Air-to-Air Heat Exchangers

The heat exchanger operating principle is to use heat recovered from exhaust air to temper (pre-warm) the fresh air coming into the building, which helps to reduce the overall load and potentially the size of the air conditioning equipment required to maintain set point within the building. The air-to-air heat exchanger offers a highly-efficient way of providing fresh air to and extract air from a building and can help comply with building regulations.

A constant flow of fresh air is mandatory in an indoor environment where a large number of people are present in the same rooms for extended periods of times. Utilising an air-to-air heat exchanger can also reduce the load within a building, reducing overall power consumption.

The ventilation in air-tight insulated buildings may cause the unwanted loss of heat whenever the exhaust air is rejected outdoors. In these conditions, the stale air should be exhausted and effectively replaced by new fresh air to maintain the correct oxygen levels and remove most pollutants.

In buildings where different premises have different ventilation needs (kitchens, hospitals, laboratories, etc.) it is important to create the right balance of air flow in order to prevent diffusion of unwanted odours and humidity.

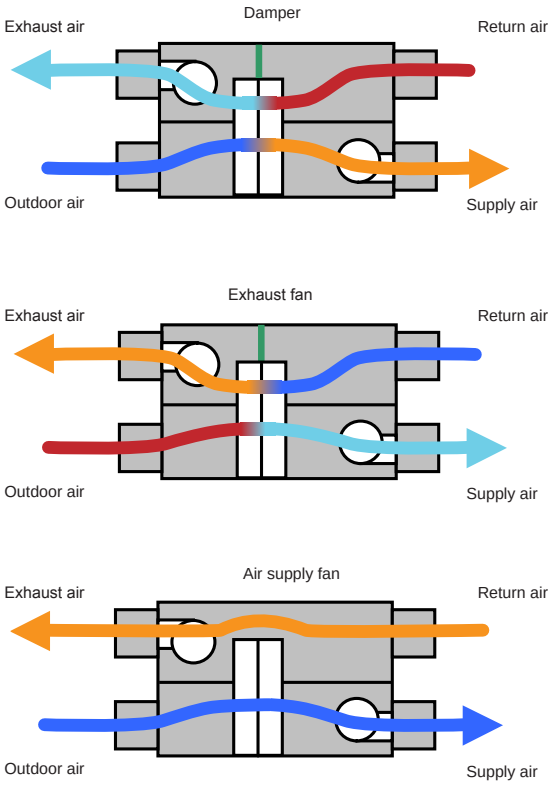
The use of an air-to-air heat exchanger, to complete both functions of stale air exhaust and fresh air intake, limits this heat dispersion and consequently reduces the load on the air conditioning equipment.

Fresh Air Process Patterns

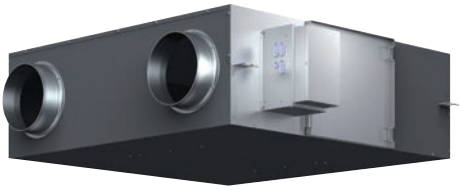
Heating mode
Outdoor cold air and saturated hot air pass through the exchanger element. The unit blows fresh clean air inside the ducts.

Cooling mode
Outdoor hot air and saturated cold air pass through the exchanger element. The unit blows warm clean air inside the ducts.

Free cooling mode
Outdoor fresh air passes through the filter element and enters without treatment.



