ReCooler HP

Integrated cooling/heating unit

FläktWoods

Save Energy, Economy and Environment with Fläkt Woods

Energy optimization is an important aspect of ventilation solutions and an area in which Fläkt Woods have acclaimed expertise. We use the symbol e^3 to highlight products and solutions that are particurlarly effective. They serve a dual purpose of saving both your long-term economy and our environment.
www.flaktwoods.com/energy

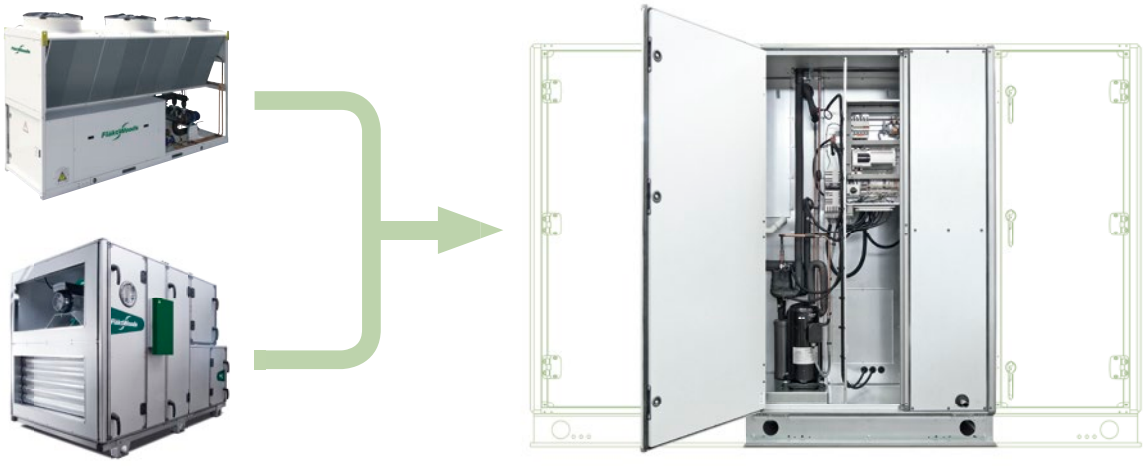
The new ReCooler HP

A simple solution for the best possible indoor climate with the least possible environmental impact

In our urbanized civilization, people spend most of their time indoor and they deserve the best possible environment. We can help you achieve that!
At Fläkt Woods we are committed to providing energy efficient Air Climate Solutions to combine the best indoor climate with the best cost and energy efficiency thus reducing the environmental impact, for us it is in our DNA.
Our research and long experience has helped us identify the key parameters to designing optimal cooling and heating systems in buildings: **Energy Efficiency, Reliability and a small Footprint.** As a direct accomplishment of this knowledge and a natural step in our e^3 strategy we are proud to introduce our new ReCooler Heat Pump (ReCooler HP).

Integrated cooling/heating unit with exceptional installation simplicity

The new and innovative ReCooler HP from Fläkt Woods is **the combination of a reversible heatpump unit and a recovery wheel** – this brings a number of benefits from design to running. A traditional installation would include a condensing unit or a chiller. Both of those solutions require many hours of preparation and construction work on site (piping, concrete slab, …). A refrigeration specialist would be required and sources of failure could be derived from multiple suppliers with differing responsibilities. The ReCooler HP is one block unit factory tested and ready to operate upon arrival. It is not more complex to install than any other air handling unit component.



Because ReCooler HP is designed from the outset to be fitted as an integral part in AHUs, installation is very quick with no need for any plumbing work. The overall footprint is also very small with no need for a chiller or boiler.

