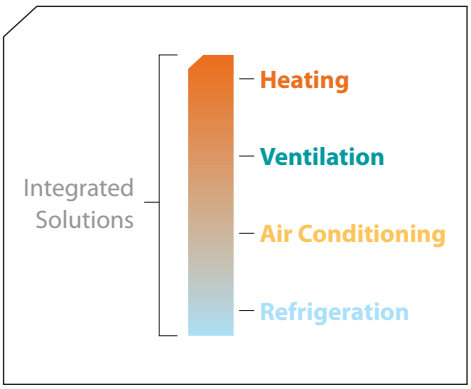
DAIKIN

your comfort. **our world.**

Commercial heating solutions

Reducing energy consumption and CO_2 emissions



Daikin commercial heating systems offer highly efficient, low carbon solutions that can help to reduce the energy consumption and environmental impact of all kinds and sizes of buildings: from schools and hospitals to apartments and public buildings.

Leading the way in low carbon, renewable heating solutions

With more than 50 years' experience in the design and manufacture of heating and cooling technologies, Daikin is a market leader in heat pump technology, renowned for innovation and quality.

We bring this world-class track-record in heat pump design together with an intelligent approach to developing fully integrated solutions, in order to meet the needs of today's designers, installers and building managers for energy-efficient, low carbon heating that reduces running costs, without compromising on comfort.

Daikin UK solutions

Innovating ahead of legislation

Climate change legislation and current building regulations provide ever higher challenges for designers and operators of heating systems. Daikin's heat pump solutions meet all of these challenges, helping to save energy, running costs and carbon emissions.

The Climate Change Act 2008 set the target of achieving a minimum 80% reduction in legislated greenhouse gas emissions by 2050, compared with 1990 levels.

This transformation to a low carbon economy will be a defining challenge over the next generation, driving ever stricter building regulations, Eco-design legislation and financial measures to penalise poor energy performance. Meanwhile, fuel security is likely to become an even more serious issue, providing an inevitable pressure on energy bills.

Energy efficient heating solutions therefore have an important role to play in reducing running costs and carbon emissions from our built environment.

Daikin is already ahead of this curve, with innovative heat pump solutions such as Daikin Altherma Flex, packaged heat pump and VRV heating-only systems, which optimise energy efficiency ahead of the very latest legislation.

Maximising the efficiency of commercial heating

As energy prices continue to rise, choosing a heat pump solution for your commercial property can provide major savings[1] on heating and hot water costs, by maximising the use of air source and solar renewable energy.

Daikin's heating solutions use renewable energy from the outdoor air to drive the heating process - even when the outside temperature is well below zero.

They generate 3-4 kW of usable heat for every 1 kW of electricity consumed, making these solutions much more energy efficient than heating systems that run entirely on fossil fuels.

What's more, a heating solution from Daikin can be integrated as part of a whole building management system, which can control up to 50% of the energy use of an entire building. An integrated solution can deliver a rapid payback through year on year energy savings, for a lower lifecycle cost.

Daikin's commercial heating solutions offer:

- Excellent energy efficiency
- Reduced running costs
- Low CO_2 emissions
- Modular products which can be scaled to your requirements
- A complete range of low and high temperature products
- Easy specification and installation
- Integration with solar thermal systems
- Space saving, low noise outdoor units
- High reliability for easy maintenance

[1] Savings of 46% compared with an oil boiler, assuming price of oil at 60p per litre, prices current at time of going to print in March 2012

Progressing towards a low carbon economy

Energy efficient heating solutions have never been so important in helping to meet all the latest planning guidelines and carbon targets.

Building Regulations Part L

Part L of the Building Regulations is one of the Government's key methods of reducing CO_2 emissions in new and refurbished buildings. Compliance with the current Part L regulations for non domestic buildings demands a reduction of at least 25% compared with the previous standard (Part L 2006).

Heating and hot water can account for up to 50% of the building's CO_2 emissions. The first step for designers to improve energy efficiency is to reduce the actual energy demand by improving the thermal efficiency of the building fabric. Highly insulated buildings are also increasingly suited to energy efficient solutions such as air source heat pumps.

Zero carbon targets

Today's buildings must achieve a 25% reduction in carbon emissions compared with 2006. But this isn't the end of the story as the UK strives to achieve its tough targets for further reductions in CO_2 emissions. A framework of continuous improvements has been set, with further revisions of the Building Regulations due in 2013 and 2019.

This means that by 2019, all new buildings must deliver zero carbon emissions from the energy required for heating, cooling, hot water and lighting. These challenging targets will require considerable innovations to improve on current practices.

The Carbon Reduction Commitment (CRC)

The CRC Energy Efficiency Scheme is a mandatory scheme aimed at improving energy efficiency and cutting emissions in large public and private sector organisations, which are responsible for around 10% of the UK's carbon emissions.

Qualifying organisations - including supermarkets, banks, water companies, universities, hospitals, local authorities and central Government departments - must comply legally with the scheme or face financial penalties.

The scheme also features an annual performance league table of more than 1300 organisations, which ranks participants on energy performance, encouraging organisations to develop energy management strategies. So the CRC Energy Efficiency Scheme provides both financial and reputational drivers for organisations to address the energy efficiency of their buildings and operations.

Shaping a sustainable built environment

Planning policies now have in-built renewables targets, while the Carbon Reduction Commitment Energy Efficiency Scheme provides a retrospective urge for organisations to improve energy efficiency - or pay the penalties….

The London Plan

The London Plan is the overall strategic plan for London, it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031.

One of the plans strategic targets is to reduce Londons CO_2 emissions by 60% from 1990 levels by 2025. In order to achieve this, the plan calls for further CO_2 reductions than those set out in the building regulations, thus setting tougher standards for developments in the capital.

To enable this, the London Plan sets out a clear energy hierachy:

1. Be lean: use less energy
2. Be clean: supply energy efficiently
3. Be green: use renewable energy

It advocates that "All major development proposals will seek to reduce carbon dioxide emissions by at least 20 per cent through the use of on-site renewable energy generation wherever feasible.

Development proposals should seek to utilise renewable energy technologies such as: biomass heating; cooling and electricity; renewable energy from waste; photovoltaics; solar water heating; wind and heat pumps."

Local planning policies

The Merton Rule is a planning policy that requires new commercial buildings of over 1,000 sq m to generate at least 10% of their energy needs using on site renewable energy equipment. [1]

First developed and implemented by Merton Council in 2003, the Merton Rule has since been implemented by many councils. In 2008, the UK government published its central planning guidance that requires all UK local planning authorities to adopt a "Merton rule" policy.

[1] Source: http://www.merton.gov.uk/environment/planning/planningpolicy/mertonrule/merton_rule_the_exact_policy_.htm

Designing for BREEAM

BREEAM is becoming one of the measures that defines a building's green credentials, ensuring that all aspects of the design, construction and building life cycle are taken into consideration.

The process is managed by BRE trained assessors, whose role is to ensure that the design of the building and its services meet the criteria specified with the BREEAM documentation. Specific credits can be given for integrated services, building management and pollution control. Further awards for innovation are also possible but will depend on the system design.

Many organisations and local governments are using BREEAM to ensure that both new build and existing premises will meet the exact requirements for CO_2 emission reductions. An example is the healthcare sector, which has designated that all new buildings must meet a BREEAM Excellent rating and existing building stock has to achieve a Very Good rating. Property agents are using BREEAM to promote the environmental credentials and benefits of a building to potential purchasers and tenants, while local governments can use BREEAM as a tool to aid Building Regulation compliance.

Heat pump technology is one of the system types that will assist building designers in meeting the requirements of BREEAM by delivering heat into a building in an energy efficient and controlled manner. Whether for low temperature under floor heating, domestic hot water requirements, or combined with other sources of heat generation, the overall effect will be to reduce the overall CO_2 footprint of a building.

