

TECHNICAL MANUAL

WM: CO2 EVAPORATOR

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GENERAL

1. TEV Ltd recommend that personnel working on this equipment be skilled and fully conversant with the appropriate Air Conditioning, Refrigeration and Electrical practices and have sound knowledge of current Industrial Safe Working practices.
2. These units are supplied with a holding charge of oxygen free nitrogen.
Do not open the valves until the system is fully installed.
3. These units contain live electrical components, moving parts and refrigerant under pressure.
Always site out of reach of children and protect from vandalism.
4. The data plate only gives information for the indoor unit.
5. Evaporator tested to 90 bar pressure.
6. Max operating pressure 60 bar
7. Appropriate safety devices must be fitted to ensure maximum operating pressure is not exceeded.

PART NUMBERS

WM UNITS

WM	Cool Only
	WM 60
	55600069

KITS

DESCRIPTION	PART NUMBER
LHPW Coil FFO	97300523
Electric Heater Kit	55600401
Condensate Pump (5m head - with flow protection) Kit	97300446
Programmable Timer Kit	52500151
Return Air Sensor Kit	97200212

UNPACKED DIMENSIONS AND WEIGHTS

MODEL	WM 60
HEIGHT mm	350
WIDTH mm	1200
DEPTH mm	223
WEIGHT kg	19

FEATURES/ACCESSORIES

INDOOR UNITS	WM
Top air discharge	STD
Adjustable air deflection	STD
Long life washable filter	STD
3 fan speeds	STD
De-ice thermostat	STD
Electric heating	*
Remote hard wired control	STD
Remote temperature sensor	*
Programmable timer	*
Gravity drain	STD
5m high condensate pump	*

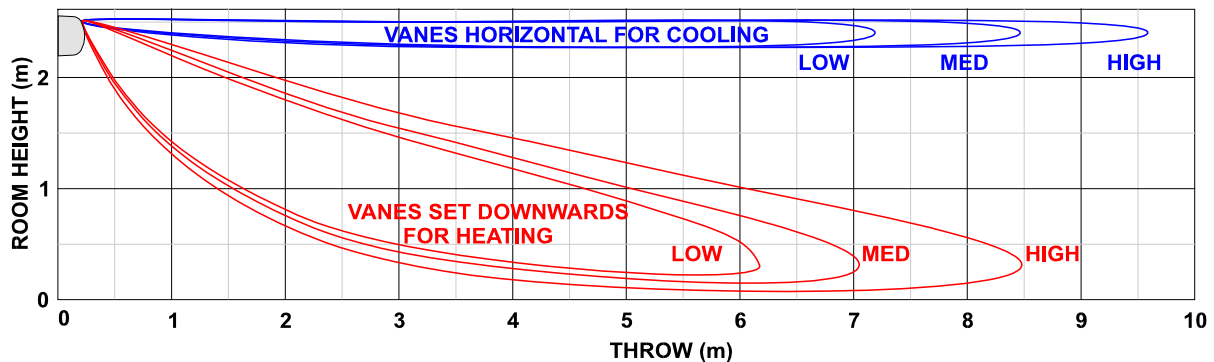
OPTIONAL ELECTRIC HEATING (kW)

WM (L) (E)	230V 50Hz	240V 50Hz
60	1.2	1.3

AIRFLOWS

WM (L) (E)	LOW SPEED	MEDIUM SPEED	HIGH SPEED
	m ³ /s	m ³ /s	m ³ /s
60	0.17	0.19	0.28

AIR THROWS



SOUND POWER and SOUND PRESSURE LEVELS

556 SERIES WM (L) (E)

MODEL	SPEED	SOUND POWER LEVELS						SOUND PRESSURE LEVELS	
		Frequency Hz						dBA	NC
60	MIN	125	250	500	1K	2K	4K	dBA	NC
	MED	36.8	37	39.1	38.8	34.4	31.7	25	19
	MAX	41	43.4	45.8	45.1	39.6	35.4	31	25
		46.7	48.6	50.6	50.4	46.6	39	37	31

Sound Power Levels obtained in conformance with BS 4196: Part 5: 1981. Values are shown in dB with a standard reference of 1 pW.

Sound Pressure Levels are dB relative to $2 \times 10^{-5} \text{N/m}^2$ and are calculated from results measured in anechoic conditions. Values relate to a position 3m away from the centre line of the unit, 1m down.

ELECTRICAL LOADS:

Amps (230V 50Hz 1Ph) or A/Ph (400V 50Hz 3PhN)

WM (L) (E)	60
Fan Motor	0.4
Electric heater	5.2

TECHNICAL INFORMATION – CO2

MODEL	Airflow l/s	EVAPORATING TEMPERATURE °C								
		2.5			5			7.5		
		Capacity kW			Capacity kW			Capacity kW		
		Total	Latent	Sensible	Total	Latent	Sensible	Total	Latent	Sensible
WM 60 @ 23°C Air ON	170	4.60	1.55	3.06	3.84	1.17	2.68	3.05	0.69	2.36
	190	4.90	1.63	3.27	4.11	1.24	2.87	3.26	0.72	2.55
	280	5.96	1.89	4.07	5.02	1.43	3.60	4.03	0.75	3.28

Heating Duty at Air 20°C (kW)				
Water Temperatures °C				
60 - 30	60-40	65 - 40	50 - 30	82-71
0.21	0.33	0.34	0.19	1.46

