Sectra™ Commercial Zoning System

Engineering Data

LENNOX

A BETTER PLACE™

NOTE - ELECTRONIC VERSION ONLY

October 2002

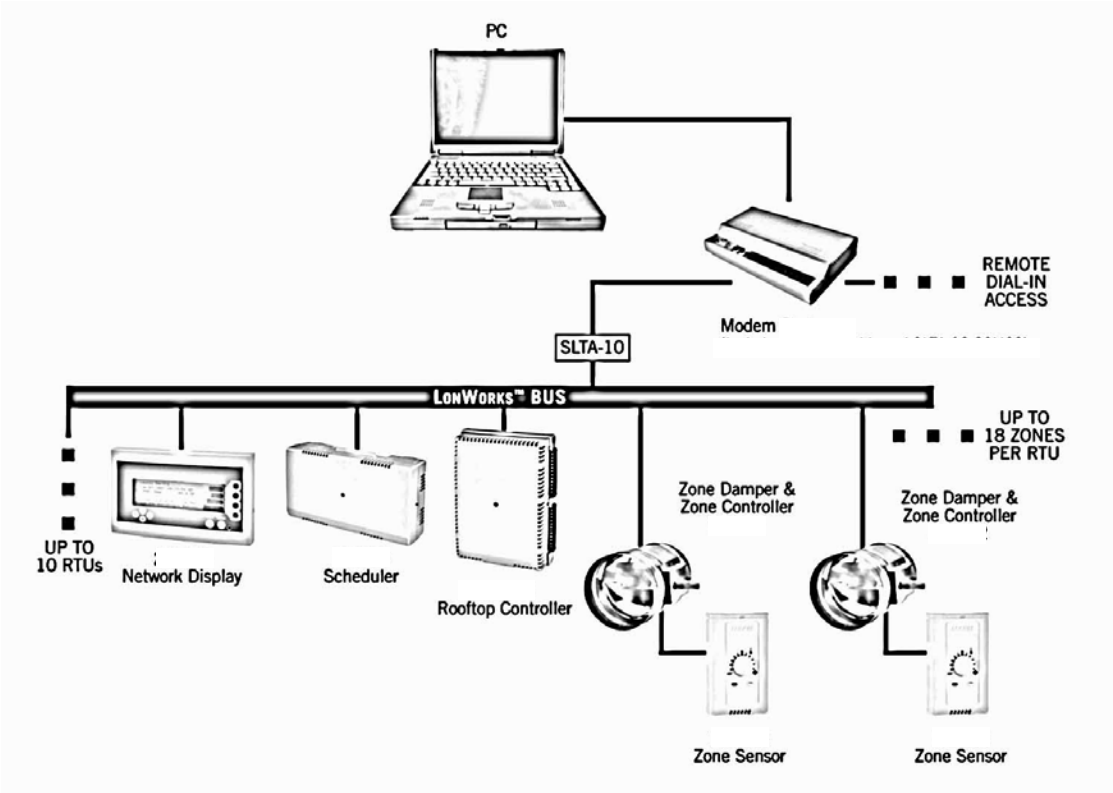
Bulletin No. 210366E

INDEX

The Sectra™ Commercial Zoning System is an affordable, technologically advanced system that provides customized comfort throughout an entire light commercial facility.

SYSTEM OVERVIEW

- Can be used with 2-30 Ton Lennox L Series® and 16 series packaged rooftop units
- Factory or field installed on L Series® units
- Field installed only on 16 Series units
- Up to 18 zones per rooftop
- Up to 10 zoned rooftops per Network
- Up to 120 modules per Network; approximately 100 zones per Network
- Fully modulating dampers with DDC connection
- Complete building automation solutions including: control of lighting, exhaust fans, make-up air units, lawn sprinklers, humidifiers, dehumidification via Humiditrol® option on L Series® units, and fan powered boxes
- Others modules available include single zone rooftops, communicating programmable thermostats, wireless thermostats and hydronic controllers



APPLICATION OVERVIEW

Sectra Zoning configures constant volume single zone HVAC equipment and a series of dampers to maintain the desired temperature for up to 18 separate zones per rooftop unit (RTU). Each project can have up to 10 RTU subsystems. Each zone is capable of having an adjustable setpoint, a programmable time-of-day schedule for each day of the week, and an independent unoccupied override input. The system satisfies the space temperature setpoints by first reading the space temperature deviation from setpoint for each zone, then energizing heating or cooling in the HVAC unit and controlling the position of a supply damper ducted to each zone. Individual Sectra Zoning dampers modulate open and closed based on the zone temperature versus setpoint and the temperature of the RTU discharge air (heating or cooling).

Sectra Zoning controls the static pressures in the supply duct by modulating a bypass damper that channels air from the supply duct directly into the return air duct or return air plenum. When static pressure increases above the adjustable setpoint (due to the closing of individual zone dampers), the bypass damper opens to reroute the supply air and decrease the static pressure.

Sectra Zoning can be used in a variety of buildings. The most common use of the system is for buildings where a constant volume HVAC unit is applied to maintain temperature in various areas, each with different load conditions. Since one thermostat usually controls a single zone unit, the varying load conditions often result in frequent setpoint changes or uncomfortable occupants. In these cases, typically one or more areas require cooling due to sun, equipment, or people loads while other areas require heating due to outside conditions or orientation to the sun.

An example of a building with varying load conditions that could use zoning for better comfort is a single story, 10, 000 square foot (900 m^2) building (see Fig. 1). The loads vary due to the building design and usage. The sun load in the reception/ atrium area during the morning conflicts with the conference room load on the East Side of the building, which may not be occupied or may have heating loads on cool mornings or sunny winter days. Two ten-ton RTUs control temperature in the spaces where the thermostats are located; however, the perimeter offices suffer. In addition to the varying load conditions, building and zone occupancy can also change because certain offices are not occupied at all times or they are occupied after hours or on weekends. These varying conditions make Sectra Zoning an excellent program to configure the controls for this building. Sectra Zoning configures and monitors rooftop controllers. It is designed to work in smaller commercial applications or in a section of a larger commercial structure.

Sectra Zoning configures the rooftop Controller to control a constant volume heating/cooling unit, duct static pressure and up to 18 zone temperatures. In addition to the zone temperature and static pressure control, the system can be configured to monitor and annunciate alarms for various equipment safety and diagnostic functions such as cooling, heating and economizer failures and airflow failure.

Sectra Zoning monitors zone space temperature deviation from setpoint for zones 1 to 18 and, depending on the total demand from the zones, energizes heating or cooling. Individual dampers modulate open or closed to allow more or less of the conditioned air

into the space. For example, if a particular zone requires heating and the unit is in the cooling mode, the zone damper modulates closed (or to its minimum position) depending on the space conditions or how the system is configured. When the minimum time in mode expires, the unit changes over to heating and satisfies any and all zones needing heat. Sectra Zoning sets minimum on, off and interstage time delays to ensure equipment protection.

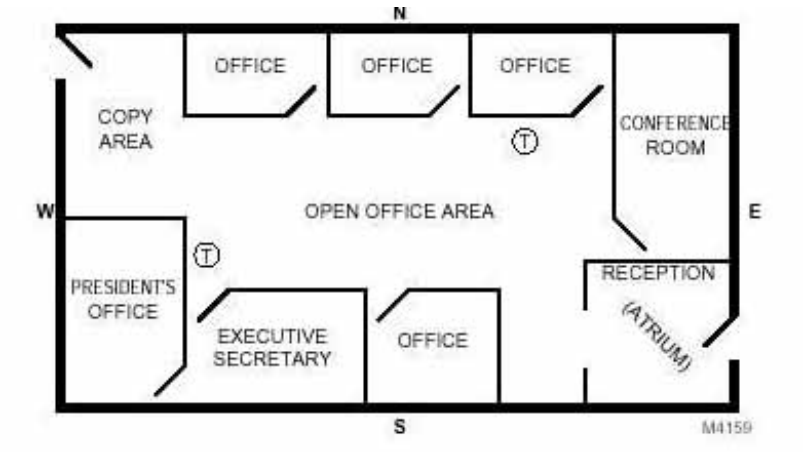


Fig. 1. Typical building with varying zone loads served by two constant volume, single zone units.

Sectra Zoning works with the Lennox rooftop air handling unit (RTU) and Sectra dampers in each conditioned zone of the building. Sectra Zoning RTU controllers communicate through the LONWORKS® bus. See Fig. 2 for a typical Sectra Zoning system.

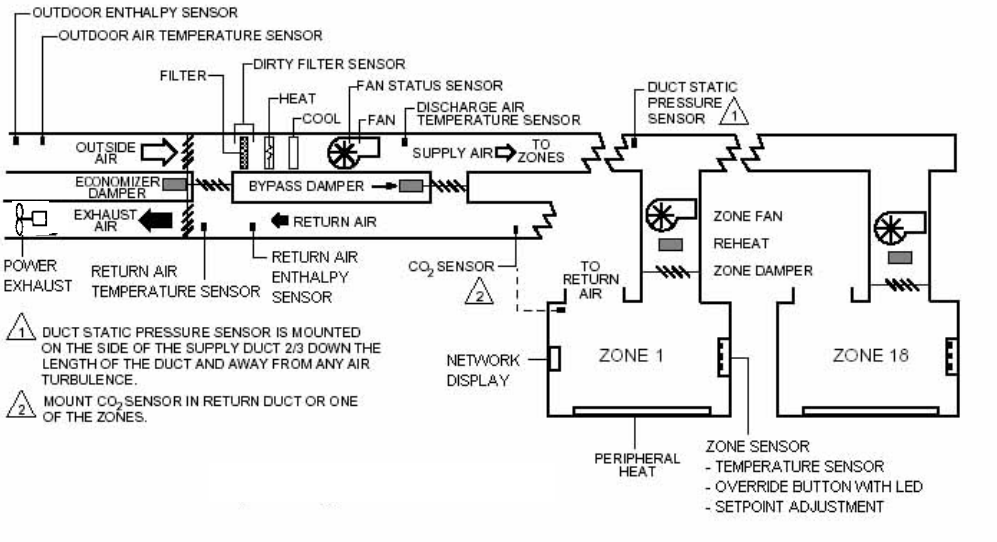


Fig. 2 Typical Sectra Zoning System

APPLICATION CONSIDERATIONS

The Sectra system combines constant volume single package HVAC equipment with electronic damper controls to vary air volume for zoning. Basic guidelines for good general design practices also apply to designing zoning systems.

