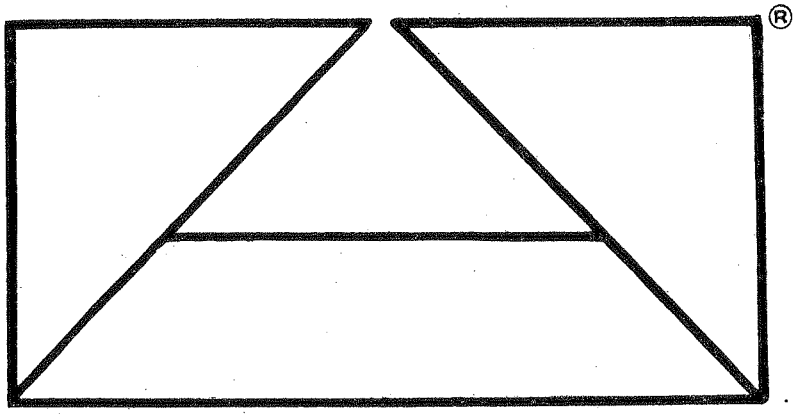
CATALOG
HV-MBI - 77

ANEMOSTAT®



INSTALLATION, BALANCING, MAINTENANCE

terminal boxes

ANEMOSTAT® ALL-AIR HIGH VELOCITY

SERIES
HV

TABLE OF CONTENTS

DCA

ANEMOSTAT PRODUCTS DIVISION/DYNAMICS CORPORATION OF AMERICA
888 NORTH KEYSER AVENUE / SCRANTON, PENNSYLVANIA 18501 / (717) 346-6586

HV

DUAL DUCT BOXES

CONSTANT VOLUME • VARIABLE VOLUME • MANUAL VOLUME

(1) DUAL INLET VALVES: Connected to a single thermostatically controlled pneumatic motor, limit leakage to less than 2% of nominal rated capacity at 6 inches W.G. Ps, right hand and left hand hot inlet units available, inlets can be reversed in field.

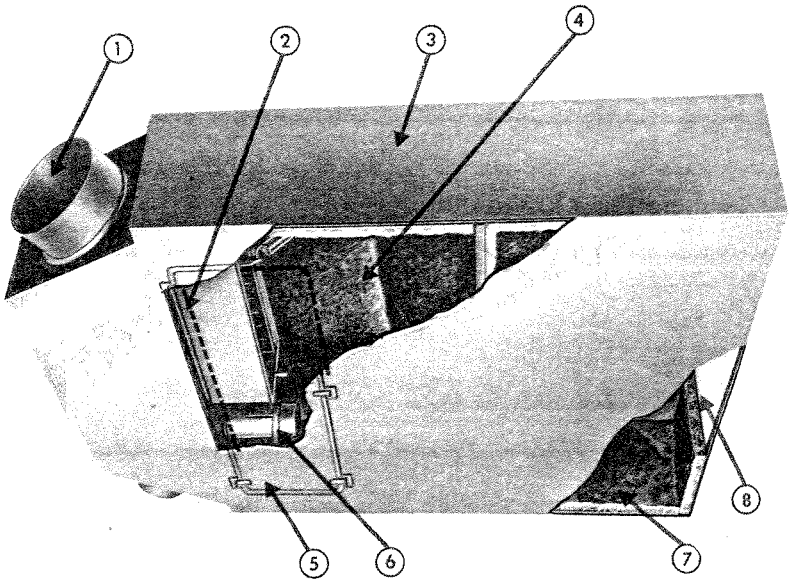
(2) VOLUME REGULATOR: Mechanical or Manual available.

- MANUAL VOLUME CONTROLLER: Construction of corrosion resistant steel, can be easily field set by external adjustment, handle located on side of box. (Type M)
- MECHANICAL VOLUME REGULATORS: Factory set for design CFM and can be field reset. Construction is of corrosion-resistant steel, extruded aluminum and stainless steel, requires no periodic lubrication or maintenance.

Four types of High Velocity Volume Regulators available:

- MCV – Mechanical Constant Volume – Maintains constant air flow to within ±5% from min Ps to 4" W.G. (Shown below). Regulator is equipped with an internal direct indicating CFM scale for field reset. Also available upon request for a higher pressure range of up to 8" W.G.
- VCV – Variable Constant Volume – Maintains ±5% of maximum volume setting from minimum Ps to 6" W.G. Regulator is reset pneumatically to a reduced volume, which is then held constant for variations in inlet static pressures to within ±5%. Reset limit is a volume reduction down to 40% of design or maximum volume adjustment.
- DCV – Dial Constant Volume – Same accuracy of volume control as VCV regulator. DCV permits external dial balancing of regulator by merely turning a dial on the bottom of the box.
- FCV – Fixed Constant Volume – Same basic regulator as DCV, but regulator can be field reset with an internal volume adjustment.

For more information on regulators, refer to ENGINEERING SECTION - VOLUME CONTROL.



(3) CASING: Corrosion-resistant coated steel casing, designed to maximize installation adaptibility, casing leakage less than 2% of nominal rated capacity at 1" internal static pressure.

(4) BAFFLES: Air mixing and Acoustical, designed to reduce box discharge sound level and aid in rapid mixing of hot and cold air.

(5) ACCESS DOOR: Fully gasketed, removal does not require special tools, large enough for inspection and regulator removal. Sizes 5 thru 8 are equipped with quick open snap locks, sizes 10 thru 16 are equipped with wing nuts.

(6) TEMPERATURE CONTROL PNEUMATIC OPERATOR: Operator supplied by Temperature Control Contractor, installed by Anemostat to insure proper operation of components. One (1) pneumatic operator required for temperature modulation of dual valves (shown above). If VCV regulator is used, additional operators required. Refer to ENGINEERING SECTION - VOLUME CONTROL.

(7) INSULATION: Acoustical-Thermal glass fiber insulation coated to prevent erosion. Meets requirements of NFPA Bulletin 90A.

(8) DISCHARGE: (Three types available)

- End discharge
- Diffuser discharge
- Octopus discharge

SINGLE DUCT BOXES

CONSTANT VOLUME • VARIABLE VOLUME • MANUAL VOLUME • REHEAT

HV

(1) SINGLE INLET: Single open inlet (Type O) for:
- Constant Volume Boxes
- Constant Volume Reheat Boxes
- Variable Constant Volume Boxes with or without reheat
- Manual Volume Control Boxes with or without reheat

Available with (Type S) shut-off valve in the single inlet for variable volume boxes with a constant volume high limit controller.

(2) VOLUME REGULATOR: Mechanical or Manual available.

- MANUAL VOLUME CONTROLLER: Construction of corrosion-resistant steel, can be easily field set by external adjustment, handle located on side of box. (Type M)

- MECHANICAL VOLUME REGULATORS: Factory set for design CFM and can be field reset. Construction is of corrosion-resistant steel, extruded aluminum and stainless steel, requires no periodic lubrication or maintenance.

Four types of High Velocity Volume Regulators available:

- MCV – Mechanical Constant Volume – Maintains constant air flow to within ±5% from min Ps to 4" W.G. Regulator is equipped with an internal direct indicating CFM scale for field reset. Also available upon request for a higher pressure range of up to 8" W.G.
- VCV – Variable Constant Volume – Maintains ±5% of maximum volume setting from minimum Ps to 6" W.G. Regulator is reset pneumatically to a reduced volume, which is then held constant for variations in inlet static pressures to within ±5%. Reset limit is a volume reduction down to 40% of design or maximum volume adjustment.
- DCV – Dial Constant Volume – Same accuracy of volume control as VCV rgeulator, DCV permits external dial balancing of regulator by merely turning a dial on the bottom of the box.
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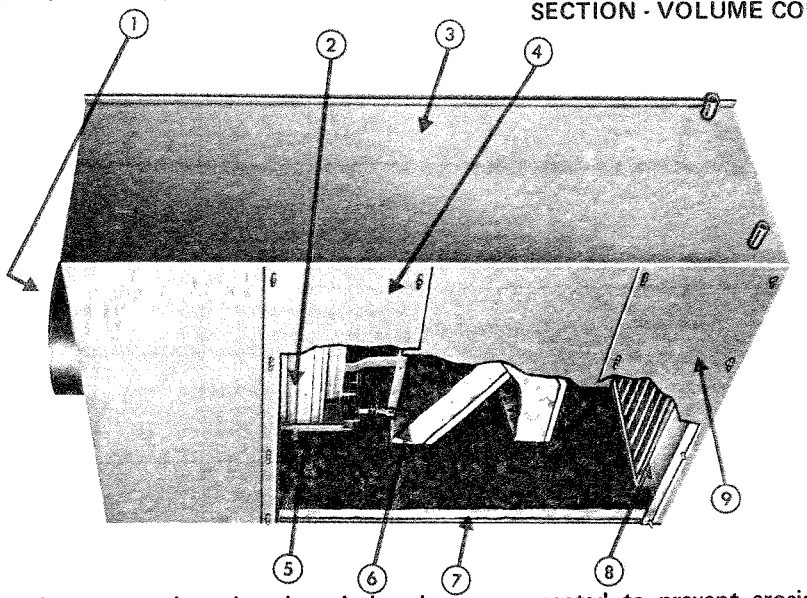
For more information on regulators, refer to ENGINEERING SECTION - VOLUME CONTROL.



(3) CASING: Corrosion-resistant coated steel casing, designed to maximize installation adaptibility, casing leakage less than 2% of nominal rated capacity at 1" internal static pressure.

(4) ACCESS DOOR: Fully gasketed, removal does not require special tools, large enough for inspection and regulator removal. Sizes 5 thru 8 are equipped with quick open snap locks, sizes 10 thru 16 are equipped with wing nuts.

(5) VARIABLE VOLUME PNEUMATIC OPERATOR: Operator supplied by Temperature Control Contractor, installed by Anemostat to insure proper operation of components. Pneumatic operators required on single duct units utilizing VCV regulators or Type S inlets.

Refer to ENGINEERING SECTION - VOLUME CONTROL.

(6) BAFFLES: Air Equalization and Acoustical, designed to reduce box discharge sound level and aid in velocity equalization of discharge air.

(7) INSULATION: Acoustical-Thermal glass fiber insulation coated to prevent erosion. Meets requirements of NFPA Bulletin 90A.

(8) DISCHARGE: (Three (3) types are available)
- End discharge
- Diffuser discharge
- Octopus discharge

(8) HOT WATER COIL: Seamless copper tubing with aluminum fins, standardly available in 1 or 2 row configurations, factory installed for right or left hand water connections. Coils are mounted internal to box for superior protection during transit.

