

# PCTH COMPACT TUBE HEATERS



## ENGINEERING SUBMITTAL COMPACT GAS-FIRED LOW-INTENSITY INFRA-RED RADIANT TUBE HEATERS

**WARNING!** These heaters must be installed and serviced by trained gas heater installation and service personnel only! Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating, and maintenance instructions thoroughly before installing or servicing this equipment. Observe all safety information. Retain instructions for future reference.

**MODELS**

Model #	Gas Type	Gas Input (MBTUH)	Heater Length	Heater Width	Typical Mounting Height	Shipping Weight
PCTH-N	Natural	30	48 inches	24 inches	8' – 14'	102#
PCTH-L	LP/Propane	28	48 inches	24 inches	8' – 14'	102#

MBTUH = 1000 BTU per hour.

Submitted by: \_\_\_\_\_ Date: \_\_\_\_\_

Job Title: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Contractor: \_\_\_\_\_ Phone #: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Engineer: \_\_\_\_\_

Local Representative: \_\_\_\_\_

Notes: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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## SPECIFICATIONS AND CLEARANCES

### SPECIFICATIONS

#### APPROVALS

- CSA International Design Certified under ANSI Z83.20-latest edition, Report # 163199-1110933.
- Indoor / Outdoor Approval.
- Commercial / Industrial Approval.

#### HEATER SYSTEM

- Compact design: 24" x 48" x 5-1/2".
- Basic heater pre-assembled.
- Simple chain hanging arrangement.

#### BURNER AND CONTROLS.

- 30,000 BTUH natural gas input rating.
- 28,000 BTUH LP/propane gas input rating.
- Control signals blower for 30-second pre-purge and 5-minute post-purge.
- Direct spark ignition – 100% safety shut-off.
- 3 trials for ignition.
- Electronic flame monitoring for safety.
- Sight glass for burner observation.
- Two (2) safety pressure switches.
- 24 VAC, 1 Phase, 60 Hz thermostatic control.

- External terminal board for easy wiring of thermostat.
- All controls easily accessible in removable control package.
- Fixed screened inlet air opening.

#### COMBUSTION CHAMBER / HEAT EXCHANGER

- 2.75" O.D. serpentine shaped tubing – 15 linear foot equivalent.
- 14 ga. Aluminized Steel for excellent corrosion resistance.
- Wave formed turbulator for increased efficiency.

#### REFLECTOR

- 0.024" highly polished stainless steel reflector.

#### POWER SUPPLY

- 120 VAC, 60 Hz, 1 phase.
- Power consumption is 72 VA.
- Maximum current draw is 0.6 amp.
- Replaceable panel fuse, 0.6 amp.
- 3-prong plug power cord 36" long.

#### GAS CONNECTION

- 3/8" MPT gas inlet.

#### GAS SUPPLY (W.C.)

- |                          | NAT   | LP  |
|--------------------------|-------|-----|
| • Minimum inlet pressure | 7"    | 11" |
| • Maximum inlet pressure | 10.5" | 13" |

#### COMBUSTION AIR / EXHAUST VENTING

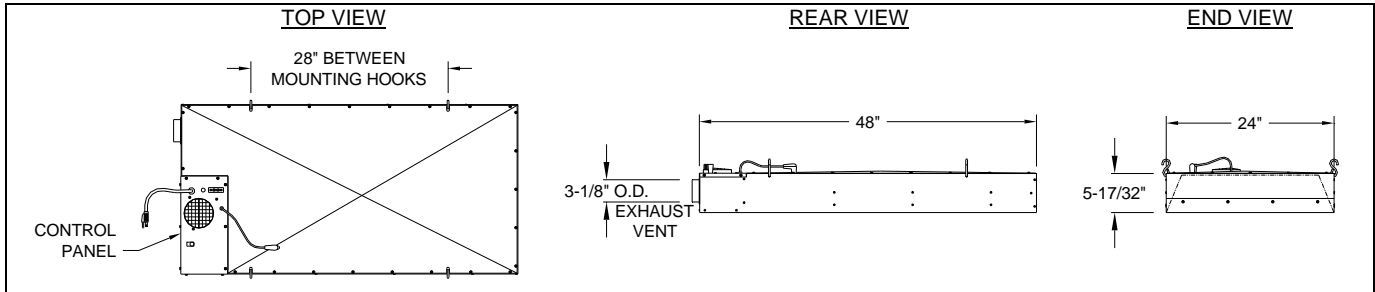
- Indoor or outdoor combustion air.
- Wall or roof combustion air – 3" diameter pipe up to 15 linear feet. (No more than two 90-degree elbows, one elbow equals 5 lineal feet.)
- Dry exhaust – no condensation of flue gases during steady state operating conditions.
- Exhaust may be unvented or vented.
- Wall or roof venting – 3" diameter pipe up to 20 linear feet. (No more than two 90-degree elbows, one elbow equals 5 lineal feet.)

