Installation
Operation
Maintenance

CGCL
Air Cooled Water Chiller With Centrifugal Fans
Sizes 200 - 250 - 300 - 350 - 400 - 450 - 500 - 600

To be used with the manual of SMM Module Reference L80IM022E

CGCL-SVX01A-E4

General information

Foreword

These installation, operation and maintenance instructions are given as a guide to good practice in the installation, putting into service, operation, and maintenance by the user, of Trane CGCL chillers. They do not contain full service procedures necessary for the continued successful operation of this equipment; The services of a qualified technician should be employed through the medium of a maintenance contract with a reputable service company.

Warranty

Warranty is based on the general terms and conditions of the manufacturer. The warranty is void if the equipment is repaired or modified without the written approval of the manufacturer, if the operating limits are exceeded or if the control system or the electrical wiring is modified.

Damage due to misuse, lack of maintenance or failure to comply with the manufacturer's instructions or recommendations is not covered by the warranty obligation. If the user does not conform to the rules of chapter "Maintenance", it may entail cancellation of warranty and liabilities by Trane.

Reception

On arrival, inspect the unit before signing the delivery note. Specify any damage on the delivery note, and send a registered letter of protest to the last carrier of the goods within 72 hours of delivery. Notify the local Trane Sales Office at the same time.

The unit should be totally inspected within 7 days of delivery. If any concealed damage is discover, send a registered letter of protest to the carrier within 7 days of delivery and notify the local Trane Office.

Units are shipped with the refrigerant operating or holding charge and should be examined with an electronic leak detector to determine the hermetic integrity of the unit. The refrigerant charge is not included in the standard Trane Warranty Cover.

General information

About this manual

Caution appears at appropriate places in this instruction manual. Your personal safety and the proper operation of this machine require that you follow them carefully. The constructor assumes no liability for installations or servicing performed by unqualified personnel.

About the unit

These CGCL units are assembled, pressure tested, dehydrated, charged and run tested before shipment. The information contained in this manual applies to units designated CGCL.

Refrigerant

The refrigerant provided by the manufacturer meets all the requirements of our units. When using recycled or reprocessed refrigerant, it is advisable to ensure its quality is equivalent to that of a new refrigerant. For this, it is necessary to have a precise analysis made by a specialized laboratory. If this condition is not respected, the manufacturer warranty could be cancelled.

Contents

General unit characteristics

Table 1 - CGCL general data

		CGCL 200 R407C	CGCL 250 R407C	CGCL 300 R407C	CGCL 350 R407C	CGCL 400 R407C	CGCL 450 R407C	CGCL 500 R407C	CGCL 600 R407C
Performances (1)									
Cooling Capacity	kW	48.9	60.7	73.5	86.3	100.1	109.8	125.0	149.7
Power input	kW	19.9	24.7	28.0	34.7	42.7	47.0	50.6	59.7
Pressure drop	kPa	42	41	42	41	39	46	56	68
Main Power supply		400/3/50							
Sound Power Level 300 Pa	dB(A)	88	84	87	89	91	94	90	94
Sound Power Level 400 Pa	dB(A)	90	86	89	90	93	95	92	95
Sound Power Level 500 Pa	dB(A)	91	88	90	92	94	96	93	96
System Data									
Refrigerant Circuit	-	-	-	1				2	
Compressor									
Number			2			3			4
Type		Scroll							
Model		10T+10T	10T+15T	2x15T	2x10T+15T	10T+2x15T	3x15T	2x(10T+15T)	4x15T
Speeds number		1	1	1	1	1	1	1	1
Motors Number		1	1	1	1	1	1	1	1
Nominal Amps	A	37	46	55	65	74	83	92	110
Starting Amps	A	138	193	202	212	221	230	239	257
Motor RPM	rpm	2900	2900	2900	2900	2900	2900	2900	2900
Heat Exchanger									
Number		1							
Type		Brazed plate							
Model		V45-40	V45-50	V45-60	V45-70	V45-90	V45-90	DV47-102	DV47-134
Water volume (total)	l	4.7	5.9	7.0	8.2	10.5	10.5	12.3	16.1
Antifreeze Heater	W	65						130	
Water Connections									
Type: ISO R7		Male							
Diameter		1 1/2"				2"		2 1/2"	
Coil									
Type		Plate Fin							
Tube size	mm	9.52							
Tube type		Smooth							
Height	mm	914	1219			1219		1626	
Length	mm	1829	1829			2743		2743	
Face Area	m^2	1.67	2.23			3.34		4.46	
Rows		4.0	4.0			4.0		4.0	
Fins per inch (fpf)		180.0	180.0			180.0		180.0	
Control VA	VA	800							
Fan									
Type		Centrifugal							
Number		1			2			3	
Diameter	mm	AT 18-18							
Drive type		Pulley + Belt							
Speeds number		2							
Air flow	m^3/h	Refer to table 2							
Static pressure	Pa	Refer to table 2							
Motors Number		1							
Motor	kW	Refer to table 2							
Nominal Amps	A	Refer to table 2							
Starting Amps	A	Refer to table 2							
Motor RPM (Low/High)	rpm	Refer to table 2							
Dimensions									
Height	mm		1997			1997		1997	
Length	mm		2268			3230		3230	
Width	mm		866			866		1216	
Weight uncrated	kg	700	820	880	1080	1140	1200	1380	1500
Weight crated	kg	740	860	920	1130	1190	1250	1450	1570
System Data									
Refrigerant circuit		1	1	1	1	1	1	2	2
R407C Refrigerant Charge									
Circuit A	kg	12	15	15	23	23	23	15	15
Circuit B	kg	-	-	-	-	-	-	15	15

(1) Water temp 12/7°C outside air temp 35°C
(2) Without fan - refer to table 2 for fan amps