Refer to ENGINEERING SECTION - HOT WATER COILS.

(8) ELECTRIC RESISTANCE COIL: Available, field installed on box, mounted externally at the end-discharge opening to allow complete access.

(9) HOT WATER COIL ACCESS DOOR: Boxes utilizing Hot Water Coils are supplied with a full width access door directly below coil to facilitate inspection, cleaning and/or removal of hot water coil. Access door is removable without use of special tools.

VOLUME CONTROL

MECHANICAL CONSTANT VOLUME REGULATORS

ANEMOSTAT Mechanical Volume Regulators provide an automatic volume control for single and dual duct, high and medium velocity air distribution systems. Air systems equipped with boxes incorporating these regulators maintain desired air quantities at each unit, regardless of load variations or load levels in adjacent areas.

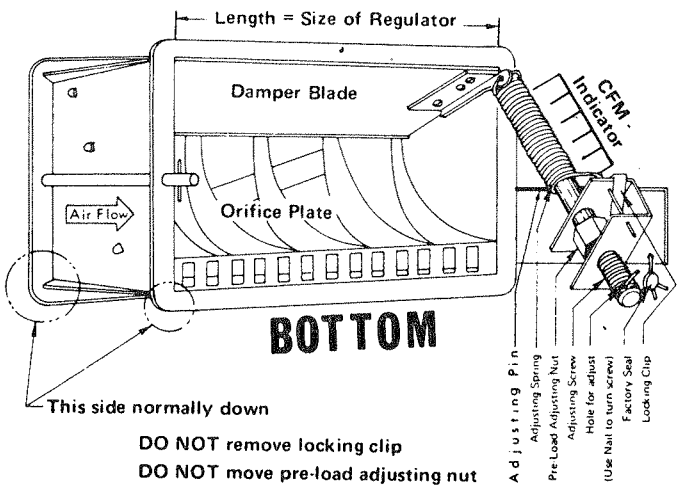
The Mechanical Volume Regulators (or self-contained automatic air volume regulators) are simple, spring-actuated volume controllers that are powered by the energy within the moving air stream. They require no outside power source or sensing elements. They maintain output constant within ±5% of the required air volume regardless of inlet pressure variations from mnimum Ps to maximum catalogued Ps.

All ANEMOSTAT Mechanical Volume Regulators are factory set for desired air flow rate and can be reset in the field. Their construction incorporates the use of corrosion-resistant steel, aluminum and stainless steel to offer years of trouble-free operation. They are designed such that they require no periodic maintenance or lubrication.

Two basic regulator designs are utilized in ANEMOSTAT High Velocity and Medium Velocity equipment, the MCV and the VCV.

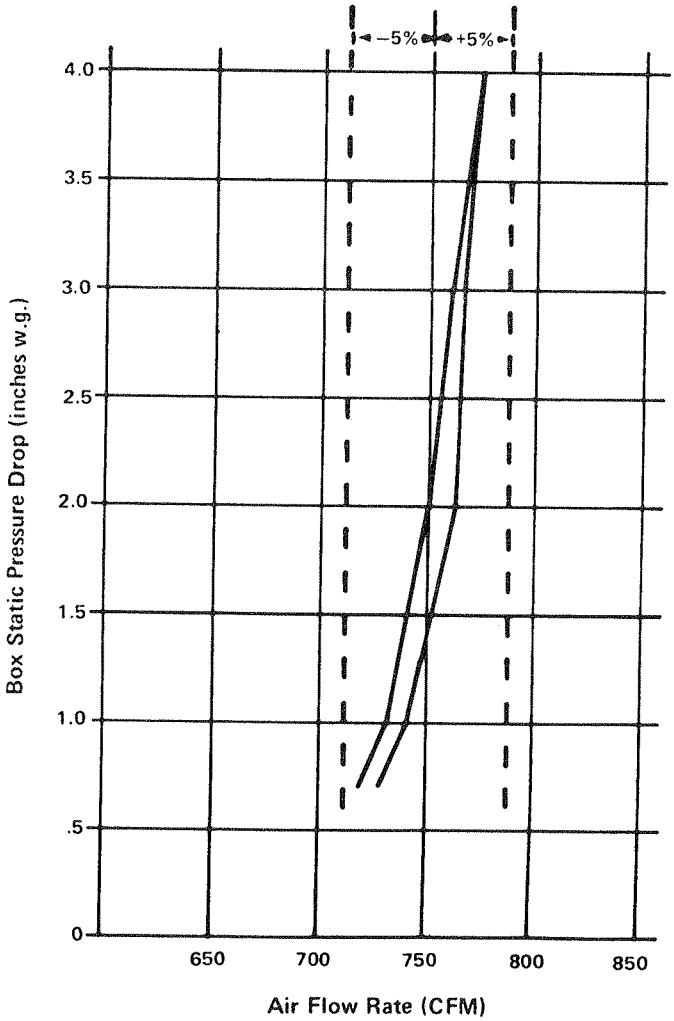
- MCV – Mechanical Constant Volume Regulator is comprised of an orifice, damper blade, damper housing, spring and an adjustment screw. The MCV is shown in FIGURE: 1. It is a unique non-corrosive all-metal device having only one moving part – an extruded aluminum damper blade mounted on a shaft with nylon bearings which require no lubrication.

FIGURE: 1 MCV REGULATOR



Against minimum inlet pressures, the spring holds the blade in the wide open position. As the air flow tries to increase due to a rise in inlet pressure, the blade is gradually forced toward the closed position against the spring pressure, thus maintaining constant air flow volume. Each device is calibrated at the factory to maintain constant air flow within ±5% over the inlet static pressure range from minimum to 4" W. G. A typical test curve of volume control for the MCV volume regulator is shown in FIGURE: 2. (To meet special needs due to unusual circumstances, ANEMOSTAT offers Constant Volume Regulators which operate against inlet pressures up to 8" W. G.).

FIGURE: 2 VOLUME CONTROL CURVE
HVE-8-C WITH 28" MCV



VOLUME CONTROL

MECHANICAL CONSTANT VOLUME REGULATORS

MCV Regulators are equipped with a direct indicating CFM scale on each regulator to facilitate readjustment in the field, if there are changes in load, occupancy or field conditions which require it.

Shown in TABLE: 1 are the capacity ranges of the MCV Regulators as employed in the HV Boxes.

TABLE: 1 CAPACITY RANGE OF MECHANICAL CONSTANT VOLUME REGULATOR - TYPE MCV

BOX TYPE AND SIZE	BOX MAXIMUM CFM RANGE	REGULATOR SIZE & STANDARD BOX CFM RANGE							
		4S	4	8	12	18	28	18T	28T
HV*-5-C	80-325	80-109	110-174	175-300					
HV*-6-C	175-500			200-299	300-500				
HV*-7-C	300-750				300-449	450-750			
HV*-8-C	450-1050					450-749	750-1050		
HV**-10-C	700-1500					700-749	750-1049	1050-1500	
HV**-12-C	900-2100							1000-1499	1500-2100
HV**-14-C	1500-3600	REFER TO TABLE: 2, FCV REGULATORS							
HV**-16-C	2600-5000	REFER TO TABLE: 2, FCV REGULATORS							
STANDARD REGULATOR RANGE		80-110	110-175	175-325	300-500	450-750	750-1050	900-1500	1500-2100

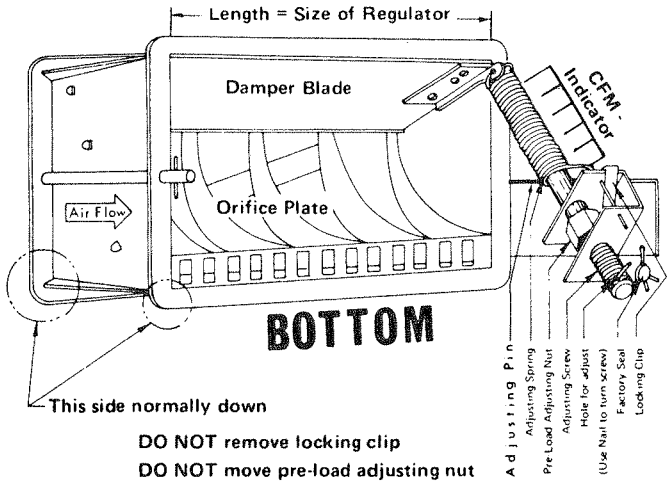
* - E, D, O or R

** - E or R

The boxes designated as medium velocity (MVE, MVD, MVO and MVR) incorporate the basic MCV Regulator with an alteration in the spring used in the regulation of the valve. The medium velocity version is factory calibrated to maintain constant air flow over an inlet static pressure range from minimum (approximately 0.35" W.G.) to 2" W.G. Due to the lower dynamic energy levels available in a medium velocity low pressure air stream, volume control accuracy closer than ±10% over the full dynamic pressure, velocity and modulation range should not be expected.

The MCV has been utilized in ANEMOSTAT Boxes since 1958 and it offers years of satisfactory, service-free operation to a building owner, simplified balancing to the Contractor and a controlled air volume output for the design Engineer.

FIGURE 3: HOW TO RESET THE MECHANICAL CONSTANT VOLUME REGULATOR



4"S MCV 4" MCV 8" MCV 12" MCV

18" MCV 28" MCV 18T MCV 28T MCV

A. Remove the factory-set wire seal.

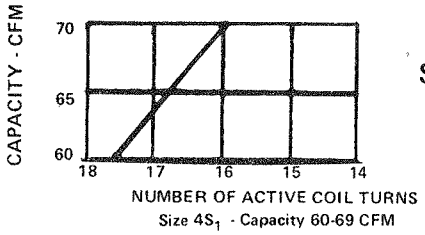
B. With a nail or small Allen wrench, change the regulator spring setting by turning the adjusting screw until the red end of the adjusting pin points to the required cfm on the cfm scale plate.

C. Label device indicating new capacity and date reset.

D. As this Mechanical Constant Volume Regulator has been factory set, once the seal is broken, the guarantee on the factory setting is no longer valid, but a close approximation of air flow may be obtained by using these procedures.

