



CHILLER - PRECISION AS PROMISED

Future-Proof Refrigerants and Factory-Built Heat Pump Solutions

CHILLER

Company Presentation

- Chiller
- Our Approach
- Product Solutions
- Projects

built onsite

F-gas regulation

- Refrigerants
- Safety concept

NovaDual energy station

Completed projects

Chillers factory, Factory, shopping center





EXPERTS AND INNOVATORS IN COOLING AND HEATING

Chiller

Vision: The most desired partner in carbon-negative construction.

Core Business involves developing and manufacturing intelligent and energy-efficient cooling and heating solutions.

Established in 1990, headquarters and factory in Finland (Tuusula), regional offices in Finland, Sweden and Estonia.

Turnover in 2025: €42,8 million / Employees approx. 120

We are part of Koja Group

Finnish experts in air-handling solutions and services, as well as industrial fans

Established in 1935

Employees: approx. 500 employees

Turnover in 2025: €140 million



NEW FACTORY 2026

- The highest BREEAM score ever achieved by a Finnish building.
Approximately 1,800 BREEAM-certified buildings in Finland.

Key success factors:

- Energy (System level, controllability)
- Indoor environmental quality analytics and continuous monitoring)
- Project management (Effective project execution, waste management and recycling)
- Refrigerants and environmental impact



STRESS-FREE CONSTRUCTION



Expert assistance

- Support from the planning stage throughout the entire project
- Industry-leading equipment selection program



On the property's conditions

- Solutions tailored to the requirements of the project
- Comprehensive factory-ready packages



Tested for reliability

- Factory testing ensures high quality devices and reliable operation
- Development and manufacturing at our factory in Finland



Constant quality control

- We supervise and maintain our equipment from commissioning throughout its lifecycle.

NOT JUST PARTS, BUT COMPLETE SYSTEMS

Seamlessly integrated, factory-assembled comprehensive solutions



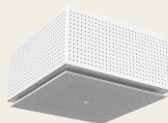
Grand



Studio



Giant



Box



Smart



Solid



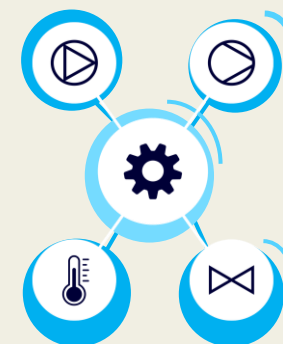
Steady



Chilled Water Stations
20-400 kW



Heat Pumps
20-550 kW

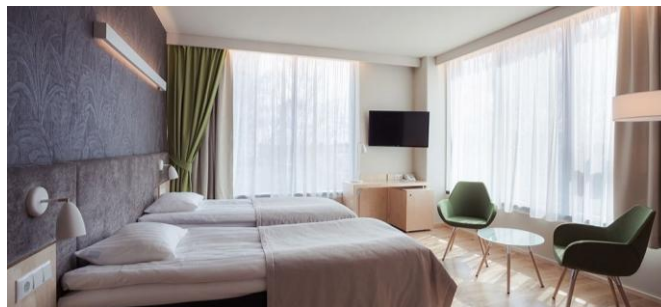


Control and Automation Systems

THOUSANDS OF SATISFIED CLIENTS



Office Buildings:
incl. Common Areas, Offices



Hotels



Public Buildings: incl. Schools, Cultural
Spaces, Hospitals, Military Bases



Industry



Residential Buildings



Shopping Centers

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CHILLER STATION

COMPREHENSIVE FACTORY-BUILT SOLUTION

Factory-built chilled water- / heat pump station compared to an on-site assembled unit:

- **Quality Assurance** – Standardized methods and precise testing.
- **Operational Reliability** – Compatibility and functionality ensured in advance.
- **Faster Commissioning** – Less work required at the site.
- **Cost Efficiency** – Fewer installation errors and reduced on-site resources.
- **Warranty and Support** – One complete unit, easier maintenance and clearer responsibility.
- **Documentation** – Better traceability and easier maintenance.
- **Floor Space** – Smaller floor space compared to an on-site assembled unit.

The end result is a more reliable, faster-to-commission, and cost-effective solution.



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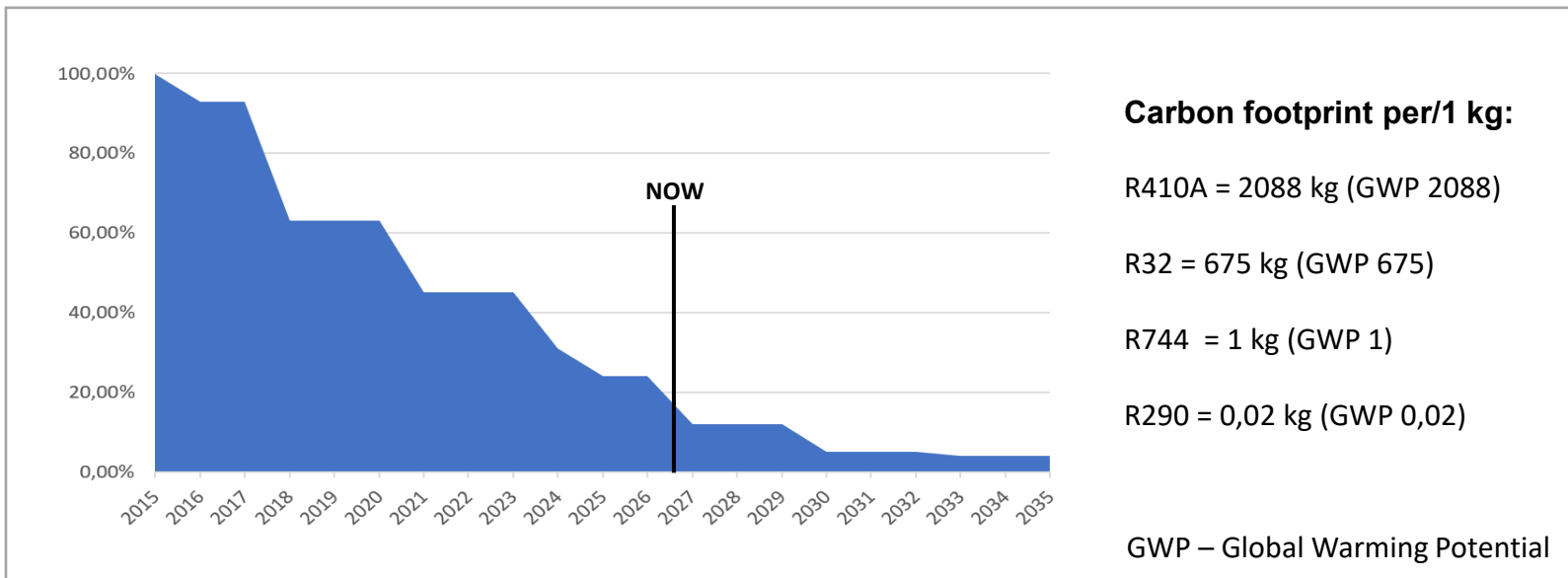
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REFRIGERANTS

