



TRANE®

Air-cooled liquid chiller with integrated hydraulic module

Cooling only

CGAN 209 - 210 - 211 - 212 - 213 - 214

Reversible

CXAN 209 - 210 - 211 - 212 - 213 - 214

AquaStream²®



CG-PRC015-E4



Introduction

The AquaStream2® chillers range equipped with Scroll compressors combines the latest technologies available to offer an optimum answer for today's air conditioning and process cooling applications:

- Scroll compressor technology, with high performance, limited maintenance and longer lifetime design
- Latest generation of Trane controls, with user friendly graphical interface and integral Adaptive Control™ to guarantee maximum dependability
- High efficiency heat exchangers, allowing significant savings on operating costs
- Integrated hydraulic packages, to shorten installation and commissioning time
- Super-Quiet version, to reduce sound nuisance

Controls

Figure 6 - DynaView operator interface



Human Interfaces

DynaView is an LCD touchscreen display (Figure 6) that is navigated by file tabs. This is an advanced interface that allows the user to access any important information concerning setpoints, active temperatures, modes, electrical data, pressures, and diagnostics. It uses full text display available in 15 languages.

Adaptive Safety Controls

A centralised microcomputer offers a higher level of machine protection. Since the safety controls are smarter, they limit compressor operation to avoid compressor or evaporator failures, thereby minimizing nuisance shutdown. Tracer™ Chiller Controls directly senses the control variables that govern the operation of the chiller: motor current draw, evaporator pressure and condenser pressure. When any one of these variables approaches a limit condition where damage may occur to the unit or shutdown on a safety, Tracer Chiller Controls takes corrective action to avoid shutdown and keep the chiller operating. This happens through combined actions of compressor stage modulation and fan staging. Tracer Chiller Controls optimises total chiller power consumption during normal operating conditions. During abnormal operating conditions, the microprocessor will continue to optimise chiller performance by taking the corrective action necessary to avoid shutdown. This keeps cooling capacity available until the problem can be solved. Whenever possible, the chiller is allowed to perform its function; making chilled or hot water. In addition, microcomputer controls allow for more types of protection such as phase reversal protection. Overall, the safety controls help keep the building or process running and out of trouble.

Controls

Stand-alone controls

Interfacing to stand-alone units is very simple: only a remote auto/stop for scheduling is required for unit operation. Signals from the chilled-water pump contactor auxiliary, or a flow switch, are wired to the chilled-water flow interlock. Signals from a time clock or some other remote device are wired to the external auto/stop input.

Standard Features External

Auto/Stop

A job-site-provided contact closure will turn the unit on and off.

Chilled Waterflow Interlock

Unit is equipped with a water flow control, it will allow unit operation if a load exists. This feature will allow the unit to run in conjunction with the pump system.

External Interlock

A job-site-provided contact opening wired to this input will turn the unit off and require a manual reset of the unit microcomputer. This closure is typically triggered by a job-site provided system such as a fire alarm.

Chilled Water Pump Control

Unit controller manage operation of the optional single or dual pump of the chiller. When the hydraulic modules is not mounted, unit controls can provide an output to control the external chilled-water pump(s).

One contact closure to the chiller is all that is required to initiate the chilled-water system. Chilled water pump controlled by the chiller is a common point for all AquaStream2[®] chillers.

Additional Features that May Be Added (require some optional factory-installed hardware)

- Ice-making card
- LON communication card
- Temperature display, compressor kW inhibit, setpoint reset, external setpoint, auxiliary setpoint.
- Customer report relay (alarm latching, alarm auto reset, chiller running, Chiller at full load)

Easy Interface to a Generic Building Management System

Controlling the AquaStream2[®] chillers with building management systems is state-of-the-art, yet simple with either:

- the LonTalk Communications Interface for Chillers (LCI-C)
- or Generic Building Management System Hardwire Points.

Simple Interface with Other Control Systems

Microcomputer controls afford simple interface with other control systems, such as time clocks, building automation systems, and ice storage systems. This means you have the flexibility to meet job requirements while not having to learn a complicated control system.

This setup has the same standard features as a stand-alone water chiller, with the possibility of having additional optional features.



Controls

The Tracer system reads monitoring information such as entering- and leaving-evaporator-water temperatures and air temperature. Over 60 individual diagnostic codes can be read by the Tracer system. In addition, the Tracer system can provide sequencing control for up to 25 units on the same chilled-water loop. Pump sequencing control can be provided from the Tracer system.

Tracer ICS is not available in conjunction with the external set point capability.