Code for Sustainable Homes

The Code for Sustainable Homes (CfSH) was implemented in April 2007 as a voluntary standard designed to encourage construction of new homes to higher environmental and sustainable standards.

The energy requirements of CfSH Level 3 are designed to match the requirements of Building Regulations Part L. There are many local requirements to encourage new publically funded homes to meet CfSH Level 4 which can be easily achieved using a heat pump solution.

Daikin's renewable energy heating systems can help designers deliver homes with higher Code for Sustainable Homes ratings - and ultimately progress towards Zero Carbon design in new homes.

Heat pumps provide an answer…

We face increasing pressure to address the current and future challenges of:

> Reducing CO_2 emissions
> Implementing on site renewable technologies
> Achieving stringent planning and building regulations
> Reducing reliance on fossil fuels

Traditional heating practices must be reviewed, because 'business as usual' is simply no longer acceptable. A fundamental change is required in how we heat buildings in order to deliver a low carbon future. Heat pumps are more than capable of meeting such challenges:

> Advanced heat pump technology delivers high season efficiencies
> Recognised worldwide as a real renewable heating technology
> Deliver real running cost and CO_2 reductions
> Provide both heating and hot water for buildings

Integrated solutions deliver energy savings

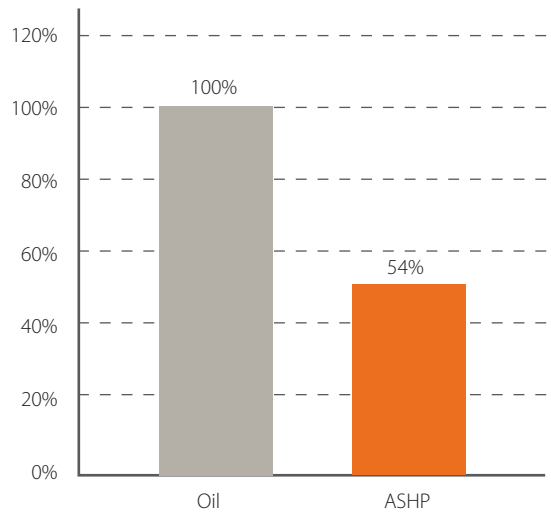
Daikin commercial heating range can be combined with ventilation systems, air curtains and hot water provision to create a fully integrated solution for optimum energy efficiency.

Scalable solutions

Daikin provides a full range of heating and renewable energy solutions, which are scalable and can be configured in different ways according to your particular requirements.

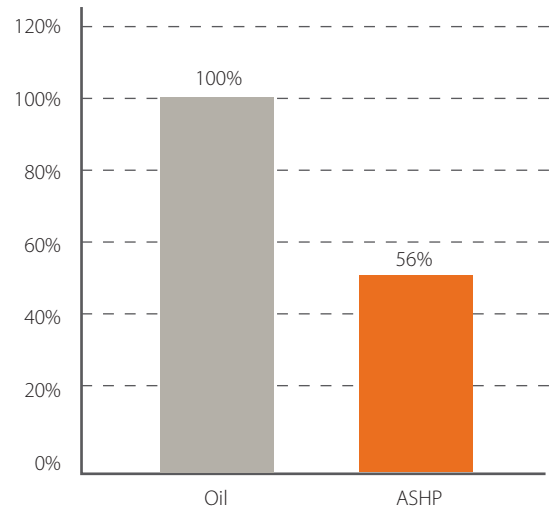
Daikin's comprehensive range of high and low temperature air source heat pumps , packaged heat pumps and heating only systems are suitable for all kinds of new build projects – whether commercial buildings, residential developments or major mixed use schemes.

Running cost



Electricity cost	11p / kWhr
Oil cost	60p / litre
Gas cost	3.8p / kWhr
Oil boiler efficiency	89%
Heat pump efficiency	300%

CO_2 emissions



CO2 emission rates taken from SAP2009

Electricity	0.517kg/kWhr
Oil	0.274kg/kWhr

How a heat pump works

Heat pumps extract latent heat from the outside air, even when the temperature outside is -20°C. They require a small amount of energy to deliver a higher heating output. For every unit of energy used by the heat pump in operation, three or more units of heat are generated for use in a building. The energy absorbed from the outside air is counted as renewable energy.

The vapour compression cycle

Heat pump technology is based around the vapour compression cycle. The cycle has 4 main steps:

> The working fluid contained in the heat pump is naturally colder than the outside air. This working fluid is passed through a heat exchanger in the outdoor unit. As it does so, it absorbs energy from the air which causes it to evaporate

> The vapour then enters the compressor, which increases the vapour pressure and, by doing so, also increases its temperature

> The hot vapour then enters a second heat exchanger, where it rejects its heat to either water (if an air source system) or air (if an air to air system). As it does so, it condenses into a liquid

> The liquid then passes through an expansion valve. By allowing the liquid to expand, it naturally reduces in temperature ready to start the cycle again.

Low temperature heat pump cycle

How a heat pump works…

Cascade heat pump technology

Daikin Altherma Flex Type uses two refrigerant cycles - R-410A and R-134a - to heat the water circuit. This cascade system attains pressures and temperatures that cannot be reached using just one refrigerant cycle. By doing so, it exploits the best characteristics of each of the two refrigeration cycles: the R-410A refrigerant circuit is excellent at low evaporating temperatures, while the R-134a circuit is excellent at high condensing temperatures. So the cascade technology optimises the performance of both refrigerant cycles.

Advantages over single refrigerant cycle heat pumps:

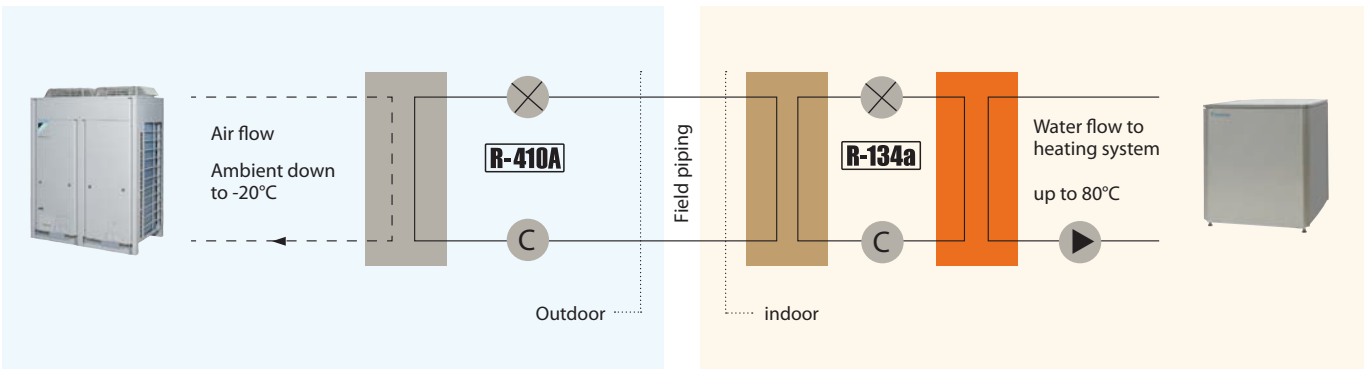
> Wide water temperature range (25°C – 80°C) means that all types of heat emitters can be connected, including under floor heating, fan coil units, low temperature radiators and existing radiators

> No reduction in efficiency with increasing water temperatures

> High capacities at low ambient temperatures

> No electrical heater required

High temperature cascade heat pump cycle



Heat exchanger Expansion valve Compressor Circulation pump

For apartment buildings and collective housing

- Seasonal COP of 3.0
- Weather compensation
- Highly insulated domestic hot water cylinder
- No electric heater required

Rushlight Awards 2011

In 2011 Daikin Altherma Flex Type won the Ground and Air Source Power award at the Rushlight Awards

Environmental & Energy Awards 2011

In 2011 the Innovation Award for Environmental Technology at the Environmental & Energy Awards was given to Daikin Altherma Flex Type.

