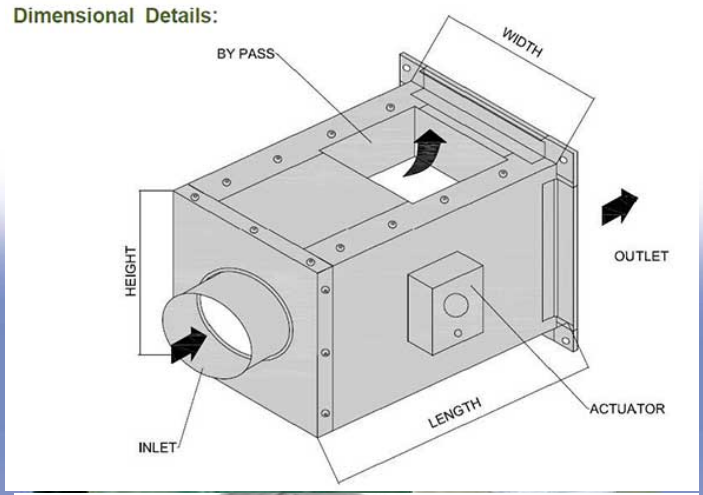
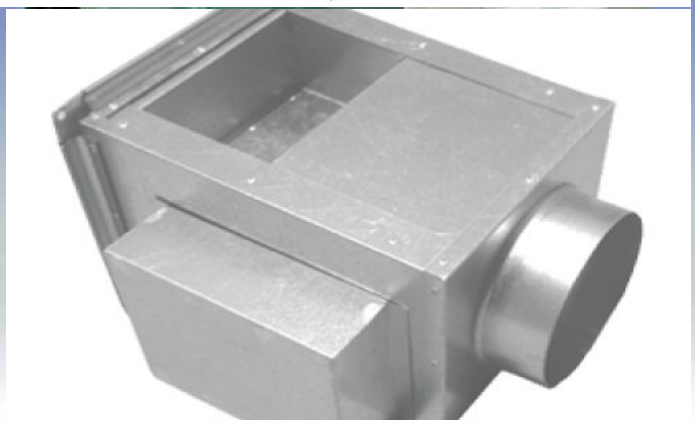
Dimensional Details:



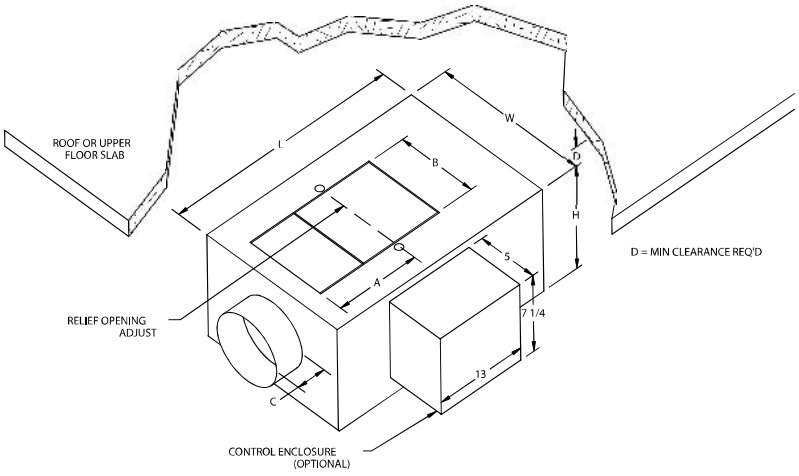


Airflow AC Middle East LLC

Email:-Airflowacme@gmail.com,www.Airflowac.me,Tel:050-9293811

By Pass Type VAV

Airflow ac manufactures Variable Air Volume (VAV) control assemblies, which are used in central air conditioning systems. VAV hold a variable amount of air making air conditioning systems more efficient by regulating the amount of cooling targeted toward any specific room or area. These VAV boxes are designed to suit and control the volume flow rate of the conditioned air in to an occupied zone in response to a duct static pressure or, zone temperature control signal.



Engineering Features:

VAV systems are also usually designed with a diversity factor which means that the main air handler design airflow is less than the sum of the total airflow of all the VAV's. This is a common design because not all of the VAV's in a building will be in full load during standard operation.

