Ceiling swirl diffusers
Type RFD

Horizontal
swirling air discharge

Without discharge nozzle

With discharge nozzle

Circular diffuser face

With low sound power level for comfort and industrial zones, with fixed air control blades

Circular and square ceiling swirl diffusers

- Nominal sizes 125, 160, 200, 250, 315, 400
- Volume flow rate range 4 – 330 l/s or 14 – 1188 m^3/h
- Diffuser face made of galvanised sheet steel, powder-coated, or of aluminium (depending on variant)
- For supply and extract air
- For variable and constant volume flows
- For all types of ceiling systems
- With discharge nozzle ideal for cooling in case of freely suspended installation
- High induction results in a rapid reduction of temperature differences and airflow velocities
- Air change rates of up to 35 per hour can be achieved by arranging several diffusers in a row with a minimum pitch of 0.9 m (centre line to centre line)
- Ideal for comfort zones

Optional equipment and accessories

- Exposed diffuser face available in RAL CLASSIC colours
- Horizontal or vertical duct connection
- Plenum box with cord-operated damper blade and pressure tap
- Shallow plenum box

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Diffuser faces

Product examples

RFD-Q-D

RFD-R-D

RFD-Q

RFD-R

Spigots

RFD-Q-D-K

RFD-R-D-K

RFD-Q-US

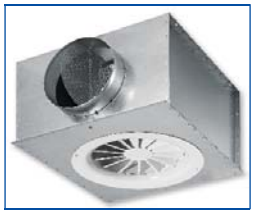
RFD-R-UO

Plenum boxes

RFD-Q-D-A

RFD-R-D-A

RFD-R-D-N



Installation examples

Installation in continuous ceilings

Description

For detailed information on plenum boxes see Chapter K1 – 1.5.

Application
- Type RFD ceiling swirl diffusers are used as supply air or extract air diffusers for comfort zones
- Attractive design element for building owners and architects with demanding aesthetic requirements
- Horizontal swirling supply air discharge for mixed flow ventilation
- The efficient swirl creates high induction levels, thereby rapidly reducing temperature differences and airflow velocities (supply air variant)
- For variable and constant volume flows
- For supply air to room air temperature differences from –12 to +10 K
- For room heights up to 4 m (lower edge of suspended ceiling)
- For all types of ceiling systems
- With an extended border and discharge nozzle also suitable for freely suspended installation (supply air variant)

Variants
- RFD-Q: Square diffuser face
- RFD-R: Circular diffuser face
- RFD-*-D: Diffuser face with discharge nozzle

Connection
- K: Vertical duct connection, with duct collar
- US: Vertical duct connection, with transition piece
- A: Horizontal duct connection, with plenum box

Only RFD-R
- UO: Vertical duct connection, with transition piece and cross bar

Only RFD-R-D
- UD: Vertical duct connection, with transition piece, cross bar and discharge nozzle
- N: Horizontal duct connection, with shallow plenum box to be installed above open cell ceilings

Nominal sizes
- 125, 160, 200, 250, 315, 400

Attachments
- M: Damper blade for volume flow rate balancing
- MN: Pressure tap and cord-operated damper blade for volume flow rate balancing with the diffuser face in place

Accessories
- Lip seal

Special characteristics
- Low sound power level, ideal for comfort zones
- Fixed blades
- For all types of ceiling systems
- Horizontal or vertical duct connection
- Air change rates of up to 35 per hour can be achieved by arranging several diffusers in a row with a minimum pitch of 0.9 m (centre line to centre line)

Parts and characteristics
- Circular or square diffuser face
- Diffuser face with radially arranged fixed air control blades

Construction features
- Spigot suitable for circular ducts to EN 1506 or EN 13180
- Spigot with groove for lip seal (if accessory lip seal has been ordered)

Materials and surfaces
- Q: Diffuser face made of aluminium
- R: Diffuser face made of galvanised sheet steel
- Plenum box, duct collar and cross bar made of galvanised sheet steel
- Transition piece made of aluminium
- Lip seal made of rubber
- Diffuser face powder-coated RAL 9010, pure white
- P1: Powder-coated, RAL CLASSIC colour

Installation and commissioning
- Preferably for rooms with a clear height up to 4.0 m
- Flush ceiling installation
- RFD-*-D: Also for freely suspended installation
- RFD-*-UO, RFD-*-UD: Clamping between ceiling tiles of up to 20 mm
- Horizontal or vertical duct connection

1

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

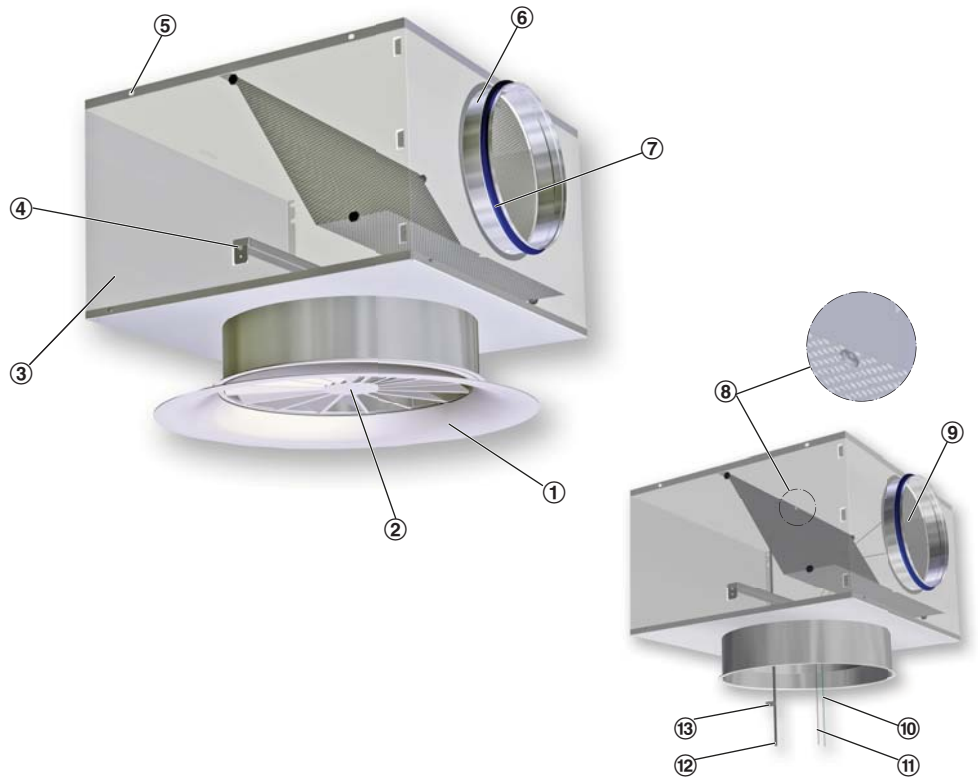
Nominal sizes	125, 160, 200, 250, 315, 400 mm
Minimum volume flow rate, with Δt_Z = –6 K	4 – 36 l/s or 14 – 130 m³/h
Maximum volume flow rate, with L_{WA} ≅ 50 dB(A)	22 – 330 l/s or 79 – 1188 m³/h
Supply air to room air temperature difference	–12 to +10 K

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 RFD ceiling swirl diffusers have fixed blades. Air discharge is horizontal omni directional.
The supply air to room air temperature difference may range from –12 to +10 K.
A damper blade (optional) simplifies volume flow rate balancing for commissioning. Pressure tap and cord-operated damper blade (optional) allow for volume flow rate balancing with the diffuser face in place.
To give rooms an aesthetic, uniform look, Type RFD diffusers may also be used for extract air.

Schematic illustration of the RFD-R-D, with plenum box for horizontal duct connection



① Diffuser face
② Central fixing screw
③ Plenum box
④ Cross bar
⑤ Suspension hole
⑥ Spigot

Options
⑦ Lip seal
⑧ Pressure tap
⑨ Damper blade for volume flow rate balancing
⑩ Green cord for closing the damper blade
⑪ White cord for opening the damper blade
⑫ Measuring tube
⑬ Text label indicating plenum box variant

Horizontal omni directional air discharge

1

Order code

RFD

RFD – Q – D – A – M – L / 200 / P1 – RAL ...
1 2 3 4 5 6 7 8

1 Type
RFD Swirl diffuser

2 Construction style
R Circular
Q Square

3 Construction
No entry: without discharge nozzle
D With discharge nozzle

4 Connection
K Vertical, with duct collar
US Vertical, with transition piece
A Horizontal, with plenum box
Only RFD-R
UO Vertical, with transition piece and cross bar
Only RFD-R-D
UD Vertical, with transition piece,
cross bar and discharge nozzle
N Horizontal, with shallow plenum box

5 Damper blade for volume flow rate balancing
No entry: none
M With (only for connection types A and N)
MN With cords and pressure tap
(only for connection type A)

6 Accessories
No entry: none
L With lip seal
(only for connection types A and N)

7 Nominal size [mm]
125
160
200
250
315
400

8 Exposed surface
No entry: powder-coated RAL 9010,
pure white
P1 Powder-coated,
specify RAL CLASSIC colour

Gloss level
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

Order example

RFD–Q–D–A–M–L/200/P1-RAL 9016

Construction style	Square
Construction	With discharge nozzle
Connection	Horizontal
Damper blade for volume flow rate balancing	With
Accessories	Lip seal
Nominal size	200
Exposed surface	RAL 9016, traffic white, gloss level 70 %

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

The minimum volume flow rates apply to a supply air to room air temperature difference of –6 K.

