

Phoenix Controls venturi valves with Theris® LonMark® valve controllers are specifically designed for the ventilation requirements of critical spaces in healthcare facilities where infection control, energy savings and reducing maintenance costs are an important part of business operations. Theris controllers provide a variable air volume (VAV) solution for directional airflow, climate control, and overall ventilation balance.

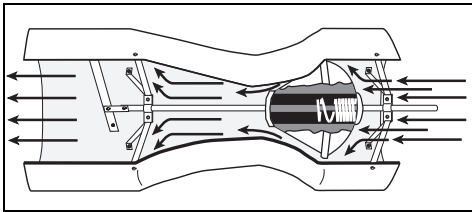
System Benefits

- Factory characterization reduces system commissioning time
- Pressure-independent valves avoid rebalancing costs
- No flow sensors to maintain
- High turndown ratios contribute to reducing energy costs

PRODUCT MODELS

PRODUCT	DESCRIPTION
Theris-TP (Tracking Pair VAV)	To meet the need of directional airflow, Theris-TP features tracking valve pairs that maintain a prescribed CFM offset to enable accurate space pressurization and complete room climate control.
Theris-TX (Enhanced Tracking Pair VAV)	For tracking pair applications in isolation rooms, operating rooms, and other spaces, Theris-TX provides extra I/O to meet the needs of humidity control and pressure monitoring, plus optional shut-off capability for decontamination procedures.
Theris-SO (Supply-only VAV)	In VAV applications where ducted exhaust is sufficient to meet local codes and engineering guidelines, Theris-SO provides a cost-effective supply valve when no tracking exhaust valve is required.

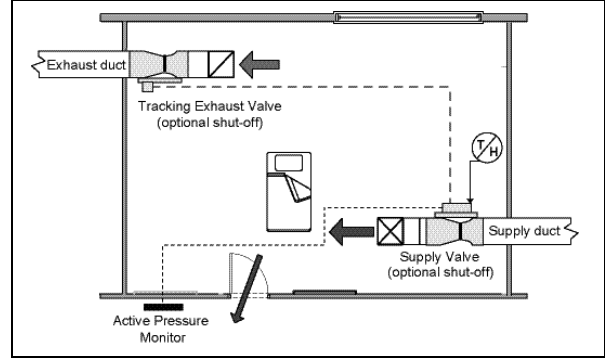
Pressure Independence



Phoenix Controls venturi valves use a simple mechanical regulator to compensate for the changes in static pressure, so accurate flow control is assured at all times.

Unlike commercial controls that use velocity pressure sensors mounted in the airstream, venturi valves are impervious to dust, dirt, and sensor drift. Phoenix Controls venturi valves continue to work even in the event of a power failure, assuring that the correct room pressurization and directional airflow are maintained at all times.

Unique 48-point flow characterization curves for the supply and exhaust valves are downloaded to every Theris valve controller's on-board microprocessor before the valve leaves the factory. The controller uses this flow data to accurately control flow-tracking between the two valves, virtually eliminating the need for field calibration and rebalancing.



Theris-TX valve controllers maintain directional airflow with variable air volume (VAV) temperature and humidity control.

OSHPD Certified

This device is certified for OSHPD Seismic Certification Preapproval per 2013 CBC, 2012 IBC, ASCE 7-10, and IEC-ES-AC-156. OSHPD Special Certification number OSP-0290-10.

NVLAP Accreditation

All venturi valves are characterized on NVLAP Accredited Airstations, Lab Code 200992-0. NVLAP is administered by the National Institute of Standards and Technology (NIST).

ISO

Phoenix Controls Designs, Develops, Manufactures, and sells products, systems, and service to control the environment and airflow of critical spaces. Phoenix Controls is registered to ISO 9001:2015.

Warranty

Phoenix Controls Warrants all venturi valves against defects in material and workmanship for a period of 5 years. In addition, all other equipment manufactured by Phoenix Controls, such as sash sensors, fume hood displays, and equipment supplied but not manufactured by Phoenix Controls is covered by a 3 year warranty.

