DAIKIN

technical data

air conditioning systems

VRV Air Handling Applications - Control Box

EKEXMCB

VRV III

TABLE OF CONTENTS

EKEXMCB

1 Specifications

1-1 TECHNICAL SPECIFICATIONS				EKEXMCBV3
Casing	Colour			White grey
	Material			Resin
Dimensions	Unit	Height	mm	132
		Width	mm	400
		Depth	mm	200
	Packing	Height	mm	215
		Width	mm	495
		Depth	mm	310
Weight	Unit		kg	3.5
	Packed Unit		kg	4.5
Packing	Material			Carton
	Weight		kg	0.38
	Material			EPS
	Weight		kg	0.24
	Material			Plastic
	Weight		kg	0.09
Operation Range	Cooling	Min	°CDB	-5.0
		Max	°CDB	46.0
Standard Accessories	Item			Thermistor (R1T)
	Quantity			1
	Item			Thermistor (R2T/R3T)
	Quantity			2
	Item			Insulation Sheet
	Quantity			2
	Item			Rubber sheet
	Quantity			2
	Item			Wire to wire splice
	Quantity			6
	Item			Installation and operation manual
	Quantity			1
	Item			Screw nut
	Quantity			9
	Item			Tie-wraps
	Quantity			6
	Item			Capacity setting adapter
	Quantity			8
	Item			Stopper (closing up)

1 Specifications

1-2 ELECTRICAL SPECIFICATIONS				EKEXMCBV3
Power Supply	Name			V3
	Phase			1
	Frequency		Hz	50
	Voltage		V	230
	Voltage range	Minimum	V	-10%
		Maximum	V	+10%
Wiring connections	For Power Supply	Quantity		3
		Remark		Earth wire included
	For connection with indoor	Quantity		2
		Remark		F1-F2
	For remote control	Quantity		2
		Remark		P1,P2
	For expansion valve kit	Quantity		6
		Remark		Y1~Y6
	Thermistors liquid pipe	Quantity		2
		Remark		R1,R2
	Thermistors gas pipe	Quantity		2
		Remark		R3,R4
	Thermistor air	Quantity		2
		Remark		R5,R6
	ON/OFF	Remark		T1,T2
Power Supply Intake				Bottom

2 Options

EKEX

N°	Item	EKEXMCB
1	Remote Control (Wired type)	BRC1D527
2	Wiring adaptor for electrical appendices	KRP4A516
3	Remote sensor	KRC501-1
4	Valve kits	EKEXV50,63,80,100,125,140,200,250

Caution for options:
- Do not connect the system to DIII-NET devices (intelligent controller, intelligent manager, DMS-IF, bacnet gateway...) This could result in malfunction or breakdown of the total system.
- Do not use this system in combination with a field supplied air handling unit.
  Do not connect this system to other indoor units.
- See combination table for application of valve kits.

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3 Capacity tables

3 - 1 Combination table

Combination table

				Control box	Expansion valve kit							
				Control Z	Class 50	Class 63	Class 80	Class 100	Class 125	Class 140	Class 200	Class 250
outdoor unit				EKEXMCB	EKEXV50	EKEXV63	EKEXV80	EKEXV100	EKEXV125	EKEXV140	EKEXV200	EKEXV250
System B (C/O)	3 ph	5 hp	RXQ5P7W1B	n	n	n	n	n	n	n	n	n
		8 hp	RXQ8P7W1B	n	n	n	n	n	n	n	n	n
		10 hp	RXQ10P7W1B	n	n	n	n	n	n	n	n	n
		12 hp	RXQ12P7W1B	n	n	n	n	n	n	n	n	n
		14 hp	RXQ14P7W1A	n	n	n	n	n	n	n	n	n
		16 hp	RXQ16P7W1A	n	n	n	n	n	n	n	n	n
		18 hp	RXQ18P7W1A	n	n	n	n	n	n	n	n	n

n: Qty determined by connection ration or maximum number of indoors units (in combination with VRV-outdoor, the EKEXV-kit is considered as one of the indoor units)