Determine which building areas require zoning. Smaller buildings may require one HVAC unit combined with Sectra system components. Medium to large buildings may require multiple HVAC units with Sectra system components.

Sections of buildings served by an area zone system (one HVAC unit with zone dampers) should have similar system schedules, similar internal or solar heat gain and loss profiles and similar heating, cooling and ventilation requirements. Do not group areas that have need for both heating and cooling with areas requiring continuous high demand for cooling only.

Careful attention should be given to designing duct systems applied with the Sectra Zoning system. For example, the system relies on the fact that areas requiring heating be satisfied quickly so that the system may switch to cooling. The reverse is also true. This assures that ample capacity is available to satisfy a given mode in a relatively short period of time. Another factor, referred to as the “rate of change", is also important. This is the amount of time before a satisfied zone once again requires air conditioning. A large computer room would be an example of an area that has a high rate of change. It would be considered improper design to include a large computer room within an area zone system that also serves normal loads. A separate HVAC unit for the computer room would be the ideal solution (only if the computer room can be served with non specialized HVAC equipment). The goal is to keep all areas served by the Sectra Zoning system within 1 to 2 degrees of room setpoint.

Use the following suggested guidelines to divide the area into separate zones:

- Area zoning (one HVAC unit with zone dampers) should not combine both interior and exterior areas.
- Area zoning should not include different usage areas. Generally, do not combine an area that has a wide range of occupancies or load levels in the same zone area that has a constant or predictable load.
    - *Example: a conference room combined with individual offices.*
- Building areas combined into one zone should have the same sun exposure. They should also have the same exterior glass area.
    - *Example: do not combine a corner office with two exposures with an office with only one side exposure.*
- Determine if offices with similar exposure should be designed as one common zone.
- Determine if the occupants of each area would be comfortable at the same temperature.

- In any system decision, economic considerations are important. Common sense must be used when zoning to ensure that, whenever possible, decisions are based on optimizing system efficiency and economy, but not at the expense of occupant comfort.

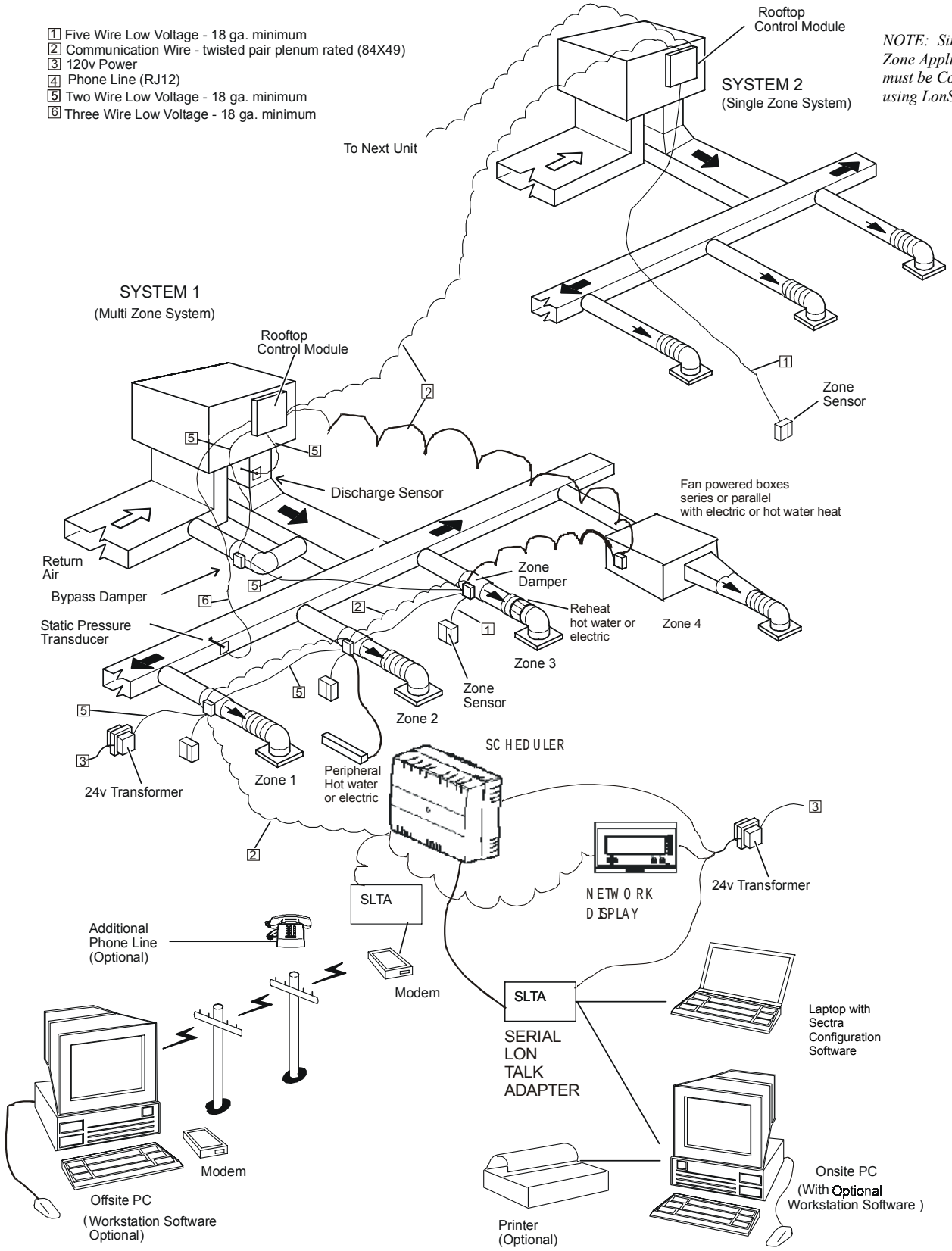
Zone Sensor location is very important!

Do not install sensors in direct sunlight, in close proximity to a supply air diffuser, on exterior walls, in close proximity to exterior doors, or close to a heat source. Be aware that metal column enclosures could cause cold surface temperatures. The location of the sensors in zoning applications must be such that sensors will not interfere with one another. Remember, zoning systems are designed to control individual rooms and not designed to control common areas.

Averaging the space temperature in large common areas can be achieved by adding additional sensors. The number of sensors should reflect proper engineering practices. The wall sensor should be mounted approximately 5 ft. (1.5 m) above the finished floor. Refer to local code requirements for handicap height requirements.

The wall sensor must be installed in an area where the temperature will be maintained between 32ºF to 131ºF (0ºC to 55ºC; humidity must be within 0-100%RH (non-condensing)).

Typical Sectra Zoning System Layout



BYPASS DAMPER SIZING

Bypass damper sizing should be selected based on the following:

TOTAL AIR VOLUME - SMALLEST ZONE AIR VOLUME = BYPASS AIR VOLUME

The bypass damper dimension must be selected using the BYPASS AIR VOLUME at a damper velocity of 1500 fpm (7. 6 m/s).

Note -The smallest zone air volume must be at least 10% of the total air volume or whichever is greater.

The following chart can be used as a simple guideline for tonnage to bypass damper sizing:

Tons	*Qty Rect*	*Width (in)*	*Height (in)*
3	1	12	10
3.5	1	12	12
4	1	14	12
5	1	14	14
6	1	16	14
7.5	1	18	16
8.5	1	20	16
10	1	24	16
12.5	1	26	18
13.5	1	30	18
15	1	32	18
17.5	2	18	18
20	2	20	18
25	2	28	18
30	2	32	18

- Bypass dampers should be ducted to the return
- Dampers should be insulated

Supply Air Diffusing

The correct supply outlets - properly sized and located - control the air pattern within a given space to obtain proper air motion and temperature equalization.

Outlets should be sized to project air so that velocity and temperature reach acceptable levels before entering an occupied zone.

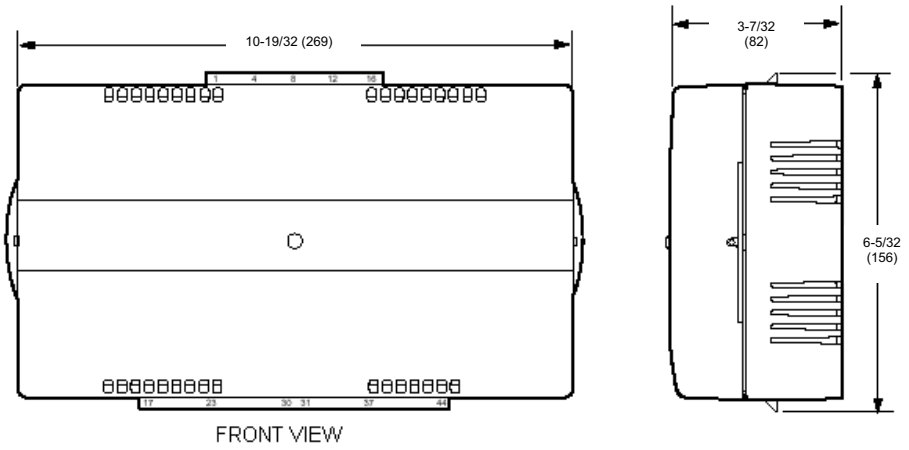
All air diffusing equipment should be selected using a low diffuser noise criteria (NC) rating of between 15 to 20 NC (Approximately its mid-point capacity). This selection process will allow the diffuser to operate at a lower velocity and pressure, allowing for

flexibility with slight increases in air quantities during the system pressure stability period (approximately 5 to 10 seconds).

