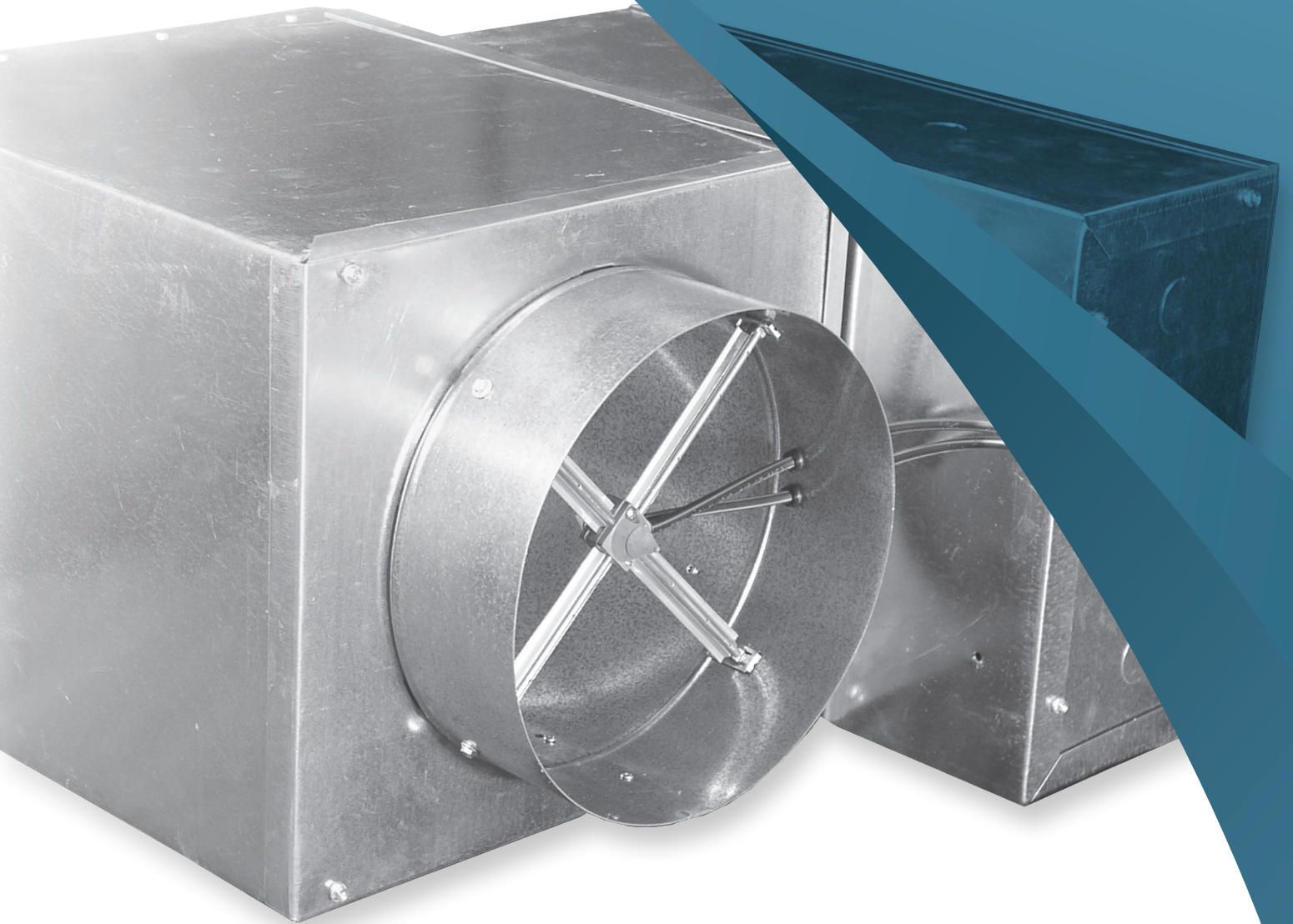


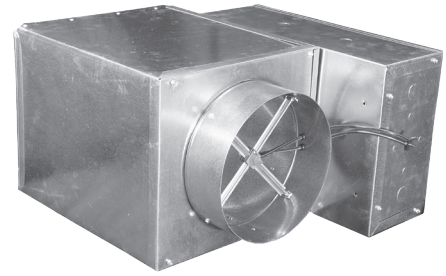
HART COOLEY®

VAV Boxes



SINGLE DUCT TERMINAL UNIT

SDV



SDV

BASIC FEATURES

The SDV, single duct air terminal, features a primary inlet with an integral damper and a discharge plenum sized to fit standard Hart & Cooley hot water coils. The SDV is lined with insulation to provide sound absorption and thermal resistance.