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3 Capacity tables

3 - 2 Cooling capacity tables

EKEXMCB

Evaporator capacity table

Capacity index	Outdoor °CDB	Indoor air temp. 14WB 20DB TC	16WB 23DB TC	18WB 26DB TC	19WB 27DB TC	20WB 28DB TC	22WB 30DB TC	24WB 32DB TC
50	10,0	3,8	4,5	5,2	5,6	6,0	6,7	7,4
	12,0	3,8	4,5	5,2	5,6	6,0	6,7	7,3
	14,0	3,8	4,5	5,2	5,6	6,0	6,7	7,2
	16,0	3,8	4,5	5,2	5,6	6,0	6,7	7,1
	18,0	3,8	4,5	5,2	5,6	6,0	6,7	7,0
	20,0	3,8	4,5	5,2	5,6	6,0	6,7	6,9
	21,0	3,8	4,5	5,2	5,6	6,0	6,7	6,8
	23,0	3,8	4,5	5,2	5,6	6,0	6,6	6,7
	25,0	3,8	4,5	5,2	5,6	6,0	6,5	6,6
	27,0	3,8	4,5	5,2	5,6	6,0	6,4	6,6
	29,0	3,8	4,5	5,2	5,6	6,0	6,3	6,5
	31,0	3,8	4,5	5,2	5,6	6,0	6,2	6,4
	33,0	3,8	4,5	5,2	5,6	6,0	6,1	6,3
	35,0	3,8	4,5	5,2	5,6	5,9	6,0	6,2
	37,0	3,8	4,5	5,2	5,6	5,8	5,9	6,1
	39,0	3,8	4,5	5,2	5,6	5,7	5,8	6,0
63	10,0	4,8	5,7	6,6	7,1	7,6	8,5	9,3
	12,0	4,8	5,7	6,6	7,1	7,6	8,5	9,2
	14,0	4,8	5,7	6,6	7,1	7,6	8,5	9,1
	16,0	4,8	5,7	6,6	7,1	7,6	8,5	9,0
	18,0	4,8	5,7	6,6	7,1	7,6	8,5	8,8
	20,0	4,8	5,7	6,6	7,1	7,6	8,5	8,7
	21,0	4,8	5,7	6,6	7,1	7,6	8,5	8,7
	23,0	4,8	5,7	6,6	7,1	7,6	8,4	8,5
	25,0	4,8	5,7	6,6	7,1	7,6	8,3	8,4
	27,0	4,8	5,7	6,6	7,1	7,6	8,1	8,3
	29,0	4,8	5,7	6,6	7,1	7,6	8,0	8,2
	31,0	4,8	5,7	6,6	7,1	7,6	7,9	8,1
	33,0	4,8	5,7	6,6	7,1	7,6	7,8	7,9
	35,0	4,8	5,7	6,6	7,1	7,5	7,7	7,8
