



**Installation, Operation
And
Maintenance Manual
For:**

Fan Coil Units.

**47 CENTRAL AVENUE
WEST MOLESEY
SURREY KT8 2QZ
www.diffusion-group.com
TEL: 020 8783 0033**

INDEX

	Page No.
INTRODUCTION.	//
1. HEALTH AND SAFETY AND CAUTIONARY NOTES.	2
2. DELIVERIES AND RECEIPT OF EQUIPMENT.	2
3. OFF-LOADING AND HANDLING.	3
4. UNITS HELD IN STORAGE CONDITION.	3
5. INSTALLATION.	4
6. COMMISSIONING OF UNIT.	
6.01 Access to motor and impeller.	5
6.03 Rotation of fan.	5
6.04 Electrical connections to the unit.	5
6.05 ec/dc Speed control signal.	5
6.06 Earth Bonding.	5
6.07 Test running.	5
6.08 Condensate trapping.	5
6.09 Panel filter orientation.	5
7. AIR FILTERS	
7.01 Panel filters – Type and Removal.	5
8. ELECTRIC AIR HEATERS	
8.01+8.05 Electrical connections to the unit.	6
8.02 High temp cut-outs.	6
8.03 Air flow proving.	6
8.04 Re-setting of hi-temp cut-outs.	6
9. COIL SECTION	
9.01 Water treatment.	6
9.02 Drain pan.	6
9.03 Water coils.	6
9.04 Site pipe-work supports.	6
9.05 Heating and Cooling connections.	6
9.06 Venting and Draining.	6
10. SERVICE AND MAINTENANCE.	
10.01 Electric motors.	7
10.02 Fan impeller.	7
10.03 Casing internal surfaces.	7
10.04 Access panels.	7
10.05 Electric Air Heaters.	7
10.06 Panel type filters.	8
10.07 Coil / Heat exchanger.	8
11. ANNUAL INSPECTION.	
11.01 Filter.	8
11.02 Coil / Heat exchanger.	8
11.03 Screws and Fixings.	8
11.04 Electrical terminations.	8
11.05 Wire / Cable insulation.	8
11.06 Wiring looms.	8
11.07 Casing external surfaces.	8
11.08 Access door gasket seals.	8
ROUTINE MAINTENANCE SCHEDULE.	9
Notes on Static pressure / Sound power levels.	9
Invalidation of Guarantee.	10
SPARE PARTS:	
Spare parts.	11
End of Life / Disposal.	11

1) - HEALTH AND SAFETY.

Working Conditions and Pre-Installation checks.

This section “working conditions”, deals with the hazards that could be encountered when any work is carried out on the equipment for which this manual is written.

Therefore the following points should be observed to avoid any injury or health hazards.

The unit shall be checked that:

- a) It is suitable for the electrical supply available.
- b) It is suitable for the atmosphere and environment in which it is to operate.
- c) It is suitable for the working media, temperature, and pressure for which it is to be used.
- d) It is manually isolated from the mains power supply before any work is carried out. Do not open the unit whilst the fans are still running.
- e) Electrical equipment is earthed to comply with I.E.E. regulations and local by-laws.

CAUTIONARY NOTES:

NO PART OF THE UNIT SHALL BE DISMANTLED UNTIL A CAREFUL STUDY HAS BEEN MADE OF THIS MANUAL.

THE NATURE OF THE EQUIPMENT CAN RESULT IN SHARP EDGES, SHARP ANGLES AND ROUGH SURFACES WITHIN SOME ACCESSIBLE PARTS OF THIS UNIT.

THIS MANUAL DEALS IN DETAIL WITH THE ERECTION, COMMISSIONING AND SERVICING, AND SHALL BE STRICTLY ADHERED TO.

WHENEVER ANY MAINTENANCE WORK IS DONE WITHIN THE UNIT, THE INTERIOR SHALL BE LEFT CLEAN AND ACCESS PANELS SHALL BE CORRECTLY FASTENED.

2) – DELIVERIES AND RECEIPT OF EQUIPMENT.

