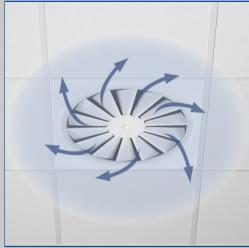
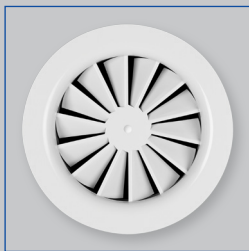


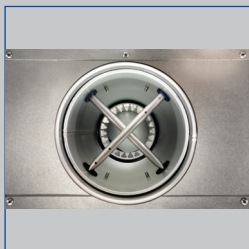
RFD-Sirius, cross bar



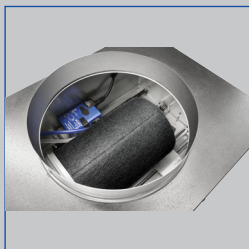
Horizontal swirling air discharge



Circular diffuser face



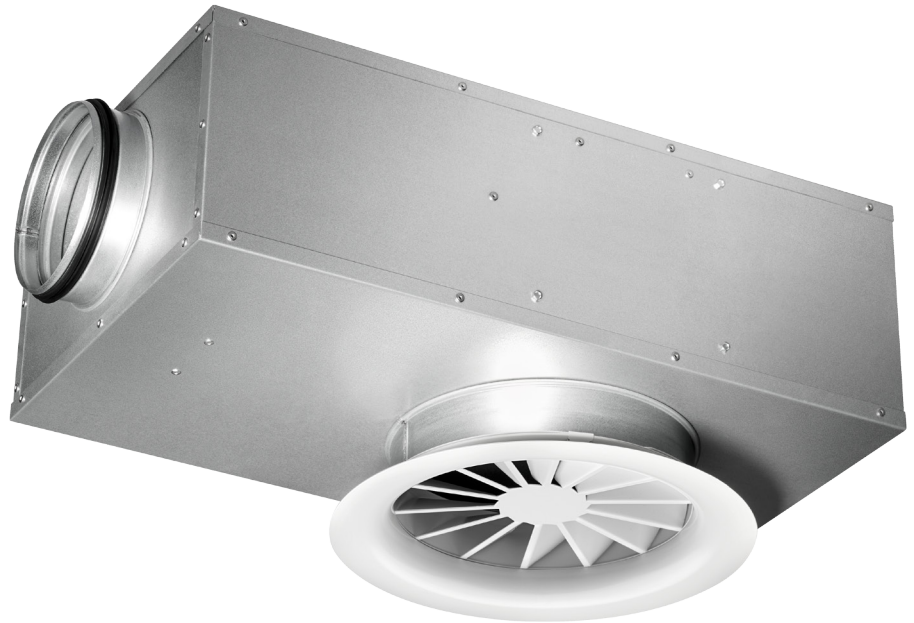
RFD-SIRIUS, integral measuring tubes



RFD-SIRIUS, volume flow controller

Ceiling swirl diffusers

Type RFD-SIRIUS



RFD-SIRIUS is an air terminal device combined with a VAV terminal unit

RFD-SIRIUS is used in ventilation and air conditioning systems for the demand-based volume flow control and as an air terminal device.

- RFD nominal sizes: 6.3, 7.9, 9.8, 12.4 and 15.7
- SIRIUS nominal sizes: 4.9, 6.3, 7.9 and 9.8
- Volume flow rate range: 10 to 363 cfm or 17 to 617 m³/h
- For supply air
- Flush ceiling installation, with discharge nozzle also suspended installation
- Control input signal via MP bus, LonWorks FTT-10A, Modbus RTU, or analogue signal
- Integral noise insulation element
- High induction results in a rapid reduction of the temperature difference and airflow velocity
- Ideal for comfort zones

Optional equipment and accessories

- Exposed diffuser face available in RAL CLASSIC colours

Type		Page
RFD-SIRIUS	General information	SIRIUS – 2
	Function	SIRIUS – 4
	Technical data	SIRIUS – 5
	Quick sizing	SIRIUS – 6
	Specification text	SIRIUS – 8
	Order code	SIRIUS – 9
	Variants	SIRIUS – 11
	Dimensions and weight	SIRIUS – 12
	Installation examples	SIRIUS – 16
	Installation details	SIRIUS – 17
	Basic information and nomenclature	SIRIUS – 19

Application

Application

- For supplying air to comfort zones in cases where the supply air flow rate is to be controlled
- The variant with discharge nozzle allows for suspended installation
- The efficient swirl creates high induction levels, thereby rapidly reducing the temperature difference and airflow velocity
- Closed-loop volume flow control using an external power supply
- Differential pressure measurement with integral measuring tubes

- volume flow controller, sound attenuator, plenum box and air terminal device in one unit.
- Low sound power level, ideal for comfort zones
- For all types of ceiling systems, also suitable for freely suspended installation
- Differential pressure measurement with integral measuring tubes

Nominal sizes

- RFD: 6.3, 7.9, 9.8, 12.4 and 15.7
- SIRIUS: 4.9, 6.3, 7.9 and 9.8

Special characteristics

- RFD-SIRIUS combines the functions of a

Description

Variants

Diffuser face

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

Control components

- BC0
- BL0
- BM0
- BM0-J6

For information on control components see Type Compact controllers.

