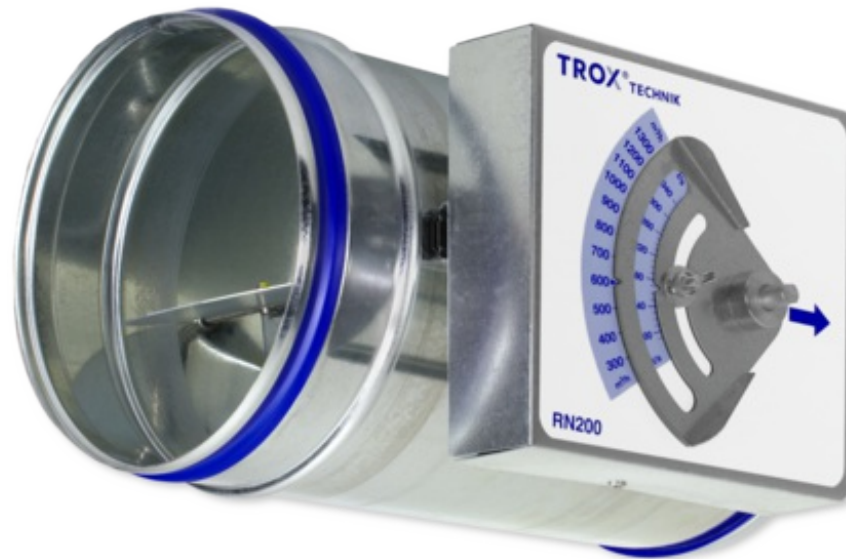


## Type RN



### FOR THE PRECISE CONTROL OF CONSTANT VOLUME FLOW RATES

Circular self-powered volume flow controllers for the control of supply air or extract air in constant air volume systems

- Volume flow rate can be set using an external scale, no tools required
- High control accuracy
- No on-site test measurements required for commissioning
- Suitable for airflow velocities of up to 12 m/s
- Any installation orientation; maintenance-free
- Casing air leakage to EN 1751, class C

#### Optional equipment and accessories

- Acoustic cladding for the reduction of case-radiated noise
- Secondary silencer Type CA, CS or CF for the reduction of air-regenerated noise
- Hot water heat exchanger Type WL and electric air heater Type EL for reheating the airflow
- Actuator for switching between setpoint values



## APPLICATION

### Application

- Circular CONSTANTFLOW CAV controllers of Type RN for the precise supply air or extract air flow control in constant air volume systems
- Mechanical self-powered volume flow control without external power supply
- Simplified project handling with orders based on nominal size
- Volume flow rate setpoint can be set on external scale
- Switching between  $V_{\min}$  and  $V_{\max}$  using optional actuator

### Special features

- Volume flow rate can be set using an external scale; no tools required
- High volume flow rate control accuracy
- Any installation orientation

### Nominal sizes

- RN-S: 80, 100, 125
- RN: 80, 100, 125, 160, 200, 250, 315, 400
- RN-FL: 100, 125, 160, 200, 250, 315, 400

## DESCRIPTION

### Variants

- RN-S: Compact-height volume flow controller
- RN: Volume flow controller
- RN-D: Volume flow controller with acoustic cladding
- RN-FL: Volume flow controller with flanges on both ends
- RN-D-FL: Volume flow controller with acoustic cladding and flanges on both ends
- Units with acoustic cladding and/or a secondary silencer Type CA, CS or CF for demanding acoustic requirements
- Acoustic cladding cannot be retrofitted

### Construction

- Galvanised sheet steel
- P1: Powder-coated, silver grey (RAL 7001)

- A2: Stainless steel

### **Parts and characteristics**

- Ready-to-commission controller
- Damper blade with low-friction bearings
- Bellows that acts as an oscillation damper
- Cam plate with leaf spring
- Scale with pointer to set the volume flow rate setpoint
- Aerodynamic function testing of each unit on a special test rig prior to shipping
- Correct operation even under unfavourable upstream conditions (1.5 D straight section required upstream)

### **Attachments**

- Min/Max actuators: Actuators for switching between minimum and maximum volume flow rate setpoint values
- Modulating actuators: Actuators for the stepless adjustment of volume flow rates or to switch between minimum and maximum volume flow rate setpoint values
- Retrofit kits: Actuators and installation accessories
- Variant RN-S cannot be combined with an actuator

### **Accessories**

- Lip seals on both ends (factory fitted)
- Matching flanges for both ends

### **Useful additions**

- Secondary silencer Type CA, CS or CF
- Heat exchanger Type WL
- Electric air heater Type EL

### **Construction features**

- Circular casing
- Spigot suitable for circular ducts to EN 1506 or EN 13180
- Spigot with groove for lip seal (RN-P1/80 and RN-A2/80 without groove)
- RN-FL: Circular flanges to EN 12220

