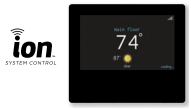
F80CSU
80% AFUE, Ultra-Low NOx, Variable-Speed, Communicating, Single Stage Gas Furnace

Arcoaire®
Air Conditioning & Heating

Product Specifications



SYST0101CW Recommended (sold separately)

A210058

WARNING

This furnace is not designed for use in mobile homes, trailers, or recreational vehicles. Such use could result in property damage and/or death.

Use of the AHRI Certified TM Mark indicates a manufacturer's participation in the program. For verification of certification for individual products, go to www.ahridirectory.org .

ISO 9001 Quality

A200115

TOUGHER

- Constant airflow variable-speed ECM blower motor
- Single-stage gas valve
- Stainless steel, tubular heat exchanger
- Pilot free, hot surface ignition
- High temperature limit control designed to prevent overheating
- Blocked vent switch

EASIER TO SELL

- 80% AFUE
- Ultra-low NOx emissions - meets the nitrogen oxides (NOx) emission limit of 14 nanograms/joule for the South Coast Air Quality Management District, San Joaquin Valley Air Pollution Control District in California, and Bay Area Air Quality Management District.
- Four-position furnace: Upflow, Horizontal Right, Horizontal Left, Downflow (6 different vent options)
- Supports two-stage and multi stage cooling units
- Dehumidification feature in cooling
- 24 VAC humidifier terminal, electric air cleaner terminal
- Category I venting
- Cabinet air leakage less than 2.0% at 1.0 in. W.C. and cabinet air leakage less than 1.4% at 0.5 in. W.C. when tested in accordance with ASHRAE Standard 193

QUIETER

- Pre-mix burner
- Variable speed inducer motor

EASIER TO INSTALL AND SERVICE

- Approved for installations up to 5,400 feet
- 33 1/4" (843.9mm) high, for ease of installation
- Quarter turn knobs for easy door removal and secure attachment
- Factory shipped for natural gas, not convertible to propane
- Flexible installation: Upflow, Downflow, Horizontal
- Two position vent elbow capability
- Common venting with other Category I appliances
- Self diagnostics

