

Ventilation

Product catalogue 2020
for professionals



Fresh air for the residential and commercial sector
Heat recovery ventilation and air handling applications

MODULAR L (SMART)



D-AHU MODULAR R

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Widest range of DX integrated ventilation on the market

Daikin offers a variety of solutions from small energy recovery ventilation to large-scale air handling units for the provision of fresh air ventilation to homes, or commercial premises.

Ventilation solutions

Daikin offers state-of-the-art ventilation solutions that can easily be integrated into any project:

- › **Unique portfolio** within DX manufacturers
- › High-quality solutions complying with the **highest Daikin quality standards**
- › **Seamless integration** of all products to provide the best indoor climate
- › All Daikin products connected to a single controller for **complete control** of the HVAC system.

Energy Recovery Ventilation

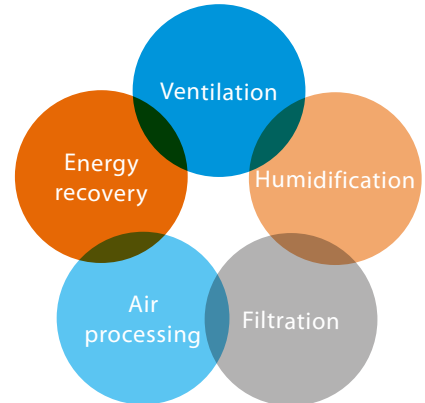
Our energy recovery units **recover sensible energy** (Modular L Pro / Modular L Smart) or **total (sensible + latent) energy** (VAM/VKM), substantially reducing the load on the air conditioning system up to 40%.

Ventilation with DX connection - Control over fresh air temperature

Daikin offers a range of inverter condensing units to be used in combination with Daikin AHUs for ultimate control over the fresh air. There are four control possibilities when **combining AHU and Daikin outdoor units** hence offering all the required flexibility for any installation. Indoor units can be combined to the same outdoor unit to reduce the installation costs. For **false-ceiling installations** where space is a constraint, the VKM can fit perfectly to deliver fresh air at a comfortable temperature and it has an optional humidification element.

Five components of indoor air quality

- › **Ventilation:** Ensures the provision of fresh air
- › **Energy recovery:** Delivers energy savings by transferring heat and moisture between airflows
- › **Air processing:** Delivers the right supply temperature to decrease the indoor unit load
- › **Humidification:** Ensures relative indoor humidity levels are respected
- › **Filtration:** Separates pollen, dust and pollution odours that are harmful to individuals' health



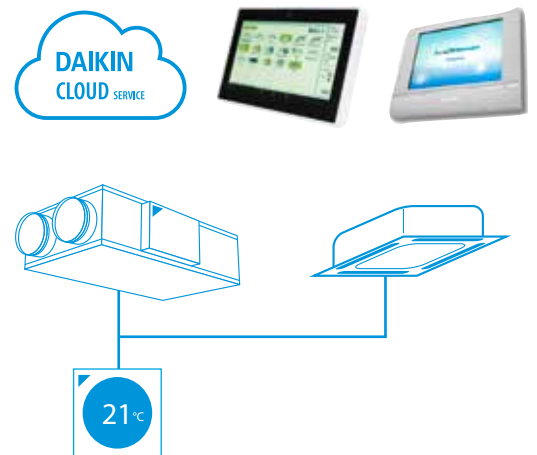
Fresh air portfolio



Five reasons why Daikin's ventilation range is unique in the market

1 Market leading controls & connectivity

- › Interlock of ventilation and air conditioning system
 - Control ERV/HRV and air conditioning from the same controller
 - Aligns the operation mode between the systems to save energy
- › Easy integration in the total solution
 - Online control and monitoring via the Daikin Cloud Service
 - Full portfolio integration in the intelligent Touch Manager, Daikin's cost-effective mini BMS
- › User-friendly controller with premium design
 - Intuitive touch button control



Madoka



red dot award 2018 winner

2 Unique installation benefits

- › Integrates seamlessly in the Daikin total solution, ensuring a single point of contact
- › Total fresh air solution with Daikin supplying both the VAM/Modular L Smart and the electrical heater
- › Daikin AHU and condensing unit connect Plug & Play, factory mounted controls, expansion valves, etc.





3 High energy efficiency

- › Energy recovery of up to 92%, reducing running costs
- › Free night-time cooling using fresh outside air
- › EC Fan Technology
- › ErP compliant



4 Best comfort

- › Wide range of units to control fresh air and humidity
- › Wide range of optional filters to suit the application available up to ePM₁ 80% (F9)
- › Special paper heat exchanger recovers heat and moisture from extract air to warm up and humidify fresh air to comfortable levels (VAM, VKM)



5 Top reliability

- › Most extensive testing before new units leave the factory
- › Widest support network and after sales service
- › All spare parts available in Europe



Did you know?

CO₂ levels and ventilation rates all have significant, independent impacts on cognitive function:

COGNITIVE FUNCTION SCORES ...



+ 61%
IN GREEN BUILDING
CONDITIONS



+ 101%
IN ENHANCED
GREEN BUILDING CONDITIONS

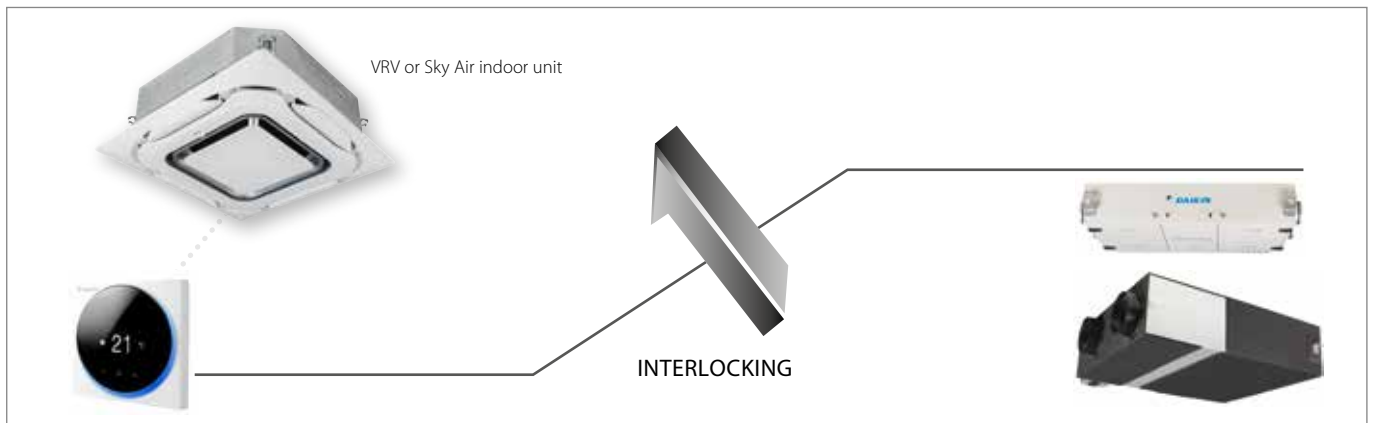


1 Market leading controls & connectivity

Interlock of the ventilation operation with the air conditioner operation

Interlock of the ventilation operation with the air conditioner operation greatly simplifies overall system control. The same remote controller provides air conditioning and ventilation functions.

By incorporating a variety of centralised control equipments, the user can build a large, high grade centralised control system.



Madoka

User-friendly wired remote controller with premium design



BRC1H519W7/S7/K7

- › Sleek and elegant design
- › Intuitive touch button control
- › Three colour versions
- › Advanced settings and monitoring can be easily done via your smartphone
- › Flat back for easy wall installation
- › Compact to fit standard size socket boxes



reddot award 2018 winner



Advanced user settings



Field settings

Plug & Play - integrated ventilation

- › One-stop shop for all system components, which results in streamlined design and business solutions
- › Efficient project follow-up, installation and subsequent commissioning and maintenance
- › Ventilation easily interlocked to air conditioner operation thanks to simplified system control



2 Easy and flexible installation

High Static Pressure

External static pressure (ESP) up to 600 Pa (ALB) facilitates the use of ducts of varying lengths.

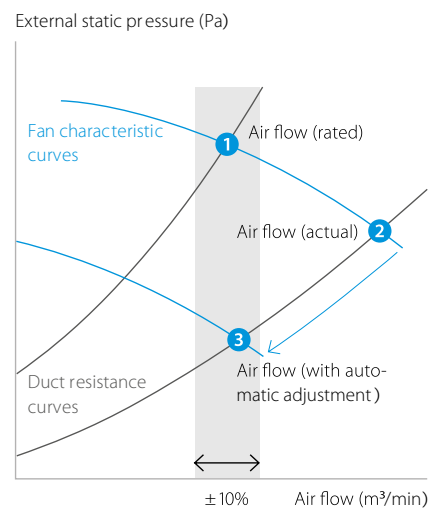
Automatic Airflow Adjustment function

Automatically selects the most appropriate fan curve to achieve the units' nominal air flow within $\pm 10\%$.

Why?

After installation the real ducting will frequently differ from the initially calculated air flow resistance \rightarrow the real air flow may be much lower or higher than designed.

The airflow Adjustment function will automatically adapt the unit's fan speed to any ducting automatically (45 fan curves are available on every model (ALB/VAM)), making installation much faster.



Wide operation range

The ERV/HRV unit can be installed practically anywhere. The standard operation range (outdoor temperature) is from -15°C to 40°CDB for VKM units, from -10°C ($+5^{\circ}\text{C}$ in case of upside-down installation) to 46°CDB for VAM units, and can be extended down if a Daikin heater is installed.

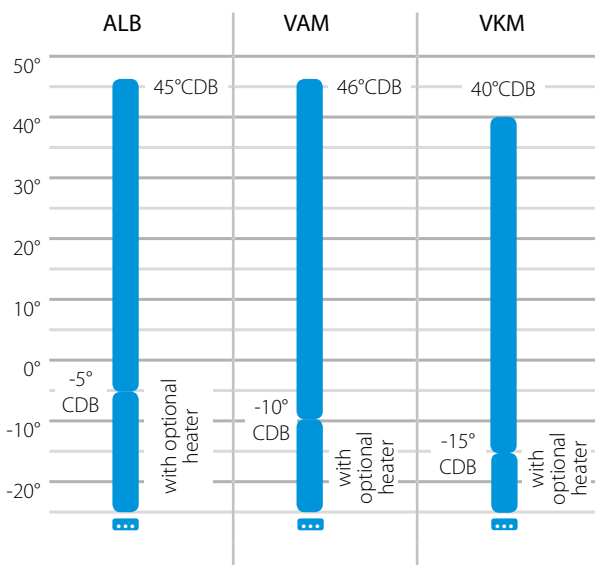
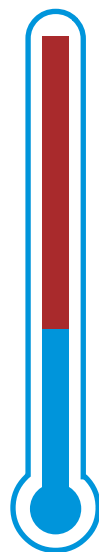
¹ Contact your local dealer for more information and restrictions



Optional heater for VAM



Optional heater for Modular L Smart



Flexible installation

Slim Design

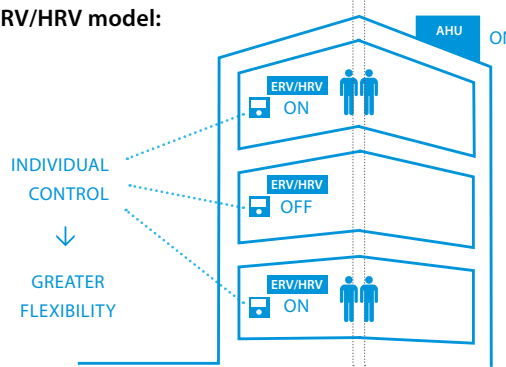
At just 280 mm high, the slim design of the HRV unit enables it to be mounted in narrow ceiling cavities and irregularly shaped spaces



Flexible

Compared to a standard air handling unit, the HRV models provide much greater flexibility to match the actual building use, in case of a multi-tenant installation. Additionally, the renovation of a building can be carried out in phases.

ERV/HRV model:



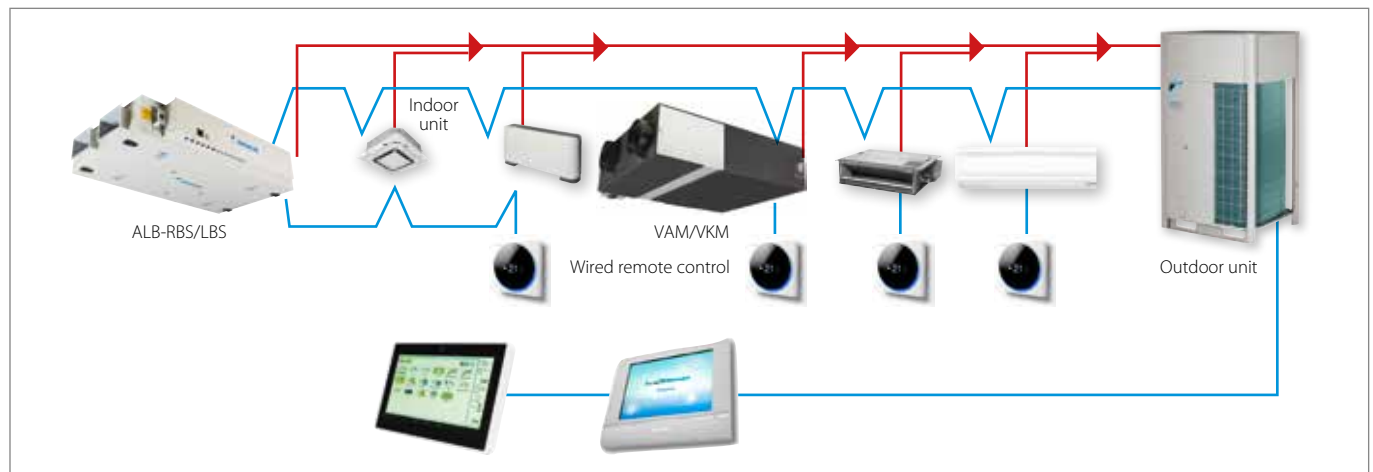
Standard air handling unit:

CENTRAL CONTROL

“Super Wiring” System

A Super Wiring system is used to enable the shared use of wiring between indoor units, outdoor units and the centralised remote control. This system makes it easy for the user to retrofit the existing

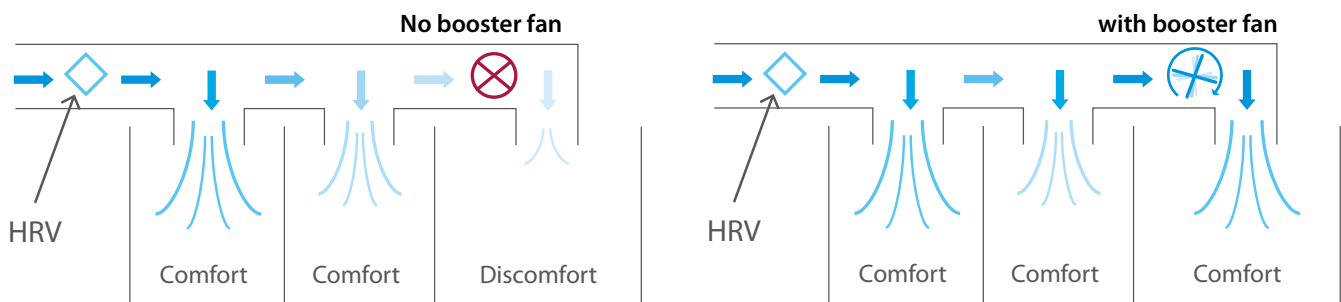
system with a centralised remote control, simply by connecting it to the outdoor units. Thanks to a non polarity wiring system, incorrect connections are avoided and installation time is reduced.



Connection to field-supplied booster fan increases flexibility even more

- > Longer ducting or use of central duct possible
- > Overcomes actual field situation when ducting is different from calculation
- > Lower cost by using the booster fan instead of replacing with a larger unit when the ESP is not matched

Example when HRV ESP is not high enough or field situation differs from calculation



3 High efficiency

Energy saving ventilation via heat recovery of both heat and humidity

Recovers up to
92%
of wasted energy

Daikin's ERV/HRV solutions prevent energy being wasted by recovering up to 92% waste heat from the extract air instead of simply expelling the heat, offering high energy efficiency.

