

K-SERIES (Single-Stage)
STK-SERIES (2-Stage)



ENGINEERING SUBMITTAL DATA
HIGH INTENSITY GAS-FIRED INFRA-RED 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.

INDICATE QUANTITY	Model #	CIRCLE GAS TYPE		INDICATE CONTROL VOLTAGE			Square Inches of Radiating Surface	Recommended Mounting Heights With Standard Reflector Angled 30°	Shipping Weight
		Natural Gas MBTUH	LP/ Propane Gas MBTUH	Direct Spark		Manual			
				120 V (DSA)	24 V (QSA or *ST)	Millivolt (TA)			
	K-30	30	na				173	10' – 12'	30 #
	K-35	35	35				173	11' – 13'	30 #
	K-40	40	na				173	11' – 13'	30 #
	K-45	45	na				173	12' – 14'	30 #
	K-50	50	50				173	12' – 14'	30 #
	K-55	55	na				173	13' – 15'	30 #
	K-60	60	na				173	13' – 15'	30 #
	K-70	70	70				346	13' – 15'	36 #
	K-75	75	75				346	14' – 16'	36 #
	K-80	80	80				346	14' – 16'	36 #
	K-85	85	85				346	15' – 17'	36 #
	K-90	90	90				346	15' – 17'	36 #
	*STK-90/45	na	*90/45	na		na	346	15' – 17'	41 #
	K-95	95	na				346	15' – 17'	36 #
	K-100	100	na				346	15' – 17'	36 #
	*STK-100/50	*100/50	na	na		na	346	15' – 17'	41 #
	K-110	110	na				519	15' – 18'	49 #
	K-120	120	120				519	16' – 18'	49 #
	*STK-120/80	na	*120/80	na		na	519	16' – 18'	54 #
	K-125	125	na				519	16' – 19'	49 #
	K-130	130	na				519	16' – 19'	49 #
	K-135	135	na				519	16' – 19'	49 #
	K-150	150	na				519	17' – 20'	49 #
	*STK-150/100	*150/100	na	na		na	519	17' – 20'	54 #
	K-160	160	na				519	17' – 20'	49 #
	K-160	na	160				692	17' – 20'	62 #
	*STK-160/80	na	*160/80	na		na	692	17' – 20'	67 #
	K-175	175	na				692	18' – 21'	62 #
	K-200	200	na				692	19' – 22'	62 #
	*STK-200/100	*200/100	na	na		na	692	19' – 22'	67 #

* = 2-Stage Models. MBTUH = 1000 Btu per hour heater input rating. na = not available.

Submitted by: _____ Date: _____

Job Title: _____

Address: _____ City: _____ State: _____ Zip: _____

Contractor: _____ Phone #: _____

Address: _____ City: _____ State: _____ Zip: _____

Engineer: _____

Local Representative: _____

Notes: _____

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SPECIFICATIONS, CLEARANCES & WARNINGS

K-SERIES & *STK-SERIES SPECIFICATIONS

<p>APPROVALS</p> <ul style="list-style-type: none"> CSA International Design Certified, Report # 163199-1110931. Approved For Indoor Installation Only. Commercial / Industrial Approval. <p>CONTROLS</p> <ul style="list-style-type: none"> Various control styles available. See Controls Available below. *2-Stage controls when chosen: provide correct air to gas ratios for complete efficient combustion at both high and low fire rates, stop energy overshoot, cut energy consumption when less heat is needed, yet provide more heat quickly when temperatures fall sharply. Redundant gas safety shut-off 100%. Controls easily accessible. 	<ul style="list-style-type: none"> Direct Spark Ignition controls when chosen provide 3 trials for ignition and automatic recycle after inadvertent shutdown. <p>BURNER</p> <ul style="list-style-type: none"> Reaches maximum operating temperature in less than 30 seconds. Ceramic combustion surface capable of reaching 1850 degrees F and withstanding thermal shock when water quenched. <p>MAIN FRAME</p> <ul style="list-style-type: none"> Corrosion-free 16 ga. aluminized steel main frame. Frame has four (4) 3/8" diameter holes for easy mounting with S-hooks and chain. 	<p>REFLECTORS</p> <ul style="list-style-type: none"> Highly polished Mirror Brite aluminum reflectors for maximum efficiency. Standard design reflector mounted to heater at factory. <p>GAS CONNECTION</p> <ul style="list-style-type: none"> 1/2" FPT gas inlet. <table border="1"> <tr> <td>GAS PRESSURE (W.C.)</td> <td>NAT</td> <td>LP</td> </tr> <tr> <td>Manifold pressure</td> <td>6"</td> <td>10"</td> </tr> <tr> <td>Minimum inlet pressure</td> <td>7"</td> <td>11"</td> </tr> <tr> <td>Maximum inlet pressure</td> <td>14"</td> <td>14"</td> </tr> </table> <p>LIMITED WARRANTY</p> <ul style="list-style-type: none"> 1 year limited warranty covering the entire heater including burner and controls. <p>MADE IN THE USA</p>	GAS PRESSURE (W.C.)	NAT	LP	Manifold pressure	6"	10"	Minimum inlet pressure	7"	11"	Maximum inlet pressure	14"	14"
GAS PRESSURE (W.C.)	NAT	LP												
Manifold pressure	6"	10"												
Minimum inlet pressure	7"	11"												
Maximum inlet pressure	14"	14"												

