



# Packaged Unit

## General Catalog



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## Features

In all Tahviah Arya packaged units the frames are from galvanized steel sheets while the chassis and body panels are made from galvanized steel sheets in appropriate thicknesses .

Tahviah Arya packaged units are manufactured in sections descriptions of which are offered below all units are completely painted in the proper thickness .

### 1. Fan Section :

In this section double width – double inlet centrifugal fans with forward curved blades are normally used for low pressure drop requirements as opposed to fans with backward curved blades which are for high pressure drop applications . Fans and housings are made of galvanized steel sheets .

Each set of fan plus other related components such as shafts are statically and dynamically balance , shafts are selected from proper material and size . Other power transmission components such as pulleys and belts are also suitably chosen depending on the required fan speed and electric motor power . Fan (S) and the corresponding electric motor (S) are installed on an independent chassis which is itself installed on the main chassis unit vibration dampers in order to eliminator transfer of vibrations to the structure . To further reduce the effects of vibrations , fan outlet (S) are also connected to the structure via flexible material such as canvas. Blower electric motor is installed in the fan section . All 380V/3 $\phi$ /50Hz electric motors are selected with insulation class of (F) and ingress protection of (Ip-54). Electric motors with ingress protection of (Ip-55) are also available upon request .

### 2. Coil Section :

This section could include the D.X Cooling coil by itself or the D.X Coil plus the heating coil , The D.X Coils are constructed of 3/8" & 5/8" OD copper tubes also plate finned ( 10,12 or 14 Fpi ) in aluminum or copper as required.

In systems equipped with D.X. Coils , refrigerants such as R-22 , R-407c or R-13a may be used. The D.X. coils are available in 4 or 6 rows configurations .

Heating coils are available in two types of hot water and steam , The hot water coil is offered in 1 and 2 row configurations . Steam heating coils are constructed of ½ “ seamless steel pipe spiral finned in aluminum or copper .

Upon request instead of hot water heating coil , electrical heating elements with the required power rating and stages may be installed .

In order to prevent water droplets from entering the fan section , one row of droplet eliminator is installed after the D.X. Coil .

### 3. Mixing Box Section :

This section is where the fresh and return air streams are mixed and an independent air damper is included for each air stream.

Dampers are manufactured from aluminum in opposed blade configuration and air sealed through the use of rubber strip gasket. Damper actuators may be easily installed when required the use of rubber strip gasket . Damper actuators may be easily installed when required .

Washable aluminum filter modules 2 inches in thickness are arranged in (V) type configuration inside these boxes .

In this section a free space for special filter of the pleated type only has been considered .

#### 4. Special Filter Section :

This section may include plated or bag filter which are installed as per customer requirements . Efficiency and class of special filters are specified by the client.

Notes :

- 1- Allowable air velocity over the special filter section must be less than or equal to 500 fpm .
- 2- In cases where only plated filters are required they are easily installed in the mixing box and not in the special filter section .

#### 5. Condenser Section :

In cases where air cooling unitary packaged units are selected , the condenser section is an integral part of the unit .

This section includes air cooling condenser coils , the fan and corresponding electric motor , electrical panel and the required valves.

In air cooling packaged units of capacity the coils for this section are installed in a flat position while for the higher capacity models the coils are installed in an slant in order for the coils to occupy less space .

Air cooling condenser coil include 3/8 “ copper tubes aluminum or copper finned ( as per request ) in 8,10,12 or 14 FPI . In normal climates aluminum finning is used while for more demanding climates copper finning could be used .

In cases where corrosion is a concern , the coils are coated with protective coating . Electrical panel which includes all electrical and control components of the packaged unit section and the air cooling condenser section is installed at this section .

Fans installed for this section are of the axial type directly coupled with 380V/30ø/50Hz , Ins .CI.F and Ip-55 electric motors .

#### 5. Compressor Section :

In cases where split air or water cooling packaged units are selected , this section would be an integral portion of the packaged unit .

In water cooling packaged units , this section includes compressor (S) , water cooling condenser , electrical panel , different types of valves and the corresponding piping and for air cooling split packaged unit this section includes compressor (S) , electrical panel , different types of valves and corresponding piping .

## Selection Procedure

### Water Cooled Packaged Unit

Given :

Cooling load = 265000 BTU/hr

Heating load = 500000 BTU/hr

Required air flow rate = 9400 CFM

External static air P.D = 0.65 In.W.G

Condenser leaving water temp. = 95 °F

Ambient altitude = 3000 Ft<sup>2</sup>

Summer room design condition = 75 °F DB / 63 °F WB

Winter entering air temp. = 50 °F

Heating media = Steam - 10 PSIG

D.X. Coil fin per inch = 14

Heating Coil Fin per inch = 8

Fresh & Return air ( Mixing air )

### Select Suitable Unit To Satisfy Condition Above :

Entering table 18 -63 °F Ent. W.B. and 95 °F Condenser Lvg . Water temp, Select An pu 30 1 W producing 285000 BTU/hr of cooling , the nominal CFM of 9500 . As 9400 CFM is 99% of the nominal CFM , from table 6 the capacity correction factor is 0.994 . Therefore actual cooling capacity is ( 285000 x 0.994 = 283290 BTU/hr ) . From table 18 , condenser water flow rate and the corresponding pressure drop are given as 70 GPM and 7.6 Ft<sup>2</sup> . of water respectively .

From table 7 , 63 °F Ent . W.B and 75 °F Ent . D.B , the approximate sensible heat factor is 0.74

$$\begin{aligned} \text{Lvg. DB temp.} &= \text{Ent. DB temp.} - \frac{\text{Cooling Capacity} \times \text{Sensible Heat Factor}}{1.085 \times \text{CFM}} = \\ &= 75 - \frac{(283290)(0.74)}{(1.085)(9400)} = 54.45 \text{ °F} \end{aligned}$$

$$H_{\text{LVG}} = H_{\text{ENT}} - \frac{\text{Total Cooling Capacity}}{4.45 \times \text{CFM}} = 30.16 - \frac{283290}{4.45 \times 9400} = 23.38 \text{ BTU/Lb}$$

Entering table 18 , 3000 Ft<sup>2</sup> altitude and  $H_{\text{LVG}} = 23.38 \text{ BTU/LB}$  , LVG . Wb temp. Is determined to be 53.4 °F From table 13 considering a An pu 30 1 W and nominal CFM of 9500 , Ent . DB temperature of 50 °F , the capacity of a 1 row heating coil using steam , 5 psig is 558000 BTU/hr .

From table 6 , CFM ratio of 99% under heating , Correction factor of 0.995 Is determined .

Corrected heating capacity is (558000 x 0.995 x 1.07 = 594074 ) .

From table 1 coil face area is 19.9 SQFT .

$$\text{Coil face velocity} = \frac{\text{Air Flow Rate}}{\text{Coil Face Area}} = \frac{9400}{19.9} = 472 \text{ FPM}$$

From table 9 & 11 . Coil face velocity determine the air P.D.

D.X. Coil P.D = 0.76 In.W.G

Heating coil P.D = 0.136 x 0.69 = 0.094 In. W.G

Eliminator air P.D = 0.1 In. W.G

Filter air P.D = 0.085 In . W.G

Mixing box air P.D = 0.06 In. W.G

Damper air P.D = 0.05 In. W.G

Internal static air P.D = 0.76 + 0.094 + 0.085 + 0.1 + 0.06 + 0.05 = 1.15 In. W.G

Total static air P.D = Internal static air P.D + External static air P.D = 1.15 + 0.65 = 1.8 In. W.G

## Air Cooled Packaged Unit

Cooling load = 235000 BTU/hr

Heating load = 550000 BTU/hr

Required air flow rate = 9400 CFM

External static air P.D = 0.65 In W.G

Max. Ambient temp. = 110 °F

Ambient altitude = 3000 Ft

Summer room design condition = 75 °F DB / 63 °F WB

Winter entering air temp. = 50 °F

Entering hot water temp. = 200 °F

D.X & Heating coil fin per inch = 14

Fresh & Return air ( mixing air )

Select suitable unit to satisfy the above conditions :

Entering table 14 , 63 °F Ent. WB and 110 °F ambient air temperature , select unit An pu 30 1 A producing 240000 BTU/hr of cooling , the nominal CFM of 9500 as 9400 CFM is 99% of the nominal CFM , from table 10 the capacity correction factor is 0.994 Therefore , actual cooling capacity is ( 240000 x 0.994 = 238560 BTU/hr ) .

From table 14 we also determine the T.H.R to be 303000 BTU/hr .

Entering table 7 , 63 °F Ent. W.B and 75 °F Ent. D.B the approximate sensible heat factor is 0.74 .

$$\text{Lvg. DB temp.} = \text{Ent. DB temp.} - \frac{\text{Cooling Capacity} \times \text{Sensible Heat Factor}}{1.085 \times \text{CFM}} =$$

$$75 - \frac{(238560)(0.74)}{(1.085)(9400)} = 57.7 \text{ °F} \leftarrow$$

To determine Lvg . WB temp. :

$$H_{\text{LVG}} = H_{\text{ENT.}} - \frac{\text{Total Cooling Capacity}}{4.45 \times \text{CFM}} = 30.16 - \frac{238560}{4.45 \times 9400} = 24.45 \text{ BTU/Lb}$$

Entering table 18 , 3000 Ft . Altitude and HLVG. = 24.45 BTU/hr , Lvg. WB temp. Is determined to be 55.1 °F

From table 14 and considering a An pu 30 1 A and nominal CFM of 9500 , Ent. DB temperature of 50 °F , the capacity of a 1 row heating coil using hot water , 180 °F is 508000 BTU/hr .

From table 6 , CFM ratio of 99% , under heating , correction factor of 0.995 Is determined .