	37,0	4,8	5,7	6,6	7,1	7,4	7,5	7,7
	39,0	4,8	5,7	6,6	7,1	7,2	7,4	7,6
80	10,0	6,1	7,2	8,4	9,0	9,6	10,8	11,8
	12,0	6,1	7,2	8,4	9,0	9,6	10,8	11,7
	14,0	6,1	7,2	8,4	9,0	9,6	10,8	11,5
	16,0	6,1	7,2	8,4	9,0	9,6	10,8	11,4
	18,0	6,1	7,2	8,4	9,0	9,6	10,8	11,2
	20,0	6,1	7,2	8,4	9,0	9,6	10,8	11,1
	21,0	6,1	7,2	8,4	9,0	9,6	10,8	11,0
	23,0	6,1	7,2	8,4	9,0	9,6	10,6	10,8
	25,0	6,1	7,2	8,4	9,0	9,6	10,5	10,7
	27,0	6,1	7,2	8,4	9,0	9,6	10,3	10,5
	29,0	6,1	7,2	8,4	9,0	9,6	10,2	10,4
	31,0	6,1	7,2	8,4	9,0	9,6	10,0	10,2
	33,0	6,1	7,2	8,4	9,0	9,6	9,8	10,1
	35,0	6,1	7,2	8,4	9,0	9,5	9,7	9,9
	37,0	6,1	7,2	8,4	9,0	9,3	9,5	9,8
	39,0	6,1	7,2	8,4	9,0	9,2	9,4	9,6
100	10,0	7,6	9,0	10,5	11,2	11,9	13,4	14,7
	12,0	7,6	9,0	10,5	11,2	11,9	13,4	14,5
	14,0	7,6	9,0	10,5	11,2	11,9	13,4	14,4
	16,0	7,6	9,0	10,5	11,2	11,9	13,4	14,2
	18,0	7,6	9,0	10,5	11,2	11,9	13,4	14,0
	20,0	7,6	9,0	10,5	11,2	11,9	13,4	13,8
	21,0	7,6	9,0	10,5	11,2	11,9	13,4	13,7
	23,0	7,6	9,0	10,5	11,2	11,9	13,2	13,5
	25,0	7,6	9,0	10,5	11,2	11,9	13,0	13,3
	27,0	7,6	9,0	10,5	11,2	11,9	12,8	13,1
	29,0	7,6	9,0	10,5	11,2	11,9	12,6	12,9
	31,0	7,6	9,0	10,5	11,2	11,9	12,4	12,7
	33,0	7,6	9,0	10,5	11,2	11,9	12,2	12,5
	35,0	7,6	9,0	10,5	11,2	11,8	12,1	12,3
	37,0	7,6	9,0	10,5	11,2	11,6	11,9	12,2
	39,0	7,6	9,0	10,5	11,2	11,4	11,7	12,0