APPLIED



Air-to-Air Heat Exchangers Standard Version

Air-to-Air Heat Exchanger		VN-	M150HE	M250HE	M350HE	M500HE
Operating Range	Around Unit	°C - %RH	-10 to 40 - ≤ 80	-10 to 40 - ≤ 80	-10 to 40 - ≤ 80	-10 to 40 - ≤ 80
	Outdoor Air	°C - %RH	-15 to 43 - ≤ 80	-15 to 43 - ≤ 80	-15 to 43 - ≤ 80	-15 to 43 - ≤ 80
	Return Air	°C - %RH	5 to 40 - ≤ 80	5 to 40 - ≤ 80	5 to 40 - ≤ 80	5 to 40 - ≤ 80
Air Flow	Standard Extra High - High - Low	l/s	42 - 42 - 30	70 - 70 - 43	97 - 97 - 58	138 - 138 - 108
	Standard Extra High - High - Low	m^3/h	150 - 150 - 110	250 - 250 - 155	350 - 350 - 210	500 - 500 - 390
Fan	External Static Pressure Extra High - High - Low	Pa	102 - 78 - 64	98 - 65 - 40	125 - 83 - 94	150 - 99 - 92
	Specific Power Extra High - High - Low	W/l/s	0.93 - 0.8 - 0.78	0.99 - 0.79 - 0.69	0.94 - 0.75 - 0.76	0.86 - 0.7 - 0.66
Efficiency	Temperature Exchange Extra High - High - Low	%	81.5 - 81.5 - 83.0	78.0 - 78.0 - 81.5	74.5 - 74.5 - 79.5	76.5 - 76.5 - 78.0
	Enthalpy Exchange Efficiency Cooling Extra High - High - Low	%	69.5 - 69.5 - 71.0	65.0 - 65.0 - 69.0	60.5 - 60.5 - 67.0	64.5 - 64.5 - 66.5
	Enthalpy Exchange Efficiency Heating Extra High - High - Low	%	74.5 - 74.5 - 76.0	70.0 - 70.0 - 74.0	65.0 - 65.0 - 71.5	72.0 - 72.0 - 73.5
Sound	Pressure Extra High - High - Low	dB(A)	28.0 - 25.5 - 20.0	30.0 - 27.0 - 21.0	35.0 - 32.0 - 27.0	34.0 - 31.0 - 26.0
	Power Level Extra High - High - Low	dB(A)	43.0 - 40.5 - 35.0	45.0 - 42.0 - 36.0	50.0 - 47.0 - 42.0	49.0 - 46.0 - 41.0
Unit	Heat Exchanger		Special paper + Resin	Special paper + Resin	Special paper + Resin	Special paper + Resin
	Filter Type		Nonwoven fabric	Nonwoven fabric	Nonwoven fabric	Nonwoven fabric
	Standard Air Filter		Gravitational method	Gravitational method	Gravitational method	Gravitational method
	High Efficiency Air Filter		Colorimetric method	Colorimetric method	Colorimetric method	Colorimetric method
	Filtration Efficiency Grade (Collection Effect Weighing Method)	%	82	82	82	82
	Height x Width x Depth	mm	900 x 900 x 290	900 x 900 x 290	900 x 900 x 290	1140 x 1140 x 350
	Weight	kg	36	36	38	53
	Duct Nominal Diameter Supply/Return	mm	100 x 2/100 x 2	150 x 2/150 x 2	150 x 2/150 x 2	200 x 2/200 x 2
Electrical	Power Input (Heat exchange mode) Extra High - High - Low	W	78 - 67 - 47	138 - 111 - 59	182 - 145 - 88	238 - 192 - 142
	Run Current Extra High - High - Low	A	0.33 - 0.28 - 0.20	0.61 - 0.49 - 0.26	0.76 - 0.62 - 0.38	1.00 - 0.81 - 0.60
	Maximum Run Current	A	0.33	0.61	0.76	1.00
	Power Supply	V/ph/Hz	220-240/1/50	220-240/1/50	220-240/1/50	220-240/1/50
	Suggested Fused Supply (with Heater Kit)	A	3 (10)	3 (10)	6 (10)	6 (16)
	Remote Controller Option		Wired 2-core non-polarity	Wired 2-core non-polarity	Wired 2-core non-polarity	Wired 2-core non-polarity

