

RECTANGULAR CAV AND VAV

AIR VOLUME CONTROL TERMINALS

NK / NL SERIES



HC GROEP
HC BARCOL-AIR | AIR DISTRIBUTION

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Rectangular VAV and CAV air volume control terminals

Type designation
Single wall (NK.....)
Double wall (NL.....)

Composition type designation:

N - L - O - D - O - O - B

N Position 1: **Product group**

N = air volume control terminals

K Position 2: **Function**

O = not applicable
K = single wall, rectangular VAV terminal, flanged type
L = double wall, rectangular VAV terminal, flanged type
1 = non standard, specify separately

O Position 3: **Controls (manufacturer)**

O = without controls
For controls, contact our sales staff

D Position 4: **Outlet and sound attenuator**

O = not applicable
A = rectangular outlet
D = rectangular outlet with sound attenuator
N = rectangular outlet with plenum for electric reheat coil
R = rectangular outlet with sound attenuator and with plenum for electric reheat coil
1 = non standard, specify separately

O Position 5: **Reheat coil**

O = without reheat coil
E = 1-stage 230VAC/1-phase electric reheat coil
F = 2-stage 230VAC/1-phase electric reheat coil
G = 3-stage 230VAC/1-phase electric reheat coil
H = 1-stage 400VAC/3-phase electric reheat coil
J = 2-stage 400VAC/3-phase electric reheat coil
1 = non standard, specify separately

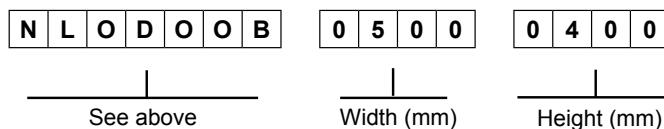
O Position 6: **Controls (type & function)**

O = without controls
R = return/extract application
For controls, contact our sales staff

B Position 7: **Sensor**

O = not applicable
B = Flo-Cross®, 2 x 12 point averaging and signal amplifying air flow sensor (standard)
1 = non standard, specify separately

Ordering example:



Ordering information:

Standard terminals:

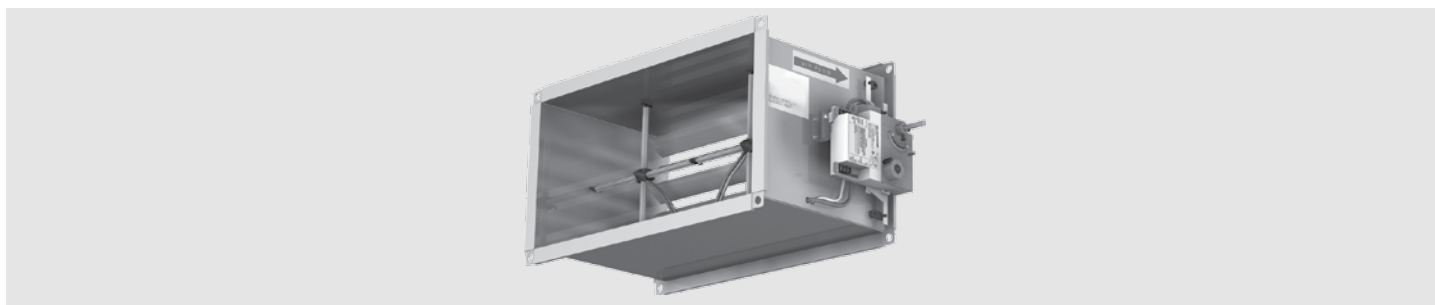
- quantity of terminals
- complete 7 digit code
- terminal size or model
- air volume setting (V_{max} , V_{min} etc)
- control handing (standard right side)
- if applicable, electric reheat coil capacity

Non standard terminals:

- for non standard terminals a full description and/or drawing are requested

Rectangular VAV and CAV air volume control terminals

Technical data
Single wall (NK.....)
Double wall (NL.....)



Application

Types NK and NL are rectangular pressure-independent VAV and CAV air volume control terminals.