Parts and characteristics

- Circular or square diffuser face
- Diffuser face with radially arranged fixed air control blades
- Control component can be moved back and

forth

Attachments

Variable volume flow control with electronic Compact controller to switch an external control signal and an actual value signal for integration into the central BMS.

- Supply voltage 24 V AC/DC
- The signal interface depends on the selected control component variant
- Variable air or constant air volume flow control
- The flow rate is measured according to the dynamic measurement principle
- Volume flow rate control range: approx. 10 – 100 % of the nominal volume flow rate

Deviation from the operating range:

- 10 – 20% of the nominal volume flow rate: +/- 25%

- 20 – 40% of the nominal volume flow rate: +/- 10%
- 40 – 100% of the nominal volume flow rate: +/- 4%

Electrical connection with cable or plug, depending on the selected control component variant.

Construction features

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

Materials and surfaces

- Diffuser face and plenum box made of galvanised sheet steel
- Measuring unit made of aluminium

- Exposed parts of the diffuser face powder-coated RAL 9010, pure white
- P1: Powder-coated, RAL CLASSIC colour
- Noise insulating fleece on the controller cage

Standards and guidelines

- Sound power level of the air-regenerated noise measured according to EN ISO 5135
- Hygiene conforms to VDI 6022

Maintenance

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

Functional description

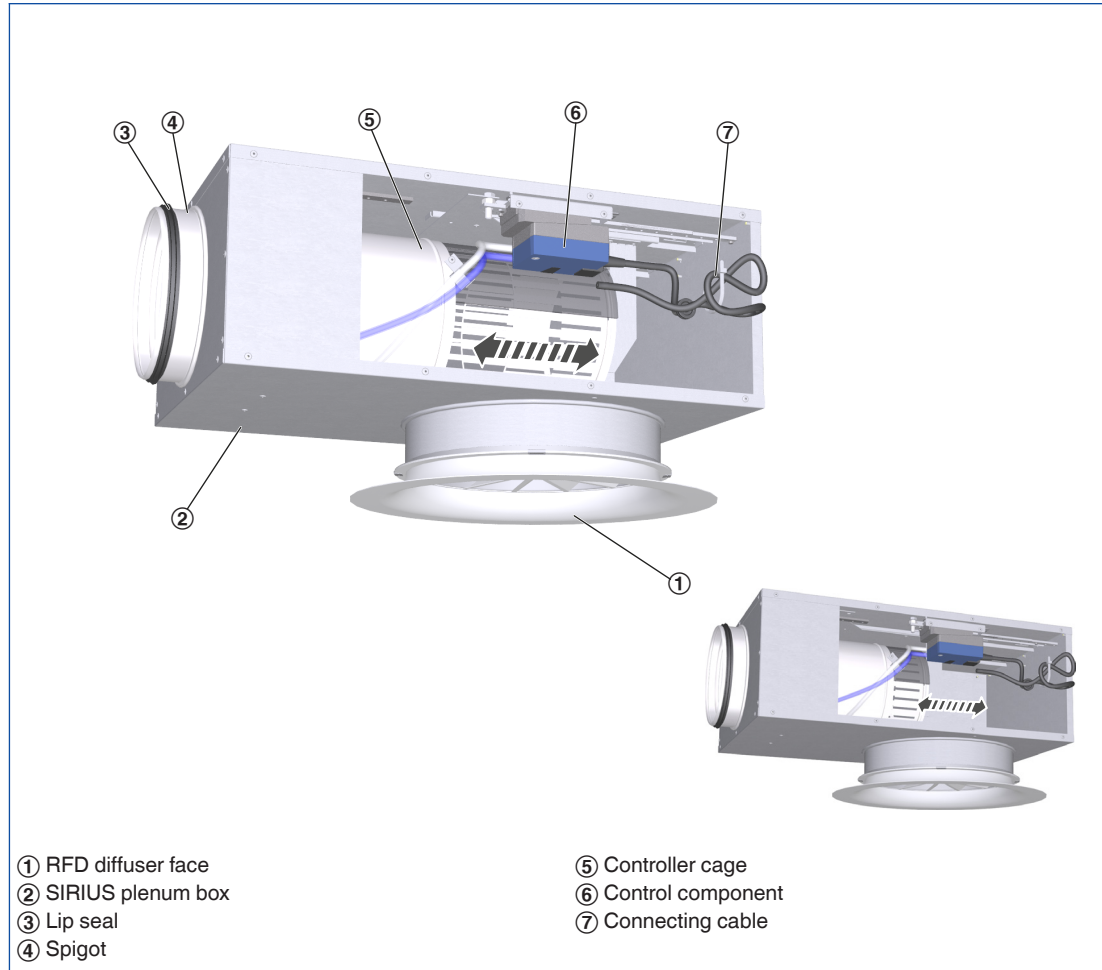
RFD-SIRIUS combines the functions of a volume flow controller, sound attenuator, plenum box and air terminal device in one unit.

