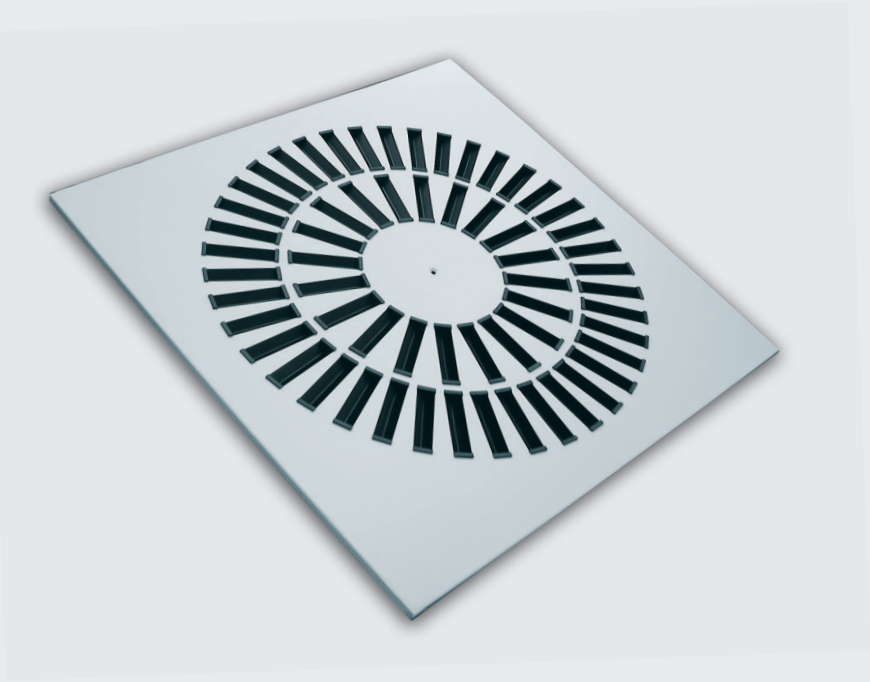
C 16.01
EN.00



CPA

Swirl **Diffuser**

KES KLIMA
AIR CONTROL SYSTEMS

Description

The CPA type diffusers are designed for ceiling applications. They can be used for supply or extract air.

Properties

The CPA type diffusers have adjustable blades. For supply air purposes, they are characteristically suitable for horizontal and vertical air throws. These diffusers are recommended for use with ceiling heights up to 4 m., with a supply air temperature difference of (+/-) $10^{O}C$. The diffuser is produced as square or circular shape, depending on request.

Materials

The diffuser is manufactured from 1.2 mm thick steel sheet. The internal blades are made of black coloured plastic.

Surface Treatment

The surfaces of the diffuser is first cleaned, then painted with electrostatic powder paint to 20% gloss RAL 9010 (white) as standard. Other colours are also available upon request.

Accessories

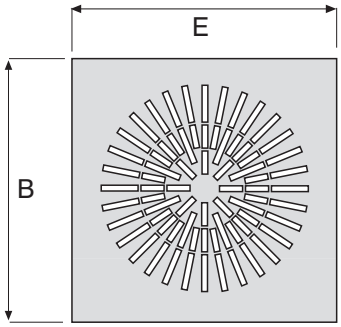
Plenum Box

The plenum box is used to achieve optimum throw characteristics. It has the inlet either at the top or at one side. Depending on request, a damper can be installed at the inlet, which can be operated internally or externally (has to be specified with the order). The plenum boxes are made from 0.6 mm thick galvanized steel sheets and have 4 hanging brackets on their body. Optionally, a 6 mm thick acoustic foam can be laid inside the plenum box.

Dimensions (Square Diffuser)

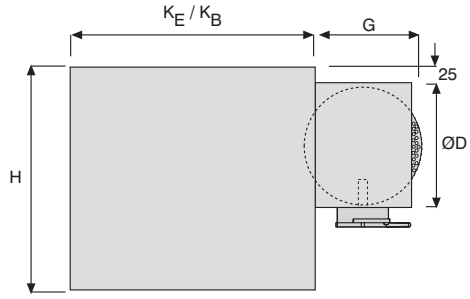
Standard Dimensions (mm)

E / B	No.off Blades	K_E / K_B	H	ØD	G
300	10	285	270	142	125
400	16	385	320	193	150
500	36	485	370	244	175
600 (595)	48	585	420	295	200
800	72	785	520	396	250