Each unit is thoroughly inspected before leaving the factory and care is taken to ensure safe transit to site.

Upon receipt of equipment a visual inspection shall be made and any damage noted on the delivery form.

The driver delivering the equipment should endorse particulars of any damage or short delivery.

No responsibility can be held for damage sustained during the unloading from the delivery vehicle or on the site thereafter.

All claims for damage or short delivery should be made to Diffusion within two days, and confirmed in writing within five days of receipt of the equipment.

3) – OFF LOADING AND HANDLING.

- 3.01 All units should only be handled by the main external casework; care should be taken not to lift by the electrical connecting cable and enclosure or the drain tray extension!
- 3.02 When lifting and positioning manually, please refer to EC guidelines for recommended maximum weights.
- 3.03 Mechanical handling equipment should be selected to ensure even support across casework panels.
- 3.04 Extreme care should be exercised when undertaking any handling to move and position the unit; as the unit exterior panels will easily distort if the weight is not supported carefully and evenly.

4) – UNITS HELD IN STORAGE CONDITION.

- 4.01 The packaging provided by Diffusion is standard and intended as transit protection only, to protect against minor damage prior to installation, and does not offer protection against impact or abrasion; it is not weatherproof or fire proof.
- 4.02 Units that are not for immediate use should be stored protected by the original packaging when possible. If this packing has been removed the unit/s should be re-packaged with suitable materials providing protection from dust and abrasion.
- 4.03 The packaging provided by Diffusion is not intended to protect against outside weather conditions, thus should the units need to be stored outside at any time appropriate weatherproof sheeting should be used.
- 4.04 Interior:
If ducting is not connected it is essential that all inlets and discharge openings be completely sealed.
Whenever any access panels are removed for inspection purposes they are to be replaced and made secure, care to be taken not to damage the seals.
- 4.05 Exterior:
The exterior shall be kept free from any falling building material, dampness or extreme cold or heat.
It is advisable to encapsulate the unit where possible, exterior surfaces should be checked on a monthly basis and any signs of corrosion or scratches should be treated immediately.
- 4.06 Static indentation:
Machines fitted with ball bearings may be damaged if left stationary for long periods. The balls and races may suffer damage by fretting corrosion (false brinelling, stationary vibration or static vibration marking). Consequently, no motor should be permitted to stand on a vibrating floor while in storage, manually rotating the motors during the monthly inspection will reduce the risk of this effect occurring.
- 4.07 For all accessory module storage instructions please refer to the appropriate section within the specific manual.

The foregoing instructions are intended to preserve the life of all static and moving parts of the equipment during the period of storage. It is advisable that regular attention to the equipment is maintained.

When the equipment is put into commission this manual is to be strictly adhered to. The procedures detailed above are particularly brought to your attention and do not exclude other necessary procedures commensurate with good engineering practice.

5) – INSTALLATION.

- 5.01 All units must be installed in accordance with good engineering practices and standards, correctly oriented, true and level.
- 5.02 Before mounting the unit into position it is advisable that consideration is given to the aspect of access to the unit for service and maintenance, particularly reference to the following:
That provision is made for access to:
Fans and Fan plate assembly. – via main access panel.
Valves, Coil and Drain tray components.
Filter section.
- 5.03 Electrical control enclosure covers. – min. of 200mm clear access required.
- 5.04 All electrical connections to the unit should be in accordance with current I.E.E regulations and local by-laws, wired to the appropriate wiring detail issued with the unit.
- 5.05 Ensure the size of all cables and contactors wired to the unit are suitable for the load being carried.
- 5.06 Flexible connectors are not essential for connecting ductwork to the units; however the use of this may be required to overcome any site ductwork misalignments.
- 5.07 Unit modules that are being delivered in sections for assembly on site should be carefully checked against the general arrangement drawing to ensure erection in the correct sequence and handing.
- 5.08 Ensure that adequate supports are provided accounting for unit weight and size.
- 5.09 If surface damage to the unit has been caused during installation of the unit, this should be made good. For painted components touch-up paint for the case and panelling is available from Diffusion for this purpose.
- 5.10 It is necessary to connect additional electrical and hydraulic controls equipment to the unit to provide a functional product, where any free issued controls have been factory fitted the installing contractor retains the responsibility for their correct function and all associated warranties.