The unit ranges are suitable for either by pass or temperature dependent applications with a capability of handling induct pressure up to 750 Pa.

VAV terminals are suitable for both constant and Variable Air Volume supplies with options of Pneumatic, Electrical Control or Automated Control Systems (ACS) to suit most of the various applications on controls.

Pneumatic Control systems are becoming obsolete. The VAV damper is opened and closed by a controller sending air pressure to an actuator hooked to the VAV damper.

Electrical Control System simply sends a signal from the thermostat in volts to an electrically operated actuator connected to the VAV damper.

ACS works the same as electric except there is a automated system set up in the building that gets information from all the VAV's and air handlers displaying it in text and graphics form.

VAV unit provides energy saving by maintaining constant room temperature with low-pressure drops, and Variable Air Volume supplies, for the low and medium pressure package air handling or air conditioning systems.

Airflow ac VAV's are easy to install with any Air conditioning units in buildings or offices & can easily relocated as interiors requirement.

Air flow capacity ranges from 30 – 1500 lps with minimum inlet static pressure of 100Pa. A minimum air volume of 20% can be set if required. Design air volume varies from factory set to specified value within ±5% of set point.

Airflow ac VAV are designed to produce low NC levels with minimum pressure drop for main system static.

Units are supplied with By-pass port dampers to divert the excess air flow to return duct.

Airflow ac manufacture Zero maintenance VAV's, quick opening access panels can be provided for easy inspection and service as optional.

By Pass Type VAV

Construction Specifications:

The housing of VAV is made of galvanized sheet steel of thickness 22g Z-22 to Z-27

Damper blade is of either double wall thickness G.I plate, sandwiching a closed cell neoprene gasket or 1.2mm thick galvanized sheet with full round gasket for air tight operation.

The damper blade is having a precision die cast zinc alloy shaft which rotates in self lubricating brass* bushes, or stainless steel ball bearings (optional), resulting an extremely low friction for damper operation.

Airflow ac Variable Air Volume units are designed to ensure airtight operations with low leakage factor of 2 % of total air volume at 3" inlet static pressure as per international standards DW 142 Class C.

Internal walls of Aurion VAV's are lined with 12mm thick, density 24 kg/m³ acoustic liner made of mineral fiber & edges are coated with adhesive or concealed with metal stiffener to seal loose fiber.

Tight closure of damper with gasket, ensure low leakage with less than 2% of total air volume at 750Pa maximum static pressure meeting international standards and referred to NFPA 90 A and UL 181 standards for erosion, casing leakage rate to Class2 in accordance with DIN24194 & fire hazard classification 25/50 as per ASTME 84 & UL723.

Rectangular discharge opening is designed for slip & drive cleat connection. Flanged or other end connection are optional.

Insulation meet bacteriological and fungi resistant test standard.

Box Construction

The VAV boxes are manufactured to specific dimensions designed, calibrated and tested to achieve the air flow rate required by the system; the Table C (page6) indicates the dimensional details of the VAV Boxes with details of the Airflow that can be handled by the Box and other necessary dimensional data.

Control

Standard control component supplied with Bypass type VAV are ON / OFF Type with Analog Controls. Modulating by DC 0 to 10V or Digital or DDC or BMS controls can be supplied as optional. Electronic thermostat and actuator provide temperature dependent inflow of conditioned air. The standard control works on an operating voltage of 230 V controls.

Actuator capable of supplying at least 35in-lb of torque to the damper shaft and mounted externally for service access. Terminals with internal actuator mounting or linkage connection include gasketed access panel, removable without disturbing ductwork.

The control components are factory mounted by Acevac on an external mounting galvanized control panel. Generally zero maintenance is required for Airflow ac VAV's.

Product	Controls		Standard
BPV	Actuator	ON / OFF	Standard Supply
		Floating	Optional
		Modulating	Optional
	Thermostat	Analog	Standard Supply
		Digital	Optional
	Sound Attenuator		Optional
	Heater		Optional

Wiring control diagram affixed to the control-mounting panel and marked with specific setting and location tagging, digital type damper actuator 230 / 24 Vac of type compatible.