Entering table 5, Ent. Hot water temperature of 200 °F and temperature drop of 20°F , the correction factor is 1.25 , Therefore , corrected capacity is ( 508000 x 0.995 x 1.25 = 631825 BTU/hr )

From table 13 , Coil face area is 19.9 SQFT.

$$\text{Coil face velocity} = \frac{\text{Air Flow Rate}}{\text{Coil Face Area}} = \frac{9400}{19.9} = 472 \text{ FPM}$$

From table 9 & 11 . coil face velocity determine the air P.D

D.X Coil P.D = 0.76 In. W.G

Heating coil P.D = 0.136 x 0.69 = 0.094 In . W.G

Eliminator air P.D = 0.1 In. W.G

Filter air P.D = 0.085 In. W.G

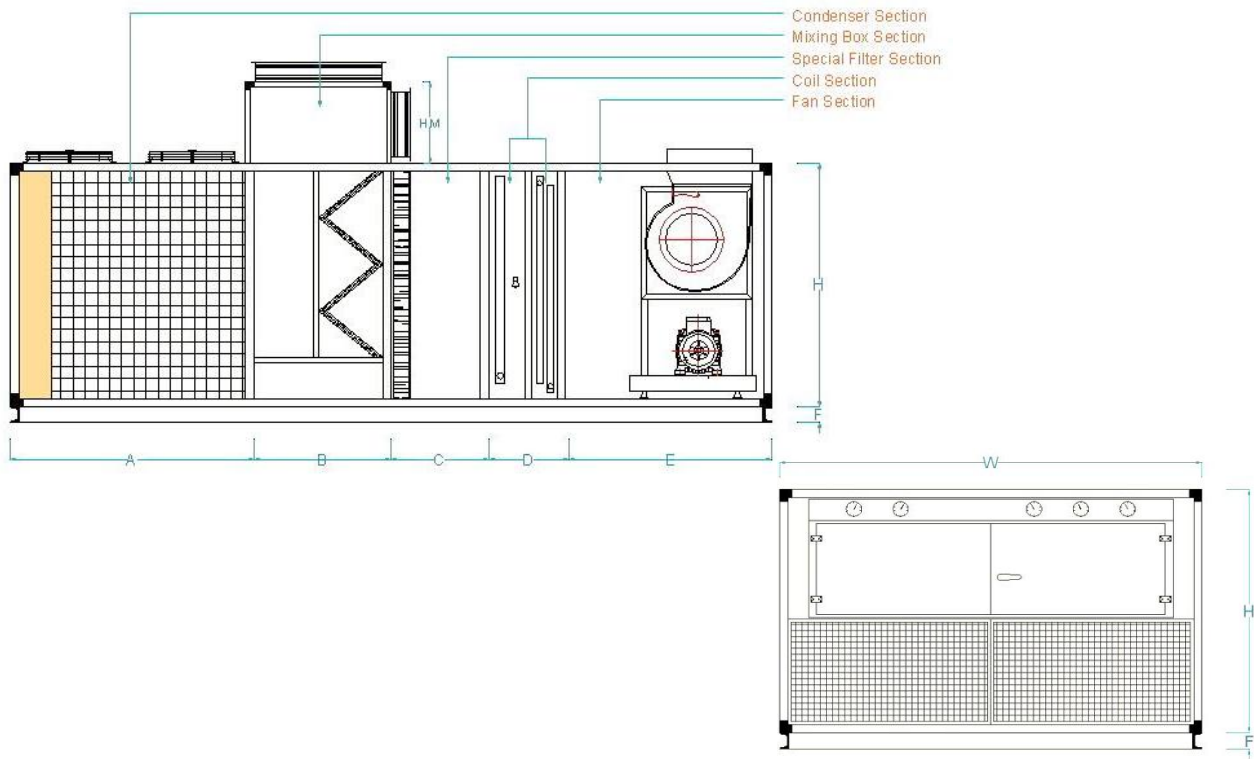
Mixing box air P.D = 0.06 In. W.G

Damper air P.D = 0.05 In.W.G

Internal static air P.D = 0.76 + 0.94 + 0.085 + 0.1 + 0.06 + 0.05 = 1.15 In. W.G

Total static pressure = internal static air P.D + External static air P.D = 1.15 + 0.65 = 1.8 In. W.G

## Roof Top Air Cooled Packaged Unit



**Table 1**

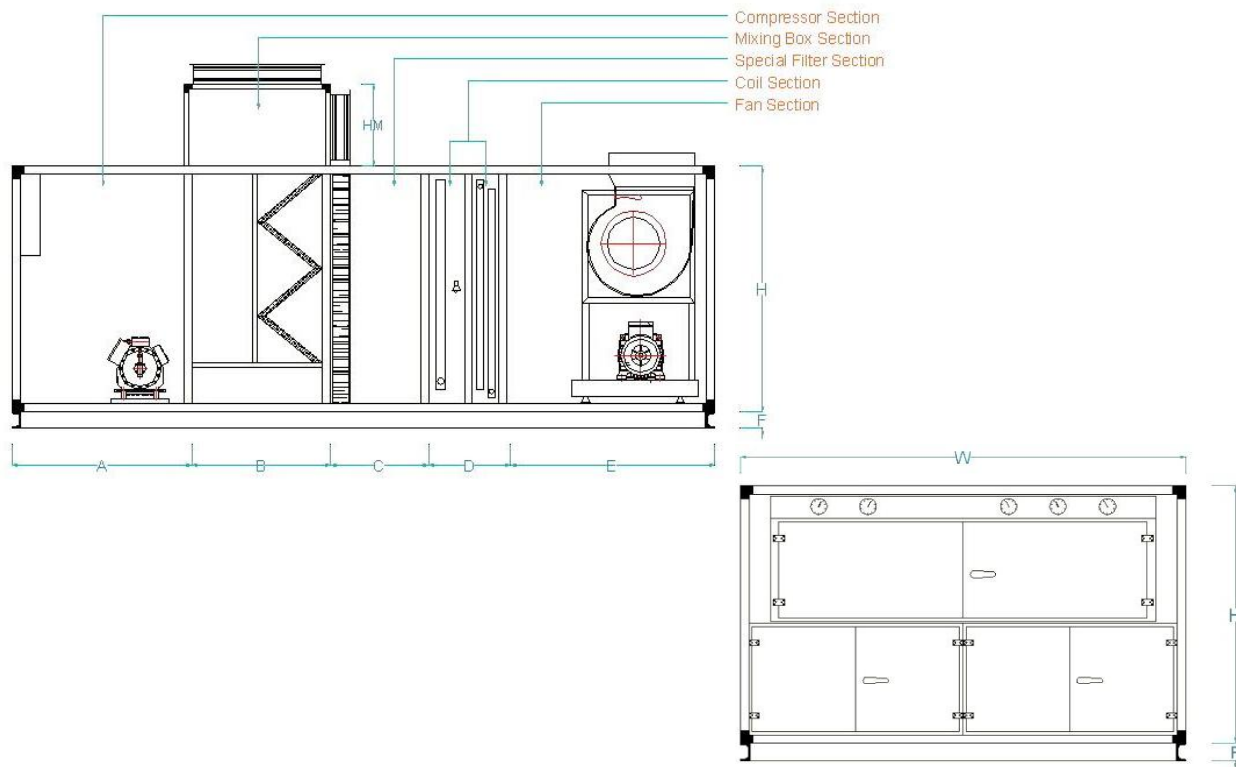
**Dimensions**

Model	A	B	C	D	E	H	HM	W	F
Ta pu 5 1 A	2620	700	1000	700	900	1200	300	1000	100
Ta pu 8 1 A	3350	700	1000	700	950	1300	400	1000	100
Ta pu 10 1 A	3100	800	1000	700	950	1350	300	1500	100
Ta pu 15 1 A	3000	800	1000	700	1000	1500	300	1500	100
Ta pu 20 1 A	3020	850	1000	700	1050	1350	300	2000	100
Ta pu 25 1 A	3620	850	1000	700	1050	1350	300	2000	100
Ta pu 30 1 A	3620	950	1000	700	1200	1500	400	2300	100
Ta pu 35 1 A	4100	950	1000	700	1200	1600	400	2300	100
Ta pu 40 1 A	4100	950	1000	700	1250	1650	400	2300	100
Ta pu 50 1 A	4150	1050	1000	750	1250	1700	450	2700	120
Ta pu 60 1 A	4450	1050	1000	750	1450	1950	550	2700	120
Ta pu 10 2 A	3100	800	1000	700	950	1350	300	1500	100
Ta pu 15 2 A	3020	850	1000	700	1000	1300	300	2000	100
Ta pu 20 2 A	3620	850	1000	700	1050	1350	300	2000	100
Ta pu 30 2 A	3620	950	1000	700	1200	1500	400	2300	100
Ta pu 40 2 A	4100	950	1000	700	1250	1650	400	2300	100
Ta pu 50 2 A	4150	1050	1000	750	1280	1700	450	2700	120
Ta pu 60 2 A	4550	1050	1000	750	1450	1950	550	2700	120
Ta pu 70 2 A	4600	1050	1000	750	1450	2050	550	2700	120
Ta pu 80 2 A	5200	1050	1000	750	1650	2150	650	3000	120
Ta pu 100 2 A	5450	1100	1000	830	1650	2350	700	3500	140
Ta pu 120 2 A	6300	1200	1000	830	1750	2650	700	3500	140

Note :

- 1- All dimensions in mm.
- 2- The values for E & HC are based on T.D = 15 °F and are subject to change with possible T.D change .
- 3- T.D = Condensing Temp. – Ambient Temp .
- 4- Drawing shown in the fan section indicates an up-blast discharge arrangement while other options such as horizontal-blast and down-blast are also available upon request .

