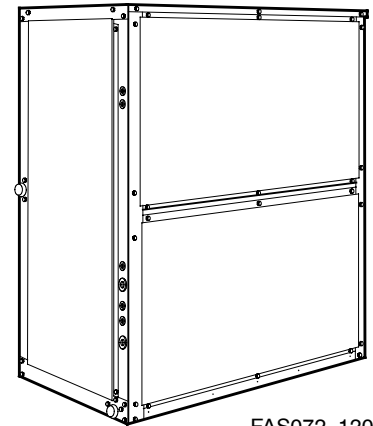


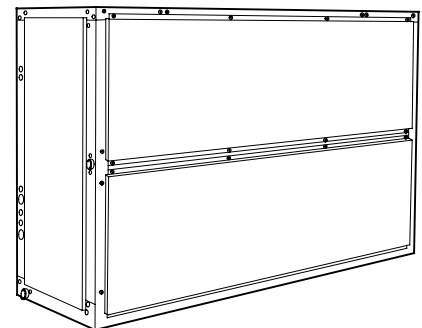
DIRECT EXPANSION COMMERCIAL PACKAGED AIR HANDLING UNITS, 6 - 15 TONS STANDARD ASHRAE 90.1-2010 EFFICIENCY

BUILT TO LAST, EASY TO INSTALL AND SERVICE

- Multi-position design for horizontal or vertical installation without modification.
- Two sloped condensate pans on each unit for horizontal or vertical applications.
- Cleanable insulation treated with Environmental Protection Agency (EPA) registered antimicrobial agent improves indoor air quality.
- 2 inch filters.
- High-static design meets a wide range of applications.
- Powerfull belt-driven forward cured fans.
- Single blower on 6 to 10 ton units; dual blower on 12.5 to 15 ton units.
- Cooling coils with mechanically bonded fins provide peak heat transfer.
- Standard factory-installed thermo-static expansion valve (TXV) with removable power element.
- Easy manitenance – removal of single panel allows access to virtually all components.
- Die-formed galvanized steel casings provide durability and structural integrity. Optional paint is available.
- Economizer accessory provides ventilation air and “free” cooling.
- Hot water coil, steam coil, and electric heat accessories are available.



FAS072-120



FAS150-180



ARI Standard
340/360



WARRANTY

- 1 Year parts limited warranty

UNIT PERFORMANCE DATA

UNIT	Nominal Tons	Number of Circuits	Unit Dimensions H x W x L [mm]	Unit Weight lb. [kg]
FAS072*AAA0A0A	6	1	56-1/16" x 49" x 28-3/16" [1424 x 1244 x 714]	399 [181]
FAS091*AAA0A0A	7 1/2	1	56-1/16" x 49" x 28-3/16" [1424 x 1244 x 714]	404 [183]
FAS120*AAA0A0A	10	2	56-1/16" x 49" x 28-3/16" [1424 x 1244 x 714]	425 [193]
FAS150*AAA0A0A	12 1/2	2	56-1/16" x 89" x 28-3/16" [1424 x 2261 x 714]	695 [315]
FAS180*AAA0A0A	15	2	56-1/16" x 89" x 28-3/16" [1424 x 2261 x 714]	713 [323]

* Indicates Unit voltage: K = 208/230-1-60, H = 208/230-3-60, M = 208/230/460-3-60, S = 575-3-60

NOTE: BASE MODEL NUMBERS LISTED. SEE MODEL NOMENCLATURE LISTING FOR ADDITIONAL OPTIONS

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MODEL NOMENCLATURE

MODEL SERIES	F	A	S	0	9	1	M	A	A	A	0	A	0	A
Position Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
F = R-410A Fan Coil Unit														
A = Air Conditioning (Cooling Only)	Type													
S = Standard ASHRAE 90.1-2010 Efficiency	Efficiency													
072 = 6 Tons (1 circuit)	Nominal Cooling Capacity													
091 = 7.5 Tons (1 circuit)														
120 = 10 Tons (2 circuit)														
150 = 12.5 Tons (2 circuit)														
180 = 15 Tons (2 circuit)														
K = 208/230-1-60 (6 & 7.5 ton models)	VOLTAGE													
H = 208/230-3-60 (15 ton with high static motor)														
M = 460/208/230-3-60 (6 to 12.5 ton models)														
S = 575-3-60														
A = Belt Drive, Standard Low-Med Static	Indoor Fan Motor													
B = Belt Drive, High Static Option														
A = Al/Cu	Indoor Coil													
A = Standard D/X Coil	Refrigerant System Options													
0 = Standard (Future use)	Future Use													
A = Unpainted Cablnet	Service Options													
B = Painted cabinet (Gray)														
0 = Standard (Future use)	Future Use													
A = Standard	Packaging													

FACTORY OPTIONS AND/OR ACCESSORIES

ACCESSORIES		
Model Number	Description	Used on Unit Size (Tons)
AGRC01AA	Return Air Grille	6 to 10
AGRC02BA	Return Air Grille	12-1/2 to 15
ASPC01AA	Steam Coil (1 Row)	6 to 10 Ton
ASPC02BA	Steam Coil (1 Row)	12-1/2 to 15
ASBC01A	Floor Mount Base (Subbase)	6 to 15
AHBC01A	Overhead Suspension Brackets	6 to 15
ACSC01A	Condensate Overflow Switch	6 to 15
APDC01AA	Discharge Plenum	6 to 10
APDC02BA	Discharge Plenum	12-1/2 to 15
DNCBDIOX005A00	CO ₂ Sensor for Economizer	6 to 15
AEMC01AA	Economizer	6 to 10
AEMC02BA	Economizer	12-1/2 to 15
AHWC01AA	Hot Water Coil (2 Row)	6 to 10
AHWC02BA	Hot Water Coil (2 Row)	12-1/2 to 15

Alternate fan motors and drives are available to provide the widest possible range of performance.

Prepainted steel units are available from the factory for applications that require painted units. Units are painted with American Sterling Gray color.

Field-installed accessories

Two-row hot water coils have copper tubes mechanically bonded to aluminum plate fins and non-ferrous headers.

One-row steam coil has copper tubes and aluminum fins. The Inner Distributing Tube (IDT) design provides uniform temperatures across the coil face. The steam coil has a broad operating pressure range; up to 20 psi (138 kPag) at 260°F (126°C). The IDT steam coils are especially suited to applications where sub-freezing air enters the unit.

Electric resistance heat coils have an open-wire design and are mounted in a rigid frame. Safety cutouts for high temperature conditions are standard. Terminal block for single-point power connection is included.

Economizer (enthalpy controlled) provides ventilation air and “free” cooling if outside ambient temperature and humidity are suitable. It can also be used with CO₂ sensors to help meet indoor air quality requirements.

ITEM	OPTION*	ACCESSORY†
High Static Fan Motor / Drives	X	
CO ₂ Sensors		X
Condensate Drain Trap		X
Discharge Plenum		X
Economizer		X
Electric Heat		X
Hot Water Heating Coils		X
Overhead Suspension Package		X
Prepainted Units	X	
Return Air Grille		X
Steam Heating Coil		X
Subbase		X

* Factory—installed option.

† Field—installed accessory

Discharge plenum directs the air discharge directly into the occupied space; integral horizontal and vertical louvers enable redirection of airflow. Accessory is available unpainted or painted. Field assembly is required (only applicable for vertical application).

Return-air grille provides a protective barrier over the return-air opening and gives a finished appearance to units installed in the occupied space. Accessory is available unpainted or painted.

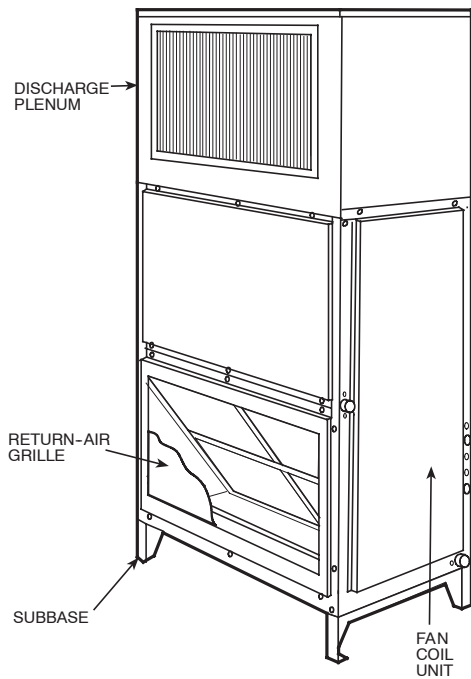
Subbase provides a stable, raised platform and room for condensate drain trap connection for vertical floor-mounted units. Accessory is available unpainted or painted.

Overhead suspension package includes necessary brackets to support units in horizontal ceiling installations.

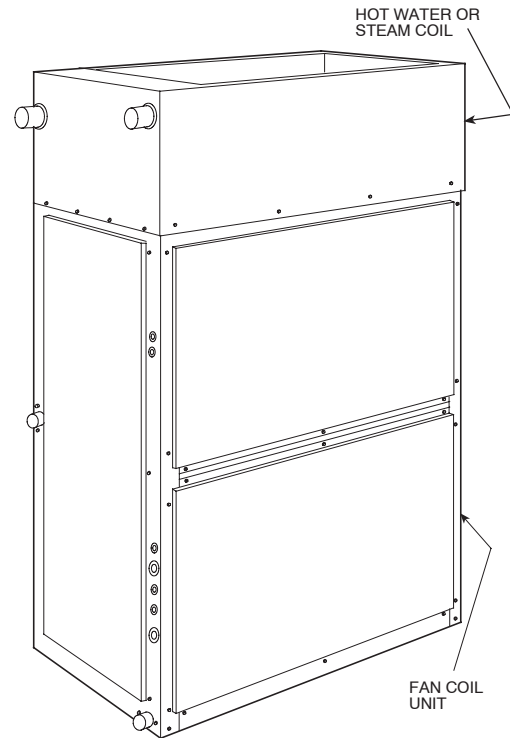
CO₂ sensors can be used in conjunction with the economizer accessory to help meet indoor air quality requirements. The sensor signals the economizer to open when the CO₂ level in the space exceeds the set point. A programmable thermostat can be used to override the sensor if the outside-air temperature is too high or too low.

Condensate drain trap includes an overflow shutoff switch that can be wired to turn off the unit if the trap becomes plugged. Kit also includes a wire harness that can be connected to an alarm if desired. The transparent trap is designed for easy service and maintenance.

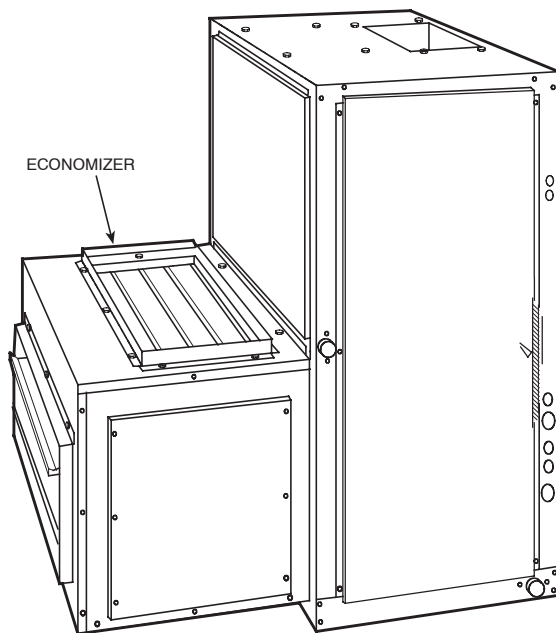
FAS WITH DISCHARGE PLENUM,
RETURN AIR GRILLE AND SUBBASE



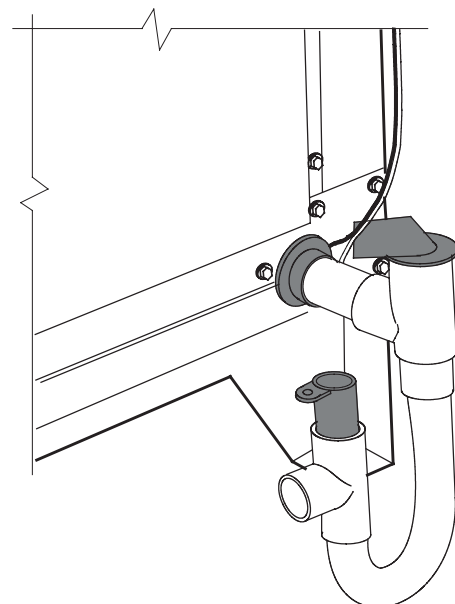
FAS WITH HOT WATER OR STEAM COIL



FAS WITH ECONOMIZER



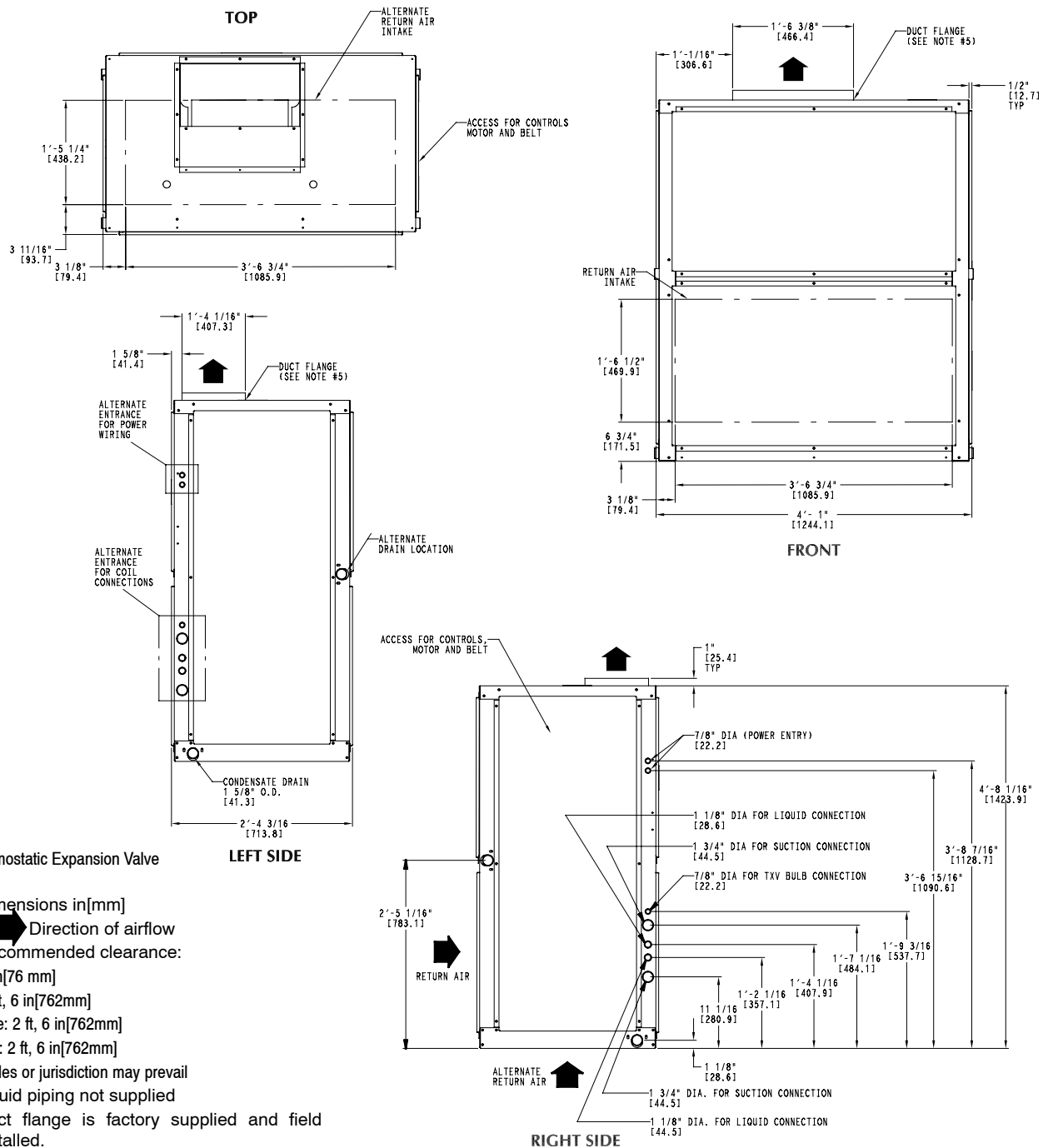
FAS WITH CONDENSATE TRAP



Physical Data, English - Cooling Units					
UNIT FAS	072	091	120	150	180
NOMINAL CAPACITY (Tons)	6	7.5	10	12.5	15
OPERATING WEIGHT (lb)					
Base Unit with TXV	399	404	425	695	713
Plenum	175	175	175	225	225
FANS					
Qty...Diam. (in)	1...15	1...15	1...15	2...15	2...15
Nominal Airflow (cfm)	2400	3000	4000	5000	6000
Ari flow Range (cfm)	1800-3000	2250-3750	3000-5000	3750-6250	4500-7500
Nominal Motor HP (Standard Motor)					
208/230 -1-60	1.3	2.4	-	-	-
208/230-3/60 and 460-3-60	2.4	2.4	2.4	2.9	3.7
575-3-60	1.0	2.0	2.0	3.0	3.0
Motor Speed (rpm)					
208/230 -1-60	1725	1725	-	-	-
208/230-3/60 and 460-3-60	1725	1725	1725	1725	1725
575-3-60	1725	1725	1725	1725	1725
Nominal Motor HP (High Static Motor)					
208/230 -1-60	2.4	2.4	-	-	-
208/230-3/60 and 460-3-60	2.9	2.9	3.7	3.7	5.0
575-3-60	2.0	3.0	3.0	5.0	5.0
Motor Speed (rpm)					
208/230 -1-60	1725	1725	-	-	-
208/230-3/60 and 460-3-60	1725	1725	1725	1725	1725
575-3-60	1725	1725	1725	1725	1725
REFRIGERANT					
	R-410A				
Operating charge (lb) - (approx per circuit)*	3	3	1.5/1.5	2.0/2.0	2.0/2.0
DIRECT-EXPANSION COIL					
	Enhanced Copper Tubes, - Aluminum Sine-Wave Fins				
Max Working Pressure (psig)	435				
Face Area (sq ft)	6.67	8.33	10.01	13.25	17.67
No. of Splits	1	1	2	2	2
No. of Circuits per Split D/X (4 row)	12	15	9	12	16
Split Type...Percentage	-	-	Face 50/50		
Fins/in	15	15	17	15	15
STEAM COIL					
Max Working Pressure (psig at 260 F)	20				
Total Face Area (sq ft)	6.67	6.67	6.67	13.33	13.33
Rows...Fins/in	1...9	1...9	1...9	1...10	1...10
HOT WATER COIL					
Max Working Pressure (psig)	150				
Total Face Area (sq ft)	6.67	6.67	6.67	13.33	13.33
Rows...Fins/in	2...8.5	2...8.5	2...8.5	2...8.5	2...8.5
Water Volume					
gal	8.3		13.9		
ft cubed	1.1		1.85		
PIPING CONNECTIONS					
Quantity...Size					
DX Coil - Suction (ODF)	1...1 1/8	1...1 1/8	2...1 1/8	2...1 1/8	2...1 1/8
DX Coil - Liquid Refrigerant (ODF)	1...5/8		2...5/8		
Steam Coil, in (MPT)	1...2 1/2		1...2 1/2		
Steam Coil, out (MPT)	1...1 1/2		1...1 1/2		
Hot Water Coil, in (MPT)	1...1 1/2		1...1 1/2	1...2	
Hot Water Coil, out (MPT)	1...1 1/2		1...1 1/2	1...2	
Condensate (PVC)	1...1 1/4 ODM/1 IDF				
FILTERS					
Throwaway - Factory Shipped					
Quantity...Size	4...16 x 24 x 2		4... 16 x 20 x 2		
Access Location	(Either Side) 4... 16 x 24 x 2				
LEGEND					
DX - Direct Expansion					
TXV - Thermostatic Expansion Valve					
* - Units are shipped without refrigerant charge					

