MODINE
APPLIED THERMAL INNOVATION™

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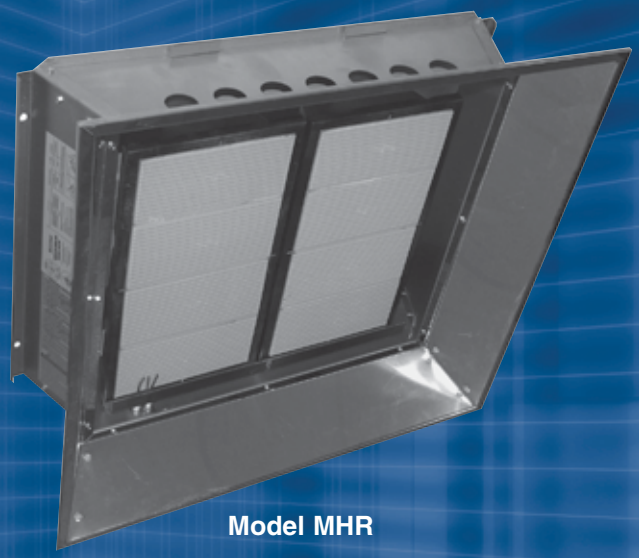
Gas-Fired High Intensity Infrared Heaters



Model MHR

INDOOR AIR SOLUTIONS

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Modine's MHR Series is a gas-fired, high intensity ceramic infrared heater. Ideal for spot heating, the MHR series offers simple gas and power connections, as well as inexpensive maintenance.

This catalog describes the design and construction features and benefits, typical applications, dimensional data, and configurations available for the MHR Series.

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Refer to page 6 for information regarding the Breeze™ AccuSpec Sizing and Selection Program

Infrared Heating Defined

Infrared heating systems rely upon the transfer of radiant energy from hot heat exchanger surfaces (up to 1850°F for high intensity heaters) through the air to cooler surfaces, without the use of an air mover. Since radiant energy always travels in a straight line from its source, people and objects within a direct line-of-sight of the heat exchanger become warmed immediately.

While capable of being used for total building heating or large area heating, they are ideally suited for spot heating applications. Spot heating involves small areas such as loading dock doors and single person work cells.

Advantages of Infrared Heating

- No air mover, reducing electricity and maintenance costs, while increasing worker comfort from the absence of drafts and annoying fan noise.
- Quick temperature recovery, as only objects need to be heated, not large volumes of air.
- Significant energy savings through use of zone control and/or spot heating which heats objects without the need to heat large air volumes.

Typical Applications

The following are examples of applications that can benefit from high-intensity infrared heating.

- Manufacturing facilities
- Vehicle repair centers
- Warehouses and loading docks
- Aircraft hangars
- Indoor tennis courts
- Indoor golf driving ranges
- Emergency vehicle garages
- Indoor stadium seating areas

See Infrared Design and Engineering Guide 9-200 for additional application information.

