

FLO-CROSS® AIRFLOW SENSOR

BARCOL-AIR

SIG AIR HANDLING

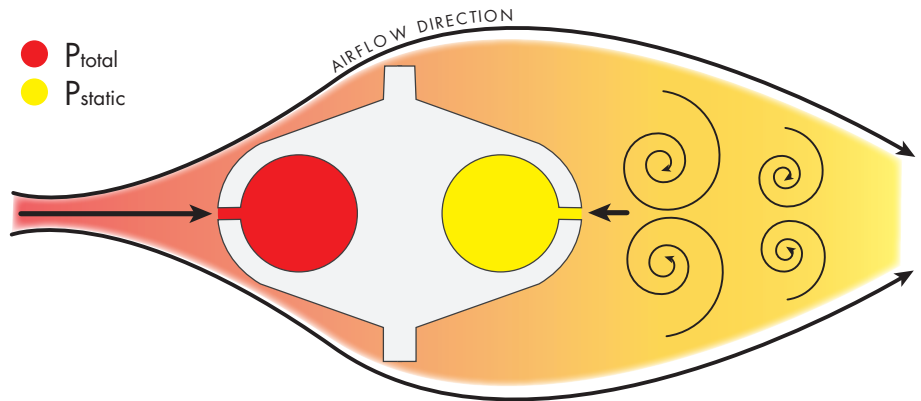
Application

The Flo-Cross® is an original Barber-Colman design (former Barcol-Air) and is a multi-point averaging airflow sensor and is used to exactly measure the pressure difference inside a rectangular or circular VAV/CAV terminal to determine the airflow going through the unit.

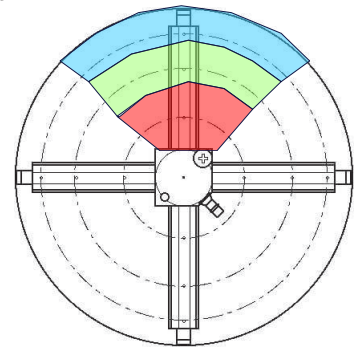
The Flo-Cross sensor amplifies the air pressure signal linearly with an amplification factor of at least 2.0. The sensor always contains 2x12 sensing points, which are arranged in two perpendicular axis. The sensing holes are arranged in such a way that each four points in a ring sense the air pressure across concentric circles of equal area in a round duct. The signal is then averaged and measured from the centre of the Flo-Cross. The accuracy of the signal is better than 2,5% even with irregular duct approach.

Benefits

- Multiple test points (at least 2 x 12 points) equally distributed in the duct area.
- Only 1 diameter installations space required.
- Better than 2,5% accuracy
- Centre averaged signal
- Linear amplified
- Available in 12 different sizes Ø (100, 125, 150, 160, 180, 200, 250, 300, 315, 355, 400, 450)



Special shaped wings provide a "Linear Amplification"



Test point locations according to the "Equal Area" method. Insensitive to air flow pattern!



CFD Presentation

Flo-Cross® pressure difference in Pa and air volume in l/s - SI unities for the standard Flo-Cross® models.

