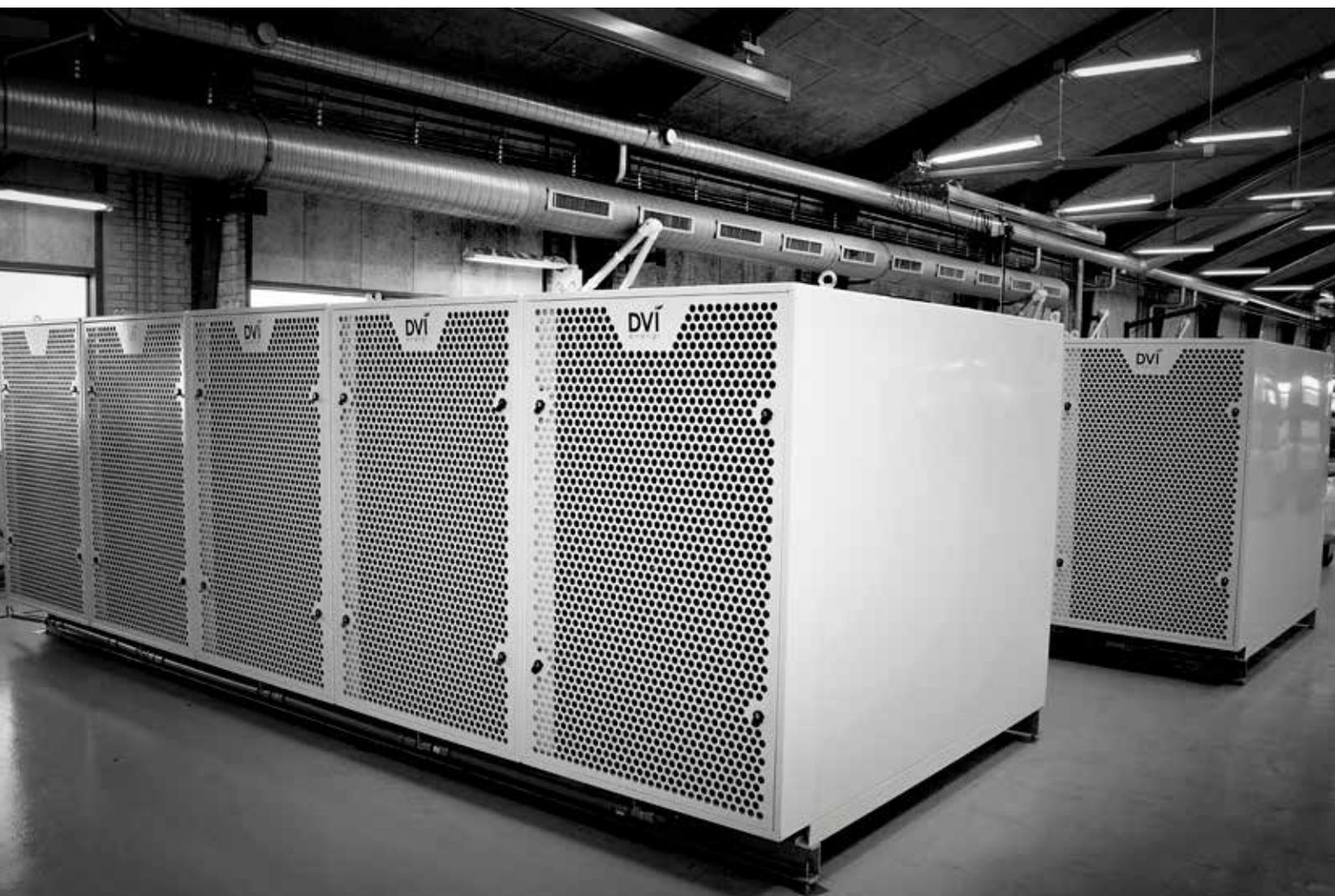




HIGH-PERFORMANCE HEAT PUMPS

SUSTAINABLE ENERGY FROM THE AIR

GREEN TRANSITION - DESIGNED AND PRODUCED IN DENMARK 🇩🇰



Heat Pumps in a Class by Themselves

A DVI system is a high-quality product that you will benefit from for many years. You will receive a system with very low operating costs that requires a minimal amount of maintenance. Besides these key factors, there are several additional good reasons for choosing a heat pump from DVI.