## **Materials and surfaces**

### Galvanised sheet steel construction

- Casing made of galvanised sheet steel
- Interior parts, nominal sizes 80 – 125: stainless steel 1.4301, nominal sizes 160 – 400: galvanised sheet steel
- Polyurethane bellows
- Plain bearings with PTFE coating
- Leaf spring made of stainless steel

### Powder-coated construction (P1)

- Casing made of galvanised sheet steel, powder-coated
- Interior parts, nominal sizes 80 – 125: stainless steel 1.4301, nominal sizes 160 – 400: galvanised sheet steel, powder-coated

### Stainless steel construction (A2)

- Casing made of stainless steel 1.4301
- Interior parts made of stainless steel

### Variant with acoustic cladding (-D)

- Acoustic cladding made of galvanised sheet steel
- Rubber profile for the insulation of structure-borne noise
- Lining is mineral wool

### Mineral wool

- To EN 13501, fire rating class A1, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EC

### **Standards and guidelines**

- Hygiene conforms to VDI 6022
- Casing air leakage to EN 1751, class C

### **Maintenance**

- Maintenance-free as construction and materials are not subject to wear

## **TECHNICAL INFORMATION**

Function, Technical data, Quick sizing, Specification text, Order code, Produktbeziehungen

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### **FUNCTION**

#### **Functional description**

The volume flow controller is a mechanical self-powered unit and works without external power supply. A damper blade with low-friction bearings is adjusted by aerodynamic forces such that the set volume flow rate is maintained within the differential pressure range.

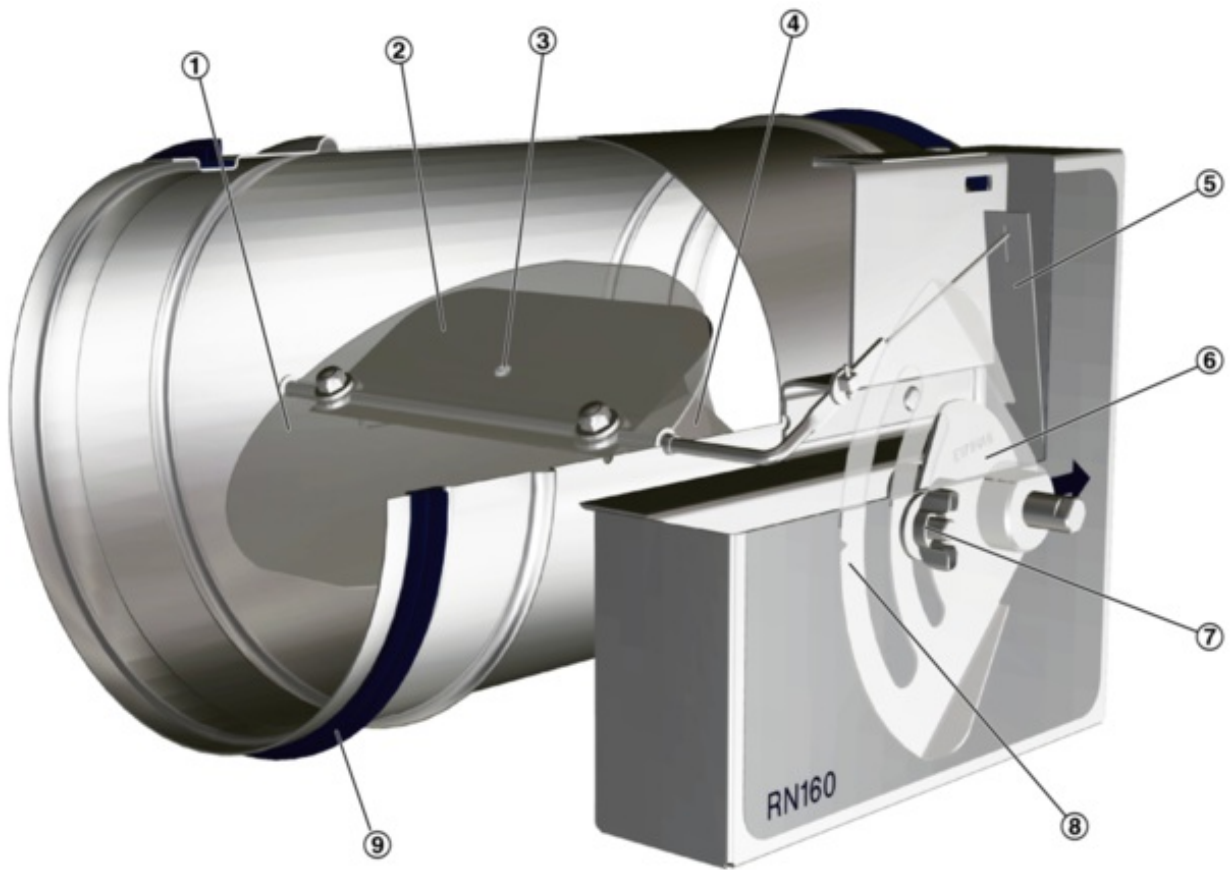
The aerodynamic forces of the airflow create a closing torque on the damper blade. The bellows extends and increases this force while at the same time acting as an oscillation damper. The closing force is countered by a leaf spring that unrolls over a cam plate. The shape of the cam plate is such that a change in the differential pressure leads to an adjustment of the damper blade in a way that the volume flow rate is maintained almost exactly.

