



ENGINEERING DATA

LF24

**GAS-FIRED UNIT HEATER
Compact - Low Profile - Horizontal**

Bulletin No. 210108

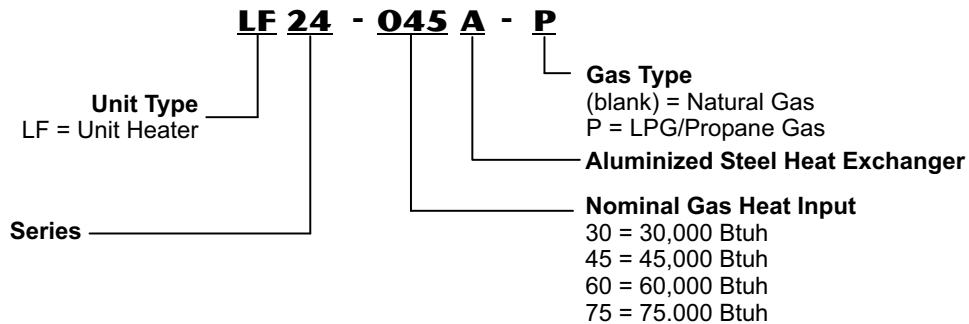
May 2008

Supersedes November 2003



**Steady-State Efficiency - up to 81%
Input - 30,000 to 75,000 Btuh**

MODEL NUMBER IDENTIFICATION



FEATURES

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WARRANTY

Aluminized steel heat exchanger - limited warranty for **ten years**.
All other covered components - **five years** in residential installations and one year in non-residential installations.
 Refer to Lennox Equipment Limited Warranty certificate included with unit for specific details.

APPROVALS

Units certified by CSA International for use with natural or LPG/propane gas (optional kit required for LPG/Propane conversion). Units are approved for vertical or horizontal venting.

APPLICATIONS

Horizontal unit heaters are low profile, compact in design and easy to install.
 Steady State Efficiencies of up to 81%.
 Ideal for economical heating systems in garages and non-confined living spaces.
 Shipped completely assembled with controls factory installed and wired.
 Hanging brackets are shipped loose for field installation.
 Each unit is test operated at the factory to ensure proper operation and dependability.
 Installer has only to locate unit, make unit gas supply, electrical connections and mount thermostat to complete the installation.

FEATURES

CABINET

- 1 Constructed of pre-painted heavy gauge cold rolled steel. Inside cabinet insulation keeps outer cabinet surface temperatures low. Adjustable louvers are furnished on cabinet for control of air flow direction. Wiring junction box is conveniently located inside unit cabinet. Contains all electrical and safety controls. Hanging brackets for suspending unit are furnished for field installation. Unit may be turned over to change gas, electrical and flue positions. See dimension drawing.

HEATING SYSTEM

24 volt redundant combination gas control valve combines a manual main shutoff valve, pressure regulation and automatic electric valve (dual) into one compact combination control. Solid-state electronic direct spark ignition control provides positive main burner ignition. Spark is intermittent and occurs only when required. Separate electronic flame sensor control assures safe and reliable operation. Should loss of flame occur, flame sensor controls will initiate 3 attempts at re-ignition before locking out unit operation. Combustion air inducer prepurges heat exchanger and safely vents flue products. Pressure switch proves inducer operation before allowing gas valve to open. Combustion air inducer operates only during heating cycle.

2 Tubular Aluminized Steel Heat Exchanger

Tubular heat exchanger is constructed of aluminized steel for superior resistance to corrosion and oxidation. Curving design of heat exchanger allows complete exposure of heating surfaces to supply air stream. Round tube surfaces create minimum air resistance and allow air to surround all surfaces for excellent heat transfer. Compact design reduces space requirements in unit cabinet. Heat exchanger has been laboratory life cycle tested.

