

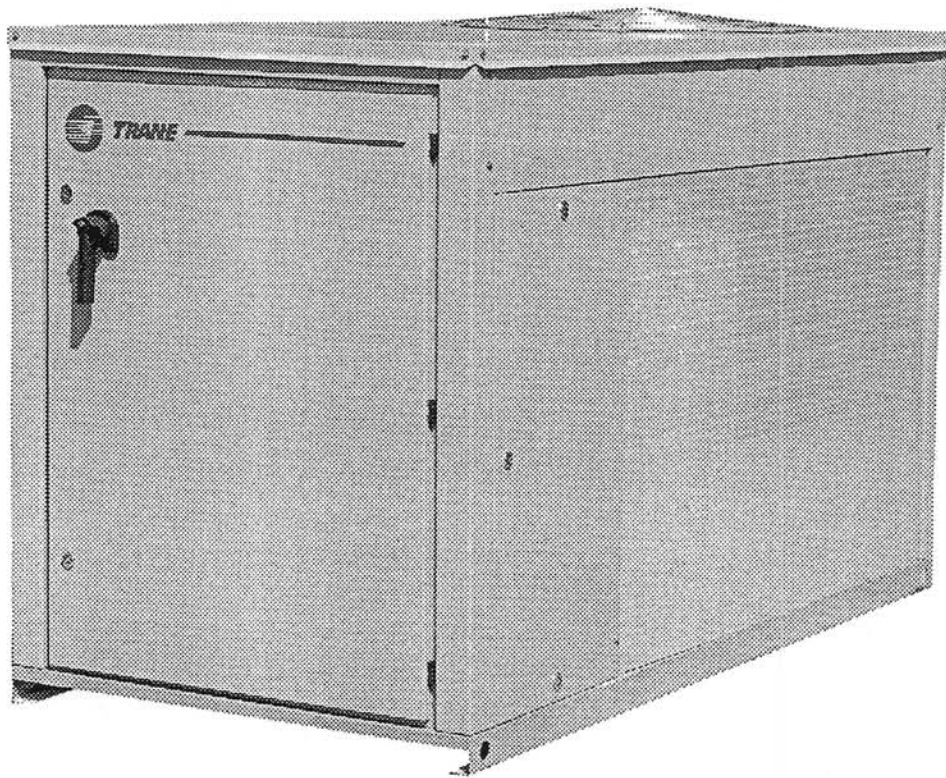


TRANE™

CGAH Air cooled liquid chillers

**Installation
Operation
Maintenance**

Sizes 115 - 120 - 125 - 225 -
230 - 235 - 240 - 250



To be used with manual for
module SMM
reference L80 IM 019 E



Quality Management System approval

C10 IM 002 E

CGAH
Air cooled liquid chillers

Foreword

The aim of this document for users is to set out the rules for the installation, set-up, operation and maintenance of this type of Trane liquid chiller.

The maintenance operations required to insure that this machine operates reliably throughout its full service life are not exhaustively described. Only the services of a qualified technician employed by a reputable service company can insure that the machine operates durably and reliably.

Warranty

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

Acceptance on delivery

All air-conditioning units are shipped to their installation site on a wooden skid.

All machines reach final destination completely connected and assembled ready for immediate start-up.

Please check that the unit has not in any way been damaged during the transport, as soon as it arrives on site. If damage is observed, or even on suspicion of damage.

⇒ Carry out instructions for notification of damage in transport, and warn your Trane Agency.

Caution: Failure to conform to the above rules will result in loss of insurance cover.

Note: If the unit is delivered with its operating refrigerant charge, check that there are no leaks, using an electronic detector.

Special reminder: the Trane warranty does not cover above refrigerant charge.

Important: This document should be used alongside the document covering regulation module SMM reference L80 IM 019 E.

General

About this manual:

"Caution" and "Warnings" messages appear at the appropriate place throughout the manual.

Your personal safety and the proper operation of this machine require that you follow them carefully.

Trane Europe assumes no liability for installations or servicing performed by unqualified personnel.

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Installation

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 g.

The current intensity (shown in amps) is the maximum for the rated operating voltage.

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 of the unit.

Water drain hole


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

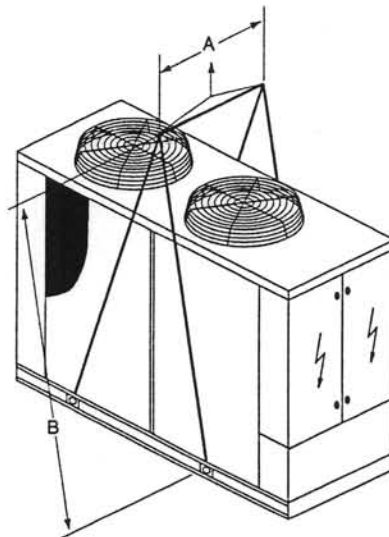
Clearance

Insure there is sufficient clearance around the unit to allow maintenance operations to take place without obstruction.

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

Handling

MODELE - MODEL - MODELL N°				
SERIE - SERIAL - SERIEN N°				
TENSION NOMINALE NOMINAL POWER ANSCHLUSSPANNUNG	V/PHZ/PH	CIRCUIT - KÄLTEKREIS A B A&B	CIRCUIT CONTROLE CONTROL CIRCUIT STEUERUNG	
INTENSITE MINIMUM MINIMUM INTENSITY STROMAUFNAHME	AMP			
MOTEUR COMPRESSEUR COMPRESSOR MOTOR VERDICHTERMOTOR	CIRC A B	QTE ANZ	Nb VITESSE SPEEDS DREHZAHL	KW IN FLA NENNSTROM
MOTEUR VENTILATEUR CDS CDS FAN MOTOR VENTIL MOTOR VERFL				
EVAPORATEUR - EVAPORATOR - VERDAMPFER				
PRESSION DE SERVICE EVP COTE EAU SERVICE PRESSURE OF EVP WATER SIDE BETRIEBSDRUCK VERDAMPFER WASSERSEITIG				
CHARGE DE REFRIGERANT REFRIGERANT CHARGE KÄLTEMITTELFÜLLUNG	KG	OF		
PRESSION D'EPREUVE TEST PRESSURE PRÜFDRUCK	HAUTE - HIGH - HOCH			
	BASSE - LOW - NIEDER			
 TRANE		SOCIETE TRANE 88190 GOLBEY - FRANCE		



CGAH	115	120	125	225	230	235	240	250
A (mm)	1500	1500	1500	1500	1500	1500	2400	2400
B (mm)	1800	1800	1800	1800	1800	1800	1800	1800
Maximum weight (kg)	725	850	975	1250	1375	1425	1550	1750

Water to evaporator connection

Install water circulation pump upstream of the evaporator, insuring that the evaporator is under positive pressure.

