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HEAT RECOVERY UNITS

Installation, Operation & Maintenance Manual

Introduction

AVT's comprehensive and extensive range of Heat Recovery Units direct drive and belt driven models for plant-room and roof installation are able to deliver up to 2.0 m³/sec ensuring that any installation requirement can be met. Additionally, AVT can custom build units with a capacity of up to 12.0 m³/sec.

General Construction

The HR range of heat recovery units can be broken down into two distinct styles. The HRP range of units is designed for internal applications. These are of a standard construction of a 25mm thick double skinned case. The case has inner and outer skins of spangled galvanized sheet steel and is filled with 45kg/m³ density mineral wool slab. The HRR range of units is designed for external applications. These are of a standard construction of a 25mm thick double skinned case. The case has inner and outer skins of spangled galvanized sheet steel. The outer skins have a plastic coated finish. Panels are filled with 45kg/m³ density mineral wool slab. HRR units have pitched weather lid with plastic coated finish. Standard plastic coat finish to colour: BS10A05. Units come with fresh air inlet and exhaust air cowls with bird mesh guard.

Inspection Upon Receipt Of Goods

Immediately upon receipt of any goods, a careful inspection should be undertaken to ensure neither damage nor missing parts. Particular attention should be paid to the fan impeller, motor shaft, anti-vibration mounts, flexible connection, coil connections and casework.

In the event of such damage or loss having occurred, inform AVT (01264 356415) **WITHIN 3 WORKING DAYS** of the delivery date, giving the serial number which can be found on the nameplate. After this period we will be unable to entertain any claim for loss or damage.

Handling

Units being craned into position must be handled with care to avoid damage.

Installation

When installing our equipment, the following must be observed.

Safety: It is the responsibility of the installer to ensure that the installation complies with the

legal regulations and the current **HEALTH AND SAFETY AT WORK ACT.**

Ambient Temperatures: The range of units covered by this manual are designed for use in an environment where the ambient air temperature is unlikely to exceed 40°C.

Positioning Using Cranes: Units being craned into position must be handled with care to avoid any damage. This applies particularly to weatherproof units, with overhanging lids and cowls, and also painted units. Where lifting lugs are provided these **MUST** be used. A spreader bar should be employed so as to prevent damage to the top of the unit. Strong points are provided on weather lids for straps.

Mounting: All centrifugal fan units **MUST** be mounted so that the fan shaft is horizontal. Failure to comply will result in fan failure.

Positioning/Assembly: All units should be mounted on a completely flat base. Units supplied in sections should be bolted together using the self adhesive rubber tape and fasteners supplied. For belt drive units only; once the unit is located in position **YELLOW TRANSIT BOLT** securing the fan and motor assembly **MUST** be removed.

Duct Connections: Adjoining ductwork should always be independently supported to avoid undue stress on the unit casing. Fans are internally isolated thus removing the need for external flexible connections or anti-vibration mounts.

Access: All units are designed with easily removable components for maintenance purposes. Sufficient room should be allowed adjacent to the unit to allow components to be withdrawn.

Electrical Wiring

Electrical supply must be fully isolated before attempting to affect any work on the unit. All wiring should be carried out by a competent electrician and should comply fully with the current I.E.E. Wiring regulations. Wiring diagrams are provided within the motor terminal box. The electrical supply must be as stated on the nameplate.



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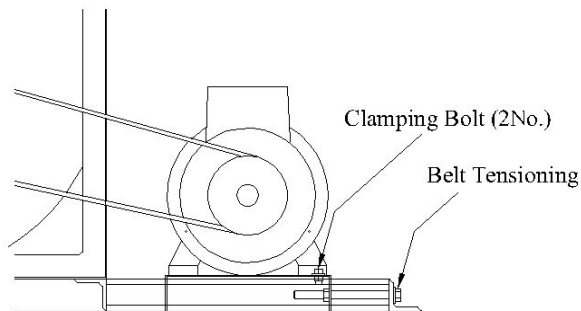
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When the wiring is complete, check for free & correct rotation of the fan impellor