Air-To-Air Heat Exchanger		VN-	M650HE	M800HE	M1000HE1	M1500HE1	M2000HE1
Operating Range	Around Unit	°C - %RH	-10 to 40 - ≤ 80	-10 to 40 - ≤ 80	-10 to 40 - ≤ 80	-10 to 40 - ≤ 80	-10 to 40 - ≤ 80
	Outdoor Air	°C - %RH	-15 to 43 - ≤ 80	-15 to 43 - ≤ 80	-15 to 43 - ≤ 80	-15 to 43 - ≤ 80	-15 to 43 - ≤ 80
	Return Air	°C - %RH	5 to 40 - ≤ 80	5 to 40 - ≤ 80	5 to 40 - ≤ 80	5 to 40 - ≤ 80	5 to 40 - ≤ 80
Air Flow	Standard Extra High - High - Low	l/s	180 - 180 - 145	222 - 222 - 195	278 - 278 - 194	417 - 417 - 333	555 - 555 - 388
	Standard Extra High - High - Low	m^3/h	650 - 650 - 520	800 - 800 - 700	1000 - 1000 - 700	1500 - 1500 - 1200	2000 - 2000 - 1400
Fan	External Static Pressure Extra High - High - Low	Pa	107 - 82 - 96	158 - 132 - 112	105 - 80 - 70	140 - 110 - 80	105 - 80 - 70
	Specific Power Extra High - High - Low	W/l/s	0.81 - 0.72 - 0.66	0.86 - 0.8 - 0.77	1.4 - 1.2 - 1.0	1.5 - 1.4 - 1.0	1.4 - 1.2 - 1.0
Efficiency	Temperature Exchange Extra High - High - Low	%	75.0 - 75.0 - 76.5	76.5 - 76.5 - 77.5	73.5 - 73.5 - 77.0	76.5 - 76.5 - 79.0	73.5 - 73.5 - 77.5
	Enthalpy Exchange Efficiency Cooling Extra High - High - Low	%	61.5 - 61.5 - 64.0	64.0 - 64.0 - 65.5	60.5 - 60.5 - 64.5	64.0 - 64.0 - 67.0	60.5 - 60.5 - 65.5
	Enthalpy Exchange Efficiency Heating Extra High - High - Low	%	69.5 - 69.5 - 71.5	71.0 - 71.0 - 71.5	68.5 - 68.5 - 71.5	71.0 - 71.0 - 73.5	68.5 - 68.5 - 72.0
Sound	Pressure Extra High - High - Low	dB(A)	36.0 - 34.0 - 31.0	38.5 - 37.0 - 33.5	38.0 - 37.0 - 33.0	41.0 - 40.0 - 36.0	41.5 - 40.5 - 36.5
	Power Level Extra High - High - Low	dB(A)	51.0 - 49.0 - 46.0	53.5 - 52.0 - 48.5	53.0 - 52.0 - 48.0	56.0 - 55.0 - 51.0	56.5 - 55.5 - 51.5
Unit	Heat Exchanger		Special paper + Resin	Special paper + Resin	Special paper + Resin	Special paper + Resin	Special paper + Resin
	Filter Type		Nonwoven fabric	Nonwoven fabric	Nonwoven fabric	Nonwoven fabric	Nonwoven fabric
	Standard Air Filter		Gravitational method	Gravitational method	Gravitational method	Gravitational method	Gravitational method
	High Efficiency Air Filter		Colorimetric method	Colorimetric method	Colorimetric method	Colorimetric method	Colorimetric method
	Filtration Efficiency Grade (Collection Effect Weighing Method)	%	82	82	82	82	82
	Height x Width x Depth	mm	1140 x 1140 x 350	1189 x 1189 x 400	1189 x 1189 x 400	1189 x 1189 x 810	1189 x 1189 x 810
	Weight	kg	53	70	62	126	126
	Duct Nominal Diameter Supply/Return	mm	200 x 2/200 x 2	250 x 2/250 x 2	250 x 2/250 x 2	250 x 4/283 x 730 x 2	250 x 4/283 x 730 x 2
Electrical	Power Input (Heat exchange mode) Extra High - High - Low	W	290 - 258 - 191	383 - 353 - 300	390 - 340 - 190	640 - 570 - 320	780 - 680 - 380
	Run Current Extra High - High - Low	A	1.30 - 1.14 - 1.30	1.67 - 1.57 - 1.31	2.56	4.32	4.8
	Maximum Run Current	A	1.30	1.67	2.70	5.08	5.08
	Power Supply	V/ph/Hz	220-240/1/50	220-240/1/50	220-240/1/50	220-240/1/50	220-240/1/50
	Suggested Fused Supply (with Heater Kit)	A	6 (16)	6 (16)	10 (16)	10 (16)	10 (20)
	Remote Controller Option		Wired 2-core non-polarity	Wired 2-core non-polarity	Wired 2-core non-polarity	Wired 2-core non-polarity	Wired 2-core non-polarity