Safety group	Lower toxicity (harmless to health)	Higher toxicity (harmful to health)
Non-flammable	A1	B1
Lower flammability	A2L	B2L
Higher flammability	A3	B3

Chillers	2027	2030	2032
Capacity <12kW	GWP 150		Natural refrigerants
Capacity >12kW	GWP 750		
Heat pumps			
Capacity <12kW	GWP 150		Natural refrigerants
Capacity <50kW	GWP 150		
Capacity >50kW		GWP 150	



Reach regulation - PFAS Restrictions ?

- HFC125
- HFC134a
- HFO1234yf
- HFO1234ze
- R407C
- R410A
- R450A
- R454B
- R513A
- R515B

The EU F-gas regulation limits the total carbon footprint of refrigerants.

REFRIGERANTS DIFFERENTS

R32

Pros

- Cost-effective solution for comfort cooling
- A2L refrigerant can be diluted in a machinery room (room size)

Cons

- Higher GWP than natural refrigerants
- Limited supply-water temperatures (~50°C)

R290, propane

Pros

- Natural refrigerant, GWP 0.02
- Suitable for conventional water-side ΔT of 5–10 K
- Ideal for geothermal, heat recovery systems, up to 75 °C
- Long-term future potential

Cons

- A3 refrigerant, highly flammable
- Requires safety concept
- May need risk assessment processes, in Finland consultant can do this

R744, Carbon dioxide

Pros

- Natural refrigerant, GWP 1
- Non-flammable (A1)
- Good performance with large temperature lifts

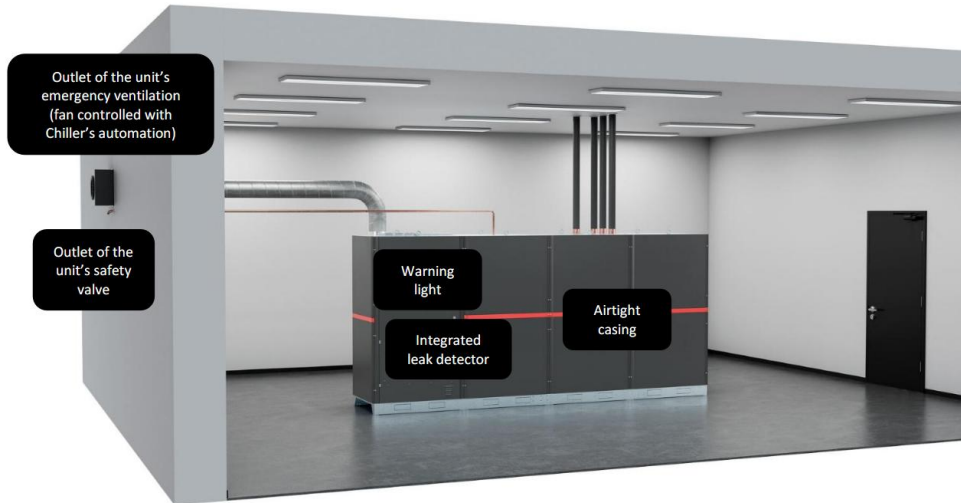
Cons

- High refrigerant charge (5 times more than R32 in AWHP)
- **Larger** and more **expensive** components & units (cost more than double).
- Requires a large water-side temperature rise for example 5–15°C to 70°C
- Not perfect solution for our solutions.
- Very high operating pressures (70–140 bar)

If this would be good and cost efficient solution to comfort cooling&heating there would be much more competitors.

SAFETY CONCEPT

A2L & A3 REFRIGERANTS



Ventilated outdoor

SCO – A2L & A3 refrigerants

Airtight frame

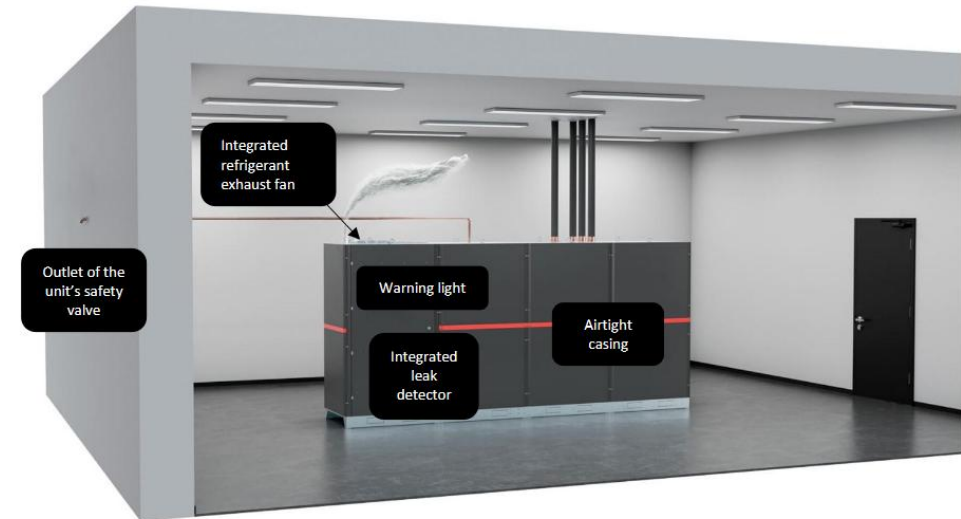
Emergency ventilation, controlled by Chiller's automation

Non sparking exhaust fan included

Safety valve exhaust must be piped out (1,5 radius Zone 2 area)

Refrigerant leak detector alerts at 0.25 x LFL

Device automation according to safety solution.