National Heat Pump Awards 2011

In 2011 Daikin Altherma Flex Type won another award at the National Heat Pump Awards for Product Innovation of the Year.

Daikin Altherma Flex Type is the first heating system for apartments and collective housing that fully incorporates the use of renewable energy sources, making large residential buildings more environmentally sustainable by reducing primary energy usage - thus delivering lower running costs and CO_2 emissions.

A typical installation includes one outdoor unit (from 23 to 45kW) for up to 10 indoor units. Multiple outdoor units can be installed for larger applications.

Daikin Altherma Flex Type guarantees the perfect climate for indoor comfort, delivering heating and hot water all year round:

- High heating capacities, even at low ambient temperatures down to -20°C
- High cooling capacities, in combination with the heat pump convector or fan coil units
- Hot water can be produced up to 75°C, without the assistance of an electric heater

Heating

This 3-in-1 solution uses heat from the outside air and recovered from the cooling cycle to provide energy efficient heating and inexpensive hot water.

The outdoor unit extracts heat from the outdoor air, raises and transfers it at intermediate temperature to the individual indoor units (6, 9, 11, 14 and 16 kW).

The indoor units then raise the temperature further in the second refrigerant cycle and feed heated water to radiators, heat pump convectors or under floor heating units. If necessary, the indoor unit can also provide cooling.

Cooling

The second R-134a refrigerant cycle can be bypassed to offer efficient cooling. The R-410A refrigerant cycle is simply reversed, so the cool water circuit can be used to cool the rooms.

Effective heating and hot water

For commercial buildings

The perfect heating system

In places that require heating rather than cooling - such as hospitals, public buildings and schools - Daikin Altherma Flex Type can be configured to provide controllable heating via radiators, heat pump convectors and underfloor heating. A versatile system like this requires a range of temperatures from 35°C for underfloor heating up to 80°C for radiators. To do this cost effectively with minimal energy usage, a combination of heat pumps with cascade technology is the ideal solution.

Hot water heating up to 75°C

Thanks to the cascade technology, Daikin Altherma Flex Type can reach water temperatures of 75°C to heat up the hot water tank. This makes it highly efficient for the production of hot water.

- Hot water can be produced up to 75°C without electric heater back-up
- No electric heater is required for Legionella disinfection
- Seasonal COP of 3.0 for heating from 15°C to 60°C
- Heat-up time from 15° to 60°C in 70 minutes (200l tank)
- Equivalent hot water volume of 320l at 40°C (without reheating) for a 200l tank at a tank temperature of 60°C. Higher volumes of equivalent hot water are available with the 260l tank, or by using a higher tank temperature.

Quick heat up times

Daikin's unique combination of heat pump and cascade technology delivers rapid heat up times for space heating and hot water. This is particularly important in applications such as fitness centres, where spaces with low heating demand are counter-balanced by spaces with high hot water demand. The heat from one area can be recovered, instead of releasing it to the outside air, and 'reused' for heating or hot water production, thus reducing heat up times and lowering operating costs.

Tank volume sizes to your needs

Sometimes very large volumes of hot water are needed. That is why the Daikin Altherma Flex Type can be connected to all sizes of tank. To ensure the correct tank dimensioning for your specific hot water requirements, please contact your regional office.

Storage operation

At a pre-programmed time of the day, for example during low energy tariff periods, the indoor unit will heat up the hot water tank to a high storage temperature of about 75°C. To guarantee sufficient hot water throughout the day, the indoor unit will keep the tank at the pre-set reheat temperature.

Daikin Altherma Flex Type

Renowned for energy efficiency

Daikin Altherma Flex Type makes use of Daikin's renowned VRV® Technology, which continuously adjusts the circulating refrigerant volume in response to load variations in the connected indoor units.

The VRV® technology means that multiple indoor units can be connected to a single outdoor unit and the indoor units can operate independently of each other. So each apartment has control of its own heating, hot water and cooling, assuring total flexibility.

Inverter compressors

Daikin Altherma owes its remarkable low energy consumption to a unique combination of highly efficient inverter-controlled Daikin compressors, which have a variable operating point. This matches capacity exactly to the actual heating demand of the building. The ability to fully control the heat capacity of the outdoor unit also maximises comfort and minimises energy consumption.

Heat recovery

If heating and cooling is selected, heat absorbed while cooling one apartment can be recovered instead of being simply released into the air. This recovered heat can be used for:

> Hot water production in the same apartment

> Space heating and hot water production in other apartments

With the heat recovery function, energy efficiency is maximized, thus reducing electricity costs.

Modular System Design

For rapid installation

Modular system design

The modular design of the Daikin Altherma Flex Type means that consultants and architects can incorporate the system into any development project. A typical installation uses one outdoor unit (from 23 to 45 kW) for up to ten indoor units. Multiple outdoor units can be installed for larger applications. What's more, Daikin Altherma Flex Type range is designed to be installed quickly and flexibly, contributing to the timely completion of your project.

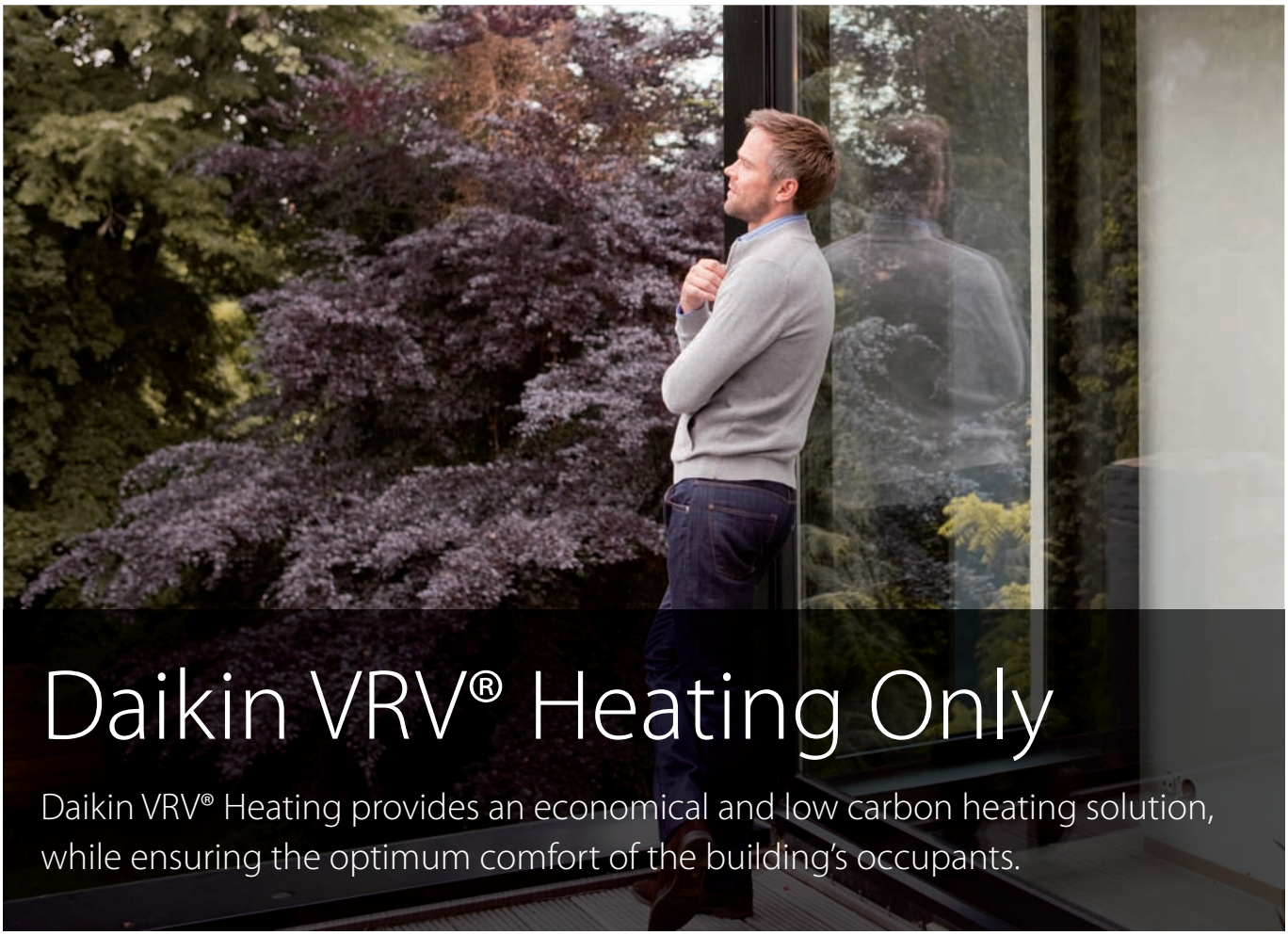
> The indoor units are fully equipped with all the required hydraulic components and can be connected directly to the heat distribution system
> The hot water tanks can be stacked on the indoor units. This limits the footprint (<0.6 m2 per apartment) and installation workload (quick-couplings)
> The outdoor unit is sufficiently compact to allow easy transportation. Thanks to its lightweight construction and vibration-free operation, floors do not need to be reinforced
> Daikin's piping system can be installed quickly and easily thanks to its small refrigerant pipes and refnet piping options