The differential pressure is measured with integral measuring tubes and transmitted to the controller.

An integral linear actuator adjusts the damper blade such that the required setpoint value is achieved.

The construction of the diffuser ensures that sound is effectively absorbed, which results in low sound power levels.

Schematic illustration of the RFD, with Sirius



Air patterns

Horizontal air discharge

Horizontal omni directional air discharge



RFD nominal sizes	6.3, 7.9, 9.8, 12.4, 15.7 in
SIRIUS nominal sizes	4.9, 6.3, 7.9, 9.8 in
Volume flow rate	10.0 – 363 cfm or 17 – 617 m³/h
Supply air to room air temperature difference	–12 to +10 K

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).

Sound power level [dB (A)] – RFD-SIRIUS

Combination	$\dot{V}$		Δp_t			
	cfm	m³/h	inWg			
			.20	.40	.80	1.2
RFD-6.3 SIRIUS 4.9	11	17	≤.06	≤.06	≤.06	.06
	30	52	.10	.11	.12	.12
	51	87	.13	.14	.14	.15
	72	123	.14	.15	.16	.17
RFD-7.9 SIRIUS 4.9	15	25	.06	.07	.08	.09
	47	80	.10	.11	.12	.13
	78	134	.12	.13	.14	.15
	112	189	.13	.14	.16	.16
RFD-7.9 SIRIUS 6.3	15	25	≤.06	.06	.07	.08
	53	90	.10	.12	.13	.13
	91	155	.12	.14	.15	.16
	129	219	–	.15	.16	.17
RFD-9.8 SIRIUS 6.3	21	37	≤.06	.06	.07	.08
	72	121	.09	.10	.12	.12
	121	204	.11	.12	.14	.14
	170	288	.12	.14	.15	.16
RFD-9.8 SIRIUS 7.9	21	37	.08	.10	.11	.12
	83	141	.11	.13	.14	.15
	144	245	.12	.14	.16	.16
	206	349	–	.15	.16	.17
RFD-12.4 SIRIUS 7.9	40	68	.11	.12	.14	.16
	106	180	.12	.14	.16	.17
	172	292	.12	.14	.16	.17
	237	404	.13	.14	.16	.18
RFD-12.4 SIRIUS 9.8	40	68	.07	.09	.10	.11
	110	187	.10	.12	.14	.14
	180	305	.12	.14	.15	.16
	250	424	.13	.14	.16	.17
RFD-15.7 SIRIUS 9.8	57	96	.10	.12	.13	.14
	155	263	.12	.13	.15	.16
	252	429	.12	.14	.16	.17
	352	596	.13	.14	.16	.18

Sound power level [dB (A)] – RFD-SIRIUS-D

Combination	$\dot{V}$		Δp_t			
	cfm	m³/h	inWg			
			2.0	3.9	7.9	11.8
RFD-D-6.3 SIRIUS 4.9	13	23	.09	.10	.11	.11
	42	72	.12	.12	.14	.14
	72	122	.13	.14	.15	.15
	102	171	.14	.15	.16	.16
RFD-D-7.9 SIRIUS 4.9	19	32	.06	.07	.08	.09
	57	97	.09	.11	.12	.13
	95	161	.11	.12	.14	.14
	133	226	.12	.13	.14	.15
RFD-D-7.9 SIRIUS 6.3	19	32	.08	.09	.10	.11
	72	121	.11	.12	.14	.14
	123	210	.13	.14	.15	.16
	176	299	.14	.15	.16	.16
RFD-D-9.8 SIRIUS 6.3	30	50	≤.06	.06	.08	.09
	78	134	.08	.10	.11	.12
	129	218	.10	.11	.13	.14
	178	303	.11	.12	.14	.15
RFD-D-9.8 SIRIUS 7.9	30	50	.08	.10	.12	.13
	100	170	.11	.13	.15	.16
	172	290	.12	.14	.16	.17
	242	410	.13	.15	.17	.18
RFD-D-315 SIRIUS 7.9	53	90	.09	.12	.14	.16
	125	214	.10	.13	.15	.17
	199	339	.11	.14	.16	.18
	273	463	.11	.14	.16	.18
RFD-D-12.4 SIRIUS 9.8	53	90	.09	.10	.12	.12
	144	245	.11	.12	.14	.15
	235	401	.12	.14	.15	.16
	326	556	.13	.14	.16	.16
RFD-D-15.7 SIRIUS 9.8	76	128	.10	.11	.12	.14
	172	291	.12	.13	.14	.15
	267	454	.12	.14	.15	.16
	362	617	.13	.14	.15	.16

