

AR – ABOVE RAIL UNIT COOLER

156 MODELS

Ammonia, Halocarbon, and Glycol Refrigerants
1 to 12 Tons Refrigeration (3.5 to 42 kW)
3100 to 27,200 CFM (1463 to 12,836 L/s)



- Air Defrost • Hot Gas Defrost • Water Defrost
- Medium and High Temperature

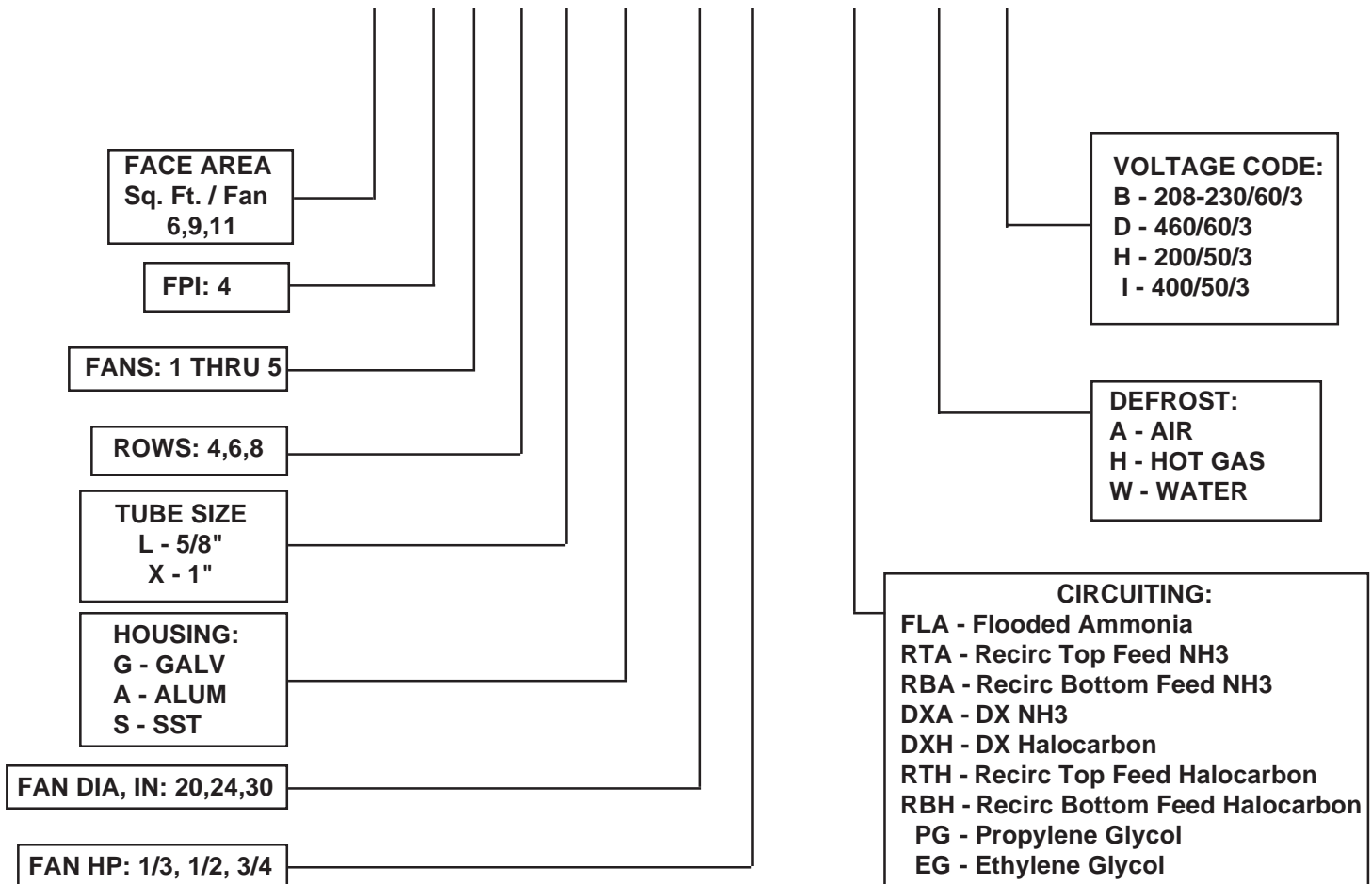
“The Heat Transfer Experts”

TABLE OF CONTENTS

MODEL NOMENCLATURE	2
ENGINEERING SPECIFICATIONS	3
OPTIONAL FEATURES	4
APPLICATION GUIDELINES	5
RATINGS, ENGLISH	6
RATINGS, SI	7
REFRIGERANT CONNECTION SIZES	8
DEFROST AND DRAINPAN CONNECTIONS	8
SPECIFICATIONS, ENGLISH & SI UNITS	9
ELECTRICAL SPECIFICATIONS	11
UNIT DIMENSIONS	11

MODEL NOMENCLATURE "AR" Above the Rail Unit Cooler

AR 9 - 4 2 4 X - G - 24 1/2 - FLA - H - B



ENGINEERING SPECIFICATIONS

I. EVAPORATORS GENERAL

- **Coil** - Ammonia - FL and RB: To be constructed with 1" OD x .065" wall seamless drawn Aluminum tubing.
Ammonia - RT and DX: To be constructed with 5/8" OD x .049" seamless drawn Aluminum tubing.
Halocarbon - FL and RB: To be constructed of 1" x .035" wall seamless, Copper tubing.
Halocarbon - RT and DX: To be constructed with 5/8" x .025" seamless, Copper tubing.
**Glycol: To be constructed with 5/8" x .025" seamless, Copper tubing.
****Consult Factory for Performance Ratings.**
- **Fins** - Shall be aluminum 1100 alloy. Fins shall be continuous flat plate type with full length, self-spacing collars. Tubes to be staggered in direction of airflow, expanded into fin collars to form a tight mechanical bond between tube and fin.
- **Headers** - Ammonia: Shall be made of schedule 40 (minimum) Aluminum pipe. All joints TIG welded.
Halocarbon: Shall be made of Type "L" Copper. All joints brazed with 5% Silver Solder.
- **Coil Connections** - Ammonia - Shall be aluminum flange unions. (Dielectric bushing and washers which will electrically isolate aluminum coil flanges from the supplied mating steel socket weld flanges, are optional.)
Halocarbon - Copper "sweat."
- **Ammonia Coils** - Shall be tested for leaks after welding at 500 psig (35 bar) with dry air under water.
Halocarbon coils - Shall be tested for leaks after welding at 350 psig (25 bar) with dry air under water.
- **Fans & Motors** - Propeller fans constructed of Aluminum blades on steel spiders. 20" (508mm) and 24" (610mm) diameter fans driven at 1140/950 RPM @ 60/50 Hz. 30" (762mm) diameter fans driven at 850/950 RPM @ 60/50 Hz. Fan motors to be TEAO severe duty. Motors have ball bearings and internal thermal protection, Single Phase and Three Phase.
- **Cabinet** - Standard construction is of 16 Ga. Galvanized Steel, with Aluminum drainpans and access panels. (Special materials are also available. See Optional Features)
- **Drainpans** - Drainpan shall be insulated and protected by a galvanized steel cover.
Note: **Insulated Drain Pans** are required by the USDA in meat processing facilities.

