Air-cooled Chillers with High Speed Centrifugal Compressors

Model GVAF-X 577 - 1580 kW
Model GVAF-XP 719 - 1245 kW
Model GVAF-XPG 453 - 1243 kW

July 2020

CTV-PRC018C-GB

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Introduction

GVAF eXcellent is a new model within Trane's Sintesis Excellent range able to reach market-leading Energy Efficiency Ratio (EER) and European Seasonal Energy Efficiency Ratio (ESEER) with lower sound levels.

As a part of the Ingersoll Rand EcoWise™ portfolio of products, this model GVAF is available with the new R1234ze which has a GWP value of less than one to exceed current F-Gas legislation requirements and help customers reduce their carbon dioxide (CO_2) emissions and achieve extreme part load and full load efficiencies.

GVAF chillers are available in 2 sound levels and 3 efficiency levels to answer accurately to every customer`s needs.

Sound levels

- Low Noise (LN)
- Extra Low Noise (XLN)

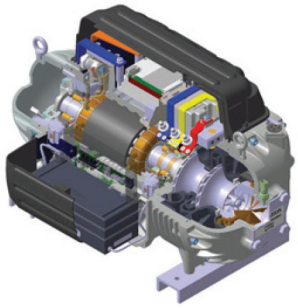
Efficiency levels

- High Efficiency (X)
- Extra Efficiency (XP)
- Extra Efficiency with next-generation, low GWP R1234ze (XPG)

Figure 1 – Model GVAF

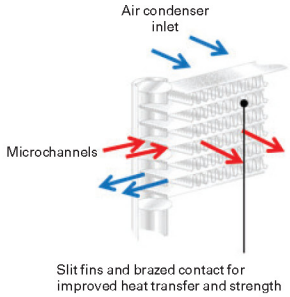
Features and Benefits

High Speed Centrifugal Compressors



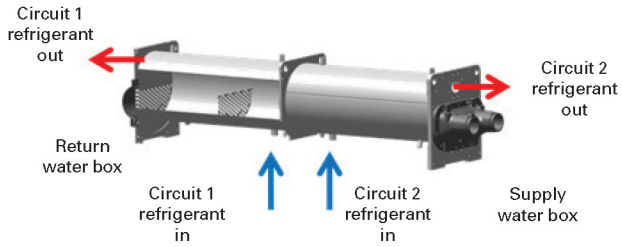
- Two stages, high speed centrifugal compressors with higher aerodynamic efficiency
- Magnetic bearings provide quiet, reliable and 100% oil free operation
- Soft start module significantly reduces high in-rush current at startup
- Integrated variable frequency drive
- Variable speed adjusts to changes in load and/or condensing temperature
- One main moving part. The two impellers are keyed directly to the motor rotor.

Micro-channel condenser coils



- Increased efficiency
- Less refrigerant
- 10% overall unit weight reduction
- Increased corrosion resistance
- Reduced carbon footprint

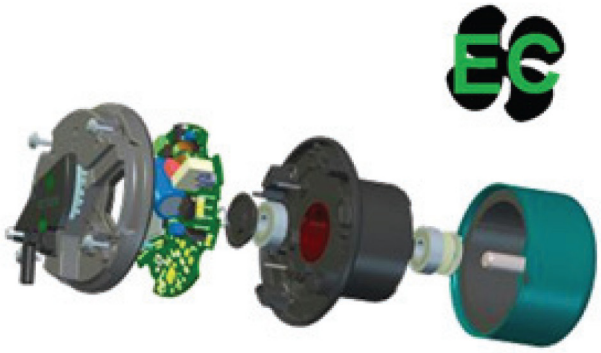
CHIL* flooded evaporator



- Reduced refrigerant volume
- Increased efficiency
- Reduced carbon footprint

* Compact - High performance – Integrated design - Low charge

Electronically commutated (EC) fans



- Better partload efficiency
- Improved capacity modulation
- Reduced power consumption up to 13%
- Lower sound levels

Control and interface

- Intuitive & user friendly interface
- 7″ color touchscreen
- Main processor in the control panel
- Data trending
- Clear alarm log
- TIS enable for remote monitoring

Options

SmartFlow Control

Constant speed pump – Variable frequency drive adjustment

The unit is equipped with a pump package driven by a speed inverter, without providing continuous modulation of the speed. The water flow is fixed during commissioning. The goal of this alternative is to provide the appropriate flow rate and hydraulic balance, without the need for a mechanical balancing valve, and by taking advantage of the energy consumption optimization of the pump.

Water flow is adjusted through parameter 204 of the speed inverter (TR200), when having the dual pump option, the active pump arbitration is based on pump equalization time and pump failure status.

Variable speed pump – Constant differential pressure (DP)

The unit is equipped with a pump package driven by a speed inverter. The modulation of the pump speed is made in order to ensure that the Differential Pressure (DP) remains constant within the system. The minimum pump speed is factory set at 60% of the nominal speed. The minimum pump frequency can be adjusted through inverter. The constant DP option is intended to be used with 2-way water regulation valves in the customer hydraulic system. At minimum system partial load, when most of the 2-way valves are closed, a minimum flow rate must be ensured through the chiller evaporator. DP is measured by a differential pressure sensor supplied by Trane, that the customer must install on the water loop, in a freeze protected area. A regulation valve should be installed on the by-pass line.

Variable speed pump – Constant differential temperature (DT)

The unit will be equipped with a pump package driven by a speed inverter. The modulation of the pump speed is managed to ensure that chiller DT stays constant. Entering and leaving temperatures at the evaporator will be measured directly by the chiller controller, through the factory-supplied sensor. A DT setpoint will be present on the unit controller. The option for constant DT is intended to be used with 3-way valves on water systems, or 2-way valves on water system but constant flow at the by-pass. The minimum pump frequency can be adjusted on the inverter.

Direct and Glycol Free Free-cooling

In order to take advantage of the low ambient temperatures, Sintesis Excellent chillers propose four alternatives of free cooling:

- Total Direct Free-cooling
- Partial Direct Free-cooling
- Total Glycol free Free-cooling
- Partial Glycol free Free-cooling

The advantages of this type of application are:

- A small footprint compared to a system where a dry cooler and a chiller are used
- One single equipment control
- A wide range of capacities

The Sintesis Excellent Series, GVAF Free Cooling are designed for countries that have a significant yearly number of hours below 0 °C and for applications where cooling is needed year round.

Sound level options

Low noise

All GVAF units are equipped with EC fans, compressors are enclosed in a box and discharge line insulated.

Low noise with NNSB

Night noise set back allow to reduce the sound level of the chiller by reducing the speed of EC fans controlled with an external on/off contact.

Extra low noise

Extra low noise units are equipped with NNSB and fan diffusers.

Electrical options

Under over voltage protection IP20 internal protection. Flow switch: the flow switch is sent as an accessory and has to be installed on site.

Hydraulic module option*

Hydraulic module includes the following components: water strainer, expansion vessel 80l, pressure relief valve set at 5 bars, twin pump low head allowing a pressure drop in the water circuit up to 120kPa or twin pump high head allowing a pressure drop in the water circuit up to 220kPa, balancing valve and anti-freeze protection.

Control options

BACnet™ communications interface

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

LonTalk™ (LCI-C) Communications Interface

Provides the LonMar chiller profile inputs/outputs for use with a generic building automation system via a single twisted pair wiring to a factory installed and tested communication board.

ModBus™ Communications Interface

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

External chilled water setpoint

UC800 accepts either a 2-10 VDC or a 4-20mA input signal, to adjust the chilled water setpoint from a remote location.

External current limit setpoint

UC800 accepts either a 2-10VDC or a 4-20mA input signal to adjust the current limit setpoint from a remote location.

Run test report - Optional

Run test report gives the results of the performance test of the unit in the design conditions specified in the order write up with water without glycol.

The data recorded are: cooling capacity, power input, air temperature, water entering temperature, water leaving temperature and water flow.

* Components may differ depending on unit model and size. Contact your local sales office for details.

Other Options

Relief valves

Dual relief valve plus 3 way valve on high pressure side.

High performance insulation

Evaporator is insulated with 2 layers of Armaflex II or equivalent of 19 mm (3/4 inches) thickness and K factor of 0,26 W/m²°K.

Evaporator without insulation

Evaporator is not insulated and a specific insulation can be done on site.

Coated condensing coils

Condensing coils are protected with a cathodic epoxy electro deposition coating UV resistant.

Neoprene pads

Neoprene pads avoid a direct contact of the base of the unit with the ground.

Neoprene isolators

Isolators provide isolation between chiller and structure to help eliminate vibration transmission and have an efficiency of 95% minimum.

Grooved pipe plus weld coupling

Grooved pipes are connected on water inlet and outlet, the cooling allows the connection between the grooved pipe and the evaporator water connection.

Export shipping package

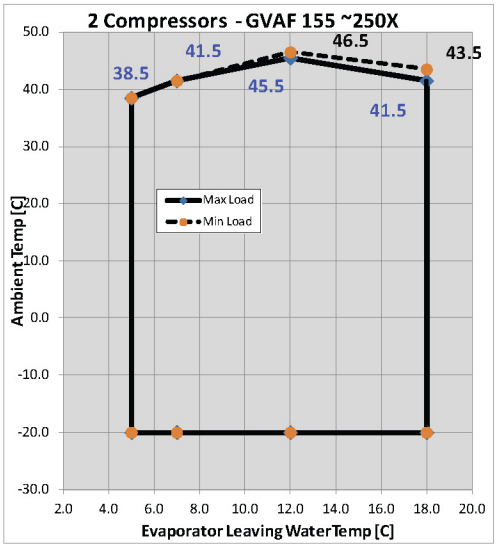
Metallic clog are fixed on the base frame of the unit. It prevents direct contact between the chiller and the container while loading and unloading from the container.

