R290 / R1270

MIDLINE

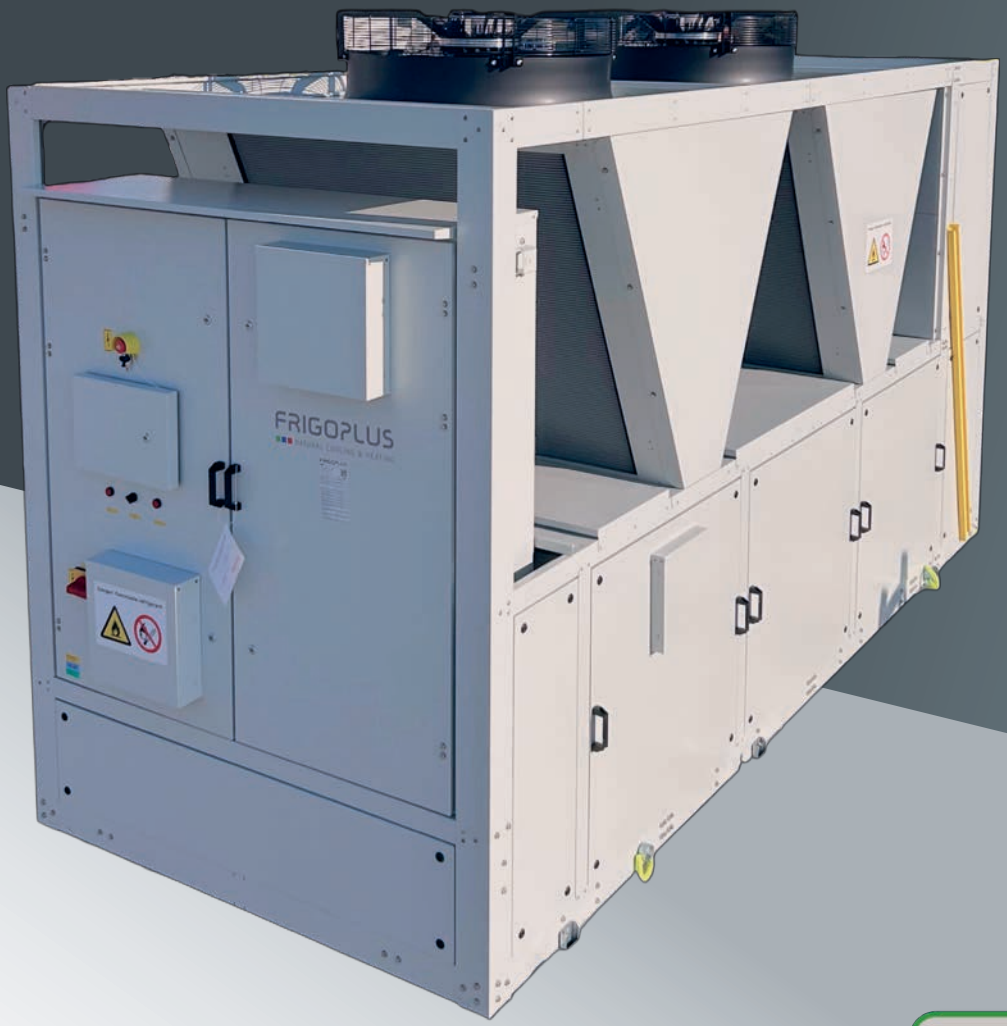
MIDLINE

AIR-COOLED WATER CHILLER

Natural refrigerant: Propane (R290) **or** Propylene (R1270)

Cooling capacity range[1]:

from 60 kW to 330 kW



EN 378
compliant
enclosed housing

[1] Ambient air temperature 35°C; Evaporator inlet/outlet water temperature 12/7 °C

FRIGOPLUS
NATURAL COOLING & HEATING

R290 R1270

AIR-COOLED WATER CHILLERS

Air-cooled chillers are used for indirect cooling for air conditioning of buildings, industrial processes, logistics centers for food retail, precision cooling of data centers etc. Cooling medium can be water, mixture of water and ethylene/propylene glycol or some other cooling medium.

An air-cooled chiller is packaged in a single housing and all the components of the refrigerant circuit are built into the unit. Thus, chillers are compact and easy to install on site. A microprocessor controls the operation of the unit and optimizes parameters in order to achieve as high efficiency as possible.

