

TECHNICAL DATA & SERVICE MANUAL



**INDOOR UNIT: KPSW2B5XAB
KPSW3B5XAB
KPSW4B5XAB**

SPLIT SYSTEM AIR CONDITIONER

Model No.	Product Code No.
KPSW2B5XAB	38.7105.970
KPSW3B5XAB	38.7105.971
KPSW4B5XAB	38.7105.972

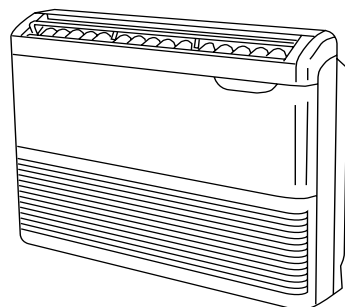
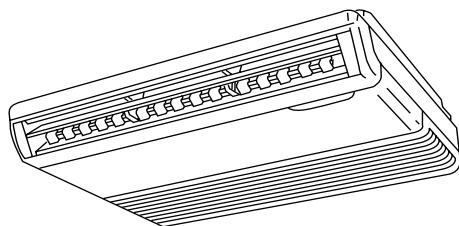


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1. SPECIFICATIONS

1-1 Unit Specifications

KPSW2B5XAB

Power source	230 V - 50 Hz
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Performance			
Input		kW	0,040
Running Amps		A	0,19
Total cooling capacity (1)	High/Med./Low	kW	2,4/1,8/1,07
Sensible cooling capacity (1)	High/Med./Low	kW	1,97/1,5/0,93
Heating capacity (2)	High/Med./Low	kW	3,48/2,7/1,84
Air circulation	High/Med./Low	m ³ /h	415/300/200

Features			
Controls/Temperature controls			Microprocessor/ I.C. thermostat
Control unit			Wireless remote control unit
Timer			ON/OFF 24 hours
Fan speed			3 and Auto
Airflow direction			Auto (Remote control)
Water FLOW in cooling	High/Med./Low	l/h	420/312/184
Pressure drop on water in cooling (1)	High/Med./Low	kPa	21,0/12,1/4,8
Pressure drop on water in heating (2)	High	kPa	13
Air Filter			Washable, polypropylene, class HB (UL94)
Power noise level	High/Med./Low	dB-A	48/43/35
Water tubing connections			1/2" gas male
Air clean filter			Optional
3-Way valve + By-pass (1/2 gas male, KVS 1,6, 230V NC)			Optional

Dimensions & Weight			
Unit dimensions	Height	mm	680
	Width	mm	900
	Depth	mm	190
Package dimensions	Height	mm	770
	Width	mm	995
	Depth	mm	280
Weight	Net	kg	23,5
	Shipping	kg	31,5
Shipping volume		m ³	0,21

DATA SUBJECT TO CHANGE WITHOUT NOTICE

- (1) Air inlet 27°C (D.B.) / 19°C (W.B.); Water inlet 7°C; Water outlet 12°C
 (2) Air inlet 20°C; Water inlet 50°C (same water capacity as in conditions (1))

OPERATION LIMITS

Min. water inlet temperature 4°C

Max. water inlet temperature 60°C

Max. operating pressure of hydraulic circuit 16 bar

Min. air recirculation temperature 5°C

Max. air recirculation temperature 32°C

KPSW3B5XAB

Power source	230 V - 50 Hz
--------------	---------------

Performance			
Input		kW	0,046
Running Amps		A	0,23
Total cooling capacity (1)	High/Med./Low	kW	3,19/2,4/1,13
Sensible cooling capacity (1)	High/Med./Low	kW	2,47/1,8/0,95
Heating capacity (2)	High/Med./Low	kW	4,07/3,4/2,05
Air circulation	High/Med./Low	m ³ /h	520/430/210

Features			
Controls/Temperature controls			Microprocessor/ I.C. thermostat
Control unit			Wireless remote control unit
Timer			ON/OFF 24 hours
Fan speed			3 and Auto
Airflow direction			Auto (Remote control)
Water capacity in cooling	High/Med./Low	l/h	550/413/191
Pressure drop on water in cooling (1)	High/Med./Low	kPa	26,6/19,9/4,4
Pressure drop on water in heating (2)	High	kPa	23,7
Air Filter			Washable, polypropylene, class HB (UL94)
Power noise level	High/Med./Low	dB-A	50/45/35
Water tubing connections			1/2" gas male
Air clean filter			Optional
3-Way valve + By-pass (1/2 gas male, KVS 1,6, 230 NC)			Optional

Dimensions & Weight			
Unit dimensions	Height	mm	680
	Width	mm	900
	Depth	mm	190
Package dimensions	Height	mm	770
	Width	mm	995
	Depth	mm	280
Weight	Net	kg	23,5
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OPERATION LIMITS

Min. water inlet temperature 4°C

Max. water inlet temperature 60°C

Max. operating pressure of hydraulic circuit 16 bar

Min. air recirculation temperature 5°C

Max. air recirculation temperature 32°C

KPSW4B5XAB

Power source	230 V - 50 Hz
--------------	---------------

Performance			
Input		kW	0,070
Running Amps		A	0,39
Total cooling capacity (1)	High/Med./Low	kW	3,6/3,0/1,77
Sensible cooling capacity (1)	High/Med./Low	kW	3,06/2,5/1,48
Heating capacity (2)	High/Med./Low	kW	5,3/4,3/2,4
Air circulation	High/Med./Low	m ³ /h	675/570/327

Features			
Controls/Temperature controls			Microprocessor/ I.C. thermostat
Control unit			Wireless remote control unit
Timer			ON/OFF 24 hours
Fan speed			3 and Auto
Airflow direction			Auto (Remote control)
Water capacity in cooling	High/Med./Low	l/h	617/520/309
Pressure drop on water in cooling (1)	High/Med./Low	kPa	25,8/19/7,4
Pressure drop on water in heating (2)	High	kPa	25,8
Air Filter			Washable, polypropylene, class HB (UL94)
Power noise level	High/Med./Low	dB-A	54/51/40
Water tubing connections			1/2" gas male
Air clean filter			Optional
3-Way valve + By-pass (1/2 gas male, KVS 1,6, 230 NC)			Optional

Dimensions & Weight			
Unit dimensions	Height	mm	680
	Width	mm	900
	Depth	mm	190
Package dimensions	Height	mm	770
	Width	mm	995
	Depth	mm	280
Weight	Net	kg	23,5
	Shipping	kg	31,5
Shipping volume		m ³	0,21

DATA SUBJECT TO CHANGE WITHOUT NOTICE

- (1) Air inlet 27°C (D.B.) / 19°C (W.B.); Water inlet 7°C; Water outlet 12°C
(2) Air inlet 20°C; Water inlet 50°C (same water capacity as in conditions (1))

OPERATION LIMITS

Min. water inlet temperature 4°C

Max. water inlet temperature 60°C

Max. operating pressure of hydraulic circuit 16 bar

Min. air recirculation temperature 5°C

Max. air recirculation temperature 32°C

1-2 Major Component Specifications

KPSW2B5XAB

Controller PCB		
Part No.		SAC ON-OFF IDU
Controls		Microprocessor
Control circuit fuse		250 V - 3,15 A
Jumper setting JP1..JP5		2,54mm-5pcs

