

ENGINEERING
TOMORROW

Danfoss

NeoCharge

Take the shortcut to low-charge

NeoCharge is a game changer in industrial refrigeration. This unique yet simple technology reduces the charge in both new and existing systems. With easy installation in any type of system, NeoCharge gives you a shortcut to low-charge.

Reduce energy costs by
up to 20% and increase
capacity by up to

40%



**Low-charge
your system.
Super-charge
your business**

Introducing NeoCharge:

Cut ammonia charge and reduce energy cost



NeoCharge is a complete solution

that gives industrial refrigeration systems low-charge capabilities. This allows refrigeration facilities to either cut energy and refrigerant costs—or increase capacity with the same charge in existing system. In Direct Expansion (DX) systems, NeoCharge eliminates superheat by operating evaporators in a much more stable and controlled way. This means that ammonia returns from evaporators with zero superheat or slightly wet.

In recirculating systems, the NeoCharge solution delivers a stable and controllable low recirculating ratio regardless of changing conditions. This reduces the ammonia charge by 30-40% in existing systems or even more in new systems.

In short, NeoCharge is a complete solution that turns the tables when it comes to low-charge.

How **NeoCharge** works

NeoCharge is a simple solution that takes evaporator control to a new level. In essence, it ensures evaporators are always fed with the exact right refrigerant charge.

The solution includes sensors, pressure transmitters, temperature sensors, electronic control and valves.

Put simply, NeoCharge detects how much liquid is leaving each evaporator to control the injection valve. The heart of the solution is the NeoController, which runs with just a few parameters.

The system relies on differences in liquid gas heat conductivity to make reliable two-phase measurements; it is equipped with a dual-sensor system that relies on superheat and heat assisted superheat signals.

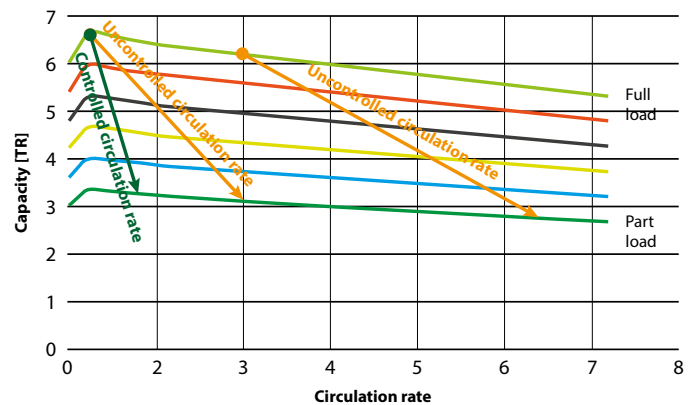
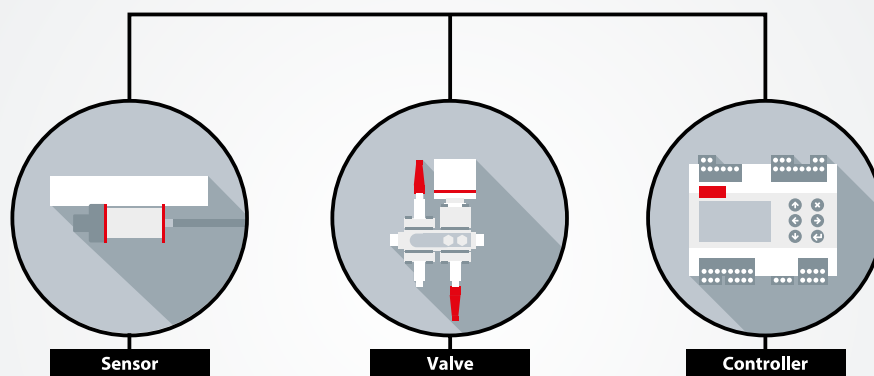


Figure 2: A stable system

NeoCharge feeds each evaporator with the exact right charge at all times. Even during capacity reduction, the circulation rate remains fixed. With NeoCharge dynamic control, all cooling processes remain stable.