Air terminal can be provided with modulating control linkage to allow repositioning and regulating the damper from normally open at maximum air flow to normally closed, or vice versa.

Controls for By Pass Type VAV

Standard Supply : On / Off Controls

ON/OFF controls operate from shut-off position to full range by supplying variable air volume or to a minimum set air volume to the conditioned zone in response to room demand by change in temperature ±1 °C by the room thermostat. Low speed actuators slow down the response of damper resulting in efficient control of room temperature.

Floating Controls / On-Off Three Stage Control :

Floating controls operate similar to modulating control from full shut-off to full open or to any intermediate position by supplying variable air volume or to a minimum set air volume to the conditioned zone in response to room demand by change in temperature ±1 °C by the room thermostat. Low speed actuators slow down the response of damper resulting in efficient control of room temperature.

Modulating Controls DC 0 to 10V

Airflow ac VAV Modulating Controls are customized for various application with proven working experience. Modulating Controls in combination with airflowacVAV operate proportionally from full discharge to full by-pass by supplying variable air volume or minimum set air volume to the conditioned zone in response to room demand by change in temperature ±1 °C by the room thermostat.

Airflow ac VAV with modulating controls are compatible with room thermostat combination with analog or digital display.

Modulating controls allow the VAV units to monitor the desired flow rate as directed by the thermostat and compensate the requirement instantly for any changes in supply air pressure which tend to alter the supply air volume.

BMS DDC Controls for Building Management System with central monitoring unit is available on request and is optional. These controls allow the VAV units to monitor the desired flow rate as directed by the thermostat and compensate the requirement instantly for any changes in supply air pressure which tend to alter the supply air volume.

Controls are field set by the contractor for the scheduled minimum and maximum flow rates. Flow measuring taps & flow curves are supplied with each terminal for field balancing airflow. Actuator is of direct connection shaft mount type without linkage. All controls are installed in approved NEMA1 sheet metal enclosure.

CONTROL	MAKE
ACTUATOR THERMOSTAT	BELIMO/HONEYWELL/ SIEMENS/ANYCOMPATIBLE

Thermostat

Room temperature control is achieved by supplying the required quantity of cool or hot air, to the conditioned zone to satisfy the room thermostat demand. Excess air is returned directly to the return air plenum for Bypass models. The thermostat shall be field wired to the circuit board.

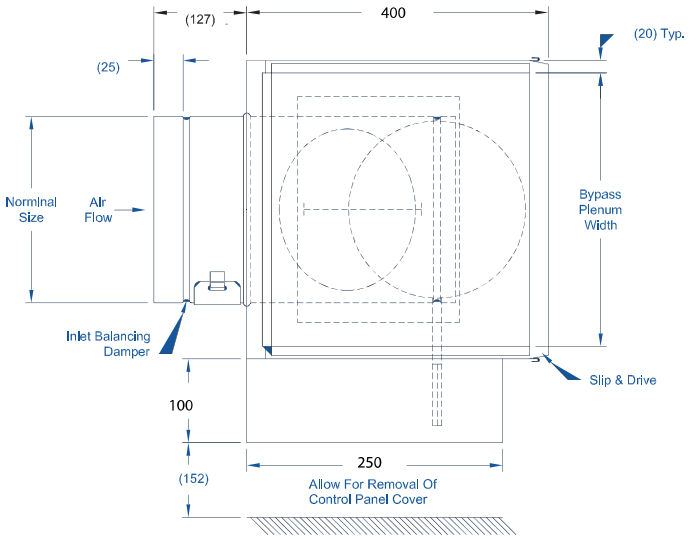
Optional room thermostat have plug-in facility to a portable operator terminal to get the following additional operation showing -Damper percentage opening, Room temperature sensor are wired to DDC / VAV controller using a two wire non polarity sensitive cable. Differential pressure across flow sensor, Flow in CFM, VAV box maximum flow, VAV box minimum flow, Heater status, Minimum flow setting for heaters

VAV controller parameters can be modified from the room thermostat key buttons without the use of any additional devices.