Remote Control Unit	SAC W-REM
---------------------	-----------

Fan & Fan Motor				
Type				Cross - flow
Q'ty Dia. and lenght	mm			2.... Ø 130 / L 180
Fan motor model...Q'ty				K35406-M02046 ...1
No. Of poles...rpm (230 V, High)				4... 1040
Running Amps	A			0,17
Power input	W			37
Coil resistance (Ambient temp. 25 °C)	Ω			GRY-PNK: 150,7 GRY-WHT: 605 WHT-VLT: 130,4 VLT-ORG: 66,5 ORG-YEL: 150,4
Safety devices	Type			Internal thermal protector
	Operating temp.	Open	°C	150 ± 5
		Close	°C	Automatic reclosing
Run capacitor	μF			1,2
	VAC			440

Flap Motor		
Type		Stepping motor
Model		MP24Z2
Rating		DC 12 V
Coil resistance (Ambient temp. 25 °C)	Ω	400 ± 7%

Heat Exch. Coil		
Coil		Aluminium plate fin / Copper tube
Rows		2
Fin pitch	mm	1,4
Face area	m ²	0,178
Quantity of water	l	1,00

DATA SUBJECT TO CHANGE WITHOUT NOTICE

KPSW3B5XAB

Controller PCB		
Part No.		SAC ON-OFF IDU
Controls		Microprocessor
Control circuit fuse		250 V - 3,15 A
Jumper setting JP1...JP5		2,54mm-5pcs

Remote Control Unit	SAC W-REM
---------------------	-----------

Fan & Fan Motor			
Type			Cross - flow
Q'ty Dia. and lenght	mm		2.... Ø 130 / L 180
Fan motor model...Q'ty			K48407-MO1596 ...1
No. Of poles...rpm (230 V, High)			4... 1250
Running Amps	A		0,29
Power input	W		65
Coil resistance (Ambient temp. 25 °C)	Ω		GRY-WHT: 194 ÷ 223 WHT-PNK: 238 ÷ 274 WHT-VLT: 80,1 ÷ 92,2 VLT-ORG: 80,1 ÷ 92,2 ORG-YEL: 200 ÷ 230
Safety devices	Type		Internal thermal protector
	Operating temp. Open	°C	145 ± 5K
	Close	°C	Automatic reclosing
Run capacitor	μF		1,5
	VAC		450

Flap Motor		
Type		Stepping motor
Model		MP24Z2
Rating		DC 12 V
Coil resistance (Ambient temp. 25 °C)	Ω	400 ± 7%

Heat Exch. Coil		
Coil		Aluminium plate fin / Copper tube
Rows		2
Fin pitch	mm	1,4
Face area	m ²	0,178
Quantity of water	l	1,00

DATA SUBJECT TO CHANGE WITHOUT NOTICE

KPSW4B5XAB

Controller PCB		
Part No.		SAC ON-OFF IDU
Controls		Microprocessor
Control circuit fuse		250 V - 3,15 A
Jumper setting JP1..JP5		2,54mm-5pcs

Remote Control Unit	SAC W-REM
---------------------	-----------

Fan & Fan Motor			
Type			Cross - flow
Q'ty Dia. and lenght	mm		2.... Ø 130 / L 180
Fan motor model...Q'ty			K48410-MO1598 ...1
No. Of poles...rpm (230 V, High)			4... 1350
Running Amps	A		0,41
Power input	W		88
Coil resistance (Ambient temp. 25 °C)	Ω		GRY-WHT: 124 ÷ 144 WHT-PNK: 255 ÷ 294 WHT-VLT: 69,3 ÷ 79,8 VLT-ORG: 69,3 ÷ 79,8 ORG-YEL: 200 ÷ 233
Safety devices	Type		Internal thermal protector
	Operating temp. Open	°C	145 ± 5K
	Close	°C	Automatic reclosing
Run capacitor	μF		2,0
	VAC		450

Flap Motor		
Type		Stepping motor
Model		MP24Z2
Rating		DC 12 V
Coil resistance (Ambient temp. 25 °C)	Ω	400 ± 7%

Heat Exch. Coil		
Coil		Aluminium plate fin / Copper tube
Rows		2
Fin pitch	mm	1,4
Face area	m ²	0,178
Quantity of water	l	1,00

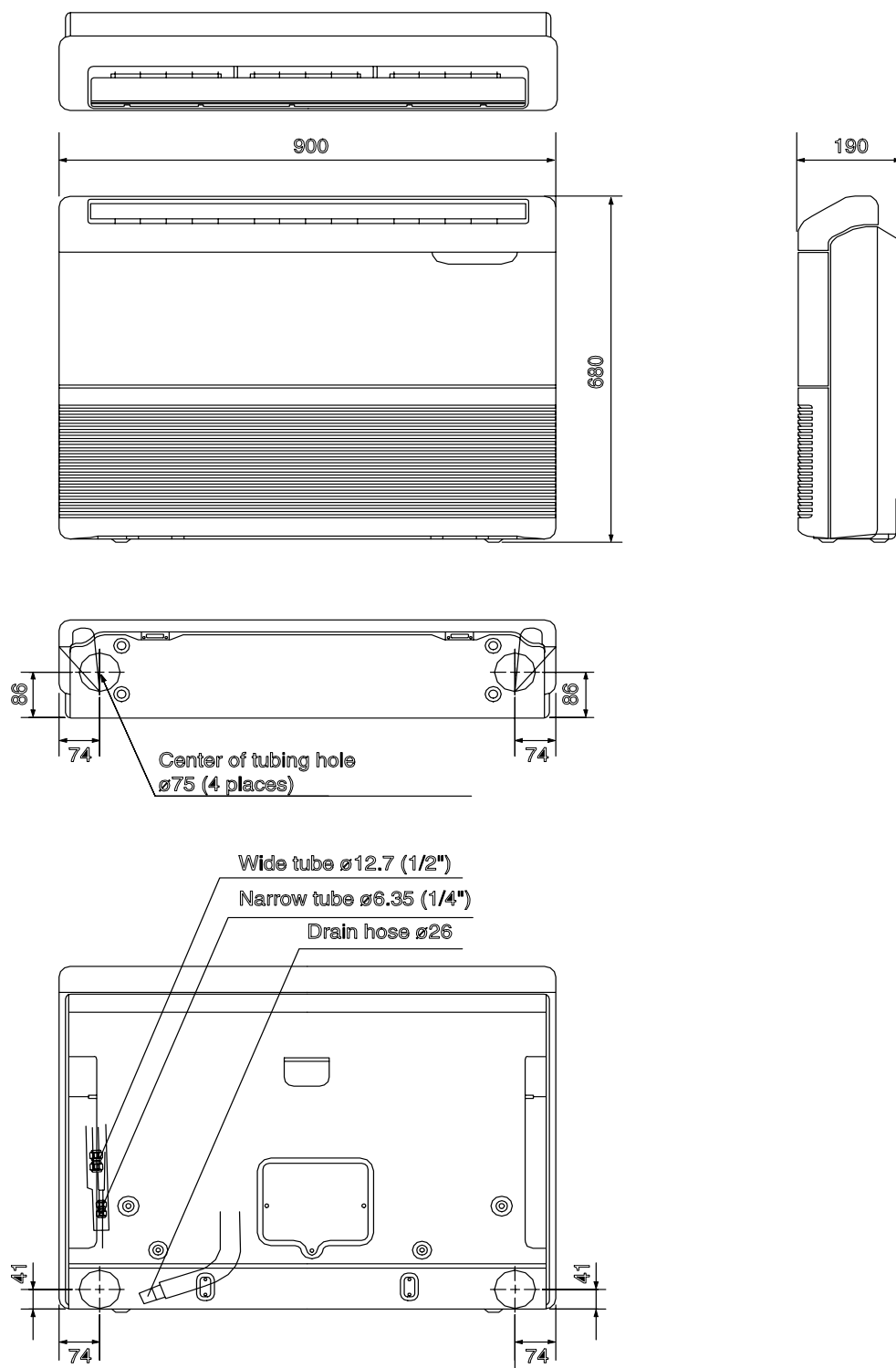
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1-3 Other Component Specifications