Physical Data, SI - Cooling Units					
UNIT FAS	072	091	120	150	180
NOMINAL CAPACITY (kW)	21	26	35	43	52
OPERATING WEIGHT (kg)					
Base Unit with TXV	181	183	193	315	323
Plenum	80	80	80	102	102
FANS					
Qty...Diam. (mm)	1...381	1...381	1...381	2...381	2...381
Nominal Airflow (L/s)	1133	1604	1888	2360	2831
Airflow Range (L/s)	850-1416	1203-2006	1416-2360	1770-2949	2124-3539
Nominal Motor kW (Standard Motor)					
208/230 -1-60	0.97	1.79	-	-	-
208/230-3/60 and 460-3-60	1.79	1.79	1.79	2.16	2.76
575-3-60	0.75	1.49	1.49	2.24	2.24
Motor Speed (rpm)					
208/230 -1-60	28.8	28.8	-	-	-
208/230-3/60 and 460-3-60	28.8	28.8	28.8	28.8	28.8
575-3-60	28.8	28.8	28.8	28.8	28.8
Nominal Motor kW (High Static Motor)					
208/230 -1-60	1.79	1.79	-	-	-
208/230-3/60 and 460-3-60	2.16	2.16	2.76	2.76	3.73
575-3-60	1.49	2.24	2.24	3.73	3.73
Motor Speed (rpm)					
208/230 -1-60	28.8	28.8	-	-	-
208/230-3/60 and 460-3-60	28.8	28.8	28.8	28.8	28.8
575-3-60	28.8	28.8	28.8	28.8	28.8
REFRIGERANT			R-410A		
Operating charge (kg) - (approx per circuit)*	1.36	1.36	.68/.68	.90/.90	1.13/1.13
DIRECT-EXPANSION COIL			Enhanced Copper Tubes, - Aluminum Sine-Wave Fins		
Max Working Pressure (psig)			3102		
Face Area (sq m)	0.62	0.77	0.93	0.93	1.64
No. of Splits	1	1	2	2	2
No. of Circuits per Split D/X (4 row)	12	15	9	9	16
Split Type...Percentage	-	-		Face 50/50	
Fins/m	591	591	670	591	591
STEAM COIL					
Max Working Pressure (psig at 260 F)			138		
Total Face Area (sq m)	0.62	0.62	0.62	1.24	1.24
Rows...Fins/m	1...355	1...355	1...355	1...394	1...394
HOT WATER COIL					
Max Working Pressure (psig)			1034		
Total Face Area (sq m)	0.62	0.62	0.62	1.24	1.24
Rows...Fins/in	2...335	2...335	2...335	2...335	2...335
Water Volume					
L		31.4		52.6	
m cubed		0.031		0.052	
PIPING CONNECTIONS					
Quantity...Size					
DX Coil - Suction (ODF)	1...1 1/8	1...1 1/8	2...1 1/8	2...1 1/8	2...1 1/8
DX Coil - Liquid Refrigerant (ODF)		1...5/8		2...5/8	
Steam Coil, in (MPT)		1...2 1/2		1...2 1/2	
Steam Coil, out (MPT)		1...1/2		1...1 1/2	
Hot Water Coil, in (MPT)		1...1 1/2		1...2	
Hot Water Coil, out (MPT)		1...1 1/2		1...2	
Condensate (PVC)			1...1 1/4 ODM/1 IDF		
FILTERS			Throwaway - Factory Shipped		
Quantity...Size		4...406 x 610 x 51		4...406 x 508 x 51	
Access Location				4...406 x 610 x 51	
				Either Side	
LEGEND					
DX - Direct Expansion					
TXV - Thermostatic Expansion Valve					
* - Units are shipped without refrigerant charge					

Dimensions - Sizes 6 - 10 Ton



LEGEND

TXV - Thermostatic Expansion Valve

NOTES:

1. Dimensions in [mm]
2. Direction of airflow
3. Recommended clearance:

Rear: 3 in [76 mm]

Front: 2 ft, 6 in [762 mm]

Right side: 2 ft, 6 in [762 mm]

Left side: 2 ft, 6 in [762 mm]

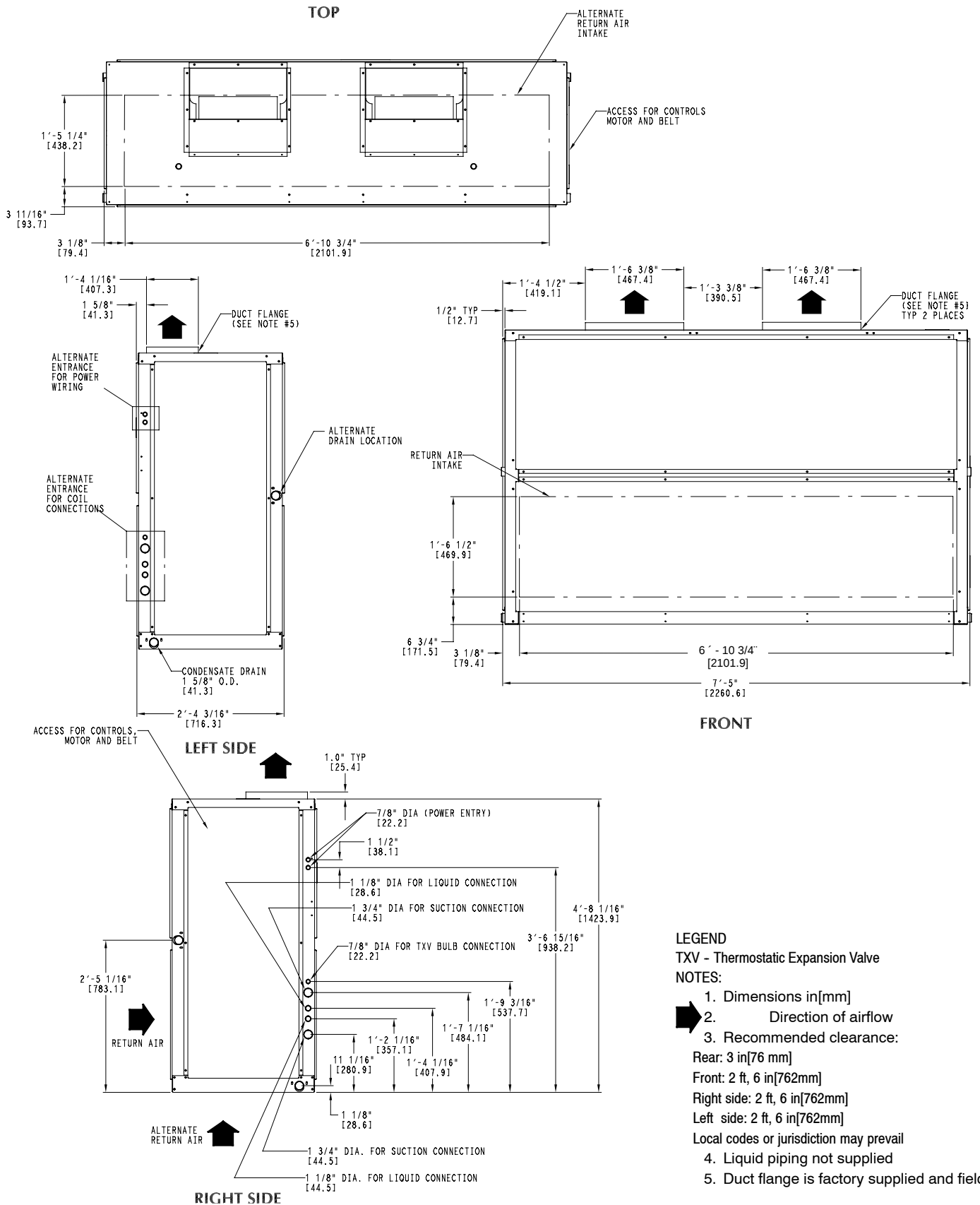
Local codes or jurisdiction may prevail

4. Liquid piping not supplied

5. Duct flange is factory supplied and field installed.

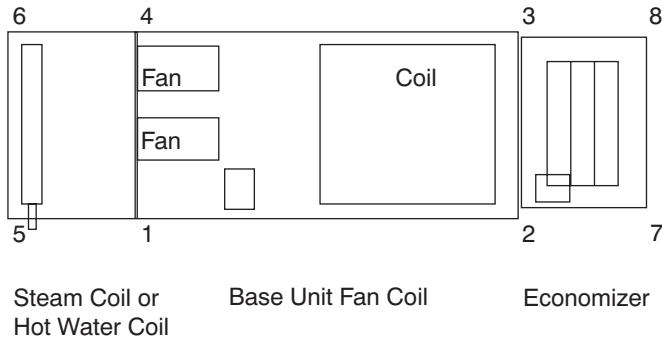
UNIT	UNIT WEIGHT lb(kg)
FAS072	399 (181)
FAS091	404 (183)
FAS120	425 (193)

Dimensions - Sizes 12.5 & 15 Ton



UNIT	UNIT WEIGHT lb(kg)
FAS150	695 (315)
FAS180	713 (323)

CORNER WEIGHTS HORIZONTAL POSITION



FAS – U.S.

FAS UNIT SIZE	UNIT OR ACCESSORY NAME		UNIT OR ACCESSORY WEIGHT (lb)	CORNER NUMBER (WEIGHT IN LB)							
				1	2	3	4	5	6	7	8
FAS072	FAN COIL BASE UNIT		399	109.3	106.1	90.6	93.4	—	—	—	—
FAS091	FAN COIL BASE UNIT		404	110.7	107.5	91.7	94.5	—	—	—	—
FAS120	FAN COIL BASE UNIT		425	116.4	113.0	96.5	99.4	—	—	—	—
FAS 072, 091, 120	STEAM COIL	ADD	215	40.2	0.0	0.0	40.6	66.5	67.5	0.0	0.0
	HOT WATER COIL	ADD	195	35.9	0.0	0.0	36.7	60.4	62.0	0.0	0.0
	ECONOMIZER	ADD	185	0.0	36.8	35.7	0.0	0.0	0.0	56.8	55.1
	ECO + STEAM COIL	ADD	400	38.8	38.6	37.4	39.2	64.2	65.2	59.5	57.7
	ECO + HW COIL	ADD	380	36.9	35.8	34.6	37.7	62.1	63.8	55.1	53.4
FAS150	FAN COIL BASE UNIT		695	224.0	177.7	129.8	163.7	—	—	—	—
FAS180	FAN COIL BASE UNIT		713	229.8	182.3	133.2	167.9	—	—	—	—
FAS 150, 180	STEAM COIL	ADD	340	61.4	0.0	0.0	62.0	107.8	108.8	0.0	0.0
	HOT WATER COIL	ADD	285	51.7	0.0	0.0	51.3	91.5	90.6	0.0	0.0
	ECONOMIZER	ADD	340	0.0	66.9	62.0	0.0	0.0	0.0	109.8	102.0
	ECO + STEAM COIL	ADD	680	64.4	63.7	59.0	65.0	113.0	114.1	104.5	97.1
	ECO + HW COIL	ADD	625	60.0	57.6	53.4	59.5	106.2	105.1	94.6	87.8

FAS – SI

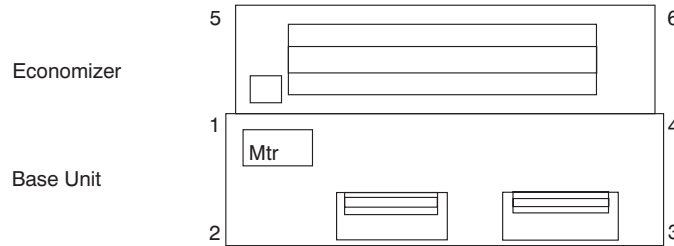
FAS UNIT SIZE	UNIT OR ACCESSORY NAME		UNIT OR ACCESSORY WEIGHT (kg)	CORNER NUMBER (WEIGHT IN KG)							
				1	2	3	4	5	6	7	8
FAS072	FAN COIL BASE UNIT		181	49.6	48.1	41.1	42.3	—	—	—	—
FAS091	FAN COIL BASE UNIT		183	50.1	48.6	41.5	42.8	—	—	—	—
FAS120	FAN COIL BASE UNIT		193	52.9	51.3	43.8	45.2	—	—	—	—
FAS 072, 091, 120	STEAM COIL	ADD	98	18.2	0.0	0.0	18.4	30.2	30.6	0.0	0.0
	HOT WATER COIL	ADD	89	16.4	0.0	0.0	16.7	27.5	28.2	0.0	0.0
	ECONOMIZER	ADD	84	0.0	16.7	16.2	0.0	0.0	0.0	25.8	25
	ECO + STEAM COIL	ADD	182	17.6	17.5	17.0	17.8	29.1	29.6	27.0	26.2
	ECO + HW COIL	ADD	173	16.8	16.3	15.8	17.2	28.3	29.0	25.1	24.3
FAS150	FAN COIL BASE UNIT		315	86.3	83.7	71.5	73.7	—	—	—	—
FAS180	FAN COIL BASE UNIT		323	88.5	85.9	73.3	75.6	—	—	—	—
FAS150, 180	STEAM COIL	ADD	155	28.1	0.0	0.0	28.3	49.3	49.3	0.0	0.0
	HOT WATER COIL	ADD	130	23.6	0.0	0.0	23.4	41.8	41.2	0.0	0.0
	ECONOMIZER	ADD	155	0.0	30.2	28.3	0.0	0.0	0.0	50.3	46.2
	ECO + STEAM COIL	ADD	310	29.3	29.0	26.9	29.6	51.5	51.9	47.6	44.2
	ECO + HW COIL	ADD	285	27.5	26.4	24.4	27.1	48.5	47.9	43.1	40.1

LEGEND:

ECO – Economizer

HW – Hot Water

CORNER WEIGHTS VERTICAL POSITION



NOTE: Steam, Hot Water & Plenum
on top of positions 1,2,3,4

FAS – U.S.

FAS UNIT SIZE	UNIT OR ACCESSORY NAME		UNIT OR ACCESSORY WEIGHT (lb)	CORNER NUMBER (WEIGHT IN LB)					
				1	2	3	4	5	6
FAS072	FAN COIL BASE UNIT		399	100.5	114.9	98.0	85.8	—	—
FAS091	FAN COIL BASE UNIT		404	101.7	116.3	99.1	86.9	—	—
FAS120	FAN COIL BASE UNIT		425	107.6	122.3	108.0	87.1	—	—
FAS 072, 091, 120	STEAM COIL	ADD	215	54.1	54.1	53.4	53.4	0.0	0.0
	HOT WATER COIL	ADD	195	49.4	49.4	48.1	48.1	0.0	0.0
	PLENUM	ADD	175	50.8	36.7	36.7	50.8	0.0	0.0
	ECONOMIZER	ADD	195	38.9	0.0	0.0	37.1	59.9	58.3
	ECO + STEAM COIL	ADD	410	93.0	53.4	52.6	91.1	61.0	59.1
	ECO + HW COIL	ADD	390	88.9	52.3	50.9	86.5	56.7	54.9
FAS150	FAN COIL BASE UNIT		695	191.2	210.5	153.8	139.5	—	—
FAS180	FAN COIL BASE UNIT		713	196.2	216.0	157.8	143.1	—	—
FAS150, 180	STEAM COIL	ADD	340	85.4	85.4	84.6	84.6	0.0	0.0
	HOT WATER COIL	ADD	285	70.9	70.9	71.6	71.6	0.0	0.0
	PLENUM	ADD	225	72.5	40.0	40.0	72.5	0.0	0.0
	ECONOMIZER	ADD	340	66.5	0.0	0.0	62.0	109.5	102.0
	ECO + STEAM COIL	ADD	680	153.0	89.1	88.7	147.7	104.5	97.0
	ECO + HW COIL	ADD	625	139.9	82.5	83.3	136.7	94.7	87.9

FAS – SI

FAS UNIT SIZE	UNIT OR ACCESSORY NAME		UNIT OR ACCESSORY WEIGHT (kg)	CORNER NUMBER (WEIGHT IN LB)					
				1	2	3	4	5	6
FAS072	FAN COIL BASE UNIT		181	45.5	52.3	44.4	38.8	—	—
FAS091	FAN COIL BASE UNIT		183	46.0	52.7	44.9	39.4	—	—
FAS120	FAN COIL BASE UNIT		193	48.5	55.6	47.4	41.5	—	—
FAS 072, 091, 120	STEAM COIL	ADD	98	24.6	24.6	24.4	24.4	0.0	0.0
	HOT WATER COIL	ADD	89	22.4	22.4	22.1	22.1	0.0	0.0
	PLENUM	ADD	80	23.3	16.8	16.8	23.3	0.0	0.0
	ECONOMIZER	ADD	84	16.8	0.0	0.0	16.2	25.8	25.2
	ECO + STEAM COIL	ADD	182	41.3	23.6	23.3	40.3	27.0	26.5
	ECO + HW COIL	ADD	173	39.3	23.1	22.5	38.2	25.0	24.9
FAS150	FAN COIL BASE UNIT		315	86.6	95.5	69.8	63.3	—	—
FAS180	FAN COIL BASE UNIT		323	88.9	97.9	71.6	64.9	—	—
FAS150, 180	STEAM COIL	ADD	155	39.0	39.0	38.5	38.5	0.0	0.0
	HOT WATER COIL	ADD	130	32.4	32.4	32.6	32.6	0.0	0.0
	PLENUM	ADD	102	32.9	18.1	18.1	32.9	0.0	0.0
	ECONOMIZER	ADD	155	31.1	0.0	0.0	28.5	49.7	45.7
	ECO + STEAM COIL	ADD	310	69.8	40.7	40.4	67.3	47.6	44.2
	ECO + HW COIL	ADD	285	63.8	37.6	37.8	62.2	43.1	40.5

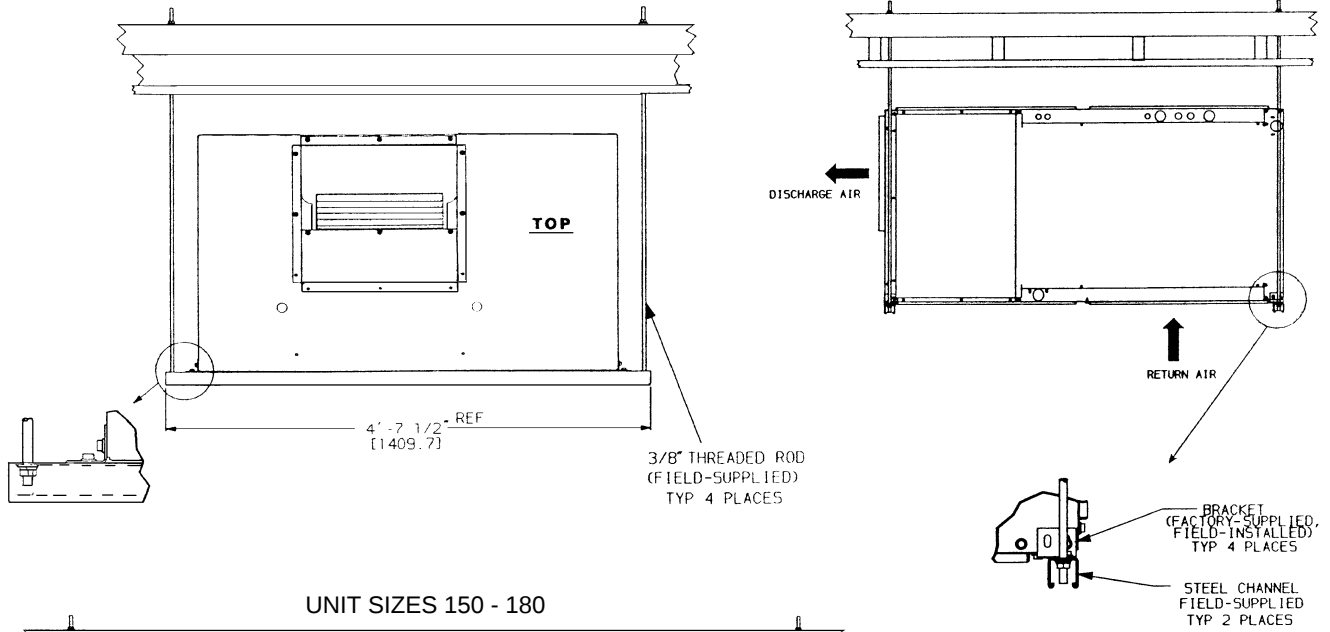
LEGEND:

ECO – Economizer
HW – Hot Water

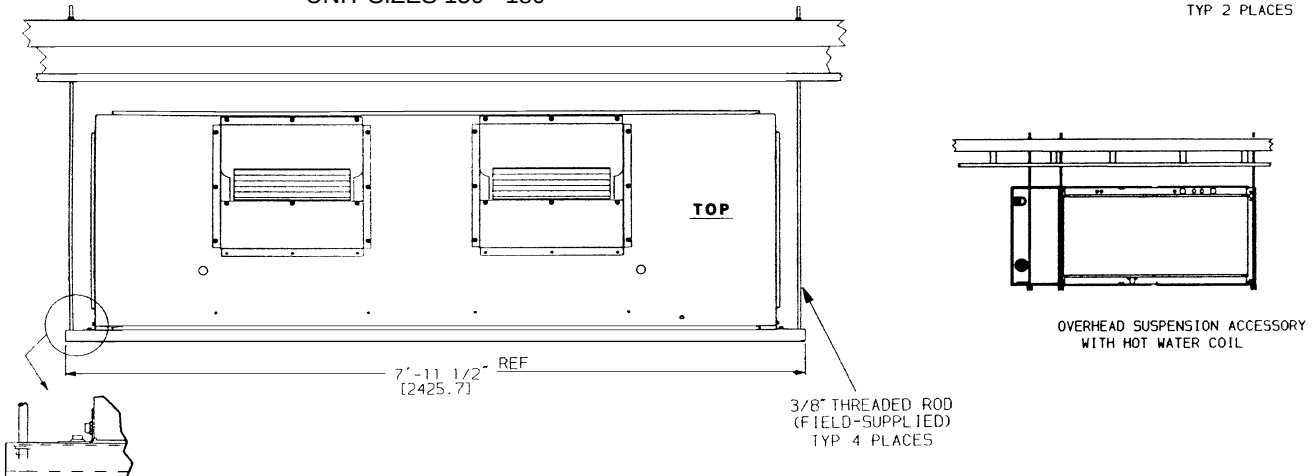
Dimensions (cont.)