#### **Efficient commissioning**

The volume flow rate setpoint value can be set quickly and easily using the pointer on the external scale; no measurements are required.

The advantage over flow adjustment dampers is that there is no need for repeat measurements or adjustments by an air conditioning engineer. Should the system pressure change, e.g. by opening or closing of duct sections, the flow rates in the entire system will also change if flow adjustment dampers are used; however, this is not the case with mechanical self-powered volume flow controllers. A mechanical self-powered controller reacts immediately and adjusts the damper blade such that the set constant volume flow rate is maintained.

#### **Schematic illustration of the RN**



- ① Damper blade
- ② Bellows
- ③ Bellows inlet
- ④ Crossbar
- ⑤ Leaf spring
- ⑥ Cam plate
- ⑦ Volume flow rate scale lock
- ⑧ Volume flow rate scale
- ⑨ Lip seal

## TECHNICAL DATA

### Volume flow rate ranges

The minimum differential pressure of CAV controllers is an important factor in designing the ductwork and in rating the fan including speed control.

Sufficient duct pressure must be ensured for all operating conditions and for all control units. The measurement points for fan speed control must be selected accordingly.

<b>Nominal sizes</b>	80 – 400 mm
<b>Volume flow rate range</b>	11 – 1400 l/s or 40 – 5040 m <sup>3</sup> /h
<b>Volume flow rate control range</b>	Approx. 25 to 100 % of the nominal volume flow rate
<b>Scale accuracy</b>	± 4 %
<b>Minimum differential pressure</b>	50 Pa (nominal size 80: 100 Pa)
<b>Maximum differential pressure</b>	1000 Pa
<b>Operating temperature</b>	10 – 50 °C

## QUICK SIZING

Quick sizing tables provide a good overview of the room sound pressure levels that can be expected. Approximate intermediate values can be interpolated. Precise intermediate values and spectral data can be calculated with our Easy Product Finder design programme.

The first selection criteria for the nominal size are the actual volume flow rates  $V_{\min}$  and  $V_{\max}$ . The quick sizing tables are based on generally accepted attenuation levels. If the sound pressure level exceeds the required level, a larger air terminal unit and/or a silencer is required.

### Sizing example

#### Given data

$V_{\max} = 280 \text{ l/s (1010 m}^3\text{/h)}$

$\Delta p_{\text{st}} = 150 \text{ Pa}$

Required sound pressure level in the room 35 dB(A)

### Quick sizing

RN/200 with circular silencer CS 050/200×1000

Air-regenerated noise  $L_{PA} = 26 \text{ dB(A)}$

Case-radiated noise  $L_{PA} = 31 \text{ dB(A)}$

### RN, Sound pressure level at differential pressure 150 Pa

Nominal size	V		Air-regenerated noise				Case-radiated noise	
			①	②	③	④	①	⑤
Nominal size	V		LPA	LPA1			LPA2	LPA3
	l/s	m³/h	dB(A)					
80	11	40	37	24	17	15	22	<15
	20	72	39	27	19	17	24	<15
80	40	144	47	34	24	22	31	<15
	45	162	48	35	25	24	32	<15
100	22	79	37	24	17	15	22	<15
	40	144	40	29	22	20	21	<15
100	70	252	47	35	27	26	29	<15
	90	324	50	38	30	29	33	<15
125	35	126	37	27	21	18	15	<15
	60	216	43	34	27	25	19	<15
125	115	414	50	41	35	33	27	<15
	140	504	52	44	39	37	30	<15



160	60	216	40	32	26	24	29	<15
	105	378	45	37	32	29	33	<15
160	190	684	49	41	35	33	39	<15
	240	864	50	41	36	34	41	16
200	90	324	40	31	24	22	28	<15
	160	576	43	35	28	26	32	<15
200	300	1080	48	40	33	32	40	17
	360	1296	49	41	35	33	42	20
250	145	522	41	32	24	22	29	15
	255	918	42	34	28	26	33	<15
250	470	1692	46	39	33	31	40	19
	580	2088	48	41	35	34	43	22
315	230	828	39	33	26	23	30	<15
	400	1440	42	35	29	27	35	<15
315	750	2700	44	38	32	31	40	19
	920	3312	46	41	35	34	43	23
400	350	1260	46	39	33	29	45	<15
	610	2196	48	42	36	32	49	18
400	1130	4068	50	44	38	35	54	24
	1400	5040	51	45	40	37	56	27

- ② RN with secondary silencer CS/CF, insulation thickness 50 mm, length 500 mm
- ③ RN with secondary silencer CS/CF, insulation thickness 50 mm, length 1000 mm
- ④ RN with secondary silencer CS/CF, insulation thickness 50 mm, length 1500 mm
- ⑤ RN-D

## SPECIFICATION TEXT

Circular volume flow controllers for constant air volume systems, mechanical self-powered, without external power supply, suitable for supply or extract air, available in 8 nominal sizes.

