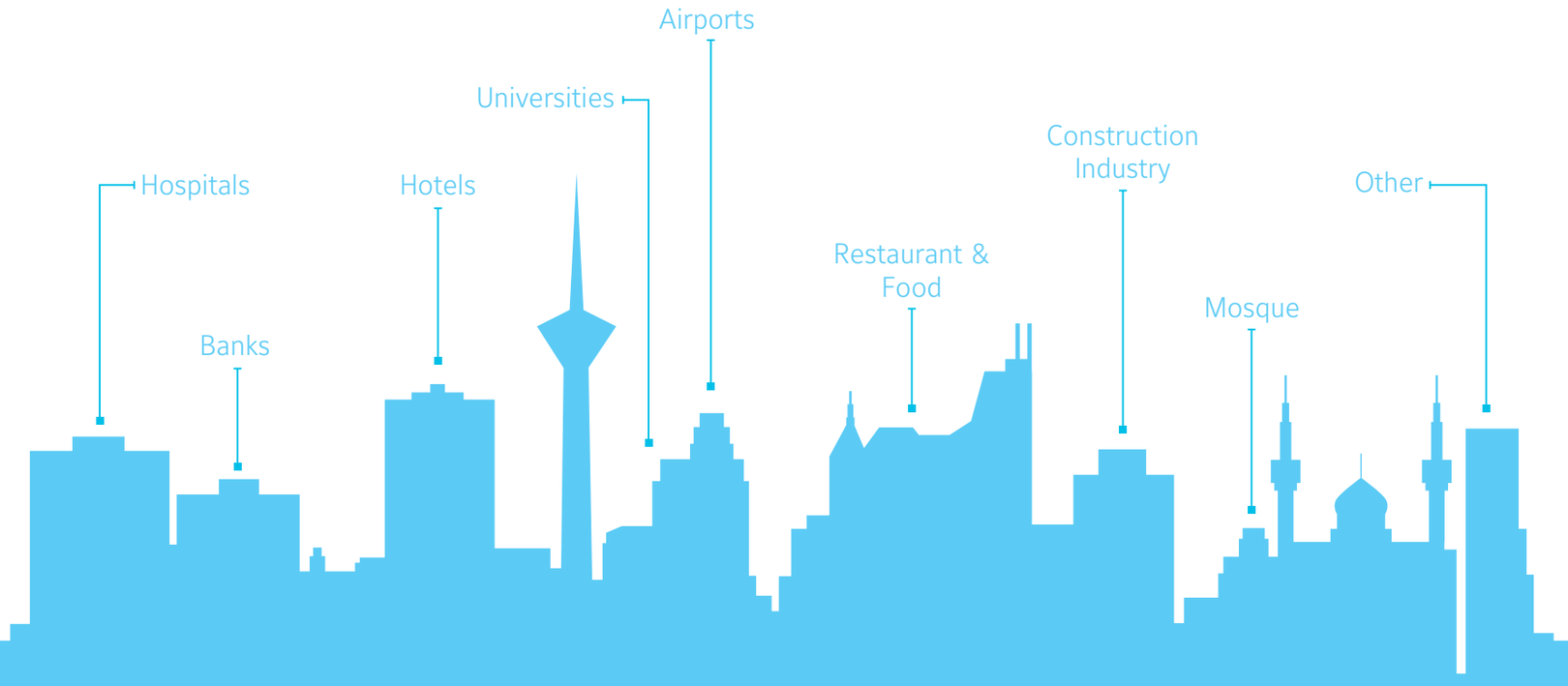
www.saran-mfg.com saran@saran-mfg.com

AIR-COOLED
CONDENSER

Saran
Life's Pleasant Breeze



AIR CONDITIONING MFG.GROUP

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Contents

NOMENCLATURE

SR AC - 900 - 2P

- 2P — NUMBER OF CIRCUITS
- 900 — MODEL NUMBER
- AC — AIR COOLED CONDENSER
- SR — SARAN

Introduction

Saran air-cooled condensers are available in 11 models in range of 3 to 189 TR for wide range of air conditioning and refrigeration applications (Capacities upper than 189 TR available upon request).
All components of Saran air-cooled condensers selected from reliable and famous international brands or designed and constructed base on international air-conditioning equipment's standards.

Main Features

Casing:

Suitable heavy gage galvanized steel sheets are used for constructing of Saran air-cooled condenser's casing panels. To facilitate installation, the units are mounted on a proper chassis equipped with lifting lugs. The base channels and casings are coated with proper thickness painting for archive to maximum corrosion protection.

Coils:

The condenser coils are made of staggered rows of 3/8 inches diameter seamless inner grooved copper tube, mechanically expanded into slit aluminum (copper) fins to ensure optimum heat exchange capability. The fins have full spacing collars, which completely cover each tube. The staggered tube design improves the thermal efficiency of the coil and eliminates bypassing of air around the tubes. A separate sub cooling circuit is standard on all units to maximize energy efficiency.

