PRA

Adjustment And Measurement Unit

- Airflow balancing, adjustment and measurement unit
- Manual adjustment, no tools required
- Accurate airflow measurement based on flow nozzle principle
- Minimised sound generation due to conical adjustment section
- Temperature operation range from -30 °C to +70 °C
- Self-locking adjustment mechanism, position can be ensured with locking screw
- Duct cleaning enabled through the unit up to size 315
- Adjustment position marker indicates proper position e.g. repositioning after cleaning
- Inlet and outlet spigots equipped with integral rubber gaskets
- Application option as supply air jet nozzle for air diffusion in large spaces
- Classification of casing leakage EN 1751 class C

Product Models

- PRA -unit (PRA/R) integrated with cleaning access panel. RLA enables removal of the adjustment damper and access to ductwork for cleaning.

MATERIAL

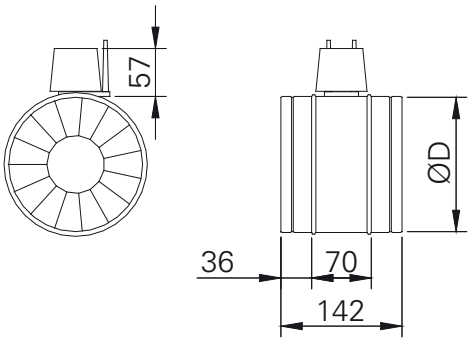
PART	MATERIAL	NOTE
Casing	Galvanised steel	
Blades	Galvanised steel	
Operating mechanism	ABS and PBT plastic	Sizes 100...315
Operating mechanism	Steel	Sizes 350...1000
Duct gaskets	1C-polyurethane hybrid	
Measurement taps	Polyurethane (PU)	

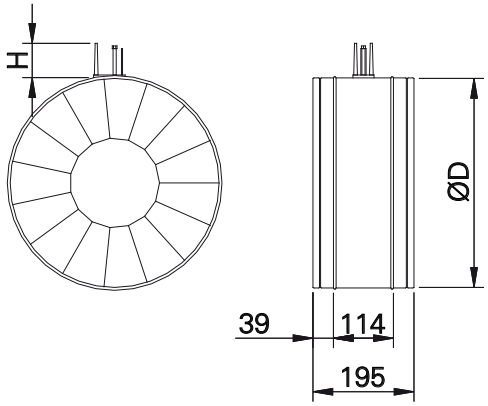
QUICK SELECTION

D [mm]	qmin [l/s]	qmin [m³/h]	qmax [l/s]	qmax [m³/h]
100	8	28	47	170
125	12	44	74	265
160	20	72	121	434
200	31	113	188	679
250	49	177	295	1060
315	78	281	468	1683
350	96	346	577	2078
400	126	452	754	2714
500	196	707	1178	4241
630	312	1122	1870	6733
800	503	1810	3016	10857
1000	785	2827	4712	16965

qmin 1 m/s duct velocity
qmax 6 m/s duct velocity - recommended maximum airflow for comfort applications

DIMENSIONS



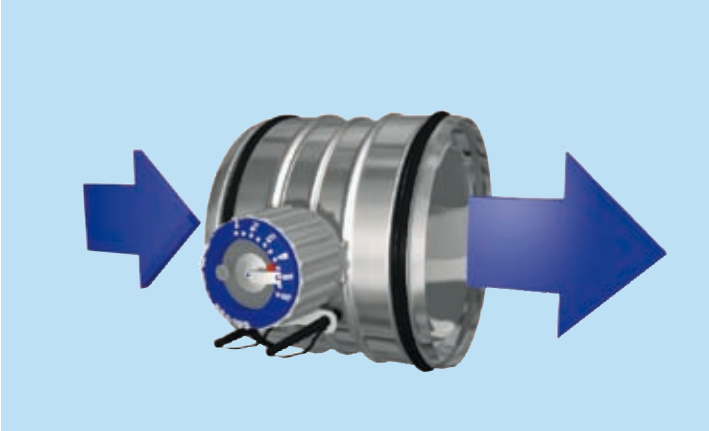


PRA 100...315

NS	ØD
100	99
125	124
160	159
200	199
250	249
315	314

PRA 350...1000

NS	ØD	H
350	349	70
400	399	70
500	499	70
630	629	70
800	799	70
1000	999	85



PRA 100...315

The operating mechanism is positioned partly outside the device and between the adjustment cone and casing. The unit can be cleaned with normal duct sweeping equipment when the device is fully opened.

PRA 400...1000

The operating mechanism is located partly outside the device and inside the adjustment cone. The device can be cleaned with normal duct sweeping equipment, when the device is fully opened and the cleaning equipment is passed carefully through the operating mechanism.

Function

The airflow rate is adjusted by turning the adjustment knob in order to change the aperture size of the adjustment cone formed by iris blades. Once the opening area is reduced, the airflow rate decreases and the total pressure loss caused by the device increases.
The airflow can be determined by measuring the differential pressure in the measurement taps.

Supply air jet nozzle PRA/S

The PRA-unit can also be used as a supply air nozzle in e.g. industrial spaces. Refer to the technical data for PRA/S -model presented in the technical performance chapter.

Installation

Sizes 100...315

CODE	DESCRIPTION
1	Air flow direction indicator
2	Adjustment knob
3	Locking screw of adjustment Position
4	Adjustment position indicator
5	Adjustment position marker for Cleaning
6	Adjustment scale
7	Measurement taps

Sizes 350...1000

CODE	DESCRIPTION
1	Adjustment position indicator
2	Adjustment knob
3	Measurement taps

Installation

Fix the damper to the ductwork e.g. with rivets. Ensure that the rivet does not prevent the operation of the PRA. The position of the rivet must be at least 10 mm from the duct end.

