



COMMERCIAL

PHS

Product Specifications

PACKAGE HEAT PUMP UNIT - 70 to 110 MBtuh

REFRIGERATION CIRCUIT

- Scroll compressors on most models.
- High and low pressure switches.
- State of the art defrost system.
- Anti-cycle timer built into the electronic board.

BUILT TO LAST

- Pre-painted galvanized steel cabinet for long life and quality appearance.
- Integral Commercial strength base rails. Holes provided for lifting lugs makes rooftop installation easier.
- Non-corrosive, sloped condensate drain pan, meets ASHRAE 62.

EASY TO INSTALL AND SERVICE

- Electric cooling and heating, self contained for year-round comfort. Systems installed on rooftop or ground level. The unit is shipped in the horizontal position and can easily be converted to downflow.
- Thru-the-bottom utility connection capability allow power and control wiring to be routed through unit base pan, minimizing roof penetrations.
- Factory wired to accept economizer.
- Refrigerant filter drier.

WARRANTY

- 5 year compressor limited warranty
- 1 year parts limited warranty



PHS090-120 Shown



UNIT PERFORMANCE DATA

Model Number *	COOLING			HEATING		Unit Dimensions H X W X L	Unit Weight
	Rated Capacity BTUH	E.E.R	IPLV	ARI Rated Heating Capacity BTUH (Net...High / Low	COP High / Low		
PHS072H000A	70,000	9.05	n/a	72,400 / 42,000	3.2 / 2.1	33-5/16" x 45" x 73-11/16"	590
PHS072L000A	70,000	9.05	n/a	72,400 / 42,000	3.2 / 2.1	33-5/16" x 45" x 73-11/16"	590
PHS072S000A	70,000	9.05	n/a	72,400 / 42,000	3.2 / 2.1	33-5/16" x 45" x 73-11/16"	590
PHS090H000A	85,000	8.9	9.2	77,000 / 35,000	3.0 / 1.8	41-5/16" x 57-3/4" x 87-3/8"	870
PHS090L000A	85,000	8.9	9.2	77,000 / 35,000	3.0 / 1.8	41-5/16" x 57-3/4" x 87-3/8"	870
PHS090S000A	85,000	8.9	9.2	77,000 / 35,000	3.0 / 1.8	41-5/16" x 57-3/4" x 87-3/8"	870
PHS120H000A	110,000	8.9	8.9	103,000 / 52,000	3.0 / 2.0	49-15/16" x 57-3/4" x 87-3/8"	1000
PHS120L000A	110,000	8.9	8.9	103,000 / 52,000	3.0 / 2.0	49-15/16" x 57-3/4" x 87-3/8"	1000
PHS120S000A	110,000	8.9	8.9	103,000 / 52,000	3.0 / 2.0	49-15/16" x 57-3/4" x 87-3/8"	1000

* Unit voltage: H = 208/230v, L = 460v, S = 575v

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7/05/07

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MODEL NUMBER IDENTIFICATION GUIDE							
MODEL NUMBER	P	H	S	090	H	000	A
PRODUCT FAMILY Package Units							Sales Code
TYPE H= Heat Pump G = Gas/Electric A = Air Conditioner							OPTIONS
DESIGN SERIES							VOLTAGE / PHASE / HERTZ H = 208/230-3-60 L = 460-3-60 S = 575-3-60
							COOLING CAPACITY (NOMINAL BTUH) 072 = 6 Ton 090 = 7-1/2 Ton 120 = 10 Ton

UNIT SPECIFICATIONS									
MODELS									
COOLING	PHS072H	PHS072L	PHS072S	PHS090H	PHS090L	PHS090S	PHS120H	PHS120L	PHS120S
ARI Rated Capacity Btuh (Net)	70,000			85,000			110,000		
Nominal Tons	6			7-1/2			10		
Standard CFM	2400			3200			4100		
EER	9.0			8.9			8.9		
IPLV	N/A			9.2			8.9		
Sound Rating (Bels)	8.6			8.6			8.4		
Unit Operating Weight	590			940			1015		
HEATING									
ARI Rated Heating Capacity Btuh (Net)....High / Low	72,400 / 42,000			77,000 / 35,000			103,000 / 52,000		
COP..... High / Low	3.2 / 2.1			3.0 / 1.8			3.0 / 2.0		
ELECTRICAL	PHS072H	PHS072L	PHS072S	PHS090H	PHS090L	PHS090S	PHS120H	PHS120L	PHS120S
Volts/ 3 Phase/ 60Hertz	208/230	460	575	208/230	460	575	208/230	460	575
Voltage Range Min/Max	187 / 254	414 / 508	518 / 632	187 / 254	414 / 508	518 / 632	187 / 254	414 / 508	518 / 632
Power Supply MCA	35.6 / 35.6	17.6	14.0	38.8 / 38.8	19.1	15.4	47.3 / 47.3	23.4	18.7
Power Supply MOCP*	40 / 40	20	15	40 / 40	20	20	50 / 50	25	20
COMPRESSOR - QTY	SCROLL - 1			RECIPROCATING - 2			SCROLL - 2		
Model	SR(Y,H,J)752AE*			CR42K6			ZR57KC		
Oil (Oz.)	54			45 each			54 each		
RLA / LRA	22.7 / 146	11.4 / 73	9.1 / 58.4	13.4 / 91	6.7 / 42	5.4 / 39	17.2 / 124	8.6 / 59.6	6.9 / 49.4
REFRIGERANT TYPE	R-22								
Expansion Device	Fixed Orifice Metering Device								
Operating Charge....lb. oz....Circuit 1	11 - 2			5 - 14			7 - 14		
...Circuit 2	N/A			5 - 13			8 - 3		
CONDENSER FAN	Propeller Type								
Nominal CFM	4000			6500			6500		
Quantity..Diameter (In.)	1...22			2...22			2...22		
Motor Hp...RPM	1/4...1100			1/4...1100			1/4...1100		
Watts Input (Total)	325			500			500		
FLA	1.4	0.7	0.7	1.4	0.7	0.7	1.4	0.7	0.7
CONDENSER COIL	Enhanced Copper Tubes, Aluminum Lanced fins								
Rows...Fin/In.	2...17			1...17			2...17		
Total Face Area (Sq. Ft..)	16.53			20.50			18.30		
EVAPORATOR COIL	Enhanced Copper Tubes, Aluminum Double Wavy Fins								
Rows...Fins/Inche	3...15			3...15			3...15		
Total Face Area (sq. ft.)	5.5			8.0			11.1		
EVAPORATOR FAN	Centrifugal Type								
Quantity...Size (in.)	1...10 x 10			1...15 x 15			1...15 x 15		
Type Drive	Belt			Belt			Belt		
Nominal CFM	2400			3000			4000		
Max. Continuous Bhp	2.4			2.4			2.4		
FLA-208-230/460/575V	5.8 / 2.6 / 2.6			5.8 / 2.6 / 2.6			5.8 / 2.6 / 2.6		
Motor Frame Size	56			56			56		
Fan RPM Range	1070-1460			590-840			685-935		
Motor Bearing	Ball			Ball			Ball		
Maximum Allowable RPM	2100			2100			2100		
Motor Pulley Pitch / Diameter Min/Max. (in.)	2.8 / 3.8			2.4 / 3.4			2.8 / 3.8		
Motor Shaft Diameter (in.)	5/8			5/8			5/8		
Fan Pulley Pitch Diam (in)	4.5			7.0			7.0		
Belt, Quantitiy...Type... Length (in.)	1...A...40			1...A...49			1...A...49		
Pulley Center Line Distance (in)	14.7-15.55			16.75-19.25			15.85-17.50		

* Y = 208/230V, H = 460V, J = 575V

See legends and notes on following page.

UNIT SPECIFICATIONS (cont.)

	MODELS		
	PHS072	PHS090	PHS120
EVAPORATOR FAN (CONT)	Centrifugal Type		
Speed Change per Full Turn of Movable Pulley Flange (RPM)	60	50	50
Pulley Max. full Turns From Closed Postion	5	5	5
Factory Setting	3.5	5	5
Factory Speed Setting RPM	1225	590	685
Fan Shaft Diam. at Pulley	5/8	1	1
HIGH-PRESSURE SWITCH (psig)			
Standard Compressor	450 +/- 50	450 +/- 50	450 +/- 50
Internal Relief (Differential) Cutout	428	428	428
Reset (Auto.)	320	320	320
LOSS-OF-CHARGE SWITCH (psig) (LOW-PRESS.)			
Cutout	7 +/- 3	7 +/- 3	7 +/- 3
Reset (Auto.)	22 +/- 7	22 +/- 7	22 +/- 7
FREEZE PROTECTION THERMOSTAT (F)			
Opens	30 +/- 5	30 +/- 5	30 +/- 5
Closes	45 +/- 5	45 +/- 5	45 +/- 5
RETURN-AIR FILTERS (THROWAWAY)			
Quantity...Size (in.)	2...16 x 25 x 2	4...16 x 20 x 2	4...20 x 20 x 2

LEGENDS AND NOTES

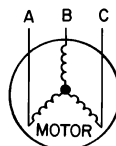
Bhp = Brake Horsepower

Legend

Bels	-	Sound Levels
EER	-	Energy Efficiency Ratio
IPLV	-	Integrated Part Load Values
MCA	-	Minimum Circuit Amps
MOCP	-	Maximum Over-current Protection
FLA	-	Full Load Amps
LRA	-	Locked Rotor Amps
*	-	Fuse or HACR circuit breaker
RLA	-	Rated Load Amps

- NOTES: 1. Rated in accordance with ARI Standards 210/240, latest revision (for sizes 090 & 120) or 360, latest revision (for size 150).
2. ARI ratings are net values, reflecting the effects of circulating fan heat.
3. Ratings are based on:
Cooling Standard: 80F db, 67F wb indoor entering air temperture and 95F db air entering outdoor unit.
IPLV Standard: 80F db, 67F wb indoor entering air temperture and 80F db entering air temperature.

EXAMPLE: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\begin{aligned} \text{Average Voltage} &= \frac{452 + 464 + 455}{3} \\ &= \frac{1371}{3} \\ &= 457 \end{aligned}$$

NOTES:

- In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the over-current protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.

2. 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 percent voltage imbalance.

% Voltage Imbalance

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

Determine maximum deviation from average voltage.

$$(AB) 457 - 452 = 5 \text{ V}$$

$$(BC) 464 - 457 = 7 \text{ V}$$

$$(AB) 457 - 455 = 2 \text{ V}$$

Maximum deviation is 7 v.

Determine percent voltage imbalance.

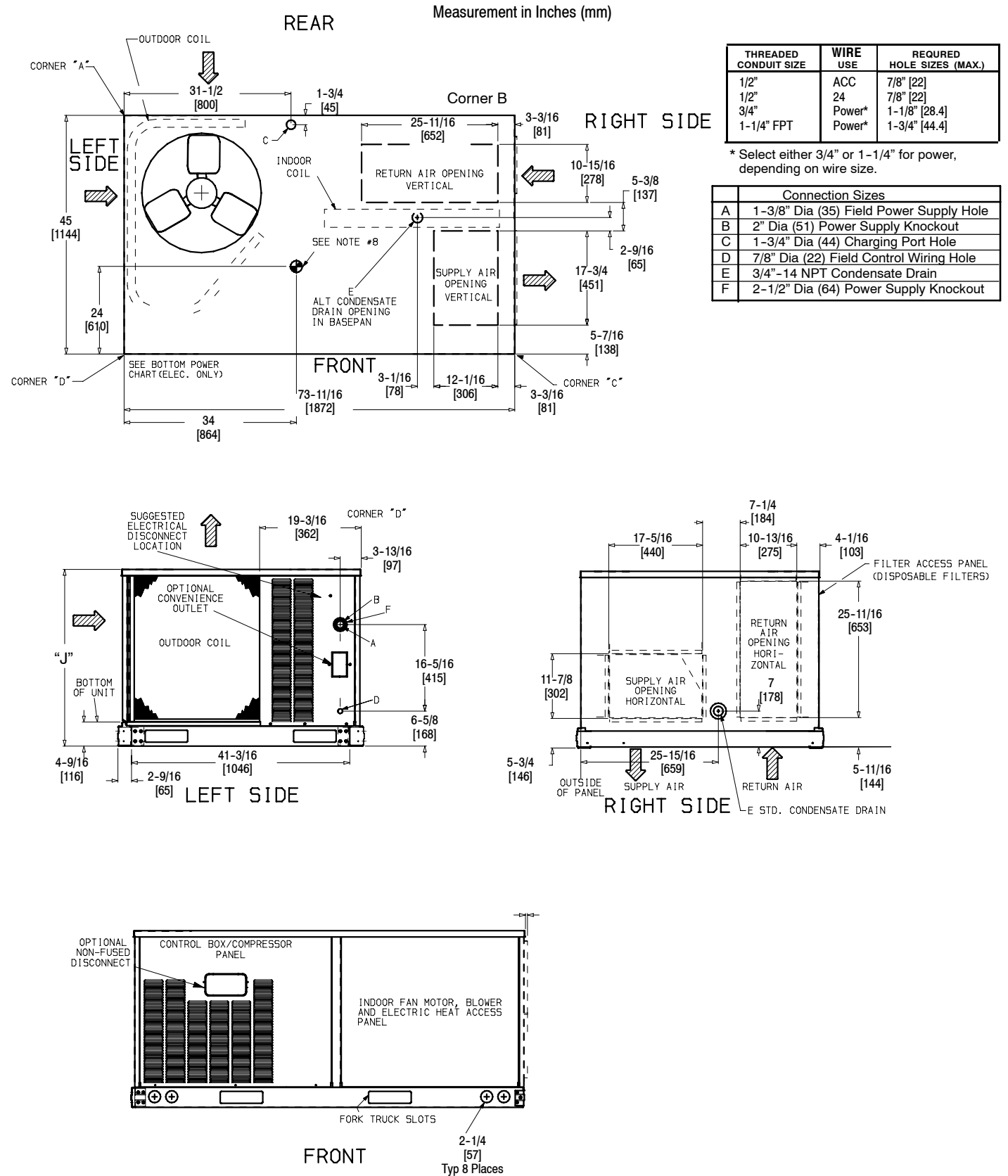
$$\begin{aligned} \% \text{ Voltage Imbalance} &= 100 \times \frac{7}{457} \\ &= 1.53\% \end{aligned}$$

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.