CPA.40

Externally operated , Side inlet



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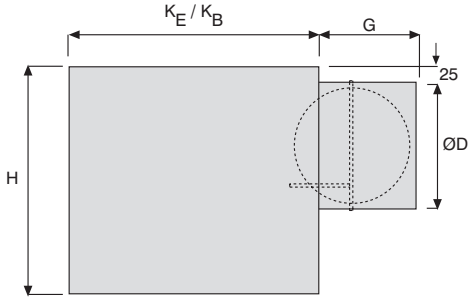
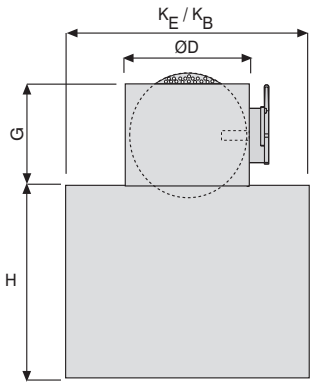
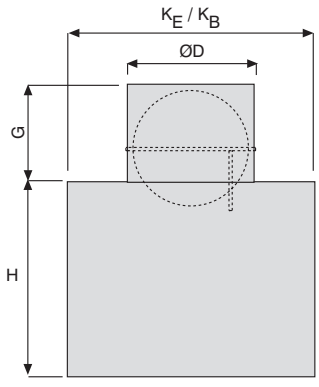
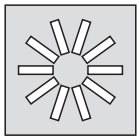


Externally operated ,Top inlet



Internally operated , Top inlet

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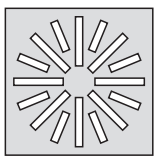
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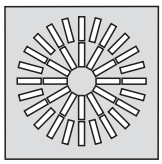
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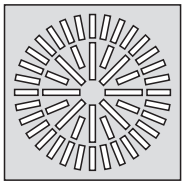
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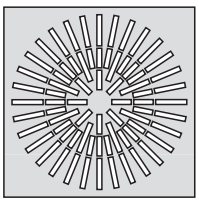
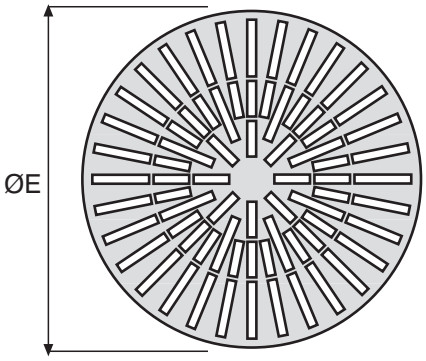

800 x 72

Dimensions (Circular Diffuser)

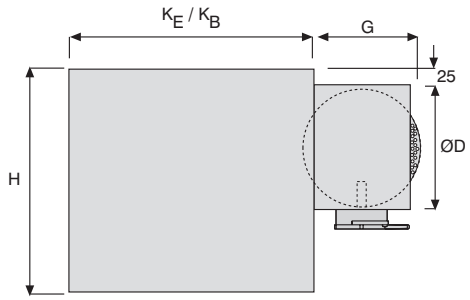
Standard Dimensions (mm)

ØE	No.off Blades	K_E / K_B	H	ØD	G
300	10	282	200	142	125
400	16	385	250	193	150
500	36	485	300	244	175
600	48	580	350	295	200
800	72	785	450	396	250

