# **TW2 Series**

# **Installation Manual**

**Overhead High-Output Medium Wave Electric Infrared Heater** 

1, 2, and 3 Lamp Units





# **A WARNING**



All persons involved with the installation, operation, and maintenance of the heater system must read and understand all the information in this manual.

Improper installation, adjustment, alteration, service, or maintenance can cause property damage, injury, or death. Read and understand the installation, operating, and maintenance instructions thoroughly before installing or servicing this equipment.

INSTALLER: Present this manual to the end user.				
Keep these instructions in a clean and dry place for future reference.				
Model#: Serial #:				
	(located on rating label)			

LIOTW2-Rev. 05319 Print: 1M-10/19 (CDS)

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# **A** WARNING

#### **California Proposition 65**

This product can expose you to chemicals including lead and carbon monoxide, which are known to the State of California to cause birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov.

# **1.0 Safety**

# **AWARNING**



Improper installation, adjustment, alteration, service, or maintenance can cause property damage, serious injury, or death. Read and understand the installation, operating, and maintenance instructions thoroughly before installing or servicing this equipment. Only trained, qualified personnel with proper electrical experience may install or service this equipment.

### **Safety Symbols**

Safety is the most important consideration during installation, operation, and maintenance of the infrared heater. You will see the following symbols and signal words when there is a hazard related to safety or property damage.

# **A WARNING**

**Warning** indicates a potentially hazardous situation which, if not avoided, could result in death or injury.

### **A CAUTION**

**Caution** indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

### **NOTICE**

**Notice** indicates a potentially hazardous situation which, if not avoided, could result in property damage.

### **Applications**

This is not an explosion proof heater. No TW2 series heater may be used in a Class 1 or Class 2 Explosive Environment. Consult your local fire marshal, insurance carrier, and other authorities for approval if the proposed installation is in question.

#### Commercial / Industrial (Indoors & Outdoors)

Infrared heaters are designed and certified for use in industrial and commercial buildings such as warehouses, manufacturing plants, aircraft hangars, and vehicle maintenance shops. For maximum safety, the building must be evaluated for potential hazards before installing the heater system. A critical safety factor to consider before installation is the clearances to combustibles.

#### **Outdoor Residential Only**

This heater is **NOT** approved for use in an indoor residential application. This includes, but is not limited to, attached garages, living quarters, solariums, etc. Consult the local fire marshal and/or insurance provider if unsure of your application.

## **AWARNING**





#### Not For Residential Use.

Installation of this infrared heater system in residential indoor spaces, RVs, mobile homes, etc. may result in property damage, fire, serious injury, or death.

**Chart 1.1 • Model Number Designation Chart** 

Series	Material Type	Lamp Qty.	Voltage Code	Lamp Wattage Code
		1	A = 120 VAC B = 208 VAC	15 = 1,500 16 = 1,600
TW2-24 TW2-33 TW2-46	B = Black Powder Coat or S = Stainless Steel	2	C = 240 VAC D = 277 VAC	23 = 2,300 25 = 2,500
1112 10	3 - Stairliess Steel 3	G = 480 VAC H = 575 VAC	36 = 3,650 38 = 3,800	

Model Configuration Examples: TW2-24B1-C16 or TW2-33S2-G25

**Chart 1.2 • Available Models and Operational Specifications** 

Series	Lamp Qty.	Voltage; Phase	Amperes	Watts	BTU/h
		120; 1ph	13.33	1,500	5,118
		208; 1ph	7.69		5,459
	1	240; 1ph	6.67	1,600	
		277; 1 ph	5.77	1,600	5,459
		480; 1ph	3.33		
		208; 1ph	15.38		
TW2-24	2	240; 1ph	13.33	3,200	10,919
	2	277; 1 ph	11.54	3,200	10,919
		480; 1ph	6.67		
		208; 1 or 3ph	23.08		
	3	240; 1 or 3ph	20.00	4,800	16,378
	3	277; 1 or 3 ph	17.31	4,800	10,378
		480; 1 or 3ph	10.00		
		120; 1ph	19.16	2,300	7,848
	2	208; 1ph	12.02		8,530 17,065
		240; 1ph	10.42	2,500	
TW2-33		277; 1 ph	9.02	2,300	
		480; 1ph	5.21		
		208; 1ph	24.04		
		240; 1ph	20.83	5,000	
		277; 1 ph	18.04	3,000	17,005
		480; 1ph	10.42		
	3	277; 1 or 3 ph	27.06	7,500	25,590
	ŭ	480; 1 or 3ph	15.625	7,000	20,000
		208; 1ph	17.55	3,650	12,454
		240; 1ph	15.21	3,650	12,454
	1	277; 1 ph	11.55	3,200	10,919
		480; 1ph	7.60	3,650	12,454
TW2-46		575; 1ph	6.60	3,800	12,978
1112 40		277; 1 ph	23.10	6,400	21,838
	2	480; 1ph	15.21	7,300	24,909
		575; 1ph	13.22	7,600	25,955
	3	480; 1 or 3ph	22.81	10,950	37,636
	J	575; 1 or 3ph	19.83	11,400	38,933

