

# Ceiling swirl diffusers

## Type VD



Horizontal swirling air discharge



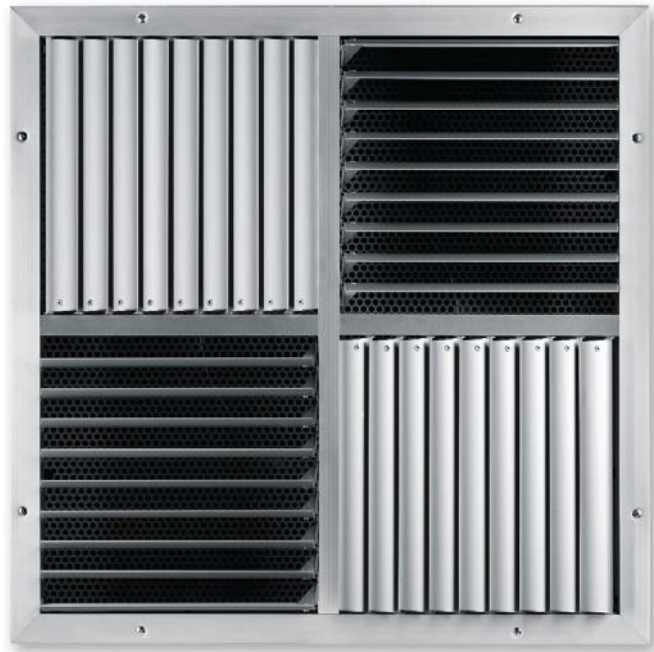
Vertical air discharge



Protective cage



Extended border



### For high rooms, with adjustable air control blades

Square ceiling swirl diffusers, with manual or motorised adjustment of the air pattern to ensure draught-free ventilation of the occupied zone both in heating and cooling modes

- Nominal sizes 425, 600, 775, 1050
- Volume flow rate range 95 – 1490 l/s or 342 – 5364 m<sup>3</sup>/h
- Diffuser face made of aluminium with anodised finish
- For supply air
- For variable and constant volume flows
- High induction results in a rapid reduction of temperature differences and airflow velocities
- Discharge direction can be adjusted manually or with an actuator
- Ideal for high rooms

#### Optional equipment and accessories

- Exposed diffuser face available in RAL CLASSIC colours
- Horizontal or vertical duct connection
- An extended border improves the horizontal air discharge in cooling mode
- Protective cage for use in gymnasiums
- Actuators for adjusting the air discharge direction

1

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## Variants

Product examples

VD-V



VD-V-K



VD-V-S



## Installation examples

### Freely suspended installation



### Description

For detailed information on control units and actuators see Chapter K1 – 10.

### Application

- Type VD ceiling swirl diffusers are used as supply air diffusers for high rooms in comfort and industrial zones
- For production halls, gymnasiums, theatres and conference rooms as well as for large internal spaces in airports, railway stations and shopping centres
- For mixed flow ventilation with different air patterns in heating and cooling modes
- Horizontal swirling supply air discharge in cooling mode
- The efficient swirl creates high induction levels, thereby rapidly reducing temperature differences and airflow velocities
- Air discharge from 0° (horizontal) to 90° (vertical)
- For variable and constant volume flows
- For supply air to room air temperature differences from –12 to +15 K
- For room heights exceeding 3.8 m
- With freely suspended installation, an extended border supports the horizontal air discharge in cooling mode

### Variants

- Diffuser face only

### Connection

- H: Horizontal duct connection
- V: Vertical duct connection

### Nominal sizes

- 425, 600, 775, 1050

### Accessories

- Electric actuators for adjusting the air discharge direction
- Extended border and protective cage

### Useful additions

- TDC temperature difference control module

### Special characteristics

- With adjustable air control blades for high rooms
- The air pattern can be adjusted manually or with an actuator
- Horizontal or vertical duct connection

### Parts and characteristics

- Square diffuser face with four sections of blades
- Diffuser face with blades that can be adjusted simultaneously, for air discharge from horizontal (0°) to vertical (90°)
- Plenum box for horizontal or vertical duct connection

### Construction features

- Spigot suitable for circular ducts to EN 1506 or EN 13180

### Materials and surfaces

- Diffuser face made of extruded aluminium sections
- Plenum box, cross bar and extended border made of galvanised sheet steel
- Protective cage made of steel mesh
- Diffuser face anodised, E6-C-0, natural colour
- Protective cage powder-coated RAL 9010, pure white
- Extended border powder-coated RAL 9006, white aluminium
- P1: Powder-coated, RAL CLASSIC colour

### Installation and commissioning

- Preferably for rooms with a clear height from 3.8 m
- Flush ceiling installation
- VD-...-K: Also freely suspended installation
- VD-V: Ceiling distance of at least 300 mm allows for continuous adjustment of the air pattern
- Horizontal or vertical duct connection

### Standards and guidelines

- Sound power level of the air-regenerated noise measured according to EN ISO 5135

### Maintenance

- Maintenance-free as construction and materials are not subject to wear
- Inspection and cleaning to VDI 6022

### Technical data

Nominal sizes	425, 600, 775, 1050 mm
Minimum volume flow rate	95 – 675 l/s or 342 – 2430 m <sup>3</sup> /h
Maximum volume flow rate, with $L_{WA} \cong 50$ dB(A)	280 – 1490 l/s or 1008 – 5364 m <sup>3</sup> /h
Supply air to room air temperature difference	–12 to +15 K