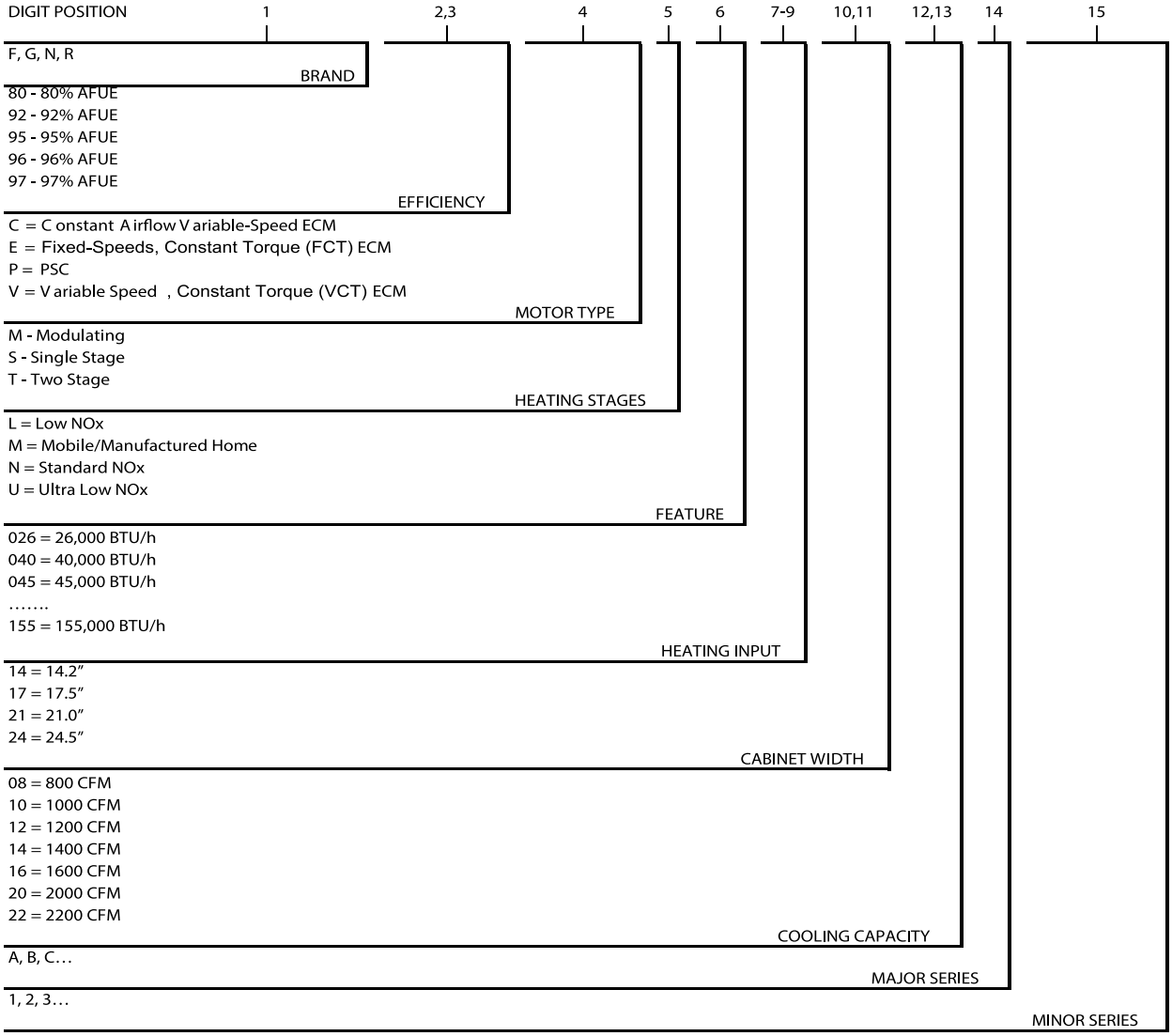
LIMITED WARRANTY *

- 5 year No Hassle Replacement™ limited warranty
- Lifetime heat exchanger limited warranty with timely registration
- 5 year parts limited warranty
  - With timely registration, an additional 5 year parts limited warranty

    * For residential applications only. See warranty certificate for complete details and restrictions, including warranty coverage for other applications.

Model	Input (BTUH)	Efficiency AFUE	Cooling Capacity CFM range @ .5 in. w.c. (125 Pa)	Dimensions H x W x D Inches (Millimeters)	Shipping Wt. Lbs (Kg)
F80CSU0401712B	40,000	80%	505 - 1490	33-1/4 x 17-1/2 x 29 (844 x 445 x 737)	119 (54)
F80CSU0601716B	60,000	80%	535 - 1480	33-1/4 x 17-1/2 x 29 (844 x 445 x 737)	124 (56)
F80CSU0802120B	80,000	80%	990 - 2390	33-1/4 x 21 x 29 (844 x 533 x 737)	144 (65)
F80CSU1002120B	100,000	80%	1130 - 2260	33-1/4 x 21 x 29 (844 x 533 x 737)	154 (70)