The terminals are designed particularly for systems with larger air volumes and duct sizes and for the accurate measurement and control of air volumes courtesy of the patented airflow sensor type Flo-Cross®.

In CAV application, the terminals maintain the required constant airflow independent to the inlet static pressure.

In VAV application, the terminals control the air volume to the room, depending on the cooling load required thus saving energy consumption in both cooling and heating applications.

Alternatively VAV terminals are ideal to be used for CO₂ control. Dependent of the indoor air quality, always the correct amount of fresh air will be supplied to the room. Of course the primary air handling system need to be suitable for this.

The VAV or CAV terminals can be used either for supply or return air applications in new or refurbishment projects.

The terminals do have a single wall (type NK) or double wall (type NL) construction and can optionally be supplied with an additional sound attenuator and a plenum with built-in electric reheat coil.

Features:

- Pressure independent control functions.
- Compact design.
- Volume control range 100% down to 10%.
- Low pressure loss over the terminal.
- Single or double wall construction.
- Factory fitted additional attenuator and/or plenum with built-in electric reheat coil.
- Multi-leaf damper blade; full shut-off optional.
- Low noise production.
- Suitable for large air volumes.
- Suitable for all control functions (VAV, CAV, shut-off, etc.) to maximise system energy savings.
- Flo-Cross® 2 x 12 points averaging and signal amplifying airflow sensor, better than 2,5% accuracy even with irregular duct approach.
- Maintenance free.

Technical information

Casing:

Single or double wall, air-tight construction made of galvanized sheet steel; casing leakage rate to Class II VDI 3803 / DIN 24 194. 30 mm flange connections at the in- and outlet. In case of double wall construction 25 mm insulation material is used, completely enclosed by the double wall construction.

Insulation:

The terminal is supplied with 25 mm thermal and acoustical insulation (30 kg/m³) complying to: NFPA90A and 90B surface burning characteristics, BS476 part 6 and 7 fire propagation, UL 181 class 0 surface spread of flame and UL 94 HF 1 flamability.

Damper:

Damper blades: aluminium, aerofoil 50 mm opposed blade construction with external linkage.

Blades are optional provided with neoprene gasket for full shut-off function.

Damper shaft: steel, ø10 mm rotating in self lubricating Nylon bearings.

Flo-Cross®:

Extruded aluminium construction with nylon core + feet.

Sound attenuator:

Constructed from galvanized sheet steel, internal acoustic insulation tested to Class 'O' fire regulation, erosion proof up to 30 m/s. Special version insulation for hospital application on request.

Reheat coil:

Choice of electric reheat coil 230VAC/1-phase or 400VAC/3-phase.

Coils are fitted in plenum made of galvanized sheet steel with 13 mm internal isolation, type fireflex S305 (30 kg/m³). More detailed technical information can be found in the separate NO documentation.

Controls:

Suitable for use with pneumatic, analogue electronic or DDC controllers. Controls can be factory fitted, wired and calibrated. Controls enclosure (galvanized sheet steel) can be provided optionally.

Delivery format

Delivery format:

- The VAV or CAV terminal will be supplied as a single mounting assembly. Optional ordered distribution plenum, reheat coil and/or controls are factory fitted, wired and calibrated. The on site delivered terminal is ready to be installed and commissioned.
- Controls location and hot water or electric connections are as a standard fitted on the right hand side of the terminal when looking in the direction of the airflow.
- On request, the terminal can be delivered with connections on the left hand side.
- When terminals are ordered with controls, these will be factory fitted, wired and calibrated upon request.
- When terminals are ordered with 'free-issue' controls by others, wiring diagrams and mounting instructions must be provided.

Rectangular VAV and CAV air volume control terminals

Technical data
Single wall (NK.....)
Double wall (NL.....)