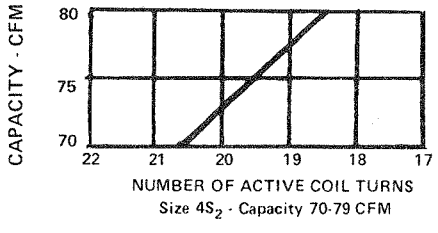
MCV VOLUME ADJUSTMENTS

(MECHANICAL CONSTANT VOLUME)



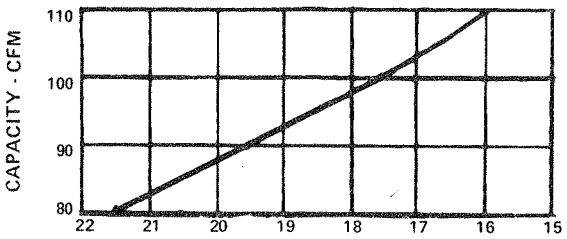
Size $4S_1$ - Capacity 60-69 CFM

SIZE
$4S_1$



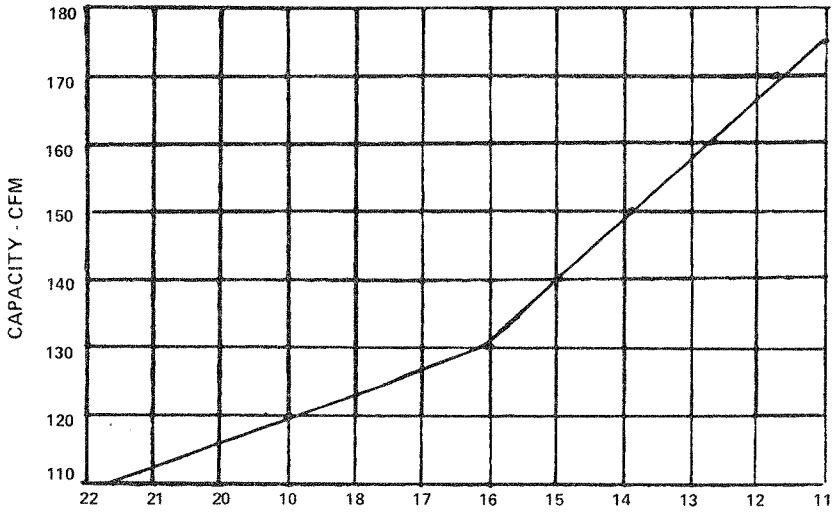
Size $4S_2$ - Capacity 70-79 CFM

SIZE
$4S_2$



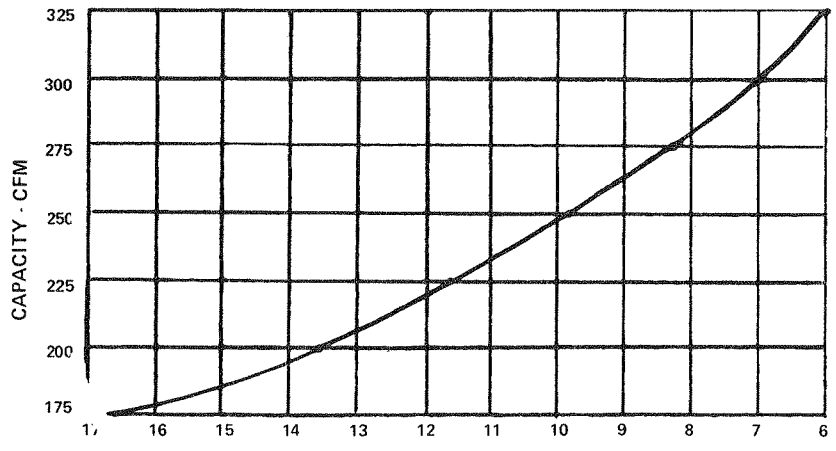
Size $4S_3$ - Capacity 80-110 CFM

SIZE
$4S_3$



Size 4" - Capacity 110-175 CFM

SIZE
4"

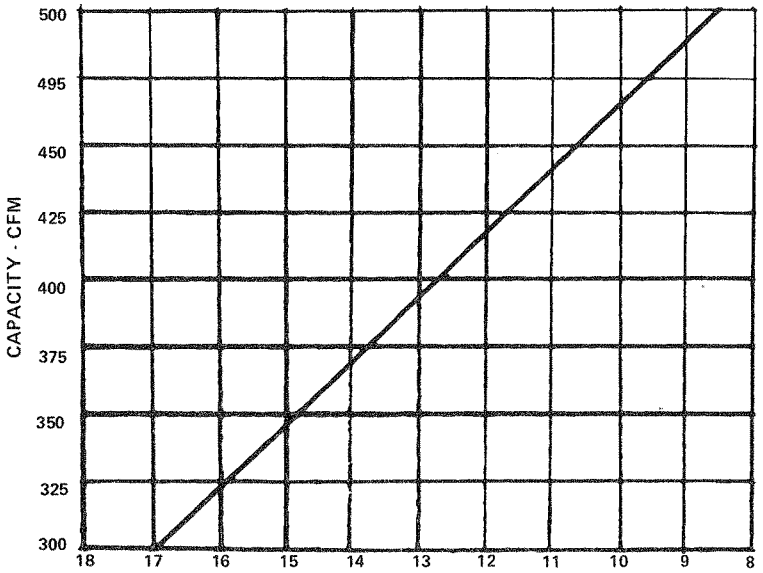


Size 8" - Capacity 175-325 CFM

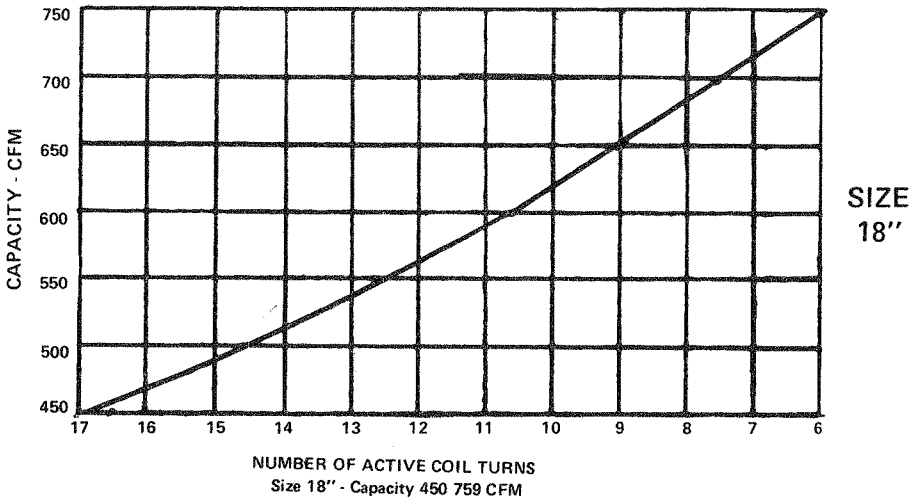
SIZE
8"

MCV VOLUME ADJUSTMENTS

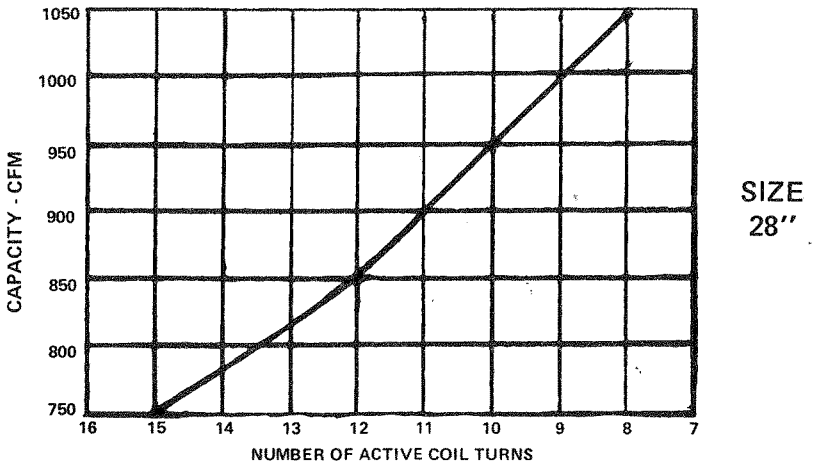
(MECHANICAL CONSTANT VOLUME)



Size 12" - Capacity 300-500 CFM



Size 18" - Capacity 450 759 CFM



Size 28" - Capacity 750-1050 CFM

CAPACITY RANGE (cfm) OF MECHANICAL CONSTANT VOLUME UNITS
@HIGH STATIC PRESSURE

Refer to High Velocity Catalog for capacities, pressure drop, and sound data of Anemostat Mechanical Constant Volume Units.

Mechanical Constant Volume units require the minimum static pressure shown in High Velocity Catalog to operate the Constant Volume Regulator. Minimum pressure is approximately .75" w.g., depending upon the type of unit and the air quantity required.

When selected on the basis of information contained in High Velocity Catalog, these factory-calibrated units maintain constant air volume within ± 5 per cent of the selected capacity with the inlet static pressure ranging from the minimum pressure to 4" w.g.

However, use of these units is not restricted to a maximum inlet static pressure of 4" w.g. Air delivery as a function of inlet static pressure for Mechanical Constant Volume Regulators is shown in Figure 4 below. The maximum range of inlet static pressure within which the units maintain delivery within ± 5 per cent of capacity can also be found in Figure 4 below. Above this pressure range, the tolerance of ± 5 per cent is exceeded.