Accessories

NRC-01HE	Remote Controller	VN-M150-2000HE
RBC-AMT32E	Remote Controller Built-In Timer	Full control including service functions
RBC-AMS41E	Remote Controller Built-In Timer	Full control including service functions with fully-programmable 7-day timer
RBC-AMS55E-ES	Remote Controller	Includes timer and backlight display as well as power-save functions, multilingual
RBC-VNL1	CN705 Unit Interface Lead 1.5 m	VN-M150-2000HE external 0 V contact closure for ON/OFF, local controller lock, increase fan speed and damper position
RBC-VNMC-PE	Heater Kit Controller	Control of the VN-M Heater Kits
RBC-VNMH1-PE	100 mm Heater Kit 1 kW	VN-M150HE Heat Exchanger
RBC-VNMH2-PE	150 mm Heater Kit 1 kW	VN-M250/350HE Heat Exchanger
RBC-VNMH3-PE	200 mm Heater Kit 2 x 1 kW	VN-M500/650HE Heat Exchanger
RBC-VNMH4-PE	250 mm Heater Kit 2 x 1 kW	VN-M800/1000HE Heat Exchanger
TCB-PCUC2E	Indoor Control Interface	Application Control Kit

APPLIED

VRF Air-to-Air Heat Exchangers + DX Coil

CODE			41	65	82
Air-to-Air Heat Exchanger		**MMD-**	**VN502HEX1E**	**VN802HEX1E**	**VN1002HEX1E**
Combinations				**SMMSe - SHRMe - MiNi SMMSe**	
Nominal	Cooling Capacity	kW	4.10 (1.30)	6.56 (2.06)	8.25 (2.32)
	Heating Capacity	kW	5.53 (2.33)	8.61 (3.61)	10.92 (4.32)
Operating Range	Around Unit	°C - %RH	-10 to 40 - ≤ 80	-10 to 40 - ≤ 80	-10 to 40 - ≤ 80
	Outdoor Air	°C - %RH	-15 to 43 - ≤ 80	-15 to 43 - ≤ 80	-15 to 43 - ≤ 80
	Return Air	°C - %RH	5 to 40 - ≤ 80	5 to 40 - ≤ 80	5 to 40 - ≤ 80
Air Flow	Standard Extra High - High - Low	l/s	139 - 139 - 122	222 - 222 - 178	264 - 264 - 228
	Standard Extra High - High - Low	m^3/h	500 - 500 - 440	800 - 800 - 640	950 - 950 - 820
Fan	External Static Pressure Extra High - High - Low	l/s	167 - 92	267 - 133	317 - 178
	Specific Power Extra High - High - Low	m^3/h	600 - 330	960 - 480	1140 - 640
	Temperature Exchange Extra High - High - Low	Pa	120 - 105 - 115	120 - 100 - 100	135 - 120 - 105
	Enthalpy Exchange Efficiency Cooling Extra High - High - Low	W/l/s	1.08 - 1.01 - 0.96	1.14 - 1.05 - 0.94	1.04 - 1.03 - 1.06
Efficiency	Enthalpy Exchange Efficiency Heating Extra High - High - Low	%	70.5 - 70.5 - 71.5	70.0 - 70.0 - 72.5	65.5 - 65.5 - 67.5
	Pressure Extra High - High - Low	%	56.5 - 56.5 - 57.5	56.0 - 56.0 - 59.0	52.0 - 52.0 - 54.0
	Power Level Extra High - High - Low	%	68.5 - 68.5 - 69.0	70.0 - 70.0 - 73.0	66.0 - 66.0 - 68.5
Sound	Pressure Extra High/High/Low	dB(A)	37.5 - 36.5 - 34.5	41.0 - 40.0 - 38.0	43.0 - 42.0 - 40.0
	Power Level Extra High/High/Low	dB(A)	52.5 - 51.5 - 49.5	56.0 - 55.0 - 53.0	58.0 - 57.0 - 55.0
Unit	Heat Exchanger		Special paper + Resin	Special paper + Resin	Special paper + Resin
	Filter Type		Nonwoven fabric	Nonwoven fabric	Nonwoven fabric
	Standard Air Filter		Gravitational method	Gravitational method	Gravitational method
	High Efficiency Air Filter		Colorimetric method	Colorimetric method	Colorimetric method
	Filtration Efficiency Grade (Collection Effect Weighing Method)	%	82	82	82
	Height x Width x Depth	mm	430 x 1140 x 1690	430 x 1189 x 1739	430 x 1189 x 1739
	Weight	kg	84	100	101
	Duct Nominal Diameter Supply/Return	mm	200 x 2/200 x 2	250 x 2/250 x 2	250 x 2/250 x 2
Pipe Connection	Flare Connection (gas - liquid)	inch	3/8 - 1/4	1/2 - 1/4	1/2 - 1/4
	Drain Pipe Connection OD/ID	mm	VP30/25	VP30/25	VP30/25
Electrical	Power Input (Heat exchange mode) Extra High - High - Low	W	300 - 280 - 235	505 - 465 - 335	550 - 545 - 485
	Run Current Extra High - High - Low	A	1.30 - 1.21 - 1.01	2.25 - 2.07 - 1.46	2.46 - 2.43 - 2.16
	Maximum Run Current	A	1.3	2.25	2.46
	Power Supply	V/ph/Hz	220-240/1/50	220-240/1/50	220-240/1/50
	Suggested Fused Supply (with Heater Kit)	A	3 (10)	3 (10)	6 (10)
	Remote Controller Option		Wired 2-core non-polarity	Wired 2-core non-polarity	Wired 2-core non-polarity