Preferred Suspension Technique - Overhead Suspension Accessory

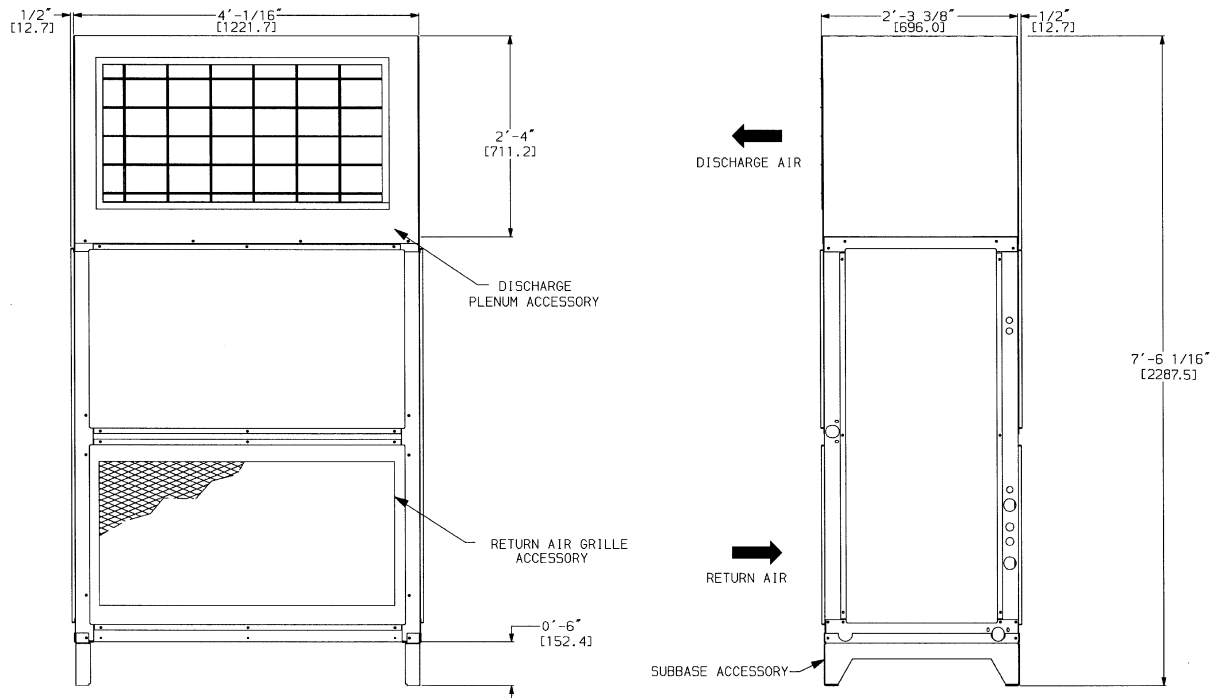
UNIT SIZES 072 - 120



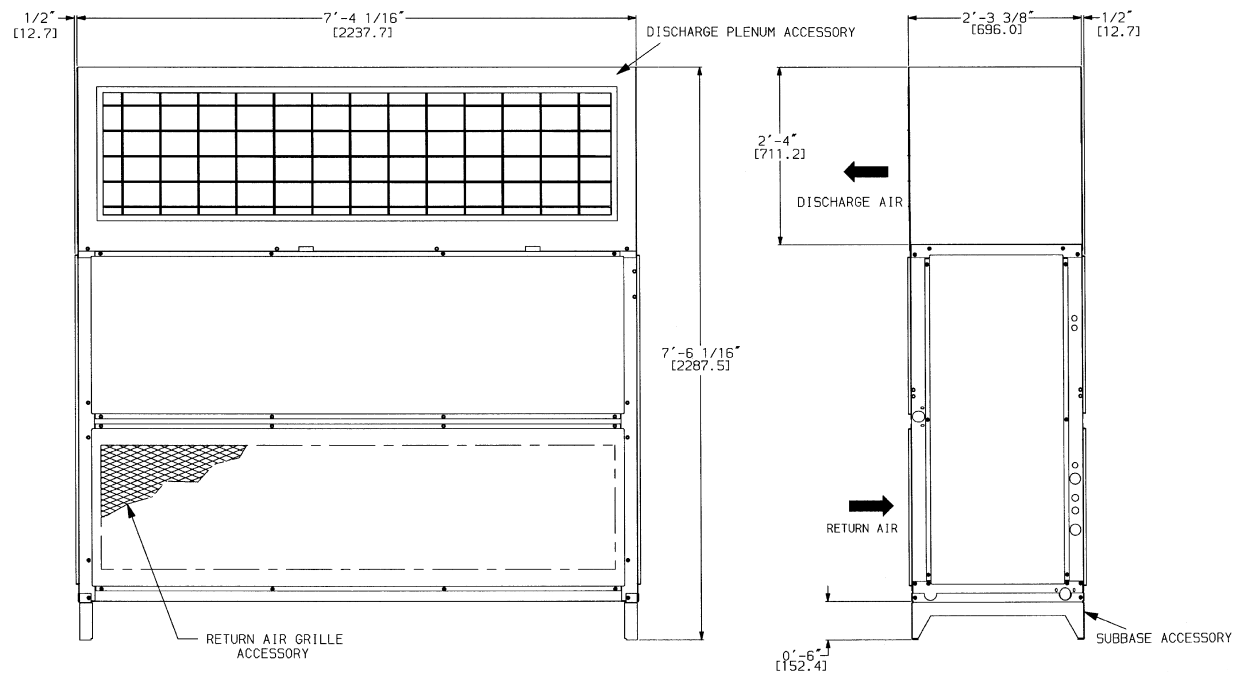
UNIT SIZES 150 - 180



PLENUM, RETURN-AIR GRILLE, AND SUBBASE ACCESSORIES
UNIT SIZES 072 - 120

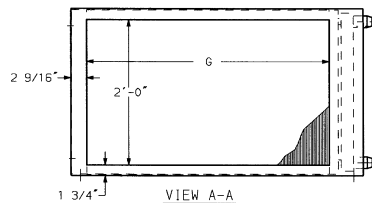
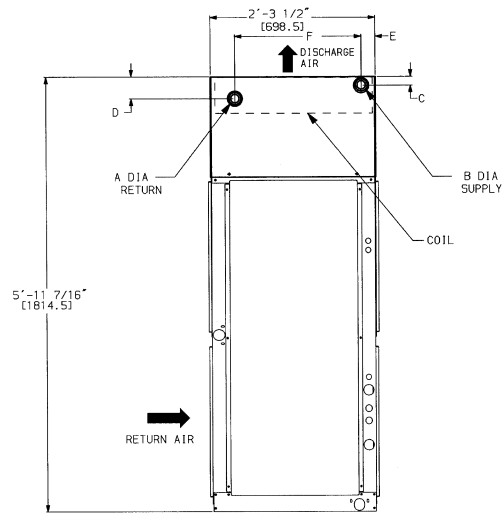
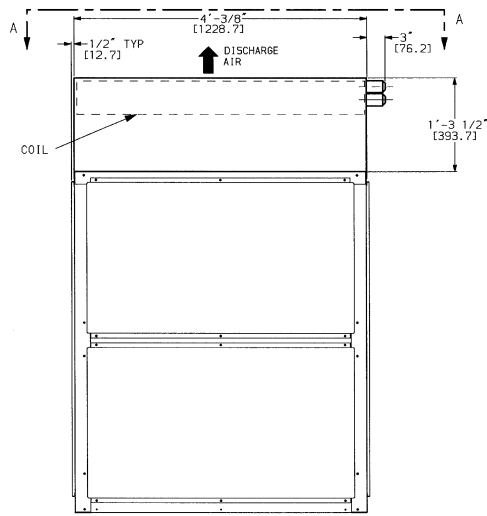


UNIT SIZE 150 - 180

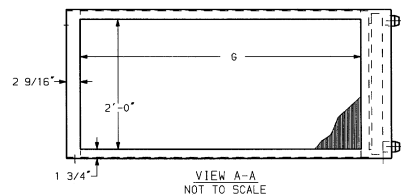
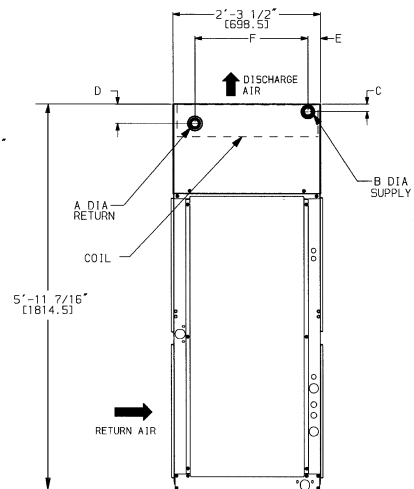
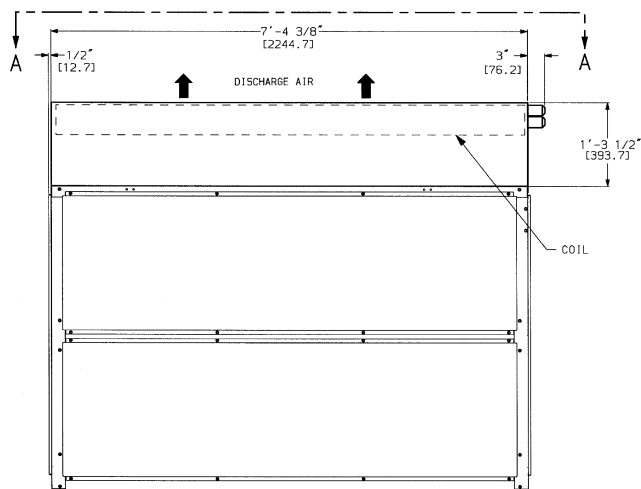


NOTE: Dimensions in [] are millimeters.

HOT WATER AND STEAM COIL ACCESSORIES UNIT SIZES 072 - 120



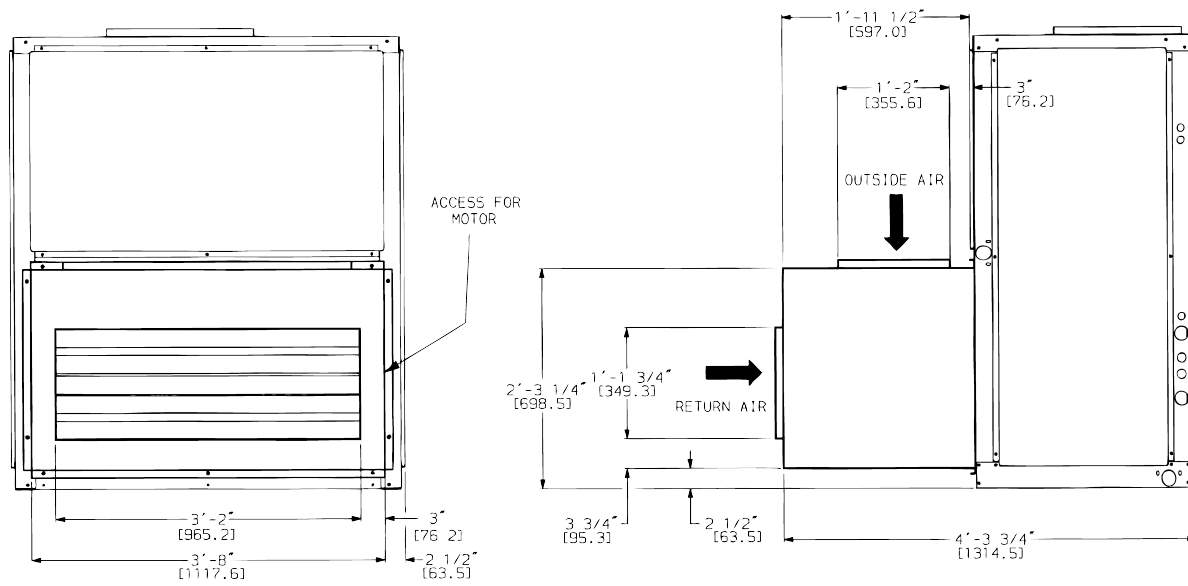
UNIT SIZE 150 - 180



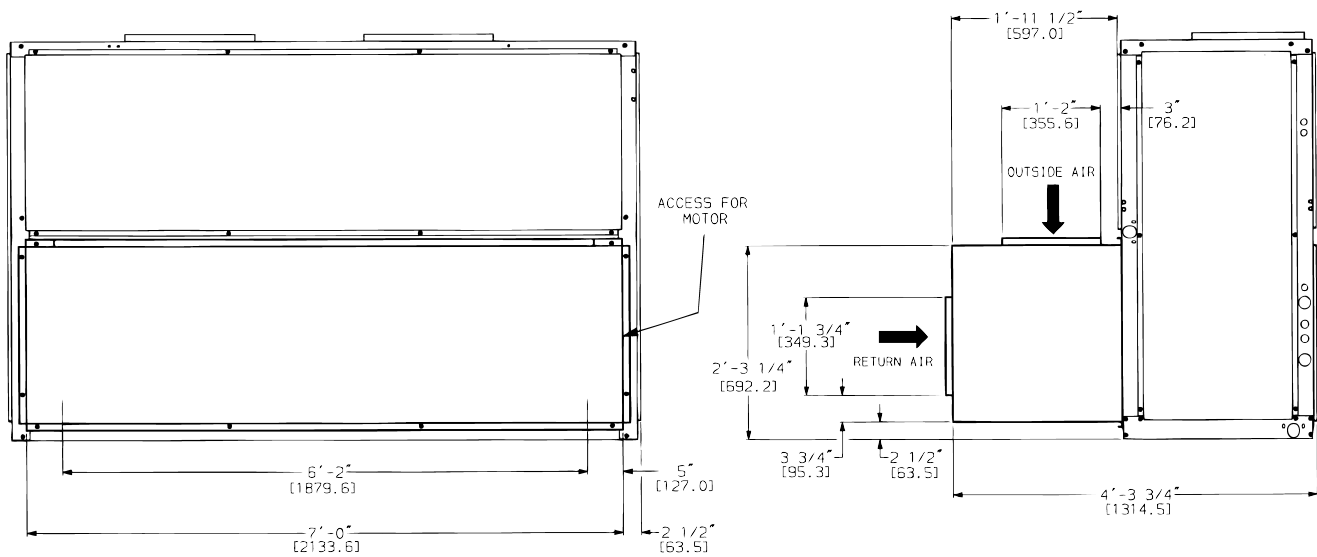
NOTE: Dimensions in [] are millimeters.

ECONOMIZER ACCESSORY

UNIT SIZES 072 - 120



UNIT SIZE 150 - 180

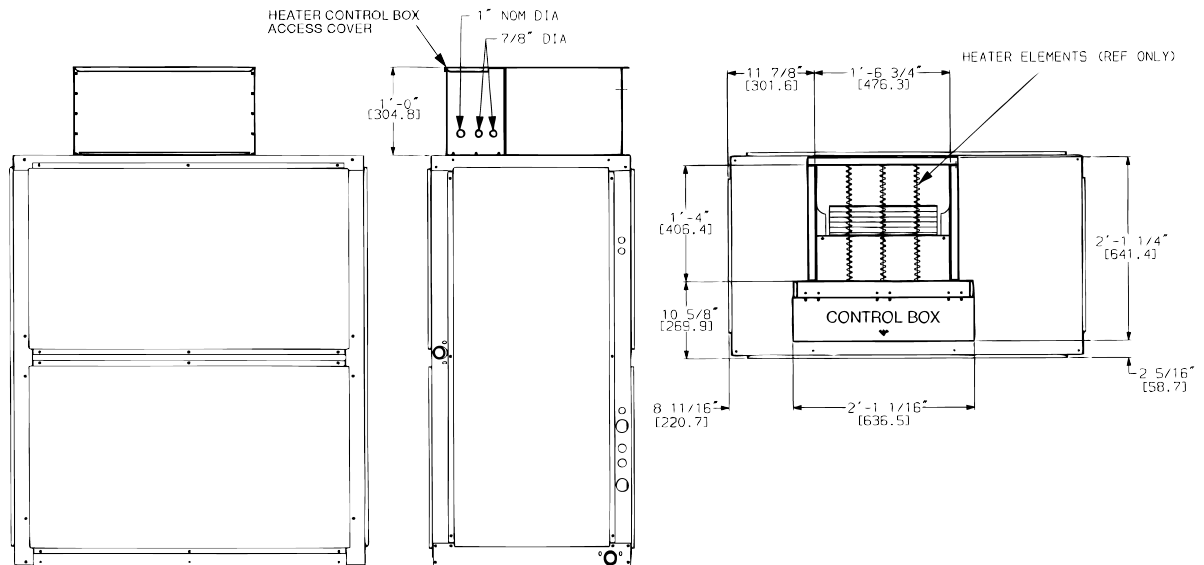


NOTE:

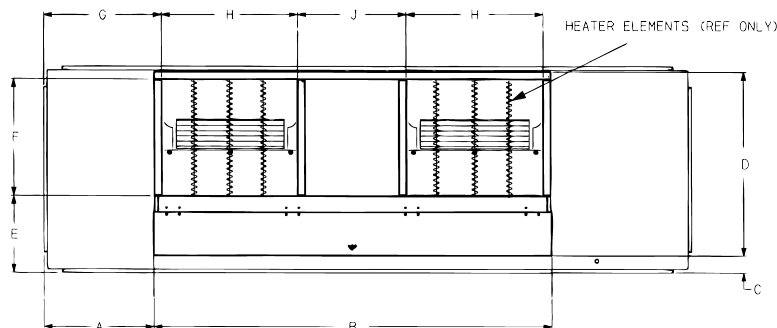
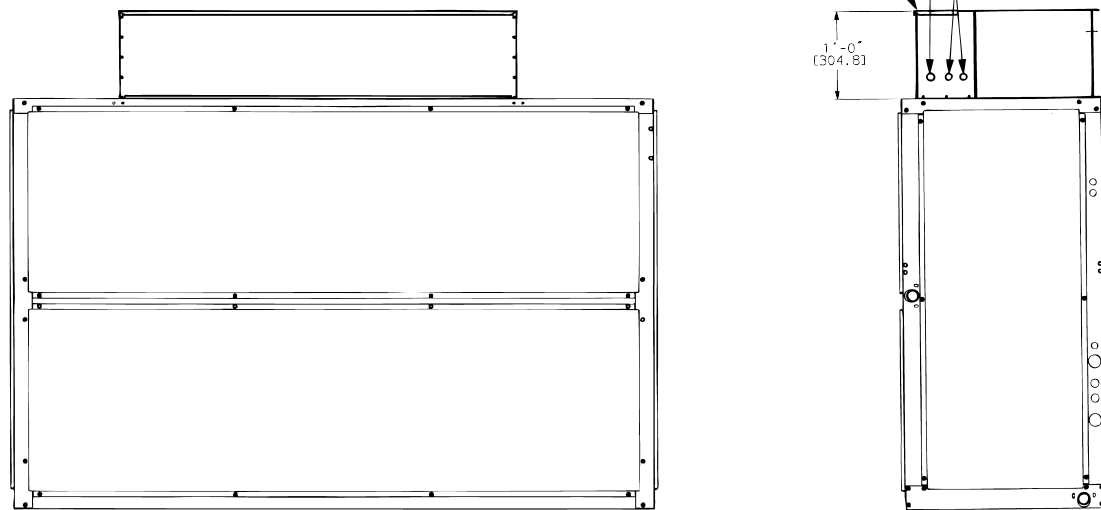
1. For horizontal unit applications, economizer can be attached to end of unit opposite duct connections.
2. Dimensions in [] are millimeters.

ELECTRIC HEAT ACCESSORY

UNIT SIZES 072 - 120



UNIT SIZE 150 - 180



Unit Size	A	B	C	D	E	F	G	H	J
150-180	1'-3 3/4" [387.4]	4'-6 3/8" [1381.1]	2 5/16" [58.7]	2'-1 1/4" [641.4]	10 5/8" [269.9]	1' 4" [406.4]	1'-4 5/16" [414.3]	1'-6 3/4" [414.3]	1'-7/8" [327.0]

SELECTION PROCEDURE (WITH EXAMPLE)

Cooling (DX)

I. Determine the cooling load and temperature and quantity of air entering the evaporator.

Given:

Total Capacity 200,000 Btuh

Sensible Heat Capacity 130,000 Btuh

Air Temperature Entering Indoor

Coil 80°F (27°C)db, 67°F (19°C) wb

Air Quantity Entering Indoor Coil 6000 cfm

Ductwork Static Pressure Loss 0.8 in. wg

Power Supply 230-3-60

II. Determine unit selection and coil refrigerant temperature.

Enter the Cooling Capacities table at 6000 cfm. Select a FAS180 unit which has a total capacity of 207,000 and 174,000 Btuh at 40 and 45°F (4 and 7°C) coil refrigerant temperature, respectively. By interpolation, coil refrigerant temperature of 41.1°F (5.1°C) is needed to give a total capacity of 200,000 Btuh. Sensible capacity is approximately 149,000 Btuh. Cooling load is satisfied.

Heating (Hot Water Coil)

I. Determine heating load and temperature of air entering the indoor coil.

Given:

Load 425,000 Btuh

Entering-Air Temperature 70°F (21°C)

Coils 2-Row Hot Water

Coil Entering-Water Temperature 200°F (93°C)

Water Temperature Drop 20°F (-7°C)

II. Find the heating capacity.

Enter Hydronic Heating Capacities table for the FAS180 unit at 6000 cfm. A 2-row hot water coil delivers 471,000 Btuh (based on 60°F/16°C entering air temperature and 20°F/-7°C water temperature drop). Since existing entering air temperature is 70°F (21°C), enter the Heating Correction Factors table for hot water coils at 200°F (93°C) entering water temperature, 20°F (-7°C) water temperature drop and 70°F (21°C) entering air. Read a constant of 0.93.

$$471,000 \times 0.93 = 438,000$$

The 438,000 Btuh rating satisfies the heating load.

Fan

I. Determine fan speed and brake horsepower:

From the Accessory Pressure Drop table, read a loss of 0.23 in. wg for a hot water coil at 6000 cfm.

$$\begin{aligned}\text{External static pressure} &= 0.80 + 0.23 \\ &= 1.03 \text{ in. wg}\end{aligned}$$

Enter FAS180 Fan Performance table at 6000 cfm and 1.03 in. wg. Interpolate and determine fan speed of 864 rpm and 3.1 bhp.

II. Determine motor and drive.

Enter the fan motor data tables and find that the 230 v standard motor for a FAS180 unit is rated at 3.7 Hp. Since the bhp required is 3.1, a standard motor satisfies the requirement and should be used.