#### LIMITED WARRANTY

- 1 year on complete heater.

#### MADE IN THE USA

### PHYSICAL DIMENSIONS

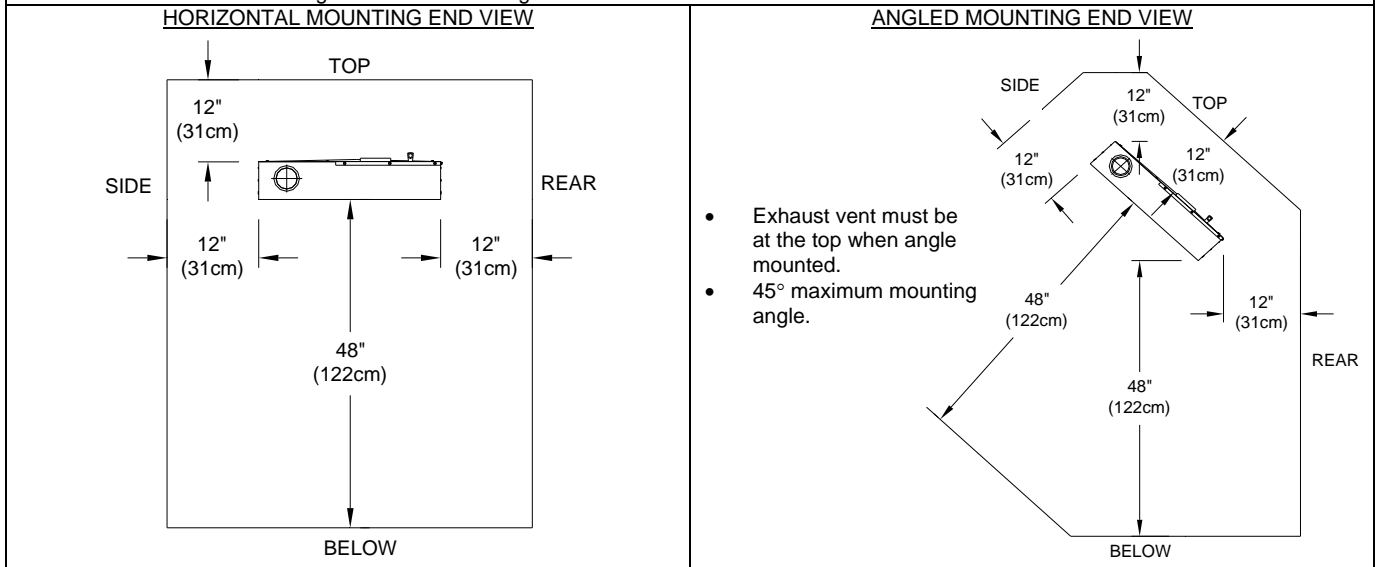


### CLEARANCES

#### CLEARANCES TO COMBUSTIBLES\* (INCHES)

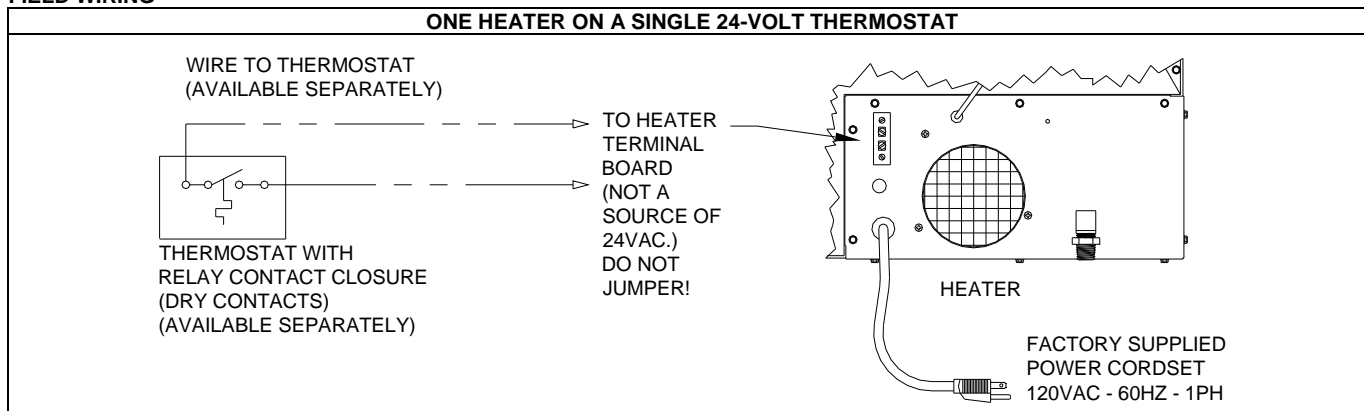
MOUNTING ANGLE	TOP	SIDE	REAR	END	BELOW	VENT PIPING
0°-45°	12	12	12	12	48	18

Note: Minimum Installation Height: 8 feet from floor/ground level.



## FIELD WIRING & ACCESSORIES

### FIELD WIRING



- The Compact Tube Heater **MUST** be controlled by a thermostat, timer, or other automatically operated device with a relay contact closure (dry contacts).
- The terminal board on the heater is not a source of 24 VAC. When wired to a 24 VAC thermostat with dry contacts, the heater circuit is completed for thermostatic control. THE HEATER WILL NOT OPERATE A 24 VAC PROGRAMMABLE THERMOSTAT, which requires it's own independent 24 VAC supply.
- DO NOT JUMPER THE THERMOSTAT TERMINALS AT THE TERMINAL BOARD ON TOP OF THE HEATER! The heater will run continuously until the 120 VAC power cordset is unplugged.
- DO NOT REPLACE THE THERMOSTAT WITH A MANUAL ON/OFF SWITCH! The heater is designed to work with a thermostat or timer. The heater will run continuously until the 120 VAC power cordset is unplugged or the switch turned off.