II. CIRCUITING

- **Liquid Overfeed Circuiting** - RB (Recirc. Bottom Feed) coils are circuited parallel-flow to optimize circuit feeding and coil performance at all load conditions. RT (Recirc. Top Feed) coils must be circuited counter-flow because of vertical-up airflow. Liquid overfeed orifices shall be used at each circuit entrance, sized for 5 psi pressure drop to insure good liquid distribution.
- **Flooded Circuiting** - FL (Gravity Flooded) coils are circuited parallel flow to optimize circuit feeding and coil performance at all load conditions.
- **Direct Expansion Circuiting** -DX coils are circuited counterflow to produce superheated refrigerant on last pass. (Required for thermostatic expansion valve operation).

III. DEFROST

- **Hot Gas Defrost** - Coils arranged for hot gas defrosting shall be "coil only" defrost. (Heated drainpan is available as an option - see Optional Features).
- **Water Defrost** - Coil to be arranged for water defrosting. Water shall be distributed evenly over the entire coil surface (excluding return bends and headers) by a spray tree, mounted above the fins. Piping is external for easy access to nozzles.

IV. APPROVED VENDOR

- **Approved Vendor** -Colmac Coil Manufacturing, Inc. **Model: AR**_____

V. ORDERING INFORMATION

- **Please Specify**
 1. Complete model number.
 2. Saturated suction temperature.
 3. Room temperature.
 4. Overfeed ratio (if pump recirculatedd).
 5. Options or special features.

OPTIONAL FEATURES

(Consult Factory for more information)

- Dual circuiting for capacity control.
- Corrosion resistant fin coatings.
- Variable fin spacing for heavy frost conditions. First row on 4 row coils and first 2 rows on 6 and 8 row coils are 2 FPI, remaining rows of coil are 4 FPI.
- Stainless steel or all Aluminum cabinet.
- Dielectric steel flanges & bolts.
- Electric Defrost.
- Heated Drainpan, Hot Gas Defrost.
- Fan Speed Controls, Single and three phase

APPLICATION GUIDELINES

AR Unit Coolers are suitable for produce storage areas, populated cold-storage work areas, and other applications where a low profile and low air-velocities are required.

Fan Motor Heat - Is not included in the ratings and should be added to the room cooling load as follows:

HP	English	SI	
	Btu / (HP*hr)	kW	Watts / kW
1/8 to 1/2	4250	0.1 to 0.4	1670
3/4 to 3	3700	0.6 to 2.2	1454
5 to 20	2950	3.7 to 14.9	1159

Low Coil Face Velocity - 600 FPM, or less - Allows AR units to operate with a wet surface without moisture carry-over.

High TD's are recommended when dirty air has the potential for coating the fins with debris (loading docks, etc.), and when low humidity is desired.

- Frosted fins are "cleaned" during defrost cycle.
- High TD's ensure better performance with dirty fins in no-frost conditions.
- Colder fins condense more moisture.

Low TD's - Approx. 10°F (6°C) - are recommended for high humidity applications such as Carcass Chillers and Wet Produce storage.

- Carcass Chilling requires a higher initial refrigeration capacity. Removing body heat raises initial TD during pulldown. Size liquid lines for the maximum load anticipated.

Units should be located so that the air discharges parallel to beams whenever possible.

Recommended Coil Circuiting for Ammonia

RB - Pump Recirculated, Bottom Feed - Is recommended for all hot gas defrost systems. The coil should always have hot gas fed at the top (suction) to ensure good liquid and oil drainage during defrost.

RT - Pump Recirculated, Top Feed - Is recommended for all air and water defrost systems. Although not recommended, top Feed can also be used in hot gas defrost systems provided hot gas is fed into the liquid header at the top of the coil. Gas flowing through the liquid feed orifices will experience some pressure drop which may penalize defrost performance.

FL - Gravity Flooded, Bottom Feed - Is typically cost effective for small systems (4 evaporators or less), and is recommended when a variable load exists. May be used with Hot Gas or Water Defrost, provided the coil has hot gas fed into the suction header to ensure good liquid and oil drainage during defrost.

DX - Direct Expansion Feed - Should not be used when saturated suction temperature is 0°F (-18°C) or less. For best results, DX coils should be used with a minimum TD of 12 to 15°F (7 to 9°C)

- **Liquid Overfeed Systems** - Must provide liquid at 5 psi (35 kPa) above suction pressure and at a temperature not exceeding 30°F (17°C) above saturated suction temperature.
- **Water Defrost** - Defrost water must be provided to AR units at 5 psig pressure at rated flow rate.

Recommended Circuiting / Defrost Combinations

Circuiting	Defrost Configuration			
	Hot Gas	Water	Air	Electric
FLA / FLH	✓	✓	✓	N/R
RBA / RBH	✓	✓	✓	N/R
RTA / RTH	N/R	✓	✓	✓
DXA / DXH	✓	✓	✓	✓

Table 1

AMMONIA & R-22 RATINGS, ENGLISH UNITS

English Capacities of Colmac AR Series Refrigeration Equipment
(Generated at 30° EADB, 0.90 Sens. Heat Ratio)