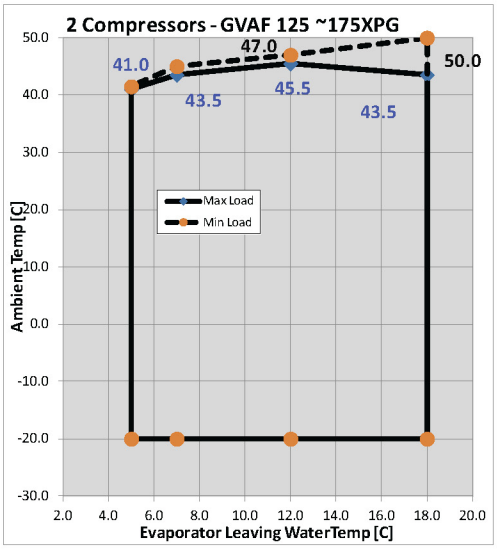
Options

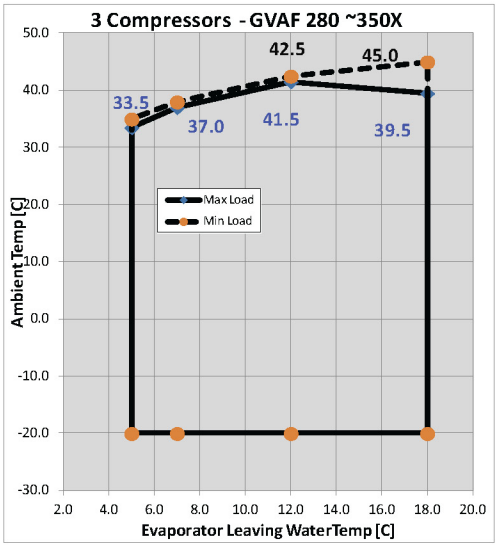
Operating Map

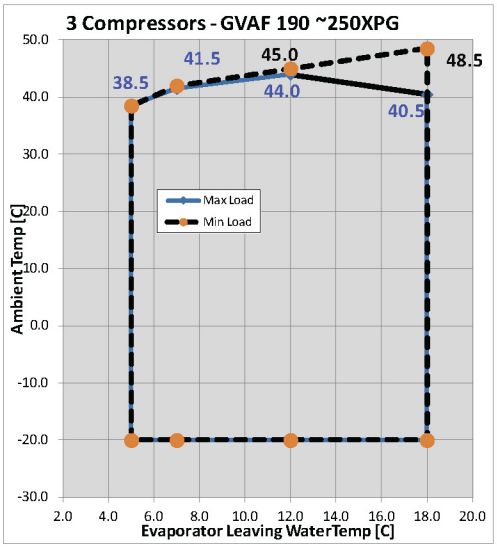
To choose the unit configuration, refer to operating map figure below:

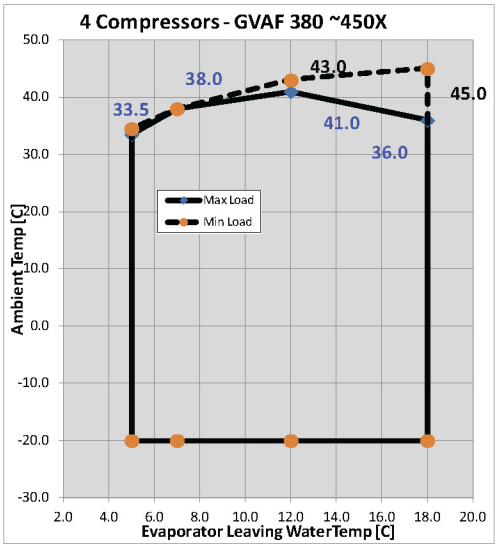
Figure 2 – GVAF Operating Map

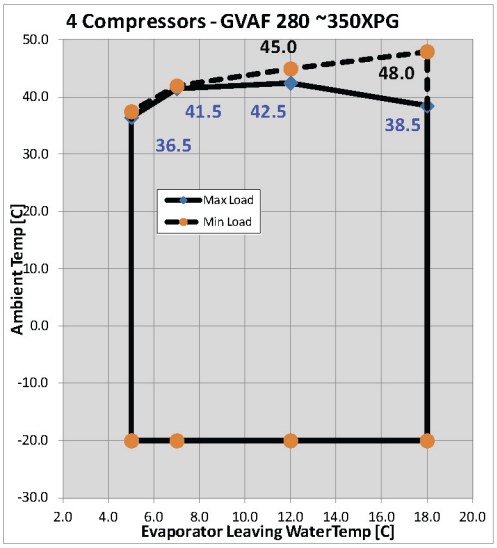






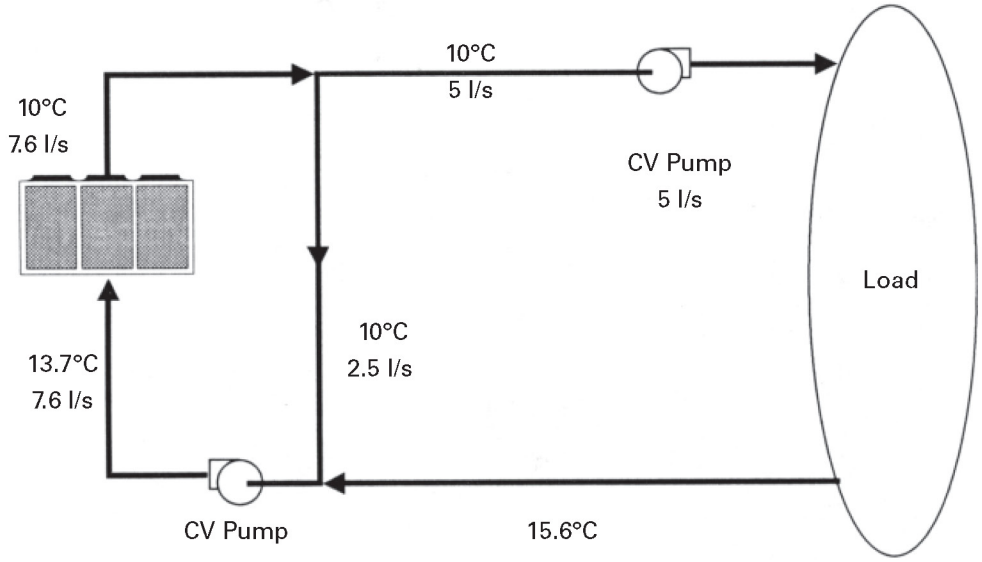






Application Considerations

Figure 3 – Flow rate Out of Range



Important

Certain application constraints should be considered when sizing, selecting, and installing Trane Sintesis Excellent chillers. Unit and system reliability is often dependent on properly and completely complying with these considerations. When the application varies from the guidelines presented, it should be reviewed with your local sales engineer.

Unit Sizing

Unit capacities are listed in the performance data section. Intentionally oversizing a unit to ensure 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 oversizing is desired, consider using two units.

Water Treatment

Dirt, scale, products of corrosion, and other foreign material will adversely affect heat transfer between the water and system components. Foreign matter in the chilled-water system can also increase pressure drop and, consequently, reduce water flow. Proper water treatment must be determined locally, depending on the type of system and local water characteristics. Neither salt nor brackish water is recommended for use in Trane Sintesis Excellent chillers. Use of either will lead to a shortened chiller life. Trane encourages the employment of a reputable water-treatment specialist, familiar with local water conditions, to assist in this determination and in the establishment of a proper water- treatment program.

Effect of Altitude on Capacity

Sintesis Excellent chiller capacities given in the performance data tables are for use at sea level. At elevations substantially above sea level, the decreased air density will reduce condenser capacity and, therefore, unit capacity and efficiency.

Ambient Limitations

Trane Sintesis Excellent chillers are designed for year-round operation over a range of ambient temperatures. For operation outside of the operating map, contact the local sales office.

Water Flow Limits

The minimum water flow rates are given in Tables 7 - 9. Evaporator flow rates below the tabulated values will result in laminar flow and cause freeze-up problems, scaling, stratification, and poor control.

The maximum evaporator water flow rate is also given in the general data section. Flow rates exceeding those listed may result in excessive tube erosion.

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 Model Sintesis Excellent evaporator. A simple piping change can alleviate this problem. For example: a plastic injection molding process requires 5.0 l/s [80 gpm] of 10°C [50°F] water and returns that water at 15.6°C [60°F]. The selected chiller can operate at these temperatures, but has a minimum flow rate of 7.6 l/s [120 gpm]. The following system can satisfy the process.

Application Considerations

Flow Control

Trane requires the chilled water flow control in conjunction with the Sintesis Excellent Chiller to be done by the chiller. This will allow the chiller to protect itself in potentially harmful conditions.

Leaving-Water Temperature Limits

The standard leaving solution temperature range is 4.4 to 18°C [40 to 65°F].

