Solaronics Heavy-Duty Gas Infra-Red Tube Heaters

VERSAMOUNT SERIES TUBE HEATERS

ENGINEERING SUBMITTAL DATA
SINGLE-STAGE GAS-FIRED LOW-INTENSITY INFRA-RED RADIANT TUB

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

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

Date: 12/14/15

MOST FREQUENTLY SPECIFIED MODELS

Additional C.S.A. design certified models are available in 5 MBTUH increments from the low MBTUH to high MBTUH listed for each heater length. See the online catalog at www.solaronics usa.com for additional models.

Straight Heater Length	5-foot Option ***	MBTUH	Natural Gas				LP / Propane Gas				Typical Mounting Height	Wt.**	U-Tube Heater Length
			Straight Heaters		U*		Straight Heaters		U*				
			Model #	Qty	U*	Qty	Model #	Qty	U*	Qty			
12'-1/4"	+5'	40	STG 40-10AN		U*+5'		STG 40-10AL		U*+5'		9' – 14'	135#	13'-4-1/4"
22'-1/4"	na	40	STG 40-20AN		U*		STG 40-20AL		U*		9' – 14'	150#	13'-4-1/4"
22'-1/4"	na	50	STG 50-20AN		U*		STG 50-20AL		U*		10' – 15'	150#	13'-4-1/4"
22'-1/4"	na	60	STG 60-20AN	3	U*		STG 60-20AL		U*		10' – 15'	150#	13'-4-1/4"
22'-1/4"	+5'	65	STG 65-20MBN		U*		STG 65-20MBL		U*		11' – 16'	150#	13'-4-1/4"
22'-1/4"	+5'	75	STG 75-20MBN		U*		STG 75-20MBL		U*		11' – 16'	150#	13'-4-1/4"
22'-1/4"	+5'	80	STG 80-20MBN		U*		STG 80-20MBL		U*		11' – 18'	150#	13'-4-1/4"
22'-1/4"	+5'	85	STG 85-20MBN		U*		STG 85-20MBL		U*		11' – 18'	150#	13'-4-1/4"
32'-1/4"	+5'	65	STG 65-30BN		U*		STG 65-30BL		U*		11' – 16'	225#	18'-4-1/4"
32'-1/4"	+5'	75	STG 75-30BN		U*		STG 75-30BL		U*		11' – 16'	225#	18'-4-1/4"
32'-1/4"	+5'	100	STG 100-30BN		U*		STG 100-30BL		U*		12' – 20'	225#	18'-4-1/4"
32'-1/4"	+5'	125	STG 125-30MCN		U*		na		na		14' – 25'	225#	18'-4-1/4"
32'-1/4"	+5'	130	STG 130-30MCN		U*		na		na		15' – 27'	225#	18'-4-1/4"
42'-1/4"	na	65	STG 65-40BN		U*		STG 65-40BL		U*		11' – 16'	275#	23'-4-1/4"
42'-1/4"	na	75	STG 75-40BN		U*		STG 75-40BL		U*		11' – 16'	275#	23'-4-1/4"
42'-1/4"	+5'	100	STG 100-40BN		U*		STG 100-40BL		U*		12' – 20'	275#	23'-4-1/4"
42'-1/4"	+5'	125	STG 125-40BN		U*		STG 125-40CL		U*		14' – 25'	275#	23'-4-1/4"
42'-1/4"	+5'	130	STG 130-40CN		U*		STG 130-40CL		U*		15' – 27'	275#	23'-4-1/4"
42'-1/4"	+5'	150	STG 150-40CN		U*		STG 150-40CL		U*		16' – 30'	275#	23'-4-1/4"
52'-1/4"	na	100	STG 100-50BN		U*		STG 100-50BL		U*		12' – 20'	350#	28'-4-1/4"
52'-1/4"	na	125	STG 125-50BN		U*		STG 125-50CL		U*		14' – 25'	350#	28'-4-1/4"
52'-1/4"	na	130	STG 130-50CN		U*		STG 130-50CL		U*		15' – 27'	350#	28'-4-1/4"
52'-1/4"	+5'	150	STG 150-50CN		U*		STG 150-50CL		U*		16' – 30'	350#	28'-4-1/4"
52'-1/4"	+5'	175	STG 175-50CN		U*		STG 175-50CL		U*		17' – 35'	350#	28'-4-1/4"
52'-1/4"	+5'	200	STG 200-50CN		U*		STG 200-50CL		U*		19' – 42'	350#	28'-4-1/4"
62'-1/4"	+5'	150	STG 150-60CN		U*		STG 150-60CL		U*		16' – 30'	400#	33'-4-1/4"
62'-1/4"	+5'	175	STG 175-60CN		U*		STG 175-60CL		U*		17' – 35'	400#	33'-4-1/4"
62'-1/4"	+5'	200	STG 200-60CN		U*		STG 200-60CL		U*		19' – 42'	400#	33'-4-1/4"
72'-1/4"	na	150	STG 150-70CN		U*		STG 150-70CL		U*		16' – 30'	475#	38'-4-1/4"
72'-1/4"	na	175	STG 175-70CN		U*		STG 175-70CL		U*		17' – 35'	475#	38'-4-1/4"
72'-1/4"	na	200	STG 200-70CN		U*		STG 200-70CL		U*		19' – 42'	475#	38'-4-1/4"