#### **Clearances to Combustibles**

### **AWARNING**







Placement of explosive objects, flammable objects, liquids, and vapors close to the heater may result in explosion, fire, property damage, serious injury, or death. Do not store or use explosive objects, liquids, or vapors in the vicinity of the heater.

Failure to comply with the published clearances to combustibles could result in personal injury, death, and/or property damage.

The outside surfaces of the heater are hot during operation and after operation. If contact is made, permanent skin damage may occur. Do not move, handle, or service the unit during operation or while hot.

### **A CAUTION**



Signs shall be posted specifying the maximum permissible stacking height in order to maintain clearances to combustibles.

#### **Hazards Include:**

For maximum safety the building must be evaluated for hazards before installing the heater system. Examples include, but are not limited to:

- · Gas and electrical lines
- Combustible and explosive materials
- Chemical storage areas
- Areas of high chemical fume concentrations
- Provisions for accessibility to the heater
- Adequate clearances around air openings
- Vehicle parking areas

- Vehicles with lifts or cranes
- Storage areas with stacked materials
- Lights
- Sprinkler heads
- · Overhead doors and tracks
- Dirty, contaminated environment

A critical safety factor to consider before installation is the clearances to combustibles. **Clearance to combustibles** is defined as *the minimum distance you must have between the indicated surface and the combustible item*. Considerations must also be made for moving objects around the infrared heater. The following is a partial list of items to maintain clearances from:

#### Combustible Items Include:

- Wood
- Paper
- Fabric
- Chemicals
- Wall or roof insulation
- Plastics

#### **Moving Objects Include:**

- Overhead doors
- Vehicles on lifts
- Cranes
- Hoists
- Car wash equipment

When installing the infrared heater system, the minimum clearances to combustibles must be maintained. These distances are shown in Chart 1.3 and on the heater. If you are unsure of the potential hazards, consult your local fire marshal, fire insurance carrier, or other qualified authorities on the installation of infrared heaters for approval of the proposed installation.

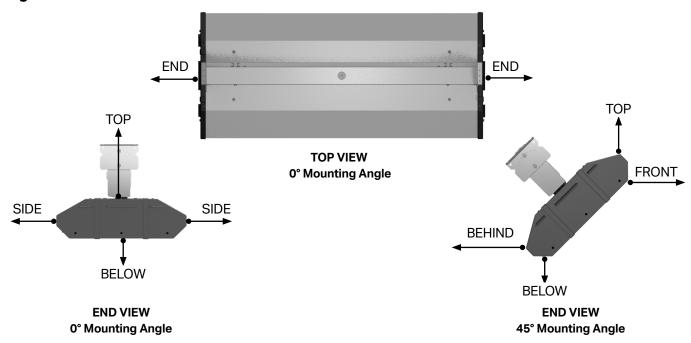
Chart 1.3 • Clearances to Combustibles in Inches (Millimeters) - see Figure 1.1

	Mounting	⊢—— Sic	de ——			
Length	Angle	Front	<b>Behind</b>	End	Тор	Below
Single Eleme	nt					
24" 33"	0°	16 (407)	16 (407)	12 (305)	6 (153)	56 (1423)
46"	45°	47 (1194)	4 (102)	12 (305)	10 (254)	40 (1016)
Double Eleme	ent					
24" 33"	O°	28 (712)	28 (712)	26 (661)	6 (153)	86 (2185)
46"	45°	86 (2185)	4 (102)	26 (661)	10 (254)	86 (2185)
Triple Element						
24" 33"	0°	31 (788)	31 (788)	34 (864)	9 (229)	105 (2667)
46"	45°	105 (2667)	4 (102)	34 (864)	10 (254)	105 (2667)

<sup>\*</sup> Heaters mounted on an angle between 0° and 45° must maintain clearances posted for 0° or 45°, whichever is greater.

**NOTE:** Ensure that building materials with a low heat tolerance (i.e, awnings, fabrics, plastics, sprinklers, insulation, etc.) are protected against degradation. This may require the heater to be mounted at a distance in excess of the published clearances to combustibles. Contact the material manufacturer for specific details.