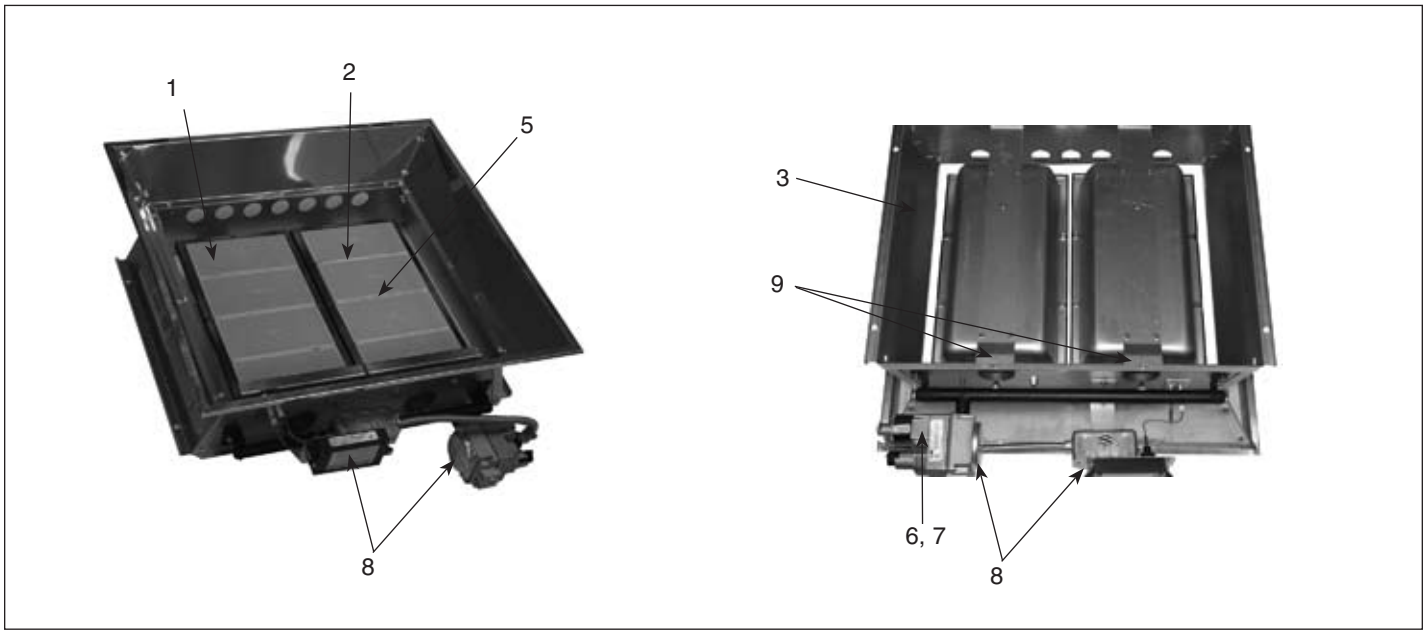
⚠ WARNING

Do not locate ANY gas-fired unit in areas where chlorinated, halogenated or acid vapors are present in the atmosphere.

⚠ WARNING

Do not install in potentially explosive or flammable atmosphere laden with dust, sawdust, or similar airborne materials.

Figure 3.1 - Construction Features



Features

1. High temperature cordierite-based grooved ceramic tiles with perforations along both the top and bottom of the grooves.
2. Polished aluminum reflectors.
3. 16 gauge aluminized steel frame.
4. No air mover is utilized.
5. Input ranges from 30,000 Btu/hr through 200,000 Btu/hr in Natural or Propane gas.
6. Direct spark or self-energizing standing pilot ignition.
7. 115V, 25V, or millivolt controls.
8. Externally-mounted controls.
9. Burners are replaced by removing one fastener.
10. CSA design certification for indoor, unvented operation in commercial and industrial installations.
11. Propane and/or High Altitude kits for field conversions.

Benefits

1. Increased temperature and surface area to provide maximum heat transfer while maintaining lower gas input ratings.
2. Efficiently direct radiant heat to the desired area, for increased comfort over wider areas.
3. Provides support for simple chain mounting.
4. Eliminates fan noise, drafts, maintenance and reduces electrical energy costs.
5. Wide input range to accommodate a variety of heating requirements
6. Maximize application flexibility.
7. Accommodate a wide range of electrical inputs.
8. Allow convenient access to gas valve, control system, transformer, and gas orifices, increasing ease of installation and service.
9. Eliminates the removal of the unit from its mounted position for service.
10. Assures that the unit conforms to national safety standards.
11. Allows for quick and easy field modification of unit to use propane gas and/or operate at elevations of up to 7,000 feet above sea level.

