

# **QUARTZ Fan Coils**

**INSTALLATION, OPERATION**

**&**

**MAINTENANCE INSTRUCTIONS  
FOR**

**SAPPHIRE SERIES**

**WATERSIDE CONTROLLED, HORIZONTAL  
CEILING VOID MOUNTED  
CHASSIS UNITS**

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## INTRODUCTION

QUARTZ Sapphire Series fan coil units are a purpose built range of cooling and heating units, factory wired and tested and suitable for ceiling void mounting.

The casings are manufactured from galvanised sheet steel.

The units are fully lined with a class O material that provides both thermal and acoustic insulation.

The heat exchange coils are suitable for both heating and cooling using low pressure hot water and chilled water. A stainless steel insulated drain tray is mounted below the coil to collect and drain any condensation.

The fans are direct drive with motors mounted within the impeller. They are fitted onto a heavy gauge laminated steel bulkhead manufactured to minimise vibration. The fans discharge into an acoustically lined discharge plenum complete with circular outlet spigots.

Speed control of the fan motors is achieved by means of a multitapped auto transformer which is wired to a three speed and fine adjustment switches.

The continuous filament media filters have an extended surface that vastly increases the periods between maintenance and will last up to 6 times as long as a normal filter.

Access to the fan is on the underside via a full width access panel.

# HEALTH AND SAFETY

## **Working Conditions and Pre-installation Check**

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 safety or health hazards.

The unit shall be checked to ensure that:-

- 1 It is suitable for the electrical supply available.
- 2 It is suitable for the atmosphere or the environment in which it is to be used.
- 3 It is suitable for the working media, temperature and pressure for which it is to be used.
- 4 It is manually isolated from the electrical mains supply
- 5 Electrical equipment is earthed to comply with IEE regulations and local by-laws.
- 6 The unit is wired in accordance with IEE regulations.
- 7 The procedure for removing and replacing the filter media is carried out as laid down in this manual.

## **CAUTIONARY NOTES**

No part of the unit shall be dismantled until a careful study has been made of this manual. This manual deals in detail with installation, commissioning and servicing and shall be strictly adhered to. All persons performing any maintenance or repair work on these units must be fully trained and competent to carry out the necessary tasks. On completion the interior shall be left clean and free of debris and all access panels shall be correctly re-fastened.

### **Water Treatment**

Check for any treatment that is required to the water supply for prevention of corrosion of the equipment. The materials of construction in contact with the water are copper tubes, brass fittings and valve bodies, and stainless steel valve stem. In addition, allowance should be made for materials in the external pipe system.

Information regarding the necessary action to be taken can be obtained from the relevant Water Authority, particulars of which can be found in the Water Engineers Handbook Yearly Edition.

# **SECTION 1—DELIVERY, INSTALLATION AND COMMISSIONING**

## **GENERAL**

This section of the manual deals with the requirements for the delivery and installation of the QUARTZ Sapphire range of fan coil units and must be read before attempting any installation or commissioning.

### **1.01 RECEIPT OF EQUIPMENT**

Upon receipt of equipment a visual inspection should 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 accepted for damage sustained during unloading from the delivery vehicle or on site thereafter.

All claims for damage or short delivery should be advised to TEV LTD. within three days and confirmed in writing within seven days of receipt of the equipment.

### **1.02 OFF-LOADING**

The units are supplied on pallets unless otherwise specified and should be off-loaded from the delivery vehicle using a forklift truck or similar equipment.

### **1.03 INSTALLATION**

Before installation the units it is advisable to ensure that suitable access is available for routine maintenance and the removal of coils and fans.

All units must be installed in accordance with good engineering standards, be level in all planes and care not to damage the casing finish.

N.B. The condensate tray has a built in fall to drain.

## **1.04 EXTENDED STORAGE – MAINTENANCE OF UNITS HELD IN STORAGE FOR A PERIOD OF UP TO TWO YEARS**

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### **MAINTENANCE**

It is essential that the following instructions as laid down in this section are carried out and maintained during the period of storage before commissioning.

### **UNIT INTERIOR AND EXTERIOR SURFACES**

#### **INTERIOR**

If ducting is not connected it is essential that all inlets, discharge openings and pipe openings are 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 seal.

#### **EXTERIOR**

The exterior shall be kept free from any falling building materials, dampness, extreme cold or heat. (Units are delivered packed in bubble-wrap). The unit exterior surfaces must be inspected on a monthly basis and any signs of corrosion or scratches are to be treated immediately.