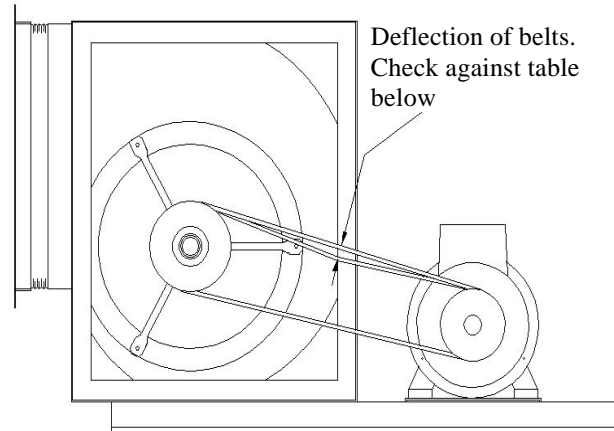
Heat Recovery: Units fitted with Cross Flow Plate Heat Exchangers **MUST** not have the supply and extract fans run independently from each other as this will cause damage to the heat exchanger module. It is also recommended that an interlock be fitted within the controls to turn both fans off in the event of one failing.

Vee Belt Drives: Not all units covered by these operating instructions are fitted with a Vee-Belt Drive. Unit sizes 7 & 8 are the belt driven models. Before the unit is run, it is essential that drive is checked to ensure correct alignment. The fan and motor shafts **MUST** be parallel. The motor pulley **MUST** be aligned with the fan pulley using a straight edge. Turn the fan shaft by hand to ensure free rotation.

The belts should not be over tensioned as this may cause damage to the bearings and excessive wear on the belts. See the following diagrams for tensioning details. Belts should be re-tensioned after one months running



To tighten belt: Slacken off the two clamping bolts, turn the head of the belt tensioning stud until the required tension is achieved. Retighten the two clamping bolts.



Belts should be tensioned so the deflection of the belt (shown above) should not exceed 16mm per 1 metre pulley centre distance, when a given force is applied to the belt (See chart below).

Small Pulley Diameter	Setting force	
	Newtons (N)	Kilograms (kgf)
56 to 71	16	1.6
71 to 90	18	1.8
90 to 125	20	2
Over 125	22	2.2

Belts should be inspected on a regular basis, checking for slackness or wear. Any slackness should be taken up as described on the previous page. Wear may be down to miss aligned pulleys - this should be checked.

Under normal conditions, the stretch within new belts will occur in the first few days of operation.

New and used Vee Belts **MUST NOT** be mixed. Vee Belts of different types or brands **MUST NOT** be mixed.

Always fit new belts of the same set

Heating and Cooling Coils: Winter Conditions:-

It is important that coils are protected against adverse weather during the winter period that may cause freezing and the danger of air being delivered at below 4.5°C. To protect heating coils, a thermostat should be installed down stream of the heater and set to 4.5°C. Its action should be to either stop the fan or close outside air dampers. Chilled water cooling coils fitted upstream of any heating coil should be drained to prevent freezing.

Water Condition:-

It is recommended that a check is made on the water condition to ensure that any treatment to



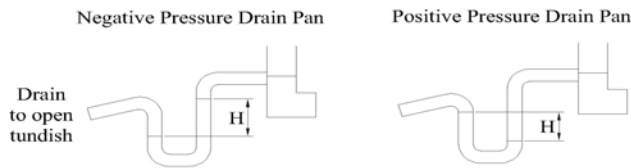
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prevent corrosion or scaling has been applied. Information relating to this can be obtained from the relevant Water Authorities particulars which can be found in the Water Engineer Handbook yearly edition.

Trapping:-

Correct trapping of the condensate line is essential to prevent flooding or liquid splashing back into the drain pan.

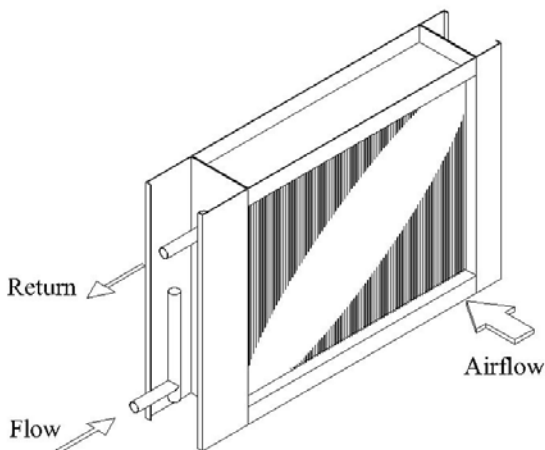


INSTALLATION AND GENERAL NOTES FOR ELECTRIC HEATER BATTERIES.

