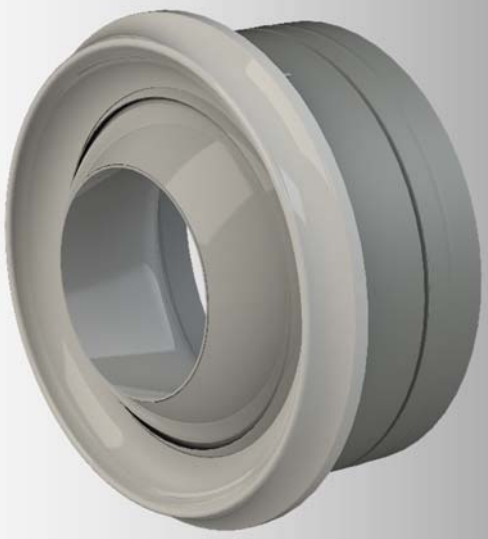
Technical documentation



WDA

Long throw nozzle

Contents

SCHAKO KG
Steigstrasse 25-27
D-78600 Kolbingen

Phone +49 (0) 7463-980-0
Fax +49 (0) 7463-980-200
schako.com | info@schako.de

FUNCTION AND USE

A horizontal supply air pattern is often required for large, high rooms such as theatres, concert halls, production halls, etc. Long range nozzles type WDA are particularly suitable for this application. Their **low noise level** allows a **high blow velocity, resulting in correspondingly long throw distances**. The nozzles are also very well suited for vertical throws.
Please note, however, that nozzles which are designed for heating mode can cause draughts in cooling mode. This can be avoided if the nozzles are designed for cooling mode. In this case, in heating mode, individual nozzles can be blanked off to achieve a higher exit velocity than that of the remaining ones, thus resulting in increased penetration. An alternative would be to design the nozzles based on maximum penetration during heating and to reduce the total air volume during ventilation, thus saving energy costs. We have also developed accessories for the nozzles in order to extend their possible uses. A **swivel head** allows you to **move** the nozzle by approx. 30 degrees **in all directions**. This does not affect the noise level or pressure loss. This adjustment can be done manually or electrically. The swirl discs greatly reduce the penetration.
For mounting in the ceiling or wall, inspection openings for the electrical connection must be provided on-site in sufficient number and size.

Attention:
Please note that for size 400 the connection spigot of the throw nozzles must be fitted on-site.
The installation of WDA into spiral ducts must take place free of stress. Avoid using non-circular or deformed spiral ducts, in order to protect the nozzle from distortion.

MODELS

WDA-N-…	Nozzle without installation components (not available with -SK swivel head)
WDA-F-…	for flexible hose connection
WDA-W-…	for spiral duct connection
WDA-D-…	for ceiling and wall installation (not possible for NW 400)
WDA-K-…	for duct connection
WDA-R-…	for duct connection (using saddle bracket, not possible for NW 031-050 and NW 400)
WDA-…-SK-…	with swivel head

PROCESSING

Nozzle part

-- painted Zincor (only NW031-063):
  - RAL 9010 (white) (-9010, standard).
  - To a different RAL colour (at an extra charge, -xxxx).
-- Painted aluminium (starting from NW080):
  - RAL 9010 (white) (-9010, standard).
  - To a different RAL colour (at an extra charge, -xxxx).

Cover plate

-- Painted sheet steel:
  - RAL 9010 (white) (-9010, standard).
  - To a different RAL colour (at an extra charge, -xxxx).

Connection spigot

-- Painted sheet steel:
  - RAL 9010 (white) (-9010, standard).
  - To a different RAL colour (at an extra charge, -xxxx).
-- Galvanised sheet steel (only with WDA-D)

Mounting ring

-- Painted sheet steel:
  - RAL 9010 (white) (-9010, standard).
  - To a different RAL colour (at an extra charge, -xxxx).

Saddle bracket (only WDA-R-…)

-- Painted sheet steel:
  - RAL 9010 (white) (-9010, standard).
  - To a different RAL colour (at an extra charge, -xxxx).

ACCESSORIES

Swivel head (-S0 / -SK)

-- without swivel head (-S0).
-- with swivel head (-SK):
  - painted Zincor (only NW031-045):
    - RAL 9010 (white) (-9010, standard).
    - To a different RAL colour (at an extra charge, -xxxx).
  - Painted aluminium (starting from NW063):
    - RAL 9010 (white) (-9010, standard).
    - To a different RAL colour (at an extra charge, -xxxx).

Swirl disc (-DS0 / -DS1 / -DS2)

-- without swirl disc (-DS0).
-- with swirl disc (-DS1 / -DS2, not possible in combination with damper -DV1 / -DV2):
  - made of painted sheet steel:
    - RAL 9010 (white) (-9010, standard).
    - To a different RAL colour (at an extra charge, -xxxx)
  - made of galvanised sheet steel

Reduction piece (-R0 / -RS)

-- without reduction piece (-R0).
-- with reduction piece (possible only with WDA-W/D-…-S0/SK):
  - made of painted sheet steel:
    - RAL 9010 (white) (-9010, standard).
    - To a different RAL colour (at an extra charge, -xxxx)
  - made of galvanised sheet steel (only with WDA-D)

Ball impact guard (-B0 / -BS)

-- without ball impact guard (-B0).
-- with ball impact guard (-BS):
  - made of painted sheet steel and round steel:
    - RAL 9010 (white) (-9010, standard).
    - To a different RAL colour (at an extra charge, -xxxx)

Cover plate / flange ring (-BN / -BR / -FR)

-- without cover plate (-BN).
-- with cover plate (-BR):
  - made of painted aluminium:
    - RAL 9010 (white) (-9010, standard).
    - To a different RAL colour (at an extra charge, -xxxx)
-- with flange ring (-FR, possible only with WDA-K-…-SK):
  - made of stainless steel (V2A)

Damper (-DV0 / -DV1 / -DV2)

-- without damper (-DV0).
-- with damper (-DV1 / -DV2, not possible in combination with swirl disc -DS1 / -DS2, only possible for NW 400):
  - made of painted sheet steel:
    - RAL 9010 (white) (-9010, standard).
    - To a different RAL colour (at an extra charge, -xxxx)
  - made of galvanised sheet steel (only with WDA-D)

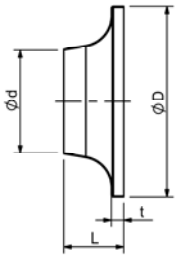
Actuator (-E000-AA / -E…-AL/AR/AI)

-- without actuator (-E000-AA)
-- with actuator (-E…, possible only with -SK swivel head, actuator inside (-AI) in connection with swirl disc (-DS1/-DS2), reduction piece (-RS) or damper (-DV) available only upon request)
  - 24VAC / 3-point (actuator outside, only for NW063-250) (-E047-AL/AR)
  - 230VAC / 3-point (actuator outside, only for NW063-250) (-E048-AL/AR)
  - 24VAC / 0-10 V DC (actuator outside, only for NW063-250) (-E049-AL/AR)
  - 24VAC / 3-point (actuator inside, only for NW063-250) (-E090-AI)
  - 24VAC / 0-10 V DC (actuator inside, only for NW063-250) (-E091-AI)
  - 230VAC / 3-point (actuator inside, only for NW063-250) (-E092-AI)

DIMENSIONS

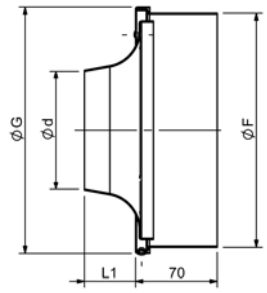
without swivel head (-S0)

WDA-N-...

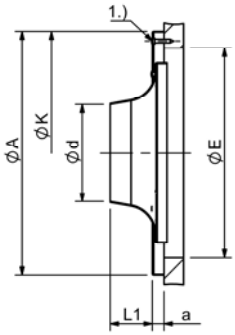


Nozzle without installation components
(not available with swivel

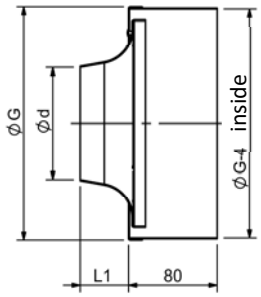
WDA-F-...



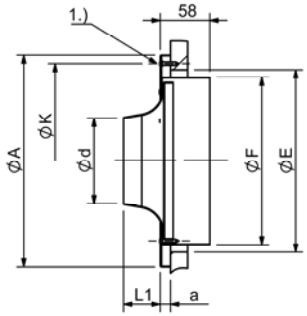
WDA-K-...



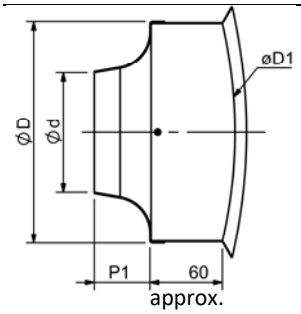
WDA-W-...



WDA-D-... (NW 400 not possible)



WDA-R-... (not possible for NW 031-050 and NW 400)



Available sizes

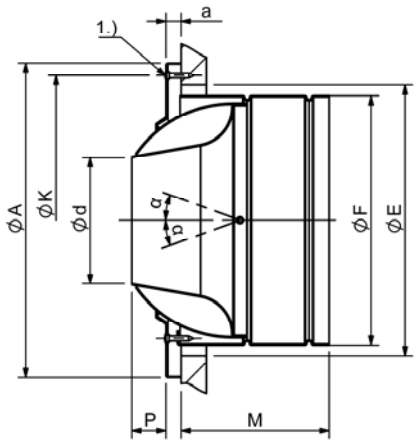
NW	ød	øA	øE	øF	øG	øK	a	L	t	P1	øD1	øD	L1
031	31	150	115	98	108	130	9	87	12	-	-	90	72
040	40							63		-			48
045	45							49	10	-			34
050	50							34.5		-			20
063	63	250	215	198	208	230	12	163	12	151	181 - 800*	185	148
080	80							114	14	102			99
087	87							114		83			80
100	100							91	12	82			43
125	125	450	415	398	408	430		192		175	356 - 800*	360	174
160	160							212		195			192
175	175							168		153			150
200	200							99		84			81
250	250							79		67			64
400	400	845	800	752	808	815	20	340	20	-	-	724	318

* Larger diameters are also available upon request!
1.) 3x indentation for slotted shallow-raised countersunk-head tapping screw DIN ISO 7051 pitch 3.9 (6x for NW 400)

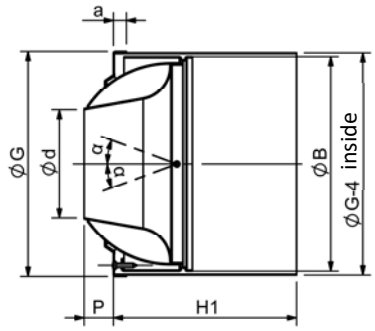
DIMENSIONS OF ACCESSORIES

Swivel head (-SK, NW 050 not possible)

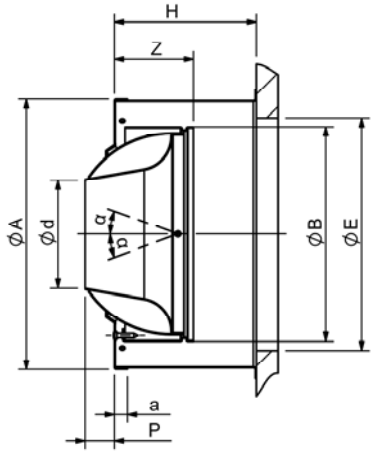
WDA-D-…-SK-… (NW 400 not possible)



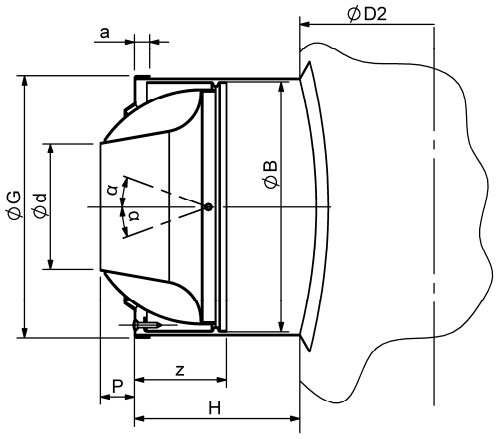
WDA-W-…-SK-…



WDA-K-…-SK-…



WDA-R-…-SK-…
(not possible for NW 031-045 and NW 400)



