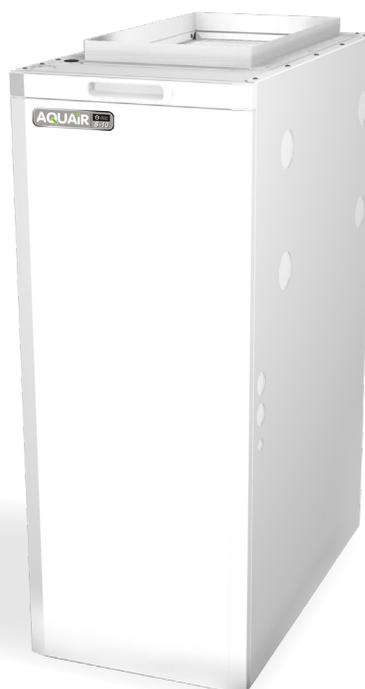


AQUAIR S-10

Water to Air Space Heater



INSTALLATION, COMMISSIONING & SERVICING INSTRUCTIONS

Aquair S-10

These instructions are to be left with the User



CONTENTS

1. Features	3	16. Servicing & Maintenance	10
2. Carton Content	3	<i>Routine Maintenance</i>	
3. General Description	4	<i>PCB Replacement</i>	
4. Building Standards & Regulations	4	<i>PCB Removal</i>	
5. Safety Information	4	<i>Fan Removal</i>	
<i>Handling the Unit</i>		<i>Heat Exchanger Removal</i>	
<i>Electrical Supply</i>		<i>Air Filter Removal</i>	
6. Duct Information	5	17. Fault Finding	11
7. Technical Data	5	18. Dimensions	13
8. Positioning & Preparation	5	19. Spares List	14
9. Installation Instructions	6	20. Exploded Diagram	15
<i>Downflow Configuration</i>			
<i>Upflow Configuration</i>			
<i>Water Connections</i>			
<i>Upflow Automatic Air Vent</i>			
<i>Electrical Harness</i>			
<i>Ancillaries Available</i>			
10. Return Air System	7		
11. Electrical	8		
<i>Summer Air Circulation</i>			
12. Circuit Diagram	8		
13. Fan Performance	9		
14. Operating Modes	9		
<i>High Temperature Mode</i>			
<i>Low Temperature Mode</i>			
15. Commissioning	10		
<i>Setting Maximum Speed</i>			
<i>Setting Minimum Speed</i>			
<i>With Thermista-stat fitted</i>			
<i>With no Thermista-stat fitted</i>			

In the interest of continuous development Johnson and Starley reserves the right to change specification without prior notice.
Johnson and Starley prides itself on its ability to supply spare parts quickly and efficiently.

1. FEATURES

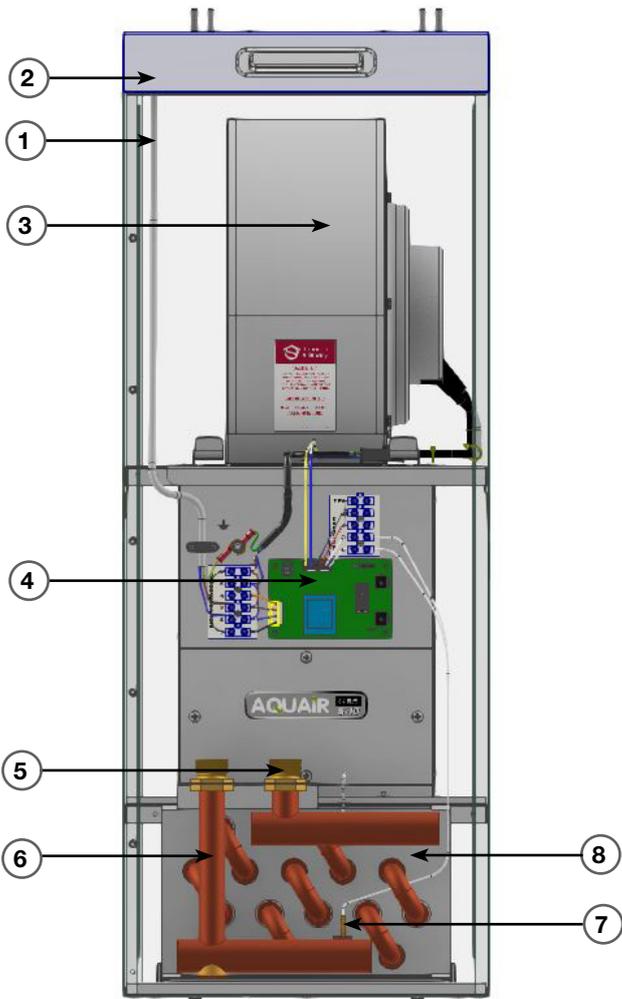


FIGURE 1A. DOWNFLOW CONFIGURATION

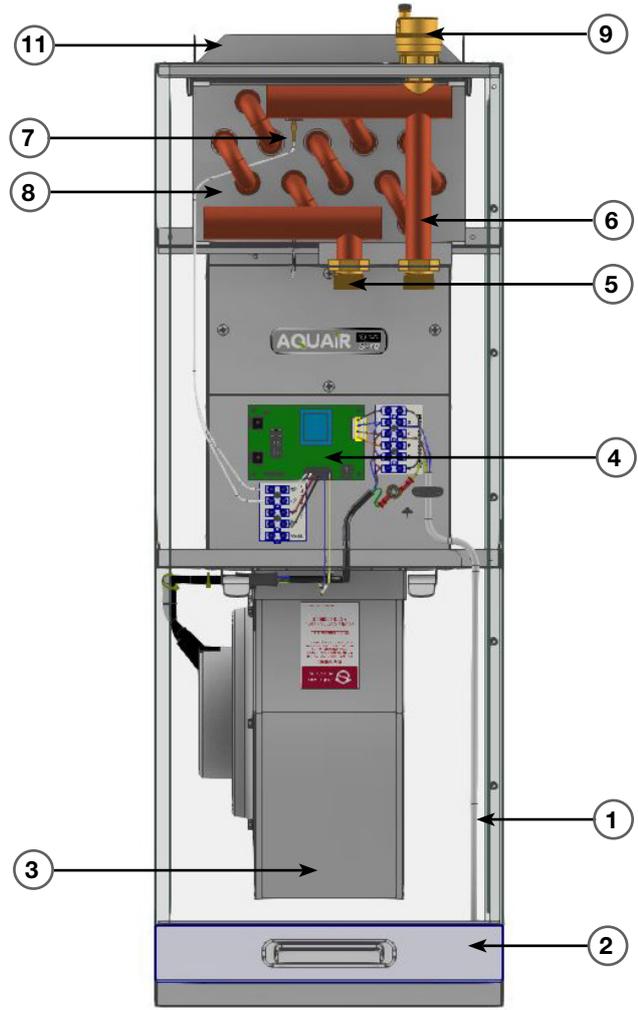


FIGURE 1B. UPFLOW CONFIGURATION

AQUAIR S-10 FEATURES

1	Mains Supply
2	Air Filter
3	Air Circulation Fan with EC technology
4	PCB Control Board
5	Hot Water Return to Heat Source