Accessories

NRC-01HE	Remote Controller	VN-M150-2000HE
RBC-AMT32E	Remote Controller Built-In Timer	Full control including service functions
RBC-AMS41E	Remote Controller Built-In Timer	Full control including service functions with fully-programmable 7-day timer
RBC-AMS55E-ES	Remote Controller	Includes timer and backlight display as well as power-save functions, multilingual
RBC-VNL1	CN705 Unit Interface Lead 1.5 m	VN-M150-2000HE external 0 V contact closure for ON/OFF, local controller lock, increase fan speed and damper position
RBC-VNMC-PE	Heater Kit Controller	Control of the VN-M Heater Kits
RBC-VNMH1-PE	100 mm Heater Kit 1 kW	VN-M150HE Heat Exchanger
RBC-VNMH2-PE	150 mm Heater Kit 1 kW	VN-M250/350HE Heat Exchanger
RBC-VNMH3-PE	200 mm Heater Kit 2 x 1 kW	VN-M500/650HE Heat Exchanger
RBC-VNMH4-PE	250 mm Heater Kit 2 x 1 kW	VN-M800/1000HE Heat Exchanger

APPLIED

VRF Air-to-Air Heat Exchangers + DX Coil + Humidifier

CODE			41	65	82
Air-to-Air Heat Exchanger		**MMD-**	**VNK502HEX1E**	**VNK802HEX1E**	**VNK1002HEX1E**
Combinations				**SMMSe - SHRMe - MiNi SMMSe**	
Nominal	Cooling Capacity	kW	4.10 (1.30)	6.56 (2.06)	8.25 (2.32)
	Heating Capacity	kW	5.53 (2.33)	8.61 (3.61)	10.92 (4.32)
Operating Range	Around Unit	°C - %RH	-10 to 40 - ≤ 80	-10 to 40 - ≤ 80	-10 to 40 - ≤ 80
	Outdoor Air	°C - %RH	-15 to 43 - ≤ 80	-15 to 43 - ≤ 80	-15 to 43 - ≤ 80
	Return Air	°C - %RH	5 to 40 - ≤ 80	5 to 40 - ≤ 80	5 to 40 - ≤ 80
Air Flow	Standard Extra High - High - Low	l/s	139 - 139 - 122	222 - 222 - 178	264 - 264 - 228
	Standard Extra High - High - Low	m^3/h	500 - 500 - 440	800 - 800 - 640	950 - 950 - 820
Fan	Limit Upper - Lower	l/s	167 - 92	267 - 133	317 - 178
	Limit Upper - Lower	m^3/h	600 - 330	960 - 480	1140 - 640
	External Static Pressure Extra High - High - Low	Pa	95 - 85 - 95	105 - 85 - 90	110 - 90 - 115
	Specific Power Extra High - High - Low	W/l/s	1.10 - 1.03 - 0.98	1.19 - 1.09 - 0.98	1.09 - 1.07 - 1.14
Efficiency	Temperature Exchange Extra High - High - Low	%	70.5 - 70.5 - 71.5	70.0 - 70.0 - 72.5	65.5 - 65.5 - 67.5
	Enthalpy Exchange Efficiency Cooling Extra High - High - Low	%	56.5 - 56.5 - 57.5	56.0 - 56.0 - 59.0	52.0 - 52.0 - 54.5
	Enthalpy Exchange Efficiency Heating Extra High - High - Low	%	68.5 - 68.5 - 69.0	70.0 - 70.0 - 73.0	66.0 - 66.0 - 68.5
Sound	Pressure Extra High - High - Low	dB(A)	36.5 - 35.5 - 33.5	40.0 - 39.0 - 38.0	42.0 - 41.0 - 39.0