Thermistor (Coil sensor TH1)	
Resistance	K Ω 10 \pm 3%

Thermistor (Room sensor)	
Resistance	k Ω NTC-THERMISTOR 10 at 25 °C

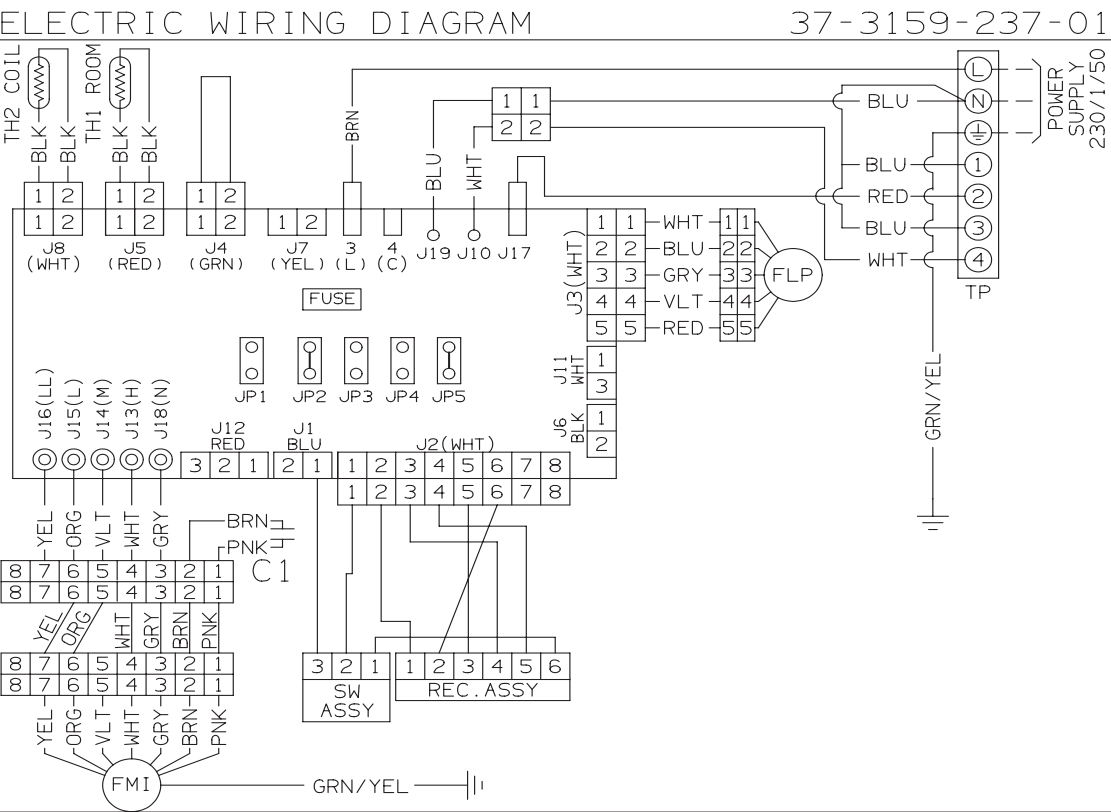
2. DIMENSIONAL DATA



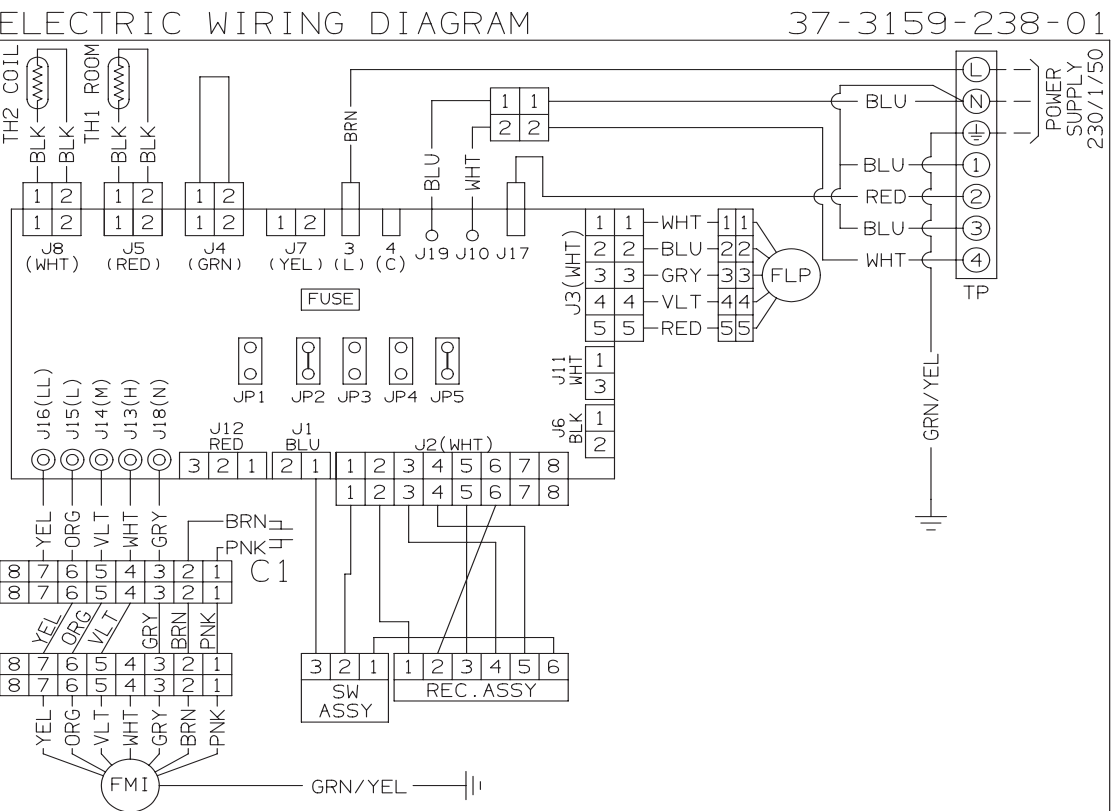
3. ELECTRICAL DATA

3-1 Electric Wiring Diagrams

KPSW2B5XAB KPSW4B5XAB

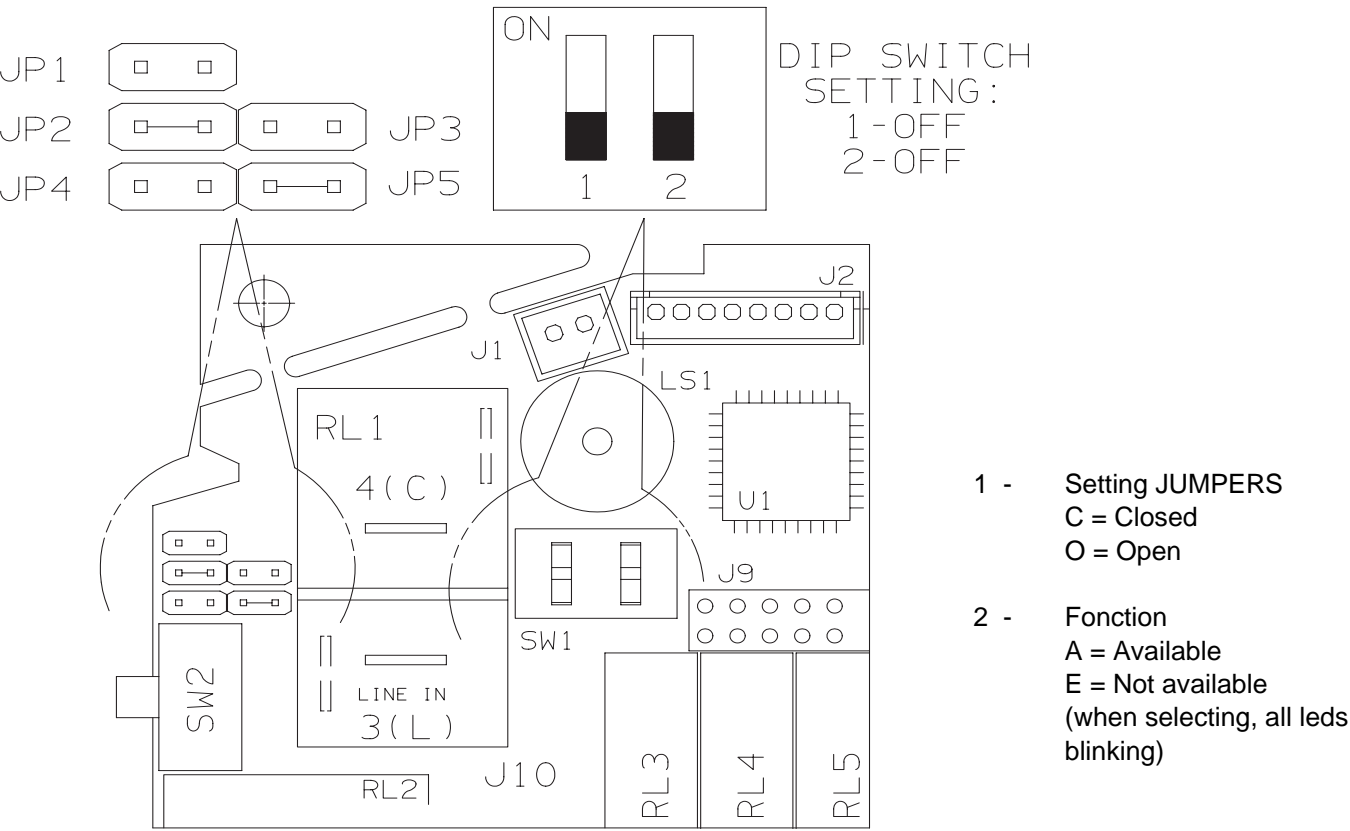


KPSW3B5XAB



3-2 JUMPERS CONFIGURATION

Jumpers are located on the indoor PCB near the MODE button.





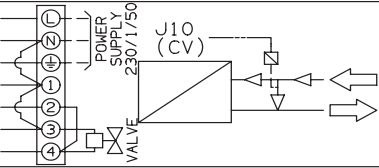


NOTE: settings different from the factory one must be done by special worker





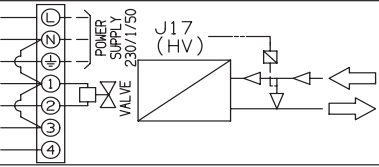
FACTORY SYSTEM CONFIGURATION:COOLING ONLY WITH VALVE

COOLING ONLY SYSTEM	FUNCTIONS					JUMPERS				
					FAN ONLY	JP1	JP2	JP3	JP4	JP5
	A	E	E	A	A	O	C	O	O	C





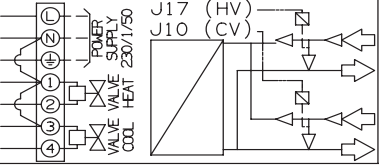
SYSTEM CONFIGURATION:COOLING OR HEATING WITH VALVE

COOLING ONLY SYSTEM	FUNCTIONS					JUMPERS				
					FAN ONLY	JP 1	JP2	JP3	JP4	JP5
	A	A	E	A	A	0	0	0	0	C

SYSTEM CONFIGURATION:HEATING ONLY WITH VALVE

COOLING ONLY SYSTEM	FUNCTIONS					JUMPERS				
					FAN ONLY	JP 1	JP2	JP3	JP4	JP5
	E	A	E	E	A	0	0	0	0	0

SYSTEM CONFIGURATION:COOLING WITH VALVE OR HEATING WITH VALVE

COOLING ONLY SYSTEM	FUNCTIONS					JUMPERS				
					FAN ONLY	JP 1	JP2	JP3	JP4	JP5
	A	A	A	A	A	0	0	0	0	C

3-3 CONTACTS FOR BUILDING AUTOMATION

3-3.1 INPUT CONTACT (J4 - green)

The status of this input affects system operation according to the following:

- Contact OPEN : system does not operate (always OFF) – inputs from wireless remote controller are not processed
- Contact CLOSED: system operates in the normal way according to the inputs coming from wireless remote controller