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

RFD-SIRIUS is an air terminal device combined with a VAV terminal unit.

The ceiling diffuser with a square or circular diffuser face is preferably used as a supply air diffuser for comfort zones.

The fixed air control blades allow for horizontal swirling supply air discharge creating high induction levels.

The diffuser is suitable for installation into all types of suspended ceilings.

The diffuser is fixed with a central fixing screw to the cross bar (no tools required); the cross bar is inserted into the SIRIUS plenum box (no tools required) and held in place with magnets.

The SIRIUS plenum box is fitted with two spigots, one for connection to the ductwork and another one for connection of the diffuser face.

The SIRIUS plenum box contains two cylinders, one fitted inside the other; one of the cylinders is perforated.

The perforated cylinder is moved along a toothed bar upon control input from the volume flow controller, and the free area changes as a consequence.

A fleece covering the perforated cylinder acts as an equalising element.

This special construction feature allows for omitting any additional sound attenuator.

Special characteristics

- RFD-SIRIUS combines the functions of a volume flow controller, sound attenuator, plenum box and air terminal device in one unit.
- Low sound power level, ideal for comfort zones
- For all types of ceiling systems, also suitable for freely suspended installation
- Differential pressure measurement with integral measuring tubes

Materials and surfaces

- Diffuser face and plenum box made of galvanised sheet steel
- Measuring unit made of aluminium
- Exposed parts of the diffuser face powder-coated RAL 9010, pure white
- P1: Powder-coated, RAL CLASSIC colour

- Noise insulating fleece on the controller cage

Attachments

Variable volume flow control with electronic Compact controller to switch an external control signal and an actual value signal for integration into the central BMS.

- Supply voltage 24 V AC/DC
- The signal interface depends on the selected control component variant
- Variable air or constant air volume flow control
- The flow rate is measured according to the dynamic measurement principle
- Volume flow rate control range: approx. 10 – 100 % of the nominal volume flow rate

Deviation from the operating range:

- 10 – 20% of the nominal volume flow rate: +/- 25%
- 20 – 40% of the nominal volume flow rate: +/- 10%
- 40 – 100% of the nominal volume flow rate: +/- 4%

Electrical connection with cable or plug, depending on the selected control component variant.

Technical data

- RFD nominal sizes: 6.3, 7.9, 9.8, 12.4, 15.7 in SIRIUS nominal sizes: 4.9, 6.3, 7.9, 9.8 in
- Volume flow rate: 10.0 – 363 cfm or 17 – 617 m³/h
- Supply air to room air temperature difference: –12 to +10 K

Sizing data

- $\dot{V}$ _____
[cfm]
- Δp_t _____
[inWg]
- Air-regenerated noise
- L_{WA} _____
[dB(A)]

RFD with Sirius

RFD-SIRIUS – R – D – T / 6.3 – 9.8 / BC0 / E0 / 24 – 118 / P1 – RAL 9010								
1	2	3	4	5	6	7	8	9

1 Type

RFD-SIRIUS Ceiling diffuser

2 Construction style

R Circular

Q Square

3 Construction

No entry: without discharge nozzle

D With discharge nozzle

4 Connection

T Cross bar with magnets and quick fixing kit

5 Nominal size [in]

Ø spigot for duct connection

4.9 For diffuser faces 6.3 and 7.9 For

6.3 diffuser faces 7.9 and 9.8 For

7.9 diffuser faces 9.8 and 12.4 For

9.8 diffuser faces 12.4 and 15.7

Ø spigot for diffuser face connection (nominal size of diffuser face)

6.3

7.9

9.8

12.4

15.7

6 Attachment (control component)

BC0 Volume flow controller with MP bus interface and analogue interface 0 – 10 V / 2 – 10 V

BL0 Volume flow controller with LonWorks FTT-10A interface

BM0 Volume flow controller with Modbus RTU interface

BM0-J6 Volume flow controller with Modbus RTU interface and RJ12 socket for connecting an X-AIRCONTROL zone module