Model	FPI	No. Fans	Rows	Fan Dia	Horsepower		A Face ft ²	Air Flow & Velocities				Capacity / °TD, (Btuh / °F)					
					60 Hz	50 Hz		FL / RB		DX / RT		FL / RB		RT		DX	
								CFM	FPM	CFM	FPM	Wet	Frosted	Wet	Frosted	Wet	Frosted
AR6-414	4	1	4	20"	1/3	1/3	6	3500	583	3400	567	1804	1640	1766	1606	1571	1428
AR6-416	4	1	6	20"	1/3	1/3	6	3300	550	3175	529	2362	2147	2294	2085	1889	1717
AR6-418	4	1	8	20"	1/3	1/3	6	3100	517	2950	492	2627	2388	2530	2299	2155	1959
AR9-414	4	1	4	24"	1/2	3/4	9.375	5400	576	5300	565	2793	2539	2755	2504	2450	2227
AR9-416	4	1	6	24"	1/2	3/4	9.375	5250	560	5150	549	3741	3400	3687	3351	3040	2763
AR9-418	4	1	8	24"	1/2	3/4	9.375	5100	544	5000	533	4270	3882	4206	3823	3597	3270
AR11-414	4	1	4	30"	1/2	3/4	11.25	6800	604	6600	587	3473	3157	3397	3088	3025	2749
AR11-416	4	1	6	30"	1/2	3/4	11.25	6500	578	6200	551	4596	4178	4435	4031	3657	3325
AR11-418	4	1	8	30"	1/2	3/4	11.25	6200	551	5800	516	5175	4704	4918	4471	4200	3818
AR6-424	4	2	4	20"	1/3	1/3	12	7000	583	6800	567	3609	3280	3533	3211	3142	2856
AR6-426	4	2	6	20"	1/3	1/3	12	6600	550	6350	529	4723	4294	4587	4170	3778	3434
AR6-428	4	2	8	20"	1/3	1/3	12	6200	517	5900	492	5255	4777	5059	4599	4310	3918
AR9-424	4	2	4	24"	1/2	3/4	18.75	10800	576	10600	565	5586	5078	5510	5009	4900	4454
AR9-426	4	2	6	24"	1/2	3/4	18.75	10500	560	10300	549	7482	6801	7374	6703	6080	5527
AR9-428	4	2	8	24"	1/2	3/4	18.75	10200	544	10000	533	8541	7763	8412	7647	7195	6540
AR11-424	4	2	4	30"	1/2	3/4	22.5	13600	604	13200	587	6946	6314	6795	6177	6049	5499
AR11-426	4	2	6	30"	1/2	3/4	22.5	13000	578	12400	551	9193	8356	8870	8063	7315	6649
AR11-428	4	2	8	30"	1/2	3/4	22.5	12400	551	11600	516	10351	9409	9837	8942	8400	7636
AR6-434	4	3	4	20"	1/3	1/3	18	10500	583	10200	567	5413	4921	5299	4817	4713	4284
AR6-436	4	3	6	20"	1/3	1/3	18	9900	550	9525	529	7085	6440	6881	6255	5667	5151
AR6-438	4	3	8	20"	1/3	1/3	18	9300	517	8850	492	7882	7165	7589	6898	6466	5877
AR9-434	4	3	4	24"	1/2	3/4	28.125	16200	576	15900	565	8380	7617	8265	7513	7350	6681
AR9-436	4	3	6	24"	1/2	3/4	28.125	15750	560	15450	549	11223	10201	11060	10054	9120	8290
AR9-438	4	3	8	24"	1/2	3/4	28.125	15300	544	15000	533	12811	11645	12619	11470	10792	9810
AR11-434	4	3	4	30"	1/2	3/4	33.75	20400	604	19800	587	10419	9471	10192	9265	9074	8248
AR11-436	4	3	6	30"	1/2	3/4	33.75	19500	578	18600	551	13789	12534	13305	12094	10972	9974
AR11-438	4	3	8	30"	1/2	3/4	33.75	18600	551	17400	516	15526	14113	14755	13412	12600	11453
AR6-444	4	4	4	20"	1/3	1/3	24	14000	583	13600	567	7218	6561	7065	6422	6283	5712
AR6-446	4	4	6	20"	1/3	1/3	24	13200	550	12700	529	9447	8587	9175	8340	7556	6868
AR6-448	4	4	8	20"	1/3	1/3	24	12400	517	11800	492	10510	9553	10118	9198	8621	7836
AR9-444	4	4	4	24"	1/2	3/4	37.5	21600	576	21200	565	11173	10156	11020	10017	9800	8908
AR9-446	4	4	6	24"	1/2	3/4	37.5	21000	560	20600	549	14963	13602	14747	13405	12160	11054
AR9-448	4	4	8	24"	1/2	3/4	37.5	20400	544	20000	533	17081	15527	16825	15294	14389	13080
AR11-444	4	4	4	30"	1/2	3/4	45	27200	604	26400	587	13892	12628	13590	12353	12099	10998
AR11-446	4	4	6	30"	1/2	3/4	45	26000	578	24800	551	18386	16713	17740	16126	14630	13298
AR11-448	4	4	8	30"	1/2	3/4	45	24800	551	23200	516	20701	18818	19673	17883	16800	15271
AR6-454	4	5	4	20"	1/3	1/3	30	17500	583	17000	567	9022	8201	8832	8028	7854	7140
AR6-456	4	5	6	20"	1/3	1/3	30	16500	550	15875	529	11809	10734	11468	10425	9444	8585
AR6-458	4	5	8	20"	1/3	1/3	30	15500	517	14750	492	13137	11942	12648	11497	10776	9795

Table 2

AMMONIA & R-22 RATINGS, SI UNITS

SI Capacities of Colmac AR Series Refrigeration Equipment
(Generated at -1°C EADB, 0.90 Sens. Heat Ratio)

