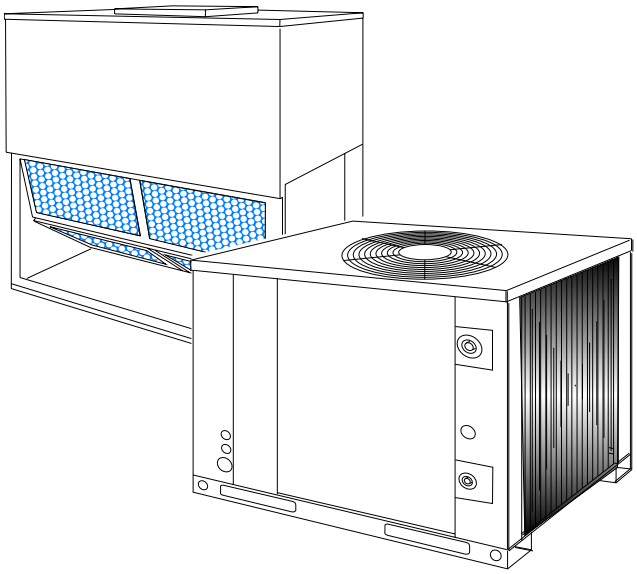
YORK®
Heating and Air Conditioning

TECHNICAL GUIDE

SPLIT-SYSTEM
HEAT PUMPS

EA090/FA090



208/230/460
VOLT ONLY

ISO 9001 CERTIFIED

DESCRIPTION

YORK has combined the latest concepts in modern technology with time-proven quality standards to design a split-system heat pump to meet the demands of the energy-and quality-conscious commercial market.

Both the outdoor and indoor units are completely piped and wired at the factory. Only the interconnecting liquid and vapor lines are required to complete the refrigerant circuit. Every unit is dehydrated, evacuated, leak tested and pressure tested before being pressurized with a holding charge of refrigerant-22 for shipment and/or storage. The compressor, the fan motors and the controls are functionally tested after the units are fabricated to assure a reliable start-up and years of dependable operation.

These units have been tested by Underwriters' Laboratories and will be shipped with UL and CUL labels.

OUTDOOR UNIT

Every outdoor unit includes a heavy-duty compressor with a crankcase heater, line break overload protection, a suction line accumulator with a fusible plug, a 4-way reversing valve with a 24-volt solenoid, outdoor fan motor(s) with inherent protection, and a copper tube/aluminum fin coil that is positioned vertically for better drainage of the water that will condense on it during the heating cycle.

They also include a filter-drier, an expansion valve and a distributor that are only used during the heating cycle plus a check valve to provide the proper flow of refrigerant through the unit during both the cooling and heating cycles.

To eliminate the costly cabinet deterioration problems usually associated with outdoor equipment, all sheet metal parts are constructed of commercial grade (G90) galvanized steel. After fabrication, each part is thoroughly cleaned to remove any grease or dirt from its surfaces. The parts that will be exposed to the weather are then coated with a “desert sand” powder paint to assure a quality finish for many years. This coating system has passed the 750 hour, salt spray test per ASTM Standard B117. To assist in servicing, the high and low pressure service connections are exterior to the cabinet, allowing simple access.

The fan guards are vinyl-coated to provide additional rust protection. An optional decorative coil guard is available to protect the coil on the outdoor unit.

INDOOR UNIT

Every indoor unit includes a well-insulated cabinet, a copper tube/aluminum fin coil, 1" throwaway filters, a centrifugal blower, a blower motor, adjustable drive components, a blower motor contactor and a small holding charge of refrigerant-22.

They also include a filter-drier, an expansion valve and a distributor that are only used during the cooling cycle plus a check valve to provide the proper flow of refrigerant through the coil during both the cooling and heating cycles.

The units are shipped in the vertical position ready for field installation. For horizontal installation, interchange the solid bottom panel and the return air duct flange on the front of the unit.

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APPLICATION FLEXIBILITY

OUTDOOR UNITS

These outdoor units are lightweight and can be installed on almost any roof.

Units can be lifted using nylon straps with hooks at the holes provided in the base rails, or they may be lifted with a forklift through the slotted openings in the base rails.

A quality appearance and low sound levels make these units suitable for most ground level locations.

Remember that during heat and defrost cycles, condensate will drip from the underside of the unit coils and that this condensate will freeze when the temperature of the outdoor air is below 32°F. A gravel bed or some other means of handling this condensate may have to be provided.

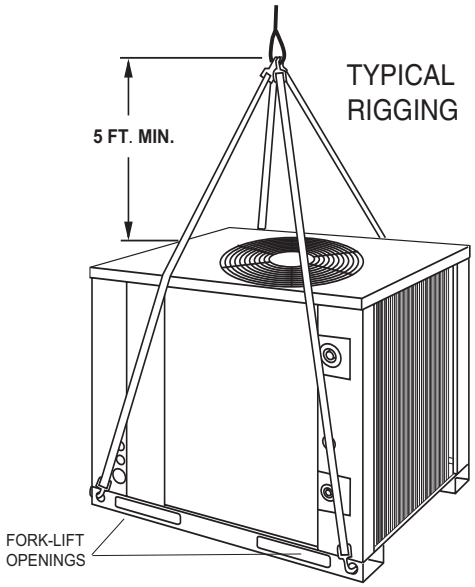


FIGURE 1: EA090 - OUTDOOR UNITS

INDOOR UNITS

These indoor units are shipped for vertical installation, but may be field converted for horizontal applications by separating and repositioning the Blower Section. See product installation manual for for detail.

- The Supply Air Plenum and the Return Air Grille accessories can be used on either arrangement.
- The Base accessory can only be used on the vertical arrangement.

Units installed horizontally are designed for ceiling suspension. Four 3/8" - 16 weldnuts are provided in the angle supports on the front of the unit. Knockouts are provided in the exterior panels for access to these weldnuts. The hanger rods must be supplied in the field.

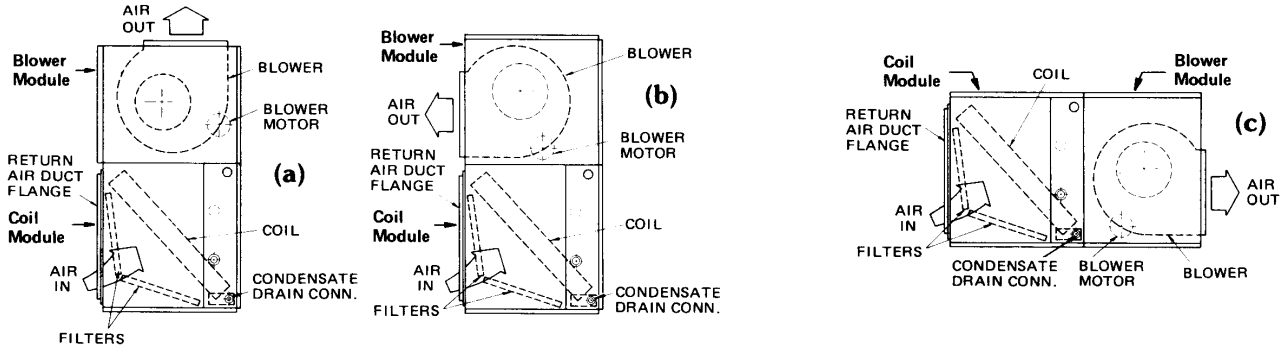


FIGURE 2: FA090 - INDOOR UNITS

TABLE 1: ARI RATINGS [1]- COOLING, HEATING AND SOUND

Model		Cooling Capacity		Heating Capacity			
				High Outdoor Temperature (47º F)		Low Outdoor Temperature (17º F)	
Outdoor Unit	Indoor Unit	MBH[3]	EER	MBH[3]	COP	MBH[3]	COP
EA090	FA090	90	10.67	87.7	3.25	55	2.34

Outdoor Unit	Sound Rating[2] (bels)
EA090	8.9

1 Certified in accordance with the Unitary Large Equipment certification program, which is based on ARI Standard 340/360.

