FläktGroup

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HeaMo GEO

REG 050-205 AD22, REG 195-415 AD42
TECHNICAL DATA

Table of Contents

Unit type code

FläktGroup *HeaMo* GEO

R E	G	4 1 5	A	D	4	2
FläktGroup *HeaMo*	3rd heat exchanger	Capacity stage	Serie	Refrigerant	Number of compressors	Power supply

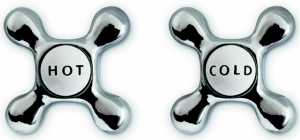
FläktGroup *HeaMo* GEO
water cooled units for indoor installation
for simultaneous cooling and heating

RE	FläktGroup *HeaMo*
A	air-cooled (outdoor installation)
G	**water cooled (indoor installation)**
050, 055,	2 compressors
065, 075,	2 compressors
080, 090,	2 compressors
125, 160,	2 compressors
205;	2 compressors
195, 225,	4 compressors
255, 285,	4 compressors
315, 365,	4 compressors
415	4 compressors
A	Unit series
D	R-410A
2	Number of compressors
4	
2	400 V/3~/50 Hz (+PE)

Capacity in kW

Effective distribution of energy

Energy efficiency is on everyone's lips and is demanded not only by lawmakers, but also by demanding customers. Especially in building technology, sustainability with respect to energy-reduced operation has become essential. That is why investors, planners and architects demand a resource-saving energy management for building technology.



Ventilation and air conditioning demand precision work in temperature control and the treatment of room air. This is the only way to harmonise optimal comfort with maximum energy savings.

Buildings of all kinds account for 40% of total world energy consumption, and are responsible for 21% of global greenhouse gas emissions. There is great potential for energy savings here – both from ecological as well as economical standpoints. Simultaneous cooling and heating is no longer a rarity in advanced building services. Some reasons for this can be found in the reduction of heat-transmission losses, a high share of inner cooling loads, and also in the continually growing share of glass façade glazing in modern architecture. Certain types of buildings demand the simultaneous provision of heating and cooling over long periods.These include buildings with north and south orientation, facilities with requirements for all-year cooling of electronic switching and communications centers, and applications with great demand for warm water for sanitary facilities.The same especially applies to the spring and autumn of each year in hotels. This is true for hotels, especially during the transition times: simultaneous heating and cooling in individual rooms is often indispensable because of the individual temperature sensitivity of the guests.

Simultaneous supply of heat and cooling with minimal expenditure of energy

Today it is no rarity for systems to provide chilled water for cooling requirements and systems to supply warm water, to be operated in parallel. However, energy optimization potentials then remain unused.

FläktGroup HeaMo controls heat exchange within a building, whereby the cos effectiveness of the unit increases when heating and cooling are required at the same time.

The FläktGroup *HeaMo* unit (*HeaMo* stands for Heat in Motion) uses the heat arising from refrigeration to supply the warm water requirements of the building. Depending on the cooling and heating load in the building, the output and the temperatures of the cold and hot water system can be individually controlled. The greatest possible effectiveness is achieved when simultaneously cooling and heating energy must be provided in equilibrium. This ensures that no refrigeration or heat energy is emitted to the environment unused. With respect to size, FläktGroup *HeaMo* units should be selected so that the unit runs as many operating hours as possible in simultaneous heating and cooling mode. The peak requirements of heating or cooling, for instance on cold winter days or in midsummer, should deliberately not be provided by FläktGroup *HeaMo* units, but rather by supplementary equipment. The integration of thermal storage units helps to use the simultaneous heating and cooling as often as possible.

One unit, many applications

Office buildings:

Buildings facing the north and south require simultaneous heating and cooling for most of the year. Whereas rooms on the south side require cooling owing to solar radiation, rooms on the north side still require heating.

Hotels:

Hotels require treat amounts of warm water all year long, e.g. for sanitary facilities, kitchens, laundries, etc. Furthermore the temperature sensitivity of every individual guest is different, with the result that both cold as well as warm water must be provided for comfort control of the rooms.

Buildings with glass façades:

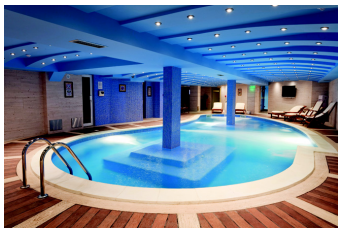
During spring and autumn, buildings with large glazed facades require simultaneous heating and cooling. Rooms with large glazed areas need cooling through solar radiation alone, whereas rooms with small windows must be heated.

Fitness centers:

Here, chilled water is required almost the entire year for air conditioning the fitness rooms, and warm water for washing and showering facilities.

Computer centers with adjacent office space:

In data processing centers with adjacent office space -- the same as in production plants with high cooling requirements -- electronic equipment must be cooled throughout the entire year, whereas the offices must be heated during spring and autumn, and during the winter months.



Swimming pools:

Swimming pools require heating energy throughout the year to provide pleasant pool temperatures in the water, and to supply warm water for showers, etc. Furthermore, swimming pools must also be dehumidified during the entire year. The generated chilled water is required for this purpose.

Clinics and hospitals:

Medical facilities such as clinics and hospitals need cold water for air conditioning the patient rooms, and to cool plant machine rooms. warm water is required the whole year for sanitary facilities, kitchens, and laundries. The warm water can likewise be used to heat the building.

This image shows a water-cooled model for indoor installation, for exploitation of geothermal sources of energy for pure cold- or hot-water operation. In chilled water operation alone, the geothermal heat exchanger is used as a condenser, and in warm water operation alone as an evaporator.

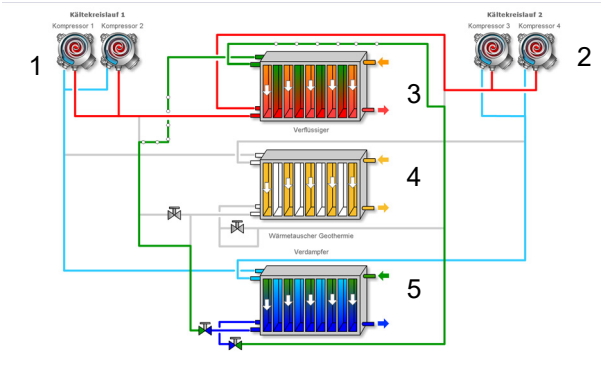
- 18 unit sizes with output ranges of 50 - 440 kW (coolness/heating output)
- 2 independent refrigerating cycles
- 1 to 2 compressors per unit size per refrigeration circuit
- Operating range:
  - Chilled water: +2 °C to +15 °C water outlet temperature
  - Warm water: 26 °C to 55 °C water outlet temperature
- Copeland Scroll compressor
- Brazed plate heat exchangers for geothermal energy; cold- and hot-water side made of AISI 316
- As option, the sound power level can be reduced by 4 dB(A) for models with 2 scroll compressors, and by 10 dB(A) for models with 4 scroll compressors
- Compact equipment dimensions
- Extensive accessories

Controllers fitted in FläktGroup *HeaMo* GEO model satisfy all advanced requirements such as the following:

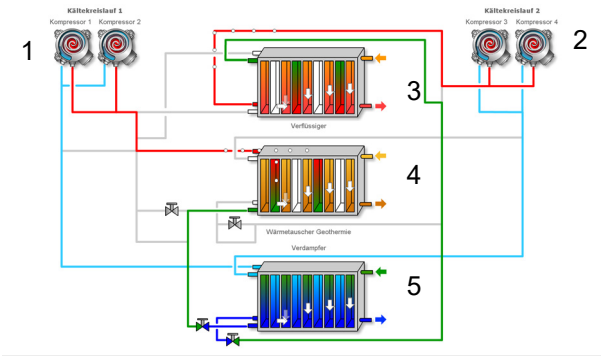
- Alphanumeric display
- Intuitive-use menu assistance
- Automatic compensation of operating hours for compressor
- Control system for the cold- and hot-water pump and of the geothermal pump
- Integration into building services
- Retrieval of system information possible by LAN and Internet

Cooling Heating Refrigerant Scroll compressor

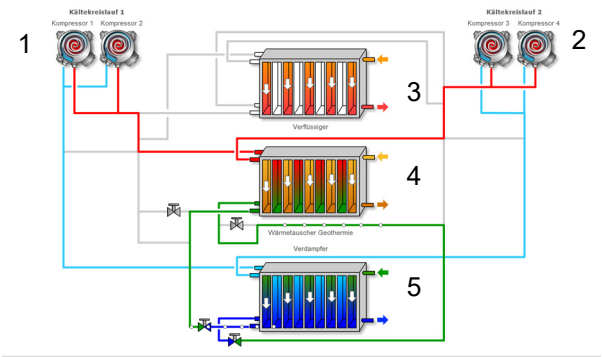
One application – various operating modes



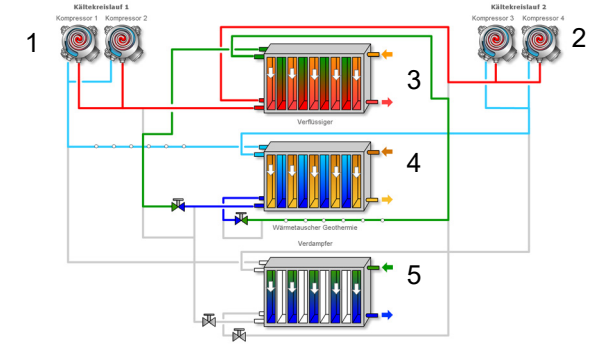
100 % cooling demand – 100 % heating demand
The FläktGroup *HeaMo* unit operates under an optimal energetic mode. The energy removed from the chilled water is added to the warm water. This way the FläktGroup unit can supply the building with chilled water for cooling and warm water for various heating purposes, without energy waste. Energy is re-distributed throughout the building wherever it is momentarily needed . The operation of this unit corresponds to that of a water-cooled chiller – whereby the output of the hot-water side can also be individually controlled, and not only the chilled-water side. The water-cooled geothermal heat exchanger is not in operation.



100 % cooling demand – 50 % heating demand
All compressors are in operation, in order to meet cooling demand. Both of the refrigerant cycles remove energy from the chilled-water heat exchanger, which cools the chilled water. Since, however, only 50 % of the heating capacity is required, only one refrigeration circuit to the hot-water heat exchanger is in operation. The second refrigeration circuit uses the geothermal heat exchanger as a condenser to give off surplus heat.



100 % cooling demand – 0 % heating demand
The system functions as a chiller. Energy is removed from the chilled-water heat exchanger and is given off to the ground or well-water via the geothermal heat exchanger. The compressors switch on and off, according to the cooling demand, in order to assure constant chilled-water temperatures. If hot water is required again during this mode, one refrigeration circuit changes from the geothermal heat exchanger to the hot-water heat exchanger.



0 % cooling demand – 100 % heating demand
The FläktGroup *HeaMo* unit uses either geothermal energy or well-water energy as a free energy source, in order to remove the energy from these sources and supply the latter to the building as warm water. During this operational mode, refrigerant is not pumped to the chilled-water heat exchanger. If changes in the heating load occur, compressors will switch on and off accordingly. If the demand for chilled water increases, one chilled-water cycle will switch over from the geothermal heat exchanger (which is used as an evaporator in this mode) to the chilled-water heat exchanger.

1: Refrigeration circuit 1 with compressor 1 + 2
2: Refrigeration circuit 2 with compressor 3 + 4
3: Warm water heat exchanger
4: Geothermal heat exchanger
5: Chilled water heat exchanger

Triply combinable – meaning efficiency and environmental protection

Four different modes of operations are possible with only one unit. Refer to Page 47 et seq. for further details on how to select the required operating mode.

Fig. 1: Unit configuration FläktGroup HeaMo GEO

Automatic mode:

This mode simultaneously produces hot and cold water and switches output on or off depending on the desired temperatures. Surplus energy or an energy shortfall is automatically emitted to or extracted from the environment. In automatic mode, all three water pumps for the chilled water, warm water and geothermal circuits are activated.

Cooling only mode:

If the FläktGroup *HeaMo* is not required to produce warm water for a prolonged period, it is possible to switch to "Cooling only" mode. The FläktGroup *HeaMo* then works as a chiller and the warm water pump is deactivated.

Heating only mode:

If there is no requirement for cold water in the building for a longer period of time, it is possible to switch to "Heating only" mode. The FläktGroup *HeaMo* now functions like a heat pump. The cold-water pump is shut down.

Heat recovery:

The FläktGroup *HeaMo* covers hot-water requirements only if there is a demand for chilled water. If the required value for warm water is reached, the surplus heat energy is emitted to the environment. All three water pumps are continuously operating. When the chilled water set point is reached, the last compressor is deactivated and no more warm water is produced. Please read the notices on Page 42.

Energy efficiency - work economically and calculate the

EER value:

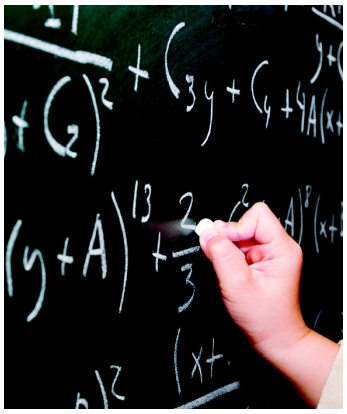
The EER value (Energy Efficiency Ratio) of a chiller indicates the relationship between cooling capacity and consumed electrical power with consideration of the following measurement conditions for water cooled units:

$$\mathrm{EER} = \frac{\text{cooling capacity}}{\text{electrical power consumption}}$$

- Medium water
- Chilled water inlet temperature 12 °C
- Chilled water outlet temperature 7 °C
- Warm water inlet temperature 30 °C
- Warm water outlet temperature 35 °C
- Unit operates under full load

The higher the EER value, the more energy-efficient the unit operation at 100 % full load.

COP value:
The COP value (Coefficient of Performance) of a heat pump indicates the relationship between heating capacity and consumed electrical power with consideration of the following measurement conditions for water cooled units:



$$COP = \frac{\text{heating capacity}}{\text{electrical power consumption}}$$

- Medium water
- Warm water inlet temperature 40 °C
- Warm water outlet temperature 45 °C
- Chilled water inlet temperature 10 °C
- Chilled water outlet temperature 5 °C
- Unit operates under full load

The higher the COP value, the more energy-efficient the unit operation at 100 % full load.

ITEE value:

The above-mentioned EER and COP values are energy efficiency values that are measured and certified for chiller and heat pumps according to Eurovent requirements. In order to define a measure of the energy efficiency in simultaneously cooling- and heating operation for the innovative FläktGroup *HeaMo* unit, FläktGroup has introduced the ITEE value (Index of Total Energy Efficiency).

In order to define a measure of the energy efficiency in simultaneously cooling and heating operation for the innovative FläktGroup *HeaMo* unit, FläktGroup has introduced the ITEE value (Index of Total Energy Efficiency) for water-cooled units.

$$ITEE = \text{Index of Total Energy Efficiency} = \frac{\text{cooling capacity + heating capacity}}{\text{electrical power consumption}}$$

- Medium water
- Warm water inlet temperature 40 °C
- Warm water outlet temperature 45 °C
- Chilled water inlet temperature 12 °C
- Chilled water outlet temperature 7 °C
- Unit operates under full load

Unit design

REG 050-205 AD22

Control cabinet

Alphanumeric display with intuitive menu navigation and LEDs for indicating current operating mode

Victaulic groove-lock coupling

Optionally suitable Victaulic groove-lock couplings with a counter pipe are available.

Compressor section

2 refrigeration circuits for all unit sizes for independent production of chilled or warm water as well as chilled and warm water

Compressor

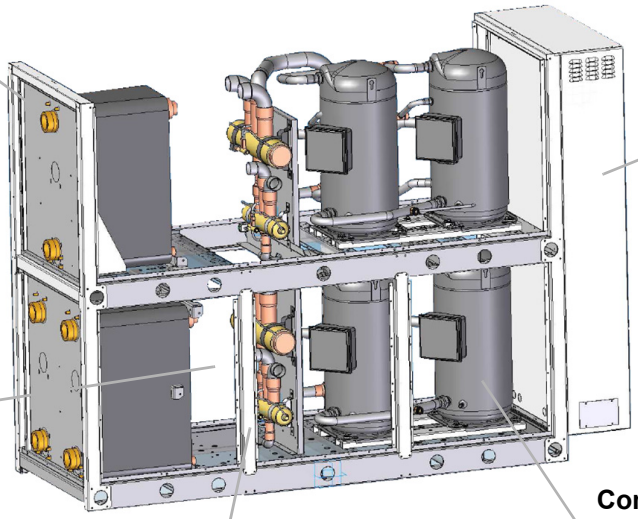
2 compressors in 2 refrigeration circuits

Protective panels

Units are standard fitted with unit casing

Fig. 2: REG 050-205 AD22

REG 195-415 AD42



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Control cabinet

Alphanumeric display with intuitive menu navigation and LEDs for indicating current operating mode

Compressor section

2 refrigeration circuits for all unit sizes for independent production of chilled or warm water as well as chilled and warm water

Compressor

4 compressors in 2 refrigeration circuits Top and bottom section are each fitted with 2 compressors to ensure the largest possible stability.

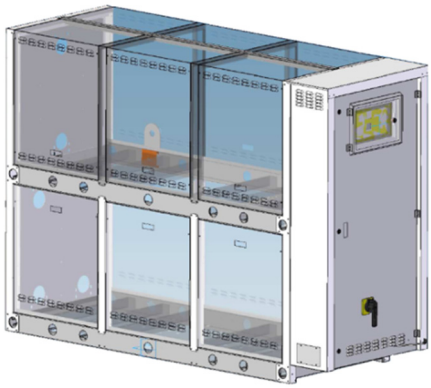
Protective panels

Panels for unit protection and sound attenuation available as option (.I44).

Fig. 3: REG 195-415 AD42

Sound power level

Depending on the installation location it is important for the units to operate extremely quietly. For this reason, the FläktGroup *HeaMo* GEO unit series is also available in a low-noise version that enables especially quiet operation.

REG 050-205 AD22	REG 195-415 AD42
	
Optional additional sound insulation is available to reduce the sound power level by 4 dB(A) (.I17).	Optional additional sound insulation is available to reduce the sound power level by 10 dB(A) (.I44).

FläktGroup *HeaMo* GEOs are water-cooled units for simultaneous heating and cooling operations in indoor installations. In the factory, they are filled with refrigerator oil and refrigerant and a test run is performed, so that when the units are installed on site only water and electrical connections have to be established. A functional test must also be carried out.

This FläktGroup unit series is only designed for operation with the refrigerant R410A.

Components

FläktGroup *HeaMo*: A generation of units offering excellent energy efficiency

The state-of-the-art system

The FläktGroup *HeaMo* unit series is set apart thanks to an excellent ratio of thermally to electrically absorbed energy. The optimum operating point is reached when the ratio of the cooling capacity and heating capacity required is about the same. This ensures that the energy removed from the chilled water circuit can be fed into the warm water circuit without any loss. A delivery or absorption of energy to or from the environment is therefore unnecessary. This means that over 8 kW of thermal energy can be recovered from 1 kW of electrical energy.

If, however, the cooling and heating requirements differ, the FläktGroup *HeaMo* series units continue to guarantee a safe operating mode. Surplus energy or an energy shortfall is simply delivered to or absorbed from the environment via the additional 3rd heat exchanger.

The re-styled plate heat exchangers for chilled, warm and geothermal water circuits enable even better and more efficient distribution of the refrigerant in a liquid and gaseous state.

Furthermore, an optimum result was achieved by carefully designing all internal components so as to fully exploit the performance characteristics of the R-410A refrigerant used. Particular attention was paid to the surfaces of the heat exchangers and the compressors.

The intelligent control of the chilled and warm water inlet temperature reduces fluctuations in relation to the specified setpoint and vastly reduces the time the system needs until it is ready for operation. The precision and rapid reaction of the intelligent control system facilitate optimum control in the event of load fluctuations, which means that stable operating conditions can be achieved very quickly, even when in part-load mode. Due to varying load reduction the automatic switching from one operating mode to another (cooling and heating/cooling only/heating only) occurs without interrupting the compressor operation. A carefully dimensioned system implemented in these units results in considerable energy savings and vastly reduces operating and maintenance costs.

Basic construction

The frame and panels are made of galvanized, plastic-coated sheet steel (RAL 7035). The self-supporting construction offers excellent access to the individual components during maintenance and repair work.

Compressor

Fig. 4: Scroll compressor

Fully hermetic, low-vibration and suction-refrigerant cooled Copeland scroll compressor complete with oil heating for safe compressor start-up, electronic overheating protection with manual reset and a two-pole electric motor. These Copeland scroll compressors are also highly economical to run and have a sound power level that is some 6 dB(A) lower than piston compressors.

The sizes 050-205 have 2 compressors in two refrigeration circuits. Units of model sizes 195-415 are fitted with four compressors, with two compressors integrated in each of two refrigeration circuits.

Heat exchangers for chilled, warm water and geothermal energy

Fig. 5: Plate heat exchanger

The heat exchangers used in this unit series are plate heat exchangers made of AISI 316. The advantages of plate heat exchangers are their very compact construction combined with high performance. The channel plates consist of stamped stainless steel plates that are closely connected using a special soldering technique. This means that a high-turbulence flow occurs on both primary and secondary sides which results in an extremely efficient exchange of heat between the refrigerant and the heat transfer medium. This construction also means that the required amount of refrigerant can be reduced to a minimum.

The heat exchangers are non-permeable and are provided with comprehensive abrasion-resistant insulation.

4-way valve

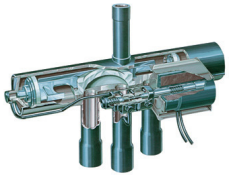


Fig. 6: 4-way valve

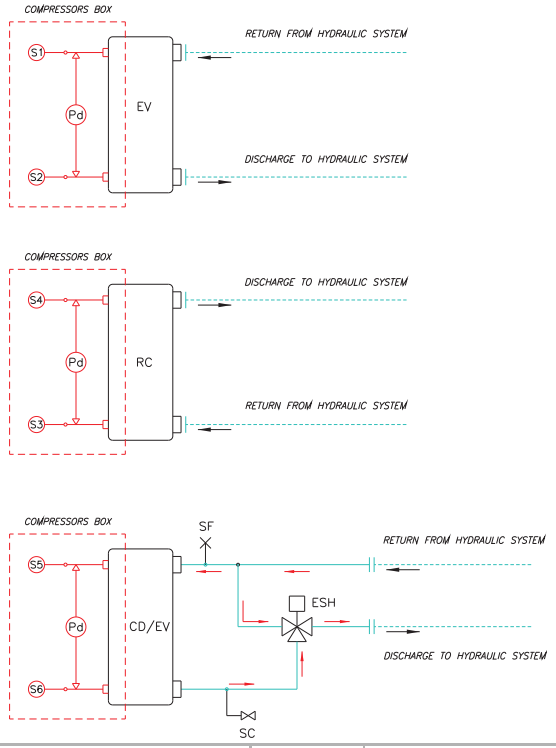
The 4-way valve is installed in the refrigeration circuit after the compressor. Depending on the required mode (heating and cooling, only cooling or only heating) the decision is made into which stainless steel heat exchanger hot gaseous refrigerant is directed or from which heat exchanger cold suction gas is to be sucked for evaporation. Thanks to the 4-way valve geothermal stainless steel plate heat exchangers can function as an evaporator or condenser.

A refrigerant circuit

Each of the two refrigeration circuits essentially comprises the following components:

- 1 or 2 compressors
- 4-way valve
- Stainless steel plate heat exchanger for chilled and warm water and for geothermal energy
- Thermostatic expansion valves
- Solenoid valves
- Non-return valves
- filter-drier
- Sight glas with liquid indicator
- Safety valves for the high and low pressure sides
- Service/Schrader valves
- high-pressure and low-pressure sensor

Hydraulic circuit with a 3-way valve



EV	Chilled water heat exchanger	S1	Temperature sensor at chilled water inlet
RC	Warm water heat exchanger	S2	Temperature sensor at chilled water outlet
CD/EV	3rd heat exchanger, geothermal model	S3	Temperature sensor at warm water inlet
ESH	3-way valve (modulating)	S4	Temperature sensor at warm water outlet
Pd	Water side differential pressure switch	S5	Temperature sensor at geothermal line inlet
SC	Fill and drain valve	S6	Temperature sensor at geothermal line outlet
SF	Vent cock		

NOTICE!
Use a suitable water strainer to protect the water inlet on the chilled and warm water side as well as geothermal circuit from dirt.
Install flow switches on corresponding water outlets of the chilled and warm water circuits as well as geothermal circuit, the flow switches must then be wired with the FläktGroup *HeaMo* unit (refer to Page 45 ff.).

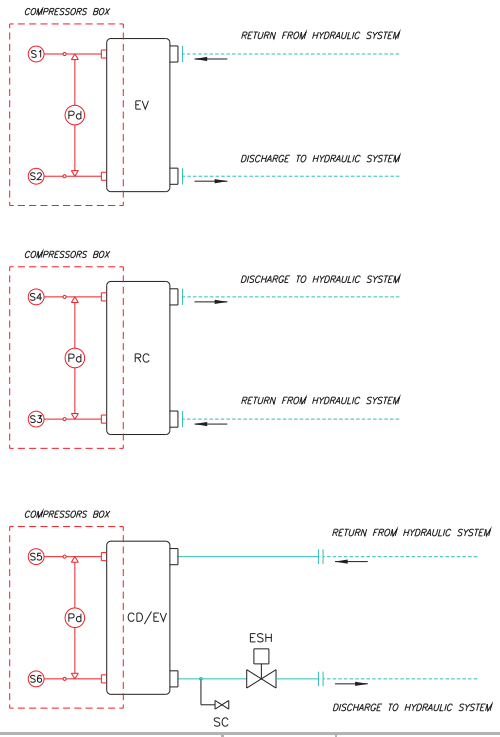
Connecting geothermal heat exchanger

The FläktGroup *HeaMo* GEO unit is standard fitted and wired with a modulating 3-way valve, so that only water-supply and water-return connections to the geothermal circuit have to be completed.

If the geothermal heat exchanger is used as a condenser and FläktGroup *HeaMo* GEO is operating to supply only chilled water, the bypass line of the 3-way valve is opened or closed, depending on the high pressure. The aim is to prevent a reduction in the condensing pressure and ensure the unit performance within operating range. If the condensing pressure is falling, the 3-way valve opens the bypass line by using a modulating method, if the condensing pressure is rising - the bypass line is closed.

In "only heating" mode the geothermal heat exchanger is operating as evaporator and absorbs heat from medium. The 3-way valve is controlled depending on the evaporating pressure. If the evaporating pressure is decreasing too fast, the 3-way valve blocks the bypass line and entire water flow is directed via the unit. Thanks to a larger water volume the evaporating pressure increases again. With an excessively high evaporating pressure the bypass line is opened again.

Hydraulic circuit with a 2-way valve (option .I54)



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Install flow switches on corresponding water outlets of the chilled and warm water circuits as well as geothermal circuit, the flow switches must then be wired with the FläktGroup *HeaMo* unit (refer to Page 45 ff.).

Connecting geothermal heat exchanger

As an option a standard supplied 3-way valve can be substituted by a modulating 2-way valve. The 2-way valve is installed and wired too, so that only water supply and return lines must be connected to the geothermal circuit.

If the geothermal heat exchanger is used as a condenser and FläktGroup *HeaMo* GEO unit is operating to generate only chilled water, the 2-way valve is opened or closed, depending on the high pressure. The aim is to prevent a reduction in the condensing pressure and ensure the unit performance within operating range. If the condensing pressure falls - the 2-way valve closes in a modulating method, if the condensing pressure rises - the 2-way opens.

In "only heating" mode the geothermal heat exchanger is operating as evaporator and absorbs heat from medium. The 2-way valve is controlled depending on the evaporating pressure. If the evaporating pressure is decreasing too fast, the 2-way valve opens and the entire water flow is directed through the unit. Thanks to a larger water volume the evaporating pressure increases again. With an excessively high evaporating pressure the 2-way valve is closed again.

If a 2-way valve is used, a speed-regulated geothermal pump must be used, differential pressure is used to regulate this pump.

Control cabinet

Control cabinet is divided into power and control module and is manufactured according to EN 60204-1, electromagnetic compatibility as of 2004/108/EC and Low Voltage Directive 2006/95/EC, complete with:

– Switch cabinet in a separate casing sealed within the unit
– Transformer for generating control voltage
– Door-locking main isolator
– Motor protection switch and contactors for compressor
– Terminal block control voltage
– Automatic circuit breaker for load and control current circuit
– Phase sequence protection for the compressor
– Contact for external remote ON/OFF
– Contact for general error message
– Clip contact for flow switch
– Operation status message from compressor (option .E03)

Electronic controls

Fig. 7: Display

Electronic controls of the FläktGroup controller - step II features the following:

– Plain-text and alphanumerical LCD display
– Selection between 7 different languages is possible.
– Automatic self-diagnosis of the electronic control.
– Display of all analog recorded temperature and pressure values.
– Display of faults in compressors and refrigeration circuits.
– Display of common unit errors.
– Control of the chilled and warm water inlet temperature.
– Safety times for compressors, such as compressor cycle protection, minimum downtime of compressors or maximum compressor start-ups per hour.
– Operating hours counter for compressor and pumps.
– Automatic compensation of operating hours for compressor.
– Notification about maintenance intervals of compressors and pumps (can be adjusted).
– Read out latest 200 alarm messages.
– Service possible via PC and system software.
– Pump lead and overrun times for safe switching unit on and off.
– Chilled water setpoint shift via an external 4-20 mA signal.

Accessories and special equipment

Accessories for controls

Fig. 8: Serial card for connection to a building management system or for master/slave control

– Operation message of compressors (option .E03)
volt free contact for status indication of each compressor.
– Unit connection to the building management system (BMS) using a serial card.
The following protocols are used to transmit digital and analog values:
  – Reading off error messages
  – Reading off temperature and pressure values provided by the controller
  – Operating status of individual compressors
  – Unit enabling
  – Set point variation
  – Toggling between operating modes automatic, cooling only, heating only, heating with heat recovery.

  – Modbus (option .E14).
  – LonWorks® (option .E15).
  – BACnet via IP (option .E16).
  – BACnet via MS/TP RS485 (option .E17).

Fig. 9: Remote control

– Second control connection for remote monitoring and regulation. Up to 10 units in the same controller family can be connected to an additional remote control. (option .E19 for remote control up to 200 meters and .E20 for remote control up to 500 meters distance).
– 2nd chilled water setpoint via normally open contact by others (option .E22).
Two setpoint values are changed externally by closing a floating on-site contact. Raising the setpoint, e.g. during night mode operation, can realize significant savings potential.
(only model size 195-415)
– Demand limit contact (option .E23)
Reduction of electrical power consumption by deactivating compressors or their capacity stages (demand limit contact) by opening a dry contact by others. This function is used if a limited electrical power supply is temporarily available, e.g. during operation via emergency generator.
(only model size 195-415)

Electrical accessories

– Soft start for compressor drive motors* (option .E06).
Soft start for each unit compressor for reduction of starting current to 60 % of rated starting current.

Refrigeration circuit accessories

– Shut off valve on compressor suction side (option .R02).
Service shut off valve fitted in suction line for fast and easy maintenance.
– Shut off valve on compressor discharge side (option .R10). Service shut off valve fitted in discharge line for fast and easy maintenance.
– High and low pressure gauge (option .R13).
Refrigerant gauge for high and low pressure side for each refrigeration circuit for reading off current operating pressures.

Installation of accessories

– Rubber anti-vibration isolators for unit installation (.I02).
Anti-vibration isolators with rubber elements for reduction of vibration transfer (supplied loose).
– Water filter for installation in hydraulic circuit at unit inlet (supplied loose)
(option .I12 for chilled water heat exchanger, option .I30 for warm water heat exchanger).
Before the direct inlet into the heat exchanger a water filter must be installed, that protects the heat exchanger from dirt and deposits. The water filter of „Y-type“ has a mesh width of 0.9 mm.The filter body can be trouble-free removed and cleaned for maintenance purposes without dismantling the valve body.

Fig. 10: Water filter

– Additional sound attenuation (-4 bB(A) sound power level) (option .I17)
Additional unit sound attenuation enables to reduce the sound power level by 4 dB(A). If this option is selected, the unit weight increases. Consider the order-related documentation.
(only model size 050-205)
– Additional sound-attenuating casing (-10 dB(A) sound power level) (option .I44)
Unit casing with integrated additional sound attenuation for minimizing the sound power level by 10 dB(A). If this option is selected, the dimensions and weight of the unit change. Consider the order-related documentation.
(only model size 195-415)

Fig. 11: Sound-attenuated casing

** Each compressor motor is operated via a soft start.*
Soft start reduces the starting current of each compressor to 60 %.
Example of maximum starting current for unit size 205:
1. Maximum current consumption of a compressor that is already in operation (58.9 A)
*2. Starting current of compressor, that is additionally switched on (310 A * 0.6 = 186 A; factor 0.6 because of soft start)*
3. Sum of results from step 1 and 2 (58.9 A + 186 A = 244.9 A)

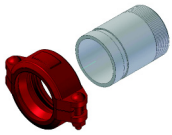

Fig. 12: Victaulic coupling with counter pipe

– Victaulic coupling and counter piece with threaded connection (Option .I33).
The unit connection is prepared for a connection to Victaulic couplings. With this option the suitable Victaulic groove-lock coupling and the corresponding counter pipe are enclosed and must be connected to field-provided piping. The counter pipe ends with an external thread.
(only model size 050-205)

– 2-way valve for temperature control (option .I54)
with modulating 2-way valve for temperature control in geothermal heat exchanger. Regulation of a 2-way valve is done by the controller of the unit. 2-way valve can only be used in combination with a speed-regulated pump. Pump regulation must only be performed by the unit. If a 2-way valve is used - the standard supplied 3-way valve is not applicable.
– Flow switch with paddle (3 pieces) (option .I55)
for installation in the hydraulic circuit at the outlet of chilled-water, warm-water and geothermal heat exchanger to be wired with the unit (supplied loose).

Packaging accessories

– Unit packaging with nylon film in open timber crate (option .O01).
The unit is supplied in open timber crate for additional protection against shipping damage. The unit is additionally protected with nylon film against weather effects and contamination.