Fans:

Saran air-cooled condensers are equipped with suitable low noise axial fans from well-known international brands, which automatically controlled base on condensing temperature to obtain a satisfactory performance in different ambient conditions.

Additional Equipment:

Each condenser circuit is equipped with a proper storage receiver, service liquid shut-off valve, safety valve and charging valve.

Factory Testing:

Saran air-cooled condenser's coils are leak tested at 450 psig after production and the entire unit is tested at 350 psig working pressure after production and evacuated and backfilled with 15 psig nitrogen gas prior to shipment.

Selection Information

Capacities of Saran air-cooled condensers presented in the "Performance Data" tables; cover the most frequently encountered condensing range (Condensing temperature - ambient dry bulb temperature).
Generally, considering the condenser temperature of 20°F higher than the ambient temperature (20°F condensing range) is the best compromise for the most economical selection of air-cooled condensers. In addition, following hints shall be considered for air-cooled condenser selection:

- Maximum allowable condensing temperature for R22 & R407C: 130°F
- Maximum allowable condensing temperature for R134a: 140°F
- Optimum condensing temperature for R22 & R407C: 120°F
- Optimum condensing temperature for R134a: 130°F
- Condenser total heat rejection (MBH)=System cooling capacity (MBH)+Compressor motor power input (kW)×3.412

Correction factors:

The Performance tables of condensers in this catalogue are based on 12 FPI coil fin spacing and sea level altitude. For other condition, performance adjustment factors shall be attend in condenser selection (See Table 1,2).

Table 1: Fin Arrangement Correction Factor

Coil Fin Spacing (FPI)	Correction Factor
8	0.79
10	0.91
12	1.00

Table 2: Altitude Correction Factor

Altitude (ft)	Correction Factor
0	1.00
1000	0.98
2000	0.97
3000	0.95
4000	0.93
5000	0.92
6000	0.90

Selection Example:

Given:
System cooling capacity: 398 MBH
Condensing Temperature: 120°F
Ambient Air Temperature: 100°F
Compressor Power Input: 32.2 kW
Design Altitude: 2000 ft
Coil Fin per Inch: 12 FPI
Fin Material: Aluminum
Refrigerant: R22

Solution:

Step 1: Determining selection required total data:
Base on above selection information and formulas, we can determine required air-cooled condenser selection data, so we have

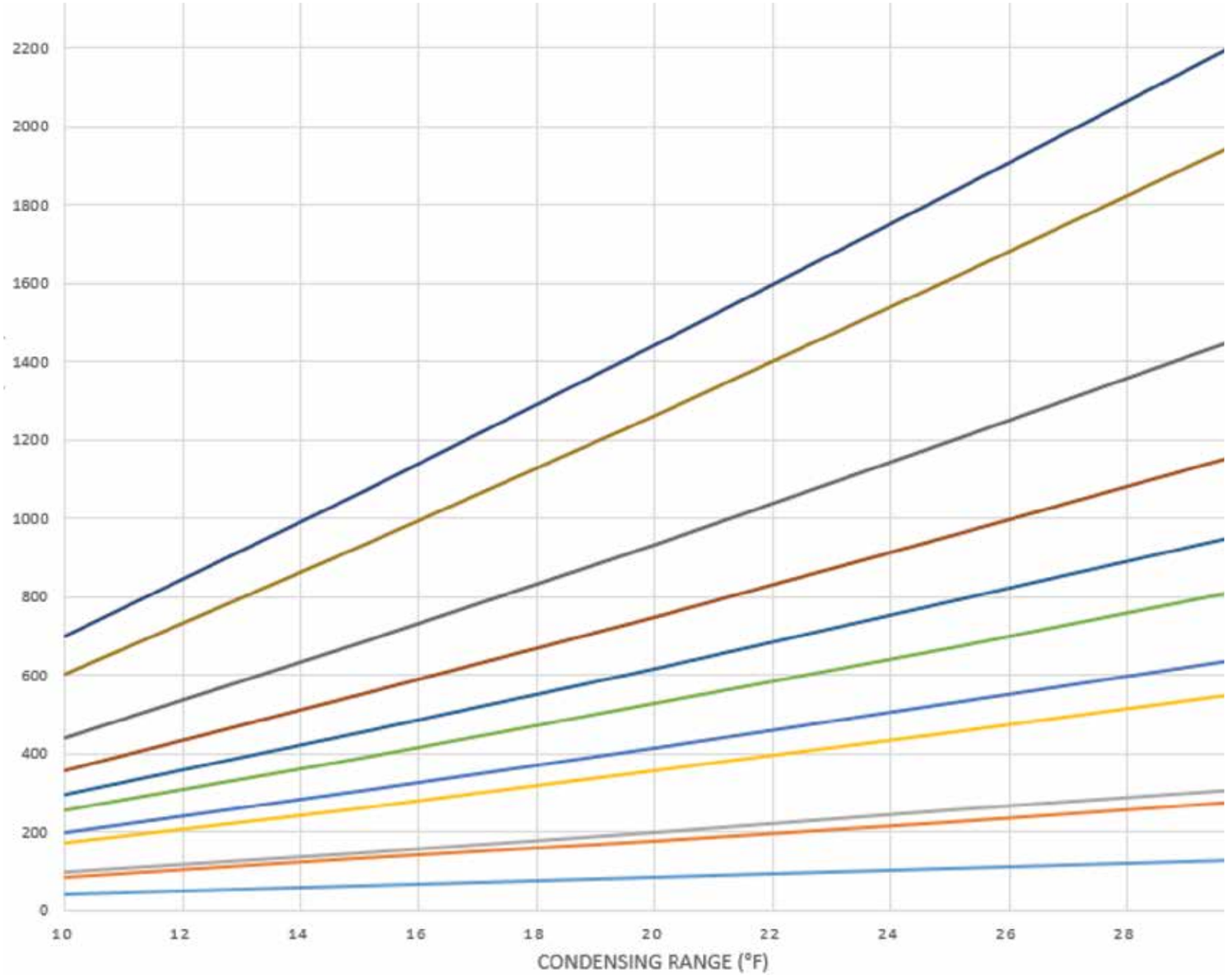
THR (MBH)= System cooling capacity (MBH)+Compressor motor power input (kW)×3.412
THR (MBH)=398 (MBH)+32.2 (kW)×3.412 =507.9 MBH