MODEL NUMBER NOMENCLATURE



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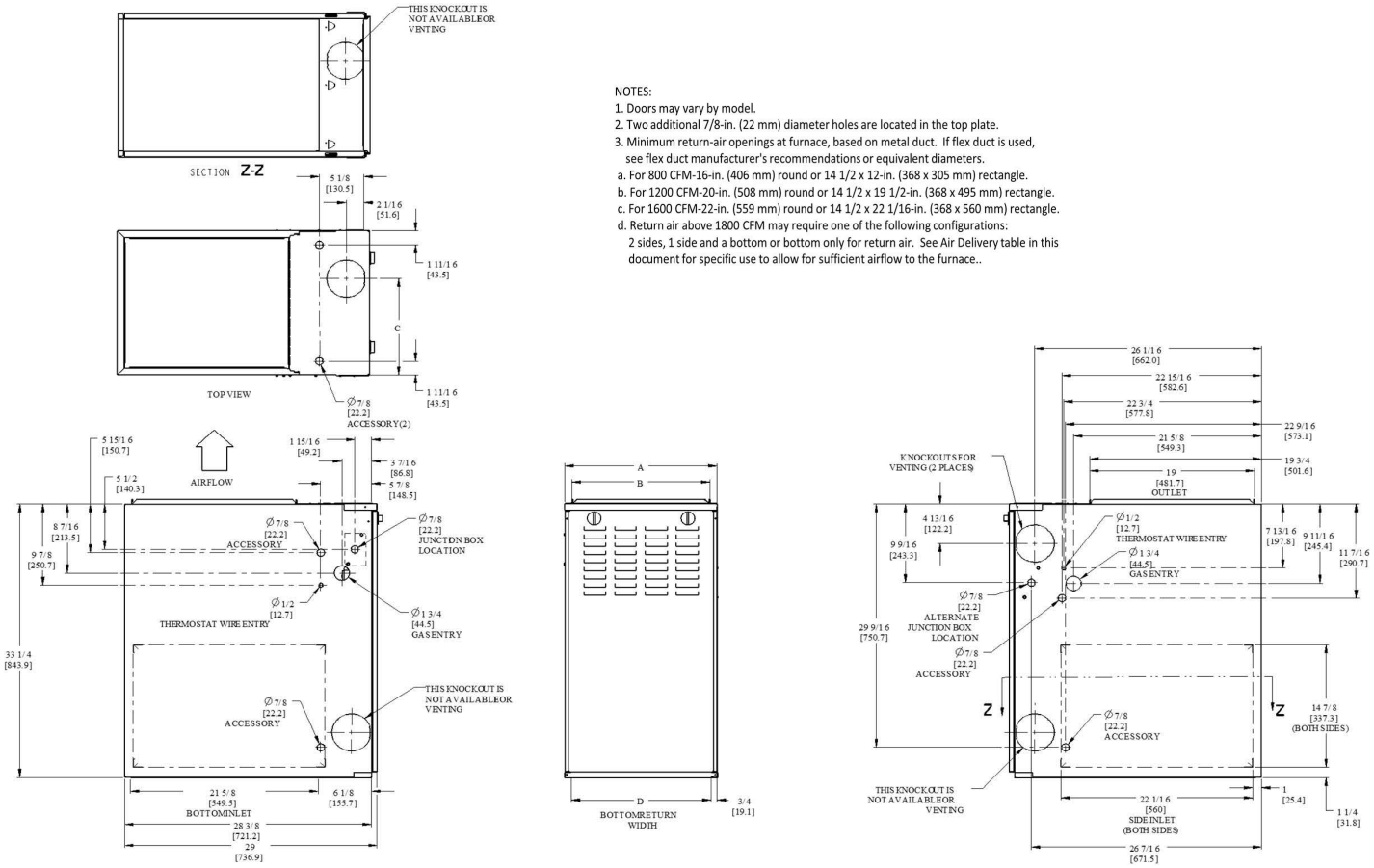
ECM-Electronically Commutated Motor

UNIT DIMENSIONS



NOTES:
1. Doors may vary by model.
2. Two additional 7/8-in. (22 mm) diameter holes are located in the top plate.
3. Minimum return-air openings at furnace, based on metal duct. If flex duct is used, see flex duct manufacturer's recommendations or equivalent diameters.
   a. For 800 CFM-16-in. (406 mm) round or 14 1/2 x 12-in. (368 x 305 mm) rectangle.
   b. For 1200 CFM-20-in. (508 mm) round or 14 1/2 x 19 1/2-in. (368 x 495 mm) rectangle.
   c. For 1600 CFM-22-in. (559 mm) round or 14 1/2 x 22 1/16-in. (368 x 560 mm) rectangle.
   d. Return air above 1800 CFM may require one of the following configurations: 2 sides, 1 side and a bottom or bottom only for return air. See Air Delivery table in this document for specific use to allow for sufficient airflow to the furnace..

NOTE: ALL DIMENSIONS IN INCH (MM) U.S. ECCN: Not Subject to Regulation (N.S.R.)

