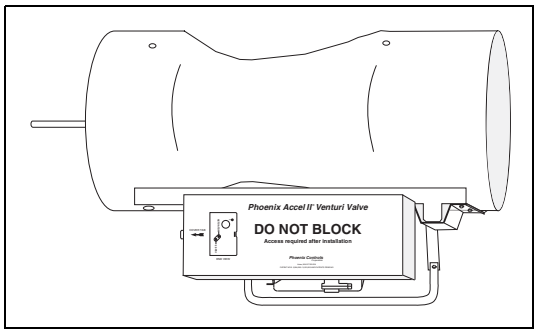
Phoenix Controls Accel® II Venturi Valves combine a mechanical, pressure-independent regulator with a high-speed position/airflow controller to meet the unique requirements of airflow control. These valves can be used in constant volume, two-position, or VAV applications—all designed to maximize flow performance while reducing related noise. Valves for VAV applications may be either electrically or pneumatically actuated.

- **Pressure-independent operation**—All valve types include an immediate response mechanical assembly to maintain airflow set point as duct static pressure varies.
- **Airflow control**—By positioning the flow rate controller assembly, the airflow can be adjusted.



Accel® II valve (VAV pneumatic unit shown).

Accel II valves are available in:

- **VAV** (EXV/MAV series) with VAV closed-loop feedback control with pneumatic for fume hood applications or low-speed electric actuation for tracking pair applications
- **Constant volume** (CEV/CSV series) for maintaining an airflow set point under variable static pressure conditions.
- **Two-position** (PEV/PSV series) for high/low flow control (pneumatic only)
- **Base upgradable** (BEV/BSV series) for pneumatic or fixed flow control with feedback option and upgradability to VAV (pneumatic only)

OPERATION

Airflow Volume Controller Types

Variable Air Volume (VAV) (EXV/MAV series)

For VAV closed-loop feedback control of fume hood and modulating airflow applications. Available with either digital Celeris or analog controls.

- **Celeris**—The Celeris LonWorks based valve controller (LVC) utilizes distributed control architecture to perform all critical room control functions. This LVC offers the power and flexibility of a conventional room control system but in a more streamlined, cost-effective manner. Celeris can operate as either a standalone or fully integrated control system. Available in pneumatic, high-speed or low-speed electric actuation.
- **Analog**—The analog-based valve controller provides the conventional control solution for critical environments. Available with either pneumatic or high-speed electric actuation.

Constant Volume,Two-position and Base Upgradable

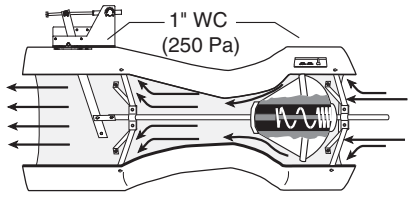
For two-position and fixed, field adjustable flow controls. Base upgradable includes optional electric flow verification and upgrading to VAV type valve.

- **Constant volume**—The valve's shaft/cone assembly is locked into the specific position required to provide the scheduled airflow via factory calibration.
- **Pneumatic**—Switched pneumatic air is applied to the valve's actuator. This positions the shaft/cone assembly to two distinct airflows. Mechanical clamps assure precise minimum and maximum airflows via factory calibration.
- **Base upgradable/pneumatic**—Switched or varying pneumatic air is applied to the valve's actuator. A feedback potentiometer linked to the shaft is provided for optional flow verification and upgrading to a VAV-type valve.

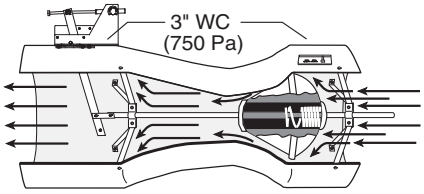
Pressure-independent Controller

All valves maintain a fixed flow of air by adjusting to changes in static pressure. Each valve has a cone assembly with a spring designed to compensate for changes in duct pressure.

When there is low static pressure, less force is applied to the cone, which causes the spring within the cone to expand.



As static pressure increases force on the cone, the spring compresses and the cone moves into the venturi to maintain set flow.