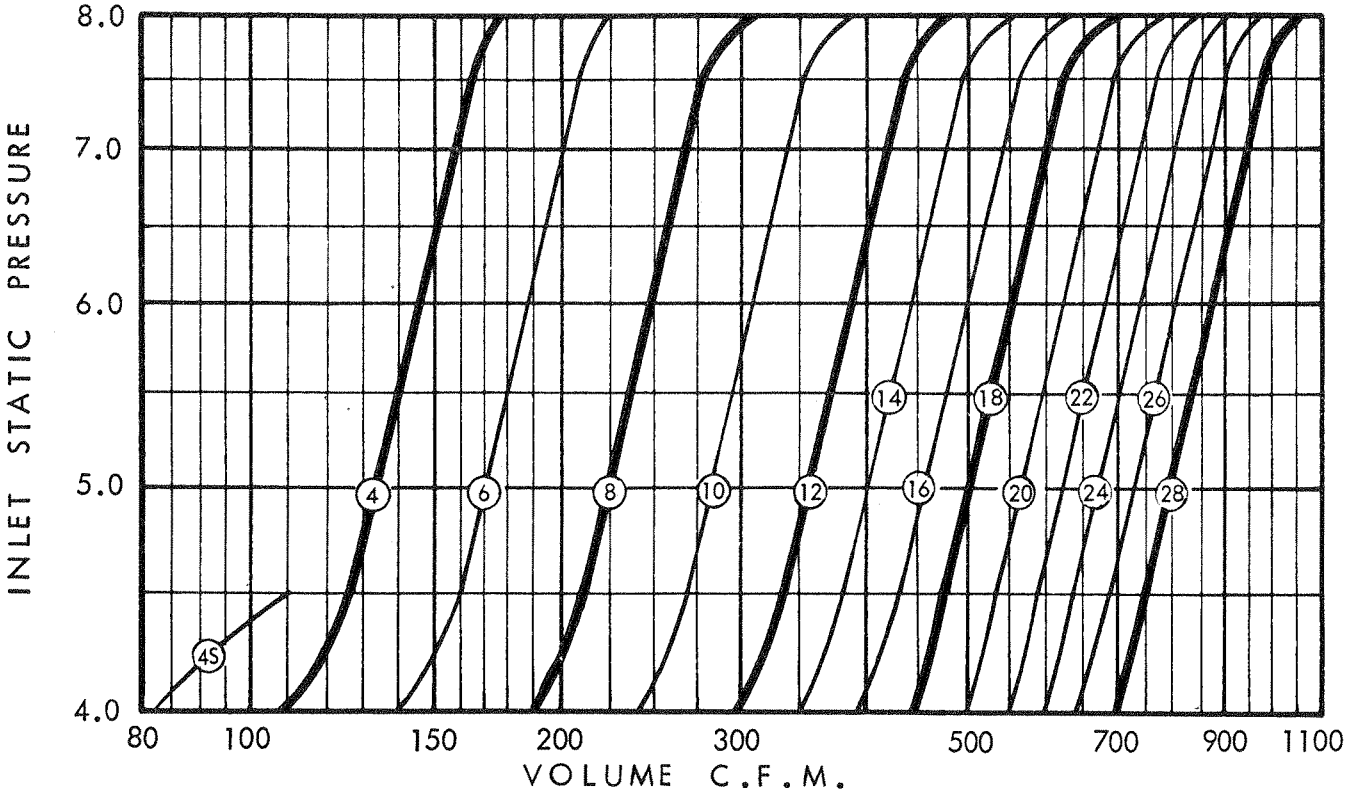


Figure 4. Air Delivery as a Function of Inlet Static Pressure for Mechanical Constant Volume Regulator

The following examples illustrate the use of the graph (Figure 4).

Example 1. A 12" Mechanical Constant Volume Regulator set at 400 cfm, and installed in either an HVE-6-C or HVE-7-C delivers 400 cfm, ± 5 per cent, with the inlet static pressure varying from minimum pressure to approximately 6.25" w.g.

Example 2. An 18" Mechanical Constant Volume Regulator set at 600 cfm, and installed in either an HVE-7-C or HVE-8-C delivers 600 cfm, ± 5 per cent, with the inlet static pressure varying from minimum pressure to 7" w.g.

Example 3. However, if an 18" unit is required to handle a capacity of only 550 cfm at the same pressure of 7" w.g., the regulator orifice must be partly blanked off in order to increase both the maximum and minimum pressures for correct air delivery.

Therefore, in all cases where the static pressure exceeds the values shown in the graph for a specific capacity, a regulator with blank-off baffle is required, and should be specified on the purchase order.

Mechanical Constant Volume Regulators are manufactured in 4, 8, 12, 18 and 28-inch sizes. Flow control orifices are in 2-inch increments. To obtain other than standard sizes, the following blank-off baffles must be installed:

Standard	28" MCV					18" MCV			12" MCV		8" MCV		4" MCV	
Special	28	26	24	22	20	18	16	14	12	10	8	6	4	4
# of baffles	0	1	2	3	4	0	1	2	0	1	0	1	0	1

To obtain Volume vs Inlet Static Pressure of blanked off Mechanical Constant Volume Regulators, refer to the graph (Figure 4). Standard sizes are indicated in bold lines. The volumes of special sizes are shown in table above and indicated by light lines in the graph (Figure 4).

All Mechanical Constant Volume units are factory set to discharge the air quantity specified in the purchase order. Therefore, under normal conditions, balancing of the units in the field by the contractor is unnecessary as balancing is accomplished in the design stage by factory calibration before the system is installed.

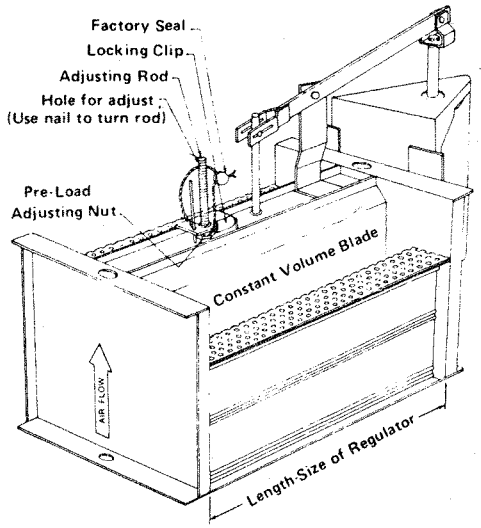
IMPORTANT NOTE: All unit adjustments are sealed to safeguard factory calibration.

ANEMOSTAT VARIABLE CONSTANT VOLUME MIXING BOX: HV-V SERIES

- VCV — Variable Constant Volume regulator is constructed of corrosion-resistant materials, coated steel and aluminum. The VCV with pneumatic operator for remote (or thermostat) reset is shown in FIGURE: 5. A sectional view of the regulators' orificing and volume control blades is shown in FIGURE: 6.

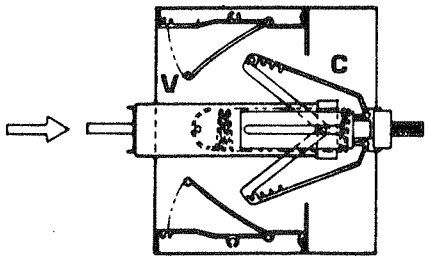
The regulator functionally is comprised of a pair of blades used for volume control (C), a pair of blades used to create a variable orifice (V), damper housing, a spring for volume control, a means of adjusting the volume setting, and a snubber dash-pot to eliminate valve pulsations.

FIGURE: 5 VCV REGULATOR WITH PNEUMATIC OPERATOR



DO NOT remove locking clip
DO NOT move pre-load adjusting nut

FIGURE: 6 SECTIONAL VIEW THRU VCV REGULATOR ORIFICING AND VOLUME CONTROL BLADES



The pair of volume control blades (C) are spring loaded. At minimum Ps the blades are lying in close proximity to the spring creating a large area thru which air can pass. As the inlet static pressure increases, blades (C) spread, decreasing the area for air to pass through, the spring controls the rate at which the area is closed down with increasing static pressure, such that the movement of the vanes is proportional to changes in inlet static pressure. These proportional changes maintain constant volume control within ±5% of set volume over the full range of inlet statics (minimum Ps to 6" W.G.). The air flow rate is factory balanced by adjusting the spring load. The VCV Regulator can be re-adjusted in the field, if there are changes in load, occupancy requirements or field conditions which require it.

The second pair of blades, (V) are adjusted by external means (Pneumatic operator or "Dial" control) to vary the orifice area. With blades (V) flush against the regulator frame, blades (C) function at their maximum set air volume. If the thermostat demands (or manual changes for "DCV") less air blades (V) are moved to form a smaller orificing area, blades (C) then function to hold a lower constant volume. At their maximum closure blades (V) form an orificing area such that blades (C) are holding a constant volume which may be down to 40% of the maximum set air volume.

There are three (3) variations of the VCV Regulator:

- VCV with pneumatic operator
- DCV - Dial Constant Volume
- FCV - Fixed Constant Volume

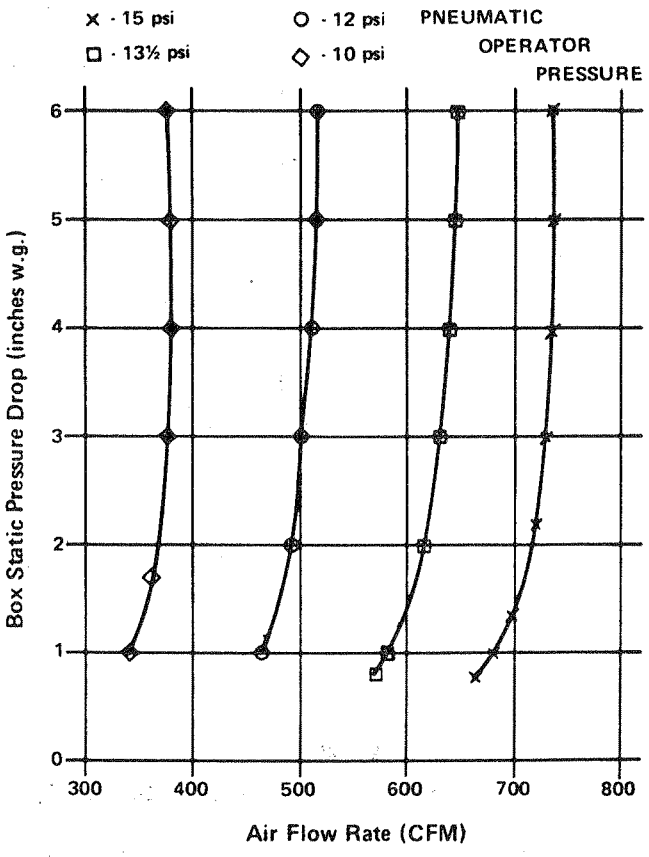
- VCV with pneumatic operator modulates from one constant volume setting to a second as signalled by either a thermostat or other remote means such as an air switch on an exhaust hood application. The VCV with pneumatic operator will allow the flow to be varied from 100% to 40% of its set capacity without changing the initial spring setting. For minimum flows other than 40%, i.e. (50-60-70 and 80%) retraction stops can be attached to the pneumatic operator shaft to limit "return stroke". Shown in FIGURE: 5 is a typical test curve for VCV with pneumatic operator set for 50% volume reduction. The VCV for pneumatic operation is standard with a linkage for a direct acting thermostat (O psi is minimum air flow). A linkage is available for use with a reverse acting thermostat.

The pneumatic operator is supplied by the temperature control contractor and installed by ANEMOSTAT to insure proper operation of components. Boxes with VCV sizes 5 thru 12 require one (1) pneumatic operator per box; box sizes 14 and 16 require two (2) pneumatic operators per box.