## Split Air Cooled Packaged Unit (Horizontal)



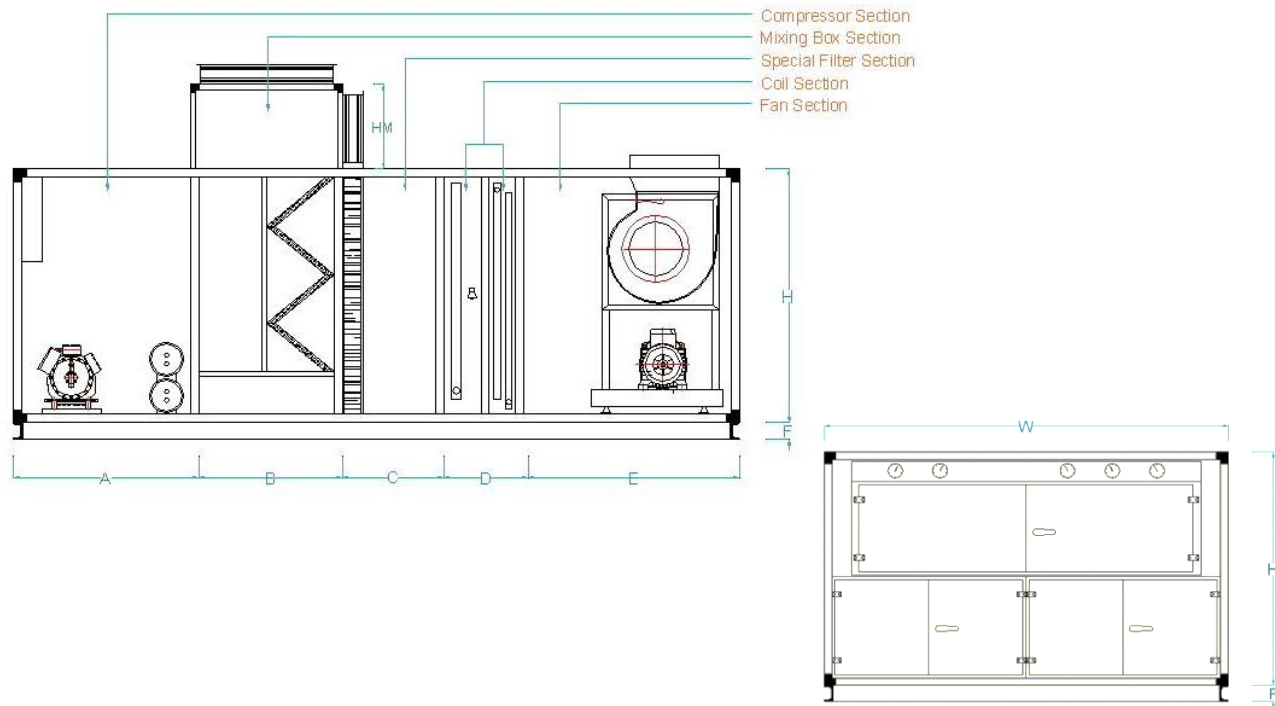
**Table 2** Dimensions

Model	A	B	C	D	E	H	HM	W	F
Ta pu 5 1 A	650	700	1000	700	900	1200	300	1000	100
Ta pu 8 1 A	650	700	1000	700	950	1300	400	1000	100
Ta pu 10 1 A	700	800	1000	700	950	1350	300	1500	100
Ta pu 15 1 A	700	800	1000	700	1000	1500	300	1500	100
Ta pu 20 1 A	700	850	1000	700	1050	1350	300	2000	100
Ta pu 25 1 A	700	850	1000	700	1050	1350	300	2000	100
Ta pu 30 1 A	750	950	1000	700	1200	1500	400	2300	100
Ta pu 35 1 A	750	950	1000	700	1200	1600	400	2300	100
Ta pu 40 1 A	750	950	1000	700	1250	1650	400	2300	100
Ta pu 50 1 A	800	1050	1000	750	1250	1700	450	2700	120
Ta pu 60 1 A	800	1050	1000	750	1450	1950	550	2700	120
Ta pu 10 2 A	800	800	1000	700	950	1350	300	1500	100
Ta pu 15 2 A	800	850	1000	700	1000	1300	300	2000	100
Ta pu 20 2 A	900	850	1000	700	1050	1350	300	2000	100
Ta pu 30 2 A	900	950	1000	700	1200	1500	400	2300	100
Ta pu 40 2 A	900	950	1000	700	1250	1650	400	2300	100
Ta pu 50 2 A	900	1050	1000	750	1280	1700	450	2700	120
Ta pu 60 2 A	900	1050	1000	750	1450	1950	550	2700	120
Ta pu 70 2 A	900	1050	1000	750	1450	2050	550	2700	120
Ta pu 80 2 A	900	1050	1000	750	1650	2150	650	3000	120
Ta pu 100 2 A	1000	1100	1000	830	1650	2350	700	3500	140
Ta pu 120 2 A	1000	1200	1000	830	1750	2650	700	3500	140

Note :

- 1- All dimensions in mm.
- 2- Drawing shown in the fan section indicates an up-blast discharge arrangement while other options such as horizontal-blast and down-blast are also available upon request .

## Water Cooled Packaged Unit ( Horizontal )



**Table 3** Dimensions

Model	A	B	C	D	E	H	HM	W	F
Ta pu 5 1 W	800	700	1000	700	900	1200	300	1000	100
Ta pu 8 1 W	800	700	1000	700	950	1300	400	1000	100
Ta pu 10 1 W	1000	800	1000	700	950	1350	300	1500	100
Ta pu 15 1 W	1000	800	1000	700	1000	1500	300	1500	100
Ta pu 20 1 W	1000	850	1000	700	1050	1350	300	2000	100
Ta pu 25 1 W	1000	850	1000	700	1050	1350	300	2000	100
Ta pu 30 1 W	1050	950	1000	700	1200	1500	400	2300	100
Ta pu 35 1 W	1050	950	1000	700	1200	1600	400	2300	100
Ta pu 40 1 W	1050	950	1000	700	1250	1650	400	2300	100
Ta pu 50 1 W	1100	1050	1000	750	1250	1700	450	2700	120
Ta pu 60 1 W	1100	1050	1000	750	1450	1950	550	2700	120
Ta pu 10 2 W	1100	800	1000	700	950	1350	300	1500	100
Ta pu 15 2 W	1100	850	1000	700	1000	1300	300	2000	100
Ta pu 20 2 W	1100	850	1000	700	1050	1350	300	2000	100
Ta pu 30 2 W	1200	950	1000	700	1200	1500	400	2300	100
Ta pu 40 2 W	1200	950	1000	700	1250	1650	400	2300	100
Ta pu 50 2 W	1200	1050	1000	750	1280	1700	450	2700	120
Ta pu 60 2 W	1200	1050	1000	750	1450	1950	550	2700	120
Ta pu 70 2 W	1200	1050	1000	750	1450	2050	550	2700	120
Ta pu 80 2 W	1200	1050	1000	750	1650	2150	650	3000	120
Ta pu 100 2 W	1350	1100	1000	830	1650	2350	700	3500	140
Ta pu 120 2 W	1350	1200	1000	830	1750	2650	700	3500	140

Note :

- 1- All dimensions in mm.
- 2- Drawing shown in the fan section indicates an up-blast discharge arrangement while other options such as horizontal-blast and down-blast are also available upon request .



## Water Cooled & Air Cooled Vertical Packaged Unit

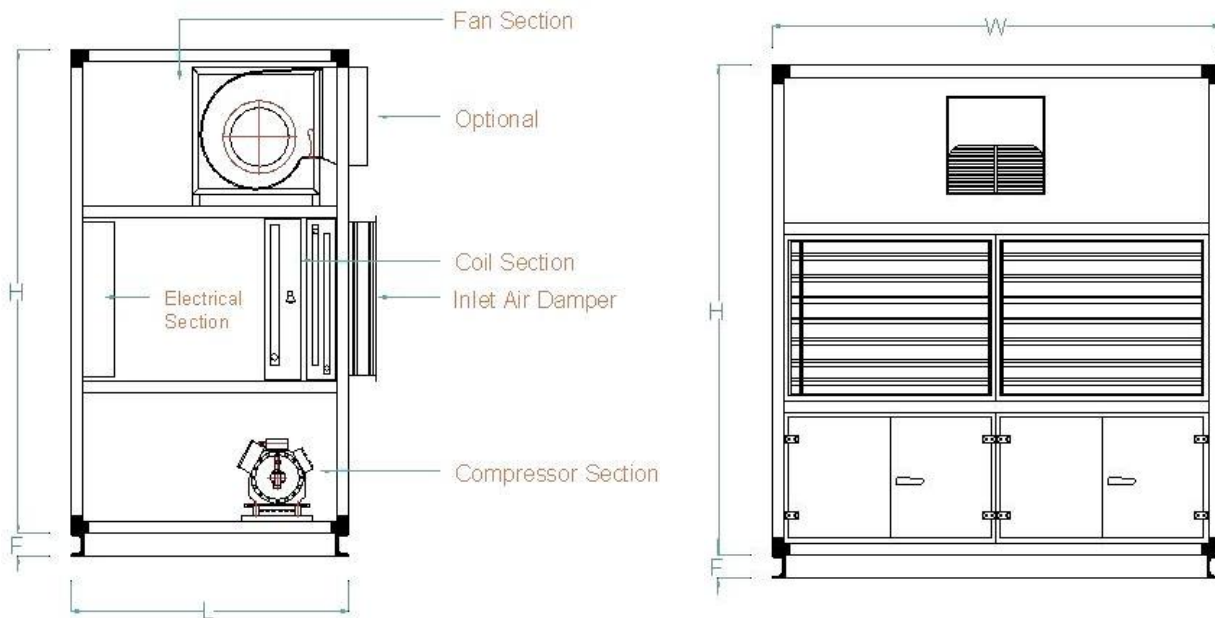


Table 4				Dimensions			
Model	L	H	W	F			
Ta pu 5 1 A / W	800	2100	1000	100			
Ta pu 8 1 A / W	850	2400	1000	100			
Ta pu 10 1 A / W	900	2300	1500	100			
Ta pu 15 1 A / W	1000	2550	1500	100			
Ta pu 20 1 A / W	1000	2400	2000	100			
Ta pu 25 1 A / W	1000	2600	2000	100			
Ta pu 30 1 A / W	1050	2650	2300	100			
Ta pu 35 1 A / W	1100	3000	2300	100			
Ta pu 40 1 A / W	1150	3300	2300	100			
Ta pu 50 1 A / W	1150	3350	2700	120			
Ta pu 60 1 A / W	1300	3850	2700	120			
Ta pu 10 2 A / W	900	2300	1500	100			
Ta pu 15 2 A / W	950	2300	2000	100			
Ta pu 20 2 A / W	1000	2600	2000	100			
Ta pu 30 2 A / W	1100	2950	2300	100			
Ta pu 40 2 A / W	1150	3250	2300	100			
Ta pu 50 2 A / W	1150	3350	2700	120			
Ta pu 60 2 A / W	1300	3800	2700	120			
Ta pu 70 2 A / W	1300	4000	2700	120			
Ta pu 80 2 A / W	1500	4350	3000	120			

Note :

- 1- All dimensions in mm.
- 2- Drawing shown in the fan section indicates an up-blast discharge arrangement while other options such as horizontal-blast and down-blast are also available upon request .

