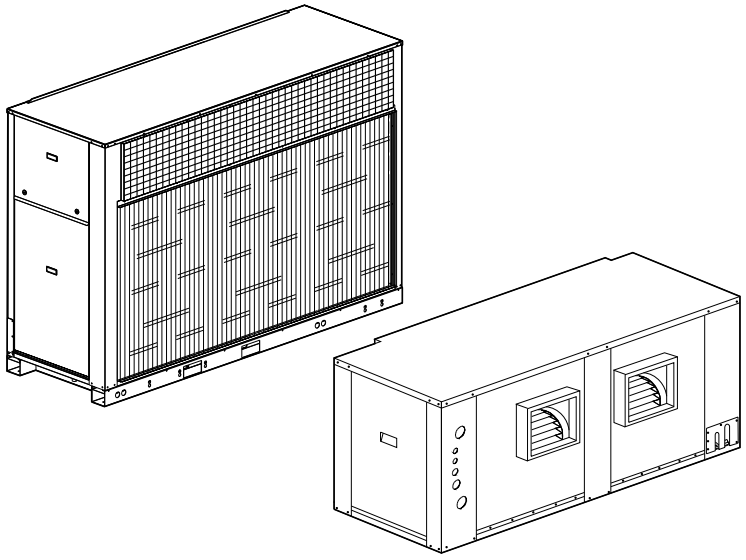
YORK
BY JOHNSON CONTROLS

LARGE SPLIT AIR - AIR VITALITY SERIES Air Conditioners
VCH 20A to 90A / VIR 25A to 90A



Installation manual

Ref.: N-27696_EN 0714

CE

Johnson Controls

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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 no 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 protections and/or 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 Inspection

Upon reception, inspect the goods and notify the carrier and the insurance company, in writing, of any possible damage during transportation.

1.3.2 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.

1.3.3 Disposal of the unit

When removing the unit, the components must be ecologically recovered. The cooling circuit is full of coolant that must be extracted and delivered to the gas manufacturer for recycling.

ATTENTION

The refrigerant gas contains greenhouse-effect fluorinated gas covered by the Kyoto protocol.

Please see the specifications plate for type of gas and quantity per system.

GWP (Global Warming Potential): 2088

There will be oil left in the hermetic compressor, therefore it must be delivered with the circuit sealed.

The air conditioner shall be deposited in the area established by local authorities, to facilitate its selective recovery.

1.3.4 Handling

The unit must be moved using the metal rails provided for its installation and transport.

1.4 Technical data

1.4.1 Test conditions and correction factors

Test conditions

Voltage	Length of connection pipes [m]	Summer				Winter			
		Out. temp. °C		Ind. temp. °C		Out. temp. °C		Ind. 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

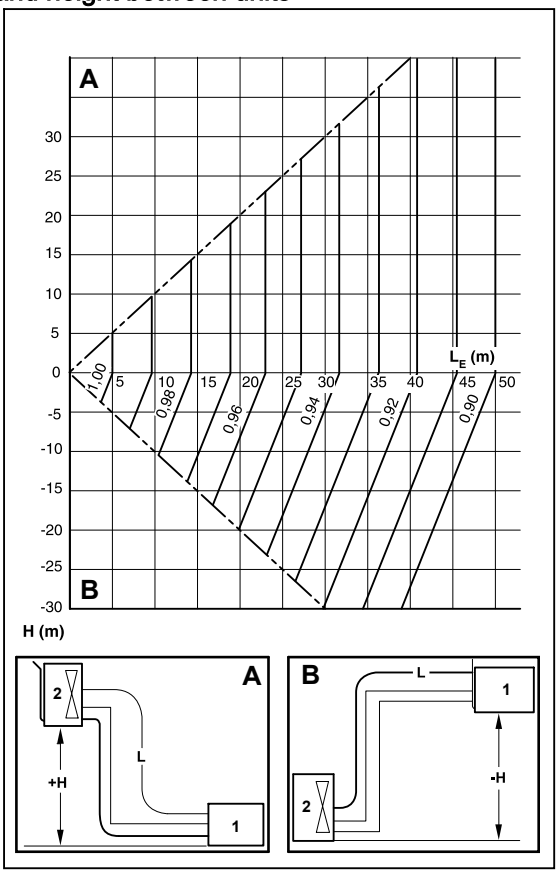
L_E Equivalent length of pipes between the indoor unit and the outdoor unit (consider a single line)

A Outdoor unit above indoor unit

B Indoor unit above outdoor unit

1 Indoor unit

2 Outdoor unit



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

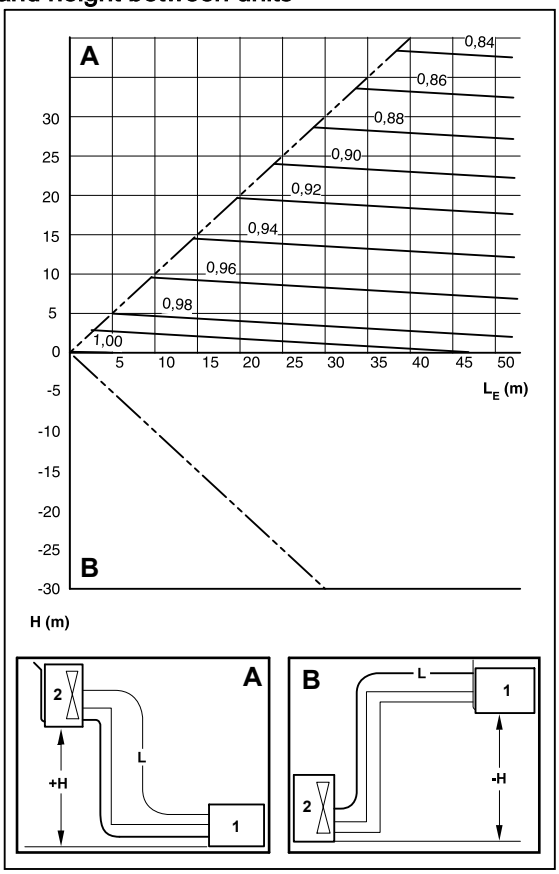
L_E Equivalent length of pipes between the indoor unit and the outdoor unit (consider a single line)

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	360/440							
VCH/ VIR	Summer cycle	Temperature of air input in indoor coil	WB °C Min./Max.	15/23	15/23	15/23	14/23	14/23	14/23	14/23	14/23
			DB °C Min./Max.	20/32	20/32	20/32	20/32	20/32	20/32	20/32	20/32
		Outdoor temperature (1), (2)	DB °C Min./Max.	10/50	10/50	10/48	10/50	10/50	10/50	10/50	10/50
	Winter cycle	Temperature of air input in indoor coil (3)	DB °C Min./Max.	10/27	10/27	10/27	10/27	10/27	10/27	10/27	10/27
		Outdoor temperature (4)	DB °C Min./Max.	-20/20	-20/20	-20/20	-20/20	-20/20	-20/20	-20/20	-20/20

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 Units (VCH 20A to 40A)

Models		VCH	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	kW	1,5	1,5	3	3
	Electric power supply	V / ph / Hz	400 / 3 / 50			
	Degree of protection	IP	55			
	Motor speed	rpm	1400			
	Impeller diameter (x2)	mm	270	270	320	320
	Impeller width (x2)	mm	270	270	320	320
Motor pulley	Original type / diameter		SPZ /100		SPZ /90	
	No. of channels / shaft diameter (no. of pulleys)		2 / 24		2 / 28	
Fan pulley	Original type / diameter		SPZ /150		SPZ /140	
	No. of channels / shaft diameter (no. of pulleys)		2 / 20		2 / 25	
Belts	Type		SPZ			
	Dimensions		1010 (x2)		1075 (x2)	
Outdoor coil	Number of elements	No.	1	1	1	1
	Pipes (depth x height)		5 x 37	5 x 37	5 x 40	5 x 40
	Pipe diameters	inches	3/8 "			
	Area	m^2	1,01	1,01	1,47	1,47
Dimensions with packaging	Height	mm	1413	1413	1546	1546
	Width	mm	1460	1460	1838	1838
	Length	mm	890	890	880	880
Approximate weight	Net	kg	285	310	355	375
	Gross	kg	290	314	360	614

Outdoor Units (VCH 45A to 90A)

Models		VCH	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
	Degree of protection	IP	21			
	Electric power supply		400 / 3 / 50			
Outdoor fan	Standard rating	kW	2 x 2,2	2 x 2,2	2 x 4	2 x 4
	Electric power supply	V / ph / Hz	400 / 3/ 50			
	Degree of protection	IP	55			
	Motor speed	rpm	1400			
	Impeller diameter (x2)	mm	380	380	380	380
	Impeller width (x2)	mm	380	380	380	380
Motor pulley	Original type / diameter		SPZ /100		SPZ /90	
	No. of channels / shaft diameter (no. of pulleys)		2 / 24 (x2)		2 / 28 (x2)	
Fan pulley	Original type / diameter		SPZ /200	SPZ /170	SPZ /140	
	No. of channels / shaft diameter (no. of pulleys)		2 / 25 (x2)		2 / 25 (x2)	
Belts	Type		SPZ			
	Dimensions		1262 (x2)	1200 (x2)	1137 (x2)	
Outdoor coil	Number of elements	No.	2	2	2	2
	Pipes (depth x height)		5 x 42	5 x 42	5 x 48	5 x 48
	Pipe diameters	inches	3/8 "			
	Area	m^2	2 x 1,02	2 x 1,02	2 x 1,44	2 x 1,44
Dimensions with packaging	Height	mm	1660	1660	1814	1814
	Width	mm	2340	2340	2760	2760
	Length	mm	880	880	1000	1000
Approximate weight	Net	kg	578	589	710	715
	Gross	kg	582	593	715	720

Indoor Units

Models		VIR	25A	40A	45A	60A	75A	90A
Indoor fan	Rated power	kW	0,75	1,5	1,5	2,2	3	4
	Electric power supply	V / ph / Hz	400 / 3 / 50					
	Protection rating	IP	55					
	Motor speed	rpm	1400					
	Turbine diameters	mm	320	320 x 2	320 x 2	320 x 2	380 x 2	380 x 2
	Turbine width	mm	320	240 x 2	320 x 2	320 x 2	380 x 2	380 x 2
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		365 x 543 x 24	447 x 616 x 24	640 x 715 x 24		547 x 789 x 24	
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	1120	1120
Weight	Net	kg	128	173	223	223	310	312
	Gross	kg	152	198	250	250	340	342

1.4.4 Electrical specifications

Outdoor Units

Model	Compressor		
	Power supply [V / ph (Hz)]	Rated current [A]	Start-up current [A]
VCH 20A	400/3 (50)	8,5	74
VCH 25A	400/3 (50)	11,8	95
VCH 30A	400/3 (50)	15	118
VCH 40A	400/3 (50)	19,3	140
VCH 45A	400/3 (50)	2 x 12	95
VCH 60A	400/3 (50)	2 x 15	118
VCH 75A	400/3 (50)	2 x 19	140
VCH 90A	400/3 (50)	2 x 25	198

Model	Outdoor-indoor fan	Outdoor fan motor		Indoor fan motor	
	Power supply (3) [V / ph (Hz)]	kW	Rated current [A]	kW	Rated current [A]
VCH 20A	400/3 (50)	1,5	2,5	0,75	1,8
VCH 25A	400/3 (50)	1,5	2,5	0,75	1,8
VCH 30A	400/3 (50)	3	4,9	1,5	2,7
VCH 40A	400/3 (50)	3	4,9	1,5	2,7
VCH 45A	400/3 (50)	2 x 2,2	2 x 3.4	1,5	3,1
VCH 60A	400/3 (50)	2 x 2,2	2 x 4.4	2,2	4,6
VCH 75A	400/3 (50)	2 x 4	2 x 7.9	3	4,7
VCH 90A	400/3 (50)	2 x 4	2 x 7.9	4	7

Model	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) [mm²]
VCH 20A	6,7	13	9	17	20	4
VCH 25A	8,3	16	11	20	25	4
VCH 30A	12	22	17	29	32	6
VCH 40A	14	27	19	33	40	10
VCH 45A	17	33	24	44	50	10
VCH 60A	23	43	31	55	63	16
VCH 75A	32	59	39	76	80	25
VCH 90A	39	72	49	86	100	35

(1) K Curve (DIN, VDE 0660-104).

(2) Based on copper conductors.

(3) Main power supply: 400/3 + 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 Units

Model	Power supply [V / ph (Hz)]	Rated power [kW]	Rated current [A]	Start-up current [A]	Power cable cross-section [mm²]
VIR 25A	400/3 (50)	0,75	1,8	8	4 x 1.5
VIR 40A	400/3 (50)	1,5	2,7	17	4 x 1.5
VIR 45A	400/3 (50)	1,5	3,1	17	4 x 1.5
VIR 60A	400/3 (50)	2,2	4,6	22	4 x 1.5
VIR 75A	400/3 (50)	3	4,7	36	4 x 1.5
VIR 90A	400/3 (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

Outdoor unit		Indoor unit		Summer		
Model	Air flow [m³/h]	Model	Air flow [m³/h]	Cooling power [W]	Consumption [W]	E.E.R
VCH 20A	6235	VIR 25A	4590	16800	5900	2,85
VCH 25A	6235	VIR 25A	4590	20600	7480	2,75
VCH 30A	11975	VIR 40A	7500	28700	10250	2,80
VCH 40A	11975	VIR 40A	7500	32400	12810	2,53
VCH 45A	17250	VIR 45A	9000	43500	14810	2,94
VCH 60A	20340	VIR 60A	10500	54100	20860	2,60
VCH75A	25200	VIR 75A	13700	76100	29210	2,61
VCH 90A	25200	VIR 90A	16000	87300	34920	2,50

Outdoor unit		Indoor unit		Winter		
Model	Air flow [m^3/h]	Model	Air flow [m^3/h]	Heating power [W]	Consumption [W]	C.O.P.
VCH 20A	6235	VIR 25A	4590	21500	5680	3,79
VCH 25A	6235	VIR 25A	4590	23200	6840	3,39
VCH 30A	11975	VIR 40A	7500	32300	9950	3,25
VCH 40A	11975	VIR 40A	7500	39300	12870	3,05
VCH 45A	17250	VIR 45A	9000	47400	13750	3,45
VCH 60A	20340	VIR 60A	10500	53000	20000	2,80
VCH75A	25200	VIR 75A	13700	77700	27560	2,82
VCH 90A	25200	VIR 90A	16000	89900	33190	2,71

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

NOTE

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

VIR Models		25A	40A	45A/60A	75A/90A
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 VCH outdoor units	Model							
	20A	25A	30A	40A	45A	60A	75A	90A
Vertical transformation kit	A	A	A	A	O/A	O/A	O/A	O/A
LAK condensation control - 1(1)	O	O	O	O				
LAK condensation control - 2(1)					O	O	O	O
Tray resistor - 1	O/A	O/A	O/A	O/A				
Tray resistor - 2					O/A	O/A	O/A	O/A
Soft compressor starter			O	O	O	O	O	O

(A): accessory. Supplied separately.