- DCV – Dial Constant Volume replaces the pneumatic operator on the VCV with a dial action which permits manual adjustment. This variation of the variable constant volume regulator permits Dial Balance at the box to reset the regulator from minimum to maximum air flow, by merely turning a dial on the bottom of the box. This sort of adjustment is made by the building engineer to adjust air flow setting to occupant's requirements.

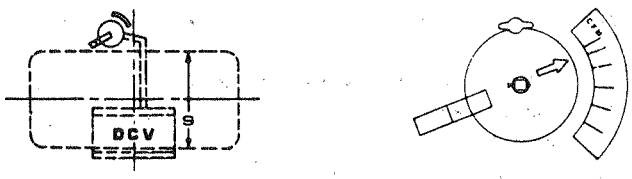
- FCV – Fixed Constant Volume – The resettable air flow vanes (V) in the VCV Regulator are fixed flush against the regulator frame. The resulting regulator is a mechanical constant volume regulator whose accuracy and volume control characteristics are similar to the VCV Regulator.

FIGURE: 7 VOLUME CONTROL CURVE
HVE-8-VO WITH 12" VCV
SET FOR 50% REDUCTION



The VCV, DCV and FCV Regulators may be used in any High Velocity (HV Type) Box including end discharge, octopus discharge and diffuser discharge configurations. They may also be used with Hot Water Coil or Electric Reheat Coil Boxes.

FIGURE: 8 DIAL CONSTANT VOLUME - DIAL CONTROL



NOTE: Multiple Regulators used for Dial Constant Volume Capacities above 2500 cfm, Maximum range of adjustment is 1500 cfm.

ANEMOSTAT VARIABLE CONSTANT VOLUME MIXING BOX: HV-V SERIES

Shown in TABLE 2: are the capacity ranges of the VCV, FCV and DCV Regulators as employed in the HV Boxes.

TABLE: 2 CAPACITY RANGE OF MECHANICAL VOLUME REGULATORS - TYPE VCV, FCV, DCV

BOX TYPE AND SIZE	BOX MAXIMUM CFM RANGE	REGULATOR SIZE AND STANDARD CFM RANGE						
		4S	4	8	12	18	23	23L
HV*-5-†	80-300	110-159	160-300					
HV*-6-†	160-500		160-299	300-500				
HV*-7-†	300-750			300-474	475-750			
HV*-8-†	475-1100				475-749	750-1100		
HV**-10-†	700-1500					700-1099	1100-1500	
HV**12-†	700-2500					1000-1099	1100-1499	1500-2500
HV**-14-†	1500-3600	(1-23L;1500-2500) : (1-23L + 1-18;2501-3600)						
HV**-16-†	2600-5000	(1-23L + 1-23;2600-4000) : (2-23L;4001-5000)						
STANDARD REGULATOR RANGE		110-159	160-300	300-500	475-750	700-1100	1100-1500	1500-2500

* - E, D, O or R
** - E or R
† - V, D, or F

VOLUME CONTROL — MANUAL VOLUME ADJUSTMENT

The ANEMOSTAT LV Boxes are equipped with (M) Manual Volume Dampers. Constructed of corrosion-resistant steel, they are easily field set by an external adjustment handle which is located on the side of the box.

For low pressures, single duct, fixed operating characteristic systems such as single duct reheat systems, boxes which incorporate Type (M) dampers offer economy of operation due to their low minimum static pressure requirements. Since dual duct systems are dynamic, provisions must be made to limit the variations in static pressure which take place at the boxes. Fluctuations in pressure which occur at the boxes will cause a corresponding fluctuation in air flow through the box.

With Type (M) volume dampers incorporated into the LV Boxes the inlet velocities should be held below 2000 fpm and anticipated pressure drop through the boxes should not exceed 1" W. G.

Single duct, HV Boxes can also be equipped with an (M) Type volume damper.

It should be noted that boxes with (M) Volume Dampers cannot be factory set and must be field adjusted.

VOLUME CONTROL — SHUT—OFF VALVE

Single duct boxes equipped with Type (S) inlet are furnished with a pneumatically operated inlet damper capable of throttling the air flow to shut-off. The Type (S) inlets shut-off with leakage of less than 2% of nominal rated air flow at 8" W.G.

For boxes requiring variable volume control down to zero air flow, the Type (S) inlet is incorporated into the HV and MV Single Duct Boxes. The Mechanical Constant Volume regulators in the HV and MV Boxes control the maximum design air flow constant when demand is for full volume; when less air is required, the (S) damper will modulate towards the closed position, overriding the constant volume controller and reduce the volume.

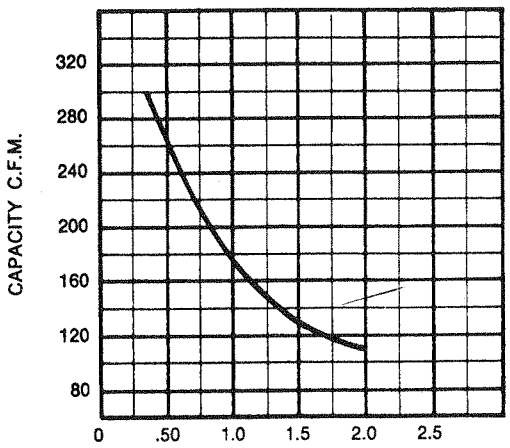
Boxes which incorporate the (S) valve (thermostatically controlled) are ideally suited to variable volume systems, where the load (lights, occupants and other heat sources) in the space is reduced to zero during night-time or week-end shut-down. These boxes (controlled by an air switch or electro-pneumatic relay) are also suited for use with exhaust air hood applications when intermittent make-up air is required.

Pneumatic operators for (S) inlets are supplied by the Temperature Control Contractor and installed by ANEMOSTAT to insure proper operation of components.

ANEMOSTAT VARIABLE CONSTANT VOLUME MIXING BOX:

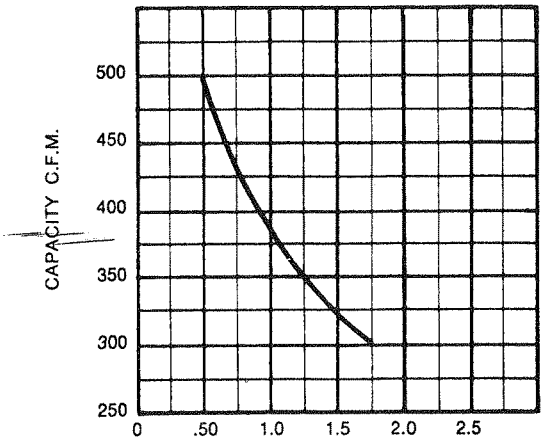
4" VCV 8" VCV 12" VCV 18" VCV 23" VCV 23L VCV

4" VCV



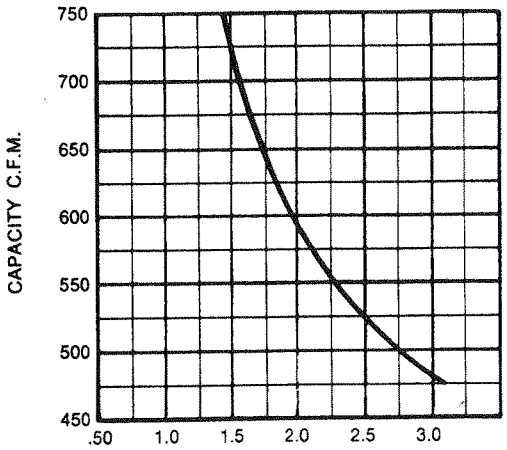
"T"—inches projection of adjusting rod
Capacity 110 cfm to 300 cfm

8" VCV



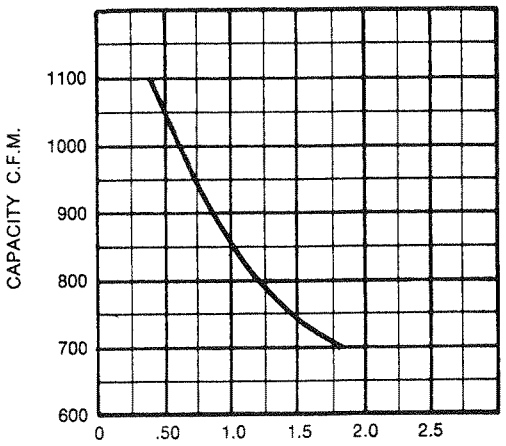
"T"—inches projection of adjusting rod
Capacity 300 cfm to 500 cfm

12" VCV



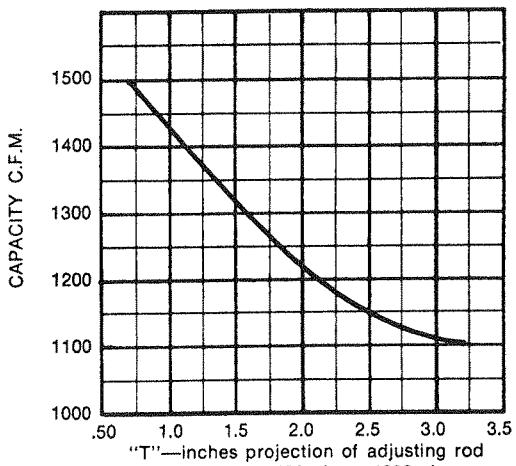
"T"—inches projection of adjusting rod
Capacity 475 cfm to 750 cfm

18" VCV



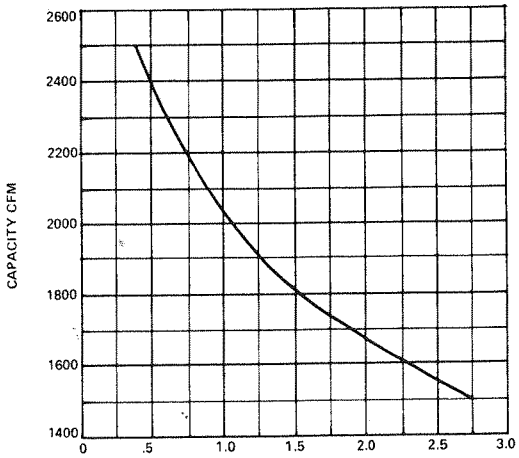
"T"—inches projection of adjusting rod
Capacity 700 cfm to 1100 cfm