Table 4.1 - Performance and Dimensional Data

Model	Gas Controls ④ ⑤	Input Rating (Btu/hr)		Recommended Mounting Height (ft.) ①				Dimensions (in) ②		Ship Wt (lbs) ③	Radiating Area (sq. in.)
				Standard Reflector		Parabolic Reflector					
		Natural	Propane	0° Angle	30° Angle	0° Angle	30° Angle	A	B		
MHR 30	Single Stage or Millivolt	30,000	-	11.0 – 13.0	10.0 – 12.0	-	-	16.625	14.625	30	173
MHR 50	Single Stage or Millivolt	-	50,000	13.5 – 15.5	12.5 – 14.5	15.5 – 18.5	14.0 – 17.0				
MHR 60	Single Stage or Millivolt	60,000	-	14.5 – 16.5	13.0 – 15.0	16.0 – 20.0	15.0 – 18.0				
MHR 90	Single Stage or Millivolt	90,000	90,000	16.0 – 18.5	14.5 – 17.0	19.5 – 22.5	17.5 – 20.5	25.250	23.250	36	346
	Two Stage	-	90,000/45,000	16.0 – 18.5	14.5 – 17.0	19.5 – 22.5	17.5 – 20.5				
MHR100	Single Stage or Millivolt	100,000	-	17.0 – 19.5	15.0 – 17.5	20.5 – 23.5	18.5 – 21.5				
	Two Stage	100,000/50,000	-	17.0 – 19.5	15.0 – 17.5	20.5 – 23.5	18.5 – 21.5				
MHR120	Single Stage or Millivolt	120,000	120,000	17.5 – 21.0	15.5 – 18.5	21.5 – 25.0	20.0 – 23.0	33.875	31.875	49	519
	Two Stage	-	120,000/80,000	17.5 – 21.0	15.5 – 18.5	21.5 – 25.0	20.0 – 23.0				
MHR150	Two Stage	150,000/100,000	-	18.5 – 22.5	16.5 – 20.0	24.0 – 27.5	21.5 – 24.5				
MHR160	Single Stage or Millivolt	160,000	160,000	19.0 – 23.0	17.0 – 20.5	25.0 – 28.5	22.5 – 25.5				
MHR160	Two Stage	-	160,000/80,000	19.0 – 23.0	17.0 – 20.5	25.0 – 28.5	22.5 – 25.5	42.500	40.500	62	692
MHR200	Single Stage or Millivolt	200,000	-	20.5 – 25.0	18.5 – 22.5	27.0 – 31.0	24.5 – 28.0				
	Two Stage	200,000/100,000	-	20.5 – 25.0	18.5 – 22.5	27.0 – 31.0	24.5 – 28.0				

① See Table 5.1 for allowable mounting angles.
② See Figure 4.1.
③ Add 5 lbs for units with 2-stage gas controls.
④ Single stage and two stage controls are direct spark ignition with 100% safety shutoff and are available as either 115V or 24V (except two-stage which is 24V only).
⑤ Millivolt controls are self-energizing standing pilot requiring no external power source. Units include a millivolt thermostat and 35 feet of wire.