Diluted to machineroom

SCI – A2L refrigerants

Airtight frame

Emergency exhaust fan, controlled by chiller's automation

Safety valve exhaust must be piped out (1,5 radius Zone 2 area)

Refrigerant leak detector alerts at 0.25 x LFL

Device automation according to safety solution.

Machine room minimum 30m², height 2.5 m

LFL = Lower flammability limit

EXTENDED SAFETY CONCEPT

ACCESSORIES

SCE – Two refrigerant leak detectors with UPS

- Redundant leak detectors.
- The unit controller and leak detection system remain operational for approximately 1 hour during a power outage.
- Enables refrigerant leak alarms to be transmitted to the building automation system (BMS).

SCG – Liquid circuits refrigerant leak detection system

- Includes separately supplied gas separators for the unit's water and brine circuits.
- The unit is equipped with leak-monitored connections for the gas separators.
- Provides an early warning alarm at 10% of the LFL (possible leak) and activates the warning beacon on the machinery room door.

BOK – Battery-Backed Device Controller

- The controller continuously monitors the power supply and performs a controlled shutdown of the cooling system in case of voltage disturbances or power failure.
- The controller remains operational for approximately 1-2 hours during a power outage.
- Supports a controlled recovery after a power interruption. The controller automatically clears internal alarms and quickly restores cooling operation when power returns.

Energy measurement

- ☒ No option
- ☐ CTL : Electric energy measurement (Coptronic Light)

BMS connections

- ☒ RTU : Modbus RTU
- ☐ TCP : Modbus TCP-IP
- ☐ BAC : BACnet IP/ethernet
- ☐ KHI : Standard connections

ServiceNext Remote monitoring

- ☒ SN : Remote control
- ☐ SN0 : Remote control ready
- ☐ GC : GroupController (up to 6 units)

Refrigerant leak ventilation

- ☒ SCO : Duct fan, outdoor installation (R32 and R290)
- ☐ SCI : A mixing fan for the engine room (only for R32)
- ☐ SCE : Two refrigerant leak detectors with UPS
- ☐ SCG : Liquid circuits refrigerant leak detection system
- ☐ BOK : Battery-backed device controller

☐ ESP : Special feature - contact Sales

☐ NF : Nitrogen filled refrigerant circuit (Unit commissioning by Chiller)

OK Cancel

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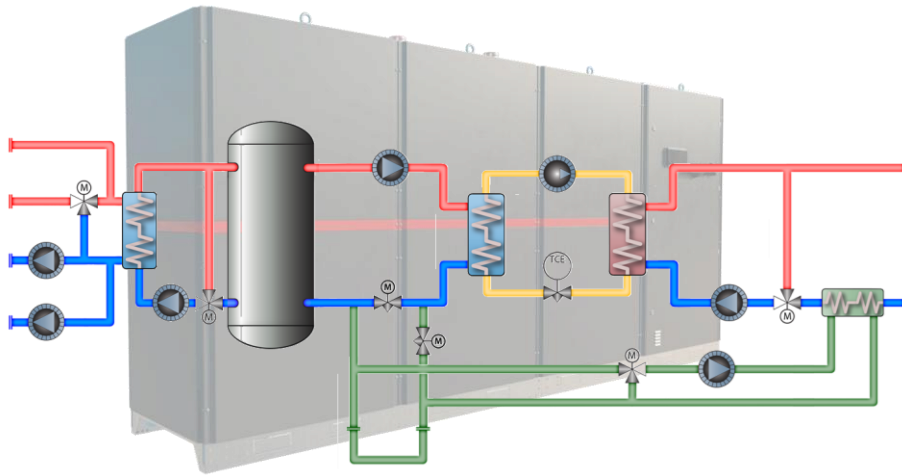
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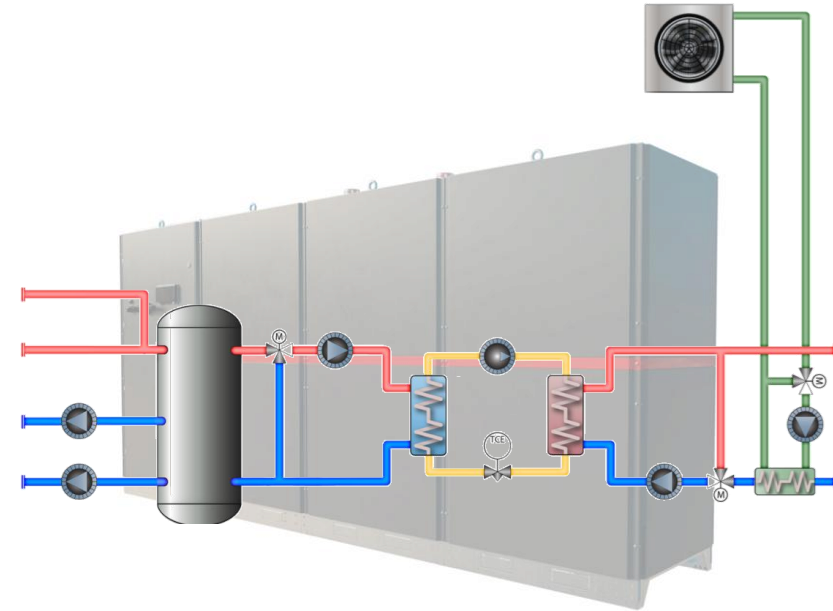
INTRODUCING NOVADUAL

SMART AUTOMATION, INTEGRATED FUNCTIONS



Geoenergy model

- Heating from the geoenenergy well
- Free cooling from the geoenenergy well
- Cooling, heat charging into the geoenenergy well
- Energy recycling (combined heating and cooling)

