

Packaged Unit



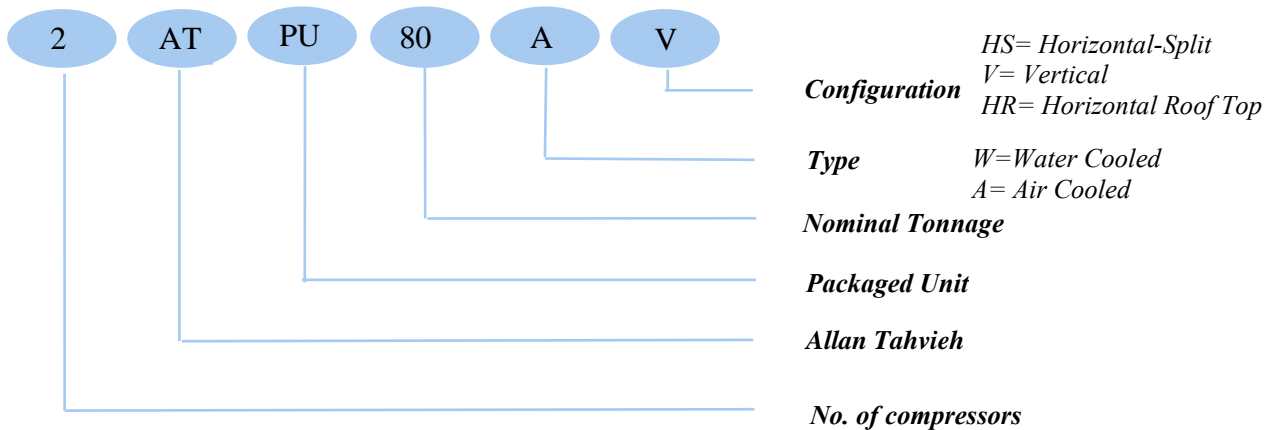
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Nomenclature



Features

In all Allan Tahviah Packaged Units the frames are from galvanized steel sheets while the chassis and body panels are made from galvanized steel sheets in appropriate thicknesses. Allan Tahviah 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 balanced, 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 eliminate 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/3Ø/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" 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-407cor R-134a 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 rows configurations. Steam heating coils are constructed of 1/2" 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. Washable aluminum filter modules 2 inches in thickness are arranged in (V) type configuration inside these boxes. In this section a free space f or special filter of the pleated type only has been considered.

4- Special Filter Section:

This section may include pleated 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 pleated 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 a slant in order for the coils to occupy less space.

Air cooling condenser coils 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 380 V/ 3Ø/50 Hz, Ins.Cl.F and IP-55 electric motors.

6- Compressor Section:

In cases where Split Air or Water Cooling Packaged Units are selected, this section would be an integral portion of the pack aged 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
 Refrigerant = R22
 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
 Attitude = 3000 FT
 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 table1 @ 63°F Ent. W.B. and 95°F condenser LVG Water temp., Select 1ALPU-30W producing 285000 Btu/hr of cooling @ the nominal CFM of 9500. As 9400 CFM is 99% of the nominal CFM, from table7 the capacity correction factor is 0.994.

Therefore actual cooling capacity is $(285000 \times 0.994 = 283290 \text{ Btu/hr})$.

From table1, condenser water flow rate and the corresponding pressure drop are given as 70 GPM and 7.6 Ft of water respectively.

$$\text{Lvg. DB temp.} = \text{Ent. DB temp.} - \frac{\text{Cooling Capacity} \times \text{Sensible Heat Factor}}{1.085 \times \text{CFM}} = 75 - \frac{283290 \times 0.74}{1.085 \times 9400} = 54.45^\circ\text{F}$$

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

Entering table17 @ 3000FT altitude and $H_{\text{LVG}} = 23.38 \text{ Btu/hr}$, LVG. WB temp is determined to be 53.4°F. From table5 considering a 1TIPU-30W 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 table7 @ CFM ratio of 99% under heating, correction factor of 0.995 is determined. From table6B for 10PSIG saturated steam, the capacity correction factor is 1.07, Therefore, the corrected heating capacity is $(558000 \times 0.995 \times 1.07 = 594074)$. From table1 coil face area is 19.9 ft².

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

By referring to table8, table10, table10A, table11 and table12 determine the air P.D.

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

Heating coil P.D. = $0.136 \times 0.69 = 0.094 \text{ In.W.G}$

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. = $0.76 + 0.094 + 0.085 + 0.1 + 0.06 + 0.05 = 1.15 \text{ In.W.G}$

Total static air P.D. = Internal static air P.D. + External static air P.D. = $1.15 + 0.65 = 1.8 \text{ In.W.G}$

Air Cooled Packaged Unit

Given:

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 table3 @ 63°F Ent. WB and 110 °F ambient air temperature, select unit 1ATPU-30A producing 240000Btu/hr of cooling @ the nominal CFM of 9500 as 9400 CFM is 99% of the nominal CFM, from table7 the capacity correction factor is 0.994 Therefore, actual cooling capacity is (240000 x 0.994 = 238560 Btu/hr).

From table3 we also determine the T.H.R to be 324000 Btu/hr.

Entering table9 @ 63°F Ent.W.B and 75°F Ent.D.B the approximate sensible heat factor is 0.74.

$$\text{Lvg. DB temp.} = \text{Ent. DB temp.} - \frac{\text{Cooling Capacity} \times \text{Sensible Heat Factor}}{1.085 \times \text{CFM}} = 75 - \frac{238560 \times 0.74}{1.085 \times 9400} = 57.7^\circ\text{F}$$

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

Entering table17 @ 3000 Ft. Altitude and H LVG. = 24.45 Btu/hr , Lvg. WB temp. is determined to be 55.1°F

From table5 and considering a 1ATPU- 30 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 table7 @ CFM ratio of 99%, under heating, correction factor of 0.995 is determined. Entering table6A @ 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 0.995x 1.25 = 631825 Btu/hr.) From table3, coil face area is 19.9 ft².

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

By referring to table8, table10, table10A, table11 and table12 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 pressure = internal static air P.D. + External static air P.D. = 1.15 + 0.65 = 1.8 In .W.G

Performance Tables

Water Cooled Packaged Unit (Refrigerant: R22)

Table 1

Model	Nomi. CFM	Coil Face Area (Sq.Ft)	Cooling								
			E.WB.T (°F)	Condenser Water		Condensing Temperature (°F)					
						85		95		105	
				GPM	PD (Ft.WG)	TC (KBH)	KW	TC (KBH)	KW	TC (KBH)	KW
1ATPU-5-W	2000	4.2	59	15.5	2.9	69	3.4	66	3.75	60	4.14
			63	15.9	2.9	71	3.30	68	3.74	63	4.16
			67	16.3	3.2	75	3.29	69	3.75	66	4.18
			71	16.7	3.3	77	3.28	72	3.75	69	4.19
1ATPU-8-W	3300	6.2	59	26.5	5.9	119	5.7	112	6.36	105	7.06
			63	27.3	6.2	123	5.7	116	6.36	108	7.06
			67	27.9	6.4	127	5.57	119	6.36	111	7.2
			71	28.7	6.7	131	5.57	122	6.36	115	7.2
1ATPU-10-W	4000	8.2	59	31.3	6.5	141	6.7	132	7.46	123	8.4
			63	32	6.9	145	6.56	136	7.6	127	8.35
			67	32.9	6.9	149	6.56	139	7.6	132	8.5
			71	33.7	7.5	154	6.6	144	7.6	136	8.5
1ATPU-15-W	5500	11.2	59	40.5	5.9	182	8.96	171	10.2	159	11.4
			63	41.5	6.3	187	8.9	176	10.2	165	11.4
			67	42.7	6.4	192	8.9	181	10.3	169	11.5
			71	43.7	6.5	198	8.86	187	10.3	175	11.5
1ATPU-20-W	7000	13.4	59	45.2	6.1	199	10.7	186	11.9	174	13
			63	46.2	6.3	205	10.7	192	11.9	179	13.2
			67	47.3	6.6	211	10.7	198	11.9	185	13.3
			71	48.5	6.9	218	10.7	204	12.1	189	13.4
1ATPU-25-W	8000	16.8	59	57	9.2	252	13.8	237	15.4	222	16.9
			63	58.7	9.6	259	13.9	244	15.5	229	16.9
			67	60	9.8	267	13.9	252	15.5	236	17.1
			71	61.7	10.2	275	13.9	259	15.6	244	17.2
1ATPU-30-W	9500	19.9	59	68.1	6.9	298	16.8	281	18.7	262	20.4
			63	49.9	7.1	308	16.9	289	18.8	271	20.5
			67	71.7	7.9	317	16.9	298	18.9	279	20.7
			71	73.5	8.4	327	16.9	308	18.9	288	20.9
1ATPU-35-W	11500	25.1	59	83.1	5	361	21.4	339	23.7	316	25.9
			63	85.1	5.3	372	21.4	349	23.8	326	26.2
			67	87.3	5.6	383	21.5	359	23.9	336	26.3
			71	89.5	5.8	394	21.5	369	24.1	346	26.5
1ATPU-40-W	14000	28.2	59	99.5	5.2	434	25.3	407	28.1	379	30.7
			63	102	5.4	447	25.4	419	28.2	392	31.9
			67	104.9	5.6	461	25.4	432	28.4	404	31.2
			71	107.5	5.9	475	25.5	446	28.5	417	31.4
1ATPU-50-W	15500	33.6	59	119.3	6.4	521	29.9	489	32.9	456	35.8
			63	122.5	6.5	537	29.9	504	33.2	469	36.1
			67	125.7	6.6	554	30.1	519	33.4	485	36.4
			71	129.1	6.9	571	30.2	536	33.5	501	36.7
1ATPU-60-W	18500	39.7	59	144.9	9.2	657	36	617	39.9	578	43.7
			63	148.6	9.4	698	36.1	656	40.4	615	44.3
			67	152.6	9.9	755	36.2	710	40.7	667	44.9
			71	156.4	10.3	785	36.3	739	40.8	639	45.3

Notes:

- 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.)
- KBH = 1000 Btu/hr

Performance Tables

Water Cooled Packaged Unit (Refrigerant: R22)

Table 1 (Cont.)

Model	Nomi. CFM	Coil Face Area (Sq.Ft)	E.WB.T (°F)	Cooling							
				Condenser Water		Condensing Temperature (°F)					
				GPM	PD (Ft.WG)	85		95		105	
						TC (KBH)	KW	TC (KBH)	KW	TC (KBH)	KW
2ATPU-10-W	4000	8.4	59	30.9	5.7	139	6.7	131	7.47	121	8.27
			63	31.7	5.9	143	6.59	135	7.47	125	8.4
			67	32.5	6.3	149	6.57	139	7.49	131	8.35
			71	33.3	6.5	153	6.55	143	7.49	137	8.39
2ATPU-15-W	6600	12.4	59	52.9	11.7	239	11.3	223	12.8	209	14.2
			63	53.5	12.3	245	11.3	231	12.8	215	14.2
			67	55.7	12.7	253	11.3	237	12.8	221	14.3
			71	57.3	12.3	261	11.3	24	12.8	229	14.3
2ATPU-20-W	8000	16.4	59	62.5	12.9	281	12.13	263	14.9	245	16.7
			63	64	13.7	289	13.2	271	15	253	16.8
			67	65.7	13.9	257	13.2	279	15	261	16.9
			71	67.3	14.9	307	13	287	15	269	16.9
2ATPU-30-W	11000	22.4	59	80.9	11.7	363	17.9	341	20.2	319	22.7
			63	82.9	12.5	373	17.9	351	20.2	329	22.7
			67	85.7	12.7	388	17.9	361	20.4	339	22.9
			71	87.2	12.9	395	17.8	373	20.4	349	22.9
2ATPU-40-W	14000	26.8	59	90	12	397	20.13	371	23.6	347	26
			63	92	12.5	409	20.13	383	23.8	357	26.3
			67	94.5	13	421	20.13	395	23.8	369	26.5
			71	96.9	13.7	435	20.13	407	24	379	26.7
2ATPU-50-W	16000	33.6	59	114	18.3	503	27.5	473	30.6	443	33.7
			63	117.3	19	517	27.7	487	30.8	457	33.9
			67	120	19.4	532	27.6	502	30.8	470	34
			71	123.3	20.3	549	27.7	517	31	487	34.3
2ATPU-60-W	19000	39.8	59	137	13.9	695	32.5	561	37.2	523	40.7
			63	139.7	14	615	33.7	571	37.4	541	40.9
			67	143.3	15.9	633	33.7	595	37.6	557	41.3
			71	146.9	16.7	653	33.9	615	37.8	535	41.3
2ATPU-70-W	23000	50.2	59	166	9.9	721	42.7	677	47.2	631	51.9
			63	170	10.5	743	42.7	697	47.4	651	52.3
			67	174.5	11	765	42.9	719	47.8	671	52.5
			71	178.9	17.5	787	42.9	739	48	791	52.9
2ATPU-80-W	28000	56.4	59	198.9	10.3	867	50.5	813	56	759	61.3
			63	205	10.7	893	50.7	836	56.3	783	61.9
			67	209.7	11	921	50.7	863	56.7	807	62.3
			71	214.9	11.7	949	50.9	891	56.9	833	62.7
2ATPU-100-W	31000	67.2	59	238.5	12.7	1041	59.7	977	65.9	911	71.5
			63	244.9	12.9	1073	59.9	1007	66.3	939	72
			67	251.3	13	1107	60	1039	66.7	969	72.7
			71	259	13.9	1141	60.3	1071	66.9	1001	73.3
2ATPU-120-W	37000	79.4	59	289.8	18.3	1313	71.9	1233	79.9	1155	87.3
			63	297.3	18.7	1395	72	1311	80.7	1229	88.5
			67	305.3	19.7	1509	72.3	1419	81.3	1333	89.9
			71	312.9	20.5	1569	72.5	1477	81.5	1279	90.5

NOTES:

- 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.)
- KBH = 1000 Btu/hr

Performance Tables

Water Cooled Packaged Unit (Refrigerant: R134a)

Table 2

Model	Nomi. CFM	Coil Face Area (Sq.Ft)	Cooling								
			E.WB.T (°F)	Condenser Water		Condensing Temperature (°F)					
						85		95		105	
				GPM	PD (Ft.WG)	TC (KBH)	KW	TC (KBH)	KW	TC (KBH)	KW
1ATPU-5-W	2000	4.2	59	16.6	2.9	74	3.79	69	4.25	64	4.67
			63	17	3.4	76.7	3.89	71.7	4.27	66.6	4.69
			67	17.6	3.7	79	3.89	75	4.28	69	4.73
			71	18	3.8	82	3.89	76.6	4.29	71.6	4.76
1ATPU-8-W	3000	5.9	59	19.9	5.7	89.7	4.6	83.6	5.06	77.6	5.7
			63	20.7	5.8	92.6	4.6	86.6	5.2	81	5.66
			67	21.3	5.9	95.6	4.6	89.6	5.2	84	5.66
			71	21.9	5.9	99	4.5	92.6	5.2	87	5.7
1ATPU-10-W	4000	8.2	59	30.3	6.9	136	6.96	126	7.8	116	8.46
			63	31.3	7.4	141	6.96	131	7.76	119	8.6
			67	32	7.8	145	7	135	7.86	124	8.7
			71	33	8	149	7.06	139	7.9	129	8.66
1ATPU-15-W	5500	11.2	59	36.9	5.8	166	8.46	154	9.56	142	10.6
			63	38	6	172	8.6	159	9.7	147	10.6
			67	39.3	6	178	8.6	165	9.66	152	10.8
			71	40.3	6	184	8.6	171	9.8	158	10.9
1ATPU-20-W	8200	16.8	59	54	8	234	14.9	218	16.3	201	17.5
			63	55.7	9	242	15	225	16.4	208	17.7
			67	57.3	8.3	249	15.2	233	16.6	216	17.9
			71	58.9	8.4	258	15.3	241	16.8	223	18.2
1ATPU-30-W	9500	19.9	59	65.9	7	286	18	265	19.6	244	21
			63	67.9	7.2	296	18.2	274	19.8	253	21.4
			67	69.9	7.9	306	18.4	284	20	262	21.6
			71	72	8	316	18.5	293	20.3	271	21.9
1ATPU-40-W	13000	25.5	59	76.7	4.7	335	20.2	313	21.9	291	23.7
			63	78.9	4.8	347	20.2	324	22	301	23.9
			67	81.3	4.9	359	20.3	335	22.3	312	24
			71	83.7	4.9	371	20.4	347	22.4	323	24.3
1ATPU-50-W	14500	30	59	89.9	5.7	388	24.9	362	27	337	28.9
			63	92.5	5.8	401	25.2	375	27.3	349	29.3
			67	95.3	5.9	415	25.3	388	27.6	362	29.5
			71	98	6.1	429	25.5	402	27.8	374	29.9
1ATPU-60-W	18500	39.7	59	105.7	8.7	459	28.3	429	31	397	33.4
			63	108.7	8.8	475	28.5	444	31.4	412	33.8
			67	111.9	8.9	491	28.6	459	31.6	427	34.2
			71	115	8.9	507	28.8	474	31.9	441	34.5

Notes:

- 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.)
- KBH = 1000 Btu/hr

Performance Tables

Water Cooled Packaged Unit (Refrigerant: R134a)

Table 2 (Cont.)