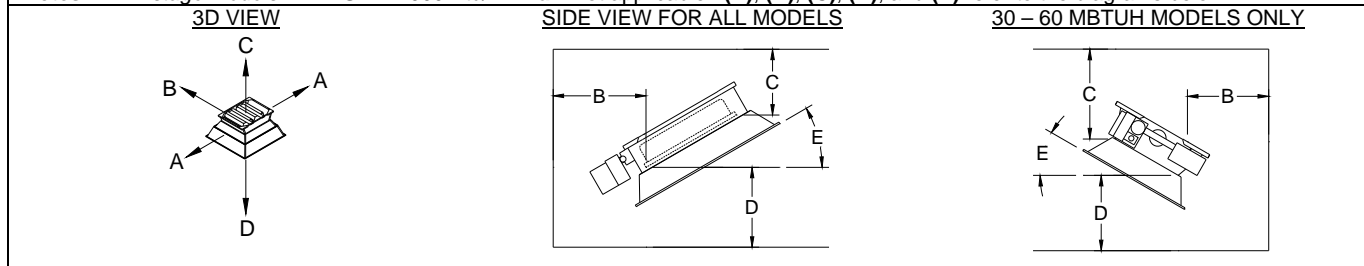
CONTROLS AVAILABLE

Control Designation		Control Voltage	Control Description	Maximum Current Draw	Maximum Power Draw
Natural Gas	LP/Propane Gas				
*STN	*STL	24 VAC	*2-Stage, Direct Spark Ignition, 100% Shut-off	0.96 Amps.	23.1 VA
DSAN	DSAL	120 VAC	Single-Stage, Direct Spark Ignition, 100% Shut-off	0.14 Amps.	16.8 VA
QSAN	QSAL	24 VAC	Single-Stage, Direct Spark Ignition, 100% Shut-off	0.66 Amps.	15.9 VA
TAN	TAL	Millivolt	Single-Stage, Manual Pilot Ignition, 100% Shut-off	None	None

CLEARANCE TO COMBUSTIBLES

Natural Gas Models MBTUH	30-60	70-100 *100/50	110-150 *150/100	160	175-200 *200/100
LP/Propane Gas Models MBTUH	35 & 50	70-90 *90/45	120 *120/80	160 *160/80	
Clearance	Inches	Inches	Inches	Inches	Inches
SIDE OF HEATER (A)	30	36	46	48	48
BACK OF HEATER (B)	30	30	33	33	33
TOP OF HEATER (C):					
- Mounting Angle (E) = 5°-29° (C)	60	62	64	68	68
- Mounting Angle (E) = 30° ONLY (C)	48	50	58	68	68
- With Optional Heat Shield (C)	34	38	na	na	na
BELOW HEATER (D):					
- Standard Reflector (D)	80	105	125	140	140
- With Optional Parabolic Reflector (D)	110	135	165	180	180

Notes: * = 2-stage models. MBTUH = 1000 Btu/hr. na = not applicable. (A), (B), (C), (D), and (E) refer to the diagrams below.