Figure 4.1 - Unit Dimensional Drawing

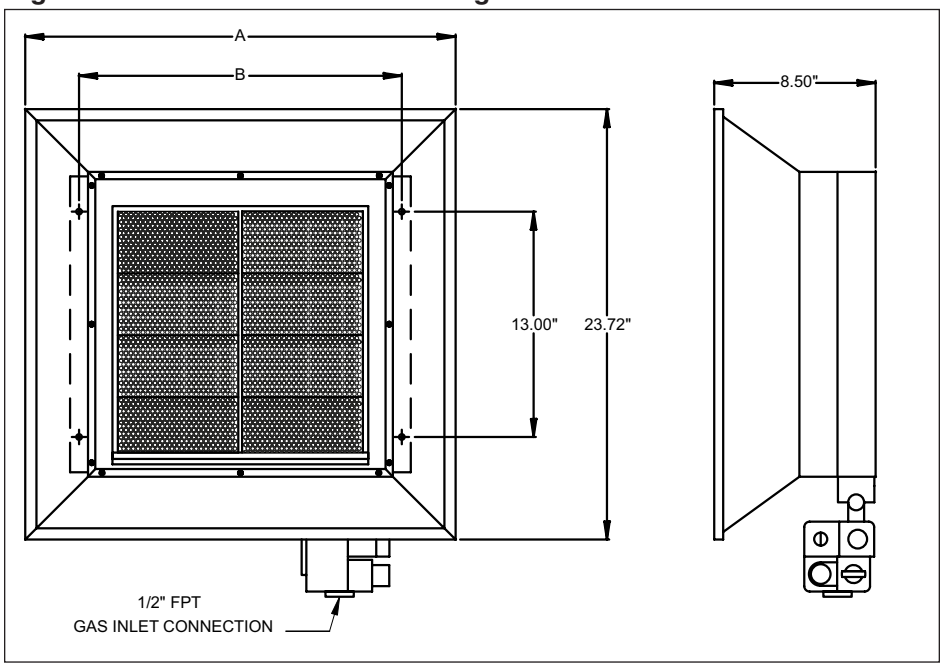


Table 5.1 - Allowable Mounting Angle Range

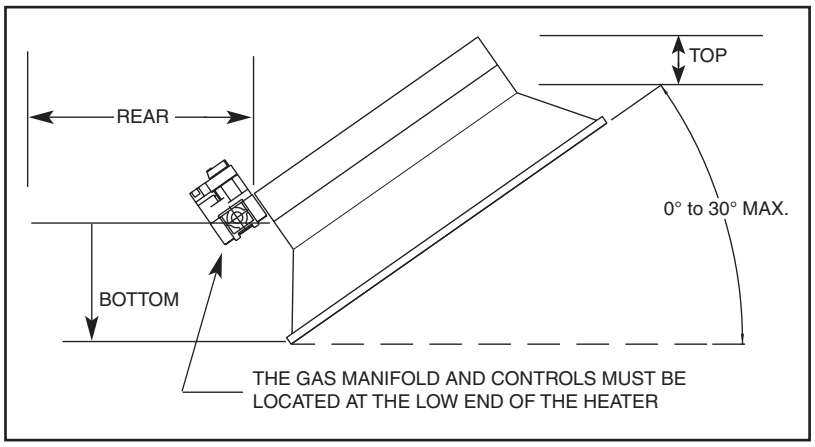
Model Size	Allowable Mounting Angle Range
30 – 60	0° – 30°
90 – 100	5° – 29°
120 – 150	0° – 30°
160	5° – 29°
200	0° – 30°

Table 5.2 - Clearances to Combustible Materials (see Figure 5.1)

Model Sizes	30-60 ①②	90, 100 ③	120, 150	160, 200
SIDE OF HEATER	30	36	46	48
BACK OF HEATER	30	30	33	33
TOP OF HEATER:				
- Mounted 0-29°	60	62	64	68
- Mounted 30° only	48	50	58	68
- w/ Optional Heat Deflector 0-29°	34	38	N/A	N/A
- w/ Optional Heat Deflector 30° only	34	38	N/A	N/A
BELOW HEATER:				
- Standard Reflector	80	105	125	140
- w/ Optional Parabolic Reflector	110	135	165	180

① 30MBH models not available in Canada.
② 60MBH models require a re-radiating wire grid accessory for use in Canada.
③ See Table 5.2 for allowable mounting angles.

