



CGAF

Air-cooled scroll chillers

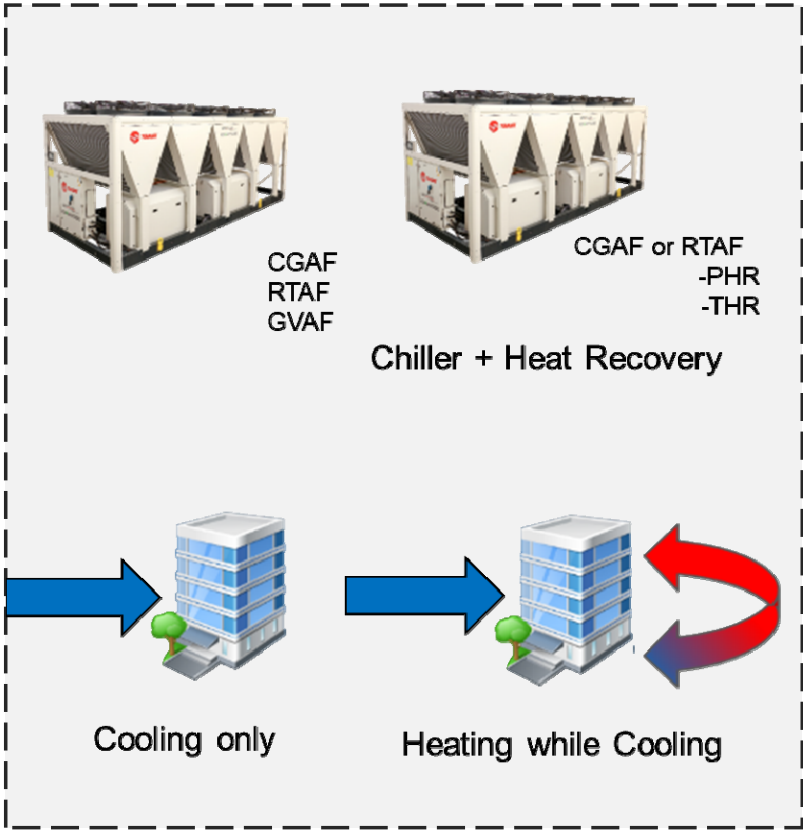
260 – 710 kW

August 2021



Air-cooled Chillers - Full Portfolio of Solutions

Let's focus on CGAF



CXAF

Heat Pump



Heating or Cooling



RTXC
CXAF
-PHR

Heat Recovery
Heat Pump



Heating while Cooling
Or
Heating/Cooling



CMAF

Multi-pipe



Any combination



Share Our Videos With Customers on What We Offer

CGAF Chiller



Microchannel condenser coil

- Sintesis V-coil, 100% Aluminum
- Lower refrigerant charge
- Higher cooling performances
- Overall unit weight reduction



Tracer UC800 + TD7 display

- Advanced algorithms ensuring optimal and smooth operation
- Perfect balance of performance and economy
- Easy service access
- Compatible with BACnet, Modbus, LonTalk



Variable speed outdoor fans Brand new generation of AC and EC fans (2021):

- Improved capacity modulation
- Reduced power consumption
- Reduced energy costs
- Optional high external static pressure EC fans (up to 100 Pa)

Brazed plate heat exchangers

- Compact, reliable and proven design
- Low water pressure drops
- Full protection against ice formation
- Same used in CGAF / CXAF

Hydraulic module package

- Integrated inside chiller frame to keep overall footprint to the minimum
- Single or dual pump
- Water buffer tank
- Water strainer

Industry leading variable volume scroll compressor

- Optimized for higher seasonal efficiency
- Reliable operation over the lifetime of the unit
- Reduced energy consumption: no over-compression thanks to intermediate discharge valves (IDVs)



CGAF – Extensive Range

Extensive offering in terms of capacity, efficiency and acoustic level

Cooling/heating capacity kW

250 270 290 310 330 350 370 390 410 430 450 470 490 510 530 550 570 590 610 630 650 670 690 700

Product Line Up



TRANE
CGAF

	250	270	290	310	330	350	370	390	410	430	450	470	490	510	530	550	570	590	610	630	650	670	690	700	
SE	●	●		●		●		●		●		●		●		●		●		●		●		●	
HE			●		●		●		●		●		●		●		●		●		●		●		●
XE			●	●		●		●		●		●		●		●		●		●		●		●	



Cooling capacity

- 260 – 700 kW
- 14 sizes



3 Efficiency levels

- Standard efficiency
- High efficiency
- Extra high efficiency
EER up to 3.41
SEER up to 4.74



3 Acoustic levels

- Standard noise
- Low noise
- Extra low noise
- Night noise set back for extra silence