The PRA iris damper shall be installed in the ductwork taking into account the safety distances outlined in the installation guidelines. Safety distances are not required next to duct transitions between only one nominal duct size.

The orientation of the unit shall correspond to the airflow direction. The airflow direction is marked with an arrow indicator on the label on the casing. In order to get accurate measurement readings the orientation of the unit shall be selected so that the location of the measurement taps (below the knob) corresponds to the installation guidelines.

Safety distances

Recommended safety distance in order to get accurate measurement readings are presented in the figure below.

Direct duct with no flow disturbances

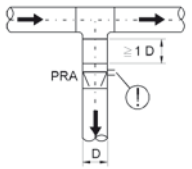
- safety distance 4 D upflow of the PRA unit
- safety distance 1 D downflow of the PRA unit

In cases where recommended safety distances cannot be met, use the correction factors of the attached figures for determination of the airflow rate.

Note the position of the measurement taps marked in the figures.

1

2



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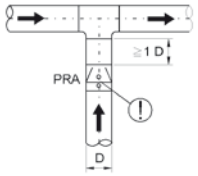

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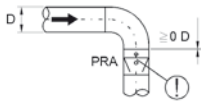

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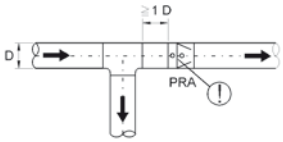

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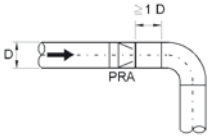

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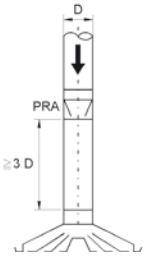

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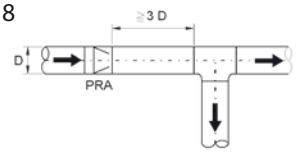


Figure	Installation case	Duct velocity upflow of the pra unit	K-factor
1	Recommended safety distance		1
2	T-branch, supply air		0.95 (1D) ...1.00 (4D)
3	T-branch, exhaust air	> 2 m/s 1... 2 m/s	0.95 (1D) ...1.00 (4D) 0.90 (1D) ...1.00 (4D)
4	90° bend		0.97 (0D) ...1.00 (4D)
5	T-branch		1
6	90° bend		1
7	Upflow of a supply air device		1
8	T-branch		1

Adjustment

Set the adjustment knob in the desired adjustment position (pre-set position if available).
The airflow rate is determined by measuring the differential pressure in measurement tabs using a manometer.
The flow rate is calculated using the formula below.

$$q_v = k * \sqrt{\Delta p_m}$$

K-factor is retrieved in both the tables presented below and in installation guidelines. K-factor depends on the unit size and adjustment position (a).
Note that when recommended safety distances are not met, the correction factors for the installation case shall be used.

PRA 100, k-factor

Opening a	qv l/s	qv m³/h	qv cfm
1	1.8	6.5	60.2
1.5	2.1	7.6	70.2
2	2.4	8.6	80.3
2.5	2.7	9.7	90.3
3	3.1	11.2	103.7
3.5	3.6	13.0	120.4
4	4.1	14.8	137.1
4.5	4.7	16.9	157.2
5	5.5	19.8	183.9
5.5	6.4	23.0	214.0
6	7.8	28.1	260.8

PRA 125, k-factor

Opening a	qv l/s	qv m³/h	qv cfm
1	2,5	9,0	83.6
1.5	2.9	10,4	97,0
2	3,3	11,9	110,3
2.5	3,8	13,7	127,1
3	4,4	15,8	147,1
3.5	5	18,0	167,2
4	5,9	21,2	197,3
4.5	6,8	24,5	227,4
5	7,9	28,4	264,2
5.5	9,5	34,2	317,7
6	11,6	41,8	387,9

PRA 160, k-factor

Opening a	qv l/s	qv m³/h	qv cfm
1	4,1	14,8	137,1
1.5	4,7	16,9	157,2
2	5,5	19,8	183,9
2.5	6,4	23,0	214,0
3	7,6	27,4	254,1
3.5	9	32,4	300,9
4	10,6	38,2	354,4
4.5	12,6	45,4	421,3
5	15	54,0	501,6
5.5	18,2	65,5	608,6
6	22,9	82,4	765,7

PRA 200, k-factor

Opening a	qv l/s	qv m³/h	qv cfm
1	7,1	25,6	237,4
1.5	8	28,8	267,5
2	8,8	31,7	294,3
2.5	10	36,0	334,4
3	11,4	41,0	381,2
3.5	13,1	47,2	438,0
4	15,1	54,4	504,9
4.5	17,5	63,0	585,2
5	20,5	73,8	685,5
5.5	24,2	87,1	809,2
6	29	104,4	969,7

Airflow (qv) diffrential pressure (Δpm) [Pa]

PRA 250, k-factor

Opening a	qv l/s	qv m³/h	qv cfm
1	10,5	37,8	351,1
1.5	11,9	42,8	397,9
2	13,8	49,7	461,4
2.5	16,1	58,0	538,3
3	18,9	68,0	632,0
3.5	22	79,2	735,6
4	25,6	92,2	856,0
4.5	30,1	108,4	1006,5
5	35,8	128,9	1197,1
5.5	42,9	154,4	1434,5
6	52,8	190,1	1765,5

PRA 315, k-factor

Opening a	qv l/s	qv m³/h	qv cfm
1	18,3	65,9	611,9
1.5	21,8	78,5	728,9
2	26	93,6	869,4
2.5	30,7	110,5	1026,5
3	36,5	131,4	1220,5
3.5	43,3	155,9	1447,8
4	51,3	184,7	1715,3
4.5	61,5	221,4	2056,4
5	74,3	267,5	2484,4
5.5	92,6	333,4	3096,3
6	120,2	306,0	4019,2

