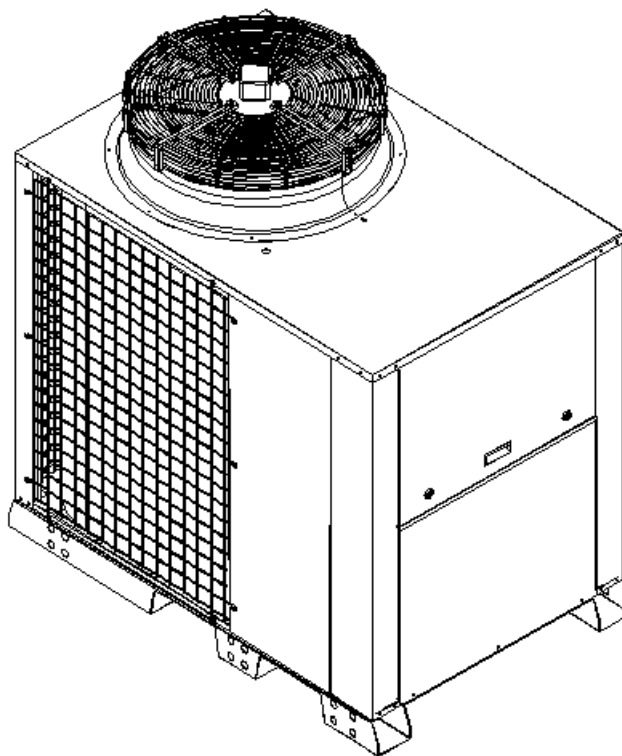




BY JOHNSON CONTROLS

LARGE SPLIT AIR - AIR VITALITY SERIES Air Conditioners



Installation manual

Ref.: N-27728_EN 0210



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1

Installation manual

1.1 Safety instructions

This document contains the necessary information for the safe and efficient transportation, assembly and installation of the air conditioning unit. This guarantees the condition of the unit and its operating safety.

Only an authorised company may assemble the air conditioning unit.



ATTENTION

Only authorised companies with the appropriate technical resources and suitably trained personnel may install the air conditioning unit.



CAUTION

The specialists responsible for installing the air conditioning unit must make sure they have all of the information and knowledge required to correctly install, test and deliver the unit. Johnson Controls Inc. shall not be considered responsible for any damage caused by installation of the unit that is not consistent with that described in this document or others specifically provided with the unit.

During regular equipment installation, the fitter must pay special attention to certain situations in order to prevent injuries or damage to the unit.

Situations that could jeopardise the safety of the fitter or that of others nearby or that could put the unit itself at risk are clearly indicated in this manual.

A series of special symbols are used to clearly identify these situations.

Pay careful attention to these symbols and to the messages following them, as your safety and the safety of others depends on it.

1.2 Icons used in this document



DANGER

- *The text following this symbol contains information and instructions relating directly to your safety and physical wellbeing.*
- *Not taking these instructions into account could lead to serious, very serious or even fatal injuries to you and others in the proximities of the unit.*

Information can also be found on safe procedures during unit handling. This will help reduce the risk of accidents.



CAUTION

- *The text following this symbol contains information and instructions relating directly to your safety and physical wellbeing.*
- *Not taking these instructions into account could lead to minor injuries to you and others in the proximities of the unit.*
- *Not taking these instructions into account could lead to unit damage.*

Information can also be found on safe procedures during unit handling. This will help reduce the risk of accidents.



NOTE

- *The text following this symbol contains information or instructions that may be of use or that is worthy of a more thorough explanation.*
- *Instructions regarding inspections to be made on unit parts or systems may also be included.*

1.3 Instructions for storage, transport, loading and unloading of the unit



CAUTION

Outdoor units must be moved and stored vertically to prevent oil from leaking from the compressor.

Delivery inspection

The unit should be carefully inspected for visible damage or abnormalities as soon as it is received.

Any abnormalities or damage to the unit should be communicated to both the transportation and insurance company in writing.

Storage instructions

The unit should be stored in a place suitable to the purpose (warehouse or similar), protected from the weather, water, humidity and dust.

Cover the unit with a canvas of a suitable size.

The unit should be appropriately protected from knocks and dust, ensuring the protective parts it was supplied with remain in place. Where these are not in place, establish the necessary protection and barriers to keep vehicles or fork-lift trucks away.

Transport, loading and unloading of the unit

The units should only be handled by personnel from the company responsible for their installation.

Transport of the unit should be in such a manner that no damage is caused by faulty or inadequate mooring to the bed or body of the vehicle.

Where necessary, protect all of the edges of the unit against knocks and scratches and moor it to the bed or body of the vehicle using suitable textile belts or slings to keep it perfectly still.

Loading and unloading the unit from a truck or trailer should be on flat, solid ground using an appropriate crane with sufficient capacity.

1.3.1 Disposal of packaging

The packaging is recyclable. Dispose of it in the appropriate place or take it to an appropriate collection centre. Respect the regulations in force for this type of waste in the country where the unit is being installed.

Packaging remains must be correctly disposed of. Improper disposal of packaging generates environmental problems that affect human life.

1.3.2 Hoisting points

The points designed for hoisting the unit are located on the beams on its base.

Before hoisting the unit, check that the cables or slings are firmly hooked to these points and make sure the crane and the cables or slings are capable of lifting the weight.

Place spacers at the top of the unit to prevent the cables or slings from touching it.

Attach guide ropes so that that the unit does not rotate freely.

The cables or slings should be long enough to form an angle of over 45° to the horizontal plane. Hoist the unit keeping it in a horizontal position.

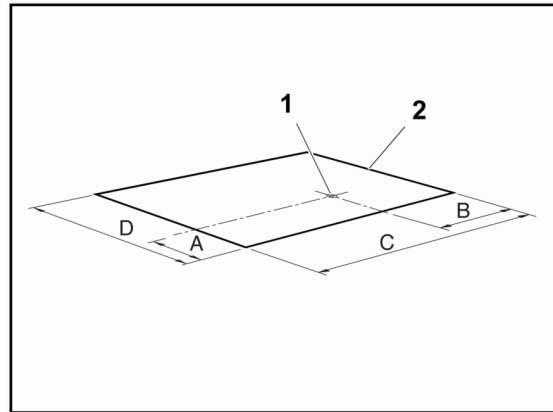


DANGER

There should not be onlookers within a radius of 10 m of the unit when it is being hoisted.

1.3.3 Centre of gravity of the unit

1. Centre of gravity.
2. End of the outdoor coil.



Centre of gravity values table



NOTE

All measurements in mm.

Models	VAC-VAH 20A	VAC-VAH 25A	VAC-VAH 30A	VAC-VAH 40A	VAC-VAH 45A	VAC-VAH 60A	VAC-VAH 75A	VAC-VAH 90A
A	441	441	441	813.5	813.5	813.5	813.5	813.5
B	500	500	500	510	510	510	785	785
C	1354	1354	1354	1453	1453	1453	2099	2099
D	882	882	882	1627	1627	1627	1627	1627

1.4 Technical data

1.4.1 Test conditions and correction factors

Test conditions

Voltage	Length of connection pipes [m]	Summer				Winter			
		Ext. temp. °C		Int. temp. °C		Ext. temp. °C		Int. temp. °C	
		DB	TH	DB	TH	DB	TH	DB	TH
400	7,5	35	24	27	19	7	6	20	12

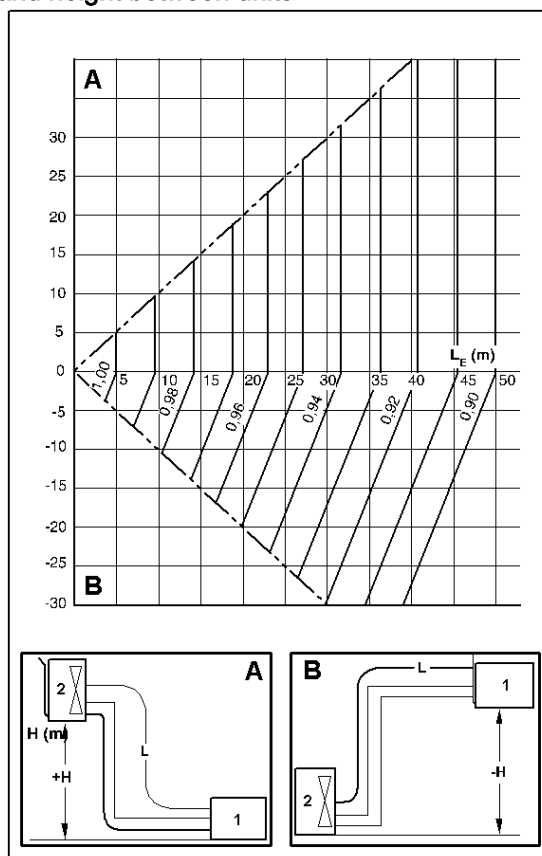
Correction factors for cooling capacities

Cooling capacity correction factors for different air flows to the nominal flows in the indoor coil

% Flow	80	90	100	110	120	130
Total capacity	0,96	0,98	1	1,016	1,032	1,046
Sensible capacity	0,945	0,973	1	1,038	1,075	1,118
Comp. absorbed power	0,98	0,99	1	1,009	1,017	1,025

Cooling capacity correction factors according to length and height between units

- H Vertical distance between the indoor unit and the outdoor unit
- L_E Equivalent length of pipes between the indoor unit and the outdoor unit (consider a single line)
- A Outdoor unit above indoor unit
- B Indoor unit above outdoor unit
- 1 Indoor unit
- 2 Outdoor unit



1.4 Technical data

Correction of the actual air inlet temperature on the outdoor coil for different air flows to the nominal flow

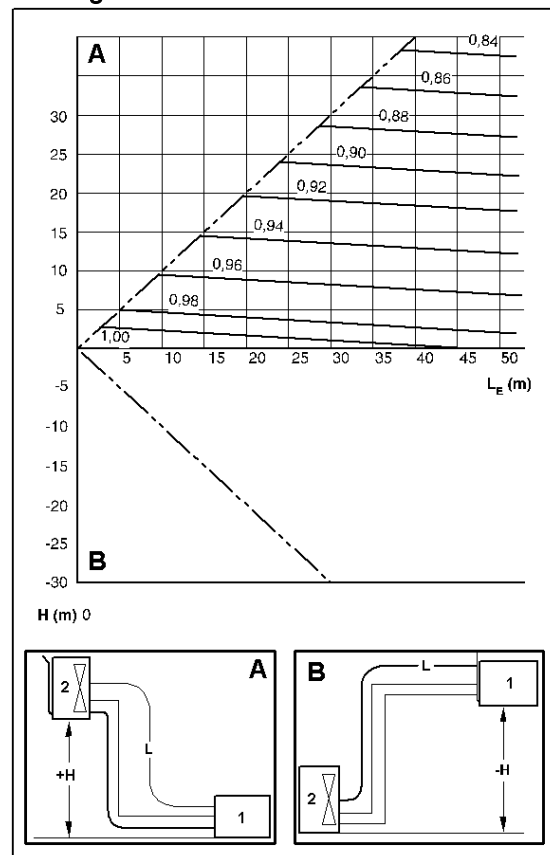
% Flow	70	80	90	100	110	120	130
Correction in °C of the actual air inlet temperature on the outdoor coil	5	3	1,5	0	-1	-2	-2,5

Correction factors for heating capacities

Indoor unit supply air DB temperature °C	Indoor unit air DB temperature °C				
	14	10	6	0	-8
23	1,2	1,04	0,96	0,77	0,58
20	1,25	1,1	1	0,8	0,69
17	1,3	1,13	1,04	0,83	0,63

Heating capacity correction factors according to length and height between units

- H Vertical distance between the indoor unit and the outdoor unit
- L_E Equivalent length of pipes between the indoor unit and the outdoor unit (consider a single line)
- A Outdoor unit above indoor unit
- B Indoor unit above outdoor unit
- 1 Indoor unit
- 2 Outdoor unit



Correction of the actual air inlet temperature on the outdoor coil for different air flows to the nominal flow

% Flow	70	80	90	100	110	120	130
Correction in °C of the actual air inlet temperature on the outdoor coil	-2	-1,5	-0,5	0	0,5	1	1,2

1.4.2 Limits of use

Model				20A	25A	30A	40A	45A	60A	75A	90A
Voltage limits			Min.Max V	342457							
VAC-VIR VAH-VIR	Summer cycle	Temperature of air input in indoor coil	WB C Min.Max.	1523	1523	1523	1423	1423	1423	1423	1423
			DB C Min.Max.	2032	2032	2032	2032	2032	2032	2032	2032
		Outdoor temperature (1), (2)	DB C Min.Max.	1050	1050	1048	1050	1050	1050	1050	1050
VAH-VIR	Winter cycle	Temperature of air input in indoor coil (3)	DB C Min.Max.	1027	1027	1027	1027	1027	1027	1027	1027
		Outdoor temperature (4)	DB C Min.Max.	-1020	-1020	-1020	-1020	-1020	-1020	-1020	-1020

DB dry bulb.

WB wet bulb.

(1) with the condensation control option, the limit is -10 °C.

(2) with rated indoor and outdoor air flows.

(3) the unit is able to run for a short period at temperatures below 10 °C to raise the temperature of the air in the air conditioned room to 10 °C.

(4) at below -10 °C only the emergency heating resistor or hot water coil (optional) remains connected.