Leaving-Water Temperature

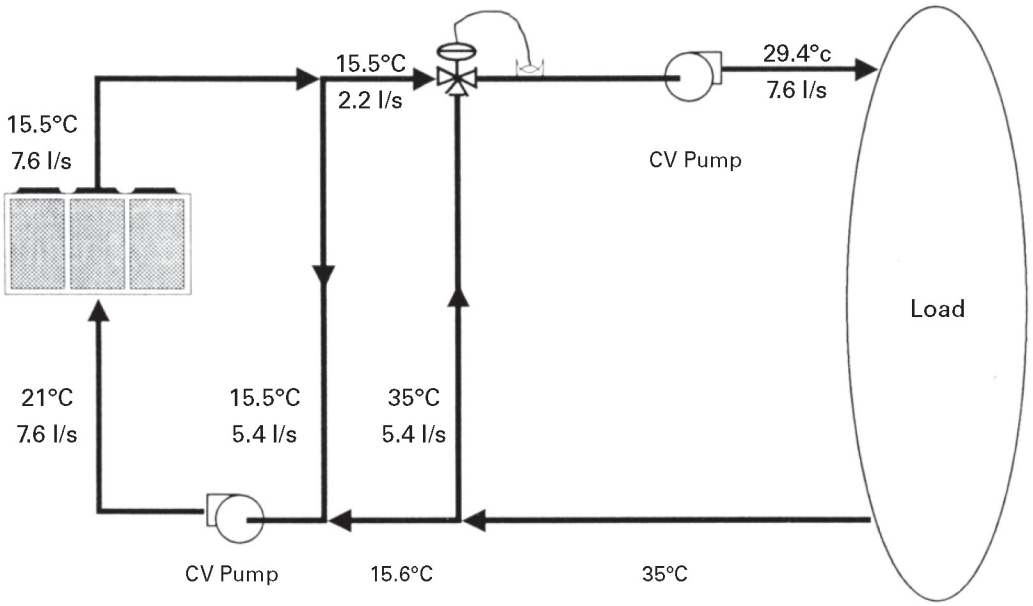
Out of Range

Many process cooling jobs require temperature ranges that cannot be met with the minimum and maximum published values for the GVAF evaporator. A simple piping change can alleviate this problem. For example: a laboratory load requires 7.6 l/s [120 gpm] of water entering the process at 29.4°C [85°F] and returning at 35°C [95°F]. The accuracy required is higher than the cooling tower can give. The selected chiller has adequate capacity, but has a maximum leaving-chilled- water temperature of 18°C [64°F]. In the example shown, both the chiller and process flow rates are equal. This is not necessary. For example, if the chiller had a higher flow rate, there would be more water bypassing and mixing with warm water.

Supply-Water Temperature Drop

The performance data for the Trane Sintesis Excellent chiller is based on a chilled-water temperature drop of 6°C [43°F]. Chilled-water temperature drops from 3.3 to 10°C [38 to 50°F] may be used as long as minimum and maximum water temperature, and minimum and maximum flow rates, is not violated. Temperature drops outside this range are beyond the optimum range for control, and may adversely affect the microcomputer's ability to maintain an acceptable supply-water temperature range. Further, temperature drops of less than 3.3°C [38°F] may result in inadequate refrigerant superheat. Sufficient superheat is always a primary concern in any direct-expansion refrigerant system and is especially important in a package chiller where the evaporator is closely coupled to the compressor. When temperature drops are less than 3.3°C [38°F], an evaporator runaround loop may be required.

Figure 4 – Flow rate Out of Range



Short Water Loops

The proper location of the temperature control sensor is in the supply (outlet) water connection or pipe. This location allows the building to act as a buffer and assures a slowly-changing return- water temperature. If there is not a sufficient volume of water in the system to provide an adequate buffer, temperature control can be lost, resulting in erratic system operation and excessive compressor cycling. A short water loop has the same effect as attempting to control using the building return water. Typically, a two-minute water loop is sufficient to prevent a short water loop. Therefore, as a guideline, ensure that the volume of water in the evaporator loop equals or exceeds two times the evaporator flow rate per minute. For a rapidly changing load profile, the amount of volume should be increased. To prevent the effect of a short water loop, the following item should be given careful consideration: a storage tank or larger header pipe to increase the volume of water in the system and, therefore, reduce the rate of change of the return water temperature.

Application Types

- Comfort cooling
- Industrial process cooling
- Thermal storage
- Low-temperature process cooling.

General Performance Data

Table 1 – GVAF X - LN Low Noise

Eurovent performances (1)		GVAF X 155 LN	GVAF X 175 LN	GVAF X 205 LN	GVAF X 245 LN	GVAF X 250 LN	GVAF X 280 LN	GVAF X 310 LN	GVAF X 350 LN	GVAF X 380 LN	GVAF X 410 LN	GVAF X 450 LN
Net cooling capacity	(kW)	577	640	758	849	883	1002	1121	1238	1375	1473	1580
EER		3.63	3.60	3.40	3.04	3.58	3.53	3.36	3.10	3.39	3.29	3.12
ESEER		4.92	4.89	4.97	4.88	5.30	5.22	5.11	4.88	5.35	5.27	5.16
Eurovent efficiency class cooling		A	A	A	B	A	A	A	A	A	A	A
Sound power level	(dBA)	92	93	93	94	95	95	95	96	96	96	97
Dimensions												
Unit length	(mm)	7895	7895	7895	7895	11260	11260	11260	11260	13510	13510	13510
Unit width	(mm)	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
Unit height	(mm)	2526	2526	2526	2526	2526	2526	2526	2526	2526	2526	2526
Weights (2)												
Operating weight	(kg)	4274	4274	4274	4274	5840	5840	5840	5840	7235	7235	7235

Table 2 – GVAF XP - LN Low Noise

Eurovent performances (1)		GVAF XP 190 LN	GVAF XP 205 LN	GVAF XP 245 LN	GVAF XP 310 LN	GVAF XP 350 LN
Net cooling capacity	(kW)	719	759	878	1117	1245
EER		3.55	3.54	3.48	3.47	3.49
ESEER		5.53	5.37	5.30	5.50	5.43
Eurovent efficiency class cooling		A	A	A	A	A
Sound power level	(dBA)	94	94	94	96	96
Dimensions						
Unit length	(mm)	11260	11260	11260	13510	13510
Unit width	(mm)	2200	2200	2200	2200	2200
Unit height	(mm)	2526	2526	2526	2526	2526
Weights (2)						
Operating weight	(kg)	5840	5840	5840	7235	7235

Table 3 – GVAF XPG - LN Low Noise

Eurovent performances (1)		GVAF XPG 125 LN	GVAF XPG 145 LN	GVAF XPG 155 LN	GVAF XPG 175 LN	GVAF XPG 190 LN	GVAF XPG 205 LN	GVAF XPG 245 LN	GVAF XPG 250 LN	GVAF XPG 280 LN	GVAF XPG 310 LN	GVAF XPG 350 LN
Net cooling capacity	(kW)	453	536	578	642	693	756	878	961	999	1121	1243
EER		4.03	3.92	3.76	3.45	4.02	3.98	3.72	3.41	3.92	3.73	3.47
ESEER		5.34	5.28	5.46	5.42	5.81	5.79	5.65	5.43	5.80	5.59	5.33
Eurovent efficiency class cooling		A	A	A	A	A	A	A	A	A	A	A
Sound power level	(dBA)	90	90	92	93	92	93	94	95	94	95	96
Dimensions												
Unit length	(mm)	7895	7895	7895	7895	11260	11260	11260	11260	13510	13510	13510
Unit width	(mm)	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
Unit height	(mm)	2526	2526	2526	2526	2526	2526	2526	2526	2526	2526	2526
Weights (2)												
Operating weight	(kg)	4274	4274	4274	4274	5840	5840	5840	5840	7235	7235	7235

(1) At evaporator water temperature: 12°C / 7°C - Condenser air temperature 35°C according to EN14511:2013

(2) Rated condition without pump package

Table 4 – GVAF X - XLN Extra Low Noise

Eurovent performances (1)		GVAF X 155 XLN	GVAF X 175 XLN	GVAF X 205 XLN	GVAF X 245 XLN	GVAF X 250 XLN	GVAF X 280 XLN	GVAF X 310 XLN	GVAF X 350 XLN	GVAF X 380 XLN	GVAF X 410 XLN	GVAF X 450 XLN
Net cooling capacity	(kW)	577	640	758	849	883	1002	1121	1238	1375	1473	1580
EER		3.68	3.66	3.44	3.07	3.64	3.58	3.40	3.13	3.43	3.32	3.15
ESEER		5.00	4.97	5.06	4.96	5.39	5.31	5.18	4.96	5.44	5.35	5.24
Eurovent efficiency class cooling		A	A	A	B	A	A	A	A	A	A	A
Sound power level	(dBA)	90	91	91	92	93	93	93	94	94	94	95
Dimensions												
Unit length	(mm)	7895	7895	7895	7895	11260	11260	11260	11260	13510	13510	13510
Unit width	(mm)	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
Unit height	(mm)	2672	2672	2672	2672	2672	2672	2672	2672	2672	2672	2672
Weights (2)												
Operating weight	(kg)	4414	4414	4414	4414	6040	6040	6040	6040	7475	7475	7475

Table 5 – GVAF XP - XLN Extra Low Noise

Eurovent performances (1)		GVAF XP 190 XLN	GVAF XP 205 XLN	GVAF XP 245 XLN	GVAF XP 310 XLN	GVAF XP 350 XLN
Net cooling capacity	(kW)	719	759	878	1117	1245
EER		3.61	3.60	3.53	3.52	3.54
ESEER		5.62	5.46	5.38	5.59	5.51
Eurovent efficiency class cooling		A	A	A	A	A
Sound power level	(dBA)	92	92	92	94	94
Dimensions						
Unit length	(mm)	11260	11260	11260	13510	13510
Unit width	(mm)	2200	2200	2200	2200	2200
Unit height	(mm)	2672	2672	2672	2672	2672
Weights (2)						
Operating weight	(kg)	6040	6040	6040	7475	7475