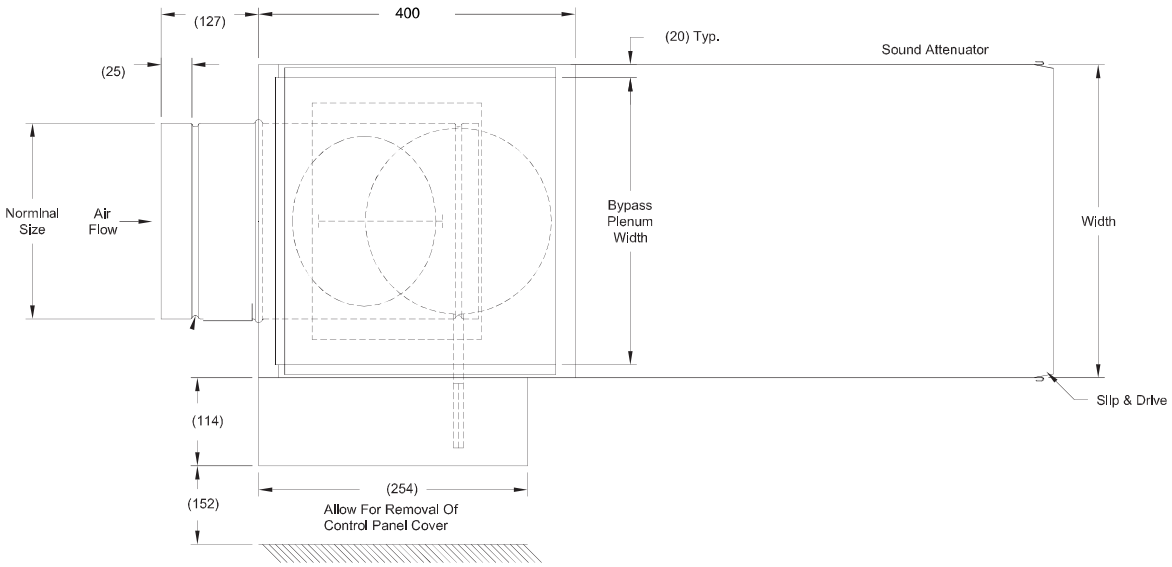
Noise Level

These VAV units are designed to meet the stringent noise criteria (NC 35) required in the specified zone without the incorporation of any additional attenuation, under normal design conditions.

BPV - Standard



BPV with Sound Attenuator



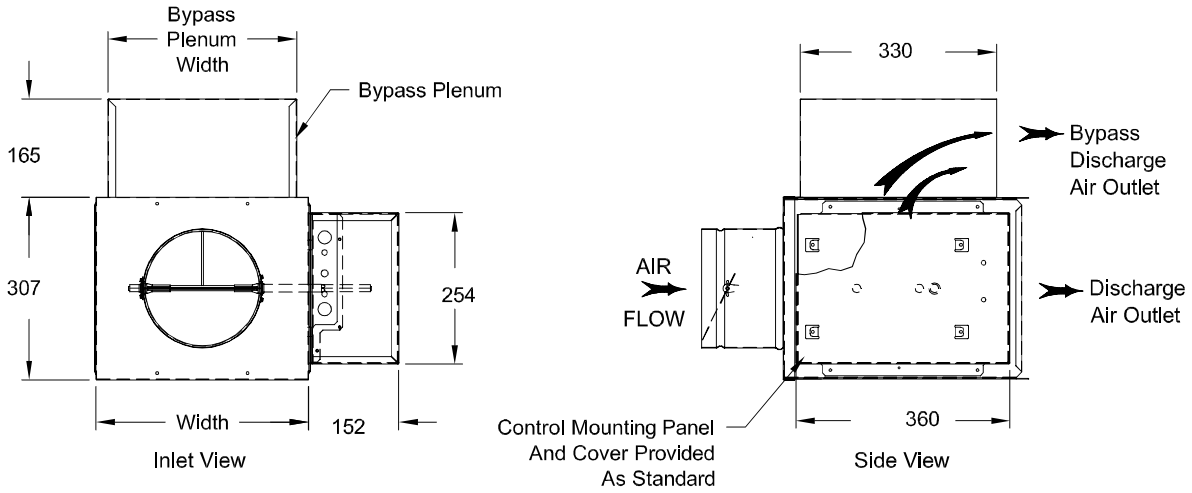
BY PASS TYPE VAV SELECTION TABLE

PERFORMANCE CHART:

Model	Air flow Range (LPS)	Air flow Range (CFM)	Inlet Dia. (mm)	Minimum Operating Static Pressure (Pa)	Pressure Drop (Pa)	Discharge Noise Level (NC @ 100Pa)	Discharge Noise Level (NC@750 Pa)
BPV-15	0 - 283	0 - 600	150 ø	25 - 100	6 - 16	30 - 35	35 - 45
BPV-20	0 – 472	0-1000	200 ø	25 - 100	8 - 18	30 - 35	35 - 45
BPV-25	0 – 755	0-1600	250 ø	25 - 100	10 - 20	30 - 35	35 - 45
BPV-30	0 – 1038	0-2200	300 ø	25 - 100	12 - 24	35 - 40	40 - 50
BPV-35	0–1416	0-3000	350 ø	25 - 100	15 - 25	35 - 45	40 - 55
BPV-40	0–1888	0-4000	400 ø	25 - 100	25 -30	40 - 45	45 - 55

PERFORMANCE NOTES:

Sound power levels are in decibels re 10-12 watts.
All Sound data are raw data without any allowance for correction factor or room absorption.
Minimum discharge SP is the static pressure loss through the unit with 100% airflow through discharge outlet.



BPV – DISCHARGE SOUND POWER

Sound Power at **Δ** Ps = Min and 1.0 in.w.g.

Unit Size	CFM (L/s)		Min Ps in.wg. (Pa)		Min Ps							Inlet Ps = 1.0 in.wg. (250 Pa)						
					Octave Band Sound Power, Lw, dB						NC	Octave Band Sound Power, Lw, dB						NC
					2	3	4	5	6	7		2	3	4	5	6	7	
15	200	(94)	0.030	(7.5)	51	40	35	32	30	22	< 15	60	59	56	54	49	47	18
	300	(142)	0.080	(19.9)	50	48	44	43	35	25	< 15	62	64	61	61	53	51	22
	400	(189)	0.130	(32.4)	55	55	51	51	44	39	< 15	65	66	64	65	56	54	25
	600	(283)	0.300	(74.7)	66	66	63	62	55	52	25	71	74	71	73	63	60	34
20	400	(189)	0.020	(5.0)	57	44	39	36	36	25	< 15	62	64	63	64	55	52	22
	500	(236)	0.030	(7.5)	57	49	45	43	33	23	< 15	65	65	64	66	57	53	24
	700	(330)	0.050	(12.4)	59	57	55	53	45	38	< 15	69	69	69	70	61	57	28
	1000	(472)	0.100	(24.9)	66	66	63	63	55	49	24	74	75	75	75	67	62	34
25	600	(283)	0.020	(5.0)	57	46	42	37	28	24	< 15	63	63	64	62	55	53	21
	800	(378)	0.030	(7.5)	58	54	49	46	37	27	< 15	68	68	68	65	58	56	26
	1100	(519)	0.050	(12.4)	61	60	57	54	46	41	16	70	71	71	69	62	59	29
	1600	(755)	0.100	(24.9)	65	63	65	61	58	54	20	74	74	76	74	66	64	33
30	1100	(519)	0.040	(10.0)	54	49	47	45	37	27	< 15	66	67	67	61	66	56	25
	1200	(566)	0.050	(12.4)	58	51	50	48	40	32	< 15	67	68	67	67	61	58	26
	1500	(708)	0.090	(22.4)	58	58	57	55	48	42	< 15	69	70	73	72	66	61	28
	1600	(755)	0.099	(24.5)	59	58	58	56	49	43	< 15	69	71	73	73	67	62	29
	2200	(1038)	0.150	(37.3)	62	60	61	61	55	51	16	72	74	76	76	70	65	33
35	1500	(708)	0.050	(12.4)	54	58	54	47	41	36	< 15	70	72	71	65	61	58	31
	1800	(850)	0.070	(17.4)	54	61	61	54	49	46	18	71	73	75	67	63	59	32
	2100	(992)	0.100	(24.9)	60	64	65	58	53	50	21	73	75	77	70	65	61	34
	2400	(1133)	0.130	(32.4)	65	67	68	62	56	53	25	75	77	79	72	67	63	37
	3000	(1416)	0.200	(49.8)	73	73	74	68	63	60	32	78	80	84	76	70	67	40
40	2000	(944)	0.060	(14.9)	55	53	55	53	45	38	< 15	71	69	69	67	62	58	27
	2800	(1322)	0.120	(29.9)	62	62	64	63	56	51	19	73	76	76	74	68	64	35
	3200	(1510)	0.160	(39.8)	66	77	68	67	60	55	37	75	77	78	76	70	66	37
	3600	(1699)	0.210	(52.3)	69	70	73	72	65	60	28	75	79	81	78	72	66	39
	4000	(1888)	0.250	(62.2)	72	73	74	72	65	60	32	78	79	82	80	74	69	39