Condensing range = Condensing temperature - ambient dry bulb temperature = 120 °F – 100 °F = 20 °F

Step 2: Air-cooled condenser model selection:
By referring to air-cooled condenser performance tables of air-cooled condenser, we can see total heat rejection capacity of SRAC-450 in condensing range of 20 °F is 564 MBH.

By multiply above value to altitude correction factor in given conditions (0.97 @ 2000 ft), total heat rejection of SRAC-450 will be 547 MBH. Therefore, this unit satisfy our requirements.

Quick Selection Chart



NOTE

- 1MBH = 1000 Btu/hr
- Condensing Range = Condensing Temperature - Ambient Temperature.
- All above data are based on 12 FPI coil fin spacing, aluminum fin, sea level altitude and R134a. For other condition, please refer to performance data tables.
- All above data subject to change without notice.

Performance Data

Table 3: Total Heat Rejection (MBH) - R22

Models	Condensing Range									
	Aluminum Fin					Copper Fin				
	10°F	15°F	20°F	25°F	30°F	10°F	15°F	20°F	25°F	30°F
SRAC-75	35	54	74	95	117	36	55	76	97	119
SRAC-110	75	117	162	210	259	77	120	166	215	266
SRAC-150	85	132	183	236	291	87	135	187	241	298
SRAC-225	151	236	326	421	521	154	241	334	432	535
SRAC-300	176	275	379	489	604	180	281	388	501	619
SRAC-375	225	350	483	622	767	230	358	494	636	785
SRAC-450	262	409	564	728	899	268	418	577	746	921
SRAC-600	320	502	695	898	1109	327	513	711	920	1137
SRAC-750	398	630	878	1139	1409	407	645	901	1169	1448
SRAC-900	535	839	1163	1504	1861	547	858	1191	1543	1910
SRAC-1150	625	969	1331	1708	2098	636	988	1358	1743	2142

Table 4: Total Heat Rejection (MBH) - R407C

Models	Condensing Range									
	Aluminum Fin					Copper Fin				
	10°F	15°F	20°F	25°F	30°F	10°F	15°F	20°F	25°F	30°F
SRAC-75	33	51	70	90	111	34	52	72	93	114
SRAC-110	71	112	156	202	251	73	115	159	207	257
SRAC-150	81	127	176	227	282	82	129	180	233	289
SRAC-225	143	225	313	407	505	146	230	321	417	518
SRAC-300	168	263	365	473	586	171	269	373	484	600
SRAC-375	215	335	464	601	743	219	342	475	615	761
SRAC-450	250	391	542	703	871	254	399	555	720	893
SRAC-600	306	482	671	872	1081	312	493	687	893	1108
SRAC-750	381	607	851	1110	1379	390	622	873	1139	1417
SRAC-900	510	804	1120	1456	1809	521	822	1147	1493	1856
SRAC-1150	599	933	1287	1659	2045	609	951	1313	1693	2087

Table 5: Total Heat Rejection (MBH) - R134a

Models	Condensing Range									
	Aluminum Fin					Copper Fin				
	10°F	15°F	20°F	25°F	30°F	10°F	15°F	20°F	25°F	30°F
SRAC-75	40	61	82	104	127	41	62	84	107	130
SRAC-110	84	129	175	223	272	86	132	179	228	279
SRAC-150	94	144	196	249	304	96	148	201	255	312
SRAC-225	168	257	350	445	544	172	263	358	457	558
SRAC-300	196	300	407	517	631	200	306	416	530	646
SRAC-375	250	382	518	658	802	255	390	530	673	821
SRAC-450	291	446	606	770	939	298	456	620	789	963
SRAC-600	352	540	735	936	1143	360	552	752	959	1171
SRAC-750	434	669	916	1171	1433	444	686	939	1201	1471
SRAC-900	592	909	1237	1577	1927	606	930	1268	1617	1977
SRAC-1150	684	1043	1412	1790	2176	697	1064	1440	1827	2221

NOTE

- 1MBH = 1000 Btu/hr
- Condensing Range = Condensing Temperature - Ambient Temperature.
- All above data are based on 12 FPI coil fin spacing and sea level altitude. For other condition, performance adjustment factors shall be attend in condenser selection (See Table 1,2).
- Interpolation is allowed but extrapolation outside table boundary is not allowed. Contact Saran MFG group for operating conditions outside table boundary.
- The above data is subject to change without notice.