6	Hot Water Flow from Heat Source
7	Temperature Sensor
8	Heat Exchanger
9	Air Vent
10	Finger Guard
11	Spigot Frame (inc with side return or bottom return)

2. CARTON CONTENT

ITEM	DESCRIPTION	QTY.
1	Aquair S-10 Unit	1
2	Decal	2
3	Installation Instructions	1
4	User Instructions	1

3. GENERAL DESCRIPTION

- 3.1 The Aquair S-10 is a “water to air” heat exchanger unit with a heat output of 10kW (assuming a hot water supply at 80 °C is available). It is supplied as a downflow unit but it is also suitable for upflow installations. When used in upflow installations an “air vent” (see 9.5.2) must be fitted to the heat exchanger. Modairflow control is incorporated. A wire mesh filter is fitted as standard. The unit requires a supply of hot water at a minimum temp. of 60 °C. Water connections are available out the top or the sides through the location markers.
- 3.2 Air drawn in through the air filter or Cleanflow filter is passed through the heat exchanger by a centrifugal fan, and it is discharged through the opposite end of the unit. A Summer Air Circulation switch (optional) allows the facility to supply unheated air to the air outlets during warm weather. An external timer (not provided) will be required if it is necessary to set the periods of operation.
- 3.3 The Aquair S-10 unit has been designed to allow for downflow and upflow configurations.

4. BUILDING STANDARDS & REGULATIONS

NOTE: Installation shall be in accordance with the following

- **Building Standards (Scotland) (Consolidation) Regulations**
- **Building Regulations Part L**
- **The Water Fittings Regulations or Water Byelaws in Scotland**
- **Model and Local Authority Byelaws**
- **BS 5720** Mechanical Ventilation and Air Conditioning in Buildings
- **BS 7671** Institute of Electrical Engineers (I.E.E) Wiring Regulations
- **Health & Safety Document No. 635**
- **The Electricity at Work Regulations, 1989**
- **BS 7593** Preparation, commissioning and maintenance of domestic heating and cooling water systems.
- **IMPORTANT:** This appliance is CE certificated for safety and performance. It is important that no modifications are made to this appliance, unless fully approved in writing by Johnson & Starley Ltd. If in doubt, please Ring Johnson & Starley Ltd on Telephone 01604 762881.



5. SAFETY INFORMATION

5.1 HANDLING THE UNIT

- 5.1.1 The weight of this appliance exceeds that recommended for a one-man lift. It will therefore be necessary to gain assistance at times during it's removal from the packaging and during installation procedure. Manoeuvring the boiler may include the use of a sack truck and involve lifting, pushing and pulling.
- 5.1.2 It should be noted that this appliance may contain sharp edges. Care **MUST** be taken when handling the appliance to prevent injury. It is advised that engineers wear suitable P.P.E. when handling the unit.
- 5.1.3 Once the appliance has been fired beware that certain parts will be hot to the touch.
- 5.1.4 Do not install flues during rain, high winds or in severe weather conditions.

5.2 ELECTRICAL SUPPLY

- 5.2.1 Ensure the mains supply voltage, frequency, number of phases and power rating comply with details on the rating label.
- 5.2.2 All wiring must be in accordance with the appropriate standards.
- 5.2.3 Ensure safety regulations and practices are adhered to when installing and using this appliance.

6. DUCT INFORMATION

- 6.1 The duct system should be carefully designed (Guidelines taken from the British System Design Manual) to suit the needs specific to the heating requirements and building layout.
- 6.2 The duct work should be installed with the least number of fittings to minimise the airflow resistance and the ducting runs should be as straight as possible. They should be fully insulated and protected from any crushing. Ducting passing through unheated roof voids must be insulated.
- 6.3 It is an advantage to have all the compatible ductwork already installed and ready to connect to the appliance frame. The base duct must be constructed to support the weight of the unit. The appliance, duct work and blanking plate must be secured and sealed.

7. TECHNICAL DATA

ITEM		S-10
Nominal Rated Output	kW	10
"Air on" Temperature	°C	20
"Air off" Temperature	°C	67
Water Supply Temperature	°C	80
Water Return Temperature	°C	73
Water Flow Rate	l/s	0.4
Air Volume	m ³ /h	576
Water Connections	bsp	¾
Maximum Water Pressure	Bar	3
Maximum Power Consumption	W	150
Dimensions (H/W/D)	mm	796 x 300 x 550
Return Air Frame	mm	222.8 x 491.9
Electrical Supply	A	230V, 50Hz, fuse rated at 3A
Weight	kg	26

8. POSITIONING & PREPARATION

- 8.1 The unit should be positioned to suit any duct work. Mount on a plenum or frame strong enough to avoid any strain being placed on associated pipe and duct work.
- 8.2 Clearance of 450 mm is required at the front of the casing for servicing and replacement of the heat exchanger. It is recommended that provision be made for complete removal of the unit.
- 8.3 Sufficient clearance must be provided for the assembly of ducting and pipework.

9. INSTALLATION INSTRUCTIONS

- 9.1 The Aquair S-10 unit is supplied as a downflow configured appliance as standard. It has been designed with the provision to be converted to an upflow unit.
- 9.2 Once the unit has been unpacked, unscrew the transit plate from the base of the unit and discard.

NOTE: This unit could contain sharp edges and care **MUST** be taken when handling.

9.3 DOWNFLOW CONFIGURATION *See Figure 2*

- 9.3.1 Remove the filter to expose the two screws holding the door in place. Remove the screws and gently pull and lift the door off the unit.
- 9.3.2 Lift the appliance onto the plenum or base support and position correctly. Seal the joint with the appropriate sealing material.
- 9.3.3 The water connections to the unit should be by compression. Fittings that are suitable for the duty and isolation valves must be fitted to facilitate the removal of the heat exchanger assembly.
- 9.3.5 Once the installation is complete, stick the Aquair decal in position on the front cover, top left hand side.

