

**FF1E  
Base Series Fan Coil  
Sizes 018 thru 036**



Turn to the Experts.™

## Product Data

### FEATURES



The FF1E Series Fan Coil unit is primarily designed for apartment applications as upflow indoor air handlers for split-system heat pumps and air conditioners for use with either Puron® or R-22 refrigerant. They are available with factory- or field-installed electric heaters, both of which include the disconnect. A field-installed cooling control with disconnect is also available. A TDR (Time Delay Relay) is included with either the electric heat or the cooling control packages. Both models are available with a factory-installed TXV, Puron or R-22 refrigerant.

This fan coil may be installed free-standing, wall hung or flush mounted in the wall. The 22-in. wide cabinet size in all models allows units to fit between standard stud spacings. No return-air ductwork is required if the application provides for return air in the front of the cabinet through either a louvered closet door or an optional accessory decorative grille panel.

The cabinet exterior is made of pre-painted galvanized sheet metal. The cabinet is fully insulated to meet applications in conditioned space. Additional insulation is required if the unit is installed in an unconditioned space. The unit is supplied with a replaceable filter.

Multispeed, direct-drive, PSC blower motors have been selected to provide the proper air handling for both heating and cooling. Motors are suspended at three points on rubber grommets for quieter operation.

All refrigerant lines, electrical power, and thermostat wiring enter from the top of the cabinet. Sweat-type refrigerant connections on both liquid and suction lines make for swift, low-cost installation. All service access to the unit is conveniently located in the front.

All units come with a factory-supplied hard-shutoff thermostatic expansion valve (TXV) metering device for performance improvement.

The drain pan is constructed of high-impact, sound-deadening, corrosion-proof polyester resin. Primary and secondary drain connections exit from the bottom or either side of the cabinet.

**FF1E**

**NOMENCLATURE CHART  
CARRIER FAN COILS**

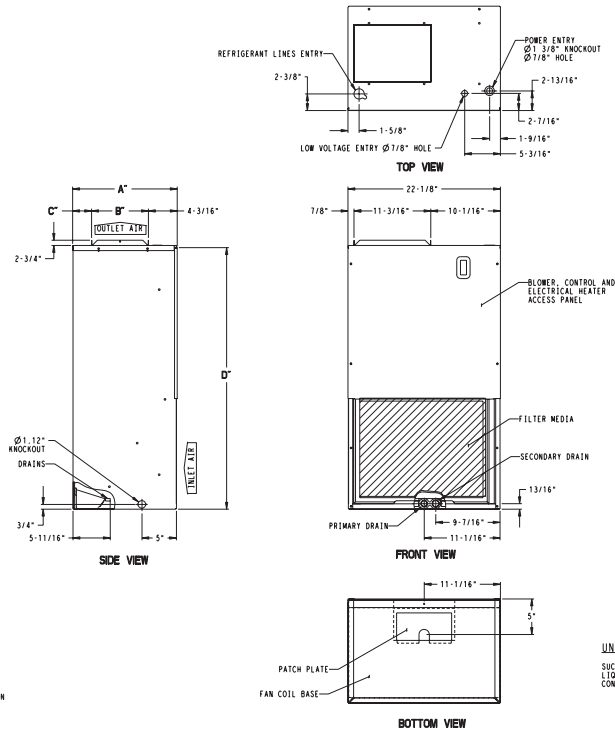
1	2	3	4	5	6	7, 8, 9	10, 11, 12	13	14	15	16
F	F	1	E	N	P	030	000	A	A	A	A
Product Series	Type	Position	Major Series	Electrical	Cabinet/Insulation	Nominal Capacity (Btu)	Heating Size (kW)	Variations			
F = Fan Coil	F = Apartment	1 = Upflow	E	N = 208/230v-1ph-60hz	P = Puron TXV E = R-22 TXV	018 = 18,000 024 = 24,000 030 = 30,000 036 = 36,000	000 - no heat 005 - 5 kW 075 - 7.5 kW 011 - 11 kW				



ISO 9001:2000



Certification applies only when the complete system is listed with ARI.



NOTE:  
 1. SERIES DESIGNATION IS THE 14TH POSITION OF THE UNIT NUMBER.

