

MAKING MODERN LIVING POSSIBLE



## **Danfoss DHP-R**

**Transforming solar energy into heating and hot water**

# Reducing running costs, whilst benefiting the environment and the future

**The Danfoss DHP-R produces heating and hot water using stored solar energy from the bedrock, surface ground, groundwater or exhaust air from the building. It reduces heating costs, enabling initial investment to be paid for over a short space of time, whilst benefiting the environment and future generations.**

Heat pumps extract stored solar energy from the soil, bedrock and ground water. Heat can also be reclaimed from the exhausted air from buildings.

## Comfort cooling

The Danfoss DHP-R is suitable for all buildings with heat capacity requirements up to 550 kW. Systems can be

adapted to suit the exact requirements of the building. For instance, the new system can be integrated with an old system, whether it runs on gas, electricity, oil, pellets or district heating. The Danfoss DHP-R can also be simply upgraded to supply the building with comfort cooling, enabling a comfortable indoor climate, regardless of the weather outside.

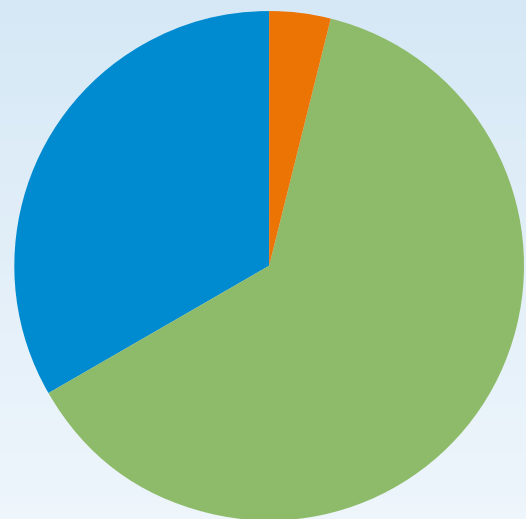
## Annual efficiency

The best way to judge the performance of a heat pump is to measure its annual efficiency. This is the ratio between how much energy is consumed and how much energy the heat pump provides over a year. The energy gain comes for example from the bedrock, ground or the building's exhaust air system.

## You can save this much energy

The whole circle represents the total amount of heating and hot water used in the building. The blue field indicates energy consumed by the heat pump, the red indicates additional energy which could be used during peak loads and the green indicates free energy. This example has been calculated for a 1000-square-metre building over one year in normal weather conditions. The higher a building's energy consumption, the faster the investment pays off.

Visit [www.heatpumps.danfoss.com](http://www.heatpumps.danfoss.com) for a list of Danfoss sales companies. Your local representative will assist you in providing an exact calculation based on the specification of your building.



- Energy consumed by the heat pump
- Possible additional energy used during peak loads
- Free energy



## Suitable for all buildings

More and more people are discovering the long-term benefits that heat pumps can provide; they can improve your overall economy whilst reducing running costs, maximise operational reliability and increase comfort levels. As well as this, heat pumps also greatly benefit the environment.

The Danfoss DHP-R is suitable for buildings with heat capacity requirements of up to 550 kW.

The heat pump system provides both heating and cooling and can be

used in several energy-saving ways. For example, the heat from lamps and other heat-radiating equipment in a shop can be used to heat apartments in the same building. When the heat pump produces hot water for the apartments, cooling is produced as a bi product which can be used to cool building areas.

Passive cooling can be used in bore hole and ground water systems. This is a very inexpensive way of cooling a building simply by circulating the cool liquid in the collector loop.

# Benefits offered by the Danfoss DHP-R

High annual efficiency minimises energy consumption.

Simple and logical controls make the system easy to use.

Intelligent controller monitors the whole system (heat pumps, auxiliary heat, cooling, sub-shunt groups, hot water).

Our internet monitoring facility provides you with the re-assurance with SMS or email in the unlikely event that a fault should occur.



Superb hot water production with the added benefit of an anti-legionella function.

Built-in desuperheater for increased hot water temperature.