Capacity index	Outdoor °CDB	Indoor air temp. 14WB 20DB TC	16WB 23DB TC	18WB 26DB TC	19WB 27DB TC	20WB 28DB TC	22WB 30DB TC	24WB 32DB TC
125	10,0	9,5	11,3	13,1	14,0	14,9	16,8	18,4
	12,0	9,5	11,3	13,1	14,0	14,9	16,8	18,2
	14,0	9,5	11,3	13,1	14,0	14,9	16,8	18,0
	16,0	9,5	11,3	13,1	14,0	14,9	16,8	17,7
	18,0	9,5	11,3	13,1	14,0	14,9	16,8	17,5
	20,0	9,5	11,3	13,1	14,0	14,9	16,8	17,2
	21,0	9,5	11,3	13,1	14,0	14,9	16,8	17,1
	23,0	9,5	11,3	13,1	14,0	14,9	16,5	16,9
	25,0	9,5	11,3	13,1	14,0	14,9	16,3	16,6
	27,0	9,5	11,3	13,1	14,0	14,9	16,1	16,4
	29,0	9,5	11,3	13,1	14,0	14,9	15,8	16,2
	31,0	9,5	11,3	13,1	14,0	14,9	15,6	15,9
	33,0	9,5	11,3	13,1	14,0	14,9	15,3	15,7
	35,0	9,5	11,3	13,1	14,0	14,8	15,1	15,4
	37,0	9,5	11,3	13,1	14,0	14,5	14,9	15,2
	39,0	9,5	11,3	13,1	14,0	14,3	14,6	15,0
140	10,0	10,8	12,9	15,0	16,0	17,0	19,1	21,0
	12,0	10,8	12,9	15,0	16,0	17,0	19,1	20,7
	14,0	10,8	12,9	15,0	16,0	17,0	19,1	20,5
	16,0	10,8	12,9	15,0	16,0	17,0	19,1	20,2
	18,0	10,8	12,9	15,0	16,0	17,0	19,1	19,9
	20,0	10,8	12,9	15,0	16,0	17,0	19,1	19,7
	21,0	10,8	12,9	15,0	16,0	17,0	19,1	19,5
	23,0	10,8	12,9	15,0	16,0	17,0	18,9	19,3
	25,0	10,8	12,9	15,0	16,0	17,0	18,6	19,0
	27,0	10,8	12,9	15,0	16,0	17,0	18,3	18,7
	29,0	10,8	12,9	15,0	16,0	17,0	18,1	18,5
	31,0	10,8	12,9	15,0	16,0	17,0	17,8	18,2
	33,0	10,8	12,9	15,0	16,0	17,0	17,5	17,9
	35,0	10,8	12,9	15,0	16,0	16,9	17,3	17,6
	37,0	10,8	12,9	15,0	16,0	16,6	17,0	17,4
	39,0	10,8	12,9	15,0	16,0	16,3	16,7	17,1
200	10,0	15,1	18,0	21,0	22,4	23,8	26,8	29,4
	12,0	15,1	18,0	21,0	22,4	23,8	26,8	29,0
	14,0	15,1	18,0	21,0	22,4	23,8	26,8	28,7
	16,0	15,1	18,0	21,0	22,4	23,8	26,8	28,3
	18,0	15,1	18,0	21,0	22,4	23,8	26,8	27,9
	20,0	15,1	18,0	21,0	22,4	23,8	26,8	27,5
	21,0	15,1	18,0	21,0	22,4	23,8	26,8	27,4
	23,0	15,1	18,0	21,0	22,4	23,8	26,4	27,0
	25,0	15,1	18,0	21,0	22,4	23,8	26,1	26,6
	27,0	15,1	18,0	21,0	22,4	23,8	25,7	26,2
	29,0	15,1	18,0	21,0	22,4	23,8	25,3	25,8
	31,0	15,1	18,0	21,0	22,4	23,8	24,9	25,4
	33,0	15,1	18,0	21,0	22,4	23,8	24,5	25,0
	35,0	15,1	18,0	21,0	22,4	23,6	24,2	24,6
	37,0	15,1	18,0	21,0	22,4	23,2	23,8	24,3
	39,0	15,1	18,0	21,0	22,4	22,8	23,4	23,9
250	10,0	18,9	22,5	26,2	28,0	29,8	33,5	36,8
	12,0	18,9	22,5	26,2	28,0	29,8	33,5	36,3
	14,0	18,9	22,5	26,2	28,0	29,8	33,5	35,9
	16,0	18,9	22,5	26,2	28,0	29,8	33,5	35,4
	18,0	18,9	22,5	26,2	28,0	29,8	33,5	34,9
	20,0	18,9	22,5	26,2	28,0	29,8	33,5	34,4
	21,0	18,9	22,5	26,2	28,0	29,8	33,5	34,2
	23,0	18,9	22,5	26,2	28,0	29,8	33,0	33,7
	25,0	18,9	22,5	26,2	28,0	29,8	32,6	33,2
	27,0	18,9	22,5	26,2	28,0	29,8	32,1	32,8
	29,0	18,9	22,5	26,2	28,0	29,8	31,6	32,3
	31,0	18,9	22,5	26,2	28,0	29,8	31,1	31,8
	33,0	18,9	22,5	26,2	28,0	29,8	30,6	31,3
	35,0	18,9	22,5	26,2	28,0	29,5	30,2	30,8
	37,0	18,9	22,5	26,2	28,0	29,0	29,7	30,4
	39,0	18,9	22,5	26,2	28,0	28,5	29,2	29,9