Ready-to-commission unit consists of the casing containing a damper blade with low-friction bearings, bellows, external cam plate and leaf spring.

Volume flow controllers without actuators are factory set to a reference volume flow rate (customers can set the required volume flow rate on site).

Spigot with groove for lip seal, suitable for connecting ducts according to EN 1506 or EN 13180.

Casing air leakage to EN 1751, class C.

### Special features

- Volume flow rate can be set using an external scale; no tools required
- High volume flow rate control accuracy
- Any installation orientation

### Materials and surfaces

Galvanised sheet steel construction

- Casing made of galvanised sheet steel
- Interior parts, nominal sizes 80 – 125: stainless steel 1.4301, nominal sizes 160 – 400: galvanised sheet steel
- Polyurethane bellows
- Plain bearings with PTFE coating
- Leaf spring made of stainless steel

Powder-coated construction (P1)

- Casing made of galvanised sheet steel, powder-coated

- Interior parts, nominal sizes 80 – 125: stainless steel 1.4301, nominal sizes 160 – 400: galvanised sheet steel, powder-coated

#### Stainless steel construction (A2)

- Casing made of stainless steel 1.4301
- Interior parts made of stainless steel

#### Variant with acoustic cladding (-D)

- Acoustic cladding made of galvanised sheet steel
- Rubber profile for the insulation of structure-borne noise
- Lining is mineral wool

#### Mineral wool

- To EN 13501, fire rating class A1, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EC

#### Construction

- Galvanised sheet steel
- P1: Powder-coated, silver grey (RAL 7001)
- A2: Stainless steel

#### Technical data

- Nominal sizes: 80 to 400 mm
- Volume flow rate range: 11 to 1400 l/s or 40 to 5040 m<sup>3</sup>/h
- Volume flow rate control range: approx. 25 – 100 % of the nominal volume flow rate
- Minimum differential pressure: 50 Pa (nominal size 80: 100 Pa)
- Maximum differential pressure: 1000 Pa

#### Sizing data

- V \_\_\_\_\_ [m³/h]
- $\Delta p_{st}$  \_\_\_\_\_ [Pa]

Air-regenerated noise

- $L_{PA}$  \_\_\_\_\_ [dB(A)]

Case-radiated noise

- $L_{PA}$  \_\_\_\_\_ [dB(A)]

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

## ORDER CODE

### Notes on the order code

RN-S

- RN-S-A2/80: no lip seal (D2)

RN

- RN/80: no flange (FL), no matching flange (G2)
- RN-A2/80: no lip seal (D2)

### Order example: RN/160/D2

Nominal size	160
Material	Galvanised sheet steel
Accessories	Lip seal on both ends

### Order example: RN-D-FL/250/G2/B50

Acoustic cladding	With
Flange	Both ends
Material	Galvanised sheet steel
Nominal size	250
Accessories	Matching flanges for both ends
Actuator	B50

**RN – D – P1 – FL / 160 / G2 / B50 / 300 – 800**

1

2

3

4

5

6

7

8

**1** Type

RN Volume flow controller

**2** Acoustic cladding

No entry: none

D With acoustic cladding

**3** Material

No entry: galvanised sheet steel

P1 Powder-coated (RAL 7001), silver grey

A2 Stainless steel

**4** Flange

No entry: none

FL Flanges on both ends

**5** Nominal size [mm]

80

100

125

160

200

250

315

400

**6** Accessories

No entry: none

D2 Lip seals on both ends

G2 Matching flanges for both ends

**7** Actuator

No entry: without

For example

B50 24 V AC/DC, 3-point

B52 24 V AC/DC, 3-point, with auxiliary switch

B70 24 V AC/DC, modulating 2 – 10 V DC

**8** Volume flow rates [m<sup>3</sup>/h or l/s]only actuators **7**V<sub>min</sub> – max for factory setting

<b>1</b> Type		<b>3</b> Nominal size [mm]
RN-S	Volume flow controller	80
		100
		125
<b>2</b> Material		<b>4</b> Accessories
	No entry: galvanised sheet steel	No entry: none
P1	Powder-coated (RAL 7001), silver grey	
A2	Stainless steel	D2 Lip seals on both ends

## Variants, Attachments, Dimensions and weight

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### VARIANTS

#### RN-S

- Compact-height volume flow controller for constant volume flow rate control
- Spigot to make connections to the ducting