### Function

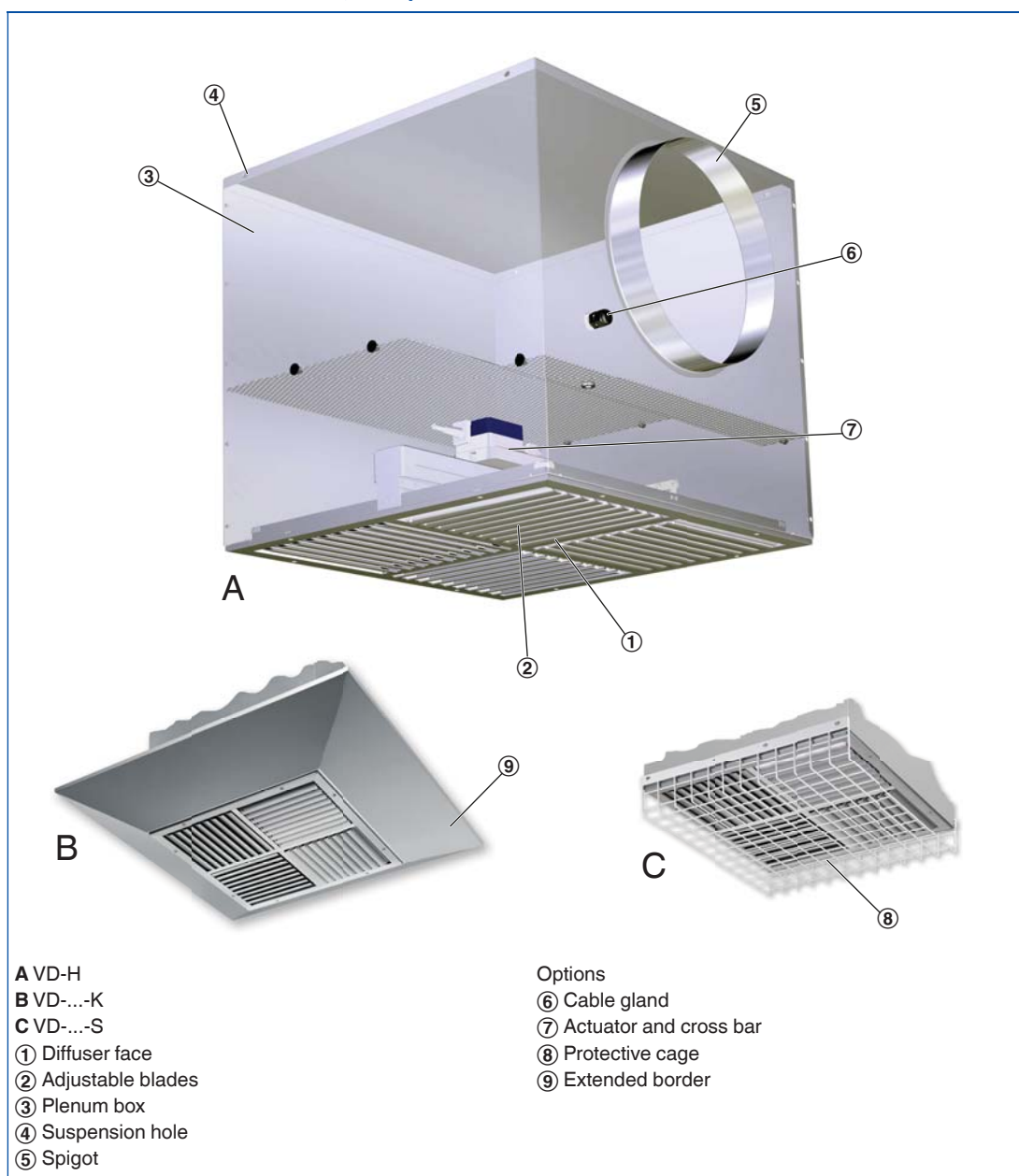
#### Functional description

Ceiling swirl diffusers in air conditioning systems create a swirl to supply air to rooms. The resulting airflow induces high levels of room air, thereby rapidly reducing the airflow velocity and the temperature difference between supply air and room air. Ceiling swirl diffusers allow for large volume flow rates. The result is a mixed flow ventilation in comfort zones, with good overall room ventilation, creating only very little turbulence in the occupied zone.

Type VD ceiling swirl diffusers have adjustable air control blades. Different air patterns allow for cooling or heating mode, or for the adjustment to varying loads. Horizontal air discharge is omnidirectional. Vertical air discharge is possible in heating mode. The supply air to room air temperature difference may range from  $-12$  to  $+15$  K.

An actuator (optional) adjusts the blades based on demand.

#### Schematic illustration of the VD, with plenum box for horizontal duct connection



Air patterns

Horizontal omni directional air discharge



Vertical air discharge



Order code

VD

VD – V – E1 – K / 600 / P1 – RAL ...

1 2 3 4 5 6

**1 Type**

**VD** Swirl diffuser

**2 Connection**

No entry: diffuser face only

**H** Horizontal, with plenum box

**V** Vertical, with plenum box

**3 Adjustment**

No entry: manual

Electric actuator

**E1** 230 V AC, 3-point

**E2** 24 V AC/DC, 3-point

**E3** 24 V AC/DC, modulating 2 – 10 V DC

**4 Accessories**

**K** Extended border

**S** Protective cage

Only for variant with plenum box

Supplied separately

K and S cannot be combined

**5 Nominal size [mm]**

425

600

775

1050

**6 Exposed surface of diffuser face**

No entry: anodised, natural colour, E6-C-0

**P1** Powder-coated, specify RAL CLASSIC colour

Gloss level

RAL 9010 50 %

RAL 9006 30 %

All other RAL colours 70 %

Order example

**VD-V-E1-K/600/P1-RAL 9016**

<b>Connection</b>	Vertical
<b>Adjustment</b>	Electric actuator 230 V AC
<b>Attachment</b>	Extended border
<b>Nominal size</b>	600 mm
<b>Exposed surface of diffuser face</b>	RAL 9016, traffic white, gloss level 70 %

### VD-H

#### Quick sizing – sound power level and total differential pressure

Quick sizing tables provide a good overview of the volume flow rates and corresponding sound power levels and differential pressures.

The maximum volume flow rates apply to a sound power level of approx. 50 dB (A).

Exact values for all parameters can be determined with our Easy Product Finder design programme.

Nominal size	$\dot{V}$		$\Delta p_t$ Pa	$L_{WA}$ dB(A)
	l/s	m <sup>3</sup> /h		
425	95	342	6	21
	150	540	15	32
	215	774	31	42
	280	1008	52	50
600	210	756	9	28
	310	1116	20	37
	410	1476	35	44
	510	1836	54	50
775	375	1350	8	26
	510	1836	14	34
	660	2376	23	41
	885	3186	42	50
1050	675	2430	13	36
	825	2970	19	41
	975	3510	27	46
	1120	4032	35	50

### VD-V

#### Quick sizing – sound power level and total differential pressure

Nominal size	$\dot{V}$		$\Delta p_t$ Pa	$L_{WA}$ dB(A)
	l/s	m <sup>3</sup> /h		
425	95	342	6	17
	175	630	19	31
	260	936	41	41
	340	1224	70	50
600	210	756	7	19
	355	1278	21	32
	410	1476	28	36
	660	2376	75	50
775	375	1350	6	22
	545	1962	14	32
	715	2574	24	42
	885	3186	38	50
1050	675	2430	11	30
	950	3420	22	38
	1225	4410	37	44
	1490	5364	55	50

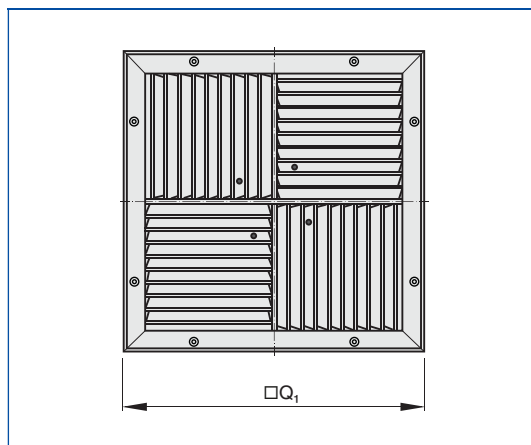


1



VD

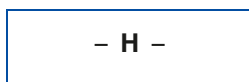
### Diffuser face VD



### Dimensions

Nominal size	□Q <sub>1</sub>	A <sub>eff</sub>	A <sub>eff</sub> vertical air discharge	
	mm		m <sup>2</sup>	
425	425	0.0307	0.0781	
600	595	0.0685	0.1819	
775	763	0.1242	0.3405	
1050	1043	0.2247	0.6358	

### VD-H



Order code detail

### Variant

- Ceiling swirl diffuser with square diffuser face
- With plenum box for horizontal duct connection

### Nominal sizes

- 425, 600, 775, 1050

### Parts and characteristics

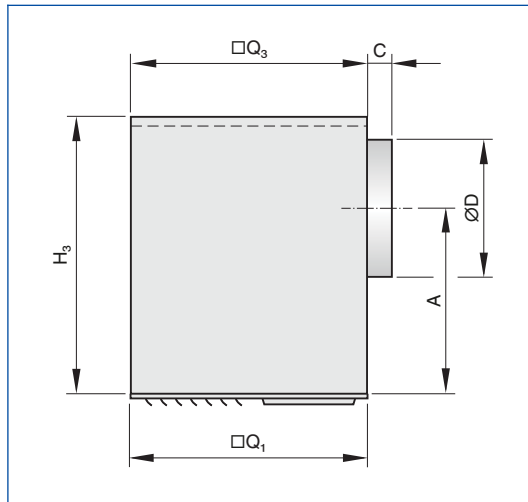
- Square diffuser face with four sections of blades
- Diffuser face with blades that can be adjusted simultaneously, for air discharge from horizontal (0°) to vertical (90°)
- Plenum box for horizontal duct connection