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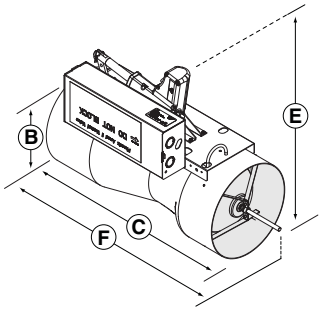
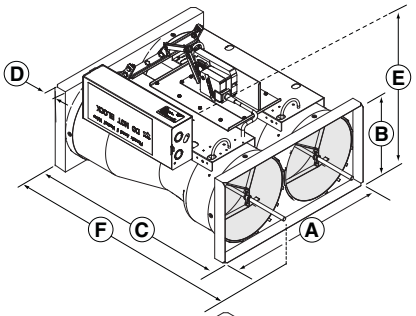
DIMENSIONS AND WEIGHTS

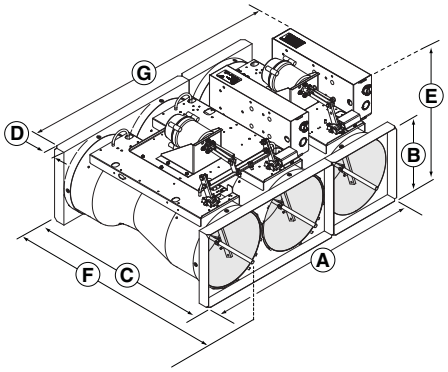
Single
(EXV-electric)



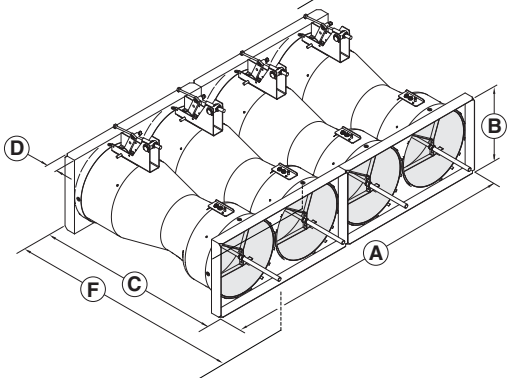
Dual
(MAV-pneumatic normally closed shown)



Triple
(MAV-pneumatic normally closed shown)



Quad
(CEV shown)



	A*		B*		C		D		E**		F		G		Weight (CxV valves)		Weight (all others)	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs	kg	lbs	kg
Single 8	—	—	7.88	200	23.50	597	—	—	14.56	370	27.77[1]	705	10.3	262	7	3.2	12	5.5
Single 10	—	—	9.88	251	21.75	552	—	—	16.56	420	26.20[1]	665	11.20	284	7	3.2	13	6.0
Single 12	—	—	11.88	302	26.81	681	—	—	18.56	471	32.67[1]	830	12.04	306	9	4.1	16	7.3
Single 14	—	—	13.88	353	30.00	762	—	—	21.43	544	36.59[1]	930	13.52	343	13	6.0	20	9.1
Dual 10	20.13	511	10.13	257	24.75	629	1.5	38	16.77	426	27.70	704	21.47	545	18	8.2	30	13.6
Dual 12	24.13	613	12.13	308	29.81	757	1.5	38	18.75	476	34.60	879	24.47	622	23	10.4	36	16.3
Triple 12	37.06	941	12.13	308	29.81	757	1.5	38	18.75	476	34.60	879	36.77	934	32	14.5	52	23.6
Quad 12	48.26	1226	12.13	308	29.81	757	1.5	38	18.75	476	34.60	879	48.65	1236	46	20.9	72	32.7
Dual 14	30.00	762	15.00	381	33.00	838	1.5	38	21.43	544	38.09	968	28.90	734	37	16.8	50	22.7
Triple 14*	45.00	1143	15.00	381	33.00	838	1.5	38	21.43	544	38.09	874	42.27	1074	50	18.2	70	31.8
Quad 14*	60.00	15.24	15.00	381	33.00	838	1.5	38	21.43	544	38.09	874	57.13	1452	74	33.6	100	45.4

1. For this valve's flanged measurement, add 1.5" for single or 3.0" for double flanged.
* indicates outer dimension **indicates maximum for valve type (some configurations may be smaller)