7 Signalling (can be selected only for BC0)

E0 0 – 10 V DC (variable volume flow rate)

F0 0 – 10 V DC (constant volume flow rate)

E2 2 – 10 V DC (variable volume flow rate)

F2 2 – 10 V DC (constant volume flow rate)

8 Volume flow rate

Variable: $\dot{V}_{\min}$, $\dot{V}_{\max}$

Constant: $\dot{V}_{\text{const}}$

9 Exposed surface of diffuser face

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-SIRIUS-R-D-T/6.3-9.8/BC0/E0/35-106/P1-RAL 9016

Construction style	Circular
Construction	With discharge nozzle
Connection	Cross bar with magnets and quick fixing kit
Ø spigot for duct connection	6.3 in
Nominal size of diffuser face	9.8 in
Control component	Volume flow controller with MP bus interface and analogue interface 0 – 10 V / 2 – 10 V
Control input signal	0 – 10 V DC (variable volume flow rate)
Volume flow rate	35 – 106 cfm
Exposed surface of diffuser face	Powder-coated RAL 9016, traffic white, gloss level 70%

Order example: RFD-SIRIUS-Q-T/6.3-9.8/BM0/59-94

Construction style	Square
Construction	Without discharge nozzle
Connection	Cross bar with magnets and quick fixing kit
Ø spigot for duct connection	6.3 in
Nominal size of diffuser face	9.8 in
Control component	Volume flow controller with Modbus RTU interface
Control input signal	Modbus RTU
Volume flow rate	59 – 94 cfm
Exposed surface of diffuser face	Powder-coated RAL 9010, pure white, gloss level 25%

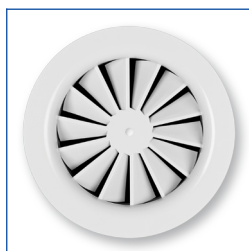
Diffuser faces

Product examples

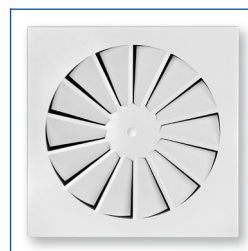
RFD-Q-D



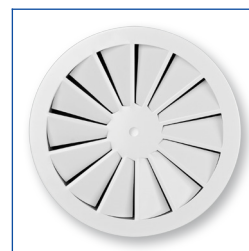
RFD-R-D



RFD-Q



RFD-R

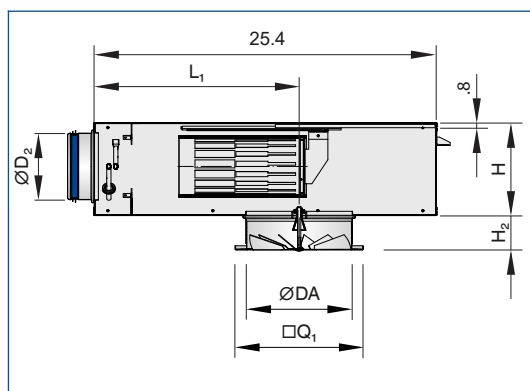


Plenum boxes

RFD-SIRIUS



RFD-SIRIUS-Q

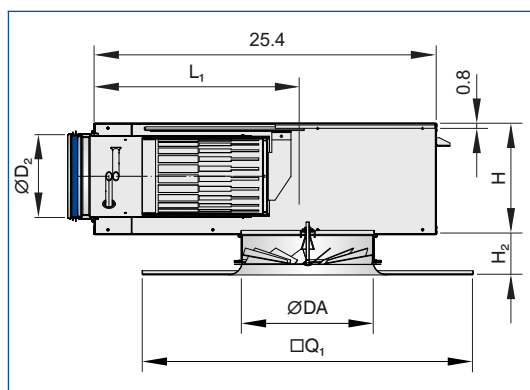


RFD-SIRIUS-Q

Nominal size	ØDA	□Q ₁	ØD ₂	B	L ₁	H	H ₂	A _{eff}	m	SIRIUS weight	RFD weight
	in							ft ²		lbs	
RFD 6.3 SIRIUS 4.9	6.2	7.8	4.8	12.8	15.2	6.9	2.4	0.04	20	19	2
RFD 7.9 SIRIUS 4.9	7.8	9.8	4.8	12.8	15.2	6.9	2.4	0.07	20	18	2
RFD 7.9 SIRIUS 6.3	7.8	9.8	6.2	14.2	15.8	8.3	2.4	0.07	23	21	2
RFD 9.8 SIRIUS 6.3	9.8	11.7	6.2	14.2	15.8	8.3	2.4	0.12	23	20	3
RFD 9.8 SIRIUS 7.9	9.8	11.7	7.8	15.7	17.1	9.4	2.4	0.12	28	24	3
RFD 12.4 SIRIUS 7.9	12.3	15.7	7.8	15.7	17.1	9.4	2.4	0.22	28	23	5
RFD 12.4 SIRIUS 9.8	12.3	15.7	9.8	17.7	15.4	11.4	2.4	0.22	33	28	5
RFD 15.7 SIRIUS 9.8	15.7	19.6	9.8	17.7	15.4	11.4	2.4	0.30	34	26	8