Figure 1.1 • Clearances to Combustibles

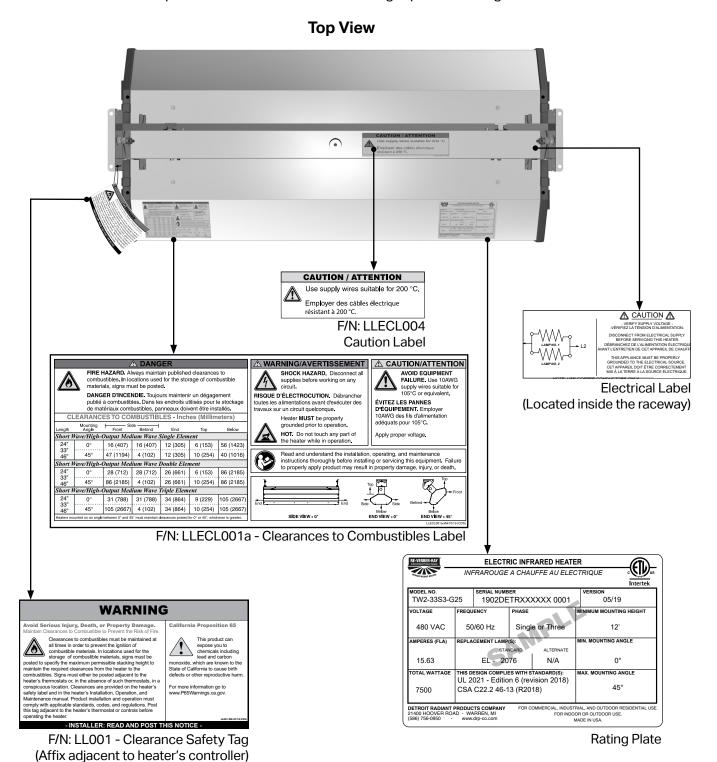


<sup>\*\*</sup> Clearances to combustibles must be maintained when using recessed mount kits (P/N: ELx-FRxx). For additional information, refer to form # LSH123a - Recessed Mounting Frame Installation Instructions or contact the factory.

#### Safety Labels and Their Locations

It is important to provide warnings to alert individuals to potential hazards and safety actions. Signs should state the hazards for the particular application and be legible to the building occupants. Consult the factory or a factory representative for additional information on signage compliance.

Safety warning labels must be maintained on the infrared heater. Illustrations of the safety labels and their locations are pictured below. When no longer legible, they must be replaced. Contact either your local distributor or the product manufacturer for obtaining replacement signs or labels.



#### Standards, Certifications, and Government Regulations

Installation of this infrared heater must comply with all applicable local, state, and national specifications, regulations, and building codes. Contact the local building inspector and/or fire marshal for guidance.

The heater must be electrically grounded in accordance with the following codes:

**United States:** Refer to National Electrical Code®, ANSI/NFPA 70 (latest edition).

Wiring must conform to the latest edition of National Electrical

Code®, local ordinances, and any special diagrams from the manufacturer.

Canada: Refer to Canadian Electrical Code CSA C22.1 Part 1 (latest edition).

Detroit Radiant Products Company units comply with or are certified by one or more of the following organizations or standards:

- CSA 22.2 #46 M1988
- UL 2021

# 2.0 Installation

### **A WARNING**



Read and understand the installation, operation, and maintenance instructions thoroughly before installing or servicing this equipment.

### Design

To ensure a safe, properly designed heating system, a layout should be developed for the correct placement of the infrared heater(s).

Aside from safety factors such as clearances to combustibles (see Chart 1.3 on page 6), consideration should also be given to factors such as the environment (e.g., cold/drafty, average, protected), heat coverage (sq. ft.) needed, heater centers, the distance behind a person or work station(s), etc. Also, the effective infrared surface temperature of a person or object may be diminished with wind above 5 mph. Wind barrier(s) may be required. Most importantly, clearances to combustibles **must** always be maintained! Refer to hazards on page 5.

When positioning the heaters, keep in mind the location of combustible materials, lights, sprinkler heads, overhead doors, storage areas with stacked materials, gas and electrical lines, parked vehicles, cranes, etc. Refer to page 6 for minimum clearances to verify that a safe installation exists.

This installation manual, along with national, state, provincial, and local codes, addresses these issues. It is critical that you read, understand, and follow all guidelines and instructions. Always inspect and evaluate the mounting conditions, application, and wiring.

When heated, materials high in hydrocarbons (solvents, paint thinner, mineral spirits, formaldehydes, etc.) can evaporate and/or degrade. This may result in odors or fumes being emitted into the environment. To correct this problem, clean the area and/or introduce additional ventilation. Heaters installed and serviced in accordance with the installation manual do not emit foul odors into the environment.