Engineering Data

Table 6: Technical Data

Models	Propeller Fan Data				Coil Data		Refrigerant Charge (kg)			No. of Circuit	Weight (kg)
	Qty	Dia. (mm)	RPM	Total Air Flow Rate (CFM)	Rows	Coil Face Area (Sq ft)	R22	R407C	R134a		
SRAC-075	1	710	900	6500	3	8.7	5.1	4.8	5.2	1	173
SRAC-110	2	710	900	13000	3	18.3	10.6	10.0	10.8	1	325
SRAC-150	2	710	900	14000	3	21.3	11.8	11.2	12.0	1	353
SRAC-225	4	710	900	25600	3	36.8	19.8	18.8	20.2	1,2	622
SRAC-300	4	710	900	28800	3	44.6	23.3	22.1	23.8	1,2	675
SRAC-375	5	710	900	36000	3	58.1	29.7	28.2	30.3	1,2	855
SRAC-450	6	710	900	43200	3	65.9	32.8	31.2	33.5	1,2	943
SRAC-600	4	800	900	50000	3	80.9	39.3	37.3	40.1	1,2	1049
SRAC-750	6	800	900	63000	3	94.9	44.8	42.5	45.7	1,2	1214
SRAC-900	8	800	900	88000	3	131.1	60.2	57.1	61.4	1,2,4	1736
SRAC-1150	8	800	900	80000	4	131.1	77.9	73.9	79.5	1,2,4	1957

NOTE

- The above data is subject to change without notice.

Table 7: Electrical Data

Models	Motor				System		
	Qty	Input Power(kW)	Rated Current(A)	Starting Current(A)	Input Power(kw)	Total Current(A)	Wire Size
SRAC-075	1	0.9	1.9	7.2	0.9	1.9	4*1.5
SRAC-110	2	0.9	1.9	7.2	1.8	3.8	4*1.5
SRAC-150	2	0.9	1.9	7.2	1.8	3.8	4*1.5
SRAC-225	4	0.9	1.9	7.2	3.6	7.6	4*2.5
SRAC-300	4	0.9	1.9	7.2	3.6	7.6	4*2.5
SRAC-375	5	0.9	1.9	7.2	4.5	9.5	4*2.5
SRAC-450	6	0.9	1.9	7.2	5.4	11.4	4*4
SRAC-600	4	1.2	2.85	14.7	4.8	11.4	4*4
SRAC-750	6	1.2	2.85	14.7	7.2	17.1	4*6
SRAC-900	8	1.2	2.85	14.7	9.6	22.8	4*6
SRAC-1150	8	1.2	2.85	14.7	9.6	22.8	4*6

NOTE

- System Power Supply: 380~400V/3ϕ/50Hz
- Cable size are based on copper conductor at maximum ambient temperature of 50°C and maximum distance of 70 meter.

