



STANDARD HEATER APPLICATIONS

INSTALLATION & OPERATION INSTRUCTIONS

WARNING: Improper installation, adjustment, alteration, excessive vibration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installation or servicing this equipment.



The Cata-Dyne™ heater can be used in all industrial indoor locations where a source of infrared radiant heat is required, providing adequate ventilation is available.

CERTIFICATION

Model WX (Series X) & MKII Cata-Dyne™ Explosion-proof, flameless infrared catalytic gas heaters are certified by the Canadian Standards Association (CSA) for use in Class I, Divisions 1 and 2, Group D hazardous (classified) locations and FM Approvals, for use in Class I, Division 1, Group D hazardous (classified) locations, temperature code T2C at an ambient temperature of 40°C (104°F). WXS models are suitable for Class I, Division I, Group D, temperature code T2B at an ambient temperature of 40°C (104°F). Models WX & MKII are certified ATEX/CE for use in gas environments, Category 2, Zone 1 & 2, Group IIA.

The Model BX (Series G) Cata-Dyne™ heater is certified by CSA and FM for use in general industrial non-hazardous locations. Models listed are certified for industrial use only, for either natural gas or propane gas. CSA approved models are equipped for high altitudes: 0 - 4,500 ft. (0-1,370 m) above sea level.

INSTALLATION

To ensure maximum efficiency of your Cata-Dyne™ heater, it should be installed with the heating surface positioned plus or minus 45° from the vertical plane at a height of no more than 8 ft. (2.44 m). All heaters must be installed in accordance with the latest revisions of the codes described in the table below and in accordance with any local codes and regulations. Before installing the heater, all information on the

Cata-Dyne™ Heater - Models Available

WXS Model (Series X)					
Approved for use in Class I, Division 1, Group D hazardous (classified) locations by FM, T-code T2B at 40°C Ambient					
Model Number	Max. Gas Input		Max. Gas Input		
	Nat. Gas Btu/hr	Propane Btu/hr	Nat. Gas kW	Propane kW	
WXS 6 x 6	1,750	1,750	0.513	0.513	
WXS 6 x 12	3,500	3,500	1.025	1.025	
WXS 6 x 24	7,000	7,000	2.050	2.050	
WXS 8 x 8	3,111	3,111	0.911	0.911	
WXS 10 x 12	5,833	5,833	1.708	1.708	
WXS 12 x 12	7,000	7,000	2.050	2.050	
WXS 12 x 24	14,000	14,000	4.100	4.100	
WX Model (Series X)					
Approved for use in Class I, Division 1 and 2, Group D hazardous (classified) locations by both FM and CSA T-Code T2C @ 40°C Ambient					
Model Number	Specifications (Btu/hr Input Ratings) For Both Natural and Propane Gas		Model Number	Specifications (Btu/hr Input Ratings) For Both Natural and Propane Gas	
	Max. Btu/hr	Max. kW		Max. Btu/hr	Max. kW
WX 6 x 6	1,000 Btu/hr	0.293 kW	WX 18 x 24	12,000 Btu/hr	3.514 kW
WX 6 x 12	2,000 Btu/hr	0.586 kW	WX 18 x 30	15,000 Btu/hr	4.393 kW
WX 6 x 24	4,000 Btu/hr	1.171 kW	WX 18 x 36	18,000 Btu/hr	5.272 kW
WX 6 x 60	10,000 Btu/hr	2.929 kW	WX 18 x 48	24,000 Btu/hr	7.029 kW
WX 8 x 8	1,778 Btu/hr	0.521 kW	WX 18 x 60	30,000 Btu/hr	8.786 kW
WX 10 x 12	3,333 Btu/hr	0.976 kW	WX 18 x 72	36,000 Btu/hr	10.543 kW
WX 12 x 12	4,000 Btu/hr	1.171 kW	WX 24 x 24	16,000 Btu/hr	4.686 kW
WX 12 x 24	8,000 Btu/hr	2.343 kW	WX 24 x 30	20,000 Btu/hr	5.857 kW
WX 12 x 36	12,000 Btu/hr	3.514 kW	WX 24 x 36	24,000 Btu/hr	7.029 kW
WX 12 x 48	16,000 Btu/hr	4.686 kW	WX 24 x 48	32,000 Btu/hr	9.372 kW
WX 12 x 60	20,000 Btu/hr	5.857 kW	WX 24 x 60	40,000 Btu/hr	11.715 kW
WX 12 x 72	24,000 Btu/hr	7.029 kW	WX 24 x 72	48,000 Btu/hr	14.058 kW
MKII Model (Series X)					
Approved for use in Class I, Division 1 and 2, Group D hazardous (classified) locations by both FM and CSA T-Code T2C @ 40°C Ambient					
Model Number	Specifications (Btu/hr Input Ratings) For Both Natural and Propane Gas				
	Max. Btu/hr	Max. kW			
MKII 12 x 12	4,000 Btu/hr	1.171 kW			
MKII 12 x 24	8,000 Btu/hr	2.343 kW			
MKII 18 x 24	12,000 Btu/hr	3.514 kW			
MKII 24 x 24	16,000 Btu/hr	4.686 kW			
MKII 24 x 48	32,000 Btu/hr	9.372 kW			
BX Model (Series G)					
Approved for use in general industrial non-hazardous locations by both FM and CSA					
Model Number	Specifications (Btu/hr Input Ratings) For Both Natural and Propane Gas		Model Number	Specifications (Btu/hr Input Ratings) For Both Natural and Propane Gas	
	Max. Btu/hr	Max. kW		Max. Btu/hr	Max. kW
BX 6 x 6	1,500 Btu/hr	0.4 kW	BX 18 x 24	18,000 Btu/hr	5.3 kW
BX 6 x 12	3,000 Btu/hr	0.9 kW	BX 18 x 30	22,500 Btu/hr	6.6 kW
BX 6 x 24	6,000 Btu/hr	1.8 kW	BX 18 x 36	27,000 Btu/hr	7.9 kW
BX 8 x 8	3,500 Btu/hr	1.0 kW	BX 18 x 48	36,000 Btu/hr	10.5 kW
BX 10 x 12	5,000 Btu/hr	1.5 kW	BX 18 x 60	45,000 Btu/hr	13.2 kW
BX 12 x 12	6,000 Btu/hr	1.8 kW	BX 18 x 72	54,000 Btu/hr	15.8 kW
BX 12 x 24	12,000 Btu/hr	3.5 kW	BX 24 x 24	24,000 Btu/hr	7.0 kW
BX 12 x 36	18,000 Btu/hr	5.3 kW	BX 24 x 30	30,000 Btu/hr	8.8 kW
BX 12 x 48	24,000 Btu/hr	7.0 kW	BX 24 x 36	36,000 Btu/hr	10.5 kW
BX 12 x 60	30,000 Btu/hr	8.8 kW	BX 24 x 48	48,000 Btu/hr	14.1 kW
BX 12 x 72	36,000 Btu/hr	10.5 kW	BX 24 x 60	60,000 Btu/hr	17.5 kW
			BX 24 x 72	72,000 Btu/hr	21.0 kW

The WX Series Cata-Dyne™ features an improved efficiency catalyst pad that required 1/3 less fuel to generate the same value as our BX Series Cata-Dyne™ heater



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heater nameplate must be carefully reviewed. The nameplate lists all the fuel and electrical requirements for the heater.