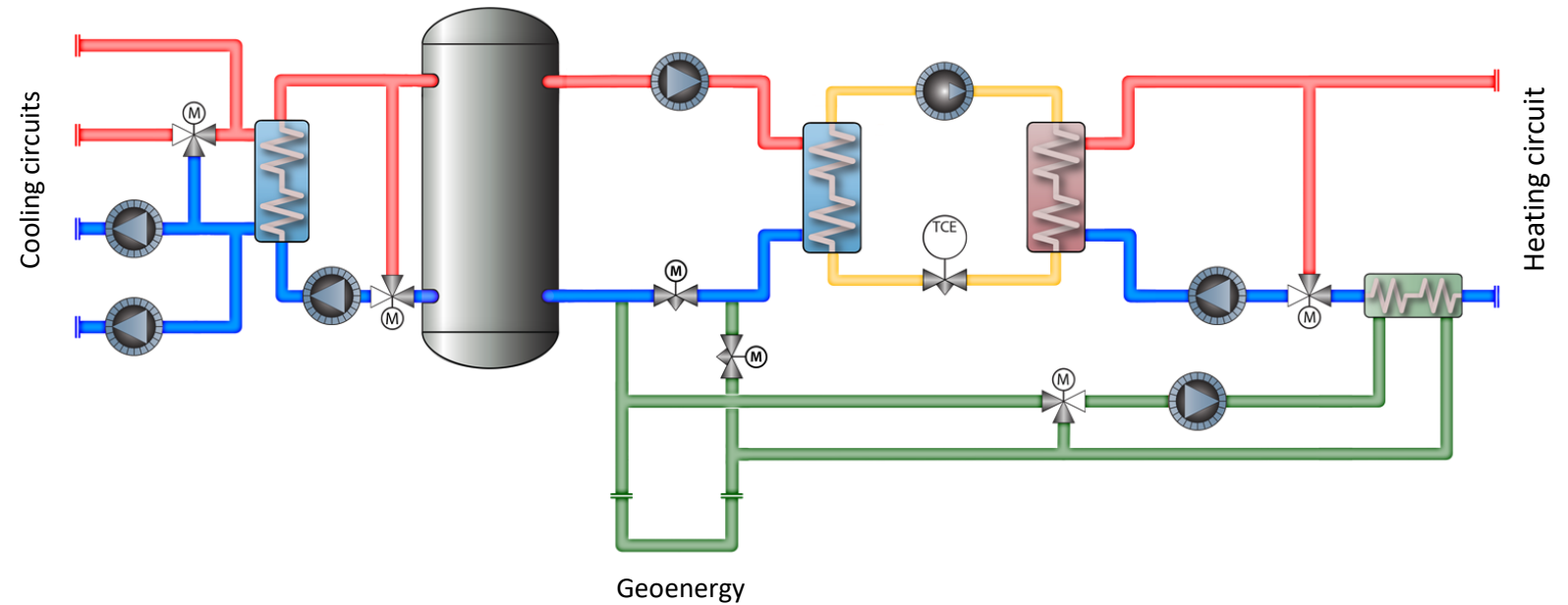


Heat recovery model

- Heating with heat recovery energy
- Cooling, condensation with a liquid cooler
- Energy recycling (combined heating and cooling)

