

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

Dayton® Natural Gas Construction Heater

Description

Dayton Model 3VH21 heater is 250,000 Btu/Hr construction heater. This heater uses natural gas for combustion. It is primarily intended for the temporary heating of buildings under construction, alteration, or repair. This heater should never be used in occupied dwellings.

Unpacking

1. Remove all packing items applied to heater for shipment. Keep plastic cover caps (attached to valve inlet for storage).
2. Remove all items from carton.
3. Check all items for shipping damage. If heater is damaged, promptly inform dealer where you bought heater.
4. Hose not included. User must supply hose or flexible connector and appropriate gas supply pressure.



Figure 1 – Model 3VH21

▲ GENERAL HAZARD WARNING

Failure to comply with the precautions and instructions provided with this heater can result in death, serious bodily injury, and property loss or damage from hazards of fire, explosion, burn, asphyxiation, carbon monoxide poisoning, and/or electrical shock.

Only persons who can understand and follow the instructions should use or service this heater.

If you need assistance or heater information such as an instructions manual, labels, etc. contact the manufacturer.

▲ WARNING Not for home or recreational vehicle use.

▲ WARNING Fire, burn, inhalation, and explosion hazard. Keep solid combustibles such as building materials, paper or cardboard, a safe distance away from the heater as recommended by the instructions. Never use the heater in spaces which do or may contain volatile or airborne combustibles, or products such as gasoline, solvents, paint thinner, dust particles, or unknown chemicals.

The heater is designed for use as a construction heater. Certain standards govern the use of fuel gases and heating products for specific uses. Your local authority can advise you about these. The primary purpose of construction heaters is to provide temporary heating of buildings under construction, alteration or repair. Properly used, the heater provides safe economical heating. Products of combustion are vented into the area being heated.

We cannot foresee every use which may be made of our heaters. **CHECK WITH YOUR LOCAL FIRE SAFETY AUTHORITY IF YOU HAVE QUESTIONS ABOUT HEATER USE.**

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General Safety Information

Make certain you read and understand all warnings. Keep these instructions for reference. It is your guide to safe and proper operation of this heater.

Safety information appears throughout these instructions. Pay close attention to them. Below are definitions for the safety information listed throughout this manual.

▲ DANGER Under this heading, installation, operating and maintenance procedures or practices will be found that, if not carefully followed, WILL result in IMMEDIATE serious personal injury or death.

▲ WARNING Under this heading, installation, operating, and maintenance procedures or practices will be found that, if not carefully followed, COULD result in severe personal injury or death.

▲ CAUTION Under this heading, installation, operating, and maintenance procedures or practices will be found that, if not carefully followed, MAY result in minor personal injury, product or property damage.

IMPORTANT: Every possible circumstance that might involve a hazard cannot be anticipated. The warnings in this manual and on tags or decals affixed to the unit are therefore not all-inclusive. If a procedure, work method, or operating technique not specifically recommended by Dayton is used, you must make sure it is safe for you and others. You should also ensure that equipment will not be damaged or made unsafe by the operating or maintenance method you choose.

▲ DANGER *Carbon monoxide poisoning: Some people are more affected by carbon monoxide than others. Early signs of carbon monoxide poisoning resemble the flu, with headaches, dizziness, and/or nausea. If you have these signs, the heater may not be operating properly. Get fresh air at once! Have heater serviced.*

Natural Gas: Natural gas has a distinctive odor. This odor helps you detect a natural gas leak. However, the odor may fade. Natural gas may be present even though no odor exists.

▲ WARNING *• Install and use heater with care. Follow all local ordinances and codes. In the absence of local ordinances and codes, refer to the National Fuel Gas Code Handbook, NFPA54/ANSI Z223.1 and the Natural Gas Installation Code, CAN/CGA B149.2. This instructs on the safe storage and handling of flammable gases.*

