F1 Series
Indoor Air Handling Units
Engineering Catalog

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Features and Options

AAON F1 Series indoor air handling units, for residential and commercial applications, are return air only. The F1 Series air handling unit and AAON CB Series condensing unit have been designed and engineered to work together as a high efficiency system. They can be matched to create a high efficiency cooling split system air conditioner or high efficiency heating and cooling split system heat pump.

Convenience and Serviceability
Each F1 Series air handling is delivered to the jobsite ready for connection to the condensing unit, refrigerant charging, and startup. All components are labeled and connected with color-coded wiring that matches the unit's color-coded wiring diagram. Corrosion and UV resistant condensate drain pans minimize indoor air quality concerns such as rust and water leakage and drain connections at either side of the unit allow flexibility of unit placement.

Reliability
The F1 Series air handling unit cabinet is constructed entirely of embossed G90 galvanized steel to provide strength and durability. The forward curved supply fan is powered by a direct drive, variable speed, Electrically Commutated Motor (ECM), eliminating the need to adjust or replace belts.

Efficiency
ECM technology is not only reliable, but ultra-high efficiency, dramatically increasing the unit's SEER ratings. The electronically controlled motor quietly varies fan speed to maintain air volume, provide exceptional temperature control, and consistent comfort.

Environmentally Friendly
AAON designed and engineered the F1 air handler with the future in mind. Non-ozone depleting R-410A refrigerant, which is unaffected by refrigerant phase-out, is standard for the air handler, making it both environmentally friendly and maintainable.

Modulating Hot Gas Reheat Option
Humidity control option that minimizes temperature swings during dehumidification. Moisture related indoor air quality issues are minimized by reducing space humidity without sacrificing occupant comfort.

Split System Heat Pump Option
Energy efficient heating option that allows split system to be able to provide on demand heating and cooling with the refrigeration circuit. Option is available as a matched split system with a CB Series condensing unit and an F1 Series air handling unit.

Painted Cabinet Option
The F1 Series cabinet exterior can be painted to provide the unit with an attractive finish.

Application Options
The standard F1 Series air handler provides vertical upflow supply. The multi-position configuration option is designed to provide the unit with placement flexibility, allowing the unit to be able to supply air vertically (upflow), or by placing the unit on its side, to supply air horizontally.

Heating Options
An air conditioning or heat pump system can be enhanced with electric resistance heaters to provide up to 25 kW of electric heat. A hot water heating coil option is also offered on the F1 Series air handling unit.

The AAON F1 and CB Series Residential Matched Split System

The Importance of a Matched System
AAON quality components are designed to work with other brands, but replacing only one component means that you may not experience all that a matched system has to offer. Investing in AAON matched components is the best way to ensure the ultimate in home comfort, consistent performance and lower energy consumption than any other system can provide.

AAON F1 Series air handling units have been engineered to provide quiet, energy efficient, total home comfort.

Humidity Control
The AAON exclusive Modulating Hot Gas Reheat Dehumidification System represents the ultimate in comfort. The unit can dehumidify your whole home while still maintaining the desired temperature. By adding a specialized AAON control sequence and a special coil specifically designed for humidity control applications, the AAON matched system controls both temperature and humidity independently, to provide total comfort unmatched by any other system on the market.

Enhanced Air Flow
By only operating the fan at higher speeds when required by a large cooling requirement, the indoor unit operates quieter and provides better dehumidification than other systems.

Quick and Convenient Access
Electrical, refrigeration and filter components are easily accessible through the front of the unit.

Economical Operation
Increased efficiency may substantially lower your home heating and cooling costs.

Two Stage Cooling
Two stages of cooling meet any outdoor climate conditions, supply consistent interior comfort and provide improved humidity control.

Durable Construction
Components are selected to provide long-lasting performance and reliability.

Environmentally Friendly
AAON residential products never contain the refrigerant R-22. AAON uses refrigerant R-410A, which contains no chlorine, so it is not damaging to the atmosphere's ozone layer.