Table 2 - CGCL Fan performance

Size	Airflow (m^3/h)			Available Static Pressure (Pa)		
				300	400	500
CGCL 200	15300	High speed *	(kW)	0.75	1.1	1.1
		High Speed	(KW)	4.0	5.5	5.5
		Nominal Amps Low speed *	(A)	3.2	3.7	3.7
		Nominal Amps High speed	(A)	8.9	11	11
		Starting Amps *	(A)	14	12	12
CGCL 250	17800	High speed *	(kW)	0.75	1.1	1.5
		High Speed	(KW)	4.0	5.5	7.5
		Nominal Amps Low speed *	(A)	3.2	3.7	5.0
		Nominal Amps High speed	(A)	8.9	11	15.3
		Starting Amps *	(A)	14	12	17
CGCL 300	23800	High speed *	(kW)	1.5	1.5	2.8
		High Speed	(KW)	7.5	7.5	11.0
		Nominal Amps Low speed *	(A)	5.0	5.0	7.7
		Nominal Amps High speed	(A)	15.3	15.3	21.5
		Starting Amps *	(A)	17	17	33
CGCL 350	26800	High speed *	(kW)	1.5	2.8	2.8
		High Speed	(KW)	7.5	11.0	11.0
		Nominal Amps Low speed *	(A)	5.0	7.7	7.7
		Nominal Amps High speed	(A)	15.3	21.5	21.5
		Starting Amps *	(A)	17	33	33
CGCL 400	30600	High speed *	(kW)	2.8	2.8	3.8
		High Speed	(KW)	11	11	15
		Nominal Amps Low speed *	(A)	7.7	7.7	10.1
		Nominal Amps High speed	(A)	21.5	21.5	28.6
		Starting Amps *	(A)	33	33	43
CGCL 450	34500	High speed *	(kW)	3.8	3.8	4.8
		High Speed	(KW)	15.0	15.0	18.5
		Nominal Amps Low speed *	(A)	10.1	10.1	12.1
		Nominal Amps High speed	(A)	28.6	28.6	34.6
		Starting Amps *	(A)	43	43	45
CGCL 500	39100	High speed *	(kW)	2.8	3.8	3.8
		High Speed	(KW)	11.0	15.0	15.0
		Nominal Amps Low speed *	(A)	7.7	10.1	10.1
		Nominal Amps High speed	(A)	21.5	28.6	28.6
		Starting Amps *	(A)	33	43	43
CGCL 600	47600	High speed *	(kW)	4.8	4.8	5.3
		High Speed	(KW)	18.5	18.5	22.0
		Nominal Amps Low speed *	(A)	12.1	12.1	13.2
		Nominal Amps High speed	(A)	34.9	34.9	40.9
		Starting Amps *	(A)	45	45	48

*: Fan motor always start in Low speed

Unit nominal amps = nominal fan amps (according to static pressure) + compressor nominal amps
Unit starting amps = nominal fan amps (according tostatic pressure) + compressor starting amps

Table 3 - Pressure drop through condenser coil and air filter

Unit	Airflow	Pressure drop (Pa)			
	m^3/h	Cds coil	AR300 filter	A150 Filter	M8 Filter
CGCL 200	**15300**	96	100	66	28
CGCL 250	**17800**	77	85	56	22
CGCL 300	**23800**	124	122	84	40
CGCL 350	**26800**	77	85	56	22
CGCL 400	**30600**	96	100	68	28
CGCL 450	**34500**	117	117	80	36
CGCL 500	**39100**	124	95	64	26
CGCL 600	**47600**	163	122	84	40

For minimum clearance, consult the certified submittals, which are available on request from your Trane Agency.

Unit nameplate

The unit nameplate gives the complete model reference numbers. The unit power rating is shown, and power supplies should not deviate by more than 5 % from the rated power.

Compressor motor amperage is shown in box I.MAX.
The customer's electrical installation must be able to withstand this current.

Installation instructions

Foundations
No special foundations are required, provided the supporting surface is flat and level, and can withstand the weight or the unit.

Anti-vibration rubber pads
They are supplied as standard with the machine, and should be placed between the supporting floor and the unit to attenuate vibrations.
- 4 pads for the sizes 200 to 300
- 6 pads for the sizes 350 to 600
- Trane does not allow to install spring isolators.

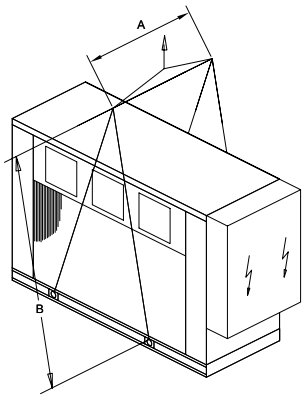
Water drain hole
Install a drain hole wide enough to drain away water from the unit in the event of shut-down or repair.

Clearance
Respect recommended clearance around the unit to allow maintenance operation to take place without obstruction and recommended clearance around condenser.

Caution: Unit operation is function of the air temperature. Any recycling of the air fed out by the fans will increase the air intake temperature over the condenser fins and can result in high pressure cut-out.
In this case the standard operating conditions are modified.
Operation of the unit may be affected by an increase in air temperature on the condenser.
See submittals

Handling

Figure 1



Note :
The plates welded at the end of the bases must not be used for handling.