- *Use only with natural gas. Do NOT attempt to use with LP gas.*
- *Provide adequate ventilation. Before using heater, provide at least a three-square-foot opening of fresh, outside air for each 100,000 Btu/Hr of rating. This heater produces carbon monoxide, which is listed by the State of California as a reproductive toxin under Proposition 65.*
- *For indoor use only. Do NOT use heater outdoors.*
- *Do NOT use heater in occupied dwellings or in living or sleeping quarters.*
- *Do NOT use heater below ground level.*
- *Keep appliance area clear and free from combustible materials, gasoline, paint thinner, and other flammable vapors and liquids. Do NOT use heater in areas with high dust content.*
- *Minimum heater clearances from combustible materials:
Sides: 6 Ft. Top: 5 Ft.*
- *Check heater for damage before each use. Do NOT use a damaged heater.*
- *Check hose (if used) before each use of heater. If highly worn or cut, replace before using heater.*
- *Locate heater on stable and level surface if heater is hot or operating.*
- *Not intended for use on finished floors.*
- *Never block air inlet (bottom of shell) or air outlet (top of shell) of heater.*
- *Keep heater away from strong drafts, water spray, rain, or dripping water.*
- *Keep children and animals away from heater.*
- *Do NOT leave heater unattended.*
- *Never move, handle, or service a hot or operating heater. Severe burns may result. You must wait 20 minutes after turning heater off.*
- *To prevent injury, wear gloves when handling heater.*
- *Never attach duct work to heater.*
- *Do NOT alter heater. Keep heater in its original state.*
- *Do NOT use heater if altered.*
- *Turn off natural gas supply to heater when not in use.*
- *Use only original replacement parts. This heater must use design-specific parts. Do NOT substitute or use generic parts. Improper replacement parts could cause serious or fatal injuries.*