Complete
NeoCharge
solution

Take the
shortcut to
low-charge

NeoCharge
The new
game changer

NeoCharge benefits

- Reduce energy costs by up to 20%
- Increase capacity by up to 40%
- Easy to install in any shape of air cooler: traditionally overfeed or in direct expansion system
- Fully plug-and-play and self-adaptive technology
- Retrofit existing systems or deploy in new-builds
- Smaller system footprint, liquid separator, and piping

Cut costs for refrigerants and energy

NeoCharge drastically improves the performance of both new and existing refrigeration systems.

In traditional overfeed systems, the charge is reduced by up to 45% (CCR), in Direct Expansion systems, evaporator performance is kept at 0K superheat (WDX), and in new systems, energy performance is improved markedly.

Ammonia charge with NeoCharge technology

Ammonia charge (kg/kW)

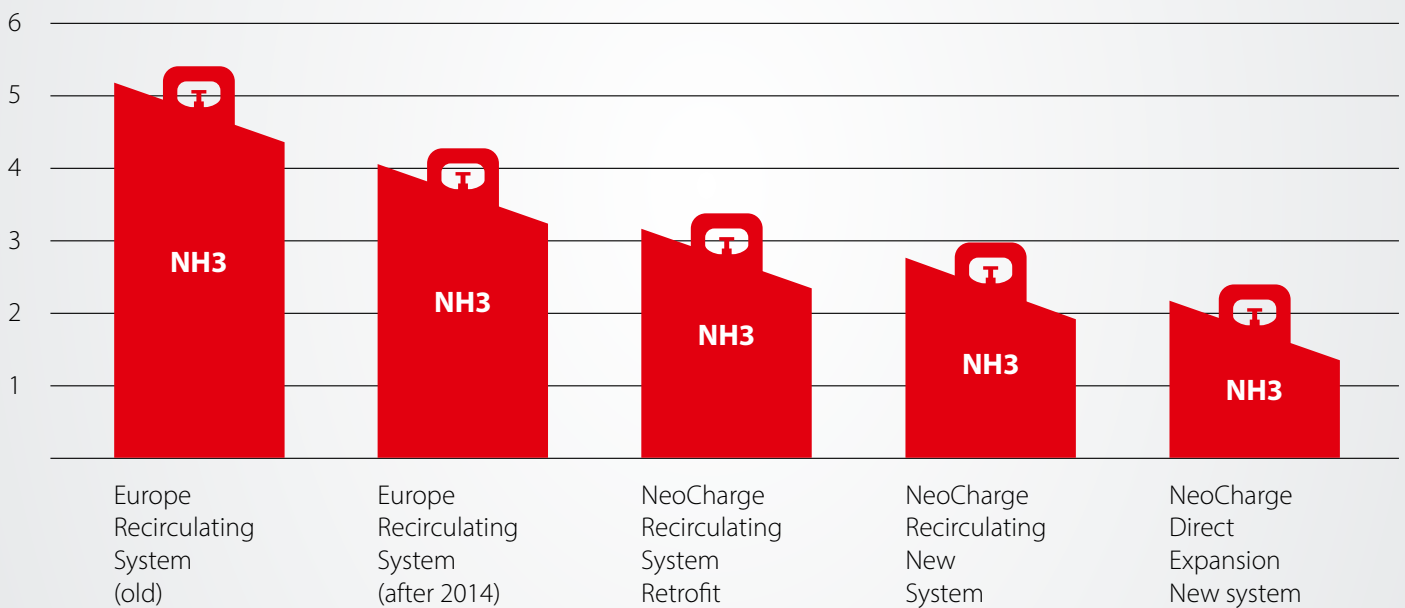


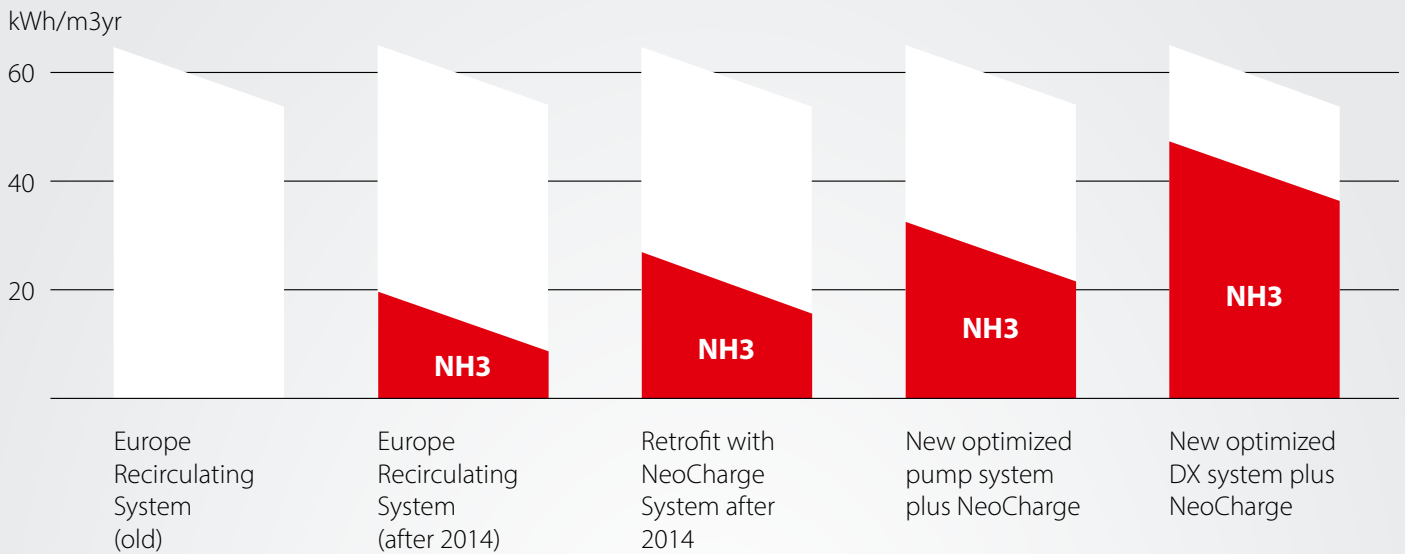
Figure 3: Charge reduction with NeoCharge

- Charge reduction up to 45%
- 40% extra capacity with the same charge in case of retrofit

NH3 100 KW -35°C	Design r=3	Actual r=4,65	Controlled r=1,5	Saving
Evaporator V=100 l	23 kg	27 kg	16 kg	11 kg
Wet suction pipe DN100 10 m	13 kg	17 kg	7 kg	10 kg
Tot	36 kg	44 kg	23 kg	21 kg

Figure 4: Ammonia savings in systems retrofit with NeoCharge

Energy savings potential with NeoCharge technology



Based on 100.000 m³ cold storage energy consumption.