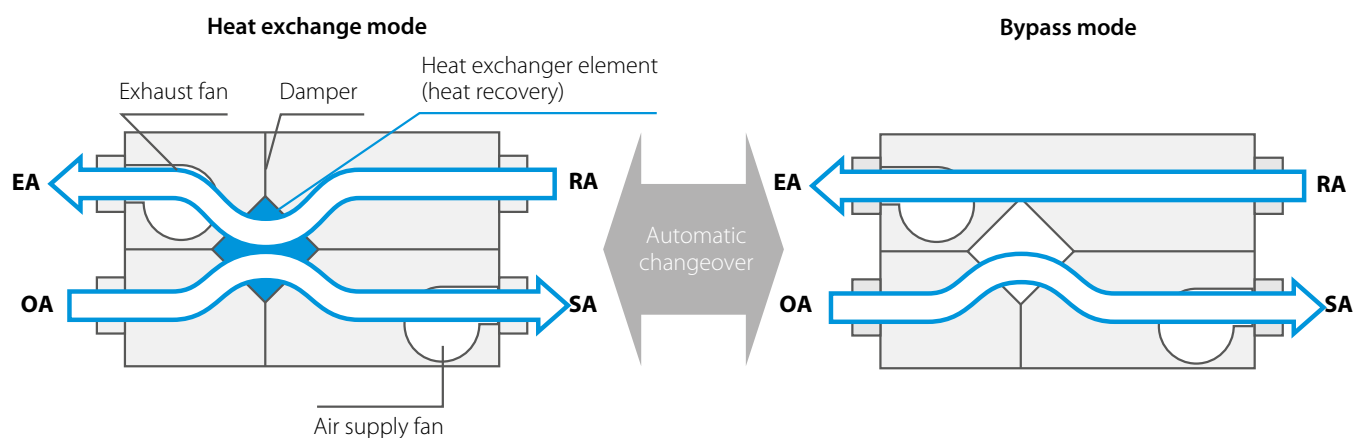


ALB-RBS/LBS

Reduce the load on the air conditioning system by up to 40%

- > 24% by using heat recovery ventilation (in comparison with normal ventilation fans)
- > 6% by switching over to auto-ventilation mode
- > 2% by using the pre-cool, pre-heat control (reduces air conditioning load by running the HRV unit after the air conditioning is switched on)
- > 5% by enabling the free cooling operation overnight
- > 3% by preventing over-ventilation with the optional CO₂ sensor

Different operation modes of ERV/HRV units



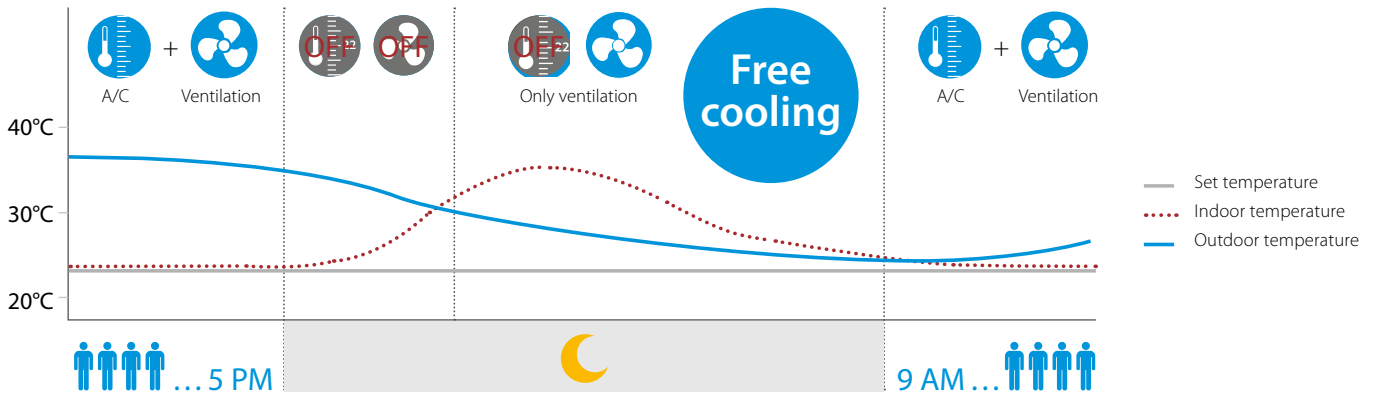
EA: Exhaust air RA: Return air (from room) OA: Outdoor air SA: Supply air (to room)

Night-time free cooling

Night-time free cooling operation is an **energy saving function operating at night** when the air conditioning is switched off. By ventilating rooms containing office equipment that increases room temperature,

free cooling reduces the cooling load when air conditioning is switched on in the morning, reducing the daily running costs.

The VAM and Modular L Smart can also perform nighttime free cooling in stand alone operation. The set temperature is a field setting at installation.

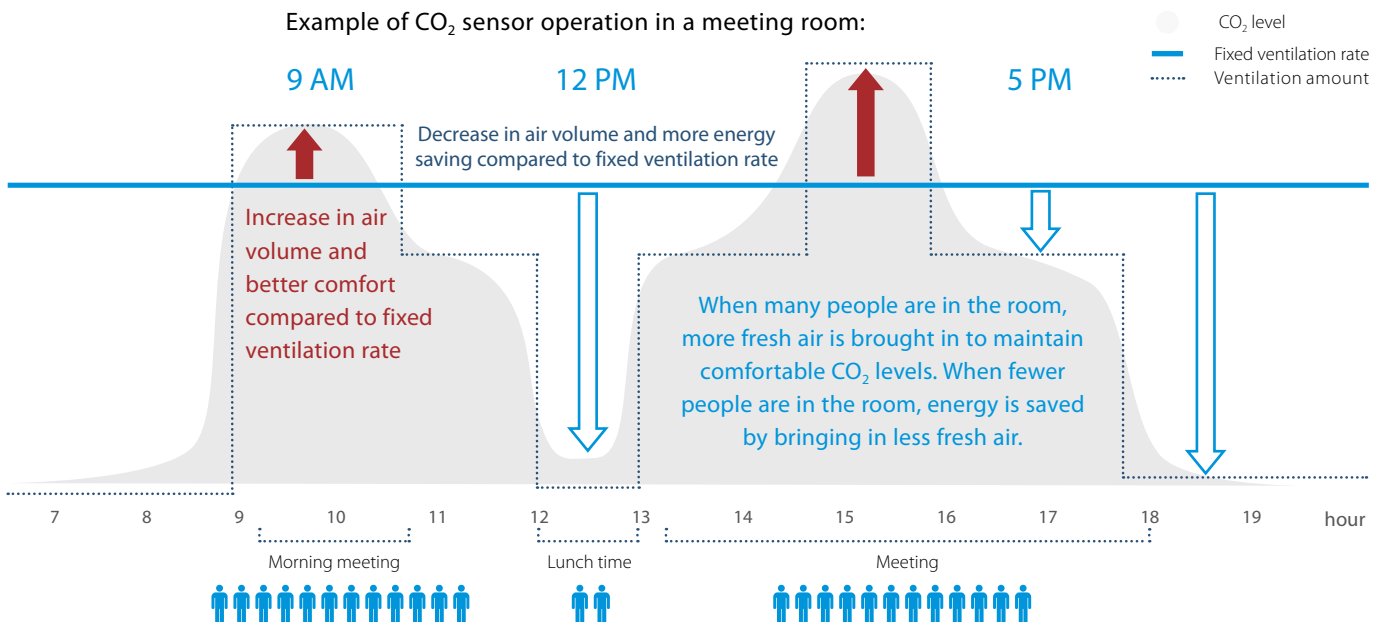


Prevent energy losses from over-ventilation with CO₂ sensor

Enough fresh air is needed to create an enjoyable environment, but ventilating constantly is leading to energy waste. Therefore an optional CO₂ sensor

can be installed which switches off the ventilation system when there is enough fresh air in the room, thus saving energy.

Example of CO₂ sensor operation in a meeting room:



Up to 75% less energy consumed for ventilation in Herten building

A two-year test at a 'netZero Energy Building' in Herten has revealed that a huge energy saving is possible by using CO₂ sensors in conjunction with the Daikin VAM systems.

4 Best Comfort

Optional medium and fine dust filters available

Optional filters up to ePM₁, 70% (F8) for VAM and ePM₁, 80% (F9) for ALB are available to meet your customer request or the local legislation.



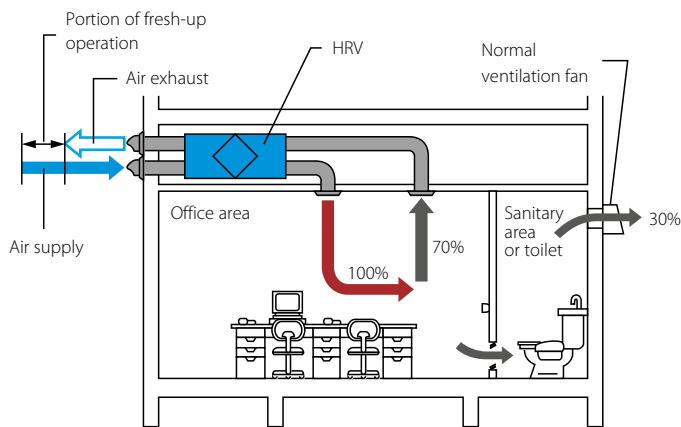
The optional filter comply with ISO 16890

Can operate in over and underpressure to prevent unpleasant odours

The user can select 2 fresh-up modes via the remote control for a more comfortable air environment.

1. Supply rich mode (overpressure):

A higher air supply than air exhaust maintains proper room pressure to prevent back-flow of toilet/kitchen odours or moisture inflow.

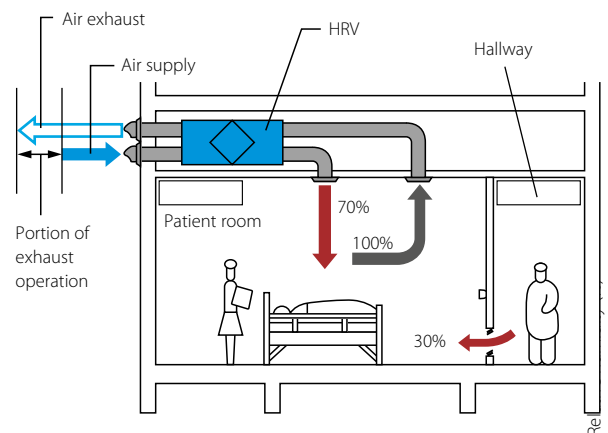


eg. Office

Preventing that toilet odours flow to the office.

2. Exhaust fresh-up (underpressure):

A higher exhaust air than air supply decreases room pressure to prevent the leaking of odours or floating bacteria and viruses into other rooms.



eg. Hospital

No bacteria can flow from the patient room to the hallway.

Low operation sound level

Continuous research by Daikin into reducing operation sound levels has resulted in sound pressure levels down to 20.5dBA (VAM150).

Daikin ERV/HRV unit →

DBA	PERCEIVED LOUDNESS	SOUND
0	Threshold of hearing	-
20	Extremely soft	Rustling leaves
40	Very soft	Quiet room
60	Moderately loud	Normal conversation
80	Very loud	City traffic noise
100	Extremely loud	Symphonic orchestra
120	Threshold of feeling pain	Jet taking off

5 Top Reliability

Extensive testing for quality assurance

All Daikin ventilation systems are extensively tested at our factories in Europe for the highest quality standards and to ensure that Daikin ventilation solutions not only comply with, but exceed new ErP requirements.

Widest support network and after sales service

At Daikin, we offer a wide range of support and maintenance services to ensure your system achieves optimal performance throughout its lifetime.

We understand that you are not looking for a supplier, but a partner. That's why we make it our mission to accompany you throughout the design, set up and maintenance of your installation to deliver a product that meets all your climate needs. Together with our Service Partners, we offer a range of service plans to oversee, manage and monitor your installation.

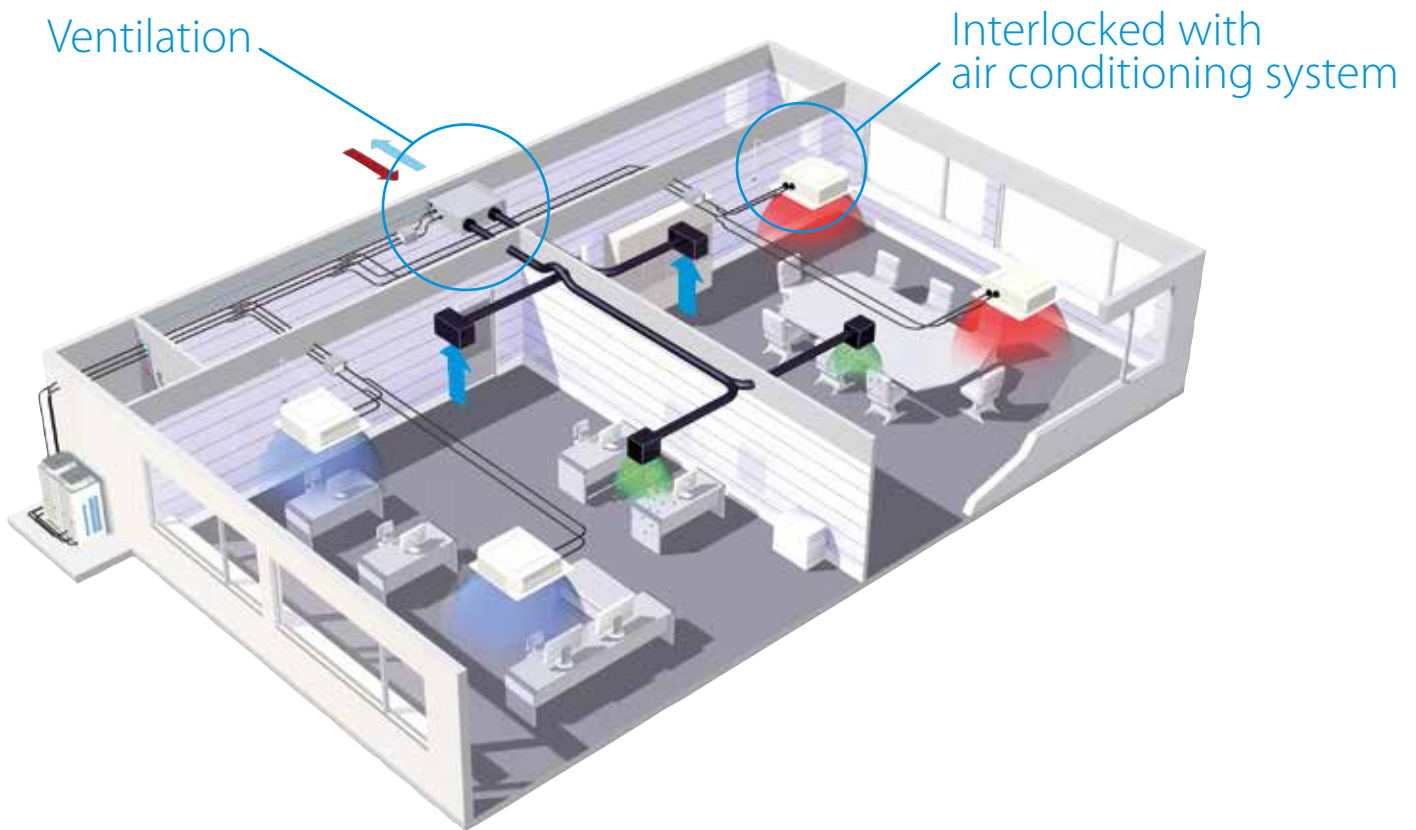
All spare parts available in Europe

If a component fails, Daikin has over 14,000 spare parts based in the UK, supported by our European parts centre that holds 700,000 parts. So we can deliver 97% of critical A parts within two days.

The Spare Parts Bank is available 24 hours a day 365 days a year and enables you to select, quote and order your parts online at any time of the day. You can access spare part codes and drawings and email your spare part order to us, all from within the Spare Parts Bank.



Energy / Heat Recovery Ventilation



**Premium efficiency heat recovery unit
Modular L (Smart) (ALB-(RBS/LBS))**

19

- > Heat recovery unit
- > Counter flow plate heat exchanger
- > ESP up to 600 Pa
- > Operates as stand-alone or combined with Sky Air or VRV systems



Energy recovery ventilation (VAM-FC9/J)

24

- > Heat and moisture recovery
- > Achieve free cooling with fresh outdoor air
- > Operates as stand-alone or combined with Sky Air or VRV systems



**Energy recovery ventilation with humidification
and air processing (VKM-GB(M))**

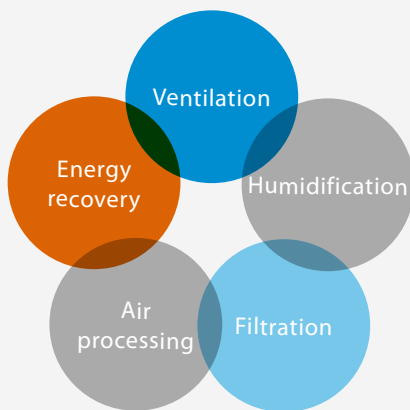
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- > Heat and moisture recovery
- > Humidification and air processing (preconditioning) of fresh air
- > Achieve free cooling with fresh outdoor air
- > Plug & Play piping and wiring connection with Daikin VRV unit(s)

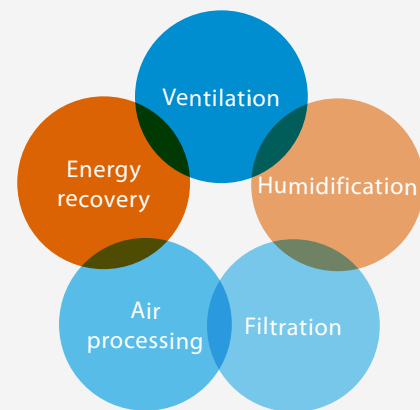
ERV

energy recovery ventilation

Heat recovery ventilation, air processing and humidification



VAM-FC9 / VAM-J



VKM-GB(M)

High efficiency

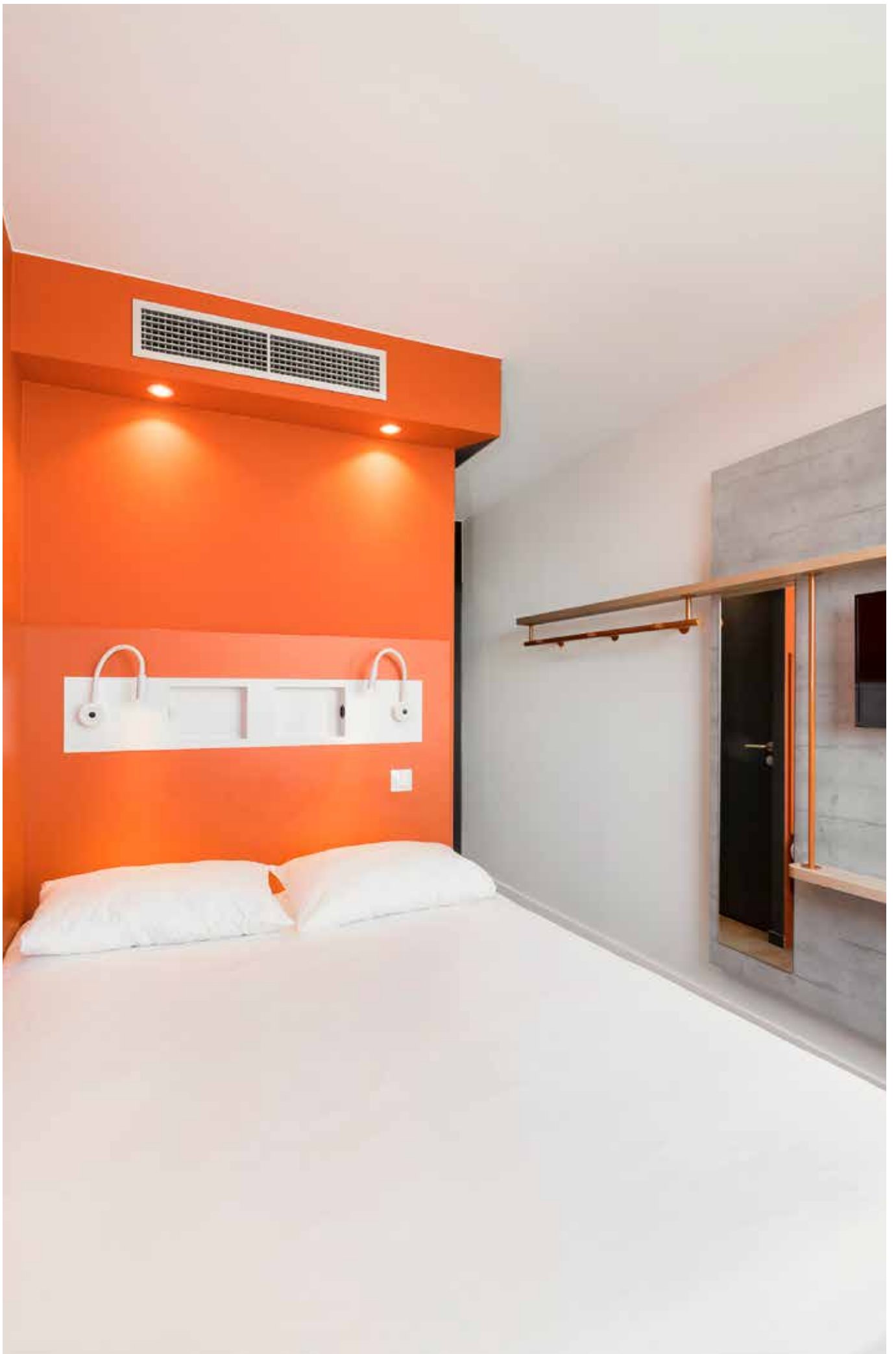
- › Energy saving ventilation via enthalpy recovery of both heat and humidity
- › Reduce the load on the air conditioning system by up to 40%
- › Night-time free cooling
- › Prevent energy losses from over-ventilation with CO₂ sensor