DOCUMENT REF: DO1001

Note: If you are not in possession of the above manual contact AVT (01264 356415) to request a copy. **NO WORK** should be Dim H= TOTAL STATIC PRESSURE mm Wg+12mm minimum.

Water Coils:



Air Vents and Drain Plugs:-

These are not fitted to the coil but must be fitted in adjacent pipe-work. The air vent should be fitted at the highest point by the return connection and the drain below the flow connection. The water flow connection is that on the air off

side of the coil.

When the coil is mounted at a high point of the system it **MUST** be regularly vented, otherwise the coil may become air locked with a loss of duty

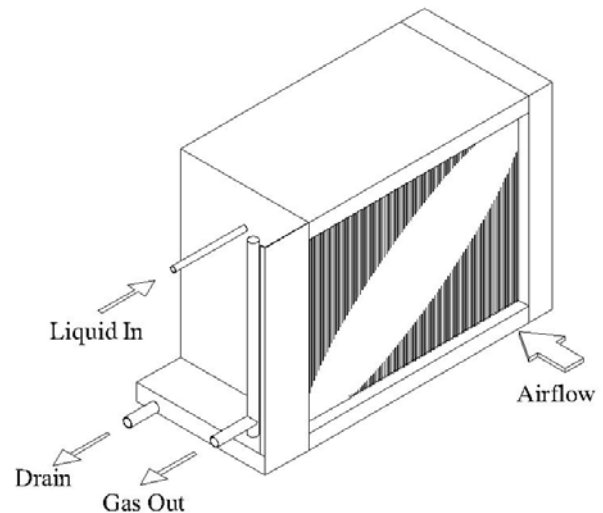
Electric Heater Batteries:

REFER TO SEPARATE MANUAL ENTITLED. **INSTALLATION AND GENERAL NOTES FOR ELECTRIC HEATER BATTERIES.**

DOCUMENT REF: DO1001

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Dx Cooling Coils:



Must be fitted in accordance with accepted codes of practice for refrigeration systems. If fitted upstream of a heating coil, care must be taken to ensure that the air temperature does not fall below 0°C.

Control Sensor Positioning:

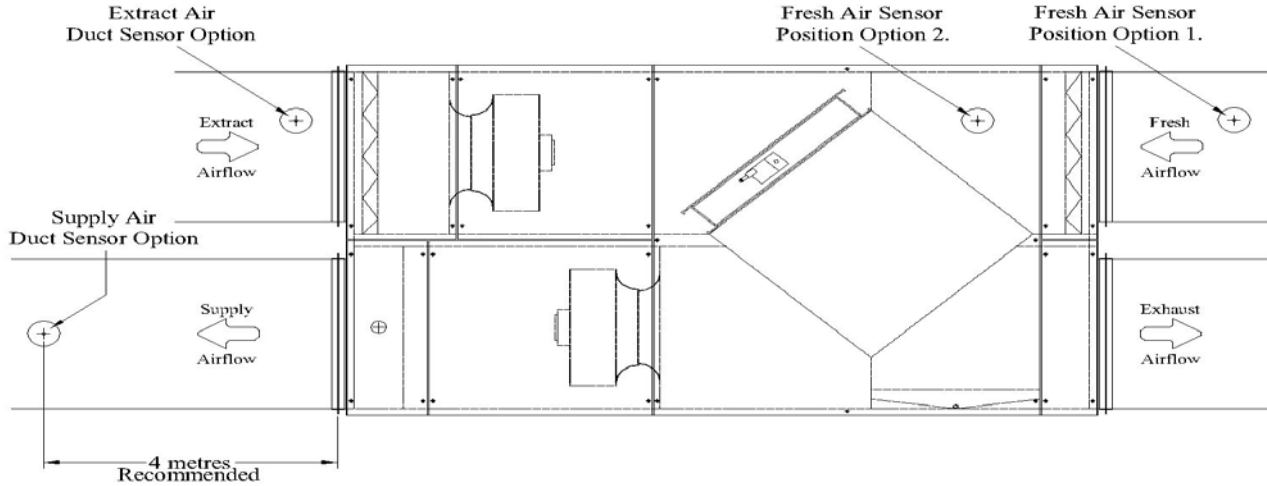
Fresh air sensor

As shown in the diagram below (Fig 1), there are two options for the position of this sensor. . Option One is for a fresh air duct mounted sensor position, option two has the sensor mounted within the fresh air side of the heat exchanger section of the air handing unit. This sensor will control the face & bypass damper configuration.