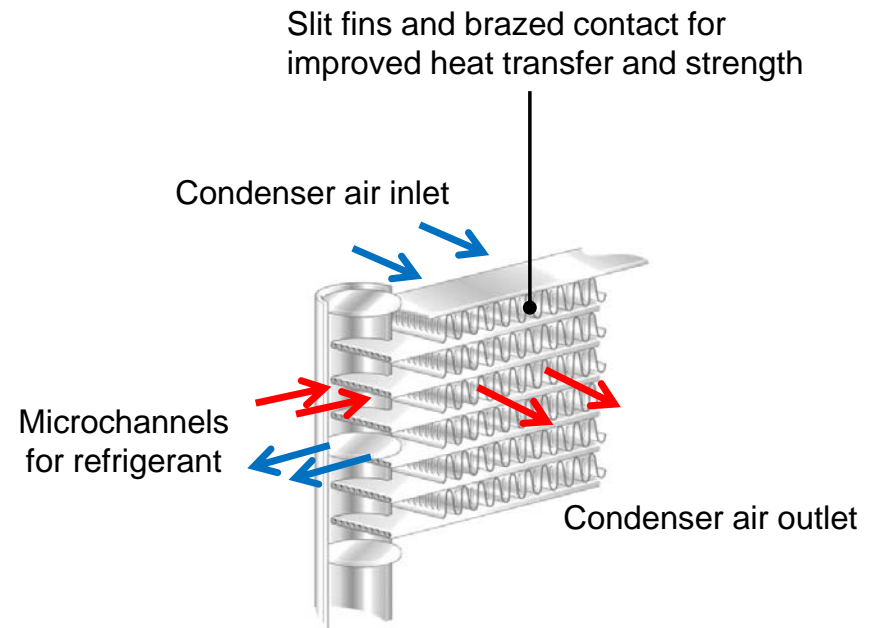
Energy saving solutions

- EC fans
- Free cooling
- Total heat recovery
- Partial heat recovery



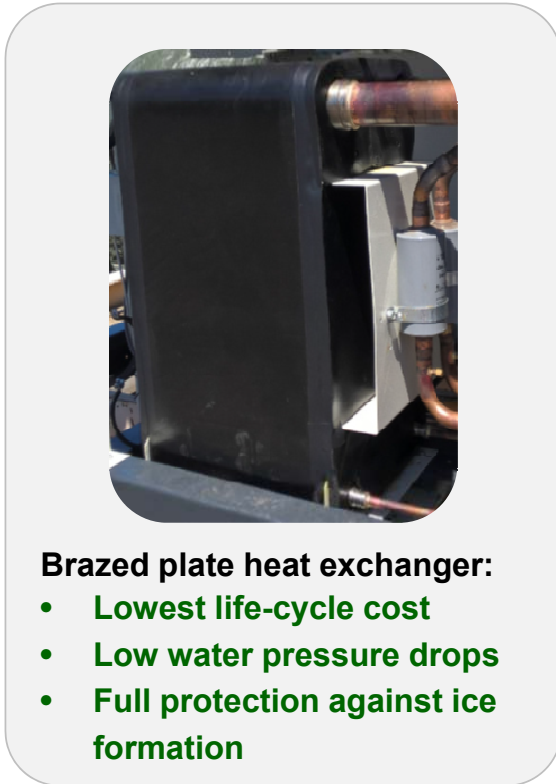
Microchannel Condenser Coils

- Leading-edge coil design for increased corrosion resistance
 - No galvanic corrosion
- Longer life expectancy
- **Sustainability**
 - Increased chiller efficiency
 - Lower refrigerant charge
 - R454B or R410A suitable
- 10% overall unit weight reduction

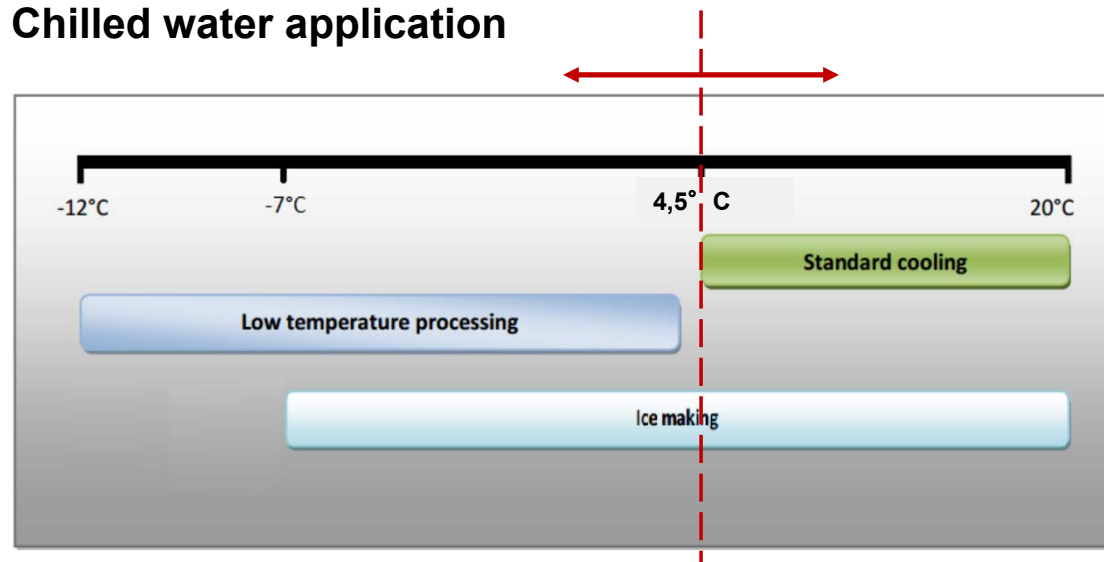


Standard on all CGAF chillers

Brazed Plate Heat Exchanger



Chilled water application



Ice making / ice storage application:

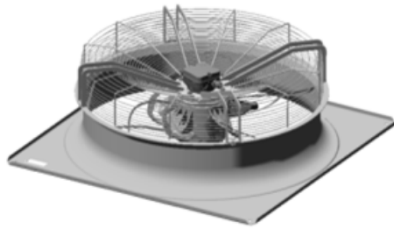
- Chiller produces ice at night (off-peak period), which can be used for thermal storage to produce cooling when melted during the day (on-peak period)
- Requires one or multiple ice storage tank(s)
- Glycol solution in chilled water system for freeze protection
- UC800 accepts several inputs (hard-wired) to initiate Ice Building



CGAF Fan Configuration

Fan technology

AC fixed speed

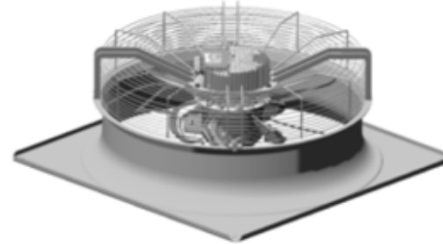


Standard on SE and HE models

- AC motor
- 1 speed, 3 poles
- Class F insulation, IP54 enclosure

- First installation cost

EC variable speed

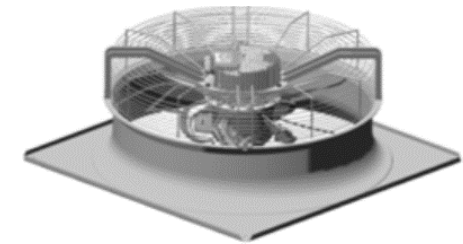


Optional on SE and HE models

- EC motor with variable speed control
- Class F insulation, IP54 enclosure
- Night Noise Set Back option

- Low ambient operation in cooling mode
- High ambient operation in heating mode
- Improved capacity modulation
- Reduced energy costs

EC variable speed + strong motor for HESP



Optional on SE and HE models

- EC motor with variable speed control
- Strong fan motor for up to 100 Pascal external static pressure
- NNSB – Night Noise Set Back option

- SN/LN versions: More capacity for the same fan power = higher efficiency
- XLN version: Reduced fan speed for the same capacity = lower noise