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.

RFD-*-K

Quick sizing – sound power level and total differential pressure

Nominal size	$\dot{V}$		Δp_t	L_{WA}
	l/s	m³/h	Pa	dB(A)
125	**4.4**	**16**	2	<15
	10	**36**	16	29
	15	**54**	36	38
	24	**86**	92	50
160	**5**	**18**	1	<15
	15	**54**	8	16
	30	**108**	34	34
	47	**169**	83	50
200	**7**	**25**	1	<15
	30	**108**	15	26
	50	**180**	43	38
	75	**270**	96	50
250	**10**	**36**	1	<15
	45	**162**	14	27
	80	**288**	43	41
	114	**410**	87	50
315	**19**	**68**	1	<15
	75	**270**	12	25
	130	**468**	37	40
	185	**666**	75	50
400	**27**	**97**	1	<15
	95	**342**	12	26
	165	**594**	35	40
	230	**828**	69	50

RFD-*-D-K

Quick sizing – sound power level and total differential pressure

Nominal size	$\dot{V}$		Δp_t	L_{WA}
	l/s	m³/h	Pa	dB(A)
125	**4.4**	**16**	1	<15
	15	**54**	8	18
	30	**108**	33	36
	46	**166**	79	50
160	**6,4**	**23**	1	<15
	25	**90**	8	16
	45	**162**	26	33
	76	**274**	74	50
200	**9**	**32**	0	<15
	45	**162**	11	23
	75	**270**	31	37
	110	**396**	66	50
250	**14**	**50**	0	<15
	65	**234**	10	21
	115	**414**	33	38
	164	**590**	66	50
315	**25**	**90**	1	<15
	95	**342**	11	23
	165	**594**	32	38
	240	**864**	67	50
400	**36**	**130**	1	<15
	135	**486**	12	24
	235	**846**	36	40
	330	**1188**	71	50

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RFD-*-US

Quick sizing – sound power level and total differential pressure

Nominal size	V̇		Δp_t	L_{WA}
	l/s	m³/h	Pa	dB(A)
125	4	14	2	<15
	10	36	17	28
	15	54	37	39
	22	79	80	50
160	5	18	1	<15
	20	72	15	24
	30	108	35	37
	42	151	68	50
200	7	25	1	<15
	30	108	22	23
	50	180	60	39
	70	252	117	50
250	10	36	1	<15
	45	162	19	25
	80	288	61	40
	114	410	123	50
315	19	68	1	<15
	70	252	17	25
	130	468	59	42
	170	612	101	50
400	27	97	1	<15
	90	324	15	24
	155	558	44	39
	220	792	88	50

RFD-*-D-US

Quick sizing – sound power level and total differential pressure

Nominal size	V̇		Δp_t	L_{WA}
	l/s	m³/h	Pa	dB(A)
125	4.4	16	1	<15
	15	54	10	17
	25	90	28	34
	38	137	64	50
160	6	22	1	<15
	25	90	9	16
	45	162	29	35
	66	238	62	50
200	9	32	1	<15
	40	144	22	20
	70	252	66	37
	102	367	140	50
250	14	50	1	<15
	60	216	21	22
	105	378	63	39
	145	522	120	50
315	25	90	2	<15
	90	324	21	22
	155	558	62	38
	220	792	125	50
400	36	130	1	<15
	120	432	17	22
	205	738	49	38
	285	1026	95	50

RFD-*-A

The maximum volume flow rates apply to a sound power level of approx. 50 dB (A) with damper blade position 0°.

Quick sizing – sound power level and total differential pressure

Nominal size	V̇		Damper blade position					
			0°		45°		90°	
			Δp_t	L_{WA}	Δp_t	L_{WA}	Δp_t	L_{WA}
	l/s	m³/h	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)
125	4	14	2	<15	3	<15	4	<15
	10	36	17	28	19	28	26	28
	15	54	38	38	43	39	58	38
	22	79	82	50	93	49	124	50
160	5	18	1	<15	1	<15	1	<15
	15	54	9	16	11	17	15	15
	30	108	35	34	43	36	60	34
	47	169	86	50	105	51	147	51
200	7	25	1	<15	1	<15	1	<15
	25	90	12	21	15	21	20	21
	44	158	36	35	45	36	61	35
	70	252	91	50	114	52	156	51
250	10	36	1	<15	1	<15	1	<15
	45	162	14	25	19	26	25	25
	75	270	40	38	52	40	70	39
	110	396	86	50	113	52	151	52
315	19	68	1	<15	1	<15	2	<15
	70	252	12	24	17	26	22	24
	120	432	35	39	49	40	63	38
	175	630	75	50	103	52	135	50
400	27	97	1	<15	1	<15	1	<15
	90	324	10	24	13	25	17	24
	160	576	33	40	40	41	53	39
	220	792	63	50	75	52	100	49

RFD-*-D-A

Quick sizing – sound power level and total differential pressure

Nominal size	$\dot{V}$		Damper blade position					
			0°		45°		90°	
			Δp_t	L_{WA}	Δp_t	L_{WA}	Δp_t	L_{WA}
	l/s	m³/h	Pa	dB(A)	Pa	dB(A)	Pa	dB(A)
125	4.4	16	1	<15	1	<15	3	<15
	15	54	12	19	17	20	33	23
	30	108	48	37	68	40	132	41
	43	155	98	50	139	52	271	53
160	6.4	23	1	<15	1	<15	2	<15
	30	108	16	22	24	22	44	25
	50	180	45	37	68	38	123	41
	71	256	91	50	138	53	250	54
200	9	32	1	<15	1	<15	2	<15
	40	144	13	21	19	22	34	24
	70	252	39	37	59	38	104	40
	105	378	89	50	133	53	234	54
250	14	50	1	<15	1	<15	2	<15
	60	216	12	20	18	23	32	23
	108	389	39	37	58	39	103	40
	153	551	79	50	116	53	207	52
315	25	90	1	<15	2	<15	2	<15
	90	324	13	23	20	25	29	25
	150	540	35	38	55	40	82	40
	215	774	72	50	114	52	168	52
400	36	130	1	<15	1	<15	2	<15
	120	432	11	23	15	23	22	23
	205	738	33	38	44	39	65	39
	290	1044	65	50	87	50	131	51

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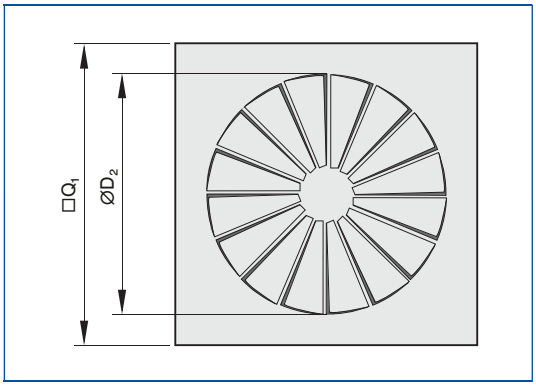
RFD-Q

– Q –

Order code detail

Diffuser face RFD-Q



Dimensions

Nominal size	RFD-Q-K		RFD-Q-D-K		ØD2
	□Q1	Aeff	□Q1	Aeff	
	mm	m²	mm	m²	mm
125	198	0.0026	198	0.0034	120
160	198	0.0037	248	0.0060	155
200	248	0.0066	248	0.0092	195
250	298	0.0110	298	0.0150	245
315	398	0.0205	398	0.0265	310
400	498	0.0280	498	0.0355	395

