PFC

ACCESS FLOOR PERIMETER FAN UNIT

APPLICATION GUIDE

Titus

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Introduction

The PFC, perimeter fan powered terminal, was designed to supply air to the perimeter zones in access floor applications. Because of the varying loads at the perimeter, the perimeter has always been a challenge for access floor applications. The LHK handles the perimeter like a typical series fan powered terminal and has been used in many applications, but there have been occasions when a series fan terminal was too much terminal for the area.

The LHK is a standard series fan box with a primary inlet and an induced air inlet. In a raised floor plenum, both inlets would be supplying primary air, unless one inlet is ducted to the room above. In many applications, this added a level of complexity that was not required. A simpler method of supplying air to the perimeter was to boost the airflow at the perimeter without mixing any return air into the unit. The PFC is designed to act as a “booster” box on the perimeter.

PFC Features

The PFC fan powered terminal unit is designed to be installed between the pedestals in an access floor system. The dimensions are such that the PFC is narrower than the 24" pedestal spacing in width. The PFC is available in two heights: 14" tall to fit under a 16" raised floor and 16" tall to fit under an 18" raised floor.

The PFC is made out of 20" steel. Steel inlet screen covers the inlet side of the unit to protect the fan from debris. The PFC has top access to high and low voltage controls for easy access from room above. Rectangular discharge opening is designed for flanged duct connections.

The standard permanent split capacitor, energy efficient fan motor is mounted on vibration isolators. Like all Titus fan terminals, the PFC comes standard with an adjustable SCR fan speed control with minimum voltage stop. The PFC is available with electric or hot water reheat. The ultra high efficiency ECM motor and a fan inlet sensor are also available on the PFC.

Applications and Control Sequence

The typical application for the PFC is for the perimeter zone surrounding an open plan office area. Because the perimeter is often used as a walkway in this type of application, temperature control and air velocity is not as big a concern as reducing the heat load of the glass in the summer and reheating the glass in the winter.

The PFC is usually ducted to linear bar diffusers, such as the CT, or diffuser and plenum units, such as the TAF-D. The airflow of the diffusers is directed at the glass like a typical ceiling system. There are several options for controlling the PFC. The PFC can supply constant airflow to the perimeter or be used to modulate the airflow to the perimeter.

Modulating the fan speed to vary the amount of air supplied to the zone is the most common control sequence used for the PFC. The PFC controller will determine the speed of the fan based on zone temperature. For example, the fan would run 100% when the zone is 75oF and modulated down to 30% as the zone approaches 70oF.

This sequence can be handled by either the standard motor or ECM motor. Both motors would require a 0-10V signal from the DDC controller. The ECM motor controlled by a “remote” PWM is the preferred method because the ECM motor also provides a large energy savings over standard motors. Contact Titus for more information on using a remote SCR for the PFC.

Depending on the controls manufacturer, there is the possibility that a fan coil controller can be used in place of a VAV box controller on the PFC. Fan coil controls tend to be less expensive that VAV box controls. This possibility should be discussed with the controls contractor on the project to ensure proper operation of the PFC.

Specifications

1. Furnish and install TITUS Model DPFC fan powered terminals of the sizes and capacities shown on the plans. Unit size limitations shall be as follows to ensure that all terminals will fit the available space. The terminal including all control enclosures shall be designed to fit in the plenum space below a raised floor. The unit shall fit within a 24"x 24" pedestal grid system without modifications to the grid.

2. Terminals should be certified under the ARI Standard 880 Certification Program and carry the ARI Seal. Non-certified terminals may be submitted after testing at an independent testing laboratory under conditions selected by the engineer in full compliance with ARI Standard 880. These tests must be witnessed by the engineering consultant with all costs to be borne by the terminal manufacturer. Testing does not insure acceptance.

3. The terminal shall be designed, built, and tested as a single unit including motor and fan assembly, water or electric heating coils, and accessories as shipped. Unit shall ship as a complete assembly requiring no field assembly (including accessories). Field assembly of the unit is acceptable with the costs borne by the terminal manufacturer. All electrical components shall be UL listed and installed in accordance with UL Standard 1995. Electrical connection shall be single point. All electrical components, including low voltage controls, shall be mounted in sheet metal control enclosures. The entire terminal shall be ETL listed as a complete assembly.

4. The terminal casing shall be minimum 20 gauge galvanized steel. The terminal shall have top access to high and low voltage controls and components and allow removal of fan and servicing of terminal without disturbing duct connections.

5. The fan shall be constructed of steel and have a forward curved, dynamically balanced wheel with direct drive motor. The motor shall be suitable for (120) (208) (240) (277) volt, 60 cycle, single phase power. The motor shall be of energy efficient design, permanent split capacitor type, with integral thermal overload protection and permanently lubricated bearings, and be specifically designed for use with an SCR for fan speed adjustment. Fan assembly shall include torsion-flex tuned spring steel suspension and isolation between motor and fan housing.

6. The terminals shall utilize a manual SCR or a remote signal, which allows continuously adjustable fan speed from maximum to minimum, as a means of setting fan airflow. Setting fan airflow with any device that raises the pressure across the fan to reduce airflow is not acceptable. The speed control shall incorporate a minimum voltage stop to ensure that the motor cannot operate in a stall mode.

ECM MOTOR

(Substitute paragraph 5 below for paragraph 5 in the PFC Basic Unit Specification.)

5. Fan motor assembly shall be forward curved centrifugal fan with a direct drive motor. Motors shall be General Electric ECM variable-speed dc brushless motors specifically designed for use with single phase, 277 volt, 60 hertz electrical input. Motor shall be complete with and operated by a single phase integrated controller/inverter that operates the would stator and senses rotor position to electronically commutate the stator. All motors shall be designed for synchronous rotation. Motor rotor shall be permanent magnet type with near zero rotor losses. Motor shall have built-in soft start and soft speed change ramps. Motor shall be able to be mounted with shaft in horizontal or vertical orientation. Motor shall be permanently lubricated with ball bearings. Motor shall be direct coupled to the blower. Motor shall maintain a minimum of 70% efficiency over its entire operating range. Provide isolation between fan motor assembly and unit casing to eliminate any vibration from the fan to the terminal unit casing.

Notes

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