**COIL AIR SIDE PRESSURE DROP ( IN.W.G )**

**Table 9**

FIN Per Inch	Rows Deep	Coil Face Velocity									
		300		400		500		600	700	800	
		Dry	Wet	Dry	Wet	Dry	Wet	Dry	Dry	Dry	
14	1	0.07	0.10	0.10	0.15	0.15	0.20	0.20	0.28	0.32	
	2	0.13	0.20	0.22	0.29	0.32	0.42	0.44	0.57	0.70	
	3	0.16	0.29	0.23	0.45	0.41	0.64	0.57	0.73	0.90	
	4	0.22	0.36	0.35	0.58	0.51	0.84	0.70	0.88	1.12	
	6	0.35	0.57	0.49	0.88	0.75	1.23	1.03	1.33	1.67	

**P.D CORRECTION FACTOR**

Coil FPI			
8	10	12	14
0.69	0.80	0.91	1.0

**Notes:**

- In order to determine air-side pressure drop for cases where the number of fin per inch are less than 14 FPI , multiply the values by the corresponding correction factor given in the table above.
- F.P.I = fin per inch

**BYPASS FACTOR**

**Table 10**

Coil Face velocity ( FPM)	4 Row	6 Row
400	0.20	0.10
450	0.21	0.11
500	0.23	0.12
550	0.26	0.13
600	0.27	0.14

**FILTER AIR PRESSURE DROP**

**Table 11**

Filter	Face Velocity F.P.M									
	300	350	400	450	500	550	600	650	700	800
Cleanable	0.037	0.050	0.065	0.081	0.099	0.120	0.156	0.182	0.235	0.325

**Notes:**

- All pressure Drops in inches of water.
- Filter area in flat configuration equals the coil face area .

**ACCESSORIES AIR SIDE PRESSURE DROP ( IN.W.G )  
( AT 500 F.P.M. VELOCITY )**

**Table 12**

Damper	Mixing Box Without Filter	Electrical Heater	Eliminator
0.05	0.06	0.02	0.1

**HOT WATER CORRECTION FACTOR**

**Table 5**

Temp. Drop ( F )	Ent. Water Temp. F			
	160	180	200	220
10	0.95	1.20	1.50	1.75
20	0.75	1.00	1.25	1.50
30	0.56	0.77	1.10	1.27

**CAPACITY FACTOR FOR NAN STANDARD CFM**

**Table 6**

CFM/Nom. CFM	80%	90%	100%	110%	120%
Cooling Capacity	0.87	0.94	1.00	1.04	1.09
Heating Capacity	0.89	0.95	1.00	1.02	1.05

**APPROXIMATE SENSIBLE HEAT FACTOR**

**Table 7**

Ent. W.B Temp. ( F )	30			
	30	30	30	30
59	0.94	0.97	1.00	1.00
63	0.74	0.80	0.92	1.00
67	0.56	0.70	0.84	1.00
71	0.41	0.52	0.64	0.74

**STEAM CORRECTION FACTOR**

**Table 8**

Pressure PSIG	2	5	10	15	20	30
Temp. F	218.5	227.2	239.4	249.7	258.8	274.1
Latent Heat BTU/LB	966.2	960.5	952.5	945.5	939.3	928.5
Correction Factor	0.95	1	1.07	1.14	1.19	1.28

## PERFORMANCE TABLES

### WATER COOLED PACKAGED UNIT ( ONE COMPRESSOR )

**Table 13**

Model	Nominal CFM	Coil F.A. Sq. Ft	Cooling										Heating		
			E.WB.T (°F)	Condenser Water		Ambient Temp. (°F)						E.A.T (°F)	Capacity ( MBH )		Steam 5 PSIG 1-Row
						85		95		105			Hot Water [ΔT=20°F]		
				GPM	P.D. Ft.WG	TC (MBH)	KW	TC (MBH)	KW	TC (MBH)	KW		1-Row	2-Row	
Ta pu-5 W 1	2000	4.2	59	16	3.0	70	3.3	65	3.7	61	4.2	40	110	170	121
			63	17	3.3	73	3.3	68	3.7	64	4.2	50	100	155	110
			67	18	3.7	76	3.3	71	3.8	67	4.2	60	90	140	99
			71	18	3.7	79	3.3	74	3.8	69	4.3	70	81	126	89
Ta pu-8 W 1	3300	6.2	59	27	6.0	121	5.6	113	6.3	106	7.1	40	170	267	187
			63	28	6.4	126	5.6	118	6.4	110	7.1	50	154	243	169
			67	30	7.2	131	5.6	123	6.4	115	7.2	60	139	220	152
			71	31	7.7	136	5.6	128	6.4	119	7.2	70	124	198	136
Ta pu-10 W 1	4000	8.2	59	32	6.8	142	6.6	133	7.5	124	8.4	40	227	350	250
			63	34	7.5	148	6.6	139	7.5	130	8.4	50	207	320	227
			67	35	7.9	154	6.6	144	7.5	135	8.5	60	188	290	206
			71	36	8.3	160	6.6	150	7.5	141	8.5	70	169	261	185
Ta pu-15 W 1	5500	11.2	59	42	6.0	184	8.9	173	10.1	162	11.3	40	321	491	353
			63	43	6.2	191	8.9	180	10.2	169	11.4	50	293	450	322
			67	45	6.7	198	8.9	187	10.2	175	11.5	60	266	408	292
			71	46	7.0	206	8.9	194	10.2	182	11.5	70	238	368	261
Ta pu-20 W 1	7000	13.4	59	47	6.4	204	10.6	192	11.9	180	13.1	40	383	596	420
			63	49	6.9	212	10.6	200	11.9	188	13.2	50	350	546	385
			67	50	7.1	221	10.6	208	12.0	195	13.3	60	316	494	347
			71	52	7.6	229	10.6	216	12.0	203	13.4	70	284	445	312
Ta pu-25 W 1	8000	16.8	59	59	9.5	255	13.8	240	15.4	226	16.9	40	460	707	505
			63	61	10.0	266	13.8	250	15.4	235	17.0	50	420	648	460
			67	63	10.5	276	13.8	261	15.5	245	17.2	60	381	587	419
			71	65	11.1	287	13.8	271	15.6	255	17.3	70	342	529	375
Ta pu-30 W 1	9500	19.9	59	67	7.0	290	16.2	274	18.2	257	20.0	40	555	851	610
			63	70	7.6	302	16.2	285	18.3	268	20.2	50	508	781	558
			67	72	8.0	314	16.2	297	18.3	280	20.4	60	461	710	507
			71	74	8.4	327	16.2	310	18.4	291	20.5	70	414	640	455
Ta pu-35 W 1	11500	25.1	59	85	5.2	367	21.3	344	23.7	322	26.0	40	695	1061	764
			63	88	5.5	381	21.4	358	23.9	335	26.3	50	637	973	700
			67	91	5.8	396	21.4	372	24.0	349	26.5	60	579	886	635
			71	94	6.1	412	21.5	387	24.2	363	26.7	70	521	800	573
Ta pu-40 W 1	14000	28.2	59	102	5.3	440	25.3	414	28.1	386	30.8	40	824	1271	905
			63	106	5.6	459	25.3	431	28.3	403	31.2	50	756	1167	830
			67	109	5.9	478	25.4	449	28.5	420	31.4	60	688	1062	755
			71	113	6.2	497	25.5	467	28.7	437	31.7	70	621	962	680
Ta pu-50 W 1	15500	33.6	59	124	6.5	539	29.5	505	33.0	472	36.3	40	952	1450	1030
			63	128	6.8	562	29.5	526	33.2	492	36.6	50	873	1330	960
			67	133	7.2	555	29.5	548	33.3	513	36.6	60	795	1216	845
			71	137	7.6	608	29.5	571	33.3	534	37	70	717	1098	786
Ta pu-60 W 1	18500	39.7	59	148	9.3	645	36.0	604	40.0	564	43.6	40	1105	1700	1215
			63	153	9.8	672	36.1	630	40.2	589	44.1	50	1010	1560	1110
			67	158	10.3	699	36.1	656	40.4	613	44.5	60	924	1423	1010
			71	164	11.0	728	36.1	683	40.6	639	44.8	70	834	1285	915

**Notes:**

- E.A.T. : Entering Air D.B. Temperature (°F)
- E.WB.T. : Entering Air W.B. Temperature (°F)
- T.C. : Total Cooling Capacity
- KW : Compressor Kilowatt Input
- Entering and leaving Condenser Water Temperature Difference : 10 °F
- Entering Hot Water Temperature = 180 °F
- P.D. : Condenser Water Pressure Drop ( Ft.W.G.)
- ΔT<sub>H</sub> : Hot Water Entering and Leaving Temperature Difference
- MBH = 1000 BTU/HR