Next, find the type of drive that satisfies the 864 rpm requirement in the Drive Data tables. For a FAS180 unit, the Medium-Static Drive table shows an rpm range of 742 to 943. Since the rpm required is 864, the medium-static drive satisfies the requirement and should be used. Select the standard motor and medium-static drive combination (option code "A" Standard or "B" High Static).

To select an outdoor unit for this FAS180 indoor section, refer to the Combination Rating sheets for CAS condensing units in the condensing unit Specification

PERFORMANCE DATA

HYDRONIC HEATING CAPACITIES — U.S.

UNIT SIZE	AIRFLOW (Cfm)	1-ROW STEAM*		2-ROW HOT WATER COIL†			
		Cap.	Ldb	Cap.	Ldb	Water Flow (Gpm)	PD
FAS072	1,800	146	134	156.0	140	15.6	3.4
	2,400	173	126	183.0	131	18.3	4.3
	3,000	209	123	206.0	124	20.6	5.2
FAS091	2,250	168	129	174.0	133	17.4	4.0
	3,000	209	123	206.0	124	20.6	5.2
	3,750	240	117	238.0	118	23.8	6.5
FAS120	3,000	209	123	299.0	152	29.9	5.0
	4,000	243	115	275.0	124	27.5	6.6
	5,000	279	111	316.0	119	31.6	8.2
FAS150	3,750	370	150	362.0	149	36.2	4.2
	5,000	425	137	409.0	136	40.9	5.1
	6,250	465	128	456.0	128	45.6	6.0
FAS180	4,500	402	141	412.0	145	41.2	4.5
	6,000	458	129	471.0	133	47.1	5.5
	7,500	479	118	529.0	125	52.9	6.6

LEGEND:

Cap. — Capacity (Btuh in thousands)

Ldb — Leaving Air Dry Bulb Temp (F)

PD — Pressure Drop (ft water)

* Based on 5 psig steam, 60° F entering-air temperature. All steam coils are non-freeze type.

† Based on 200° F entering water, 20° F water temperature drop, 60° F entering-air temperature.

NOTES:

- Maximum operating limits for heating coils: 20 psig at 260 F.
- Leaving db = ent db (F) + $\frac{\text{Capacity (Btuh)}}{1.1 \times \text{cfm}}$
- See Heating Correction Factors table.

HEATING CORRECTION FACTORS — U.S.

HOT WATER COIL						
Water Temp Drop (F)	Ent Water Temp (F)	Entering-Air Temp (F)				
		40	50	60	70	80
10	140	0.72	0.64	0.57	0.49	0.41
	160	0.89	0.81	0.74	0.66	0.58
	180	1.06	0.98	0.90	0.83	0.75
	200	1.22	1.15	1.07	1.00	0.92
	220	1.39	1.32	1.24	1.17	1.09
20	140	0.64	0.57	0.49	0.41	0.33
	160	0.81	0.74	0.66	0.58	0.51
	180	0.98	0.91	0.83	0.75	0.68
	200	1.15	1.08	1.00	0.93	0.85
	220	1.32	1.25	1.17	1.10	1.02
30	140	0.56	0.49	0.41	0.33	0.24
	160	0.74	0.66	0.58	0.51	0.43
	180	0.91	0.83	0.76	0.68	0.60
	200	1.08	1.00	0.93	0.85	0.78
	220	1.25	1.18	1.10	1.03	0.95

STEAM COIL					
Steam Pressure (psig)	Entering-Air Temp (F)				
	40	50	60	70	80
0	1.06	0.98	0.91	0.85	0.78
2	1.09	1.02	0.95	0.89	0.82
5	1.13	1.06	1.00	0.93	0.87

NOTE: Multiply capacity given in the Hydronic Heating Capacities table by the correction factor for conditions at which unit is actually operating. Correct leaving-air temperature using formula in Note 2 of Hydronic Heating Capacities table.

HYDRONIC HEATING CAPACITIES — SI

UNIT SIZE	AIRFLOW (L/s)	1-ROW STEAM*		2-ROW HOT WATER COIL†			
		Cap.	Ldb	Cap.	Ldb	Water Flow (L/s)	PD
FAS072	850	43	57	46	59	1.0	10.2
	1150	53	53	53	53	1.2	12.8
	1450	62	51	61	50	1.3	16.0
FAS091	1000	48	55	50	56	1.1	11.5
	1400	59	50	60	50	1.3	15.3
	1800	71	47	70	47	1.5	19.5
FAS120	1450	62	50	88	65	1.9	15.0
	1900	72	46	90	54	2.0	24.7
	2350	82	44	93	48	2.0	24.5
FAS150	1750	108	66	106	65	2.3	12.4
	2350	122	58	120	57	2.6	15.2
	2950	136	53	134	52	2.9	17.9
FAS180	2100	117	61	120	62	2.6	13.3
	2800	129	53	137	55	3.0	16.2
	3500	140	48	154	51	3.3	19.5

LEGEND:

Cap. — Capacity (Btuh in thousands)

Ldb — Leaving Air Dry Bulb Temp (C)

PD — Pressure Drop (ft water)

* Based on 34.5 kPag steam, 15.6° C entering-air temperature. All steam coils are non-freeze type.

† Based on 93.3° C entering water temperature, 11.1° C water temperature drop, 15.6° C entering-air temperature.

NOTES:

- Maximum operating limits for heating coils: 138 kPag at 126.7 C.
- Leaving db = ent db (C) + $\frac{\text{Capacity (kW)}}{1.23 \times 10^{-3} \times \text{L/s}}$
- See Heating Correction Factors table.

HEATING CORRECTION FACTORS — SI

HOT WATER COIL						
Water Temp Drop (C)	Ent Water Temp (C)	Entering-Air Temp (C)				
		4	10	16	20	25
5	60	0.72	0.64	0.55	0.50	0.43
	70	0.87	0.79	0.71	0.65	0.58
	80	1.02	0.94	0.86	0.80	0.73
	90	1.17	1.09	1.01	0.95	0.89
	100	1.32	1.24	1.16	1.10	1.04
11	60	0.65	0.56	0.48	0.42	0.35
	70	0.80	0.72	0.63	0.58	0.51
	80	0.95	0.87	0.79	0.73	0.66
	90	1.10	1.02	0.94	0.89	0.82
	100	1.26	1.18	1.09	1.04	0.97
16	60	0.56	0.48	0.39	0.33	0.26
	70	0.72	0.63	0.55	0.49	0.42
	80	0.87	0.79	0.70	0.65	0.58
	90	1.02	0.94	0.86	0.81	0.74
	100	1.18	1.10	1.02	0.97	0.90

STEAM COIL					
Steam Pressure (kPag)	Entering-Air Temp (C)				
	4	10	16	20	25
0	1.07	0.99	0.91	0.86	0.80
14	1.10	1.02	0.95	0.90	0.84
35	1.14	1.07	0.99	0.95	0.89

NOTE: Multiply capacity given in the Hydronic Heating Capacities table by the correction factor for conditions at which unit is actually operating. Correct leaving-air temperature using formula in Note 2 of Hydronic Heating Capacities table.

PERFORMANCE DATA

FAN PERFORMANCE DATA — FAS 208/230-1-60 0.0-1.2 in. wg ESP — 60 Hz, U.S.

FAS UNIT SIZE 4-Row Coil	AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)													
		0.0		0.2		0.4		0.6		0.8		1.0		1.2	
		Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
072	1,800	419	0.21	471	0.26	564	0.37	649	0.49	<u>727</u>	<u>0.63</u>	<u>797</u>	<u>0.77</u>	<u>862</u>	<u>0.92</u>
	2,100	471	0.31	519	0.37	602	0.49	<u>679</u>	<u>0.62</u>	<u>751</u>	<u>0.77</u>	<u>819</u>	<u>0.92</u>	<u>882</u>	<u>1.09</u>
	2,400	524	0.44	568	0.51	645	0.64	<u>715</u>	<u>0.79</u>	<u>781</u>	<u>0.94</u>	<u>844</u>	<u>1.11</u>	<u>905</u>	<u>1.28</u>
	2,700	578	0.61	619	0.69	<u>690</u>	<u>0.84</u>	<u>755</u>	<u>0.99</u>	<u>816</u>	<u>1.15</u>	<u>875</u>	<u>1.33</u>	<u>932</u>	<u>1.51</u>
	3,000	633	0.81	<u>671</u>	<u>0.90</u>	<u>738</u>	<u>1.07</u>	<u>799</u>	<u>1.24</u>	<u>856</u>	<u>1.41</u>	<u>910</u>	<u>1.60</u>	<u>963</u>	<u>1.79</u>
091	2,250	290	0.10	510	0.39	594	0.51	669	0.65	739	0.79	<u>806</u>	<u>0.95</u>	<u>870</u>	<u>1.12</u>
	2,600	349	0.19	561	0.55	640	0.70	709	0.84	<u>773</u>	<u>1.00</u>	<u>834</u>	<u>1.16</u>	<u>893</u>	<u>1.34</u>
	3,000	579	0.70	621	0.79	695	0.96	<u>759</u>	<u>1.12</u>	<u>818</u>	<u>1.30</u>	<u>874</u>	<u>1.47</u>	<u>928</u>	<u>1.66</u>
	3,400	646	0.99	683	1.09	<u>752</u>	<u>1.29</u>	<u>813</u>	<u>1.48</u>	<u>869</u>	<u>1.67</u>	<u>920</u>	<u>1.86</u>	<u>970</u>	<u>2.06</u>
	3,750	705	1.31	739	1.42	<u>804</u>	<u>1.63</u>	<u>862</u>	<u>1.85</u>	<u>915</u>	<u>2.05</u>	<u>964</u>	<u>2.26</u>	<u>1011</u>	<u>2.48</u>

Plain type — Standard Motor and fan drive

— High static motor & drive

— Medium static range: std motor & field—supplied drive

BOLD — High static motor & field—supplied drive

ITALIC — Standard motor & field—supplied drive required

FAN PERFORMANCE DATA — FAS 208/230-1-60 1.4-2.4 in. wg ESP — 60 Hz, U.S.

FAS UNIT SIZE 4-Row Coil	AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)											
		1.4		1.6		1.8		2.0		2.2		2.4	
		Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
072	1,800	<u>921</u>	<u>1.07</u>	<u>975</u>	<u>1.23</u>	<u>1026</u>	<u>1.39</u>	<u>1074</u>	<u>1.55</u>	1120	1.72	1164	1.90
	2,100	<u>942</u>	<u>1.26</u>	<u>997</u>	<u>1.43</u>	<u>1048</u>	<u>1.61</u>	1097	1.79	1143	1.97	1186	2.16
	2,400	<u>963</u>	<u>1.47</u>	<u>1017</u>	<u>1.66</u>	<u>1069</u>	<u>1.85</u>	1118	2.05	1164	2.25	—	—
	2,700	<u>987</u>	<u>1.71</u>	<u>1039</u>	<u>1.91</u>	1090	2.12	1138	2.33	1185	2.55	—	—
	3,000	<u>1015</u>	<u>1.99</u>	<u>1065</u>	<u>2.20</u>	1113	2.42	1161	2.65	—	—	—	—
091	2,250	<u>930</u>	<u>1.29</u>	<u>986</u>	<u>1.47</u>	<u>1039</u>	<u>1.65</u>	<u>1089</u>	<u>1.84</u>	<u>1136</u>	<u>2.03</u>	<u>1181</u>	<u>2.22</u>
	2,600	<u>950</u>	<u>1.53</u>	<u>1005</u>	<u>1.72</u>	<u>1057</u>	<u>1.92</u>	<u>1107</u>	<u>2.13</u>	<u>1154</u>	<u>2.33</u>	—	—
	3,000	<u>980</u>	<u>1.86</u>	<u>1031</u>	<u>2.06</u>	<u>1081</u>	<u>2.27</u>	<u>1129</u>	<u>2.49</u>	<u>1175</u>	<u>2.72</u>	—	—
	3,400	<u>1018</u>	<u>2.26</u>	<u>1065</u>	<u>2.48</u>	<u>1111</u>	<u>2.70</u>	<u>1156</u>	<u>2.93</u>	—	—	—	—
	3,750	<u>1057</u>	<u>2.69</u>	<u>1101</u>	<u>2.92</u>	<u>1144</u>	<u>3.15</u>	<u>1186</u>	<u>3.39</u>	—	—	—	—

Plain type — Standard Motor and fan drive

— High static motor & drive

— Medium static range: std motor & field—supplied drive

BOLD — High static motor & field—supplied drive

ITALIC — Standard motor & field—supplied drive required

FAN PERFORMANCE DATA — FAS 208/230-3-60 & 460-3-60
0.0-1.2 in. wg ESP — 60 Hz, U.S.

UNIT FAS 4-Row Coil	AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)													
		0.0		0.2		0.4		0.6		0.8		1.0		1.2	
		Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
072	1,800	419	0.21	471	0.26	564	0.37	649	0.49	<u>727</u>	<u>0.63</u>	<u>797</u>	<u>0.77</u>	<u>862</u>	<u>0.92</u>
	2,100	471	0.31	519	0.37	602	0.49	<u>679</u>	<u>0.62</u>	<u>751</u>	<u>0.77</u>	<u>819</u>	<u>0.92</u>	<u>882</u>	<u>1.09</u>
	2,400	524	0.44	568	0.51	645	0.64	<u>715</u>	<u>0.79</u>	<u>781</u>	<u>0.94</u>	<u>844</u>	<u>1.11</u>	<u>905</u>	<u>1.28</u>
	2,700	578	0.61	619	0.69	<u>690</u>	<u>0.84</u>	<u>755</u>	<u>0.99</u>	<u>816</u>	<u>1.15</u>	<u>875</u>	<u>1.33</u>	<u>932</u>	<u>1.51</u>
	3,000	633	0.81	<u>671</u>	<u>0.90</u>	<u>738</u>	<u>1.07</u>	<u>799</u>	<u>1.24</u>	<u>856</u>	<u>1.41</u>	<u>910</u>	<u>1.60</u>	<u>963</u>	<u>1.79</u>
091	2,250	290	0.10	510	0.39	594	0.51	669	0.65	739	0.79	<u>806</u>	<u>0.95</u>	<u>870</u>	<u>1.12</u>
	2,600	349	0.19	561	0.55	640	0.70	709	0.84	<u>773</u>	<u>1.00</u>	<u>834</u>	<u>1.16</u>	<u>893</u>	<u>1.34</u>
	3,000	579	0.70	621	0.79	695	0.96	<u>759</u>	<u>1.12</u>	<u>818</u>	<u>1.30</u>	<u>874</u>	<u>1.47</u>	<u>928</u>	<u>1.66</u>
	3,400	646	0.99	683	1.09	<u>752</u>	<u>1.29</u>	<u>813</u>	<u>1.48</u>	<u>869</u>	<u>1.67</u>	<u>920</u>	<u>1.86</u>	<u>970</u>	<u>2.06</u>
	3,750	705	1.31	739	1.42	<u>804</u>	<u>1.63</u>	<u>862</u>	<u>1.85</u>	<u>915</u>	<u>2.05</u>	<u>964</u>	<u>2.26</u>	<u>1011</u>	<u>2.48</u>
120	3,000	421	0.35	592	0.73	670	0.90	737	1.06	<u>797</u>	<u>1.23</u>	<u>854</u>	<u>1.41</u>	<u>908</u>	<u>1.59</u>
	3,500	626	0.98	664	1.08	735	1.28	798	1.48	<u>855</u>	<u>1.67</u>	<u>908</u>	<u>1.87</u>	<u>958</u>	<u>2.07</u>
	4,000	706	1.42	738	1.54	803	1.77	862	2.00	<u>917</u>	<u>2.23</u>	<u>967</u>	<u>2.45</u>	<u>1014</u>	<u>2.67</u>
	4,500	786	1.99	815	2.12	<u>873</u>	<u>2.39</u>	<u>929</u>	<u>2.65</u>	<u>980</u>	<u>2.90</u>	<u>1028</u>	<u>3.16</u>	<u>1073</u>	<u>3.41</u>
	5,000	<u>867</u>	<u>2.70</u>	<u>893</u>	<u>2.84</u>	<u>946</u>	<u>3.14</u>	<u>997</u>	<u>3.43</u>	<u>1046</u>	<u>3.72</u>	<u>1092</u>	<u>4.00</u>	<u>1135</u>	<u>4.28</u>
150	3,750	410	0.43	467	0.55	567	0.83	649	1.12	721	1.41	<u>788</u>	<u>1.72</u>	<u>851</u>	<u>2.05</u>
	4,300	455	0.62	504	0.74	599	1.05	679	1.38	<u>748</u>	<u>1.70</u>	<u>811</u>	<u>2.04</u>	<u>871</u>	<u>2.39</u>
	5,000	514	0.92	556	1.06	641	1.39	718	1.76	<u>786</u>	<u>2.14</u>	<u>847</u>	<u>2.52</u>	<u>903</u>	<u>2.91</u>
	5,700	575	1.32	612	1.47	686	1.82	<u>759</u>	<u>2.23</u>	<u>825</u>	<u>2.66</u>	<u>884</u>	<u>3.09</u>	<u>939</u>	<u>3.52</u>
	6,250	624	1.71	657	1.87	725	2.24	<u>793</u>	<u>2.66</u>	<u>856</u>	<u>3.12</u>	<u>915</u>	<u>3.59</u>	<u>969</u>	<u>4.06</u>
180	4,500	437	0.61	483	0.72	576	1.01	660	1.35	<u>732</u>	<u>1.69</u>	<u>797</u>	<u>2.03</u>	<u>856</u>	<u>2.38</u>
	5,300	499	0.95	538	1.07	617	1.37	696	1.74	<u>767</u>	<u>2.13</u>	<u>830</u>	<u>2.53</u>	<u>888</u>	<u>2.94</u>
	6,000	555	1.34	590	1.48	659	1.79	<u>730</u>	<u>2.17</u>	<u>798</u>	<u>2.59</u>	<u>860</u>	<u>3.04</u>	<u>918</u>	<u>3.49</u>
	6,800	620	1.91	651	2.06	712	2.39	<u>774</u>	<u>2.78</u>	<u>836</u>	<u>3.22</u>	<u>896</u>	<u>3.71</u>	<u>952</u>	<u>4.21</u>
	7,500	677	2.52	706	2.69	<u>761</u>	<u>3.04</u>	<u>817</u>	<u>3.44</u>	<u>873</u>	<u>3.89</u>	<u>929</u>	<u>4.39</u>	<u>984</u>	<u>4.93</u>

Plain type — Standard Motor and fan drive

 — Medium static range: std motor & field—supplied drive

ITALIC — Standard motor & field—supplied drive required

 — High static motor & drive

BOLD — High static motor & field—supplied drive

FAN PERFORMANCE DATA — FAS 208/230-3-60 & 460-3-60
1.4-2.4 in. wg ESP — 60 Hz, U.S.

