

Gas-Fired High Intensity Infrared Heaters



Modine's MT Series is a gas-fired, high intensity ceramic infrared heater. Ideal for spot heating, the MT 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 MT Series.

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



! WARNING

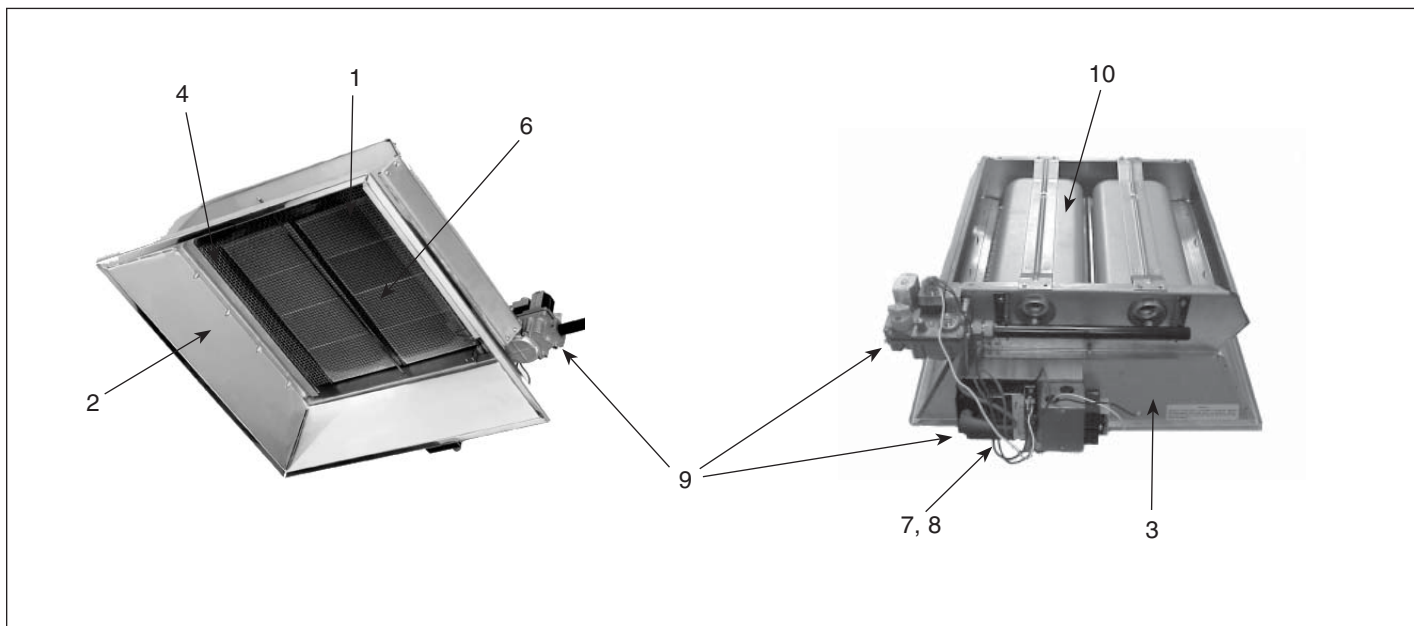
Do not locate ANY gas-fired unit in areas where chlorinated, halogenated or acid vapors are present in the atmosphere.

! WARNING

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

As Modine Manufacturing Company has a continuous product improvement program, it reserves the right to change design and specifications without notice.

Figure 3.1 - Construction Features



Features

1. High temperature diamond-faced ceramic tiles.
2. Polished aluminum reflectors.
3. 16 gauge aluminized steel frame.
4. Corrosion-resistant 330 stainless steel full-face screen.
5. No air mover is utilized.
6. Input ranges from 27,500 Btu/hr through 160,000 Btu/hr in Natural or Propane gas.
7. Direct spark, intermittent pilot, or self-energizing standing pilot ignition.
8. 115V, 25V, or millivolt controls.
9. Externally-mounted controls.
10. Burners are replaced by removing four fasteners.
11. CSA design certification for indoor, unvented operation in commercial and industrial installations.
12. Propane and/or High Altitude kits for field conversions.

Benefits

1. Provide maximum heat transfer.
2. Efficiently direct radiant heat to the desired area, for increased comfort over wider areas.
3. Provides support for simple chain mounting.
4. Re-radiates heat back to the ceramic tiles for increased temperature and efficiency, while protecting the tiles from foreign objects.
5. Eliminates fan noise, drafts, maintenance and reduces electrical energy costs.
6. Wide input range to accommodate a variety of heating requirements
7. Maximize application flexibility.
8. Accommodate a wide range of electrical inputs.
9. Allow convenient access to gas valve, control system, transformer, and gas orifices, increasing ease of installation and service.
10. Eliminates the removal of the unit from its mounted position for service.
11. Assures that the unit conforms to national safety standards.
12. Allows for quick and easy field modification of unit to use propane gas and/or operate at elevations of up to 7,500 feet above sea level.