## PERFORMANCE TABLES

### WATER COOLED PACKAGED UNIT ( TWO COMPRESSOR )

Cont. Table 13

Model	Nominal CFM	Coil F.A. Sq. Ft	Cooling									Heating			
			E.WB.T (°F)	Condenser Water		Ambient Temp. (°F)						E.A.T (°F)	Capacity ( MBH )		Steam 5 PSIG 1-Row
						85			95		105		Hot Water [ΔT=20°F]		
				GPM	P.D. Ft.W.G	TC (MBH)	KW	TC (MBH)	KW	TC (MBH)	KW		1-Row	2-Row	
Ta pu-10 W 2	4000	8.4	59	32	3.0	140	6.6	130	7.4	122	8.4	40	220	340	242
			63	34	3.3	146	6.6	136	7.4	128	8.4	50	200	310	220
			67	36	3.7	152	6.6	142	7.6	134	8.4	60	180	280	198
			71	36	3.7	158	6.6	148	7.6	138	8.4	70	162	252	178
Ta pu-15 W 2	6600	12.4	59	54	6.0	242	11.2	226	12.6	212	14.2	40	340	534	374
			63	56	6.4	252	11.2	236	12.8	220	14.2	50	308	486	338
			67	60	7.2	262	11.2	246	12.8	230	14.4	60	278	440	304
			71	62	7.7	272	11.2	256	12.8	238	14.4	70	248	396	272
Ta pu-20 W 2	8000	16.4	59	64	6.8	284	13.2	266	15	248	16.8	40	454	700	500
			63	68	7.5	296	13.2	278	15	260	16.8	50	414	640	454
			67	70	7.9	308	13.2	288	15	270	17	60	376	580	412
			71	72	8.3	320	13.2	300	15	282	17	70	338	522	370
Ta pu-30 W 2	11000	22.4	59	84	6.0	368	17.8	346	20.2	324	22.6	40	642	982	706
			63	86	6.2	382	17.8	360	20.4	338	22.6	50	586	900	644
			67	90	6.7	396	17.8	374	20.4	350	23	60	532	816	584
			71	92	7.0	412	17.8	388	20.4	364	23	70	476	736	522
Ta pu-40 W 2	14000	26.8	59	94	6.4	408	21.2	384	23.8	360	26.2	40	766	1192	840
			63	98	6.9	424	21.2	400	23.8	376	26.4	50	700	1092	770
			67	100	7.1	442	21.2	416	24	390	26.6	60	632	988	694
			71	104	7.6	458	21.2	432	24	406	26.8	70	568	890	624
Ta pu-50 W 2	16000	33.6	59	118	9.5	510	27.6	480	30.8	452	33.8	40	920	1414	1010
			63	122	10.0	532	27.6	500	30.8	470	34	50	840	1296	920
			67	126	10.5	552	27.6	522	31	490	34.4	60	762	1174	838
			71	130	11.1	574	27.6	542	31.2	510	34.6	70	684	1058	750
Ta pu-60 W 2	19000	39.8	59	134	7.0	580	32.4	548	36.4	514	40	40	1110	1702	1220
			63	140	7.6	604	32.4	570	36.6	536	40.4	50	1016	1562	1116
			67	144	8.0	628	32.4	594	36.6	560	40.8	60	922	1420	1014
			71	148	8.4	654	32.4	620	36.8	582	41	70	828	1280	910
Ta pu-70 W 2	23000	50.2	59	170	5.2	734	42.6	688	47.4	644	52	40	1390	2122	1528
			63	176	5.5	762	42.8	716	47.8	670	52.6	50	1274	1946	1400
			67	182	5.8	792	42.8	744	48	698	53	60	1158	1772	1270
			71	188	6.1	824	43	774	48.4	726	53.4	70	1042	1600	1146
Ta pu-80 W 2	28000	56.4	59	204	5.3	880	50.6	828	56.2	772	61.6	40	1648	2542	1810
			63	212	5.6	918	50.6	862	56.6	806	62.4	50	1512	2334	1660
			67	218	5.9	956	50.8	898	57	840	62.8	60	1376	2124	1510
			71	226	6.2	994	51	934	57.4	874	63.4	70	1242	1924	1360
Ta pu-100 W 2	31000	67.2	59	248	6.5	1078	59	1010	66	944	72.6	40	1904	2900	2060
			63	256	6.8	1124	59	1052	66.4	984	73.2	50	1746	2660	1960
			67	266	7.2	1110	59	1096	66.6	1026	73.6	60	1590	2432	1690
			71	274	7.6	1216	59	1142	66.6	1068	74	70	1434	2196	1572
Ta pu-120 W 2	37000	79.4	59	296	9.3	1290	72	1208	80	1128	87.2	40	2210	3400	2430
			63	306	9.8	1344	72.2	1260	80.4	1178	88.2	50	2020	3120	2220
			67	316	10.3	1398	72.2	1312	80.8	1226	89	60	1848	2846	2020
			71	328	11.0	1456	72.2	1366	81.2	1278	89.6	70	1668	2570	1830

Notes:

- E.A.T. : Entering Air D.B. Temperature (°F)
- E.WB.T. : Entering Air W.B. Temperature (°F)
- T.C. : Total Cooling Capacity
- KW : Compressor Kilowatt Input
- Entering and leaving Condenser Water Temperature Difference : 10 °F
- Entering Hot Water Temperature = 180 °F
- P.D. : Condenser Water Pressure Drop ( Ft.W.G.)
- ΔT<sub>H</sub> : Hot Water Entering and Leaving Temperature Difference
- MBH = 1000 BTU/HR

## PERFORMANCE TABLES

### AIR COOLED PACKAGED UNIT ( ONE COMPRESSOR )

**Table 14**

Model	Nominal CFM	Coil F.A. Sq. Ft	Cooling										Heating			
			E.W.B.T (°F)	Ambient Temp. (°F)									E.A.T (°F)	Capacity ( MBH )		Steam 5 PSIG 1-Row
				90			100			110				Hot Water [ΔT=20°F]		
				TC (MBH)	KW	THR (MBH)	TC (MBH)	KW	THR (MBH)	TC (MBH)	KW	THR (MBH)		1-Row	2-Row	
Ta pu-5 A 2	2000	4.2	59	59	4.3	71	57	4.5	70	54	4.7	68	40	110	170	121
			63	62	4.4	74	59	4.6	72	57	4.8	71	50	100	155	110
			67	64	4.4	77	62	4.6	75	60	4.8	73	60	90	140	99
			71	67	4.5	79	65	4.7	78	62	4.9	76	70	81	126	89
Ta pu-8 A 2	3300	6.2	59	102	7.4	122	98	7.8	120	95	8.1	116	40	170	267	187
			63	106	7.5	126	102	7.8	124	99	8.2	121	50	154	243	169
			67	111	7.5	131	107	7.9	128	103	8.2	125	60	139	220	152
			71	115	7.5	135	111	7.9	133	107	8.3	130	70	124	198	136
Ta pu-10 A 2	4000	8.2	59	120	8.8	144	116	9.2	141	111	9.6	138	40	227	350	250
			63	125	8.8	149	121	9.3	146	116	9.7	143	50	207	320	227
			67	130	8.9	154	126	9.3	151	121	9.8	148	60	188	290	206
			71	136	9.0	159	131	9.4	156	126	9.9	155	70	169	261	185
Ta pu-15 A 2	5000	11.2	59	157	11.9	189	152	12.4	185	146	13.0	182	40	321	491	353
			63	163	12.0	195	158	12.5	192	152	13.1	188	50	293	450	322
			67	170	12.1	202	164	12.6	198	158	13.2	194	60	266	408	292
			71	176	12.1	209	171	12.7	205	165	13.3	201	70	238	368	261
Ta pu-20 A 2	7000	13.4	59	174	13.7	211	168	14.3	207	162	14.8	203	40	383	596	420
			63	181	13.8	219	175	14.4	214	169	15.0	210	50	350	546	385
			67	189	13.9	226	182	14.6	222	176	15.2	217	60	316	494	347
			71	197	14.1	234	190	14.7	229	183	15.3	225	70	284	445	312
Ta pu-25 A 2	8000	16.8	59	218	17.6	266	210	18.3	260	203	19.0	255	40	460	707	505
			63	227	17.8	275	219	18.5	270	211	19.2	264	50	420	648	460
			67	237	18.0	285	228	18.7	279	220	19.4	273	60	381	587	419
			71	246	18.1	295	238	18.9	289	229	19.7	283	70	342	529	375
Ta pu-30 A 2	9500	19.9	59	248	20.9	306	239	21.8	299	230	22.6	293	40	555	851	610
			63	259	21.1	316	250	22.0	310	240	22.8	303	50	508	781	558
			67	270	21.3	328	260	22.2	321	250	23.1	314	60	461	710	507
			71	281	21.5	339	271	22.4	332	261	23.4	325	70	414	640	455
Ta pu-35 A 2	11500	25.1	59	310	27.1	385	299	28.2	377	288	29.2	367	40	695	1061	764
			63	323	27.4	398	311	28.5	390	300	29.6	382	50	637	973	700
			67	336	27.7	412	324	28.9	403	312	30.0	395	60	579	886	635
			71	350	28.0	426	338	29.2	417	325	30.3	408	70	521	800	573
Ta pu-40 A 2	14000	28.2	59	372	32.2	460	359	33.4	451	345	34.6	441	40	824	1271	905
			63	389	32.5	477	374	33.8	467	360	35.1	457	50	756	1167	830
			67	405	32.9	494	391	34.2	484	376	35.6	474	60	688	1062	755
			71	422	33.2	511	407	34.6	500	392	36.0	491	70	621	962	680
Ta pu-50 A 2	15500	33.6	59	456	37.9	558	440	39.5	547	424	41.0	537	40	952	1450	1030
			63	475	38.2	578	459	39.9	567	443	41.4	556	50	873	1330	960
			67	495	38.6	598	478	40.2	587	462	41.9	576	60	795	1216	845
			71	516	38.8	619	499	40.6	607	481	42.3	596	70	717	1098	786
Ta pu-60 A 2	18500	39.7	59	545	45.4	668	526	47.3	654	508	49.0	642	40	1105	1700	1215
			63	568	46.0	692	549	47.8	678	530	49.7	665	50	1010	1560	1110
			67	593	46.4	717	572	48.4	703	552	50.3	689	60	924	1423	1010
			71	617	46.9	742	596	48.9	727	576	50.9	713	70	834	1285	915

**Notes:**

- E.A.T. : Entering Air D.B. Temperature (°F)
- E.W.B.T. : Entering Air W.B. Temperature (°F)
- T.C. : Total Cooling Capacity
- KW : Compressor Kilowatt Input
- T.H.R : Condenser Total Heat Rejection Capacity
- Entering Hot Water Temperature = 180°F
- ΔT<sub>H</sub> - : Hot Water Entering and Leaving Temperature Difference
- MBH = 1000 BTU/HR

