



TRANE®

*Cooling and Heating
Systems and Services*

Product Catalog

AquaStream 3G™ Air-Cooled Liquid Chillers

Model CGAM - Made in France

Model CXAM - Made in France



Introduction

Design and manufacturing excellence makes Trane a leader in the air-cooled chiller marketplace. This tradition of using excellence to meet market demands is illustrated with the new Trane AquaStream 3G the 55-350 kW air-cooled cooling unit and 225-350 kW reversible chiller. The introduction of this next-generation chiller is an exciting step forward in energy-efficiency, sound, reliability, ease of serviceability, control precision, application versatility, and operational cost-effectiveness. The new chiller is designed to deliver proven AquaStream 3G performance based on the redesign of a European model that has been a market leader, plus all the benefits of new heat transfer and fan designs, as well as, low-speed, direct-drive scroll compressors.

Important Design Advances and New Features

- Higher full-load and part-load energy efficiency that reduce operating costs.
- Significantly lower noise levels than other scroll compressor chillers.
- HFC-410A optimized design.
- Factory-installed evaporator pump and buffer tank available to make installation easier.
- Flow switch and water strainer are factory installed in the optimum locations for seamless operation and reduced chiller installation and maintenance time.
- Trane CH530™ with Adaptive Controls™ have improved fan algorithms for more reliable operation at extreme conditions.
- Single chiller time of day scheduling communication for easier control of small jobs.
- Easily integrated with existing BAS via BACnet™, Modbus™, or LonTalk™ communication interface.
- All major service components are close to the unit edge for safe and easy maintenance.
- The chiller is designed for easy serviceability with input from our extended experience in design, testing and field operation.

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Features and Benefits

Reliability

- Years of laboratory testing including running the chiller at extreme operating conditions have resulted in optimized compressor and chiller systems reliability by confirming a robust design and verifying quality each step of the way.
- Direct-drive, low-speed scroll compressors with fewer moving parts provide maximum efficiency, high reliability, and low maintenance requirements. Suction gas-cooled motor stays at a uniformly low temperature for long motor life.
- The third generation microprocessor control system provides improved control capabilities with Adaptive Control™ to keep the unit operating even in adverse conditions. Advanced microelectronics protect both the compressor and the motor from typical electrical fault conditions like thermal overload and phase rotation.
- Flow switch is factory-installed at the optimum location in the piping for reduced chiller installation cost and superior flow sensing, reducing the potential for nuisance trips.
- Exceptionally rigid condenser coil structure is designed with finished element analysis.
- Innovative condenser pressure integrated fan control algorithms provide more reliable operation at extreme temperature conditions.

Life Cycle Cost-Effectiveness

- Industry leading full- and part-load efficiency
- Electronic expansion valve and high speed suction temperature sensor enables tight chilled water temperature control and low superheat, resulting in more efficient full-load and part-load operation than previously available.
- The factory-installed and tested pump package available with many options to meet a variety of customer needs.

Application Versatility

- Industrial/low temperature process cooling - Excellent operating temperature range and precise control capabilities enable tight control.
- Ice/thermal storage - Utilities and owners benefit from reduced cooling energy cost. The AquaStream 3G chiller's dual setpoint control and industry leading ice energy storage efficiency assures reliable operation and superior system efficiency.

Simple, Economical Installation

- There are a variety of sound options to help meet many different job site requirements: compact, super quiet and comprehensive acoustic package.
- System integration available with LonTalk, or ModBus, or BACnet through a single twisted-pair wire for a less expensive translation to an existing building automation system.
- Powder-coated paint provides superior durability, corrosion protection, and is less likely to be damaged while rigging/lifting/installing the chiller.
- Factory commissioned unit-mounted starter reduces overall job cost and improves system reliability by eliminating job site design, installation and labor coordination requirements.

Precision Control

- Microprocessor-based Trane CH530 controls monitor and maintain optimal operation of the chiller and its associated sensors, actuators, relays, and switches, all of which are factory-installed, powered up and tested prior to shipping.
- Adaptive Control maintains chiller operation under adverse conditions, when many other chillers might simply shut down. Operating conditions that are compensated for include high condensing pressure and low suction pressure.



Features and Benefits

- AquaStream 3G advanced microprocessor controls enable variable primary flow applications providing chilled water temperature control accuracy of $\pm 2^{\circ}\text{F}$ (1.1°C) for flow changes up to 10 percent per minute, plus handling of flow changes up to 30 percent per minute with continuous operation.
- Easy-to-use operator interface displays all operating and safety messages, with complete diagnostics information, on a highly readable panel with a scrolling touch-screen display. Status and diagnostic messages are in plain language - no codes to interpret - and are available in 20 languages.

Improved Serviceability

- All major serviceable components are close to the edge. Service shutoff valves and water strainer are conveniently located to enable easy service.
- Water piping connections are factory piped to the edge of the unit to make installation safer and faster.
- Electronic expansion valve designed so controls can be removed and serviced without refrigerant handling.
- The optional pump package is designed to be serviced in place. The unit structure includes a rigging point for pump servicing, making inspection, cleaning and pump seal changes easier.
- High pressure transducer and temperature sensors mountings enable troubleshooting and replacement without removing refrigerant charge, greatly improving serviceability over the life of the unit.
- Dead front panel construction provides for enhanced service technician safety.

Application Considerations

Certain application constraints should be considered when sizing, selecting and installing Trane AquaStream 3G chillers. Unit and system reliability is often dependent upon proper and complete compliance with these considerations. Where the application varies from the guidelines presented, it should be reviewed with your local Trane sales engineer.

Note: The terms water and solution are used interchangeably in the following paragraphs.

Unit Sizing

Intentionally over-sizing a unit to assure adequate capacity is not recommended. Erratic system operation and excessive compressor cycling are often a direct result of an oversized chiller. In addition, an oversized unit is usually more expensive to purchase, install, and operate. If over sizing is desired consider using two smaller units.

Water Treatment

The use of untreated or improperly treated water in chillers may result in scaling, erosion, corrosion, and algae or slime buildup. This will adversely affect heat transfer between the water and system components. Proper water treatment must be determined locally and depends on the type of system and local water characteristics.

Neither salt nor brackish water is recommend for use in Trane air-cooled AquaStream 3G chillers. Use of either will lead to a shortened life. Trane encourages the employment of a qualified water treatment specialist, familiar with local water conditions, to assist in the establishment of a proper water treatment program.

Foreign matter in the chilled water system can also increase pressure drop and, consequently, reduce water flow. For this reason it is important to thoroughly flush all water piping to the unit before making the final piping connections to the unit.

Effect of Altitude on Capacity

At elevations substantially above sea level, the decreased air density will decrease condenser capacity and, therefore, unit capacity and efficiency.

Ambient Limitations

Trane AquaStream 3G chillers are designed for year-round operation over a range of ambient temperatures. The air-cooled model CGAM chiller will operate in ambient temperatures of 46°C. Selecting the low ambient option will allow the chiller to operate with ambient temperature as low as -18°C and high ambient option will increase the operational capability of the chiller to operate in ambient temperatures up to 52°C. The heat pump model CXAM with standard ambient will operate in cooling mode with ambient temperatures of 0°C to 46°C. Selecting the low ambient option will allow the chiller to operate down to -10°C. Without the low ambient option freeze damage can occur with operation below

The minimum ambient temperatures are based on still conditions (winds not exceeding 8 km/h). Greater wind velocities will result in a drop in head pressure, therefore increasing the minimum starting and operating ambient temperature. The Adaptive Control™ microprocessor will attempt to keep the chiller on-line when high or low ambient conditions exist, making every effort to avoid nuisance trip-outs and provide the maximum allowable tonnage.

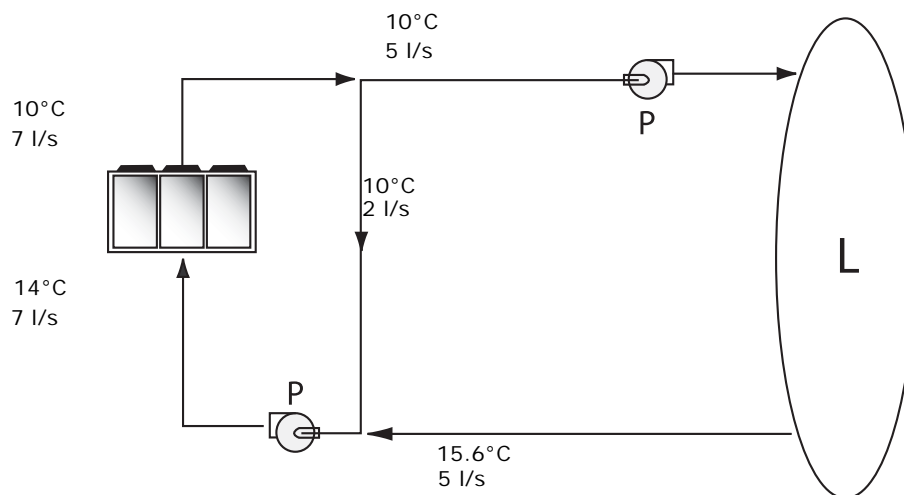
Water Flow Limits

The minimum water flow rates are given in the General Data section of this catalog. Evaporator flow rates below the tabulated values will result in laminar flow causing freeze-up problems, scaling, stratification and poor control. The maximum evaporator water flow rate is also given. Flow rates exceeding those listed may result in very high pressure drop across the evaporator.

Flow Rates Out of Range

Many process cooling jobs require flow rates that cannot be met with the minimum and maximum published values within the AquaStream 3G evaporator. A simple piping change can alleviate this problem. For example: a plastic injection molding process requires 5.0 l/s of 10°C water and returns that water at 15.6°C. The selected chiller can operate at these temperatures, but has a minimum flow rate of 6.6 l/s. The system layout in Figure 1 can satisfy the process.

Figure 1. Flow Rate Out of Range Systems Solution



Flow Proving

Trane provides a factory-installed water flow switch monitored by CH530 which protects the chiller from operating in loss of flow conditions.

Variable Flow in the Evaporator

An attractive chilled water system option may be a Variable Primary Flow (VPF) system. VPF systems present building owners with several cost-saving benefits when compared with Primary/Secondary chilled water systems. The most obvious cost savings results from eliminating the constant volume chiller pump(s), which in turn eliminates the related expenses of the associated piping connections (material, labor), and electrical service and switch gear. In addition to the installed cost advantage building owners often cite pump related energy savings as the reasons that prompted them to select a VPF system.

The AquaStream 3G has the capability to handle variable evaporator flow without losing leaving water temperature control. The microprocessor and capacity control algorithms are designed to take a 10 percent change in water flow rate per minute while maintaining a $\pm 1.1^{\circ}\text{C}$ leaving water temperature control accuracy. The chiller tolerates up to 30 percent per minute water flow variation as long as the flow is equal or above the minimum flow rate requirement.

With the help of a software analysis tool such as System Analyzer™, DOE-2 or TRACE™, you can determine whether the anticipated energy savings justify the use of variable primary flow in a particular application. Existing constant flow chilled water systems may be relatively easily converted to VPF and benefit greatly from the inherent efficiency advantages.

Water Temperature

Leaving Water Temperature Limits

Trane AquaStream 3G chillers have three distinct leaving water categories:

- standard, with a leaving solution range of 5.5 to 18°C
- low temperature process cooling, with leaving solution range of -12 to 18°C
- ice-making, with leaving solution range of -7 to 18°C

Since leaving solution temperature below 5.5°C results in suction temperature at or below the freezing point of water, a glycol solution is required for all low temperature and ice-making machines. Ice making control includes dual setpoint controls and safeties for ice making and standard cooling capabilities. Consult your local Trane sales engineer for applications or selections involving low temperature or ice making machines.

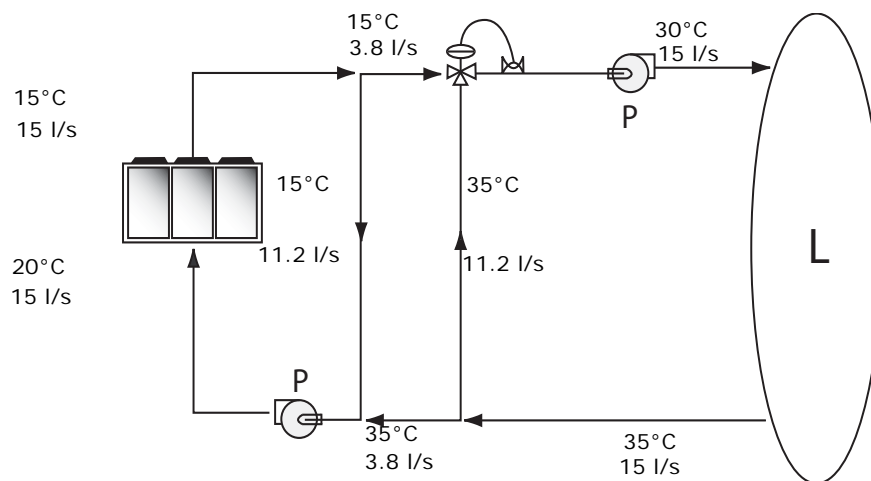
The maximum water temperature that can be circulated through the CGAM evaporator when the unit is not operating is 51.7°C. For the CXAM the water temperature limit is 60°C. Evaporator damage may result above this temperature.

Application Considerations

Leaving Water Temperature Out of Range

Similar to the flow rate limitations above, many process cooling jobs require temperature ranges that are outside the allowable minimum and maximum operating values for the chiller. Figure 2 below shows a simple example of a mixed water piping arrangement change that can permit reliable chiller operation while meeting such cooling conditions. For example, a laboratory load requires 5 l/s of water entering the process at 30°C and returning at 35°C. The chiller's maximum leaving chilled water temperature of 15.6°C. In the example shown, both the chiller and process flow rates are equal, however, this is not necessary. For example, if the chiller had a higher flow rate, there would simply be more water bypassing and mixing with warm water returning to the chiller.

Figure 2. Temperature Out of Range System Solution



Supply Water Temperature Drop

Full load chilled water temperature drops from 3.3 to 10°C may be used as long as minimum and maximum water temperature and minimum and maximum flow rates are not violated. Temperature drops outside this range at full load conditions are beyond the optimum range for control and may adversely affect the microcomputer's ability to maintain an acceptable supply water temperature range. Furthermore, full load temperature drops of less than 3.3°C may result in inadequate refrigerant superheat which is critical to long term efficient and reliable operation. Sufficient superheat is always a primary concern in any refrigerant system and is especially important in a packaged chiller where the evaporator is closely coupled to the compressor.

