TAP Horizontal Product Coolers

PRODUCT DATA & INSTALLATION

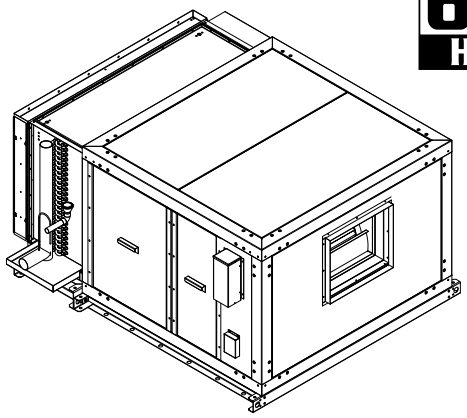
AIR DEFROST FOR APPLICATIONS 35°F *(1.6 °C)* **(ELECTRIC AND HOT GAS DEFROST MODELS OPTIONAL)**

UP TO 30 TONS NOMINAL CAPACITY

Bulletin T30-TAP-PDI-2

1097719

For the latest product updates and further information, visit **www.trentonrefrigeration.com**



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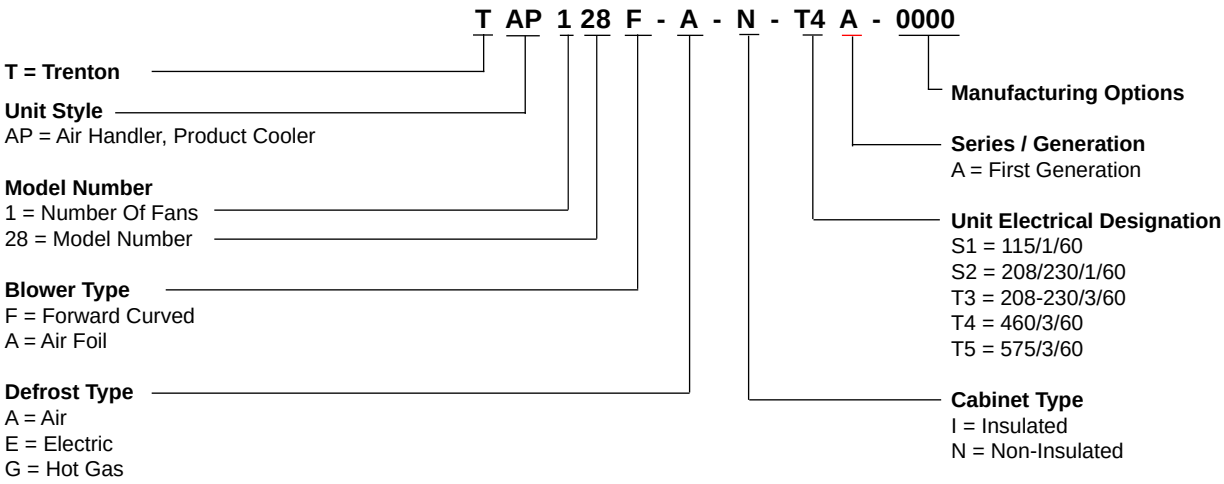


STANDARD FEATURES

● **Indoor Applications Only** ● Large Face Area Centrifugal Fan

● "Bolt-On" Coil for Maximum Capacity in Minimum Space

● Single Wall Heavy Gauge Galvanized Cabinet

● Full Size Access Doors for Easy Maintenance ● Efficient Forward Curved Blower

● 10 Models ● Up to 6" Total Static Pressure

● Up to 44,000 CFM ● Internal Motor ● Up to 30 HP

● Horizontal and Vertical Air Discharge

● External Electrical Box Mounted to Cabinet

● Extended Grease Lines with External Access

● Aluminum Fan Head Drain Pan (Models 137 thru 164, downblast configuration not available)

OPTIONAL FEATURES (Factory Mounted)

● Double Wall Cabinet with 2" Mineral Wool Insulation

● Internal Vibration Isolators

● Airfoil (Up to 8" Total Static Pressure)

● Disconnect Switch ● Flat Filter

● Angle Filters

● Aluminum Fan Head Drain Pan (Models 108 thru 128, downblast configuration not available)

OTHER OPTIONS ARE AVAILABLE AT YOUR REQUEST. CONSULT FACTORY FOR PRICING.

CAPACITY DATA

Cooling Capactites - BTU/H °F T.D.(1) Based On 600 FPM *(183m/min)* Face Velocity

MODEL NUMBER	CFM * @ 600 FPM *(Litre/sec. @183m/min.)*	FACE AREA SQ. FT. *(m^2)*	ROWS DEEP	COIL ENT. AIR FROM 32°F *(0°C)* to 35°F *(1.6°C)*			**COIL ENT. AIR BELOW 32°F *(0°C)*	
				FIN SPACING			FIN SPACING	
				8 FPI DX	6 FPI DX	4 FPI DX	6 FPI DX	4 FPI DX
AP 108	6340 *(2992)*	10.5 *(.975)*	4	3460	3210	2630	2870	2350
			6	4420	4120	3360	3800	3130
			8	5040	4670	3830	4480	3680
			10	5610	5200	4270	5020	4120
AP 111	8500 *(4012)*	14.1 *(1.30)*	4	4630	4310	3520	3840	3150
			6	5920	5520	4510	5120	4200
			8	6750	6290	5130	6010	4930
			10	7500	6980	5730	6740	5510
AP 114	10650 *(5026)*	17.7 *(1.64)*	4	5810	5400	4410	4820	3940
			6	7410	6940	5650	6400	5250
			8	8450	7880	6450	7530	6170
			10	9400	8740	7170	8440	6920
AP 117	12800 *(6041)*	21.3 *(1.97)*	4	6980	6510	5310	5790	4750
			6	8940	8310	6800	7690	6330
			8	10160	9450	7750	9070	7410
			10	11300	10500	8620	10150	8290
AP 122	15700 *(7410)*	26.2 *(2.43)*	4	8560	7960	6530	7120	5830
			6	10920	10180	8330	9420	7750
			8	12490	11560	9500	11100	9080
			10	13870	12890	10580	12450	10180
AP 128	19600 *(9250)*	32.6 *(3.02)*	4	10480	9950	8120	8860	7270
			6	13630	12730	10400	11820	9660
			8	15560	14440	11820	13870	11360
			10	17260	16120	13180	15450	12720
AP 137	26150 *(12341)*	43.6 *(4.05)*	4	14270	13240	10850	11880	9710
			6	18280	17000	13920	15750	12890
			8	20780	19290	15750	18480	15170
			10	23060	21470	17580	20660	16880
AP 141	29800 *(14064)*	49.6 *(4.60)*	4	16250	15110	12310	13460	10990
			6	20760	19360	15770	17830	14630
			8	23660	21900	17950	21040	17150
			10	26270	24420	20050	23480	19240
AP 150	34900 *(16471)*	58.1 *(5.39)*	4	19000	17650	14460	15790	12920
			6	24320	22610	18430	20980	17220
			8	27740	25750	21090	24610	20200
			10	30780	28600	23420	27600	22610
AP 164	43600 *(20577)*	72.6 *(6.74)*	4	23700	22040	18050	19780	16090
			6	30450	28260	23040	26170	21520
			8	34680	32210	26320	30880	25220
			10	38480	35720	29360	34580	28240

* For Applications in room temperatures above 35°F *(1.6°C)* maximum face velocity should not exceed 500 FPM *(152m/min)* and capacities corrected accordingly (see table below for correction factors).

** These ratings are based on moderate coil frosting. For heavy frosting use factor of 0.95.

(1) "T.D." - Represents the difference between temperature of air entering cooling coil and coil refrigerant temperature.

Ratings for units using electric defrost may be determined by multiplying ratings in above table by 0.95

FACE VELOCITY CAPACITY CORRECTION FACTORS

Face Velocity FPM *(m/min.)*	Rows Deep In Direction Of Airflow			
	4	6	8	10
600 *(183)*	1.0	1.0	1.0	1.0
500 *(152)*	.91	.90	.89	.89
400 *(122)*	.80	.78	.76	.73

FEATURES A NEW ADVANCED DYNAMIC DESIGN BLOWER SECTION

• HIGH EFFICIENCY FAN PERFORMANCE
• FANS TESTED PER AMCA CODE No. 210
• MINIMUM FAN TIP SPEEDS
• CLASS II CONSTRUCTION

The air handler blower section is a matched assembly combining advanced engineering techniques with the finest materials available.
Forward-curved centrifugal fans were designed specifically to operate at low tip-speeds with minimum power consumption. To meet the low noise level requirements of comfort air conditioning, fan outlet velocities have been reduced without sacrificing good fan performance. Blowers are fully performance tested and certified in accordance with DIN, ISO, BS and AMCA 210 standards. Blowers are rated for CLASS II operation and have bearings selected to guarantee a minimum L50 life time of 200,000 hours. The fan section is complete with a rugged drive assembly. The heavy duty motor base is designed for quick and simple belt adjustment. All drives are furnished with matched V-belts.

EXCLUSIVE STEEL FRAME CONSTRUCTION

Sectionalized construction provides complete flexibility of unit arrangements with each individual section structurally designed to provide the absolute maximum in unit strength and rigidity. All static and dynamic forces are directly transmitted to the unit framework. The blowers are supported entirely by rigid frame members, eliminating all dynamic forces from the casing panel. Optional internal blower isolators are also available on all models.

For maximum durability, the entire cabinet assembly is fabricated of continuous galvanized steel. This heavy protective finish is maintained intact, completely undisturbed and is complimented with the use of corrosion resistant permanent fasteners. The positive fastening principle of a permanent fastener provides the rigidity and stability necessary for lifetime performance. Optional 2” insulated panels are available on all models. Outdoor construction is available on all models. These exclusive construction features offer you the ultimate in air handling design.

INTERNAL BLOWER CONSTRUCTION

All blower housings are manufactured in galvanized sheet steel. Impellers are also manufactured in galvanized sheet steel with tab locked blades. All impellers are balanced, both statically and dynamically, to an accuracy grade of G = 6.3 in accordance to DIN ISO 1940-1 and ANSI S2.19 – 1989. Bearings are self-aligning, single row, and deep groove ball type, in pillow block cast iron housings. All bearings have been selected to guarantee a minimum L50 life time of 200,000 hours. Operating temperatures range from -25°F to + 131°F (*-31°C to +55°C*) for all blowers. For operating temperatures outside these limits please consult factory. Extended lubrication lines are standard. Airfoil constructed blowers available for all models for static pressures above 6” – consult factory (models 103 & 104 excluded).

GENERAL

Certain basic factors must be predetermined prior to the selection of a central station air handler. The factors which will control the unit selection are applicable codes, ventilation requirements, heating and cooling space loads, acceptable temperature differentials, thermal media and installation limitations. The selection of the unit can then be resolved to 4 steps:

1. Unit type and size,
2. Cooling coil,
3. Accessories and,
4. Motor size.

SELECTION OF UNIT TYPE AND SIZE

With the overall system designed to minimize the number of units and the cooling and ventilation requirements for the various zones established, selection of the optimum unit size can be made based on the required air volume. The cooling load and ventilation requirement will establish a CFM need, any one of which may be the maximum.
The unit air volume for cooling is dependent upon the sensible space cooling load and the design dry bulb temperature differential. Normal temperature differentials for air conditioning are from 12 to 25°F. The minimum air volume is calculated using the following formula:

$$\text{CFM} = \frac{\text{Sensible Space Load (Btuh)}}{1.09 \times \text{Temp. Differential (°F)}}$$

The required air volume for ventilation is generally less than that for cooling. However, where toxic fumes or unusual contaminants are encountered, the ventilation requirements may establish a minimum air volume in excess of that determined for cooling.
The unit size can then be selected based on maximum air volume required. Usually more than one unit size can be selected to deliver the required air. Therefore, fan outlet velocity, coil face velocity, fan RPM and BHP should also be given consideration in the final selection. The fan performance tables are conveniently arranged with CFM,fan outlet velocity, coil face velocity, fan RPM and BHP in tabular form for simple selection of the optimum unit size.

SELECTION OF COILS

Having determined the unit size, the selection of the coil is resolved to three steps:

1. Choice of the face area coil for optimum face velocity,
2. Choice of the type of coil suited to the application, and
3. Determination of number of rows and fin series.

COOLING COIL

The coil size should be selected for maximum face velocity to obtain peak heat transfer efficiency and minimum cost. Generally 500 to 600 FPM is considered the optimum coil face velocity range for dehumidification application. Determination of the number of rows and fin spacing is made using the current cooling coil catalogues.

SELECTION OF ACCESSORIES

Accessories should be selected to provide a complete cooling unit with proper cleaning of the air. A complete line of filter accessories is available.

AIR CLEANING

A filter section should be selected to provide filter area such that the filter velocity will be compatible with the choice of filter media. Two filter sections are offered; flat, for units 108 thru 164 and angular, for units 114 thru 164.

SELECTION OF FAN MOTOR

The determination of the actual fan performance requires an accurate calculation of the resistance to air flow thru the entire system. This total resistance consists of two parts. The external static pressure of the distribution system, and the internal unit resistance.

The internal unit resistance is found by summing the resistances of the coils and filter sections. Filter Air Friction table located on page 9.

DETERMINATION OF FAN SPEED AND MOTOR HP REQUIREMENTS

Final determination of the actual fan performance requires an accurate calculation of the total resistance to air flow through the entire system. This total static pressure (TSP) will consist of two parts: (1) the external resistance due to air flow through the ducts, discharge grilles, diffusers, etc. of the distribution system, and (2) the internal resistance of the unit which results from air flow through the coils, filters, unit cabinet and other accessories. The method of calculating the resistance for the various components of the distribution system are well established. The internal resistances are easily determined from Blower Data table (see page 4) which tabulates the resistance values for the various unit components in increments of air volume. For the internal resistances as shown in Blower Data table (see page 4). The resistances of the cooling coil must be added. These may be obtained from the charts on page 4. After calculating the total static pressure, the fan speed and motor horsepower requirements can be accurately determined. With the unit model, CFM and TSP known, the fan RPM and BHP is easily determined from the Fan Performance Tables. (page 7-8)

FAN PERFORMANCE INFORMATION

This catalogue contains all of the blower data for central station air handlers. Units are equipped with forward curved fan wheels as standard.

SELECTION RULES

The fan performance calculation procedure is predicated on the fact that a fan is a constant volume machine, provided the RPM and static pressure do not change. This means the delivered air volume (CFM) will not change, even though the temperature may. The BHP required is inversely proportional to final air temperature and altitude; consequently BHP decreases with an increase in final air temperature or higher altitude and increases with a decrease in final air temperature or lower altitude. This requires that the static pressure be adjusted for any air conditions other than standard. After the calculation of RPM and BHP, only the BHP need be corrected to the specified conditions.

SELECTION PROCEDURE

The following data is required to determine the fan performance. The unit type, unit size, CFM, total static pressure, operating temperature and altitude.

1. From table below, obtain the temperature and altitude conversion factor.
2. Divide the specified total static pressure by the conversion factor to obtain a corrected total static pressure.
3. At the specified CFM and corrected total static pressure, determine the RPM and BHP. (pageS 7-8)
4. Multiply the BHP by the conversion factor to obtain the BHP required at the specified altitude and temperature.