Dimensions

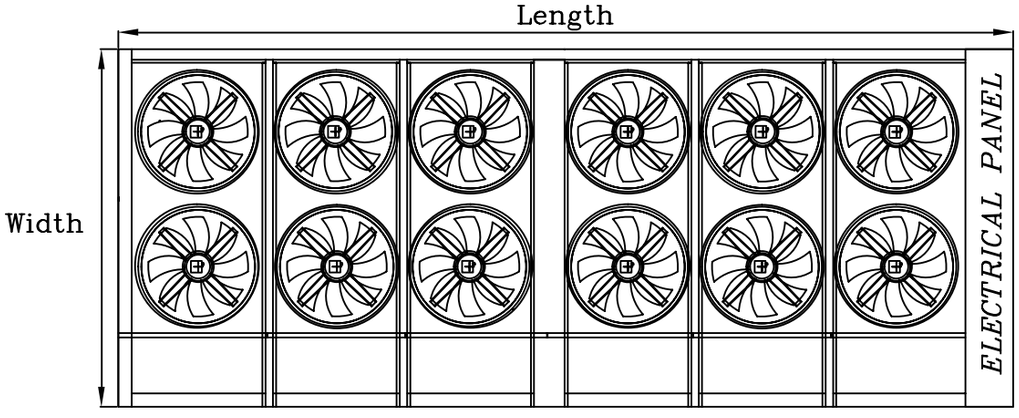
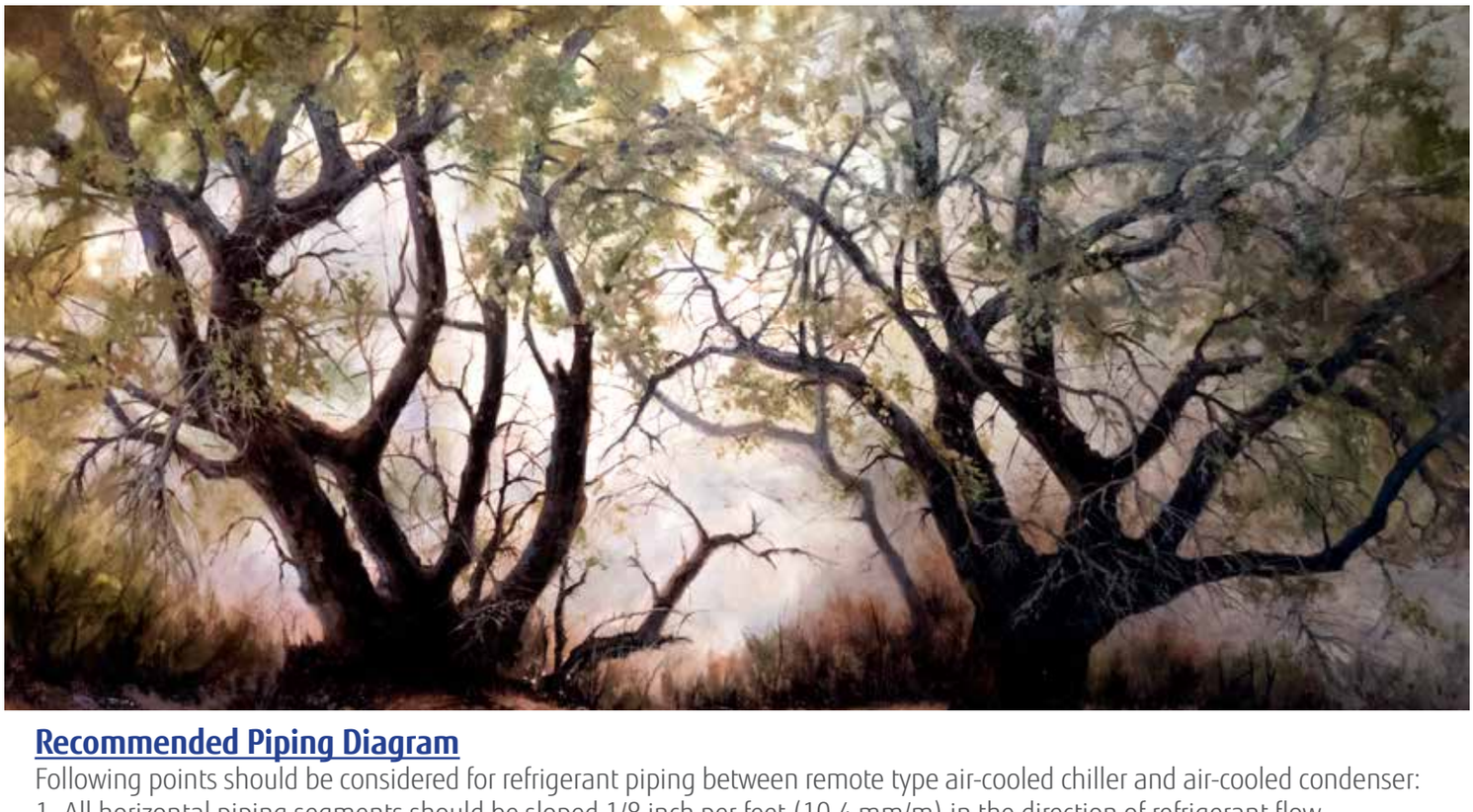


Table 8: Dimensions

Models	Length	Width	Heigth
SRAC-075	1440	1200	1300
SRAC-110	1440	2100	1300
SRAC-150	1400	2100	1300
SRAC-225	2120	2100	1350
SRAC-300	2120	2100	1350
SRAC-375	3010	2100	1350
SRAC-450	3010	2100	1650
SRAC-600	3100	2400	1600
SRAC-750	3800	2400	1600
SRAC-900	4850	2400	1450
SRAC-1150	4850	2400	1450