3 Inshot Burners

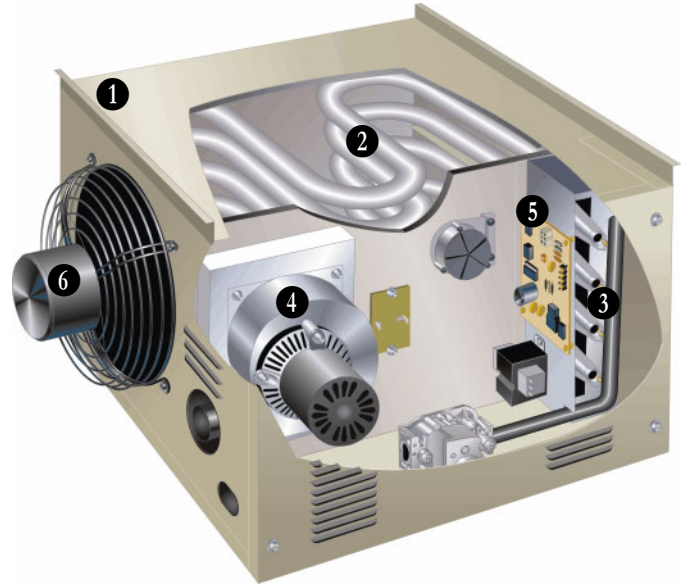
Aluminized steel inshot burners provide efficient trouble free operation. Burner venturi mixes air and gas in correct proportion for proper combustion. Burner assembly is removeable from the unit as a single component for ease of service and each burner may be removed individually.

Limit Control

Limit control has fixed temperature setting and protects heating system from abnormal operating conditions.

4 Combustion Air Inducer

Prepurges heat exchanger and safely vents combustion products. Blower motor has sleeve bearings and is thermally protected. Pressure switch prevents unit operation in case of blockage of combustion air inlet or flue outlet.



OPTIONS/ACCESSORIES

LPG/Propane Conversion Kit

Conversion kit is required for field changeover from natural gas. See Specifications tables.

CONTROLS

- 5 The following controls are furnished as standard equipment: 24 volt main gas valve with 100% safety shutoff, direct spark ignition, main shutoff valve, gas pressure regulation (natural gas models), 115/24v transformer, low voltage terminal strip, solid-state control board with LED diagnostics, fan timer control - fan on (45 seconds - fixed) fan off (150 seconds fixed).

OPTIONS/ACCESSORIES

Thermostat

See Thermostat bulletins in Controls section and Lennox Price Book for a complete list of thermostats.

DIRECT DRIVE FAN

- 6 All models are equipped with efficient and quiet operating direct drive propeller type fan with permanently lubricated fan motor.

SPECIFICATIONS

Gas Heating Performance	Model No.	LF24-30A	LF24-45A	LF24-60A	LF24-75A
	Heating Capacity Input - Btuh	30,000	45,000	60,000	75,000
	Heating Capacity Output - Btuh	24,300	36,500	48,000	60,000
	Steady State Efficiency	81.0%	81.0%	80.0%	80.0%
	Temperature rise - °F	42	45	55	60
Connections in.	Flue size (round) - Vertical venting	1 3	1 3	2 4	2 4
	Horizontal venting - residential	3 4	3 4	4 5	4 5
	Gas Piping Size	1/2	1/2	1/2	1/2
Fan Data	Number of fans	1	1	1	1
	Fan Diameter - in.	10	10	14	14
	Number of blades	4	4	3	3
	Motor Output - hp	1/20	1/20	1/10	1/10
	Amps	1.7	1.7	4.1	4.1
	rpm	1650	1650	1050	1050
	Air Volume - cfm	535	750	830	950
	Air throw at 8 ft. mounting height - ft.	25	25	40	40
Electrical Characteristics	115 volts - 60 hertz - 1 phase				
Shipping Weight - lbs. 1 package	60	63	87	91	

OPTIONAL ACCESSORIES - MUST BE ORDERED EXTRA

LPG/Propane Kit	20L05	20L05	20L05	20L05

¹ 2-1/8 x 3 in. diameter adaptor is furnished with unit for flue connection

² 2 x 4 in. diameter adaptor is furnished with unit for flue connection.

³ 3 x 4 in. vent adaptor required (not furnished) for horizontal venting in residential applications.

⁴ 4 x 5 in. vent adaptor required (not furnished) for horizontal venting in residential applications.

INSTALLATION CLEARANCES - IN. (MM)

	in.	mm
Top	1	25
Side opposite access panel	1	25
Access Panel Side	18	457
Back	18	457
Bottom	0	0
Flue	6	152

NOTE - Provide adequate clearance for servicing.

See Installation Instructions for further installation considerations.