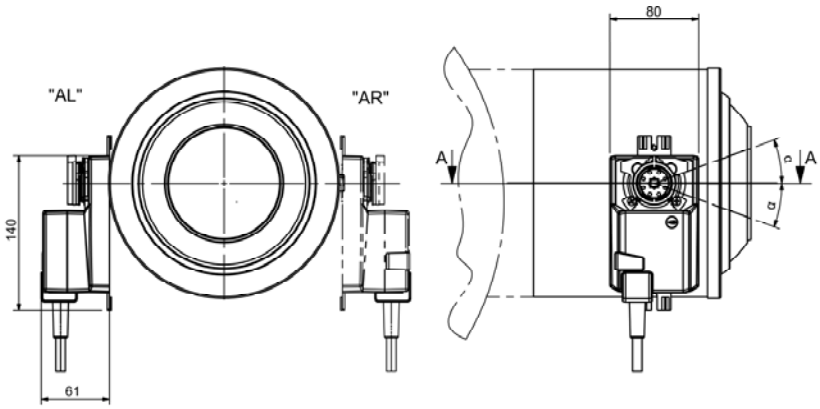
Available sizes

NW	ød	øA	øE	øF	øG	øK	a	α	P	H	H1	M	øB	z	øD2
031	31	150	115	98	108	130	9	28	42	62	99	41	102	53	-
040	40								18						
045	45								7						
063	63	250	215	198	208	230	12	25	98	131	170	118	197	74	200 - 1200*
080	80								50						
087	87								50						
100	100							20	27						
125	125	450	415	398	408	430		30	86	201	241	163	398	155	400 - 1200*
160	160							28	108						
175	175								64						
200	200							22	56						
250	250							13	35						
400	400	845	800	-	808	-	20	20	111	336.5	375	-	793	240	-

* Larger diameters are also available upon request!
1.) 3 x indentation for slotted shallow-raised countersunk-head tapping screw DIN ISO 7051 pitch 3.9

Electrical actuator (only possible with NW 063-250)

Mounted externally (-AL/-AR, standard)



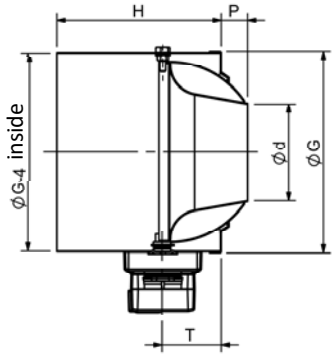
"AL" = left-hand version (standard)
0 V = nozzles on top
Direction of rotation "R"

"AR" = right-hand version
0 V = nozzles on top
Direction of rotation "L"

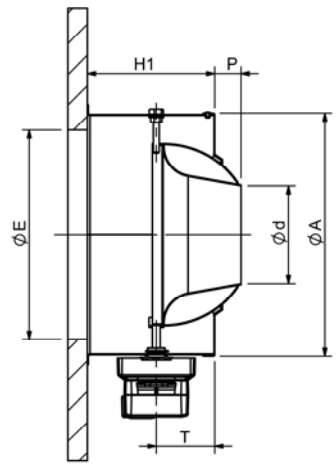
For an externally fitted actuator, please make sure that the distance to the ceiling or wall is greater than 10 mm.

List of actuators	Actuator internal NW 063 - 250	Actuator external NW 063 - 250
230 V AC, 3-point	E092 (Siemens GLB 331.2)	E048 (Belimo NM230A-F)
24 V AC, 0-10 V DC (standard)	E091 (Siemens GLB 163.2E)	E049 (Belimo NM24A-SR-F)
24 V AC, 3-point	E090 (Siemens GLB 131.2E)	E047 (Belimo NM24A-F)

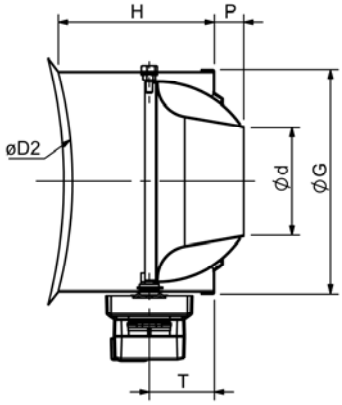
Section A-A
WDA-W-…-SK-…-E…-…



Section A-A
WDA-K-…-SK-…-E…-…



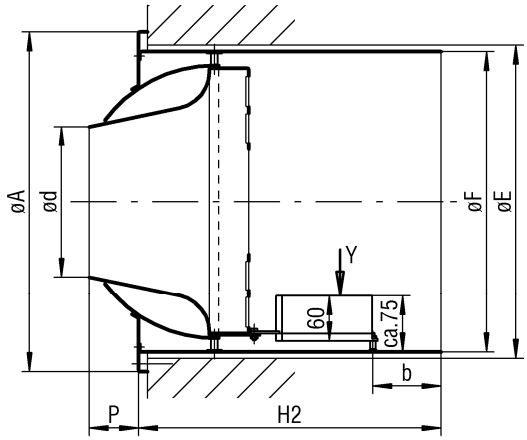
Section A-A
WDA-R-…-SK-…-E…-…



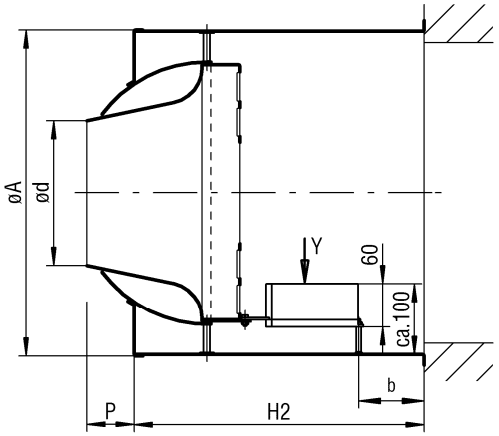
NW	T
063-100	55
125-250	90

Mounted internally (-AI, at an extra charge)

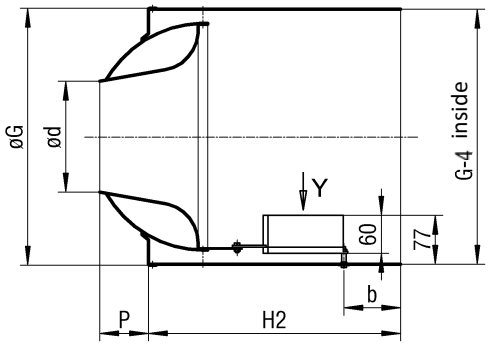
WDA-D-…-SK-…-E…-AI-…



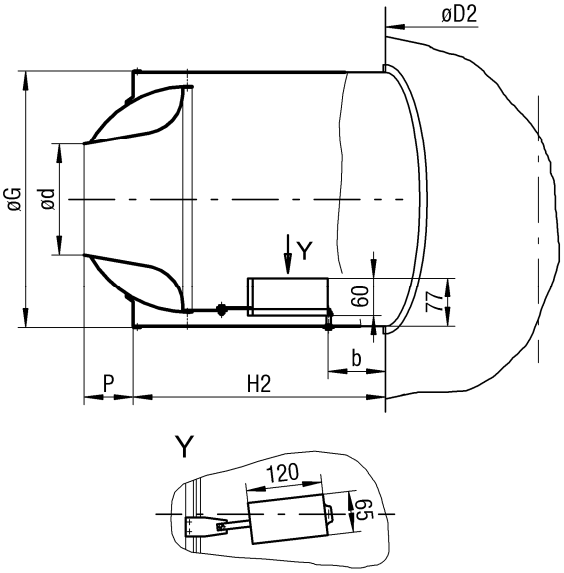
WDA-K-…-SK-…-E…-AI-…



WDA-W-…-SK-…-E…-AI-…



WDA-R-…-SK-…-E…-AI-…



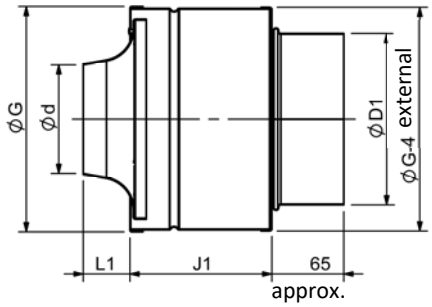
Available sizes WDA-…-SK-…-E…-…
(mounted internally / mounted externally)

NW	ød	P	øA	øG	øE	øF	H	H2	øD2	b	α Actuator mounting external	α Actuator mounting inside
063	63	104	250	208	215	198	170	250	200 - 1200*	10	25	22
080	80	55										
087	87	36										
100	100	29									20	
125	125	92	450	408	415	398	240	400	400 - 1200*	95	30	
160	160	110									28	
175	175	71										
200	200	65									22	
250	250	35									13	13

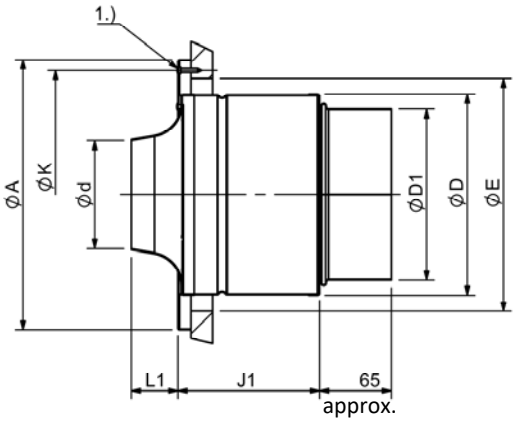
* Larger diameters are also available upon request!
WDA-…-SK-…-E…-AI in connection with swirl disc (-DS1/-DS2), reduction piece (-RS) or damper (-DV) available only upon request!

Reduction piece (-RS, only available for NW 063–250)

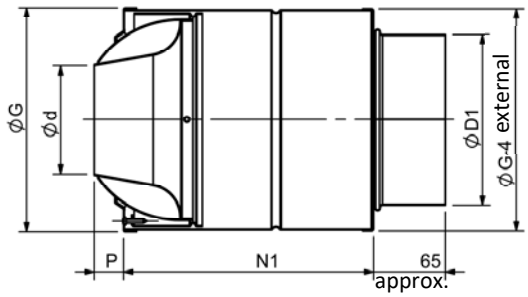
WDA-W-…-RS-…



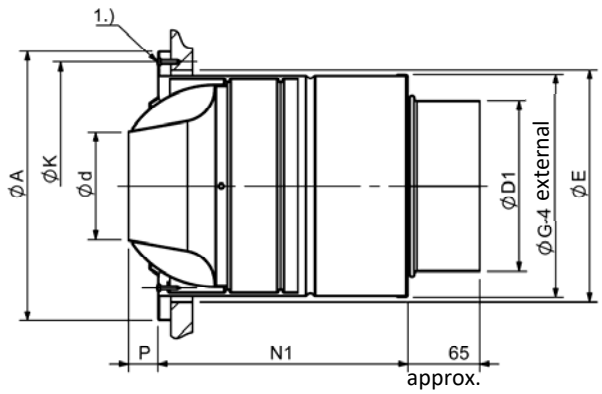
WDA-D-…-RS-…



WDA-W-…-SK-…-RS-…



WDA-D-…-SK-…-RS-…

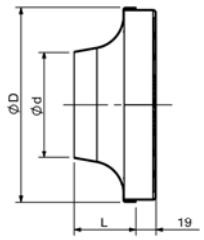


1.) 3x indentation for slotted shallow-raised countersunk-head tapping screw DIN ISO 7051 pitch 3.9

Available sizes -RS

NW	ød	L1	øD1	P	øD	øA	J1	N1	øG	øK	øE
063	63	148	98	104	185	250	130	230	208	230	215
080	80	99	123	55							
087	87	80	138	36							
100	100	43	158	29							
125	125	174	198	92	360	450	200	300	408	430	415
160	160	192	248	110							
175	175	150	278	71							
200	200	81	313	65							
250	250	64	313	35							

Swirl disc (-DS1/2, only available for NW 063–250, not possible in combination with damper -DV1/-DV2)

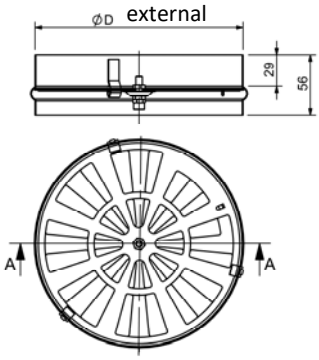


Swirl discs no. 1 and 2 only differ by having different perforations. The swirl discs can be mounted for all models.