ABOUT DVI

Since 1979 DVI has worked intensely with the development and production of heat pumps and geothermal heat pumps. We are among the best within the field of heating systems using sustainable energy sources from the ground and the air, and additionally we work with recycled process heat.

DVI delivers quality heat pump systems to households, companies and institutions, and our units can be installed in newly built constructions as well as they can enter into energy rehabilitation of existing constructions – and we experience great satisfaction among users. DVI are among the best within the field of heat pumps in regard to technology. Part of this is due to our creative development-team, who continuously develops new heat pumps and cooling systems as well as hardware and software with new functions.

DVI heat pumps are produced in our facilities located in northern Jutland, just south of Aalborg. Here our competent team of employees guarantees high quality and good workmanship.

COMPETENT COOPERATING PARTNER

DVI designs and delivers systems that are optimized and adjusted to the individual customer and their needs. We are experts at dimensioning and configuring the most optimal solution for any building – both in relation to heating systems and cooling systems for buildings but also hot water for domestic use.

- ✓ More than 40 years of experience
- ✓ Designed and produced in Denmark for the Danish climate
- ✓ Excellent support



Mode of Operation and Technology

ONE- OR MULTI-LEVEL SYSTEMS OF MODULAR CONSTRUCTION

DVI has made it easy to advise in and install larger air-water heat pumps because the system is delivered as one unit. This saves expensive installer hours for interconnection and pipe building during installation and reduces the risk of failure. The heat pumps are built in modules, each with a heat output of 40 kW. These modules are interconnected to achieve the desired overall heat output for the specific project. The heat pump is a profitable solution to use in projects with heat demands ranging from 40 - 500 kW.

HYBRID SYSTEMS

The heat pump's control unit automatically adjusts supplemental heat from oil, gas, biomass or electric heat through a heat shunt. The supplementary heat source is used to supply extra effect or an elevated temperature which is outside of the heat pump's capacity. Hybrid systems are an excellent form of installation, where you achieve a lower investment and also experience great savings in regard to economics and CO².

ABSORPTION OF HEAT IN THE AIR

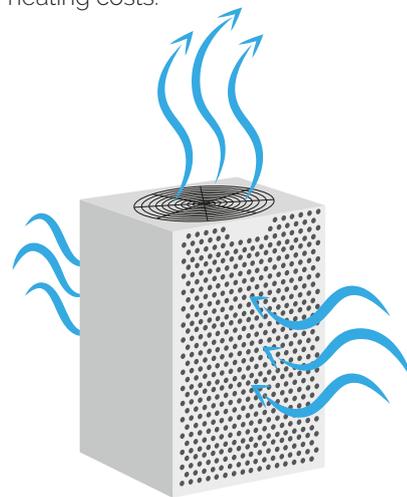
The heat pump extracts the energy from the air, which is sucked through the sides of the heat pump and thrown vertically through a ventilator located at the top of the heat pump (see illustration). All the way down to -15 degrees, energy is extracted from the air, which is transformed into hot water up to +65 degrees.

FLEXIBLE HEAT PUMP CONTROL

Informative and user-friendly electronics control and monitor the heat pump so that it automatically adjusts to the optimal and most energy-efficient operation. By default, the temperature of the heating system is automatically adjusted in relation to the outside temperature, whereas the hot water is kept at a constant high temperature.