Model	Fin Pitch (mm)	No. Fans	Rows	Fan Dia. (mm)	kWatts		AFace (m ²)	Air Flow & Velocities				Capacity / °TD, (W / °K)					
					60 Hz	50 Hz		FL / RB		DX / RT		FL / RB		RT		DX	
								L / s	m/s	L / s	m/s	Wet	Frosted	Wet	Frosted	Wet	Frosted
AR6-414	6.4	1	4	508	0.25	0.25	0.56	1652	2.96	1604	2.88	952	865	932	847	829	753
AR6-416	6.4	1	6	508	0.25	0.25	0.56	1557	2.79	1498	2.69	1246	1132	1210	1100	996	906
AR6-418	6.4	1	8	508	0.25	0.25	0.56	1463	2.62	1392	2.50	1386	1260	1334	1213	1137	1033
AR9-414	6.4	1	4	610	0.37	0.56	0.87	2548	2.93	2501	2.87	1473	1339	1453	1321	1292	1175
AR9-416	6.4	1	6	610	0.37	0.56	0.87	2477	2.84	2430	2.79	1973	1794	1945	1768	1604	1458
AR9-418	6.4	1	8	610	0.37	0.56	0.87	2407	2.76	2360	2.71	2253	2048	2219	2017	1898	1725
AR11-414	6.4	1	4	762	0.37	0.56	1.05	3209	3.07	3115	2.98	1832	1665	1792	1629	1596	1450
AR11-416	6.4	1	6	762	0.37	0.56	1.05	3067	2.94	2926	2.80	2425	2204	2339	2127	1929	1754
AR11-418	6.4	1	8	762	0.37	0.56	1.05	2926	2.80	2737	2.62	2730	2482	2594	2358	2215	2014
AR6-424	6.4	2	4	508	0.25	0.25	1.11	3303	2.96	3209	2.88	1904	1730	1863	1694	1657	1506
AR6-426	6.4	2	6	508	0.25	0.25	1.11	3115	2.79	2997	2.69	2492	2265	2420	2200	1993	1811
AR6-428	6.4	2	8	508	0.25	0.25	1.11	2926	2.62	2784	2.50	2772	2520	2669	2426	2274	2067
AR9-424	6.4	2	4	610	0.37	0.56	1.74	5097	2.93	5002	2.87	2947	2679	2907	2642	2585	2350
AR9-426	6.4	2	6	610	0.37	0.56	1.74	4955	2.84	4861	2.79	3947	3587	3890	3536	3207	2915
AR9-428	6.4	2	8	610	0.37	0.56	1.74	4813	2.76	4719	2.71	4505	4095	4438	4034	3795	3450
AR11-424	6.4	2	4	762	0.37	0.56	2.09	6418	3.07	6229	2.98	3664	3331	3584	3258	3191	2901
AR11-426	6.4	2	6	762	0.37	0.56	2.09	6135	2.94	5852	2.80	4849	4408	4679	4253	3859	3507
AR11-428	6.4	2	8	762	0.37	0.56	2.09	5852	2.80	5474	2.62	5460	4963	5189	4717	4431	4028
AR6-434	6.4	3	4	508	0.25	0.25	1.67	4955	2.96	4813	2.88	2855	2596	2795	2541	2486	2260
AR6-436	6.4	3	6	508	0.25	0.25	1.67	4672	2.79	4495	2.69	3737	3397	3630	3299	2989	2717
AR6-438	6.4	3	8	508	0.25	0.25	1.67	4389	2.62	4176	2.50	4158	3780	4003	3639	3411	3100
AR9-434	6.4	3	4	610	0.37	0.56	2.61	7645	2.93	7503	2.87	4420	4018	4360	3963	3877	3524
AR9-436	6.4	3	6	610	0.37	0.56	2.61	7432	2.84	7291	2.79	5920	5381	5834	5303	4811	4373
AR9-438	6.4	3	8	610	0.37	0.56	2.61	7220	2.76	7079	2.71	6758	6143	6656	6051	5693	5175
AR11-434	6.4	3	4	762	0.37	0.56	3.14	9627	3.07	9344	2.98	5496	4996	5376	4887	4787	4351
AR11-436	6.4	3	6	762	0.37	0.56	3.14	9202	2.94	8777	2.80	7274	6612	7018	6380	5788	5261
AR11-438	6.4	3	8	762	0.37	0.56	3.14	8777	2.80	8211	2.62	8190	7445	7783	7075	6646	6042
AR6-444	6.4	4	4	508	0.25	0.25	2.23	6607	2.96	6418	2.88	3807	3461	3727	3388	3315	3013
AR6-446	6.4	4	6	508	0.25	0.25	2.23	6229	2.79	5993	2.69	4983	4530	4840	4399	3986	3623
AR6-448	6.4	4	8	508	0.25	0.25	2.23	5852	2.62	5568	2.50	5544	5039	5337	4852	4547	4134
AR9-444	6.4	4	4	610	0.37	0.56	3.48	10193	2.93	10004	2.87	5894	5357	5813	5284	5170	4699
AR9-446	6.4	4	6	610	0.37	0.56	3.48	9910	2.84	9721	2.79	7893	7175	7779	7071	6415	5831
AR9-448	6.4	4	8	610	0.37	0.56	3.48	9627	2.76	9438	2.71	9010	8190	8875	8067	7590	6900
AR11-444	6.4	4	4	762	0.37	0.56	4.18	12836	3.07	12458	2.98	7328	6661	7169	6516	6382	5801
AR11-446	6.4	4	6	762	0.37	0.56	4.18	12269	2.94	11703	2.80	9698	8816	9358	8506	7717	7015
AR11-448	6.4	4	8	762	0.37	0.56	4.18	11703	2.80	10948	2.62	10920	9926	10378	9433	8862	8055
AR6-454	6.4	5	4	508	0.25	0.25	2.79	8258	2.96	8022	2.88	4759	4326	4659	4235	4143	3766
AR6-456	6.4	5	6	508	0.25	0.25	2.79	7786	2.79	7491	2.69	6229	5662	6050	5499	4982	4529
AR6-458	6.4	5	8	508	0.25	0.25	2.79	7314	2.62	6961	2.50	6930	6299	6672	6065	5684	5167

Table 3, Refrigerant Connection Sizes (IPS, inches)

Ammonia			Liquid Line Sizes			Suction Sizes - Flooded and Liquid Overfeed						Suction Sizes - DX		
Capacity Tons (kW)	Lb/min, 4:1 (Note 1 & 2)		4:1 Recirc.	Flooded	DX Note 3	Saturated Suction Temp, °F (°C)						SST, °F / °C		
						30° (-1°)	20° (-7°)	0° (-18°)	-20° (-29°)	-30° (-34°)	-40° (-40°)	30° (-1°)	20° (-7°)	0° (-18°)
1 (3.5)	1.76		1/2	1	"	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1	1	1
2 (7)	3.52		1/2	1	"	1 1/4	1 1/4	1 1/4	1 1/2	2	2	1	1	1
5 (17.6)	8.8		3/4	1 1/2	"	1 1/4	1 1/2	1 1/2	2	2 1/2	2 1/2	1	1 1/4	1 1/4
7 (24.6)	12.32		3/4	1 1/2	"	1 1/2	1 1/2	2	2 1/2	2 1/2	3	1 1/4	1 1/4	1 1/2
10 (35.2)	17.6		3/4	2	"	2	2	2 1/2	2 1/2	3	3	1 1/4	1 1/2	2
15 (52.8)	26.4		3/4	2 1/2	"	2 1/2	2 1/2	2 1/2	3	4	4	1 1/2	2	2
20 (70.3)	35.2		1	3	"	3	3	3	4	4	5	2	2	2 1/2
25 (87.9)	44		1	3	"	3	3	3	4	5	5	2	2	2 1/2
30 (105.5)	52.8		1	3	"	3	3	4	4	5	5	2	2 1/2	3
40 (140.7)	70.4		1 1/4	4	"	3	3	4	5	5	6	2 1/2	2 1/2	3
50 (175.9)	88		1 1/4	4	"	3	4	5	5	6	6	2 1/2	3	4
60 (211)	105.6		1 1/4	4	"	4	4	5	5	6	6	3	3	4
70 (246.2)	123.2		1 1/4	4	"	4	4	5	6	6	8	3	3	4
80 (281.4)	140.8		1 1/2	4	"	4	5	5	6	6	8	3	4	4
90 (316.5)	158.4		1 1/2	4	"	4	5	5	6	6	8	3	4	4
100 (351.7)	176		1 1/2	5	"	5	5	5	6	8	8	4	4	4