Available sizes -DS

NW	ød	L	øD
063	63	163	185
080	80	114	
087	87	95	
100	100	58	
125	125	189	360
160	160	207	
175	175	165	
200	200	96	
250	250	79	

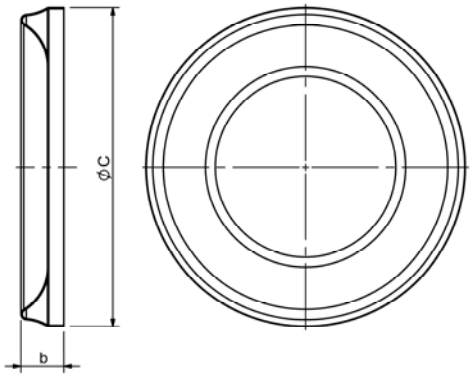
Damper -DV1 / -DV2 (not possible in combination with swirl disc -DS1/-DS2)



Available sizes -DV1 / -DV2

Model	NW	øD
WDA-…-S0-…-DV1	400	719
WDA-…-SK-…-DV2	400	778

Cover plate (-BR, concealed mounting, only available for NW 063–250)

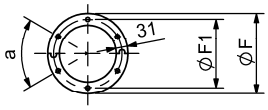


Available sizes -BR

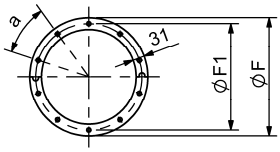
NW	WDA-D/K/D-…-S0/SK-…-E000/Exxx-…		WDA-F/W/R-…		WDA-W/R-…-SK-…-E000/Exxx-…		WDA-F/D/K-…-S0/SK-…-E000/Exxx-…		WDA-W/R-…-S0/DK-…-E000/Exxx-…	
	øC	b	øC	b	øC	b	øC	b	øC	b
063 - 100	253	34	211	29	211	28	-	-	-	-
125 - 250	-	-	-	-	-	-	452	49	412	40

Flange ring (-FR, for WDA-K-…-SK-…)

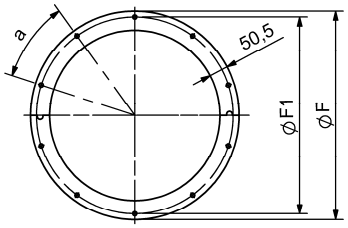
NW 031-045



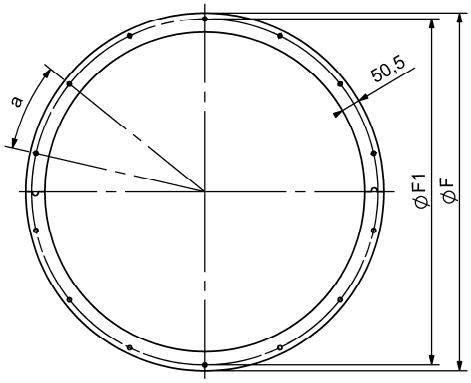
NW 063-100



NW 125-250



NW 400



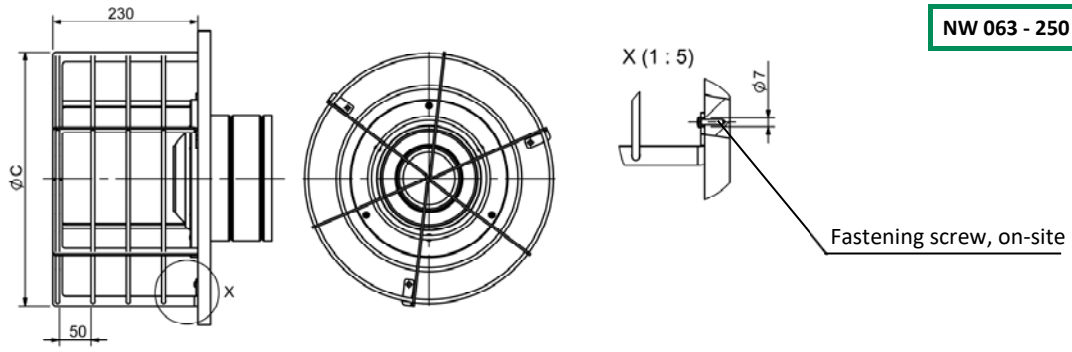
Available sizes -FR

NW	øF	øF1	a	n
031	181	212	60°	6
040				
045				
063	281	312	36°	10
080				
087				
100				
125	551	520	36°	10
160				
175				
200				
250				
400	946	915	25,7°	14

Drilling diameter = ø 11 mm
n = Number of bores

Ball impact guard (-BS)

WDA-D-…-S0/SK-...-BS-… / WDA-K-...-S0-...-BS-...



Number of fastening holes

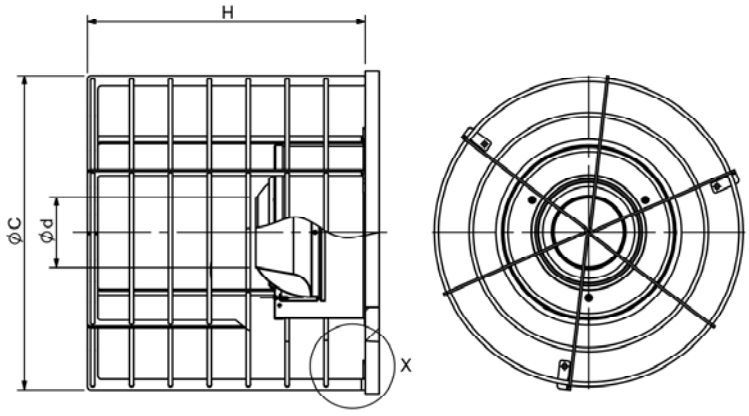
NW 063 - 250	**3**

The models WDA-N-… / WDA-W-…-S0/SK-… / WDA-F-…-S0-… / WDA-R-…-S0/SK-… are not available with ball impact guard.

Available sizes WDA-D-…-S0/SK-…-BS-… / WDA-K-…-S0-…-BS-…

NW	ød	øA	øB	øC	øE	øF	øG	øK
063	63	250	342	398	215	198	208	230
080	80							
087	87							
100	100							
125	125	450	542	598	415	398	408	430
160	160							
175	175							
200	200							
250	250							

WDA-K-…-SK-…-BS-…



For detailed view X, see p. 10

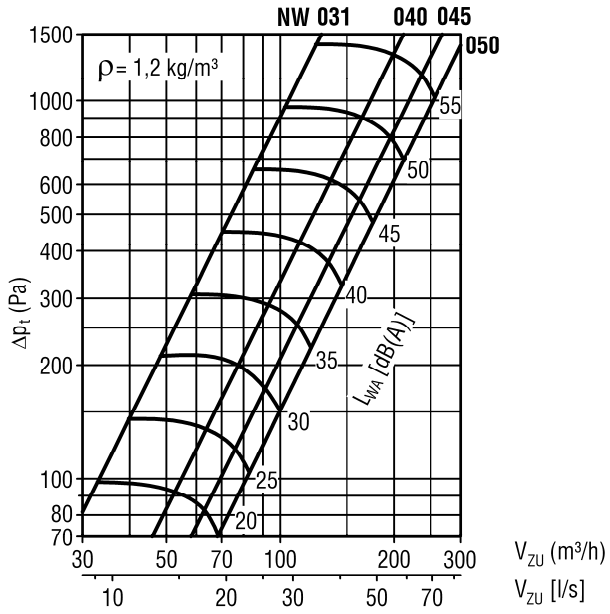
Available sizes WDA-K-…-SK-…-BS-…

NW	ød	øA	øB	øC	øE	øF	øG	øK	H
063	63	250	342	450	215	198	208	230	400
080	80								
087	87								
100	100								
125	125	450	542	650	415	398	408	430	540
160	160								
175	175								
200	200								
250	250								

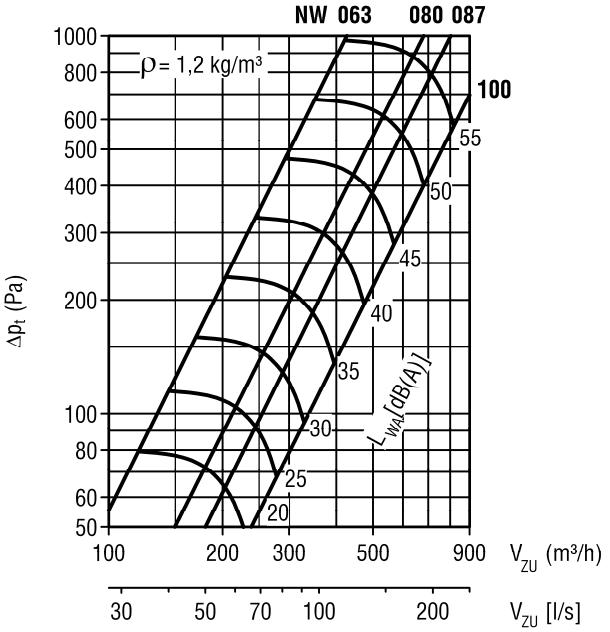
TECHNICAL DATA

Pressure loss and noise level

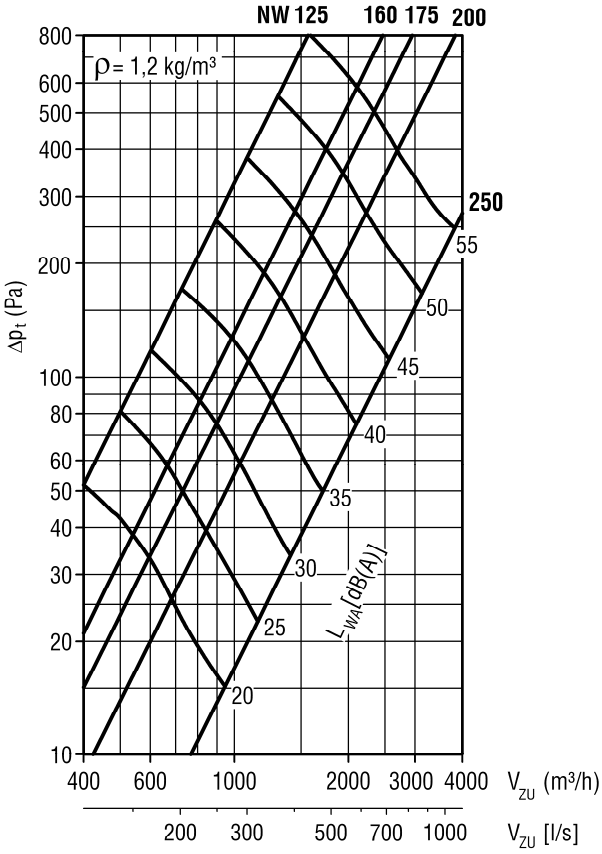
WDA-...-031 / -040 / -045 / -050-...

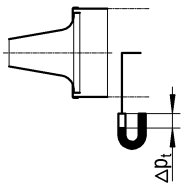


WDA-...-063 / -080 / -087 / -100-...



WDA-...-125 / -160 / -175 / -200 / -250-...