– K /

Order code detail

RFD-Q-K

Variant RFD-Q-K

– Ceiling swirl diffuser with square diffuser face

Nominal sizes

– 125, 160, 200, 250, 315, 400

Parts and characteristics

– Square diffuser face
– Circular duct collar for connection to a vertical duct

Construction features

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

RFD-Q-D-K

Variant RFD-Q-D-K

– Ceiling swirl diffuser with discharge nozzle and square diffuser face

Nominal sizes

– 125, 160, 200, 250, 315, 400

Parts and characteristics

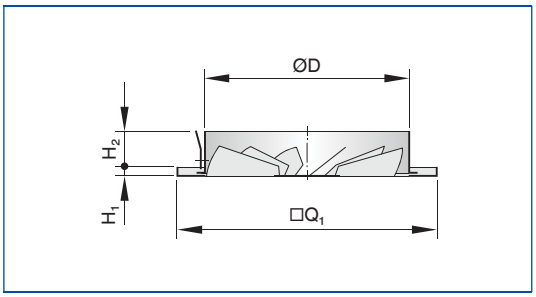
– Square diffuser face
– Discharge nozzle improves aerodynamic and acoustic characteristics
– Circular duct collar for connection to a vertical duct

Construction features

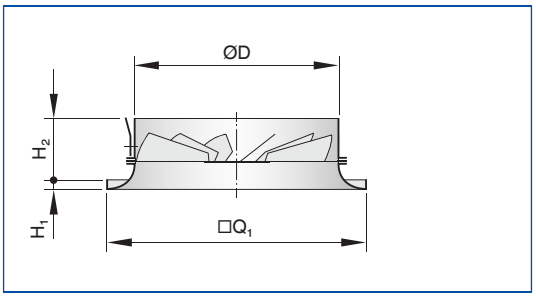
– Spigot suitable for circular ducts to EN 1506 or EN 13180

Dimensions

RFD-Q-K



RFD-Q-D-K



Dimensions [mm] and weight [kg]

Nominal size	RFD-Q-K			RFD-Q-D-K			ØD	H_1
	$□Q_1$	H_2	m	$□Q_1$	H_2	m		
	mm		kg	mm		kg	mm	
125	198	42	0.6	198	67	0.7	123	8
160	198	45	0.7	248	70	0.9	158	8
200	248	45	1.0	248	70	1.2	198	8
250	298	42	1.5	298	67	1.7	248	8
315	398	45	2.4	398	80	2.9	313	8
400	498	45	3.6	498	80	4.3	398	8

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– US /

Order code detail

RFD-Q-US

Variant RFD-Q-US
– Ceiling swirl diffuser with square diffuser face

Nominal sizes
– 125, 160, 200, 250, 315, 400

Parts and characteristics
– Square diffuser face
– Transition piece for connection to a vertical duct

Construction features
– Spigot suitable for circular ducts to EN 1506 or EN 13180

RFD-Q-D-US

Variant RFD-Q-D-US
– Ceiling swirl diffuser with discharge nozzle and square diffuser face

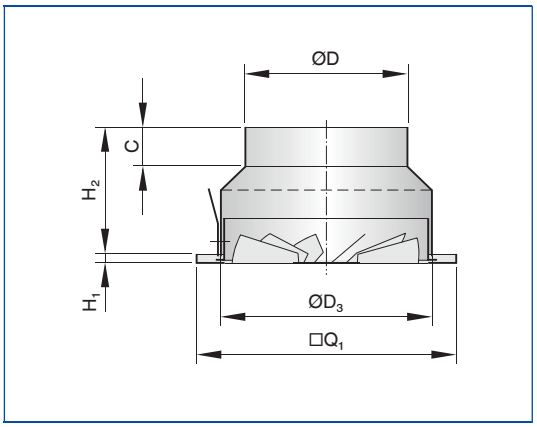
Nominal sizes
– 125, 160, 200, 250, 315, 400

Parts and characteristics
– Square diffuser face
– Discharge nozzle improves aerodynamic and acoustic characteristics
– Transition piece for connection to a vertical duct

Construction features
– Spigot suitable for circular ducts to EN 1506 or EN 13180

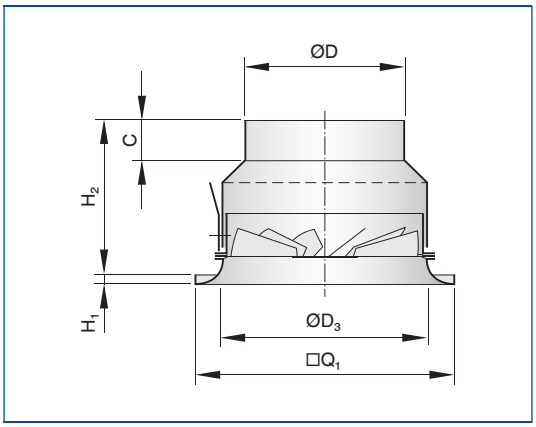
Dimensions

RFD-Q-US



Sizes 125 and 160 without perforated sheet metal

RFD-Q-D-US



Sizes 125 and 160 without perforated sheet metal

Dimensions [mm] and weight [kg]

Nominal size	RFD-Q-US			RFD-Q-D-US			ØD	H_1	$ØD_3$	C
	$□Q_1$	H_2	m	$□Q_1$	H_2	m				
	mm		kg	mm		kg	mm			
125	198	120	0.7	198	145	0.8	98	8	127	40
160	198	125	0.9	248	150	1.1	123	8	162	40
200	248	128	1.2	248	153	1.4	158	8	202	40
250	298	133	1.7	298	158	2.0	198	8	252	40
315	398	140	2.7	398	175	3.2	248	8	318	40
400	498	150	4.1	498	185	4.7	313	8	403	40

– **A**

Order code detail

RFD-Q-A

Variant RFD-Q-A
– Ceiling swirl diffuser with square diffuser face

Nominal sizes
– 125, 160, 200, 250, 315, 400

Parts and characteristics
– Square diffuser face
– Plenum box for horizontal duct connection
– Circular opening to accommodate the diffuser face
– Simple installation of the diffuser face due to central fixing screw with decorative cap
– Damper blade for volume flow rate balancing (optional)
– Pressure tap and cord-operated damper blade for volume flow rate balancing (optional)
– Lip seal (optional)

Construction features
– Spigot suitable for circular ducts to EN 1506 or EN 13180
– Spigot with groove for lip seal (if accessory lip seal has been ordered)

RFD-Q-D-A

Variant RFD-Q-D-A
– Ceiling swirl diffuser with discharge nozzle and square diffuser face

Nominal sizes
– 125, 160, 200, 250, 315, 400

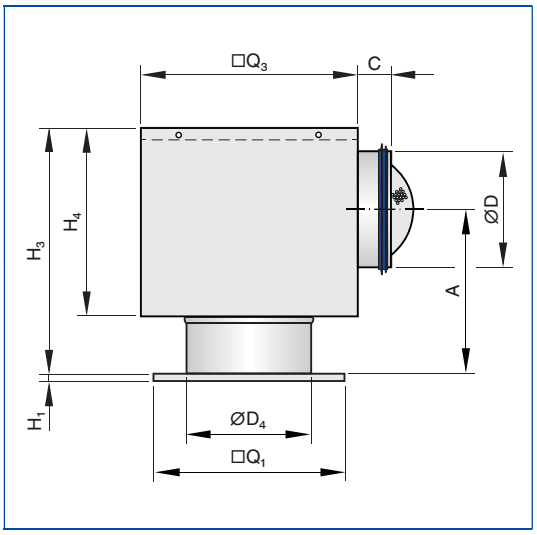
Parts and characteristics
– Square diffuser face
– Discharge nozzle improves aerodynamic and acoustic characteristics
– Plenum box for horizontal duct connection
– Circular opening to accommodate the diffuser face
– Simple installation of the diffuser face due to central fixing screw with decorative cap
– Damper blade for volume flow rate balancing (optional)
– Pressure tap and cord-operated damper blade for volume flow rate balancing (optional)
– Lip seal (optional)

Construction features
– Spigot suitable for circular ducts to EN 1506 or EN 13180
– Spigot with groove for lip seal (if accessory lip seal has been ordered)

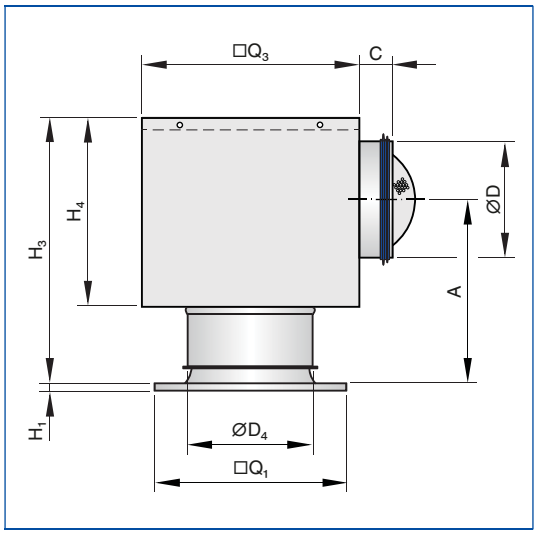
1

Dimensions

RFD-Q-A



RFD-Q-D-A



Dimensions [mm] and weight [kg]