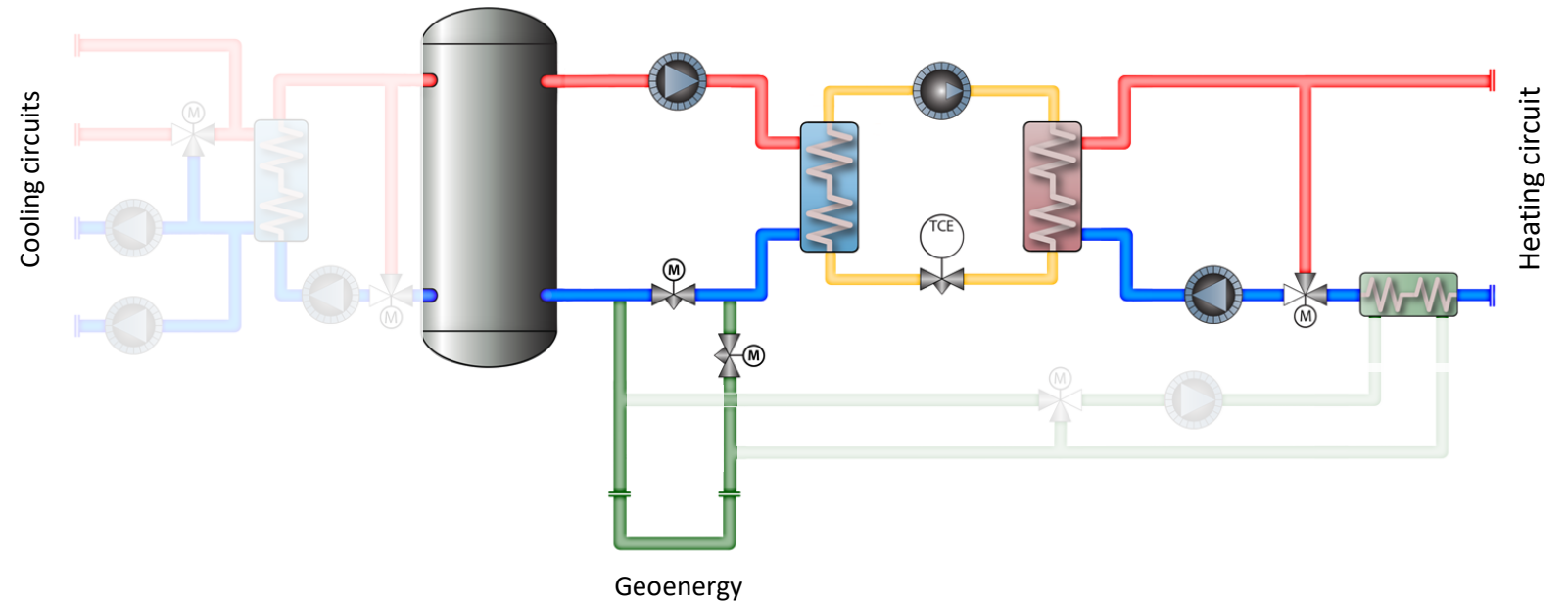
NOVADUAL GEOENERGY MODEL

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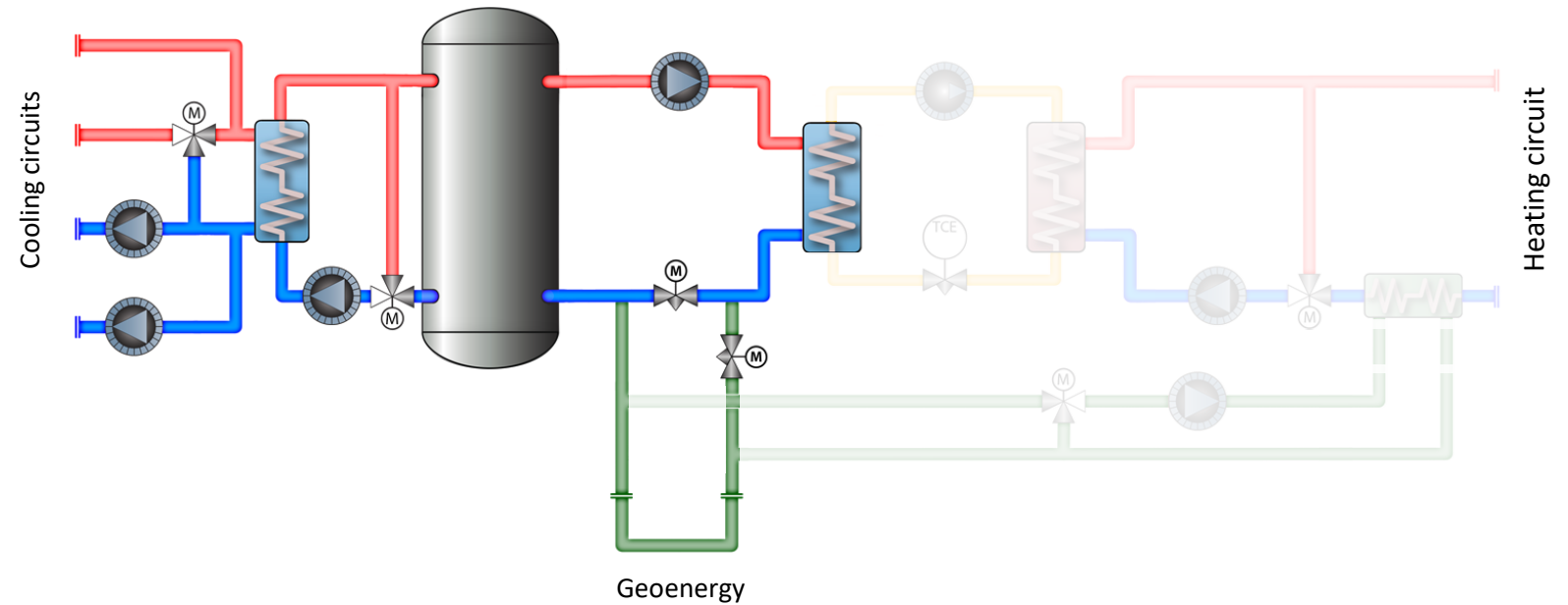
NOVADUAL GEOENERGY MODEL