Figure 1 - CB Series Condensing Unit

F1 Series Feature String Nomenclature

Model Options : Unit Feature Options

GEN	MJREV	UNIT SIZE	VLT	APPLIC	HEAT	1	2	3	4	5	6	7	8	9	10
F1	- B -	060	- 1 -	M	- C :	C	0	0	0	C	0	0	0	0	0

BASE MODEL

SERIES AND GENERATION
F1

REVISION
A = Design Sequence

UNIT SIZE
024 = 24 MBtu/h (2 ton)
036 = 36 MBtu/h (3 ton)
048 = 48 MBtu/h (4 ton)
060 = 60 MBtu/h (5 ton)

VOLTAGE
1 = 208-230V/1Φ/60Hz

APPLICATION
V = Vertical Position (Upflow)
M = Multi-Position (Upflow or Horizontal)

HEATING
0 = No Heat
A = 5 kW
B = 10 kW
C = 15 kW
D = 20 kW
E = 25 kW
G = Hot Water Heating

FEATURE 1: MOTORS
A = ECM - 1/2 hp
B = ECM - 3/4 hp
C = ECM - 1.0 hp

FEATURE 2: FILTERS
0 = Standard - 1" Fiberglass

FEATURE 3: CONTROLS
0 = Standard - Terminal Block

FEATURE 4: BLANK
0 = Standard

FEATURE 5: REFRIGERATION
0 = Standard - Split System Air Conditioner
C = Split System Heat Pump
D = Split System Air Conditioner + Modulating Hot Gas Reheat
F = Split System Heat Pump + Modulating Hot Gas Reheat

FEATURE 6: BLANK
0 = Standard

FEATURE 7: BLANK
0 = Standard

FEATURE 8: BLANK
0 = Standard

FEATURE 9: CABINET
0 = Standard - Embossed Galvanized Steel
A = Painted Cabinet Exterior

FEATURE 10: SPECIAL
0 = Standard
X = Special Price Authorization

Model Number
Revision

Example: F1-**B**-060-1-M-C:C000C00000

B = *Design Sequence* - This digit is used for future product updates, improvements, and revisions.

Model Number
Unit Size

Example: F1-B-**060**-1-M-C:C000C00000

The unit size designates nominal MBtu/h cooling capacity when matched with a comparable condensing unit at standard conditions (95°F Ambient, 45°F Saturated Suction). Actual capacities will vary with application conditions.

Table M1 - Unit Sizes

Model	Nominal Values		
	MBtu/h	tons	cfm
F1-**024**	24	2	800
F1-**036**	36	3	1200
F1-**048**	48	4	1600
F1-**060**	60	5	2000

Model Number
Voltage

Example: F1-B-060-**1**-M-C:C000C00000

All units have single point power blocks with grounding lugs, 24 VAC control circuits, and branch circuit fusing.

1 = 208-230V/1Φ/60Hz

Model Number
Application

Example: F1-B-060-1-**M**-C:C000C00000

V = *Vertical (Upflow)* - Vertical air handler cabinet with top supply air connection, with duct flange.
M = *Multi-Position (Upflow or Horizontal)* - Multi-position cabinet option that allows the unit to be installed with top supply air connection, with duct flange or horizontal supply air connection, with duct flange. Factory installed condensate drain pans and connections provide for either configuration.

Model Number
Heating

Example: F1-B-060-1-M-**C**:C000C00000

0 = *No Heat*
***A** = 5 kW *Electric Heat* - Single element heater with 5kW element for 230V (3.75kW for 208V). The 5 kW option is single stage heating.
***B** = *10 kW Electric Heat* - Multiple element heater with one 10kW element for 230V (7.5kW for 208V). The 10kW option is single stage heating.
***C** = *15 kW Electric Heat* - Multiple element heater with one 10kW and one 5kW element for 230V (7.5kW and 3.75kW for 208V). The 15 kW option is two stage heating.
***D** = *20 kW Electric Heat* - Multiple element heater with two 10kW elements for 230V (7.5kW for 208V). The 20 kW option is two stage heating.
***E** = *25 kW Electric Heat* - Multiple element heater with two 10kW elements and one 5kW element for 230V (7.5kW and 3.75kW for 208V). The 25 kW option is three stage heating, with W1 and W2 terminals and a time delayed third stage.
G = *Hot Water Heating Coil* - Aluminum finned copper tube hot water heating coil. Control valves must be field provided. Not available on units with modulating hot gas reheat (Feature 5 = D or F).

*Field power wiring to each electric heat circuit breaker is required.