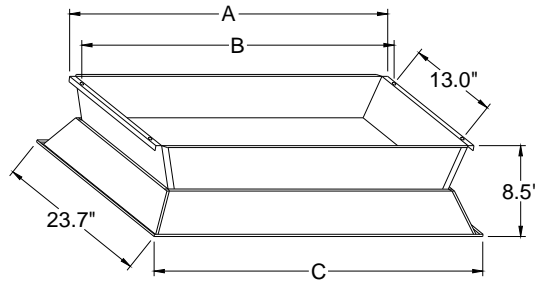


WARNINGS

<p>FOR INDOOR INSTALLATION ONLY. NOT FOR RESIDENTIAL USE.</p> <ul style="list-style-type: none"> Do not use for the following applications: <ul style="list-style-type: none"> Residential living, sleeping or garage areas. Enclosed swimming pool areas. Areas requiring explosion-proof equipment. Areas with contaminated atmospheres. Process heating applications. Read and understand the installation, operation and maintenance manual prior to installing or servicing these heaters. 	<ul style="list-style-type: none"> In locations used for the storage of combustible materials, signs shall be posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to combustibles. Where vehicles may be parked or hoisted below the heater, ensure that the clearances to combustibles distances will be maintained from the highest possible point of a raised vehicle. Failure to comply with the stated clearance to combustibles could result in personal injury, death and/or property damage. The installer is responsible to ensure building materials with a low heat tolerance are protected to prevent degradation.
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PHYSICAL DIMENSIONS & FIELD WIRING

PHYSICAL DIMENSIONS

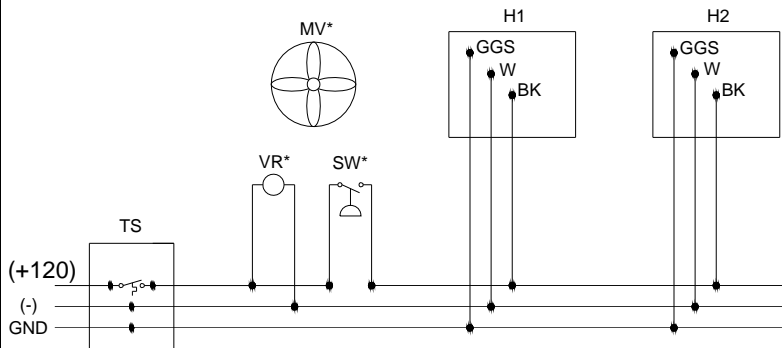


Model MBTUH	# of Burners	A	B**	C
30 – 60	1	15.3"	14.6"	16.6"
70 – 100, *90/45, *100/50	2	23.9"	23.3"	25.3"
110 – 160N, *120/80, *150/100	3	32.6"	31.9"	33.9"
160L – 200, *160/80, *200/100	4	41.2"	40.5"	42.5"

* = 2-stage models. ** Four (4) mounting holes (.375" diameter) for balanced suspension are located in the frame by dimensions B x 13.0".

FIELD WIRING

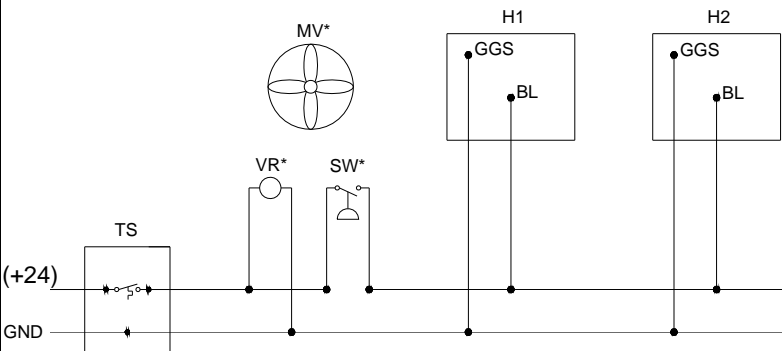
Typical Wiring for 120 VAC Single-Stage Heaters



LEGEND

- (+120) = 120 VAC Supply Voltage
- (-) = Supply Neutral
- GND = Earth Ground
- MV* = Mechanical Ventilation*
- VR* = Ventilation Relay*
- SW* = Ventilation Interlock Switch* (normally opened)
- TS = Thermostat
- H1 = Heater #1
- H2 = Heater #2
- GGS = Green Ground Screw (inside control box)
- W = White Wire – Neutral
- BK = Black Wire – 120 VAC call for heat

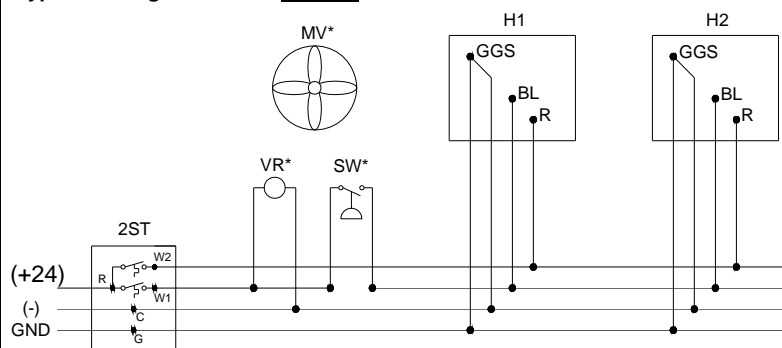
Typical Wiring for 24 VAC Single-Stage Heaters