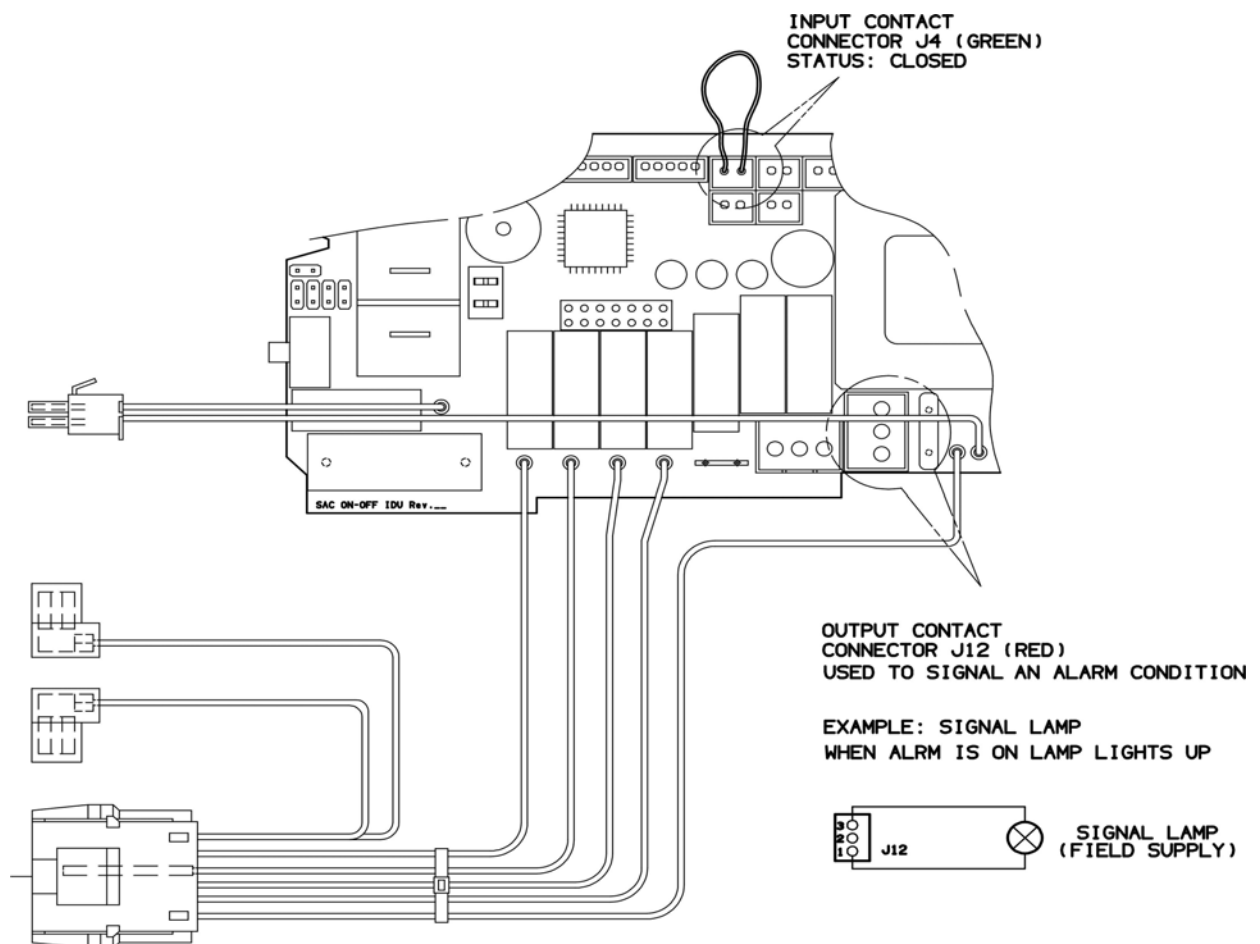
3-3.2 OUTPUT CONTACT (J12)

This connector is directly tied to the contact (normally open) of a power relay which activates every time the following alarm condition occur:

- RAT damaged
- ICT damaged

In this case when alarm happens, on poles 1 and 3 of J12 connector, 220 VAC-50Hz are available.

Max electrical load: **1A- 240VAC**



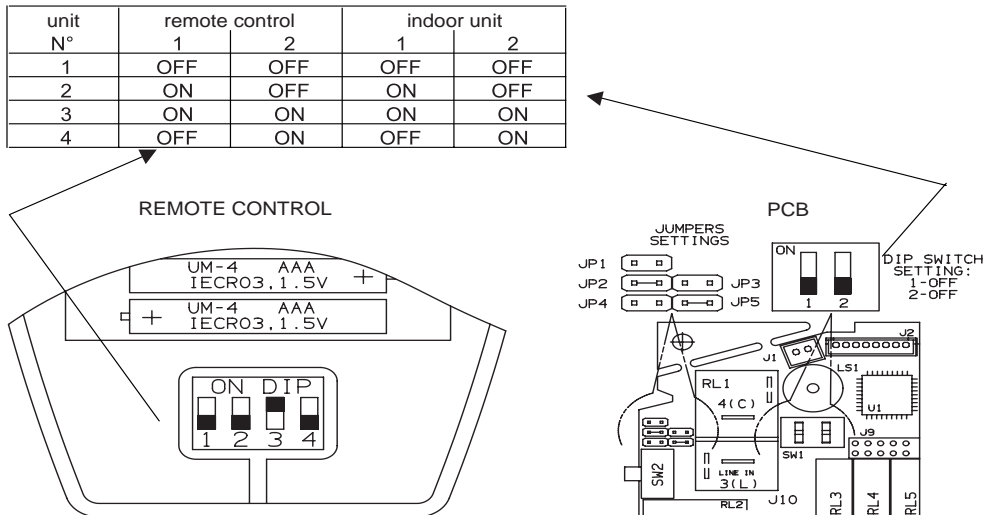
3-4 MAINTENANCE

Changing the Address of the Air Conditioner

In case of more than one air conditioner operating in the same room, it may be necessary to assign an address to each unit in order to avoid operation conflicts. Address is set acting on the dip-switches located on the indoor PCB and on the remote controller. The PCB settings must match the corresponding ones on the wireless remote controller.

How to change address of the air conditioner

Dip switch is located on the indoor PCB near the buzzer.
Set the PCB to the address desired



As default switches SW1 and SW2 are in off status (PCB factory state).