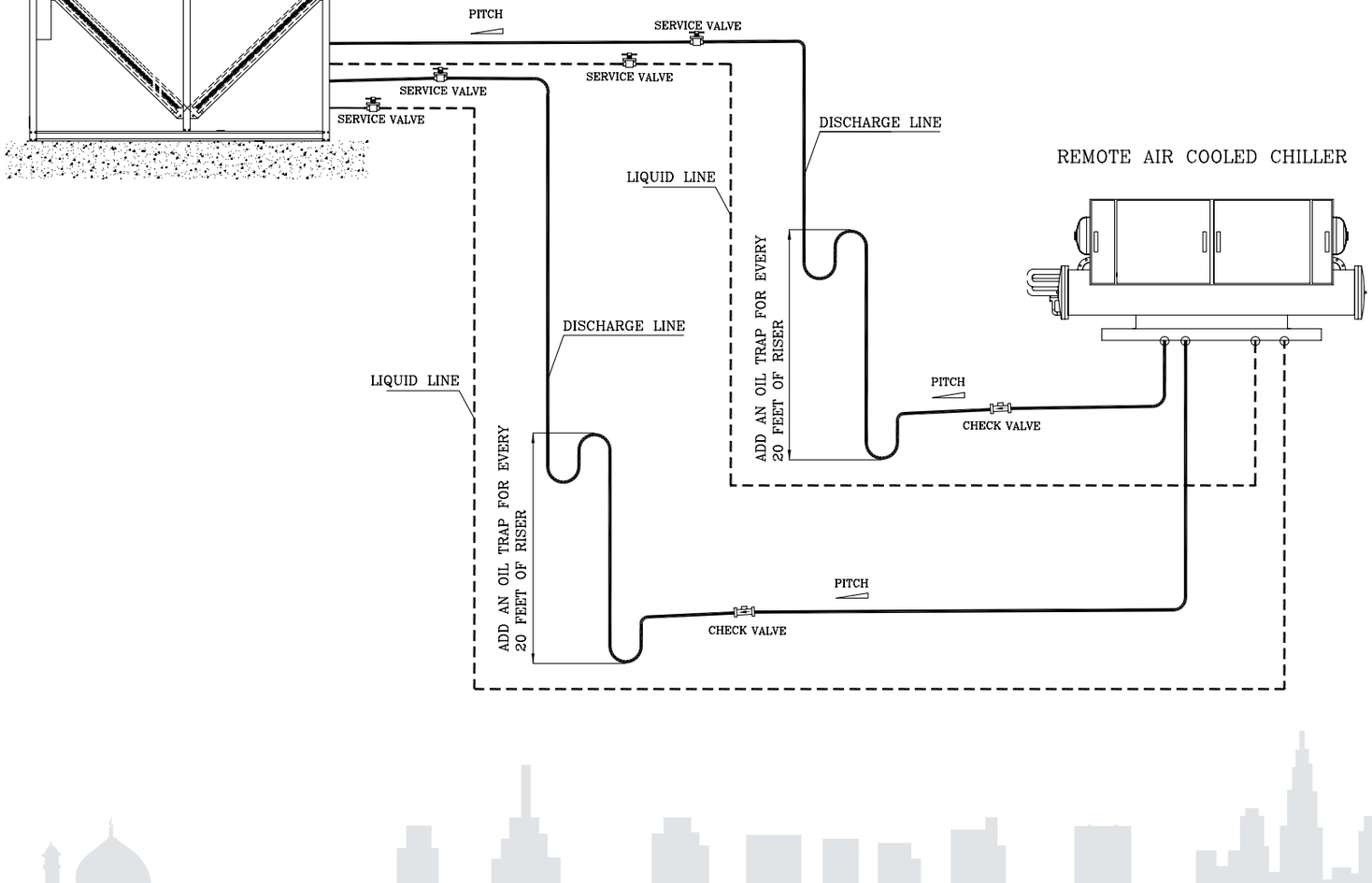
NOTE

- All dimensions are in millimeter
- The above data is subject to change without notice.



Recommended Piping Diagram

Following points should be considered for refrigerant piping between remote type air-cooled chiller and air-cooled condenser:
1- All horizontal piping segments should be sloped 1/8 inch per feet (10.4 mm/m) in the direction of refrigerant flow.
2- Whenever a condenser is located above the compressor, an inverted trap or check valve should be installed at the condenser inlet to prevent liquid refrigerant from flowing backwards into the compressor during off cycles. In addition, Intermediate trap should be installed every 20 feet of riser in discharge line.
3- For proper oil return back to compressor, install air-cooled condenser a minimum of 3 feet above the compressor.



Installation Recommendation

Following points should be considered for installation location of the air-cooled condensers:

1- Do not install the unit in air shaft, courtyard, or other places which is limited for the unit or it will maximize the vibration and noise because of the echo and resonance of the wall or other obstacles.

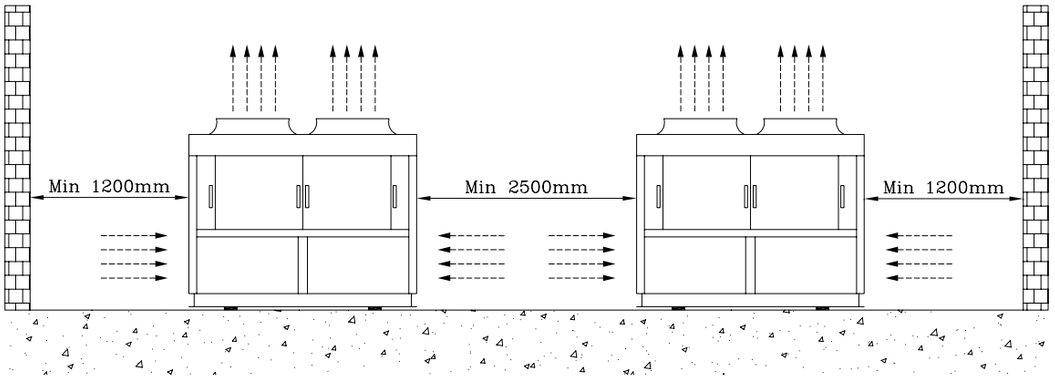
2- Space for access to front and sides of the equipment must be provided to accommodate such maintenance and service and to permit unobstructed flow of air to and from the unit.