Basic unit capacity stages 050-205 AD22
General Data

Capacity stage			050	055	065	075	080	090	125	160	205
Operating mode: cooling only											
Refrigeration capacity[1)]	$\dot{Q}_e$	[kW]	49.9	57.7	66.6	75.6	85.6	100.4	131.4	163.0	211.9
Unit power consumption (total)	P_e	[kW]	7.8	8.9	10.3	12.2	13.6	16.1	21.4	26.2	34.1
EER			6.40	6.48	6.47	6.20	6.29	6.24	6.14	6.22	6.21
Chilled water flow rate	$\dot{V}_e$	[m³/h]	8.6	9.9	11.5	13.0	14.7	17.3	22.6	28.1	365
Pressure drop (chilled water side)	Δp_e	[kPa]	30.2	27.6	26.5	30.5	34.1	36.1	42.1	45.3	47.1
Geothermal capacity	$\dot{Q}_G$	[kW]	57.1	65.7	76.0	86.7	97.9	115.0	150.7	186.8	242.7
Heat exchanger volume flow with geothermal model	$\dot{V}_G$	[m³/h]	4.5	5.2	6.0	6.8	7.7	9.1	11.9	14.7	19.1
Geothermal heat exchanger pressure drop	Δp_G		8.3	7.5	7.2	8.4	9.4	9.9	11.6	12.5	13.0
Operating mode: heating only											
Heating capacity[2)]	$\dot{Q}_c$	[kW]	52.1	59.7	69.3	79.0	88.9	104.4	134.8	168.8	218.9
Unit power consumption (total)	P_c	[kW]	12.4	13.8	16.2	18.5	20.4	23.9	31.0	38.4	49.9
COP			4.20	4.33	4.28	4.27	4.36	4.37	4.35	4.40	4.39
Warm water volume flow	$\dot{V}_c$	[m³/h]	9.1	10.4	12.0	13.7	15.4	18.1	23.4	29.3	38.0
Pressure drop (warm water side)	Δp_c	[kPa]	33.5	30.1	29.3	34.0	37.5	39.8	45.1	49.5	51.2
Geothermal capacity	$\dot{Q}_G$	[kW]	40.4	46.7	54.1	61.7	69.7	82.0	105.6	132.7	172.0
Heat exchanger volume flow with geothermal model	$\dot{V}_G$	[m³/h]	5.0	5.7	6.7	7.6	8.6	10.1	13.0	16.3	21.2
Geothermal heat exchanger pressure drop	Δp_G	[kPa]	10.1	9.2	9.0	10.4	11.5	12.3	13.9	15.3	15.8
Operating mode: simultaneous cooling and heating											
Refrigeration capacity[3)]	$\dot{Q}_e$	[kW]	40.4	46.7	54.1	61.7	69.7	82.0	105.6	132.7	172.0
Chilled water flow rate	$\dot{V}_e$	[m³/h]	6.9	8.0	9.3	10.6	12.0	14.1	18.2	22.8	29.5
Pressure drop (chilled water side)	Δp_e	[kPa]	19.7	18.0	17.5	20.2	22.5	24.0	27.1	29.9	31.0
Heating capacity[3)]	$\dot{Q}_c$	[kW]	52.1	59.7	69.3	79.0	88.9	104.4	134.8	168.8	218.9
Warm water volume flow	$\dot{V}_c$	[m³/h]	9.0	10.4	12.1	13.7	15.5	18.2	23.4	29.3	38.1
Pressure drop (warm water side)	Δp_c	[kPa]	33.5	30.1	29.3	34.0	37.5	39.9	45.1	49.5	51.2
Unit power consumption (total)	P	[kW]	12.4	13.8	16.2	18.5	20.4	23.9	31.0	38.4	49.9
ITEE			7.5	7.7	7.6	7.6	7.8	7.8	7.8	7.9	7.8
Controls			FläktGroup controller - step II								
Compressor			**Fully hermetic Copeland scroll compressor**								
Number of compressors		n	2	2	2	2	2	2	2	2	2
Number of refrigeration circuits		n	2	2	2	2	2	2	2	2	2
Speeds per unit		n	2	2	2	2	2	2	2	2	2
Compressor type 1			ZP 90	ZP 103	ZP 120	ZP 137	ZP154	ZP 180	ZP 235	ZP 295	ZP 385
Compressor type 2			ZP 90	ZP 103	ZP 120	ZP 137	ZP154	ZP 180	ZP 235	ZP 295	ZP 385
Oil type			Mobil EAL Arctic 22 CC								
Oil heating		W	2 x 90	2 x 90	2 x 90	2 x 90	2 x 90	2 x 70	2 x 120	2 x 150	2 x 150
Coil resistance per coil / compressor		Ω	1.61	1.37	1.24	1.24	0.70	0.70	0.63	0.51	0.35
Chilled water heat exchanger			**Brazed stainless steel plate heat exchanger**								
Minimum chilled water flow rate	$\dot{V}_e$	[m³/h]	4.8	5.5	6.5	7.3	8.3	9.8	12.7	15.9	20.7
Maximum chilled water volume	$\dot{V}_e$	[m³/h]	13.1	15.1	17.6	19.9	22.5	26.4	34.2	42.8	62.0
Maximum chilled water side operating pressure		[bar]	10	10	10	10	10	10	10	10	10
Evaporator inlet/outlet connection	G*	["]	2"	2"	2"	2"	2"	2"	2" ½	2" ½	2" ½
Warm water heat exchanger			**Brazed stainless steel plate heat exchanger**								
Minimum warm water volume flow	$\dot{V}_c$	[m³/h]	5.5	6.3	7.4	8.4	9.5	11.1	14.4	18.0	23.4
Maximum warm water volume flow	$\dot{V}_c$	[m³/h]	11.2	12.9	15.0	17.0	19.2	22.5	29.1	36.4	47.2
Maximum chilled water side operating pressure		[bar]	10	10	10	10	10	10	10	10	10
Condenser inlet and outlet connection	G*	["]	2"	2"	2"	2"	2"	2"	2" ½	2" ½	2" ½
Geothermal heat exchanger			**Brazed stainless steel plate heat exchanger**								
Minimum volume flow	$\dot{V}_s$	[m³/h]	2.8	3.3	3.8	4.4	4.9	5.8	7.6	9.5	12.4
Maximum volume flow	$\dot{V}_s$	[m³/h]	11.9	13.6	15.8	18.0	20.3	23.8	30.8	38.5	49.9
Maximum chilled water side operating pressure		[bar]	10	10	10	10	10	10	10	10	10
Heat exchanger connection: inlet and outlet	G*	["]	2"	2"	2"	2"	2"	2"	2" ½	2" ½	2" ½
Filling quantities											
Refrigerant R-410A[4)]		[kg]	5.6	6.4	7.4	8.2	8.8	10.0	14.0	16.4	21.2
Oil		[kg]	5.0	6.5	6.5	6.5	6.5	6.5	9.4	13.6	12.6
Minimum chilled water system content		[l]	600	700	800	910	1030	1210	1580	1960	2550
Minimum warm water system content		[l]	630	720	840	950	1070	1260	1620	2030	2630
Weight											
Transport weight		[kg]	450	470	490	505	525	550	745	825	910
Noise levels											
Sound power level[5)]		[dB(A)]	73	74	74	74	75	76	77	78	79
Sound pressure level[6)]		[dB(A)]	42	43	43	43	44	45	46	47	48

** G: Groove lock (Victaulic) coupling connection: the Victaulic coupling can be optionally ordered with a counter piece.*
1 Performance data for input parameters: heat exchanger chilled water (inlet/outlet) 12/7 °C; heat exchanger geothermal model (inlet/outlet) 15/26 °C;
2 Performance data for input parameters: heat exchanger warm water (inlet/outlet) 40/45 °C; heat exchanger geothermal model (inlet/outlet) 14/7 °C;
3 Performance data for input parameters: heat exchanger chilled water (inlet/outlet) 12/7 °C; heat exchanger geothermal model (inlet/outlet) 40/45 °C;
4 For exact refrigerant charge volume - refer to the unit identification plate.
5 The sound power level is determined using ISO 3744.
6 In 10 m free-field conditions (see chapter "Acoustics")

Tab. 1

Capacity stage		050	055	065	075	080	090	125	160	205
Compressor										
Max. power consumption	[kW]	2x9.0	2x10.1	2x11.8	2x13.2	2x14.4	2x17.0	2x22.3	2x27.4	2x35.8
Max. current consumption	[A]	2x15.3	2x16.4	2x20.4	2x22.6	2x25.5	2x30.5	2x36.1	2x45.8	2x58.9
Starting current of each compressor	[A]	2x95	2x111	2x118	2x118	2x140	2x173	2x225	2x272	2x310
Total [1,2,3)]										
Max. power consumption	[kW]	18.0	20.2	23.6	26.4	28.8	34.0	44.6	54.8	71.6
Max. current consumption	[A]	30.6	32.8	40.8	45.2	51.0	61.0	72.2	91.6	117.8
Starting current of entire unit	[A]	110.3	127.4	138.4	140.6	165.5	203.5	261.1	317.8	368.9
Maximum connectable cable cross-sections [1)]										
Rectangular	[mm]	-	-	-	-	-	16x3	16x3	16x3	20x5
Round	[mm²]	50	50	50	50	50	50	50	50	120
Maximum permissible pre-fuse ratings (fuse type gLgG) [2)]										
Pre-fuse	[A]	63	63	80	80	80	100	100	125	160
Dimensions										
L (length)	[mm]	1220	1220	1220	1220	1220	1220	1220	1220	1220
B (width)	[mm]	877	877	877	877	877	877	877	877	877
H (height)	[mm]	1496	1496	1496	1496	1496	1496	1496	1496	1496
Clearances										
R1	[mm]	800	800	800	800	800	800	800	800	800
R2	[mm]	800	800	800	800	800	800	800	800	800
R3	[mm]	800	800	800	800	800	800	800	800	800
R4	[mm]	800	800	800	800	800	800	800	800	800

Tab. 2

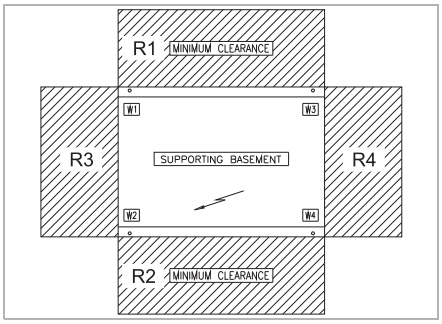

Fig. 13: Clearances

1 Please observe the regionally applicable safety regulations and constructional conditions relevant to the dimensioning of the supply line.
2 Please observe the regionally applicable standards for cable cross-sections and backup fuses.
Voltage tolerance: max. 10 %, voltage imbalance between phases: max. 3 %.
3 Unit without pump module GLPE and/or GLPC

NOTICE!

For detailed planning please only use the order-related documentation. Detailed dimensional drawings can be obtained on request from your responsible FläktGroup sales office. Specifications and technical data are subject to regular updates. The manufacturer reserves the right to make necessary changes to information without prior written notice.

Capacity stage of basic unit 195-415 AD42
General data

Capacity stage			195	225	255	285	315	365	415
Operating mode: cooling only									
Refrigeration capacity[1)]	$\dot{Q}_e$	[kW]	**199.7**	**232.3**	**263.8**	**293.9**	**325.9**	**375.3**	**426.0**
Unit power consumption (total)	P_e	[kW]	32.1	37.3	42.6	47.5	52.5	60.4	68.1
EER			6.22	6.23	6.19	6.19	6.21	6.21	6.26
Chilled water flow rate	$\dot{V}_e$	[m³/h]	34.4	40.0	45.4	50.6	56.1	64.6	73.3
Pressure drop (chilled water side)	Δp_e	[kPa]	44.6	47.4	47.0	46.1	46.9	46.8	47.3
Geothermal capacity	$\dot{Q}_G$	[kW]	228.9	266.0	302.1	336.9	373.6	430.0	487.6
Heat exchanger volume flow with geothermal model	$\dot{V}_G$	[m³/h]	18.0	21.0	23.8	26.6	29.4	33.9	38.4
Geothermal heat exchanger pressure drop	Δp_G		12.3	13.0	13.0	12.7	12.9	12.9	13.0
Operating mode: heating only									
Heating capacity[2)]	$\dot{Q}_c$	[kW]	**208.2**	**239.5**	**270.1**	**303.3**	**337.7**	**388.2**	**439.7**
Unit power consumption (total)	P_c	[kW]	47.7	54.7	61.8	69.2	76.8	88.4	99.6
COP			4.36	4.38	4.37	4.38	4.40	4.39	4.41
Warm water volume flow	$\dot{V}_c$	[m³/h]	36.2	41.6	46.9	52.7	58.7	67.5	76.4
Pressure drop (warm water side)	Δp_c	[kPa]	49.3	51.3	50.2	50.0	51.3	51.0	51.4
Geothermal capacity	$\dot{Q}_G$	[kW]	163.3	188.1	212.0	238.2	265.6	305.1	348.1
Heat exchanger volume flow with geothermal model	$\dot{V}_G$	[m³/h]	20.1	23.1	26.1	29.3	32.7	37.5	42.6
Geothermal heat exchanger pressure drop	Δp_G	[kPa]	15.2	15.8	15.5	15.5	15.9	15.8	15.9
Operating mode: simultaneous cooling and heating									
Refrigeration capacity[3)]	$\dot{Q}_e$	[kW]	163.3	188.1	212.0	238.2	265.6	305.1	346.1
Chilled water flow rate	$\dot{V}_e$	[m³/h]	28.1	32.3	36.4	40.9	45.6	52.4	59.5
Pressure drop (chilled water side)	Δp_e	[kPa]	29.7	31.0	30.3	30.2	31.0	30.8	31.1
Heating capacity[3)]	$\dot{Q}_c$	[kW]	208.2	239.5	270.1	303.3	337.7	388.2	439.7
Warm water volume flow	$\dot{V}_c$	[m³/h]	36.2	41.6	47.0	52.7	58.7	67.5	76.4
Pressure drop (warm water side)	Δp_c	[kPa]	49.4	51.3	50.3	50.0	51.3	51.0	51.4
Unit power consumption (total)	P	[kW]	47.7	54.7	61.8	69.2	76.8	88.4	99.6
ITEE			7.79	7.82	7.80	7.83	7.86	7.84	7.89
Controls			FläktGroup controller - step II						
Compressor			**Fully hermetic Copeland scroll compressor**						
Number of compressors		n	4	4	4	4	4	4	4
Number of refrigeration circuits		n	2	2	2	2	2	2	2
Speeds per unit		n	4	4	4	4	4	4	4
Compressor type 1			ZP 180 KCE	ZP 180 KCE	ZP 235 KCE	ZP 235 KCE	ZP 295 KCE	ZP 295 KCE	ZP 385 KCE
Compressor type 2			ZP 180 KCE	ZP 235 KCE	ZP 235 KCE	ZP 295 KCE	ZP 295 KCE	ZP 385 KCE	ZP 385 KCE
Compressor type 3			ZP 180 KCE	ZP 180 KCE	ZP 235 KCE	ZP 235 KCE	ZP 295 KCE	ZP 295 KCE	ZP 385 KCE
Compressor type 4			ZP 180 KCE	ZP 235 KCE	ZP 235 KCE	ZP 295 KCE	ZP 295 KCE	ZP 385 KCE	ZP 385 KCE
Oil type			Mobil EAL Arctic 22 CC						
Oil heating		W	4 x 70	2x70/2x120	4 x 120	2x120/2x150	4 x 150	4 x 150	4 x 150
Coil resistance per coil / compressor		Ω	4 x 0.70	2x0.70/2x0.63	4 x 0.63	2x0.63/2x0.51	4 x 0.51	2x0.51/2x0.35	4 x 0.35
Chilled water heat exchanger			**Brazed stainless steel plate heat exchanger**						
Minimum chilled water flow rate	$\dot{V}_e$	[m³/h]	19.5	22.6	25.6	28.7	31.9	36.7	41.7
Maximum chilled water volume	$\dot{V}_e$	[m³/h]	62.0	62.0	62.0	62.0	85.6	98.3	105.0
Maximum chilled water side operating pressure		[bar]	10	10	10	10	10	10	10
Evaporator inlet/outlet connection	G*	["]	3"	3"	3"	3"	4"	4"	4"
Warm water heat exchanger			**Brazed stainless steel plate heat exchanger**						
Minimum warm water volume flow	$\dot{V}_c$	[m³/h]	22.3	25.6	28.9	32.5	36.2	41.6	47.2
Maximum warm water volume flow	$\dot{V}_c$	[m³/h]	44.9	51.6	62.0	62.0	72.7	83.5	94.6
Maximum chilled water side operating pressure		[bar]	10	10	10	10	10	10	10
Condenser inlet and outlet connection	G*	["]	3"	3"	3"	3"	4"	4"	4"
Geothermal heat exchanger			**Brazed stainless steel plate heat exchanger**						
Minimum volume flow	$\dot{V}_s$	[m³/h]	11.7	13.5	15.3	17.2	19.1	22.0	24.9
Maximum volume flow	$\dot{V}_s$	[m³/h]	47.3	62.0	62.0	62.0	76.9	88.4	100.2
Maximum chilled water side operating pressure		[bar]	10	10	10	10	10	10	10
Heat exchanger connection: inlet and outlet	G*	["]	3"	3"	3"	3"	4"	4"	4"
Filling quantities									
Refrigerant R-410A4)		[kg]	22.6	25.0	30.4	31.2	33.2	37.4	40.2
Oil		[kg]	13	16	19	23	27	26	25
Minimum chilled water system content		[l]	2400	2790	3170	3530	3920	4510	5110
Minimum warm water system content		[l]	2500	2880	3250	3640	4060	4660	5280
Weight									
Transport weight		[kg]	975	1165	1365	1445	1610	1710	1810
Noise levels									
Sound power level[5)]		[dB(A)]	86	87	88	89	90	91	91
Sound pressure level[6)]		[dB(A)]	54	55	56	57	58	59	59

** G: Groove lock (Victaulic) coupling connection: the Victaulic coupling can be optionally ordered with a counter piece.*
1 Performance data for input parameters: heat exchanger chilled water (inlet/outlet) 12/7 °C; heat exchanger geothermal model (inlet/outlet) 15/26 °C;
2 Performance data for input parameters: heat exchanger warm water (inlet/outlet) 40/45 °C; heat exchanger geothermal model (inlet/outlet) 14/7 °C;
3 Performance data for input parameters: heat exchanger chilled water (inlet/outlet) 12/7 °C; heat exchanger geothermal model (inlet/outlet) 40/45 °C;
4 For exact refrigerant charge volume - refer to the unit identification plate.
5 The sound power level is determined using ISO 3744.
6 In 10 m free-field conditions (see chapter "Acoustics")

Tab. 3

Capacity stage		195	225	255	285	315	365	415
Compressor								
Max. power consumption	[kW]	4x17	2x17+ 2x22.3	4x22.3	2x22.3+ 2x27.4	4x27.4	2x27.4+ 2x35.8	4x35.8
Max. current consumption	[A]	4x30.5	2x30.5+ 2x36.1	4x36.1	2x36.1+ 2x45.8	4x45.8	2x45.8+ 2x58.9	4x58.9
Starting current of each compressor	[A]	4x173	2x173+ 2x225	4x225	2x225+ 2x272	4x272	2x272+ 2x310	4x310
Total [1,2,3)]								
Max. power consumption	[kW]	68.0	78.6	89.2	99.4	109.6	126.4	143.2
Max. current consumption	[A]	122.0	133.2	144.4	163.8	183.2	209.4	235.6
Starting current of entire unit	[A]	264.5	322.1	333.3	390.0	409.4	460.5	486.7
Maximum connectable cable cross-sections [1)]								
Rectangular	[mm]	20x5	20x5	20x5	20x5	20x5	2x25x5	2x25x5
Round	[mm²]	120	120	120	120	120	240	240
Maximum permissible pre-fuse ratings (fuse type gLgG) [2)]								
Pre-fuse	[A]	160	200	200	250	250	315	315
Dimensions								
L (length)	[mm]	2560	2560	2560	2560	2560	2560	2560
B (width)	[mm]	891	891	891	891	891	891	891
H (height)	[mm]	1810	1810	1810	1810	1810	1810	1810
Clearances								
R1	[mm]	800	800	800	800	800	800	800
R2	[mm]	800	800	800	800	800	800	800
R3	[mm]	1000	1000	1000	1000	1000	1000	1000
R4	[mm]	1000	1000	1000	1000	1000	1000	1000

Tab. 4

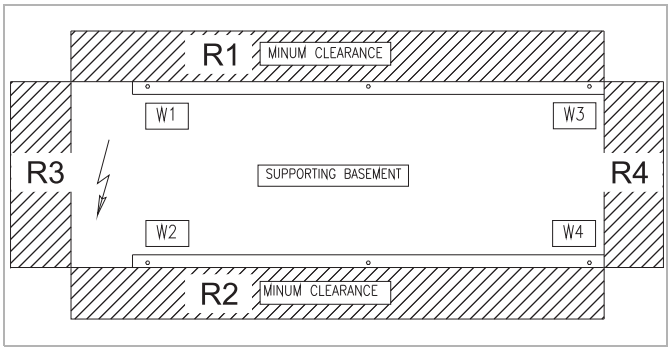

Fig. 14: Clearances

1 Please observe the regionally applicable safety regulations and constructional conditions relevant to the dimensioning of the supply line.
2 Please observe the regionally applicable standards for cable cross-sections and backup fuses.
Voltage tolerance: max. 10 %, voltage imbalance between phases: max. 3 %.
3 Unit with a maximum 2 pumps
4 Unit with 3-4 pumps

NOTICE!

For detailed planning please only use the order-related documentation. Detailed dimensional drawings can be obtained on request from your responsible FläktGroup sales office. Specifications and technical data are subject to regular updates. The manufacturer reserves the right to make necessary changes to information without prior written notice.

Capacity data
REG 050 AD22 – REG 125 AD22

REG 050 AD22

Tco	Teo	5	6	7	10	12	15
26	Q_e	46,5	48,1	49,6	54,1	57,1	61,6
	V_e	8,0	8,3	8,5	9,3	9,8	10,6
	Dp_e	26,1	27,9	29,7	35,4	39,5	46,1
	Qc	54,0	55,6	57,1	61,8	64,8	69,4
	Vc	9,3	9,6	9,9	10,7	11,2	12,0
	Dpc	35,6	37,6	39,8	46,5	51,2	58,8
	P	7,9	8,0	8,0	8,1	8,2	8,3
30	Q_e	45,0	46,5	48,0	52,5	55,5	60,1
	V_e	7,7	8,0	8,2	9,0	9,6	10,4
	Dp_e	24,4	26,1	27,8	33,3	37,3	43,8
	Qc	53,1	54,6	56,2	60,8	63,9	68,5
	Vc	9,2	9,5	9,7	10,5	11,1	11,9
	Dpc	34,5	36,5	38,6	45,2	49,9	57,4
	P	8,7	8,7	8,8	8,9	8,9	9,0
35	Q_e	42,8	44,2	45,7	50,2	53,2	57,7
	V_e	7,4	7,6	7,9	8,6	9,2	9,9
	Dp_e	22,1	23,6	25,2	30,5	34,2	40,4
	Qc	51,9	53,4	54,9	59,5	62,6	67,1
	Vc	9,0	9,3	9,5	10,3	10,8	11,6
	Dpc	33,1	35,0	37,0	43,4	48,0	55,3
	P	9,7	9,8	9,8	9,9	10,0	10,1
40	Q_e	40,3	41,8	43,2	47,5	50,5	54,9
	V_e	6,9	7,2	7,4	8,2	8,7	9,5
	Dp_e	19,6	21,1	22,5	27,3	30,8	36,5
	Qc	50,6	52,1	53,6	58,0	61,0	65,4
	Vc	8,8	9,0	9,3	10,1	10,6	11,4
	Dpc	31,6	33,4	35,3	41,4	45,7	52,7
	P	11,0	11,0	11,0	11,1	11,2	11,2
45	Q_e	37,7	39,1	40,4	44,6	47,4	51,6
	V_e	6,5	6,7	6,9	7,7	8,2	8,9
	Dp_e	17,1	18,4	19,7	24,0	27,2	32,3
	Qc	49,3	50,7	52,1	56,3	59,1	63,3
	Vc	8,6	8,8	9,1	9,8	10,3	11,0
	Dpc	30,0	31,7	33,5	39,1	43,2	49,6
	P	12,3	12,4	12,4	12,5	12,5	12,5
50	Q_e	34,8	36,1	37,4	41,3	43,9	47,9
	V_e	6,0	6,2	6,4	7,1	7,6	8,2
	Dp_e	14,6	15,7	16,9	20,6	23,3	27,8
	Qc	47,8	49,1	50,5	54,4	57,0	60,9
	Vc	8,3	8,6	8,8	9,5	9,9	10,6
	Dpc	28,3	29,9	31,6	36,7	40,3	46,0
	P	13,9	13,9	13,9	14,0	14,0	13,9
54	Q_e	32,3	33,5	34,8	38,4	40,9	44,5
	V_e	5,6	5,8	6,0	6,6	7,0	7,7
	Dp_e	12,6	13,6	14,6	17,8	20,2	24,1
	Qc	46,6	47,8	49,1	52,8	55,2	58,8
	Vc	8,1	8,3	8,6	9,2	9,6	10,3
	Dpc	27,0	28,5	29,9	34,6	37,9	43,0
	P	15,2	15,2	15,2	15,3	15,2	15,2

REG 055 AD22

Tco	Teo	5	6	7	10	12	15
26	Q_e	53,5	55,3	57,2	62,7	66,3	71,9
	V_e	9,2	9,5	9,8	10,8	11,4	12,4
	Dp_e	23,7	25,3	27,0	32,5	36,5	43,0
	Qc	62,0	63,8	65,7	71,3	75,1	80,8
	Vc	10,7	11,0	11,4	12,3	13,0	14,0
	Dpc	32,1	34,0	36,0	42,5	47,1	54,5
	P	9,0	9,1	9,1	9,3	9,3	9,5
30	Q_e	51,6	53,3	55,1	60,3	63,8	69,1
	V_e	8,9	9,2	9,5	10,4	11,0	11,9
	Dp_e	22,0	23,5	25,1	30,1	33,8	39,7
	Qc	60,8	62,6	64,4	69,8	73,4	78,8
	Vc	10,5	10,8	11,1	12,1	12,7	13,6
	Dpc	31,0	32,8	34,7	40,8	45,1	51,9
	P	9,8	9,9	10,0	10,1	10,2	10,3
35	Q_e	49,1	50,7	52,4	57,4	60,7	65,7
	V_e	8,4	8,7	9,0	9,9	10,4	11,3
	Dp_e	19,9	21,3	22,7	27,2	30,5	35,9
	Qc	59,4	61,1	62,8	67,9	71,3	76,4
	Vc	10,3	10,6	10,9	11,8	12,4	13,2
	Dpc	29,6	31,4	33,2	38,8	42,7	49,1
	P	11,0	11,1	11,1	11,3	11,3	11,4
40	Q_e	46,4	48,0	49,6	54,4	57,6	62,4
	V_e	8,0	8,3	8,5	9,4	9,9	10,8
	Dp_e	17,8	19,0	20,3	24,5	27,5	32,3
	Qc	58,0	59,6	61,2	66,2	69,4	74,3
	Vc	10,1	10,3	10,6	11,5	12,0	12,9
	Dpc	28,3	29,9	31,6	36,9	40,6	46,5
	P	12,3	12,3	12,4	12,5	12,6	12,7
45	Q_e	43,6	45,2	46,7	51,4	54,5	59,2
	V_e	7,5	7,8	8,0	8,8	9,4	10,2
	Dp_e	15,7	16,9	18,0	21,9	24,6	29,1
	Qc	56,5	58,1	59,7	64,5	67,7	72,5
	Vc	9,8	10,1	10,4	11,2	11,8	12,6
	Dpc	27,0	28,5	30,1	35,1	38,7	44,4
	P	13,7	13,7	13,8	13,9	14,0	14,1
50	Q_e	40,7	42,2	43,8	48,4	51,5	56,1
	V_e	7,0	7,3	7,5	8,3	8,9	9,7
	Dp_e	13,7	14,7	15,8	19,4	22,0	26,2
	Qc	55,0	56,6	58,1	62,9	66,0	70,8
	Vc	9,6	9,9	10,1	10,9	11,5	12,3
	Dpc	25,7	27,2	28,7	33,5	37,0	42,6
	P	15,2	15,2	15,3	15,4	15,5	15,6
54	Q_e	38,3	39,8	41,3	45,9	49,0	53,8
	V_e	6,6	6,8	7,1	7,9	8,4	9,3
	Dp_e	12,1	13,1	14,1	17,5	19,9	24,0
	Qc	53,8	55,4	56,9	61,6	64,8	69,7
	Vc	9,4	9,7	9,9	10,7	11,3	12,2
	Dpc	24,7	26,1	27,6	32,3	35,8	41,3
	P	16,5	16,5	16,6	16,7	16,8	16,9

REG 080 AD22

T_{eo}	T_a	5	6	7	10	12	15
26	Q_e	79,6	82,2	84,9	92,9	98,4	106,6
	V_e	13,7	14,1	14,6	16,0	16,9	18,4
	Dp_e	29,3	31,3	33,4	40,1	45,0	53,0
	Qc	92,4	95,2	97,9	106,3	111,9	120,3
	Vc	16,0	16,4	16,9	18,4	19,3	20,8
	Dpc	40,0	42,4	44,9	52,9	58,6	67,7
	P	13,7	13,8	13,9	14,2	14,3	14,6
30	Q_e	76,9	79,5	82,0	89,9	95,1	103,1
	V_e	13,2	13,7	14,1	15,5	16,4	17,8
	Dp_e	27,4	29,3	31,2	37,5	42,1	49,5
	Qc	90,8	93,4	96,1	104,2	109,6	117,8
	Vc	15,7	16,2	16,6	18,0	19,0	20,4
	Dpc	38,7	41,0	43,4	51,0	56,4	65,1
	P	14,8	14,9	15,0	15,3	15,4	15,7
35	Q_e	73,3	75,8	78,2	85,7	90,8	98,4
	V_e	12,6	13,0	13,4	14,7	15,6	17,0
	Dp_e	24,9	26,6	28,4	34,1	38,3	45,1
	Qc	88,6	91,2	93,8	101,5	106,7	114,5
	Vc	15,4	15,8	16,2	17,6	18,5	19,8
	Dpc	37,0	39,2	41,4	48,5	53,6	61,8
	P	16,3	16,5	16,6	16,8	17,0	17,2
40	Q_e	69,4	71,8	74,1	81,3	86,1	93,4
	V_e	11,9	12,3	12,7	14,0	14,8	16,1
	Dp_e	22,3	23,9	25,5	30,7	34,5	40,6
	Qc	86,5	88,9	91,4	98,8	103,7	111,2
	Vc	15,0	15,4	15,9	17,1	18,0	19,3
	Dpc	35,3	37,4	39,5	46,1	50,8	58,4
	P	18,1	18,3	18,4	18,6	18,8	19,0
45	Q_e	65,2	67,5	69,7	76,5	81,1	88,0
	V_e	11,2	11,6	12,0	13,2	14,0	15,2
	Dp_e	19,7	21,1	22,5	27,2	30,6	36,1
	Qc	84,2	86,5	88,9	95,9	100,6	107,6
	Vc	14,6	15,0	15,5	16,7	17,5	18,7
	Dpc	33,6	35,5	37,5	43,6	48,0	54,9
	P	20,2	20,3	20,4	20,6	20,8	20,9
50	Q_e	60,8	62,9	65,1	71,5	75,8	82,3
	V_e	10,5	10,8	11,2	12,3	13,0	14,2
	Dp_e	17,1	18,4	19,6	23,7	26,7	31,6
	Qc	81,9	84,1	86,3	93,0	97,4	104,0
	Vc	14,3	14,6	15,0	16,2	17,0	18,1
	Dpc	31,9	33,7	35,5	41,1	45,1	51,5
	P	22,4	22,5	22,6	22,9	23,0	23,1
54	Q_e	57,1	59,1	61,1	67,2	71,3	77,5
	V_e	9,8	10,2	10,5	11,6	12,3	13,4
	Dp_e	15,1	16,2	17,3	21,0	23,6	28,0
	Qc	80,0	82,1	84,2	90,5	94,7	101,0
	Vc	14,0	14,3	14,7	15,8	16,5	17,6
	Dpc	30,5	32,2	33,9	39,1	42,8	48,7
	P	24,4	24,5	24,6	24,8	24,9	25,0