- THERMOSTAT REQUIREMENTS: A simple 24-volt ON/OFF thermostat should be used with this heater. Thermostat must have a relay contact closure (dry contacts) for the thermostat output. DO NOT USE a programmable type of thermostat unless it has isolated contacts that act as a relay for the heater's thermostat circuit and unless it has a separate and isolated power source to run the internal thermostat circuitry only.

### MANDATORY ACCESSORIES

QTY	ITEM #	DESCRIPTION	NOTES
	20050	Outdoor hood kit – Required for exposed outdoor use	Consists of: (1) 24" x 50" x 5" hood; (1) 3" type B exhaust vent cap; (1) 3" female to female 4½" long, 26 ga. duct stub.
	20055	Vented exhaust kit (roof or wall) – Required for residential garage use	Consists of: (1) 3" type B exhaust vent cap for 3" duct; (1) 3" female to female 4½" long, 26 ga. duct stub; 15' of 3" single wall 26 ga. exhaust duct (6 pieces each 2½" long); (2) 3" adjustable sheet metal 90° elbows; (1) 3" locking collar; (1) wall brace. All parts galvanized. RTV sealant and hardware included. Used to exhaust flue gases outdoors.

### RECOMMENDED ACCESSORIES

QTY	ITEM #	DESCRIPTION	NOTES
	132026-4	Standard thermostat	40°F-80°F (4°C-27°C) 24V. for heaters up to 2640VA total
	1802-95-101	Thermostat wire	18 ga. 2-conductor thermostat wire, red and white conductors, 35' long.
	CH-58	Mounting chain set	50 feet of 1/0 chain plus (8) S-hooks.
	00072	Flexible gas connector	Stainless steel flexible gas connector, 24" long, ½" NPT x 3/8" NPT with gas cock.