Table 6 – GVAF XPG - XLN Extra Low Noise

Eurovent performances (1)		GVAF XPG 125 XLN	GVAF XPG 145 XLN	GVAF XPG 155 XLN	GVAF XPG 175 XLN	GVAF XPG 190 XLN	GVAF XPG 205 XLN	GVAF XPG 245 XLN	GVAF XPG 250 XLN	GVAF XPG 280 XLN	GVAF XPG 310 XLN	GVAF XPG 350 XLN
Net cooling capacity	(kW)	453	536	578	642	693	756	878	961	999	1121	1243
EER		4.08	3.97	3.81	3.50	4.08	4.04	3.77	3.46	3.97	3.78	3.52
ESEER		5.41	5.36	5.54	5.50	5.90	5.88	5.74	5.51	5.88	5.66	5.39
Eurovent efficiency class cooling		A	A	A	A	A	A	A	A	A	A	A
Sound power level	(dBA)	88	89	90	91	90	91	92	93	92	93	94
Dimensions												
Unit length	(mm)	7895	7895	7895	7895	11260	11260	11260	11260	13510	13510	13510
Unit width	(mm)	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
Unit height	(mm)	2672	2672	2672	2672	2672	2672	2672	2672	2672	2672	2672
Weights (2)												
Operating weight	(kg)	4414	4414	4414	4414	6040	6040	6040	6040	7475	7475	7475

(1) At evaporator water temperature: 12°C / 7°C - Condenser air temperature 35°C according to EN14511:2013

(2) Rated condition without pump package

General Data

Table 7 – General Data GVAF 155-450 - High Efficiency Low Noise and Extra Low Noise

		GVAF X 155	GVAF X 175	GVAF X 205	GVAF X 245	GVAF X 250	GVAF X 280	GVAF X 310	GVAF X 350	GVAF X 380	GVAF X 410	GVAF X 450
Unit electrical data (2) (3) (5)												
Maximum Power input in cooling	(kW)	315	315	315	315	469	469	469	469	620	620	620
Unit rated amps (Max compr +Fan+Control)	(A)	506	506	506	506	755	755	755	755	998	998	998
Unit start up amps	(A)	506	506	506	506	755	755	755	755	998	998	998
Unit displacement power factor		0.88	0.88	0.88	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Max power cable cross section (mm²)	(mm²)	2x300	2x300	2x300	2x300	4x185	4x185	4x185	4x185	4x185	4x185	4x185
Disconnect switch size (A)		800	800	800	800	1250	1250	1250	1250	1250	1250	1250
Compressor												
Quantity	#	2	2	2	2	3	3	3	3	4	4	4
Type		Centrifugal										
Model (9)		TT350/TT350					TT350-TT350/TT350			TT350-TT350/TT350-TT350		
RPM range (up to)		29461	29461	29461	29461	29461	29461	29461	29461	29461	29461	29461
Max Compr Power input Circuit 1/Circuit 2	(kW)	143.4/143.4					143.4-143.4/143.4			143.4-143.4/143.4-143.4		
Max Amps Circuit1 / Circuit 2 (3) (5)	(A)	231/231					231-231/231			231-231/231-231		
Start up Amps Circuit1 / Circuit 2 (3) (5)	(A)	231/231					231-231/231-231			231-231/231-231		
Evaporator												
Quantity	#	1	1	1	1	1	1	1	1	1	1	1
Type		Flooded shell and tube heat exchanger										
Evaporator model		250-B	250-B	250-B	250-B	300-A	300-A	300-A	300-A	500-B	500-B	500-B
Evaporator Water Content volume	(l)	118	118	118	118	120	120	120	120	170	170	170
Antifreeze Heater	(W)	2040	2040	2040	2040	2240	2240	2240	2240	2440	2440	2440
Two pass evaporator												
Evap. Water Flow rate - Minimum	(l/s)	17.9	17.9	17.9	17.9	17.9	22.8	22.8	22.8	30.3	30.3	30.3
Evap. Water Flow rate - Maximum (6)	(l/s)	66.5	66.5	66.5	66.5	66.5	84.8	84.8	84.8	112.5	112.5	112.5
Nominal water connection size (Grooved coupling)	(in) - DN	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	8" - 200	8" - 200	8" - 200
Two pass with turbulator evaporator												
Evap. Water Flow rate - Minimum	(l/s)	14.9	14.9	14.9	14.9	14.9	19	19	19	25.3	25.3	25.3
Evap. Water Flow rate - Maximum (6)	(l/s)	59.7	59.7	59.7	59.7	59.7	76.1	76.1	76.1	101.1	101.1	101.1
Nominal water connection size (Grooved coupling)	(in) - DN	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	8" - 200	8" - 200	8" - 200
Hydraulic Module Components												
Standard head pressure pump option												
Available Head Pressure (1)	(kPa)	199	182	145	112	159	127	91	51	142	127	109
Max Motor Power input	(kW)	11	11	11	11	15	15	15	15	22	22	22
Max Amps	(A)	20.80	20.80	20.80	20.80	28	28	28	28	39.7	39.7	39.7
High head pressure pump option												
Available Head Pressure (1)	(kPa)	308	293	258	226	286	239	185	121	N/A	N/A	N/A
Max Motor Power input	(kW)	18.5	18.5	18.5	18.5	22	22	22	22	N/A	N/A	N/A
Max Amps	(A)	34.50	34.50	34.50	34.50	39.7	39.7	39.7	39.7	N/A	N/A	N/A
Expansion Tank Volume	(l)	80	80	80	80	160	160	160	160	160	160	160
Max User water loop Volume for factory mounted expansion tank (1)	(l)	6000	6000	6000	6000	8000	8000	8000	8000	8000	8000	8000
Max. Water-side Operating Pressure without pump package	(kPa)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Max. Water-side Operating Pressure with pump package	(kPa)	450	450	450	450	450	450	450	450	450	450	450
Antifreeze Heater with pump package	(W)	3100	3100	3100	3100	4300	4300	4300	4300	4300	4300	4300
Condenser												
Type		Full aluminum Micro channel heat exchanger										
Quantity	#	7/7	7/7	7/7	7/7	14/6	14/6	14/6	14/6	12/12	12/12	12/12
Face area per coil (m²)		2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Condenser Fan												
Quantity	#	14	14	14	14	20	20	20	20	24	24	24
Diameter	(mm)	800	800	800	800	800	800	800	800	800	800	800
Standard / High and Low ambient fan option												
Fan / motor Type		Propeller fan / Variable Brushless DC motor										
Airflow per Fan	(m^3/h)	19340	19340	20000	20000	20000	20000	20000	20000	20000	20000	20000
Max Power input per Motor	(kW)	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Max Amps per Motor	(A)	2.1	2.1	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Motor RPM	(rpm)	880	880	910	910	910	910	910	910	910	910	910

Table 7 – General Data GVAF 155-450 - High Efficiency Low Noise and Extra Low Noise (continued)

		GVAF X 155	GVAF X 175	GVAF X 205	GVAF X 245	GVAF X 250	GVAF X 280	GVAF X 310	GVAF X 350	GVAF X 380	GVAF X 410	GVAF X 450
Extra Low Noise fan option												
Fan / motor Type		Propeller fan / Variable Brushless DC motor										
Airflow per Fan	(m^3/h)	19302	19302	20000	20000	20000	20000	20000	20000	20000	20000	20000
Max Power input per Motor	(kW)	0.9	0.9	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Max Amps per Motor	(A)	1.6	1.6	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Motor RPM	(rpm)	830	830	860	860	860	860	860	860	860	860	860
System data (5)												
Nb of refrigerant circuit	#	2	2	2	2	2	2	2	2	2	2	2
Minimum cooling load % (4) (7)	%	36	32	27	24	24	20	18	16	20	19	18
R134a refrigerant charge Circuit1 / Circuit 2 (5)	(kg)	70/75	70/75	70/75	70/75	140/75	140/75	140/75	140/75	140/140	140/140	140/140

(2) Under 400V/3/50Hz.
(3) Rated Condition without Pump Package.
(4) Percent minimum load may be adjusted around 15%-20% according to operating conditions by local sales office.
(5) Electrical & system data are indicative and subject to change without notice. Please refer to unit nameplate data.
(6) Not applicable for Glycol application - see tables with Minimum Flow with Glycol.
(7) Max speed - range is 60% to 100% of max speed.
(8) Refrigerant charge may vary according to option - for instance +20% for process (digit 19=P). For real value refer to unit nameplate.
(9) Data containing information on two circuits shown as follows: ckt1/ckt2.

