Model Setra FLEX Design Guide Specification

1. Differential Room Pressure is to be monitored by a Setra Systems, Inc. – Setra FLEX (Device), with functions that include both visible and audible monitoring and alarming of room environmental conditions, and control of related equipment when required.

2. Software Monitoring Operation:

   a) The Device is capable of monitoring the differential pressure between three individual spaces at all specified locations on the drawings.
   b) The display has the capability to show up to three rooms individually, or together on one screen.
   c) Each of the three rooms may show up to 6 parameters. The standard parameters available for selection are room differential pressure, temperature, relative humidity, and air changes per hour (also known as air change rate, or ACH). Two optional user-defined parameters may be displayed.
   d) The two user-defined parameters accept most sensors including light, sound, airflow velocity, gases (CO2), particle mass (PM2.5 or similar) via either electrical or BACnet input signals.
   e) The display has the capability to show the following parameters together on a single screen:
      a. Room name
      b. Up to 4 user-defined room Profiles (or modes), with an addition to STANDBY
      c. Full-screen mode selection, which causes the display to show all rooms simultaneously on one screen
      d. Configuration mode selection, to define the operation of the Device
      e. A banner indicating NORMAL, WARNING, ALARM, and STANDBY modes. During ALARM mode, the entire display background turns red.
      f. Alarm delay period, selectable from 0-9999 seconds
      g. Alarm silence period, selectable from 0 to infinite
      h. One-touch disable of all alarm functions
      i. Room icon, intended to provide a visual depiction of the room's use
      j. Two lines of user-defined text, intended to inform staff of the room's use
      k. Icons which appear to indicate alarm, silence, door, or reset functions
      l. A choice of 3 screen background colors; green, blue, and purple
      m. Up to 6 environmental parameters per room, total of 18, noted above
   f) Each Device has two levels of password protection; Operator and Supervisor, which will limit permission to access levels of functionality. Key switches as methods of security are not acceptable. Out of the box, a supervisor passcode must be entered in order to configure the unit.
   g) Each Device has the ability to be set in Negative, Positive, or Neutral status enabled through alarm setup. Key switches to change room mode are not acceptable.
   h) When configured with an on-board differential pressure sensor, each Device is able to be calibrated through the touch screen interface with simultaneous access to the on-board sensor module and corresponding output signal.

i) Each Device has the option to communicate on either BACnet MS/TP networks or BACnet/IP networks. When using BACnet/IP, either static IP or Dynamic Host Control Protocol (DHCP) may be used.

j) Each Device has the ability for the setup to be cloned, so that the settings can be copied and uploaded to each Device in the facility if desired. This is to be done through a standard USB connection.

k) Each Device has the ability for the setup to be network-configured, so that the settings can be copied and uploaded to each Device in the facility if desired. This is to be done through either a BACnet MS/TP network or BACnet/IP network.

l) Any function that can be configured via the touch display interface can also be configured over the network via BACnet protocol. Exceptions include changing Operator or Supervisor passwords, Device ID, and other read-only attributes.

m) A secondary Device may operate as a slave, or duplicate display, whereby functions of the master Device are mapped via BACnet objects from one Device to the other. In this manner, one Device may monitor and alarm on the parameters of the other Device.

n) Each Device has the ability to diagnose the BACnet network by a) sending a who-is command and b) looking at specific features of an active BACnet network / statistics.

3. Software Control Operation:

a) The Device is capable of performing equipment control operation using a Proportional-Integral (PI) control loop that drives on-board or external analog output and relay.

b) The Device is capable of performing equipment control operation by read/write control of BACnet objects on the network (BACnet Setpoint Override), mapping control points from other Devices or third-party controllers. Three independent control functions operate in this manner.

c) Any of the 6 environmental parameters per room, total of 18, can be configured for control operation.

d) BACnet Setpoint Override allows for both override setpoint changes and duration of setpoint override.

4. Mechanical and Electrical Operation:

a) The Device utilizes a direct pressure sensing device for differential pressure measurement; flow-through technologies (i.e. hot wire anemometers) that require frequent cleaning are not acceptable. The Device has an internal pressure sensor as well as the capability to use an external (remote) pressure sensor input. Each Device must be provided with a NIST-traceable calibration certificate for the differential pressure sensing element.

b) The on-board or external differential pressure sensor provided by Setra is a capacitive-based transducer, with bi-directional ranges from ±0.05" WC (±12.5 Pa) to ±1.0" WC (±250 Pa). Performance characteristics are that the sensor has an Accuracy RSS ±0.25% of full-scale, Non-linearity by Best Fit Straight Line (BFSL) method ±0.24%, Hysteresis

±0.05%, Non-repeatability ±0.05%, Span Setting Tolerance ±0.5% Rdg, Zero/Span Shift ±0.03% of full-scale.

c) The differential pressure sensor is dead-ended in design, where tubes and the sensing element require no cleaning for continuous reliable operation.

d) Each Device is provided with a 3-inch anti-kink tubing section for each remote pressure pickup port.

e) Each Device has the option of either an internal differential pressure sensor, or external differential pressure sensor, with the ability to send an analog output of 4 to 20 mA, 0 to 5 VDC, or 0 to 10 VDC to a system controller. A 250-ohm precision resistor is needed for the 4-20 mA sensor input. The device has a display resolution of 0.0001" WC.

f) Each Device has a 7" projected-capacitive display, dimmable, full color touch-screen display with an 800x600 resolution, capable of use with medical gloves. The brightness of the display has 5 levels from dim to bright, with an ability to control brightness over the BACnet network. The Device also has a 'black room' feature which will turn the screen to black until the end user touches the screen, useful for example in vivarium applications.

g) Each Device can be set up with time and date manually or via BACnet time synch feature. The time and date can be enabled to be viewed on the main display.

h) Each Device can use one of the configurable analog inputs in digital mode to represent a NO or NC switch to indicate door open / closed status. Once configured and the door is open, a small door icon will appear showing the door is open. The Device can only support one digital door status input so if the user wishes to configure more than one door, the switches must be daisy chained.

i) Each Device is flush mount design and installed in a standard off-the-shelf electrical wall box with no visible external fasteners; visible screw heads are not acceptable. Stand-off from the wall surface does not exceed 0.72" (18.3 mm).

j) The Device is configured with dual audible alarm buzzers which can be enabled / disabled by user configuration.

k) The Device shall has on-board inputs and outputs, including 3 universal inputs, 1 analog input, 1 analog output, and 1 relay output.

l) All connectors for wiring are removable, for convenience of installation.

m) Power is either 24 volts AC or DC, compliant with full operation in the range of 18-32 volts.

n) Ingress Protection (IP) rating is IP-65.

o) The Device depth within the wall cavity does not exceed 50 mm.

5. Acceptable Manufacturers:

a) The functions of room monitoring, alarming, and optional control are captured within Setra FLEX as manufactured by Setra Systems, Inc., Boxborough, MA. Telephone (978) 263-1400 Fax (978) 264-0292 Web Site www.setra.com