MAXIMUM VENT CONNECTOR LENGTHS

No. of Elbows	Maximum Length (feet) of Straight Vent Pipe ft.
1	25
2	20
3	15
4	10
5	5

NOTES - For residential installations only, maximum permissible horizontal vent length is 5 ft. plus one elbow.

Minimum horizontal vent length is 3 ft.

Horizontal venting must terminate in a tee or 90° elbow

Single wall vent pipe must be used for horizontal venting.

Maximum total length of vent pipe must not exceed 30 ft.

One elbow is equivalent to 5 ft. of vent pipe.

Single or double wall (type B) vent pipe may be used for vertical venting.

Minimum clearance to combustible material is 6 in. with single wall vent pipe.

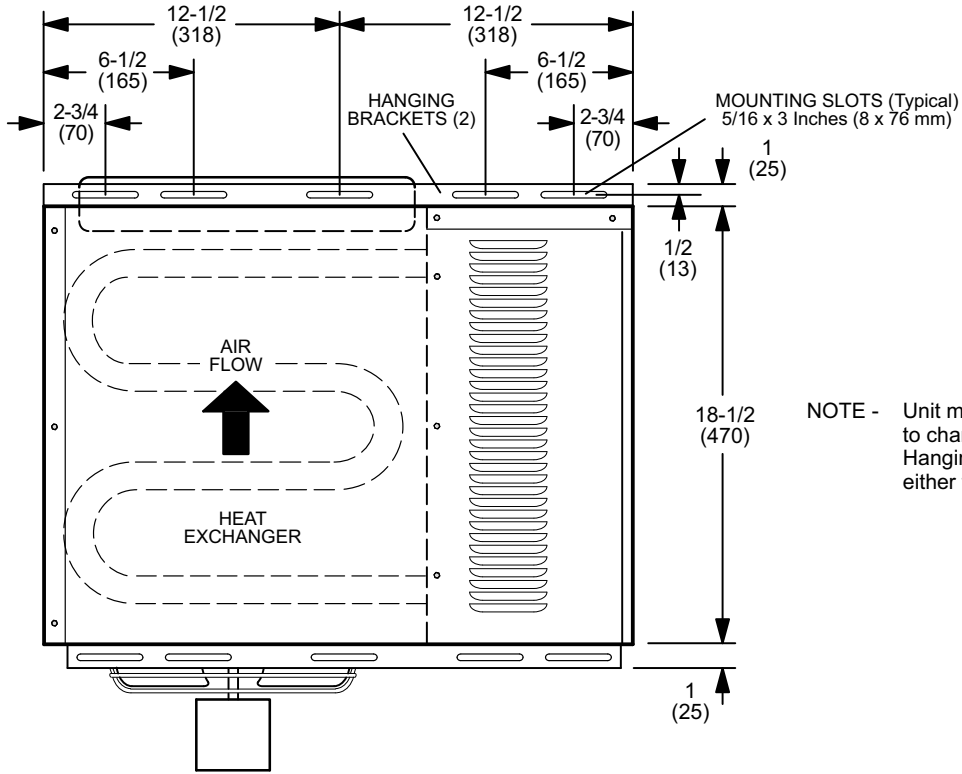
HIGH ALTITUDE INFORMATION

All units may be fired at full input up to 2000 ft. above sea level. LF24-30 and LF24-60 units may be fired at full input up to 7500 ft. LF24-45 units may be fired at full input up to 6500 ft., at altitudes above 6501 ft. units are adjusted by derating manifold pressure, see below. LF24-75 units installed above 2500 ft. are adjusted by derating manifold pressure. See table below for correct pressure. If any unit is installed at an altitude greater than 7500 ft. unit must be derated 4% for each additional 1000 ft. above 7500 ft.. Thus, at an altitude of 8500 feet, an LF24-75 would require an additional derate of 4%.

NOTE - This is the only permissible derate for the units.