UNIT FAS 4-Row Coil	AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)											
		1.4		1.6		1.8		2.0		2.2		2.4	
		Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
072	1,800	<u>921</u>	<u>1.07</u>	<u>975</u>	<u>1.23</u>	<u>1026</u>	<u>1.39</u>	<u>1074</u>	<u>1.55</u>	<u>1120</u>	<u>1.72</u>	<u>1164</u>	<u>1.90</u>
	2,100	<u>942</u>	<u>1.26</u>	<u>997</u>	<u>1.43</u>	<u>1048</u>	<u>1.61</u>	<u>1097</u>	<u>1.79</u>	<u>1143</u>	<u>1.97</u>	<u>1186</u>	<u>2.16</u>
	2,400	<u>963</u>	<u>1.47</u>	<u>1017</u>	<u>1.66</u>	<u>1069</u>	<u>1.85</u>	<u>1118</u>	<u>2.05</u>	<u>1164</u>	<u>2.25</u>	—	—
	2,700	<u>987</u>	<u>1.71</u>	<u>1039</u>	<u>1.91</u>	<u>1090</u>	<u>2.12</u>	<u>1138</u>	<u>2.33</u>	<u>1185</u>	<u>2.55</u>	—	—
	3,000	<u>1015</u>	<u>1.99</u>	<u>1065</u>	<u>2.20</u>	<u>1113</u>	<u>2.42</u>	<u>1161</u>	<u>2.65</u>	—	—	—	—
091	2,250	<u>930</u>	<u>1.29</u>	<u>986</u>	<u>1.47</u>	<u>1039</u>	<u>1.65</u>	<u>1089</u>	<u>1.84</u>	<u>1136</u>	<u>2.03</u>	<u>1181</u>	<u>2.22</u>
	2,600	<u>950</u>	<u>1.53</u>	<u>1005</u>	<u>1.72</u>	<u>1057</u>	<u>1.92</u>	<u>1107</u>	<u>2.13</u>	<u>1154</u>	<u>2.33</u>	—	—
	3,000	<u>980</u>	<u>1.86</u>	<u>1031</u>	<u>2.06</u>	<u>1081</u>	<u>2.27</u>	<u>1129</u>	<u>2.49</u>	<u>1175</u>	<u>2.72</u>	—	—
	3,400	<u>1018</u>	<u>2.26</u>	<u>1065</u>	<u>2.48</u>	<u>1111</u>	<u>2.70</u>	<u>1156</u>	<u>2.93</u>	—	—	—	—
	3,750	<u>1057</u>	<u>2.69</u>	<u>1101</u>	<u>2.92</u>	<u>1144</u>	<u>3.15</u>	<u>1186</u>	<u>3.39</u>	—	—	—	—
120	3,000	<u>961</u>	<u>1.78</u>	<u>1012</u>	<u>1.98</u>	<u>1062</u>	<u>2.19</u>	<u>1111</u>	<u>2.41</u>	<u>1158</u>	<u>2.64</u>	—	—
	3,500	<u>1005</u>	<u>2.27</u>	<u>1052</u>	<u>2.49</u>	<u>1098</u>	<u>2.71</u>	<u>1142</u>	<u>2.94</u>	<u>1186</u>	<u>3.18</u>	—	—
	4,000	<u>1058</u>	<u>2.90</u>	<u>1101</u>	<u>3.13</u>	<u>1143</u>	<u>3.36</u>	<u>1184</u>	<u>3.60</u>	—	—	—	—
	4,500	<u>1116</u>	<u>3.66</u>	<u>1157</u>	<u>3.91</u>	<u>1196</u>	<u>4.16</u>	—	—	—	—	—	—
	5,000	<u>1176</u>	<u>4.56</u>	—	—	—	—	—	—	—	—	—	—
150	3,750	<u>912</u>	<u>2.39</u>	<u>971</u>	<u>2.76</u>	<u>1028</u>	<u>3.14</u>	<u>1083</u>	<u>3.54</u>	<u>1135</u>	<u>3.95</u>	<u>1185</u>	<u>4.36</u>
	4,300	<u>928</u>	<u>2.75</u>	<u>982</u>	<u>3.13</u>	<u>1036</u>	<u>3.53</u>	<u>1087</u>	<u>3.94</u>	<u>1138</u>	<u>4.37</u>	<u>1187</u>	<u>4.81</u>
	5,000	<u>956</u>	<u>3.30</u>	<u>1007</u>	<u>3.71</u>	<u>1056</u>	<u>4.13</u>	<u>1104</u>	<u>4.56</u>	<u>1151</u>	<u>5.00</u>	<u>1196</u>	<u>5.46</u>
	5,700	<u>990</u>	<u>3.96</u>	<u>1039</u>	<u>4.40</u>	<u>1086</u>	<u>4.85</u>	<u>1130</u>	<u>5.31</u>	<u>1174</u>	<u>5.78</u>	—	—
	6,250	<u>1019</u>	<u>4.54</u>	<u>1067</u>	<u>5.02</u>	<u>1112</u>	<u>5.50</u>	<u>1156</u>	<u>5.99</u>	<u>1198</u>	<u>6.49</u>	—	—
180	4,500	<u>912</u>	<u>2.75</u>	<u>967</u>	<u>3.12</u>	<u>1019</u>	<u>3.52</u>	<u>1070</u>	<u>3.92</u>	<u>1120</u>	<u>4.35</u>	<u>1168</u>	<u>4.79</u>
	5,300	<u>942</u>	<u>3.34</u>	<u>992</u>	<u>3.76</u>	<u>1041</u>	<u>4.18</u>	<u>1088</u>	<u>4.61</u>	<u>1134</u>	<u>5.06</u>	<u>1179</u>	<u>5.52</u>
	6,000	<u>971</u>	<u>3.95</u>	<u>1020</u>	<u>4.40</u>	<u>1067</u>	<u>4.86</u>	<u>1112</u>	<u>5.33</u>	<u>1156</u>	<u>5.81</u>	<u>1198</u>	<u>6.29</u>
	6,800	<u>1005</u>	<u>4.72</u>	<u>1054</u>	<u>5.23</u>	<u>1101</u>	<u>5.75</u>	<u>1145</u>	<u>6.27</u>	<u>1187</u>	<u>6.79</u>	—	—
	7,500	<u>1036</u>	<u>5.48</u>	<u>1084</u>	<u>6.04</u>	<u>1131</u>	<u>6.61</u>	<u>1174</u>	<u>7.17</u>	—	—	—	—

Plain type — Standard Motor and fan drive

 — Medium static range: std motor & field—supplied drive

ITALIC — Standard motor & field—supplied drive required

 — High static motor & drive

BOLD — High static motor & field—supplied drive

FAN PERFORMANCE DATA — FAS 575-3-60
0.0-1.2 in. wg ESP — 60 Hz, U.S.

UNIT FAS 4-Row Coil	AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)													
		0.0		0.2		0.4		0.6		0.8		1.0		1.2	
		Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
072	1,800	419	0.21	471	0.26	564	0.37	649	0.49	<u>727</u>	<u>0.63</u>	<u>797</u>	<u>0.77</u>	<u>862</u>	<u>0.92</u>
	2,100	471	0.31	519	0.37	602	0.49	<u>679</u>	<u>0.62</u>	<u>751</u>	<u>0.77</u>	<u>819</u>	<u>0.92</u>	<u>882</u>	<u>1.09</u>
	2,400	524	0.44	568	0.51	645	0.64	<u>715</u>	<u>0.79</u>	<u>781</u>	<u>0.94</u>	<u>844</u>	<u>1.11</u>	<u>905</u>	<u>1.28</u>
	2,700	578	0.61	619	0.69	<u>690</u>	<u>0.84</u>	<u>755</u>	<u>0.99</u>	<u>816</u>	<u>1.15</u>	<u>875</u>	<u>1.33</u>	<u>932</u>	<u>1.51</u>
	3,000	633	0.81	<u>671</u>	<u>0.90</u>	<u>738</u>	<u>1.07</u>	<u>799</u>	<u>1.24</u>	<u>856</u>	<u>1.41</u>	<u>910</u>	<u>1.60</u>	<u>963</u>	<u>1.79</u>
091	2,250	290	0.10	510	0.39	594	0.51	669	0.65	739	0.79	<u>806</u>	<u>0.95</u>	<u>870</u>	<u>1.12</u>
	2,600	349	0.19	561	0.55	640	0.70	709	0.84	<u>773</u>	<u>1.00</u>	<u>834</u>	<u>1.16</u>	<u>893</u>	<u>1.34</u>
	3,000	579	0.70	621	0.79	695	0.96	<u>759</u>	<u>1.12</u>	<u>818</u>	<u>1.30</u>	<u>874</u>	<u>1.47</u>	<u>928</u>	<u>1.66</u>
	3,400	646	0.99	683	1.09	<u>752</u>	<u>1.29</u>	<u>813</u>	<u>1.48</u>	<u>869</u>	<u>1.67</u>	<u>920</u>	<u>1.86</u>	<u>970</u>	<u>2.06</u>
	3,750	705	1.31	739	1.42	<u>804</u>	<u>1.63</u>	<u>862</u>	<u>1.85</u>	<u>915</u>	<u>2.05</u>	<u>964</u>	<u>2.26</u>	<u>1011</u>	<u>2.48</u>
120	3,000	421	0.35	592	0.73	670	0.90	737	1.06	<u>797</u>	<u>1.23</u>	<u>854</u>	<u>1.41</u>	<u>908</u>	<u>1.59</u>
	3,500	626	0.98	664	1.08	735	1.28	798	1.48	<u>855</u>	<u>1.67</u>	<u>908</u>	<u>1.87</u>	<u>958</u>	<u>2.07</u>
	4,000	706	1.42	738	1.54	803	1.77	862	2.00	<u>917</u>	<u>2.23</u>	<u>967</u>	<u>2.45</u>	<u>1014</u>	<u>2.67</u>
	4,500	786	1.99	815	2.12	<u>873</u>	<u>2.39</u>	<u>929</u>	<u>2.65</u>	<u>980</u>	<u>2.90</u>	<u>1028</u>	<u>3.16</u>	<u>1073</u>	<u>3.41</u>
	5,000	<u>867</u>	<u>2.70</u>	<u>893</u>	<u>2.84</u>	<u>946</u>	<u>3.14</u>	<u>997</u>	<u>3.43</u>	<u>1046</u>	<u>3.72</u>	<u>1092</u>	<u>4.00</u>	<u>1135</u>	<u>4.28</u>
150	3,750	410	0.43	467	0.55	567	0.83	649	1.12	721	1.41	<u>788</u>	<u>1.72</u>	<u>851</u>	<u>2.05</u>
	4,300	455	0.62	504	0.74	599	1.05	679	1.38	<u>748</u>	<u>1.70</u>	<u>811</u>	<u>2.04</u>	<u>871</u>	<u>2.39</u>
	5,000	514	0.92	556	1.06	641	1.39	718	1.76	<u>786</u>	<u>2.14</u>	<u>847</u>	<u>2.52</u>	<u>903</u>	<u>2.91</u>
	5,700	575	1.32	612	1.47	686	1.82	<u>759</u>	<u>2.23</u>	<u>825</u>	<u>2.66</u>	<u>884</u>	<u>3.09</u>	<u>939</u>	<u>3.52</u>
	6,250	624	1.71	657	1.87	725	2.24	<u>793</u>	<u>2.66</u>	<u>856</u>	<u>3.12</u>	<u>915</u>	<u>3.59</u>	<u>969</u>	<u>4.06</u>
180	4,500	437	0.61	483	0.72	576	1.01	660	1.35	<u>732</u>	<u>1.69</u>	<u>797</u>	<u>2.03</u>	<u>856</u>	<u>2.38</u>
	5,300	499	0.95	538	1.07	617	1.37	696	1.74	<u>767</u>	<u>2.13</u>	<u>830</u>	<u>2.53</u>	<u>888</u>	<u>2.94</u>
	6,000	555	1.34	590	1.48	659	1.79	<u>730</u>	<u>2.17</u>	<u>798</u>	<u>2.59</u>	<u>860</u>	<u>3.04</u>	<u>918</u>	<u>3.49</u>
	6,800	620	1.91	651	2.06	712	2.39	<u>774</u>	<u>2.78</u>	<u>836</u>	<u>3.22</u>	<u>896</u>	<u>3.71</u>	<u>952</u>	<u>4.21</u>
	7,500	677	2.52	706	2.69	<u>761</u>	<u>3.04</u>	<u>817</u>	<u>3.44</u>	<u>873</u>	<u>3.89</u>	<u>929</u>	<u>4.39</u>	<u>984</u>	<u>4.93</u>

Plain type — Standard Motor and fan drive

 — Medium static range: std motor & field—supplied drive

ITALIC — Standard motor & field—supplied drive required

 — High static motor & drive

BOLD — High static motor & field—supplied drive

FAN PERFORMANCE DATA — FAS 575-3-60
1.4-2.4 in. wg ESP — 60 Hz, U.S.

UNIT FAS 4-Row Coil	AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)											
		1.4		1.6		1.8		2.0		2.2		2.4	
		Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
072	1,800	<u>921</u>	<u>1.07</u>	<u>975</u>	<u>1.23</u>	<u>1026</u>	<u>1.39</u>	<u>1074</u>	<u>1.55</u>	<u>1120</u>	<u>1.72</u>	<u>1164</u>	<u>1.90</u>
	2,100	<u>942</u>	<u>1.26</u>	<u>997</u>	<u>1.43</u>	<u>1048</u>	<u>1.61</u>	<u>1097</u>	<u>1.79</u>	<u>1143</u>	<u>1.97</u>	<u>1186</u>	<u>2.16</u>
	2,400	<u>963</u>	<u>1.47</u>	<u>1017</u>	<u>1.66</u>	<u>1069</u>	<u>1.85</u>	<u>1118</u>	<u>2.05</u>	<u>1164</u>	<u>2.25</u>	—	—
	2,700	<u>987</u>	<u>1.71</u>	<u>1039</u>	<u>1.91</u>	<u>1090</u>	<u>2.12</u>	<u>1138</u>	<u>2.33</u>	<u>1185</u>	<u>2.55</u>	—	—
	3,000	<u>1015</u>	<u>1.99</u>	<u>1065</u>	<u>2.20</u>	<u>1113</u>	<u>2.42</u>	<u>1161</u>	<u>2.65</u>	—	—	—	—
091	2,250	<u>930</u>	<u>1.29</u>	<u>986</u>	<u>1.47</u>	<u>1039</u>	<u>1.65</u>	<u>1089</u>	<u>1.84</u>	<u>1136</u>	<u>2.03</u>	<u>1181</u>	<u>2.22</u>
	2,600	<u>950</u>	<u>1.53</u>	<u>1005</u>	<u>1.72</u>	<u>1057</u>	<u>1.92</u>	<u>1107</u>	<u>2.13</u>	<u>1154</u>	<u>2.33</u>	—	—
	3,000	<u>980</u>	<u>1.86</u>	<u>1031</u>	<u>2.06</u>	<u>1081</u>	<u>2.27</u>	<u>1129</u>	<u>2.49</u>	<u>1175</u>	<u>2.72</u>	—	—
	3,400	<u>1018</u>	<u>2.26</u>	<u>1065</u>	<u>2.48</u>	<u>1111</u>	<u>2.70</u>	<u>1156</u>	<u>2.93</u>	—	—	—	—
	3,750	<u>1057</u>	<u>2.69</u>	<u>1101</u>	<u>2.92</u>	<u>1144</u>	<u>3.15</u>	<u>1186</u>	<u>3.39</u>	—	—	—	—
120	3,000	<u>961</u>	<u>1.78</u>	<u>1012</u>	<u>1.98</u>	<u>1062</u>	<u>2.19</u>	<u>1111</u>	<u>2.41</u>	<u>1158</u>	<u>2.64</u>	—	—
	3,500	<u>1005</u>	<u>2.27</u>	<u>1052</u>	<u>2.49</u>	<u>1098</u>	<u>2.71</u>	<u>1142</u>	<u>2.94</u>	<u>1186</u>	<u>3.18</u>	—	—
	4,000	<u>1058</u>	<u>2.90</u>	<u>1101</u>	<u>3.13</u>	<u>1143</u>	<u>3.36</u>	<u>1184</u>	<u>3.60</u>	—	—	—	—
	4,500	<u>1116</u>	<u>3.66</u>	<u>1157</u>	<u>3.91</u>	<u>1196</u>	<u>4.16</u>	—	—	—	—	—	—
	5,000	<u>1176</u>	<u>4.56</u>	—	—	—	—	—	—	—	—	—	—
150	3,750	<u>912</u>	<u>2.39</u>	<u>971</u>	<u>2.76</u>	<u>1028</u>	<u>3.14</u>	<u>1083</u>	<u>3.54</u>	<u>1135</u>	<u>3.95</u>	<u>1185</u>	<u>4.36</u>
	4,300	<u>928</u>	<u>2.75</u>	<u>982</u>	<u>3.13</u>	<u>1036</u>	<u>3.53</u>	<u>1087</u>	<u>3.94</u>	<u>1138</u>	<u>4.37</u>	<u>1187</u>	<u>4.81</u>
	5,000	<u>956</u>	<u>3.30</u>	<u>1007</u>	<u>3.71</u>	<u>1056</u>	<u>4.13</u>	<u>1104</u>	<u>4.56</u>	<u>1151</u>	<u>5.00</u>	<u>1196</u>	<u>5.46</u>
	5,700	<u>990</u>	<u>3.96</u>	<u>1039</u>	<u>4.40</u>	<u>1086</u>	<u>4.85</u>	<u>1130</u>	<u>5.31</u>	<u>1174</u>	<u>5.78</u>	—	—
	6,250	<u>1019</u>	<u>4.54</u>	<u>1067</u>	<u>5.02</u>	<u>1112</u>	<u>5.50</u>	<u>1156</u>	<u>5.99</u>	<u>1198</u>	<u>6.49</u>	—	—
180	4,500	<u>912</u>	<u>2.75</u>	<u>967</u>	<u>3.12</u>	<u>1019</u>	<u>3.52</u>	<u>1070</u>	<u>3.92</u>	<u>1120</u>	<u>4.35</u>	<u>1168</u>	<u>4.79</u>
	5,300	<u>942</u>	<u>3.34</u>	<u>992</u>	<u>3.76</u>	<u>1041</u>	<u>4.18</u>	<u>1088</u>	<u>4.61</u>	<u>1134</u>	<u>5.06</u>	<u>1179</u>	<u>5.52</u>
	6,000	<u>971</u>	<u>3.95</u>	<u>1020</u>	<u>4.40</u>	<u>1067</u>	<u>4.86</u>	<u>1112</u>	<u>5.33</u>	<u>1156</u>	<u>5.81</u>	<u>1198</u>	<u>6.29</u>
	6,800	<u>1005</u>	<u>4.72</u>	<u>1054</u>	<u>5.23</u>	<u>1101</u>	<u>5.75</u>	<u>1145</u>	<u>6.27</u>	<u>1187</u>	<u>6.79</u>	—	—
	7,500	<u>1036</u>	<u>5.48</u>	<u>1084</u>	<u>6.04</u>	<u>1131</u>	<u>6.61</u>	<u>1174</u>	<u>7.17</u>	—	—	—	—

Plain type — Standard Motor and fan drive

 — Medium static range: std motor & field—supplied drive

ITALIC — Standard motor & field—supplied drive required

 — High static motor & drive

BOLD — High static motor & field—supplied drive

PERFORMANCE DATA (cont.)

LEGEND AND NOTES FOR STANDARD AND HIGH- CAPACITY COIL FAN PERFORMANCE DATA TABLES (U.S.)

LEGEND:

Bhp — Brake Horsepower Input to Fan

ESP — External Static Pressure

NOTES:

1. Maximum allowable fan speed is 1200 rpm for all sizes.

2. Fan performance is based on deductions for wet coil, clean 2-in. filters, and unit casing. See table below for factory-supplied filter pressure drop.

DUCT SOUND POWER LEVELS (L_w)

MODEL	SIZE	CFM	dB(A)	OCTAVE BAND CENTER FREQUENCY (Hz)						
				63	125	250	500	1000	2000	4000
FAS	072	2,400	86.3	93.2	89.2	85.2	84.2	80.2	78.2	74.2
	091	3,000	88.3	95.3	91.3	87.3	86.3	82.3	80.3	76.3
	120	4,000	91.6	98.6	94.6	90.6	89.6	85.6	83.6	79.6
	150	5,000	91.1	97.3	93.3	89.3	90.3	84.3	82.3	78.3
	180	6,000	92.7	98.9	94.9	90.9	91.9	85.9	83.9	79.9

LEGEND:

ASHRAE — American Society of Heating, Refrigerating and Air Conditioning, Inc.

HVAC — Heating, Ventilation and Air Conditioning

NOTES:

1. The above estimated sound power levels are based upon the ASHRAE calculation approach from the ASHRAE 1987 HVAC Systems and Applications handbook, Chapter 52.

2. Since this data is calculated, these sound power levels may be different than the actual sound power levels.

3. The acoustic center of the unit is located at the geometric center of the unit.

FACTORY-SUPPLIED FILTER PRESSURE DROP — U.S.

UNIT FAS	AIRFLOW (Cfm)	PRESSURE DROP (in. wg)
FAS072	1,800	0.05
	2,400	0.08
	3,000	0.11
FAS091	2,250	0.07
	3,000	0.11
	3,750	0.15
FAS120	3,000	0.11
	4,000	0.17
	5,000	0.23
FAS150	3,750	0.06
	5,000	0.10
	6,250	0.13
FAS180	4,500	0.08
	6,000	0.12
	7,500	0.17

* Data not available.

FACTORY-SUPPLIED FILTER PRESSURE DROP — SI

UNIT	AIRFLOW (L/s)	PRESSURE DROP (Pa)
FAS072	850	13
	1150	20
	1450	28
FAS091	1000	17
	1400	27
	1800	38
FAS120	1450	28
	1900	42
	2350	56
FAS150	1750	15
	2350	24
	2950	33
FAS180	2100	20
	2800	30
	3500	42

* Data not available.

ACCESSORY PLENUM AIR THROW DATA — U.S. (Ft)

UNIT	AIRFLOW (Cfm)	VANE DEFLECTION		
		Straight	21°	45°
FAS072	2,400	39	33	24
FAS091	3,000	45	38	28
FAS120	4,000	55	46	33
FAS150	5,000	45	38	28
FAS180	6,000	50	43	31

NOTE: Throw distances shown are for 75 fpm terminal velocity. Use the following multipliers to determine throw values for other terminal velocities.

TERMINAL VELOCITY (Fpm)	THROW FACTOR
50	X 1.50
100	X 0.75
150	X 0.50

ACCESSORY PLENUM AIR THROW DATA — SI(m)

UNIT	AIRFLOW (L/s)	VANE DEFLECTION		
		Straight	21°	45°
FAS072	1150	11.71	9.91	7.20
FAS091	1400	13.87	11.71	8.63
FAS120	1900	16.65	13.93	9.99
FAS150	2350	13.77	11.63	8.57
FAS180	2800	15.41	13.25	9.55

NOTE: Throw distances shown are for 0.381 m/sec terminal velocity. Use the following multipliers to determine throw values for other terminal velocities.

TERMINAL VELOCITY (m/sec)	THROW FACTOR
0.254	X 1.50
0.508	X 0.75
0.762	X 0.50

PERFORMANCE DATA (cont.)