1.4.3 Technical and physical data

OUTDOOR DEVICES

Models		VACVAH	20A	25A	30A	40A
Compressors	Quantity		1	1	1	1
	Standard rating	kW	4,9	6,4	7,9	10,5
	Degree of protection	IP	21			
	Electric power supply		400 3 50			
Outdoor fan	Standard rating		600			
	No. of fans		1	1	1	2
	Electric power supply	V ph Hz	230 1 50			
	Degree of protection	IP	54			
	Motor speed	rpm	900			
	Impeller diameter	mm	630			
Outdoor coil	Number of elements	No.	1	1	1	2
	Pipes (depth x height)		2 x 36 3 x 36	3 x 36	3 x 42	2 x 42
	Pipe diameters	inches	3 8 "			
	Area	m ²	1,85	1,85	1,85	1.74 (x2)
Dimensions with packaging	Height	mm	1232	1232	1382	1378
	Length	mm	1411	1411	1411	1511
	Width	mm	977	977	977	1727
Approximate weight	Net	kg	227	228	250	355
	Gross	kg	229	230	252	358

Models		VACVAH	45A	60A	75A	90A
Compressors	Quantity		2	2	2	2
	Standard rating	kW	2 x 6	2 x 8.1	2 x 10.7	2 x 13.4

1.4 Technical data

Models		VACVAH	45A	60A	75A	90A
	Degree of protection	IP	21			
	Electric power supply	400 3 50				
Outdoor fan	Standard rating	600				
	No. of fans		2	2	4	4
	Electric power supply	V ph Hz	230 1 50			
	Degree of protection	IP	54			
	Motor speed	rpm	900			
	Impeller diameter	mm	630			
Outdoor coil	Number of elements	No.	2	2	2	2
	Pipes (depth x height)		2x42 3x44	3x42 3x44	3x48	3x48
	Pipe diameters	inches	3 8 "			
	Area	m ²	1.74 (x2) 1.95 (x2)	1.69 (x2) 1.95 (x2)	2.47 (x2)	2.47 (x2)
Dimensions with packaging	Height	mm	1378 1429	1378 1429	1534	1534
	Length	mm	1511	1511	2157	2157
	Width	mm	1727	1727	1727	1727
Approximate weight	Net	kg	470	483	610	610
	Gross	kg	473	488	614	614

INDOOR DEVICES

Models		VIR	25A	40A	45A	60A	75A	090
Indoor fan	Standard rating	kW	0,75	1,5	1,5	2,2	3	4
	Electric power supply	V ph Hz	400 3 50					
	Degree of protection	IP	55					
	Motor speed	rpm	1400					
	Turbine diameters	mm	320	320x2	320x2	320x2	380x2	380x2
	Turbine width	mm	320	240x2	320x2	320x2	380x2	380x2
Indoor coil	Number of elements	No.	1	1	1	1	1	1
	Pipes (depth x height)		4x21	4x25	4x29	4x29	5x32	5x32
	Pipe diameters	inches	3 8 "					
	Area	m ²	0,57	0,84	1,40	1,40	1,76	1,76
EU3 air filters	Quantity	No.	3					
	Dimensions		365x543x24	447x616x24	640x715x24		547x789x24	
Dimensions with packaging	Height	mm	760	825	925	925	1000	1000
	Width	mm	1470	1850	2350	2350	2760	2760
	Depth	mm	1020	1020	1020	1020	1020	1020
Weight	Net	kg	128	173	223	223	310	312
	Gross	kg	152	198	250	250	340	342

1.4.4 Electrical specifications

OUTDOOR DEVICES

Model	Compressor		
	Power supply [V ph (Hz)]	Rated current [A]	Start-up current [A]
VAC 20A VAH 20A	4003 (50)	8,5	74
VAC 25A VAH 25A	4003 (50)	11,8	95

Model	Compressor		
	Power supply [V ph (Hz)]	Rated current [A]	Start-up current [A]
VAC 30A VAH 30A	4003 (50)	15	118
VAC 40A VAH 40A	4003 (50)	19,3	140
VAC 45A VAH 45A	4003 (50)	2 x 12	95
VAC 60A VAH 60A	4003 (50)	2 x 15	118
VAC 75A VAH 75A	4003 (50)	2 x 19	140
VAC 90A VAH 90A	4003 (50)	2 x 25	198

Model	Outdoor fan	Indoor fan	Outdoor fan motor		Indoor fan motor	
	Power supply [V ph (Hz)]	Power supply [V ph (Hz)]	kW	Rated current [A]	kW	Rated current [A]
VAC 20A VAH 20A	2301 (50)	4003 (50)	0,5	2,4	0,75	1,8
VAC 25A VAH 25A	2301 (50)	4003 (50)	0,5	2,4	0,75	1,8
VAC 30A VAH 30A	2301 (50)	4003 (50)	0,5	2,4	1,5	2,7
VAC 40A VAH 40A	2301 (50)	4003 (50)	2 x 0,5	2 x 2,4	1,5	2,7
VAC 45A VAH 45A	2301 (50)	4003 (50)	2 x 0,5	2 x 2,4	1,5	3,1
VAC 60A VAH 60A	2301 (50)	4003 (50)	2 x 0,5	2 x 2,4	2,2	4,6
VAC 75A VAH 75A	2301 (50)	4003 (50)	4 x 0,5	4 x 2,4	3	4,7
VAC 90A VAH 90A	2301 (50)	4003 (50)	4 x 0,5	4 x 2,4	4	7

Model	Power supply [V ph (Hz)] ⁽³⁾	Total rated power [kW]	Total rated current [kW]	Total maximum power [kW]	Total maximum current (kW)	Circuit breaker (K Curve) ⁽¹⁾ [A]	Power cable cross-section ⁽²⁾ [mm ²]
VAC 20A VAH 20A	4003 (50)	6,3	13	9	17	20	4
VAC 25A VAH 25A	4003 (50)	7,2	16	11	20	25	4
VAC 30A VAH 30A	4003 (50)	10	20	14	26	32	6
VAC 40A VAH 40A	4003 (50)	13	27	17	33	40	10
VAC 45A VAH 45A	4003 (50)	14	29	21	37	50	10
VAC 60A VAH 60A	4003 (50)	19	37	26	47	63	16
VAC 75A VAH 75A	4003 (50)	24	48	32	63	80	25
VAC 90A VAH 90A	4003 (50)	29	61	40	73	100	35

⁽¹⁾ K Curve (DIN, VDE 0660-104).

⁽²⁾ Based on copper conductors.

⁽³⁾ Main power supply 4003 + N (50)



NOTE

The size of the circuit breaker and the cross-section of the power lines are illustrative and must be corrected based on site conditions, length between units and current regulations.

INDOOR DEVICES

Model	Power supply [V ph (Hz)]	Standard rating [kW]	Rated current [A]	Start-up current [A]	Power cable cross-section [mm ²]
VIR 25A	4003 (50)	0,75	1,8	8	4 x 1,5
VIR 40A	4003 (50)	1,5	2,7	17	4 x 1,5
VIR 45A	4003 (50)	1,5	3,1	17	4 x 1,5
VIR 60A	4003 (50)	2,2	4,6	22	4 x 1,5

1.4 Technical data

Model	Power supply [V ph (Hz)]	Standard rating [kW]	Rated current [A]	Start-up current [A]	Power cable cross-section [mm ²]
VIR 75A	4003 (50)	3	4,7	36	4 x 1.5
VIR 90A	4003 (50)	4	7	42	4 x 2.5

⁽¹⁾ K Curve (DIN, VDE 0660-104).

⁽²⁾ Based on copper conductors.

**NOTE**

The size of the circuit breaker and the cross-section of the power lines are illustrative and must be corrected based on site conditions, length between units and current regulations.

1.4.5 Rated features

Rated features, cool only models

Outdoor unit		Indoor unit		Summer		
Model	Air flow [m ³ h]	Model	Air flow [m ³ h]	Cooling power [W]	Consumption [W]	E.E.R
VAC 20A	8900	VIR 25A	4590	19100	5601	3,41
VAC 25A	8900	VIR 25A	4590	23000	6991	3,29
VAC 30A	8800	VIR 40A	7500	28800	9600	3,00
VAC 40A	18600	VIR 40A	7500	35100	11622	3,02
VAC 45A	18600	VIR 45A	9000	42900	13533	3,17
VAC 60A	18600	VIR 60A	10500	54000	18600	2,9
VAC 75A	32000	VIR 75A	13000	72300	23099	3,13
VAC 90A	32000	VIR 90A	16000	86100	28605	3,01

Rated features, models with heat pump

Outdoor unit		Indoor unit		Summer			Winter		
Model	Air flow [m ³ h]	Model	Air flow [m ³ h]	Cooling power [W]	Consumption [W]	E.E.R	Cooling power [W]	Consumption [W]	C.O.P.
VAH 20A	8900	VIR 25A	4590	19100	5601	3,41	21200	4942	4,29
VAH 25A	8900	VIR 25A	4590	23000	6991	3,29	25200	6738	3,74
VAH 30A	8800	VIR 40A	7500	28800	9600	3,00	31900	8417	3,79
VAH 40A	18600	VIR 40A	7500	35100	11622	3,02	41000	12094	3,39
VAH 45A	17900	VIR 45A	9000	42900	13533	3,17	44800	12691	3,53
VAH 60A	17900	VIR 60A	10500	52100	18607	2,8	59400	17069	3,48
VAH 75A	32000	VIR 75A	13000	72300	23099	3,13	81000	22131	3,66
VAH 90A	32000	VIR 90A	16000	86100	28605	3,01	93100	28824	3,23

1.4.6 Options and accessories

Options and accessories for indoor units



NOTE

Electric resistors and hot water coils cannot be installed at the same time in the same unit.

VIR indoor unit accessories		Model					
		25A	40A	45A	60A	75A	90A
Indoor electric resistor	10 kW	O					
Indoor electric resistor	15 kW	O					
Indoor electric resistor	10 kW		O				
Indoor electric resistor	20 kW		O				
Indoor electric resistor	15 kW			O	O		
Indoor electric resistor	30 kW			O	O		
Indoor electric resistor	30 kW					O	O
Indoor electric resistor	40 kW					O	O
50 m connection cable		A	A	A	A	A	A
Hot water coil (20 m)		O					
Hot water coil (20 m)			O				
Hot water coil (20 m)				O	O		
Hot water coil (20 m)						O	O
Vertical transformation kit for model		A					
Vertical transformation kit for model			A				
Vertical transformation kit for model				A	A		
Vertical transformation kit for model						A	A
H.S.D H.S.D.M		O	O	O	O	O	O
Economiser (20 m)		A	A	A	A	A	A
50 m communication cable (economiser or water coil) ⁽¹⁾		A	A	A	A	A	A
Soft fan starter				O	O	O	O

(A) accessory. Supplied separately.

(O) optional. Factory-fitted.

⁽¹⁾ Where the indoor units is fitted with an economiser and hot water coil, only 50 m of cable is required.

Weights of the options and accessories for indoor units

VIR Models		25A	40A	45A60A	75A90A
Economiser	kg	54	69	78	90
Electric resistor	kg	15	18	20	29
Hot water coil	kg	16	20	37	43
Extra weight for Cu Cu coil	kg	14	19	38	56

Options and accessories for outdoor units

Accessories for VAC-VAH outdoor units	Model							
	20A	25A	30A	40A	45A	60A	75A	90A
LAK condensation control	O	O	O	O	O	O	O	O
Soft compressor starter	O	O	O	O	O	O	O	O

(A) accessory. Supplied separately.

(O) optional. Factory-fitted.

Weights of the options and accessories for outdoor units

Models		VAC 20A	VAH 20A, VAC-VAH 25A	VAC-VAH 30A	VAC-VAH 40A, VAC 45A	VAH 45A, VAC-VAH 60A	VAC-VAH 75A/90A
Condensation control	kg	0,5	0,5	0,5	0,5	0,5	1
Extra weight for Cu Cu coil	kg	31	47	54	70	117	119

1.4.7 VIR units with auxiliary resistor

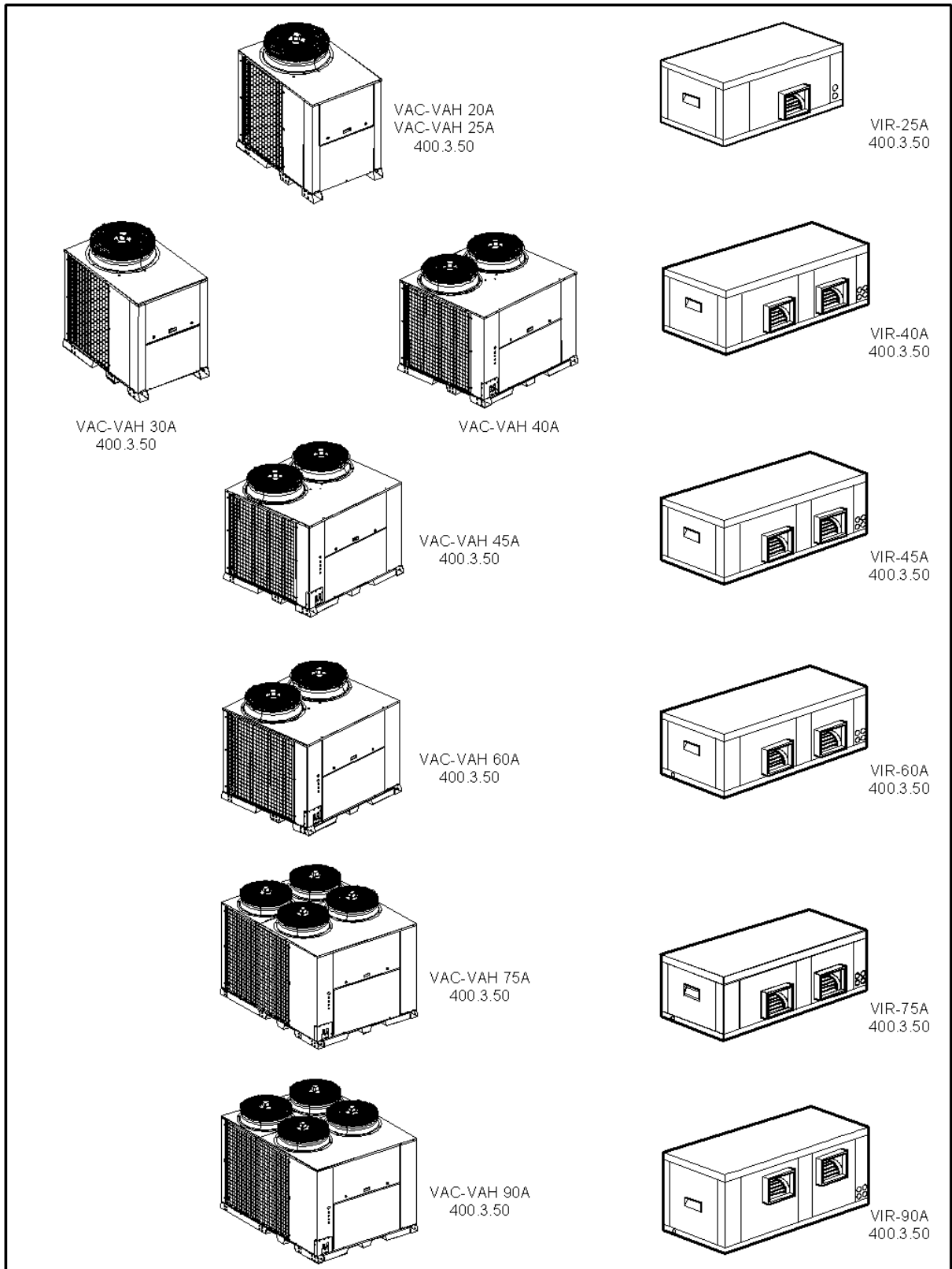
Model	Electric power supply	Power	Consumption	Stages	Circuit breaker Q1 ⁽¹⁾	Minimum cable cross-section ⁽²⁾	Front surface	Pressure drop ⁽³⁾
VIR	V Ph Hz	kW	A		A	mm ²	m ²	Pa
25A	400 3 50	10	15	1	20	2,5	0,53	2,9
25A	400 3 50	15	22	1	25	4	0,53	2,9
40A	400 3 50	10	15	1	20	2,5	0,74	4,9
40A	400 3 50	20	30	2	40	6	0,74	4,9
45A and 60A	400 3 50	15	22	1	25	4	0,98	7,1
45A and 60A	400 3 50	30	46	2	50	10	0,98	7,1
75A and 90A	400 3 50	30	46	2	50	10	0,16	7,1
75A and 90A	400 3 50	40	60	2	80	25	0,16	7,1

⁽¹⁾ K Curve (DIN, VDE 0660-104).