### Construction features

- Spigot suitable for circular ducts to EN 1506 or EN 13180



VD-H



Dimensions [mm] and weight [kg]

Nominal size	□Q <sub>1</sub>	□Q <sub>3</sub>	H <sub>3</sub>	ØD	A	C	m
	mm						kg
425	425	425	500	248	335	46	11
600	595	600	550	313	353	48	19
775	763	775	750	448	498	60	34
1050	1043	1050	800	498	523	60	57

Weights apply to the variant with actuator

### VD-V

# 1



Order code detail

### Variant

- Ceiling swirl diffuser with square diffuser face
- With plenum box for vertical duct connection

### Nominal sizes

- 425, 600, 775, 1050

### Parts and characteristics

- Square diffuser face with four sections of blades
- Diffuser face with blades that can be adjusted simultaneously, for air discharge from horizontal (0°) to vertical (90°)
- Plenum box for vertical duct connection

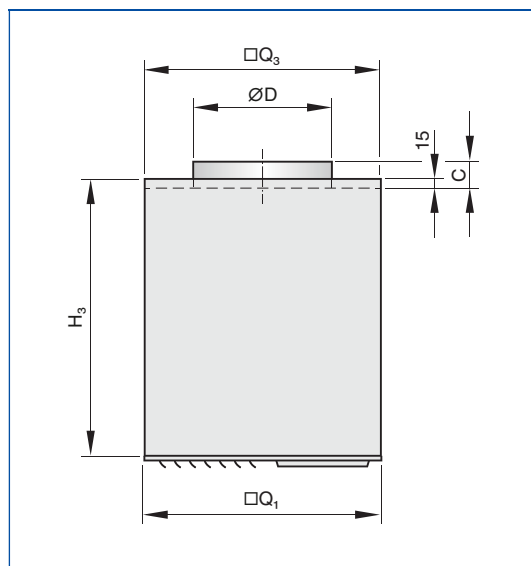
### Construction features

- Spigot suitable for circular ducts to EN 1506 or EN 13180



VD-V

### VD-V



### Dimensions [mm] and weight [kg]

Nominal size	□Q <sub>1</sub>	□Q <sub>3</sub>	H <sub>3</sub>	ØD	C	m
	mm					kg
425	425	425	500	248	46	11
600	595	600	550	313	48	19
775	763	775	550	448	60	29
1050	1043	1050	600	498	60	51

Weights apply to the variant with actuator

**VD-\*-K**

- K /

Order code detail

**Accessories**

- Extended border

**Nominal sizes**

- 425, 600, 775, 1050

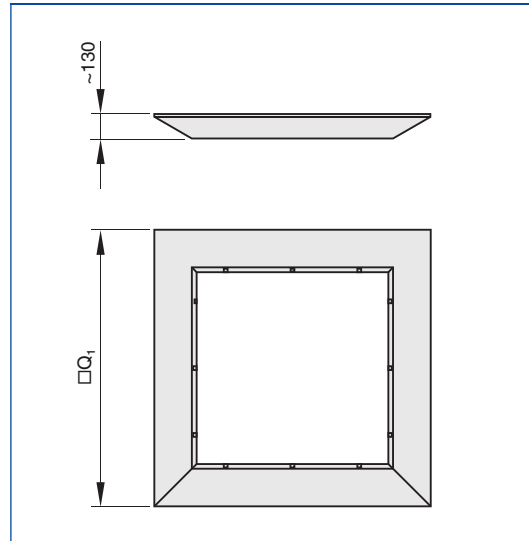
**Parts and characteristics**

- An extended border supports the horizontal air discharge in cooling mode



VD-V-K

**VD-\*-K**



**Dimensions [mm] and weight [kg]**

Nominal size	□Q <sub>1</sub>	m
	mm	kg
425	833	5
600	1003	6
775	1171	8
1050	1451	10

VD-\*S

### Accessories

- Protective cage

### Nominal sizes

- 425, 600, 775, 1050

### Parts and characteristics

- A protective cage protects the blades, e.g. in gymnasiums

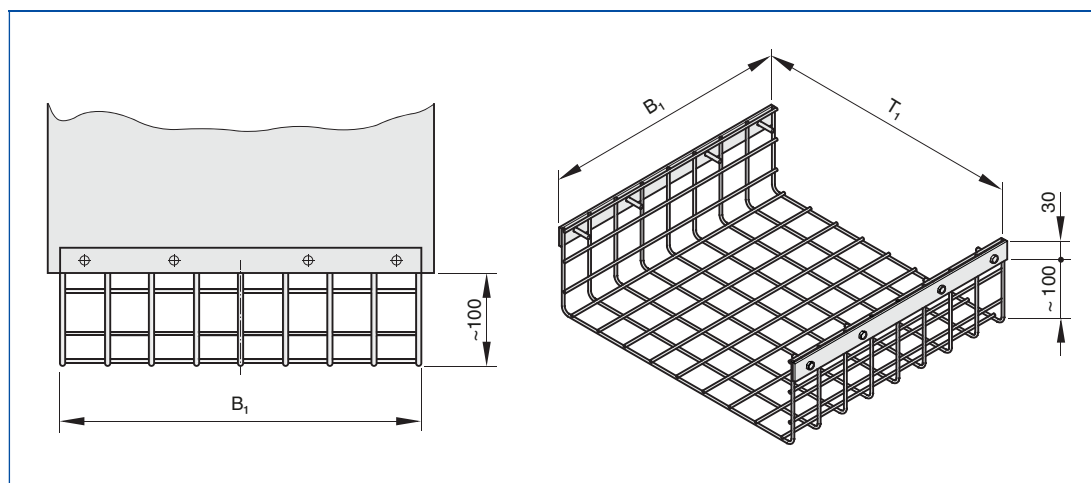
- S /

Order code detail



VD-V-S

VD-\*S



### Dimensions [mm] and weight [kg]

Nominal size	$B_1$	$T_1$	m
	mm		kg
425	404	449	3
600	604	624	4
775	754	799	6
1050	1054	1074	9

## Description

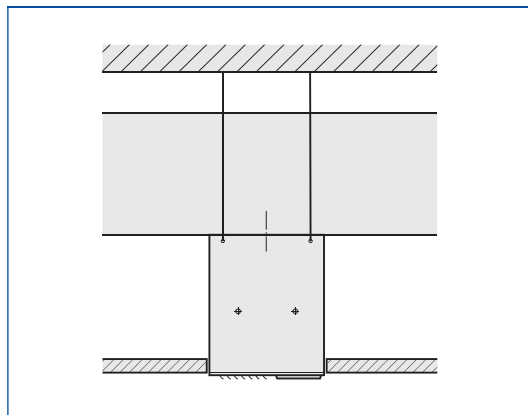
### Installation information

- Installation can be flush with the ceiling or freely suspended
- If the VD is mounted flush with an open cell ceiling, the resulting air pattern is the same as with freely suspended installation
- Continuous adjustment of the air pattern using an actuator is only possible with freely suspended installation, installation flush with an open cell ceiling, or installation with the diffuser protruding from an open cell ceiling
- Installation and making connections to be performed by others

## Installation types

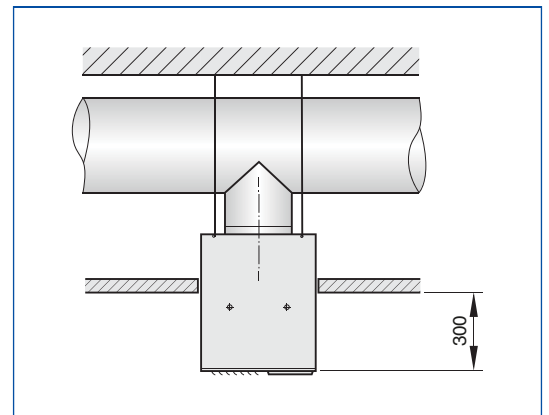
These are only schematic diagrams to illustrate installation details.