Table 4 - Dimensions of recommended slings and swing-bar

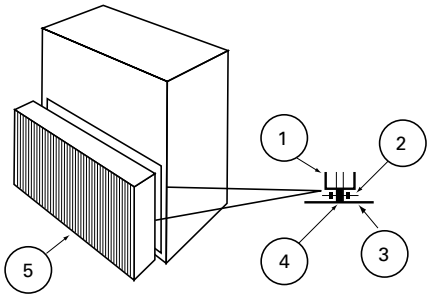
CGCL	200	250	300	350	400	450	500	600
A (mm)	1150	1150	1150	1150	1150	1150	1500	1500
B (mm)	2550	2550	2550	2700	2700	2700	2700	2700
Weight (kg)	950	1100	1200	1450	1550	1600	1900	2000

Installation of air inlet and discharge ducting

Duct connections
Duct connections of suction and discharge of the unit and accessories must be made of flexible hose. The duct connection must be flexible enough to prevent transmitting vibrations to the tube network (see Figures 2, 3 and 4).

Warning: When fixing the duct to the condenser inlet, make sure the fixing screws do not pierce the coil.

Figure 2



1. Accessory
2. Attachment bolts
3. Unit frame
4. Sealing strip
5. Accessory (filter)

Figure 3

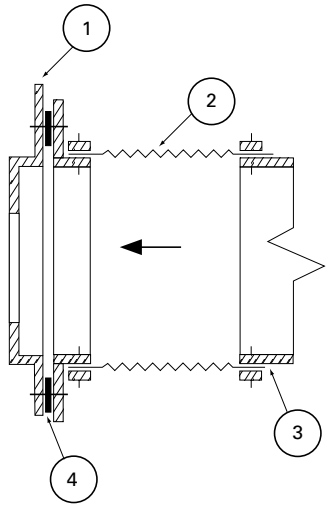
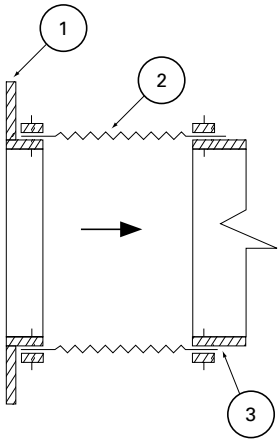


Figure 4



1. Unit body
2. Flexible couplig (field supply)
3. Ductwork
4. Seal

To prevent a reduction in fan efficiency, which would reduce the air flow and the unit's cooling capacity, the duct connections must be designed and connected according to normal trade practice.

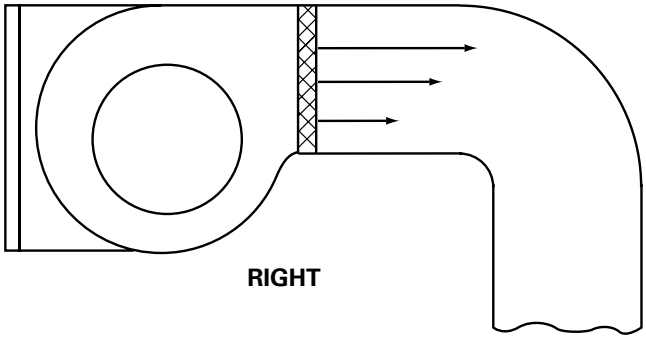
Warning: If the duct network does not provide the external static pressure stipulated on selection, it will have repercussions on the air flow and therefore on the unit's performance.

This type of problem may if necessary be referred to the Trane service office, which may be able to advise you as to the necessary modifications, if any. On all units, a straight duct section connected to a fan must have at least the same cross sectional area as the output panel orifice, and its minimum length must be one and a half times the fan diameter, before any bend or deviation.

There must be no tight bends, particularly at the fan output where the air velocity gradient is high. A large proportion of the air initially flows at the top of the duct. If a bend is close to the fan it must be installed so that its external curvature radius is in the trajectory of the air discharged by the high speed side of the fan (see figures 5 and 6).

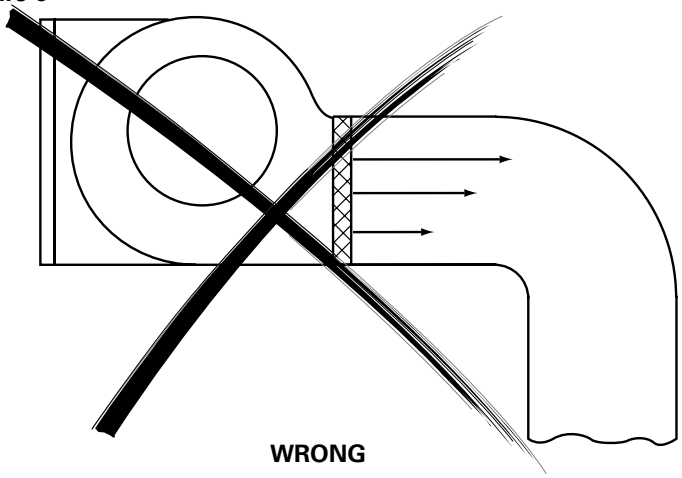
Before making any connections, make sure the labelling for entering and leaving water corresponds to the submittals.

Figure 5



RIGHT

Figure 6

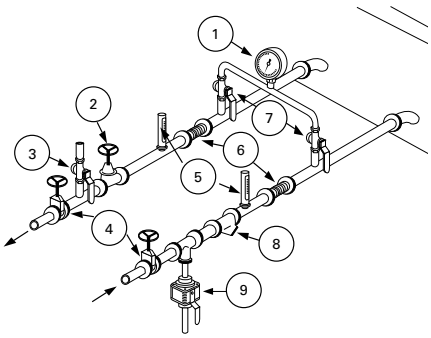


WRONG

Water to evaporator connection

Install water circulation pump upstream of the evaporator, insuring that the evaporator is under positive pressure.
Tables for water connections diameter are shown on the certified submittals.
These drawings are available on request from your Trane agency.