□Q₁ is available as an option for all ØDA units in sizes 23.3, 23.5, 24.3 and 24.5

RFD-SIRIUS-Q-D

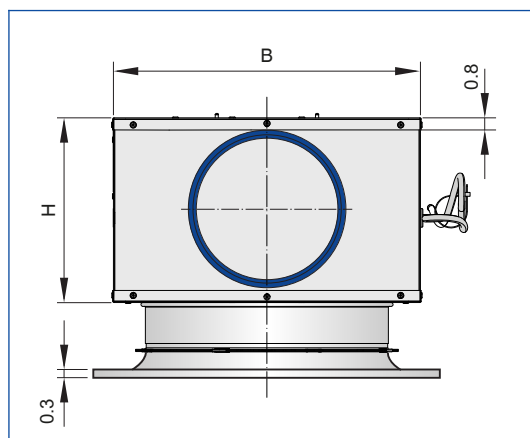


RFD-SIRIUS-Q-D

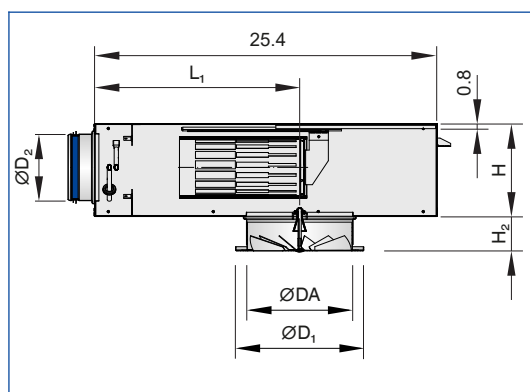
Nominal size	ØDA	□Q ₁	ØD ₂	B	L ₁	H	H ₂	A _{eff}	m	SIRIUS weight	RFD weight
	in									lbs	
RFD 6.3 SIRIUS 4.9	6.2	9.8	4.8	12.8	15.2	6.9	3.1	0.06	21	19	2
RFD 7.9 SIRIUS 4.9	7.8	9.8	4.8	12.8	15.2	6.9	3.1	0.10	20	18	3
RFD 7.9 SIRIUS 6.3	7.8	9.8	6.2	14.2	15.8	8.3	3.1	0.10	24	21	3
RFD 9.8 SIRIUS 6.3	9.8	11.7	6.2	14.2	15.8	8.3	3.1	0.16	24	20	4
RFD 9.8 SIRIUS 7.9	9.8	11.7	7.8	15.7	17.1	9.4	3.1	0.16	28	24	4
RFD 12.4 SIRIUS 7.9	12.3	15.7	7.8	15.7	17.1	9.4	3.5	0.29	30	23	6
RFD 12.4 SIRIUS 9.8	12.3	15.7	9.8	17.7	15.4	11.4	3.5	0.29	34	28	6
RFD 15.7 SIRIUS 9.8	15.7	19.6	9.8	17.7	15.4	11.4	3.5	0.12	36	26	9

□Q₁ is available as an option for all ØDA units in sizes 23.3, 23.5, 24.3 and 24.5

RFD-SIRIUS-Q and RFD-SIRIUS-Q-D (RFD-SIRIUS-Q-D shown)