General Data

Table 8 – General Data GVAF 190 - 350 - Extra Efficiency Low Noise and Extra Low Noise

		GVAF XP 190	GVAF XP 205	GVAF XP 245	GVAF XP 310	GVAF XP 350
Unit electrical data (2) (3) (5)						
Maximum Power input in cooling	(kW)	469	469	469	620	620
Unit rated amps (Max compr +Fan+Control)	(A)	764	764	764	998	998
Unit start up amps	(A)	764	764	764	998	998
Unit displacement power factor		0.89	0.89	0.89	0.89	0.89
Max power cable cross section (mm²)	(mm²)	4x185	4x185	4x185	4x185	4x185
Disconnect switch size (A)		1250	1250	1250	1250	1250
Compressor						
Quantity	#	3	3	3	4	4
Type				Centrifugal		
Model (9)			TT350-TT350/TT350		TT350-TT350/TT350-TT350	
RPM range (up to)		29461	29461	29461	29461	29461
Max Compr Power input Circuit 1/Circuit 2	(kW)		143.4-143.4/143.4		143.4-143.4/143.4-143.4	
Max Amps Circuit1 / Circuit 2 (3) (5)	(A)		231-231/231		231-231/231-231	
Start up Amps Circuit1 / Circuit 2 (3) (5)	(A)		231-231/231		231-231/231-231	
Evaporator						
Quantity	#	1	1	1	1	1
Type						
Evaporator model		300-A	300-A	300-A	500-B	500-B
Evaporator Water Content volume	(l)	120	120	120	170	170
Antifreeze Heater	(W)	2240	2240	2240	2440	2440
Two pass evaporator						
Evap. Water Flow rate - Minimum	(l/s)	22.8	22.8	22.8	30.3	30.3
Evap. Water Flow rate - Maximum (6)	(l/s)	84.8	84.8	84.8	112.5	112.5
Nominal water connection size (Grooved coupling)	(in) - DN	6" - 150	6" - 150	6" - 150	8" - 200	8" - 200
Two pass with turbulator evaporator						
Evap. Water Flow rate - Minimum	(l/s)	19	19	19	25.3	25.3
Evap. Water Flow rate - Maximum (6)	(l/s)	76.1	76.1	76.1	101.1	101.1
Nominal water connection size (Grooved coupling)	(in) - DN	6" - 150	6" - 150	6" - 150	8" - 200	8" - 200
Hydraulic Module Components						
Standard head pressure pump option						
Available Head Pressure (1)	(kPa)	196	188	161	175	160
Max Motor Power input	(kW)	15	15	15	22	22
Max Amps	(A)	28	28	28	39.7	39.7
High head pressure pump option						
Available Head Pressure (1)	(kPa)	335	324	288	N/A	N/A
Max Motor Power input	(kW)	22	22	22	N/A	N/A
Max Amps	(A)	39.7	39.7	39.7	N/A	N/A
Expansion Tank Volume	(l)	160	160	160	160	160
Max User water loop Volume for factory mounted expansion tank (1)	(l)	8000	8000	8000	8000	8000
Max. Water-side Operating Pressure without pump package	(kPa)	1000	1000	1000	1000	1000
Max. Water-side Operating Pressure with pump package	(kPa)	450	450	450	450	450
Antifreeze Heater with pump package	(W)	4300	4300	4300	4300	4300
Condenser						
Type				Full aluminum Micro channel heat exchanger		
Quantity	#	14/6	14/6	14/6	12/12	12/12
Face area per coil (m²)		2.4	2.4	2.4	2.4	2.4
Condenser Fan						
Quantity	#	20	20	20	24	24
Diameter	(mm)	800	800	800	800	800
Standard / High and Low ambient fan option						
Fan / motor Type				Propeller fan / Variable speed - EC motor		
Airflow per Fan	(m^3/h)	20000	20000	20000	20000	20000
Max Power input per Motor	(kW)	1.3	1.3	1.3	1.3	1.3
Max Amps per Motor	(A)	2.3	2.3	2.3	2.3	2.3
Motor RPM	(rpm)	910	910	910	910	910

Table 8 – General Data GVAF 190 - 350 - Extra Efficiency Low Noise and Extra Low Noise (continued)

		GVAF XP 190	GVAF XP 205	GVAF XP 245	GVAF XP 310	GVAF XP 350
Extra Low Noise fan option						
Fan / motor Type						
Airflow per Fan	(m^3/h)	20000	20000	20000	20000	20000
Max Power input per Motor	(kW)	1.1	1.1	1.1	1.1	1.1
Max Amps per Motor	(A)	1.8	1.8	1.8	1.8	1.8
Motor RPM	(rpm)	860	860	860	860	860
System data (5)						
Nb of refrigerant circuit	#	2	2	2	2	2
Minimum cooling load % (4) (7)	%	28	26	23	25	22
R134a refrigerant charge Circuit1 / Circuit 2 (5)	(kg)	140/75	140/75	140/75	140/140	140/140

(2) Under 400V/3/50Hz.
(3) Rated Condition without Pump Package.
(4) Percent minimum load may be adjusted around 15%-20% according to operating conditions by local sales office.
(5) Electrical & system data are indicative and subject to change without notice. Please refer to unit nameplate data.
(6) Not applicable for Glycol application - see tables with Minimum Flow with Glycol.
(7) Max speed - range is 60% to 100% of max speed.
(8) Refrigerant charge may vary according to option - for instance +20% for process (digit 19=P). For real value refer to unit nameplate.
(9) Data containing information on two circuits shown as follows: ckt1/ckt2.

General Data

Table 9 – General Data GVAF 125 350 - Extra Efficiency XPG (HFO) Low Noise and Extra Low Noise

		GVAF XP-G 125	GVAF XP-G 145	GVAF XP-G 155	GVAF XP-G 175	GVAF XP-G 190	GVAF XP-G 205	GVAF XP-G 245	GVAF XP-G 250	GVAF XP-G 280	GVAF XP-G 310	GVAF XP-G 350
Unit electrical data (2) (3) (5)												
Maximum Power input in cooling	(kW)	234	234	234	234	347	347	347	347	457	457	457
Unit rated amps (Max compr +Fan+Control)	(A)	374	374	374	374	557	557	557	557	734	734	734
Unit start up amps	(A)	374	374	374	374	557	557	557	557	734	734	734
Unit displacement power factor		0.88	0.88	0.88	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Max power cable cross section (mm²)	(mm²)	2x300	2x300	2x300	2x300	2x300	2x300	2x300	2x300	4x185	4x185	4x185
Disconnect switch size (A)		630	630	630	630	800	800	800	800	1250	1250	1250
Compressor												
Quantity	#	2	2	2	2	3	3	3	3	4	4	4
Type							Centrifugal					
Model (9)			TG310/TG310				TG310-TG310/TG310			TG310-TG310/TG310-TG310		
RPM range (up to)		27957	27957	27957	27957	27957	27957	27957	27957	27957	27957	27957
Max Compr Power input Circuit 1/Circuit 2	(kW)		101.3/101.3				101.3-101.3/101.3				101.3-101.3/101.3-101.3	
Max Amps Circuit1 / Circuit 2 (3) (5)	(A)		165-165				165-165/165				165-165/165-165	
Start up Amps Circuit1 / Circuit 2 (3) (5)	(A)		165-165				165-165/165				165-165/165-165	
Evaporator												
Quantity	#	1	1	1	1	1	1	1	1	1	1	1
Type												
Evaporator model		250-B	250-B	250-B	250-B	300-A	300-A	300-A	300-A	500-B	500-B	500-B
Evaporator Water Content volume	(l)	118	118	118	118	120	120	120	120	170	170	170
Antifreeze Heater	(W)	2040	2040	2040	2040	2240	2240	2240	2240	2440	2440	2440
Two pass evaporator												
Evap. Water Flow rate - Minimum	(l/s)	17.9	17.9	17.9	17.9	22.8	22.8	22.8	22.8	30.3	30.3	30.3
Evap. Water Flow rate - Maximum (6)	(l/s)	66.5	66.5	66.5	66.5	84.8	84.8	84.8	84.8	112.5	112.5	112.5
Nominal water connection size (Grooved coupling)	(in) - DN	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	8" - 200	8" - 200	8" - 200
Two pass with turbulator evaporator												
Evap. Water Flow rate - Minimum	(l/s)	14.9	14.9	14.9	14.9	19	19	19	19	25.3	25.3	25.3
Evap. Water Flow rate - Maximum (6)	(l/s)	59.7	59.7	59.7	59.7	76.1	76.1	76.1	76.1	101.1	101.1	101.1
Nominal water connection size (Grooved coupling)	(in) - DN	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	6" - 150	8" - 200	8" - 200	8" - 200
Hydraulic Module Components												
Standard head pressure pump option												
Available Head Pressure (1)	(kPa)	225	208	198	181	201	188	161	139	188	175	160
Max Motor Power input	(kW)	11	11	11	11	15	15	15	15	22	22	22
Max Amps	(A)	20.8	20.8	20.8	20.8	28	28	28	28	39.7	39.7	39.7
High head pressure pump option												
Available Head Pressure (1)	(kPa)	334	318	308	292	341	325	288	256	N/A	N/A	N/A
Max Motor Power input	(kW)	18.5	18.5	18.5	18.5	22	22	22	22	N/A	N/A	N/A
Max Amps	(A)	34.5	34.5	34.5	34.5	39.7	39.7	39.7	39.7	N/A	N/A	N/A
Expansion Tank Volume	(l)	80	80	80	80	160	160	160	160	160	160	160
Max User water loop Volume for factory mounted expansion tank (1)	(l)	6000	6000	6000	6000	8000	8000	8000	8000	8000	8000	8000
Max. Water-side Operating Pressure without pump package	(kPa)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Max. Water-side Operating Pressure with pump package	(kPa)	450	450	450	450	450	450	450	450	450	450	450
Antifreeze Heater with pump package	(W)	3100	3100	3100	4300	4300	4300	4300	4300	4300	4300	4300
Condenser												
Type							Full aluminum Micro channel heat exchanger					
Quantity	#	7/7	7/7	7/7	7/7	14/6	14/6	14/6	14/6	12/12	12/12	12/12
Face area per coil (m²)		2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Condenser Fan												
Quantity	#	14	14	14	14	20	20	20	20	24	24	24
Diameter	(mm)	800	800	800	800	800	800	800	800	800	800	800
Standard / High and Low ambient fan option												
Fan / motor Type												
Airflow per Fan	(m^3/h)	16703	17802	18901	20000	16703	17802	18901	20000	17802	18901	20000
Max Power input per Motor	(kW)	0.8	0.9	1.1	1.3	0.8	0.9	1.1	1.3	0.9	1.1	1.3
Max Amps per Motor	(A)	1.3	1.6	1.9	2.3	1.3	1.6	1.9	2.3	1.6	1.9	2.3
Motor RPM	(rpm)	760	810	860	910	760	810	860	910	810	860	910

