

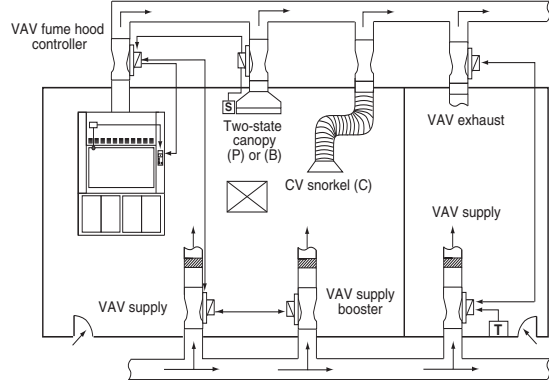
APPLICATIONS

Airflow Volume Control

Variable air volume (VAV) control schemes are commonly used for fume hoods, general exhaust, and room supply air.

- Fume hood control—For typical fume hood applications, high-speed (< 1 second speed of response) actuation is required. The Celeris Valve Controller (CVC) interfaces with our fume hood monitors for actuation. The Celeris platform provides room-level control functions in either standalone or integrated systems.
- Tracking pair control—In applications where make-up air control and an interface with our fume hood monitors are not required, low-speed electric actuation is an economical solution for room-level control in either standalone or integrated systems.

Celeris controllers provide room pressurization, temperature, humidity, occupancy and emergency control functions in make-up air and tracking pair control applications.



SPECIFICATIONS

Construction

- 16 ga. spun aluminum valve body with continuous welded seam
- Valve bodies available as uncoated aluminum or with corrosion-resistant baked phenolic coatings or with PVDF (Polyvinylidene fluoride)
- Composite Teflon® shaft bearings
- Spring grade stainless steel spring and polyester or PPS slider assembly
- Supply valves* insulated with 3/8" (9.5 mm) flexible closed-cell polyethylene. Flame/smoke rating 25/50. Density is 2 lb/ft³ (32 kg/m³)

Operating Range

- 32-122 °F (0-50 °C) ambient
- 10-90% non-condensing RH

Performance

- Pressure independent over a 0.3"-3.0" WC (75-750 Pa) drop across valve
- Volume control accurate to ±5%, 5 cfm of airflow command signal
- No additional straight duct runs needed before or after valve
- Available in flows from 35-5600 cfm (60-9514 m³/hr)
- Response time to change in command signal:
 - <1 second (control type M and N)
 - <1 minute (control type L)
- Response time to change in duct static pressure: <1 second

Pneumatic Actuation

(Not available with the 14-inch valve)

- 20 psi (-0/+2 psi) with a 20 micron filter main air required
- Compressor sizing: Accel II Valves are not continuous air-consuming devices. For compressor sizing, use:
 - single and dual valves: 10 scfm
 - triple and quad valves: 20 scfm

Sound

Designed for low sound power levels to meet or exceed ASHRAE noise guidelines.

CVC Controller

Power: 24 Vac (±15%) @ 50/60 Hz

Power Consumption:

Control Type	Single	Dual
L (low-speed electric)	13 VA	17 VA
M (high-speed electric)	70 VA	70 VA
N (pneumatic)	11 VA	11 VA


I/O available for connecting field devices:

- 3 universal inputs. Accepts volt, mA, ohms or NTC 2 or 3 thermistor signals.
- 1 digital input
- 2 analog outputs. Provides volt or mA signals.
- 1 digital output (Type C, 1 amp @ 24 Vac/Vdc)
- Input accuracy: Voltage, current, resistance: ±1% full scale
- Output accuracy
 - 0 to 10 Vdc: ±1% full scale into 10 k Ω minimum
 - 4 to 20 mA: ±1% full scale into 500 Ω +0/-50 Ω

Agency compliance:

- CSA
 - CE
 - FCC Part 15, Subpart J, Class A
- Room-level communications: FTT-10, 78 KB, bus topology, LonTalk™ network
 Building-level communications: TP-1250, 1.2 MB, bus topology, LonTalk™ network



 See wiring diagrams

* Not applicable to CVV series.
 Teflon is a registered trademark of DuPont Company.
 LonWorks is a registered trademark of Echelon Corporation.