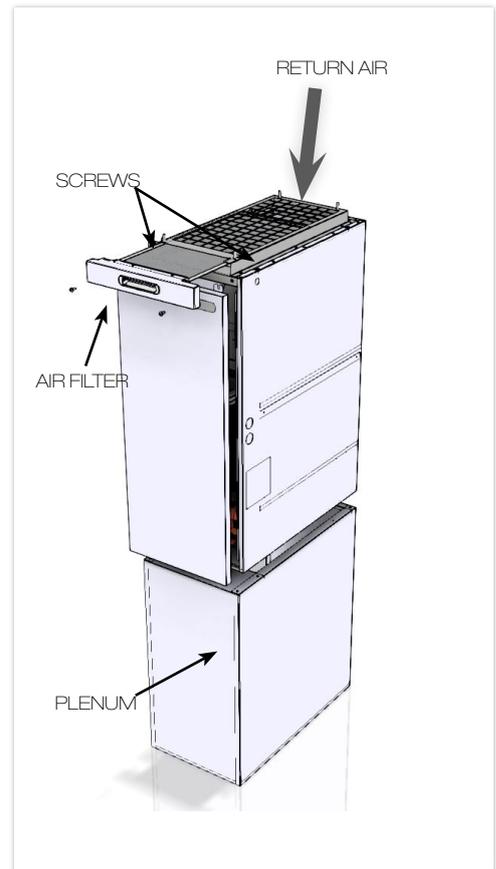


FIGURE 2. DOWNFLOW CONFIGURATION

9.4 UPFLOW CONFIGURATION

See Figure 3

- 9.4.1 To fit the upflow configuration, you need the additional SRAQ10 Side Return Air Kit or BRAQ10 Bottom Return Air Kit.
- 9.4.2 Remove the filter to expose the two screws holding the door in place and remove the screws and gently pull and lift the door off the unit.
- 9.4.3 If a BRAQ10 is being fitted, keep the air filter frame in place and fit the BRAQ10 on top of the air filter frame and screw in the four positions.
If a SRAQ10 is being fitted, unscrew the air filter frame and fit the blanking plate in its place. Cut out one side of the unit for the SRAQ10 to be fitted over the hole and screw into place.
- 9.4.4 Invert the unit so the air filter will be at the bottom of the unit.
- 9.4.5 Both the BRAQ10 and SRAQ10 kit come with a spigot which can be fitted onto the warm air outlet on the top. This forms a duct connection spigot for the warm air.
- 9.4.6 Place the appliance onto the plenum, base support or floor (this depends on the location of the return air duct) and position correctly. Seal the joint with the appropriate sealing material.
- 9.4.7 An automatic air valve must be fitted as shown in figure 3. More information can be found in section 9.5.2
- 9.4.8 Once the installation is complete, stick the Aquair decal in position on the front cover, top left hand side.

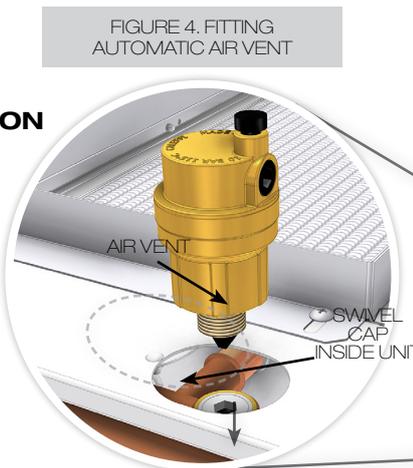


FIGURE 4. FITTING AUTOMATIC AIR VENT

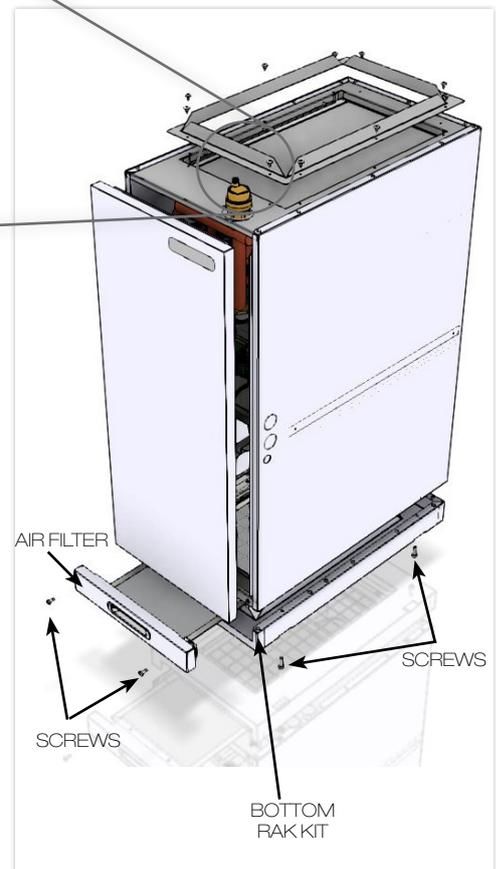


FIGURE 3. UPFLOW CONFIGURATION

9.5 WATER & ELECTRICAL CONNECTIONS

9.5.1 WATER CONNECTIONS

The water connections to the unit should be compression type fittings that are suitable for the duty of the appliance. Isolation valves must be fitted to facilitate the removal of the heat exchanger assembly.

- 9.5.2 It is important that the system is flushed thoroughly before the appliance is left to operate (as recommended in BS 7593) in order to maintain an efficiently operating heating system and to prevent the Aquair from becoming a trap for system debris. Failure to do so could produce a blockage, cause damage to the system and reduce the efficiency. This **MUST** comply with the water treatment guidelines.

After the system has been flushed, an inhibitor (suitable for stainless steel heat exchangers) should be added. Appropriate inhibitors are available, for example Sentinel, Fernox and Salamander.

The manufacturer's instructions supplied must not be taken as overriding any statutory requirements.

A 'Y' strainer MUST be fitted on the flow to the Aquair. The boiler/heatsource must also have the manufactures recommended filter fitted. Failure to fit either of these will invalidate the guarantee.

9.5.3 UPFLOW AUTOMATIC AIR VENT

When a unit is being fitted as an upflow, an air vent (Part No. 1000-0302300) **MUST** be fitted to the top of the unit.

Any queries contact Johnson & Starley Ltd for details, telephone 01604 762881.

- 9.5.4 To fit the vent, swivel the disc cap by breaking the paint seal, tap the disc and swivel. Remove the cap in the end of the flow pipe and screw in the air vent.

NOTE: Care must be taken with the heat exchanger matrix, as it is fragile and is easily damaged.

9.5.5 ELECTRICAL HARNESS

Re-route the harness cable through the side knockout. Use the grommet attached to seal the hole.

