DAIKIN

Ventilation Guide

Indoor air quality solutions for residential and commercial environments

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Clean air is a basic requirement of life. The quality of air inside homes and commercial buildings where people spend a large part of their life is an essential determinant of healthy life and people's well-being.

Daikin offers a variety of solutions from small energy recovery ventilation to large air handling units for the provision of fresh air ventilation to residential and commercial buildings.

Ventilation solutions

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

- **Wide ventilation portfolio,** unique among AC manufacturers
- High-quality solutions complying with the **highest legislative standards**
- **Seamless integration** of all products to provide the best indoor environment quality
- All Daikin products connected to a single front end 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%.

Control of fresh air temperature

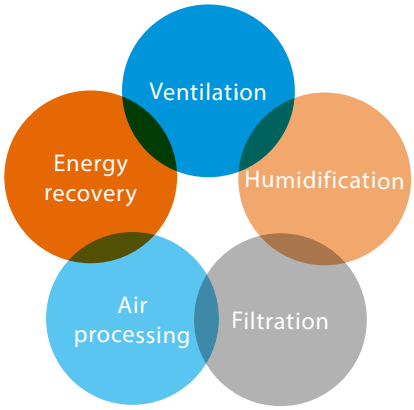
Daikin offers a range of inverter condensing units and chillers which can be used in combination with Daikin Air Handling Units (AHUs) for the ultimate in control over fresh air.

There are four control possibilities when combining AHUs and Daikin outdoor units, offering all the required flexibility for any installation.

Multiple indoor units can be combined with the same outdoor unit to reduce the installation costs. For false-ceiling installations where space is a constraint, the VKM can fit perfectly, delivering fresh air at a comfortable temperature and with optional humidification.

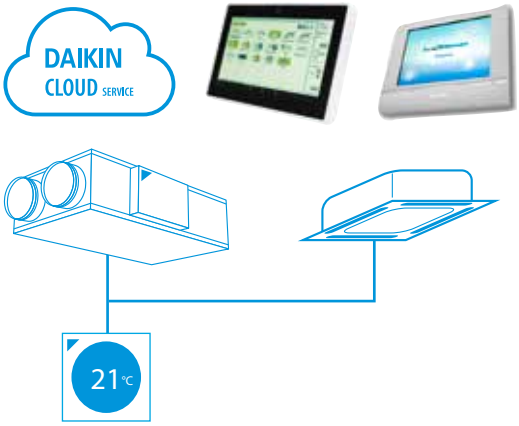
Five components of indoor air quality:

- **Ventilation:** ensures the provision of fresh air
- **Energy recovery:** saves energy 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 harmful to health



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

1 Market leading controls & connectivity

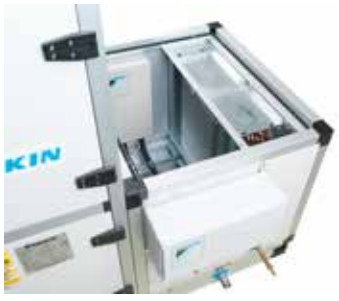


› Interlocking ventilation and air conditioning system:
- Control ERV/HRV and air conditioning from the same controller
- Aligns the operation mode between the systems to save energy

› 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

2 Unique installation benefits



› Integrates seamlessly within 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 thanks to same pipe diameters, 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
- Higher Efficency EC Fans
- ErP compliant

Up to 92% energy recovery

4 Best comfort

- Wide range of units to control fresh air for comfort cooling applications
- Wide range of optional filters to suit the application available up to ePM_1 80% (F9)
- Special paper heat exchanger recovers heat and moisture from extracted air to warm up and humidify fresh air to comfortable levels (VAM, VKM)
- Aluminum plate heat exchanger, eliminating the risk of cross contamination between air flows (Modular L & Modular P)

EUROVENT CERTIFIED PERFORMANCE www.eurovent-certification.com

5 Total reliability

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

ErP COMPLIANT

Indoor air quality decision guide

Full fresh Air
Tempered air -(i.e supplied at room temperature)

Heat Recovery Ventilation (HRV)

Decentralised systems
150 - 200Pa (i.e by floor, medium ESP)

VAM-FC9 / VAM-J

Ventilation with heat recovery as standard

- 0.04-0.56 m^3/s
- @ 90Pa
- 80% Efficiency
- SA: ePMCoarse 50%
- RA: ePMCoarse 50%

VKM-GB(M)

With DX coil for post-treated fresh air

- 0.04-0.56 m^3/s
- @ 90Pa
- 80% Efficiency
- SA: ePMCoarse 50%
- RA: ePMCoarse 50%