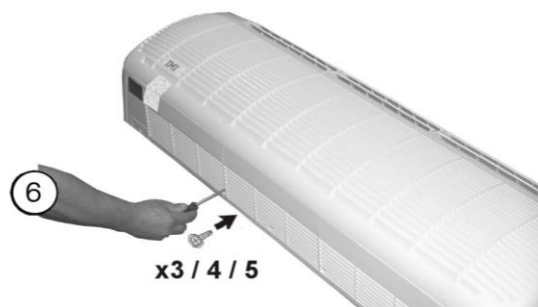
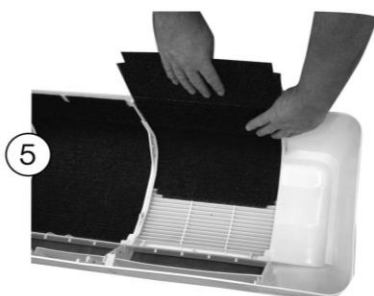
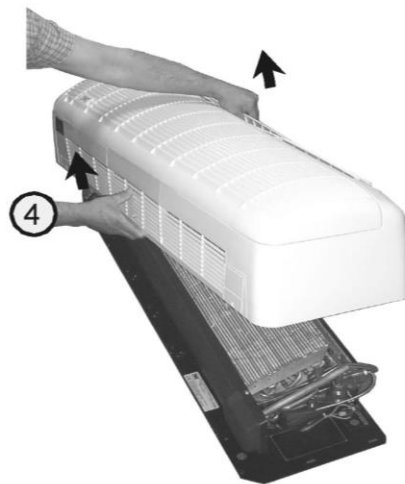
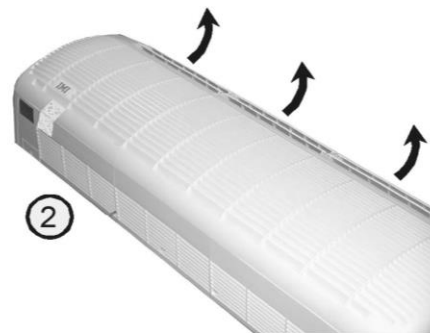
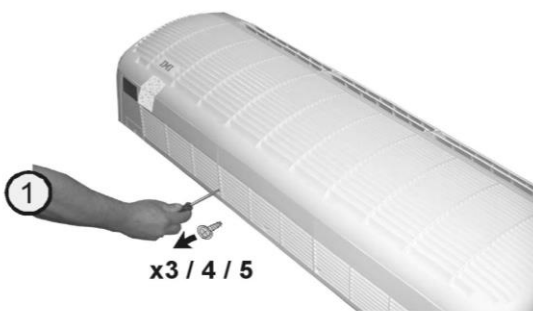
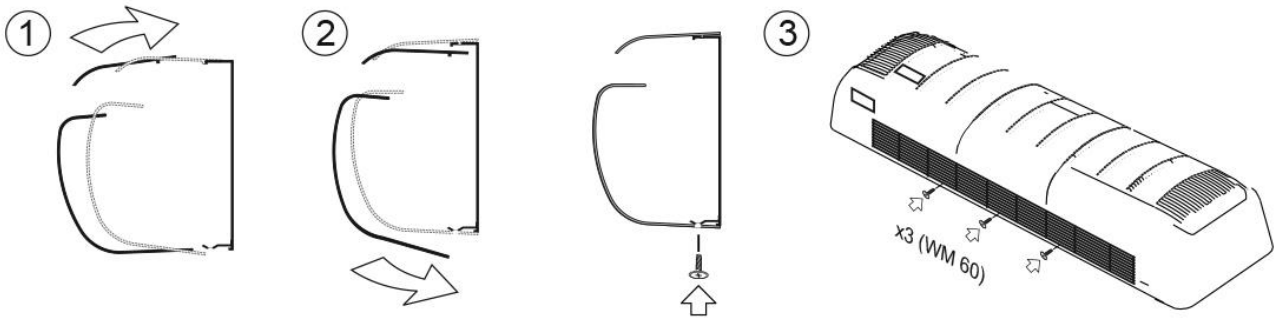
ELECTRICAL SUPPLY

1. Mains, control and interconnecting cables must be supplied and fitted by the installer. Follow local and national wiring regulations.
2. Cables must be size compatible with the recommended system fuse size.
3. Position an isolator switch within easy reach of the indoor unit.
4. Ensure the equipment is earthed.

