Technical Details BluAstrum 1500
Never installed, brand new
Year of construction : 2022

Scope of Supply
GEA BluAstrum 1500 (W)

Ammonia-Liquid Chiller Type GEA BluAstrum 1500 (W)
High-efficient Ammonia liquid Chiller with screw compressor, evaporator and condenser in execution as shell & plate type heat
exchanger, evaporator as combined device (evaporator/liquid separator) as a compact, factory packaged unit, ready for connection on site. The GEA BluAstrum series is equipped with VSD (variable speed drive) by default. The base tub is executed as a drip tray.

1. Technical data
Cond. 1 Cond. 2 Cond. 3
Refrigerant R717
Rated cooling capacity 653 989 984 kW
EER - Energy Efficiency Ratio (line) 2,44 2,36 2,32
Total electrical consumption (line) 268 420 424 kW

Evaporator / liquid separator
Plate heat-exchanger of fully welded design with integrated liquid separator; stainless steel secondary refrigerant ports, completed with Victaulic connections including counter piece (welded stud).
Medium Ethylene glycol 25%
Secondary refrigerant inlet temperature 4,7 4,5 4,0 °C
Secondary refrigerant outlet temperature 1,7 1,5 1,0 °C
Secondary refrigerant volume flow 197,2 298,4 297,1 m³/h
Secondary refrigerant NB in/out 125 DN
Design pressure liquid side 16 bar(g)
Design pressure refrigerant side 16 bar(g)
Secondary refrigerant min. circuit pressure 1 bar(g)
Plate material AISI 316L
Pressure drop < 0,7 < 0,7 < 0,7 bar

Condenser
Plate heat-exchanger of fully welded design; stainless steel media ports, completed with Victaulic connections including counter piece (welded stud).
Medium Water (non-corrosive)
Condenser capacity 730 1152 1151 kW
Cooling medium inlet temperature 45,0 45,0 45,0 °C
Cooling medium outlet temperature 55,0 55,0 55,0 °C
Cooling medium volume flow 63,6 100,4 100,3 m³/h
Cooling medium NB in/out 100 DN
Design pressure liquid side 10 bar(g)
Design pressure refrigerant side 28 bar(g)
Cooling medium min. circuit pressure 1 bar(g)
Cassette material AISI 316L
Pressure drop < 1,0 < 1,0 < 1,0 bar

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Please notice that in case of water as secondary refrigerant or cooling media the selection of the plate material of evaporator, condenser and oil cooler (if selected) is based on the assumption of a water quality comparable to VDI rule 3803 and a maximum concentration of Chloride Ions of 200 ppm (evaporator) and 150 ppm (condenser / oilcooler).

Also required are pH values of both – secondary refrigerant and cooling media – between 7 and 9.
If variable flow is required, please ensure that suction pressure will not vary faster than 3K/120s. (limit to stop the chiller automatically). Please include a proper sized buffer tank on secondary refrigerant side!

2. Dimensions

The following values for dimensions, weights and charges are preliminary. Final binding data according to the latest version of
the general drawing only.
Length 7200 mm
Width 2400 mm
Height 1200 mm
Oil charge 190 l
Refrigerant charge of supplied components 85 kg
Total transport weight 9700 kg
Total operational weight 10194 kg
ATTENTION
The unit exceeds the loading dimensions of the selected form of transport. Respective parts will be dismounted and delivered loosely.

3. General declarations

Deviations in cooling capacity and power input maximum acc. to EN 12900 and DIN 8976; selection of oil according to GEA documentation.
The chiller is designed according to the operating conditions written in this document. Intended deviations have to be confirmed
by GEA.
Min ambient temperature 5 °C
Max ambient temperature 40 °C
Max elevation 1000 m
Installation conditions Indoor
Power supply (from net) 400 V / 50 Hz ± 5%
Recommended oil type GEA PR OLEO C MH68A
(for alternatives please contact GEA Berlin)
The oil charge is included in the scope of supply.
All performance data refer to a constant volume flow of the secondary refrigerant and cooling medium.
The ammonia supplied for GEA chillers and heat pumps must not include more than 0,3% water contents. During operation the water content in the ammonia cycle must not exceed 1% of the ammonia charge.

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4. Main components

Description of the screw compressor type NMR-N2655T-28

GEA Grasso M series screw compressor with adapted variable internal volume ratio and continuous capacity control.
Scope of supply in detail:
Prepared for gas pulsation protection for high pressure ratios.
Solenoid valves specification 5 coils for solenoid valves DC 24V
O-ring material CR
Vi range: 2.6 - 5.5
Without oil pump

Electric drive motor

Manufacturer WEG
Number of poles 2
Degree of protection IP 55
Efficiency class Not applicable
Voltage 400 V ± 5%
Frequency motor windings variable
Drive motor rating 450 kW
Nominal motor current 755 A
Maximum speed (for the component motor) 4500 min^{-1}
Minimum speed (for the component motor) 1000 min^{-1}
Winding Protection 3 x PTC
Bearing Temperature 2 x PT100
Maximum installation height above sea level 1000 m

Oil filter

Single oil filter with filter fineness 20 micron and stop valves.

Suction filter

Integrated suction filter with filter fineness 100 micron.