(O): optional. Factory-fitted.

(1) No protection against outdoor indications.

Weights of the options and accessories for outdoor units

Models		VCH			
		20A/25A	30A/40A	45A/60A	75A/90A
Condensation control	kg	16	18	22	28
Extra weight for Cu / Cu coil	kg	31	47	75	109

1.4.7 VIR units with auxiliary resistor

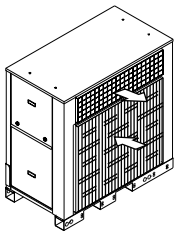
Model	Electric power supply	Power	Consumption	Stages	Circuit breaker Q1 (1)	Minimum cable cross-section (2)	Front surface	Pressure drop (3)
VIR	V / Ph / Hz	kW	A		A	mm^2	m^2	Pa
25A	400 / 3 / 50	10	15	1	20	2,5	0,53	2,9
25A	400 / 3 / 50	15	22	1	25	4	0,53	2,9
40A	400 / 3 / 50	10	15	1	20	2,5	0,74	4,9
40A	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).

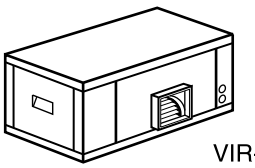
(2) Based on copper conductors.

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

1.5 Indoor and outdoor unit combinations



VCH-20A y 25A
400.3.50



VIR-25A
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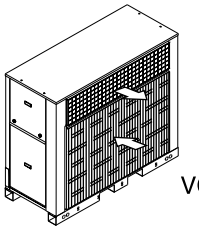
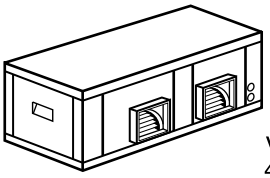
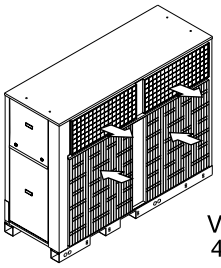


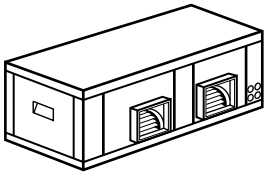
VCH-30A y 40A
400.3.50



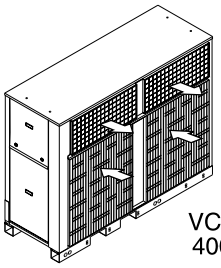
VIR-40A
400.3.50



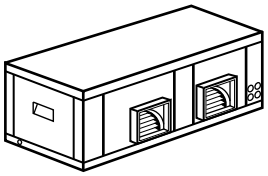
VCH-45A
400.3.50



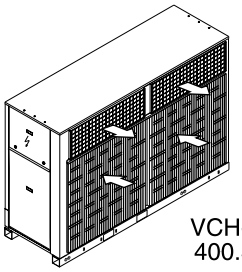
VIR-45A
400.3.50



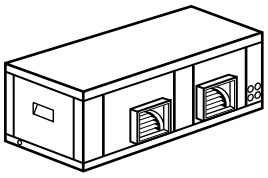
VCH-60A
400.3.50



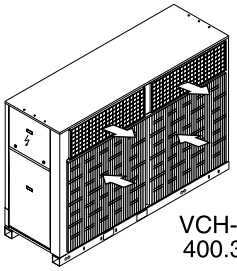
VIR-60A
400.3.50



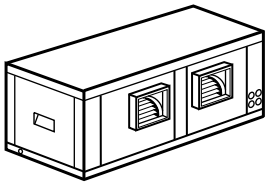
VCH-75A
400.3.50



VIR-75A
400.3.50



VCH-90A
400.3.50



VIR-90A
400.3.50

1.6 Measurements, clearances and accesses

1.6.1 Clearances

When installing each unit, clearances should be left for:

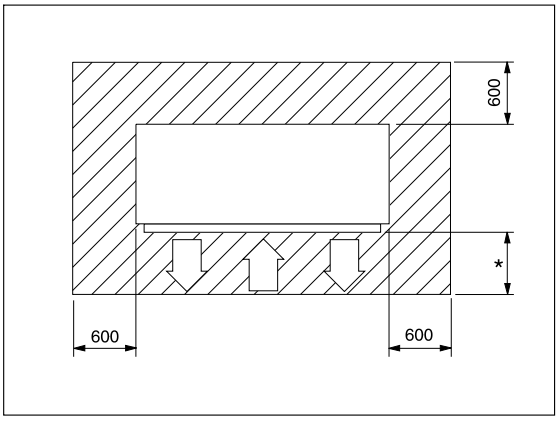
1. Intake and discharge of air from the outdoor unit.
2. Connection of drain and electricity pipes.
3. Air ducts.
4. Maintenance servicing.
5. Power supply connections.

To operate correctly, all minimum clearances shown on the general dimension diagrams should be respected, with regard to the possible obstruction of air circulation or of the work of an operator.

Minimum technical clearance VCH

* Return air without ducts (minimum clearance 600 mm)

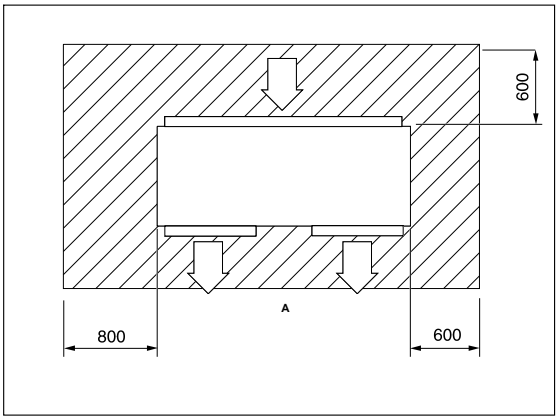
Return air with ducts (no clearance required)



NOTE
Distances in millimetres

Minimum technical clearance VIR

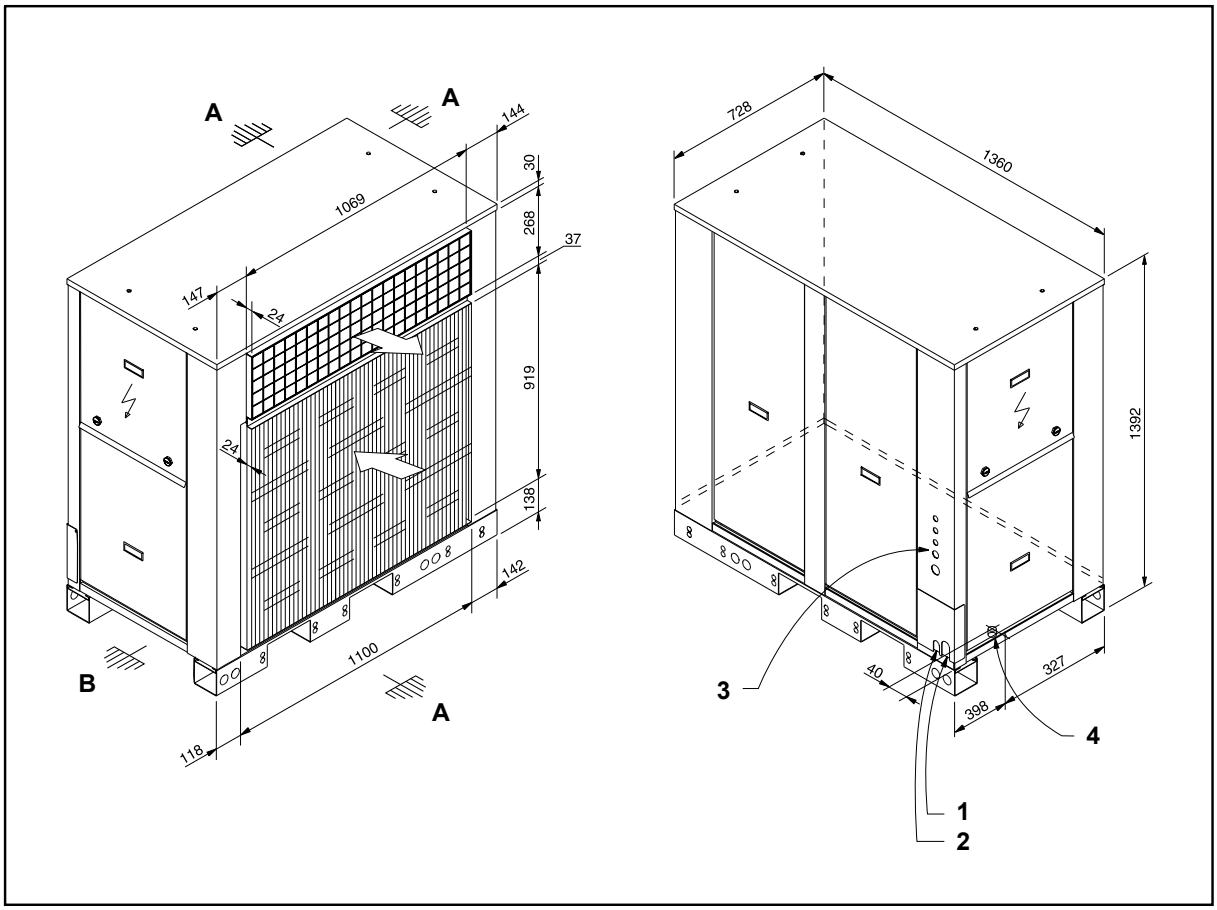
A Return air



NOTE
Distances in millimetres

1.6.2 General dimensions

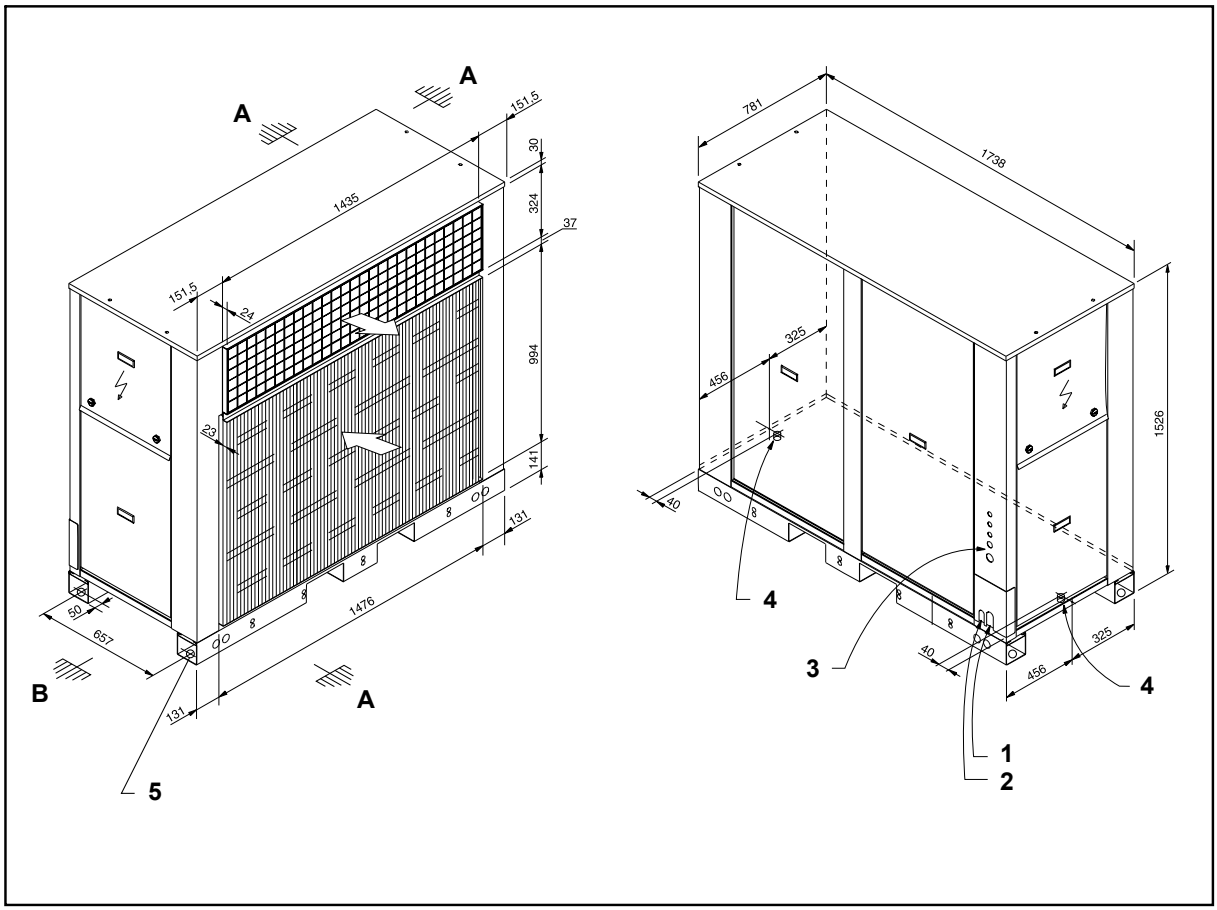
General dimensions, VCH 20A and 25A



A. Minimum clearance 600 mm
B. Minimum clearance 800 mm
1. Gas piping diameter 1 ⅛"
2. Liquid piping diameter 1/2"
3. Electrical connections
4. Drain pipe (outer diameter 28.5 mm)