Model	Nomi. CFM	Coil Face Area (Sq.Ft)	Cooling								
			E.WB.T (°F)	Condenser Water		Condensing Temperature (°F)					
						85		95		105	
				GPM	PD (Ft.WG)	TC (KBH)	KW	TC (KBH)	KW	TC (KBH)	KW
2ATPU-10-W	4000	8.4	59	34	5.9	149	7.57	139	8.49	129	9.33
			63	35	6.7	154	7.59	144	8.53	134	9.39
			67	36	7.3	159	7.59	149	8.55	139	9.45
			71	37	7.5	165	7.59	154	8.59	144	9.6
2ATPU-15-W	6000	11.8	59	39.9	11	179	9.5	168	10.2	156	11.3
			63	41.3	11.3	186	9.5	174	10.3	161	11.4
			67	42.5	11.5	192	9.5	179	10.3	167	11.4
			71	43.7	11.7	199	9.5	186	10.3	174	11.5
2ATPU-20-W	8000	16.4	59	60.5	13.5	271	13.9	251	15.5	232	16.9
			63	62.5	14.5	281	13.9	261	15.6	239	17.1
			67	64	15.3	289	14.3	269	15.8	247	17.3
			71	66	16	299	14.2	277	15.9	257	17.4
2ATPU-30-W	11000	22.4	59	73.7	11	331	16.9	307	19.2	283	21.3
			63	76	11.5	343	17.1	317	19.3	293	21.3
			67	78.5	11.7	355	17.1	329	19.4	303	21.5
			71	80.5	11.9	367	17.1	341	19.5	315	21.7
2ATPU-40-W	16400	33.6	59	109	15.7	467	29.9	435	32.5	401	34.9
			63	111.4	15.9	283	30	449	32.7	415	35.3
			67	114.6	16.3	299	30.3	465	33	431	35.7
			71	117.8	16.5	515	30.5	481	33.5	445	36.3
2ATPU-60-W	19000	39.8	59	131.8	13.9	571	36	529	39	487	42.1
			63	135.8	14	591	36.3	547	39.5	505	42.7
			67	139.8	15.5	611	36.7	567	40	523	43
			71	144	16	631	36.9	585	40.5	541	43.7
2ATPU-80-W	26000	51	59	153.4	9	669	40.3	625	43.9	581	47.3
			63	157.8	9.3	693	40.3	647	44.1	601	47.3
			67	162.6	9.5	717	40.7	669	44.4	623	48
			71	167.4	9.7	741	40.7	693	44.7	645	48.5
2ATPU-100-W	29000	67.2	59	179.8	11	775	49.9	723	54	673	57.7
			63	184.9	11.3	801	50.3	749	54.05	697	58.5
			67	190.5	11.7	829	50.5	775	55.1	723	59
			71	196	12	857	50.9	803	55.5	747	59.7
2ATPU-120-W	37000	79.4	59	211.4	17	917	56.5	857	62.1	793	66.7
			63	217.4	17.3	949	56.9	887	62.7	823	67.5
			67	223.4	17.5	981	57	917	63.1	851	68.3
			71	231	17.9	1013	57.6	947	63.7	881	68.9

Notes:

- 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.)
- KBH = 1000 Btu/hr

Performance Tables

Air Cooled Packaged Unit (Refrigerant: R22)

Table 3

Model	Nomi. CFM	Coil Face Area Sq.Ft	Cooling									
			E.WB.T (°F)	Ambient Temperature (°F)								
				90			100			110		
				TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)
1ATPU-5-A	2000	4.2	59	69	3.30	77	65	3.73	74	60	4.13	71
			63	71	3.29	79	67	3.73	76	62	4.15	73
			67	74	3.28	81	69	3.74	75	65	4.17	75
			71	76	3.27	83	71	3.74	80	68	4.19	77
1ATPU-8-A	3300	6.2	59	119	5.60	132	111	6.35	127	104	7.05	122
			63	122	5.60	136	115	6.35	130	107	7.05	125
			67	126	5.60	139	118	6.35	104	110	7.10	129
			71	130	5.60	143	122	6.35	137	114	7.10	132
1ATPU-10-A	4000	8.2	59	140	6.06	156	131	7.45	150	122	8.30	144
			63	144	6.55	160	135	7.50	154	126	8.35	127
			67	128	6.55	164	139	7.50	158	130	8.40	151
			71	153	6.50	168	143	7.50	162	134	8.40	155
1ATPU-15-A	5500	11.2	59	181	8.95	202	170	10.1	196	159	11.3	189
			63	186	8.90	207	175	10.1	201	164	11.3	194
			67	190.5	8.90	213	180	10.2	206	169	11.4	198
			71	197	8.85	218	186	10.2	211	174	11.4	203
1ATPU-20-A	7000	13.4	59	198	10.1	225	185	11.8	216	173	14.0	207
			63	204	10.1	230	191	11.7	222	178	13.1	213
			67	210	10.1	236	197	11.9	227	184	13.2	218
			71	217	10.1	242	203	12.0	233	189	13.3	224
1ATPU-25-A	8000	16.8	59	251	13.7	285	237	15.3	276	221	16.8	266
			63	258	13.8	293	243	15.4	283	228	16.9	273
			67	266	13.8	300	251	15.4	290	235	17.0	280
			71	274	13.8	308	258	15.5	299	243	17.1	287
1ATPU-30-A	9500	19.9	59	297	16.7	340	280	18.6	328	261	20.3	315
			63	307	16.8	349	288	18.7	337	270	20.4	324
			67	316	16.8	358	297	18.8	346	278	20.6	333
			71	326	16.9	367	307	18.9	355	287	20.8	342
1ATPU-35-A	11500	25.1	59	360	21.3	415	338	23.6	400	315	25.9	385
			63	371	21.3	425	348	23.7	410	325	26.1	395
			67	382	21.4	436	359	23.9	421	335	26.2	405
			71	393	21.4	447	369	24.0	432	345	26.4	416
1ATPU-40-A	14000	28.2	59	433	25.2	497	406	28.0	479	379	30.6	461
			63	446	25.3	510	418	28.1	492	391	30.9	473
			67	460	25.3	524	431	28.3	505	403	31.1	486
			71	474	25.3	537	445	28.4	518	416	31.3	499
1ATPU-50-A	15500	33.6	59	520	29.9	596	488	32.9	574	455	35.7	550
			63	536	29.9	607	533	33.1	589	469	36.0	565
			67	553	30.0	625	519	33.3	605	484	36.3	580
			71	570	30.1	645	535	33.4	621	500	36.6	596
1ATPU-60-A	18500	39.7	59	650	35.9	723	610	39.8	696	572	43.4	669
			63	705	36.0	774	663	40.3	746	622	44.2	718
			67	763	36.1	829	718	40.6	799	674	44.9	769
			71	793	36.2	857	746	40.7	826	701	45.2	796

NOTES:

- 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
- Maximum Condensing Temperature is 135°F
- Entering Hot Water Temperature = 180°F
- THR: Total Heat Rejection
- KBH = 1000 Btu/hr

Performance Tables

Air Cooled Packaged Unit (Refrigerant: R22)

Table 3 (Cont.)

Model	Nomi. CFM	Coil Face Area Sq.Ft	Cooling									
			E.WB.T (°F)	Ambient Temperature (°F)								
				115			120			125		
				TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)
1ATPU-5-A	2000	4.2	59	58	4.32	70	56	4.51	68	54	4.69	66
			63	60	4.35	72	58	4.54	70	56	4.74	68
			67	62	4.38	74	60	4.58	72	58	4.77	70
			71	64	4.40	76	62	4.61	74	60	4.81	72
1ATPU-8-A	3300	6.2	59	100	7.35	119	96.5	7.70	117	93	8.00	64
			63	103	7.40	123	99.5	7.75	120	96	8.10	67
			67	107	7.45	126	103	7.80	123	99	8.15	121
			71	110	7.50	129	106	7.85	126	102	8.20	124
1ATPU-10-A	4000	8.2	59	118	8.70	141	114	9.10	138	109	9.50	135
			63	122	8.75	144	117	9.20	141	113	9.60	138
			67	125	8.80	148	121	9.25	145	116	9.65	142
			71	129	8.85	152	125	9.30	149	120	9.70	146
1ATPU-15-A	5500	11.2	59	154	11.8	185	149	12.3	182	144	12.9	178
			63	159	11.9	190	153	12.4	186	148	13.0	181
			67	164	11.9	195	158	12.5	191	153	13.1	187
			71	169	12.0	200	163	12.6	196	157	13.2	192
1ATPU-20-A	7000	13.4	59	166	13.6	203	160	14.1	198	154	14.7	194
			63	172	13.7	208	165	14.3	204	159	14.8	199
			67	177	13.8	214	170	14.4	209	164	14.9	204
			71	183	13.9	219	176	14.5	214	169	15.15	210
1ATPU-25-A	8000	16.8	59	214	17.5	261	206	18.2	255	199	18.8	250
			63	221	17.6	268	213	18.2	262	205	19.0	257
			67	228	17.8	278	220	18.5	269	212	19.2	263
			71	235	17.9	282	227	18.6	276	218	19.4	260
1ATPU-30-A	9500	19.9	59	252	21.1	309	243	21.9	302	234	22.6	195
			63	260	21.3	317	251	22.1	311	241	22.9	304
			67	269	21.5	326	259	22.3	319	249	23.1	312
			71	277	21.7	338	267	22.5	328	257	23.3	320
1ATPU-35-A	11500	25.1	59	304	26.9	378	293	28.0	376	282	29.0	362
			63	314	27.2	387	302	28.3	380	291	29.3	372
			67	324	27.4	397	312	28.5	389	300	29.6	381
			71	334	27.6	408	322	28.7	398	310	29.9	391
1ATPU-40-A	14000	28.2	59	365	31.9	452	351	33.2	441	338	34.4	432
			63	377	32.2	464	363	33.5	454	349	34.7	444
			67	389	32.5	476	375	33.8	467	361	35.1	457
			71	402	32.7	489	387	34.1	479	373	35.4	469
1ATPU-50-A	15500	33.6	59	438	37.1	538	421	38.4	525	404	39.6	512
			63	452	37.4	552	435	38.7	539	417	40.0	526
			67	467	37.7	567	449	39.2	554	431	40.5	540
			71	481	38.1	582	463	39.5	569	444	40.9	555
1ATPU-60-A	18500	39.7	59	553	45.2	656	535	46.9	644	517	48.7	632
			63	602	46.2	704	582	48.1	691	563	49.9	678
			67	653	47.0	755	632	49.1	740	611	51.1	726
			71	679	47.4	781	658	49.6	766	637	51.7	751

NOTES:

- 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
- Maximum Condensing Temperature is 135°F
- Entering Hot Water Temperature = 180°F
- THR: Total Heat Rejection
- KBH = 1000 Btu/hr

Performance Tables

Air Cooled Packaged Unit (Refrigerant: R22)

Table 3 (Cont.)

Model	Nomi. CFM	Coil Face Area Sq.Ft	Cooling									
			E.WB.T (°F)	Ambient Temperature (°F)								
				90			100			110		
				TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)
2ATPU-10-A	4000	8.4	59	139	6.62	155	131	7.46	148	120	8.26	142
			63	143	6.59	159	135	7.46	152	124	8.30	146
			67	149	6.58	163	139	7.48	150	130	8.34	150
			71	153	6.56	167	143	7.48	160	136	8.38	154
2ATPU-15-A	6600	12.4	59	239	11.4	265	222	12.7	254	208	14.1	244
			63	244	11.4	273	230	12.7	260	214	14.1	250
			67	252	11.4	279	236	12.7	208	220	14.2	258
			71	260	11.4	287	244	12.7	274	228	14.2	264
2ATPU-20-A	8000	16.4	59	281	12.3	313	263	14.9	300	244	16.6	288
			63	289	13.2	321	271	15.0	308	252	16.7	254
			67	257	13.2	329	279	15.0	316	260	16.8	302
			71	306	13.1	337	287	15.0	324	268	16.8	310
2ATPU-30-A	11000	22.4	59	363	17.9	405	341	20.2	392	318	22.6	378
			63	372	17.9	415	352	20.2	402	328	22.6	388
			67	382	17.9	427	362	20.4	412	338	22.8	396
			71	395	17.8	437	373	20.4	422	348	22.8	406
2ATPU-40-A	14000	26.8	59	398	20.2	451	371	23.6	432	346	28.0	414
			63	409	20.2	462	383	23.3	444	356	26.2	426
			67	421	20.2	473	395	23.8	454	368	26.4	436
			71	435	20.2	485	407	24.0	466	378	26.6	448
2ATPU-50-A	16000	33.6	59	504	27.5	571	476	30.6	552	442	33.6	532
			64	517	27.7	587	487	30.8	566	456	33.8	546
			68	533	27.7	601	503	30.8	580	470	34.0	560
			72	549	27.7	617	517	31.0	598	486	34.2	574
2ATPU-60-A	19000	39.8	59	595	33.5	681	561	37.2	656	522	40.6	630
			64	615	33.7	699	577	37.4	674	540	40.8	648
			68	633	33.7	717	595	37.6	692	556	41.2	666
			72	653	33.9	735	614	37.8	710	574	41.6	684
2ATPU-70-A	23000	50.2	59	721	42.7	832	676	47.2	800	630	51.8	770
			64	743	42.7	853	696	47.4	820	650	52.2	790
			67	765	42.9	874	718	47.8	842	670	52.4	810
			72	787	42.9	896	738	48.0	864	690	52.8	832
2ATPU-80-A	28000	56.4	59	867	50.5	995	812	56.0	958	758	61.2	922
			64	893	50.7	1021	836	56.2	984	782	61.8	946
			68	921	50.7	1049	862	56.6	1010	806	62.2	972
			72	949	50.7	1076	890	56.8	1036	832	62.6	998
2ATPU-100-A	31000	67.2	59	1041	59.9	1193	976	65.8	1148	910	71.4	1100
			64	1073	59.9	1215	1066	66.2	1178	938	72.0	1130
			68	1107	60.1	1251	1038	66.6	1210	968	72.6	1160
			72	1140	60.4	1291	1070	66.8	1242	1000	73.2	1192
2ATPU-120-A	37000	79.4	59	1301	71.9	1447	1220	79.6	1392	1144	86.8	1338
			64	1411	72.2	1549	1326	80.6	1492	1244	88.4	1436
			68	1527	72.2	1659	1436	81.2	1598	1348	89.8	1538
			72	1587	72.4	1715	1492	81.4	1652	1402	90.4	1592

NOTES:

- 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
- Maximum Condensing Temperature is 135°F
- Entering Hot Water Temperature = 180°F
- THR: Total Heat Rejection
- KBH = 1000 Btu/hr

Performance Tables

Air Cooled Packaged Unit (Refrigerant: R22)

Table 3 (Cont.)