## PERFORMANCE TABLES

### AIR COOLED PACKAGED UNIT ( ONE COMPRESSOR )

**Cont. Table 14**

Model	Nominal CFM	Coil F.A. Sq. Ft	Cooling										Heating			
			E.W.B.T (°F)	Ambient Temp. (°F)									E.A.T (°F)	Capacity ( MBH )		Steam 5 PSIG 1-Row
				115			120			125				Hot Water [DT=20°F]		
				TC (MBH)	KW	THR (MBH)	TC (MBH)	KW	THR (MBH)	TC (MBH)	KW	THR (MBH)		1-Row	2-Row	
Ta pu-5 A 2	2000	4.2	59	52	4.9	66	51	5.0	66	50	5.1	65	40	110	170	121
			63	55	5.0	69	54	5.0	68	52	5.1	67	50	100	155	110
			67	57	5.0	72	56	5.1	71	55	5.1	70	60	90	140	99
			71	60	5.1	74	59	5.2	73	57	5.3	73	70	81	126	89
Ta pu-8 A 2	3300	6.2	59	91	8.4	114	90	8.5	113	87	8.7	112	40	170	267	187
			63	95	8.5	119	93	8.6	117	91	8.8	116	50	154	243	169
			67	99	8.6	123	98	8.7	122	95	9.0	120	60	139	220	152
			71	103	8.7	127	102	8.8	126	99	9.0	124	70	124	198	136
Ta pu-10 A 2	4000	8.2	59	107	10.0	135	105	10.1	134	103	10.3	132	40	227	350	250
			63	112	10.1	139	110	10.2	138	107	10.5	136	50	207	320	227
			67	116	10.2	144	115	10.4	143	112	10.6	141	60	188	290	206
			71	121	10.3	149	119	10.5	148	117	10.7	146	70	169	261	185
Ta pu-15 A 2	500	11.2	59	141	13.5	178	139	13.7	177	136	14.0	175	40	321	491	353
			63	147	13.7	184	145	13.9	183	141	14.2	181	50	293	450	322
			67	153	13.8	190	150	14.0	189	148	14.4	187	60	266	408	292
			71	159	13.9	197	157	14.2	195	153	14.5	193	70	238	368	261
Ta pu-20 A 2	7000	13.4	59	156	15.3	199	154	15.5	197	150	15.8	194	40	383	596	420
			63	163	15.5	206	160	15.7	204	157	16.1	201	50	350	546	385
			67	170	15.7	213	167	16.0	211	163	16.3	208	60	316	494	347
			71	177	15.9	220	174	16.2	218	170	16.5	215	70	284	445	312
Ta pu-25 A 2	8000	16.8	59	195	19.6	249	192	19.9	247	187	20.2	244	40	460	707	505
			63	203	19.9	258	200	20.2	256	195	20.5	252	50	420	648	460
			67	212	20.2	267	209	20.4	265	204	20.8	261	60	381	587	419
			71	221	20.4	277	218	20.7	274	212	21.1	270	70	342	529	375
Ta pu-30 A 2	9500	19.9	59	221	23.3	286	217	23.6	283	211	24.1	278	40	555	851	610
			63	230	23.6	296	226	24.0	293	220	24.4	288	50	508	781	558
			67	240	23.9	306	236	24.3	303	230	24.7	298	60	461	710	507
			71	250	24.2	317	246	24.5	314	240	25.1	309	70	414	640	455
Ta pu-35 A 2	11500	25.1	59	276	30.2	361	272	30.6	358	265	31.2	353	40	695	1061	764
			63	288	30.7	374	283	31.1	370	277	31.7	365	50	637	973	700
			67	300	31.1	387	296	31.5	383	288	32.2	378	60	579	886	635
			71	313	31.5	400	308	31.9	396	301	32.6	391	70	521	800	573
Ta pu-40 A 2	14000	28.2	59	331	35.8	431	326	36.3	427	318	37.0	421	40	824	1271	905
			63	346	36.4	447	340	36.8	443	332	37.6	437	50	756	1167	830
			67	361	36.9	463	356	37.4	459	347	38.1	453	60	688	1062	755
			71	377	37.4	480	371	37.9	476	362	38.7	469	70	621	962	680
Ta pu-50 A 2	15500	33.6	59	409	42.4	527	403	43.0	523	395	43.9	517	40	952	1450	1030
			63	427	43.0	545	421	43.6	541	412	44.5	535	50	873	1330	960
			67	446	43.4	565	439	44.1	560	430	45.1	554	60	795	1216	845
			71	465	44.0	584	458	44.6	580	449	45.6	573	70	717	1098	786
Ta pu-60 A 2	18500	39.7	59	490	50.8	630	483	51.5	625	472	52.5	619	40	1105	1700	1215
			63	511	51.5	652	504	52.2	647	493	53.3	640	50	1010	1560	1110
			67	533	52.2	676	526	52.9	671	515	54.1	664	60	924	1423	1010
			71	556	52.8	699	548	53.6	695	537	54.8	686	70	834	1285	915

Notes:

- E.A.T. : Entering Air D.B. Temperature (°F)
- E.W.B.T. : Entering Air W.B. Temperature (°F)
- T.C. : Total Cooling Capacity
- KW : Compressor Kilowatt Input
- T.H.R : Condenser Total Heat Rejection Capacity
- Entering Hot Water Temperature = 180°F
- ΔT<sub>H</sub> - : Hot Water Entering and Leaving Temperature Difference
- MBH = 1000 BTU/HR

## PERFORMANCE TABLES

### AIR COOLED PACKAGED UNIT ( TWO COMPRESSOR )

Cont. Table 14

Model	Nominal CFM	Coil F.A. Sq. Ft	Cooling										Heating			
			E.WB.T (°F)	Ambient Temp. (°F)									E.A.T (°F)	Capacity ( MBH )		Steam 5 PSIG 1-Row
				90			100			110				Hot Water [ΔT=20°F]		
				TC (MBH)	KW	THR (MBH)	TC (MBH)	KW	THR (MBH)	TC (MBH)	KW	THR (MBH)		1-Row	2-Row	
Ta pu-10 A 2	4000	8.4	59	118	8.6	142	114	9	140	108	9.4	136	40	220	340	242
			63	124	8.8	148	118	9.2	144	114	9.6	142	50	200	310	220
			67	128	8.8	154	124	9.2	150	120	9.6	146	60	180	280	198
			71	134	9	158	130	9.4	156	124	9.8	152	70	162	252	178
Ta pu-15 A 2	6600	12.4	59	204	14.8	244	196	15.6	240	190	16.2	232	40	340	534	378
			63	212	15	252	204	15.6	248	198	16.4	242	50	308	486	338
			67	222	15	262	214	15.8	256	206	16.4	250	60	278	440	304
			71	230	15	270	222	15.8	266	214	16.6	260	70	248	396	272
Ta pu-20 A 2	8000	16.4	59	240	17.6	288	232	18.4	282	222	19.2	276	40	454	700	500
			63	250	17.6	298	242	18.6	292	232	19.4	286	50	414	640	454
			67	260	17.8	308	252	18.6	302	242	19.6	296	60	376	580	412
			71	272	18	318	262	18.8	312	252	19.8	306	70	338	522	370
Ta pu-30 A 2	11000	22.4	59	314	23.8	378	304	24.8	370	292	26	364	40	642	982	706
			63	326	24	390	316	25	384	304	26.2	376	50	586	900	644
			67	340	24.2	404	328	25.2	396	316	26.4	388	60	532	816	584
			71	352	24.2	418	342	25.4	410	330	26.6	402	70	476	736	522
Ta pu-40 A 2	14000	26.8	59	348	27.4	422	336	28.6	414	324	29.6	406	40	766	1192	840
			63	362	27.6	438	350	28.8	428	338	30	420	50	700	1092	770
			67	378	27.8	452	364	29.2	444	352	30.4	434	60	632	988	694
			71	394	28.2	468	380	29.4	458	366	30.6	450	70	568	890	624
Ta pu-50 A 2	16000	33.6	59	436	35.2	532	420	36.6	520	406	38	510	40	920	1414	1010
			63	454	35.6	550	438	37	540	422	38.4	528	50	840	1296	920
			67	474	36	570	456	37.4	558	440	38.8	546	60	762	1174	838
			71	492	36.2	590	476	37.8	578	458	39.4	566	70	684	1058	750
Ta pu-60 A 2	19000	39.8	59	496	41.8	612	478	43.6	598	460	45.2	586	40	1010	1702	1220
			63	518	42.2	632	500	44	620	480	45.6	606	50	1016	1562	1116
			67	540	42.6	656	520	44.4	642	500	46.2	628	60	922	1420	1014
			71	562	43	678	542	44.8	664	522	46.8	650	70	828	1280	910
Ta pu-70 A 2	23000	50.2	59	620	54.2	770	598	56.4	754	576	58.4	734	40	1390	2122	1528
			63	646	54.8	796	622	57	780	600	59.2	764	50	1274	1946	1400
			67	672	55.4	824	648	57.8	806	642	60	790	60	1158	1772	1270
			71	700	56	852	676	58.4	834	650	60.6	816	70	1042	1600	1146
Ta pu-80 A 2	28000	56.4	59	744	64.4	920	718	66.8	902	690	69.2	882	40	1648	2542	1810
			63	778	65	954	748	67.6	934	720	70.2	914	50	1512	2334	1660
			67	810	65.8	988	782	68.4	968	752	71.2	948	60	1376	2124	1510
			71	844	66.4	1022	814	69.2	1000	784	72	982	70	1242	1924	1360
Ta pu-100 A 2	31000	67.2	59	912	75.8	1116	880	79.0	1094	848	82	1074	40	1904	2900	2060
			63	950	76.4	1156	918	79.8	1134	886	82.8	1112	50	1746	2660	1960
			67	990	77.2	1196	956	80.4	1174	924	83.8	1152	60	1590	2432	1690
			71	1032	77.6	1238	998	81.2	1214	962	84.6	1192	70	1434	2196	1572
Ta pu-120 A 2	37000	79.4	59	1090	90.8	1336	1052	94.6	1308	1016	98	1284	40	2210	3400	2430
			63	1136	92	1384	1098	95.6	1356	1060	99.4	1330	50	2020	3120	2220
			67	1186	92.8	1434	1144	96.8	1406	1104	100.6	1378	60	1848	2846	2020
			71	1234	93.8	1484	1192	97.8	1454	1152	101.8	1426	70	1668	2570	1830

Notes:

- E.A.T. : Entering Air D.B. Temperature (°F)
- E.WB.T. : Entering Air W.B. Temperature (°F)
- T.C. : Total Cooling Capacity
- KW : Compressor Kilowatt Input
- T.H.R : Condenser Total Heat Rejection Capacity
- Entering Hot Water Temperature = 180°F
- ΔT<sub>H</sub> - : Hot Water Entering and Leaving Temperature Difference
- MBH = 1000 BTU/HR