A190257

FURNACE SIZE	A	B	C	D	VENT CONNECTION SIZE IN. (MM)	SHIP WT LB (KG)
	CABINET WIDTH IN (MM)	OUTLET WIDTH IN (MM)	TOP OUTLET IN (MM)	BOTTOM INLET WIDTH IN (MM)		
F80CSU0401712	17-1/2 (445)	15-7/8 (403)	11-9/16 (294)	16 (406)	4 (102)	123 (56)
F80CSU0601716	17-1/2 (445)	15-7/8 (403)	11-9/16 (294)	16 (406)	4 (102)	130 (59)
F80CSU0802120	21 (533)	19-3/8 (492)	13-5/16 (338)	19-1/2 (495)	4 (102)	144 (65)
F80CSU1002120	21 (533)	19-3/8 (492)	13-5/16 (338)	19-1/2 (495)	4 (102)	154 (70)

Manufacturer reserves the right to change, at any time, specifications and designs without notice and without obligations.

Minimum Clearances to Combustible Materials for All Units

⚠ WARNING

ELECTRIC SHOCK AND MOVING PARTS HAZARD

High voltage and rotating fan blades may be present in blower compartment when door switch is pressed. Keep hands clear.

⚠ WARNING

FIRE, EXPLOSION, ASPHYXIATION HAZARD

Improper adjustment, alteration, service, maintenance, or installation can cause serious injury or death.
Read and follow instructions and precautions in User's Information Manual provided with this furnace. Installation and service must be performed by a qualified service agency or the gas supplier.

⚠ CAUTION

Check entire gas assembly for leaks after lighting this appliance

INSTALLATION

1. This furnace must be installed in accordance with the manufacturer's instructions & local codes. In the absence of local codes, follow the National Fuel Gas Code ANSI Z223.1 / NFPA54 or CSA B-149.1 Gas Installation Code.
2. This furnace must be installed so there are provisions for combustion & ventilation air. See manufacturer's installation information provided with this appliance.

OPERATION

This furnace is equipped with manual reset limit switch(es) in burner compartment to protect against overheat conditions that can result from inadequate combustion air supply or blocked vent conditions.

1. Do not bypass limit switches.
2. If a limit opens, call a qualified serviceman to correct the condition & reset limit switch.

INSTALLATION

MINIMUM INCHES CLEARANCE TO COMBUSTIBLE CONSTRUCTION

This forced air furnace is equipped for use with natural gas at altitudes 0 - 5,400ft (0 - 1,646m). An accessory kit, supplied by the manufacturer, shall be used to convert to propane gas use or may be required for Some natural gas applications. This furnace is for indoor installation in a building constructed on site.This furnace may be installed on combustible flooring in alcove or closet at minimum clearance as indicated in the table from combustible material. This furnace may be used with a Type B-1 Vent and may be vented in common with other gas fired appliances. This furnace is approved for UPFLOW, DOWNFLOW, and HORIZONTAL installations.

	TOP	BOTTOM†	SIDES*	BACK	FRONT∅	VENT	FRONT SERVICE
Inches	1	0	0	0	3	0	24
mm	25.4	0	0	0	76.2	0	610
Vent Clearance to combustibles		Single Wall: 6 inch				Type B-1: 1 inch	

DOWNFLOW POSITIONS:

† Installation on non-combustible floors only. For installation on combustible flooring only when installed on a manufacturer approved special base kit or manufacturer recommended coil assembly.

∅ 18 inches front clearance required for alcove.

* Indicates supply or return sides when furnace is in the horizontal position. Line contact only permissible between lines formed by intersections of the Top and two Sides of the furnace jacket, and building joists, studs or framing.