**UNIT CONNECTION SIZES**  
 SUCTION: 018, 024, 030, 036 - 3/4" I.D. SWEAT  
 LIQUID: 3/8" I.D. SWEAT  
 CONDENSATE: 3/4" NPT

A05415

### DIMENSIONS

UNIT	SERIES	A (IN.)	B (IN.)	C (IN.)	D (IN.)
FF1EN(P,E)018	A	15-3/16	8-1/4	2-3/4	38-1/16
FF1EN(P,E)024	A	15-3/16	8-1/4	2-3/4	38-1/16
FF1EN(P,E)030	A	15-3/16	8-1/4	2-3/4	38-1/16
FF1EN(P,E)036	A	18-3/8	9-1/4	5	43-3/16

## PHYSICAL DATA

ODS CATALOG ORDERING NO.	FACTORY-INSTALLED HEAT (kW)	FACTORY SUPPLIED DISCONNECTS	NOMINAL COOLING CAPACITY (BTUH)	HEIGHT (IN.)	WIDTH (IN.)	DEPTH (IN.)	SHIPPING WEIGHT (LB.)
FF1EN(P,E)018000	Bare Box	N/A	18,000	38-1/16	22-1/8	15-3/16	85
FF1EN(P,E)018005	5	STD					90
FF1EN(P,E)018075	7.5	STD					90
FF1EN(P,E)018011	11	STD					90
FF1EN(P,E)024000	Bare Box	N/A	24,000	38-1/16	22-1/8	15-3/16	87
FF1EN(P,E)024005	5	STD					92
FF1EN(P,E)024075	7.5	STD					92
FF1EN(P,E)024011	11	STD					92
FF1EN(P,E)030000	Bare Box	N/A	30,000	38-1/16	22-1/8	15-3/16	90
FF1EN(P,E)030005	5	STD					95
FF1EN(P,E)030075	7.5	STD					95
FF1EN(P,E)030011	11	STD					95
FF1EN(P,E)036000	Bare Box	N/A	36,000	43-3/16	22-1/8	18-3/8	105
FF1EN(P,E)036005	5	STD					110
FF1EN(P,E)036075	7.5	STD					110
FF1EN(P,E)036011	11	STD					110

## SPECIFICATIONS

MODEL FF1E	018	024	030	036
<b>REFRIGERANT METERING DEVICE</b>	TXV – factory-installed hard-shutoff, bi-flow type for heat pump application			
<b>TXV SIZE</b>	3 ton for R-22			
	2 ton for Puron (R-410A)		3 ton for Puron (R-410A)	
Rows/Fins Per In.	3 / 14.5			
Height x Width (In.)	18 x 17.8	22 x 17.8		28 x 17.8
Face Area (Sq Ft)	2.23	2.72		3.46
Configuration	Slope			
<b>BLOWER &amp; MOTOR</b>				
Air Discharge	Upflow			
Blower Type	Direct Drive			
Wheel Size (In.)	10 X 6			10 X 7
CFM (Nominal)	600	800	1000	1200
Motor Type	PSC	PSC	PSC	PSC
Motor Hp	1/5	1/5	1/3	1/3
Motor Speeds	2			
<b>FILTER Cleanable (In.)</b>	16 X 20 X 1			20 X 20 X 1
<b>CONNECTIONS (Sweat)</b>				
Suction	3/4			
Liquid	3/8			
Condensate (FPT)	3/4			

## PERFORMANCE DATA

### AIRFLOW PERFORMANCE (CFM)

Model & Size	Blower Speed	0.10	0.20	0.30	0.40	0.50	0.60
018	High	995	955	910	862	811	–
	Low	738	711	678	641	600	–
024	High	950	908	861	810	754	693
	Low	732	699	662	621	576	527
030	High	1128	1082	1030	973	911	845
	Low	1053	1011	964	911	854	791
036	High	1408	1355	1295	1227	1152	1068
	Low	1191	1157	1113	1061	1000	931

**NOTE:**

- Airflow based upon dry coil at 230v with factory approved filter and electric heater (2 element heater sizes 18 through 36).
- Not recommended for use above 0.60 in. external static pressure.
- Shading – Airflow outside 450 cfm/ton.