HOT-WATER PRIORITY

The heat pump's control unit is set to prioritize the production of hot water, which is important in sports centers, institutions and other installations with a high hot-water consumption. This gives the heat pump the best possible working conditions and the customer the lowest possible heating costs.



The heat pump can be connected to a number of heat distribution systems, ranging from underfloor heating systems to unit air heaters in production facilities. Areas, buildings and use are essential factors for configuration. DVI Energi can help you assess how the heat pump can be adapted to your heating system and needs.

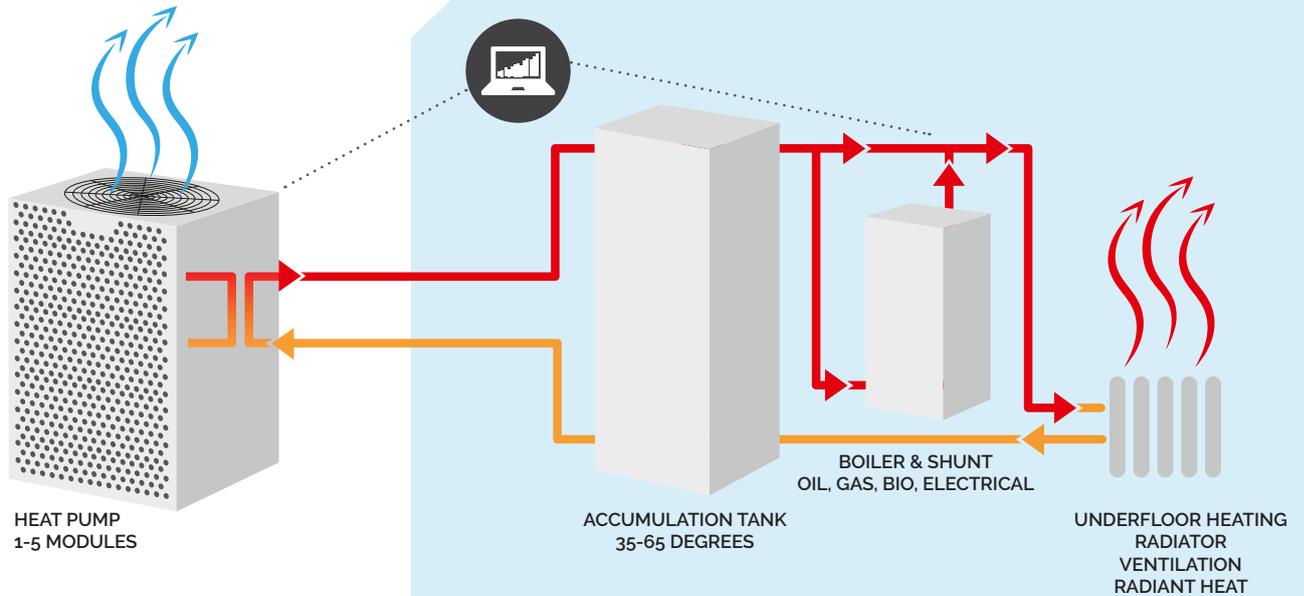
LOW SOUND PRESSURE

The heat pump is designed with low sound levels to ensure the possibility of implementation in sound sensitive areas. A special type of ventilator has been used, which reduces turbulence and noise considerably. In addition, the ventilator's sound and air pressure are oriented vertically to prevent causing nuisance to the nearest neighbors.

Ask us for an opportunity to try to listen to our pumps. We guarantee that you will be impressed.

The Principles of Hybrid Systems

EXAMPLE OF A SYSTEM WITH SUPPLEMENT HEAT FROM A BOILER.





Green Transition with Cascade Technology

Energy efficient air-to-water heat pumps in a cascade constellation provide both a green profile and great savings at Fårup Sommerland.

Over the past few years, Fårup Sommerland in North Jutland, with 600,000 annual visitors, has begun to work up a green profile in terms of energy. The bulbs in all the park's light chains have been changed to LED bulbs, the light in administration buildings have been supplied with timers, and the temperature in the park's large water park is lowered at night.

