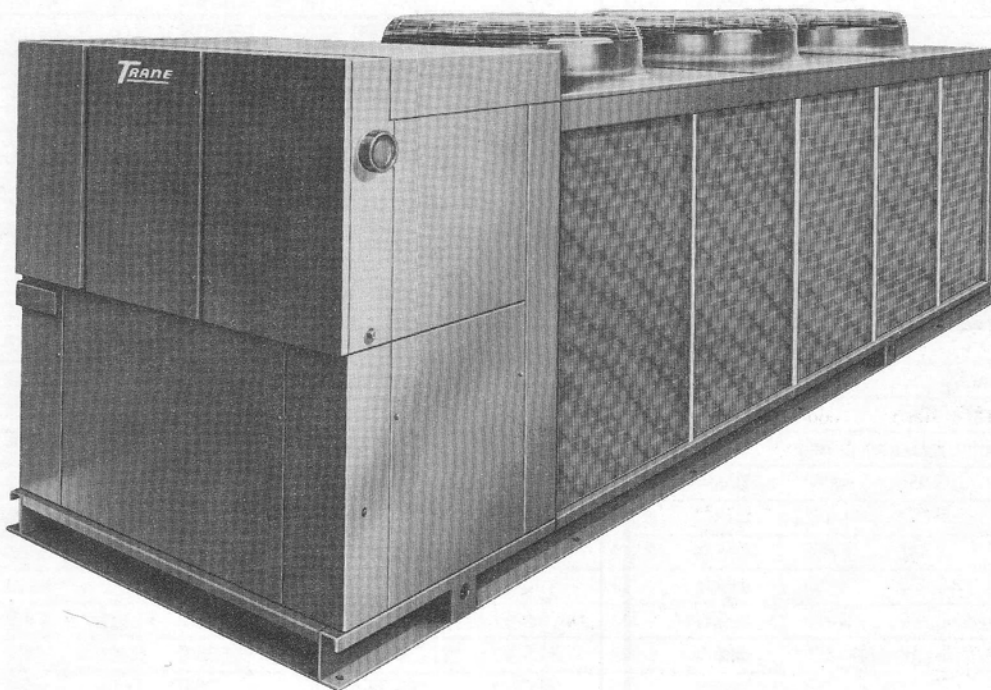




# AIR COOLED LIQUID CHILLERS

FOR OUTDOOR INSTALLATION  
SERIES CGA

NOMINAL REFRIGERATION CAPACITIES FROM 309 TO 562 kW



## Selection Data (50 Hz)

ER7A/SD6-E

## GUIDE TO SELECTION

The capacity table shows the capacity data for the most frequently required conditions. For other conditions within the range of the table, direct interpolation may be used. For conditions not contained in the table, contact your local Trane Sales Office for assistance.

To select an Air Cooled Water Chiller the following factors must be known :

1. Design capacity (kW)
2. Design chilled water temperature (°C)
3. Design temperature drop through the chiller (°C)
4. Design chilled water flow rate (litre/sec)
5. Design ambient air temperature (°C)

When any two factors of (1), (3) and (4) are known, the third can be calculated using the formula :

$$\text{Chilled water flow} = \frac{0.239 \times \text{kW refr.}}{\text{temp. drop EVP (°C)}} = (\text{l/s})$$

Once the design flow has been determined it should be maintained at all times during chiller operation, otherwise chiller freeze-up and failure may occur.

## GENERAL NOTES

1. The ratings are based on chillers with standard components. For particular conditions, certain non-standard component combinations are possible. Contact your local Trane Sales Office for assistance in selection.
2. The capacity ratings are applicable for a temperature drop within the range 4 to 8°C except as limited by the maximum or minimum water flow rates as indicated by evaporator hydraulic resistance table (Table 5).
3. Compressor kW input figures do not include condenser fan motor power input. Refer to Table 1.
4. Ratings are based on fouling factor of 0.035 m<sup>2</sup>K/kW in the evaporator (commercially clean tubes).

Correction factors for other fouling factors are shown in Table 4.