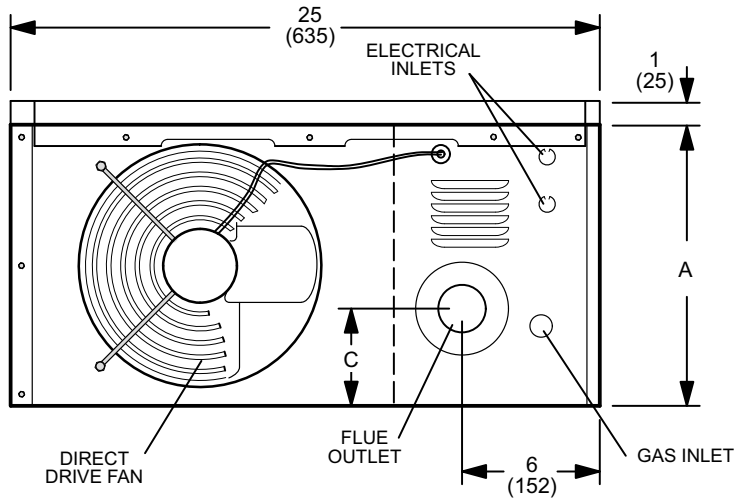
Model No.	Manifold Pressure - in. w.c.									
	2500-3500 ft.		3501-4500 ft.		4501-5500 ft.		5501-6500 ft.		6501-7500 ft.	
	Natural Gas	LPG/Propane	Natural Gas	LPG/Propane	Natural Gas	LPG/Propane	Natural Gas	LPG/Propane	Natural Gas	LPG/Propane
LF24-30 LF24-60	No adjustment									
LF24-45	No adjustment								3.4	9.2
LF24-75	3.5	9.5	3.4	9.2	3.3	8.9	3.2	8.6	3.1	8.3

DIMENSIONS - INCHES (MM)

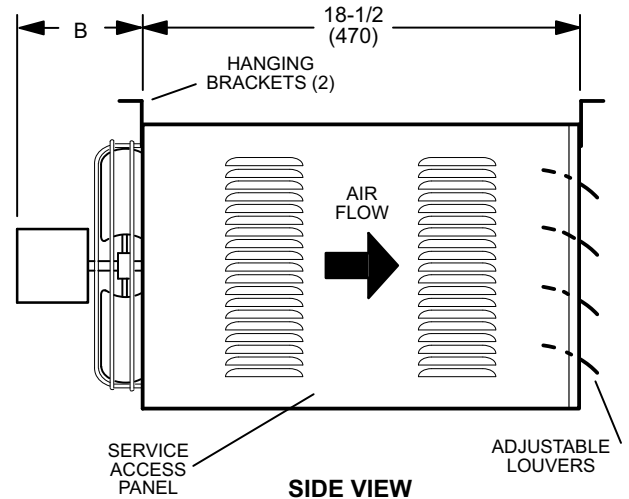


NOTE - Unit may be rotated 180° top for bottom to change gas, electrical and flue positions. Hanging brackets may be installed on either top or bottom of unit.

TOP VIEW



BACK VIEW



SIDE VIEW

Model No.	LF24-30A LF24-45A	LF24-60A LF24-75A
A	12 (305)	17 (432)
B	5-1/2 (140)	6-1/2 (165)
C	4-1/4 (108)	6-3/4 (171)

GUIDE SPECIFICATIONS

This specification specifies **[Lennox Industries LF24]** gas-fired unit heaters. Revise specification section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles.

This specification utilizes the Construction Specifications Institute (CSI) *Manual of Practice*, including *MasterFormat™*, *SectionFormat™* and *PageFormat™*. Optional text and text requiring a decision is indicated by **bold brackets[]** and proprietary information is indicated by **bold, italicize brackets[]**; delete text not required in final copy of specification. Specifier Notes typically precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate symbols typically are used in Specifier Notes; symbols are not used in specification text. Metric conversion, where used, is soft metric conversion.

SECTION 23 55 33

FUEL-FIRED UNIT HEATERS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Gas-Fired unit heaters

Specifier Note: Revise paragraph below to suit project requirements. Add section numbers and titles per CSI *MasterFormat* and specifier's practice.

B. Related Sections:

Specifier Note: Article below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain Reference Article when specifying products and installation by an industry reference standard. If retained, list standard(s) referenced in this section. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced. Conditions of the Contract or Division 1 References Section may establish the edition date of standards. This article does not require compliance with standard, but is merely a listing of references used. Article below should list only those industry standards referenced in this section. Retain only those reference standards to be used within the text of this Section. Add and delete as required for specific project.