2 Rated in accordance with ARI Standard 270.

3 Deduct 1 MBH when a unit operates at 208 volts.

TABLE 2: SYSTEM APPLICATION DATA

Air Temperature on OUTDOOR Coil, ºF				Air Temperature on INDOOR Coil, ºF			
Minimum		Maximum		minimum		Maximum	
Cool	Heat	Cool	heat	Cool	Heat	Cool	Heat
40 db	0 db[1]	115 db	75 db	57 wb	50 db[2]	72 wb	80 db

Air Flow across INDOOR Coil, CFM (Min./Max.)	
FA090	2400/3600

1 Below 0ºF, the control circuit will lock out the compressor and allow the electric heat accessory to cycle at its standby capacity.

2 Operation below this temperature is permissible for a short period of time when a unit is required to heat the conditioned space up to 50ºF.

TABLE 3: REFRIGERANT PIPING LIMITATIONS[1]

System (Tons)	Maximum Vertical Rise,[2] (Feet)	Maximum Total Length (Feet)
7-1/2	60	125

1 Refer to installation instruction Form 035-18474-000 for more detailed information on refrigerant piping.

2 Based on the loss of static head in the liquid riser during the heating cycle.

SYSTEM FLEXIBILITY

The coils for both the indoor and outdoor units are not only circuited and headered for optimum heating and cooling performance, but also for ample subcooling during all modes of operation. The sub-cooling permits the outdoor unit to be mounted 60 feet over or under the indoor unit without any danger of flashing liquid refrigerant during the heating or the cooling cycle.

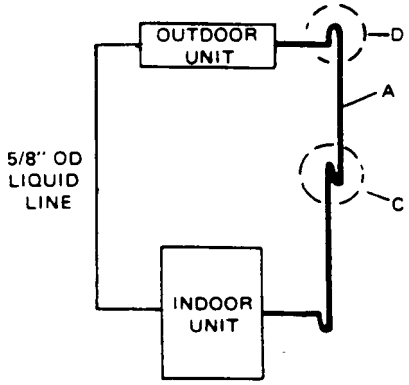
Refer to the REFRIGERANT PIPING table above for more detailed information on refrigerant pipe limitations.

A = 1-3/8" OD Vapor Line

B = 1-1/8" OD Vapor Line

C = Intermediate Trap - only required when a riser exceeds 50 feet.

D = Inverted Trap - only required when the horizontal run to the unit exceeds 25 feet.



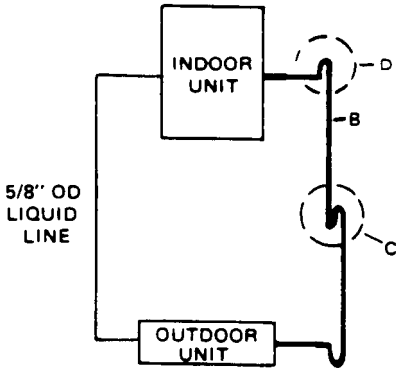


TABLE 4: COOLING CAPACITY - EA090

Air On Evaporaor Coil		Temperature of Air on Condenser Coil																	
		85°F									95°F								
		Total Capacity [1]	Total Input [2]	Sensible Capacity (MBh)							Total Capacity [1]	Total Input [2]	Sensible Capacity (MBh)						
				Return Dry Bulb (°F)									Return Dry Bulb (°F)						
CFM	WB(°F)	(MBh)	(kW)	86	83	80	77	74	71	68	(MBh)	(kW)	86	83	80	77	74	71	68
2400	72	99	7.0	59	52	45	39	32	-	-	96	7.7	58	51	44	37	31	-	-
	67	91	6.9	73	66	59	52	46	39	32	88	7.6	72	65	58	51	44	37	31
	62	82	6.7	82	78	71	64	57	50	43	82	7.5	82	77	70	63	56	50	43
	57	86	6.7	86	83	76	69	62	55	49	89	7.5	87	80	73	66	59	53	46
2850	72	102	7.1	66	58	49	41	33	-	-	99	7.8	65	57	48	40	32	-	-
	67	94	7.0	81	73	64	56	48	40	32	90	7.7	80	71	63	55	47	38	30
	62	84	6.8	84	82	77	69	61	52	44	84	7.5	84	81	76	68	60	52	44
	57	88	6.8	88	87	83	74	66	58	50	91	7.5	90	86	80	71	63	55	47
3300	72	105	7.2	73	63	53	44	34	-	-	101	7.9	71	62	52	43	33	-	-
	67	96	7.1	89	79	70	60	50	41	31	92	7.7	88	78	68	59	49	39	30
	62	86	7.0	86	86	83	74	64	54	45	85	7.6	85	85	83	73	64	54	44
	57	90	6.9	90	90	89	80	70	60	51	93	7.6	93	93	86	77	67	57	48
3450	72	106	7.2	75	65	55	45	34	-	-	103	7.9	74	64	54	44	34	-	-
	67	97	7.1	92	82	72	61	51	41	31	94	7.7	91	81	70	60	50	40	30
	62	87	7.0	87	87	86	75	65	55	45	87	7.6	87	87	85	75	65	55	45
	57	91	6.9	91	91	91	81	71	60	50	94	7.6	94	94	89	79	68	58	48
3600	72	107	7.2	78	67	56	45	35	-	-	104	7.9	77	66	55	45	34	-	-
	67	99	7.1	95	84	73	63	52	41	31	95	7.7	94	83	73	62	51	40	30
	62	88	7.0	88	88	88	77	66	56	45	88	7.6	88	88	88	77	66	56	45
	57	93	6.9	93	93	93	82	71	60	50	96	7.6	96	96	91	81	70	59	49