9.6 ANCILLARIES AVAILABLE

PART NO	DESCRIPTION	PART NO	DESCRIPTION
PFA10	PASSIVE FILTER KIT	TC2A10	TOP CLOSURE 2 SIDED
CFA10	CLEANFLOW FILTER KIT	TC2A10R	TOP CLOSURE 2 SIDED (REAR RISER)
AQRAK10	RETURN AIR KIT	TC4A10	TOP CLOSURE 4 SIDED
WBA10	BASE DUCT (STD)	TC4A10R	TOP CLOSURE 4 SIDED (REAR RISER)
WBA10S	BASE DUCT (SHORT)	SFA10	SLOT FIX KIT
WBA10R	BASE DUCT (REAR RISER)	SFGA10	SLOT FIX KIT WITH GRILLE
SRAQ10	SIDE RETURN AIR KIT	BRAQ10	BOTTOM RETURN AIR KIT

10. RETURN AIR SYSTEM

- 10.1 The return air system should be constructed of fire-resistant material. It is important that the correct size of return air grilles and ducting is used. Refer to the table below for return air duct size, flexible duct size and the return air grille size at maximum output.

AQUAIR	DUCT EQUIVALENT SIZE	FLEXIBLE DUCT SIZE	RETURN AIR GRILLE
S-10	250 x 200mm (10" x 8")	300mm (12") dia	860cm ² (137in ²)

- 10.2 An adequate and unobstructed return air path is required from areas not served by a directly ducted return and to which warm air is delivered. All such rooms should be fitted with relief grilles which have a free area of 0.0088 m²/kW (1 in²/250Btu/h) of heat supplied to the room. The only exceptions are kitchens, bathrooms and WCs.

11. ELECTRICAL

11.1 The appliance is supplied with PVC sheathed, 3 core 0.75 mm² CSA rated at 6 A, connected to a terminal block and exiting through the casing at the top left hand front. The cable is suitable for a 230 V, 50 Hz single phase supply.

11.2 The means of isolating the appliance MUST be via a double pole switch with a contact separation of at least 3 mm in both poles, and fused at 3 A. If switched live is fitted, a triple pole switch should be used.

11.3 SUMMER AIR CIRCULATION

To run the fan at full commissioned speed in warm weather and in order to circulate the air, a single pole, volt free switch (not supplied) must be connected across terminals 3-4 (see circuit diagram Figure 4).

12. CIRCUIT DIAGRAM

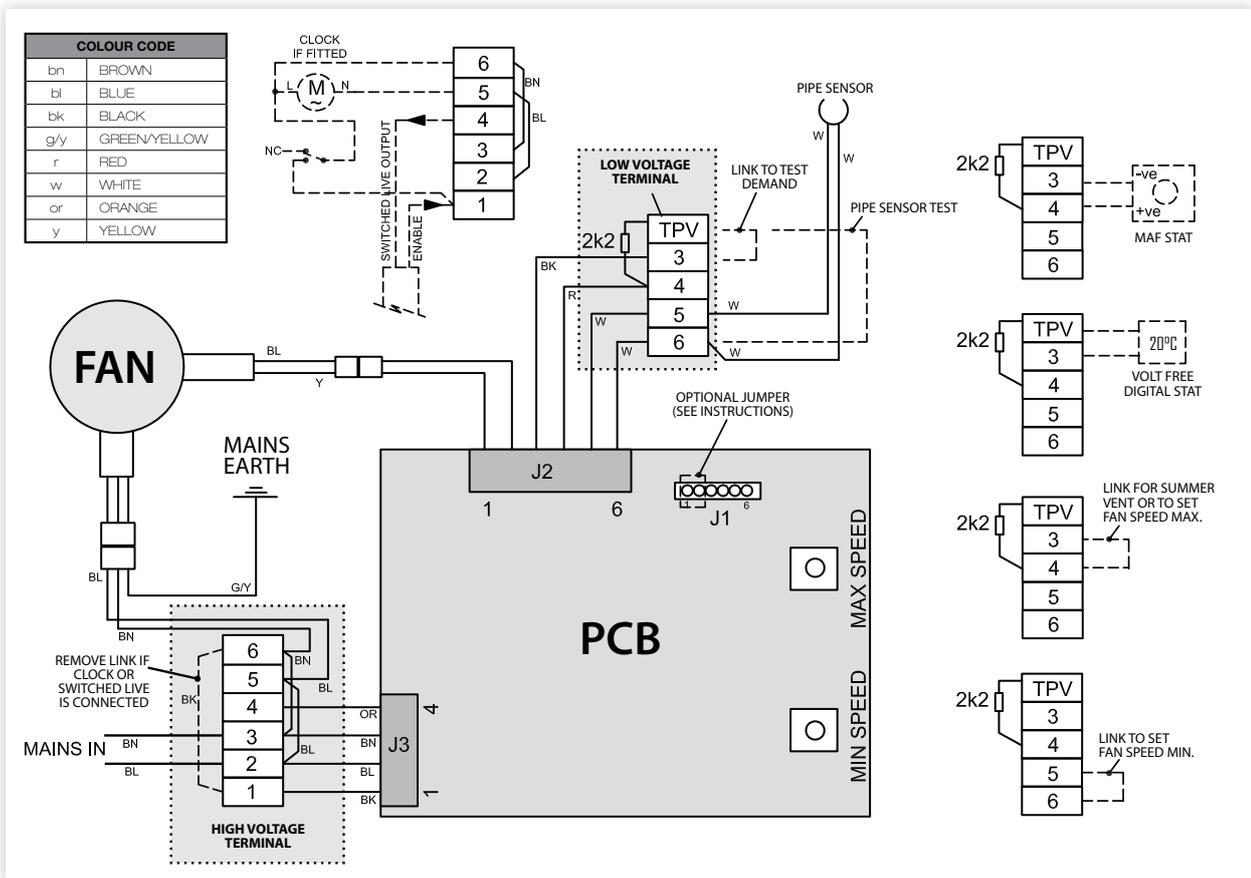
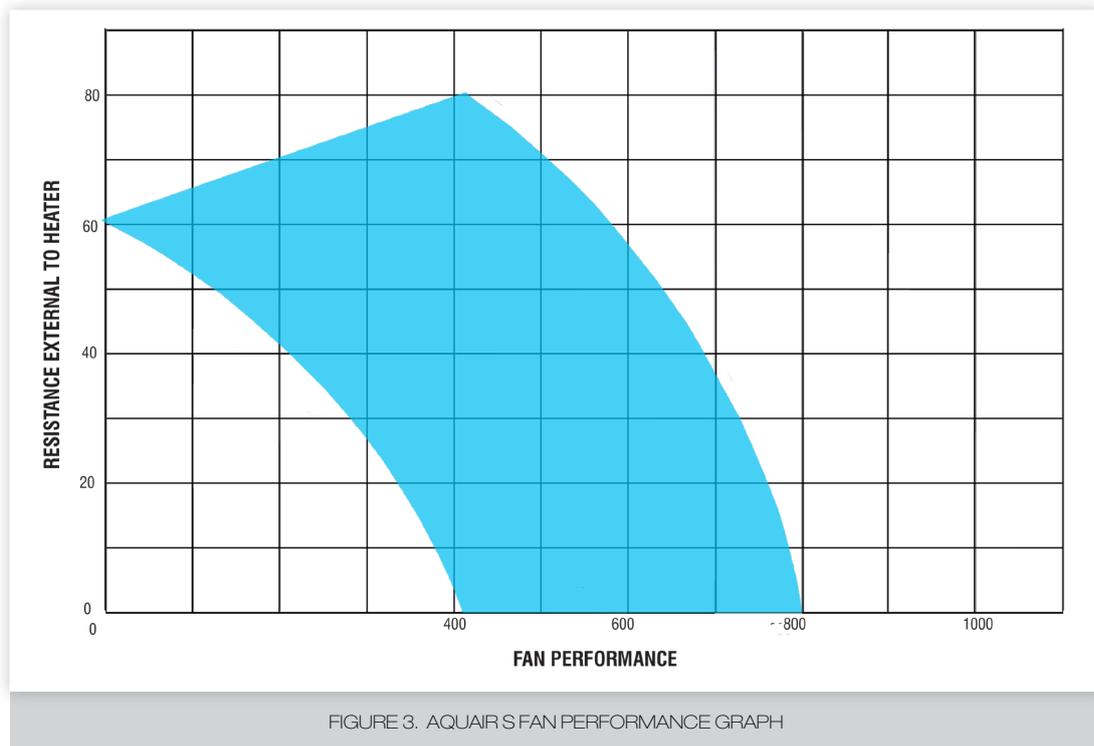