All Cata-Dyne™ Heaters Installed In Canada	All Cata-Dyne™ Heaters Installed In the USA	All Cata-Dyne™ Heaters Installed Internationally
CSA/CAN - C22.1-02, Canadian Electrical Code	NFPA 70, National Electrical Code	Install according to local and national/international fuel and electrical codes.
CSA/CAN - B149.1-09, Natural Gas and Propane Installation Code	NFPA 54, National Fuel Gas Code	

NOTE: Ensure that the heater is not operational in an excessive vibration environment or premature failure of the heater may occur.

SPECIFICATIONS

Clearances

Appropriate clearances from the heating surface must be observed during the installation of the Cata-Dyne™ heaters (See Figure 1 & Table 1). Maintain nameplate clearances from combustible materials such as wood, cloth, paper, etc.

Fuels

The Cata-Dyne™ flameless gas heater is designed

TABLE 1

HEATER CLEARANCE										
	D - Radiant Surface			C - Sides	A - Top			B - Bottom		
Radiant Surface Position	Heaters Up To 12,000 Btu/hr (3.514 kW)	Heaters Up To 48,000 Btu/hr (14.058 kW)	Over 48,000 Up To 72,000 Btu/hr (21 kW)	All Heaters Up To 72,000 Btu/hr (21 kW)	Heaters Up To 12,000 Btu/hr (3.514 kW)	Over 12,000 Up To 48,000 Btu/hr (14.058 kW)	Over 48,000 Up To 72,000 Btu/hr (21 kW)	Heaters Up To 12,000 Btu/hr (3.514 kW)	Over 12,000 Up To 48,000 Btu/hr (14.058 kW)	Over 48,000 Up To 72,000 Btu/hr (21 kW)
Vertical (0°)	28 in. (711 mm)	42 in. (1067 mm)	60 in. (1524 mm)	12 in. (305 mm)	18 in. (457 mm)	18 in. (457 mm)	42 in. (1067 mm)	7 in. (178 mm)	12 in. (305 mm)	18 in. (457 mm)
0-45° up	28 in. (711 mm)	42 in. (1067 mm)	60 in. (1524 mm)	12 in. (305 mm)	18 in. (457 mm)	32 in. (813 mm)	54 in. (1372 mm)	0 in. (0 mm)	12 in. (305 mm)	18 in. (457 mm)
0-45° down	28 in. (711 mm)	42 in. (1067 mm)	60 in. (1524 mm)	12 in. (305 mm)	18 in. (457 mm)	18 in. (457 mm)	18 in. (457 mm)	22 in. (559 mm)	24 in. (610 mm)	42 in. (1067 mm)

Piping

1. A main shut-off valve must be installed upstream of all auxiliary heater controls.
2. The 100% safety shut-off valve and appliance regulator (natural gas heaters only) must be installed in the upright position (horizontally).
3. The thermostatic temperature controller should be installed with the dial shaft in the horizontal position.
4. The maximum inlet pressure to the 100% safety shut-off valve, thermostatic temperature control and appliance regulator is 1/2 psi (3.4 kPa). If the inlet pressure is higher than this, a low-pressure service regulator must be installed upstream of these components.

to operate on clean, dry natural gas or propane as specified on the heater nameplate.

Natural Gas - these heaters are designed to use natural gas (1,000 Btu/ft³, 37 MJ/m³) at 7 in. w.c. (1.73 kPa), 4.5 in. w.c. (1.12 kPa), or 3.5 in. w.c. (0.86 kPa).

Propane - these heaters are designed to use propane gas (2,500 Btu/ft³, 92 MJ/m³) at 11 in. w.c. (2.72 kPa).

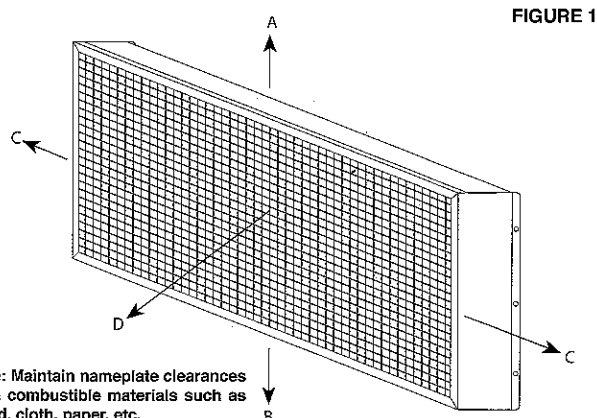


FIGURE 1

5. The maximum inlet pressure to the low-pressure service regulator (available from CCI Thermal) is 250 psi (1.7 MPa). If the inlet pressure is higher than this, a high-pressure regulator must be installed upstream.
6. All components should be installed as indicated in Figure 2 (WX and BX models only) or Figure 3 (MKII model only).

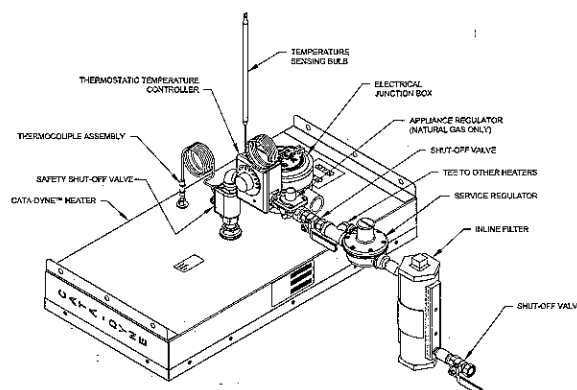


FIGURE 2

Diagram illustrates typical Natural Gas installation.

Gas appliance regulators and manual shut off valves are required standard components for all CSA approved heaters; they are available as optional accessories for FM approved heaters.