Tables for power supply connections and water return are shown on the certified submittals.

These drawings are available on request from your Trane agency.

The 1/4 coupling located on the outlet connections may be used as the draining outlet from the plate heat exchanger.

Note: Complete draining of all the installation is difficult. The use of anti-freeze liquid is recommended to protect the heat exchanger.

The following recommendations refer to Figure 2.

1. Pressure gauges: shows entering and leaving water pressure. Stop valves should be provided on water inlets and outlets.
2. Vibration dampers: these are supplied as standard with the machine, and should be placed between the supporting floor and the unit to prevent vibrations being transmitted to the chilled water circuits.
3. Thermometers: indicate chilled water entering and leaving temperatures.
4. Balancing valve: controls water flow
5. Stop valves: isolate chillers and water circulating pump during maintenance operations.

Insure that all chilled water pipes are fully insulated, in order to prevent frost damage. Insulate heating resistors on all water pipes exposed to negative temperatures.

Minimum water capacity

Minimum volume of water in the chilled water circuit must be no less than 10% of the volume of water circulating per hour in the unit.

If necessary, a buffer tank should be fitted. Safety and regulation devices will only operate correctly if there is sufficient water in the system.

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. The services of a qualified water treatment specialist are recommended to determine what treatment, if any, is advisable. Trane disclaims any liability with regard to damage arising from the use of untreated or improperly treated water, or from the use of saline or brackish water.

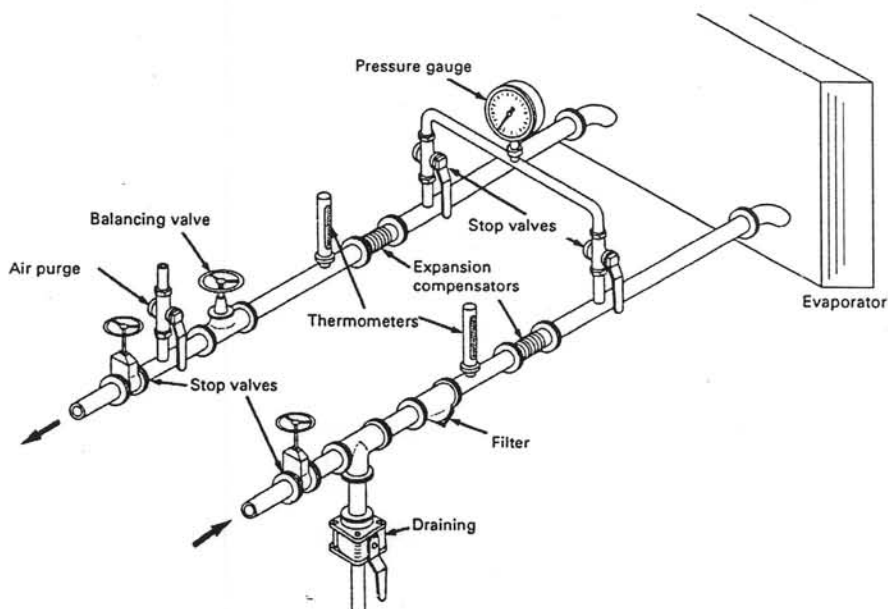
Caution:

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 drawing. Adequate insulation should be chosen, ensuring that 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. Copper wiring only should be used. The unit terminals are designed for copper only. Using aluminum wires can produce galvanic corrosion, and possibly lead to superheat and failure of connection points.

Figure 2 - Water-to-evaporator connection



General unit characteristics

Size			115	120	125	225	230	235	240	250
Compressors			10T+10T	10T+15T	15T+15T	(10T+10T)+15T	(10T+15T)+15T	(15T+15T)+15T	2X(10T+15T)	2X(15T+15T)
Circuit			1	1	1	2	2	2	2	2
Capacity control		%	50	58 ou 42	50	75/30	70/34	66/33	80/50/20	75/50/25
Max load amps (1) 28 bar disch. 5 bar suct.	380V	A	42	53	64	74	85	96	106	128
	415V	A	39	49	59	69	79	89	97	118
Nominal load amps 25bar disch. 5 bar suct.	380V	A	38	48	58	67	77	87	96	116
	415V	A	35	44	54	62	71	81	88	107
Starting amps (2)	380V	A	107	143	154	163	173	183	196	218
	415V	A	114	158	168	176	185	195	207	227
Control cir. amps	230V	A	1.8	1.8	1.8	2.8	2.8	2.8	2.8	2.8
Evaporator water volume		Litres	3.76	4.7	5.66	7.52	8.46	9.42	9.42	11.32
Number of fan(s)			1	2	2	2	2 ou 3	2 ou 3	2 ou 3	2 ou 3
Condenser air flow		m3/s	4.25	4.96	6.61	7.46	8.4	9.5	11.8	11.8
Nominal fan speed		rev/mn	5.5	10.9	10.9	10.9	16.3	16.3	21.9	21.7
Fan motor kW each		kW	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Fan motor starting amps (3)	380V	A	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1
	415V	A	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4
Fan motor full load amps (3)	380V	A	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
	415V	A	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Unit oil charge			See submittal							
Weight			725	850	975	1250	1375	1425	1550	1750
Cooling fluid charge			See submittal							
Length			See submittal							
Width			See submittal							
Height			See submittal							

NOTES:

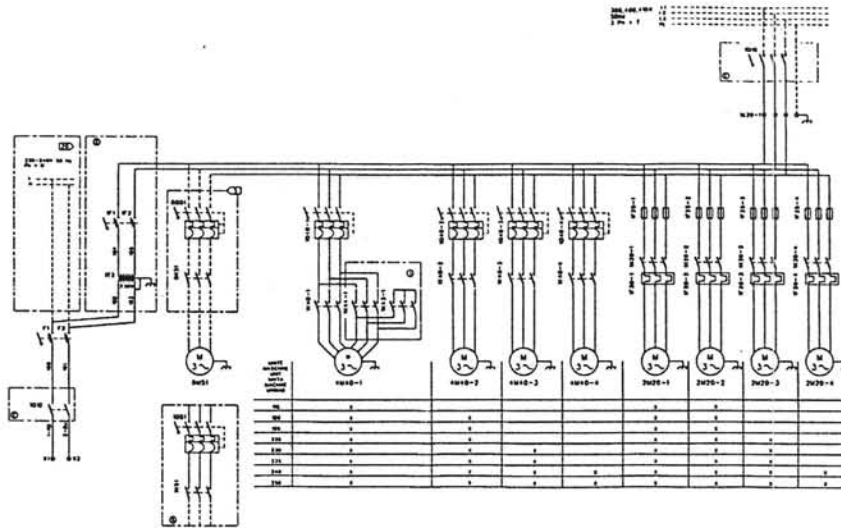
- (1) Maximum load amps to be used for sizing of cables, fuses and disconnect switch
- (2) Starting amps with one compressor starting ,the remaining compressor(s) running at full load

Fuses

10 T	25A
15 T	40A

Each compressor is supplied with its own fuses.

Wiring diagram - customer electric power supply



Repère	Options	Zubehoer	Options
⑤	Démarrage pompe EVP.	Anlauf.Wasserpumpe VERD.	EVP Water pump start
⑥	Interrupteur unité	Hauptschalter Maschine	Disconnect switch
⑦	Résistance coffret	Heizung Schaltschrank	Control panel heater
⑧	Transfo. alimentation contrôle	Transformator	Transformer
⑨	Sonde de température	Fuehler Temperatur	Temperature sensor

—————	Câblage Trane	Trane-Verdrahtung	Wiring by Trane
-----	Câblage Client	Verdrahtung durch Kunden	Wiring by Customer

Note: The above wiring diagram is shown for information purposes only. Please consult wiring diagram supplied with unit. Extra copies may be supplied by your Trane agency.

Starting up the unit

Unit start-up

Before start up, carry out all operations on check list and follow the instructions below to ensure 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.

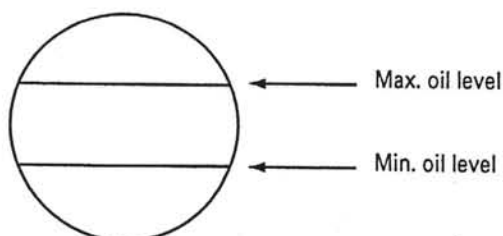
1. Chilled water circuit ready to operate, filled with water, pressure test carried out, purged, filter cleaned after 2 hours operation of the chilled water pump.
2. Thermometers and pressure gauges installed on chilled water circuit.
3. Chilled water pump interconnected to control panel.
4. Check that all electrical connections are clean and sound. Check that circuits comply with the wiring diagram supplied. Technical data shown at the top of the wiring diagram should match the information shown on the unit nameplate plate.
5. Check that mains power supply switch is sound.
6. Check compressor oil level at rest. The level should reach at least halfway up indicator located on housing. See fig 4. for correct level.
7. Check direction of rotation of compressors using phasemeter.
8. On start-up of each motor in the system, check the direction of rotation and operation of all the components they drive.
9. Check extent of pressure drops through evaporator, so that the value matches values shown on graphs A and B.
10. Check that there is sufficient demand for cooling on the day of start-up (around 50% of nominal load).

Differential water pressure switch:

If the unit pressure switch is adjustable, please refer to information sheet available from your Trane agency, and adjust the setpoint as required. Some units have preset pressure switches already fitted, and these should not be changed.

Warning: The water circuit to the evaporator may be under pressure. Please refer to appropriate instructions to bring down this pressure before opening up the system before rinsing or filling operations. Failure to comply with this instruction may cause accidental injury to maintenance personnel.

Figure 4 - Compressor oil level



Caution: If a cleansing solution is used, the chiller unit should be isolated from the circuit in order to avoid permanent damage to the chiller tubes.

Caution: The compressors must operate in a single direction of rotation only. If the unit is equipped with manometer option, if refrigerant high pressure remains stable in the 30 seconds after compressor start up, immediately shut down unit and call in nearest Trane service agency.

Preparation

Before starting up the system, carry out the following checks and operations:

1. Before making any electrical connection, insure that the isolation resistance of all power supply terminals to ground complies with standards and regulations in force.
Check the isolation of all electric motors using a 500 V DC megohmmeter which meets manufacturer's specifications.

Caution: Do not start up a motor whose isolation resistance is less than 2 megohms. The motor should never, in any circumstances, be switched on when under internal vacuum conditions.

2. Check that all electrical connections are clean and sound.
Insure that circuits comply with the unit wiring diagram. The technical data shown at the top of the wiring diagram should match the information shown on the unit nameplate.
3. Switch on mains power supply switch.
4. Check that unit power supplies match rated input power.

Caution: Phase imbalance should not be greater than 2%. The voltage supplied to motors should be within 5% of the rated voltage shown on the compressor nameplate.

5. Insure all water and refrigerant valves are in service positions, and start up water circulation pumps.
6. Reset all manually set control devices.
7. Insure sensor is properly installed in its bulbwell and submerged in heat conducting product. Check fixing of capillary tubes (check protection from vibration and from wear, and insure that they are not damaged).

Start-up

1. Start-up chilled water pump or pumps.
2. Start-up each compressor turning switches S1, S2, S3, or S4 separately. If one of the compressors will not start up, check the following points:
 - a) SMM control module should be in "cooling" position.
 - b) Connection between the unit and chilled water pump contactor must be made.