**IMPORTANT:** Fire sprinkler heads must be located at an appropriate distance from the heater to avoid an inadvertent discharge. This distance may exceed the published clearances to combustibles. Certain applications may require the use of high temperature sprinkler heads or relocation of the heaters.

## **A CAUTION**

Fire sprinkler systems containing propylene glycol, antifreeze, or other potentially flammable substances shall not be used in conjunction with this heater without careful consideration for, and avoidance of, inadvertent discharge hazards. For further information consult applicable NFPA codes. Always observe applicable state and local codes.

2.0 Installation • Design

Chart 2.1 • TW2 Series Basic Heating Application Chart

Series	Lamp Qty.	Recommended Mounting Height (Ft.)* [Dim. A]	Recommended Distance Between Heaters (Ft.) [Dim. B]	Approximate Square Foot Coverage	Approximate Watts per Square Foot
	1	10 to 12	5 to 10	400	4
TW2-24	2	10 to 12	6 to 12	400	8
	3	12 to 14	7 to 14	600	8
	1	10 to 12	6 to 12	400	6
TW2-33	2	12 to 14	7 to 14	600	8
	3	12 to 14	8 to 16	600	12
	1	12 to 14	7 to 14	600	6
TW2-46	2	14 to 16	8 to 16	850	8 to 9
	3	14 to 16	9 to 18	850	12 to 13

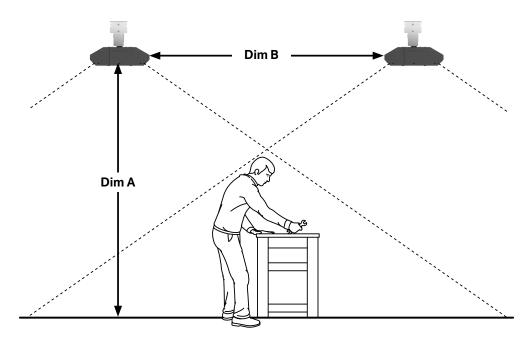
<sup>\*</sup> Clearances to combustibles published in this manual and on safety labels must be maintained at all times. Factory recommended mounting heights are listed as a guideline. If infrared heaters are mounted too low or too high, they may result in discomfort or lack of heat.

**Chart 2.2 • Estimating Required Load** 

Type of Building	Watts Req. per Square Foot at Floor Level
Insulated	10
Uninsulated	16
Outdoor Sheltered	25 to 30
Outdoor Unsheltered	30 to 45

When comfort heating people, two heaters should be used to heat both sides of the individual. Heater installation shall comply with all IOPM, NEC, ANSI/NFPA-70, CEC, and local restrictions.

Figure 2.1 • Heating Application



### **Heater Mounting**

### **A WARNING**



Improper suspension of the infrared heater may result in collapse and being crushed. Always suspend from a permanent part of the building structure that can support the total force and weight of the heater.



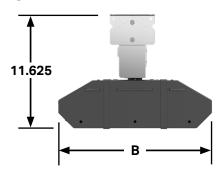
Failure to maintain minimum clearance to combustibles may result in fire and/or explosion, property damage, serious injury, or death. Always maintain minimum clearances and post signs or provided tags (F/N: LL001) adjacent to heater's controller. Signs should state the hazards for the particular application and be legible to the building occupants. Consult the factory or a factory representative for additional information on signage compliance.

The heater can be suspended with chains or rigid threaded rod. Local codes, or conditions that would cause the unit to move (e.g., wind drafts, blowers, crane rails, etc.), may require rigid threaded rod. Consult all applicable codes before installation.

Clearances to combustibles must be maintained when using recessed mount kits (P/N: ELx-FRxx). For additional information, refer to form # LSH123a - Recessed Mounting Frame Installation Instructions or contact the factory.

The heater must be level from end to end and may be 0° to 45° on horizontal. Refer to Figures 2.2 and 2.3.

Figure 2.2 • Heater Dimensions





Model No.	Α	В	С
TW2-24X1	23.50	9.625	24.50
TW2-24X2	23.50	15.25	24.50
TW2-24X3	23.50	21.00	24.50
TW2-33X1	32.50	9.625	33.50
TW2-33X2	32.50	15.25	33.50
TW2-33X3	32.50	21.00	33.50
TW2-46X1	45.50	9.625	46.50
TW2-46X2	45.50	15.25	46.50
TW2-46X3	45.50	21.00	46.50

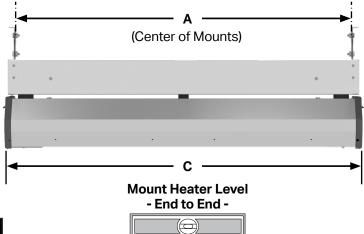
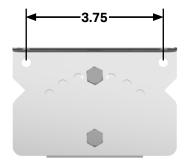