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EKXMCB

Capacity calculation for multi combination of third manufacturer air handling unit.

Introduction
The capacity of the indoor unit must be selected on the standard operation conditions as specified below because the connected Air handling unit is operating in combination with other appliances connected to the outdoor.

Selection of capacity table
Take the capacity of the selected air handling unit heat exchanger on the standard operation conditions. (see below)
Determin the capacity class according to below table "Heat exchanger capacity class", use its capacity table as base for capacity table as base for capacity calculations.

HEAT EXCHANGER CAPACITY CLASS			
Capacity class	Capacity (kW)		
	minimum	standard	maximum
50	5.0	5.6	6.2
63	6.4	7.1	7.8
80	8.1	9.0	9.9
100	10.1	11.2	12.3
125	12.6	14.0	15.4
140	14.4	16.0	17.6
200	20.2	22.4	24.6
250	25.2	28.0	30.8

Heat exchanger capacity as defined under these conditions
Standard operation conditions of the indoor unit:

SST	6°	(evaporator saturated suction temperature)
SH	5K	(superheat at evaporator exit.)
SC	3K	(Sub cool condensor)
suction air temperature	27/19(°CWB/°CDB)	(Degree Celcius Dry Bulb/ Wet Bulb)

Correction of capacity table to actual heat exchanger capacity
to make the value more correct, a correction needs to be done on the capacity, based on the ratio of the actual heat exchanger capacity and th standard capacity.
the capacity class * ratio (actual capacity / standard capacity) = Air handling unit capacity index.

Power input of combination:
Take sum of all capacities of the combined appliances.
See outdoor unit capacity table for the matching power input.

Example:
Capacity table
An evaporator with capacity of 6,9kW at the "standard operation conditions" with an internal volume of 1.4dm^3.
A 10 HP outdoor unit is connected with 2 FXSQ50 class (standard indoor) + the mentioned air handling unit:

Indoor capacity
for the Air handling unit: the unit is within the range of a 63 class. => the table of the 63 class must be used.
To calculate the exact capacity correction is needed
63 class indoor: standard capacity is 7,1kW
The selected indoor unit has on the standard operation conditions a capacity of 6,9kW.
The values of the table need to be corrected with the ratio of: actual capacity / standard capacity

$$\frac{\text{actual capacity}}{\text{standard capacity}} = \frac{6.9\ (kW)}{7.1\ (kW)} = 97\%$$

For correct capacity: the table of the capacity class of 63 need to be multiplied with 0.97.
capacity index of air handling unit: 0.97*63=61
Power input of combination
Take sum of capacity index of each individual indoor.
50 + 50 + 61 = 161
Power input must be selected from 10 HP capacity table based on the 161 as total capacity index.

Notes
Actual operation depends on the operating conditions (outdoor temperature / indoor load / connected indoors operating ...)
See outdoor unit data for additional correction when the connection ration passes over 100%, effect of long piping and other connections)

Connection limitations to the outdoor condensing unit

Introduction
The outdoor unit determins the limmitations of the allowed combination to keep its rliability. 2 limits exist.
Number of appliances that are connected (appliance can be standard Daikin indoor or free choice Air handling unit)
Sum of the size for the connected appliances

Maximum allowed number of indoor/evaporator units:
See outdoor unit engineering data or manual for the maximum number of appliances that may be connected.

Minimum and maximum size of connected appliances.
Step 1: Calculate the individual connection ratio of each individual appliance.
Step 2: Make sum of al the connected appliances

Indoor connection size		
Connection ratio	Heat exchanger Volume (dm3)	
	minimum	maximum
50	0.76	0.96
63	0.96	1.22
80	1.22	1.53
100	1.53	1.91
125	1.91	2.14
140	2.14	3.06
200	3.06	3.82
250	3.82	4.78

Outdoor connection		
outdoor class (HP)	connection ratio	
	minimum	maximum
	50%	130%
5	62.5	162.5
8	100	260
10	125	325
12	150	390
14	175	455
16	200	520
18	225	585

Heat exchangervolume: total inner volume of the evaporator heat excganger. (not including connection pipe and header)

Calculate the individual connection ratio of each individual appliance.
See above table of "indoor connection size"
The inner volume of the connected heat exchanger determins the connection size.