- After unit start-up, leave in operation for at least 15 minutes, to insure pressure is stabilized. Then check:
 - compressor and powered fan power consumption
 - suction pressure
 - discharge pressure
 - the liquid sightglass(es)
 - superheat
 - subcooling
 - pressure drops and temperatures of evaporator.

All measurements and readings from pressure gauges must be recorded, according to the procedures set out below:

Liquid line sightglass

The refrigerant should be seen to flow through the sightglass in a regular manner, and be free of bubbles. Bubbles are a sign that there is not enough refrigerant, and of a possible leak or obstruction on the liquid line.

Caution: If a single compressor only is in operation on a dual compressor circuit, the presence of gas bubbles in the liquid indicator is normal.

Each sightglass is fitted with a moisture indicator. As the refrigerant flows through, the sightglass will show the degree of moisture in the refrigerant. This reading is also temperature dependent. The indicator should show dry refrigerant. If "moist refrigerant" is displayed, keep unit in operation for at least twelve hours, and check again.

Caution: Keep compressor(s) in operation for at least 2 hours before taking initial readings for moisture levels. The element reacts both to moisture and temperature, and the system must reach normal operating temperature before the moisture readings are reliable.

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 your nearest Trane agency.

Superheat

Normal superheat is 7°-10°K on the standard unit. Excess power supplied to the evaporator produces high suction pressure, and a low degree of superheat can draw the refrigerant back the compressor. Insufficient superheat is corrected by adjusting the expansion valve reduction lever. If this produces no result, it shows that either the expansion valve bulb or shutter valve seat are no longer operating satisfactorily. The defective component must to be replaced.

Sub-cooling

If the system is correctly filled, the sub-cooling value of the refrigerant valve on the liquid line should be 8°-10°K on a standard unit.

Caution:

- Excessive emulsion shows that the refrigerant is present and the result will be that the compressor is not lubricated enough. Shut down motor and identify cause.
- Excess oil in compressor may have as much an adverse effect as not enough oil. Before adding oil, consult a Trane technician. Use only products recommended by Trane.

Condensor fan motors

All fans are secured directly to the motor shaft. The operating sequence of fan motors is controlled by the SMM module.

Refer to the IOM of the SMM control module.

Low temperature operations (air intake to condenser)

If the unit is set to operate at a low air intake temperature, follow procedures below to insure the chilled water circuit is properly protected.

Switch on power to evaporator and water pipe heating resistors. Insure that all pipes are perfectly protected against freezing

Use antifreeze solution in chilled water circuit. If for any reason, the heating resistors in the chilled water circuit cannot be supplied with current, the solution must be able to withstand any ice formation in the circuit. When using the antifreeze solution, manufacturers' instructions for filling of the chilled water circuit, the degree of protection and test procedures must be strictly followed.

Final check

Bring unit into operation on a stage by stage basis, to meet changing levels in the degree of cooling required. Once the unit is operating as it should, a final check should be made for the following points:

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

Caution: Unit operation is dependent on the temperature of the air intake of the condenser vanes. 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-off. Standard operating settings will, in this case, need to be modified. Sunlight on the condenser may also cause operating problems. Trane will not accept liability for unit operating failures under these and similar conditions.

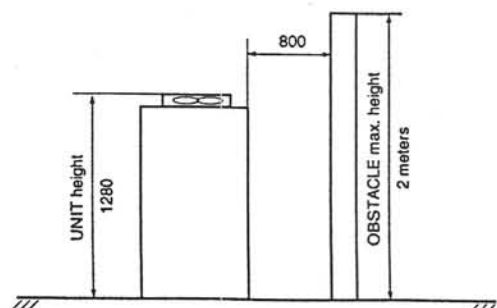


Figure A - Evaporator pressure drops with R134a

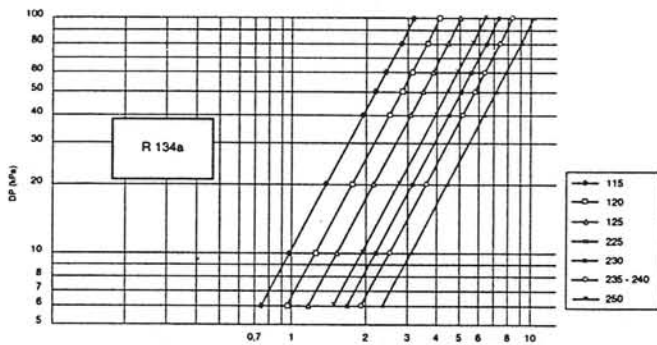
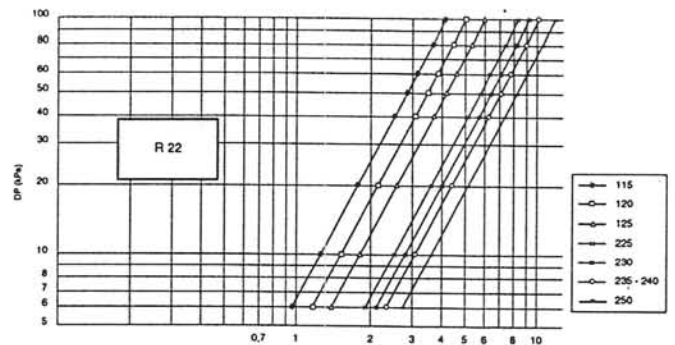


Figure B - Evaporator pressure drops with R22



Operation

System regulation

Regulation is through the SMM control module. Refer to the module IOM N° L80 IM 019 E

A sensor is placed in the bulbwell on evaporator water leaving side, where it registers water leaving temperature from evaporator.

Unit operations

Switch on fused mains power switch to chilled water circulation pump, and start-up pump.

Unit will start up when S1 switch in control/command box switches to position 1 (S2 switch to position 1, etc.). The unit will operate correctly when there is sufficient water flow at the evaporator. The compressor(s) will start up if the evaporator water leaving temperature is above the SMM control module setpoint.

The SMM control module will react based on the increase or decrease in the evaporator water outlet temperature.

Weekly start-up

1. Start up chilled water pump.
2. Switch S1 to position 1, starting up unit.

Weekend shutdown

If the unit needs to be shut down for a short time, switch S1 to 0.

If the unit is shut down for a longer period, see under "Seasonal shutdown", below.