Model	Nomi. CFM	Coil Face Area Sq.Ft	Cooling									
			E.WB.T (°F)	Ambient Temperature (°F)								
				115			120			125		
				TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)
2ATPU-10-A	4000	8.5	59	118	8.65	141	113	9.03	137	109	9.39	133
			63	121	8.71	145	117	9.09	141	113	9.49	137
			67	125	8.77	149	121	9.17	145	117	9.55	141
			71	129	8.81	153	125	9.23	149	121	9.63	145
2ATPU-15-A	6600	12.5	59	201	14.8	239	193	15.6	236	187	16.2	129
			64	207	14.9	247	199	15.7	242	193	16.4	135
			67	215	15	253	206	15.7	247	199	16.4	243
			71	221	15.1	259	212	15.8	253	205	16.5	249
2ATPU-20-A	8000	16.5	59	236	17.5	283	229	18.4	277	219	19.1	271
			63	245	17.6	289	235	18.6	283	227	19.3	277
			67	251	17.7	297	243	18.6	291	233	19.4	285
			71	259	17.8	305	251	18.7	299	241	19.5	293
2ATPU-30-A	11000	22.5	59	309	23.7	371	299	24.7	365	289	25.9	357
			63	319	23.9	381	307	24.9	373	297	26.1	363
			67	329	23.9	391	317	25.2	383	307	26.3	375
			71	339	24.1	401	327	25.4	393	315	26.5	385
2ATPU-40-A	14000	26.9	59	333	27.3	407	321	28.4	397	309	29.5	389
			63	345	27.5	417	331	28.7	409	319	29.7	399
			67	355	27.7	429	341	28.9	419	329	29.9	409
			71	367	27.9	439	353	29.2	429	339	30.2	421
2ATPU-50-A	16000	33.7	59	429	35.1	523	413	36.6	511	399	37.7	501
			63	443	35.3	537	427	36.6	525	411	38.1	515
			67	457	35.7	557	441	37.2	539	425	38.5	527
			71	471	35.9	565	455	37.4	553	437	38.9	521
2ATPU-60-A	19000	39.9	59	505	42.3	619	487	43.9	605	469	45.3	391
			63	521	42.7	635	503	44.3	623	483	45.9	609
			67	539	43.1	653	519	44.7	639	499	46.3	625
			71	555	43.5	677	535	45.2	657	515	46.7	641
2ATPU-70-A	23000	50.3	59	609	53.9	757	587	56.2	753	565	58.1	725
			63	629	54.5	775	605	56.8	761	583	58.7	745
			67	649	54.9	795	625	57.2	779	601	59.3	763
			71	669	55.3	817	645	57.6	799	621	59.9	783
2ATPU-80-A	28000	56.5	59	731	63.9	905	703	66.6	883	677	68.9	865
			63	755	64.5	929	727	67.2	909	699	69.5	889
			67	779	65.1	953	751	67.8	935	723	70.3	915
			71	805	65.5	979	775	68.4	959	747	70.9	939
2ATPU-100-A	31000	67.3	59	877	74.3	1077	843	76.9	1051	809	79.3	1025
			63	905	74.9	1105	871	77.5	1079	835	80.2	1053
			67	935	75.6	1135	899	78.5	1109	863	81.1	1081
			71	963	76.3	1165	927	79.2	1139	889	81.9	1111
2ATPU-120-A	37000	79.5	59	1107	90.5	1313	1071	93.9	1289	1035	97.5	1265
			63	1205	92.5	1409	1165	96.3	1383	1127	99.8	1357
			67	1307	94.2	1511	1265	98.3	1482	1223	102.5	1453
			71	1359	94.9	1563	1317	99.3	1533	1275	103.6	1502

NOTES:

- 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
- Maximum Condensing Temperature is 135°F
- Entering Hot Water Temperature = 180°F
- THR: Total Heat Rejection
- KBH = 1000 Btu/hr

Performance Tables

Air Cooled Packaged Unit (Refrigerant: R134a)

Table 4

Model	Nomi. CFM	Coil Face Area Sq.Ft	Cooling									
			E.WB.T (°F)	Ambient Temperature (°F)								
				90			100			110		
				TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)
1ATPU-5-A	2000	4.3	59	75	3.78	82.7	68	4.25	78	65	4.67	75.7
			63	77	3.79	86	71.7	4.27	81.7	66.7	4.68	79
			67	79	3.79	87.8	75	4.28	85	69	4.73	80.7
			71	83	3.79	91	76.7	4.29	86.7	71.7	4.77	84
1ATPU-8-A	3000	5.9	59	89.7	4.5	99.7	83.7	5.07	95.5	77.7	5.7	92
			63	92.7	4.5	104	86.5	5.2	98.5	82	5.68	96
			67	95.5	4.5	106	89.5	5.1	101	83	5.65	97
			71	99	4.5	109	92.7	5.2	106	87	5.8	99.7
1ATPU-10-A	4000	8.3	59	136	6.95	152	126	7.8	145	116	8.47	137
			63	141	6.95	157	131	7.78	149	118	8.7	141
			67	145	7	161	135	7.87	154	124	8.7	146
			71	149	7.05	166	139	7.8	158	129	8.67	148
1ATPU-15-A	5500	11.3	59	165	8.45	185	154	9.57	177	142	10.7	168
			63	171	8.5	191	159	9.7	182	147	10.7	173
			67	177	8.5	197	165	9.67	188	152	10.8	179
			71	183	8.5	202	171	9.8	193	158	10.9	184
1ATPU-20-A	8200	16.9	59	233	14.9	271	218	16.3	259	201	17.5	247
			63	241	15	279	225	16.4	268	208	17.7	254
			67	249	15.8	287	233	16.7	275	216	17.9	262
			71	257	15.3	295	241	16.8	282	223	18.2	269
1ATPU-30-A	9500	19.9	59	285	18	328	266	19.6	315	244	21	299
			63	295	18.2	338	274	19.8	324	253	21.5	308
			67	305	18.4	348	284	20	334	262	21.7	317
			71	315	18.5	361	293	20.3	344	271	21.9	327
1ATPU-40-A	13000	25.5	59	334	20.2	384	313	21.8	369	291	23.7	351
			63	346	20.2	395	324	22	379	301	23.9	362
			67	358	20.3	407	335	22.4	388	312	24	373
			71	370	20.5	419	347	22.5	402	323	24.4	384
1ATPU-50-A	14500	30	59	387	24.9	448	362	27	431	337	28.8	412
			63	400	25.2	463	375	27.3	444	349	29.4	425
			67	414	25.3	477	388	27.7	457	362	29.7	437
			71	428	25.6	491	402	27.9	471	374	29.9	451
1ATPU-60-A	18500	39.7	59	458	28.4	529	429	31	507	397	33.4	483
			63	474	28.6	544	444	31.5	522	412	33.8	498
			67	490	28.7	558	459	31.7	538	427	34.2	513
			71	506	28.8	577	474	31.9	552	440	34.5	528

Notes:

- 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
- Maximum Condensing Temperature is 145°F
- Entering Hot Water Temperature = 180°F
- THR: Total Heat Rejection
- KBH = 1000 Btu/hr

Performance Tables

Air Cooled Packaged Unit (Refrigerant: R134a)

Table 4 (Cont.)

Model	Nomi. CFM	Coil Face Area Sq.Ft	Cooling									
			E.WB.T (°F)	Ambient Temperature (°F)								
				115			120			125		
				TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)
1ATPU-5-A	2000	4.3	59	61.7	4.87	75	58	5.07	73	56.7	5.4	71
			63	65	4.9	77	61.7	5.2	75	58.7	5.27	73
			67	67	4.94	78.7	63.7	5.17	76.7	62	5.4	74.6
			71	68.7	4.98	82	67	5.4	78	64	5.37	76.7
1ATPU-8-A	3000	5.8	59	74.7	5.87	88	71.7	6.3	86.7	69	6.4	84.7
			63	78	5.8	91.7	75	6.17	89.7	72	6.37	88
			67	79.7	5.97	94.7	76.6	6.3	93	73.7	6.47	89.7
			71	82.7	6	98	79.6	6.27	96	77	6.7	92.7
1ATPU-10-A	4000	8.3	59	111	8.77	133	106	9.3	128	101	9.6	126
			63	115	8.87	137	108	9.4	133	105	9.7	129
			67	119	8.97	142	114	9.6	137	109	9.7	133
			71	123	9.07	146	118	9.5	141	113	9.8	137
1ATPU-15-A	5500	11.3	59	136	11	164	128	11.7	159	125	11.9	156
			63	141	11.3	169	135	11.8	164	129	12	158
			67	146	11.4	174	138	11.8	169	133	12.2	164
			71	151	11.5	179	145	11.9	175	138	12.5	168
1ATPU-20-A	8200	16.9	59	193	18	241	185	18.7	234	177	19.2	228
			63	198	18.4	248	192	18.9	241	183	19.6	235
			67	207	18.6	255	198	19.2	249	188	19.9	242
			71	214	18.8	263	205	19.5	256	197	21	249
1ATPU-30-A	9500	19.8	59	234	21.8	291	223	22.5	283	213	24	275
			63	242	22	298	232	22.8	291	221	23.5	283
			67	251	22.4	309	238	23	298	229	23.8	292
			71	258	22.7	318	248	23.4	308	237	24.2	301
1ATPU-40-A	13000	25.7	59	278	24.6	343	269	25.2	337	258	25.8	327
			63	288	24.7	353	279	25.5	347	268	26.4	337
			67	298	24.8	364	289	25.8	357	278	26.7	347
			71	311	25.2	376	299	27	367	288	26.9	357
1ATPU-50-A	14500	31	59	324	29.9	402	312	30.7	393	298	31.7	384
			63	336	30.2	415	323	31	406	312	31.8	396
			67	348	30.7	421	335	31.5	418	324	32.5	408
			71	361	30.9	438	348	31.9	428	334	32.8	418
1ATPU-60-A	18500	39.8	59	382	34.5	471	366	35.4	459	348	36.3	447
			63	395	34.9	487	379	35.9	473	363	36.8	458
			67	410	35.3	498	393	36.4	487	375	37.2	473
			71	424	35.7	515	407	36.8	502	388	37.8	488

Notes:

- 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
- Maximum Condensing Temperature is 145°F
- Entering Hot Water Temperature = 180°F
- THR: Total Heat Rejection
- KBH = 1000 Btu/hr

Performance Tables

Air Cooled Packaged Unit (Refrigerant: R134a)

Table 4(Cont.)

Model	Nomi. CFM	Coil Face Area Sq.Ft	Cooling									
			E.WB.T (°F)	Ambient Temperature (°F)								
				90			100			110		
				TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)
2ATPU-10-A	4000	8.5	59	149	7.57	166	139	8.49	159	129	9.33	152
			63	154	7.59	172	144	8.53	164	134	9.39	157
			67	159	7.59	176	149	8.55	169	139	9.45	162
			71	165	7.59	181	184	8.59	174	144	9.6	167
2ATPU-15-A	6000	11.9	59	178	9	198	168	10.2	192	156	11.3	183
			63	187	9	207	174	10.3	198	161	11.4	189
			67	192	9	214	178	10.3	203	167	11.4	195
			71	199	9	219	186	10.4	209	173	11.5	198
2ATPU-20-A	8000	16.7	59	271	13.8	303	251	15.6	289	231	16.8	273
			63	281	13.8	313	261	15.7	298	239	17	281
			67	289	15	321	269	15.8	307	247	17.4	291
			71	299	14.8	331	277	15.9	315	257	17.6	299
2ATPU-30-A	11000	22.5	59	331	16.8	369	307	19.2	353	283	21.3	335
			63	343	18	381	317	19.4	364	294	21.4	345
			67	355	18	393	327	19.5	376	303	21.5	358
			71	367	18	403	341	19.6	385	315	21.7	368
2ATPU-40-A	16400	33.7	59	467	29.9	541	435	32.6	517	401	34.9	494
			63	483	30	557	449	32.7	533	415	35.4	507
			67	499	30.3	573	465	33	547	431	35.8	523
			71	515	30.5	589	481	33.6	563	446	36.3	538
2ATPU-60-A	19000	39.9	59	571	37	659	529	39	629	488	42	598
			63	591	36.3	679	547	39.6	647	505	42.8	615
			67	611	36.7	699	567	40	667	523	43	633
			71	631	36.9	721	585	40.5	687	541	43.7	653
2ATPU-80-A	26000	51	59	669	40.4	767	625	43.9	735	581	47.3	701
			63	693	40.5	789	647	44	757	601	47.6	723
			67	717	40.6	813	669	44.6	779	623	48	745
			71	741	40.7	837	693	44.7	803	646	48.6	767
2ATPU-100-A	29000	61	59	775	49.9	899	723	54	861	673	57.7	823
			63	801	50.4	925	749	54.6	887	697	58.6	849
			67	829	50.5	953	775	55	913	723	59	873
			71	857	50.9	981	803	55.7	942	741	59.7	901
2ATPU-120-A	37000	79.5	59	917	56.5	1057	857	62	1013	793	66.7	965
			63	949	50.9	1087	887	62.8	1043	823	67.6	995
			67	981	58	1119	917	63	1075	851	68.4	1025
			71	1013	57.5	1151	947	63.8	1105	881	68.9	1055

Notes:

- 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
- Maximum Condensing Temperature is 145°F
- Entering Hot Water Temperature = 180°F
- THR: Total Heat Rejection
- KBH = 1000 Btu/hr

Performance Tables

Air Cooled Packaged Unit (Refrigerant: R134a)

Table 4 (Cont.)