Note: For commercial applications, AAONEcat32™ will calculate the heating size for electric heat and choose the correct heating option, if any of the electric heat options are selected, based on the desired leaving air and entering air temperature conditions.

Feature 1
Motors

Example: F1-B-060-1-M-C:**B**000C00000

A = *ECM - 1/2 hp* - The supply blower is powered by an ultra-high efficiency, direct drive, electronically commutated motor (ECM) that provides quiet operation, low power consumption, and increased SEER when compared to induction motors. The motor is inherently variable, adjusting fan speed to maintain airflow. Standard size motor for F1-024 and F1-036.
B = *ECM - 3/4 hp* - Same as option A except standard size motor for F1-048 and F1-060. Optional high static pressure motor for F1-024 and F1-036.
C = *ECM - 1.0 hp* - Same as option A except optional high static pressure motor for F1-048 and F1-060.

Note: For commercial applications, AAONECat32™ will select the correct option for Feature 1 based on unit conditions and the input from the fan selection program. When all of the other features have been selected, you will be prompted to select the supply blower motor under the "Fan Selection" window. Fan curves will also be available for viewing.

Feature 2
Filters

Example: F1-B-060-1-M-C:C**0**00C00000

0 = *Standard - 1" Fiberglass* - Unit filter frame with replaceable 1" thick fiberglass air filter.

Feature 3
Controls

Example: F1-B-060-1-M-C:C0**0**0C00000

0 = *Standard - Terminal Block* - Terminal block for power and thermostat/humidistat controls wiring. Electrical safeties include internal fan motor overload protection and branch circuit fusing.

Feature 4
Blank

Example: F1-B-060-1-M-C:C00**0**C00000

0 = *Standard*

Feature 5
Refrigeration

Example: F1-B-060-1-M-C:C000**C**00000

0 = *Split System Air Conditioner* - Split system air conditioner for energy efficient cooling. Liquid line filter dryer is factory provided and field installed with the CB Series condensing unit.
***C** = *Split System Heat Pump* - Factory installed reversing valve in the matching CB Series condensing unit along with heat pump TXV valves, on both the F1 and CB coils, allows the indoor coil to act as the condenser and the outdoor coil to act as the evaporator for energy efficient heating, in addition to energy efficient cooling. CB Series condensing unit also includes factory installed suction line accumulator and factory provided and field installed heat pump liquid line filter dryer and liquid line receiver tank.
***D** = *Split System Air Conditioner + Modulating Hot Gas Reheat* - Factory installed reheat coil mounted downstream of the evaporator coil with modulating control valves in the matching CB Series condensing unit which together provide humidity control. Digital controller and modulating valves control the flow of refrigerant to the reheat coil to maintain precise supply air temperature during dehumidification. A thermostat with a built in humidistat (Normally Closed) or standalone wall mounted space humidistat (NC) is required and available as an accessory. Liquid line filter dryer, liquid line receiver tank, reheat coil check valve, and liquid line check valve are factory provided and field installed. Requires field installation of a hot gas line from CB Series condensing unit to reheat coil (See F1 or CB IOM for installation details). Field installed suction line accumulator is recommended.
***F =** *Split System Heat Pump + Modulating Hot Gas Reheat* - Options C + D. A thermostat with a built in humidistat (Normally Closed) or standalone wall mounted space humidistat (NC) is required and available as an accessory. Heat pump liquid line filter dryer, liquid line receiver tank, and reheat coil check valve are factory provided and field installed. Requires field installation of a hot gas line from CB Series condensing unit to reheat coil (See F1 or CB IOM for installation details). CB Series condensing unit includes factory installed suction line accumulator.

*These options are available with the selection of a matching CB Series condensing unit.

Feature 6
Blank

Example: F1-B-060-1-M-C:C000C**0**0000

0 = *Standard*

Feature 7
Blank

Example: F1-B-060-1-M-C:C000C0**0**000

0 = *Standard*

Feature 8
Blank

Example: F1-B-060-1-M-C:C000C00**0**00

0 = *Standard*

Feature 9
Cabinet

Example: F1-B-060-1-M-C:C000C000**0**0

0 = *Standard - Embossed Galvanized Steel* - Single wall embossed G90 galvanized steel cabinet construction with 1/2", 1.5 lb./ft^3 foil faced insulation. Corrosion and UV resistant drain pans.
A = *Painted Cabinet Exterior* - Single wall embossed G90 galvanized steel cabinet construction with 1/2", 1.5 lb./ft^3 foil faced insulation. Corrosion and UV resistant drain pans. Cabinet exterior is primer washed then spray coated with a two part polyurethane, heat-baked exterior paint. The paint is gray in color and is capable of withstanding at least 2,500 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with the ASTM B117-95 test procedure.