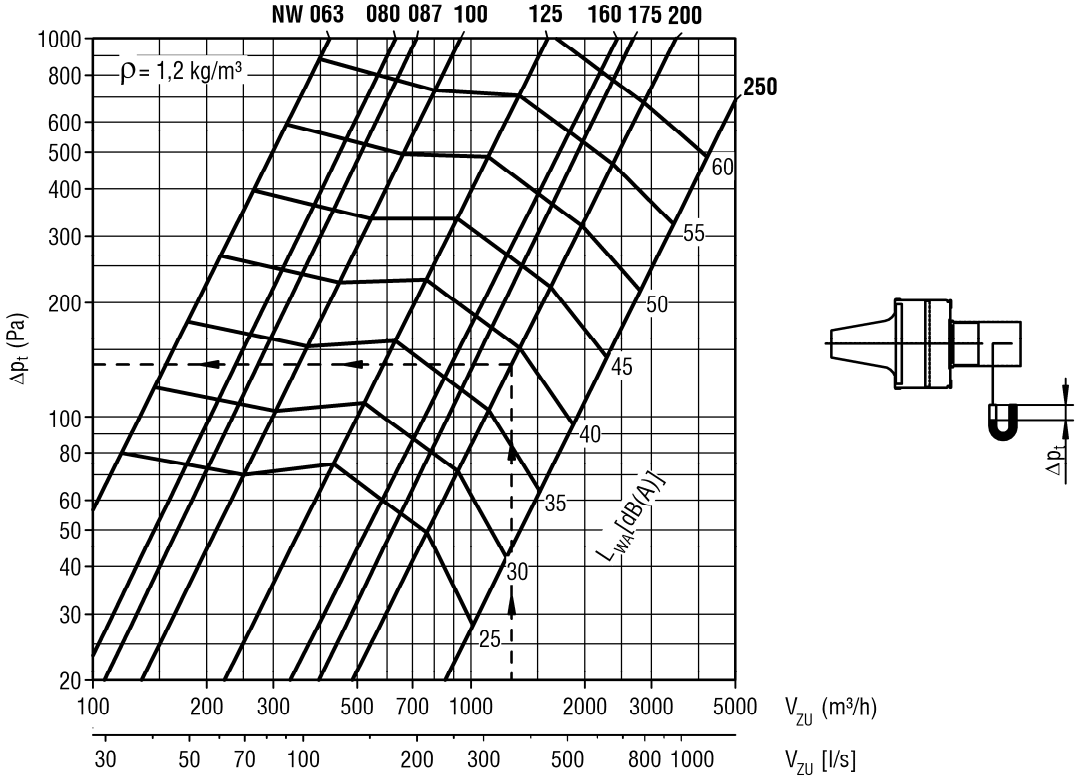




Correction factor for swirl disc (-DS1/-DS2), NW 063 - 250

	DS		NW							
		063	080	087	100	125	160	175	200	250
v_{max}	1	x 0.80	x 0.72	x 0.80	x 0.59	x 0.76	x 0.69	x 0.65	x 0.62	x 0.51
	2	x 0.65	x 0.40	x 0.65	x 0.31	x 0.64	x 0.57	x 0.53	x 0.47	x 0.36
y_H	1	x 0.93	x 0.75	x 0.93	x 0.62	x 0.91	x 0.84	x 0.80	x 0.76	x 0.65
	2	x 0.65	x 0.30	x 0.65	x 0.27	x 0.84	x 0.77	x 0.73	x 0.67	x 0.56
y	1	x 1.10	x 1.30	x 1.10	x 1.60	x 1.20	x 1.40	x 1.60	x 1.70	x 2.00
	2	x 1.50	x 3.50	x 1.50	x 3.70	x 1.40	x 1.70	x 2.00	x 2.20	x 2.60
TV	1	x 0.67	x 0.64	x 0.67	x 0.56	x 0.69	x 0.68	x 0.67	x 0.66	x 0.64
	2	x 0.60	x 0.54	x 0.60	x 0.38	x 0.59	x 0.55	x 0.54	x 0.49	x 0.44
i	1	x 1.20	x 1.40	x 1.20	x 1.70	x 1.30	x 1.40	x 1.50	x 1.60	x 1.80
	2	x 1.60	x 2.60	x 1.60	x 3.20	x 1.50	x 1.70	x 1.90	x 2.10	x 2.50
Δp_t	1	x 1.04	x 1.08	x 1.04	x 1.15	x 1.03	x 1.10	x 1.134	x 1.20	x 1.61
	2	x 1.10	x 1.30	x 1.10	x 1.69	x 1.06	x 1.14	x 1.20	x 1.38	x 2.52
L_{WA}	1	+6	+7	+8	+11	+5	+7	+8	+10	+15.5
	2	+10	+14	+18	+22	+7.5	+12	+14	+16.5	+23.0

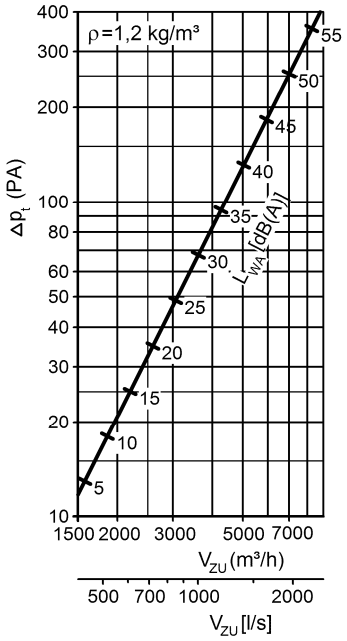
WDA-...-RS-..., with reduction piece



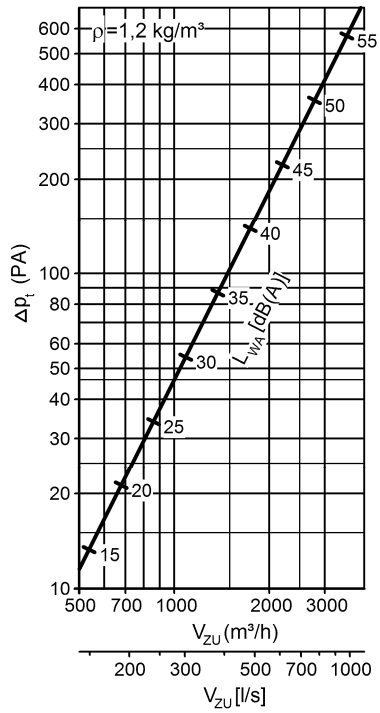
Correction factor for swirl disc (-DS1/-DS2) with reduction piece (-RS)

	DS		NW							
		063	080	087	100	125	160	175	200	250
Δp_t	1	x 1.02	x 1.09	x 1.17	x 1.21	x 1.06	x 1.065	x 1.08	x 1.11	x 0.969
	2	x 1.09	x 1.25	x 1.33	x 1.54	x 1.12	x 1.12	x 1.17	x 1.22	x 1.670
L_{WA}	1	+4	+6	+8	+11.5	+4.5	+4.5	+8	+11	+13
	2	+8	+13	+16	+21	+8.5	+10	+13.5	+19	+22.4

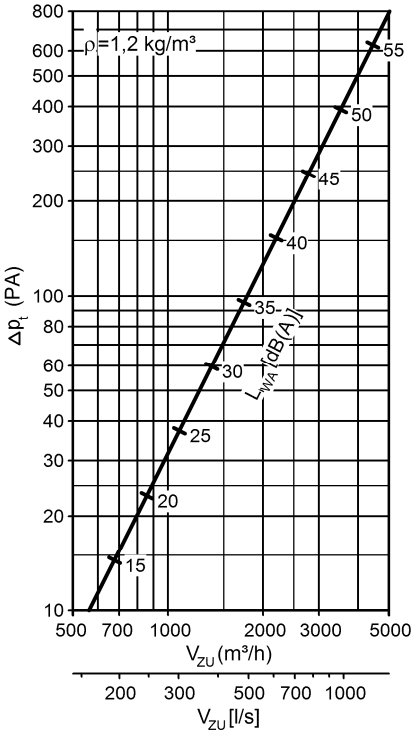
WDA-…-400-… (without damper)



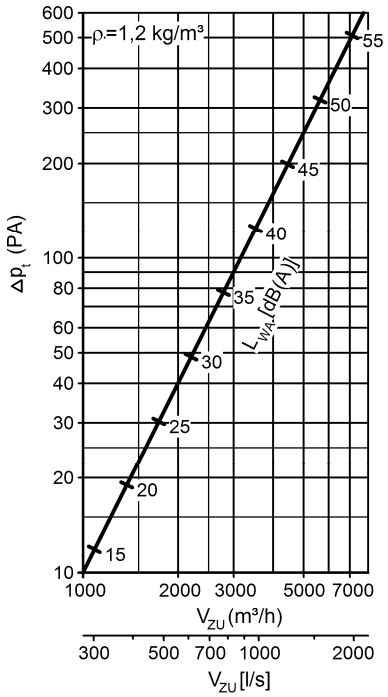
WDA-…-400-…-DV-…, damper OPEN 50%



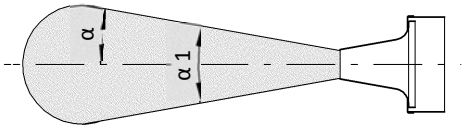
WDA-…-400-…-DV-…, damper OPEN 75%



WDA-…-400-…-DV-…, damper OPEN 100%



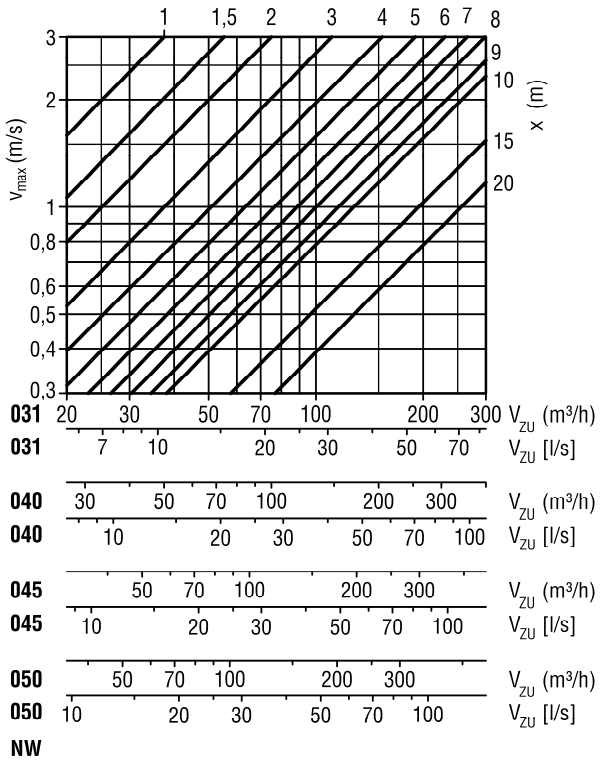
Jet angle α



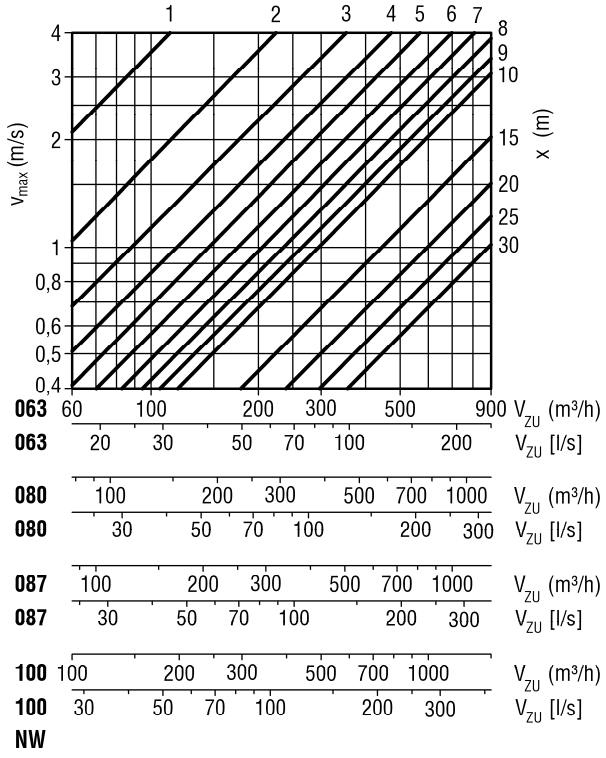
NW	α	α 1
WDA-...-031-...	7°	14°
WDA-...-040-...	5°	10°
WDA-...-045-...	6°	12°
WDA-...-050-...	5°	10°
WDA-...-063-...	6°	12°
WDA-...-063-...-DS1-...	15°	30°
WDA-...-063-...-DS2-...	21°	42°
WDA-...-080-...	5°	10°
WDA-...-080-...-DS1-...	25°	50°
WDA-...-080-...-DS2-...	35°	70°
WDA-...-087-...	5°	10°
WDA-...-087-...-DS1-...	30°	60°
WDA-...-087-...-DS2-...	35°	70°
WDA-...-100-...	5°	10°
WDA-...-100-...-DS1-...	20°	40°
WDA-...-100-...-DS2-...	26°	52°
WDA-...-125-...	6°	12°
WDA-...-125-...-DS1-...	20°	40°
WDA-...-125-...-DS2-...	26°	52°
WDA-...-160-...	10°	20°
WDA-...-160-...-DS1-...	20°	40°
WDA-...-160-...-DS2-...	26°	52°
WDA-...-175-...	8°	16°
WDA-...-175-...-DS1-...	21°	42°
WDA-...-175-...-DS2-...	26°	52°
WDA-...-200-...	8°	16°
WDA-...-200-...-DS1-...	26°	52°
WDA-...-200-...-DS2-...	30°	60°
WDA-...-250-...	5°	10°
WDA-...-250-...-DS1-...	9°	18°
WDA-...-250-...-DS2-...	19°	38°