OPERATING PRINCIPLE

The SDV is the most common air terminal unit offered by Hart & Cooley. It operates on the principle that as the space cooling load is satisfied, the primary damper modulates closed to restrict air flow to the space so that a constant space temperature is maintained. As the space cooling load is further satisfied, the SDV closes to a pre-set minimum flow, which is usually determined by the minimum level of ventilation required in the space. In addition, the SDV can also be used at full shut-off for those applications where minimum ventilation requirements are not necessary. Upon call for heat the damper shuts down to minimum. If more heat is required, a reheat coil (hot water or electric) can be energized to provide further heating.

SOUND

The goal in designing VAV systems is to operate air terminals at low pressures and air flows, while still satisfying the design conditions. The SDV is designed for quiet performance at typical operating conditions. However, for those critical sound applications, an integral sound attenuator is offered as an option for the SDV.

APPLICATIONS

The basic SDV is designed for interior zones where no reheat is required. However, reheat coils can be added to the discharge plenum for perimeter zone applications or other applications where supplemental reheat may be required.

FEATURES

- Patented Flo-Cross® Sensor which features 24 point upstream and downstream sensing with center averaging chambers and exclusive amplification wings (Patent # 4,453,419)
- A wide variety of sizes (10) results in a total flow range of 45 to 7100 CFM
- ARI certified performance data (refer to www.ari.org for a free copy of the ARI Applied Directory)
- Heavy duty 22 gauge casing construction
- Industry standard round inlet collars sized to accept either flexible or rigid duct
- Internally lined casing utilizing 1/2" thick dual density fiberglass insulation. Insulation meets or exceeds the safety and erosion requirements of standard UL-181 and NFPA 90A
- Round damper blade constructed of elastomeric gasket sandwiched between two heavy-duty 22 gauge galvanized steel plates, resulting in low air leakage
- Shaft with Delrin bearings. Shaft features a position indicator for easy identification of damper angle
- Slip and Drive connection on the discharge plenum

OPTIONS

- Hot Water (ARI certified)

SD

SINGLE DUCT TERMINAL UNIT

Casing

Sturdy low leakage 22 gauge galvanized steel casing.

Insulation

Standard insulation is dual density and coated to resist air erosion. Meets requirements of NFPA 90A and UL 181.

Outlet

Slip and Drive duct connection.

Bearings

Low friction Delrin bearings are unaffected by temperature and humidity.

Flow Sensor

Flo-Cross® is an exclusive patented 24 point center-averaging sensor. It amplifies velocity pressure signals and provides accurate flow with 1/2 diameter of straight inlet duct.

Inlet

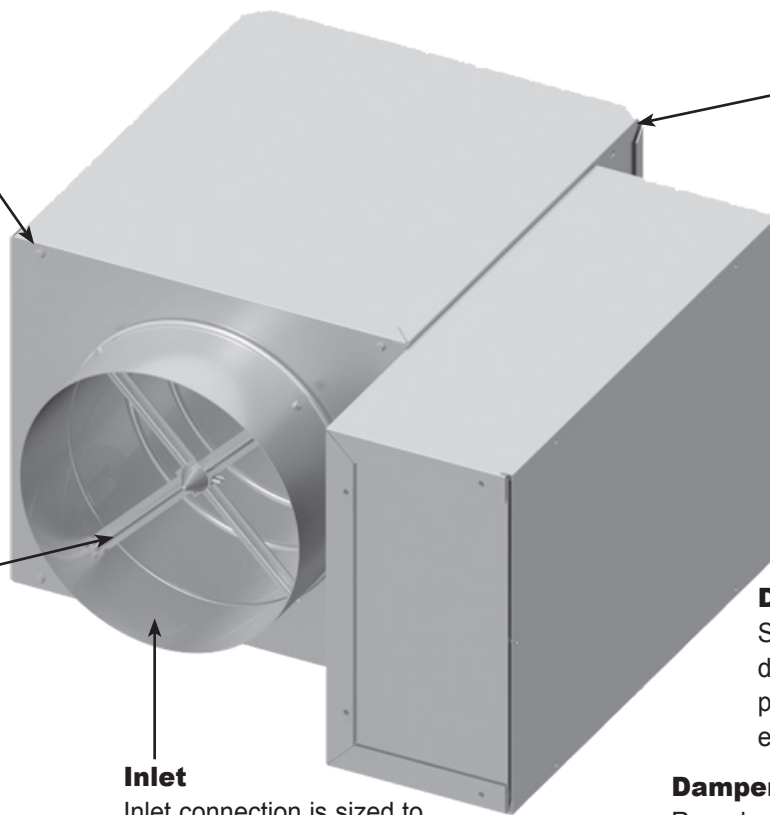
Inlet connection is sized to fit standard round rigid and flexible duct.