TABLE 1 — ELECTRICAL AND GENERAL DATA (50 Hz)

MODEL	CGA	210 R	211 R	213 E	214 E	215 E
Compressor model		CRHR 600 CRHR 500	CRHR 600	L2E-61N	L2E-61N L2E-81N	L2E-81N
Number of compressors		2	2	2	2	2
Capacity control	%	100-81-44-29 or 100-85-55-37	100-83-50-33	100-75-50-25	100-71-43-21 or 100-79-57-29	100-75-50-25
Compressor full load amps (1)	380 V	209	232	246	292	338
	415 V	191	212	226	267	308
Compressor starting amps (2)	380 V	421	444	513	655	701
	415 V	443	464	539	694	735
Evaporator model	EVP	290/2	290/2	291/2	422	422
Water storage capacity	litres	140	140	188	253	253
Heater cable on evaporator	Watts	217	217	217	217	217
Heater cables on internal water piping	Watts	2 × 168	2 × 168	2 × 168	2 × 168	2 × 168
Condenser model	CAUA	210	211	213	215	215
Number of fans		2	3	3	4	4
Air flow	m <sup>3</sup> /s	24.0	36.3	34.5	46.1	46.1
Nominal fan speed	rev/s	10	10	10	10	10
Nominal fan motor size	kW	2 × 5.5	3 × 5.5	3 × 5.5	4 × 5.5	4 × 5.5
Condenser fan full load amps (3)	380 V	24.0	36.0	36.0	48.0	48.0
	415 V	22.0	33.0	33.0	44.0	44.0
Condenser fan starting amps (4)	380 V	78.0	78.0	78.0	78.0	78.0
	415 V	71.5	71.5	71.5	71.5	71.5
Shipping weight	kg	4050	4350	5300	6290	6540
Operating weight	kg	4000	4270	5275	6350	6440
R22 Operating charge	kg	90	95	140	180	180

(1) Compressor full load amps based on the two compressors running, at 5 bar suction, 25 bar discharge pressure.

(2) Unit starting amps with one compressor at full load and the second one starting. On CGAA 210 R and 214 E the compressor starting is the larger one of the two compressors.

(3) Full load amps for all fans running.

(4) Starting amps per fan motor.

(5) Standard units start and operate in ambient temperatures down to -4°C. Standard starting is accomplished by a timer which temporarily overrides the low pressure control at start-up.

Low ambient units have factory installed accessories which permit start-up and operation down to -18°C. Low ambient start-up is accomplished with the use of a timer across the low pressure control and with an internal damper assembly on one fan.

## SELECTION EXAMPLE

GIVEN :

15.5 l/s chilled water to be cooled from 12°C to 6°C with a design maximum outside air temperature of 30°C.

FIND :

Chiller size

Cooling capacity

kW input

Evaporator hydraulic resistance

SELECTION :

$$1. \text{ Capacity} = \frac{15.5 \times (12 - 6)}{0.239} = 389.1 \text{ kW refrigeration}$$

2. Assume CGA 213 E and enter Table 2 at :  
6°C leaving chilled water temperature.  
30°C condenser entering air temperature.

3. Read :  
398 kW cooling capacity (at 0.035 m<sup>2</sup>K/kW fouling factor).  
116.3 kW compressor power input.  
36.3 kPa evaporator hydraulic resistance (Table 5).

4. For the implantation and dimensions of the CGAA 213 refer to Table 3.

TABLE 2 — COOLING CAPACITY AND POWER INPUT (50 Hz)