EXAMPLE OF SELECTION PROCEDURE

TAP111 with 5000 CFM @ 1.0” total static pressure, 20°F air temp, 5000 feet elevation:

1. Conversion factor = 0.92
2. New TSP = 1.0” / 0.92 = 1.09”
3. 1.09” = 586 RPM and 1.35 BHP
4. New BHP = 1.35 x 0.92 = 1.24

Selection = 5000 CFM @ 586 RPM and 1.24 BHP

TEMPERATURE AND ALTITUDE CONVERSION FACTORS

AIR TEMP. °F	ALTITUDE (FEET)								
	0	1000	2000	3000	4000	5000	6000	7000	8000
-20	1.2	1.16	1.12	1.08	1.04	1	0.97	0.93	0.89
0	1.15	1.1	1.08	1.02	0.99	0.95	0.92	0.88	0.85
20	1.11	1.06	1.02	0.98	0.95	0.92	0.88	0.85	0.82
40	1.06	1.02	0.98	0.94	0.91	0.88	0.84	0.81	0.78
60	1.02	0.98	0.94	0.91	0.88	0.85	0.81	0.79	0.76
70	1	0.96	0.93	0.89	0.86	0.83	0.8	0.77	0.74
80	0.98	0.94	0.91	0.88	0.84	0.81	0.78	0.75	0.72
100	0.94	0.91	0.88	0.84	0.81	0.78	0.75	0.72	0.7
120	0.92	0.88	0.85	0.81	0.78	0.76	0.72	0.7	0.67
140	0.89	0.85	0.82	0.79	0.76	0.73	0.7	0.68	0.65

TAP BLOWER DATA (Based on DUCTED OUTLET) 60Hz

Fan RPM and Motor HP Requirements

MODEL AP	FACE VELOCITY FPM (m/min.)	CFM (litre/sec.)	TOTAL STATIC PRESSURE (Inches - Water Gauge)																CABINET SP (In. W.G)
			0.125		0.25		0.50		0.75		1.0		1.25		1.50		1.75		
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	
108	400 (122)	4220 (1992)	380	0.57	421	0.66	502	0.84	580	1.01	654	1.2	727	1.4	797	1.62	863	1.86	0.08
	500 (152)	5290 (2497)	456	1.05	490	1.17	557	1.41	621	1.63	683	1.84	744	2.06	804	2.29	862	2.54	0.13
	600 (183)	6340 (2992)	533	1.74	562	1.88	619	2.17	674	2.46	728	2.72	780	2.98	832	3.24	882	3.5	0.18
111	400 (122)	5670 (2676)	316	0.64	359	0.75	435	1	504	1.26	568	1.52	629	1.8	688	2.09	744	2.39	0.05
	500 (152)	7090 (3346)	371	1.19	409	1.31	477	1.61	537	1.92	593	2.24	646	2.56	697	2.89	747	3.23	0.07
	600 (183)	8500 (4012)	429	2	462	2.12	524	2.45	579	2.82	629	3.19	677	3.57	722	3.95	767	4.34	0.1
114	400 (122)	7100 (3351)	372	1.19	409	1.31	477	1.61	537	1.92	594	2.25	646	2.56	697	2.89	747	3.23	0.05
	500 (152)	8800 (4153)	442	2.21	474	2.33	534	2.67	588	3.04	638	3.43	684	3.82	729	4.22	772	4.61	0.07
	600 (183)	10650 (5026)	521	3.87	548	3.98	602	4.33	650	4.76	695	5.21	737	5.68	777	6.15	816	6.62	0.1
117	400 (122)	8540 (4030)	431	2.03	464	2.14	525	2.48	580	2.85	630	3.22	678	3.6	723	3.99	767	4.38	0.04
	500 (152)	10680 (5040)	522	3.91	549	4.01	603	4.36	651	4.79	696	5.25	738	5.71	778	6.18	817	6.66	0.07
	600 (183)	12800 (6041)	615	6.7	638	6.78	684	7.11	728	7.57	769	8.08	807	8.62	843	9.17	878	9.73	0.09
122	400 (122)	10480 (4946)	350	1.98	376	2.14	429	2.54	481	3.01	531	3.52	580	4.04	627	4.58	673	5.14	0.06
	500 (152)	13100 (6183)	426	3.75	446	3.94	488	4.38	532	4.9	574	5.47	615	6.08	654	6.71	694	7.35	0.09
	600 (183)	15700 (7410)	504	6.35	519	6.57	554	7.06	590	7.62	626	8.23	662	8.9	696	9.6	595	8.57	0.13
128	400 (122)	13060 (6164)	300	2.32	323	2.56	370	3.15	415	3.77	459	4.39	502	5.04	544	5.7	585	6.39	0.03
	500 (152)	16330 (7707)	363	4.39	382	4.63	421	5.31	458	6.06	494	6.83	530	7.6	565	8.39	600	9.18	0.05
	600 (183)	19600 (9250)	428	7.49	444	7.73	477	8.44	508	9.28	540	10.18	570	11.1	600	12.02	630	12.96	0.07
137	400 (122)	17440 (8231)	274	3.54	293	3.8	335	4.53	374	5.36	411	6.2	447	7.04	482	7.88	516	8.74	0.05
	500 (152)	21800 (10289)	333	6.77	348	7.03	381	7.79	414	8.73	446	9.74	477	10.79	507	11.83	536	12.88	0.08
	600 (183)	26150 (12341)	394	11.58	406	11.83	433	12.58	461	13.57	489	14.69	516	15.89	542	17.13	567	18.37	0.12
141	400 (122)	19860 (9373)	222	3.28	243	3.62	283	4.46	320	5.39	356	6.36	391	7.34	424	8.34	458	9.36	0.07
	500 (152)	24820 (11714)	267	6.15	284	6.56	318	7.49	350	8.57	380	9.71	410	10.9	438	12.11	466	13.33	0.1
	600 (183)	29800 (14064)	314	10.38	328	10.9	358	11.95	385	13.11	412	14.39	438	15.74	463	17.13	487	18.55	0.15
150	400 (122)	23250 (10973)	200	4.03	213	4.28	248	5.01	283	5.97	315	7.04	675	8.17	376	9.35	404	10.58	0.07
	500 (152)	29060 (13715)	244	7.69	254	7.98	279	8.69	307	9.64	335	10.79	362	12.06	388	13.4	413	14.8	0.12
	600 (183)	34900 (16471)	289	13.15	297	13.5	316	14.26	337	15.16	361	16.29	385	17.6	408	19.04	430	20.56	0.17
164	400 (122)	29060 (13715)	166	4.16	185	4.66	221	6.03	252	7.44	280	8.84	308	10.23	334	11.65	359	13.09	0.09
	500 (152)	36330 (17146)	198	7.9	213	8.34	244	9.82	273	11.55	298	13.32	322	15.09	345	16.83	367	18.57	0.14
	600 (183)	43600 (20577)	232	13.52	244	13.87	271	15.29	296	17.21	320	19.3	342	21.42	363	23.53	383	25.65	0.2

Internal Airside Resistance - INCHES, W.G.

COIL ROWS DEEP	COIL FACE VELOCITY FPM (m/min)								
	400 (122)			500 (152)			600 (183) **		
	FINS PER INCH								
	4	6	8	4	6	8	4	6	8
4	.09	.12	.14	.13	.17	.20	.18	.23	.27
5	.12	.14	.16	.17	.21	.25	.23	.28	.34
6	.13	.16	.20	.20	.25	.30	.27	.34	.41
8	.18	.23	.27	.27	.34	.41	.35	.44	.53
10	.23	.28	.34	.34	.42	.51	.45	.56	.68

** Coil face velocity should not exceed 500 FPM *(152 m/min.)* for applications where room temperature is above 35°F *(1.6 °C)*.

Wet Coil Correction Factor *

Ent. Air Dew Point Minus Refr. Temp.	
10ºF *(5.5ºC)* or Less	11ºF *(6.1ºC)* to 18ºF *(10ºC)*
1.12	1.24

* For medium frosted coil, use factor of 1.3

TAP BLOWER DATA (Based on FREE OUTLET) 60Hz

Fan RPM and Motor HP Requirements

MODEL AP	FACE VELOCITY FPM (m/min.)	CFM (litre/sec.)	TOTAL STATIC PRESSURE (Inches - Water Gauge)																CABINET SP (In. W.G)
			0.125		0.25		0.50		0.75		1.0		1.25		1.50		1.75		
			RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	
108	400 (122)	4220 (1992)	454	0.74	490	0.82	558	0.96	626	1.13	693	1.3	760	1.5	825	1.72	888	1.96	0.08
	500 (152)	5290 (2497)	555	1.4	583	1.5	637	1.68	691	1.87	746	2.07	800	2.28	854	2.5	908	2.74	0.13
	600 (183)	6340 (2992)	656	2.37	679	2.48	724	2.71	769	2.93	815	3.15	860	3.38	905	3.62	951	3.87	0.18
111	400 (122)	5670 (2676)	381	0.82	415	0.93	477	1.16	537	1.39	596	1.65	653	1.91	708	2.19	761	2.49	0.05
	500 (152)	7090 (3346)	462	1.53	489	1.67	541	1.94	590	2.22	639	2.52	686	2.82	733	3.14	779	3.46	0.07
	600 (183)	8500 (4012)	544	2.58	568	2.74	611	3.06	653	3.38	695	3.72	736	4.07	776	4.43	816	4.79	0.1
114	400 (122)	7100 (3351)	462	1.53	489	1.67	541	1.94	590	2.22	639	2.52	686	2.82	733	3.14	779	3.46	0.05
	500 (152)	8800 (4153)	562	2.85	584	3.02	627	3.34	668	3.68	708	4.03	748	4.39	729	4.22	825	5.13	0.07
	600 (183)	10650 (5026)	672	4.97	691	5.17	726	5.56	761	5.95	795	6.36	829	6.78	862	7.2	894	7.63	0.1
117	400 (122)	8540 (4030)	544	2.58	568	2.74	611	3.06	653	3.38	695	3.72	736	4.07	776	4.43	816	4.79	0.04
	500 (152)	10680 (5040)	672	4.97	691	5.17	726	5.56	761	5.95	795	6.36	829	6.78	862	7.2	894	7.63	0.07
	600 (183)	12800 (6041)	801	8.54	817	8.77	847	9.23	876	9.7	905	10.18	934	10.66	962	11.16	990	11.66	0.09
122	400 (122)	10480 (4946)	424	2.5	447	2.69	491	3.1	535	3.55	578	4.02	621	4.51	664	5.03	707	5.57	0.06
	500 (152)	13100 (6183)	520	4.76	539	4.99	574	5.48	609	5.99	644	6.54	679	7.11	714	7.7	749	8.31	0.09
	600 (183)	15700 (7410)	618	8.08	633	8.36	662	8.91	692	9.5	721	10.12	750	10.77	780	11.44	809	12.12	0.13
128	400 (122)	13060 (6164)	363	3.06	383	3.32	421	3.86	460	4.41	499	4.99	538	5.6	576	6.23	614	6.9	0.03
	500 (152)	16330 (7707)	446	5.81	462	6.14	492	6.79	523	7.46	554	8.14	585	8.85	616	9.57	647	10.32	0.05
	600 (183)	19600 (9250)	530	9.89	543	10.28	568	11.04	594	11.83	620	12.63	645	13.45	671	14.28	697	15.13	0.07
137	400 (122)	17440 (8231)	336	4.57	353	4.92	386	5.63	418	6.36	450	7.11	482	7.89	513	8.67	545	9.48	0.05
	500 (152)	21800 (10289)	413	8.69	427	9.12	453	9.98	479	10.86	505	11.77	531	12.7	556	13.64	581	14.6	0.08
	600 (183)	26150 (12341)	491	14.8	502	15.3	525	16.31	546	17.34	568	18.41	590	19.49	611	20.59	632	21.7	0.12
141	400 (122)	19860 (9373)	272	4.21	289	4.6	321	5.4	353	6.26	384	7.15	415	8.08	447	9.02	477	10	0.07
	500 (152)	24820 (11714)	333	7.97	347	8.44	372	9.4	398	10.42	423	11.47	449	12.57	474	13.68	499	14.82	0.1
	600 (183)	29800 (14064)	396	13.58	407	14.12	428	15.23	450	16.41	471	17.63	492	18.88	513	20.17	534	21.48	0.15
150	400 (122)	23250 (10973)	236	4.72	252	5.09	282	5.93	311	6.88	339	7.9	367	8.99	394	10.12	421	11.32	0.07
	500 (152)	29060 (13715)	289	9.01	301	9.43	325	10.37	349	11.44	373	12.59	396	13.82	418	15.1	441	16.43	0.12
	600 (183)	34900 (16471)	343	15.42	353	15.9	373	16.94	393	18.1	413	19.38	433	20.72	452	22.15	471	23.62	0.17
164	400 (122)	29060 (13715)	204	5.34	219	5.95	246	7.19	273	8.45	298	9.74	323	11.05	347	12.4	371	13.78	0.09
	500 (152)	36330 (17146)	249	10.06	261	10.8	284	12.29	306	13.85	327	15.41	347	17.01	368	18.62	388	20.25	0.14
	600 (183)	43600 (20577)	294	17.04	305	17.9	324	19.66	343	21.48	361	23.32	379	25.21	396	27.11	414	29.02	0.2

Internal Airside Resistance - INCHES, W.G.

COIL ROWS DEEP	COIL FACE VELOCITY FPM (m/min)								
	400 (122)			500 (152)			600 (183) **		
	FINS PER INCH								
	4	6	8	4	6	8	4	6	8
4	.09	.12	.14	.13	.17	.20	.18	.23	.27
5	.12	.14	.16	.17	.21	.25	.23	.28	.34
6	.13	.16	.20	.20	.25	.30	.27	.34	.41
8	.18	.23	.27	.27	.34	.41	.35	.44	.53
10	.23	.28	.34	.34	.42	.51	.45	.56	.68

** Coil face velocity should not exceed 500 FPM *(152 m/min.)* for applications where room temperature is above 35°F *(1.6 °C)*.

Wet Coil Correction Factor *

Ent. Air Dew Point Minus Refr. Temp.	
10ºF *(5.5ºC)* or Less	11ºF *(6.1ºC)* to 18ºF *(10ºC)*
1.12	1.24

* For medium frosted coil, use factor of 1.3

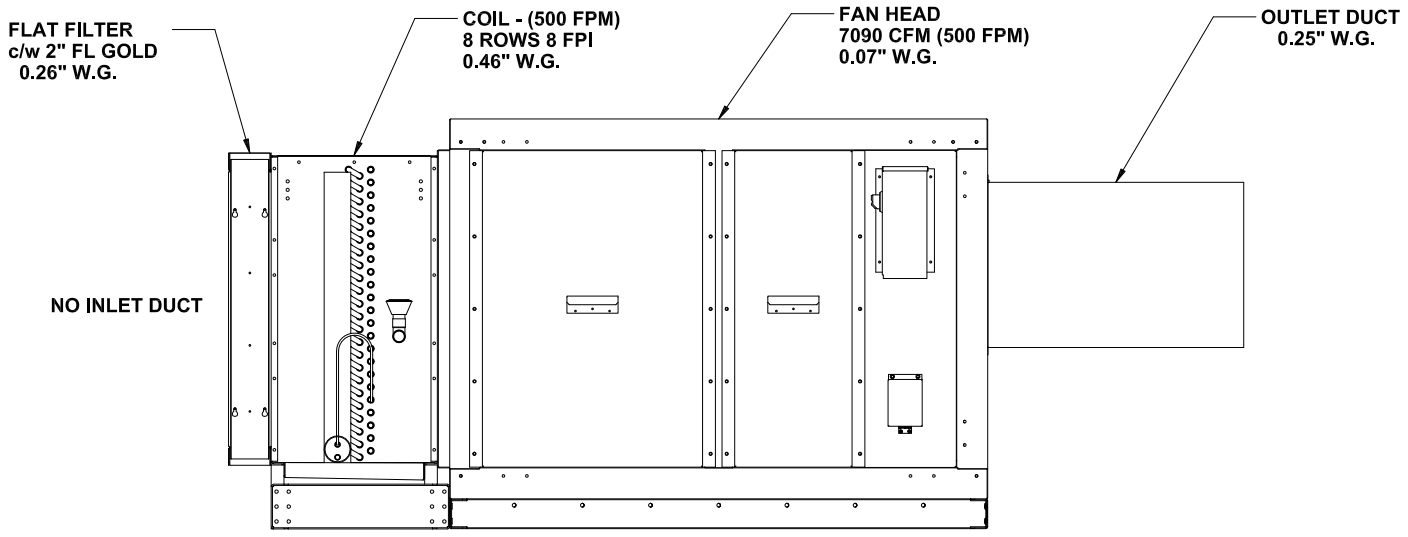
CALCULATION OF TOTAL STATIC PRESSURE

Example #1

1. Select model based on CFM requirement and estimated static pressure.
2. Example model selected TAP111F-A-N-T4A- : 7090 CFM or 500 FPM @ 0.25” ESP.
3. Verify total internal airside resistance using charts on page 7.
    a) using coil of 8 rows deep and 8 FPI @ 500 FPM = 0.41” W.G.
    b) using example of 40°F Evap. Temp.
    c) using example of 45°F Ent. Air Dew Point.
    d) Wet Coil correction factor = 1.12
    e) therefore 0.41” x 1.12 = 0.46” is the total internal airside resistance.
4. For filter static pressure refer to page 9 - 0.26” @ 533 FPM.
5. For cabinet effect static pressure refer to Blower Data on pages 7-8 - 0.07”
6. Recalculate total static pressure - total now becomes 1.04” W.G

Note: this example does not allow for detailed velocity inlet and outlet pressure.

MODEL: KAP111F-A-N-T4A-



CALCULATE TOTAL STATIC PRESSURE (TSP)

TSP: 0.26" + 0.46" + 0.07" + 0.25" = 1.04" W.G.