How to change address on Remote Control Unit

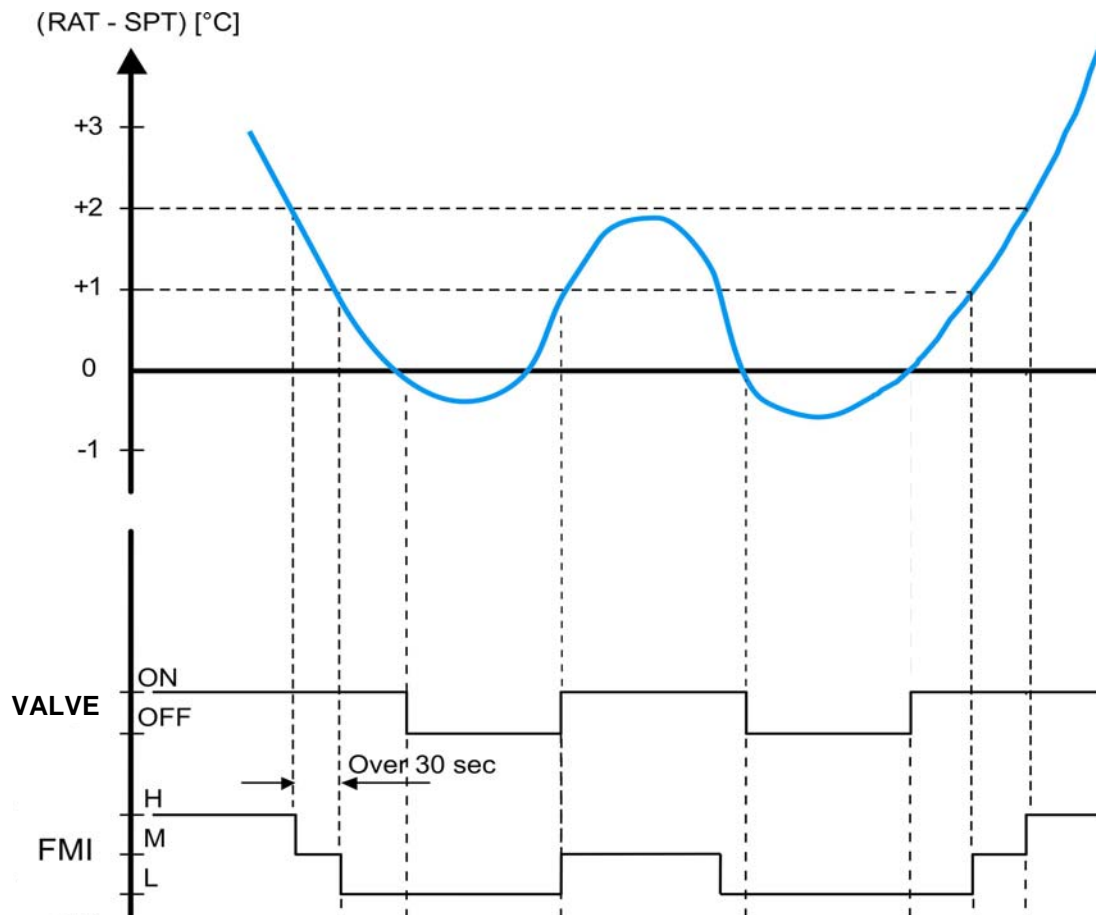
Dip switch is located on the battery compartment.

- 1) Pull out the door and remove the batteries.
- 2) Set the switch SW1 and SW2 according to the indoor PCB settings (do not act on SW3 and SW4)
- 3) Insert the batteries and pull on the door

As default switches SW1 and SW2 are in off status (remote controller factory state).

4.FUNCTION

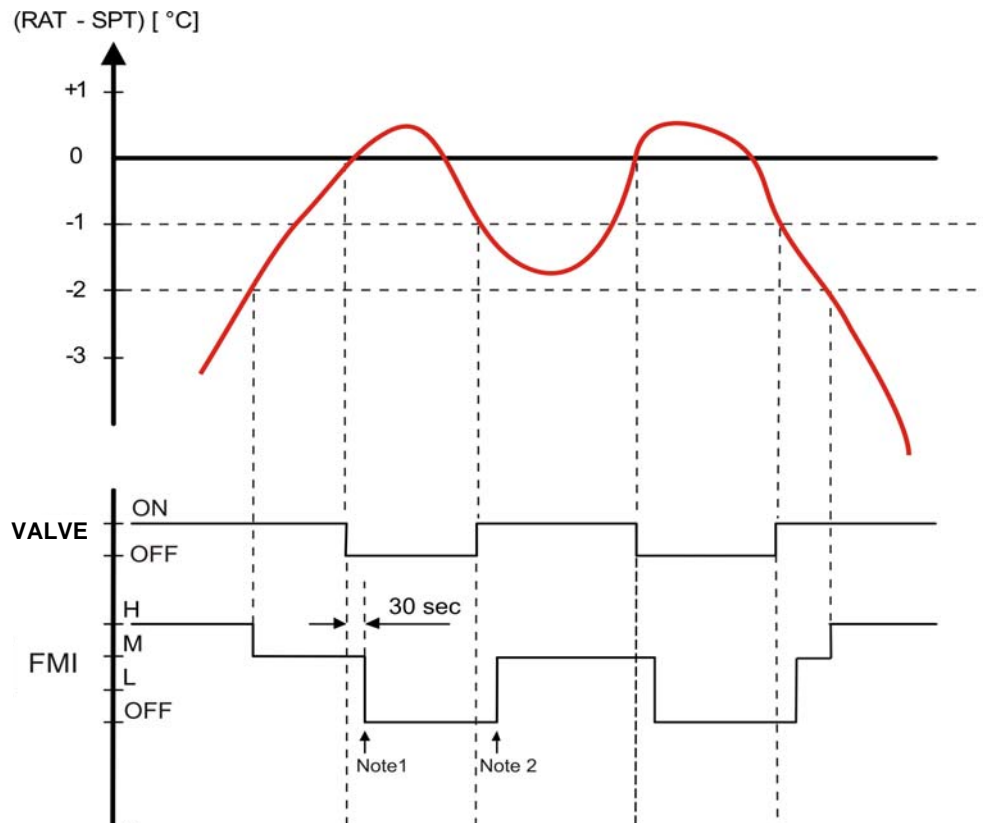
4-1 Cool Mode Operation



NOTES

1. In this graph, the FMI is operating with the "Auto Fan Speed" setting. If the user has selected the Low, Medium or High fan speed, the FMI will run at that speed only.
2. The indoor fan can change speed only after it has operated at the same speed for 30 sec if in AUTO and 1 sec for the other settings (High, Med, Low).

4-2 Heat Mode Operation

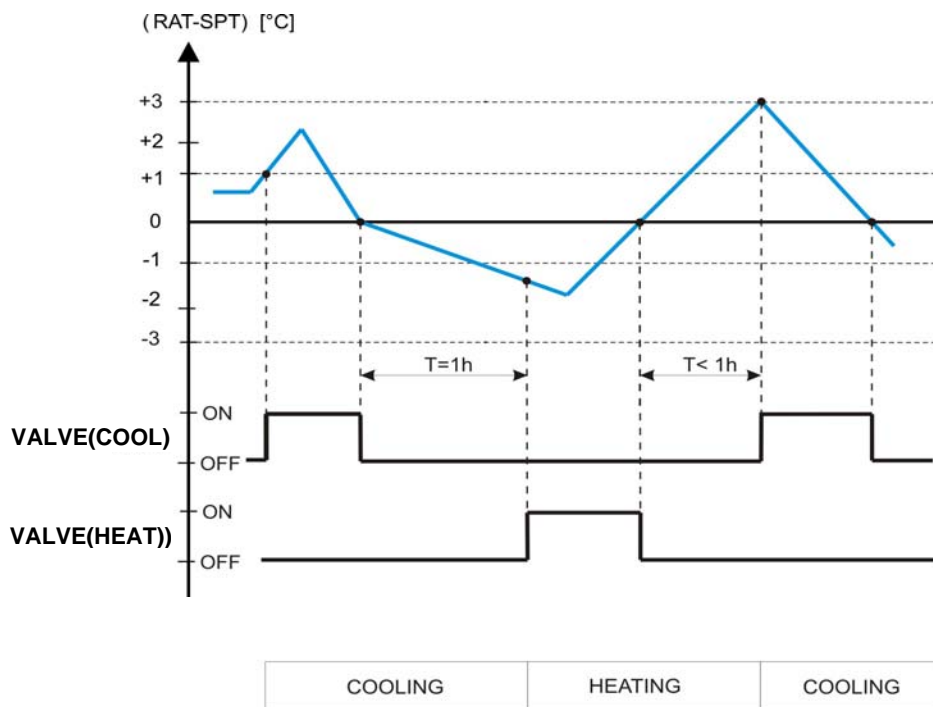


The Heating mode operation is similar to the Cooling mode operation. The VALVE and FMI are mainly controlled by the value of $(RAT - SPT)$. In the graph above, the FMI is operating in AUTO speed mode. Therefore, the FMI speed changes automatically according to the $(RT - SPT)$.