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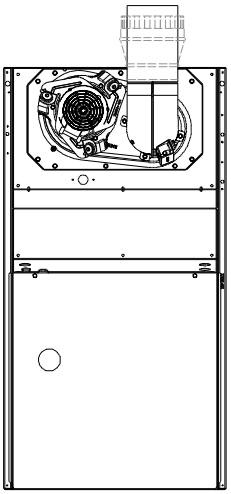
A240399

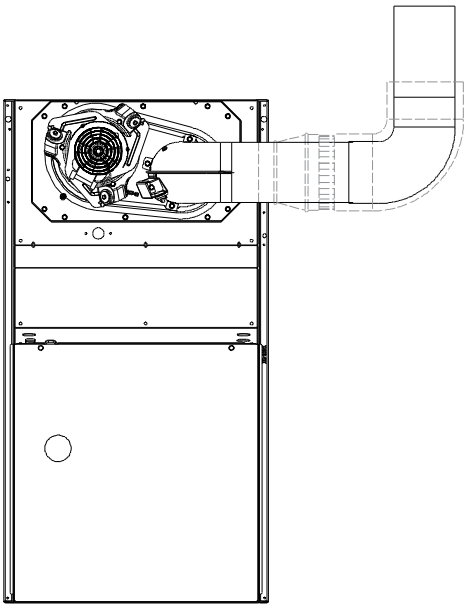
Venting Configurations



SEE NOTES: 1,2,4,7,8,9 on the page following these figures

A03208

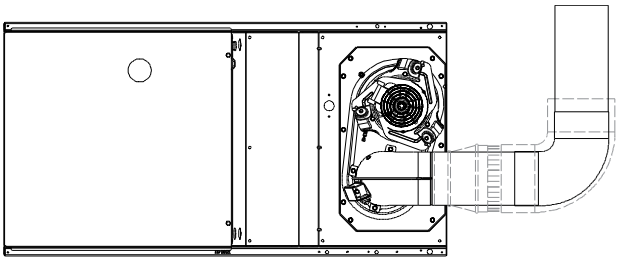
Upflow Application-Vent Elbow Up



SEE NOTES: 1,2,3,4,7,8,9 on the pages following these figures

A03209

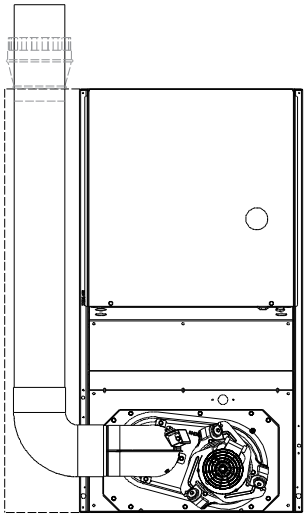
Upflow Application-Vent Elbow Right



SEE NOTES: 1,2,4,7,8,9 on the page following these figures

A03218

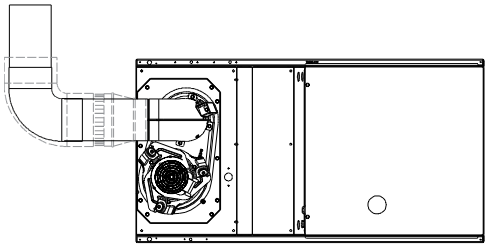
Horizontal Right Application-Vent Elbow Right



SEE NOTES: 1,2,4,5,6,7,8,9 on the page following these figures

A03207

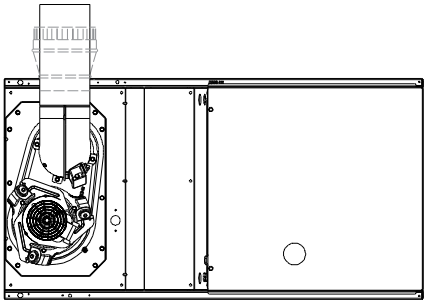
Downflow Application-Vent Elbow Left then Up