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SPECIFICATIONS

Construction

- 16 ga. spun aluminum valve body with continuous welded seam
- Aluminum valve body
- Composite Teflon® shaft bearings
- Spring grade stainless steel spring and PPS slider assembly
- Supply valves insulated with 3/8" (9.5 mm) flexible closed-cell polymer-based foam. Flame/smoke rating 25/50. Density is 1.5 lb/ft³ (24.0 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 (74-747 Pa) drop across valve.
- Volume control accurate to ±5% of airflow command signal.
- No additional straight duct runs needed before or after valve.
- Available in flows from 35-5000 CFM (59-8495 m³/hr).
- Response time to change in command signal:
 - Standard (Design A)
 - < 40 seconds: Control Type L
 - < 1 minute: Control Type H (with 60 Hz power) and I (except dual 14")
 - <= 2 minutes: Control Type I on dual 14"
 - Shut-off (Designs S and L)
 - < 50 seconds: Control Type L
 - < 1.5 minute: Control Type H (with 60 Hz power) and I (except dual 14")
 - <= 2.5 minutes: Control Type I on dual 14"
- Response time to change in duct static pressure: <1 second.

Sound

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

Power

24 Vac (±15%) @ 50/60 Hz

Power Consumption (singles and duals)

- SO (one controller/one actuator): 10 VA
- TP, TX (one controller/two actuators): 12 VA

Notes:

1. All power consumption VA ratings listed here are based on fully-loaded I/O except for floating point reheat actuators.
2. VA ratings for floating point reheat actuators must be factored in separately.

Input Accuracy

Voltage, current, resistance: ±1% full scale

Output Accuracy

- 0 to 10 Vdc: ±1% full scale into 10 KΩ minimum
- 4 to 20 mA: ±1% full scale into 500 Ω +0/-50 Ω

Full Span Travel Time

- Standard (Design = A) valves
 - Control Type L: 40 seconds @ 50 or 60 Hz
 - Control Type H: 60 seconds @ 60 Hz; 70 seconds @ 50 Hz; Single 8, 10, and 12" only
 - Control Type I:
 - 60 seconds @ 50 or 60 Hz; All singles and 10 and 12" duals
 - 120 seconds @ 50 or 60 Hz; 14" duals
- Shut-off (Design = S or L) valves
 - Control Type L: 50 seconds @ 50 or 60 Hz
 - Control Type H: 90 seconds @ 60 Hz; 110 seconds @ 50 Hz; Single 8, 10, and 12"
 - Control Type I:
 - 90 seconds @ 50 or 60 Hz; All singles and 10 and 12" duals
 - 150 seconds @ 50 or 60 Hz; 14" duals

Interoperability

- Based on LonWorks® technology for peer-to-peer communication between room controllers
- LonMark® certified according to the Interoperability Guidelines Version 3.4
- LonMark functional profile SCC-VAV #8502



Room-level Communications

FTT-10, 78 KB, LonTalk™ network

Regulatory Compliance



- RoHS
- FCC

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.

- EU Contact Address:
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FEATURES

FEATURE	THERIS MODEL	DESCRIPTION
Pressure independence	All	CFM airflow maintained regardless of changes in duct static pressure.
No flow sensors	All	Factory flow characterization eliminates the need for flow sensors.
Airflow offset maintained	TP, TX	Supply and exhaust CFM offset settings maintain accurate pressurization.
Temperature and occupancy control	TP, TX, SO	Primary and secondary PID loops. Occupied, unoccupied or standby. Building Management System (BMS) or local set point input.
Humidity control and pressure monitoring	TX	Humidity monitoring and control. Pressure monitoring. BMS control available.
HVAC emergency modes	TP, TX, SO	Multiple modes available. Custom setup for each mode.
Floating point reheat	TP, TX, SO	Control algorithm and TRIAC support for tri-state hydronic reheat valves.
Proportional reheat	TP, TX, SO	Control algorithm and AO support for proportional hydronic reheat valves.
Flexible I/O	TP, TX, SO	Up to 14 Standard LON Network Variable Types (SNVT) per I/O point available to read/write via LonTalk.
Additional inputs/outputs (I/O)	TX	Two additional universal inputs (humidity, pressure).
Shut-off capability	TX	Optional shut-off valve configuration enables room decontamination procedures.