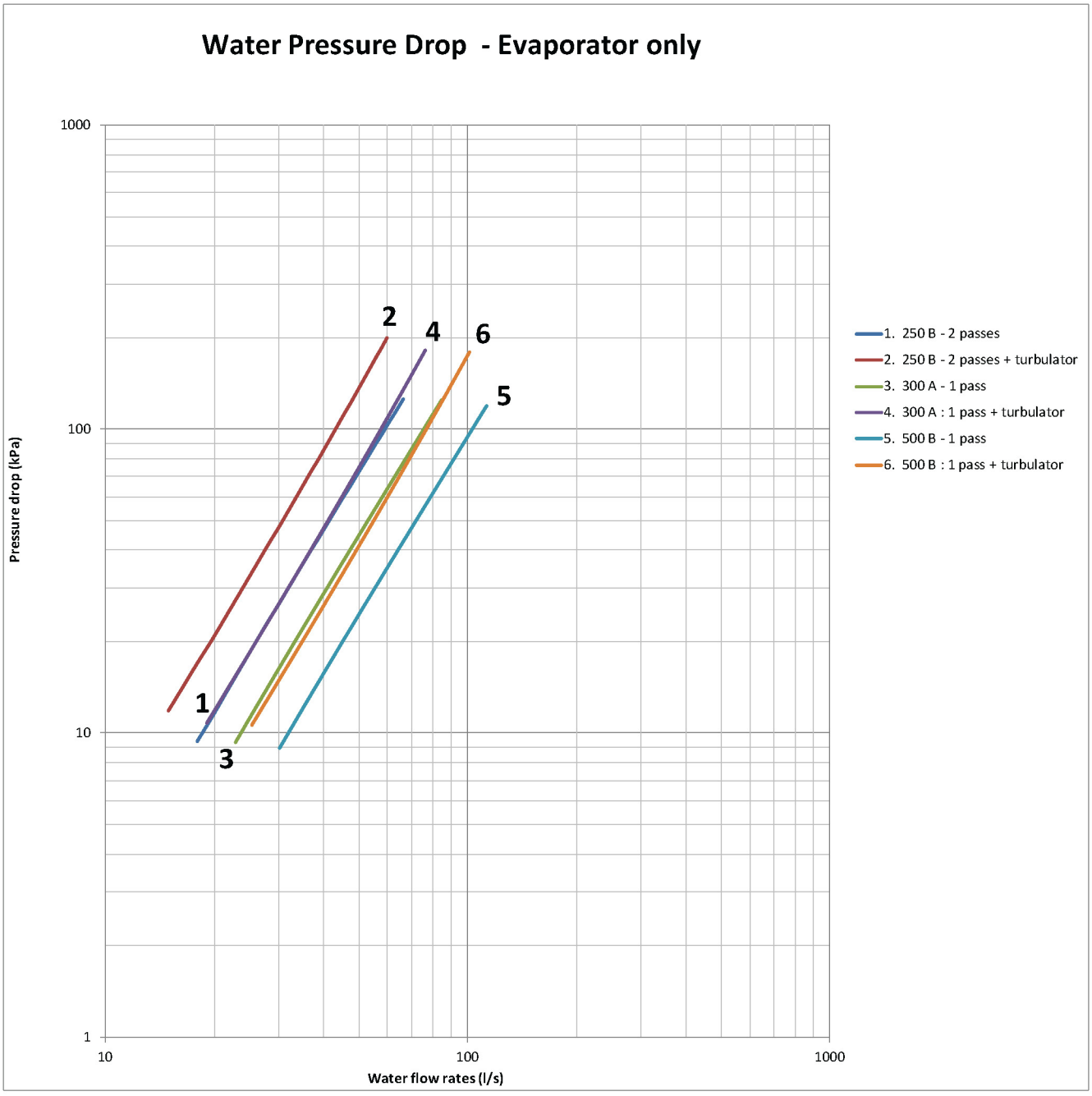
Table 9 – General Data GVAF 125 350 - Extra Efficiency XPG (HFO) Low Noise and Extra Low Noise (continued)

		GVAF XP-G 125	GVAF XP-G 145	GVAF XP-G 155	GVAF XP-G 175	GVAF XP-G 190	GVAF XP-G 205	GVAF XP-G 245	GVAF XP-G 250	GVAF XP-G 280	GVAF XP-G 310	GVAF XP-G 350
Extra Low Noise fan option												
Fan / motor Type												
Airflow per Fan	(m^3/h)	16512	17674	18837	20000	16512	17674	18837	20000	17674	18837	20000
Max Power input per Motor	(kW)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Max Amps per Motor	(A)	1.0	1.2	1.5	1.8	1.0	1.2	1.8	1.8	1.2	1.5	1.8
Motor RPM	(rpm)	710	760	810	860	710	760	810	860	760	810	860
System data (5)												
Nb of refrigerant circuit	#	2	2	2	2	2	2	2	2	2	2	2
Minimum cooling load % (4) (7)	%	34	29	27	24	20	18	16	16	14	13	12
R1234ze(E) refrigerant charge Circuit1 / Circuit 2 (5)	(kg)	70/75	70/75	70/75	70/75	140/75	140/75	140/75	140/75	140/140	140/140	140/140

(2) Under 400V/3/50Hz.
(3) Rated Condition without Pump Package.
(4) Percent minimum load may be adjusted around 15%-20% according to operating conditions by local sales office.
(5) Electrical & system data are indicative and subject to change without notice. Please refer to unit nameplate data.
(6) Not applicable for Glycol application - see tables with Minimum Flow with Glycol.
(7) Max speed - range is 60% to 100% of max speed.
(8) Refrigerant charge may vary according to option - for instance +20% for process (digit 19=P). For real value refer to unit nameplate.
(9) Data containing information on two circuits shown as follows: ckt1/ckt2.

Evaporator Waterside

Figure 5 – Evaporator water pressure drop

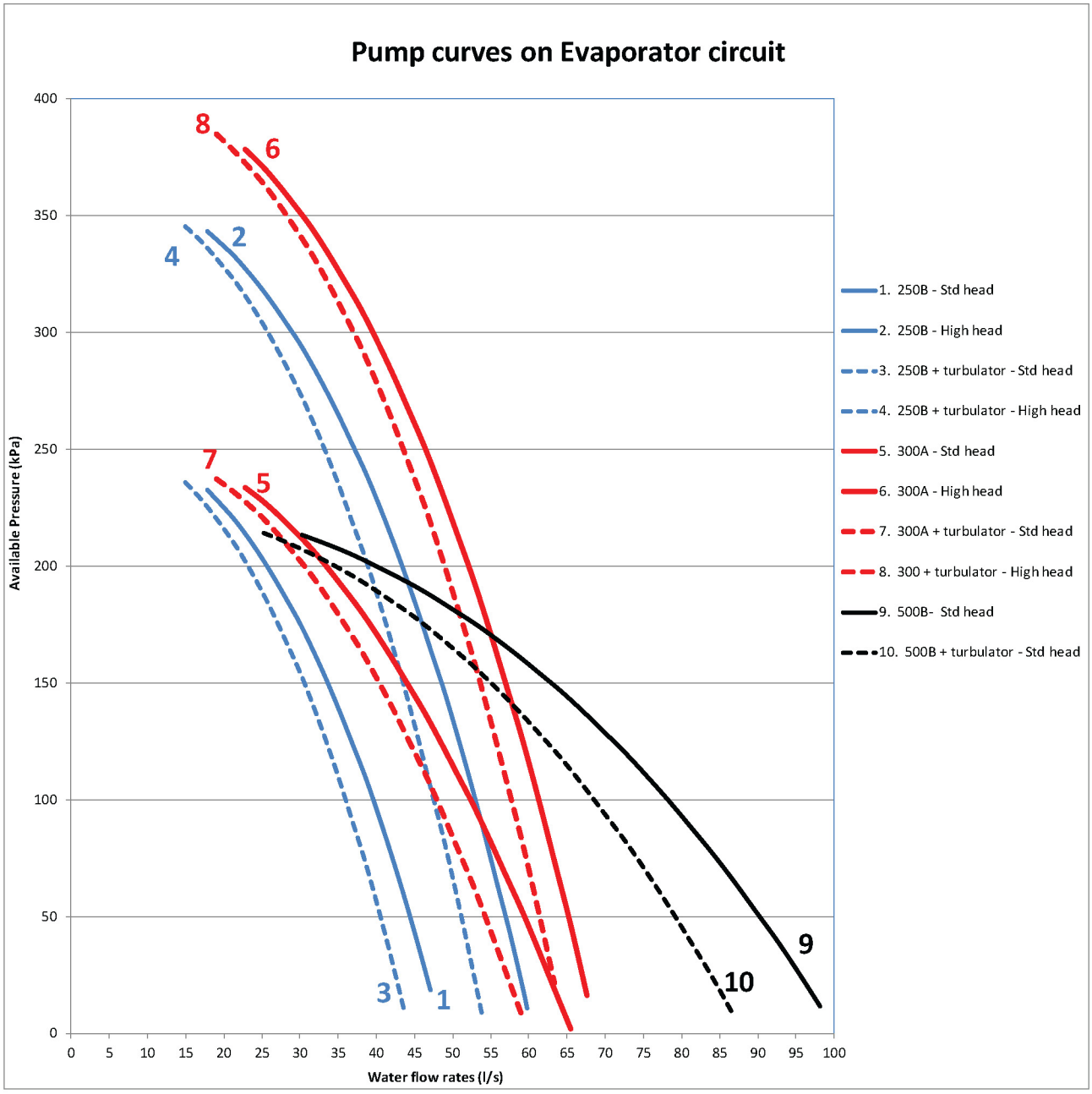


Optional Integrated Pump Package

Pump Curves

In the figures below are described Pump Curves with a combination of Standard Head - High Head with standard tubes and turbulators inside the evaporator for the whole unit range.