BASE UNIT WEIGHT AND DIMENSIONS - PHS072

Unit	Total Weight		Corner A		Corner B		Corner C		Corner D		Dim "J"	
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	inches	mm
PHS072	590	268	148	68	142	64	148	67	152	69	33 5/16	847



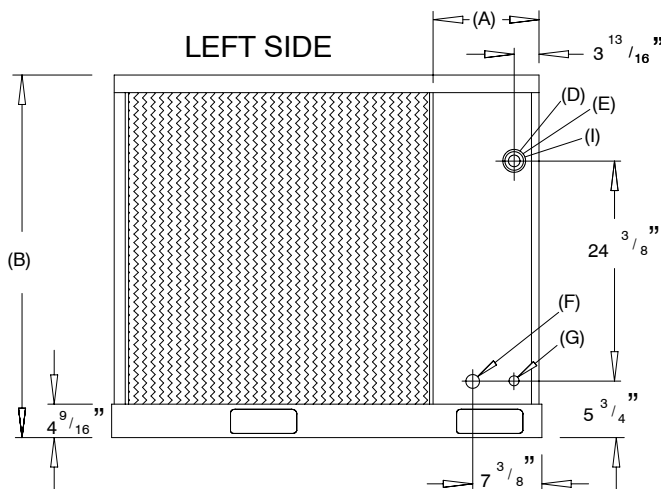
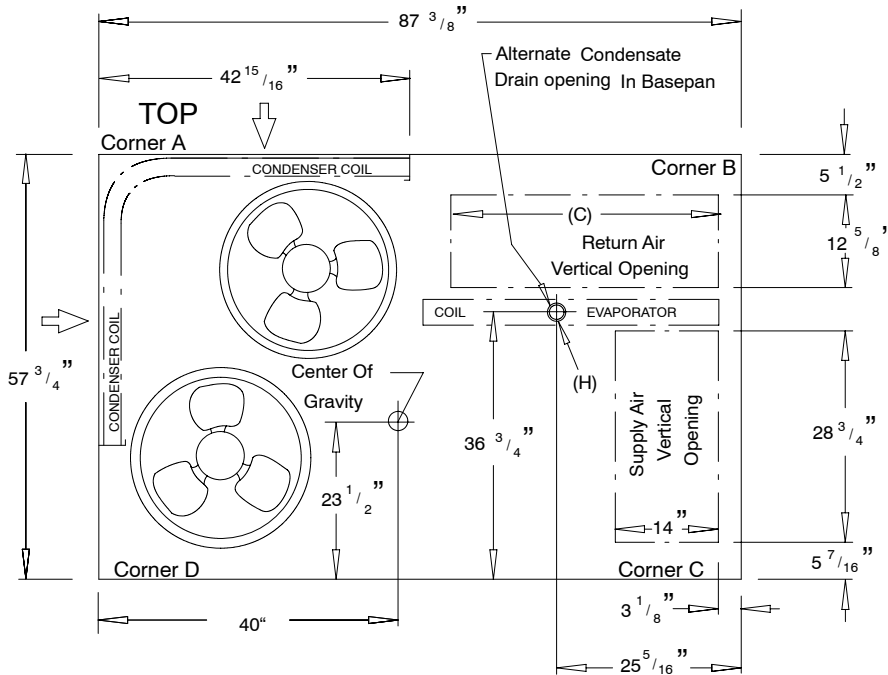
BASE UNIT WEIGHT AND DIMENSIONS - PHS090 / 120

Unit	Total Weight		Corner A		Corner B		Corner C		Corner D		Dim A		Dim B		Dim C	
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	inches	mm	inches	mm	inches	mm
PHS090	940	426	207	94	178	81	254	115	301	136	24 ⁷ / ₈	632	41 ⁵ / ₁₆	1050	33 ¹¹ / ₁₆	856
PHS120	1015	460	223	101	193	88	274	124	325	147	34 ⁷ / ₈	885	49 ⁵ / ₁₆	1253	36 ³ / ₈	924

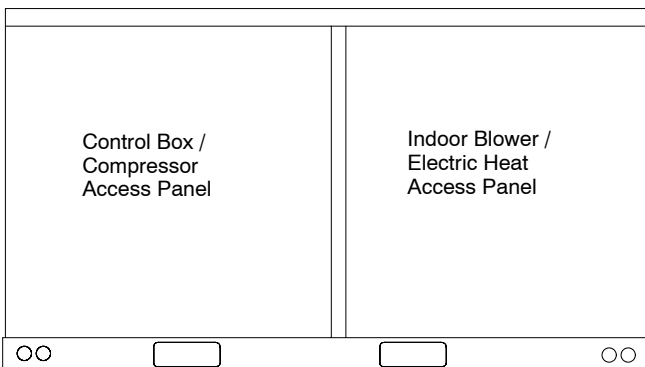
THREADED CONDUIT SIZE	WIRE USE	REQUIRED HOLE SIZES (MAX.)
1/2"	24	7/8" [22]
3/4"	Power*	1-1/8" [28.4]
1-1/4" FPT	Power*	1-3/4" [44.4]

* Select either 3/4" or 1-1/4" for power, depending on wire size.

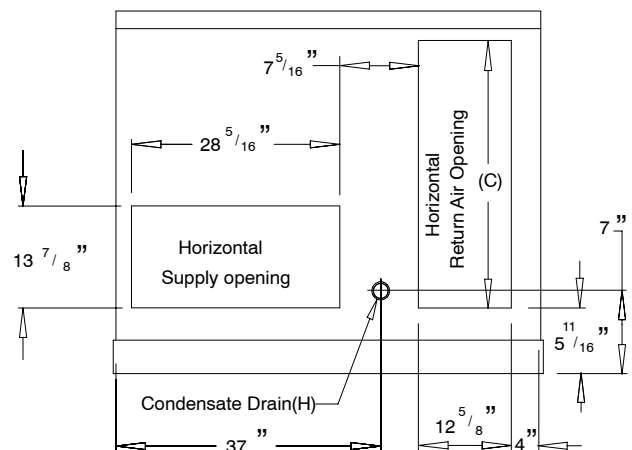
Connection Sizes	
D	1-3/8" Dia (35) Field Power Supply Hole
E	2-1/2" Dia (64) Power Supply Knockout
F	1-3/4" Dia (44) Charging Port Hole
G	7/8" Dia (22) Field Control Wiring Hole
H	3/4"-14 NPT Condensate Drain
I	2" Dia (51) Power Supply Knockout



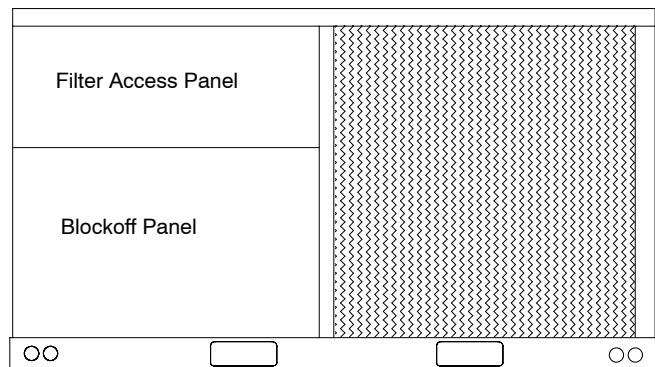
FRONT



RIGHT SIDE



BACK



EXPANDED PERFORMANCE COOLING DATA - PHS072 - 6 Ton (GROSS DATA)

Temp (F) Outdoor Entering Air (Edb)		Indoor Entering Air — Cfm/BF								
		1800/0.10			2400/0.13			3000/0.19		
		Indoor Entering Air — Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC SHC kW	81.1	77.6	72.1	84.0	80.3	75.2	84.2	81.1	77.8
		36.2	46.9	57.0	39.1	52.4	65.4	40.8	56.2	72.2
		5.16	5.11	5.01	5.23	5.16	5.06	5.23	5.17	5.11
85	TC SHC kW	80.7	75.8	70.0	83.9	79.3	73.4	84.1	80.8	76.2
		36.1	46.5	56.4	39.7	52.9	65.2	41.6	58.3	71.9
		5.83	5.74	5.65	5.90	5.81	5.69	5.90	5.84	5.76
95	TC SHC kW	79.3	73.0	67.3	82.0	76.7	70.8	83.0	79.1	73.5
		35.8	45.4	55.3	39.3	52.3	64.3	42.2	58.9	69.7
		6.54	6.37	6.28	6.60	6.47	6.37	6.62	6.55	6.40
105	TC SHC kW	76.0	70.6	64.3	79.6	73.4	67.9	80.7	75.5	71.3
		34.6	44.8	54.1	38.8	51.2	62.9	42.0	57.6	67.8
		7.21	7.12	6.94	7.34	7.15	7.06	7.36	7.22	7.14
115	TC SHC kW	72.7	67.5	61.1	75.8	70.6	64.7	77.9	71.8	68.5
		33.6	43.7	52.7	37.6	50.7	60.9	41.5	56.4	65.2
		7.95	7.86	7.63	8.06	7.95	7.77	8.14	7.94	7.90
125	TC SHC kW	70.1	63.9	57.6	71.8	66.9	61.6	73.5	68.6	65.4
		32.9	42.4	51.2	36.4	49.5	58.4	40.2	56.1	62.3
		8.82	8.62	8.37	8.83	8.73	8.54	8.89	8.79	8.69

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving indoor coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

3. The SHC is based on 80 F edb temperature of air entering indoor coil. Below 80 F edb, subtract (corr factor x cfm) from SHC. Above 80 F edb, add (corr factor x cfm) to SHC.

LEGEND

BF — Bypass Factor
Edb — Entering Dry-Bulb
Ewb — Entering Wet-Bulb
kW — Compressor Motor Power Input
Ldb — Leaving Dry-Bulb
Lwb — Leaving Wet-Bulb
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

EXPANDED PERFORMANCE HEATING DATA - PHS072 (Instantaneous and Integrated Heating Ratings)

Return Air (F db)	Cfm (Standard Air)	Air Temperature Entering Outdoor Coil (F)																
		0		10		17		30		40		47		50		60		
55	1800	Cap.	37.8	32.2	43.9	40.3	48.3	44.1	58.0	50.8	66.2	66.2	72.3	72.3	75.2	75.2	86.0	86.0
		kW	4.72		4.97		5.16		5.58		5.96		6.25		6.40		6.95	
	2400	Cap.	37.9	32.2	44.0	40.4	48.5	44.2	58.4	51.2	66.6	66.6	72.8	72.8	75.9	75.9	87.0	87.0
		kW	4.55		4.76		4.92		5.28		5.57		5.81		5.93		6.38	
	3000	Cap.	38.0	32.3	44.0	40.4	48.5	44.3	58.5	51.3	66.9	66.9	73.1	73.1	76.2	76.2	87.5	87.5
		kW	4.46		4.64		4.78		5.09		5.35		5.56		5.67		6.07	
70	1800	Cap.	37.3	31.7	43.6	40.0	48.1	43.9	57.5	50.4	65.2	65.2	71.1	71.1	74.0	74.0	84.6	84.6
		kW	5.32		5.61		5.84		6.33		6.75		7.10		7.27		7.91	
	2400	Cap.	37.5	31.9	43.8	40.2	48.2	43.9	57.7	50.5	65.6	65.6	71.8	71.8	74.7	74.7	85.4	85.4
		kW	5.13		5.38		5.57		5.97		6.32		6.61		6.74		7.25	
	3000	Cap.	37.6	32.0	43.9	40.3	48.3	44.0	57.8	50.7	66.0	66.0	72.1	72.1	75.0	75.0	86.0	86.0
		kW	5.03		5.25		5.41		5.76		6.08		6.32		6.44		6.89	
80	1800	Cap.	36.8	31.3	43.1	39.6	47.9	43.7	57.1	50.1	64.8	64.8	70.5	70.5	73.4	73.4	83.6	83.6
		kW	5.75		6.09		6.34		6.88		7.35		7.72		7.90		8.58	
	2400	Cap.	37.0	31.4	43.4	39.8	48.0	43.8	57.4	50.3	65.1	65.1	71.1	71.1	73.9	73.9	84.5	84.5
		kW	5.55		5.83		6.04		6.49		6.87		7.18		7.33		7.89	
	3000	Cap.	37.1	31.5	43.5	39.9	48.1	43.9	57.5	50.4	65.3	65.3	71.5	71.5	74.4	74.4	85.0	85.0
		kW	5.44		5.68		5.87		6.26		6.60		6.88		7.01		7.49	

EXPANDED COOLING PERFORMANCE DATA PHS090 7-1/2 Ton (GROSS Capacity)

Airflow CFM IDB (BF)			Outdoor Ambient Temperature - Degrees F, Dry Bulb														
			75			85			95			105			115		
			Entering Indoor Air Temperature - Degrees F, Wet Bulb														
			62	67	72	62	67	72	62	67	72	62	67	72	62	67	72
80	3750 (0.11)	MBH	100.9	108.7	117.0	96.1	104.2	112.9	83.9	89.8	97.9	79.4	84.1	92.4	74.9	78.2	86.3
		S/T	0.90	0.67	0.45	0.91	0.70	0.47	1.00	0.82	0.56	1.00	0.85	0.58	1.00	0.89	0.60
		KW	6.38	6.60	6.84	6.90	7.17	7.43	7.80	8.04	8.37	8.29	8.51	8.85	8.81	8.96	9.34
	3200 (0.08)	MBH	98.7	107.2	115.8	93.6	102.4	111.3	88.5	96.5	105.6	83.7	90.2	99.9	78.8	84.1	93.4
		S/T	0.87	0.64	0.44	0.89	0.66	0.45	0.91	0.69	0.46	0.91	0.72	0.48	0.92	0.75	0.49
		KW	6.32	6.56	6.82	6.80	7.09	7.37	7.29	7.58	7.88	7.76	8.06	8.45	8.23	8.49	8.90
	3000 (0.06)	MBH	96.5	105.4	114.5	91.2	100.7	109.7	86.1	94.8	104.0	81.0	88.8	98.3	76.4	82.7	92.0
		S/T	0.84	0.62	0.43	0.86	0.64	0.43	0.89	0.66	0.45	0.91	0.68	0.46	0.91	0.71	0.47
		KW	6.26	6.50	6.76	6.72	7.03	7.31	7.19	7.51	7.84	7.64	7.98	8.35	8.10	8.41	8.85
	2250 (0.04)	MBH	90.8	99.9	108.2	85.7	95.0	103.6	80.8	89.6	99.1	75.6	84.1	93.4	70.3	78.7	87.5
		S/T	0.75	0.57	0.40	0.78	0.58	0.41	0.80	0.59	0.41	0.83	0.61	0.42	0.86	0.63	0.43
		KW	6.09	6.34	6.56	6.54	6.84	7.09	6.97	7.31	7.66	7.39	7.76	8.14	7.78	8.20	8.63

FORMULAS AND NOTES FOR USING EXPANDED PERFORMANCE DATA

To find leaving wet bulb and dry bulb from the expanded performance charts, use the following formulas.