### OTHER ACCESSORIES

QTY	ITEM #	DESCRIPTION	NOTES
	0002-42-114/5	Locking thermostat guard	Plastic / or metal guard. Specify material: _____.
	20055	Vented exhaust kit (roof or wall)	Consists of: (1) 3" type B exhaust vent cap for 3" duct; (1) 3" female to female 4½" long, 26 ga. duct stub; 15' of 3" single wall 26 ga. exhaust duct (6 pieces each 2½" long); (2) 3" adjustable sheet metal 90° elbows; (1) 3" locking collar; (1) wall brace. All parts galvanized. RTV sealant and hardware included. Used to exhaust flue gases outdoors.
	20014	Outdoor combustion air kit (roof or wall)	Consists of: (1) 3" type B inlet air cap for 3" duct; (1) 3" adapter for inlet air cap; (1) 3" combustion air male to male 4½" long, 26 ga. stub; 10' of 3" single wall inlet air ducts 26 ga. (4 pieces each 2½" long); (1) 3" to 4" tapered inlet air adapter; (2) 3" adjustable sheet metal 90° elbows. All parts galvanized. Used to bring in combustion air from outdoors.
	10017	3" exhaust vent cap assembly	3" type B vent cap assembled with female stub for 3" duct for roof or wall exhaust venting.
	10001	3" inlet air cap	3" type B vent cap for roof or wall inlet air ONLY. Requires 00011 – 3" adapter for inlet air cap.
	00011	3" adapter for inlet air cap	Adapts 3" type B inlet air cap to single wall 3" duct. Used with 10001 – 3" inlet air cap.
	00078	3" combustion air male to male stub	4½" long stub used to adapt two female single wall 3" combustion air ducts, 26 ga. galvanized.
	00009	3" to 4" tapered inlet air adapter	Adapts 3" inlet air duct to 4" combustion air opening on heater, 26 ga. galvanized.
	00006	3" single wall duct 2½'	3" single wall sheet metal duct 2½ feet long, male to female, 26 ga. galvanized.
	00007	3" adjustable 90° elbow	Adjustable sheet metal male to female 90° elbow for 3" duct, 26 ga. galvanized.
	00086	RTV silicone sealant	Tube of sealant. Used to seal vent piping.
	00012	3" locking collar	Used to fasten 3" ducting to wall.
	132097	Wall brace	Used to support vent pipe extended beyond outside wall.

## WRITTEN SPECIFICATIONS

### SECTION 23 55 23 – FUEL-FIRED RADIANT HEATERS

#### PART 1 – GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 01 Specification Sections apply to this Section.

##### 1.2 SUMMARY

- A. Section includes:
  1. Gas-Fired Low-Intensity Infra-Red Radiant Tube Heaters
- B. Related Sections:
  1. Division 23, Section 23 10 00 "Facility Fuel Systems"
  2. Division 23, Section 23 51 00 "Breechings, Chimneys, and Stacks"

##### 1.3 QUALITY ASSURANCE

- A. Building Codes and Standards
  1. Gas-fired radiant tube heaters shall be Design Certified by CSA (American Gas Association and Canadian Gas Association) and comply with current ANSI, CAN/CSA and Occupational Safety and Health (OSHA) Requirements. The supplier shall provide the CSA Certification Number and the heaters shall bear the CSA Seal of Certification.
  2. Gas-fired radiant tube heaters shall be furnished and installed in accordance with local codes, building drawings and manufacturer's recommendations.

##### 1.4 SUBMITTALS

- A. The supplier shall furnish the owner/contractor with \_\_\_\_\_ copies of the engineering specification forms, showing physical dimensions, installation detail, recommendations, and field wiring.

##### 1.5 WARRANTY

- A. The supplier shall provide a manufacturer's published warranty covering the complete heater for one (1) year.

#### PART 2 – PRODUCTS

##### 2.1 MANUFACTURER

- A. Gas-fired radiant tube heaters shall be SOLARONICS COMPACT TUBE HEATER of the model numbers as manufactured by Solaronics, Inc., Rochester, Michigan 48307.