## PERFORMANCE TABLES

### AIR COOLED PACKAGED UNIT ( TWO COMPRESSOR )

Cont. Table 14

Model	Nominal CFM	Coil F.A. Sq. Ft	Cooling									Heating				
			E.WB.T (°F)	Ambient Temp. (°F)									E.A.T (°F)	Capacity ( MBH )		Steam 5 PSIG 1-Row
				115			120			125				Hot Water [AT=20°F]		
				TC (MBH)	KW	THR (MBH)	TC (MBH)	KW	THR (MBH)	TC (MBH)	KW	THR (MBH)		1-Row	2-Row	
Ta pu-10 A 2	4000	8.4	59	104	9.8	132	102	10	132	100	10.2	130	40	220	340	242
			63	110	10	138	108	10	136	104	10.2	134	50	200	310	220
			67	114	10	144	112	10.2	142	110	10.4	140	60	180	280	198
			71	120	10.2	148	118	10.4	146	114	10.6	146	70	162	252	178
Ta pu-15 A 2	6600	12.4	59	182	14.8	228	180	17	226	174	17.4	224	40	340	534	378
			63	190	17	238	186	17.2	234	182	17.6	232	50	308	486	338
			67	198	17.2	246	196	17.4	244	190	18	240	60	278	440	304
			71	206	17.4	254	204	17.6	252	198	18	248	70	248	396	272
Ta pu-20 A 2	8000	16.4	59	214	20	270	210	20.2	268	206	20.6	264	40	454	700	500
			63	224	20.2	278	220	20.4	276	214	21	272	50	414	640	454
			67	232	20.4	288	230	20.8	286	224	21.2	282	60	376	580	412
			71	242	20.6	298	238	21	296	234	21.4	292	70	338	522	370
Ta pu-30 A 2	11000	22.4	59	282	27	356	278	27.4	354	272	28	350	40	642	982	706
			63	294	27.4	368	290	27.8	366	282	28.4	362	50	586	900	644
			67	306	27.6	380	300	28	378	296	28.8	374	60	532	816	584
			71	318	27.8	394	314	28.4	390	306	29	386	70	476	736	522
Ta pu-40 A 2	14000	26.8	59	312	30.6	398	308	31	394	300	31.6	388	40	766	1192	840
			63	326	31	412	320	31.4	408	314	32.2	402	50	700	1092	770
			67	340	31.4	426	334	32	422	326	32.6	416	60	632	988	694
			71	354	31.8	440	348	32.4	436	340	33	430	70	568	890	624
Ta pu-50 A 2	16000	33.6	59	390	39.2	498	384	39.8	494	374	40.4	488	40	920	1414	1010
			63	406	39.8	516	400	40.4	512	390	41	504	50	840	1296	920
			67	424	40.4	534	418	40.8	530	408	41.6	522	60	762	1174	838
			71	442	40.8	554	436	41.4	548	424	42.2	540	70	684	1058	750
Ta pu-60 A 2	19000	39.8	59	442	46.6	572	434	47.2	566	422	48.2	556	40	1010	1702	1220
			63	460	47.2	592	452	48	586	440	48.8	576	50	1016	1562	1116
			67	480	47.8	612	472	48.6	606	460	49.4	596	60	922	1420	1014
			71	500	48.4	634	492	49	628	480	50.2	618	70	828	1280	910
Ta pu-70 A 2	23000	50.2	59	552	60.4	722	544	61.2	716	530	62.4	706	40	1390	2122	1528
			63	576	61.4	748	566	62.2	740	554	63.4	730	50	1274	1946	1400
			67	600	62.2	774	592	63	766	576	64.4	756	60	1158	1772	1270
			71	626	63	800	616	63.8	792	602	65.2	782	70	1042	1600	1146
Ta pu-80 A 2	28000	56.4	59	662	71.6	862	652	72.6	854	636	74	842	40	1648	2542	1810
			63	692	72.8	894	680	73.6	886	664	75.2	874	50	1512	2334	1660
			67	722	73.8	926	712	74.8	918	694	76.2	906	60	1376	2124	1510
			71	754	74.8	960	742	75.8	952	724	77.4	938	70	1242	1924	1360
Ta pu-100 A 2	31000	67.2	59	818	84.8	1054	806	86	1046	790	87.8	1034	40	1904	2900	2060
			63	854	86	1090	842	87.2	1082	824	89	1070	50	1746	2660	1960
			67	892	86.8	1130	878	88.2	1120	860	90.2	1108	60	1590	2432	1690
			71	930	88	1168	916	89.2	1160	898	91.2	1146	70	1434	2196	1572
Ta pu-120 A 2	37000	79.4	59	980	101.6	1260	966	103	1250	944	105	1238	40	2210	3400	2430
			63	1022	103	1304	1008	104.4	1294	986	106.6	1280	50	2020	3120	2220
			67	1066	104.4	1352	1052	105.8	1342	1030	108.2	1328	60	1848	2846	2020
			71	1112	105.6	1398	1096	107.2	1390	1074	109.6	1372	70	1668	2570	1830

Notes:

- E.A.T. : Entering Air D.B. Temperature (°F)
- E.WB.T. : Entering Air W.B. Temperature (°F)
- T.C. : Total Cooling Capacity
- KW : Compressor Kilowatt Input
- T.H.R. : Condenser Total Heat Rejection Capacity
- Entering Hot Water Temperature = 180°F
- ΔT<sub>H</sub> - : Hot Water Entering and Leaving Temperature Difference
- MBH = 1000 BTU/HR

## Weights And Operating Charges

**Table 15**

Model		Ref. charge (Kg)		Oil Charge U.S Gals	Section (Kg)						
		Water Cooled	Air Cooled		Fan Section	Coil Section	Mix Box Section	S. Filter Section	Air Cooled Condenser Section	Compressor Section	
										Water Cooled	Air Cooled
Ta pu	5 1	3.5	2.5	0.5	240	210	160	160	280	430	330
Ta pu	8 1	5.5	3.5	1	275	235	190	180	400	480	380
Ta pu	10 1	7.0	4.5	1	300	370	290	220	595	585	430
Ta pu	15 1	10.5	7.0	1	420	445	330	235	880	660	480
Ta pu	20 1	14.0	9.0	1	485	510	370	255	1100	720	520
Ta pu	25 1	17.5	11.5	1.1	500	530	385	265	1170	760	530
Ta pu	30 1	21.0	13.5	1.1	650	565	435	280	1350	810	570
Ta pu	35 1	24.5	16.0	1.1	660	580	450	285	1400	865	585
Ta pu	40 1	28.0	18.0	2	700	685	510	300	1700	915	630
Ta pu	50 1	35.0	22.5	2	800	800	560	360	2000	1100	730
Ta pu	60 1	42.0	27.0	2	940	910	670	385	2340	1280	780
Ta pu	10 2	7.0	5.0	1	300	370	290	220	595	770	550
Ta pu	15 2	11.0	7.0	2	420	445	290	235	880	850	630
Ta pu	20 2	14.0	9.0	2	485	510	370	255	1100	970	670
Ta pu	30 2	21.0	14.0	2	650	565	435	280	1350	975	725
Ta pu	40 2	28.0	18.0	2	700	685	510	295	1700	1180	790
Ta pu	50 2	35.0	23.0	2.2	800	800	560	360	2000	1330	890
Ta pu	60 2	42.0	27.0	2.2	940	910	670	385	2340	1480	940
Ta pu	70 2	49.0	32.0	2.2	960	945	680	395	2680	1570	990
Ta pu	80 2	56.0	36.0	4	1090	1240	700	425	3250	1730	1080
Ta pu	100 2	70.0	45.0	4	1200	1450	770	470	3900	1950	1230
Ta pu	120 2	84.0	54.0	4	1320	1600	850	520	4600	2200	1400

Note :

- 1- For split air cooled packaged units, add the condenser and the connecting piping charges to the corresponding table values .
- 2- Values given above may vary based on specific design requirements .

### Weight Of Refrigerant In Cooper Lines Kg Per 100 Ft .

Table 16 Dimensions		
O.D Line Size (Inch)	Liquid -100°F	Hot Gas -120 °F Condensing
3/8	1.75	0.10
1/2	3.24	0.17
5/8	5.24	0.28
7/8	10.90	0.57
1 1/8	18.55	0.97
1 3/8	28.23	1.48
1 5/8	40.00	2.10
2 1/8	69.55	3.65
2 5/8	107.27	5.64
3 1/8	152.73	8.05
3 5/8	207.27	10.91
4 1/8	269.10	14.14

## Engineering Data

### Single Compressor Models

Table 17

Model	pu-5 A 1		pu 8 A 1		pu-10 A 1		pu-15 A 1		pu-20 A 1		pu-25 A 1		pu-30 A 1		pu-35 A 1		pu-40 A 1		pu-50 A 1		pu-60 A 1			
	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled		
Compressor Motor (Per Unit)	HP	5		7.5		10		15		20		25		30		35		40		50		60		
	RLA	7.5	8.6	12.9	14.9	14.9	17.4	19.8	23.3	23.1	26.2	29.0	33.0	32.3	38.1	45.6	52.1	50.4	57.2	68.1	77.1	81.9	92.4	
	FLA	8.1	9.7	14.0	17.0	16.3	18.6	21.8	25.1	24.9	28.2	31.4	35.5	36.3	41.4	49.5	56.3	54.5	61.8	73.3	82.3	88.2	99.6	
	MOC	10.3		18.0		21.3		28.0		30.5		40.1		47.7		62.4		71.8		91.6		107.0		
	LRA	55		106		121		129		160		192		218		284		347		444		544		
Blower	HP	2		2		3		4		5.5		5.5		7.5		7.5		10		10		10		
	FLA	3.4		3.4		4.8		6.5		8.3		8.3		10.9		10.9		15.2		15.2		15.2		
	LRA	20		20		24.2		41.3		49.3		49.3		73.2		73.2		107.3		107.3		107.3		
System	Max <sup>1</sup> Kw Input	6.3	7.4	9.6	11.3	11.5	11.8	15.5	18.7	18.6	22.0	22.7	26.9	28.2	33.2	34.1	40.7	41.5	49.4	46.9	56.1	55.0	66.2	
	FLA	11.5	13.1	17.4	20.4	21.1	23.4	28.3	31.6	33.2	36.5	39.7	43.8	47.2	52.3	60.4	67.2	69.7	77.0	88.5	97.5	103.4	114.8	
	Wire <sup>2</sup> Size	4 x 4		4 x 4		4 x 6		4 x 10		4 x 10		4 x 16		3 x 25 / 16		3 x 25 / 16		3 x 35 / 16		3 x 50 / 25		3 x 50 / 25		3 x 70 / 35