PRA 350, k-factor

Opening a	qv l/s	qv m³/h	qv cfm
1	17,6	63,4	588,5
2	24,3	87,5	812,5
3	35,2	126,7	1177,0
4	50	80,0	1671,9
5	71,6	257,8	2394,1
6	99	356,	3310,3

PRA 400, k-factor

Opening a	qv l/s	qv m³/h	qv cfm
1	20,5	73,8	685,5
2	26,5	95,4	886,1
3	36,5	131,4	1220,5
4	55	198,0	1839,1
5	86	309,6	2875,6
6	137	493,2	4581

PRA 500, k-factor

Opening a	qv l/s	qv m³/h	qv cfm
1	27,5	99,0	919,5
2	39	140,4	1304,1
3	59	212,4	1972,8
4	86	309,6	2875,6
5	123	442,8	4112,8
6	175	630	5851,6

PRA 630, k-factor

Opening a	qv l/s	qv m³/h	qv cfm
1	65	234,0	2173,4
2	90	324,0	3009,4
3	115	414,0	3845,3
4	154	554,4	5149,4
5	202	727,2	6754,4
6	295	954	8861

PRA 800, k-factor

Opening a	qv l/s	qv m³/h	qv cfm
1	98	273,3	3276,9
2	137	382,0	4581,0
3	198	552,1	6620,6
4	280	780,8	9362,5
5	393	1095,9	13141,0
6	570	1589,5	19059,4

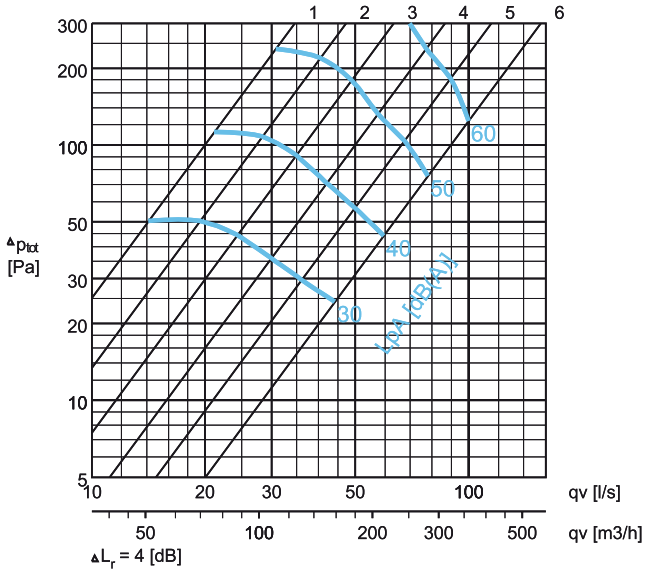
PRA 1000, k-factor

Opening a	qv l/s	qv m³/h	qv cfm
1	144	518,4	4815,0
2	220	792,0	7356,3
3	310	116,0	10365,7
4	440	1584,0	14712,5
5	620	2232,0	20731,3
6	890	3204,0	29759,5

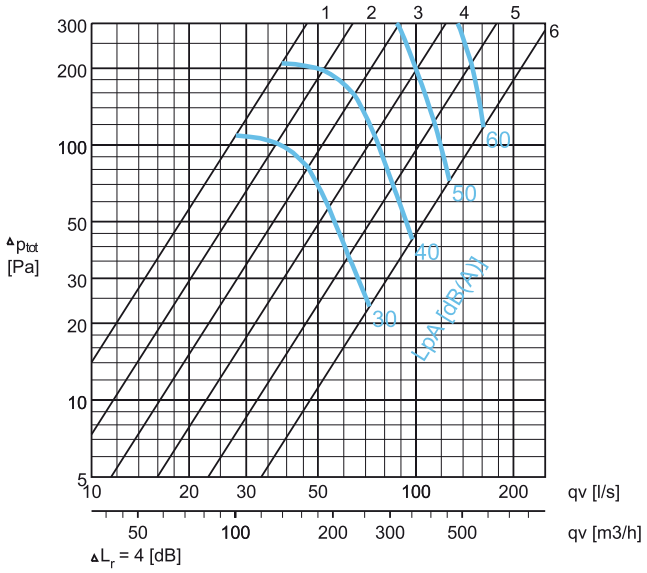
Airflow (qv) diffrential pressure (Δpm) [Pa]