⁽²⁾ Based on copper conductors.

⁽³⁾ Considering the rated air flow of the indoor section.

1.5 Indoor and outdoor unit combinations



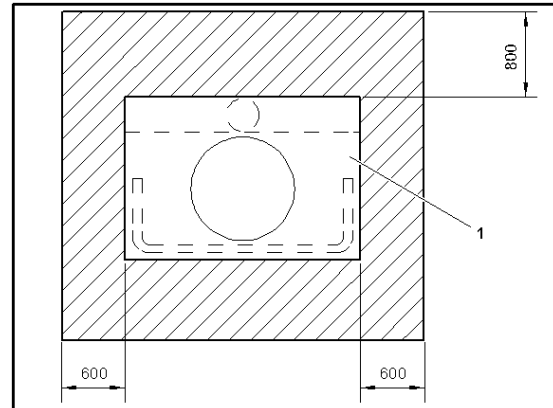
1.6 Measurements, clearances and accesses

1.6.1 Minimum clearance

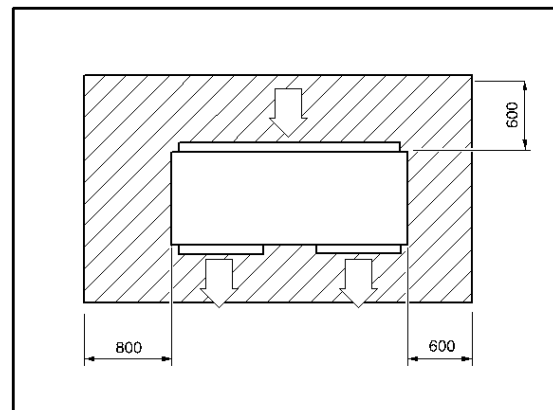
When installing each unit, clearances should be left for

- 1 Intake and discharge of air from the outdoor unit.
- 2 Connection of drain and electricity pipes.
- 3 Air ducts.
- 4 Maintenance servicing.
- 5 Power supply connections.

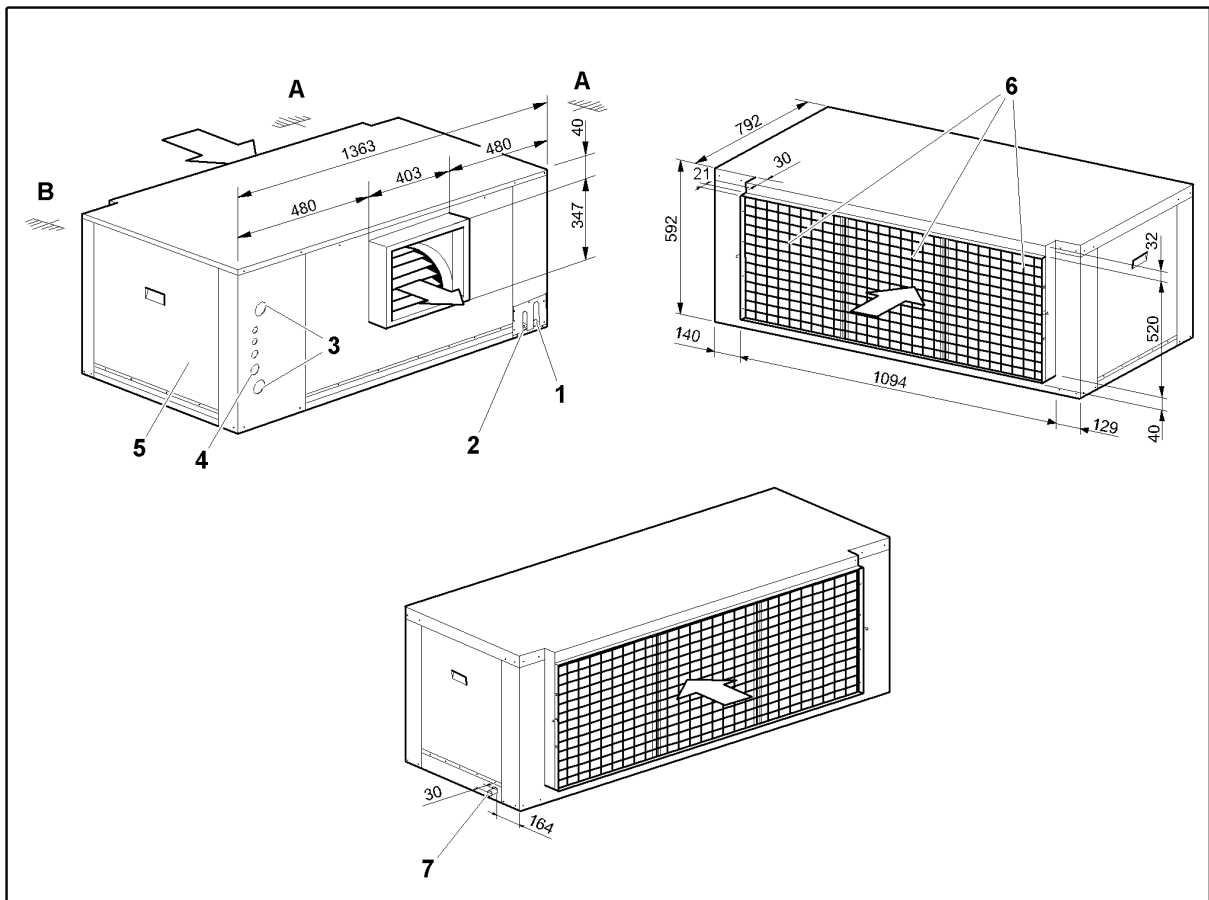
VAC - VAH unit



VIR unit

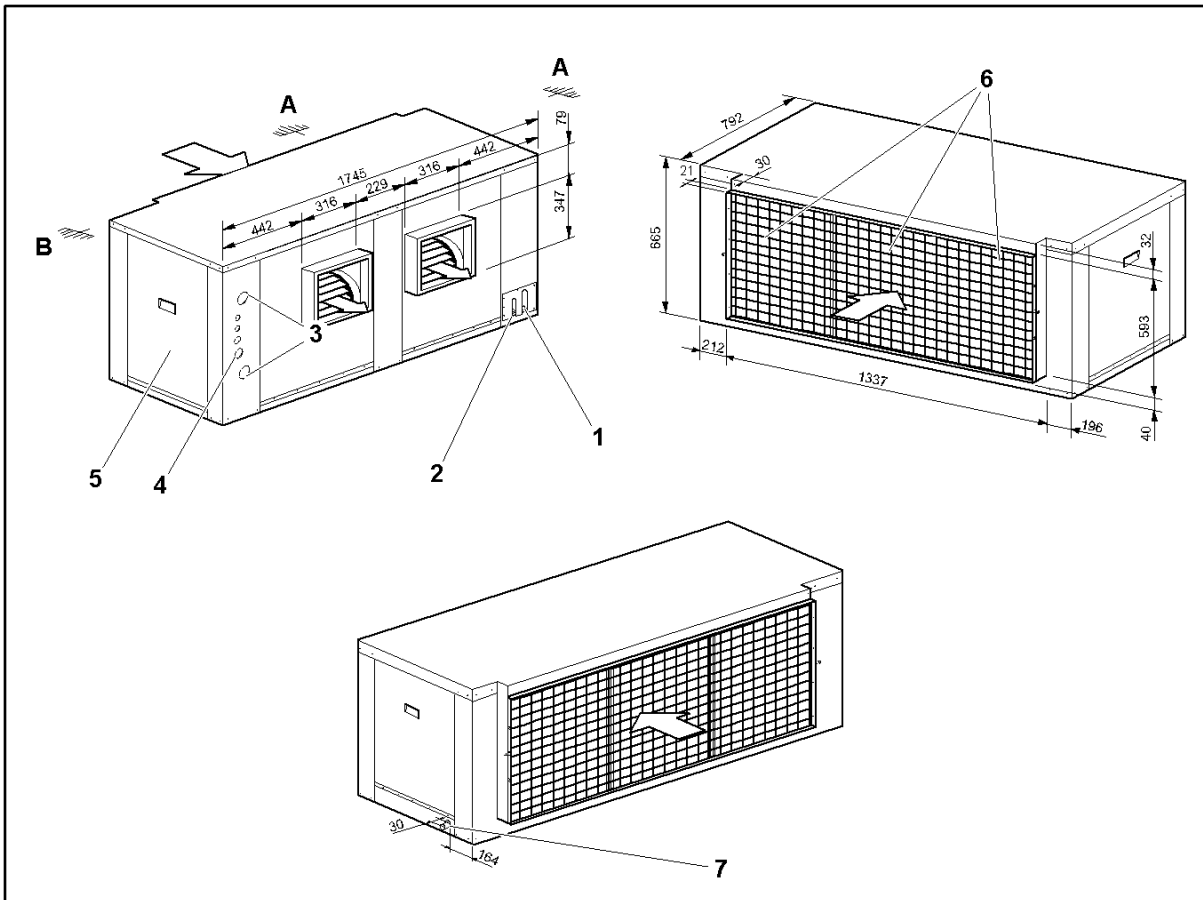


1.6.2 General dimensions, VIR 25A



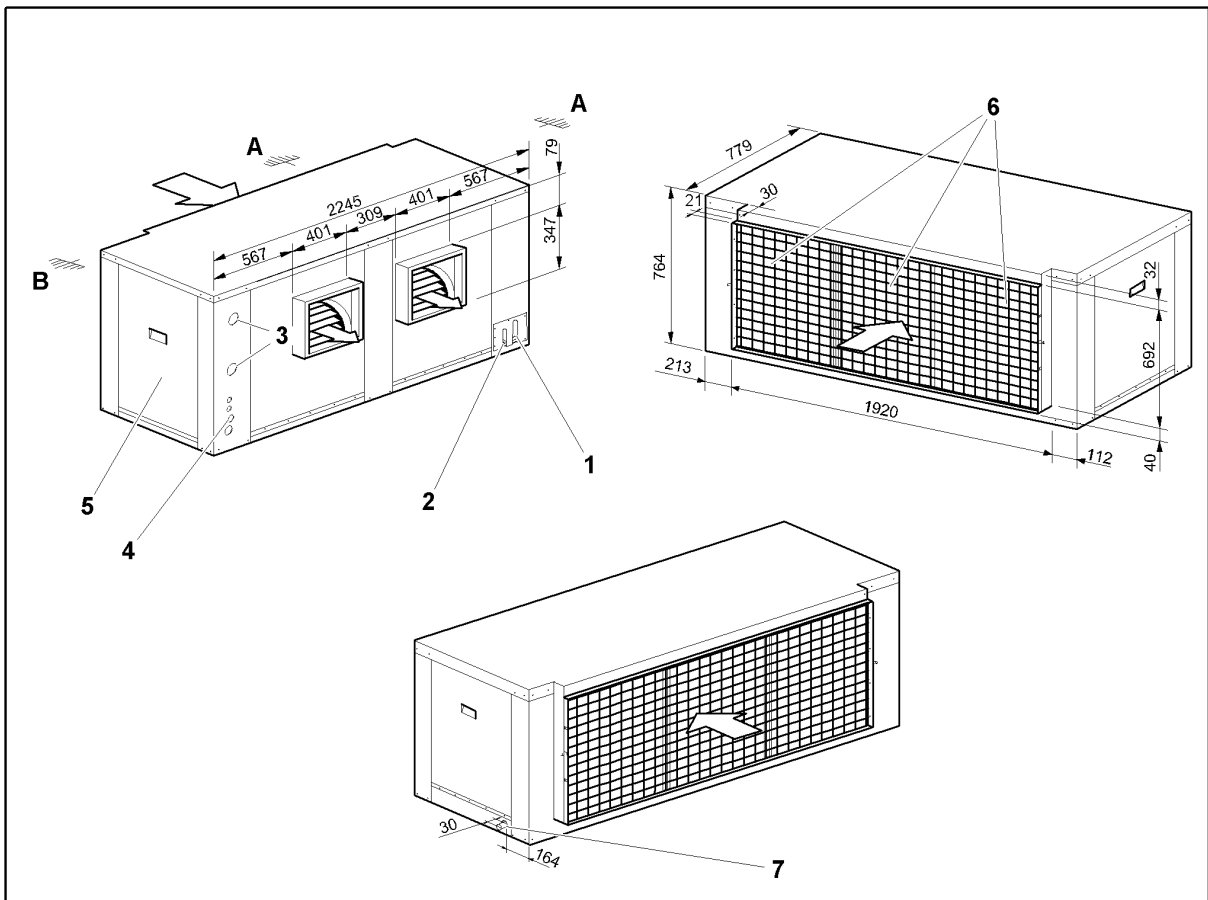
- A. Minimum clearance 600 mm
- B. Minimum clearance 800 mm
- 1. Gas connection 1 - 18
- 2. Liquid connection 12
- 3. Hot water coil accessory connections
- 4. Electrical connections
- 5. Motor access panel
- 6. Filters
- 7. Drain pipe (outer diameter 28.5 mm)