MODULAR L (SMART) (ALB)

High efficiency counterflow heat exchanger

- 0.08-0.75 m^3/s
- @ 150Pa
- >90% Efficiency
- SA: ePM1 50%
- RA: ePM10 75%

Ventilation

Airconditioning
with % Fresh air (i.e. re-circulation)

Centralised systems
200-400Pa (i.e. plant room,high ESP)

Centralised systems
250-500Pa (i.e. plant room, high ESP)

MODULAR P (ADT)

High efficiency aluminium plate heat exchanger

- 0.41-5.83 m^3/s
- @ 250Pa
- >80% Efficiency
- SA: ePMCoarse 60%/ ePM1 50%
- RA: ePMCoarse 60%

MODULAR R (ADT)

Rotary heat exchanger (sorption and sensible technology)

- 0.5-5.28 m^3/s
- @ 250Pa
- >80% Efficiency
- SA: ePM Coarse 60%/ePM1 50%
- RA: ePMCoarse 60%

AHU by Others

OEM Approach

- If DX coil consider Daikin expansion valve (EXEXV) and condenser (ERQ/VRV)
- If chilled water coil consider Daikin chiller options 2kW to 2mW.

Rooftop UATYQ

- 1.38-7.2 m3/s
- 19.5-107kW
- @ 300Pa
- SA: ePM Coarse 60%

Note:
SA - Supply Air
RA - Return Air

Legislation and standards

Ventilation Rates

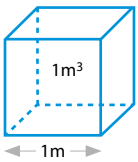
Part F	
Room	Extract rates
Rooms containing printers and photocopiers in substantial use (greater than 30 minutes per hour)	Air extract rate of 20l/s per machine during use. Note that, if the operators are in the room continuously, use the greater of the extract and whole building ventilation rates
Office sanitary accomodation and washrooms	Intermitent air extract rate of: 15l/s per shower/bath 6l/s per WC/urinal
Food and beverage preparation areas (not commercial kitchens)	Intermitent air extract rate of: 15l/s with microwave and beverages only 30l/s adjacent to the hob with cooker(s) 60l/s elsewhere with cooker(s) All to operate while food and beverage preperation is in progress
Specialist buildings/spaces (e.g. commercial kitchens, sports centres)	See table 6.3

Table 6.1b Whole building ventilation rate for air supply to offices	
Air supply rate	
Total outdoor air supply rate for office (no smoking and no significant pollutant sources)	10l/s/person

CIBSE - Guide B		
CIBSE Guide B Section	Building sector	Recommendation
2.3.5	Broadcasting studios	6–10 ACH
2.3.24.2	Call centres	4–6 ACH
2.3.8	Communal residential building	0.5–1 ACH
2.3.24.4	Darkrooms (photographic)	6–8 ACH
2.3.24.5	Dealing rooms	As offices for ventilation
2.3.10	Dwellings (inc. high-rise dwellings)	0.5–1 ACH
2.3.12	High-rise (non-domestic) buildings	4–6 ACH for office areas up to 10 ACH for meeting spaces
2.3.14	Hotels	10–15 ACH minimum for guest rooms with en-suite bathrooms
2.3.16	Laboratories	6–15 ACH (allowance must be made for fume cupboards)
2.3.19	Schools and educational buildings	See Table 2.26
2.3.20	Shops and retail premises	5–8 l/s per person
2.3.22	Toilets	Building Regulations apply: mechanical ventilation at 6 l/s per WC or 3 CH minimum for non-domestic buildings

Calculation Examples

3ach on 1m3 volume
1m3 x 3ach = 3m³/hr
Or
3m3/hr÷3600 = 0.0008m³/s
Or
3m³/hr÷3.6=0.833l/s



Occupancy (No. of people)

16 people at 10l/s/person
16people x 10l/s = 160l/s
Or
160l/s÷1000=0.16m³/s
Or
0.16m³/s*3600=576m³/hr

Part L Guidelines (NDBCG)

Recommended minimum dry heat recovery efficiency for heat exchangers	
Heat exchanger type	Dry heat recovery
Plate Heat Exchanger	50%
Thermal Wheel	60%

Maximum specific fan power in air distribution system in new and existing building			
Air Distribution System Type		New Build SFP (W/l.s))	Existing Build
Modular P&R	Central balance mechanical ventilation with heating and cooling	1.6	2.2
	Central balance mechanical ventilation with heating only	1.5	1.8
	All other central balanced mechanical ventilation systems	1.1	1.6
VAM/VKM Modular L	Zonal supply and extract ventilation units, such as ceiling or roof units serving a single room or zone with heating and heat recovery	1.9	1.9
	Local balanced supply and extract ventilation units, such as ceiling or roof units serving a single area with heating and heat recovery	1.6	1.6