1. Direct interpolation is permissible. Do not extrapolate.

2. The following formulas may be used:

$$t/db = t\ edb - \text{sensible capacity Btuh} / (1.10 \times \text{cfm})$$

$$t/wb = \text{Wet bulb temp. corresponding to enthalpy of air leaving evaporator coil (h/wb)}$$

$$h/wb = h\ ewb - \text{total capacity Btuh} / (4.5 \times \text{cfm})$$

where h ewb = Enthalpy of air entering evap. coil

3. The SHC is based on 80F edb of air entering evap coil.
Below 80F edb, subtract (corr factor x cfm) from SHC.
Above 80F edb, add (corr factor x cfm) to SHC.

LEGEND

MBH = Total Capacity (Gross)
S/T = Sensible to Total Ratio
KW = Compressor Motor Power Input.
IDB = Indoor Dry Bulb
edb = Entering Dry Bulb
ewb = Entering Wet Bulb
t/db = Leaving Dry Bulb
t/wb = Leaving Wet Bulb
h/wb = Enthalpy of Leaving Wet Bulb
SHC = Sensible Heat Capacity

BYPASS FACTOR (BF)	ENTERING AIR DRY BULB					
	79	78	77	76	75	under 75
	81	82	83	84	85	over 85
	Correction Factor					
.05	1.04	2.07	3.11	4.14	5.18	Use formulas shown below
.10	0.98	1.96	2.94	3.92	4.90	
.20	0.87	1.74	2.62	3.49	4.36	
.30	0.76	1.53	2.29	3.05	3.82	

$$\text{Correction Factor} = 1.10 \times (1 - \text{BF}) \times (\text{edb} - 80).$$

EXPANDED HEATING PERFORMANCE DATA PHS090 (Instantaneous and Integrated Heating Ratings)

Return Air 70 deg. F		Outdoor Ambient Temperature - Degrees F, Dry Bulb															
		60		50		47		40		30		17		10		0	
3200 cfm	MBH	89.6	89.6	79.4	79.4	76.0	76.0	69.0	69.0	59.7	52.2	47.7	43.3	41.6	38.0	33.7	28.6
	KW	8.04		7.56		7.39		7.03		6.56		5.97		5.67		5.28	
2600 cfm	MBH	89.0	89.0	77.8	77.8	74.7	74.7	67.8	67.8	58.7	51.4	46.7	42.6	41.2	37.6	32.9	28.0
	KW	8.35		7.74		7.56		7.17		6.66		6.03		5.73		5.30	
2000 cfm	MBH	86.5	86.5	75.5	75.5	72.5	72.5	65.8	65.8	56.9	49.8	45.3	41.2	39.8	36.6	31.9	27.2
	KW	8.77		8.04		7.82		7.37		6.82		6.13		5.81		5.34	

LEGEND: Mbtu = Heating Capacity (1000 btuh) includes indoor fan motor heat).

KW = Total Power input (includes compressor motor power).

NOTES: Integrated capacity - maximum instantaneous capacity less effect of frost on outdoor coil and heat required to defrost it.

EXPANDED COOLING PERFORMANCE DATA PHS120 10 Ton (GROSS Capacity)

Airflow CFM IDB (BF)			Outdoor Ambient Temperature - Degrees F, Dry Bulb														
			75			85			95			105			115		
			Entering Indoor Air Temperature - Degrees F, Wet Bulb														
			62	67	72	62	67	72	62	67	72	62	67	72	62	67	72
80	4700 (0.21)	MBH	118.8	127.1	134.9	114.7	124.1	131.8	110.9	119.4	128.1	106.8	113.9	122.7	102.2	108.4	118.2
		S/T	0.96	0.72	0.51	0.97	0.75	0.52	0.98	0.77	0.54	0.98	0.79	0.54	0.98	0.82	0.56
		KW	8.08	8.25	8.51	8.94	9.22	9.46	9.93	10.20	10.46	10.99	11.21	11.50	12.12	12.37	12.77
	4100 (0.18)	MBH	116.0	125.5	133.6	112.3	121.7	130.4	107.8	117.2	125.9	103.4	112.1	121.7	98.7	106.6	116.2
		S/T	0.92	0.70	0.50	0.94	0.72	0.51	0.96	0.73	0.52	0.97	0.75	0.53	0.98	0.78	0.54
		KW	7.98	8.23	8.47	8.88	9.14	9.40	9.81	10.11	10.36	10.84	11.15	11.50	11.94	12.29	12.65
	3750 (0.16)	MBH	114.5	124.3	132.2	110.7	120.2	129.0	105.8	115.6	124.3	101.3	110.7	120.6	96.5	105.4	114.9
		S/T	0.90	0.68	0.49	0.92	0.70	0.50	0.94	0.71	0.51	0.96	0.73	0.51	0.97	0.75	0.52
		KW	7.92	8.21	8.41	8.85	9.10	9.36	9.75	10.03	10.30	10.74	11.11	11.47	11.82	12.25	12.59
	2800 (0.11)	MBH	108.9	118.6	125.5	104.8	114.5	122.7	100.7	110.3	120.0	96.1	105.6	115.1	91.4	100.5	110.3
		S/T	0.82	0.63	0.47	0.84	0.64	0.48	0.86	0.65	0.48	0.88	0.67	0.48	0.90	0.68	0.49
		KW	7.76	8.06	8.18	8.61	8.90	9.10	9.52	9.89	10.18	10.50	10.91	11.21	11.56	12.00	12.39

FORMULAS AND NOTES FOR USING EXPANDED PERFORMANCE DATA

To find leaving wet bulb and dry bulb from the expanded performance charts, use the following formulas.

- Direct interpolation is permissible. Do not extrapolate.
- The following formulas may be used:

$$t/db = t\ edb - \text{sensible capacity Btuh} / (1.10 \times \text{cfm})$$

$$t/wb = \text{Wet bulb temp. corresponding to enthalpy of air leaving evaporator coil (h/wb)}$$

$$h/wb = h\ ewb - \text{total capacity Btuh} / (4.5 \times \text{cfm})$$
 where h ewb = Enthalpy of air entering evap. coil
- The SHC is based on 80F edb of air entering evap coil. Below 80F edb, subtract (corr factor x cfm) from SHC. Above 80F edb, add (corr factor x cfm) to SHC.

LEGEND

MBH = Total Capacity (Gross)
 S/T = Sensible to Total Ratio
 KW = Compressor Motor Power Input.
 IDB = Indoor Dry Bulb
 edb = Entering Dry Bulb
 ewb = Entering Wet Bulb
 t/db = Leaving Dry Bulb
 t/wb = Leaving Wet Bulb
 h/wb = Enthalpy of Leaving Wet Bulb
 SHC = Sensible Heat Capacity

BYPASS FACTOR (BF)	ENTERING AIR DRY BULB					
	79	78	77	76	75	under 75
	81	82	83	84	85	over 85
	Correction Factor					
.05	1.04	2.07	3.11	4.14	5.18	Use formulas shown below
.10	0.98	1.96	2.94	3.92	4.90	
.20	0.87	1.74	2.62	3.49	4.36	
.30	0.76	1.53	2.29	3.05	3.82	

Correction Factor = $1.10 \times (1 - BF) \times (edb - 80)$.

EXPANDED HEATING PERFORMANCE DATA PHS120 (Instantaneous and Integrated Heating Ratings)

Return Air 70 deg. F		Outdoor Ambient Temperature - Degrees F, Dry Bulb															
		60		50		47		40		30		17		10		0	
4400 cfm	MBH	121.9	121.9	107.0	107.0	102.8	102.8	94.4	94.4	82.5	72.3	67.8	61.7	59.9	55.0	50.2	42.7
	KW	10.11		9.52		9.36		9.02		8.61		8.14		7.90		7.58	
4100 cfm	MBH	121.5	121.5	106.8	106.8	102.6	102.6	94.2	94.2	92.2	72.1	67.6	61.7	59.7	54.8	50.2	42.6
	KW	10.24		9.63		9.48		9.12		8.69		8.20		7.94		7.62	
3500 cfm	MBH	121.0	121.0	106.4	106.4	102.2	102.2	93.8	93.8	82.0	71.7	62.3	61.3	59.3	54.4	49.8	42.4
	KW	10.64		9.95		9.77		9.38		8.90		8.37		8.08		7.74	

LEGEND: Mbtu = Heating Capacity (1000 btuh) includes indoor fan motor heat).

KW = Total Power input (includes compressor motor power).

NOTES: Integrated capacity - maximum instantaneous capacity less effect of frost on outdoor coil and heat required to defrost it.

CIRCULATING BLOWER PERFORMANCE - PHS072 - Standard Motor (Belt Drive)* (Horizontal Discharge)																				
Airflow CFM	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
1800	888	532	984	662	1069	802	1148	951	1221	1109	1289	1276	1354	1450	1415	1632	1473	1822	2.27	2019
1900	927	610	1019	747	1102	892	1179	1046	1250	1208	1317	1379	1380	1557	1441	1743	1498	1937	-	-
2000	965	697	1054	839	1135	990	1210	1149	1280	1316	1345	1491	1408	1673	1467	1863	1524	2060	-	-
2100	1004	792	1090	940	1169	1096	1242	1260	1310	1432	1375	1611	1436	1798	1494	1993	-	-	-	-
2200	1044	896	1127	1050	1203	1211	1274	1381	1341	1557	1405	1742	1465	1933	1522	2132	-	-	-	-
2300	1084	1009	1164	1169	1238	1336	1308	1511	1373	1693	1435	1882	1494	2078	-	-	-	-	-	-
2400	1123	1132	1201	1298	1273	1471	1341	1651	1405	1838	1466	2032	-	-	-	-	-	-	-	-
2500	1164	1265	1239	1437	1309	1616	1375	1801	1438	1994	-	-	-	-	-	-	-	-	-	-
2600	1204	1409	1277	1586	1345	1771	1410	1962	-	-	-	-	-	-	-	-	-	-	-	-
2700	1244	1563	1315	1747	1382	1938	1445	2135	-	-	-	-	-	-	-	-	-	-	-	-
2800	1285	1729	1354	1919	1419	2116	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2900	1326	1907	1393	2104	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3000	1367	2097	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

LEGEND

Watts = Input Watts to motor.

* Motor drive range: 1070 to 1460 rpm. All other rpms require a field-supplied drive.

CIRCULATING BLOWER PERFORMANCE - PHS090 - Standard Motor (Belt Drive)* (Horizontal Discharge)																				
Airflow CFM	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
2250	465	459	555	621	629	786	694	959	752	1138	806	1326	855	1521	902	1723	946	1932	988	2148
2300	471	483	560	648	634	817	698	992	757	1174	810	1363	859	1561	906	1765	950	1976	991	2194
2400	483	534	570	705	644	880	708	1061	765	1248	818	1443	868	1644	914	1853	958	2068	-	-
2500	495	588	581	767	653	948	717	1134	774	1327	827	1527	876	1733	922	1946	966	2165	-	-
2550	501	617	586	799	658	983	722	1173	779	1368	832	1570	880	1779	926	1994	970	2215	-	-
2600	507	647	592	832	663	1020	727	1212	784	1410	836	1615	885	1826	931	2043	-	-	-	-
2700	519	709	603	902	674	1096	736	1294	793	1498	845	1708	893	1923	939	2146	-	-	-	-
2800	532	775	614	976	684	1176	746	1381	802	1590	854	1805	902	2026	-	-	-	-	-	-
2900	544	846	625	1054	694	1261	756	1472	812	1687	863	1907	911	2134	-	-	-	-	-	-
3000	557	922	637	1137	705	1351	766	1568	821	1789	872	2015	-	-	-	-	-	-	-	-
3100	570	1002	648	1224	716	1445	776	1669	831	1896	882	2127	-	-	-	-	-	-	-	-
3200	582	1087	660	1317	727	1545	786	1774	841	2008	-	-	-	-	-	-	-	-	-	-
3300	595	1177	671	1414	738	1649	797	1885	851	2125	-	-	-	-	-	-	-	-	-	-
3400	608	1271	683	1517	749	1759	807	2002	-	-	-	-	-	-	-	-	-	-	-	-
3500	622	1372	695	1625	760	1874	818	2124	-	-	-	-	-	-	-	-	-	-	-	-
3600	635	1477	707	1738	771	1995	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3700	648	1588	720	1857	783	2121	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3750	655	1646	726	1918	788	2187	-	-	-	-	-	-	-	-	-	-	-	-	-	-

LEGEND

Watts = Input Watts to motor.

* Motor drive range: 860 to 1080 rpm. All other rpms require a field-supplied drive.