1.6.3 General dimensions, VIR 40A



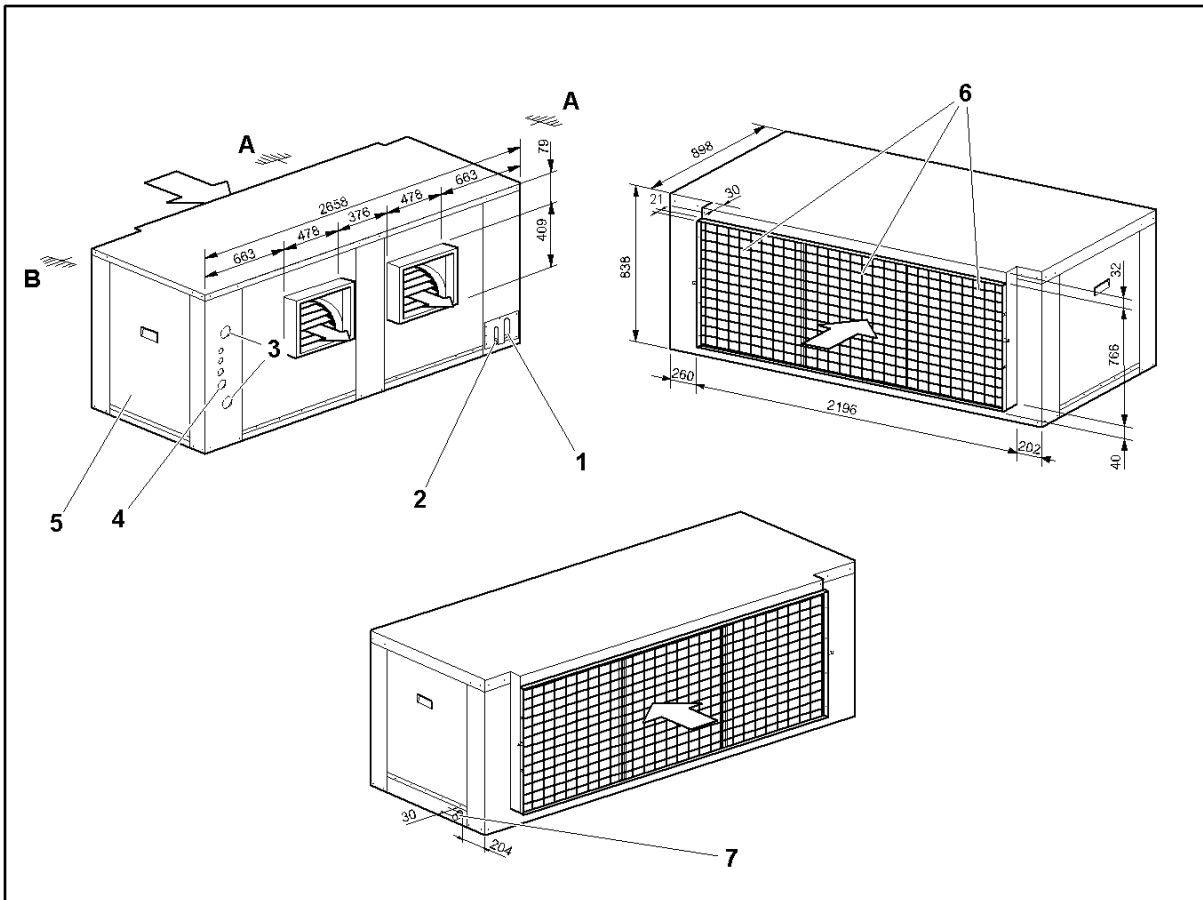
- A. Minimum clearance 600 mm
- B. Minimum clearance 800 mm
- 1. Gas connection 1 - 18
- 2. Liquid connection 58
- 3. Hot water coil accessory connections
- 4. Electrical connections
- 5. Motor access panel
- 6. Filters
- 7. Drain pipe (outer diameter 28.5 mm)

1.6.4 General dimensions, VIR 45A, VIR 60A



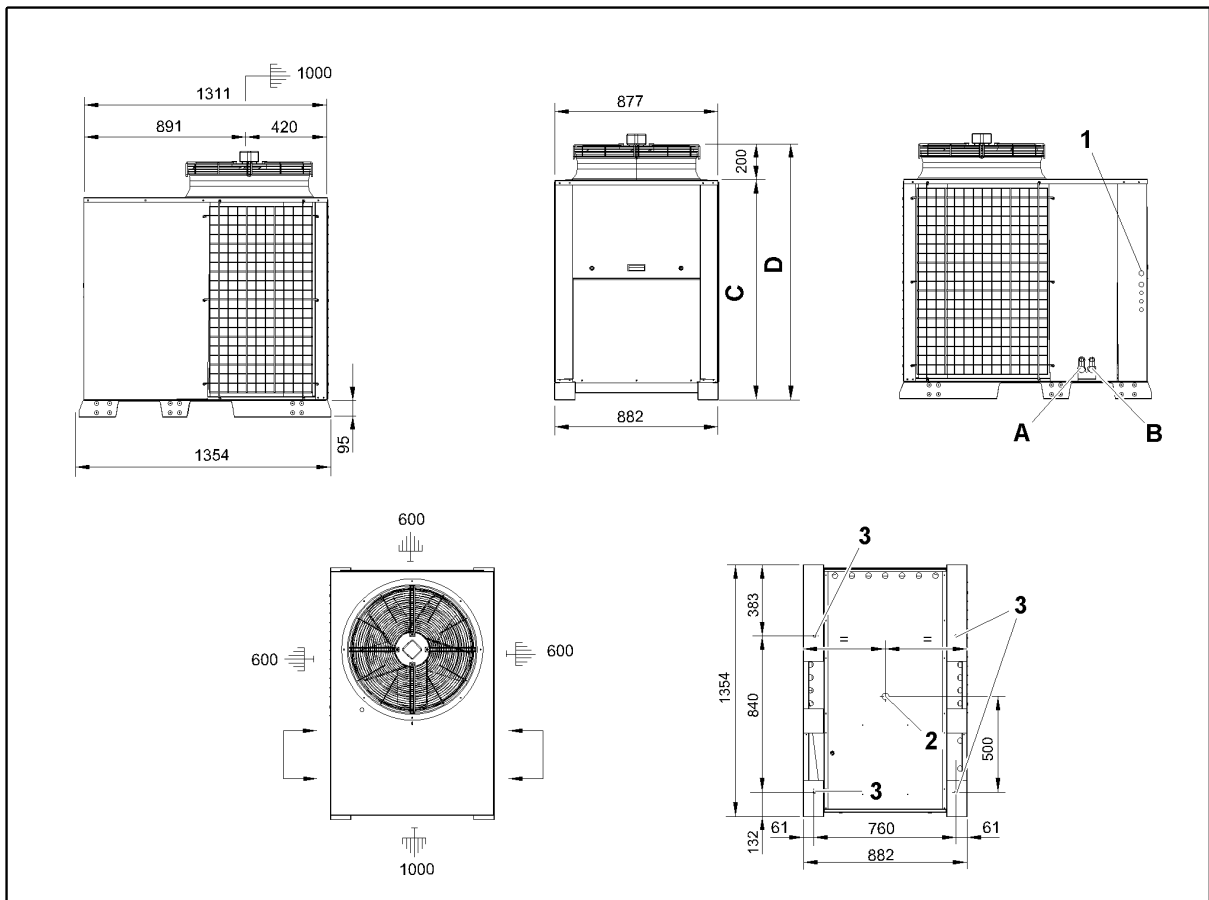
- A. Minimum clearance 600 mm
- B. Minimum clearance 800 mm
- 1. Gas connection 1 - 18 (x2)
- 2. Liquid connection 12 (45A), 58 (60A) (x2)
- 3. Hot water coil accessory connections
- 4. Electrical connections
- 5. Motor access panel
- 6. Filters
- 7. Drain pipe (outer diameter 28.5 mm)

1.6.5 General dimensions, VIR 75A, VIR 90A



- A. Minimum clearance 600 mm
- B. Minimum clearance 800 mm
- 1. Gas connection 1 - 38 (x2)
- 2. Liquid connection 78 (x2)
- 3. Hot water coil accessory connections
- 4. Electrical connections
- 5. Motor access panel
- 6. Filters
- 7. Drain pipe (outer diameter 28.5 mm)

1.6.6 General dimensions and accesses (VAC-VAH 20A25A30A models)



1. Electrical connections

2. Centre of gravity

3. Ø 14 support points

Weight per support point

VAC-VAH 20A25A

VAC-VAH 30A

A. Gas pipe diameter

VAC-VAH 20A25A

VAC-VAH 30A

1-18

1-18

B. Liquid pipe diameter

VAC-VAH 20A25A

VAC-VAH 30A

C VAC-VAH 20A

VAC-VAH 25A

VAC-VAH 30A

D VAC-VAH 20A

VAC-VAH 25A

VAC-VAH 30A

12

58

1030

1030

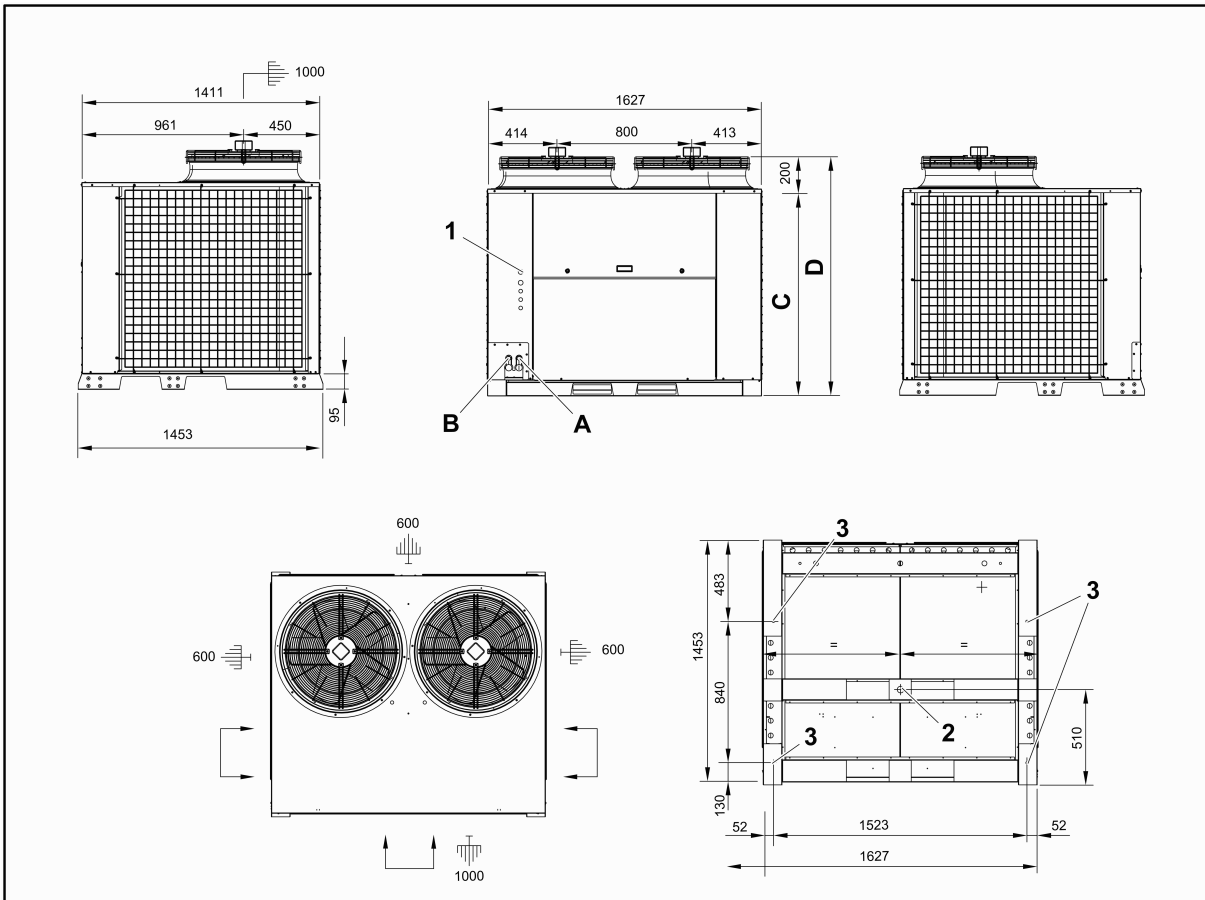
1182

1230

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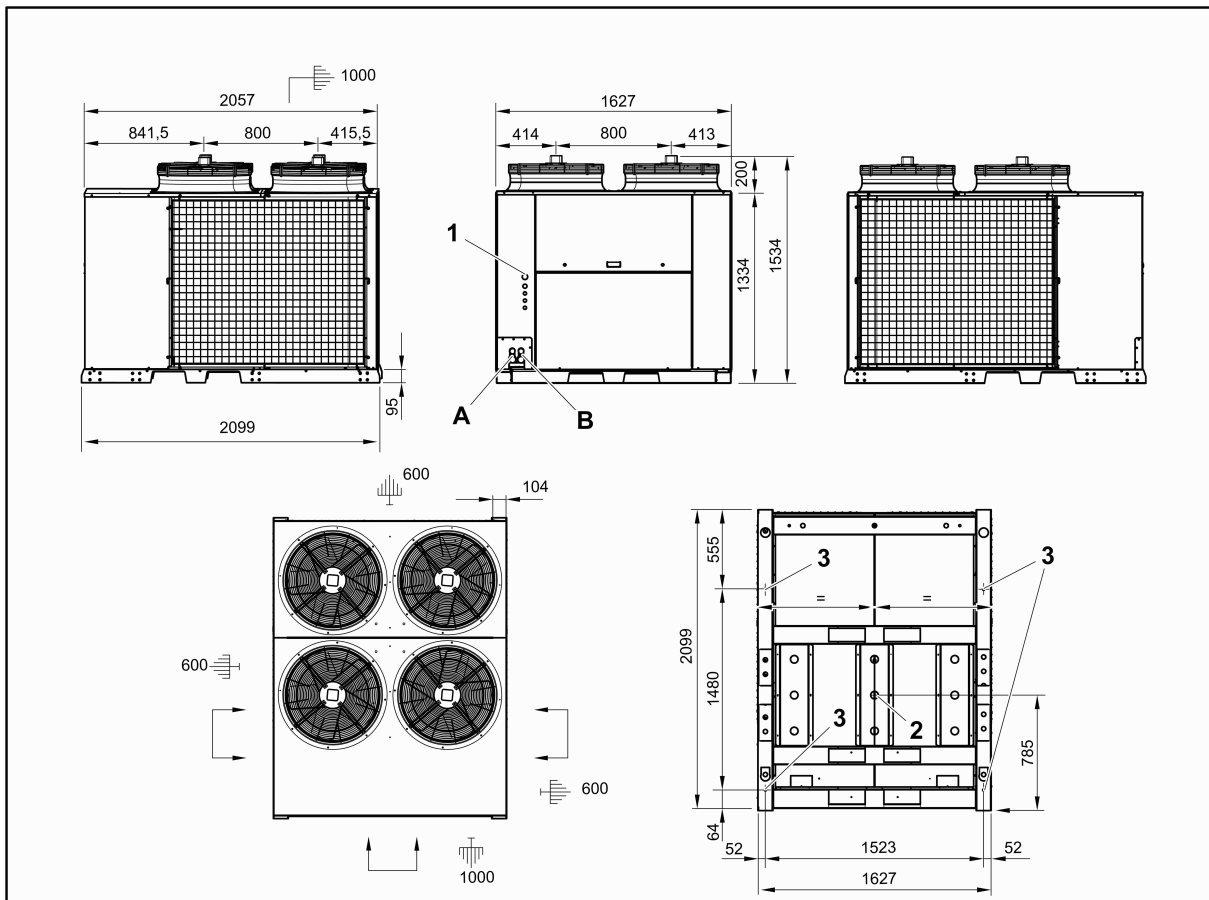
1382