The first 10-ft. (3 m) of ductwork upstream from the diffusers should be acoustically insulated. The smallest zone must be capable of delivering a minimum of 10% of the total air volume without diffusers exceeding a 32 NC rating.

Note: Manual balancing damper should be installed upstream from all zone dampers.

SCHEDULER



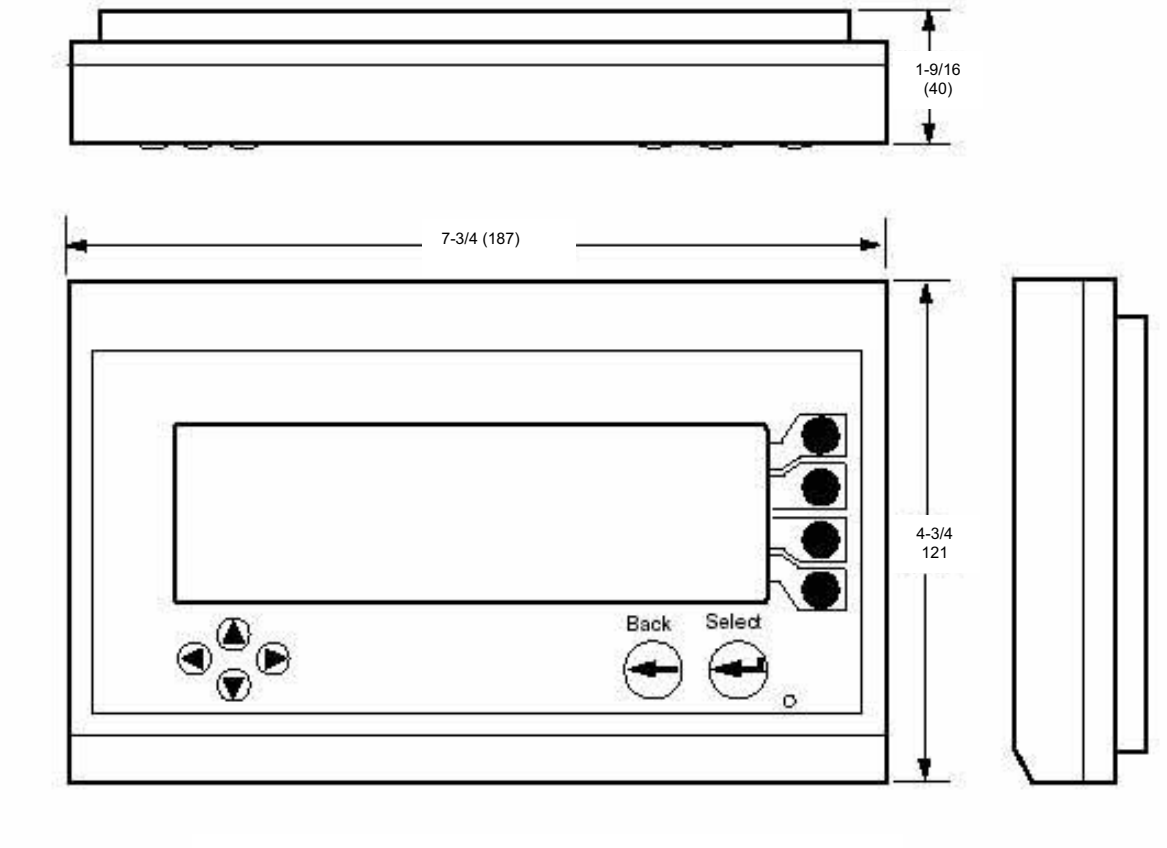
SCHEDULER DIMENSIONS IN INCHES (mm)

The Scheduler is an optional network device that is used to schedule, trend, monitor and handle alarms. One Scheduler can handle four zoned rooftops. The Scheduler can have up to eight different schedules with six mode changes per day and twenty holidays. Other features include demand limiting control, automatic daylight savings changeover, leap year changeover and remote access via modem.

Feature / Benefits

- Real-time clock with time synchronization and automatic daylight savings time adjustment
- Time-of-day scheduling
- Coordinates alarms, reporting, and dial-out
- Energy history, bypass and equipment runtime logging; non-battery backup
- Programmable control of mechanical equipment and auxiliary points
- 16 trends, continuous, periodic, delta and one-shot
- Demand Limit Control (intelligent shed and restore)
- Setpoint Reset
- Adaptive Intelligent Recovery™
- Time-of-Day Override
- Sectra Zoning alarm prioritization, routing, multi-site dial-out and history log
- Energy and Sectra Zoning alarm history, override usage and runtime log with backup capability
- Four dry contact digital inputs
- Eight 24 Vac Triac digital outputs (500 mA maximum up 80 VA). These outputs are tied automatically to the eight schedules for immediate control of lighting or exhaust fans. The outputs can also be assigned to six spare control loops.
- Two 4-20 mA analog outputs
- One 21 Vdc power supply for auxiliary devices with a maximum current of 70 mA.
- Eight 0-10V, 0-10,000 ohms (20K NTC) analog inputs for additional sensors such as humidity, lighting and/or building pressurization when used with LonSpec
- Dial-out on critical alarm and buffer full when used with LonSpec

NETWORK DISPLAY

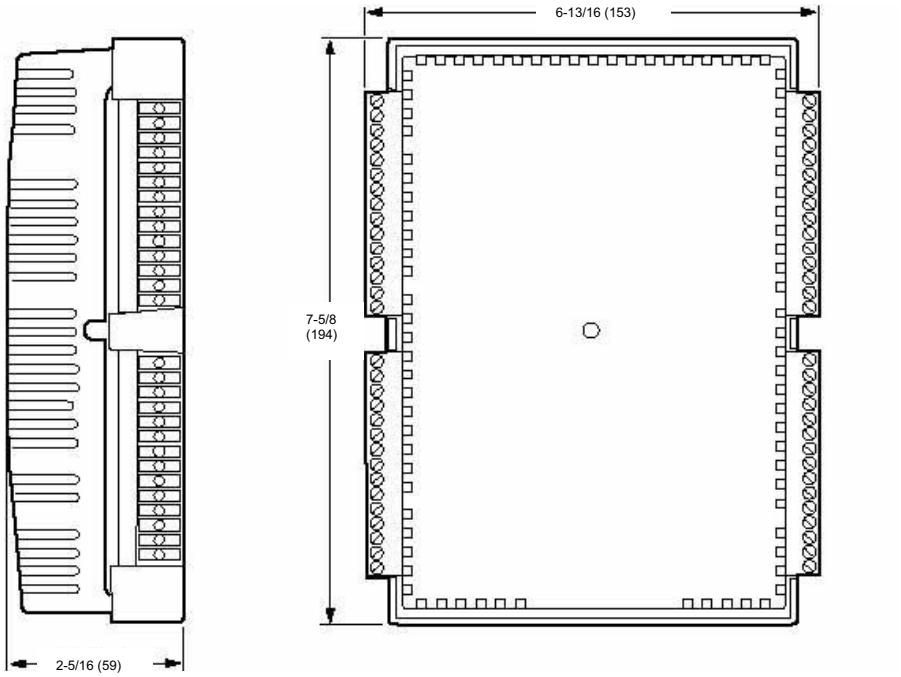


Network Display - Dimensions in Inches (mm)

Feature / Benefits

- One Network Display can handle up to four RTU subsystems.
- Attractive wall-mount packaging.
- Backlit LCD display; eight lines high by forty characters wide.
- Two-piece construction for easy installation.
- 10-key keypad for menu-item selection. Audible beep when keys are pressed.
- Several layers of display screens provide different views: Rooftop, Zones, and Schedules
- Local display allows setpoint and schedule changes and alarm acknowledgment.
- Password protected with View Only, Override, Setpoint and Schedule levels.
- Cost-effective interface to local HVAC system.
- Low-cost LonWorkș communications wiring using a Free Topology Transceiver (FTT).