CIRCULATING BLOWER PERFORMANCE - PHS120 - Standard Motor (Belt Drive) (Horizontal Discharge)																				
Airflow CFM	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
3000	523	541	592	680	657	825	718	977	775	1135	830	1298	883	1466	934	1638	982	1815	1029	1996
3100	536	587	603	730	666	879	726	1035	783	1195	837	1363	889	1534	938	1710	986	1891	1033	2075
3200	549	637	614	783	676	936	735	1096	790	1260	843	1431	894	1606	944	1785	991	1969	1037	2157
3300	562	689	626	839	686	996	743	1159	798	1328	850	1502	901	1680	949	1863	996	2051	1041	2242
3400	575	744	637	898	696	1059	752	1226	806	1398	858	1576	907	1758	955	1944	1001	2135	-	-
3500	588	802	649	961	707	1125	762	1296	815	1472	865	1653	914	1838	961	2029	1007	2223	-	-
3600	601	864	661	1026	717	1194	771	1369	823	1548	873	1733	921	1922	967	2116	-	-	-	-
3700	614	929	673	1095	728	1267	781	1445	832	1629	81	1816	928	2010	974	2207	-	-	-	-
3800	628	997	685	1167	739	1343	791	1525	841	1712	889	1904	936	2100	-	-	-	-	-	-
3900	641	1069	697	1243	750	1423	801	1608	850	1799	898	1995	944	2195	-	-	-	-	-	-
4000	655	1144	709	1322	761	1506	812	1695	860	1890	907	2089	-	-	-	-	-	-	-	-
4100	668	1223	722	1405	773	1593	822	1786	870	1984	916	2187	-	-	-	-	-	-	-	-
4200	682	1305	734	1492	784	1683	833	1880	880	2082	-	-	-	-	-	-	-	-	-	-
4300	696	1392	747	1582	796	1777	844	1979	890	2184	-	-	-	-	-	-	-	-	-	-
4400	710	1482	760	1677	808	1876	855	2081	-	-	-	-	-	-	-	-	-	-	-	-
4500	723	1577	773	1775	820	1978	866	2187	-	-	-	-	-	-	-	-	-	-	-	-
4600	737	1675	785	1877	832	2085	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4700	751	1778	798	184	844	2195	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4800	765	1885	812	2095	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4900	779	1996	825	2210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5000	793	2112	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

LEGEND

Watts = Input Watts to motor.

* Motor drive range: 685 to 935 rpm. All other rpms require a field-supplied drive.

Maximum continuous bhp is 2.40.

Evaporator-Fan Motor Efficiency	
Unit: PHS	Motor Efficiency (%)
072	84
090-120	80

All 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.

EVAPORATOR-FAN MOTOR PERFORMANCE

Unit PHS	Evaporator-Fan Motor	Unit Voltage	Max. Acceptable Continuous BHP*	Max. Acceptable Operating Watts	Max. AMP Draw
072	Standard	208/230	2.40	2120	6.0
		460			3.0
		575			3.0
090	Standard	208/230	2.40	2120	6.0
		460			3.0
		575			3.0
120	Standard	208/230	2.40	2120	6.0
		460			3.0
		575			3.0

LEGEND: BHP = Brake Horsepower

* Extensive motor and electrical testing on these units ensures that the full horsepower range of the motors can be utilized with

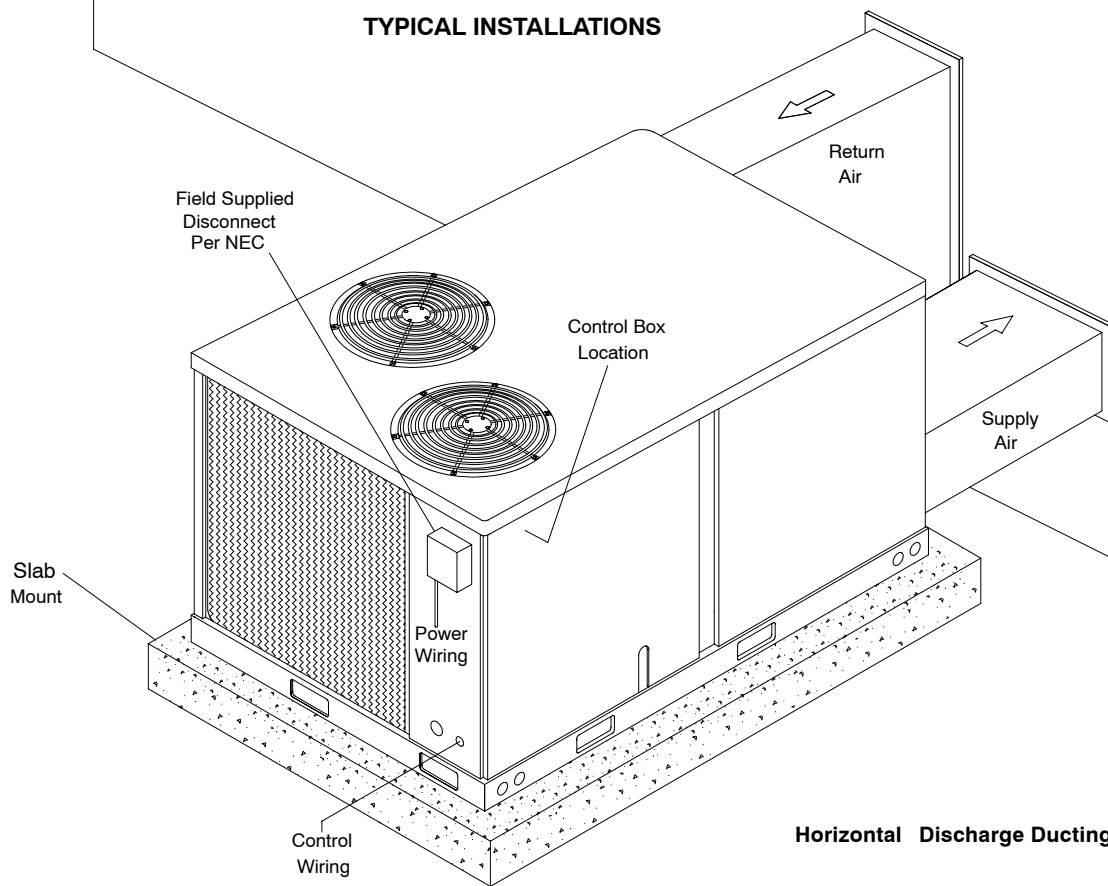
confidence. Using your fan motors up to the horsepower ratings shown in this table will not result in nuisance tripping or premaure motor failure. Unit Warranty will not be affected.

FAN RPM MOTOR PULLEY SETTINGS

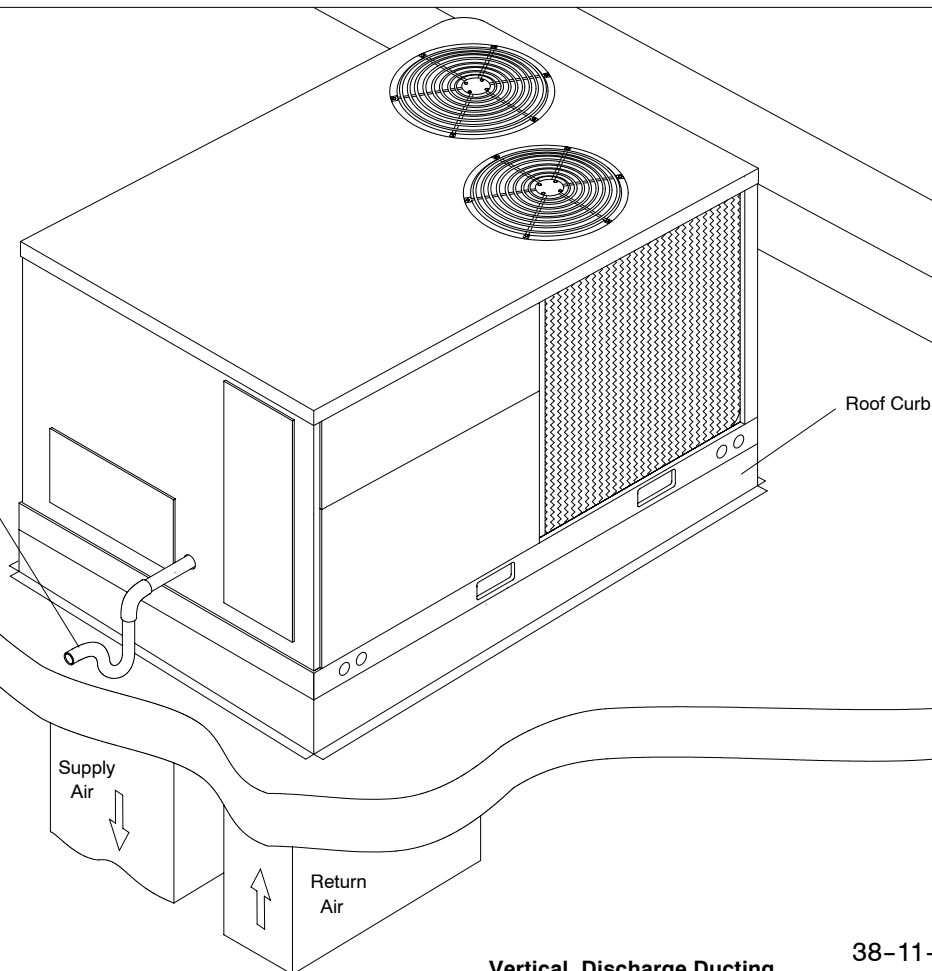
Unit PHS	MOTOR PULLEY TURNS OPEN												
	0	1/2	1	1-1/2	2	2-1/2	3	3-1/2	4	4-1/2	5	5-1/2	6
072	1460	1421	1382	1343	1304	1265	1226	1187	1148	1109	1070	-	-
090	840	815	790	765	740	715	690	665	635	615	590	-	-
120	935	910	885	860	835	810	785	760	735	710	685	-	-

* Approximate fan rpm shown.

TYPICAL INSTALLATIONS



Condensate Drain
(Field Installed)



38-11-37

ACCESSORIES - PHS072

ROOF CURBS

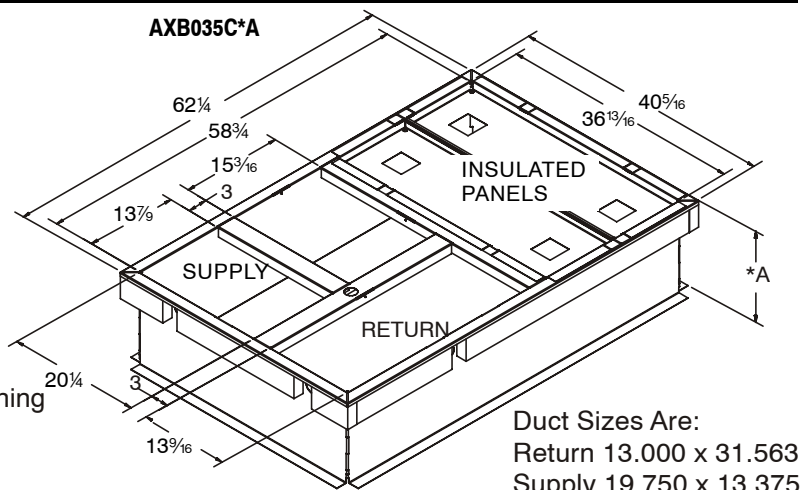
Description	Model Number	Where Used
8" High *	AXB035CLA	072
14" High *	AXB035CMA	072
24" High *	AXB035CHA	072

CURB ADAPTOR

Description	Model Number	Where Used *
Curb Adaptor	AXB035CAA	072
Curb Adaptor With Duct	AXB035CBA	072

* Used with AXB030 curbs.

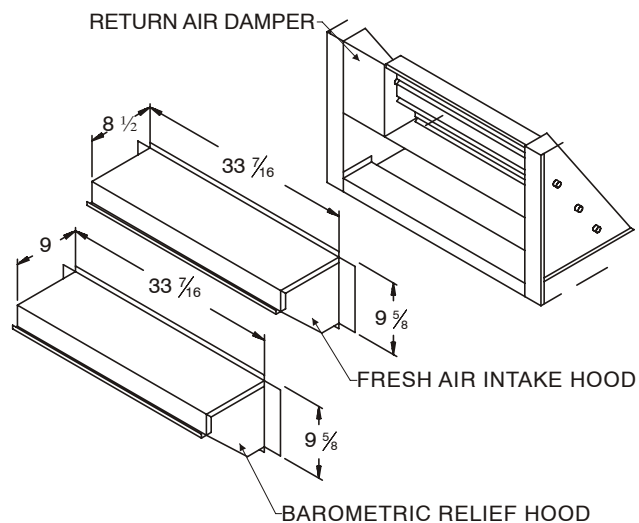
Roof Opening
35" Long
40" Wide



ECONOMIZER - DOWNFLOW

Description	Model Number	Where Used
Fully Modulating	AXB035EMA	072
Three Position	AXB035EPA	072

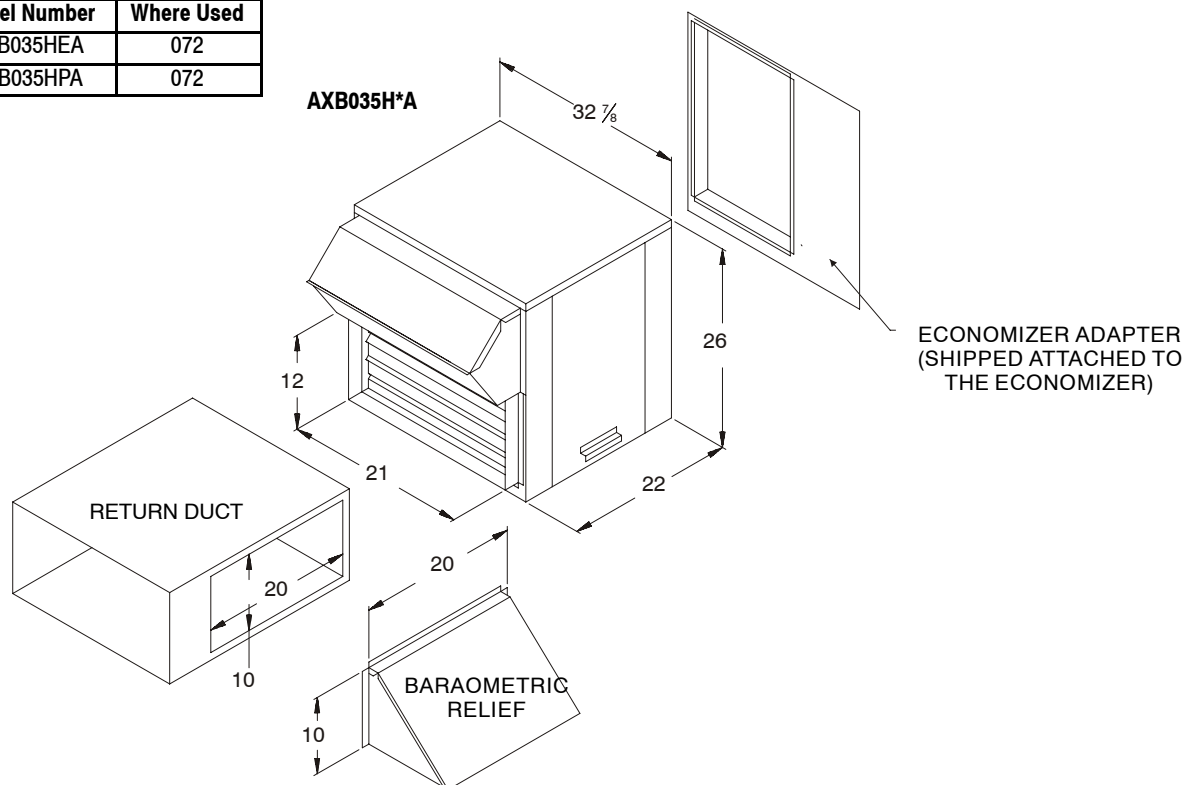
AXB035E*A



ECONOMIZER - HORIZONTAL

Description	Model Number	Where Used
Fully Modulating	AXB035HEA	072
Three Position	AXB035HPA	072