### Flush ceiling installation



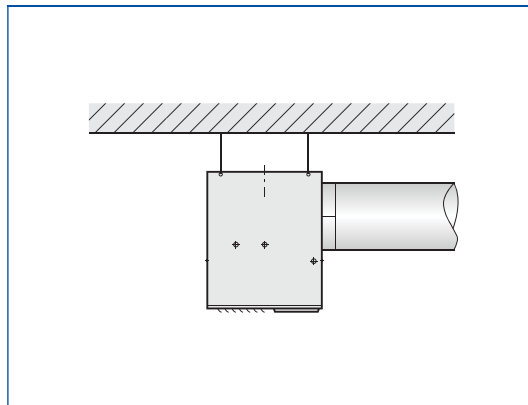
- Two discharge directions, horizontal and vertical
- Horizontal or vertical duct connection

### Protruding installation



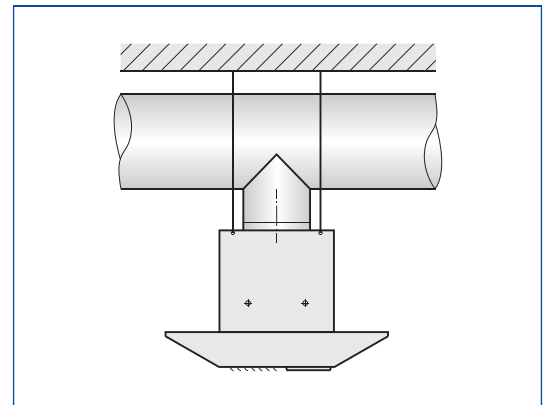
- Continuous adjustment of the discharge direction
- Vertical duct connection
- 300 mm minimum distance to the suspended ceiling

### Freely suspended installation



- Continuous adjustment of the discharge direction
- Horizontal or vertical duct connection
- Preferably for industrial zones

### Freely suspended installation of VD-...-K



- Two discharge directions, horizontal and vertical
- An extended border supports the horizontal air discharge
- Horizontal or vertical duct connection
- Preferably for comfort zones

### Standard text

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme.

Ceiling swirl diffusers with square diffuser face for high rooms in comfort and industrial zones. For supply air only. Blades in diagonally opposed sections can be adjusted for air discharge from horizontal (0°) to vertical (90°). Horizontal air discharge with high induction. For freely suspended installation or for suspended ceilings of all types. Ready-to-install component which consists of the diffuser face with four equal blade arrays, a cross bar for fixing the actuator, a plenum box with side entry or top entry spigot, and suspension holes. The diffuser face is fixed to the plenum box with a screw. Spigot suitable for ducts to EN 1506 or EN 13180. Sound power level of the air-regenerated noise measured according to EN ISO 5135.

### Special characteristics

- With adjustable air control blades for high rooms
- The air pattern can be adjusted manually or with an actuator
- Horizontal or vertical duct connection

### Materials and surfaces

- Diffuser face made of extruded aluminium sections
- Plenum box, cross bar and extended border made of galvanised sheet steel
- Protective cage made of steel mesh
- Diffuser face anodised, E6-C-0, natural colour
- Protective cage powder-coated RAL 9010, pure white
- Extended border powder-coated RAL 9006, white aluminium
- P1: Powder-coated, RAL CLASSIC colour

### Technical data

- Nominal sizes: 425, 600, 775, 1050 mm
- Minimum volume flow rate: 95 – 675 l/s or 342 – 2430 m<sup>3</sup>/h
- Maximum volume flow rate, with  $L_{WA} \approx 50$  dB(A): 280 – 1490 l/s or 1008 – 5364 m<sup>3</sup>/h
- Supply air to room air temperature difference: -12 to +15 K

### Sizing data

- $\dot{V}$  \_\_\_\_\_ [m<sup>3</sup>/h]
- $\Delta p_t$  \_\_\_\_\_ [Pa]
- $L_{WA}$  Air-regenerated noise \_\_\_\_\_ [dB(A)]

### Order options

#### 1 Type

**VD** Swirl diffuser

#### 2 Connection

No entry: diffuser face only

- H** Horizontal, with plenum box
- V** Vertical, with plenum box

#### 3 Adjustment

No entry: manual

Electric actuator

- E1** 230 V AC, 3-point
- E2** 24 V AC/DC, 3-point
- E3** 24 V AC/DC, modulating 2 – 10 V DC

#### 4 Accessories

- K** Extended border
- S** Protective cage

Only for variant with plenum box

Supplied separately

K and S cannot be combined

#### 5 Nominal size [mm]

- 425**
- 600**
- 775**
- 1050**

#### 6 Exposed surface of diffuser face

No entry: anodised, natural colour, E6-C-0

- P1** Powder-coated, # specify RAL CLASSIC colour

Gloss level

RAL 9010 50 %

RAL 9006 30 %

All other RAL colours 70 %

# Ceiling diffusers

## Basic information and nomenclature



- Product selection
- Principal dimensions
- Nomenclature
- Sizing and sizing example
- Installation information
- Commissioning



# Ceiling diffusers

## Basic information and nomenclature

### Product selection

	Ceiling swirl diffusers								
	AIRNAMIC	VDW	TDV-SilentAIR	RFD	FD	TDF-SilentAIR	VD	VDL	FDE
<b>Diffuser face style</b>									
Circular	●	●	●	●	●	●		●	
Square	●						●		●
<b>Diffuser face</b>									
Circular	●	●	●	●	●	●		●	
Square	●	●	●	●	●	●	●		●
Galvanised sheet steel		●	●	●	●	●		●	●
Aluminium				●			●		
Plastic	●								
<b>Air control blades</b>									
Fixed	●			●	●	●			●
Adjustable		●	●				●	●	
Plastic, black and white		●	●						
<b>Duct connection</b>									
Horizontal	●	●	●	●	●	●	●	●	●
Vertical		●	●	●	●	●	●	●	
FLEXTRO	●	●	●		●	●			
<b>Attachments</b>									
Damper blade	●	●	●	●	●	●			●
Pressure tap		●	●	●	●	●			●
Actuator							●	●	
<b>Accessories</b>									
Lip seal	●	●	●	●	●	●			●
Protective cage							●	●	
Extended border							●	●	
<b>Nominal sizes</b>									
Circular diffuser face	400, 600	300, 400, 500, 600, 625	300, 400, 500, 600, 625		300, 400, 500, 600, 625	300, 400, 500, 600, 625			
Square diffuser face	300, 600, 625	300, 400, 500, 600, 625, 825					425, 600, 775, 1050		600, 625
Spigot*				125, 160, 200, 250, 315, 400				315, 400, 630, 800	250, 315
<b>Technical data</b>									
Volume flow rate range [l/s]	13 – 385	7 – 470	11 – 315	4 – 330	9 – 235	10 – 295	95 – 1490	65 – 1080	51 – 365
Volume flow rate range [m³/h]	47 – 1386	25 – 1692	40 – 1134	14 – 1188	31 – 846	36 – 1026	342 – 5364	234 – 3888	184 – 1314
Supply air to room air temperature difference	-12 – +10 K						-12 – +15 K		-12 – +10 K
●	Possible								
	Not possible								