Seasonal shutdown

(Requires qualified technician)

1. The evaporator may be drained by opening the 1/4 connection on the water outlet pipe.

Note: Complete drainage is difficult to achieve. Ensure there is anti-freeze in the heat exchanger.

2. Switch off mains power supply switch. Ensure that it cannot be switched on while the unit is at rest.

Seasonal start-up

(Requires qualified technician)

1. Ensure all the instructions in "Annual maintenance" instructions manual, in the "maintenance" chapter, have been complied with.
2. Fill up and purge chilled water circuits.
3. Insure liquid line stop-valve is open.
4. Check for possible leaks in system.
5. Switch on S1 switch to 0
6. Switch on main power supplies to system.
7. Start up system.
8. Check all interconnected devices operate properly.
9. Check oil level and service pressures after the system has been in operation for 15 to 20 minutes, under full load.
10. Check refrigerant flow is regular. If bubbles appear, check for possible leaks in system.

Caution: If a single compressor only is in operation on a dual compressor circuit, the appearance of gas bubbles in the liquid indicator is normal.

11. Check that high and low pressures are correct, as required for the type of unit manufactured.

Maintenance

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 breakdowns.

Keep service records up to date, showing weekly 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.

Weekly maintenance

1. Check compressor oil level at rest. Oil level should be halfway up sightglass located on the housing. Check oil level every 30 minutes. If oil level does not reach level shown below, contact qualified technician. Use Trane-recommended compressor oil.

Caution: Excessive emulsion indicates presence of refrigerant in oil, resulting in poor lubrication of compressor. Stop motor and check cause.

2. Excess oil in the compressor can be as damaging as not enough oil. Before topping up, contact a qualified technician. Use only Trane-recommended oils.
3. Refrigerant flow through the sightglass should be regular and bubble-free. Bubbles show either that there is not enough refrigerant, or a possible leak, or constriction in liquid line. Contact a qualified technician.

Caution: If a single compressor operates on a dual compressor circuit, gas bubbles in the liquid sightglass can be expected.

Each indicator is fitted with a moisture indicator whose element color will change with the moisture level in the refrigerant. However it is also affected by temperature. It should display "dry" refrigerant. If "moist" is displayed, operate unit for 12 hours minimum and re-check.

If the display remains on "caution" or "moisture present", contact a qualified technician.

Caution: On start up, keep compressor running for at least 2 hours before taking moisture readings. The moisture display is sensitive both to moisture and temperature. This means that the system must be at normal operating temperatures before readings are reliable.

5. Check service pressures. If they are above or below normal, see "Operating defects" chapter. Normal service pressures are shown in table 3.
6. Inspect the entire system for undesirable effects, such as noisy compressor, loose access panels, leaks in pipes, or loose contactors.
7. Keep records of temperatures, pressures, dates and times, or other observations in log book.

Recommended oil

Please refer to specific Trane documentation on oil, available from your nearest Trane agency.

Note: Oils recommended by Trane have been exhaustively tested in Trane laboratories to the specific requirements of Trane compressors, 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 loss of warranty.

Annual maintenance

1. Check chilled water circuit, valve, pipes, and clean filters if necessary. Analyze water quality. Cleaning may be required, in which case use professional assistance.

Caution: Chilled water circuit may be pressurized. Check instructions to reduce circuit pressure before opening chilled water circuit. Failure to comply with this instruction may result in accident or injury to maintenance personnel.

2. Clean corroded outer surfaces, and repaint. Check status of circulation pump and accessories.
3. Check for leaks in the chilled water circuit. Check circulating pump operation and associated devices. Check percentage of anti-freeze in chilled water circuit, and top up as necessary.
4. Carry out all weekly maintenance inspections.

Maintenance inspection

The first and last inspections will include the procedures required for seasonal shutdown and startup, as the case may be. Follow instructions in "Operating" chapter.

Inspections must include the following:

- Check contactors.
- Check adjustment and operation of each control device.

Oil samples will need to be taken and analyzed by the manufacturer through your Trane agency, to check on wear of compressors, particles in suspension, and acidity. Refer to maintenance guide available from Trane agency.

Only this analysis will show whether compressor oil should be replaced.

Warning: Oil analysis 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.

- Check for leaks in refrigerant.
- Check insulation of motor windings.

Other interventions may be necessary, depending on the age and service life of unit.

Note: It is important for unit to be regularly maintained by a qualified technician, at least once a year or every 1,000 hours of operation. Contact TRANE SERVICE for information on maintenance contracts.

Failure to comply with this rule may result in the cancellation of the warranty, and refusal by Société Trane to accept liability.

A maintenance inspection by a qualified technician is also recommended after the first 500 hours of operations from unit start-up.

Cleaning of condensers

1. Turn the fans by hand to make sure they rotate perfectly.

Caution: Switch off unit mains power supplies before any intervention. Failure to follow this safety instruction can lead to accidental death or the maintenance personnel and may also destroy equipment.

2. Clean the condenser coils with a brush or jet of water. If the batteries are too dirty, consult a cleaning professional.

Caution: Never steam clean condenser coils because the resulting increase in pressure could cause some refrigerant to be lost through the safety valve.

Maintenance inspection

If the unit does not operate to full satisfaction, consult "Operating anomalies" This shows operating problems and ways to correct them.

Troubleshooting guide

These are simple diagnostic hints. If there is a breakdown, the Trane Agency should be called in to confirm.

Problem symptoms	Probable cause	Action recommended
A) The compressor will not start up		
Compressor terminals are live, but motor will not start.	Motor burned out.	Replace compressor.
Starter motor not operational.	Coil burned out or broken contacts.	Repair or replace.
No current ahead of motor starter.	a) Power cut. b) Main power supply switched off.	Check fuses and connection. See why system tripped. If system is operational, switch on mains power switch.
Current ahead of starter, but not on fuse side.	Fuse blown.	Replace fuse. Check motor insulation.
Low voltage reading on volt meter.	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.
Compressor will not run. Compressor motor "groans".	Compressor sticking (damaged or sticking components).	Re-set compressor.
Open contact on high pressure switch. Discharge pressure greater than setpoint.	Discharge pressure greater than lower differential value.	See instructions for "discharge pressure too high".
B) Compressor stops		
High pressure switch tripped.	Discharge pressure greater than lower differential value.	See instructions for "discharge pressure too high".
Over current thermal relay tripped.	a) Voltage too low. b) Cooling demand too high, or compensation temperature too high.	a) Contact power supply utility. b) See instruction "discharge pressure too high".
Coil thermostat tripped.	Not enough cooling fluid.	Repair leak. Add refrigerant.
Anti-freeze security tripped.	Reduced water flow to evaporator.	Check water flow rate, and pressure switch contact in water.

