DAIKIN

AIR CONDITIONING

HRV
Heat Reclaim Ventilation



VAM-FA Series

VKM-GM Series

VKM-G Series

OPTIMISED DESIGN R-410A

Table of Contents

Daikin Europe N.V.

Daikin has a worldwide reputation based on over 70 years' experience in the successful manufacture of high quality air conditioning equipment for industrial, commercial and residential use.

In all of us, a green heart

Environmental Consciousness

Enhancing the present - safeguarding the future

Throughout the last 50 years or so the basic building blocks of life - air, water and the earth - have been systematically subjected to increasing levels of pollution with little regard to their potentially devastating effects on future generations.

Recently however, concern has grown regarding climate changes, acid rain, water and air pollution and the constant degradation of Earth's natural resources. The very technology that created these problems is now being harnessed to halt and reverse them. Depletion of the ozone layer and global warming have been highlighted and are now being addressed. Government legislation prohibiting the use of toxic substances and the generation of pollutants has slowed down the destruction of the environment.

Daikin Europe is proud to have been pro active in this respect, closely following its Japanese parent in implementing policies that have often pre-empted official legislative codes and directives. As a result, a culture of "environmental management" has since 2001, played a key role in the company's day to day activities and development strategies.

Top management commitment is reflected in the establishment of a number of action plans, which are now strictly observed and implemented throughout the Daikin Group.

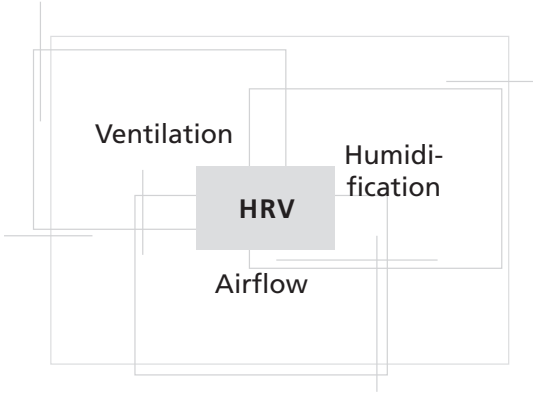
HRV helps create a high quality environment by interlocking with the air conditioning system

The Daikin HRV (Heat Reclaim Ventilation) recovers heat energy lost through ventilation and holds down room temperature changes caused by ventilation, thereby maintaining a comfortable and clean environment. This also reduces the load on the air conditioning system and conserves energy.

In addition, the HRV interlocks with Daikin's VRV system, Sky Air and other air conditioning systems and automatically switches over ventilation mode, further increasing the effects of energy conservation. HRV operation has been centralised on the air conditioner remote control allowing total control over air conditioning and ventilation via a simple configuration.

The current line-up includes models with DX coil and/or humidifier - the DX coil helps prevent the direct impact of cold airflow upon personnel during the heating cycle and vice versa. High static pressure enhances design flexibility.

Components of Indoor Air Quality



New Features VKM unit

- Humidifier
- DX coil
- High static pressure

Line-up

Air flow rate (m^3/h)	150	250	350	500	650	800	1000	1500	2000
VAM-FA Ventilation	✗	✗	✗	✗	✗	✗	✗	✗	✗
VKM-GM: Ventilation, DX coil & humidifier				✗		✗	✗		
VKM-G: Ventilation & DX coil				✗		✗	✗		