1.6.7 General dimensions and accesses (VAC-VAH 40A45A60A models)



- | | | |
|---------------------------|-------------------------|-------|
| 1. Electrical connections | B. Liquid pipe diameter | |
| 2. Centre of gravity | VAC-VAH 40A | 58 |
| 3. Ø 14 support points | VAC-VAH 45A | 2x 12 |
| Weight per support point | VAC-VAH 60A | 2x 58 |
| VAC-VAH 40A | C. VAC 40A, 45A, 60A | 1178 |
| VAC-VAH 45A | VAH 40A | 1178 |
| VAC-VAH 60A | VAH 45A, 60A | 1229 |
| A. Gas pipe diameter | D. VAC 40A, 45A, 60A | 1378 |
| VAC-VAH 40A | VAH 40A | 1378 |
| VAC-VAH 45A | VAH 45A, 60A | 1429 |
| VAC-VAH 60A | | |

1.6.8 General dimensions and accesses (VAC-VAH 75A90A models)



1. Electrical connections

2. Centre of gravity

3. Ø 14 support points

Weight per support point

VAC-VAH 75A90A

A. Gas pipe diameter

VAC-VAH 75A90A 2x 1-38

B. Liquid pipe diameter

VAC-VAH 75A90A 2x 78

1.7 Sensible cooling capacities, VAH (Heat pump)

1.7 Sensible cooling capacities, VAH (Heat pump)

Model	Dry fresh air temp. °C (DB)	Wet supply air temp. °C (WB)	Total capacity	Sensible capacity [W]				Comp. absorbed power
				Dry temp. of supply air to coil °C (DB)				
				22	24	27	29	
			W	W	W	W	W	kW
VAH 20A VIR 25A	25	22	22920	6918	9750	13998	16834	4,12
		19,5	20628	10459	13291	17539	20376	4,31
		17	19100	14217	17049	19100	19100	4,51
	35	22	21201	6341	9173	13421	16253	4,66
		19,5	19100	9899	12731	16979	19100	4,90
		17	17572	12856	15688	17572	17572	5,15
	45	22	19100	5699	8531	12779	15611	5,39
		19,5	17190	9259	12091	16339	17190	5,64
		17	15662	12844	15662	15662	15662	5,88
VAH 25A VIR 25A	25	22	27600	8533	11365	15613	18450	4,28
		19,5	24840	12043	14875	19123	21960	4,49
		17	23000	15824	18656	22904	23000	4,69
	35	22	25530	7811	10643	14891	17723	4,85
		19,5	23000	11344	14176	18424	21256	5,10
		17	21160	14157	16989	21160	21160	5,36
	45	22	23000	7009	9841	14089	16921	5,61
		19,5	20700	10548	13380	17628	20460	5,87
		17	18860	14120	16952	18860	18860	6,12
VAH 30A VIR 40A	25	22	34560	10401	14778	21343	25726	7,06
		19,5	31104	15878	20255	26820	31104	7,39
		17	28800	21681	26058	28800	28800	7,73
	35	22	31968	9536	13912	20478	24855	7,98
		19,5	28800	15037	19414	25979	28800	8,40
		17	26496	19027	23404	26496	26496	8,82
	45	22	28800	8572	12948	19514	23890	9,24
		19,5	25920	14076	18453	25018	25920	9,66
		17	23616	19619	23616	23616	23616	10,08
VAH 40A VIR 40A	25	22	42120	13000	17377	23942	28325	8,23
		19,5	37908	18428	22805	29370	33755	8,62
		17	35100	24270	28647	35100	35100	9,02
	35	22	38961	11900	16277	22842	27219	9,31
		19,5	35100	17364	21741	28306	32683	9,8
		17	32292	20990	25367	31932	32292	10,29
	45	22	35100	10680	15057	21622	25999	10,78
		19,5	31590	16152	20529	27094	31471	11,27
		17	28782	21674	26051	28782	28782	11,76
VAH 45A VIR 45A	25	22	51480	15768	21430	29922	35592	9,83
		19,5	46332	22811	28473	36966	42637	10,3
		17	42900	30353	36015	42900	42900	10,76
	35	22	47619	14441	20103	28595	34257	11,12
		19,5	42900	21525	27187	35679	41341	11,7
		17	39468	27594	33256	39468	39468	12,29
	45	22	42900	12966	18628	27121	32783	12,87
		19,5	38610	20059	25721	34214	38610	13,46
		17	35178	27212	32874	35178	35178	14,04
VAH 60A VIR 60A	25	22	62520	19287	25806	35548	42112	13,48
		19,5	56268	27374	33892	43670	50200	14,12
		17	52100	36073	42591	52100	52100	14,77
	35	22	57831	17656	24175	33953	40472	15,25
		19,5	52100	25792	32313	42091	48610	16,05
		17	47932	32428	38947	47932	47932	16,85
	45	22	52100	15846	22364	32142	38661	17,66
		19,5	46890	23997	30516	40294	48813	18,46

Model	Dry fresh air temp. °C (DB)	Wet supply air temp. °C (WB)	Total capacity	Sensible capacity [W]				Comp. absorbed power
				Dry temp. of supply air to coil °C (DB)				
				22	24	27	29	
W	W	W	W	W	kW			
VAH 75A VIR 75A	25	17	42722	32222	38741	42722	42722	19,26
		22	86760	26856	35684	48926	57767	16,80
		19,5	78084	37791	46619	59860	68704	17,60
		17	72300	49581	58409	71650	72300	18,40
	35	22	80253	24580	33408	46649	55477	19,00
		19,5	72300	35589	44417	57658	66486	20,00
		17	66516	45592	54420	66516	66516	21,00
		22	72300	22054	30882	44124	52951	22,00
	45	19,5	65070	33083	41911	55152	63980	23,00
		17	59286	44214	53041	59286	59286	24,00
		22	103320	32112	42331	57660	67894	21,42
		19,5	92988	44748	54967	70295	80533	22,44
VAH 90A VIR 90A	25	17	86100	58409	68628	83957	86100	23,46
		22	95571	29383	39602	54930	65150	24,23
		19,5	86100	42109	52328	67657	77876	25,50
	35	17	79212	53327	63546	78875	79212	26,78
		22	86100	26356	36575	51904	62123	28,05
		19,5	77490	39108	49327	64656	74875	29,33
	45	17	70602	51983	62202	70602	70602	30,60

1.8 Specifications table

1.8.1 Rated flows for the indoor unit



NOTE

- *H.S.D High-speed kit.*
- *H.S.D.M High-speed kit with motor included.*
- *The cooling and heating capacities in the corresponding tables are valid for the following rated flows. For other flows, apply the correction factors of the corresponding table [Test conditions and correction factors](#) , see on page 5 and [Limits of use](#) , see on page 7 .*

Model	Rated flow		Minimum flow		Maximum flow		Available rated pressure of indoor fan
	m³h	m³s	m³h	m³s	m³h	m³s	
VIR 25A	4590	1,3	3600	1	5500	1,5	117
VIR 40A	7500	2,1	6000	1,7	8300	2,3	118
VIR 45A	9000	2,5	7200	2	10800	3	130
VIR 60A	10500	2,9	8400	2,3	12600	3,5	137
VIR 75A	13700	3,8	11000	3,1	17500	4,9	125
VIR 90A	16000	4,4	12800	3,6	17500	4,9	175

1.8.2 Features of the indoor fan gear standard and with high-speed kit

VIR 25A

Ventilation gear	Code	Flow m ³ h													
		3600		3900		4250		4590		4900		5200		5500	
		Ps	P	Ps	P	Ps	P	Ps	P	Ps	P	Ps	P	Ps	P
Standard	-	172	720	156	790	137	825	117	895	92	965	-	-	-	-
H.S.D	611991087	267	900	253	980	-	-	-	-	-	-	-	-	-	-
H.S.D.M	611991088	267	900	253	980	238	1040	222	1100	200	1160	180	1220	158	1290

VIR 40A

Ventilation gear	Code	Flow m ³ h													
		6000		6500		7000		7500		7800		8000		8300	
		Ps	P	Ps	P	Ps	P	Ps	P	Ps	P	Ps	P	Ps	P
Standard	-	153	1070	150	1100	137	1200	118	1305	105	1355	98	1390	85	1440
H.S.D	611991089	242	1280	241	1340	233	1460	217	1585	206	1655	200	1700	188	1760

VIR 45A

Ventilation gear	Code	Flow m ³ h													
		7200		7800		8400		9000		10500		12000		12600	
		Ps	P	Ps	P	Ps	P	Ps	P	Ps	P	Ps	P	Ps	P
Standard	-	150	1375	146	1405	141	1430	130	1490	-	-	-	-	-	-
H.S.D	611991091	203	1575	201	1615	197	1650	188	1720	-	-	-	-	-	-
H.S.D.M	611991090	203	1575	201	1615	197	1650	188	1720	141	2030	65	2400	52	2570

VIR 60A

Ventilation gear	Code	Flow m ³ h													
		8400		9100		9800		10500		11100		11800		12600	
		Ps	P	Ps	P	Ps	P	Ps	P	Ps	P	Ps	P	Ps	P
Standard	-	178	1475	175	1600	160	1750	137	1920	122	2065	90	2270	50	2450
H.S.D	611991092	277	1865	276	2010	266	2170	246	2360	-	-	-	-	-	-
H.S.D.M	611991093	277	1865	276	2010	266	2170	246	2360	234	2510	206	2700	172	2940

VIR 75A

Ventilation gear	Code	Flow m ³ h													
		11000		12000		12900		13700		15000		16300		17500	
		Ps	P	Ps	P	Ps	P	Ps	P	Ps	P	Ps	P	Ps	P
Standard	-	170	1660	156	1830	140	2010	125	2170	97	2450	65	2775	28	3000
H.S.D	611991091	289	2150	282	2380	271	2640	260	2830	-	-	-	-	-	-
H.S.D.M	611991094	289	2150	282	2380	271	2640	260	2830	235	3200	207	3600	175	3930

VIR 90A

Ventilation gear	Code	Flow m ³ h													
		12800		14000		15000		16000		16500		17000		17500	
		Ps	P	Ps	P	Ps	P	Ps	P	Ps	P	Ps	P	Ps	P
Standard	-	240	2570	222	2910	200	3150	175	3420	161	3575	146	3730	131	3900
H.S.D	611991095	399	3350	388	3770	374	4090	-	-	-	-	-	-	-	-
H.S.D.M	611991096	399	3350	388	3770	374	4090	354	4450	342	4630	328	4830	313	5000

Ps Static pressure available [Pa]

P Consumed power [W]

H.S.D. High-speed kit

H.S.D.M High-speed kit with motor included

Indoor fan high-speed kit (H.S.D and H.S.D.M)

H.S.D and H.S.D.M configuration for VIR units												
Description	Code	Fan pulley			Motor pulley			Motor		Motor trip switch		
		Original diameter	type	Axis diameter	Original diameter	type	Axis diameter	Power [kW]	Quantity	Adjustment (1) (A)	Code	
H.S.D. VIR25A	611991087	125	SPZ (x2)	25								
H.S.D.M VIR25A	611991088	140	SPZ (x2)	25	95	SPZ (x2)	24	1,1	1	3		
H.S.D. VIR40A	611991089	150	SPZ (x2)	25								
H.S.D. VIR45A75A	611991091	160	SPZ (x2)	25								
H.S.D.M VIR45A	611991090	160	SPZ (x2)	25	100	SPZ (x2)	28	3	1	6	006776702	
H.S.D. VIR60A	611991092	140	SPZ (x2)	25								
H.S.D.M VIR60A	611991093	140	SPZ (x2)	25	95	SPZ (x2)	28	3	1	6		
H.S.D.M VIR75A	611991094	160	SPZ (x2)	25				4	1	9,5	006776704	
H.S.D. VIR90A	611991095	160	SPZ (x3)	25								
H.S.D.M VIR90A	611991096	160	SPZ (x3)	25				5,5	1	12,5	006776705	

(1) The adjustment is illustrative and must be set to the installation conditions

H.S.D and H.S.M codes for VIR units							
Description	Code	VIR 25	VIR 40	VIR 45	VIR 60	VIR75	VIR 90
High-speed kit (H.S.D)	611991087	x					
	611991089		x				
	611991091			x		x	
	611991092				x		
	611991095						x
High-speed kit with motor included (H.S.D.M)	611991088	x					
	611991090			x			
	611991093				x		

H.S.D and H.S.M codes for VIR units							
Description	Code	VIR 25	VIR 40	VIR 45	VIR 60	VIR75	VIR 90
	611991094					x	
	611991096						x

1.9 Outdoor fan features

Model	Static pressure available		Air flow		Absorbed power
	mm c.d.a	Pa	m ³ h	m ³ s	W
VAC-VAH 20A VAC-VAH 25A	0	0	8900	2,47	532
	2	20	8200	2,28	554
	4	39	7300	2,03	570
VAC-VAH 30A	0	0	8800	2,44	518
	2	20	8700	2,42	520
	4	39	8600	2,39	524
VAC 45A60A, VAC-VAH 40A	0	0	18600	5,16	1040
	2	20	16800	4,66	1090
	4	39	14900	4,14	1140
VAH 45A60A	0	0	17900	4,97	1073
	2	20	16200	4,5	1120
	4	39	14500	4	1160
VAC-VAH 75A VAC-VAH 90A	0	0	32000	8,89	2100
	2	20	28600	7,94	2200
	6	39	26300	7,31	2300

1.10 Instructions for installation and connection of the unit

1.10.1 Characteristics of the location

Location of VIR 25A to 90A indoor units

Locate the indoor unit as close as possible to outdoor walls for easier installation, maintenance and drainage. Make sure the ceiling fastening where the unit is located will withstand its weight.