Figure 2.3 • Mounting Centers



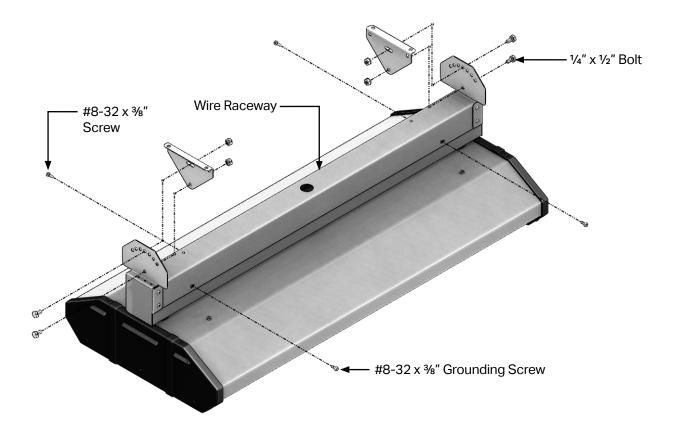
### **Top Channel Assembly**

• Attach the mounting brackets to the top wire raceway. On each end, place (1) 1/4" x 1/2" bolt through the bottom hole of the mounting bracket and through the bottom hole of the top wire raceway. Place (1) 1/4" lock nut on each bolt. Do not tighten completely. Refer to Figure 2.4.

**NOTE**: The mounting brackets are **NOT** required for chain suspension.

- 2 Adjust wire raceway to desired mounting angle.
- 3 On each side, place (1)  $\frac{1}{4}$ " x  $\frac{1}{2}$ " bolt through slot in the mounting bracket and the hole in the top wire raceway. Place (1)  $\frac{1}{4}$ " lock nut on each bolt and tighten.
- 4 Tighten lock nuts from Step 1.
- 6 Hook heater body into mounted wire raceway. Unit will hang freely by the "T" hinge, leaving both hands free to wire unit. Refer to Figure 2.4.
- **6** Run supplied high temperature wires out to field supplied junction box. **DO NOT** make connections inside the wire raceway.
- Close wire raceway using the (4) #8-32 x %" grounding screws provided in hardware pack.

Figure 2.4 • Top Channel Assembly



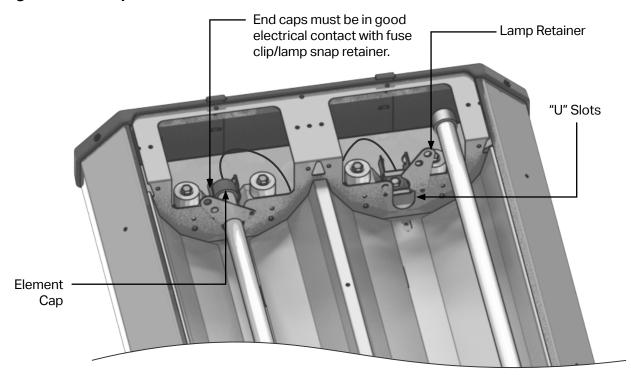
#### **Lamp Installation**

### **A** CAUTION

Disconnect power prior to installing or replacing supplied quartz lamp(s). The elements can and should be installed prior to mounting the heater.

- 1 Ensure appliance is OFF and is cool to the touch.
- 2 Remove both service access panels using a 1/4" nut driver.
- Open lamp retainers by firmly rotating the retainers on both sides of the unit (see Figure 2.5).
- Position heating elements in "U" slots and firmly press the connector end into the clip(s), one end at a time. Avoid handling the quartz glass as much as possible.
- 6 Rotate the lamp retainer into closed position.
- 6 Repeat steps 3 through 5 until all heating elements have been installed.
- After heating elements have been installed, the quartz glass should be wiped down with alcohol using a clean cloth.
- 8 Reinstall the service access panels.

Figure 2.5 • Lamp Installation



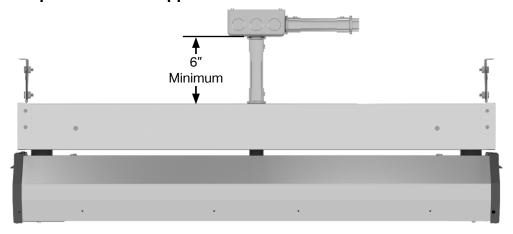
**NOTE:** TW2 series heaters are designed for use with tungsten lamp infrared heating elements only. They are **NOT** intended to be used with straight metal rod heating elements. Replace lamps with parts from Detroit Radiant Products Company only!

### **Totally Exposed Outdoor Applications**

### **A CAUTION**

For totally exposed outdoor applications (not ceiling protected) ensure connections are made as illustrated in Figure 2.6.