TP = Tracking pair VAV
 TX = Enhanced Tracking pair VAV
 SO = Supply-only VAV

AVAILABLE INPUTS AND OUTPUTS*

TYPE		DESCRIPTION
Universal input	UI 1	Dry contact ($\leq 100 \Omega$ = Closed, $\geq 100 K\Omega$ = Open), 0-10.5 Vdc, 4-20 mA, Thermistor NTC2 and 3 (resistance 0-10 K Ω)
Universal input	UI 2	Same as UI 1
Universal input	UI 3	Same as UI 1
Universal input	UI 4**	Same as UI 1; for humidity sensor or spare
Universal input	UI 5**	Same as UI 1; for Active Pressure Monitor (APM) pressure sensor or spare
Digital input	DI 1	Dry contact ($\leq 100 \Omega$ = Closed, $\geq 100 K\Omega$ = Open); logic level (≤ 0.7 Vdc = OFF, ≥ 1.4 Vdc = ON)
Analog output	AO 1	0-10.5 Vdc, 4-20 mA
Analog output	AO 2	Same as AO1
Digital output	DO	Type C, 1 Amp @24 Vac/Vdc
TRIAC 1	Main valve control	TRIAC to control main low-speed actuator
TRIAC 2	Tracking valve control	TRIAC to control tracking low-speed actuator
TRIAC 3	Floating point reheat control	TRIAC to control 24 Vac floating point actuator for reheat valve; 6 VA max @ 24 Vac

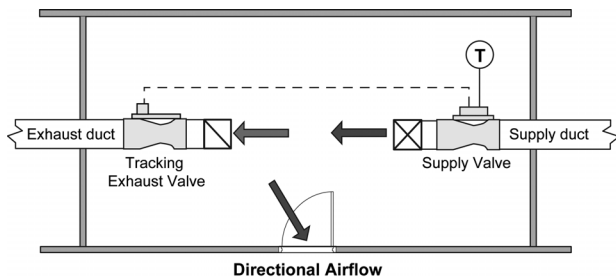
* The flow tracking function does not use any of the inputs or outputs above. For more details, see the wiring diagrams on pages 8-10.

** Available only on Theris-TX.

APPLICATIONS

Theris-TP VAV Isolation or Patient Room

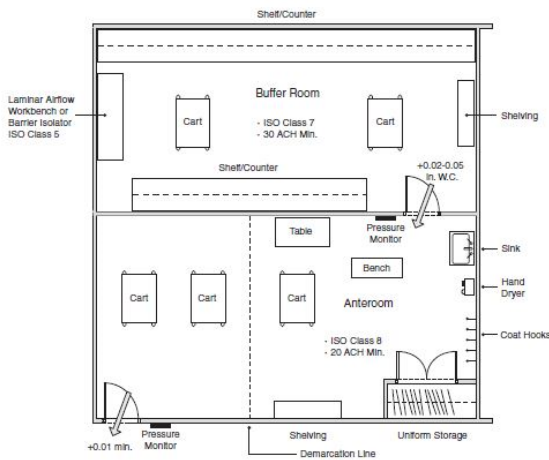
VAV Tracking Pair - One Supply and One Exhaust Valve



This patient room has Theris-TP valve controllers on the supply and exhaust sides. Supply and exhaust both track airflow rates to maintain room pressure and offset. The Theris-TP supply valve controller can have an associated temperature sensor and control a hot water valve, as well as a second stage of heating, if needed. An optional duct temperature sensor can be placed in the ductwork on either the supply or exhaust side to monitor or control temperature.

Theris-TP VAV Tracking Pair

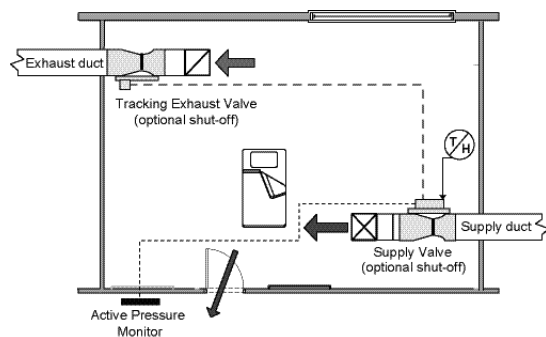
Hospital Pharmacy Using Compounded Sterile Preparations



Hospital pharmacies using Compound Sterile Preparations (CSP) for cancer treatment are required by USP 797 to maintain an ISO Class 7 clean room. Theris-TP valve controllers can be used in both the buffer and ante rooms to maintain reliable pressurization.