Parameters which influence the water temperature stability:

- Ambient temperature and water temperature (modify cooling capacity)
- Number of capacity steps
- Minimum time between starts of a compressor
- Control dead band
- Water loop volume
- Load fluctuations
- Fluid type or percentage of glycol

Typical Water Piping

All building water piping must be flushed prior to making final connections to the chiller. To reduce heat loss and prevent condensation, insulation should be applied. Expansion tanks are also usually required so that chilled water volume changes can be accommodated.

Avoidance of Short Water Loops

Adequate chilled water system water volume is an important system design parameter because it provides for stable chilled water temperature control and helps limit unacceptable short cycling of chiller compressors.

The AquaStream 3G chiller's temperature control sensor is located in the supply (outlet) water connection or pipe. This location allows the building to act as a buffer to slow the rate of change of the system water temperature. If there is not a sufficient volume of water in the system to provide an adequate buffer, temperature control can suffer, resulting in erratic system operation and excessive compressor cycling.

Typically, a two-minute water loop circulation time is sufficient to prevent short water loop issues. Therefore, as a guideline, ensure the volume of water in the chilled water loop equals or exceeds two times the evaporator flow rate. For systems with a rapidly changing load profile the amount of volume should be increased.

If the installed system volume does not meet the above recommendations, the following items should be given careful consideration to increase the volume of water in the system and, therefore, reduce the rate of change of the return water temperature.

- A volume buffer tank located in the return water piping.
- Larger system supply and return header piping (which also reduces system pressure drop and pump energy use).

Application Considerations

An optional factory-installed buffer tank is designed to meet the minimum two minute loop time without additional job site piping. The buffer tank can also be used on jobs that already meet or exceed the minimum loop time to further reduce the potential for compressor cycling, increasing the compressor life span, and reducing system temperature fluctuations.

Minimum water volume for a process application

If a chiller is attached to an on/off load such as a process load, it may be difficult for the controller to respond quickly enough to the very rapid change in return solution temperature if the system has only the minimum water volume recommended. Such systems may cause chiller low temperature safety trips or in the extreme case evaporator freezing. In this case, it may be necessary to add or increase the size of the mixing tank in the return line or consider the optional factory-installed buffer tank with the chiller.

Multiple Unit Operation

Whenever two or more units are used on one chilled water loop, Trane recommends that their operation be coordinated with a higher level system controller for best system efficiency and reliability. The Trane Tracer system has advanced chilled plant control capabilities designed to provide such operation.

Ice Storage Operation

An ice storage system uses the chiller to make ice at night when utilities generate electricity more efficiently and charge less for electricity with lower demand and energy charges. The stored ice reduces or even replaces mechanical cooling during the day when utility rates are at their highest. This reduced need for cooling results in significant utility cost savings and source energy savings.

Another advantage of an ice storage system is its ability to eliminate chiller over sizing. A “rightsized” chiller plant with ice storage operates more efficiently with smaller support equipment while lowering the connected load and reducing operating costs. Best of all this system still provides a capacity safety factor and redundancy by building it into the ice storage capacity for practically no cost compared to over sized systems.

The Trane air-cooled chiller is uniquely suited to low temperature applications like ice storage because of the ambient relief experienced at night. Chiller ice making efficiencies are typically similar to or even better than standard cooling daytime efficiencies as a result of night-time dry-bulb ambient relief.

Standard smart control strategies for ice storage systems are another advantage of the AquaStream 3G chiller. The dual mode control functionality are integrated right into the chiller. Trane Tracer building management systems can measure demand and receive pricing signals from the utility and decide when to use the stored cooling and when to use the chiller.

Unit Placement

Setting The Unit

A base or foundation is not required if the selected unit location is level and strong enough to support the unit's operating weight (see "Weights" section of this catalog).

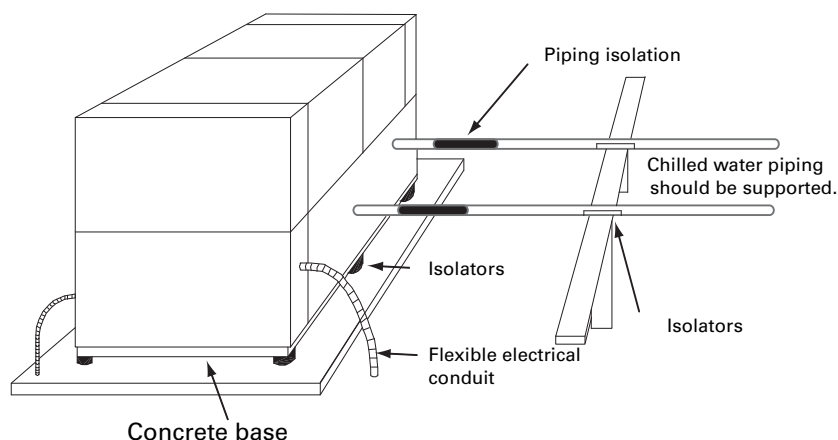
For a detailed discussion of base and foundation construction, refer to the sound engineering bulletin or the unit IOM. Manuals are available through the local Trane office.

HVAC equipment must be located to minimize sound and vibration transmission to the occupied spaces of the building structure it serves. If the equipment must be located in close proximity to a building, it should be placed next to an unoccupied space such as a storage room, mechanical room, etc. It is not recommended to locate the equipment near occupied, sound sensitive areas of the building or near windows. Locating the equipment away from structures will also prevent sound reflection, which can increase sound levels at property lines or other sensitive points.

Isolation and Sound Emission

Structurally transmitted sound can be reduced by elastomeric vibration eliminators. Elastomeric isolators are generally effective in reducing vibratory noise generated by compressors, and therefore, are recommended for sound sensitive installations. An acoustical engineer should always be consulted on critical applications.

Figure 3. Installation Example



Application Considerations

For maximum isolation effect, water lines and electrical conduit should also be isolated. Wall sleeves and rubber isolated piping hangers can be used to reduce the sound transmitted through water piping. To reduce the sound transmitted through electrical conduit, use flexible electrical conduit.

Local codes on sound emissions should always be considered. Since the environment in which a sound source is located affects sound pressure, unit placement must be carefully evaluated. Sound power levels for chillers are available on request.

Servicing

Adequate clearance for evaporator and compressor servicing should be provided. Recommended minimum space envelopes for servicing are located in the dimensional data section and can serve as a guideline for providing adequate clearance. The minimum space envelopes also allow for control panel door swing and routine maintenance requirements. Local code requirements may take precedence.

Unit Location

General

Unobstructed flow of condenser air is essential to maintain chiller capacity and operating efficiency. When determining unit placement, careful consideration must be given to assure a sufficient flow of air across the condenser heat transfer surface. Two detrimental conditions are possible and must be avoided: warm air recirculation and coil starvation. Air recirculation occurs when discharge air from the condenser fans is recycled back to the condenser coil inlet. Coil starvation occurs when free airflow to the condenser is restricted.

Condenser coils and fan discharge must be kept free of snow or other obstructions to permit adequate airflow for satisfactory unit operation. Debris, trash, supplies, etc., should not be allowed to accumulate in the vicinity of the air-cooled chiller. Supply air movement may draw debris into the condenser coil, blocking spaces between coil fins and causing coil starvation.

Application Considerations

Both warm air recirculation and coil starvation cause reductions in unit efficiency and capacity because of the higher head pressures associated with them. The air-cooled AquaStream 3G chiller offers an advantage over competitive equipment in these situations. Operation is minimally affected in many restricted air flow situations due to its advanced Adaptive Control™ microprocessor which has the ability to understand the operating environment of the chiller and adapt to it by first optimizing its performance and then staying on line through abnormal conditions. For example, high ambient temperatures combined with a restricted air flow situation will generally not cause the air-cooled model CGAM chiller to shut down. Other chillers would typically shut down on a high pressure nuisance cut-out in these conditions.

Cross winds, those perpendicular to the condenser, tend to aid efficient operation in warmer ambient conditions. However, they tend to be detrimental to operation in lower ambients due to the accompanying loss of adequate head pressure. Special consideration should be given to low ambient units. As a result, it is advisable to protect air-cooled chillers from continuous direct winds exceeding 4.5 m/s in low ambient conditions.

The recommended lateral clearances are depicted in the close spacing engineering bulletin available from your local office.

Provide Sufficient Unit-to-Unit Clearance

Units should be separated from each other by sufficient distance to prevent warm air recirculation or coil starvation. Doubling the recommended single unit air-cooled chiller clearances will generally prove to be adequate.

Walled Enclosure Installations

When the unit is placed in an enclosure or small depression, the top of the surrounding walls should be no higher than the top of the fans. The chiller should be completely open above the fan deck. There should be no roof or structure covering the top of the chiller. Ducting individual fans is not recommended.

Model Number Descriptions

Digit 1-4 — Chiller Model

- CGAM = Air-Cooled Scroll Packaged Chiller
CXAM = Air-Cooled Scroll Heat Pump

Digit 5-7 — Unit Nominal Tonnage

- 080 = 80 Tons
090 = 90 Tons
100 = 100 Tons
110 = 110 Tons
120 = 120 Tons

Digit 8 — Unit Voltage

- E = 400 Volt 50 Hz 3 Phase

Digit 9 — Manufacturing Plant

- 1 = Epinal, France

Digit 10-11 — Design Sequence

- A-Z = Factory/ABU Assigned

Digit 12 — Unit Type

- 1 = Standard Efficiency/Performance
2 = High Efficiency/Performance

Digit 13 — Agency Listing

- B = CE Certification (EUR)

Digit 14 — Pressure Vessel Code

- 4 = Europe Standard

Digit 15 — Unit Application

- A = Standard Ambient (32-115F/0-46C)
B = High Ambient (up to 52C)
C = Low Ambient (0 to 115/-18 to 46C)
D = Wide Ambient (-18 to 52C)
E = Standard Ambient Heat Pump Cooling Mode (0-46C)
F = Low Ambient Heat Pump Cooling Mode (-10 to 46C)

Digit 16 — Refrigerant Isolation Valves

- 1 = No Isolation Valves

Digit 17

- A

Digit 18 — Freeze Protection (Factory-Installed Only)

- X = Without Freeze Protection
2 = With Freeze Protection (CH530 Control)

Digit 19 — Insulation

- A = Factory Insulation - All Cold Parts

Digit 20 — Factory Charge

- 1 = Full Factory Refrigerant Charge (HFC-410A)

Digit 21 — Evaporator Application

- A = Standard Cooling (5.5 to 18°C)
B = Low Temperature Processing (lower than 5.5°C)
C = Ice-Making - hardwired interface (-7 to 18°C)

Digit 22 — Water Connection (Evap)

- 1 = Grooved Pipe Connection
2 = Grooved Pipe with Flange Adapter

Digit 23 — Condenser Fin Material

- A = Lanced Aluminum Fins
B = Non-Lanced Aluminum Fins
E = Non-Lanced Aluminum Fins w/ Pre-Coat (Black Epoxy)
F = Non-Lanced Aluminum Fins w/ Pre-Coat (Blue Fin)

Digit 24 — Condenser Heat Recovery

- X = No Heat Recovery
2 = Partial Heat Recovery w/o Fan Control

Digit 25

- X

Digit 26 — Starter Type

- A = Across the Line Starter/ Direct on Line
B = Solid State Soft Starter
C = Across the Line Starter/ Power Factor Correction

Digit 27 — Incoming Power Line Connection

- 1 = Single Point Power Connection

Digit 28 — Power Line Connection Type

- B = Disconnect Switch

Digit 29 — Enclosure Type

- 2 = IP55 Protection

Digit 30 — Unit Operator Interface

- A = Dyna-View/English
B = Dyna-View/Spanish-Spain
C = Dyna-View/Spanish-Mexico
D = Dyna-View/French
E = Dyna-View/German
F = Dyna-View/Dutch
G = Dyna-View/Italian
H = Dyna-View/Japanese
J = Dyna-View/Portuguese-Portugal
K = Dyna-View/Portuguese-Brazil
L = Dyna-View/Korean
M = Dyna-View/Thai
N = Dyna-View/Simplified Chinese
P = Dyna-View/Traditional Chinese
R = Dyna-View/Russian
T = Dyna-View/Polish
U = Dyna-View/Czech
V = Dyna-View/Hungarian
W = Dyna-View/Greek
Y = Dyna-View/Romanian
Z = Dyna-View/Swedish

Model Number Descriptions

Digit 31 — Remote Interface (digital comm)

- X = No Remote Digital Communication
- 1 = LonTalk LCI-C Interface with Modbus Interface
- 2 = LonTalk/Tracer Summit Interface
- 3 = Time of Day Scheduling
- 4 = BACNet Interface

Digit 32 — Ext. Chilled/Hot Water and Curr. Demand Limit Setpoint

- X = No Ext. Chilled Water Setpoint
- A = Ext Chilled Water and Demand Limit Setpoint - 4-20mA
- B = Ext Chilled Water and Demand Limit Setpoint - 2-10Vdc

Digit 33 — % Capacity

- X = Without % Capacity
- 1 = With % Capacity

Digit 34 — Programmable Relays

- X = No Programmable Relays
- A = Programmable Relays

Digit 35 — Pump Type

- X = No Pumps and no Contactors
- 1 = No Pumps w/ Single Contactors
- 2 = No Pumps w/ Dual Contactors
- 3 = No Pumps w/ Single Contactors Single High Head Pump
- 4 = No Pumps w/ Dual Contactors Dual High Head Pump
- 5 = Single Standard Head Pump
- 6 = Single High Head Pump

Digit 36 — Pump Flow Control

- X = No Pump Flow Control
- A = Pump Flow Controlled by Triple Duty Valve
- B = Pump Flow Controlled by Variable Speed Drive

Digit 37 — Buffer Tank

- X = No Tank
- 1 = With Tank

Digit 38 — Short Circuit Rating

- A = Default A Short Circuit Rating

Digit 39 — Installation Accessories

- 1 = Elastomeric Isolators
- 4 = Neoprene Pads

Digit 40 — Water Strainer

- X = No Strainer
- A = With Water Strainer Factory-Installed

Digit 41 — Sound Attenuator Package

- 1 = Compact
- 3 = Super Quiet
- 4 = Super Quiet with Night Noise Setback
- 5 = Comprehensive Acoustic Package