REG 065 AD22

Tco	Teo	5	6	7	10	12	15
26	Q_e	62,1	64,1	66,1	72,1	76,1	82,0
	V_e	10,7	11,0	11,4	12,4	13,1	14,1
	Dp_e	23,0	24,5	26,0	31,0	34,6	40,4
	Qc	71,9	73,9	76,0	82,1	86,2	92,3
	Vc	12,4	12,8	13,1	14,2	14,9	15,9
	Dpc	31,1	32,9	34,8	40,6	44,7	51,3
	P	10,4	10,5	10,5	10,7	10,8	10,9
30	Q_e	60,1	62,1	64,0	70,0	73,9	79,8
	V_e	10,3	10,7	11,0	12,0	12,7	13,8
	Dp_e	21,5	23,0	24,5	29,2	32,7	38,2
	Qc	70,8	72,8	74,8	80,9	84,9	90,9
	Vc	12,2	12,6	12,9	14,0	14,7	15,7
	Dpc	30,3	32,0	33,8	39,5	43,5	49,9
	P	11,4	11,4	11,5	11,6	11,7	11,8
35	Q_e	57,3	59,2	61,1	66,9	70,8	76,7
	V_e	9,8	10,2	10,5	11,5	12,2	13,2
	Dp_e	19,5	20,9	22,3	26,8	30,0	35,2
	Qc	69,2	71,2	73,2	79,2	83,1	89,0
	Vc	12,0	12,3	12,7	13,7	14,4	15,4
	Dpc	29,1	30,7	32,5	38,0	41,8	48,0
	P	12,8	12,8	12,9	13,0	13,1	13,1
40	Q_e	54,1	55,9	57,8	63,5	67,3	73,0
	V_e	9,3	9,6	9,9	10,9	11,6	12,6
	Dp_e	17,4	18,7	19,9	24,1	27,1	32,0
	Qc	67,5	69,5	71,4	77,2	81,0	86,8
	Vc	11,7	12,1	12,4	13,4	14,1	15,1
	Dpc	27,7	29,3	31,0	36,2	39,9	45,8
	P	14,3	14,4	14,4	14,6	14,6	14,7
45	Q_e	50,5	52,3	54,1	59,6	63,3	68,9
	V_e	8,7	9,0	9,3	10,3	10,9	11,9
	Dp_e	15,2	16,3	17,5	21,2	24,0	28,5
	Qc	65,6	67,5	69,3	74,9	78,7	84,3
	Vc	11,4	11,7	12,1	13,0	13,7	14,7
	Dpc	26,3	27,8	29,3	34,3	37,8	43,4
	P	16,1	16,2	16,2	16,3	16,3	16,4
50	Q_e	46,6	48,3	50,1	55,3	58,9	64,4
	V_e	8,0	8,3	8,6	9,5	10,1	11,1
	Dp_e	12,9	13,9	14,9	18,3	20,8	24,8
	Qc	63,5	65,3	67,1	72,5	76,1	81,5
	Vc	11,1	11,4	11,7	12,6	13,3	14,2
	Dpc	24,7	26,1	27,6	32,2	35,4	40,7
	P	18,1	18,1	18,1	18,2	18,3	18,3
54	Q_e	43,2	44,8	46,5	51,6	55,1	60,4
	V_e	7,4	7,7	8,0	8,9	9,5	10,4
	Dp_e	11,1	12,0	12,9	15,9	18,2	21,9
	Qc	61,7	63,4	65,1	70,3	73,8	79,1
	Vc	10,8	11,1	11,4	12,3	12,9	13,8
	Dpc	23,4	24,7	26,1	30,4	33,5	38,5
	P	19,7	19,8	19,8	19,9	19,9	19,9

REG 075 AD22

Tco	Teo	5	6	7	10	12	15
26	Q_e	70,5	72,8	75,1	82,0	86,6	93,6
	V_e	12,1	12,5	12,9	14,1	14,9	16,1
	Dp_e	26,4	28,1	29,9	35,8	40,0	46,8
	Qc	82,0	84,4	86,7	93,8	98,5	105,7
	Vc	14,2	14,6	15,0	16,2	17,0	18,3
	Dpc	36,1	38,2	40,4	47,2	52,1	59,9
	P	12,3	12,3	12,4	12,6	12,7	12,9
30	Q_e	68,2	70,5	72,8	79,6	84,3	91,3
	V_e	11,7	12,1	12,5	13,7	14,5	15,7
	Dp_e	24,7	26,4	28,1	33,8	37,9	44,5
	Qc	80,7	83,0	85,4	92,4	97,1	104,3
	Vc	14,0	14,4	14,8	16,0	16,8	18,0
	Dpc	35,0	37,1	39,2	46,0	50,8	58,5
	P	13,3	13,4	13,4	13,6	13,7	13,8
35	Q_e	65,0	67,3	69,5	76,3	80,8	87,7
	V_e	11,2	11,6	11,9	13,1	13,9	15,1
	Dp_e	22,5	24,0	25,7	31,0	34,8	41,1
	Qc	78,9	81,2	83,5	90,4	95,0	102,0
	Vc	13,7	14,1	14,5	15,7	16,5	17,7
	Dpc	33,6	35,6	37,6	44,1	48,7	56,2
	P	14,8	14,8	14,9	15,0	15,1	15,2
40	Q_e	61,5	63,6	65,8	72,3	76,7	83,4
	V_e	10,6	10,9	11,3	12,4	13,2	14,4
	Dp_e	20,1	21,5	23,0	27,8	31,4	37,1
	Qc	77,0	79,2	81,4	88,0	92,5	99,2
	Vc	13,4	13,7	14,1	15,3	16,0	17,2
	Dpc	32,1	34,0	35,9	42,0	46,3	53,3
	P	16,5	16,5	16,6	16,7	16,8	16,8
45	Q_e	57,6	59,6	61,7	67,8	72,0	78,2
	V_e	9,9	10,2	10,6	11,7	12,4	13,5
	Dp_e	17,6	18,9	20,2	24,5	27,6	32,7
	Qc	74,9	77,0	79,0	85,3	89,5	95,7
	Vc	13,0	13,4	13,7	14,8	15,6	16,6
	Dpc	30,5	32,2	34,0	39,6	43,5	49,8
	P	18,4	18,4	18,5	18,6	18,6	18,6
50	Q_e	53,3	55,2	57,1	62,8	66,6	72,3
	V_e	9,2	9,5	9,8	10,8	11,5	12,5
	Dp_e	15,1	16,2	17,3	21,0	23,7	28,0
	Qc	72,6	74,5	76,5	82,2	86,0	91,7
	Vc	12,6	13,0	13,3	14,3	15,0	16,0
	Dpc	28,8	30,3	31,9	36,9	40,4	45,9
	P	20,5	20,5	20,6	20,6	20,6	20,6
54	Q_e	49,7	51,4	53,2	58,4	61,9	67,1
	V_e	8,5	8,8	9,1	10,1	10,7	11,6
	Dp_e	13,1	14,1	15,0	18,2	20,4	24,0
	Qc	70,7	72,5	74,3	79,5	83,0	88,1
	Vc	12,3	12,6	13,0	13,9	14,5	15,4
	Dpc	27,3	28,7	30,2	34,6	37,7	42,5
	P	22,3	22,4	22,4	22,4	22,4	22,4

REG 125 AD22

T_{eo}	T_a	5	6	7	10	12	15
26	Q_e	121,9	126,1	130,3	143,0	151,6	164,6
	V_e	20,9	21,7	22,4	24,6	26,1	28,4
	Dp_e	36,0	38,6	41,2	49,7	56,0	66,1
	Qc	142,0	146,3	150,7	163,8	172,6	185,9
	Vc	24,5	25,3	26,0	28,3	29,8	32,1
	Dpc	49,4	52,5	55,6	65,7	73,0	84,7
	P	21,4	21,6	21,7	22,1	22,3	22,6
30	Q_e	117,3	121,4	125,4	137,7	146,0	158,5
	V_e	20,2	20,9	21,6	23,7	25,1	27,3
	Dp_e	33,4	35,7	38,2	46,1	51,9	61,3
	Qc	138,9	143,1	147,2	159,9	168,4	181,1
	Vc	24,0	24,7	25,5	27,6	29,1	31,3
	Dpc	47,4	50,3	53,3	62,8	69,7	80,6
	P	22,9	23,1	23,2	23,6	23,8	24,1
35	Q_e	111,4	115,2	119,1	130,9	138,8	150,8
	V_e	19,1	19,8	20,5	22,5	23,9	26,0
	Dp_e	30,1	32,2	34,4	41,6	46,9	55,5
	Qc	135,0	139,0	143,0	155,2	163,3	175,6
	Vc	23,4	24,1	24,8	26,9	28,3	30,4
	Dpc	44,9	47,6	50,4	59,4	65,8	76,0
	P	25,1	25,3	25,4	25,8	26,1	26,4
40	Q_e	105,1	108,8	112,5	123,8	131,5	143,0
	V_e	18,1	18,7	19,3	21,3	22,6	24,6
	Dp_e	26,8	28,7	30,7	37,3	42,1	49,9
	Qc	131,1	135,0	138,9	150,6	158,5	170,3
	Vc	22,8	23,4	24,1	26,1	27,5	29,6
	Dpc	42,5	45,1	47,7	56,1	62,1	71,8
	P	27,7	27,9	28,0	28,5	28,7	29,1
45	Q_e	98,5	102,1	105,6	116,5	124,0	135,3
	V_e	16,9	17,5	18,2	20,0	21,3	23,3
	Dp_e	23,5	25,3	27,1	33,0	37,4	44,6
	Qc	127,3	131,0	134,8	146,1	153,8	165,4
	Vc	22,1	22,8	23,4	25,4	26,7	28,8
	Dpc	40,2	42,6	45,1	53,0	58,7	68,0
	P	30,7	30,9	31,0	31,5	31,8	32,1
50	Q_e	91,6	95,0	98,5	109,0	116,3	127,5
	V_e	15,7	16,3	16,9	18,8	20,0	22,0
	Dp_e	20,4	21,9	23,5	28,9	32,9	39,7
	Qc	123,6	127,2	130,8	141,8	149,3	160,9
	Vc	21,5	22,1	22,8	24,7	26,0	28,0
	Dpc	38,1	40,3	42,6	50,1	55,6	64,5
	P	34,0	34,2	34,4	34,9	35,2	35,6
54	Q_e	85,9	89,2	92,5	102,8	110,0	121,2
	V_e	14,8	15,3	15,9	17,7	18,9	20,9
	Dp_e	17,9	19,3	20,8	25,7	29,5	35,9
	Qc	120,6	124,1	127,6	138,4	145,9	157,5
	Vc	21,0	21,6	22,3	24,1	25,4	27,5
	Dpc	36,4	38,5	40,7	47,9	53,2	62,0
	P	37,0	37,2	37,4	37,9	38,2	38,6

Q_e	*[kW]*	*Chilled water capacity*
V_e	*[m³/h]*	*Chilled water volume flow*
Δp_e	*[kPa]*	*Chilled water pressure drop*
P	*[kW]*	*Unit power consumption (total)*
T_{co}	*[°C]*	*Warm water outlet temperature*

Q_c	*[kW]*	*Warm water capacity*
V_c	*[m³/h]*	*Warm water volume flow*
Δp_c	*[kPa]*	*Warm water pressure drop*
T_{eo}	*[°C]*	*Chilled water outlet temperature*

Performance data are valid for the following input parameters: chilled water temperature difference (inlet temperature – outlet temperature) = 5 K
Coolant medium = 100 % water, evaporator and condenser operation relate to cooling mode.

Capacity data
REG 205 AD22 – REG 255 AD42

REG 090 AD22

T_{eo}	T_a	5	6	7	10	12	15
	Q_e	**93,2**	**96,4**	**99,5**	**109,2**	**115,7**	**125,6**
	V_e	16,0	16,6	17,1	18,8	19,9	21,6
	Dp_e	31,0	33,2	35,4	42,7	48,0	56,7
26	**Qc**	**108,4**	**111,7**	**114,9**	**124,8**	**131,4**	**141,5**
	Vc	18,7	19,3	19,9	21,6	22,7	24,4
	Dpc	42,4	45,0	47,7	56,2	62,3	72,2
	P	16,2	16,3	16,4	16,6	16,7	16,9
	Q_e	**90,1**	**93,1**	**96,2**	**105,5**	**111,8**	**121,3**
	V_e	15,5	16,0	16,5	18,1	19,2	20,9
	Dp_e	29,0	31,0	33,0	39,8	44,8	52,8
30	**Qc**	**106,5**	**109,7**	**112,8**	**122,4**	**128,8**	**138,5**
	Vc	18,4	19,0	19,5	21,2	22,3	23,9
	Dpc	41,1	43,5	46,1	54,2	60,0	69,3
	P	17,5	17,6	17,7	18,0	18,1	18,3
	Q_e	**85,9**	**88,8**	**91,7**	**100,6**	**106,6**	**115,6**
	V_e	14,8	15,3	15,8	17,3	18,3	19,9
	Dp_e	26,4	28,2	30,1	36,2	40,7	48,0
35	**Qc**	**104,1**	**107,1**	**110,1**	**119,2**	**125,4**	**134,6**
	Vc	18,0	18,6	19,1	20,7	21,7	23,3
	Dpc	39,3	41,6	44,0	51,6	57,0	65,7
	P	19,4	19,5	19,6	19,8	20,0	20,2
	Q_e	**81,4**	**84,2**	**87,0**	**95,4**	**101,1**	**109,7**
	V_e	14,0	14,5	15,0	16,4	17,4	18,9
	Dp_e	23,7	25,3	27,0	32,6	36,6	43,2
40	**Qc**	**101,6**	**104,4**	**107,3**	**116,0**	**121,8**	**130,6**
	Vc	17,6	18,1	18,6	20,1	21,1	22,7
	Dpc	37,6	39,7	42,0	49,0	54,1	62,1
	P	21,4	21,5	21,6	21,9	22,1	22,2
	Q_e	**76,7**	**79,3**	**82,0**	**90,0**	**95,3**	**103,5**
	V_e	13,2	13,6	14,1	15,5	16,4	17,8
	Dp_e	21,0	22,5	24,0	29,0	32,6	38,5
45	**Qc**	**98,9**	**101,7**	**104,4**	**112,7**	**118,2**	**126,5**
	Vc	17,2	17,7	18,2	19,6	20,5	22,0
	Dpc	35,8	37,8	39,9	46,4	51,1	58,5
	P	23,6	23,8	23,9	24,2	24,3	24,5
	Q_e	**71,7**	**74,2**	**76,7**	**84,2**	**89,3**	**97,0**
	V_e	12,3	12,7	13,2	14,5	15,4	16,7
	Dp_e	18,4	19,7	21,0	25,4	28,6	33,8
50	**Qc**	**96,2**	**98,8**	**101,4**	**109,2**	**114,4**	**122,2**
	Vc	16,8	17,2	17,7	19,0	19,9	21,3
	Dpc	34,0	35,8	37,7	43,8	48,0	54,8
	P	26,1	26,2	26,3	26,6	26,7	26,9
	Q_e	**67,5**	**69,9**	**72,3**	**79,4**	**84,3**	**91,6**
	V_e	11,6	12,0	12,4	13,7	14,5	15,8
	Dp_e	16,3	17,4	18,6	22,6	25,5	30,1
54	**Qc**	**94,0**	**96,5**	**99,0**	**106,4**	**111,4**	**118,8**
	Vc	16,4	16,8	17,3	18,6	19,4	20,7
	Dpc	32,5	34,2	36,0	41,7	45,6	51,9
	P	28,2	28,3	28,4	28,7	28,8	28,9

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Tco	Teo	5	6	7	10	12	15
	Q_e	**196,7**	**203,4**	**210,1**	**230,4**	**244,0**	**264,7**
	V_e	33,8	35,0	36,1	39,6	42,0	45,6
	Dp_e	40,4	43,2	46,1	55,6	62,5	73,6
26	**Qc**	**228,9**	**235,8**	**242,7**	**263,6**	**277,5**	**298,6**
	Vc	39,5	40,7	41,9	45,5	47,9	51,6
	Dpc	55,3	58,7	62,2	73,3	81,3	94,1
	P	34,2	34,4	34,7	35,3	35,6	36,1
	Q_e	**189,9**	**196,4**	**202,9**	**222,6**	**235,9**	**256,0**
	V_e	32,6	33,7	34,9	38,3	40,6	44,1
	Dp_e	37,7	40,3	43,0	51,9	58,4	68,9
30	**Qc**	**224,5**	**231,2**	**237,9**	**258,2**	**271,8**	**292,4**
	Vc	38,8	40,0	41,1	44,6	47,0	50,6
	Dpc	53,3	56,6	59,9	70,6	78,2	90,5
	P	36,8	37,0	37,2	37,8	38,2	38,7
	Q_e	**180,8**	**187,0**	**193,3**	**212,3**	**225,0**	**244,5**
	V_e	31,1	32,1	33,2	36,5	38,7	42,1
	Dp_e	34,1	36,5	39,0	47,2	53,1	62,8
35	**Qc**	**218,8**	**225,3**	**231,8**	**251,3**	**264,4**	**284,3**
	Vc	37,9	39,0	40,1	43,5	45,8	49,2
	Dpc	50,8	53,9	57,0	67,1	74,3	85,8
	P	40,5	40,7	40,9	41,6	41,9	42,4
	Q_e	**171,0**	**177,0**	**183,0**	**201,1**	**213,4**	**232,0**
	V_e	29,4	30,4	31,4	34,6	36,7	40,0
	Dp_e	30,6	32,7	35,0	42,4	47,8	56,6
40	**Qc**	**213,0**	**219,2**	**225,4**	**244,2**	**256,8**	**275,9**
	Vc	37,0	38,0	39,1	42,4	44,6	47,9
	Dpc	48,4	51,2	54,1	63,5	70,3	81,1
	P	44,7	45,0	45,2	45,8	46,2	46,6
	Q_e	**160,6**	**166,3**	**172,0**	**189,3**	**201,0**	**218,8**
	V_e	27,6	28,6	29,5	32,6	34,6	37,7
	Dp_e	27,0	28,9	30,9	37,5	42,3	50,3
45	**Qc**	**207,1**	**213,0**	**218,9**	**236,8**	**248,8**	**267,1**
	Vc	36,0	37,0	38,1	41,2	43,3	46,4
	Dpc	45,9	48,5	51,2	60,0	66,2	76,3
	P	49,5	49,7	50,0	50,6	50,9	51,4
	Q_e	**149,6**	**155,0**	**160,3**	**176,7**	**187,7**	**204,6**
	V_e	25,7	26,6	27,5	30,4	32,3	35,3
	Dp_e	23,4	25,1	26,9	32,7	37,0	44,0
50	**Qc**	**201,1**	**206,7**	**212,3**	**229,2**	**240,6**	**258,0**
	Vc	35,0	36,0	37,0	39,9	41,9	44,9
	Dpc	43,4	45,8	48,4	56,4	62,1	71,4
	P	54,8	55,0	55,2	55,9	56,3	56,7
	Q_e	**140,4**	**145,4**	**150,5**	**166,0**	**176,6**	**192,7**
	V_e	24,1	25,0	25,9	28,6	30,4	33,2
	Dp_e	20,6	22,1	23,7	28,9	32,7	39,0
54	**Qc**	**196,2**	**201,5**	**206,8**	**222,9**	**233,8**	**250,4**
	Vc	34,2	35,1	36,1	38,9	40,8	43,7
	Dpc	41,4	43,7	46,0	53,5	58,9	67,5
	P	59,4	59,6	59,9	60,5	60,9	61,4

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Tco	Teo	5	6	7	10	12	15
	Q_e	**185,6**	**191,8**	**198,1**	**217,2**	**230,0**	**249,6**
	V_e	31,9	33,0	34,0	37,3	39,6	43,0
	Dp_e	38,3	41,0	43,7	52,6	59,1	69,7
26	**Qc**	**216,0**	**222,5**	**228,9**	**248,4**	**261,5**	**281,4**
	Vc	37,3	38,4	39,5	42,9	45,2	48,6
	Dpc	52,5	55,6	58,9	69,4	76,9	89,0
	P	32,4	32,6	32,8	33,2	33,5	33,8
	Q_e	**179,4**	**185,4**	**191,5**	**209,8**	**222,2**	**241,1**
	V_e	30,8	31,9	32,9	36,1	38,3	41,5
	Dp_e	35,8	38,3	40,8	49,1	55,2	65,0
30	**Qc**	**212,3**	**218,5**	**224,8**	**243,6**	**256,3**	**275,5**
	Vc	36,7	37,8	38,9	42,1	44,3	47,6
	Dpc	50,8	53,8	56,9	66,9	74,0	85,5
	P	35,0	35,2	35,4	36,0	36,3	36,6
	Q_e	**171,1**	**176,9**	**182,7**	**200,2**	**212,0**	**229,9**
	V_e	29,4	30,4	31,4	34,4	36,5	39,6
	Dp_e	32,6	34,8	37,1	44,7	50,2	59,1
35	**Qc**	**207,5**	**213,4**	**219,4**	**237,5**	**249,6**	**267,9**
	Vc	35,9	37,0	38,0	41,1	43,2	46,4
	Dpc	48,7	51,5	54,5	63,8	70,5	81,1
	P	38,7	38,9	39,1	39,7	40,0	40,4
	Q_e	**162,3**	**167,8**	**173,3**	**190,0**	**201,2**	**218,1**
	V_e	27,9	28,8	29,8	32,7	34,6	37,6
	Dp_e	29,3	31,3	33,4	40,2	45,2	53,3
40	**Qc**	**202,5**	**208,2**	**213,9**	**231,2**	**242,7**	**260,0**
	Vc	35,1	36,1	37,1	40,1	42,1	45,1
	Dpc	46,5	49,2	51,9	60,6	66,8	76,7
	P	42,8	43,0	43,2	43,8	44,2	44,5
	Q_e	**152,9**	**158,1**	**163,3**	**179,2**	**189,8**	**205,8**
	V_e	26,3	27,2	28,1	30,8	32,7	35,5
	Dp_e	26,0	27,8	29,7	35,8	40,2	47,4
45	**Qc**	**197,3**	**202,7**	**208,2**	**224,6**	**235,5**	**251,9**
	Vc	34,3	35,2	36,2	39,0	40,9	43,8
	Dpc	44,3	46,8	49,4	57,4	63,2	72,2
	P	47,3	47,5	47,7	48,3	48,6	49,0
	Q_e	**142,9**	**147,9**	**152,8**	**167,8**	**177,8**	**192,9**
	V_e	24,6	25,4	26,3	28,9	30,6	33,2
	Dp_e	22,7	24,3	26,0	31,4	35,3	41,7
50	**Qc**	**191,9**	**197,1**	**202,3**	**217,8**	**228,1**	**243,5**
	Vc	33,4	34,3	35,2	37,9	39,7	42,4
	Dpc	42,1	44,4	46,8	54,2	59,5	67,8
	P	52,1	52,4	52,6	53,2	53,5	53,8
	Q_e	**134,6**	**139,3**	**144,0**	**158,3**	**167,8**	**182,2**
	V_e	23,1	23,9	24,7	27,2	28,9	31,4
	Dp_e	20,2	21,6	23,1	27,9	31,5	37,2
54	**Qc**	**187,5**	**192,5**	**197,4**	**212,2**	**222,0**	**236,7**
	Vc	32,7	33,6	34,4	37,0	38,7	41,3
	Dpc	40,3	42,5	44,7	51,6	56,5	64,2
	P	56,4	56,6	56,8	57,4	57,6	57,9

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T_{eo}	T_a	5	6	7	10	12	15
	Q_e	**151,6**	**156,6**	**161,8**	**177,1**	**187,5**	**203,0**
	V_e	26,0	26,9	27,8	30,5	32,3	35,0
	Dp_e	39,0	41,6	44,4	53,4	59,8	70,4
26	**Qc**	**176,3**	**181,6**	**186,8**	**202,6**	**213,2**	**229,1**
	Vc	30,5	31,4	32,3	35,0	36,8	39,6
	Dpc	53,3	56,5	59,9	70,4	77,9	90,0
	P	26,4	26,5	26,7	27,1	27,4	27,7
	Q_e	**146,4**	**151,4**	**156,4**	**171,4**	**181,5**	**196,7**
	V_e	25,2	26,0	26,9	29,5	31,2	33,9
	Dp_e	36,4	38,9	41,5	49,9	56,1	66,0
30	**Qc**	**173,1**	**178,2**	**183,3**	**198,8**	**209,1**	**224,7**
	Vc	29,9	30,8	31,7	34,4	36,2	38,9
	Dpc	51,5	54,6	57,8	67,9	75,2	86,8
	P	28,3	28,5	28,7	29,2	29,4	29,8
	Q_e	**139,5**	**144,3**	**149,1**	**163,5**	**173,3**	**188,1**
	V_e	24,0	24,8	25,6	28,1	29,8	32,4
	Dp_e	33,0	35,3	37,7	45,5	51,1	60,4
35	**Qc**	**168,8**	**173,8**	**178,7**	**193,6**	**203,7**	**218,8**
	Vc	29,2	30,1	31,0	33,5	35,3	37,9
	Dpc	49,2	52,1	55,1	64,7	71,5	82,5
	P	31,2	31,3	31,5	32,0	32,3	32,7
	Q_e	**132,1**	**136,6**	**141,2**	**155,1**	**164,4**	**178,6**
	V_e	22,7	23,5	24,3	26,7	28,3	30,8
	Dp_e	29,6	31,7	33,8	40,9	46,0	54,5
40	**Qc**	**164,4**	**169,1**	**173,9**	**188,2**	**197,8**	**212,3**
	Vc	28,5	29,3	30,2	32,7	34,3	36,8
	Dpc	46,8	49,5	52,3	61,3	67,7	78,0
	P	34,4	34,6	34,8	35,3	35,5	35,9
	Q_e	**124,1**	**128,4**	**132,7**	**145,9**	**154,8**	**168,3**
	V_e	21,3	22,1	22,8	25,1	26,6	29,0
	Dp_e	26,1	28,0	29,9	36,2	40,8	48,4
45	**Qc**	**159,8**	**164,3**	**168,8**	**182,4**	**191,5**	**205,3**
	Vc	27,8	28,6	29,3	31,7	33,3	35,7
	Dpc	44,4	46,9	49,5	57,8	63,7	73,2
	P	38,1	38,2	38,4	38,9	39,1	39,4
	Q_e	**115,5**	**119,5**	**123,6**	**136,1**	**144,5**	**157,3**
	V_e	19,8	20,5	21,2	23,4	24,9	27,1
	Dp_e	22,6	24,2	25,9	31,5	35,5	42,2
50	**Qc**	**155,1**	**159,3**	**163,5**	**176,3**	**184,9**	**197,8**
	Vc	27,0	27,7	28,5	30,7	32,2	34,4
	Dpc	41,9	44,2	46,6	54,2	59,6	68,2
	P	42,1	42,3	42,5	42,8	43,0	43,2
	Q_e	**108,2**	**112,0**	**115,9**	**127,7**	**135,7**	**147,8**
	V_e	18,6	19,3	19,9	22,0	23,4	25,5
	Dp_e	19,9	21,3	22,8	27,7	31,4	37,3
54	**Qc**	**151,1**	**155,1**	**159,1**	**171,2**	**179,3**	**191,5**
	Vc	26,4	27,1	27,8	29,9	31,3	33,4
	Dpc	39,9	42,1	44,3	51,3	56,2	64,1
	P	45,7	45,8	46,0	46,3	46,4	46,5

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Tco	Teo	5	6	7	10	12	15
	Q_e	**215,5**	**222,9**	**230,3**	**252,9**	**268,1**	**291,3**
	V_e	37,0	38,3	39,6	43,5	46,1	50,2
	Dp_e	40,6	43,4	46,4	56,0	63,0	74,6
26	**Qc**	**250,8**	**258,4**	**266,0**	**289,1**	**304,6**	**328,2**
	Vc	43,3	44,6	45,9	49,9	52,6	56,7
	Dpc	55,5	58,9	62,5	73,8	81,9	95,0
	P	37,5	37,8	38,0	38,5	38,9	39,3
	Q_e	**207,8**	**215,0**	**222,1**	**243,9**	**258,5**	**280,8**
	V_e	35,7	36,9	38,2	41,9	44,5	48,4
	Dp_e	37,7	40,4	43,1	52,1	58,6	69,3
30	**Qc**	**245,7**	**253,1**	**260,5**	**282,8**	**297,8**	**320,4**
	Vc	42,5	43,8	45,0	48,9	51,5	55,4
	Dpc	53,4	56,7	60,0	70,8	78,5	90,8
	P	40,3	40,6	40,8	41,4	41,8	42,2
	Q_e	**197,7**	**204,5**	**211,4**	**232,1**	**246,1**	**267,3**
	V_e	34,0	35,1	36,3	39,9	42,4	46,1
	Dp_e	34,1	36,5	39,0	47,2	53,1	62,8
35	**Qc**	**239,4**	**246,4**	**253,5**	**274,9**	**289,3**	**310,9**
	Vc	41,5	42,7	43,9	47,6	50,1	53,8
	Dpc	50,9	53,9	57,1	67,1	74,3	85,8
	P	44,4	44,6	44,9	45,5	45,9	46,3
	Q_e	**186,9**	**193,5**	**200,0**	**219,9**	**233,3**	**253,6**
	V_e	32,1	33,2	34,4	37,8	40,2	43,7
	Dp_e	30,5	32,7	35,0	42,3	47,7	56,5
40	**Qc**	**233,0**	**239,7**	**246,5**	**267,1**	**280,8**	**301,6**
	Vc	40,4	41,6	42,8	46,3	48,7	52,3
	Dpc	48,3	51,2	54,2	63,5	70,3	81,0
	P	49,0	49,2	49,5	50,2	50,6	51,0
	Q_e	**175,6**	**181,8**	**188,1**	**207,1**	**220,0**	**239,6**
	V_e	30,2	31,2	32,3	35,6	37,9	41,3
	Dp_e	26,9	28,9	30,9	37,6	42,4	50,4
45	**Qc**	**226,5**	**233,0**	**239,5**	**259,2**	**272,5**	**292,5**
	Vc	39,4	40,5	41,6	45,1	47,4	50,8
	Dpc	45,9	48,5	51,3	60,1	66,4	76,5
	P	54,2	54,5	54,7	55,4	55,8	56,3
	Q_e	**163,7**	**169,6**	**175,6**	**193,8**	**206,2**	**225,2**
	V_e	28,1	29,1	30,2	33,3	35,5	38,8
	Dp_e	23,4	25,1	26,9	32,9	37,3	44,6
50	**Qc**	**220,0**	**226,2**	**232,5**	**251,4**	**264,2**	**283,6**
	Vc	38,3	39,4	40,5	43,8	46,0	49,4
	Dpc	43,4	45,9	48,5	56,7	62,6	72,2
	P	60,0	60,3	60,5	61,3	61,7	62,2
	Q_e	**153,7**	**159,4**	**165,1**	**182,8**	**194,9**	**213,5**
	V_e	26,4	27,4	28,4	31,4	33,5	36,8
	Dp_e	20,6	22,2	23,8	29,3	33,3	40,1
54	**Qc**	**214,8**	**220,8**	**226,8**	**245,2**	**257,6**	**276,7**
	Vc	37,5	38,5	39,6	42,8	44,9	48,3
	Dpc	41,5	43,9	46,3	54,1	59,7	68,9
	P	65,0	65,3	65,6	66,3	66,8	67,3

REG 255 AD42

Tco	Teo	5	6	7	10	12	15
	Q_e	**244,5**	**252,9**	**261,4**	**287,1**	**304,5**	**330,9**
	V_e	42,0	43,5	44,9	49,4	52,4	57,0
	Dp_e	40,2	43,1	46,0	55,6	62,6	74,1
26	**Qc**	**284,7**	**293,4**	**302,1**	**328,5**	**346,2**	**373,1**
	Vc	49,2	50,7	52,2	56,7	59,8	64,4
	Dpc	55,1	58,5	62,0	73,3	81,5	94,6
	P	42,7	43,0	43,3	44,0	44,4	44,9
	Q_e	**235,4**	**243,5**	**251,7**	**276,5**	**293,2**	**318,5**
	V_e	40,4	41,8	43,3	47,6	50,5	54,9
	Dp_e	37,3	39,9	42,6	51,6	58,1	68,7
30	**Qc**	**278,3**	**286,8**	**295,2**	**320,7**	**337,8**	**363,6**
	Vc	48,1	49,6	51,0	55,5	58,4	62,9
	Dpc	52,8	56,1	59,4	70,1	77,8	90,1
	P	45,7	46,0	46,3	47,0	47,4	48,0
	Q_e	**223,4**	**231,2**	**239,1**	**262,8**	**278,8**	**303,0**
	V_e	38,4	39,7	41,1	45,2	48,0	52,2
	Dp_e	33,6	36,0	38,5	46,6	52,5	62,1
35	**Qc**	**270,5**	**278,6**	**286,7**	**311,2**	**327,6**	**352,3**
	Vc	46,9	48,3	49,7	53,9	56,7	61,0
	Dpc	50,0	53,1	56,2	66,2	73,4	84,9
	P	50,1	50,4	50,7	51,5	51,9	52,5
	Q_e	**210,8**	**218,3**	**225,9**	**248,7**	**264,0**	**287,4**
	V_e	36,2	37,5	38,8	42,8	45,4	49,5
	Dp_e	29,9	32,1	34,3	41,7	47,1	55,9
40	**Qc**	**262,8**	**270,5**	**278,4**	**302,0**	**317,8**	**341,7**
	Vc	45,6	46,9	48,3	52,4	55,1	59,3
	Dpc	47,4	50,2	53,2	62,6	69,3	80,1
	P	55,2	55,6	55,9	56,7	57,2	57,8
	Q_e	**197,6**	**204,8**	**212,0**	**234,0**	**249,0**	**271,8**
	V_e	34,0	35,2	36,4	40,2	42,9	46,8
	Dp_e	26,3	28,2	30,3	36,9	41,9	50,0
45	**Qc**	**255,1**	**262,6**	**270,1**	**293,0**	**308,4**	**331,8**
	Vc	44,3	45,6	47,0	50,9	53,6	57,7
	Dpc	44,8	47,5	50,3	59,1	65,5	75,8
	P	61,2	61,5	61,8	62,7	63,2	63,9
	Q_e	**183,8**	**190,7**	**197,6**	**218,9**	**233,6**	**256,2**
	V_e	31,6	32,8	34,0	37,7	40,2	44,1
	Dp_e	22,7	24,5	26,3	32,3	36,8	44,4
50	**Qc**	**247,6**	**254,8**	**262,0**	**284,2**	**299,4**	**322,7**
	Vc	43,1	44,4	45,6	49,5	52,1	56,2
	Dpc	42,4	44,9	47,5	55,8	62,0	72,0
	P	67,8	68,2	68,5	69,5	70,0	70,8
	Q_e	**172,3**	**178,9**	**185,7**	**206,5**	**221,0**	**243,6**
	V_e	29,6	30,7	31,9	35,5	38,0	42,0
	Dp_e	20,0	21,5	23,2	28,8	33,0	40,2
54	**Qc**	**241,6**	**248,6**	**255,6**	**277,4**	**292,5**	**315,8**
	Vc	42,1	43,4	44,6	48,4	51,0	55,1
	Dpc	40,5	42,8	45,3	53,4	59,3	69,1
	P	73,7	74,1	74,5	75,5	76,0	76,8

Q_e	*[kW]*	*Chilled water capacity*
V_e	*[m³/h]*	*Chilled water volume flow*
Δp_e	*[kPa]*	*Chilled water pressure drop*
P	*[kW]*	*Unit power consumption (total)*
T_{co}	*[°C]*	*Warm water outlet temperature*

Q_c	*[kW]*	*Warm water capacity*
V_c	*[m³/h]*	*Warm water volume flow*
Δp_c	*[kPa]*	*Warm water pressure drop*
T_{eo}	*[°C]*	*Chilled water outlet temperature*

Performance data are valid for the following input parameters: chilled water temperature difference (inlet temperature – outlet temperature) = 5 K
Coolant medium = 100 % water, evaporator and condenser operation relate to cooling mode.