SAFETY & QUALITY

- All units are designed in accordance with the highest safety standards and follow EN 378 for refrigerants from group A3.
- Units are tested according to EN 14511
- ISO 9001 : 2015
- Module A2 - Monitoring of Final Assessment, according to Directive 2014/68/EU

NATURAL REFRIGERANTS

Propane – R290 with GWP_{100} = 0,02 is suitable for temperature range from -25 to 20 °C

Propylene – R1270, with GWP_{100} = 0 is suitable for low temperature (LT) applications.

Both refrigerants are exempted from the restrictions prescribed by the F-gas Regulation (EU) 2024/573.

ECOLOGY AND ENERGY EFFICIENCY

Thanks to the ideal thermodynamic characteristics of the natural refrigerants used and the optimal selection of the key components of the refrigeration circuit, MIDLINE units have high energy efficiency and meet the requirements of ECODESIGN requirements.

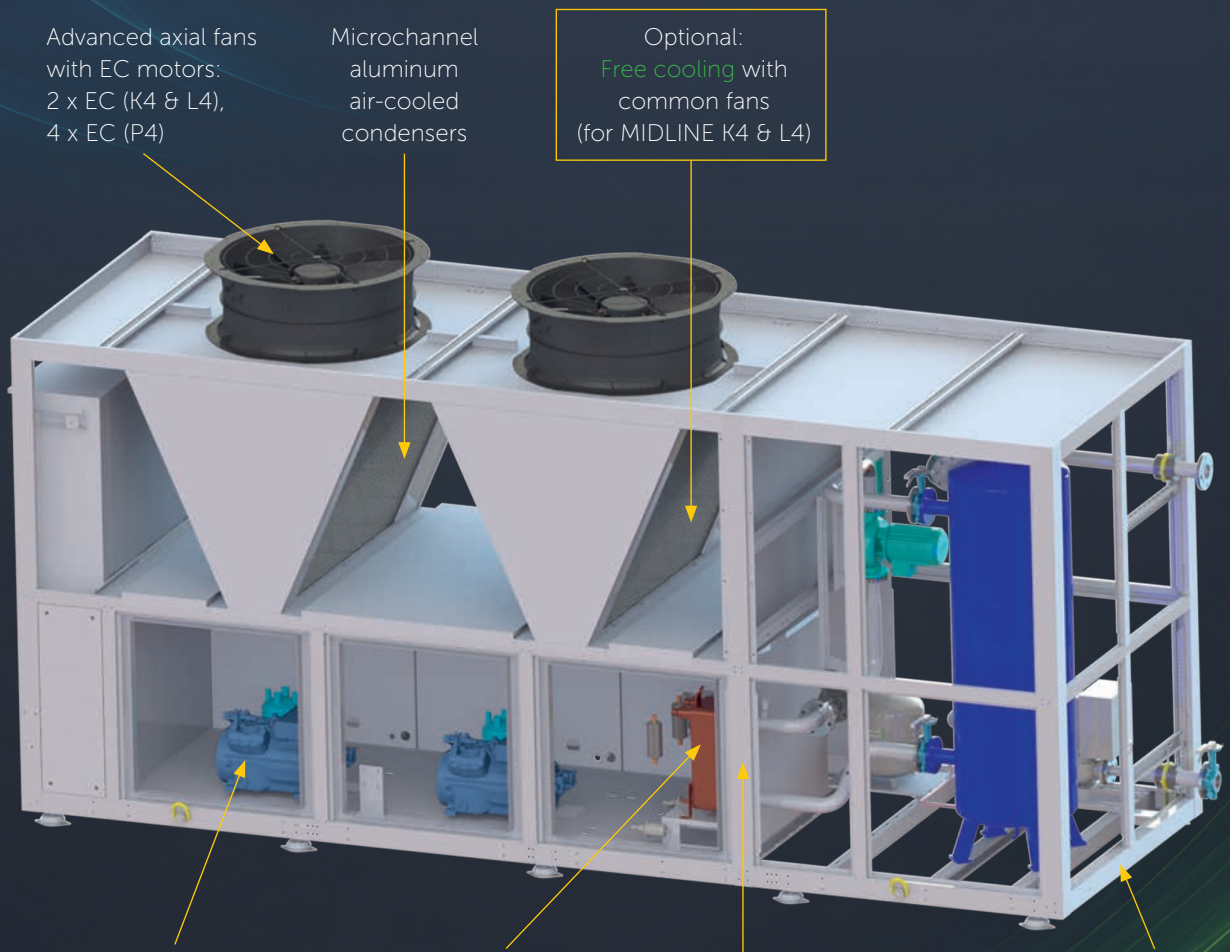


MIDLINE

Cooling | Reciprocating compressor | Free cooling | Heat recovery

AIR-COOLED WATER CHILLER

MIDLINE series consists of high-efficiency air-cooled water chillers offering a high degree of configurability. Extensive configuration options make MIDLINE a reliable, high-quality solution for medium-sized industrial and commercial cooling systems. MIDLINE units have two refrigeration circuits, with one compressor per circuit. All MIDLINE units are designed for outdoor installation.

