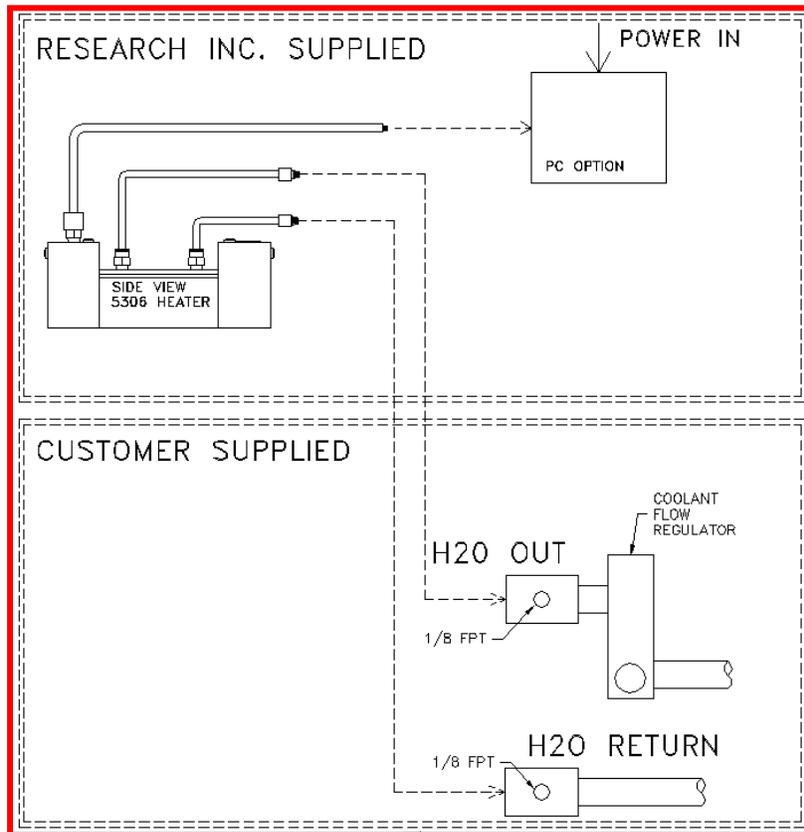


Figure 5-1. Typical Model 5306 Installation.

5.3 HEATER COOLING CONNECTIONS: Each Model 5306 is designed with two ‘quick-disconnect’ fittings protruding from the top of the heater cover. The fittings located at the outer ends of the heater are the inlet/outlet cooling water ports.

Both fittings accept 1/4-inch outer-diameter flexible nylon tubing. A 20-ft. (6 m) length of tubing and two additional quick-disconnect fittings are shipped with each Model 5306 heater. The tubing should be cut to specific lengths so that cooling water can be supplied to the heater. The additional fittings should be used for connecting the tubing directly to the cooling water source.

Once cut to the appropriate lengths, each individual tube length should be inserted into the appropriate fittings on both the heater and the cooling water sources. Figure 5-2 details a typical installation for the Model 5306 heater.

Proper coolant flow must be maintained during operation of the heater. See Section 3 – Specifications for required cooling-water flow for each Model 5306 heater size.

5.4 ELECTRICAL CONNECTIONS: The T3 lamp of the Model 5306 is electrically wired to an intermediate terminal block within the heater.

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 5306 includes replacement of the T3-style lamp and quartz window and cleaning of the reflector.

6.1 LAMP REMOVAL/REPLACEMENT/INSTALLATION: The T3-style lamp is installed into the Model 5306 heater when shipped from the factory. The following procedure details the process to replace the lamps in the Model 5306 (reference Figure 6-1, 6-2, & 6-3):

Note:

- *Remove all power from the heater BEFORE attempting to install/replace the lamp.*
- *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.*

1. Remove end-cover screws (2 per end cover).
2. Remove end covers on both ends of the heater.

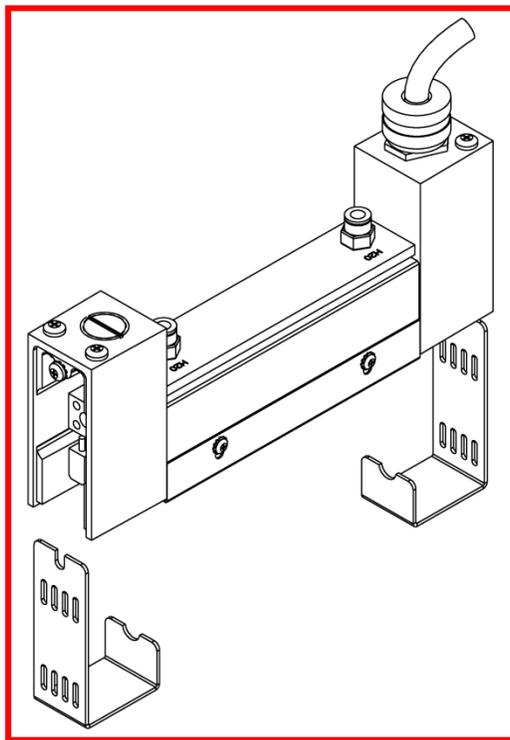


Figure 6-1. Model 5306 End Cover Removal.