FIGURE 4. AQUAIR S CIRCUIT DIAGRAM

13. FAN PERFORMANCE



14. OPERATING MODES

14.1 HIGH TEMPERATURE MODE

- 14.1.1 This unit is supplied by default in high temperature mode.
- 14.1.2 With a Thermista-stat connected (see note below), the fan will run when a water temp. of 60 °C is reached and it stops when the water temperature falls to 42 °C. The fan speed is controlled by the Thermista-stat demand.
- 14.1.3 With no Thermista-stat connected, the fan will run when a water temperature of 44 °C is reached, the fan speed is controlled by the water temperature. The maximum fan speed is reached when the water temperature is at 60 °C.

14.2 LOW TEMPERATURE MODE

- 14.2.1 For low temperature mode, J1 must have a jumper across pins 1 + 2.
- 14.2.2 With the Thermista-stat connected, the fan will run when a water temperature of 33 °C is reached and it stops when the water temperature falls to 20 °C. The fan speed is controlled by the Thermista-stat demand.
- 14.2.3 With no Thermista-stat connected, the fan will run when a water temperature of 22 °C is reached, the fan speed is controlled by the water temperature. The maximum fan speed is reached when the water temperature is 32 °C.

NOTE: Modairflow thermista-stat (BOS01243) or single zone wireless smart thermostat (1000-0030130) to be ordered seperatly.

IMPORTANT: On installations where there is a single Boiler & Aquair, the Johnson & Starley preferred method of control is to link between TPV + 3 (see Figure 4) and to fit the thermostat and time control to the boiler. The Aquair will then operate according to the pipe temperature.

15. COMMISSIONING

- 15.1 Ensure the heater is correctly fitted with water and all air vented from the flow and return circuits.
- 15.2 Switch on electrical supply.
- 15.3 Setting maximum fan speed.**
 - 15.3.1 Make a short across Thermista-stat connections, if fitted, and adjust the fan speed as required, then remove the short.
- 15.4 Setting minimum fan speed.**
 - 15.4.1 Make a short across the pipe sensor and adjust the fan speed as required, then remove short.
- 15.5 WITH MODAIRFLOW THERMISTA-STAT FITTED**
 - 15.5.1 Turn up Thermista-stat to call for heat.
 - 15.5.2 Check for 230V on switch live out.
 - 15.5.3 With the water at the required temperature, ensure fan starts.
 - 15.5.4 Allow the system to warm up and check temperature rise across unit is 40 °C.
 - 15.5.5 Set water differential to 20 °C using lock shield valve or equivalent.
 - 15.5.6 Turn off Thermista-stat and check there is NO 230V on switch live out.
 - 15.5.7 Check fan stops when water cools to required temperature.
- 15.6 WITH BOILER CONTROLLED ROOM THERMISTA-STAT FITTED**
 - 15.6.1 With the water at the required temperature ensure fan starts.
 - 15.6.2 Allow the system to warm up and check temperature rise across unit is 40 °C.
 - 15.6.3 Set water differential to 20 °C using lock shield valve or equivalent.
 - 15.6.4 Check fan stops when water cools to required temperature.

16. SERVICING & MAINTENANCE

16.1 ROUTINE MAINTENANCE

IMPORTANT: Before carrying out any work on the unit, ALWAYS ENSURE THE MAINS ELECTRICAL SUPPLY IS ISOLATED FROM THE UNIT.

Remove the filter and unscrew the two retaining screws holding the front cover on the unit, gently pull it forward. Servicing and maintenance should be carried out at least once per year.

- 16.1.1 Check that the heat exchanger airways is free from obstructions. To access the heat exchanger, remove the screws from the heat exchanger cover, just below the PCB (downflow) If necessary, clean with a vacuum cleaner from the air inspection panel, taking care to not damage the airways.
- 16.1.2 Check the condition of the external strainer, cleaning as necessary.
- 16.1.3 Check that the air filter is being regularly cleaned in accordance with the User Instructions.

16.2 PCB REMOVAL & REPLACEMENT

- 16.2.1 Disconnect the wiring at the PCB terminal block.
- 16.2.2 Release the 4 clips securing the PCB and withdraw the panel, disconnecting the fan supply lead at the fan tray terminal block.
- 13.2.3 Reassemble or replace in reverse order.

16.4 FAN REMOVAL

- 16.4.1 Disconnect the electrical connections.
- 16.4.2 Remove the screws securing the fan and withdraw on the location runners.
- 16.4.3 Reassemble or replace in reverse order.