Air On Evaporaor Coil		Temperature of Air on Condenser Coil																	
		105°F									115°F								
		Total Capacity [1]	Total Input [2]	Sensible Capacity (MBh)							Total Capacity [1]	Total Input [2]	Sensible Capacity (MBh)						
				Return Dry Bulb (°F)									Return Dry Bulb (°F)						
CFM	WB(°F)	(MBh)	(kW)	86	83	80	77	74	71	68	(MBh)	(kW)	86	83	80	77	74	71	68
2400	72	93	8.5	56	49	42	35	29	-	-	89	9.3	54	47	40	33	26	-	-
	67	83	8.4	70	63	56	49	42	36	29	79	9.3	68	61	54	48	41	34	27
	62	79	8.2	79	75	68	61	55	48	41	76	9.0	76	73	66	60	53	46	39
	57	83	8.3	82	76	69	62	55	48	42	78	9.1	78	72	65	58	51	44	37
2850	72	95	8.6	63	55	46	38	30	-	-	91	9.4	61	53	45	36	28	-	-
	67	85	8.5	77	70	62	53	45	37	29	80	9.4	75	68	60	52	44	36	27
	62	81	8.3	81	79	75	67	59	50	42	78	9.1	78	76	74	65	57	49	41
	57	85	8.3	84	81	76	67	59	51	43	79	9.1	79	76	72	63	55	47	39
3300	72	97	8.7	70	60	51	41	31	-	-	92	9.5	68	58	49	39	30	-	-
	67	87	8.6	85	77	67	58	48	38	29	82	9.4	82	76	66	57	47	37	28
	62	82	8.4	82	82	82	72	63	53	43	79	9.2	79	79	81	71	62	52	42
	57	87	8.4	87	87	82	73	63	54	44	81	9.2	81	81	79	69	59	50	40
3450	72	99	8.7	72	62	52	42	32	-	-	95	9.5	70	60	50	40	30	-	-
	67	89	8.6	87	79	69	59	49	38	28	84	9.4	84	78	68	57	47	37	27
	62	84	8.4	84	84	84	73	63	53	43	81	9.2	81	81	82	72	62	51	41
	57	88	8.4	88	88	85	74	64	54	44	83	9.2	83	83	80	70	60	50	40
3600	72	100	8.7	75	64	53	43	32	-	-	97	9.5	72	62	51	40	30	-	-
	67	90	8.6	90	82	71	60	49	39	28	86	9.4	86	80	69	58	48	37	26
	62	86	8.4	86	86	85	75	64	53	42	83	9.2	83	83	83	72	62	51	40
	57	90	8.4	90	90	87	76	65	55	44	84	9.2	84	84	82	71	61	50	39

TABLE 4: COOLING CAPACITY - EA090 (CONT.)

Air On Evaporaor Coil		Temperature of Air on Condenser Coil 125°F								
		Total Capacity [1] (MBh)	Total Input [2] (kW)	Sensible Capacity (MBh) Return Dry Bulb (°F)						
CFM	WB(°F)			86	83	80	77	74	71	68
2400	72	85	10.2	52	45	38	31	24	-	-
	67	74	10.1	66	59	53	46	39	32	25
	62	74	9.8	74	71	65	58	51	44	37
	57	72	9.9	72	67	61	54	47	40	33
2850	72	87	10.3	59	51	43	34	26	-	-
	67	76	10.2	73	67	59	51	42	34	26
	62	75	9.9	75	74	72	64	56	48	39
	57	73	10.0	73	71	68	60	51	43	35
3300	72	88	10.4	66	57	47	38	28	-	-
	67	77	10.3	77	75	65	55	46	36	27
	62	76	10.0	76	76	76	70	61	51	41
	57	75	10.1	75	75	75	65	56	46	37
3450	72	90	10.4	68	58	48	38	28	-	-
	67	79	10.3	79	76	66	56	46	36	25
	62	78	10.0	78	78	78	70	60	50	40
	57	77	10.1	77	77	76	66	56	46	36
3600	72	93	10.3	70	60	49	38	27	-	-
	67	81	10.3	81	78	67	57	46	35	24
	62	80	9.9	80	80	80	70	59	48	38
	57	79	10.0	79	79	78	67	56	45	35

Nominal Rating

1 - These capacities are gross ratings. For net capacity, deduct air blower motor, MBh = 3.415 x kW. Refer to the appropriate Blower Performance Table for the kW of the supply air blower motor.

2 - These ratings include the condenser fan motors (total 1 kW) and the compressor motors but not the supply air blower motor.

The capacities shown are gross ratings. For net capacities, determine the KW requirement of the supply air blower motor per the SUPPLY AIR BLOWER PERFORMANCE table. Convert KW to MBH by the following equation and deduct this equivalent heat from the gross cooling ratings.

Blower Motor Heat (MBH) = Blower Motor KW x 3.415

Apply the following correction factors to determine the unit performance at different CFM.

These ratings include the compressor KW and the following KW for the outdoor fan motor(s).

% Nominal Supply Air CFM	80	90	100	110	120
Total Capacity Correction Factor	0.963	0.981	1.000	1.015	1.030
Sensible Capacity Correction Factor	0.935	0.965	1.000	1.049	1.098
Kilowatt Correction Factor	0.981	0.992	1.000	1.008	1.019

NOTE: Sensible capacity can never exceed total capacity. A higher corrected sensible capacity indicates a dry coil, and it should be reduced to the corrected total capacity.

Outdoor Unit Size	7-1/2 Ton
Outdoor Fan Motor KW - 60 HZ	0.83

Blower motor KW is not included. Refer to the SUPPLY AIR BLOWER PERFORMANCE table for the KW rating of the supply air blower motor at the design conditions and add this power requirement to the KW rating.

UNIT MODEL EA090

OUTDOOR TEMPERATURE (F) (72% RH)

CFM	ID DB	0	10	20	30	40	50	60	70
2400	60 MBH	12.237	28.142	44.048	59.954	75.859	91.765	107.671	123.576
2400	KW	2.090	3.179	4.268	5.357	6.447	7.536	8.625	9.714
2400	70 MBH	9.673	25.579	41.485	57.390	73.296	89.201	105.107	121.013
2400	KW	2.576	3.665	4.754	5.844	6.933	8.022	9.111	10.201
2400	80 MBH	9.589	25.495	41.401	57.306	73.212	89.118	105.023	120.929
2400	KW	3.352	4.441	5.530	6.619	7.709	8.798	9.887	10.976
3300	60 MBH	13.565	29.471	45.377	61.282	77.188	93.094	108.999	124.905
3300	KW	1.417	2.506	3.595	4.685	5.774	6.863	7.952	9.041
3300	70 MBH	10.826	26.732	42.637	58.543	74.449	90.354	106.260	122.166
3300	KW	1.852	2.941	4.030	5.119	6.209	7.298	8.387	9.476
3300	80 MBH	10.916	26.822	42.727	58.633	74.539	90.444	106.350	122.256
3300	KW	2.679	3.768	4.857	5.946	7.035	8.125	9.214	10.303
3600	60 MBH	14.284	30.189	46.095	62.001	77.906	93.812	109.718	125.623
3600	KW	1.353	2.442	3.531	4.620	5.710	6.799	7.888	8.977
3600	70 MBH	11.720	27.626	43.531	59.437	75.343	91.248	107.154	123.060
3600	KW	1.839	2.928	4.018	5.107	6.196	7.285	8.374	9.464
3600	80 MBH	11.636	27.542	43.448	59.353	75.259	91.165	107.070	122.976
3600	KW	2.615	3.704	4.793	5.883	6.972	8.061	9.150	10.239

THE MBH AND KW VALUES DO NOT INCLUDE THE SUPPLY AIR BLOWER MOTOR.
FOR NET CAPACITY, ADD THE SUPPLY AIR BLOWER MOTOR HEAT (MBH = 3.415 x KW)

These ratings are based on an outdoor relative humidity of 72%. They include an allowance for defrost but not for the supply air blower motor heat. Refer to the BLOWER PERFORMANCE table for the KW rating of the supply air blower motor at the design conditions. Convert this KW rating to MBH using the following equation and add this equivalent heat to the heating capacity.