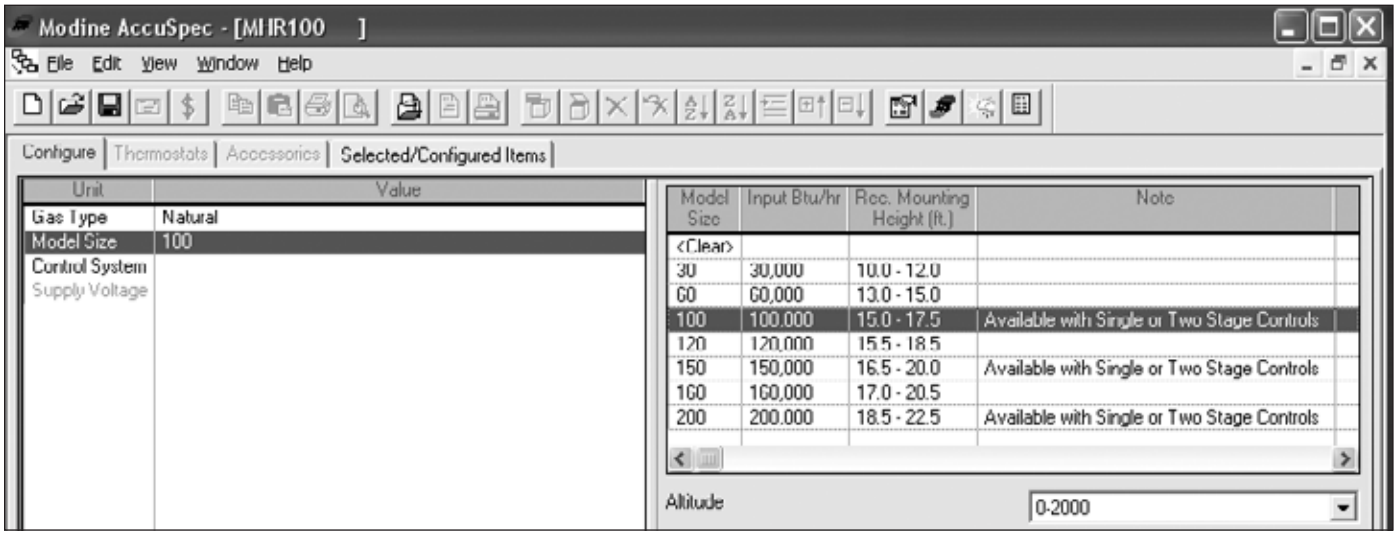
Figure 5.1 - Clearances to Combustibles (see Table 5.2)



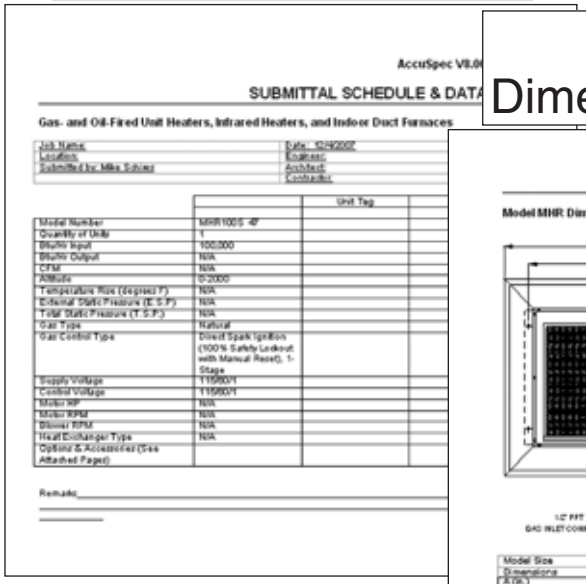
Modine Breeze™ AccuSpec Sizing and Selection Program

The Modine Breeze AccuSpec is the fastest way to generate performance data based on actual job conditions. The Breeze AccuSpec program is a Windows based sizing and selection program. The program provides a series on step-by-step questions that allow for the easy configuration of Modine products. After a model has been configured, the program can generate Submittal Schedules, Submittal Data including performance and dimensional drawings, and Specifications.

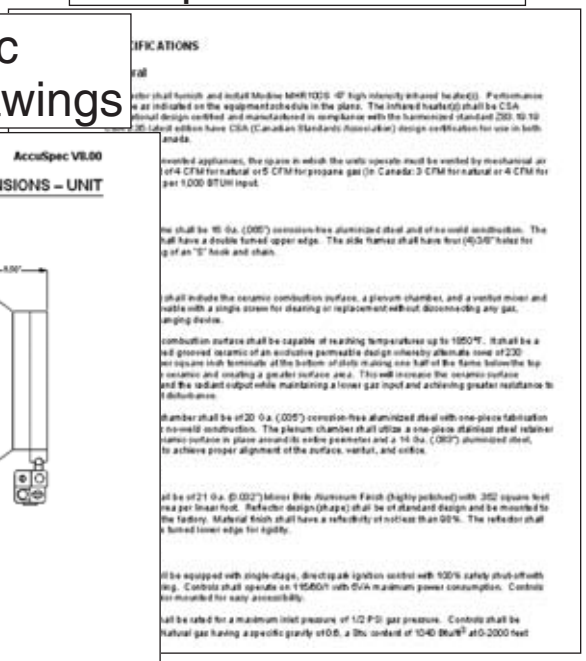
Fast and Simple Unit/Thermostat/Accessory Selection