Capacity data
REG 285 AD42 – REG 415 AD42

REG 285 AD42							
T_{eo}	T_a	5	6	7	10	12	15
26	Q_e	273,0	282,2	291,5	319,5	338,3	366,7
	V_e	46,9	48,5	50,1	54,9	58,2	63,2
	Dp_e	39,6	42,3	45,1	54,3	61,0	71,8
	Qc	317,8	327,4	336,9	365,6	384,9	413,9
	Vc	54,9	56,5	58,2	63,1	66,5	71,5
	Dpc	54,2	57,5	60,9	71,7	79,5	91,9
	P	47,7	48,0	48,3	49,1	49,6	50,3
30	Q_e	263,4	272,4	281,4	308,5	326,7	354,3
	V_e	45,3	46,8	48,3	53,1	56,2	61,0
	Dp_e	36,9	39,4	42,1	50,7	56,9	67,1
	Qc	311,5	320,7	330,0	358,0	376,7	404,9
	Vc	53,9	55,5	57,1	61,9	65,1	70,0
	Dpc	52,2	55,4	58,6	69,0	76,4	88,2
	P	51,1	51,5	51,8	52,7	53,2	53,9
35	Q_e	250,7	259,3	267,9	294,0	311,5	338,0
	V_e	43,1	44,5	46,0	50,6	53,6	58,2
	Dp_e	33,4	35,7	38,1	46,0	51,7	61,1
	Qc	303,4	312,3	321,3	348,2	366,3	393,5
	Vc	52,6	54,1	55,6	60,3	63,4	68,2
	Dpc	49,7	52,7	55,7	65,5	72,4	83,6
	P	56,1	56,5	56,8	57,7	58,3	59,0
40	Q_e	237,0	245,2	253,5	278,5	295,4	321,0
	V_e	40,7	42,1	43,6	47,9	50,8	55,3
	Dp_e	29,8	32,0	34,1	41,3	46,5	55,1
	Qc	295,2	303,8	312,4	338,3	355,7	381,9
	Vc	51,2	52,7	54,2	58,7	61,7	66,3
	Dpc	47,2	50,0	52,9	62,0	68,5	79,0
	P	61,9	62,3	62,6	63,6	64,1	64,8
45	Q_e	222,5	230,3	238,2	262,2	278,4	303,0
	V_e	38,2	39,6	40,9	45,1	47,9	52,2
	Dp_e	26,3	28,2	30,2	36,6	41,3	49,1
	Qc	286,9	295,1	303,3	328,1	344,8	370,1
	Vc	49,9	51,3	52,7	57,0	59,9	64,3
	Dpc	44,8	47,3	50,0	58,5	64,6	74,5
	P	68,5	68,9	69,2	70,2	70,7	71,3
50	Q_e	207,1	214,6	222,1	244,9	260,5	284,3
	V_e	35,6	36,9	38,2	42,1	44,8	49,0
	Dp_e	22,8	24,5	26,2	31,9	36,2	43,2
	Qc	278,5	286,2	294,1	317,8	333,8	358,1
	Vc	48,5	49,8	51,2	55,3	58,1	62,4
	Dpc	42,3	44,7	47,2	55,1	60,8	70,0
	P	75,9	76,3	76,6	77,5	78,0	78,6
54	Q_e	194,2	201,3	208,5	230,5	245,5	268,7
	V_e	33,4	34,6	35,8	39,6	42,3	46,3
	Dp_e	20,0	21,5	23,1	28,3	32,1	38,6
	Qc	271,6	279,1	286,6	309,4	324,8	348,4
	Vc	47,4	48,7	50,0	53,9	56,6	60,8
	Dpc	40,4	42,6	44,9	52,4	57,8	66,5
	P	82,4	82,7	83,1	83,9	84,4	84,9

REG 315 AD42							
T_{eo}	T_a	5	6	7	10	12	15
26	Q_e	303,1	313,2	323,4	353,9	374,4	405,2
	V_e	52,1	53,8	55,6	60,9	64,4	69,8
	Dp_e	40,4	43,1	46,0	55,2	61,9	72,6
	Qc	352,7	363,1	373,6	405,0	426,0	457,6
	Vc	60,9	62,7	64,5	69,9	73,6	79,0
	Dpc	55,3	58,6	62,0	72,9	80,6	93,0
	P	52,8	53,1	53,5	54,4	55,0	55,7
30	Q_e	292,9	302,8	312,6	342,4	362,4	392,6
	V_e	50,3	52,0	53,7	58,9	62,4	67,6
	Dp_e	37,7	40,3	43,0	51,7	58,0	68,2
	Qc	346,2	356,4	366,6	397,3	417,9	448,8
	Vc	59,9	61,6	63,4	68,7	72,3	77,6
	Dpc	53,4	56,6	59,9	70,3	77,8	89,7
	P	56,7	57,0	57,4	58,4	59,0	59,9
35	Q_e	279,2	288,6	298,1	326,8	346,1	375,3
	V_e	48,0	49,6	51,2	56,2	59,6	64,7
	Dp_e	34,3	36,6	39,1	47,1	52,9	62,3
	Qc	337,7	347,6	357,4	387,1	407,0	437,0
	Vc	58,5	60,2	61,9	67,0	70,5	75,7
	Dpc	51,0	54,0	57,1	67,0	74,0	85,3
	P	62,3	62,7	63,1	64,1	64,8	65,6
40	Q_e	264,3	273,4	282,4	309,9	328,4	356,5
	V_e	45,4	47,0	48,5	53,3	56,5	61,4
	Dp_e	30,7	32,9	35,1	42,3	47,6	56,2
	Qc	328,9	338,4	347,8	376,2	395,3	424,1
	Vc	57,1	58,7	60,3	65,3	68,6	73,6
	Dpc	48,5	51,3	54,2	63,5	70,1	80,7
	P	68,7	69,1	69,5	70,6	71,2	72,0
45	Q_e	248,4	256,9	265,6	291,7	309,3	336,0
	V_e	42,7	44,1	45,6	50,2	53,2	57,9
	Dp_e	27,1	29,0	31,0	37,5	42,2	50,0
	Qc	319,8	328,7	337,7	364,8	382,9	410,2
	Vc	55,6	57,1	58,7	63,4	66,5	71,3
	Dpc	46,0	48,6	51,3	59,9	66,0	75,7
	P	76,0	76,4	76,8	77,8	78,3	78,9
50	Q_e	231,3	239,4	247,5	272,1	288,7	314,0
	V_e	39,7	41,1	42,5	46,8	49,7	54,1
	Dp_e	23,5	25,2	26,9	32,6	36,8	43,6
	Qc	310,3	318,7	327,2	352,6	369,7	395,3
	Vc	54,0	55,5	57,0	61,4	64,4	68,8
	Dpc	43,5	45,9	48,4	56,2	61,7	70,6
	P	84,1	84,5	84,8	85,7	86,1	86,5
54	Q_e	216,8	224,4	232,1	255,5	271,2	295,2
	V_e	37,2	38,6	39,9	43,9	46,7	50,9
	Dp_e	20,7	22,2	23,7	28,8	32,5	38,5
	Qc	302,5	310,5	318,4	342,5	358,5	382,6
	Vc	52,7	54,1	55,5	59,7	62,5	66,7
	Dpc	41,5	43,7	45,9	53,1	58,2	66,3
	P	91,2	91,5	91,8	92,5	92,9	93,1

REG 365 AD42							
T_{eo}	T_a	5	6	7	10	12	15
26	Q_e	348,7	360,5	372,3	407,8	431,7	467,7
	V_e	59,9	61,9	64,0	70,1	74,3	80,6
	Dp_e	40,2	43,0	45,8	55,1	61,8	72,7
	Qc	405,7	417,9	430,0	466,6	491,1	527,9
	Vc	70,1	72,2	74,3	80,6	84,8	91,2
	Dpc	55,0	58,3	61,8	72,7	80,5	93,1
	P	60,6	61,0	61,4	62,5	63,2	64,1
30	Q_e	336,8	348,2	359,7	394,3	417,5	452,7
	V_e	57,9	59,8	61,8	67,8	71,9	78,0
	Dp_e	37,5	40,1	42,8	51,5	57,8	68,1
	Qc	398,0	409,8	421,7	457,4	481,3	517,3
	Vc	68,8	70,9	72,9	79,1	83,2	89,5
	Dpc	53,0	56,2	59,5	70,1	77,6	89,6
	P	65,2	65,6	66,0	67,2	67,8	68,7
35	Q_e	320,7	331,7	342,7	376,1	398,5	432,5
	V_e	55,1	57,0	58,9	64,7	68,6	74,5
	Dp_e	34,0	36,4	38,8	46,8	52,7	62,2
	Qc	388,1	399,5	410,9	445,4	468,4	503,3
	Vc	67,2	69,2	71,2	77,1	81,1	87,2
	Dpc	50,6	53,6	56,7	66,6	73,7	85,1
	P	71,7	72,1	72,5	73,7	74,4	75,3
40	Q_e	303,5	314,0	324,6	356,4	378,0	410,6
	V_e	52,1	54,0	55,8	61,3	65,1	70,7
	Dp_e	30,5	32,6	34,8	42,1	47,4	56,1
	Qc	377,9	388,8	399,7	432,7	454,9	488,4
	Vc	65,6	67,5	69,4	75,1	78,9	84,7
	Dpc	48,1	51,0	53,9	63,1	69,8	80,4
	P	79,1	79,6	80,0	81,2	81,9	82,8
45	Q_e	285,2	295,1	305,1	335,4	355,9	387,0
	V_e	49,0	50,7	52,4	57,7	61,3	66,7
	Dp_e	26,9	28,8	30,8	37,3	42,0	49,8
	Qc	367,4	377,8	388,2	419,6	440,7	472,6
	Vc	63,9	65,7	67,5	72,9	76,6	82,1
	Dpc	45,7	48,3	51,0	59,6	65,7	75,6
	P	87,5	88,0	88,4	89,5	90,2	91,0
50	Q_e	265,6	275,0	284,4	313,0	332,4	361,8
	V_e	45,6	47,2	48,9	53,8	57,2	62,3
	Dp_e	23,3	25,0	26,7	32,5	36,6	43,5
	Qc	356,6	366,4	376,2	405,9	425,8	456,0
	Vc	62,1	63,8	65,5	70,7	74,1	79,4
	Dpc	43,2	45,6	48,1	55,9	61,6	70,6
	P	96,8	97,3	97,7	98,8	99,4	100,1
54	Q_e	249,1	258,0	266,9	294,0	312,4	340,5
	V_e	42,8	44,3	45,9	50,6	53,8	58,7
	Dp_e	20,5	22,0	23,5	28,6	32,4	38,5
	Qc	347,7	357,0	366,3	394,5	413,4	442,0
	Vc	60,6	62,3	63,9	68,8	72,1	77,1
	Dpc	41,2	43,4	45,7	53,0	58,2	66,5
	P	105,0	105,4	105,8	106,9	107,4	108,0

REG 415 AD42							
T_{eo}	T_a	5	6	7	10	12	15
26	Q_e	395,7	409,1	422,5	463,1	490,3	531,5
	V_e	68,0	70,3	72,6	79,6	84,4	91,6
	Dp_e	40,7	43,5	46,4	55,8	62,7	73,8
	Qc	459,9	473,7	487,6	529,4	557,4	599,5
	Vc	79,4	81,8	84,2	91,4	96,2	103,5
	Dpc	55,5	58,9	62,4	73,5	81,5	94,3
	P	68,3	68,8	69,3	70,6	71,4	72,4
30	Q_e	381,9	395,0	408,0	447,5	474,0	514,1
	V_e	65,6	67,9	70,1	77,0	81,6	88,6
	Dp_e	37,9	40,5	43,2	52,1	58,6	69,0
	Qc	450,9	464,4	477,9	518,6	545,9	587,0
	Vc	78,0	80,3	82,6	89,7	94,4	101,5
	Dpc	53,5	56,7	60,1	70,8	78,4	90,7
	P	73,4	73,9	74,4	75,7	76,5	77,6
35	Q_e	363,6	376,1	388,7	426,6	452,2	490,9
	V_e	62,5	64,6	66,8	73,4	77,8	84,6
	Dp_e	34,3	36,7	39,2	47,4	53,3	62,9
	Qc	439,5	452,5	465,5	504,7	531,0	570,7
	Vc	76,1	78,4	80,6	87,4	92,0	98,8
	Dpc	51,0	54,1	57,2	67,3	74,4	86,0
	P	80,8	81,3	81,8	83,1	83,9	85,0
40	Q_e	344,1	356,1	368,0	404,3	428,8	465,9
	V_e	59,1	61,2	63,2	69,5	73,8	80,3
	Dp_e	30,8	32,9	35,2	42,6	47,9	56,7
	Qc	427,9	440,3	452,8	490,4	515,6	553,8
	Vc	74,2	76,4	78,6	85,1	89,5	96,1
	Dpc	48,5	51,4	54,3	63,7	70,4	81,2
	P	89,1	89,7	90,2	91,5	92,4	93,4
45	Q_e	323,4	334,7	346,1	380,6	403,9	439,3
	V_e	55,6	57,5	59,5	65,5	69,5	75,7
	Dp_e	27,2	29,1	31,1	37,7	42,5	50,4
	Qc	416,0	427,8	439,7	475,5	499,6	536,1
	Vc	72,3	74,4	76,4	82,6	86,8	93,2
	Dpc	46,0	48,7	51,4	60,1	66,4	76,4
	P	98,6	99,1	99,6	101,0	101,9	103,0
50	Q_e	301,4	312,1	322,8	355,4	377,4	411,0
	V_e	51,8	53,6	55,5	61,1	65,0	70,8
	Dp_e	23,6	25,3	27,1	32,9	37,1	44,1
	Qc	403,9	415,1	426,3	460,2	483,1	517,7
	Vc	70,3	72,3	74,2	80,1	84,1	90,1
	Dpc	43,5	46,0	48,5	56,5	62,3	71,5
	P	109,0	109,6	110,1	111,5	112,4	113,5
54	Q_e	282,9	293,0	303,2	334,1	355,1	387,2
	V_e	48,6	50,3	52,1	57,5	61,1	66,7
	Dp_e	20,8	22,3	23,9	29,1	32,9	39,2
	Qc	394,0	404,6	415,3	447,6	469,4	502,6
	Vc	68,7	70,6	72,4	78,1	81,9	87,6
	Dpc	41,5	43,8	46,2	53,6	59,0	67,6
	P	118,2	118,7	119,2	120,7	121,6	122,7

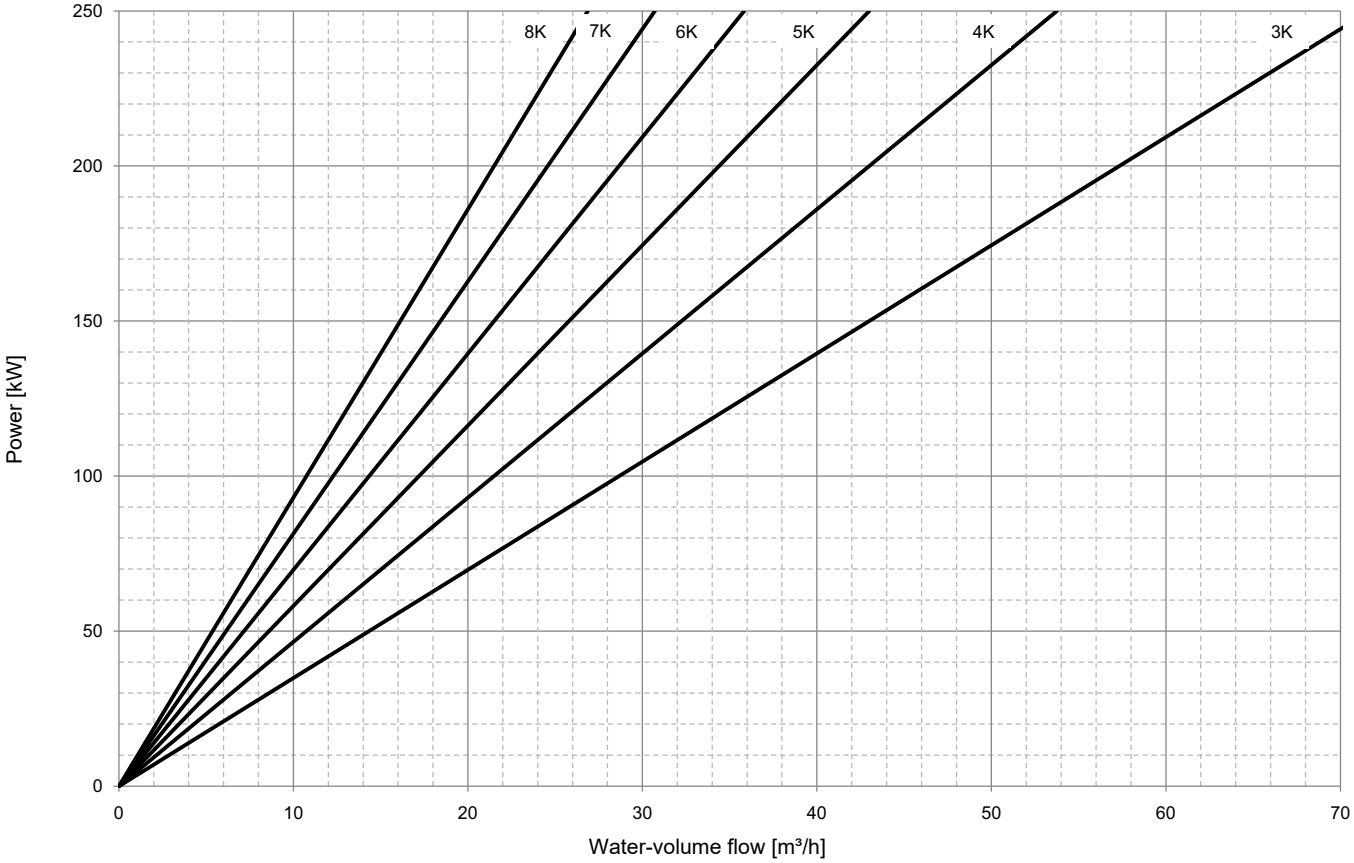
Q_e	*[kW]*	*Chilled water capacity*
V_e	*[m³/h]*	*Chilled water volume flow*
Δp_e	*[kPa]*	*Chilled water pressure drop*
P	*[kW]*	*Unit power consumption (total)*
T_{co}	*[°C]*	*Warm water outlet temperature*

Q_c	*[kW]*	*Warm water capacity*
V_c	*[m³/h]*	*Warm water volume flow*
Δp_c	*[kPa]*	*Warm water pressure drop*
T_{eo}	*[°C]*	*Chilled water outlet temperature*

Performance data are valid for the following input parameters: chilled water temperature difference (inlet temperature – outlet temperature) = 5 K
Coolant medium = 100 % water, evaporator and condenser operation relate to cooling mode.

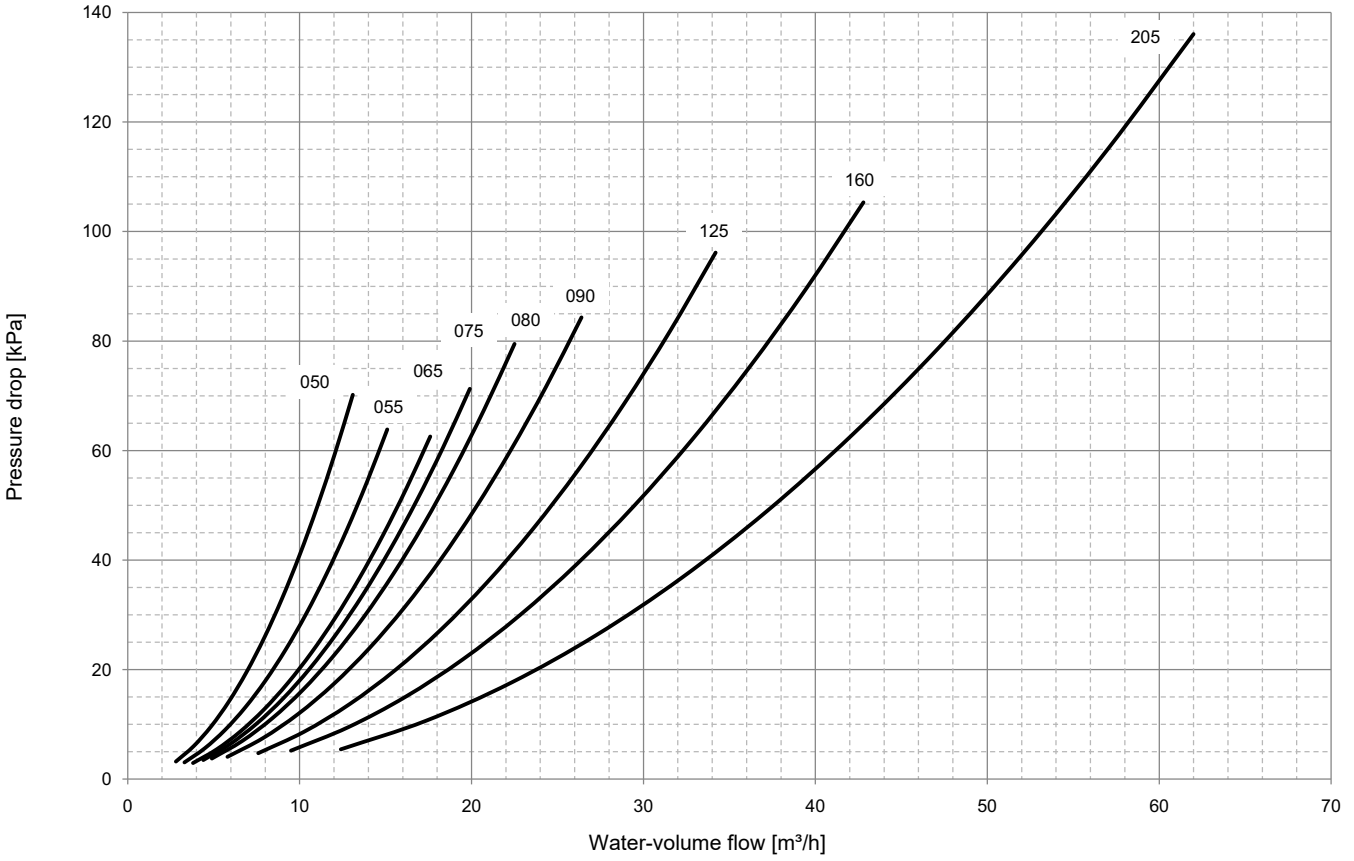
Warm/chilled water volume flow capacity stage 050-205 (depending on operating mode)

D. 1



Water-side pressure loss plate of heat exchanger capacity stage 050-205

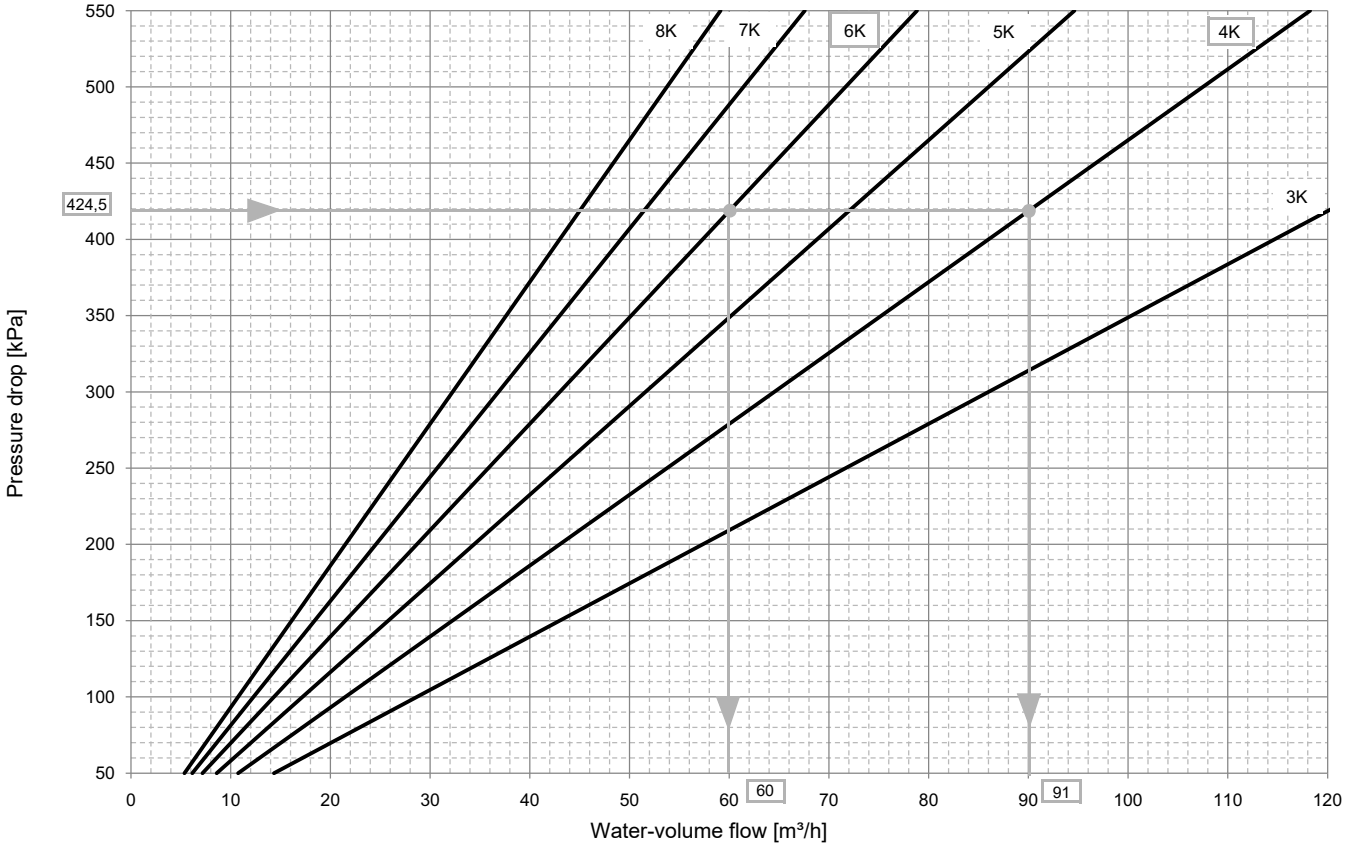
D. 2



** Please pay attention to the maximum allowed volume flow on Page 20 and following pages.*

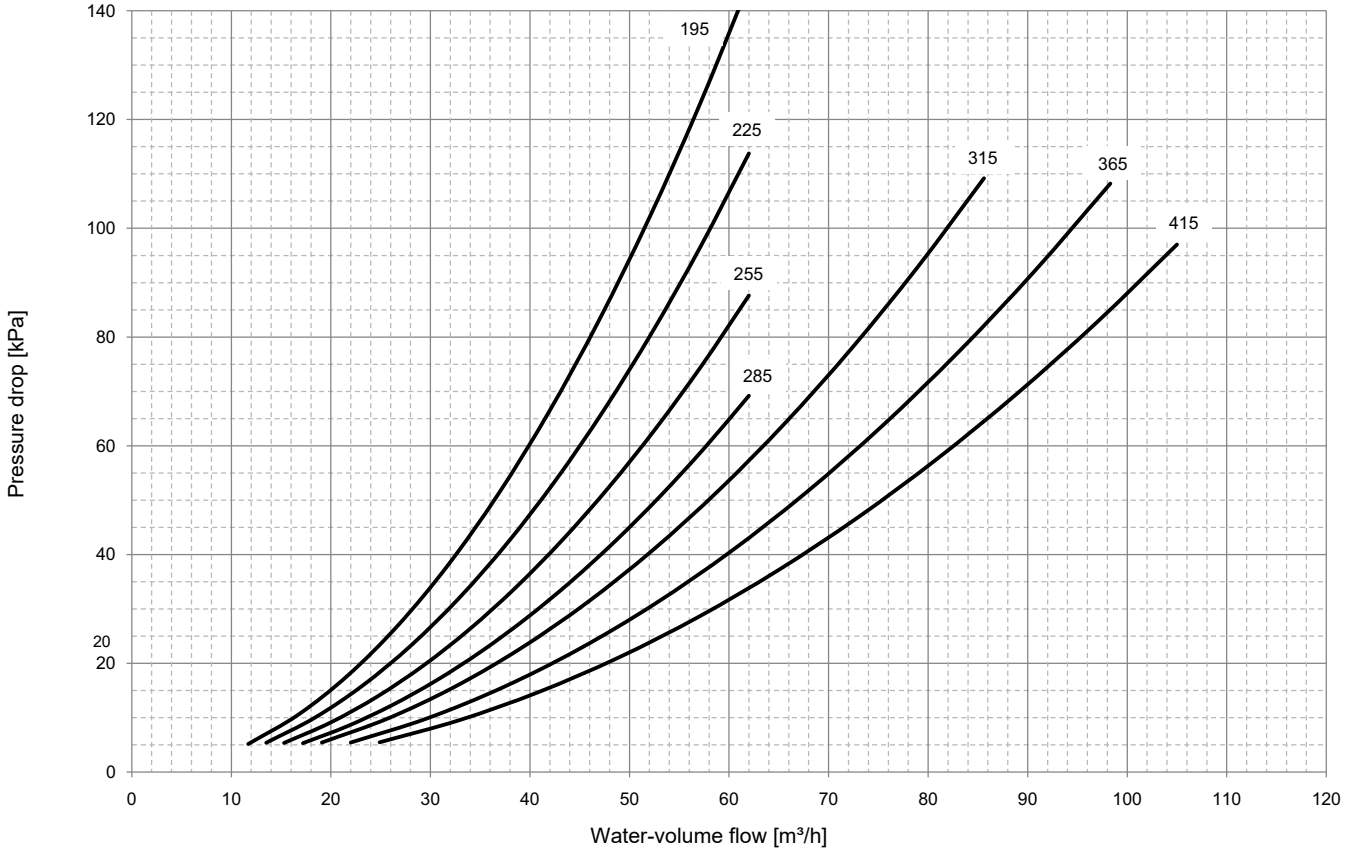
Warm/chilled water volume flow capacity stage 195-415 (depending on operating mode)

D. 3



Water-side pressure loss plate of heat exchanger capacity stage 195-415

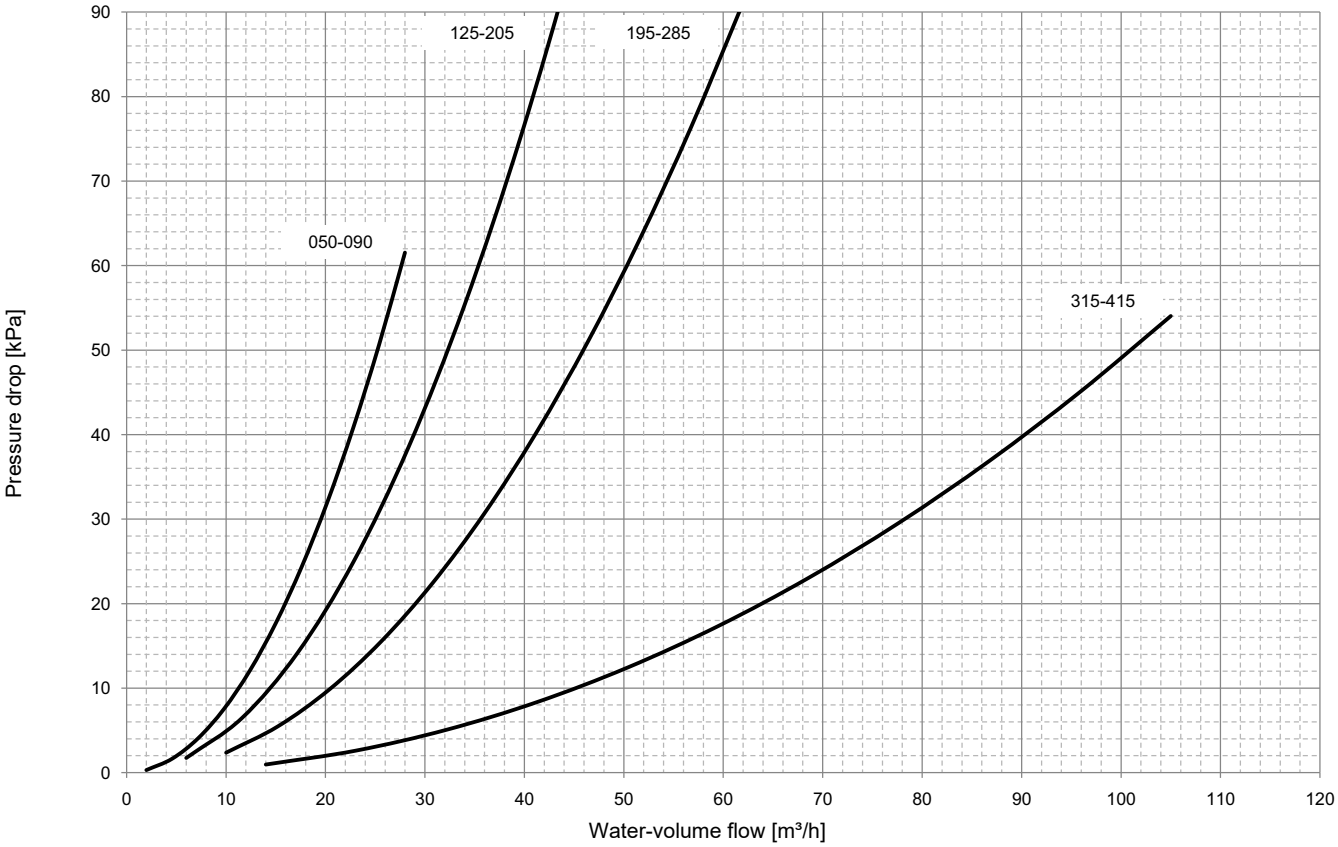
D. 4



** Please pay attention to the maximum allowed volume flow on Page 20 and following pages.*

Pressure drop of the water filter for capacity stage 050-415

D. 5



The connection diameter for the water filter is:

2" for capacity stage 050-090

2 ½" for capacity stage 125-205

3" for capacity stage 195-285

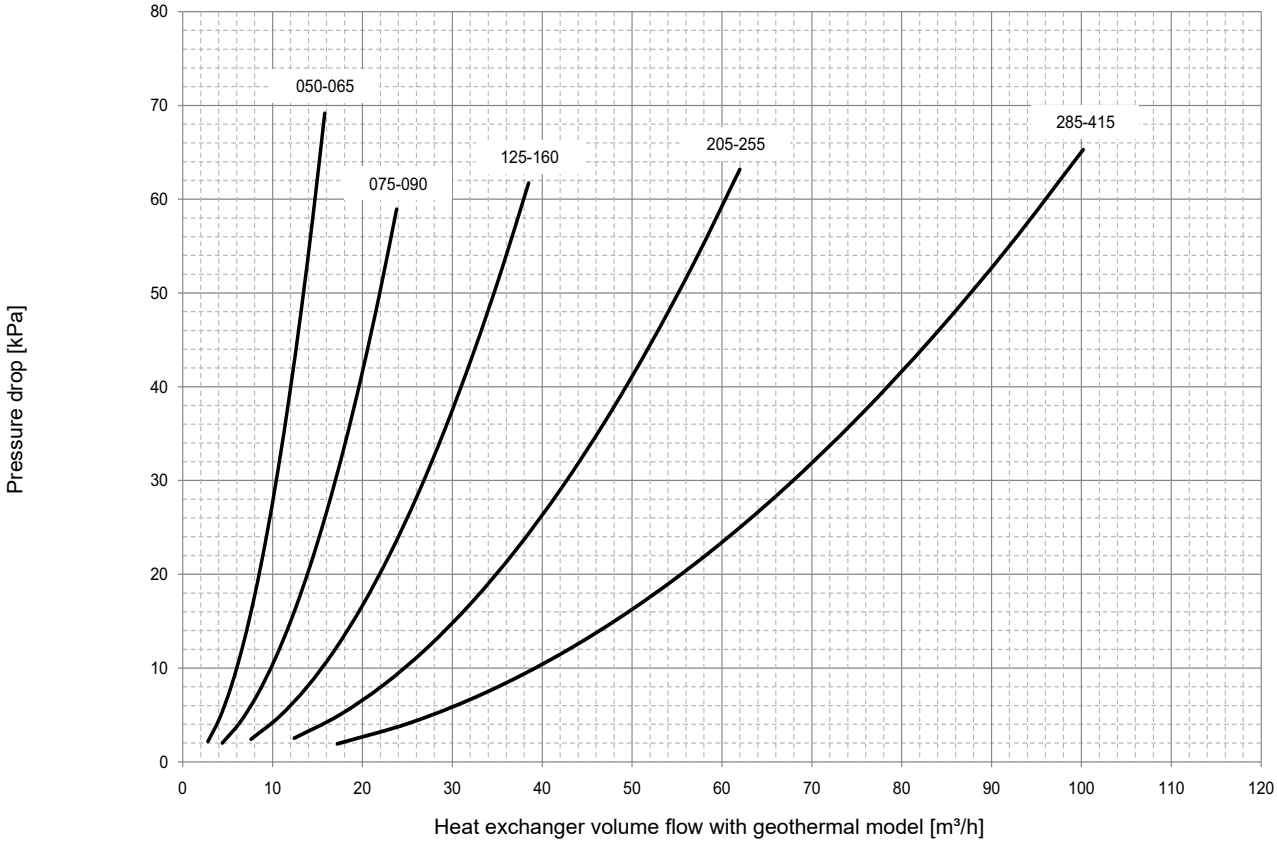
4" for capacity stage 315-415

DAMAGE TO THE UNIT!