23" VCV



"T"—inches projection of adjusting rod
Capacity 1100 cfm to 1500 cfm

23L" VCV



"T" – inches projection of adjusting rod
Capacity 1500 cfm to 2500 cfm

Variable Constant Volume Regulator, Capacity Calibration Charts

ANEMOSTAT VARIABLE CONSTANT VOLUME MIXING BOX:

4" VCV 8" VCV 12" VCV 18" VCV 23" VCV 23L VCV

VOLUME ADJUSTMENTS

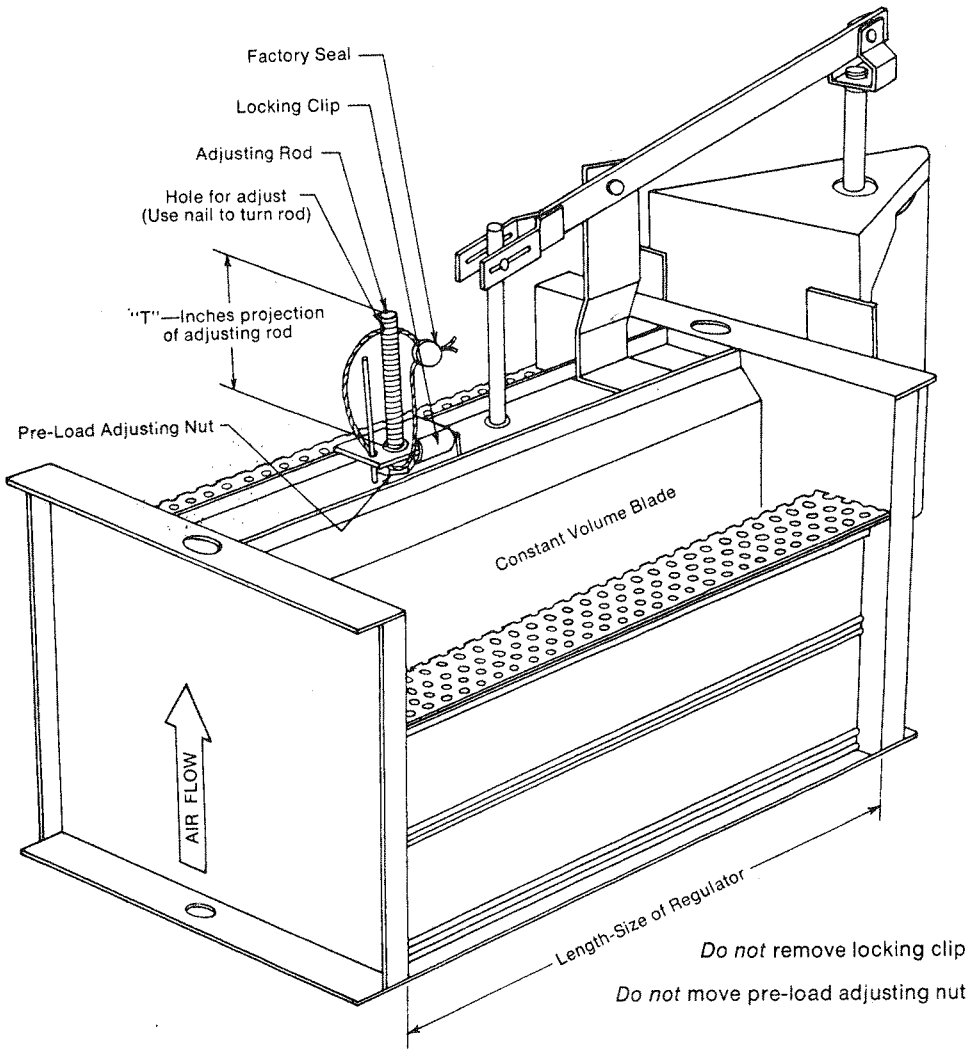


Figure 9. **HOW TO RESET THE VARIABLE CONSTANT VOLUME REGULAR**

The Variable Constant Volume Regulator is accurate within ±5%. If due to field changes, it is necessary to reset air flow in the field, the following procedure must be used:

a Using the correct chart for the VCV Regulator size, on Page 13 obtain the "T" dimension of the present setting and the proposed new setting.

b Remove the factory-set wire seal.

c With a small Allen wrench or nail, rotate the adjusting rod to increase or decrease the projection distance "T" for the new setting. Turn clockwise if the air quantity is less than factory setting and counter- clockwise if the air quantity is greater than factory setting.

d Replace lead seal and label the Regulator, indicating the date reset and the new capacity.

e As this Variable Constant Volume Regulator has been factory set, due to manufacturing tolerances the "T" dimension of the original setting may not be exactly as shown on the chart, and for this reason we use the difference in position rather than the total length as a guide for changing air flow. Once the seal is broken, the guarantee on the factory setting is no longer valid, but a close approximation of air flow may be obtained by using these charts.

HOW TO RESET VARIABLE CONSTANT VOLUME REGULATOR	
1. Check for number and size of VCV regulator in HV-V unit.	For Capacity range (cfm), see Table 2.
2. Check VCV regulator in unit to be changed for size.	If mechanical drawings are not at hand, inspect unit.
3. Check if capacity desired can be handled by installed VCV regulator; if so, proceed with steps 1 through 7.	See Table 2. 1. Remove access door. 2. Break factory seal. 3. Turn adjust screw clockwise to decrease. 4. Turn adjust screw counterclockwise to increase. 5. Reseal VCV regulator. 6. Label regulator indicating new capacity and date reset. 7. Replace access door.
4. If capacity desired is below range shown on Table 2.	1. Order smaller VCV regulator from Anemostat Products Division. 2. Blank off open space left by using smaller VCV regulator.
5. If capacity desired is above range shown on Table 2.	1. Check if larger VCV regulator can be installed in HV-V unit. 2. If so, order larger VCV regulator from Anemostat Products Division. 3. Check in High Velocity Catalog that new capacity is within specified sound levels. 4. Check in High Velocity Catalog that new capacity can be maintained with actual static pressure available.
6. If desired capacity is beyond performance range in regard to sound and/or static pressure.	1. Order new HV-V unit from Anemostat Products Division. 2. Check High Velocity Catalog for dimension of new HV-V unit, plus diffuser size and inlet connections.

NOTE: When ordering new VCV regulators or HV-V units, always specify maximum & minimum capacity (cfm) to be handled.

ANEMOSTAT HIGH VELOCITY CONSTANT VOLUME MIXING BOX: WITH VERTICAL MOTOR MOUNT

REVERSAL OF INLET PORTS IN THE FIELD, SIZES 5, 6, 7 & 8

Constant Volume Units are normally furnished by Anemostat Products Division with:

Hot inlet, valve normally open

(Hot inlet may be left-hand or right-hand } Requires direct acting thermostat

Cold inlet, valve normally closed

If it is desired to reverse the inlet ports in the field from left-hand normally open to right-hand normally open, or from right-hand to left-hand, refer to Figure 10 and proceed as follows:

1. Remove access door to provide access to Constant Volume Regulator.
2. Remove Constant Volume Regulator by loosening the two device rods from the end plate to provide access to the valve chamber.
3. Apply air pressure to operator to overcome preload to ease change of linkage.
4. Remove pneumatic operator link from valve bracket and replace clevis pin through link
5. Relieve air pressure from pneumatic operator.
6. Remove wing nut holding motor mount plate on end plate.
7. Lift motor and mount plate off weld stud and slide forward and twist to unlock tabs from end plate.
8. Install operator and plate on opposite side of end plate and replace wing nut on weld stud.
9. Apply pressure to operator to ease installation of motor link to valve bracket.
10. Install operator link on valve bracket using same hardware.
11. Replace Constant Volume Regulator and inspect pneumatic line to operator to insure there are no links.
12. Replace access door.

ANEMOSTAT HIGH VELOCITY CONSTANT VOLUME MIXING BOX: WITH VERTICAL MOTOR MOUNT

SIZES 5-8

VIEWS FROM TOP OF BOX

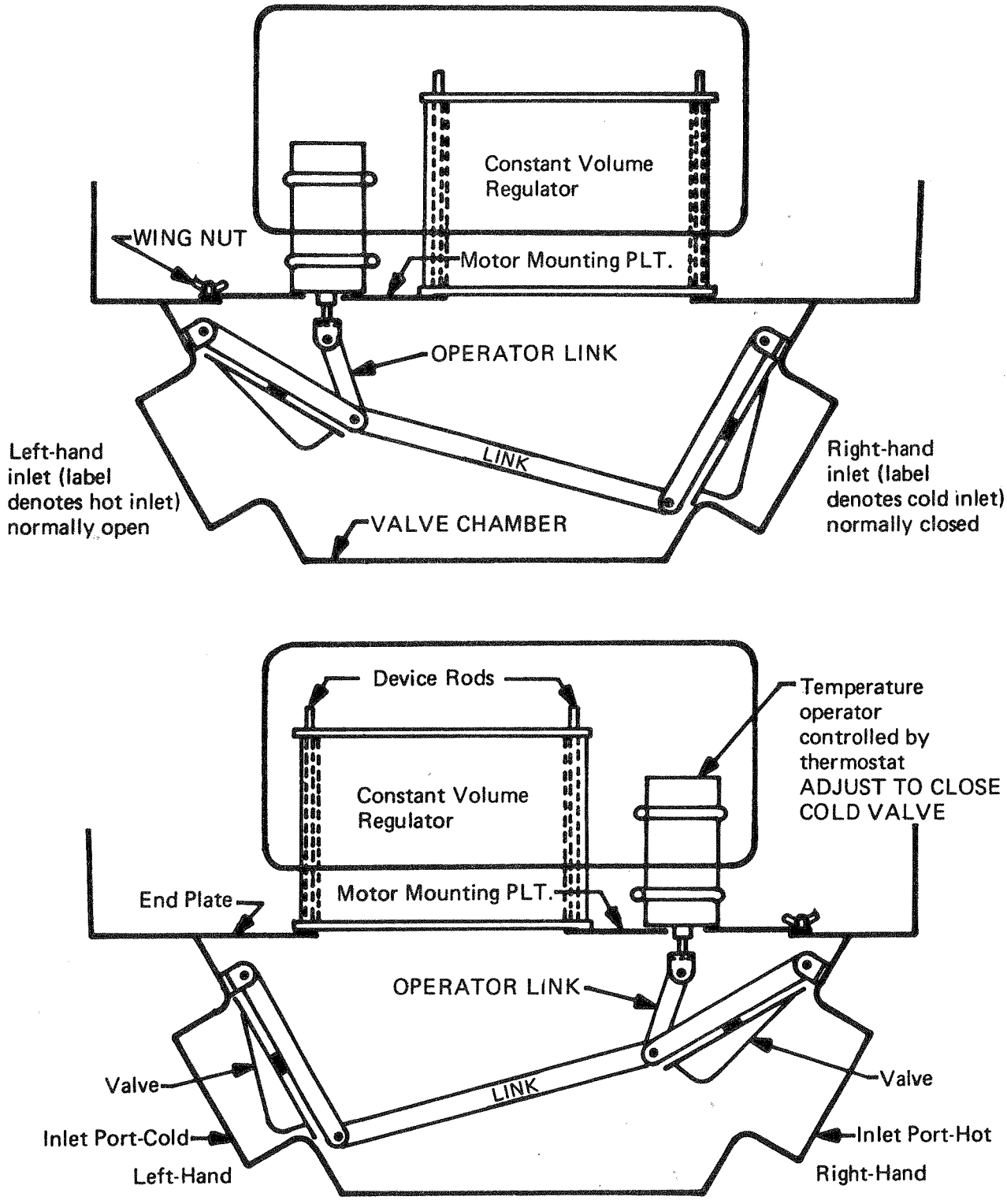


Figure 10. Reversal of Inlet Ports from Left-Hand Open to Right-Hand Open
Type HV Sizes 5, 6, 7 and 8