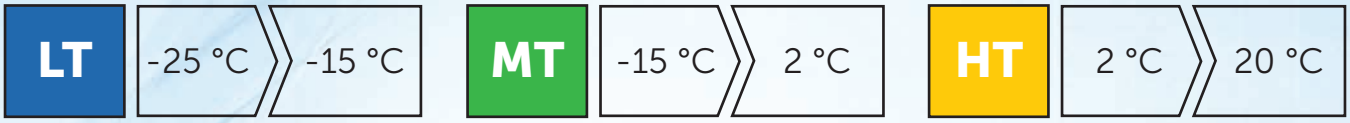


EN 378 compliant:

✓ Enclosed housing - All refrigerant circuit components installed inside the housing

✓ Safety strategy: refrigerant gas leak detector + differential air pressure switch + ATEX fan

TEMPERATURE RANGE



GENERAL CHARACTERISTICS

- Compressor with two Rotalock valves, crankcase oil heater and oil sight glass
- Thermal protection of motor windings with electronic protection module
- HP pressure switch connected directly to the compressor, before the Rotalock valve
- Anti-vibration tubes for 2- and 4-cylinder compressors
- Service ball valve before filter dryer and sight glass
- Schrader service valves on the HP and LP side
- Economizer for increased refrigeration circuit efficiency
- Thermal insulation of the LP side of the refrigeration circuit
- Safety valve on HP and LP side
- Electronic expansion valve with protection against excessive evaporation pressure

HOUSING

- Housing made of powder-coated galvanized sheet metal
- Stainless steel screws, nuts and rivets
- Guard grille at the axial fan outlet
- Lockable panels for the compressor and hydronic compartments

ELECTRICAL COMPONENTS

- High-quality electrical components from Siemens and Phoenix Contact
- Clearly structured and professionally assembled electrical cabinet
- All electrical wires individually labeled with durable printed wire markers
- Complete identification of electrical components and wiring according to the electrical schematic
- Main isolator switch integrated into the electrical cabinet
- Automatic chiller restart after power failure
- UV-resistant electrical cables for outdoor installation
- Secure cable fixation and strain relief for the main power supply cable
- Electrical cabinet fully tested before delivery

MIDLINE units have two refrigeration circuits, with one compressor per circuit.

MIDLINE K4

COOLING CAPACITY:

60 kW	W7 °C / A35 °C	100 kW	HT
40 kW	B-8 °C / A35 °C	90 kW	MT
20 kW	B-25 °C / A35 °C	45 kW	LT

Dimensions:

- Length, without connections: 3475 – 5175 mm
- Width: 1600 mm
- Height: 2448 mm

Note: Unit length depends on the hydronic circuit configuration.



MIDLINE L4

COOLING CAPACITY:

100 kW	W7 °C / A35 °C	190 kW	HT
80 kW	B-8 °C / A35 °C	140 kW	MT
45 kW	B-25 °C / A35 °C	70 kW	LT

Dimensions:

- Length, without connections: 3875 – 5575 mm
- Width: 1800 mm
- Height: 2760 mm

Note: Unit length depends on the hydronic circuit configuration.



MIDLINE P4

COOLING CAPACITY:

160 kW	W7 °C / A35 °C	330 kW	HT
140 kW	B-8 °C / A35 °C	210 kW	MT
70 kW	B-25 °C / A35 °C	100 kW	LT