II. General HRV (VAM+VKM) Features

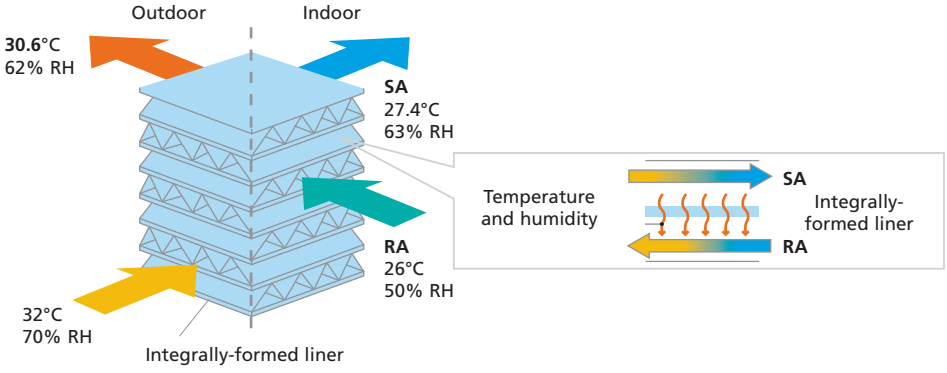
1 Energy Efficiency

- **Over 30 % Size Reduction**
  Use of the high efficiency paper (HEP) element and optimized design of the fan and airflow passages have resulted in matchless compactness without detriment to the 28% or so reduction in air conditioning load achieved by previous models. A reduction of up to 40mm in height allows the main unit to fit easily into limited spaces such as ceilings
  On average 28 % air conditioning load reduction (maximum 40 %):
  - 20% by operating in total heat exchange mode (in comparison with normal ventilation fans)
  - a further 6 % by auto-ventilation mode changeover switching
  - a further 2 % by pre-cool, pre-heat control (reduces air conditioning load by not running the HRV while air is still clean soon after the air conditioner is switched on.)

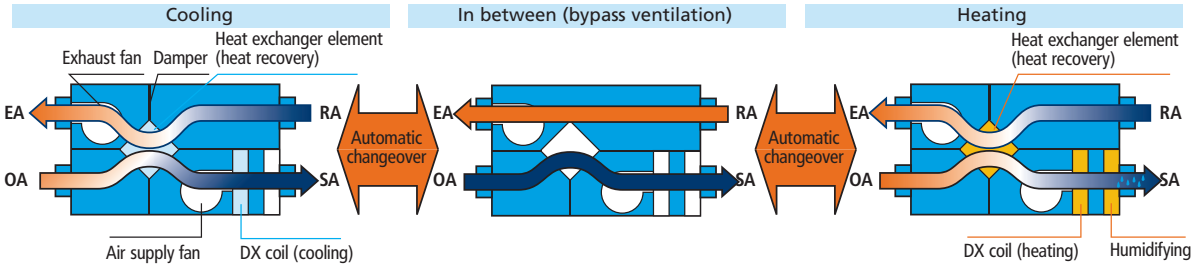
  Note: the values mentioned above may vary according to weather and other environmental conditions at the location of the unit's installation

- **Proprietary Developed HEP Element**
  The heat exchange element uses a high efficiency paper (HEP) possessing superior moisture absorption and humidifying properties.
  The heat exchange unit speedily recovers heat contained in latent heat (vapour). The element is made of a material with flame resistant properties and is treated with an anti-moulding agent.

Operation of the heat exchanger element



- **Automatic Changeover to Efficient Operation Patterns**
  Operation automatically switches to the optimum pattern to suit prevailing conditions

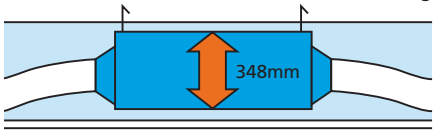


2 Design Flexibility

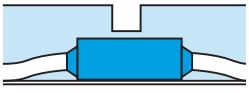
- **Outdoor Operation Temperature down to -15°C**
  If the outdoor air suction temperature falls below -10°C, the unit switches to intermittent operation to prevent freezing of the heat exchanger element and dew condensation within the unit.
  Intermittent operation = a thermistor (standard equipment) within the unit detects the outdoor air temperature. Unit operation varies according to the detected temperature.

- **Slim Design**
  The slim design of the HRV unit enables it to be mounted in narrow ceiling voids and irregularly shaped spaces.

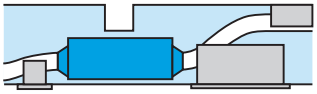
• Installation under the floor of a small building



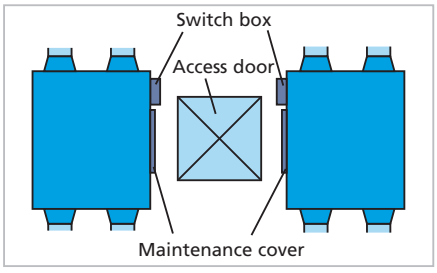
• Installation under a beam



• Installation in an irregular space



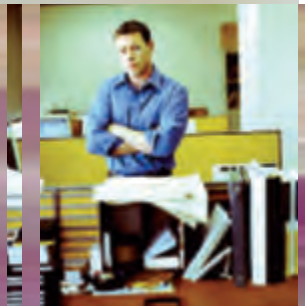
- **Simple Design and Construction**
  The unit can be installed either horizontally or vertically in accordance with the conditions of the location.
  A 450mm square inspection hatch enables maintenance and heat exchange element replacement to be performed with ease.