	Power Level Extra High - High - Low	dB(A)	51.5 - 50.5 - 48.5	55.0 - 54.0 - 53.0	57.0 - 56.0 - 54.0
Unit	Heat Exchanger		Special paper + Resin	Special paper + Resin	Special paper + Resin
	Filter Type		Nonwoven fabric	Nonwoven fabric	Nonwoven fabric
	Standard Air Filter		Gravitational method	Gravitational method	Gravitational method
	High Efficiency Air Filter		Colorimetric method	Colorimetric method	Colorimetric method
	Filtration Efficiency Grade (Collection Effect Weighing Method)	%	82	82	82
	Height x Width x Depth	mm	430 x 1140 x 1690	430 x 1189 x 1739	430 x 1189 x 1739
	Weight	kg	91	111	112
	Humidifier		Permeable film humidifier	Permeable film humidifier	Permeable film humidifier
	Humidifier Capacity	kg/h	3.0	5.0	6.0
	Humidifier Feed Water Pressure	mPa	0.02 - 0.49	0.02 - 0.49	0.02 - 0.49
	Duct Nominal Diameter Supply/Return	mm	200 x 2/200 x 2	250 x 2/250 x 2	250 x 2/250 x 2
Pipe Connection	Flare Connection (gas - liquid)	inch	3/8 - 1/4	1/2 - 1/4	1/2 - 1/4
	Water Supply Connection External Threaded		R1/2	R1/2	R1/2
	Drain Pipe Connection OD/ID	mm	VP30/25	VP30/25	VP30/25
Electrical	Power Input (Heat Exchange Mode) Extra High - High - Low	W	305 - 285 - 240	530 - 485 - 350	575 - 565 - 520
	Run Current Extra High - High - Low	A	1.33 - 1.24 - 1.03	2.37 - 2.14 - 1.54	2.56 - 2.51 - 2.31
	Maximum Run Current	A	1.33	2.37	2.56
	Power Supply	V/ph/Hz	220-240/1/50	220-240/1/50	220-240/1/50
	Suggested Fused Supply (with Heater Kit)	A	6 (10)	6 (10)	6 (10)
	Remote Controller Option		Wired 2-core non-polarity	Wired 2-core non-polarity	Wired 2-core non-polarity

Accessories

NRC-01HE	Remote Controller	VN-M150-2000HE
RBC-AMT32E	Remote Controller Built-In Timer	Full control including service functions
RBC-AMS41E	Remote Controller Built-In Timer	Full control including service functions with fully-programmable 7-day timer
RBC-AMS55E-ES	Remote Controller	Includes timer and backlight display as well as power-save functions, multilingual
RBC-VNL1	CN705 Unit Interface Lead 1.5 m	VN-M150-2000HE external 0 V contact closure for ON/OFF, local controller lock, increase fan speed and damper position
RBC-VNMC-PE	Heater Kit Controller	Control of the VN-M Heater Kits
RBC-VNMH1-PE	100 mm Heater Kit 1 kW	VN-M150HE Heat Exchanger
RBC-VNMH2-PE	150 mm Heater Kit 1 kW	VN-M250/350HE Heat Exchanger
RBC-VNMH3-PE	200 mm Heater Kit 2 x 1 kW	VN-M500/650HE Heat Exchanger
RBC-VNMH4-PE	250 mm Heater Kit 2 x 1 kW	VN-M800/1000HE Heat Exchanger