Caution: The unit cooling circuit is under pressure. Safety instructions should be followed and pressure reduced before maintenance operation.

Caution: The chilled water circuit may be under pressure. Service instructions should be followed to reduce pressure before intervention.

Caution: Switch off unit mains power supplies before any intervention on electrical components. Failure to follow this instruction can lead to accidental death or injury by electrocution.

The following operations must be carried out by a qualified refrigeration technician as part of a maintenance contract.

The recommended frequency of maintenance inspections is:

- 4 times a year for chillers permanently in service .
- 2 times per year for chillers used during the hot season only.

Problem/symptoms	Probable cause	Action recommended
C) Compressor short-circuit		
Suction pressure too low. Drier filter iced up.	Drier filter obstructed.	Replace.
Compressor starts and stops rapidly	Motor defective.	Replace compressor.
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.
Bubbles in indicator.	a) Not enough refrigerant. b) Dehydration filter obstructed.	a) Repair leak. Add more refrigerant. b) Replace filter cartridge.
Chilled water temperature output too high.	Excess cooling demand on system.	Look for possible causes of excess outside air intake. Check quality of insulation in premises requiring air-conditioning, and if necessary, reduce the water flow rate through regulation valve.
E) Loss of oil in compressor		
Oil level too low in indicator.	Not enough oil.	Add oil.
Gradual fall in oil level.	Drier filter clogged.	Replace.
Aspiration duct abnormally cold. Compressor noisy.	Liquid flow back to compressor.	Adjust superheat and check bulb fixing.
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) Not enough power in system		
Thermostatic expansion valve "whistles".	Not enough refrigerant.	Add refrigerant.
Excess pressure drops through drier filter.	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.
Insufficient superheat.	Pressure drops through evaporator.	Check adjustment of superheat and adjust thermostatic pressure release.
Chilled water output temperature too high, or too low, and emulsion in oil.	Superheat poorly adjusted.	Adjust thermostatic expansion valve. Check superheat.

Problem symptoms	Probable cause	Action recommended
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 coil. Check operation of motor ventilators.
I) Discharge pressure too low		
Bubbles in sightglass	Lack of refrigerant.	Repair the leak and top up the refrigerant.
J) 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.
K) Suction pressure too low		
Bubbles in sightglass	Not enough refrigerant.	Repair leak and top up refrigerant.
Excessive pressure drops through drier filter. Refrigerant does not flow through thermostatic expansion valve.	Drier filter clogged. Expansion valve bulb has lost its refrigerant.	Replace the dehydrator. 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.
Low pressure drops through evaporator.	Low water flow rate.	Check water flow rate. Check state of filters, 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 simply 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.

Installation checklist

CGAH Trane air cooled liquid chiller

This list must be checked off by the installer, to insure correct installation before the unit starts up.

Unit acceptance

- Check for damage, if any, on transportation
- Check for equipment shipped against delivery slip
- Check lifting system

Unit positioning

- Remove packaging
- Check position of unit
- Check unit is level
- Check clearance around condenser
- Check clearance required for maintenance access
- Check position of dampers

Chilled water circuit

- Check for leaks in chilled water pipes
- Check thermometer positioning
- Check manometer positioning
- Check chilled water flow rate balancing system
- Check rinsing and filling of chilled water pipes
- Check pump operation and measurements for loss of fluid

Electrical equipment

- Check direction of ventilator and compressor fan motors
- Check chilled water pump drive rotation
- Check installation and rating of mains power switch/fuse
- Check that electrical connections comply with specifications
- Check that electrical connections match information on manufacturer's identification plate
- Check electrical connections and connections to mains power switch
- Check fuse on the evaporator heating resistor
- Thermostatic heating check for chilled water pipes
- Water pressure switch

General

- Check available cooling charge (50% of rated installation load)
- Check with other trades handling installation works

Comment:

.....

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Signature : Name:

Order No.:

Work site:

Please return to Trane Agency with responsibility for equipment installation and set up

Safety recommendations

In order to avoid any damage to equipment and injury to operating personnel, the following safety precautions should be observed throughout repair and maintenance operations.

1. While testing for leaks, do not go above 20 bar pressure on high pressure side and 10 bar pressure on low pressure side.
2. Before starting up the system, open up stop valve on liquid line.
3. Close door of control/command box before switching on power to control system.
4. Any repair to the cooling circuit or electrical circuit must be carried out by qualified and experienced personnel.

Maintenance contract

Users are strongly recommended to take out a maintenance contract with their local Trane agency. This contract warrants regular monitoring of the unit by a specialist who has comprehensive knowledge of Trane equipment.

If so, possible problems in operation will be detected in time, which means rapid action, so avoiding serious damage to the unit.

Finally, effective maintenance insures a longer operating life.