NOTES:

1. Leave 14" (356 mm) access space to all electronic controls.
2. Single valve circular flange dimensions are in the *Flanges for Single Body Valves* Product Data Sheet.
3. Dimensions given are accurate to ±0.13" (3 mm).
4. Triple and quad valve units are shipped as single and dual valves. Field assembly is required.
5. Slip type flange material is 20 ga. galvanneal with powder coating.
6. Valves need no additional straight runs before or after valve. However, as identified by dimension F above, the shaft needs up to 9.0" (229 mm) of unobstructed space in the duct on the inlet side of the valve in the maximum flow position.
7. Weights given are approximate and listed for reference only. For shipping, add 6 lbs. (2.7 kg) for singles and duals; 12 lbs. (5.4 kg) for triples and quads.
8. Linkages for NO valves and some NC valves must be connected by installer (pneumatic valves).
9. E clip supplied for CxV adjustment mechanism. Must be inserted by installer (see Figure 2 next page).
10. Dimensions do not account for valves with 3/8" (9.5 mm) insulation.
11. Refer to the installation instructions on the next page for additional details.
12. The 14-inch valve is not available with a pneumatic actuator at this time.

OSHPD Certified

Phoenix Controls Accel II valves (except cage rack valves) are 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.

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INSTALLATION

1. Read all instructions completely prior to installing valves.
2. Check that tag number on valve label matches HVAC schedule.
3. Verify correct airflow direction and orientation of the valve in the ductwork (e.g., horizontal). NOTE: Valves mounted out of horizontal or vertical position (as determined by a level) will affect valve performance.
4. Allow a minimum of 14 in. (356 mm) of free unobstructed space around the valve for access. In general, the valve may be installed in a 360° rotation. However, single body horizontal hood valves should be installed so that the pivot arm (see Fig. 1 and 4) is located between 8 and 4 o'clock (not within 4 to 8 o'clock).
5. Allow 9.0" (229 mm) of unobstructed space in the duct on the valve's inlet side for the shaft to reach the maximum flow position.
6. Linkage Connection—Many valves require field connection of pivot arm (see Figs. 1 and 2).
7. For multiple valves, assemble the valve sets on the floor using duct sealant and fasteners (see Fig. 3). Slip L style mating piece onto valve flange.
8. Use duct sealant on all valve/duct connections (or flange gaskets for circular flanges).
9. Install a hanger stock to support the ductwork within 12 in. (305 mm) of the valve connection. Install valve by sleeving it into the duct after the hanger stock is in place.
10. Follow the appropriate installation diagram (see Fig. 5). NOTE: Screws, fasteners, duct sealant, hanger stocks, companion flanges, and gaskets are not provided by Phoenix Controls.
11. Duct work should be free of construction debris so as not to damage valve internals.

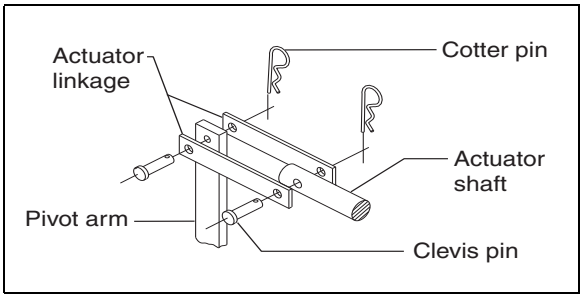


Fig. 1 Linkage connection for normally closed pneumatic valves (normally open valves similar).

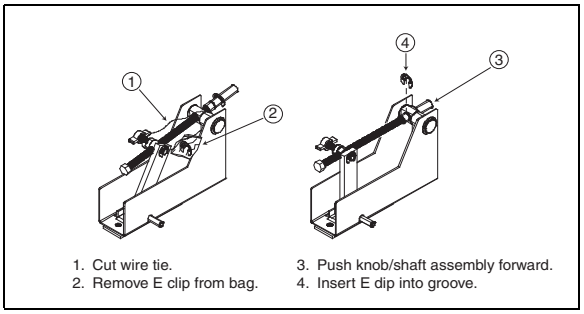


Fig. 2 Constant volume valves.