The unit must be installed completely horizontally or sloping slightly towards the drain side.

Location of VACVAH 20A to 90A outdoor units

The location of the unit must be studied to ensure a completely satisfactory installation. To do so, the environmental conditions of the area where the unit is to be installed must be taken into account.

Furthermore, the normal weather conditions should be instrumental in determining the best position of the unit and the hoods, screens or covers required to ensure its correct working order.

If possible, in warm zones like the southern Europe, the unit should be located on the north or east side of the building or property.

The location chosen for the unit must provide the condenser with an unlimited air supply.

As well as the technical data given in this document and any others that are applicable, please bear in mind that the unit has been designed for outdoors installation only.

Where the unit is to be installed at ground level, refer to section *Specifications for the foundation or anchoring of the unit*, see on page 28.

Where the unit is to be installed on the roof of a building or property, make sure that the roof structure can support the weight of the unit plus that of any optional equipment and/or accessories to be fitted.

Special instructions for locations where there is regular snowfall or with ambient temperatures of close to 0°C or less

In areas where there is regular or sporadic snowfall, the unit must be elevated above the ground or roof where it is installed. The height should be enough to prevent the unit, the condenser and evaporator air inlets and the access to the unit panels from becoming blocked by accumulated snow.

Protection against ice

In areas where the temperature can drop below 0°C, there must be some kind of additional protection to prevent the water in the condensate drain pipe from freezing.

Use an electric cord resistor in the drain trap as well as in the drain, where applicable.

In heat pumps, also use cord resistors in the outdoor coil tray to prevent any ice from accumulating.

Special instruction for locations with high ambient temperatures

In areas where the ambient temperature is over 43°C, the unit must not be located in direct sunlight and, therefore a specific sunshade will be required.

The installation of a special sunshade over the unit must not effect the air flow required by the unit to work correctly. See *Minimum clearance*, see on page 14.

1.10 Instructions for installation and connection of the unit

1.10.2 Characteristics of the facility where the unit will be installed

Indoor unit air ducts

The air duct installation where the unit is to be installed must be formed by a closed return duct system. The additional installation of economisers or outdoor air intakes is not excluded.

To reduce operating noise, the supply and return air duct connections on the unit must be made using flexible joints.

The supply and return air duct systems must be designed for the air flow requirements of the installation. The ducts should not be sized based on the supply and return air connection sizes of the unit.

Hatches should be installed on each discharge duct bypass and where access is planned for cleaning and replacement of filters.

1.10.3 Specifications for the foundation or anchoring of the unit

Where the unit is to be installed at ground level, the characteristics of the ground it will sit on must be taken into account.

Characteristics, such as acceptable surface firmness, must be suitable for the foundation the unit requires.

1.10.4 Characteristics of utility provider connections

In general, the different connections required by the unit are made following the shortest route possible. Under no circumstances may any local or national regulations be contravened when performing the preparatory work for service connections.



NOTE

For further information on this subject, always keep the current regulations for the country where the unit is being installed at hand.



CAUTION

- *Before the connection work, possible losses of flow, temperature and voltage drops, etc. that might affect the distances between planned connection points and the unit must be taken into account.*
- *As a result, each connection must be sized accordingly.*

1.10.5 Unit refrigerant connection

The indoor and outdoor units are connected by refrigerant pipes that form a sealed refrigerant circuit.

Pipes to be used



CAUTION

Do not leave compressors or dehydrator filters exposed.

Use K or L-type cooling quality copper pipes, SASTMB88.

The pipes must be sealed and insulated until they are connected to the units.

The pipe insulation must be made of a suitable material with a minimum thickness of 8 mm to avoid condensation and minimum temperature loss due to radiation.

Connection pipe installation



DANGER

Do not carry out work outdoors in the event of adverse weather conditions



CAUTION

Do not use stripping products on Cu - Cu joints.

Use rods with a low melting point and a minimum silver content of 5% when welding the pipes. During this process, there must be a current of dry nitrogen inside the pipe to prevent rust and scale from forming that would damage the welding and, therefore, affect the watertightness of the circuit.



NOTE

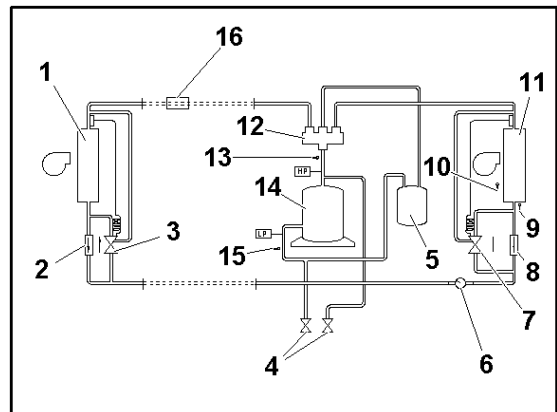
- *The connection pipes between units must be as short as possible.*
- *No drain traps are necessary where connecting piping specifications are met.*

Cooling layout

The refrigerant pipes must be connected to the units using pipe flaring.

As indicated in the diagram, a dehydrator filter must be fitted (one or two, depending on model) on the liquid pipe of the installation.

- 1 Indoor coil
- 2 Check valve
- 3 Expansion valve
- 4 Service valve
- 5 Suction accumulator
- 6 Liquid sight glass
- 7 Expansion valve
- 8 Check valve
- 9 Liquid sensor
- 10 Outdoor air sensor
- 11 Outdoor coil
- 12 4-way reversing valve
- 13 Discharge sensor
- 14 Compressor
- 15 Suction sensor
- 16 Dehydrator filter (obligatory in the installation)



Vacuum and dehydrating

The presence of air and dampness in the cooling circuit must be completely eliminated to avoid

- Damage to the compressor and other parts of the cooling circuit.
- A drop in unit performance.
- Capillary blocking due to freezing.
- Unwanted high pressure increases.
- Increased electricity consumption.



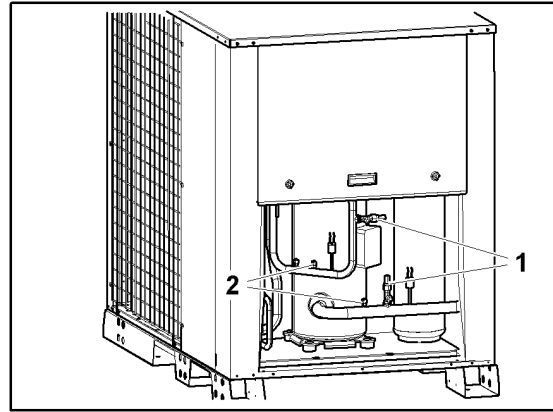
NOTE

Prior to the vacuum process, nitrogen gas can be swept through the system to remove most of the dampness and other contaminants in the cooling circuit. The vacuum should be broken on several occasions using nitrogen to ensure dampness is eliminated.

The vacuum is ensure in each cooling circuit as follows

1.10 Instructions for installation and connection of the unit

- 1 Connect the vacuum pump to the service valves -1- on the installation and connect the service manometers to the valve stems (¼ valves) -2- in the circuit.
- 2 Open the stopcocks on the service valves and the vacuum pump.
- 3 Activate the vacuum pump.
- 4 Vacuum to at least 50 microns.
- 5 Detect leaks.



1.10.6 Preparation and connecting to the various utilities

Electricity. Power and control

POWER LINE

Power must be supplied to the unit through a specific electricity supply line with an exclusive power control and differential breaker, installed in line with national and local regulations.



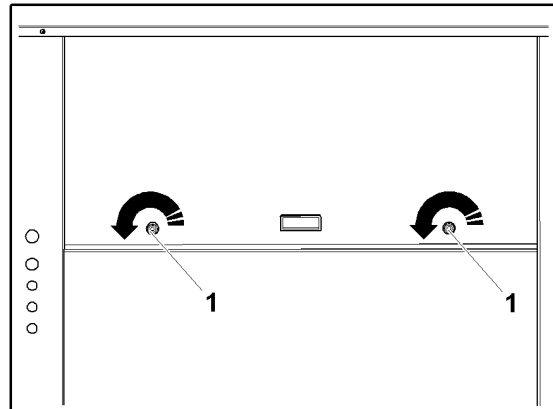
NOTE

For further information on this subject, always keep the current regulations for the country where the unit is being installed at hand.

Make sure that the electricity supply line has enough capacity to power the unit. Its length, the cable diameter and their protection (cover or jacket) should be appropriate for the unit.

Use a multimeter to check that the supply voltage remains within the accepted limits.

To install the power cable, loosen the closures -1- by 14 turn and remove the electrical board panel.



Press the the appropriate openings on the edge of the unit -1- until they are released.

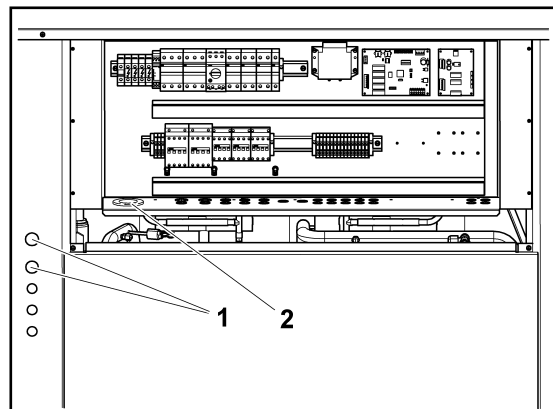
Fit packing glands to fit the cable and pull the cable through to the inside of the electrical panel through the grommets in the tray -2-.

Connect the cable to the input connections indicated and firmly tighten the set screws. Also consult the Wiring Diagrams.



NOTE

The complete wiring diagram for the unit is attached



to the inside of the electrical panel.

The electrical panel is fitted with a phase detector to ensure the electrical connection follows the sequence of phases R-S-T. Where the connection does not respect this sequence, the electronic control circuit remains disconnected and the unit will not start.

To correct the phase sequence, change the position of two of the three unit power cables on the input terminals.

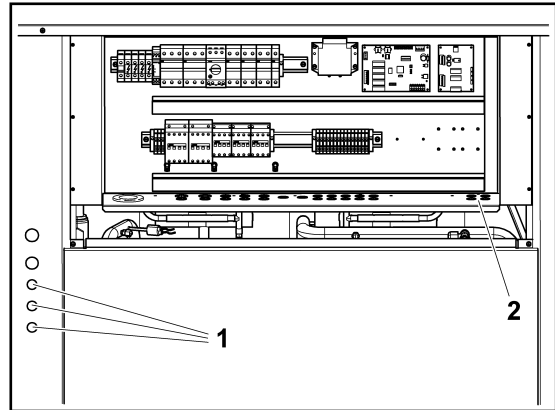
CONTROL LINE

Passing the power and control cables through the front of the unit.

Press the the appropriate openings on the edge of the unit -1- until they are released.

Fit packing glands to fit the cable and pull the cable through to the inside of the electrical panel through the grommets in the tray -2-.

Connect the cable to the terminals indicated and firmly tighten the set screws. Also consult the wiring diagrams for the unit and *Wiring diagrams* , see on page 31 .

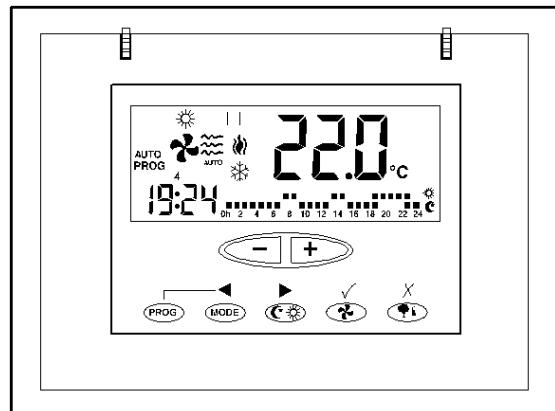


NOTE

The complete wiring diagram for the unit is attached to the inside of the electrical panel.

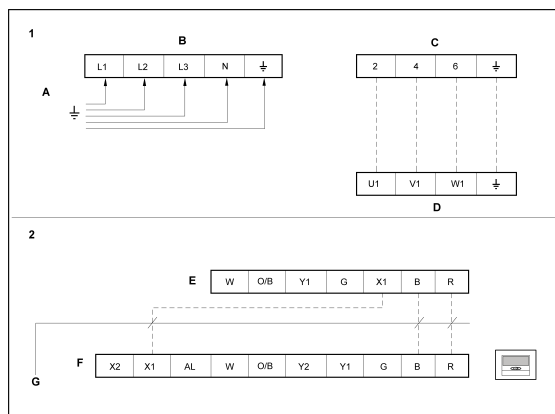
THERMOSTAT CONNECTION

The outdoor unit and the thermostat are connected by means of a 10-pin x 0.22 mm² shielded communication cable. Connect the cable to the terminals indicated and firmly tighten the set screws. Also consult the wiring diagrams for the unit and *Wiring diagrams* , see on page 31 .



Wiring diagrams

1. Power connection
2. Thermostat connection
- A. Main power supply
- B. Outdoor unit
- C. Contactor
- D. Indoor fan motor (star connection)
- E. Outdoor unit terminal strip
- F. DPC-1 thermostat
- G. 10-pin shielded communications cable x 0.22 mm²



1.11 Instructions for starting up the unit

Condensates. Insulation and/or protection of ducts

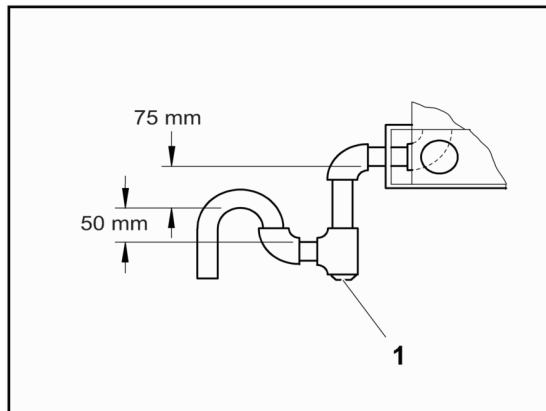
Condensates should be released by means of a specific installation in line with local or national regulations.