Reduced project timescales

By using our selection and dimensioning tools, it is easy to design a single solution for heating, cooling and hot water. Daikin's advanced piping design and the elimination of heat exhaust systems means that Daikin Altherma Flex Type can be integrated easily into any building, thus saving on installation time and adding value to the project.

Quick installation

Our systems are dispatched from the factory with all the hydraulic components pre-fitted and ready to be connected to the external piping. This makes them quicker and easier to install, especially when multiple elements are involved, as there's no need for on-site configuration. Installing hot water tanks on top of the system's indoor units using Daikin's 'plug-and-play' functionality saves additional time.



Daikin VRV® Heating Only

Daikin VRV® Heating provides an economical and low carbon heating solution, while ensuring the optimum comfort of the building's occupants.

The VRV® Heating Only system by Daikin is an air to air heat pump system that uses renewable energy from the outdoor air to drive the heating process. It generates 4 kW of usable heat for every 1 kW of electricity consumed, which makes it much more efficient than heating systems that burn fossil fuels. VRV® Heating Only is ideal for buildings in which cooling is not required in summer and which have different zones with individual heating requirements.

Inverter controlled efficiencies

At the heart of the VRV system is Daikin's renowned heat pump and inverter technology. VRV® Heating Only uses inverter control of the compressor speed, so that it adapts the heating output to match the actual building demand. Once the rooms are at their optimum temperature, the system generates just enough heat to efficiently maintain comfort levels.

VRV® Heating Only also quickly responds to any changes in outdoor and indoor temperatures, so occupants enjoy optimum temperatures, ventilation and humidity, while the system operates at peak efficiency.

Flexible installation options

Outdoor units from 25 to 170 kW support up to 64 separate indoor units, with each indoor unit receiving exactly the heat it needs. Long piping lengths are possible and the system's modular construction results in quick installation. Start-up costs can be spread with phased installation, and of course, there is no longer any need for fuel storage tanks and pumps.

Wide range of indoor units

Fifteen different indoor units are supported, including ceiling mounted, floor-standing and wall mounted models. Ventilation and Biddle air curtains can be integrated, and the system supports a wide range of control possibilities, including remote online monitoring of multiple buildings.

Zone by zone control

A zone by zone control strategy means that you can adjust individual comfort settings in each room and practice smart energy management by controlling where heating is switched on. VRV® offers user-friendly control options for maximum efficiency and versatility, so you can integrate climate control within an entire building management system.

Daikin offers a wider range of stylish indoor units to suit all requirements, including floor and wall mounted, ducted units and concealed or ceiling mounted cassettes. So you can choose exactly the right units to blend in with the interior scheme.

	Nominal heating capacity kW	1.9	2.5	3.2	4.0	5.0	6.3	8.0	9.0	10.0	12.5	16.0	18.0	25.0	31.5
Ceiling mounted cassette	FXFQ-P9		✓	✓	✓	✓	✓	✓		✓	✓	✓			
	FXZQ-M9	✓	✓	✓	✓	✓	✓								
	FXCQ-M8		✓	✓	✓	✓	✓	✓		✓		✓			
	FXKQ-MA			✓	✓	✓		✓							
Concealed ceiling unit	FXDQ-M9		✓	✓											
	FXDQ-P7	✓	✓	✓	✓	✓	✓	✓							
	FXSQ-P		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		
	FXMQ-P7		✓	✓	✓	✓	✓	✓		✓	✓	✓			
	FXMQ-MA													✓	✓
Wall mounted unit	FXAQ-P	✓	✓	✓	✓	✓	✓	✓							
Ceiling suspended unit	FXHQ-MA				✓			✓			✓				
	FXUQ-MA								✓		✓	✓			
Floor standing unit	FXNQ-P		✓	✓	✓	✓	✓	✓							
	FXLQ-P		✓	✓	✓	✓	✓	✓							

Packaged inverter heat pump

A packaged heat pump system is ideal for larger buildings where efficiency and economy are vital for low lifecycle costs. Daikin offers a wide range of packaged inverter heat pumps. The EWA/YQ-BA series is a new range of large capacity air source heat pumps.

Benefits of inverter technology

The use of inverter driven compressors in our heat pumps provides high partial load efficiencies making them ideal for systems with variable load requirements. The integrated inverter in the EWA/YQ~BA range adjusts both compressor and fan speed to the actual heating/cooling demand, ensuring the heat pump operates at optimal efficiency. Power consuming starts and stops are also reduced, since the compressor operates for longer periods at optimal efficiency.

As it consumes only the power needed to match the load, the inverter reduces annual energy consumption and operational costs. Inverter technology also delivers:

> Lower sound levels at partial load conditions

> High precision on water flow temperatures

The air cooled EWA/YQ~BA range offers:

> 7 sizes from 16 kW up to 75 kW

> Flow temperature upto 50°C

> Wide operation range

> Weather compensation

> Master/slave control up to 16 unit

> Easily accessible serviced parts, simplifying maintenance

> Multiple inverter scroll compressors

> Reduced service

> High efficiency inverter fans

> Low lifecycle costs

> Advanced controls

Dedicated service from Daikin UK

At Daikin UK, we aim to anticipate the future needs of our customers. As well as remaining at the forefront of technological innovation, that means offering the very highest standards of service to all our clients, both large and small.

Training for best practice

As part of Daikin UK's commitment to quality, we offer customised product training at our industry leading technology centres in Birmingham, Bristol, Glasgow, Manchester and Woking. These training courses are designed to raise standards, set industry benchmarks and help to develop both product and service expertise to support best practice in the industry.

Investment in skills

Daikin partners with specialist technical colleges - City of Bath College, College of North West London, Dudley College and West Suffolk College. This investment in the very highest standards of skills training ensures that Daikin trained engineers have the necessary expertise to deliver the highly energy efficient heating systems on which our homes and businesses will depend.

Application assistance

When it comes to system design, we can provide application design assistance and technical support every stage. Dedicated software tools are available to help specifiers design the optimum solution. Daikin Specified Solutions Engineers are available to assist.

Dedicated sales advice

As part of our commitment to ongoing service and quality, Daikin offers pre-sales and after-sales support and advice at all regional offices. Our dedicated sales teams include our Corporate Clients division, which develops the best possible framework agreements for national operators, while our network of regional offices will provide local expertise, technical advice and design support for individual projects.