Pressure drop and sound data

PRA-100



PRA-125



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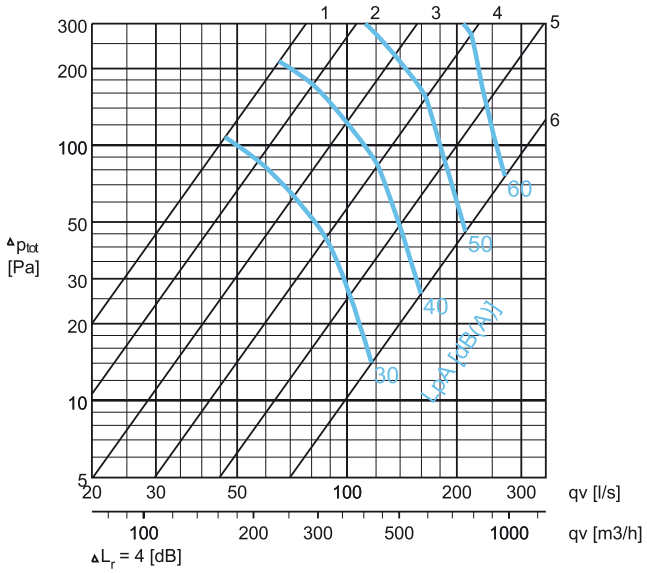
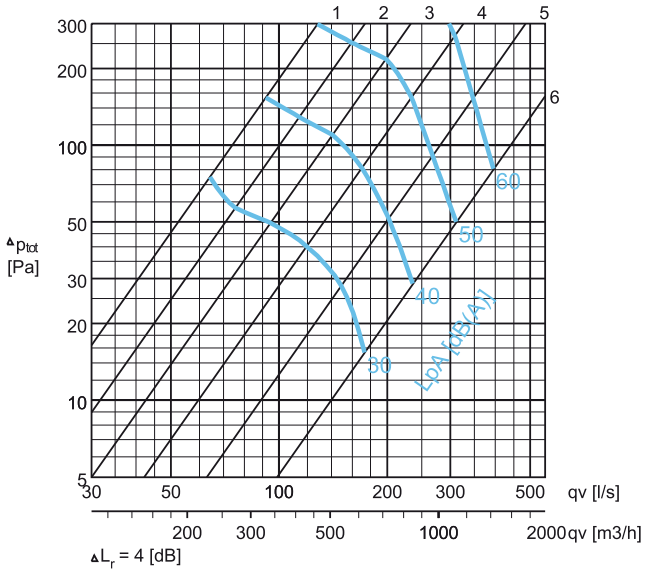
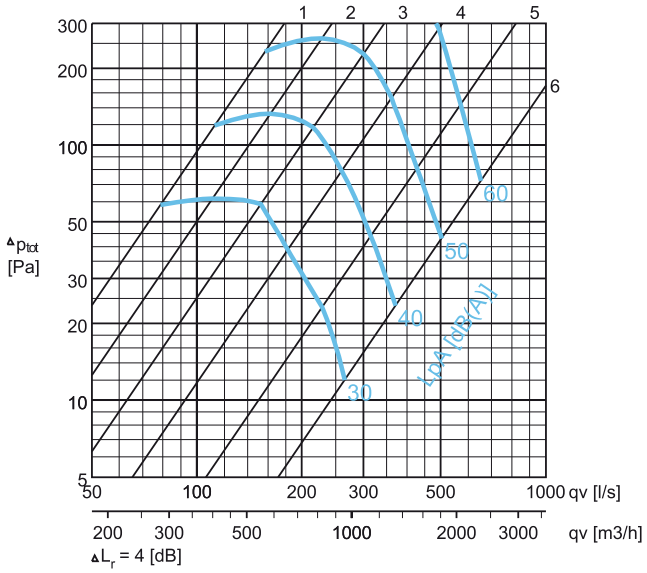


PRA-200



Pressure drop and sound data

PRA-250



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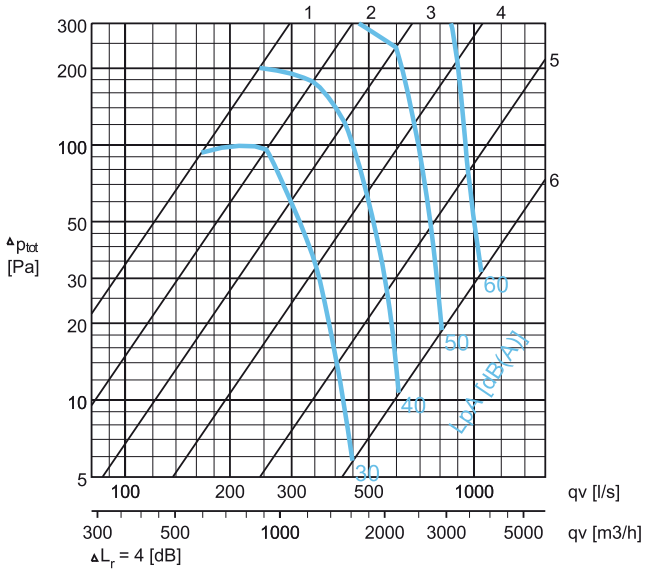

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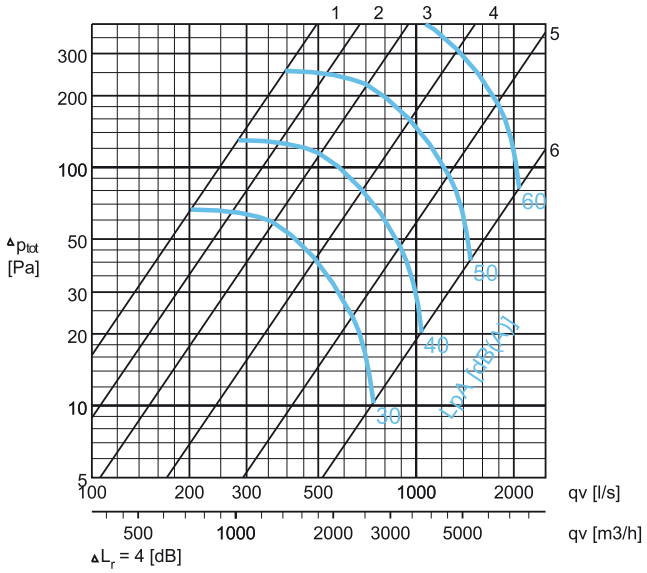