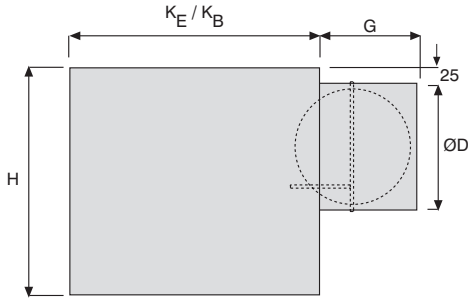


CPA.00

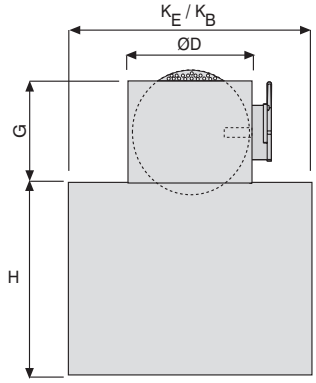
Externally operated , Side inlet



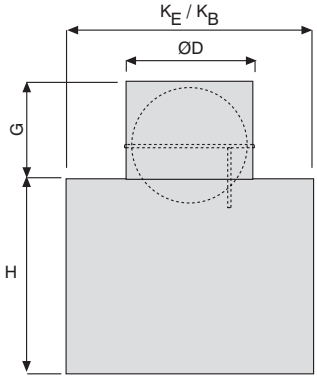
Internally operated , Side inlet

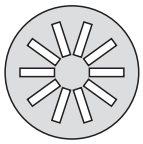


Externally operated ,Top inlet



Internally operated , Top inlet

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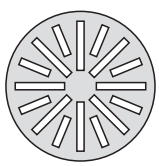
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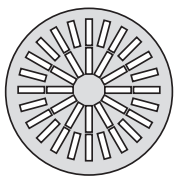
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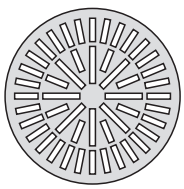
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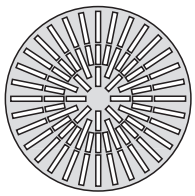
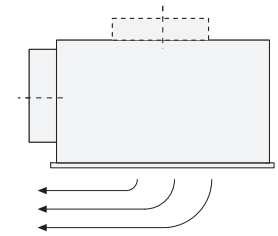
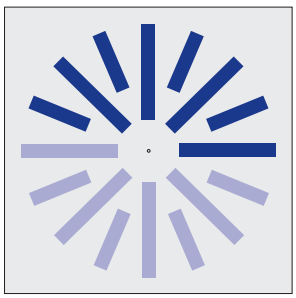

800 x 72

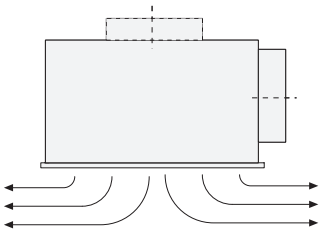
One-way throw

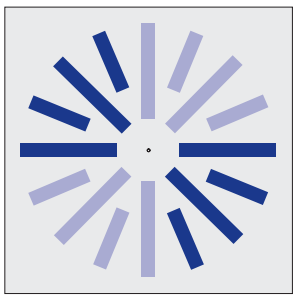




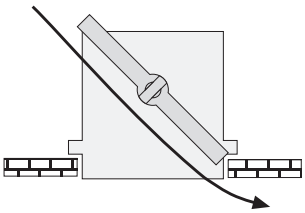
Blades set to the left
Blades set to the right

Two-way throw

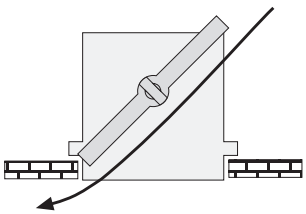




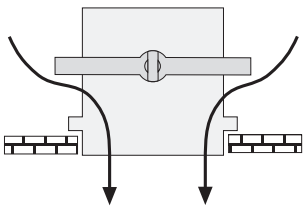
Blades set to the left
Blades set to the right