Model 3VH21

Product Identification

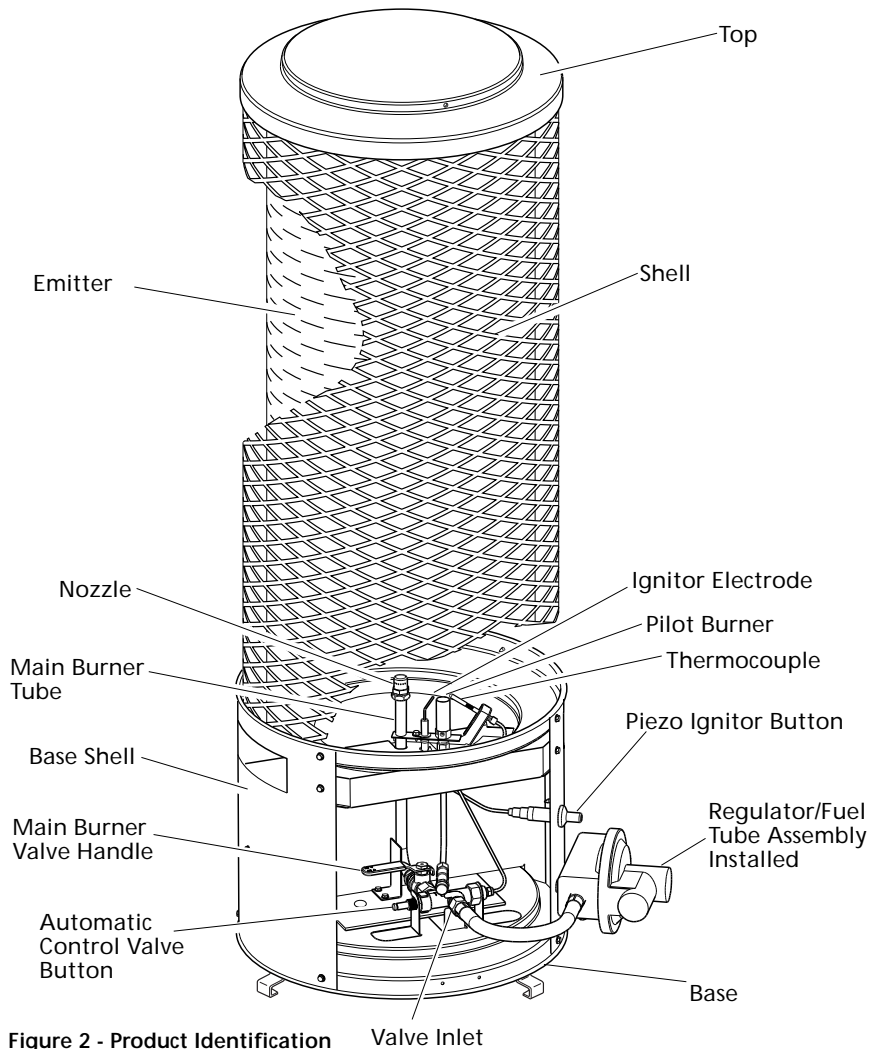


Figure 2 - Product Identification

Specifications

Model	Output Rating Btu/Hr	Fuel	Fuel Consumption	Size L x W x H (Inches)	Weight (pounds)
3VH21	250,000	Natural Gas Only	250 cubic ft/hr	16 x 16 x 46	33 (Heater) 40 (Shipping)

Maximum Supply Pressure to Regulator	Maximum Supply to Heater without Regulator	Minimum Supply Pressure to Heater	Manifold Pressure
200 PSI	4 PSI	4 PSI	3.5 PSI

Theory of Operation

THE FUEL SYSTEM: The gas supply attaches to the heater by a minimum 3/8 inch i.d. hose or flexible connector. User must supply hose or flexible connector. The length should be no more than 10 feet long. The natural gas moves through the regulator (if used) and through the control valve, then out the nozzle.

THE IGNITION SYSTEM: The piezo ignitor lights the burner fuel supply.

THE AUTOMATIC CONTROL SYSTEM: The automatic control valve shuts off the heater if the flame goes out.

Natural Gas Supply

The user must furnish the natural gas supply and the connections to the heater.

Regulate the natural gas supply down to a minimum 4 PSI. If over 4 PSI is supplied, then use the supplied regulator on the heater. The natural gas supply capacity should be able to supply a minimum of 250 cubic feet of gas at pressure for each heater connected to the system.

Consult your natural gas supplier for proper sizing of the natural gas supply lines.

Follow all local ordinances and codes. In the absence of local ordinances and codes, refer to the National Fuel Gas Code Handbook, NFPA54/ANSI Z223.1 and the Natural Gas Installation Code, CAN/CGA B149.2. Less gas is vaporized at lower temperatures. Two or more 100-pound tanks or one larger tank may be needed in colder weather. Your local natural gas dealer will help you select the proper supply system.

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Ventilation

▲ WARNING Provide at least a 7.5-square-foot opening of fresh, outside air while running heater. If proper fresh, outside air ventilation is not provided, carbon monoxide poisoning can occur. Provide proper fresh, outside air ventilation before running heater.

FRESH OUTSIDE AIR OPENING REQUIREMENTS

Heater Size	Square feet opening
250,000 Btu/Hr	7.5

Installation

▲ WARNING Review and understand the warnings in the Safety Information Section. They are needed to safely operate this heater. Follow all local codes when using this heater.

▲ WARNING Test all gas piping and connections for leaks after installation or servicing. Never use an open flame to check for a leak. Apply a mixture of liquid soap and water to all joints. Bubbles forming show a leak. Correct all leaks at once.

1. Provide natural gas supply system.
2. Install plumbing from natural gas supply system to heater. Provide minimum 4 PSI gas pressure to heater. If gas supply pressure is over 4 PSI, use high pressure regulator (provided).
3. Connect gas supply to heater using minimum 3/8" i.d. hose. Maximum hose length is 10 feet.
4. Connect hose or plumbing to 1/2" SAE flare fitting at the valve inlet. Tighten all fittings with a wrench.
5. Open natural gas supply valve slowly. Check all connections for leaks. Never use an open flame to check for a leak.

Apply mixture of liquid soap and water to gas joints. Bubbles forming show a leak that must be corrected. Correct all leaks at once.

6. Close natural gas supply valve.

INSTALLING HIGH PRESSURE REGULATOR

If the inlet supply pressure is above 4 psi, you must use the high pressure regulator (supplied). Follow the instructions below to install regulator.