Additional Models Specified:

MBTUH = 1000 BTU per hour.
na = not available.
U* = U (STU) replaces G (STG) in the model number for U-tube heaters.
Wt.** = Shipping Weight. Add 25# to weight for U-tube heaters. Add 45# to weight for +5' option.
5-foot Option*** = +5' indicates a 5-foot heater section may be added to the straight heater models only.

Submitted by: Andrew Kent Date: 12-3-2015
Job Title: Project Engineer
Address: 1400 Hotel Road City: Auburn State: ME Zip: 04210
Contractor: Thayer Corporation Phone #: 207-782-4097
Address: (Same as above) City: State: Zip:
Engineer:
Local Representative:
Notes: (3) M/N STG-60-20-AN-OS

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Solaronics, Inc.
GAS INFRA-RED HEATERS

Solaronics Heavy-Duty Gas Infra-Red Tube Heaters

SPECIFICATIONS AND CLEARANCES

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 12/14/15

VERSAMOUNT SERIES SPECIFICATIONS

APPROVALS
- CSA International Design Certified, Report # 163199-1063506. AGA / CGA Approval.
- Indoor / Outdoor Approval.
- Commercial / Industrial Approval.

BURNER AND CONTROLS
- Blower thermally protected and permanently lubricated.
- Blower impeller balanced statically and dynamically.
- Controls isolated from combustion air.
- Safety differential pressure switch.
- Redundant gas safety shut-off 100%.
- Durable direct spark ignitor.
- Independent flame rod sensing.
- Sight glass for burner observation.
- 3 trials for ignition and automatic recycle after inadvertent shutdown.
- 3 validation lights: power on, air pressure normal & operation normal.
- Controls easily accessible – 3 sides.

HEAT EXCHANGER TUBES
- Heavy-duty 12 ga. 4" O.D. black steel for excellent heat transfer emissivity and durability.
- Turbulator baffle factory installed.
- 8" long clamps of 2 layers of 18 ga. aluminized steel with 4 clamping bolts.

COMBUSTION TUBES
- 4" O.D. Aluminized 409 Stainless steel or Aluma Therm for excellent corrosion resistance.

REFLECTORS
- 91.7% reflectional efficiency.
- Brite finished aluminum.
- Rotate sections independently or continuous overlap.

POWER SUPPLY
- 120 VAC, 60 Hz, 1 phase.
- Maximum current draw is 3 amps.
- 3-prong plug power cord 36" long.

GAS CONNECTION
- ½" FPT gas inlet.
- 36" long flexible gas connector.

GAS SUPPLY (W.
- Manifold pres
  - 40 to 100
  - 105 to 20(
- Minimum inlet

40 to 125 MBTUH	6"	11"
130 to 200 MBTUH	7"	11"
Maximum inlet pressure	14"	14"

COMBUSTION AIR / VENTING
- Wall or roof venting – 4" diameter pipe up to 35 linear feet for 40 to 125 MBTUH units and up to 40 linear feet for 130 to 200 MBTUH units. (No more than two 90-degree elbows; one elbow equals 10 lineal feet.)

LIMITED WARRANTY
- 10 years on Burner Core.
- 10 years on **All** Heat Exchanger & Combustion Tubes.
- 2 years on **All** Burner Controls.