NOTE

For further information on this subject, always keep the current regulations for the country where the unit is being installed at hand.

Install a drain trap on the exhaust outlet of the unit. The drain trap must have an access register -1- to facilitate emptying and cleaning when necessary.



Lay the condensate drain pipe from the connection at the bottom of the unit to a nearby drain.



NOTE

- *The condensate drain pipe should be at a minimum gradient of 2% (2 cm of drop for each metre in length).*
- *The condensate drain pipe must be correctly insulated.*

Protection against ice

In areas where the temperature can be 0°C or less, there should be some kind of additional protection to prevent the water contained in the condensate drain pipe from freezing.

An electric heater (wire heater) should be installed in the drain trap and in the condensate drain pipe.

For units with heat pumps, electric heaters must also be installed in the outdoor coil tray to prevent possible ice accumulation.

1.11 Instructions for starting up the unit

1.11.1 Electrical checks



DANGER

- *All side panels except for that of the electrical box, must be fitted, closed and secured with their corresponding locks before turning the general switch on the unit.*
- *The unit has a remote control, which means that the fan turbine may start unexpectedly.*



CAUTION

Loose connection terminals produce overheating of cables and terminals. The unit will work incorrectly and there is a risk of fire.

Check that the cables are firmly secured to their connection terminals.



CAUTION

Do not start the unit until all installation work has been completed.

Initial connection of the unit

Once all of the planned accessories are installed, and before starting the unit, its general switch on the installation must be turned on.

Press the "Test" button for two seconds so that the unit recognises the installed accessories. When the recognition process is complete, the red pilot light switches off.

YKN2 Open control board

The unit control software is in the YKN2 Open control board. The control algorithm can be configured or changed by

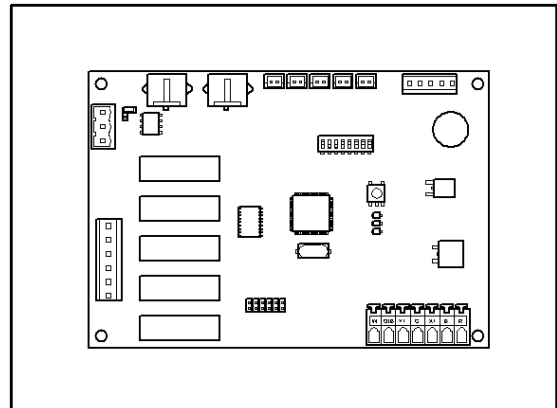
- The position of the micro-switches.
- The connection of accessories detected by the board.

The control board indicates the faults detected by means of the red V3 LED on the board or the fault codes indicated on the DPC-1 thermostat.



NOTE

For further information, see the technical information on the YKN2 Open control board.



Rotational direction of Scroll compressors

The Scroll compressors and the fans only operate correctly if they rotate in the correct direction. All of the motors and compressors in the unit are connected so that they rotate correctly.

If the compressors are not connected correctly and are rotating in the wrong direction

- The compressor will not compress.
- Operating noise will be abnormal.
- Electricity consumption (A) will be low.
- They overheat.

1.12 Unblocking the unit safely in case of breakdown



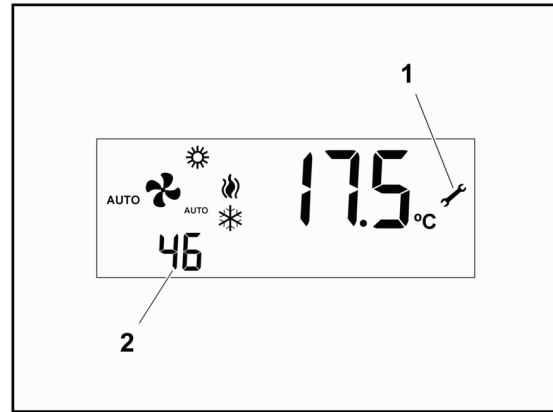
DANGER

- *All side panels except for that of the electrical box, must be fitted, closed and secured with their corresponding locks before turning the general switch on the unit.*
- *The unit has a remote control, which means that the fan turbine may start unexpectedly.*

To unlock the unit, see "Restarting the air conditioning unit in the case of damage" in the User Manual.

1.13 Regular maintenance tasks performed by specialised personnel

If the thermostat display keeps showing the pilot light -1- and any fault code -2- or if the air conditioning unit does not start, contact a Johnson Controls Inc. Authorised Technical Assistance Service.



1.13 Regular maintenance tasks performed by specialised personnel

Like any other machine, the unit requires regular maintenance, as the wear to which some of its parts are subjected can effect its mechanical reliability, electrical consumption and working life.

In order to keep the unit in similar working order to when it was installed and commissioned, a series of maintenance tasks must be performed every so often.

Furthermore, all maintenance and servicing tasks required by local and national regulations must be carried out.



DANGER

Only qualified personnel with the appropriate technical resources may install the air conditioning unit.



CAUTION

Johnson Controls Inc. shall not be considered responsible for any damage caused by inappropriate use or maintenance of the unit that is in any way inconsistent with that described in this document or others specifically provided with the platform.

1.13.1 Planned Maintenance Schedule

The following table shows the recommended frequency for regular maintenance tasks. Depending on the environmental and working conditions where the unit is installed, maintenance tasks may be carried out more or less frequently. The units must undergo all planned maintenance, without exception.

The person responsible for the building or property where the unit is installed must ensure that these inspections are performed at the appropriate time. Likewise, this person should keep and maintain a log book reflecting both planned and unplanned work by the Johnson Controls Inc. Authorised Technical Assistance Service.

Task	Frequency			
	1 month	2 months	6 months	Annual
Belts (indoor fan)		X		
Air filters	X			
Indoor coil		X		
Condensate tray and drain trap		X		
Outdoor coils		X		
Outdoor air intake (accessory)	X			
Refrigerant circuit			X	
Electrical and mechanical operation			X	
Integrity of the unit structure and components				X
Hot water coil (accessory)				X

1.13.2 Maintenance tasks performed by specialised personnel



DANGER

- *The unit has a remote control, which means that the fan turbine may start unexpectedly.*
- *Disconnect the electricity supply to the unit before removing any of its side panels.*

Air filters

Wash once removed from the unit, sliding them out from their guide rails.

Indoor coil

Visually inspect the indoor coil when performing air filter maintenance.

The complete surface of the fins must be kept clean. If they need to be cleaned, use a soft brush or a vacuum cleaner, taking special care not to damage the fins.



DANGER

Never use a water hose to clean the indoor coil compartment.

1.14 Unit sound power level indication (L_w in dB A)

Condensate tray and drain trap

Remove all dirt and residue accumulated in the condensate tray.

Check that neither the condensation outlet nor the drain trap is blocked.

Check that the condensate (water) has been correctly released to the outside.

Fill the drain trap with water if required (prime it).

Outdoor coils

The complete surface of the fins must be kept clean. If they need to be cleaned, use a soft brush or a vacuum cleaner, taking special care not to damage the fins.

Given that they are exposed to the outdoors, the fins can accumulate a lot of dirt and grime (dust, soot, sand, etc.). To clean the fins more thoroughly, use water with a neutral detergent (e.g. washing-up liquid). Clean from the inside out and from top to bottom.

Cooling Circuit

Before the start of each season when the unit is in use, a thorough check of the refrigerant circuit must be made, including operating pressures, controls and temperature rises, etc.

Electrical and mechanical operation

Before the start of each season when the unit is in use, check the consumption (in amps) of all motors, the condition of the electrical connections and the correct working order of the safety and protection systems.

The motor bearings for both the indoor and outdoor fans are permanently lubricated and do not need additional lubricant during maintenance.

Condition of the unit structure and components

Check the correct condition of the unit structure and outdoor components for knocks, dents, scratched paint or rust. Check that screws are properly secured and the condition of leak-proof seals and panel locks and make sure they close properly.

Hot water coil (accessory)

Before the start of each season when the unit is in use, check the level of water in the system, that air has been purged from the coil and that the controls work properly.

Depending on the climate where the unit is installed, the mix of anti-freeze and water must be checked.

1.14 Unit sound power level indication (L_w in dB A)

Octave band sound spectrum dB(A), outdoor

VACVAH models	20	25	30	40	45	60	75	90
125 Hz	55,5	60,6	63,3	63,5	66	66	66,9	71,9
250 Hz	63,9	63,8	66,2	68,5	70,6	70,6	69,8	71,2
500 Hz	66,4	67,6	69,4	71,8	72	72	73,4	73,2
1,000 Hz	69,3	70,8	72	73,3	73	73	76,1	76
2,000 Hz	64,2	65,6	66,9	68,7	67,8	67,8	70,4	71
4,000 Hz	58	60,9	62,4	63,5	61,9	61,9	63,3	64,1
8,000 Hz	63,3	56,2	53,9	56,6	54,9	54,9	57,1	58,3
Sound power level L _w dB A	71,6	73	76,2	77,5	77,6	77,6	79,1	79,5

Octave band sound spectrum dB(A), indoor

VIR Models	25	40	45	60	75	90
125 Hz	63,7	68,6	73,9	75,5	67	68,6
250 Hz	63,7	70,1	73,5	75,1	70	71,6

VIR Models	25	40	45	60	75	90
500 Hz	69,8	73,8	74,5	76,1	73,8	75,4
1,000 Hz	70,6	74,8	77,2	78,8	74	75,6
2,000 Hz	68,7	75,1	77,1	78,7	74,6	76,2
4,000 Hz	64,9	70,5	72,5	74,1	73,7	75,3
8,000 Hz	55,8	62,3	65	66,6	67,5	69,1
Sound power level L _w dB A	75,4	81,3	82,7	84,3	81,5	83,1



NOTE

Where the sound pressure value of 63 Hz is required, between 0 and 10 dB will be added to the sound pressure value at 125 Hz

2

Unit installation data

2.1 List of tests for unit start-up

Please complete the following data to register the full details of the installation and the start-up inspection. Complete the blank fields or mark the appropriate box, as applicable.

2.1 List of tests for unit start-up

Please complete the following forms to register the full details of the installation and the start-up inspection.

Complete the blank fields or mark the appropriate box, as applicable.

Company performing installation

Company performing installation	
Installing technician	
Name project number	
Location of the unit	
Address of the unit location	
Person in charge of the building or property where the unit is installed	
Installation work start date	
Unit model number	
Unit serial number	
Plate and version	
Thermostat, model and version	

General inspection of the unit

	Visual appearance
	Levelling of the unit
	Check the unit for transport, loading and unloading damage
	Unit installed with sufficient clearance
	Check the circuit for the presence of oil (significant refrigerant leaks).
	Terminals and connections correctly secured in the control panel and accessories
	Air filters installed
	Condensate drain pipe and drain trap installed correctly
	Thermostat and connection cabling installed correctly
	Air duct installation complete and correct
	Accessories and planned options installed (if applicable)

Inspection of the air supply fan

	Drive belt and pulleys aligned and correctly fastened
	Drive belt tension correctly adjusted
	Verification of direction of rotation

Inspection of compressors

	Verification that direction of rotation is correct
--	--

2.2 Start-up Data

Electrical data

	Rating plate	Actual
Power supply	Check specifications in the Installation Manual	
Control voltage		
Fan consumption (A)		
Consumption of condenser fan 1 (A)		
Consumption of condenser fan 2 (A)		
Consumption of compressor 1 (A)		
Consumption of compressor 2 (A)		
Consumption of supply fan (A)		
Electric heater 1 (Optional)		
Electric heater 2 (Optional)		

Cool and heat modes

Refrigerant circuit. Compressor 1		
Mode	Value	
Subcooling (min. 8 K, max. 18 K)	C	Liquid pressure ____ bar
		Liquid temperature ____ C
Subcooling (min. 4 K, max. 10 K)	C	Suction pressure ____ bar
		Suction temperature ____ C
	Complete liquid line checked in sight glass	
	Correct oil level checked in sight glass	

Refrigerant circuit. Compressor 2		
Mode	Value	
Subcooling (min. 8 K, max. 18 K)	C	Liquid pressure ____ bar
		Liquid temperature ____ C
Subcooling (min. 4 K, max. 10 K)	C	Suction pressure ____ bar
		Suction temperature ____ C
	Complete liquid line checked in sight glass	
	Correct oil level checked in sight glass	

Air flow values

	m ³ h
Design	
Measured	

2.2 Start-up Data

Air temperature

Mode (cool or heat)	Temperature (C)
Outdoor air	
Supply air	
Return air	
Indoor air mix (if economiser is fitted)	

Options

Heating mode (hot water coil)	
Air temperature	
Capacity _____ (kW)	Temperature (C)
Supply air (at 100 %)	
Return air	

Hydraulic circuit		
	Temperature (C)	Pressure (bar)
Water inlet		
Water outlet		

Others

Outdoor fan 1	Type or model	
		Surge protection adjusted

Outdoor fan 2	Type or model	
		Surge protection adjusted

Indoor fan	Type or model	
		Surge protection adjusted

Belts	Type or model	
Economiser		Minimum outdoor air setting

3

Wiring diagrams

3.1 Micro switch configuration

The micro switches are used to establish the following configurations:



ATTENTION

In order to update the new configuration of the micro switches the power supply has to be shut off

MICRO SWITCH CONFIGURATION

Number	Status	Description
1 / 2	OFF/OFF	Defrosting time 0'
	ON/OFF	Defrosting time 30'
	OFF/ON	Defrosting time 60'
	ON/ON	Defrosting time 90'
3	ON	Crossed coils
	OFF	Independent coils
4	ON	Selection of 2 compressors (tandem) - 1 circuit
	OFF	Selection of 1 compressor - 1 circuit
5	ON	Cold selection
	OFF	Heat pump selection
6	ON	4-way valve active in heat
	OFF	4-way valve active in cold
7	ON	Receives signal B from thermostat (active in heat)
	OFF	Receives signal O from thermostat (active in cold)
8	ON	Fan enabled during defrost
	OFF	Fan disabled during defrost

3.2 Fault table

The red LED on the YKNOpen electronic board is responsible for showing the state of faults on the unit:

- When the red LED remains off there are no faults in the unit.
- If the red LED does two series of flashes in a constant sequence, there is a fault which must be checked in the following table:

FAULT TABLE (RED LED)

Red LED flashes		Description
1st Series	2nd Series	
1, 2 or 3	1	Discharge temperature exceeded
	2	High-pressure switch, outdoor fan thermal switch or compressor module thermal switch
	3	Low-pressure switch
	4	Indoor fan thermal switch
	5	Repeated cold start-up or suction temperature < -25°C
4	1	Gas control 1 or resistor 1 fault
	2	Gas control 2 or resistor 2 fault
	3	Resistor stage 3 fault
	4	Resistor stage 4 fault
	5	Fault in economiser or hot water coil (outdoor supply sensor, water return)
	6	Smoke or high temperature detection (accessory) or supply temperature > 80 C

3.3 Incidents

The green LED on the YKNOpen electronic board is responsible for showing the state of incidents on the unit:

- If the green LED flashes in a constant sequence, there are no incidents in the unit.
- If the green LED does three series of flashes in a constant sequence, there is an incident which must be checked in the following table:



NOTE

The first series indicates the affected circuit: one flash for the first compressor, two for the second, three for the third and four for miscellaneous incidents. A short pause follows. The second and third series specify the direct cause of the incident.

