SPECIFICATIONS

Electronic Temperature Controller for Fan Coil Unit

The thermostat for fan coil unit shall be electronic type with integrated ON/OFF, 3 FAN SPEED and HEAT/FAN/COOL switches. The thermostat shall operate on 230 V mains voltage and shall be suitable for operating 2 position motorized 3/2 way mixing/diverting valve . The thermostat shall have a precalibrated NTC thermistor and shall be suitable for operation in the range of 15^{0}-35° C with a switching differential of 1° C.

All thermostat shall be fitted on standard mounting plate as recommended by the manufacturer.

Electronic Temperature Controller for fan Coil Units with temperature reset facility

The temperature controller for Fan Coil Unit will be electronic type with integrated ON/OFF and 3 FAN SPEED switches. It will be suitable for operating 2 position, 3/2 Way Valve. The controller will have a precalibrated NTC thermistor sensor and will be suitable for operation in the range of 15°-35° C with a switching differential of 1°C.

The controller will have provision to accept centralized signals for
- Heat/Cool changeover
- Temperature set point reset.

Occupied Mode:-

The thermostat works on set point.

Unoccupied Mode:-

The thermostat sets the temperature up by 3° C from set point in cooling operation. It sets the temperature down by 3° C from set point in heating operation

Electronic Modulating Temperature Controller

An electronic temperature controller with 3 point output, working on 24V AC, shall be used to modulate the 2 position reversible motor of 2/3 way mixing/diverting valves of AHU. The sensing element of electronic temperature controller shall be a precalibrated NTC thermistor sensor mounted either within the controller or in the return air duct. The range of the electronic temperature controller shall be 15°-35° C with a differential of 1°C.

SPECIFICATIONS

Two/Three Way Valve

The 2/3 way mixing/diverting valves for AHUs shall be of C.I. constructions suitable for operation up to 10 bar. The water flow through the valve shall be regulated by the rotation of brass slipper between the main and the by pass ports. It shall be possible to rotate the brass slipper, manually, through 360° and interchange the main and the common ports, to facilitate installation at site. All internals of the valves shall be rust-proof and the `O' rings shall be of EPDM/NITRILE.

The valve actuator shall be electronic type with brushless DC motor. The actuator's angle of rotation shall be 90° . It shall be without any limit switches and shall be overload proof. It shall have an indicator to indicate the position and push-button to disengage the gear train for manual operation.

SPECIFICATIONS

Air Differential Pressure Switch

Air Differential Pressure Switch with a potential free changeover contact shall be used to detect the status of pressure drop across the filters. The N/O contact of the Air Differential Pressure Switch shall be connected to neon lamp to indicate the `filter dirty' status.

The Air Differential Pressure Switch shall be of silicone diaphragm type with calibrated adjustment knob to facilitate pressure setting suitable for operation over a wide range of temperature from -20° C to 85° C. The maximum operating pressure shall be 50 m bar.

SPECIFICATIONS

Auto Airvent

The Auto Air vent shall be installed on all high points in the water piping system to automatically remove the trapped air.

The body shall be of brass construction and a plastic cap shall be provided on the outlet to shut the air vent when not in use.

The float shall be of synthetic material and shall keep the venting valve closed under normal condition . When air is collected inside the float chamber, the water level inside the auto air vent shall decrease and the venting valve shall be opened. The collected air then shall escape through the venting valve and the water level inside the float chamber shall increase again, closing the venting valve. This process shall continue as long as air is collected in the float chamber.

There shall be a check valve at the bottom to seal the system when the auto air vent is removed for servicing.

SPECIFICATIONS

Closed Expansion Tank

The closed expansion tank will be of M.S. construction with interchangeable EPDM-BUTYL rubber membrane. The expansion tank shall be complete with safety relief valve, pressure reducing valve and pressure gauge.

The tank will be of pressure rating to suit the system pressure and will be sized to adequately compensate for water expansion due to operating temperature variations. The tank shall be fabricated as per IS 2825-1969 for "*non-fired pressure vessels*" and the flanges shall be as per IS 6392-1971.

For chilled water application, it will be insulated with 50mm thick insulation to the specifications and cladded with 26G-aluminium cladding.

The expansion tank shall be supplied along with pressurization unit. The pressurization unit shall consist of two nos. (1 working + 1 stand-by) high pressure pumps of suitable pressure rating mounted on M.S. frame, complete with interconnecting piping, isolation valves, NRV, Y-strainer, pressure gauge, pressure transmitter, auto-logic panel (IP 55) with dry-run protection, electrical MCB and interconnecting wiring.

The unit shall be housed in powder-painted canopy suitable for external installation, if required.

SPECIFICATIONS

Suction Guide

Suction Guide shall be installed at the inlet of each pump. Suction Guide shall have MS/CI body, outlet guide vanes, removable SS strainer and fine mesh brass/SS start-up strainer.

The strainer shall be corrugated type with minimum of 5 times free area of the pipe cross-section.