HEATING FROM GEOENERGY WELL



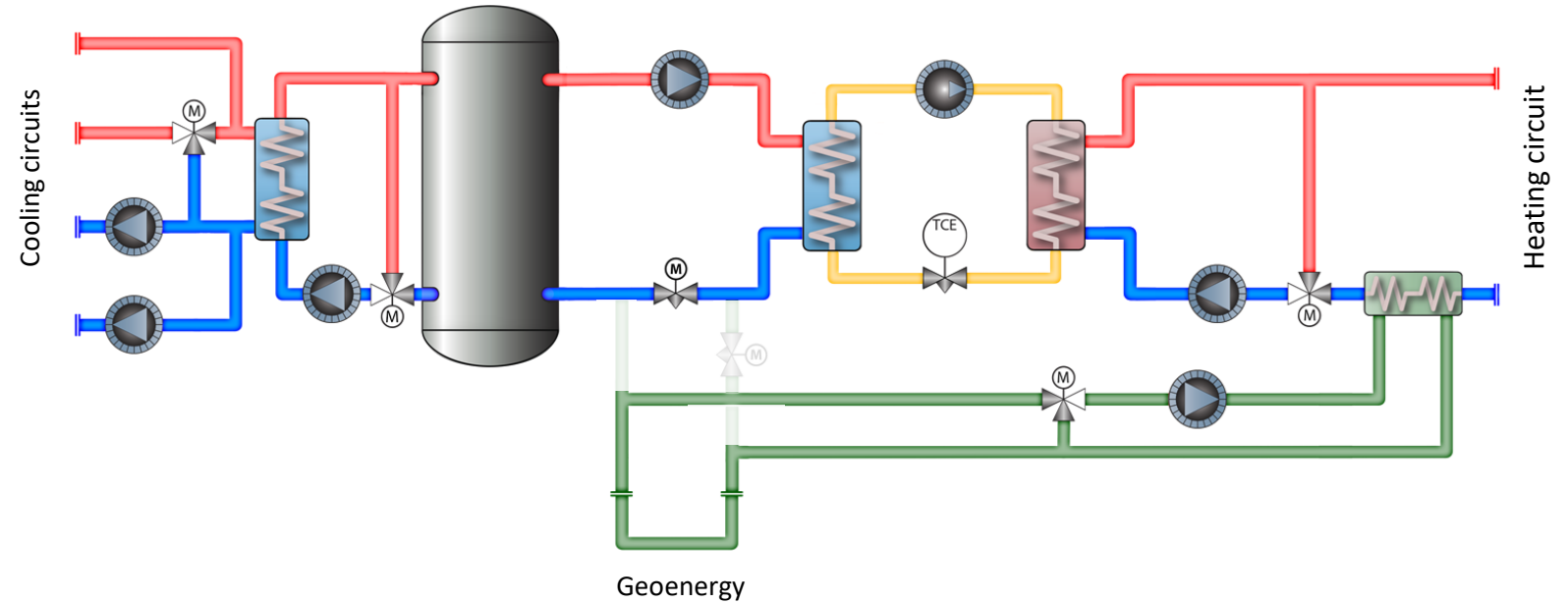
NOVADUAL GEOENERGY MODEL

FREE COOLING FROM GEOENERGY WELL

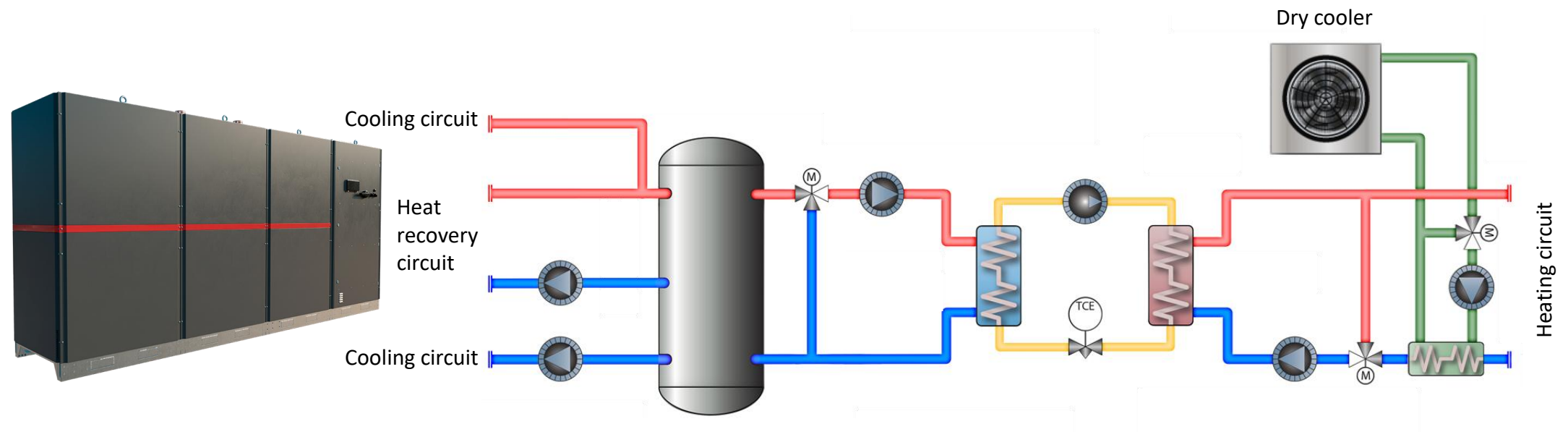


NOVADUAL GEOENERGY MODEL

COOLING& HEATING, HEAT CHARGING INTO GEOENERGY WELL

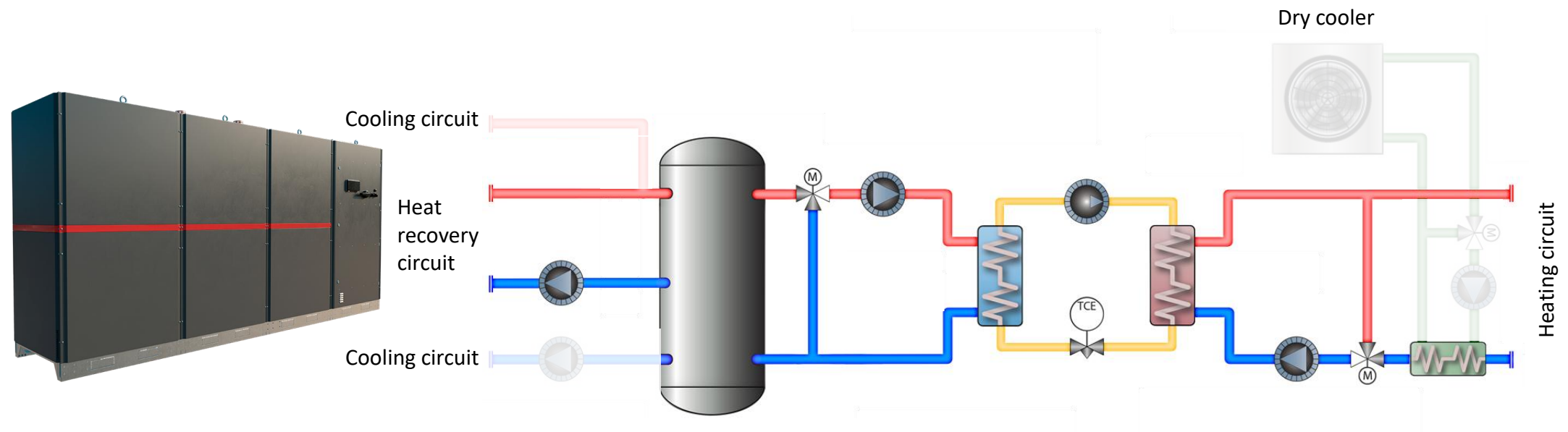


NOVADUAL HEAT RECOVERY MODEL