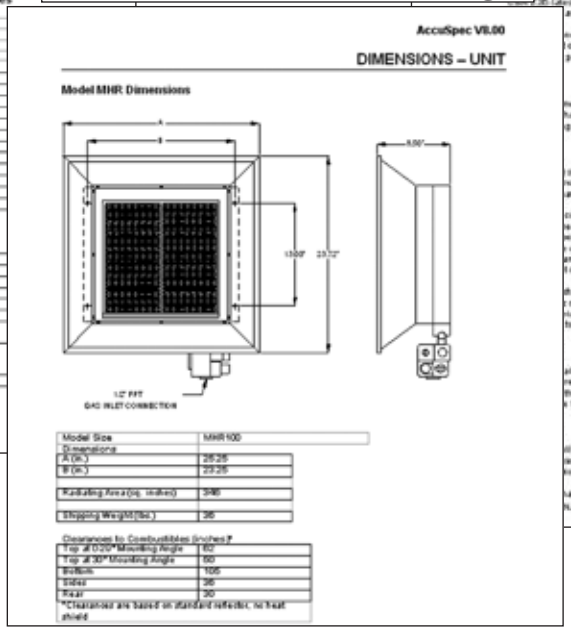
Submittal Schedules



Job Specific Specifications



Unit Specific Dimensional Drawings



For a copy of the Breeze AccuSpec program, contact your local Modine sales representative.

General

Contractor shall furnish and install Modine model MHR high intensity infrared heater(s). The infrared heater(s) shall be CSA International design certified and manufactured in compliance with the harmonized standard Z83.19.19 CSA 2.35-latest edition have CSA (Canadian Standards Association) design certification for use in both the US and Canada.

Certified as unvented appliances, the space in which the units operate must be vented by mechanical air displacement of 4 CFM for natural or 5 CFM for propane gas (In Canada: 3 CFM for natural or 4 CFM for propane gas) per 1,000 BTUH input.

Casing

The 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. The side frames shall have four (4) 3/8" holes for easy mounting of an "S" hook and chain.

Burner

The burner(s) shall include the 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.

The ceramic combustion surface shall be capable of reaching temperatures up to 1850°F. It 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 greater surface area. This will increase the ceramic surface temperature and the radiant output while maintaining a lower gas input and achieving greater resistance to air movement disturbance.

The plenum chamber shall be of 20 Ga. (.035") corrosion-free aluminized steel with 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 to achieve proper alignment of the surface, venturi, and orifice.

Reflectors

Reflectors shall be of 21 Ga. (0.032") Mirror Brite Aluminum Finish (highly polished) with .352 square feet of reflective area per linear foot. Reflector design (shape) shall be of standard design and be mounted to the heater at the factory. Material finish shall have a reflectivity of not less than 98%. The reflector shall have a double turned lower edge for rigidity.

(Optional) An accessory field installed parabolic reflector extension shall be included for concentrating infra-red energy, usually for spot heating or higher mounting height applications.

Controls

Heater(s) shall be equipped with (check one):

☐ Single-stage, direct spark ignition control with 100% safety shut-off with flame monitoring. Controls shall operate on 115V/60Hz/1ph (Alternate: 24V) with 6VA maximum power consumption.

☐ Two-stage, direct spark ignition control with 100% safety shut-off with flame monitoring. Controls shall operate on 24V/60Hz/1ph with 6VA maximum power consumption.

☐ Self-energizing millivolt controls. Heater(s) shall be equipped with a safety shut-off, manually lit pilot. The constant pilot flame shall energize the 750 mV power pile, which shall energize the control circuit. Millivolt control option shall include a compatible millivolt thermostat and 35 ft. of 18-2 wire.

Controls shall be exterior mounted for easy accessibility.