3. If installed in the heater, remove the quartz window from the heater by removing the screws on the window brackets, and carefully set the window aside (see Figure 6-2). Take this opportunity to clean the window using non-abrasive cleaning solvent and clean, soft cotton cloth (see Section 6-2).

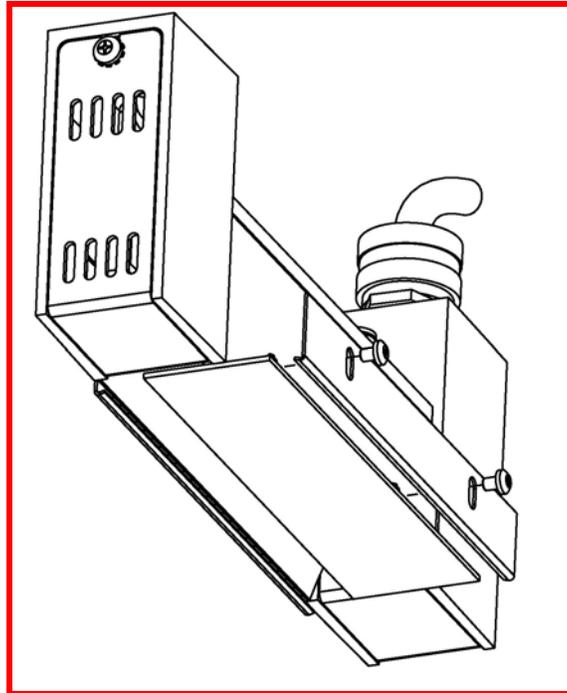


Figure 6-2. Model 5306 Quartz Window Removal.

4. Loosen (do not remove) the setscrews in the ceramic terminal block on each end of the heater (see Figure 6-3).

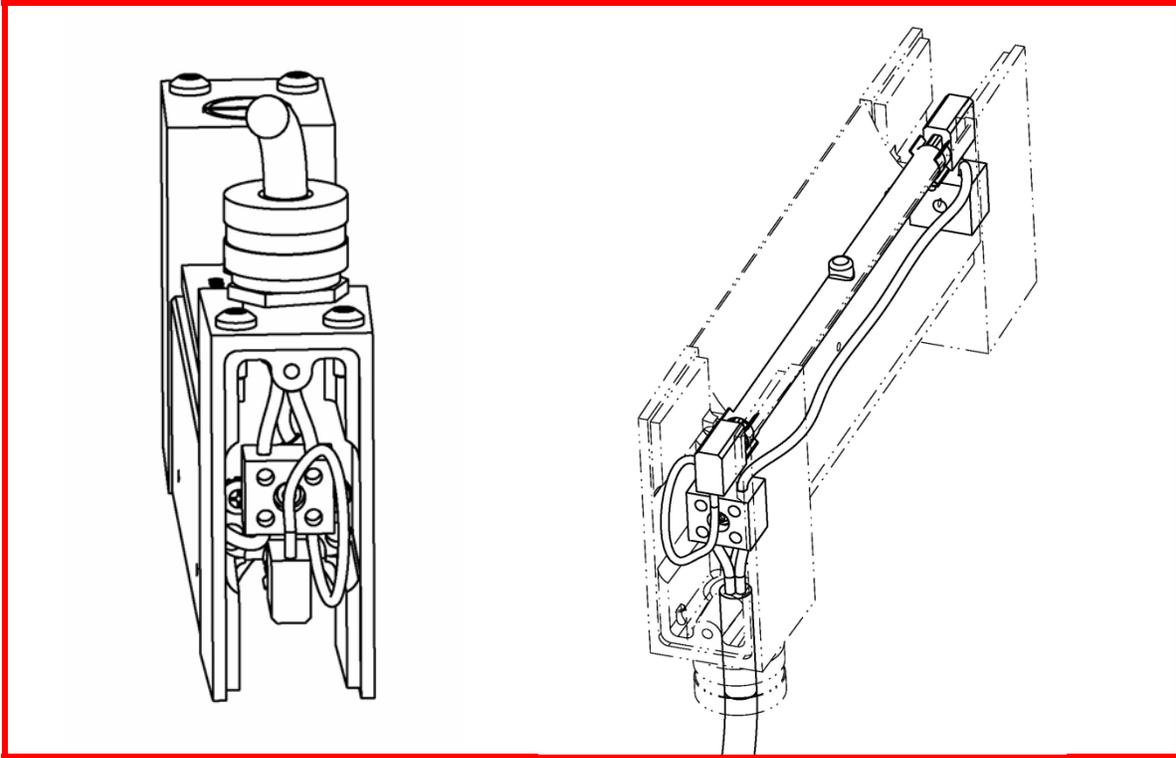


Figure 6-3. Model 5306 Lamp Removal.