FROM BLOWER DATA CHART: 7090 CFM
2.27 BHP
600 RPM

FILTER AIR FRICTION (Inches Of Water)

FILTER FACE VELOCITY	FARR 30/30 (throw-aways)		FARR 44 (washable)	FL GOLD (metal / Renu frame)	ALUM. MESH (washable)
FPM	2"	4"	2"	2"	2"
250	0.1	0.08	0.03	0.1	0.08
300	0.14	0.12	0.05	0.13	0.1
350	0.17	0.15	0.06	0.15	0.12
400	0.21	0.19	0.07	0.18	0.15
450	0.26	0.23	0.09	0.21	0.18
500	0.31	0.27	0.11	0.25	0.21
550	NR	NR	0.14	0.29	0.24
600	NR	NR	0.16	0.33	0.27

To determine filter face velocity, divide the CFM by the filter area (see Physical Data table).
NR = Not Recommended
Ratings are at initial resistance.

SOUND DATA

SOUND
with the necessary attenuation analysis, which may include considerations of unit placement (away from occupied areas), acoustical insulation in the equipment room, duct silencers, or acoustical duct lining.

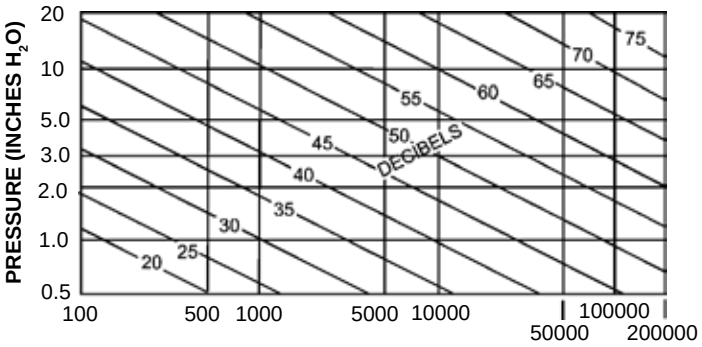
SOUND POWER LEVEL ESTIMATING
The following method of estimating centrifugal fan sound power level spectrums is taken from the latest ASHRAE sources. The method does not take into consideration such factors as cabinet attenuation or inefficient unit selection, but does provide conservative approximate values upon which to base an acoustical attenuation analysis.
Sound power levels in decibels are 10-12 watts in each of the eight octave bands may be estimated with the following formula:
dB = (Base dB) + (System dB) + (Blade Passage Frequency dB)

Base dB
The base dB is found in the table below by entering the octave band and reading the dB in the appropriate row.

OCTAVE BAND CENTRE FREQUENCY								
Hz	63	125	250	500	1000	2000	4000	8000
dB	47	43	39	33	28	25	23	20

SYSTEM dB
The system dB is found in the chart below by entering the chart at the flow rate, rise vertically to the pressure of the system and read the decibels

CFM - PRESSURE CHART



BLADE PASSAGE FREQUENCY dB
The Blade Passage Frequently dB is found:

1. For forward curved fan wheel units - add 2 dB to the one octave band which contains the frequency equal to the RPM of the fan.

2. For airfoil units - add 3 dB to the one octave band which contains the frequency equal to the RPM of the fan.

TAP

PERFORMANCE AND PHYSICAL DATA

60Hz

DESCRIPTION			UNIT SIZE									
			108	111	114	117	122	128	137	141	150	164
STANDARD FAN DATA	FORWARD CURVED	Outlet Area - Square Feet	2.04	2.86	2.86	2.86	4.38	5.5	6.9	8.67	10.91	13.74
		Number - Diameter (in) - Type	1 - 15 FC	1 - 18 FC	1 - 18 FC	1 - 18 FC	1 - 20 FC	1 - 22 FC	1 - 25 FC	1 - 28 FC	1 - 32 FC	1 - 36 FC
		Shaft and Bearing Size (in)	1 3/16	1 7/16	1 7/16	1 7/16	1 11/16	2	2 7/16	2 7/16	2 3/16	2 7/16
OPTIONAL FAN DATA	AIRFOIL	Outlet Area - Square Feet	2.04	2.86	2.86	2.86	4.38	5.5	6.9	8.67	10.91	13.74
		Number - Diameter (in) - Type	1 - 15 AF	1 - 18 AF	1 - 18 AF	1 - 18 AF	1 - 20 AF	1 - 22 AF	1 - 25 AF	1 - 28 AF	1 - 32 AF	1 - 36 AF
		Shaft and Bearing Size (in)	1 7/16	1 1/2	1 1/2	1 1/2	1 11/16	2	2	2 3/16	2 3/16	2 7/16
COIL FACE SIZE		Inches	34 1/2 x 44 1/8	34 1/2 x 59 1/8	34 1/2 x 74 1/8	34 1/2 x 89 1/8	40 1/2 x 93 1/8	40 1/2 x 116 1/8	52 1/2 x 116 1/4	61 1/2 x 116 1/4	72 x 116 1/4	90 x 116 1/4
		mm	*876 x 1118*	*876 x 1499*	*876 x 1880*	*876 x 2261*	*1029 x 2362*	*1029 x 2953*	*1334 x 2953*	*1562 x 2953*	*1829 x 2953*	*2286 x 2953*
COIL FACE AREA		ft.²	10.5	14.1	17.7	21.3	26.2	32.6	43.6	49.6	58.1	72.6
		m²	*0.975*	*1.3*	*1.64*	*1.97*	*2.43*	*3.02*	*4.05*	*4.6*	*5.39*	*6.74*
FILTER DATA	2" FLAT FILTER SECTION	Number - Size (in)	2 - 16x20x2 2 - 16x25x2	6 - 16x20x2	6 - 16x25x2	4 - 16x20x2 4 - 16x25x2	12 - 16x20x2	12 - 20x20x2	12 - 20x25x2	18 - 20x20x2	12 - 20x25x2 6 - 20x20x2	6 - 20x25x2 18 - 20x20x2
		Filter Area - Square Feet	10	13.3	16.7	20	26.7	33.4	41.6	50.2	58.4	70.6
	4" FLAT FILTER SECTION	Number - Size (in)	2 - 16x20x4 2 - 16x25x4	6 - 16x20x4	6 - 16x25x4	4 - 16x20x4 4 - 16x25x4	12 - 16x20x4	12 - 20x20x4	12 - 20x25x4	18 - 20x20x4	12 - 20x25x4 6 - 20x20x4	6 - 20x25x4 18 - 20x20x4
		Filter Area - Square Feet	10	13.3	16.7	20	26.7	33.4	41.6	50.2	58.4	70.6
	2" ANGULAR FILTER SECTION	Number - Size (in)	N/A	N/A	2 - 16x25x2 6 - 20x25x2	8 - 20x25x2	16 - 16x25x2	12 - 20x25x2	16 - 20x25x2	24 - 20x20x2	24 - 20x25x2	30 - 20x25x2
		Filter Area - Square Feet			26.4	27.8	33.4	41.8	55.5	66.7	83.2	104
	2' COMBINATION ANGULAR FILTER SECTION	Number - Size (in)	6 - 16x25x2	6 - 20x25x2	2 - 16x25x2 6 - 20x25x2	8 - 20x25x2	16 - 16x25x2	12 - 20x25x2	16 - 20x25x2	24 - 20x20x2	24 - 20x25x2	30 - 20x25x2
		Filter Area - Square Feet	16.7	20.9	26.4	27.8	33.4	41.8	55.5	66.7	83.2	104
METAL GAUGES	BLOWER SECTION	Frame	16	16	16	16	16	16	16	16	16	16
		Non Insulated Panels	16	16	16	16	16	16	16	16	16	16
		Insulated Panels	20	20	20	20	20	20	20	20	20	20
		Base	12	12	12	12	12	12	10	10	10	10
	COOLING COIL SECTION	Frame	16	16	16	16	16	16	16	16	16	16
		Non Insulated Panels	16	16	16	16	16	16	16	16	16	16
		Insulated Panels	20	20	20	20	20	20	20	20	20	20
		Base	12	12	12	12	12	12	10	10	10	10
MOTORS	MINIMUM HP		3/4	3/4	3/4	3/4	1	1-1/2	1-1/2	1-1/2	1-1/2	3
	MAXIMUM FRAME SIZE		254T	256T	284T	284T	324T	324T	364T	365T	365T	365T
ELECTRIC DEFROST * KW REQUIREMENTS	ROWS DEEP	4	6.1	7.1	8.6	12.1	13.8	17.3	17.3	19.6	21.9	26.3
		6	6.1	7.1	8.6	12.1	13.8	17.3	17.3	19.6	21.9	26.3
		8	7.1	9.1	11.1	13.6	15.6	21.8	21.8	24.1	28.6	35.3
		10	9.1	11.1	13.6	16.6	19.1	26.3	26.3	30.8	35.3	44.3
HOT GAS DEFROST DRAIN PAN CONNECTIONS			ALL SIZES 1-5/8" (41 mm) O.D. COPPER									

* Defrost heaters rated for 230, 460 or 575 volt operation.

TAP ELECTRIC DEFROST HEATER ELECTRICAL DATA † 60Hz

† Maximum current for each fused heater circuit must not exceed 48 amps (60 amp fuses).

MODEL AP	COIL ROWS DEEP	COIL HEATER QTY	TOTAL WATTS	230V/3/60									460V/3/60						575V/3/60		
				CIRCUIT #1			CIRCUIT #2			CIRCUIT #3			CIRCUIT #1			CIRCUIT #2			CIRCUIT #1		
				AMPS	MCA	MOP	AMPS	MCA	MOP	AMPS	MCA	MOP	AMPS	MCA	MOP	AMPS	MCA	MOP	AMPS	MCA	MOP
108	4,5,6	5	6160	15.7	19.6	20	-	-	-	-	-	-	7.8	9.8	15	-	-	-	6.3	7.8	15
	8	6	7160	19.5	24.4	25	-	-	-	-	-	-	9.8	12.2	15	-	-	-	7.8	9.8	15
	10	8	9160	23.2	29	30	-	-	-	-	-	-	11.6	14.5	15	-	-	-	9.3	11.6	15
111	4,5,6	6	7160	19.5	24.4	25	-	-	-	-	-	-	9.8	12.2	15	-	-	-	7.8	9.8	15
	8	8	9160	23.2	29	30	-	-	-	-	-	-	11.6	14.5	15	-	-	-	9.3	11.6	15
	10	10	11160	30.1	37.7	40	-	-	-	-	-	-	15.1	18.8	20	-	-	-	12	15.1	20
114	4,5,6	6	8660	23.7	29.6	30	-	-	-	-	-	-	11.8	14.8	15	-	-	-	9.5	11.8	15
	8	8	11160	28.2	35.3	40	-	-	-	-	-	-	14.1	17.7	20	-	-	-	11.3	14.1	15
	10	10	13660	37.7	47.1	50	-	-	-	-	-	-	18.8	23.5	25	-	-	-	15.1	18.8	20
117	4,5,6	7	12110	33.9	42.4	45	-	-	-	-	-	-	16.9	21.2	25	-	-	-	13.6	16.9	20
	8	8	13610	34.3	42.9	45	-	-	-	-	-	-	17.2	21.4	25	-	-	-	13.7	17.2	20
	10	10	16610	45.2	56.5	60	-	-	-	-	-	-	22.6	28.2	30	-	-	-	18.1	22.6	25
122	4,5,6	7	13860	39.5	49.4	50	-	-	-	-	-	-	19.8	24.7	25	-	-	-	15.8	19.8	20
	8	9	17360	45.7	57.2	60	-	-	-	-	-	-	22.9	28.6	30	-	-	-	18.3	22.9	25
	10	11	20860	26.4	33	35	26.4	33	35	-	-	-	26.4	33	35	-	-	-	21.1	26.4	30
128	4,5,6	7	17360	23.3	29.1	30	25.9	32.4	35	-	-	-	25.4	31.8	35	-	-	-	20.3	25.4	30
	8	9	21860	31.5	39.4	40	33.9	42.4	45	-	-	-	28.5	35.6	40	-	-	-	22.8	28.5	30
	10	11	26360	33.9	42.4	45	33.9	42.4	45	-	-	-	33.9	42.4	45	-	-	-	27.1	33.9	35
137	4,5,6	7	17360	23.3	29.1	30	25.9	32.4	35	-	-	-	25.4	31.8	35	-	-	-	20.3	25.4	30
	8	9	21860	31.5	39.4	40	33.9	42.4	45	-	-	-	28.5	35.6	40	-	-	-	22.8	28.5	30
	10	11	26360	33.9	42.4	45	33.9	42.4	45	-	-	-	33.9	42.4	45	-	-	-	27.1	33.9	35
141	4,5,6	8	19610	31.5	39.4	40	25.9	32.4	35	-	-	-	25.4	31.8	35	-	-	-	20.3	25.4	30
	8	10	24110	33.9	42.4	45	33.9	42.4	45	-	-	-	33.9	42.4	45	-	-	-	27.1	33.9	35
	10	13	30860	42.6	53.3	60	42.6	53.3	60	-	-	-	42.4	53	60	-	-	-	33.9	42.4	45
150	4,5,6	9	21860	31.5	39.4	40	33.9	42.4	45	-	-	-	28.5	35.6	40	-	-	-	22.8	28.5	30
	8	12	28610	42.6	53.3	60	33.9	42.4	45	-	-	-	37	46.2	50	-	-	-	29.6	37	40
	10	15	35360	33.9	42.4	45	33.9	42.4	45	33.9	42.4	45	46.7	58.3	60	-	-	-	37.3	46.7	50
164	4,5,6	11	26360	33.9	42.4	45	33.9	42.4	45	-	-	-	33.9	42.4	45	-	-	-	27.1	33.9	35
	8	15	35360	33.9	42.4	45	33.9	42.4	45	33.9	42.4	45	46.7	58.3	60	-	-	-	37.3	46.7	50
	10	19	44360	42.6	53.3	60	42.6	53.3	60	33.9	42.4	45	28.5	35.6	40	29.8	37.2	40	46.5	58.1	60

FAN MOTOR LOCATIONS

TOP VIEWS

MOTOR LOCATIONS M1 & M2
FOR MODELS 108 through 128 ONLY

MOTOR LOCATIONS M3 & M4
FOR MODELS 137 through 164 ONLY

LOCATIONS ARE TYPICAL FOR ALL
AIR FLOW CONFIGURATIONS

MOTOR CONSTRUCTION ARRANGEMENT

M1 LOCATION, - F1
M2 LOCATION, - F2
M3 LOCATION, - F1
M4 LOCATION, - F2

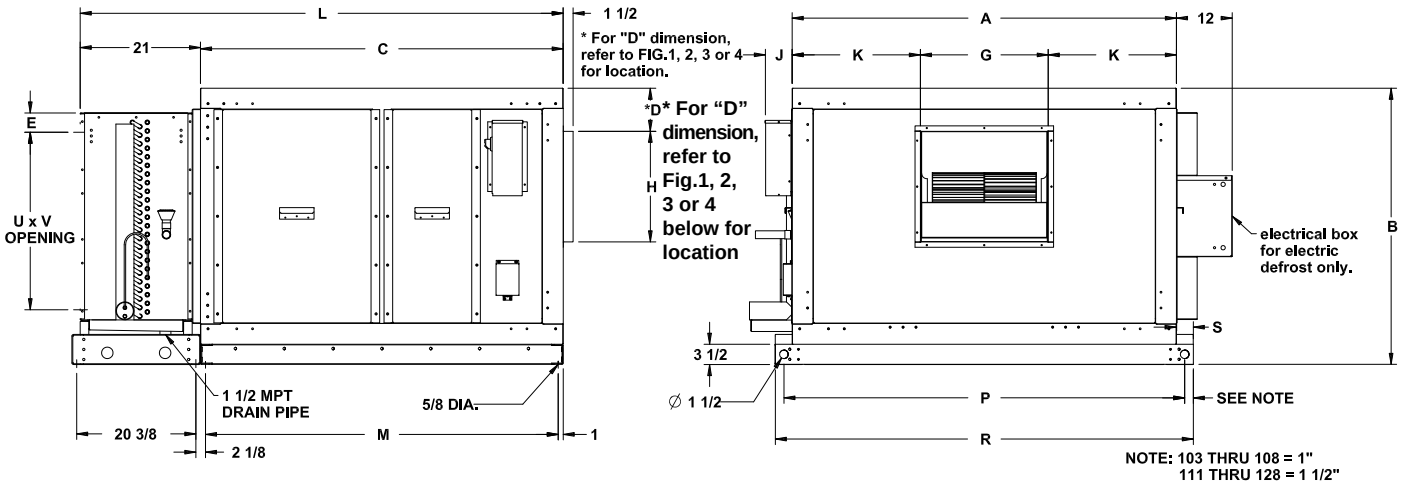
SEE MOTOR PART NUMBERS IN ELECTRICAL DATA TABLES

DRIVE INSTALLATION

A. All motors are mounted on a heavy duty slide base located inside the cabinet.
B. Drives are pre-set for desired RPM.
C. Belt tension is factory set.