Refrigerant Connection Sizes (ODS, inches)

R-22		3:1 Liquid Overfeed							Direct Expansion						
Capacity Tons (kW)	Lb/min, 3:1 (Note 1 & 2)	Suction Size, Type 'L' Cu @ SST (°F/°C)							Suction Size, Type 'L' Cu @ SST (°F/°C)						
		Liquid	30° (-1°)	20° (-7°)	0° (-18°)	-20° (-29°)	-30° (-34°)	-40° (-40°)	Liquid	30° (-1°)	20° (-7°)	0° (-18°)	-20° (-29°)	-30° (-34°)	-40° (-40°)
1 (3.5)	9.4	1/2	1 1/8	1 3/8	1 3/8	1 5/8	1 5/8	2 1/8	1/2	7/8	1 1/8	1 1/8	1 3/8	1 3/8	1 5/8
2 (7)	18.8	5/8	1 3/8	1 5/8	1 5/8	2 1/8	2 5/8	2 5/8	1/2	1 1/8	1 3/8	1 3/8	1 5/8	2 1/8	2 1/8
5 (17.6)	47.1	7/8	2 1/8	2 1/8	2 5/8	3 1/8	3 1/8	3 1/8	5/8	1 5/8	1 5/8	2 1/8	2 5/8	2 5/8	2 5/8
7 (24.6)	65.9	1 1/8	2 5/8	2 5/8	2 5/8	3 1/8	3 5/8	3 5/8	7/8	2 1/8	2 1/8	2 1/8	2 5/8	3 1/8	3 1/8
10 (35.2)	94.2	1 1/8	2 5/8	2 5/8	3 1/8	3 5/8	3 5/8	4 1/8	7/8	2 1/8	2 1/8	2 5/8	3 1/8	3 1/8	3 5/8
15 (52.8)	141.3	1 3/8	3 1/8	3 1/8	3 5/8	4 1/8	4 1/8	**5	7/8	2 5/8	2 5/8	3 1/8	3 5/8	3 5/8	4 1/8
20 (70.3)	188.4	1 3/8	3 1/8	3 1/8	3 5/8	4 1/8	**5	**6	1 1/8	2 5/8	2 5/8	3 1/8	3 5/8	4 1/8	**5
25 (87.9)	235.5	1 5/8	3 5/8	4 1/8	4 1/8	**5	**6	**6	1 1/8	3 1/8	3 1/8	3 5/8	4 1/8	**5	**5
30 (105.5)	282.6	1 5/8	3 5/8	4 1/8	4 1/8	**6	**6	**8	1 1/8	3 1/8	3 1/8	3 5/8	**5	**5	**6
40 (140.7)	376.8	2 1/8	4 1/8	4 1/8	**5	**6	**8	**8	1 1/8	3 5/8	3 5/8	4 1/8	**5	**6	**6
50 (175.9)	471	2 1/8	4 1/8	**5	**6	**8	**8	**10	1 3/8	3 5/8	4 1/8	**5	**6	**6	**8
60 (211)	565.2	2 1/8	**5	**5	**6	**8	**8	**10	1 3/8	4 1/8	4 1/8	**5	**6	**6	**8
70 (246.2)	659.4	2 1/8	**5	**6	**6	**8	**10	**10	1 3/8	4 1/8	**5	**5	**6	**8	**8
80 (281.4)	753.6	2 1/8	**5	**6	**8	**10	**10	**10	1 5/8	4 1/8	**5	**6	**8	**8	**8

- Notes:
1. Lb/min x .00756 = kg/s
 4. Suction Sizes based on .5°F / 100ft (0.9°C / 100m)
 2. At 95°F (35°C) Liquid Temp, -30°F (-34°C) Suction Temp.
 5. Tons Refrigeration x 3.517 = kW.
 3. DX Liquid size to be determined at Factory.
 6. * * Use Steel, SCH 40, IPS inches.

Table 4 Water Connection Sizes

AR6				AR9				AR11			
Model	MPT Connections, IPS, (Qty.) / Size			Model	MPT Connections, IPS, (Qty.) / Size			Model	MPT Connections, IPS, (Qty.) / Size		
	Inlet Water Defrost	Drain Air/HG Defrost	Drain Water Defrost		Inlet Water Defrost	Drain Air/HG Defrost	Drain Water Defrost		Inlet Water Defrost	Drain Air/HG Defrost	Drain Water Defrost
414	(2) / 1	(1) / 1	(1) / 2	414	(2) / 1	(1) / 1	(1) / 2	414	(2) / 1	(1) / 1 1/2	(1) / 3
416	(2) / 1	(1) / 1	(1) / 2	416	(2) / 1	(1) / 1	(1) / 2	416	(2) / 1	(1) / 1 1/2	(1) / 3
418	(2) / 1	(1) / 1	(1) / 2	418	(2) / 1	(1) / 1	(1) / 2	418	(2) / 1	(1) / 1 1/2	(1) / 3
424	(2) / 1	(1) / 1	(1) / 2	424	(2) / 1	(1) / 1	(1) / 2	424	(2) / 1	(1) / 1 1/2	(1) / 3
426	(2) / 1	(1) / 1	(1) / 2	426	(2) / 1	(1) / 1	(1) / 2	426	(2) / 1	(1) / 1 1/2	(1) / 3
428	(2) / 1	(1) / 1	(1) / 2	428	(2) / 1	(1) / 1	(1) / 2	428	(2) / 1	(1) / 1 1/2	(1) / 3
434	(2) / 1	(1) / 1 1/2	(1) / 3	434	(2) / 1	(1) / 1 1/2	(1) / 3	434	(2) / 1	(1) / 2	(1) / 4
436	(2) / 1	(1) / 1 1/2	(1) / 3	436	(2) / 1	(1) / 1 1/2	(1) / 3	436	(2) / 1	(1) / 2	(1) / 4
438	(2) / 1	(1) / 1 1/2	(1) / 3	438	(2) / 1	(1) / 1 1/2	(1) / 3	438	(2) / 1	(1) / 2	(1) / 4
444	(2) / 1	(1) / 1 1/2	(1) / 3	444	(2) / 1	(1) / 1 1/2	(1) / 3	444	(2) / 1	(1) / 2	(1) / 4
446	(2) / 1	(1) / 1 1/2	(1) / 3	446	(2) / 1	(1) / 1 1/2	(1) / 3	446	(2) / 1	(1) / 2	(1) / 4
448	(2) / 1	(1) / 1 1/2	(1) / 3	448	(2) / 1	(1) / 1 1/2	(1) / 3	448	(2) / 1	(1) / 2	(1) / 4
454	(2) / 1	(1) / 1 1/2	(1) / 3								
456	(2) / 1	(1) / 1 1/2	(1) / 3								
458	(2) / 1	(1) / 1 1/2	(1) / 3								