Blower Motor Heat (MBH) = Blower Motor KW x (3.415 MBH/KW)

Use the following equation to determine the C.O.P. at any operating condition.

C.O.P. = Total MBH (including Blower Motor Heat)/[Total KW (including Blower Motor KW) x 3.415]

correct the MBH and KW ratings with the following factors for different supply air CFM's.

These ratings include the compressor KW and the following KW for the outdoor fan motor(s).

Correction Factor	80	90	100	110	120
MBH	0.96	0.98	1.00	1.02	1.04
KW	1.030	1.015	1.000	0.985	0.970

NOTE: Apply these factors to the above ratings before correcting for the supply air blower heat and power requirements.

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Outdoor Unit Size	7-1/2 Ton
Outdoor Fan Motor KW - 60 HZ	0.96

Blower motor KW is not included. Refer to the SUPPLY AIR BLOWER PERFORMANCE table for the KW rating of the supply air blower motor at the design conditions and add this power requirement to the KW rating.

TABLE 5: ELECTRIC HEAT ACCESSORY

Heater Model		Nominal Voltage	Heating Capacity							
			Nominal		Defrost		Supplemental		Standby and Emergency	
			KW	MBH	KW	MBH	KW	MBH	KW	MBH
2HS045010	25A	240[1]	10	34.2	10	34.2	10	34.2	10	34.2
	46A	480[2]								
2HS045016	25A	240[1]	16	54.7	10	34.2	16	54.7	16	54.7
	46A	480[2]								
2HS045026	25A	240[1]	26	88.8	16	54.7	26	88.8	26	88.8
	46A	480[2]								
2HS045036	25A	240[1]	36	123.0	16	54.7	26	88.8	36	123.0
	46A	480[2]								

[1] For 208 volts, multiply the MBH and KW values by (208/240)^2 or 0.751.
For 208 volts, multiply the MBH and KW values by (230/240)^ 2 or 0.918.

[2] For 460 volts, multiply the MBH and KW values by (460/480)^2 or 0.918.

TABLE 6: BLOWER MOTOR AND DRIVE DATA

Indoor Unit Model	Motor HP	Blower HP	Adjustable Motor Pulley		Fixed Blower Pulley		Belt	
			Pitch Diameter, (in.)	Bore, (in.)	Pitch Diameter, (in.)	Bore, (in.)	Designation	Pitch Length, (in.)
FA090	1-1/2	690 - 920	2.8 - 3.8	7/8	7.5	1	A36	37.3

*Motor Specifications:	• 1750 RPM	• inherently protected
	• 208/230/460-3-60**	• 1.15 service factor
	• solid base	• permanently lubricated ball bearings
	• 56 frame	

**These motors will always be wired for a 460 volt power supply. Refer to the wiring diagram inside the motor terminal box when the motor leads have to be reconnected for a 208 or 230 volt power supply.

TABLE 7: SUPPLY AIR BLOWER PERFORMANCE FA090[1,2]

7.5 HEAT PUMP BLOWER PERFORMANCE																		
ESP	**CFM**	**RPM**	**Watts**	**CFM**	**RPM**	**Watts**	**CFM**	**RPM**	**Watts**	**CFM**	**RPM**	**Watts**	**CFM**	**RPM**	**Watts**	**CFM**	**RPM**	**Watts**
0.2	4152	895	1877	4014	892	1844	3725	819	1378	3443	774	1201	3219	734	1015	2949	691	855
0.4	3901	900	1752	3753	897	1714	3404	823	1255	3091	777	1084	2818	736	899	2503	694	744
0.6	3617	905	1607	3478	902	1569	3000	837	1118	2671	855	943	2149	740	762	-	-	-
0.8	3232	911	1443	3083	907	1406	2468	831	957	-	-	-	-	-	-	-	-	-
1	2740	916	1222	2431	913	1185	-	-	-	-	-	-	-	-	-	-	-	-
	0 turns			1 turn			2 turns			3 turns			4 turns			5 turns		

[1] Available static pressure in IWG to overcome the resistance of the duct system and any accessories added to the unit. Refer to the table above for additional motor and drive data and to Table 10 for the resistance of these accessories.

[2] Refer to Form 515.41-AD1 for blower performance curves.

TABLE 8: SUPPLY AIR PLENUM PERFORMANCE DATA

INDOOR UNIT MODEL FA	CFM	FACE VELOCITY (FPM)	ANGLE OF DEFLECTION																	
			0° SPREAD VERTICAL LOUVERS[1] (PLAN VIEW)				HORIZONTAL LOUVERS[2] (ELEVATION VIEW)		22-1/2° SPREAD		VERTICAL LOUVERS[1] (PLAN VIEW)		HORIZONTAL LOUVERS[2] (ELEVATION VIEW)		45° SPREAD		VERTICAL LOUVERS[1] (PLAN VIEW)		HORIZONTAL LOUVERS[2] (ELEVATION VIEW)	
			THROW (FEET[3])		SPREAD (FEET)[3]		0° SPREAD 18°		THROW (FEET)[3]		SPREAD (FEET)[3]		0° SPREAD 18°		THROW (FEET)[3]		SPREAD (FEET)[3]		0° SPREAD 18°	
			MIN.	MAX.	MIN.	MAX	DROP (FEET)[4]		MIN.	MAX	MIN.	MAX	DROP (FEET)[4]		MIN.	MAX.	MIN.	MAX.	DROP (FEET)[4]	
090	2400	615	47	74	20	29	19	9	34	53	23	33	17	8	26	39	45	65	9	5
	2700	690	53	83	22	32	20	10	39	59	25	36	18	9	29	45	48	71	10	5
	3000	770	59	92	24	35	21	10	42	66	27	40	19	9	32	50	52	78	10	5
	3300	845	65	101	26	38	21	10	46	73	29	44	19	9	35	55	56	85	10	5
	3600	920	71	110	28	41	22	11	50	79	32	47	20	10	38	60	60	91	11	6

1 Adjusting the vertical louvers will vary the throw, the spread and the drop.

2 Adjusting the horizontal louvers will only vary the drop.

3 The velocity of the air will be 125 ft./min. at the minimum distance and 80 ft./min. at the maximum distance.

4 The velocity of the conditioned air at the bottom of the drop will be 50 ft./min. Drafts will occur if the drop extends into the occupied level of the conditioned space.