Figure 7



1. Pressure gauges: show entering and leaving water pressure.
2. Balancing valve: adjusts water flow.
3. Air purge allows to remove the air from the water circuit during fill up.
4. Stop valves: isolate chillers and water circulating pump during maintenance operations.
5. Thermometers: indicate chilled water entering and leaving temperatures.
6. Expansion compensators: avoid mechanical stress between chiller and piping installation.
7. Stop valve located on the outlet connection: used to measure the water pressure inlet or outlet of evaporator.
8. Strainer: avoid to get heat exchangers dirty. All installation must be equipped with efficient strainer in order that only clean water enters into exchanger. If there is no stainer, reserve will be formulated by the Trane technician at the start-up of the unit. The strainer used must be able to stop all particles with a diameter greater than 1 mm.

9 Draining: used as the draining the plate heat exchanger.

Minimum water volume

Why the water volume is an important parameter?
The water volume is an important parameter because it allows a stable chilled water temperature and avoids short cycle operation of the compressors.

Parameters which influence the water temperature stability
- Number of capacity step.
- Minimum time between two starts of a compressor.
- Water loop volume.
- Load fluctuations.

Minimum water volume for a comfort application
For comfort application we can allow water temperature fluctuation at part load.

The parameter to take into account is the minimum operating time of the compressor.

In order to avoid any lubrication problem, scroll compressor must run for at least 2 minutes (120 seconds) before it stops.

The minimum volume can be determined by using the following formula :
Volume = Cooling capacity x Time/Number of steps/Specific heat/Dead band.
Minimum operating time = 12 seconds.
Specific heat = 4.18 kj/kg.
Dead band recommended = 3°C.
With these value the formula becomes :
Volume = Cooling capacity steps.
For the CGCL running in following conditions :
Air temperature 35°C, water 12/7°C, this gives the following volumes.

Table 5 - Evaporator water content

Unit size	Water volume (l)
CGCL 200	4.7
CGCL 250	5.9
CGCL 300	7.0
CGCL 350	8.2
CGCL 400	10.5
CGCL 450	10.5
CGCL 500	12.3
CGCL 600	16.1

If the total water volume of the installation is below the above mentioned values it is necessary to use a hydraulic module.

Minimum water volume for a process application or for a chiller which has to run all year long.
For process application we have to minimise the water temperature fluctuation at part load.
In order to avoid any problem scroll compressor must run at least 2 minutes (120 seconds) before it stops and with a minimum time between two starts of 5 minutes (300 seconds).
The water volume has to be able to provide the cooling capacity while the unit is shut down.

The minimum volume can be determined by using the following formula :
Volume = Cooling capacity x Time/Number of steps/Steps/Specific heat/Dead band.
Minimum time = 180 seconds (300-120).
Specific heat = 4.18 kj/kg
Dead band recommended = Function of the process.
With these value the formula becomes : Volume = Cooling capacity x 43/Number of capacity steps/Dead band.
An hydraulic module can, on request, be provided by Trane.

Water treatment

Untreated or insufficiently treated water, if used in this unit, may cause scale, slime or algae to accumulate or cause erosion and corrosion.
As Trane does not know the components used in the hydraulic network and the quality of the water used, we recommend the services of a qualified water treatment specialist.
The following materials are used in Trane chillers heat exchangers :

- Stainless steel plates AISI 316, 1.4401 witch copper brasing.
- Water piping: copper 99,9 %
- Water connections: brass

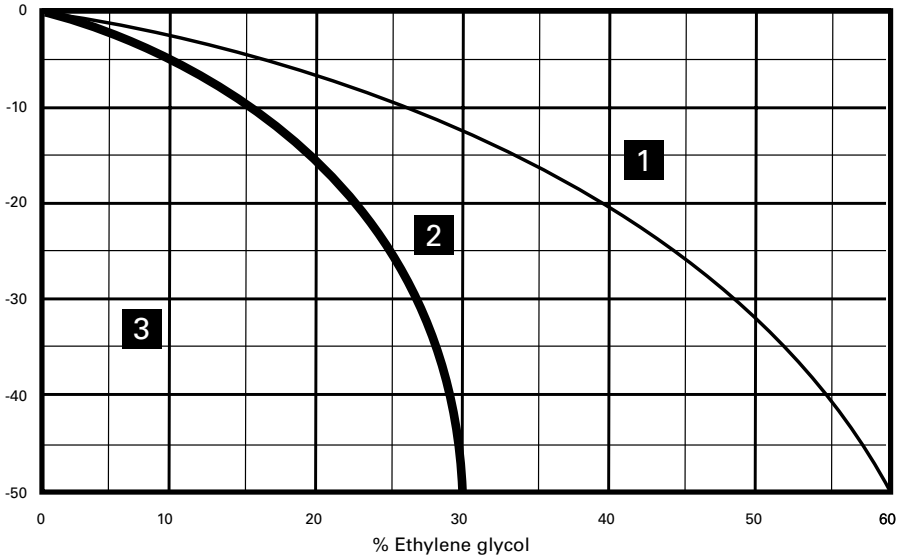
Trane will not accept any ability in regards of damage due to the use of untreated or improperly treated water or from the use of saline or brackish water.
If required, contact your local Trane sales office.

Antifreeze protection.

During negative ambient air temperature chilled water piping must be fully insulated.
Insure that all safeties are taken to prevent frost damage during negative ambiant air temperature.
Following system can be used:

- Electrical heater mounted on all water piping exposed to negative temperatures.
- Start chilled water pump during negative ambiant air temperature.
- Add ethylene glycol in the chilled water.