\*Nominal diameter

# Ceiling diffusers

## Basic information and nomenclature

### Product selection

1

	Design ceiling swirl diffusers		Ceiling swirl diffusers with perforated face plate
	XARTO	ADD	DCS
<b>Diffuser face style</b>			
Circular	●	●	●
Square	●		●
<b>Diffuser face</b>			
Circular	●	●	
Square	●	●	●
Galvanised sheet steel	●	●	●
Aluminium			
Plastic			
<b>Air control blades</b>			
Fixed	●	●	●
Adjustable			
Plastic, black and white			
<b>Duct connection</b>			
Horizontal	●	●	●
Vertical		●	●
FLEXTRO			
<b>Attachments</b>			
Damper blade	●	●	
Pressure tap		●	
Actuator			
<b>Accessories</b>			
Lip seal	●	●	
Protective cage			
Extended border			
<b>Nominal sizes</b>			
Circular diffuser face	600	250, 300, 450, 500, 600	
Square diffuser face	600, 625	250, 300, 450, 500, 600, 625	600, 625
Spigot*		125, 160, 200, 250, 315	125, 160, 200, 250, 315, 400
<b>Technical data</b>			
Volume flow rate range [l/s]	31 – 265	20 – 465	4 – 260
Volume flow rate range [m <sup>3</sup> /h]	110 – 954	72 – 1674	16 – 936
Supply air to room air temperature difference	-12 – +10 K		
●	Possible		
	Not possible		

\*Nominal diameter

# Ceiling diffusers

## Basic information and nomenclature

### Product selection

1

	Ceiling diffusers						
	VDR	ADLQ	DLQ	ADLR	DLQL	DLQ-AK	DLK-Fb
<b>Diffuser face style</b>							
Circular	●			●			
Square		●	●		●	●	●
<b>Diffuser face</b>							
Circular	●			●			
Square		●	●	●	●	●	●
Galvanised sheet steel			●		●	●	●
Aluminium	●	●		●			
Plastic							
<b>Air control blades</b>							
Fixed		●	●	●	●	●	●
Adjustable	●						
Plastic, black and white							
<b>Duct connection</b>							
Horizontal	●	●	●	●	●	●	●
Vertical	●			●	●		
FLEXTRO		●					
<b>Attachments</b>							
Damper blade		●	●	●	●		
Pressure tap		●	●	●			
Actuator	●						
<b>Accessories</b>							
Lip seal		●	●	●	●		
Protective cage							
Extended border							
<b>Nominal sizes</b>							
Circular diffuser face	630, 800			244, 300, 356, 412, 468, 542, 598, 654			
Square diffuser face		250, 300, 400, 500, 600, 625	250, 300, 400, 500, 600, 625	600 625	250, 300, 400, 500, 600	300, 400, 500, 600, 625	600, 625
Spigot*	315, 400, 630, 800						
<b>Technical data</b>							
Volume flow rate range [l/s]	175 – 1495	20 – 665	20 – 700	20 – 650	6 – 285	40 – 565	220 – 460
Volume flow rate range [m³/h]	630 – 5382	72 – 2394	72 – 2520	72 – 2340	22 – 1026	144 – 2034	792 – 1656
Supply air to room air temperature difference	-10 to +15 K	-10 to +10 K					
●	Possible						
	Not possible						

\*Nominal diameter

# Ceiling diffusers

## Basic information and nomenclature

### Principal dimensions

 **$\varnothing D$  [mm]**

Outside diameter of the spigot

 **$\varnothing D_1$  [mm]**

Outer diameter of a circular diffuser face

 **$\varnothing D_2$  [mm]**

Diameter of a circular diffuser face style

 **$\varnothing D_3$  [mm]**

Diameter of a circular plenum box

 **$\square Q_1$  [mm]**

Outer diameter of a square diffuser face

 **$\square Q_2$  [mm]**

Dimensions of a square diffuser face style

 **$\square Q_3$  [mm]**

Dimensions of a square plenum box

 **$H_1$  [mm]**

Distance (height) from the lower edge of the suspended ceiling to the lower edge of the diffuser face

 **$H_2$  [mm]**

Height of a ceiling diffuser, from the lower edge of the suspended ceiling to the upper edge of the spigot

 **$H_3$  [mm]**

Height of a ceiling diffuser with plenum box, from the lower edge of the suspended ceiling to the upper edge of the plenum box or of the spigot

 **$A$  [mm]**

Position of the spigot, defined by the distance of the spigot centre line to the lower edge of the suspended ceiling

 **$C$  [mm]**

Length of the spigot

 **$m$  [kg]**

Weight

### Nomenclature

 **$L_{WA}$  [dB(A)]**

A-weighted sound power level of air-regenerated noise

 **$\dot{V}$  [m<sup>3</sup>/h] and [l/s]**

Volume flow rate

 **$\Delta t_z$  [K]**

Supply air temperature difference

 **$\Delta p_t$  [Pa]**

Total differential pressure

 **$A_{eff}$  [m<sup>2</sup>]**

Effective air discharge area

All sound power levels are based on 1 pW.

# Ceiling diffusers

## Basic information and nomenclature

### 1 Sizing with the help of this catalogue

This catalogue provides convenient quick sizing tables for ceiling diffusers. The tables give supply air volume flow rates for all nominal sizes. The maximum volume flow rates are for an open damper blade. A smaller opening of the damper blade results in higher sound power levels and a higher total differential pressure. The tables show values for damper blade positions 45° and 90°.

Sizing data for other volume flow rates and damper blade positions can be determined quickly and precisely using the Easy Product Finder design programme.

### Sizing example

#### Given data

$\dot{V} = 300 \text{ l/s}$  (1280 m<sup>3</sup>/h)  
Square ceiling diffuser, steel,  
with fixed air control blades  
Maximum sound power level 40 dB(A)  
with damper blade position 45°  
Four-way air discharge

#### Quick sizing

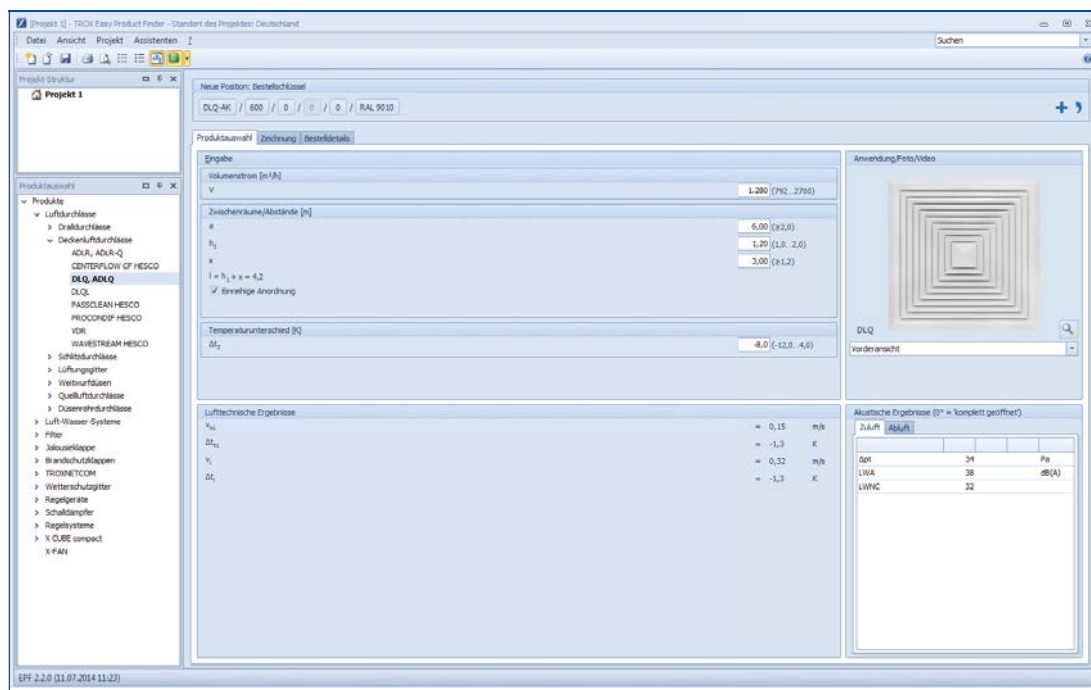
Type DLQ  
Nominal sizes: 600, 625  
Selected: DLQ/600

### Easy Product Finder



The Easy Product Finder allows you to size products using your project-specific data.