High indoor air quality & whisper quiet operation

- › Optional medium and fine dust filters (VAM-FC9/J only)
- › Can operate in over and underpressure to prevent unpleasant odours
- › Low operation sound level

Maximum flexibility

- › Plug & Play - integrated ventilation
- › Flexible installation
- › Wide range of units
- › High static pressure
- › Wide operation range
- › Connection to field-supplied booster fan increases flexibility even more (VAM-FC9/J only)
- › No drain needed (VAM-FC9/J only)

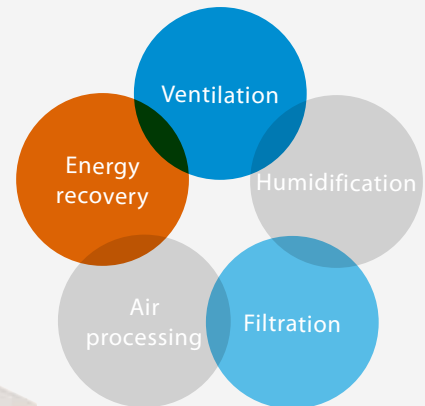


Modular L Smart

Premium Efficiency Heat Recovery Unit



ALB-RBS/LBS



Highlights

- › Connects Plug&Play into the Sky Air and VRV control network
- › Easy installation and commissioning
- › Internal pre-filter stage (up to ePM₁ 50% (F7) + ePM₁ 80% (F9)) making the unit reach highest indoor air quality requirements.
- › Wide air flow coverage from 0.041m³/s to 0.96m³/s
- › Exceeding ErP 2018 requirements
- › Best choice when compactness is needed (only 280 mm height up to 0.15m³/s)
- › 50 mm double skin panel (120 kg/m³) for a maximum sound and thermal insulation

EC centrifugal fan

- › Maximum ESP available 600 Pa (depending on model sizes and airflow)
- › Inverter driven with IE4 premium efficiency motor
- › High-efficient blade profiling
- › Reduced energy consumption
- › Optimized SFP (Specific Fan Power) for an efficient unit operation

Heat exchanger

- › Premium quality counter flow aluminium plate heat exchanger
- › Up to 92% of the thermal energy recovered
- › High grade aluminum allowing optimum corrosion protection

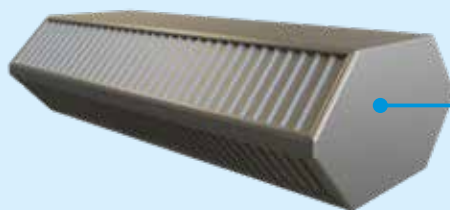


Premium quality to meet most sophisticated needs



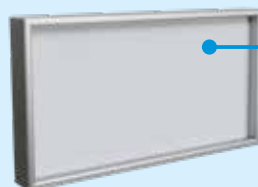
Heat exchanger

- › Premium quality counterflow plate heat exchanger
- › Up to 92% of the thermal energy recovered
- › High grade aluminium that allows best corrosion protection
- › Completely joint sealing
- › No screws or rivets in any part



Filters

- › Easy replaceable compact filters with large surface area, which can be removed from bottom access
- › Up to ePM₁ 50% (F7) + ePM₁ 80% (F9) filtration efficiency
- › No tools are needed to change the filters
- › Fresh air filters* (ePM₁ 50% (F7) efficiency as standard)
- › Return filters* (ePM₁₀ 75% (M5) efficiency as standard)



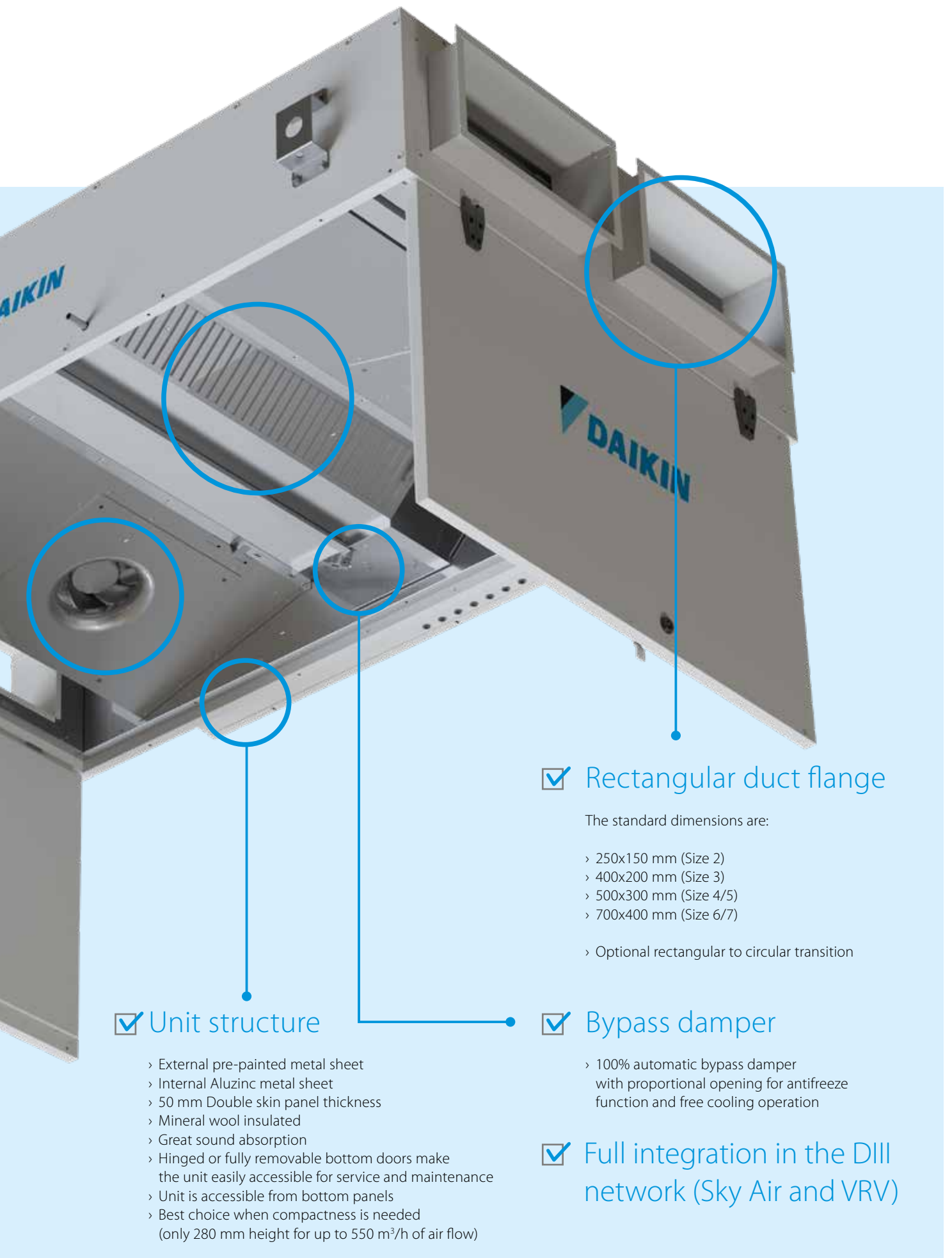
*Optional additional filter and pre-filter stage coarse 55% (G4), ePM₁₀ 75% (M5), ePM₁ 50% (F7), ePM₁ 80% (F9)



Supply/Return fan

- › Fan/motor combination with very low noise level
- › Reduced energy consumption
- › Inverter driven with IE4 motor efficiency
- › Infinitely variable speed
- › Ultra-efficient blade profiling
- › Maintenance-free ball bearings
- › No screws or rivets in any part





✓ Unit structure

- › External pre-painted metal sheet
- › Internal Aluzinc metal sheet
- › 50 mm Double skin panel thickness
- › Mineral wool insulated
- › Great sound absorption
- › Hinged or fully removable bottom doors make the unit easily accessible for service and maintenance
- › Unit is accessible from bottom panels
- › Best choice when compactness is needed (only 280 mm height for up to 550 m³/h of air flow)

✓ Rectangular duct flange

The standard dimensions are:

- › 250x150 mm (Size 2)
- › 400x200 mm (Size 3)
- › 500x300 mm (Size 4/5)
- › 700x400 mm (Size 6/7)
- › Optional rectangular to circular transition

✓ Bypass damper

- › 100% automatic bypass damper with proportional opening for antifreeze function and free cooling operation

✓ Full integration in the DIII network (Sky Air and VRV)

Technical details

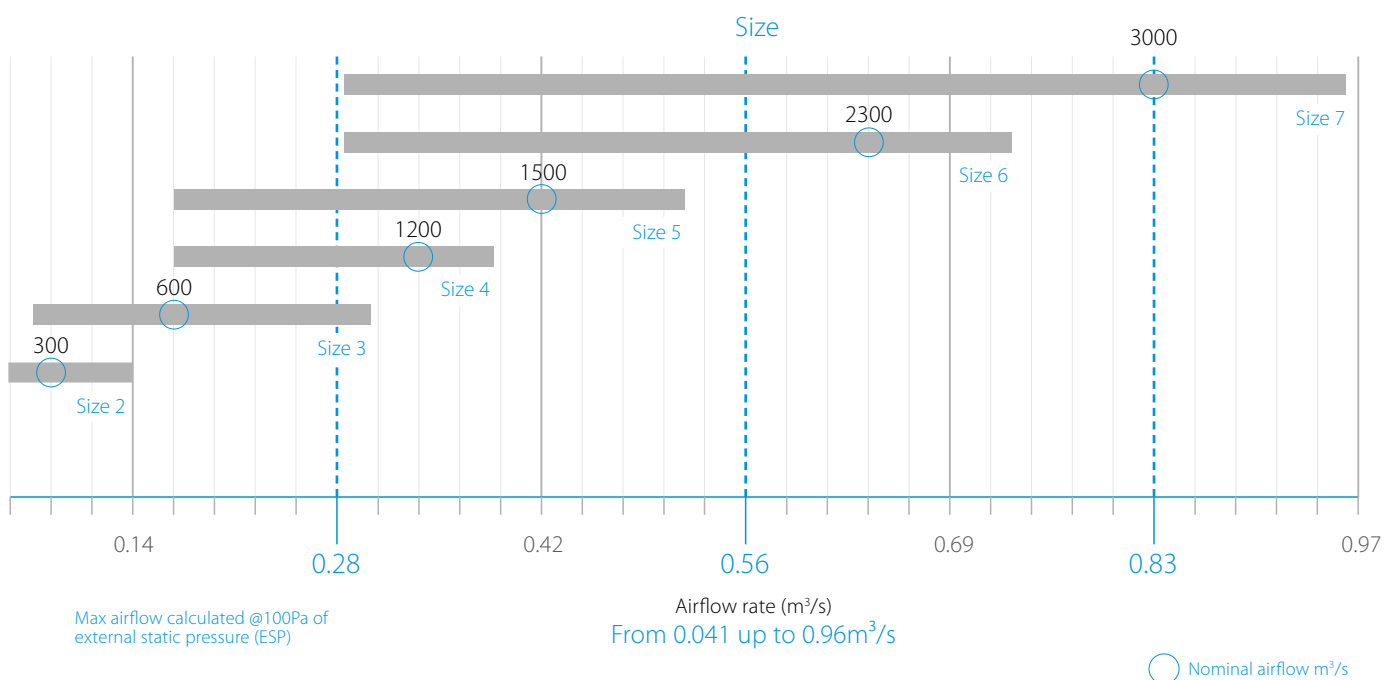


Control logic

- > Air quality analysis with the capability of monitoring and control of the actual level of CO₂ through optional sensor (option)
- > Full automatic bypass to manage free cooling
- > Filter alarm in accordance with the EU Reg 1253
- > DIII-net integration through Daikin building air conditioning control systems (D-BACS)
- > BMS integration through dedicated interfaces (Modbus, BACnet)

Air flow range

Modular L Smart is available in 6 sizes covering a wide range of applications such as hotels, offices, schools and light commercial buildings





Right drain connection (ALB-RBS)



Left drain connection (ALB-LBS)

Technical details

D-AHU Modular L Base Unit		ALB02*B(S)	ALB03*B(S)	ALB04*B(S)	ALB05*B(S)	ALB06*B(S)	ALB07*B(S)	
Unit Nominal Performance	Supply/Extract Airflow [m3/s]	0.08	0.17	0.33	0.42	0.64	0.75	
	Thermal Efficiency [%]	93	93	93	92	94	93	
	Nominal ESP [Pa]	160	100	175	150	150	140	
	Nominal Fan Current - Supply and Extract [A]	0.52	1.17	1.91	2.48	4.39	5.39	
	Nominal Power Input [kW]	0.12	0.27	0.44	0.57	1.01	1.24	
	SFPv [kW/m3/s]	1.50	1.50	1.50	1.50	1.50	1.50	
	Electrical Supply [V-Ph-Hz]	230-1-50	230-1-50	230-1-50	230-1-50	230-1-50	230-1-50	
	Length	1660	1800	2000	2000	2000	2000	
	Width	920	1100	1600	1600	2000	2000	
	Height	280	350	415	415	500	500	
	Length	125	180	270	280	355	360	
	Duct Connection Size (mm)	Width	250	400	500	500	700	700
		Height	150	200	300	300	400	400
	Sound Power Level - Lw dB(A) ⁽¹⁾		53	61	62	58	63	60
Sound Pressure Level - Lp dB(A) ⁽²⁾		34	39	41	37	46	41	

* Indicates handing of unit, R=Right Hand

(S) Indicates Modular Light Smart

⁽¹⁾Sound Power Level

The SFP figure shown in the above table is based at the nominal airflow and nominal ESP shown.



Direct integration into the Sky Air or VRV control solution

- › Saves up to 40% in running costs
- › Unified control point for the complete air conditioning and ventilation installation

Wide range of decentralised ERV/HRV units to suit the building needs

Energy saving ventilation via enthalpy recovery of both heat and humidity

Recovers up to **85%** of waste heat

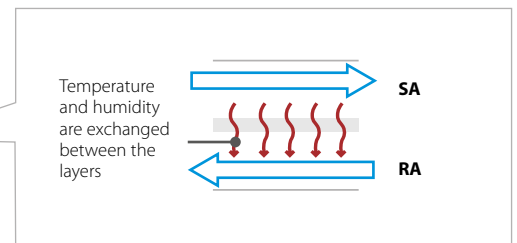
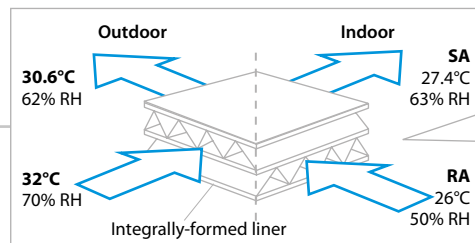
Daikin's ERV solutions prevent energy being wasted by recovering up to 85% waste heat from the extract air instead of simply expelling the heat, offering high energy efficiency.

Specially developed heat exchange element

The heat exchange element rapidly recovers heat contained in latent heat (vapour).

Operation of the high efficiency paper.

Cross flow of air to exchange heat and moisture.



RH: Relative Humidity
SA: Supply Air (to room)
RA: Return Air (from room)

High indoor comfort

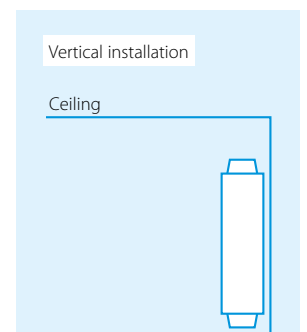
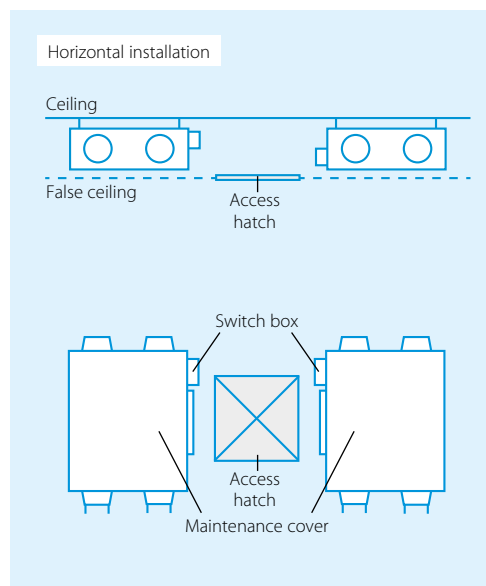
Thanks to the heat and moisture exchange, the hot and humid outside air is brought to levels close to indoor conditions saving on the air conditioning running cost and maintaining comfort.

Can be installed horizontally, upside down or vertically

The VAM models do not require a drain, giving greater flexibility for the installation of the units.

In case of upside down or vertical installation the minimum fresh air temperature is +5°C instead of -10°C.

Add a heater to reach this condition, if necessary.