Specify as:

Example:

Supply and install, variable air volume terminals, double-wall construction with sound attenuator with rectangular outlet, constructed from galvanized sheet steel. The casing leakage rate shall be classified according to class II, VDI 3803/DIN 24 194 and the duct-sleeve connections shall be 30 mm flange type. The VAV terminals shall have a multi-leaf opposed blade damper with steel damper shaft rotating in self lubricating Nylon bearings. A centre averaging airflow sensor with at least 2 x 12 test points and amplified signal air flow sensor, type Flo-Cross® shall control the airflow with an accuracy not less than 2.5 %. The VAV terminal shall be supplied with an additional sound attenuator made of galvanized sheet steel and internal isolation according to class '0' fire regulation.

The controller shall be I/A Series DDC controller:
LON® compatible, type MNL-V2RVx
or
BACnet® compatible type MNB-V2.

Controls must be factory fitted, wired and calibrated according to the following requirements.

Maximum air volume 1280 l/s
Minimum air volume 512 l/s
Terminal size 400 x 400 mm
Max. pressure loss 38 Pa
Max. discharge sound index < NC35 (@250Pa Δp)
Max. radiated sound index < NC35 (@250Pa Δp)

Ordering example: type – width – height =
NL0DOOB – 0400 – 0400

Manufacturer: HC Barcol-Air

Installation Instructions:

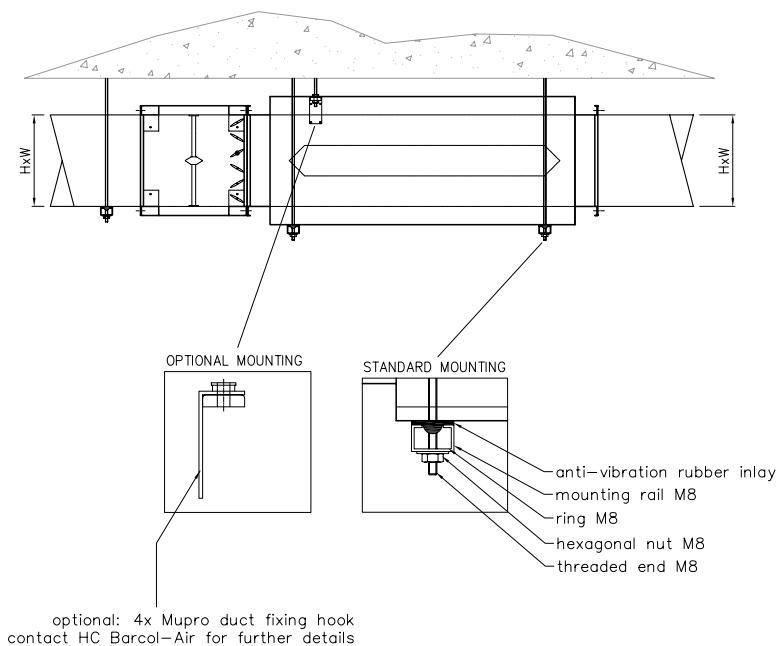
The HC Barcol-Air VAV terminals shall be installed using at least two support brackets (DIN-rail or L-profile), with anti-vibration rubber under the terminal. Each of these brackets shall be fixed with two threaded rods to the ceiling slab above.

This installation method:

- 1 Shall prevent the body of the VAV terminal from high mechanical tension, which could damage the construction and performance of the terminal.
- 2 Shall prevent torsion on the VAV terminals, which could cause malfunction of the damper blades.
- 3 Provides some flexibility to the final location of the VAV terminals.
- 4 Use at least 1x diagonal straight duct length before the VAV inlet.