You will find the Easy Product Finder on our website.



The screenshot shows the 'Easy Product Finder' software interface. The main window is titled 'Projekt 1 - TROX Easy Product Finder - Standard des Projektes: Deutschland'. The interface is divided into several sections:

- Project Structure:** Shows 'Projekt 1' and 'Neue Position: Bestellkessel'.
- Product Selection:** A tree view on the left lists various product classes under 'Produkte', including 'Luftkurkklasse', 'Drallkurkklasse', 'Deckenluftkurkklasse', 'ADLR, ADLR-Q', 'CENTERFLOW OF HESCO', 'DLQ, ADLQ', 'DUL', 'PASSCLEAN HESCO', 'PROCONDIF HESCO', 'VEM', 'WAVESTREAM HESCO', 'Sichtkurkklasse', 'Lüftungsgitter', 'Weißmuffosen', 'Quellluftkurkklasse', 'Querschnittkurkklasse', 'Luft-Wasser-Systeme', 'Filter', 'Jalousieklappe', 'Brandschutzklappen', 'TROMMELCOM', 'Witterschutzgitter', 'Regelgeräte', 'Schallkörper', 'Regelsysteme', 'X-CURE compact', and 'X-FAN'.
- Input Section:** Contains fields for 'Produktauswahl' (DLQ AK // 600 // 0 // 0 // 0 // RAL 9010), 'Eingabe' (Volumenstrom [m³/h] V = 1.280 [792..2795]), 'Zusammenräume/Abstände [m]' (a = 6,00 [x2,0], b₁ = 1,20 [1,0..2,0], x = 3,00 [x1,2], l = b₁, s x = 4,2, and a checked 'Einseitige Anordnung'), and 'Temperaturunterschied [K]' (ΔTₑ = 8,0 [-12,0..4,4]).
- Technical Results:** A table showing 'Lufttechnische Ergebnisse' with values: vₘ = 0,15 m/s, ΔPₘ = -1,3 K, vₑ = 0,32 m/s, and ΔPₑ = -1,3 K.
- Acoustic Results:** A table showing 'Akustische Ergebnisse (0° = Kompletzt geöffnet)' with values: Lₐ,ₑ = 34 dB, Lₙ,ₑ = 28 dB(A), and Lₙ,ₑ = 22 dB(A).
- Visuals:** A 3D rendering of a square ceiling diffuser is shown in the 'Anwendung/Foto/Video' section.

# Ceiling diffusers

## Basic information and nomenclature

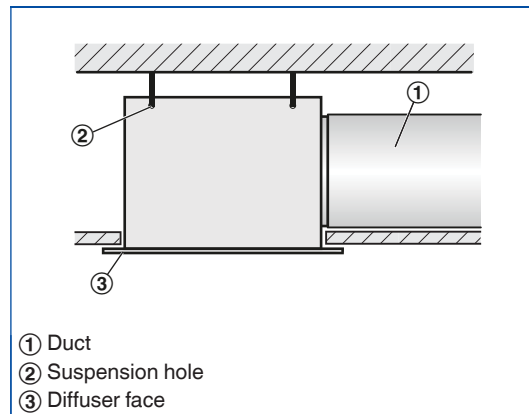
### Description

### Installation information

- Installation and making connections to be performed by others
- The optimum aerodynamic function is only achieved with flush ceiling installation
- The diffuser face is fixed to the plenum box cross bar using the central fixing screw
- Central fixing screw is concealed by a decorative cap

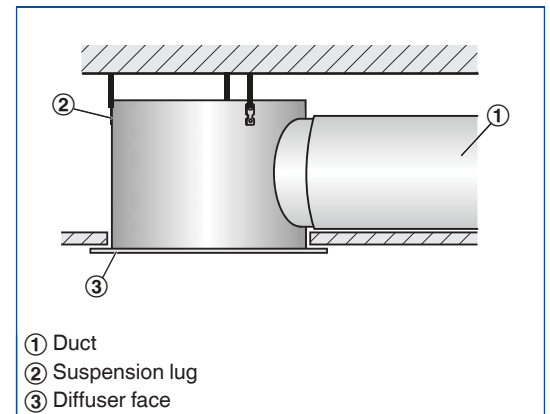
### Installation types

#### Flush ceiling installation with square plenum box



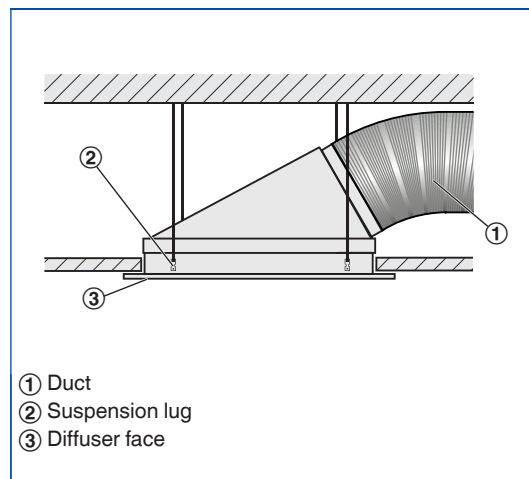
- Horizontal duct connection
- Four suspension holes
- Suspension with cords, wires or hangers, to be provided by others

#### Flush ceiling installation with circular plenum box



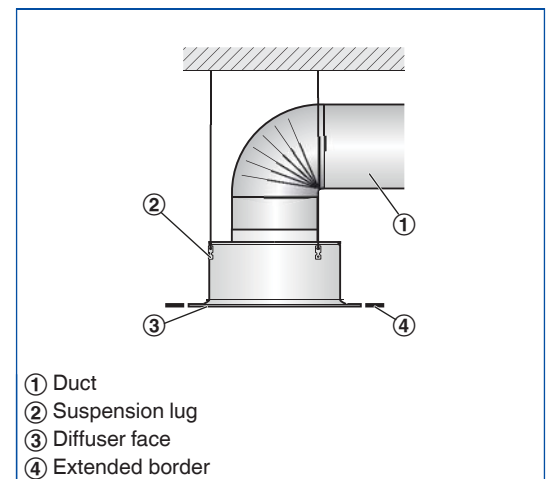
- Horizontal duct connection
- Three suspension lugs
- Suspension with cords, wires or hangers, to be provided by others

#### Flush ceiling installation with plenum box FLEXTRO



- Spigot at 30° angle
- Four suspension lugs
- Suspension with cords, wires or hangers, to be provided by others