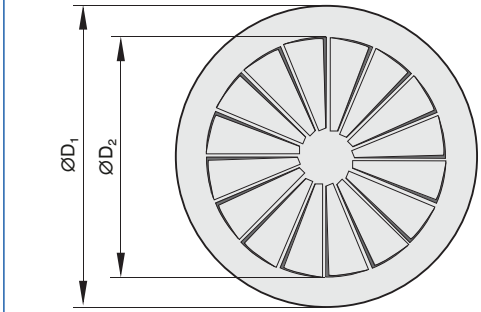
Nominal size	RFD-Q-A				RFD-Q-D-A				H_1	$□Q_3$	H_4	$ØD_4$	ØD	C	Plenum box
	$□Q_1$	H_3	A	m	$□Q_1$	H_3	A	m							
	mm			kg	mm			kg	mm						
125	198	255	170	3.0	198	276	196	3.1	8	216	195	125	98	50	AK-Uni-028
160	198	280	182	3.5	248	301	208	3.8	8	266	220	160	123	48	AK-Uni-029
200	248	310	194	4.3	248	331	220	4.5	8	290	250	200	158	50	AK-Uni-030
250	298	355	219	8.7	298	376	245	9.0	8	476	295	250	198	50	AK-Uni-031
315	398	395	244	12.0	398	436	281	12.5	8	567	345	315	248	48	AK-Uni-032
400	498	470	277	15.1	498	501	313	15.8	8	615	410	400	313	50	AK-Uni-033

RFD-R

– R –

Order code detail

Diffuser face RFD-R



Dimensions

Nominal size	RFD-R-K		RFD-R-D-K		$ØD_2$
	$ØD_1$	A_{eff}	$ØD_1$	A_{eff}	
	mm	m^2	mm	m^2	mm
125	158	0.0026	200	0.0034	120
160	197	0.0037	250	0.0060	155
200	241	0.0066	300	0.0092	195
250	295	0.0110	350	0.0150	245
315	364	0.0205	450	0.0265	310
400	450	0.0280	580	0.0355	395

– K /

Order code detail

RFD-R-K

Variant RFD-R-K
– Ceiling swirl diffuser with circular diffuser face

Nominal sizes
– 125, 160, 200, 250, 315, 400

Parts and characteristics
– Circular diffuser face
– Circular duct collar for connection to a vertical duct

Construction features
– Spigot suitable for circular ducts to EN 1506 or EN 13180

RFD-R-D-K

Variant RFD-R-D-K
– Ceiling swirl diffuser with discharge nozzle and circular diffuser face

Nominal sizes
– 125, 160, 200, 250, 315, 400

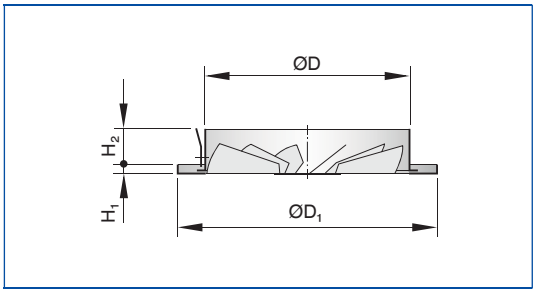
Parts and characteristics
– Circular diffuser face
– Discharge nozzle improves aerodynamic and acoustic characteristics
– Circular duct collar for connection to a vertical duct

Construction features
– Spigot suitable for circular ducts to EN 1506 or EN 13180

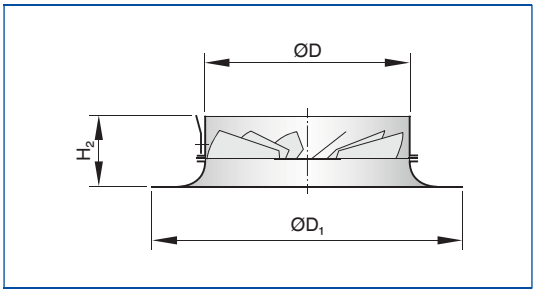
1

Dimensions

RFD-R-K



RFD-R-D-K



Dimensions [mm] and weight [kg]

Nominal size	RFD-R-K			RFD-R-D-K			ØD	H_1
	$ØD_1$	H_2	m	$ØD_1$	H_2	m		
	mm		kg	mm		kg	mm	
125	158	42	0.4	200	67	0.5	123	8
160	197	45	0.6	250	70	1.0	158	8
200	241	45	0.9	300	70	1.3	198	8
250	295	42	1.3	350	67	1.8	248	8
315	364	45	1.9	450	80	2.8	313	8
400	450	45	2.9	580	80	4.1	398	8

– US /

Order code detail

RFD-R-US

Variant RFD-R-US
– Ceiling swirl diffuser with circular diffuser face

Nominal sizes
– 125, 160, 200, 250, 315, 400

Parts and characteristics
– Circular diffuser face
– Transition piece for connection to a vertical duct

Construction features
– Spigot suitable for circular ducts to EN 1506 or EN 13180

RFD-R-D-US

Variant RFD-R-D-US
– Ceiling swirl diffuser with discharge nozzle and circular diffuser face

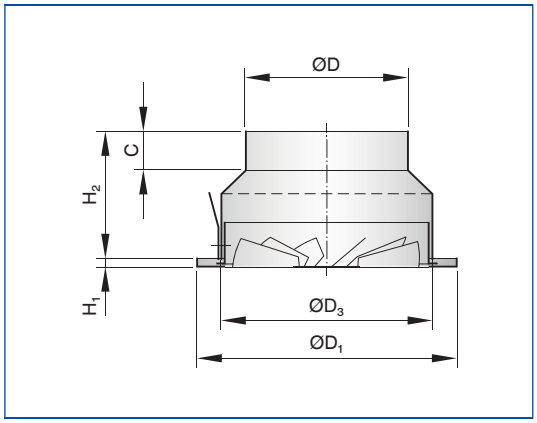
Nominal sizes
– 125, 160, 200, 250, 315, 400

Parts and characteristics
– Circular diffuser face
– Discharge nozzle improves aerodynamic and acoustic characteristics
– Transition piece for connection to a vertical duct

Construction features
– Spigot suitable for circular ducts to EN 1506 or EN 13180

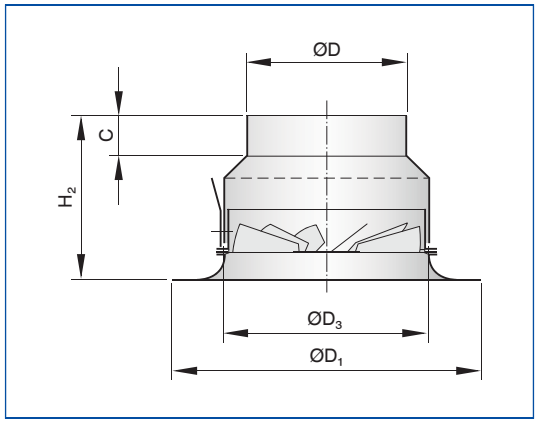
Dimensions

RFD-R-US



Sizes 125 and 160 without perforated sheet metal

RFD-R-D-US



Sizes 125 and 160 without perforated sheet metal

Dimensions [mm] and weight [kg]

Nominal size	RFD-R-US			RFD-R-D-US			ØD	H_1	$ØD_3$	C
	$ØD_1$	H_2	m	$ØD_1$	H_2	m				
	mm		kg	mm		kg	mm			
125	158	120	0.5	200	153	0.6	98	8	127	40
160	197	125	0.8	250	158	1.1	123	8	162	40
200	241	128	1.1	300	161	1.5	158	8	202	40
250	295	133	1.6	350	166	2.1	198	8	252	40
315	364	140	2.3	450	183	3.2	248	8	318	40
400	450	150	3.4	580	193	4.6	313	8	403	40

1

– **U***

Order code detail

RFD-R-UO

Variant RFD-R-UO
– Ceiling swirl diffuser with circular diffuser face

Nominal sizes
– 125, 160, 200, 250, 315, 400

Parts and characteristics
– Circular diffuser face
– Transition piece for connection to a vertical duct
– Simple installation of the diffuser face due to central fixing screw with decorative cap