Model	Nomi. CFM	Coil Face Area Sq.Ft	Cooling									
			E.WB.T (°F)	Ambient Temperature (°F)								
				115			120			125		
				TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)	TC (KBH)	KW	THR (KBH)
2ATPU-10-A	4000	8.5	59	124	9.73	149	119	10.2	145	114	10.5	141
			63	129	9.9	153	124	10.3	149	118	10.7	145
			67	133	9.87	158	128	10.4	154	123	10.7	148
			71	138	9.95	163	133	10.5	159	127	10.8	154
2ATPU-15-A	6000	11.9	59	148	11.8	179	144	12.3	174	137	12.7	168
			63	155	11.9	184	149	12.4	178	143	12.8	175
			67	158	11.9	188	154	12.6	185	148	12.8	178
			71	166	12	195	158	12.7	191	153	13	186
2ATPU-20-A	8000	16.5	59	221	17.6	265	211	18.3	259	201	18.9	251
			63	229	17.8	273	219	18.5	265	209	19	257
			67	237	17.9	283	227	18.7	273	217	19.3	265
			71	245	18.2	291	235	18.9	281	225	19.5	273
2ATPU-30-A	11000	22.5	59	271	22	327	259	23	317	247	23.9	309
			63	281	22.3	337	269	23.3	327	257	24	319
			67	291	22.5	347	279	23.5	337	265	24.4	329
			71	301	22.7	357	289	23.7	349	275	24.7	339
2ATPU-40-A	16400	33.7	59	385	36	481	369	37.3	467	353	38.3	455
			63	399	36.7	495	383	37.7	481	365	38.9	469
			67	413	37	509	395	38.3	497	379	39.5	483
			71	427	37.5	525	409	38.9	511	393	41	497
2ATPU-60-A	19000	39.9	59	467	43.5	581	445	44.9	565	415	46	549
			63	482	44	599	463	45.5	581	441	46.9	565
			67	501	44.7	617	479	46	599	457	47.5	583
			71	519	45.4	635	495	46.8	619	473	48.3	601
2ATPU-80-A	26000	51	59	559	48.9	685	537	50.3	669	515	51.9	650
			63	579	49.3	705	557	50.9	689	535	52.5	670
			67	599	49.9	727	577	51.5	709	555	53	692
			71	621	50.3	749	597	52	731	575	53.6	713
2ATPU-100-A	29000	61	59	647	59.7	803	623	61.3	785	599	63	765
			63	671	60.3	829	645	62	809	621	63.9	789
			67	695	61	853	669	62.9	833	645	64.7	815
			71	721	61.7	879	695	63.7	859	667	65.5	839
2ATPU-120-A	37000	79.5	59	763	68.9	941	731	70.7	917	699	72.5	891
			63	789	69.7	971	757	71.7	945	725	73.5	919
			67	819	70.5	999	785	72.7	973	751	74.6	947
			71	847	71.3	1029	813	73.5	1003	779	75.6	975

NOTES:

- 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
- Maximum Condensing Temperature is 145°F
- Entering Hot Water Temperature = 180°F
- THR: Total Heat Rejection
- KBH = 1000 Btu/hr

Performance Tables

Hot Water and Steam

Table 5

Table 5 (Cont.)

Model	Nomi. CFM	Coil Face Area (Sq.Ft)	Heating				Model	Nomi. CFM	Coil Face Area (Sq.Ft)	Heating			
			E.A.T (°F)	Capacity(KBH)						E.A.T (°F)	Capacity(KBH)		
				Hot Water (ΔTH=20°F)		Steam 5PSIG 1 Row					Hot Water (ΔTH=20°F)		Steam 5PSIG 1 Row
				1 Row	2 Rows						1 Row	2 Rows	
1ATPU-5	2000	4.3	40	111	171	121	2ATPU-10	4000	8.5	40	221	341	242
			50	101	156	110				50	201	311	220
			60	91	141	99				60	181	281	198
			70	82	127	89				70	163	253	178
1ATPU-8	3300	6.3	40	171	268	187	2ATPU-15	6600	12.5	40	341	535	374
			50	155	244	169				50	309	487	338
			60	140	221	152				60	279	441	304
			70	125	199	136				70	249	397	272
1ATPU-10	4000	8.3	40	228	351	250	2ATPU-20	8000	16.5	40	455	701	500
			50	208	321	227				50	415	641	454
			60	189	291	206				60	377	581	412
			70	170	262	185				70	339	523	370
1ATPU-15	5500	11.3	40	322	492	353	2ATPU-30	11000	22.5	40	643	983	706
			50	294	451	322				50	587	902	644
			60	267	409	292				60	533	817	584
			70	239	369	261				70	477	737	522
1ATPU-20	7000	13.5	40	384	597	420	2ATPU-40	14000	26.9	40	767	1193	840
			50	351	547	385				50	702	1093	770
			60	317	495	347				60	633	989	694
			70	285	446	312				70	569	892	624
1ATPU-25	8000	16.9	40	461	708	505	2ATPU-50	16000	33.7	40	921	1415	1010
			50	421	649	460				50	841	1297	920
			60	382	588	419				60	763	1175	838
			70	343	530	375				70	685	1059	750
1ATPU-30	9500	19.8	40	556	851	610	2ATPU-60	19000	39.9	40	1111	1703	1220
			50	509	782	558				50	1017	1563	1116
			60	462	711	507				60	923	1422	1014
			70	415	641	455				70	829	1281	910
1ATPU-35	11500	25.2	40	696	1062	764	2ATPU-70	23000	50.3	40	1391	2123	1528
			50	638	974	700				50	1275	1947	1400
			60	579	887	635				60	1159	1773	1270
			70	522	801	573				70	1043	1601	1146
1ATPU-40	14000	28.3	40	825	1272	905	2ATPU-80	28000	56.5	40	1649	2543	1810
			50	757	1168	830				50	1513	2335	1660
			60	689	1063	755				60	1377	2125	1510
			70	622	963	680				70	1243	1925	1360
1ATPU-50	15500	33.7	40	953	1451	1030	2ATPU-100	31000	67.3	40	1905	2902	2060
			50	874	1331	960				50	1747	2662	1920
			60	796	1217	845				60	1591	2432	1690
			70	717	1098	786				70	1435	2197	1572
1ATPU-60	18500	39.8	40	1105	1700	1215	2ATPU-120	37000	79.5	40	2210	3400	2430
			50	1010	1560	1110				50	2021	3121	2220
			60	924	1423	1010				60	1849	2847	2020
			70	834	1285	915				70	1669	2572	1830

Notes:

- E.A.T: Entering Air D. B. Temperature (°F)
- Entering Hot Water Temperature = 180°F
- ΔTH: Hot Water Entering and Leaving Temperature Difference
- KBH = 1000 Btu/hr

Hot Water Correction Factor
Table 6A

Temp. Drop (°F)	Entering Water Temp.(°F)			
	160	180	200	220
10	0.96	1.21	1.51	1.76
20	0.76	1.00	1.26	1.51
30	0.57	0.78	1.10	1.28

Steam Correction Factor
Table 6B

Pressure(PSIG)	2	5	10	15	20	30
Temp(°F)	218.6	277.3	239.5	249.8	258.9	274.1
Latent Heat(Btu/lb)	966.3	960.5	952.6	945.6	939.4	928.5
Correction Factor	0.96	1	1.08	1.15	1.20	1.28

Capacity Factor for Non Standard CFM
Table 7

CFM/Nom. CFM	80%	90%	100%	110%	120%
Cooling Capacity	0.88	0.95	1.01	1.05	1.09
Heating Capacity	0.88	0.96	1.01	1.03	1.05

Filter Air Pressure Drop (In.W.G.)
Table 8

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

NOTE:
-Filter area in flat configuration equals the coil face area.

Coil Air Pressure Drop (In.W.G.)
Table 10

Fin Per Inch	Rows Deep	Coil Face Velocity F.P.M.											
		300		400		500		600		700		800	
		Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
14	1	0.08	0.11	0.11	0.15	0.16	0.21	0.21	0.29	0.32			
	2	0.14	0.21	0.23	0.30	0.32	0.43	0.45	0.58	0.70			
	3	0.17	0.30	0.24	0.46	0.41	0.65	0.58	0.74	0.90			
	4	0.23	0.37	0.36	0.59	0.51	0.85	0.71	0.89	1.12			
	5	0.28	0.45	0.43	0.74	0.63	1.07	0.90	1.12	1.41			
	6	0.36	0.58	0.49	0.89	0.75	1.24	1.04	1.34	1.67			

P.D. Correction Factor
Table 10 A

Coil Fin Per Inch			
8	10	12	14
0.69	0.80	0.91	1.0

Note:
- In order to determine air-side pressure drop for cases where the number of fin per inch are less than 14 Fin Per Inch, multiply the values by the corresponding correction factor given in the table above.

Approximate Sensible Heat Factor
Table 9

Ent. W.B. Temp. (°F)	Ent. Dry Bulb Temp (°F)			
	75	80	85	90
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

Bypass Factor
Table 11

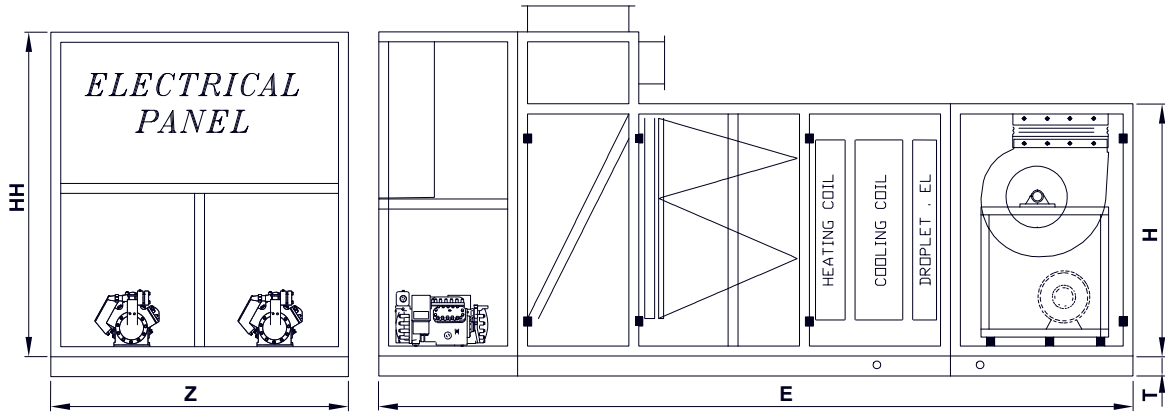
Coil Face Velocity(FPM)	4 Rows	6 Rows
400	0.20	0.10
450	0.21	0.11
500	0.23	0.12
550	0.26	0.13
600	0.27	0.14

Accessories Air Pressure Drop (In.W.G.) (At 500 FPM Velocity)
Table 12

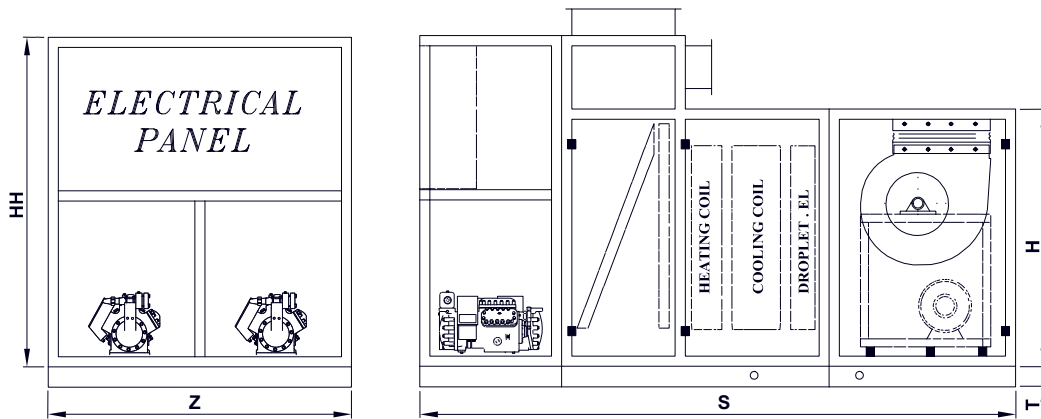
Damper	Mixing Box Without Filter	Electrical Heater	Eliminator
0.05	0.06	0.02	0.1

REFRIGERANT: R22

Split Air Cooled & Water Cooled Packaged Unit (With Special Filter)



Split Air Cooled & Water Cooled Packaged Unit (Without Special Filter)



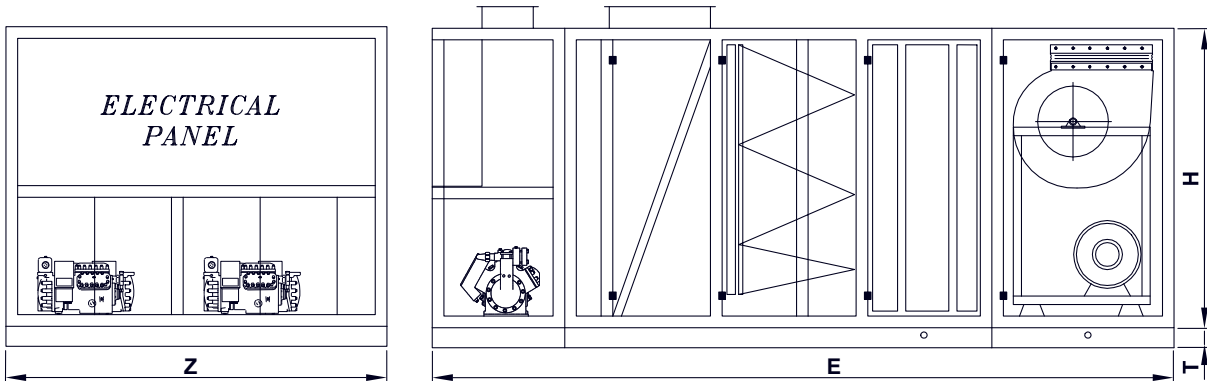
Model	E	S	Z	H	HH	T
1ATPU-8	356	270	151	118	154	10
1ATPU-10	381	295	151	126	162	10
1ATPU-15	381	295	201	126	162	10
1ATPU-20	416	328	201	155	195	10
1ATPU-25	416	328	231	165	205	12
1ATPU-30	416	328	231	165	205	12
2ATPU-15	381	295	201	126	162	10
2ATPU-20	416	328	201	155	195	10
2ATPU-30	416	328	231	165	205	12

Note:

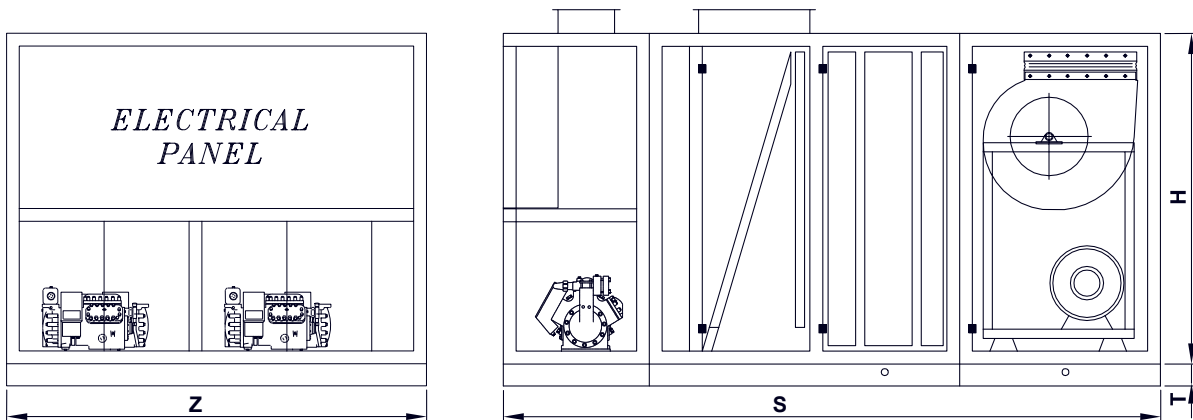
- All dimensions in cm.
- Drawing shown in the fan section indicates an up-blast discharge arrangement while other options such as horizontal -blast and down-blast are also available upon request.