Blades set to the right

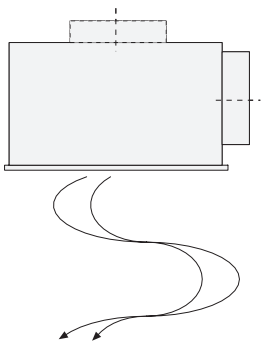


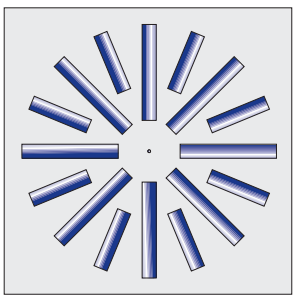
Blades set to the left



Blades set Horizontally

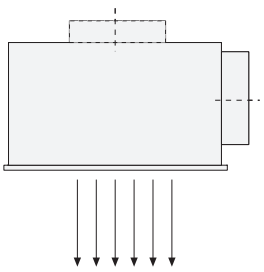
Swirl throw

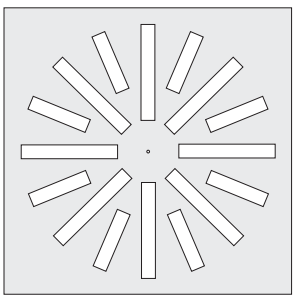




Blades set to one side

Vertical throw

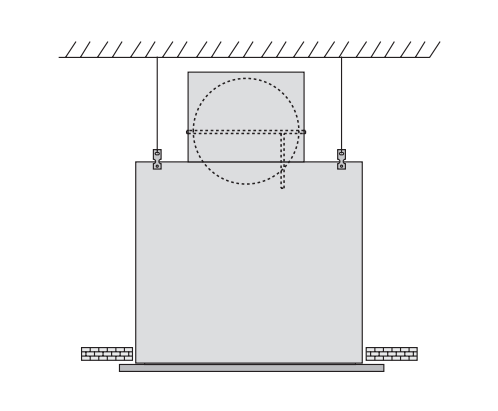




Blades set horizontally

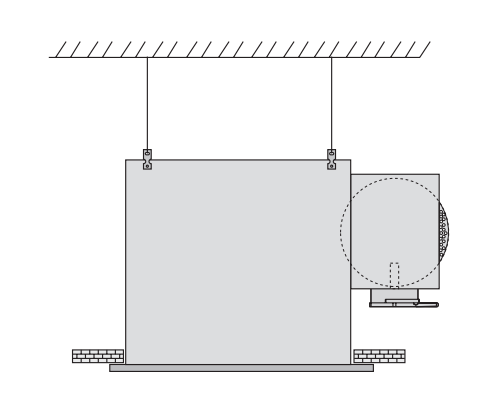
Installation

Plenum Box Installation (top inlet)



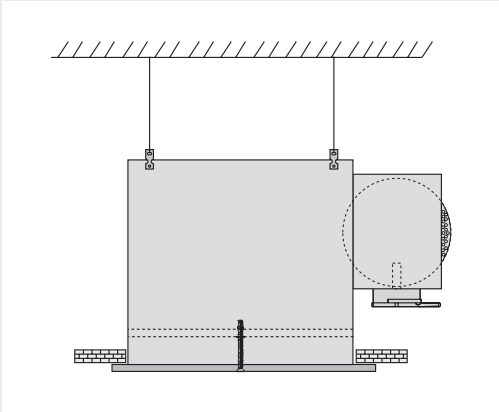
There are 4 hanging brackets on the box as standard

Plenum Box Installation (side inlet)



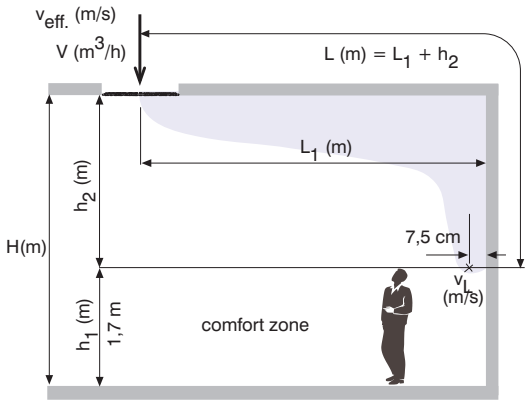
There are 4 hanging brackets on the box as standard

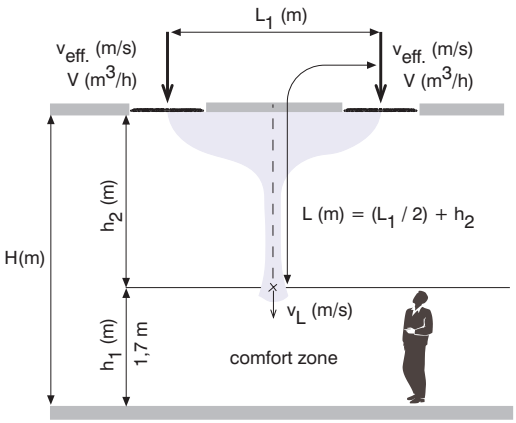
Installation with bridge



One Ø6x71 mm screws, painted the same colour, is given with the product

Nomenclature





L_1	Distance between diffuser centres or diffuser centre and wall. (m)
h1	Comfort zone height (m)
h2	Distance between a diffuser and comfort zone (m)
$v_{eff.}$	Effective outlet velocity (m/s)
v_L	Velocity of core in comfort zone
Δt_0	Difference between supply air and room temperature (^oC)
Δt_L	Difference between core and comfort zone temperature (^oC)
L	Throw distance (m)
V	Air flow rate (m^3/h)
H	Room height (m)
S	Sound power level dB(A)

To achieve "Coanda effect", the outlet velocity must be greater than 2m/s. The general comfort conditions require that the sound power level is below 40 dB(A). The height of the comfort zone is taken as 1.70m above the floor. It is important that 0.25 m/s core velocity is not exceeded in this zone.