#### RN

- Volume flow controller for constant air volume flow control
- Spigot to make connections to the ducting

#### RN-D

- Volume flow controller with acoustic cladding for constant air volume flow control
- Spigot to make connections to the ducting
- For rooms where the case-radiated noise of the unit is not sufficiently reduced by a false ceiling
- The circular ducts for the room under consideration must have adequate acoustic insulation (provided by others) on the fan and room ends
- Acoustic cladding cannot be retrofitted

#### RN-FL

- Volume flow controller for constant air volume flow control

- With flanges to make detachable connections to the ductwork

## RN-D-FL

- Volume flow controller with acoustic cladding for constant air volume flow control
- With flanges to make detachable connections to the ductwork
- For rooms where the case-radiated noise of the unit is not sufficiently reduced by a false ceiling
- The circular ducts for the room under consideration must have adequate acoustic insulation (provided by others) on the fan and room ends
- Acoustic cladding cannot be retrofitted
- Powder-coated surface (P1) or stainless steel construction (A2) not possible

## Materials

Order code detail	Part	Material	Notes
-	Casing	Galvanised sheet steel	
	Damper blade	Stainless steel, material no. 1.4301	Nominal size 80
-	Damper blade	Stainless steel, material no. 1.4310	Nominal sizes: 100, 125
	Damper blade	Galvanised sheet steel	Nominal sizes from 160
-	Shaft	Stainless steel, material no. 1.4301	Nominal sizes 80 to 200
	Shaft	Stainless steel, material no. 1.4104	Nominal sizes 250 to 400
-	Plain bearings	Steel with PTFE coating	
D	Acoustic cladding	Galvanised sheet steel	
	Rubber profile for the insulation of structure-borne noise	Rubber	



D	Lining	Mineral wool	
P1	Casing	Galvanised sheet steel	Powder-coated
	Damper blade	Stainless steel, material no. 1.4301	Nominal size 80
P1	Damper blade	Stainless steel, material no. 1.4310	Nominal sizes: 100, 125
	Damper blade	Galvanised sheet steel	Powder-coated, nominal sizes from 160
P1	Shaft	Stainless steel, material no. 1.4301	Nominal sizes 80 to 200
	Shaft	Stainless steel, material no. 1.4305	Nominal sizes 250 to 400
P1	Plain bearings	Bronze with PTFE coating	
A2	Casing	Stainless steel, material no. 1.4301	
	Damper blade	Stainless steel, material no. 1.4301	Nominal size 80
A2	Damper blade	Stainless steel, material no. 1.4310	Nominal sizes: 100, 125
	Damper blade	Stainless steel, material no. 1.4301	Nominal sizes from 160
A2	Shaft	Stainless steel, material no. 1.4301	Nominal sizes 80 to 200
	Shaft	Stainless steel, material no. 1.4305	Nominal sizes 250 to 400
A2	Plain bearings	Bronze with PTFE coating	