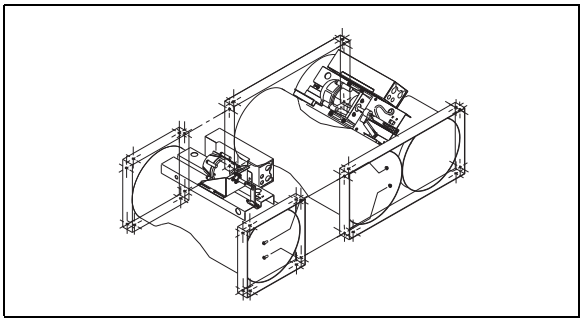


Fig. 3 Points for fastening multiple assemblies.

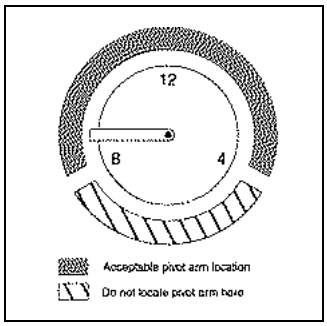


Fig. 4 Pivot arm orientation installed.

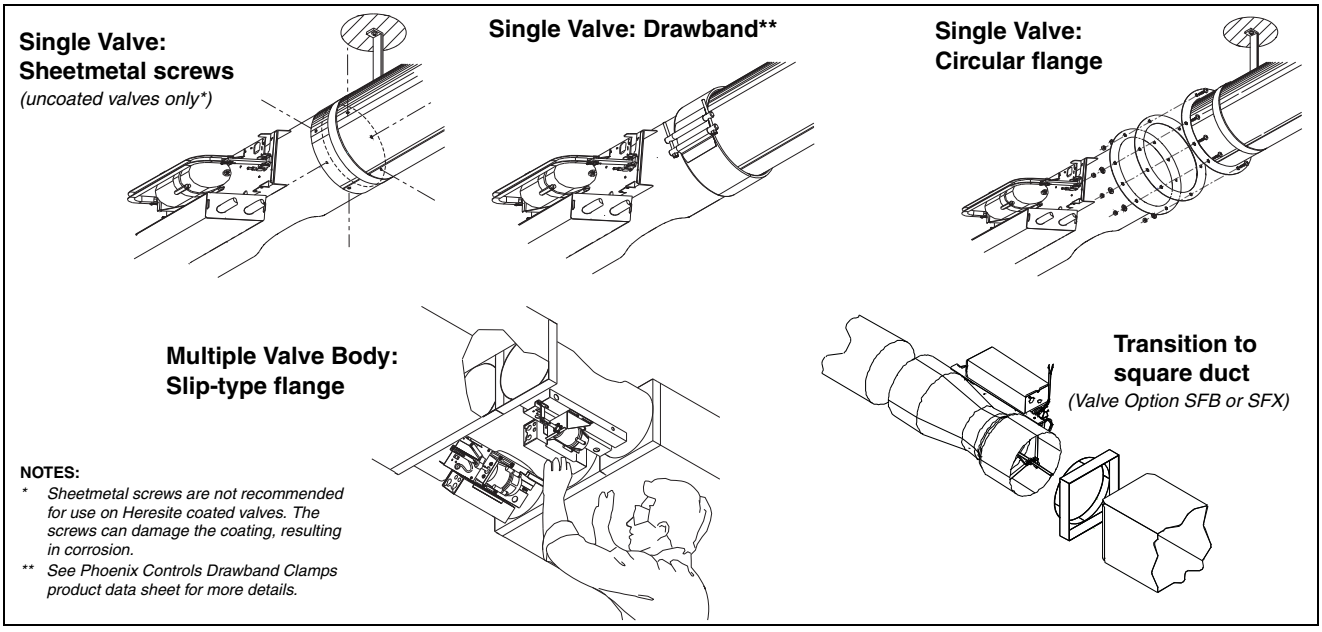
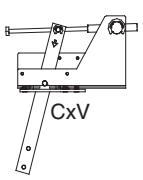
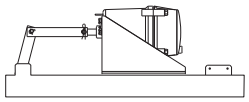


Fig. 5 Valve installation methods.