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(Fig 1)

Heating/Room Sensor

Figure 1 shows the two possible options for monitoring the room temperature.

1. Supply Air duct sensor

If the supply is for “make up” air, with additional background heating within the area being supplied; a duct sensor should be used. The sensor must be mounted in the supply duct away from direct radiated heat. The control panel will then maintain a constant supply duct air temperature.

2. Extract Air duct sensor

If the air supplied to the area is for total area heating, then a room sensor should be used. In some installations a duct sensor mounted in the extract air duct may be used as an alternative. In this type of installation the typical system response time is very large and may cause the supply air to enter at very high or very low temperatures for some length of time.

Maintenance:

3 Monthly:-

Filters should be inspected and if found to be heavily soiled, replaced.

If grease nipples are fitted to any fan/motor bearing or plumber block bearing, then inspect and recharge as necessary

6 Monthly:-The fan impeller should be carefully cleaned with a brush. This will prevent the impeller from becoming unduly dirty and become unbalanced. Coils should be inspected to ensure no foreign material has accumulated on the fins. Should any be found, the fins can be cleaned using a soft brush and a mild detergent solution. Care **MUST** be taken not to damage the fins during this process. Should debris accumulate on the fins on a regular basis, check the filtration system to ensure

correct operation. Damper cogs, blades and frames should be cleaned and lubricated with a PTFE or silicone oil aerosol lubricant.

12 Monthly:-

The security and integrity of all fasteners should be checked. Particular attention should be paid to the impeller fixing onto the fan shaft. If the unit has a paint finish this should be checked to ensure no deterioration and if necessary repainted with a suitable touch-up paint. Check A.V. mountings and flexible connections for signs of perishing or damage.

Heat Exchanger:-

Plate heat exchangers have no moving parts, therefore only minimal maintenance is required. Periodically inspect heat exchange matrix for any debris, dust or dirt build up. If found it should be removed by one of the following methods.

Superficial dust or debris can be removed from the surface of the heat exchange matrix by gently brushing with a soft long haired brush. Loosened debris can then be flushed through with warm water or vacuumed from the surface of the matrix.

Stubborn deposits can be removed by using a low pressure washer with an approved detergent solution. The solution temperature should not exceed 50°C. When using any pressure device care must be taken not to damage the heat exchange matrix.

Under **NO** circumstances should the heat exchanger be steam cleaned.



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Spares:

Spare parts or direct replacements are normally held in stock and are available for a period of up to 10 years from installation.

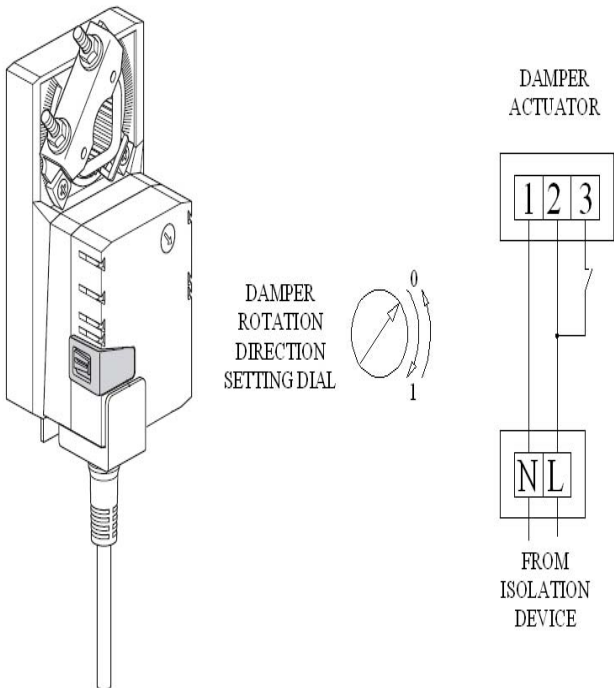
Any spare part can be ordered by contacting AVT (01264 356415) and quoting the unit serial number which can be found on the nameplate.

A complete list of recommended spares can be issued upon request.

