SmartLab Room Controller

SLC2000

- **Microprocessor-based, digital control**
- **Utilizes high-speed ARCnet communications network**
- **Compatible with most BAS systems using Modbus or BACnet protocols**
- **Networking capabilities for up to 243 units per network**
- **Optional volumetric flow measurement**
- **Digital and analog input and output capabilities, fully scaleable**
- **Various simple installation options for new or retrofit applications**

General Description

The **SmartLab Controller** is a versatile, high-speed direct digital controller specifically for airflow and temperature control in laboratories and other critical environments. The **SmartLab Controller** is a fully distributed microprocessor-based controller, operating interdependently with other controllers in the lab. Although each controller may share data with other controllers, each is capable of maintaining its own control loops without intervention of other networked or central controllers.

Speed

The **SmartLab Controller** scans its inputs, performs control equations, and updates outputs at least 5 times per second. This eliminates control lag and allows the **SmartLab Controllers** in a lab to respond instantly to changes in fume hood exhaust volume. Room static pressure is maintained at the proper level at all times, thus containing odors and vapors within the lab envelope. When fans are being controlled, the proper level of duct static pressure is maintained quickly and accurately, providing a stable and responsive system.

Stability

Changes in airflow and temperature can occur quickly in labs and cleanrooms due to high air change rates in these areas. The **SmartLab Controller's** control algorithms and tuning constants are designed specifically for fast, yet stable control. Split-second response can be obtained without the "hunting" problems typical of slower controllers. High resolution, 16-bit A/D convertors and fast scan rates allow small output increments in rapid succession, allowing the operator to tune for zero overshoot without sluggish response.

The **SmartLab Controller** has a total of four analog inputs available. Two can be selected to work with 4-20 mA active, 0-10VDC or 10,000 ohm @ 77° F (25° C), T3 thermistor devices. The other two are intended for 4-20 mA devices only, active or passive, with 15 VDC exitation voltage available at the terminal strip. Other devices can be connected such as flow transmitters, temperature transmitters, thermistor type temperature sensors, static pressure transmitters, and DP transmitters (software offers sq.-root extraction to linearize signals from pitot-type devices).

Two digital inputs are provided for input from dry contact-type devices such as relays, damper end-switches, manual switches, time clocks, and auxiliary contacts on motor starters.

Three analog outputs are provided, which are selectable as 4-20mA or 2-10 VDC outputs. Damper motors, variable frequency drives, current-to-pressure transducers (I/Ps), and voltage -to-pressure transducers (E/Ps) can be connected to these outputs.

Two digital outputs are provided, issuing isolated switched 24 VAC. Each output is discrete, and can be manipulated through software. Alarm lights, alarm annunciators and relays can be connected to these outputs.

One SPDT dry contact relay configurable via software is provided for control and alarming.

Optional VorTek Volumetric Flow Measurement

Tek-Air's **VorTek Airflow Probes** provide volumetric sensing capabilities with the **SmartLab Controller**. The **VorTek** airflow measuring system consists of multi-sensor probes which are inserted in the ductwork before the air valve.

Vortek sensing provides pulse type electronic output signals which have a frequency that is directly proportional and linear to the airflow velocity. These digital pulses from each sensor are totalized in the **SmartLab Controller**. By providing true velocity averaging, exhaust volume is accurately measured and the value can be used for a variety of airflow control applications.

Tek-Air Systems, Inc.
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SmartLab System Airflow Controller SLC2000

The **SmartLab Controller** is designed for direct input from Tek-Air's **VorTek Airflow Measuring System** with up to 4 sensor probes in one array. The **VorTek Transmitter** board is mounted on the **SmartLab Controller** board allowing simple plug-in connection of the **VorTek Probe** without the need to run power wiring to the probe. The **VorTek Probe** connects to the controller with a simple plug-in cable available in lengths from 3 to 100 feet. Refer to the **VorTek 4000** data sheet for more information.

Mounting Options

The **SmartLab Controller** is provided, in its standard form, for wall mounting, using flanges integral to the controller's enclosure.

The **SmartLab Controller** can be provided with an optional bracket for mounting on ductwork. The bracket acts as a standoff to keep the controller away from hot or cold ducts, reducing temperature effects on the electronic components. The bracket also allows the duct to be insulated without "burying" the controller.

The **SmartLab Controller** can be factory-mounted on Tek-Air's **PRD Airflow Control Valve**, with airflow sensors and current-to-pressure transducers. This makes the air valve a completely unitized and intelligent measurement and control device, capable of controlling additional external devices, due to an I/O compliment designed to handle all tasks necessary for a typical lab. Installation is greatly simplified and installation wiring is reduced to low-voltage power and a single communications bus cable.

Applications

The **SmartLab Solution** is well suited for all types of educational, government and industrial research facilities and FDA regulated cGMP and GLP areas. It is imperative that a proper air balance be maintained at all times to assure that fumes cannot migrate from lab areas to non-lab areas. When a fume hood sash is closed quickly, its controller will close the exhaust air valve in order to maintain the air balance in the lab. The supply and general exhaust air valves must be modulated almost immediately to track this change in exhaust volume. The **SmartLab Controller** is used to measure and control Total Exhaust and Supply to provide volumetric synchronization to maintain a design room pressurization at all times.

The **SmartLab Controller** can be used to control supply airflow into a room in Constant Volume, Variable Volume or Synchronization schemes. Temperature control can be accomplished by modulating the reheat coil and resetting the room airflow.

Specifications

Power..... 24 VAC +/- 20%, 12 VA max.

Analog Inputs

Two (2) 4-20 mA current source, two or three-wire, 15 VDC loop exitation power

Two (2) analog, selectable 4-20 mA, 0-10 VDC, or thermistor, two-wire, passive

Analog Outputs

Three (3) selectable 4-20 mA or 2-10 VDC, two-wire

Digital Inputs

Two (2) current sink at 15 VDC

Digital Outputs

Two (2) 24VAC triac, 2.0 Amps max.

Relay Output

One (1) SPDT relay, dry contact, 0.5 Amp contact rating at 24VAC

Communications

One (1) port, terminal strip connection, two-wire RS485, ARCnet at 625 Kilobits/sec.*

Operating Temperature

Range..... +40°F to 130°F

Enclosure..... Enameled steel, NEMA 1, with external flange mounts

***NOTE:** Due to high speed, network requires low cap 12.5pF, 24 AWG shield type CMP (UL) 75C equal to Windy City #042002

SmartLab Models

SLC2100 Basic unit includes controller.

SLC2200 Basic unit includes controller with VorTek input board (operated with a PVP valve when the controller needs to be mounted remotely).

OPTIONAL EQUIPMENT

Lab Interface Modules (**LIM2000 or SLI N2**) are available for use with the SmartLab series of controllers. The **LIM2000** and the **SLI N2** serve as:

- a user interface port for local access to the ARCnet network.
- isolation of the Lab network from the Building Network. (The **LIM2000** also serves as a repeater to the ARCnet).
- a room temperature sensor.

All specifications are subject to change without notice.

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