NOTES

1. After VALVE is switched off, the FMI runs for 30s in order to purge heat from the indoor coil.
2. The FMI will not be turned on until the indoor coil temperature is warm enough to prevent the supply of cool air (see COLD DRAFT PREVENTION mode for details). The indoor fan can change speed only after it has operated at the same speed for 30 sec if in AUTO and 1 sec for the other settings (High, Med, Low).

4-3 Auto (cool/heat) Mode Operation



In Auto Mode, the unit switches automatically between the Auto Cooling and Auto Heating in order to maintain the room temperature (RAT) at the prescribed set point (SPT).
The switching between the two modes is according to the above graph.
Refer to the sections 5.1 COOLING MODE and 5.2 HEATING MODE for system operation details.

4-4 Dry Mode Operation

Dry operation remove moisture from indoor air running, in cooling mode, at a low level without reducing the ambient temperature. This is done cycling ON and OFF indoor and outdoor units according to below.

ROOM TEMP	DRY LEVEL	JP4 OPEN	JP4 CLOSED
$\geq \text{SPT} + 2^{\circ}\text{C}$	LEVEL 0	Operation according to COOLING mode	Operation according to COOLING mode
$< \text{SPT} + 2^{\circ}\text{C}$ $\geq \text{SPT} - 1^{\circ}\text{C}$	LEVEL 1	CM off	CM off
		FMO on	FMO off
		FMI runs at LOW speed RV off	FMI runs at LOW speed RV off
$< \text{SPT} - 1^{\circ}\text{C}$ $\geq 15^{\circ}\text{C}$	LEVEL 2	CM off	CM off
		FMO switches 3 minutes on and 9 minutes off	FMO off
		FMI switches LL and L during FMO operation	FMI switches LL and L (3 MIN. on and 9 OFF)
		RV off	RV off
$< 15^{\circ}\text{C}$	DRY OFF ZONE	CM off	CM off
		FMO off	FMO off
		FMI off	FMI off
		RV off	RV off

SPT = Set Point Temperature

4-5 Fan Mode Operation

With this mode, the indoor fan is turned on while cooling and heating valve stay off all the time. The user can select between 3 speeds: HIGH, MEDIUM and LOW.

4-6 Auto Fan speed

With this option selected, the indoor fan speed changes automatically according to the difference between the detected air temperature (RAT sensor) and the set point (SPT):

COOLING MODE

$2 \leq (\text{RAT} - \text{SPT})$:	HIGH speed
$1 \leq (\text{RAT} - \text{SPT}) < 2$:	MEDIUM speed
$(\text{RAT} - \text{SPT}) < 1$:	LOW speed

HEATING MODE

$2 \leq (\text{SPT} - \text{RAT})$:	HIGH speed
$(\text{SPT} - \text{RAT}) < 2$:	MEDIUM speed

NOTE

SPT = Set Point Temperature

4-7 Forced Mode

In this mode the system operates (COOLING or HEATING mode – fixed settings) or is switched off by means of the MODE button of the indoor unit control board. The operation modes can be selected pressing the button in a cyclic way (OFF ⇒ COOL ⇒ HEAT ⇒ OFF...). The settings are:

COOLING mode

SET POINT temperature = 25°C
FAN SPEED = HIGH

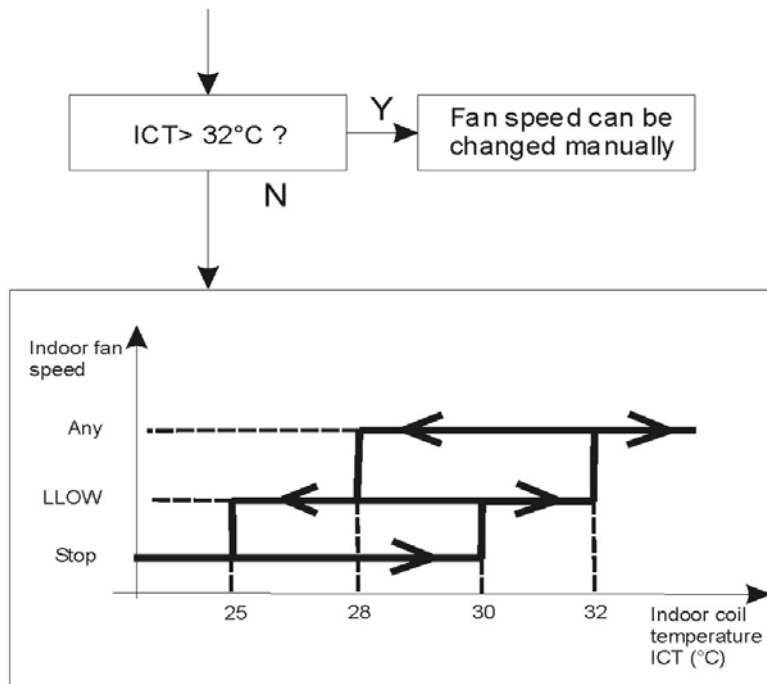
HEATING mode

SET POINT temperature = 21°C
FAN SPEED = HIGH

4-8 Protection operations in Heat Mode

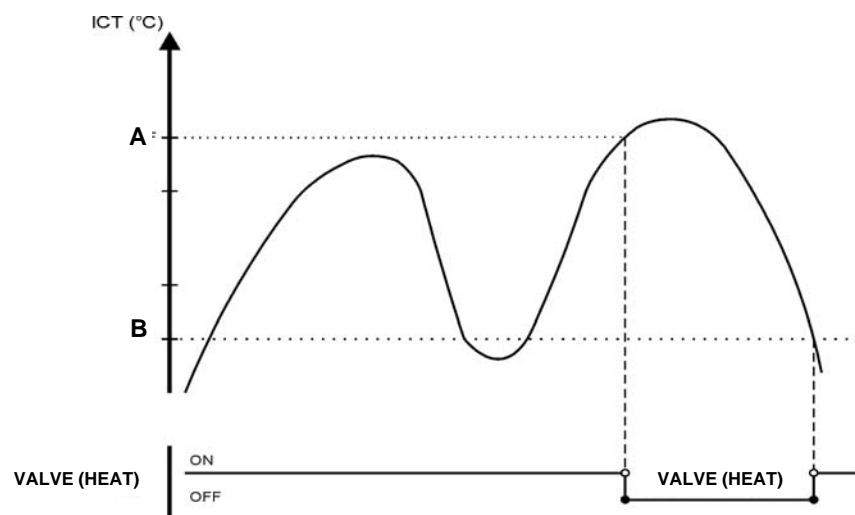
5-8.1 Cold draft

This feature prevents the supply of cold air forcing the indoor fan to a speed which cannot be changed by the user. As soon as the protection mode is exited speed can be changed manually through the remote controller. The protection acts in the following