Specialist on-site support

Daikin UK has a team of expert engineers based at our regional offices nationwide, operating throughout the country to assure satisfaction for our customers. If you require additional support with installations, you can rely on a quick response from a highly qualified Daikin UK engineer.

Daikin product warranty

Daikin offer industry leading comprehensive warranties for extra peace of mind supported by our nationwide network of engineers.

Comprehensive service support

Daikin UK offers comprehensive service support for all heating and renewable products:

> Expert and experienced advice

> Local fast response

> Nationwide network of Daikin trained service engineers

Altherma Flex Type schematics

The Altherma Flex Type is an exceptionally flexible product that is both modular and easily scalable to meet even the most diverse heating and hot water requirements

The following simple schematics have been provided to give a glimpse of the many configurations possible, they cover:

> Low temperature hot water to 4 heating circuits plus domestic hot water

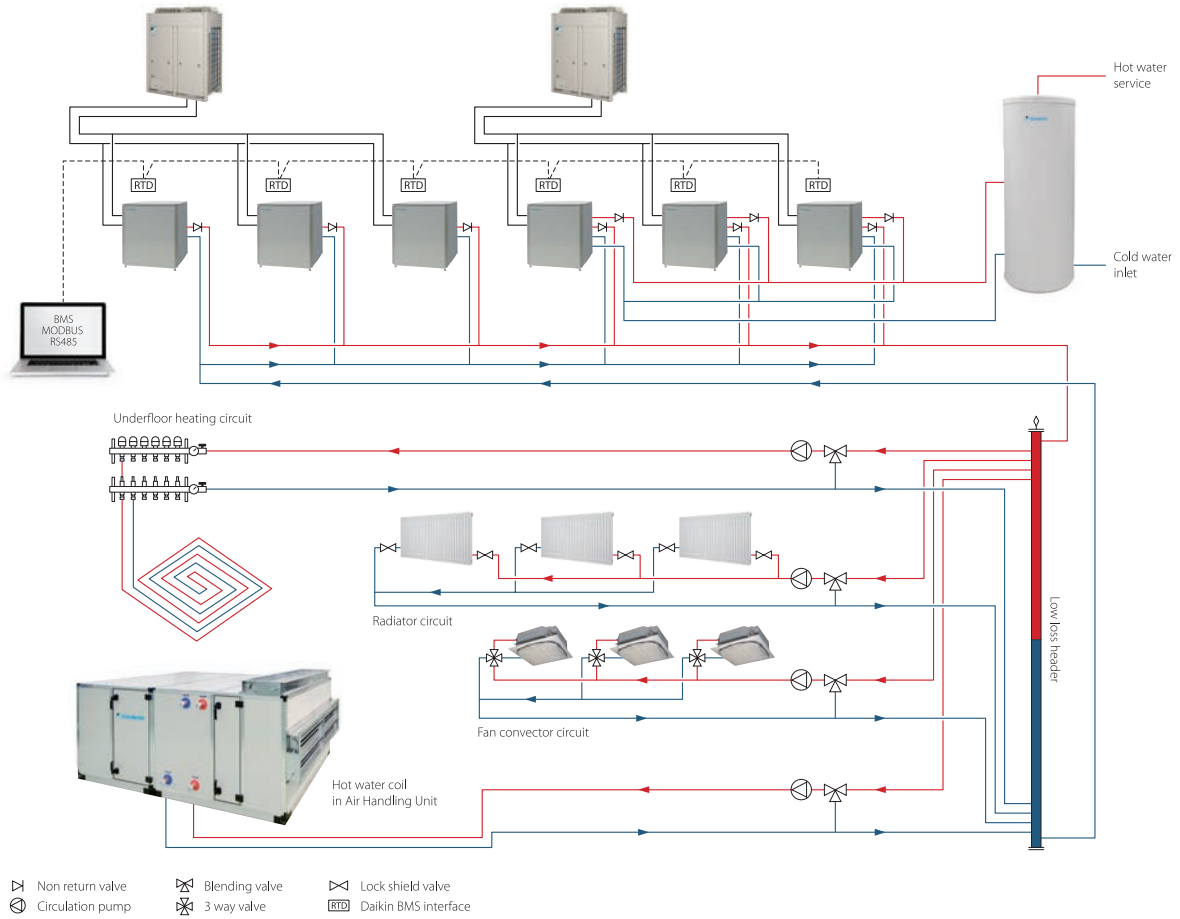
> Low temperature hot water to heating circuits plus solar thermal domestic hot water

> Domestic hot water only via 3rd party calorifier

> Altherma Flex Type for apartments

The diagram below illustrates an example layout of how the Altherma Flex Type can be configured. The system provides hot water to a number of separate heating circuits: underfloor heating, radiators, fan coil units, air handling unit and calorifier for domestic hot water. Air source heat pump supplies a common flow temperature to the low loss header and each circuit has its own temperature reducing device to enable independent flow temperature control.

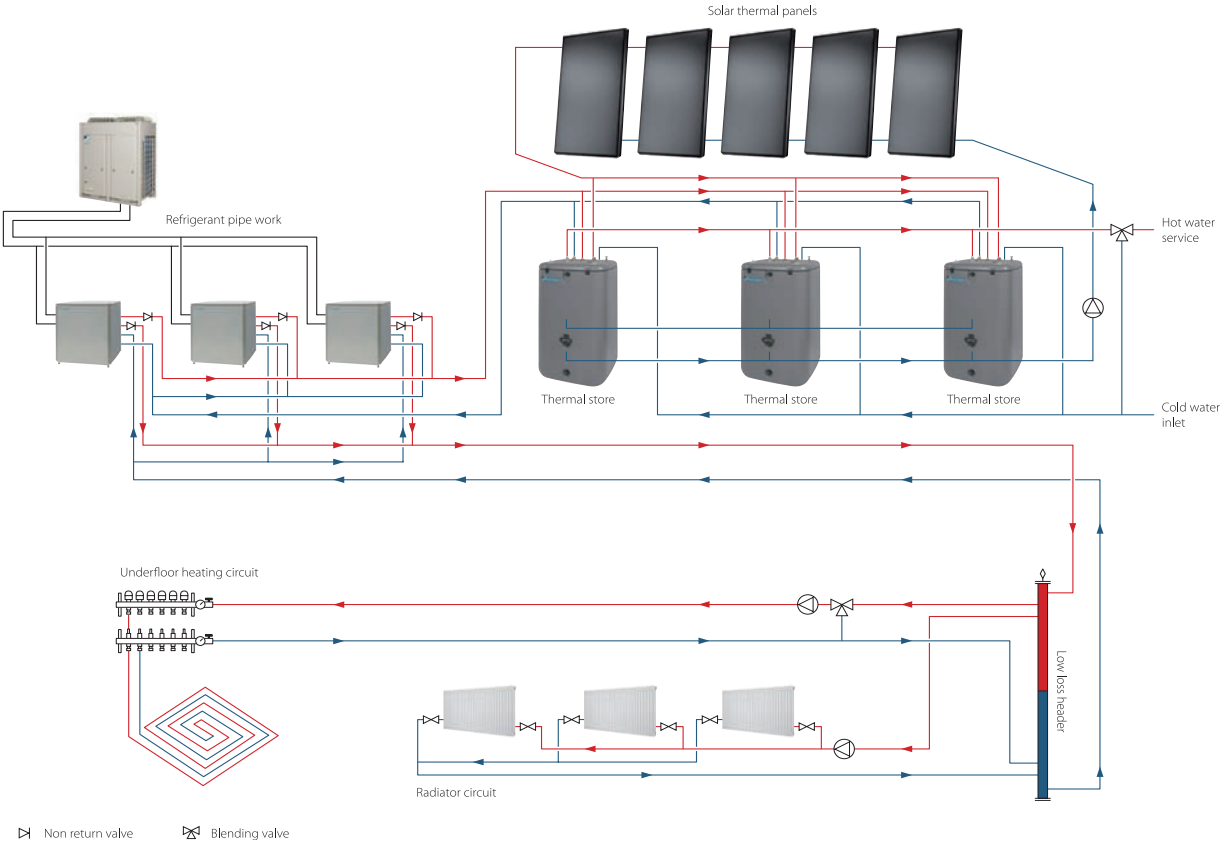
LTHW to 4 heating circuits plus domestic hot water