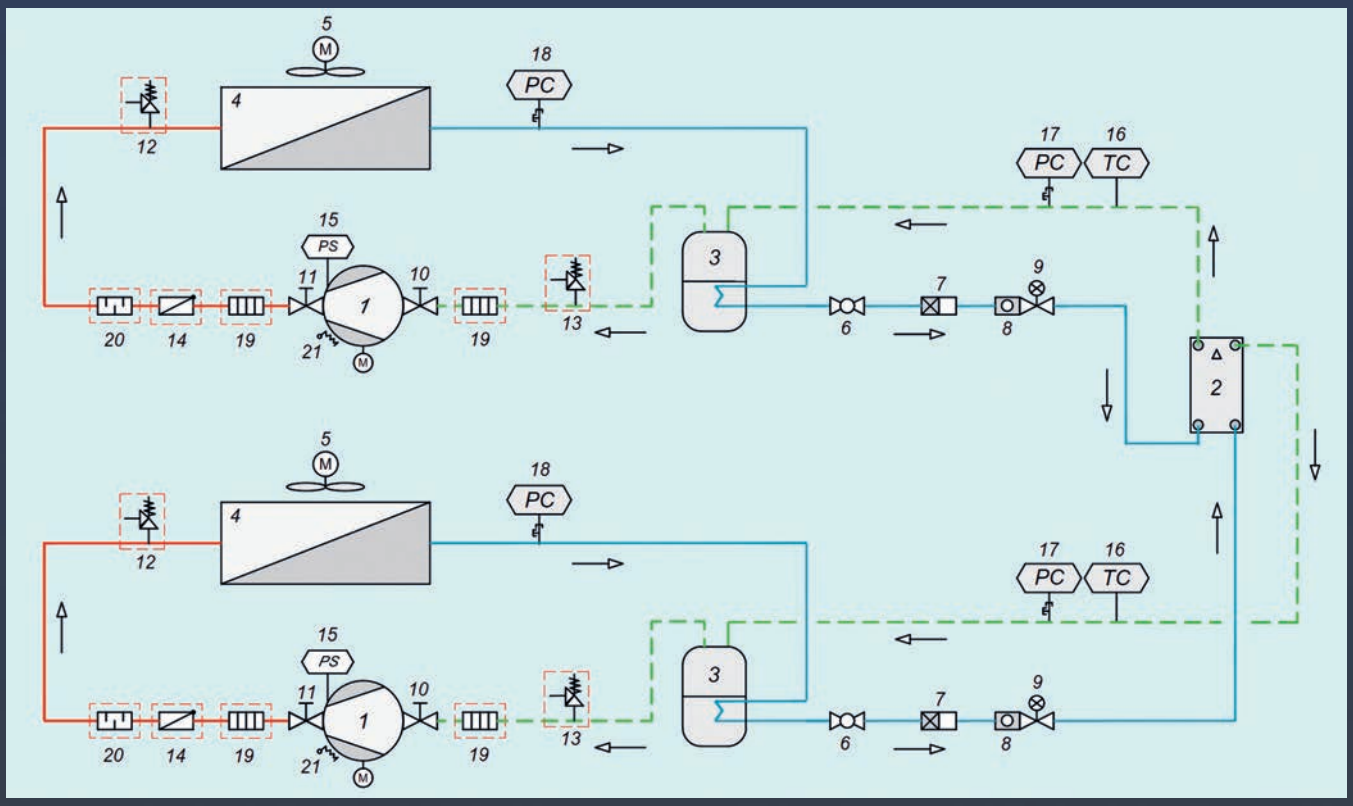
Dimensions:

- Length, without connections: 3875 – 5575 mm
- Width: 2350 mm
- Height: 2783 mm

Note: Unit length depends on the hydronic circuit configuration.



SIMPLIFIED REFRIGERANT CIRCUIT P&ID



Pos.	Part name
1	Compressor
2	Evaporator (BPHE)
3	Suction separator
4	Air-cooled condenser
5	Fan
6	Shut-off ball valve
7	Filter drier
8	Sight glass
9	El. expansion valve
10	Rotalock valve LP
11	Rotalock valve HP
12	Safety valve HP
13	Safety valve LP
14	Check valve
15	Pressure switch
16	Temperature probe
17	Pressure probe LP
18	Pressure probe HP
19	Anti-vibration tube
20	Muffler
21	Crankcase heater



Semi-hermetic reciprocating compressors



Highly effective, versatile
True Dual evaporator



Suction line
liquid separator

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NATURAL COOLING & HEATING

INTEGRATED HYDROMODULE CONFIGURATIONS

MIDLINE units support various integrated hydromodule configurations, providing a complete hydronic solution with all key hydronic components housed within the unit. This factory-assembled design simplifies installation, reduces on-site piping and wiring, and enables seamless integration into hydronic cooling systems.