MADE IN THE USA

PHYSICAL DIMENSIONS

Straight Heater Bottom View

Burner End View of U-Tube Heater

CLEARANCES

CLEARANCES TO COMBUSTIBLES* (INCHES)					
MBTUH (1000 BTU per hour)	**MOUNTING ANGLE**	**FRONT**	**REAR**	**TOP**	**BELOW**
40, 45 & 50	0°-30°	40	40	12	40
	31°-45°	40	12	12	40
55 & 60	0°-30°	50	50	12	50
	31°-45°	50	12	12	50
65, 70, 75, 80, 85, 90, 95 & 100	0°-30°	24	24	12	60
105, 110, 115, 120 & 125	0°-30°	32	32	12	72
130, 135, 140, 145 & 150	0°-30°	48	48	12	82
	31°-45°	70	12	12	82
155, 160, 165, 170 & 175	0°-30°	58	58	12	92
	31°-45°	80	12	12	92
180, 185, 190, 195 & 200	0°-30°	68	68	12	102
	31°-45°	90	12	12	102

* FOR ALL SYSTEMS: 12" FROM BURNER END AND 68" FROM U-BEND.

0° MOUNTING

30° MOUNTING

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FIELD WIRING & ACCESSORIES

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FIELD WIRING

ONE OR MORE HEATERS ON A SINGLE 120-VOLT THERMOSTAT

ONE OR MORE HEATERS ON A SINGLE 24-VOLT THERMOSTAT

RECOMMENDED ACCESSORIES

QTY	ITEM #	DESCRIPTION	NOTES
	132026-4	Standard thermostat	(40-80°F) 120V or 24V for heaters up to 2640VA total. Up to 7 heaters.
	CH-50	Mounting chain set	50 feet of chain plus 16 S-hooks.
	0002-10-133	Gas ball valve	½" full port ball valve with ½" female NPT pipe threads for gas supply.
	131402	4" roof vent cap for single heater	Required for single 4" roof vents.

OTHER ACCESSORIES

QTY	ITEM #	DESCRIPTION	NOTES
	132654	Blower enclosure installed	Protects burner blower motor in harsh environments. Factory installed with air collar.
	132446	90-degree 4" OD tube elbow & clamp	For L-shaped heater. 16 ga. aluminized steel 90-degree elbow with tube clamp 132571.
	132486	Raintight 120V thermostat	(40-100°F) NEMA-4X, weather resistant, with stainless steel coil. Up to 5 heaters.
	0002-42-157	Night setback 120V thermostat	(50-90°F) mechanical 120V for heaters up to 1920VA total. Up to 5 heaters.
	0002-42-121	Night setback 24V thermostat	(45-90°F) microelectronic 24V for heaters up to 36VA total. Use with 0002-42-119.
	0002-42-119	120V transformer / relay	(8A94-2) Use with 132026-4, or 0002-42-121 for 24V thermostatic control of 120V heaters.
	0002-42-114/5	Locking thermostat guard	Plastic / or metal guard. Specify material: _____.
	132860	4" wall vent cap for single heater	Standard for single 4" wall vents.
	132336	4" wall air supply kit for single heater	Required for single 4" wall supply. Wall cap, flex duct, sleeve & collar.
	132337	4" roof air supply kit for single heater	Required for single 4" roof supply. Roof cap, flex duct, sleeve & collar.
	130828	4"x4"x5" Y-coupler for dual venting	Joins **two** heaters to one common 5" vent using **one** thermostat. 16 ga. aluminized steel Y with (2) tube clamps 132571.
	132149	5" roof vent cap for venting 2 heaters	Required for common 5" roof vents.
	132861	5" wall vent cap for venting 2 heaters	Required for common 5" wall vents.
	132746	4"x4"x6" dual vent coupler (Y)	Joins **two** heaters to one common 6" vent using **only one** thermostat. Sheet metal.
	131461	Indoor venting kit	Required for all units when operating unvented. Cap & elbow.
	132115	U-bend reflector assembly	Use when ordering U-tube heater. Includes (2) pipe hangers.
	131421	Corner reflector assembly	Use with 132446 elbow. Includes (2) pipe hangers.
	132481	Reflector side extension assembly	Focus radiant heat below and in front of heater. 5-foot long with S-hooks.
	132129	Parabolic reflector assembly	Focus radiant heat below heater. 10-foot long with support brackets.
	132352	End cap for reflector	Cap for reflector at the end of the heater.

Solaronics Heavy-Duty Gas Infra-Red Tube Heaters

WRITTEN SPECIFICATIONS

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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 Infra-Red 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 heater's burner core for a period of ten (10) years, heat exchanger and combustion chamber tubes for a period of ten (10) years, and all components utilized in the heater control assembly and hardware for a period of two (2) years.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Gas-fired radiant tube heaters shall be SOLARONICS SUNTUBE IV VERSAMOUNT SERIES of the model numbers and inputs in MBTUH as manufactured by Solaronics, Inc. Rochester, Michigan 48307.