LEGEND

- (+24) = 24 VAC Supply Voltage
- GND = Earth Ground
- MV* = Mechanical Ventilation*
- VR* = Ventilation Relay*
- SW* = Ventilation Interlock Switch* (normally opened)
- TS = Thermostat
- H1 = Heater #1
- H2 = Heater #2
- GGS = Green Ground Screw (inside control box)
- BL = Blue Wire – 24 VAC call for heat

Typical Wiring for 24 VAC 2-Stage Heaters



LEGEND

- (+24) = 24VAC Supply Voltage
 - (-) = Supply Neutral
 - GND = Earth Ground
 - MV* = Mechanical Ventilation*
 - VR* = Ventilation Relay*
 - SW* = Ventilation Interlock Switch* (normally opened)
 - 2ST = 2-Stage Thermostat
 - H1 = Heater #1
 - H2 = Heater #2
 - GGS = Green Ground Screw (inside control box)
 - BL = Blue Wire – 24 VAC call for LOW heat
 - R (on heater) = Red Wire – 24 VAC call for HIGH heat
- Use 18/4 solid class 2, thermostat cable of maximum length 125 feet.

* = If necessary, when all combustion air is provided by a mechanical air supply system.

ACCESSORIES

ELECTRICAL SUPPLY & THERMOSTATIC CONTROLS

QTY	Item Number	Description	Notes
	0002-42-156	*2-stage 24-volt thermostat	Operates 2-stage 24 VAC heaters, up to 24 VA.
	0002-42-177	*2-stage 24-volt raintight thermostat	Operates 2-stage 24 VAC heaters, up to 1900 VA.
	0002-42-176	*2-stage 24-volt programmable thermostat	Operates 2-stage 24 VAC heaters, up to 36 VA
	132026-4	Standard thermostat (single-stage)	Operates single-stage 120 or 24 VAC heaters, up to 2600 VA.
	132486	Raintight thermostat (single-stage)	Operates single-stage 120 or 24 VAC heaters, up to 1900 VA.
	0002-42-121	24V night setback thermostat (single-stage)	Operates single-stage 24 VAC heaters, up to 36 VA or millivolt.
	0002-42-157	120V night setback thermostat (single-stage)	Operates single-stage 120 VAC heaters, up to 1900 VA.
	0002-42-114	Plastic locking thermostat guard	Clear plastic, ID: 4.5" H x 7" W x 3" D, for use with 132026-4.
	0002-42-115	Metal locking thermostat guard	Baked enamel, ID: 4.6" H x 7.1" W x 3.2" D, for all thermostats.
	0002-42-024-2	40 VA transformer	60 Hz, 120V to 24V, or 24V to 120V.
	0002-42-078	75 VA transformer	50/60 Hz, 120V to 24V

GAS SUPPLY & MOUNTING

QTY	Item Number	Description	Notes
	0002-10-046	Standard gas supply flex connector	24" long, stainless steel, 1/2" psi. max. w/ 1/2" gas cock & 1/8" tap.
	CH-30 DM	Chain mounting kit – adjustable 0° to 30°	Pre-assembled 5' chain set & S-hooks to mount heater 0° - 30°.
	CH-20	20-foot chain set	20 feet of chain and 8 S-hooks.
	132010	S-hook	One #5 S-hook.

HEAT SHIELDS**

- Used to reduce clearance to combustibles above heaters.

QTY	Item Number	Description	Notes
	00K1-10-505	Heat shield for heater with 1 burner	30 – 60 MBTUH.
	00K2-10-005-1	Heat shield for heater with 2 burners	70 – 100, *90/45, & *100/50 MBTUH.

SECONDARY RE-RADIATING WIRE GRIDS**

- Used to increase radiant efficiency and improve performance in drafty areas.

QTY	Item Number	Description	Notes
	00K1-10-003	Wire grid for heater with 1 burner	30 – 60 MBTUH.
	00K2-10-003	Wire grid for heater with 2 burners	70 – 100, *90/45 & *100/50 MBTUH.
	00K3-10-003	Wire grid for heater with 3 burners	110 – 160N, *120/80 & *150/100 MBTUH.
	00K4-10-003	Wire grid for heater with 4 burners	160L – 200, *160/80 & *200/100 MBTUH.