Standard equipment:

- Mechanical flow switch
- Safety valve
- Automatic air-vent valves
- Drain valves
- Thermal insulation
- Temperature probes

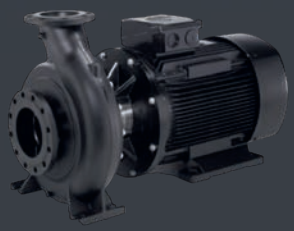


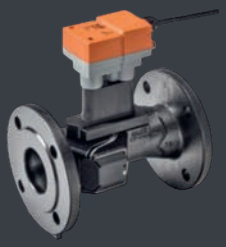


Optional equipment for:

- Evaporator *(cold side)*
- Heat recovery *(hot side)*





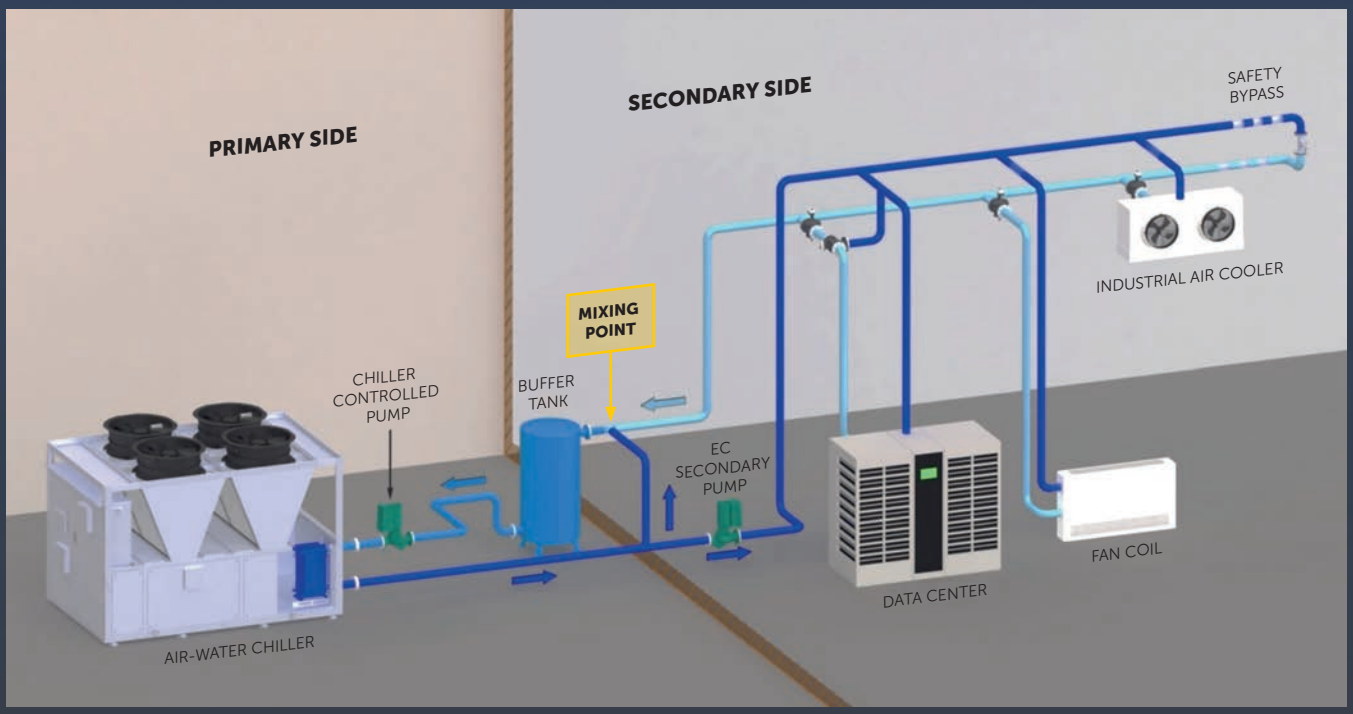


- Flow meter (cold side)
- Expansion vessel
- Y-strainer + Closing valves
- 1 x Primary side pump
- 2 x Primary side pump (duty+standby)
- 1 or 2 x Primary pump + Buffer tank (2 connections) or Hydraulic separator (4 connections)
- 1 x Primary pump + Hydraulic separator + 1 x Secondary pump
- Pressure transmitter for pump protection

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INTEGRATION INTO HYDRONIC SYSTEMS

The following example illustrates one of the recommended ways to properly integrate a MIDLINE chiller into a complex hydronic system.



PRIMARY SIDE: CONSTANT FLOW RATE

- **Flow rate control:** primary side pump operates continuously and is controlled by the chiller.
- The primary side total flow rate must be **higher** than secondary side flow rate at all times.
- The hydraulic separation line compensates for the flow difference between the primary and secondary sides.
- The mixing point is located in the return pipe, before the buffer tank inlet.

SECONDARY SIDE: VARIABLE FLOW RATE

- Secondary side pump operates in constant differential pressure mode (constant Δp mode).
- For hydraulic balancing and flow limitation, a pressure-independent control valve (PICV) on each terminal unit is installed.