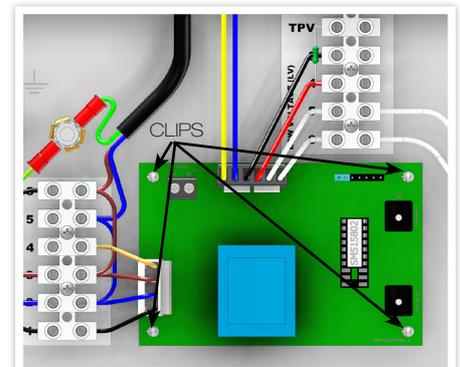


FIGURE 4. AQUAIR S PCB REMOVAL

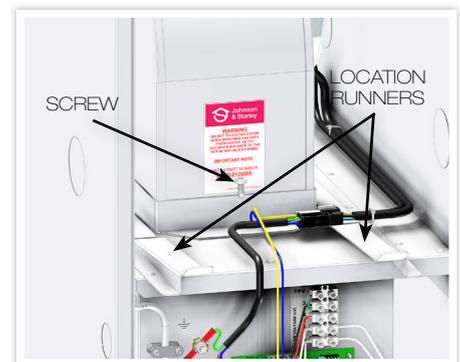


FIGURE 5. AIR CIRCULATION FAN REMOVAL

16.5 HEAT EXCHANGER REMOVAL

CAUTION: THE ELEMENTS OF THE HEAT EXCHANGER ARE VERY FRAGILE.

- 16.5.1 Close the isolation valves and drain down the unit.
- 16.5.2 Release the clip and the temperature sensor, remove the heat exchanger and its associated pipework from the unit.
- 16.5.3 Reassemble or replace in reverse order. Ensure all air locks are expelled, and check for water soundness.

16.6 AIR FILTER REMOVAL

- 16.6.1 The air filter is removed by sliding it out from the air filter frame.

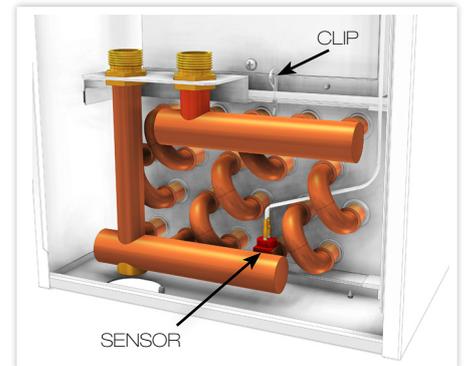
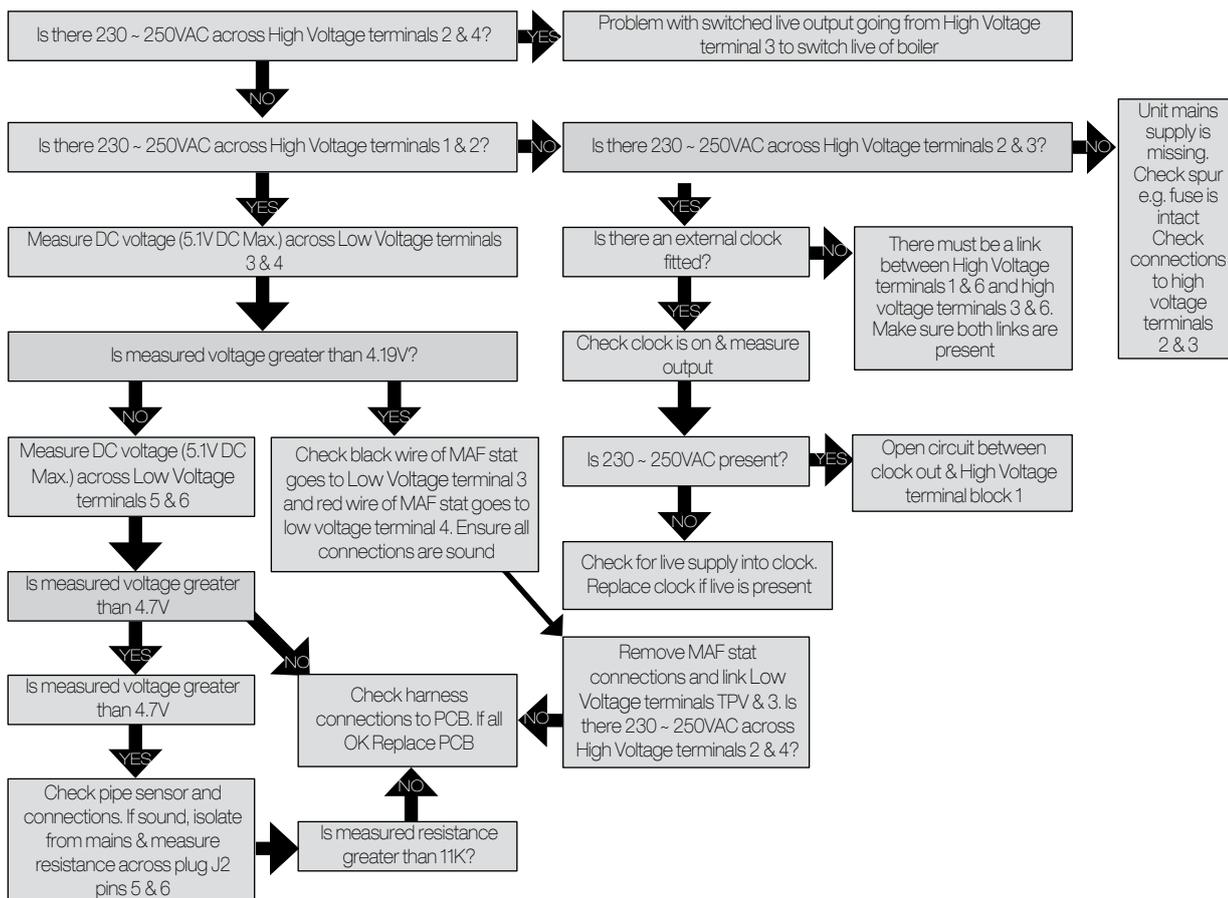