##### 2.2 DESCRIPTION

- A. Gas-Fired Low-Intensity Infrared Heaters shall comply with ANSI Z83.20.
- B. The heater shall be compact in size: 24" x 48" x 5½".
- C. The heater shall be designed to provide 30,000 BTUH input rating when specified for natural gas. The heater shall be designed to provide 28,000 BTUH input rating when specified for LP/propane gas.
- D. Gas-fired radiant tube heaters shall be designed to satisfactorily operate at a minimum inlet pressure of: 7 inches W.C. when specified for natural gas; or 11 inches W.C. when specified for LP/propane gas; and at a maximum inlet pressure of: 10.5 inches W.C. when specified for natural gas; or 13 inches W.C. when specified for LP/propane gas.
- E. Gas-fired radiant tube heaters shall be designed to operate without adjustments when burning natural gas having a heat value of 1000 BTU per cubic foot with a specific gravity of .65, or when burning LP/propane gas having a heat value of 2500 BTU per cubic foot with a specific gravity of 1.53.
- F. No condensation shall form as a result of combustion in the combustion chamber or heat exchanger tubes while at operating temperatures.

##### 2.3 CONSTRUCTION

- A. The heater's combustion chamber / heat exchanger shall be 2.75" O.D. Aluminized Steel 14 ga. (.083") wall thickness. Aluminized Steel provides excellent mechanical properties at elevated temperatures and for corrosion / oxidation resistance is coated with 8% silicon/aluminum alloy, and shall meet MIL 500 hour salt spray test.

- B. Tube heaters shall utilize a downstream turbulator that shall be factory installed, wave formed for optimal turbulence, acceleration and impingement of the products of combustion resulting in appropriate velocity pressure and momentum for maximum thermal efficiency.
- C. Reflector shall be .024" thick highly polished stainless steel.
- D. The heater shall be designed to be mounted and to operate horizontally facing down, or angled to maximum of 45° from horizontal.
- E. Tube heaters shall be equipped with a sight glass permitting a visual inspection of the spark ignitor and burner operation from the floor.
- F. Heaters shall have a decorative aluminum grille.
- G. Tube heaters shall be designed such that, at the customer's option, outside combustion air may be supplied without the use of additional supply fans.
- H. Heaters shall be either directly vented outdoors with insulated flue pipe, or indirectly vented by positive air displacement of 4 CFM and one square inch of net free area per 1,000 BTUH input, when permitted.
- I. The heater's controls shall be enclosed with a corrosion resistant housing. The controls shall be easily accessible by removing the control panel.

##### 2.4 CONTROLS

- A. The heaters shall provide a 3/8"NPT male pipe thread for gas supply connection.
- B. Heaters shall be equipped with a direct spark ignition system with three (3) trials-for-ignition and upon loss of flame sensing three (3) re-trials-for-ignition.
- C. The direct spark ignitor shall be durable to resist breakage.
- D. Power supplied to each burner shall be 120 VAC, 1 Phase, 60 Hz. Maximum heater electrical current draw shall not exceed 6/10 amp. Maximum electrical power consumption is 72 VA.
- E. Heater controls shall include a replaceable panel fuse, 6/10 amp. No tools required.
- F. The heater controls shall have a three (3) copper conductor electrical power cord extending a minimum of thirty-six (36) inches from the control box with a three (3) prong plug.
- G. Heater controls shall provide 24 VAC, 1 Phase, 60 Hz for thermostat contacts and provide an external terminal board for thermostat wiring.
- H. Heater controls shall include two safety differential pressure switches, factory set (non-field adjustable), to monitor combustion airflow, so as to provide complete burner shutdown due to insufficient combustion air or flue blockage.
- I. The heater's control system shall be designed to shut off the gas flow to the burner in the event either a gas supply or power supply interruption occurs.
- J. Combination gas control valve shut-off shall be of the redundant type. 100% safety shut-off.
- K. The heater shall automatically recycle itself after an inadvertent shutdown.
- L. The heater's airflow control system shall provide a 30-second pre-purge prior to initiating burner operation, and a 5-minute post-purge after completion of burner operation.
- M. Heater shutdown shall occur in the event of circuit control lockout. An interruption of power (reset thermostat) will restart the firing sequence.

#### PART 3 – EXECUTION

##### 3.1 INSTALLATION

- A. Installation shall be in accordance with the requirements of the manufacturer.
- B. An Installation, Operation, and Maintenance Manual shall be supplied with each heater.