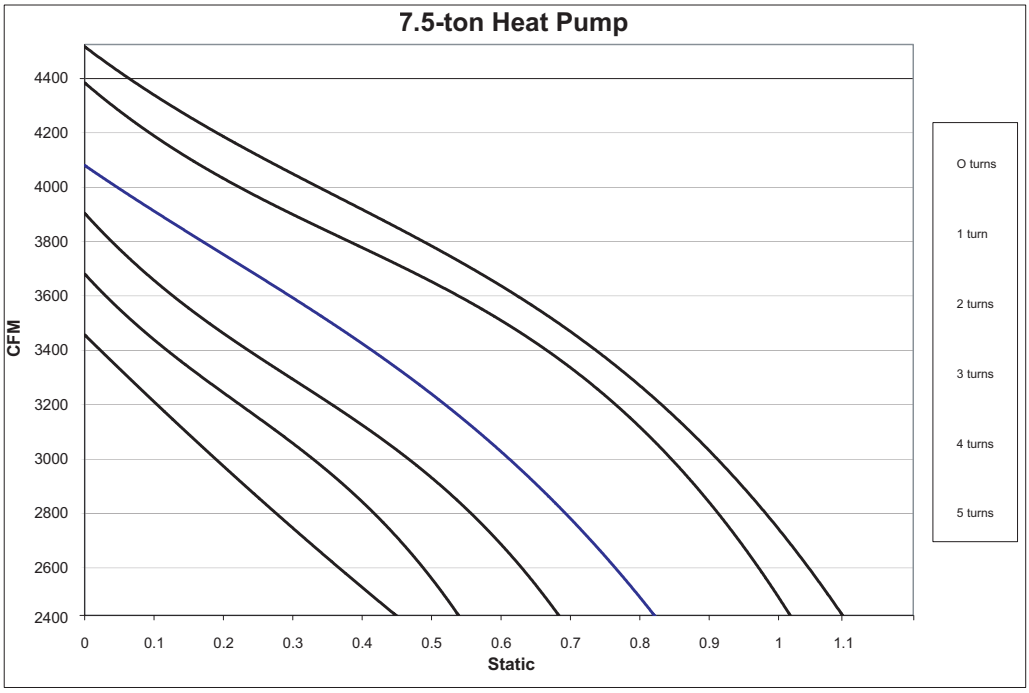


FIGURE 3: FA090 AIRFLOW CHART

TABLE 9: STATIC RESISTANCES FOR UNIT ACCESSORIES (IWG)

Unit Model	Accessory		CFM				
			2400	2700	3000	3300	3600
FA090	ELECTRIC HEAT	10 KW	0.01	0.01	0.01	0.02	0.02
		16 KW	0.01	0.02	0.02	0.03	0.04
		26 KW	0.03	0.04	0.05	0.06	0.07
		36 KW	0.05	0.07	0.08	0.10	0.11
	Supply Air Plenum		0.03	0.03	0.04	0.05	0.06
	Return Air Grille		0.02	0.03	0.04	0.05	0.06

ACCESSORIES (FIELD-INSTALLED)

Three-Phase Electric Heaters are available in several capacities to provide maximum flexibility. The heater can be selected to precisely meet the supplemental heating requirement of the conditioned space.

These heaters are designed for easy field-installation over the supply air opening of the indoor unit. They have been tested by Underwriters' Laboratories and will be shipped with a UL label. Every heater will be fully protected against excessive current and temperature by fuses and two high limit thermostats.

Units with Electric Heat will require only one power supply for both the heating elements and the supply air blower motor, and the power wiring can be protected by either dual element/time delay fuses or an inverse time circuit breaker.

Supply Air Plenums and Return Air Grilles (expanded metal) are available for free-standing indoor units located in the conditioned space. Both accessories are finished to match the exterior of the basic unit, and both can be applied with either vertical or horizontal units. The supply air plenums are fully insulated and have double-deflection, adjustable grilles.

Base Sections are available to raise vertical indoor units above the floor. Outdoor air may be introduced through these bases by cutting an access opening for the outdoor air duct connection. These bases are finished to match the exterior of the basic unit. They may have to be insulated in the field for certain applications.

Decorative Coil Guards can be field installed to enhance protection of the unit.

Thermostats with either manual or automatic changeover are available for precise control of the temperature within the conditioned space. The manual thermostat has a four-position selector switch - COOL, OFF, HEAT, and EMERGENCY HEAT, and three stages of control - one stage of cooling and two stages of heating. The automatic thermostat has a three-position selector switch - OFF, AUTOMATIC and EMERGENCY HEAT, and four stages of control - two stages of cooling and two stages of heating.

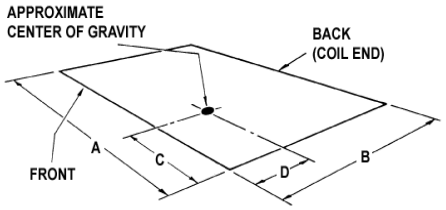
Both thermostats have a two-position fan switch, AUTO and ON to provide intermittent or continuous blower operation.

NOTE: The automatic changeover thermostat must be used on units equipped with a field-supplied economizer.

The first cooling stage of the automatic thermostat will only control the position of the reversing valve; the system will still operate with only one stage of cooling.

The EMERGENCY HEAT position on the selector switch and the second stage of heating will only function on systems with an electric heat accessory.

CENTER OF GRAVITY



CLEARANCES

Overhead (Top)[1]	120”
Front (Piping and Access Panels	30”
Left Side	24”
Right Side	24”
Rear	24”
Bottom[2]	0”

[1] Unit must be installed outdoors. Overhanging structures or shrubs should not obstruct air discharge outlet.

[2] Adequate snow clearance must be provided if winter operation is expected.

Unit	Dim. (inches.)			
	A	B	C	D
EA090	70-1/8	32	29-5/8	16-1/2

All dimensions are in inches. They are subject to change without notice. Certified dimensions will be provided upon request.