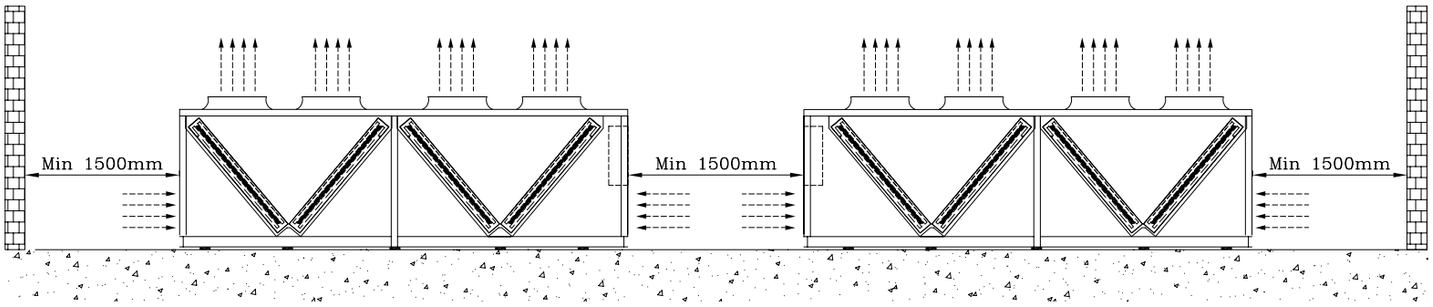
3- Install the air-cooled condensers in a way such that hot air distributed by the unit cannot be drawn in again (as in the case of short circuit of hot discharge air).

4- Ensure that there is no obstruction of airflow into or out of the unit. Remove obstacles that block air intake or discharge.

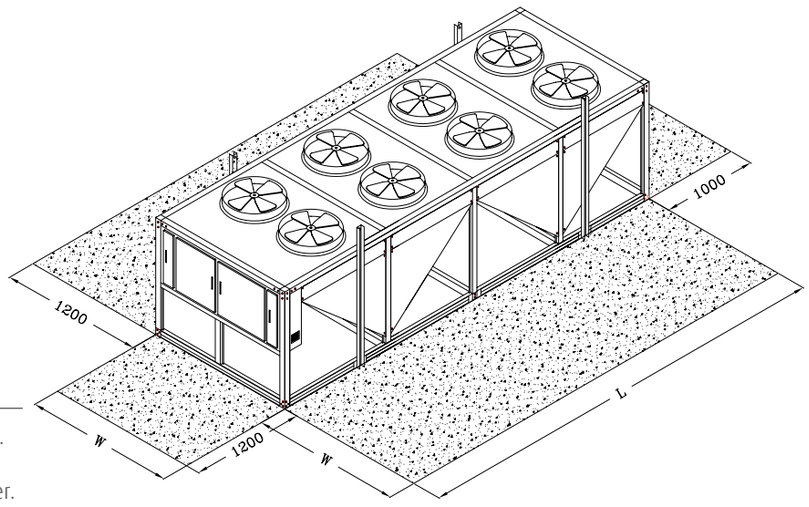
5- The location must be well ventilated, so that the unit can draw in and distribute plenty of air thus lowering the condensing temperature.

6- The unit should be have at least 1200 to 1500 millimeter distance from any wall or other obstacles base on following schematics:





7- Set apart some service space. Space ranges are recommended in following schematics:

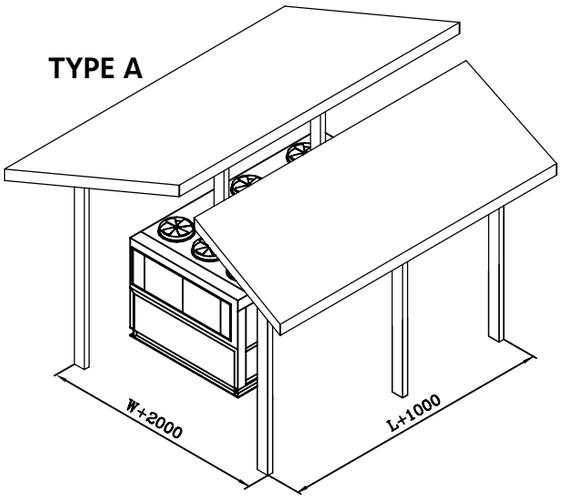


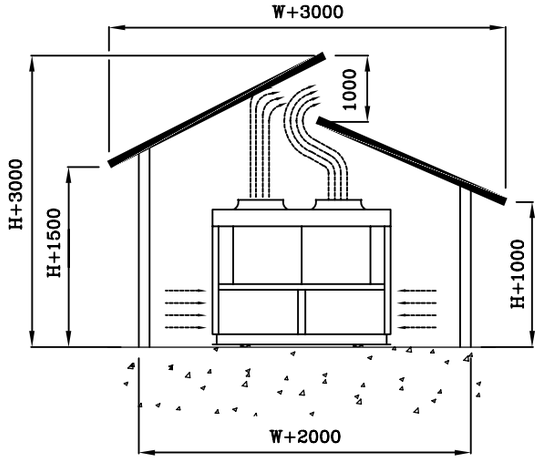
NOTE

- L: Air Cooled Condenser length.
- W: Air Cooled Condenser width
- All dimensions are in millimeter.