Refrigerant: R22

Split Air Cooled & Water Cooled Packaged Unit (With Special Filter)



Split Air Cooled & Water Cooled Packaged Unit (Without Special Filter)



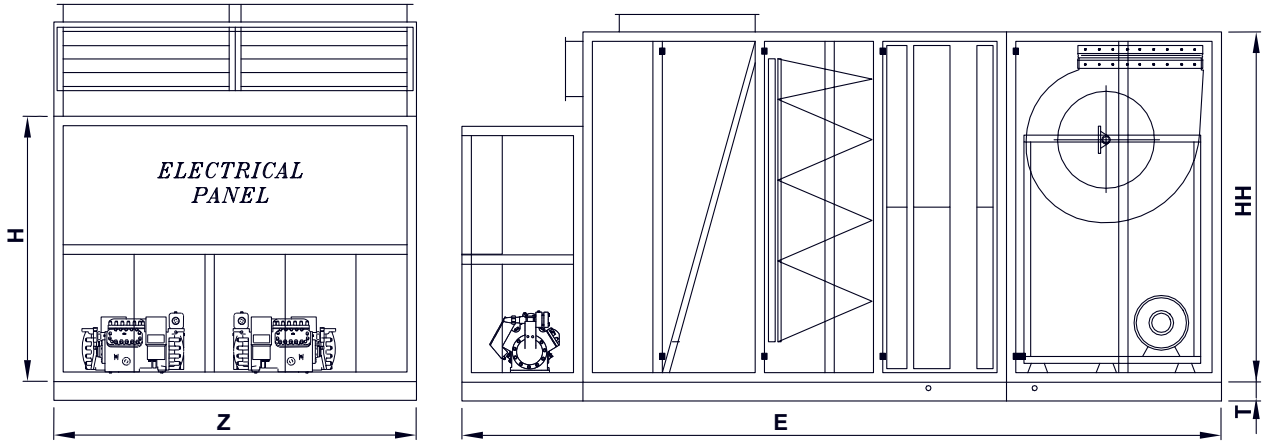
Model	E	S	Z	H	T
1AT PU-35	449	361	231	180	12
1AT PU-40	449	361	231	180	12
1AT PU-50	461	373	231	205	12
1AT PU-60	481	393	271	190	12
2AT PU-40	449	361	231	180	12
2AT PU-50	461	373	231	205	12
2AT PU-60	481	393	271	190	12
2AT PU-70	506	418	271	210	12
2ATPU-80	531	443	271	225	12

Note:

- All dimensions in cm.
- 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.

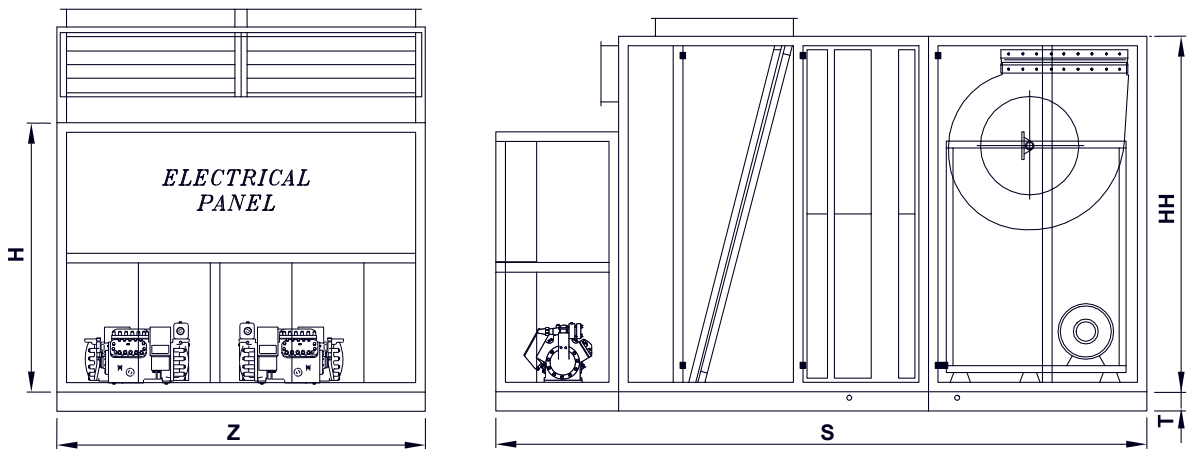
Refrigerant: R22

Split Air Cooled & Water Cooled Packaged Unit (With Special Filter)



22

Split Air Cooled & Water Cooled Packaged Unit (Without Special Filter)



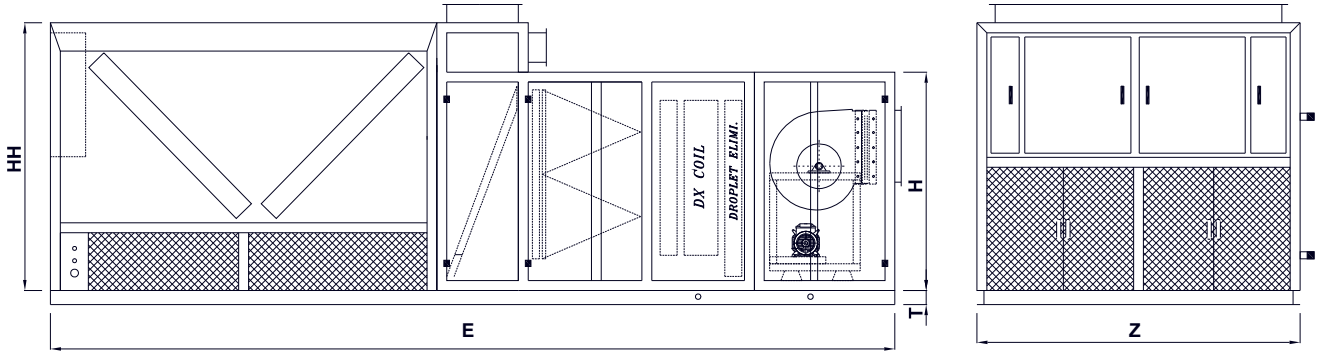
Model	E	S	Z	H	HH	T
2ATPU-100	566	478	271	197	260	14
2ATPU-120	691	603	271	187	240	14

Note:

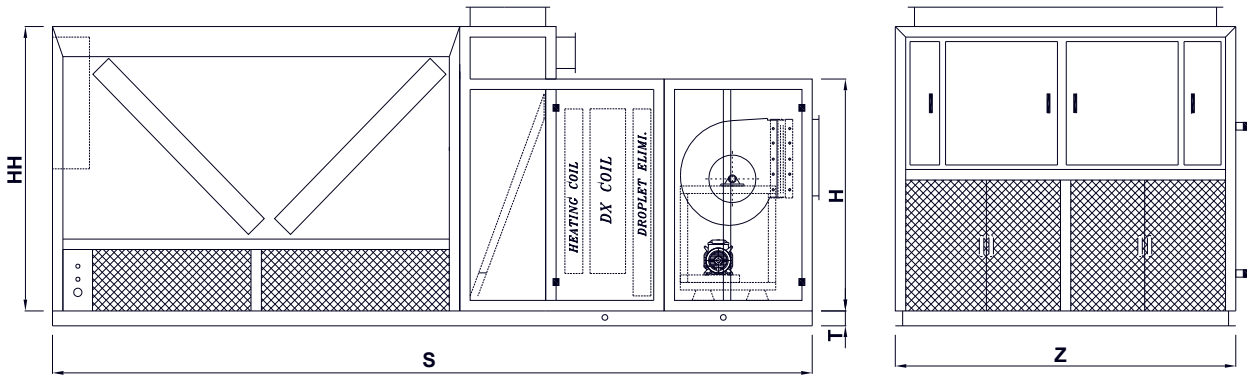
- All dimensions in cm.
- Drawing shown in the fan section indicates an up-blast discharge arrangement while other options such as horizontal -blast and down-blast are also available upon request.

Refrigerant: R22

Roof Top Air Cooled Packaged Unit (With Special Filter)



Roof Top Air Cooled Packaged Unit (Without Special Filter)



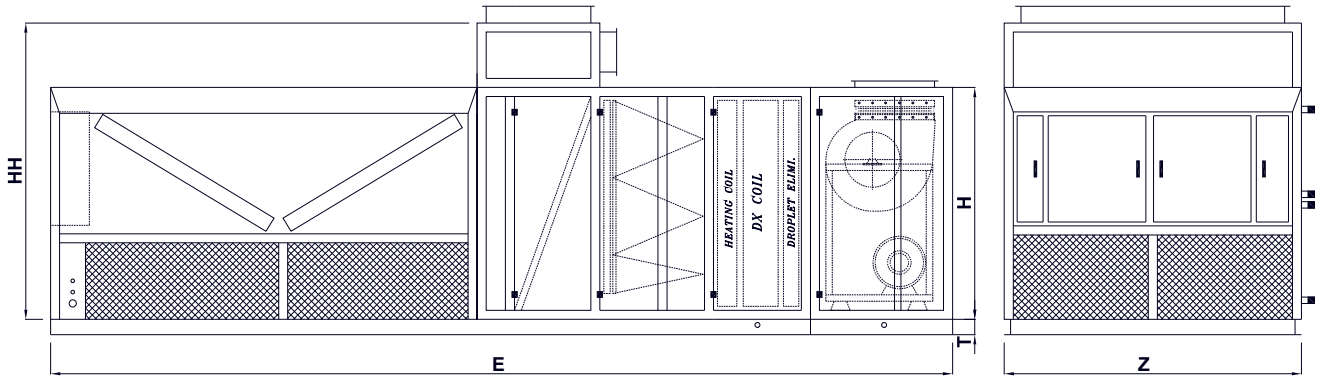
Model	E	S	Z	H	HH	T
1ATPU-8	481	395	151	118	145	10
1ATPU-10	506	420	151	126	145	10
1ATPU-15	511	425	201	126	160	10
1ATPU-20	591	503	201	155	180	10
1ATPU-25	611	523	231	165	195	10
1ATPU-30	611	523	231	165	195	10
2ATPU-15	511	425	201	126	160	10
2ATPU-20	591	503	201	155	180	10
2ATPU-30	611	523	201	165	195	10

NOTE:

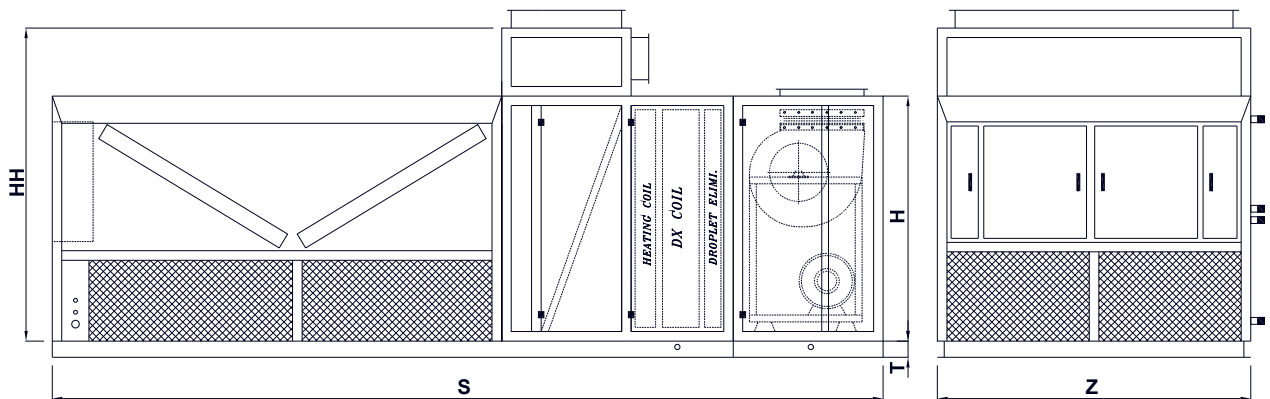
- All dimensions in cm.
- Drawing shown in the fan section indicates an up-blast discharge arrangement while other options such as horizontal -blast and down-blast are also available upon request.

Refrigerant: R22

Roof Top Air Cooled Packaged Unit (With Special Filter)



Roof Top Air Cooled Packaged Unit (Without Special Filter)



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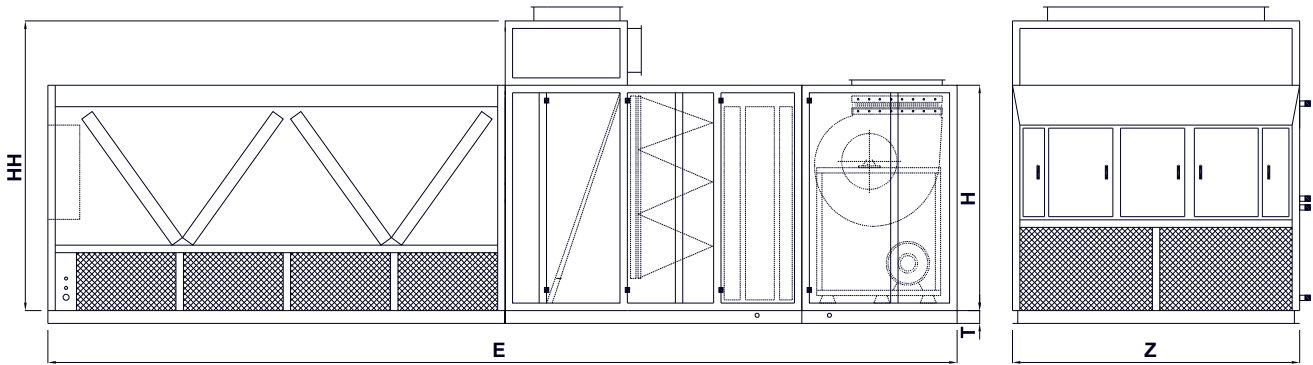
Model	E	S	Z	H	HH	T
1ATPU-35	699	611	231	180	190	12
1ATPU-40	699	611	231	180	230	12
1ATPU-50	769	681	231	205	255	12
1ATPU-60	791	702	271	190	250	12
2ATPU-40	699	611	231	180	230	12
2ATPU-50	769	681	231	205	255	12
2ATPU-60	791	703	271	190	250	12
2ATPU-70	856	768	271	210	270	12
2ATPU-80	896	808	271	225	285	12

Note:

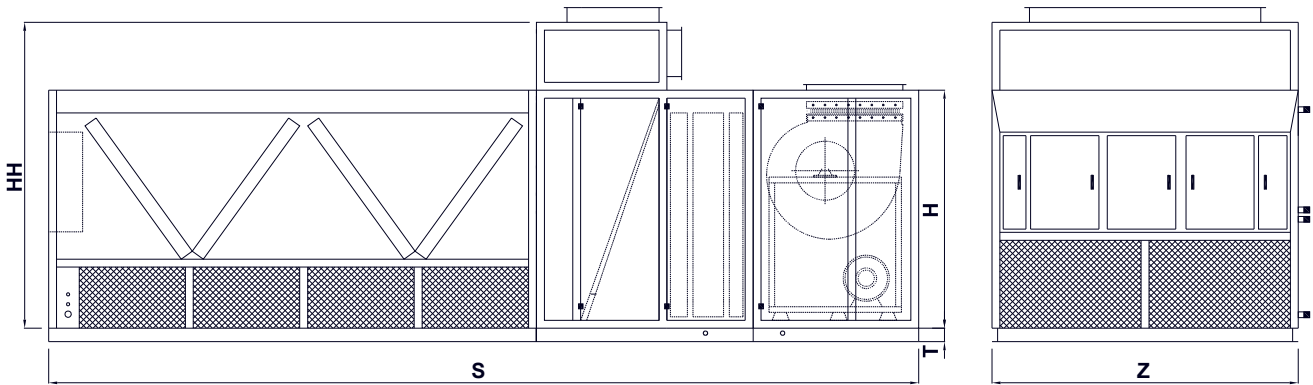
- All dimensions in cm.
- Drawing shown in the fan section indicates an up-blast discharge arrangement while other options such as horizontal -blast and down-blast are also available upon request.