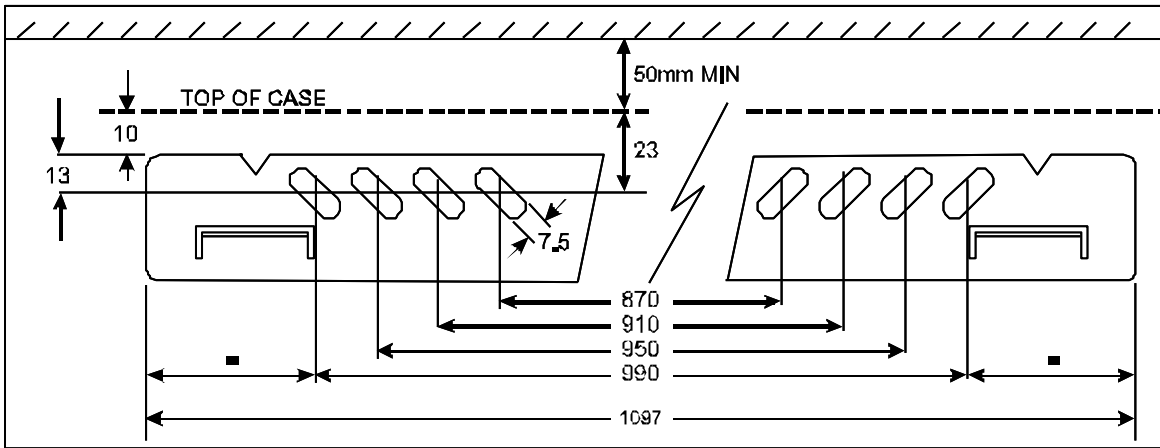
FUSE RATING

WM E	S	H
60 E	5	10

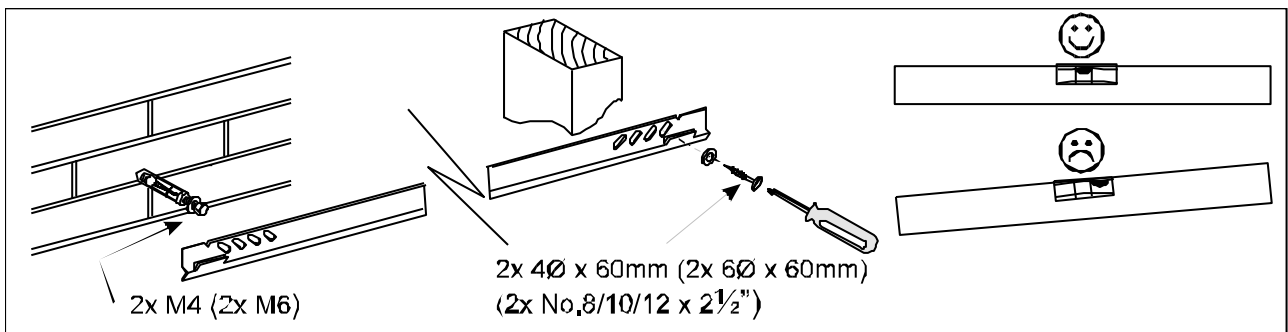
CASE REMOVAL AND FILTER CHANGE



HANGING RAIL

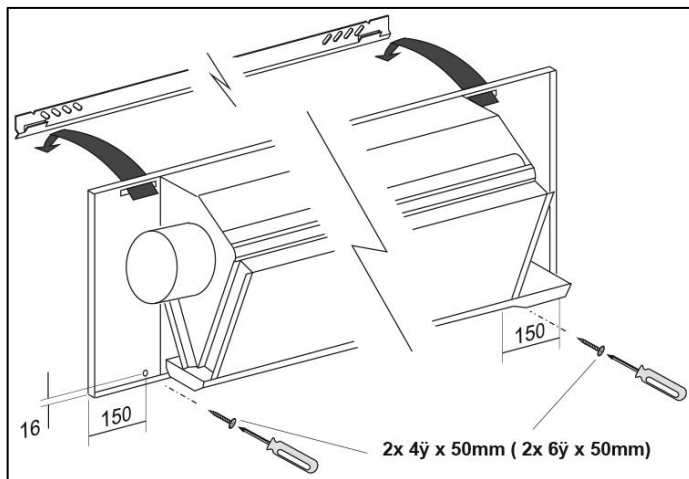


FIXING THE HANGING RAIL

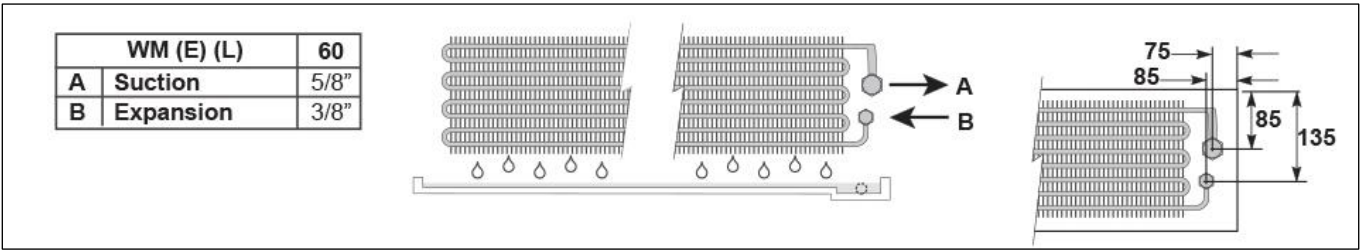


HANGING THE CHASSIS

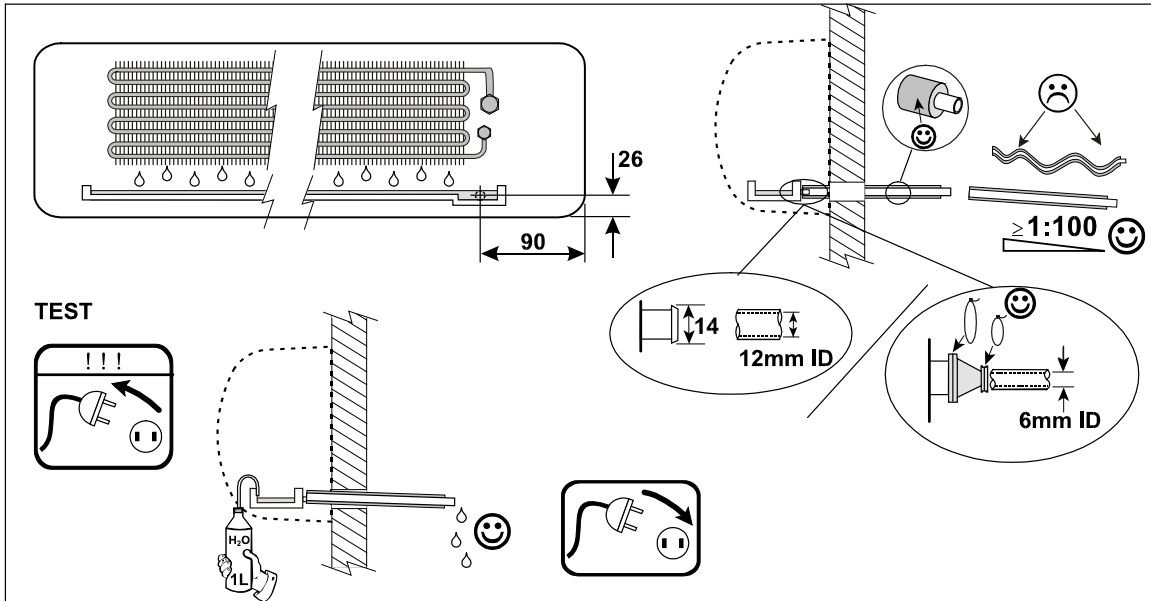
WM 60



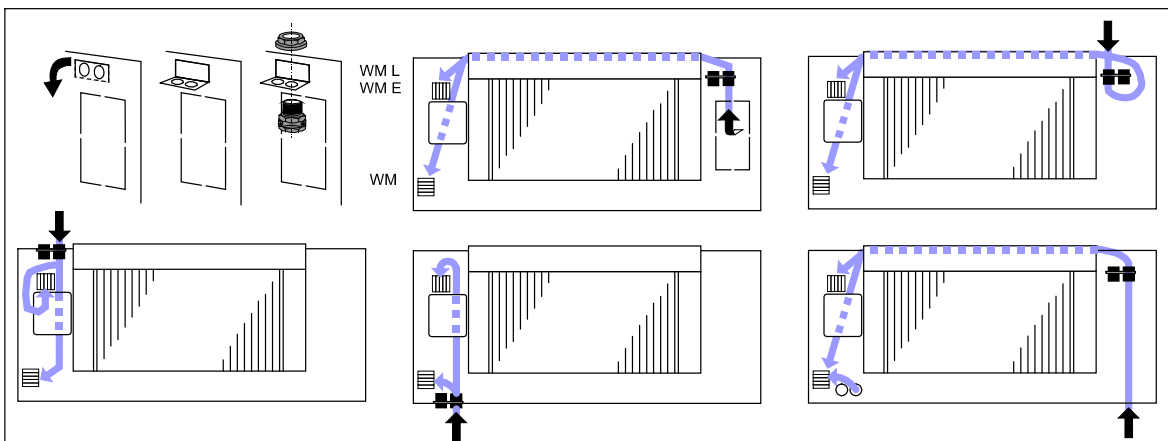
REFRIGERATION PIPEWORK



GRAVITY DRAIN



CABLE ROUTING



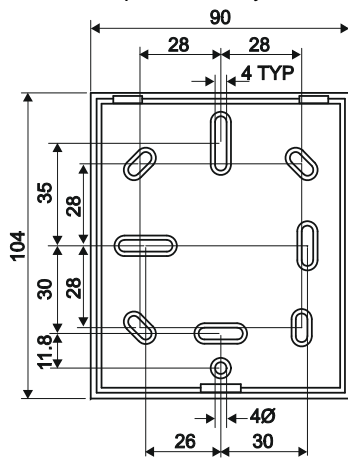
RCC 30 REMOTE CONTROLLER 97200211 - NEW INSTALLATION

The position of the thermostat should account for specific site application:-

- i) Mount on a flat surface within the area conditioned by the unit to which it is connected.
- ii) Avoid draughts, heat from radiators, proximity to hot/cold water pipes, direct sunlight.
- iii) Avoid corners of the room where air is likely to stagnate.
- iv) Avoid direct air discharge from the unit onto the thermostat.
- v) Avoid positions where the thermostat may be covered or obscured.
- vi) If the room contains pillars, mount on the side of the pillar furthest away from the unit.