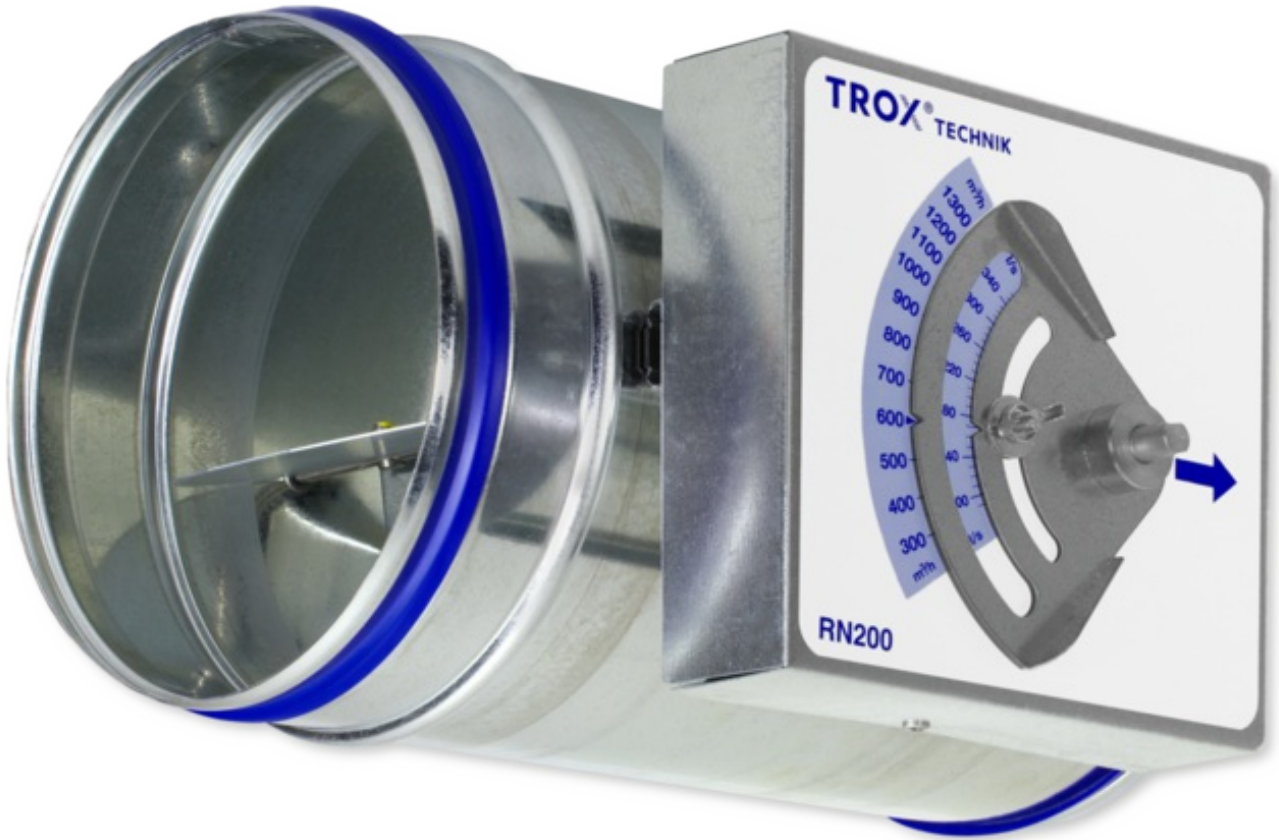
## Surfaces

Order code detail	Part	Surface	Notes
-	Casing	Untreated	
P1	Casing	Powder-coated, RAL 7001, silver grey	

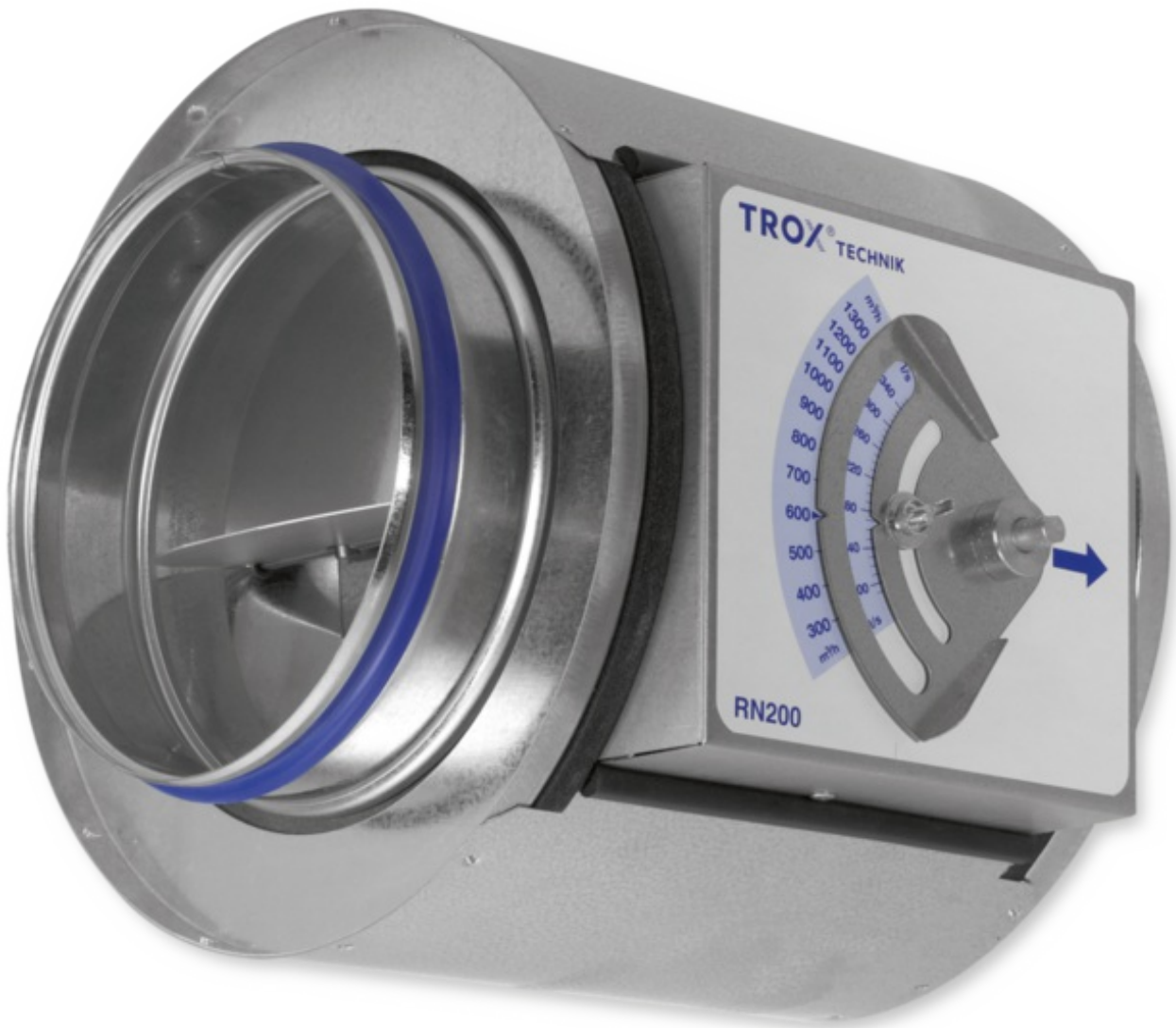
CAV controller variant RN-S, compact height