Benefits



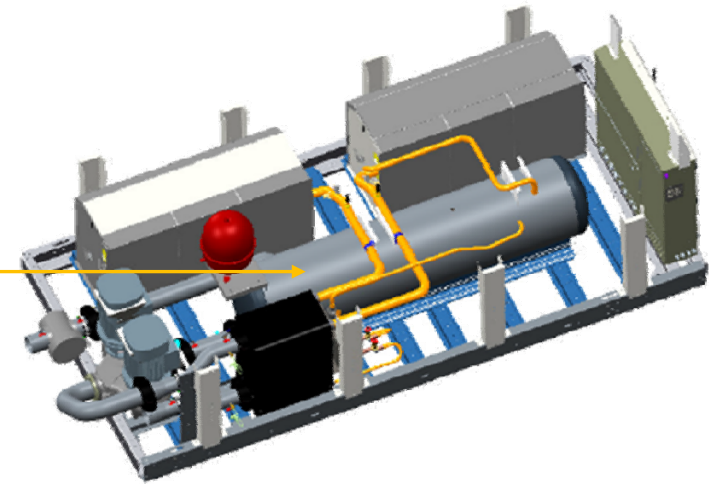
Fan Choice Impacts Efficiency and Sound Level

Main Options



Main Options

- Single or dual pump, standard or high head pressure
- Integrated water buffer tank
- Variable primary flow
- Total / Partial Heat Recovery (THR or PHR)
- Free cooling
- Low noise or extra low noise
- High external static pressure EC fans
- UC800 controller communication interfaces - 3 options
- Soft starter
- Aluminum hydrophilic (blue) coating
- Epoxy coated aluminum fins (gold)
-and more*



Modbus
BACnet
LONWORKS



Options Guide

Sintesis Air-to-water Scroll Reversible Heat Pump
Models CXAF
290 - 680 kW

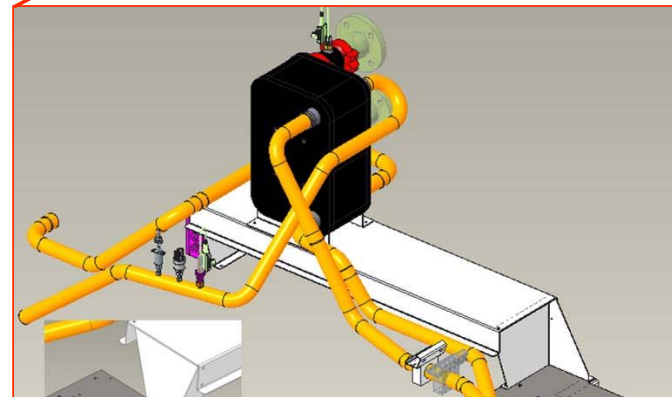
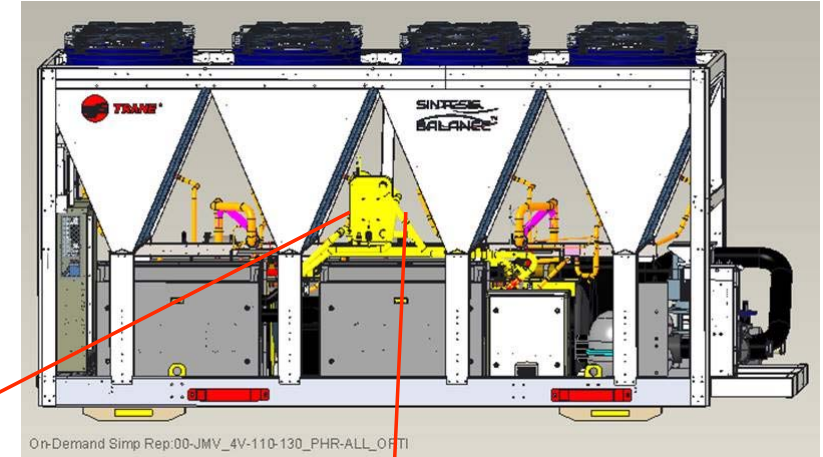


** Visit our Litweb
for Options Guide*



CGAF Partial Heat Recovery (option)

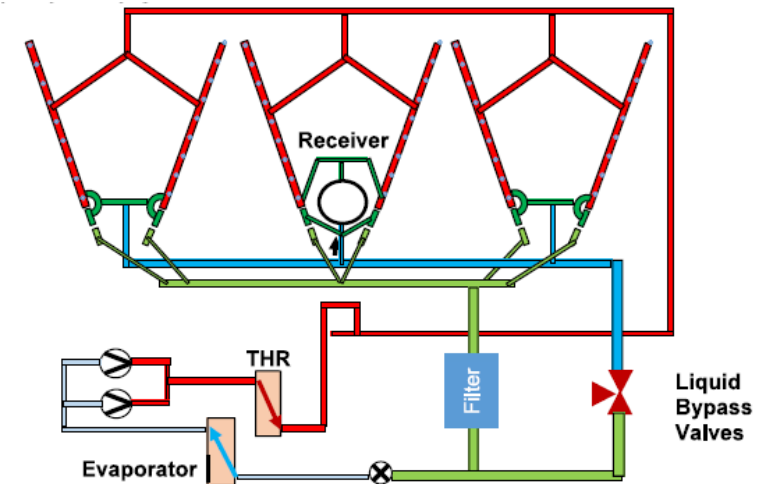
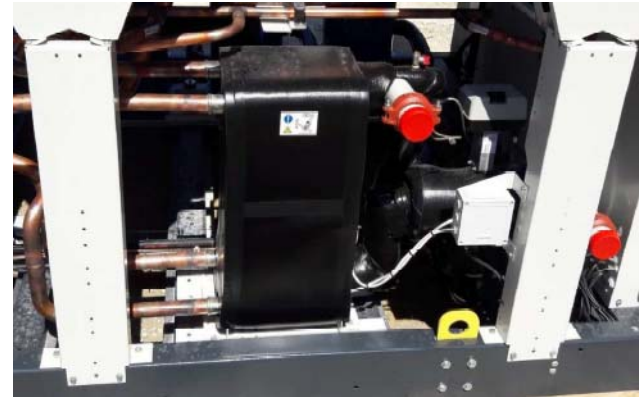
- To recover max. **25%** of cooling capacity,
 - representing maximum of 90% of the total compressor power input
- Reach highest capacity with:
 - large ΔT over the recovery heat exchanger
- Partial heat recovery option on all models
 - One BPHE, in series with the air-cooled condenser, for both refrigerant circuits
 - Two temperature sensors to measure inlet and outlet hot water
 - Freeze protection heater for ambient air temperatures down to -18°C (optional)



Great for Simultaneous Chilled and Hot Water Production

CGAF Total Heat Recovery (option)

- Heating capacity will be **50-85%** of delivered cooling capacity
 - $7^{\circ}\text{C} < \text{Ambient air temp.} < 50^{\circ}\text{C}$
 - $30^{\circ}\text{C} < \text{Leaving hot water temp} < 55^{\circ}\text{C}$
- Reach highest capacity with:
 - large ΔT over the recovery heat exchanger
- Total heat recovery option:
 - One BPHE, installed on discharge line, in series with the air-cooled condenser, for both refrigerant circuits
 - 3-way valve and 2 water temperature sensors
 - Freeze protection heater for ambient air temperatures down to -18°C (optional)
 - Heat recovery mode is activated, via dry contact, by the customer