ROOFTOP CONTROLLER



Rooftop Controller - Dimensions in Inches (mm)

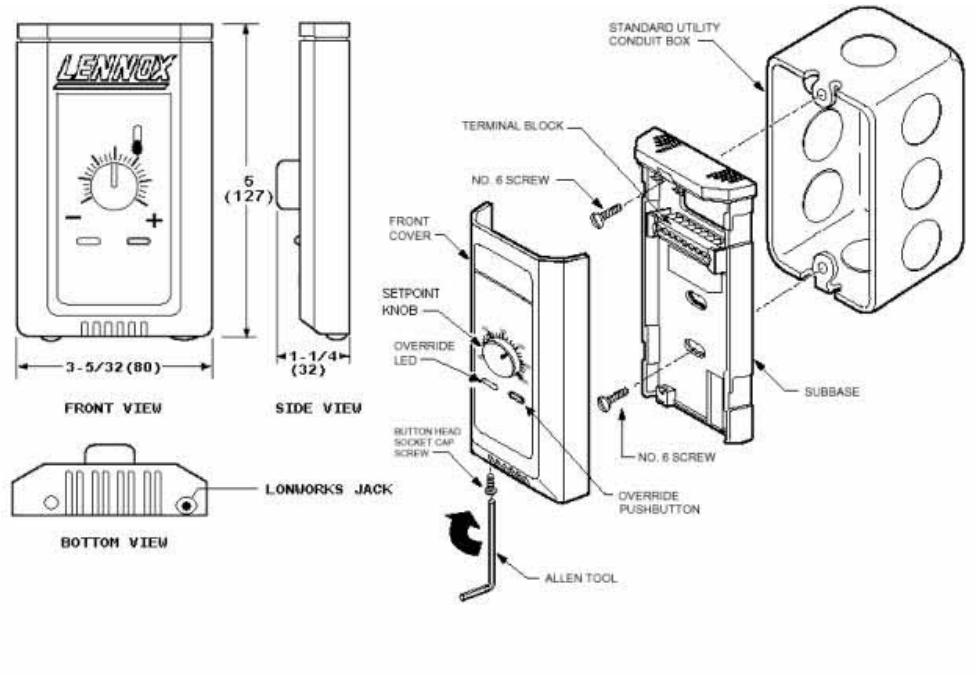
Feature / Benefits

- Control of all heating, cooling and economizer functions
- Factory installed, wired, mounted and tested with jackplug harness on L Series® units
- Field kit for L Series® rooftop
- Eight analog inputs including discharge, return & outdoor temperature, static pressure, optional outdoor & return air enthalpy and optional carbon dioxide sensor
- Eight binary inputs including air proving switch, Integrated Module Control service relay, optional dirty filter switch, shutdown relay to interface with optional smoke detectors/firestats, freezestats for optional modulating hot or cold water valves
- Eight binary outputs for blower, 3 stage cool, 2 stage heat and power exhaust
- Six analog outputs including bypass damper, optional economizer and optional modulating hot or cold water valves
- Proportional control of economizer for minimum position, IAQ and free cooling
- Coaxial plug connection for laptop connection
- Installation includes return air sensor and blower proving switch
- The following advanced logic functions can be programmed using LonSpec:
  - Start/Stop Loops (eight maximum)
  - If/Then/Else Logic Loops (32 maximum)
  - Math Functions: MIN, MAX, AVG, SUM, SUB, SQRT, MUL, DIV, and ENTHALPY (36 maximum)

Accessories

- Dirty filter switch

ZONE SENSOR WITH SETPOINT ADJUSTMENT

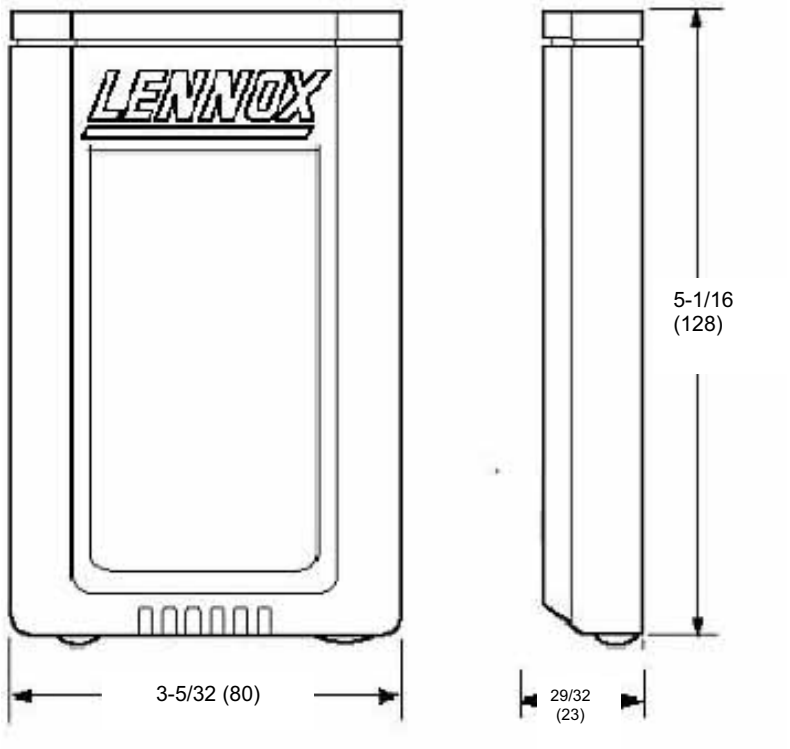


Zone Sensor - Dimensions in Inches (mm)

Feature / Benefits

- Attractively styled Wall mounted sensor
- Terminal block wiring connection to damper controller
- Warmer/cooler setpoint adjustment: +/- 2ºF (+/- 1.1ºC) (adjustable)
- Unoccupied override button for temporary occupancy (3 hours adjustable) with LED
- Lonjack for laptop connection
- Subbase provided for handy box mounting
- Complete with locking screw and Allen tool

ZONE SENSOR WITHOUT SETPOINT ADJUSTMENT

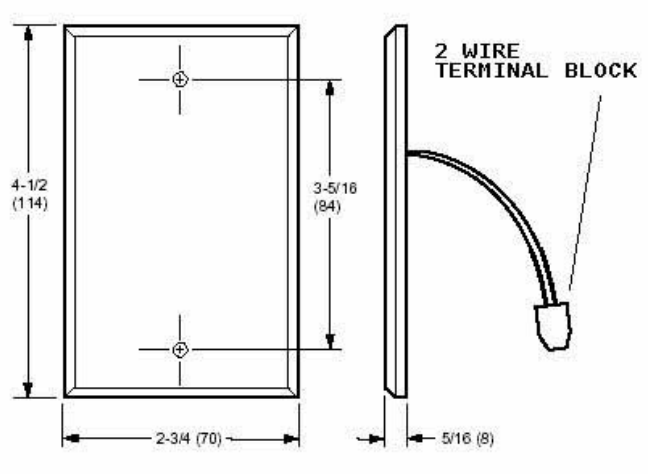


Zone Sensor - Dimensions in Inches (mm)

Feature / Benefits

- Attractively styled wall mount sensor
- Terminal block wiring connection to damper controller
- Warmer/cooler setpoint adjustment: +/- 2ºF (+/- 1.1ºC) (adjustable)
- Without unoccupied override button for temporary occupancy (3hours) with LED
- Without Lonjack for laptop connection
- Subbase provided for handy box mounting
- Complete with locking screw and Allen tool

WALLPLATE ZONE SENSOR



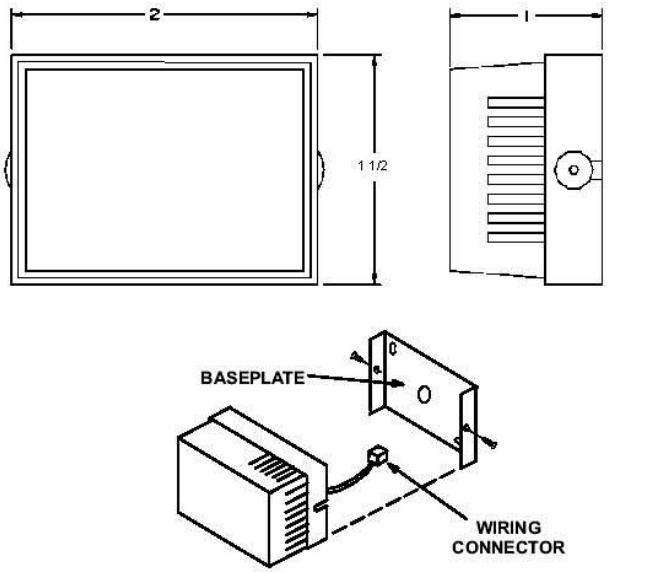
Zone Sensor - Dimensions in Inches (mm)

The Wallplate Temperature Sensors are designed to be used with the Sectra zone sensor and single zone rooftops to provide a resistive output signal proportional to sensed room or space temperature. The wallplate sensor is well suited for low profile wall mounted applications where durability and tamperproof construction is desired, such as schools, prisons and other institutions.