Under all circumstances please remember to install a water filter before the direct inlet into the water side heat exchanger. The water filter prevents formation of dirt and scale of all kinds on the heat exchangers. Water filters are optional and can be ordered separately but are needed for safe and trouble-free operation of the unit and thus constitute a requirement for upholding the validity of the warranty.

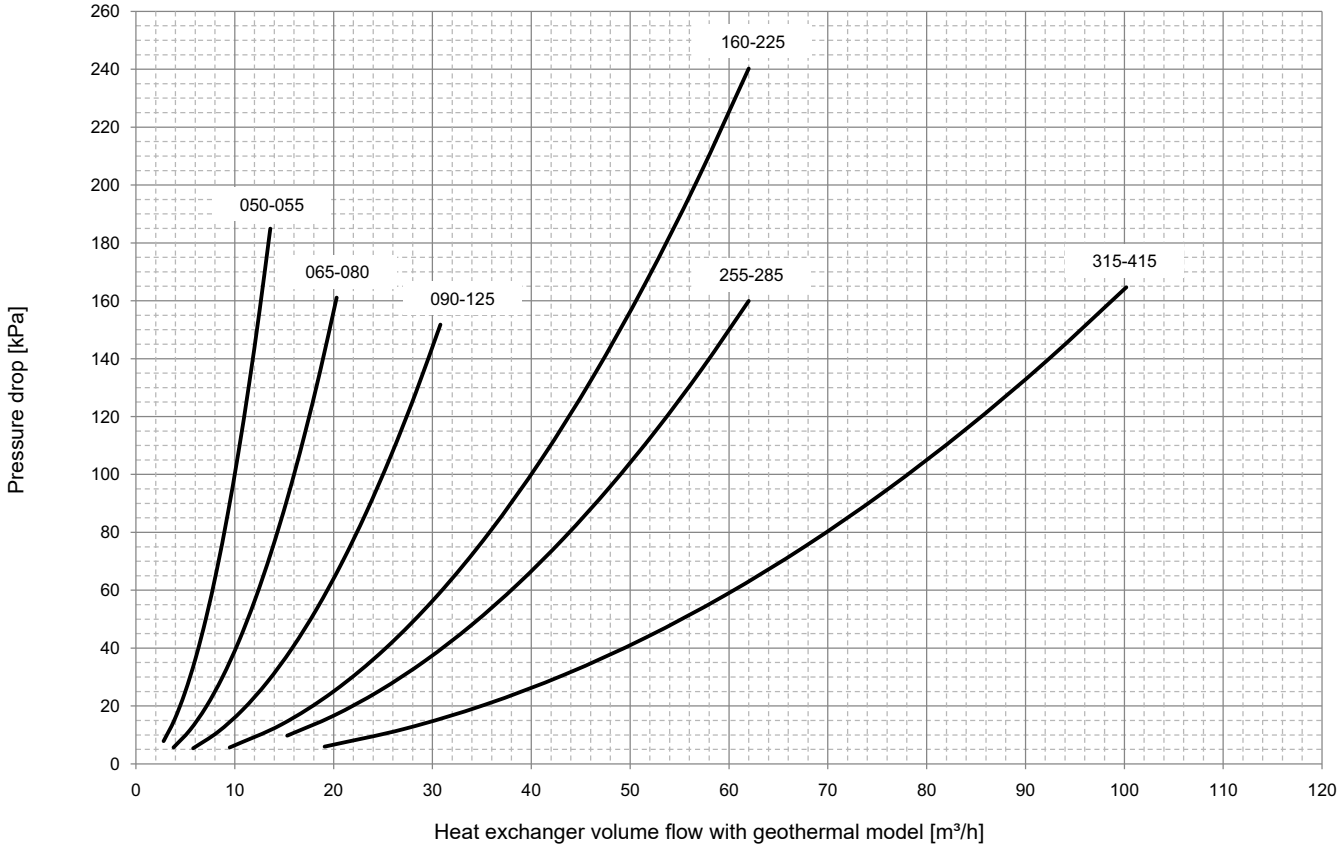
Pressure drop of 3-way valve for capacity stage 050-415

D. 6



Pressure drop of 2-way valve for capacity stage 050-415

D. 7



** Please pay attention to the maximum allowed volume flow on Page 20 and following pages.*

Water volume flow and water-side pressure drop (for $\Delta T_e \neq 5$ K)

Use the diagrams to determine the chilled water flow and the pressure drop (Page 27 et seq.).

NOTICE!
The minimum and maximum permissible water flow rates at the heat exchanger are calculated and presented in the curve.
Extrapolation is not permitted.

Water-glycol mixtures

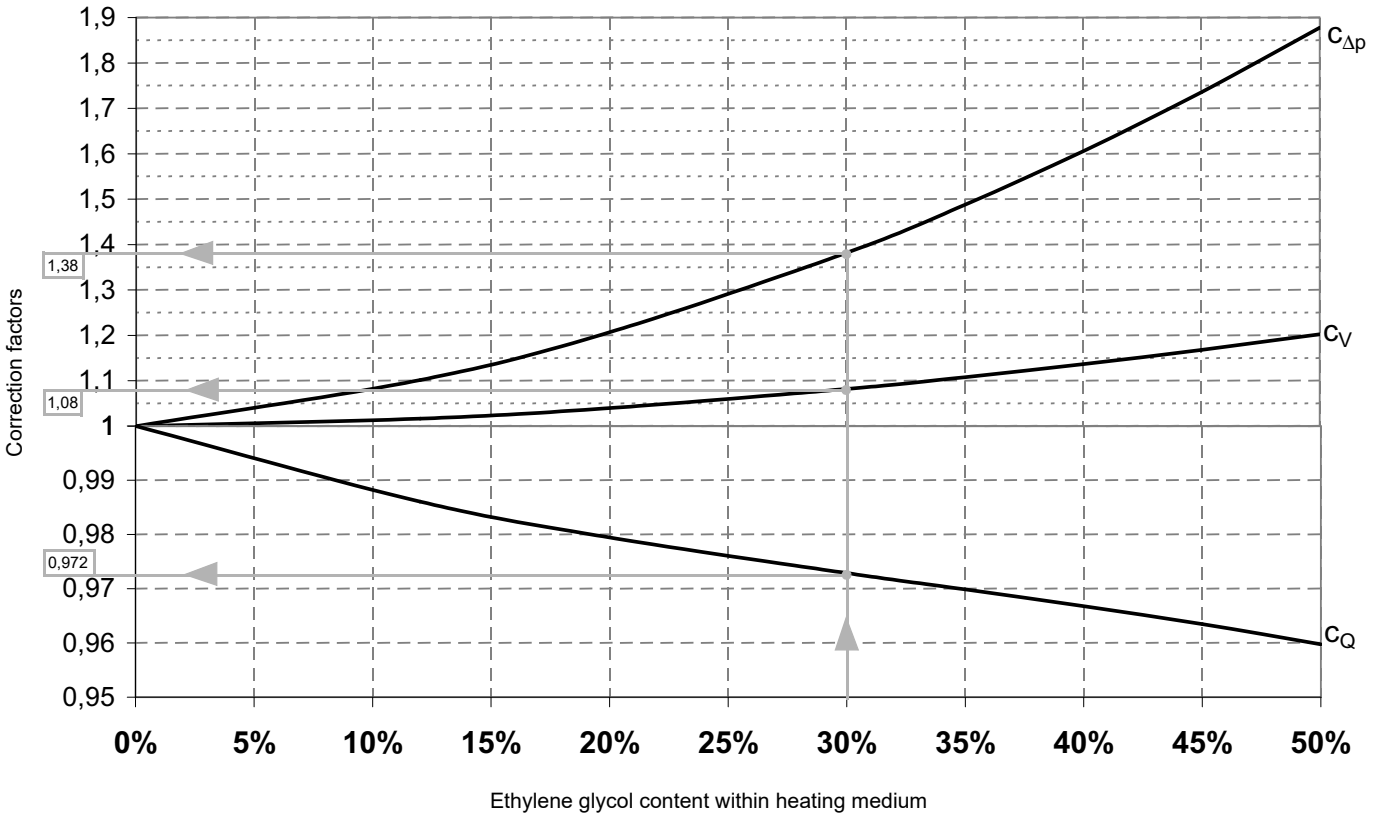
The use of a water-glycol mixtures instead of clean and pure water as the heating medium changes the performance features of the unit. The performance and operating data for cooling/heating capacity, water flow rate and pressure drop on the water side are calculated with the help of correction factors specified in the diagram and conditional equations (next page).

Freezing point	[°C]	0	-5	-10	-15	-20	-25	-30	-35
Ethylene glycol content	[Vol.-%]	0	12	20	30	35	40	45	50

Tab. 5: Freeze resistance of the heating medium and the necessary glycol concentration

Correction factors for glycol concentration

D. 8



c_Q - Correction factor for cooling/heating capacity
c_V - Correction factor for the water volume flow
$c_{\Delta p}$ - Correction factor for water-side pressure drop

NOTICE!
Extrapolation is not permitted.

Conditional equations
Pressure drop of 2-way valve

Use the value readings from the diagram in the following equations in order to arrive at correct values for the water glycol mixtures.

Cooling/heating capacity
in relation to ethylene glycol concentration

Adding ethylene glycol to heating medium (water) reduces the cooling/heating capacity. Check that the necessary cooling/heating capacity is achieved. Otherwise select the next larger size (unit type) and repeat the calculation.

➔ $\dot{Q}_G = c_Q \cdot \dot{Q}$ *Gl. 1*

$\dot{Q}_G$ [kW] - Cooling/heating capacity depending on ethylene glycol concentration
c_Q - Correction factor for cooling/heating capacity
$\dot{Q}$ [kW] - Cooling/heating output (from table “Performance data”)

Water flow rate depending on ethylene glycol concentration

➔ $\dot{V}_G = c_V \cdot \dot{V}$ *Gl. 2*

$\dot{V}_G$ [m³/h] - Volume flow depending on the ethylene glycol concentration
c_V - Correction factor for chilled water volume flow
$\dot{V}$ [m³/h] - Water volume flow (from table "Performance data" or calculated value with chilled water temperature difference ≠ 5 K)

Pressure drop (water-side)
in relation to ethylene glycol content

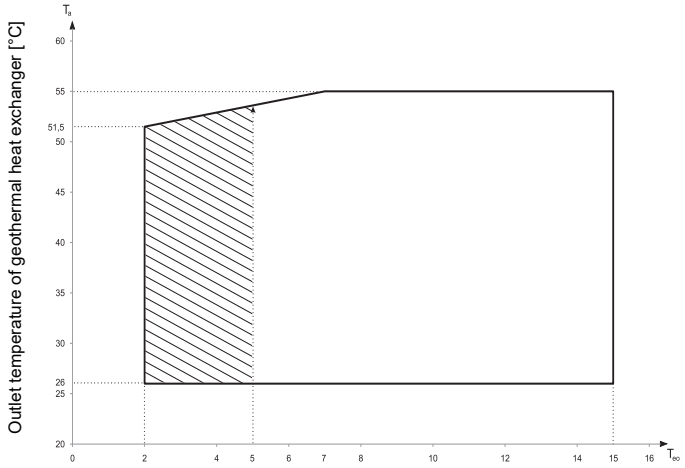
➔ $\Delta p_G = c_{\Delta p} \cdot \Delta p$ *Gl. 3*

Δp_g [kPa] - Pressure drop depending on ethylene glycol concentration
$c_{\Delta p}$ - Correction factor for chilled water side pressure drop
Δp [kPa] - Pressure drop (on water side) (from “Performance data” table or calculated value with chilled water temperature difference ≠ 5 K)

NOTE ON UNIT PLANNING AND CONFIGURATION!
For your individual unit design please use our web-based Aid@ unit-layout software or contact your FläktGroup sales office.

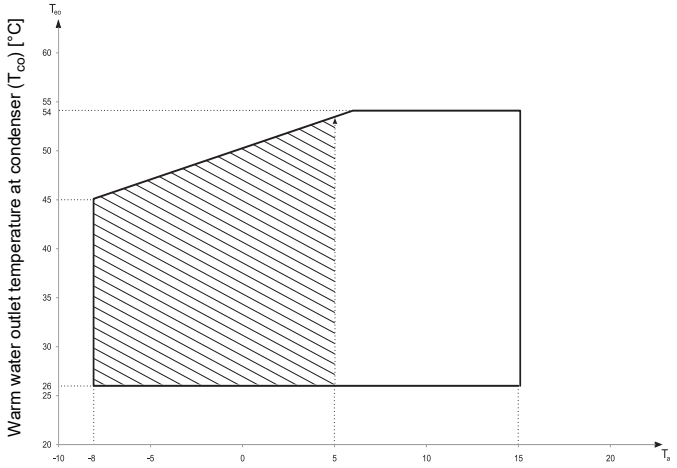
D. 9

Cooling only



Chilled water outlet temperature at evaporator (T_{eo}) [°C]

Heating only



Outlet temperature of geothermal heat exchanger [°C]

The operating limits apply for continuous operation of the unit and the water pumps given that the correct commissioning, cleaning, maintenance and setup/installation of the unit and the system is carried out.

For operational reasons chilled water and/or geothermal heat exchanger requires freeze-up protection by adding glycol to water. FläktGroup recommends to use at least 30 % ethylene glycol.

		REG ### AD #2							
		Chilled water heat exchanger Evaporator		Geothermal heat exchanger applies to only cooling operating mode		Warm water heat exchanger Condensers		Geothermal heat exchanger applies to only cooling operating mode	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Water inlet	[°C]	5	23	10	51	18	50	-5	23
Water outlet	[°C]	2	15	26	55	26	54	-8	15
Δ T in condenser	[K]	-	-	4	16	4	16	-	-
Δ T at water outlet temp. > 5 °C	[K]	4	8	-	-	-	-	4	8
Δ T at water outlet temp. ≤ 5 °C	[K]	3	3	-	-	-	-	3	5

Tab. 6

For detailed design please contact your FläktGroup sales office.

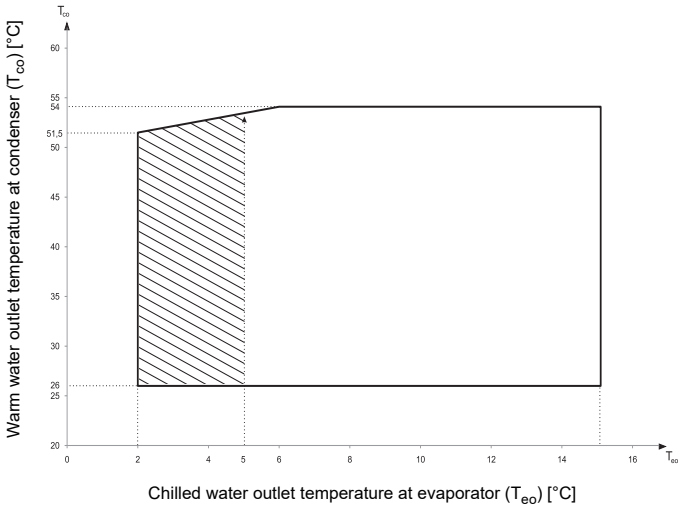
NOTICE!

- Depending on water and/or ambient temperatures, chilled, warm and/or geothermal circuits may require freeze-up protection. FläktGroup recommends the use at least 30 % ethylene glycol.
- Cooling operation: immediately after the compressor start and to ensure safe operation of the unit, maintain the minimum warm water outlet temperature at 26 °C (heat exchanger warm water and geothermal heat exchanger).
- Relative humidity during operation must not exceed 90 %.

Operating limits for heating or cooling operation
Capacity stages 050-415

Heating and cooling

D. 10



Chilled water outlet temperature at evaporator (T_{eo}) [°C]

The operating limits apply for continuous operation of the unit and the water pumps given that the correct commissioning, cleaning, maintenance and setup/installation of the unit and the system is carried out.

For operational reasons chilled water and/or geothermal heat exchanger requires freeze-up protection by adding glycol to water. FläktGroup recommends to use at least 30% ethylene glycol.

		REG ### AD #2			
		Chilled water heat exchanger		Warm water heat exchanger	
		Evaporator		Condensers	
		Min.	Max.	Min.	Max.
Water inlet	[°C]	5	23	18	51
Water outlet	[°C]	2	15	26	55
Δ T in condenser	[K]	-	-	4	8
Δ T at water outlet temp. > 5 °C	[K]	4	8	-	-
Δ T at water outlet temp. ≤ 5 °C	[K]	3	3	-	-

Tab. 7

For detailed design please contact your FläktGroup sales office.

NOTICE!

- Depending on water and/or ambient temperatures, chilled, warm and/or geothermal circuits may require freeze-up protection. FläktGroup recommends the use at least 30 % ethylene glycol.
- Cooling operation: immediately after the compressor start and to ensure safe operation of the unit, maintain the minimum warm water outlet temperature at 26 °C (heat exchanger warm water and geothermal heat exchanger).
- Relative humidity during operation must not exceed 90 %.

Single circuit buffer tank with one pump for the entire system

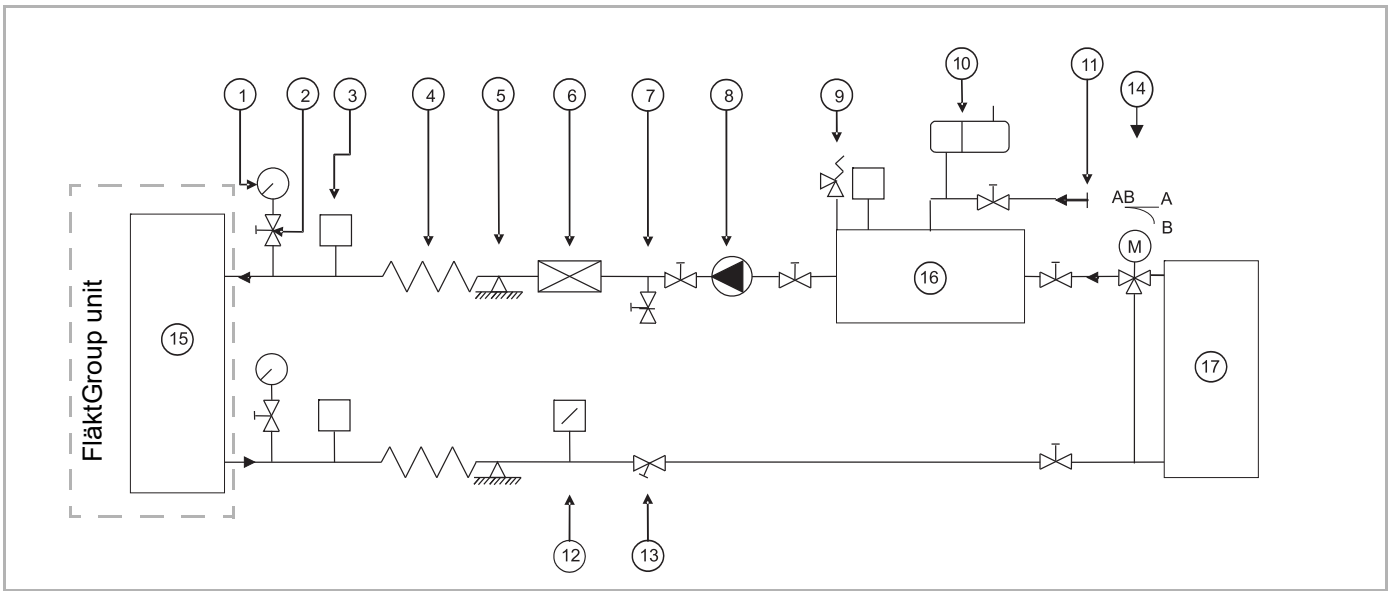


Fig. 15: Hydraulic circuit of single circuit buffer tank

1	Pressure gauge	10	Expansion tank
2	Stop cock	11	Filling valve
3	Automatic venting	12	Flow switch
4	Vibration damping connection	13	Balancing valve / double regulating valve
5	Unit-independent pipeline fixing point	14	3-way valve
6	Water filter (maximum mesh size 1 mm^2)	15	FläktGroup unit
7	Drain valve	16	Single circuit buffer tank
8	Pump – primary circuit	17	Consumer
9	Safety valve		

Items 4, 5, 6 and 12 are also specified by FläktGroup in addition to the internal parts required by legal regulations.
The hydraulic integration of the single circuit buffer tank as illustrated above can be used for both a chilled and a warm water circuit.

Intended use: with a single-circuit buffer tank, the buffer tank primarily serves to increase the volume in the hydraulic system, to ensure the compressor's minimum run-time and to prevent unneeded frequent unit activations and deactivations.

Application: with small to medium-sized air-conditioning systems, a single-circuit buffer tank system is used, wherever possible, with identical consumers requiring the same volume flow and identical water temperatures.

Hydraulics: water is pumped from the buffer tank into the unit at required capacity reduction. The water is cooled/heated. The chilled/warm water now flows via the consumer(s) and is heated/cooled again. The 3-way valve is fully open in position A - AB. The bypass line B is closed. If the load reduction of the consumers drops, the bypass line B is opened. This ensures a constant water/volume flow across the unit, regardless of the load reduction. The unit requires a constant water/volume flow for trouble-free operation. Therefore, pumps that are speed-regulated during operation must not be used. If the bypass line B is fully open due to a missing load reduction, water stops flowing across the consumer(s). The water temperature approaches the setpoint of the unit and the compressor switches off gradually. The water pump continuously remains in operation in order to record the current water temperatures in the system. If the load reduction increases again, the unit switches on the individual compressors again depending on how far the temperature deviates from the setpoint.

Regulation: external enabling of the unit should be done by e.g. a timer and/or outside air temperature. Switching the external enabling via the water temperature or the position of the 3-way valve is not permitted, as this would prevent the unit from automatically regulating the capacity to optimise energy consumption. This would cause an undesirable cycle operation. The compressor's capacity is controlled depending on the temperature difference (setpoint and actual value) from the unit. Depending on the unit configuration, the water pump control function can be withdrawn from the unit. The consumers and the 3-way valve are controlled by others.

Hydraulic or pump module: depending on unit configuration and selected accessories, the unit can also be fitted with one or two water pumps, a buffer tank and other hydraulic components (see the available accessories).

Dual circuit buffer tank with multiple pumps for the entire system

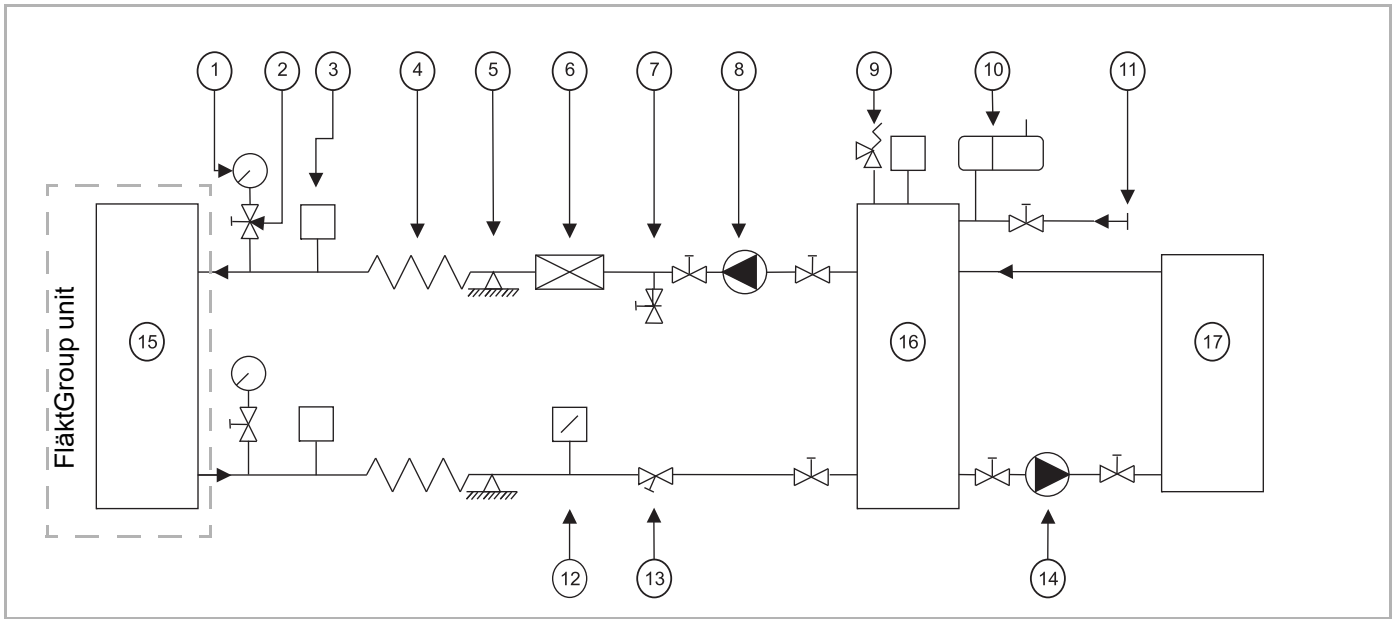


Fig. 16: Hydraulic circuit of twin-circuit buffer tank

1	Pressure gauge	10	Expansion tank
2	Stop cock	11	Filling valve
3	Automatic venting	12	Flow switch
4	Vibration damping connection	13	Balancing valve / double regulating valve
5	Unit-independent pipeline fixing point	14	Pump – secondary circuit
6	Water filter (maximum mesh size 1 mm^2)	15	FläktGroup unit
7	Drain valve	16	Hydraulic switch/buffer tank suitable for chilled and warm water systems
8	Pump – primary circuit		
9	Safety valve	17	Consumer

Items 4, 5, 6 and 12 are also specified by FläktGroup in addition to the internal parts required by legal regulations.

The hydraulic integration of the dual circuit buffer tank as illustrated above can be used for both chilled and warm water circuits. With the warm water circuit, however, it must be noted that the pump for the primary circuit takes the supply from the buffer tank from below, where the chilled water collects. The water is conveyed to the unit by the primary pump. The supply to the pump for the secondary circuit must be taken from the buffer tank from above, as the warmest water can be taken from here. The secondary pump conveys the water to the consumers.

Intended use: with dual-circuit buffer tank, the buffer tank fulfils two main tasks. First, the buffer tank increases the volume. A generously dimensioned buffer tank not only guarantees the compressor's minimum running time, it also achieves proper thermal layering within the buffer tank.

The second task is to separate the water volume flows on the primary and secondary sides. This enables the most diverse of consumers to be individually supplied and regulated in the secondary side.

Application: A dual-circuit buffer tank is mainly used in medium to large air-conditioning systems containing a number of different consumers. The required water volume flow of the individual consumers can vary. The consumer can be supplied by various, speed-regulated secondary pumps.

Hydraulics

Chilled water operation: water is pumped downwards from the buffer tank into the primary circuit of the unit at required capacity reduction. The water is cooled and returned to the buffer tank from below. The chilled water in the secondary circuit is taken from the buffer tank from below and fed to the consumers via additional secondary pumps. The heated water flows back to the buffer tank from above.

Warm water operation: water is pumped upwards from the buffer tank into the unit in the primary circuit at the required capacity reduction. The water is heated and returned to the buffer tank from above. The warm water in the secondary circuit is taken from the buffer tank from above and fed to the consumers via additional secondary pumps. The cooled water flows back to the buffer tank from below.

A constant water volume flow across the unit must be ensured in the primary circuit. The water volume flow on the secondary side, i.e. at the consumers, can vary due to hydraulic separation, thus enabling the use of speed-regulated pumps. With a dual-circuit buffer tank, individual consumer circuits can also be switched off and on depending on demand. The transported volume of the primary pumps must be greater than the total transported volume on the secondary side. This ensures that the return flow temperatures of the secondary circuit do not influence the inlet temperatures of the secondary circuit.

If the water temperature in the buffer tank approaches the setpoint, the compressors are switched off gradually via the unit control system. The water pump on the primary side continuously remains in operation in order to record the current water temperatures in the system. If the load reduction increases again, the unit switches on the individual compressors again depending on how far the temperature deviates from the setpoint.

Regulation: external enabling of the unit should be done by e.g. a timer and/or outside air temperature. Switching the external enabling via the water temperature in the buffer tank is not permitted, as this would prevent the unit from automatically regulating the capacity to optimise energy consumption. This would cause an undesirable cycle operation. The compressor's capacity is controlled depending on the temperature difference (setpoint and actual value) from the unit. Depending on the unit configuration, the water pump control function can be withdrawn from the unit. The consumers and the secondary pumps are controlled by others.

Hydraulic or pump module: depending on unit configuration and selected accessories, the unit can also be fitted with one or two water pumps, a buffer tank and other hydraulic components (see the available accessories).

DAMAGE TO THE UNIT!

Under all circumstances please remember to install a water filter before the direct inlet into the water side heat exchanger. The water filter prevents formation of dirt and scale of all kinds on the heat exchangers.Water filters are optional and can be ordered separately but are needed for safe and trouble-free operation of the unit and thus constitute a requirement for upholding the validity of the warranty.

DAMAGE TO THE UNIT!

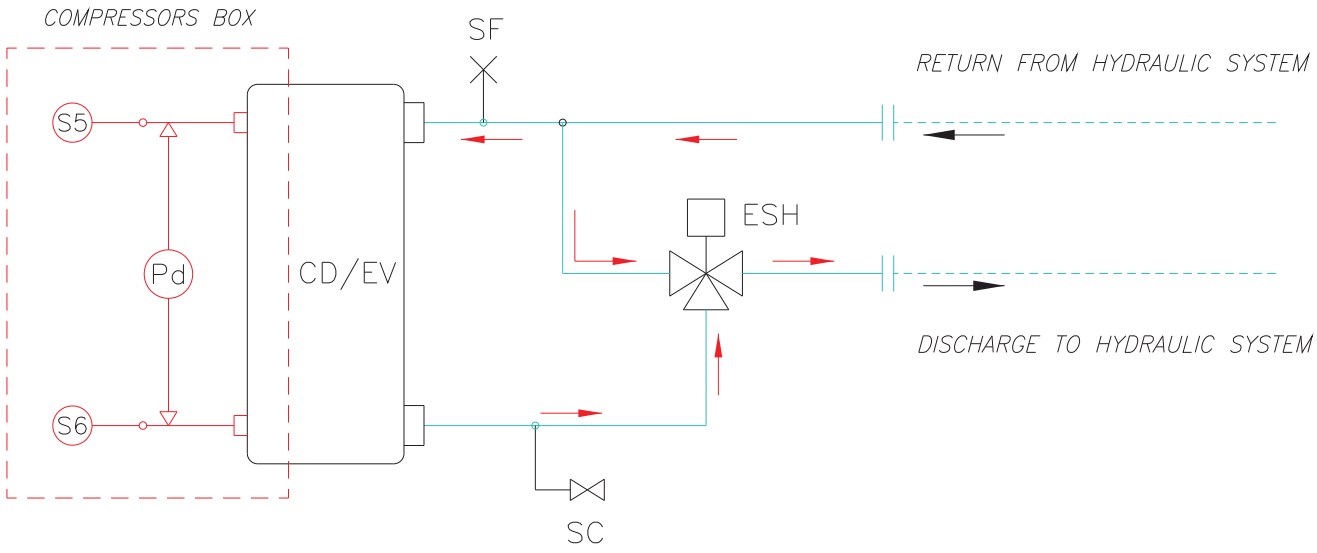
Remember that a constant water volume flow across the evaporator/condenser must be ensured during unit operation. Refer to the "Planning Manual on Chillers" for further instructions on hydraulic integration of chillers and heat pumps.