- **Quiet Operation**
  Sound pressure levels are remarkable low at 20.5dBA (VAM150FA)

dB(A)	Perceived loudness	Sound
0	Treshold 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	Jet taking off

Daikin units

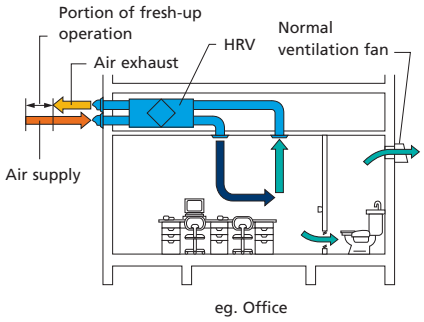


3 Clean Air

- **Fresh-Up Operation**
  The user can select between 2 fresh-up modes via the remote control

1. Supply rich mode:

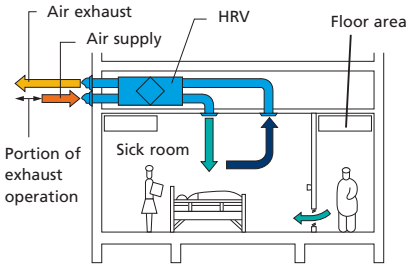
Raising the air supply maintains proper room pressure to prevent back-flow of toilet/kitchen odours or moisture inflow.



eg. Office

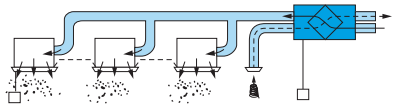
2. Exhaust fresh-up:

Raising exhaust air decreases room pressure to prevent the leaking of odours or floating bacteria into other rooms.



eg. Hospital

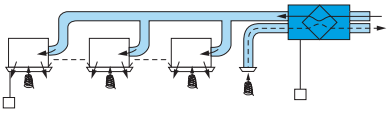
- **Dust Prevention**
  Prevents dust from falling thanks to directly mounted ducts



OFF Dust

With Competitors' Products

When conventional total heat exchange units, which are independently operated using a dedicated remote control, are directly connected by a duct, there is a possibility of dust falling from the air filter of the indoor unit when the air conditioner is OFF.



Blowing mode No dust is blown out

With HRV

When the HRV is operating independently, the fan in a interlocked indoor unit continues turning, so dust does not fall from the air filter.

- **Filter Cleaning**
  A signal on the remote control indicates when the air filter needs cleaning