Figure 8 - Freezing point versus ethylene glycol percentage



1. Liquid
2. Freezing without burst effect
3. Freezing with burst effect

Electrical connections

Caution:

1. The greatest care should be taken when cutting through passages and installing electric wiring. Under no circumstances should chips of metal or cuttings of copper or isolating material fall into the starter panel or electric components. Relays, contactors, terminals and control wiring should be covered and protected before power supplies are connected.
2. Install power supply cabling as shown in wiring diagram.

Adequate cable gland should be chosen, ensuring no foreign bodies enter the electrical housing or components.

Caution:

1. Cabling must comply with standards in force. The type and location of fuses must also comply with standards. As a safety measure, fuses should be visibly installed, close to the unit.
2. Only copper wiring should be used. Using aluminium wires can produce galvanic corrosion and possibly lead to superheat and failure of connection points.

As an option, Trane provides the unique power supply which includes the transformer. If the transformer is not ordered, it is necessary to foresee the power supply of the electronic module separately.
Warranty reserves will be formulated if a transformer, not supplied by Trane, is installed inside the electric panel.

General start-up

START UP PREPARATION

Carry out all operations on check list and that the unit is correctly installed and ready to operate.
The installer must check all the following points before calling in the Trane Servicing Department to put the equipment into service:

- Check position of unit
- Check unit is level
- Check type and position of rubber pads
- Check clearance required for maintenance access (See submittals)
- Check clearance around condenser (See Submittals)
- Chilled water circuit ready to operate, filled with water, pressure test carried out and air purged.
- Chilled water circuit must be rinsed
- Check the presence of water strainer ahead of evaporator
- The strainers must be cleaned after 2 hours of pumps operation
- Check the thermometers and manometers position
- Check chilled water pumps interconnection to control panel
- Insure that the isolation resistance of all power supply terminals to ground complies with standards and regulations in force.
- Check that unit voltage and frequency supplied match rated input voltage and frequency
- Check that all electrical connections are clean and sound - Check that main power supply switch is sound.
- Check Ethylene glycol % in the chilled water circuit if Ethylene glycol presence is required.
- Check chilled water pressure drop through evaporator is in accordance with the Trane order write-up (See table 6).
- On start-up of each motor in the system, check the direction of rotation and operation of all the components they drive
- Water flow control checking: decrease the water flow and check the electrical contact in the control panel.
- Check that there is sufficient demand for cooling on the day of start-up (around 50% of nominal load)

START-UP

Follow the instructions below to correctly start-up the unit.

Installation and chiller inspection:

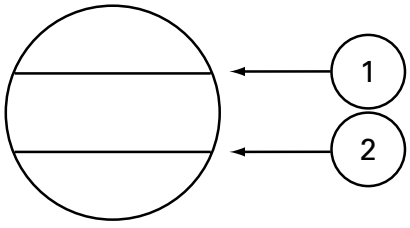
- Ensure that all the operations above (start-up preparation), are followed.
- Follow the instruction stuck inside the electrical cabinet:
- Unscrew the screws securing the isolators located under the rails supporting the compressor.
- Put the plexiglass supplied by Trane in front of the power terminal.
- Insure all water and refrigerant valves are in service positions,
- Insure that the unit is not damaged,
- Insure that sensors are properly installed in their bulb-wells and submerged in heat conducting product,
- Check fixing of capillary tubes (protection from vibration and from wear) and insure that they are not damaged,
- Reset all manually set control devices,
- Check refrigerating circuits tightness

Checking and setting:

Compressors:

- Check oil level at rest. The level should reach at least halfway up indicator located on housing. See fig. 9 for correct level.

Figure 9 - Compressor oil level



1. Max. oil level
2. Min. oil level

- Check fixing of capillary tubes (protection from vibration and from wear) and insure that they are not damaged,
- Reset all manually set control devices,
- Check refrigerating circuits tightness
- Check oil acidity,
- Check electrical terminals tightening of the motors and in the control panel,
- Check the isolation of the motors using a 500V DC megohmeter which meets manufacturer's specifications (minimum value 2 meghoms)
- Check the direction of the rotation using phasemeter.

Electrical power wiring:

- Check all the electrical terminals tightening,
- Set-up compressors overload relays,
- Set-up fan-motors overload relays,

Electrical control wiring:

- Check all the electrical terminals tightening,
- Check all the pressostats,
- Check and set-up the SMM module
- Test and start-up without the electrical power.

Condenser:

- Check setting of the safety pressure valve,
- Check direction of the rotation of fans,
- Check the isolation of the motors using a 500V DC megohmeter which meets manufacturer's specifications (minimum value 2 meghoms)

Operating parameters statement:

- Switch on main power supply switch,
- Start the water pump(s),
- Start-up the unit pushing button"I" of control module. The green LED must be lit, the SMM control module must be in"cooling mode"

The unit and the chilled water pumps contactor must be connected together,

- After unit start up, leave in operation for at least 15 minutes, to insure pressures are stabilized.

Then check:

- voltage,
- compressors and fan-motors currents,
- leaving and return chilled water temperature,
- suction temperature and pressure,
- ambient air temperature,

- blowing air temperature,
- discharge pressure and temperature,
- liquid refrigerant temperature and pressure,
- operating parameters:
- chilled water pressure drops through evaporator. It must be in accordance with Trane order write-up,
- superheat: difference between suction temperature and dew point temperature. Normal superheat must be within 5°C and 10°C,
- sub-cooling: difference between liquid temperature and bubble point temperature. Normal sub-cooling should be 2 to 5°C with 407C,
- difference between dew point temperature in high pressure and condenser air inlet temperature.

Normal value on standard unit with R407C, should be 20 to 23°C.

- difference between outlet water temperature and dew point temperature in low pressure.

Normal value on standard unit, without Ethylene glycol in chilled water, should be about 3°C with R407C.

Final check:

When the unit is operating correctly:

- Check that the unit is clean and clear of any debris, tools, etc...
- All valves are in operating position,
- Close control and starter panel doors and check panels fixation.