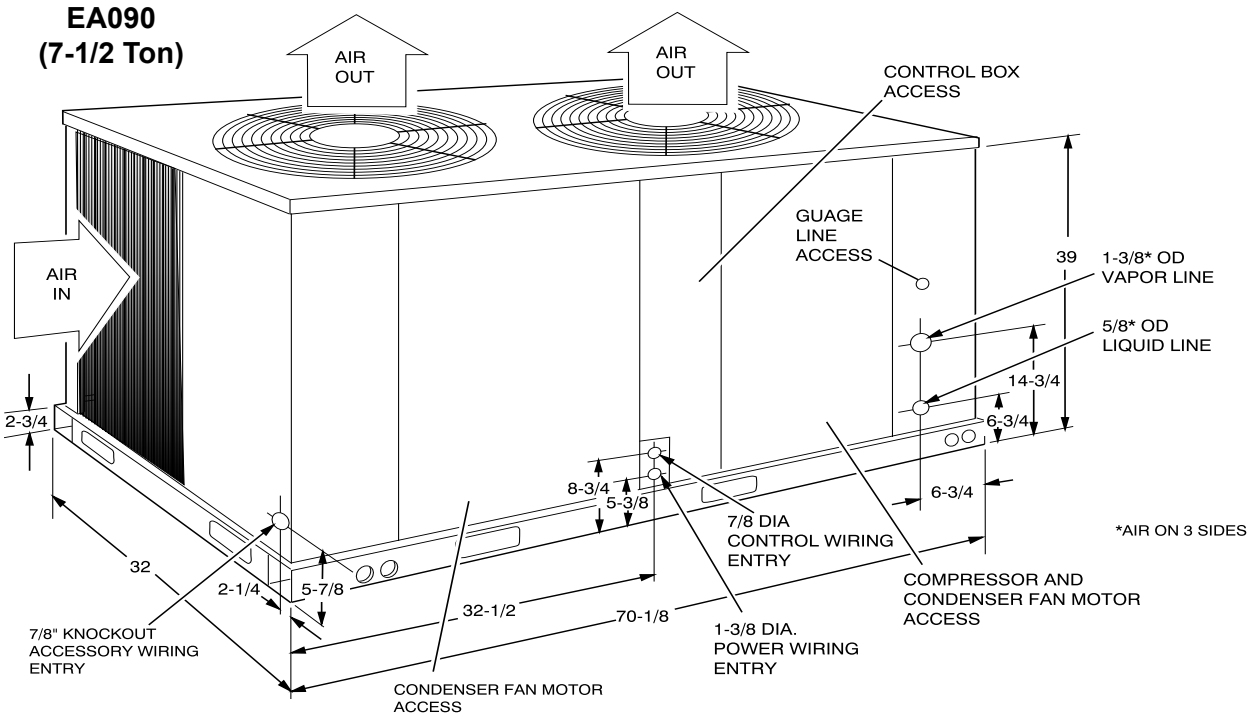


FIGURE 4: UNIT DIMENSIONS & CLEARANCES - OUTDOOR UNITS

ACCESSORIES

- ELECTRIC HEATER - Add 14-1/4” to unit height when used.
- SUPPLY AIR PLENUM - Add 27-1/2” to unit height when used.
- BASE - Add 20” to unit height when used.

MINIMUM CLEARANCES	
Side with RETURN AIR opening	24”
Side with SUPPLY AIR opening	24”[1]
Side with PIPING CONNECTIONS	52”[2]
Side opposite PIPING CONNECTIONS	12”
Side with access for both POWER & CONTROL WIRING	--[3]
Bottom	--[4]

1 Overall dimension of the unit will vary if an electric heater, a supply air plenum or a base is used.

2 This dimension is required for removal of the coil. Only 26” is required for normal servicing.

3 Although no clearance is required for service and operation, some clearance may be required for routing the power wiring and the control wiring.

4 Allow enough clearance to trap the condensate drain line.

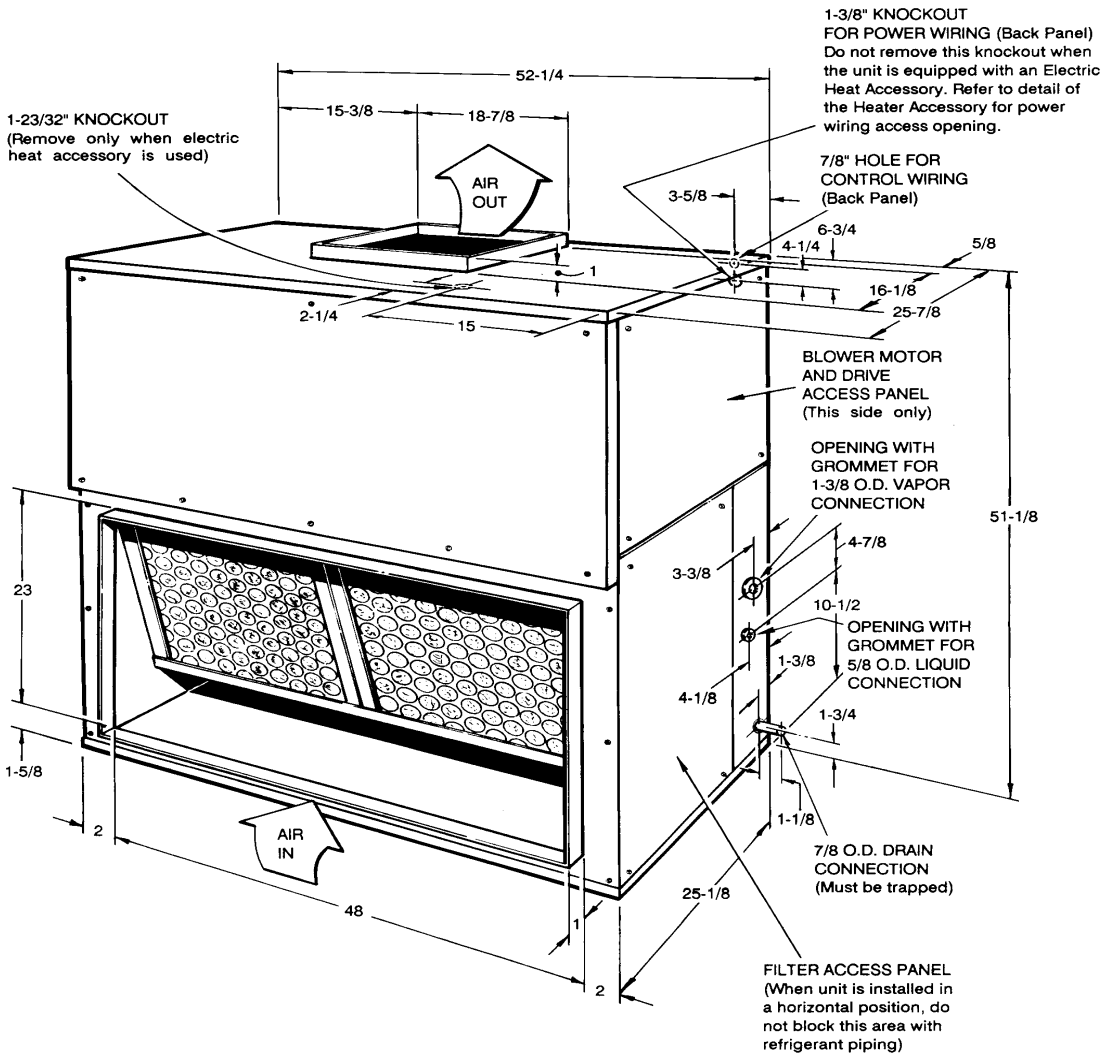
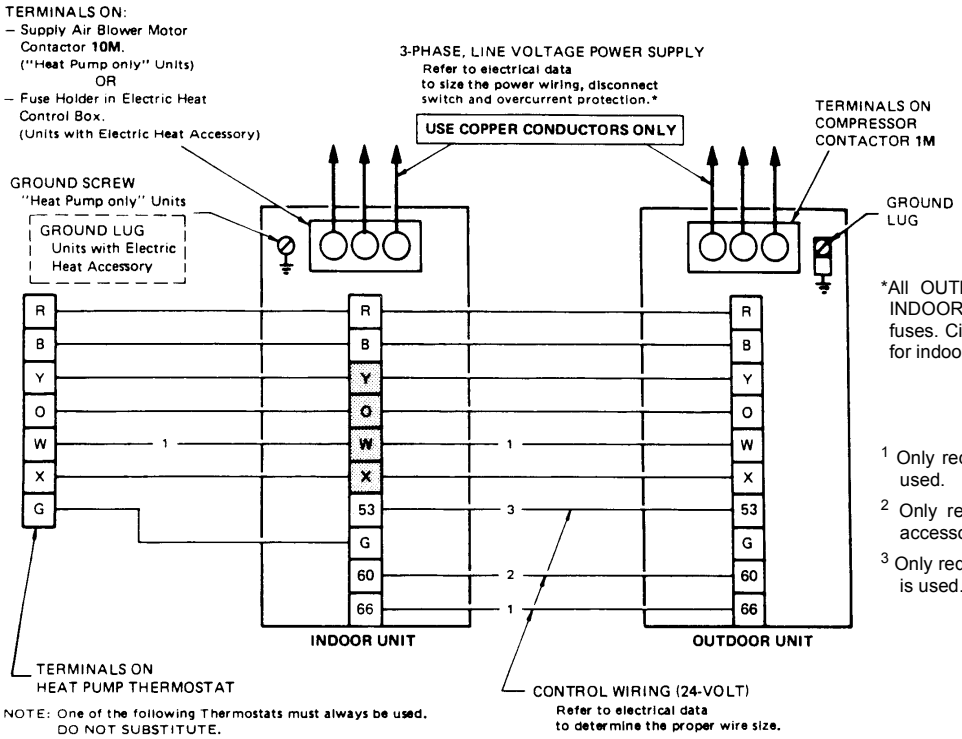