# GROSS COOLING CAPACITIES (mbh)

UNIT SIZE	INDOOR COIL AIR		SATURATED TEMPERATURE LEAVING EVAPORATOR (°F)														
			35			40			45			50			55		
	CFM	EWB	TC	SHC	BF	TC	SHC	BF	TC	SHC	BF	TC	SHC	BF	TC	SHC	BF
FF1ENP 018	525	72	40	20	0.00	36	18	0.00	32	16	0.00	27	14	0.02	21	11	0.02
		67	33	20	0.02	29	18	0.02	24	16	0.03	20	14	0.03	14	12	0.03
		62	27	21	0.03	22	18	0.03	18	16	0.03	14	14	0.08	12	12	0.22
	600	72	44	22	0.00	40	20	0.00	35	17	0.01	30	15	0.02	24	13	0.03
		67	36	22	0.03	32	20	0.03	27	18	0.03	22	15	0.04	16	13	0.04
		62	29	23	0.04	25	21	0.04	20	18	0.04	16	16	0.10	13	13	0.24
	675	72	48	24	0.00	43	21	0.00	38	19	0.02	32	16	0.03	26	14	0.04
		67	40	25	0.04	35	22	0.04	29	19	0.04	23	17	0.04	17	14	0.05
		62	32	25	0.05	27	23	0.05	22	20	0.05	17	17	0.11	14	14	0.26
FF1ENP 024	700	72	52	26	0.00	47	23	0.00	41	20	0.01	34	18	0.02	28	15	0.03
		67	43	26	0.03	37	23	0.03	32	21	0.03	25	18	0.03	18	15	0.04
		62	34	27	0.03	29	24	0.03	23	21	0.04	18	18	0.09	15	15	0.24
	800	72	57	28	0.01	52	26	0.00	45	23	0.02	38	20	0.03	30	16	0.03
		67	47	29	0.04	41	26	0.04	35	23	0.04	28	20	0.04	20	17	0.05
		62	38	30	0.04	32	27	0.04	26	24	0.05	20	20	0.11	17	17	0.25
	900	72	63	31	0.00	56	28	0.00	49	25	0.03	41	21	0.04	33	18	0.04
		67	51	32	0.05	45	29	0.05	38	25	0.05	30	22	0.05	22	19	0.06
		62	41	33	0.05	35	29	0.05	28	26	0.06	22	22	0.13	19	19	0.27
FF1ENP 030	875	72	60	30	0.00	54	27	0.00	47	24	0.03	40	20	0.04	32	17	0.04
		67	50	31	0.04	43	27	0.05	37	24	0.05	29	21	0.05	21	18	0.05
		62	40	31	0.05	34	28	0.05	27	25	0.06	22	22	0.12	18	18	0.27
	1000	72	66	33	0.00	59	29	0.01	52	26	0.04	44	22	0.05	35	19	0.05
		67	54	34	0.06	47	30	0.06	40	27	0.06	32	23	0.06	23	20	0.07
		62	44	35	0.06	37	31	0.07	30	28	0.07	24	24	0.15	20	20	0.29
	1100	72	71	35	0.00	63	31	0.02	55	28	0.05	46	24	0.06	37	20	0.06
		67	58	36	0.06	51	33	0.07	43	29	0.07	34	25	0.07	25	21	0.08
		62	47	37	0.07	39	34	0.07	32	30	0.08	26	26	0.17	22	22	0.30
FF1ENP 036	1050	72	80	39	0.01	71	35	0.00	62	31	0.02	52	27	0.03	42	23	0.04
		67	65	40	0.04	57	36	0.04	48	32	0.04	38	28	0.05	28	23	0.05
		62	52	41	0.05	44	37	0.05	35	33	0.05	28	28	0.11	24	24	0.26
	1200	72	88	43	0.00	78	39	0.00	68	34	0.03	58	30	0.04	46	25	0.05
		67	72	45	0.05	63	40	0.05	53	35	0.06	42	31	0.06	30	26	0.06
		62	58	46	0.06	49	41	0.06	39	36	0.07	31	31	0.14	26	26	0.28
	1350	72	95	47	0.00	85	42	0.02	74	37	0.05	62	32	0.06	49	27	0.06