The difference in static pressure from inlet to discharge is Ps
Minimum Ps is the lowest static pressure difference (Damper 100% open).
Sound power level are in dB, re 10-12 watts.
Radiated sound power is noise transmitted through the casing walls.

BPV – DISCHARGE SOUND POWER

Sound Power at ▲Ps = Min and 1.0 in.w.g.

Unit Size	CFM (L/s)		Min Ps in.wg. (Pa)		Min Ps							ΔPs = 1.0 in.wg. (250 Pa)						
					Octave Band Sound Power, Lw, dB						NC	Octave Band Sound Power, Lw, dB						NC
					2	3	4	5	6	7		2	3	4	5	6	7	
15	200	(94)	0.030	(7.5)	35	35	29	29	20	20	< 15	53	48	47	40	38	33	21
	300	(142)	0.080	(19.9)	45	39	42	35	27	20	15	60	54	48	45	42	38	22
	400	(189)	0.130	(32.4)	50	46	45	43	36	29	19	60	54	49	46	44	41	23
	600	(283)	0.300	(74.7)	54	49	46	47	41	39	20	62	56	50	51	46	45	25
20	400	(189)	0.020	(5.0)	45	38	33	26	20	20	< 15	61	56	50	46	42	36	25
	500	(236)	0.030	(7.5)	51	42	37	33	23	20	< 15	63	57	53	48	46	38	27
	700	(330)	0.050	(12.4)	60	53	45	40	31	27	22	66	59	53	50	48	40	30
	1000	(472)	0.100	(24.9)	66	55	48	46	40	35	30	72	61	53	52	46	42	38
25	600	(283)	0.020	(5.0)	56	35	30	23	20	20	17	65	59	49	43	38	34	29
	800	(378)	0.030	(7.5)	51	43	38	32	24	20	< 15	67	60	55	50	41	37	31
	1100	(519)	0.050	(12.4)	57	49	45	40	33	28	19	69	63	61	51	44	41	35
	1600	(755)	0.100	(24.9)	59	51	52	46	40	35	26	72	65	63	54	48	45	38
30	1100	(519)	0.040	(10.0)	50	48	45	37	28	20	19	71	65	56	51	46	42	36
	1200	(566)	0.050	(12.4)	50	46	46	40	31	23	20	70	67	58	52	48	44	38
	1600	(755)	0.099	(24.5)	59	53	47	42	35	29	21	74	70	60	55	50	46	41
	2200	(1038)	0.150	(37.3)	63	57	50	45	38	32	26	75	70	63	57	53	49	41
35	1500	(708)	0.050	(12.4)	58	49	47	42	34	25	21	68	67	63	59	55	50	38
	1800	(850)	0.070	(17.4)	58	50	48	44	37	33	22	69	67	62	60	56	51	38
	2100	(990)	0.100	(24.9)	57	54	53	49	43	41	27	72	68	64	62	58	52	39
	2400	(1133)	0.130	(32.4)	56	58	58	53	48	49	33	74	69	65	63	59	53	41
	3000	(1416)	0.200	(49.8)	71	68	64	57	52	50	39	76	73	68	66	60	55	45
40	2000	(944)	0.060	(14.9)	57	54	53	48	40	21	27	70	70	68	55	51	46	44
	2800	(1322)	0.120	(29.9)	60	62	61	57	50	43	36	74	73	71	58	52	49	47
	3200	(1510)	0.160	(39.8)	62	63	62	59	52	40	37	74	74	72	60	54	51	48
	3600	(1699)	0.210	(52.3)	67	68	67	64	58	53	43	75	75	73	62	57	57	49
	4000	(1888)	0.250	(62.2)	72	71	67	62	58	55	43	77	77	75	65	60	60	51