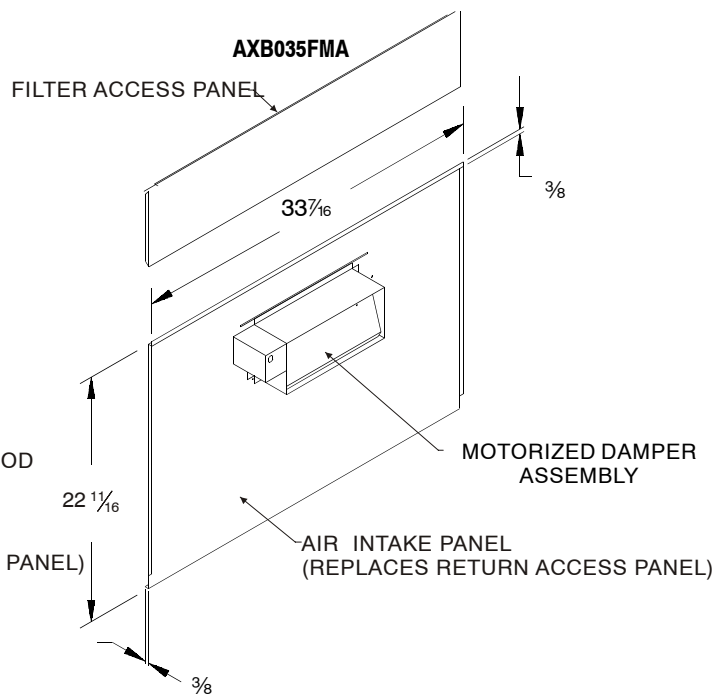
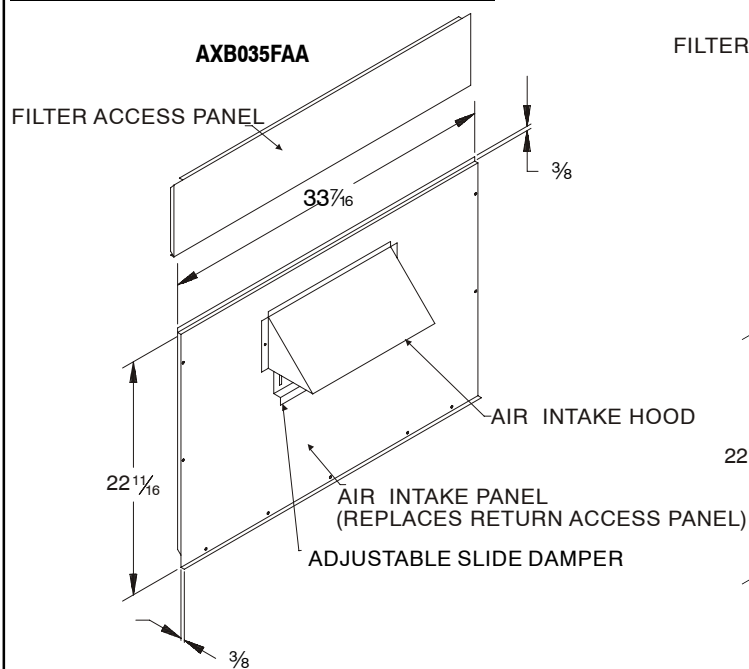
AXB035H*A



ACCESSORIES: PHS072 (CONT.)

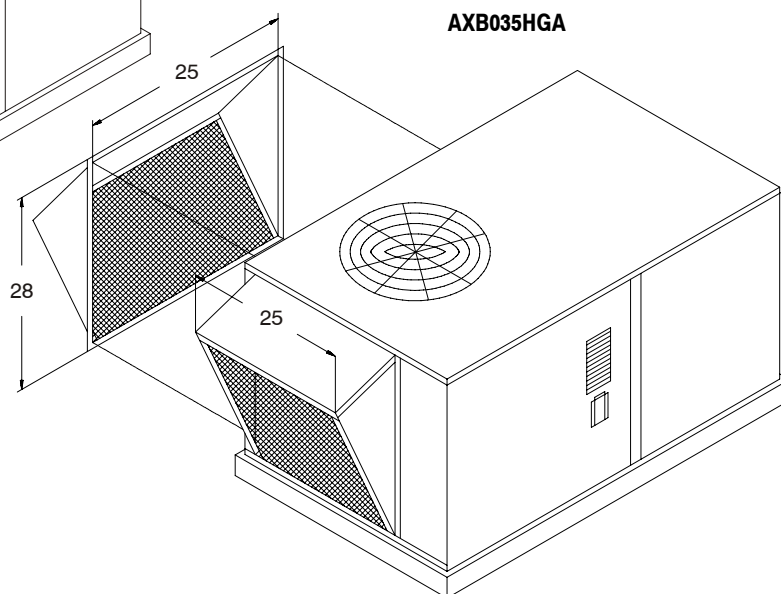
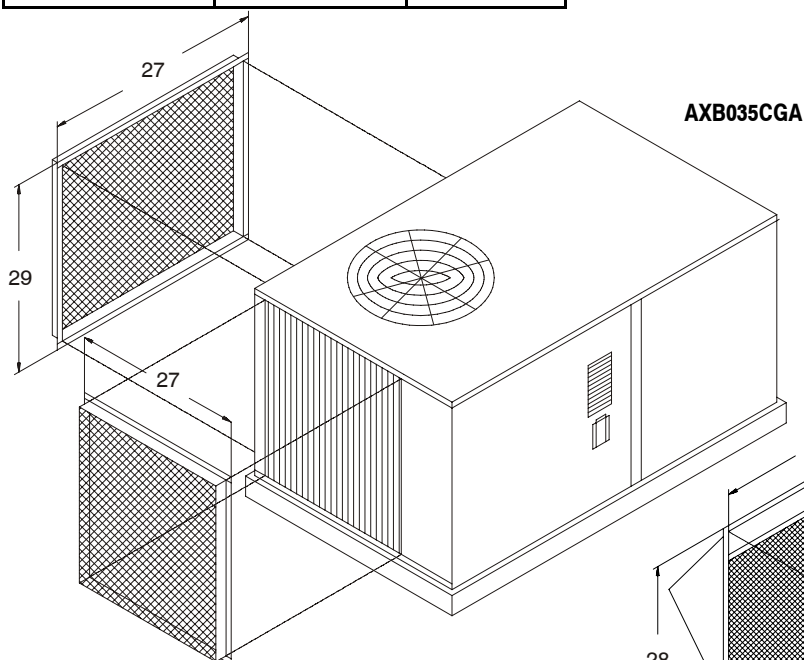
FRESH AIR DAMPER

Description	Model Number	Where Used
Manual	AXB035FAA	072
Motorized	AXB035FMA	072



COIL PROTECTION

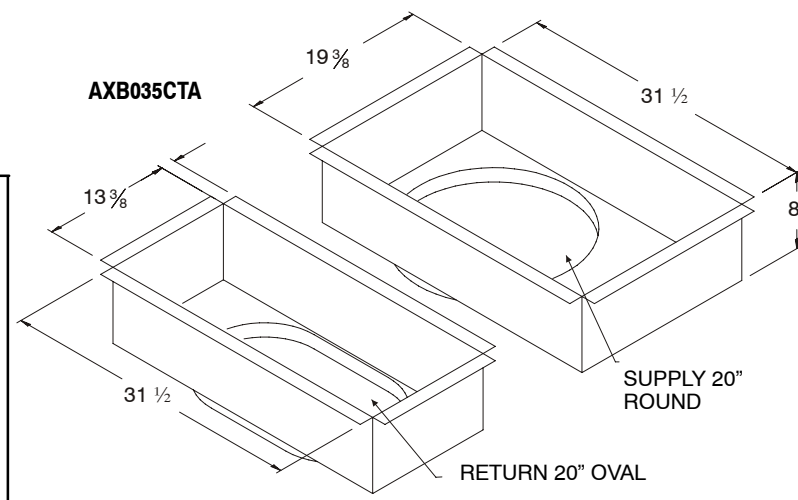
Description	Model Number	Where Used
Coil Guard	AXB035CGA	072
Hail Guard	AXB035HGA	072



ACCESSORIES: PHS072 (CONT.)

CONCENTRIC DUCT KIT

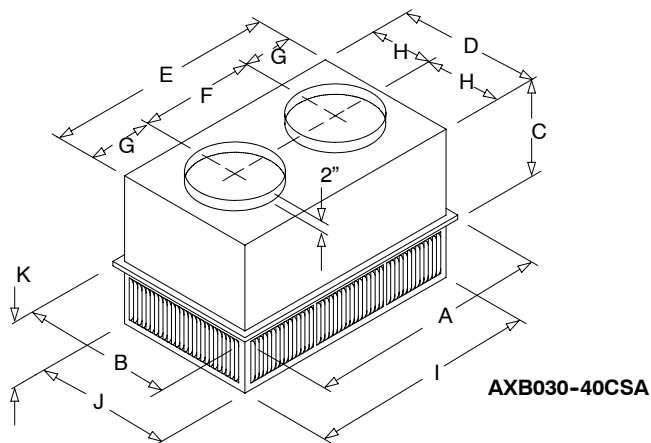
Description	Model Number	Where Used
20" Round.	AXB035CTA	072



PERFORMANCE DATA ON NEXT PAGE

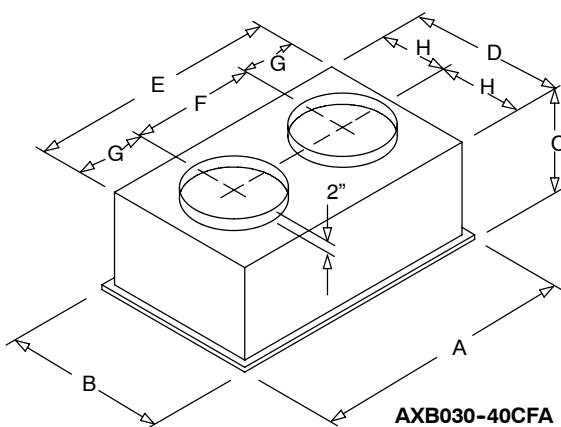
CONCENTRIC DIFFUSER

Description	Model Number	Used With
Flush Mount	AXB030CFA	072
Flush Mount	AXB040CFA	072
Step Down	AXB030CSA	072
Step Down	AXB040CSA	072



CONCENTRIC DIFFUSER (Step Down)

Model Number	A	B	C	D	E	F	G	H	I	J	K	Duct Size
AXB030CSA	47-5/8	23-5/8	11-3/8	21-1/2	45-1/2	22-1/2	11-1/2	10-3/4	45-1/2	21-1/2	7-1/8	18" RD
AXB040CSA	47-5/8	29-5/8	14-3/8	27-1/2	45-1/2	22-1/2	11-1/2	13-3/4	45-1/2	27-1/2	8-1/8	20" RD



CONCENTRIC DIFFUSER (Flush Mount)

Model Number	A	B	C	D	E	F	G	H	Duct Size
AXB030CFA	47-5/8	23-5/8	13-1/2	21	45	22-1/2	11-1/4	10-1/2	18" RD
AXB040CFA	47-5/8	29-5/8	16-5/8	27	45	22-1/2	11-1/4	13-1/2	20" RD

ACCESSORIES: PHS072 (CONT.)

CSA SERIES STEP-DOWN PERFORMANCE

Part No. AXB	CFM	Static Pressure In. WC	Throw Feet	Neck / Jet Velocity FPM	db Sound Levels
030CSA	1200	.17	11-18	421	20
	1400	.20	12-19	491	20
	1600	.24	12-20	561	20
	1800	.30	13-21	632	20
	2000	.36	14-23	702	20
	2200	.40	16-25	772	20
040CSA	2600	.17	24-29	669	20
	2800	.20	25-30	720	25
	3000	.25	27-33	772	25
	3200	.31	28-35	823	25
	3400	.37	30-37	874	30

CFA SERIES FLUSH MOUNT PERFORMANCE

Part No. AXB	CFM	Static Pressure In. WC	Throw Feet	Neck Velocity FPM	Jet Velocity FPM	db Sound Level
030CFA	1000	.14	15-20	391	694	20
	1200	.17	16-22	469	833	25
	1400	.20	17-24	547	972	30
	1600	.24	18-25	625	1111	30
	1800	.30	20-28	703	1250	35
	2000	.36	21-29	781	1389	40
	2200	.40	22-30	859	1528	40
040CFA	2600	.17	19-24	663	1294	30
	2800	.20	20-28	714	1393	35
	3000	.25	21-29	765	1492	35
	3200	.31	22-29	816	1592	40
	3400	.37	22-30	867	1692	40

CSA/CFA NOTES:

1. All data is based on the Air Diffusion Council guidelines.
2. Throw data is based on Terminal Velocities of 75 FPM using isothermal air.
3. Throw is based on diffuser blades being directed in a straight pattern.
4. Actual sound levels are less than those shown.
5. Minimum height 9' above floor.

LOW AMBIENT KIT

Model Number	Used With
AXB035LAA	072

THRU-THE-BASE POWER KIT

Model Number	Used With
AXB035PKA	072

ACCESSORIES: PHS072 (CONT.)