NOTE
Measurements in mm

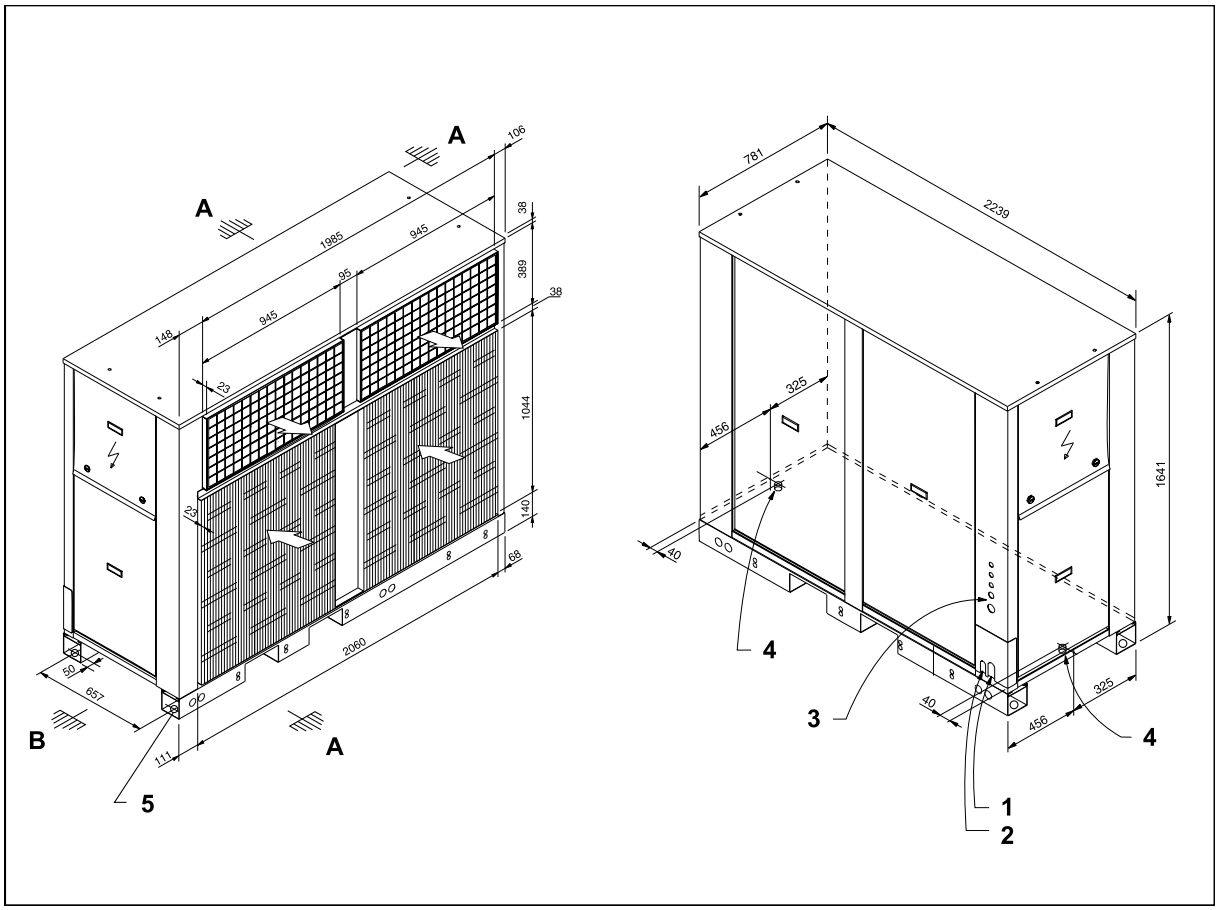
General dimensions, VCH 30A and 40A



A. Minimum clearance 600 mm
B. Minimum clearance 800 mm
1. Gas piping diameter 1 ⅛"
2. Liquid piping diameter 5/8"
3. Electrical connections
4. Drain pipe (outer diameter 28.5 mm)
5. Anti-vibratory fixture (diameter 14 mm) (x4) 2 on each side of the unit

NOTE
Measurements in mm

General dimensions, VCH 45A and 60A

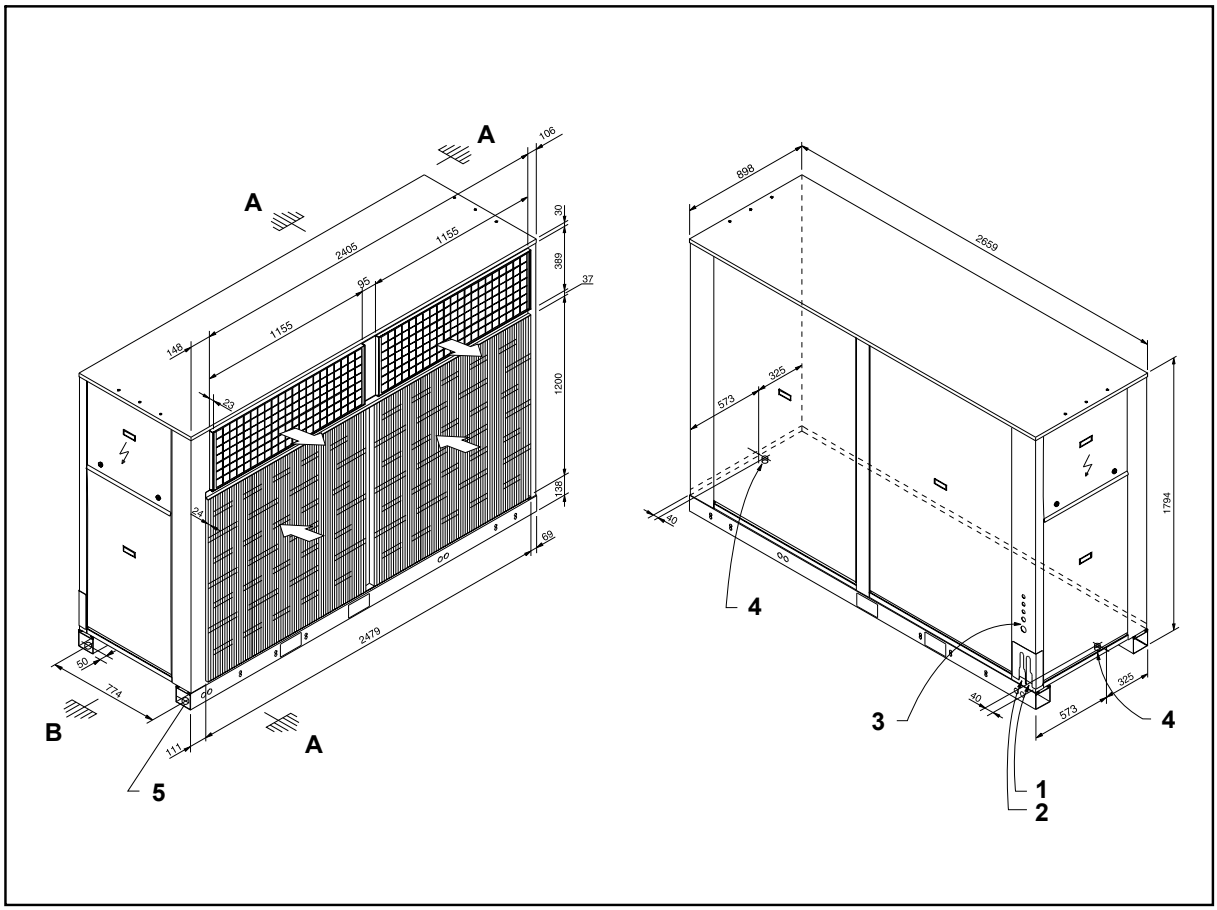


A.	Minimum clearance 600 mm
B.	Minimum clearance 800 mm
1.	Gas piping diameter 1 ⅛" (x2)
2.	Liquid piping diameter 5/8" (60A) (x2) 1/2" (45A) (x2)
3.	Electrical connections
4.	Drain pipe (outer diameter 28.5 mm)
5.	Anti-vibratory fixture (diameter 14 mm) (x4) 2 on each side of the unit

NOTE

Measurements in mm

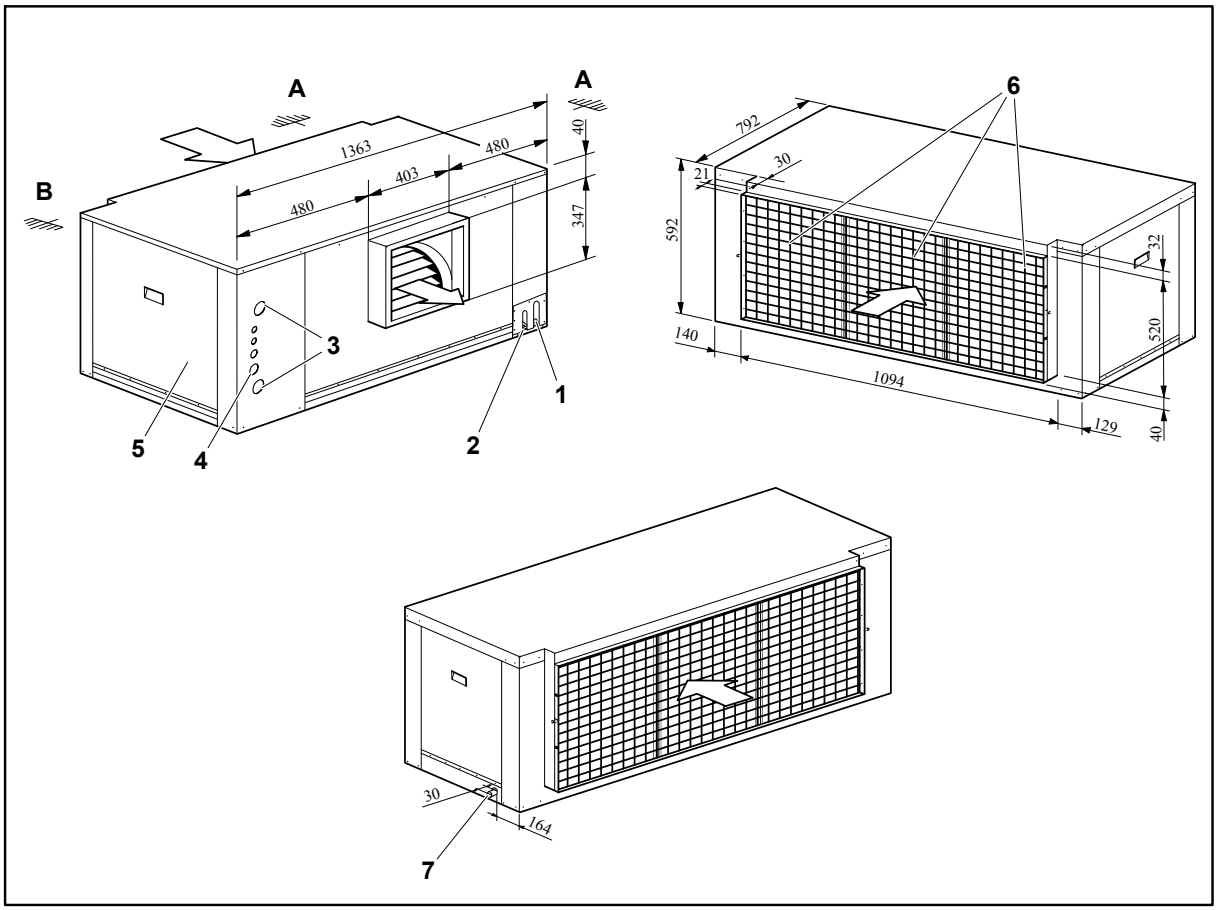
General dimensions, VCH 75A and 90A



A. Minimum clearance 600 mm
B. Minimum clearance 800 mm
1. Gas piping diameter 1 ⅜" (x2)
2. Liquid piping diameter 7/8" (x2)
3. Electrical connections
4. Drain pipe (outer diameter 28.5 mm)
5. Anti-vibratory fixture (diameter 14 mm) (x4) 2 on each side of the unit