Read more about our range of energy efficient air handling units:
flaktwoods.com

KEY BENEFITS OF THE RECOOLER HP

ONE PACKAGE

- Ease of installation (Plug & Play)
- One supplier responsible for complete solution

* No refrigeration skill required for installation

COMPACTNESS

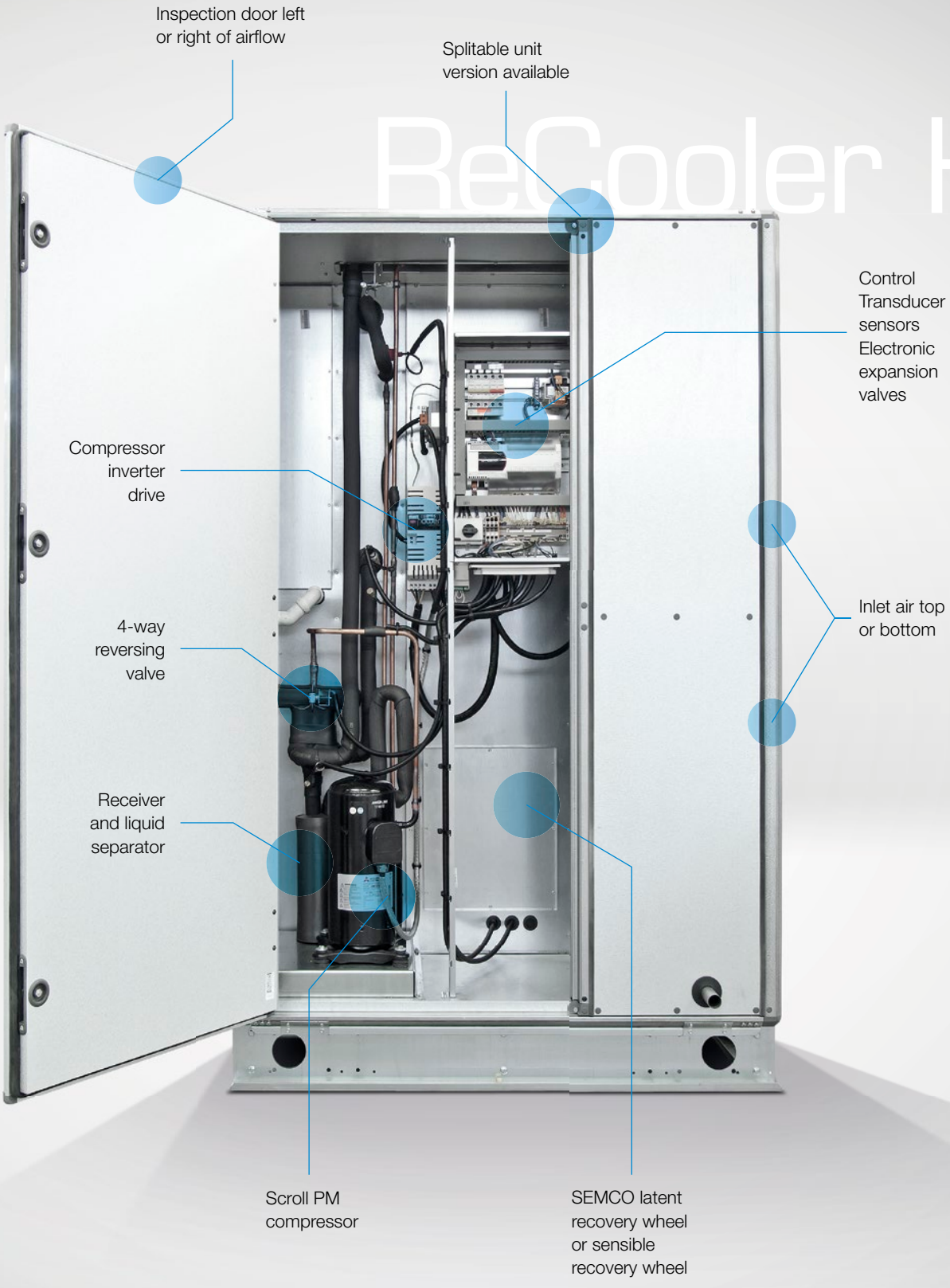
- Embedded in the air handling unit
- No additional fan needed (AHU fans)
- Aesthetical (everything is located indoor)
- No need for a chiller or a boiler