Digit 42 — Appearance Options

- X = No Appearance Options
- A = Architectural Louvered Panels
- B = Half Louvers
- C = Access Guards
- D = Access Guards and Half Louvers

Digit 43

- X

Digit 44 — Label and Literature Language

- A = Bulgarian
- B = Spanish and English
- C = German
- D = English
- E = French
- H = Dutch SI (Hollandais)
- J = Italian
- L = Danish
- M = Swedish
- N = Norwegian
- P = Polish
- R = Russian
- T = Czech
- U = Greek
- V = Portuguese
- Y = Romanian
- Z = Serbian
- 1 = Slovak
- 2 = Croatian
- 3 = Hungarian

Digit 45

- X

Digit 46 — Shipping Package

- X = No Skid (Standard)
- A = Unit Containerization Package

Digit 47

- X

Digit 48

- X

Digit 49

- X

Digit 50 — Specials

- X = None
- S = Special

Notes:

1. If a digit is not defined it may be held for future use.

General Data

Table 1. CGAM - Standard Efficiency

Size		Compact		Super Quiet	
		110	120	110	120
Eurovent Performances (1)					
Net capacity	(kW)	306.2	338.4	301.1	332.6
Total power input	(kW)	111.2	115.4	112.0	116.6
EER	(kW/kW)	2.75	2.93	2.69	2.85
Main power supply		400/3/50	400/3/50	400/3/50	400/3/50
Sound power level	(dBA)	95	93	90	88
System Data					
Refrigerant circuit	#	2	2	2	2
Capacity steps	%	23-45-73-100	25-50-75-100	23-45-73-100	25-50-75-100
Units Amps (2)					
Nominal amps	(A)	298	326	298	326
Start-up amps - standard unit	(A)	504	517	508	522
Start-up amps - with soft starter option	(A)	387	400	391	405
Short circuit unit capacity	(kA)	15	15	15	15
Maximum supply cable size	(mm²)	240	240	240	240
Minimum supply cable size	(mm²)	150	150	150	150
Compressor					
Number	#	4	4	4	4
Type		Scroll		Scroll	
Model		SH300&SH380	SH380&SH380	SH300&SH380	SH380&SH380
Motor RPM	(rpm)	2900	2900	2900	2900
Power factor	#	0.86	0.88	0.86	0.88
Sump heater per circuit	(W)	160 & 160	160 & 160	160 & 160	160 & 160
Evaporator					
Quantity	#	1	1	1	1
Type		Brazed plate		Brazed plate	
Water volume/storage (total)	(L)	32.4	34.1	32.4	34.1
Antifreeze heater	(W)	400	500	400	500
Minimum flow	(L/Sec)	6.6	7.3	6.6	7.3
Maximum flow	(L/Sec)	19.7	21.8	19.7	21.8
Pump Package					
Number pump set	#	1	1	1	1
Motor RPM	(rpm)	2900	2900	2900	2900
Pump power (single / dual) - standard head	(kW)	7.5	7.5	7.5	7.5
Rated amps (single / dual) - standard head	(A)	13.8	13.8	13.8	13.8
Pump power (single / dual) - high head	(kW)	7.5	11	7.5	11
Rated amps (single / dual) - high head	(A)	13.8	19.6	13.8	19.6
Hydraulic Module Components					
Water strainer mesh size	(mm)	1.6	1.6	1.6	1.6
Expansion tank volume	(L)	60	60	60	60
User volume expansion capacity	(L)	1750	1750	1750	1750
Max. water-side pressure without pump	(kPa)	1000	1000	1000	1000
Max. water-side pressure with pump	(kPa)	500	500	500	500

Table 1. CGAM - Standard Efficiency (continued)

		Compact		Super Quiet	
Size		110	120	110	120
Antifreeze heater	(W)	180	180	180	180
Water tank volume	(L)	592	592	592	592
Water tank antifreeze heater	W	800	800	800	800
Condenser					
Type		Fin and Tube		Fin and Tube	
Quantity of coils	#	4	4	4	4
Fan					
Type		Propeller		Propeller	
Quantity per circuit	#	3	3	3	3
Diameter	(mm)	732	732	732	732
Drive type		Direct drive		Direct drive	
Airflow per fan	(m³/h)	18757	17770	15780	14719
Static pressure	(Pa)	0	0	0	0
Motor RPM	(rpm)	920	920	700	700
Unit Water Connection					
Chilled water	(DN)	100	100	100	100
Type (standard)		Grooved		Grooved	
Dimensions					
Unit length	(mm)	3647	3647	3647	3647
Unit width	(mm)	2273	2273	2273	2273
Unit height	(mm)	2344	2344	2344	2344
Weight					
Shipping weight (3)	(kg)	2454	2559	2454	2559
Operating weight (3)	(kg)	2498	2605	2498	2605
Additional weight (pump - standard head)	(kg)	374	374	374	374
Additional weight (pump - high head)	(kg)	376	457	376	457
Additional weight (pump + buffer tank)	(kg)	676	757	676	757
Refrigerant & Oil Charge					
Refrigerant charge	(kg)	29.9 / 29.9	38.1 / 38.1	29.9 / 29.9	38.1 / 38.1
Oil charge	(L)	13.9 / 13.9	14.4 / 14.4	13.9 / 13.9	14.4 / 14.4

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

(2) Amps for base unit without pump package, without freeze protection.

(3) Without pump package

General Data

Table 2. CGAM - High Efficiency - Compact

Size		80	90	Compact 100	110	120
Eurovent Performances(1)						
Net capacity	(kW)	233.7	263.4	292.2	321.5	343.6
Total power input	(kW)	75.9	84.3	94.7	102.4	111.9
EER	(kW/kW)	3.08	3.13	3.09	3.14	3.07
Main power supply		400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Sound power level	(dBA)	94	93	91	92	93
System Data						
Refrigerant circuit	#	2	2	2	2	2
Capacity steps	%	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100
Units Amps (2)						
Nominal amps	(A)	144	148	180	208	238
Start-up amps - standard unit	(A)	345	405	428	499	513
Start-up amps - with soft starter option	(A)	269	324	347	382	396
Short circuit unit capacity	(kA)	15	15	15	15	15
Maximum supply cable size	(mm ²)	150	240	240	240	240
Minimum supply cable size	(mm ²)	95	150	150	150	185
Compressor						
Number	#	4	4	4	4	4
Type		Scroll				
Model		SH240&SH240	SH240&SH300	SH300&SH300	SH300&SH380	SH380&SH380
Motor RPM	(rpm)	2900	2900	2900	2900	2900
Power factor	#	0.86	0.85	0.84	0.86	0.88
Sump heater per circuit	(W)	160 & 160	160 & 160	160 & 160	160 & 160	160 & 160
Evaporator						
Quantity	#	1	1	1	1	1
Type		Brazen plate				
Water volume/storage (total)	(L)	26.5	28.2	32.4	39.2	39.2
Antifreeze heater	(W)	400	400	400	400	500
Minimum flow	(L/Sec)	5.0	5.7	6.3	6.9	7.4
Maximum flow	(L/Sec)	15.1	17.0	18.8	20.7	22.2
Pump Package						
Number pump set	#	1	1	1	1	1
Motor RPM	(rpm)	2890	2890	2890	2900	2900
Pump power (single / dual) - standard head	(kW)	5.5	5.5	5.5	7.5	7.5
Rated amps (single / dual) - standard head	(A)	10.6	10.6	10.6	13.8	13.8
Pump power (single / dual) - high head	(kW)	7.5	7.5	7.5	7.5	11
Rated amps (single / dual) - high head	(A)	13.8	13.8	13.8	13.8	19.6
Pump Module Components						
Water strainer mesh size	(mm)	1.6	1.6	1.6	1.6	1.6
Expansion tank volume	(L)	60	60	60	60	60
User volume expansion capacity	(L)	1750	1750	1750	1750	1750
Max. water-side pressure without pump	(kPa)	1000	1000	1000	1000	1000

Table 2. CGAM - High Efficiency (continued)- Compact

		Compact				
Size		80	90	100	110	120
Max. water-side pressure with pump	(kPa)	500	500	500	500	500
Antifreeze heater	(W)	180	180	180	180	180
Water tank volume	(L)	592	592	762	762	762
Water tank antifreeze heater	W	800	800	1200	1200	1200
Condenser						
Type		Fin and tube				
Quantity of coils	#	4	4	4	4	4
Fan						
Type		Propeller				
Quantity per circuit	#	2	3	3	4	4
Diameter	(mm)	757	757	757	757	757
Drive type		Direct drive				
Airflow per fan	(m³/h)	14109	13162	13630	12796	12799
Static pressure	(Pa)	0	0	0	0	0
Motor RPM	(rpm)	920	920	920	920	920
Unit Water Connection						
Chilled water	(DN)	100	100	100	100	100
Type (standard)		Grooved				
Dimensions						
Unit length	(mm)	3647	3647	4230	4230	4230
Unit width	(mm)	2273	2273	2273	2273	2273
Unit height	(mm)	2344	2344	2344	2344	2344
Weight						
Shipping weight (3)	(kg)	2298	2444	2766	2834	2859
Operating weight (3)	(kg)	2337	2483	2812	2888	2912
Additional weight (pump - standard head)	(kg)	294	294	377	377	377
Additional weight (pump - high head)	(kg)	376	376	379	379	460
Additional weight (pump + buffer tank)	(kg)	676	676	719	719	800
Refrigerant & Oil Charge						
Refrigerant charge	(kg)	35.4 / 35.4	37.2 / 37.2	41.7 / 41.7	43.5 / 43.5	43.5 / 43.5
Oil charge	(L)	13.4 / 13.4	13.4 / 13.4	13.4 / 13.4	13.9 / 13.9	14.4 / 14.4

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

(2) Amps for base unit without pump package, without freeze protection.

(3) Without pump package

General Data

Table 3. CGAM - High Efficiency - Super Quiet

		Super Quiet				
Size		80	90	100	110	120
Eurovent Performances(1)						
Net capacity	(kW)	234.7	263.7	292.8	321.4	343.5
Total power input	(kW)	75.2	84.0	94.2	102.2	111.7
EER	(kW/kW)	3.12	3.14	3.11	3.14	3.07
Main power supply		400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Sound power level	(dBA)	88	87	85	87	87
System Data						
Refrigerant circuit	#	2	2	2	2	2
Capacity steps	%	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100
Units Amps (2)						
Nominal amps	(A)	144	148	180	208	238
Start-up amps - standard unit	(A)	345	405	428	499	513
Start-up amps - with soft starter option	(A)	269	324	347	382	396
Short circuit unit capacity	(kA)	15	15	15	15	15
Max supply cable size	(mm²)	150	240	240	240	240
Min supply cable size	(mm²)	95	150	150	150	185
Compressor						
Number	#	4	4	4	4	4
Type		Scroll				
Model		SH240&SH240	SH240&SH300	SH300&SH300	SH300&SH380	SH380&SH380
Motor RPM	(rpm)	2900	2900	2900	2900	2900
Power factor	#	0.86	0.85	0.84	0.86	0.88
Sump heater per circuit	(W)	160 & 160	160 & 160	160 & 160	160 & 160	160 & 160
Evaporator						
Quantity	#	1	1	1	1	1
Type		Brazed plate				
Water volume/storage (total)	(L)	26.5	28.2	32.4	39.2	39.2
Antifreeze heater	(W)	400	400	400	500	500
Minimum flow	(L/Sec)	5.0	5.7	6.3	6.9	7.4
Maximum flow	(L/Sec)	15.1	17.0	18.9	20.7	22.2
Pump Package						
Number pump set	#	1	1	1	1	1
Motor RPM	(rpm)	2890	2890	2890	2900	2900
Pump power (single / dual) - standard head	(kW)	5.5	5.5	5.5	7.5	7.5
Rated amps (single / dual) - standard head	(A)	10.6	10.6	10.6	13.8	13.8
Pump power (single / dual) - high head	(kW)	7.5	7.5	7.5	7.5	11
Rated amps (single / dual) - high head	(A)	13.8	13.8	13.8	13.8	19.6
Hydraulic Module Components						
Water strainer mesh size	(mm)	1.6	1.6	1.6	1.6	1.6
Expansion tank volume	(L)	60	60	60	60	60
User volume expansion capacity	(L)	1750	1750	1750	1750	1750
Max. water-side pressure without pump	(kPa)	1000	1000	1000	1000	1000

Table 3. CGAM - High Efficiency (continued)- Super Quiet

		Super Quiet				
Size		80	90	100	110	120
Max. water-side pressure with pump	(kPa)	500	500	500	500	500
Antifreeze heater	(W)	180	180	180	180	180
Water tank volume	(L)	592	592	762	762	762
Water tank antifreeze heater	W	800	800	1200	1200	1200
Condenser						
Type		Fin and tube				
Quantity of coils	#	4	4	4	4	4
Fan						
Type		Propeller				
Quantity per circuit	#	2	3	3	4	4
Diameter	(mm)	732	732	732	732	732
Drive type		Direct drive				
Airflow per fan	(m³/h)	14678	13302	13992	12751	12753
Static pressure	(Pa)	0	0	0	0	0
Motor RPM	(rpm)	700	700	700	700	700
Unit Water Connection						
Chilled water	(DN)	100	100	100	100	100
Type (standard)		Grooved				
Dimensions						
Unit length	(mm)	3647	3647	4230	4230	4230
Unit width	(mm)	2273	2273	2273	2273	2273
Unit height	(mm)	2344	2344	2344	2344	2344
Weight						
Shipping weight(3)	(kg)	2360	2452	2776	2842	2867
Operating weight(3)	(kg)	2398	2492	2823	2895	2920
Additional weight (standard head pump)	(kg)	294	294	377	377	377
Additional weight (high head pump)	(kg)	376	376	379	379	460
Additional weight (buffer tank + pump)	(kg)	676	676	719	719	800
Refrigerant & Oil Charge						
Refrigerant charge	(kg)	35.4 / 35.4	37.2 / 37.2	41.7 / 41.7	43.5 / 43.5	43.5 / 43.5
Oil charge	(L)	13.4 / 13.4	13.4 / 13.4	13.4 / 13.4	13.9 / 13.9	14.4 / 14.4

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

(2) Amps for base unit without pump package, without freeze protection.