REVERSAL OF INLET PORTS IN THE FIELD, SIZES 10, 12, 14 and 16

All Constant Volume Units are normally furnished by Anemostat Products Division with:

Hot inlet, valve normally open

(Hot inlet may be left-hand on right-hand) } Requires direct-acting thermostat

Cold inlet, valve normally closed

If it is desired to reverse the inlet ports in the field from left-hand normally open to right-hand normally open, or from right-hand to left-hand, refer to Figure 11 and proceed as follows:

A. Apply air pressure to the pneumatic operator until the shaft moves approximately 1/4".

B. Loosen clamp nut on No. 1 damper crank.

C. Rotate shaft No. 1 until the No. 1 damper is fully closed.

D. Tighten clamp nut on No. 1 damper crank.

E. Apply air pressure to the pneumatic operator until the shaft travels thru the full stroke.

F. Relieve the air pressure on the pneumatic operator until the shaft retracts approximately 1/4".

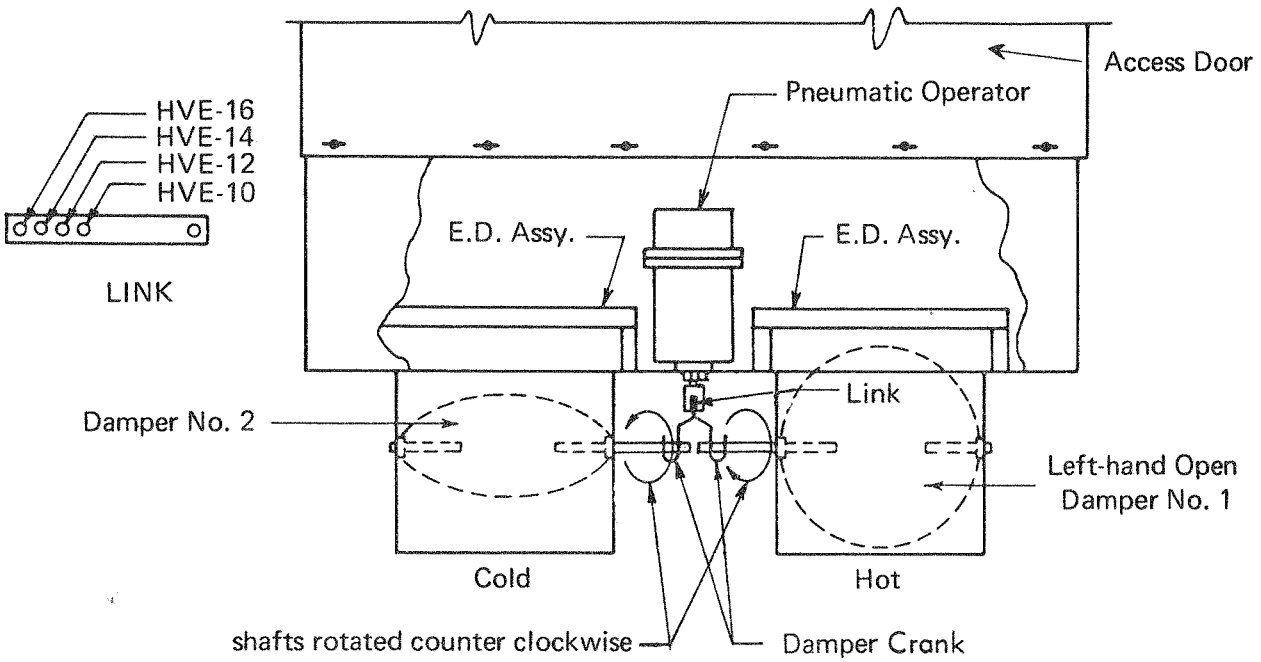
G. Loosen clamp nut on No. 2 damper crank.

H. Rotate shaft No. 2 until the No. 2 damper is fully closed.

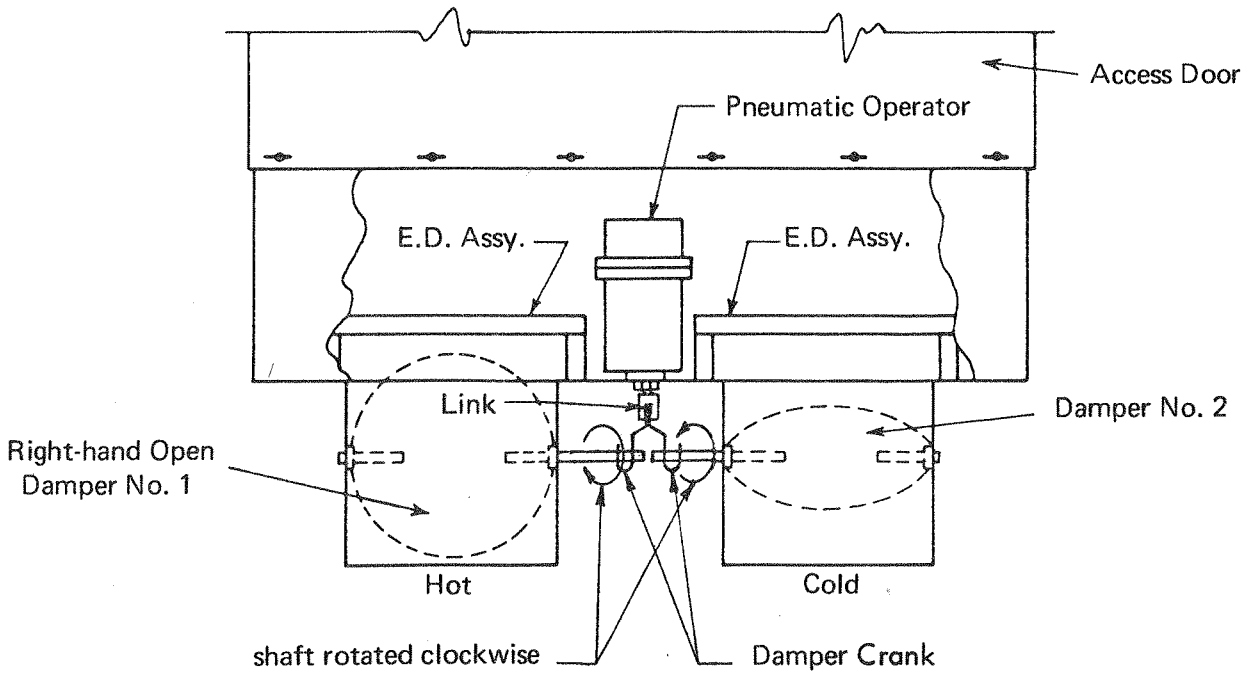
I. Tighten clamp nut on No. 2 damper crank.

Sizes 10-16

VIEWS LOOKING UP AT BOTTOM OF BOX



To Change From Left Hand Normally Open to Right Hand Normally Open



To Change From Right Hand Normally Open to Left Hand Normally Open

Type HV Sizes 10, 12, 14 and 16

Figure 11: Reversal of Inlet Ports in the Field Sizes 10-16

THERMOSTATS

Thermostats are the control elements that sense air temperature changes in room, space, or duct, and provide a modulating signal to the control device in order to actuate it. Thermostats fall into two classifications:

1. Direct-acting thermostats that cause an increase in branch pressure when temperature increases.

2. Reverse-acting thermostats that cause a decrease in branch pressure when temperature increases.

For a given application, the thermostat must be selected to close the hot valve when temperature increases or, conversely, to open the hot valve when temperature decreases. In dual-duct systems, the required movement of the hot valve causes an equal and opposite movement of the cold valve.

The types of thermostats required for various applications of dual-duct high velocity systems are:

REVERSE ACTING? DIRECT ACTING?

Temperature Control System	Dual Duct		Single Duct		Reheat	Upon loss of compressed air box fails to:
	Hot Valve	Cold Valve	Cold Valve	VCV Regulator	Hot Water Valve	
Direct Acting	Normally open (N.O.) @ O psi	Normally closed (N.C.) @ O psi	Normally closed (N.C.) @ O psi	Minimum CFM @ O psi	Normally open (N.O.) @ O psi	Full heating (Minimum Cooling)
Reverse Acting	Normally closed (N.C.) @ O psi	Normally open (N.O.) @ O psi	Normally open (N.O.) @ O psi	Maximum CFM @ O psi	Normally closed (N.C.) @ O psi	Full cooling

TABLE 3. HIGH VELOCITY SYSTEM BALANCING CHECK LIST	
Obtain layout of system.	1. Check specification. 2. Check that HV units are installed as shown at locations on plans. 3. Check total capacities of units vs fan capacities. 4. Check that filters are clean and tight. 5. Check that diffuser and extract dampers are fully open. 6. Automatic control system in full operation.
Before starting supply, return, and exhaust fans	1. Manually operate all fresh, return, and exhaust air dampers. 2. Set fresh air damper for minimum capacity. 3. Remove any interference with free operation of dampers, then lock in place for balancing.
Start supply, return, and exhaust fans.	1. Check for rotation and belt slippage. 2. Check fan rpm vs design rpm. 3. Supply fan rpm should be at or slightly higher than design rpm. 4. Return and exhaust fan rpm should be at or slightly lower than design rpm. 5. Measure fan static pressure beyond fan discharge. 6. Measure inlet static ahead of fan inlet.
Measure and compare actual amps and BHP with design data.	1. If discharge static pressure is higher than design, and amps lower than design, indications are less than design air flow. 2. If discharge static pressure is lower than design, and amps higher than design, indications are more than design flow.
Measure inlet static pressure between filters and dampers.	1. With fresh air damper at minimum open. 2. With return air dampers at maximum open. 3. With exhaust air damper (if any) closed. 4. Inlet static pressure should be not less than minus .2" to .3" w.g.
If inlet static is less than minus .2" w.g.	1. Partially close return air dampers. 2. Slow down return air fan until minus .2" w.g. is attained.
Cycle dampers from maximum to minimum fresh air.	1. Minus static pressure should remain fairly constant. 2. Leave dampers in minimum fresh air supply position.
Make system ready to balance.	1. With minimum fresh air quantity. 2. With thermostats set for total cooling, 15 psi branch pressure. 3. With hot air available in hot deck. 4. With temperature controls calibrated. 5. With scheduling temperatures set.