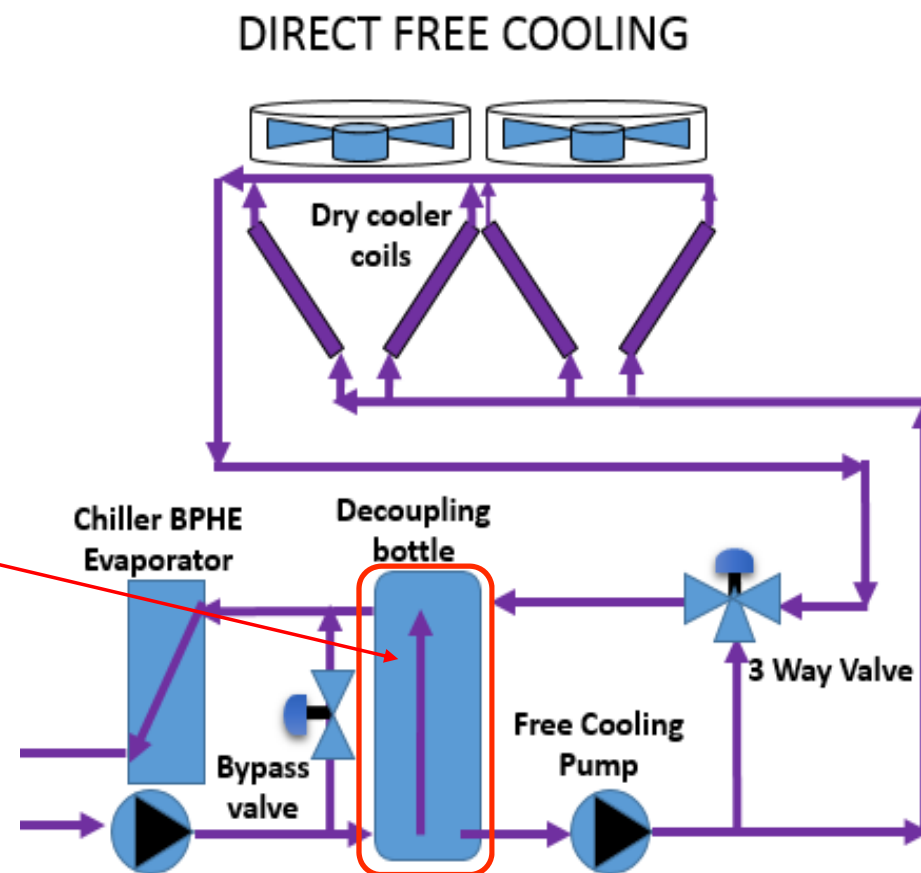


Sustainability - Simultaneous Cooling and “Free Heating”

CGAF Direct Free Cooling (option)



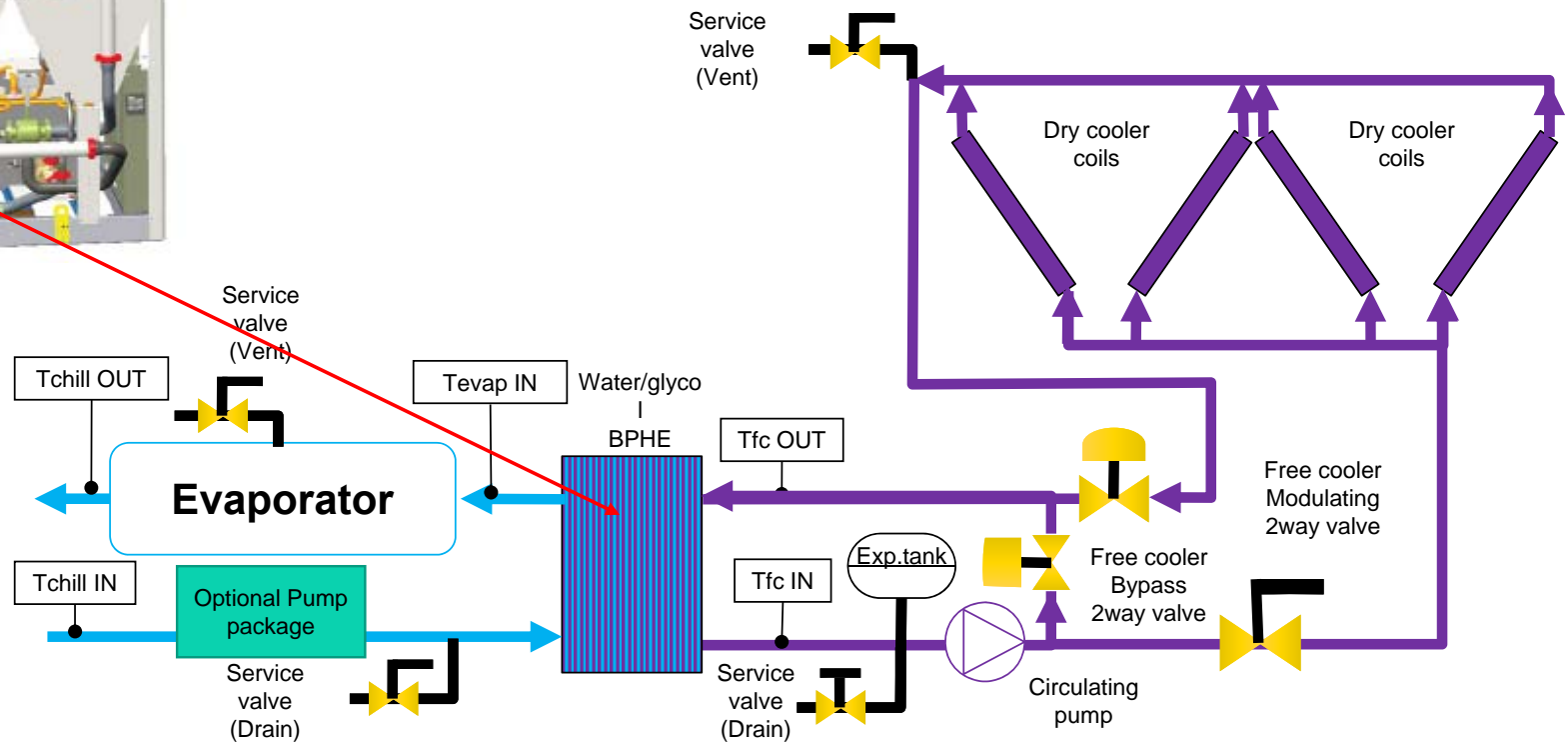
- A decoupling bottle is used on direct free-cooling option
 - Only available with direct free-cooling option
- 2 refrigerant coils are not covered by a free-cooling coil
- Several water pump packages available