Feature / Benefits

- Low profile when mounted on industry standard utility conduit box
- Rugged brushed stainless steel wallplate
- Integral foam pad isolates wallplate sensor from conduit box
- Insulated screw terminals ensure reliable field wiring connection

MINIATURE ZONE SENSOR

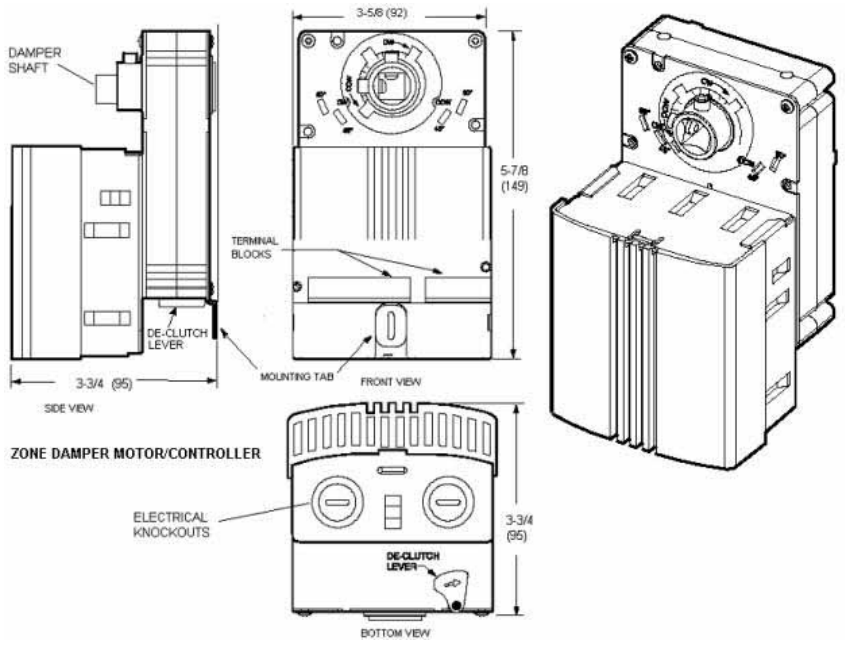


Zone Sensor - Dimensions in Inches

Feature / Benefits

- Small size
- Terminal block for wiring connections
- Neutral Color (Beige) Cover
- Dimensions (H x W x D): 1-1/2 x 2 x 1 in. (38 x 51 x 25 mm)

ZONE CONTROLLER

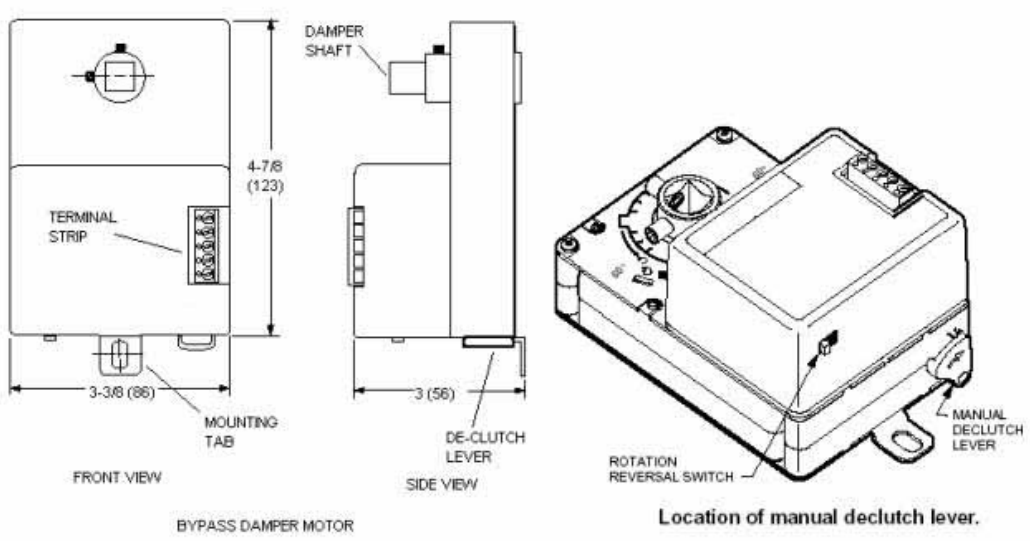


Zone Controller- Dimensions in Inches (mm)

Feature / Benefits

- The actuator is a synchronous wire motor complete with VAV controller.
- The information received by the controller via the supply air sensor from the rooftop will determine the damper position, along with the zone sensor demand and other considerations.
- The zone sensor will ultimately modulate the supply air damper to provide adequate conditioned air to heat or cool the area.
- Each zone will accommodate optional auxiliary heat which can be controlled as 1st or 2nd stage reheat or peripheral electric heat or modulating hot water valve.
- Can also control series or parallel fan powered boxes - 300 to 3600 CFM – with optional electric or hot water coils; various IAQ liners; optional ECM motors
- Minimum, maximum and ventilation damper position can be set.
- All information at the zone level can be shared throughout the system.
- The supply air dampers must be sized to maintain air velocities between 600 to 1000 fpm (3 to 5 m/s). Insulating the supply air duct between the unit and the diffuser or at least 10-ft. (3.0 m) upstream of the diffuser is recommended.
- Dampers within 5-ft (1.5 m) of a supply air outlet shall not exceed 700-fpm (3.5 m/s) air velocity and must be acoustically insulated to maintain acceptable noise levels.
- Clear inside duct dimensions must be maintained.
- Available in rectangular 8”x 8” to 48”x20” and in round 5” to 18”

BYPASS DAMPER ACTUATOR



Bypass Damper Actuator - Dimensions in Inches (mm)

Feature / Benefits

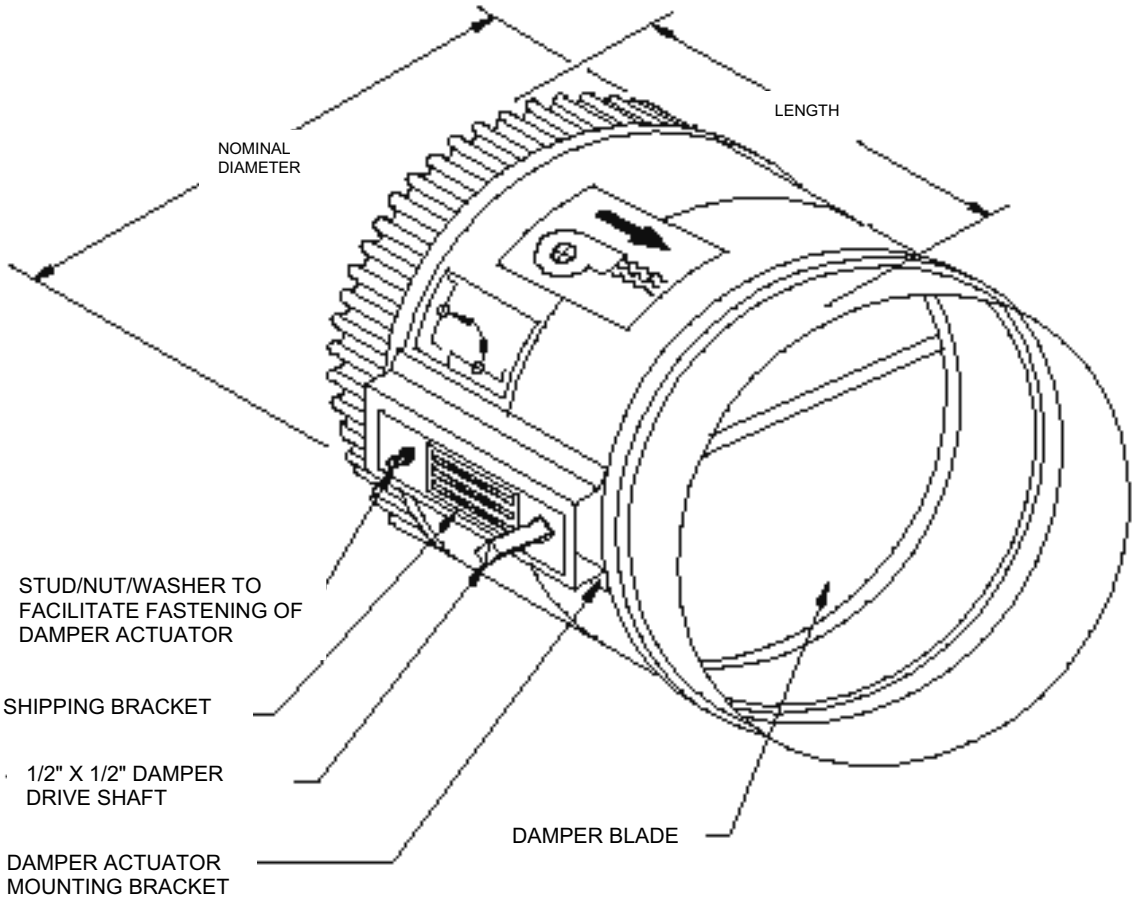
- The 24VAC electric motor actuator is driven by a proportional control signal (0-10VDC).
- The position of the actuator is visually indicated from 0-90.
- Bypass Damper is used to provide constant air delivery through an HVAC unit in a multi-zone system. As building load is satisfied, the zone dampers in the system start to modulate closed. This reduces building air requirements.
- The rooftop controller directs the damper actuator via an analog input from the static pressure transducer located in the supply air ductwork. Analog input is translated to a damper position reflecting the duct system pressures. The system external static pressure must not exceed 1.5 in. w.g. (373 Pa).
- Bypass dampers can easily be paired when a single bypass damper will not meet damper size requirements. The total net face area must be maintained when pairing, and both dampers must be of the same physical dimensions.