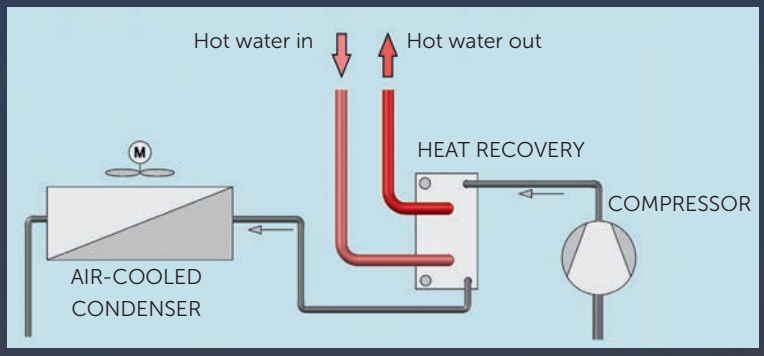
** For other recommendations and guidelines, see 'Hydronic System Recommendations For Air-cooled Chillers' on our website or contact Frigo Plus directly.*

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HEAT RECOVERY



Waste heat recovery is an optional feature available in MIDLINE units. During chiller operation, thermal energy that would otherwise be rejected through the condensers is recovered using a plate heat exchanger integrated into the refrigeration circuit between the compressor and the air-cooled condenser.

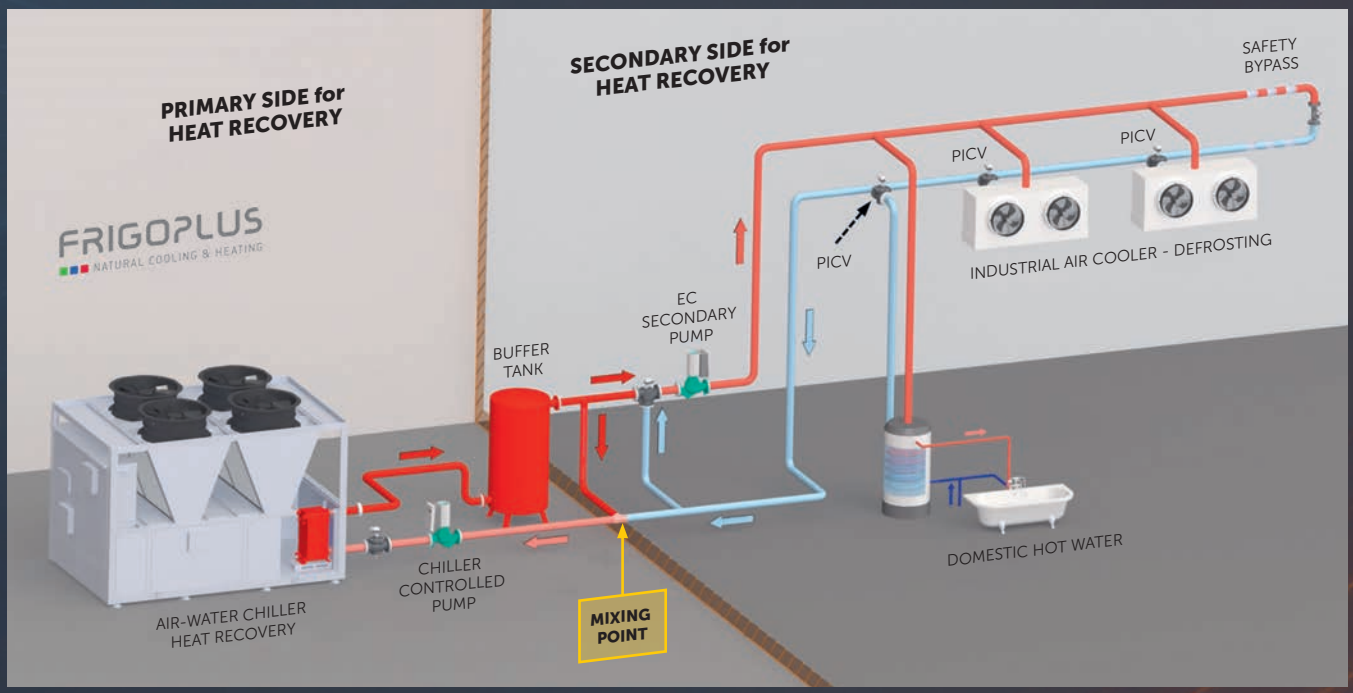


Alternatively, waste heat can partially be recovered using a desuperheater which has relatively smaller heating capacity, but allows water heating at a relatively high temperature – up to 65°C.