INCIDENT TABLE (GREEN LED)

Green Led flashes			Description	
1st Series	2nd Series	3rd Series	Type	Incident
1, 2 or 3	1	1	Sensors	Discharge sensor open or short circuited
		2		Liquid sensor open or short circuited
		3		Intake sensor open or short circuited
	2	1	Temperature	Repeated defrosting
		2		The discharge temperature is not recovered
	4	1	1	Sensors
2			Return sensor open or short circuited	
3			Outdoor sensor open or short circuited	
4			Water sensor open or short circuited	
5			Fault in the enthalpy sensors	
2		1	Thermostat	Signal Y1 or Y2 without signal G
		2		Signal W without signal B
		3		Signal W without signal G
		4		Signal Y2 without signal Y1
3		1	Auxiliary heat	Heating element thermal switch 1
		2		Heating element thermal switch 2
		3		Heating element thermal switch 3
		4		Heating element thermal switch 4
4		1	Temperature	The water coil temperature is not recovered
		2		Outdoor temperature too low
		3		Water coil performing antifrost operation
		4		Supply temperature above 55 °C
		5		Supply temperature < 25 °C with gas
5		1	Others	Transceiver ID unknown
		2		There is at least one accessory not found
		3		Air quality demand
		4		Dirty filters
		5		Presence sensor in unoccupied
		6		Intake temperature < 0 °C, economiser

3.3.1 Test button

- If the test button is pressed until the green led is activated, certain times are shortened.
- If the test button is pressed until the orange led is activated, any fault that has been detected is reset.
- If the test button is pressed until the red led is activated, the optional accessories and sensors connected to the board are identified.

3.4 DPC-1 thermostat

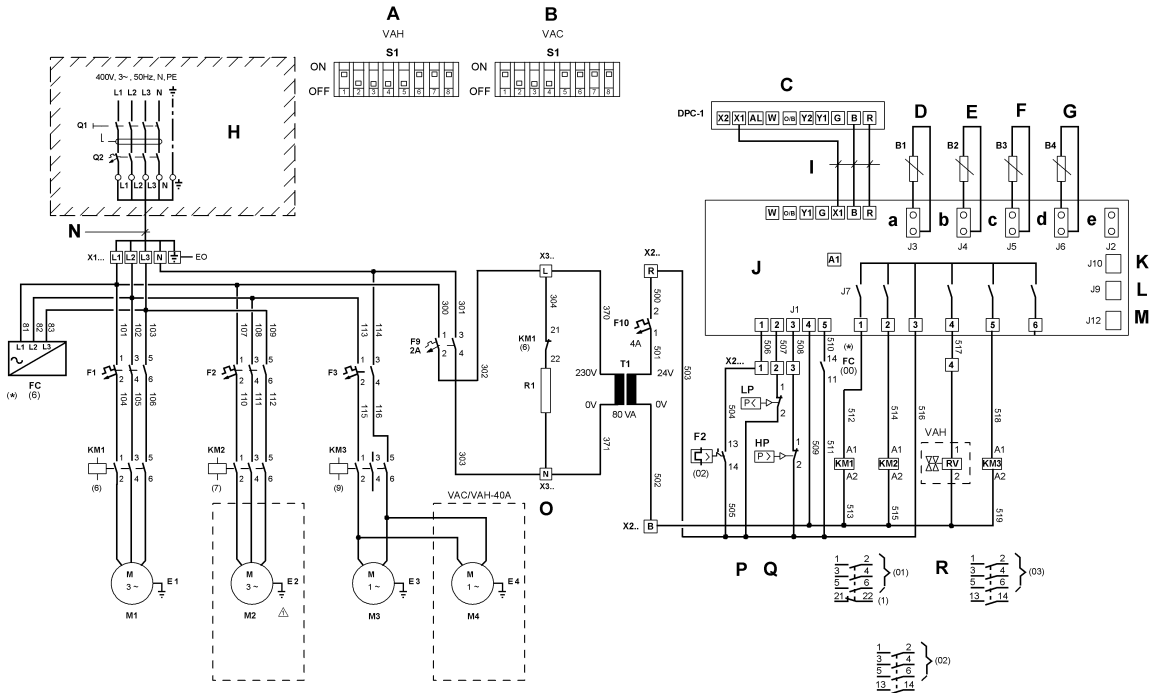
When a fault occurs and there is communication between the unit and the thermostat, the thermostat alternately displays the time and the fault produced according to the unit fault table.

It also displays other faults related to the thermostat.

MICRO SWITCH CONFIGURATION

Type	Thermostat numbers		Description
Thermostat	9	1	Ambient sensor open or short circuited
	9	2	Internal sensor not calibrated
	9	3	Communication error
	9	4	Fault with AL terminal connected
	9	5	S5 digital sensor not detected
	9	6	S6 digital sensor not detected
	9	7	S7 digital sensor not detected
	9	8	S8 digital sensor not detected
	9	9	Digital outdoor sensor not detected

3.5 Unit wiring diagrams



I-2627-1
 VAC/VAH-20, 25, 30, 40A
 400.3.50

Model	Q2 [A]	Cross-section B [mm ²]	F1 [A]	F2 [A] REG.	F3 [A]
20A	20	5 x 4	16	2,5	3
25A	25	5 x 4	16	2,5	3
30A	32	5 x 6	25	3,8	3
35A	40	5 x 10	32	3,8	6

A	S1 configuration on A1 board (VAH models)	O	Crankcase heater
B	S1 configuration on A1 board (VAC models)	P	Indoor fan motor trip switch
C	Thermostat	Q	High and low pressure switch
D	Intake fan [B1]	R	4-way valve 1
E	Liquid sensor [B2]	a	Black connector
F	Discharge sensor [B3]	b	Green connector
G	Outdoor sensor [B4]	c	White connector
H	On-site installation. These components are not supplied by the manufacturer	d	Yellow connector
I	Shielded cable, 10 x 0.22 mm ²	e	Red connector
J	Electronic board [A1]	M1	Compressor
K	Accessories connection	M2	Indoor fan
L	YKTOOL connection	M3	Outdoor fan
M	RS-485 connection	M4	Outdoor fan (VAC/VAH 40A models)
N	Cross-section B mm ² Cu		

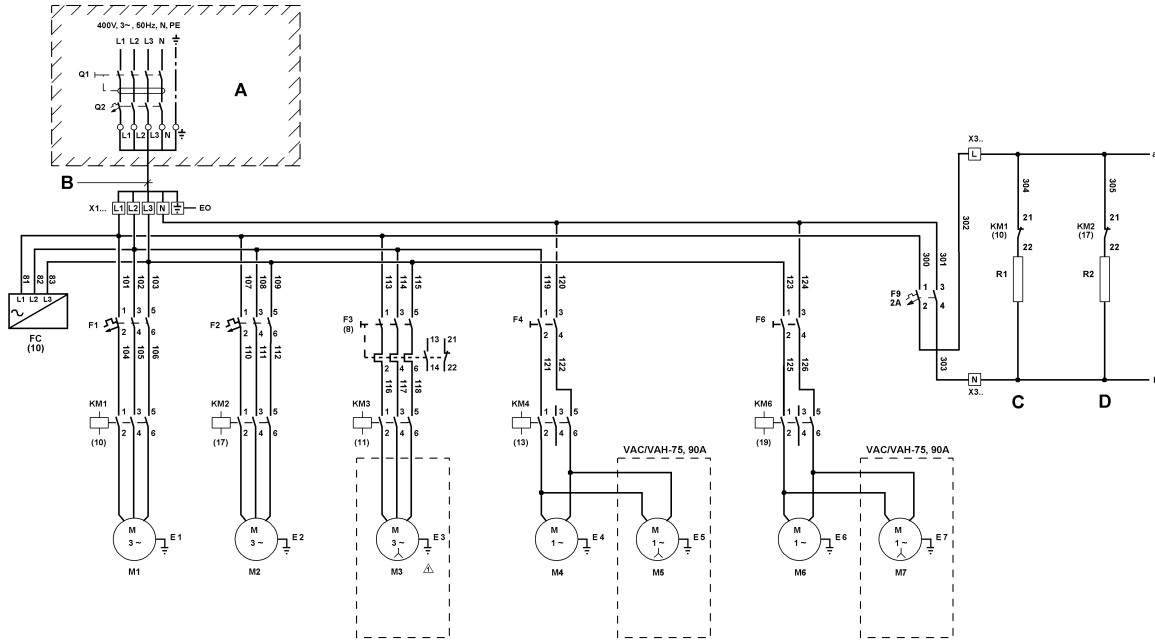
(*) If the unit has power and the green LED V2 on board A1 is off, check that the sequence of phases L1, L2, L3 is correct



NOTE

Indoor fan M2 is connected on site. See electrical specifications table.

3 Wiring diagrams
 3.5 Unit wiring diagrams



I-2628-1a
 VAC/VAH-45, 60, 75, 90A
 400.3.50

Model	Q2 [A]	Cross-section B [mm ²]	F1 [A]	F2 [A]	F3 [A] REG.	F4 [A]	F5 [A]
45A	50	5 x 10	16	16	3,8	3	3
60A	63	5 x 16	25	25	5,1	3	3
75A	80	5 x 25	32	32	6	6	6
90A	100	5 x 35	32	32	8,7	6	6

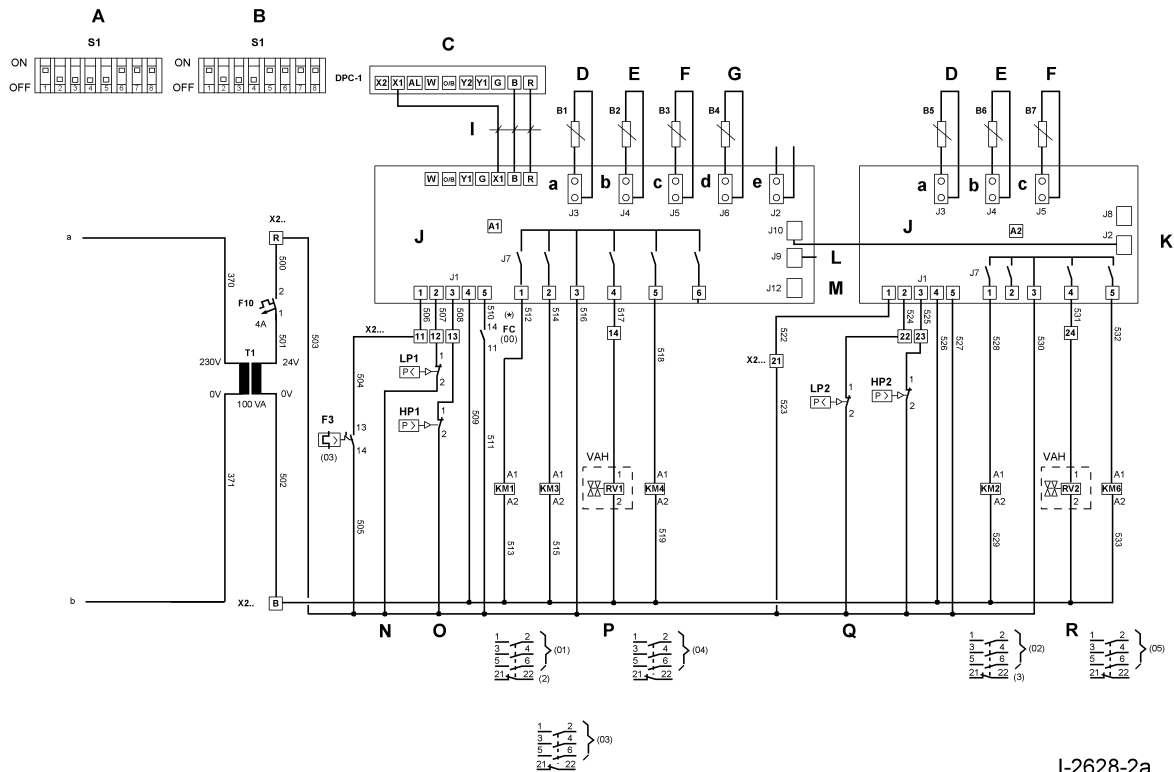
A	On-site installation. These components are not supplied by the manufacturer	M3	Indoor fan
B	Cross-section B mm ² Cu	M4	Outdoor fan 1
C	Crankcase heater 1	M5	Outdoor fan 2 (VAC/VAH 75,90A)
D	Crankcase heater 2	M6	Outdoor fan 3
M1	Compressor 1	M7	Outdoor fan 4 (VAC/VAH 75,90A)
M2	Compressor 2		

(*) If the unit has power and the green LED V2 on board A1 is off, check that the sequence of phases L1, L2, L3 is correct



NOTE

Indoor fan M3 is connected on site. See electrical specifications table.



I-2628-2a
VAC/VAH-45, 60, 75, 90A
400.3.50

A	S1 configuration on A1 board (VAH models)	M	RS-485 connection
B	S1 configuration on A1 board (VAC models)	N	Indoor fan motor trip switch
C	Thermostat	O	High and low pressure switch 1
D	Intake fan [B1]	P	4-way valve 1
E	Liquid sensor [B2]	Q	High and low pressure switch 2
F	Discharge sensor [B3]	R	4-way valve 2
G	Outdoor sensor [B4]	a	Black connector
H	On-site installation. These components are not supplied by the manufacturer	b	Green connector
I	Shielded cable, 10 x 0.22 mm ²	c	White connector
J	Electronic board [A1 and A2]	d	Yellow connector
K	Accessories connection	e	Red connector
L	YKTOOL connection		