1.02 REFERENCES

- A. Certifications:
1. CSA International
 2. For use with natural or LPG/propane gas
 3. California Energy Commission (CEC)
- B. ISO 9001, units manufactured to quality standard

Specifier Note: Article below should be restricted to statements describing design or performance requirements and functional (not dimensional) tolerances of a complete system. Limit descriptions to composite and operational properties required to link components of a system together and to interface with other systems.

1.03 SYSTEM DESCRIPTION

- A. Electrical Requirements:
1. 60 Hz.
 2. 115 V
 3. Single phase
 4. 115V/24V or 120V/24V transformer
- B. Fuel Requirements: **[Natural gas] [and]/[or] [LPG/propane]**

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Conditions of the Contract and Division 1 Submittal Procedures Section.

1.04 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures.
- B. Product Data: Submit product data for specified products.
- C. Shop Drawings:
1. Submit shop drawings in accordance with Section **[01330 - Submittal Procedures]**.
 2. Indicate:
 - a. Equipment, piping and connections, together with valves, strainers, control assemblies, thermostatic controls, auxiliaries and hardware and recommended ancillaries which are mounted, wired and piped ready for final connection to building system, its size and recommended bypass connections.
 - b. Piping, valves and fittings shipped loose showing final location in assembly.
 - c. Control equipment shipped loose, showing final location in assembly.
 - d. Field wiring diagrams.
 - e. Dimensions, internal and external construction details, installation clearances, recommended method of installation, sizes and location of mounting bolt holes.
 - f. Detailed composite wiring diagrams for control systems showing factory installed wiring and equipment on packaged equipment or required for controlling devices or ancillaries, accessories, controllers.

GUIDE SPECIFICATIONS

- D. Quality Assurance:
 - 1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
 - 2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
 - 3. Manufacturer's Instructions: Manufacturer's installation instructions.

Specifier Note: Coordinate paragraph below with Part 3 Field Quality Requirements Article herein. Retain or delete as applicable.

- E. Manufacturer's Field Reports: Manufacturer's field reports specified herein.
- F. Closeout Submittals: Submit the following:
 - 1. Warranty: Warranty documents specified herein.
 - 2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance. Include names and addresses of spare part suppliers.
 - 3. Provide brief description of unit, with details of function, operation, control and component service.
 - 4. Commissioning Report: Submit commissioning reports, report forms and schematics in accordance with Section 01810 - Commissioning.

1.05 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

1.06 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 Product Requirements.
- B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Packing, Shipping, Handling and Delivery:
 - 1. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
 - 2. Ship, handle and unload units according to manufacturer's instructions.
- D. Storage and Protection:
 - 1. Store materials protected from exposure to harmful weather conditions.
 - 2. Factory shipping covers to remain in place until installation.

Specifier Note: Coordinate article below with Conditions of the Contract and Division 1 Closeout Submittals (Warranty).

1.07 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

Specifier Note: Coordinate paragraph below with manufacturer's warranty requirements.

- C. Warranty: Commencing on Date of Installation.

Specifier Note: Refer to Lennox Equipment Limited Warranty certificate included with equipment for details.

- 1. Heat Exchanger:
 - a. Aluminized Steel: 10 years, limited (non-residential applications)
 - b. Stainless Steel: 15 years, limited (non-residential applications)
- 2. Solid-State Ignition Module: 1 year, limited (non-residential applications)
- 3. All other components: 1 year limited (non-residential applications)

PART 2 PRODUCTS

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards and descriptions as applicable. Use of such phrases as "or equal" or "or approved equal" or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining "or equal" products.

2.01 [Lennox LF24] GAS-FIRED UNIT HEATERS

- A. Manufacturer: [Lennox Industries]
 - 1. Contact: [2100 Lake Park Blvd., Richardson, TX 75080; Telephone: (800) 453-6669; Web site: www.lennox.com]

GUIDE SPECIFICATIONS

B. General:

1. Air-Flow: Horizontal
2. Venting
 - a. Horizontal
 - b. Vertical
3. All units to be shipped completely assembled at the factory
4. Hanging brackets to be supplied by manufacturer for field mounting of unit heater
5. Controls to be factory installed and wired
6. All units must pass a factory run-test before shipping
7. Installer to:
 - a. Make unit gas supply connections
 - b. Make electrical connections
 - c. Mount thermostat
 - d. Make flue connections

Specifier Note: LF24 models with BTUH requirements: 030 (30,000 Btuh), 045 (45,000 Btuh), 060 (60,000 Btuh), 075 (75,000 Btuh), 115 (115,000 Btuh), 145 (145,000 Btuh), 175 (175,000 Btuh), 200 (200,000 Btuh), 230 (230,000 Btuh), 250 (250,000 Btuh), 300 (300,000 Btuh), 345 (345,000 Btuh), and 400 (400,000 Btuh).