Feature 10
Type

Example: F1-B-060-1-M-C:C000C0000**0**

0 = *Standard*
X = *Special Price Authorization* - The Applications Department must issue a Special Pricing Authorization (SPA) to include a non-standard option.

General Data
Unit Information

Table 1 - F1 Series Unit Information

	F1-024	F1-036	F1-048	F1-060
Supply Blower				
Type/Diameter	FC (Forward Curved)/9”		FC/10”	
Standard Motor	1/2 hp		3/4 hp	
High Static Application Motor	3/4 hp		1 hp	
Nominal CFM	800	1200	1600	2000
Evaporator A-Coil				
Refrigerant	R-410A			
Coil Face Area	4.89 ft^2		6.07 ft^2	
Rows/FPI	3/15		3/12	
Electric Heat				
kW Capacity - 230 V	5, 10	5, 10, 15	5, 10, 15, 20	5, 10, 15, 20, 25
kW Capacity - 208V	3.75, 7.5	3.75, 7.5, 11.25	3.75, 7.5, 11.25, 15	3.75, 7.5, 11.25, 15, 18.75
Stages	5, 10 kW - 1 stage / 15, 20 - 2 stage / 25 kW - 3 stage			
Hot Water Coil				
Coil Face Area	1.56 ft^2		2.07 ft^2	
Rows/FPI	4/14		2/10	
Condensate Drain	3/4” Connection			
Air Filter	20” x 20” x 1”			

Table 2 - Matching CB Unit Information

	CB-024	CB-036	CB-048	CB-060
Compressor				
Type	R-410A Two Step Scroll			
Number/Nominal Tons	1/2	1/3	1/4	1/5
Crankcase Heater	Yes			
Condenser Fan				
Number/Diameter	1/22”		1/26”	
hp	1/3			
Condenser Coil				
Rows	1			
Liquid Line Connection	3/8”			
Suction Line Connection	3/4”		7/8”	
Nominal Unit Weight (lbs.)	257		306	

Electrical Information

Table 3 - F1 Supply Blower and Unit Electrical Information

Unit Voltage	Supply Fan		Unit		
	hp	FLA	FLA	MCA	MOP
208-230V/1Φ	0.5	4.2	4.2	5.0	15.0
	0.75	5.4	5.4	7.0	15.0
	1.0	8.0	8.0	10.0	15.0

Table 4 - F1 Electric Heat Electrical Information

Unit Voltage	kW	Circuit #	Amps	MCA	MOP
208-230V/1Φ	5	1	21	26.0	30
	10	1	42	52.1	60
	15	1	42	52.1	60
		2	21	26.0	30
	20	1	42	52.1	60
		2	42	52.1	60
	25	1	42	52.1	60
		2	42	52.1	60
		3	21	26.0	30

Table 5 - Matching CB Electrical Information

Model	Voltage	Unit			Compressor	Condenser Fan
		FLA	MCA	MOP	Quantity / RLA	Quantity / hp / FLA
CB-024	208-230/1Φ	13	16	25	1 / 10.3	1 / 0.33 / 2.8
CB-036		20	24	40	1 / 16.7	
CB-048		24	29	50	1 / 21.2	
CB-060		28	35	60	1 / 25.6	