Damper Shaft

Solid two-piece damper shaft with a position indicator on end of shaft.

Damper

Round sandwich damper with seal is designed for low leakage, low pressure drop, and low discharge sound power level.

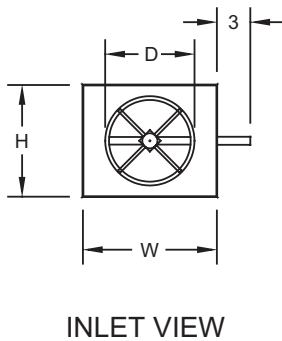
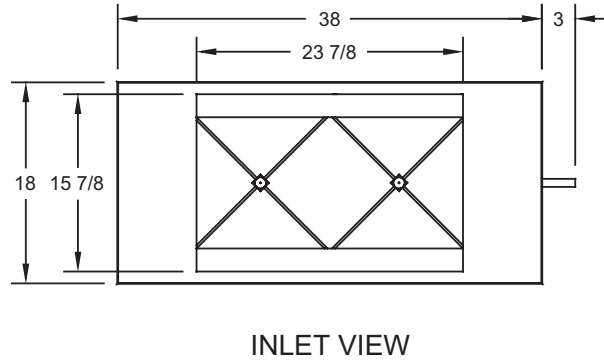
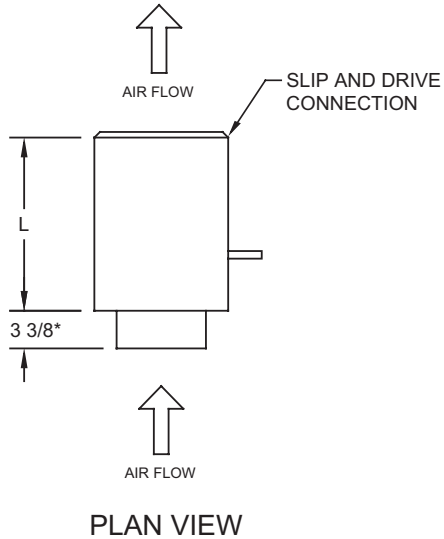


SD

PRODUCT DIMENSIONS

SDV Basic Unit

SIZES 4-14



Unit Size	CFM Range	Length (L)	Height (H)	Width (W)	Inlet Diameter (D)
	Min To Max				
6	0/100-520	15-1/2	8	12	5-7/8
8	0/185-925	15-1/2	10	12	7-7/8
10	0/290-1450	15-1/2	12-1/2	14	9-7/8
12	0/420-2100	15-1/2	15	16	11-7/8
14	0/580-2900	15-1/2	17-1/2	20	13-7/8

*5-3/8" for sizes 4 and 5 (A reducer is used on a size 6 inlet)

SELECTION PROCEDURE & GENERAL INFORMATION

Noise Criteria (NC)										
Inlet Size	Max CFM	Min. Op. Pressure (in. wc)	DISCHARGE				RADIATED			
			P _s				P _s			
			0.5"	1.0"	1.5"	3.0"	0.5"	1.0"	1.5"	3.0"
06	100	0.011	-	-	16	20	-	16	20	25
	200	0.044	15	17	20	25	15	20	22	27
	300	0.101	20	23	26	31	21	26	28	33
	400	0.180	20	25	28	33	26	31	33	38
	500	0.283	23	28	32	37	30	35	38	41
	520	0.306	26	30	33	38	32	36	38	42
08	185	0.011	-	17	22	27	-	-	17	22
	200	0.013	-	17	22	27	-	-	17	22
	400	0.051	-	16	20	26	16	20	22	25
	600	0.115	15	21	25	31	21	25	27	31
	800	0.205	17	25	28	35	26	30	32	35
	925	0.275	18	28	32	38	30	33	36	42
10	290	0.010	-	-	16	22	17	18	23	31
	500	0.031	-	-	17	23	20	21	25	33
	700	0.061	-	20	23	30	25	27	27	33
	900	0.101	16	22	26	32	28	31	31	35
	1100	0.152	21	26	31	36	33	35	36	38
	1300	0.213	23	31	33	41	36	38	38	41
12	1450	0.266	28	33	38	45	38	41	42	43
	420	0.012	-	17	22	31	15	20	23	32
	700	0.032	-	20	23	32	16	22	25	33
	1000	0.066	-	21	25	33	21	25	30	35
	1300	0.111	17	23	27	36	25	28	32	37
	1600	0.169	21	26	30	37	28	33	36	40
14	1900	0.237	23	28	31	38	31	36	40	42
	2100	0.290	26	30	33	40	35	38	42	50
	580	0.012	-	16	21	28	17	18	23	32
	1000	0.036	-	16	21	28	20	22	25	33
	1400	0.071	15	20	25	32	28	31	32	35
	2000	0.144	21	25	28	36	37	40	41	43
14	2400	0.207	23	28	31	38	42	45	47	48
	2800	0.281	26	31	33	38	46	48	50	53
	2900	0.301	26	31	33	40	46	48	50	53