PROTECTIVE SCREENS FOR STANDARD REFLECTORS**

- Used to protect ceramic surface from foreign objects striking heater.

QTY	Item Number	Description	Notes
	0M30-16-100	Std. protective screen for heater w/ 1 burner	Fits standard reflector. 30 – 60 MBTUH.
	0M60-16-100	Std. protective screen for heater w/ 2 burners	Fits standard reflector. 70 – 100, *90/45 & *100/50 MBTUH.
	0M90-16-100	Std. protective screen for heater w/ 3 burners	Fits standard reflector. 110 – 160N, *120/80 & *150/100 MBTUH.
	M120-16-100	Std. protective screen for heater w/ 4 burners	Fits standard reflector. 160L – 200, *160/80 & *200/100 MBTUH.

PARABOLIC REFLECTOR EXTENSIONS**

- Used to concentrate radiant infrared energy below heater. Increase clearance to combustible materials below heater.

QTY	Item Number	Description	Notes
	0M30-10-007-0	Parabolic reflector for heater with 1 burner	Reflector extension. 30 – 60 MBTUH.
	0M60-10-008-0	Parabolic reflector for heater with 2 burners	Reflector extension. 70 – 100, *90/45, & *100/50 MBTUH.
	0M90-10-007-0	Parabolic reflector for heater with 3 burners	Reflector extension. 110 – 160N, *120/80, & *150/100 MBTUH.
	M120-10-007-0	Parabolic reflector for heater with 4 burners	Reflector extension. 160L – 200, *160/80, & *200/100 MBTUH.

PROTECTIVE SCREENS FOR PARABOLIC REFLECTORS**

- Used to protect ceramic surface from foreign objects striking heater.

QTY	Item Number	Description	Notes
	0M30-16-300	Para. protective screen - heater w/ 1 burner	Fits parabolic reflector. 30 – 60 MBTUH.
	0M60-16-300	Para. protective screen - heater w/ 2 burners	Fits parabolic reflector. 70 – 100, *90/45 & *100/50 MBTUH.
	0M90-16-300	Para. protective screen - heater w/ 3 burners	Fits parabolic reflector. 110 – 160N, *120/80 & *150/100 MBTUH.
	M120-16-300	Para. protective screen - heater w/ 4 burners	Fits parabolic reflector. 160L – 200, *160/80 & *200/100 MBTUH.

* = 2-stage models.

** = Heat shields, secondary re-radiating wire grids, protective screens and parabolic reflector extensions require some field assembly.

WRITTEN SPECIFICATIONS – K-SERIES (Single-Stage) & *STK-SERIES (2-Stage)

SECTION 23 55 23 – GAS-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 High-Intensity Infrared Radiant 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
- Heaters shall be Design Certified by CSA to ANSI Z83.19 Gas-Fired High-Intensity Infrared Heaters and comply with current Occupational Safety and Health (OSHA) Requirements. The supplier shall provide the CSA Certification Number and the heaters shall bear the CSA Seal of Certification.
 - Heaters shall be furnished and installed in accordance with local codes, building drawings and manufacturer's recommendations.
 - Natural or mechanical means shall be provided to supply and exhaust at least 4 CFM per 1000 Btu/hour input of installed heaters.
 - In locations used for the storage of combustible materials, signs shall be posted to specify the maximum permissible stacking height to maintain required clearances from the heater to the combustibles.

1.4 SUBMITTALS

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

1.5 WARRANTY

- A. Heaters shall carry a manufacturer's limited warranty covering the entire heater including burner and controls for a period of one (1) year.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Heaters shall be SOLARONICS K-SERIES (single-stage) or *STK-SERIES (2-stage) Gas-Fired High-Intensity Infrared Heaters of the model numbers and inputs in MBTUH as manufactured by Solaronics, Inc. of Rochester, Michigan 48307, which has over 50 years of experience manufacturing gas-fired high-intensity infrared heaters.