Figure 6 – Pump Curve



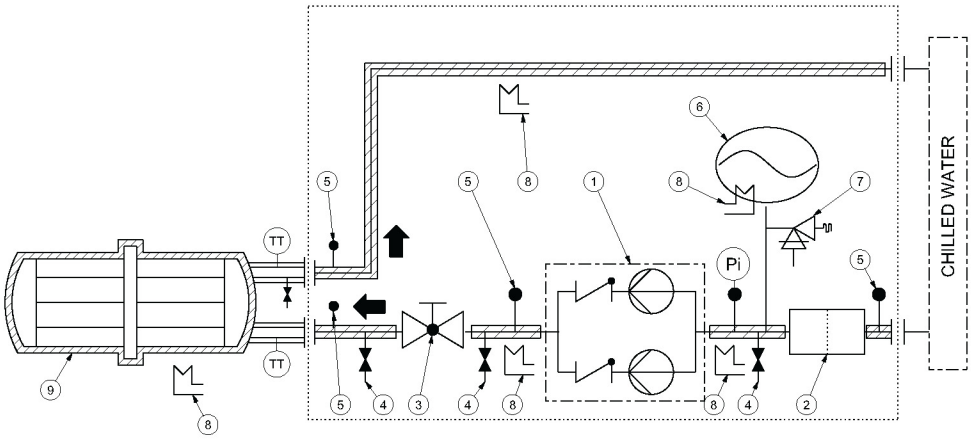
Hydraulic Module

The hydraulic module includes*:

- Twin water pump: Low pressure or High pressure
- Water strainer to protect the water circuit against fouling
- Expansion vessel and pressure relief valve to protect the water circuit against over pressure
- Thermal insulation for antifreeze protection
- Balancing valve to adjust the water flow
- Drain valve

* Components may differ depending on unit model and size. Contact your local sales office for details.

Figure 7 – Hydraulic module option



1 = Twin centrifugal pump
2 = Water strainer
3 = Balancing valve
4 = Drain valve
5 = Valve for pressure point
6 = Expansion tank
7 = Pressure relief valve
8 = Antifreeze protection
9 = Evaporator
Pi = Gauge
TT = Temperature sensor

Controls System

Tracer UC800 Controller

Today's Sintesis Excellent chillers offer predictive controls that anticipate and compensate for load changes. Other control strategies made possible with the Tracer UC800 controls are:

Feedforward Adaptive Control

Feedforward is an open-loop, predictive control strategy designed to anticipate and compensate for load changes. It uses evaporator entering-water temperature as an indication of load change.

This allows the controller to respond faster and maintain stable leaving-water temperatures.

Soft Loading

The chiller controller uses soft loading except during manual operation. Large adjustments due to load or setpoint changes are made gradually, preventing the compressor from cycling unnecessarily. It does this by internally filtering the setpoints to avoid reaching the differential-to-stop or the demand limit. Soft loading applies to the leaving chilled-water temperature and demand limit setpoints.

Adaptive Controls

There are many objectives that the controller must meet, but it cannot satisfy more than one objective at a time. Typically, the controllers primary objective is to maintain the evaporator leaving water temperature.

Whenever the controller senses that it can no longer meet its primary objective without triggering a protective shutdown, it focuses on the most critical secondary objective. When the secondary objective is no longer critical, the controller reverts to its primary objective

Rapid Restart

The controller allows the Sintesis Excellent chiller to perform a Rapid Restart. A Rapid Restart is performed after a momentary power loss if it occurs during operation. Similarly, if the chiller shuts down on a non-latching diagnostic and the diagnostic later clears itself, a Rapid Restart will be initiated

AdaptiSpeed Control

The speed control is now optimized mathematically and controlled simultaneously. The increased performance of the UC800 Controller allows the chiller to operate longer at higher efficiency, and with greater stability.

Variable-Primary Flow (VPF)

Chilled-water systems that vary the water flow through chiller evaporators have caught the attention of engineers, contractors, building owners, and operators. Varying the water flow reduces the energy consumed by pumps, while having limited effect on the chiller energy consumption. This strategy can be a significant source of energy savings, depending on the application.

TD7 Operator Interface

The standard TD7 display provided with the Trane UC800 controller features a 7" LCD touch-screen, allowing access to all operational inputs and outputs. This is an advanced interface that allows the user to access any important information concerning setpoints, active temperatures, modes, electrical data, pressure, and diagnostics.

Display Features Include:

- Factory-mounted above the control panel door
- UV Resistant touchscreen
- -40°C to 70°C Operating temperature
- IP56 rated
- CE marking
- Emissions: EN55011(Class B)
- Immunity: EN61000(Industrial)
- 7" diagonal
- 800x480 pixels
- TFT LCD @ 600 nits brightness
- 16 bit color graphic display
- Display features:
  Alarms
  Reports
  Chiller settings
  Display settings
  Graphing
  Support for 15 languages

Figure 8 – TD7 operator interface

TracerTU Interface

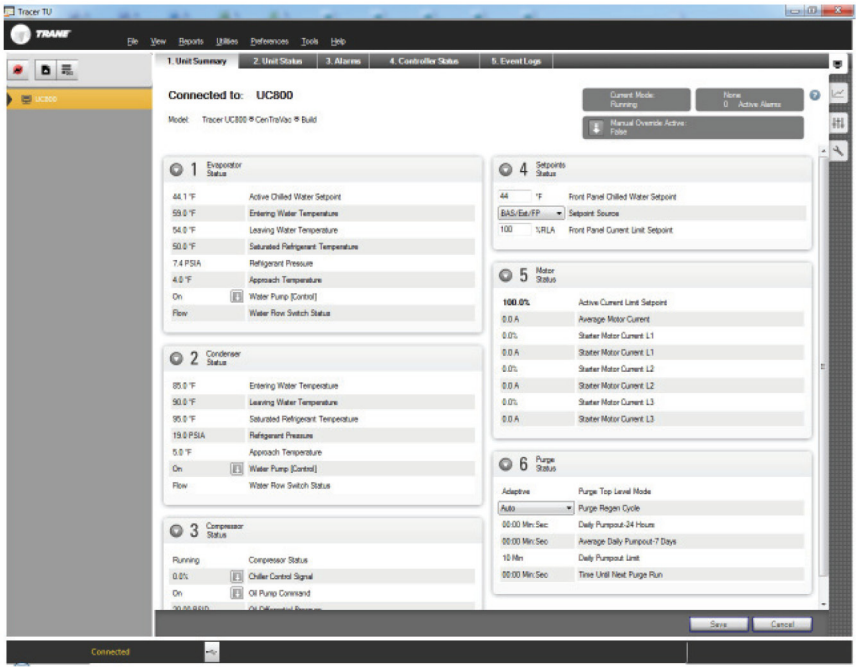
TracerTU (n on-Trane personnel, contact your local Trane office for software) adds a level of sophistication that improves service technician effectiveness and minimizes chiller downtime. The portable PC-based service-tool software, TracerTU, supports service and maintenance tasks. TracerTU serves as a common interface to all Trane® chillers, and will customize itself based on the properties of the chiller with which it is communicating. Thus, the service technician learns only one service interface. The panel bus is easy to troubleshoot using LED sensor verification. Only the defective device is replaced. TracerTU can communicate with individual devices or groups of devices. All chiller status, machine configuration settings, customizable limits, and up to 100 active or historic diagnostics are displayed through the service-tool software interface. LEDs and their respective TracerTU indicators visually confirm the availability of each connected sensor, relay, and actuator.

TracerTU is designed to run on a customer's laptop, connected to the Tracer TD7 control panel with a USB cable. Your laptop must meet the following hardware and software requirements:

- 1 GB RAM (minimum)
- 1024 x 768 screen resolution
- CD-ROM drive
- Ethernet 10/100 LAN card
- An available USB 2.0 port
- Microsoft® Windows® XP Professional operation system with Service Pack 3 (SP3) or Windows 7 Enterprise or Professional operating system (32-bit or 64-bit)
- Microsoft .NET Framework 4.0 or later

Note: TracerTU is designed and validated for this minimum laptop configuration. Any variation from this configuration may have different results. Therefore, support for TracerTU is limited to only those laptops with the configuration previously specified.

Figure 9 – Screen TD7 interface



Controls System

System Integration

Stand-Alone Controls

Single chillers installed in applications without a building management system are 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.