Theris-TX Enhanced VAV Tracking Pair

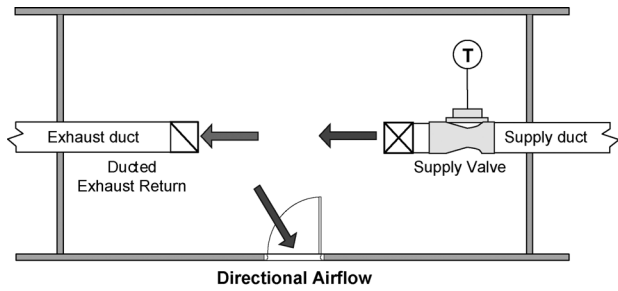
Operating Rooms and Other Critical Pressurized Spaces



Applications for Theris-TX valve controller include operating rooms, isolation rooms, hazardous materials storage, pharmacies, and other critical spaces. The available functionality includes all the features of Theris-TP valve controller, plus full temperature control, humidity control, and valve shut-off capability.

Theris-SO VAV Patient Room

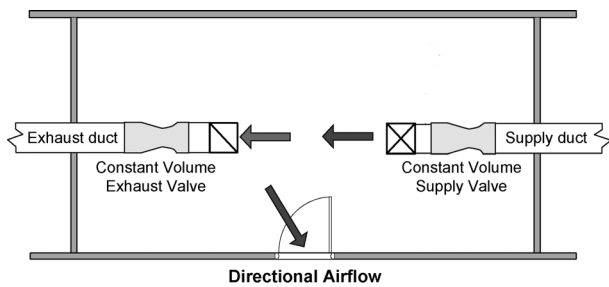
Standalone Supply with Ducted Return



This patient room has a standalone Theris-SO valve controller on the supply side and a ducted return on the exhaust side. The Theris-SO valve controller can have an associated temperature sensor and control a hot water valve. An optional temperature sensor can be placed in the ductwork to monitor duct temperature either on the supply or exhaust side.

Constant Volume Patient Room

Constant Volume with Supply and Exhaust



This patient room has Phoenix Controls constant volume valve on both the supply and exhaust. Temperature control can be managed by a separate controlling thermostat. Equipment can be set and left alone. No maintenance is required and valve will keep these flow settings indefinitely. *Refer to MKT-0274 and MKT-0278 for details on Phoenix Controls constant volume valves.*

ORDERING GUIDE

HSV A 2 10 M - A I E H Z - P S L

VALVE FAMILY

HSV = Theris Supply valve
(comes standard with insulation)
HEV = Theris Exhaust valve

VALVE CONSTRUCTION

A = Body and cone uncoated aluminum;
shaft uncoated 316 stainless steel

NUMBER OF VALVE BODIES

F = One valve body with welded circular flanges
1 = One valve body, no flange
2 = Two valve bodies (dual); 10", 12" and 14" only

VALVE SIZE

08 = 8" valve (7.88"/200mm actual diameter); see Note 1
10 = 10" valve (9.67"/246mm actual diameter)
12 = 12" valve (11.84"/301mm actual diameter)
14 = 14" valve (13.88"/353mm actual diameter); see Note 2

FLOW/PRESSURE OPERATING RANGE

See the *Flow/Pressure Operating Range* tables in this section
M = Medium pressure operation; pressure independent over a range of 0.6 to 3.0" WC (150 to 750 Pa), associated pressure switch trips at 0.3" WC
L = Low pressure operation; pressure independent over a range of 0.3 to 3.0" WC (75 to 750 Pa), associated pressure switch trips at 0.2" WC; see Notes 3, 4

VALVE OPTIONS

EVI = Exhaust valve with insulation and blocks
IBO = Insulation blocks only, no insulation
PSL = Pressure switch, low limit
REI = Remote electronics - indoor; see Note 5
WRE = Weather-resistant electronics - LonMark only; see Notes 6, 7
SFB = Square flanges on both ends of bodies = 1
SFD = Single square flange on discharge of bodies = 1 (supply or exhaust)
SFI = Single square flange on inlet of bodies = 1 (supply or exhaust)