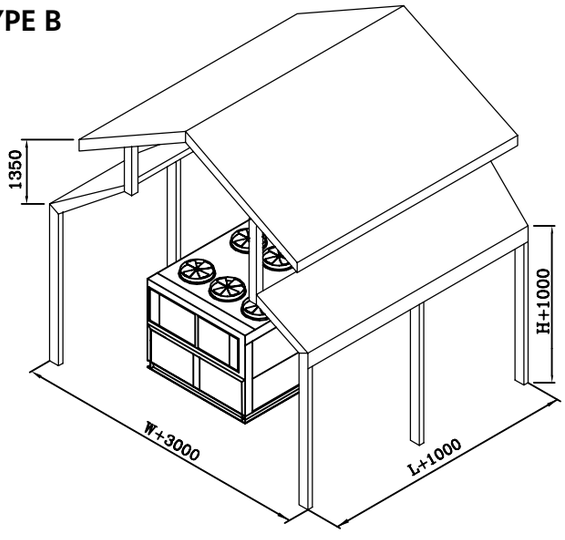
8- If the unit is installed in a high temperature environment, it is recommended to cover the unit with a shelter base on following schematic:

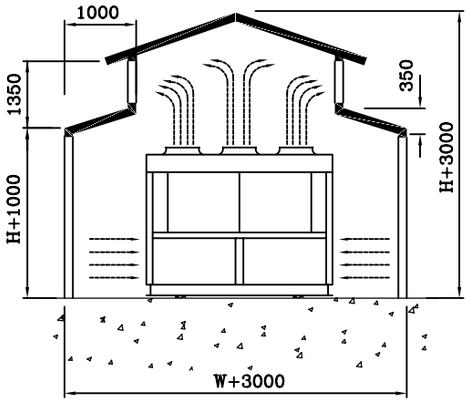
TYPE A





TYPE B





NOTE

- L: Air Cooled Condenser length
- W: Air Cooled Condenser width
- H: Air Cooled Condenser height
- All dimensions are in millimeter.

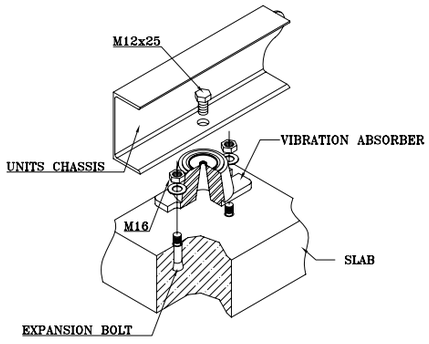
Bearing Platform

1- The unit should be installed on concrete or steel structure bearing platform that is firm and the surface of the baring platform should be smooth and flat. The intensity of the platform should hold the whole unit, if the intensity is not strong enough, it is easy to cause vibration and noise.

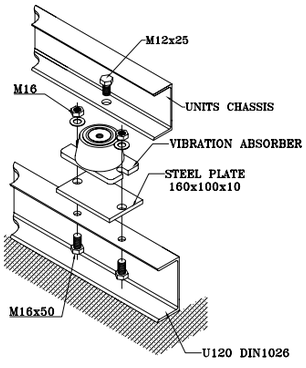
2- The surface of the concrete base platform normally has been plastered as horizontal ornament with waterproof treatment. the surrounding of it should have drainage sink placed, and the slope angle should be no less than 0.5% and the slope should lead to drainage outlet.

3- In order to maintain quiet operation and prevent the vibration and noise transmission from interfering the under floors, the absorber should be laid between the unit base and base platform. Please maintain horizontal when install the unit and mount anti vibration pad when it is necessary.

4- In order to keep connection pipe from being twisted to crack by earthquake, typhoon, or by long time running caused movement. The fixation method should be taken into consideration, refers to following examples for platform installation and fixation:



ARMOURED CEMENT FOUNDATION



ARMOURED CEMENT FOUNDATION

Hanging and Transporting of the Unit:

1- Each unit has been carefully tested and inspected at the factory where every precaution was taken to ensure that it reaches its destination in prefect condition. It is very important that the installers, movers, and riggers use the same care in handling the unit. Chains, cables, or other moving equipment should be placed to avoid damage to any part of the unit. For proper method of rigging consult the label on the unit.

2- To prevent any damage to the unit, at least 45 degree angle between the unit and the hosting chain should be maintained.