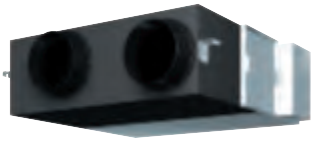
IV. Line-up

VAM-FA: ventilation

VAM150FA7VE

VAM250FA7VE

VAM350FA7VE

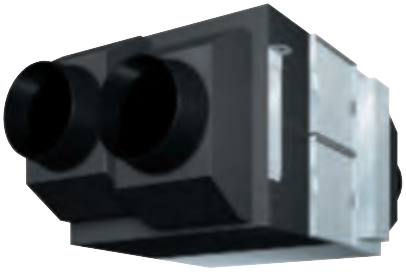


VAM500FA7VE

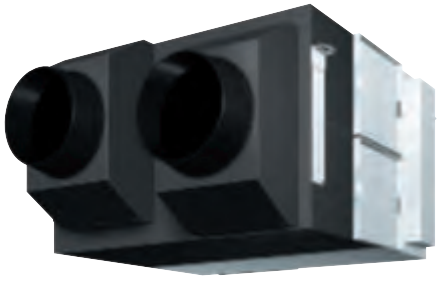
VAM650FA7VE

VAM800FA7VE

VAM1000FA7VE



VAM1500FA7VE



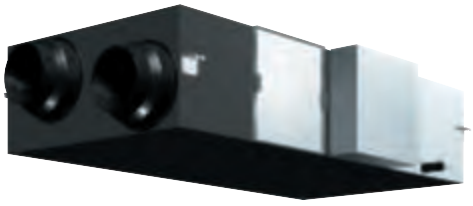
VAM2000FA7VE

VKM-GM: ventilation, DX coil and humidifier

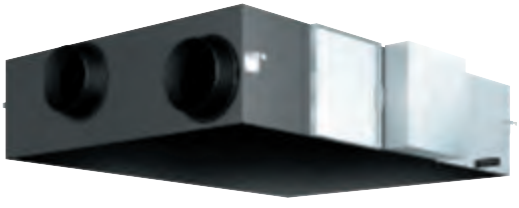
VKM50GMV1

VKM80-100GMV1

VKM-G: ventilation and DX coil



VKM50GV1



VKM80-100GV1

V. Control Systems

HRV can also be connected to :

DS-net

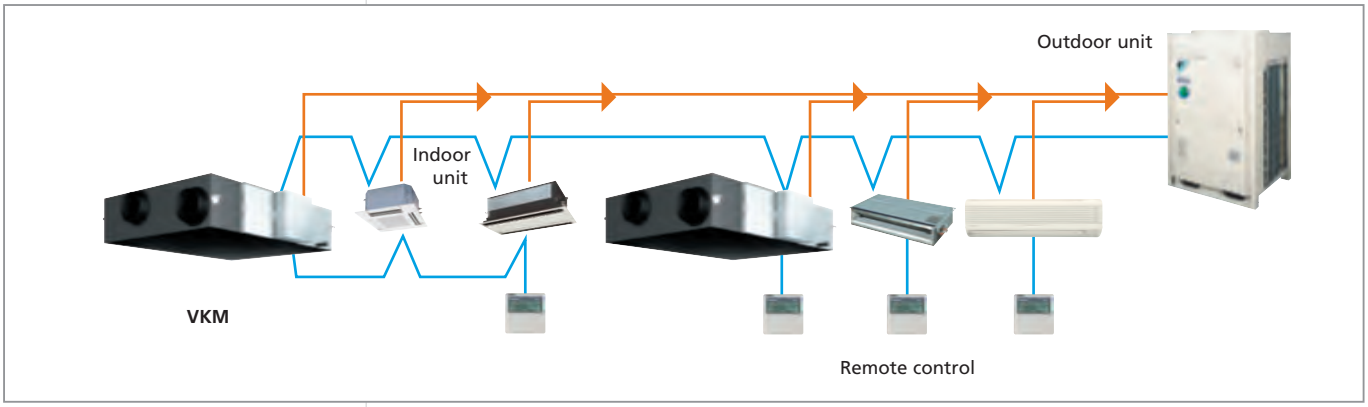
intelligent Touch Controller

intelligent Manager

BACnet Gateway

SMS-IF

Operation of the air conditioner using the remote control is interlocked with HRV operation, greatly simplifying overall system control. The same remote control centralizes air conditioning and ventilation operations, obviating any need for HRV remote control installation work. Using a centralized remote control also frees the user to choose from a wide range of control systems that integrate air conditioning and ventilation. By incorporating a variety of centralized control equipment, the user can build a large, high grade centralized control system.