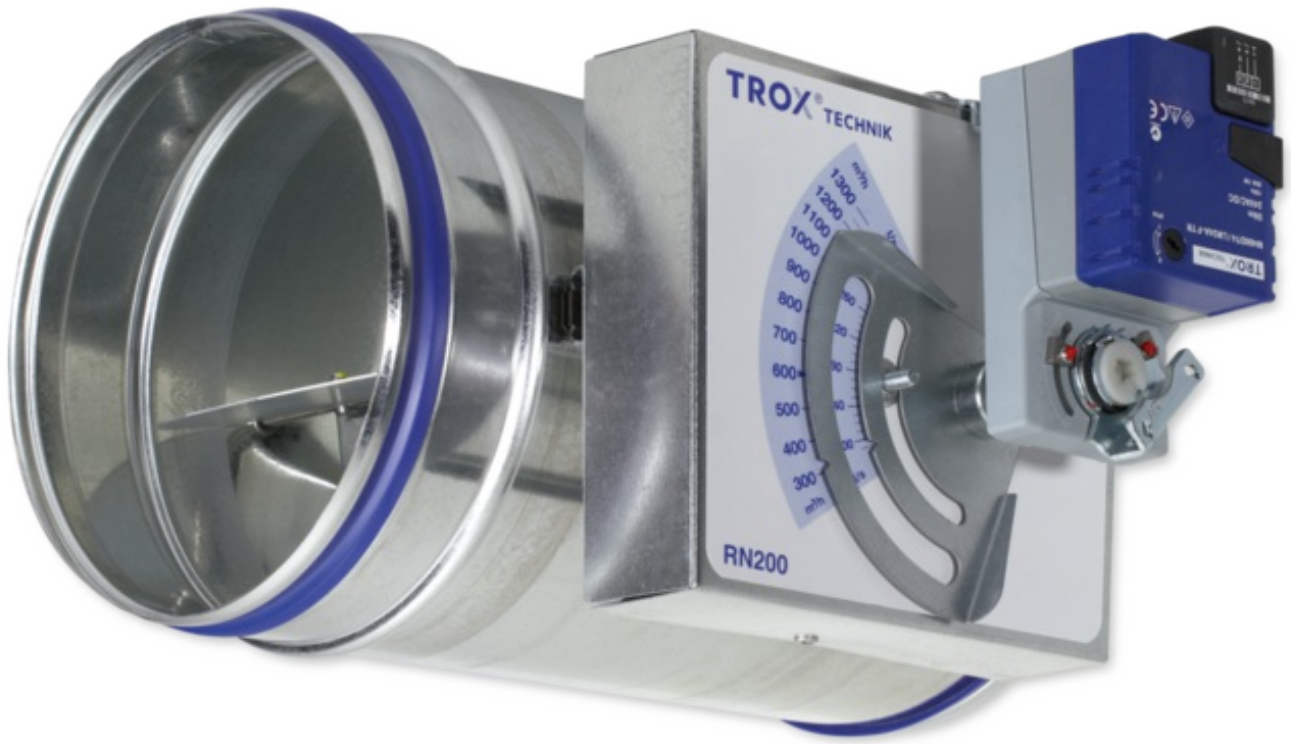
CAV controller variant RN



CAV controller variant RN-D



CAV controller variant RN, with actuator for switching between setpoint values



## ATTACHMENTS

RN, actuators





BPG	V	MP-Bus		Separates Bauteil	Schnelllaufender Stellantrieb	②		●	●	●	●	●	●	●	●
BB1	V			Separates Bauteil	Stellantrieb, Drehmoment für TVT	②				●					
BB3	V			Separates Bauteil	Stellantrieb	②		●	●		●	●	●	●	●
BBB	V			Separates Bauteil	Federrücklaufantrieb	②			●	●	●	●	●	●	●
XD1	V			Integriert	Stellantrieb	③		●	●	●	●	●	●	●	●
XD3	V			Integriert	Federrücklaufantrieb	③		●	●	●	●	●	●	●	●
BR1	$\Delta p$	MP-Bus		100 Pa	Stellantrieb, Drehmoment für TVT	②				●					
BR3	$\Delta p$	MP-Bus		100 Pa	Stellantrieb	②		●	●		●	●	●	●	●
BRB	$\Delta p$	MP-Bus		100 Pa	Federrücklaufantrieb	②		●	●	●	●	●	●	●	●
BRG	$\Delta p$	MP-Bus		100 Pa	Schnelllaufender Stellantrieb	②		●			●	●	●	●	●
BS1	$\Delta p$	MP-Bus		600 Pa	Stellantrieb, Drehmoment für TVT	②				●					
BS3	$\Delta p$	MP-Bus		600 Pa	Stellantrieb	②		●	●						●
BSB	$\Delta p$	MP-Bus		600 Pa	Federrücklaufantrieb	②		●	●	●					
BSG	$\Delta p$	MP-Bus		600 Pa	Schnelllaufender Stellantrieb	②		●	●	●					
BG1	$\Delta p$			100 Pa	Stellantrieb, Drehmoment für TVT	②				●					
BG3	$\Delta p$			100 Pa	Stellantrieb	②		●	●		●	●	●	●	●



BGB	$\Delta p$			100 Pa	Federrücklaufantrieb	②		●	●	●	●	●	●	●	●