NOTE
Measurements in mm

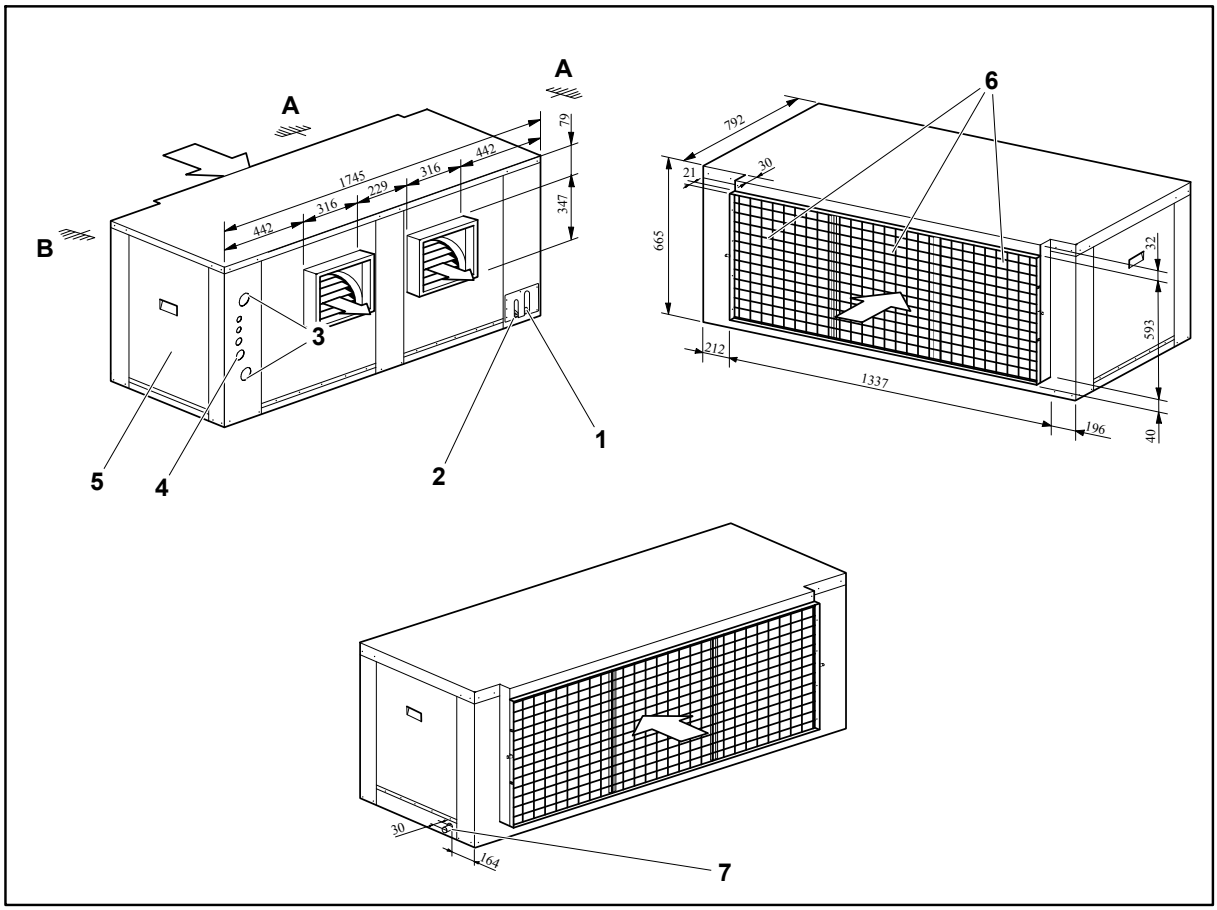
General dimensions, VIR 25A



A. Minimum clearance 600 mm
B. Minimum clearance 800 mm
1. Gas connection 1 ⅛"
2. Liquid connection 1/2"
3. Hot water coil accessory connections
4. Electrical connections
5. Motor access panel
6. Filters
7. Drain pipe (outer diameter 28.5 mm)

NOTE
Measurements in mm

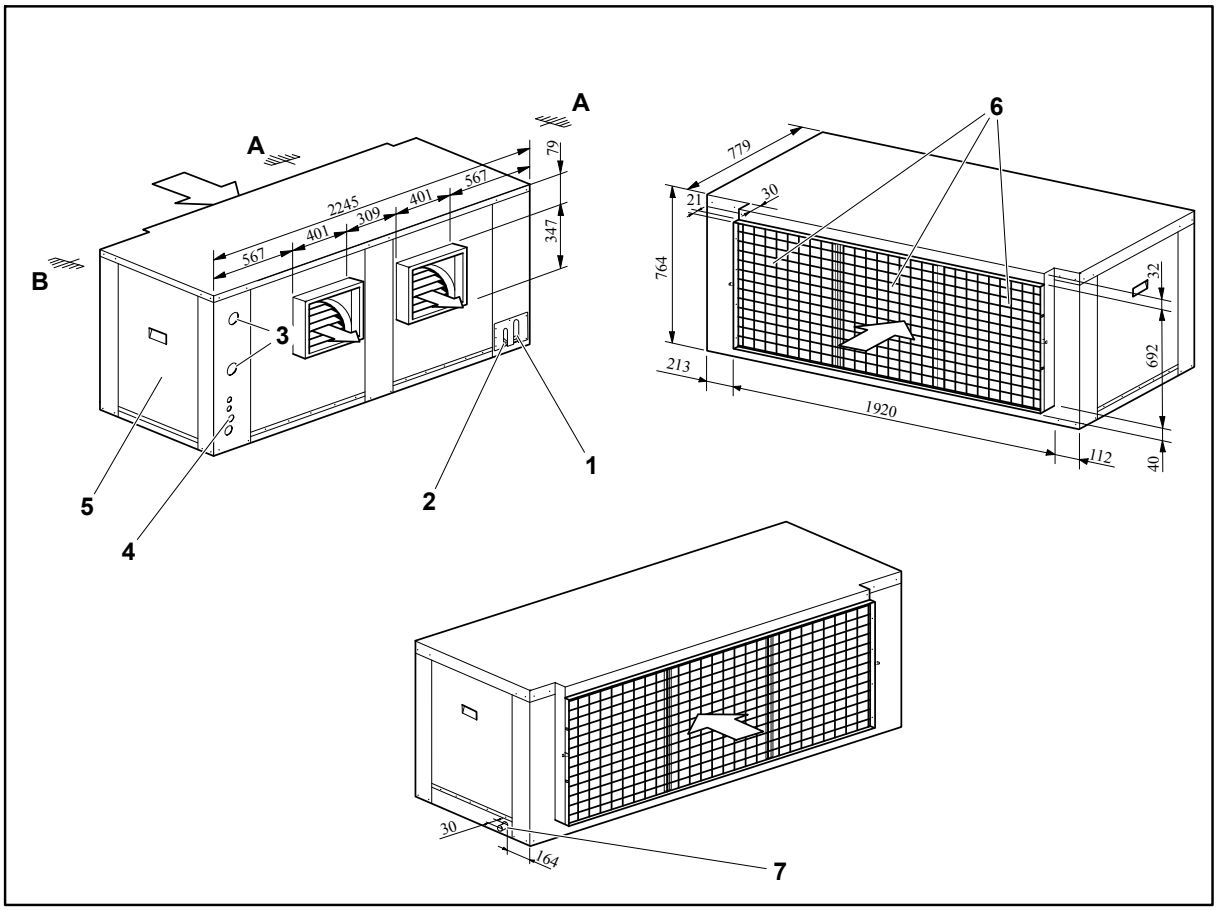
General dimensions, VIR 40A



A. Minimum clearance 600 mm
B. Minimum clearance 800 mm
1. Gas connection 1 ⅛"
2. Liquid connection 5/8"
3. Hot water coil accessory connections
4. Electrical connections
5. Motor access panel
6. Filters
7. Drain pipe (outer diameter 28.5 mm)

NOTE
Measurements in mm

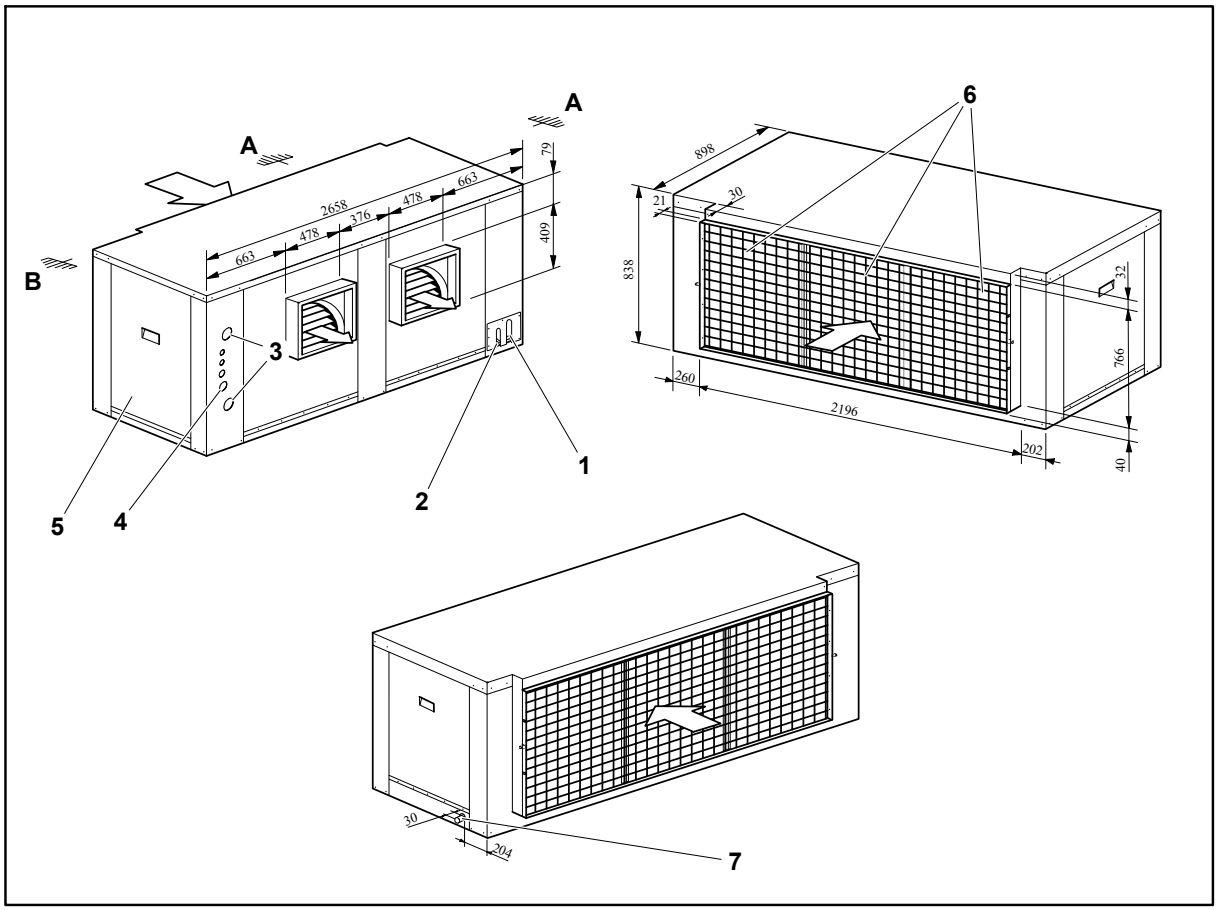
General dimensions, VIR 45A and VIR 60A



A. Minimum clearance 600 mm
B. Minimum clearance 800 mm
1. Gas connection 1 ⅛" (x2)
2. Liquid connection
   1/2" (45A) (x2)
   5/8" (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)

NOTE
Measurements in mm

General dimensions, VIR 75A and VIR 90A



A. Minimum clearance 600 mm
B. Minimum clearance 800 mm
1. Gas connection 1 ⅛" (x2)
2. Liquid connection 7/8" (x2)
3. Hot water coil accessory connections
4. Electrical connections
5. Motor access panel
6. Filters
7. Drain pipe (outer diameter 28.5 mm)

NOTE
Measurements in mm

1.7 Cooling capacities

1.7.1 Sensible cooling capacities

Model	Dry fresh air temp. °C (TS)	Wet supply air temp. °C (TH)	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
VCH 20A / VIR 25A	25	22	20160	5996	8828	13076	15912	4,08
		19,5	18144	9552	12384	16632	18144	4,28
		17	16800	13294	16126	16800	16800	4,47
	35	22	18648	5501	8333	12581	15413	4,62
		19,5	16800	9069	11901	16149	16800	4,86
		17	15456	12106	14938	15456	15456	5,10
	45	22	16800	4948	7780	12028	14860	5,35
		19,5	15120	8517	11349	15120	15120	5,59
		17	13776	12109	13776	13776	13776	5,83
VCH 25A / VIR 25A	25	22	24720	7532	10364	14612	17448	5,38
		19,5	22248	11061	13893	18141	20978	5,63
		17	20600	14829	17661	20600	20600	5,89
	35	22	22866	6900	9732	13980	16812	6,08
		19,5	20600	10449	13281	17529	20361	6,40
		17	18952	13352	16184	18952	18952	6,72
	45	22	20600	6198	9030	13278	16110	7,04
		19,5	18540	9750	12582	16830	18540	7,36
		17	16892	13331	16163	16892	16892	7,68
VCH 30A / VIR 40A	25	22	34440	10361	14738	21303	25686	6,64
		19,5	30996	15838	20215	26781	30996	6,95
		17	28700	21641	26018	28700	28700	7,27
	35	22	31857	9499	13876	20441	24818	7,51
		19,5	28700	15000	19377	25943	28700	7,90
		17	26404	18997	23374	26404	26404	8,30
	45	22	28700	8539	12916	19481	23858	8,69
		19,5	25830	14043	18420	24985	25830	9,09
		17	23534	19587	23534	23534	23534	9,48
VCH 40A / VIR 40A	25	22	38880	11872	16249	22815	27198	8,82
		19,5	34992	17323	21700	28265	32650	9,24
		17	32400	23149	27526	32400	32400	9,66
	35	22	35964	10875	15252	21817	26194	9,98
		19,5	32400	16356	20733	27298	31675	10,50
		17	29808	20142	24519	29808	29808	11,03
	45	22	32400	9767	14144	20709	25086	11,55
		19,5	29160	15254	19631	26196	29160	12,08
		17	26568	20786	25163	26568	26568	12,60
VCH 45A / VIR 45A	25	22	52080	15976	21638	30131	35801	10
		19,5	46872	23015	28677	37170	42841	10,47
		17	43400	30560	36222	43400	43400	10,95
	35	22	48174	14630	20292	28785	34447	11,31
		19,5	43400	21711	27373	35866	41527	11,90
		17	39928	27766	33428	39928	39928	12,50
	45	22	43400	13135	18797	27290	32951	13,09
		19,5	39060	20225	25887	34380	39060	13,69
		17	35588	27376	33038	35588	35588	14,28