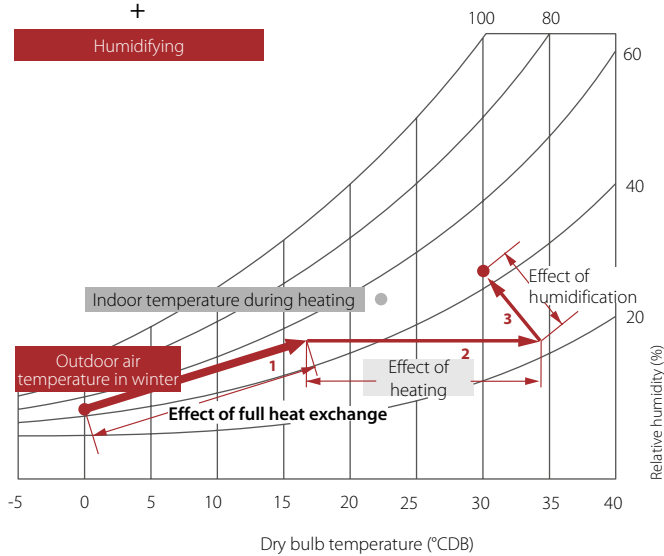
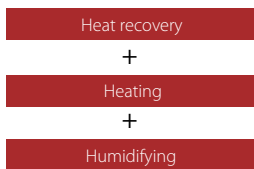


Creating a high quality environment

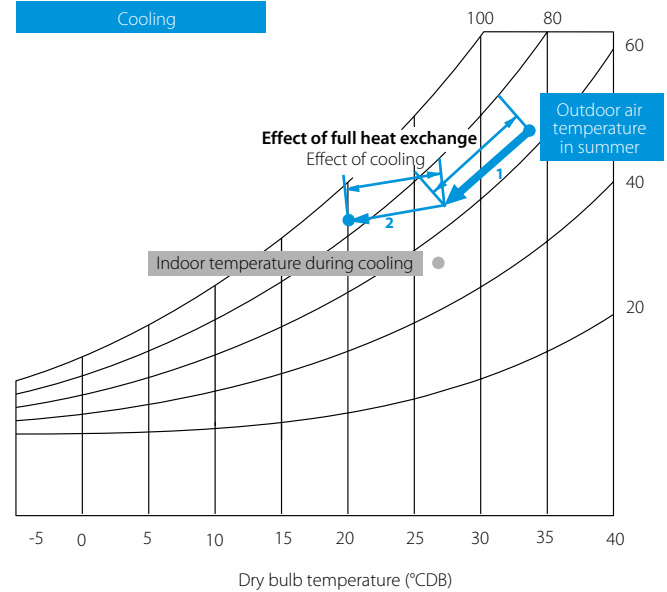
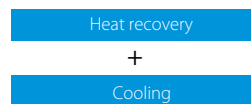
Maintain a comfortable indoor environment without fluctuations in room temperature.

How do the VKM units work?

In heating



In cooling

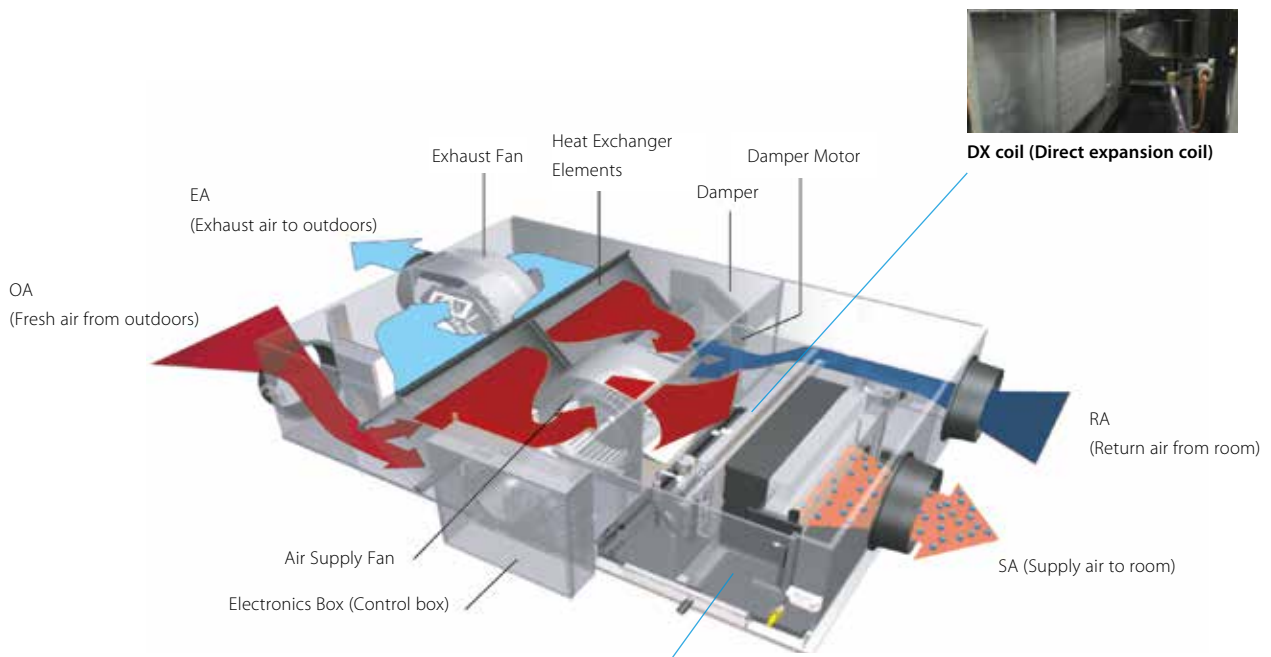


<p>In heating we bring in cold outdoor fresh air and want to avoid cold draught and dry air.</p>	<p>In cooling we bring in hot outdoor fresh air and want to prevent additional load on the air conditioning system and too hot indoor temperatures.</p>
<p>1. Cold outside air is crossed with hot inside air. In the example the fresh air is heated up from 0 to 16°CDB while keeping the same relative humidity. This is the effect of the heat and moisture exchange.</p>	<p>1. Hot outside air is crossed with cold inside air. In the example the fresh air is cooled down from 34 to 27°CDB while keeping the same relative humidity. This is the effect of the heat and moisture exchange.</p>
<p>2. The DX coil further heats up the air to prevent cold draught. In the example the fresh air is further heated from 16 to 34°CDB. Because the air is heated up the relative humidity decreases.</p>	<p>2. The DX coil further cools down the air to prevent hot indoor temperatures and reduce the load on the air conditioning system. In the example the fresh air is further cooled down from 27 to 20°CDB.</p>
<p>3. To counter negative effects of dry air the air passes the humidifier which adds moisture in case needed. In the example the relative humidity rises from 22 to a comfortable 42%.</p>	<p>3. No humidification is needed in cooling as the air is not dried out.</p>
<p>The result is fresh air with the same humidity and slightly higher temperature for perfect comfort.</p>	<p>The result is fresh air with a slightly lower temperature for perfect comfort.</p>



Humidification

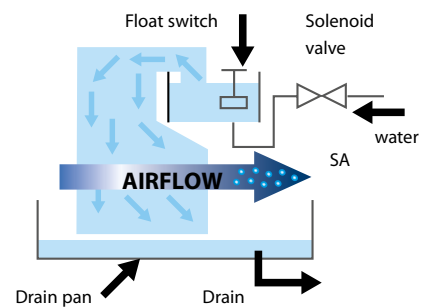
Operation example: humidification & air processing (heating mode)¹



DX coil (Direct expansion coil)

Humidifier element:

Utilizing the principle of capillary action, water is permeated throughout the humidifier element. The heated air from the DX coil passes through the humidifier and absorbs the moisture.

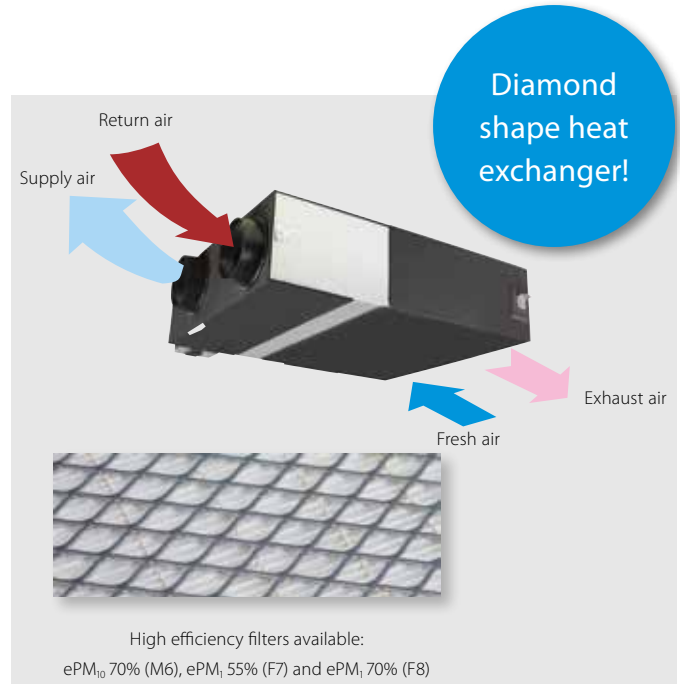


¹ VKM-GM example

Energy recovery ventilation

Ventilation with heat recovery as standard

- › Thinnest high-efficiency enthalpy heat exchanger in the market (J-series)
- › Energy saving ventilation using indoor heating, cooling and moisture recovery
- › Free cooling possible when outdoor temperature is below indoor temperature (eg. during nighttime)
- › Prevent energy losses from over-ventilation while improving indoor air quality with optional CO₂ sensor
- › Possibility to change ESP via wired remote control allows optimisation of the supply air volume (J - series)
- › Can be used as stand alone or integrated in the Sky Air or VRV system
- › Wide range of units: air flow rate from 150 up to 2,000 m³/h
- › Shorter installation time thanks to easy adjustment of nominal air flow rate, so less need for dampers compared with traditional installation
- › No drain piping needed
- › Can operate in over- and under pressure
- › Total solution for fresh air with Daikin supply of both VAM / VKM and electrical heaters



Ventilation		VAM/VAM		150FC9	250FC9	350J	500J	650J	800J	1000J	1500J	2000J								
Power input - 50Hz	Heat exchange mode	Nom.	Ultra high/High/Low	kW	0.132/0.111/0.058	0.161/0.079/0.064	0.097/0.070/0.039	0.164/0.113/0.054	0.247/0.173/0.081	0.303/0.212/0.103	0.416/0.307/0.191	0.548/0.384/0.273								
	Bypass mode	Nom.	Ultra high/High/Low	kW	0.132/0.111/0.058	0.161/0.079/0.064	0.085/0.061/0.031	0.148/0.100/0.045	0.195/0.131/0.059	0.289/0.194/0.086	0.417/0.300/0.119	0.525/0.350/0.239	0.835/0.600/0.239							
Temperature exchange efficiency - 50Hz	Ultra high/High/Low			%	77.0(1)/72.0(2)/78.3(1)/72.3(2)/82.8(1)/73.2(2)	74.9(1)/69.5(2)/76.0(1)/70.0(2)/80.1(1)/72.0(2)	85.1/86.7/90.1	80.0/82.5/87.6	84.3/86.4/90.5	82.5/84.2/87.7	79.6/81.8/86.1	83.2/84.8/88.1	79.6/81.8/86.1							
	Enthalpy exchange efficiency - 50Hz	Cooling	Ultra high/High/Low	%	60.3(1)/61.9(1)/67.3(1)	60.3(1)/61.2(1)/64.5(1)	65.2/67.9/74.6	59.2/61.8/69.5	59.2/63.8/73.1	67.7/70.7/76.8	62.6/66.4/74.0	68.9/71.8/77.5	62.6/66.4/74.0							
Heating		Ultra high/High/Low	%	66.6(1)/67.9(1)/72.4(1)	66.6(1)/67.4(1)/70.7(1)	75.5/77.6/82.0	69.0/72.2/78.7	73.1/76.3/82.7	72.8/75.3/80.2	68.6/71.7/77.9	73.8/76.1/80.8	68.6/71.7/77.9								
Operation mode				Heat exchange mode, bypass mode, fresh-up mode																
Heat exchange system				Air to air cross flow total heat (sensible + latent heat) exchange																
Heat exchange element				Specially processed non-flammable paper																
Dimensions	Unit	HeightxWidthxDepth		mm	285x776x525		301x1113x886		368x1,354x920		368x1,354x1,172		731x1,354x1,172							
Weight	Unit			kg	24.0		46.5		61.5		79.0		157							
Casing				Galvanised steel plate																
Fan	Air flow rate - 50Hz	Heat exchange mode	Ultra high/High/Low	m ³ /h	150/140/105	250/230/155	350(1)/300(1)/200(1)	500(1)/425(1)/275(1)	650(1)/550(1)/350(1)	800(1)/680(1)/440(1)	1,000(1)/850(1)/550(1)	1,500(1)/1,275(1)/825(1)	2,000(1)/1,700(1)/1,100(1)							
		Bypass mode	Ultra high/High/Low	m ³ /h	150/140/105	250/230/155	350(1)/300(1)/200(1)	500(1)/425(1)/275(1)	650(1)/550(1)/350(1)	800(1)/680(1)/440(1)	1,000(1)/850(1)/550(1)	1,500(1)/1,275(1)/825(1)	2,000(1)/1,700(1)/1,100(1)							
External static pressure - 50Hz		Ultra high/High/Low		Pa	90/87/40	70/63/25	90(1)/70.0/50.0(1)													
Air filter				Multidirectional fibrous fleeces																
Sound pressure level - 50Hz	Type	Ultra high/High/Low		dB(A)	27.0/26.0/20.5		28.0/26.0/21.0		34.5(1)/32.0(1)/29.0(1)		37.5(1)/35.0(1)/30.5(1)		39.0(1)/36.0(1)/31.0(1)		42.0(1)/39.0(1)/33.5(1)		45.0(1)/41.5(1)/36.0(1)			
		Bypass mode		Ultra high/High/Low	dB(A)	27.0/26.5/20.5		28.0/27.0/21.0		34.5(1)/32.0(1)/28.0(1)		38.0(1)/35.0(1)/29.5(1)		38.0(1)/34.5(1)/30.5(1)		40.0(1)/36.5(1)/32.5(1)		42.5(1)/39.0(1)/32.5(1)		45.0(1)/41.0(1)/35.0(1)
Operation range				Around unit	°CDB		0°C~40°CDB, 80% RH or less													
Connection duct diameter				mm	100	150	200		250		2x250									
Power supply				Phase/Frequency/Voltage	Hz/V															
Current				Maximum fuse amps (MFA)	A				15.0				16.0							
Specific energy consumption (SEC)	Cold climate		kWh/(m ² ·a)	-56.0(5)		-60.5(5)		-												
	Average climate		kWh/(m ² ·a)	-22.1(5)		-27.0(5)		-												
	Warm climate		kWh/(m ² ·a)	-0.100(5)		-5.30(5)		-												
SEC class				D / See note 5 B / See note 5																
Maximum flow rate at 100 Pa ESP	Flow rate		m ³ /h	130		207		-												
	Electric power input		W	129		160		-												
Sound power level (Lwa)				dB	40		43		51		54		58		61		62		65	
Annual electricity consumption				kWh/a	18.9(5)		13.6(5)		-											
Annual heating saved	Cold climate		kWh/a	41.0(5)		40.6(5)		-												
	Average climate		kWh/a	80.2(5)		79.4(5)		-												
	Warm climate		kWh/a	18.5(5)		18.4(5)		-												

(1) Measured according to JIS B 8628 | (2) Measured at reference flow rate according to EN13141-7 | (5) At reference flow rate in accordance with commission regulation (EU) No 1254/2014

Energy recovery ventilation, humidification and air processing

Post heating or cooling of fresh air for lower load on the air conditioning system

- › Energy saving ventilation using indoor heating, cooling and moisture recovery
- › Creates a high quality indoor environment by pre conditioning of incoming fresh air
- › Humidification of the fresh air results in comfortable indoor humidity level, even during heating
- › Free cooling possible when outdoor temperature is below indoor temperature (eg. during night-time)
- › Low energy consumption thanks to DC fan motor
- › Prevent energy losses from over-ventilation while improving indoor air quality with optional CO₂ sensor
- › Shorter installation time thanks to easy adjustment of nominal air flow rate, so less need for dampers compared with traditional installation
- › Specially developed heat exchange element with High Efficiency Paper (HEP)
- › Can operate in over- and under pressure



VKM80-100GB(M)

Ventilation		VKM-GB/VKM-GBM		50GB	80GB	100GB	50GBM	80GBM	100GBM	
Power input - 50Hz	Heat exchange mode	Nom.	Ultra high/High/Low	kW	0.270/0.230/0.170	0.330/0.280/0.192	0.410/0.365/0.230	0.270/0.230/0.170	0.330/0.280/0.192	0.410/0.365/0.230
	Bypass mode	Nom.	Ultra high/High/Low	kW	0.270/0.230/0.140	0.330/0.280/0.192	0.410/0.365/0.230	0.270/0.230/0.170	0.330/0.280/0.192	0.410/0.365/0.230
Fresh air conditioning load	Cooling			kW	4.71 / 1.91 / 3.5	7.46 / 2.96 / 5.6	9.12 / 3.52 / 7.0	4.71 / 1.91 / 3.5	7.46 / 2.96 / 5.6	9.12 / 3.52 / 7.0
	Heating			kW	5.58 / 2.38 / 3.5	8.79 / 3.79 / 5.6	10.69 / 4.39 / 7.0	5.58 / 2.38 / 3.5	8.79 / 3.79 / 5.6	10.69 / 4.39 / 7.0
Temperature	Ultra high/High/Low			%	76/76/77.5	78/78/79	74/74/76.5	76/76/77.5	78/78/79	74/74/76.5
- 50Hz	Enthalpy exchange	Cooling	Ultra high/High/Low	%	64/64/67	66/66/68	62/62/66	64/64/67	66/66/68	62/62/66
	Heating	Ultra high/High/Low	%	67/67/69	71/71/73	65/65/69	67/67/69	71/71/73	65/65/69	
Operation mode		Heat exchange mode / Bypass mode / Fresh-up mode								
Heat exchange system		Air to air cross flow total heat (sensible + latent heat) exchange								
Heat exchange element		Specially processed non-flammable paper								
Humidifier	System	Natural evaporating type								
Dimensions	Unit	HeightxWidthxDepth	mm	387x1,764x832	387x1,764x1,214			387x1,764x832	387x1,764x1,214	
Weight	Unit		kg	94	110	112	100	119	123	
Casing	Material	Galvanised steel plate								
Fan-Air flow rate - 50Hz	Heat exchange mode	Ultra high/High/Low	m ³ /h	500/500/440	750/750/640	950/950/820	500/500/440	750/750/640	950/950/820	
	Bypass mode	Ultra high/High/Low	m ³ /h	500/500/440	750/750/640	950/950/820	500/500/440	750/750/640	950/950/820	
Fan-External static pressure - 50Hz	Ultra high/High/Low		Pa	210/170/140	210/160/110	150/100/70	200/150/120	205/155/105	110/70/60	
Air filter	Type	Multidirectional fibrous fleeces								
Sound pressure level - 50Hz	Heat exchange mode	Ultra high/High/Low	dBA	39/37/35	41.5/39/37	41/39/36.5	38/36/34	40/37.5/35.5	40/38/35.5	
	Bypass mode	Ultra high/High/Low	dBA	40/38/35.5	41.5/39/37	41/39/36.5	39/36/34.5	41/38/36	41/39/35.5	
Operation range	Around unit		°CDB	0°C~40°CDB, 80% RH or less						
	Supply air		°CDB	-15°C~40°CDB, 80% RH or less						
	Return air		°CDB	0°C~40°CDB, 80% RH or less						
	On coil temperature	Cooling/Max./Heating/Min.	°CDB	-15/43			-15/43			
Refrigerant	Control	Electronic expansion valve								
	Type	R-410A								
	GWP	2,087.5								
Connection duct diameter			mm	200	250			200	250	
Piping connections	Liquid	OD	mm	6.35						
	Gas	OD	mm	12.7						
	Water supply		mm	6.4						
	Drain		mm	-						
Power supply	Phase/Frequency/Voltage		Hz/V	PT3/4 external thread						
Current	Maximum fuse amps (MFA)		A	1~/50/220-240						
				15						

A man in a dark suit and blue tie is walking away from the camera down a long, modern office hallway. The hallway has a grey carpet, white walls, and a drop ceiling. Large windows are on the left side, and glass-walled offices are on the right. The lighting is bright and even.