9” Supply Blower Fan Curves

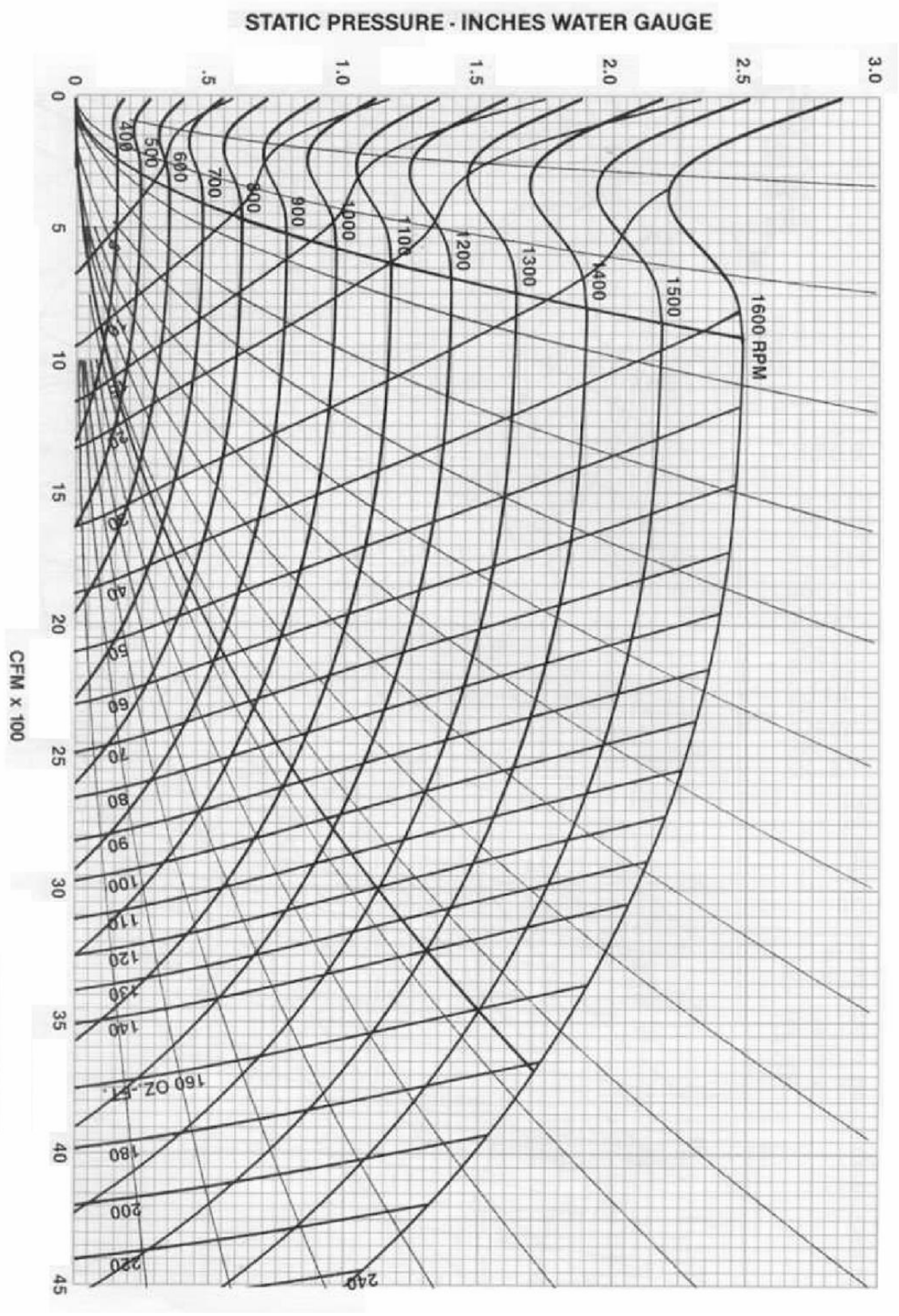

Figure F1 - Standard Fan Curves for F1-024,036

10” Supply Blower Fan Curves

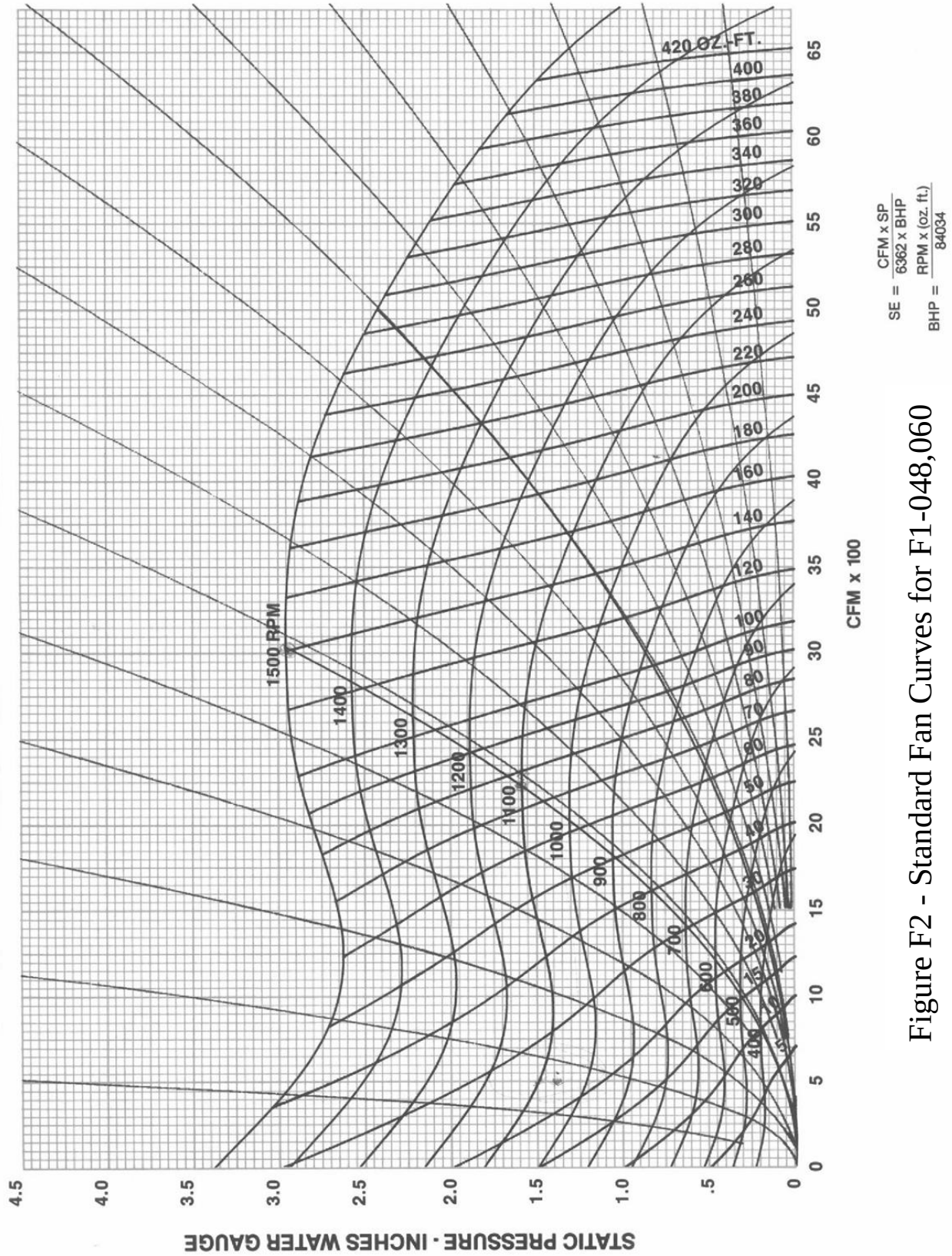

Figure F2 - Standard Fan Curves for F1-048,060

Performance Data

Table 6 - Matching CB and F1 Air Conditioner Performance Information

Condensing Unit	Air Handler	Nominal Capacity	SEER/EER
CB-024	F1-024	25.8 MBH	17.30 / 13.80
CB-036	F1-036	37.0 MBH	16.00 / 12.20
CB-048	F1-048	49.0 MBH	16.20 / 12.55
CB-060	F1-060	58.5 MBH	14.60 / 10.65

Table 7 - Matching CB and F1 Heat Pump Performance Information

Condensing Unit	Air Handler	Nominal Heat Capacity	SEER/EER	HSPF
CB-024	F1-024	26.6 MBH	16.00 / 13.05	9.30
CB-036	F1-036	37.2 MBH	15.25 / 12.00	9.60
CB-048	F1-048	49.5 MBH	14.60 / 9.55	8.20
CB-060	F1-060	62.5 MBH	14.00 / 10.30	8.70

Literature Change History

November 2013
Updated performance data and Longview address.

October 2017
Removed references to AU Series A Coils, 115V option, and hot water heating-no cooling options.
Updated paint specifications.

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