Required Options

Tracer Interface

Additional Options that May Be Used

Ice-Making Control

External Trane Devices Required

Tracer Summit™, Tracer 100 System or Tracer Chiller Plant Control

Ice-Making Systems Controls

An ice-making option may be ordered with the air-cooled chiller. The unit will have two operating modes, ice making and normal daytime cooling. In the ice making mode, the air-cooled chiller will operate at full compressor capacity until the return chilled-fluid temperature entering the evaporator meets the ice making set point. Two input signals are required to the air-cooled chiller for the ice-making option. The first is an auto/stop signal for scheduling, and the second is required to switch the unit between the ice-making mode and normal daytime operation. The signals are provided by a remote job site building-automation device such as a time clock or a manual switch. In addition, the signals may be provided over the twisted wire pair from a Tracer™ system, or a LonTalk Communication Interface but will require the communication boards provided with the Ice Making Control Option.

Additional Options That May Be Used

- Failure Indication Contacts Communications Interface (For Tracer Systems)
- Chilled-Water Temperature Reset



Options

Operation

- Cooling only
- Reversible

Hydraulic

7 versions available

- No hydraulic control
- With one contractor (16A) to control a remote pump
- With two contractors (16A) to control 2 remote double pumps
- With single pump integrated hydraulic module with high head pressure
- With single pump integrated hydraulic module with low head pressure
- With double pump integrated hydraulic module with high head pressure
- With double pump integrated hydraulic module with low head pressure

Hydraulic module

- Single or double pump
- Expansion vessel (50 l)
- Pressure relief valve set to 4 bar
- Water strainer
- Shut-off valves
- Drainage valve
- Pressure ports for gauge connection
- Water pressure gauge
- Thermally insulated evaporator and liquid line to reduce water condensing or freezing
- Pump winter freeze protection down to -18°C (the pump is activated under an ambient temperature setting)

Balancing valve

The balancing valve is necessary to tune the water flow to reach the requested water temperature difference. It is an accessory to be mounted on site.

Hydraulic connection for welding

Victaulic extra length tubes to weld the chiller to the hydraulic circuits

Buffer tank (only available with hydraulic module)

The water tank is located inside the standard chiller base which allow to keep the same footprint. The 600 litre tank is fully insulated and is engineered for a continuous flow.

The purpose of such device is to increase the circuit inertia, it is necessary with short water loops. A high circuit inertia reduces the compressors cycling to increase the compressors life span and also to smooth the water temperature for comfort or demanding processes (see Table 1).

Condenser

Fan control for low ambient operation in cooling mode:
1-speed fan down to 0°C (standard)
One 2-speed fan per circuit to work down to -10°C
One inverter fans per circuit to work down to -18°C (CGAN only)

Super-Quiet version

Use special design fan that provides -5dB(A) average sound reduction compared to the standard version. The condenser is fitted with special designed low speed fans and all compressors will be isolated inside a sound attenuating compartment.

Condenser fins type

- Aluminum fins and copper tubes (standard)
- Copper fins
- Aluminum fins with black epoxy fin protection, for locations where the coils might be exposed to corrosive environment.

Coil protection grilles

Side coils are protected with grilles

Full protection grilles

Coil protection grilles and protection of the lower part of the unit, to protect also the refrigerant circuits and most components.

Refrigerant circuit - HP and LP pressure gauges

Reading is done on each circuit on the high pressure and low pressure and side. Pressure measurement can also be done through the controller (pressure transducers)

Neoprene isolator

Isolating pad specially dimensioned to reduce vibration transmission to the supporting structure of the unit.