Infrared Heating Systems Defined

Infrared heating systems rely upon the transfer of radiant energy from hot heat exchanger surfaces (up to 2200°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.

Infrared heating systems can serve three basic functions:

- Total building heating - The infrared heaters are used to heat the entire building. The system is designed to heat the floor, which, in turn, creates convection currents that heat the air above it.
- Partial building heating - The infrared heaters are used to heat sections of a building such as an assembly line or an office section located in an open area of a warehouse.
- Spot heating - The infrared heaters are used for heating only small areas, such as a loading dock or a single-person work cell. High intensity heaters are ideal for these applications.

Advantages of Infrared Heating

- There is no air mover. This reduces electricity and maintenance costs, and also results in better worker comfort, since there are no uncomfortable drafts or annoying fan noise.
- Temperature recovery is quick if cold air is introduced from open doors or windows. A conventional warm air system must first heat the cold air, which then heats the objects in the space. In contrast, an infrared system supplies immediate heat to the surfaces in the space.
- Zone heat control is easy with infrared heating, due to its ability to efficiently heat small areas.
- There can be a significant energy cost savings in spot heating applications. If only a small section of a large, open building requires heat, a conventional warm air system must heat and deliver a large volume of air. This is especially significant in a building with high ceilings, where the warm air will tend to collect. Infrared heaters will more efficiently heat only the surfaces required, at lower thermostat settings.

Example of typical heat distribution in a building:

Infrared heating	Conventional heating
40°F	90°F
50°F	80°F
65°F	70°F

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
- Vestibules

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

GENERAL PERFORMANCE/DIMENSIONAL DATA



Table 5.1 - Performance and Dimensional Data

	Model	Btu/hr Input		Radiating ^① Area (sq. in.)	Overall Dimensions (in.) (see figure 5.1)		Shipping Weight (lb.)	Recommended Mounting Heights (ft.) ^②		
		Natural Gas	Propane Gas		A	B		Total Building Heating		Spot Heating
								10° Angle	35° Angle	35° Angle
	MT 28	27,500	-	93	17-1/4	7-5/8	30	8-14	7-12	8-14
	MT 30	30,000	30,000							
	MT 33	33,500	-							
	MT 56	55,000	-	186	24	14-1/2	40	14-20	12-16	12-20
	MT 60	60,000	60,000							
	MT 66	67,000	-							
	MT 84	82,500	-	279	30-3/4	21-1/2	48	20-26	16-24	18-26
	MT 90	90,000	90,000							
	MT 99	100,500	-							
	MT 112	110,000	-	372	37-5/8	28-1/8	59	26-32	20-30	22-36
	MT 120	120,000	120,000							
	MT 132	134,000	-							
	MT 160	160,000	160,000					26-40	22-38	24-36

① All models except the 160 include a 330 stainless steel re-radiating screen.

② Refer to Design and Engineering guide 9-200 for more information. Note that these recommendations are guidelines; actual heights may vary depending upon installation conditions.

Figure 5.1 - Unit Drawing

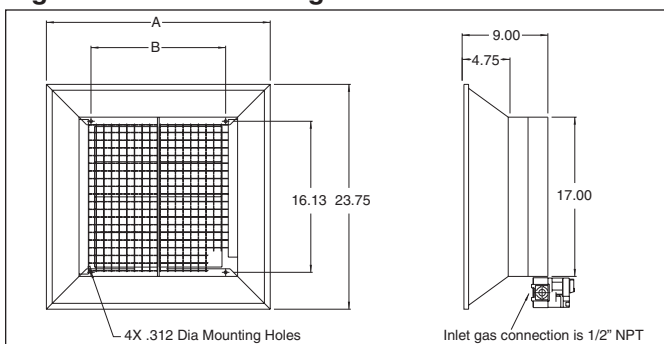


Table 5.2 - Control Systems

Ignition Type	Description	Gas Type	Control Voltage
Direct Spark	100% Safety Lockout with Manual Reset	Natural or Propane	25V or 115V
Intermittent Pilot ^③	Non-100% Shut Off	Natural only	25V or 115V
Standing Pilot ^{③④}	100% Safety Shut Off, Self-energizing	Natural or Propane	Millivolt