DIMENSIONAL DATA

Models 108-128



DIMENSIONS - IMPERIAL (inches)

UNIT SIZE	A	B	C	FIG. #1 D	FIG. #2 D	FIG. #3/4 D	E	G	H	J	K	L	M	P	R	S	U	V
108	51 7/8	48	53 9/16	12 1/4	19 7/8	6 3/16	1 1/2	19	16 1/4	4 3/4	16 7/16	74 9/16	51 9/16	55 3/8	57 3/8	2 3/4	33 1/8	44 1/8
111	66 7/8	48	63 1/8	7 1/2	17 1/8	7 1/4	1 1/2	22 1/4	19 1/4	4 3/4	22 5/16	84 1/8	61 1/8	69 3/4	72 3/4	2 15/16	33 1/8	59 1/8
114	81 7/8	48	63 1/8	7 1/2	17 1/8	7 1/2	1 1/2	22 1/4	19 1/4	4 3/4	29 13/16	84 1/8	61 1/8	84 3/4	87 3/4	2 15/16	33 1/8	74 1/8
117	96 7/8	48	63 1/8	6 7/8	16 1/2	7 1/8	1 1/2	22 1/4	19 1/4	4 3/4	37 5/16	84 1/8	61 1/8	99 3/4	102 3/4	2 15/16	33 1/8	89 1/8
122	100 7/8	54	69 1/8	6 1/2	17 1/2	6 1/2	2 1/2	25 3/8	25 3/8	4 3/4	37 3/4	90 1/8	67 1/8	103 3/4	106 3/4	2 15/16	39 1/8	93 1/8
128	123 7/8	57	73 1/8	5 1/4	17	6 3/4	2 1/2	28 1/4	28 1/4	4 3/4	47 13/16	94 1/8	71 1/8	126 3/4	129 3/4	2 15/16	39 1/8	116 1/4

NOTE: All dimensions are approximate. Certified drawings available on request.

* NOTE: "D" DIMENSION VARIES BASED ON AIRFLOW CONFIGURATION

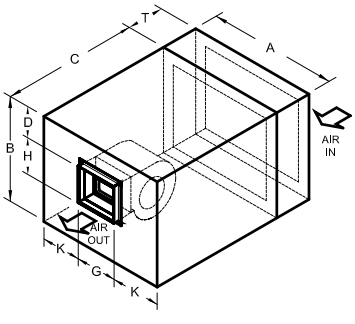


FIG. #1

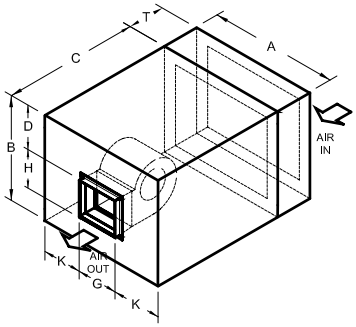


FIG. #2

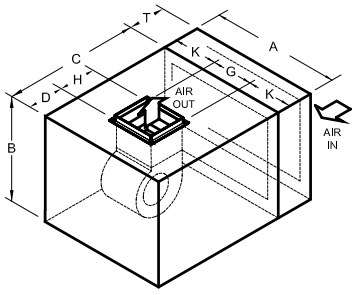


FIG. #3

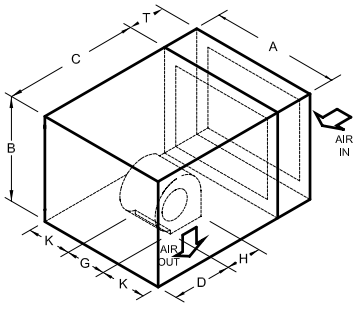
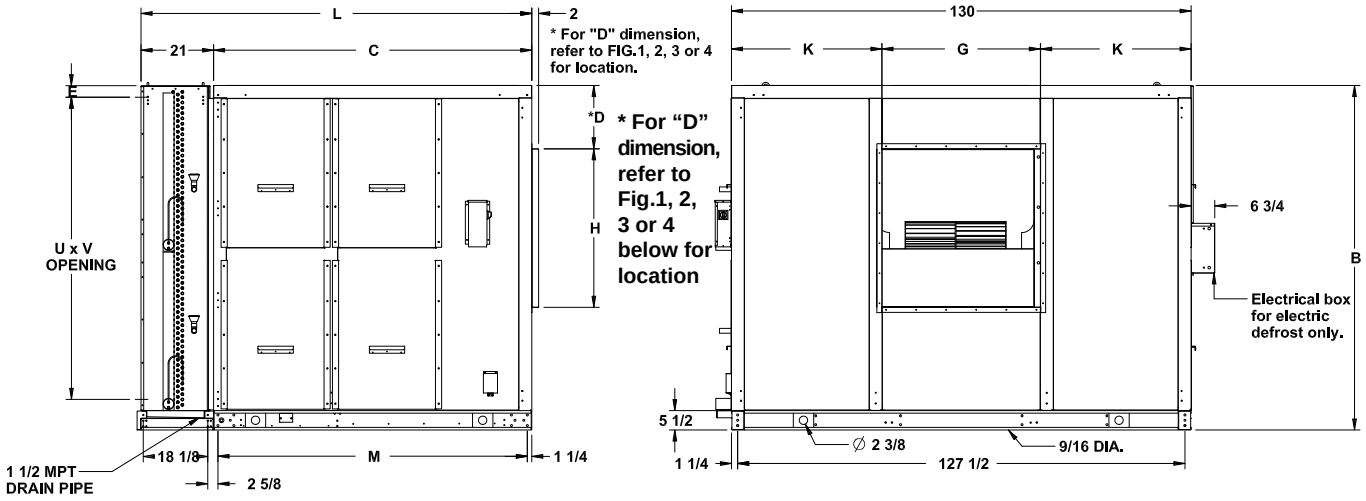


FIG. #4

DIMENSIONAL DATA (cont'd)

Models 137 - 164



DIMENSIONS - IMPERIAL (inches)

UNIT SIZE	A	B	C	FIG. #1 D	FIG. #2 D	FIG. #3/4 D	E	G	H	J	K	L	M	U	V
137	130	61 1/2	70	5 3/4	17 7/8	15 7/8	2 1/2	31 3/4	31 3/4	4 3/4	49 1/8	91	67 1/2	51 7/8	116 1/4
141	130	70 1/2	75	6	20 1/4	17 7/8	2 1/2	35 5/8	35 5/8	4 3/4	47 3/16	96	72 1/2	60 1/8	116 1/4
150	130	79 1/2	82	10 1/4	27 7/8	19 3/4	1 3/4	40	40	4 3/4	45	103	79 1/2	70 5/8	116 1/4
164	130	97 1/2	90	21 1/4	40 7/8	23 1/4	1 3/4	44 3/4	44 3/4	5 3/4	42 5/8	111	87 1/2	88 5/8	116 1/4

NOTE: All dimensions are approximate. Certified drawings available on request.

* NOTE: "D" DIMENSION VARIES BASED ON AIRFLOW CONFIGURATION

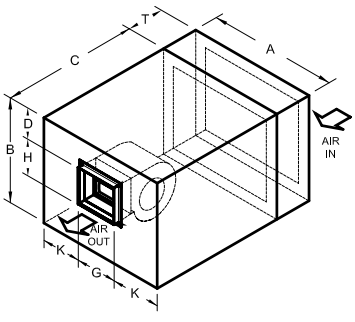


FIG. #1

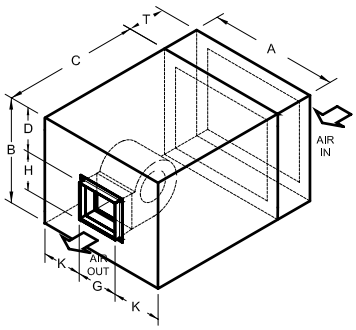


FIG. #2

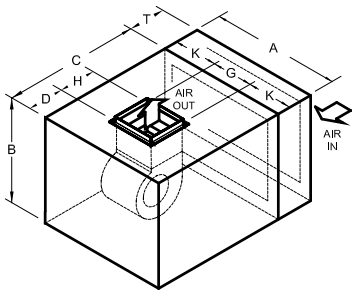


FIG. #3

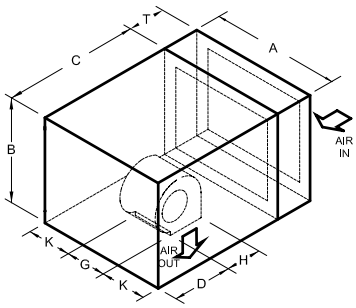
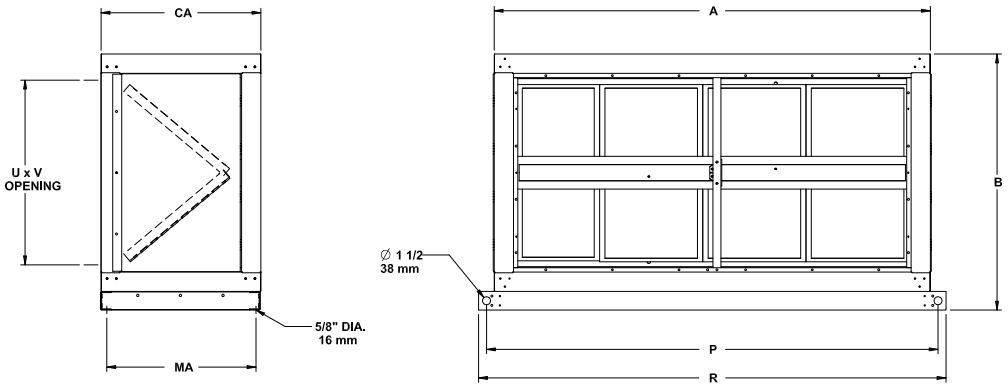


FIG. #4

DIMENSIONAL DATA - ANGULAR FILTER SECTIONS

Note: Optional Duct Extension Flanges (1-1/2) available.



Note:
Models 114 through 128 have 12GA. “C” rails extended as shown.
Curb mount capability.
See Mounting Hole Locations on Page 18

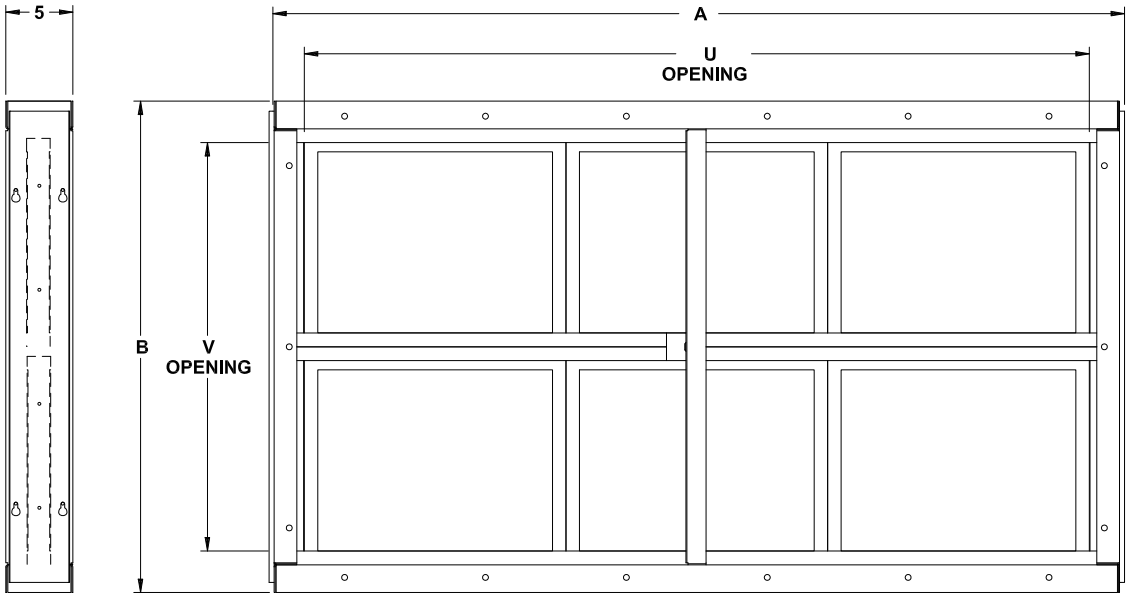
Note:
Models 137 through 164 have 10GA frame structure flush with cabinet.

DIMENSIONS - IMPERIAL (inches)

UNIT SIZE	STANDARD WIDTH			STANDARD HEIGHT	ANGULAR FILTER LENGTH		INLET OPENING	
	A	P	R	B	CA	MA	U	V
114	81 7/8	84 3/4	87 3/4	48	30	28	35 11/16	73
117	96 7/8	99 3/4	102 3/4	48	30	28	35 11/16	88
122	100 7/8	103 3/4	106 3/4	54	30	28	41 11/16	90 1/2
128	123 7/8	126 3/4	129 3/4	57	30	28	44 11/16	115
137	130	-	130	61 1/2	30	28	55 3/4	121 1/8
141	130	-	130	76 1/8	30	28	61 3/4	121 1/8
150	130	-	130	79 1/4	30	28	74	121 1/8
164	130	-	130	97 1/2	35	33	86 1/2	121 1/8

NOTE: All dimensions are approximate. Certified drawings available on request.

DIMENSIONAL DATA - FLAT FILTER BOLT-ON



*** AVAILABLE WITH 2” FILTERS ONLY**

DIMENSIONS - IMPERIAL (inches)

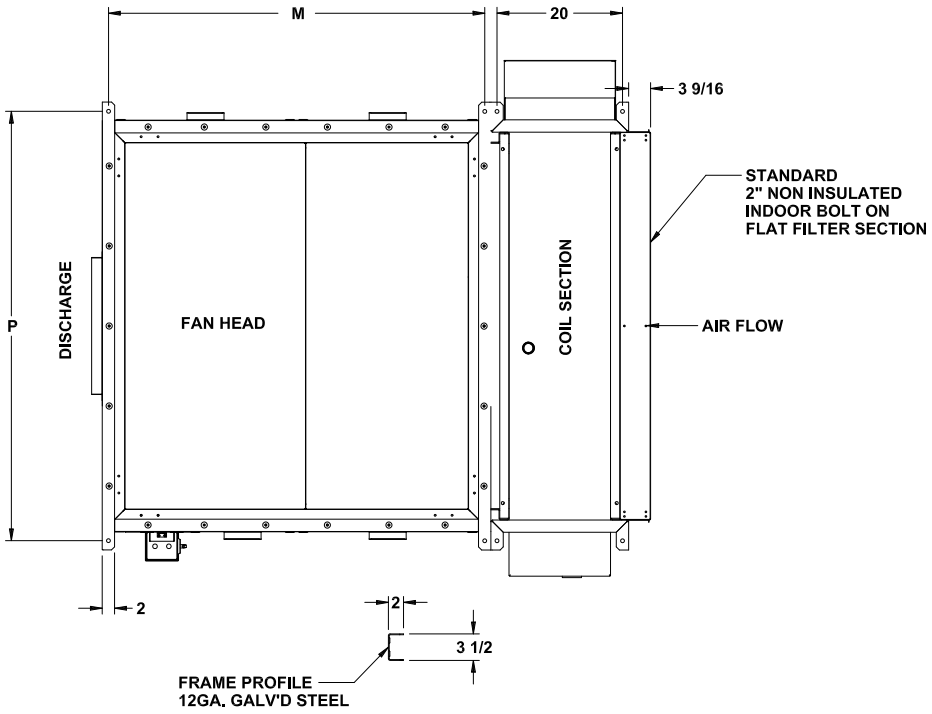
UNIT SIZE	A	B	INLET OPENING	
			U	V
108	48	36 5/8	44 5/8	32 1/2
111	63	36 5/8	59 5/8	32 1/2
114	78	36 5/8	74 5/8	32 1/2
117	93	36 5/8	89 5/8	32 1/2
122	97	43 5/8	93 5/8	40 1/8
128	120	43 5/8	116 5/8	40 1/8
137	119 3/8	55 1/8	116 5/8	50 1/8
141	119 3/8	63 3/8	116 5/8	60 1/8
150	119 3/8	73 1/8	116 5/8	70 1/8
164	119 3/8	91 1/8	116 5/8	85 1/4

NOTE: All dimensions are approximate. Certified drawings available on request.