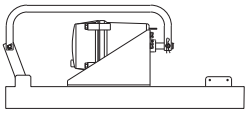
VALVE FAMILY CONTROL TYPES



CxV



PSV/BSV-pneumatic
normally closed



PEV/BEV-pneumatic
normally open

MAV-pneumatic
normally closed

EXV-pneumatic
normally open

MAV-electric normally closed
or EXV-electric normally open

MAINTENANCE

Accel II valves require no ongoing preventive maintenance. Once the field engineer has completed the field startup, the valves will provide years of continuous operation.

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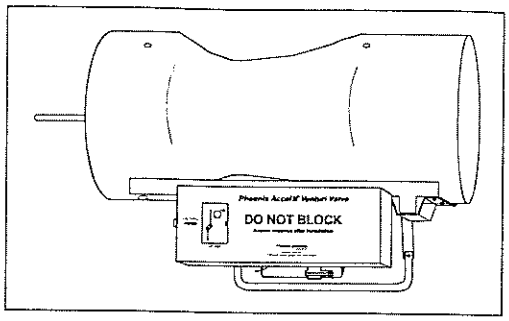
Phoenix Controls Corporation

MEDIUM-PRESSURE ACCEL® II VENTURI VALVES: OVERVIEW

Phoenix Controls Accel® II Venturi Valves combine a mechanical, pressure-independent regulator with a high-speed position/airflow controller to meet the unique requirements of airflow control. These valves can be used in constant volume, two-position, or VAV applications—all designed to maximize flow performance while reducing related noise. Valves for VAV applications may be either electrically or pneumatically actuated.

- **Pressure-independent operation**—All valve types include an immediate response mechanical assembly to maintain airflow set point as duct static pressure varies.
- **Airflow control**—By positioning the flow rate controller assembly, the airflow can be adjusted.



Accel® II valve (VAV pneumatic unit shown).

Accel II valves are available in:

- VAV (EXV/MAV series) with VAV closed-loop feedback control with pneumatic for fume hood applications or low-speed electric actuation for tracking pair applications
- **Constant volume** (CVV series) for maintaining an airflow set point under variable static pressure conditions
- **Two-position** (PEV/PSV series) for high/low flow control (pneumatic only)
- **Base upgradable** (BEV/BSV series) for pneumatic or fixed flow control with feedback option and upgradability to VAV (pneumatic only)

OPERATION

Airflow Volume Controller Types

Variable Air Volume (VAV) (EXV/MAV series)

For VAV closed-loop feedback control of fume hood and modulating airflow applications. Available with either digital (Celeris or analog controls).

- **Celeris**—The Celeris LonWorks based valve controller (LVC) utilizes distributed control architecture to perform all critical room control functions. This LVC offers the power and flexibility of a conventional room control system but in a more streamlined, cost-effective manner. Celeris can operate as either a standalone or fully integrated control system. Available in pneumatic, high-speed or low-speed electric actuation.
- **Analog**—The analog-based valve controller provides the conventional control solution for critical environments. Available with either pneumatic or high-speed electric actuation.

Constant Volume, Two-position and Base Upgradable

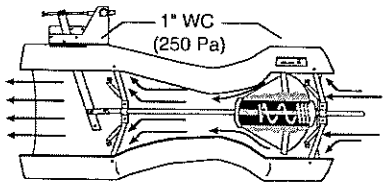
For two-position and fixed, field adjustable flow controls. Base upgradable includes optional electric flow verification and upgrading to VAV type valve.

- **Constant volume**—The valve's shaft/cone assembly is locked into the specific position required to provide the scheduled airflow via factory calibration.
- **Pneumatic**—Switched pneumatic air is applied to the valve's actuator. This positions the shaft/cone assembly to two distinct airflows. Mechanical clamps assure precise minimum and maximum airflows via factory calibration.
- **Base upgradable/pneumatic**—Switched or varying pneumatic air is applied to the valve's actuator. A feedback potentiometer linked to the shaft is provided for optional flow verification and upgrading to a VAV-type valve.