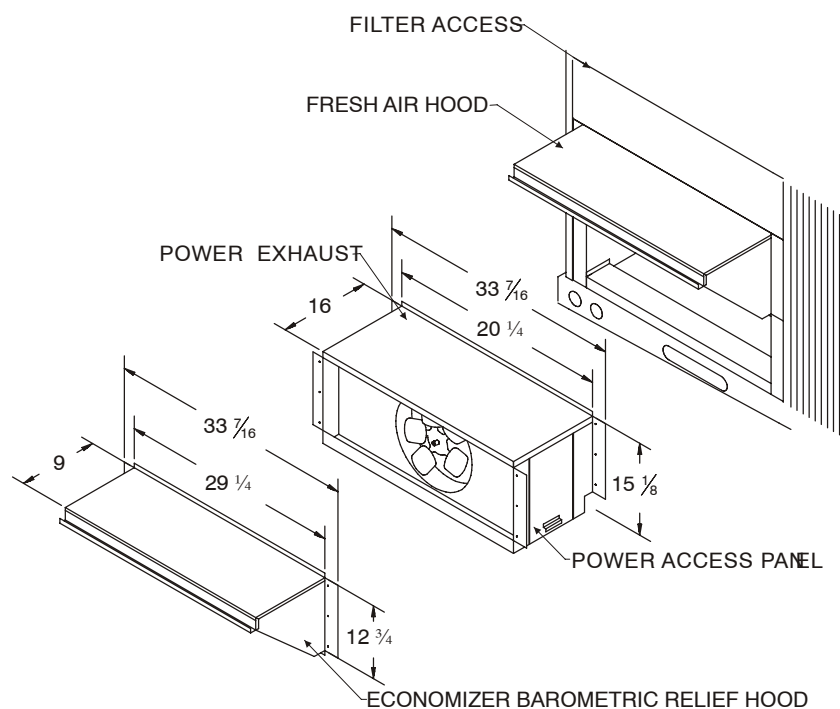
POWER EXHAUST

Description	Model Number	Where Used
208/230 Volt	AXB035PEH	072
460 Volt	AXB035PEL	072
575 Volt	AXB035PES	072

POWER EXHAUST PERFORMANCE DATA

Model	Volt/Phase/ Hertz	Motor			Unit								
		Qty	HP	RPM	Cir. Qty	LRA	FLA	MCA	Fuse Size	@0.0		@0.3	
										CFM	RPM	CFM	RPM
AXB035PEH	208-230/1/60	1	1	1725	1	10.2	4.3	5.4	10	2400	1725	2100	1725
AXB035PEL	460/1/60	1	1	1625	1	4.1	1.7	2.2	4	2300	625	2000	1625
AXB035PES	575/1/60	1	1	1625	1	4.1	1.7	2.2	4	2300	1625	2000	1625

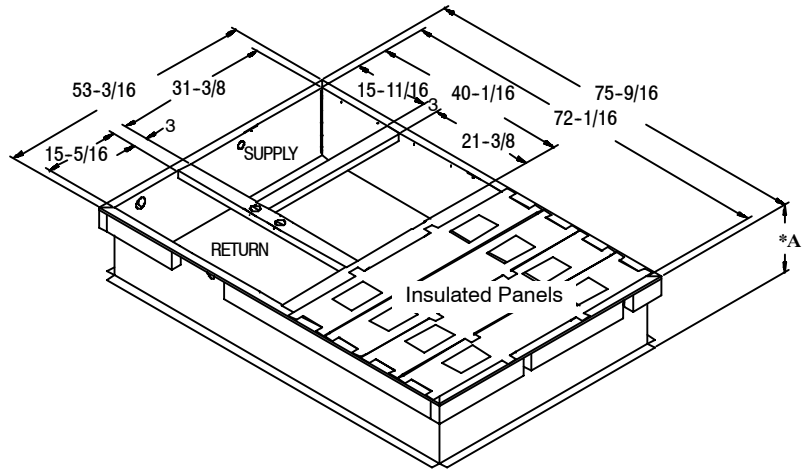
NOTE: Power exhaust is wired single phase, drop third leg when installing.



ACCESSORIES - PHS090 - 120

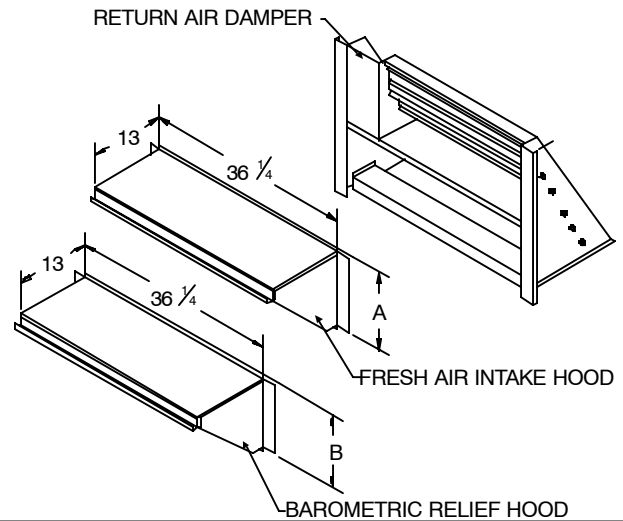
ROOF CURBS

Description	Model Number	Where Used
8" High *	AXB045CLA	090, 120
14" High *	AXB045CMA	090, 120
24" High *	AXB045CHA	090, 120
* A Dimension		



ECONOMIZER - DOWNFLOW

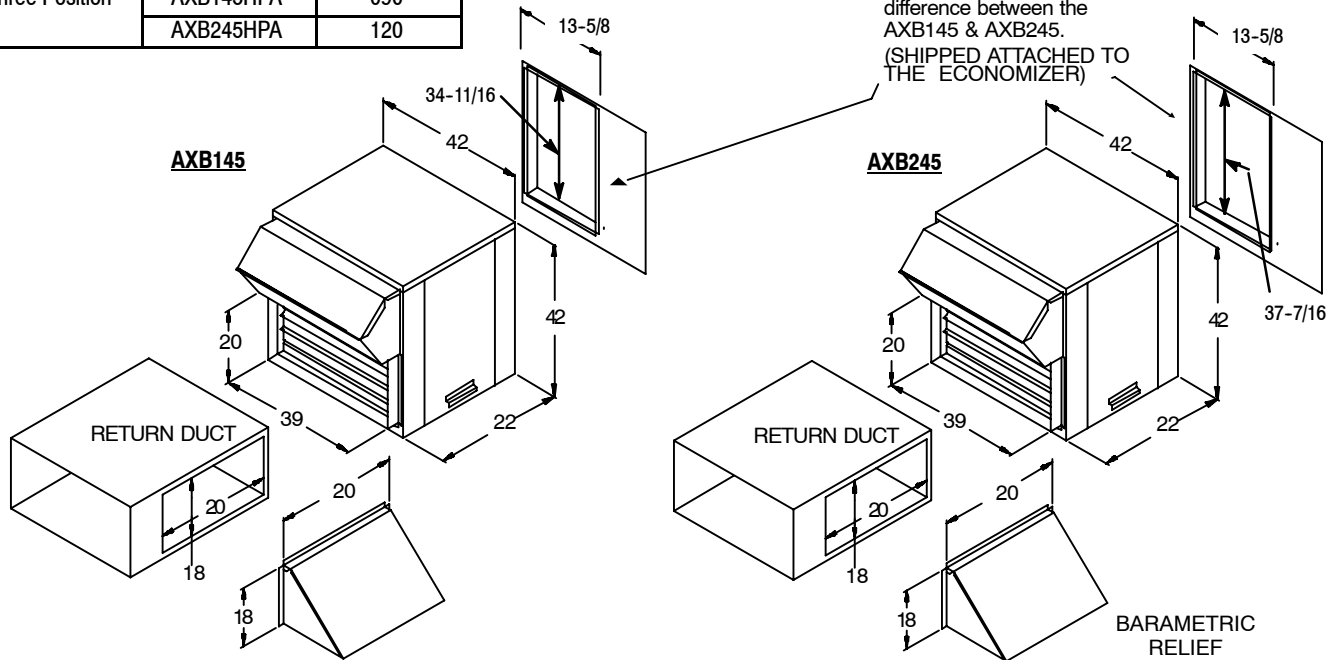
Description	Model Number	A Dimension	B Dimension	Where Used
Fully Modulating	AXB145EMA	13-3/4"	12-3/4"	090
	AXB245EMA	16-1/2"	17-3/4"	120
Three Position	AXB145EPA	13-3/4"	12-3/4"	090
	AXB245EPA	16-1/2"	17-3/4"	120



ECONOMIZER - HORIZONTAL

Description	Model Number	Where Used
Fully Modulating	AXB145HEA	090
	AXB245HEA	120
Three Position	AXB145HPA	090
	AXB245HPA	120

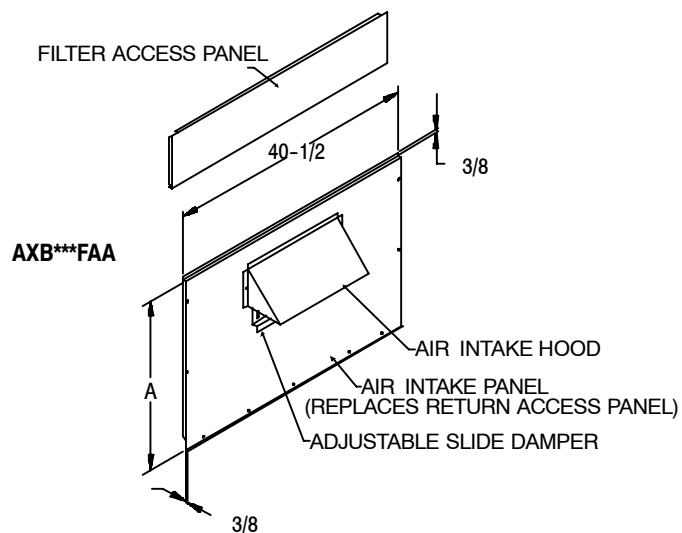
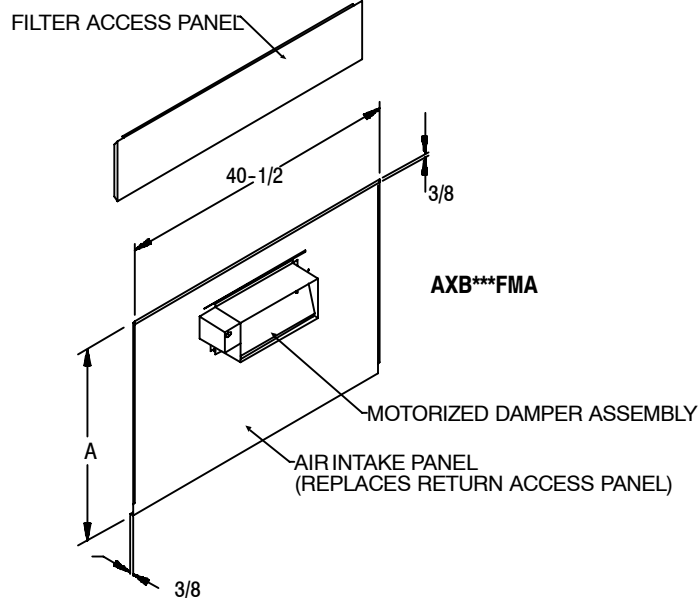
ECONOMIZER ADAPTOR
The height of the economizer adaptor opening is the only difference between the AXB145 & AXB245.
(SHIPPED ATTACHED TO THE ECONOMIZER)



ACCESSORIES - PHS090 - 120 (CONT.)

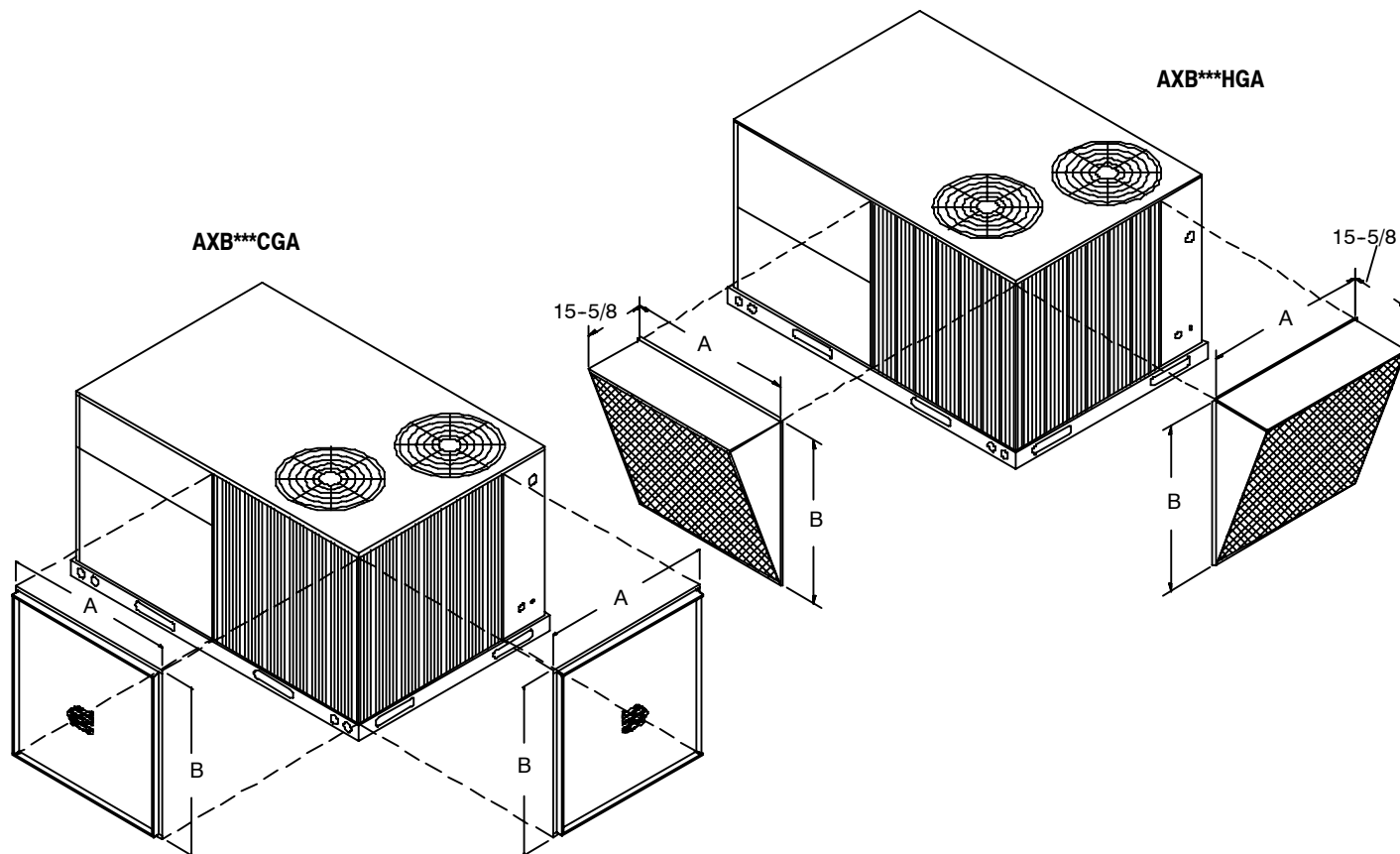
FRESH AIR DAMPER

Description	Model Number	A Dimension	Where Used
Manual	AXB145FAA	27-15/16	090
	AXB245FAA	32-1/2	120
Motorized	AXB145FMA	27-15/16	090
	AXB245FMA	32-1/2	120