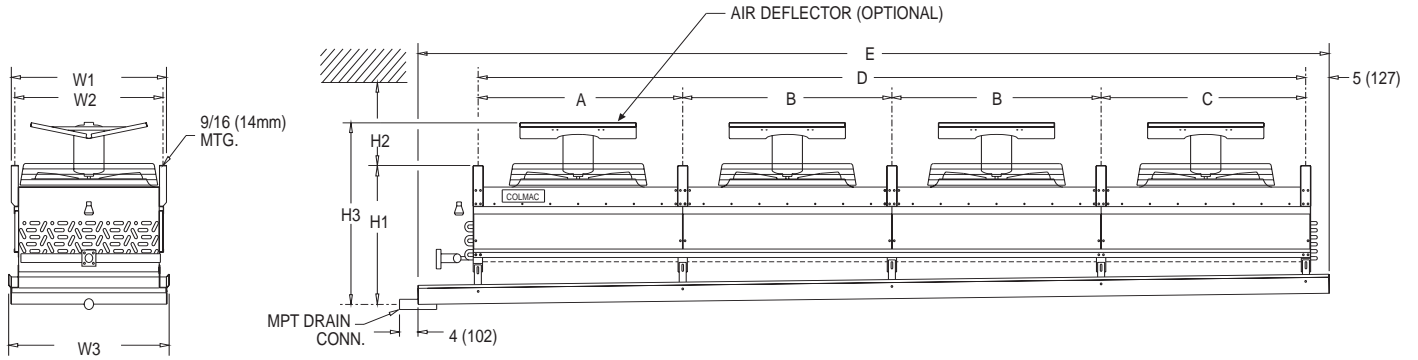
Table 5, Specifications, English & SI Units

AR6					Direct Expansion & Recirc. Top								Flooded & Recirc. Bottom							
Model	Face Area		Water Defrost		Dry Weight				Internal Volume				Dry Weight				Internal Volume			
	ft2	m2	GPM @ 5 PSI	L/s @ 34 kPa	R-22		NH3		R-22		NH3		R-22		NH3		R-22		NH3	
					lb	kg	lb	kg	ft3	L	ft3	L	lb	kg	lb	kg	ft3	L	ft3	L
414	6	0.56	15.00	0.95	187	85	188	85	0.41	11.61	0.33	9.35	229	104	204	93	0.5	14.16	0.47	13.31
416	6	0.56	15.00	0.95	210	95	207	94	0.62	17.56	0.5	14.16	278	126	247	112	0.76	21.44	0.71	20.11
418	6	0.56	15.00	0.95	232	105	225	102	0.83	23.51	0.67	18.97	326	148	289	131	1.01	28.72	0.95	26.90
424	12	1.11	30.00	1.89	341	155	336	152	0.81	22.94	0.65	18.41	414	188	371	168	0.95	27.02	0.89	25.20
426	12	1.11	30.00	1.89	384	174	372	169	1.22	34.55	0.98	27.75	503	228	444	201	1.44	40.75	1.34	37.95
428	12	1.11	30.00	1.89	426	193	409	186	1.62	45.88	1.31	37.10	591	268	518	235	1.92	54.46	1.79	50.69
434	18	1.67	45.00	2.84	495	225	485	220	1.2	33.98	0.97	27.47	599	272	538	244	1.41	39.90	1.31	37.0
436	18	1.67	45.00	2.84	558	253	538	244	1.81	51.26	1.46	41.35	728	330	642	291	2.12	60.07	1.98	56.07
438	18	1.67	45.00	2.84	621	282	592	269	2.41	68.25	1.95	55.22	857	389	747	339	2.83	80.23	2.64	74.76
444	24	2.23	60.00	2.65	649	294	633	287	1.6	45.31	1.29	36.53	784	356	704	319	1.86	52.79	1.74	49.28
446	24	2.23	60.00	2.65	732	332	704	319	2.4	67.97	1.94	54.94	953	432	840	381	2.80	79.38	2.61	73.92
448	24	2.23	60.00	2.65	815	370	776	352	3.2	90.62	2.59	73.35	1122	509	976	443	3.74	106.00	2.49	70.52
454	30	2.79	75.00	4.73	803	364	781	354	1.99	56.36	1.61	45.60	969	440	871	395	2.32	65.67	2.16	61.17
456	30	2.79	75.00	4.73	906	411	870	395	2.99	84.68	2.42	68.53	1178	534	1038	471	3.49	98.72	3.25	92.04
458	30	2.79	75.00	4.73	1009	458	959	435	3.99	113.00	3.23	91.47	1387	629	1205	547	4.65	131.74	4.34	122.91