Construction features
– Spigot suitable for circular ducts to EN 1506 or EN 13180

RFD-R-D-UD

Variant RFD-R-D-UD
– Ceiling swirl diffuser with discharge nozzle and circular diffuser face

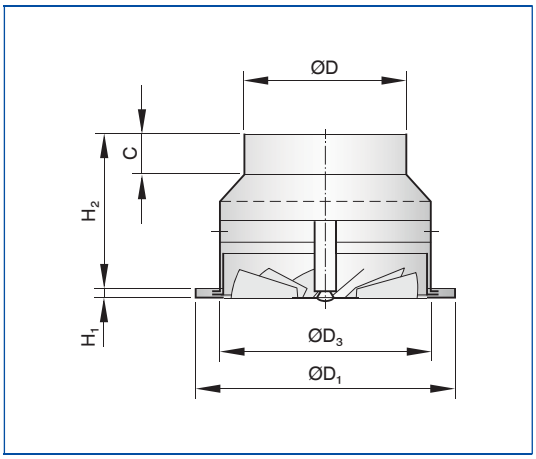
Nominal sizes
– 125, 160, 200, 250, 315, 400

Parts and characteristics
– Circular diffuser face
– Discharge nozzle improves aerodynamic and acoustic characteristics
– Transition piece for connection to a vertical duct
– Simple installation of the diffuser face due to central fixing screw with decorative cap

Construction features
– Spigot suitable for circular ducts to EN 1506 or EN 13180

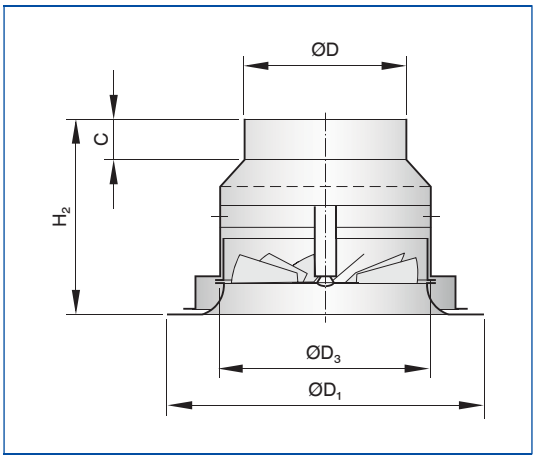
Dimensions

RFD-R-UO



Sizes 125 and 160 without perforated sheet metal

RFD-R-D-UD



Sizes 125 and 160 without perforated sheet metal

Dimensions [mm] and weight [kg]

Nominal size	RFD-R-UO			RFD-R-D-UD			ØD	H_1	$ØD_3$	C
	$ØD_1$	H_2	m	$ØD_1$	H_2	m				
	mm		kg	mm		kg	mm			
125	158	146	0.6	200	192	0.7	98	8	127	40
160	197	151	0.8	250	196	1.2	123	8	162	40
200	241	154	1.2	300	197	1.7	158	8	202	40
250	295	159	1.6	350	202	2.2	198	8	252	40
315	364	166	2.5	450	219	3.6	248	8	318	40
400	450	176	3.7	580	229	5.3	313	8	403	40

– **A**

Order code detail

RFD-R-A

Variant RFD-R-A
– Ceiling swirl diffuser with circular diffuser face

Nominal sizes
– 125, 160, 200, 250, 315, 400

Parts and characteristics
– Circular diffuser face
– Plenum box for horizontal duct connection
– Circular opening to accommodate the diffuser face
– Simple installation of the diffuser face due to central fixing screw with decorative cap
– Damper blade for volume flow rate balancing (optional)
– Pressure tap and cord-operated damper blade for volume flow rate balancing (optional)
– Lip seal (optional)

Construction features
– Spigot suitable for circular ducts to EN 1506 or EN 13180
– Spigot with groove for lip seal (if accessory lip seal has been ordered)

RFD-R-D-A

Variant RFD-R-D-A
– Ceiling swirl diffuser with discharge nozzle and circular diffuser face

Nominal sizes
– 125, 160, 200, 250, 315, 400

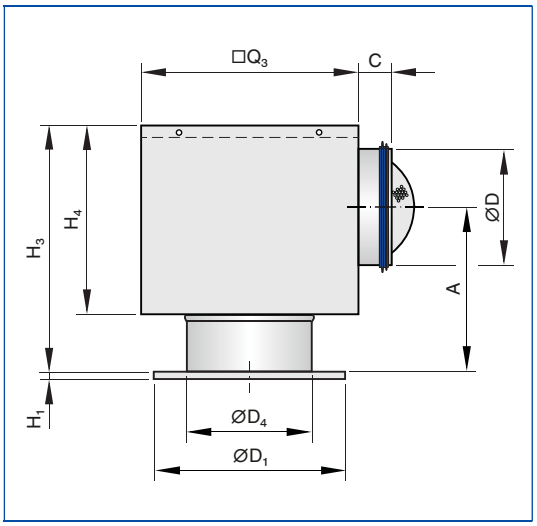
Parts and characteristics
– Circular diffuser face
– Discharge nozzle improves aerodynamic and acoustic characteristics
– Plenum box for horizontal duct connection
– Circular opening to accommodate the diffuser face
– Simple installation of the diffuser face due to central fixing screw with decorative cap
– Damper blade for volume flow rate balancing (optional)
– Pressure tap and cord-operated damper blade for volume flow rate balancing (optional)
– Lip seal (optional)

Construction features
– Spigot suitable for circular ducts to EN 1506 or EN 13180
– Spigot with groove for lip seal (if accessory lip seal has been ordered)

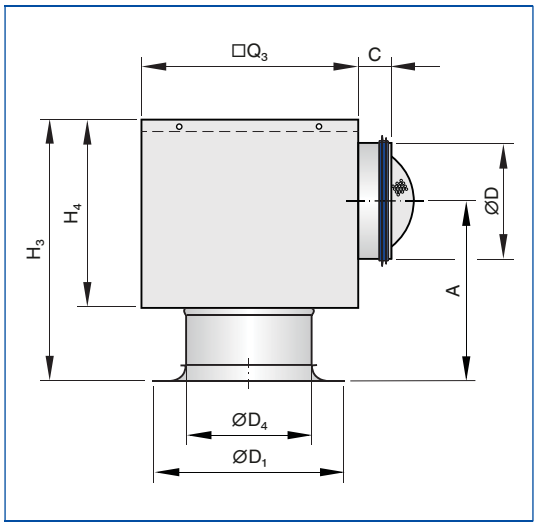
1

Dimensions

RFD-R-A



RFD-R-D-A



Dimensions [mm] and weight [kg]

Nominal size	RFD-R-A				RFD-R-D-A				H_1	$□Q_3$	H_4	$ØD_4$	ØD	C	Plenum box
	$ØD_1$	H_3	A	m	$ØD_1$	H_3	A	m							
	mm			kg	mm			kg	mm						
125	158	255	170	2.8	200	284	204	2.9	8	216	195	125	98	50	AK-Uni-028
160	197	280	182	3.5	250	309	216	3.8	8	266	220	160	123	48	AK-Uni-029
200	241	310	194	4.2	300	339	228	4.6	8	290	250	200	158	50	AK-Uni-030
250	295	355	219	8.5	350	384	253	9.0	8	476	295	250	198	50	AK-Uni-031
315	364	395	244	11.6	450	444	289	12.5	8	567	345	315	248	48	AK-Uni-032
400	450	470	277	14.4	580	509	321	15.7	8	615	410	400	313	50	AK-Uni-033

1

RFD-R-D-N

RFD-R-D-N

– R – D – N

Order code detail

Variant RFD-R-D-N

– Ceiling swirl diffuser with discharge nozzle and circular diffuser face

Nominal sizes

– 125, 160, 200, 250, 315, 400

Parts and characteristics

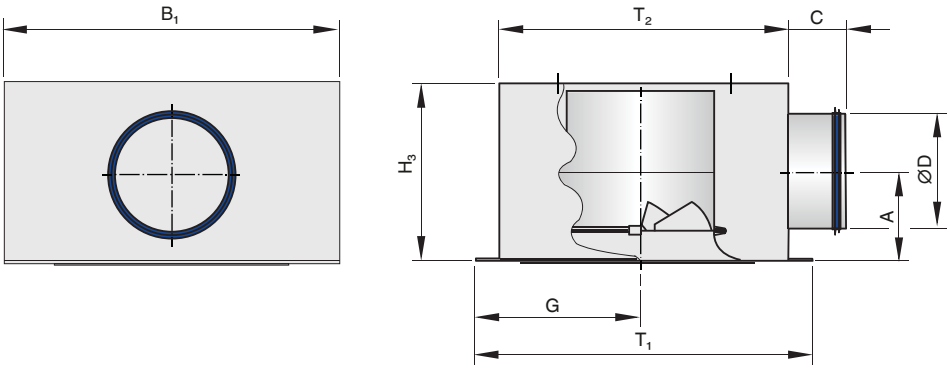
– Circular diffuser face
– Discharge nozzle improves aerodynamic and acoustic characteristics
– Plenum box for horizontal duct connection
– Compact unit which consists of the diffuser and a plenum box, shallow construction for installation above open cell ceilings
– Damper blade for volume flow rate balancing (optional)
– Lip seal (optional)