5. While holding the lamp, gently pull the lead wires out of the ceramic terminal blocks, out of the lamp clips, and set the old lamp aside for disposal. (The model 5306-02 does not have lamp clips, but a half-circle groove that the lamp fits in.)
6. While holding the replacement lamp by the ceramic 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.
7. Insert the bare wire of each insulated lamp lead into the ceramic terminal block position that previously held the old lamp. Push each lead wire into the terminal block far enough so, that when tightened, the setscrew will hold the lead securely.
8. Tighten the setscrews in each terminal block so the lead wires are held securely.
Note: tighten the terminal block set screws to a torque of 0.6 Ft.-Lbs. [0.82 N-m].
9. Form a loop within each lead along its length from the top of the cooling manifold and the ceramic terminal block. This loop will act as a strain relief within the lead during normal operation of the heater.
10. Reinstall the quartz window by replacing the screws in the window brackets.
11. Reinstall both end covers and secure each to the heater with the two screws per end cover.
Note: tighten the end cover screws to a torque of 1.7 Ft.-Lbs. [2.3 N-m].

6.2 Quartz Window Cleaning and Replacement: The optional quartz window can be replaced or removed from the Model 5306 for periodic cleaning. Use the following procedure to remove/reinstall/clean the quartz window:

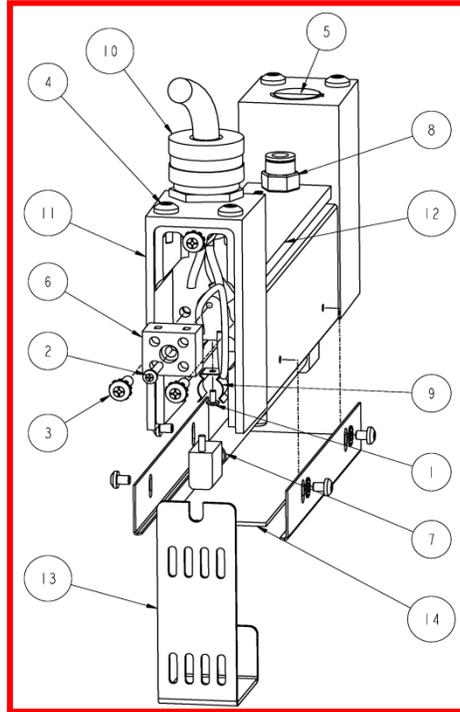
1. Remove the quartz window from the heater by removing the screws on the window brackets, and carefully set the window aside .
2. Take care so that the quartz window does not bind and subsequently chip or crack as it is removed.
3. If cleaning the window, use a non-abrasive glass cleaner and a clean, dry, lint-free cloth. After cleaning, do not touch the inside surface of the window unless wearing cotton gloves.
4. Reinstall the quartz window by replacing the screws in the window brackets.

6.3 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 5306 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, quartz window (if so desired), and the heater end covers as outlined in Section 6.1 – Lamp Removal/Replacement/Installation.

Section 7 – SPARE & REPLACEMENT PARTS



Figures 7-1. Model 5306 Parts Identification.

ITEM	PART NO.	DESCRIPTION	5306-02	5306-05	5306-10	5306-16	5306-25	5306-38
1	054979-001	Panhead Screw, 2-56X3/16	N/A	2	2	2	2	2
2	054979-026	Panhead Screw, 4-40X3/4	1	2	2	2	2	2
3	054979-099	Panhead Screw, 8-32X5/8	6	6	6	6	6	6
4	054979-123	Panhead Screw, 10-32X.5	4	4	4	4	4	4
5	063042-001	Plug, 1/2NPT X 1/4LG	1	1	1	1	1	1
6	100571-001	Terminal Block, 10A	1	2	2	2	2	2
7	106587-001	Lamp-QIH120-1000W	1					
	103390-002	Lamp-QIH240-1000W		1				
	103390-004	Lamp-QIH240-2000W			1			
	103390-012	Lamp-QIH240-3000W				1		
	103390-008	Lamp-QIH600-5000W					1	
	103390-010	Lamp-QIH480-3800W						1
8	103830-001	Fitting-1/8NPT x 1/4"	2	2	2	2	2	2
9	103831-001	Spring Clip	N/A	2	2	2	2	2
10	106684-001	Power Cable Assembly, 8ft	1	1	1	1	1	1
11	106833-002	End Casting	2	2	2	2	2	2
12	106834-001	Reflector-5306-02	1					
	106834-002	Reflector-5306-05		1				
	106834-003	Reflector-5306-10			1			
	106834-004	Reflector-5306-16				1		
	106834-005	Reflector-5306-25					1	
	106834-006	Reflector-5306-38						1
13	106835-001	End Cover	2	2	2	2	2	2
14	087851-011	Option-Quartz Window Kit,5306-02	1					
	087851-001	Option-Quartz Window Kit,5306-05		1				
	087851-003	Option-Quartz Window Kit,5306-10			1			
	087851-030	Option-Quartz Window Kit,5306-16				1		
	087851-007	Option-Quartz Window Kit,5306-25					1	
	087851-009	Option-Quartz Window Kit,5306-38						1