ROUND DAMPER SHELLS

FEATURES

- **Galvanized Steel Construction**
  - **Duct: 24ga**
  - **Damper Blade: 20ga**
  - **Drive Motor Mounting Bracket: 16GA**

1. **DAMPER SHIPPED WITH BLADE IN OPEN POSITION FOR ZONE DAMPER**
2. **CLOSE BLADE PRIOR TO MOUNTING BY-PASS DAMPER ACTUATOR**



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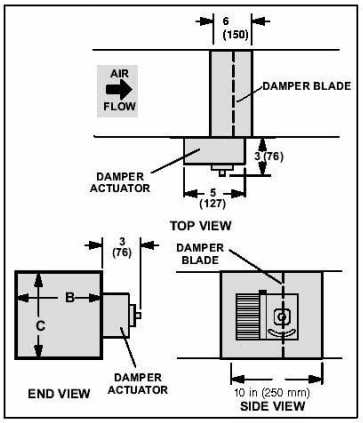
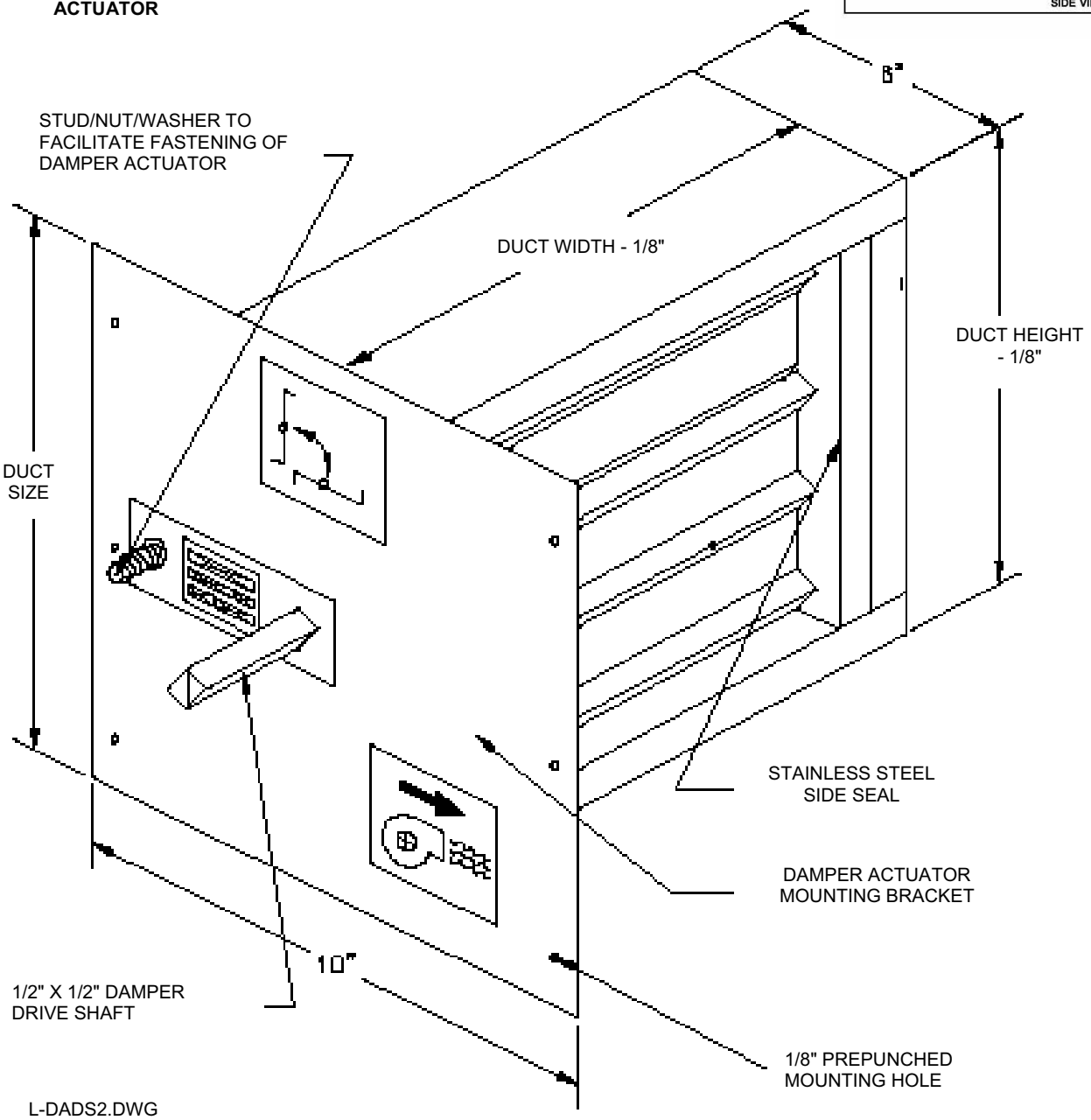
RECTANGULAR DAMPER SHELLS



FEATURES:

- **GALVANIZED STEEL CONSTRUCTION**
- **STAINLESS STEEL SIDE SEALS**
- **DRIVE MOTOR MOUNTING BRACKET**

1. **DAMPER SHIPPED WITH BLADES IN OPEN POSITION FOR ZONE DAMPERS**
2. **CLOSE BLADES PRIOR TO MOUNTING BY-PASS DAMPER ACTUATOR**



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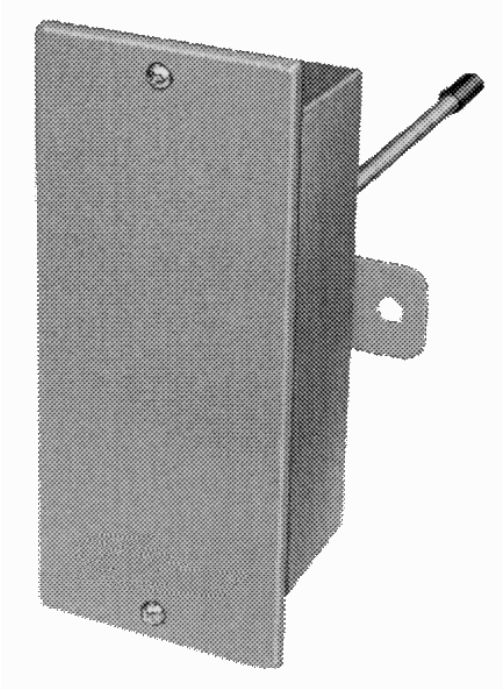
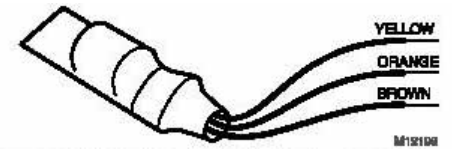
STATIC PRESSURE TRANSDUCER



The Static Pressure Transducer drives the Bypass Damper partially open to allow the excess air to flow from the supply side to the return side of the HVAC unit. This eliminates excessive system static pressure. Constant air quantities can be maintained through the HVAC unit. This also prevents the generation of noise at the diffusers and erratic loss of temperature control in the zones.

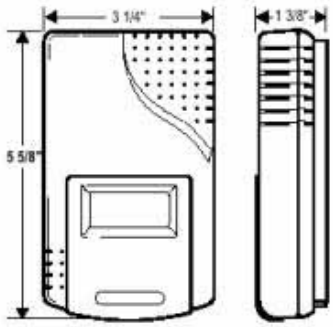
Must be located 2/3 down the longest duct!

TERMINATION MODULE



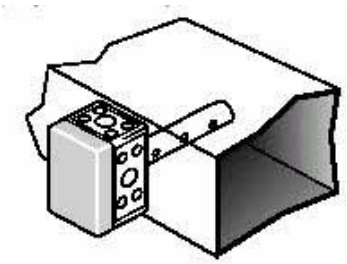
E-Bus Free Topology Transceiver (FTT)/Linked Power Transceiver (LPT) networks require termination. Depending on the network topology, one or more FTT/LPT Termination Modules may be required.

CARBON DIOXIDE (CO_2) SENSOR



- Sectra Zoning system can utilize a 0–2000 PPM sensor to modulate the economizer open in poor CO_2 conditions.
- Scheduler can also trend the information for future retrieval.
- CO_2 sensor can be wall mounted or can installed within an aspiration box onto a return duct system upstream of a bypass damper.
- Available in black or white, with or without the CO_2 display.

ASPIRATION BOX



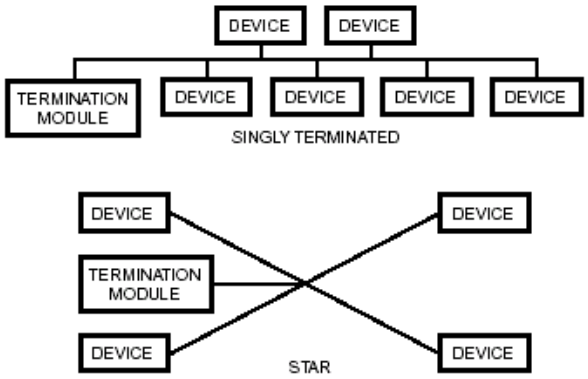
- For return air duct mounting; lightweight and durable
- Any Lennox CO_2 sensor can be installed inside the aspiration box
- The box is mounted outside the ductwork for ease of maintenance and operation
- Wiring connections are made through a knockout and then attaching the wires to the sensor mounted plate

TRANSFORMER

- Required for zone and bypass damper operation as well as for Scheduler and Network Display
- 240/ 120v//24v – 75VA, foot or conduit mount with circuit breaker

EXTERNAL COMMUNICATIONS

- The Echelon Lonworks® network should be used to communicate externally
- The Free Topology Transceiver (FTT) supports polarity insensitive, free topology wiring.
- This frees the system installer from wiring using a specific bus topology.
- T-tap, star, loop, and mixed wiring topologies are all supported by this architecture.
- Free topology wiring reduces the time and expense of system installation by allowing the wiring to be installed in the most expeditious manner.
- It also simplifies network expansion by eliminating restrictions on wire routing, splicing, and device placement.
- High speed 78 kilobit system