Electrical

1. All wiring is to be installed in accordance with the latest revisions of the Canadian Electrical Code (CEC)/National Electrical Code (NEC) and/or any applicable local codes.
2. It is desirable to install an indicating light on all starting systems. This will reduce the possibility of the power being left on once the heater is started, which can severely reduce the lifespan of the heater.
3. Ground connections for 120 V and higher voltage heaters are required as indicated in Figures 4 and 5.
4. The number of terminals in the junction box can be two or four depending on the number of elements used in the fabrication of the heater. All MKII models incorporate a single element and therefore have only two terminals. The connection procedure for the different combinations is as described in Figures 4 and 5:

Ventilation

The catalytic reaction in Cata-Dyne™ heaters occurs when natural gas or propane reacts with oxygen to produce water vapor, carbon dioxide and infrared energy. Ventilation must be provided to allow adequate supply of oxygen for the reaction.

For every 1.0 ft² (0.093 m²) of heater surface, 40 ft³/hr (1.13 m³/hr) of air supply is required. For example, a WX 24 x 24 heater (16,000 Btu/hr / 4.686 kW) would require 160 ft³/hr (4.53 m³) of air to ensure proper operation of the Cata-Dyne™ heater.

To reduce the carbon dioxide and water vapor concentrations in the building, a vent hood assembly can be installed to provide positive ventilation from the heater (See Figure 6).

FIGURE 3

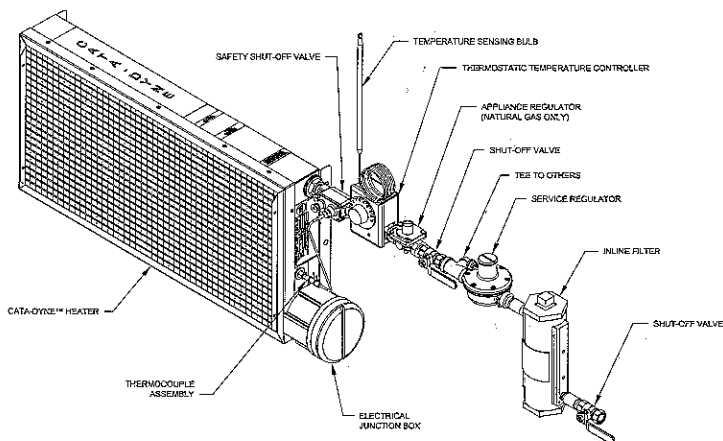


Diagram illustrates typical Natural Gas installation.

Gas appliance regulators and manual shut off valves are required standard components for all CSA approved heaters; they are available as optional accessories for FM approved heaters.

FIGURE 4

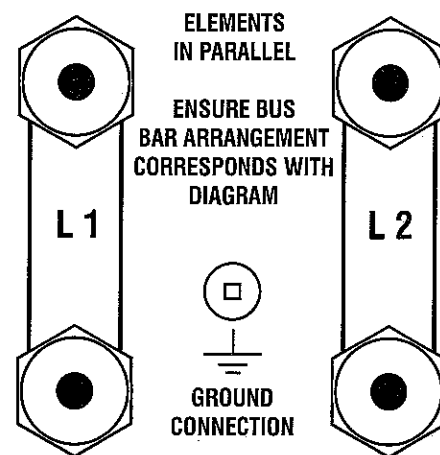


FIGURE 5

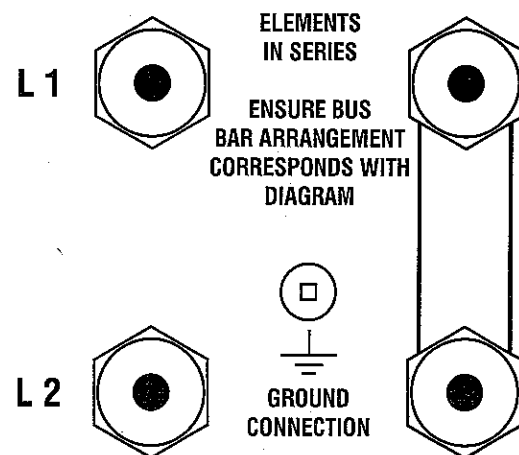
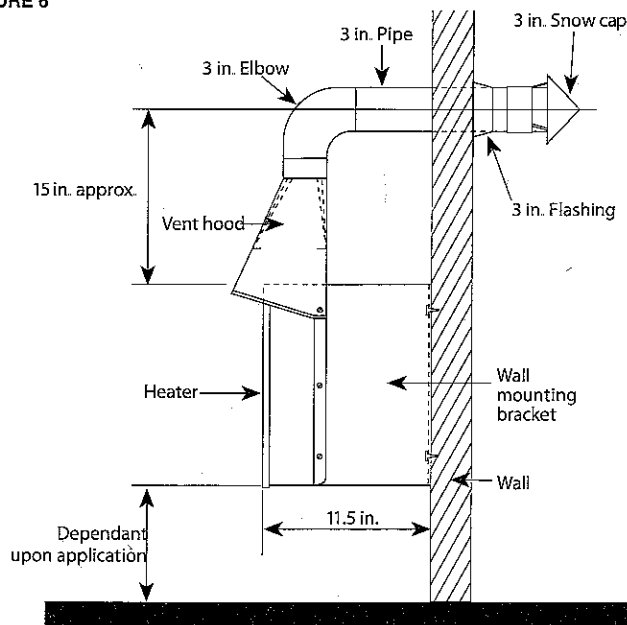


FIGURE 6



OPERATION

All Cata-Dyne™ heaters are supplied with a Safety Shut-Off Valve (SSOV)/Thermocouple assembly to ensure the safe operation of the heater. Under no circumstances should the reset button be held or locked into the depressed position by use of a mechanical restraint. A tamper resistant model SSOV is available if desired.

Start-up

1. Ensure the heater has been installed according to all instructions and relevant codes.
2. Turn on the main gas supply to the system.
3. If the heater is equipped with a thermostatic temperature controller, rotate the dial completely clockwise to the fully open position.
4. Turn on the power to the electrical elements.
5. After 15 minutes, depress the reset button on the top of the 100% safety shut-off valve. The button should return to the original position and internally open the valve and allow gas to flow to the heater. If the valve does not stay open when the reset button is released, it may be necessary to wait an additional few minutes and then depress the reset button again. This will allow the electrical elements additional time to warm up.
6. When the catalytic reaction is well established, turn off the electrical power to the elements.
7. If the heater is equipped with a thermostatic temperature controller, it can be set to the desired setting after the catalytic reaction has been established for at least one hour.

Shut Down

Turn off the gas supply to the heater.