SEE NOTES: 1,2,4,7,8,9 on the page following these figures

A03213

Horizontal Left Application-Vent Elbow Left



SEE NOTES: 1,2,4,5,7,8,9 on the page following these figures

A03215

Horizontal Left Application-Vent Elbow Up

Venting Notes

1. For common vent, vent connector sizing and vent material: United States, latest edition of the National Fuel Gas Code (NFGC), NFPA54/ANSI Z223.1.
2. Immediately increase to 5-in. (127 mm) vent connector outside furnace casing when 5-in. (127 mm) vent connector required, refer to Note 1.
3. Side outlet vent for upflow and downflow installations must use Type B vent immediately after exiting the furnace, except when accessory Downflow Vent Guard is used in downflow position.
4. Type B vent where required, refer to Note 1.
5. 4-in. (102 mm) single wall vent must be used inside furnace casing and the Downflow Vent Guard Kit.
6. Accessory Downflow Vent Guard Kit required in downflow installations with bottom vent configuration.
7. Secure vent connector to furnace elbow with (2) corrosion-resistant sheet metal screws, space approximately 180° apart.
8. Secure all other single wall vent connector joints with (3) corrosion-resistant screws spaced approximately 120° apart.
9. Secure Type B vent connectors per vent connector manufacturer's recommendations.

Product Specifications

FURNACE SIZE		0401712	0601716	0802120	1002120
RATINGS AND PERFORMANCE					
Input Btuh*		40,000	60,000	80,000	100,000
Output Capacity (Btuh)†		31,000	48,000	64,000	81,000
AFUE†		80.0	80.0	80.0	80.0
Certified Temperature Rise Range - °F (°C)		25 - 55 (14 - 31)	25 - 55 (14 - 31)	25 - 55 (14 - 31)	25 - 55 (14 - 31)
External Static Pressure (in. w.c.)‡	Heating	.10	.12	.15	.20
	Cooling	.50	.50	.50	.50
Airflow Delivery @ ESP Listed Above (CFM)	Heating	650	1000	1450	1650
	Cooling	505-1490	535-1480	990-2390	1130-2260
ELECTRICAL					
Unit Volts-Hertz-Phase		115-60-1			
Operating Voltage Range	Min-Max	104-127			
Maximum Unit Amps		11.1	11.1	14.4	14.4
Unit Ampacity		14.4	14.4	18.5	18.5
Maximum Wire Length - Measure one way in Ft		25	25	31	31
Minimum Wire Size		14	14	12	12
Maximum Fuse or Ckt Bkr Size (Amps)**		15	15	20	20
Transformer (24v)		40 VA			
External Control Power Available	Heating	12 VA			
	Cooling	35 VA			
Air Conditioning Blower Relay		Standard			
CONTROLS					
Limit Control		SPST			
Heating Blower Control		Solid-State Time Operation			
Gas Connection Size		1/2-in. NPT			
GAS CONTROLS					
Gas Valve (Redundant)	Mfr.	White Rodgers			
	Min. inlet pressure (In. W.C.)	3.5 Natural Gas			
	Max. inlet pressure (In. W.C.)	13.6 Natural Gas			
Ignition Device		Hot Surface Ignitor			
Factory-installed orifice		3.35mm	#18	#10	#6
BLOWER DATA					
Direct-Drive Motor HP		3/4	3/4	1	1
Motor Full Load Amps		8.8	8.8	11.5	11.5
Nominal RPM		1050	1050	1050	1050
Blower Wheel Diameter x Width - In. (mm)		10 x 8 (243 x 203)	11 x 8 (279 x 203)	11 x 11 (279 x 279)	11 x 11 (279 x 279)

*. Gas input ratings are certified for elevations to 5,400 ft. (1646 M). In USA, for elevations above 2,000 ft. (610 M), reduce ratings 2 percent for each 1,000 ft. (305 M) above sea level. Refer to National Fuel Gas Code NFPA 54/ANSI Z223.1 Table F.4 or furnace installation instructions.
†. Capacity in accordance with U.S. Government DOE test procedures.
‡. DOE minimum External Static Pressure
**. Time-delay type is recommended.
ICS = Isolated Combustion System

AIR DELIVERY

Table 1 – 0401712 Airflow in CFM

Setting	External Static Pressure (in.w.c.)									
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
1*	488							†		
2	525									
3	555									
4	600									
5	650									
6	700									
7	740									
8‡	800									
9	875									
10	925									
11	975									
12	1000									
13**	1050									
14	1138									
15	1200									
16	1225									
17	1300									
18	1400									
19	1480									
20	1600									
Constant Fan Airflow (cfm)	Settings 1 - 9 (+488 - 875cfm)									
	Settings above 9 are not recommended									
	Heat Stage									
Setting	High									
Comfort 1	510									
Comfort 2††	565									
Efficiency 1	650									
Efficiency 2	750									