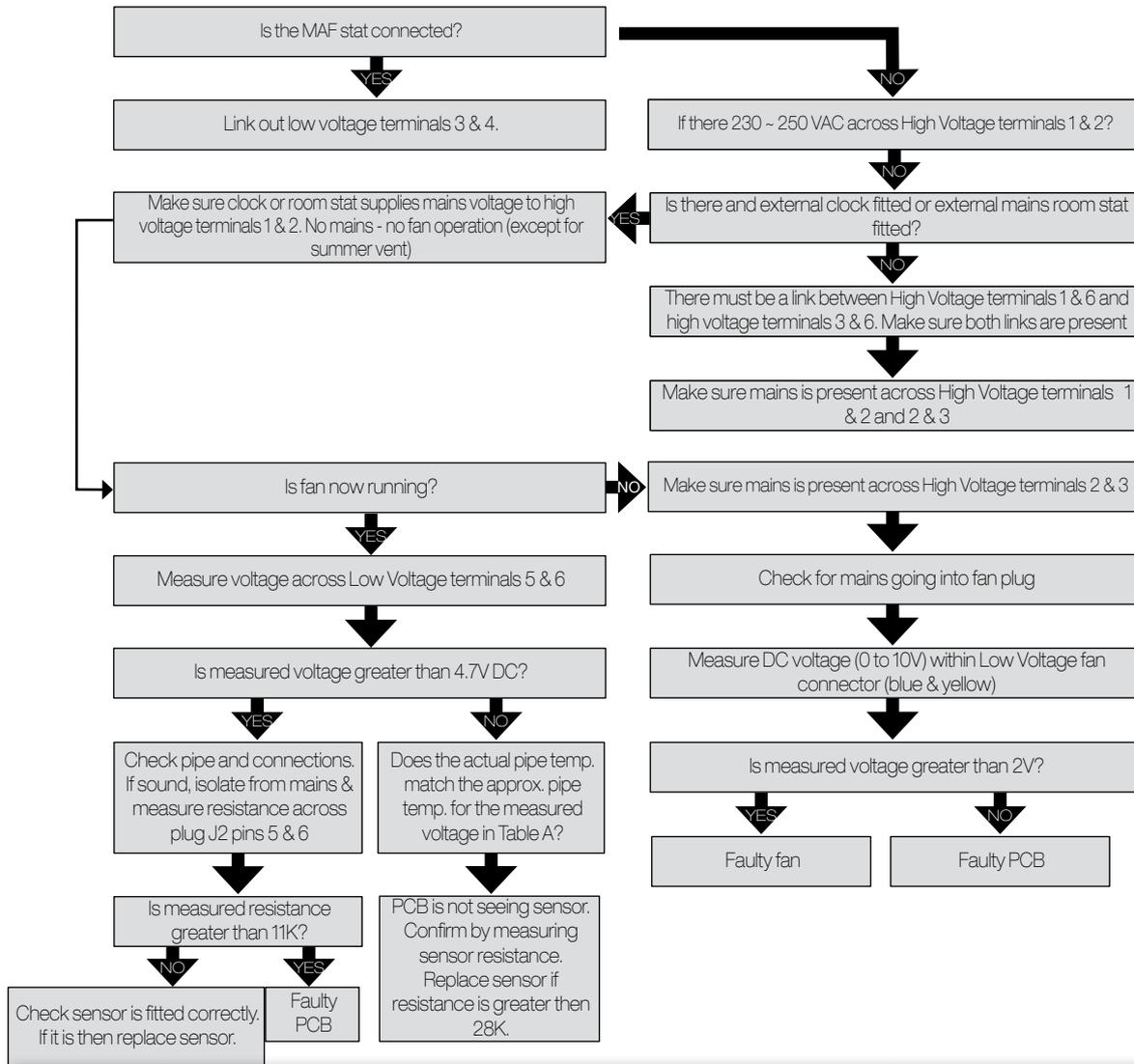
FIGURE 6. HEAT EXCHANGER REMOVAL

17. FAULT FINDING

MAF STAT CONNECTED NOT CALLING FOR HEAT (BOILER NOT FIRING) WHEN MAF STAT ON MAXIMUM



FAN NOT OPERATING WHEN PIPE IS ABOVE 60°C

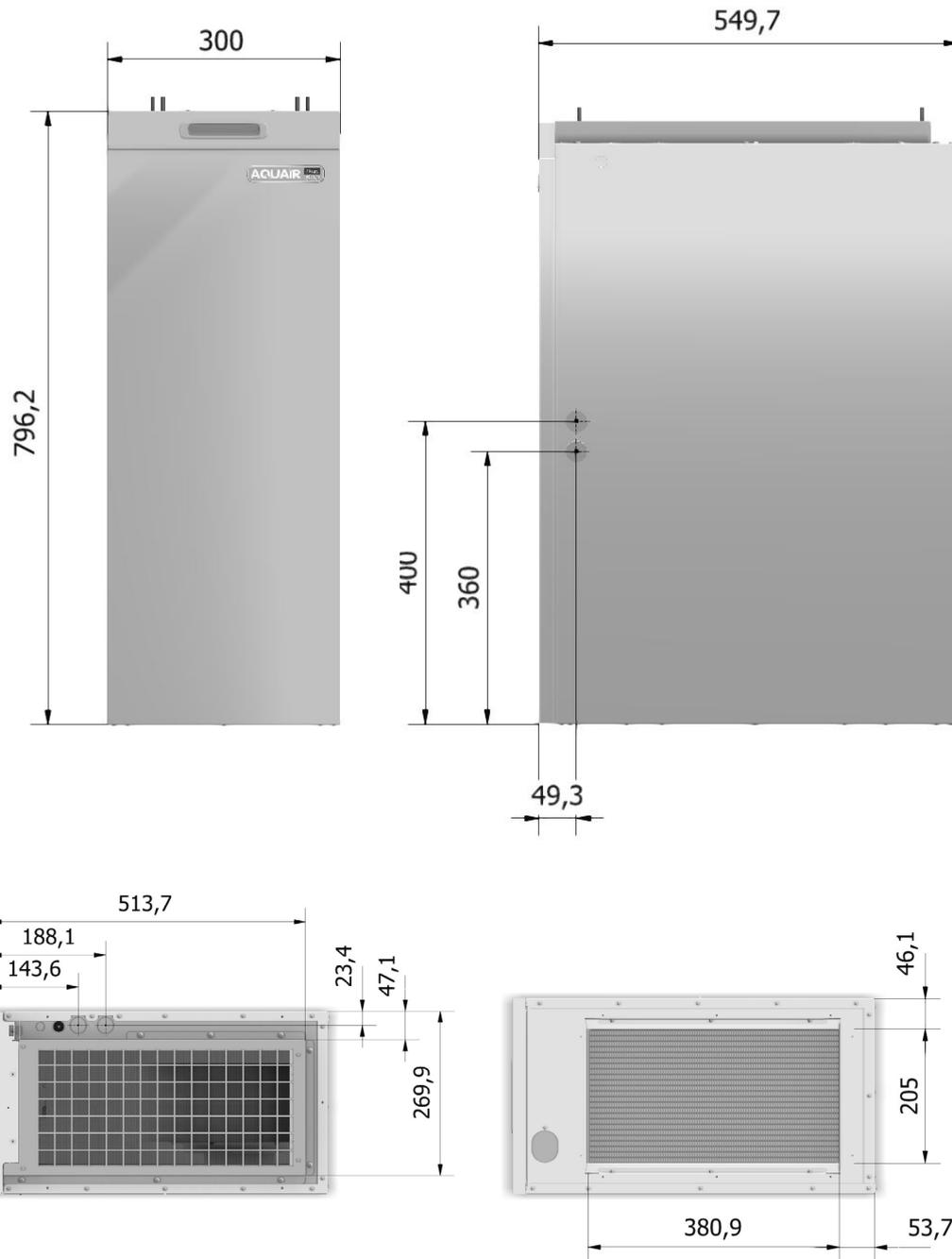


DC VOLTAGE ACROSS PIPE SENSOR	APPROX. PIPE TEMP. °C	DC VOLTAGE ACROSS PIPE SENSOR	APPROX. PIPE TEMP. °C	DC VOLTAGE ACROSS PIPE SENSOR	APPROX. PIPE TEMP. °C	DC VOLTAGE ACROSS PIPE SENSOR	APPROX. PIPE TEMP. °C
3.24	10	2.13	33	1.26	56	0.73	79
3.19	11	2.08	34	1.23	57	0.71	80
3.14	12	2.04	35	1.20	58	0.70	81
3.09	13	1.99	36	1.17	59	0.68	82
3.04	14	1.95	37	1.15	60	0.66	83
2.99	15	1.91	38	1.12	61	0.65	84
2.94	16	1.87	39	1.09	62	0.63	85
2.89	17	1.83	40	1.07	63	0.63	86
2.84	18	1.79	41	1.04	64	0.60	87
2.79	19	1.75	42	1.02	65	0.59	88
2.75	20	1.71	43	0.99	66	0.58	89
2.70	21	1.67	44	0.97	67	0.56	90
2.65	22	1.63	45	0.95	68	0.55	91