ACCESSORY PRESSURE DROP — U.S. (in. wg)

UNIT	AIRFLOW (Cfm)	DISCHARGE PLENUM	RETURN AIR GRILLE	HEATING COILS			ECONOMIZER
				Hot Water	Steam	Electric	
FAS072	1,800	0.06	0.01	0.10	0.10	0.04	0.05
	2,400	0.10	0.01	0.16	0.16	0.06	0.07
	3,000	0.14	0.02	0.23	0.23	0.10	0.09
FAS091	2,250	0.09	0.01	0.15	0.15	0.06	0.06
	3,000	0.14	0.02	0.23	0.23	0.10	0.09
	3,750	0.21	0.03	0.35	0.35	0.15	0.15
FAS120	3,000	0.14	0.02	0.23	0.23	0.10	0.09
	4,000	0.22	0.04	0.37	0.37	0.17	0.17
	5,000	0.32	0.06	0.53	0.53	0.26	0.28
FAS150	3,750	0.07	0.01	0.11	0.11	0.04	0.05
	5,000	0.12	0.02	0.17	0.17	0.07	0.07
	6,250	0.17	0.02	0.25	0.25	0.11	0.11
FAS180	4,500	0.10	0.01	0.15	0.15	0.06	0.06
	6,000	0.16	0.02	0.23	0.23	0.10	0.09
	7,500	0.23	0.03	0.33	0.33	0.15	0.15

ACCESSORY PRESSURE DROP — SI (Pa)

UNIT	AIRFLOW (L/s)	DISCHARGE PLENUM	RETURN AIR GRILLE	HEATING COILS			ECONOMIZER
				Hot Water	Steam	Electric	
FAS072	850	15	2	25	25	9	12
	1150	25	3	41	41	16	18
	1450	36	5	60	60	26	23
FAS091	1000	20	2	33	33	12	13
	1400	34	5	57	57	24	22
	1800	51	8	85	85	39	39
FAS120	1450	36	5	60	60	26	23
	1900	56	10	93	93	43	43
	2350	79	15	132	132	65	69
FAS150	1750	18	2	26	26	10	12
	2350	29	5	43	43	17	17
	2950	43	5	62	62	26	27
FAS180	2100	24	2	36	36	14	15
	2800	39	5	57	57	24	22
	3500	56	7	82	82	37	37

-ELECTRICAL DATA

STANDARD MOTORS

UNIT	V-PH-Hz	VOLTAGE LIMITS	FAN MOTOR		POWER SUPPLY	
			Hp (kW)	FLA	Minimum Circuit Amps	MOCP
FAS072	208/230-1-60	187-253	1.3 (0.97)	7.6	9.5	15
	208/230-3-60	187-253	2.4 (1.79)	5.8	7.3	15
	460-3-60	414-506	2.4 (1.79)	2.6	3.3	15
	575-3-60	518-632	1.0 (0.75)	1.4	1.7	15
FAS091	208/230-1-60	187-253	2.4 (1.79)	11.0	13.8	20
	208/230-3-60	187-253	2.4 (1.79)	5.8	7.3	15
	460-3-60	414-506	2.4 (1.79)	2.6	3.3	15
	575-3-60	518-632	2.0 (1.49)	2.4	3.0	15
FAS120	208/230-3-60	187-253	2.4 (1.79)	5.8	7.3	15
	460-3-60	414-506	2.4 (1.79)	2.6	3.3	15
	575-3-60	518-632	2.0 (1.49)	2.4	3.0	15
FAS150	208/230-3-60	187-253	2.9 (2.16)	7.9	9.4	15
	460-3-60	414-506	2.9 (2.16)	3.4	4.3	15
	575-3-60	518-632	3.0 (2.24)	3.8	4.8	15
FAS180	208/230-3-60	187-253	3.7 (2.76)	10.6	13.3	20
	460-3-60	414-506	3.7 (2.76)	4.8	6.0	15
	575-3-60	518-632	3.0 (2.24)	3.8	4.8	15

LEGEND

FLA — Full Load Amps

MOCP — Maximum Overcurrent Protection

* Motors are designed for satisfactory operation within 10% of nominal voltages shown. Voltages should not exceed the limits shown in the Voltage Limits column.

NOTES:

1. Minimum circuit amps (MCA) and MOCP values are calculated in accordance with NEC (National Electrical Code) (U.S.A. standard), Article 440.
2. Motor FLA values are established in accordance with UL (Underwriters Laboratories) Standard 1995 (U.S.A. standard).
3. Indoor fan motors 5 hp and larger meet the minimum efficiency requirements as established by the Energy Policy Act of 1992 (EPA) effective October 24, 1997.
4. Unbalanced 3-Phase Supply Voltage
Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 230-3-60



AB = 224 v

BC = 231 v

AC = 226 v

$$\begin{aligned} \text{Average Voltage} &= \frac{(224 + 231 + 226)}{3} = \frac{681}{3} \\ &= 227 \end{aligned}$$

Determine maximum deviation from average voltage.

(AB) 227 - 224 = 3 v

(BC) 231 - 227 = 4 v

(AC) 227 - 226 = 1 v

Maximum deviation is 4 v.

Determine percent of voltage imbalance.

$$\begin{aligned} \% \text{ Voltage Imbalance} &= 100 \times \frac{4}{227} \\ &= 1.76\% \end{aligned}$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.



ELECTRICAL DATA (cont.)

HIGH STATIC MOTORS

UNIT	V-PH-Hz	VOLTAGE LIMITS	FAN MOTOR		POWER SUPPLY	
			Hp (kW)	FLA	Minimum Circuit Amps	MOCP
FAS072	208/230-1-60	187-253	2.4 (1.79)	11.0	13.8	20
	208/230-3-60	187-253	2.9 (2.16)	7.5	9.4	15
	460-3-60	414-506	2.9 (2.16)	3.4	4.3	15
	575-3-60	518-632	2.0 (1.49)	2.4	3.0	15
FAS091	208/230-1-60	187-253	2.4 (1.79)	11.0	13.8	20
	208/230-3-60	187-253	2.9 (2.16)	7.5	9.4	15
	460-3-60	414-506	2.9 (2.16)	3.4	4.3	15
	575-3-60	518-632	3.0 (2.24)	3.8	4.8	15
FAS120	208/230-3-60	187-253	3.7 (2.76)	10.6	13.3	20
	460-3-60	414-506	3.7 (2.76)	4.8	6.0	15
	575-3-60	518-632	3.0 (2.24)	3.8	4.8	15
FAS150	208/230-3-60	187-253	3.7 (2.76)	10.6	13.3	20
	460-3-60	414-506	3.7 (2.76)	4.8	6.0	15
	575-3-60	518-632	5.0 (3.73)	5.1	6.4	15
FAS180	208/230-3-60	187-253	5.0 (3.73)	14.6/12.8	18.3/16.0	30/25
	460-3-60	414-506	5.0 (3.73)	6.4	8.0	15
	575-3-60	518-632	5.0 (3.73)	5.1	6.4	15

LEGEND

FLA — Full Load Amps

MOCP — Maximum Overcurrent Protection

* Motors are designed for satisfactory operation within 10% of nominal voltages shown. Voltages should not exceed the limits shown in the Voltage Limits column.

NOTES:

1. Minimum circuit amps (MCA) and MOCP values are calculated in accordance with NEC (National Electrical Code) (U.S.A. standard), Article 440.

2. Motor FLA values are established in accordance with UL (Underwriters Laboratories) Standard 1995 (U.S.A. standard).

3. Indoor fan motors 5 hp and larger meet the minimum efficiency requirements as established by the Energy Policy Act of 1992 (EPACT) effective October 24, 1997.

4. Unbalanced 3-Phase Supply Voltage

Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 230-3-60



AB = 224 v

BC = 231 v

AC = 226 v

$$\begin{aligned} \text{Average Voltage} &= \frac{(224 + 231 + 226)}{3} = \frac{681}{3} \\ &= 227 \end{aligned}$$

Determine maximum deviation from average voltage.

(AB) 227 – 224 = 3 v

(BC) 231 – 227 = 4 v

(AC) 227 – 226 = 1 v

Maximum deviation is 4 v.

Determine percent of voltage imbalance.

$$\begin{aligned} \% \text{ Voltage Imbalance} &= 100 \times \frac{4}{227} \\ &= 1.76\% \end{aligned}$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.



ELECTRICAL DATA (cont.)

ELECTRIC HEATER DATA

HEATER PART NO.	SIZE	V-PH-Hz	FAN MOTOR			Nominal Capacity (kW)	ELECTRIC HEATER(S) Actual Capacity (kW)			FLA	MCA*	MOCP*	
			Hp	kW	FLA		Stage 1	Stage 2	Total				
AAHC05AHA	FAS072–120	208-3-60	1.3†	0.97	7.6	5	3.8	—	3.8	10.4	22.5	25	
			2.4†	1.79	11.0	5	3.8	—	3.8	10.4	26.8	35	
			2.4	1.79	5.8	5	3.8	—	3.8	10.4	20.3	25	
			2.9	2.16	7.5	5	3.8	—	3.8	10.4	22.4	25	
			3.7	2.76	10.6	5	3.8	—	3.8	10.4	26.3	30	
		240-3-60	1.3†	0.97	7.6	5	5.0	—	5.0	12.0	24.5	25	
			2.4†	1.79	11.0	5	5.0	—	5.0	12.0	28.8	35	
			2.4	1.79	5.8	5	5.0	—	5.0	12.0	22.3	25	
			2.9	2.16	7.5	5	5.0	—	5.0	12.0	24.4	25	
			3.7	2.76	10.6	5	5.0	—	5.0	12.0	28.3	30	
AAHC05ALA		480-3-60	2.4	1.79	2.6	5	5.0	—	5.0	6.00	10.8	15	
			2.9	2.16	3.4	5	5.0	—	5.0	6.00	11.8	15	
			3.7	2.76	4.8	5	5.0	—	5.0	6.00	13.5	15	
AAHC05ASA		575-3-60	1.0	0.75	1.4	5	5.0	—	5.0	5.00	8.0	15	
			2.0	1.49	2.4	5	5.0	—	5.0	5.00	9.3	15	
			3.0	2.24	3.8	5	5.0	—	5.0	5.00	11.0	15	
AAHC10AHA		FAS072–120	208-3-60	1.3†	0.97	7.6	10	7.5	—	7.5	20.8	35.6	40
				2.4†	1.79	11.0	10	7.5	—	7.5	20.8	39.8	40
				2.4	1.79	5.8	10	7.5	—	7.5	20.8	33.3	35
				2.9	2.16	7.5	10	7.5	—	7.5	20.8	35.4	40
	3.7			2.76	10.6	10	7.5	—	7.5	20.8	39.3	40	
	240-3-60		1.3†	0.97	7.6	10	10.0	—	10.0	24.1	39.6	40	
			2.4†	1.79	11.0	10	10.0	—	10.0	24.1	43.8	50	
			2.4	1.79	5.8	10	10.0	—	10.0	24.1	37.4	40	
			2.9	2.16	7.5	10	10.0	—	10.0	24.1	39.4	40	
			3.7	2.76	10.6	10	10.0	—	10.0	24.1	43.4	50	
AAHC10ALA	480-3-60	2.4	1.79	2.6	10	10.0	—	10.0	12.0	18.3	20		
		2.9	2.16	3.4	10	10.0	—	10.0	12.0	19.3	20		
		3.7	2.76	4.8	10	10.0	—	10.0	12.0	21.0	25		
AAHC10ASA	575-3-60	1.0	0.75	1.4	10	10.0	—	10.0	10.0	14.3	15		
		2.0	1.49	2.4	10	10.0	—	10.0	10.0	15.5	20		
		3.0	2.24	3.8	10	10.0	—	10.0	10.0	17.3	20		
AAHC15AHA	FAS072–120	208-3-60	1.3†	0.97	7.6	15	11.3	—	11.3	31.3	48.6	50	
			2.4†	1.79	11.0	15	11.3	—	11.3	31.3	52.9	60	
			2.4	1.79	5.8	15	11.3	—	11.3	31.3	46.4	50	
			2.9	2.16	7.5	15	11.3	—	11.3	31.3	48.5	50	
			3.7	2.76	10.6	15	11.3	—	11.3	31.3	52.4	60	
		240-3-60	1.3†	0.97	7.6	15	15.0	—	15.0	36.1	54.6	60	
			2.4†	1.79	11.0	15	15.0	—	15.0	36.1	58.9	60	
			2.4	1.79	5.8	15	15.0	—	15.0	36.1	52.4	60	
			2.9	2.16	7.5	15	15.0	—	15.0	36.1	54.5	60	
			3.7	2.76	10.6	15	15.0	—	15.0	36.1	58.4	60	

LEGEND

FLA — Full Load Amps

Hp — Horsepower

MCA — Minimum Circuit Amps

MOCP — Maximum Overcurrent Protection (Amps)

* Values shown are for single-point connection of electric heat access-
ory and air handler.

† Single-phase motors. All other motors are 3-phase.

NOTES:

1. Electrical resistance heaters are rated at 240 v, 480 v, or 575 v. To
determine heater capacity (kW) at unit nameplate multiply the
240-v, 480-v, or 575-v capacity (kW) by the factor shown in the
table below for the unit voltage.

HEATER RATING VOLTAGE	ACTUAL HEATER VOLTAGE										
	200	208	230	240	400	440	460	480	550	575	600
240	0.694	0.751	0.918	1	—	—	—	—	—	—	—
480	—	—	—	—	0.694	0.84	0.918	1	—	—	—
575	—	—	—	—	—	—	—	—	0.915	1	1.089

2. The following equation converts kW of heat energy to Btuh:

$$\text{kW} \times 3,412 = \text{Btuh.}$$

3. Heater contactor coils are 24 v and require 8 va holding
current.

4. Electric heaters are tested and ETL approved at maximum total
external static pressure of 1.9 in. wg.

5. MCA and MOCP values apply to both standard and alternate
factory-supplied motors.

6. Approximate shipping weight for heaters that fit 6 to 10 ton
units is 55 lb (25 kg) each. Approximate shipping weight for
heaters that fit 12.5 to 15 ton units is 60 lb (27 kg) each.



ELECTRICAL DATA (cont.)

ELECTRIC HEATER DATA (cont)

HEATER PART NO.	SIZE	V-PH-Hz	FAN MOTOR			Nominal Capacity (kW)	ELECTRIC HEATER(S) Actual Capacity (kW)			FLA	MCA*	MOCP*
			Hp	kW	FLA		Stage 1	Stage 2	Total			
AAHC15ALA	FAS072–120	480-3-60	2.4	1.79	2.6	15	15.0	—	15.0	18.0	25.8	30
			2.9	2.16	3.4	15	15.0	—	15.0	18.0	26.8	30
			3.7	2.76	4.8	15	15.0	—	15.0	18.0	28.6	30
AAHC15ASA		575-3-60	1.0	0.75	1.4	15	15.0	—	15.0	15.1	20.6	25
			2.0	1.49	2.4	15	15.0	—	15.0	15.1	21.9	25
			3.0	2.24	3.8	15	15.0	—	15.0	15.1	23.6	25
AAHC25AHA		208-3-60	1.3†	0.97	7.6	25	11.3	7.5	18.8	52.1	74.7	80
			2.4†	1.79	11.0	25	11.3	7.5	18.8	52.1	78.9	80
			2.4	1.79	5.8	25	11.3	7.5	18.8	52.1	72.4	80
			2.9	2.16	7.5	25	11.3	7.5	18.8	52.1	74.5	80
			3.7	2.76	10.6	25	11.3	7.5	18.8	52.1	78.4	80
		240-3-60	1.3†	0.97	7.6	25	15.0	10.0	25.0	60.1	84.7	90
			2.4†	1.79	11.0	25	15.0	10.0	25.0	60.1	88.9	90
			2.4	1.79	5.8	25	15.0	10.0	25.0	60.1	82.4	90
			2.9	2.16	7.5	25	15.0	10.0	25.0	60.1	84.6	90
			3.7	2.76	10.6	25	15.0	10.0	25.0	60.1	88.4	90
AAHC25ALA		480-3-60	2.4	1.79	2.6	25	15.0	10.0	25.0	30.1	40.8	50
			2.9	2.16	3.4	25	15.0	10.0	25.0	30.1	41.8	50
			3.7	2.76	4.8	25	15.0	10.0	25.0	30.1	43.6	50
AAHC25ASA		575-3-60	1.0	0.75	1.4	25	15.0	10.0	25.0	25.1	33.1	35
			2.0	1.49	2.4	25	15.0	10.0	25.0	25.1	34.4	35
	3.0		2.24	3.8	25	15.0	10.0	25.0	25.1	36.1	40	
AAHC35CHA	FAS091, 120	208-3-60	2.4†	1.79	11.0	35	15.0	11.3	26.3	73.0	105.0	110
			2.4	1.79	5.8	35	15.0	11.3	26.3	73.0	98.5	100
			2.9	2.16	7.5	35	15.0	11.3	26.3	73.0	100.6	110
			3.7	2.76	10.6	35	15.0	11.3	26.3	73.0	104.5	110
		240-3-60	2.4†	1.79	11.0	35	20.0	15.0	35.0	84.2	119.0	125
			2.4	1.79	5.8	35	20.0	15.0	35.0	84.2	112.5	125
			2.9	2.16	7.5	35	20.0	15.0	35.0	84.2	114.6	125
			3.7	2.76	10.6	35	20.0	15.0	35.0	84.2	118.5	125
AAHC35CLA		480-3-60	2.4	1.79	2.6	35	20.0	15.0	35.0	42.1	55.9	60
			2.9	2.16	3.4	35	20.0	15.0	35.0	42.1	56.9	60
AAHC35CSA		575-3-60	2.0	1.49	2.4	35	20.0	15.0	35.0	35.1	46.9	50
			3.0	2.24	3.8	35	20.0	15.0	35.0	35.1	48.7	50

LEGEND

FLA — Full Load Amps

Hp — Horsepower

MCA — Minimum Circuit Amps

MOCP — Maximum Overcurrent Protection (Amps)

* Values shown are for single-point connection of electric heat accessory and air handler.

† Single-phase motors. All other motors are 3-phase.

NOTES:

1. Electrical resistance heaters are rated at 240 v, 480 v, or 575 v. To determine heater capacity (kW) at unit nameplate multiply the 240-v, 480-v, or 575-v capacity (kW) by the factor shown in the table below for the unit voltage.

HEATER RATING VOLTAGE	ACTUAL HEATER VOLTAGE										
	200	208	230	240	400	440	460	480	550	575	600
240	0.694	0.751	0.918	1	—	—	—	—	—	—	—
480	—	—	—	—	0.694	0.84	0.918	1	—	—	—
575	—	—	—	—	—	—	—	—	0.915	1	1.089

2. The following equation converts kW of heat energy to Btuh:
kW x 3,412 = Btuh.

3. Heater contactor coils are 24 v and require 8 va holding current.

4. Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

5. MCA and MOCP values apply to both standard and alternate factory-supplied motors.

6. Approximate shipping weight for heaters that fit 6 to 10 ton units is 55 lb (25 kg) each. Approximate shipping weight for heaters that fit 12.5 to 15 ton units is 60 lb (27 kg) each.



ELECTRICAL DATA (cont.)

ELECTRIC HEATER DATA (cont)

HEATER PART NO.	SIZE	V-PH-Hz	FAN MOTOR			Nominal Capacity (kW)	ELECTRIC HEATER(S) Actual Capacity (kW)			FLA	MCA*	MOCP*
			Hp	kW	FLA		Stage 1	Stage 2	Total			
AAHC10BHA	FAS150, 180	208-3-60	2.9	2.16	7.5	10	7.5	—	7.5	20.8	35.4	40
			3.7	2.76	10.6	10	7.5	—	7.5	20.8	39.3	40
			5.0	3.73	14.6	10	7.5	—	7.5	20.8	41.3	50
		240-3-60	2.9	2.16	7.5	10	10.0	—	10.0	24.1	39.4	40
			3.7	2.76	10.6	10	10.0	—	10.0	24.1	43.4	50
			5.0	3.73	12.8	10	10.0	—	10.0	24.1	46.1	50
AAHC10BLA		480-3-60	2.9	2.16	3.4	10	10.0	—	10.0	12.0	19.3	20
			3.7	2.76	4.8	10	10.0	—	10.0	12.0	21.0	25
			5.0	3.73	6.4	10	10.0	—	10.0	12.0	23.0	25
AAHC10BSA		575-3-60	3.0	2.24	3.8	10	10.0	—	10.0	10.0	17.3	20
			5.0	3.73	5.1	10	10.0	—	10.0	10.0	18.9	20
AAHC20BHA		208-3-60	2.9	2.16	7.5	20	14.9	—	14.9	41.5	61.3	70
			3.7	2.76	10.6	20	14.9	—	14.9	41.5	65.1	70
			5.0	3.73	14.6	20	14.9	—	14.9	41.5	70.1	80
		240-3-60	2.9	2.16	7.5	20	19.9	—	19.9	47.9	69.2	70
			3.7	2.76	10.6	20	19.9	—	19.9	47.9	73.1	80
			5.0	3.73	12.8	20	19.9	—	19.9	47.9	75.8	80
AAHC20BLA		480-3-60	2.9	2.16	3.4	20	20.0	—	20.0	24.1	34.3	35
			3.7	2.76	4.8	20	20.0	—	20.0	24.1	36.1	40
			5.0	3.73	6.4	20	20.0	—	20.0	24.1	38.1	40
AAHC20BSA		575-3-60	3.0	2.24	3.8	20	20.0	—	20.0	20.1	29.9	30
			5.0	3.73	5.1	20	20.0	—	20.0	20.1	31.5	35
AAHC30BHA		208-3-60	2.9	2.16	7.5	30	15.0	7.5	22.5	62.5	87.5	90
			3.7	2.76	10.6	30	15.0	7.5	22.5	62.5	91.4	100
			5.0	3.73	14.6	30	15.0	7.5	22.5	62.5	96.4	100
		240-3-60	2.9	2.16	7.5	30	20.0	10.0	30.0	72.2	99.6	100
			3.7	2.76	10.6	30	20.0	10.0	30.0	72.2	103.5	110
			5.0	3.73	12.8	30	20.0	10.0	30.0	72.2	106.2	110
AAHC30BLA		480-3-60	2.9	2.16	3.4	30	20.0	10.0	30.0	36.1	49.4	50
			3.7	2.76	4.8	30	20.0	10.0	30.0	36.1	51.1	60
			5.0	3.73	6.4	30	20.0	10.0	30.0	36.1	53.1	60
AAHC30BSA		575-3-60	3.0	2.24	3.8	30	20.0	10.0	30.0	30.1	42.4	50
			5.0	3.73	5.1	30	20.0	10.0	30.0	30.1	44.0	50

LEGEND

FLA — Full Load Amps

Hp — Horsepower

MCA — Minimum Circuit Amps

MOCP — Maximum Overcurrent Protection (Amps)

* Values shown are for single-point connection of electric heat access-ory and air handler.