### **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 marking). Consequently, no motor should be permitted to stand on a vibrating floor while in storage if it can be voided. If this is unavoidable, then the machine should be placed on thick blocks of rubber, cork or felt.

### **FILTERS**

All filters must be suitable wrapped and sealed to prevent damp and ingress of dust or foreign bodies, and must be held in a dry store.

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 to be put into commission the Maintenance 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.

## 1.05 COMMISSIONING

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Ensure that all units sections are thoroughly clean and free from installation debris.

Ensure all panels, if removed during installation, are in a position and secure.

Ensure all electrical wiring complies with IEE regulations and local by-laws and all components, where applicable, are provided with all necessary safety protection and isolating devices.

Check all coil connections for leaks. Ensure that all air is vented from both the coils and system independently. Check that the coil faces are free from debris.

Introduce water to the condense tray to verify free flow of water into drain.

Start fan and blow-through the system thoroughly.

Check unit air volume and external pressure is as specified. Adjust air volume as necessary using speed selector and fine adjustment switches.

Check motor full load current. Nameplate denotes full load current at speed 6 (NR40). Nameplate value to be unit max current value.

Check on/off temperature across coils and adjust water flows accordingly. Check the functioning of controls and (water flow temperatures).

Check after two weeks running

After initial start-up and continuous running of the unit, it is recommended to make the following checks:-

Motor full load current

Filter condition

Condensate and drains for free flow and leaks.

Check valve connections for leaks

Operation of controls

### Airside Measuring and Balancing

The most accurate air side measurements for air volume and balancing are obtained by taking readings with an anemometer traverse across the inlet to the fan coil unit.

Pressure readings are most accurately obtained if taken in the discharge ducting of the fan coil unit.

Where dampers are fitted in the ductwork they should be used for balancing purposes only and not to regulate the air volume. Where possible this should be adjusted at the fan coil unit.

## **SECTION 2 – SERVICE AND MAINTENANCE**

### **GENERAL**

This section of the manual deals with the requirements for servicing and maintenance of QUARTZ fan coil units and must be read before any maintenance is attempted.

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

### **2.01 INVALIDATION OF WARRANTY**

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The following misuse or maltreatment of QUARTZ equipment will render warranties void.

1. Failure to install, set up or put to work any part of the equipment as specified in QUARTZ Installation, Operating and Service Instructions.
2. Attempting to operate motors and other electrical equipment with an electrical supply other than that designated on the nameplate or failing to connect and protect such equipment in accordance with IEE regulations and local by-laws.
3. Failure to notify TEV LTD in writing of equipment damaged on receipt within three days as detailed in TEV LTD Conditions of Sale.
4. Failure to run equipment within the design specifications as notified at the time of order.
5. Modification to designed arrangement or performance without prior written approval of TEV LTD.
6. Damage caused to equipment on-site through lack of adequate protection from the elements or misuse by other trades.
7. Failure to observe all normally accepted engineering practices during installation, commissioning and subsequent operation of equipment.

## **2.02 FAN/S**

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A regular check on the fan/motor assembly is advisable to ascertain if any overheating of the motor is occurring and that the fan impeller is free running and has not sustained any damage.

If any over heating is occurring, check that the full load current of the motor is within the nameplate rated value, the impeller is running free and that there is no obstruction upstream of the fan causing a high resistance with consequent lack of airflow. Also check that the external resistance of the unit is not low, thus causing an increase in power input.

Check security of fan fixing bolts.

TO REMOVE FAN ASSEMBLY THE FOLLOWING PROCEDURE MUST BE ADOPTED.

1. Isolate electrical supply
2. Remove access panel.
3. Disconnect wiring loom from terminal block on side of fan scroll.
4. Remove two off M6 bolts connecting fan scroll to bulkhead.
5. Remove fan from unit through access opening, taking care not to damage impellers.
6. To re-install, follow reverse procedure.

## **2.03 CONDENSATE TRAY**

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The condensate tray may be removed for cleaning independently of the coil.

Should any debris be found, the condensate tray should be cleaned thoroughly. Ensure drain connection is free from obstructions.

To remove condensate tray the following procedure must be adopted:-

1. Isolate the electrical supply.
2. Disconnect drainpipe from condensate tray after ensuring all water has been drained off.
3. Remove fan access panel by removing four M6 retaining screw at underside of unit.
4. Remove three M5 retaining screws from tray; two at return and one at header.
4. Lower drain tray
5. To replace, reverse the above procedure.

## **2.04 COILS**

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

Should any matter be found, the coils shall be cleaned by using a soft brush and a mild solution of detergent. Great care to be taken not to damage the fins.