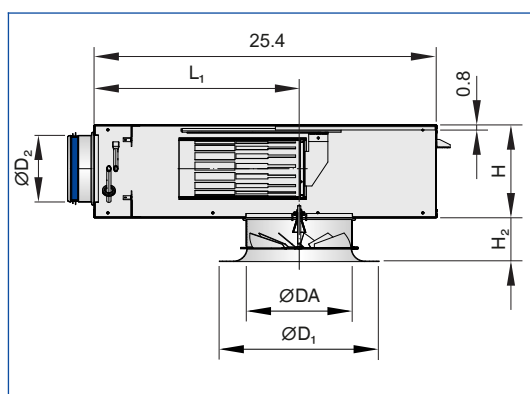
RFD-SIRIUS-R



RFD-SIRIUS-R

Nominal size	ØDA	ØD ₁	ØD ₂	B	L ₁	H	H ₂	A _{eff}	m	SIRIUS weight	RFD weight
	in							ft ²		lbs	
RFD 6.3 SIRIUS 4.9	6.2	7.8	4.8	12.8	15.2	6.9	2.2	0.04	20	19	1
RFD 7.9 SIRIUS 4.9	7.8	9.5	4.8	12.8	15.2	6.9	2.2	0.07	20	18	2
RFD 7.9 SIRIUS 6.3	7.8	9.5	6.2	14.2	15.8	8.3	2.2	0.07	23	21	2
RFD 9.8 SIRIUS 6.3	9.8	11.6	6.2	14.2	15.8	8.3	2.2	0.12	23	20	3
RFD 9.8 SIRIUS 7.9	9.8	11.6	7.8	15.7	17.1	9.4	2.2	0.12	27	24	3
RFD 12.4 SIRIUS 7.9	12.3	14.3	7.8	15.7	17.1	9.4	2.2	0.22	27	23	4
RFD 12.4 SIRIUS 9.8	12.3	14.3	9.8	17.7	15.4	11.4	2.2	0.22	32	28	4
RFD 15.7 SIRIUS 9.8	15.7	17.7	9.8	17.7	15.4	11.4	2.2	0.30	33	26	6

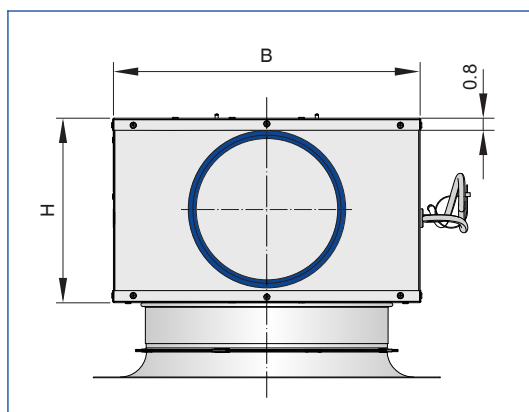
RFD-SIRIUS-R-D



RFD-SIRIUS-R-D

Nominal size	ØDA	ØD ₁	ØD ₂	B	L ₁	H	H ₂	A _{eff}	m	SIRIUS weight	RFD weight
	in									lbs	
RFD 6.3 SIRIUS 4.9	6.2	9.8	4.8	12.8	15.2	6.9	3.1	0.06	21	19	2
RFD 7.9 SIRIUS 4.9	7.8	11.8	4.8	12.8	15.2	6.9	3.1	0.10	21	18	3
RFD 7.9 SIRIUS 6.3	7.8	11.8	6.2	14.2	15.8	8.3	3.1	0.10	24	21	3
RFD 9.8 SIRIUS 6.3	9.8	13.8	6.2	14.2	15.8	8.3	3.1	0.16	24	20	4
RFD 9.8 SIRIUS 7.9	9.8	13.8	7.8	15.7	17.1	9.4	3.1	0.16	28	24	4
RFD 12.4 SIRIUS 7.9	12.3	17.7	7.8	15.7	17.1	9.4	3.1	0.29	29	23	6
RFD 12.4 SIRIUS 9.8	12.3	17.7	9.8	17.7	15.4	11.4	3.1	0.29	34	28	6
RFD 15.7 SIRIUS 9.8	15.7	22.8	9.8	17.7	15.4	11.4	3.1	0.38	35	26	9

RFD-SIRIUS-R and RFD-SIRIUS-R-D (RFD-SIRIUS-R-D shown)



Installation in continuous ceilings



Installation in continuous ceilings



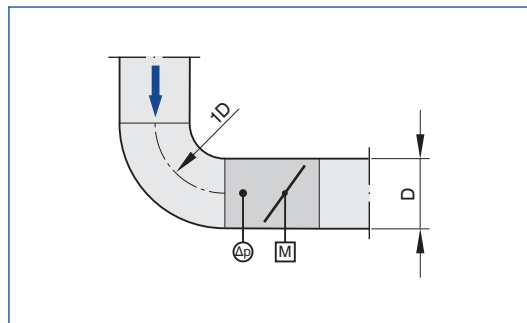
Installation and commissioning

- Preferably for rooms with a clear height up to 13 ft
- Flush ceiling installation; variant RFD-*-D is suitable for suspended installation

Upstream conditions

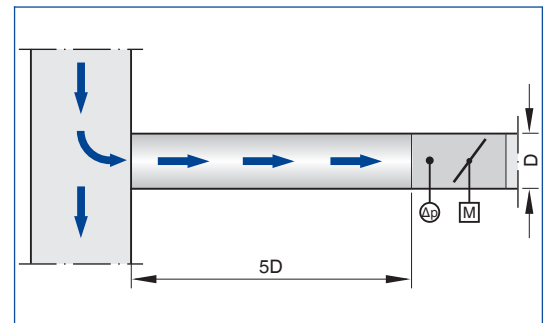
The volume flow rate accuracy $\Delta\dot{V}$ applies to a straight upstream section of the duct. Bends, junctions or a narrowing or widening of the duct cause turbulence that may affect measurement. Duct connections, e.g. branches off the main duct, must comply with EN 1505. Some installation situations require straight duct sections upstream.