Connecting geothermal heat exchanger

The heat exchanger of the geothermal model is designed for connection to a well-water or geothermal energy source where constant temperatures are expected throughout the entire year. Observe that the medium temperatures must be within the operating range of the unit.

By connecting the geothermal heat exchanger to a heat-rejection unit, year-round operation of the unit can not be ensured if the heating demand exceeds the cooling demand.

3-way valve:



CD/EV	3rd heat exchanger, geothermal model	SF	Vent cock
ESH	3-way valve (modulating)	S5	Temperature sensor at geothermal line inlet
Pd	Water side differential pressure switch	S6	Temperature sensor at geothermal line outlet
SC	Fill and drain valve		

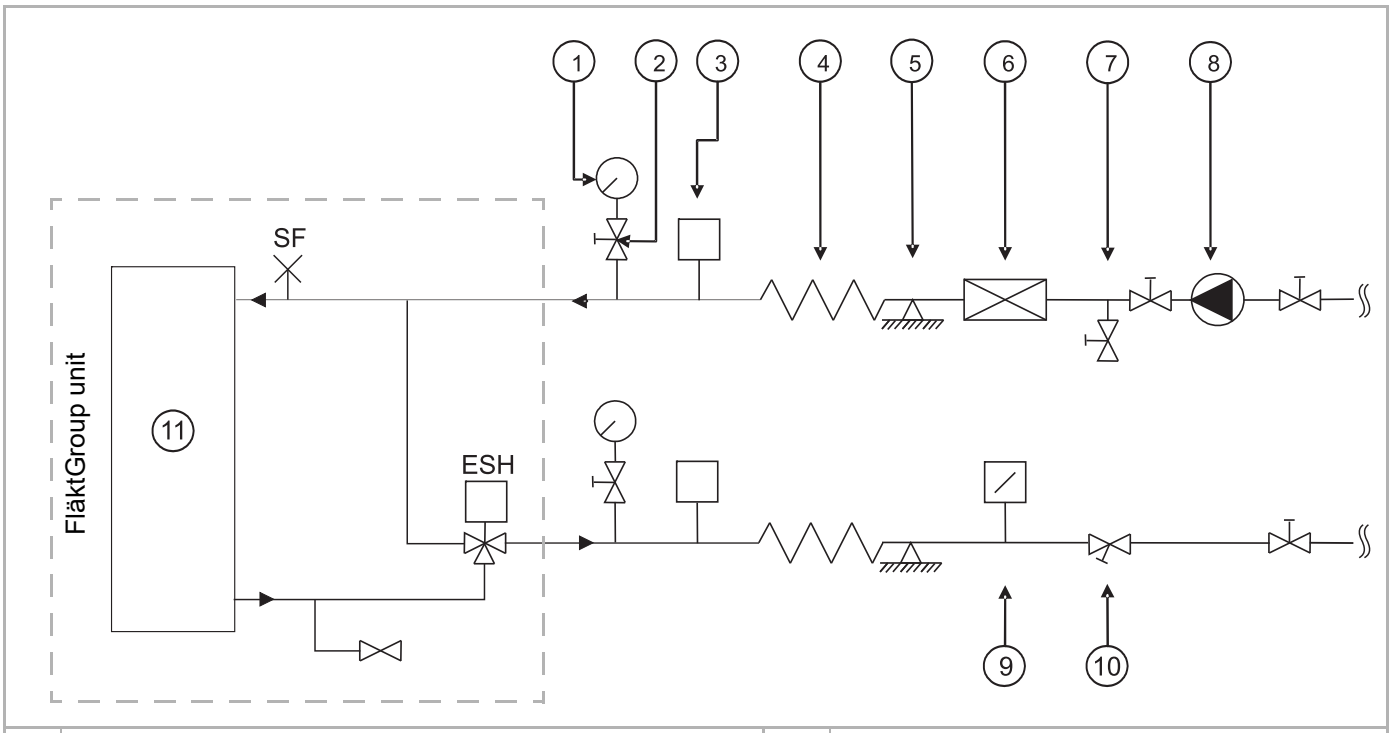
Fig. 17: 3-way valve

The FläktGroup *HeaMo* GEO unit is standard fitted and wired with a modulating 3-way valve, so that only water-supply and water-return connections to the geothermal circuit have to be completed.

If the geothermal heat exchanger is used as a condenser and FläktGroup *HeaMo* GEO is operating to supply only chilled water, the bypass line of the 3-way valve is opened or closed, depending on the high pressure. The aim is to prevent a reduction in the condensing pressure and ensure the unit performance within operating range. If the condensing pressure is falling, the 3-way valve opens the bypass line by using a modulating method, if the condensing pressure is rising - the bypass line is closed.

In "only heating" mode the geothermal heat exchanger is operating as evaporator and absorbs heat from medium. The 3-way valve is controlled depending on the evaporating pressure. If the evaporating pressure is decreasing too fast, the 3-way valve blocks the bypass line and entire water flow is directed via the unit. Thanks to a larger water volume the evaporating pressure increases again. With an excessively high evaporating pressure the bypass line is opened again.

Schematic design of a geothermal circuit with a 3-way valve



1	Pressure gauge	8	Pump in geothermal circuit
2	Stop cock	9	Flow switch
3	Automatic venting	10	Balancing valve / double regulating valve
4	Vibration damping connection	11	Geothermal heat exchanger
5	Unit-independent pipeline fixing point	SF	Vent cock
6	Water filter (maximum mesh size 1 mm^2)	SC	Fill and drain valve
7	Drain valve	ESH	3-way valve

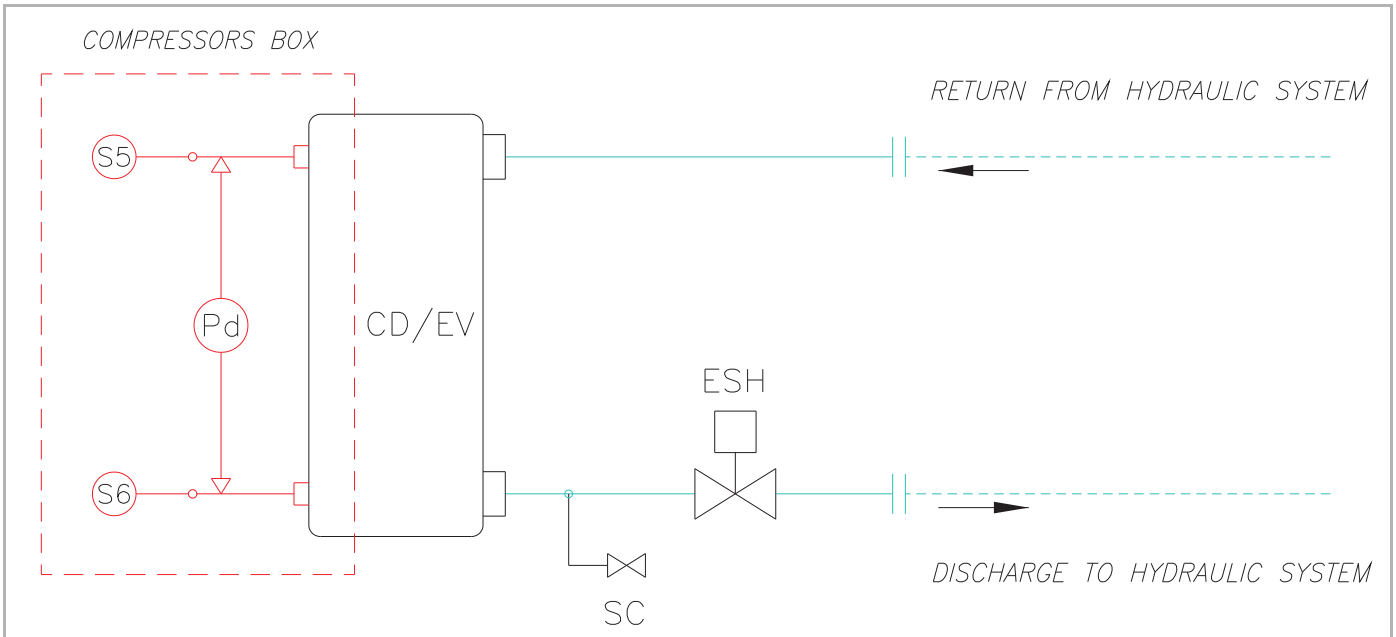
Fig. 18

Pump regulation in the geothermal circuit must only be performed by the FläktGroup *HeaMo* unit. Speed regulation of the pump in the geothermal circuit is not allowed during operation.

DAMAGE TO THE UNIT!

Under all circumstances please remember to install a water filter before the direct inlet into the water side heat exchanger. The water filter prevents formation of dirt and scale of all kinds on the heat exchangers.Water filters are optional and can be ordered separately but are needed for safe and trouble-free operation of the unit and thus constitute a requirement for upholding the validity of the warranty.

2-way valve:



CD/EV	3rd heat exchanger, geothermal model	SF	Vent cock
ESH	2-way valve (modulating)	S5	Temperature sensor at geothermal line inlet
Pd	Water side differential pressure switch	S6	Temperature sensor at geothermal line outlet
SC	Fill and drain valve		

Fig. 19: 2-way valve

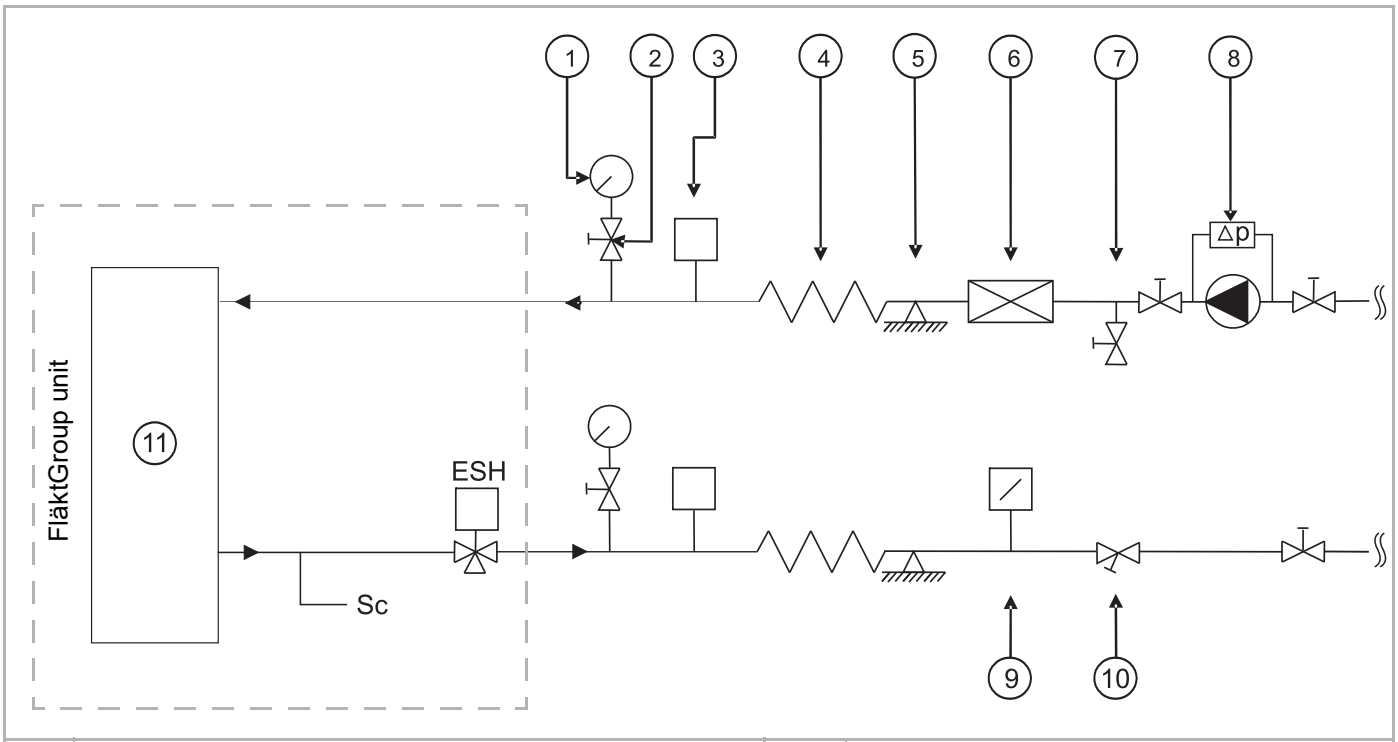
As an option a standard supplied 3-way valve can be substituted by a modulating 2-way valve. The 2-way valve is installed and wired too, so that only water supply and return lines must be connected to the geothermal circuit.

If the geothermal heat exchanger is used as a condenser and FläktGroup *HeaMo* GEO unit is operating to generate only chilled water, the 2-way valve is opened or closed, depending on the high pressure. The aim is to prevent a reduction in the condensing pressure and ensure the unit performance within operating range. If the condensing pressure falls - the 2-way valve closes in a modulating method, if the condensing pressure rises - the 2-way opens.

In "only heating" mode the geothermal heat exchanger is operating as evaporator and absorbs heat from medium. The 2-way valve is controlled depending on the evaporating pressure. If the evaporating pressure is decreasing too fast, the 2-way valve opens and the entire water flow is directed through the unit. Thanks to a larger water volume the evaporating pressure increases again. With an excessively high evaporating pressure the 2-way valve is closed again.

If a 2-way valve is used, a speed-regulated geothermal pump must be used, differential pressure is used to regulate this pump.

Schematic design of a geothermal circuit with a 2-way valve



1	Pressure gauge	8	Pump in geothermal circuit, speed-regulated
2	Stop cock	9	Flow switch
3	Automatic venting	10	Balancing valve / double regulating valve
4	Vibration damping connection	11	Geothermal heat exchanger
5	Unit-independent pipeline fixing point	SC	Fill and drain valve
6	Water filter (maximum mesh size 1 mm^2)	ESH	2-way valve
7	Drain valve		

Fig. 20

Pump regulation in the geothermal circuit must only be performed by the FläktGroup *HeaMo* unit. The speed of the pump in the geothermal circuit should be regulated via differential pressure to prevent pump operation at maximum speed with a closing 2-way valve.

DAMAGE TO THE UNIT!

Under all circumstances please remember to install a water filter before the direct inlet into the water side heat exchanger. The water filter prevents formation of dirt and scale of all kinds on the heat exchangers. Water filters are optional and can be ordered separately but are needed for safe and trouble-free operation of the unit and thus constitute a requirement for upholding the validity of the warranty.

The waste heat produced during pure cooling operation can be wisely used by operating the FläktGroup *HeaMo* unit in "Cooling + Heat recovery". In this mode the compressors are switched on and off in dependence of the chilled water temperature or the load reduction in the chilled water circuit. If the warm water temperature is below the setpoint, the thermal energy withdrawn from the chilled water is delivered to the warm water circuit. When the warm water setpoint is reached, the unit switches and delivers the thermal energy to the geothermal circuit. Pre-requisite for the heat recovery mode is the cool request. An independent heating operation is not possible in "Cooling + heat recovery" mode.

Operating mode "Cooling + Heat recovery" enables to extend the plant by using a heat-rejection unit. Depending on the design of the heat-rejection unit, the FläktGroup *HeaMo* GEO can be automatically operated in the desired operating modes of cooling and heating, cooling only or heating only down to approx. +2°C. If at ambient temperatures lower than approx. +2°C, the heating load is greater than the refrigeration demand, a reliable heating operation can no longer be guaranteed. An ambient temperature-dependent switching from automatic mode to the "cooling + heat recovery" mode is recommended here. In this operating mode the thermal energy withdrawn from the chilled water is delivered to the warm water circuit without wasting this energy to the environment. Thus unit operation within the operating range is ensured. If a heat-rejection unit is used, ensure that an alternative source of heat is available if the ambient temperature falls below +2°C.

To toggle between "Automatic", "Cooling only", "Heating only", "Cooling with heat recovery" modes, refer to the notes for electrical integration in Page 47 et seq.

Capacity stage		050	055	065	075	080	090	125	160	205
Sound level[1]										
Sound power	[dB(A)]	73	74	74	74	75	76	77	78	79
Sound pressure level [2]										
10 m	[dB(A)]	42	43	43	43	44	45	46	47	48
Sound power level via octave band [dB(A)]										
63		74	75	75	75	76	76	77	78	79
125		72	73	73	73	74	74	75	76	77
250		69	70	70	70	71	75	76	77	78
500		70	71	71	71	72	74	75	76	77
1000		70	71	71	71	72	70	71	72	73
2000		63	64	64	64	65	68	69	70	71
4000		59	60	60	60	61	64	65	66	67
8000		53	54	54	54	55	53	54	55	56

Tab. 8: Noise levels of basic unit capacity stage 050-205

Capacity stage		195	225	255	285	315	365	415
Sound level[1]								
Sound power	[dB(A)]	86	87	88	89	90	91	91
Sound pressure level [2]								
10m	[dB(A)]	54	55	56	57	58	59	59
Sound power level via octave band [dB(A)]								
63		75	76	77	78	79	80	80
125		77	78	79	80	81	82	82
250		81	82	83	84	85	86	86
500		80	81	82	83	84	85	85
1000		82	83	84	85	86	87	87
2000		80	81	82	83	84	85	85
4000		74	75	76	77	78	79	79
8000		68	69	70	71	72	73	73

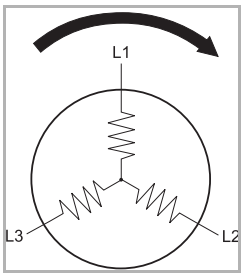
Tab. 9: Noise levels of basic unit capacity stage 195-415

[*] Data on operating conditions
Data applies only to chilled water inlet and outlet temperature of 12 °C/ 7 C° and warm water inlet and outlet temperature of 40 °C/45 °C.
[1] Data on sound power
The sound power level is determined using ISO 3744.

NOTICE!
This certification expressly refers to sound power in dB(A), which thus constitutes obligatory data in this case.

[2] Specification of sound pressure level
The sound pressure level is determined according to enveloping surface method with a reflecting surface (Q=2). 10 m clearance is related to the external dimensions of the unit.
The following correction values can be used for the sound pressure level:
Sound pressure level at 5 m: +5 dB for sound pressure level in 10 meters spacing
Sound pressure level at 15 m: -3 dB for sound pressure level in 10 meters spacing
Sound pressure level at 20 m: -6 dB for sound pressure level in 10 meters spacing
The total sound pressure level total as well as the sound pressure level over the octave range can be calculated with the selection software Aid@ depending on the distance.

NOTICE!
Only an externally commissioned acoustics engineer can carry out specific sound level calculations that are valid for your installation site.



Before you start setting up the unit's electrical connections, check the following points without fail:

– The properties of the mains power supply must comply with EN 60204-1 regulations and the power requirements of the unit.
– Voltage tolerance of mains power supply must not exceed tolerances ± 10 % with a maximum phase difference of 3 %. Do not operate the motors if the voltage difference between the phases exceeds 3 %, as this will invalidate the warranty. To check, use the following formula (see example).

$$\text{Voltage deviation [\%]}\ \Delta U_{max} = \frac{\text{max. voltage deviation from average value}}{\text{average voltage } U_m} \times 100$$

EXAMPLE

	Input data		**→ Result**
Requirements Calculate and determine specific input data and measurements beforehand.	Rated voltage	→ 400 V/50 Hz/3 phases	
	Voltage between phases	→ L1/L2 = 409 V; L2/L3 = 398 V; L1/L3 = 396 V	
1st Step Determine the average voltage U_m	Average voltage	→ $U_m = \frac{\Sigma U}{3}$ $\frac{(409 + 398 + 396)}{3} = 401\ V$	→ **U_m = 401 V**
2nd Step Determine the maximum voltage imbalance ΔU_{max}	Voltage imbalance ΔU_{max} in %? U_{max} = 409 V U_m = 401 V	→ $\Delta U_{max} = \frac{\text{max. voltage deviation}}{U_m} \times 100$ $\frac{(409 - 401)V}{401\ V} \times 100 = 2\ \%$	→ **ΔU_{max} = 2 %** ✓

NOTICE!

When connecting the supply voltage, make sure you observe the **clockwise rotation direction**!

If the rotation direction is wrong, change the phases at the main power supply of the unit. Change the phase sequence of the power supply line at the on-site source, never change the wiring in the unit switch box.

Connecting power supply using the main isolator of chiller

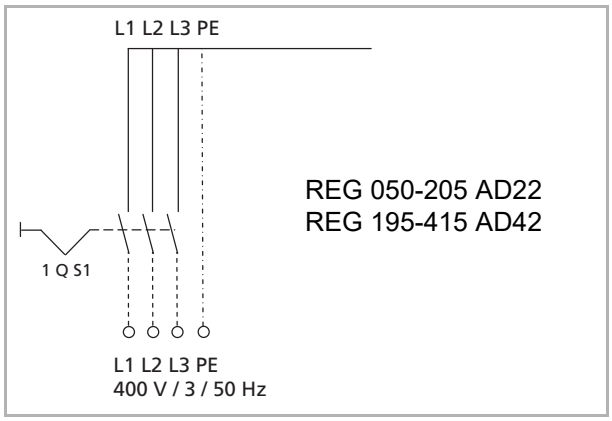


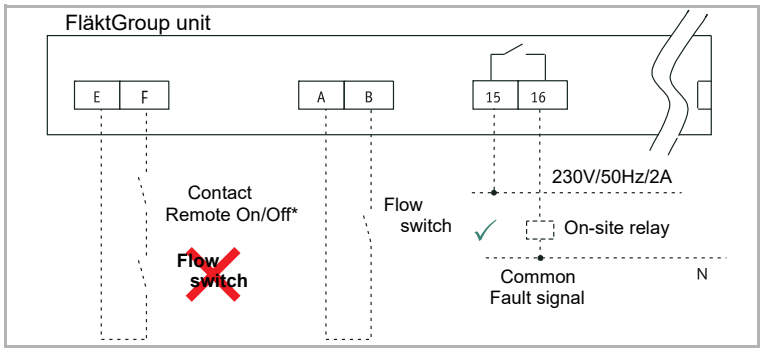
Fig. 21: REG mains isolator

Integrating flow switch

DAMAGE TO THE UNIT!

✗ Do **not** use the flow switch to switch the remote On/Off contact.

✓ Connect the flow switch to terminals A-B in the chiller's switch box. The flow switch acts as a safety device and not as a regular switching device for the unit.



- Connect the external **flow switch**. See the electrical wiring diagram enclosed with the unit, terminals A/B. Cable specification: terminals under voltage for wiring a volt-free contact by others. Maximum cable length 100 m, minimum cable cross-section 1.5 mm².

Fig. 22: Electrical integration of flow switch

Terminals:
A - B: Connection of flow switch by others
E - F: Remote contact for switching the unit on and off using the Normally Open Contact (NOC) by others
15 - 16: Common fault signal (voltage by others max. 230 V/50 Hz / 2 A/AC)

NOTICE!

Under all circumstances remember to install an additional flow switch at the water outlet of the unit and connect it to terminals A-B in the switch box of the unit. The additional flow switch can be optionally ordered and is a requirement for safe and trouble-free operation of the unit and thus constitutes an integral requirement to uphold the validity of the warranty.

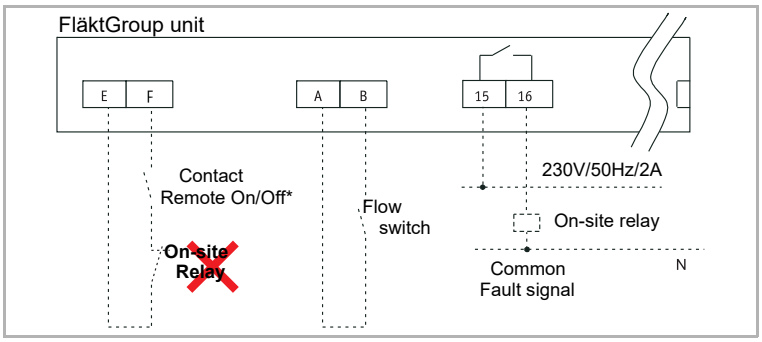
For the FläktGroup *HeaMo* GEO units, 3 flow switches must be installed at the chilled and warm water outlets as well as geothermal water outlet. The flow switches must be connected to terminals A-B for the chilled water side, to terminals A1-B1 for the warm water side and terminals A2-B2 for the geothermal circuit in the switch box of the unit.

Integration of the common fault signal

DAMAGE TO THE UNIT!

Do **not** open the remote on/off contact, e.g. via the changeover contact of the on-site relay, if the system is faulty.

– As a result, the fault can be reset,
– and the cause of the malfunction cannot be determined.
– The entire unit stops operating although only one refrigeration circuit is possibly affected.



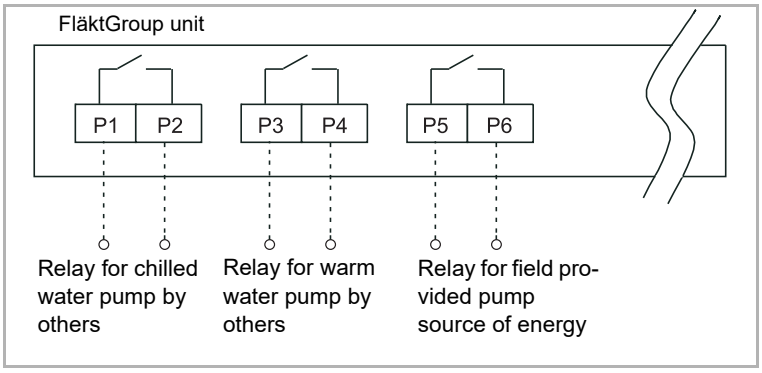
- Connect the cable for the **common fault signal** (volt-free contact, suitable for 230 V AC / 50 Hz / 2 A). See the enclosed electrical wiring diagram supplied with the unit, terminals 15-16.

Fig. 23: Electric integration of error message

Terminals: *A - B:* *Connection of flow switch by others*
E - F: *Remote contact for switching the unit on and off using the Normally Open Contact (NOC) by others*
15 - 16: *Common fault signal (voltage by others max. 230 V/50 Hz / 2 A/AC)*

Integrating the water pumps

The water pumps for chilled water, warm water and geothermal water pump must be controlled by the FläktGroup *HeaMo* unit. Controlling the water pumps via the unit ensures that the relevant pumps operate, regardless of which operating mode (automatic, cooling only, heating only, cooling with heat recovery) is selected. Furthermore, the required pump lead and overrun times are observed by the control system of the unit. Control of the water pumps by others is not permitted.



- Connect the cable for the pump enabling contact (suitable volt-free contact; for 230 V/ 50 Hz / 2 A/AC). Refer to the electric wiring diagram supplied with the unit.

Fig. 24: Electrical integration of the water pumps

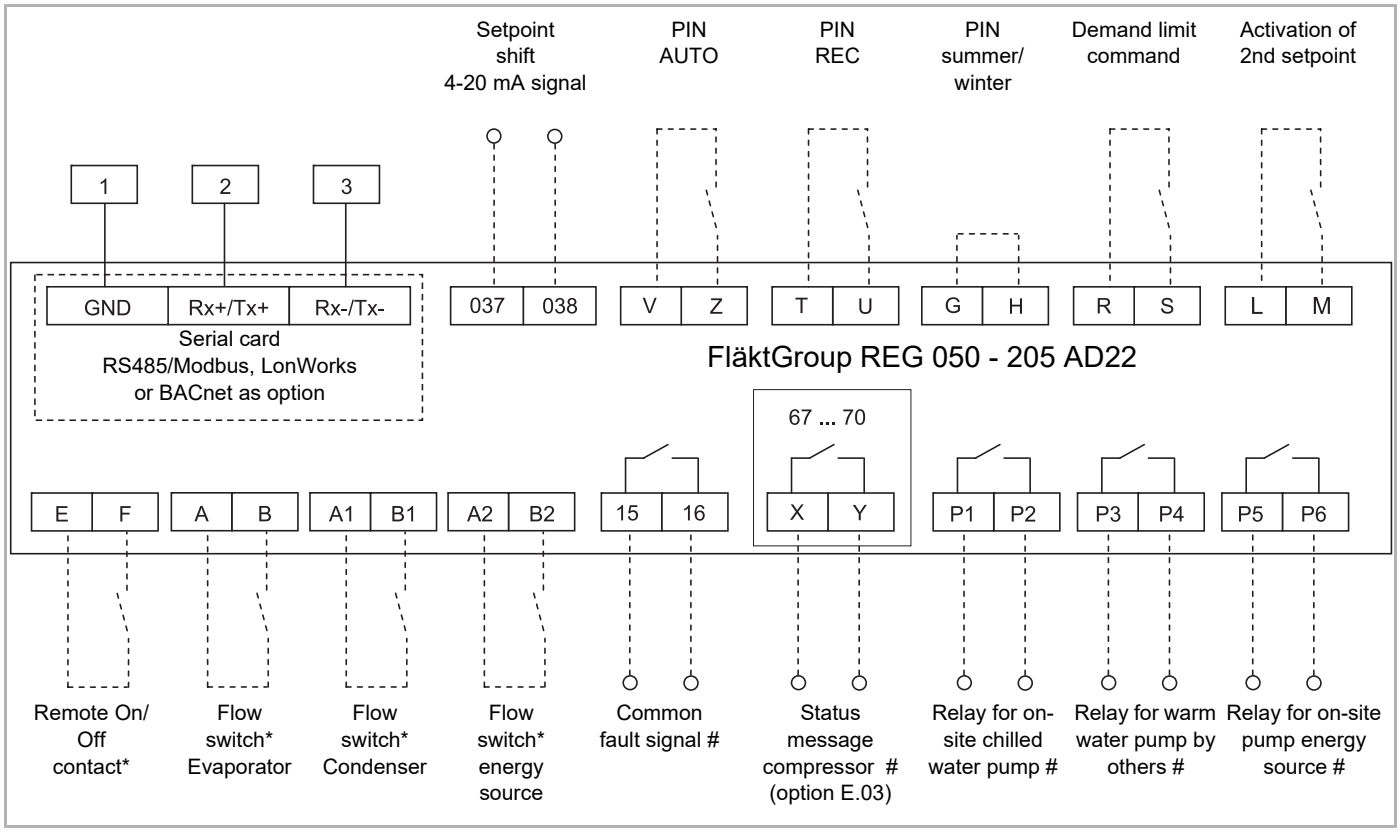


Fig. 25: Electrical integration REG 050-205 AD22

Terminals:	*A - B:*	*Connecting the heat exchanger chilled water flow switch by others*
	A1-B1:	*Connecting the heat exchanger warm water flow switch by others*
	A2 - B2	*Connecting field-provided flow switch for geothermal heat exchanger*
	E - F:	*Remote contact for switching the unit on and off via the NO contact by others*
	L - M:	*Activation of 2nd setpoint chilled water*
	R - S:	*Demand limit command, capacity limitation via NC contact by others[1)]*
	P1 - P2:	*Relay for controlling the chilled water pump*
	P3 - P4:	*Relay for controlling the warm water pump*
	P5 - P6:	*Relay for controlling geothermal pump*
	15 - 16:	*Common fault signal*
	67 - 68:	*Status message compressor 1 (option E.03)*
	69 - 70:	*Status message compressor 2 (option E.03)*
	037 - 038:	*Chilled water setpoint shift via a 4-20 mA signal*
	V - Z:	*PIN Auto - Contact for assigning the operating mode - refer to Table 10.*
	T - U:	*PIN REC - Contact for assigning the operating mode - refer to Table 10.*
	G - H:	*PIN summer/winter - Contact for assigning the operating mode - see Table 10.*
	1 - 2 - 3 :	*Connection to serial card[2)]*
	- - - - - - -	*On-site cabling*
	#	*potential by others necessary (max. 230 V / 50 Hz / 2 A / AC)*
	*	*On-site potential not approved (potential supply is from the controller)*

[1)] Reduction of capacity (demand limit switch) and of electrical power consumption by opening a volt free contact by others.
[2)] The serial card is required to link the unit to a building management system.

Digital input:	PIN Auto	PIN Rec	PIN summer/winter
Terminals:	**V - Z**	**T - U**	**G - H**
Operating Mode			
Automatic	Open	Closed	Closed
Cooling only	Closed	Closed	Closed
only heating	Open	Open	Closed
Cooling with heat recuperation	Closed	Open	Closed

Tab. 10

A change to the operating mode by others via digital contacts T - U and V - Z must be reduced to a maximum of 4-times per hour!