Maximum end velocity of jet

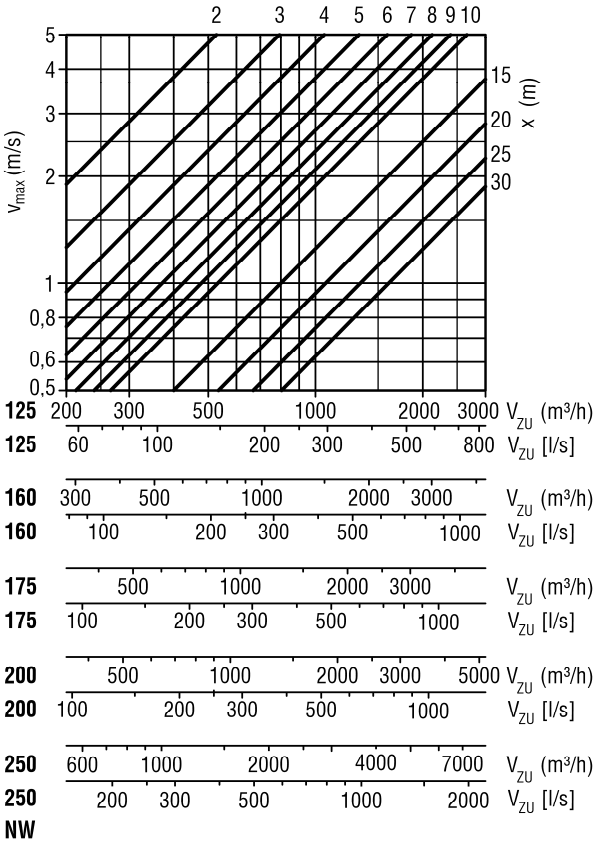
WDA-...-031 / -040 / -045 / -050-...

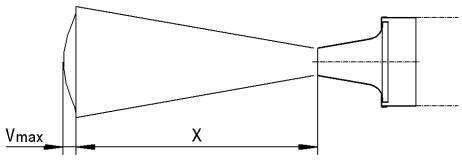


WDA-...-063 / -080 / -087 / -100-...



WDA-...-125 / -160 / -175 / -200 / -250-...

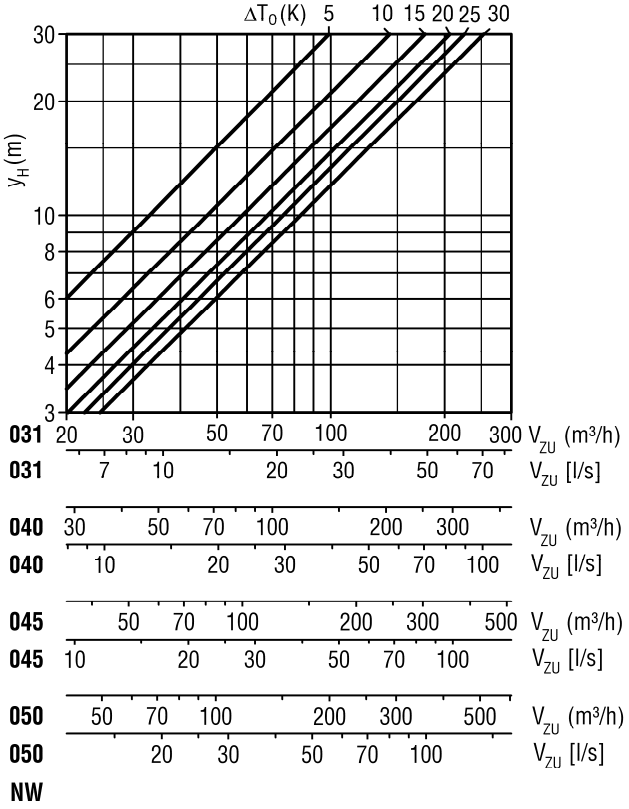




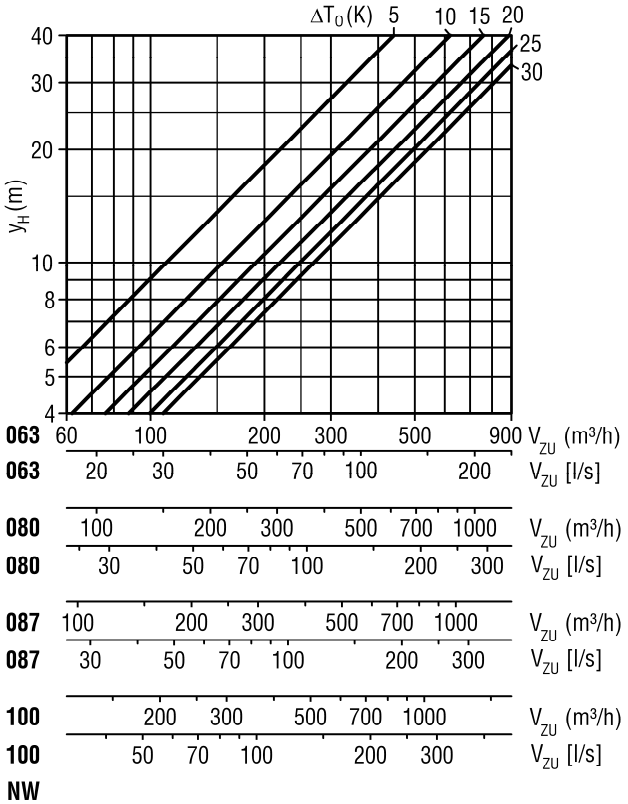
$V_{mittel} = v_{max} \times 0.33$

Maximum penetration

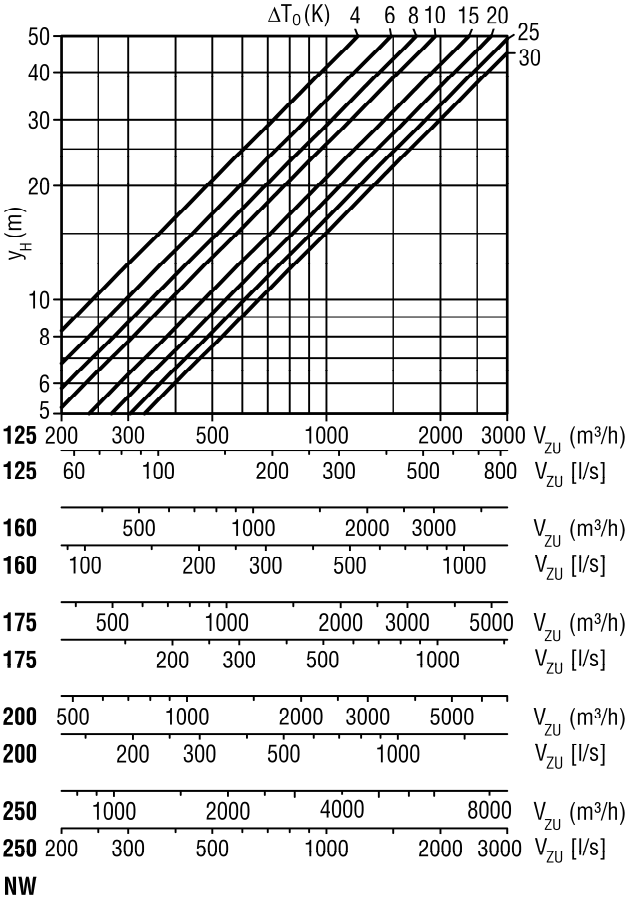
WDA-...-031 / -040 / -045 / -050-...

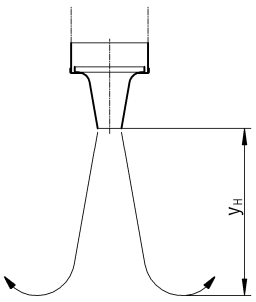


WDA-...-063 / -080 / -087 / -100-...



WDA-...-125 / -160 / -175 / -200 / -250-...





Model for vertical nozzle mounting for cooling mode

Correction factors of the expected average velocity in vertical installation of the nozzles

ΔT [K]	without swirl disc	with swirl disc 1	with swirl disc 2
-4	0.3	0.26	0.19
-6	0.4	0.31	0.24
-8	0.5	0.36	0.27
-10	0.6	0.43	0.33

Calculation of the average velocity, relative to the ΔT for vertically integrated nozzles.

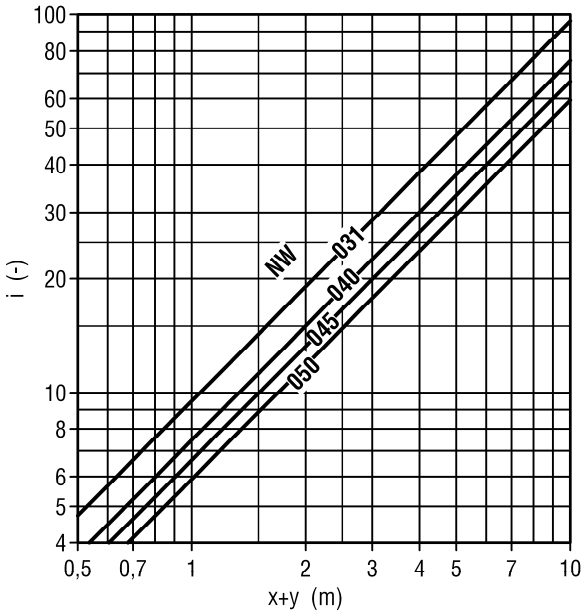
Example:
WDA-…-200-… at 250 m³/h, mounting height = 9.5 m, ΔT = -6 K:
Head height = 9.5 m -1.8 m = 7.7 m
y (m) would be 7.7 m according to SCHAKO's design program; since the nozzle is mounted horizontally according to the design program, the **y value** for vertically integrated nozzles must be entered under **x (m)**! x = 7.7 m
According to the program, the maximum velocity in the isothermal state is 0.344 m/s at head height. Taking into account a correction factor of **0.4** at -6 K without swirl disc, this gives an average velocity of: 0.344 m/s x 0.4 = 0.137 m/s.

Result:
WDA-…-200-… at 250 m³/h, mounting height = 9.5 m, ΔT = -6 K, **V_{mittel} = 0.137 m/s at head height**

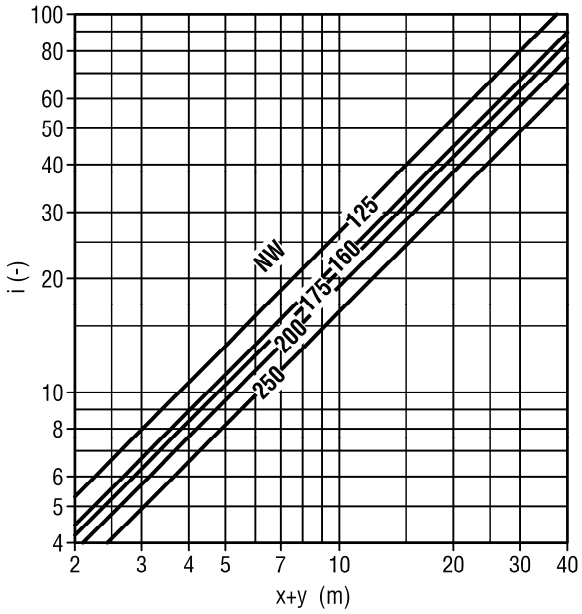
If the velocity is too high, simply calculate again using the correction factors of swirl disc 1 (-DS1) or swirl disc 2 (-DS2).