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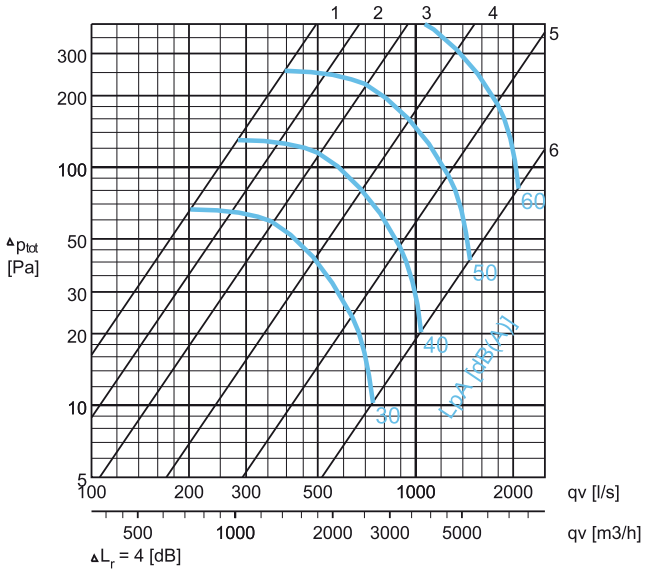
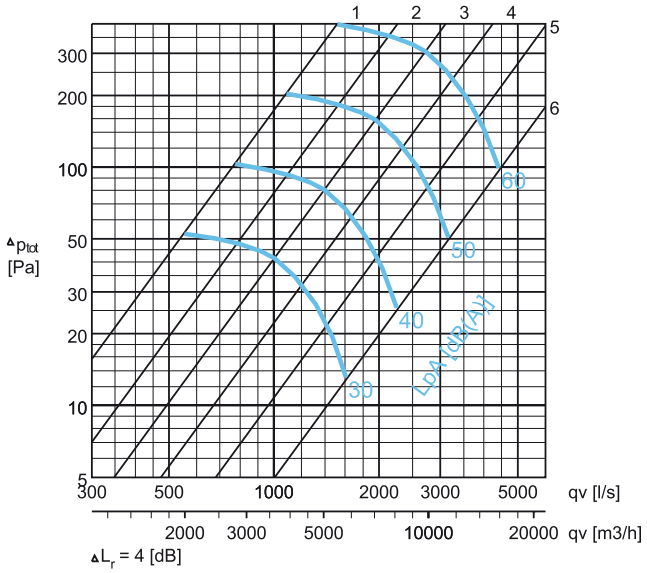
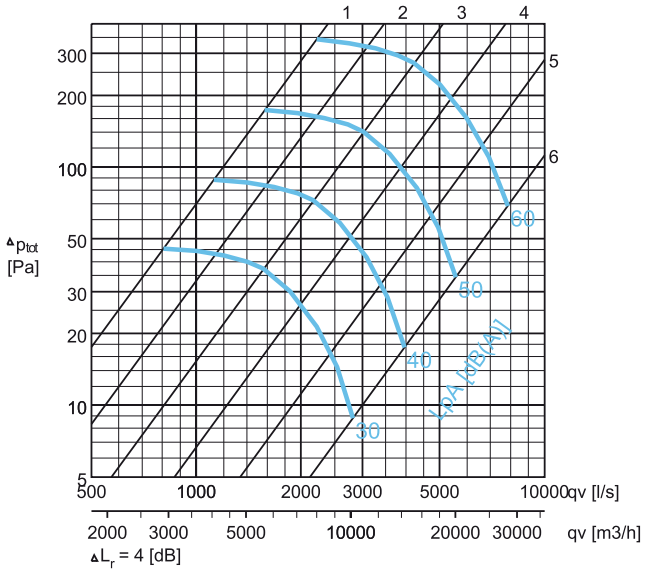