DIMENSIONAL DATA - MOUNTING HOLES

MODELS 108 - 128

BOTTOM VIEW



DIMENSIONS - IMPERIAL (inches)

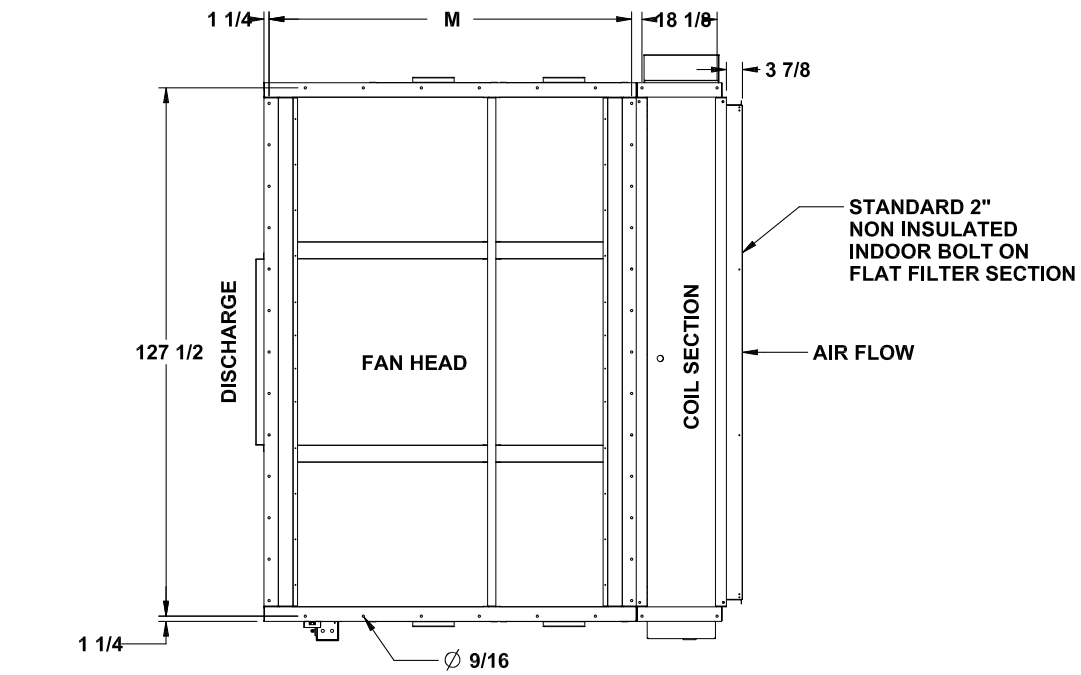
MODEL	STANDARD WIDTH	FAN HEAD
	P	M
108	55 3/8	51 9/16
111	69 3/4	61 1/8
114	81 3/4	61 1/8
117	99 3/4	61 1/8
122	103 3/4	67 1/8
128	126 3/4	71 1/8

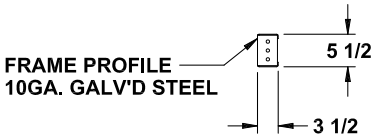
NOTE: All dimensions are approximate.
Certified drawings available on request.

DIMENSIONAL DATA - MOUNTING HOLES

MODELS 137 - 164

BOTTOM VIEW





DIMENSIONS - IMPERIAL (inches)

MODEL	FAN HEAD
	M
137	67 1/2
141	72 1/2
150	79 1/2
164	87 1/2

NOTE: All dimensions are approximate.
Certified drawings available on request.

GENERAL

Furnish and install where shown on plans, Type AP Product Coolers. Sizes and performance shall be as indicated in the Unit Schedule. Each unit shall be complete with factory furnished components as shown on the plans.
Cabinets shall be of sectionalized construction, and all sheet metal parts including accessories shall be fabricated of continuous galvanized steel. The casing panels shall be removable for easy access to the interior of the unit. Care should be taken to ensure that sufficient access is available for servicing the unit.
All cooling coils shall be arranged within the coil section in a vertical position with the air passing horizontally through the coil to insure quick removal of the condensate from the coil surface. All product coolers must be installed level to ensure proper drainage of water from the pre-engineered drain pan.

FAN ASSEMBLY

Fans shall be forward curved and designed for Class II operation. Fan ratings shall be based on fan tests conducted in accordance with AMCA Code No. 210. Fan housings and wheels shall be continuous galvanized steel. All fan wheels shall be keyed to the fan shaft.

BEARINGS AND FAN SHAFT

The fan shaft shall be solid high carbon steel, fully sized throughout. The maximum rated fan RPM shall be well below the first critical fan shaft speed.
Bearing shall be self-aligning, grease lubricated, ball type (9-9 T2 through 28-28 T2) in pillow block cast iron housings, roller type (32-32 T2 through 40-40 T2) in pillow block split cast iron housings . Lubrication fittings shall be provided, and permanently lubricated bearings will be unacceptable.

COILS - GENERAL

Coils shall be constructed with 5/8" O.D. and or 1/2 " O.D. copper tubes and (aluminum) (copper) rippled-corrugated fins spaced (8) (10) (12) per inch. Tubes shall be arranged in a staggered tube pattern with respect to air flow. Fins shall have full drawn collars to provide a continuous secondary surface cover over the entire tube length.
Tubes shall be expanded into fins to provide a continuous primary to secondary compression contact over the entire finned length.
Coil casing shall be of continuous galvanized steel. Coil face velocity shall be as indicated on the unit schedule. The rows of coil shall be as required to produce the capacities as indicated in the performance schedule. All water coils shall be circulated to obtain optimum tube water velocity. No devices shall be used inside the coil tubes which interfere with the drainability or increase water pressure drop. Depending on applications, coils shall be tested with 300, 450 or 650 PSIG air under water.

DIRECT EXPANSION COILS

Cooling coils are designed for use with most common refrigerants. Sweat type copper suction connections shall be located at the bottom of the suction headers for gravity oil drainage. (Coils shall be circuited for (face control) (row control) capacity reduction.) Pressure type liquid distributors shall be used.

CHILLED WATER COILS

Cooling coils shall be designed for use with chilled water. With a vent connection at the highest point, and a drain connection at the lowest point. Headers shall be fabricated of copper tubes, and the connections shall be male pipe threaded with protective caps.

DEFROSTING

Product Coolers are obtainable with electric or hot gas defrost systems. On hot gas defrost units, the distributor on the evaporator coil is equipped with a side port connection to facilitate a hot gas connection.

A liquid line solenoid valve (supplied by others) should be used so that evaporator coil may be pumped out before each defrost cycle.

The following defrost control (supplied by others) methods may be used with Product Coolers.

(1) TIME INITIATED- TEMPERATURE TERMINATED

When using a time initiated - temperature terminated method of defrosting a Paragon Timer 8145-20 or equal is recommended for this application. Timer is used in conjunction with a defrost termination thermostat. For 3 phase applications, the timer must be used with a contactor. As well as the defrost termination thermostat, the timer will also have a fail safe feature built into unit.

The defrost termination thermostat should be set at approx. 35°F *(1.6°C)* and should be adjustable. Differential should be 5°F *(2.8°C)* or less. Bulb should be attached to a tube of the evaporator. As a part of this system, a fan delay thermostat should be used to provide a delay period between the end of the defrost and the start-up of the fan. The fan delay thermostat should be adjustable and set at 10-25°F *(5.6 - 13.9°C)* (depending on application) and bulb should be attached to evaporator tube. When installing thermostats, care should be taken to ensure that bulbs are not attached to evaporator heater tubes.

(2) TIME CONTROLLED OPERATION

Defrosting may also be carried out by a time controlled sequence. This system utilizes a timer and fan delay thermostat. Timer should have an adjustable length of defrost from 2-110 minutes and should be Paragon 8045-20 or equal. Fan delay thermostat should be as indicated in (1) above.

Initially, 4-30 minute defrost per day are recommended. However, it is important that the coil be completely cleared of defrost at the end of the cycle. Should coil not be cleared of all frost at the end of 30 minutes, more frequent defrost of shorter duration should be used.

WIRING

For suggested wiring of defrost heaters see Dwg. No. 1099000 & 1099001 furnished with the product cooler.

FILTER SECTION

Furnish factory built (flat) (angular) filter section complete with filters as specified herein. The filter area shall be as specified on the Unit Schedule. (Flat and Angular filter sections shall have access doors on both ends.)

FILTERS

Filters shall be (throwaway) (permanent) (permanent high velocity) type.

INSTALLATION & ASSEMBLY INSTRUCTIONS

GENERAL

A. The items should be carefully checked against the bills of lading to be sure all crates and cartons have been received. All units should be carefully inspected for damage when received. Visible or concealed damage should be reported immediately to the carrier and a claim filed for damage.

B. Air Handler units are constructed of heavy gauge galvanized steel and are thoroughly inspected before leaving the plant. Care must be taken during installation to prevent damage to units.

C. In order to insure long and trouble-free life, the units should have proper care and maintenance. Enough space should be left around the unit for filter removal, lubrication, and removal of coils if this should become necessary.

D. Flexible connections should be used on the outlet connections and oil inlet duct connections of' the unit.

E. Special care should be taken when handling the blower section. All fans are dynamically balanced before leaving the plant. Rough handling, however, can cause misalignment of the drives. Sheaves should be carefully inspected before unit installation to make sure this has not happened.

F. Screws, bolts, etc., for assembly of sections are supplied in a cloth bag attached to each section. Gasketing to be used between sections, when assembling, is supplied in rolls in the unit.

G. Drain line from drain pan connection must be adequately pitched and must have a “water seal.”

Some units are shipped in sections and must be assembled on the job.

A. HANDLING OF SECTIONS:

1. Lifting / Isolator rails are supplied for bottom lifting only. Models 108 thru 128.
2. Lifting rails are supplied with 5/8” dia. Holes, suitable for ½” rod.
3. If units are to be moved using just one hoist, a spreader bar should be used to prevent damage to the unit.
4. Models 137 thru 164 come with lifting gussets located in the base frame. Fig.6

B. GASKETING:

The gasketing is supplied with each section that has to be assembled on the job.

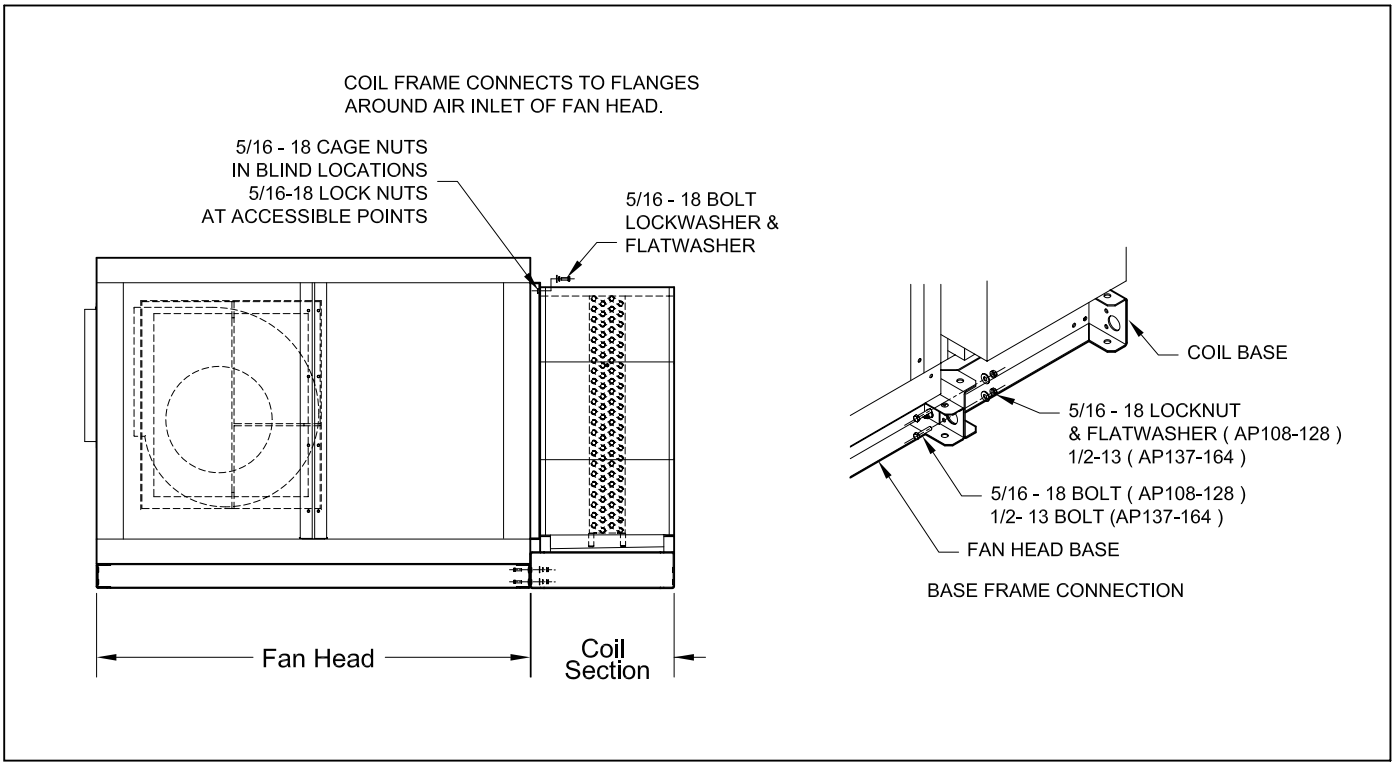
1. Gasket the perimeter of the section when necessary. Join ends tight to avoid air leakage. Fig. 2 & 3

C. FASTENING OF SECTIONS:

1. Figure 1 shows the typical attaching method used for fan head and heating and ventilating coil sections.
   a. Gasket the perimeter of the coil section flange as outlined in “Gasketing”. Fig. 2 & 3
   b. Align the sections using the mounting brackets a shown in Fig.1.
   c. Bolt the base frame as shown in Fig.1.

Figure 1

TYPICAL ATTACHING METHOD



GENERAL (cont'd)

D. MOUNTING OF SECTION

1. All models are to be moved into position using the bottom lifting rails (108 thru 128) or the base frame (137 thru 164). No units are to be lifted from the top.
2. When crane lifting, proper spreader bars should be used to avoid damage to the cabinet material. See Fig.4, 5, & 6.

Figure 2
BLOWER SECTION to COIL and ACCESSORY SECTIONS Models AP108 - 128

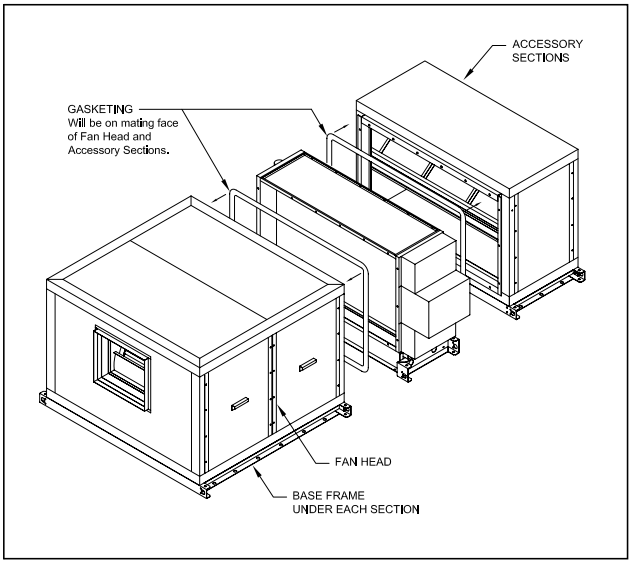
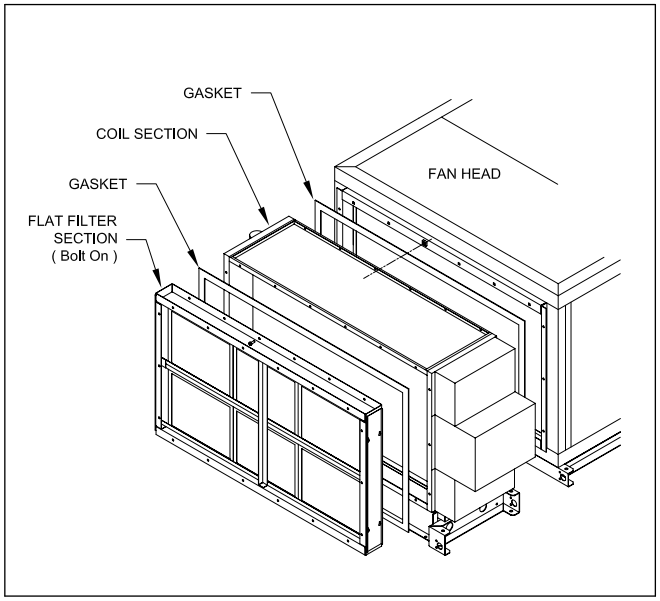


Figure 3
ANGULAR FILTER (Bolt-On Style) to COIL or ACCESSORY SECTIONS - ALL MODELS



LOCATING AND INSTALLATION HINTS
IMPORTANT: Product Coolers AP137, AP141, AP150 and AP164 MUST be platform or floor mounted.