Multi-Heater Start-up

Cata-Dyne™ heaters can also be purchased/installed in multi-heater assemblies. If these assemblies are 12 V, each heater must be started individually. This ensures the correct voltage and current will be reaching the heater from the power supply.

12 V HAZARDOUS ELECTRICAL INSTALLATIONS

FIGURE 7

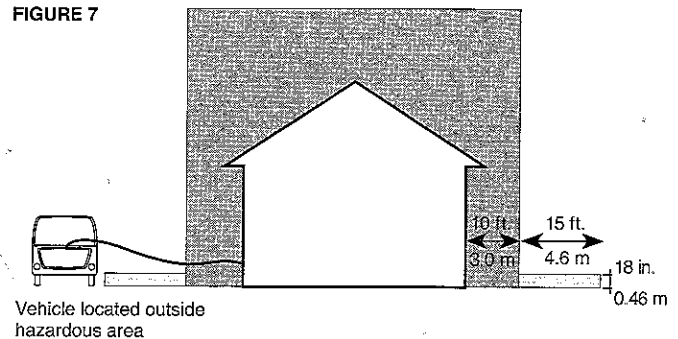
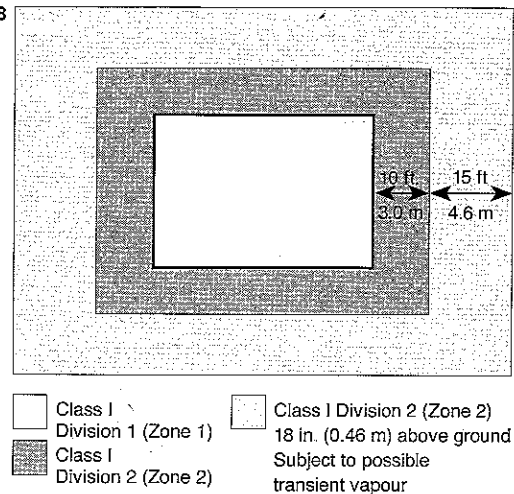


FIGURE 8

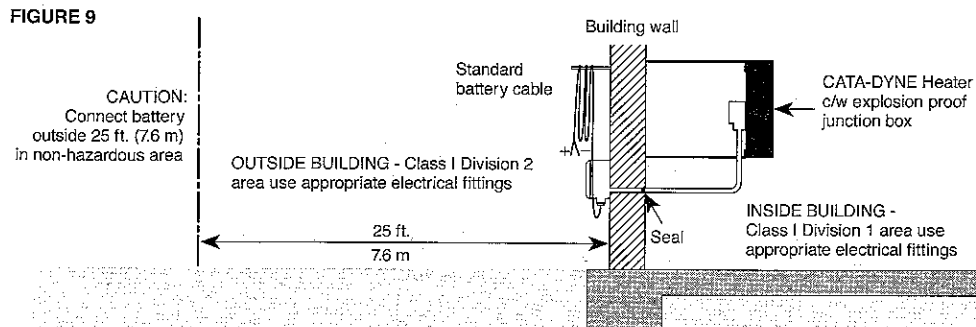


Most oil and gas production buildings have an area classification as follows:

1. Class I, Division 1, within the building. (Refer to Figure 7, 8)
2. Class I, Division 2, outside the building for a distance of 10 ft. (3.0 m) from the building a distance of 25 ft. (7.6 m) from the building at all elevations up to. (Refer to Figure 7, 8)
3. Class I, Division 2, outside the building for a distance of 25 ft. (7.6 m) from the building at an elevation of 18 in. (0.46 m) above the ground. (Refer to Figure 7, 8)

All electrical apparatus and wiring within this area must conform to the appropriate codes. Connection to the power supply must be outside of the Class I, Division 2 location. (Refer to Figure 9)

FIGURE 9



SPOT HEATING

There are several factors to consider when Cata-Dyne™ heaters are utilized for spot heating.

Infrared energy travels in straight lines from the face of the Cata-Dyne™ heater covering approximately 160° of arc and is inversely proportional to the square of the distance. The heater should therefore be mounted as close as practical (min of 8 in. (20 cm)) to the object requiring heat for maximum temperature rise.

Match the shape of the object requiring heat with the appropriate Cata-Dyne™ heater, e.g. WX/BX 6 x 24 for long narrow objects or WX/BX 12 x 12 for a square object.

Objects requiring heat should be painted dull, dark colors for maximum infrared absorption and objects not requiring heat should be painted light or reflective colors.

Insulate and protect plastic, rubber and similar materials from direct intense infrared heat.

SPACE HEATING

A separate heat load calculation should be done for each building in which a Cata-Dyne™ heater will be installed for space heating purposes.

The heatload calculation determines the building heat losses through the structure and allows for air infiltration (refer to the sample Heat Load Calculation in the Cata-Dyne™ catalog).

Cata-Dyne™ heaters produce low intensity infrared heat that is absorbed by objects within the range of the heat source. The closer the object is to the source of heat the more heat the object will absorb. Cata-Dyne™ heaters should be placed close to the floor level within the building to heat objects close to the floor.

Ideally, Cata-Dyne™ heaters should be mounted 1-3 ft.(0.3-1 m) from the floor and equally spaced around the building perimeter for space heating applications.

If low mounting is not practical, then overhead mounting may be utilized. Overhead mounted heaters should be sloped face down to a maximum 45° angle to direct the infrared energy towards the floor. Overhead mounting should be restricted to heaters of 30,000 Btu.hr (8.8 kW) capacity and larger.

If the building requires only one heater, place the Cata-Dyne™ heater as close as possible to the center of the longest wall.

For multiple heater installations, space the Cata-Dyne™ heaters as evenly as possible around the perimeter of the building.

Make sure the piping is large enough to handle the gas load (refer to the sample Piping Calculation in the Cata-Dyne™ catalog for sizing information).

Make sure the electrical starting system has sufficient current carrying capacity and conforms to all applicable electrical codes.

It is advisable to install an indicator light in the electrical circuit to reduce the possibility of the power being left on once the heater is started.

PERSONAL SAFETY

The Cata-Dyne™ flameless infrared catalytic gas heater does not produce harmful carbon monoxide gas when used with natural gas or propane. Adequate ventilation must be incorporated in any building design to ensure oxygen replenishment and removal of any carbon dioxide. Protective grills should be used on any installation where personnel may come in contact with the face of the heater.