Caution:

- For the warranty to apply, any start-up carried out directly by the customer must be recorded in a detailed report, which must be sent as soon as possible to the nearest Trane office.
- Do not start-up a motor whose insulation resistance is less than 2 meghoms
- Phase imbalance should not be greater than 2%.
- The voltage supplied to motors should be within 5% of the rated voltage on the compressor nameplate.
- Excessive emulsion of the oil in the compressor shows that refrigerant is present in the oil and the result will be that compressor is not lubricated enough. Shut down compressor and consult Trane technician.
- Excess oil in compressor can damage the compressor. Before adding oil, consult Trane technician. Use only Trane products recommended.
- The compressors must operate in a single direction of rotation. If refrigerant high pressure remains stable in the 30 seconds after compressor start-up, immediately shut down unit and check the direction of rotation using phasemeter.

Warning

- The chilled water circuit may be under pressure. Bring down this pressure before opening up the system to rise out or fill up the water circuit. Failure to comply with this instruction may cause accidental injury to maintenance personnel.
- If a cleaning solution is used in the chilled water circuit, the chiller must be isolated from the water circuit to avoid all the damage risks of the chiller and evaporator water pipes.

Table 6 - Evaporator pressure drop

				Water flow (l/s)				
P.D. (kPa)	CGCL 200	CGCL 250	CGCL 300	CGCL 350	CGCL 400	CGCL 450	CGCL 500	CGCL 600
10	1.155	1.449	1.736	1.912	2.282	2.282	2.500	2.700
20	1.631	2.045	2.447	2.809	3.343	3.343	3.561	3.853
40	2.301	2.886	3.448	4.129	4.898	4.898	5.074	5.499
60	2.815	3.530	4.215	5.172	6.125	6.125	6.241	6.771
80	3.248	4.072	4.860	6.068	7.177	7.177	7.228	7.848
100	3.629	4.550	5.427	6.868	8.116	8.116	8.100	8.800

When ethylen glycol is added in the chilled water circuit the following adjustment factors have to be taken in account.

Table 7 - Ethylen glycol adjustment factors

LWTE	PCT EG	Adjustment factors			
(%)	Flow rate	Pressure drop	Power Input	Cooling Cap.	
12	30	1.11	1.20	1.005	0.98
5	30	1.11	1.24	1.005	0.98
4	10	1.02	1.08	-	-
0	20	1.05	1.19	-	-
-4	27	1.08	1.29	-	-
-8	33	1.10	1.46	-	-
-12	37	1.12	1.62	-	-

Operation

Control System

The control is through the SMM control module.

Unit operations

- Check the chilled water pump(s) operates
- Start up unit pushing button"I" of the SMM control module. The unit will operate correctly when there is sufficient water flow. The compressors will start up if the evaporator water leaving temperature is above the SMM control module setpoint.

Weekly start up

- Check the chilled water pump(s) operates
- Push button"I" of the module to allow chiller operation.

Week end shutdown

- If the unit needs to be shut down for a short period of time, push button "O" of the module.
- If the unit is shut down for a longer period, see under "Seasonal shutdown", below.
- Insure that all safeties are taken to prevent frost damages during negative ambient temperature. (see page 5)
- Do not put the general and control disconnect switches to off.

Seasonal shutdown

- Check water flows and interlocks.
- Check Ethylene glycol % in the chilled water circuit if glycol presence is required
- Carry out leak test.
- Carry out oil analysis
- Record operating pressures, temperatures, amperages and voltage.
- Check operation of machines/compare conditions of operation against original commissioning data.
- Push button"O" of the module.
- Insure that all safeties are taken to prevent frost damages during negative ambient temperature. (see page 5)
- Fill out the visit log sheet and review with the operator - Do not put the general and control disconnect switches to off.

Seasonal start-up

- Check water flows and interlocks.
- Check Ethylene glycol % in the chilled water circuit if glycol presence is required
- Check operational set points and performance.
- Calibrate controls.
- Check operation of all safety devices.
- Inspect contacts and tighten terminals.
- Megger the motor compressor windings.
- Record operating pressures, temperatures, amperages and voltage.
- Carry out leak test.
- Check configuration of unit control module.
- Change the oil as required based upon results of the oil analysis made during seasonal shutdown
- Check operation of machines/compare conditions of operation against original commissioning data.
- Fill out the visit log sheet and review with the operator

Maintenance

Maintenance Instructions

The following maintenance instructions are part of maintenance operations required for this equipment. A qualified technician is needed for regular maintenance as part of a regular maintenance contract.

Carry out all operations as required by schedule. This will insure long unit service life and reduce the possibility of serious and costly breakdown.

Keep service records up to date, showing monthly information on unit operations. These records can be of great help to maintenance personnel diagnostics.

Similarly, if machine operator keeps a log of changes in unit operating conditions, problems can be identified and solutions found before more serious problems arise.

Inspection visit after the first 500 hours of operation from unit start up

- Carry out oil analysis
- Carry out leak test.
- Inspect contacts and tighten terminals.
- Record operating pressures, temperatures, amperages and voltage.
- Check operation of machines/compare conditions of operation against original commissioning data.
- Fill out inspection visit log sheet and review with the operator

Monthly preventive visit

- Carry out leak test.
- Oil test of acidity
- Check Ethylene glycol % in the chilled water circuit if glycol presence is required
- Inspect contacts and tighten terminals.
- Record operating pressures, temperatures, amperages and voltage.
- Check operation of machines/compare conditions of operation against original commissioning data.
- Fill out visit log sheet and review with the operator.