1. Install pipe or flexible connector (not supplied) from gas supply to high pressure regulator. Pipe or flexible connector must be a minimum of 3/8" i.d. with a maximum length of 10 feet. Attach pipe or flexible connector to inlet of regulator. The female threads of the regulator are 1/2 npt. *Note:* The natural gas supply must deliver 250 CFH of natural gas at 4 psi pressure for each heater connected to the system.
2. Mount regulator to heater base below piezo ignitor button (see Figure 3). Use 1/4-20 screws from hardware bag to attach regulator to heater. Mount regulator so the outlet with male connector points toward the heater inlet.
3. Attach the 1/2" copper fuel tube (supplied) to male connector on regulator. Attach other end of fuel tube to heater inlet. Firmly tighten fuel tube flare nuts onto each fitting.
4. Open natural gas supply valve slowly. Check all connections for leaks. Never use an open flame to check for a leak. Apply mixture of liquid soap and water to gas joints. Bubbles forming show a leak that must be corrected. Correct all leaks at once.
5. Close natural gas supply valve.
6. Follow steps under *To Start Heater* in the *OPERATION* section (page 5) of this manual.

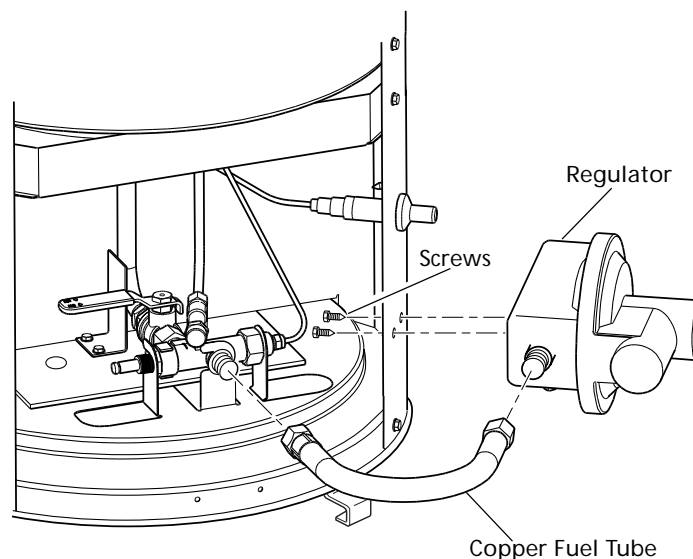


Figure 3 - Installing Regulator

Model 3VH21

Operation

⚠ WARNING *Review and understand the warnings in the Safety Information Section. They are needed to safely operate this heater. Follow all local codes when using this heater.*

TO START HEATER

1. Follow all installation, ventilation, and safety information.
2. Locate heater on stable and level surface. Make sure strong drafts do not blow on heater.

⚠ WARNING *Fully close main burner valve before lighting pilot. If not, severe burns can occur. Do this by turning valve handle towards the OFF position until it stops.*

3. Open natural gas supply valve slowly.
4. Push in and hold automatic control valve button (see Figure 4). Push piezo ignitor button (see Figure 4). You may need to push the piezo ignitor button 3-8 times until the pilot lights.
Note: Hose may be filled with air. If so, keep automatic control valve button pressed and wait 20 seconds for gas to clear before pressing ignitor button again. When pilot lights, keep automatic control valve button pushed in. Release button after 30 seconds.
5. If pilot light goes out, repeat step 4.
6. When pilot remains lit, fully open main burner valve. Do this by turning main burner valve handle towards the ON position until it stops.
Note: Arrows on main burner valve handle show directions for ON and OFF.

TO STOP HEATER

1. Tightly close natural gas supply valve.
2. Using a gloved hand, shut off main burner valve. Do this by turning main burner valve handle towards the OFF position until it stops.
Note: Arrows on main burner valve handle show direction for ON and OFF.