Figure 2.6 • Exposed Outdoor Application



**NOTE:** All conduit, conduit fittings, and junction boxes are field supplied. Must be NEMA Type 4X or equivalent. Heater must be suspended from mounting brackets.

### **Electrical**

## **AWARNING**



#### **Electric Shock**

Field wiring to the heater must be connected and grounded in accordance with national, state, provincial, and local codes, and to the guidelines in the this manual. In the United States, refer to the most current revisions to the ANSI/NFPA 70 Standard and in Canada, refer to the most current revisions the CSA C22.1 Part I Standard.

Disconnect power to heater before servicing.

Failure to follow these instructions can result in death or electrical shock.

This fixture is equipped with high temperature silicone lead wires to make connections to branch circuit. Remove the wire-ties prior to making electrical connections.

Wiring connections should always be through one of the knockouts in the top wire raceway. Wire connections must also be made outside of the top of the wire raceway. Consult the factory or a qualified electrician for details on staging.

Supply wires must be a copper conductor type with a minimum size of 10 AWG.

The heater must be connected to the earthing conductor (green wire) installed by the factory.

Reference top of page 14 for use in totally exposed outdoor applications.

### **Wiring Diagrams**

Figure 2.7 • Wiring Diagram for Units with 1 Lamp



Figure 2.8 • Wiring Diagram for Units with 2 Lamps

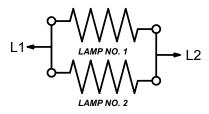
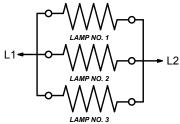


Figure 2.9 • Wiring Diagram for Units with 3 Lamps



### **Field Wiring**

Figure 2.10 • Single Phase Service

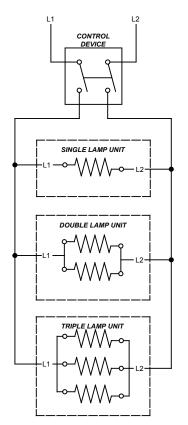
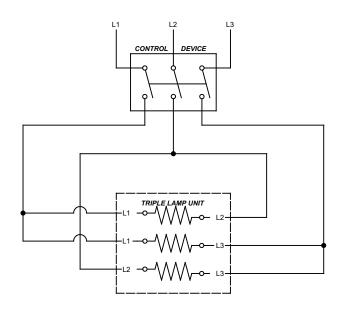


Figure 2.11 • Three Phase Service



# 3.0 Maintenance

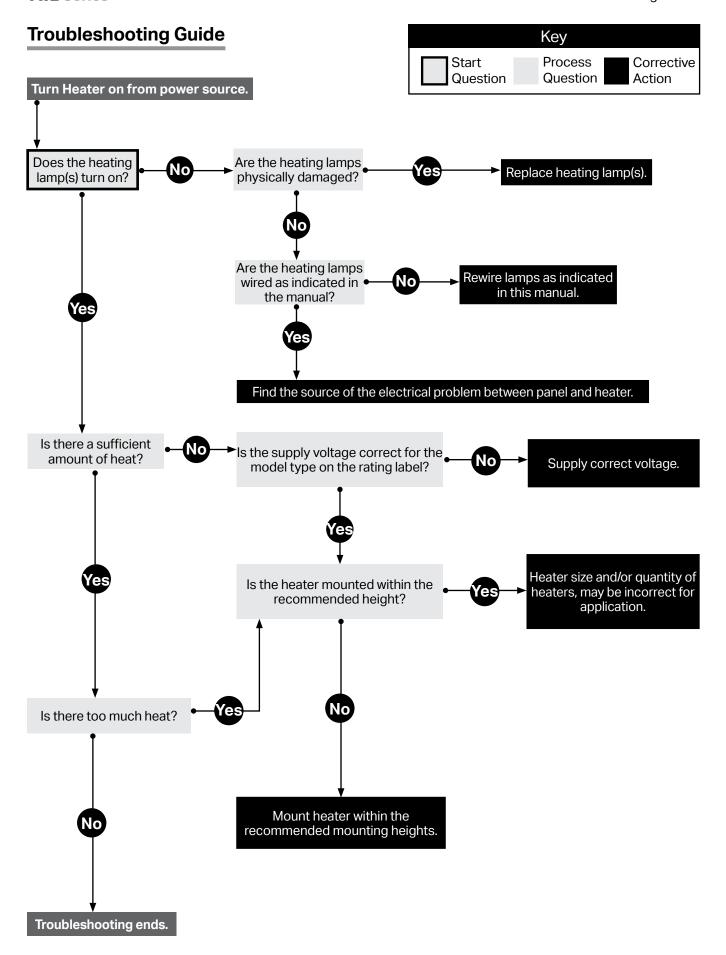
It is recommended that the following become a standard yearly procedure to obtain maximum operating efficiency and trouble-free operation.