FIGURE 5: UNIT DIMENSIONS & CLEARANCES- INDOOR UNITS



*All OUTDOOR Units and all HEAT PUMP only INDOOR Units require dual element, time delay fuses. Circuit breakers can be used in lieu of fuses for indoor units with an electric heat accessory.

[1] Only required when an electric heat accessory is used.

[2] Only required with a 16 or 26KW electric heat accessory is used.

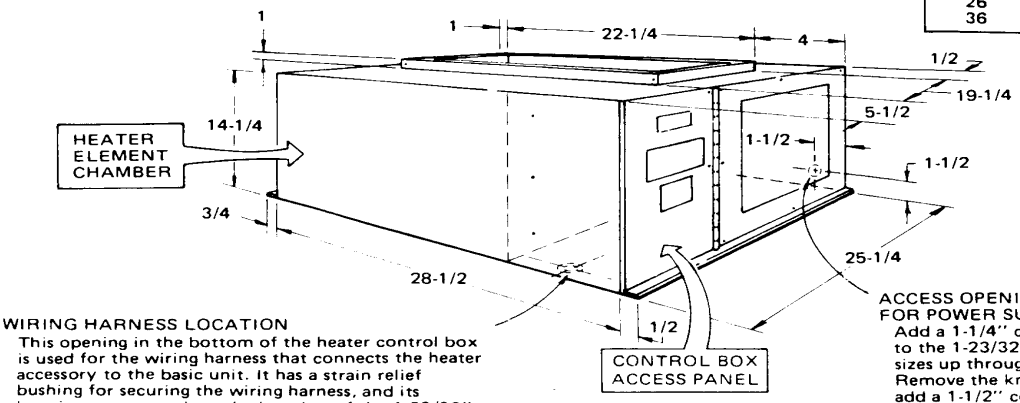
[3] Only required with a 36KW electric heat accessory is used.

The field wiring connected to these dummy terminals (shaded) on TB1 can be routed directly from the outdoor unit to the thermostat if desired. Terminal R on TB1 can also be bypassed if the indoor unit is not equipped with an electric heat accessory.

FIGURE 6: FIELD WIRING

ELECTRIC HEATER

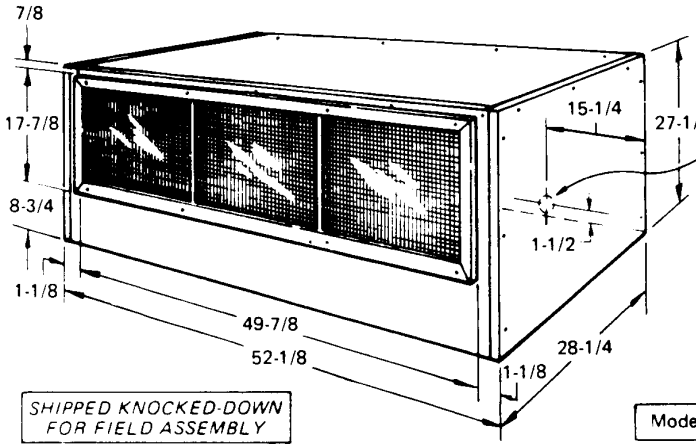
Nom-KW	Model Numbers
10	*2HS04501025, 46*
16	*2HS04501625, 46*
26	*2HS04502625, 46*
36	*2HS04503625, 46*



WIRING HARNESS LOCATION
This opening in the bottom of the heater control box is used for the wiring harness that connects the heater accessory to the basic unit. It has a strain relief bushing for securing the wiring harness, and its location corresponds to the location of the 1-23/32" knockout in the top panel of the basic unit.

ACCESS OPENING FOR POWER SUPPLY WIRING
Add a 1-1/4" conduit fitting to the 1-23/32" hole for wire sizes up through #1 AWG. Remove the knockout ring and add a 1-1/2" conduit fitting to the 1-31/32" hole for wire sizes up through #0 AWG.

SUPPLY AIR PLENUM



SHIPPED KNOCKED-DOWN FOR FIELD ASSEMBLY

KNOCKOUT FOR POWER WIRING

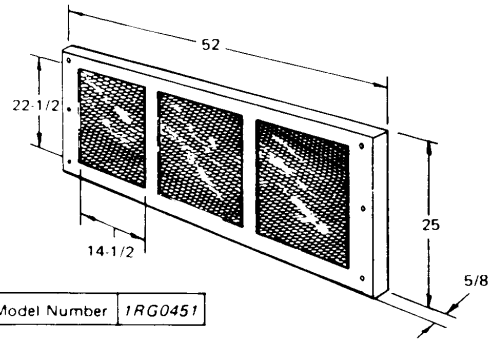
WITH ELECTRIC HEAT – Remove this 2-1/2" knockout from the rear panel of the plenum. Route the power wiring conduit through this opening and connect it to the field-supplied fitting on the electric heat accessory. Connect the power wiring to the fuse block in the heater control box.

Install the control wiring per basic unit instruction Form 035-18475-000. DO NOT route any field control wiring through the plenum.