Indoor unit connection ratio value:
The connection ratio of the outdoor unit must be within the limits specified by the outdoor unit and must additiionally be within 50% or 13% when EKEXMCB is connected.
The limits of 50% to 130% are shown in above table.
The connection ratio is teh sum of all the units connected to an outdoor unit.
For standard indoor units: the capacity class is the value needed to calculate the connection ratio/
Note: This is also the class of the expansion valve that needs to be used for this heat exchanger.

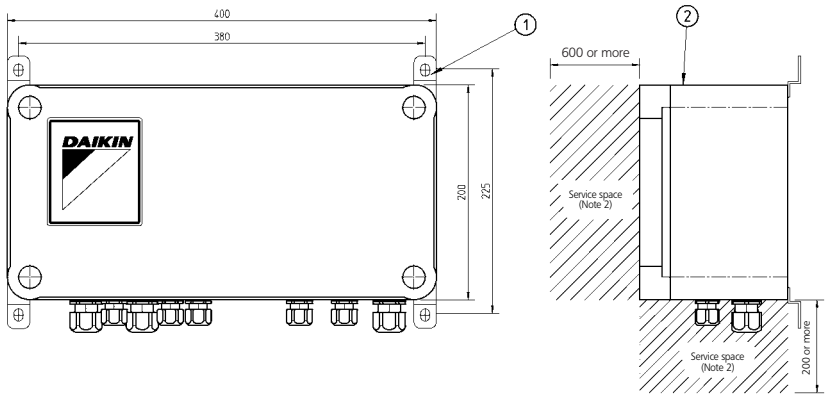
example:
An evaporator with a capacity of 6.9 kW at the "standard indoor conditions" with an internal volume of 1.4dm^3.
A 10 HP outdoor unit is connected with: 2 FXSQ class (standard indoor) + the mentioned air handling unit:
FXQ 50 = 2 tomes 50
1.4dm^3 iswithin the values of the 80 class 10 outdoor unit.
total connection ratio = FXSQ 50 + FXSQ 50 + Air handling unit 80 = 180
180 is within thye limits of the class 10 outdoor unit
A 10HP outdoor unit can control more than 3 units
=>combination is allowed.

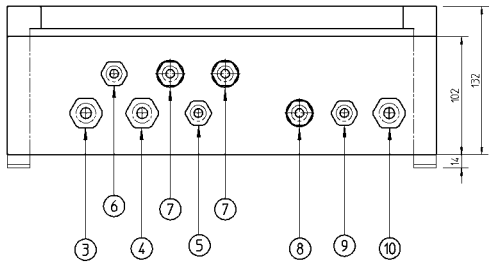
3TW28082-2

4 Dimensional drawing & centre of gravity

4 - 1 Dimensional drawing

EKEXMCB





① 4 holes to fix control box
② Control box lid
③ Screw nut for power supply cable
④ Screw nut for expansion valve cable
⑤ Screw nut for thermistor cable (liquid) R2T
⑥ Screw nut for thermistor cable (gas) R3T
⑦ Screw nut for communication cable
⑧ Screw nut for thermistor cable (air) R1T
⑨ Screw nut for remote controller
⑩ Screw nut for connection cable to controller

Notes:

1 Installation:
Make sure that the control box is installed horizontal, screw nuts position downwards.
The option boxes (expansion valve and electrical control box) can be installed inside and outside.
Do not install the option boxes in or on the outdoor unit.
Do not put the option boxes in direct sunlight. Direct sunlight will increase the temperature inside the option boxes and may reduce its lifetime and influence its operation.
Choose a flat and strong mounting surface.