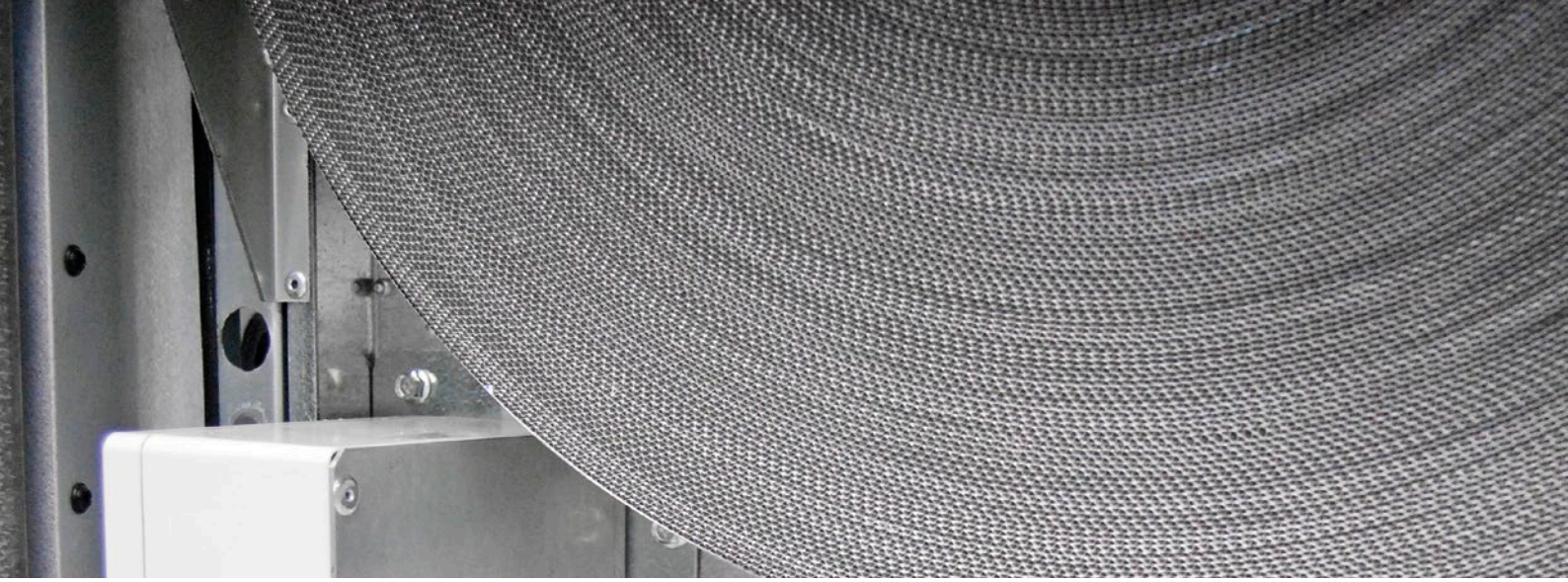
ENERGY RECOVERY

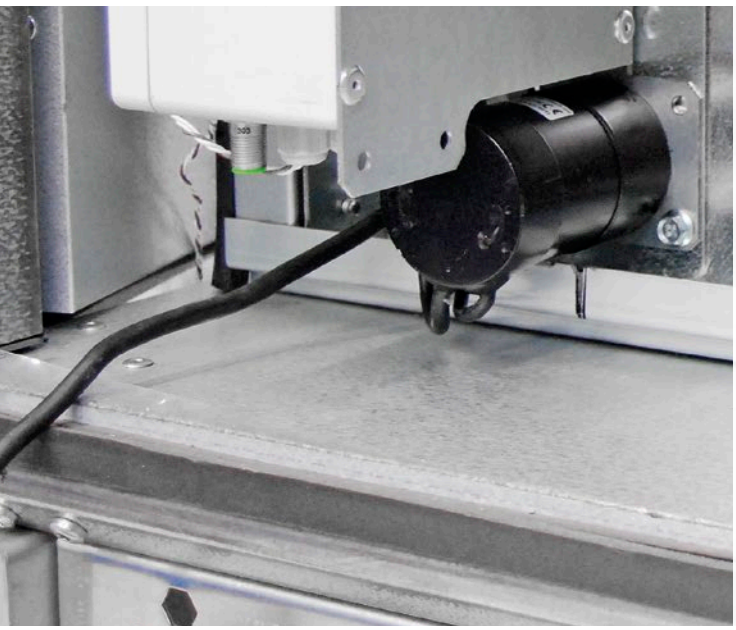
- Energy recovery in the summer and winter by Recovery wheel
- Simulataneous mode with heating, cooling and Recovery wheel
- Compressor downsizing due to very efficient latent wheel