ORDERING INFORMATION

You can order any of CCI Thermal's products by telephone, fax, mail or e-mail. To assist us in processing your order as quickly and efficiently as possible, please provide us with the following information:

- ◆ Cata-Dyne™ product name
- ◆ Cata-Dyne™ model number
- ◆ Fuel gas - natural gas or propane
- ◆ Starting voltage - 12, 24, 120, 208, 240, 480, or 600V
- ◆ Accessories required:
 - Protection Grill
 - Wall Mount Brackets
 - Thermostat
 - Regulator
 - Start Up Leads (12 V system only)
 - Vent Hood
 - Other
- ◆ Company name and contact
- ◆ Billing address and phone number
- ◆ Shipping instructions
- ◆ Special tagging instructions
- ◆ Date required
- ◆ Method or payment:
 - on account - P.O. number required
 - credit card - VISA or Mastercard number
 - cash or cheque

GUARANTEE

CCI Thermal warrants all Cata-Dyne™ flammable infrared heaters sold to be free from defects in material or workmanship under normal use and service. The company agrees to repair or replace any Cata-Dyne™ heater which, upon examination, reveals it to have been defective due to faulty workmanship or material, if returned to our factory, transportation PREPAID, within one (1) year from date of purchase. The company does not assume responsibility for misuse or misapplication of its heaters.

Warranty is void if Cata-Dyne™ heaters are used with sour, dirty or wet gas, or where sulphur content is greater than allowable for utility gas specifications. Warranty is void if, upon our inspection, if the SSOV or thermocouple have been tampered with. Neither CCI Thermal nor the selling dealer shall be held responsible for loss of time, inconvenience, commercial loss or consequential damages relating to the use of Cata-Dyne™ heaters.

RETURN GOODS POLICY

Prior written approval must be obtained from CCI Thermal for the return of any Cata-Dyne™ product(s). A restocking charge of 15% will apply. All returns must be shipped to our factory in Edmonton, freight prepaid. Final acceptance will be contingent on inspection at our factory.

REPAIRS

Cata-Dyne™ heaters may require periodic maintenance or repair. Our factory is staffed with technicians who are qualified to perform any required repairs. The procedure to follow to have a heater repaired is as follows.

Send the heater to our factory in Edmonton. Include the following information with the heater:

- ◆ Company name and address
- ◆ Contact name
- ◆ Telephone number/fax number/e-mail
- ◆ P.O. Number
- ◆ Advise if an estimate is required prior to starting the repair
- ◆ Details on the repair or conversion required
- ◆ Return shipping instructions

NOTE: Under the terms of our certification, all repairs must be performed at our factory in Edmonton.

TROUBLE SHOOTING

1. Ensure that the fuel matches that listed on the nameplate.
2. Ensure that the voltage matches that listed on the nameplate.
3. Check for any physical damage. All signs of physical damage to the catalyst pad such as holes, tears or a general deterioration of the catalyst bed signal that it is time to have the heater repaired. Excessive vibration may cause damage to the inner catalysts structure which may cause premature failure.
4. Check the gas supply pressure at the heater – 7 in. w.c. (1.73 kPa), 4.5 in. w.c. (1.12 kPa), or 3.5 in. w.c. (0.86 kPa) for natural gas and 11 in. w.c. (2.72 kPa) for propane.
5. Check the gas orifice for obstructions or dirt and ensure the size matches that listed on the nameplate. It may be necessary to install a filter upstream of the heater or regulator if the gas supply is dirty. If the fuel supply is constantly dirty and/or wet it would be advisable to use bottled propane fuel.
6. Check the mounting position of the heater. The face of the heater should be preferably in the vertical position and should not vary more than 45° from the vertical position for maximum efficiency.
7. Check for saturation of the catalyst face caused by condensation or rain running down the face of the heater. If the heater has been exposed to water, it is advisable to place the unit in a warm area for a period of a few hours or longer if required. Once the moisture is removed, the heater can be re-installed and re-started.
8. Check the jumper cable size to ensure that the resistance of the cable is not reducing the current to the heater. This would not allow sufficient power to the electrical element to preheat the catalyst to the activity temperature. It is recommended to run the service vehicle at fast idle while starting the heater.
9. Cata-Dyne™ heaters are designed to use clean fuel and to be used in non-contaminated atmospheres. Sulphur compounds in the fuel or atmosphere will poison the catalyst bed over a period of time and render the heater inoperative. If the heater has been exposed to sulphur compounds, it should be sent to the factory for service.
10. Avoid spraying the face of the heater with high-pressure air, steam or water because this can damage the catalyst bed, if physical damage is visible, return the heater to the factory for servicing.
11. Ensure that the temperature controller is correct for the model size, fuel, and pressure specifications for the heater it is fitted to. If the temperature controller is too low, the heater will not have sufficient fuel rating to operate and will stop.

CAUTION

The CATA-DYNE™ Flameless Gas heater may be installed in any position from vertical to plus or minus 45° from the vertical plane for maximum efficiency. Clearances from radiant surface of heater to combustible material must be observed as per table below.

TABLE OF MINIMUM CLEARANCE (INCHES/CM)

	BURNER ANGLE	RADIANT SURFACE	SIDES	TOP	BELOW
All Models 12,000 BTU/hr (3.3 kW) or less	0-(Vertical)	28/70	12/30	18/45	7/17.5
	0-45° Up	28/70	12/30	18/45	0/0
	0-45° Down	28/70	12/30	18/45	22/55
All Models greater than 12,000 BTU/hr (3.5 kW) up to 48,000 BTU/hr (14 kW)	0-(Vertical)	42/105	12/30	18/45	12/30
	0-45° Up	42/105	12/30	32/80	12/30
	0-45° Down	42/105	12/30	18/45	24/60
All Models greater than 48,000 BTU/hr (14 kW)	0-(Vertical)	60/150	12/30	42/105	18/45
	0-45° Up	60/150	12/30	54/135	18/45
	0-45° Down	60/150	12/30	18/45	42/105

OPERATING INSTRUCTIONS

START UP

1. Turn on gas supply.
2. Turn on power to electrical elements and wait 15 minutes.
3. Depress reset button on safety shut-off valve until valve stays open when released. Leave electrical power on for additional few minutes to ensure catalytic reaction is well established.
4. Turn off power to electrical start-up element.

SHUT DOWN

1. Turn off gas supply.

POST THIS LABEL ADJACENT TO HEATER



WARNING: 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.