Pressure drop and sound data

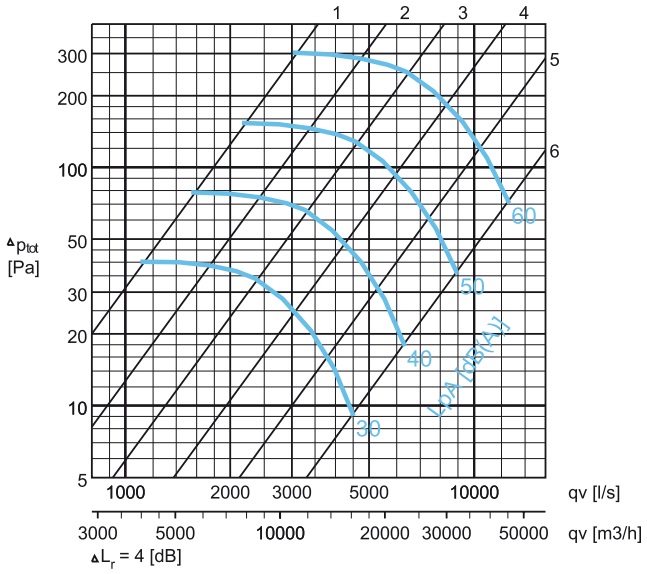
PRA-630



PRA-800



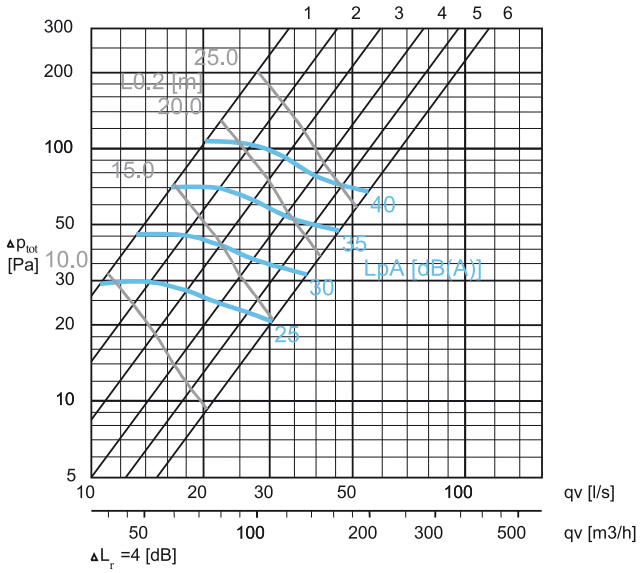
PRA-1000



Supply air jet nozzle; PRA/S

Pressure drop, flow pattern and sound data

PRA/S-100



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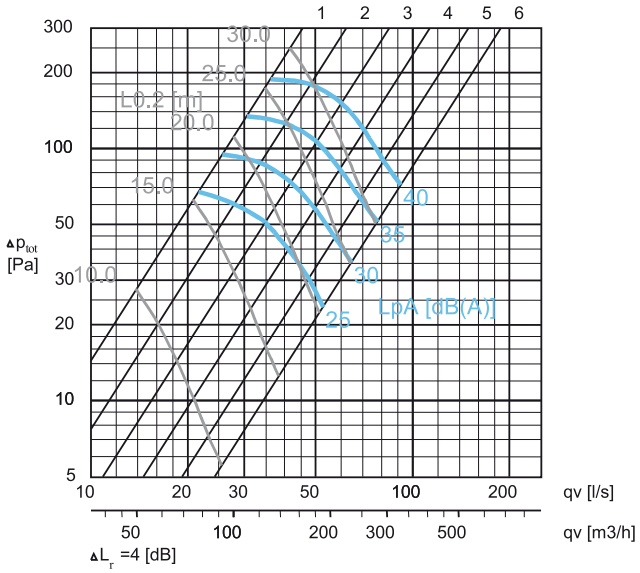

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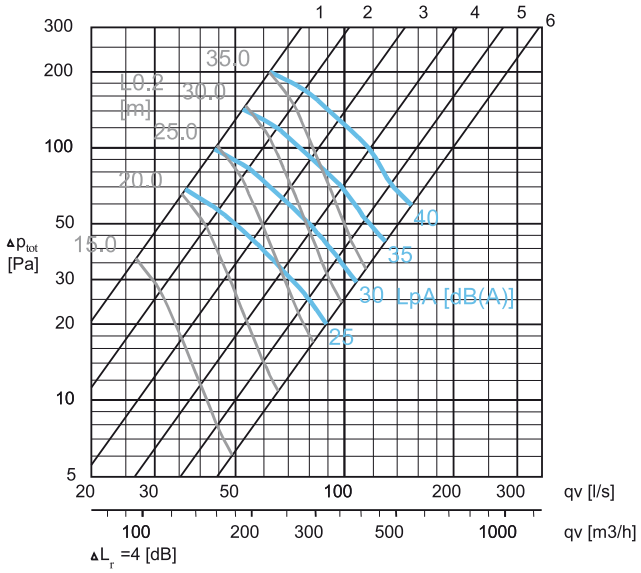

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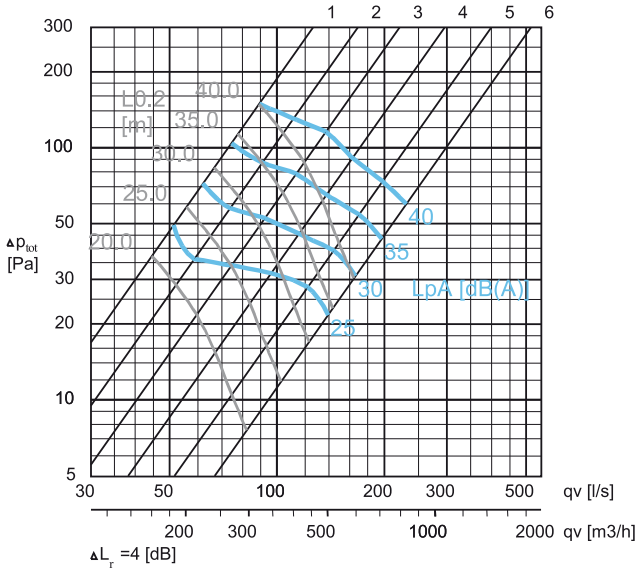
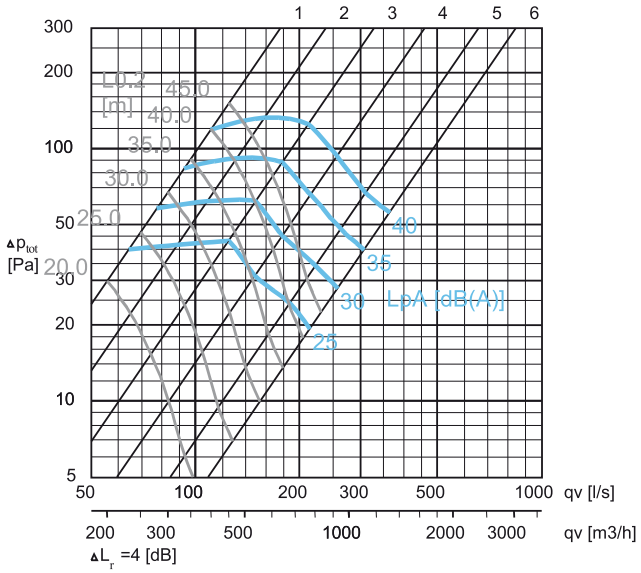