2.60	23	1.59	46	0.92	69	0.54	92
2.55	24	1.56	47	0.90	70	0.53	93
2.50	25	1.52	48	0.88	71	0.51	94
2.45	26	1.49	49	0.86	72	0.50	95
2.40	27	1.45	50	0.84	73	0.49	96
2.36	28	1.42	51	0.82	74	0.48	97
2.31	29	1.39	52	0.80	75	0.47	98
2.26	30	1.35	53	0.78	76	0.46	99
2.22	31	1.32	54	0.76	77	0.45	100
2.17	32	1.29	55	0.75	78		

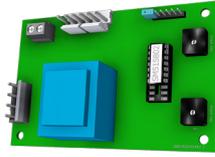
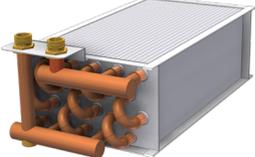
TABLE A

18. DIMENSIONS

AQUAIR S-10



19. SPARES LIST

ITEM	DESCRIPTION	MODEL	QTY	PART No.	
1	Air Filter	S-10	1	PFA10	
2	Air Circulation Fan	S-10	1	AQ10-0126005	
3	PCB Board		1	1000-0526275	
4	Temperature Flow Sensor		1	1000-0526505	
5	Front Cover	S-10	1	AQ10-0212000	
6	Heat Exchanger	S-10	1	AQ10-0138005	
7	Thermista-stat		1	BOS01242	

NOTES

20. EXPLODED DIAGRAM

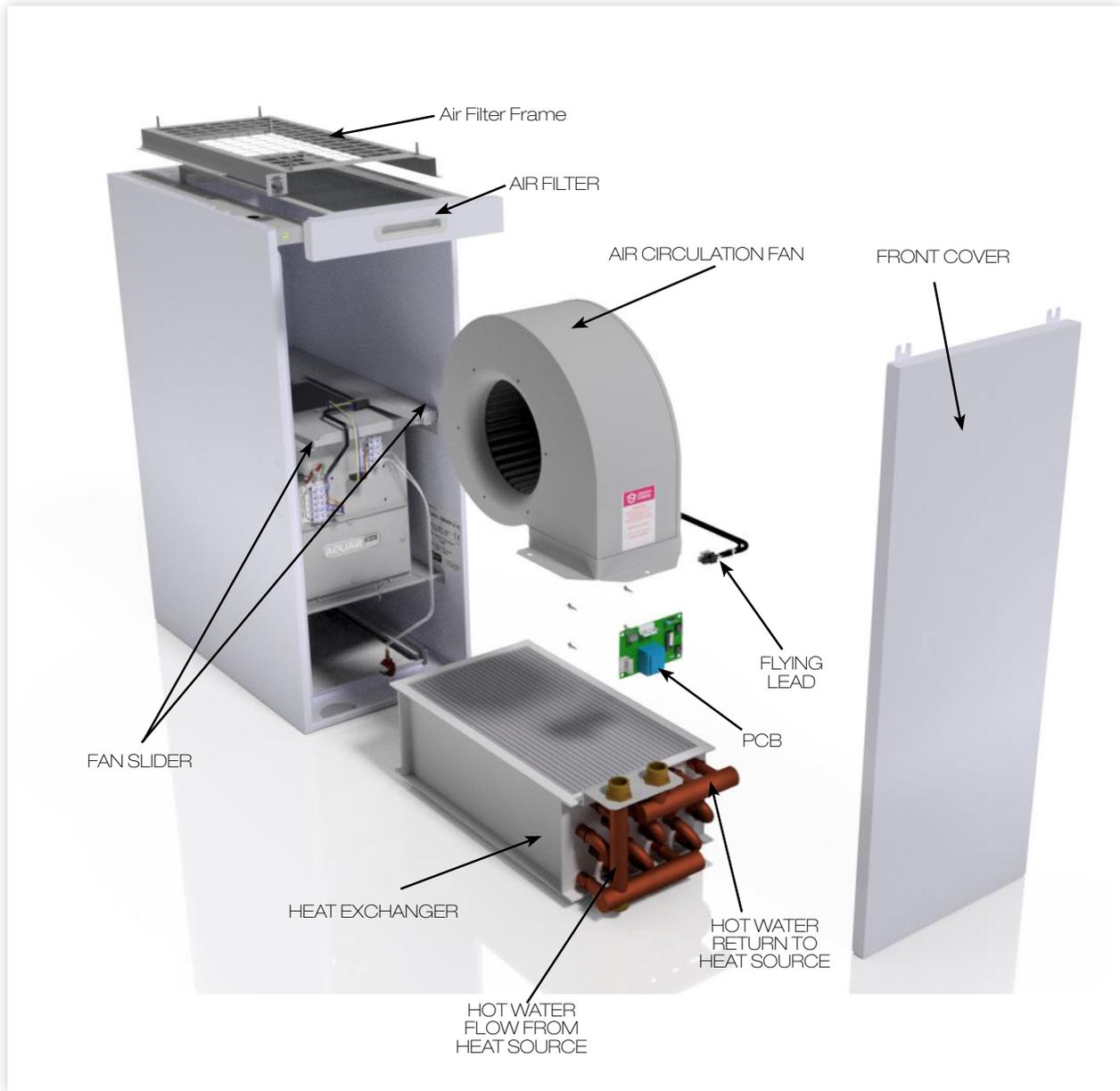


FIGURE 8. AQUAIR S EXPLODED DIAGRAM



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