The Contractor shall inspect the strainer prior to start-up of the pump and shall remove the fine mesh brass strainer after short running period. Space shall be provided for removal of strainer and for connection of blow down valve.

SPECIFICATIONS

Thermal Energy Metering System. The system shall consist of the following components.

1. Flow Meter
2. Temp. Sensors (2 Nos.)
3. Energy Meter

1. Flow Meter

It shall be multi-jet, dry dial, direct reading type. The flow measurement accuracy shall be within ± 2% in the normal flow range. The meter shall have mechanical indicator to indicate the totalized flow and a pulse emitter with selectable pulse value.

Choose a location along the pipe where 10 pipe diameters upstream and 5 pipe diameters downstream of the sensor provide no flow disturbance. Pipe bonds, valves, other fittings, pipe enlargements and reductions should not be present in this length of pipe.

2. Temperature Sensor

It shall be NTC Thermistor with interchangeable accuracy of better than 0.2 Deg. C. The Sensor shall be housed in brass sleeves suitable for mounting in thermowells.

3. Energy Meter

It shall be microprocessor based with power fail back up for retention of stored data and programme. The meter shall receive signals from Flow Meter and Temperature Sensors; and shall calculate the thermal energy usage. The meter shall display this-

- Flow Rate
- Energy Rate
- Flow Total
- Energy Total
- Supply & Return Temperature and Temperature difference.

The Display shall be 8 characters by 2 lines, alphanumeric, dotmatrix STN LCD display with backlight.

The password protection shall be provided to prevent unauthorized tampering of stored parameters and data.

The meter shall have provision to

- Offset the temp. difference between the sensors
- Pulse Rate selection of flow meter
- Password change

Clear the totalized values

SPECIFICATIONS

Energy Monitor

The Energy Monitor shall be microprocessor based digital unit capable of calculating and displaying energy rate, energy total or flow rate on two line x eight character alphanumeric LCD. It shall be possible to display energy rate in Kbtu/hr or kW, energy total in Btu or kWh, and flow rate in gpm or Ipm.

The energy monitor shall accept flow input in pulse or sine wave and temperature input from thermistors. The output from the energy monitor shall be a 100 ms pulse, user programmed to transmit energy total.

Flow Monitor

The flow monitor shall be a microprocessor based, digital unit capable of calculating and displaying both rate of flow and total flow on a two line by eight character alpha-numeric LCD. The flow monitor shall accept digital inputs or optional sine wave or analog signals and may be field configured to display rate and total values in any unit of measure. All data shall be entered via four keys mounted on the front panel. Monitor shall feature a software lock to protect the entered data from unauthorized changes. A non-volatile memory, requiring no battery back-up shall protect the data from electronic losses.

The flow monitor shall feature standard open collector transistor outputs, one based on rate and one based on total. Set points or time delays for rate, scaling or pulse width for total may be configured in the field.

Options shall include analog inputs, analog output or control relays, all programmable from the keypad.

Flow Sensor

The flow sensor shall be an insertion type with a non-magnetic, spinning impeller (paddle wheel) as the only moving part. The sensor sleeve will be brass (or 316 stainless steel) with the sensor housing being PPS. The impeller shall be glass-filled nylon or Tefzel with a UHMPWE or Tefzel Sleeve bearing. The shaft material shall be tungsten carbide. The sensor will have all electronics epoxy-sealed with a 2-conductor, shielded cable extending out through a 1/2" conduit connection on the top of the sensor. The sensor shall operate in line pressures up to 400 psi and liquid temperatures up to 220 F, and operate in flows of 1 foot per second to 30 feet per second in pipes of 3" diameter up to 40" in diameter with linearity of $\pm$ 1% and repeatability of $\pm$ 1%.

SPECIFICATIONS

CO2 Sensor/Transmitter

The CO2 sensor/transmitter shall have gold plated Non-dispersive Infrared (NDIR) sensor with measurement range of 0-2000 p.p.m and accuracy of better than ± 50 p.p.m. Sensor life expectancy shall be more than 10 years. The output shall be 0-10V-dc or 4-20 ma, as required.

SPECIFICATIONS

Air Separators

The centrifugal air - separator will be of M.S. construction with flanged connections. The air separator will be adequately sized to achieve maximum air-separation. It will be provided with a high capacity super-vent at the top. The shell shall be fabricated as per IS 2825-1969 for “non-fired pressure vessels” and the flanges shall be as per IS 6392-1971.

For chilled water application, it will be insulated with 50 mm thick insulation to the specifications and cladded with 26G-aluminium cladding.

SPECIFICATIONS

Test Point

A Test Point shall be installed at the inlet and outlet of each pump, balancing valve and heat exchange equipment like Chiller, Condenser, Cooling Tower, Water Cooling Coil, Boiler. Test Points shall also be provided at different locations in the water pipe line to facilitate pressure measurement.

Test Point shall be of brass construction, 1/4" BSP with NEOPRENE sealing bushes and shall be provided with screwed cover.

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The unit shall be housed in powder-painted canopy suitable for external installation, if required.

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