Model	Ø	100	125	160	180	200	250	315	355	400	450
Kv-values	dm ³ /s	5,5	8,5	15	20	24,9	35,4	58,9	74,3	92,6	122,3
Flo-Cross ΔP	Pa	Airvolume l/s									
ca. 2.5 m/s	2	8	12	21	28	35	50	83	105	131	173
	4	11	17	30	40	50	71	118	149	185	245
	6	13	21	37	49	61	87	144	182	227	300
	8	16	24	42	57	70	100	167	210	262	346
	10	17	27	47	63	79	112	186	235	293	387
	12	19	29	52	69	86	12	204	257	321	424
	14	21	32	56	75	93	132	220	278	346	458
	16	22	34	60	80	100	142	236	297	370	489
	18	23	36	64	85	106	150	250	315	393	519
	20	25	38	67	89	111	158	263	332	414	547
	25	28	43	75	100	125	177	295	372	463	612
	30	30	47	82	110	136	194	323	407	507	670
	35	33	50	89	118	147	209	348	440	548	724
	40	35	54	95	126	157	224	373	470	586	773
	45	37	57	101	134	167	237	395	498	621	820
	50	39	60	106	141	176	250	416	525	655	865
	55	41	63	111	148	185	263	437	551	687	907
	60	43	66	116	155	193	274	456	576	717	947
	65	44	69	121	161	201	285	475	599	747	986
	70	46	71	125	167	208	296	493	622	775	1023
	75	48	74	130	173	216	307	510	643	802	1059
	80	49	76	134	179	223	317	527	665	828	1094
	85	51	78	138	184	230	326	543	685	854	1128
	90	52	81	142	190	236	336	559	705	878	1160
	95	54	83	146	195	243	345	574	724	903	1192
	100	55	85	150	200	249	354	589	743	926	1223
	110	58	89	157	210	261	371	618	779	971	1283
	120	60	93	164	219	273	388	645	814	1014	1340
	130	63	97	171	228	284	404	672	847	1056	1394
	140	65	101	177	237	295	419	697	879	1096	1447
	150	67	104	184	245	305	434	721	910	1134	1498
	160	70	108	190	253	315	448	745	940	1171	1547
	170	72	111	196	261	325	462	768	969	1207	1595
	180	74	114	201	268	334	475	790	997	1242	1641
	190	76	117	207	276	343	488	812	1024	1276	1686
ca. 12 m/s	200	78	120	212	283	352	501	833	1051	1310	1730
	210	80	123	217	290	361	513	854	1077	1342	1772
	220	82	126	222	297	369	525	874	1102	1373	1814
	230	83	129	227	303	378	537	893	1127	1404	1855
	240	85	132	232	310	386	548	912	1151	1435	1895
250	87	134	237	316	394	560	931	1175	1464	1934	

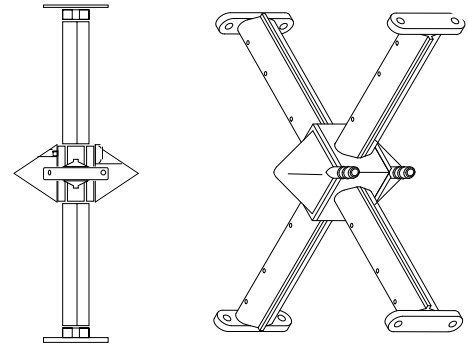
The Kv-value is set according to the specific mass of air of 1,2 kg/m³. Flo-Cross® 2 x 12 points averaging and signal amplifying airflow sensor, better than 2,5% accuracy even with irregular duct approach.

Input- and measurement data.

Tabel: Pa <-> l/s

Flo-Cross® Airflow sensor

Minimum 1x Ø straight duct length



Calculate Air volume and Flo-Cross® diff. pressure:

For different types of VAV terminals with a Flo-Cross® airflow sensor, it's possible to calculate the air volumes and differential pressure through a special factor which is the Kv-value. The Kv-value is the air volume at a differential pressure of 1 Pascal.

Meaning of the different symbols in the formula:

ΔP = Flo-Cross® differential pressure

Q = Air volume (l/s)

Kv = Kv-value in (l/s/1Pa)

You can calculate the air volume at a given differential pressure with the following formula:

$$\text{Air volume } Q \text{ (l/s)} = Kv \times \sqrt{\Delta P}$$

Example:

Model Flo-Cross® = 200

Kv-value = 24.9 l/s/1Pa

Pressure difference ΔP = 100 Pa

Air volume = 24.9 x √100 = 249 l/s

To calculate the measuring signal at a given air volume, you can use the following formula:

$$\text{Measuring signal } \Delta P = (Q / Kv)^2$$

Example:

Model Flo-Cross® = 125

Kv-value = 8.5 l/s/1Pa

Air volume = 85 l/s

Measuring signal ΔP = (85/8.5)² = 100Pa

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