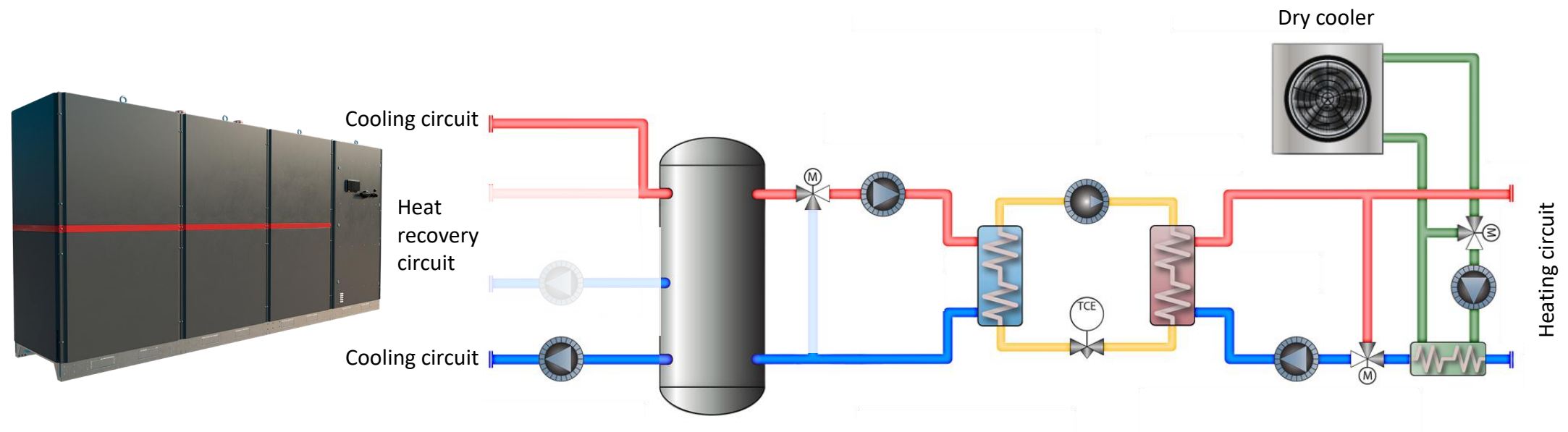
NOVADUAL HEAT RECOVERY MODEL

HEATING WITH RECOVERED ENERGY



NOVADUAL HEAT RECOVERY MODEL

COOLING WITH HEAT RECOVERY, EXCESS HEAT REJECTED WITH A DRYCOOLER



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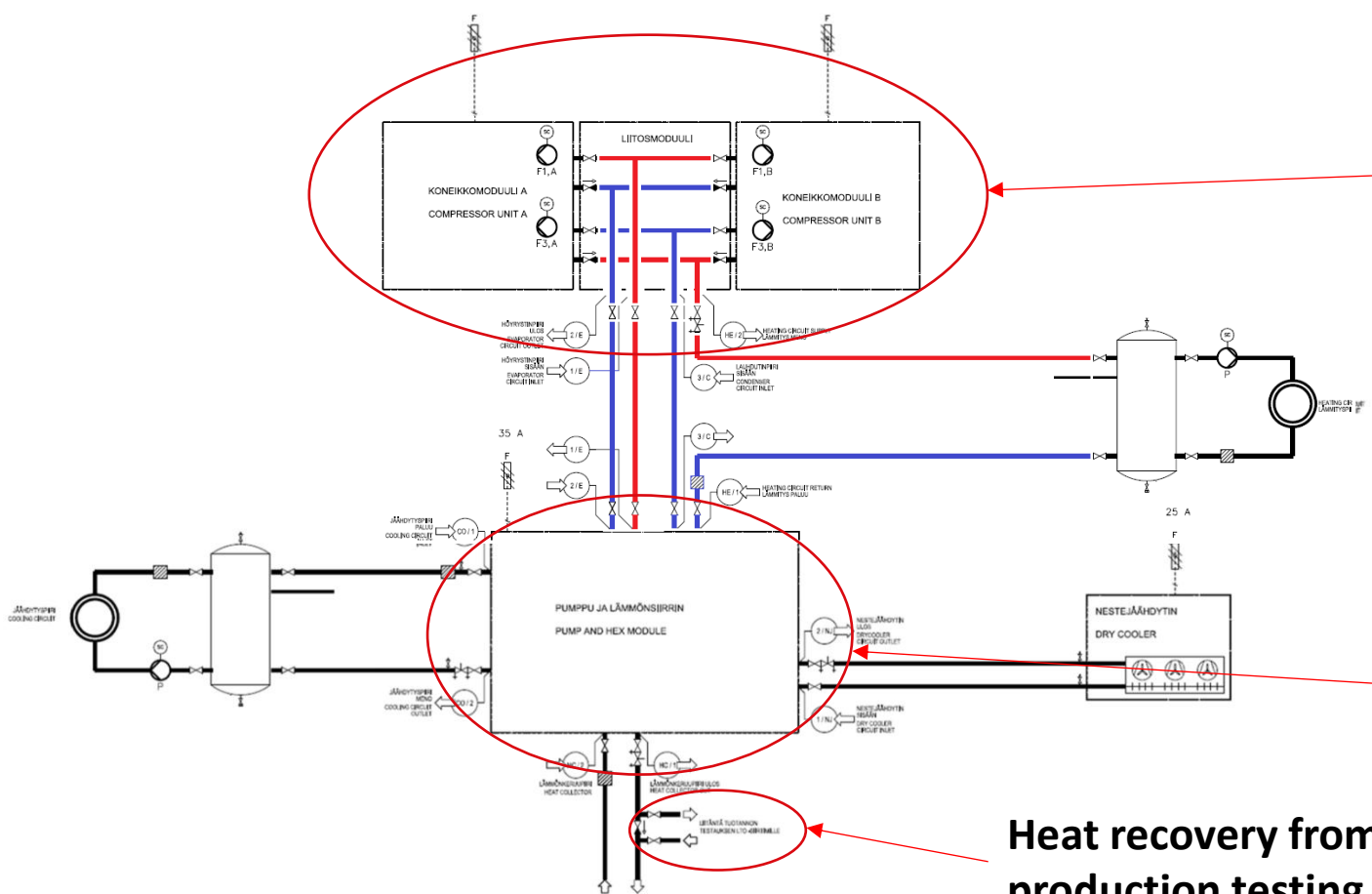