- ✓ Reduced operating costs
- ✓ Lower heating energy consumption
- ✓ Higher overall system efficiency
- ✓ Improved sustainability

HEAT RECOVERY INTEGRATION

The following example illustrates one of the recommended ways about how to properly integrate a MIDLINE chiller equipped with heat recovery into a complex hydronic system.



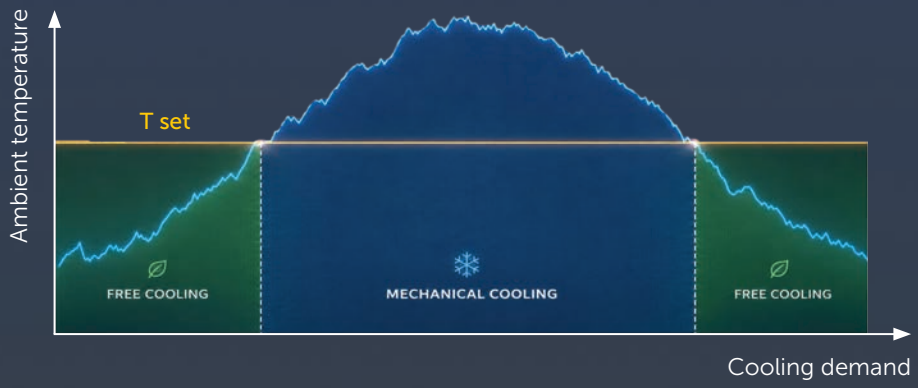
SECONDARY SIDE: VARIABLE FLOW RATE

- Secondary side pump operates in constant differential pressure mode (constant Δp mode). For hydraulic balancing and flow limitation, a pressure-independent control valve (PICV) on each terminal unit is installed.

FREE COOLING

Free cooling

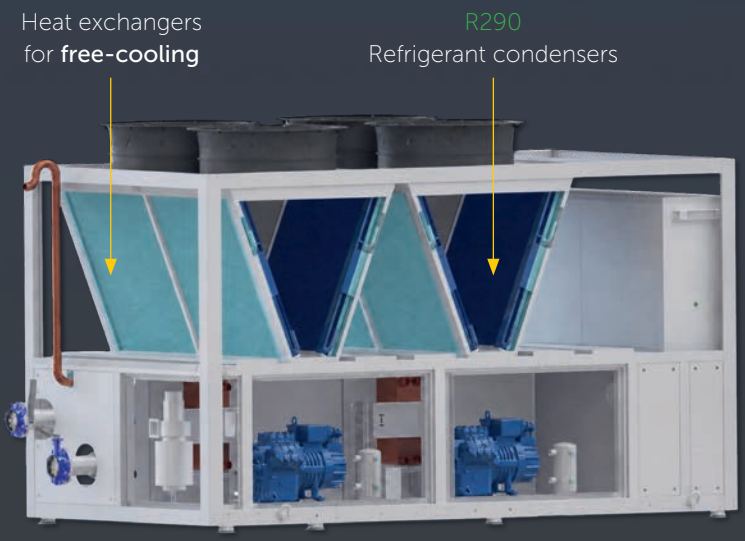
Free cooling is an optional feature available for use in MINILINE chillers. It is used for direct cooling of water (cooling medium) using cold ambient air. When the ambient air temperature is below the required outlet water temperature (T set), the water can be cooled by additional air heat exchangers. Free cooling can be utilized while the compressors are turned off or operating at a low load.



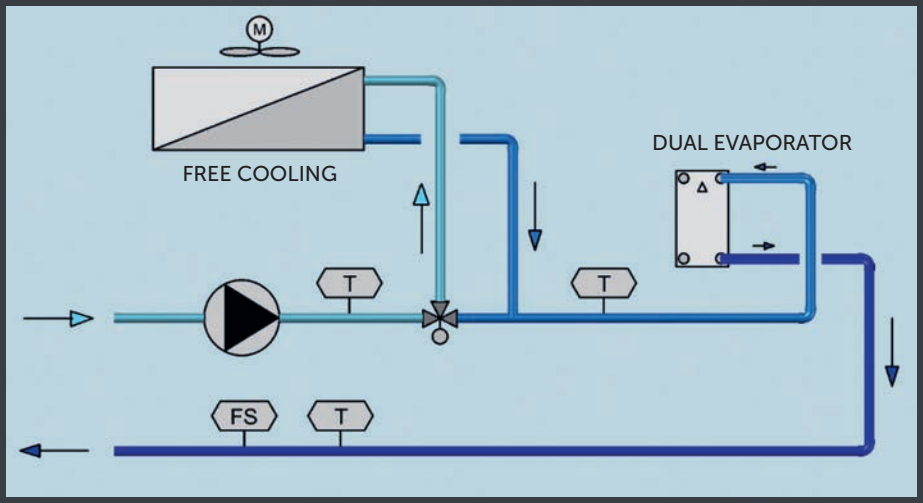
- ✓ Lower compressor runtime
- ✓ Significant energy savings
- ✓ Reduced operating costs
- ✓ Sustainability and efficiency