2.2 DESCRIPTION

A. Gas-fired radiant tube heaters shall be designed to satisfactorily operate at a minimum inlet pressure of: 6 inches W.C. for 40-125 MBTUH units, and 7 inches W.C. for 130-200 MBTUH units, when specified for natural gas; or 11 inches W.C. when specified for LP/propane gas; and at a maximum inlet pressure of 14 inches W.C.

B. 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.

2.3 CONSTRUCTION

A. The heater's controls shall be totally enclosed with a corrosion resistant housing. The controls shall be easily accessible from three sides by removing the cover. The burner core assembly shall be constructed of durable materials specially designed for high efficiency, maximum heat transfer, extremely quiet operation and extended life.

B. The heater's combustion chamber shall be 4" O.D. Aluminized 409 stainless steel or Aluma Therm (aluminized titanium alloy steel) (40-100 MBTUH); or Aluminized 409 stainless steel or Aluma Therm finished with a high emissivity rated, corrosion resistant, black coating (105-200 MBTUH). Aluminized 409 stainless steel and Aluma Therm provide 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.

C. The heater's heat exchanger tube shall be heavy-duty 12 ga. (.109") wall thickness 4" O.D. black steel.

D. The heaters are CSA Design Certified for alternate construction utilizing radiant tubes of all Aluma Therm finished with a high emissivity rated, corrosion resistant, black coating.

E. The 4" O.D. tubes shall be joined by two layers of 18 ga. (.052") wall thickness aluminized steel tube clamp assembly and shall be a minimum of 8" in length for maximum support. Clamp shall be of a compression coupling design for uniform draw and pressure, and four (4) 5/8"-11x2" zinc plated carriage bolts and nuts to draw up (tighten to a minimum of 65 foot-pounds of torque).

F. The direct spark ignitor shall be durable t

G. Reflectors shall be .025" thick - #3003H2 geometrically designed configuration not reflectional efficiency, shall be held by a . wire hanger. Hanger shall incorporate th reflector up to 45 degrees, in either direct center of the combustion chamber or hea rotation.

H. Each 5 or 10-foot reflector section shall have the ability to be independently rotated from all other 5 or 10-foot sections, or overlapped between 5 or 10-foot sections, or a combination of both over the entire length of the system. The heater's reflector hanging system shall be designed to permit expansion while minimizing noise and/or rattles. Reflectors shall be assembled to the heater without the use of tools.

I. Heaters shall utilize a downstream turbulator that shall be factory installed in the last 10-foot heat exchanger section, wave formed for optimal turbulation, acceleration and impingement of the products of combustion resulting in appropriate velocity pressure and momentum for maximum thermal efficiency.

J. Heaters shall be equipped with a sight glass permitting a visual inspection of the spark ignitor and burner operation from the floor.

K. 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.

L. 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.

M. Heaters shall come with a 36" long stainless steel flexible gas connector.

2.4 CONTROLS

A. Heater controls shall be isolated from combustion air to prevent corrosion from wet or dirty air.

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. Flame sensing shall be via an independent sensing rod and circuit.

C. Power supplied to each burner shall be 120 VAC, 60 Hz. (Optional 50 Hz units available.) Maximum heater electrical current draw shall not exceed 3 amps.

D. 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.

E. Heater controls shall include a safety differential pressure switch, factory set (non-field adjustable), to monitor combustion airflow, so as to provide complete burner shutdown due to insufficient combustion air or flue blockage.

F. 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.

G. Combination gas control shall have a step open feature for softer ignition. Gas valve shut-off shall be of the redundant type. 100% safety shut-off.

H. The heater shall have an 1/8" – 27 FPT externally accessible inlet gas pressure test point.

I. The heater shall automatically recycle itself after an inadvertent shutdown.

J. The heater shall have three (3) system validation lights easily visible on the bottom of the burner housing. Lights shall validate "Power On," "Air Pressure Normal," and "Operation Normal."

K. The heater's blower motor shall be thermally protected, permanently lubricated and the blower motor's impeller shall be both statically and dynamically balanced.

L. The heater's airflow control system shall provide a pre-purge prior to initiating burner operation.

M. No condensation shall form as a result of combustion in the combustion chamber or heat exchanger tubes while at operating temperatures.

N. Total heater shutdown shall occur in the event of circuit control lockout, including burner operation and combustion air blower. 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.