*. Constant Fan Default
†. Operation in the blank region is not recommended because heat operation will exceed 1.0" w.c. ESP.
‡. Low Cooling Default
**. High Cooling Default
††. Heating Default

Table 2 – 0601716 Airflow in CFM

Setting	External Static Pressure (in.w.c.)									
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
1*	488			†						
2	525									
3	555									
4	600									
5	650									
6	700									
7	740									
8	800									
9	875									
10	925									
11	975									
12	1000									
13‡	1050									
14	1138									
15	1200									
16	1225									
17	1300									
18**	1400									
19	1480									
20	1600									
Constant Fan Airflow (cfm)	Settings 1 - 9 (+488 - 875)									
	Settings above 9 are not recommended									
	Heat Stage									
Setting	High									
Comfort 1	785									
Comfort 2††	870									
Efficiency 1	1000									
Efficiency 2	1125									

*. Constant Fan Default
†. Operation in the blank region is not recommended because heat operation will exceed 1.0" w.c. ESP.
‡. Low Cooling Default
**. High Cooling Default
††. Heating Default

Table 3 – 0802120 Airflow in CFM

Setting	External Static Pressure (in.w.c.)									
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
1*	650									
2	700				†					
3	740									
4	800									
5	875									
6	925									
7	975									
8	1000									
9	1050									
10	1138									
11	1200									
12	1225									
13‡	1300									
14	1400									
15	1480									
16	1600									
17	1625									
18**	1750									
19	1850									
20	1910									
21	2000									
22	2100									2060
23	2180							2160	2110	2060
24	2200							2160	2110	2060
Constant Fan Airflow (cfm)	Settings 1 - 9 (+650 - 1050)									
	Settings above 9 are not recommended									
	Heat Stage									
Setting	High									
Comfort 1	1120									
Comfort 2††	1250									
Efficiency 1	1450									
Efficiency 2	1700									

*. Constant Fan Default
†. Operation in the blank region is not recommended because heat operation will exceed 1.0" w.c. ESP.
‡. Low Cooling Default
**. High Cooling Default
††. Heating Default

Table 4 – 1002122 Airflow in CFM

Setting	External Static Pressure (in.w.c.)									
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
1*	650									
2	700					†				
3	740									
4	800									
5	875									
6	925									
7	975									
8	1000									
9	1050									
10	1138									
11	1200									
12	1225									
13‡	1300									
14	1400									
15	1480									
16	1600									
17	1625									
18**	1750									
19	1850									
20	1910									
21	2000								1980	1930
22	2100							2040	1980	1930
23	2180					2155	2100	2040	1980	1930
24	2200					2155	2100	2040	1980	1930
Constant Fan Airflow (cfm)	Settings 1 - 9 (+650 - 1050)									
	Settings above 9 are not recommended									
	Heat Stage									
Setting	High									
Comfort 1	1300									
Comfort 2††	1435									
Efficiency 1	1650									
Efficiency 2	1875									

*. Constant Fan Default
†. Operation in the blank region is not recommended because heat operation will exceed 1.0" w.c. ESP.
‡. Low Cooling Default
**. High Cooling Default
††. Heating Default