- Read the instruction manual
- Ensure that installation conforms to all national and local gas and electrical codes
- Ensure that the fuel supply, inlet pressure and starting voltage all match exactly the information shown on the rating plate attached to heater
- Ensure clearances to combustible materials are observed at all times
- Do not alter any part of the heater or accessories including safety shut-off valves, pressure regulators, orifices, heater housing, catalyst bed, electrical components, etc.
- Tampering will result in loss of certification
- Do not operate if there is damage to any part of the heater or accessories. Inspect the heater face carefully for any type of damage or foreign deposits
- Do not flame start the heater
- Have the heater serviced immediately if there is a reduction in normal heat output
- Not for residential or recreational use



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Single and Second-Stage LP-Gas Regulators



WARNING

Fisher equipment must be installed, operated, and maintained in accordance with federal, state, and local codes and Fisher instructions. The installation in most states must also comply with NFPA No. 54 and 58 standards.

Only personnel trained in the proper procedures, codes, standards, and regulations of the LP-gas industry should install and service this equipment. Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion and/or fire causing property damage and personal injury or death.

Things To Tell The Gas Customer:

1. Point out the regulator's vent to the customer (or vent assembly or vent tube), and **stress that this opening must remain unobstructed at all times**. Tell the customer to be sure to check the vent opening after a freezing rain, sleet storm, or snow to make sure ice has not formed in the vent.
2. Show the customer the shutoff valve on the container. The customer should close this valve immediately if gas can be smelled, appliance pilot lights fail to stay on or appear higher than usual, or any other abnormal situation occurs.
3. Tell the customer to call your company to service the regulator. If the regulator vents gas or leak develops in the system, only qualified gas serviceman should install or service the regulator.

Introduction

Scope of Manual

This instruction manual covers installation and maintenance for the following single and second-stage LP-gas regulators: Types 912, R322 (integral two-stage), R352, R722, R922, R932, and S102L.

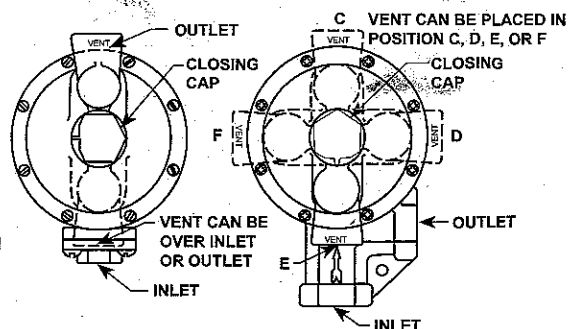


Figure 1. Typical Regulator Configurations

Description

All the regulators are designed for low pressure (inches of water column) vapor service and are not to be used for liquid service. Their outlet pressure setting is usually 11-inches w.c. (27 mbar).

Single-stage regulators (reducing container pressure to 11-inches w.c. (27 mbar)) are normally painted gray while second-stage regulators (reducing the outlet of a first-stage regulator to 11-inches w.c. (27 mbar)) are normally painted palm green. The units differ in construction and capacity rating.

Specifications

The Specifications table lists the specifications for the regulators. Contact the factory if the regulators are to be used on any service other than LP-gas, natural gas, or air. Temperature limits are -20° to 160° F (-29° to 71° C). Second-stage regulators are limited to 20 psig (1,4 bar) inlet pressure and must be used with a first-stage regulator.

Installation



WARNING

All vents should be kept open to permit free flow of air into and out of the regulator. Protect openings against the entrance of rain, snow, ice formation, paint, mud, insects, or any other foreign material that could plug the vent or vent line.

Low Pressure Regulators

Specifications

TYPE NUMBER	SIZE, INCH FNPT		TYPE OF SERVICE	MAXIMUM INLET PRESSURE, PSIG (bar)	VAPOR CAPACITY, BTU/HR. PROPANE
	INLET CONNECTION	OUTLET CONNECTION			
912 [†]	1/4	1/4 or 3/8	Single-Stage	250 (17,2)	350,000*
R322	1/4	1/2 or 3/4	Integral Two-Stage	250 (17,2)	660,000
R352	3/4	3/4	Second-Stage	20 (1,38)	1,250,000
R722	3/4 or F. POL	3/4	Single-Stage	250 (17,2)	4,250,000
	3/4	3/4	Second-Stage	20 (1,38)	2,500,000
R922	1/4, 1/2 or F. POL	1/2 or 3/4	Single-Stage	250 (17,2)	725,000*
	1/2	1/2 or 3/4	Second-Stage	20 (1,38)	750,000
R932	3/4 or F. POL	3/4	Single-Stage	250 (17,2)	1,200,000
	1/2	3/4	Second-Stage	20 (1,38)	1,250,000
S102L	3/4 - 1-1/2	3/4 - 1-1/2	Second-Stage	20 (1,38)	2,000,000

*320,000 BTU/Hr. with pigtails

*437,500 BTU/Hr. with pigtails

[†]Vent not normally tapped for vent tubing

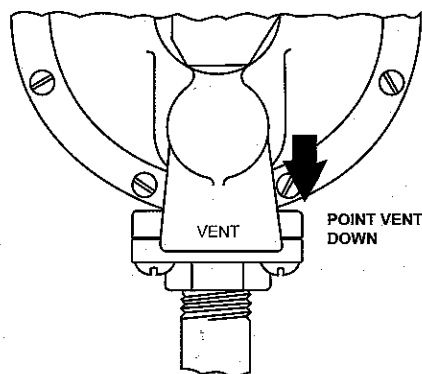


Figure 2. Point Vent Down on Outdoor Installations

LP-gas may discharge to the atmosphere through the vent. An obstructed vent which limits air or gas flow can cause abnormally high pressure that could result in personal injury or property damage. Failure to use a vent line on indoor installations can cause a hazardous accumulation of gas which could result in personal injury or property damage.

Never use a first-stage (pounds to pounds) regulator on low pressure (inches of water column) service because personal injury or property damage could occur.

Make sure gas flow through the regulator is in the same direction as the arrow on the body - "Inlet" and "Outlet" connections are clearly marked. The installation should be adequately protected from vehicular traffic and damage from other external sources. Install the regulator so that any gas discharge through the vent or vent assembly is over 3-feet (0,91 meters) horizontally from any building opening below the level of the discharge.