Extending specific fan power for additional components in new and existing buildings	
Component	SFP (W/(l.s))
Additional return filter for heat recovery	+0.1
HEPA filter	+1.0
Heat recovery - Thermal Wheel	+0.3
Heat recovery - other systems	+0.3
Humidifier/dehumidifier (airconditioning system)	+0.1

Note: SFP = Specific Fan Power

Filtration Standard

	EN 779 2012	**EN ISO 16890 (July 2018)**			
	Filter Class	Coarse >10µm	ePM10 0.3 to 10µm	ePM2,5 0.3 to 2.5µm	ePM1 0.3 to 1µm
Gross	G1	-	-	-	-
	G2	30% - 50%	-	-	-
	G3	45% - 65%	-	-	-
	G4	60% - 85%	-	-	-
Med	M5	80% - 95%	40% - 70%	10% - 45%	5% - 35%
	M6	>90%	60% - 80%	20% - 50%	10% - 40%
Fine	F7	>95%	80% - 90%	65% - 75%	60% - 85%
	F8	>95%	90% - 100%	75% - 95%	60% - 85%
	F9	>95%	90% - 100%	85% - 95%	80% - 90%

Note:
Classification is based on achieving a min of 50% efficiency
Efficiency value of filter is rounded down to nearest 5% for classification purposes

Unit construction

DX COIL MODULE

Thermal Wheel

› Reduces unit length
› Low pressure drops
› High sensible efficiency
› 3% carry over (ie: cross contamination)

Plate Heat Exchanger

› Larger unit
› High dry efficiency
› No risk of cross contamination

Feature	Detail	VAM/VKM	Modular L Smart	Modular L Pro	Modular P	Modular R
System Type	De-Centralised	✓	✓	✓		
	Centralised				✓	✓
Controls	F1/F2	STD	STD			
	Siemens MT3			STD	STD	STD
Mixing Box					OPT	OPT
EC Fan			STD	STD	STD	STD
Dampers	Fresh Air inlet				STD	STD
	Exhaust Air Discharge				STD	STD
Frost Coil	Electric		OPT[1]	OPT[1]	OPT	OPT
	LPHW				OPT[2]	OPT[2]
Filters	Panel	STD	OPT	OPT	OPT	OPT
	Bag		STD	STD	OPT	OPT
Heat Recovery	Cross Flow (Paper)	STD				
	Plate (Aluminium)		STD	STD	STD	
	Thermal Wheel					STD
Cooling Coil	DX Heat Pump R410a				OPT	OPT
	Chilled Water			OPT[1]	OPT	OPT
Heating Coil	Electric			OPT[1]	OPT	OPT
	LPHW			OPT[1]	OPT	OPT
Attenuators	Atmosphere Side		OPT[1]	OPT[1]	OPT	OPT
	Room Side		OPT[1]	OPT[1]	OPT	OPT
Humidifier Section					OPT[3]	OPT[3]
Empty Section	Before Cooling Coil				OPT	OPT
	After Cooling Coil				OPT	OPT

Notes:
1. Optional module, supplied loose for field installation
2. 'Factory Special', contact Applied Department
3. Includes supply and fitting of Steam Distributor(s) and loose supply of Carel HumiSteam Basic immersed electrode humidifier(s).

DAMPER AND EC FAN

HEAT RECOVERY
WHEEL AND FILTER

Accessory List

	Mandatory	Recommended	Optional
Spare Filter		✓	
Lifting Bracket			✓
Flat Roof	✓[1]		
Lamp Wired To External Switch			✓
LED Lamp Wired To External Switch			✓
Port Hole			✓
Rain Hood	✓[1]		
Louvre	✓[1]		
Flexible Connection		✓	
Circular Spigot			✓
Flexible Connection - VDI Class			✓
Noise Reduction Laminar Straightener			✓
Screen Door	✓		
Microswitch			✓
Frost Protection Thermostat		✓[2]	
'U' Tube Manometer			✓
Minihelic Gauge			✓
CO2 Sensor			✓
Room Thermostat			✓
Remote Interface			✓
Humidity Sensor			✓
BACNET Module		✓[3]	
MODBUS Module			✓

Notes:
1. For units mounted outdoors
2. For units fitted with electric frost coil
3. For integration with ITM frontend

CE

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FSC

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