Refrigerant: R22

Roof Top Air Cooled Packaged Unit (With Special Filter)



Roof Top Air Cooled Packaged Unit (Without Special Filter)



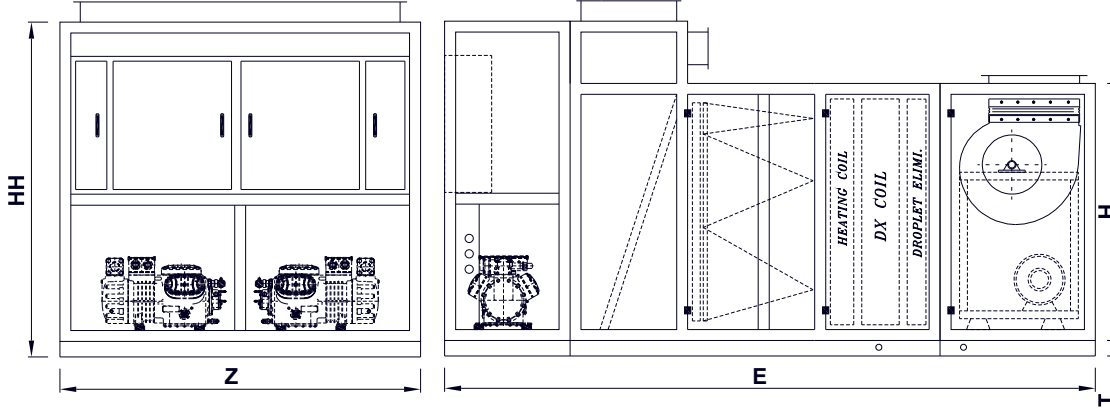
Model	E	S	Z	H	HH	T
2AT PU-100	921	833	271	225	260	14
2AT PU-120	1066	978	301	230	240	14

NOTE:

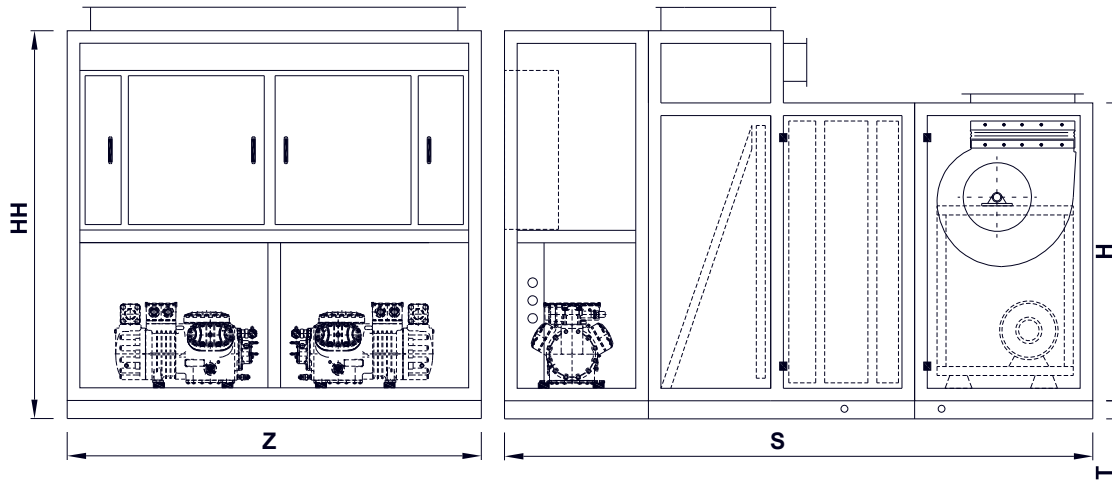
- All dimensions in cm.
- Drawing shown in the fan section indicates an up-blast discharge arrangement while other options such as horizontal -blast and down-blast are also available upon request.

Refrigerant: R134a

Split Air Cooled & Water Cooled Packaged Unit (With Special Filter)



Split Air Cooled & Water Cooled Packaged Unit (Without Special Filter)



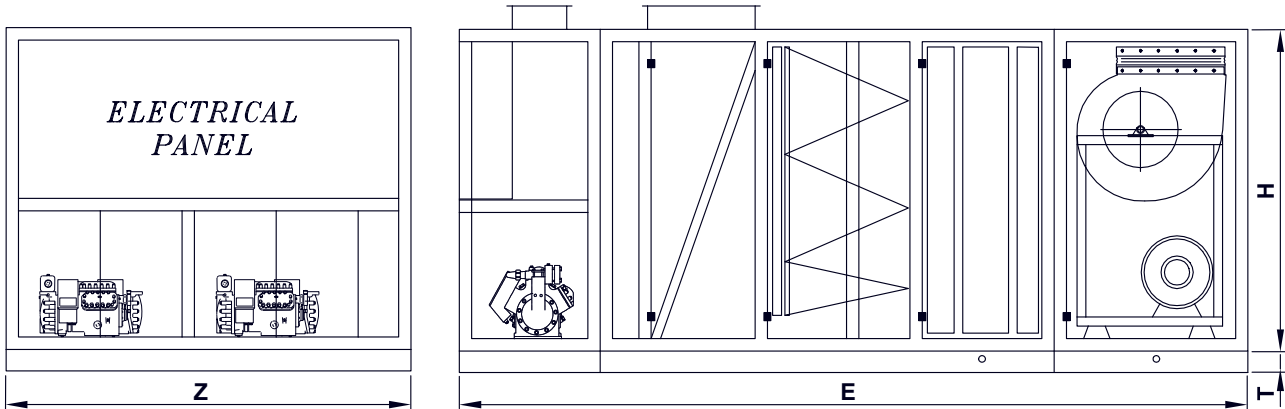
Model	E	S	Z	H	HH	T
1ATPU-10	371	285	151	128	154	10
1ATPU-15	381	295	201	126	162	10
1ATPU-20	381	295	201	126	162	10
1ATPU-30	399	311	201	155	177	10
2ATPU-10	371	285	151	128	154	10
2ATPU-15	381	295	201	126	162	10
2ATPU-20	381	295	201	126	162	10
2ATPU-30	399	311	201	155	177	10

NOTE:

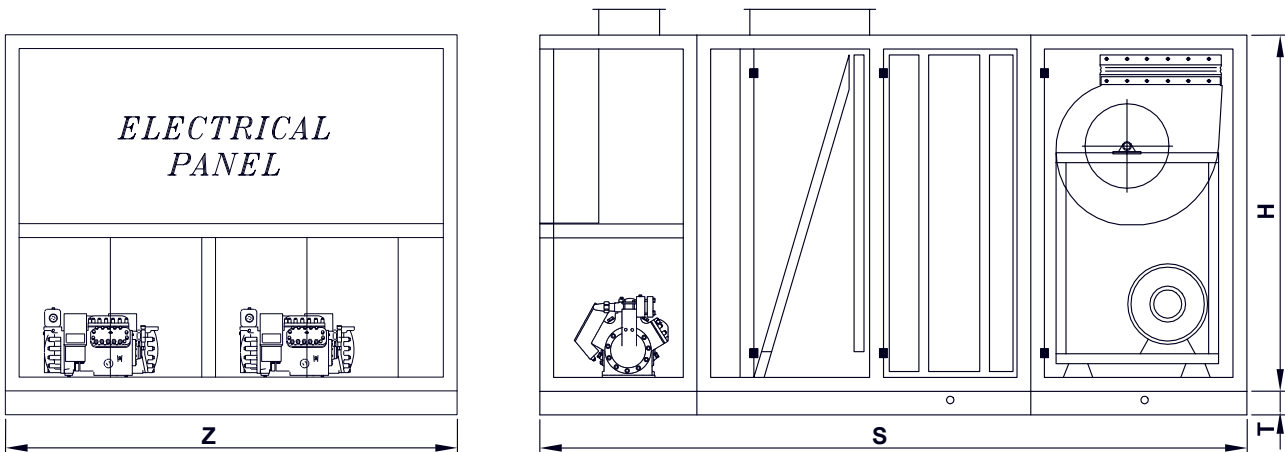
- All dimensions in cm.
- Drawing shown in the fan section indicates an up-blast discharge arrangement while other options such as horizontal -blast and down-blast are also available upon request.

Refrigerant: R134a

Split Air Cooled & Water Cooled Packaged Unit (With Special Filter)



Split Air Cooled & Water Cooled Packaged Unit (Without Special Filter)



27

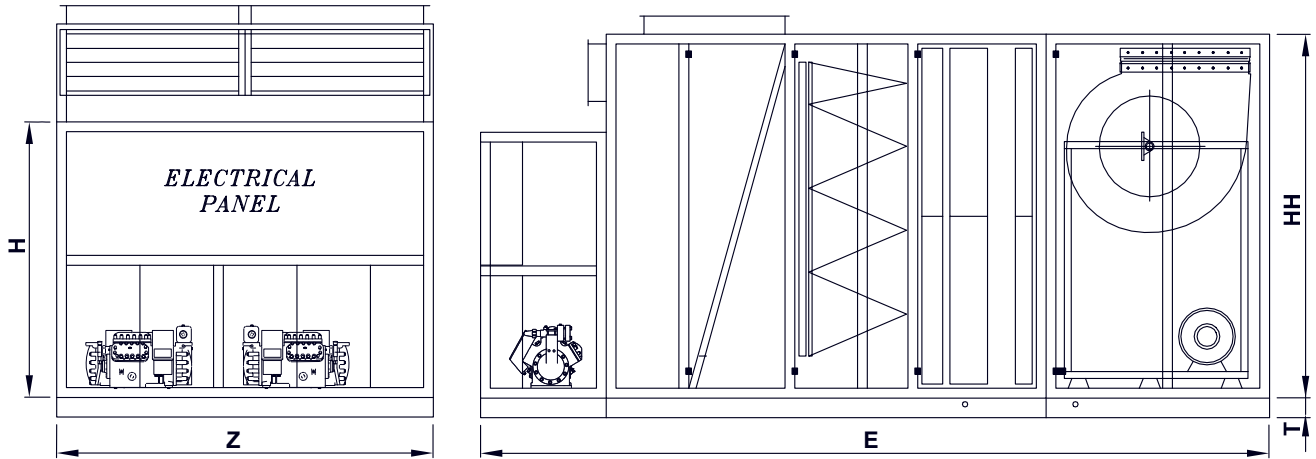
Model	E	S	Z	H	T
1ATPU-40	449	361	231	180	10
1ATPU-50	449	361	231	180	12
1ATPU-60	461	373	231	205	12
2ATPU-40	449	361	231	180	10
2ATPU-60	461	373	231	205	12
2ATPU-80	506	418	271	210	12
2ATPU-100	531	443	271	225	12

NOTE:

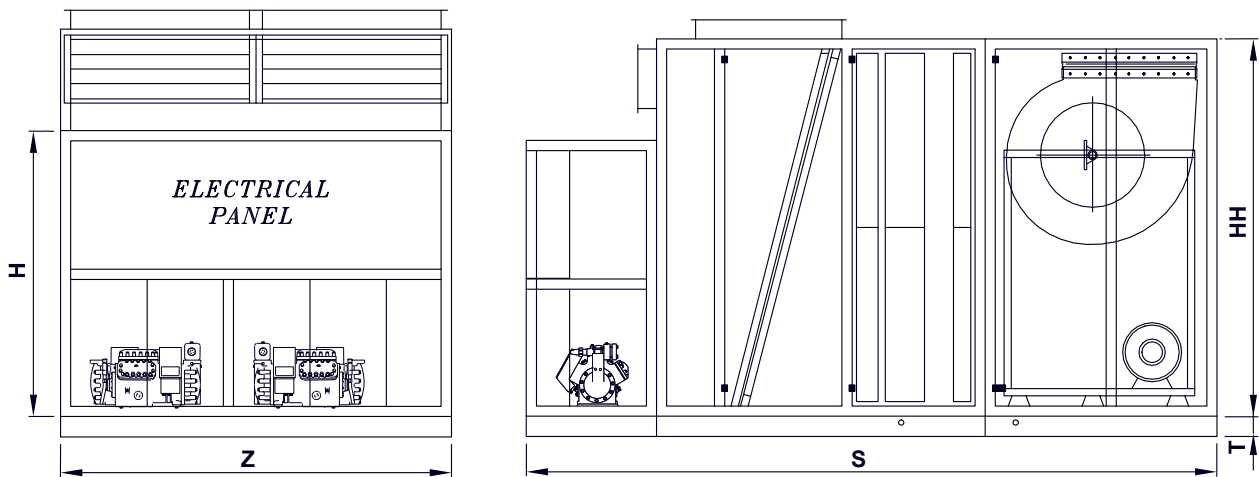
- All dimensions in cm.
- Drawing shown in the fan section indicates an up-blast discharge arrangement while other options such as horizontal -blast and down-blast are also available upon request.

Refrigerant: R134a

Split Air Cooled & Water Cooled Packaged Unit (With Special Filter)



Split Air Cooled & Water Cooled Packaged Unit (Without Special Filter)



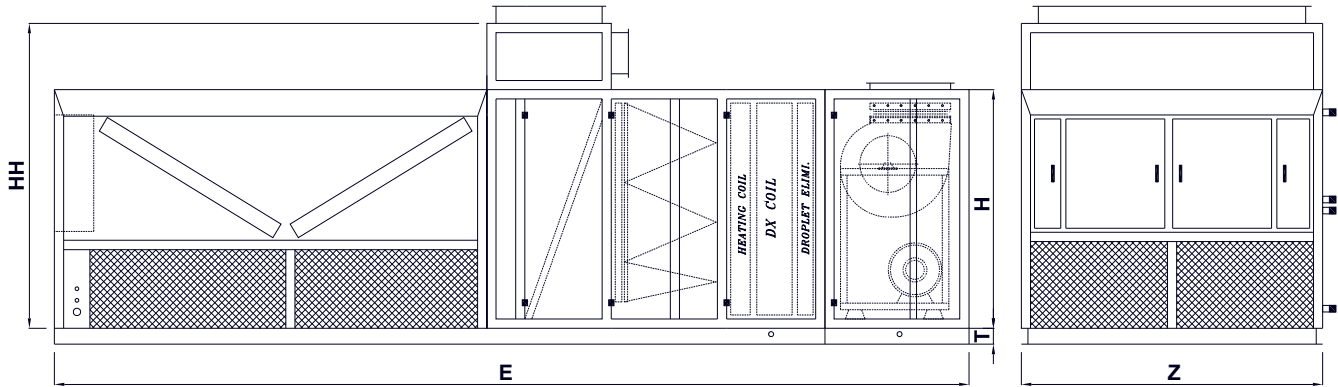
Model	E	S	Z	H	HH	T
2ATPU-120	565	477	270	190	260	14

NOTE:

- All dimensions in cm.
- 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.