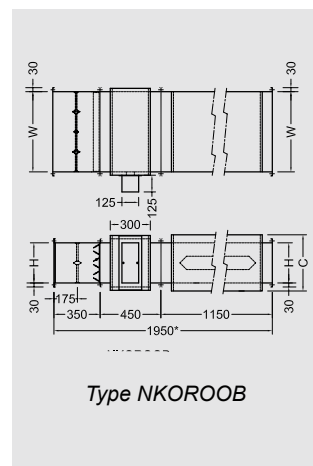
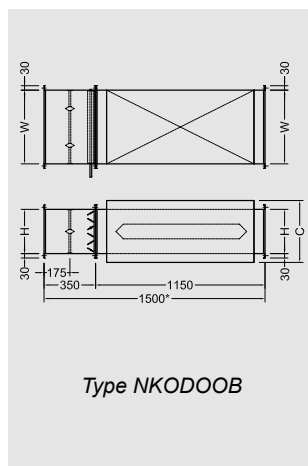
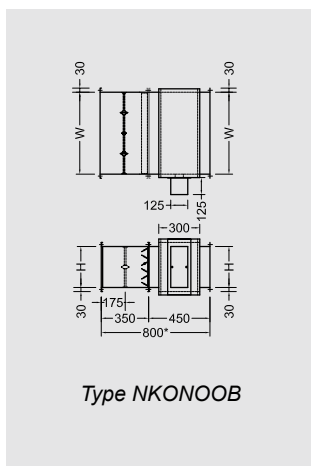
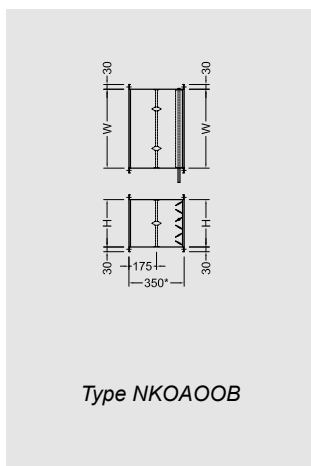
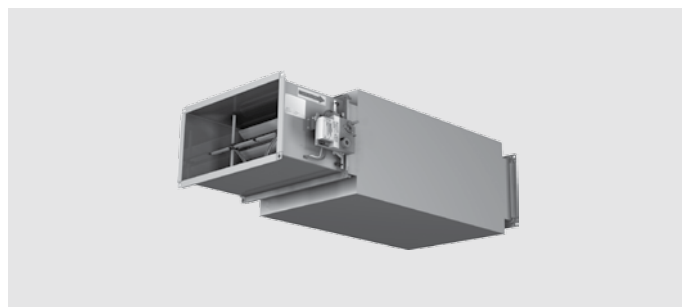
- 5 Additional manual volume control dampers (VCD's) before the inlet are not required / recommended!!
6. All connections shall be thermally isolated.
7. Pressure sensing tubes of Flo-Cross® airflow sensor shall not be "kinked" or otherwise obstructed by the external duct insulation.

Optional 4 x Mupro fixing hooks can be used (see drawing).



Rectangular VAV and CAV air volume control terminals

Model overview Single wall - type NK.....



Dimensions NK/NL

height C ↓	H ↓	width W →	200	250	300	350	400	450	500	600	700	750	800
300	200		•	•	•	•	•	•	•	•	•	•	•
370	250			•	•	•	•	•	•	•	•	•	•
450	300				•	•	•	•	•	•	•	•	•
520	350					•	•	•	•	•	•	•	•
600	400						•	•	•	•	•	•	•
735	450							•	•	•	•	•	•
765	500								•	•	•	•	•
850	600									•	•	•	•

All dimensions in mm.
Other dimensions are available upon request.