FEATURES

FEATURE/OPTION	VAV (EXV/MAV)		
	L	N	M
Control type			
Actuator type	Low-speed electric	Pneumatic*	High-speed electric
Flow feedback signal	✓	✓	✓
Fail-safe	Last Position	NO/NC	NO/NC/Last Position
Factory-insulated valve body (supply)	✓	✓	✓
Field-adjustable flow	✓	✓	✓
Flow alarm via feedback circuit	✓	✓	✓
Flow alarm via pressure switch	Option	Option	✓
Low noise diffuser construction†	✓	✓	✓

All valves include pressure independent controller, factory-calibrated position controller.

†Accel II valves are designed to reduce sound over all frequencies, but significantly target the lower bands (125-500 Hz) to help eliminate the need for silencers.

*The pneumatic actuator is not available for the 14-inch valve at this time.

FCC COMPLIANCE

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

ORDERING GUIDE

MAV A 1 1 0 L - A L E H N - P

VALVE FAMILY
 EXV = Celeris digital exhaust valve
 MAV = Celeris digital supply valve

VALVE CONSTRUCTION
 A = Body and cone—uncoated aluminum; Shaft—uncoated 316 stainless steel
 B = Body and cone with phenolic coating, PFA coated stainless steel shaft (for standard fume hood applications)
 C = Body, cone and hardware with phenolic coating, PFA coated stainless steel shaft (for highly corrosive fume hood applications)
 D = Body, cone and hardware with PVDF coating, with PFA coated 316 stainless steel shaft (see note 6)
 S = Special coating and/or components

NUMBER OF VALVE BODIES
 (see note 1)
 F = One valve body with welded circular flange (single flanged)
 1 = One valve body (single, no flange)
 2 = Two valve bodies (dual)

VALVE SIZE
 08 = 8" valve (7.88"/200 mm actual diameter)
 10 = 10" valve (9.88"/251 mm actual diameter)
 12 = 12" valve (11.88"/302 mm actual diameter)
 14 = 14" valve (13.88"/352 mm actual diameter)

FLOW/PRESSURE OPERATING RANGE

FAIL-SAFE POSITION
 (see note 3)
Exhaust Valves
 O = Normally open exhaust valve
 E = Normally closed exhaust valve
 M = Fail-to-last position exhaust valve (control types L and M only)

Supply Valves (provided with insulation)
 C = Normally closed supply valve
 S = Normally open supply valve
 N = Fail-to-last position supply valve (control types L and M only)

VALVE ORIENTATION
 H = Horizontal
 U = Vertical upflow
 D = Vertical downflow

CONTROL TYPE
 (see note 3)
 L = Celeris 2—low-speed electric actuation
 N = Celeris 2—pneumatic (see note 4)
 M = Celeris 2—high-speed electric

VALVE DESIGN
 A = Conical shape diffuser (Accel II®)

VALVE OPTIONS
 (As required; list alphabetically, then numerically)
 B = Square flanges on each end of single body valves
 F = Single square flange mounted on **either**:
 • Inlet of single body exhaust valves **or**
 • Discharge of single body supply valves
 P = Pressure switch (see note 2)
 O = Power supply, valve-mounted, 120 V
 R = Remote electronics
 T = Power supply, valve-mounted, 230 V
 01-999 = Denotes factory-assigned special

VALVE CONTROLLER DESIGNATION
 (see note 3)
 E = Electronic valve
 H = Hood exhaust valve with pressure switch

Designation	Size	Operating Range in CFM (m3/hr)				Pressure Drop Across Valve (75-750 Pa)
		Single	Dual	Triple	Quad	
L = Low pressure	08"	35-500 (60-850)	—	—	—	0.3-3.0" WC (75-750 Pa)
	10"	50-550 (85-934)	100-1100 (170-1869)	—	—	
	12"	90-1050 (153-1784)	180-2100 (306-3568)	270-3150 (459-5352)	360-4200 (612-7136)	
	14"	200-1400 (340-2379)	400-2800 (680-4757)	—	—	

- NOTES:**
- For triples, specify one single with B option and one dual valve; for quads, specify two dual valves. Triples and quads will represent two nodes on the network.
 - Pressure switch set point = 0.2" WC (50 Pa).
 - Fail-safe options: Normally closed (NC) and normally open (NO) for high-speed electric and pneumatic only. Fail-to-last position for high- and low-speed electric only.
 - Not available in the 14-inch valve size.
 - Shut-off not available on 8" coated valve bodies.
 - Class D valves are only available in single body valves (F or 1) without square flanges.