EFFICIENCY

- Uses exhaust air temperature instead of outside air temperature, resulting in much higher efficiency than traditional units
- DC inverter scroll compressor, EER up to 5.5, COP up to 6.5


Inspection door left or right of airflow
Splitable unit version available
Control Transducer sensors Electronic expansion valves
Compressor inverter drive
4-way reversing valve
Inlet air top or bottom
Receiver and liquid separator
Scroll PM compressor
SEMCO latent recovery wheel or sensible recovery wheel

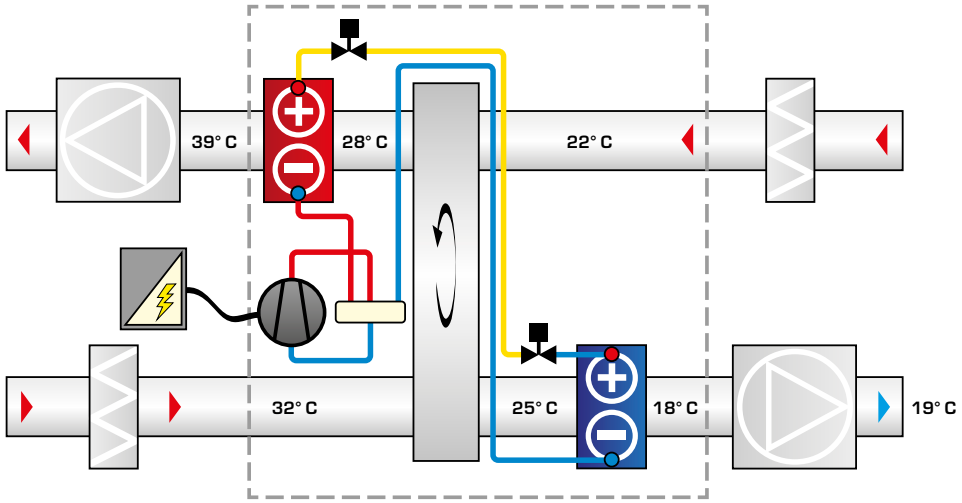




Energy recovery

Energy recovery is always more efficient than any other mean of cooling and heating. Located between the inlet and exhaust coil, the Semco recovery wheel maximizes savings and comfort. As standard our wheel is coated with a patented SEMCO coating. Our rotor is best in class in latent energy recovery:

- Energy recovery going above 83% in sensible and in latent recovery.
- More energy recovery in summer mode (latent recovery)
- Better comfort in winter mode, less humidity will be exhausted.
- Rotor will operate to lower temperatures and require less defrost.



AIR FLOW DESIGN:

1. Coils are located after the rotor so compressors and Recovery Wheel run together efficiently, simultaneously. In the example above:
   - Half of cooling is done by the recovery wheel
   - The remaining half is done by the thermodynamic cooling
   - The SEMCO rotor extracts more humidity than a standard rotor therefore less dehumidification is required by the cooling coil

2. Exhaust coil benefits from room return temperature, instead of external conditions.
   - When a chiller operates at 32° C external temperature the ReCooler condenser will operate by 28° C or even less

> The new and innovative ReCooler HP with cutting-edge technology achieves new levels of energy efficiency, reliability and ease of installation.