Using a flat-bladed screwdriver in the slot at the bottom of the casing, lever off the cover.

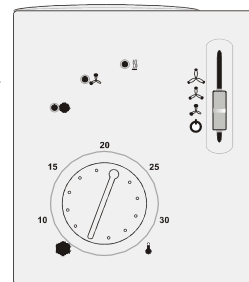
Mount the backpanel directly to a wall or onto a plinth, using the fasteners supplied.



VIEW SHOWING MOUNTING HOLE POSITIONS ONLY

- ⓘ Neon lit in heating
- ⓘ Neon lit when fan runs
- Neon lit in cooling

Adjustable thermostat
(normally 17°C- 30°C)



- ⓘ Max fan speed
- ⓘ Med fan speed
- ⓘ Min fan speed
- Off (standby)

The thermostat should be wired with 7 cores of double insulated cable, 0.5mm² minimum, preferably in plastic conduit for good appearance. Connections are shown on the table on page 2.

The temperature range is factory set to 17°C - 30°C: it is recommended that this is maintained, but if adjustment is needed (eg. to save energy, a range of 21°C - 25°C might be desired) carefully prise off the rotary dial and reset the stops to suit.

Heating is possible only if the system includes a heat pump outdoor unit, or if electric heaters or a Low Pressure Hot Water coil (CW) has been fitted.

RCC 30 optional return air sensor 97200212 can detect return air temperature at the unit rather than the controller. It should be wired between B1 and M on the RCC 30.

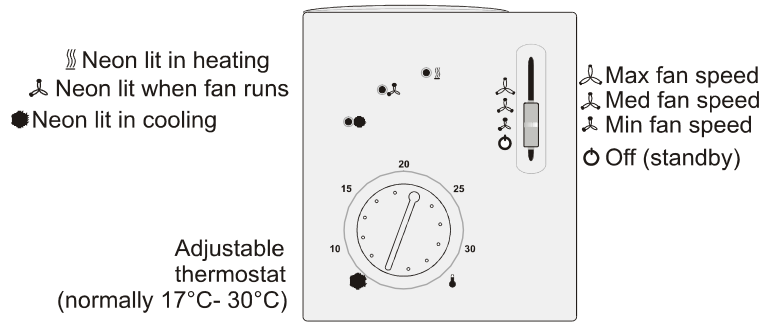
The KLRe 52552 return air sensor is not suitable for use with the RCC 30 thermostat: use 97200212 return air sensor.

DIP switches at the bottom rear of the controller are factory set as shown below: these are the recommended settings.

DIP switch	Function	ON position	OFF position
1	Fan control	Fan control is temperature dependent in all operating modes	Fan control in normal operation is temperature independent
2	Operating mode changeover via external switch	Changeover between normal operation and energy saving mode	Changeover between normal operation and standby
3	Action of switch for externally operated mode changeover	Changeover activated when contact of switch is closed	Changeover activated when contact of switch is open
4	Standby	Frost protection disabled	Frost protection enabled
5	Switching differential	1K in heating mode, 0.5K in cooling mode	4K in heating mode, 2K in cooling mode
6	Dead zone in normal operation	2K	5K

= factory settings

OPERATING INSTRUCTION RCC 30 REMOTE CONTROLLER



ON / OFF AND FAN SPEEDS

The slider controls the fan speeds as shown above: in its lowest position the unit is in standby ie. the air conditioner has power supplied to it but does not operate.

TEMPERATURE CONTROL

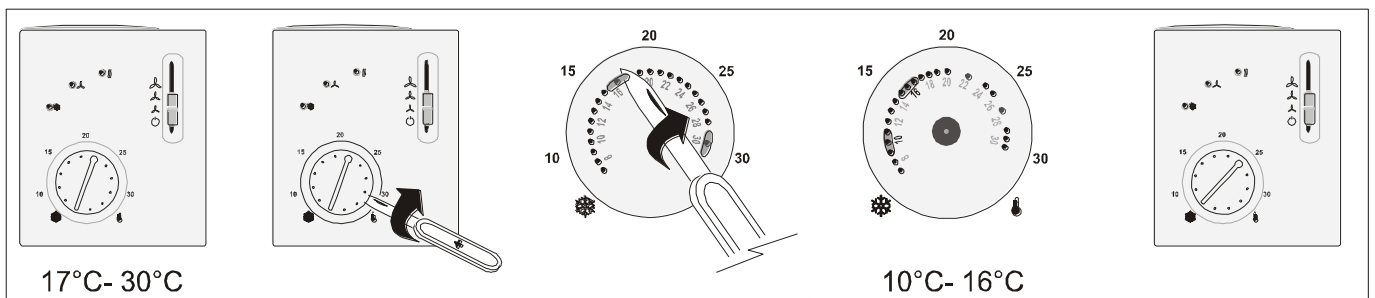
The desired room temperature is set using the rotary switch.

Normally the range is restricted to 17°C - 30°C, although the installer may have set the minimum higher or the maximum lower (eg 20°C - 25°C) to conserve energy.

After resetting the temperature, there may be a short delay (2-3 minutes) before the system operates in its new mode. The air conditioner will then attempt to satisfy the set temperature.

Heating is possible only if the system includes a heat pump outdoor unit or if electric heaters have been fitted (DX systems), or if an LPHW coil is fitted or the unit is supplied from a reverse cycle chiller (CW systems).

For specified low temperature systems : the range is restricted from between 10°C and 16°C.