6) – COMMISSIONING OF THE UNIT.

- Note: It is essential that the unit be completely assembled prior to being operated. All ductwork is securely fixed and free access cannot be made to the rotating parts of the unit.
- 6.01 Access to the fan is made by removal of the main access panel.
- 6.02 Access panels are retained by screw fixings or key operated locks and should only be opened by a competent or qualified person once they have familiarised themselves with this manual.
- 6.03 With the unit completely isolated from the power supply; remove the access panel and check fan for free rotation.
- 6.04 The fan motor controls shall be connected to external controls in accordance to I.E.E. regulations and local by-laws, wired to the appropriate wiring detail issued for the project.
- 6.05 Speed control signal to fan coils fitted with ec/dc motors must not exceed 10.0Vdc, and be capable of supporting up to 2mAmp. Load.
- 6.06 **Earth Bonding.**
All units are connected internally to the earth wiring; however it is recommended that a separate earth be made to the casework of the unit and associated modules.
- 6.07 Test run the fan motor to ensure correct operation; monitor the impeller rotation direction.
- 6.08 Check that the condensate drain is trapped, prime as required by pouring water into the drain tray, checking that the water drains completely from the drain tray.
- 6.09 Replace and secure all access panels.
- 6.10 Prior to operation of any electric air heaters the correct airflow through the unit should be established.

7) – AIR FILTERS.

- 7.01 The unit is designed to operate with a clean filter, and therefore compliance with the maintenance schedule detailed in this manual is essential. Failure to comply with this routine, as a minimum, will result in the loss of volumetric and thermal performance; additionally this can lead to condensate draining problems.
- 7.02 Access is gained by removal of retaining channels or specific cover panels retained by either M6 Pozidriv #3 or thumbscrews.
- 7.03 Metal mesh filters should be cleaned by careful vacuuming whilst retained within the unit, or by releasing the thumb screws; removed from the unit carefully cleaned by vacuuming, light brushing or washing in warm water with a mild detergent. (Washed filters should be fully dry before re-fitting into the fan coil).
- 7.04 Synthetic filament pad and framed filters should be cleaned by careful vacuuming whilst retained within the unit, or by releasing the thumb screws; removed from the unit and carefully cleaned by vacuuming, gently tapping to remove loose dust or washing in warm water with a mild detergent. (Washed filters should be fully dry before re-fitting into the fan coil).
- 7.05 When fitting replacement filters care should be taken to ensure the same grade components are used, incorrect filters will affect the established tested performance of the unit.

8) – ELECTRIC AIR HEATERS

- 8.01 Electric air heaters should be wired in accordance with I.E.E regulations and local by-laws, wired to the appropriate wiring detail issued with the unit. Ensure fan control is interlocked with the heater control, i.e. the fan must be running prior to the heater being enabled.
- 8.02 Heater modules are fitted with high temp cut-out protection, Refer to unit / project specific wiring diagram for safety interlock function detail.
- 8.03 Prior to operation of the electric heater ensure correct airflow through the unit, reduced / no airflow will cause the high temperature thermal cut-outs to operate.
- 8.04 Manual re-set thermal cut-outs should only be re-set after isolating all power to the unit and determining / removing the cause for cut-out operation.
- 8.05 Ensure the size of the cables and contactors wired to the heater are suitable for the load being carried.

9) – COIL SECTION.