(3) Without pump package

General Data

Table 4. CXAM - Standard Efficiency

		Compact			Super Quiet		
Size		100	110	120	100	110	120
Eurovent Performances(1)							
Net cooling capacity	(kW)	287.6	307.1	332.0	283.5	300.9	324.1
Total power input in cooling	(kW)	98.6	106.5	116.1	97.6	106.9	117.3
EER	(kW/kW)	2.92	2.88	2.86	2.91	2.81	2.76
Net heating capacity	(kW)	303.1	321.2	340.9	299.2	316.1	335.1
Total power input in heating	(kW)	98.6	106.5	116.1	97.6	106.9	117.3
Heating COP	(COP)	3.07	3.02	2.94	3.07	2.96	2.86
Main power supply		400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Sound power level	(dBA)	93	94	95	87	88	89
System Data							
Refrigerant circuit	#	2	2	2	2	2	2
Capacity steps	%	25-50-75-100	23-45-73-100	25-50-75-100	25-50-75-100	23-45-73-100	25-50-75-100
Units Amps (2)							
Nominal amps	(A)	273	301	329	272	300	328
Start-up amps - standard Unit	(A)	443	510	523	450	517	530
Start-up amps - with soft starter option	(A)	362	393	406	369	400	413
Short circuit unit capacity	(kA)	15	15	15	15	15	15
Maximum supply cable size	(mm²)	240	240	240	240	240	240
Minimum supply cable size	(mm²)	150	150	150	150	150	150
Compressor							
Number	#	4	4	4	4	4	4
Type		Scroll			Scroll		
Model		SH300 SH300	SH300 SH380	SH380 SH380	SH300 SH300	SH300 SH380	SH380 SH380
Motor RPM	(rpm)	2900	2900	2900	2900	2900	2900
Power factor	#	0.84	0.86	0.88	0.84	0.86	0.88
Sump heater per circuit	(W)	160 & 160	160 & 160	160 & 160	160 & 160	160 & 160	160 & 160
Evaporator							
Quantity	#	1	1	1	1	1	1
Type		Brazen plate			Brazen plate		
Water volume/storage (total)	(L)	32.4	32.4	39.2	32.4	32.4	39.2
Antifreeze heater	(W)	400	400	500	400	400	500
Minimum flow	(L/Sec)	6.2	6.6	7.1	6.1	6.5	7.0
Maximum flow	(L/Sec)	18.5	19.8	21.4	18.3	19.4	20.9
Pump Package							
Nb pump set	#	1	1	1	1	1	1
Motor RPM	(rpm)	2890	2900	2900	2890	2900	2900
Pump power (single / dual) - standard head	(kW)	5.5	7.5	7.5	5.5	7.5	7.5
Rated amps (single / dual) - standard head	(A)	10.6	13.8	13.8	10.6	13.8	13.8
Pump power (single / dual) - high head	(kW)	7.5	7.5	11	7.5	7.5	11
Rated amps (single / dual) - high head	(A)	13.8	13.8	19.6	13.8	13.8	19.6

Table 4. CXAM - Standard Efficiency (continued)

		Compact			Super Quiet		
Size		100	110	120	100	110	120
Hydraulic Module Components							
Water strainer mesh size	(mm)	1.6	1.6	1.6	1.6	1.6	1.6
Expansion tank volume	(L)	60	60	60	60	60	60
User volume expansion capacity	(L)	1750	1750	1750	1750	1750	1750
Maximum water-side pressure without pump	(kPa)	1000	1000	1000	1000	1000	1000
Maximum water-side pressure with pump	(kPa)	500	500	500	500	500	500
Antifreeze heater	(W)	180	180	180	180	180	180
Water tank volume	(L)	762	762	762	762	762	762
Water tank antifreeze heater	W	1200	1200	1200	1200	1200	1200
Condenser							
Type		Fin and Tube			Fin and Tube		
Quantity of coils	#	4	4	4	4	4	4
Fan							
Type		Propeller			Propeller		
Quantity per circuit	#	4	4	4	4	4	4
Diameter	(mm)	732	732	732	762	762	762
Drive type		Direct			Direct		
Airflow per fan	(m³/h)	16869	17594	17596	14239	14244	14251
Static pressure	(Pa)	0	0	0	0	0	0
Motor RPM	(rpm)	920	920	920	700	700	700
Unit Water Connection							
Chilled water	(DN)	100	100	100	100	100	100
Type (standard)		Grooved			Grooved		
Dimensions							
Unit length	(mm)	4230	4230	4230	4230	4230	4230
Unit width	(mm)	2273	2273	2273	2273	2273	2273
Unit height	(mm)	2344	2344	2344	2344	2344	2344
Weight							
Shipping weight (3)	(kg)	2973	2983	3012	2973	2983	3012
Operating weight (3)	(kg)	2992	3002	3035	2992	3002	3035
Additional weight (pump - standard head)	(kg)	261	261	261	261	261	261
Additional weight (pump - high head)	(kg)	263	263	344	263	263	344
Additional weight (pump + buffer tank)	(kg)	587	587	668	587	587	668
Refrigerant & Oil Charge							
Refrigerant charge	(kg)	39.6 / 39.6	42.3 / 42.3	45.7 / 45.7	39.6 / 39.6	42.3 / 42.3	45.7 / 45.7
Oil charge	(L)	13.4 / 13.4	13.9 / 13.9	14.4 / 14.4	13.4 / 13.4	13.9 / 13.9	14.4 / 14.4

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

(2) Amps for base unit without pump package, without freeze protection.

(3) Without pump package

General Data

Table 5. CXAM - High Efficiency - Compact

		Compact				
Size		80	90	100	110	120
Eurovent Performances(1)						
Net cooling capacity	(kW)	233.1	262.4	298.0	313.0	338.7
Total power input in cooling	(kW)	72.8	84.4	96.3	10.4	115.7
EER	(kW/kW)	3.2	3.11	3.09	2.97	2.93
Net heating capacity	(kW)	243.9	277.4	315.8	334.8	357.5
Total power input in heating	(kW)	72.8	84.4	96.3	105.4	115.7
Heating COP	(COP)	3.35	3.28	3.28	3.18	3.09
Main power supply		400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Sound power level	(dBA)	94	93	92	92	93
System Data						
Refrigerant circuit	#	2	2	2	2	2
Capacity steps	%	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100
Units Amps (2)						
Nominal amps	(A)	212	240	270	298	326
Start-up amps - standard Unit	(A)	353	409	437	503	517
Start-up amps - with soft starter option	(A)	277	328	356	386	400
Short circuit unit capacity	(kA)	15	15	15	15	15
Maximum supply cable size	(mm²)	150	240	240	240	240
Minimum supply cable size	(mm²)	95	150	150	150	185
Compressor						
Number	#	4	4	4	4	4
Type		Scroll				
Model		SH240&SH240	SH240&SH300	SH300&SH300	SH300&SH380	SH380&SH380
Motor RPM	(rpm)	2900	2900	2900	2900	2900
Power factor	#	0.86	0.85	0.84	0.86	0.88
Sump heater per circuit	(W)	160 & 160	160 & 160	160 & 160	160 & 160	160 & 160
Evaporator						
Quantity	#	1	1	1	1	1
Type		Brazed plate				
Water volume/storage (total)	(L)	24.0	39.2	39.2	32.4	39.2
Antifreeze heater	(W)	400	500	500	400	500
Minimum flow	(L/Sec)	5.0	5.6	6.4	6.7	7.3
Maximum flow	(L/Sec)	15.0	16.9	19.2	20.2	21.8
Pump Package						
Nb pump set	#	1	1	1	1	1
Motor RPM	(rpm)	2890	2890	2890	2900	2900
Pump power (single / dual) - standard head	(kW)	5.5	5.5	5.5	7.5	7.5
Rated amps (single / dual) - standard head	(A)	10.6	10.6	10.6	13.8	13.8
Pump power (single / dual) - high head	(kW)	7.5	7.5	7.5	7.5	11
Rated amps (single / dual) - high head	(A)	13.8	13.8	13.8	13.8	19.6
Hydraulic Module Components						
Water strainer mesh size	(mm)	1.6	1.6	1.6	1.6	1.6

Table 5. CXAM - High Efficiency (continued)- Compact

		Compact				
Size		80	90	100	110	120
Expansion tank volume	(L)	60	60	60	60	60
User volume expansion capacity	(L)	1750	1750	1750	1750	1750
Maximum water-side pressure without pump	(kPa)	1000	1000	1000	1000	1000
Maximum water-side pressure with pump	(kPa)	500	500	500	500	500
Antifreeze heater	(W)	180	180	300	300	300
Water tank volume	(L)	762	762	762	762	762
Water tank antifreeze heater	W	1200	1200	1200	1200	1200
Condenser						
Type		Fin and Tube				
Quantity of coils	#	4	4	4	4	4
Fan						
Type		Propeller				
Quantity per circuit	#	4	4	5	5	5
Diameter	(mm)	757	757	757	757	757
Drive type		Direct				
Airflow per fan	(m³/h)	13012	13015	13013	13014	13016
Static pressure	(Pa)	0	0	0	0	0
Motor RPM	(rpm)	920	920	920	920	920
Unit Water Connection						
Chilled water	(DN)	100	100	100	100	100
Type (standard)		Grooved				
Dimensions						
Unit length	(mm)	4230	4230	5145	5145	5145
Unit width	(mm)	2273	2273	2273	2273	2273
Unit height	(mm)	2344	2344	2344	2344	2344
Weight						
Shipping weight (3)	(kg)	2741	2888	3336	3327	3356
Operating weight (3)	(kg)	2756	2911	3359	3346	3379
Additional weight (pump - standard head)	(kg)	181	181	261	261	261
Additional weight (pump - high head)	(kg)	263	263	263	263	344
Additional weight (pump + buffer tank)	(kg)	587	587	587	587	668
Refrigerant & Oil Charge						
Refrigerant charge	(kg)	32.1 / 32.1	36.1 / 36.1	41 / 41	43.1 / 43.1	46.6 / 46.6
Oil charge	(L)	13.4 / 13.4	13.4 / 13.4	13.4 / 13.4	13.9 / 13.9	14.4 / 14.4

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

(2) Amps for base unit without pump package, without freeze protection.

(3) Without pump package

General Data

Table 6. CXAM - High Efficiency - Super Quiet

		Super Quiet				
Size		80	90	100	110	120
Eurovent Performances(1)						
Net cooling capacity	(kW)	233.3	262.5	298.1	313.1	339.0
Total power input in cooling	(kW)	72.4	84.0	95.8	104.8	115.2
EER	(kW/kW)	3.22	3.12	3.11	2.99	2.94
Net heating capacity	(kW)	241.9	275.6	307.9	327.0	349.2
Total power input in heating	(kW)	72.4	84.0	95.8	104.8	115.2
Heating COP	(COP)	3.34	3.28	3.21	3.12	3.03
Main power supply		400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Sound power level	(dBA)	88	87	86	87	88
System Data						
Refrigerant circuit	#	2	2	2	2	2
Capacity steps	%	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100
Units Amps (2)						
Nominal amps	(A)	212	240	270	298	326
Start-up amps - standard Unit	(A)	353	409	437	503	517
Start-up amps - with soft starter option	(A)	277	328	356	386	400
Short circuit unit capacity	(kA)	15	15	15	15	15
Maximum supply cable size	(mm²)	150	240	240	240	240
Minimum supply cable size	(mm²)	95	150	150	150	185
Compressor						
Number	#	4	4	4	4	4
Type		Scroll				
Model		SH240&SH240	SH240&SH300	SH300&SH300	SH300&SH380	SH380&SH380
Motor RPM	(rpm)	2900	2900	2900	2900	2900
Power factor	#	0.86	0.85	0.84	0.86	0.88
Sump heater per circuit	(W)	160 & 160	160 & 160	160 & 160	160 & 160	160 & 160
Evaporator						
Quantity	#	1	1	1	1	1
Type		Brazen plate				
Water volume/storage (total)	(L)	24.0	39.2	39.2	32.4	39.2
Antifreeze heater	(W)	400	500	500	400	500
Minimum flow	(L/Sec)	5.0	5.6	6.4	6.7	7.3
Maximum flow	(L/Sec)	15.0	16.9	19.2	20.2	21.9
Pump Package						
Nb pump set	#	1	1	1	1	1
Motor RPM	(rpm)	2890	2890	2890	2900	2900
Pump power (single / dual) - standard head	(kW)	5.5	5.5	5.5	7.5	7.5
Rated amps (single / dual) - standard head	(A)	10.6	10.6	10.6	13.8	13.8
Pump power (single / dual) - high head	(kW)	7.5	7.5	7.5	7.5	11
Rated amps (single / dual) - high head	(A)	13.8	13.8	13.8	13.8	19.6
Hydraulic Module Components						
Water strainer mesh size	(mm)	1.6	1.6	1.6	1.6	1.6

Table 6. CXAM - High Efficiency (continued)- Super Quiet

		Super Quiet				
Size		80	90	100	110	120
Expansion tank volume	(L)	60	60	60	60	60
User volume expansion capacity	(L)	1750	1750	1750	1750	1750
Maximum water-side pressure without pump	(kPa)	1000	1000	1000	1000	1000
Maximum water-side pressure with pump	(kPa)	500	500	500	500	500
Antifreeze heater	(W)	180	180	300	300	300
Water tank volume	(L)	762	762	762	762	762
Water tank antifreeze heater	W	1200	1200	1200	1200	1200
Condenser						
Type		Fin and Tube				
Quantity of coils	#	4	4	4	4	4
Fan						
Type		Propeller				
Quantity per circuit	#	4	4	5	5	5
Diameter	(mm)	732	732	732	732	732
Drive type		Direct				
Airflow per fan	(m³/h)	13162	13165	13163	13164	13166
Static pressure	(Pa)	0	0	0	0	0
Motor RPM	(rpm)	700	700	700	700	700
Unit Water Connection						
Chilled water	(DN)	100	100	100	100	100
Type (standard)		Grooved				
Dimensions						
Unit length	(mm)	4230	4230	5145	5145	5145
Unit width	(mm)	2273	2273	2273	2273	2273
Unit height	(mm)	2344	2344	2344	2344	2344
Weight						
Shipping weight (3)	(kg)	2741	2888	3336	3327	3356
Operating weight (3)	(kg)	2756	2911	3359	3346	3379
Additional weight (pump - standard head)	(kg)	181	181	261	261	261
Additional weight (pump - high head)	(kg)	263	263	263	263	344
Additional weight (pump + buffer tank)	(kg)	587	587	587	587	668
Refrigerant & Oil Charge						
Refrigerant charge	(kg)	32.1 / 32.1	36.1 / 36.1	41 / 41	43.1 / 43.1	46.6 / 46.6
Oil charge	(L)	13.4 / 13.4	13.4 / 13.4	13.4 / 13.4	13.9 / 13.9	14.4 / 14.4

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

(2) Amps for base unit without pump package, without freeze protection.