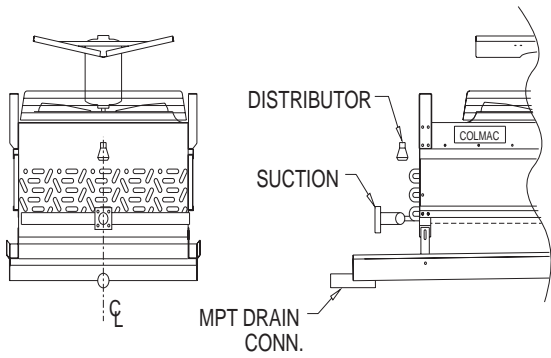
AR9					Direct Expansion & Recirc. Top								Flooded & Recirc. Bottom							
Model	Face Area		Water Defrost		Dry Weight				Internal Volume				Dry Weight				Internal Volume			
	ft2	m2	GPM @ 5 PSI	L/s @ 34 kPa	R-22		NH3		R-22		NH3		R-22		NH3		R-22		NH3	
					lb	kg	lb	kg	ft3	L	ft3	L	lb	kg	lb	kg	ft3	L	ft3	L
414	9.38	0.87	15.00	0.95	243	110	242	110	0.64	18.12	0.52	14.73	303	137	279	127	0.77	21.69	0.71	20.11
416	9.38	0.87	15.00	0.95	278	126	272	123	0.97	27.47	0.78	22.09	375	170	333	151	1.16	32.82	1.08	30.59
418	9.38	0.87	15.00	0.95	313	142	302	137	1.29	36.53	1.04	29.45	447	203	387	176	1.55	43.95	1.45	41.06
424	18.75	1.74	30.00	1.89	442	200	432	196	1.26	35.68	1.02	28.89	550	249	498	226	1.48	41.83	1.38	39.08
426	18.75	1.74	30.00	1.89	509	231	491	223	1.89	53.52	1.53	43.33	684	310	599	272	2.22	63.01	2.07	58.62
428	18.75	1.74	30.00	1.89	575	261	549	249	2.52	71.37	2.04	57.77	817	371	700	318	2.97	84.20	2.77	78.45
434	28.13	2.61	45.00	2.84	641	291	623	283	1.87	52.96	1.52	43.05	798	362	717	325	2.19	61.96	2.04	57.77
436	28.13	2.61	45.00	2.84	739	335	710	322	2.82	79.86	2.28	64.57	992	450	865	392	3.29	93.20	3.07	86.94
438	28.13	2.61	45.00	2.84	838	380	797	362	3.76	106.48	3.04	86.09	1187	538	1013	459	4.39	124.44	4.1	116.11
444	37.50	3.48	60.00	3.79	840	381	813	369	2.49	70.52	2.01	56.92	1045	474	936	425	2.90	82.07	2.7	76.46
446	37.50	3.48	60.00	3.79	970	440	929	422	3.7	105.9	3	85.53	1301	590	1131	513	4.36	123.4	4.1	115
448	37.50	3.48	60.00	3.79	1100	499	1044	474	4.99	141.32	4.03	114.13	1557	706	1326	601	5.82	164.68	5.42	153.49

AR11					Direct Expansion & Recirc. Top								Flooded & Recirc. Bottom							
Model	Face Area		Water Defrost		Dry Weight				Internal Volume				Dry Weight				Internal Volume			
	ft2	m2	GPM @ 5 PSI	L/s @ 34 kPa	R-22		NH3		R-22		NH3		R-22		NH3		R-22		NH3	
					lb	kg	lb	kg	ft3	L	ft3	L	lb	kg	lb	kg	ft3	L	ft3	L
414	11.25	1.05	15.00	0.95	282	128	272	123	0.77	21.81	0.62	17.56	341	155	310	141	0.92	26.05	0.86	24.36
416	11.25	1.05	15.00	0.95	318	144	308	140	1.6	32.85	0.94	26.62	427	194	374	170	1.39	39.39	1.3	36.82
418	11.25	1.05	15.00	0.95	353	160	343	156	1.55	43.90	1.25	35.40	513	233	438	199	1.86	52.73	1.74	49.28
424	22.5	2.09	30.00	1.89	496	225	476	216	1.51	42.76	1.22	34.55	613	278	548	249	1.77	50.21	1.65	46.73
426	22.5	2.09	30.00	1.89	570	259	544	247	2.27	64.29	1.83	51.83	772	350	668	303	2.67	75.61	2.49	70.52
428	22.5	2.09	30.00	1.89	643	292	613	278	3.03	85.81	2.45	69.38	931	422	788	357	3.57	101.02	3.33	94.31
434	33.75	3.14	45.00	2.84	711	323	680	308	2.25	63.72	1.82	51.54	886	402	787	357	2.63	74.34	2.45	69.38
436	33.75	3.14	45.00	2.84	822	373	781	354	3.38	95.72	2.73	77.31	1118	507	963	437	3.95	111.84	3.68	104.22
438	33.75	3.14	45.00	2.84	934	424	882	400	4.51	127.72	3.64	103.08	1350	612	1139	517	5.27	149.33	4.92	139.33
444	45	4.18	60.00	3.79	925	420	884	401	2.99	84.68	2.42	68.53	1158	525	1025	465	3.48	98.50	3.24	91.76
446	45	4.18	60.00	3.79	1075	488	1018	462	4.49	127.16	3.63	102.80	1463	664	1257	570	5.23	148.06	4.88	138.20
448	45	4.18	60.00	3.79	1224	555	1152	523	5.99	169.64	4.84	137.07	1768	802	1489	675	6.98	197.62	6.51	184.36