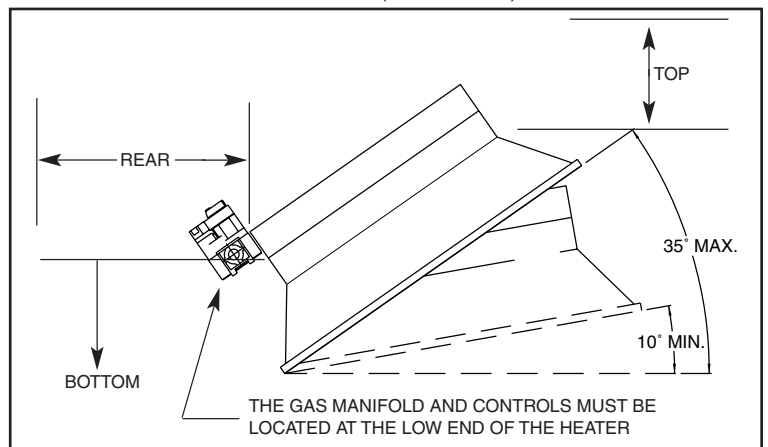
③ Not available on MT160, direct spark control only.

④ Supplied with thermostat and 35 feet of wire.

**Table 5.3
Clearances to Combustible Materials** (see Figure 5.2)

Model	Minimum Clearances to Combustible Materials (in.)			
	Top	Sides	Rear	Bottom
MT 28 MT 30 MT 33	30	30	24	72
MT 56 MT 60 MT 66	36	36	33	88
MT 84 MT 90 MT 99	48	42	39	104
MT 112 MT 120 MT 132	54	48	45	120
MT 160	60	54	51	136

**Figure 5.2
Clearances to Combustibles** (see Table 5.3)





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

Unit	Value
Gas Type	Natural
Model Size	30
Control System	Direct Spark Ignition of Burner (100% Safety Lockout with Manual Reset)
Supply Voltage	115/60/1

Model Size	Input Btu/hr	Rec. Mounting Height (ft.)	Note
<Clear>			
28	27,500	8 - 14	Natural Gas Only
30	30,000	8 - 14	
33	33,500	8 - 14	Natural Gas Only
56	55,000	14 - 20	Natural Gas Only
60	60,000	14 - 20	
66	67,000	14 - 20	Natural Gas Only
84	82,500	20 - 26	Natural Gas Only
90	90,000	20 - 26	
99	100,500	20 - 26	Natural Gas Only
112	110,000	26 - 32	Natural Gas Only
120	120,000	26 - 32	
132	134,000	26 - 32	Natural Gas Only
160	160,000	26 - 40	

Submittal Schedules

Job Specific Specifications

Gas-Fired Infrared Heaters

Job Name: _____ Date: _____
 Location: _____ Engineer: _____
 Submitted by: _____ Architect: _____
 Contractor: _____

Unit Tag	Value
Model Number	MT 30 G 47
Quantity of Units	1
Btu/Hr Input	
Btu/Hr Output	
CFM	N/A
Altitude	0-2000
Temperature Rise (degrees F)	N/A
External Static Pressure (E.S.P.)	
Total Static Pressure (T.S.P.)	
Gas Type	Natural
Gas Control Type	Direct Spark Ignition of Burner (100% Safety Lockout with Manual Reset)
Supply Voltage	115/60/1
Control Voltage	
Motor HP	N/A
Motor RPM	N/A
Blower RPM	N/A
Heat Exchanger Type	N/A
Options & Accessories (See Attached Pages)	

Unit Specific Dimensional Drawings

AccuSpec V6.20

DIMENSIONS – UNIT

Model MT Dimensions

Model Size: **MT30**

Dimensions	
Radiating Area (sq. inches)	85
Shipping Weight (lbs.)	30

Clearances to Combustibles (inches)	
Top	30
Bottom	72
Sides	30
Rear	24

INSTALLATION INSTRUCTIONS

Install and install Modine MT 30 G 47 high intensity infrared heater(s). Performance based on the equipment schedule in the plans. The infrared heater(s) shall have CSA (Underwriters Association) design certification for use in both the US and Canada.

Heater(s) shall be of 16 gauge aluminized steel. Casing shall utilize 1/4" hex-head fasteners on the side.

Heater(s) shall have aluminized steel combustion chamber and venturi tube, which enables thorough throughout the heat exchanger.

Heater(s) shall have high temperature diamond-faced ceramic tiles for the heat exchanger.

Heater(s) shall have type 300 stainless steel screen, to re-radiate infrared rays back to ceramic tiles for heat transfer, and to protect ceramic tile from foreign objects.

Heater(s) shall have reflectors efficiently direct infrared rays to desired area.