Construction features

– Spigot suitable for circular ducts to EN 1506 or EN 13180
– Spigot with groove for lip seal (if accessory lip seal has been ordered)

Dimensions

RFD-R-D-N



Dimensions [mm] and weight [kg]

Nominal size	ØD	B_1	T_1	H_3	T_2	A	C	G	m
	mm								kg
125	98	283	304	152	264	77	50	159	2.4
160	123	335	333	177	293	90	48	155	3.8
200	158	392	413	212	373	108	50	195	5.1
250	198	435	456	262	416	132	50	195	6.5
315	248	496	516	312	476	157	48	230	10.0
400	313	728	692	377	652	190	50	305	15.0

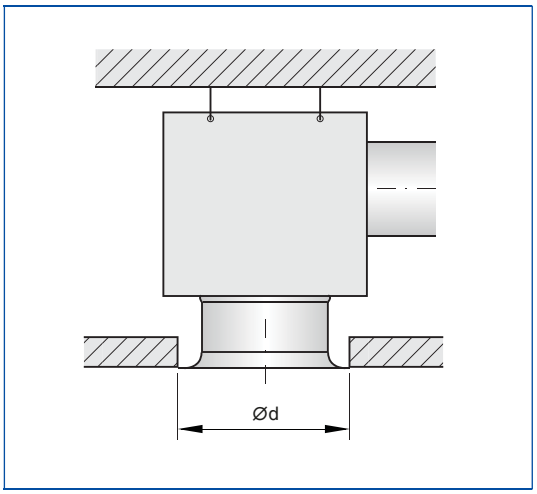
1

Installation types

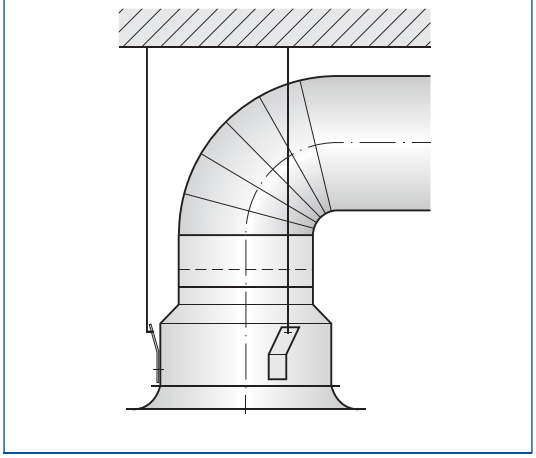
For more installation details see Chapter K1 – 1.6.

These are only schematic diagrams to illustrate installation details.

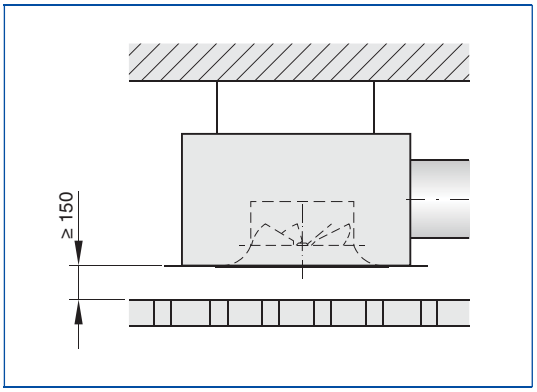
Flush ceiling installation



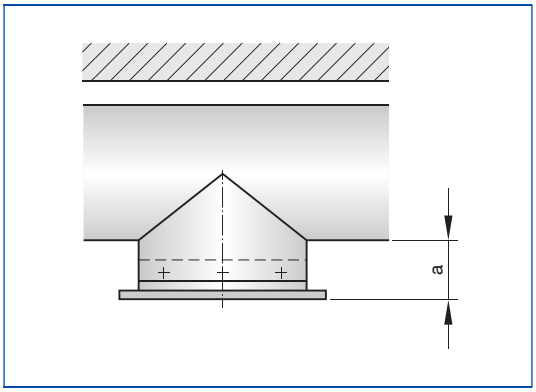
Freely suspended installation



Installation above an open cell ceiling



Installation onto a duct



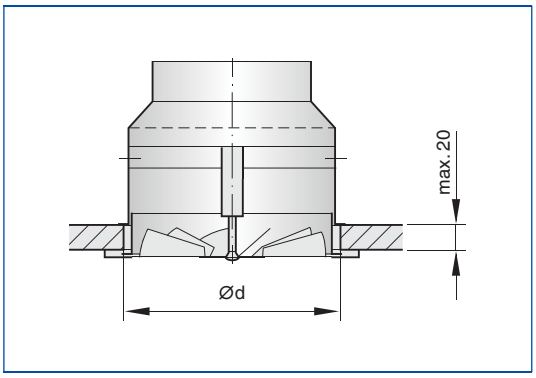
Ceiling cut-out

Dimensions

Variant	125		160		200		250		315		400	
	a	Ød	a	Ød	a	Ød	a	Ød	a	Ød	a	Ød
	mm											
RFD-Q-K	180	140	235	175	295	215	370	265	465	330	595	415
RFD-Q-D-K	180	170	235	205	295	233	370	283	465	380	595	480
RFD-Q-A		140		175		215		265		330		415
RFD-Q-D-A		170		205		233		283		380		480
RFD-R-K	180	140	235	175	295	215	370	265	465	330	595	415
RFD-R-D-K	180	170	235	205	295	245	370	295	465	380	595	480
RFD-R-UO		125		160		200		250		315		400
RFD-R-D-UD		165		200		240		290		375		460
RFD-R-A		140		175		215		265		330		415
RFD-R-D-A		170		205		245		295		380		480

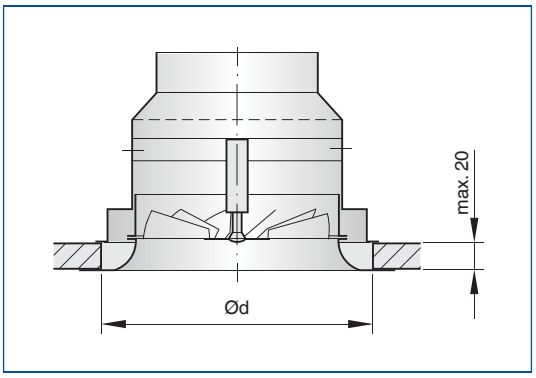
Clamping

Clamping of RFD-...-UO



Diffuser face fixing with central screw

Clamping of RFD-...-UD



Diffuser face fixing with central screw

Ceiling cut-out

Dimensions

Variant	125		160		200		250		315		400	
	a	Ød	a	Ød	a	Ød	a	Ød	a	Ød	a	Ød
	mm											
RFD-Q-K	180	140	235	175	295	215	370	265	465	330	595	415
RFD-Q-D-K	180	170	235	205	295	233	370	283	465	380	595	480
RFD-Q-A		140		175		215		265		330		415
RFD-Q-D-A		170		205		233		283		380		480
RFD-R-K	180	140	235	175	295	215	370	265	465	330	595	415
RFD-R-D-K	180	170	235	205	295	245	370	295	465	380	595	480
RFD-R-UO		125		160		200		250		315		400
RFD-R-D-UD		165		200		240		290		375		460
RFD-R-A		140		175		215		265		330		415
RFD-R-D-A		170		205		245		295		380		480

1

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 or circular diffuser face. Supply air and extract air variants for comfort zones and industrial zones.
Diffuser face with fixed air control blades for horizontal swirling supply air discharge creating high induction levels. For installation into all types of suspended ceilings.
Ready-to-install component which consists of the diffuser face with radially arranged fixed air control blades and either a spigot only or a plenum box with side entry or top entry spigot, and suspension holes or suspension lugs.
The diffuser face is fixed to the cross bar with a central 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

- Low sound power level, ideal for comfort zones
- Fixed blades
- For all types of ceiling systems
- Horizontal or vertical duct connection
- Air change rates of up to 35 per hour can be achieved by arranging several diffusers in a row with a minimum pitch of 0.9 m (centre line to centre line)