For small to large commercial spaces, Daikin offers a range of inverter condensing units for use in conjunction with air handling units. In situations where Daikin commercial range ventilation units cannot satisfy the ventilation requirement due to building constraints (large atriums, banquet halls etc), air handling units represent the ideal solution. Air handling units provide large fresh air volumes (up to 140,000 m³/h) and high ESPs enabling the use of extensive ductwork runs.

An air handler or air handling unit provides a tailor-made solution for optimising air conditions throughout multiple spaces. An air handling unit can be customised to your building - with no installation restrictions or design limitations - as Daikin air handling units are based on a completely unique modular design, so they can be sized (in increments of 1 cm) to your exact requirements.

Daikin

air handling units



Air handling unit applications

Why choose Daikin air handling units with a DX connection?	30
Why use VRV and ERQ condensing units for connection to air handling units?	32
In order to maximise installation flexibility, 4 types of control systems are offered	33
VRV - for larger capacities (from 8 to 54HP)	34
ERQ - for smaller capacities (from 100 to 250 class)	35
Integration of VRV and ERQ in third party air handling units	36
Pair and multi application selection	37

Daikin's air handling units solutions

You will find your match

Why choose Daikin air handling units with a DX connection?



Simplifying business

The unique total solution approach by Daikin helps businesses to propose better cross-pillar solutions, to increase their success ratio by providing unmatched product combinations to the end-user and to simplify the life of installers by supplying high-quality products coming from the same manufacturer. Daikin does not use OEM products in its AHU with DX offer. Many competitors are either offering OEM DX outdoor units or OEM AHU which create additional problems when warranties or faults arise. **Having a single interface for your business makes Daikin the right choice.**

One-stop shop

Daikin is the only global manufacturer in the market capable of offering a true Plug & Play solution. Daikin AHUs are manufactured by Daikin Applied Europe and certified by Eurovent, offering off-the-shelf compatibility with Daikin's unique VRV outdoor unit range for the best performance in the market.

This unique integration of cross-pillar products, gives the customer both peace-of-mind and added value when promoting a total solution approach.

Complete range of possibilities

Thanks to the **most complete offer in the market**, Daikin has the solution for all types of commercial applications requiring fresh air. Daikin provides ventilation solutions based on AHU from 2,500 m³/h up to 140,000 m³/h either with natural heat recovery or more advanced ventilation solutions where a VRV outdoor unit can be connected to the Daikin AHU for ultimate climate control. The harmonized control, between the VRV outdoor unit and the AHU, offer outstanding reliable operation of the system when connected to an iTM.

Advantages

- › Unique manufacturer offering a complete range
- › Plug & Play solution
- › Direct iTM compatibility

Daikin's fresh air solution



Highly efficient EC fan



Factory fitted and tested DX heat exchanger



Efficient filtration



Heat wheel for energy recovery

Air Handling Units

Modular-R AHU with high-efficiency rotary heat exchanger



Energy efficiency and indoor air quality

- > Predefined sizes
- > IE4 premium efficiency motor
- > High efficiency heat wheel (heat recovery)
- > Compact design
- > Advanced control features
- > Easy installation
- > Indoor air quality compliant with VDI 6022 hygiene guideline
- > Operating limits from -25 °C, -40 °C with electric heaters, up to +46 °C ambient temperature
- > VRV IV and ERQ coupling capability
- > Indoor and outdoor versions
- > Free cooling capability
- > Economy and Night mode operation
- > Monitoring and control through Daikin ITM

EC fan

- > Air flow or pressure control (Variable Air Volume – Constant Air Volume)
- > Nominal air flow programmed at factory
- > Reduced noise with option NRLS

Simple, quick installation

The Modular series' Plug & Play design is more than just a convenient feature for installers. It offers cost-saving benefits as there is no need for expensive adjustments before the unit is commissioned. Plug & Play makes everyone's life simpler, safer and more economical.

D-AHU Modular R - Base Unit c/w Thermal Wheel & DX Module											
Unit Nominal Performance	Size	ADT01FCD1	ADT02FCD1	ADT03FCD1	ADT04FCD1	ADT05FCD1	ADT06FCD1	ADT07FCD1	ADT08FCD1	ADT09FCD1	ADT10FCD1
	Supply/Extract Airflow [m³/s]	0.42	0.52	0.97	1.43	1.86	2.05	2.80	3.63	4.07	5.83
	Temp Efficiency Winter [%]	80.50	81.90	80.30	80.90	80.60	81.00	80.40	79.60	80.70	80.00
	Temp Efficiency Summer [%]	79.90	81.20	79.70	80.30	80.00	80.40	79.70	79.00	80.10	79.40
	ESP nominal [Pa]	250	250	250	250	250	250	250	250	250	250
	Nominal Fan Current - Supply/Extract [A]	3.3/3.3	3.1/3.1	1.9/1.9	4.1/4.1	3.8/3.8	4.0/4.0	9.0/9.0	7.7/7.7	4.0/4.0	9.0/9.0
	Power Input Supply, Nominal [kW]	0.46	0.58	1.06	1.59	1.99	2.26	3.06	3.88	2 x 2.25	2 x 3.18
	Power Input Extract, Nominal [kW]	0.45	0.56	1.02	1.54	1.93	2.18	2.94	3.74	2 x 2.18	2 x 3.05
	SFPv [kW/m³/s]	2.00	2.00	1.97	2.00	1.94	1.99	1.97	1.94	1.99	1.97
	Electrical Supply [V-Ph-Hz]	230-1-50	230-1-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50
	Length [mm]	2400	2400	2500	2620	2780	2980	3100	3150	2980	3100
	Depth [mm]	720	820	990	1200	1400	1400	1600	1940	1940	2300
	Height (Including Base Frame) [mm]	1320	1320	1540	1740	1740	1920	1920	2180	2460	2570
	Weight [kg]	385	414	555	667	848	895	1070	1501	1606	1986
	DX Total Cooling Capacity [kW]	3.9	4.6	8.7	13.0	16.9	18.6	25.4	34.1	37.8	52.9
	Outdoor Unit Nominal Cooling Power Input [kW]	-	-	-	3.51	4.53	5.22	7.42	2 x 4.53	2 x 5.22	2 x 7.42
Sound Power Level - Lw dB(A) ⁽¹⁾	73	76	74	78	79	79	84	81	81	88	

D-AHU Modular R - Base Unit c/w Thermal Wheel & CHW Module											
Unit Nominal Performance	Size	ADT01FCW1	ADT02FCW1	ADT03FCW1	ADT04FCW1	ADT05FCW1	ADT06FCW1	ADT07FCW1	ADT08FCW1	ADT09FCW1	ADT10FCW1
	Supply/Extract Airflow [m³/s]	0.42	0.51	0.96	1.42	1.86	2.04	2.81	3.63	4.06	5.83
	Temp Efficiency Winter [%]	80.70	82.00	80.40	81.00	80.60	81.10	80.40	79.60	80.80	80.00
	Temp Efficiency Summer [%]	80.10	81.30	79.80	80.30	80.00	80.40	79.70	79.00	80.10	79.40
	ESP nominal [Pa]	250	250	250	250	250	250	250	250	250	250
	Nominal Fan Current - Supply/Extract [A]	3.3/3.3	3.1/3.1	4.6/4.6	4.1/4.1	3.8/3.8	4.0/4.0	9.0/9.0	7.7/7.7	4.0/4.0	9.0/9.0
	Power Input Supply, Nominal [kW]	0.46	0.58	1.11	1.59	2.02	2.29	3.13	3.95	2 x 2.28	2 x 3.25
	Power Input Extract, Nominal [kW]	0.44	0.55	1.05	1.52	1.93	2.17	2.95	3.74	2 x 2.17	2 x 3.05
	SFPv [kW/m³/s]	2.00	1.99	2.00	2.00	1.94	1.99	1.98	1.94	2.00	1.97
	Electrical Supply [V-Ph-Hz]	230-1-50	230-1-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50
	Length [mm]	2400	2400	2500	2620	2780	2980	3100	3150	2980	3100
	Depth [mm]	720	820	990	1200	1400	1400	1600	1940	1940	2300
	Height (Including Base Frame) [mm]	1320	1320	1540	1740	1740	1920	1920	2180	2460	2570
	Weight [kg]	383	413	555	668	850	900	1074	1499	1601	1988
	Total Cooling Capacity [kW]	3.0	3.6	6.8	10.2	13.3	14.7	19.8	26.5	29.2	41.5
	Outdoor Unit Nominal Cooling Power Input [kW]	-	-	2.56	3.9	5.52	5.8	7.47	9.45	12.7	15.1
Sound Power Level - Lw dB(A) ⁽¹⁾	74	76	77	78	79	79	85	81	81	88	

⁽¹⁾ Sound Power Level - Supply Air Unit Outlet

⁽²⁾ Price includes G4/F7 filtration, Foam Insulation, Aluzinc internal skin and Aluzinc Pre-Painted external skin

Notes:

Default handing of units is right hand where all pipe connections and access will be from the right hand side of the unit when viewed looking in to the fresh air inlet. Units can be supplied Left hand if advised at time of order. Ancillary modules include Dual or Single Silencers, Electric or LPHW Frost Coils, Humidifier & various Heating/Cooling Coil Modules will be delivered loose for 'Bolt-Up' to main module at site by the installer.

Air Handling Units

Modular-P AHU with high-efficiency plate heat exchanger



Energy efficiency and indoor air quality

- > Predefined sizes
- > IE4 premium efficiency motor
- > High efficiency plate heat exchanger (heat recovery)
- > Compact design
- > Advanced control features
- > Easy installation
- > Indoor air quality compliant with VDI 6022 hygiene guideline
- > Operating limits from -25 °C, -40 °C with electric heaters, up to +46 °C ambient temperature
- > VRV IV and ERQ coupling capability
- > Indoor and outdoor versions
- > Free cooling capability
- > Economy and Night mode operation
- > Monitoring and control through Daikin ITM

EC fan

- > Air flow or pressure control (Variable Air Volume – Constant Air Volume)
- > Nominal air flow programmed at factory
- > Reduced noise with option NRLS

Simple, quick installation

The Modular series' Plug & Play design is more than just a convenient feature for installers. It offers cost-saving benefits as there is no need for expensive adjustments before the unit is commissioned. Plug & Play makes everyone's life simpler, safer and more economical.

D-AHU Modular P - Base Unit c/w Plate Heat Exchanger & DX Module											
Unit Nominal Performance	Size	ADT01ECD1	ADT02ECD1	ADT03ECD1	ADT04ECD1	ADT05ECD1	ADT06ECD1	ADT07ECD1	ADT08ECD1	ADT09ECD1	ADT10ECD1
	Supply/Extract Airflow [m³/s]	0.50	0.61	0.98	1.31	1.67	1.89	2.33	3.51	4.02	5.28
	Temp Efficiency Winter [%]	91.70	91.90	91.30	91.10	90.80	91.30	91.10	91.10	91.40	91.10
	Temp Efficiency Summer [%]	82.70	83.10	82.10	81.80	81.50	82.10	81.80	81.90	82.30	82.90
	ESP Nominal [Pa]	250	250	250	250	250	250	250	250	250	250
	Nominal Fan Current - Supply/Extract [A]	3.3/3.3	3.1/3.1	1.9/1.9	3.0/3.0	3.8/3.8	4.0/4.0	5.3/5.3	7.7/7.7	4.0/4.0	5.3/5.3
	Power Input Supply, Nominal [kW]	0.5	0.65	1.01	1.4	1.75	2.02	2.44	3.71	2 x 2.15	2 x 2.77
	Power Input Extract, Nominal [kW]	0.52	0.67	1.06	1.47	1.86	2.1	2.55	3.88	2 x 2.24	2 x 2.92
	SFPv [kW/m³/s]	1.88	1.98	1.94	2.00	2.00	2.00	1.98	2.00	2.00	1.99
	Electrical Supply [V-Ph-Hz]	230-1-50	230-1-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50
	Length [mm]	2730	2900	3310	3360	3500	3910	4040	4540	4760	4890
	Depth [mm]	720	820	990	1200	1400	1400	1600	1940	1940	2300
Height (Including Base Frame) [mm]	1320	1320	1540	1740	1740	1920	1920	2180	2460	2570	
Weight [kg]	402	421	591	695	882	956	1082	1618	1894	2305	
DX Total Cooling Capacity [kW]	5.0	6.2	10.0	13.6	17.4	19.6	24.4	36.8	42.3	55.00	
Outdoor Unit Nominal Cooling Power Input [kW]	-	-	-	3.51	4.53	5.22	5.22	2 x 5.22	2 x 5.22	2 x 7.42	
Sound Power Level - Lw dB(A) ⁽¹⁾	72	77	74	77	77	77	78	81	81	82	

D-AHU Modular P - Base Unit c/w Plate Heat Exchanger & CHW Module											
Unit Nominal Performance	Size	ADT01ECW1	ADT02ECW1	ADT03ECW1	ADT04ECW1	ADT05ECW1	ADT06ECW1	ADT07ECW1	ADT08ECW1	ADT09ECW1	ADT10ECW1
	Supply/Extract Airflow [m³/s]	0.50	0.60	0.98	1.29	1.67	1.89	2.33	3.51	4.26	5.28
	Temp Efficiency Winter [%]	91.70	92.00	91.30	91.10	90.80	91.30	91.10	91.10	91.20	91.10
	Temp Efficiency Summer [%]	82.70	83.20	82.10	81.90	81.50	82.10	81.80	81.90	82.00	81.80
	ESP nominal [Pa]	250	250	250	250	250	250	250	250	250	250
	Nominal Fan Current - Supply/Extract [A]	3.3/3.3	3.1/3.1	4.6/4.6	3.0/3.0	3.8/3.8	4.0/4.0	5.3/5.3	7.7/7.7	4.5/4.5	5.3/5.3
	Power Input Supply, Nominal [kW]	0.52	0.66	1.12	1.42	1.82	2.1	2.54	3.85	2 x 2.36	2 x 2.90
	Power Input Extract, Nominal [kW]	0.52	0.65	1.11	1.44	1.86	2.1	2.55	3.88	2 x 2.36	2 x 2.92
	SFPv [kW/m³/s]	1.90	1.95	2.00	2.00	2.00	2.00	1.98	2.00	2.00	2.00
	Electrical Supply [V-Ph-Hz]	230-1-50	230-1-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50	400-3+N-50
	Length [mm]	2730	2900	3310	3360	3500	3910	4040	4540	4760	4890
	Depth [mm]	720	820	990	1200	1400	1400	1600	1940	1940	2300
Height (Including Base Frame) [mm]	1320	1320	1540	1740	1740	1920	1920	2180	2460	2570	
Weight [kg]	401	420	591	696	885	961	1086	1616	1893	2308	
Total Cooling Capacity [kW]	3.9	4.8	8.0	10.9	14.0	16.0	19.3	29.2	35.4	43.3	
Outdoor Unit Nominal Cooling Power Input [kW]	1.27	1.61	2.57	3.9	5.8	5.8	7.59	13.5	13.5	15.4	
Sound Power Level - Lw dB(A) ⁽¹⁾	73	77	77	77	78	77	78	81	81	83	

⁽¹⁾ Sound Power Level - Supply Air Unit Outlet

⁽²⁾ Price includes G4/F7 filtration, Foam Insulation, Aluzinc internal skin and Aluzinc Pre-Painted external skin

Notes:

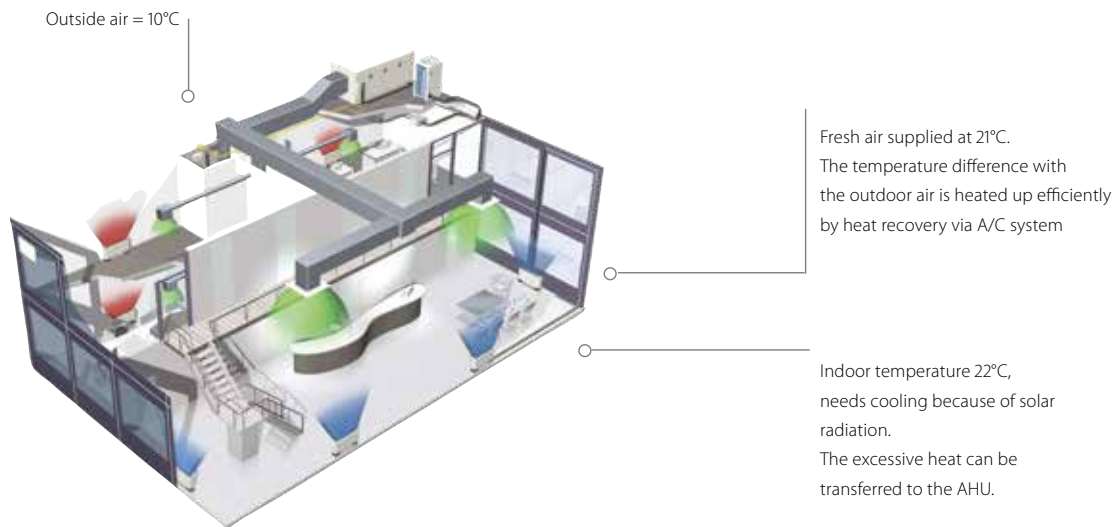
Default handing of units is right hand where all pipe connections and access will be from the right hand side of the unit when viewed looking in to the fresh air inlet. Units can be supplied Left hand if advised at time of order. Ancillary modules include Dual or Single Silencers, Electric or LPHW Frost Coils, Humidifier & various Heating/Cooling Coil Modules will be delivered loose for 'Bolt-Up' to main module at site by the installer.