Compressor technology developed for heat pump operation.

Compact in size – simple installation.

Suitable for all systems: bedrock, surface ground, groundwater and exhaust air.

Quiet operation.

Danfoss DHP-R			21H	25H	20	26	35	42
Refrigerant	Type		R134a	R134a	R407C	R407C	R407C	R407C
	Amount	kg	2.7	2.9	3.4	3.5	3.6	4.4
	Test pressure	MPa	3.2	3.2	3.2	3.2	3.2	3.2
Compressor	Type		Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
	Oil		POE	POE	POE	POE	POE	POE
Electrical connection 3-N	Rated power	kW	10.2	12.8	8.6	11.7	14.2	17.9
	Electrical connection	Volts	400 3N-50Hz	400 3N-50Hz	400 3N-50Hz	400 3N-50Hz	400 3N-50Hz	400 3N-50Hz
	Start current	A	167	198	99	127	167	198
	Start current, soft starter	A	96	106	69	82	96	106
	Fuse	A	25	25	25	25	35	35
Performance	Output capacity <sup>1)</sup>	kW	20	24	18	23	30	37
	Heat factor <sup>1)</sup>	COP	3.1	3.2	3.1	3.1	3.1	2.9
Nominal flow <sup>2)</sup>	Coolant <sup>3)</sup>	l/s	1.2	1.5	1.2	1.6	2.2	2.4
	Heat transfer fluid	l/s	0.5	0.6	0.5	0.6	0.8	1.0
External available pressure <sup>4)</sup>	Coolant	kPa	106	63	117	155	125	115
	Heat transfer fluid	kPa	57	54	60	51	47	40
Internal pressure drop	Condenser	kPa	5.6	6.6	4.7	8.9	10	12
	Evaporator	kPa	41.2	56	36.2	50.7	56.5	60
	De-superheater	kPa	0.35	0.47	0.36	0.49	0.84	1.26
Max/Min temperature	Brine	°C	20/-10	20/-10	20/-10	20/-10	20/-10	20/-10
	Heat transfer fluid	°C	70/20	70/20	60/20	60/20	60/20	60/20
Pressure switch	Low pressure switch	MPa	0.03	0.03	0.08	0.08	0.08	0.08
	Operating pressure switch	MPa	2	2	2.65	2.65	2.65	2.65
	High pressure switch	MPa	2.45	2.45	3.1	3.1	3.1	3.1
Anti-freeze			Ethylene glycol Ethanol-water	Ethylene glycol Ethanol-water	Ethylene glycol Ethanol-water	Ethylene glycol Ethanol-water	Ethylene glycol Ethanol-water	Ethylene glycol Ethanol-water
Size	Width x Height x Depth	mm	593 x 1 474 x 692	593 x 1 474 x 692	593 x 1 474 x 692	593 x 1 474 x 692	593 x 1 474 x 692	593 x 1 474 x 692
Weight		kg	296	310	291	300	316	331

<sup>1)</sup> BOW45 according to EN14511, Hot side Δ5K, Cold side Δ3K <sup>2)</sup> Nominal flow: Hot side Δ10K, Cold side Δ3K <sup>3)</sup> Anti-freeze in cooling medium Ethanol water <sup>4)</sup> At nominal flow

# Four ways of extracting energy

By extracting stored solar energy from bedrock, surface ground, groundwater or air, the DHP-R can provide ample abundant levels of heating and hot water whilst also reducing your energy costs.



## Bedrock heat

The bedrock heat pump extracts solar via pipes installed within bore holes 150-180 metres beneath the ground. The heat pump harnesses stored solar energy to heat the building and provide hot water.