Materials and surfaces

- Q: Diffuser face made of aluminium
- R: Diffuser face made of galvanised sheet steel
- Plenum box, duct collar and cross bar made of galvanised sheet steel
- Transition piece made of aluminium
- Lip seal made of rubber
- Diffuser face powder-coated RAL 9010, pure white
- P1: Powder-coated, RAL CLASSIC colour

Technical data

- Nominal sizes: 125, 160, 200, 250, 315, 400 mm
- Minimum volume flow rate, with $\Delta t_Z = -6$ K: 4 – 36 l/s or 14 – 130 m^3/h
- Maximum volume flow rate, with $L_{WA} \cong 50$ dB(A): 22 – 330 l/s or 79 – 1188 m^3/h
- Supply air to room air temperature difference: –12 to +10 K

Sizing data

- $\dot{V}$ _____ [m^3/h]
- Δp_t _____ [Pa]
- L_{WA} Air-regenerated noise _____ [dB(A)]

Order options

1 Type
RFD Swirl diffuser

2 Construction style
☐ **R** Circular
☐ **Q** Square

3 Construction
No entry: without discharge nozzle
☐ **D** With discharge nozzle

4 Connection
☐ **K** Vertical, with duct collar
☐ **US** Vertical, with transition piece
☐ **A** Horizontal, with plenum box
Only RFD-R
☐ **UO** Vertical, with transition piece and cross bar
Only RFD-R-D
☐ **UD** Vertical, with transition piece, cross bar and discharge nozzle
☐ **N** Horizontal, with shallow plenum box

5 Damper blade for volume flow rate balancing
No entry: none
☐ **M** With (only for connection types A and N)

☐ **MN** With cords and pressure tap (only for connection type A)

6 Accessories
No entry: none
☐ **L** With lip seal (only for connection types A and N)

7 Nominal size [mm]
☐ **125**
☐ **160**
☐ **200**
☐ **250**
☐ **315**
☐ **400**

8 Exposed surface
No entry: powder-coated RAL 9010, pure white
☐ **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

1

Product selection

	Ceiling swirl diffusers								
	AIRNAMIC	VDW	TDV-SilentAIR	RFD	FD	TDF-SilentAIR	VD	VDL	FDE
Diffuser face style									
Circular	●	●	●	●	●	●		●	
Square	●						●		●
Diffuser face									
Circular	●	●	●	●	●	●		●	
Square	●	●	●	●	●	●	●		●
Galvanised sheet steel		●	●	●	●	●		●	●
Aluminium				●			●		
Plastic	●								
Air control blades									
Fixed	●			●	●	●			●
Adjustable		●	●				●	●	
Plastic, black and white		●	●						
Duct connection									
Horizontal	●	●	●	●	●	●	●	●	●
Vertical		●	●	●	●	●	●	●	
FLEXTRO	●	●	●		●	●			
Attachments									
Damper blade	●	●	●	●	●	●			●
Pressure tap		●	●	●	●	●			●
Actuator							●	●	
Accessories									
Lip seal	●	●	●	●	●	●			●
Protective cage							●	●	
Extended border							●	●	
Nominal sizes									
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
Technical data									
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 [m^3/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**

Product selection

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

***Nominal diameter**

1

Product selection

	Ceiling diffusers						
	VDR	ADLQ	DLQ	ADLR	DLQL	DLQ-AK	DLK-Fb
Diffuser face style							
Circular	●			●			
Square		●	●		●	●	●
Diffuser face							
Circular	●			●			
Square		●	●	●	●	●	●
Galvanised sheet steel			●		●	●	●
Aluminium	●	●		●			
Plastic							
Air control blades							
Fixed		●	●	●	●	●	●
Adjustable	●						
Plastic, black and white							
Duct connection							
Horizontal	●	●	●	●	●	●	●
Vertical	●			●	●		
FLEXTRO		●					
Attachments							
Damper blade		●	●	●	●		
Pressure tap		●	●	●			
Actuator	●						
Accessories							
Lip seal		●	●	●	●		
Protective cage							
Extended border							
Nominal sizes							
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						
Technical data							
Volume flow rate range [l/s]	175 – 1495	20 – 665	20 – 700	20 – 650	6 – 285	40 – 565	220 – 460
Volume flow rate range [m^3/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**

Basic information and nomenclature

Principal dimensions

ØD [mm]
Outside diameter of the spigot

$ØD_1$ [mm]
Outer diameter of a circular diffuser face

$ØD_2$ [mm]
Diameter of a circular diffuser face style

$ØD_3$ [mm]
Diameter of a circular plenum box

$□Q_1$ [mm]
Outer diameter of a square diffuser face

$□Q_2$ [mm]
Dimensions of a square diffuser face style

$□Q_3$ [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^3/h] and [l/s]
Volume flow rate

Δt_z [K]
Supply air temperature difference

Δp_t [Pa]
Total differential pressure

A_{eff} [m^2]
Effective air discharge area

All sound power levels are based on 1 pW.

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 l/s (1280 m³/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

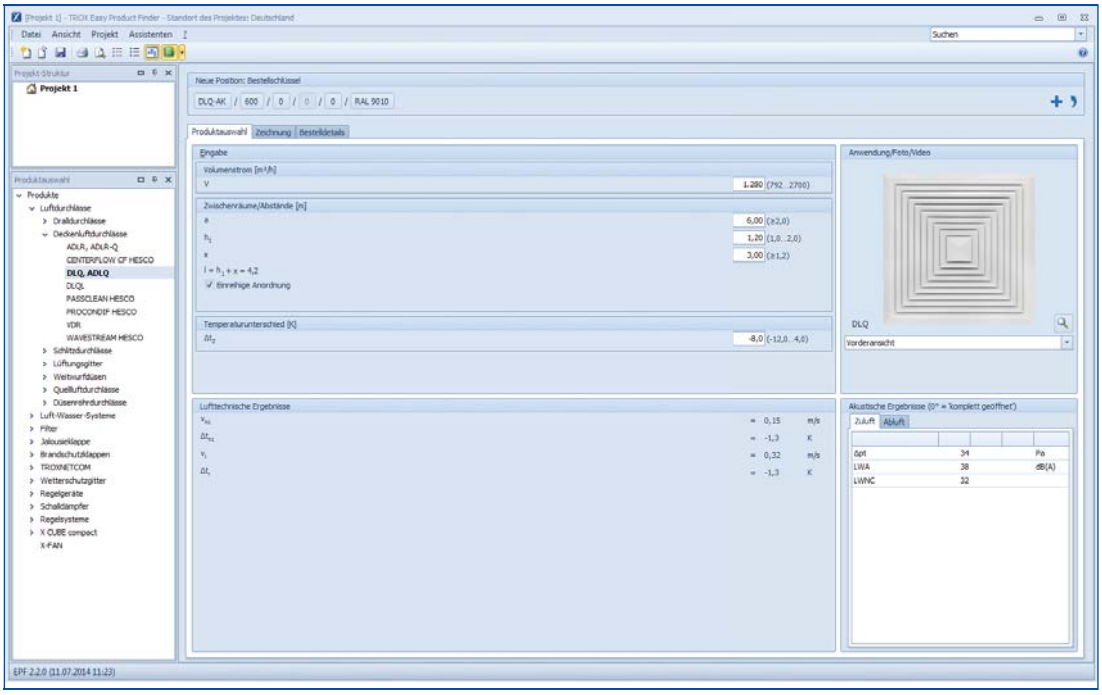
Quick sizing

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.



