

ENGINEERING
TOMORROW

Danfoss

Danfoss Solutions for Industrial Ammonia Heat Pumps

Danfoss Industrial Refrigeration valves and controls provide efficient, safe and reliable operation of large scale ammonia heat pumps.

65 bar

Maximum Working
Pressure for
Danfoss Industrial
Refrigeration Valves.

Ammonia Heat Pump

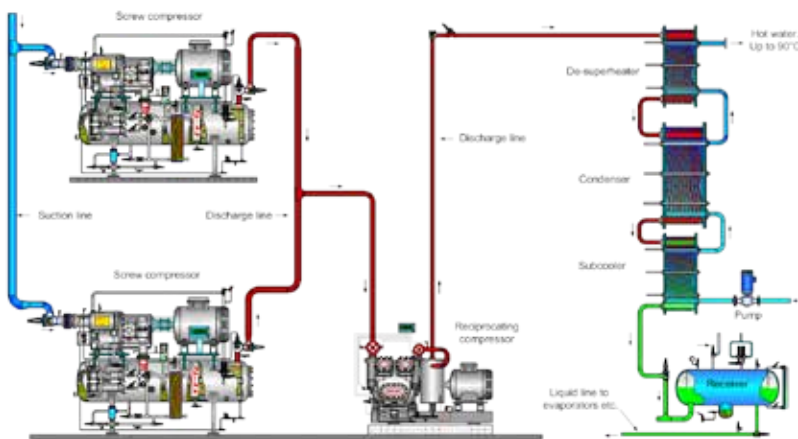
Large industrial refrigeration systems have a considerable electricity consumption. At the same time thermal energy from products is discarded to the atmosphere as a waste heat. Ammonia heat pump technology helps to utilize this low potential heat by producing hot water with temperatures up to +90°C. That could dramatically improve energy efficiency of industrial installations, as cooling needs would typically be accompanied by large heating needs. Industrial Heat pumps could also be applied for the heating purposes only, harvesting heat from such low potential sources such as sea water, sewage etc.

Ammonia heat pumps are typically running at high pressures, 52 bar or even up to 65 bar. The first challenge is that working pressures are higher than in typical ammonia systems, or even in subcritical CO₂ systems. Another challenge is that ammonia liquid at high pressures and temperatures might cause problems with sealing. Measuring of ammonia level with some technologies (such as capacitive liquid level rod) could be very inaccurate. Danfoss provides a range of components that help to solve those challenges.



Picture courtesy Wettstein Kältetechnik

Stand alone heat pumps

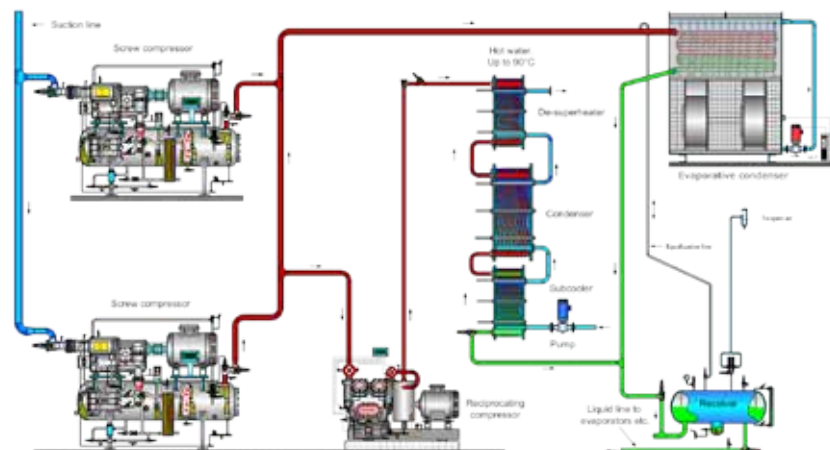


One of attractive areas for industrial heat pumps is a combination with renewable sources of energy - wind, solar, or similar - in areas where large amounts of heat are needed.

Such heatpumps could be one or two stage systems, depending on the heat source temperature. A variety of heat sources could be used depending on the heatpump location, such as sea water, sewage or some industrial processes with high potential heat.

A key difference with add-on heat pumps would be the balance of the load on 2 stage compressors in order to achieve the highest efficiency.