Annual preventive visit

- Check water flows and interlocks.
- Check Ethylene glycol % in the chilled water circuit if glycol presence is required
- Check operational set points and performance.
- Calibrate controls.
- Check operation of all safety devices.
- Inspect contacts and tighten terminals.
- Megger the motor compressor windings.
- Record operating pressures, temperatures, amperages and voltage.
- Carry out leak test.
- Check configuration of unit control module.
- Carry out oil analysis
- Change the oil as required based upon results of the oil analysis
- Check operation of machines/compare conditions of operation against original commissioning data.
- Fill out the annual start up visit log sheet and review with the operator.

Caution:

- Please refer to specific Trane documentation on oil, available from your nearest Trane office. Oils recommended by Trane have been exhaustively tested in Trane laboratories to the specific requirement of Trane chiller and hence the user's requirements. Any use of oils not meeting specifications recommended by Trane is the responsibility of the user only, who thereby is liable to warranty loss.
- Oil analysis and oil test acidity must be carried out by a qualified technician. Poor interpretation of results may cause unit operating problems. Also, oil analysis must follow the correct procedures, to avoid accidental injury to maintenance personnel.
- If the condensers are dirty, clean them with brush. If the coils are too dirty, consult a cleaning professional. Never use water to clean condenser coils.
- Contact Trane ServiceFirst for information on maintenance contracts.

Warning:

- Switch off unit main power supply before to any intervention. Failure to follow this safety instruction can lead to accident death of the maintenance personnel and may also destroy equipment.
- Never use steam or hot water above 55°C to clean condenser coils. The resulting increasing pressure could cause refrigerant lost through the safety valve.

Installation check list

This list must be checked off by the installer to ensure correct installation before the unit start up.

UNIT POSITION

☐ Check clearance around condenser
☐ Check clearance required for maintenance access
☐ Check type and position of rubbers pads

CHILLED WATER CIRCUIT

☐ Check thermometers and manometers presence and position
☐ Check water flow rate balancing valve presence and position
☐ Check presence of strainer ahead of evaporator
☐ Check presence of air-purge valve
☐ Check rinsing and filling of chilled water pipes
☐ Check water pump(s) contactor interconnected to control panel
☐ Check water flow
☐ Check chilled water pressure drop through the evaporator

ELECTRICAL EQUIPMENT

☐ Check installation and rating of mains power switch/fuses
☐ Check electrical connections complied with specification
☐ Check that electrical connections are in accordance with information on manufacturer's identification plate
☐ Check direction of rotation using phasemeter

Comments

……
……
……
……
……

Signature:……Name:……

Order N°: ……..

Work site: ……

Please return to your local Trane Service Office

Troubleshooting guide

These are simple diagnostic hints. If there is a breakdown, the Trane Service office should be contacted for confirmation and assistance.

Problems symptoms	Problem cause	Action recommended
A) The compressor does not start up	Motor burned out.	Replace compressor
Compressor terminals are live but motor does not start		
Contactor motor not operational.	Coil burned out or broken contacts.	Repair or replace.
No current ahead of motor contactor.	a) Power cut. b) Main power supply switched off.	Check fuses and connection. See why system tripped. If system is operational, switch on main power supply.
Current ahead of fuse, but not on contactor side.	Fuse blown.	Check motor insulation. Replace fuse.
Low voltage reading on voltameter.	Voltage too low.	Contact power Supply Utility.
Starter coil not excited.	Regulation circuit open.	Locate regulation device which has tripped out and see why. See instructions concerning this device. Replace compressor.
Compressor does not run. Compressor motor" groans". High pressure switch tripped to contacts open on high pressure. Discharge pressure too high.	Compressor sticking (damaged or sticking components). Discharge pressure too high	See instructions for "discharge pressure high".
B) Compressor stops **High pressure switch tripped.**		
Over current thermal relay tripped. Motor temperature thermostat tripped. Anti-freeze security tripped.	Discharge pressure too high. a) Voltage too low. b) Cooling demand too high, or condensing temperature too high. Not enough cooling fluid. Water flow to evaporator too low. Air filters dirty	See instructions for "discharge pressure high". a) Contact Power Supply Utility. b) See instruction "discharge pressure too high". Repair leak. Add refrigerant. Check water flow rate, and pressure switch contact in water. Clean or replace air filters
C) Compressor stops just after its start		
Suction pressure too low. Filter drier iced up.	Filter drier clogged.	Replace filter drier.

Problems symptoms	Problem cause	Action recommended
D) The compressor keeps running without stopping		
Temperature too high in areas requiring air-conditioning.	Excess load on cooling system.	Check thermal insulation and air-tightness of areas requiring air-conditioning.
Chilled water temperature output too high.	Excess cooling demand on system.	Check thermal insulation and air-tightness of areas requiring air-conditioning.
E) Loss of oil in compressor		
Oil level too low in indicator.	Not enough oil.	Contact Trane office before to order oil
Gradual fall in oil level.	Filter drier clogged.	Replace filter drier.
Suction line too cold. Compressor noisy	Liquid flows back to compressor.	Adjust superheat and check bulb fixing of the expansion valve.
F) Compressor noisy		
Compressor knocks.	Components broken in compressor.	Change compressor.
Suction duct abnormally cold.	a) Uneven liquid flow. b) Expansion valve locked in open position.	a) Check superheat setting and fixing of expansion valve bulb. b) Repair or replace.
G) Insufficient cooling capacity		
Thermostatic expansion valve "whistles".	Not enough refrigerant.	Check refrigerant circuit tightness and add refrigerant.
Excess pressure drops through filter drier	Drier filter clogged.	Replace.
Excessive superheat.	Superheat not properly adjusted.	Check adjustment of superheat and adjust thermostatic expansion valve.
Insufficient water flow.	Chilled water pipes obstructed.	Clean pipes and strainer.
H) Discharge pressure too high		
Condenser abnormally hot.	Presence of uncondensable liquids in system, or excess refrigerant.	Purge uncondensable fluids and drain off excess refrigerant.
Chilled water leaving temperature too high.	Overload on cooling system.	Reduce load on system. Reduce water flow if necessary.
Condenser air output too hot.	Reduced air flow. Air intake temperature higher than specified for unit	Clean or replace air filters. Clean coil. Check operation of motor fans.