TO RESTART HEATER

1. Wait five minutes after stopping heater.
2. Restart heater by following steps under *To Start Heater*.

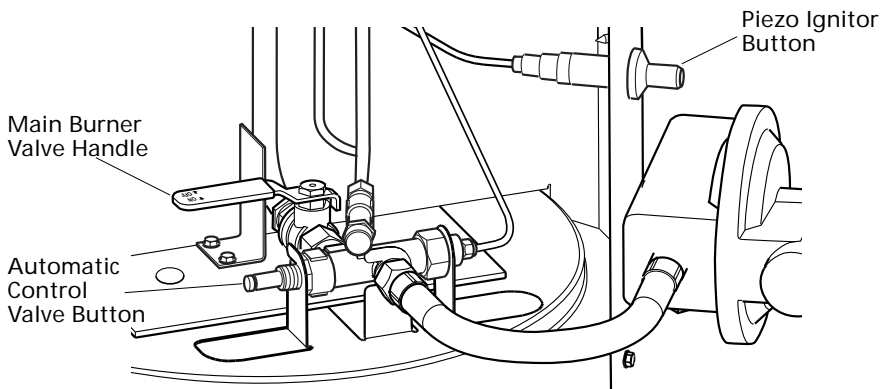


Figure 4 - Main Burner Valve Handle, Automatic Control Valve Button, and Piezo Ignitor Button Locations with Regulator Installed

Dayton® Natural Gas Construction Heater

Troubleshooting Chart

⚠ WARNING

Never attempt to service heater while it is connected to natural gas supply, operating, or hot. Severe burns can occur.

Symptom	Possible Cause(s)	Corrective Action
Pilot fails to light	<ol style="list-style-type: none"> 1. Natural gas supply valve closed 2. Air in gas line 3. Blockage in pilot orifice 4. Piezo ignition system not sparking 	<ol style="list-style-type: none"> 1. Open natural gas supply valve slowly 2. Allow several minutes to purge air while pilot button is depressed 3. Replace pilot orifice 4. Adjust ignitor electrode gap to .120". Check wire lead for damage. Replace piezo ignitor and/or ignitor electrode as necessary
Pilot lights but goes out when automatic control valve button is released	<ol style="list-style-type: none"> 1. Not enough warm-up time 2. Low gas pressure 3. Thermocouple loose or needs to be replaced 4. Automatic control valve needs to be replaced 	<ol style="list-style-type: none"> 1. Relight, hold automatic control valve button in 45 seconds 2. Check for proper gas supply 3. Tighten connection or replace thermocouple 4. Replace automatic control valve
Maximum burn rate is low	<ol style="list-style-type: none"> 1. Main burner valve not fully open 2. Plugged gas orifices 3. Low gas pressure 4. Low fuel supply 	<ol style="list-style-type: none"> 1. Fully open main burner valve by turning the valve handle towards ON position until it stops 2. Replace gas orifice 3. Check gas supply; check regulator output 4. Consult natural gas supplier
Soot forming inside heater, flame 100% yellow	<ol style="list-style-type: none"> 1. Main burner valve not open enough 2. Low fuel supply 	<ol style="list-style-type: none"> 1. Adjust main burner valve slowly towards ON position until flame has more blue color 2. Consult natural gas supplier
Burn rate too high. Flames coming out of emitter	<ol style="list-style-type: none"> 1. Pressure too high 2. Unit connected to LP 	<ol style="list-style-type: none"> 1. Check inlet pressure. If over 4 psi adjust or install regulator 2. Verify gas source. If connected to LP gas, disconnect. Connect to natural gas

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Maintenance

▲ WARNING *Never service heater while it is connected to gas supply, operating, or hot. Severe burns can occur.*

1. Keep heater clean. Clean heater annually or as needed to remove dust and debris. If heater is dirty or dusty, clean heater with a damp cloth.
2. Inspect heater before each use. Check connections for leaks. Apply mixture of liquid soap and water to connections. Bubbles forming show a leak. Correct all leaks at once.
3. Have heater inspected yearly by a qualified service agency.
4. Keep inside of heater free from combustible and foreign objects.

Storage

▲ CAUTION *Disconnect heater from natural gas supply.*

1. Place plastic cover cap over brass fitting on inlet connector.
2. Store in dry, clean, and safe place.
3. When taking heater out of storage, always check inside of heater. Insects and small animals may place foreign objects in heater. Keep inside of heater free from combustible and foreign objects.

Replacement Parts For Model 3VH21 Natural Gas Construction Heater, call 1-800-323-0620

24 hours a day — 365 days a year

Please provide following information:

- Model number
- Serial number (if any)
- Part description and number as shown in parts list

Address parts correspondence to:

Grainger Parts Operations
 P.O. Box 3074
 1657 Shermer Road
 Northbrook, IL 60065-3074 U.S.A.

