2.1.3 FloXact™-X

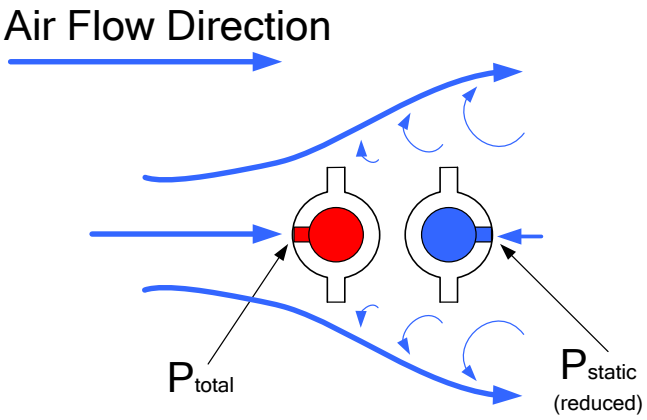
Air-Concepts Cross shaped averaging Airflow Sensor

AirConcepts

AIRFLOW MEASUREMENT AND CONTROL

Application

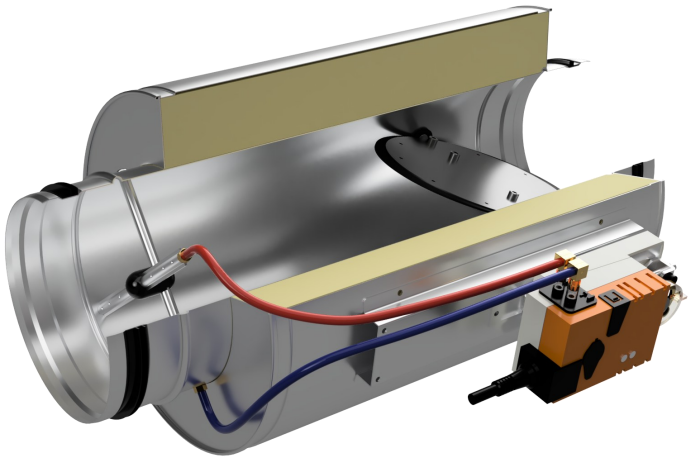
The FloXact™-X is used to measure air velocity / air volume in HVAC systems. The design is suitable for easy installation in new and refurbishment VAV terminals.
The FloXact™-X operates on the pitot tube principle and measures the total and static pressure components of airflow.
The sensor determines the average air velocity, measured over 2x4 2x6, 2x8, and 2x10 measuring points, depending on the size.
The unique shape of the measuring profile creates a linear amplification of at least 2.5x P_{dyn} making accurate measurements from as low as 1,0 m/s air velocity possible.