Product Coolers may be placed in any suitable manner in the room. However, low temperature units should not be located over entrance doors, because of the heavy frosting that will occur on the coils.

All Product Coolers must be installed level to ensure proper drainage of water from the pre-engineered drain pan.

Drain lines for all Product Cooler Models should be pitched 45° and should be as short as possible. To prevent drain line freezing problems the following recommendations should be carried out:

(a) Use a drain line heater (supplied by others) with a density of 20 watts per foot. Six to eight feet of cable per foot of drain line is recommended.
(b) Drain line heater should make at least a full turn round the outlet of the drain pan.
(c) The heated drain line should be insulated.
(d) The drain line should be provided with a trap (Fig.8 – pg.23) outside the freezer room. Traps should be filled with water before initial start-up.

WIRING

For suggested wiring of defrost heaters see Dwg. No. 46042 & 46043 furnished with the product cooler.

DRIVE INSTALLATION

A. All motors are mounted on a heavy duty slide base located inside the cabinet.
B. Drives are pre-set for desired RPM.
C. Belt tension is factory set.

UNIT INSTALLATION

A. Units 108 thru 128 come complete with lifting rails with 5/8" dia. mounting holes. Lifting rails are also designed to mount to roof curbs supplied by others. Lifting rails also allow for ceiling suspension with isolators – holes to allow 1/2 rod.
B. Units 137 thru 164 come complete with 5-1/2" "C" channel designed for bottom mounting only.

IMPORTANT
Models TAP137 through 164 are suitable for bottom mounting only. In order to suspend equipment from the ceiling, a field installed supporting structure must be provided

LIFTING INSTRUCTIONS

Air handling units and associated sections are large, heavy, mechanical equipment and must be handled as such. A fully qualified and properly crew with necessary rigging should be engaged to set the components into position. Lifting holes have been provided along base frames for attaching lifting slings.
Spreader bars must be used so that lifting forces are applied vertically.

Note:
- Coil sections, if shipped separately, will have base frames installed.
- Lifting lugs are provided on unit base rails
- Ensure that unit top side is stabilized to prevent tipping when lifting sections into place.
- Under no circumstances should coil connections, drains or weather covers be used for lifting.
- Base frames must be securely anchored to the building structure, sleeper, roof curb or concrete pad.
- the weight of the air handling unit and accessory sections alone is not enough to hold in place

Figure 4

FAN HEAD and ASSEMBLED SECTIONS - Models AP108 - 164

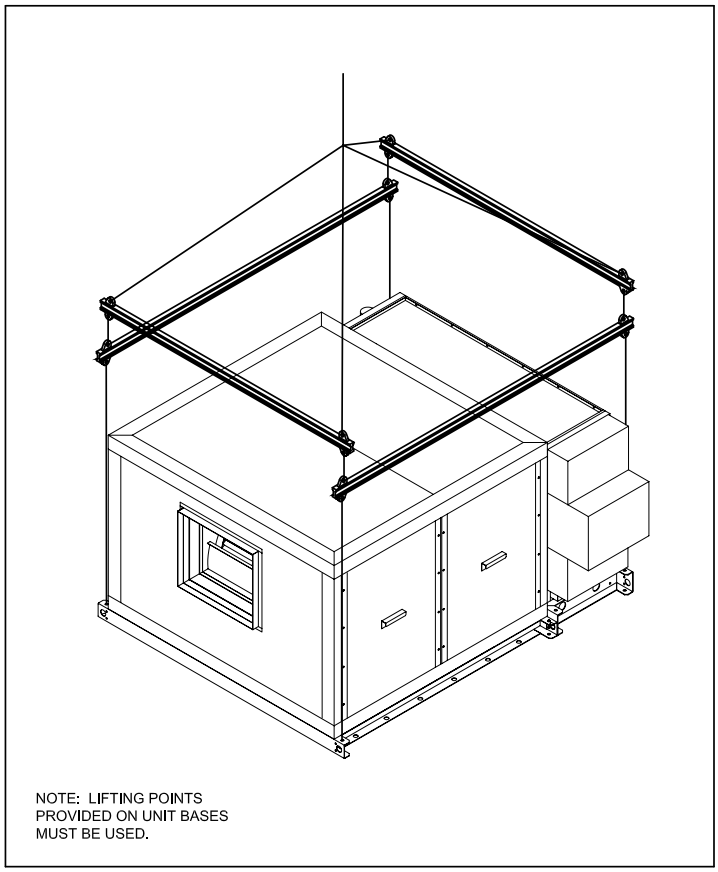


Figure 5

COILS MAY BE SHIPPED SEPARATELY

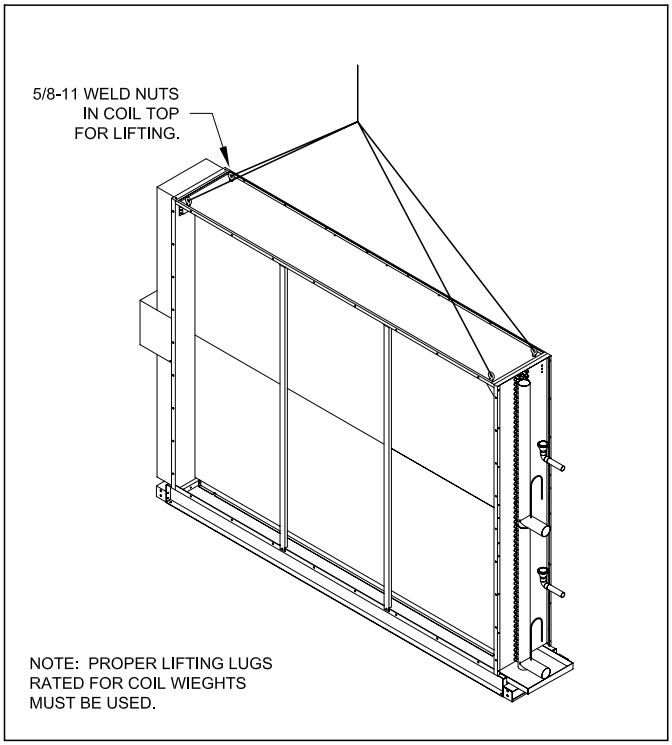
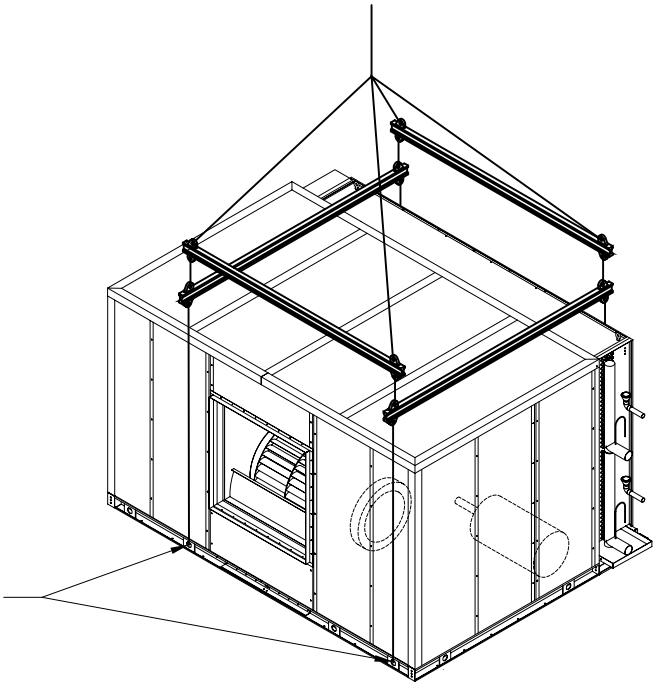


Figure 6
FAN HEAD and ASSEMBLED SECTIONS
Models AP137H - 164H



On models 137 through 164, motor and drive sizes can greatly off-set the unit centre of gravity. Welded lugs are positioned in base channels to provide available points for lifting units vertcally.

Care must be taked to locate motor postion in unit before determining appropriate lifting points.

FIELD INSTALLATION OR REMOVAL OF COILS

In all cases, the end panel of the coil section is removable. You should have access to both ends of the unit for ease of installation and proper positioning of coil. In all cases, sections or duct work must be disconnected and removed to allow access of coil close- off hardware. The procedure outlined, is for installation of coils. To remove coils, reverse the procedure.

1. Cooling Coils
   Models AP 108-164, Fig. 13
   a. Attach coil end plate holes to bottom coil brackets in drain pan .
   b. Re-attach coil section if necessary.
   c. Install piping and drain tube. See Fig.8 for proper P-Trap dimension reference.

2. Locate dimensionally the supply and return connections and drill holes in end panels of unit. Holes should be located very carefully.

3. Attach end panels to unit and slip grommets over connections to prevent air leakage.

Figure 7
AP COOLING COILS

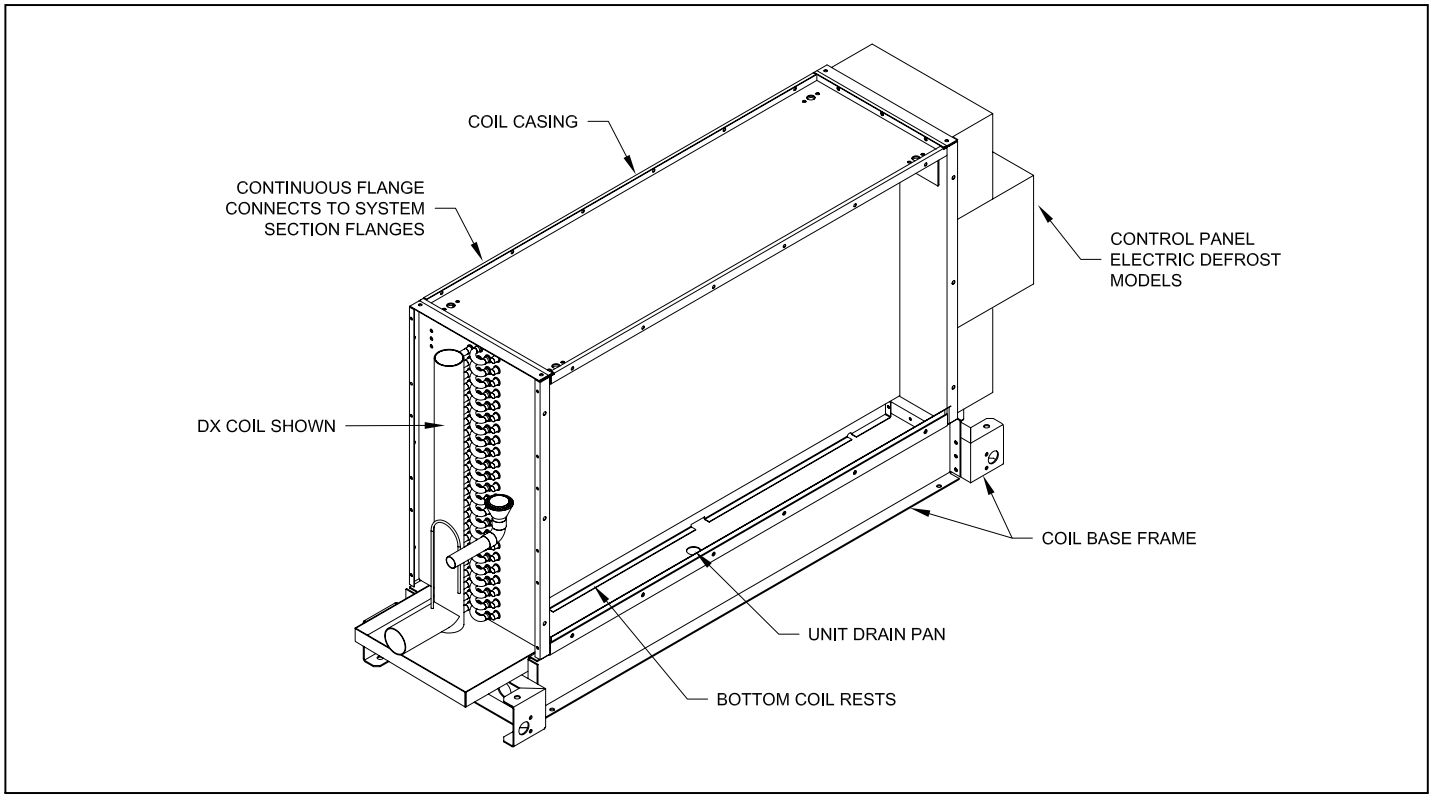
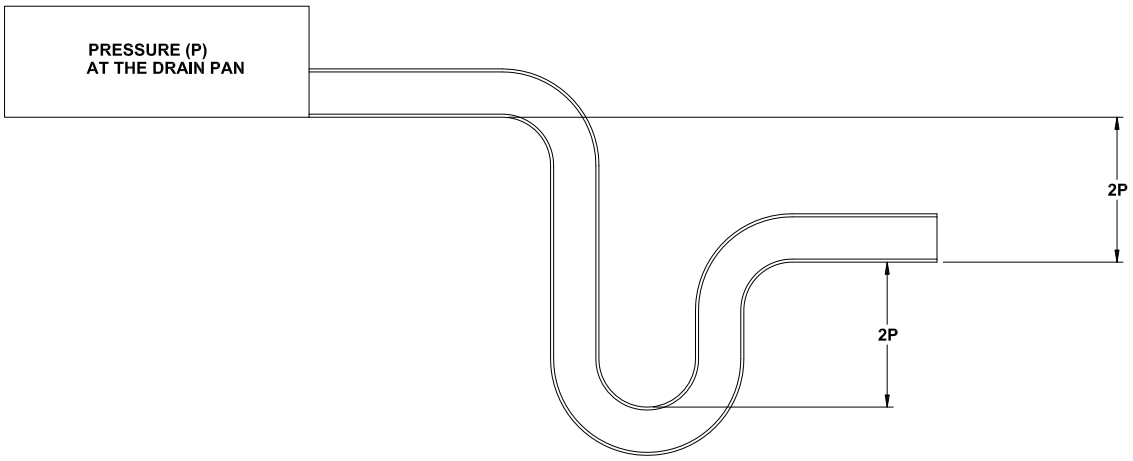


Figure 8
DRAIN PAN TRAPS



Allow adequate distance between trap outlet and drain pan outlet

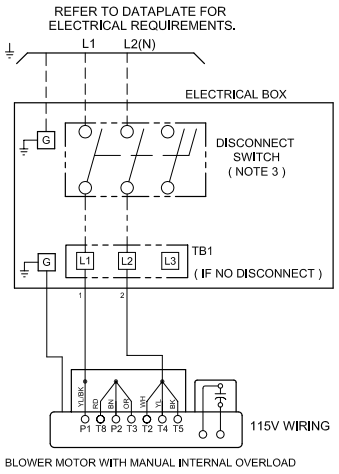
DRAIN PAN TRAPS

Run drain lines full size from the drain pan connection. Install drain pan trap to allow condensate to drain freely. The trap depth and the distance between the trap outlet and the drain pan outlet must be twice the static pressure in the drain pan section under normal operation so the trap remains sealed.