Users are also reminded that any failure to respect these installation and maintenance instructions may result in irrevocable and immediate cancellation of 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 constructor have at your disposal a refrigeration and air conditioning service school. The principal aim of this is to give operators and

maintenance 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 constructor's policy is one continuous product improvement, and he 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 :

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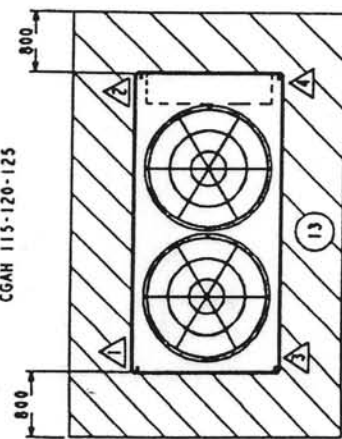
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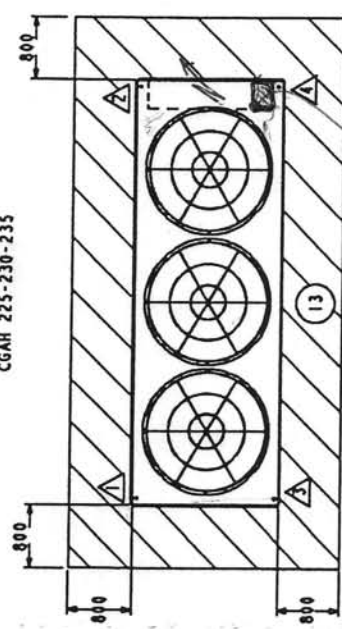
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SIZE	MA	MA	MA	MA	MA
115					
120					
125					
225					
230					
235					
240					
250					

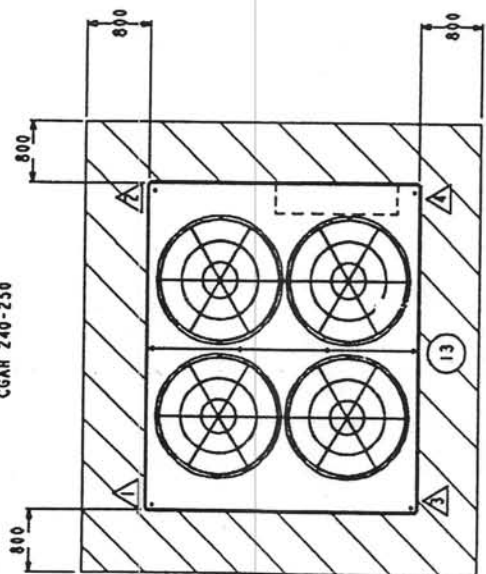
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CGAH 225-230-235



CGAH 240-250



REFRIGERATORI DI LIQUIDO / WATERKOELMACHINE / ENFRIADOR DE LIQUIDO

SIZE	1	2	3	4-5	6		7	8	9	
					R22	R134g				
115	10T+10T	2R	1	1"1/2	40	30	R22	9	7.6	725
120	10T+15T	2R	2	1"ISO R/7"	50	40	10	10	10.4	850
125	15T+15T	3R	2	MALE	60	50	13	13	13.2	975
225	10T+10T	3R	2		40	30	9	9	7.6	1250
	15T	3R			40	30	6	6	6.6	
230	10T+15T	3R	3		50	40	13	13	10.4	1375
	15T	3R			40	30	6	6	6.6	
235	15T+15T	3R	3	2" 1"ISO R/7"	60	50	13	13	13.2	1425
	15T	3R		MALE	40	30	6	6	6.6	
240	10T+15T	2R	4		50	40	10	10	10.4	1550
	10T+15T	2R			50	40	10	10	10.4	
250	15T+15T	3R	4		60	50	13	13	13.2	1750
	15T+15T	3R			60	50	13	13	13.2	

- | | | |
|---|--------------------------------------|---|
| 1 COMPRESSORE | COMPRESSOR | COMPRESOR |
| 2 CONDENSATORE | CONDENSATOR | CONDENSADOR |
| 3 NUMERO DI VENTILATORI | AANTAL VENTILATOREN | NUMERO DE VENTILADORES |
| 4 COLLEGAMENTO ACQUA ENTRATA EVAPORATORE | VERDAMPER WATERIN TREDE AANSLUITING | CONEXION DE ENTRADA DE AGUA AL EVAPORADOR |
| 5 COLLEGAMENTO ACQUA USCITA EVAPORATORE | VERDAMPER WATERUITREDE AANSLUITING | CONEXION DE SALIDA DE AGUA DEL EVAPORADOR |
| 6 NUMERO DI PIASTRE EVAPORATORE | AANTAL PLATEN VERDAMPER | NUMERO DE PLACAS EVAPORADOR |
| 7 REFRIGERANTE (kg) | KOELMIDDEL (kg) | REFRIGERANTE (kg) |
| 8 OLIO (Litri) | OLIE (Liter) | ACEITE (Litros) |
| 9 PESO UNITA IN FUNZIONE (kg) | BEDRIJSGEWICHT (kg) | PESO EN OPERACION (kg) |
| 10 PANNELLO ELETTRICO | BESTURINGSPANEEL | PANEL ELECTRICO |
| 11 PASSAGGIO ALIMENTAZIONE ELETTRICA | KABELDOORVOER | ACCESO CONEXION CLIENTE |
| 12 FORI DI SOLLEVAMENTO Ø40 | HIJSGEN Ø40 | PUNTOS DE ELEVACION Ø40 |
| 13 SPAZI MINIMI RICHIESTI PER LA MANUTENZIONE | MINIMUMAFSTAND VOOR ONDERHOUD | ESPACIO LIBRE PARA MANTENIMIENTO |
| 14 CARICO DI PARTITO | GEWICHT PER PUNT | REPARTO DE PESOS |
| 15 MANOMETRI | MANOMETERS | MANOMETROS |
| 16 SEZIONATORE DI POTENZA | HOOFDSCHAKELAAR | SECCIONADOR DE FUERZA |
| 17 SILENZIATORE DEL COMPRESSORE | COMPRESSOR GELUIDWERENDE VOORZIENING | AMORTIGUADOR DE SONIDOS COMPRESOR |