† Single-phase motors. All other motors are 3-phase.

NOTES:

1. Electrical resistance heaters are rated at 240 v, 480 v, or 575 v. To determine heater capacity (kW) at unit nameplate multiply the 240-v, 480-v, or 575-v capacity (kW) by the factor shown in the table below for the unit voltage.

HEATER RATING VOLTAGE	ACTUAL HEATER VOLTAGE										
	200	208	230	240	400	440	460	480	550	575	600
240	0.694	0.751	0.918	1	—	—	—	—	—	—	—
480	—	—	—	—	0.694	0.84	0.918	1	—	—	—
575	—	—	—	—	—	—	—	—	0.915	1	1.089

2. The following equation converts kW of heat energy to Btuh:
kW x 3,412 = Btuh.

3. Heater contactor coils are 24 v and require 8 va holding current.

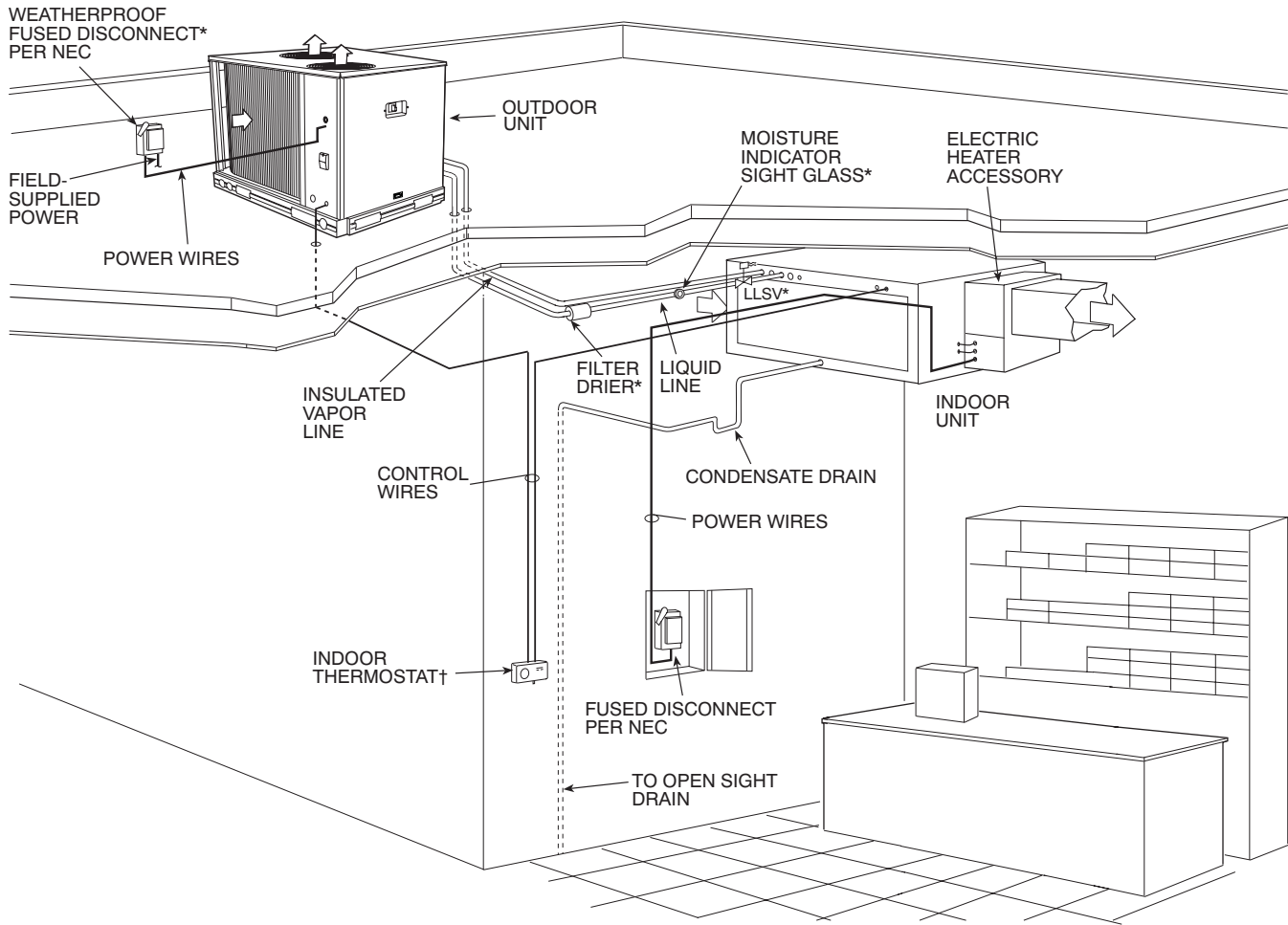
4. Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

5. MCA and MOCP values apply to both standard and alternate factory-supplied motors.

6. Approximate shipping weight for heaters that fit 6 to 10 ton units is 55 lb (25 kg) each. Approximate shipping weight for heaters that fit 12.5 to 15 ton units is 60 lb (27 kg) each.



TYPICAL PIPING AND WIRING



LEGEND:

NEC – National Electrical Code

TXV – Thermostatic Expansion Valve

* Field-supplied

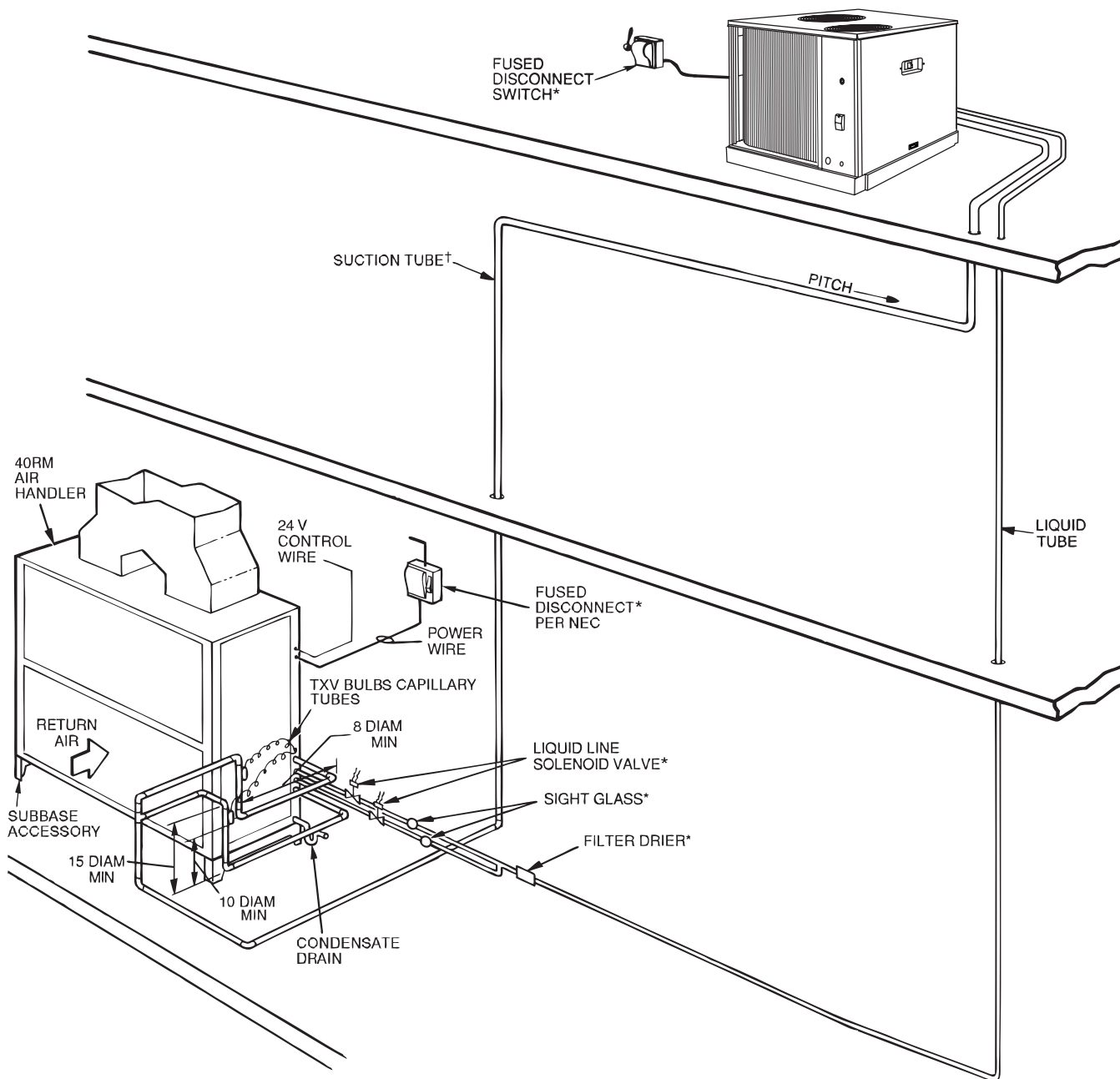
† Double riser may be required. Consult condensing unit product data catalog for details.

NOTES:

1. All piping must follow standard refrigerant piping techniques.
2. All wiring must comply with the applicable local and national codes.
3. Wiring and piping shown are general points-of-connection guides only and are not intended for, or to include all details for, a specific installation.
4. Liquid line solenoid valve (solenoid drop control) is recommended to prevent refrigerant migration to the compressor.
5. Internal factory-supplied TXVs not shown.

TYPICAL PIPING AND WIRING (cont.)

VERTICAL INSTALLATION - FAS (TYPICAL)



C09055

LEGEND:

LLSV – Liquid Line Solenoid Valve
 NEC – National Electrical Code
 TXV – Thermostatic Expansion Valve

* Field-supplied

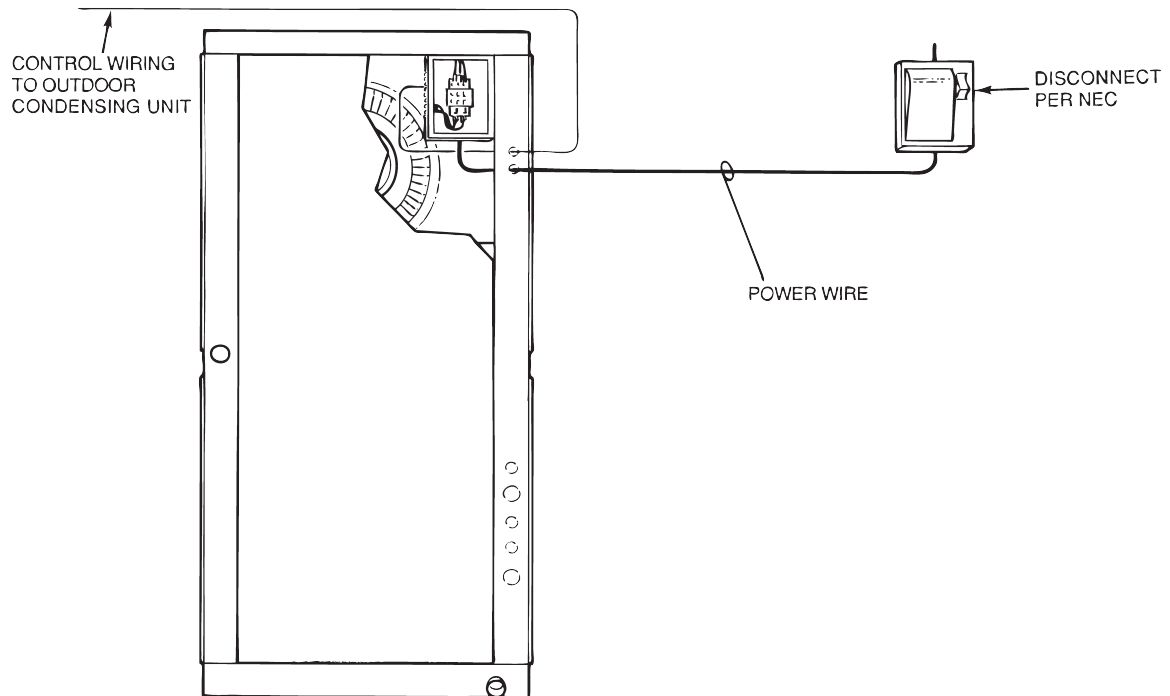
† Double riser may be required Consult condensing unit product data catalog for details.

NOTES:

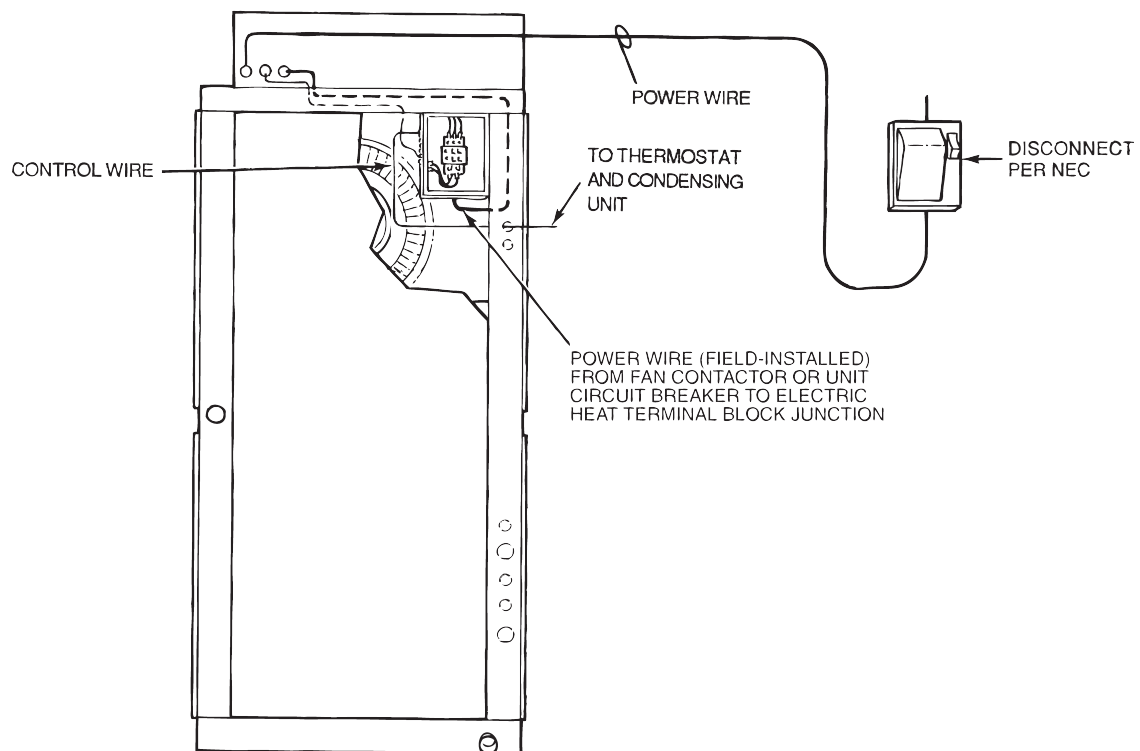
1. All piping must follow standard refrigerant piping techniques.
2. All wiring must comply with the applicable local and national codes.
3. Wiring and piping shown are general points-of-connection guides only and are not intended for, or to include all details for, a specific installation.
4. Liquid line solenoid valve (solenoid drop control) is recommended to prevent refrigerant migration to the compressor.
5. Internal factory-supplied TXVs not shown.

TYPICAL PIPING AND WIRING (cont.)

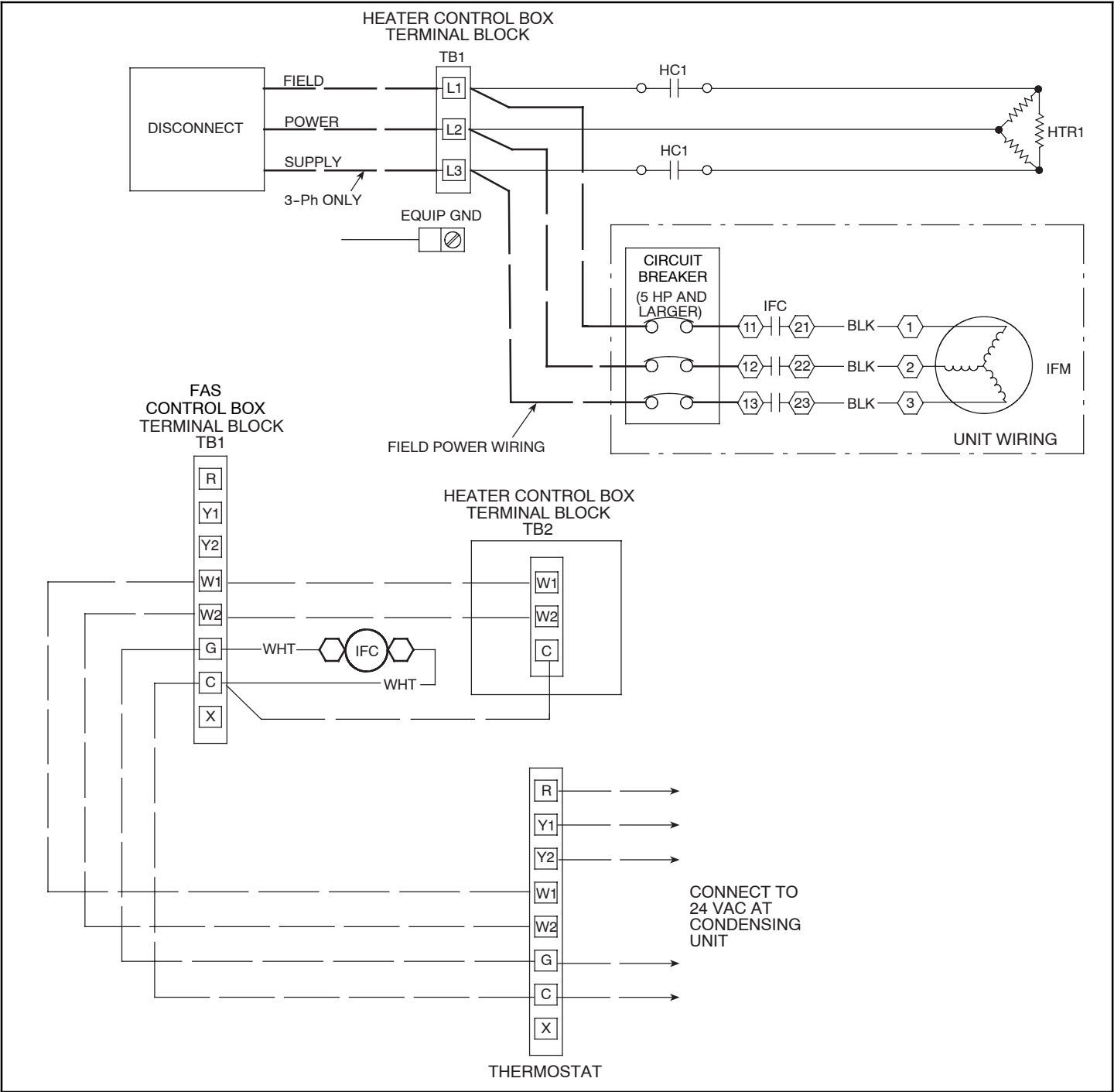
WIRING ROUTING, BASE UNIT FAS



WIRING ROUTING, UNIT WITH ELECTRIC HEAT - FAS



TYPICAL CONTROL WIRING SCHEMATIC



C09050

APPLICATION DATA

Operating limits

Maximum fan speed

FAS072-150 . . . 1200 RPM(20 R/S)

General

IMPORTANT: Do not bury refrigerant piping underground.

Select equipment to match or to be slightly less than peak load. This provides better humidity control, less unit cycling, and less part-load operation. Equipment should be selected to perform at no less than 300 cfm/ton (40 L/s per kW).

The air handler fan must always be operating when the condensing unit is operating.

Ductwork should be sized according to unit size, not building load. For larger units with two fans, a split duct transition is recommended at the fan outlets, but a

plenum can be used with slight reduction in external static pressure capability.

For variable air volume (VAV) systems with supply-to-return air recycling, use the equipment room as a return air plenum.

Hot gas bypass

Hot gas bypass may be required for low load control in certain applications. Hot gas should only be used during first stage cooling operation and should be applied to all evaporator circuits that are active at that time. To apply hot gas bypass, the FAS unit will require a field-installed auxiliary side connector(s). See the Auxiliary Side Connector Data table for part numbers.

AUXILIARY SIDE CONNECTOR DATA

UNIT FAS	P/N	INLET/OUTLET DIAMETER — ODF (in.)	AUXILIARY (Hot Gas) DIAMETER — ODF (in.)
072	1178747	1 ¹ / ₈	5 ⁵ / ₈
091	1178748	1 ³ / ₈	7 ⁷ / ₈
120	1178747	1 ¹ / ₈	5 ⁵ / ₈
150	1178747	1 ¹ / ₈	5 ⁵ / ₈
180	1178747	1 ¹ / ₈	5 ⁵ / ₈

FACTORY-INSTALLED NOZZLE AND DISTRIBUTOR DATA

UNIT FAS	COIL TYPE	TXV Qty...Part No.	DISTRIBUTOR Qty...Part No.†	FEEDER TUBES PER DISTRIBUTOR* Qty...Size (in.)	NOZZLE Qty...Part No.
072	4 Row	1...BBIZE-5-GA	1...1135	12... ¹ / ₄	1...G4
091	4 Row	1...BBIZE-6-GA	1...1136	15... ¹ / ₄	1...G5
120	4 Row	2...BBIZE-4-GA	2...1135	9... ¹ / ₄	2...G3
150	4 Row	2...BBIZE-5-GA	2...1135	9... ¹ / ₄	2...G4
		2...BBIZE-5-GA	2...1113	12... ³ / ₁₆	2...G3

* Feeder tube size is ¹/₄ in. (6.35 mm)

NOTE: Hot gas bypass applications require field-supplied auxiliary side connector.