For any other request please contact your local Trane Sales office



General Data

Table 2 - General data CGAN Standard R407C

		CGAN 209 Standard R407C	CGAN 210 Standard R407C	CGAN 211 Standard R407C	CGAN 212 Standard R407C	CGAN 213 Standard R407C	CGAN 214 Standard R407C
Eurovent Performances (1)							
Net Cooling Capacity	(kW)	287.7	315.6	350.2	389.2	428.1	462.1
Total Power input in cooling	(kW)	107.4	120.4	130.2	139.4	155.8	171.6
COP		2.68	2.62	2.69	2.79	2.75	2.69
Evaporator water pressure drop	(kPa)	33	35	34	42	43	50
Available head pressure (5)							
Low head pressure							
/ standard head pressure	(kPa)	114/173	103/167	114/162	97/146	85/135	83/134
Main Power supply		400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Sound Power Level (5)	(dBA)	95	95	95	96	96	96
System Data							
Number of refrigerant circuits		2	2	2	2	2	2
Number of capacity steps		4	4	5	6	6	6
Minimum capacity	(%)	23	25	19	17	15	17
Units Amps							
Nominal (4)	(A)	247	269	282	326	359	392
Start-up Amps							
Standard unit	(A)	509	531	544	551	621	654
With soft starter option	(A)	381	403	416	443	493	526
Short circuit unit capacity	(kA)	15	15	15	15	15	15
Min supply cable size	(mm ²)	150	150	185	185	240	240
Max supply cable size	(mm ²)	240	240	240	240	240	240
Compressor							
Number		4	4	5	6	6	6
Type					Scroll		
Model		2 X (25T+30T)	2 X (30T+30T)	3 x 25T+2 x 30T	2 x (25T+25T+25T)	3 x 25T+3 x 30T	2 x (30T+30T+30T)
Rated Amps (comp 25T/ Comp 30T)	(A)	52/62.5	62.5/62.5	52/62.5	52/52	52/62.5	62.5/62.5
Locked rotor Amps (comp 25T/ Comp 30T)	(A)	272/310	310/310	272/310	272/272	272/310	310/310
Motor RPM	(rpm)	2900	2900	2900	2900	2900	2900
Power factor (comp 25T/ Comp 30T)		0.87/0.87	0.87/0.87	0.87/0.87	0.87/0.87	0.87/0.87	0.87/0.87
Sump Heater	(W)	150	150	150	150	150	150
Evaporator							
Number		1	1	1	1	1	1
Type					Braze plate		
Water volume (total)	(l)	26.8	29.2	35.6	35.6	42.0	42.0
Antifreeze Heater	(W)	200	200	200	200	200	200
Unit water connection							
Chilled water	(Inch/mm)	4" (100)	4" (100)	4" (100)	4" (100)	4" (100)	4" (100)
Type					Victaulic		
Fan							
Type					Propeller		
Number		6	6	7	8	8	8
Diameter	(mm)	760	760	760	760	760	760
Drive type					Direct drive		
Number of speeds		1	1	1	1	1	1
Air flow	(m ³ /h)	117300	117300	131000	144700	141900	139100
Total Motor HP (4)	(kW)	9.4	9.4	11.0	12.6	12.6	12.6
Total Rated Amps (4)	(A)	19.6	19.6	22.8	26.1	26.1	26.1
Motor RPM	(rpm)	915	915	915	915	915	915
Dimensions							
Height	(mm)	2323	2323	2323	2323	2323	2323
Length	(mm)	5135	5135	5135	5135	5135	5135
Width	(mm)	2230	2230	2230	2230	2230	2230
Operating Weight	(kg)	2680	2710	3070	3370	3490	3590
Shipping Weight	(kg)	2650	2680	3030	3330	3450	3550
Refrigerant Charge (3)							
Circuit 1/Circuit 2	(kg)	41/41	41/41	56/41	56/56	60/56	60/60
Oil Charge per circuit							
Circuit 1/Circuit 2	(l)	12.6/12.6	12.6/12.6	18.9/12.6	18.9/18.9	18.9/18.9	18.9/18.9

(1) at Eurovent Conditions (Evap 12°C/7°C - Air. 35°C)

(2) for all fans

(3) per circuit

(4) Max rated conditions.

(5) Single Pump Option



General Data

Table 10 - General data - Hydraulic module (option)

Rated Amps (1)	(A)	14.7
Motor RPM	(rpm)	2900
Water strainer diameter	(inches)	4
Expansion tank volume	(l)	50
User volume expansion capacity (2)	(l)	3000
Max. water-side operating pressure		
	without hydraulic module	(kPa) 1000
	with hydraulic module	(kPa) 400
Option additional weight (1)	(kg)	300
Water tank volume (option)	(l)	600
Water tank additional shipping weight	(kg)	270

(1) For dual pump high head pressure

(2) Hydrostatic pressure 3 bar at 45°C with -12°C mini

Table 11 - Standard Operating Envelope

Fan control	1-speed fan	2-speed fan	Speed inverter (CGAN only)
Min. outdoor air temperature (°C)	+0	-10	-18
Max. outdoor air temperature (°C)	+43*	+43*	+43*
Min. leaving water temperature CGAN/CXAN (C°)	-12 / -10	-12 / -10	-12 / -10
Max. leaving water temperature (°C)	15	15	15

Note: Super Quiet version size 213-214 are limited to 39°C max ambient temperature for 7/12°C. See performance data for specific information.