Induction ratios

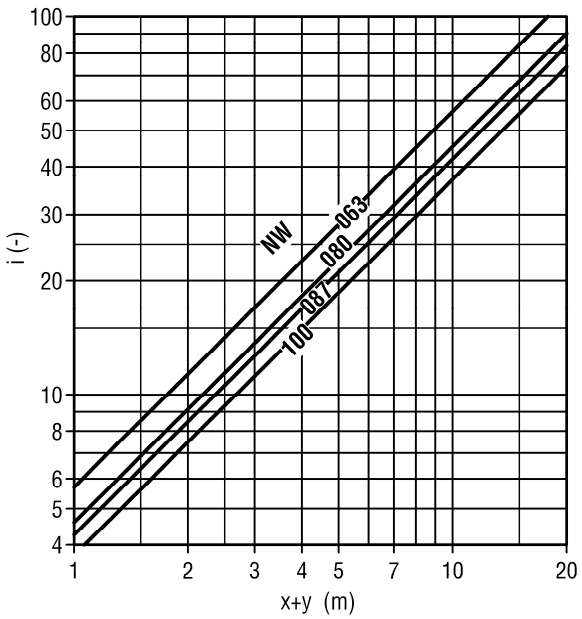
WDA-...-031 / -040 / -045 / -050-...



WDA-...-125 / -160 / -175 / -200 / -250-...

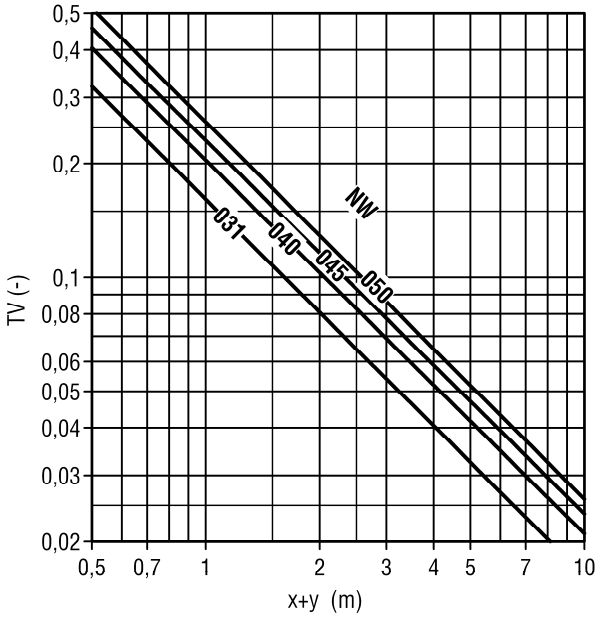


WDA-...-063 / -080 / -087 / -100-...

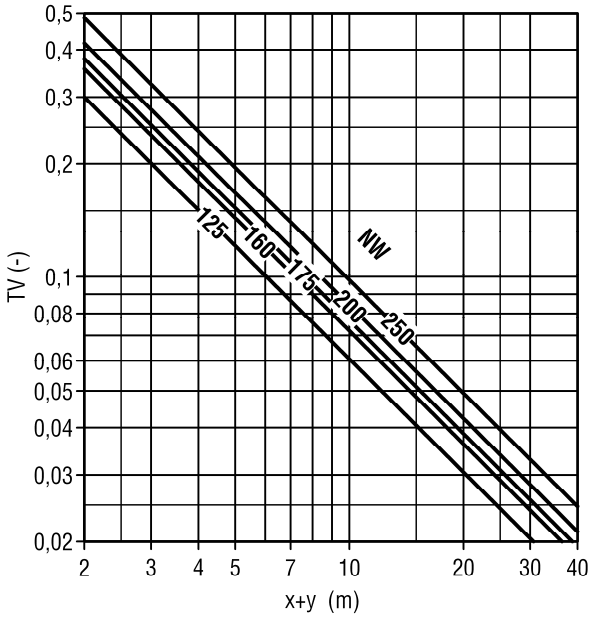


Temperature ratios

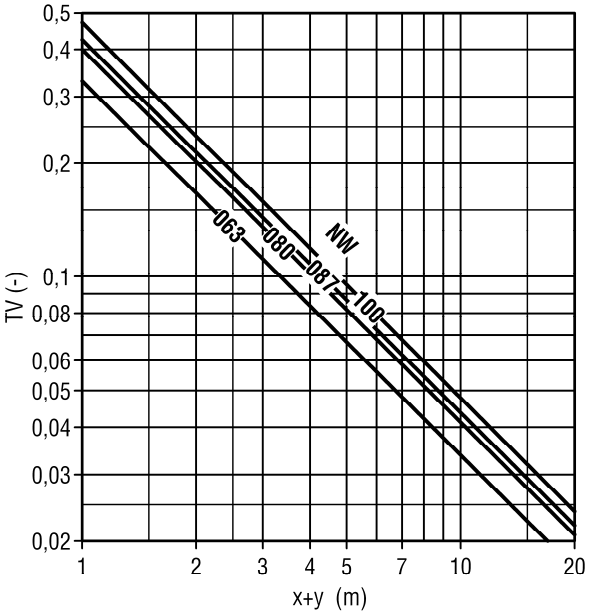
WDA-...-031 / -040 / -045 / -050-...



WDA-...-125 / -160 / -175 / -200 / -250-...

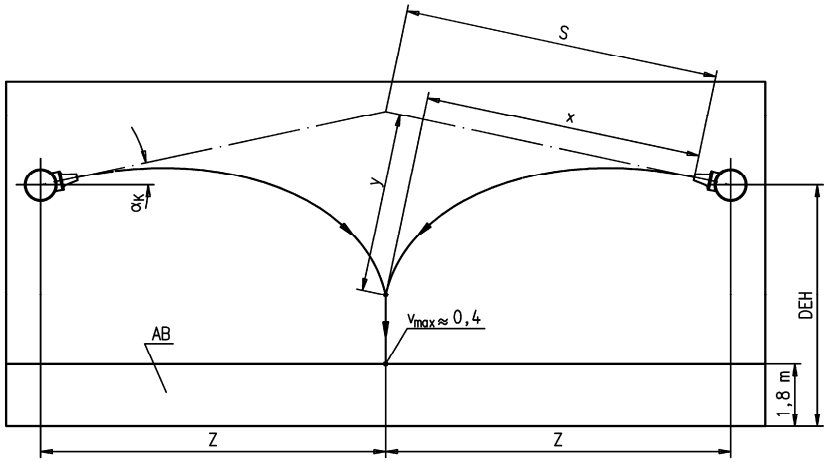


WDA-...-063 / -080 / -087 / -100-...



Definition

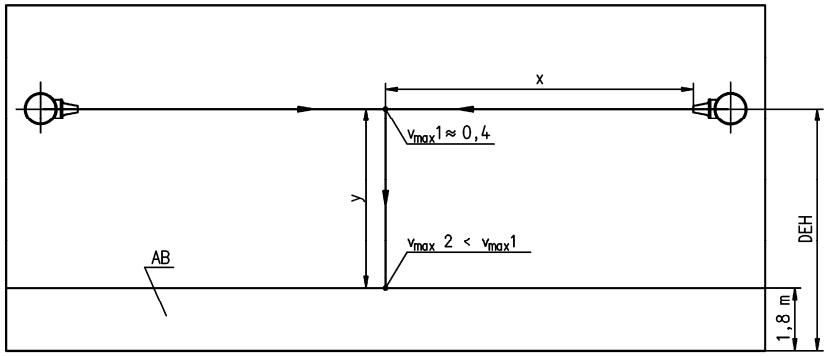
Cooling mode



Cooling mode example

Assume:	NW 100			
	V_{zu}	=	250	m³/h
	X	=	15	m
	ΔT	=	8	K
Solution:	L_{WA}	=	24.64	dB(A)
	Δp_t	=	54.42	Pa
	V_{max}	=	0.394	m/s
	TV	=	0.033	
	i	=	47.43	

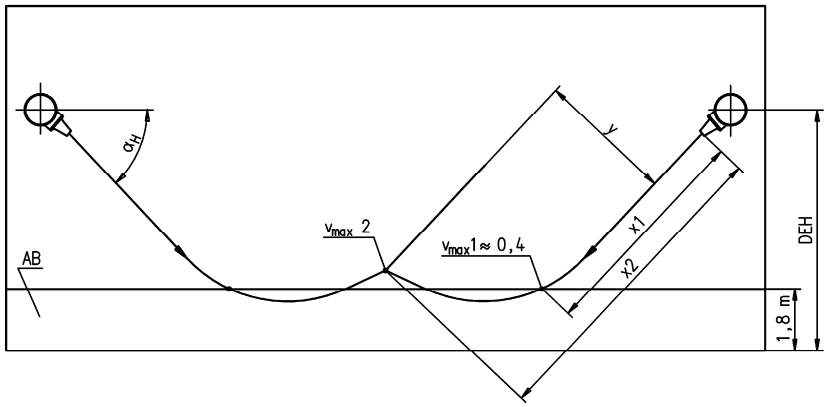
Isotherm



Example of an isotherm

Assume:	NW 100			
	V_{zu}	=	250	m³/h
	X	=	15	m
Solution:	L_{WA}	=	24.64	dB(A)
	Δp_t	=	54.52	Pa
	V_{max}	=	0.394	m/s
	TV	=	0.033	
	i	=	47.43	

Heating mode



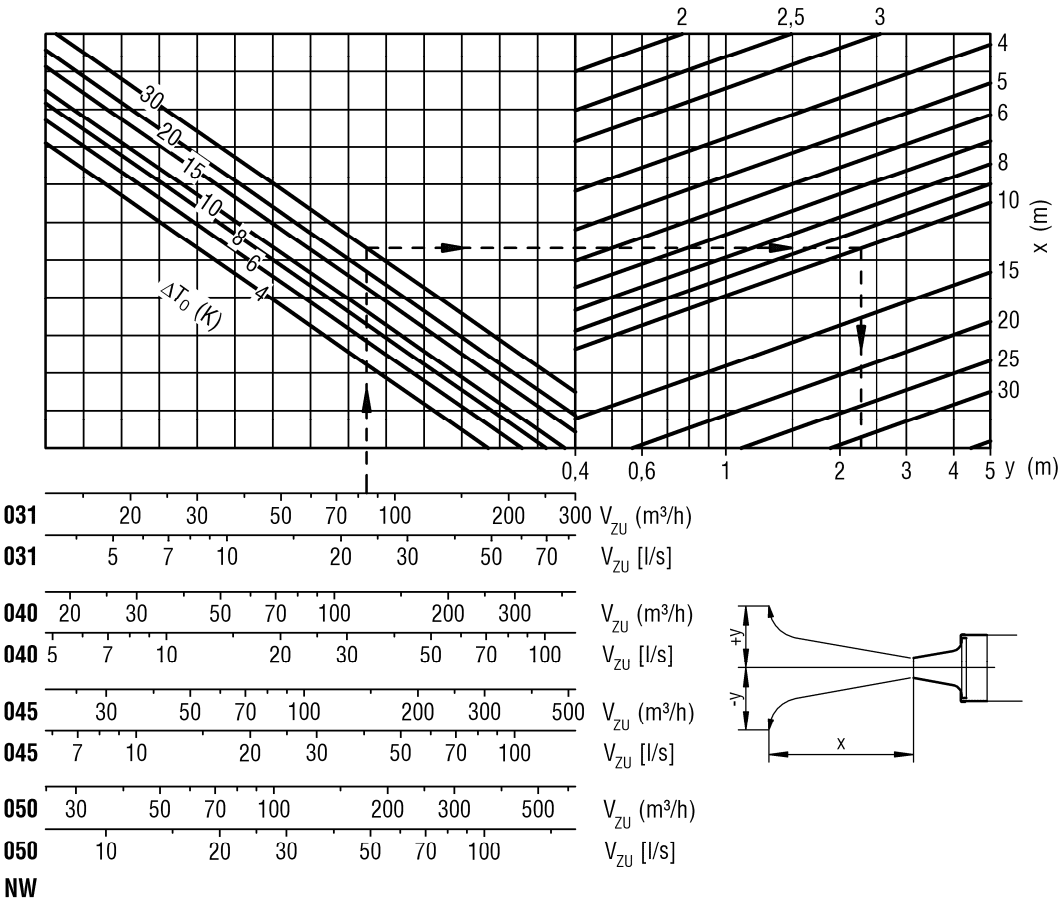
Heating mode example

Assume:	NW 100			
	α_H	=	20	°
	V_{zu}	=	250	m³/h
	X_1	=	15	m
	ΔT	=	8	K
Solution:	L_{WA}	=	24.64	dB(A)
	Δp_t	=	54.52	Pa
	V_{max}	=	0.394	m/s
	y	=	7.84	m
	y_H	=	8.67	m
	TV	=	0.033	
	i	=	47.43	