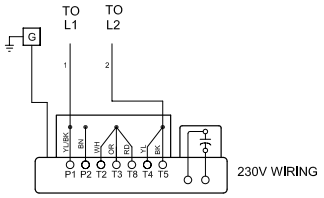
TYPICAL WIRING DIAGRAM - MOTORS - ALL MODELS

TYPICAL AIR HANDLING UNIT WIRING DIAGRAMS - 1800 RPM

115 / 230 VOLT, 1 PHASE (1/3 TO 2 HP)



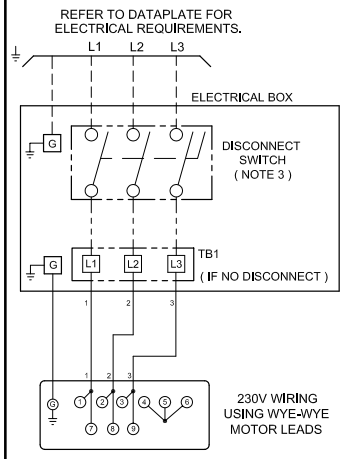
BLOWER MOTOR WITH MANUAL INTERNAL OVERLOAD



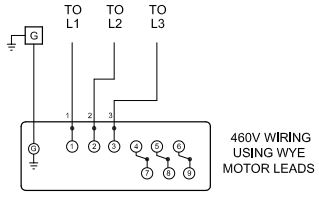
BLOWER MOTOR WITH MANUAL INTERNAL OVERLOAD

ROTATION "CW-OPE" TO REVERSE EITHER VOLTAGE INTERCHANGE RED & BLACK LEADS

230 / 460 VOLT, 3 PHASE (9 LEAD MOTOR - 1/3 TO 5 HP)



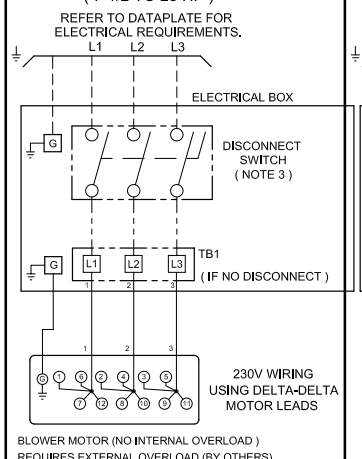
BLOWER MOTOR (NO INTERNAL OVERLOAD) REQUIRES EXTERNAL OVERLOAD (BY OTHERS)



BLOWER MOTOR (NO INTERNAL OVERLOAD) REQUIRES EXTERNAL OVERLOAD (BY OTHERS)

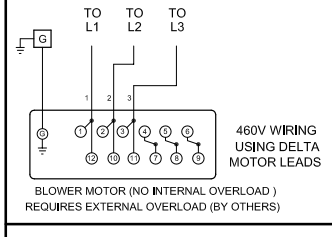
230 / 460 VOLT, 3 PHASE (12 LEAD MOTOR - 3 WIRE)

(7-1/2 TO 25 HP)



BLOWER MOTOR (NO INTERNAL OVERLOAD) REQUIRES EXTERNAL OVERLOAD (BY OTHERS)

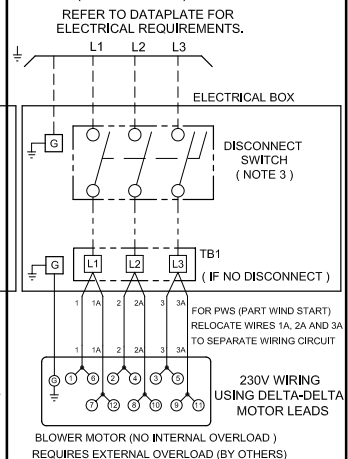
(7-1/2 TO 60 HP)



BLOWER MOTOR (NO INTERNAL OVERLOAD) REQUIRES EXTERNAL OVERLOAD (BY OTHERS)

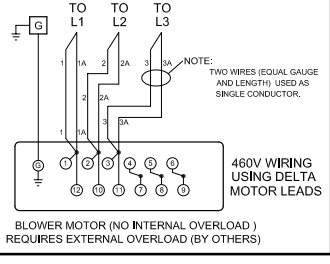
230 / 460 VOLT, 3 PHASE (12 LEAD MOTOR - 6 WIRE)

(30 TO 60 HP)



BLOWER MOTOR (NO INTERNAL OVERLOAD) REQUIRES EXTERNAL OVERLOAD (BY OTHERS)

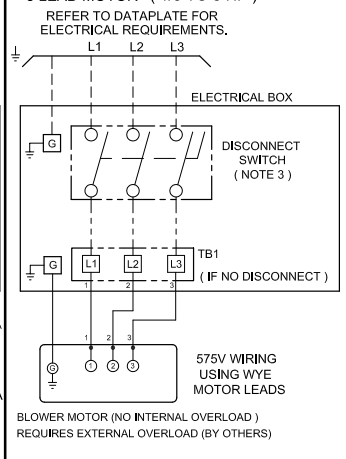
(75 & 100 HP)



BLOWER MOTOR (NO INTERNAL OVERLOAD) REQUIRES EXTERNAL OVERLOAD (BY OTHERS)

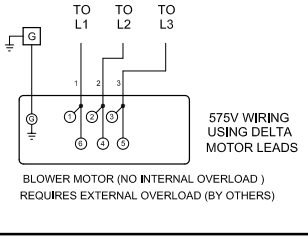
575 VOLT, 3 PHASE

3 LEAD MOTOR (1/3 TO 5 HP)



BLOWER MOTOR (NO INTERNAL OVERLOAD) REQUIRES EXTERNAL OVERLOAD (BY OTHERS)

6 LEAD MOTOR (7-1/2 TO 100 HP)



BLOWER MOTOR (NO INTERNAL OVERLOAD) REQUIRES EXTERNAL OVERLOAD (BY OTHERS)

1. USE COPPER CONDUCTORS ONLY
2. USE 75°C WIRE (OR HIGHER)
3. OPTIONAL COMPONENTS -FACTORY OR INSTALLED BY OTHERS

4. CONDUCTORS / WIRNG
   - ———— FACTORY WIRING
   - —— —— WIRING BY OTHERS
   - — — — OPTIONAL COMPONENT FACTORY WIRING

BK=BLACK RD=RED YL=YELLOW
WH=WHITE BL=BLUE BN=BROWN
YL/BK=YELLOW WITH BLACK STRIPE
OR=ORANGE GR=GRAY

5. ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.

REVISIONS		DIAGRAM NUMBER
DATE	LTR	1099106-TYPICAL
-	-	
-	-	MAR. 28/14

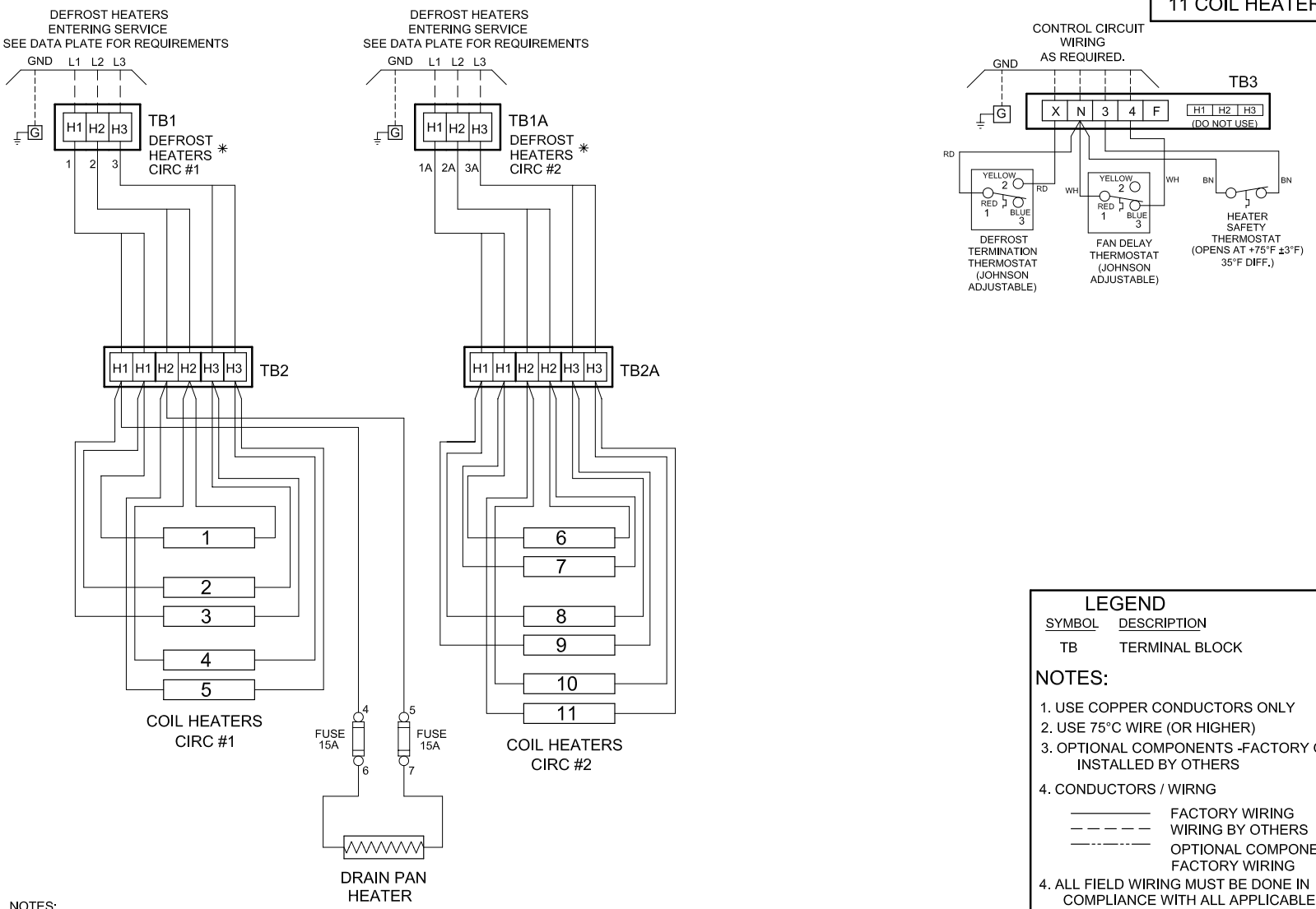
ALL 1 PHASE MOTORS c/w MANUAL THERMAL OVERLOAD

ALL 3 PHASE MOTORS ARE NOT INTERNALLY OVERLOAD PROTECTED. EXTERNAL MOTOR OVERLOAD MUST BE PROVIDED.

TYPICAL WIRING DIAGRAM - ELECTRIC DEFROST - 208-230/3/60

WIRING DIAGRAM: AP PRODUCT COOLER, ELECTRIC DEFROST COIL SECTION: 208-230V/3/60

11 COIL HEATERS



NOTES:

✳ MAXIMUM ALLOWABLE HEATER FUSE MUST NOT EXCEED 60 AMPS.

IF TOTAL HEATER AMPS EXCEEDS 48 AMPS THEN ADDITIONAL HEATER CIRCUIT (TB1A / TB1B) IS REQUIRED

LEGEND

SYMBOL	DESCRIPTION
TB	TERMINAL BLOCK

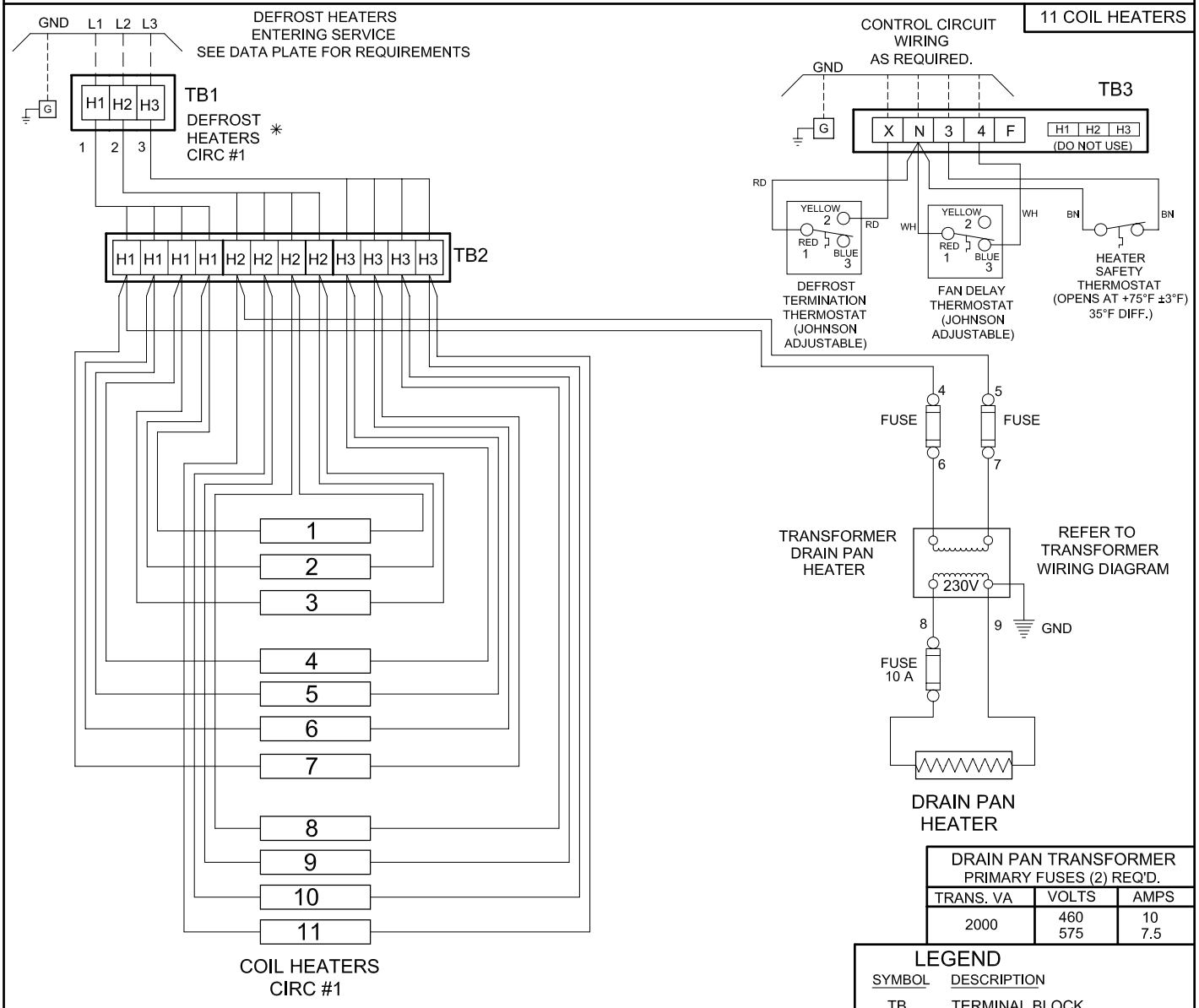
NOTES:

1. USE COPPER CONDUCTORS ONLY
2. USE 75°C WIRE (OR HIGHER)
3. OPTIONAL COMPONENTS -FACTORY OR INSTALLED BY OTHERS
4. CONDUCTORS / WIRNG
   - ———— FACTORY WIRING
   - – – – – – WIRING BY OTHERS
   - —·—·— OPTIONAL COMPONENT FACTORY WIRING
4. ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.

	REVISIONS				DIAGRAM NUMBER
	DESCRIPTION	BY	DATE	LTR	
DATE: APRIL 1/14					1099000-111-2
DRW. BY: T.B.					

TYPICAL WIRING DIAGRAM - ELECTRIC DEFROST - 460-575/3/60

WIRING DIAGRAM: AP PRODUCT COOLER, ELECTRIC DEFROST COIL SECTION: 460V/3/60 - 575V/3/60



DRAIN PAN TRANSFORMER PRIMARY FUSES (2) REQ'D.		
TRANS. VA	VOLTS	AMPS
2000	460 575	10 7.5

LEGEND

SYMBOL	DESCRIPTION
TB	TERMINAL BLOCK

NOTES:

1. USE COPPER CONDUCTORS ONLY
2. USE 75°C WIRE (OR HIGHER)
3. OPTIONAL COMPONENTS -FACTORY OR INSTALLED BY OTHERS
4. CONDUCTORS / WIRNG
   - ———— FACTORY WIRING
   - – — – — – WIRING BY OTHERS
   - —·—·— OPTIONAL COMPONENT FACTORY WIRING
4. ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.

NOTES:
✳ MAXIMUM ALLOWABLE HEATER FUSE MUST NOT EXCEED 60 AMPS. IF TOTAL HEATER AMPS EXCEEDS 48 AMPS THEN ADDITIONAL HEATER CIRCUIT (TB1A) IS REQUIRED

	REVISIONS				DIAGRAM NUMBER
	DESCRIPTION	BY	DATE	LTR	
DATE: APRIL 1/14					1099001-111
DRW. BY: T.B.					