Replacement Parts Illustration

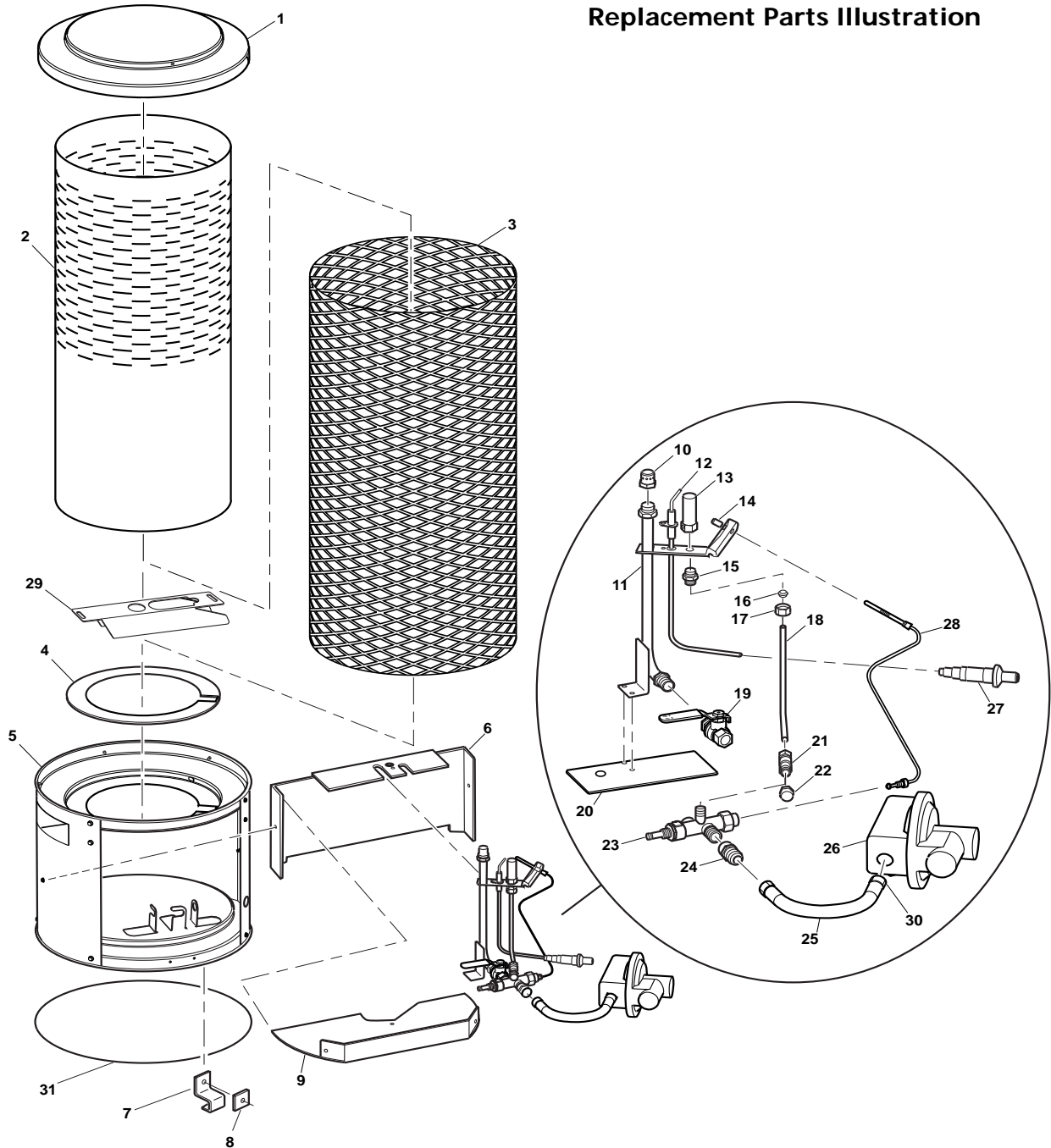


Figure 4 - Model 3VH21

Replacement Parts List

Model 3VH21 Natural Gas Construction Heater

▲ WARNING Use only original replacement parts. This heater must use design-specific parts. Do not substitute or use generic parts. Improper replacement parts could cause serious or fatal injuries. This will also protect your warranty coverage for parts replaced under warranty.