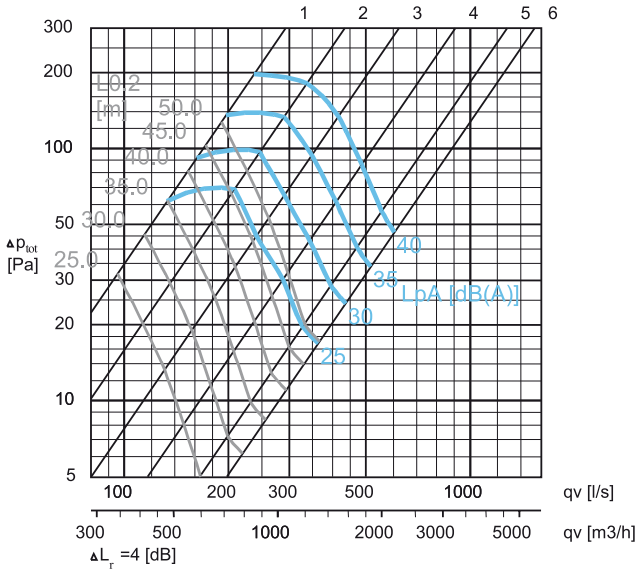
Supply air jet nozzle; PRA/S

Pressure drop, flow pattern and sound data

PRA/S-250



PRA/S-315



Supply air jet nozzle; PRA/S

SOUND DATA

100 Pa	qv		v	F (Hz)								LpA	NR
	(l/s)	(m³/h)	m/s	63	125	250	500	1000	2000	4000	8000	dB(A)	
100	20	72	2,5	36	37	36	37	38	38	34	27	38	37
	36	130	4,6	37	42	41	42	41	41	37	29	41	40
	50	180	6,4	38	45	45	45	45	45	42	35	45	44
125	51	184	4,2	40	40	41	37	32	32	27	19	33	31
	72	259	5,9	40	42	43	41	37	38	34	25	39	38
	102	367	8,3	42	45	48	46	43	46	44	32	46	45
160	45	162	2,2	41	38	34	31	28	28	25	13	29	27
	90	324	4,5	44	43	40	38	35	36	32	23	37	35
	133	479	6,6	45	45	44	42	41	43	37	29	43	42
	134	482	4,3	42	42	40	36	36	39	35	25	39	38
	188	677	6,0	44	44	42	39	40	43	39	30	43	42
	281	1012	8,9	47	49	48	46	50	51	49	37	52	50
250	199	716	4,1	42	42	40	35	38	37	30	21	38	36
	292	1051	6,0	46	46	44	40	43	43	37	27	43	42
	475	1710	9,7	49	50	50	48	52	52	50	35	53	51
315	259	932	3,3	45	40	36	31	31	28	23	13	31	27
	385	1386	4,9	46	44	40	37	38	34	28	19	37	34
	613	2207	7,9	47	49	46	44	47	45	40	27	47	44
400	248	893	2,0		37	36	35	36	33	29	20	36	33
	466	1678	3,7		39	38	37	38	35	31	22	38	34
	1314	4730	10,5		52	51	50	51	48	44	35	51	47
500	318	1145	1,6		40	39	41	40	36	29	17	39	36
	791	2848	4,0		44	43	45	44	40	33	21	44	40
	3004	10814	15,3		65	64	66	65	61	54	42	65	61
630	763	2747	2,4		44	41	41	39	37	31	21	40	36
	1562	5623	5,0		47	44	44	42	40	34	24	43	39
	4438	15977	14,2		64	61	61	59	57	51	41	60	56
800	1195	4302	2,4		46	43	43	41	39	33	23	42	38
	2548	9173	5,1		49	46	46	44	42	36	26	45	41
	9493	34175	18,9		70	67	67	65	63	57	47	66	62
1000	1739	6260	2,2		49	44	44	42	40	34	24	43	39
	4030	14508	5,1		52	47	47	45	43	37	27	46	42
	15000	54000	19,1		71	66	66	64	62	56	46	65	61

250 Pa	qv		v	F (Hz)								LpA	NR
	(l/s)	(m³/h)	m/s	63	125	250	500	1000	2000	4000	8000	dB(A)	
100	31	112	3,9	38	47	46	46	47	50	49	47	51	49
	43	155	5,5	39	48	48	49	50	50	51	48	52	51
	58	209	7,4	40	51	50	51	53	54	54	50	55	54
125	42	151	3,4	43	47	48	45	41	40	40	37	43	41
	58	209	4,7	46	47	49	46	42	41	42	39	44	42
	113	407	9,2	45	52	53	52	50	53	53	49	54	54
160	71	256	3,5	46	50	46	43	40	40	41	37	43	42
	97	349	4,8	47	50	47	44	42	42	46	41	46	46
	142	511	7,1	47	53	50	48	48	49	51	47	52	51
	117	421	3,7	50	51	50	46	44	45	45	43	47	46
	158	569	5,0	49	51	51	47	44	46	50	45	50	50
	212	763	6,8	50	53	53	49	46	49	52	48	52	53
250	163	587	3,3	47	50	51	47	46	51	48	39	51	50
	223	803	4,5	49	52	51	48	46	48	46	41	49	47
	315	1134	6,4	52	54	52	49	49	51	47	44	52	50
315	271	976	3,5	51	49	47	42	42	40	39	33	43	40
	410	1476	5,3	51	53	49	44	44	44	44	35	46	45
	609	2192	7,8	55	56	52	49	50	48	46	43	51	47
400	392	1411	3,1		51	50	49	50	47	43	34	50	46
	737	2653	5,9		53	52	51	52	49	45	36	52	48
	2077	7477	16,5		66	65	64	65	62	58	49	64	61
500	503	1811	2,6		53	52	54	53	49	42	30	53	49
	1250	4500	6,4		58	57	59	58	54	47	35	57	54
	4750	17100	24,2		79	78	80	79	75	68	56	79	75
630	1206	4342	3,9		57	54	54	52	50	44	34	53	49
	2469	8888	7,9		61	58	58	56	54	48	38	57	53
	7016	25258	22,5		78	75	75	73	71	65	55	74	70
800	1890	6804	3,8		59	56	56	54	52	46	36	55	51
	4029	14504	8,0		63	60	60	58	56	50	40	59	55
	15010	54036	29,9		83	80	80	78	76	70	60	79	75
1000	2750	9900	3,5		63	58	58	56	54	48	38	56	52
	6372	22939	8,1		66	61	61	59	57	51	41	60	56
	23717	85381	30,2		85	80	80	78	76	70	60	79	75