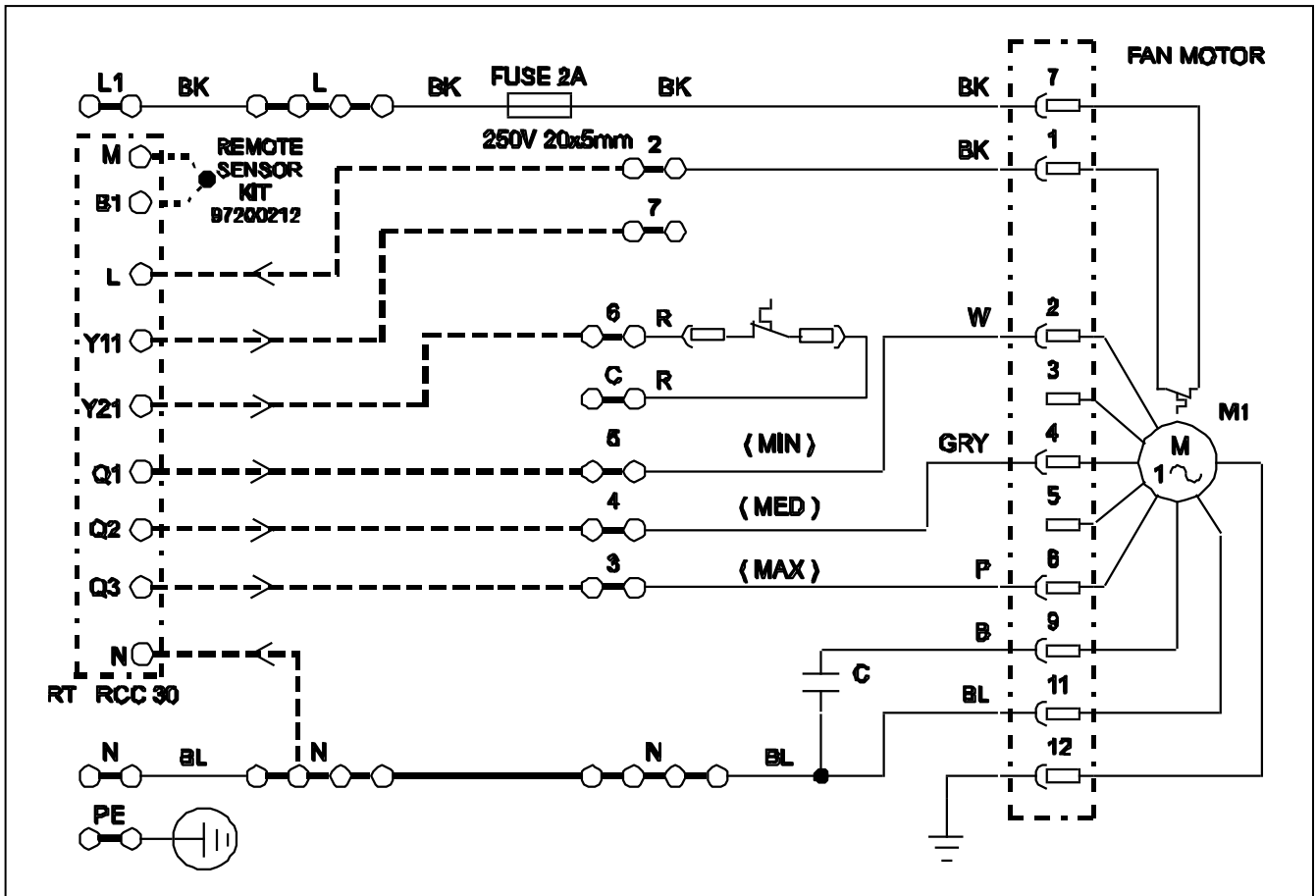


This adjustment can be carefully prising off the rotary dial and re-setting the stops as

required.

made by

WM WIRING DIAGRAM



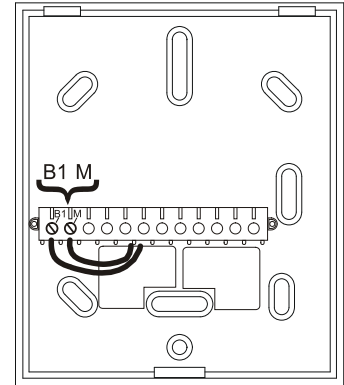
RETURN AIR SENSOR 97200212 (FOR RCC 30 REMOTE CONTROLLER 97200211)

The sensor can be fitted to the return air inlet to an air conditioning unit to improve operation eg. if the wall thermostat is placed outside the space being conditioned, or if there is considerable stratification in a room with a high ceiling, where the wall thermostat would not measure a representative temperature.

ITEM	QTY	DESCRIPTION
1	1	Sensor (2.4m lead)
2	2	Tie wrap

ISOLATE THE SYSTEM ELECTRICALLY PRIOR TO INSTALLATION OF THE SENSOR

1. Cut off the faston terminals on the cables and strip back.
2. Connect the sensor to terminals B1 and M, as shown (polarity is unimportant). Changeover to the remote sensor is automatic on power up of the controller.
3. Tie wrap the sensor to a suitable place in the return airflow, where it will soak in a representative temperature.
4. After installation, adjust the thermostat to confirm satisfactory operation.
5. Sensor input B1-M carries mains potential. If the sensor cable needs to be extended, the cables used must be suitable for mains voltage.



PROGRAMMABLE TIMER KIT 52500151

This kit can be used to give **ON/OFF** switching of the mains voltage control circuits of WM units **where the total current does not exceed 3 Amps.**

ELECTRIC HEATER CURRENTS CANNOT BE SWITCHED DIRECTLY.

It is not required for WM L units which have built in timers.

ITEM	QTY	DESCRIPTION
1	1	7 Day Programmable Timer
2	1	In Line Fuse Carrier
3	1	5 Amp Fuse, 1" x 1/4"
4	1	Terminal

PROGRAMMER SPECIFICATION:

Type:	Digital electronic 230V, 50Hz	"OFF",	<u>Selection Switch</u>
Programme:	7 day	"TMD " (TIMED)	
Setting Resolution:	1 minute		"CON " (CONSTANT ON)
Max. Switched Current:	3 A (fan load)	"ADV " (ADVANCE)	

The timer will accommodate 0.75mm² to 2.5mm² wires.

Three core cable is required between the timer and the air conditioning unit.

The timer motor must be connected to an uninterrupted supply source.

TIMER MOUNTING

1. Carefully unpack and identify the components.
2. If the unit is to be surface wired, remove the appropriate knockouts in the backplate. Screw the backplate to the wall with No. 8 wood screws through the fixing holes.
3. If the backplate is to be fixed to a BS4662 single gang plaster depth box, use 3.5mm machine screws.

WIRING FOR ON/OFF SWITCHING

1. a) Wire timer terminal 'L' to unit terminal 2.
b) Use the terminal provided to connect terminal 4 to live (terminal L, remote controller RCC 30 [97200211]).
c) Wire timer terminal 'N' to unit terminal N
2. Discard the in-line fuse carrier.
3. Plug in the unit and secure the screws.
4. Program as described in the separate timer instructions.

If, as a result of fitting this kit, more than one supply is taken into a unit, that unit must be marked:-

"Two, (or more if applicable), supplies are taken into this equipment. Isolate both, (all), before undertaking any maintenance work."

5m HIGH CONDENSATE PUMP KIT FOR WM UNITS

This kit is for use on all versions of CWM and CWM L units and is for condensate removal where a lift of up to 5m is required.

The pump runs on demand.

A high level alarm will switch off the cooling signal until condensate has dropped below a pre-set level.

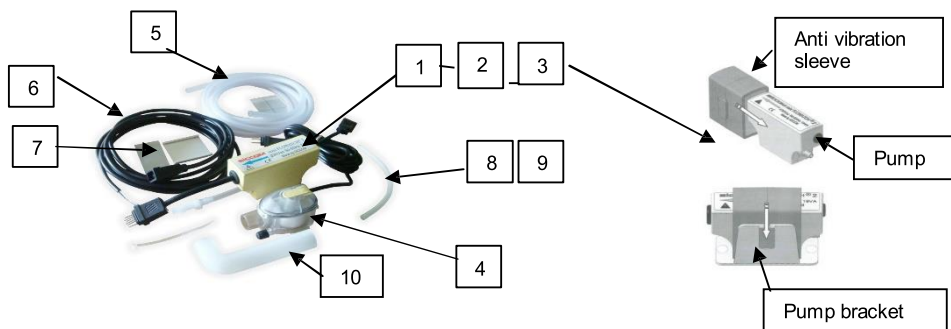
It is easier to fit this kit before installing the unit.