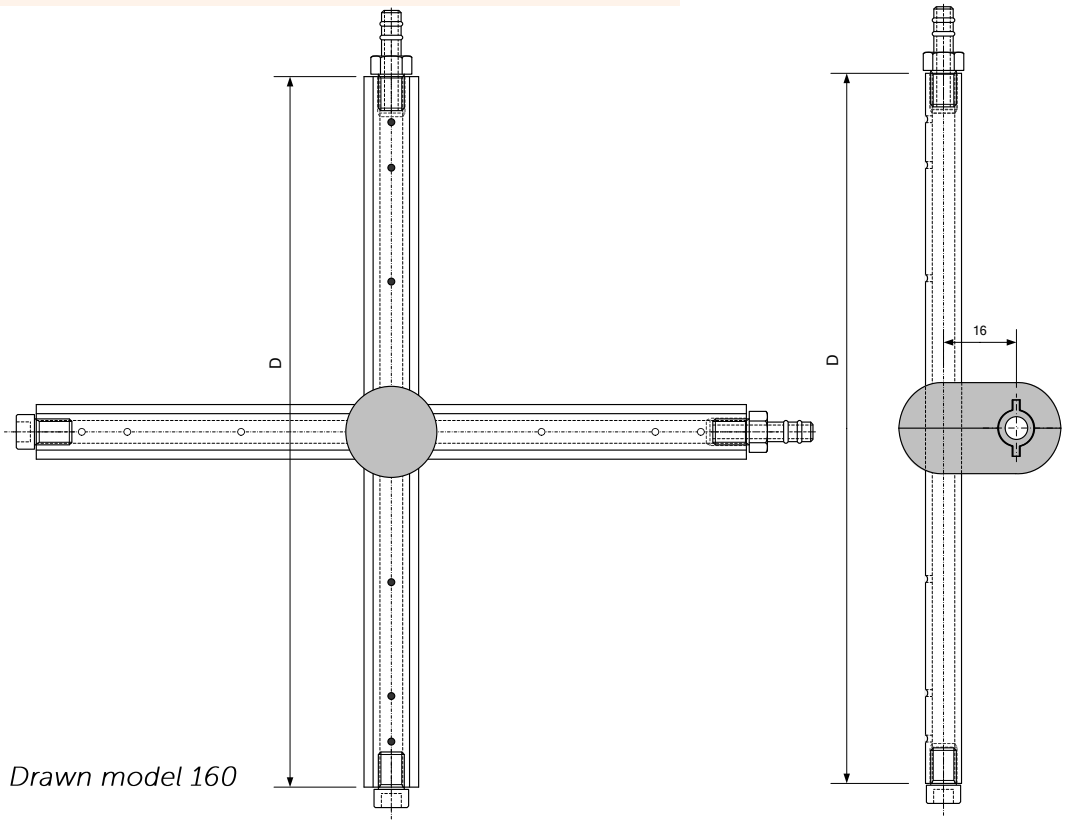


Operation of the FloXact™

Design features

- Easy installation in existing air ducts or terminals
- Multi point averaging according to the "Log-Tchebycheff" method
- 2% accuracy starting from 1,0 m/s air velocity
- The unique shape (patent pending) creates a linear amplification of at least 2.5x Pdyn.
- Chamfered entrances to eliminate air direction effects make the FloXact™ Stick insensitive to approaching multi-directional, rotating airflow with yaw and pitch up to 30º from straight flow.
- 8 standard sizes ø100, ø125, ø160, ø200, ø250, ø315, ø355 and ø400, other dimensions or sensors for rectangular duct are available upon request.
- Operating temperature +5 to +95°C





Drawn model 160

Dimensions

Model	D	holes
100	96	8
125	121	12
160	156	
200	196	
250	146	16
315	311	
355	351	
400	396	20

Operation

The FloXact™-X operates on the pitot tube principle and measures the total and static pressure components of airflow. The pressure ports located on the leading surface are sensing the total pressure (Pt) and sensing ports positioned at the rear, sense the static pressure (Ps). The difference between the total pressure and the static pressure is the dynamic pressure (Pd) which relates to the squared air velocity as:

$$P_d = \frac{1}{2} \times \rho \times v^2$$

P_d = dynamic pressure in Pa
r = density of the gas (air) in kg/m³
v = velocity in m/s

Kv value

To simplify mathematics and include the amplification and duct area, the FloXact™-X are provided with a K_v value.
The air volume can be determined with the following formula:

$$Q = K_v \times \sqrt{P_{fs}}$$

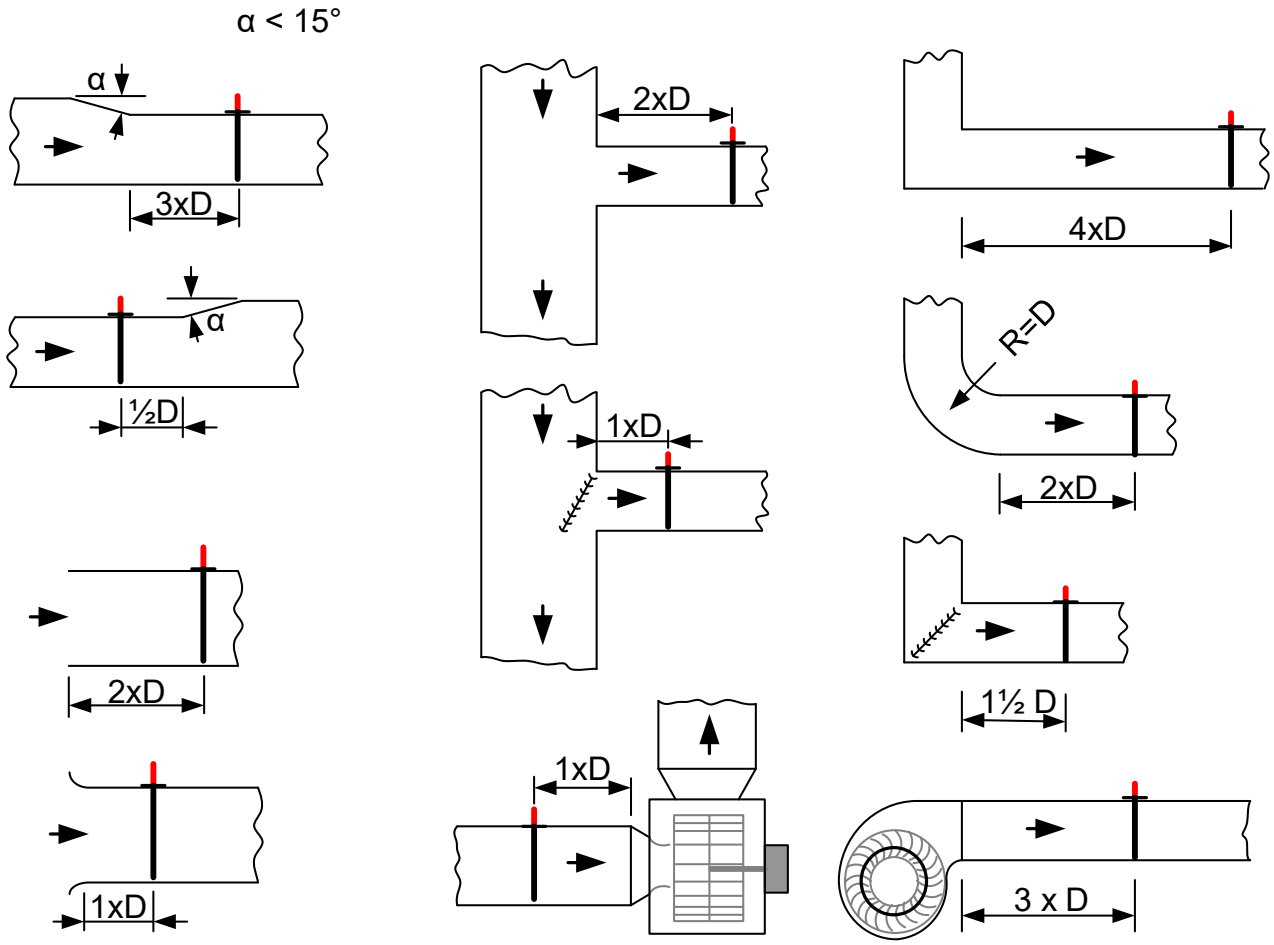
Q = air volume in l/s
K_v = K_v value in l/s/Pa
P_{fs} = pressure difference measured by the FloXact™-X in Pa

Model	100	125	160	200	250	315	355	400
Kv	5,23	8,89	15,6	25,5	41,3	67,5	86,8	111,3
P_{fs} in Pa	Air volume in l/s							
2	7	13	22	36	58	95	123	157
3	9	15	27	44	72	117	150	193
4	10	18	31	51	83	135	174	223
5	12	20	35	57	92	151	194	249
6	13	22	38	63	101	165	213	273
7	14	24	41	68	109	179	230	294
8	15	25	44	72	117	191	245	315
9	16	27	47	77	124	202	260	334
10	17	28	49	81	131	213	274	352
12	18	31	54	88	143	234	301	386
14	20	33	58	96	155	253	325	416
16	21	36	62	102	165	270	347	445
18	22	38	66	108	175	286	368	472
20	23	40	70	114	185	302	388	498
25	26	44	78	128	207	337	434	557
30	29	49	85	140	226	370	475	610
35	31	53	92	151	244	399	513	659
40	33	56	99	161	261	427	549	704
45	35	60	105	171	277	453	582	747
50	37	63	110	180	292	477	613	787
60	41	69	121	198	320	523	672	862
70	44	74	131	214	346	565	726	931
80	47	80	140	228	370	604	776	996
90	50	84	148	242	392	640	823	1.056
100	52	89	156	255	413	675	868	1.113
125	58	99	174	285	462	755	970	1.244
150	64	109	191	313	506	827	1.063	1.363
175	69	118	206	338	547	893	1.148	1.472
200	74	126	221	361	584	954	1.227	1.574
225	78	133	234	383	620	1.012	1.301	1.670
250	83	141	247	404	653	1.067	1.372	1.760
275	87	147	259	423	685	1.119	1.439	1.846
300	91	154	270	442	716	1.169	1.503	1.928

- Kv values are based on $D_{nom.}$ = D - 3 mm.
- The table above is for air with 1.20 kg/m³ density (20°C, 50% r.h. and 1013 mbar).
- The correction for different densities is determined with the following formula : $Corr = \sqrt{(\rho/1.20)}$

Type Designation

Minimum straight duct approach: (VAV installation preferences)



Round ducts : D = duct diameter
Rectangular ducts : D = 2 x (H x W) / (H + W)
Example:
W = 600, H = 300
D = 2 x (600 x 300) / (600 + 300) = 400 mm

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