Noise Criteria (NC) Notes:

- A hyphen (-) indicates the NC is lower than 15.
- Noise Criteria (NC) were found using ARI Standard 885-98 Appendix E (2002 Addendum):
 - Radiated NC were found using the type 2 ceiling (mineral fiber) condition.
 - Discharge NC were found using the large terminal condition due to the multitude of possible dischargeduct sizes.
- ARI Standard 885-98 Appendix E, Table E1. Typical Sound Attenuation Values, dB.

Damper Leakage

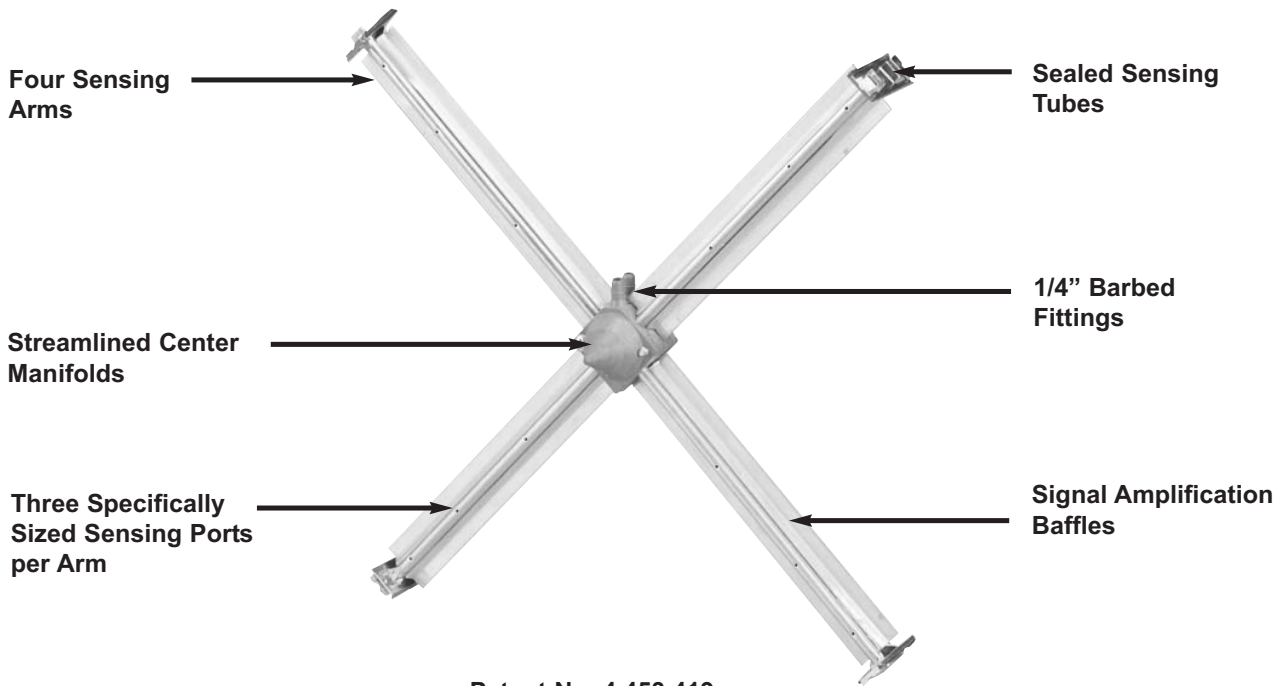
Size (in.)	1.5 in. wc		3.0 in. wc		6.0 in. wc	
	CFM	% Leakage	CFM	% Leakage	CFM	% Leakage
6	4	0.8	5	1.0	7	1.3
8	4	0.4	5	0.5	7	0.8
10	4	0.3	5	0.3	7	0.5
12	4	0.2	5	0.2	7	0.3
14	4	0.1	6	0.2	8	0.3