IF THE UNIT HAS BEEN INSTALLED, ISOLATE THE SYSTEM BEFORE FITTING THE KIT.

This external condensation replacement kit is for use on all versions of CWM indoor units and is suitable for condensate removal where a lift of up to a maximum 5m is required. The pump will run on demand. There is a built in high level alarm which will switch off the cooling signal if there is a build up of condensate. The unit will remain off until the condensate has dropped below a preset level.

CONTENTS OF KIT CHECKLIST

Item	CONDENSATION PUMP KIT	97100476	
1	Condensate pump		1
2	Condensate pump bkt		1 Supplied assembled to pump
3	Pump vibration sleeve		1 Supplied assembled to pump
4	Float switch		1
5	Clear Plastic Tube		1 piece to be cut to size
6	Mains sensor wire harness		1
7	Adhesive pad		2
8	Cable tie small		6
9	Cable tie large		1
10	Pre formed elbow pipe		1
11	Installation instruction		1
12	Float switch bracket		1 Supplied fitted to float valve
13	Earth Edge Clip		1 Not shown



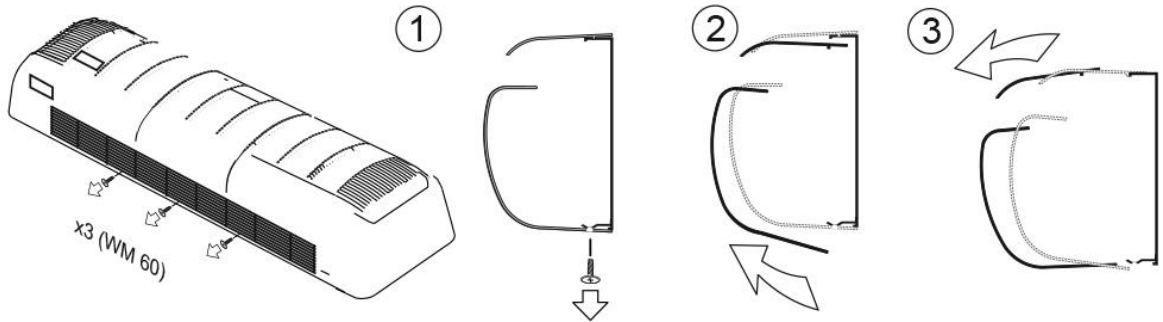
It is easiest to fit this kit prior to installing the unit if possible, but is not essential.

IMPORTANT

ISOLATE THE SYSTEM ELECTRICALLY PRIOR TO INSTALLATION OF THIS KIT

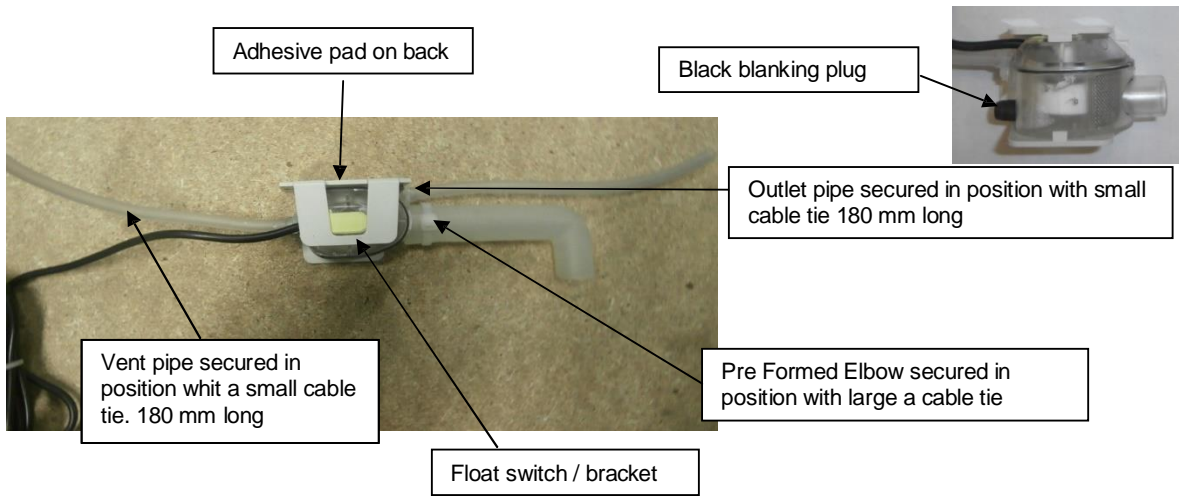
1 : CASINGREMOVAL

Cabinet Removal

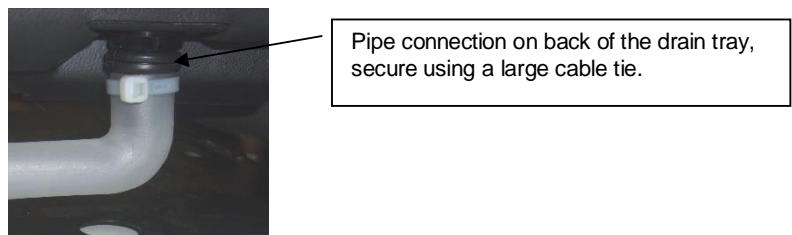


Fitting New Condensation Pump

1. Before fitting the replacement condensation pump any condensation in the drain tray must be safely collected.
2. On the back edge of the drain tray is a drain point fitted with a short piece of pipe and a rubber adaptor remove short piece of pipe leaving rubber adaptor in position and collect any condensation remaining in the drain tray.
3. Fit the pre formed elbow pipe to float valve and secure with large cable tie.
4. Fit one of the self adhesive pads to the back of the float valve mounting bracket.
5. Cut two pieces of the 6 mm dia clear plastic tube to 180 mm long and fix on to the float valve on the same size as the pre formed elbow and one on the opposite side, secure in position using a small cable ties.
6. The small black plastic cap should be fitted on the outlet connection below the vent pipe.

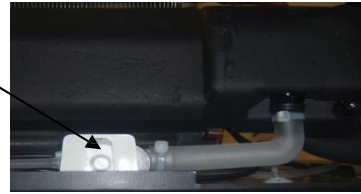


7. Secure other end of pre formed pipe to drain plug on drain tray using rubber adaptor already fitted on to drain tray to form a tight fit then secure in position using a large cable tie.