Additional oil injection is installed

Oil separator

Oil separator horizontal with oil heater. Oil return to the compressor with orifice and solenoid valve.
2 pcs. uncontrolled oil heater with safety limiter.
Electrical data 400 V ; 2 Ph ;1000 W
Heater mounted in protective pipe

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Liquid cooled oil cooler

	Cond. 1	Cond. 2	Cond. 3	
Medium Water (non-corrosive)				
Cooling medium (equal to condenser)				
Oil inlet temperature (at compressor)	60,0			°C
Cooling medium inlet temperature	45,0	45,0	45,0	°C
Cooling medium outlet temperature	55,0	55,0	55,0	°C
Cooling medium volume flow	19,1	19,5	19,5	m³/h
Oil cooling rating	219,6	223,4	224,1	kW
Oil cooling rating (min. part load)	40,1	41,1	41,2	kW

Additional refrigerant injection

Due to the operating conditions of this configuration the refrigerant injection is necessary to support the cooling process. Refrigerant injection group, mounted between condenser and compressor with discharge temperature-controlled expansion valve

Oil temperature control

Additional 3-way-valve in the oil circuit for oil temperature control.

Main valves

Suction side	1 x stop valve
	1 x check valve integrated in compressor
Discharge side (after oil separator)	1 x stop valve
	1 x suction pressure-controlled check valve

Insulation

Insulation of main parts of the LP-side (evaporator / liquid separator / main pipes) with PUR and coated with aluminum sheets. The insulation is designed for 20°C machine room temperature and 70% humidity.

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5. Control system GEA Omni with control panel

Industrial panel PC.
Implementation of a defined start and stop procedure.
Physical sequence control with a master (supplied and provided by customer!) is possible by use of hardwired signals or control via network communication (see communication guideline for details).
All sensors and actuators (stipulated by GEA) are fully wired to the compressor controller.
The touch screen (installed at eye-level 170 cm height) and input devices are integrated in a standard enclosure with door.

Power panel includes the control system.
Continuous monitoring and displaying of all important operating data. In case safety limits are exceeded the unit will shut down. Limitations for high motor current, low suction pressure, high discharge pressure and low outlet temperature (if available) help to reduce the risk of a complete shut down in case of critical operation conditions.
Capacity control possible according to all standard process values, the control variable is adjustable and alterable.
Default control variable Secondary refrigerant outlet temperature

Display language English
Communication via EtherNet/IP or Modbus TCP.

Set of standard temperature sensors 1 x suction temperature
1 x discharge temperature
1 x oil temperature
1 x oil separator sump temperature
1 x sec. refrigerant outlet (delivered loose)
1 x sec. refrigerant inlet (delivered loose)
1 x at liquid inlet condenser (delivered loose)
1 x at liquid outlet condenser (delivered loose)
2 x motor bearing temperature (with PT100)
Set of standard pressure sensors with stop valve 1 x suction pressure
1 x discharge pressure
1 x oil pressure

Electrical flow switch for second refrigerant (delivered loose).
Electrical flow switch for cooling medium (delivered loose).

6. Power supply cabinet

Power panel with IP23 protection completely mounted, wired and tested. Includes frequency converter for drive motor, main switch, emergency switch, contactors for oil heater, thermal over current release, safety fuses and power fuses. High-efficient frequency drive executed as refrigeration drive and sized according motor requirements. Frequency drive and its harmonic distortion complies with requirements of industrial environment specified by EN 55011 (class A1) and EN 61800-3 (class C2). Net Type TN-C-Net
Voltage 3~/400V/50Hz
Color RAL 7035
Cable input Below

The following values are preliminary. Final binding data according to the latest version of the electrical diagram only. Designed for nominal current 788 A- Size of main switch 800 A - Maximum back-up fuse for the inserted main switch 1600 A . Short-circuit resistance 25 kA

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7. Safety devices

- Maximum allowable pressure (PS) high stage 28,0 bar(g)
- Maximum allowable pressure (PS) low stage 16,0 bar(g)
- Overflow valve between discharge and suction side at the compressor.
- Overflow valve opening pressure 27,0 bar(g)
- Overflow valve between condenser and evaporator / liquid separator.
- Overflow valve opening pressure 28,0 bar(g)
- Dual safety valve with changeover valve at the evaporator / liquid separator.
- Safety valve opening pressure 16,0 bar(g)
- 1 x electronic safety pressure limiter DB1000/2 with two separate locks.

8. Options (included)

Evenly spread anti-vibration mounts at the base frame for operation with minimized vibration to the ground.

9. Painting

Paint system according to	DIN EN ISO 12944-2/C2 and DIN EN ISO 12944-5/A2.06
Degree of cleanliness	Sa 2 1/2 acc. to DIN EN ISO 8501-1 and DIN EN ISO 12944-4
Type of coating	C2.05 DIN EN ISO 12944-5
Color	RAL 5014, pigeon blue
Primer	2 K-EP 60 µm
Top coat	2 K-EP 60 µm
Minimum dry film	thickness 120 µm

10. Approval and certificates

CE certificate for the whole unit acc. Pressure Equipment Directive (PED) 2014/68/EU. Calculated and manufactured acc. "AD 2000" and EN 378 (H1-Module).
Documentation acc. to CE rules.
1 set of approval and certificates allocated on GEA file sharing server.
Language English

11. Documentation

- 1 set of documentation allocated on GEA file sharing server.
- 1 set(s) of documentation as hardcopy.
- Language (operator relevant only) Norwegian
- Extended nameplate is included.

12. Packing

Without packing, transport in closed systems only

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13. Loading

Transport (by customer) Standard closed truck
When loading in different containers or transport with different means of transportation, please contact GEA for prices.
Please consider the transport instructions for this product to avoid damages and transport accidents.

14. Exclusions from scope of supply

- Erection and supervision of erection on site
- Water supply and drain piping
- Refrigerant
- Foundations and anchoring bolts, as well as spare parts and special tools not explicitly offered
- All services not mentioned
- Discharge pipe at safety-valve (acc. DIN EN378-2)

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