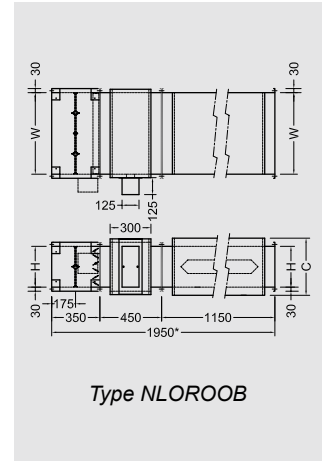
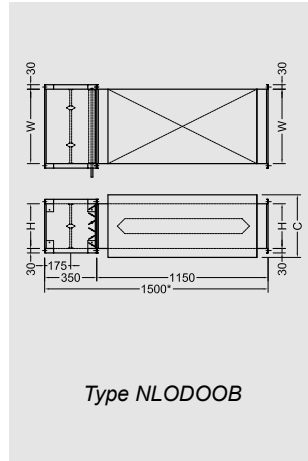
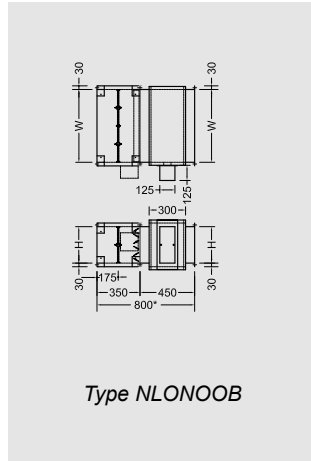
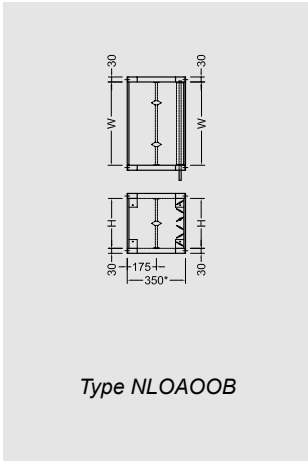
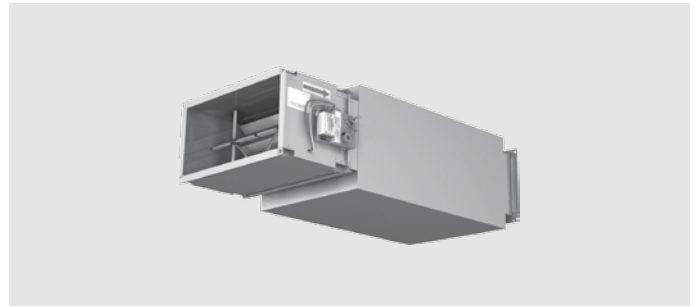
Kv values

Height (H)	Width (W)												
	200	250	300	350	400	450	500	600	700	750	800	900	1000
150	25	31	36	43	51	54	61	72					
200	34	44	51	60	68	78	88	103	122	132	137		
250		49	60	72	88	100	98	121	156	146	158	181	195
300			72	85	99	113	121	143	171	185	198	215	243
350				97	113	129	143	171	195	211	227	256	288
400					126	144	162	198	227	245	251	287	324
450						164	185	226	259	279	287	329	371
500							208	241	291	314	324	371	417
600								287	342	369	397	454	510

Flow = Kv x √ΔPfc
 ΔPfc = Flo-Cross® signal
 If ΔPfc = 30 Pa and VAV size = 500 x 350
 Flow = 143 x √30 = 783 l/s

Rectangular VAV and CAV air volume control terminals

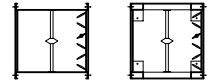
Model overview Double wall - type NL.....



For dimensions and Kv values see page 4.