(3) Without pump package

Controls

LCD Touch-Screen Display with Multi-Language Support

The standard DynaView display provided with the Trane CH530 control panel features an LCD touch-screen 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, pressure, and diagnostics. It uses full text display available in 18 languages.

Display Features Include:

- LCD touch-screen with LED backlighting, for scrolling access to input and output operating information
- Single-screen, folder/tab-style display of all available information on individual components (evaporator, condenser, compressor, etc.)
- Password entry/lockout system to enable or disable display
- Automatic and immediate stop capabilities for standard or immediate manual shutdown
- Fast, easy access to available chiller data in tabbed format, including:
 - Modes of operation, including normal cooling and heating as well as ice making
 - Water temperatures and setpoints
 - Loading and limiting status and setpoints
 - Outdoor air temperature
 - Start/stop differential timers
 - Pump status and override
 - Chilled and hot water reset settings
- Optional external setpoints, including:
 - Chilled and hot water
 - Demand limit
 - Ice building

Reports, listed on a single tabbed screen for easy access, including:

- ASHRAE, containing all guideline 3 report information
- Evaporator
- Condenser
- Compressor

Evaporator, condenser, and compressor reports containing all operational information on individual components, including:

- Water temperatures
- Refrigerant pressures, temperatures, and approach
- Flow switch status
- EXV position
- Compressor starts and run-time

Alarm and diagnostic information, including:

- Flashing alarms with touch-screen button for immediate address of alarm condition
- Scrollable list of last ten active diagnostics
- Specific information on applicable diagnostic from list of over one-hundred
- Automatic or manual resetting diagnostic types

Adaptive Controls

Adaptive Controls directly sense the control variables that govern the operation of the chiller: evaporator pressure and condenser pressure. When any one of these variables approaches a limit condition when damage may occur to the unit or shutdown on a safety, Adaptive Controls takes corrective action to avoid shutdown and keep the chiller operating. This happens through combined actions of compressor and/or fan staging. Whenever possible, the chiller is allowed to continue making chilled or hot water. This keeps cooling capacity available until the problem can be solved. Overall, the safety controls help keep the building or process running and out of trouble.

Stand-Alone Controls

Single chillers installed in applications without a building management system is simple to install and control: 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

- Auto/Stop - A job-site provided contact closure turns the unit on and off.
- External Interlock - A job-site provided contact opening wired to this input turns 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.

Hardwire Points

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

Remote devices are wired from the control panel to provide auxiliary control to a building automation system. Inputs and outputs can be communicated via a typical 4–20 mA electrical signal, an equivalent 2–10 Vdc signal, or by utilizing contact closures.

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

- Ice making control
- External chilled or hot water setpoint
- External demand limit setpoint
- Chilled water temperature reset
- Programmable relays - available outputs are: alarm-latching, alarm-auto reset, general alarm, warning, chiller limit mode, compressor running, and Tracer control

LonTalk LCI-C Interface with Modbus Interface

LonTalk (LCI-C) with ModBus communications capabilities are available, with communication link via single twisted-pair wiring to factory-installed, tested communication board.

Required features:

- LonTalk LC I-C Interface w/ Modbus Interface
- Protocol Interface Controller

Modbus is a messaging structure developed by the Modicon to transfer and register data between control devices. Modbus is a membership-based trade association that seeks to drive the adoption of the Modbus communication protocol as the messaging structure that devices support. Modbus is a system level communications protocol.

BACnet Interface

BACnet interface capabilities are available, with communication link via single twisted-pair wiring to a factory-installed and tested communication board.

Required features:

- BACnet Interface (selectable option with chiller)

BACnet is a data communication protocol for building automation and control networks developed by American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

LonTalk LCI-C Interface

LonTalk (LCI-C) communications capabilities are available, with communication link via single twisted-pair wiring to factory-installed, tested communication board.

Required features:

- LonTalk/Tracer Summit Interface (selectable option with chiller)

LonTalk is a communications protocol developed by the Echelon Corporation. The LonMark association develops control profiles using the LonTalk communication protocol. LonTalk is a unit level communications protocol.

LonTalk Communications Interface for Chillers (LCI-C) provides a generic automation system with the LonMark chiller profile inputs/outputs. In addition to the standard points, Trane provides other commonly used network output variables for greater interoperability with any automation system. The complete reference list of Trane LonTalk points is available on the LonMark web site.

Trane controls or another vendor's system can use the predefined list of points with ease to give the operator a complete picture of how the system is running

Tracer Summit

The chiller plant control capabilities of the Trane Tracer Summit building automation system are unequalled in the industry. Trane's depth of experience in chillers and controls makes us a well-qualified choice for automation of chiller plants using air-cooled AquaStream3G chillers. Our chiller plant automation software is fully pre-engineered and tested.

Required features:

- LonTalk/Tracer Summit Interface (selectable option with chiller)
- Building Control Unit (external device required)

Energy Efficiency

- Sequences starting of chillers to optimize the overall chiller plant energy efficiency
 - Individual chillers operate as base, peak, or swing based on capacity and efficiency
 - Automatically rotates individual chiller operation to equalize runtime and wear between chillers.
 - Evaluates and selects the lowest energy consumption alternative from an overall system perspective.

Easy Operation and Maintenance

- Remote monitoring and control
- Displays both current operation conditions and scheduled automated control actions
- Concise reports assist in planning for preventative maintenance and verifying performance
- Alarm notification and diagnostic messages aid in quick and accurate troubleshooting

When integrated with a Tracer Summit building management system the total building operation can be optimized. With this system option, the full breadth of Trane's HVAC and controls experience are applied to offer solutions to many facility issues. If your project calls for an interface to other systems, Tracer Summit can share data via BACnet an open systems protocol.

Time of Day Scheduling

Time of day scheduling allows the customer to perform simple chiller scheduling without the need for a building automation system.

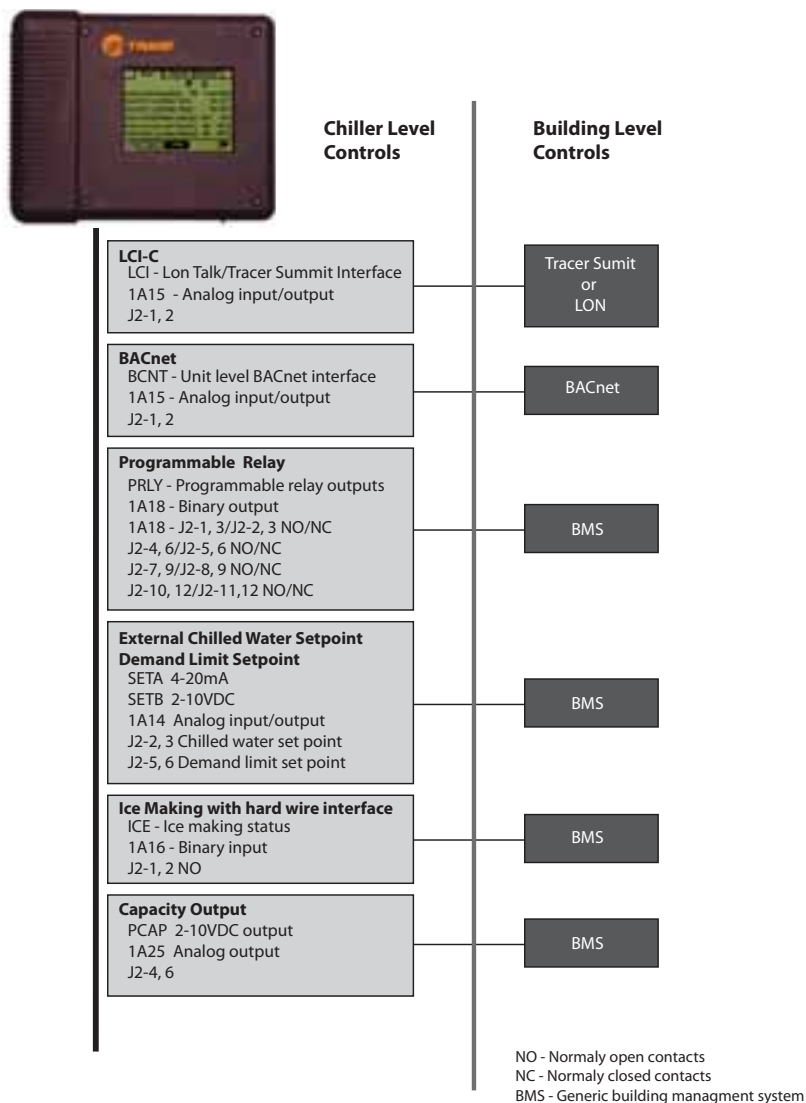
This feature allows the user to set ten events in a seven day time period. For each event the user can specify an activation time and the days of the week the event is active. Any available setpoints can be specified for each event, such as the leaving chilled water temperature (standard) and the demand limit setpoint (optional if ordered).

Required features:

- Time of day scheduling (selectable option with chiller)

Additional options that if ordered may be incorporated into the scheduling:

- External chilled or hot water setpoint
- External demand limit setpoint
- Ice-making initiation



Dimensions

Figure 4. Size 80, 90, 100, 110 and 120 Ton: Standard Unit

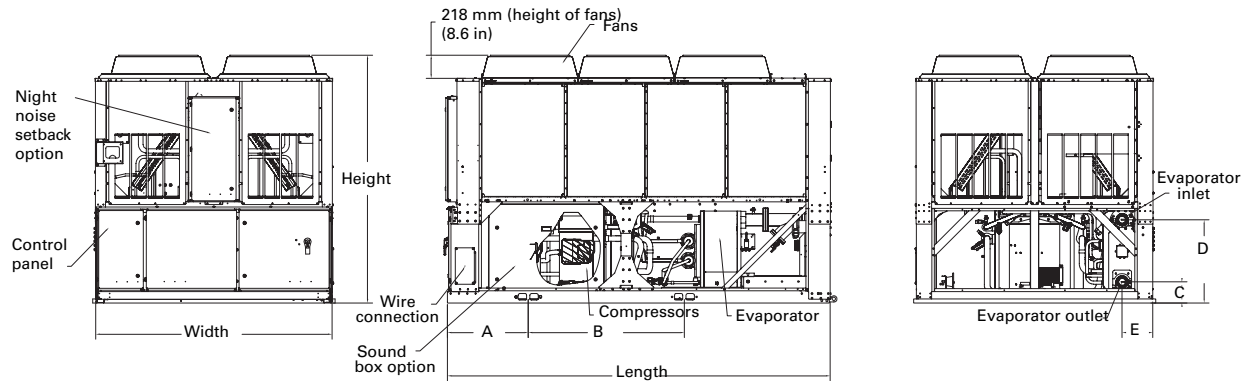


Figure 5. Size 80, 90, 100, 110 and 120 Ton: Units with Pump Package

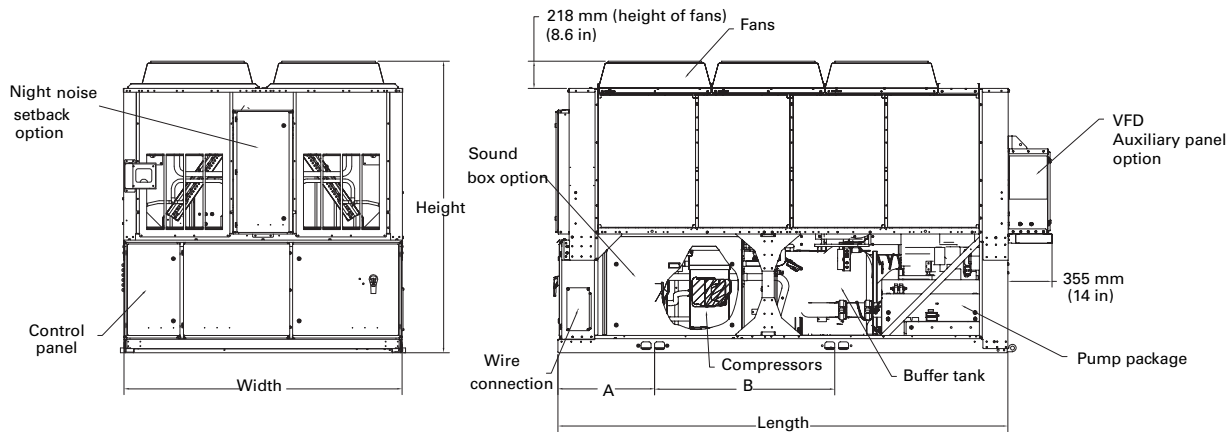
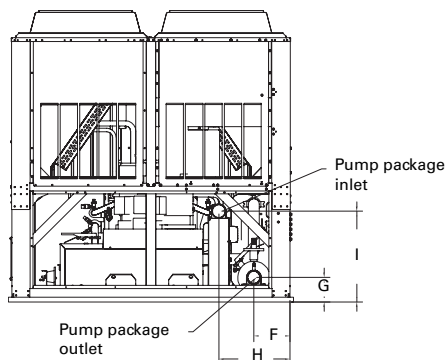