During long periods of non-usage, remove or cover heater with a polyethylene bag and disconnect from power supply. If further service to the heater is desired, contact your representative or the factory.

- 1 Clean reflector surface with a damp cloth.
- 2 Ensure heater is secure on all hanging points.
- Maintain clearances to combustibles at all times. Immediately remove objects in violation of any of the published clearances to combustibles.
- 4 Check electrical wires and connections for wear or any kind of damage.

### **Maintenance Log**

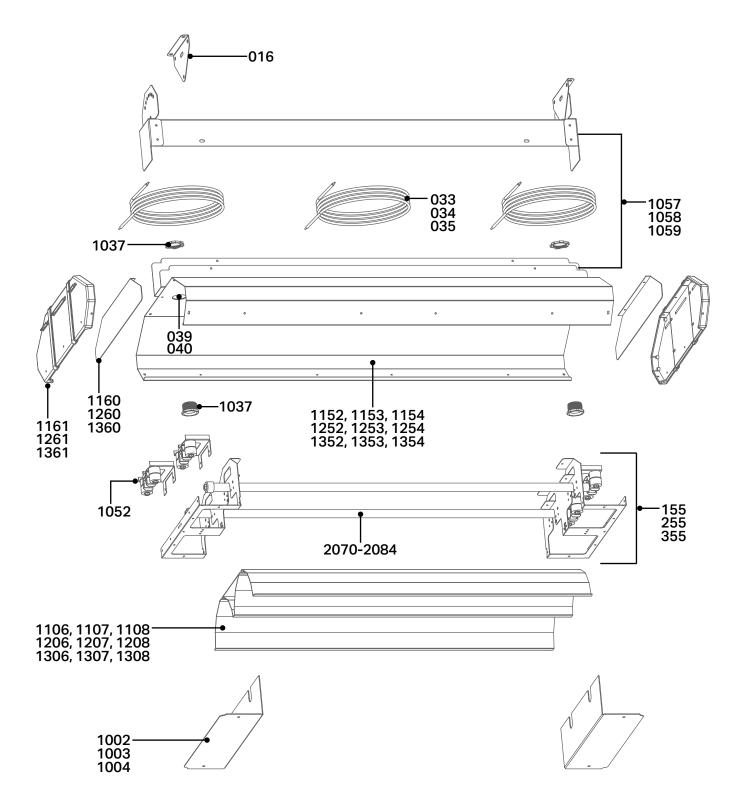
Date	Maintenance Performed	Replacement Parts Required



### **Heater Assembly Components**

For complete information on TW2 series replacement parts, visit the online replacement parts library at www.reverberray.com/shop. For discontinued models, consult the factory.