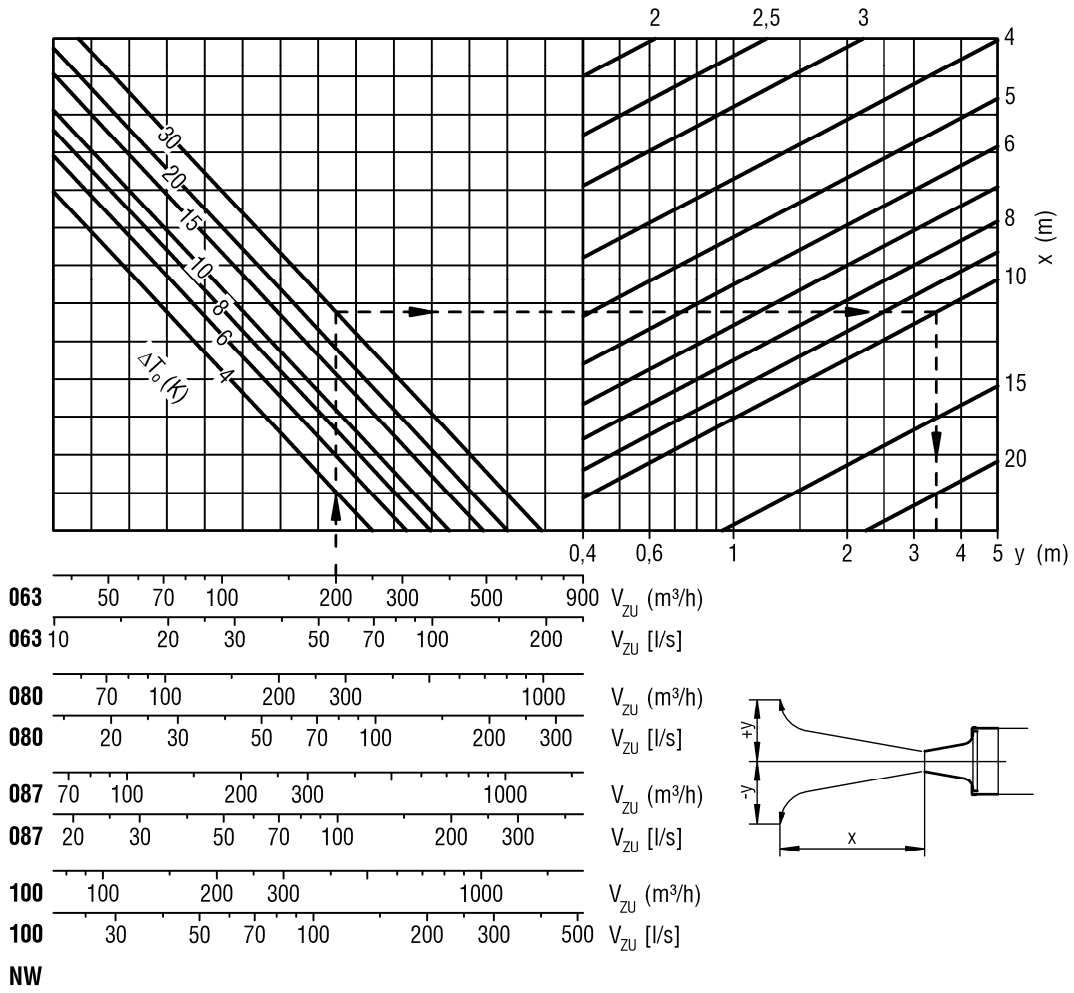
Further data

Horizontal throw (free jet)

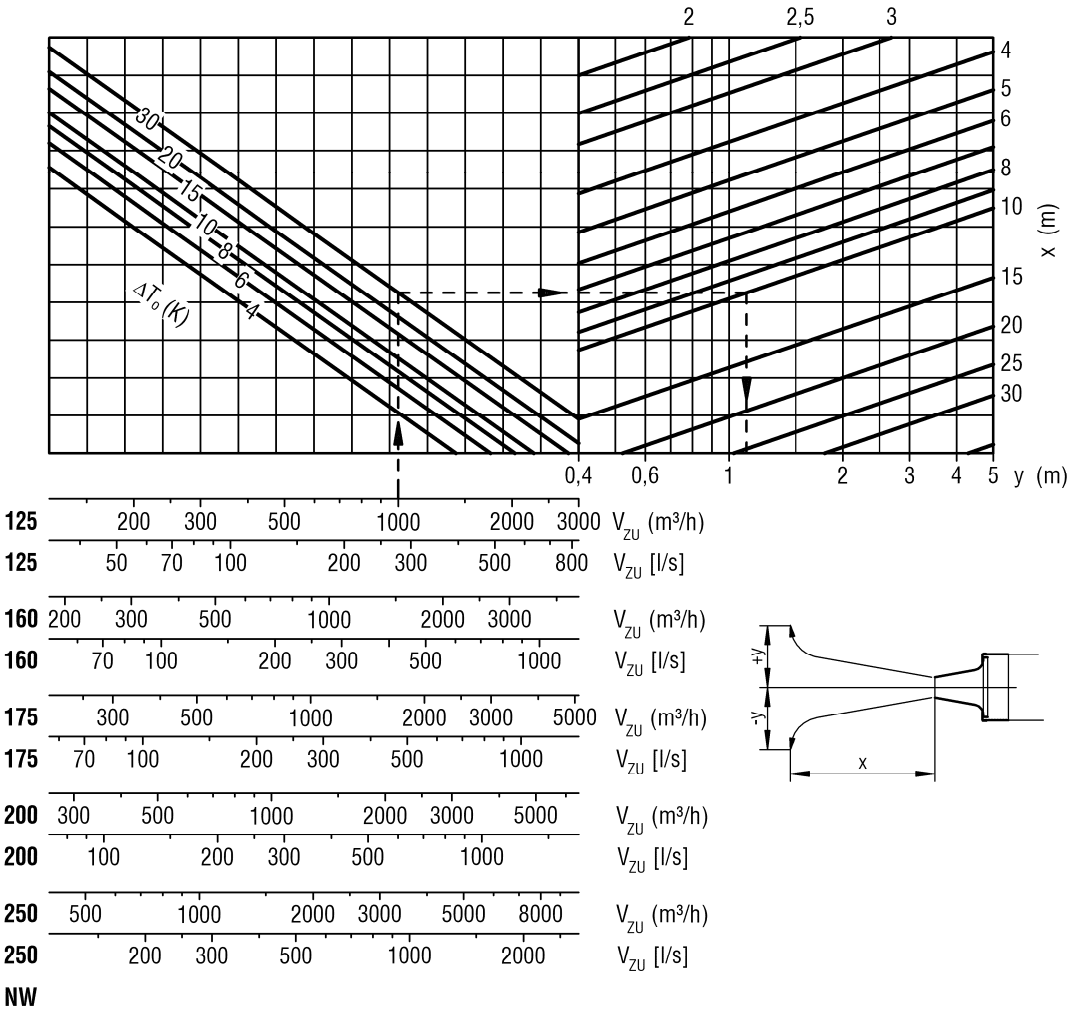
WDA-…-031 / -040 / -045 / -050-…



WDA-...-063 / -080 / -087 / -100-...



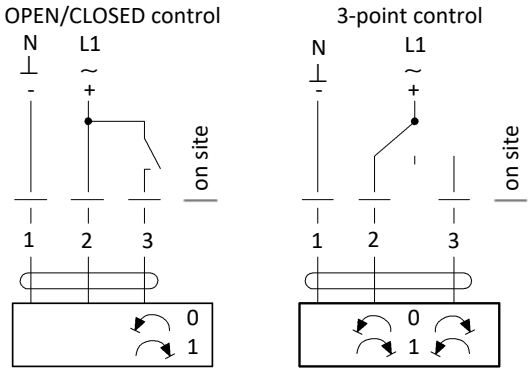
WDA-…-125 / -160 / -175 / -200 / -250-…



Connection diagrams of electric actuators

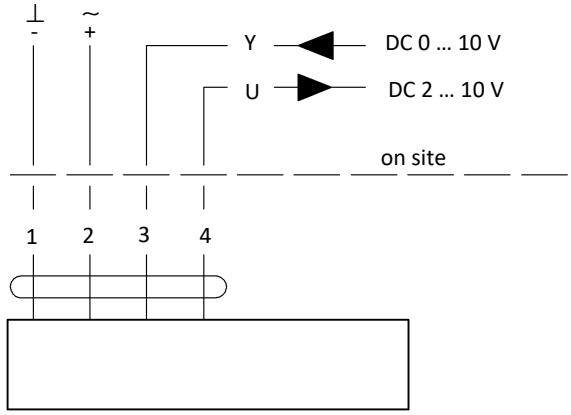
Make Belimo

E048 (NW230A-F) / **E008** (GM230A) /
E047 (NM24A-F) / **E007** (GM24A)



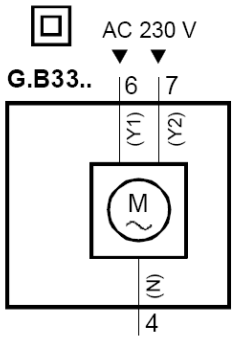
Make Belimo

E049 (standard NM24A-SR-F E0) / **E015** (GM24A-SR)



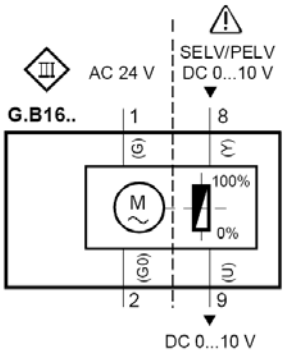
Make Siemens E092 (GLB 331.2.E)

Three-point control



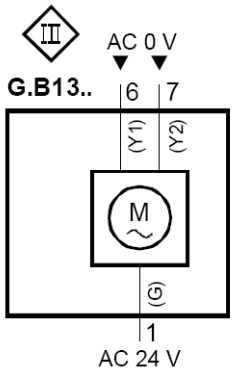
Make Siemens E091 (standard GLB 163.2.E)

Steady control



Make Siemens E090 (GLB 131.2.E)

Three-point control



Technical data - Electric actuators

Make Belimo E048 (NM230A-F)

Rated voltage:	AC 100 ... 240 V, 50 / 60 Hz
Functional range:	AC 85 ... 265 V
Power consumption	
- Operation:	2.5 W @ nominal torque
- Idle position:	0.6 W
- Dimensioning:	6 VA
Torque (rated torque):	Min. 10 Nm at the rated voltage
Running time:	150 s
Sound power level:	max. 35 dB (A)
Protection class:	II protective insulation
Degree of protection:	IP54 in all mounting positions
EMC:	CE according to 89 / 336 / EEC
Low voltage directive:	CE according to 73 / 23 / EEC
Ambient temperature:	-30 ... +50°C

Make Belimo E049 (NM24A-SR-F)

Rated voltage:	AC / DC 24 V, 50 / 60 Hz
Functional range:	AC / DC 19.2 ... 28.8 V
Power consumption	
- Operation:	2 W @ nominal torque
- Idle position:	0.4 W
- Dimensioning:	4 VA
Torque (rated torque):	Min. 10 Nm at the rated voltage
Activation	
- Actuator signal Y:	DC 0 ... 10 V, input resistance typically 100 kΩ
- Operating range:	DC 2 ... 10 V
Positional feedback (Measuring voltage U):	DC 2 ... 10 V, max. 1 mA
Running time:	150 s
Sound power level:	max. 35 dB (A)
Protection class:	III Safety extra low voltage
Degree of protection:	IP54 in all mounting positions
EMC:	CE according to 89 / 336 / EEC
Ambient temperature:	-30 ... +50°C

Make Belimo E047 (NM24A-F)

Rated voltage:	AC / DC 24 V, 50 / 60 Hz
Functional range:	AC / DC 19.2 ... 28.8 V
Power consumption	
- Operation:	1.5 W @ nominal torque
- Idle position:	0.2 W
- Dimensioning:	3.5 VA
Torque (rated torque):	Min. 10 Nm at the rated voltage
Running time:	150 s
Sound power level:	max. 35 dB (A)
Protection class:	III Safety extra low voltage
Degree of protection:	IP54 in all mounting positions
EMC:	CE according to 89 / 336 / EEC
Ambient temperature:	-30 ... +50°C