- 9.01 **Water treatment**
If any treatment is required to the water supply for prevention of corrosion and scaling to the equipment, information regarding the necessary action to be taken can be obtained from the relevant 'Water Supply Authority'.
- 9.02 **Drain Pan**
An adequately sized drain line should run from the drain connection, slopped to ensure free drainage. The drain line should have a simple, cleanable 'U' bend trap and should terminate at an open drain or tundish so that any blockage can be seen and remedied.
- 9.03 **Water Coils**
Care should be taken when connecting any fittings to the flow and return connections of the heat exchanger so as to minimise the risk of damage to the pipe work and heat exchanger headers. Ensure all fittings are restrained from turning to avoid any damage to the coil.
- 9.04 Care should be taken to ensure that all pipes and fittings connecting to the unit are independently supported so as not to impose strain on the coil pipe-work.
- 9.05 It is important to connect the water flow and return connections to the correct pipe work, refer to G.A. drawing details and unit specific labels detailing this.
- 9.06 Low-pressure water coils are fitted with an air vent and drain plug. When these coils are at the high point of the system they should be regularly vented, otherwise they could become air-locked and cause a reduction in duty. These vents and drains are accessed via service holes within the unit casework.

10) – SERVICE AND MAINTENANCE.

General

This section of the manual deals with the requirements for service and maintenance of the equipment.

It is essential that the following instructions be carried out to obtain long life from the unit.

WARNING: It is essential that before any work or maintenance is carried out, the unit must be isolated manually from the electrical supply.

10.01 **Electric motors**

An annual check on the motors is advisable to ascertain that the motor is quiet and running smoothly, check the security of all electrical connections and fixing bolts of the fan/motor assembly.

All direct driven fan motors are fitted with sealed for life; maintenance free bearings and cannot be serviced.

10.02 **Fan Impeller**

An annual check should be made to the condition of the impeller blades, any debris deposited onto the blades should be removed using a soft brush; taking care not to damage the blades.

Vacuum any loose deposits from within the fan scrolls.

10.03 **Casing internal surfaces**

An annual inspection should be made to the condition of the internal surfaces of the casework; any debris that has accumulated should be removed with a soft brush. Vacuum any loose deposits from within the casing.

10.04 **Access Panels**

During the routine servicing of the unit ensure that when an access panel is removed the gasket seals are not damaged.

Seals should remain dry and crack free and should not adhere to the access panel and case at the same time.

Seals should remain in position when the access is removed and form a complete frame around the panel perimeter to give positive seal on closure.

Ensure all retaining screws or locks are fitted and correctly tightened / adjusted to retain the access panel.

10.05 **Electric air heaters**

Check that the safety cut-outs are correctly wired to ensure shutdown in the event of overheating.

Check that the unit is achieving the correct airflow.

The fan control must be interlocked with the heater control, i.e. the fan must be running before the heater is switched on.

In the event of shutdown caused by overheating, the main isolator must be switched off before the fan is checked for failure. Ducting should be checked for obstructions, filters check for blockage, and inspection made of the heater to determine the cause of overheating before the unit is put back into service.

Heating elements should be checked periodically to ensure insulation resistance and continuity readings are correct.

10) – SERVICE AND MAINTENANCE – Cont.

10.06 Air filters – Wire mesh and Synthetic filament media type

Filters must be properly maintained in order to ensure proper air cleaning efficiency

Dirty filters will reduce the air volume handled by the unit thus adversely affecting its performance.

The length of time between cleaning of filters is dependent upon the condition of the air. A nine-week cycle is normal; more frequent servicing may be required in some cases.

Gently tapping and removing loose dust with a vacuum cleaner can clean synthetic filament pad filters.

Filters are suitable for washing in warm water with a mild detergent, rinse with clean water and allowed to dry prior to re-fitting into unit.

The operational life expectancy before cleaning or changing the filter is dependent upon the condition of the air being treated and the specific unit volumetric performance.

10.07 Coils

The coil shall be inspected every six months to ascertain if any solids or foreign matter has accumulated between the fins and that the coil connections are free from leaks.

Should any matter be found, the coil shall be cleaned by using a soft brush and a mild solution of commercial detergent. Great care is to be taken not to damage or distort the fins in the process. Do not use any metallic probes.

Should the fins become contaminated too frequently it is advisable to check the air filter systems of the plant to ensure they are functioning correctly.

11) – ANNUAL INSPECTION.