Heater(s) shall be 115/60/1 a. Heater(s) shall be equipped with a direct spark system with 100% safety lockout with manual reset, 25V automatic gas valve, and gas regulator. Infrared heater(s) shall be equipped with a 115/25V control transformer. The heater(s) shall be energized by the thermostat (or manual switch) upon call for heat. Thermostat shall be mounted in an accessible location for easy accessibility.

Heater(s) shall be rated for a maximum inlet pressure of 1/2 PSI gas pressure. Controls shall be rated for a maximum inlet pressure of 0.5, a Btu content of 1040 Btu/ft³ at 0-2000 feet

SPECIFICATIONS

General

C.S.A. (Canadian Standards Association) design certification for use in both the US and Canada to the ANSI Z83.6 - latest revision, standard for "Gas-Fired Infrared Heaters" for safe operation, construction, and performance.

Casing

Unit casing shall be of 16 gauge aluminized steel. Casing shall utilize 1/4" hex-head fasteners throughout the entire unit.

Burner

Each burner shall have aluminized steel combustion chamber and venturi tube, enabling thorough dispersion of gas throughout the heat exchanger.

Heat Exchanger

High intensity infrared heat exchanger shall have high temperature diamond-faced ceramic tiles for increased surface area and heat transfer.

Heater(s) with inputs less than 160,000 Btu/hr shall include type 330 stainless steel screen, to re-radiate infrared heat back to ceramic tiles which increases heat transfer, and to protect ceramic tile from foreign objects.

Polished aluminum reflectors efficiently direct infrared heat to desired area.

Controls

Controls shall be exterior mounted for easy accessibility and shall be selected with one of the following systems:

Direct Spark Ignition:

Input power to the infrared heater(s) shall be 115V_____, 25V_____. Heater(s) shall be equipped with a direct spark ignition control system with 100% safety lockout with manual reset, 25V automatic gas valve, and gas valve pressure regulator. The gas valve shall be energized by the thermostat on a call for heat or by manual switch. Thermostat shall operate on 115V_____, 25V_____.

Intermittent Pilot Ignition:

Input power to the infrared heater(s) shall be 115V_____, 25V_____. Heater(s) shall be equipped with an intermittent pilot ignition with non-100% shut-off, 25V automatic gas valve, safety pilot with 100% shut-off, and gas valve pressure regulator. The gas valve shall be energized by the thermostat on a call for heat or by manual switch. Thermostat shall operate on 115V_____, 25V_____.

Self-Energizing Standing Pilot Ignition:

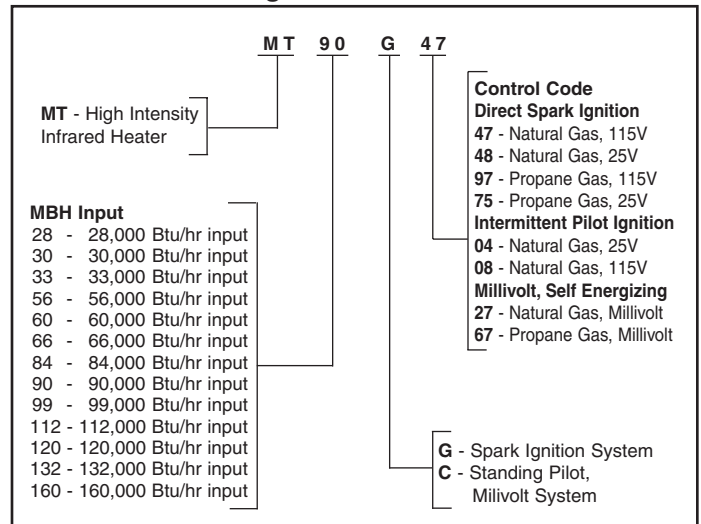
Heater(s) shall be equipped with self-energizing millivolt controls. Heater(s) shall be equipped with a safety shut-off, manually lit pilot. Pilot flame shall energize the 750 mV powerpile, which shall energize the control circuit. Millivolt control option shall include a compatible millivolt thermostat and 35 ft. of wire. Controls shall be energized by the millivolt thermostat.

The minimum gas inlet pressure shall be 7.0" W. C. for Natural gas or 11.0 W.C. for Propane gas. All controls shall be rated for a maximum inlet pressure of 14" W.C. gas pressure. Controls shall be designed for natural_____, propane_____ gas having a specific gravity of _____, a Btu content of _____ Btu/ft³ at _____ feet elevation.

Available Accessories:

- Chain mounting set
- 115V and 25V thermostats
- Flexible, stainless steel gas connection
- Pressure regulator
- 115V/25V transformer

Figure 7.1
Model Number Designations



INDOOR AIR SOLUTIONS

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.

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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