Make Siemens E092 (GLB 331.2.E) **/ E091** (GLB 163.2.E standard) **/ E090** (GLB 131.2.E)

Supply AC 24 V (SELV / PELV)	
- Operating voltage / Frequency:	AC 24 V ±20 % / 50 / 60 Hz
- Power consumption GLB13..2	2 VA / 1 W
- GLB16..2 lifting rod is moving	3 VA / 2 W
- GLB16..2 stopping state	1W
Supply AC 230 V	
- Operating voltage / Frequency:	AC 230 V ±10 % / 50 / 60 Hz
- Power consumption GLB33..2	2 VA / 1 W
Functional data	
- Nominal lifting power:	250 N
- Running time for 60 mm stroke:	150 s (50 Hz) / 125 s (60 Hz)
Actuator signal Y for GLB 16..2	
- Input voltage Y (wires 8-2)	DC 0...10 V, internally limited to DC 10 V
- Max. allowed input voltage	DC 35 V
Position detector for GLB 16..2	
- output voltage U (wires 9-2)	DC 0...10 V / DC 10...0 V
- Max. output current	DC ± 1 mA
Housing protection type	
- Protection type according to EN 60 529 (Observe mounting information)	IP 40
Protection class	
- Insulation protection class	EN 60 730
Environmental conditions	
- Temperature	-30...+55 °C / -30...+60 °C

LEGEND

V_{zu}	(m^3/h) [l/s]	=	Supply air volume
V_x	(m^3/h) [l/s]	=	total air jet volume at point x
x+y		=	horizontal and vertical throw
x	(m)	=	horizontal throw
y	(m)	=	vertical throw
DEH	(m)	=	nozzle mounting height
Z	(m)	=	horizontal distance from the nozzle to the intersection of two jets
S		=	approx. length of throw (isotherm)
AB		=	occupied area
α_K	(°)	=	Angle of throw in cooling mode
α_H	(°)	=	Angle of throw in heating mode
Δp_t	(Pa)	=	Pressure loss
ΔT_O	(K)	=	Temperature difference between supply air temperature and room temperature ($\Delta T_O = t_{ZU} - t_R$)
ΔT_{OH}	(K)	=	Temperature difference between supply air temperature and room temperature in the heating mode ($\Delta T_{OH} = t_{ZUH} - t_{RH}$)
ΔT_X	(K)	=	Temperature difference at point x
t_{ZU}	(K)	=	supply air temperature
t_R	(K)	=	room temperature
L_{WA}	[dB(A)]	=	A-weighted sound power level
v_{max}	(m/s)	=	Maximum end velocity of jet
v_{mittel}	(m/s)	=	Average end velocity of jet
y_H	(m)	=	maximum penetration depth in heating mode
TV		=	Temperature ratio ($TV = \Delta T_X / \Delta T_O$)
i	(-)	=	induction ratio ($i = V_X / V_{ZU}$)
ρ	(kg/m^3)	=	Density
DS		=	Swirl disc
NW	(mm)	=	Nominal width
He	(m)	=	Heating
Kü	(m)	=	Cooling

ORDER CODE WDA

01	02	03	04	05	06	07
Type	Model	Nominal size	Swivel head	Paint	Swirl disc	Reduction piece
Example						
WDA	-W	-125	-SK	-9010	-DS1	-R0

08	09	10	11	12	13
Ball impact guard	Cover plate / flange ring	Damper	Actuator	Actuator mounting position	Duct diameter for saddle bracket design
Example					
-B0	-BR	-DV0	-E049	-AL	-0000

Sample
WDA-W-125-SK-9010-DS1-R0-B0-BR-DV0-E049-AL-0000

Long throw nozzle type WDA | spiral duct connection | size 125 | with swivel head | RAL 9010 white | with swirl disc 1 | without reduction piece | without ball impact guard | with cover plate | without damper| with external actuator 24 V AC / 0-10 V DC | motor mounted outside on the left | no saddle bracket design

ORDER DETAILS

01 - Type
WDA = Long throw nozzle type WDA

02 - Model
N = only nozzle (only possible with -S0)
F = for flexible duct connection (only possible with -S0)
W = for spiral duct connection
D = for ceiling and wall installation, not for NW 400
K = for duct installation
R = for duct connection with saddle bracket, not for NW 031-050 and NW 400

03 - Nominal size
031 = Nozzle opening 31 mm
040 = Nozzle opening 40 mm
045 = Nozzle opening 45 mm
050 = Nozzle opening 50 mm
063 = Nozzle opening 63 mm
080 = Nozzle opening 80 mm
087 = Nozzle opening 87 mm
100 = Nozzle opening 100 mm
125 = Nozzle opening 125 mm
160 = Nozzle opening 160 mm
175 = Nozzle opening 175 mm
200 = Nozzle opening 200 mm
250 = Nozzle opening 250 mm
400 = Nozzle opening 400 mm

04 - Swivel head
S0 = Without swivel head (standard)
SK = With swivel head (not possible with NW 050)

05 - Paint
9010 = RAL colour 9010 (white, standard)
xxxx = RAL colour can be freely selected (always with 4 digits, at an extra charge)

06 - Swirl disc
DS0 = Without swirl disc (standard)
DS1 = with swirl disc 1 (not for NW 031, 040, 045, 050 and 400, not possible in combination with damper -DV1 / -DV2)
DS2 = with swirl disc 2 (not for NW 031, 040, 045, 050 and 400, not possible in combination with damper -DV1 / -DV2)

07 - Reduction piece
R0 = Without reduction piece (standard)
RS = With reduction piece (not with NW 031, 040, 045, 050 and 400, only for models WDA-W/-D-…)

08 - Ball impact guard
B0 = Without ball impact guard (standard)
BS = With ball impact guard (not with NW 031, 040, 045, 050 and 400, only for model WDA-D/-K-…)

09 - Cover plate / flange ring
BN = Without cover plate / without flange ring (standard)
BR = With cover plate (not for NW 031, 040, 045, 050 and 400)
FR = with flange ring only WDA-K-…-SK-…

10 - Damper
DV0 = without damper (standard)
DV1 = with damper only for WDA-…-S0-… (only possible for NW 400, not possible in combination with swirl disc -DS1 / -DS2)
DV2 = with damper only for WDA-…-SK-… (only possible for NW 400, not possible in combination with swirl disc -DS1 / -DS2)

11 - Actuator
E000 = Without actuator
E047 = 24 V AC / 3-point (actuator outside, only with NW 063-250, not possible for the model WDA-D-…)
E048 = 230 V AC / 3-point (actuator outside, only with NW 063-250, not possible for the model WDA-D-…)
E049 = 24 V AC / 0-10 V DC (actuator outside, only with NW 063-250, not possible for the model WDA-D-…)
E090 = 24 V AC / 3-point (actuator inside, only with NW 063-250)
E091 = 24 V AC / 0-10 V DC (actuator inside, only with NW63-250)
E092 = 230 V AC / 3-point (actuator inside, only with NW 063-250)

12 - Actuator mounting position

AA = without actuator (standard)
AL = Motor mounted externally on the left (standard for motor mounting, not possible for the model WDA-D-…)
AR = Motor mounted externally on the right (not possible for the model WDA-D-…)
AI = Motor mounted inside (in connection with swirl disc (-DS1/-DS2), reduction piece (-RS) or damper (-DV) available only upon request)

13 - Duct diameter for saddle bracket design

0000 = No saddle bracket design
xxxx = Diameter for connection pipe given in mm with 4 digits for saddle bracket design WDA-R

SPECIFICATION TEXT

Long throw nozzle for air-conditioning of large and high rooms, such as halls, theatres or concert halls. The cone-shaped body of the nozzle increases air velocity ensuring a stable core jet. This results in very long throws. The dynamic internal construction of the jet nozzle allows a very high exit velocity at low noise levels and high induction. The technical data is secured and guaranteed by measurements and documentation in SCHAKO's own fluid dynamics and acoustics laboratory. Suitable for cooling and heating modes. A wide range of connection and installation options such as wall, ceiling, duct or pipes. Consists of the nozzle part made of Zincor (only NW031-063) or painted aluminium (starting from NW080) in a RAL colour (RAL 9010, white, standard). Suitable for use in VAV systems.

NW	Volumetric flows in m³/h at:	
	35 dB(A)	40 dB(A)
031	58	71
040	92	110
045	108	130
050	120	145
063	205	245
080	315	370
087	340	420
100	400	485
125	720	900
160	1000	1220
175	1100	1350
200	1285	1550
250	1708	2070
400	4200	5000

Make: SCHAKO **type WDA-N-...**

- For flexible duct connection, with mounting ring and connection spigot
  Make: SCHAKO **type WDA-F-...**

- For spiral duct connection, with mounting ring and connection spigot
  Make: SCHAKO **type WDA-W-...**

- for ceiling / wall mounting, with mounting ring and connection spigot (not possible for NW 400)
  Make: SCHAKO **type WDA-D-...**

- For duct installation, with mounting ring
  Make: SCHAKO **type WDA-K-...**

- for duct connection, using saddle bracket (NW 031 - 050 and NW 400 not possible)
  Make: SCHAKO **type WDA-R-...**

Accessories:

Swivel head (-S0 / -SK)
- without swivel head (-S0)
- with swivel head (-SK):
  - painted Zincor (only NW031-045):
    - RAL 9010 (white) (-9010, standard)
    - RAL colour can be freely selected (at an extra charge, -xxxx)
  - Painted aluminium (starting from NW063):
    - RAL 9010 (white) (-9010, standard)
    - RAL colour can be freely selected (at an extra charge, -xxxx)

Swirl disc (-DS0 / -DS1 / -DS2)
- without swirl disc (-DS0)
- with swirl disc (-DS1 / -DS2, not possible with damper -DV1 / -DV2):
  - made of painted sheet steel:
    - RAL 9010 (white) (-9010, standard)
    - RAL colour can be freely selected (at an extra charge, -xxxx)
  - made of galvanised sheet steel (only with WDA-D)

Reduction piece (-R0 / -RS)
- without reduction piece (-R0)
- with reduction piece (possible only with WDA-W/D-…-S0/SK):
  - made of painted sheet steel:
    - RAL 9010 (white) (-9010, standard)
    - RAL colour can be freely selected (at an extra charge, -xxxx)
  - made of galvanised sheet steel (only with WDA-D)

Ball impact guard (-B0 / -BS)
- without ball impact guard (-B0)
- with ball impact guard (-BS):
  - made of painted sheet steel and round steel:
    - RAL 9010 (white) (-9010, standard)
    - RAL colour can be freely selected (at an extra charge, -xxxx)

Cover plate / flange ring (-BN / -BR / -FR)
- without cover plate (-BN)
- with cover plate (-BR):
  - made of painted aluminium:
    - RAL 9010 (white) (-9010, standard)
    - RAL colour can be freely selected (at an extra charge, -xxxx)
- with flange ring (-FR, possible only with WDA-K-…-SK):
  - made of stainless steel (V2A)

Damper (-DV0 / -DV1 / -DV2)
- without damper (-DV0)
- with damper (-DV1 / -DV2, not possible with swirl disc -DS1 / -DS2) (only possible for NW 400):
  - made of painted sheet steel:
    - RAL 9010 (white) (-9010, standard)
    - RAL colour can be freely selected (at an extra charge, -xxxx)
  - made of galvanised sheet steel (only with WDA-D)

Actuator (-E000-AA / -E…-AL/AR/AI)
- without actuator (-E000-AA)
- with actuator (-E…, possible only with -SK swivel head, actuator inside (-AI) in connection with swirl disc (-DS1/-DS2), reduction piece (-RS) or damper (-DV) available only upon request)
  - 24 V AC / 3-point (actuator outside, only for NW063-250) (-E047-AL/AR)
  - 230 V AC / 3-point (actuator outside, only for NW063-250) (-E048-AL/AR)

- 24 V AC / 0-10 V DC (actuator outside, only for NW063-250) (-E049-AL/AR)
- 24 V AC / 3-point (actuator inside, only for NW063-250) (-E090-AI)
- 24 V AC / 0-10 V DC (actuator inside, only for NW063-250) (-E091-AI)
- 230 V AC / 3-point (actuator inside, only for NW063-250) (-E092-AI)