Casing Leakage

Size (in.)	0.25 in. wc		0.5 in. wc		1.0 in. wc	
	CFM	% Leakage	CFM	% Leakage	CFM	% Leakage
6	2	0.4	3	0.6	5	1.0
8	3	0.3	4	0.4	6	0.6
10	4	0.3	5	0.3	7	0.5
12	5	0.2	7	0.3	9	0.5
14	6	0.2	9	0.3	12	0.4

FLO-CROSS®

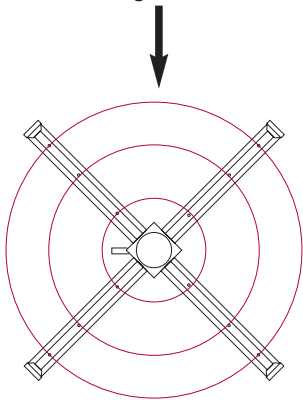
Flow Sensor



Patent No. 4,453,419

- Patented Flo-Cross® (Patent No. 4,453,419) is accurate to ±5% throughout the cataloged operating range
- Sensing arms sample the inlet cross section mitigating turbulent flow effects
- Barbed fittings positively lock plastic tubing
- 24 total sensing ports provide a differential pressure (ΔP) output proportional to the average duct velocity
- Amplification baffles strengthen ΔP signals to levels three times higher than standard Pitot tube readings
- Center manifolds average velocity profiles and reduce pulsations from dynamic ΔP signals
- Sensing tube constructions eliminates signal loss due to leakage
- Concentric ring sensing port configuration imitates major flow testing standards by locating them at the center of equal areas
- Corrosion resistant aluminum construction

Upstream and Downstream Concentric Ring Sensing Port Configuration



Flo-Cross® Sensor Performance Parameters/Formulas

Size	Area (ft²)	Cv	K*
04	0.0819	209	2.8
05	0.1296	315	3
06	0.1883	462	2.9
07	0.2578	612	3
08	0.3382	817	2.9
10	0.5319	1250	3
12	0.7691	1792	3
14	1.05	2474	3
16	1.3745	3235	3
24	2.6321	6522	3

- Flow (CFM) = $C_v \times \sqrt{\Delta P}$
- ΔP (Inches W.G.) = $K \times \left(\frac{FPM}{4005}\right)^2$
- $FPM = \frac{CFM}{Area (sq.ft)}$
- 500 to 3000 FPM Nominal Velocity Range

* "K" is the amplification factor
Cv=flow coefficient



SPECIFICATION

GENERAL

Furnish and install Hart & Cooley model SDV, single duct terminal units, to provide air at variable volume or constant volume for cooling of sizes and capacities scheduled or as shown on the plans. Single duct terminal units shall be factory assembled with a primary air damper assembly contained in a single unit housing.

CONSTRUCTION

Casing

Unit casing shall be constructed of not less than 22 gauge galvanized sheet metal, with round inlet collars of the proper diameter and Slip and Drive connection on discharge opening.

Insulation

1. 1/2" Dual Density - Interior surface of unit casing is to be thermally and acoustically lined with a 1/2" thick dual density fibrous glass blanket. The insulation is to comply with NFPA 90A, NFPA 90B, UL 181, ASTM C 1071 and have a 1.9 R value at 75 °F. This insulation is glued to the terminal unit, and all exposed edges are to be sealed.
2. Enviroseal^{ITM} - Interior surface of unit casing is to be thermally and acoustically lined with a 3/8" engineered polymer foam, fiber free insulation. Complies with NFPA 90A, NFPA 90B, UL 181 and ASTM C 534. The R value is 1.5 at 75 °F. This insulation is glued and riveted to the terminal unit.

Sensor

The unit shall be equipped with a sensor that samples duct differential pressure with no less than 24 points strategically located to represent equal duct areas. The sensor shall be the Hart & Cooley Flo-Cross[®] and will provide a differential pressure signal amplified to equal 3 times the duct velocity pressure that represents actual air flow with an accuracy of +/- 5% throughout the catalogued operating range of the unit. A length of one-half of one diameter of straight inlet duct is required before the Flo-Cross[®] sensor.

Damper Assembly

The damper assembly shall be constructed of two heavy gauge round galvanized steel plates, sandwiching an elastomeric gasket to provide minimum leakage. Damper blade will have a maximum angular travel of 90° to provide improved linearity and flow characteristics. Damper shaft shall be solid, two-piece, cast aluminum, with an indicator to show damper position and shall be riveted to the damper blades. Damper bearing shall be Delrin construction, to provide noise free operation and requiring no lubrication.

SD