VALVE CONTROLLERS AND OPTIONS: CELERIS VALVES

Valve Controller Designation

Controller Type E—Suitable for supply, make-up air, and general exhaust valve applications.

Controller Type H—Suitable for fume hood applications and includes a pressure switch for alarming.

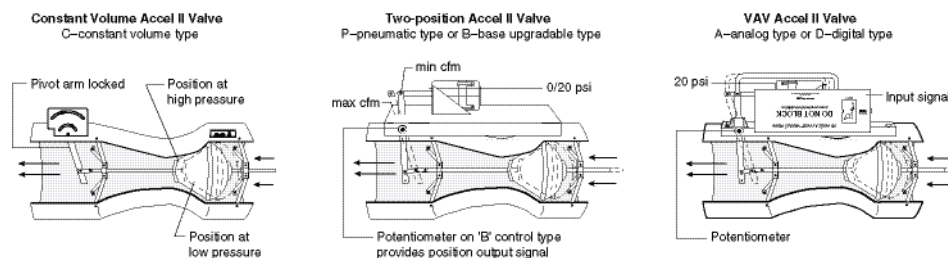
Valve Options (components added to enhance a valve's functions)

Single square flange (F)—Provides a single connection from a round single body valve to a square duct (on the inlet of single body exhaust valves; discharge of single body supply valves). typically used in Neutralizer™ applications.

Two square flanges (B)—Transitions each end of a single body valve from a round to square duct.

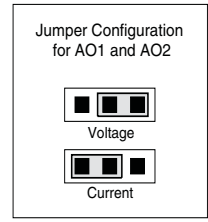
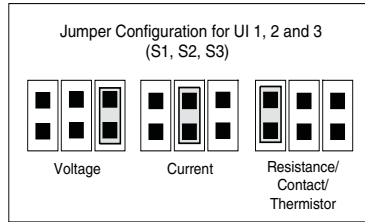
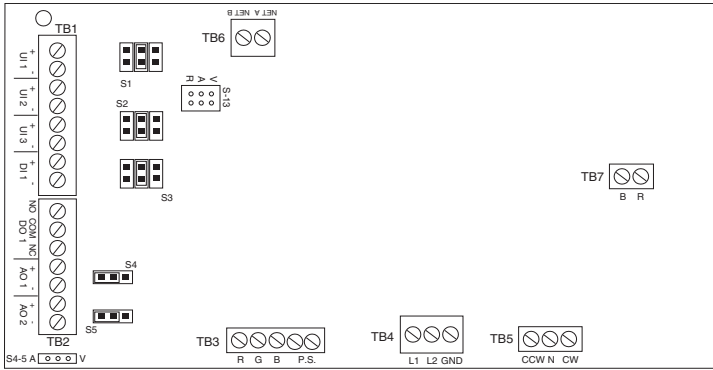
Pressure switch (P)—Detects low static pressure across the valve. Installed on non-hood exhaust valves to provide low static pressure alarm monitoring.

Power supply (O, T)—Valve mounted power supply provides +15 Vdc, -15 Vdc power to Phoenix Controls fume hood monitors and zone pressure sensors.



POINTS AND WIRING (See submittal wiring diagram for project-specific details.)