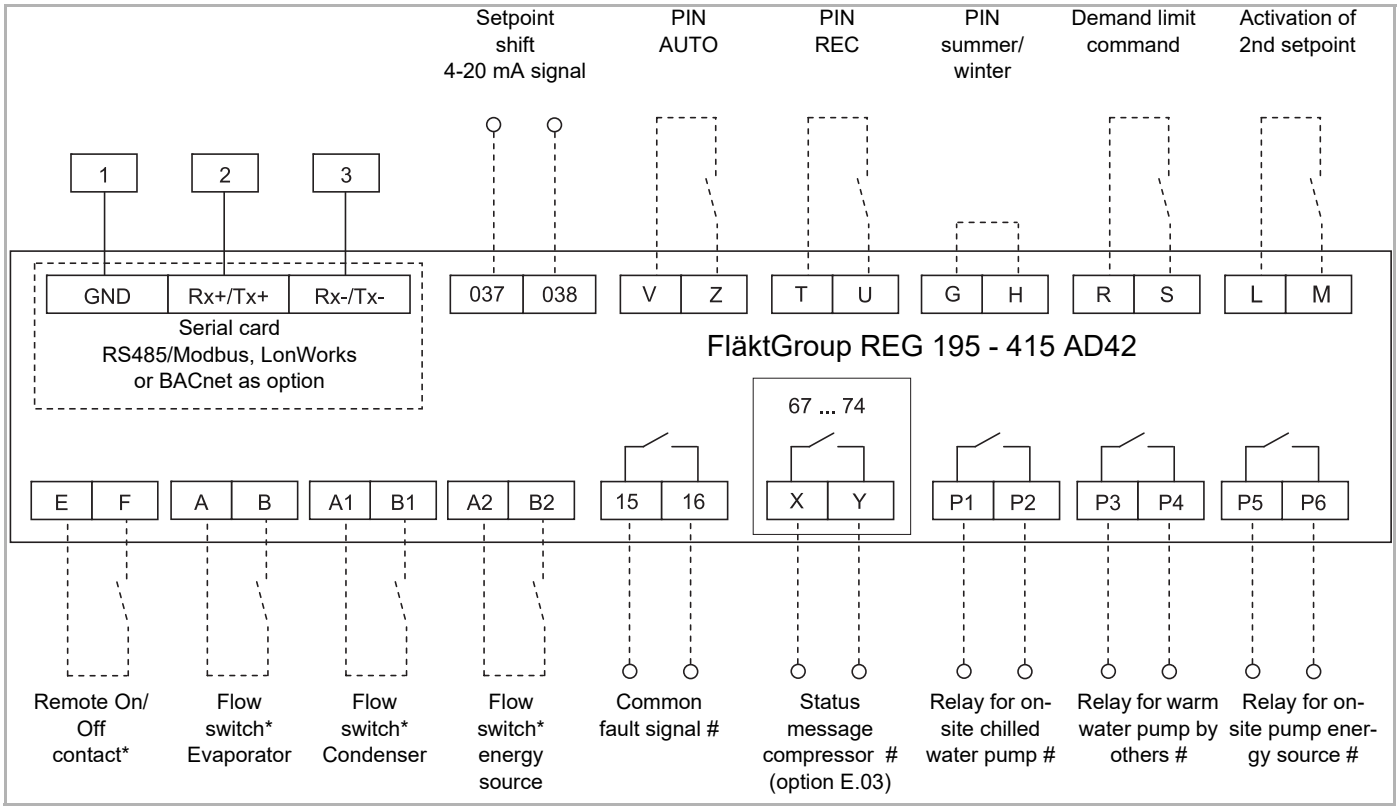


Fig. 26: Electrical integration REG 195-415 AD42

Terminals:

A - B:	*Connecting the heat exchanger chilled water flow switch by others*
A1-B1:	*Connecting the heat exchanger warm water flow switch by others*
A2 - B2	*Connecting field-provided flow switch for geothermal heat exchanger*
E - F:	*Remote contact for switching the unit on and off via the NO contact by others*
L - M:	*Activation of 2nd setpoint chilled water (option .E22)*
R - S:	*Demand limit command, capacity limitation via NC contact by others (option .E23)[1)]*
P1 - P2:	*Relay for controlling the chilled water pump*
P3 - P4:	*Relay for controlling the warm water pump*
P5 - P6:	*Relay for controlling geothermal pump*
15 - 16:	*Common fault signal*
67 - 68:	*Status message compressor 1 (option E.03)*
69 - 70:	*Status message compressor 2 (option E.03)*
69 - 70:	*Status message compressor 3 (option E.03)*
69 - 70:	*Status message compressor 4 (option E.03)*
037 - 038:	*Chilled water setpoint shift via a 4-20 mA signal*
V - Z:	*PIN Auto - Contact for assigning the operating mode - refer to Table 11.*
T - U:	*PIN REC - Contact for assigning the operating mode - refer to Table 11.*
G - H:	*PIN summer/winter - Contact for assigning the operating mode - see Table 11.*
1 - 2 - 3 :	*Connection to serial card[2)]*
- - - - - - - -	*On-site cabling*
#	*potential by others necessary (max. 230 V / 50 Hz / 2 A / AC)*
*	*potential may not be supplied by others (supplied by controller)*

[1)] Reduction of capacity (demand limit switch) and of electrical power consumption by opening a volt free contact by others.
[2)] The serial card is required to link the unit to a building management system.

Digital input:	PIN Auto	PIN Rec	PIN summer/winter
Terminals:	**V - Z**	**T - U**	**G - H**
Operating Mode			
Automatic	Open	Closed	Closed
Cooling only	Closed	Closed	Closed
only heating	Open	Open	Closed
Cooling with heat recuperation	Closed	Open	Closed

Tab. 11

A change to the operating mode by others via digital contacts T - U and V - Z must be reduced to a maximum of 4-times per hour!

Weights FläktGroup *HeaMo* GEO with 3-way valve

REG #### AD22	050	055	065	075	080	090	125	160	205
Transport weight	475	495	515	530	545	570	775	845	935
Operating weight	485	510	530	545	565	590	795	875	970

REG #### AD42	195	225	255	285	315	365	415	-	-
Transport weight	1005	1190	1385	1500	1635	1725	1810	-	-
Operating weight	1035	1230	1430	1550	1715	1815	1915	-	-

Tab. 12: All weight in kg

Unit	Weight distribution in kg				
	W1	W2	W3	W4	Total
REG 050 AD22	73	106	136	170	485
REG 055 AD22	77	110	145	178	510
REG 065 AD22	80	112	153	185	530
REG 075 AD22	82	113	160	191	545
REG 080 AD22	85	117	165	197	565
REG 090 AD22	90	121	174	205	590
REG 125 AD22	121	177	221	277	795
REG 160 AD22	135	195	242	303	875
REG 205 AD22	148	212	273	337	970

Unit	Weight distribution in kg				
	W1	W2	W3	W4	Total
REG 195 AD42	241	263	254	276	1035
REG 225 AD42	298	320	295	317	1230
REG 255 AD42	374	397	318	341	1430
REG 285 AD42	384	414	361	391	1550
REG 315 AD42	407	438	419	451	1715
REG 365 AD42	426	457	451	482	1815
REG 415 AD42	449	480	477	508	1915

Tab. 13

Weights FläktGroup *HeaMo* GEO with 2-way valve

REG #### AD22	050	055	065	075	080	090	125	160	205
Transport weight	455	475	495	510	525	550	745	820	900
Operating weight	465	490	510	525	540	570	765	845	930

REG #### AD42	195	225	255	285	315	365	415	-	-
Transport weight	965	1155	1380	1455	1600	1685	1775	-	-
Operating weight	995	1190	1420	1500	1675	1775	1870	-	-

Tab. 14: All weight in kg

Unit	Weight distribution in kg				
	W1	W2	W3	W4	Total
REG 050 AD22	78	104	129	155	465
REG 055 AD22	82	107	138	163	490
REG 065 AD22	85	109	146	170	510
REG 075 AD22	88	111	151	175	525
REG 080 AD22	90	115	155	180	540
REG 090 AD22	96	119	166	189	570
REG 125 AD22	131	172	210	251	765
REG 160 AD22	144	190	233	279	845
REG 205 AD22	160	205	260	305	930

Unit	Weight distribution in kg				
	W1	W2	W3	W4	Total
REG 195 AD42	251	256	242	246	995
REG 225 AD42	308	313	282	287	1190
REG 255 AD42	379	394	316	331	1420
REG 285 AD42	398	413	337	352	1500
REG 315 AD42	418	437	401	420	1675
REG 365 AD42	437	455	432	451	1775
REG 415 AD42	459	478	457	476	1870

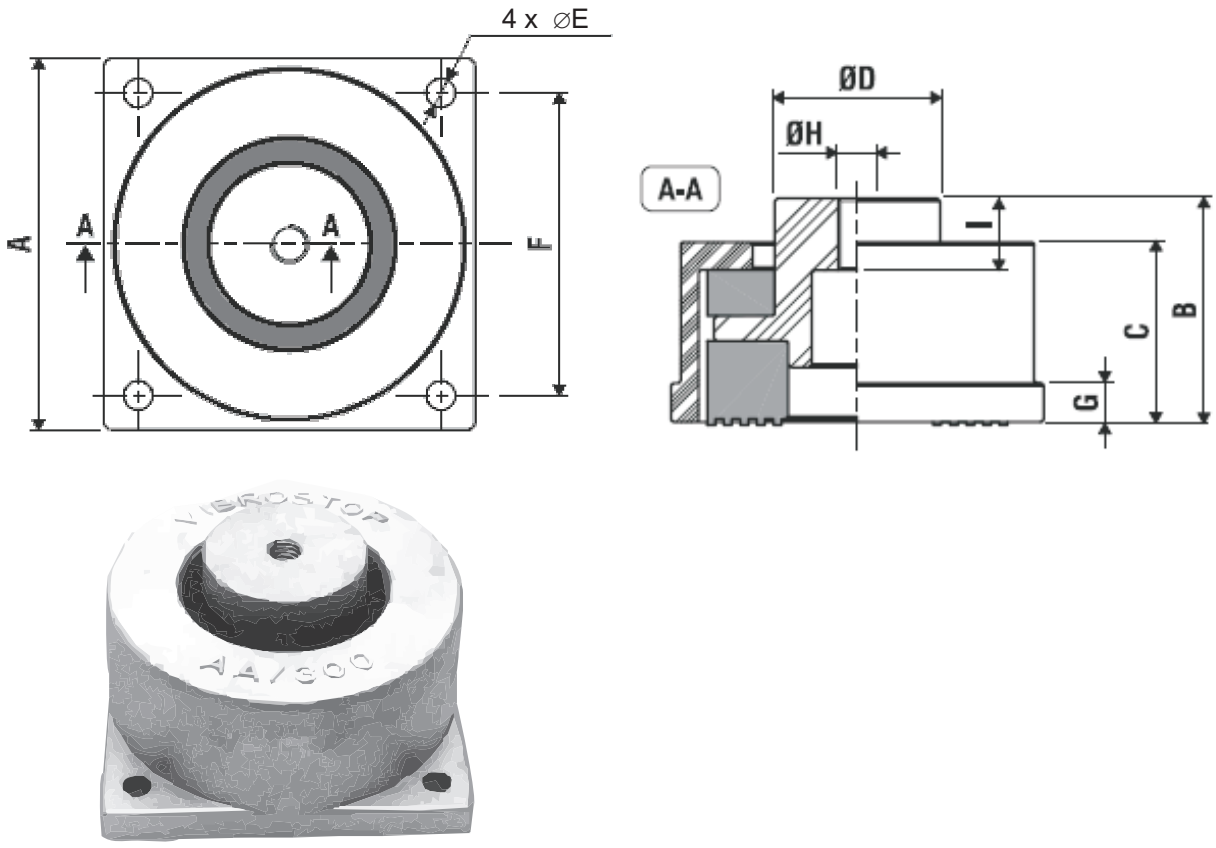
Tab. 15

Unit Type	050	055	065	075	080	090	125	160	205
	4 x AA200	4 x AA200	4 x AA200	4 x AA200	4 x AA200	4 x AA200	4 x AA300	4 x AA300	4 x AA300

Tab. 16

Unit Type	195	225	255	285	315	365	415	-	-
	4 x AA400	4 x AA400	4 x AA400	4 x AA400	4 x AA400	4 x AA400	4 x AA400	-	-

Tab. 17



Type	A	B	C	ØD	ØE	F	G	H	I
AA100N	80	60	41	25	6,5	67	8	M12	44
AA200N	108	75	55	40	8,5	90	10	M12	26
AA300N	135	81	64	60	10,5	110	12	M14	24
AA400N	155	95	80	65	12,5	125	15	M14	25
AA600N	175	100	77	70	14	140	15	M16	30
AA800N	180	120	92	75	15	150	16	M18	35
AA1000N	200	155	118	100	16	162	20	M20	35
AA1500N	220	155	120	80	17	182	18	M20	110

Tab. 18: Size of anti-vibration isolators in mm

NOTICE!

For exact positioning of the anti-vibration isolators, refer to the Operation Manual of the unit and the order-related unit documentation.

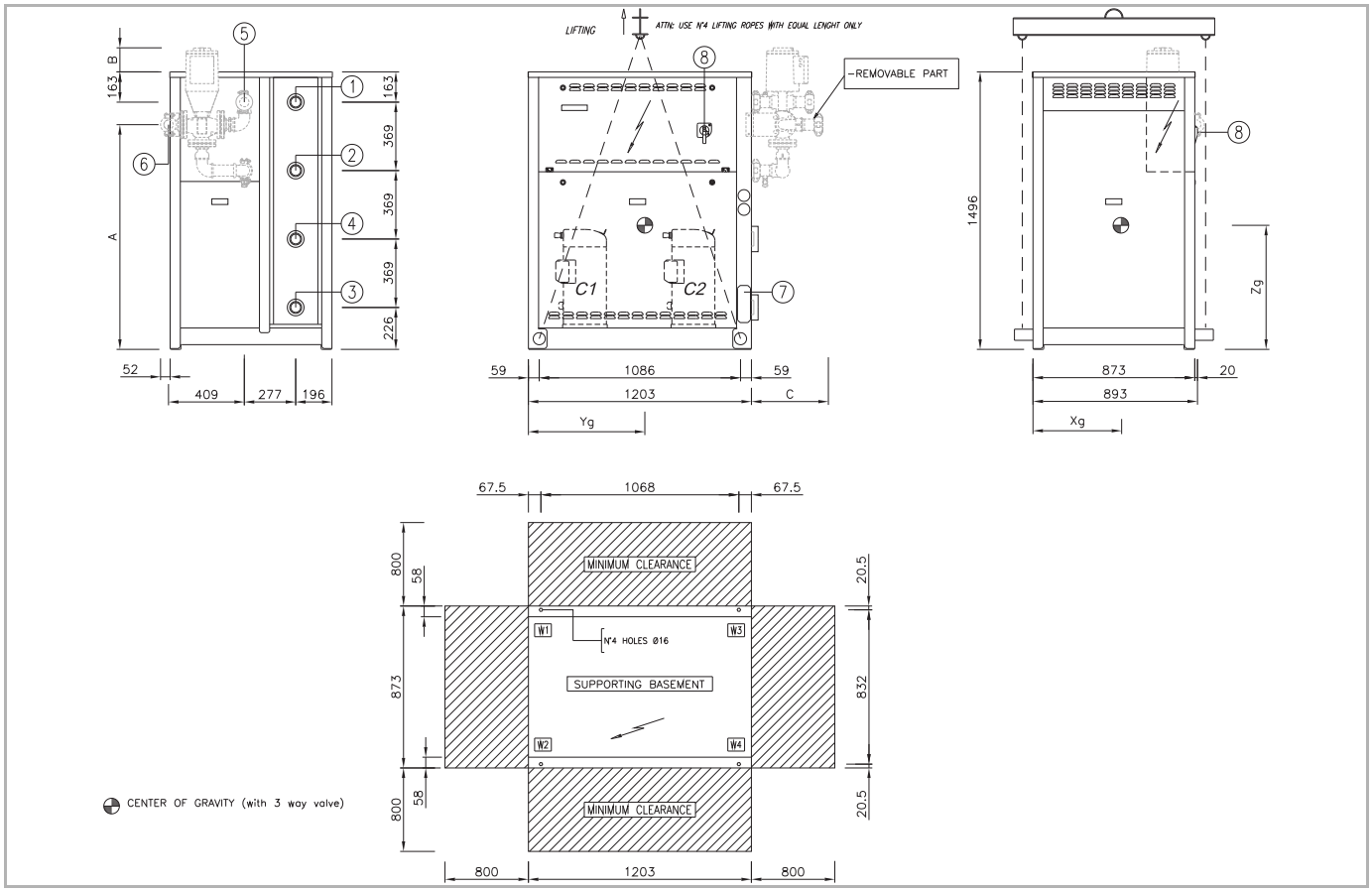


Fig. 27: DC312503-0 - REG 050-090 AD22 with 3-way valve

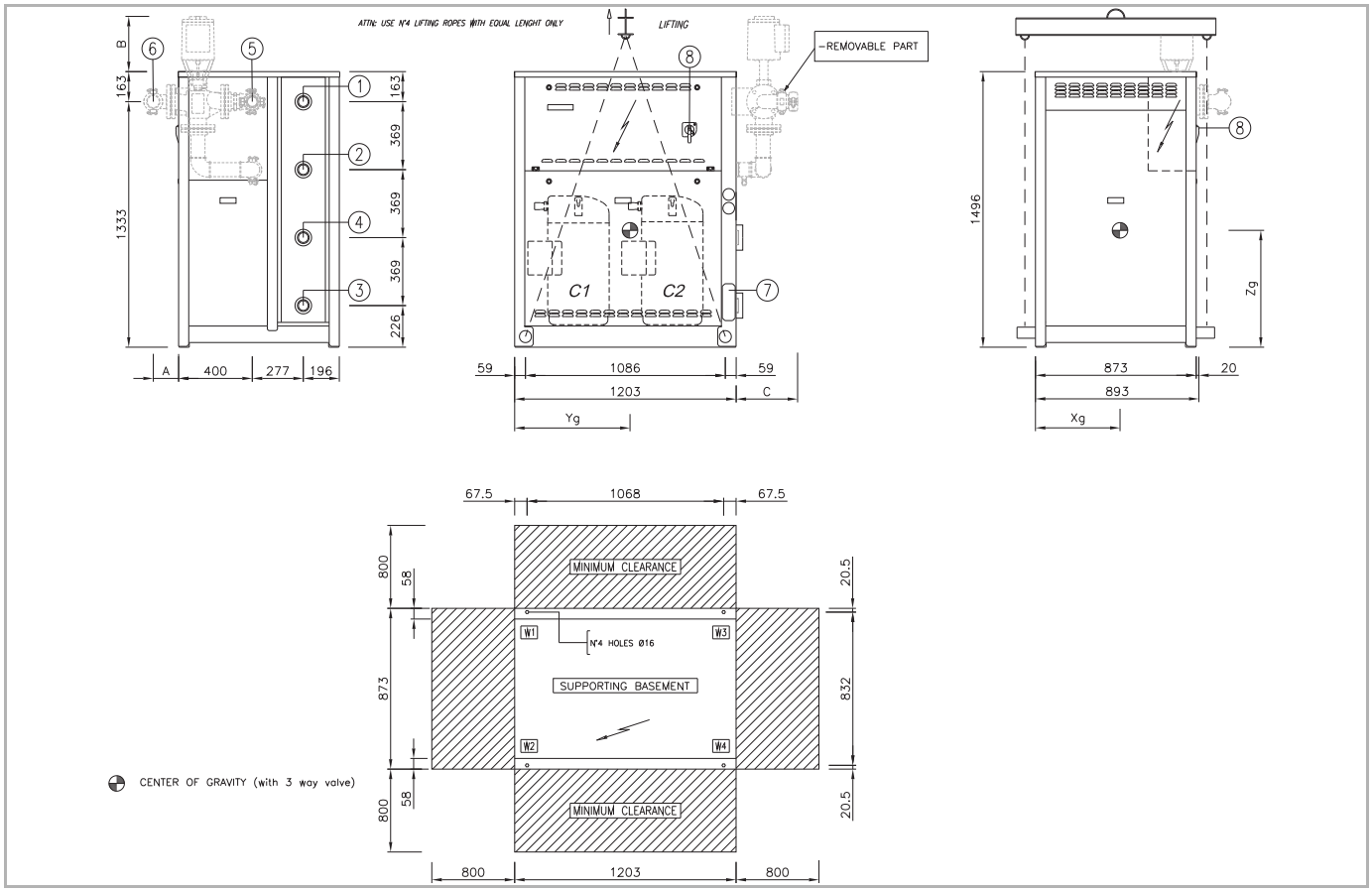


Fig. 28: DC320503-0 - REG 125-205 AD22 with 3-way valve

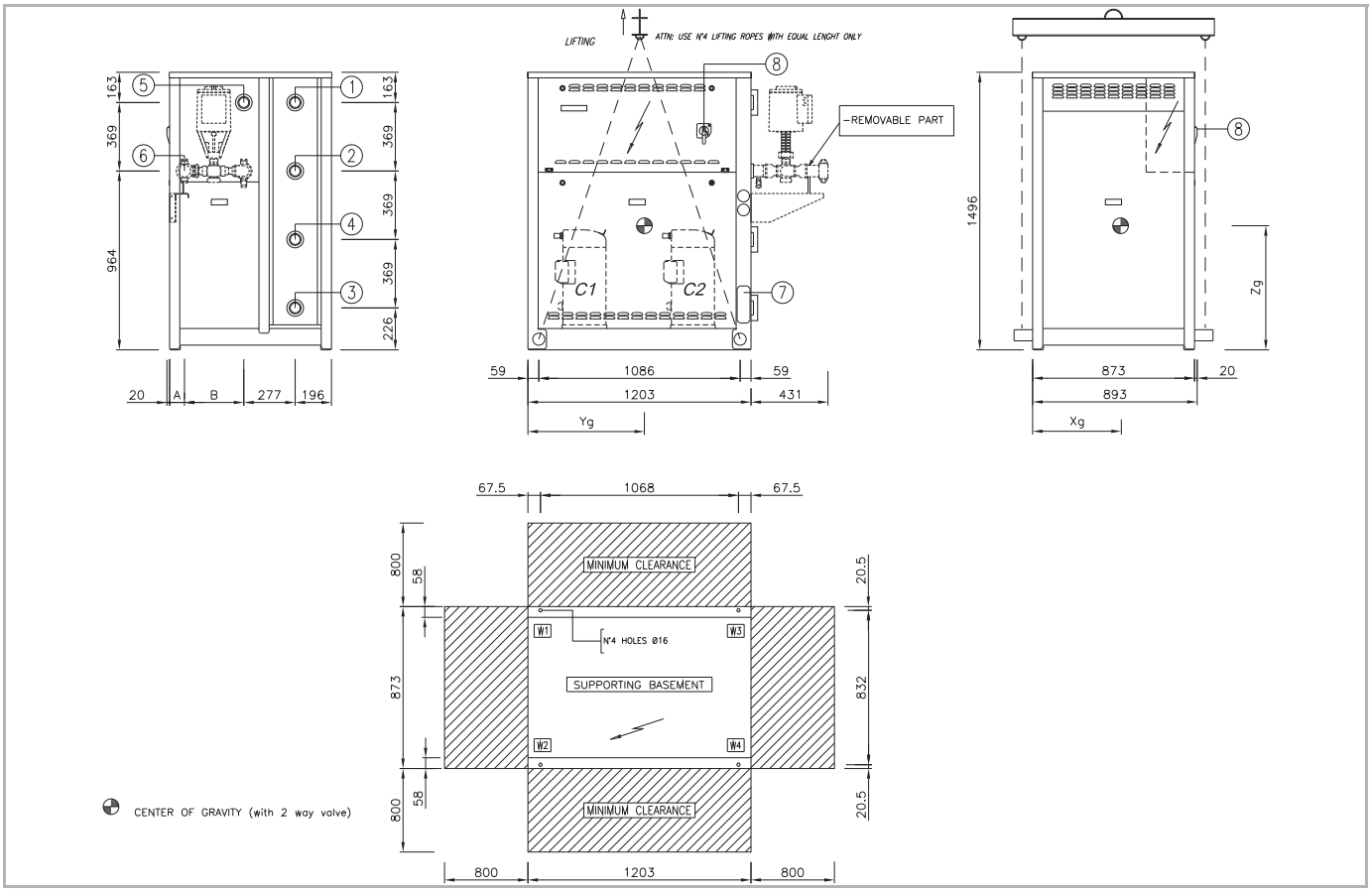


Fig. 29: DC312502-0 - REG 050-090 AD22 with 2-way valve (.I54)

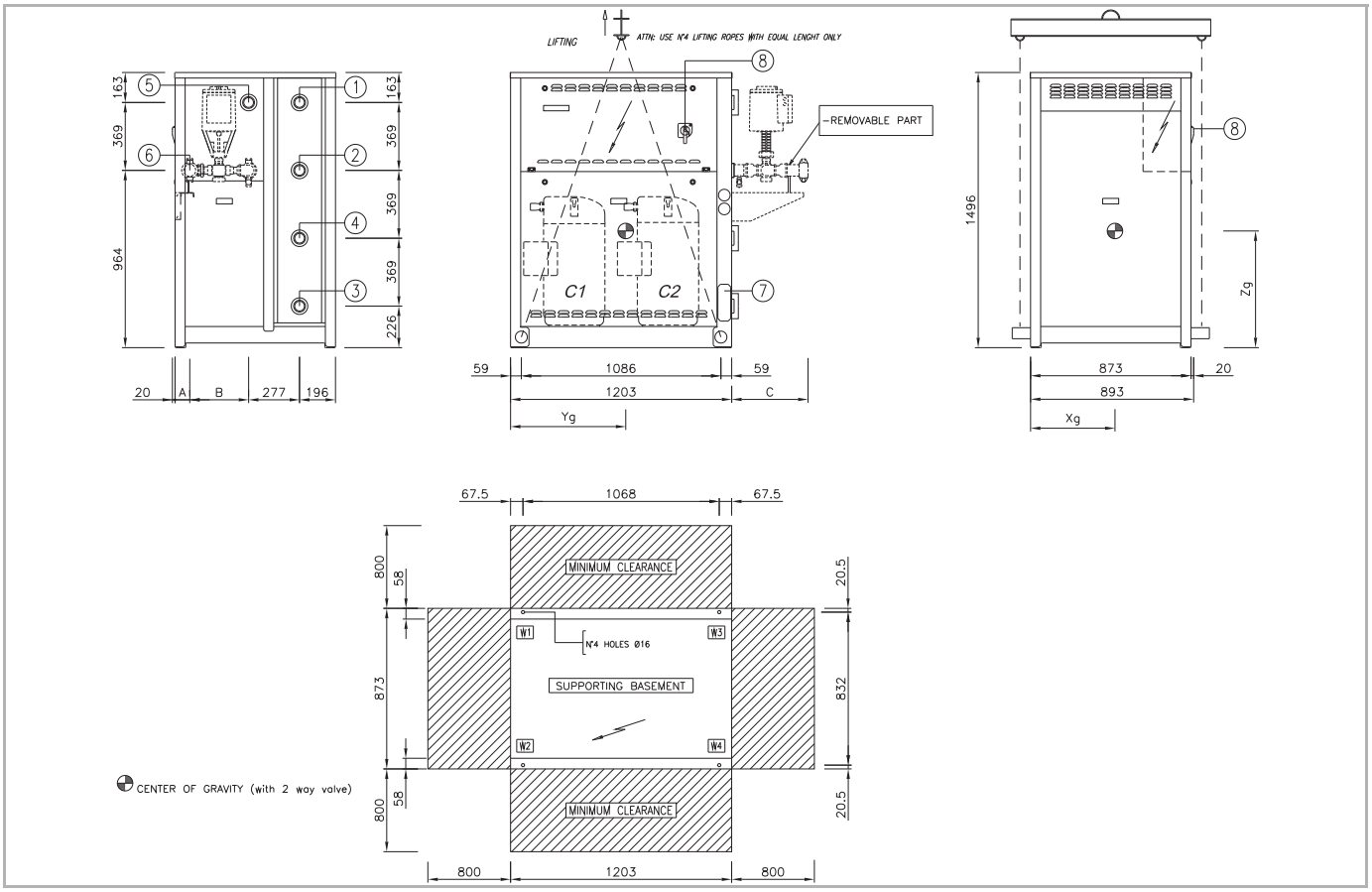


Fig. 30: DC320502-0 - REG 125-205 AD22 with 2-way valve (.I54)