Reference Number	Description	Part No. For Model 3VH21	Quantity
1	Top Disk	104145-02	1
2	Emitter	103897-02	1
3	Shell	103898-02	1
4	Insulation Ring	104116-01	1
5	Outer Base Assembly	104137-01	1
6	Rear Burner Shield	103935-01	1
7	Leg	103902-01	3
8	Spacer	103903-01	6
9	Burner Shield	103900-02	1
10	Nozzle	099138-05	1
11	Burner Tube Assembly	104114-01	1
12	Ignitor Electrode	104118-03	1
13	Pilot Burner Assembly	097163-07	1
14	Thermocouple Clip	099237-01	1
15	Pilot Burner Orifice	097161-01	1
16	Sleeve	M5788	1
17	Hex Nut	M5787	1
18	Pilot Tube	103028-02	1
19	Manual Control Valve	097152-01	1
20	Burner Support	103901-01	1
21	Tee Compression Gauge	099461-01	1
22	Brass Hex Cap	099460-01	1
23	Automatic Control Valve	097155-01	1
24	Female Connector	097157-03	1
25	Hose	104142-01	1
26	Regulator	104141-01	1
27	Piezo Ignitor	102445-01	1
28	Thermocouple	097151-01	1
29	Pilot Shield	104143-02	1
30	1/2 NPT to 1/2 45° Male Flare Connector	103401-01	1
31	Base Shield	103899-01	1
Δ	Hose Fitting Regulator Assembly	104120-01	1
Δ	Tradename Decal	099153-11	1
Δ	Operation Decal	104128-02	1
Δ	Owner's Manual	104134-01	1

(Δ) Not shown.

Dayton® Natural Gas Construction Heater

Limited Warranty

Dayton One-Year Limited Warranty. Natural gas construction heater model covered in this manual is warranted by Dayton Electric Mfg. Co. (Dayton) to the original user against defects in workmanship or materials under normal use for one year after date of purchase. Any part which is determined to be defective in material or workmanship and returned to an authorized service location, as Dayton designates, shipping costs prepaid, will be, as the exclusive remedy, repaired or replaced at Dayton's option. For limited warranty claim procedures, see PROMPT DISPOSITION below. This limited warranty gives purchasers specific legal rights which vary from jurisdiction to jurisdiction.

Limitation of Liability. To the extent allowable under applicable law, Dayton's liability for consequential and incidental damages is expressly disclaimed. Dayton's liability in all events is limited to, and shall not exceed, the purchase price paid.

Warranty Disclaimer. Dayton has made a diligent effort to provide product information and illustrate the products in this literature accurately; however, such information and illustrations are for the sole purpose of identification, and do not express or imply a warranty that the products are merchantable, or fit for a particular purpose, or that the products will necessarily conform to the illustrations or descriptions.

Except as provided below, no warranty or affirmation of fact, expressed or implied, other than as stated in "LIMITED WARRANTY" above is made or authorized by Dayton.

Product Suitability. Many jurisdictions have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While Dayton attempts to assure that its products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of a product, review the product applications, and all applicable national and local codes and regulations, and be sure that the product, installation, and use will comply with them.

Certain aspects of disclaimers are not applicable to consumer products; e.g., (a) some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you; (b) also, some jurisdictions do not allow limitations on how long an implied warranty lasts, consequently the above limitation may not apply to you; and (c) by law, during the period of this Limited Warranty, any implied warranties of implied merchantability or fitness for a particular purpose applicable to consumer products purchased by consumers, may not be excluded or otherwise disclaimed.

Prompt Disposition. Dayton will make a good faith effort for prompt correction or other adjustment with respect to any product which proves to be defective within limited warranty. For any product believed to be defective within limited warranty, first write or call dealer from whom product was purchased. Dealer will give additional directions. If unable to resolve satisfactorily, write to Dayton at address below, giving dealer's name, address, date and number of dealer's invoice, and describing the nature of the defect. Title and risk of loss pass to buyer on delivery to common carrier. If product was damaged in transit to you, file claim with carrier.



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NOT A UPC