General Data

Table 12 - Part load performance data - Integrated Part Load Value in accordance with ARI 550 590-98

R407C refrigerant	A	B	C	D	IPLV Integrated Part Load value	
	100% load	75% load	50% load	25% load		
Ambient temperatures	35°C	26.6°C	18.3°C	12.8°C	Not applicable	
Weight	0.01	0.42	0.45	0.12	(1)	(2)
CGAN Standard	EER (MBh/kW)	EER (MBh/kW)	EER (MBh/kW)	EER (MBh/kW)	IPLV - EER (MBh/kW)	IPLV - COP (kW/kW)
209	9.08	11.59	14.42	16.31	13.43	3.93
210	8.92	12.30	16.81	18.35	15.07	4.41
211	9.18	12.75	16.64	18.30	15.17	4.44
212	9.53	13.27	16.77	16.10	15.17	4.44
213	9.38	13.43	17.21	16.67	15.48	4.53
214	9.19	13.31	17.25	16.94	15.48	4.53

R407C refrigerant	A	B	C	D	IPLV Integrated Part Load value	
	100% load	75% load	50% load	25% load		
Ambient temperatures	35°C	26.6°C	18.3°C	12.8°C	Not applicable	
Weight	0.01	0.42	0.45	0.12	(1)	(2)
CGAN Super Quiet	EER (MBh/kW)	EER (MBh/kW)	EER (MBh/kW)	EER (MBh/kW)	IPLV - EER (MBh/kW)	IPLV - COP (kW/kW)
209	9.33	11.99	15.07	17.12	13.94	4.08
210	9.12	12.71	18.14	19.89	15.99	4.69
211	9.02	13.22	17.73	20.81	16.09	4.72
212	9.02	13.43	18.45	20.50	16.50	4.84
213	8.61	13.33	18.76	20.81	16.61	4.87
214	8.30	13.02	18.35	20.71	16.30	4.78

(1) $IPLV = 0.01A + 0.42B + 0.45C + 0.12D$

(2) $COP = EER / 3.42$

Conditions:

Leaving water temperature = 7°C

Entering water temperature at full load = 12°C

Constant water flow at all conditions

Ambient temperature depending on the load

Performance data

Table 15 - Cooling performance data CGAN Standard R407C

		Ambient air temperature									
		25 °C		30 °C		35 °C		40 °C		43 °C	
		Cooling cap (kW)	Power input (kW) (2)	Cooling cap (kW)	Power input (kW) (2)	Cooling cap (kW)	Power input (kW) (2)	Cooling cap (kW)	Power input (kW) (2)	Cooling cap (kW)	Power input (kW) (2)
CGAN 209 STD	5 °C	302.5	79.8	286.5	88.2	269.5	97.8	251.4	108.7	240.0	115.8
	7 °C	322.5	81.7	305.6	90.1	287.7	99.8	268.8	110.8	256.9	117.9
	9 °C	343.2	83.6	325.3	92.2	306.5	102.0	286.7	112.9	274.4	120.1
CGAN 210 STD	5 °C	334.5	90.7	315.6	99.8	295.6	110.3	274.4	120.2	261.0	129.9
	7 °C	356.6	93.0	336.7	102.2	315.6	112.8	293.4	122.7	279.5	132.6
	9 °C	379.3	95.3	358.4	104.6	336.3	115.3	313.1	125.4	298.7	135.3
CGAN 211 STD	5 °C	367.7	96.5	348.7	106.8	328.3	118.6	306.5	132.0	292.8	140.8
	7 °C	391.9	98.8	371.7	109.2	350.2	121.1	327.4	134.5	313.1	143.3
	9 °C	416.8	101.2	395.5	111.7	372.9	123.7	349.1	137.2	42 °C (1)	-
CGAN 212 STD	5 °C	405.6	102.2	386.1	113.3	365.1	126.2	342.6	140.7	328.3	150.2
	7 °C	432.1	104.5	411.3	115.8	389.2	128.7	365.5	143.2	350.7	152.6
	9 °C	459.5	106.9	437.5	118.3	414.2	131.3	389.4	145.8	373.9	155.2
CGAN 213 STD	5 °C	448.2	114.8	425.5	127.5	401.1	142.0	374.8	158.4	358.2	169.1
	7 °C	478.0	117.6	453.9	130.5	428.1	145.1	400.6	161.6	383.2	172.3
	9 °C	508.8	120.5	483.3	133.5	456.2	148.3	427.3	164.9	409.2	175.7
CGAN 214 STD	5 °C	485.4	126.9	459.8	141.0	432.3	157.2	402.7	175.4	383.9	187.3
	7 °C	518.2	130.1	491.1	144.5	462.1	160.8	431.0	179.2	411.3	191.3
	9 °C	552.0	133.4	523.5	148.0	492.9	164.6	460.3	183.3	439.8	195.4

(1) Maximum ambient temperature
(2) Compressors only