Why use VRV and ERQ condensing units for connection to air handling units?

High Efficiency

Daikin heat pumps are renowned for their high energy efficiency. Integrating the AHU with a heat recovery system is even more effective since an office system can frequently be in cooling mode

while the outdoor air is too cold to be brought inside in an unconditioned state. In this case heat from the offices is merely transferred to heat up the cold fresh air.



Fast response to changing loads resulting in high comfort levels

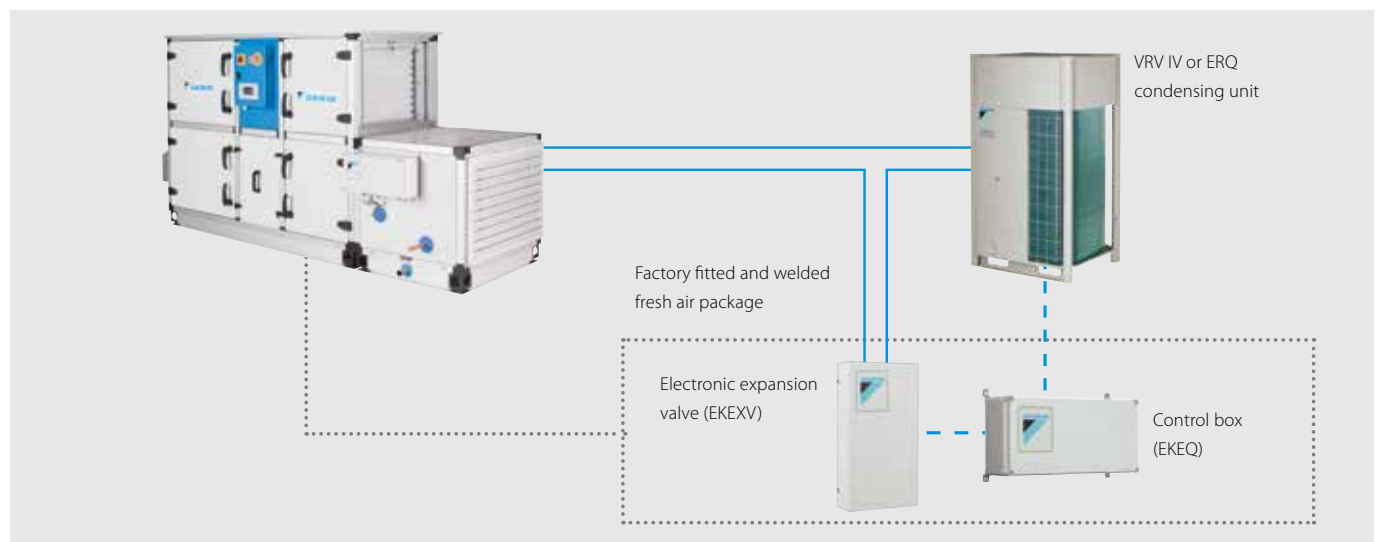
Daikin ERQ and VRV units respond rapidly to fluctuations in supply air temperature, resulting in a steady indoor temperature and resultant high comfort levels for the end user. The ultimate is the VRV range which improves comfort even more by offering continuous heating, also during defrost.

Easy Design and Installation

The system is easy to design and install since no additional water systems such as boilers, tanks and gas connections etc. are required. This also reduces both the total system investment and running cost.

Daikin Fresh air package

- > Plug & Play connection between VRV/ERQ and the entire D-AHU modular range.
- > Factory fitted and welded DX coil control and expansion valve kits.



In order to maximise installation flexibility, 4 types of control systems are offered

W control: Off the shelf control of air temperature (discharge temperature, suction temperature, room temperature) via any DDC controller, easy to setup

X control: Precise control of air temperature (discharge temperature, suction temperature, room temperature) requiring a preprogrammed DDC controller (for special applications)

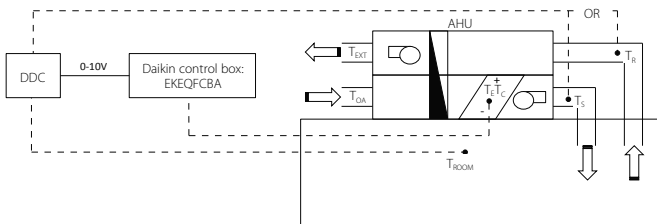
Z control: Control of air temperature (suction temperature, room temperature) via Daikin control (no DDC controller needed)

Y control: Control of refrigerant (T_e/T_c) temperature via Daikin control (no DDC controller needed)

1. W control ($T_s/T_r/T_{ROOM}$ control):

Air temperature control via DDC controller

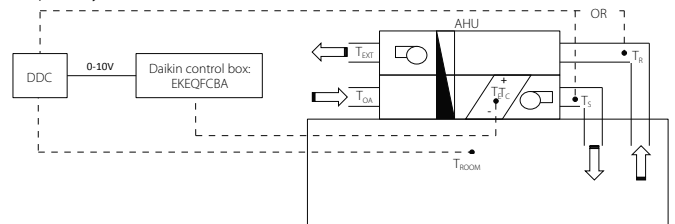
Room temperature is controlled as a function of the air handling unit suction or discharge air (customer selection). The DDC controller is translating the temperature difference between set point and air suction temperature (or air discharge temperature or room temperature) into a proportional 0-10V signal which is transferred to the Daikin control box (EKEQFCBA). This voltage modulates the capacity requirements of the outdoor unit.



2. X control ($T_s/T_r/T_{ROOM}$ control):

Precise air temperature control via DDC controller

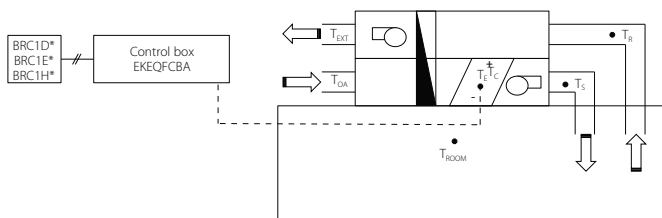
Room temperature is controlled as a function of the air handling unit suction or discharge air (customer selection). The DDC controller is translating the temperature difference between set point and air suction temperature (or air discharge temperature or room temperature) into a reference voltage (0-10V) which is transferred to the Daikin control box (EKEQFCBA). This reference voltage will be used as the main input value for the compressor frequency control.



3. Y control (T_e/T_c control):

By fixed evaporating /condensing temperature

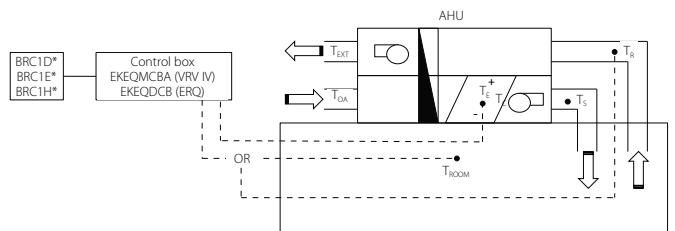
A fixed target evaporating or condensing temperature can be set by the customer. In this case, room temperature is only indirectly controlled. A Daikin wired remote control (BRC1* - optional) have to be connected for initial set-up but not required for operation.



4. Z control (T_s/T_{ROOM} control):

Control your AHU just like a VRV indoor unit with up to 100% fresh air

Allows the possibility to control the AHU just like a VRV indoor unit. Meaning temperature control will be focused on return air temperature from the room into the AHU. Requires BRC1* for operation. The only control that allows the combination of other indoor units to the AHU at the same time.



T_s = Supply air temperature	T_r = Return air temperature	T_{OA} = Outdoor air temperature	T_{ROOM} = Room air temperature
T_{EXT} = Extraction air temperature	T_e = Evaporating temperature	T_c = Condensing temperature	

	Option kit	Features
Possibility W	EKEQFCBA	Off-the-shelf DDC controller that requires no pre-configuration
Possibility X		Pre-configured DDC controller required
Possibility Y		Using fixed evaporating temperature, no set point can be set using remote control
Possibility Z	EKEQDCB EKFQMCBA*	Using Daikin infrared remote control BRC1* Temperature control using air suction temperature or room temperature (via remote sensor)

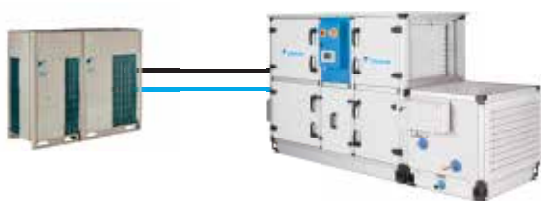
* EKEQMCB (for 'multi' application)

VRV - for larger capacities (from 8 to 54HP)

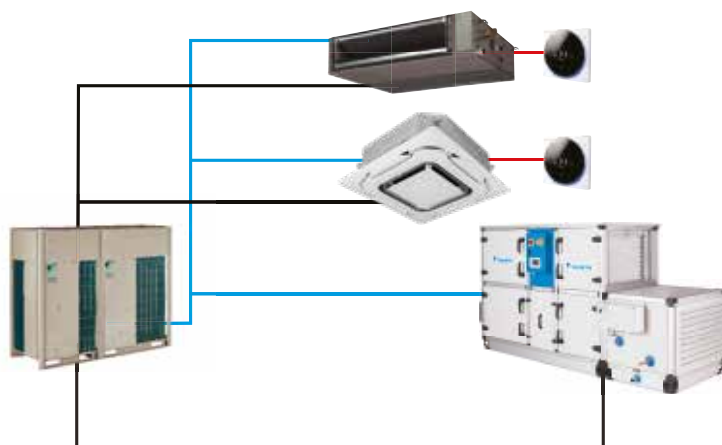
An advanced solution for both pair and multi application

- › Inverter controlled units
- › Heat recovery, heat pump
- › R-410A
- › Control of room temperature via Daikin control
- › Large range of expansion valve kits available
- › BRC1H* is used to set the set point temperature (connected to the EKEQMCBA).
- › Connectable to all VRV heat recovery and heat pump systems

W, X, Y control for VRV IV heat pump



Z control for all VRV outdoor units



- Refrigerant piping
- F1-F2
- P1-P2



ERQ - for smaller capacities (from 100 to 250 class)

A basic fresh air solution for pair application

- › Inverter controlled units
- › Heat pump
- › R-410A
- › Wide range of expansion valve kits available
- › Perfect for the Daikin Modular air handling unit

The "Daikin Fresh Air Package" provides a complete Plug & Play Solution including AHU, ERQ or VRV Condensing Unit and all unit control (EKEQ, EKEX, DDC controller) factory mounted and configured. The easiest solution with only one point of contact.



ERQ-AW1

Ventilation				ERQ	100AV1	125AV1	140AV1
Capacity range			HP	4	5	6	
Cooling capacity	Nom.		kW	11.2	14.0	15.5	
Heating capacity	Nom.		kW	12.5	16.0	18.0	
Power input	Cooling	Nom.	kW	2.81	3.51	4.53	
	Heating	Nom.	kW	2.74	3.86	4.57	
EER					3.99		3.42
COP				4.56	4.15		3.94
Dimensions	Unit	HeightxWidthxDepth	mm	1,345x900x320			
Weight	Unit		kg	120			
Casing	Material			Painted galvanized steel plate			
Fan-Air flow rate	Cooling	Nom.	m ³ /min	106			
	Heating	Nom.	m ³ /min	102	105		
Sound power level	Cooling	Nom.	dBA	66	67	69	
Sound pressure level	Cooling	Nom.	dBA	50	51	53	
	Heating	Nom.	dBA	52	53	55	
Operation range	Cooling	Min./Max.	°CDB	-5/46			
	Heating	Min./Max.	°CWB	-20/15.5			
	On coil temperature	Heating/Min./Cooling/Max.	°CDB	10/35			
Refrigerant	Type			R-410A			
	Charge		kg	4.0			
			TCO ₂ eq	8.4			
	GWP			2,087.5			
Piping connections	Control			Expansion valve (electronic type)			
	Liquid	OD	mm	9.52			
	Gas	OD	mm	15.9			19.1
	Drain	OD	mm	26x3			
Power supply	Phase/Frequency/Voltage		Hz/V	1N~/50/220-240			
Current	Maximum fuse amps (MFA)		A	32.0			

Ventilation				ERQ	125AW1	200AW1	250AW1
Capacity range			HP	5	8	10	
Cooling capacity	Nom.		kW	14.0	22.4	28.0	
Heating capacity	Nom.		kW	16.0	25.0	31.5	
Power input	Cooling	Nom.	kW	3.52	5.22	7.42	
	Heating	Nom.	kW	4.00	5.56	7.70	
EER				3.98	4.29	3.77	
COP				4.00	4.50	4.09	
Dimensions	Unit	HeightxWidthxDepth	mm	1,680x635x765	1,680x930x765		
Weight	Unit		kg	159	187	240	
Casing	Material			Painted galvanized steel plate			
Fan-Air flow rate	Cooling	Nom.	m ³ /min	95	171	185	
	Heating	Nom.	m ³ /min	95	171	185	
Sound power level	Nom.		dBA	72	78		
Sound pressure level	Nom.		dBA	54	58		
Operation range	Cooling	Min./Max.	°CDB	-5/43			
	Heating	Min./Max.	°CWB	-20/15			
	On coil temperature	Heating/Min./Cooling/Max.	°CDB	10/35			
Refrigerant	Type			R-410A			
	Charge		kg	6.2	7.7	8.4	
			TCO ₂ eq	12.9	16.1	17.5	
	GWP			2,087.5			
Piping connections	Control			Electronic expansion valve			
	Liquid	OD	mm	9.52			
	Gas	OD	mm	15.9	19.1	22.2	
	Drain	OD	mm	26x3			
Power supply	Phase/Frequency/Voltage		Hz/V	3N~/50/400			
Current	Maximum fuse amps (MFA)		A	16	25		

Integration of ERQ and VRV in third party air handling units

a wide range of expansion valve kits and control boxes

Combination table

		Control box			Expansion valve kit										Mixed connection with VRV indoor units	
		EKEQDCB Z control	EKEQFCBA W,X,Y control	EKEQMCBA Z control	EKEXV50	EKEXV63	EKEXV80	EKEXV100	EKEXV125	EKEXV140	EKEXV200	EKEXV250	EKEXV400	EKEXV500		
1-phase	ERQ100	P	P	-	-	P	P	P	P	-	-	-	-	-	-	Not possible
	ERQ125	P	P	-	-	P	P	P	P	-	-	-	-	-	-	
	ERQ140	P	P	-	-	-	P	P	P	-	-	-	-	-	-	
3-phase	ERQ125	P	P	-	-	P	P	P	P	-	-	-	-	-	-	
	ERQ200	P	P	-	-	-	-	P	P	P	P	-	-	-	-	
	ERQ250	P	P	-	-	-	-	-	P	P	P	-	-	-	-	
	VRV III	-	-	n1	n1	n1	n1	n1	n1	n1	n1	n1	n1	n1	Mandatory	
	VRV IV H/P / VRV IV W-series VRV IV S-series	-	P (1->3)	n2	n2	n2	n2	n2	n2	n2	n2	n2	n2	n2	Possible (not mandatory)	
	VRV IV H/R VRV IV i-series	-	n1	-	n1	n1	n1	n1	n1	n1	n1	n1	n1	n1	Mandatory	

- P (pair application): combination depends on the capacity of the air handling unit
- n1 (multi application) - Combination of AHUs and VRV DX indoors (mandatory). To determine the exact quantity please refer to the engineering data book.
- n2 (multi application) - Combination of AHUs and VRV DX indoors (not mandatory). To determine the exact quantity please refer to the engineering data book.
- Control box EKEQFA can be connected to some types of VRV IV outdoor units (with a maximum of 3 boxes per unit). Do not combine EKEQFA control boxes with VRV DX indoor units, RA indoor units or hydroboxes

Capacity table

Cooling

EKEXV Class	Allowed heat exchanger capacity (kW)			Allowed heat exchanger volume (dm³)	
	Minimum	Standard	Maximum	Minimum	Maximum
50	5.0	5.6	6.2	1.33	1.65
63	6.3	7.1	7.8	1.66	2.08
80	7.9	9.0	9.9	2.09	2.64
100	10.0	11.2	12.3	2.65	3.30
125	12.4	14.0	15.4	3.31	4.12
140	15.5	16.0	17.6	4.13	4.62
200	17.7	22.4	24.6	4.63	6.60
250	24.7	28.0	30.8	6.61	8.25
400	35.4	45.0	49.5	9.26	13.2
500	49.6	56.0	61.6	13.2	16.5

Saturated evaporating temperature: 6°C
Air temperature: 27°C DB / 19°C WB

Heating

EKEXV Class	Allowed heat exchanger capacity (kW)			Allowed heat exchanger volume (dm³)	
	Minimum	Standard	Maximum	Minimum	Maximum
50	5.6	6.3	7.0	1.33	1.65
63	7.1	8.0	8.8	1.66	2.08
80	8.9	10.0	11.1	2.09	2.64
100	11.2	12.5	13.8	2.65	3.30
125	13.9	16.0	17.3	3.31	4.12
140	17.4	18.0	19.8	4.13	4.62
200	19.9	25.0	27.7	4.63	6.60
250	27.8	31.5	34.7	6.61	8.25
400	39.8	50.0	55.0	9.26	13.2
500	55.1	63.0	69.3	13.2	16.5

Saturated condensing temperature: 46°C
Air temperature: 20°C DB

EKEXV - Expansion valve kit for air handling applications

Ventilation		EKEXV	50	63	80	100	125	140	200	250	400	500
Dimensions	Unit	mm	401x215x78									
Weight	Unit	kg	2.9									
Sound pressure level Nom.		dB(A)	45									
Operation range	On coil	Heating Min.	10 (1)									
	temperature	Cooling Max.	35 (2)									
Refrigerant	Type / GWP		R-410A / 2.087,5									
Piping connections	Liquid	OD	6.35				9.52				12.7	15.9

(1) The temperature of the air entering the coil in heating mode can be reduced to -5°CDB. Contact your local dealer for more information. (2) 45% Relative humidity.