FAIL SAFE POSITION

Z = Fails to last position

VALVE ORIENTATION

H = Horizontal
U = Vertical upflow
D = Vertical downflow

VALVE CONTROLLER DESIGNATION

E = Theris TP Supply (analog without boosters)
X = Theris TX Supply (controlling valve of tracking pair with expanded features)
O = Theris SO Supply only (no tracking pair ability); available on supply or exhaust
N = No electronics (tracking valve)

CONTROL TYPE

H = Rotary, low-speed electric actuator; NEMA 1; on single 8", 10", and 12" only
I = Rotary, low-speed electric actuator; IP54
L = Linear, low-speed electric actuator; IP56

VALVE DESIGN

A = Conical-shaped diffuser
S = Standard shut-off valve (metal-on-metal seal); see Note 3
L = Low-leakage shut-off valve (gasketed seal); see Note 4

NOTES:

- 8-inch shut-off Valves (Design = S or L) are available ONLY in Construction = A (uncoated).
- 14-inch valves are currently NOT available as Low Leakage Shut-off (Design = L) with Medium Pressure (Range = M).
- Low Pressure (Range = L), Standard Shut-off (Design = S) valves are NOT available in Orientation U (vertical upflow).
- Low Pressure (Range = L), Low Leakage (Design = L) valves are currently NOT available in any size.
- Option REI: Remote Electronics, indoor installations ONLY. The distance to the valve controller is limited to:
 - 150 feet (45.7 meters) of 22 gauge cable for low-speed electric actuators (Control Type = H, I, or L).
- Option WRE: Weather Resistant Electronics, outdoor installations. Applies to ELECTRICALLY actuated valves with sufficient IP ratings only. HORIZONTAL orientation ONLY.
 - Must be ordered with IP54 or IP56 rated actuators: Control Types I and L respectively.
 - Includes: sealed Vpot and large weather-resistant IP65 box mounted on base channel that houses the controller and all electric connections to/from it.
 - REQUIRES use of a dog house enclosure - provided by others - to protect the valve from the elements and maintain temperature and humidity conditions within Phoenix specifications.
- Option WRE with Theris LonMark valves is limited to Valve Controllers E, O, or X ONLY.

ORDERING GUIDE (CONTINUED)

Flow/Pressure Operating Range Tables

FLOW/PRESSURE OPERATING RANGE FOR VALVE DESIGN A

Designation	Size	Operating Range in CFM (m ³ /hr)		Pressure Drop Across Valve
		Single	Dual	
M = Medium pressure	08"	35-700 (60-1185)	—	0.6-3.0" WC (150-750 Pa)
	10"	50-1000 (85-1695)	100-2000 (170-3390)	
	12"	90-1500 (155-2545)	180-3000 (310-5090)	
	14"	200-2500 (340-4245)	400-5000 (680-8490)	
L = Low pressure	08"	35-500 (60-845)	—	0.3-3.0" WC (75-750 Pa)
	10"	50-550 (85-930)	100-1100 (170-1860)	
	12"	90-1050 (155-1780)	180-2100 (310-3560)	
	14"	200-1400 (340-2375)	400-2800 (680-4750)	

FLOW/PRESSURE OPERATING RANGE FOR SHUT-OFF VALVE DESIGNS S AND L

Designation	Size	Operating Range in CFM (m ³ /hr)		Pressure Drop Across Valve
		Single	Dual	
M = Medium Pressure	08"	35-600 (60-1015)	—	0.6-3.0" WC (150-750 Pa)
	10"	50-850 (85-1440)	100-1700 (170-2880)	
	12"	90-1300 (155-2205)	180-2600 (310-4410)	
	14"	200-1600 (340-2715)	400-3200 (680-5430)	
L = Low Pressure	08"	35-400 (60-675)	—	0.3-3.0" WC (75-750 Pa)
	10"	50-450 (85-760)	100-900 (170-1520)	
	12"	90-900 (155-1525)	180-1800 (310-3050)	
	14"	200-1000 (340-1695)	400-2000 (680-3390)	