Figure 6. Pump Package Water Connections



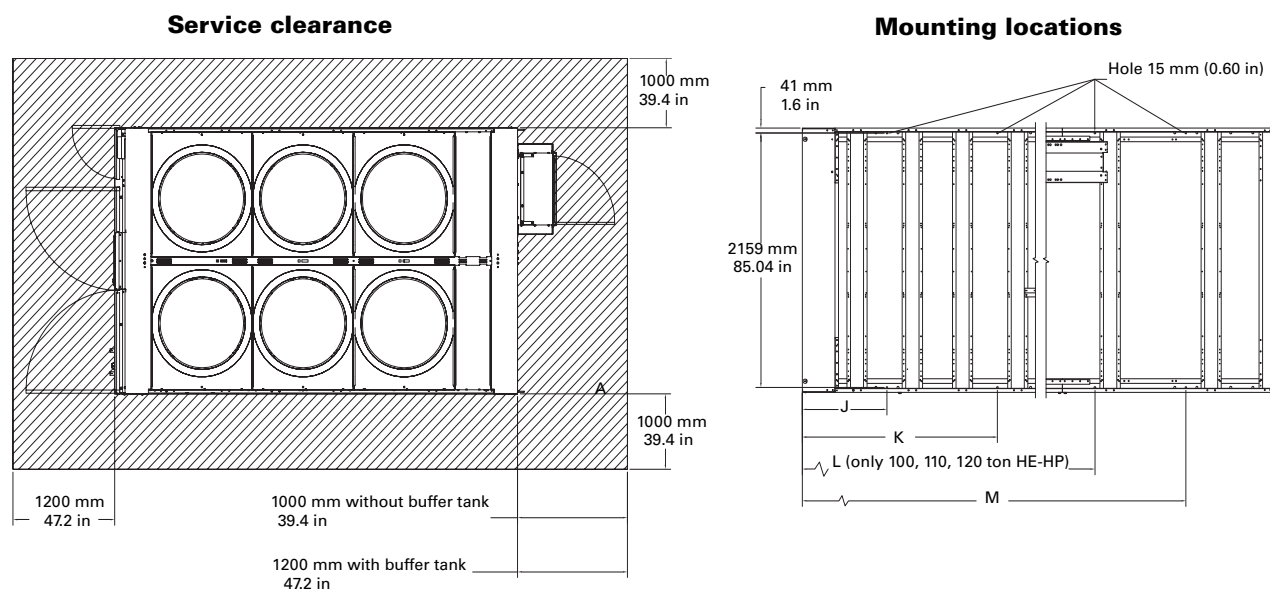


Table 7. Dimensions

	Unit	Size 80, 90 HE-CO 110, 120 SE-CO		Size 80, 90 HE-HP 100, 110, 120 HE-CO/SE-HP		Size 100, 110, 120 HE-HP	
		mm	Inch	mm	Inch	mm	Inch
Length	Length	3647	143.6	4230	166.5	5145	202.6
	Width	2273	89.5	2273	89.5	2273	89.5
	Height	2344	92.3	2344	92.3	2344	92.3
Lifting holes	A	767	30.2	767	30.2	767	30.2
	B	1647	64.8	2155	84.8	3023	119
	C	198	7.8	198	7.8	198	7.8
Evap water connections (standard unit)	D	790	31.1	790	31.1	790	31.1
	E	292	11.5	292	11.5	292	11.5
	F	292	11.5	292	11.5	292	11.5
Evap water connection (unit with pump package, buffer tank)	G	198	7.8	198	7.8	198	7.8
	H	574	22.6	574	22.6	574	22.6
	I	734	28.9	734	28.9	734	28.9
Isolators position	J	767	30.2	767	30.2	767	30.2
	K	2126	83.7	2267	89.2	1767	69.5
	L			n/a		3317	130.6
	M	3148	123.9	3731	146.9	4139	163

SE = Standard efficiency

HE = High efficiency

CO = Cooling only CGAM

HP = Heat pump CXAM

Dimensions

Table 8. Weights cooling only (CGAM)

Tons	Shipping weight		Operating weight	
	kilogram	pounds	kilograms	pounds
80 HE-CO	2197	4844	2213	4879
90 HE-CO	2359	5201	2377	5240
100 HE-CO	2642	5825	2661	5866
110 SE-CO	2350	5181	2370	5225
110 HE-CO	2751	6065	2774	6116
120 SE-CO	2470	5445	2490	5490
120 HE-CO	2751	6065	2774	6116

1. Weights include pump and buffer tank options.

Table 9. Weights heat pump (CXAM)

Tons	Shipping weight		Operating weight	
	kilogram	pounds	kilograms	pounds
80 HE-HP	2641	5822	2656	5855
90 HE-HP	2778	6124	2801	6175
100 SE-HP	2853	6290	2872	6332
100 HE-HP	3216	7090	3239	7141
110 SE-HP	2853	6290	2872	6332
110 HE-HP	3197	7048	3216	7090
120 SE-HP	2872	6332	2895	6382
120 HE-HP	3216	7090	3239	7141

1. Weights include pump and buffer tank options.

Mechanical Specifications

General

Units are constructed of galvanized steel frame with galvanized steel panels. Component surfaces are finished with a powder-coated paint. Each unit ships with full operating charges of refrigerant and oil.

Compressor and Motor

The unit is equipped with two or more hermetic, direct-drive, 3000 rpm 50 Hz suction gas-cooled scroll compressors. The simple design has only three major moving parts and a completely enclosed compression chamber which leads to increased efficiency. Overload protection is internal to the compressors. The compressor includes: centrifugal oil pump, oil level sight glass and oil charging valve. Each compressor will have compressor heaters installed and properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles.

Unit-Mounted Starter

The control panel is designed per IP-54. The starter is available in a solid-state soft starter or across-the-line configuration, factory-mounted and fully pre-wired to the compressor motor and control panel. A factory-installed, factory-wired 800 VA control power transformer provides all unit control power (110 Vac secondary) and Trane CH530 module power (24 Vac secondary). Power line connection type is standard with a fused disconnect switch.

Evaporator (CXAM condenser in heating mode)

Braze plate heat exchanger is made of stainless steel with copper as the braze material. It is designed to withstand a refrigerant side working pressure of 45bars and a waterside working pressure of 10bars. Evaporator is tested at 1.1 times maximum allowable refrigerant side working pressure and 1.5 times maximum allowable water side working pressure. It has one water pass. Blanket heaters protect the evaporator to an ambient of -18°C.

The evaporator is covered with factory-installed 19.05 mm Armaflex II or equal ($k=0.28$) insulation. Foam insulation is used on the suction line. Water pipe extensions with insulation go from the evaporator to the edge of the unit.

All evaporators are tested and stamped in accordance with PED.

Mechanical Specifications

Condenser (CXAM evaporator in heating mode)

Air-cooled coils have aluminum fins mechanically bonded to internally-finned copper tubing. The condenser coil has an integral subcooling circuit. The maximum allowable working pressure of the condenser is 45 bars. Condensers are factory proof and leak tested at 50 bars.

Direct-drive vertical discharge condenser fans are balanced. Three-phase condenser fan motors with permanently lubricated ball bearings and external thermal overload protection are provided.

Cooling only units (CGAM) start and operate from 0°C to 46°C.

Reversible units (CXAM) cooling mode are able to start and operate from 0°C to 46°C.

Reversible units (CXAM) heating mode are able to start and operate from -10°C to 20°C.

Refrigerant Circuit and Capacity Modulation

The W shaped coils have dual refrigerant circuits. Each refrigerant circuit has scroll compressors piped in parallel with a passive oil management system. A passive oil management system maintains proper oil levels within compressors and has no moving parts. Each refrigerant circuit includes filter drier and electronic expansion valve.

Capacity modulation is achieved by turning compressors on and off. The W shaped coils have four capacity stages.

Unit Controls (Trane CH530)

The microprocessor-based control panel is factory-installed and factory-tested. The control system is powered by a pre-wired control power transformer, and will turn on and off compressors to meet the load. Microprocessor-based chilled water reset based on return water is standard.

The Trane CH530 microprocessor automatically acts to prevent unit shutdown due to abnormal operating conditions associated with low evaporator refrigerant temperature and high condensing temperature. If an abnormal operating condition continues and the protective limit is reached, the machine will shut down.

The panel includes machine protection for the following conditions:

- Low evaporator refrigerant temperature and pressure
- High condenser refrigerant pressure
- Critical sensor or detection circuit faults
- High compressor discharge temperature (with low temp evaporator)
- Lost communication between modules
- Electrical distribution fault: phase reversal
- External and local emergency stop
- Loss of evaporator water flow

When a fault is detected, the control system conducts more than 100 diagnostic checks and displays results. The display will identify the fault, indicate date, time, and operating mode at time of occurrence, and provide type of reset required and a help message.

Clear Language Display Panel

Factory-mounted to the control panel door, the operator interface has an LCD touch-screen display for operator input and information output. This interface provides access to the following information: evaporator report, condenser report, compressor report, operator settings, service settings, service tests, and diagnostics. All diagnostics and messages are displayed in "clear language."

Data contained in available reports includes:

- Water and air temperatures
- Refrigerant pressures and temperatures
- Flow switch status
- EXV position
- Compressor starts and run-time

All necessary settings and setpoints are programmed into the microprocessor-based controller via the operator interface. The controller is capable of receiving signals simultaneously from a variety of control sources, in any combination, and priority order of control sources can be programmed. The control source with priority determines active setpoints via the signal it sends to the control panel. Control sources may be:

- Local operator interface (standard)
- Hard-wired 4-20 mA or 2-10 Vdc signal from an external source (interface optional; control source not supplied)
- Time of day scheduling (optional capability available from local operator interface)
- LonTalk LCI-C (interface optional; control source not supplied)
- BACNet (interface optional; control source not supplied)
- ModBus (interface optional; control source not supplied)
- Trane Tracer Summit system (interface optional; control source not supplied)

Quality Assurance

The quality management system applied by Trane has been subject to independent third-party assessment and approval to ISO 9001. The products described in this catalog are designed, manufactured and tested in accordance with the approved system requirements described in the Trane Quality Manual.

Options

Application Options

High Ambient (CGAM)

Allows for ambient temperatures between 7°C and 52°C. Applies to HE version only.

Low Ambient (CGAM)

A variable speed drive on the first fan of each circuit allows for ambient temperatures between -18°C and 46°C. Applies to SE version only.

Wide Ambient (CGAM)

A variable speed drive on the first fan of each circuit allows for ambient temperatures between -18°C and 52°C. Applied to HE version only.

Low Ambient (CXAM cooling mode)

A variable speed drive on the first fan of each circuit allows for ambient temperatures between -10°C and 46°C.

Ice-Making with Hardwired Interface

Unit controls are factory set to handle ice-making for thermal storage application. This option allows for full load operation of the chiller with leaving evaporator water temperature between -7°C and 18°C.

Low-Temperature Processing

An additional temperature sensor, at the compressor discharge, enables leaving evaporator water temperature below 5.5°C.

Sound Options

Compact

This option includes 920 rpm fans.

Super Quiet Unit

This option includes low speed 700 rpm fans and compressor sound jackets.

Super Quiet with Night Noise Setback

This option will provide two speed fan motors. At night, on a contact closure all the fans run at low speed bringing the overall sound level further down.

Comprehensive Acoustic Package

This option includes low speed 700 rpm fans and acoustical treatment for compressor.

Pump Options

Standard and High Head Pump Package

Pump package includes: one or standard or high head pumps, expansion vessels, drainage valves, shut-off valves at entering and leaving connections, and service valves to isolate each pump for repair/replacement.

The pump package is single point power integrated into the chiller unit power. The control of the pump is integrated into the chiller controller. The CH530 displays evaporator pump starts and run-times. Freeze protection down to an ambient of -18°C is included as standard. The cold parts of the pump package will also be insulated.

Standard head pump is offered for applications that have short water loops or are de-coupled. High head pump is offered for applications where the integrated chiller pump serves the entire loop volume or where there is substantial vertical rise.

The dual pump option is designed with one redundant pump, it is controlled to operate both pumps through a lead/lag and failure/recovery functionality. There is a variable flow option with factory-installed bypass line.

Dual Contactors for Pump (field installed pumps)

Dual pump contacts to control two remote standard or high head pumps are included in the control panel.

Single Contactor for Pump (field installed pumps)

Single pump contact to control a remote standard or high head pump is included in the control panel.

Pump Flow Controlled by Mechanical Balancing Valve

A mechanical balancing valve is installed. This option replaced the outlet shut off valve.

Pump Flow Controlled by Variable Speed Drive

A variable speed drive is installed in an additional panel to control the pump. The inverter is adjusted upon start up to balance the system flow and head requirements. The purpose is to save on wasted pump energy caused by a traditional balancing valve.

Options

Buffer Tank (only available with pump package)

The water tank is factory-installed for easy installation at the building site. The tank is engineered for continuous flow and is fully insulated as standard and is designed with freeze protection down to -18°C. The purpose of the tank is to increase the chilled water circuit inertia, which is necessary with short water loops. A high circuit inertia reduces the compressor's cycling to increase the compressor life span and allow for more precise water temperature accuracy. It also saves energy as compared to hot gas bypass.

Electrical Options:

Across-the-Line Starter/Direct on Line

Across-the-line starter is unit mounted with a IP-54 gasketed enclosure.

Across-the-Line Starter/Power Factor Correction

Across-the-line starter is unit mounted with a IP-54 gasketed enclosure. Power factor correction capacitors are factory-installed to correct power factor to 0.95 at all loads.

Solid-State Soft Starter

This option unit mounted starter has a IP-54 gasketed enclosure. To extend starter life contactors bypass current from the silicon control rectifies (SCRs) after startup.

Solid-State Soft Starter/Power Factor Correction

This option unit mounted starter has a IP-54 gasketed enclosure. To extend starter life contactors bypass current from the silicon control rectifies (SCRs) after startup. Power factor correction capacitors are factory-installed to correct power factor to 0.95 at all loads.

Disconnect Switch

A non-fused molded case disconnect switch, factory pre-wired with terminal power and equipped with a lockable external operator handle, is available to disconnect the chiller from main power.

Control Options:**BACNet Interface**

Allows user to easily interface via a single twisted-pair wiring to a factory-installed and tested communication board.

LonTalk/Tracer Summit Interface

LonTalk (LCI-C) or Tracer Summit communications capabilities are available with communication link via single twisted-pair wiring to factory-installed and tested communication board. This option will support the functionality required to obtain Lon Mark certification.

LonTalk LCI-C Interface with Modbus Interface

Allows user to easily interface with Modbus through LonTalk via a single twisted-pair wiring to factory-installed and tested communication board.

Time of Day Scheduling

Time of day scheduling capabilities are available for scheduling single chiller applications through Trane CH530 panel (without the need for building automation system - BAS). This feature allows the user to set up to ten events in a seven day time period.

External Chilled Water and Demand Limit Setpoint

Controls, sensors, and safeties allow reset of chilled water temperature, based on temperature signal, during periods of low outdoor air temperature (chilled water reset based on return chilled water temperature is standard). The demand limit setpoint is communicated to a factory-installed and tested communication board through a 2-10 Vdc or 4-20 mA signal.

Auxiliary setpoint

Freeze protection provided by pump activation and heaters on all cold parts.

Freeze Protection - CH530 Control

Freeze protection provided via the CH530 control interface turns the water pump on based on ambient temperature. The freeze protection is integrated into the main power of the unit. This allows for a single electrical connection when installing.

Percent Capacity

Output the number of compressors that are operating as an analog 2-10 Vdc or 4-20 mA signal.