OPZIONI / TOEBEHOREN / OPCIONES

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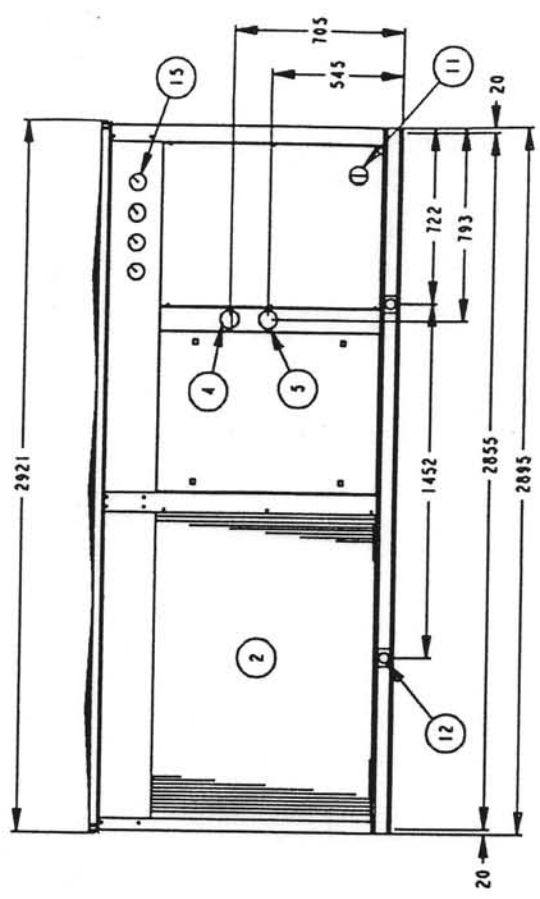
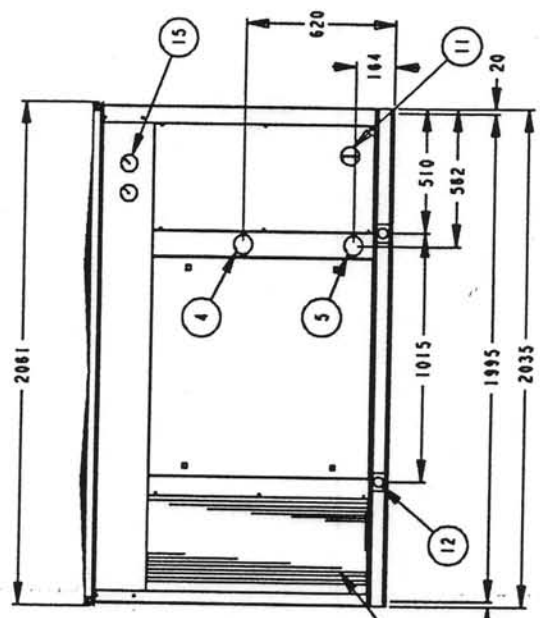
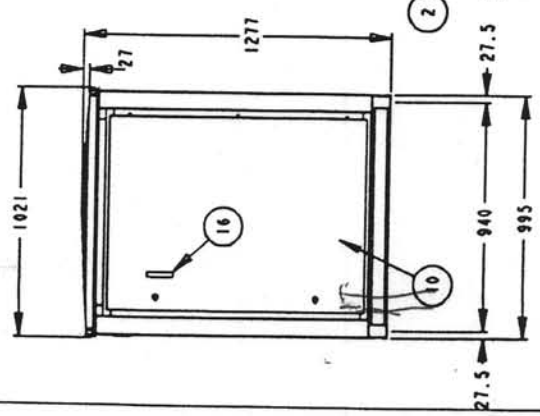
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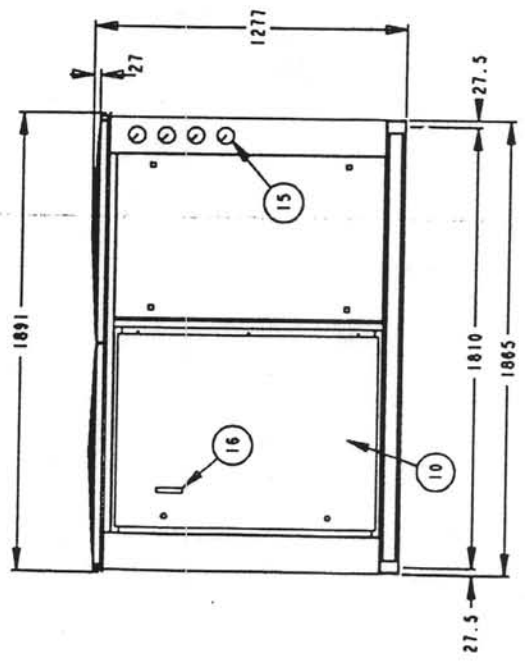
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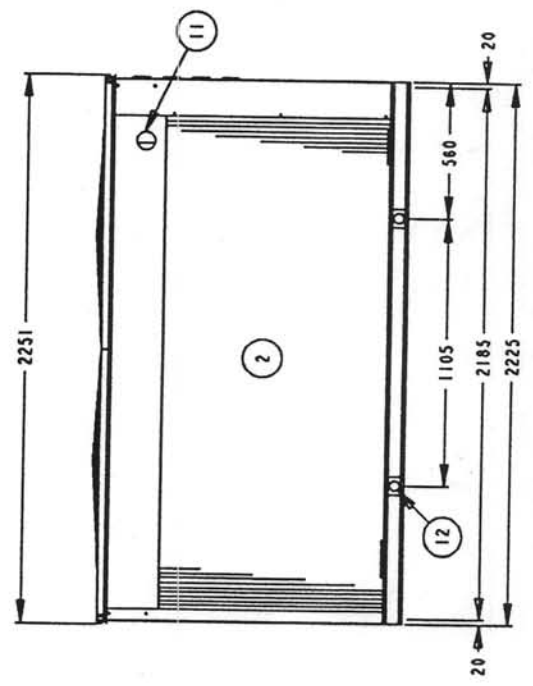
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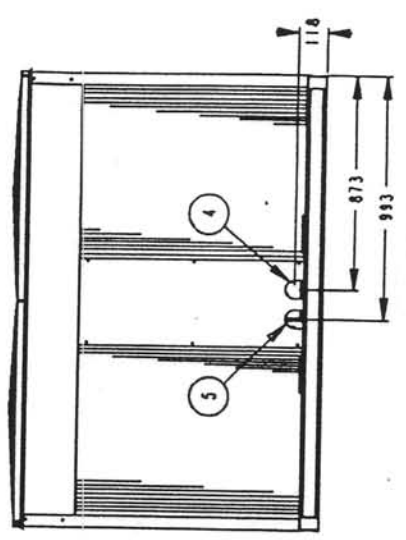
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CGAH 240-250



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