Sustainability – “Partial” up to “Full Free Cooling”

Free Cooling Glycol Free (option)

Glycol Free – Free Cooling



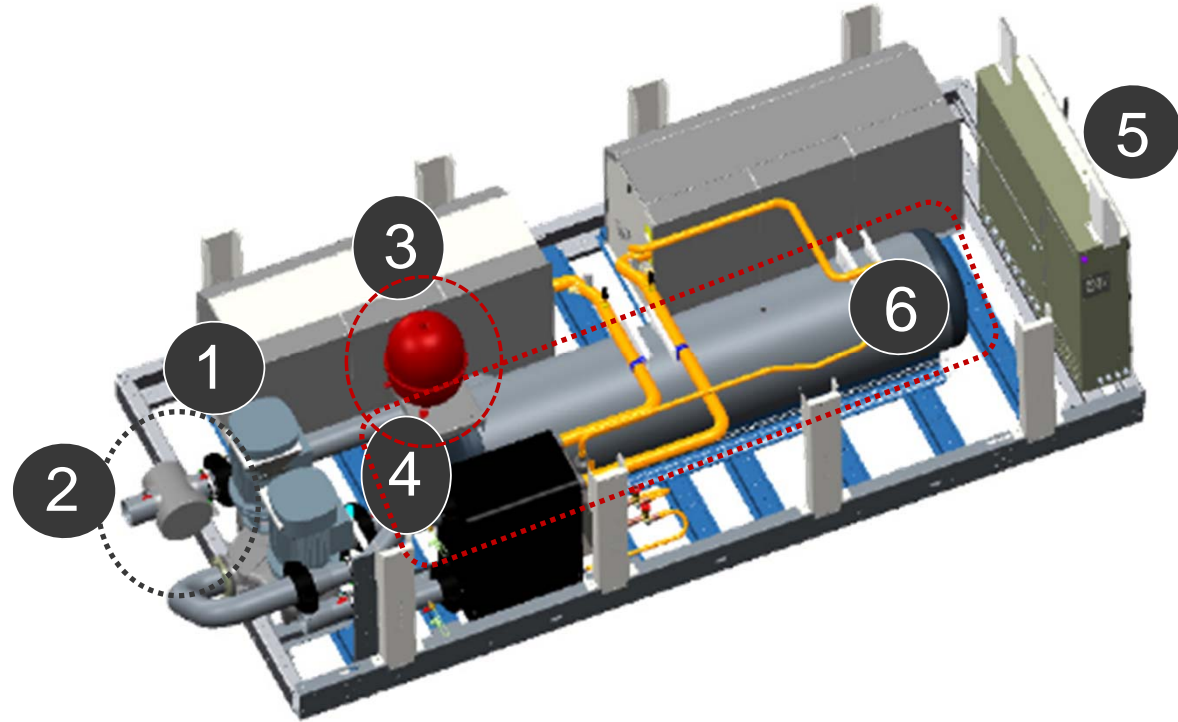
Sustainability – “Partial” up to “Full Free Cooling”

Hydraulic Module (option)

1. Dual or single water pump(s), with/without *Adaptive Frequency Drive*
2. Water strainer
3. Expansion tank and pressure relief valve
4. Balancing valve
5. Antifreeze protection
6. Water Buffer tank

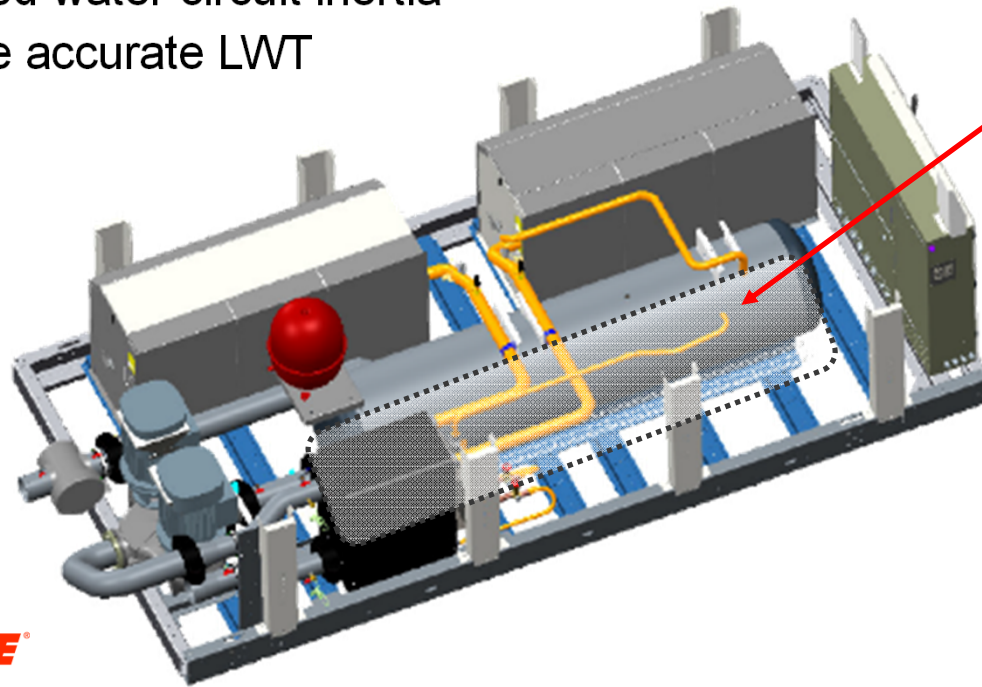
Key Benefits

- Factory-mounted
- Integrated within the unit footprint
- Lower total cost of installation
- Optimized, efficient components



Water Buffer Tank *(option)*

- Factory-mounted, located on supply side of water loop
- Works only with CGAF pump packages
- Ease of installation on site
- Increases compressor life span by increasing chilled water circuit inertia
- More accurate LWT



Unit sizes	Buffer tank volume (L)
080	607
090	607
100	607
110	607
130	777
140	777
150	777
165	777
180	777
190	777



Shell & Tube Evaporator (*option*)

- Aggressive water (high fouling factors)
- Tube cleaning is easier than cleaning a BPHE
- Better solution when a low pressure drop is requested (e.g. food and beverage industry)
- More expensive than CGAF with stainless steel BPHE