MODEL	CHILLED WATER LEAVING (°C)	CONDENSER ENTERING AIR TEMPERATURE (°C)											
		25°C		30°C		32°C		35°C		40°C		45°C	
		COOLING CAPACITY kW	COMP. INPUT kW	COOLING CAPACITY kW	COMP. INPUT kW	COOLING CAPACITY kW	COMP. INPUT kW	COOLING CAPACITY kW	COMP. INPUT kW	COOLING CAPACITY kW	COMP. INPUT kW	COOLING CAPACITY kW	COMP. INPUT kW
CGA 210 R	4	300.1	87.9	283.9	92.6	277.4	94.4	267.4	97.1	250.6	101.2	—	—
	5	308.8	89.2	292.2	94.0	285.7	95.9	275.4	98.7	258.0	103.1	—	—
	6	317.6	90.4	300.7	95.6	293.8	97.5	283.4	100.3	265.6	104.9	—	—
	7	326.4	91.8	309.1	97.0	302.1	99.1	291.4	102.0	273.1	106.8	—	—
	8	335.3	93.1	317.6	98.5	310.4	100.6	299.5	103.6	280.8	108.6	—	—
CGA 211 R	9	344.3	94.4	326.3	100.1	318.8	102.2	307.6	105.3	288.4	110.5	—	—
	4	331.8	93.5	315.2	99.0	309.7	100.6	299.4	103.7	282.1	108.6	264.3	113.4
	5	341.1	94.8	324.2	100.4	318.6	102.0	308.2	105.2	290.3	110.4	272.2	115.3
	6	350.6	96.0	333.4	101.8	327.7	103.4	316.9	106.8	298.8	112.1	280.2	117.3
	7	360.1	97.3	342.5	103.2	336.7	104.9	325.8	108.3	307.4	113.9	288.2	119.4
CGA 213 E	8	369.8	98.5	351.8	104.6	345.9	106.3	334.7	109.9	315.7	115.7	296.4	121.4
	9	379.4	99.8	361.0	106.0	355.0	107.8	343.7	111.4	324.3	117.5	304.5	123.5
	4	396.0	106.7	374.1	112.7	367.0	114.5	353.5	118.0	330.7	123.5	307.7	129.0
	5	408.3	108.3	386.1	114.4	378.6	116.4	364.9	120.0	341.7	125.9	317.9	131.8
	6	420.8	109.9	398.0	116.3	390.5	118.3	376.5	122.1	352.7	128.3	328.4	134.6
CGA 214 E	7	433.6	111.4	410.2	118.1	402.5	120.2	388.2	124.2	363.8	130.8	338.9	137.5
	8	446.4	113.0	422.5	119.9	414.7	122.1	400.0	126.3	375.1	133.3	349.6	140.5
	9	459.3	114.6	434.9	121.8	426.9	124.1	412.0	128.5	386.4	135.9	360.3	143.6
	4	483.6	122.9	457.8	130.0	447.2	132.7	431.1	136.6	403.7	142.9	375.2	148.6
	5	498.9	124.7	472.5	131.9	461.6	134.7	444.7	138.8	416.9	145.3	387.9	151.4
CGA 215 E	6	514.4	126.4	487.3	133.9	476.2	136.7	459.3	141.0	430.4	147.6	400.6	154.1
	7	530.1	128.2	502.3	135.8	490.9	138.7	473.6	143.1	444.1	150.1	413.5	156.9
	8	546.0	129.9	517.6	137.7	505.8	140.8	488.1	145.3	457.8	152.6	426.6	159.7
	9	561.9	131.7	532.8	139.6	520.8	142.8	502.6	147.5	471.7	155.1	439.7	162.6
	4	542.5	142.4	514.0	149.9	502.2	152.8	484.2	157.0	453.2	163.7	420.6	170.1
CGA 215 E	5	559.4	144.5	530.1	152.2	518.0	155.2	499.4	159.6	467.5	166.6	434.3	173.3
	6	576.4	146.6	546.3	154.5	533.9	157.6	514.9	162.1	482.1	169.5	448.1	176.6
	7	593.6	148.7	562.7	156.8	549.9	160.0	530.5	164.7	496.9	172.4	462.0	180.0
	8	611.0	150.8	579.3	159.1	566.2	162.4	546.1	167.3	511.8	175.4	476.1	183.5
	9	628.4	152.9	595.8	161.5	582.4	164.9	561.9	170.0	526.9	178.4	490.3	187.0

(1) Interpolation is possible, extrapolation is not permitted.

(2) Standard units are suitable for operation up to and including 38°C ambient temperature. For higher temperatures, the HIGH AMBIENT version is required.

The HIGH AMBIENT version of the units with standard size heat exchangers can operate under certain conditions (Chilled water leaving temperatures + 7°C or lower) at ambient temperatures as high as 48°C.

The models CGAA 211 and 213 with oversized condensers can operate at ambient temperatures as high as 50°C. For selections contact your Trane Sales Office.