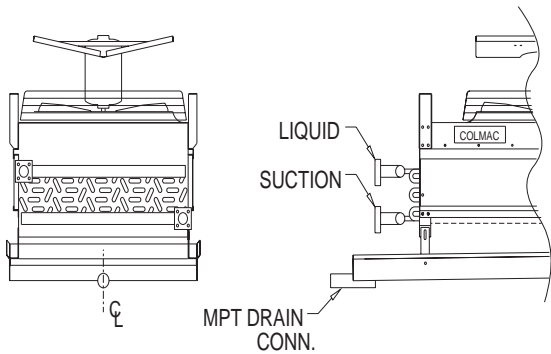
Figure 4 Unit Dimensions



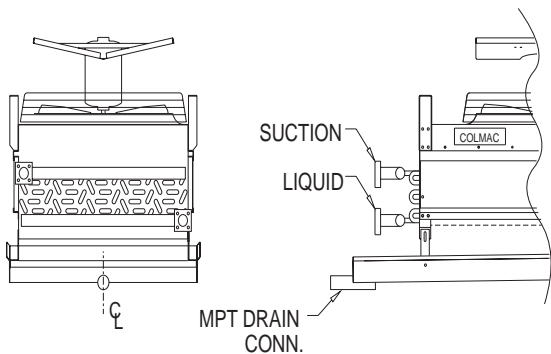
AMMONIA



HEADER END, DX CIRCUITING

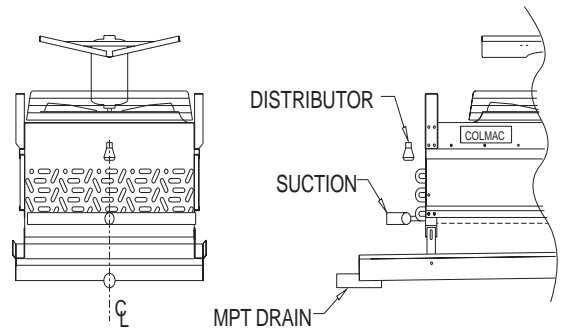


HEADER END, RT CIRCUITING

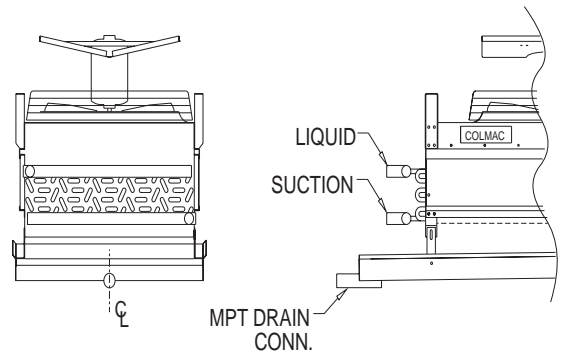


HEADER END, RB AND FL CIRCUITING

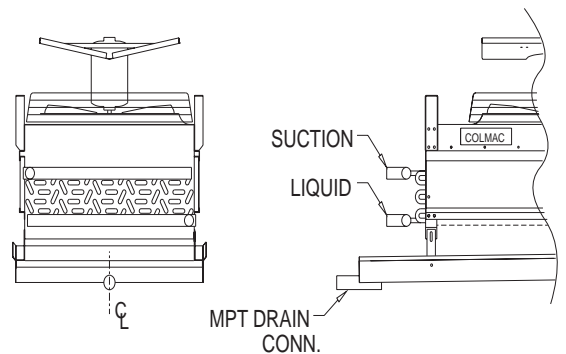
HALOCARBON



HEADER END, DX CIRCUITING



HEADER END, RT CIRCUITING



HEADER END, RB AND FL CIRCUITING

Unit Dimensions, Inches (mm) (See Figure 4)

Model	A	B	C	D	E
AR6-41_	34 (864)	—	—	34 (864)	52 (1321)
-42_	35 (889)	—	35 (889)	70 (1778)	86 (2184)
-43_	35 (889)	36 (914)	35 (889)	106 (2692)	121 (3073)
-44_	35 (889)	36 (914)	35 (889)	142 (3607)	156 (3962)
-45_	35 (889)	36 (914)	35 (889)	178 (4521)	191 (4851)
AR9-41_	43 (1092)	—	—	43 (1092)	62 (1575)
-42_	44 (1118)	—	44 (1118)	88 (2235)	106 (2692)
-43_	44 (1118)	45 (1143)	44 (1118)	133 (3378)	151 (3835)
-44_	44 (1118)	45 (1143)	44 (1118)	178 (4521)	196 (4978)
AR11-41_	43 (1092)	—	—	43 (1092)	62 (1575)
-42_	44 (1118)	—	44 (1118)	88 (2235)	106 (2692)
-43_	44 (1118)	45 (1143)	44 (1118)	133 (3378)	151 (3835)
-44_	44 (1118)	45 (1143)	44 (1118)	178 (4521)	196 (4978)

Model	W1	W2	W3
AR6	27 3/8 (695)	25 7/8 (657)	28 1/2 (724)
AR9	33 3/8 (848)	31 7/8 (810)	34 1/2 (876)
AR11	39 3/8 (1000)	37 7/8 (962)	40 1/2 (1029)

- Notes: 1. Minimum distance from ceiling:
Distance without deflector = Fan Diameter
Distance with deflector = 13 (330mm)
2. Ammonia Header Connections are Aluminum Flange.
Halocarbon Header Connections are Copper ODS "sweat"

Model	Direct Expansion & Recirc. Top (5/8" Tubes)				
	Rows	No. Fans	H1	H2	H3
AR6	4, 6, 8	1, 2	27 1/2 (700)	Note 1	39 1/2 (1003)
	4, 6, 8	3, 4, 5	28 1/4 (720)	"	40 1/4 (1020)
AR9	4, 6, 8	1, 2	27 1/2 (700)	"	39 1/2 (1003)
	4, 6, 8	3, 4	28 1/4 (720)	"	40 1/4 (1020)
AR11	4, 6, 8	1, 2	27 1/2 (700)	"	39 1/2 (1003)
	4, 6, 8	3, 4	28 1/4 (720)	"	40 1/4 (1020)

Model	Flooded & Recirc. Bottom (1" Tubes)				
	Rows	No. Fans	H1	H2	H3
AR6	4	1, 2	28 1/4 (720)	Note 1	40 (1015)
		3, 4, 5	29 (735)	"	41 (1040)
	6	1, 2	33 1/4 (845)	"	45 1/4 (1150)
		3, 4, 5	34 1/4 (870)	"	46 (1170)
AR9	4	1, 2	28 1/4 (720)	"	40 (1015)
		3, 4	29 (735)	"	41 (1040)
	6	1, 2	33 1/4 (845)	"	45 1/4 (1150)
		3, 4	34 1/4 (870)	"	46 (1170)
AR11	4	1, 2	28 1/4 (720)	"	40 (1015)
		3, 4	29 (735)	"	41 (1040)
	6	1, 2	33 1/4 (845)	"	45 1/4 (1150)
		3, 4	34 1/4 (870)	"	46 (1170)
AR11	8	1, 2	38 1/2 (975)	"	50 1/2 (1280)
		3, 4	39 1/2 (1003)	"	51 1/4 (1300)
	8	1, 2	38 1/2 (975)	"	50 1/2 (1280)
		3, 4	39 1/2 (1003)	"	51 1/4 (1300)

Table 10 Electrical Specifications

60 Hz			Single Phase 208-230V		Three Phase 208-230V/460V	
Model	HP	RPM	FLA	LRA	FLA	LRA
AR6	1/3	1140	2.0 - 1.8	7.0	1.7-1.6 / 0.8	7.5-7.2/3.6
AR9	1/2	1140	2.4 - 2.3	10.0	2.3-2.2 / 1.1	10.4-10.0/5
AR11	1/2	850	2.5 - 2.4	7.5	2.4-2.4 / 1.2	7.5/3.8

50 Hz			Single Phase 220-240V		Three Phase 200 / 400V	
Model	HP (Watts)	RPM	FLA	LRA	FLA	LRA
AR6	0.45 (338)	950	2.8 - 2.7	8.0	1.8 / 0.9	8.1/4.0
AR9	0.67 (500)	950	3.6 - 3.4	12.7	3.2 / 1.6	12.8/6.4
AR11	0.67 (500)	950	3.6 - 3.4	12.7	3.2 / 1.6	12.8/6.4

- Notes: 1. Totally Enclosed, Air-Over (TEAO) Motors
2. Motors supplied with internal thermal overload protection.



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CE(PED) Certification, ASME Sec. VIII, Canadian Registration Number, UL508, Canadian Standards Association



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