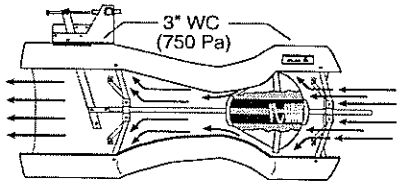
Pressure-independent Controller

All valves maintain a fixed flow of air by adjusting to changes in static pressure. Each valve has a cone assembly with a spring designed to compensate for changes in duct pressure.

When there is low static pressure, less force is applied to the cone, which causes the spring within the cone to expand.



As static pressure increases force on the cone, the spring compresses and the cone moves into the venturi to maintain set flow.



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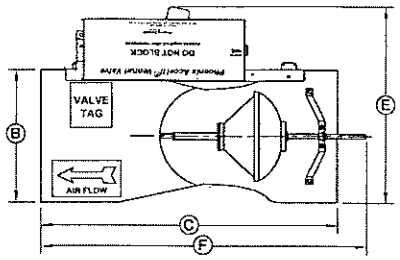
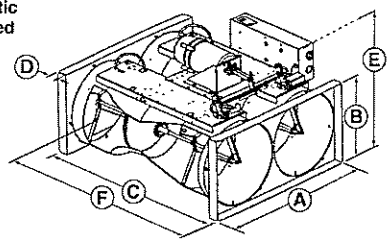
DIMENSIONS AND WEIGHTS

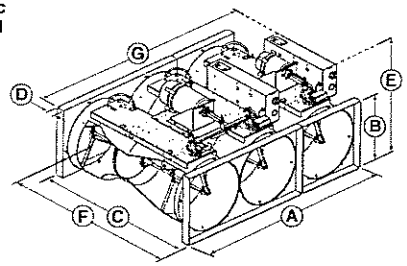
Single
(EXV-electric)



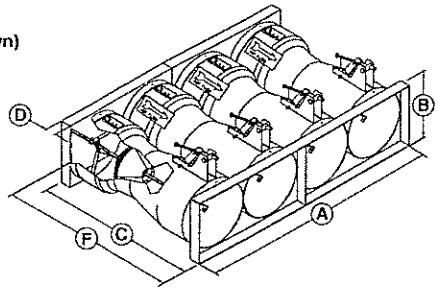
Dual
(MAV-pneumatic normally closed shown)



Triple
(MAV-pneumatic normally closed shown)



Quad
(CVV shown)



	A*		B*		C		D		E**		F		G		Weight (CVV valves)		Weight (all others)	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs	kg	lbs	kg
8	—	—	7.88	200	23.50	597	—	—	14.13	359	28.00	711	10.13	257	7	3.2	12	5.5
10	—	—	9.67	246	21.75	552	—	—	16.13	410	26.20	665	11.20	284	7	3.2	13	6.0
12	—	—	11.84	301	26.81	681	—	—	18.13	461	32.56	827	12.13	308	9	4.1	16	7.3
14	—	—	13.88	353	30.00	762	—	—	21.43	544	38.09	968	13.52	343	13	6.0	20	9.1
2-10	20.13	511	10.13	257	24.75	629	1.5	38	16.77	426	27.70	704	21.52	547	18	8.2	30	13.6
2-12	24.13	613	12.13	308	29.81	757	1.5	38	18.75	476	34.60	879	24.76	629	23	10.4	36	16.3
3-12	37.06	941	12.13	308	29.81	757	1.5	38	18.75	476	34.60	879	36.77	934	32	14.5	52	23.6
4-12	48.26	1226	12.13	308	29.81	757	1.5	38	18.75	476	34.60	879	48.65	1236	46	20.9	72	32.7
2-14	30.00	762	15.00	381	33.00	838	1.5	38	21.43	544	38.09	968	28.90	734	37	16.8	50	22.7
3-14*	45.00	1143	15.00	381	33.00	838	1.5	38	21.43	544	38.09	874	42.27	1074	40	18.2	70	31.8
4-14*	60.00	15.24	15.00	381	33.00	838	1.5	38	21.43	544	38.09	874	57.13	1452	74	33.6	100	45.4

*outer dimension **maximum of all valve types (some configurations may be smaller)

NOTES:

1. Leave 14" (356 mm) access space to all electronic controls.
2. Single valve circular flange dimensions can be found in the *Flanges for Single Body Valves* Product Data Sheet.
3. Dimensions given are accurate to ±0.13" (3 mm).
4. Triple and quad valve units are shipped as single and dual valves. Field assembly is required.
5. Slip type flange material is 20 ga. galvanneal with powder coating.
6. Valves need no additional straight runs before or after valve. However, as identified by dimension F above, the shaft needs up to 6.75" (171 mm) of unobstructed space in the duct on the inlet side of the valve in the maximum flow position.
7. Weights given are approximate and listed for reference only. For shipping, add 6 lbs. (2.7 kg) for singles and duals; 12 lbs. (5.4 kg) for triples and quads
8. Linkages for NO valves and some NC valves must be connected by installer (pneumatic valves).
9. "E" clip supplied for CVV adjustment mechanism. Must be inserted by installer (see Figure 2 on the next page).
10. Dimensions do not account for valves with 3/8" (9.5 mm) insulation.
11. Refer to the installation instructions on the next page for additional details.
12. The 14-inch valve is not available with a pneumatic actuator at this time.

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INSTALLATION

1. Read all instructions completely prior to installing valves.
2. Check that tag number on valve label matches HVAC schedule.
3. Verify correct airflow direction and orientation of the valve in the ductwork (e.g., horizontal). NOTE: Valves mounted out of horizontal or vertical position (as determined by a level) will affect valve performance.
4. Allow a minimum of 14 in. (356 mm) of free unobstructed space around the valve for access. In general, the valve may be installed in a 360° rotation. However, single body horizontal hood valves should be installed so that the pivot arm (see Fig. 1 and 4) is located between 8 and 4 o'clock (not within 4 to 8 o'clock).
5. Allow 6.75" (171 mm) of unobstructed space in the duct on the valve's inlet side for the shaft to reach the maximum flow position.
6. Linkage Connection—Many valves require field connection of pivot arm (see Figs. 1 and 2).
7. For multiple valves, assemble the valve sets on the floor using duct sealant and fasteners (see Fig. 3). Slip L style mating piece onto valve flange.
8. Use duct sealant on all valve/duct connections (or flange gaskets for circular flanges).
9. Install a hanger stock to support the ductwork within 12 in. (305 mm) of the valve connection. Install valve by sleeving it into the duct after the hanger stock is in place.
10. Follow the appropriate installation diagram (see Fig. 5). NOTE: Screws, fasteners, duct sealant, hanger stocks, companion flanges, and gaskets are not provided by Phoenix Controls.

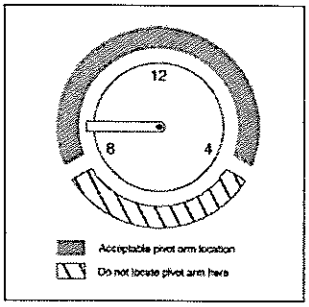

Fig. 4 Pivot arm orientation installed.

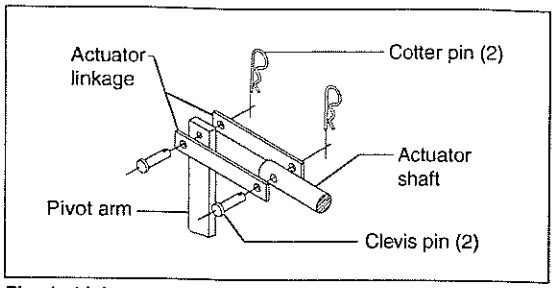

Fig. 1 Linkage connection for normally closed pneumatic valves (normally open valves similar).

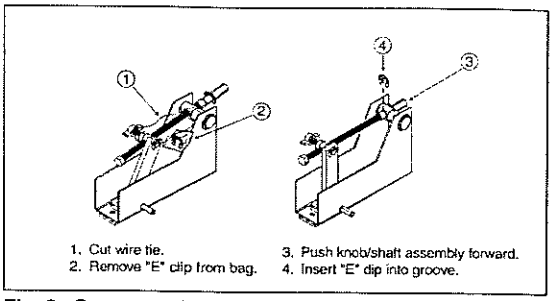

Fig. 2 Constant volume valves.