4-8.2 Overheat

This feature prevents the build up of high pressure in the indoor heat exchanger during heating operation



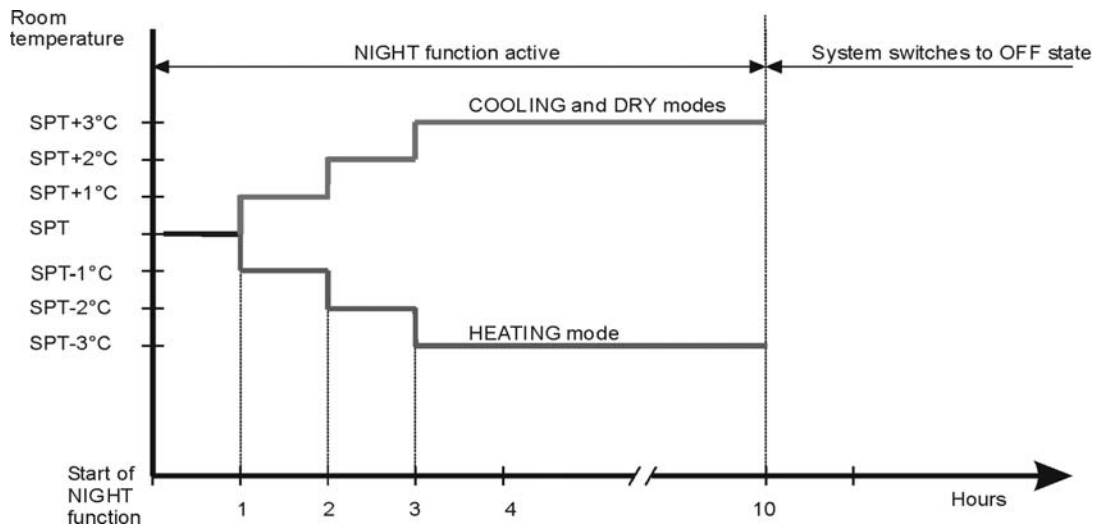
A (°C)	65
B (°C)	55

4-9 I FEEL Function

As standard configuration the air conditioner operates detecting the room temperature through the sensor equipped in the wireless remote controller (icon I FEEL shown on the display). This feature provides a personalised environment since the temperature can be detected where the remote controller is located. It is possible to de-activate this option pressing the I FEEL button on the remote controller. In this case the I FEEL icon is no longer displayed and room temperature is detected through the sensor included in the indoor unit.

4-10 NIGHT Function

When this function is active, room temperature changes automatically to compensate for body temperature variations while sleeping. After 10 hours of operation system switches automatically to OFF state. This mode of operation is available both in COOLING and HEATING mode.



4-11 Diagnostic

With this feature is possible to have a visual signal that a trouble is occurring.
This mode is always active and the signalling is made through the display board LEDS .
In case of no troubles the LEDS status follows its normal function.

NOTES

- The troubles are showed according a priority list that is in case of more than one trouble present, is always showed, at first, the one with the highest priority (1 ⇒ 2⇒ 3 etc).
- Sensor damaged means a situation where sensor is short-circuited or opened.
- In case of damaged sensors, the system (CM, FMO, FMI etc), if in OFF state, does not start.

Priority	TROUBLE	LEDS status			Effects
		LD1(stby)	LD2(opr)	LD3(timer)	
2	RAT damaged	F	O	O	System does not operate
3	ICT damaged	F	F	O	
4	WRONG MODE SELECTED	F	F	F	System does not operate

O = LED off

● = LED on

F = LED blinking

WARNING: Priority 4 only for COOLING

5 CHECKING ELECTRICAL COMPONENTS

5-1 Measurement of Insulation Resistance

The insulation is in good condition if the resistance exceeds 1 MOhm

a) Power Supply Wires

Clamp the earthed wire of the power supply wires with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on either of the power wires (fig.1).

Then measure the resistance between the earthed wire and the other power wires (fig.1).

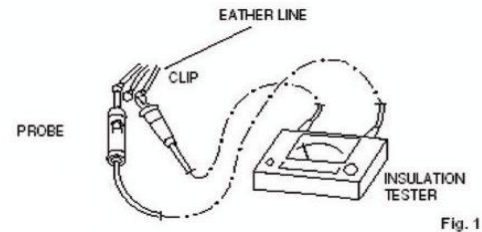


Fig. 1

b) Unit

Clamp an alluminium plate fin or copper tube with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on N terminal, and then on Lterminal the terminal plate (fig.2)

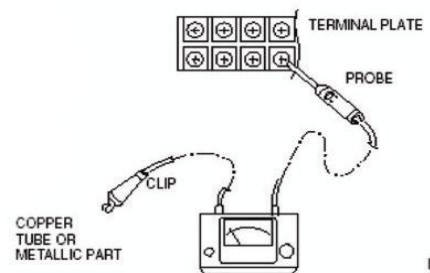


Fig. 2

c) Measurement of Insulation Resistance for Electrical Parts

Disconnect the lead wires of the disired electric part from terminal plate, PCB assy, capacitor, etc. Similary disconnect the connector. Then measure the insulation resistance (fig.1 to 4).

Refer to electric wiring diagram.

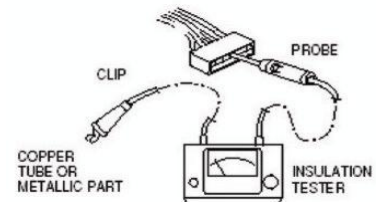


Fig. 3

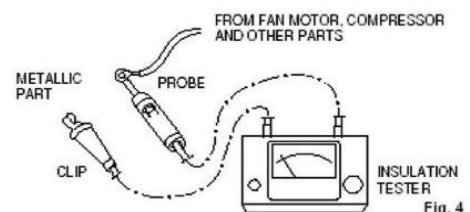


Fig. 4

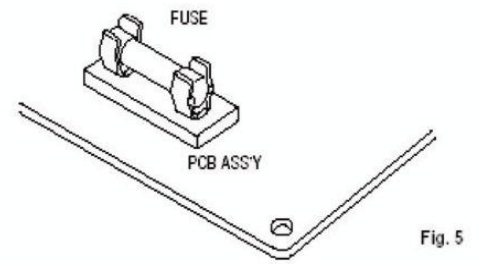
NOTE

If the probe cannot enter the poles because the hole is too narrow then use a probe with a thinner pin.

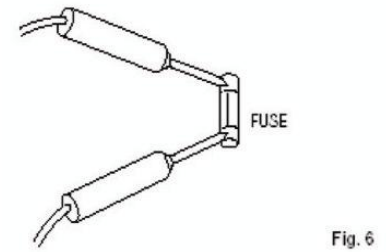
6-2 Checking Continuity of fuse on PCB assy

Remove PCB assy from electrical component box (fig.5)

Then pull out the fuse from PCB assy



Check continuity of fuse by the multimeter (fig.6)





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