Add-on heatpumps NH₃



Most typical ammonia heat pumps are so called "add-on" that utilize waste heat from refrigeration plants. Ammonia heatpumps could also be built for heating purposes only.

For the refrigeration part, standard valves and controls could be applied, while for the heatpump section some special components might be needed. Selection of components depends on the pressure rating and material compatibility.

Danfoss offers a range of 52 bar and 65 bar components for heatpump applications. 52 bar components are available as standard while 65 bar are special components.

Danfoss products used today



SVL stop valves (SVA)



Motorized valves (ICM)



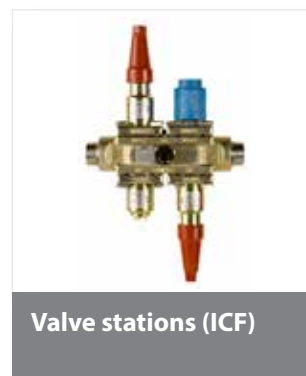
Liquid level sensors (AKS4100)



SVL line components (FIA, REG, SCA, CHV)



Pressure and temperature regulating valves (ICS)



Valve stations (ICF)

	Type	Pressure and temperature range	Features
Stop valves	SVA	Up to 52 bar, -60/+150 °C	<ul style="list-style-type: none"> One common housing that allows easy and time saving switch between the functions Allows for fast and easy service with shared spare parts and modular design Delivers a smooth opening and closing operation along with very high reliability
Check and stop check valves	CHV and SCA	Up to 65 bar, -10/+150 °C	
Hand regulating valves	REG		
Filters	FIA		
Service needle valves	SNV	Up to 65 bar, -60/+150 °C	
Pilot regulating and solenoid valves	ICS + EVM	Up to 65 bar, -10/+120 °C	<ul style="list-style-type: none"> Low energy consumption Leak risk reduced by up to 80% thanks to magnetic coupling and no dynamic sealing Reduced service costs Light and small valves with only welded connections
		ICS + CVP/CVC	
Motorized valves	ICM + ICAD	Up to 65 bar, -10/+120 °C up to DN40, liquid lines Up to 52 bar, -60/+120 °C full range, only gas lines	
Liquid level sensors	AKS 4100	Up to 100 bar, -60/+120 °C	<ul style="list-style-type: none"> Easy commissioning regardless of liquid level or refrigerant type Available with cable or coaxial (sleeve) tube Oil proof Verified in NH₃ heat pump applications
Valve stations	ICF	Up to 52 bar, -60/+150 °C	<ul style="list-style-type: none"> Great time savings, only one component 80% less installation time with only two welds Reduced need for insulation, compact design Easy to service during operation and maintenance Low refrigerant loss during operation Long service life

Danfoss Industrial Refrigeration

A world of expertise at the click of a button

Turn to Danfoss if you want to combine quality components with expert knowhow and support. Try out these free tools, designed to make your work much easier.



Coolselector® 2 – New calculation software for Industrial Refrigeration

Coolselector®2 is your brand new Danfoss calculation and selection software designed to make selection processes for all industrial refrigeration projects easier and less time consuming. Coolselector® 2 is a unique calculation and support tool for contractors and system designers, offering complete pressure drop calculations, analysis of pipe and valve design and the ability to generate performance reports. It replaces the well-known DIRcalc™ software and offers several new functionalities.



Danfoss IR app

The free IR App gives you a spare parts tool, which makes it easy for you to find the spare part number for a given Danfoss industrial refrigeration valve. It also presents all the products and benefits of the SVL Flexline™ range – with a fun game thrown in as well.



Download 3D CAD symbols

From our online product catalogue on our website, you can download 3D CAD symbols and illustrations to help you when designing refrigeration plants.



IR application tool

With this interactive PowerPoint slideshow, you can explore all the details of a two-stage ammonia plant. You will find detailed cut-away drawings and information on the valves in the installation along with links to videos, literature and product animations.



Application handbook

The Application Handbook is designed to help you every step of the way when working with industrial refrigeration systems. Among many other things, it contains examples of how to select control methods for different refrigeration systems, their design and which components to choose.

Visit www.danfoss.com/IR-tools and find all the tools you need.