2 Service space:
Keep enough free for future maintenance.

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5 Wiring diagram

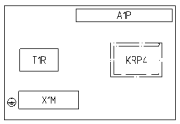
5 - 1 Wiring diagram

EKEXMCB

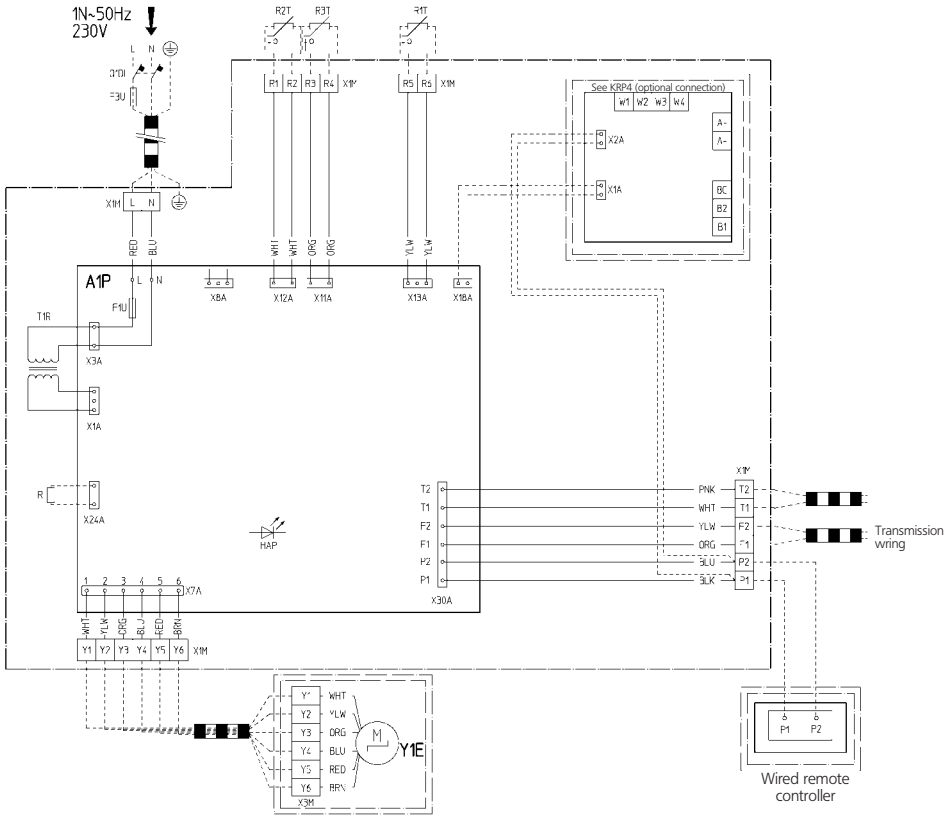
A1P : Printed circuit board
F1U : Fuse (250V, F5A) (A1P)
F3U : Field fuse
HAP : Light emitting diode (service monitor green)
Q1DI : Earth leakage breaker
R1T : Thermistor (Air)
R2T : Thermistor (Liquid)
R3T : Thermistor (Gas)
T1R : Transformer (220V/21.8V)
X1M : Terminal block
X3M : Terminal block
Y1E : Electronic expansion valve
X1M-R1/R2 : Thermistor Liquid
X1M-R3/R4 : Thermistor Gas
X1M-R5/R6 : Thermistor Air
X1M-Y1–6 : Expansion valve
X1M-P1/P2 : Communication remote controller
X1M-T1/T2 : Input: ON/OFF
X1M-F1/F2 : Communication outdoor

1 Use copper conductors only.
2 BLK: Black / WHT: White / RED: Red / BLU: Blue / BRN: Brown / GRY: Grey / GRN: Green / PINK: Pink / YLW: Yellow

L : Live
N : Neutral
: Connector
: Wire clamp
: Protective earth (Screw)
: Seperate component
: Optional accessory
: Field wiring