APPLICATION DATA (cont.)

FAN MOTOR DATA STANDARD MOTOR — U.S.

UNIT	FAS072	FA091	FA120	FA150	FA180
208/230-1-60					
Speed (rpm)	1725	1725	—	—	—
Bhp	1.3	2.4	—	—	—
Frame (NEMA)	56Y	56Y	—	—	—
Shaft Dia (in.)	$\frac{5}{8}$	$\frac{5}{8}$	—	—	—
208/230-3-60 and 460-3-60					
Speed (rpm)	1725	1725	1725	1725	1725
Bhp	2.4	2.4	2.4	2.9	3.7
Frame (NEMA)	56Y	56Y	56Y	56Y	56Y
Shaft Dia (in.)	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{7}{8}$
575-3-60					
Speed (rpm)	1725	1725	1725	1725	1725
Hp	1.0	2.0	2.0	3.0	3.0
Frame (NEMA)	56	56HZ	56HZ	56HZ	56HZ
Shaft Dia (in.)	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$

LEGEND:

NEMA — National Electrical Manufacturers Association (U.S.A.)

HIGH STATIC MOTOR — U.S.

UNIT	FA072	FA091	FA120	FA150	FA180
208/230-1-60					
Speed (rpm)	1725	1725	—	—	—
Bhp	2.4	2.4	—	—	—
Frame (NEMA)	56Y	56Y	—	—	—
Shaft Dia (in.)	$\frac{5}{8}$	$\frac{5}{8}$	—	—	—
230-3-60 and 460-3-60					
Speed (rpm)	1725	1725	1725	1725	1725
Bhp/Hp	2.9	2.9	3.7	3.7	5.0
Frame (NEMA)	56Y	56Y	Y56Y	Y56Y	S184T
Shaft Dia (in.)	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$1\frac{1}{8}$
575-3-60					
Speed (rpm)	1725	1725	1725	1745	1745
Hp	2.0	3.0	3.0	5.0	5.0
Frame (NEMA)	56HZ	56HZ	56HZ	184T	184T
Shaft Dia (in.)	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$

LEGEND:

NEMA — National Electrical Manufacturers Association (U.S.A.)

MOTOR EFFICIENCY FAS

MOTOR HP	EPACT MINIMUM	MOTOR EFFICIENCY
1.3*	—	70%
2.4	—	82%
2.9	—	82%
3.7	—	84%
5.0	87.5%	87.5%
7.5	88.5%	88.5%
10.0	89.5%	89.5%

LEGEND:

EPACT — Energy Policy and Conservation Act of 1992

* Single-phase only.

APPLICATION DATA (cont.)

FAN MOTOR DATA (cont) STANDARD MOTOR — SI

UNIT	FAS072	FAS091	FAS120	FAS150	FAS180
208/230-1-60					
Speed (r/s)	28.75	28.75	—	—	—
Shaft kW	0.97	1.79	—	—	—
Frame (NEMA)	56Y	56Y	—	—	—
Shaft Dia (mm)	15.9	15.9	—	—	—
208/230-3-60 and 460-3-60					
Speed (r/s)	28.75	28.75	28.75	28.75	28.75
Shaft kW	1.79	1.79	1.79	2.16	2.76
Frame (NEMA)	56Y	56Y	56Y	56Y	56Y
Shaft Dia (mm)	15.9	15.9	15.9	22.2	22.2
575-3-60					
Speed (r/s)	28.75	28.75	28.75	28.75	28.75
Shaft kW	0.75	1.49	1.49	2.24	2.24
Frame (NEMA)	56	56HZ	56HZ	56HZ	56HZ
Shaft Dia (mm)	15.9	22.2	22.2	22.2	22.2

LEGEND:

NEMA — National Electrical Manufacturers Association (U.S.A.)

HIGH STATIC MOTOR — SI

UNIT	FAS072	FAS091	FAS120	FAS150	FAS180
208/230-1-60					
Speed (r/s)	28.75	28.75	—	—	—
Shaft kW	1.79	1.79	—	—	—
Frame (NEMA)	56Y	56Y	—	—	—
Shaft Dia (mm)	15.9	15.9	—	—	—
208/230-3-60 and 460-3-60					
Speed (r/s)	28.75	28.75	28.75	28.75	29.08
Shaft kW	2.16	2.16	2.76	2.76	3.73
Frame (NEMA)	56Y	56Y	Y56Y	Y56Y	S184T
Shaft Dia (mm)	22.2	22.2	22.2	22.2	28.6
575-3-60					
Speed (r/s)	28.75	28.75	28.75	29.08	29.08
Shaft kW	1.50	2.24	2.24	3.73	3.73
Frame (NEMA)	56HZ	56HZ	56HZ	184T	184T
Shaft Dia (mm)	22.2	22.2	22.2	28.6	28.6

LEGEND:

NEMA — National Electrical Manufacturers Association (U.S.A.)

STANDARD DRIVE DATA, 60 Hz — U.S.

UNIT	FAS072	FAS091	FAS120	FAS150	FAS180
MOTOR DRIVE					
Motor Pulley Pitch Diameter (in.)	2.4-3.4	2.8-3.8	3.4-4.4	2.8-3.8	2.8-3.8
Pulley Factory Setting Full Turns Open	2.5	2.5	2.5	2.5	2.5
FAN DRIVE					
Pulley Pitch Dia (in.)	8.8	8.8	8.8	9.0	9.0
Pulley Bore (in.)	1	1	1	1 ^{7/16}	1 ^{7/16}
Belt No. — Section	1—A	1—A	1—A	1—A	1—A
Belt Pitch (in.)	40.3	41.3	42.3	42.3	42.3
FAN SPEEDS (rpm)					
Factory Settings	568	647	764	632	632
Range	470-666	549-745	666-863	537-728	537-728
Max Allowable Speed (rpm)	1200	1200	1200	1200	1200
Change per 1/2 turn of Moveable Motor Pulley Flange	19.6	19.6	19.7	19.1	19.1
MAX FULL TURNS FROM CLOSED POSITION					
	5	5	5	5	5
SHAFTS CENTER DISTANCE (in.)					
	10.44- 12.32	10.44- 12.32	10.44- 12.32	10.44- 12.32	10.44- 12.32

APPLICATION DATA (cont.)

MEDIUM-STATIC DRIVE DATA, 60 Hz — U.S.

UNIT	FAS072	FAS091	FAS120	FAS150	FAS180
MOTOR DRIVE					
Motor Pulley Pitch Diameter (in.)	3.4-4.4	3.4-4.4	3.4-4.4	3.4-4.4	3.4-4.7
Pulley Factory Setting Full Turns Open	2.5	2.5	2.5	2.5	3.0
FAN DRIVE					
Pulley Pitch Dia (in.)	8.8	8.0	8.0	8.2	8.6
Pulley Bore (in.)	1	1	1	1 ^{7/16}	1 ^{7/16}
Belt No. — Section	1—A	1—A	1—A	1—A	1—B
Belt Pitch (in.)	42.3	40.3	40.3	41.3	41.8
FAN SPEEDS (rpm)					
Factory Setting	764	841	841	820	842
Range	666-863	733-949	733-949	715-926	742–943
Max Allowable Speed (rpm)	1200	1200	1200	1200	1200
Change per 1/2 Turn of Moveable Motor Pulley Flange	19.7	21.6	21.6	21.1	16.7
MAX FULL TURNS FROM CLOSED POSITION	5	5	5	5	6
SHAFTS CENTER DISTANCE (in.)	10.44- 12.32	10.44- 12.32	10.44- 12.32	10.44- 12.32	10.44- 12.32

HIGH-STATIC DRIVE DATA, 60 Hz — U.S.

UNIT	FAS072	FAS091	FAS120	FAS150	FAS180
MOTOR DRIVE					
Motor Pulley Pitch Diameter (in.)	3.4-4.4	3.4-4.4	3.4-4.4	3.7-4.7	4.3–5.3
Pulley Factory Setting Full Turns Open	2.5	2.5	2.5	3.0	3.0
FAN DRIVE					
Pulley Pitch Dia (in.)	7.0	6.0*	6.0	7.4	7.9
Pulley Bore (in.)	1	1	1	1 ^{7/16}	1 ^{7/16}
Belt No. — Section	1—A	1—A	1—A	1—B	1—B
Belt Pitch (in.)	41.3	37.3	37.3	39.8	39.8
FAN SPEEDS (rpm)					
Factory Setting	961	1121	1121	979	1060
Range	838- 1084	978- 1200*†	978- 1200†	873- 1096	950- 1171
Max Allowable Speed (rpm)	1200	1200	1200	1200	1200
Change per 1/2 Turn of Moveable Motor Pulley Flange	24.6	28.7	28.7	19.4	18.4
MAX FULL TURNS FROM CLOSED POSITION	5	5	5	6	6
SHAFTS CENTER DISTANCE (in.)	10.44- 12.32	10.44- 12.32	10.44- 12.32	10.44- 12.32**	9.16- 10.99

* Values for 3-phase motor shown. For single-phase motor, pulley pitch diameter is 7 in. and resulting fan speed is 837-1096 rpm.

† It is possible to adjust drive so that fan speed exceeds maximum allowable. DO NOT exceed 1200 rpm.

** 575-v unit has a center distance of 9.16-10.99.

APPLICATION DATA (cont.)

STANDARD DRIVE DATA, 60 Hz — SI

UNIT	FAS072	FAS091	FAS120	FAS150	FAS180
MOTOR DRIVE					
Motor Pulley Pitch Diameter (mm)	61.0-86.4	71.1-96.5	86.4-111.8	71.1-96.5	71.1-96.5
Pulley Factory Setting Full Turns Open	2.5	2.5	2.5	2.5	2.5
FAN DRIVE					
Pulley Pitch Dia (mm)	224	224	224	229	229
Pulley Bore (mm)	25.4	25.4	25.4	36.5	36.5
Belt No. — Section	1—A	1—A	1—A	1—A	1—A
Belt Pitch (mm)	1024	1049	1074	1074	1074
FAN SPEEDS (r/s)					
Factory Setting	9.5	10.8	12.7	10.5	10.5
Range	7.8-11.1	9.2-12.4	11.1-14.4	9.0-12.1	9.0-12.1
Max Allowable Speed (r/s)	20.0	20.0	20.0	20.0	20.0
Change per 1/2 Turn of Moveable Motor Pulley Flange	0.327	0.327	0.328	0.318	0.318
MAX FULL TURNS FROM CLOSED POSITION	5	5	5	5	5
SHAFTS CENTER DISTANCE (mm)	265-313	265-313	265-313	265-313	265-313

MEDIUM-STATIC DRIVE DATA, 60 Hz — SI

UNIT	FAS072	FAS091	FAS120	FAS150	FAS180
MOTOR DRIVE					
Motor Pulley Pitch Diameter (mm)	86.4-111.8	86.4-111.8	86.4-111.8	86.4-111.8	94.0-119.4
Pulley Factory Setting Full Turns Open	2.5	2.5	2.5	2.5	3.0
FAN DRIVE					
Pulley Pitch Dia (mm)	224	203	203	208	218
Pulley Bore (mm)	25.4	25.4	25.4	36.5	36.5
Belt No. — Section	1—A	1—A	1—A	1—A	1—B
Belt Pitch (mm)	1074	1024	1024	1049	1062
FAN SPEEDS (r/s)					
Factory Setting	12.7	14.0	14.0	13.7	14.0
Range	11.1-14.4	12.2-15.8	12.2-15.8	11.9-15.4	12.4-15.7
Max Allowable Speed (r/s)	20.0	20.0	20.0	20.0	20.0
Change per 1/2 Turn of Moveable Motor Pulley Flange	0.328	0.360	0.360	0.352	0.278
MAX FULL TURNS FROM CLOSED POSITION	5	5	5	6	6
SHAFTS CENTER DISTANCE (mm)	265-313	265-313	265-313	265-313	265-313

APPLICATION DATA (cont.)

HIGH-STATIC DRIVE DATA, 60 Hz — SI

UNIT	FAS072	FAS091	FAS120	FAS150	FAS180
MOTOR DRIVE					
Motor Pulley Pitch Diameter (mm)	86.4- 111.8	86.4- 111.8	86.4- 111.8	94.0- 119.4	109.2- 134.6
Pulley Factory Setting Full Turns Open	2.5	2.5	2.5	3.0	3.0
FAN DRIVE					
Pulley Pitch Dia (mm)	178	152*	152	188	201
Pulley Bore (mm)	25.4	25.4	25.4	36.5	36.5
Belt No. — Section	1—A	1—A	1—A	1—B	1—B
Belt Pitch (mm)	1049	947	947	1011	1011
FAN SPEEDS (r/s)					
Factory Setting	16.0	18.7	18.7	16.3	17.7
Range	14.0-18.1	16.3-20.0*†	16.3-20.0†	14.4-18.3	15.8–19.5
Max Allowable Speed (r/s)	20.0	20.0	20.0	20.0	20.0
Change per 1/2 Turn of Moveable Motor Pulley Flange	0.410	0.478	0.478	0.323	0.307
MAX FULL TURNS FROM CLOSED POSITION	5	5	5	6	6
SHAFTS CENTER DISTANCE (mm)	265-313	265-313	265-313	265-313**	232–279

* Values for 3-phase motor shown. For single-phase motor, pulley pitch diameter is 178 mm and resulting fan speed is 14.0-18.3 r/s.

† It is possible to adjust drive so that fan speed exceeds maximum allowable. DO NOT exceed 20 r/s.

** 575-v unit has a center distance of 233-279.

GUIDE SPECIFICATIONS

Commercial Packaged Air-Handling Unit

HVAC Guide Specifications

Size Range: **2,400 to 6,000 Cfm (1150 to 2830 L/s), Nominal Airflow, 6 to 15 Tons (21 to 52 kW), Nominal Cooling**

Model Number: **FAS (Direct-Expansion Coil)**

Part 1 — GENERAL

1.01 SYSTEM DESCRIPTION

- A. Indoor, packaged air-handling unit for use in commercial split systems. Unit shall have a multi-position design and shall be capable of horizontal or vertical installation on a floor or in a ceiling, with or without ductwork. (Only vertical units are to be applied without ductwork.)
- B. Unit with direct-expansion coil shall be used in a refrigerant circuit with a matching air-cooled condensing unit. Unit with chilled water coil shall be used in a chilled water circuit.

1.02 QUALITY ASSURANCE

- A. Coils shall be designed and tested in accordance with ASHRAE 15 Safety Code for Mechanical Refrigeration (U.S.A.), latest edition.
- B. Unit shall be constructed in accordance with ETL (U.S.A.) and ETL, Canada, standards and shall carry the ETL and ETL, Canada, labels.
- C. Unit insulation and adhesive shall comply with NFPA-90A (U.S.A.) requirements for flame spread and smoke generation. Insulation shall contain an EPA-registered immobilized antimicrobial agent to effectively resist the growth of bacteria and fungi as proven by tests in accordance with ASTM standards G21 and 22 (U.S.A.).
- D. Unit shall be manufactured in a facility registered to the ISO 9001:2000 manufacturing quality standard.
- E. Direct-expansion and chilled water coils shall be burst and leak tested at 435 psi (2999 kPa).

1.03 DELIVERY AND STORAGE

Units shall be stored and handled per manufacturer's recommendations.

Part 2 — PRODUCTS

2.01 EQUIPMENT

Indoor mounted, draw-thru, packaged air-handling unit that can be used in a suspended horizontal configuration or a vertical configuration. Unit shall consist of forward-curved belt-driven centrifugal fan(s), motor and drive assembly, pre-wired fan motor contactor, factory-installed refrigerant metering devices (direct-expansion coil units), cooling coil, 2-in. (51-mm) disposable air filters, and

condensate drain pans for vertical or horizontal configurations.

A. Base Unit:

- 1. Cabinet shall be constructed of mill-galvanized steel.
- 2. Cabinet panels shall be fully insulated with 1/2-in. (12.7-mm) fire-retardant material. Insulation shall contain an EPA-registered immobilized antimicrobial agent to effectively resist the growth of bacteria and fungi as proven by tests in accordance with ASTM standards G21 and 22 (U.S.A.).
- 3. Unit shall contain non-corroding condensate drain pans for both vertical and horizontal applications. Drain pans shall have connections on right and left sides of unit to facilitate field connection. Drain pans shall have the ability to be sloped toward the right or left side of the unit to prevent standing water from accumulating in pans.
- 4. Unit shall have factory-supplied 2-in. (51 mm) throwaway-type filters installed upstream from the cooling coil. Filter access shall be from either the right or left side of the unit.

B. Coils:

DX coil is 4-row and consists of copper tubes with sine-wave aluminum fins bonded to the tubes by mechanical expansion. Suction and liquid line connections or supply and discharge connections shall be made on the same side of the coil.

- 1. Direct-expansion coils shall feature factory installed thermostatic expansion valves (TXVs) for refrigerant control. The TXVs shall be R-410A compatible and capable of external adjustment. Direct-expansion heat pump coils shall have a factory-installed bypass line and check valve assembly around the TXVs to allow liquid flow from the coil to the outdoor unit during the heating mode. Coil tubing shall be internally rifled to maximize heat transfer.

C. Operating Characteristics:

Unit shall be capable of providing _____ cfm (L/s) airflow at an external static pressure of _____ in. wg (kPag).

D. Motor:

- 1. Fan motor of the size and electrical characteristics specified on the equipment schedule shall be factory supplied and installed.

GUIDE SPECIFICATIONS (cont.)

2. Motors rated at 1.3 through 3.7 hp (0.97 through 2.76 kW) shall have internal thermal overload protection. Motors rated at 5 hp (3.73 kW) shall be protected by a circuit breaker.
3. Evaporator-fan motor shall have permanently lubricated, sealed bearings and inherent automatic-reset thermal overload protection or manual reset calibrated circuit breakers. Evaporator motors are designed specifically for our units and do not have conventional horsepower (hp) ratings listed on the motor nameplate. Motors are designed and qualified in the "air-over" location downstream of the cooling coil and carry a maximum continuous bhp rating that is the maximum application bhp rating for the motor; no "safety factors" above that rating may be applied.
4. All evaporator-fan motors 5 hp and larger shall meet the minimum efficiency requirements as established by the Energy Policy Act of 1992 (EPACT), effective October 24, 1997.

E. Special Features:

1. High Static Motor and Drive:

A high-static drive shall be available to meet the airflow and external static pressure requirements specified on the equipment schedule.

2. External Paint:

Where conditions require, units shall be painted with an American Sterling Gray finish.

3. Hot Water Coil:

Coil shall be 2-row, U-bend coil with copper tubes and aluminum plate fins bonded to the tubes by mechanical expansion. Coil shall be mounted in a galvanized steel housing that shall be fastened to the unit's fan deck for blow-thru heating operation. Coil shall have maximum working pressure of 150 psig (1034 kPag).

4. Steam Distributing Coil:

Coil shall consist of one row of copper tubes with aluminum plate fins, and shall have inner steam distributing tubes. Coil shall be mounted in a galvanized steel housing and shall be fastened to the unit's fan deck for blow-thru heating operation. Coil shall have maximum working pressure of 20 psig at 260°F (138 kPag at 126°C).

5. Electric Heaters:

Heaters for nominal 240, 480, or 575-volt, 3-phase, 60 Hz shall be factory-supplied for field installation as shown on the equipment drawings. Electric heat assembly shall be ETL (U.S.A.) and ETL, Canada, agency approved, and shall have single-point power wiring. Heater assembly shall include contactors with 24-v coils, power wiring, 24-v control wiring

terminal blocks, and a hinged access panel. Electric heaters shall not be used with air discharge plenum.

6. Air Discharge Plenum:

Plenum shall be factory-supplied to provide free-blow air distribution for vertical floor-mounted units. A grille with moveable vanes for horizontal or vertical airflow adjustment shall be included. Plenum shall be field-assembled and field-installed on the unit's fan deck for blow-thru air distribution. Plenum shall not be used with electric heaters.

7. Return-Air Grille:

Grille shall be factory-supplied for field installation on the unit's return air opening.

8. Unit Subbase:

Subbase assembly shall be factory-supplied for field installation. Subbase shall elevate floor-mounted vertical units to provide access for correct condensate drain connection.

9. Economizer:

Economizer for ventilation or "free" cooling shall be factory provided for field installation on either return air opening of air handler. For free cooling applications, economizer shall be compatible with separate thermostat; economizer dampers shall open when outdoor air enthalpy is suitable for free cooling. Economizer shall be compatible with separate CO₂ sensor accessory; economizer dampers shall open when indoor CO₂ level rises above predetermined set point. Economizer shall include enthalpy control and damper actuator.

10. Overhead Suspension Package:

Package shall include necessary brackets to support units in a horizontal ceiling installation.

11. CO₂ Sensor:

Sensor shall provide the ability to signal the economizer to open when the space CO₂ level exceeds the predetermined setpoint. Sensor shall have the capability of being connected to Comfort System relay pack or to economizer using field-supplied and field-installed Honeywell dc adapter no. Q769C1004.

12. Condensate Drain Trap:

Trap shall have transparent, serviceable design for easy cleaning. Kit shall include overflow shutoff switch and wiring harness for connection to an alarm if desired.