COMPRESSOR TECHNOLOGY

The ReCooler HP is fitted with PM motor Scroll compressors paced by a DC inverter drive:

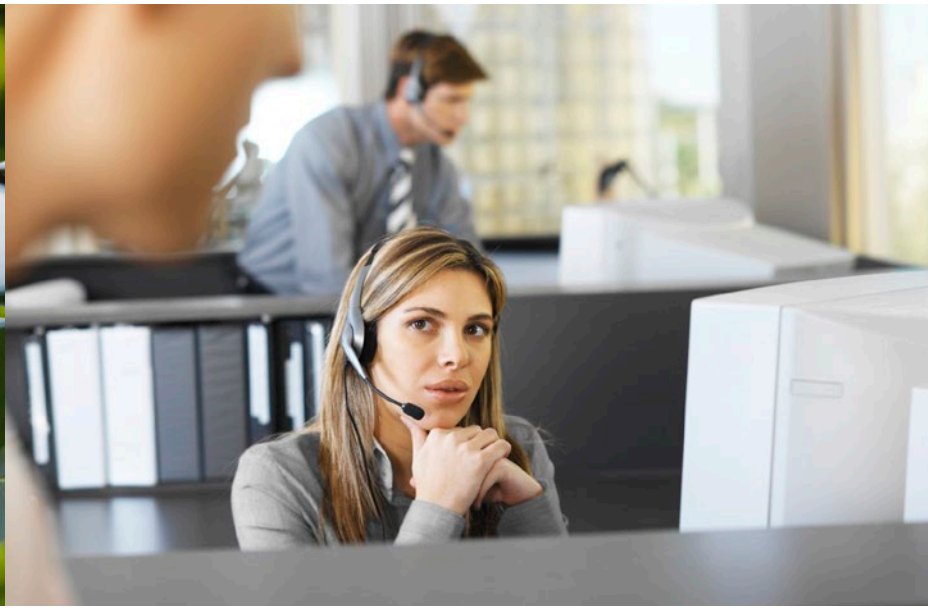
- Scroll design is among the most reliable and efficient design and made reciprocal compression obsolete.
- Motor are DC with permanent magnet reducing Joule heat effect which makes it more efficient than asynchronous.
- Inverter drive allows to operate at part load providing the best efficiency while traditional solutions are wasting energy.

SMART CONTROL

ReCooler HP embeds a very adaptive control including:

- Two electronic expansion valves to fully control cooling mode, heating mode and refrigerant charge.
- Electronic transducers in temperature and pressure to maximize reliability as well as efficiency.
- Smart software developed by Fläkt Woods control department allowing to make the best of inverter drive keeping the compressor in its operating map.
- Fläkt Woods provides complete system optimization control for ventilation, cooling and heating.

> Smart software and an easy-to-use controller makes it simple to optimize ReCooler HP for maximum energy savings



New levels of comfort, efficiency and reliability

On a yearly operation, heat-pump units require to operate less 3% of its time in full load in cooling and in heating mode. That's why part load efficiency is really what matters.

TRADITIONAL FIXED SPEED SOLUTION

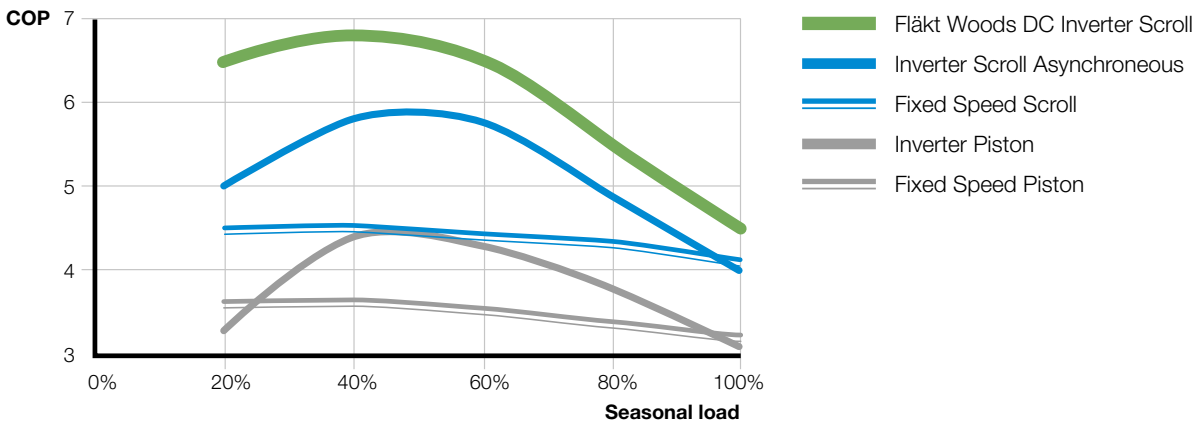
On traditional on/off compressor solutions, operation was only possible in full compressor speed. As a result customer comfort was limited and energy efficiency was constantly the less favourable one, not to mention that the on/off process had a strong negative impact on the compressor life-span.