Celeris Valve Controller



TERMINAL BLOCKS—CELERIS VALVE CONTROLLERS

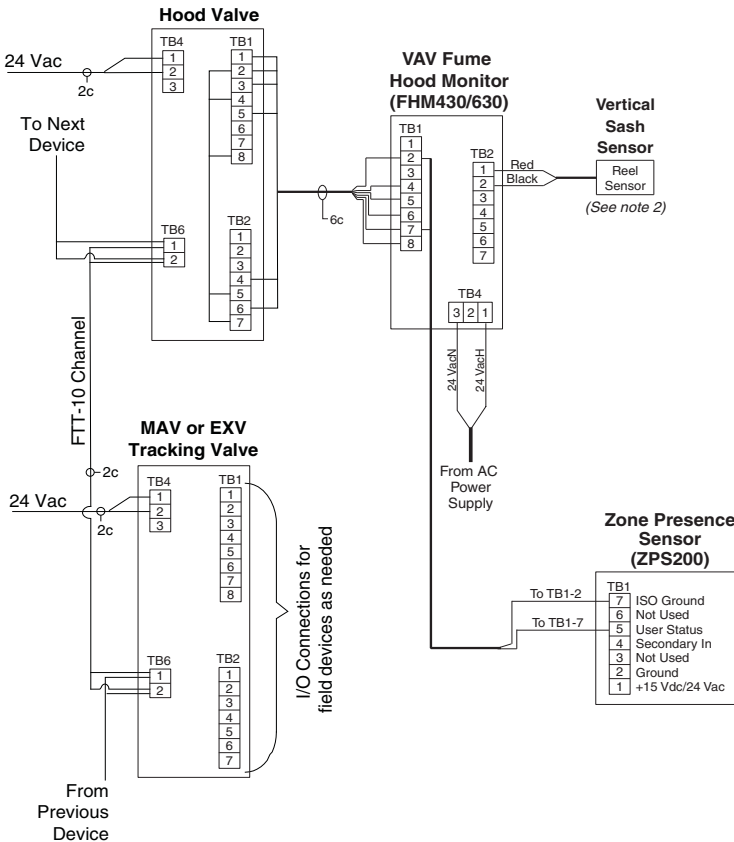
Terminal Block	Typical Function	Number of Terminations
TB1	Input connections	8
TB2	Output connections	7
TB3	vPot and pressure switch	5
TB4	Power (24 Vac input)	2
TB5	Actuator (control type L only)	2
TB6	Communication (FTT-10)	2
TB7	Actuator (control type M only)	2

NOTES:

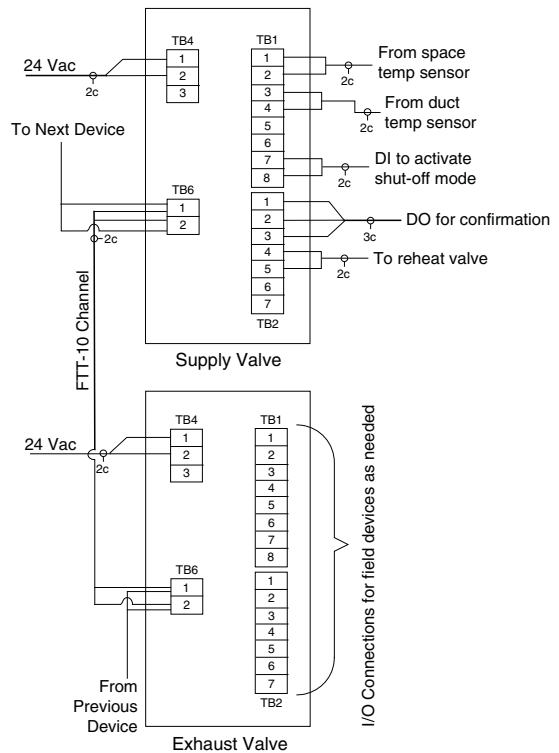
- Power—14 AWG (Controller Type M). High-speed electric valves must be connected in a star configuration.
- Power—18 AWG (Controller Type L).
- Control signal—22 AWG multi conductor, twisted pair
- Communication—22 AWG level 4; 16 AWG Belden 8471 (or equivalent)
- Each termination block (except TB3, 5 and 7) uses a depluggable connector with screw-down terminations for ease of installation.

Typical Wiring Diagrams

Hood Applications



Tracking Pair Applications



Notes:

- Eight-conductor wire is Belden 9421 (22 AWG) or equivalent. (Tape back unused conductors.)
- Sash sensor is provided with two-conductor cable. See combination sash sensors for exception.

WIRING

Transformers

The Celeris Valve Controller (CVC) requires the use of a step-down transformer (either 120/24 volt or 240/24 volt). Any transformer used to power CVCs must meet the requirements of an NEC Class 2 circuit.

- The secondary transformer must be limited to a maximum of 30 Vac.
- Secondary power shall be current limited with either internal circuit breaker protection or with a four-amps slow-blow fuse, in accordance with NEC Class 2 power requirements.

Phoenix Controls offers the following recommendations; however, designers, installers and owners should always consult their national and local electrical codes before selecting transformers for their systems.

- Transformers should not exceed 100 VA. Use multiple transformers, rather than larger transformers, when more than 100 VA is required.
- Each pressurization zone should have either a dedicated single-phase primary circuit or a secondary circuit disconnect.
- If an earth ground is provided, it should not be connected to the CVC, even though there is a three-terminal connector on the CVC board.