COMMON FANS

In MIDLINE units, the heat exchanger for free cooling is installed adjacent to the refrigerant condenser, allowing both to use the same (common) fan.

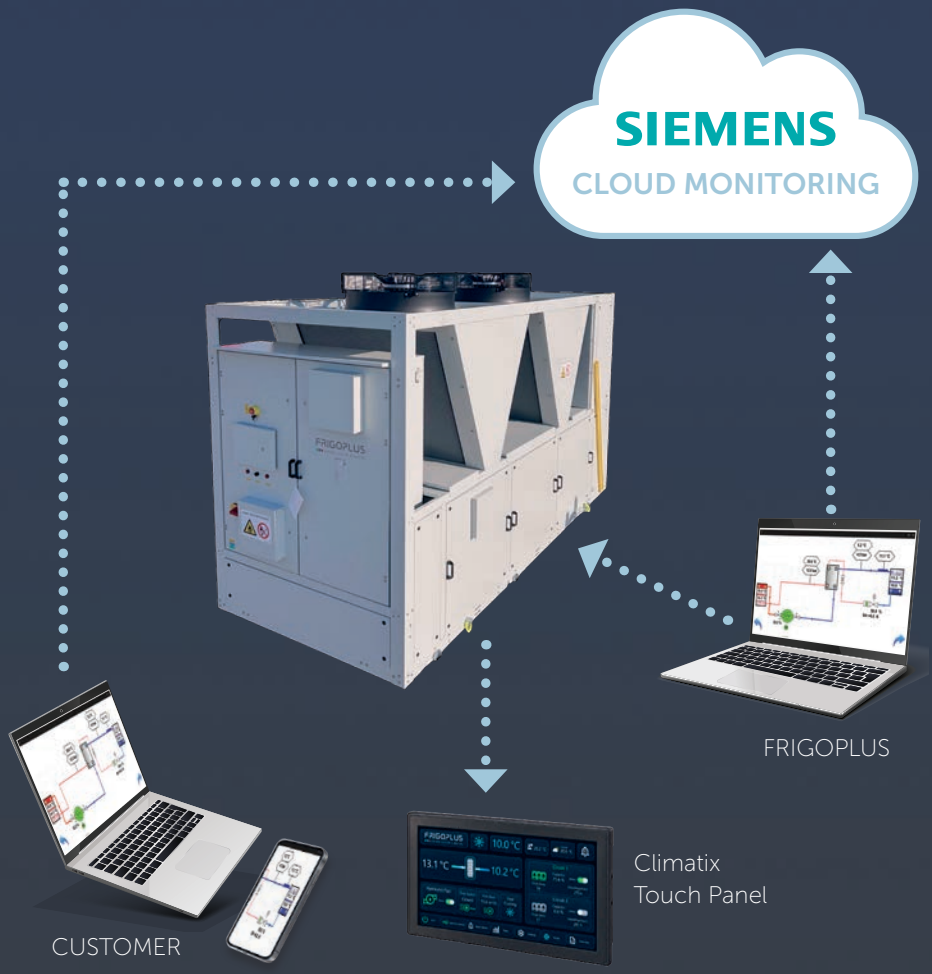


SIMPLIFIED P&ID



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ADVANCED MONITORING AND REGULATION



SIEMENS cloud:

- Live data tracking
- Device overview
- Data archive (up to a year)
- Process variable comparison
- Alarms and notifications

Controller by **SIEMENS**



OPERATION CONTROL:

- Advanced compressor frequency regulation depending on the required water temperature
- Fan speed modulation
- Superheat control
- Regulation of primary and secondary circuit pumps
- Duty/standby rotation
- Parallel configuration of units (leading-following)
- Alarm management for safe and reliable operation
- Easy connectivity with standard MODBUS or BACnet protocols

ADDITIONAL FUNCTIONS:

- Serial heat recovery or desuperheater
- Integrated free cooling
- Night mode
- Dynamic setpoint via ambient temperature or external signal

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Producing natural cooling and heating systems since 2002.

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