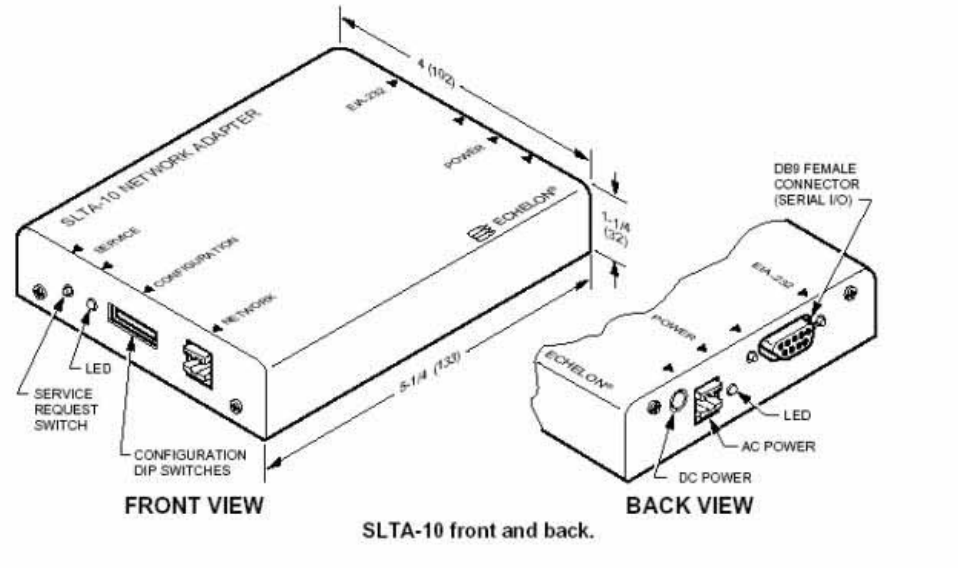


MODEM

Modem for remote communications. Requires:

- US Robotics 56K external modem V.92 with 120/9v transformer and phone cable
- Special 9-25 Pin Cable
- SLTA
- SLTA Transformer

SLTA-SERIAL LONTALK ADAPTER



SLTA-10 front and back.

The Serial LonTalk® Adapter (SLTA-10), provides communication between the LONWORKS® Bus (EBus), and a PC using an EIA-232 (previously called RS-232) port or an approved modem. The SLTA-10 works with the Sectra Zoning family of controllers.

- Serial EIA-232 interface connects host processors and modems to LONWORKS® networks.
- 1,200 to 115,200 bps serial bit rate with autobaud detection.
- Uses LONWORKS network protocol.
- LONWORKS communicates through a 78-kilobaud transformer-coupled transceiver.
- Transformer-coupled communications interface for higher degree of common mode noise rejection while assuring dc isolation.
- Color-coded, removable screw terminals for network and power wiring.
- Configuration DIP switches accessible without opening chassis.
- 24 Vac power input using removable screw terminals or a barrel connector.
- Metal enclosure for desk or wall mounting.
- CE Mark, UL, cUL, and TÜV approved.
- Automatic dial-out with compatible modem for supported applications.

Accessories

- Portable Operations Kit includes connector cable with 24 Vac transformer with connector cable.

CONFIGURATION SOFTWARE

The Configuration Software enables user to configure and commission the Sectra Zoning system easily and quickly.

Feature / Benefits

- Windows-based, user friendly program offers step by step instructions during the configuration process
- Roll-over help text and "Tech Tips" offer assistance to users
- Users can replicate similar rooftop system and/or zones to simplify the process
- Generates a complete materials checklist
- Communicates with LonWorks network using the SLTA 9-9 pin cable, an SLTA and a Portable Operations Kit.

WORKSTATION SOFTWARE

Building owners and managers of light commercial buildings can now enjoy the same advanced energy management and building control features that were once only practical for large building applications. LonStation is a low-cost, easy to use PC workstation that can be used with Sectra Zoning unitary controllers, zone controllers, and Honeywell T7300 Communicating Commercial Programmable Thermostats. The Windows®-based menu makes navigation within or between sites a snap.

LonStation® uses a proven self-discovery process to automatically create a dynamic record of all controllers on the network, eliminating the need for swapping of site databases. Users can easily view controllers and control loops, or create and view custom point groups. LonStation may be directly connected to a local network or remotely connected via a modem. Changes to the building management system's time-of-day schedules, setpoints, and operational parameters may be made from LonStation. Alarms, trends and logs are displayed by LonStation, keeping operators informed and in control.

Rely on the LonStation PC Workstation for simple monitoring, easy parameter changes and convenient remote access to your building management system.

Graphics option allows easy tailoring of standard control graphics. Customize your view by importing graphics or photos of sites, rooms, or controls for fast, at-a-glance identification.

SINGLE ZONE APPLICATIONS

Rooftop units without zone and bypass dampers can be tied into the Sectra Zoning network. This can be accomplished in one of two ways:

Communicating Thermostats

Standalone Honeywell T7300F with Q7300H communicating thermostat

- For use with multistage conventional or heat pump applications
- Proportional plus Integral (P+I) control eliminates temperature fluctuations
- Intelligent Recovery® control automatically optimizes equipment start times based on building load
- Intelligent Fan® feature energizes fan continuously in the Occupied periods. Fan can also be configured for conventional heat or electric heat fan operation.
- 7-day programmable with four periods per day
- Configurable reversing valve operation
- Selectable automatic or manual changeover
- Remote sensor capability
- Keypad lockout available
- Auxiliary contacts can interface with Lennox economizer systems for total rooftop control integration
- Provides networking capability on a LONWORKS Bus using a Free Topology Transceiver (FTT)
- Conforms to LONMARK® thermostat functional profile
- Dial-in capability allows remote monitoring and control of key variables such as time, schedule, setpoints, mode, and fan status
- Communicates schedule information to other network devices
- Selects fan operation and system mode using a remote Honeywell T7300F Thermostat
- Shares information such as time-of-day, temporary setpoint and occupancy status with other Sectra Zoning controllers
- Installer setup may be done locally from the Honeywell T7300 keypad or from a local or remote personal computer
- Fully integrated with Honeywell's light commercial building solutions to provide enhanced alarming, trending, scheduling and dial-out capabilities

Accessories

- Honeywell T7022A1010 Remote Return Air Temperature Sensor
- Honeywell T7047C Remote Wall Temperature Sensor
- Honeywell T7147A Remote Wall Temperature Sensor and Override Module
- Honeywell C7046C Discharge Air Sensor

Rooftop Module

Control Module (Honeywell W7750B) complete with Blower Proving Switch, Return Air Sensor and Wiring Harness

- Up to three stages of heating/cooling combinations, for single zone applications,
- 6 relay outputs, 2 digital inputs, 1 resistive analog input,
- Network communications, LonMark compliant,
- Uses same wall sensor as zoning system
- Standalone control (staged or modulating) of all heating, cooling, mixed air, system fan and economizer functions
- Configuration options include: supply fan type of air handler, occupancy sensor, window sensor, wall module option, dirty filter monitor, indoor air quality override and smoke control.
- Modes of operation include: occupied, standby, unoccupied, override modes, start-up and wait, cooling, heating, emergency heat, off mode, disabled mode, smoke emergency, freeze protect, manual position, fan only and disabled.
- Blower Proving Switch monitors blower operation and locks out unit in case of blower failure, Return Air Sensor provides input to module to determine heating or cooling operation and number of stages required.

Accessories

- Zone sensor with warm/cool adjust and pushbutton override
- Zone Sensor without adjustable knob
- Wallplate Zone Sensor
- Miniature Zone Sensor
- Dirty filter switch

SECTRA GUIDE SPECIFICATIONS

The Sectra™ Commercial Zoning System is composed of the following components:

SCHEDULER

- The Sectra Zoning System shall have Scheduler to provide
  - Energy Management Applications
    - Time of Day
    - Calendar and Holiday Scheduling
    - Daylight Savings Time switchover
    - Optimal Start/Stop
    - Demand Limiting or Load Rolling
  - Trend Analysis
    - A data collection utility shall be provided to automatically sample, store and display system data.
    - Measured and calculated analog and binary data shall be assignable to user-defined trends for the purpose of collecting operator specified performance data over extended periods of time.
    - Sample intervals of 1 minute to 24 hours in one minute or one hour intervals shall be provided.
    - Each Scheduler shall have a dedicated buffer for trend data and shall be capable of storing 16 trend logs.
    - Data shall be stored at the Scheduler
- The Scheduler's RAM memory shall not require battery back up
- The Scheduler's transformer shall have a built in circuit breaker
- The Scheduler shall be capable of supporting a PC hookup

MODEM

- The Sectra Zoning System shall be capable of having a modem for dial-in as well as dial-out functions.
- A telephone line connection shall be provided to the network for allowing dial in/out capability.
- The modem will require an SLTA with transformer as well as a modem cable.
- A job without a dedicated phone line shall have a telephone switcher.

NETWORK DISPLAY

- The Sectra system shall have a wall mounted human-machine interface. It shall
  - be capable of displaying systems variables and alarms.
  - allow users to modify setpoints, schedules, and acknowledge alarms.
  - have easy navigation between rooftop and zone views allowing users to easily perform the most common tasks.
  - have several layers of display screens provide different views: rooftops, buildings, zones, rooms, schedules and setpoints

- allow setpoint and schedule changes and alarm acknowledgment using local displays.
- have three levels of password protection, backlit display and a beep to announce alarms.
- handle up to 4 RTU subsystems

ROOFTOP CONTROLLER

- Each rooftop Controller shall control the stages of heating and cooling as well as directly controlling the economizer via analog output.
- The Controller shall control the economizer via minimum position, proportional free cooling or IAQ control via an optional carbon dioxide sensor.
- Each Controller shall be capable of occupied, unoccupied, purge, vent and shutdown modes.
- Each Controller shall be capable of analyzing the zone demands for up to 18 zones and to determine heating or cooling mode operation.
- Controller shall be factory installed and wired complete with Return Air Sensor, Discharge Air Sensor and Blower Proving Switch.
- Controller shall also be available as a field installation kit.
- Controller shall be capable of:
  - Controlling up to 2 stages of heat and 3 stages of cool.
  - Controlling modulating heat and/or modulating cooling hydronic valves
  - Controlling power exhaust fans
  - Providing blower on/off control.
  - Measuring discharge, outdoor and return air temperatures
  - Measures outdoor enthalpy as well as optional return air enthalpy
  - Proving airflow
  - Providing filter alarm with optional dirty filter switch
  - Providing IAQ control with optional CO_2 sensor
  - Controlling economizer output proportionally

ZONE DAMPERS

- Shall consist of VAV damper controller, incremental actuator and low leakage damper blades
- The controller shall be capable of controlling two stages of auxiliary heat as well as an incremental auxiliary heating valve.
- Supply air dampers shall be sized to maintain air velocities between 600 and 1000fpm (3 to 5m/s).
- Round damper shells shall be constructed of 24 gauge galvanized steel with deep groove stiffening ribs.
- Rectangular dampers and blades shall be of 20 gauge galvanized steel. Stainless side seals shall be provided.
- Dampers within 5 ft of a supply air outlet shall not exceed 700-fpm (3.5 m/s) air velocity and must be acoustically insulated to maintain acceptable noise levels.
- Provide a balancing damper upstream of each zone damper.