CHILLER FACTORY, COOLING & HEATING

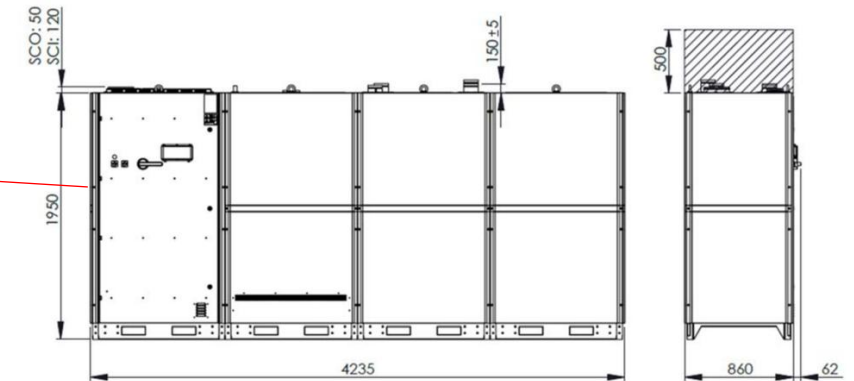
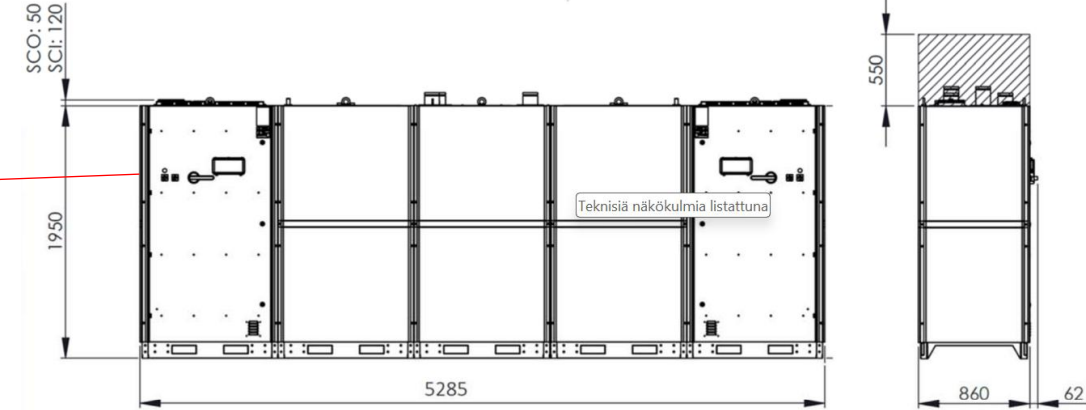
- Max heating demand 420kW
- Max cooling demand 292kW
- NOVADUAL R290 heating, cooling and energy recycling
 - Heating capacity 264kW + 140kW electric boiler
 - Cooling capacity 281kW
- 24pcs 275m deep geothermal boreholes
- Capability to recover and store approximately 150 kW of heat from production testing into the geothermal boreholes
- 150kWp Solar panel system on the roof.

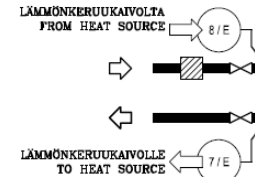


CHILLER FACTORY, COOLING & HEATING, NOVADUAL R290

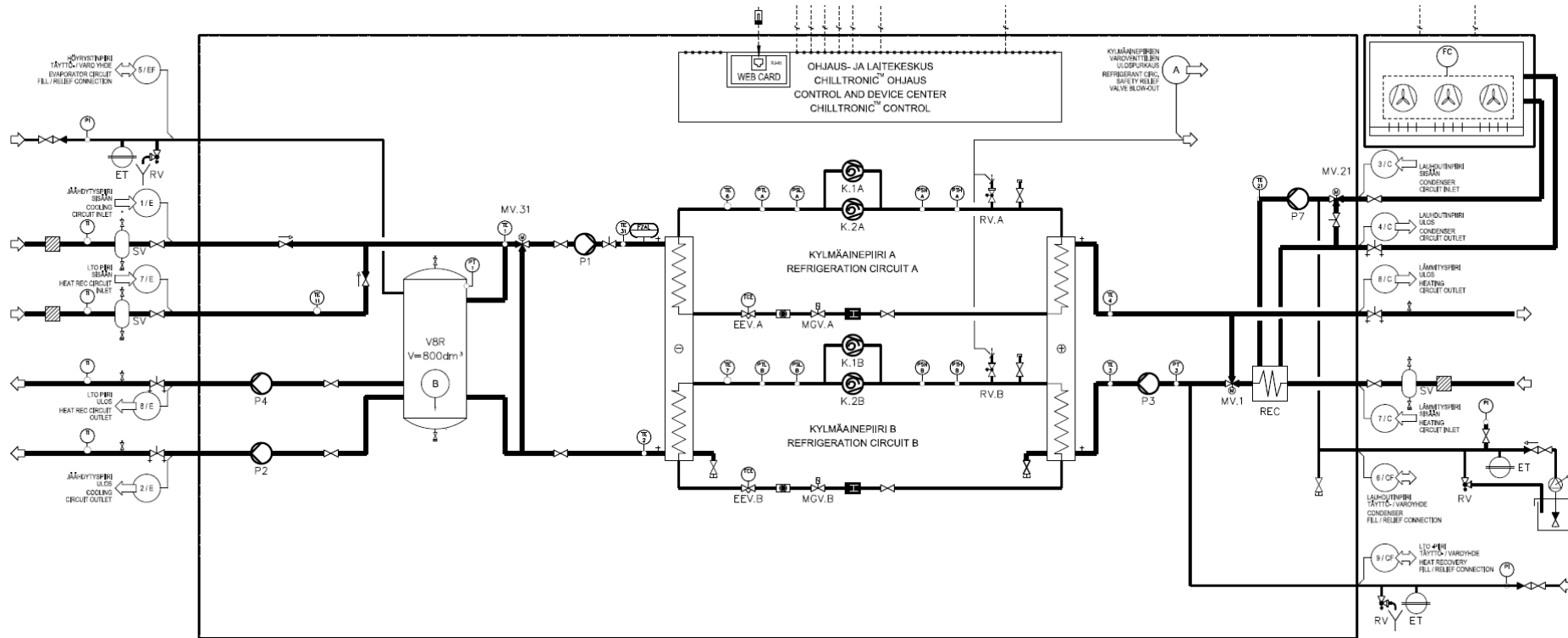


Heat recovery from
production testing





Heat recovery model



- Heat recovery mode
- Compressor cooling mode
- cooling & heating mode

THANK YOU



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