Rectangular VAV and CAV air volume control terminals

Type **NKOA00B**
NLOA00B



Sound data $\Delta p = 125 \text{ Pa}$

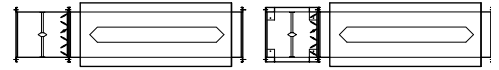
Size (W x H)	data referring to		$\Delta p = 125 \text{ Pa}$																													
			discharge sound										radiated sound single wall						radiated sound double wall													
	inlet spigot		L_w in dB/Oct. (re 1pW)						Lp values			L_w in dB/Oct. (re 1pW)					Lp values			L_w in dB/Oct. (re 1pW)				Lp values								
	velocity	air volume			min. ΔP_s	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR
m/s	l/s	CFM	m ³ /h	Pa	dB					dB						dB						dB										
350 x 300 (DN 355)	2	210	445	756	1	47	48	43	27	30	22	21	--	--	33	32	26	-	-	-	--	--	--	29	28	22	-	-	-	--	--	--
	4	420	889	1512	6	57	60	56	45	44	37	33	28	30	43	44	39	31	28	29	23	--	--	39	40	35	27	24	23	--	--	--
	6	630	1334	2268	13	59	62	58	49	48	41	35	31	33	45	46	41	35	32	33	25	--	21	41	42	37	31	28	27	21	--	--
	8	840	1779	3024	23	58	61	55	47	47	41	33	29	31	44	45	38	33	31	33	23	--	--	40	41	34	29	27	27	--	--	--
	10	1050	2224	3780	35	60	60	54	47	49	42	34	29	31	46	44	37	33	33	34	23	--	--	42	40	33	29	29	28	--	--	--
	12	1260	2668	4536	51	63	61	55	48	53	46	35	29	31	49	45	38	34	37	38	25	--	--	45	41	34	30	33	32	21	--	--
350 x 350 (DN 400)	2	245	519	882	1	48	48	43	28	30	23	22	--	--	34	32	26	-	-	-	--	--	--	30	28	22	-	-	-	--	--	--
	4	490	1038	1764	6	58	61	57	46	45	38	34	29	31	44	45	40	32	29	30	23	--	--	40	41	36	28	25	24	--	--	--
	6	735	1556	2646	13	60	63	59	49	48	42	36	31	33	46	47	42	35	32	34	25	--	21	42	43	38	31	28	28	21	--	--
	8	980	2075	3528	23	58	61	56	48	47	41	34	30	32	44	45	39	34	31	33	24	--	--	40	41	35	30	27	27	--	--	--
	10	1225	2594	4410	35	61	61	55	48	50	43	34	29	31	47	45	38	34	34	35	24	--	--	43	41	34	30	30	29	20	--	--
	12	1470	3113	5292	51	64	62	55	49	53	46	36	30	32	50	46	38	35	37	38	26	--	20	46	42	34	31	33	32	22	--	--
400 x 400 (DN 450)	2	320	678	1152	1	49	50	44	29	31	24	23	--	--	35	34	27	-	-	-	--	--	--	31	30	23	-	-	-	--	--	--
	4	640	1355	2304	6	59	62	58	47	46	39	35	30	32	45	46	41	33	30	31	25	--	20	41	42	37	29	26	25	21	--	--
	6	960	2033	3456	13	61	64	60	51	50	43	37	33	35	47	48	43	37	34	35	27	--	23	43	44	39	33	30	29	23	--	--
	8	1280	2711	4608	23	60	63	57	49	49	43	35	31	33	46	47	40	35	33	35	25	--	21	42	43	36	31	29	29	21	--	--
	10	1600	3388	5760	35	62	62	56	49	51	44	36	31	33	48	46	39	35	35	36	25	--	21	44	42	35	31	31	30	21	--	--
	12	1920	4066	6912	51	65	63	56	50	54	47	37	31	33	51	47	39	36	38	39	27	--	21	47	43	35	32	34	33	23	--	--
450 x 450	2	405	858	1458	1	49	50	45	30	32	25	19	16	23	35	34	28	-	-	-	--	--	--	31	30	24	-	-	-	--	--	--
	4	810	1715	2916	6	59	62	59	48	47	40	32	30	35	45	46	42	34	31	32	25	--	20	41	42	38	30	27	26	21	--	--
	6	1215	2573	4374	13	61	64	60	52	51	44	35	33	37	47	48	43	38	35	36	27	--	23	43	44	39	34	31	30	23	--	--