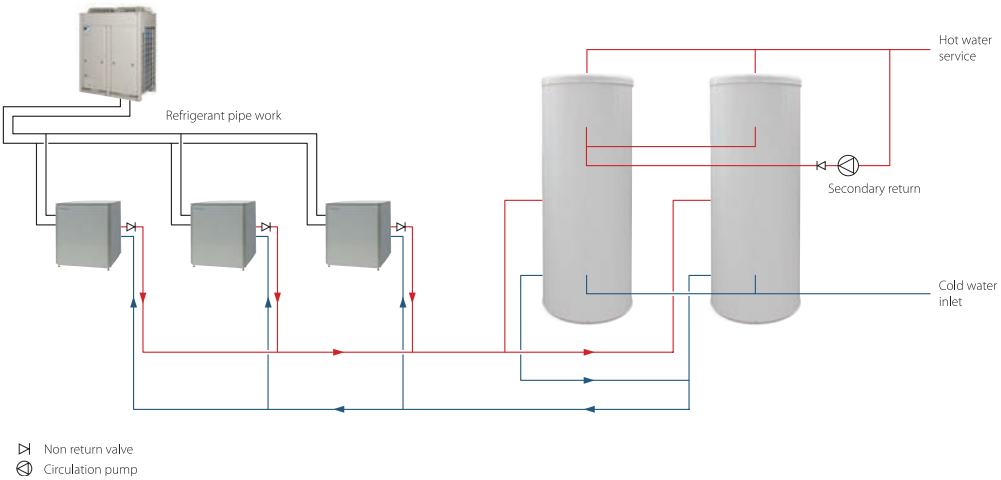
Altherma Flex Type schematics

LTHW to heating circuits plus solar thermal domestic hot water

The example system provides hot water to a number of heating circuits via a low loss header. Additionally, the domestic hot water is heated in thermal stores via Daikin solar thermal panels, backed up by the air source heat pump when solar energy is not available.



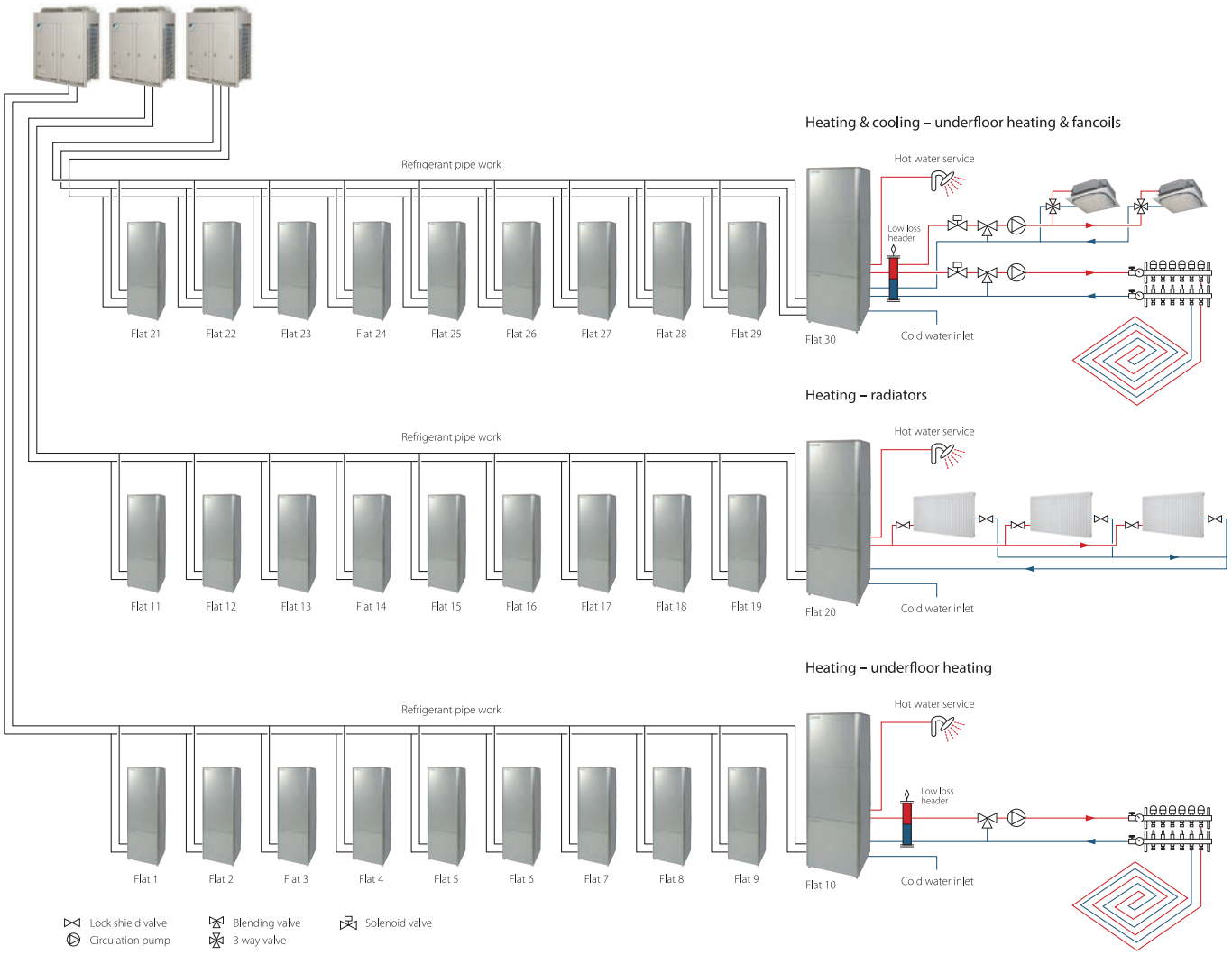
This example system shows how Daikin Altherma Flex Type can be configured for domestic hot water only. The system can be connected to either multiple Daikin domestic hot water cylinders or 3rd party calorifiers.



Altherma Flex Type schematics

Altherma Flex Type for Apartments

The below diagram illustrates an example layout of both indoor and outdoor units. The final unit in each system shows an example layout within apartments. System 1 shows radiators and domestic hot water. System 2 shows underfloor heating and domestic hot water. System 3 shows underfloor heating, domestic hot water and fan coils to provide cooling.