		67	78	49	0.06	68	44	0.06	57	39	0.07	45	34	0.07	33	28	0.07
		62	63	50	0.07	53	45	0.07	42	40	0.08	34	34	0.16	29	29	0.30
FF1ENE 018	525	72	38	19	0.00	35	17	0.00	30	15	0.01	26	13	0.02	21	11	0.02
		67	32	20	0.02	28	18	0.02	24	16	0.03	19	14	0.03	13	12	0.03
		62	26	20	0.03	22	18	0.03	18	16	0.04	14	14	0.11	12	12	0.26
	600	72	42	21	0.00	38	19	0.00	33	17	0.02	28	15	0.02	23	13	0.03
		67	35	22	0.03	30	20	0.03	26	18	0.03	21	15	0.03	15	13	0.04
		62	28	22	0.04	24	20	0.04	19	18	0.05	16	16	0.13	13	13	0.28
	675	72	45	22	0.00	41	20	0.02	36	18	0.03	30	16	0.03	24	14	0.04
		67	37	23	0.04	33	21	0.04	28	19	0.04	22	17	0.04	16	14	0.05
		62	30	25	0.05	26	22	0.05	21	20	0.06	17	17	0.15	14	14	0.30
FF1ENE 024	700	72	49	24	0.00	44	22	0.00	39	20	0.01	33	17	0.02	26	14	0.03
		67	41	25	0.03	36	23	0.03	30	20	0.03	24	18	0.03	17	15	0.04
		62	33	26	0.03	28	24	0.03	22	21	0.04	18	18	0.13	15	15	0.28
	800	72	54	27	0.00	49	24	0.01	43	22	0.03	36	19	0.03	29	16	0.03
		67	45	28	0.04	39	25	0.04	33	23	0.04	26	20	0.04	19	17	0.05
		62	36	29	0.04	31	26	0.05	25	23	0.06	20	20	0.15	17	17	0.29
	900	72	58	29	0.00	52	26	0.02	46	23	0.04	39	20	0.04	31	17	0.04
		67	48	30	0.05	42	27	0.05	36	25	0.05	29	22	0.05	20	18	0.06
		62	39	32	0.05	33	29	0.06	27	26	0.07	22	22	0.17	18	18	0.31
FF1ENE 030	875	72	58	29	0.00	52	26	0.02	46	23	0.03	39	20	0.04	31	17	0.04
		67	48	30	0.04	42	27	0.05	36	25	0.05	29	22	0.05	20	18	0.06
		62	39	32	0.05	33	29	0.05	27	26	0.07	22	22	0.16	18	18	0.31
	1000	72	63	31	0.01	57	28	0.03	50	25	0.05	42	22	0.05	34	19	0.05
		67	52	33	0.06	46	30	0.06	39	27	0.06	31	24	0.06	22	20	0.08
		62	42	35	0.06	36	32	0.07	29	28	0.08	24	24	0.19	20	20	0.33
	1100	72	67	33	0.03	60	30	0.05	53	27	0.05	45	24	0.06	35	20	0.06
		67	55	35	0.06	49	32	0.07	41	29	0.07	33	25	0.07	24	22	0.09
		62	45	37	0.07	38	34	0.08	31	31	0.10	26	26	0.21	22	22	0.34
FF1ENE 036	1050	72	72	36	0.00	65	32	0.01	56	28	0.03	48	25	0.03	37	21	0.04
		67	59	37	0.04	52	33	0.04	44	30	0.04	34	26	0.04	24	21	0.06
		62	48	38	0.05	40	35	0.05	32	31	0.06	26	26	0.16	22	22	0.31
	1200	72	79	39	0.00	71	35	0.03	62	31	0.04	52	27	0.05	41	23	0.05
		67	65	41	0.05	57	37	0.05	48	33	0.06	38	29	0.06	26	24	0.07
		62	52	42	0.06	44	38	0.06	36	34	0.08	29	29	0.18	24	24	0.33
	1350	72	85	42	0.01	76	38	0.04	66	34	0.05	55	29	0.06	44	25	0.06
		67	70	44	0.06	61	40	0.06	51	36	0.07	41	31	0.07	28	26	0.09
		62	56	46	0.07	48	42	0.07	39	37	0.09	32	32	0.20	26	26	0.34