BYPASS DAMPER

- Shall consist of VAV damper controller, static pressure transducer, proportional actuator, and low leakage damper blades
- Round damper shells shall be of 24 gauge galvanized steel with deep groove stiffening ribs
- Rectangular dampers and blades shall be of 20 gauge galvanized steel. Side seals shall be provided
- Bypass damper shall be sized based on bypass air volume at air velocity of 1500 fpm. Where:
  (Bypass Air Volume = Total Air Volume - Smallest Zone Air Volume)
- A static pressure transducer shall be installed in the supply air duct 2/3 down the longest run

ZONE SENSORS

- Shall be compact wall sensor complete with temporary override button, an LED to indicate override condition, warm/cool adjust and a service jack.
- Allows space temperature adjustment via a setpoint knob allowing variations of 1 or 2º F.
- Sensor shall not be located in direct sunlight or close to supply air diffuser or any other heat source.
- Wall sensors shall be mounted about 5 ft (1.5 m) above finished floor (refer to local codes for handicap height requirements).
- Sensor shall be connected to a rooftop or zone controller via a 6 conductor, 18 gauge wire.

SECTRA ZONING COMPONENTS

Catalog Number		Description
Rooftop Devices		
	L_Sectra	Factory installed RTU Controller for L Series
	34M41	RTU Controller field kit for 3-6 ton for L Series
	34M42	RTU Controller field kit for 7.5-30 ton for L Series
	29M48	RTU Controller for 16 Series
Bypass Devices		
	29M16	Bypass Damper Controller
	29M53	Differential Pressure Transducer
Zone Devices		
	29M52	Zone Damper Controller
	29M55	Zone Thermostat - Non Adjustable
	29M56	Zone Thermostat - Adjustable
	85X52	Zone Thermostat - Wallplate, Non-Adjustable
Sensors		
	29M54	Sensor, Ambient, 20Ka
	54G44	Sensor, Enthalpy
	19L22	Sensor, Discharge, 20Ka
	19L22	Sensor, 20 Ka
	87N54	Sensor, CO2
Configuration Devices		
	29M57	Sectra Configurator Software
	92N65	Serial LonTalk Adaper (SLTA)
	83X18	Portable Operations Kit
Remote Communication Devices		
	32M03	Modem, Sectra zoning system (Modem & T36 Transformer, US Robostics USR5686D)
	83X14	LonSpec Software, CD, ZL7760A, To include W7750B & Q7300H
	32M23	72" Cable, 9 Pin to 9 Pin
	54X01	72" Cable, 9 Pin to 25 Pin, Modem to Computer
	83X18	72" Cable, 9 Pin to 25 Pin, Modem to SLTA, Null Modem
	32M02	Header, 9 Pins, Molex 09-57-1095, Also B24 Repl
Scheduling Devices		
	29M49	Scheduler
	68E69	Clock, Time, 14 Day, (2) SPDT, 24 Vac, 100 Hour Reserve
	68E72	Clock, Time, 17 Day, SPDT, 24 Vac, 100 Hour Reserve
	32M79	Clock, Time, ST7009A 1003, Electronic, 24 Vac
	43G98	Clock, Time, 7 day, Electromechanical
	43G99	Clock, Time, 24 Hour, Electromechanical
	54E34	Clock, Time, 7 Day, SPDT with Carryover
Miscellaneous Accessories		
	29M50	Network Display Panel
	99X49	Hot Water Valve Actuator
	67K65	Relay, Exhaust Fans, 2 PDT, 24 Vac
	56L68	Relay, SPDT, 24 Vac, Zone Reheat Stage 1; stage 2; status; smoke detector alarm.
	18M59	Resistor Strip for RTU Controller, 1 Ka
	32M01	Resistor, 499 amps, 1/4 Watt, 1%
	30K49	Switch, Blower Proving, Kit used on L Series
	37X75	Termination Module
	18M13	Transfomer, 120T024, 20 Va, Plug in, used with NCP
	32M78	Transfomer, Zone, 75 Va
	99X52	Valve, 1" Sweat
	99X50	Valve, 1/2" Sweat
	99X51	Valve, 3/4" Sweat
	84X49	Wire, 1000 Ft, Twisted Pair, Plenum, 22 AWG, Zone Hookup
Single Zone Application Devices		
	23M51	Honeywell Excel 10 Controller Kit (incl. W7750B Controller, Blower Proving Switch, Return Air Sensor, Wiring Harness)
	19L21	Sensor, Room, Honeywell T7770C 1002 for W7750B Controller
	19L22	Sensor, Discharge, Honeywell C7770A 1006, 20 Ka for W7750B Controller
	29M56	Sensor, Room, Honeywell T7770C 1007 Logo for W7750B
	48G63	Sensor, Discharge, Honeywell C7046C 1034, 10 Ka for T7300F
	59N27	Honeywell T7300F 2010 Logo Stat
	60L59	Honeywell T7300F 2119 Logo Stat
	82N52	Honeywell Q7300H 2029 Subbase for T7300F Stat

BYPASS DAMPER SHELLS - Dimensions in Inches

Cat No.	Diameter	Length
21M90	6	12
21M91	7	13
21M92	8	13
21M93	9	14
21M94	10	14
21M95	11	14
21M96	12	14
21M97	14	17
21M98	16	17
34M43	5	12
34M44	18	17

RECTANGULAR DAMPER SHELLS - Dimensions in Inches

		WIDTH										
	Inches	6	8	10	12	14	16	18	20	22	24	26
	6	38M85	38M90	38M91	38M92	38M93	38M94	38M95	38M96			
	8	38M86	22M01	22M13	22M25	22M37	22M49	22M61	22M73	22M85	22M92	22M99
	10	38M87	22M02	22M14	22M26	22M38	22M50	22M62	22M74	22M86	22M93	23M00
	12	38M88	22M03	22M15	22M27	22M39	22M51	22M63	22M75	22M87	22M94	23M01
H	14	38M89	22M04	22M16	22M28	22M40	22M52	22M64	22M76	22M88	22M95	23M02
E	16		22M05	22M17	22M29	22M41	22M53	22M65	22M77	22M89	22M96	23M03
I	18		22M06	22M18	22M30	22M42	22M54	22M66	22M78	22M90	22M97	23M04
G	20		22M07	22M19	22M31	22M43	22M55	22M67	22M79	22M91	22M98	23M05
H	22		22M08	22M20	22M32	22M44	22M56	22M68	22M80	38M97	46M02	46M07
T	24		22M09	22M21	22M33	22M45	22M57	22M69	22M81	38M98	46M03	46M08
	26		22M10	22M22	22M34	22M46	22M58	22M70	22M82	38M99	46M04	46M09
	28		22M11	22M23	22M35	22M47	22M59	22M71	22M83	46M00	46M05	46M10
	30		22M12	22M24	22M36	22M48	22M60	22M72	22M84	46M01	46M06	46M11

		WIDTH										
	Inches	28	30	32	34	36	38	40	42	44	46	48
	6											
	8	23M06	23M13	30M68	30M69	30M70	30M71	30M72	30M73	30M74	30M75	30M76
	10	23M07	23M14	30M77	30M78	30M79	30M80	30M81	30M82	30M83	30M84	30M85
	12	23M08	23M15	30M86	30M87	30M88	30M89	30M90	30M91	30M92	30M93	30M94
H	14	23M09	23M16	30M95	30M96	30M97	30M98	30M99	31M00	31M01	31M02	31M03
E	16	23M10	23M17	31M04	31M05	31M06	31M07	31M08	31M09	31M10	31M11	31M12
I	18	23M11	23M18	31M13	31M14	31M15	31M16	31M17	31M18	31M19	31M20	31M21
G	20	23M12	23M19	31M22	31M23	31M24	31M25	31M26	31M27	31M28	31M29	31M30
H	22	46M12	46M17	46M22	46M27	46M32	46M37	46M42	46M47	46M52	46M57	46M62
T	24	46M13	46M18	46M23	46M28	46M33	46M38	46M43	46M48	46M53	46M58	46M63
	26	46M14	46M19	46M24	46M29	46M34	46M39	46M44	46M49	46M54	46M59	46M64
	28	46M15	46M20	46M25	46M30	46M35	46M40	46M45	46M50	46M55	46M60	46M65
	30	46M16	46M21	46M26	46M31	46M36	46M41	46M46	46M51	46M56	46M61	46M66