Incompatibilities

- Available on Standard Efficiency chillers only
- Not compatible with water buffer tank (no space)
- Not compatible with PHR or THR
- Not compatible with Free cooling
- Not compatible with following combination of options : “Power Factor Correction Capacitors” and “Variable Primary Flow”



Not compliant with Ecodesign 2021
Non-EU markets only



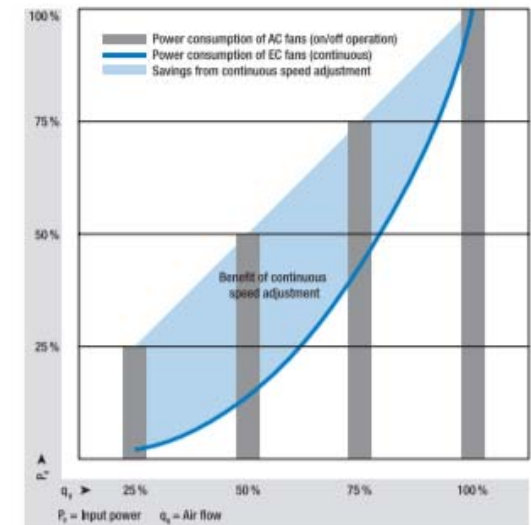
Electronically Commutated Fans Adaptive Frequency™ Drive (option)

EC fans

- Available on SE, HE and High External Static Pressure models
 - EC HESP fans for up to 100 Pa static pressure
- Improved capacity modulation
- Very low fan (motor) noise over entire speed range
- Reduced power consumption
- Reduced energy costs

Adaptive Frequency Drive on water pump

- Improved efficiency in part load conditions
- Improved capacity modulation
- Current surge reduced by a factor of 5



Multiple Energy Savings Options Available

CGAF – Sound Packages (option)

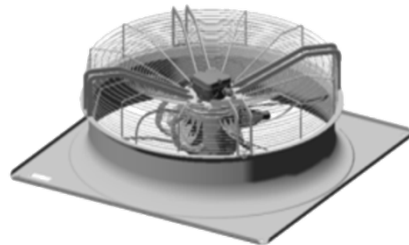
Low Noise (LN)



Extra Low Noise (XLN)



Night Noise Set Back (NNSB)



- When units need to operate quietly during certain periods of the day (e.g. night)
- Activated via external on/off contact, fans run at a lower speed
- Requires EC or EC HESP fans