FF1E

CFM - Cubic Ft. per Minute      EWB - Entering Wet Bulb (°F)      LWB - Leaving Wet Bulb (°F)      TC - Gross Cooling Capacity 1000 Btuh  
 SHC - Gross Sensible Capacity 1000 Btuh      BF - Bypass Factor      MBH - 1000 Btuh

NOTES:

- Contact manufacturer for cooling capacities at conditions other than shown in table.
- Formulas:  
 Leaving db = entering db -  $\frac{\text{sensible heat cap.}}{1.09 \times \text{CFM}}$   
 Leaving wb = wb corresponding to enthalpy of air leaving coil ( $h_{lwb}$ )  
 $h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{CFM}}$   
 where  $h_{ewb}$  = enthalpy of air entering coil. Direct interpolation is permissible. Do not extrapolate.
- SHC is based on 80°F db temperature of air entering coil. Below 80°F db, subtract (Correction Factor x CFM) from SHC. Above 80°F db, add (Correction Factor x CFM) to SHC.
- Bypass Factor = 0 indicates no psychometric solution. Use bypass factor of next lower EWB for approximation.

Interpolation is permissible.

Correction Factor =  $1.09 \times (1 - \text{BF}) \times (\text{db} - 80)$

SHC CORRECTION FACTOR

BYPASS FACTOR	ENTERING AIR DRY-BULB TEMPERATURE (°F)					
	79	78	77	76	75	Under 75
	81	82	83	84	85	Over 85
	Correction Factor					
0.10	.098	1.96	2.94	3.92	4.91	Use formula shown below
0.20	0.87	1.74	2.62	3.49	4.36	
0.30	0.76	1.53	2.29	3.05	3.82	

FF1E

**AIR DELIVERY PERFORMANCE CORRECTION COMPONENT PRESSURE DROP (IN.WC.) AT INDICATED AIRFLOW (DRY-TO-WET COIL)**

Unit Size	CFM								
	500	600	700	800	900	1000	1100	1200	1300
018	0.034	0.049	0.063	--	--	--	--	--	--
024	0.021	0.033	0.045	0.056	0.068	--	--	--	--
030	--	--	--	0.056	0.068	0.079	0.090	--	--
036	--	--	--	--	--	0.055	0.064	0.073	0.081

ELECTRICAL DATA

MODEL SIZE	MTR. HP	MTR. FLA	PH/ HZ	COOLING CONTROL*/ HEAT PACK INSTALLED	MIN. WIRE SIZE (208/230)†	MAX. FT. WIRE (208/230)‡	HEATER AMPS (208/230)	MIN. CIRCUIT AMPS (MCA) (208/230)	MAX. FUSE OR CKT. BRK. AMPS (208/230)
FF1ENP018	1/5	1.5	1/60	KFDCC0101DCC	14	394	—	1.9	15
				KFDEH0801D05	10/10	70/70	18.1/20.0	24.5/26.9	25/30
				KFDEH0901D75	8/8	75/75	27.1/30.0	35.8/39.4	40/40
				KFDEH1001D11	6/6	82/82	39.8/44.0	51.6/56.9	60/60
FF1ENP024	1/5	1.5	1/60	KFDCC0101DCC	14	394	—	1.9	15
				KFDEH0801D05	10/10	70/70	18.1/20.0	24.5/26.9	25/30
				KFDEH0901D75	8/8	75/75	27.1/30.0	35.8/39.4	40/40
				KFDEH1001D11	6/6	82/82	39.8/44.0	51.6/56.9	60/60
FF1ENP030	1/3	1.9	1/60	KFDCC0101DCC	14	312	—	2.4	15
				KFDEH0801D05	10/10	69/69	18.1/20.0	25.0/27.4	30/30
				KFDEH0901D75	8/8	74/74	27.1/30.0	36.3/39.9	40/40
				KFDEH1001D11	6/6	81/82	39.8/44.0	52.1/57.4	60/60
FF1ENP036	1/3	2.0	1/60	KFDCC0101DCC	14	300	—	2.5	15
				KFDEH0801D05	10/10	68/69	18.1/20.0	25.1/27.5	30/30
				KFDEH0901D75	8/8	73/74	27.1/30.0	36.4/40.0	40/40
				KFDEH1001D11	6/6	81/81	39.8/44.0	52.3/57.5	60/60
FF1ENE018	1/5	1.5	1/60	KFDCC0101DCC	14	394	—	1.9	15
				KFDEH0801D05	10/10	70/70	18.1/20.0	24.5/26.9	25/30
				KFDEH0901D75	8/8	75/75	27.1/30.0	35.8/39.4	40/40
				KFDEH1001D11	6/6	82/82	39.8/44.0	51.6/56.9	60/60
FF1ENE024	1/5	1.5	1/60	KFDCC0101DCC	14	394	—	1.9	15
				KFDEH0801D05	10/10	70/70	18.1/20.0	24.5/26.9	25/30
				KFDEH0901D75	8/8	75/75	27.1/30.0	35.8/39.4	40/40
				KFDEH1001D11	6/6	82/82	39.8/44.0	51.6/56.9	60/60
FF1ENE030	1/3	1.9	1/60	KFDCC0101DCC	14	312	—	2.4	15
				KFDEH0801D05	10/10	69/69	18.1/20.0	25.0/27.4	30/30
				KFDEH0901D75	8/8	74/74	27.1/30.0	36.3/39.9	40/40
				KFDEH1001D11	6/6	81/82	39.8/44.0	52.1/57.4	60/60
FF1ENE036	1/3	2.0	1/60	KFDCC0101DCC	14	300	—	2.5	15
				KFDEH0801D05	10/10	68/69	18.1/20.0	25.1/27.5	30/30
				KFDEH0901D75	8/8	73/74	27.1/30.0	36.4/40.0	40/40
				KFDEH1001D11	6/6	81/81	39.8/44.0	52.3/57.5	60/60