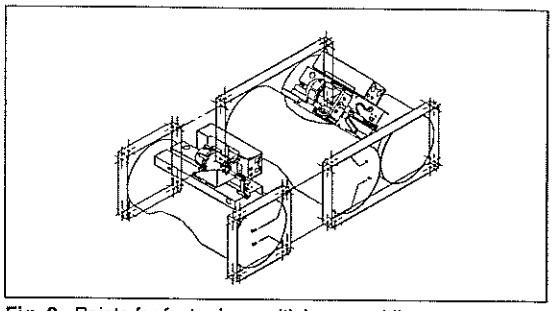

Fig. 3 Points for fastening multiple assemblies.

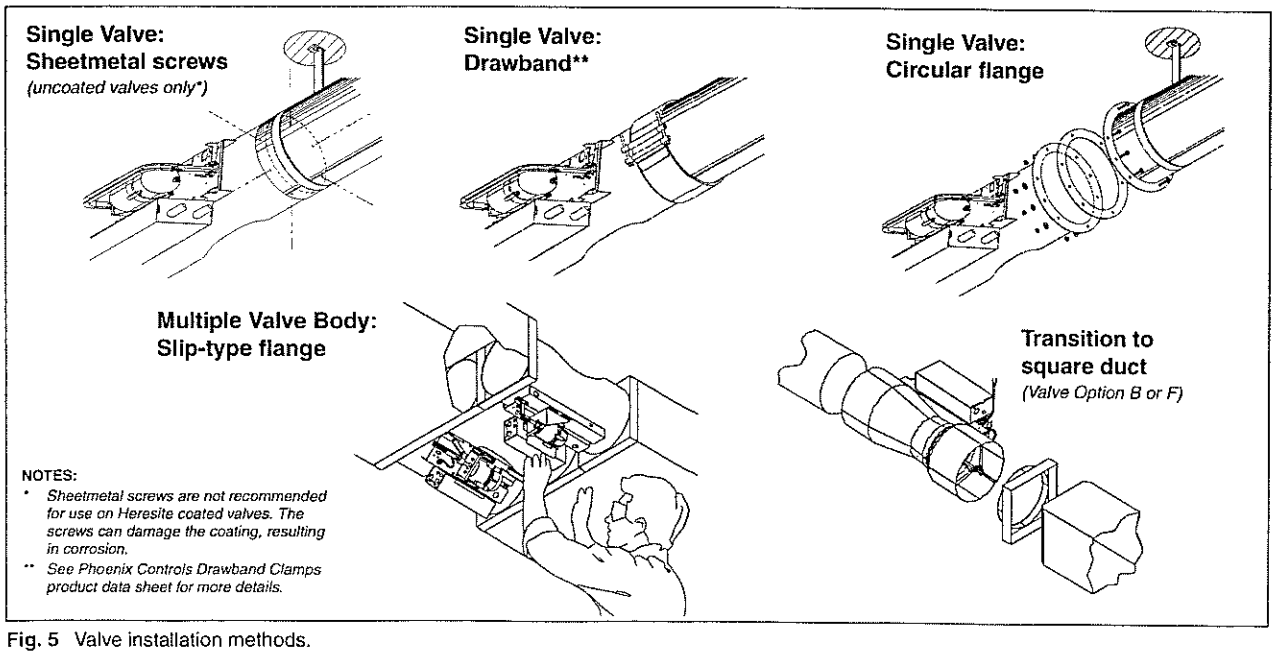

Fig. 5 Valve installation methods.

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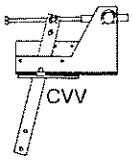
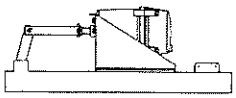
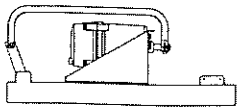
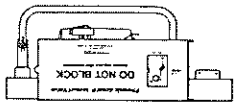
VALVE FAMILY CONTROL TYPES


CVV


PSV/BSV-pneumatic
normally closed


PEV/BEV-pneumatic
normally open

MAV-pneumatic
normally closed



EXV-pneumatic
normally open

MAV-electric normally closed
or EXV-electric normally open

MAINTENANCE

Accel II valves require no ongoing preventive maintenance. Once the field engineer has completed the field startup, the valves will provide years of continuous operation.

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