Note: The tables are given for installations flush with the ceiling (with Coanda effect). For installations apart from the ceiling, the values must be multiplied by 0.7.

Technical Data

Dimensions (mm) E / B (ØE) x No. of Blades	Flow Rate V (m^3/h)	Throw, L (m)		Pressure loss ΔP (Pa)	Sound power level S (dB(A))
		v_L=0,25 m/s	v_L=0,10 m/s		
300 x 10	100	0,80	1,90	7	<20
	150	1,20	2,70	13	23
	200	1,60	3,50	24	32
	250	2,10	4,80	37	36
	300	2,50	5,50	50	42
400 x 16	180	1,44	2,66	15	25
	260	2,00	3,55	30	33
	340	2,28	4,44	47	40
	420	2,66	4,77	75	46
	500	3,00	5,55	110	55
500 x 36	300	1,48	2,76	8	23
	450	2,12	3,92	18	32
	600	2,54	4,56	34	41
	750	2,86	5,30	60	46
	900	3,39	6,36	90	50
600 x 48 (595 X 48)	400	1,58	3,15	10	20
	550	2,26	4,31	18	30
	700	2,73	5,25	26	35
	850	3,15	6,30	39	41
	1000	3,57	7,35	55	46
800 x 72	700	1,90	3,92	8	<20
	950	2,58	4,93	18	31
	1200	3,02	5,94	25	37
	1450	3,58	7,28	36	45
	1700	4,14	8,29	46	48

Technical Data

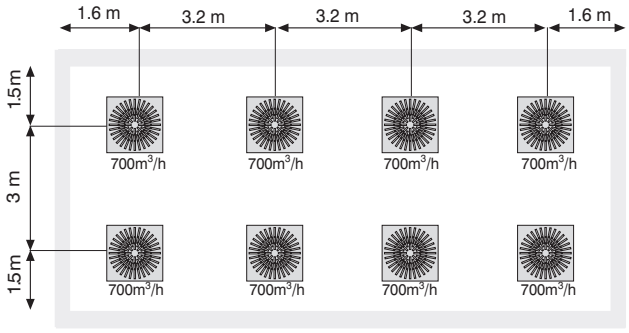
Temperature gradients along the throw path are read from the table below, depending on the Δt_O, Δt_L and throw length values. The temperature of the core at L metres from the diffuser, differs from the room temperature by the value read from the tables. The difference is plus in heating and minus in cooling. The less the difference, the better the comfort conditions.

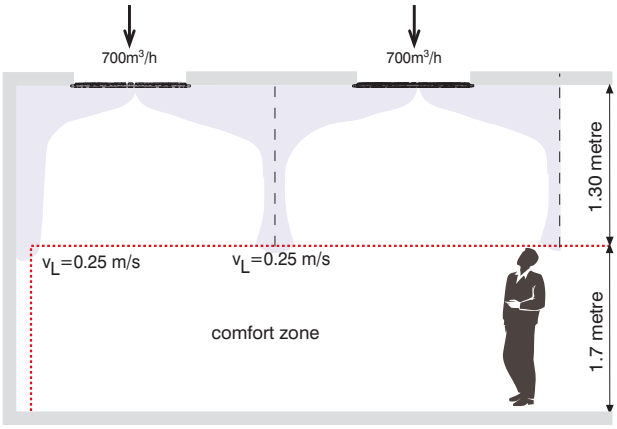
Temperature gradients along the throw path