Model	Dry fresh air temp. °C (TS)	Wet supply air temp. °C (TH)	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
VCH 60A / VIR 60A	25	22	64200	19879	26398	36176	42704	13,44
		19,5	57780	27952	34471	44249	50779	14,08
		17	53500	36659	43178	52956	53500	14,72
	35	22	59385	18194	24712	34490	41009	15,20
		19,5	53500	26322	32841	42619	49138	16
		17	49220	32905	39424	49202	49220	16,80
	45	22	53500	16324	22842	32620	39139	17,60
		19,5	48150	24467	30986	40764	47282	18,40
		17	43870	32686	39205	43870	43870	19,20
VCH 75A / VIR 75A	25	22	91320	28477	37304	50546	59387	17,89
		19,5	82188	39375	48203	61445	70288	18,74
		17	76100	51185	60013	73255	76100	19,60
	35	22	84471	26051	34879	48120	56948	20,24
		19,5	76100	37032	45860	59101	67929	21,30
		17	70012	46954	55782	69024	70012	22,37
	45	22	76100	23362	32190	45431	54259	23,43
		19,5	68490	34367	43195	56436	65264	24,50
		17	62402	45481	54309	62402	62402	25,56
VCH 90A / VIR 90A	25	22	104760	32625	42844	58172	68407	22,34
		19,5	94284	45249	55468	70797	81034	23,41
		17	87300	58916	69135	84464	87300	24,47
	35	22	96903	29848	40067	55396	65615	25,27
		19,5	87300	42566	52785	68114	78333	26,60
		17	80316	53753	63973	79301	80316	27,93
	45	22	87300	26769	36989	52317	62536	29,26
		19,5	78570	39514	49733	65062	75281	30,59
		17	71586	52384	62603	71586	71586	31,92

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 4 and Limits of use, see on page 6.*

Model	Rated flow		Minimum flow		Maximum flow		Available rated pressure of indoor fan
	m^3/h	m^3/s	m^3/h	m^3/s	m^3/h	m^3/s	Pa
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

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

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											
		Fan pulley			Motor pulley			Motor		Motor trip switch	
Description	Code	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. VIR45A/ 75A	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

H.S.D.: High-speed kit

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

(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		
	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
VCH 20A VCH 25A	0	0	7055	1,96	1090
	4	39	6420	1,78	985
	5,10	50	6235	1,73	955
	7,96	78	5715	1,59	905
	12,03	118	4990	1,38	785
	16	157	3580	0,99	685
VCH 30A VCH 40A	0	0	12700	3,54	2900
	2,04	20	12500	3,47	2800
	4	39	12175	3,38	2750
	5,10	50	11975	3,33	2700
	7,96	78	11460	3,18	2660
	12,03	118	10470	2,91	2350
	13,97	137	9880	2,74	2225
	16	157	9200	2,56	2065
VCH 45A	0	0	18340	5,09	3860
	5,10	50	17250	4,79	3540
	10,20	100	15860	4,41	3140
	15,30	150	13480	3,74	2600
	17,35	170	12390	3,44	2370
	17,86	175	12000	3,33	2290
VCH 60A	0	0	21250	5,90	5910
	5,10	50	20340	5,65	5610
	6,02	59	20170	5,60	5550
	10,20	100	19280	5,36	5220
	15,30	150	17780	4,94	4680
	20,41	200	16040	4,46	4090
	25,51	250	13630	3,79	3360
	30,61	300	9660	2,68	2560
VCH 75A VCH 90A	0	0	25650	7,13	8400
	5,10	50	25200	7,00	8240
	15,30	150	24100	6,69	7830
	22,96	225	22670	6,30	7300
	25,51	250	22020	6,12	7010
	30,61	300	19840	5,51	6080
	35,71	350	17320	4,81	5100

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 VCH 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.

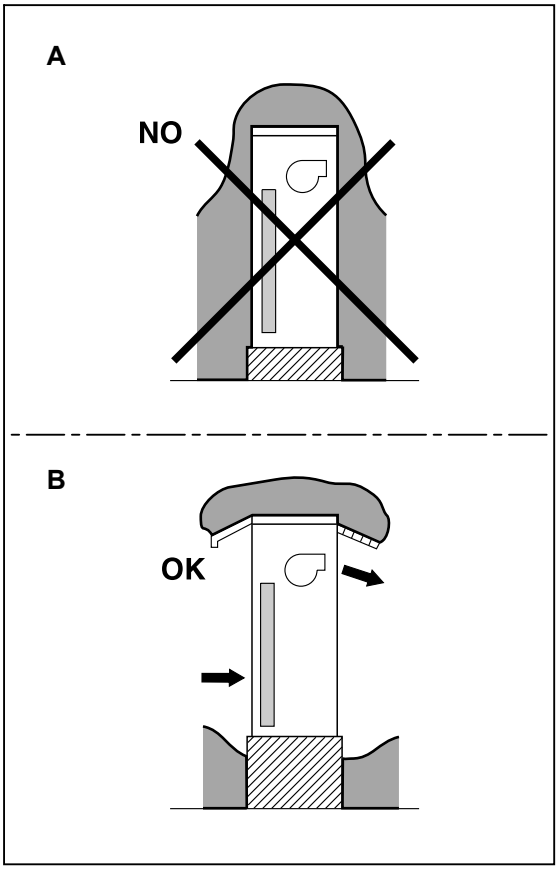
Where the unit is to be installed at ground level, refer to section *Fixture of the indoor unit to the ceiling, see on page 29*.

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.

A Without anti-snow grilles (low platform)

B With anti-snow grilles (high platform)



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 cover will be required.

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

1.10.2 Fixture of the indoor unit to the ceiling

⚠ CAUTION

Make sure the ceiling is strong enough to withstand the weight of the unit.

Before hanging the unit, test the firmness of each suspension bolt installed.

The unit must be attached to the ceiling using the indoor unit supports and the suspension bolts installed.

On attaching it, it must be completely horizontal, leaning slightly towards the drain to avoid any drops of condensation (use a spirit level for levelling).

1.10.3 Air ducts

Characteristics of the facility where the unit will be installed

Air duct installation

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.

Outdoor unit air ducts

1. Connect the ducts, isolating them from the appliance using a flexible sleeve preferably made of non-combustible material in order to prevent vibrations from being transmitted from the appliance. Ducts made of flexible materials do not transmit vibrations.
2. In VCH 45A, 60A, 75A and 90A units, two independent ducts must be installed, one for each fan up to discharge, to avoid air recirculation.
3. If the outdoor coil air is released through conducts, the first one-metre section should be made of galvanised plate to prevent damage from drops of water being dragged along.

Indoor unit air ducts

1. Connect the ducts, isolating them from the appliance using a flexible sleeve preferably made of non-combustible material in order to prevent vibrations from being transmitted from the appliance. Ducts made of flexible materials do not transmit vibrations.
2. A hatch must be located on each discharge duct bypass for correct system balancing.
3. Easy access should be established for cleaning and replacement of the air filters.

1.10.4 Drain connections

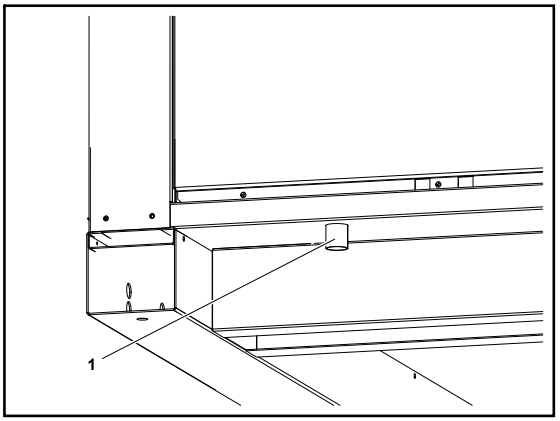
Condensates. Insulation and/or protection of ducts

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 **-1-**. The drain trap must have an access hatch 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.***

Drain connections for VCH 20A to 90A outdoor units

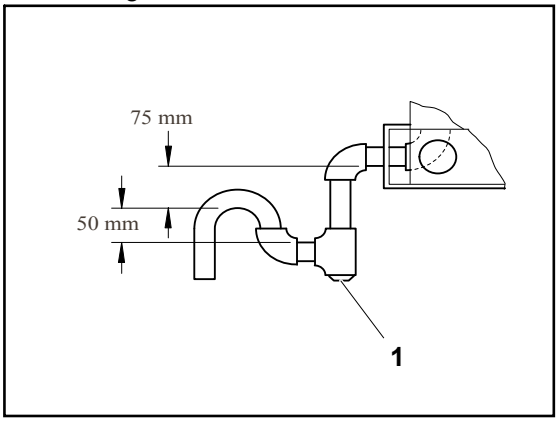
A pipe must be connected to the outdoor unit for condensate drainage. Remember:

- The appliance connection involve copper pipe with an outer diameter of 28.5 mm.

Drain connections for VIR 25A to 90A indoor units

A pipe must be connected to the indoor unit for condensate drainage. To do so:

- Leave a minimum difference in level of 25 mm between the appliance connection height and the line after the drain trap.



Drain pipe insulation

Insulate the condensate drain pipe to prevent condensation from damaging the surrounding area and the unit.

Check that the water is correctly released.

Protection against ice

In areas where the temperature can reach 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.

1.10.5 Unit interconnection

The installation of the unit includes:

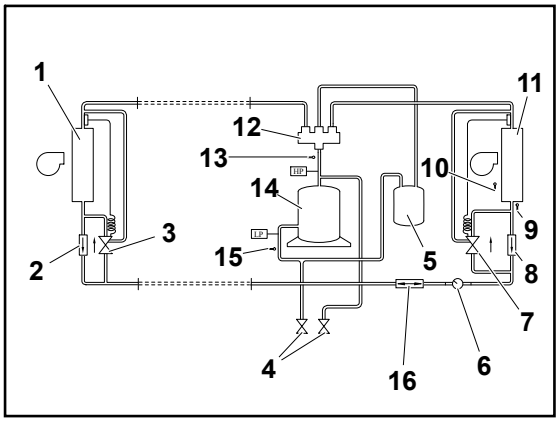
- Unit assembly.
- Refrigerant piping connection.
- Electrical installation of the unit.

In the installation of Split units, the cooling circuit must be completely airtight once assembly is complete to ensure there are no leaks. This provides the maximum performance with the minimum consumption, avoids serious faults in the unit and minimises its effects on the ecosystem.

Cooling layout

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

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 probe
10. Outdoor air probe
11. Outdoor coil
12. 4-way reversing valve.
13. Discharge probe
14. Compressor
15. Suction probe
16. Dehydrator filter



Unit refrigerant connection

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

The maximum acceptable distances with the standard circuit and tube diameter are those indicated in the graphs and tables of *Refrigerant charge and piping diameter, see on page 35* (without changing the pipe outlet diameter of the units).

- In the case of horizontal sections measuring over 20 metres in length, the suction line should slant 2% downwards towards the compressor.
- The maximum permitted speed on any section is 15 m/sec.
- With the limitations indicated and where the pipe outlet diameters on the unit are not changed, drain traps are not necessary.
- The liquid must have at least 1 °C subcooling at the expansion valve inlet to avoid the formation of gas in ascending liquid lines before entering the expansion system.
- For connection lines measuring over 25 metres in length, oil must be added (30 g/m of line).

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.*

Pipes to be used

CAUTION

Do not leave compressors or dehydrator filters exposed.

Use K or L-type cooling quality copper pipes, S/ASTMB88.

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

Insulation of refrigerant pipes

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.*

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.

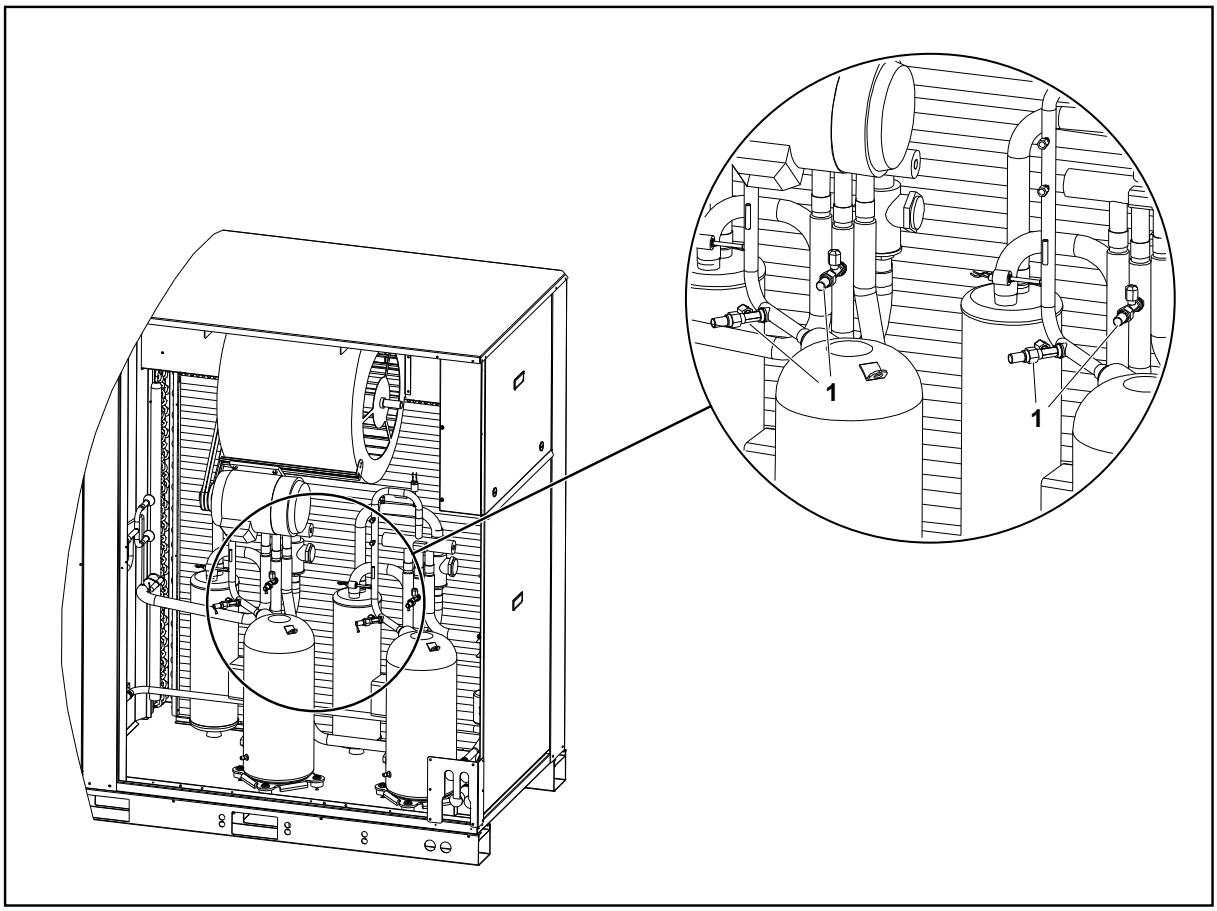
NOTE

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. Connect the vacuum pump to the service valves **-1-** (3/8" taps) on the installation and connect the service manometers to the valve stems (1/4" taps) 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.