WITHOUT ELECTRIC HEAT - **Install the power and the control wiring per basic unit instruction Form 035-18475-000. DO NOT route any wiring through the plenum and DO NOT remove this knockout.**

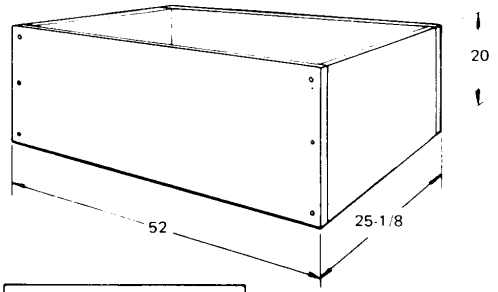
Model Number	*1SP0451*

RETURN AIR GRILLE



Model Number	*1RG0451*

BASE



SHIPPED KNOCKED-DOWN FOR FIELD ASSEMBLY

Model Number	*1BS0451*

FIGURE 7: ACCESSORY DIMENSIONS

TABLE 10: PHYSICAL DATA (OUTDOOR UNIT)

DESCRIPTION		UNIT MODEL - EA090
Compressor[1]	Rating - tons	7-1/2
Fans	Quantity	2
	Diameter - inches No. of Blades	24/3
	Nominal CFM	7800
Fan Motors[2]	HP	3/4
	RPM	1100
Coil	Rows Deep x Rows High	2 x 36
	Finned Length - inches	96
	Face Area - square feet	24.00
	Tube (Copper) OD - inches	3/8
	Fins (Aluminum) per inch	16
Refrigerant-22 (Lbs.)	Holding Charge	1.50
	Operating Charge[3]	18.8
	Pumpdown Capacity[4]	24.6
Unit Weight (Lbs.)	Shipping	510
	Operating	505

1 These compressors are fully hermetic.

2 These PSC motors are directly connected to the outdoor fans and have inherent protection, ball bearings and a 48 frame. Rotation (when viewing shaft end of motor) -090 = CW.

3 Includes outdoor unit and matched indoor blower unit, but no piping.

4 Based on a 95 ºF ambient.

TABLE 11: PHYSICAL DATA (INDOOR UNIT)

DESCRIPTION			UNIT MODEL - FA090
Coil	Rows Deep x Rows High		3 x 32
	Finned Length - inches		45.5
	Face Area - square feet		10.1
	Tube (Copper) OD - inches		3/8
	Fins (Aluminum) per inch		13
Centrifugal Blower (Forward Curve)	Diameter x Width - inches		15 X 15
Blower Motor[1]	Nominal Rating - HP		1-1/2
Filters (Throwaway)	Quantity Per Unit - 16” x 25” x 1”		4
	Total Face Area - square feet		11.1
Refrigerant-22 (Lbs.)	Holding Charge[2]		-
	Pumpdown Capacity[3]		16.5
Unit Weight[4] (lbs.)	Shipping		425
	Operating		385
Accessory Operating Weights (Lbs.)	Electric Heaters[5]	10 KW	63
		16 KW	66
		26 KW	71
		36 KW	74
	Supply Air Plenum		102
	Base		60
	Return Air Grille		15
Shipping Volume (Basic Unit) - cubic feet			45

1 All of these 1750 RPM motors have a solid base, a 56 frame, a 1.15 service factor, inherent protection & permanently lubricated ball bearings. Refer to Table 7 for additional motor & drive data.

2 Although every indoor unit is shipped with a small holding charge, this charge will be lost during installation. Loss of all refrigerant must be reclaimed during installation - NOT vented into the atmosphere. Refer to the above table on the OUTDOOR unit for the system operating charge.

3 Based on a 80ºF ambient.

4 Refer to Installation Instruction Form 035-18475-000 for the distributed weight of these indoor units.

5 Refer to Table 13 for additional electric heat accessory data.

TABLE 12: PHYSICAL DATA - ELECTRIC HEAT ACCESSORIES

Description		Nominal Heater Capacity			
		10 kW	16 KW	26 KW	36 KW
Heater Elements	% Nickel	59.2			
	% Chromium	16.0			
	Coil ID - inches	9/32			
	Watt Density - watts/sq.in.	59			
	Rows Deep	1	2	3	4
Face Area - square feet		3.0			

TABLE 13: ELECTRICAL DATA - OUTDOOR UNIT

Model EFB		Compressor				Outdoor Fan Motor			Min. Circuit Amps	Max. Fuse Size	Min. Wire Size,[1] AWG
		Power Supply	RLA	LRA	Power Factor	Power Supply	Qty.	FLA (Each)			
090A	25	200/230-3-60	25.6	190.0	0.94 @ 208V 0.84 @ 230V	208/230-1-60	2	3.03	38.1	60	8
	46	460-3-60	12.8	95.0	0.86	460-1-60	2	1.6	19.2	30	10

[1] Based on three, 60ºC insulated copper conductors in steel conduit.

TABLE 14: INDOOR UNIT - HEAT PUMP ONLY

Blower Motor HP	Power Supply	FLA	Max. Fuse Size,[1] AMPS
FA090			
1-1/2	208-3-60	5.2	15
	230-3-60	5.0	15
	460-3-60	2.6	15

[1] Dual element, time delay fuses.

TABLE 15: CONTROL WIRE SIZING

Wire Size	Max. Total Circuit Length, (Ft.)
#19 Solid	130
#18 Solid	170
#18 Stranded	180
#16 Stranded	270
#14 Stranded	455
#12 Stranded	730

To determine the total circuit length, add the following distances:

1 - Outdoor Unit to Indoor Unit _____
2 - Indoor Unit to Thermostat _____
3 - Thermostat to Indoor Unit _____
4 = Indoor Unit to Outdoor Unit _____
Total Circuit Length _____

TABLE 16: HEAT PUMP WITH ELECTRIC HEAT[1]

Nominal Heater KW[2]	Power Supply	Heater FLA	Total Unit Ampacity AMPS	Max, Fuse Size,[3] AMPS	Min. Wire Size,[4] AWG
FA090					
10	208-3-60	20.8	31.3	35	8
	230-3-60	24.1	35.1	40	8
	460-3-60	12.0	17.6	20	12
16	208-3-60	33.4	46.9	50	8
	230-3-60	38.5	53.1	60	6
	460-3-60	19.2	26.7	30	10
26	208-3-60	54.2	73	80	4
	230-3-60	62.5	83.2	90	4
	460-3-60	31.3	41.7	45	8
36	208-3-60	75.1	99	110	3
	230-3-60	86.6	113.3	125	2
	460-3-60	43.3	56.7	60	6

1 Unit with an electric heat accessory will always be wired for a single power supply.

2 Refer to the Heating Capacity table for the actual KW and MBH ratings of each heater at the different voltages.

3 Inverse time circuit breakers may be used in lieu of dual element, time delay fuses.

4 Based on three, insulated copper conductors in steel conduit: 60ºC wire when the total unit ampacity is below 100 amps; 75ºC wire when the total unit ampacity is 100 amps and above.

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Supersedes: 036-21371-001-A-0402

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