BRC1D527

air conditioner remote control

BRC301B61

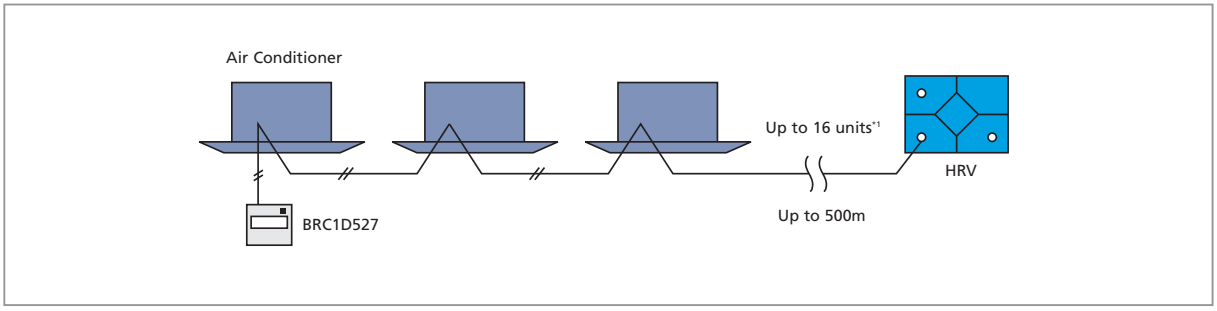
VAM remote control

1 Individual Control Systems

- Simultaneous ON/OFF of HRV and air conditioner (BRC1D527)
- ON/OFF of HRV (BRC301B61)
- Independent operation of HRV
- Airflow rate switching (initial setting)
- Ventilation mode switching (initial setting)
- Self diagnostic functions
- Filter sign display and reset
- Timer settings, simultaneous control with air conditioner (BRC1D527)
- Timer settings (BRC301B61)
- Fresh-up mode switching (Selectable: supply rich mode, exhaust rich mode; initial setting)

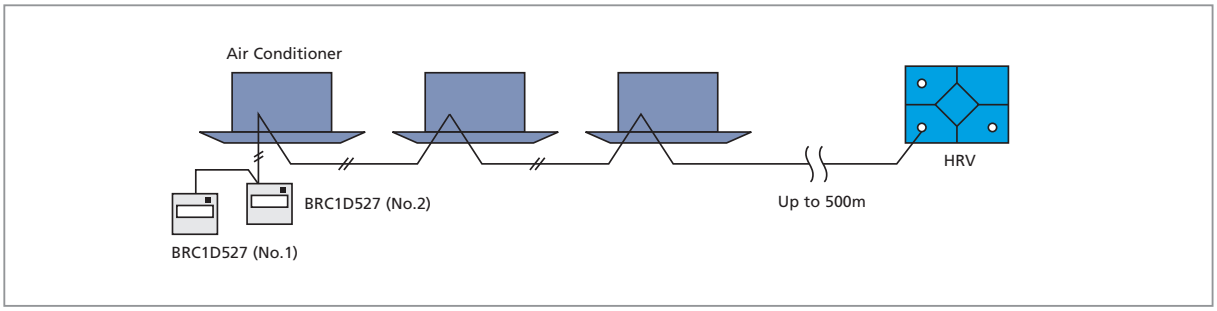
→ A variety of control systems can be controlled using only the BRC1D527

- **Group Control**
  One air conditioner remote control simultaneously controls up to 16 air conditioning and HRV units.