ACCESSORIES

PART NUMBER	DESCRIPTION	0401712	0601716	0802120	1002120
SYST0101SW	ION™ System Control	X	X	X	X
NAHA00101MS	Motor Simulator Kit	X	X	X	X
FHG1625-2*	Bottom Filter Rack, 17 inch	X	–	–	–
FHG2025-2*	Bottom Filter Rack, 21 inch	–	X	X	–
325531-402*	Washable filter, 3/4 inch 16" X 25"	X	–	–	–
325531-403*	Washable filter, 3/4 inch 21" X 25"	–	X	X	–
NAHB00101CA	Coil Adapter Kit with NO Offset	X	X	X	X
NAHB00201CA	Coil Adapter Kit with SINGLE Offset	X	X	X	X
NAHB00301CA	Coil Adapter Kit with DOUBLE Offset	X	X	X	X
NAHA01701RA	Return Air Kit, 17" Wide	X	X	–	–
NAHA02101RA	Return Air Kit, 21" Wide	–	–	X	X
NAHA01101SB	Combustible Floor Base (not required when evaporator coil case is used for downflow)	X	X	X	X
NAHB00301VC	Downflow Vent Guard (not required when vent is routed through cabinet)	X	X	X	X
AGAFLTULN01A17	Combustion Air Filter Kit – 17"	X	X	–	–
AGAFLTULN01A21	Combustion Air Filter Kit – 21"	–	–	X	X

*. Purchased through FAST Parts
X = Accessory available

GUIDE SPECIFICATIONS

General

System Description

Furnish a _____ 4-way multipoise gas-fired condensing furnace for use with natural gas or propane (factory-authorized conversion kit required for propane).

Quality Assurance

Unit will be designed, tested and constructed to the current ANSI Z 21.47/CSA 2.3 design standard for gas-fired central furnaces.

Unit will be third party certified by CSA to the current ANSI Z 21.47/CSA 2.3 design standard for gas-fired central furnaces. Unit will carry the CSA Blue Star® and Blue Flame® labels. Unit efficiency testing will be performed per the current DOE test procedure as listed in the Federal Register.

Unit will be certified for capacity and efficiency and listed in the latest AHRI Consumer's Directory of Certified Efficiency Ratings.

Unit will carry the current Federal Trade Commission Energy Guide efficiency label.

Delivery, Storage, and Handling

Unit will be shipped as single package only and is stored and handled per unit manufacturer's recommendations.

Warranty (for inclusion by specifying engineer)

U.S. and Canada only. Warranty certificate available upon request.

Equipment

Blower Wheel and ECM Blower Motor

Galvanized blower wheel shall be centrifugal type, statically and dynamically balanced. Blower motor of ECM type shall be permanently lubricated with sealed ball bearings, of _____HP, and have multiple speeds from 600-1200 RPM operating only when 24-VAC motor inputs are provided. Blower motor shall be direct drive and soft mounted to the blower housing to reduce vibration transmission.

Filters

Furnace shall have reusable-type filters.

Filter shall be _____ in. (mm) x_____ in. (mm).

An accessory highly efficient Media Filter is available as an option. _____ Media Filter.

Casing

Casing shall be of 0.030 in. thickness minimum, pre-painted steel.

Draft Inducer Motor

Draft inducer motor shall be single-speed PSC design.

Primary Heat Exchangers

Primary heat exchangers shall be 3-Pass corrosion-resistant aluminized steel of fold-and-crimp sectional design and applied operating under negative pressure.

Secondary Heat Exchangers

Secondary heat exchangers shall be of a stainless steel flow-through of fin-and-tube design and applied operating under negative pressure.

Controls

Controls shall include a micro-processor-based integrated electronic control board with at least 16 service troubleshooting codes displayed via diagnostic flashing LED light on the control, a self-test feature that checks all major functions of the furnace, and a replaceable automotive-type circuit protection fuse. Multiple operational settings available, including blower speeds for heating and cooling.

Operating Characteristics

Heating capacity shall be _____ Btuh input; _____ Btuh output capacity.

Fuel Gas Efficiency shall be _____AFUE.

Air delivery shall be _____ cfm minimum at 0.50 in. W.C. external static pressure.

Dimensions shall be: depth_____in. (mm); width _____in. (mm); height_____in. (mm) (casing only).

Height shall be_____in. (mm) with A/C coil and _____in. (mm) overall with plenum.

Electrical Requirements

Electrical supply shall be 115 volts, 60 Hz, single-phase (nominal). Minimum wire size shall be _____AWG; maximum fuse size of HACR-type designated circuit breaker shall be _____ amps.

Special Features

Refer to section of the product data identifying accessories and descriptions for specific features and available enhancements.

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