#### Freely suspended installation



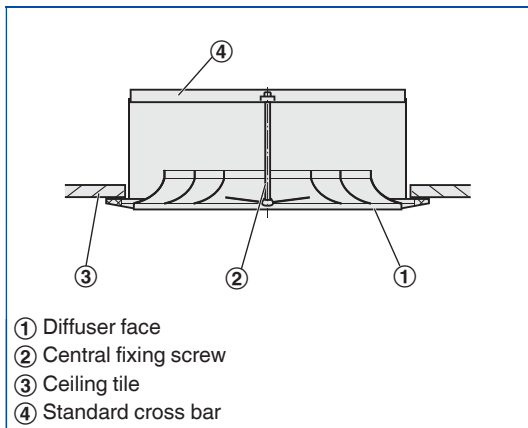
- Vertical duct connection
- Three suspension lugs
- Suspension with cords, wires or hangers, to be provided by others

# Ceiling diffusers

## Basic information and nomenclature

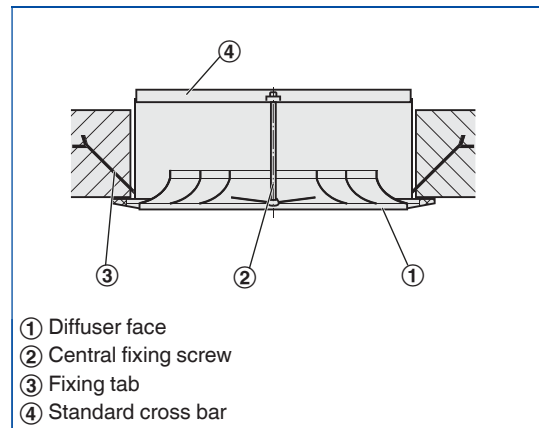
### 1 Installation without plenum box

#### Flush ceiling installation with standard cross bar G1, screw-fixed to ceiling



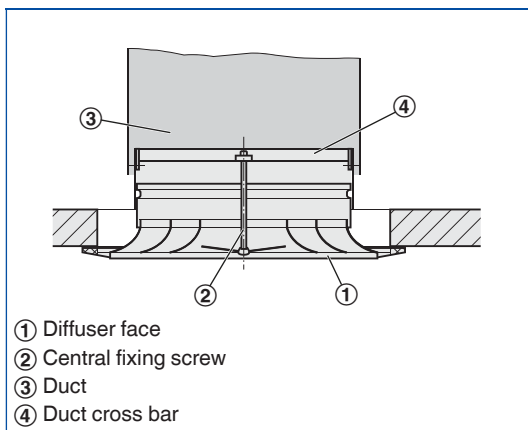
- No spigot
- Fixing of the standard cross bar to the ceiling tile is to be performed by others

#### Flush ceiling installation with standard cross bar G1, with fixing tabs mortared in



- No spigot
- The standard cross bar has to be mortared into the ceiling by others

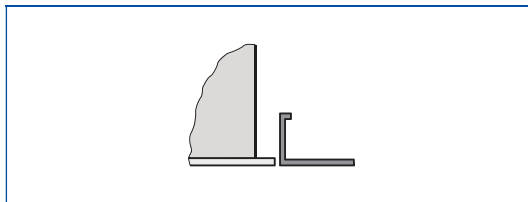
#### Flush ceiling installation with duct cross bar E1



- Vertical duct connection
- Fixing of the duct cross bar to the duct is to be performed by others

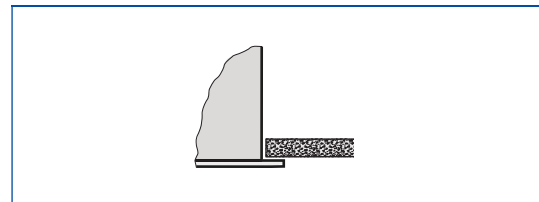
### Ceiling systems

#### Installation into grid ceilings



- Fix the plenum box to the ceiling
- The ceiling tile of the grid ceiling is independent of the ceiling diffuser
- Fix the diffuser face after the ceiling has been completed

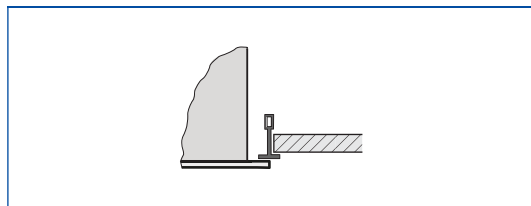
#### Installation in continuous ceilings



- Fix plenum box (including diffuser face, if necessary) to the ceiling
- Adjust plasterboard ceiling tile as required
- If necessary, fix the diffuser face after the ceiling has been completed

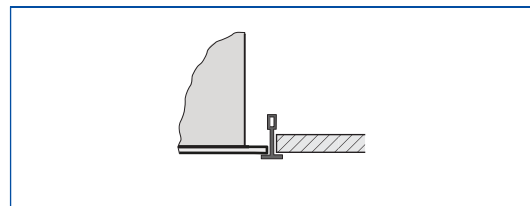


### Installation in T-bar ceilings



- Fix the plenum box to the ceiling
- The T-bar ceiling is independent of the ceiling diffuser
- Fix the diffuser face below the T-bars after the ceiling has been completed

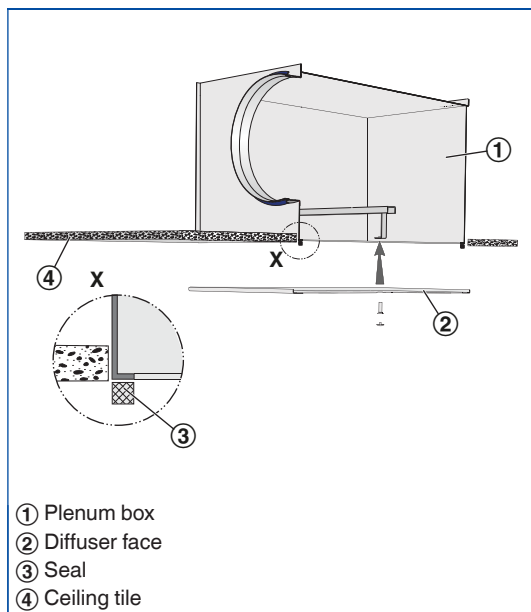
### Installation in T-bar ceilings, diffuser face rests on T-bars



- Fix the plenum box to the ceiling, if necessary
- The diffuser rests on the T-bars

### Diffuser face sealing and fixing

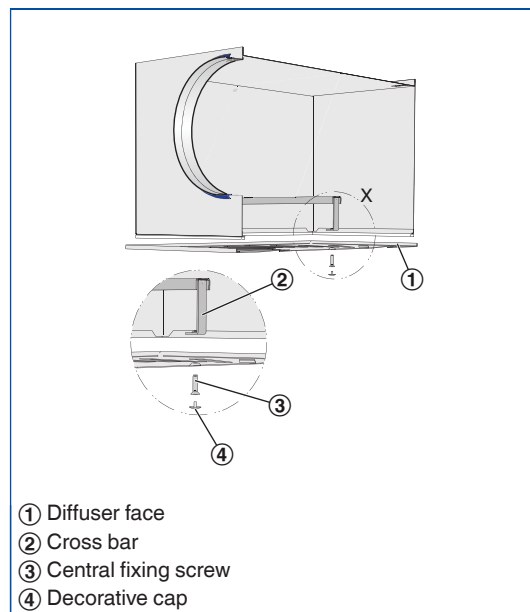
#### Diffuser face – sealing



- ① Plenum box
- ② Diffuser face
- ③ Seal
- ④ Ceiling tile

- The self-adhesive sealing tape (supplied) has to be applied to the return edges of the plenum box by others