Dimensions E / B (ØE) mm	Throw (L) m	Δt_L (°C) Values					
		Δt_0 (°C)					
		4	6	8	10	12	14
300 x 10	0,5	0,23	0,34	0,46	0,57	0,68	0,80
	1,0	0,15	0,22	0,30	0,37	0,44	0,52
	1,5	0,11	0,17	0,22	0,28	0,34	0,39
	2,0	0,09	0,13	0,18	0,22	0,26	0,31
	3,0	0,06	0,09	0,12	0,15	0,18	0,21
400 x 16	0,5	0,72	1,08	1,44	1,80	2,16	2,52
	1,0	0,42	0,63	0,84	1,05	1,26	1,47
	1,5	0,26	0,38	0,51	0,64	0,77	0,90
	2,0	0,18	0,27	0,36	0,45	0,54	0,63
	3,0	0,11	0,17	0,22	0,28	0,34	0,39
	4,0	0,08	0,12	0,16	0,20	0,24	0,28
500 x 36	0,5	0,80	1,20	1,60	2,00	2,40	2,80
	1,0	0,45	0,67	0,90	1,12	1,34	1,57
	1,5	0,27	0,41	0,54	0,68	0,82	0,95
	2,0	0,20	0,30	0,40	0,50	0,60	0,70
	3,0	0,12	0,18	0,24	0,30	0,36	0,42
	4,0	0,08	0,12	0,16	0,20	0,24	0,28
600 x 48 (595 X 48)	0,5	0,64	0,96	1,28	1,60	1,92	2,24
	1,0	0,37	0,56	0,74	0,93	1,12	1,30
	1,5	0,24	0,36	0,48	0,60	0,72	0,84
	2,0	0,17	0,25	0,34	0,42	0,50	0,59
	3,0	0,11	0,16	0,22	0,27	0,32	0,38
	4,0	0,08	0,11	0,15	0,19	0,23	0,27
800 x 72	1,5	0,30	0,45	0,60	0,75	0,90	1,05
	2,0	0,22	0,33	0,44	0,55	0,66	0,77
	2,5	0,17	0,26	0,34	0,43	0,52	0,60
	3,0	0,14	0,21	0,28	0,35	0,42	0,49
	4,0	0,10	0,15	0,20	0,25	0,30	0,35
	5	0,07	0,11	0,14	0,18	0,22	0,25

Example:

Air at 5600 m3/h, is to be supplied into a room with dimensions 12.8 x 6m, and a height of 3 m .The supply air is 8^{o}C below room temperature and 8 diffusers will be used. Determine diffuser spacings so that the core velocity in comfort zone is below 0.25 m/s.





Solution:

1) Diffusers are placed on the ceiling plan symmetrically.

2) Air flow rate per diffuser is calculated as 5600 / 8 = 700 m^3/h.

3) Calculation of path length to the comfort zone:

   Minimum distance: L= 1.50 + 1.30 = 2.80 m

   Maximum distance: L= 1.60 + 1.30 = 2.90 m.

4) From the table on page 8, the most suitable size is found as 600 x 48 mm; for 700 m3/h and 2.80 m throw.

5) From the same table with interpolation, pressure loss is read as 26 Pa and sound power level as 35 dB(A).

6) From the table on page 9; for 600x48 mm size, Δt_o=8^{o}C, and 2.80 m throw, Δt_L is found as 0.26^{o}C.

Specification Text

Air diffuser for ceiling installation. The diffuser will be manufactured from 1.2 mm thick steel sheets, and will be painted to ordered request with electrostatic powder paint and a minimum thickness of 60μ.The plenum box will be manufactured from 0.6 mm galvanized steel sheets by seams. There will be 4 hanging brackets on the box. Optionally, the entry spigot will be equipped with a volume control damper, operated externally or internally, depending on request. Also, optionally, 6-mm thick acoustic foam (according to BS 476 Part 6 & 7 Class 0) will be installed inside the plenum box. For high speed system applications, a perforated and galvanized steel plate will be installed in the plenum box.

Order Code

Model	CPA	.00	.AK	.10	-300 x 10	-9010
Frame		**00**...Circular **40**...Square				
Accessories			**AA** ..Without blades (extract) **AK** ..With blades (Supply)			
Installation				**00**...Without screw holes **10**...With screw holes **40**...Fixing with bridge		
					E / B (ØE) mm Refer to pages 3&4 **Standard Dimensions**	**No.of blades**
						Indicate RAL Colour Code **Colour Code**

Plenum Box Order Code

Model (for Square Diffuser)	PLA	.10	.S	B	.1	1	-292 x 270 x 142 x 1
Model (for circular diffuser)	PLB						
Installation		**10**...With screws **40**...Fixing with bridge					
Box inlet			**S** ....Side inlet **T**.....Top inlet				
Spigot Damper				**A** ....Without Damper **B** ....Externally operated **C** ....Internally operated			
Perforated Rectifier Plate						**0**.....Without Plate **1**.....With plate	
Insulation							**0**.....Without Insulation **1**.....With acoustic Insulation
							Please indicate if special dimensions are requested K_E / K_B x H x ØD (mm) x s (no.of inlet spigots) **Plenum Box Dimensions**

C.16.01.EN.00

C CPA Swirl Diffuser

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