Altherma Flex Type

6kW to 9kW

					Heating only		Heating & Cooling	
Indoor unit					EKHVMRD50A	EKHVMRD80A	EKHVMYD50A	EKHVMYD80A
Casing	Colour				Metallic grey		Metallic grey	
	Material				Precoated sheet metal		Precoated sheet metal	
Dimensions	Unit	HeightxWidthxDepth		mm	705x600x695		705x600x695	
Weight	Unit			kg	92		120	
Operation range	Heating	Ambient	Min.~Max.	°C	-15~20		-15~20	
		Water side	Min.~Max.	°C	25~80		25~80	
	Cooling	Ambient	Min.~Max.	°C	-		10~43	
		Water side	Min.~Max.	°C	-		5 ~20	
	Domestic hot water	Ambient	Min.~Max.	°CDB	-15~35		-15~35	
		Water side	Min.~Max.	°C	45~75		45~75	
Refrigerant	Type				R-134a		R-134a	
	Charge			kg	2		2	
Sound pressure level	Nom.			dBA	40 / 43	42 / 43	40 / 43	42 / 43
	Night quiet mode	Level 1		dBA	38		38	
Power supply	Name				V1		V1	
	Phase				1~		1~	
	Frequency			Hz	50		50	
	Voltage			V	220-240		220-240	
Current	Recommended fuses			A	20		20	

Heating only - 11kW to 16kW

Indoor unit					EKHBRD011ACV1	EKHBRD014ACV1	EKHBRD016ACV1	EKHBRD011ACY1	EKHBRD014ACY1	EKHBRD016ACY1
Casing	Colour				Metallic grey			Metallic grey		
	Material				Precoated sheet metal			Precoated sheet metal		
Dimensions	Unit	HeightxWidthxDepth		mm	705x600x695			705x600x695		
Weight	Unit			kg	144,25			147,25		
Operation range	Heating	Ambient	Min.~Max.	°C	-20 ~20			-20 ~20		
		Water side	Min.~Max.	°C	25~80			25~80		
	Domestic hot water	Ambient	Min.~Max.	°CDB	-20~35			-20~35		
		Water side	Min.~Max.	°C	25~80			25~80		
Refrigerant	Type				R-134a			R-134a		
	Charge			kg	3,2			3,2		
Sound pressure level	Nom.			dBA	43 / 46	45 / 46	46 / 46	43 / 43	45 / 45	46 / 46
	Night quiet mode	Level 1		dBA	40	43	45	40	43	45
Power supply	Name				V1			Y1		
	Phase				1~			3~		
	Frequency			Hz	50			50		
	Voltage			V	220-240			380-415		
Current	Recommended fuses			A	25			16		

Altherma Flex Type

Domestic hot water tank: Overview

Functions	1/ EKHTS-A	2/ EKHWP-A
Preferred application	Domestic hot water only	Domestic hot water – possibility for solar connection
Operation	The water stored in the tank is used for domestic hot water	Domestic hot water is not stored in the tank but flows through the tank's coil

EKHTS – domestic hot water only

> Available in 200 and 260 litres

> Efficient temperature heat-up: from 15°C to 60°C in 70 minutes

DOMESTIC HOT WATER TANK				EKHTS200AC	EKHTS260AC
Casing	Colour			Metallic grey	
	Material			Galvanised steel (precoated sheet metal)	
Dimensions	Unit	Height/Integrated on indoor unit/Width/Depth	mm	1,335/2,010/600/695	1,335/2,285/600/695
Weight	Unit	Empty	kg	70	78
Heat exchanger	Quantity			1	
	Tube material			Duplex steel (EN 1.4162)	
	Face area		m^2	1.56	
	Internal coil volume		l	7.5	
Tank	Water volume		l	200	260
	Material			Stainless steel (EN 1.4521)	
	Maximum water temperature		°C	75	
	Insulation		mm	80mm polystyrene	
	Heat loss / 24 hour △t 45°C		kW	1.2	1.5

Heat recovery

Outdoor unit					EMRQ8A	EMRQ10A	EMRQ12A	EMRQ14A	EMRQ16A
Heating capacity	Nom.			kW	22,4 (1)	28 (1)	33,6 (1)	39,2 (1)	44,8 (1)
Cooling capacity	Nom.			kW	20 (2)	25 (2)	30 (2)	35 (2)	40 (2)
Dimensions	Unit	HeightxWidthxDepth		mm	1,680x1,300x765				
Weight	Unit			kg	331			339	
Operation range	Heating	Min.~Max.		°CWB	-15~20				
	Domestic hot water	Ambient	Min.~Max.	°CDB	-15~35				
	Cooling	Min.~Max.		°CDB	10~43				
Refrigerant	Type				R-410A				
Piping connections	Liquid	OD		mm	9,52		12,7		
	Suction	OD		mm	19,1	22,2	28,6		
	High and low pressure gas	OD		mm	15,9	19,1		22,2	
	Piping length	OU - IU	Max.	m	100				
		System	Equivalent	m	120				
	Total piping length	System	Actual	m	300				
Sound power level	Heating	Nom.		dBA	78		80	83	84
Sound pressure level	Heating	Nom.		dBA	58		60	62	63
Power supply	Phase/Voltage			V	3~/380-415				

(1) Condition: Ta=7°CDB/6°CWB, 100% connection ratio (2) Condition: Ta=35°CDB, 100% connection ratio

Altherma Flex Type

Domestic hot water with possibility for solar connection

Drainback solar system

> Environmentally friendly and energy efficient
> Solar panels can produce up to 60% of the energy needed for hot water production – a major cost saving
> Specialised coatings make our solar panels highly energy efficient – all shortwave solar energy is transferred into heat
> The solar panels are charged with water only when needed for heating – avoiding the need for 'anti-freeze' protection

SOLAR COLLECTOR				EKSV26P	EKSH26P
Dimensions	Unit	HeightxWidthxDepth	mm	2,000x1,300x85	1,300x2,000x85
Weight	Unit		kg	43	
Volume			l	1.7	2.1
Surface	Outer		m^2	2.601	
	Aperture		m^2	2.364	
	Absorber		m^2	2.354	
Coating				Micro-therm (absorption max.96%, Emission ca. 5% +/-2%)	
Absorber				Harp-shaped copper pipe register with laser-welded highly selective coated aluminium plate	
Glazing				Single pane safety glass, transmission +/- 92%	
Allowed roof angle	Min.~Max.		°	15~80	
Operating pressure	Max.		bar	6	
Stand still temperature	Max.		°C	200	
Thermal performance	Zero loss collector efficiency η0		%	78.7	
	Heat loss coefficient a1		$W/m^2.K$	4,270	
	Temperature dependence of the heat loss coefficient a2		$W/m^2.K^2$	0.0070	
	Thermal capacity		kJ/K	6.5	
	Incident angle modifier	AM at 50°		0.94	
Installed position				Vertical	Horizontal

Domestic hot water tank

> Available in 300 and 500 litres
> (Pre-) heat the water for your heating system with solar energy

DOMESTIC HOT WATER TANK				EKHWP300A	EKHWP500A
Casing	Colour			Dust grey (RAL7037)	
	Material			Impact resistant polypropylene	
Weight	Unit	Empty	kg	59	92
Heat exchanger	Domestic hot water	Tube material		Stainless steel (DIN 1.4404)	
		Face area	m^2	5.7	5.9
		Internal coil volume	l	27.8	28.4
		Operating pressure	bar	6	
		Average specifc thermal output	W/K	2,795	2,860
	Charging	Tube material		Stainless steel (DIN 1.4404)	
		Face area	m^2	2.5	3.7
		Internal coil volume	l	12.3	17.4
		Average specifc thermal output	W/K	1,235	1,809
	Auxiliary solar heating	Tube material		Stainless steel (DIN 1.4404)	
		Face area	m^2	-	1.0
		Internal coil volume	l	-	5
		Average specifc thermal output	W/K	-	313
Tank	Water volume		l	300	500
	Maximum water temperature		°C	85	

Pump station

> The pump station ensures that the correct water pressure and flow rates are maintained for optimum efficiency

Solar connection				EKSRPS3
Dimensions	Unit	HeightxWidthxDepth	mm	332 x 230 x 145
Control	Type			Digital temperature difference controller with plain text display
	Power consumption		W	2
Mounting				On side of tank
Sensor	Solar panel temperature sensor			Pt1000
	Storage tank sensor			PTC
	Return flow sensor			PTC
	Feed temperature and flow sensor			Voltage signal (3.5V DC)