8. Fit the Float switch into its retaining bracket [the bracket only fits one way] then using the adhesive pad on the back of the bracket, stick the bracket in position. Leave a 7 mm gap between the bottom of the float switch bracket and the bottom return flange of the back plate.

Float switch fixed in position under drain tray on R/H side of unit.



9. Fit a self adhesive pad on to the back of condensation pump bracket.

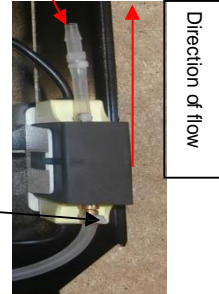
10. Position the bracket on the right hand side of the back plate approximately 60 mm from the bottom and 10mm in from the side using the self adhesive pad to hold it in position.

12. Connect the other end of the outlet pipe off the float valve to the condensation pump and secure using a small cable tie.

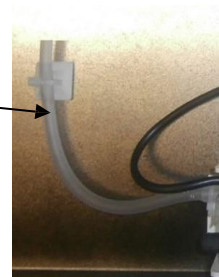
13. From the outlet pipe fitted with the anti siphon valve connect to the condensation drain pipe.

14. Secure the vent pipe to the back plate using the small self adhesive pad and a small cable tie ensure that the vent pipe terminates higher than the drain tray.

Outlet pipe with anti siphon valve



Vent Pipe



ELECTRICAL CONNECTIONS

- a] Connect wiring harness from the float valve to the connection on condensation pump, this can only fit one way.
- b] Connect the mains / High Level Alarm wiring harness plug to the condensation pump [this harness as two cables one Mains supply cable and High Level Alarm cable as a purple, black and white wire.
- c] Connect mains cable to permanent live and neutral use the earth edge clip supplied with the kit to provide an earth connection to the steel panel work.
- d] Connect black and white wires in the high level alarm harness to the same terminals on the terminal connector that the previously removed red wires were connected to.
- e] The purple wire is supplied connected to a 2 way block to make it electrically safe. This wire is the normally open wire and is not used, in a high level alarm situation voltage will be present on this wire so it is important that it is kept electrically safe.
- f] Make tidy any loose wiring using cable ties
- g] Switch on mains supply to unit; ensure controls are calling for cooling then pour some water slowly in to the black drain tray until the float switch rises; once the float switch rises it will activate the condensation pump and discharged water into the common drain. Check all pipe connections for any leaks.
- h] Refit fascia panels.

TROUBLE SHOOTING

Unit will not cool
Pump does not run
Cooling is interrupted

No mains supply to the unit.
Sensor wires disconnected from terminal connector block.
Restriction in pump flow allowing level to
Rise and trip overflow circuit. Check for blockage or kink in hoses.
Condensate at high level - tripping overflow circuit
Pump and filter blocked - remove and clean. Loose
wiring harness connections check plugs on wiring
harnesses from float chamber and condensation
pump.

Pump runs all the time

Is the float position in the reservoir located firmly
And the float located inside the reservoir around the
sensor column?
Is there any sludge inside the reservoir preventing the
float from resting on the bottom? clean with antibacterial
wash.

Excessive pump noise

Air leak in hoses and/or joints.
Pumping without water in sump – Float valve stuck in
alarm position – clean out float chamber.

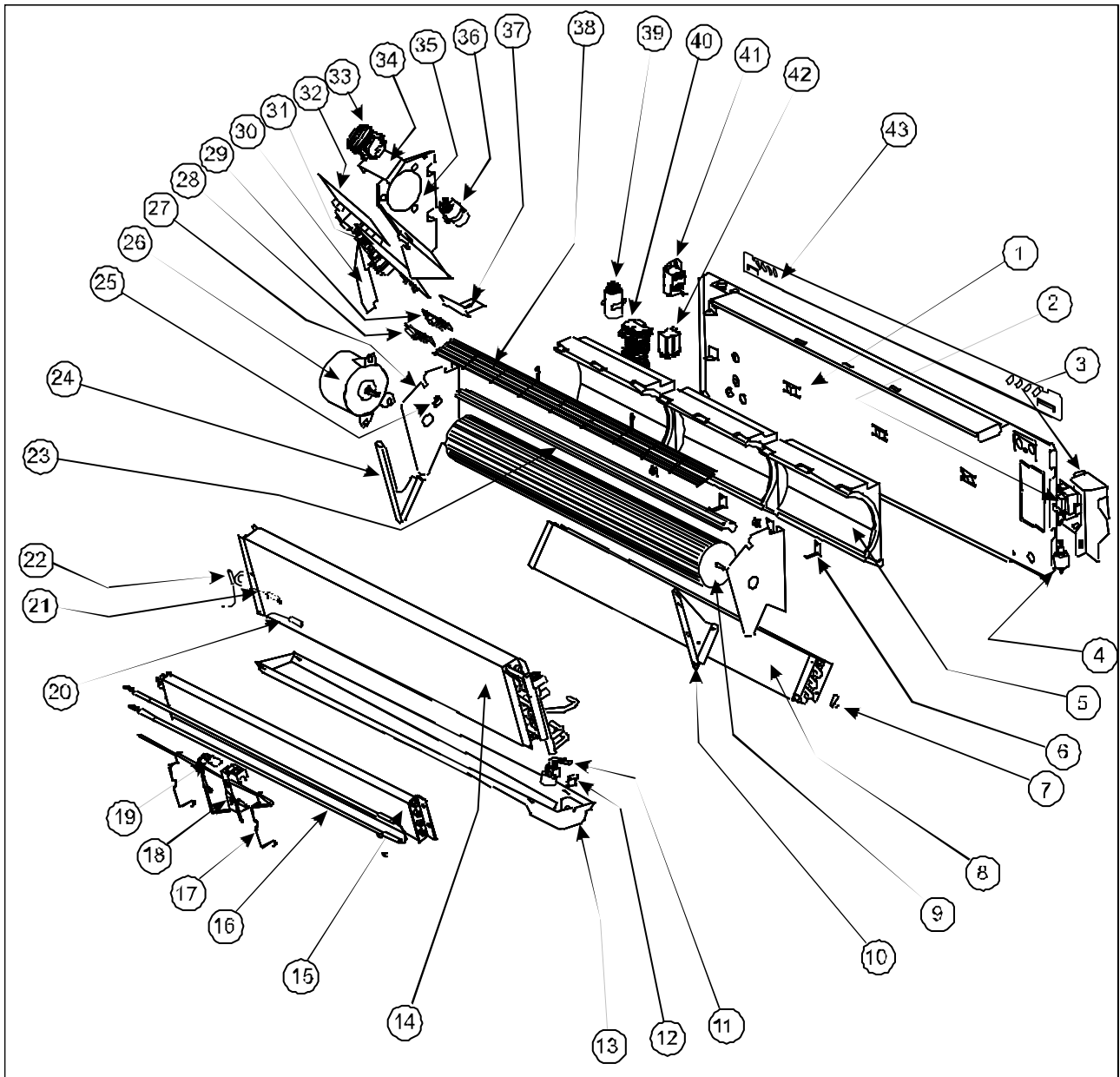
APPLICATION NOTES

- 1 The pump will work against a 5m head. [for units with latent duty of 4 kW Flow rate is highest with minimum head.
- 2 Long lengths of drain pipe should not be exposed to the outdoor ambient, otherwise freezing of condensate may occur during winter operation.
- 3 It is not advisable to have the outlet of the drain well below the position of the pump; otherwise the siphon effect may open the pump valves.
- 4 For normal applications, i.e. where the drain outlet is level or above the pump or within 1m below it, no extra check valves are needed; the pump has its own internal check valves.
- 5 Ensure that no hoses are kinked, as this could seriously affect the pump performance.
- 6 Always ensure the float chamber is sitting flat and horizontal.
- 7 Do not run the pump dry.