Problems symptoms	Problem cause	Action recommended
I) Suction pressure too high		
Compressor operates continuously.	Excess cooling demand on evaporator	Check system.
Suction duct abnormally cold.	a) Expansion valve too far open.	a) Check for superheat and check that expansion valve bulb is secure.
Refrigerant flows back to compressor.	b) Expansion valve locked in open position.	b) Replace.
J) Suction pressure too low		
Excessive pressure drop through filter drier.	Drier filter clogged.	Replace the filter drier.
Refrigerant does not flow through thermostatic expansion valve.	Expansion valve bulb has lost its refrigerant.	Replace the bulb.
Loss of power.	Expansion valve obstructed.	Replace.
Superheat too low.	Excessive pressure drops through evaporator.	Check adjustment of superheat and adjust thermostatic expansion valve.
K) Insufficient cooling capacity		
Low pressure drops through evaporator	Low water flow rate.	Check water flow rate. Check state of strainer, check for obstruction in chilled water pipes. Check pressure switch contact in water.

Caution :
The above is not a comprehensive analysis of the Scroll compressor refrigeration system. The aim is to give operators simple instructions on basic unit processes so that they have the technical knowledge to identify and bring defective operations to the notice of qualified technicians.

Control parameters of the SMM control module

To cancel a manually reset default press key 1.

A

A01	Active water set point
A02	Evaporator water outlet mix temperature
A03	Circuit 1 evaporator water outlet temperature
A04	Circuit 2 evaporator water outlet temperature
A05	Air temperature
A06	Number of compressor A1 operating hours
A07	Number of compressor A1 starts
A08	Number of compressor B1 operating hours
A09	Number of compressor B1 starts
A10	Number of compressor A2 operating hours
A11	Number of compressor A2 starts
A12	Number of compressor B2 operating hours
A13	Number of compressor B2 starts

B

B01	Evaporator outlet temperature set point
B02	Hot water outlet temperature set point
B03	Auxiliary water outlet temperature set point
B04	Circuit 1 ON validation
B05	Circuit 2 ON validation
B06	Operating mode
B07	Remote control validation
B08	Auxiliary set point validation
B09	Current date display B091 Day B092 Month B093 Year
B10	Current time display B101 Hours B102 Minutes B103 Seconds
B11	Set this parameter to 0.0°C
B12	Set this parameter to 0.0°C
B13	Set this parameter to 0.0°C

C

C01	Default display
C02	Current default reset

D

D01	Cooling set point reset type
D02	Cooling reset starting value
D03	Cooling reset value range
D04	Cooling reset range
D05	Heating set point reset type
D06	Heating reset starting value
D07	Heating reset value range
D08	Heating reset range
D09	Generic input type
D10	Evaporator pump stop timer
D11	Evaporator water pump
D12	Compressor lead-lag
D13	Default 1 report type
D14	Default 2 report type
D15	Serial link address

E

E01	Circuit 1 evaporator saturated temperature
E02	Circuit 1 evaporator saturated pressure
E03	Circuit 1 condenser saturated temperature
E04	Circuit 1 condenser saturated pressure
E05	Circuit 2 evaporator saturated temperature
E06	Circuit 2 evaporator saturated pressure
E07	Circuit 2 condenser saturated temperature
E08	Circuit 2 condenser saturated pressure
E09	Evaporator water inlet temperature
E10	Condenser water outlet temperature
E11	Condenser water inlet temperature

Notes

Notes

Safety recommendations

To avoid accidents and damage, the following recommendations should be observed during maintenance and service visits:

1. The maximum allowable pressures for system leak testing on low and high pressure side are given in the chapter "Installation". Always provide a pressure regulator.
2. Disconnect the main supply before any servicing on the unit.
3. Service work on the refrigeration system and the electrical system should be carried out only by qualified and experienced personnel.

Maintenance contract

It is strongly recommended that you sign a maintenance contract with your local Service Agency. This contract provides regular maintenance of your installation by a specialist in our equipment. Regular maintenance ensures that any malfunction is detected and corrected in good time and minimizes the possibility that serious damage will occur. Finally, regular maintenance ensures the maximum operating life of your equipment. We would remind you that failure to respect these installation and maintenance instructions may result in immediate cancellation of the warranty.

Training

The equipment described in this manual is the result of many years of research and continuous development. To assist you in obtaining the best use of it and maintaining it in perfect operating condition over a long period of time, the manufacturer has at your disposal a refrigeration and air conditioning service school. The principal aim of this is to give operators and technicians a better knowledge of the equipment they are using, or that is under their charge. Emphasis is particularly given to the importance of periodic checks on the unit operating parameters as well as on preventive maintenance, which reduces the cost of owning the unit by avoiding serious and costly breakdown.

The manufacturer has a policy of continuous product improvement, and reserves the right to alter any details of the products at any time without notice.

This publication is a general guide to install, use and properly maintain our products. The information given may be different from the specification for a particular country or for a specific order. In this event, please refer to your nearest office.

For additional information, contact:
Distributor / Installer stamp

Quality Management System Approval

TRANE®

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For more information contact your local sales office or e-mail us at comfort@trane.com

Literature Order Number	CGCL-SVX01A-E4
Date	07/01
New	
Stocking Location	