(Cont'd)

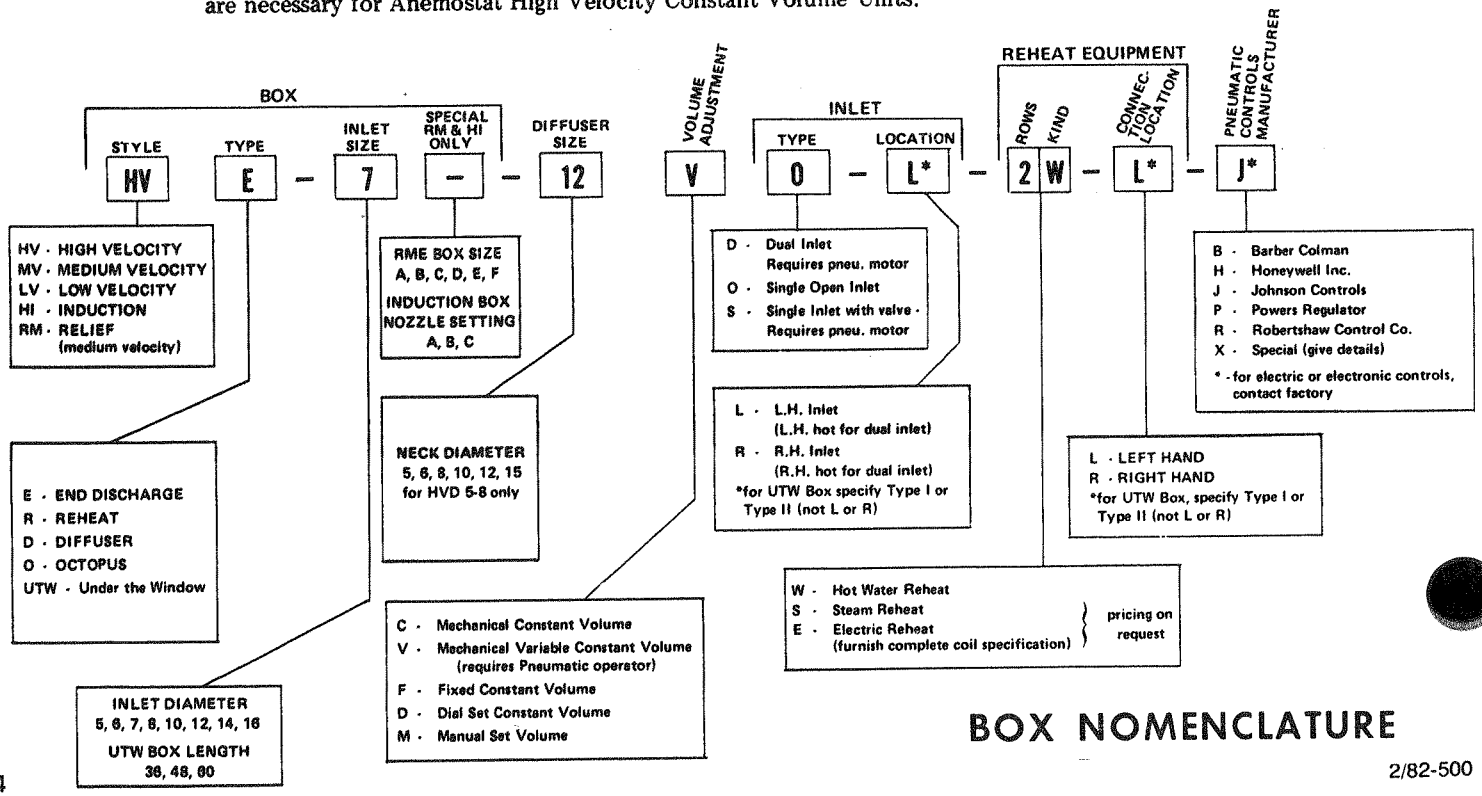
TABLE 3. (cont'd.) HIGH VELOCITY SYSTEM BALANCING CHECK LIST	
Balancing the dual duct system:	1. Select HV unit at end of system. 2. Set thermostats for total cooling, 15 psi branch pressure. 3. Measure static pressure 12" to 18" ahead of open cold valve.
Static pressure should slightly exceed:	1. Minimum static pressure requirments of the HV unit, plus 2. Pressure loss of downstream ducts, 3. Pressure loss of diffusers. Note: Any balancing dampers should be in full open position.
If static pressure is below minimum requirments,	1. Raise fan speed to meet or slightly exceed requirements. 2. Extreme condition may require ordering a new, larger HV unit.
If static pressure is higher than minimum requirements,	1. Lower fan speed to slightly above minimum requirements. 2. If pressure is higher than expected, due to more favorable duct runs, consider changing electric motors.
Balancing of diffusers and grilles:	1. Select diffuser nearest to HV unit. 2. Measure air volume with ANEMOTHERM Air Meter, and balance. 3. Proceed with other diffusers. 4. Last diffuser should have damper in full open position.
Thermostat calibration:	1. Attach pressure gage to branch line from thermostat. 2. Rotate thermostat from full heating ("0" psi) to full cooling (15" psi). 3. Observe opening and closing of hot and cold valves. 4. Set thermostat at room temperature. 5. Branch line pressure should be at mid-range of pneumatic operator spring.
Set thermostat to total heating "0" psi.	1. Measure temperature inside diffuser neck. 2. Temperature should be slightly lower than temperature of air at hot air inlet of HV unit. 3. Excessive lower temperatures indicate reversed connections. (See Figure 10 on Page 17 and Figure 11 on Page 19.) 4. Reverse linkage. 5. If trouble not remedied, cold valve is leaking.
VALVE LEAKAGE	
Cause: If valve inlet is damaged,	Remedy: Return complete unit to Anemostat Products Division for replacement of valve chamber.
If valve closes manually,	1. Check for bent linkage and parts forced out of shape; straighten bent parts. 2. Apply preload to pneumatic operator while connecting. 3. Adjust pneumatic operator rod and clevis (fork connection head) etc., so that cold valve fits tightly into inlet.

TABLE 3. (cont'd.) HIGH VELOCITY SYSTEM BALANCING CHECK LIST	
If shaft of pneumatic operator does not return to its original position,	1. Spring is damaged; replace spring. 2. Control pressure from thermostat does not decrease to "0" psi; check pressure in branch line. 3. Check function of thermostat.
If shaft of pneumatic operator does not extend fully,	1. Check for maximum pressure of pneumatic operator (15 psi). 2. Check for leak in branch line. 3. Check for damaged diaphragm of pneumatic operator.
If diaphragm is damaged or spring is defective,	Replace pneumatic operator. 1. Remove clevis pin from clevis (fork-connection head). 2. Remove branch line from pneumatic operator. 3. Remove pneumatic operator from motor mounting bracket.
Installation of new pneumatic operator:	To reassemble, follow removal steps in reverse order and adjust to close cold inlet tightly, with "0" psi on pneumatic operator (or small preload).
Set thermostat to: Full Heating "O" psi Total Cooling 15 psi minimum	1. Measure temperature inside diffuser neck. 2. Temperature should be slightly (higher) *(colder)* than air temperature on (cold) *(hot)* air inlet of HV unit. 3. Drastic higher temperatures indicate reversed linkage. 4. Reverse linkage. (See Figure 10 on Page 17 and Figure 11 on Page 19). 5. If reversing linkage does not reduce temperature, hot valve is leaking. 6. Air Leakage (See pages 23 and 24).
If insufficient cooling and/or heating,	1. Reset MCV regulator (See page 5.) 2. Reset VCV regulator (See pages 14 and 15.)
Double check after balancing.	1. Measure and compare actual performance with design data. 2. Check against specification. 3. Take all readings with system set on "cooling cycle."
Reset all thermostats to maintain design temperature.	1. If no other data available, set thermostats to 74° or 75° F. 2. Lock thermostats at this temperature. 3. Where necessary, recalibrate thermostats to maintain temperature within ± 1° of setting. 4. It may be necessary to repeat this procedure in areas not completely adjusted.

(Cont'd)

TABLE 3. (cont'd.) HIGH VELOCITY SYSTEM BALANCING CHECK LIST	
Indoor vs outdoor pressure.	1. Use magnehelic gage 0-1" w.g. 2. Keep doors and windows closed. 3. System at minimum fresh air supply. 4. Indoor pressure should be .02" to .05" w.g. greater than outdoor pressure.
If building is under negative pressure,	1. Minimum fresh air quality is low. 2. Return or exhaust fans higher than design specifications. 3. Check inlet static pressure between filters and damper. 4. Observe damper settings.
Let system operate.	1. To be checked. 2. To be tested. 3. To be rebalanced. 4. To be calibrated. 5. Do not deviate from specification or plans without approval of the design engineers.
If temperature cannot be held within, ± 1° F.	1. Check temperature at HV unit inlets. 2. Check that branch line pressure from thermostat is 15 psi. 3. Check thermostat calibration or setting. 4. Hot and cold duct connection to HV unit may be reversed. 5. Check for proper selection and/or location of HV unit. 6. Check for minimum air pressure at inlets of HV unit. 7. Check thermostat location. 8. Check for damaged inlets to HV unit.

Anemostat High Velocity Constant Volume Units do not require adjustment or lubrication after they have been properly installed and tested. Therefore, no parts lists or maintenance procedures are necessary for Anemostat High Velocity Constant Volume Units.



BOX NOMENCLATURE