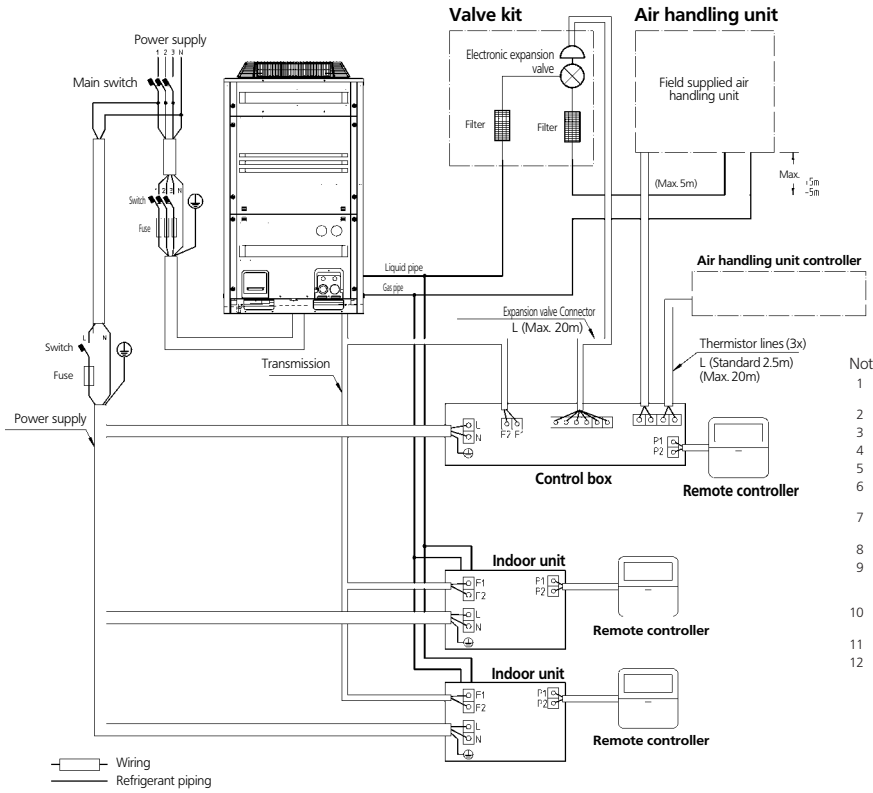
Position in switch box



5 Wiring diagram

5 - 2 External connection diagram

EKEXMCB



Notes:

1. All wiring, components and materials to be produced on the site must comply with the applicable local and national codes.
2. Use copper conductors only.
3. For more details, see wiring diagram.
4. Install a circuit breaker for safety.
5. All field wiring and components must be provided by a licensed electrician.
6. The unit shall be grounded in compliance with the applicable local and national codes.
7. Wiring shown are general points-of-connection guides only and are not intended for or to include all details for a specific installation.
8. Be sure to install the switch and the fuse to the power line of each equipment.
9. Install the main switch that can interrupt all power sources in an integrated manner because this system consists of the equipment utilizing the multiple power sources.
10. For detailed control box side connection, see control box manual and wiring diagram.
11. For detailed pipe connections and limitations, see manuals.
12. Connection appliance can be standard indoor unit or free choice of air handling unit.

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VRV III

In all of us, a green heart

Daikin's unique position as a manufacturer of air conditioning equipment, compressors and refrigerants has led to its close involvement in environmental issues. For several years Daikin has had the intension to become a leader in the provision of products that have limited impact on the environment. This challenge demands the eco design and development of a wide range of products and an energy management system, resulting in energy conservation and a reduction of waste.

Daikin Europe N.V. is approved by LRQA for its Quality Management System in accordance with the ISO9001 standard. ISO9001 pertains to quality assurance regarding design, development, manufacturing as well as to services related to the product.

ISO14001 assures an effective environmental management system in order to help protect human health and the environment from the potential impact of our activities, products and services and to assist in maintaining and improving the quality of the environment.

CE Daikin units comply with the European regulations that guarantee the safety of the product.

VRV products are not within the scope of the Eurovent certification programme.

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