SERVICE / MAINTENANCE

- 1 Every six months the reservoir should be removed taking care to clean the filter, float and reservoir thoroughly prior to re assembly
- 2 Use a chemically compatible anti bacterial wash.
- 3 Take great care to ensure the float magnet is always positioned with the magnet facing upwards.

EXPLODED VIEW OF WM (L) (E) with COMPONENT IDENTIFICATION

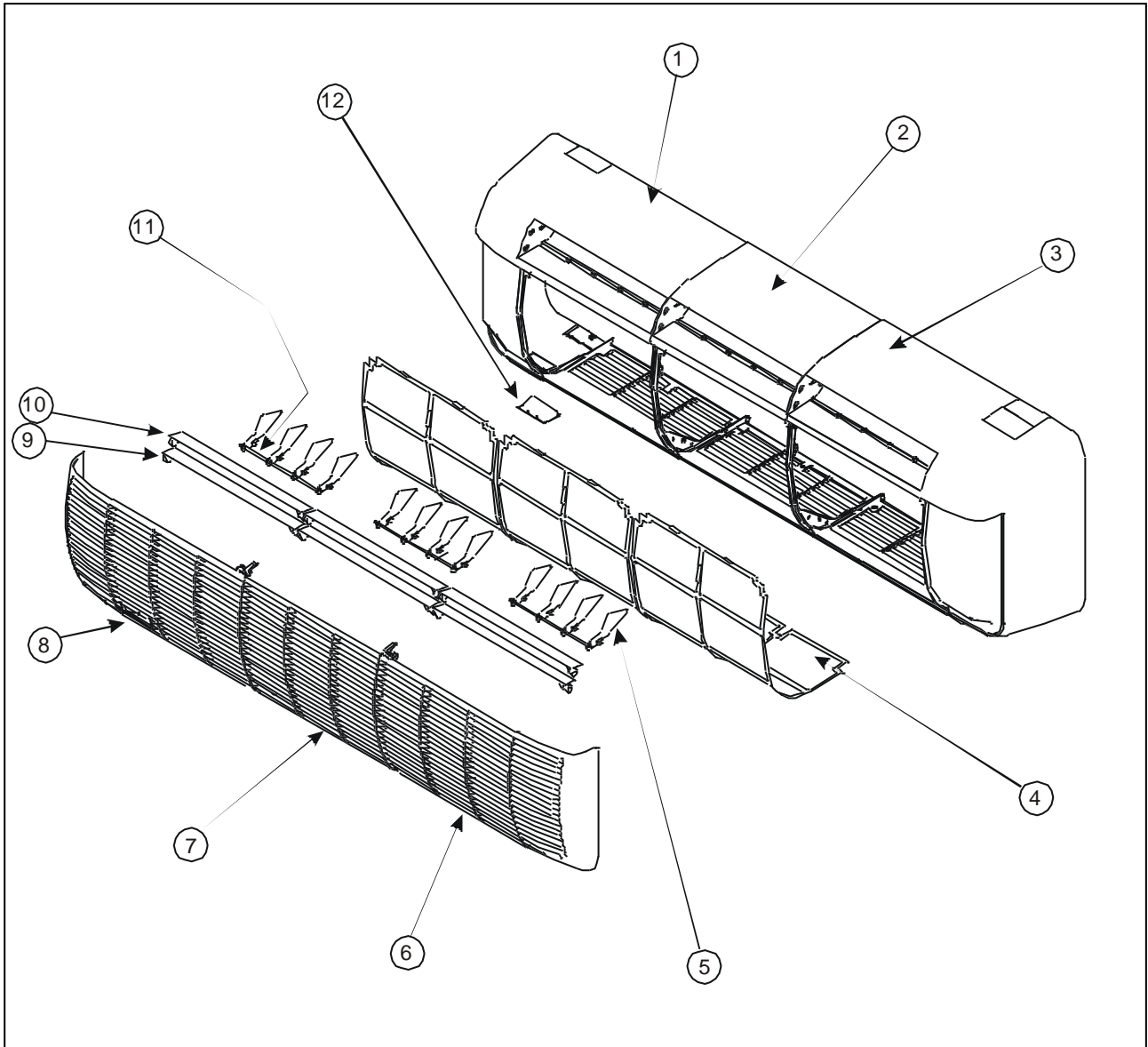


1	Back panel
2	Condensate pump PCB
3	Condensate pump bracket
4	Condensate pump
5	Scroll
6	Case fixing bracket
7	Drain tray clip
8	Coil (rear)
9	Fan
10	R/H coil support bracket
11	Condensate pump sensor/filter
12	Sensor bracket
13	Drain tray
14	Coil (front)
15	Heater coil

16	Heater elements
17	Heater coil retaining clip
18	Heater cutout bracket
19	Heater cutout
20	Return air sensor (WM L, E)
21	Coil sensor (WM E)
22	Coil sensor (WM L)
23	Air flow cut-off
24	L/H coil support bracket
25	Resistor
26	Motor
27	Fan support bracket
28	IR receiver PCB (WM E)
29	IR receiver PCB (WM L)
30	Blanking plate (WM L, E)

31	Main PCB (WM L)
32	Main PCB (WM E)
33	Terminals (WM L, E)
34	Terminal mounting bracket
35	Electrics panel
36	Capacitor (WM L, E)
37	IR PCB mounting bracket
38	Fan guard
39	Capacitor (WM)
40	Terminals (WM)
41	De-ice thermostat (WM)
42	Heater relay (WM)
43	Wall mounting bracket

EXPLODED VIEW OF CASE



1	Cover (L/H)
2	Cover (centre)
3	Cover (R/H)
4	Filter

5	Vertical air deflection vane
6	Grille (R/H)
7	Grille (centre)
8	Grille (L/H)

9	Horizontal air deflector vane (lower)
10	Horizontal air deflector vane (upper)
11	Connecting rod
12	Blank (WM): IR lens (WM L, WM E)