	8	1620	3431	5832	23	60	63	58	50	50	44	33	31	35	46	47	41	36	34	36	25	--	21	42	43	37	32	30	30	21	--	--
	10	2025	4288	7290	35	62	62	57	50	52	45	33	31	36	48	46	40	36	36	37	25	--	21	44	42	36	32	32	31	21	--	--
	12	2430	5146	8748	51	65	63	57	51	55	48	33	31	37	51	47	40	37	39	40	27	--	21	47	43	36	33	35	34	23	--	--
500 x 400 (DN 500)	2	400	847	1440	1	49	50	45	30	32	25	23	--	--	35	34	28	-	-	-	--	--	--	31	30	24	-	-	-	--	--	--
	4	800	1694	2880	6	59	62	59	48	47	40	35	30	32	45	46	42	34	31	32	25	--	20	41	42	38	30	27	26	21	--	--
	6	1200	2541	4320	13	61	64	60	52	50	44	37	33	35	47	48	43	38	34	36	27	--	23	43	44	39	34	30	30	23	--	--
	8	1600	3388	5760	23	60	63	57	50	50	44	35	31	33	46	47	40	36	34	36	25	--	21	42	43	36	32	30	30	21	--	--
	10	2000	4235	7200	35	62	62	57	50	52	45	36	31	33	48	46	40	36	36	37	25	--	21	44	42	36	32	32	31	21	--	--
	12	2400	5082	8640	51	65	63	57	51	55	48	37	31	33	51	47	40	37	39	40	27	--	21	47	43	36	33	35	34	23	--	--
600 x 400 (DN 560)	2	480	1016	1728	1	49	50	45	31	33	26	23	--	--	35	34	28	-	-	-	--	--	--	31	30	24	-	-	-	--	--	--
	4	960	2033	3456	6	59	62	59	49	48	41	35	30	32	45	46	42	35	32	33	25	--	20	41	42	38	31	28	27	21	--	--
	6	1440	3049	5184	13	61	64	60	52	51	45	37	33	35	47	48	43	38	35	37	27	--	23	43	44	39	34	31	31	23	--	--
	8	1920	4066	6912	23	60	63	58	51	50	44	35	31	33	46	47	41	37	34	36	25	--	21	42	43	37	33	30	30	21	--	--
	10	2400	5082	8640	35	62	62	57	51	53	46	36	31	33	48	46	40	37	37	38	26	--	21	44	42	36	33	33	32	21	--	--
	12	2880	6099	10368	51	65	63	57	52	56	49	37	31	33	51	47	40	38	40	41	27	--	21	47	43	36	34	36	35	23	--	--
800 x 400 (DN 630)	2	640	1355	2304	1	49	50	46	32	34	27	23	--	--	35	34	29	18	18	19	--	--	--	31	30	25	-	-	-	--	--	--
	4	1280	2711	4608	6	59	62	59	50	49	42	35	30	32	45	46	42	36	33	34	25	--	20	41	42	38	32	29	28	21	--	--
	6	1920	4066	6912	13	61	64	61	54	53	46	37	33	35	47	48	44	40	37	38	27	--	23	43	44	40	36	33	32	23	--	--
	8	2560	5421	9216	23	60	63	58	52	52	46	35	31	33	46	47	41	38	36	38	25	--	21	42	43	37	34	32	32	21	--	--
	10	3200	6776	11520	35	62	62	57	52	54	47	36	31	33	48	46	40	38	38	39	26	--	21	44	42	36	34	34	33	22	--	--
	12	3840	8132	13824	51	65	63	58	53	57	50	37	31	33	51	47	41	39	41	42	27	--	21	47	43	37	35	37	36	23	--	--
900 x 450 (DN 710)	2	810	1715	2916	1	49	50	46	33	35	28	23	--	--	35	34	29	19	19	20	--	--	--	31	30	25	-	-	-	--	--	--
	4	1620	3431	5832	6	59	62	60	51	50	43	35	30	32	45	46	43	37	34	35	25	--	20	41	42	39	33	30	29	21	--	--
	6	2430	5146	8748	13	61	64	61	55	54	47	37	33	35	47	48	44	41	38	39	27	--	23	43	44	40	37	34	33	23	--	--
	8	3240	6861	11664	23	60	63	59	53	53	47	35	31	33	46	47	42	39	37	39	26	--	21	42	43	38	35	33	33	22	--	--
	10	4050	8576	14580	35	62	62	58	53	55	48	36	31	33	48	46	41	39	39	40	26	--	21	44	42	37	35	35	34	22	--	--
	12	4860	10292	17496	51	65	63	58	54	58	51	37	31	33	51	47	41	40	42	43	28	--	21	47	43	37	36	38	37	24	--	--

- Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO 3741 and ISO 5135 standards.
- L_w in dB/Oct. (re 1pW) are sound power levels for discharge sound and case radiated sound. Figures less than 17 dB are indicated by "--".
- The discharge sound pressure levels are determined with the assumptions as referred to in table 1 for downstream ductwork including a diffuser with insulated plenum box.
- The radiated sound pressure levels are determined with the assumptions as referred to in table 1 for

- ceiling plenum and suspended ceiling absorption.
- L_p values are including a room absorption of 10 dB/Oct.
- dB(A), NC and NR index figures are sound pressure levels. Figures less than 20 are indicated by "--".
- Δp_s is static pressure drop across VAV air volume control terminal with damper fully open.
- Sound data indicated by "X" are not provided as minimum required static pressure drop is more than the given pressure drop.
- For non standard applications and/or selections, please contact our technical staff.

Rectangular VAV and CAV
air volume control terminals

Type **NKODOOB**
NLODOOB



Sound data Δ p = 125 Pa

Size (W x H)	data referring to		Δ p = 125 Pa																															
			discharge sound									radiated sound single wall						radiated sound double wall																
	inlet spigot		min. Δ Ps	L _w in dB/Oct. (re 1pW)						Lp values			L _w in dB/Oct. (re 1pW)						Lp values			L _w in dB/Oct. (re 1pW)			Lp values									
	velocity	air volume			125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR			
	m/s	l/s	CFM	m ³ /h	Pa	dB						dB			dB						dB			dB										
350 x 300 (DN 355)	2	210	445	756	8	43	38	24	-	-	-	-	-	33	32	26	-	-	-	-	-	-	-	29	28	22	-	-	-	-				
	350 x 350 (DN 400)	2	245	519	882	8	43	39	27	-	-	-	-	-	34	32	26	-	-	-	-	-	-	-	30	28	22	-	-	-	-			
		400 x 400 (DN 450)	2	320	678	1152	8	45	41	29	-	-	-	-	-	35	34	27	-	-	-	-	-	-	-	31	30	23	-	-	-	-		
			450 x 450	2	405	858	1458	9	45	41	29	17	18	-	-	-	35	34	28	-	-	-	-	-	-	-	31	30	24	-	-	-	-	
				500 x 400 (DN 500)	2	400	847	1440	8	45	41	29	-	18	-	-	-	35	34	28	-	-	-	-	-	-	-	31	30	24	-	-	-	-
					600 x 400 (DN 560)	2	480	1016	1728	8	45	41	29	17	18	-	-	-	35	34	28	-	-	-	-	-	-	-	31	30	24	-	-	-
800 x 400 (DN 630)						2	640	1355	2304	8	45	41	30	18	19	-	-	-	35	34	29	18	19	-	-	-	-	-	31	30	25	-	-	-
	900 x 450 (DN 710)					2	810	1715	2916	9	45	41	30	19	20	-	-	-	35	34	29	19	20	-	-	-	-	-	31	30	25	-	-	-

- Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO 3741 and ISO 5135 standards.
- L_w in dB/Oct. (re 1pW) are sound power levels for discharge sound and case radiated sound. Figures less than 17 dB are indicated by “-”.
- The discharge sound pressure levels are determined with the assumptions as referred to in table 1 for downstream ductwork including a diffuser with insulated plenum box.
- The radiated sound pressure levels are determined with the assumptions as referred to in table 1 for ceiling plenum and suspended ceiling absorption.
- Lp values are including a room absorption of 10 dB/Oct.
- dB(A), NC and NR index figures are sound pressure levels. Figures less than 20 are indicated by “-”.
- Δps is static pressure drop across VAV air volume control terminal with damper fully open.
- Sound data indicated by “X” are not provided as minimum required static pressure drop is more than the given pressure drop.
- For non standard applications and/or selections, please contact our technical staff.

Table 1: Assumptions for additional attenuation

Hz	125	250	500	1000	2000	4000
Discharge (dB)	5	10	20	30	30	25
Radiated (dB)	2	5	10	15	15	20

Table 2: Correction table for other unit sizes: L_{PA'} = L_{PA(0,2)} + Δ L_{PA}

WxH (m²)	0,03	0,04	0,05	0,06	0,07	0,08	0,10	0,12	0,14	0,16	0,18	0,20	0,25	0,30	0,40	0,50	0,60
Δ L _{PA} (dB)	-7	-6	-5	-4	-4	-3	-2	-1	-1	-1	0	0	0	1	1	1	2

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