- 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 requires 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, 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 V dc signal, or by utilizing contact closures. This setup has the same features as a stand-alone water chiller, with the possibility of having additional optional features:

- External chilled 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.
- **BACnet Interface**
- Tracer TD7 control can be configured for BACnet communications at the factory or in the field. This enables the chiller controller to communicate on a BACnet MS/TP network. Chiller setpoints, operating modes, alarms, and status can be monitored and controlled through BACnet. Tracer TD7 controls conforms to the BACnet B-ASC profile as defined by ASHRAE 135-2004.
- LonTalk Communications Interface (LCI-C).
- The optional LonTalk® Communications Interface for Chillers (LCI-C) is available factory or field installed. It is an integrated communication board that enables the chiller controller to communicate over a LonTalk network. The LCI-C is capable of controlling and monitoring chiller setpoints, operating modes, alarms, and status. The Trane LCI-C provides additional points beyond the standard LONMARK® defined chiller profile to extend interoperability and support a broader range of system applications. These added points are referred to as open extensions. The LCI-C is certified to the LONMARK Chiller Controller Functional Profile 8040 version 1.0, and follows LonTalk FTT-10A free topology communications.

Modbus Interface Tracer TD7 control can be configured for Modbus communications at the factory or in the field. This enables the chiller controller to communicate as a slave device on a Modbus network. Chiller setpoints, operating modes, alarms, and status can be monitored and controlled by a Modbus master device.

Tracer Summit

The chiller plant control capabilities of the Trane Tracer Summit™ building automation system are unequaled 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 GVAF 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)
- 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
- Regulatory Compliance Documentation
- Gathers information and generates the reports mandated in ASHRAE Guideline 3
- 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.

Tracer SC

The Tracer SC™ system controller acts as the central coordinator for all individual equipment devices on a Tracer building automation system. The Tracer SC scans all unit controllers to update information and coordinate building control, including building subsystems such as VAV and chiller water systems. With this system option, the full breadth of Trane's HVAC and controls experience are applied to offer solutions to many facility issues. The LAN allows building operators to manage these varied components as one system from any personal computer with web access.

The benefits of this system are:

- Improved usability with automatic data collection, enhanced data logging, easier to create graphics, simpler navigation, pre-programmed scheduling, reporting, and alarm logs.
- Flexible technology allows for system sizes from 30-120 unit controllers with any combination of LonTalk or BACnet unit controllers.
- LEED certification through site commissioning report, energy data collection measurement, optimizing energy performance, and maintaining indoor air quality.

Energy savings programs include: fan pressure optimization, ventilation reset, and chiller plant control (adds and subtracts chillers to meet cooling loads).

Building Automation and Chiller Plant Control

The UC800 controller can communicate with Trane Tracer Summit, Tracer SC and Tracer ES building automation systems, which include pre-engineered and flexible control for chiller plants. These building automation systems can control the operation of the complete installation: chillers, pumps, isolating valves, air handlers, and terminal units.

Trane can undertake full responsibility for optimized automation and energy management for the entire chiller plant.

The main functions are:

- **Chiller sequencing:** equalizes the number of running hours of the chillers. Different control strategies are available depending on the configuration of the installation.
- **Control of the auxiliaries:** includes input/output modules to control the operation of the various auxiliary equipment (water pumps, valves, etc.).
- **Time-of-day scheduling:** allows the end user to define the occupancy period, for example: time of the day, holiday periods and exception schedules.
- **Optimization of the installation start/stop time:** based on the programmed schedule of occupancy and the historical temperature records. Tracer Summit and Tracer SC calculate the optimal start/stop time of the installation to get the best compromise between energy savings and comfort of the occupants.
- **Soft loading:** the soft loading function minimizes the number of chillers that are operated to satisfy a large chilled-water-loop pull down, thus preventing an overshoot of the actual capacity required. Unnecessary starts are avoided and the peak current demand is lowered.
- **Communication capabilities:** local, through a PC workstation keyboard. Tracer Summit and Tracer SC can be programmed to send messages to other local or remote workstations and or a pager in the following cases:
  - Analog parameter exceeding a programmed value
  - Maintenance warning
  - Component failure alarm
  - Critical alarm messages. In this latter case, the message is displayed until the operator acknowledges the receipt of the information. From the remote station it is also possible to access and modify the chiller plants control parameters.

Remote communication through a modem: as an option, a modem can be connected to communicate the plant operation parameters through voice grade phone lines.

A remote terminal is a PC workstation equipped with a modem and software to display the remote plant parameters.

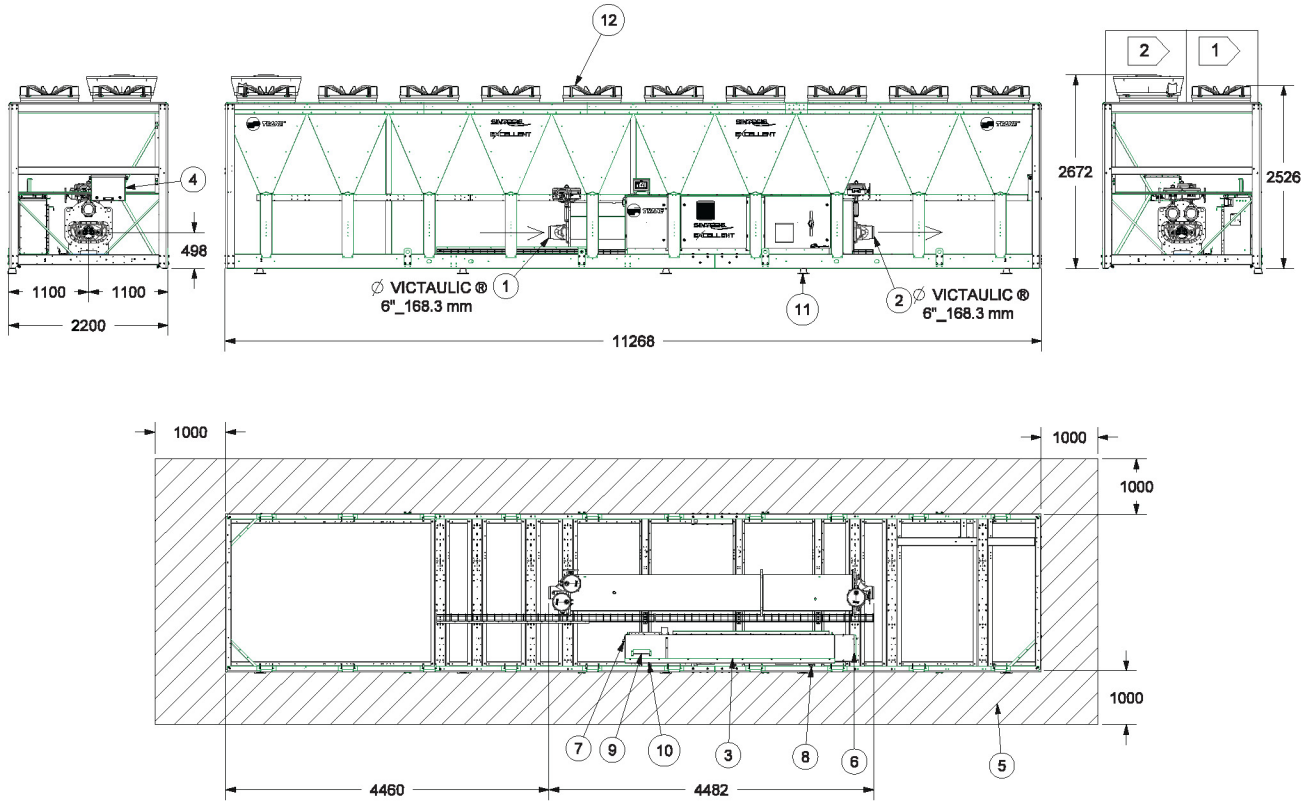
Integrated Comfort System (ICS)

The onboard Tracer chiller controller is designed to be able to communicate with a wide range of building automation systems. In order to take full advantage of chiller's capabilities, incorporate your chiller into a Tracer Summit or Tracer SC building automation system. But the benefits do not stop at the chiller plant. At Trane, we realize that all the energy used in your cooling system is important. That is why we worked closely with other equipment manufacturers to predict the energy required by the entire system. We used this information to create patented control logic for optimizing HVAC system efficiency. The building owners challenge is to tie components and applications expertise into a single reliable system that provides maximum comfort, control, and efficiency. Trane Integrated Comfort systems (ICS) are a concept that combines system components, controls, and engineering applications expertise into a single, logical, and efficient system. These advanced controls are fully commissioned and available on every piece of Trane® equipment, from the largest chiller to the smallest VAV box. As a manufacturer, only Trane offers this universe of equipment, controls, and factory installation and verification.

Dimensional Data

The dimensional data below are given for example only. Dimensions details, dimensions of hydraulic connections, electrical connections, weights, isolator positioning, specific features for free cooling are included in submittals and diagrams provided in documentation package.

Figure 10 – Typical submittal example: GVAF 250X-350X / GVAF 190XP-245XP / GVAF 190XPG-250XPG



	ENGLISH
①	EVAPORATOR WATER INLET CONNECTION
②	EVAPORATOR WATER OUTLET CONNECTION
③	ELECTRICAL PANEL
④	ELECTRICAL PANEL CONDENSER
⑤	MINIMUM CLEARANCE (AIR ENTERING AND MAINTENANCE)
⑥	POWER CABLE GLAND PLATE FOR CUSTOMER WIRING
⑦	EXTERNAL CONTROL WIRING CABLE GLAND PLATE
⑧	POWER DISCONNECT SWITCH
⑨	DISPLAY MODULE
⑩	MAIN PROCESSOR MODULE
⑪	ISOLATORS
⑫	FANS
1	SN_LN UNIT
2	OPTION XLN

Important! Additional space is required to remove evaporator tubes.
For GVAF: 2.5 m in front of the unit (evaporator side).

Notes

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Trane - by Trane Technologies (NYSE: TT), a global climate innovator - creates comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit trane.com or tranetechnologies.com.

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