### Advantages

- › Ideal solution for a restricted plot size
- › The bore hole maintains an even temperature throughout the year
- › Small impact on your plot
- › Permits passive cooling

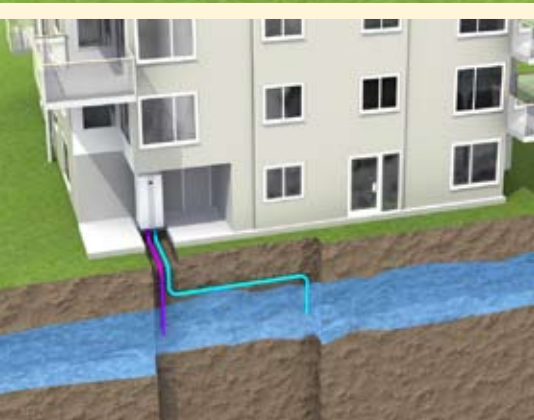


## Ground source heat

The DHP-R harnesses stored solar energy, via installation of loops of piping. These are installed from approximately 1 metre below the ground surface.

### Advantages

- › No drilling required
- › Lower investment costs
- › The collector circuit in the ground maintains an even temperature throughout the year



## Groundwater heat

In this case, groundwater is pumped up from the ground, the energy is extracted by the heat pump and the water is then returned back to the ground.

### Advantages

- › Low drilling costs
- › An even, high temperature and maximises efficiency
- › Permits passive cooling
- › Other types of process water can be used



## Exhaust air recycling

The DHP-R can also be adapted to recover the heat from the exhaust air of some buildings. Requiring mechanical ventilation, the used warm air passes through a heat recovery cell in the exhaust duct, which then transfers the recovered energy to the heat pump.

### Advantages

- › Low investment costs
- › Can be combined with another source of heat (rock, ground, etc.) to further increase efficiency
- › An excellent alternative for situations where drilling or a ground systems are not feasible

# Logical and simple to use



The logically-designed display is clear and easy to use, with the settings being easily adjusted via the keypad.

Danfoss has years of experience of developing highly efficient, reliable heat pumps. The control equipment is designed to meet high demands for maximum energy savings and comfort.

The menu system presents all the settings and information of the system's status. Auxillary heat, hot water, shunt groups, cooling and anti-legionella are regulated by the control unit.

The heat pump is equipped with a web server, which makes it possible to view and change all settings. The controller and web system offer a high level of security for use by authorised users only.

It is important that the dimensioning and settings are correct to maximise system performance and economy.

The Danfoss DHP-R has an integrated web server, which enables remote monitoring via the Internet. This gives you full control of the system wherever you are.

**Danfoss Heat Pumps**

Module name: **1 alarms**  
 Module address: **2000-01-09 16:21:45**

**Heat pump overview: MASTER**

Pump	
Primary supply temp	41.7 °C
System setpoint	42.1 °C
Outdoor temp	4 °C
Integral value	-700 °C min
Hot water start sensor	54.8 °C
Supplytemperature	46.8 °C
Returntemperature	38.6 °C
Brine in temperature	1.4 °C
Brine out temperature	-0.6 °C
Hot gas temp	90.6 °C
Extra heater	20 %
Block. extra heater	On
Start/Stop rad.pump	On
Start/Stop compressor	On
Start/Stop brinepump	On
System pump	On

Status: Ready



# Complete control

– wherever you are

The Danfoss DHP-R makes it easier than ever to optimise the operation of your heating system. Connect the heat pump to your broadband connection to give you full control of your system – wherever you are.

The Danfoss DHP-R has an integrated web server. Simply connect a network

cable to the heat pump and log into the system. You can then control and monitor your heat pump system wherever you are. You have control over all the settings, alarm management, operating history, relevant temperatures and operating situation. You receive operating history in the form of graphs with second, minute and hour databases.

The databases can then be exported to a variety of formats, such as Excel.

## **Simpler and more efficient**

All these options make it easier to optimise the operation of your system. They can also be very helpful if you require support or service for your system. Internet control offers great potential for efficiency savings if you have systems in several different locations. The system can also communicate with other supervising systems on the market.



[www.heatpumps.danfoss.com](http://www.heatpumps.danfoss.com)

Heat pumps are the future for our homes and buildings.

Solar energy is economical and sustainable.

Read more at [www.heatpumps.danfoss.com](http://www.heatpumps.danfoss.com)

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