500 Pa	qv		v	F (Hz)								LpA	NR
	(l/s)	(m³/h)	m/s	63	125	250	500	1000	2000	4000	8000	dB(A)	
100	45	162	5,7	40	55	54	53	54	58	60	62	61	64
	61	220	7,8	41	55	55	56	58	59	62	64	63	66
	82	295	10,4	41	58	57	58	61	64	66	66	67	68
125	60	216	4,9	48	55	58	55	52	50	51	51	54	53
	83	299	6,8	51	54	58	56	52	51	55	55	56	57
	115	414	9,4	50	56	60	58	55	58	57	54	59	57
160	100	360	5,0	50	58	56	53	48	48	53	55	55	58
	137	493	6,8	51	59	56	53	52	51	59	60	59	62
	201	724	10,0	50	61	58	56	58	59	65	66	65	67
	166	598	5,3	56	60	59	55	53	54	57	60	59	62
	224	806	7,1	55	60	60	57	53	53	63	63	62	65
	300	1080	9,6	55	62	62	58	53	57	65	66	65	68
250	230	828	4,7	52	59	61	57	54	62	63	57	63	63
	316	1138	6,4	55	61	61	58	53	58	60	59	61	61
	445	1602	9,1	59	63	62	59	57	62	60	61	63	63
315	383	1379	4,9	56	58	56	51	51	48	50	50	53	52
	579	2084	7,4	56	62	58	54	54	56	60	52	60	60
	861	3100	11,1	61	65	60	58	59	58	60	61	62	63
400	555	1998	4,4		61	60	59	60	57	53	44	60	56
	1042	3751	8,3		63	62	61	62	59	55	46	62	58
	2937	10573	23,4		76	75	74	75	72	68	59	75	71
500	712	2563	3,6		63	62	64	63	59	52	40	63	59
	1768	6365	9,0		68	67	69	68	64	57	45	68	64
	6718	24185	34,2		90	89	91	90	86	79	67	90	86
630	1705	6138	5,5		68	65	65	63	61	55	45	63	59
	3492	12571	11,2		72	69	69	67	65	59	49	67	63
	9923	35723	31,8		88	85	85	83	81	75	65	84	80
800	2673	9623	5,3		70	67	67	65	63	57	47	66	62
	5698	20513	11,3		73	70	70	68	66	60	50	69	65
	21227	76417	42,3		93	90	90	88	86	80	70	89	85
1000	3889	14000	5,0		73	68	68	66	64	58	48	67	63
	9012	32443	11,5		76	71	71	69	67	61	51	70	66
	33541	120748	42,7		95	90	90	88	86	70	70	89	85

750 Pa	qv		v	F (Hz)								LpA	NR
	(l/s)	(m³/h)	m/s	63	125	250	500	1000	2000	4000	8000	dB(A)	
100	55	198	7,0	41	60	59	57	58	64	66	71	68	72
	75	270	9,6	42	59	59	60	63	64	69	73	71	75
	100	360	12,7	42	62	61	62	66	69	74	76	75	77
125	73	262,8	6,0	51	59	63	61	58	56	58	59	60	61
	101	363,6	8,2	54	59	63	61	58	57	62	65	64	67
	141	507,6	11,5	53	61	65	63	60	64	65	62	66	65
160	122	439,2	6,1	52	64	62	59	54	54	60	66	63	68
	168	604,8	8,4	53	63	61	58	57	56	66	71	68	72
	247	889,2	12,3	51	66	63	61	64	65	73	76	74	78
	203	730,8	6,5	60	65	65	61	58	59	65	69	67	71
	274	986,4	8,7	59	64	66	63	57	57	71	73	71	74
	368	1324,8	11,7	58	67	68	64	57	61	72	77	74	78
250	282	1015,2	5,7	55	64	66	62	59	68	72	67	71	72
	387	1393,2	7,9	59	66	67	64	57	64	69	69	69	71
	545	1962	11,1	64	69	68	65	62	68	67	72	71	73
315	470	1692	6,0	59	63	62	56	56	53	57	60	60	62
	709	2552,4	9,1	59	67	63	60	60	63	69	62	68	69
	1054	3794,4	13,5	65	70	65	63	64	64	68	72	70	74
400	679	2444,4	5,4		67	66	65	66	63	59	50	66	62
	12777	4597,2	10,2		69	68	67	68	65	61	52	68	64
	3598	12953	28,6		82	81	80	81	78	74	65	80	77
500	871	3135,6	4,4		69	68	70	69	65	58	46	69	65
	2165	7794	11,0		74	73	75	74	70	63	51	74	70
	8227	29617	41,9		96	95	97	96	92	85	73	96	92
630	2089	7520,4	6,7		74	71	71	69	67	61	51	69	65
	4277	15397	13,7		78	75	75	73	71	65	55	74	69
	12153	43751	39,0		94	91	91	89	87	81	71	90	86
800	3273	11783	6,5		76	73	73	71	69	63	53	72	68
	6978	25121	13,9		79	76	76	74	72	66	56	75	71
	25997	93589	51,7		99	96	96	94	92	86	76	95	91
1000	4763	17147	6,1		79	74	74	72	70	64	54	73	69
	11037	39733	14,1		83	78	78	76	74	68	58	76	72
	41079	147884	52,3		99	96	96	94	92	86	76	95	90

Servicing

Before cleaning of the ductwork, check that the actual adjustment position is ticked with the adjustment position marker.
Open the damper by turning the adjustment knob counter-clockwise.
Clean the ductwork.
Reset the damper position to the marked adjustment position.

Suggested specifications

The adjustment damper shall comprise an adjustable cone and airflow measurement taps for differential pressure measurement.
The casing and adjustment cone vanes shall be made of galvanised steel.
The airflow determination shall be based on the differential pressure measurement caused by airflow over the damper cone.
The adjustment damper shall have an adjustment position indicator and adjustment position marker to be used during cleaning.

Product code

PRA/S-D

S = Model

N	Standard
R	With RLA cleaning access panel

D = Diameter of duct connection
100, 125, 160, 200, 250, 315, 350, 400, 500, 630, 800, 1000

Code example

PRA/N-100