"We have started a green initiative with our energy consumption", says Peter Borup, operations manager at Fårup Sommerland. "The first step was a new air-to-water heat pump, which we had installed in our workshops in 2014. It is a really smart solution, and we have since installed more and more of them. Since we invested in the first heat pump, we have come a long way with our green transition", he explains.

The heat pump in question is a hermetically sealed 120 kW air-to-water heat pump from the Danish company DVI Energi, which is constructed with three interconnected cascade 40 kW modules. As it gets colder, the individual 40 kW modules start, so that the pump can escalate heat production as needed throughout the year. At the same time, DVI Energi has used a new technology for air-to-water heat pumps of this magnitude that allows the compressor in the pump to withstand a larger temperature range than normal.

NEW COMPRESSION TECHNOLOGY

"The core of this heat pump is a 40 kW air-to-water heat pump. 40 kW is the largest air-to-water heat pump we can make with 10 kg of refrigerant, which is the maximum limit in Denmark. So, 40 kW makes good sense both in terms of regulation and production as a standard

unit that can then be cascaded up to 200 kW as needed", explains Henning Pallesen, development manager at DVI Energi.

At the same time, DVI Energi has used the existing refrigerant in the pump to correct one of the weaknesses of the air-to-water heat pumps.

"During the coldest time of the year, the pump must collect its heat at minus degrees, and when it has to reach a flow temperature of 65 degrees, there is a huge temperature range. Here, the very hot temperatures have been a bit of a sore point for the air-to-water heat pumps, because it can be difficult to find compressors that have such a large area of operation. We have therefore introduced a new compressor technology, where we inject part of the heat pump's refrigerant into the compressor and use it to cool it as well", Henning Pallesen explains. "Then it can do more, and that means that our compressor has a very large area of operation".

Henning Pallesen explains that it is a new thing to cool the compressor in air-to-water heat pumps of this magnitude.

"We have spent a lot of time and effort developing and testing that system, but it also means that it can now manage 65 degrees without problems", says Henning Pallesen.

ENERGY-EFFICIENT HEAT PUMPS

Actually, Peter Borup also had doubts about whether air-to-water heat pumps could handle high enough temperatures to meet Fårup Sommerland's needs.



"Traditionally, a heat pump is not able to rise to the same temperatures as an oil boiler is, and when dealing with old buildings with both radiator systems and air heaters, we should preferably be able to go up to 65 degrees", says Peter Borup. "So, I have to say that initially I was a little skeptical about whether it could do it".

Still, he was interested in researching air-to-water heat pumps when an old oil burner in the summer park's workshops had to be replaced.

"I previously worked as a manager in a major plumbing business, so I was interested in investigating whether an air-to-water heat pump could be the right solution for us. It turned out that such a cascade solution of 120 kW could actually meet our need for heat in our workshops and storage, where the need was otherwise set to 150 kW", says Peter Borup. "It's a really efficient system".

Henning Pallesen of DVI Energi points out that global warming has helped accelerate the development of highly efficient air-to-water heat pumps.

"I have been in the business for many years, and I remember when you borrowed components from the refrigeration industry that were definitely not energy optimized. But energy efficiency is more significant than ever, so the demand for energy-efficient heat pumps has increased, primarily due to global warming. Now the heat pump industry has grown big and strong, and the component manufacturers have developed some good, energy-efficient products, especially compressors", Henning Pallesen says.

This energy efficiency can also be read directly at the bottom line at Fårup Sommerland.

"We saved DKK 80,000 on the same heat the first year with the first system, so the payback time is very short. That also meant that I got a green light from the board to do more investments, so now we have replaced even more old oil boilers with new air-to-water heat pumps, and we have put them in our new stores and in our new, big hotel that opened last year. So, they have really sparked our green path", operations manager Peter Borup says.





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