Figure 3.1 • Components



### **Parts List**

**Chart 3.1 • General Parts List** 

Part No.	Description	Part No.	Description
EL-016 <sup>1</sup>	Mounting Brackets	EL-1107	Single Lamp Reflector, 33" Model
EL-033	12 Gauge Wire Length for 33" (specify color)	EL-1108	Single Lamp Reflector, 46" Model
EL-034	12 Gauge Wire Length for 24" (specify color)	EL-1152 <sup>1</sup>	Single Lamp Shell Assembly, 24" Model
EL-035	12 Gauge Wire Length for 46" (specify color)	EL-1153 <sup>1</sup>	Single Lamp Shell Assembly, 33" Model
EL-039	Rubber Spacer, LG, End (2 per heater) (not shown)	EL-1154 <sup>1</sup>	Single Lamp Shell Assembly, 46" Model
EL-040	Rubber Spacer, SM, Center (not shown)	EL-1160	Single Lamp Shield
EL-1037	Wire Bushing	EL-1161	Single Lamp Nylon End Panel
EL-1052	Busbar Assembly		Double Lamp Model Parts List
EL-1057 <sup>1</sup>	Wire Raceway Assembly, 24" Model	EL-255	Double Lamp Chassis Assembly
EL-1058 <sup>1</sup>	Wire Raceway Assembly, 33" Model	EL-1003	Double Lamp Service Access Panel
EL-1059 <sup>1</sup>	Wire Raceway Assembly, 46" Model	EL-1206	Double Lamp Reflector, 24" Model
EL-2070	Lamp; 1,500 W, 120 V, 24"	EL-1207	Double Lamp Reflector, 33" Model
EL-2071	Lamp; 1,600 W, 208 V, 24"	EL-1208	Double Lamp Reflector, 46" Model
EL-2072	Lamp; 2,500 W, 208 V, 33"	EL-1252 <sup>1</sup>	Double Lamp Shell Assembly, 24" Model
EL-2073	Lamp; 1,600 W, 240 V, 24"	EL-1253 <sup>1</sup>	Double Lamp Shell Assembly, 33" Model
EL-2074	Lamp; 2,500 W, 240 V, 33"	EL-1254 <sup>1</sup>	Double Lamp Shell Assembly, 46" Model
EL-2075	Lamp; 1,600 W, 480 V, 24"	EL-1260	Double Lamp Shield
EL-2076	Lamp; 2,500 W, 480 V, 33"	EL-1261	Double Lamp Nylon End Panel
EL-2077	Lamp; 3,650 W, 480 V, 46"		Triple Lamp Model Parts List
EL-2078	Lamp; 3,800 W, 575 V, 46"	EL-355	Triple Lamp Chassis Assembly
EL-2079	Lamp; 2,300 W, 120V, 33"	EL-1004	Triple Lamp Service Access Panel
EL-2080	Lamp; 3,650 W, 208 V, 46"	EL-1306	Triple Lamp Reflector, 24" Model
EL-2081	Lamp; 3,650 W, 240 V, 46"	EL-1307	Triple Lamp Reflector, 33" Model
EL-2082	Lamp; 1,600 W, 277 V, 24"	EL-1308	Triple Lamp Reflector, 46" Model
EL-2083	Lamp, 2,500 W, 277 V, 33"	EL-1352 <sup>1</sup>	Triple Lamp Shell Assembly, 24" Model
EL-2084	Lamp, 3,200 W, 277 V, 46"	EL-1353 <sup>1</sup>	Triple Lamp Shell Assembly, 33" Model
	Single Lamp Model Parts List	EL-1354 <sup>1</sup>	Triple Lamp Shell Assembly, 46" Model
EL-155	Single Lamp Chassis Assembly	EL-1360	Triple Lamp Shield
EL-1002	Single Lamp Service Access Panel	EL-1361	Triple Lamp Nylon End Panel
EL-1106	Single Lamp Reflector, 24" Model		

<sup>&</sup>lt;sup>1</sup> Order part number as is for black finish or add -SS for stainless steel finish. Ex: EL-016 for black mounting brackets and EL-016-SS for stainless steel mounting brackets.

Visit our online parts reference library at <a href="www.reverberray.com/shop">www.reverberray.com/shop</a> for further technical data related to parts.

4.0 Limited Warranty TW2 Series

# **4.0 Limited Warranty**

One-Year Limited Warranty. Detroit Radiant Products Company (hereinafter referred to as the Company) warrants to the original purchaser or original user that all Detroit Radiant Electric Infrared Heaters sold by it and all parts thereof are free from defects in material or workmanship under normal use and service. The Company's sole obligation under this warranty shall be limited to furnishing replacement parts, F.O.B. Warren, Michigan, for 12 months from the date of initial installation of the heater, but not to exceed 18 months from the date of shipment by the Company of the heaters, for any parts which the Company's examination shall disclose to its satisfaction to be defective. Defective parts are to be returned to the Company, transportation charges prepaid.

**General Conditions.** The warranties set out in this certificate are the exclusive remedy of the original owner or user in lieu of all other warranties written, oral or implied (including any warranty of merchantability or fitness for the purpose) and all other obligations or liabilities on the part of the Company, and the Company neither assumes nor authorizes any person to assume for it any other obligation or liabilities on the part of the Company, and the Company neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with the sale, installation or use of the heater or any parts thereof.

The Company will not be responsible for labor charges for the analysis of a defective condition in the heater or for the installation of replacement parts. The warranties provided herein will not apply if the input of the heater exceeds the rated input at time of manufacturing or if the heater in the judgment of the Company has been subjected to misuse, excessive dust, improper conversion, negligence, accident, corrosive atmospheres, excessive thermal shock, excessive vibration, physical damage to the heater, alterations by unauthorized service personnel, operation contrary to the Company's instructions or if the serial number has been altered, defaced, or removed. The Company shall not be liable for any default or delay in the performance of these warranties caused by contingency beyond its control, including war, government restriction or restraints, strikes, fire, flood, short or reduced supply of raw materials, or parts.

The warranties herein shall be null and void if the heater is not installed by a competent heating contractor and/ or if the heater is not installed according to Company instructions, normal industry practices and/or if the heater is not maintained and repaired according to Company's instructions. Normal product degradation and wear (rust, oxidation, etc.) does not constitute a material defect and applicable warranty claim.

Written permission is required for the return of any parts or equipment and any such return must be made on the basis of transportation charges prepaid. Shipment may be refused unless prior written permission is obtained and goods returned prepaid.



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