COIL PROTECTION

			DIMENSIONS	
Description	Model Number	Where Used	A	B
Coil Guard	AXB145CGA	090	44	37
	AXB245CGA	120	45-3/8	45
Hail Guard	AXB145HGA	090	42	36
	AXB245HGA	120	43-3/8	44

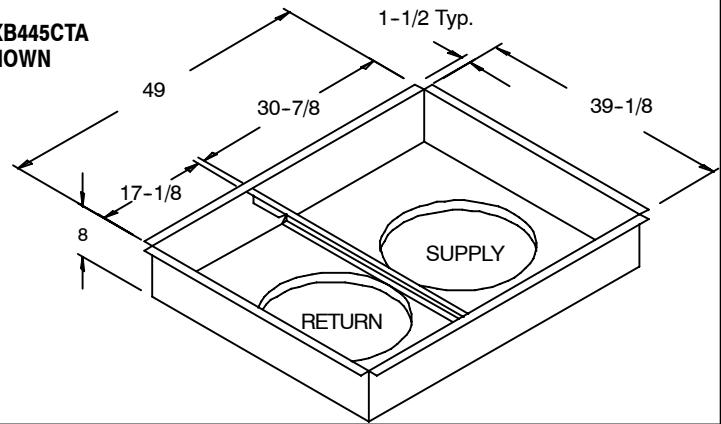


ACCESSORIES - PHS090 - 120 (CONT.)

CONCENTRIC DUCT KIT

Description	Model Number	Where Used
20" Round	AXB445CTA	090
18" x 28" Rect.	AXB545CTA	120

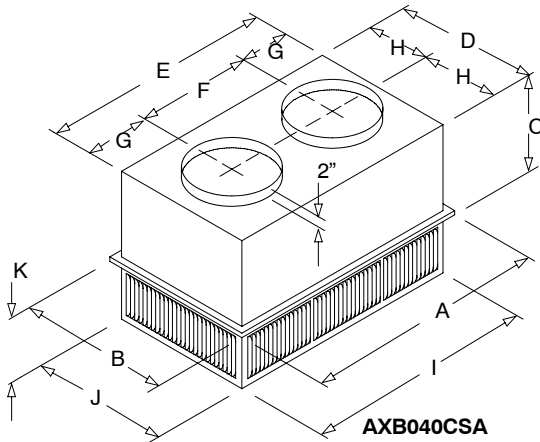
AXB445CTA
SHOWN



PERFORMANCE DATA ON NEXT PAGE

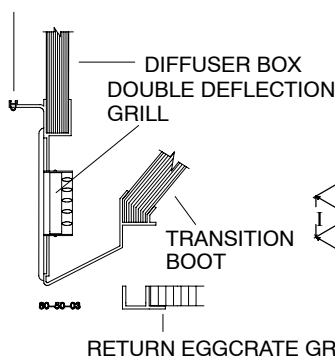
CONCENTRIC DIFFUSER

Description	Model Number	Used With
Flush Mount	AXB040CFA	AXB445CTA
Flush Mount	AXB045CFA	AXB545CTA
Flush Mount	AXB050CFA	AXB645CTA
Step Down	AXB040CSA	AXB445CTA
Step Down	AXB045CSA	AXB545CTA
Step Down	AXB050CSA	AXB645CTA

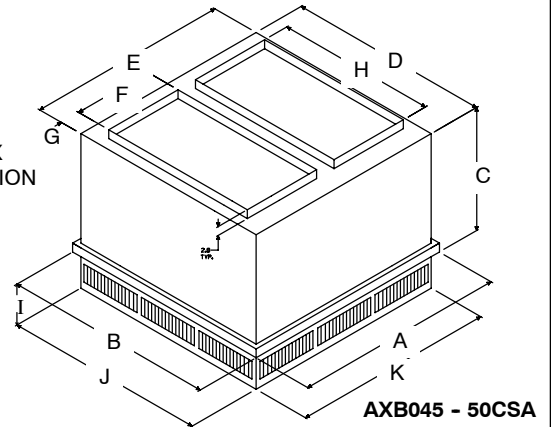


AXB040CSA

ANTI-SWEAT
GASKET



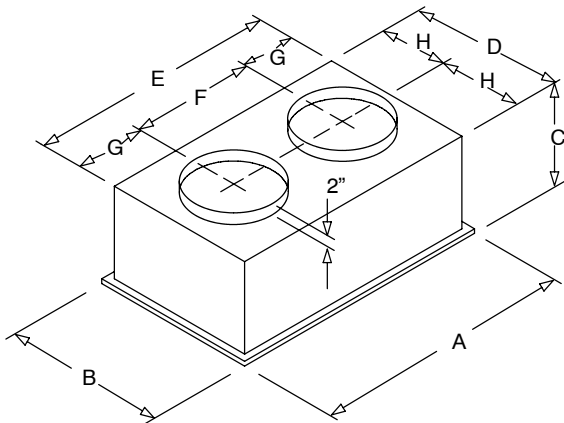
RETURN EGGCRATE GRILL



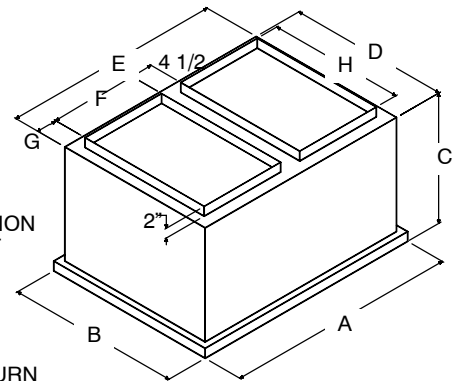
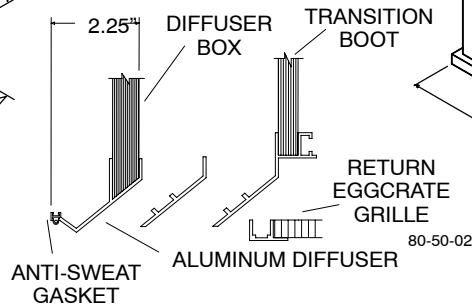
AXB045 - 50CSA

CONCENTRIC DIFFUSER (Step Down)

Model Number	A	B	C	D	E	F	G	H	I	J	K	Duct Size
AXB040CSA	47-5/8	29-3/8	14-3/8	27-1/2	45-1/2	22-1/2	11-1/2	13-3/4	45-1/2	27-1/2	8-1/8	20" RD
AXB045CSA	47-5/8	35-5/8	20-5/8	33-1/2	45-1/2	18	2-1/2	28	9-1/8	33-1/2	45-1/2	18 x 28
AXB050CSA	47-5/8	41-5/8	25-7/8	45-1/2	45-1/2	18	2-1/2	32	9-1/8	39-1/2	45-1/2	18 x 32



AXB040CFA



AXB045 - 50CFA

CONCENTRIC DIFFUSER (Flush Mount)

Model Number	A	B	C	D	E	F	G	H	Duct Size
AXB040CFA	47-5/8	29-5/8	16-5/8	27	45	22-1/2	11-1/4	13-1/2	20" RD
AXB045CFA	47-5/8	35-5/8	21-3/4	33	45	18	2-1/4	28	18 x 28
AXB050CFA	47-5/8	41-5/8	29-1/4	39	45	18	2-1/4	32	18 x 32

ACCESSORIES - PHS090 - 120 (CONT.)

CSA SERIES STEP-DOWN PERFORMANCE

Part No. AXB	CFM	Static Pressure In. WC	Throw Feet	Neck / Jet Velocity FPM	db Sound Levels
040CSA	2600	.17	24-29	669	20
	2800	.20	25-30	720	25
	3000	.25	27-33	772	25
	3200	.31	28-35	823	25
	3400	.37	30-37	874	30
045CSA	3600	.17	25-33	851	30
	3800	.18	27-35	898	30
	4000	.21	29-37	946	30
	4200	.24	32-40	993	30
	4400	.27	34-42	1040	30
050CSA	4400	.29	25-30	733	30
	4600	.31	26-31	767	30
	4800	.32	27-32	800	30
	5000	.34	28-33	833	30
	5200	.36	28-34	867	30
	5400	.39	29-35	900	30

CFA SERIES FLUSH MOUNT PERFORMANCE

Part No. AXB	CFM	Static Pressure In. WC	Throw Feet	Neck Velocity FPM	Jet Velocity FPM	db Sound Level
040CFA	2600	.17	19-24	663	1294	30
	2800	.20	20-28	714	1393	35
	3000	.25	21-29	765	1492	35
	3200	.31	22-29	816	1592	40
	3400	.37	22-30	867	1692	40
045CFA	3600	.17	22-29	844	1646	35
	3800	.18	22-30	891	1737	40
	4000	.21	24-33	938	1829	40
	4200	.24	26-35	985	1920	40
	4400	.27	28-37	1032	2011	40
050CFA	4600	.31	25-34	922	1795	40
	4800	.32	26-35	962	1873	40
	5000	.34	27-36	1002	1951	40
	5200	.36	30-39	1043	2029	45
	5400	.39	32-41	1083	2107	45

CSA/CFA NOTES:

1. All data is based on the Air Diffusion Council guidelines.
2. Throw data is based on Terminal Velocities of 75 FPM using isothermal air.
3. Throw is based on diffuser blades being directed in a straight pattern.
4. Actual sound levels are less than those shown.
5. Minimum height 9' above floor.

LOW AMBIENT KIT

Model Number	Used With
AXB045LAA	090 - 120
THRU-THE-BASE POWER KIT	
Model Number	Used With
AXB045PKA	090 - 120
With 1-1/4" Power and 3/4" Gas Connections.	

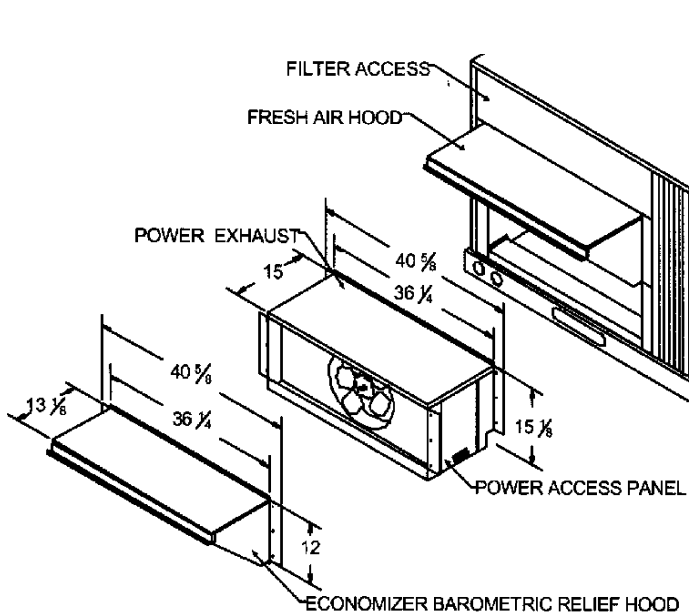
ACCESSORIES - PHS090 - 120 (CONT.)

POWER EXHAUST

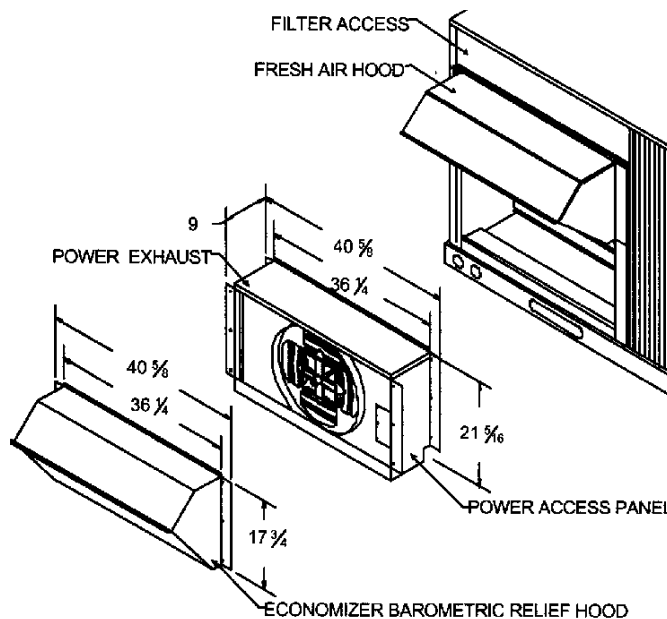
Description	Model Number	Where Used
208/230 Volt	AXB145PEH	090
460 Volt	AXB145PEL	090
575 Volt	AXB145PES	090
208/230 Volt	AXB245PEH	120
460 Volt	AXB245PEL	120
575 Volt	AXB245PES	120

POWER EXHAUST PERFORMANCE DATA

Model	Volt/Phase/ Hertz	Motor			Unit									
		Qty	HP	RPM	Cir. Qty	LRA	FLA	MCA	Fuse Size	@0.0		@0.1	@0.3	
										CFM	RPM	CFM	CFM	RPM
AXB145PEH	208-230/1/60	1	1/2	1725	1	10.2	4.3	5.4	8	2400	1725	N/A	2100	1725
AXB145PEL	460/1/60	1	1/2	1625	1	4.1	1.7	2.2	5	2300	1625	N/A	2000	1625
AXB145PES	575/1/60	1	1/2	1625	1	4.1	1.7	2.2	5	2300	1625	N/A	2000	1625
AXB245PEH	208-230/1/60	1	3/4	1075	1	24.9	5.0	6.3	10	N/A	N/A	4800	N/A	N/A
AXB245PEL	460/1/60	1	3/4	1075	1	N/A	2.2	2.8	5	N/A	N/A	4800	N/A	N/A
AXB245PES	575/1/60	1	3/4	1050	1	N/A	1.5	1.9	4	N/A	N/A	4800	N/A	N/A



POWER EXHAUST DOWNFLOW, MODEL AXB145***



POWER EXHAUST DOWNFLOW, MODEL AXB245***

ACCESSORIES - PHS090 - 120 (CONT.)