Refrigerant charge

DANGER

Due to its characteristics, R-410A refrigerant must only be handled by qualified personnel.

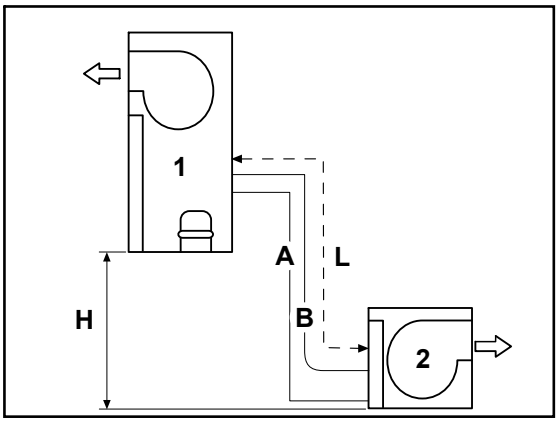
NOTE

The unit is not supplied charged

The refrigerant charge is calculated for a 7,5 m length of piping. In installations with longer (or shorter) lengths, add (reduce) refrigerant as indicated in table *Refrigerant charge and piping diameter, see on page 35*.

In installations with connection piping in excess of 25 m in length, 30 g of oil must be added for every additional metre.

A Liquid cooling line.
B Gas cooling line.
H Vertical distance between units (max. 30 m).
L Total pipe length (vertical + horizontal sections). Laid and in one direction.
1 Outdoor unit.
2 Indoor unit.



A Liquid cooling line.
B Gas cooling line.
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L Total pipe length (vertical + horizontal sections). Laid and in one direction.
1 Outdoor unit.
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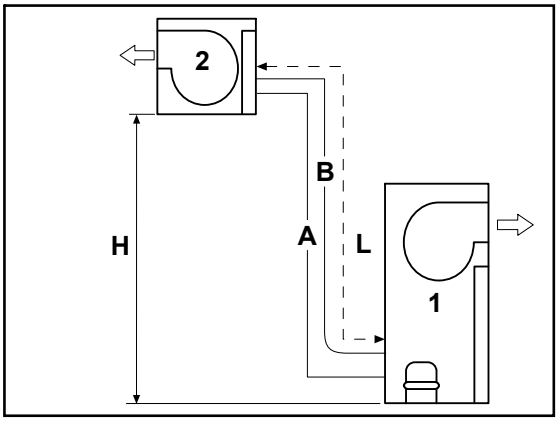


Maximum length L: this is the sum of the lengths of all straight horizontal and vertical sections in one direction, whether they hold liquid or gas.

Maximum equivalent length L_E: this is the sum of the lengths of all straight horizontal and vertical sections in one direction, whether they hold liquid or gas, plus the equivalent length of the accessories, basically elbow joints and bends.

Equivalent length of accessories in metres

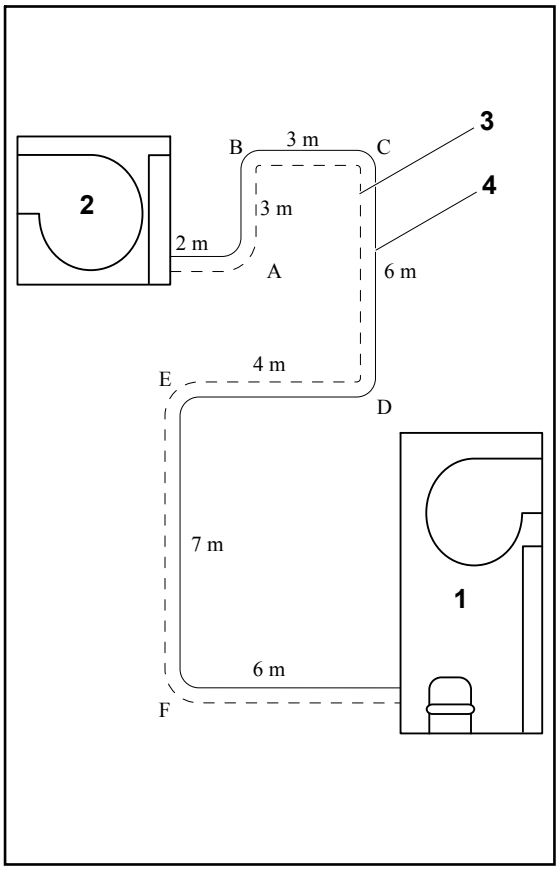
Outer pipe diameter	Short elbow joint radius	90° bend (Long radius)
3/8"	0,30	0,20
1/2"	0,40	0,30
5/8"	0,50	0,40
3/4"	0,50	0,40
7/8"	0,60	0,50
1 ⅛"	0,70	0,60
1 ⅜"	1,00	0,70
1 ⅝"	1,20	0,80

NOTE

The 45° elbow joints and bends (used in drain traps, for example) have half the equivalent length of the 90° bends.

Calculation Example

1	Outdoor unit.
2	Indoor unit.
3	1/2" liquid pipe.
4	1 ⅛" gas pipe.
A, B, C, D	Elbow joints (4)
E	Bends (2)



L = 2 + 3 +3 + 6 + 4 + 7 + 6 = 31

31 < 50 is therefore correct

To calculate the equivalent length of the interconnection piping and as for the charge loss calculation, use the data of one of the liquid lines, i.e. 1/2" outer diameter. As can be seen in the diagram, there are four elbow joints with an equivalent length of 0,5 m according to the table and two 0,4 m bends according to the table, to check that the equivalent length of piping does not exceed the accepted maximum:

$L_E = 2 + 3 + 3 + 6 + 4 + 7 + 6 + 4 \cdot (0.5) + 2 \cdot (0.4) = 33.8$ m

33.8 < 60 is therefore correct.

Refrigerant charge and piping diameter

Follow the instructions below to add or charge refrigerant to the cooling pipes:

NOTE

The refrigerant charge must be weight-controlled using scales. The refrigerant must be charged in liquid phase to ensure the components forming it are inserted in the correct proportions.

1. Connect the refrigerant cylinder to the low pressure or gas intake.
2. Open the stopcocks and allow the refrigerant to enter the pipes.

   NOTE

   Once the refrigerant has been correctly charged, the subcooling temperature (at the expansion valve inlet) must be approximately 1 °C and the overheating temperature between 5 and 10 °C.

Model	Rated charge R-410A (kg)	No. of circuits	Gas line diameter	Liquid line diameter	Additional charge (g/m)	L (m)	L_E (m)
VCH 20A / VIR 25A	8,5	1	1 ⅛" (28,5 mm)	1/2" (12,7 mm)	112	50[1]	60
VCH 25A / VIR 25A	8,5	1	1 ⅛" (28,5 mm)	1/2" (12,7 mm)	112	50[1]	60
VCH 30A / VIR 40A	12	1	1 ⅛" (28,5 mm)	5/8" (15,87 mm)	170	50	60
VCH 40A / VIR 40A	12	1	1 ⅛" (28,5 mm)	5/8" (15,87 mm)	170	50	60
VCH 45A / VIR 45A	9.5 x 2	2	1 ⅛" (28,5 mm)	1/2" (12,7 mm)	112	50	60
VCH 60A / VIR 60A	10.5 x 2	2	1 ⅛" (28,5 mm)	5/8" (15,87 mm)	170	50	60
VCH 75A / VIR 75A	15 x 2	2	1 ⅜" (35 mm)	7/8" (22 mm)	333	50	60
VCH 90A / VIR 90A	15 x 2	2	1 ⅜" (35 mm)	7/8" (22 mm)	333	50	60

L: Maximum length on straight connection pipe sections.

L_E: Maximum equivalent length of unit connection pipes.

[1]: As of a total sum of 20 metres in length on straight connection pipe sections (horizontal and vertical) between units, a suction accumulator of at least 7 litres must be fitted on the gas line.

1.10.6 Preparation and connecting to the various utilities

Electricity. Power and control

CAUTION

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

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.

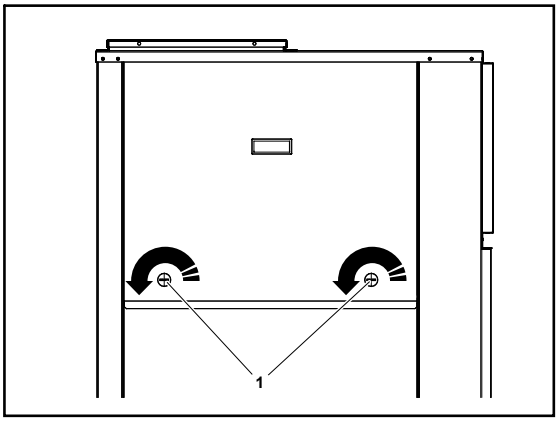
NOTE

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.

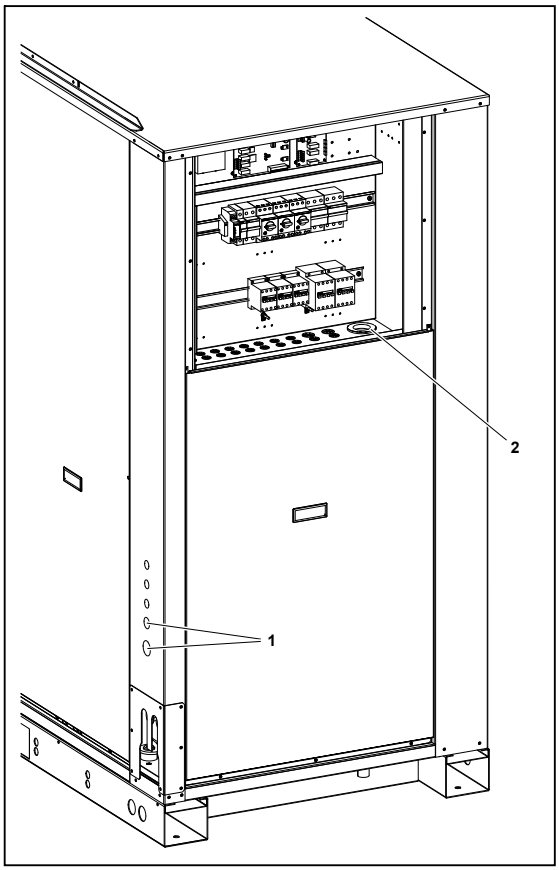
To install the power cable, loosen the closures **-1-** by 1/4 turn and remove the electrical board panel.



Press 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, see on page 39*.



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.

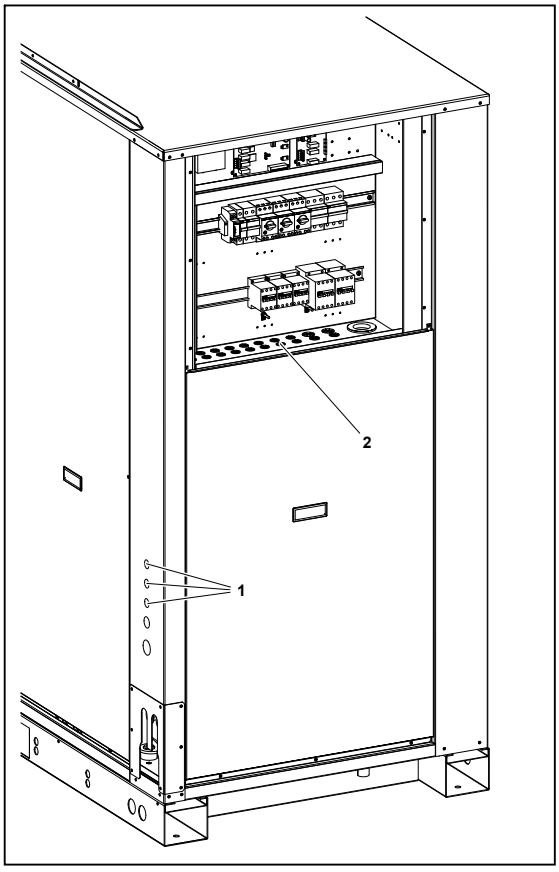
Control Line

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

Press the 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 39*.

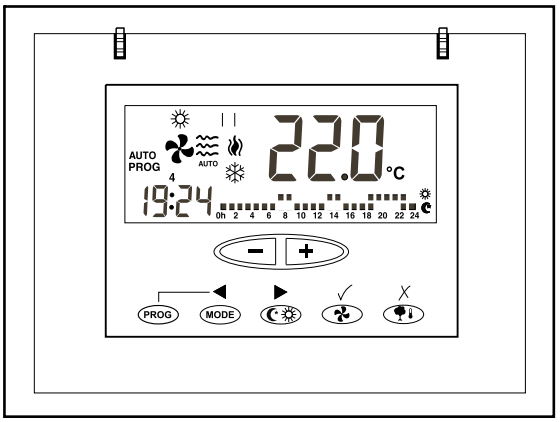


NOTE

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 mm^2 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 39*.



Fan connection for VIR 25A to 90A indoor units

Where the phase sequence is correct (R-S-T) and the fan rotates the wrong way, exchange two phases at the bottom of the fan contactor.