FLÄKT WOODS DC INVERTER SOLUTION

- DC scroll already delivers better full load efficiency than other solutions.
- Part-loads are also improved up to 2X the full load efficiency.
- Compressors are exposed to less stress then reliability is no more a problem.
- Comfort is maximized as well due to the capability to modulate compressor speed, Recooler HP can deliver the exact required temperature.

Other products on the market already propose inverter on piston compressors which are less reliable and with poor efficiency.

Recooler HP is not only a step forward it is a breakthrough!



Performance table

COOLING MODE

External air temp	Exhaust temp	Supply temp*	Performance		Size 008	011	018	023	032
35° C	27° C		Nominal cooling capacity rotor + compressor	kW	34,4	50,9	73,1	95,2	125
	45% HM		Nominal cooling capacity compressor	kW	11,6	16,3	23,5	32,4	39,4
28° C	24° C	20° C	Cooling capacity rotor + compressor	kW	12,11	18,93	31,4	33,2	47,4
	45% HM		Cooling capacity compressor	kW	5,65	9,07	13,1	15,3	23
			COP compressor**	kW/kW	4,6	4,9	4,7	5,2	5
			COP rotor + compressor**	kW/kW	9,9	10,2	9,8	11,3	10,3
32° C	24° C	20° C	Cooling capacity rotor + compressor	kW	22,53	34,9	50,1	62,9	87,5
	45% HM		Cooling capacity compressor	kW	6,33	10,2	14,7	18,1	26,4
			COP compressor**	kW/kW	4	4,2	4,1	4,3	4,2
			COP rotor + compressor**	kW/kW	14,4	14,6	14	15	14
35° C	24° C	20° C	Cooling capacity rotor + compressor	kW	33,22	49,3	70,9	87,3	122,5
	45% HM		Cooling capacity compressor	kW	8,52	11,7	17	19,1	29,6
			COP compressor**	kW/kW	3,6	3,6	3,5	4	3,7
			COP rotor + compressor**	kW/kW	16,3	15,1	14,5	18,1	15,1

HEATING MODE

External air temp	Exhaust temp	Supply temp*	Performance		Size 008	011	018	023	032
7° C	20° C		Nominal heating capacity rotor + compressor	kW	20,6	29,6	40,7	48,9	57,6
RH 90%	RH 20%		Nominal heating capacity compressor	kW	15,2	21,1	28,6	34,6	36,1
-5° C	20° C	24° C	Heating capacity rotor + compressor	kW	28,2	43,7	62,9	79,3	112
RH 90%	RH 20%		Heating capacity compressor	kW	6,72	10,8	15,6	19,7	30,1
			COP compressor**	kW/kW	4,3	4,2	4,1	4,1	3,7
			COP rotor + compressor**	kW/kW	18	16,9	16,6	16,3	14
0° C	20° C	24° C	Heating capacity rotor + compressor	kW	21,1	32,9	47,4	59,6	83,8
RH 90%	RH 20%		Heating capacity compressor	kW	4,9	9,58	13,8	17,4	25,4
			COP compressor**	kW/kW	4,7	4,6	4,5	4,5	4,6
			COP rotor + compressor**	kW/kW	16,5	15,8	15,5	15,5	15
7° C	20° C	24° C	Heating capacity rotor + compressor	kW	10,1	16	23,1	29,7	42,5
RH 90%	RH 20%		Heating capacity compressor	kW	4,69	7,61	11	14,5	21
			COP compressor**	kW/kW	5,4	5,6	5,5	5,5	5,6
			COP rotor + compressor**	kW/kW	11,6	11,8	11,7	11,3	11,2