TAP

ELECTRICAL DATA - 3 Phase / 1-30 HP Models

60Hz

230/460 Volt Models - Motor: Nema Epact Efficiency NEMA 12-11 3 phase TEFC (1800 RPM) Service Factor = 1.15

HP	RPM	FRAME	F1 Part #	F2 Part #	230V					460V					BORE DIA.
					FLA	LRA	MCA	* MOP	DISCONNECT SWITCH SIZE AMPS	FLA	LRA	MCA	* MOP	DISCONNECT SWITCH SIZE AMPS	
1	1740	143T	1093600-1-TRI-F1	1093600-1-TRI-F2	3	30	3.75	15	40	1.5	15	1.88	15	40	7/8
1.5	1740	145T	1093600-1.5-TRI-F1	1093600-1.5-TRI-F2	4.4	40	5.5	15	40	2.2	20	2.75	15	40	7/8
2	1740	145T	1093600-2-TRI-F1	1093600-2-TRI-F2	5.6	50	7	15	40	2.8	25	3.50	15	40	7/8
3	1745	182T	1093600-3-TRI-F1	1093600-3-TRI-F2	8	64	10	15	40	4	32	5.00	15	40	1 1/8
5	1745	184T	1093600-5-TRI-F1	1093600-5-TRI-F2	13	92	16.25	25	40	6.5	46	8.13	15	40	1 1/8
7.5	1750	213T	1093600-7.5-TRI-F1	1093600-7.5-TRI-F2	18.4	126	23	40	40	9.2	63	11.50	20	40	1 3/8
10	1750	215T	1093600-10-TRI-F1	1093600-10-TRI-F2	24	161	30	50	40	12	81	15.00	20	40	1 3/8
15	1750	254T	1093600-15-TRI-F1	1093600-15-TRI-F2	36.4	232	45.5	80	80	18.2	116	22.75	40	40	1 5/8
20	1750	256T	1093600-20-TRI-F1	1093600-20-TRI-F2	48.4	290	60.5	100	80	24.2	145	30.25	50	40	1 5/8
25	1760	284T	1093600-25-TRI-F1	1093600-25-TRI-F2	60	364	75	125	80	30	182	37.50	60	40	1 7/8
30	1760	286T	1093600-30-TRI-F1	1093600-30-TRI-F2	70.6	434	88.25	150	100	35.3	217	44.13	70	80	1 7/8

* **MOP - NOTE:** MOP value is for circuit wiring protection only. Actual motor protection must not exceed 1.15 x FLA

575 Volt Models - Motor: Nema Epact Efficiency NEMA 12-11 3 phase TEFC (1800 RPM) Service Factor = 1.15

HP	RPM	FRAME	F1 Part #	F2 Part #	575V					BORE DIA.
					FLA	LRA	MCA	* MOP	DISCONNECT SWITCH SIZE - AMPS	
1	1740	143T	1093600-1-575-F1	1093600-1-575-F2	1.2	12	1.5	15	40	7/8
1.5	1740	145T	1093600-1.5-575-F1	1093600-1.5-575-F2	1.76	16	2.2	15	40	7/8
2	1740	145T	1093600-2-575-F1	1093600-2-575-F2	2.24	20	2.8	15	40	7/8
3	1745	182T	1093600-3-575-F1	1093600-3-575-F2	3.2	26	4	15	40	1 1/8
5	1745	184T	1093600-5-575-F1	1093600-5-575-F2	5.2	37	6.5	15	40	1 1/8
7.5	1750	213T	1093600-7.5-575-F1	1093600-7.5-575-F2	7.36	50	9.2	15	40	1 3/8
10	1750	215T	1093600-10-575-F1	1093600-10-575-F2	9.6	65	12	20	40	1 3/8
15	1750	254T	1093600-15-575-F1	1093600-15-575-F2	14.56	93	18.2	30	40	1 5/8
20	1750	256T	1093600-20-575-F1	1093600-20-575-F2	19.36	116	24.2	40	40	1 5/8
25	1760	284T	1093600-25-575-F1	1093600-25-575-F2	24	146	30	50	40	1 7/8
30	1760	286T	1093600-30-575-F1	1093600-30-575-F2	28.24	174	35.3	60	40	1 7/8

* **MOP - NOTE:** MOP value is for circuit wiring protection only. Actual motor protection must not exceed 1.15 x FLA

Maximum Air Over Motor Temperature:
140°F / *60°C*

ELECTRICAL DATA - 3 Phase / .75 HP Models

230/460 Volt Models - Motor: General Purpose 3 phase TEFC (1800 RPM) Service Factor = 1.15

HP	RPM	FRAME	F1 Part #	230V					460V					BORE DIA.
				FLA	LRA	MCA	MOP	DISCONNECT SWITCH SIZE AMPS	FLA	LRA	MCA	* MOP	DISCONNECT SWITCH SIZE AMPS	
3/4	1725	56HC	1096305-.75-TRI-F1	2.8	19.6	3.5	15	40	1.4	9.8	1.75	15	40	5/8

* **MOP - NOTE:** MOP value is for circuit wiring protection only. Actual motor protection must not exceed 1.15 x FLA

575 Volt Models - Motor: General Purpose 3 phase TEFC (1800 RPM) Service Factor = 1.15

HP	RPM	FRAME	F1 Part #	575V					BORE DIA.
				FLA	LRA	MCA	* MOP	DISCONNECT SWITCH SIZE AMPS	
3/4	1725	56HC	1096305-.75-TRI-F1	1.1	7.8	1.38	15	40	5/8

* **MOP - NOTE:** MOP value is for circuit wiring protection only. Actual motor protection must not exceed 1.15 x FLA

ELECTRICAL DATA - 1 Phase / .75 to 2 HP Models

115/230 Volt Models - Motor: 1 phase TEFC w/ Manual Overload (1800 RPM) Service Factor = 1.15

HP	RPM	FRAME	F1 (CH) Part #	115V					230V					BORE DIA.
				FLA	LRA	MCA	MOP	DISCONNECT SWITCH SIZE AMPS	FLA	LRA	MCA	MOP	DISCONNECT SWITCH SIZE AMPS	
3/4	1725	56HC	1096300-.75-DL-F1	11	105	13.75	20	40	5.5	50	6.88	15	40	5/8
1	1725	56HC	1096300-1.0-DL-F1	13.6	125	17	30	40	6.8	65	8.5	15	40	5/8
1.5	1725	56HC	1096300-1.5-DL-F1	15.2	140	19	30	40	7.6	75	9.5	15	40	5/8
2	1725	56HC	1096300-2.0-DL-F1	20	180	25	45	40	10	95	12.5	25	40	5/8

Maximum Air Over Motor Temperature:
140°F / *60°C*

BEFORE START UP CHECKS

A. Check tightness on all bearing, sheave, and fan wheel set screws.
B. If fan wheel set screws are loose, check to be sure wheel is not rubbing on housing.
C. Leak test entire system to make sure all joints are tight.
D. Ball bearings are prelubricated and do not need grease for start up.
E. Rotate shaft by hand to be sure it is free.
F. Check fan and motor for proper rotation and ensure motor overload protection is provided.
G. Check alignment of fan and motor sheave and belt tension.

AFTER FIRST 48 HRS. OF OPERATION

A. Check all points under BEFORE START UP CHECKS (above)
B. Belts have acquired their permanent stretch. Readjust motor mount to take up slack in belts.

PERIODIC SERVICE & MAINTENANCE

A. Check all moving parts for wear every six months.
B. Check bearing collar set screws for tightness every six months.

BALL & SLEEVE BEARINGS

A. Ball Bearings

1. Motor bearings - All ball bearings are prelubricated and do not require addition of grease at time of installation. However, periodic cleaning out and renewal of grease is necessary. Please note that extreme care must be exercised to prevent foreign matter from entering the bearing. It is also important to avoid overgreasing. Only a high grade, clean mineral grease having the following characteristics should be used.

a. Consistency a little stiffer than that of vaseline, maintained over the operating temperature range; melting point preferably over 302°F *(150°C)*, freedom from separation of oil and soap under operating and storage conditions; and freedom from abrasive matter, acid, alkali and moisture.

b. Specific greasing instructions are to be found on a tag attached to the motor and should generally be adhered to.

BALL & SLEEVE BEARINGS (cont'd)

2. Fan Shaft Bearings - All ball bearings are prelubricated and do not require addition of grease at time of installation. However, periodic cleaning out and renewal of grease is necessary. Internal bearings are accessible through access panel in cabinet. Units that are equipped with extended lube lines will have grease fittings for internal bearings on drive end panel of blower section. Apply grease while bearings are running, adding slowly until a slight bleeding of grease from the seals is noted. For greasing units with extended lube lines, remove access door so bearing can be viewed when greasing.

DO NOT OVER LUBRICATE

The lubrication interval varies with the period of operation and temperature of the ambient air. The following interval is recommended using Mobilgrease XHP 222 or equivalent:

Temperature Range (°F)	Continuous Operation	12 Hr./Day Operation
60 - 80	2 years	4 years
81 - 100	1 1/2 years	3 years
101 - 120	1 year	2 years
121 - 140	3/4 year	1 1/4 years

REPLACEMENT PARTS

When replacement parts are required, furnish factory with unit model number and serial number as shown on serial plate on drive end of blower section.

TAP

APPROXIMATE NET WEIGHTS (*without Motor*)

60Hz

DESCRIPTION	UNIT SIZE												
	103	104	106	108	111	114	117	122	128	137	141	150	164
	FAN HEAD												
SINGLE WALL - not insulated	360	475	589	646	908	948	973	1156	1590	1650	1801	2059	2532
	COOLING COILS ALUMINUM FINS												
4 ROWS	133	170	219	291	362	507	622	650	799	1556	1271	1420	1981
6 ROWS	175	239	314	416	523	725	898	938	1150	1597	1835	2057	2484
8 ROWS	240	306	409	546	682	952	1174	1217	1501	2059	2471	2674	3648
10 ROWS	271	377	514	667	843	1171	1440	1509	1928	2532	2965	3299	4453
FLAT FILTER SECTION (BOLT ON)	39	49	62	86	118	140	161	189	232	278	303	342	416
ANGULAR FILTER SECTION	N/A	N/A	N/A	N/A	N/A	507	600	674	828	899	1113	1159	1426

APPROXIMATE MOTOR WEIGHTS

Motor: Nema Epact Efficiency NEMA 12-11 3 phase TEFC (1800 RPM)

HP	1	1.5	2	3	5	7.5	10	15	20	25	30
Weight - lbs.	40	48	51	89	101	136	160	270	306	372	387

Motor: General Purpose 3 phase TEFC

HP	3/4
Weight - lbs.	25

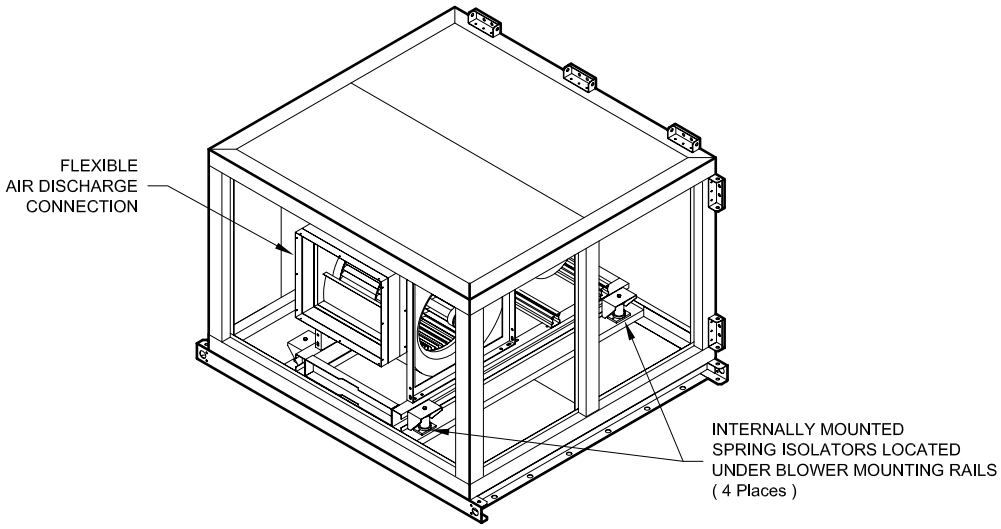
Motor: 1 phase TEFC w/ Manual Overload

HP	3/4	1	1.5	2
Weight - lbs.	30	33	41	51

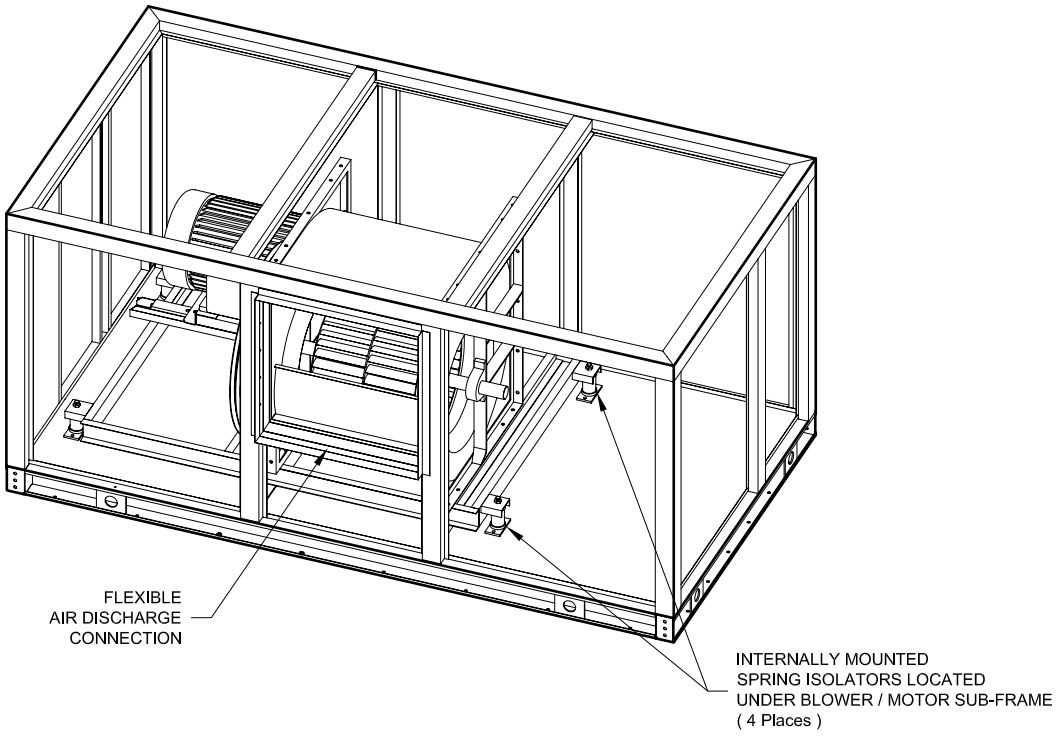
OPTIONAL INTERNAL SPRING ISOLATORS

CONSULT FACTORY FOR PROPER SPRING SELECTION

AP FAN HEAD: Models AP108 - AP128
Note: Rubber isolator style used on Model 108



AP FAN HEAD: Models AP137 - AP164



FINISHED GOODS WARRANTY

The terms and conditions as described below in the General Warranty Policy cover all products manufactured by National Refrigeration.

GENERAL WARRANTY POLICY

Subject to the terms and conditions hereof, the Company warrants all Products, including Service Parts, manufactured by the Company to be free of defects in material or workmanship, under normal use and application for a period of one (1) year from the original date of installation, or eighteen (18) months from the date of shipment from the Company, whichever occurs first. Any replacement part(s) so supplied will be warranted for the balance of the product's original warranty. The part(s) to be replaced must be made available in exchange for the replacement part(s) and reasonable proof of the original installation date of the product must be presented in order to establish the effective date of the warranty, failing which, the effective date will be based upon the date of manufacture plus thirty (30) days. Any labour, material, refrigerant, transportation, freight or other charges incurred in connection with the performance of this warranty will be the responsibility of the owner at the current rates and prices then in effect. This warranty may be transferred to a subsequent owner of the product.

THIS WARRANTY DOES NOT COVER

(a) Damages caused by accident, abuse, negligence, misuse, riot, fire, flood, or Acts of God (b) damages caused by operating the product in a corrosive atmosphere (c) damages caused by any unauthorized alteration or repair of the system affecting the product's reliability or performance (d) damages caused by improper matching or application of the product or the product's components (e) damages caused by failing to provide routine and proper maintenance or service to the product (f) expenses incurred for the erecting, disconnecting, or dismantling the product (g) parts used in connection with normal maintenance, such as filters or belts (h) products no longer at the site of the original installation (i) products installed or operated other than in accordance with the printed instructions, with the local installation or building codes and with good trade practices (j) products lost or stolen.

No one is authorized to change this WARRANTY or to create for or on behalf of the Company any other obligation or liability in connection with the Product(s). There is no other representation, warranty or condition in any respect, expressed or implied, made by or binding upon the Company other than the above or as provided by provincial or state law and which cannot be limited or excluded by such law, nor will we be liable in any way for incidental, consequential, or special damages however caused.

The provisions of this additional written warranty are in addition to and not a modification of or subtraction from the statutory warranties and other rights and remedies provided by Federal, Provincial or State laws.

PROJECT INFORMATION

System	
Model Number	Date of Start-Up
Serial Number	Service Contractor
Refrigerant	Phone
Electrical Supply	Fax

NATIONAL REFRIGERATION &
AIR CONDITIONING CANADA CORP.
159 Roy Blvd.
Brantford Ontario Canada N3R 7K1
PHONE: (519) 751-0444 800-463-9517
FAX (519) 753-1140 www.t-rp.com