Configuration of the electronic board

The unit is powered for start-up once the accessories have been installed. For the electronic board to respond according to the accessories installed, press the "test" button for around two seconds until the red LED switches off.

Cold only function selection

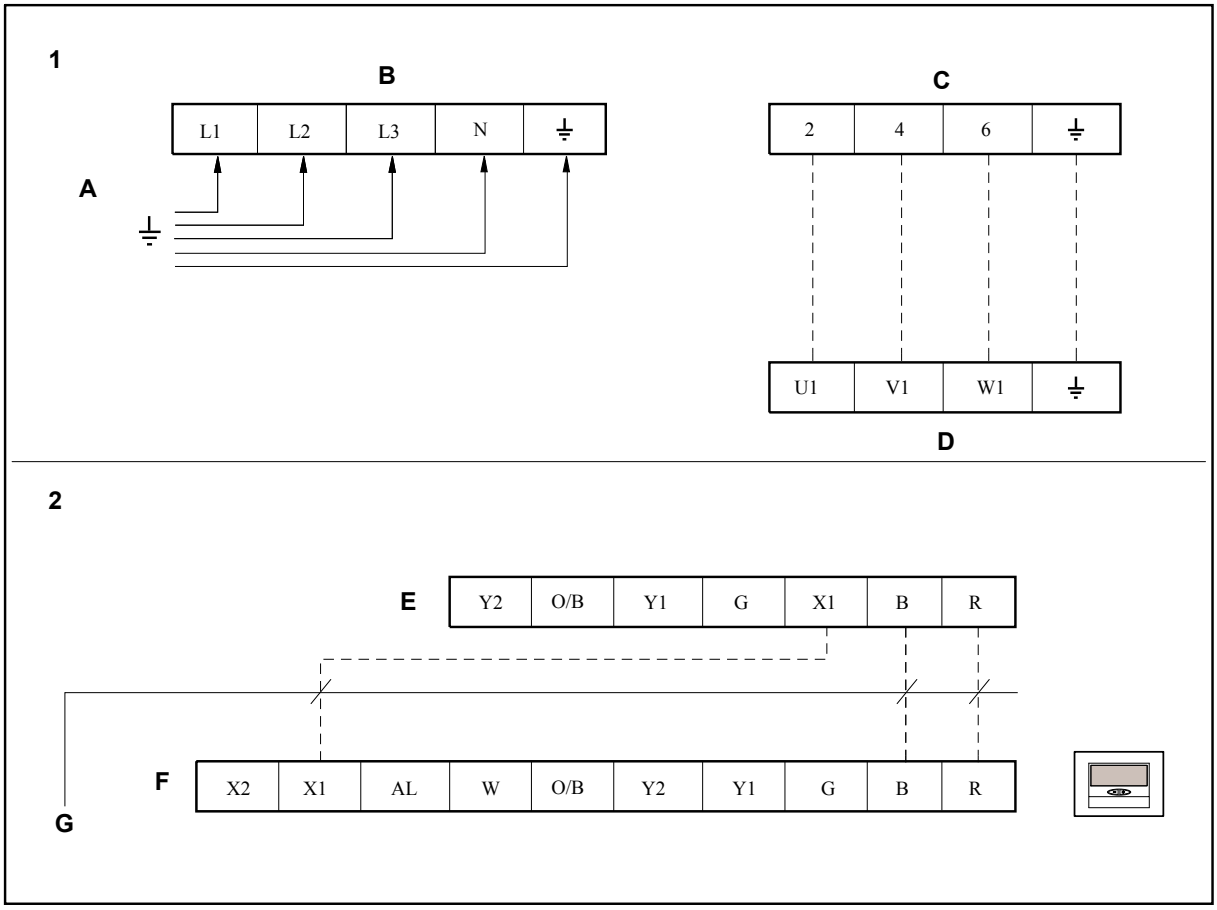
NOTE

Only use in the event of using the assembly as a cold-only unit with no heat pump

To configure the outdoor unit (VCH) in cold only mode:

- Configure micro-switch **(S1)** no. 5 and no. 4 on the YKN2 Open board to **OFF**.
- Disconnect the power supply to the board to read the new configuration.

Wiring diagrams

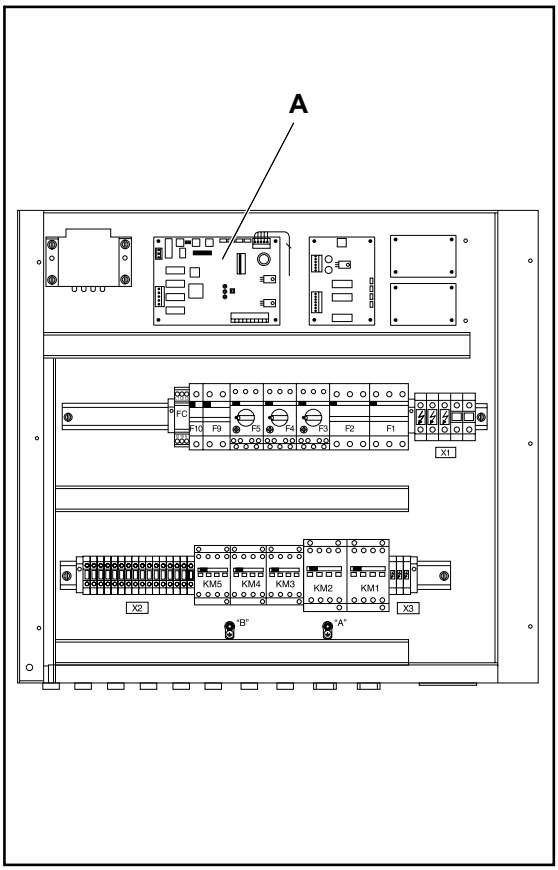


1. Power connection
2. Thermostat connection

A. Main power supply (400V / 3 / 50 + N)
B. Outdoor unit
C. Contactor
D. Indoor fan motor (star connection)
E. Outdoor unit terminal strip (VCH 20A to 90A)
F. DPC-1 thermostat
G. 10-pin shielded communications cable x 0.22 mm^2

Thermostat connections to the control board

A. Thermostat connection board.



Board connection terminals

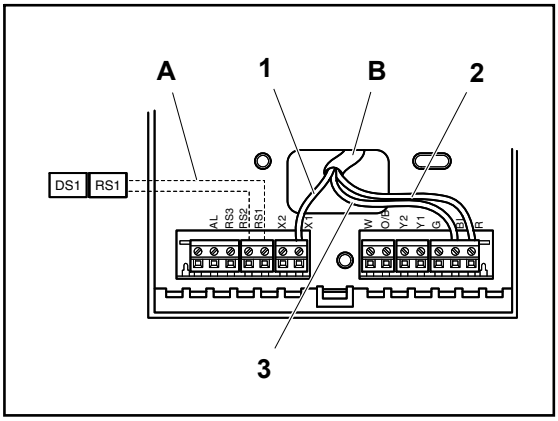
X1	To terminal X1 of the DPC-1 thermostat.
B	White. To terminal B of the DPC-1 thermostat.
R	Red. To terminal R of the DPC-1 thermostat.
Y1	–
O/B	–
Y2	–

Thermostat connections

1. Yellow cable.
2. Red cable.
3. White cable.

A. Shielded cable, 2 x 0,5 mm^2. Maximum length: 100 m.

B. Shielded cable, 10 x 0.22 mm^2. Maximum length: 100 m.



1.10.7 Safety and equipment protection systems

The VITALITY range of air conditioning units includes an entire series of safety and protection systems intended to provide a high degree of safety for users and maintenance personnel.

Those not expressly authorised to use the air conditioning unit must not handle it or perform repair or maintenance work.

Safety systems

Johnson Controls Inc. manufactures air conditioning units in accordance with EU occupational protection and user safety regulations, provided that the units are used and maintained in line with the instructions and indications given in this document.

Given that the air conditioning unit is installed on the roof of a building or property, users must under no circumstances inspect or adjust the unit themselves. All of inspections or adjustments that may be made by the user are performed using the DPC-1 thermostat.

The air conditioning unit is fitted with electrical protection systems to protect personnel responsible for its regular maintenance and upkeep.

As established by applicable electricity regulations, the electrical system is fitted with electricity surge and current leakage protection system consisting of differential circuit breakers and thermal magnetic switches (not supplied by the manufacturer, must be installed on site).

Under no circumstances is the user of the air conditioning unit exposed to live parts.

Likewise, access to moving parts by unauthorised persons is prevented. This involves placing appropriate safety locks on all of the removable covers on the unit.

Unit protection systems

The refrigerant circuit of the unit is protected against excessively high or low pressure and discharge temperature. It is also protected against repeated cold start-ups caused by the compressor suction probe when the summer cycle is activated.

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.

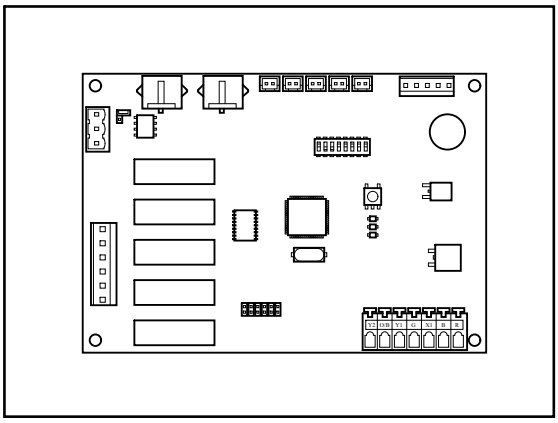
Press the "Test" button for two seconds so that the unit recognises the installed accessories. When the recognition process is complete, the red pilot light switches off.

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 LED V3 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 only operate correctly in one direction of rotation. Although these units are protected by a phase order detector, when the unit is started, check that the unit rotates in the correct direction. If it is not correct:

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.

The phase detector must have both LEDs lit for correct operation:

- Green LED lit means: Power ON.
- Yellow LED lit means: Relay ON.

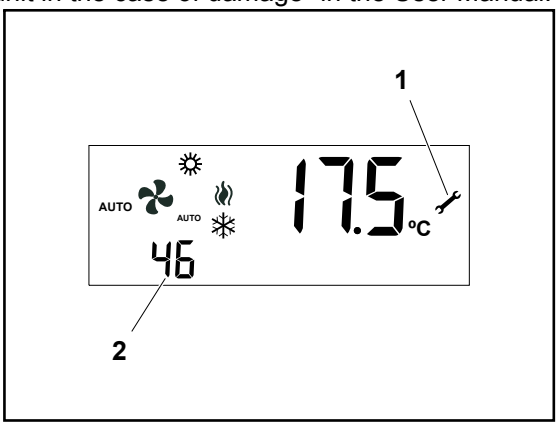
1.12 Unblocking the unit safely in case of breakdown

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.

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 affect 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 Maintenance Schedule

The HVAC unit is designed to require as little maintenance as possible. Nevertheless, to ensure the correct operation of the unit with a minimal use of electricity, a long working life and compliance with the regulations of each country, regular maintenance inspections must be made.

Johnson Controls Inc. shall not be considered responsible for any damage caused by improper maintenance of the HVAC unit, which includes anything inconsistent with that described in this document or others specifically provided with the unit.

To make them easier, maintenance tasks have been grouped by time intervals in a series of tables.

Maintenance operations	Frequency			
	1 month	2 months	6 months	annual
Outdoor fan and indoor fan belts, see on page 44		x		
Air filters, see on page 44	x			
Indoor coil, see on page 44 (evaporator)		x		
Condensate tray and drain trap, see on page 44		x		
Outdoor coils, see on page 44 (condenser)		x		
Fresh air intake, see on page 44 (accessory)	x			
Cooling Circuit, see on page 44			x	
Electrical and mechanical operation, see on page 44			x	
Integrity of the unit structure and components, see on page 45				x
Hot water coil, see on page 45 (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.***

Outdoor fan and indoor fan belts

ATTENTION

Before opening any access to the inside of the unit, disconnect all electricity supplies.

Check their condition and correct tensioning. Any replacements must be of the same type and size as the original and tensioning must be checked again after 24 hours of operations.

Air filters

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

Indoor coil

You should visually inspect the coil when performing filter maintenance. The complete surface of the fins must be kept clean.

ATTENTION

Never use water hoses inside the compartment.

Clean the fins using a soft brush or vacuum cleaning, taking care not to damage them.

Condensate tray and drain trap

Remove any dirt or remains from the tray.

- Check that the water outlet and the drain trap are not blocked.
- Check that the water is correctly released.
- Prime the drain trap (fill with water) if required.

Outdoor coils

ATTENTION

Never use water hoses inside the compartment.

Remove all dirt or remains from the surface of both sides of the coils. Clean the surface of the fins using a soft brush or compressed air, taking care not to damage them. Given that they are exposed to the outdoors, water with suitable detergent may be required for cleaning. In this case, always clean from the inside out and from top to bottom.

Fresh air intake

Where the unit is fitted with the economiser accessories or return fan, maintenance must be performed on the dampers, checking the correct working order of their components (shaft, louvers, motor).

Cooling Circuit

Check the following at the start of each cooling or heating season:

- Operating pressures.
- Control elements.
- Temperature leaps.
- Other checks according to the rules of the trade.

Electrical and mechanical operation

Check the following at the start of each cooling or heating season:

- The amps of all motors.
- The condition of the electrical connections.
- The working order of the safety controls.

The motor bearings for the indoor and outdoor fans are permanently lubricated and do not require maintenance.

Integrity of the unit structure and components

Check:

- The correct condition of the unit structure and exterior components.
- No knocks or dents.
- correct fixture of bolts.
- The correct closure of access doors, including the condition of the sealing strip and locks.

Hot water coil

Where the unit is fitted with this accessory, check the following at the start of the heating season:

- The control elements.
- System water filling.
- Bleeding of air from the coil.

NOTE

Check that the proportion of antifreeze is correct, if necessary, depending on the area and the installation.