Figure 5: Power savings in different systems with NeoCharge

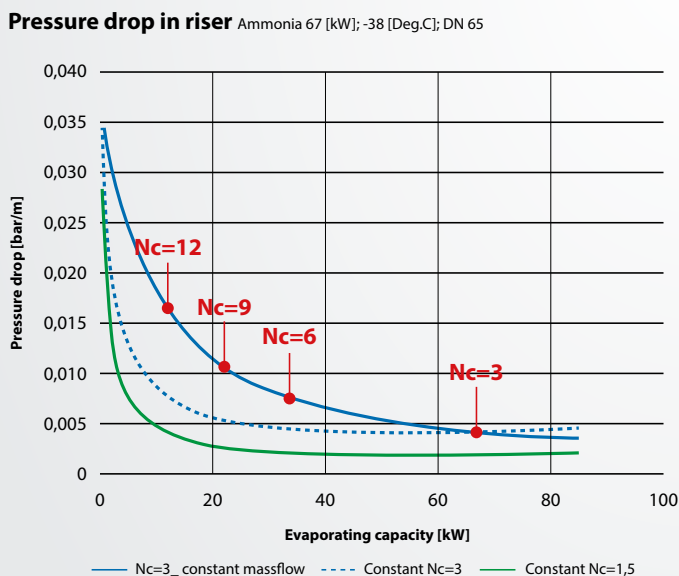
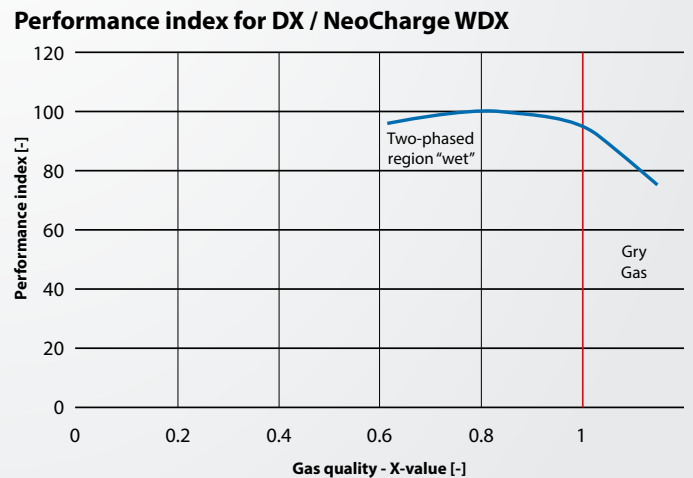
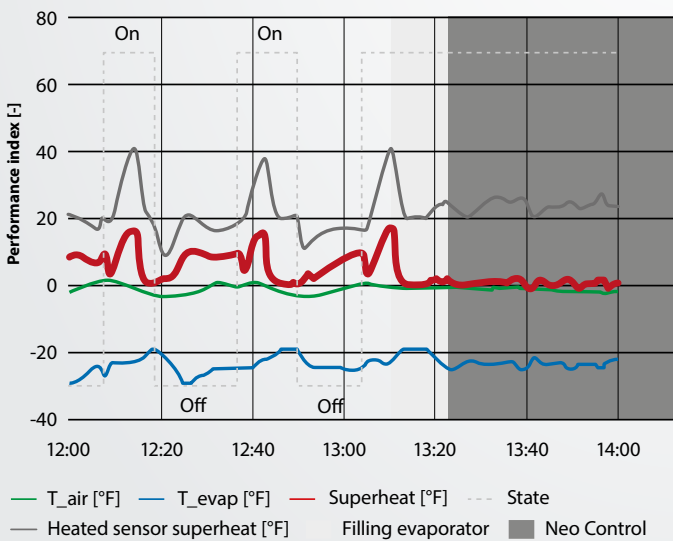


Figure 6: Reduction of suction pressure loss
 With NeoCharge, suction pressure loss can be reduced by up to 60% for a 5 m riser at -35°C reducing compressor power consumption. This means pump size can be reduced by 30% (1MW cooling capacity @-35°C).



DX energy savings



Figures 7 and 8: Direct Expansion energy savings

Direct Expansion (DX) systems are commonly controlled using the superheat signal. But the used superheat must be compensated. This results in a lower evaporating temperature, which in turn results in a 5-15% higher energy consumption. NeoCharge eliminates this need.

A plug-and-play system for easy installation



Application

NeoCharge can be applied to both NH₃ and CO₂ air coolers. It is easy to mount on bottom-, top-, or side-fed systems and is suitable for stainless steel pipes as well as carbon-steel galvanized pipes.

Signal required

Minimum signal required is Cooling ON, OFF and defrost ON/OFF (in existing system).

Defrost in new systems

In new systems, the EKE450 NeoController can manage defrost in addition to injection control.





About **Danfoss**

Danfoss is focused on engineering a better tomorrow. From one of the world's first radiator thermostats and mass-produced frequency converters to the many solutions and technologies that push the boundaries of what's possible today, we have always kept an eye on building a better future. Our journey began in 1933 when Mads Clausen founded Danfoss in his parent's farmhouse in Nordborg, Denmark. Since then, the business has grown from a solo enterprise into one of the world's leading innovative and energy-efficient solutions suppliers.

The passion for technology and our customers has led to a legacy of rising to increasingly complex challenges and delivering exceptional results. With the promise of quality, reliability, and innovation deeply rooted in our DNA, we deliver an extensive range of products and solutions across a multitude of business segments. Our focus on meeting ESG ambitions sets us apart, and we believe it allows us to pioneer decarbonization solutions, best-in-class circular products, transparency, and a better customer experience. Partner with us, and let's engineer the future together.