EKEQ - Control box for air handling applications

Ventilation		EKEQ	FCBA	DCB	MCBA
Application			See note	Pair	Multi
Outdoor unit			ERQ / VRV	ERQ	VRV
Dimensions	Unit	mm		132x400x200	
Weight	Unit	kg	3.9		3.6
Power supply	Phase/Frequency/Voltage	Hz/V		1~/50/230	

The combination of EKEQFCBA and ERQ is in pair application. The EKEQFCBA can be connected to some type of VRV IV outdoor units with a maximum of 3 control boxes. The combination with DX indoor units, hydroboxes, RA outdoor units, ... is not allowed. Refer to the combination table drawing of the outdoor unit for details.

Pair application selection

- › **the outdoor unit is connected to ONE COIL (with single circuit or maximum 3 interlaced circuits) using up to 3 control boxes**
- › **indoor unit combination is not allowed**
- › **only works with X, W, Y control**

Step 1: Required AHU capacity

An AHU with double flow, heat recovery and 100% fresh air is to be installed in Europe where the outdoor sizing temperature is 35 °CDB and the target supply air temperature for fresh air is 25 °CDB. Load calculations point to a required capacity of 45kW. By checking on the EKEXV capacity table, for cooling operation, 40kW falls within the 400 class valve. Since 40kW is not the nominal capacity, a class adjustment has to be done. $40/45=0,89$ and $0,89 \times 400=356$. So the capacity class of the expansion valve kit is 356.

Step 2: Outdoor unit selection

For this AHU, a VRV IV heat pump model with continuous heating is going to be used (RYYQ-T series). For a capacity of 40kW at 35 °CDB, an outdoor of 14HP (RYYQ14T) is selected. The capacity class of the 14 HP outdoor unit is 350.

Total connection ratio of the system is $356/350=102\%$ hence it falls within the range 90-110%.

Step 3: Control box selection

In this particular case, the control will work with precise air temperature control. Only W or X control allow this. Since the consultant wants to use an "off-the-shelf" DDC module, the EKEQFCBA box with W control allows easy set-up due to pre-set factory values.

Multi application selection

- › **the outdoor unit can be connected to MULTIPLE COILS (and their control boxes)**
- › **indoor units are also connectable but not mandatory**
- › **only works with Z control**

Step 1: Required AHU capacity

An AHU with double flow, heat recovery and 100% fresh air is to be installed in Europe where the outdoor sizing temperature is 35 °CDB and the target supply air temperature for fresh air is 25 °CDB. On top of this, for this building, 5 round-flow cassette units FXFQ50A will also be connected to this OU. Load calculations point to a required capacity of 20kW for the AHU and 22,5 kW for the indoor units. By checking on the EKEXV capacity table, for cooling operation, 20kW falls within the 200 class valve. Since 22,4 kW is the nominal capacity, a class adjustment has to be done. $20/22,4=0,89$ and $0,89 \times 200=178$. So the capacity class of the expansion valve kit is 178. Total capacity class of the indoor unit system is $178+250=428$

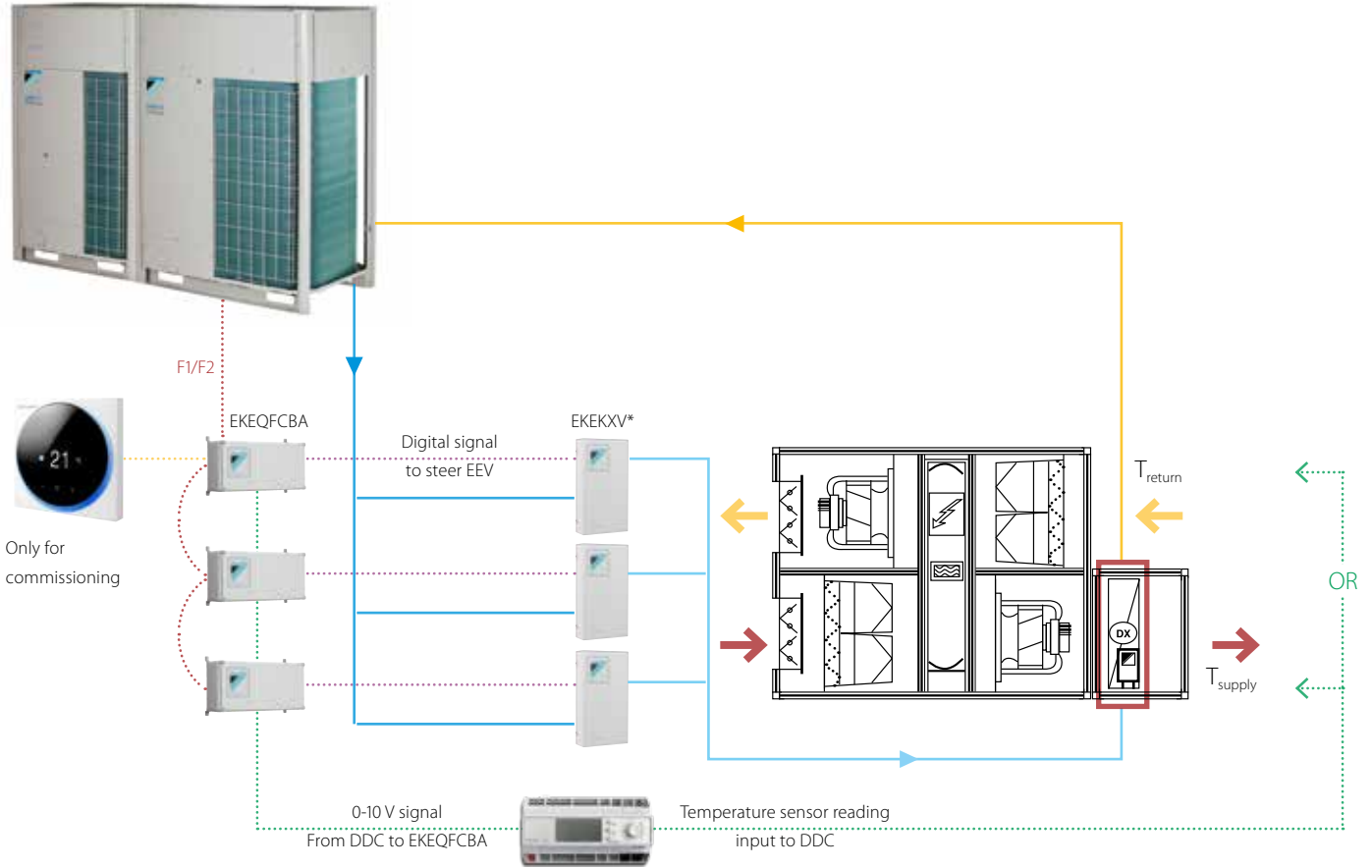
Step 2: Outdoor unit selection

For this system where a AHU is connected with indoor units, it is mandatory to use a heat recovery unit. By consulting the engineering databook for REYQ-T, the total required capacity of 42,5 kW requires a 16HP model REYQ16T. Which will deliver 45kW at the design temperature of 35 °CDB. This unit has a capacity class of 400. Total connection ratio of the system is $428/400=107\%$ hence it falls within the range 50-110%.

Step 3: Control box selection

In this particular case, the only available control is Z control and the combination of AHU and VRV DX indoor units requires EKEQMCBA control box.

Pair application examples



Outdoor unit compatibility

- RYYQ8T > RYYQ54T
- RXYQ8T > RXYQ54T
- RWEYQ8T9 > RWEYQ30T9
- ERQ100 > ERQ250¹

(1) Only available in 1 to 1 combination

Connection restrictions

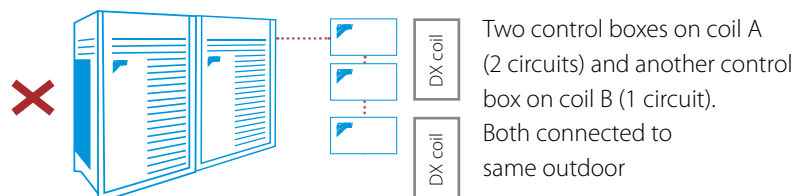
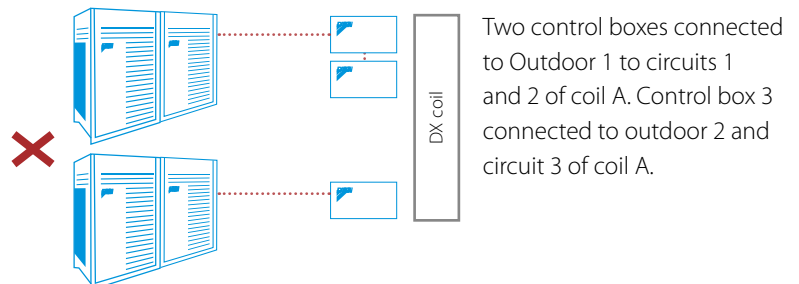
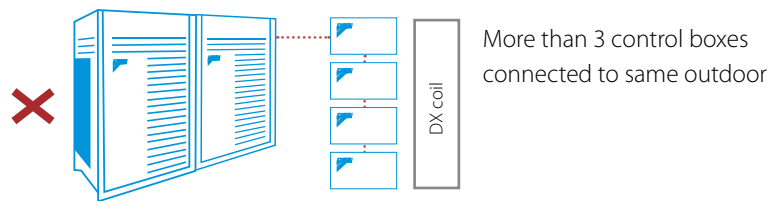
Connection Ratio VRV: between 90-110%

Connection Ratio ERQ: between 50-110%

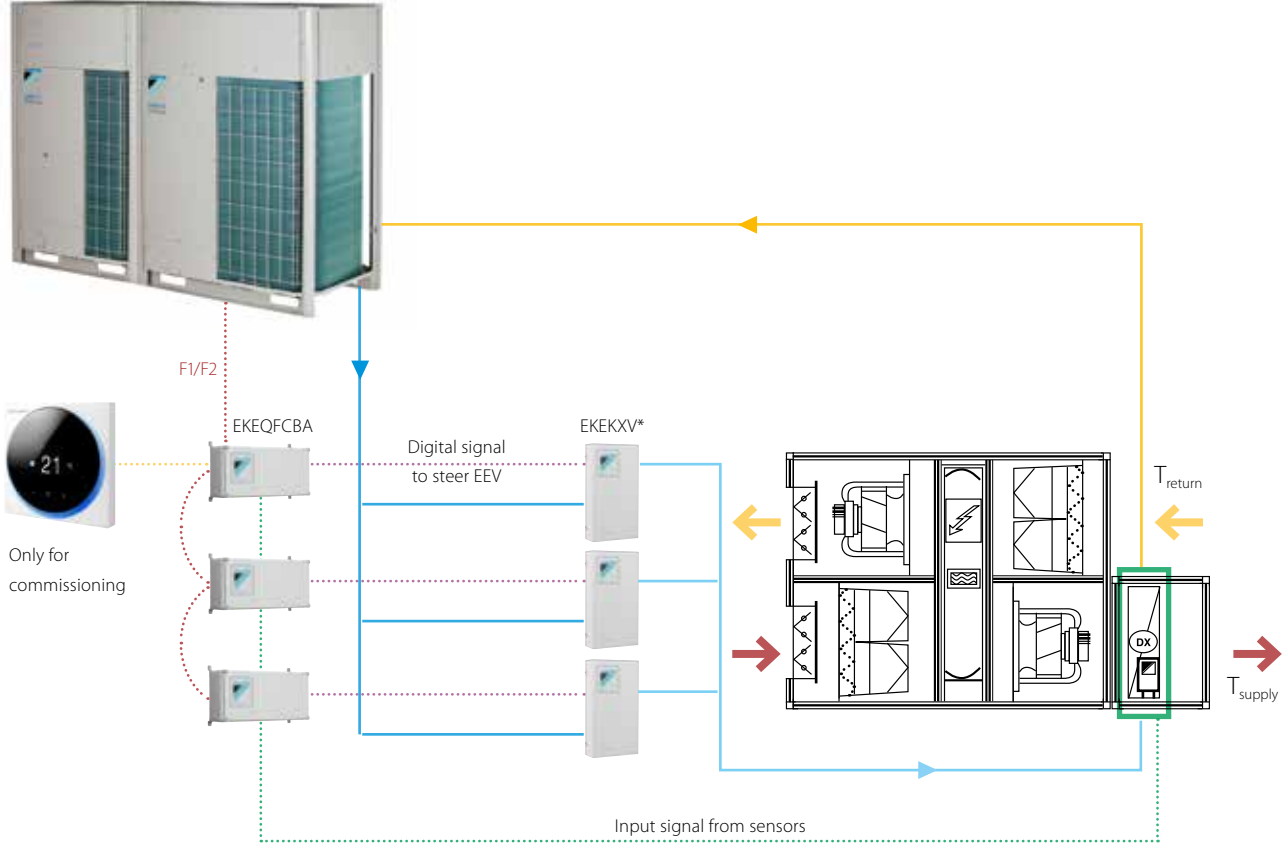
$$CR = \frac{\sum IU CC}{\sum OU CC} = \frac{\sum (CF \times EKEKXV CC)_{1-3}}{\sum OU CC}$$

CF is the correction factor

CC is the capacity class



Pair application layout #2: Example for Y control with EKEQFCBA box



Outdoor unit compatibility

- RYYQ8T > RYYQ54T
- RXYQ8T > RXYQ54T
- RWEYQ8T9 > RWEYQ30T9
- ERQ100 > ERQ250¹

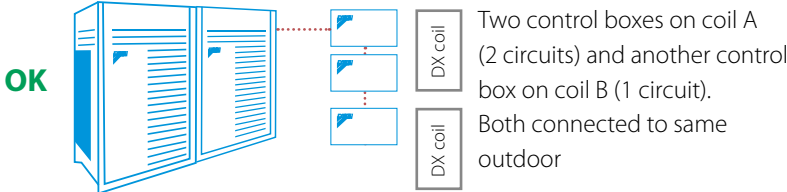
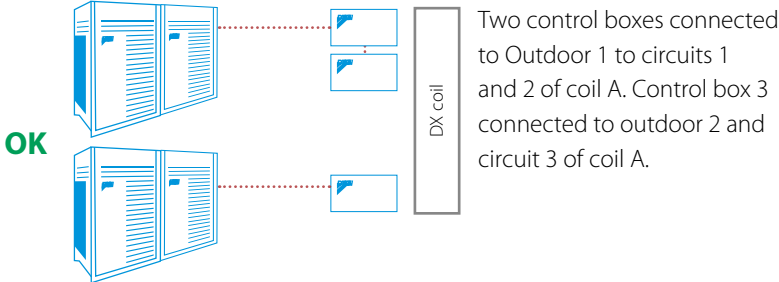
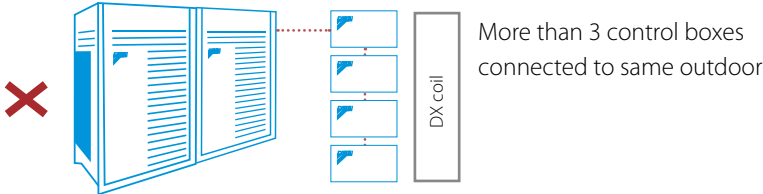
(1) Only available in 1 to 1 combination

Connection restrictions

Connection Ratio between 90-110%
 Connection Ratio ERQ: between 50-110%

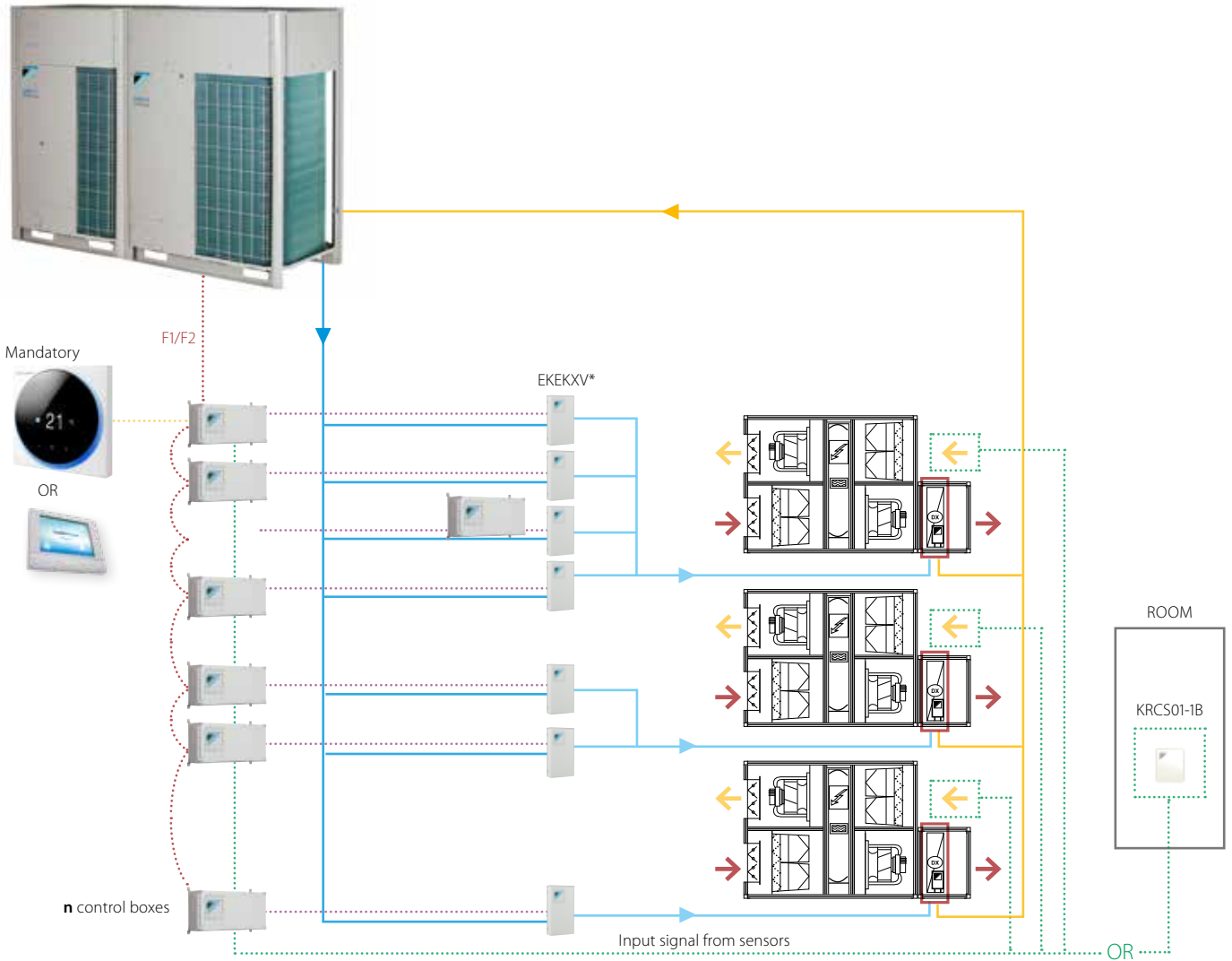
$$CR = \frac{\sum IU CC}{\sum OU CC} = \frac{\sum (CF \times EKEKXV CC)_{1-3}}{\sum OU CC}$$