Install the regulator high enough above ground level - at least 18-inches (457 mm) - so that rain splatter cannot freeze in the

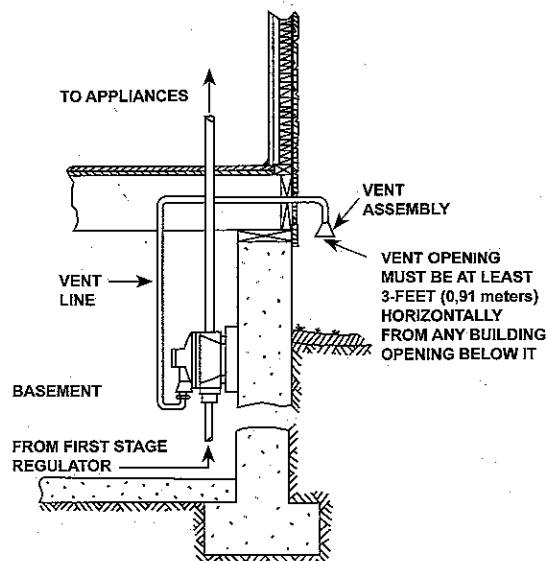


Figure 3. Typical Indoor Installation With Vent Line and Vent Assembly

vent. Whether a protective hood is used or not, do not install the regulator in a location where there can be excessive water accumulation or ice formation, such as directly beneath a down spout, gutter, or roof line of a building.

A regulator installed outdoors without a protective hood must have its vent pointed vertically down, see figure 2, to allow condensate to drain. This minimizes the possibility of freezing and of water or other foreign material entering the vent and interfering with proper operation.

Before installing the regulator, check for damage which might have occurred in shipment. Also check for and remove any dirt or foreign matter which may have accumulated in the regulator body or the pipeline. Apply pipe compound to the male threads of the pipe.

Some installations, such as in areas with heavy snow fall or on recreational vehicles where there is road splatter,

Low Pressure Regulators

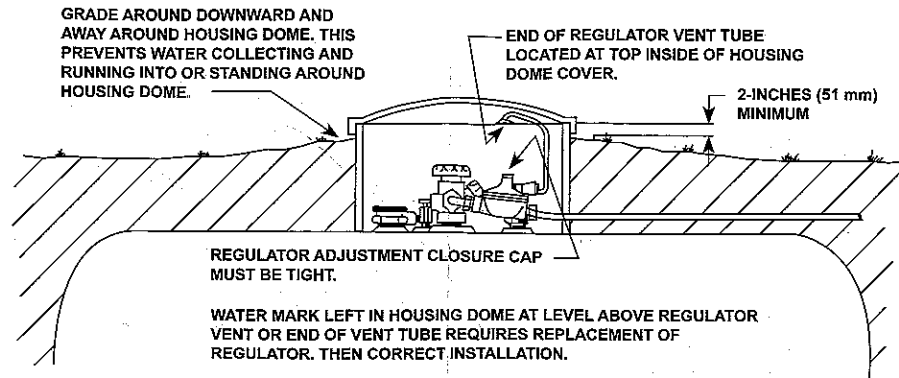


Figure 4. Regulators Installed on Underground Installations Require a Vent Tube

may require a hood or enclosure to protect the regulator. Horizontally mounted regulators, such as found on single cylinder installations, must be installed beneath a protective cover. If possible slope or turn the vent down sufficiently to allow any condensation to drain out of the spring case. Be careful that the slot in the hood or cover for the regulator's outlet piping does not extend too far and expose the vent to the elements.

Regulators installed indoors are limited to 20 psig (1,38 bar) maximum inlet pressure, and they require a vent line to the outside of the building, see figure 3. A vent assembly, such as Fisher Y602 series, should be used on the end of the vent line. The same installation precautions apply to vent assemblies as the integral regulator vents covered previously. Use pipe or tubing equal in size to the regulator's vent for the vent line. To install the vent line, remove the vent screen and apply a good grade of pipe dope to the male threads of the line. Vent piping or tubing must not restrict the flow passage of the regulator's internal relief valve.

Underground container systems require a vent tube to prevent water from entering the regulator spring case, see figure 4. Remove the vent screen and install the vent tube, such as a Fisher Type P203. The vent tube must be run from the regulator vent to above the maximum water table. The vent tube opening must terminate at the extreme top inside of the dome cover. Make sure the regulator's closing cap is on tightly, and maintain drainage away from the dome at all times. For further information on underground installations, write for a copy of "Underground LP-Gas Systems: Suggested Installation, Inspection," available from the National LP-Gas Association, 1301 W. 22nd St., Oak Brook, IL 60521.

Adjustment

Each regulator is individually factory set to deliver 11-inches w.c (27 mbar). If it becomes necessary to increase the outlet pressure, remove the closing cap, figure 1, and turn the adjusting screw clockwise. Turn the adjusting screw counterclockwise to decrease the outlet pressure. A pressure gauge or water manometer is needed to determine the regulator's outlet setting after adjustment. Always replace the closing cap after adjustment.

Overpressure Protection



WARNING

Personal injury or system damage may result if these regulators are installed without appropriate overpressure protection. Outlet pressures greater than 3 psig (0,20 bar) above the set point may cause damage to regulator parts, leaks in the regulator, or personal injury due to bursting of pressure-containing parts or explosion of accumulated gas.

If the regulator is exposed to an overpressure condition, it must be inspected for any damage that may have occurred.

Large volumes of gas may discharge through the regulator vent during internal relief valve operation which can result in fire or explosion from accumulated gas.

All of the regulators have an internal relief valve that opens when downstream pressure reaches approximately 1 psig (0,069 bar) on regulators set at 11-inches w.c. (27 mbar). When the internal relief valve opens, gas escapes to the atmosphere through the regulator's vent. The internal relief valve gives overpressure protection against excessive build-up resulting from seat leakage due to worn parts or chips of foreign material on the orifice.

Some type of external overpressure protection must be provided if inlet pressure will be high enough to damage downstream equipment. Common methods of external overpressure protection include relief valves, see figure 5, monitoring regulators, shutoff devices, and series regulation. The internal relief valve on second-stage and integral two-stage regulators with the 3/4-inch (19 mm) vent (Types R322, R352, and R922) limits downstream pressure to 2 psig (0,14 bar) as long as inlet pressure does not exceed 20 psig (1,38 bar) and the vent is unobstructed.

Low Pressure Regulators

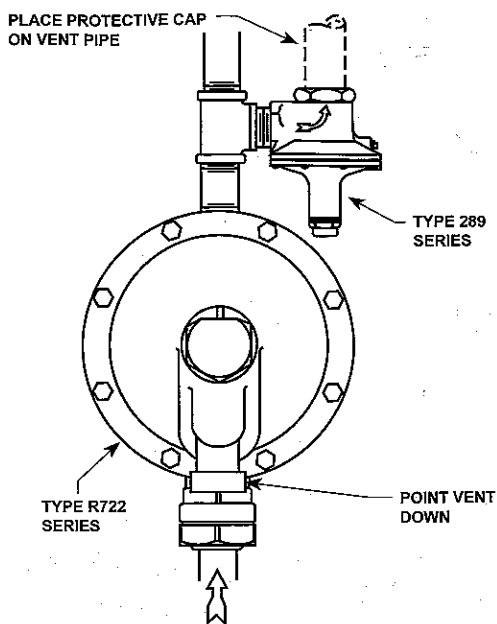


Figure 5. External Relief Valve Protects Downstream System

Maintenance



WARNING

To avoid personal injury or equipment damage, do not attempt any maintenance or disassembly without first isolating the regulator from system pressure and relieving all internal pressure.