Should the fins become contaminated too frequently it is advisable to check the air filter to ensure it is functioning correctly.

TO REMOVE THE COIL/CONDENSE TRAY ASSEMBLY FROM THE UNIT THE FOLLOWING PROCEDURE MUST BE ADOPTED.

1. Isolate the electrical supply
2. Isolate flow and return pipework to both heating and cooling connections
3. Drain down both heating and cooling coils. Then remove flow and return pipework to valves and condense pipe.
4. Disconnect valve actuator control leads.
5. Support weight of condense tray and remove eight-off M5 bolts holding tray to unit.
6. Support coil and remove 8 M5 bolts. Slide out coil from unit. CAUTION – fins on coils.
7. To re-install follow reverse procedure remembering to vent coil when re-filling with water.

## **2.05 FILTERS**

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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 dependant upon the environment. A six to twelve month cycle is normal, more frequent servicing may be required in some cases.

Filter media in frame washable air filter pads are fitted as standard and can be cleaned by gently tapping and removing loose dust with a compressed air-line or vacuum cleaner.

Having removed the pad from the frame, fully immerse in warm water to which a mild detergent has been added. Agitate the water until all contaminants have been removed. Rinse in clear water, then allow to drain and dry before replacing pad into the filter frame.

Filters on Sapphire series-units are held in place by an inbuilt channel top and bottom. To remove the filter slide the filter out from the channels.

## **2.06 INSULATION**

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Annually check the insulation for condition and security.

If insulation shows signs of deterioration it must be replaced, if peeling off then it must be made secure.

To replace the insulation the following procedure must be adopted:-

1. Isolate the electrical supply.
2. Peel off affected insulation pad from casing and discard.
3. Remove old securing tape and residue foam.
4. Clean area with ISO Propyl alcohol and secure new tape.
5. Press new insulation pad into position on tape.

*NOTE: REPLACEMENT INSULATION MUST HAVE CLASS 'O' FIRE RESISTANCE*

## 2.07 ANNUAL INSPECTION

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Fan/motor assemblies should be checked for evidence of wear.

All filters should be checked, cleaned and replaced where necessary: refer to section 9 of this manual.

Coils should be thoroughly examined for leaks and corrosion. The fins should be washed down to eliminate any dirt, lint or foreign matter. Condense trays and drain lines should be checked for any sediment and washed out clean. Check that the drainage is not restricted.

Unit casing and access panels should be checked for signs of corrosion. Any affected to be suitably cleaned and treated. Access panels should be checked to ensure that the seals are in good order to maintain the air tightness of the unit.

Check all mechanical moving parts including fans, valves, modulating mechanisms and seek for correct, smooth and unhindered operation.

### ROUTINE MAINTENANCE SCHEDULE

<b>Item</b>	<b>6 Monthly</b>	<b>Yearly</b>
Fans	2.02	2.06
Condensate Tray	2.03	2.06
Coils	2.04	2.06
Insulation	-	2.06
Filters	2.05	2.06
External Surfaces	-	2.06

## SECTION 3 – WIRING DETAIL, CONTROLS, and ANCILLARY EQUIPMENT

### GENERAL

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This section of the manual deals with the requirements for the commissioning and maintenance of the temperature controls associated with the fan coil unit if they have been supplied by TEV LTD.

Controls may have one of the following arrangements:-

- a) Heating only
- b) Cooling only
- c) Heating and cooling in sequence with a dead band between.

Normally the Cooling medium will be chilled water. Heating medium will normally be L.P.H.W but alternative coils are available to suit secondary water temperatures. Alternatively Electric Heating Coils are available, wired for single phase or three phase supply as appropriate or as specified.

Refer to Layout Drawings or the Design Specification for individual unit requirements and check against unit nameplate details.

For Fault finding and commissioning data refer to controls manufacture's technical data. Controls will generally comprise the following components:-

#### 3.01 CONTROLS-MAJOR COMPONENTS

ITEM	MASTER UNIT(S)	SLAVE UNIT(S)
Transformer 240/24VAC	1 off	N/R*
Controller	1 off	N/R
Htg. 4 port valve (if specified)	1 off	1off
Or, Contractor for Electric Heating single stage	1 off	1 off
Clg. 4 port valve (if specified)	1 off	1 off
Temperature Detector		
Return air or room mounted	1 off as required	N/R

\*Note: The number of slave units is limited by the controller output and varies from manufacturer to manufacturer. If in doubt please contact TEV LTD.

Slave units are fitted with a transformer to provide multi-speed selection.