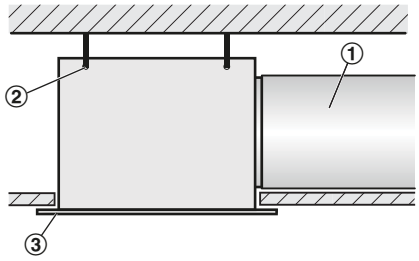
Description

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

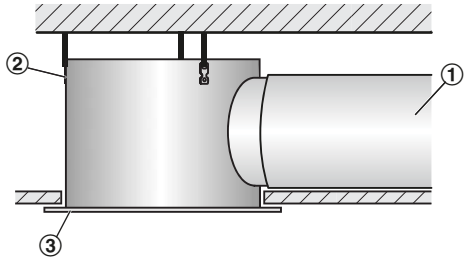
Flush ceiling installation with square plenum box



① Duct
② Suspension hole
③ Diffuser face

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

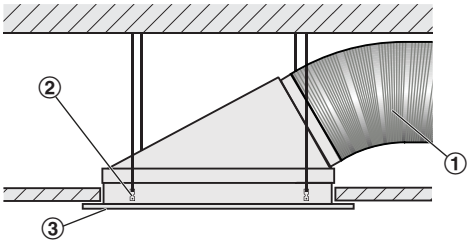
Flush ceiling installation with circular plenum box



① Duct
② Suspension lug
③ Diffuser face

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

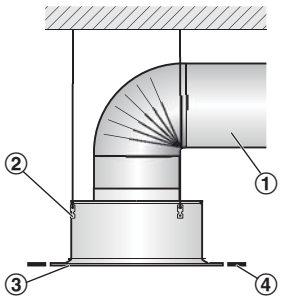
Flush ceiling installation with plenum box FLEXTRO



① Duct
② Suspension lug
③ Diffuser face

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

Freely suspended installation



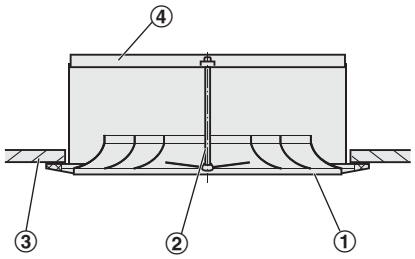
① Duct
② Suspension lug
③ Diffuser face
④ Extended border

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

1

Installation without plenum box

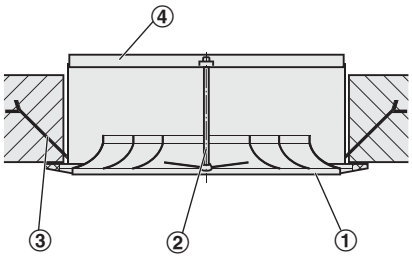
Flush ceiling installation with standard cross bar G1, screw-fixed to ceiling



① Diffuser face
② Central fixing screw
③ Ceiling tile
④ Standard cross bar

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

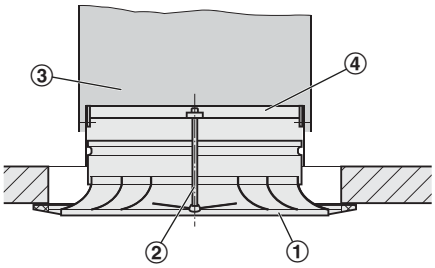
Flush ceiling installation with standard cross bar G1, with fixing tabs mortared in



① Diffuser face
② Central fixing screw
③ Fixing tab
④ Standard cross bar

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

Flush ceiling installation with duct cross bar E1

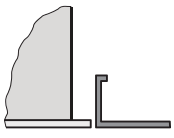


① Diffuser face
② Central fixing screw
③ Duct
④ Duct cross bar

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

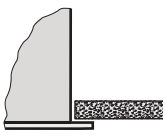
Ceiling systems

Installation into grid ceilings



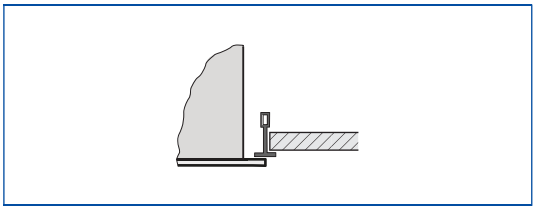
– Fix the plenum box to the ceiling
– The ceiling tile of the grid ceiling is independent of the ceiling diffuser
– Fix the diffuser face after the ceiling has been completed

Installation in continuous ceilings



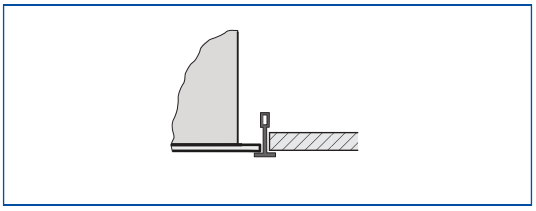
– Fix plenum box (including diffuser face, if necessary) to the ceiling
– Adjust plasterboard ceiling tile as required
– If necessary, fix the diffuser face after the ceiling has been completed

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

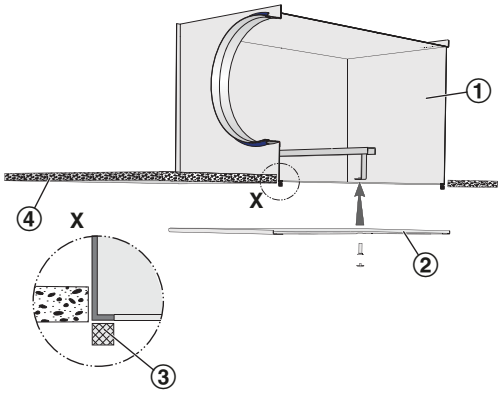
Installation in T-bar ceilings, diffuser face rests on T-bars



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

Diffuser face sealing and fixing

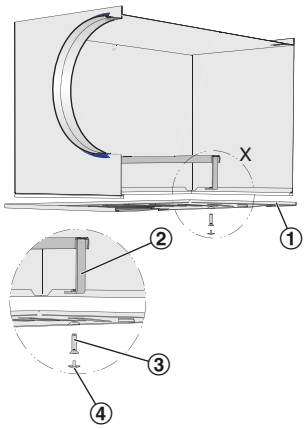
Diffuser face – sealing



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

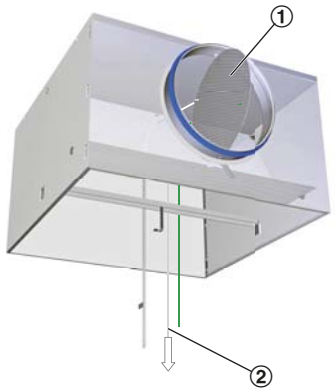
- Using the central fixing screw, fix the diffuser face to the cross bar of the plenum box
- Attach the decorative cap

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).

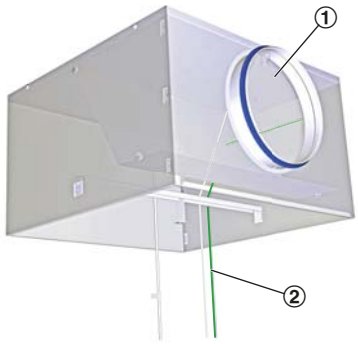
AK-Uni-...-MN Volume flow rate balancing



① Damper blade
② White cord for opening the damper blade

Open, 0°

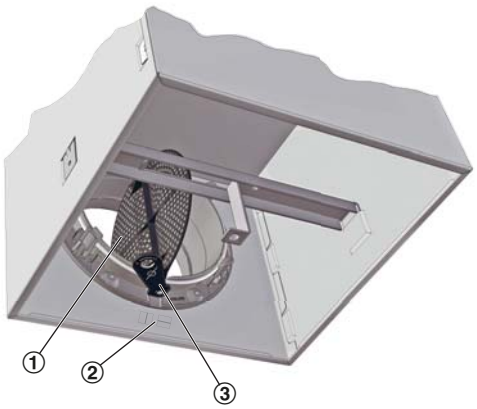
AK-Uni-...-MN Volume flow rate balancing



① Damper blade
② Green cord for closing the damper blade

Closed, 90°

AIRNAMIC, XARTO, FLEXTRO Volume flow rate balancing



① Damper blade
② Sticker explaining the damper blade position
③ Setting lever

Open, 0°

AIRNAMIC, XARTO, FLEXTRO Volume flow rate balancing

① Damper blade
② Sticker explaining the damper blade position
③ Setting lever

Closed, 90°

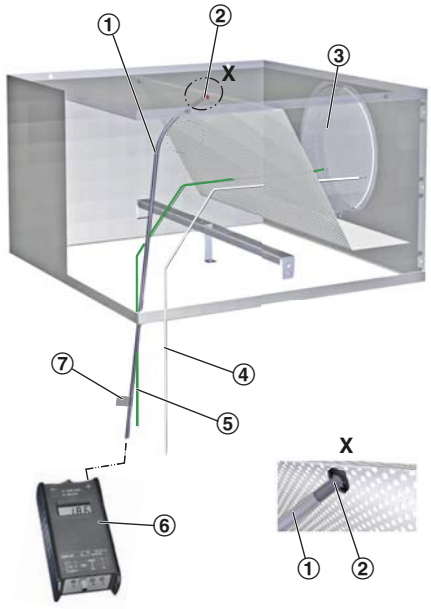
Volume flow rate measurement

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



① Measuring tube
② Pressure tap
③ Damper blade for volume flow rate balancing
④ White cord for opening the damper blade
⑤ Green cord for closing the damper blade
⑥ Digital manometer
⑦ Text label indicating plenum box variant

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/m³

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

Volume flow rate calculation for other air densities

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