#### Diffuser face – central screw fixing



- ① Diffuser face
- ② Cross bar
- ③ Central fixing screw
- ④ Decorative cap

- Using the central fixing screw, fix the diffuser face to the cross bar of the plenum box
- Attach the decorative cap

# Ceiling diffusers

## Basic information and nomenclature

### Commissioning

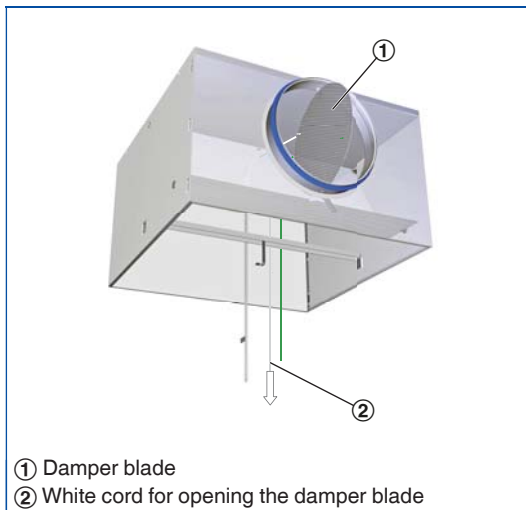
1

#### Volume flow rate balancing

When several diffusers are connected to just one volume flow controller, it may be necessary to balance the volume flow rates.

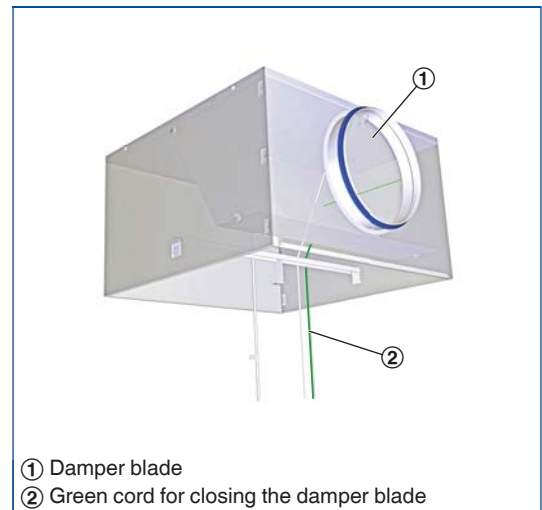
- AIRNAMIC, XARTO, FLEXTRO:  
The diffuser face can be removed to access the damper blade; the damper blade can then be set in 15° intervals between 0 and 90°
- Ceiling diffusers with universal plenum box and damper blade (variant -M):  
The diffuser face can be removed to access the damper blade; the damper blade can then be set to any position between 0 and 90°
- Ceiling diffusers with universal plenum box, damper blade and pressure tap (variant -MN):  
The diffuser face need not be removed since the damper blade can be set with two cords (white and green).

#### AK-Uni-...-MN Volume flow rate balancing



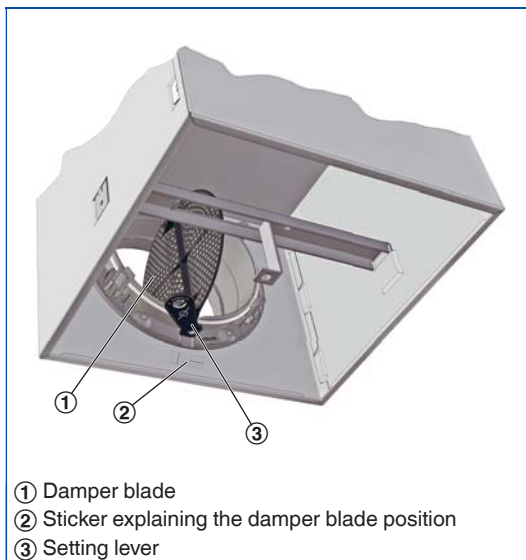
Open, 0°

#### AK-Uni-...-MN Volume flow rate balancing



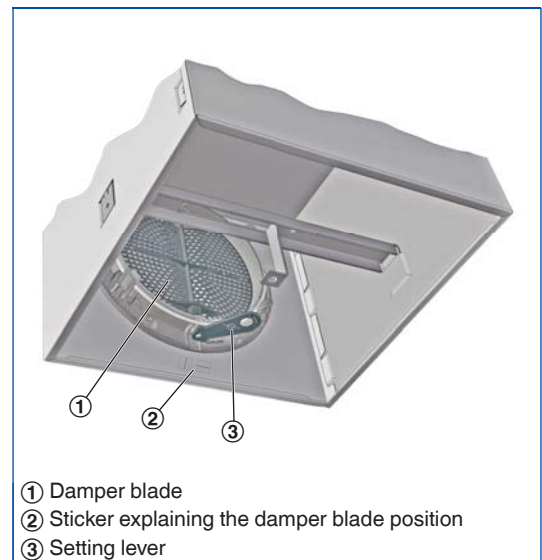
Closed, 90°

#### AIRNAMIC, XARTO, FLEXTRO Volume flow rate balancing



Open, 0°

#### AIRNAMIC, XARTO, FLEXTRO Volume flow rate balancing



Closed, 90°

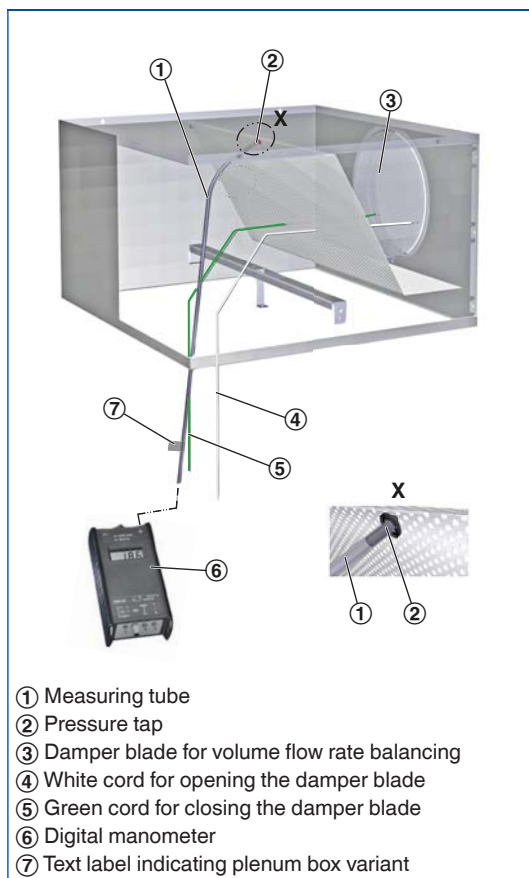
### Volume flow rate measurement

Ceiling diffusers with universal plenum box, damper blade and pressure tap (variant -MN) allow for volume flow rate balancing even with the diffuser face in place.

- Connect the measuring tube to the digital manometer
- Read the effective pressure
- Read the volume flow rate off the characteristic or calculate it
- If necessary, adjust the damper blade position with the cords

A characteristic is included with each AK-Uni plenum box.

### AK-Uni...-MN volume flow rate measurement



For K values for the AK-Uni plenum boxes refer to Chapter K1 – 1.5.

### Volume flow rate calculation for air density 1.2 kg/m<sup>3</sup>

$$\dot{V} = C \times \sqrt{\Delta p_w}$$

### Volume flow rate calculation for other air densities

$$\dot{V} = C \times \sqrt{\Delta p_w} \times \sqrt{\frac{1.2}{\rho}}$$