The difference in static pressure from inlet to discharge is Ps
Minimum Ps is the lowest static pressure difference (Damper 100% open).
Sound power level are in dB, re 10-12 watts.
Radiated sound power is noise transmitted through the casing walls.

INSTALLATION GUIDELINES

When designing small (4-6000 CFM) jobs, an engineer will often specify a constant volume air handler, and then include in the design one or more VAV zone controls. To Keep the air handler satisfied, he will specify pressure dependant bypass terminal units. These units when properly designed, installed and maintained can work fine. All too often, however they are mis-applied and therefore do not work. A Bypass unit requires damper upstream of the unit, which is often left out when all parties do not understand the proper design of this system. System can be noisy or inoeprative if not installed properly. Bypass systems must be carefully balanced, and cannot be designed to be self balancing.

PRINCIPLE OF OPERATION

The By-Pass VAV terminal is a device that received a constant volume in to the unit and provides variable volume to the space. It diverts a portion of the supply airflow to the plenum, either through a duct to the return ductwork, or directly into a return air plenum. In order for the unit to oeprate properly, it must accomplish several tasks:

It must be invisible to the air handler - That is regardless of the position of the bypass damper, the airflow into the unit should remain relatively constant.
It should always be located downstream of a balancing damper, as if it was a diffuser, as it cannot regulate the total quantity of air delivered to that branch.
It should be balanced such that the pressure drop into the plenum or return duct is the same as the diffuser(s) located downstream of the unit.

For these to take place, the balancer must carefully adjust the bypass relief damper, and the upstream damper. As the unit does not regulate total flow. It cannot be provided with standard pressure independant controls. It must be fitted with pressure dependant control, such as VVT controler or electric thermostat controlled actuator.

BALANCING GUIDELINES

- The balancer should adjust the upstream balancing damper (Optional or provided by the installing contractor) with 100% of the unit supply air going into the room, using standard balancing methods. A note should be made of the duct pressure at the inlet of the bypass unit in this condition.

The balancer should then set the unit to 100% bypass, then the discharge bypass damper should be set so that the duct pressure at the inlet of the unit is the same when the unit is supplying all the air the the zone. This will ensure that the unit delivers relatively constant airflow over the full range of bypass damper positions.

Failure to perform this balancing operation will result is air quantities varying as the thermostat calls for more or less cooling, and will likely adversely affect other constant volumes zones on the system.

CAUTIONS

Should a balancing damper not be provided, or adjusted, at the inlet of the unit, high pressure/high flows can result in excessive noise and possible damage to the damper in the unit. It is designed to operate with no more than 0.6" pressure and typically sees only 0.2" or less.

AN ALTERNATE TO BYPASS TERMINAL UNITS

Bypass units cannot be set to guarantee ventilation air flows, and may be noisy, even when properly configured. If not balanced carefully.

An effective alternative to the bypass terminal is a pressured releved loop. This system is a standard pressure independant VAV terminal design with an additional VAV terminal at the end of the run"dumping" excess air (and pressure) to the return plenum. This terminal is configured as a constant pressure unit, sensing pressure at a point typically 2/3 of the way down the run. The VAV terminals, as well as the pressure relief damper, cann be factory set, requiring a minimum of field balancing and accurate flows to the space. Bypass terminals are an effective solution to small constant air volume air handlers, but when designed or installed improperly cannot be expected to oeprature as desired.