Nominal conditions according to EN14511
** including 1° C of fan heating ** includes compressor + inverter + control*

OPERATING MAP

	Cooling mode	Heating mode
Min	24° C	-5° C
Max	40° C	15° C

For operation lower than -5°C in Recooler HP must be combined with other heating solutions.

ReCooler HP – advantages at a glance

PROPERTY OWNERS/ END USERS

- **Flexible capacity modulation** – best comfort
- **Located in Air Handling Unit** – aesthetic appearence and space saving
- **Reliable design** – low risk of failure
- **Easy maintenance** – shorter down time and lower maintenance cost
- **Low refrigerant charge** – ecological
- **Lower costs** – energy savings and system downsizing

CONSULTANTS

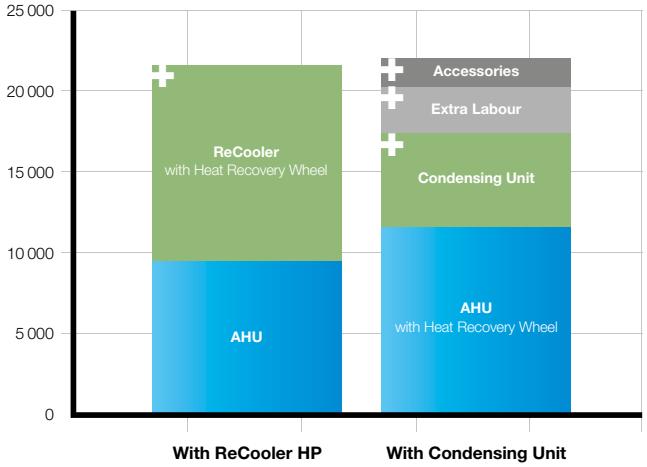
- **Enhanced operating map** – reliability and operation even in extreme conditions
- **Heat pump mode** – no need for a boiler
- **Permanent Magnet Scroll compressor** – best efficiency at all loads
- **Inverter drive** – best part load efficiency
- **Best rotor on the market** – maximum savings, very hygienic
- **Invisible and silent** – can be located indoors

INSTALLATION/MAIN-TENANCE ENGINEERS

- **Simple installation** – no need for refrigeration work, only requires electricity connection and no piping.
- **Plug and play** – Modbus communication with eQ Climatix control.
- **Inverter drive and Recovery wheel** – lower starting and running current, fuse and cabling downsizing.
- **Split version available** – ideal for renovation.

CAPITAL COST COMPARISON

ReCooler versus Traditional system (eQ size 018 example)



COST SAVINGS VS TRADITIONAL SYSTEMS

Investment cost for a condensing unit is limited compared to an integrated cooling system like the ReCooler Heat Pump. However, contractors have to consider the full price of the AHU and cooling solution, including installation on site:

- The eQ with ReCooler is delivered in one piece, refrigeration piping and cabling fully connected
- Condensing unit requires specific location for installation, extra labour for cabling and piping with a refrigeration engineer
- Condensing unit requires accessories such as control box, expansion valves kits, pipes, etc.
- **Capital cost of ReCooler vs Condensing Unit are equivalent or lower**
- **The benefits of lower energy consumption with the ReCooler brings immediate cost savings**

We Bring Air to Life

Fläkt Woods is a global leader in air management. We specialize in the design and manufacture of a wide range of air climate and air movement solutions.

Our collective experience is unrivalled. We are constantly aiming to provide systems that precisely deliver required function and performance as well as maximum energy efficiency.

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