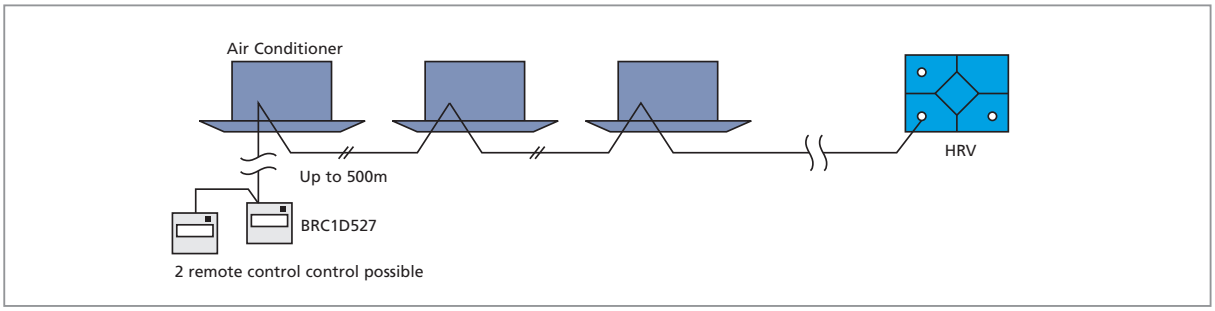


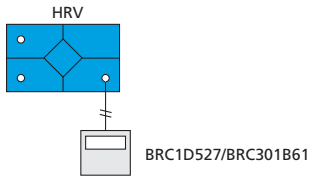
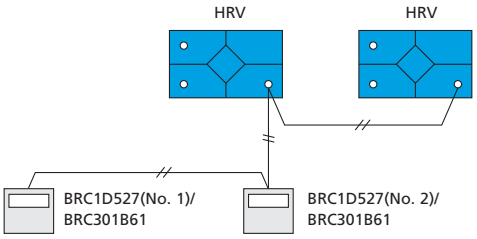
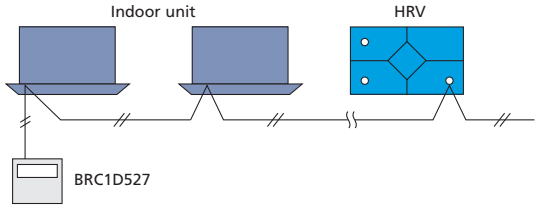
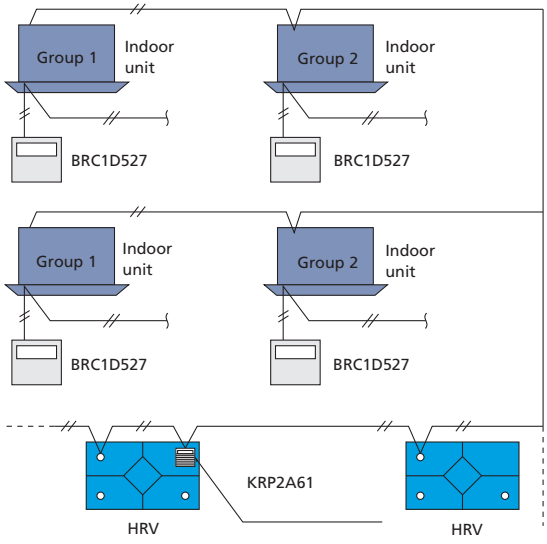
*1: Count VKM unit as two air conditioners. For details, see Table 1 on page 15.

- **Control using 2 remote controls**
  Allows control of air conditioning and HRV units from two locations by connecting two air conditioner remote controls. (group control is possible)



- **Long-distance Remote Control**
  Remote operation control - from a distant control room for example, is possible thanks to wiring of up to 500 m. (2 remote control control possible)



		System construction	System characteristics	Necessary accessories
INDEPENDENT OPERATION SYSTEM	INDEPENDENT OPERATION		• Independent operation of HRV is possible • Air conditioner remote control can be used	BRC1D527 BRC301B61
	SIMULTANEOUS OPERATION OF MULTIPLE UNITS		• Operation is possible using 2 remote controls • Multiple HRV units can be simultaneously controlled in batch. (Up to 8 HRV units can be connected)	BRC1D527 BRC301B61
AIR CONDITIONING INTERLOCKED CONTROL (VRV, SKY AIR) SYSTEM	STANDARD SYSTEM	 During group control operation, the VKM unit has a capacity equivalent to 2 standard indoor units. Up to 16 standard indoor units can be connected at the same time. Connectable indoor units: VKM 0 1 2 3 4 5 6 7 8 Max. n° of VRV 16 14 12 10 8 6 4 2 0 Note: The VKM uses 2 remote control addresses per unit. The number of units that can be group controlled is shown above.	• Multiple VRV indoor units or HRV units can be connected and controlled in batches, with interlocked operation of HRV and air conditioners by using the air conditioner remote control. • The HRV unit can also be operated independently using the remote control for the indoor unit, even if the indoor unit is not in operation	BRC1D527
	MULTIPLE GROUPS INTERLOCKED OPERATION SYSTEM		• Can control interlocked operation of multiple groups of VRV or Sky Air indoor units • When one of the multiple groups operates, HRV units are interlocked and operate simultaneously	BRC1D527

BRC301B61 only available for VAM-FA

2 Centralised Control Systems

By combining the (optional) centralised control equipment listed below, the user can achieve a wide range of comprehensive centralised control systems for air conditioning and ventilation.