Operating Maps

Perfect Fit for Comfort and Process Applications



Operating Maps

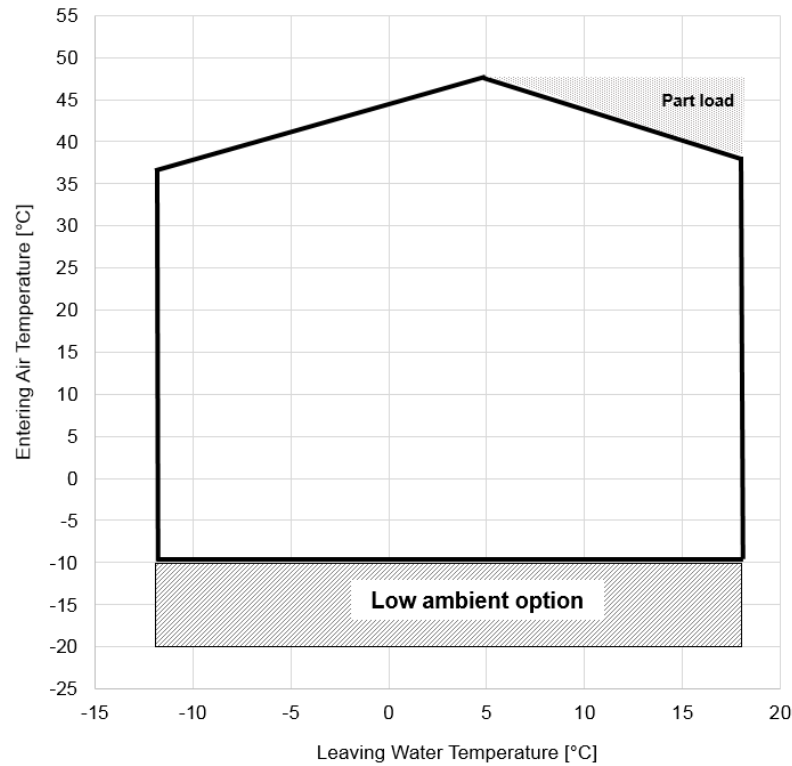
Standard ambient
-10°C to +46°C

Low ambient
(EC fans)
-20°C to +46°C

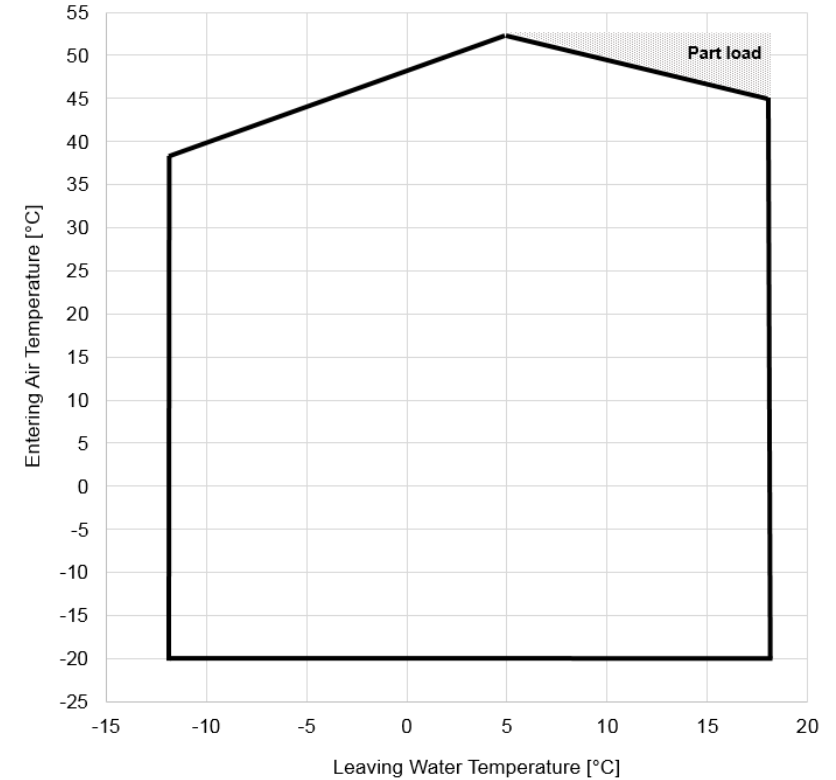
High ambient
(HE)
-10°C to +52°C

Wide ambient
(XE, or HE+EC)
-20°C to +52°C

Operating map - SE version



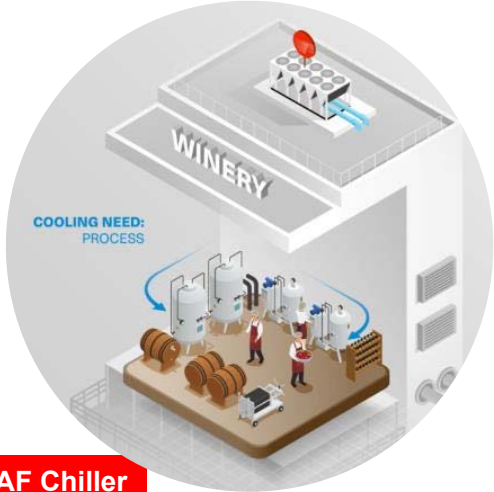
Operating map - XE version



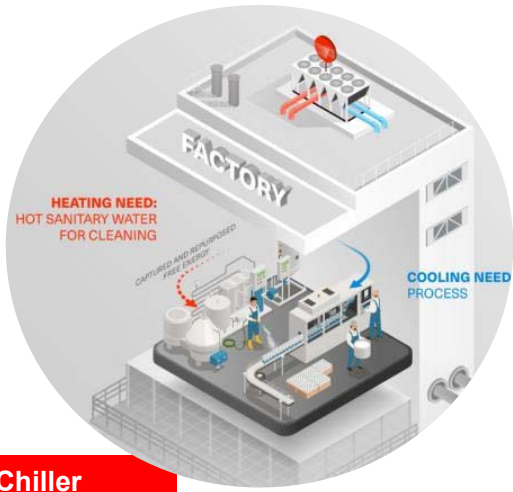
Applications



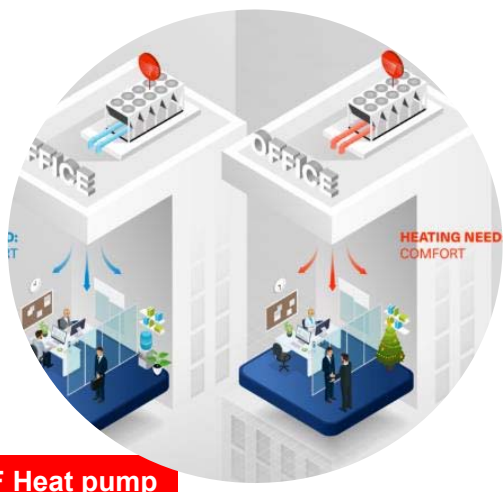
Sustainable HVAC solutions to satisfy any permanent or temporary cooling and heating needs



CGAF Chiller



CGAF Chiller with heat recovery



CXAF Heat pump



Hospitality



Healthcare



Entertainment



Office buildings



Education

Industries Using CGAF Process Chillers



- **Plastics:** To reduce cycle times in injection molding and blow molding by regulating temperatures
- **Food industry:** To cool any process such as chocolate manufacturing, vegetable processing, meat injectors etc...
- **Bakeries:** Use for the mixing process to allow longer mixing times which improves the final quality for any grade of flour
- **Pharmaceuticals:** The heat from emollient vats needs to go somewhere. Chilled water is used to reduce total manufacturing time, leading to cost savings
- **Printing industry:** Temperature regulation in presses and rollers which leads to reduction of stretching and bleeding.
- **Other applications:** Ice skating rinks, laser cutting machines, boat / airplane manufacturing, composite manufacturers, etc...



CGAF – IOM

IOM (new) – A **wealth of information** including water system design requirements next to:

- Operating principles
- Unit integrated protections
- Installation/contractor responsibilities
- Operating maps for cooling, heating, THR and free cooling
- Minimum water loop content
- General data for Total Heat recovery (THR)
- etc.....



**Installation
Operation
Maintenance**

CGAF Air-Cooled Scroll Chillers
CXAF Air to Water Scroll Heat Pumps
260 - 710 kW



The image shows three Trane scroll chillers/heat pumps. Two are shown from a top-down perspective, and one is shown from a side perspective. They are white units with black frames and multiple fans on top. The Trane logo is visible on the side of each unit.

**SINTEESIS™
ADVANTAGE**

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Unit Controller

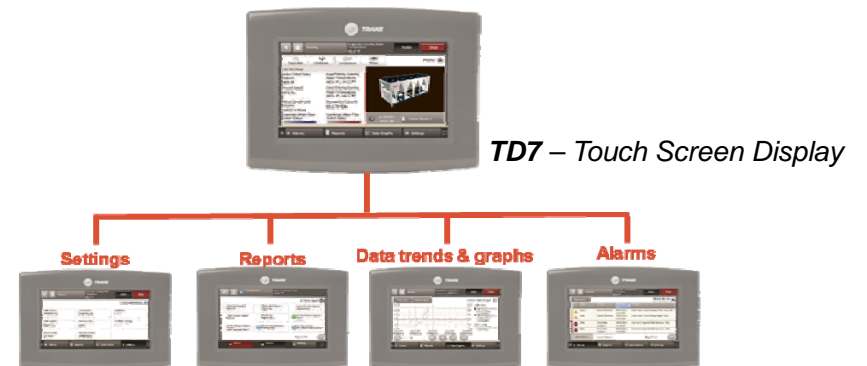
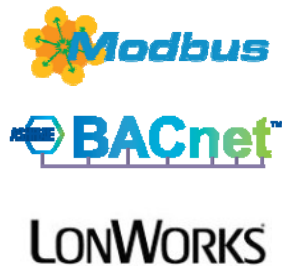


Today: UC800 Unit Controller

Simple and intuitive user interface

- ✓ **Controller Trane Tracer UC800**
 - Advanced algorithms to manage the most challenging conditions
 - Ease of maintenance and service

- ✓ **User interface with front panel TD7**
 - Large touch screen
 - Full-color interface for simple, intuitive operation
 - Main processor in the control panel



Proven, Very Reliable Unit Controller

UC800 Controls Part Load at Constant Ambient Air Temp.