2.2 DESCRIPTION

- A. Gas-Fired High-Intensity Infrared Heaters shall comply with ANSI Z83.19, section 2.10 Radiant Coefficient, without the use of a secondary re-radiating surface of either rods or screen.
- B. The ceramic radiant surface shall be horizontal when heater is installed at 0 degrees.
- C. Heaters shall be capable of angle mounting from 5 to 30 degrees, without the use of an additional reflector.
- D. Heaters shall be fully tested and ready to install, pipe and wire for operation on Natural or LP/Propane gas.
- E. Heaters shall be designed to satisfactorily operate at a minimum supply inlet gas pressure of 7 inches water column (W.C.) when specified for natural gas or 11 inches W.C. when specified for LP/propane gas and at a maximum supply inlet gas pressure of 14 inches W.C.
- F. 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.
- G. Heaters shall have a gas inlet of 1/2" FPT.
- H. When *STK-SERIES 2-stage heaters are specified, heaters shall provide 2-stage control of Both Gas and Air to provide the most efficient and complete combustion at both high and low fire rates.

2.3 CONTROLS

- A. Heaters shall be equipped with one of the following controls:
 1. *STN (natural gas) or *STL (LP/propane gas) 2-stage, 24 VAC direct spark ignition control having: 100% safety shut off with flame monitoring and 16.4 VA maximum power consumption. Heaters shall be capable of 2-stage operation on low and high modes in conjunction with a 2-stage microprocessor thermostat.

- DSAN (natural gas) or DSAL (LP/propane gas) single-stage, 120 VAC direct spark ignition control having: 100% safety shut off with flame monitoring and 10.8 VA maximum power consumption.
- QSAN (natural gas) or QSAL (LP/propane gas) single-stage, 24 VAC direct spark ignition control having: 100% safety shut off with flame monitoring and 9.2 VA maximum power consumption.
- TAN (natural gas) or TAL (LP/propane gas) single-stage, millivolt manual pilot ignition control having: 100% safety shut off of constant pilot and main burner(s) in case of pilot outage, field adjustable gas regulator, concealed pilot flame to protect it from drafts, and supplied with 30' of 18-2 wire and a millivolt thermostat. Control shall operate with no external electrical power, but instead use milli-voltage generated by the pilot flame.

- B. The heater's controls shall be easily accessible.
 C. The direct spark ignitor or manual pilot shall be durable to resist breakage.
 D. The heater is fitted with a gas orifice for each burner for proper air to gas mixture for sea level. Heaters can be ordered or converted for use at high altitudes, or with either LP/propane or natural gas.

2.4 CONSTRUCTION

- A. The heater shall be of modular design employing multiple burners to achieve the specified input.
- B. The burner(s) shall include a ceramic combustion surface, a plenum chamber and a venturi mixer and shall be removable with a single screw for cleaning or replacement without disconnecting any gas, electrical or hanging device.
- C. The ceramic combustion surface shall be capable of reaching temperatures up to 1850 degrees F (an incandescent appearance) and withstand thermal shock when water quenched.
- D. The combustion surface shall be a cordierite-based grooved ceramic of an exclusive permeable design whereby alternate rows of 230 perforations per square inch terminate at the bottom of slots making one half of the flame below the top surface of the ceramic and creating a more intimate contact between flame and surface. This design increases the ceramic surface temperature and the radiant output while maintaining a lower gas input and achieving greater resistance to drafts.
- E. The burner's plenum chamber shall be of 20 ga. (.035") corrosion-free aluminized steel, one-piece fabrication and seamless no-weld construction. The plenum chamber shall utilize a one-piece stainless steel retainer to hold the ceramic surface in place around its entire perimeter and a 14 ga. (.083") aluminized steel back bracket for holding the burner assembly in place to achieve proper alignment of the surface, venturi and orifice. The venturi shall be made of aluminized steel.
- F. The heater's main frame shall be 16 ga. (.065") corrosion-free aluminized steel and of no-weld construction. The main frame shall have a double turned upper edge and two (2) corner reinforcement brackets for rigidity. The side frames shall have four (4) 3/8" diameter holes for easy mounting with S-hooks and chain.
- G. Reflectors shall be of 21 ga. (.032") highly polished Mirror Brite aluminum with a reflectivity of not less than 98%. Standard reflector design (shape) shall have .352 square feet of reflective area per linear foot, with a double turned edge for rigidity and be mounted to the heater at the factory.

2.5 ACCESSORIES

- A. Certified accessories may be specified:
- Heat Shields shall be used for heaters of 30 thru 100 MBTUH to reduce the required clearance to combustible materials above the heater.
 - Secondary Re-radiating Wire Grids shall be used to improve heater performance in drafty areas.
 - Parabolic Reflector Extensions shall be used to concentrate radiant infrared energy for high mounting height applications or when desired for spot heating. The clearance to combustible materials below the heater is increased.
 - Protective Screens shall be used on heaters in locations where foreign objects may damage the heater's ceramic surface.

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.