Programmable Relays

Predefined, factory-installed, programmable relays allow the operation to select four relay outputs. Available outputs are: Alarm-Latching, Alarm-Auto Reset, General Alarm, Warning, Chiller Limit Mode, Compressor Running, and Tracer Control.

Other Options

Access Guards

A coated wire mesh that covers the access area under the condenser coils.

Access Guards and Half Louvers

Available on larger W coil units a coated wire mesh covers the access area under the condenser coils and half louvers cover the condenser coil.

Architectural Louvered Panels

Louvered panels cover the complete condensing coil and service area beneath the condenser.

Half Louvers

Louvered panels cover the condenser coil only. Available on the W coil units only.

Non-Lanced Aluminum Fins

Aluminum fins without slits help to prevent sand clogging the slit portion of a standard fin.

Non-Lanced Aluminum Fins with Pre-Coat Black Epoxy

This option uses pre-coated black epoxy non-slit aluminum fin stock for corrosion protection.

Non-Lanced Aluminum Fins with Pre-Coat Blue Fin

This option uses pre-coated non-slit aluminum fin stock to limit coil freezing and then defrost cycle. It is standard for CXAM.

Neoprene Pads

Neoprene isolator pads specially dimensioned to reduce vibration transmission to the supporting structure when the unit is installed. Pads ship in the control panel.

Isolators

Molded elastomeric isolators sized to reduce vibration transmission to the supporting structure when the unit is installed. Isolators ship with the chiller.

Flange Adapter

Kit to convert both water connections from grooved pipe to flanged connections. This includes: grooved couplings and grooved to flange adapters.

Water Strainer

Factory-installed 1.6 mm water strainer is provided.

Hydraulic Data

Figure 7. Pressure drops (cooling only) - without hydraulic module

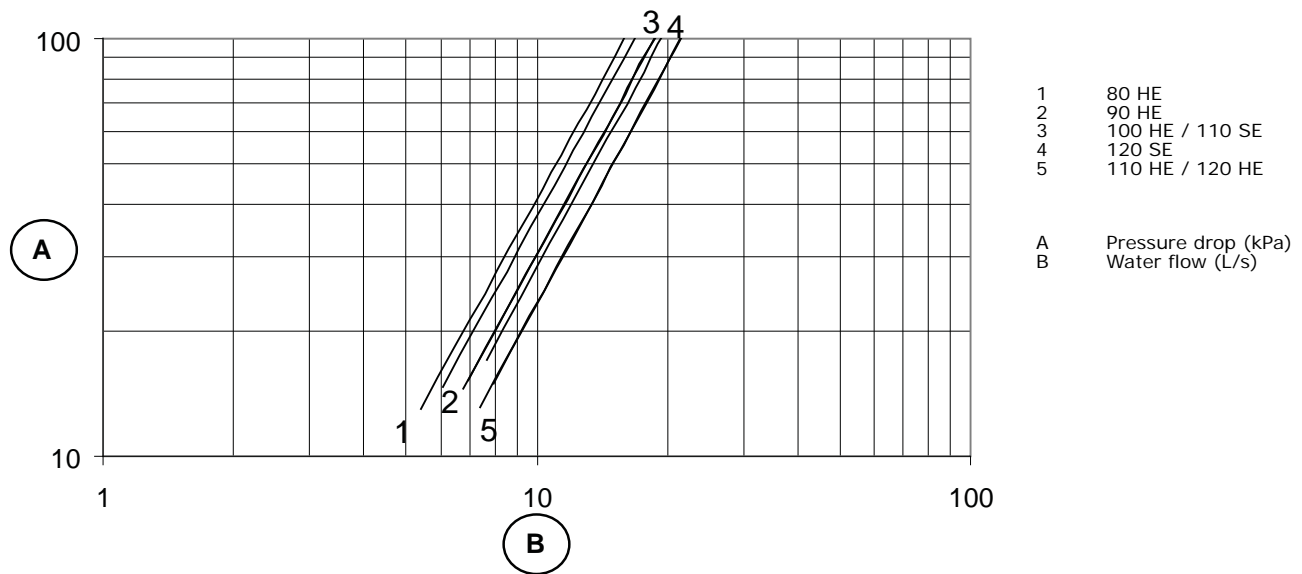
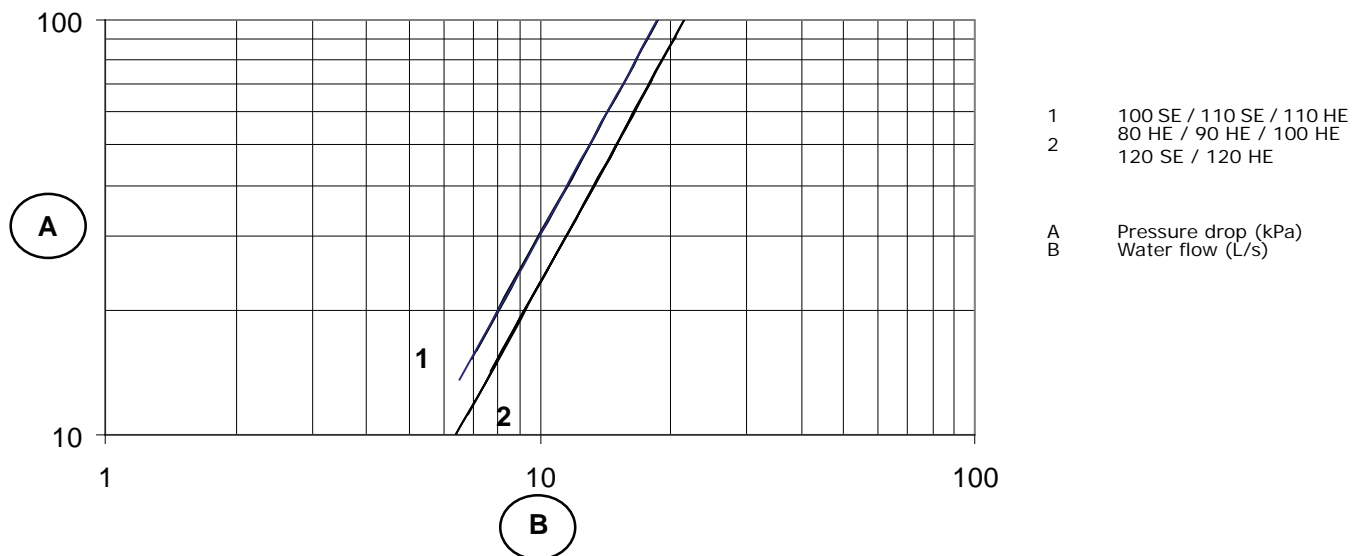


Figure 8. Pressure drops (heat pump) - without hydraulic module



Hydraulic Data

Figure 9. Standard head pressure pump (cooling only)

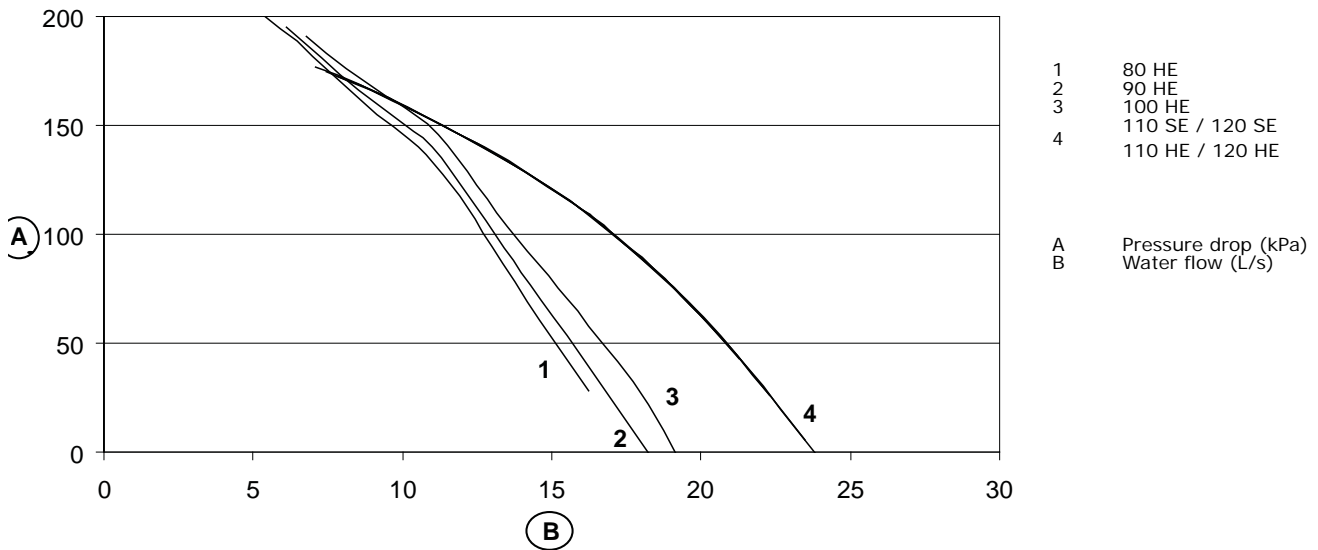


Figure 10. High head pressure pump (cooling only)

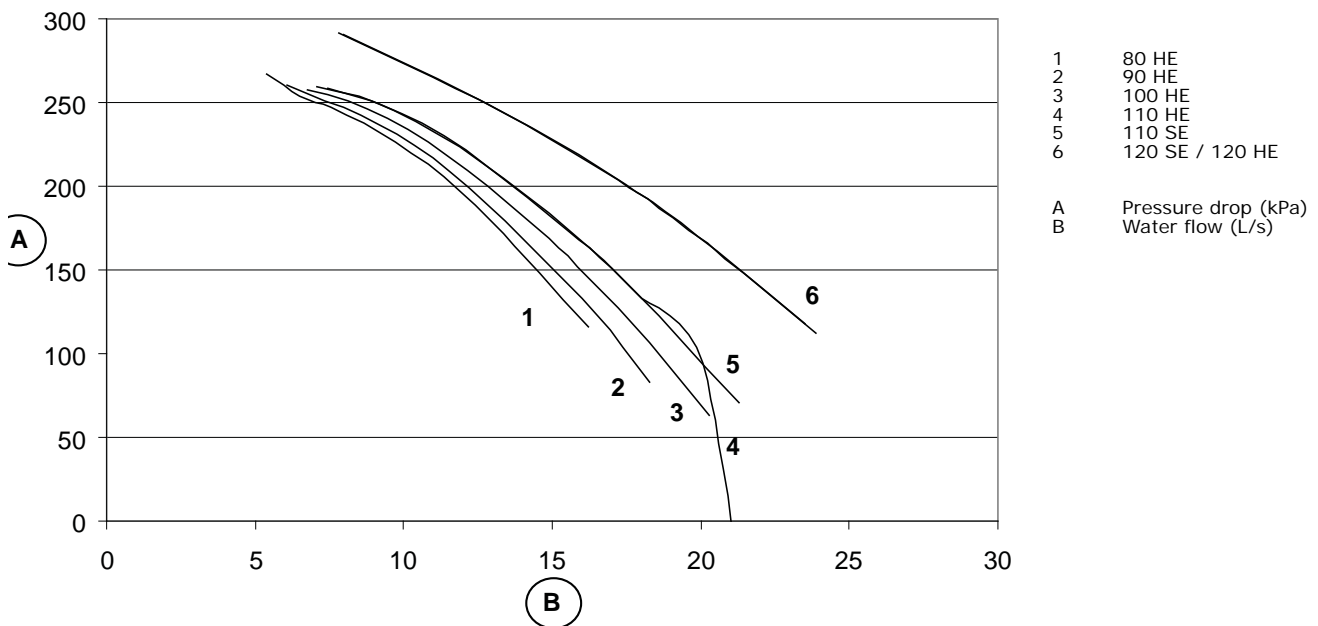


Figure 11. Standard head pressure pump (heat pump)

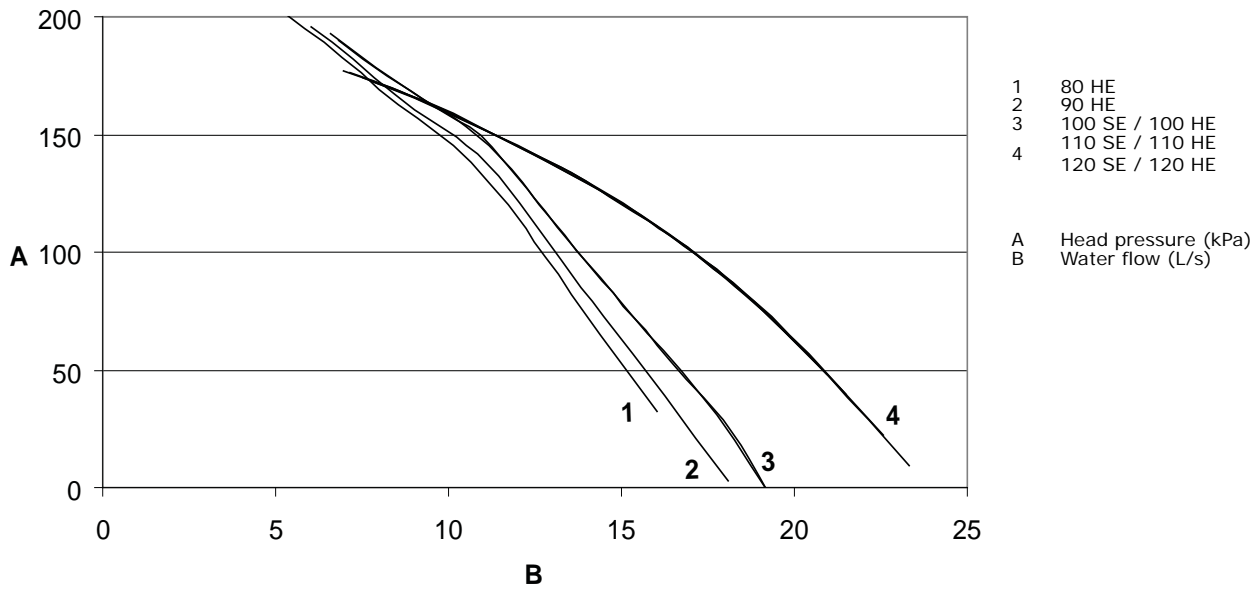
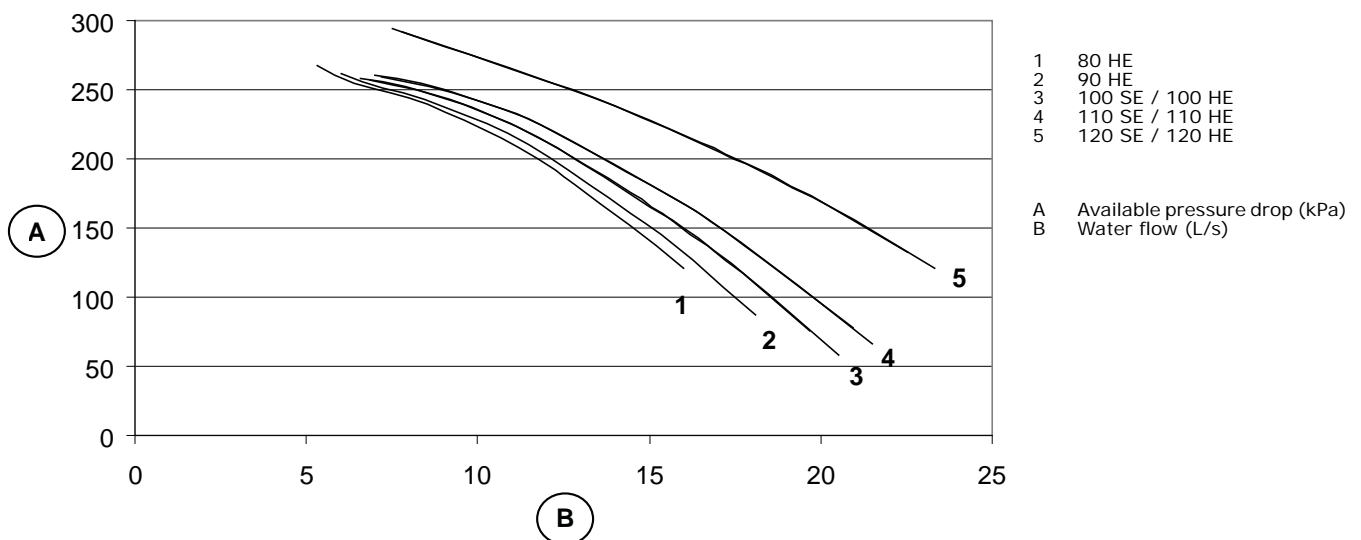