Table below shows standard unit filter sizes

Unit Size	Orientation	Internal			External			Grade	Quantity
		Filter Dimensions			Filter Dimensions				
		Width	Height	Depth	Width	Height	Depth		
1	ALL	230	200	22	-	-	-	G3	1
2	ALL	240	300	22	-	-	-	G3	1
3	FLAT	400	395	48	400	395	48	G3	1
	STACKED	475	370	48	475	370	48	G3	1
4	FLAT	475	445	48	475	445	48	G3	1
	STACKED	525	395	48	525	395	48	G3	1
5	FLAT	550	545	48	550	545	48	G3	1
	STACKED	625	520	48	625	520	48	G3	1
6	FLAT	675	595	48	675	595	48	G3	1
	STACKED	675	620	48	675	620	48	G3	1
7	FLAT	400	400	98	400	400	98	G4	4
	STACKED	400	400	98	400	400	98	G4	4
	FLAT	500	500	98	500	500	98	G4	4
8	STACKED	500	500	98	500	500	98	G4	4

Damper Actuator Wiring:

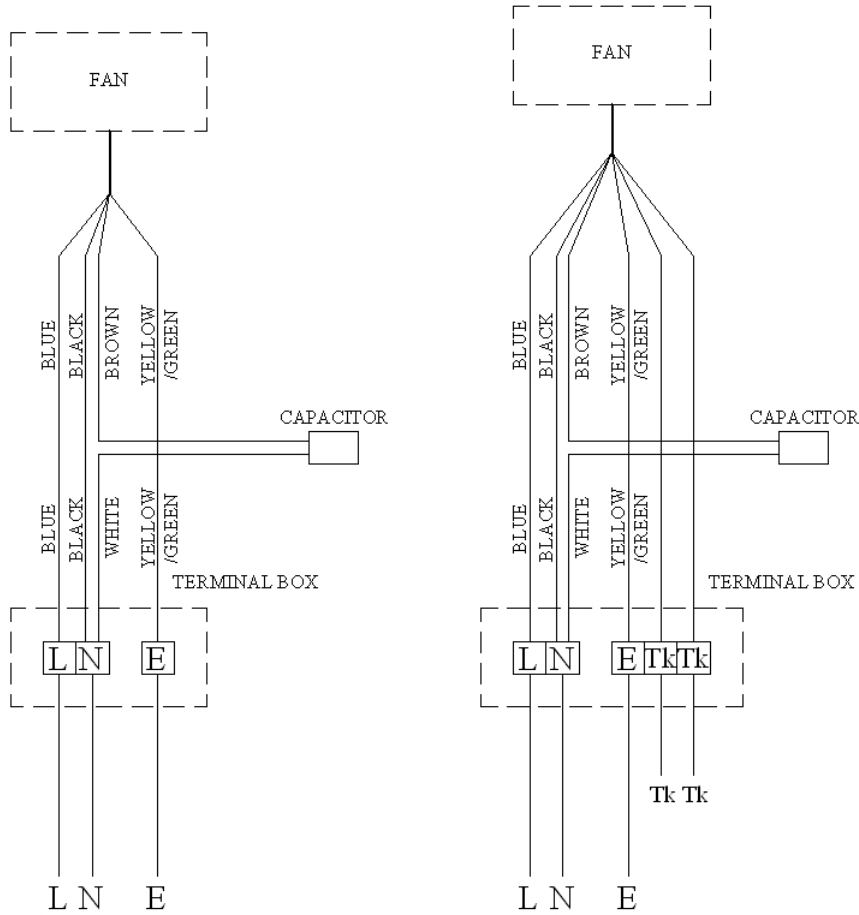




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Wiring Diagrams - Direct Drive Fans



Fan Wiring Diagram 1.
 For units:
 HRR/P 1, 2, 3-1, 3-2, 4,
 5-1, 5-2

Fan Wiring Diagram 2.
 For units:
 HRR/P 5-3, 6-1 & 6-2
 Tk – motor thermal cutout

Model	Supply	Fan Motor Power / W	Full Load Current /A	Start Current/A	Capacitor size/ μ F
1	230v 1ph	23	0.11	0.20	1.0
2	230v 1ph	58	0.26	0.51	2.0
3-1	230v 1ph	85	0.38	0.89	2.5
3-2	230v 1ph	155	0.70	1.70	5.0
4	230v 1ph	225	1.00	2.40	7.0
5-1	230v 1ph	225	1.00	2.40	7.0
5-2	230v 1ph	280	1.23	3.60	10.0
5-3	230v 1ph	480	2.40	6.30	10.0
6-1	230v 1ph	480	2.40	6.30	10.0
6-2	230v 1ph	680	3.00	5.40	14.0