Bend



A bend with a centre line curvature radius of at least $1D$ – without an additional straight duct section upstream of the VAV terminal unit – has only a negligible effect on the volume flow rate accuracy.

Junction

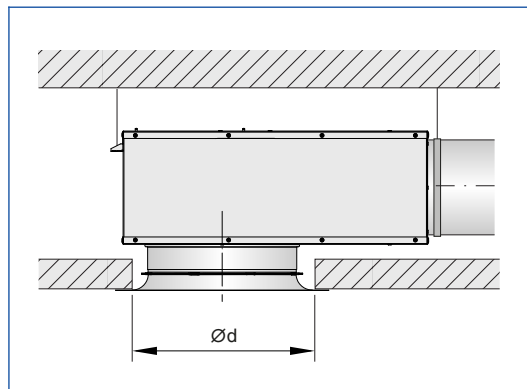


A junction causes strong turbulence. The stated volume flow rate accuracy $\Delta\dot{V}$ can only be achieved with a straight duct section of at least $5D$ upstream. Shorter upstream sections require a perforated plate in the branch and before the VAV terminal unit. If there is no straight upstream section at all, the control will not be stable, even with a perforated plate.

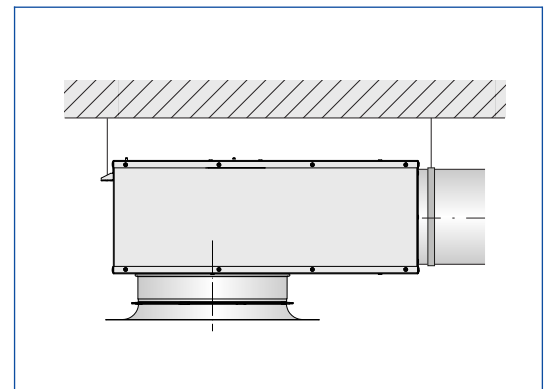
Installation types

These are only schematic diagrams to illustrate installation details.

Flush ceiling installation



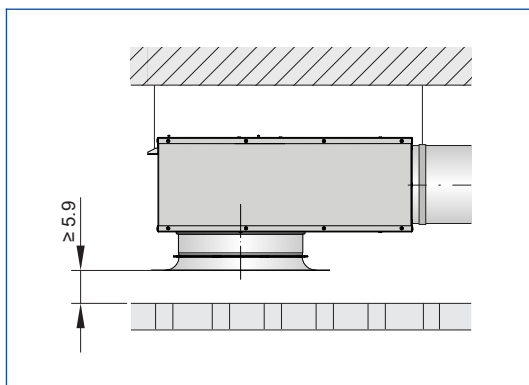
Freely suspended installation



Installation opening

Nominal size	$\varnothing D_A$	$\varnothing d$	
		Without nozzle	With nozzle
		in	
RFD 6.3	6.2	6.9	8.1
RFD 7.9	7.8	8.5	9.6
RFD 9.8	9.8	10.4	11.6
RFD 12.4	12.3	13.0	15.0
RFD 15.7	15.7	16.3	18.9

Installation above an open cell ceiling



Principal dimensions

$\varnothing D$ [in]

Outer diameter of the spigot

$\varnothing D_1$ [in]

Outer diameter of a circular diffuser face

$\varnothing D_2$ [in]

Diameter of a circular diffuser face style

$\varnothing D_3$ [in]

Diameter of a circular plenum box

$\square Q_1$ [in]

Outer diameter of a square diffuser face

$\square Q_2$ [in]

Dimensions of a square diffuser face style

$\square Q_3$ [in]

Dimensions of a square plenum box

H_1 [in]

Distance (height) from the lower edge of the

suspended ceiling to the lower edge of the diffuser face

H_2 [in]

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

H_3 [in]

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 [in]

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

C [in]

Length of the spigot

m [lbs]

Weight

Nomenclature

L_{WA} [dB(A)]

A-weighted sound power level of air-regenerated noise

$\dot{V}$ [cfm] and [cfm]

Volume flow rate

Δt_z [K]

Supply air to room air temperature difference, i.e.

supply air temperature minus room temperature

Δp_t [inWg]

Total differential pressure

A_{eff} [ft²]

Effective air discharge area

All sound power levels are based on 1 pW.