Refrigerant: R134a

Roof Top Air Cooled Packaged Unit (With Special Filter)



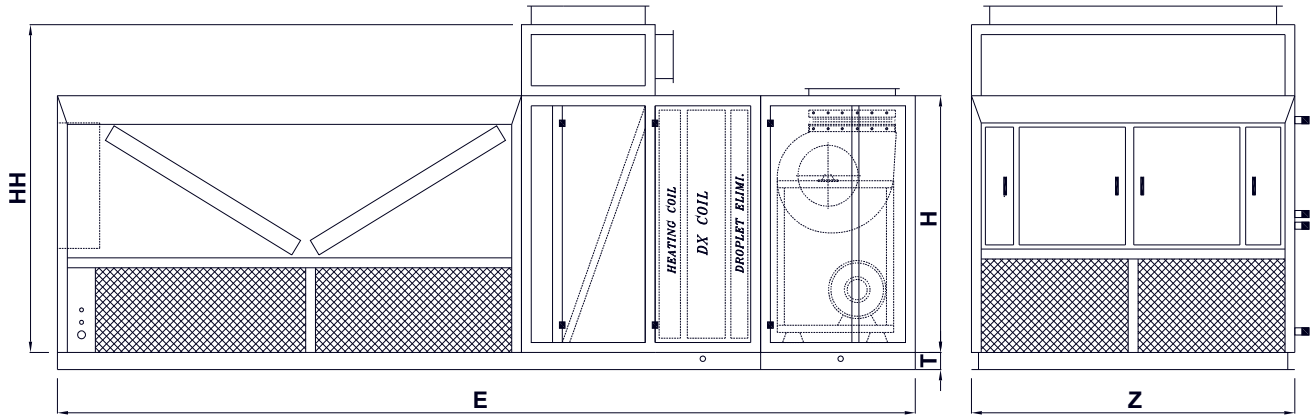
Model	E	Z	H	HH	T
1ATPU-10	431	151	118	155	10
1ATPU-15	416	151	126	155	10
1ATPU-20	506	201	126	155	10
1ATPU-30	514	201	145	155	10
1ATPU-40	569	231	160	180	12
1ATPU-50	569	231	160	180	12
1ATPU-60	634	231	170	205	12
2ATPU-10	431	151	118	155	10
2ATPU-15	416	151	126	155	10
2ATPU-20	506	201	126	155	10
2ATPU-30	514	201	145	155	10
2ATPU-40	569	231	160	180	12
2ATPU-60	634	231	170	205	12
2ATPU-80	696	271	182	210	12
2ATPU-100	721	271	194	225	12
2ATPU-120	921	271	202	260	14

NOTE:

- All dimensions in cm.
- 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.

Refrigerant: R134a

Roof Top Air Cooled Packaged Unit (Without Special Filter)



Model	E	Z	H	HH	T
1ATPU-10	345	151	118	155	10
1ATPU-15	330	151	126	155	10
1ATPU-20	420	201	126	155	10
1ATPU-30	426	201	145	155	10
1ATPU-40	481	231	160	180	12
1ATPU-50	481	231	160	180	12
1ATPU-60	546	231	170	205	12
2ATPU-10	345	151	118	155	10
2ATPU-15	330	151	126	155	10
2ATPU-20	420	201	126	155	10
2ATPU-30	426	201	145	155	10
2ATPU-40	481	231	160	180	12
2ATPU-60	546	231	170	205	12
2ATPU-80	608	271	182	210	12
2ATPU-100	633	271	194	225	12
2ATPU-120	833	271	202	260	14

NOTE:

- All dimensions in cm.
- 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.

Weights and Operating Charges

Table 13

Refrigerant: R22

Model	Ref Charge(Kg)		Oil Charge US Gals
	Water Cooled	Air Cooled	
1ATPU-5	3.5	2.5	0.5
1ATPU-8	5.5	3.5	1
1ATPU-10	7.0	4.5	1
1ATPU-15	10.5	7.0	1
1ATPU-20	14.0	9.0	1
1ATPU-25	17.5	11.5	1.1
1ATPU-30	21.0	13.5	1.1
1ATPU-35	24.5	16.0	1.1
1ATPU-40	28.0	18.0	2
1ATPU-50	35.0	22.5	2
1ATPU-60	42.0	27.0	2
2ATPU-10	7.0	5.0	1
2ATPU-15	11.0	7.0	2
2ATPU-20	14.0	9.0	2
2ATPU-30	21.0	14.0	2
2ATPU-40	28.0	18.0	2
2ATPU-50	35.0	23.0	2.2
2ATPU-60	42.0	27.0	2.2
2ATPU-70	49.0	32.0	2.2
2ATPU-80	56.0	36.0	4
2ATPU-100	70.0	45.0	4
2ATPU-120	84.0	54.0	4

Table 14

Refrigerant: R134a

Model	Ref Charge(Kg)		Oil Charge US Gals
	Water Cooled	Air Cooled	
1ATPU-5	3.5	2.5	0.5
1ATPU-8	5.5	3.5	1
1ATPU-10	7.0	4.5	1
1ATPU-15	10.5	7.0	1
1ATPU-20	14.0	9.0	1
1ATPU-30	21.0	13.5	1.1
1ATPU-40	28.0	18.0	2
1ATPU-50	35.0	22.5	2
1ATPU-60	42.0	27.0	2
2ATPU-10	7.0	5.0	1
2ATPU-15	11.0	7.0	2
2ATPU-20	14.0	9.0	2
2ATPU-30	21.0	14.0	2
2ATPU-40	28.0	18.0	2
2ATPU-60	42.0	27.0	2.2
2ATPU-80	56.0	36.0	4
2ATPU-100	70.0	45.0	4
2ATPU-120	84.0	54.0	4

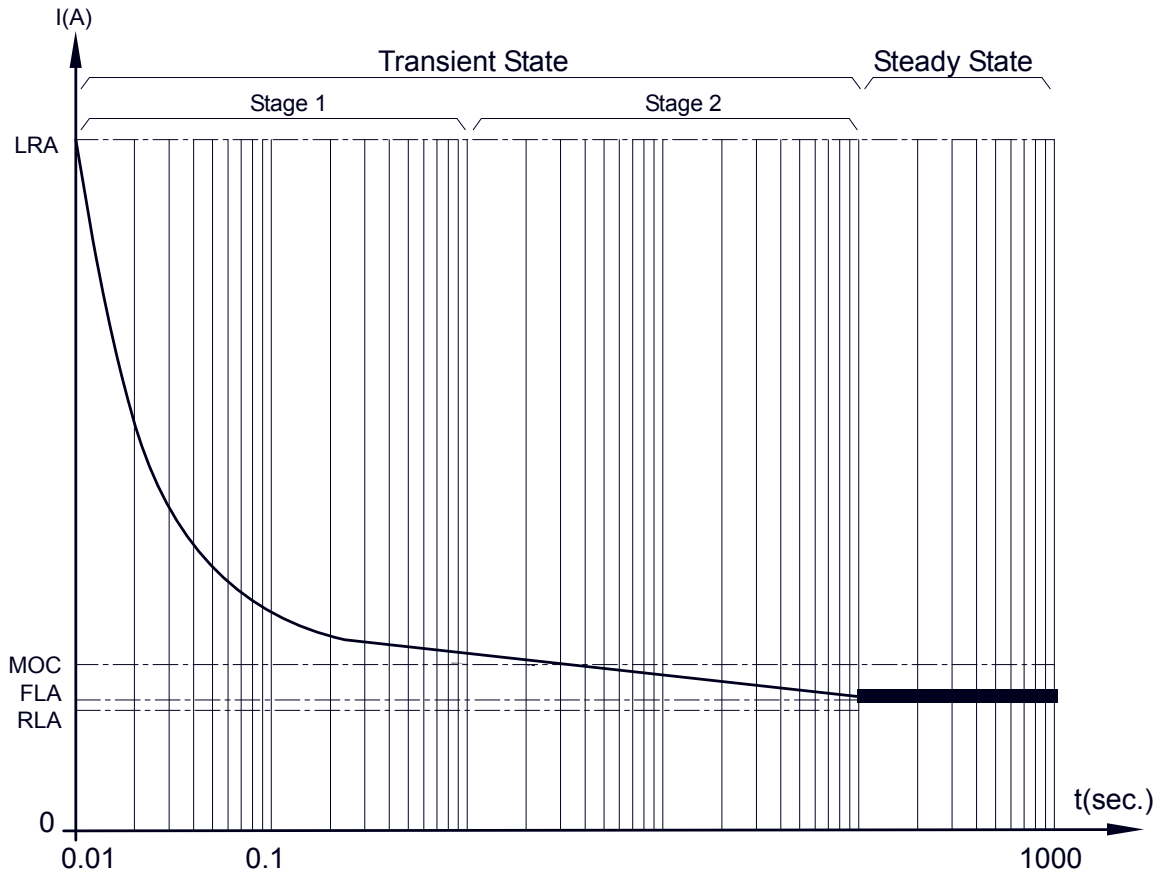
Note:

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

Weights of Refrigerant In Cooper Lines Kg per 100 Ft.

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	152.27	8.05
3 5/8	207.27	10.91
4 1/8	269.10	14.14

Electrical Schematic Curve at the Start- Up (Per Compressor)



Locked Rotor Amps (LRA): Peak of transient electrical current at the instant of compressor motor start-up. (stage1)

Maximum Operating Current (MOC): Maximum electrical current tolerates by compressor motor. This current exists only when the system has been idle (warm evaporator, condenser & connecting piping) & lasts for a short period until the system reaches the steady state condition. Other wise the stage 2 of transient state on the graph can be ignored.

Full Load Amps (FLA): Maximum electrical drawn at the most undesirable system working condition under steady state operation.

Rated Load Amps (RLA): Nominal electrical current drawn at normal working condition under steady state operation.

Note: Because of the part winding start method for packaged units equipped with 50 hp and higher compressors and packaged units that utilize unloaders the transient stage is drastically reduced and its curve differs from the above.

Engineering Data

Single Compressor Models (Refrigerant: R22)

Table 15

Model		1ATPU-5		1ATPU-8		1ATPU-10		1ATPU-15		1ATPU-20		1ATPU-25		1ATPU-30		1ATPU-35		1ATPU-40		1ATPU-50		1ATPU-60	
		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 ⁽³⁾	Max ⁽¹⁾ KW Input	6.3	7.4	9.3	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 Size ⁽²⁾	4×4		4×4		4×6		4×10		4×10		4×16		3×25/16		3×25/16		3×35/16		3×50/25		3×50/25 3×70/35	

Two Compressor Models (Refrigerant: R22)

Model		2ATPU-10		2ATPU-15		2ATPU-20		2ATPU-30		2ATPU-40		2ATPU-50		2ATPU-60		2ATPU-70		2ATPU-80		2ATPU-100		2ATPU-120	
		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 ⁽³⁾	Max ⁽¹⁾ 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 Size ⁽²⁾	4×6	4×10	4×10		4×10		3×25/16		3×25/16		3×35/16		3×50/25		3×70/35		3×70/35 3×95/50		3×120/70		3×150/70	

Note:

- LRA: Locked Rotor Amps
- FLA: Full Load Amps
- MOC: Maximum Operating Current
- 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 condenser's 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.

Single Compressor Models (Refrigerant: R134a)

Table 16

Model		1ATPU-5		1ATPU-8		1ATPU-10		1ATPU-15		1ATPU-20		1ATPU-30		1ATPU-40		1ATPU-50		1ATPU-60	
		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		30		40		50		60	
	RLA	8.5	10.4	9.6	12.2	15	18.1	19.2	23.4	30.1	36.8	36.5	44.5	49	56.5	60.2	69.1	72.5	81.9
	FLA	9.8	11.3	11.4	13.3	17	19.5	21.9	25.6	34.6	40.1	41.9	48.8	53.8	60.7	66	74.1	78.7	86.8
	MOC	12		14		20.5		17		41.9		51		55		77		88.2	
	LRA	55		70		104		156		175		221		311		458		476	
Blower	HP	2		2		3		4		5.5		7.5		10		10		10	
	FLA	3.4		3.4		4.8		6.5		8.3		10.9		15.2		15.2		15.2	
	LRA	20		20		24.2		41.3		49.3		73.2		107.3		107.3		107.3	
System ⁽³⁾	Max ⁽¹⁾ KW Input	6.9	7.9	7.9	9.2	11.9	13.7	15.2	17.6	24.4	28	30.2	34.4	35.6	39.3	40.8	46.3	46	51.8
	FLA	13.2	14.7	14.8	16.7	21.8	24.3	28.4	32.1	42.9	48.4	52.8	59.7	69	75.9	81.2	89.3	93.9	102
	Wire Size ⁽²⁾	4×4		4×4		4×6		4×10		4×16		4×25/16		3×35/16		3×50/25		3×50/25 3×70/35	

Two Compressor Models (Refrigerant: R134a)

Model		2ATPU-10		2ATPU-15		2ATPU-20		2ATPU-30		2ATPU-40		2ATPU-60		2ATPU-80		2ATPU-100		2ATPU-120	
		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		30		40		50		60	
	RLA	8.5	10.4	9.6	12.2	15	18.1	19.2	23.4	30.1	36.8	36.5	44.5	49	56.5	60.2	69.1	72.5	81.9
	FLA	9.8	11.3	11.4	13.3	17	19.5	21.9	25.6	34.6	40.1	41.9	48.8	53.8	60.7	66	74.1	78.7	86.8
	MOC	12		14		20.5		17		41.9		51		55		77		88.2	
	LRA	55		70		104		156		175		221		311		458		476	
Blower	HP	2		2		3		4		5.5		7.5		10		10		10	
	FLA	4		4		5.3		7.5		8.8		12.2		16.5		16.5		16.5	
	LRA	20		20		24.2		41.3		49.3		73.2		107.3		107.3		107.3	
System ⁽³⁾	Max ⁽¹⁾ KW Input	12.2	14.2	14.3	16.8	21.7	25.2	27.4	32.2	44.8	52	54.9	63.3	61.7	71.1	74.1	85.1	84.5	96.1
	FLA	13.2	14.7	14.8	16.7	21.8	24.3	28.4	32.1	42.9	48.4	52.8	59.7	69	75.9	81.2	89.3	93.9	102
	Wire Size ⁽²⁾	4×6	4×10	4×10		4×10		3×25/16		3×25/16		3×50/25		3×70/35 3×95/50		3×120/70		3×150/70	

NOTE:

- LRA: Locked Rotor Amps
- FLA: Full Load Amps
- MOC: Maximum Operating Current
- 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 condenser's 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.

Filters

A. Aluminum washable

High capacity, low resistance, permanent metal filters, which can be cleaned in hot water with detergent. They can be used for air cleanliness required 65-70% arrestance or as an economical alternate to disposable type pre - filter of high efficiency filter.

EU Class	2
Arrestance (%)	65 - 80

B. Panel Filter (Disposable)

Heavy duty disposable panel filters giving primary protection to the conditioned space or protect more expensive secondary filters. They are available in synthetic fiber pleated media consist of continuous filament glass fiber of progressive density.

EU Class	3	4	5
Arrestance (%)	80 - 90	90 - 95	--
Dust Spot Efficiency (%)	20 - 25	25 - 40	40 - 60

C. Bag Filter

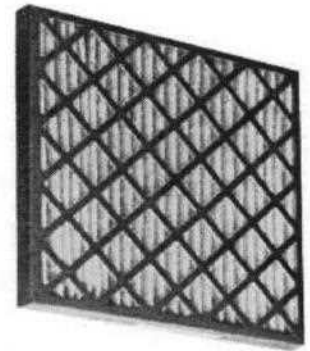
When high performance air filtration long service life and high dust holding capacity required in air handling, then extended surface pocket filters are selected. Filters are available in various efficiency depth, and number of pockets. Dust holding capacity is maximized because dirt is evenly loaded throughout the entire depth of the filter.