\* Field-installed Cooling Control Package Required

† Use copper wire only. 75°C wire must be used in this application. When using non-metallic (NM) sheathed cable, wire size required should be based on that of 60°C conductors, instead of wire sizes shown in table above per NEC 1996 Article 336-30.

‡ Length shown is as measured one way along wire path between unit and service panel for a voltage drop not to exceed 2%.

FLA — Full Load Amps

## ESTIMATED SOUND POWER LEVEL (dBA)

UNIT SIZE	CONDITIONS		OCTAVE BAND CENTER FREQUENCY*						
	CFM	Ext Static Pressure	63	125	250	500	1000	2000	4000
018	600	0.25	64.7	60.7	56.7	53.7	51.7	49.7	45.7
024	800	0.25	66.0	62.0	58.0	55.0	53.0	51.0	47.0
030	1000	0.25	67.0	63.0	59.0	56.0	54.0	52.0	48.0
036	1200	0.25	67.8	63.8	59.8	56.8	54.8	52.8	48.8

\* Estimated sound power levels have been derived using the method described in the 1987 ASHRAE HVAC Systems & Applications Handbook, Chapter 52, p. 52.7.

### AIR DELIVERY PERFORMANCE CORRECTION COMPONENT PRESSURE DROP (IN.WC.) AT INDICATED AIRFLOW

AIR DELIVERY (CFM)		400	500	600	700	800	900	1000	1100
<b>Electric Heaters</b>	1 – Element 5 kw	0.007	0.010	0.015	0.025	0.035	0.055	0.070	0.080
	2 – Element 7.5 & 11 kw	0.010	0.012	0.018	0.028	0.050	0.075	0.100	0.130

Subtract the above pressure drop corrections from unit airflow data when that component or condition is used. The remaining external static pressure will be available for the duct system.

### OPTIONAL FIELD-INSTALLED ELECTRIC HEAT PACKAGES

HEATER PART NUMBER WITH TDR	SIZE USED WITH	NOMINAL KW @ 240V	HEATER VOLTS – PHASE (60 Hz)	HEATER CAPACITY (MBH)*		APPROX. SHIP WGT. (LBS.)
				208V	230V	
KFDEH0801D05	All	5	208/230—1	14.3	17.2	7
KFDEH0901D75	All	7.5	208/230—1	20.7	25.0	7
KFDEH1001D11	All	11	208/230—1	29.7	36.0	7

\*Heater capacities shown here are for the largest size fan coil unit, and they do include blower motor heat.

### OTHER ACCESSORIES

KIT NUMBER	DESCRIPTION	USED ON SIZES
KFDCC0101DCC	Cooling Control Package	All
KFBLG0106LGL*	Louvered Wall Panel with Frame	018, 024, 030
KFBLG0206LGL*	Louvered Wall Panel with Frame	036

\* 6 pack

FF1E