Regulators that have been disassembled for repair must be tested for proper operation before being returned to service. Only parts manufactured by Fisher should be used for repairing Fisher regulators. Relight pilot lights according to normal startup procedures.

Due to normal wear or damage that may occur from external sources, these regulators must be inspected and maintained periodically. The frequency of inspection and replacement of the regulators depends upon the severity of service conditions or the requirements of

local, state, and federal regulations. Even under ideal conditions, these regulators should be replaced after 15 years from the date of manufacture or sooner should inspection reveal the need.

Visually inspect the regulator each time a gas delivery is made for:

1. Improper installation.
2. Plugged or frozen vent.
3. Wrong regulator or no regulator in the system.
4. Internal or external corrosion.
5. Age of the regulator.
6. Any other condition that could cause the uncontrolled escape of gas.

Failure to do the above could result in personal injury or property damage.

Make sure the regulator vent, vent assembly, or vent tube does not become plugged by mud, insects, ice, snow, paint, etc. The vent screen aids in keeping the vent from becoming plugged, and the screen should be clean and properly installed.

Replace any regulators that have had water in their spring case or show evidence of external or internal corrosion. Checking for internal corrosion may require complete removal of the adjusting screw and shut down of the gas system. Closely examine regulators directly connected to the container valve by means of a solid POL adaptor (horizontal mounting) for signs of corrosion. Correct any improper installations.

Older regulators are more likely to catastrophically fail because of worn or corroded parts. Replace regulators over 15 years of age; other service or environmental conditions may dictate replacement of the regulator before it becomes 15 years old, refer to Fisher Bulletin LP-32.

Regulator Repair

Regulators that have been disassembled for repair must be tested for proper operation before being returned to service. Fisher Type Y499-2 test rack can be furnished for this purpose. Only parts manufactured by Fisher should be used for the repair of Fisher regulators. Be sure to give the complete type number of the regulator when corresponding with the factory.

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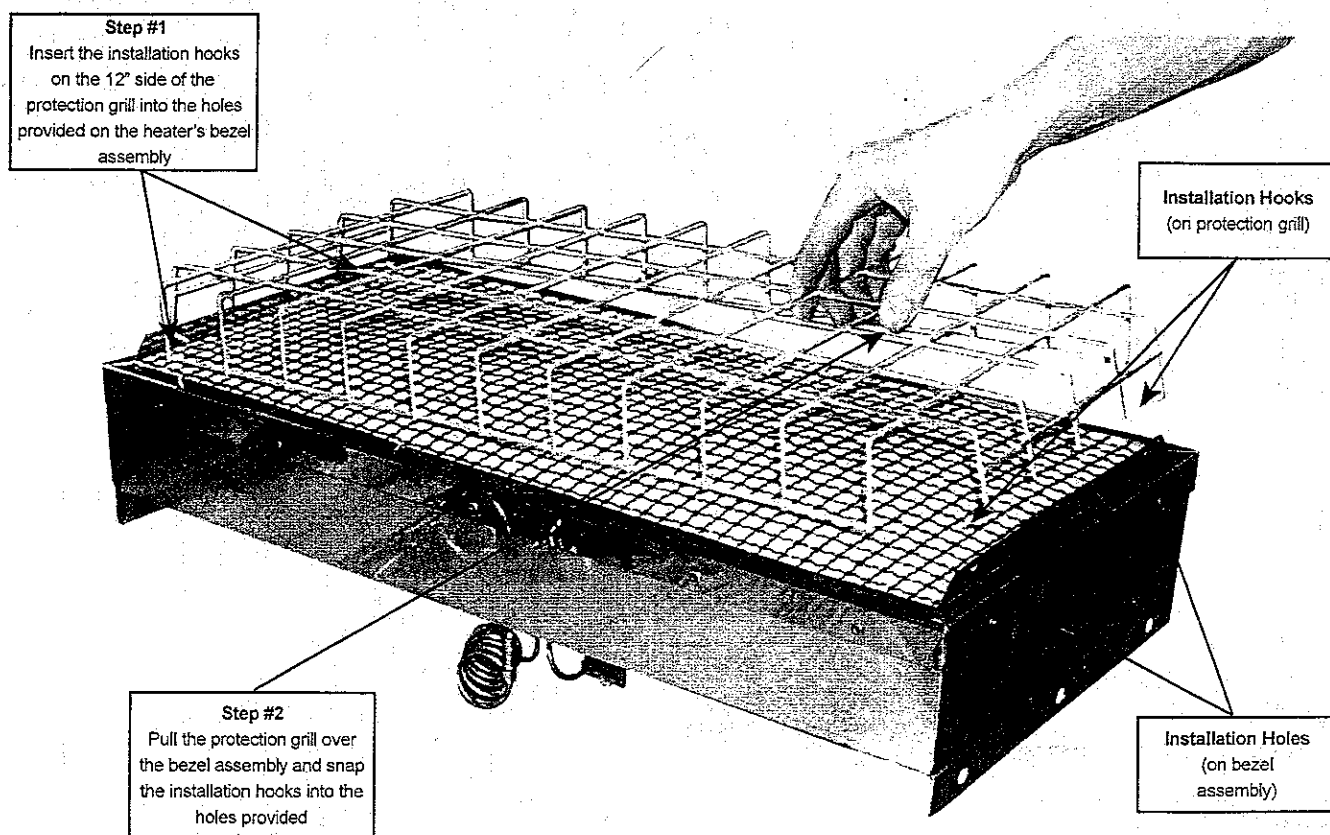
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How to Install the Cata-Dyne™ Protection Grill

The protection grill provided by CCI Thermal as an optional accessory for the Cata-Dyne™ heater has been redesigned to allow for easy installation and/or removal. The 12" x 24" grill(s) are fastened to the bezel assembly. The bezel assembly is the rectangular steel frame riveted around the front of the Cata-Dyne™ heater. No assembly hardware or tools are required to attach the grill(s).



- To remove the protection grill, perform the above steps in reverse order.
- Exercise care not to damage the heater's catalyst pad when installing or removing the protection grill.

Caution! Do not Attempt to Install or Remove the Protection Grill While the Heater is in Operation.