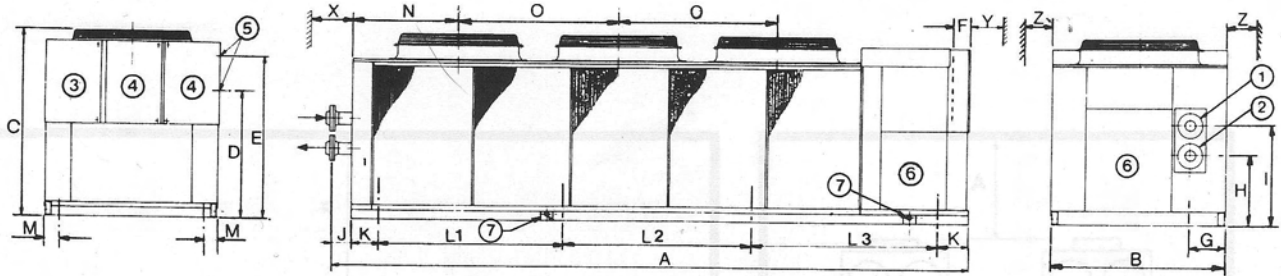


TABLE 3 — DIMENSIONS

MODEL		CGA 210 R	CGA 211 R	CGA 213 E	CGA 214 E	CGA 215 E
OVERALL DIMENSIONS	A	5690	6650	6650	8463	8463
	B	1835	1835	1835	1835	1835
	C	1945	1945	1945	1945	1945
POWER CABLE INLET LOCATION	D	1325	1325	1325	1325	1325
	E	1685	1685	1685	1685	1685
	F	115	115	115	115	115
EVAPORATOR WATER CONNECTIONS	G	335	385	385	385	385
	H	656	679	692	782	782
	I	912	996	1009	952	952
	J	200	200	200	140	140
MOUNTING HOLES (Ø 16 mm)	K	105	102	102	102	102
	L	2640	2082	2082	L1 = 1880 L3 = 2085	L2 = 2092 L4 = 2082
	M	38	38	38	38	38
LOCATION OF FANS	N	1216	1095	1095	1095	1095
	O	2133	1676	1676	1676	1676
MINIMUM CLEARANCE (1)	X	3000	3000	3000	4200	4200
	Y	1500	1500	1500	1500	1500
	Z	1800	1800	1800	1800	1800

(1) Minimum clearance Z between two machines = 3000 mm.

TABLE 4 — CORRECTION FACTORS

FOULING FACTOR	COOLING CAPACITY	POWER INPUT
0.088 m²K/kW in the evaporator	0.98	0.99
0.176 m²K/kW in the evaporator	0.96	0.98

Multiply capacities from table 2 with correction factors in case fouling factors other than standard FF (0.035) are required.

- ① WATER INLET CONNECTION (OUTLET ON SIZE 214, 215)
- ② WATER OUTLET CONNECTION (INLET ON SIZE 214, 215)
- ③ CONTROL PANEL
- ④ STARTER PANEL
- ⑤ POWER CABLE INLET
- ⑥ ACCESS PANEL
- ⑦ RIGGING EYES

TABLE 5 — WATER SIDE PRESSURE DROP (kPa)

UNIT SIZE	WATER FLOW (LITRES/S)													
	7.8	8	8.8	9	10	14	15	20	22	25	27	30	40	45
210	18	19,5	23	23,5	28,5	51	57	95	112					
211	20,5	22	26	27,5	32	57	65	108	125					
213			13,5	13,9	16,8	30	34	57	67	85	97			
214/215						23	26,5	45	54	68	78	95	160	200



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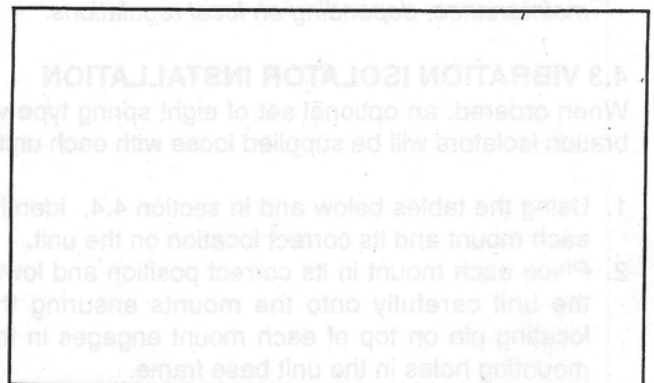
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Subject to modifications.



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