VRV Heating Only

Heating only

Outdoor unit					RXHQ8P9	RXHQ10P9	RXHQ12P9	RXHQ14P9	RXHQ16P9	RXHQ18P9
System	Outdoor unit module 1				RXHQ8P	RXHQ10P	RXHQ12P	RXHQ14P	RXHQ16P	RXHQ18P
Capacity range				HP	8	10	12	14	16	18
Heating capacity	Nom.			kW	25.0	31.5	37.5	45.0	50.0	56.5
Power input - 50Hz	Heating	Nom.		kW	5.56	7.70	9.44	11.30	12.90	15.30
COP					4.50	4.09	3.97	3.98	3.88	3.69
Maximum number of connectable indoor units					17	21	26	30	34	39
Indoor index connection	Min.				100	125	150	175	200	225
	Nom.				200	250	300	350	400	450
	Max.				260	325	390	455	520	585
Dimensions	Unit	HeightxWidthxDepth		mm	1,680x930x765			1,680x1,240x765		
Weight	Unit			kg	187	240		316		324
Sound pressure level	Heating	Nom.		dBA	61		64			67
Operation range	Heating	Min.~Max.		°CWB	-20.0~15.0					
Refrigerant	Type				R-410A					
Piping connections	Liquid	OD		mm	9.52		12.7			15.9
	Gas	OD		mm	19.1	22.2	28.6			
	Piping length	OU - IU	Max.	m	165					
	Total piping length	System	Actual	m	1,000					
	Level difference	OU - IU		m	50 (Outdoor unit in highest position) /40 (Indoor unit in highest position)					
Power supply	Phase/Frequency/Voltage			Hz/V	3N~/50/400					
Current - 50Hz	Maximum fuse amps (MFA)			A	25			40		

Outdoor unit					RXHQ20P9	RXHQ22P9	RXHQ24P9	RXHQ26P9	RXHQ28P9	RXHQ30P9	RXHQ32P9	RXHQ34P9	RXHQ36P9
System	Outdoor unit module 1				RXHQ8P	RXHQ10P	RXHQ12P	RXHQ8P	RXHQ10P	RXHQ12P	RXHQ14P	RXHQ16P	RXHQ18P
	Outdoor unit module 2				RXHQ12P			RXHQ18P					
Capacity range				HP	20	22	24	26	28	30	32	34	36
Heating capacity	Nom.			kW	62.50	69.00	75.00	81.50	88.00	94.00	102.00	107.00	113.00
Power input - 50Hz	Heating	Nom.		kW	14.95	17.08	18.89	20.69	22.98	24.67	26.63	28.23	30.62
COP					4.18	4.04	3.97	3.94	3.83	3.81	3.83	3.79	3.69
Maximum number of connectable indoor units					43	47	52	56	60	64			
Indoor index connection	Min.				250	275	300	325	350	375	400	425	450
	Nom.				500	550	600	650	700	750	800	850	900
	Max.				650	715	780	845	910	975	1,040	1,105	1,170
Sound pressure level	Heating	Nom.		dBA	66		67	68		69			70
Piping connections	Liquid	OD		mm	15.9			19.1					
	Gas	OD		mm	28.6		34.9						41.3
	Piping length	OU - IU	Max.	m	165								
	Total piping length	System	Actual	m	1,000								
	Level difference	OU - IU		m	50 (Outdoor unit in highest position) /40 (Indoor unit in highest position)								
Power supply	Phase/Frequency/Voltage			Hz/V	3N~/50/400								
Current - 50Hz	Maximum fuse amps (MFA)			A	50			63			80		

Outdoor unit					RXHQ38P9	RXHQ40P9	RXHQ42P9	RXHQ44P9	RXHQ46P9	RXHQ48P9	RXHQ50P9	RXHQ52P9	RXHQ54P9
System	Outdoor unit module 1				RXHQ8P	RXHQ10P	RXHQ12P	RXHQ8P	RXHQ10P	RXHQ12P	RXHQ14P	RXHQ16P	RXHQ18P
	Outdoor unit module 2				RXHQ12P			RXHQ18P					
Capacity range				HP	38	40	42	44	46	48	50	52	54
Heating capacity	Nom.			kW	119.00	126.00	132.00	138.00	145.00	151.00	158.00	163.00	170.00
Power input - 50Hz	Heating	Nom.		kW	30.13	32.39	34.20	35.94	38.26	39.95	41.91	43.47	45.95
COP					3.95	3.89	3.86	3.84	3.79	3.78	3.77	3.75	3.70
Maximum number of connectable indoor units					64								
Indoor index connection	Min.				475	500	525	550	575	600	625	650	675
	Nom.				950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,350
	Max.				1,235	1,300	1,365	1,430	1,495	1,560	1,625	1,690	1,755
Sound pressure level	Heating	Nom.		dBA	69		70	71					72
Piping connections	Liquid	OD		mm	19.1								
	Gas	OD		mm	41.3								
	Piping length	OU - IU	Max.	m	165								
	Total piping length	System	Actual	m	1,000								
	Level difference	OU - IU		m	50 (Outdoor unit in highest position) /40 (Indoor unit in highest position)								
Power supply	Phase/Frequency/Voltage			Hz/V	3N~/50/400								
Current - 50Hz	Maximum fuse amps (MFA)			A	100						125		

Packaged Inverter Heat Pump

Heating & Cooling

Capacity class					016	021	025	032	040	050	064
Cooling capacity	Nom.			kW	16.8	21.0	25.2	31.5	42.0	50.4	63.0
Heating capacity	Nom.			kW	16.8	21.0	25.2	31.5	42.0	50.4	63.0
Capacity control	Method				Inverter controlled						
	Minimum capacity			%	25						
Power input	Cooling	Nom.		kW	5.57	7.25	9.25	12.9	14.9	19.0	26.7
	Heating	Nom.		kW	5.51	7.09	8.87	10.5	14.2	17.8	21.0
EER					3.01	2.90	2.72	2.44	2.82	2.65	2.36
ESEER					4.75	4.65	4.45	4.00	4.60	4.40	3.95
COP					3.05	2.96	2.84	3.00	2.96	2.83	3.00
Dimensions	Unit	HeightxWidthxDepth		mm	1,684x1,371x774			1,684x1,684x774	1,684x2,358x780		1,684x2,980x780
Weight	Unit			kg	264	317		397	571		730
	Operation weight			kg	267	320		401	577		738
Water heat exchanger	Type				Brazed plate						
	Water volume			l	1			2	3		5
	Nominal water flow	Cooling		l/min	48	60	72	90	120	144	181
		Heating		l/min	48	60	72	90	120	144	181
	Nominal water pressure drop	Cooling	Total	kPa	20	30	42	30		42	30
Air heat exchanger	Type				Hi-XSS						
Fan	Air flow rate	Cooling	Nom.	m^3/min	171	185		233	370		466.0
		Heating	Nom.	m^3/min	171	185		233	370		466
Sound power level	Cooling	Nom.		dBA	78		80		81	83	
Compressor	Type				Hermetically sealed scroll compressor						
Operation range	Water side	Cooling	Min.~Max.	°CDB	5~20						
		Heating	Min.~Max.	°CDB	25~50						
	Air side	Cooling	Min.~Max.	°CDB	-5~43						
		Heating	Min.~Max.	°CDB	-15~35						
Refrigerant	Type				R-410A						
	Charge			kg	7.6			9.6	15.2		19.2
	Control				Electronic expansion valve						
	Circuits	Quantity			1						
Water circuit	Piping			inch	1-1/4"				1-1/2"		
Power supply	Phase/Frequency/Voltage			Hz/V	3N~/50/400						

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Daikin Europe N.V. participates in the Eurovent Certification Programme for Air Conditioners (AC), Liquid Chilling Packages (LCP) and Fan Coil Units (FC); the certified data of certified models are listed in the Eurovent Directory. Multi units are Eurovent certified for combinations up to 2 indoor units. VRV products, Rooftops, FWB-J and FWD-units are not within the scope of the Eurovent Certification Programme.

CE

Daikin units comply with the European regulations that guarantee the safety of the product.

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