EU Class	6	7	8	9
Dust Spot Efficiency (%)	60 - 80	80 - 90	90 - 95	95 - 99

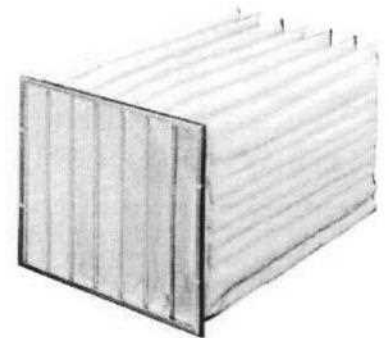
D. Hepa Filters

Hepa filter are used to remove airborne biological contaminants in hospital critical area. Pharmaceutical processing industries as well as to meet exact requirements of the laboratories and precision manufacturing and micro electronic industries filters are available in 99.97 or 99.99% efficiency with plywood or galvanized steel casing. Hepa filters are installed on specially designed knife edge type seal framing system with pressure tight lock to prevent air bypass.

EU Class	11	12	13	14
Dust Spot Efficiency (%)	99.9-99.97	99.97-99.99	99.99-99.999	99.999-99.9995



Panel Filter

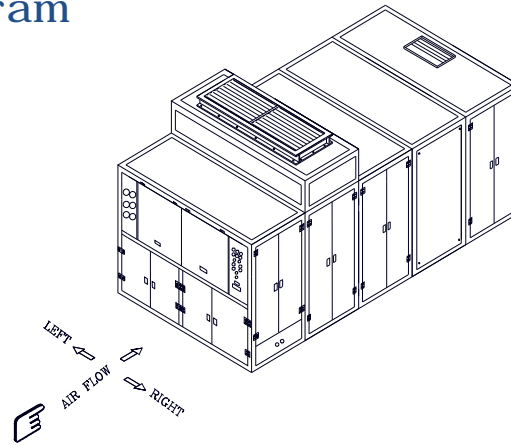


Bag Filter

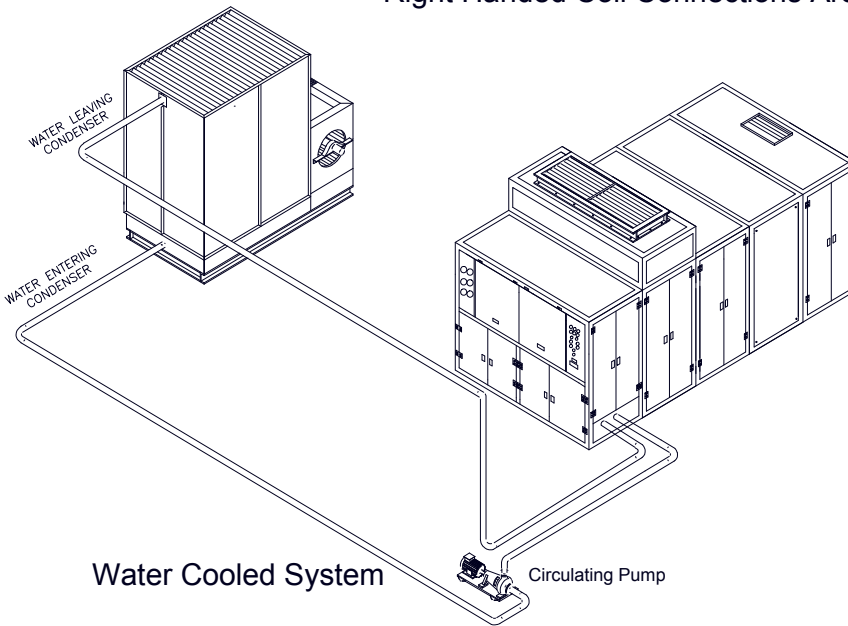


Hepa Filter

Schematic Piping Diagram

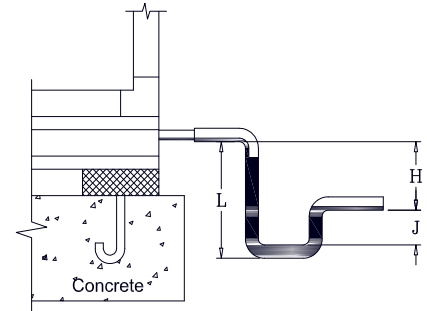


*Right Handed Coil Connections Are Shown.



Water Cooled System

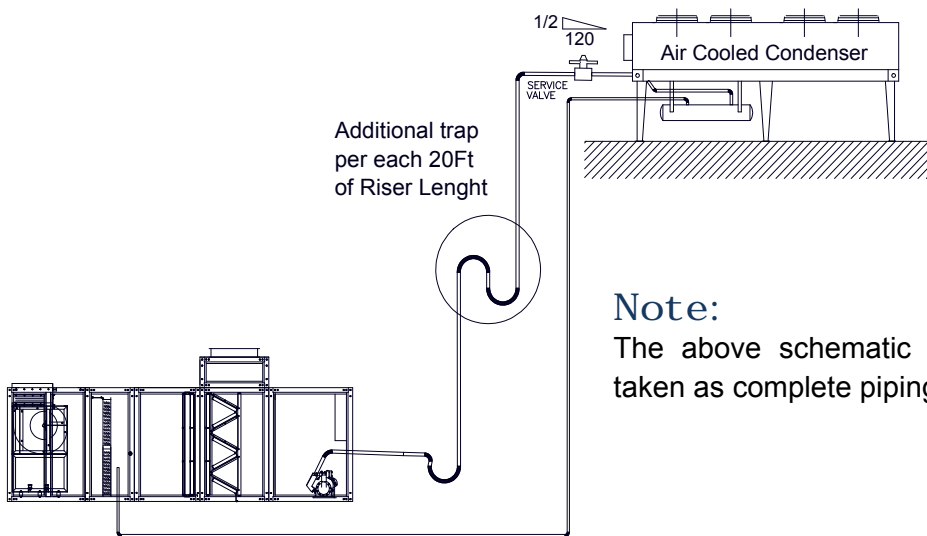
Drain Pan Trapping
Negative Pressure Trapping



$H = (1" \text{ for each of Maximum Negative Static Pressure}) + 1"$

$J = \text{Half of } H$

$L = H + J + \text{Pipe Diameter} + \text{Insulation}$

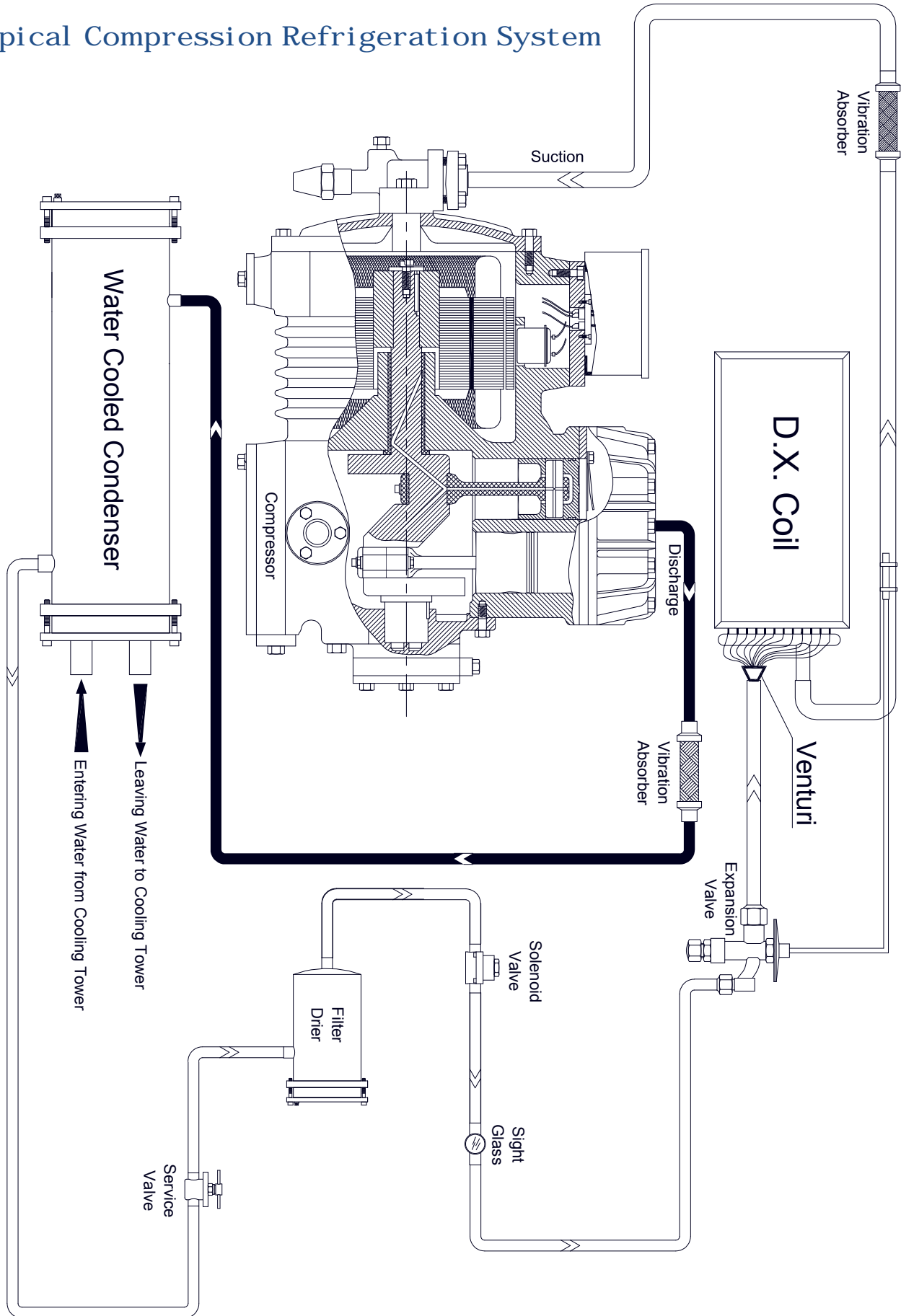


Air Cooled System

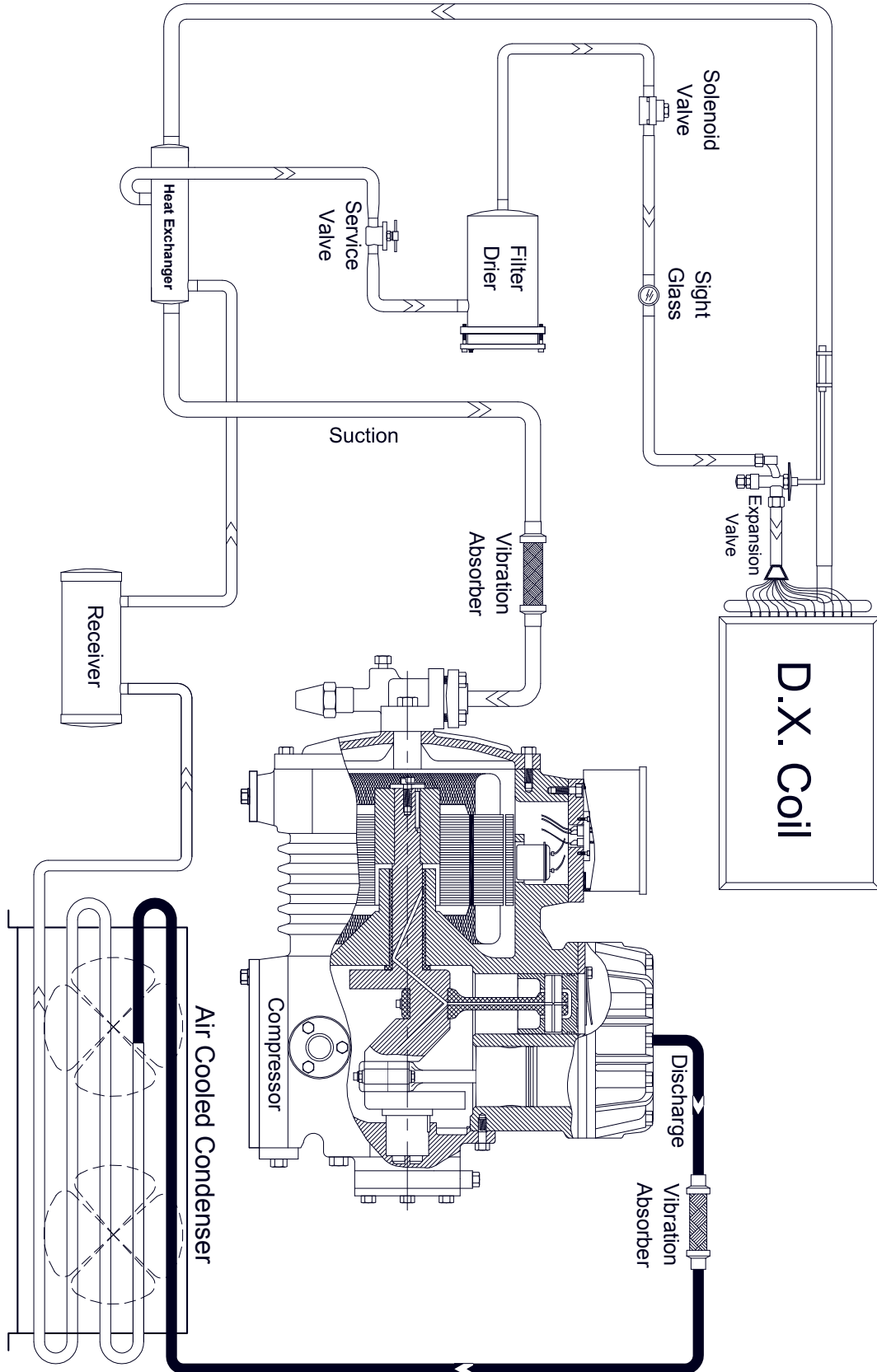
Note:

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

Typical Compression Refrigeration System



Typical Compression Refrigeration System



Enthalpy / Altitude

Table 17

Air Wet Bulb Temperature (°F)	Attitude (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	14.0	14.2	14.5
37	13.9	14.0	14.3	14.4	14.7	14.8
38	14.2	14.5	14.7	15.0	15.1	15.3
39	14.8	15.0	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	17.4
43	16.6	16.9	17.1	17.4	17.6	18.0
44	17.2	17.4	17.6	17.9	18.2	18.5
45	17.7	17.9	18.2	18.4	18.7	19.0
46	18.2	18.4	18.7	19.0	19.3	19.6
47	18.7	18.9	19.3	19.5	19.8	20.2
48	19.2	19.5	19.8	20.0	20.4	20.8
49	19.7	20.0	20.4	20.6	21.0	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	24.0
54	22.6	23.0	23.4	23.8	24.1	24.6
55	23.2	23.6	24.0	24.4	24.8	25.3
56	23.8	24.2	24.6	25.0	25.5	25.9
57	24.4	24.8	25.3	25.8	26.2	26.7
58	25.2	25.5	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	29.0	29.6	30.2	30.7	31.4
64	29.3	29.8	30.3	31.0	31.6	32.2
65	30.1	30.6	31.2	31.7	32.3	33.0
66	30.8	31.4	32.0	32.6	33.3	33.9
67	31.6	32.2	32.8	33.5	34.1	34.8
68	32.4	33.0	33.7	34.3	35.0	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	37.0	37.9	38.6
72	35.8	36.5	37.3	38.0	38.8	39.7
73	36.7	37.5	38.2	39.0	39.9	40.7
74	37.6	38.4	39.2	40.0	40.9	41.8
75	38.6	39.4	40.2	41.0	42.0	42.9
76	39.6	40.3	41.2	42.1	43.0	44.0
77	40.6	41.4	42.3	43.2	42.2	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	50.0
82	45.9	46.9	48.0	49.0	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	53.0	54.2	55.6