PHS SERIES ELECTRICAL DATA - ELECTRIC HEAT ACCESSORY

Unit	Voltage	Qty	Model Number	Evap. Fan Motor FLA	Cond. Fan Motor FLA	Electric Heater *		Power Supply		Disconnect Size **		Single Point Kit Required
						Nominal kW	FLA	MCA	MOCP ***	FLA	LRA	
PHS072	208-3-60	1	AES007EHA	5.8	1.4 each	4.9	13.6	52.6	60	50	204	-
		1	AES009EHA			7.9	21.9	63	70	60	212	AXB002SPA
		1	AES015EHA			12	33.3	77.2	80	73	223	AXB002SPA
		1 ea.	AES009EHA, AES009EHA			15.8	43.9	90.5	100	85	234	AXB003SPA
		1 ea.	AES009EHA, AES015EHA			19.9	55.2	104.6	110	98	245	AXB003SPA
PHS072	230-3-60	1	AES007EHA	5.8	1.4 each	6.5	15.6	55.1	60	52	206	-
		1	AES009EHA			10.5	25.3	67.2	70	63	215	AXB002SPA
		1	AES015EHA			16	38.5	83.7	90	79	229	AXB002SPA
		1 ea.	AES009EHA, AES009EHA			21	50.5	98.7	100	92	241	AXB003SPA
		1 ea.	AES009EHA, AES015EHA			26.5	63.8	115.3	125	108	254	AXB003SPA
PHS072	460-3-60	1	AES006ELA	2.6	.7 each	6	7.2	26.6	30	25	102	-
		1	AES011ELA			11.5	13.8	34.8	35	33	109	-
		1	AES013ELA			14	16.8	38.6	40	36	112	-
		1 ea.	AES011ELA, AES011ELA			23	27.7	52.2	60	49	123	-
		1 ea.	AES011ELA, AES013ELA			25.5	30.7	55.9	60	52	126	-
PHS090	208-3-60	1	AES010EHA	5.8	1.4 each	7.8	21.7	65.9	70	66	251	AXB007SPA
		1	AES016EHA			12.0	33.4	80.4	90	79	262	AXB007SPA
		1	AES024EHA			18.6	51.7	103.3	110	100	281	AXB009SPA
		1	AES032EHA			24.0	66.7	122.0	125	117	296	AXB009SPA
		1 ea.	AES032EHA, AES010EHA			31.9	88.4	149.1	150	142	317	AXB013SPA
PHS090	230-3-60	1	AES010EHA	5.8	1.4 each	10.4	25.0	70.0	80	69	254	AXB007SPA
		1	AES016EHA			16.0	38.5	86.9	90	85	268	AXB007SPA
		1	AES024EHA			24.8	59.7	113.4	125 #	109	289	AXB009SPA
		1	AES032EHA			32.0	77.0	135.0	150 #	129	306	AXB009SPA
		1 ea.	AES032EHA, AES010EHA			42.4	102.0	166.3	175 #	158	331	AXB013SPA
PHS090	460-3-60	1	AES014ELA	2.6	.7 each	14.0	16.7	40	45	39	124	AXB006SPA
		1	AES016ELA			16.5	19.8	43.8	45	43	128	AXB006SPA
		1	AES027ELA			27.8	33.4	60.8	70	58	141	AXB008SPA
		1	AES033ELA			33.0	39.7	68.7	70	66	147	AXB008SPA
		1 ea.	AES014ELA, AES027ELA			41.7	50.2	81.8	90 #	78	158	AXB010SPA
PHS090	575-3-60	1	AES018ESA	2.6	.7 each	17.0	17.1	36.7	40	36	114	AXB006SPA
		1	AES036ESA			34.0	34.1	68.0	60	55	131	AXB006SPA
PHS120	208-3-60	1	AES010EHA	5.8	1.4 each	7.8	21.7	74.4	80	74	317	AXB012SPA
		1	AES016EHA			12.0	33.4	88.9	90	88	328	AXB012SPA
		1	AES032EHA			24.0	66.7	130.6	150	126	362	AXB015SPA
		1 ea.	AES032EHA, AES010EHA			31.9	88.4	157.7	175	151	383	AXB017SPA
		1 ea.	AES032EHA, AES016EHA			37.5	104.2	177.8	200	170	399	AXB017SPA
PHS120	230-3-60	1	AES010EHA	5.8	1.4 each	10.4	25.0	78.6	80	78	320	AXB012SPA
		1	AES016EHA			16.0	38.5	95.4	100	94	334	AXB012SPA
		1	AES032EHA			32.0	77.0	143.6	150	138	372	AXB015SPA
		1 ea.	AES032EHA, AES010EHA			42.4	102.0	174.8	175	167	397	AXB017SPA
		1 ea.	AES032EHA, AES016EHA			50.0	120.3	167.6	175	188	415	AXB017SPA
PHS120	460-3-60	1	AES016ELA	2.6	.7 each	16.5	19.8	48.1	50	47	163	AXB011SPA
		1	AES027ELA			27.8	33.4	65.1	70	63	176	AXB014SPA
		1	AES033ELA			33.0	39.7	73.0	80	70	183	AXB014SPA
		1 ea.	AES027ELA, AES014ELA			41.7	50.2	86.1	90	82	193	AXB016SPA
		1 ea.	AES033ELA, AES016ELA			50.0	60.1	83.5	90	93	203	AXB016SPA
PHS120	575-3-60	1	AES018ESA	2.6	.7 each	17.0	17.1	40.1	50	39	135	AXB011SPA
		1	AES036ESA			34.0	34.1	61.4	70	59	152	AXB014SPA
		1 ea.	AES036ESA, AES018ESA			51.0	51.2	69.9	70	78	169	AXB016SPA

NOTE: See legend and notes for accessories.

ACCESSORY STATIC PRESSURE (in. wg)

Component	CFM									
	2250	2500	3000	3500	4000	4500	5000	5500	6000	6250
1 Heater Module	0.02	0.03	0.05	0.07	0.08	0.10	0.12	0.14	0.16	0.17
2 Heater Modules	0.03	0.05	0.07	0.09	0.12	0.14	0.16	0.19	0.21	0.20

The static pressure must be added to external static pressure. The sum and the evaporator entering-air cfm should then be used in conjunction with the Fan Performance tables to determine blower rpm and watts.

MULTIPLICATION FACTORS

Heater Rating Voltage	ACTUAL HEATER VOLTAGE									
	208	230	240	380	440	460	480	550	575	600
240 Volt	0.751	0.918	1.000							
480 Volt				0.626	0.840	0.918	1.000			
600 Volt								0.840	0.918	1.000

NOTE: The following equation converts kW of heat energy to Btuh: kW x 3.412 = Btuh.

LEGEND

FLA - Full Load Amps

MCA - Minimum Circuit Amps

MOCP - Maximum Overcurrent Protection

LRA - Locked Rotor Amps

NEC - National Electrical Code

* Heater capacity (kW) is based on heater voltage of 208 v, 240 v, 480 v, and 600 v. Heaters are rated at 240 v, 480 v, or 600 v. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly. To determine heater

** Used to determine minimum disconnect size per NEC.

*** Fuse or HACR circuit breaker.

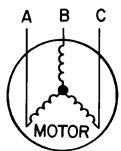
Fusing in the single point kit provides the required branch circuit protection.

NOTES

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.

2. 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 percent of voltage imbalance.

EXAMPLE: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\begin{aligned} \text{Average Voltage} &= \frac{452 + 464 + 455}{3} \\ &= \frac{1371}{3} = 457 \end{aligned}$$

Determine maximum deviation from average voltage.

$$(AB) 457 - 452 = 5 \text{ V}$$

$$(BC) 464 - 457 = 7 \text{ V}$$

$$(AB) 457 - 455 = 2 \text{ V}$$

Maximum deviation is 7 v.

Determine percent voltage imbalance.

$$\begin{aligned} \% \text{ Voltage Imbalance} &= 100 \times \frac{7}{457} \\ &= 1.53\% \end{aligned}$$

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 company immediately.



CONTROLS

OPERATING SEQUENCE

Cooling, Units Without Economizer — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor fan contactor (IFC), reversing valve solenoid (RVS1) and compressor contactor no. 1 (C1) are energized and indoor-fan motor, compressor no. 1, and outdoor fans start. The outdoor-fan motor(s) run continuously while unit is cooling. On 090-120 units, if the thermostat calls for a second stage of cooling by energizing Y2, compressor contactor no. 2 (C2) and reversing valve solenoid (RVS2) are energized and compressor no. 2 starts.

Heating, Units Without Economizer — Upon a request for heating from the space thermostat, terminal W1 will be energized with 24 v. The IFC, OFC, C1, and C2 will be energized. The reversing valves switch position and the indoor fan, outdoor fan, compressor no. 1, and compressor no. 2 are energized.

If the space temperature continues to fall while W1 is energized, W2 will be energized with 24 v, and the heater contactor(s) (HC) will be energized, which will energize the electric heater(s).

When the space thermostat is satisfied, W2 will be deenergized first, and the electric heater(s) will be deenergized. Upon a further rise in space temperature, W1 will be deenergized, and the reversing valve solenoids (RVS1 and RVS2) will be energized.

Defrost — When the temperature of the out-door coil drops below 28 F as sensed by the defrost thermostat (DFT2) and the defrost timer is at the end of a timed period (adjustable at 30, 50, or 90 minutes), reversing valve solenoids (RVS1 and RVS2) are energized and the OFC is deenergized. This switches the position of the reversing valves and shuts off the outdoor fan. The electric heaters (if installed) will be energized.

The unit continues to defrost until the coil temperature as measured by DFT2 reaches 65 F, or the duration of defrost cycle completes a 10-minute period.

During the Defrost mode, if circuit 1 defrosts first, RVS1 will oscillate between Heating and Cooling modes until the Defrost mode is complete.

At the end of the defrost cycle, the electric heaters (if installed) will be deenergized; the reversing valves switch and the out-door-fan motor will be energized. The unit will now operate in the Heating mode.

If the space thermostat is satisfied during a defrost cycle, the unit will continue in the Defrost mode until the time or temperature constraints are satisfied.

APPLICATION DATA

1. **OUTDOOR INSTALLATION** — Units approved for outdoor installation only.
2. **DUCTWORK** — Secure vertical discharge ductwork to roof curb. For horizontal discharge applications, either attach ductwork to unit, or use field-supplied flanges attached to the horizontal discharge openings and attach all ductwork to flanges.
3. **THERMOSTAT** — Use of 2-stage heating and cooling thermostat is recommended for all units.
4. **HEATING-TO-COOLING CHANGEOVER** — All units are automatic changeover from heating to cooling when automatic changeover thermostat and subbase are used.
5. **AIRFLOW** — Units are draw-thru on cooling and blow-thru on heating.
6. **MAXIMUM AIRFLOW** — To minimize the possibility of condensate blow-off from indoor coil, airflow through units should not exceed 500 cfm/ton on size 090-120 units.

7. **MINIMUM AIRFLOW** — For cooling, minimum airflow is 300 cfm/ton.

8. **MINIMUM AMBIENT COOLING OPERATING TEMPERATURE** — The minimum temperature for standard units is 25 F.

9. **MAXIMUM OPERATING OUTDOOR-AIR TEMPERATURE** — The maximum temperature for standard units is 115 F.

10. **INTERNAL UNIT DESIGN** — Due to PHS's internal unit design (draw-thru over the motor), air path, and specially designed motors, the full horsepower (maximum continuous bhp) listed in the Physical Data table and the notes following each Fan Performance table can be utilized with confidence. Using PHS motors with the values listed in the Physical and Fan Performance Data tables *will not* result in nuisance tripping or premature motor failure. The unit warranty will not be affected.

GUIDE SPECIFICATIONS: PHS072-120

CABINET:

The cabinet shall be made of sturdy baked enamel coated galvanized steel. Base rails shall be 16 gauge steel and have fork lift slots and holes provided for lifting shackles. Unit shall be designed with convertible airflow and shipped ready for downflow applications with conversion to horizontal air flow accomplished by relocating two panels.

Return air compartments shall be insulated with not less than 1/2" of water resistant coated glass fiber and not less than 1/2" of aluminum foil faced glass fiber in the furnace/supply compartments.

COOLING SECTION:

Units shall be factory charged and operationally ready. Each refrigeration circuit shall have a compressor, with internal overload protection, high and low pressure switches, filter drier and copper tube/aluminum fin evaporator and condenser coils.

Units shall be capable of cooling operation down to 25°F as shipped from the factory.

COILS:

The evaporator and condenser coils shall be fabricated with aluminum fins mechanically bonded to copper tubing. Both coils shall be pressure tested prior to assembly into the unit and electronically leak tested after assembly onto the unit. The evaporator coil shall be protected from dust and debris on the return air side by factory installed 2" air filters.

CONDENSER FAN:

The unit shall have a single direct drive propeller fan/motor assembly mounted directly to a vertical-discharge grille panel that is easily removable. Motors shall have permanently lubricated sleeve bearings and inherent overload protection.

EVAPORATOR BLOWER:

The units shall have a single belt driven evaporator blower. The motor shall have permanently lubricated ball bearings and internal overload protection. An adjustable motor drive sheave for matching air flow requirements shall be standard.