DCS302C51

Centralised remote control - DCS302C51

- 64 groups (zones) of indoor units can be controlled individually by means of the LCD remote control.
- Max. 64 groups (128 indoor units) can be controlled
- Max. 128 groups (128 indoor units) can be controlled via 2 centralised remote controls, in separate locations.
- Zone control
- Malfunction code display
- Max. wiring length 1,000 m (total : 2,000 m)
- Combination with unified ON/OFF control, schedule timer and BMS system
- Airflow volume and direction can be controlled individually for indoor units in each group operation.
- Ventilation volume and mode can be controlled for Heat Reclaim Ventilation (VKM).
- Up to 4 'operation/stop' pairs can be set per day by connecting a schedule timer.

DCS301B51

Unified ON/OFF control - DCS301B51

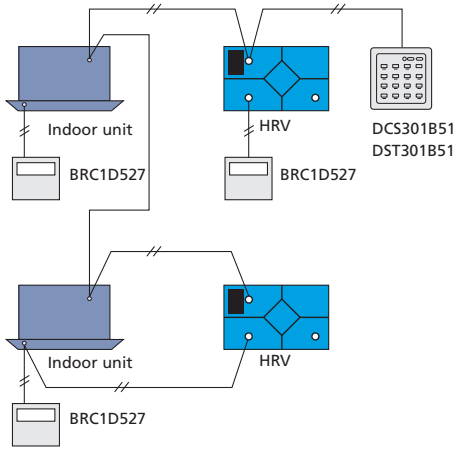
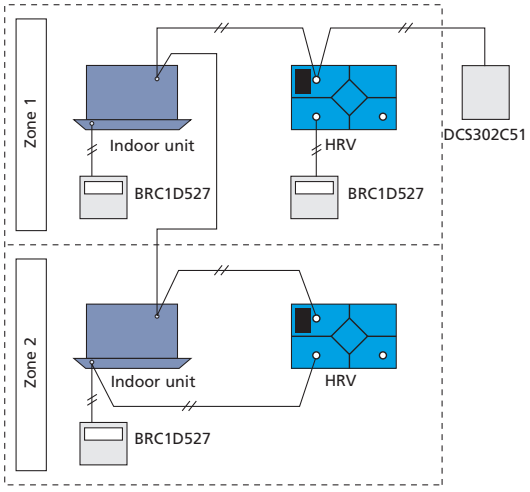
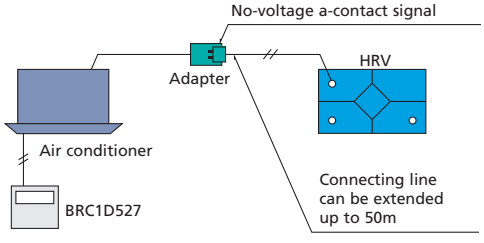
- One unit can turn ON/OFF up to 16 groups (128 units) of HRV and air conditioner units individually or in a batch.
- Lamps display operation and failure status of the connected HRV and air conditioner units.
- Up to 8 units can be linked to allow centralized control of up to 128 units.

DST301B51

Schedule timer - DST301B51

- One unit can control the operation of up to 128 HRV and air conditioner units on a weekly schedule.
- Can set two ON/OFF operations per day for a period of one week.

Number of units that can be connected per system	
Centralised remote control	2 units
Unified on/off control	8 units
Schedule timer	1 unit

		System construction	System characteristics	Necessary accessories
AIR CONDITIONING INTERLOCKED CENTRALISED CONTROL SYSTEM	BATCH / INDIVIDUAL CONTROL SYSTEM		**Unified ON/OFF control - DCS301B51** • One control can control the on/off operation of 16 groups of units collectively or individually • Up to 8 controls can be installed in one centralised transmission line (in one system), which enables control of up to 128 groups. (16 groups x 8 = 128 groups) **Schedule timer - DST301B51** • One schedule timer can control the weekly schedule of up to 128 units HRV remote control can set the individual operation of each HRV unit Control system can be expanded depending on its purposes by combining a variety of centralised control equipment	DCS301B51 or DST301B51, BRC1D527 If necessary: DCS302C51
	ZONE CONTROL SYSTEM		Centralised remote control - DCS302C51 • The centralised remote control provides settings and monitoring functions and can control up to 128 VRV and HRV units. A special adapter is required to connect Sky Air to the centralised line. • Control is possible in 3 different patterns: individual, batch or zone • Multiple groups can be controlled within the same zone • Multiple HRV units can be operated independently • System without air conditioning or HRV remote controls can be constructed • Control system can be expanded depending on requirements by combining a variety of centralised control systems	DCS302C51, BRC1D527 If necessary: DCS301B51, DST301B51
COMBINATION WITH OTHER TYPES OF AIR CONDITIONERS			• Simultaneous operation of HRVs and air conditioners is possible via BRC1D527 • Use of the HRV remote control enables to change settings or operate HRVs independently	Connection adapter (no-voltage-a-contact-signal)