Figure 12. High head pressure pump (heat pump)



Operating Map

Table 10. Cooling only units (CGAM)

Fan control	Low ambient	Standard ambient	High ambient
Min. outdoor air temperature	-18°C	+7°C	+7°C
Max. outdoor air temperature	+46°C	+46°C	+52°C
Min. leaving water temperature	-12°C	-12°C	-12°C
Max. leaving water temperature	+20°C	+20°C	+20°C

Figure 13. Operating map cooling only (CGAM)

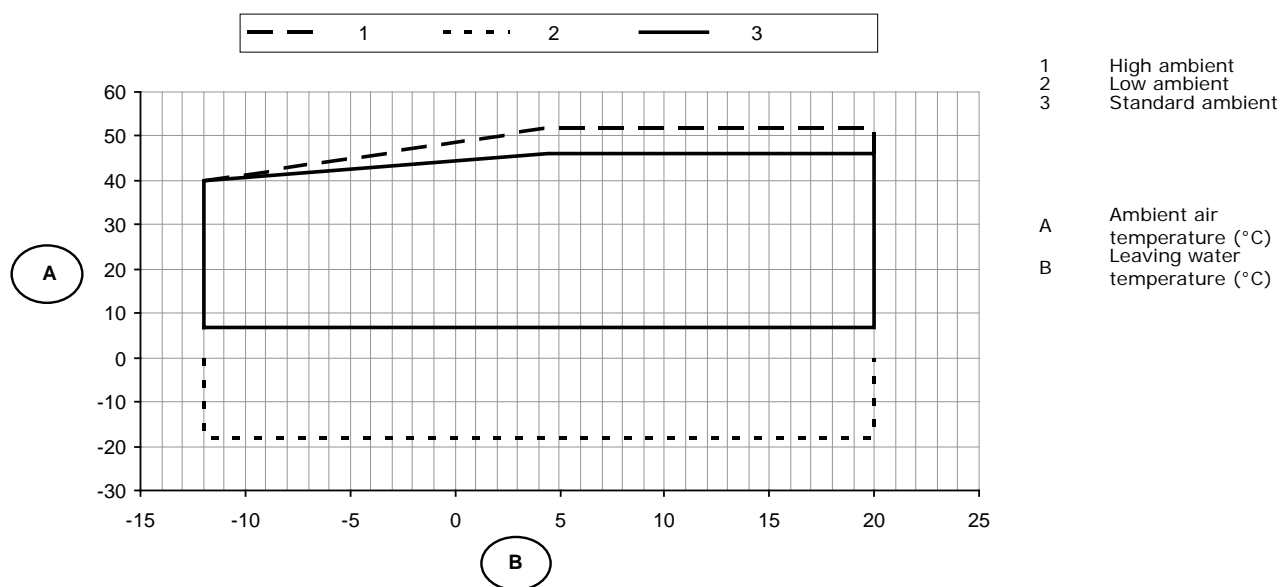
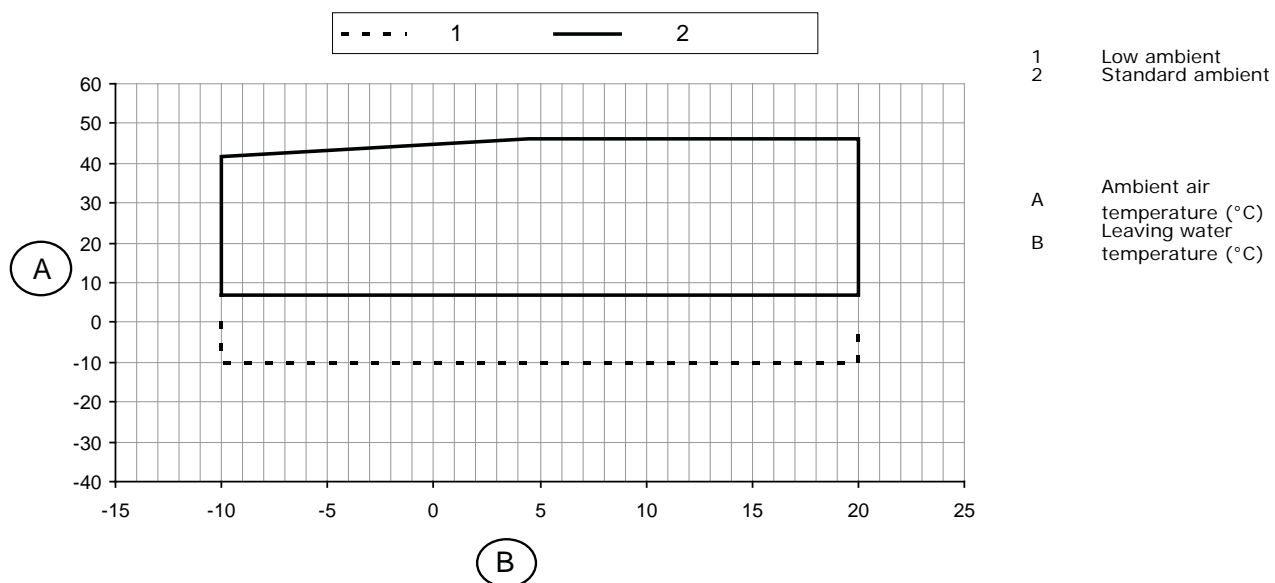


Table 11. Reversible Units (CXAM) - Cooling Mode

Fan control	Low ambient	Standard ambient
Min. outdoor air temperature	-10°C	+7°C
Max. outdoor air temperature	+46°C	+46°C
Min. leaving water temperature	-10°C	-10°C
Max. leaving water temperature	+20°C	+20°C

Figure 14. Operating map heat pump cooling mode (CXAM)

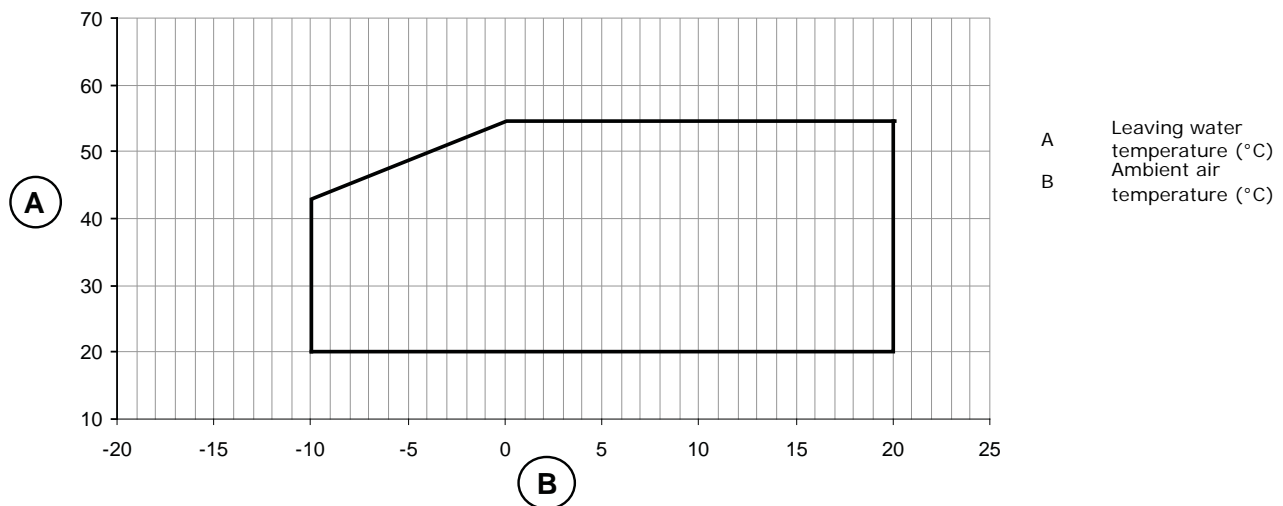


Operating Map

Table 12. Reversible Units (CXAM) - Heating Mode

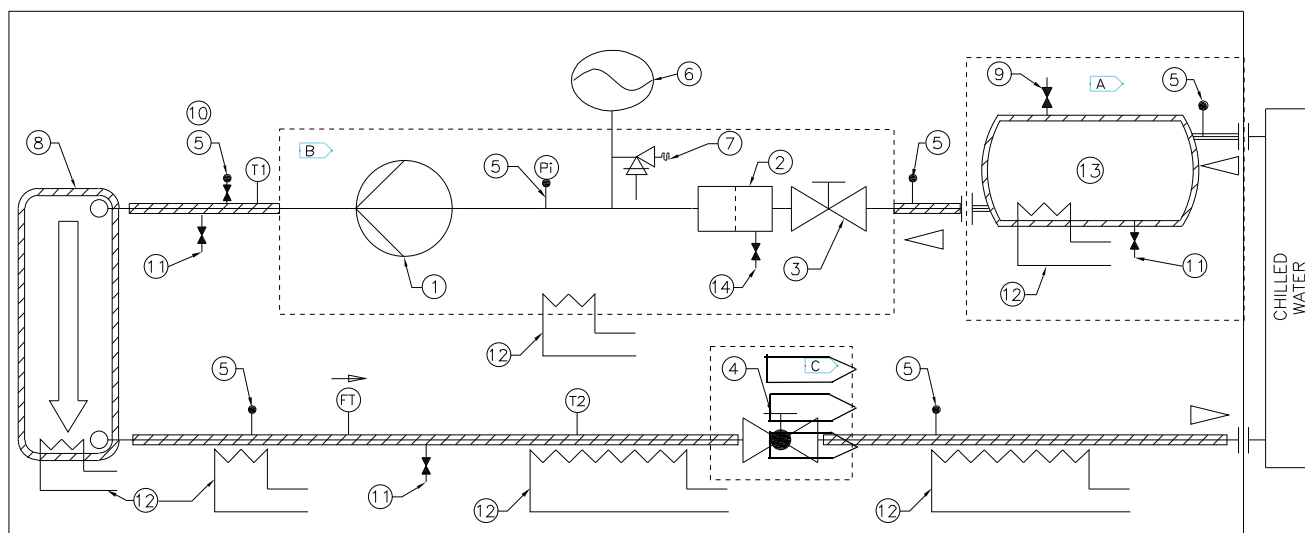
Fan control	Standard ambient
Min. outdoor air temperature	-10°C
Max. outdoor air temperature	+20°C
Min. leaving water temperature	+20°C
Max. leaving water temperature	+55°C

Figure 15. Operating map heat pumpheating mode (CXAM)



Unit Schematics

Figure 16. Hydraulic module water chart



- | | |
|----|-------------------------------|
| 1 | Single or Dual Pump |
| 2 | Water Strainer |
| 3 | Shut Off Valve |
| 4 | Stop and Balancing Valve |
| 5 | Valve for Pressure Point |
| 6 | Expansion Tank |
| 7 | Water Pressure Point |
| Pi | Gauge |
| FT | Water Flow Switch |
| T1 | Evap Water Inlet Temp Sensor |
| T2 | Evap Water Outlet Temp Sensor |

- | | |
|----|-------------------------|
| 8 | Exchanger |
| 9 | Automatic Air Bleed |
| 10 | Manual Air Bleed |
| 11 | Drain Valve |
| 12 | Antifreeze Protection |
| 13 | Buffer Tank |
| 14 | Blow Down Valve |
| A | Optional Expansion Tank |
| B | Optional Buffer Tank |
| C | Pump Box |

— Water Line

— Insulated Water Line

CIRCUIT 1

CIRCUIT 2

AIR AMBIENT
CONTROL PANEL

DISCHARGE LINE

SUCTION LINE

LIQUID LINE

COOL'D WATER

HEATED WATER

Legend:

- 1 Scroll Compressor Evaporator
- 2 (plate heat exchanger)
- 3 Condenser (air cooled exchanger)
- 4 PHR exchanger (plate heat exchanger - not available)
- 5 Filter drier
- 6 Electronic expansion tank
- 7 Service valve
- 8 Schraeder valve
- 9 Sight glass

PT Pressure transducer
PZH High pressure switch
TT Temperature sensor
TCE Electric expansion valve
FSL Evaporator water flow switch

— Refrigerant lines
— Chilled/heated water lines
Insulation

1 Only for sizes 140-150-160-170 - not available
2 Partial heat recovery option - not available
3 Only for low leaving water temperature



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