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

Outdoor units

VCH models								
Octave band sound spectrum dB(A), indoor	20A	25A	30A	40A	45A	60A	75A	90A
125 Hz	65	65,2	75,1	75,4	77,7	78,1	79,8	79,8
250 Hz	66,2	66,5	75,7	75,9	79,1	80,5	81,7	81,7
500 Hz	70,6	70,7	79,1	79,3	78,7	79	79,9	80
1000 Hz	73,9	74,1	82,2	82,4	81,8	82,2	83,1	83,2
2000 Hz	71	71,2	81,6	81,9	80,2	80,6	81,6	81,6
4000 Hz	68,2	68,4	76,6	76,8	76,3	76,3	77,1	77
8000 Hz	59,6	59,9	69,2	69,5	68,6	68,9	69,8	69,8
Sound power level dB (A)	77,8	78	87	87,3	87,5	88	88,8	88,8

Indoor units

VIR Models						
Octave band sound spectrum dB(A)	25A	40A	45A	60A	75A	90A
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
500 Hz	69,8	73,8	74,5	76,1	73,8	75,4
1000 Hz	70,6	74,8	77,2	78,8	74	75,6
2000 Hz	68,7	75,1	77,1	78,7	74,6	76,2
4000 Hz	64,9	70,5	72,5	74,1	73,7	75,3
8000 Hz	55,8	62,3	655	66,6	67,5	69,1
Sound power level dB (A)	75,4	81,3	82,7	84,3	81,5	83,5

NOTE

- *Our reverberating chamber enables us to measure the sound pressure level at 63 Hz and, therefore, the NC (ISO Noise Criteria) will be determined as of 125 Hz.*
- *Where the sound pressure value of 63 Hz is deduced, between 0 and 10 dB will be added to the pressure value at 125 Hz*
- *The data given in this table are sound power values in accordance with ISO EN3743.*

2

Wiring diagrams

2.1 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

2.2 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 probe, water return)
	6	Smoke or high temperature detection (accessory) or supply temperature > 80 °C

2.3 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	Probes	Discharge probe open or short circuited
		2		Liquid probe open or short circuited
		3		Suction probe open or short circuited
	2	1	Temperature	Repeated defrosting
		2		The discharge temperature is not recovered
4	1	1	Probes	Supply probe open or short circuited
		2		Return probe open or short circuited
		3		Outdoor probe open or short circuited
		4		Water probe open or short circuited
		5		Fault in the enthalpy probes
	2	1	Thermostat	Signal **Y1** without signal **G**
	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 antifreeze operation
		4		Supply temperature above 55 °C
		5		Supply temperature < 25 °C with gas
	5	1	Others	Defrost cycle
		2		There is at least one accessory not found
		3		Air quality demand
		4		Dirty filters
		5		Presence sensor is unoccupied
		6		Suction temperature < 0 °C, economiser
	6	1	Recovery system	Energy recovery wheel motor trip switch
		2		Energy recovery fan motor trip switch

2.3.1 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 probes connected to the board are identified.

2.4 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.

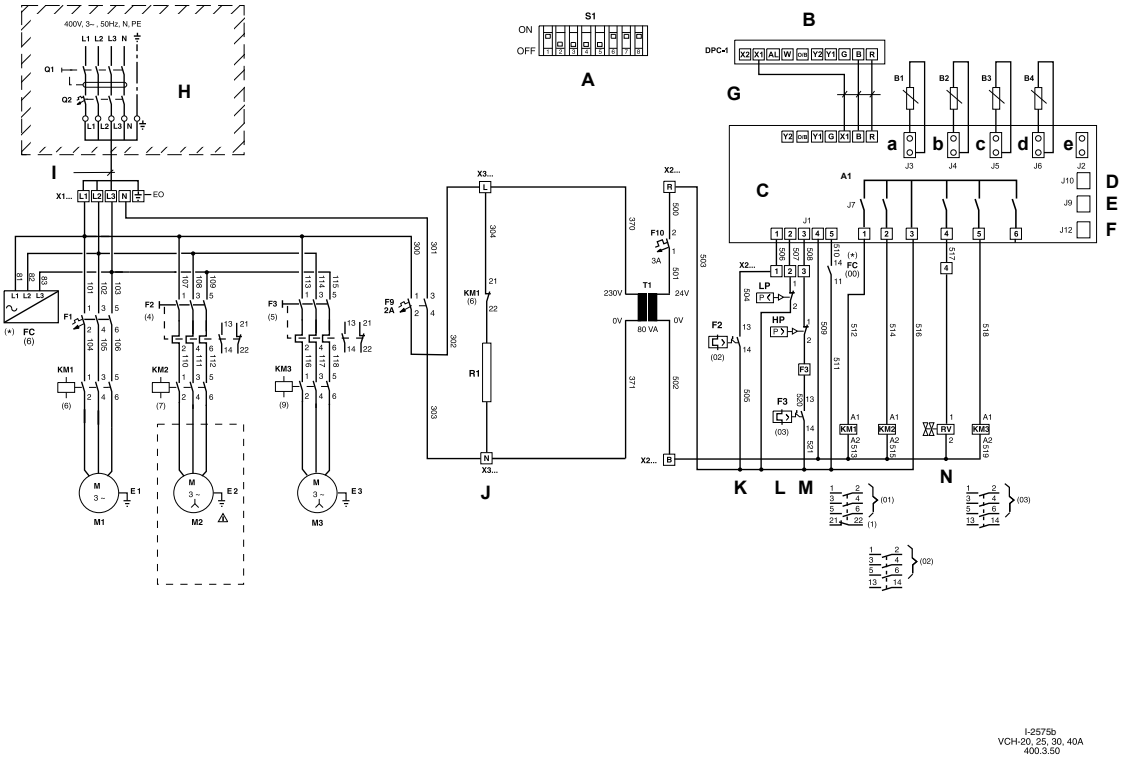
It also displays other faults related to the thermostat.

Micro switch configuration

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

2.5 Unit wiring diagrams

2.5.1 VCH 20A, 25A, 30A and 40A (400.3.50) wiring diagram



I-2575b
VCH-20, 25, 30, 40A
400.3.50

Model	Q2 [A]	Cross-section B [mm²]	F1 [A]	F2 [A] REG.	F3 [A]
20A	20	5 x 4	16	2,5	3,1
25A	25	5 x 4	16	2,5	3,1
30A	32	5 x 6	25	3,8	6,5
40A	40	5 x 10	32	3,8	6,5

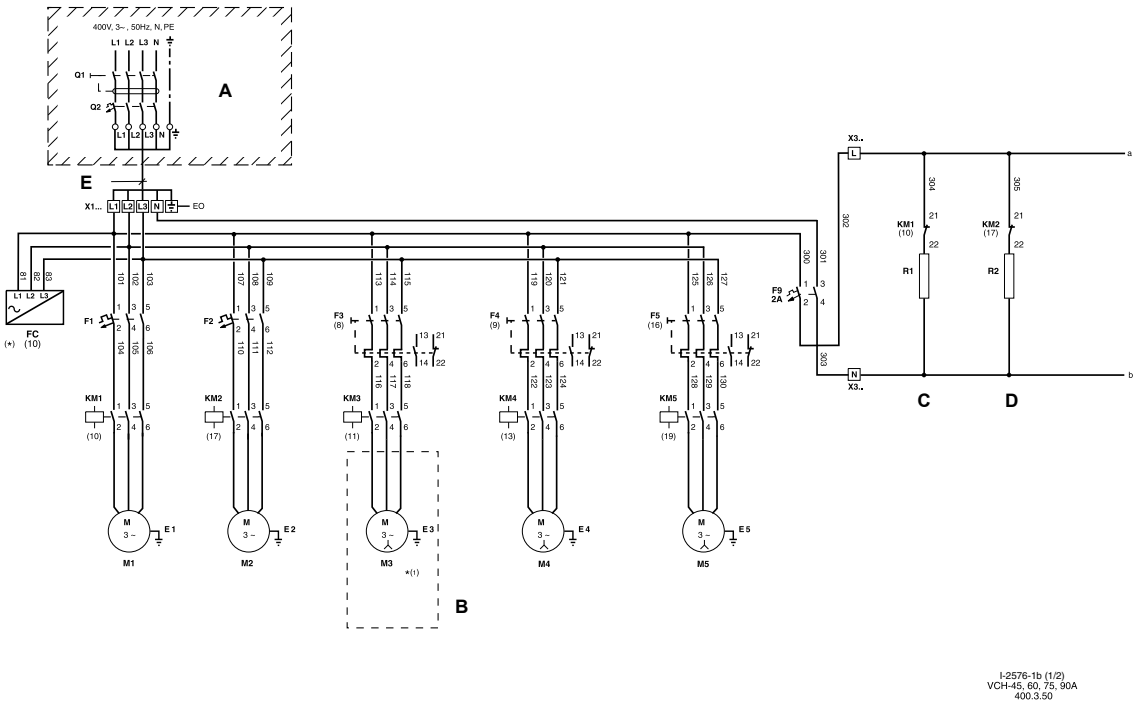
(*) If the unit has power and the green LED **V2** on board **A1** is off, check that the sequence of phases **L1**, **L2**, **L3** is correct.

NOTE

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

A	**S1** configuration on A1 board (VCH models)	a	Black connector
B	Thermostat	b	Green connector
C	Electronic board [A1]	c	White connector
D	Accessories connection	d	Yellow connector
E	YKTOOLN2 connection	e	Red connector
F	RS-485 connection	B1	Suction probe
G	Shielded cable, 10 x 0,22 mm^2	B2	Liquid probe
H	On-site installation. These components are not supplied by the manufacturer	B3	Discharge probe
I	Cross-section **B** mm^2 Cu	B4	Outdoor probe
J	Crankcase heater	M1	Compressor
K	Indoor fan motor trip switch	M2	Indoor fan
L	High and low pressure switch	M3	Outdoor fan
M	Outdoor fan motor trip switch	FC	Phase control
N	4-way valve		

2.5.2 VCH 45A, 60A, 75A and 90A (400.3.50) wiring diagram



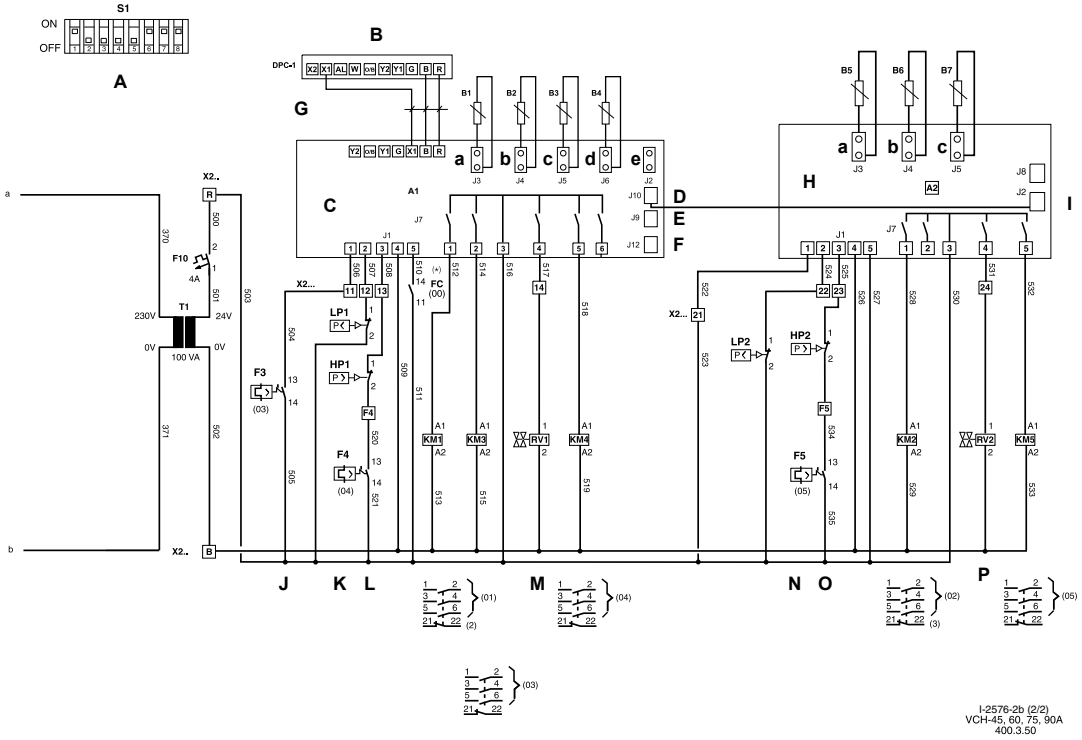
Model	Q2 [A]	Cross-section B [mm²]	F1 and F2 [A]	F3 [A] REG.	F4 and F5 [A] REG.
45A	50	5 x 10	16	3,8	4,2
60A	63	5 x 16	25	5,1	5,1
75A	80	5 x 25	32	6	9,4
90A	100	5 x 35	32	8,7	9,4

A	On-site installation. These components are not supplied by the manufacturer	FC	Phase control
B		M1, M2	Compressor
C	Crankcase heater 1	M3	Indoor fan
D	Crankcase heater 2	M4, M5	Outdoor fan 1 and 2
E	Cross-section **B** mm² 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

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



A	**S1** configuration on A1 board (VCH models)	a	Black connector
B	Thermostat	b	Green connector
C	Electronic board [A1]	c	White connector
D	Compressor 2	d	Yellow connector
E	YKTOOLN2 connection	e	Red connector
F	RS-485 connection	B1, B5	Suction probe
G	Shielded cable, 10 x 0,22 mm^2	B2, B6	Liquid probe
H	Electronic board [A2]	B3, B7	Discharge probe
I	Accessories connection	B4	Outdoor probe
J	Indoor fan motor trip switch	M1	Compressor
K	High and low pressure switch 1	M2	Indoor fan
L	Outdoor fan motor trip switch 1	M3	Outdoor fan
M	4-way valve 1	FC	Phase control
N	High and low pressure switch 2		
O	Outdoor fan motor trip switch 2		
P	4-way valve 2		