All controls shall be rated for a maximum inlet pressure of 1/2 PSI gas pressure. Controls shall be designed for Natural gas having a specific gravity of 0.60, a Btu content of 1050 Btu/ft3 (Alternate: Propane gas having a specific gravity of 1.53, a Btu content of 2500 Btu/ft3) at 0-2000 feet elevation.

Accessories

The following field installed accessories shall be included (check those that apply):

☐ A protective screen to protect the ceramic tiles from damage caused by the entrance of foreign objects.

☐ A heat deflector to permit reduced clearance above the heater. Refer to the Dimensions page for required clearance to combustible materials data.

☐ A re-radiating wire grid for increased radiant efficiency.

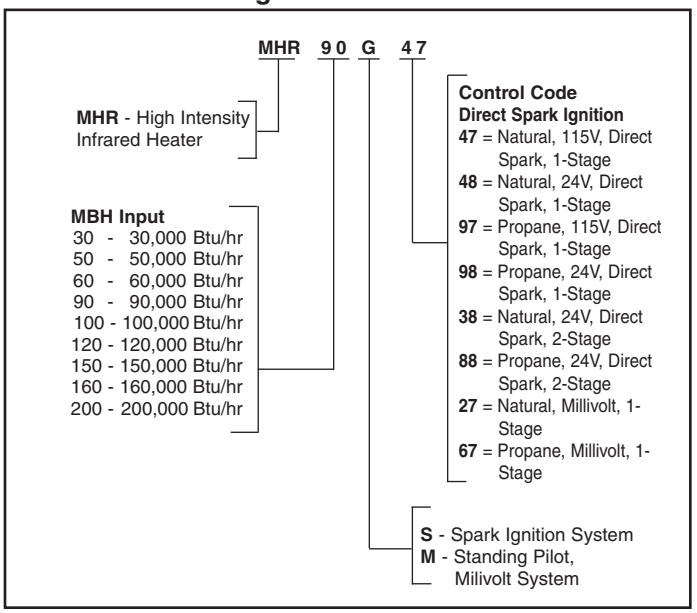
☐ A chain mounting kit that consists of 20 feet of chain and 8 "S" hooks.

☐ A flexible stainless steel gas connector, ½" MPT x 24" long. Also included is a gas ball valve with a 1/8" pressure test plug.

☐ A single-stage thermostat, 40-80°F temperature range, capable of controlling up to 20 heaters.

☐ A two-stage microprocessor based thermostat with 50-90°F temperature range, digital LCD display, rated 1.0A @ 24VAC.

Figure 7.1
Model Number Designations



The Modine brand has been the industry standard since Arthur B. Modine invented and patented the first lightweight, suspended hydronic unit heater in 1923. No other manufacturer can provide the combined application flexibility, technical expertise and fast delivery found at Modine. Consult your local Modine distributor for help in solving your indoor air problems.

INDOOR AIR SOLUTIONS

Products from Modine are designed to provide indoor air-comfort solutions for commercial, institutional and industrial applications. Whatever your heating, ventilating and cooling requirements, Modine has the product to satisfy your needs, including:

- Gas-fired unit heaters
- Gas-fired duct furnaces
- Gas-fired high-intensity infrared heaters
- Gas-fired low-intensity infrared heaters
- Steam/hot water unit heaters
- Steam/hot water cabinet unit heaters
- Steam/hot water commercial fin tube radiation
- Oil-fired unit heaters
- Electric unit heaters
- Indoor gravity vented single and multiple duct furnace make-up air units
- Indoor separated combustion single and multiple duct furnace make-up air units
- Outdoor single and multiple duct furnace make-up air units
- Direct-fired make-up air units

With burner capacities up to 7,862,000 Btu/hr and air-handling capacities as high as 60,000 CFM, Modine products are compatible with every fuel type, including:

• **Natural or Propane Gas** • **Steam/Hot Water** • **Oil** • **Electric**

Specific catalogs and computer-generated heat-loss calculations are available for each product. Catalogs 75-136 and 75-137 provide details on all Modine HVAC equipment.

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