	1A	1B	1C	2A	2B	2C	
Size	C1A	C1B	C1C	C2A	C2B	C3C	
CGAF 090	25	30	--	25	30	--	
	Possible combinations						%load
Comp part load	ON	ON	--	ON	ON	--	100%
	ON	ON	--	ON	x	--	72%
	ON	ON	--	x	ON	--	77%
	ON	x	--	ON	x	--	45%
	x	ON	--	x	ON	--	55%
	ON	ON	--	x	x	--	50%
	ON	x	--	x	ON	--	50%
	ON	x	--	x	x	--	23%
	x	ON	--	x	x	--	27%

UC800 controls which refrigeration circuit and which scroll compressor will firstly operate, based on:

- compressor wear
- number of working hours



UC800 Decides on Adequate Combination

Tomorrow: Symbio® Controls Platform

- **Next Generation Equipment and Field Installable controls**
 - Replacing UC800 controller
 - In Europe it started with Symbio™800 integrated in chillers RTAF/RTSF, CGWF/CXWF and CMAF multi-pipes
 - Developed in tandem with Tracer products, like **SC+**
- **Why do we need new controls?**
 - Technological evolution
 - To meet new market requirements
 - BACnet IP becoming more prevalent



UC800



Symbio 800

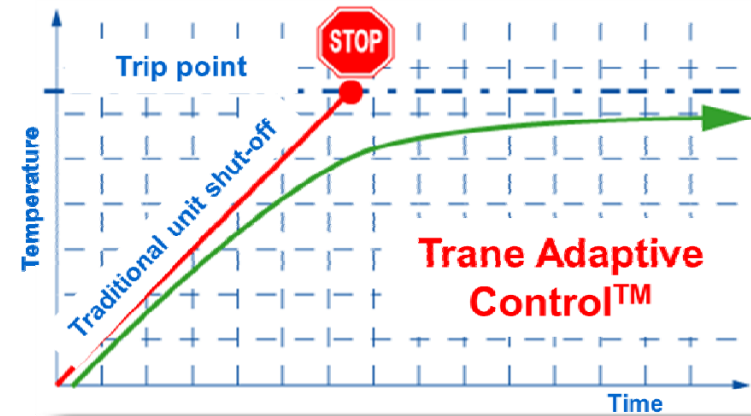


CGAF + Symbio800 – Standard Delivered After October 2021

Symbio[®] 800 New features

We kept the legendary reliability and advanced control logic of the UC800 and added new functionalities:

- New open standard protocol support incl. BACnet IP and Modbus TCP
- Better serviceability and access
 - Secure remote connectivity
 - Expandable I/O
 - Optional customer programming
- Integrated Time/Day scheduling + email alarming
- SD card backup/restore



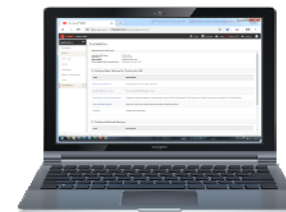
Enabled by
Symbio™



Symbio™800



TD7 - Touch
Screen Display



Service Tools



Web Based
Interface



Symbio® and Tracer® SC+: Working Together

Custom Applications suited for Symbio®

- Customize control strategy (Primary pumps)
- Control ancillary equipment (Isolation valves)
- Control associated exhaust fans (Refrigerant leak detection)
- Temporary equipment scheduling during construction phase or standalone equipment without BAS

EQUIPMENT CONTROL = Symbio® 800

Eliminates the need to add another controller for side loops and ancillary equipment control

System Applications suited for Tracer® SC+

- Central Heating and Cooling Plant control
- Air System control
- Area control
- Point/data aggregation of multiple units
- Coordinated system scheduling
- System alarming and diagnostics

SYSTEM CONTROL = Tracer® SC+

Equipment controllers should not be used for system control...what happens when a unit shuts down ?



More News

R454B - Low GWP Refrigerant



R454B Roadmap

1st shipment date shown



Conquest

- CGAX: February
- CXAX: April 2021



Cube & Flex

- CGB/CXB: Dec 2021
- FLEX: Nov 2021



Rooftops

- Airfinity One: Dec 2021
- Airfinity XL: Dec 2021



Sintesis

- **CGAF: Oct 2021**
- **CXAF: Dec 2021**
- CMAF: March 2022
- CMAC: Jan 2022
- CGAF/CXAF 2V: Dec 2021



Flex2O

- CGWF: Jan 2022
- CXWF: Jan 2022



By end of 2021: Full scroll portfolio with **low GWP R454B**

New Arrival in October 2021! CGAF R454B

You asked for: **R454B** and same Operating Map

We will offer you...

- ✓ **R454B** - HFO/HFC refrigerant with GWP of 467
 - ✓ **76% reduction compared to R410A**
 - ✓ **34% reduction against R32 !!**
- ✓ Same **CGAF** models as with R410A
- ✓ Same Operating Map due to improved DSH compressor



June: Press releases in 12 languages

Contact:

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Trane Announces Sinesis™ Advantage Air-Cooled Scroll Chiller with Low GWP R-454B Refrigerant

Trane Sinesis™ Advantage CGAF models are now available and feature R-454B as the lowest-GWP refrigerant alternative for R-410A

Brussels, Jun. xx, 2021 – [Trane®](#), a leading global provider of indoor comfort and process solutions and services and a brand of [Trane Technologies](#), announced today its latest addition to the scroll compressor chillers, heat pumps, multi-pipe units and rooftops portfolio featuring the low global warming potential (GWP) R-454B refrigerant. The [Sinesis™ Advantage CGAF air cooled chillers with R-454B](#) are now available in capacities ranging from 150 to 670 kilowatts (kW). The units deliver up to 5% better cooling efficiency and an equally wide operating map compared to equivalent models with R410A.

The R-454B refrigerant, a non-ozone depleting HFO/HFC¹ blend, has a GWP level of 467, the lowest among the refrigerants available today for scroll compressor technology. R-454B offers **76% reduction in direct GWP impact against R-410A and 34% reduction against R-32 HFC refrigerant**. This answers customers' need for a sustainable refrigerant option that future proofs their investment and mitigates the increasing tax rates put on refrigerants across Europe.

"Since 2014, Trane has been designing products operating with ultra-low GWP refrigerants that are responsible for the environment and good for our customers' business without sacrificing quality, reliability or performance," said Louis Rompre, portfolio manager at Trane in Europe, Middle East and Africa. "By moving directly from R-410A to R-454B we continue to be front running in the marketplace and offer our customers the highest possible GWP reduction of all the potential replacements."

All units with the new R-454B refrigerant are extensively tested in the Trane testing facility located in the production and design center in [Epinal](#), France. The facility functions as a validation center for new product development enabling the simulation of all, even extreme operating conditions encountered during the life of HVAC equipment. Tests conducted at the Trane testing lab include

The background of the advertisement is a composite image. On the left, there is a close-up, low-angle shot of a large, curling blue wave, creating a tunnel-like effect. On the right, there is a semi-transparent, light blue architectural rendering of a modern building with a curved facade and a grid of windows. The overall color palette is dominated by various shades of blue and teal, with a touch of red in the text and a white box.

CGAF

Designed for cooling needs

visit www.trane.eu