### Two Compressor Models

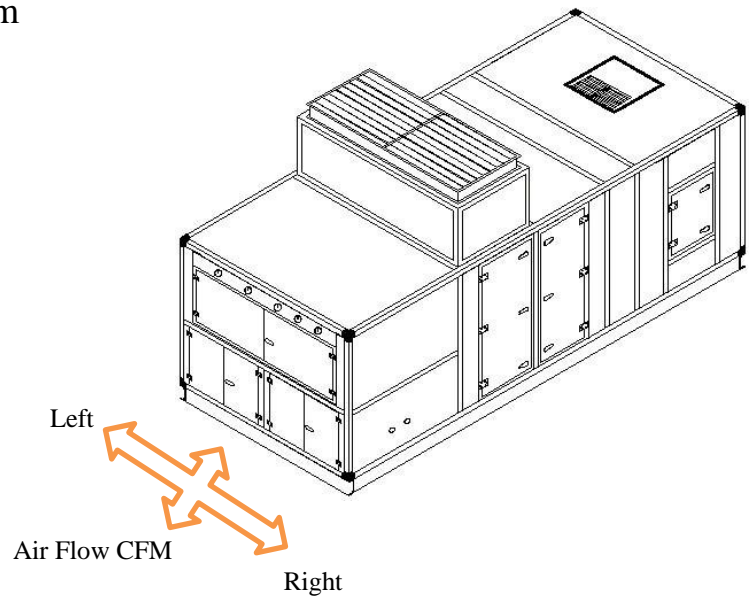
Cont Table 17

Model	pu-10 A 2		pu 15 A 2		pu-20 A 2		pu-30 A 2		pu-40 A 2		pu-50 A 2		pu-60 A 2		pu-70 A 2		pu-80 A 2		pu-100 A 2		pu-120 A 2							
	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled	Water Cooled	Air Cooled						
Compressor Motor (Per Unit)	HP	5		7.5		10		15		20		25		30		35		40		50		60						
	RLA	7.5	8.6	12.9	14.9	14.9	17.4	19.8	23.3	23.1	26.2	29.0	33.0	32.3	38.1	45.6	52.1	50.4	57.2	68.1	77.1	81.9	92.4					
	FLA	8.1	9.7	14.0	17.0	16.3	18.6	21.8	25.1	24.9	28.2	31.4	35.5	36.3	41.4	49.5	56.3	54.5	61.8	73.3	82.3	88.2	99.6					
	MOC	10.3		18.0		21.3		28.0		30.5		40.1		47.7		62.4		71.8		91.6		107.0						
	LRA	55		106		121		129		160		192		218		284		347		444		544						
Blower	HP	2		2		3		4		5.5		5.5		7.5		7.5		10		10		10						
	FLA	4		4		5.3		7.5		8.8		8.8		12.2		12.2		16.5		16.5		16.5						
	LRA	20		20		24.2		41.3		49.3		49.3		73.2		73.2		107.3		107.3		107.3						
System	Max <sup>1</sup> Kw Input	10.7	13.0	16.7	20.7	20.3	22.9	27.4	33.8	32.5	39.2	40.6	49.1	50.0	59.9	61.8	75.1	74.4	90.2	82.3	103.6	101.4	123.8					
	FLA	19.6	22.8	31.4	37.4	37.4	42.0	50.0	56.6	58.1	64.4	71.0	79.2	83.5	93.7	109.9	123.5	124.1	138.8	161.7	179.9	191.5	214.5					
	Wire <sup>2</sup> Size	4 x 6	4 x 10	4 x 10		4 x 10		3 x 35 / 16		3 x 25 / 16		3 x 35 / 16		3 x 35 / 16		3 x 50 / 25		3 x 70 / 35		3 x 70 / 35		3 x 95 / 50		3 x 120 / 70		3 x 120 / 70		3 x 150 / 70

#### Notes:

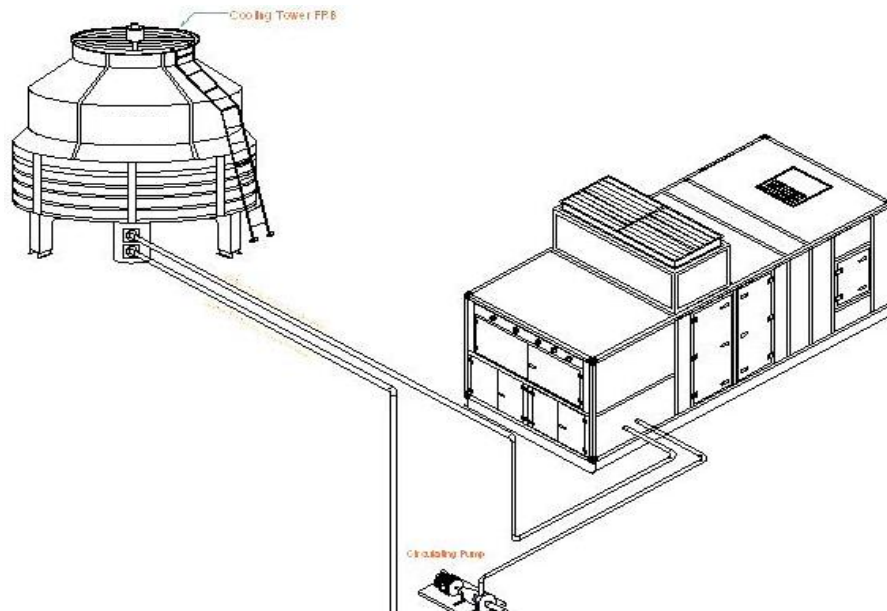
- LRA : Locked Rotor Amps
  - MOC : Maximum Operating Current
  - FLA : Full Load Amps
  - RLA : Rated Load Amps
- 1- Maximum Power Input is the value which after applying such factors as safety and future additions can be used
    - to figure out the amount of electricity required .
  - 2- Suggested cable size based on copper conductor under full load conditions (FLA) at maximum ambient
    - temperature of 50 C and maximum distance of 70 m.
  - 3- For unitary packaged units also consider the air cooled condensers data relating to items listed under
    - “ system “. As the data given under “ system “ correspond to a split type operation .
    - Excluding the amount of refrigerant for an air cooled condenser & relevant pipings .

## Schematic Piping Diagram

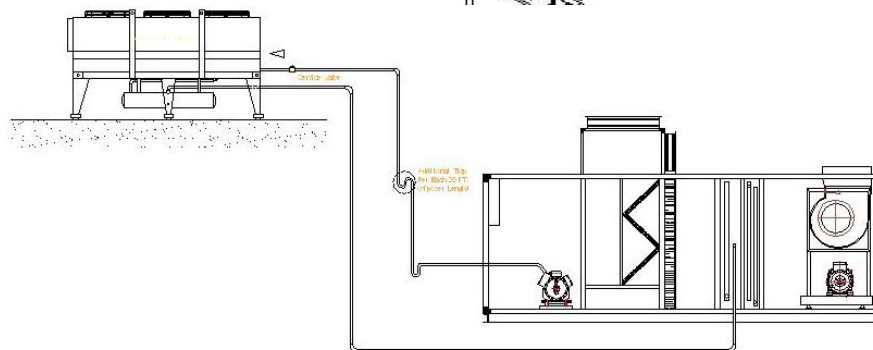


\* Right handed coil connections are shown

### Water Cooled System



### Air Cooled System



Note:

- The above schematic diagram must not be taken as complete piping procedures

Table 18		Enthalpy / Altitude				
Air Wet Bulb Temp. °F	Altitude (ft.)					
	0	1000	2000	3000	4000	5000
	Enthalpy(BTU/LB)					
35	13.0	13.2	13.3	13.5	13.7	13.9
36	13.4	13.5	13.8	14	14.2	14.5
37	13.9	14	14.3	14.4	14.7	14.8
38	14.2	14.5	14.7	15	15.1	15.3
39	14.8	15	15.2	15.4	15.6	15.9
40	15.2	15.4	15.7	15.9	16.2	16.4
41	15.7	15.9	16.1	16.4	16.6	16.8
42	16.2	16.4	16.6	16.9	17.2	17.2
43	16.6	16.9	17.1	17.4	17.6	18
44	17.2	17.4	17.6	17.9	18.2	18.5
45	17.7	17.9	18.2	18.4	18.7	19
46	18.2	18.4	18.7	19	19.3	19.6
47	18.7	18.9	19.3	19.5	19.8	20.2
48	19.2	19.5	19.8	20	20.4	20.8
49	19.7	20	20.4	20.6	21	21.3
50	20.3	20.6	20.9	21.2	21.6	22.3
51	20.9	21.2	21.5	21.8	22.2	22.6
52	21.4	21.7	22.1	22.5	22.8	23.2
53	22.0	22.4	22.7	23.1	23.5	24
54	22.6	23	23.4	23.8	24.1	24.6
55	23.2	23.6	24	24.4	24.8	25.3
56	23.8	24.2	24.6	25	25.5	25.9
57	24.4	24.8	25.3	25.8	26.2	26.7
58	25.2	25.9	25.9	26.4	26.9	27.4
59	25.8	26.2	26.7	27.2	27.6	28.2
60	26.5	26.9	27.4	27.8	28.4	28.9
61	27.2	27.6	28.1	28.6	29.2	29.7
62	27.9	28.3	28.9	29.4	29.9	30.5
63	28.5	29	26.6	30.2	30.7	31.4
64	29.3	29.8	30.3	31	31.6	32.2
65	30.1	30.6	31.2	31.7	32.3	33
66	30.8	31.4	32	32.6	33.3	33.9
67	31.6	32.2	32.8	33.5	34.1	34.8
68	32.4	33	33.7	34.3	35	35.8
69	33.2	33.9	34.5	35.3	35.9	36.7
70	34.0	34.7	35.4	36.1	36.9	37.6
71	34.9	35.6	36.3	34	37.9	38.6
72	35.8	36.5	37.3	38	38.8	39.7
73	36.7	37.5	38.2	39	39.9	40.7
74	37.6	38.4	39.2	40	40.9	41.8
75	38.6	39.4	40.2	41	42	42.9
76	39.6	40.3	41.2	42.1	43	44
77	40.6	41.4	42.3	43.2	44.2	45.2
78	41.5	42.5	43.4	44.3	45.3	46.4
79	42.6	43.5	44.5	45.5	46.5	47.5
80	43.7	44.6	45.6	46.6	47.6	48.8
81	44.8	45.8	46.7	47.8	48.8	50
82	45.9	46.9	48	49	50.3	51.4
83	47.0	48.1	49.2	50.3	51.5	52.8
84	48.2	49.3	50.4	51.6	52.9	54.2
85	49.4	50.3	51.7	53	54.2	55.9