NOTE: AC line voltage polarity must be maintained on all CVC and AC powered ancillary devices.

Transformer Sizing

To size a transformer, all of the VA loads for the circuit must be totaled. This table outlines the power ratings of Celeris products and related outside purchased equipment. Use these values to size the power transformers for the Celeris system.

Celeris Valve Controller (CVC)		
Control type L (low-speed electric)	Single valve body	13 VA
	Dual valve body	17 VA
Control type M (high-speed electric)	Single valve body	70 VA
	Dual valve body	70 VA
Control type N (pneumatic)	Single and dual valve bodies	11 VA
External Devices		
Router/repeater modules		2 VA
Sensor	Approved thermistor	0 VA
Heating valve	Belimo LM24 (2-state)	3 VA
Heating valve	Belimo LM24SR (propor)	4 VA
Each 4-20 mA device	Example: transducers	0.5 VA

Power Conductor Sizing

For low-speed valves in a bus configuration; as a rule of thumb for loads up to 100 VA, use 18 AWG cable with a maximum length of 110 feet (33 meters) between the transformer and the last daisy-chained device.

For a more exact length per load number, refer to this chart. For high-speed valves in a star configuration, refer to the 14 AWG column of this chart.

Maximum wire length (in feet) given a wire gauge and VA delivery by transformer					
VA Delivered	Wire Gauge				
	14 AWG	16 AWG	18 AWG	20 AWG	22 AWG
10	2880	1743	1095	695	433
20	1440	871	548	347	216
30	960	580	365	213	144
40	720	435	274	174	108
50	576	348	219	139	86
60	480	290	182	115	72
70	411	249	156	99	61
80	360	217	136	86	54
90	320	193	121	77	48
100	288	174	110	69	43

NOTE: Control Type M (high-speed electric actuation) must use at least 14 AWG. Wired in a star or home run configuration (not daisy-chained).

WIRING (CONTINUED)

Network Wiring

Room-level Network

Echelon Corporation has tested and approved 5 cables types for use with the FTT10 communications transceiver. Based on availability, cost and maximum distance limitations, we have focused our recommendation to two cable types:

- Generic NEMA level 4 cable, 22 AWG (0.65 mm)*
- Belden 8471, 16 AWG (1.3 mm) cable (or equivalent)

*NOTE: *Level 4 cable specified by Echelon as originally defined by the NEMA differs from the Category 4 specification proposed by the Electronic Industries Association/Telecommunication Industry Association (EIA/TIA).*

The cables Phoenix Controls recommends are stranded, two-conductor, twisted-pair (TP) without a shield. A shield, or drain wire, is not required for Celeris communications wiring and should not be used. Both of these cables are available from multiple sources either solid or stranded, in plenum and non-plenum rated versions.

- If two conductors are to be placed in a terminal opening, twist the bare conductors prior to inserting these in the terminal opening.
- If a wall-mounted sensor with a communications jack is used, the connections to the jack must be treated as either a bus connection or an EOL connection.
- While the room-level communications wiring is not polarity sensitive, it is recommended that a consistent color-coding and polarity convention be followed.
- Each terminal on the terminal block will accommodate up to two 16 AWG (1.3 mm) stranded conductors.
- Communications connections are to be made following a bus or daisy chain topology.
- Two end-of-line (EOL) terminators must be installed, one at each end of the room-level network.

Maximum Cable Lengths

- When using Level 4 cable operating in a bus topology, the maximum cable length is 4500 feet (1370 meters).
- When using 16 AWG cable operating in a bus topology, the maximum cable length is 8800 feet (2680 meters).

Phoenix Controls Wiring Recommendations

- Use cables recommended by Phoenix Controls.
- Stranded wire is strongly recommended for ease of installation.
- Follow good wiring practices:
 - Do not run the communications cable in the same conduit or wire way as the power cables.
 - If the communications cables must cross power cables, it is best to do so at a 90-degree angle.
 - Shield or drain wires, if present, should be wrapped with insulating tape to prevent contact with exposed conductors or contacts.
 - Maintain a consistent color code or polarity all the way through the wiring system.
 - All connections must meet the requirements of an NEC Class 2 circuit.
 - Local and national electrical codes take precedence.