11.01 All filters should be checked, cleaned and replaced where necessary.

11.02 Coils should be thoroughly examined for leaks and corrosion. The fins surfaces should be washed down to eliminate any dirt, lint or foreign matter.

Drain pans and drain line should be checked for any sediment and washed out clean and check that the drainage is not restricted.

11.03 Screws and fixings to be checked for tightness.

11.04 Electrical terminations checked for tightness.

11.05 Check all wiring to ensure no damage has occurred to insulation.

11.06 Check wiring looms are correctly retained and not stretched between terminations.

11.07 Casing to be checked for any signs of corrosion, any affected areas to be suitably cleaned and treated.

11.08 Access door seals are to be checked to ensure that the seals are in good order to maintain air-tightness of the unit.

RECOMMENDED OUTLINE MAINTENANCE SCHEDULE.

ITEM	Variable	6 monthly	Yearly
Motor			10.01
Fan Impeller			10.02
Case internal surfaces			10.03
Access Panels			10.04/11.8
Air filters	10.06		10.01
Coil		10.07	11.02
Screw and Fixings			11.03
Wiring terminations & condition			11.04/5/6
Case external surfaces			11.07

Numbers quoted in the time period column relate to the section in this manual that deals with the item.

NOTE:

The maintenance schedule detailed above has been calculated on the basis of an ideal installation; which permits complete unobstructed access to all the components detailed. For installations where full and unimpeded access cannot be achieved and therefore not permit the frequency of access required by the recommended scheduling; the significance of each scheduled item may be considered and reviewed separately by the appointed maintenance contractor, concluding with an acceptable compromise to this schedule.

Any queries concerning the airside performance should be accompanied by details of the measured air volume, together with the static pressure at the intake and discharge side of the unit, together with details of supply voltage and control voltage at the unit.

It is possible that faults attributed to an air movement product may be traced back to the system connected to it, such as dirty filters, blocked ducts, incorrect set dampers. Please check these before proceeding any further.

Diffusion will not accept responsibility for faults that develop in parts supplied on a “free issue” basis. Service calls due to faulty free issue parts will be chargeable.

There are no special precautions that need to be observed during the dismantling or disposals of the fan coil units other than those appropriate to electrical equipment of this size and weight which are likely to contain water.

Each unit is individually tested both mechanically and electrically. A test label is attached to each unit signed by the tester for each test completed.

INVALIDATION OF GUARANTEE.

The following misuses or maltreatment of Diffusion equipment will render all guarantees, as set out in Conditions of Sale, void.

1. Failure to install set up or put to work any part of the equipment as specified in the Diffusion - Installation, Operation and Maintenance Manual.
2. Attempting to operate motors and other equipment with an electrical supply other than that designed on the equipment data label, or failing to connect and protect such equipment in accordance with I.E.E. regulations and local By-laws.
3. Failure to notify Diffusion of equipment damaged on receipt within two days and confirming in writing within five days of receipt of equipment.
4. Modification to designed arrangement or performance without prior written approval of Diffusion.
5. Damage caused to equipment on site through lack of adequate protection from the elements or misuse by other trades.
6. Failure to observe all normally accepted engineering practices during installation, commissioning and subsequent operation of equipment.

TERMS AND CONDITIONS.

The goods supplied are subject to Diffusion's standard Terms and Conditions of Sale, a copy of which is available on request. If anything set out in these installation, operation and maintenance instructions conflicts with the terms and conditions then the terms and conditions will apply.

SPARE PARTS.

Diffusion can provide an extensive range of spare parts to cover service and maintenance requirements during the normal life expectancy of the product.

Enquiries to our Spares and Service department should include the following details:

Serial number: this can be found on the unit data plate. (Example: **78954/D/002**)

Alternatively:

Project reference / Installation address

From the unit data plate:

Fan coil unit number & Product / model.

END OF LIFE / DISPOSAL.

Diffusion is a WEEE registered company.

At the end of their useful life, the product, components and packaging should be disposed of via a suitable recycling facility.