8. See schedule for Btuh of unit required

C. **[Proprietary]** Products/Systems: **[LF24]** Gas-fired unit heaters includes the following:

1. Cabinet:
 - a. Pre-painted
 - b. Heavy gauge galvanized steel construction
 - c. Internally insulated cabinet
 - d. Adjustable louvers
 - e. Contains all electrical and safety controls

Specifier Note: Wiring Junction box located inside the cabinet on LF24 models 030, 045, 060, 075. Wiring Junction box mounted on the exterior of the cabinet on LF24 models 115, 145, 175, 200, 230, 250, 300, 345, and 400.

- f. Wiring Junction box mounted inside cabinet or on the exterior of the cabinet
2. Heating System:
 - a. Combination gas control valve
 1. 24 volt
 2. Manual shutoff valve
 3. Dual Valve:
 - a. Pressure regulator
 - b. Automatic electric valve
 - b. Solid-state igniter
 1. Direct-spark
 2. Intermittent spark
 - c. Electronic flame sensor
 - d. Combustion air inducer
 1. Prepurge heat exchanger
 2. Pressure switch to prove operation
 3. Operates only during heating
 4. Blower motor is thermally protected
 - e. Heat Exchanger:
 1. Tubular

Specifier Note: Aluminized Steel heat exchanger is available on all LF24 models. Stainless Steel heat exchanger is only available on the LF24 models 115, 145, 175, 200, 230, 250, 300, 345, and 400.

2. **[Aluminized Steel] [and]/[or] [Stainless steel]**
3. Curving design
4. Laboratory lifecycle tested
- f. Inshot burners:
 1. Aluminized steel
 2. Venturi to mix gas and air for proper combustion
 3. Assembly to be removable as a single component
 4. Individual burner removable from assembly
- g. Limit Control:
 1. Factory installed
 2. Fixed temperature setting
 3. Protect heating system from abnormal operating conditions
3. Solid state control board
 - a. Fan timer control
 - b. Diagnostic LED for trouble shooting
 - c. Continuous fan operation

GUIDE SPECIFICATIONS

4. Low voltage terminal strip
5. Supply fan:
 - a. Motor:
 1. Direct drive
 2. Permanently lubricated
 - b. Propeller type fan blade
6. [Optional Accessories]:
 - a. [Thermostat]

Specifier Note: AirFlow Nozzles are only available on the LF24 models 115, 145, 175, 200, 230, 250, 300, 345, and 400.

- b. [Airflow Nozzles:]
 1. [30° from horizontal]
 2. [45° from horizontal]
 3. [60° from horizontal]
 4. [90° from horizontal]

Specifier Note: the High Altitude Pressure Switch Kit is only available on the LF24 models 115, 145, and 175.

- c. [High Altitude Pressure Switch Kit]

2.02 PRODUCT SUBSTITUTIONS

- A. Substitutions: No substitutions permitted.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

Specifier Note: Article below is an addition to the CSI *SectionFormat*. Revise article below to suit project requirements and specifier's practice.

- A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions and product carton installation instructions.

3.02 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

3.03 INSTALLATION

- A. Install [**Lennox LF24**] gas fired unit heaters in accordance with manufacture's instructions and regulations of authorities having jurisdiction.

END OF SECTION

REVISIONS

Sections	Description of Change
Features	Revised warranty information.
Guide Specifications	Added Guide Specifications.



Visit us at www.lennox.com
For the latest technical information, www.lennoxdagenet.com
Contact us at 1-800-4-LENNOX

NOTE - Due to Lennox' ongoing commitment to quality, Specifications, Ratings and Dimensions subject to change without notice and without incurring liability. Improper installation, adjustment, alteration, service or maintenance can cause property damage or personal injury. Installation and service must be performed by a qualified installer and servicing agency.

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