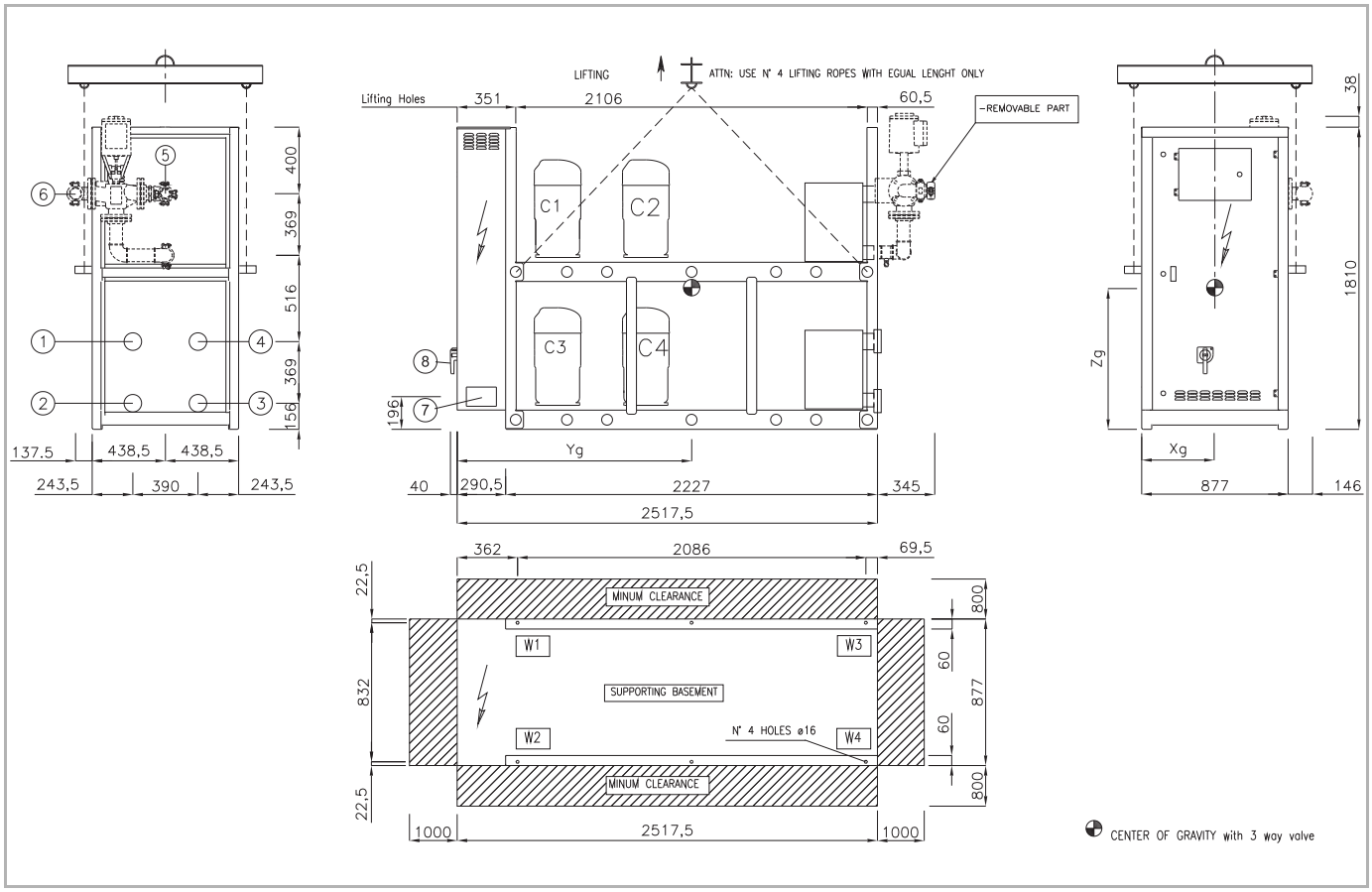


Fig. 31: DC327503-0 - REG 195-255 AD42 with 3-way valve

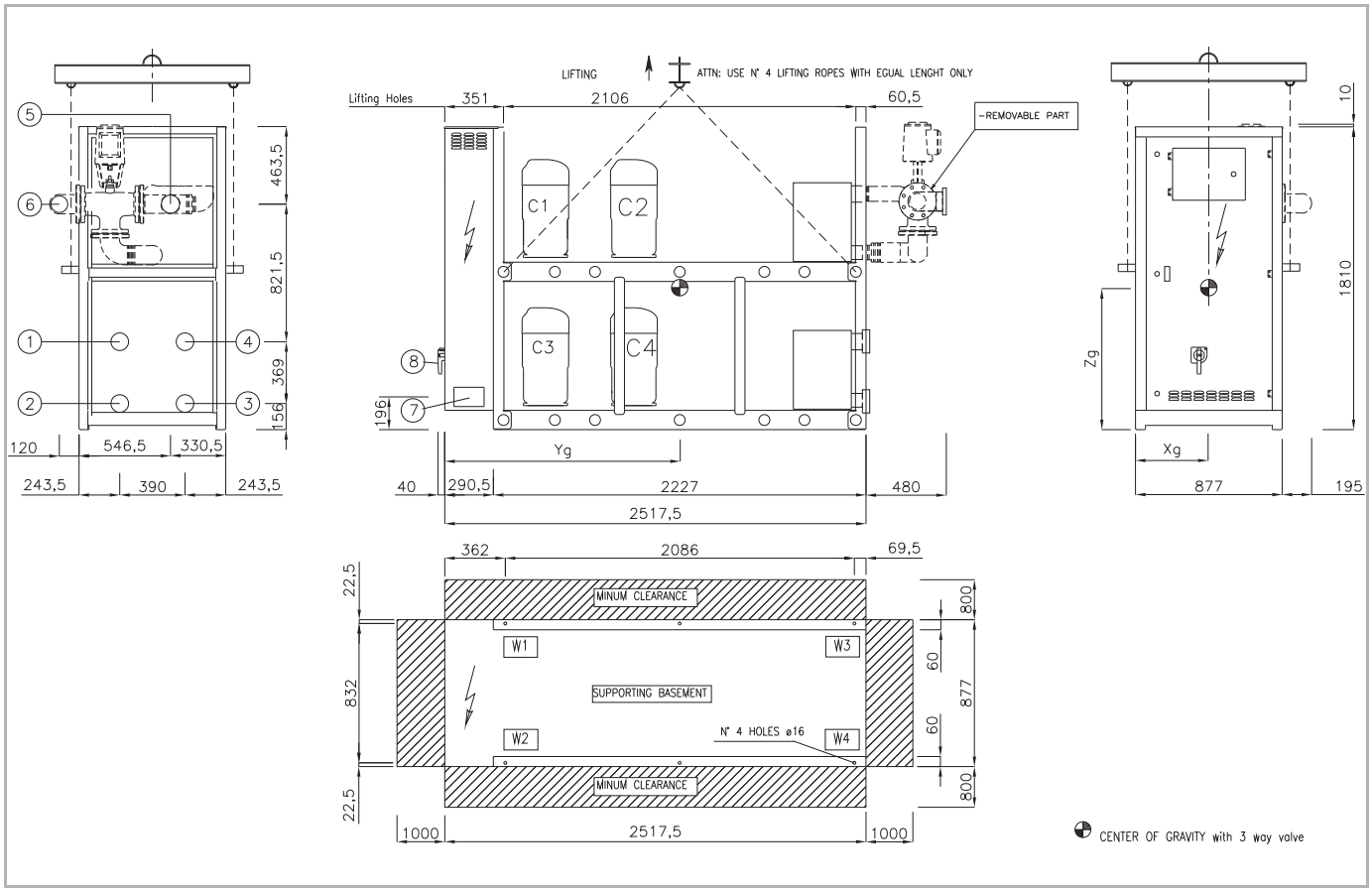


Fig. 32: DC331503-0 - REG 285 AD42 with 3-way valve

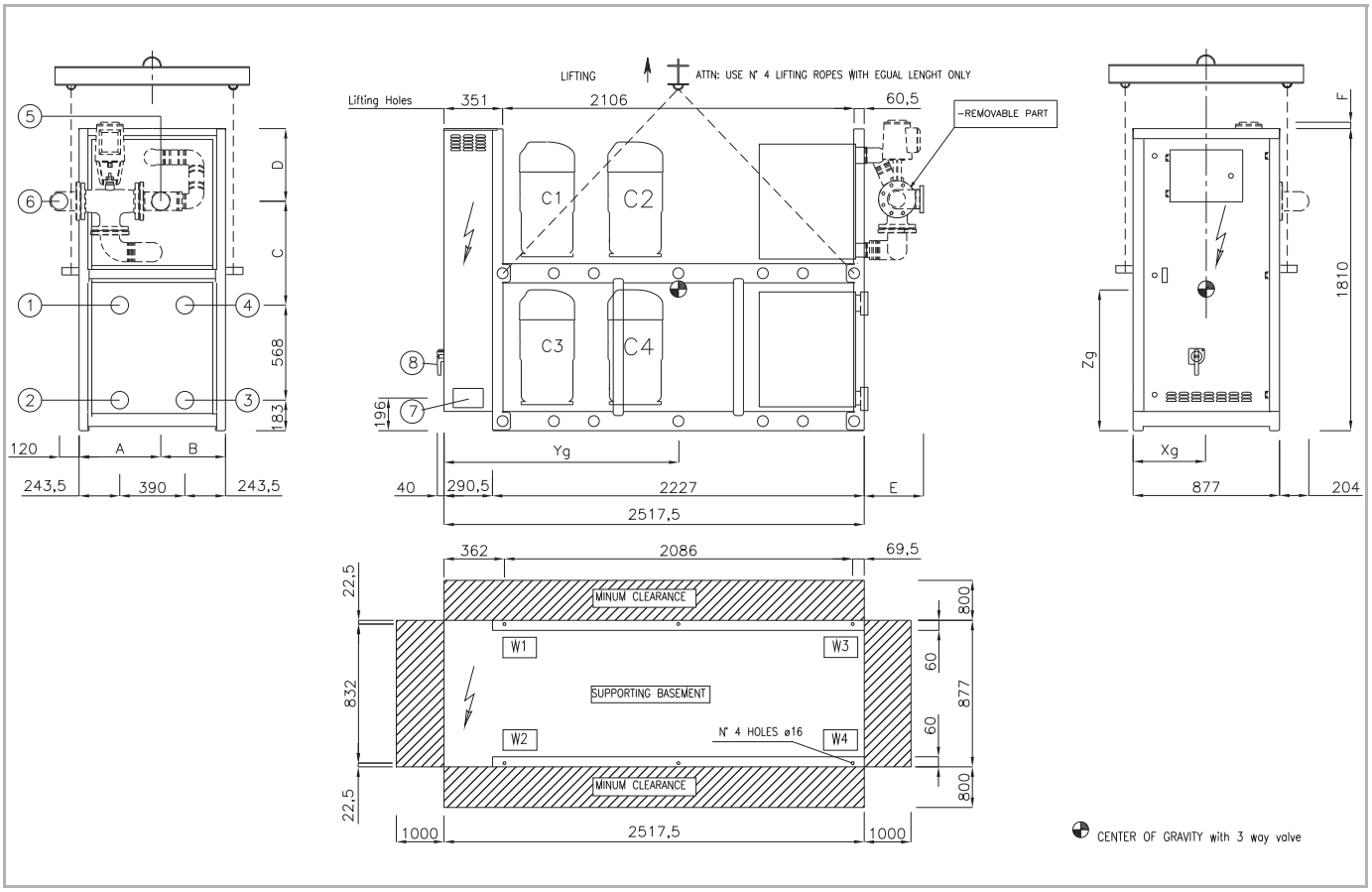


Fig. 33: DC333503-0 - REG 315-415 AD42 with 3-way valve

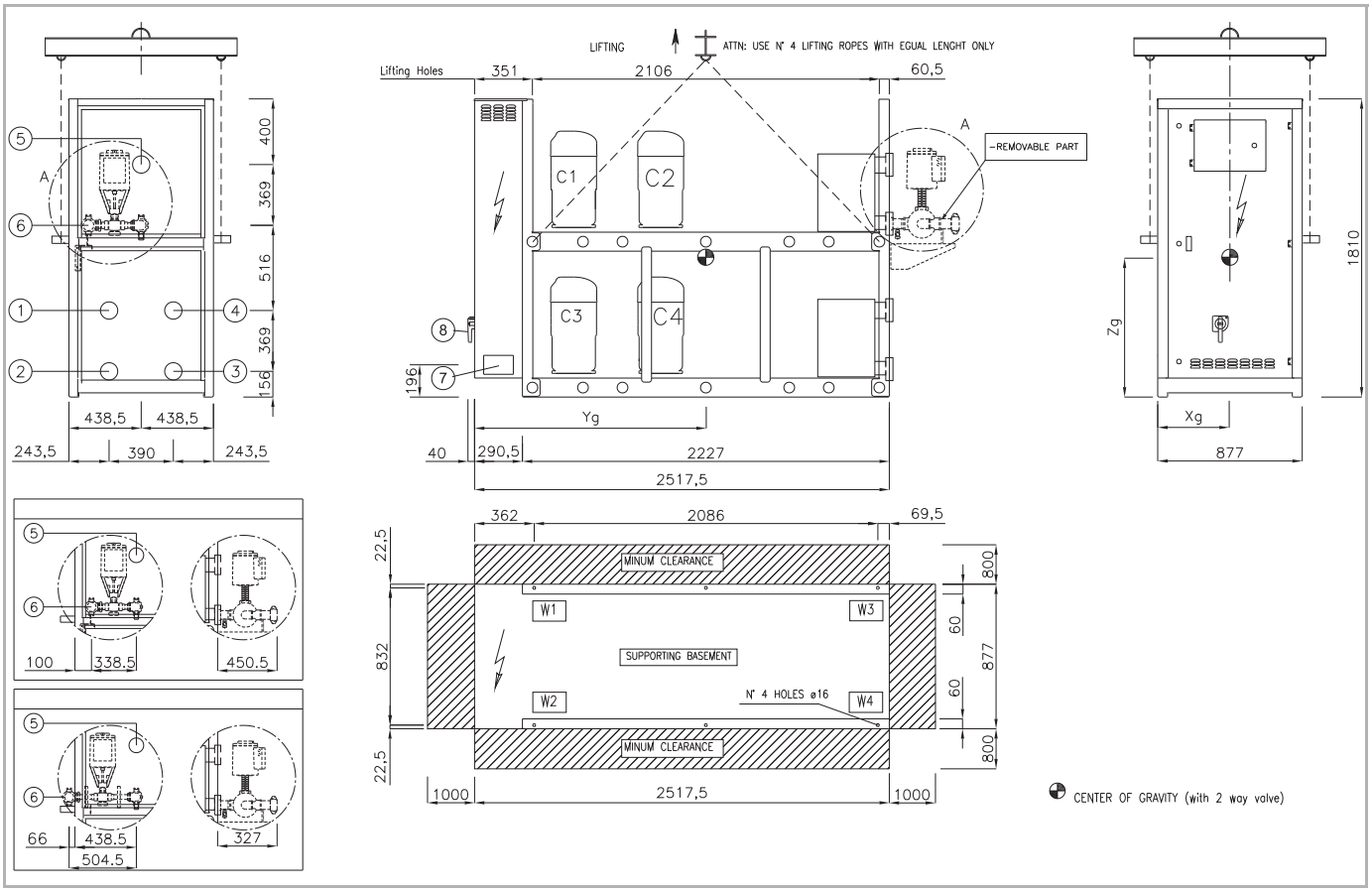
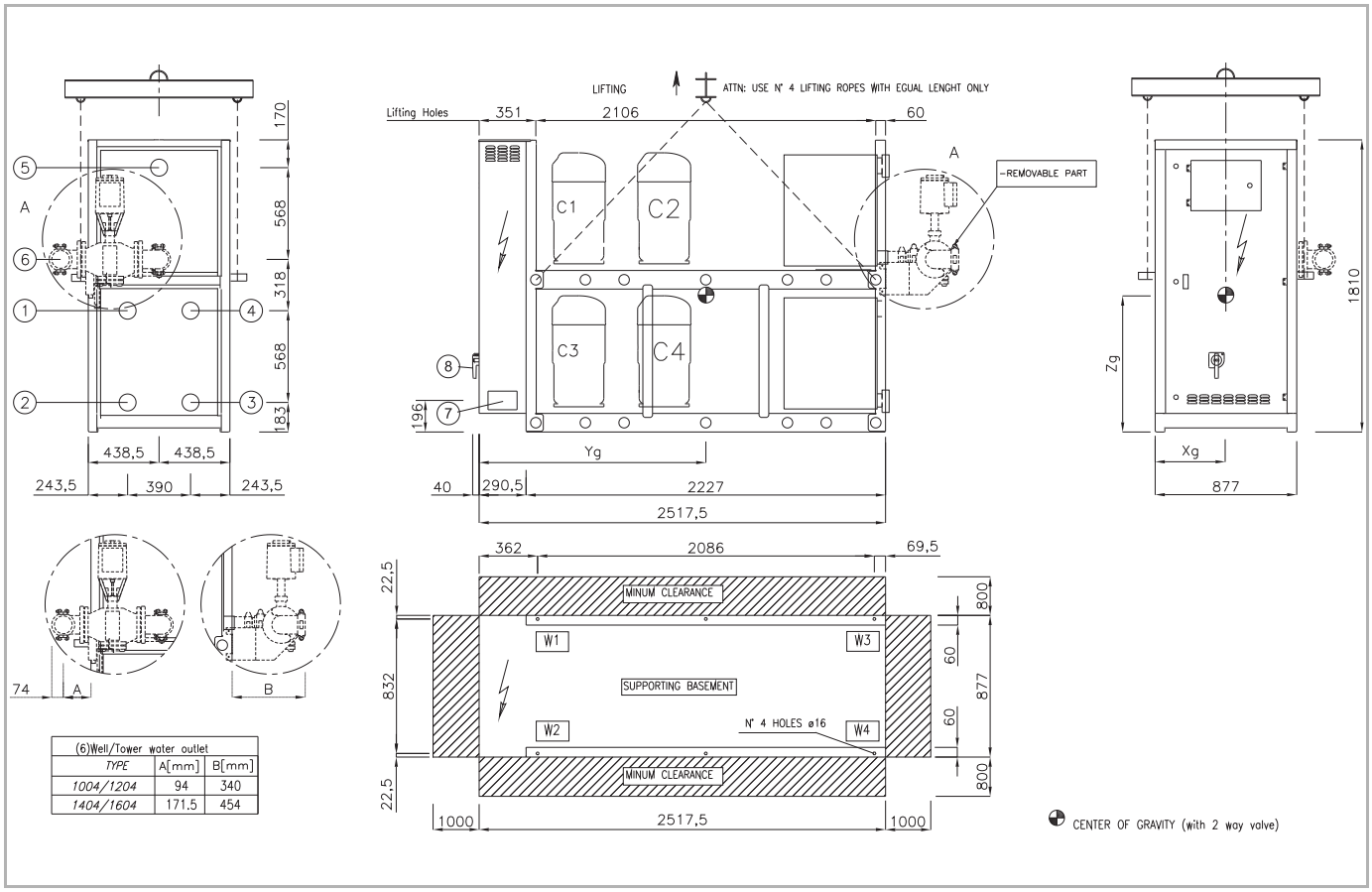


Fig. 34: DC327502-0 - REG 195-285 AD42 with 2-way valve (.I54)



(6)Well/Tower water outlet

TYPE	A[mm]	B[mm]
1004/1204	94	340
1404/1604	171.5	454

Fig. 35: DC333502-0 - REG 315-415 AD42 with 2-way valve (.I54)

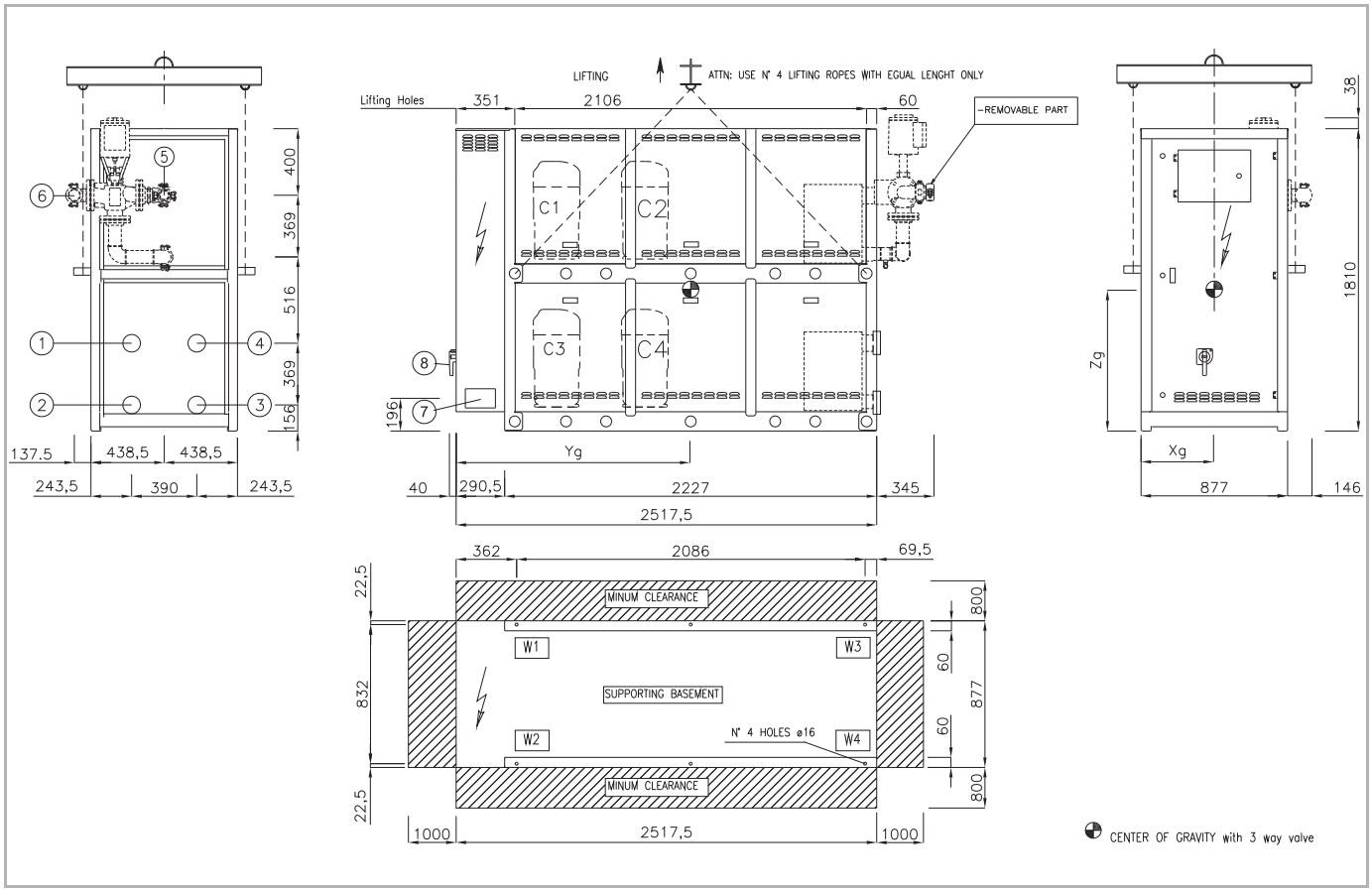


Fig. 36: DC327507-0 - REG 195-255 AD42 with 3-way valve and sound-attenuated casing (.I44)

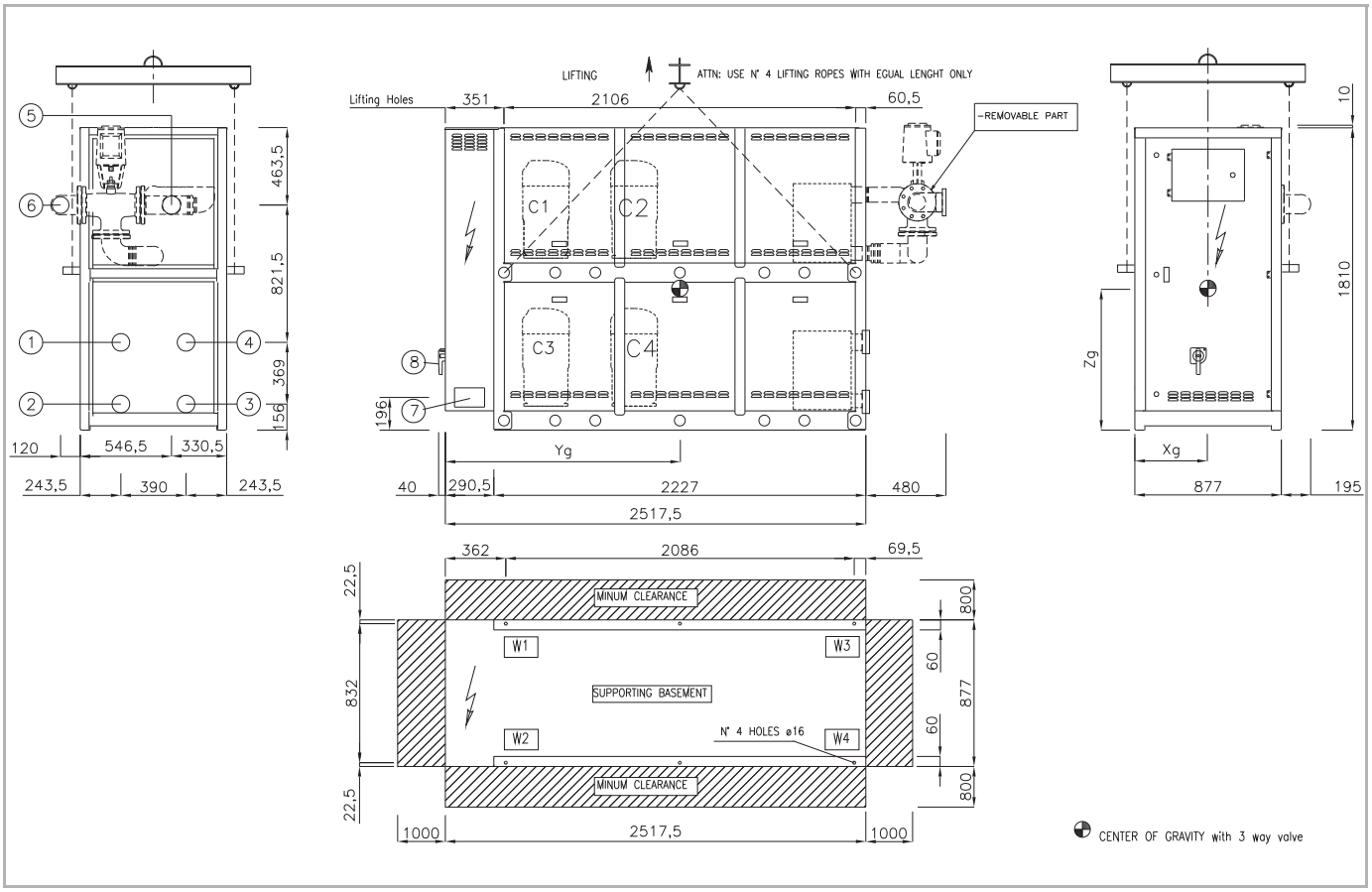


Fig. 37: DC331507-0 - REG 285 AD42 with 3-way valve and sound-attenuated casing (.I44)

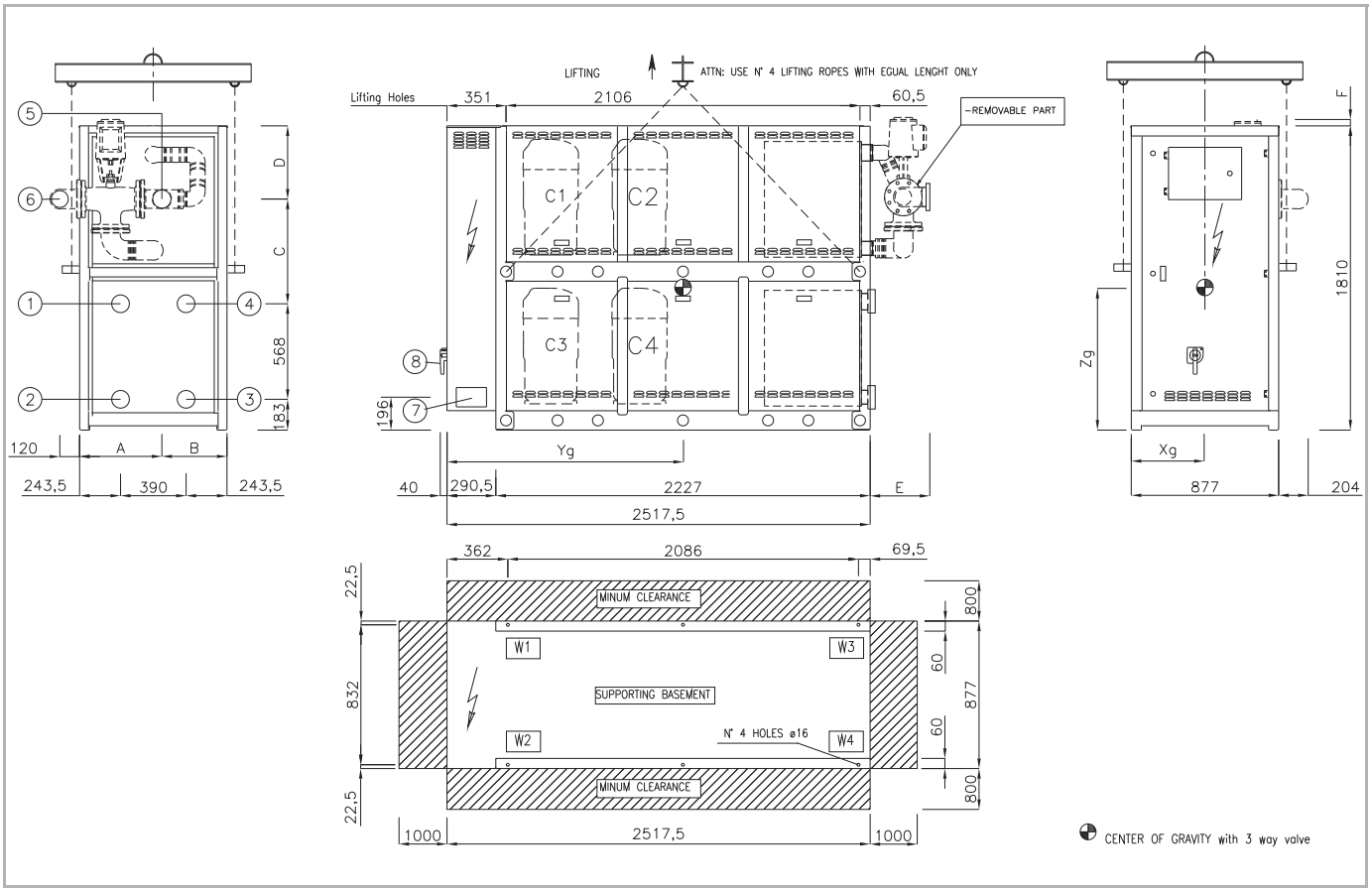


Fig. 38: DC333507-0 - REG 315-415 AD42 with 3-way valve and sound-attenuated casing (.I44)

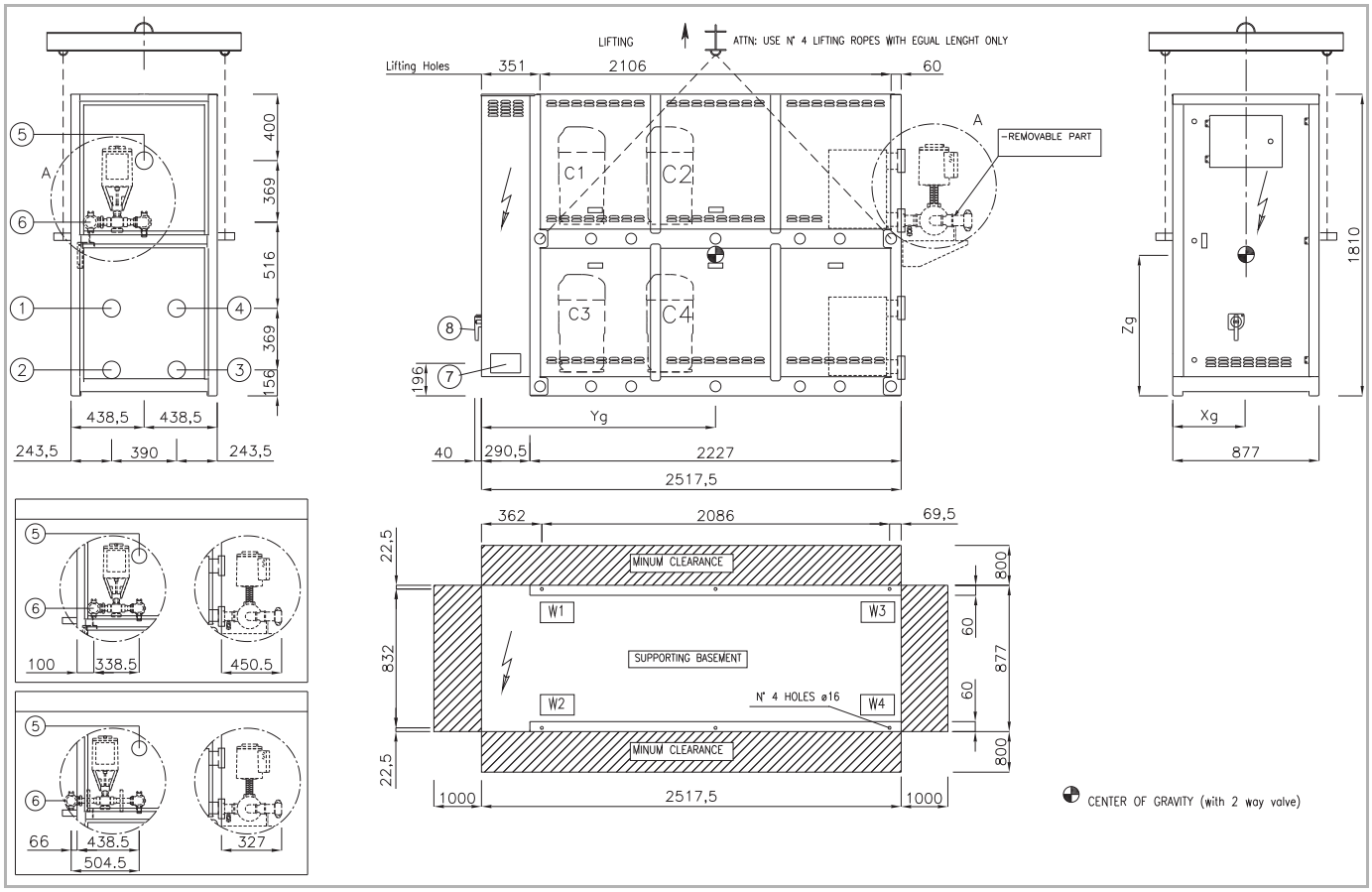
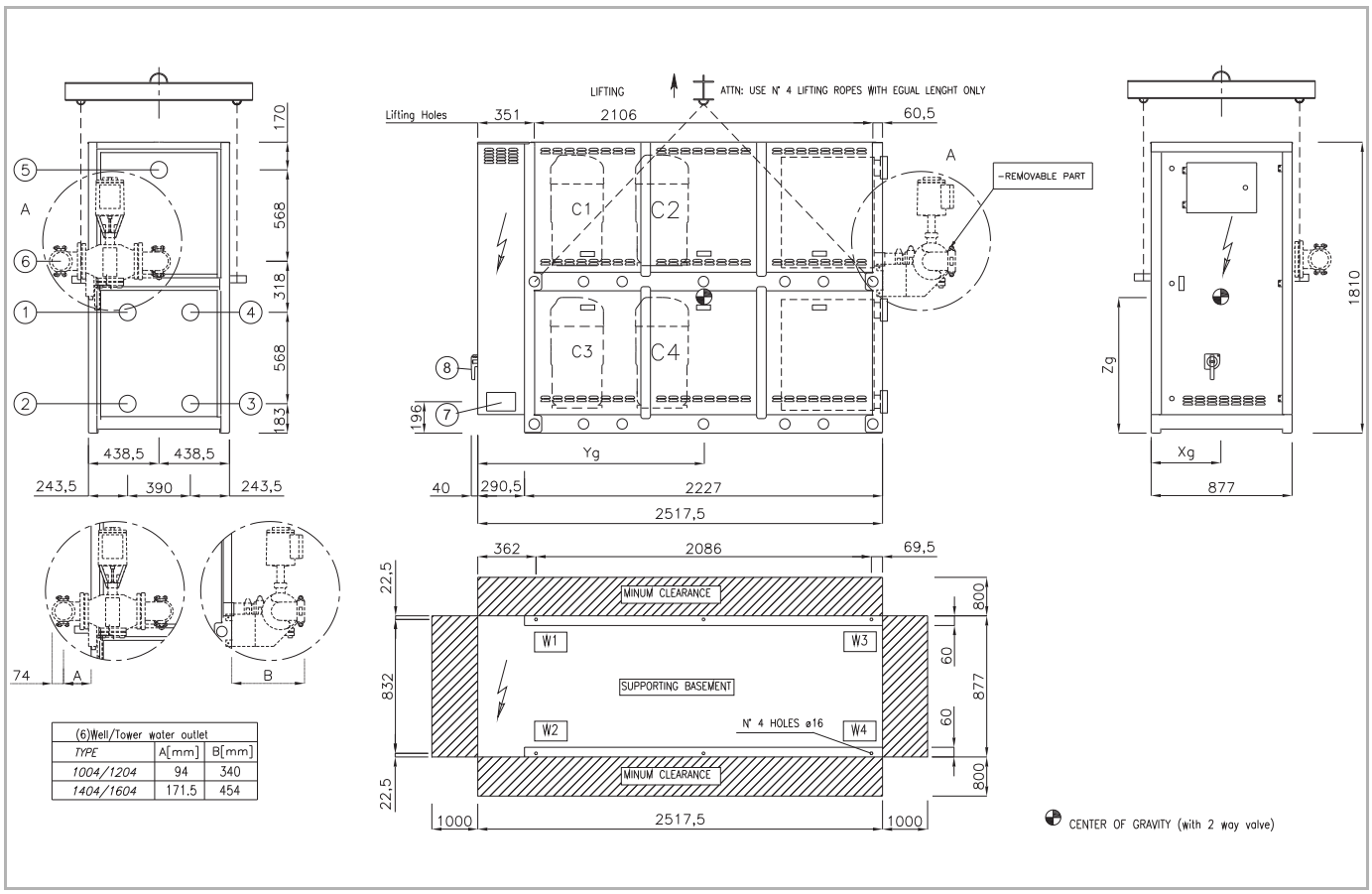


Fig. 39: DC327506-0 - REG 195-285 AD42 with 2-way valve (.I54) and sound-attenuated casing (.I44)



(6)Well/Tower water outlet		
TYPE	A[mm]	B[mm]
1004/1204	94	340
1404/1604	171.5	454

Fig. 40: DC333506-0 - REG 315-415 AD42 with 2-way valve (.I54) and sound-attenuated casing (.I44)

Legend for dimensional drawings of units – capacity stage 050-415

Abbreviation	Description
1	Water inlet chilled water - G XX ["] (connection size see Technical Data from Page 20 ff.)
2	Water inlet chilled water - G XX ["] (connection size see Technical Data from Page 20 ff.)
3	Water inlet warm water - G XX ["] (connection size see Technical Data from Page 20 ff.)
4	Water inlet warm water - G XX ["] (connection size see Technical Data from Page 20 ff.)
5	Water inlet geothermal - G XX ["] (connection size see Technical Data from Page 20 ff.)
6	Water inlet geothermal G XX ["] (connection size see Technical Data from Page 20 ff.)
7	Power supply
8	Main isolator (removable)

Tab. 19

Description of pipe connections		
Threaded connections (defined as of UNI ISO 7/1)		
Rp XX	["]	Parallel internal thread with seal through thread
Rc XX	["]	Conical internal thread with seal through thread
R XX	["]	Conical external thread with seal through thread
Threaded connections (defined as of UNI ISO 288/1)		
XX	["]	ISO G: parallel external thread with no seal through thread
Flange connections		
DN XX / PN XX	-	Nominal diameter with pressure class (e. g.DN 80 PN16: nominal diameter 80 mm, nominal pressure 16 bar)
Groove-lock connections		
G / Victaulic groove lock coupling	["]	flexible joint: rated diameter (also known as "Victaulic®" trade mark)

Tab. 20

NOTICE!

For detailed planning please only use the order-related documentation. Detailed dimensional drawings can be obtained on request from your responsible FläktGroup sales office. Specifications and technical data are subject to regular updates. The manufacturer reserves the right to make necessary changes to information without prior written notice.

Notes

Notes

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