CF is the correction factor
 CC is the capacity class



Multi application examples

Multi application layout #1: Example for Z control with EKEQMCBA box and no VRV indoor units



Outdoor unit compatibility

- RYYQ8T > RYYQ54T
- RXYQ8T > RXYQ54T
- RWEYQ8T9 > RWEYQ30T9
- EKEQMCBA control box
- ERQ100 > ERQ250¹

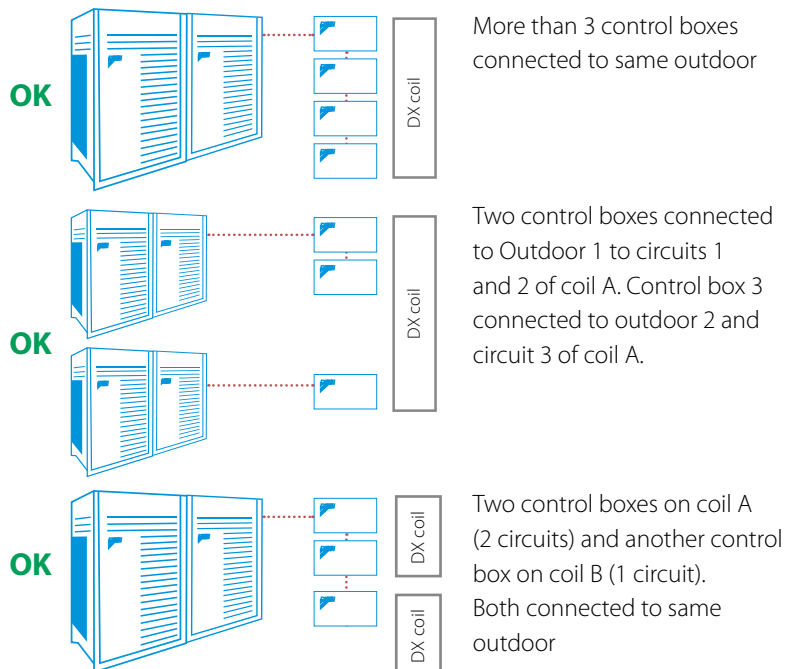
Connection restrictions

Connection Ratio between 90-110%

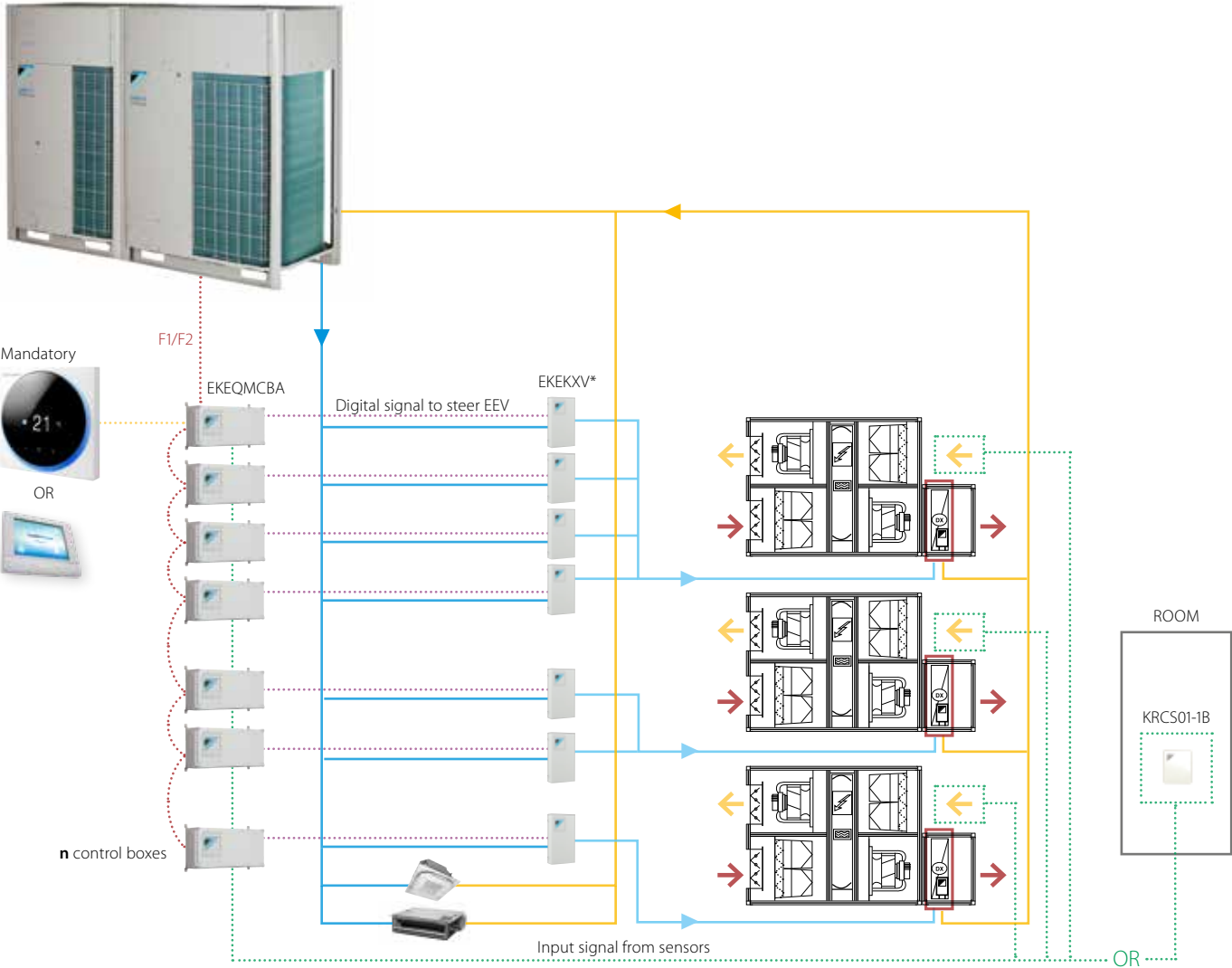
Connection Ratio ERQ: between 50-110%

$$CR = \frac{\sum IU CC}{\sum OU CC} = \frac{\sum (CF \times EKEV CC)_{1-n}}{\sum OU CC}$$

CF is the correction factor
CC is the capacity class



Multi application layout #2: Example for Z control with EKEQMCBA box and VRV indoor units



Outdoor unit compatibility

Not mandatory to have VRV DX indoors:

- RYYQ8T > RYYQ54T
- RXYQ8T > RXYQ54T
- RWEYQ8T9 > RWEYQ30T9

Mandatory to have VRV DX indoors:

- REYQ8T > REYQ54T

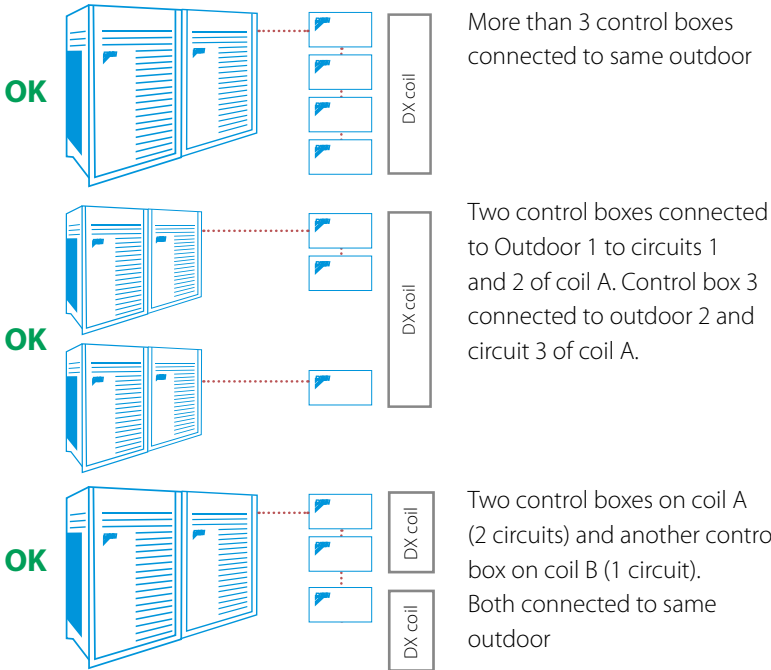
Connection restrictions

Connection Ratio between 50-110%

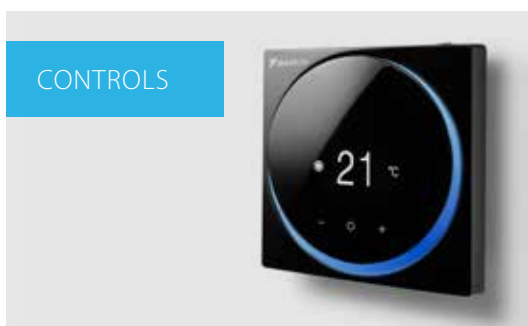
$$CR = \frac{\sum IU CC}{\sum OU CC} = \frac{\sum (CF \times EKEKXV CC)_{1-n}}{\sum OU CC}$$

RULES: $\sum EKEKXV CC$: 0-60% $\sum IU CC$: 50-110%

CF is the correction factor
CC is the capacity class



Options & accessories





Madoka

User-friendly wired remote controller with premium design



White



Silver



Black

BRC1H519W7/S7/K7

- > Sleek and elegant design
- > Intuitive touch button control
- > Three colour versions
- > Advanced settings and monitoring can be easily done via your smartphone
- > Flat back for easy wall installation
- > Compact to fit standard size socket boxes



reddot award 2018
winner



DESIGN
AWARD
2018



Advanced user settings



Field settings

DIRECT INTEGRATION
WITH DAIKIN VENTILATION PRODUCTS

		Heat Recovery Ventilation - Modular L (Smart)				VAM 150FC9	VAM 250FC9	VAM 350J
		ALB02LBS/RBS	ALB03LBS/RBS	ALB04,05LBS/RBS	ALB06,07LBS/RBS			
Individual control systems	BRC301B61 VAM wired remote control	•	•	•	•	•	•	•
	Madoka BRC1H519W7 (White) / BRC1H519S7 (Silver) / BRC1H519K7 (Black) User-friendly wired remote controller with premium design	•	•	•	•	•	•	•
	BRC1E53A/B/C Wired remote control with full-text interface and back-light	•	•	•	•	•	•	•
	BRC1D52 Standard wired remote control with weekly timer	•	•	•	•	•	•	•
Centralised control systems	DCC601A51 intelligent Tablet Controller	•	•	•	•	•	•	•
	DCS601C51 intelligent Touch Controller	•	•	•	•	•	•	•
	DCS302C51 Central remote control	•	•	•	•	•	•	•
	DCS301B51 Unified ON/OFF control	•	•	•	•	•	•	•
	DST301B51 Schedule timer	•	•	•	•	•	•	•
Building Management System & Standard protocol interface	DCM601A51 intelligent Touch Manager	•	•	•	•	•	•	•
	EKMBOXA Modbus interface	•	•	•	•	•	•	•
	DMS502A51 BACnet Interface	•	•	•	•	•	•	•
	DMS504B51 LonWorks Interface	•	•	•	•	•	•	•
Filters	Coarse 55% (G4)	ALF02G4A	ALF03G4A	ALF05G4A	ALF07G4A			
	ePM ₁₀ 75% (M5)	ALF02M5A	ALF03M5A	ALF05M5A	ALF07M5A			
	ePM ₁₀ 70% (M6)							EKAFVJ50F6
	ePM ₁ 50% (F7)	ALF02F7A	ALF03F7A	ALF05F7A	ALF07F7A			
	ePM ₁ 55% (F7)							EKAFVJ50F7
	ePM ₁ 70% (F8)							EKAFVJ50F8
	ePM ₁ 80% (F9)	ALF02F9A	ALF03F9A	ALF05F9A	ALF07F9A			
	High efficiency filter							
	Replacement air filter							
Mechanical accessories	Rail	ALA02RLA	ALA03RLA	ALA05RLA	ALA07RLA			
	Rectangular to round duct transition	ALA02RCA	ALA03RCA	ALA05RCA	ALA07RCA			
	Separate plenum							
CO₂ sensor		BRYMA200	BRYMA200	BRYMA200	BRYMA200			BRYMA65
Electrical heater		ALD02HEFB	ALD03HEFB	ALD05HEFB	ALD07HEFB	GSIEKA10009	GSIEKA15018	GSIEKA20024
Silencer (900mm depth)		ALS0290A	ALS0390A	ALS0590A	ALS0790A			
Electrical accessories	Wiring adapter for external monitoring/control (controls 1 entire system)					KRP2A51	KRP2A51	KRP2A51 (2)
	Adapter PCB for humidifier					KRP50-2	KRP50-2	KRPIC4 (5)
	Adapter PCB for third party heater					BRP4A50	BRP4A50	BRP4A50A (4)
	External wired temperature sensor							
	Adapter PCB Mounting plate							

Notes

- (1) Do not connect the system to DIII-net devices LONWorks interface, BACnet interface, ...; (intelligent Touch Manager, EKMBOXA are allowed)
- (2) Installation box KRPIBA101 needed
- (3) Adapter PCB mounting plate needed, applicable model can be found in the table above
- (4) 3rd party heater and 3rd party humidifier cannot be combined
- (5) Installation box KRP50-2A90 needed
- (6) Contains 1 plenum and can be used for half side of the unit (up to 4 plenums can be used on 1 unit)
- (7) Available only with optional plenum

Electrical heater for Modular L Smart

- › Total solution for fresh air with Daikin supply of both Modular L Smart and electrical heaters
- › Increase comfort in low outdoor temperature thanks to the heated outdoor air
- › Integrated electrical heater concept (no additional accessories required)
- › Standard dual flow and temperature sensor
- › Heater only consumes what is required to pre-heat to the desired minimum fresh air temperature; thus saving energy



Electrical heater for Modular L Smart (ALD)	02HEFB	03HEFB	05HEFB	07HEFB
Capacity kW	1,5	3	7,5	15
Connectable Modular L Smart size	02	03	04, 05	06, 07
Supply voltage	230V,1ph		400V,3ph	
Output current (maximum) (A)	6,6	13,1	10,9	21,7
Temperature sensor	15k ohms at -20 °C 10k ohms at +10 °C	16k ohms at -20 °C 10k ohms at +10 °C	17k ohms at -20 °C 10k ohms at +10 °C	18k ohms at -20 °C 10k ohms at +10 °C
Temperature control range	- 20 °C to 10 °C			
Control fuse	Mini Circuit Breaker 6 A			
LED indicators	"Yellow = Airflow fault Red = Heat ON"			
Mounting holes	Depends on duct size			
Maximum ambient adjacent to terminal box	30°C (during operation)			
Auto high temperature cutout	75°C Pre-set			
Manual reset high temperature cutout	120°C Pre-set			
Width (mm)	470	620	720	920
Depth (mm)	370	370	370	370
Height (mm)	193	243	343	443

Electrical heater for VAM

- › Total solution for fresh air with Daikin supply of both VAM and electrical heaters
- › Increased comfort in low outdoor temperature thanks to the heated outdoor air
- › Integrated electrical heater concept (no additional accessories required)
- › Standard dual flow and temperature sensor
- › Flexible setting with adjustable setpoint
- › Increased safety with 2 cut-outs: manual & automatic



		GSIEKA	10009	15018	20024	25030	35530 ⁽¹⁾
Capacity	kW		0.9	1.8	2.4	3.0	3.0
Duct diameter	mm		100	150	200	250	355
Connectable VAM			VAM150FC9	VAM250FC9	VAM350,500J	VAM650J, VAM800J, VAM1000J	VAM1500J, VAM2000J

		GSIEKA10009	GSIEKA15018	GSIEKA20024	GSIEKA25030	GSIEKA35530	
Dimensions	Height	mm	171	221	271	321	426
	Depth	mm	100	150	200	250	355
	Width	mm	370	370	370	370	373
Minimum air velocity / airflow		m/s	1.5				
		m ³ /h	45	100	170	265	535
Power supply		1~230 VAC/50Hz					
Nominal current	A	4.1	8.2	10.9	13.1	13.1	
Heating power	kW	0.9	1.8	2.4	3.0	3.0	
Connection duct diameter	mm	100	150	200	250	355	
Operation range	Min.	°C	-40°C				
	Max.	°C	40°C				
	Rel. Humidity	%	90%				
Temperature sensor		10 kΩ at +25°C / Tj-K10K					
Temperature sensor range		- 30°C to 105°C					
Temperature set point range		- 10°C to 50°C					
LED indicators	LED 1	flashing every 5 seconds	heater is starting up				
		flashing every second	air flow detected, heating allowed				
		OFF	no power supply or no flow				
	LED 2	ON	problem with duct temperature sensor, set point potentiometer or PTC airflow sensor				
		OFF	heater is not operation				
		ON	heater is operating				
Ambient temperature adjacent to controller		0°C to +50°C					
Auto high temperature cut-out		50°C					
Manual reset high temperature cut-out		100°C					



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ECPEN20-203 UK verison 07/20



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