VI. Specifications

VAM-FA7

Ventilation

VAM800FA7VE

VAM-FA7VE			150	250	350	500	650	800	1000	1500	2000
Temperature exchange efficiency (%)		ultra-high	74	72	75	74	74	74	75	75	75
		high	74	72	75	74	74	74	75	75	75
		low	79	77	80	77	77	76	76.5	78	78
Enthalpy exchange efficiency (%)	for heating	ultra-high	64	64	65	62	63	65	66	66	66
		high	64	64	65	62	63	65	66	66	66
		low	69	68	70	67	66	67	68	68	70
	for cooling	ultra-high	58	58	61	58	58	60	61	61	61
		high	58	58	61	58	58	60	61	61	61
		low	64	62	67	63	63	62	63	64	66
Power Supply		VE	1 ~, 220~240V, 50Hz								
Sound pressure level dB(A)	Heat exchange mode	ultra-high	27-28.5	28-29	32-34	33-34.5	34.5-35.5	36-37	36-37	39.5-41.5	40-42.5
		high	26-27.5	26-27	31.5-33	31.5-33	33-34	34.5-36	35-36	38-39	38-41
		low	20.5-21.5	21-22	23.5-26	24.5-26.5	27-28	31-32	31-32	34-36	35-37
	Bypass mode	ultra-high	27-28.5	28-29	32-34	33.5-34.5	34.5-35.5	36-37	36-37	40.5-41.5	40-42.5
		high	26.5-27.5	27-28	31-32.5	32.5-33.5	34-35	34.5-36	35.5-36	38-39	38-41
		low	20.5-21.5	21-22	24.5-26.5	25.5-27.5	27-28.5	31-33	31-32	33.5-36	35-37
Casing			galvanised steel plate								
Insulation Material			self-extinguishable urethane foam								
Dimensions	HxWxD	mm	269 x 760 x 509		285 x 812 x 800		348 x 988 x 852		348x988x1,140	710x1,498x852	710x1,498x1,140
Weight		kg	24		33		48		61	132	158
Heat Exchange System			air to air cross flow total heat (sensible heat + latent heat) exchange								
Heat Exchange Element Material			specially processed non-flammable paper								
Air Filter			multidirectional fibrous fleeces								
Fan	Type		sirroco fan								
	Air Flow Rate (m^3/h)	ultra-high	150	250	350	500	650	800	1,000	1,500	2,000
		high	150	250	350	500	650	800	1,000	1,500	2,000
		low	110	155	230	350	500	670	870	1,200	1,400
	External static pressure (Pa)	ultra-high	69	64	98	98	93	137	157	137	137
		high	39	39	70	54	39	98	98	98	78
		low	20	20	25	25	25	49	78	49	59
Motor Output		kW	0.030 x 2		0.090 x 2		0.140 x 2	0.230 x 2		0.230 x 4	
Connection Duct Diameter		mm	Ø 100	Ø 150		Ø 200		Ø 250		Ø 350	
Unit ambient condition			-15°C ~ +50°CDB, 80% RH or less								

Notes:
- Air flow rate can be changed over to low mode or high mode.
- Sound pressure level is measured at 1.5m below the center of the body.
- Sound pressure level is measured in an anechoic chamber.
  Sound pressure levels generally become higher than this value depending on the operating conditions, reflected sound, and peripheral noise.
- The sound pressure level at the air discharge port is about 8dB higher than the unit's sound level.
- Even when the outdoor temperature is below -15°C, the system is operable down to -20°C with the preheater installed at the outdoor air intake side.