BH1	$\Delta p$			600 Pa	Stellantrieb, Drehmoment für TVT	②				●					
BH3	$\Delta p$			600 Pa	Stellantrieb	②		●	●						
BHB	$\Delta p$			600 Pa	Federrücklaufantrieb	②		●	●	●					
XE1	$\Delta p$			Integriert, 100 Pa	Stellantrieb	③		●	●	●	●	●	●	●	●
XE3	$\Delta p$			Integriert, 100 Pa	Federrücklaufantrieb	③		●	●	●	●	●	●	●	●
XF1	$\Delta p$			Integriert, 600 Pa	Stellantrieb	③		●	●	●					
XF3	$\Delta p$			Integriert, 600 Pa	Federrücklaufantrieb	③		●	●	●					

① TROX, ② TROX/Belimo, ③ TROX/Gruner, ④ Sauter, ⑤ Siemens

☒ Bestellschlüsseldetail, V Volumenstrom,  $\Delta p$  Differenzdruck

#### Anbauteile: VARYCONTROL Regelkomponenten

☒	Regel- gröÙe	Schnittstelle	V <sub>min</sub> -/ V <sub>max</sub> - Verstellung	Differenzdruck- transmitter	Stellantrieb	Fabrikat
		Easylabregler		Statisch		
Elab	RS, RE, PC, C	TCU3		Integriert	Schnelllaufender Stellantrieb	
	RS, PC, C	TCU3		Integriert	Schnelllaufender Stellantrieb	
Elab	RE, PC, C	TCU3		Integriert	Schnelllaufender Stellantrieb	
	RS, RE, PC, FH, C	TCU3		Integriert	Schnelllaufender Stellantrieb	

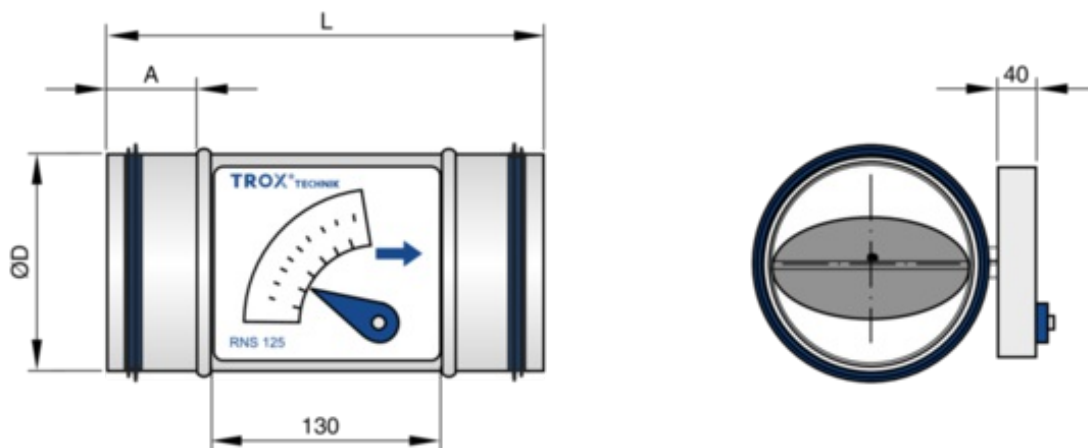
		Elektronischer Regler		Statisch	Elektronischer Regler	
<b>TMA</b>	RS, RE, PC	TCU-LON-II mit LonWorks-Schnittstelle		Integriert	Schnelllaufender Stellantrieb	
<b>TMB</b>	RS, RE, PC	TCU-LON-II mit LonWorks-Schnittstelle		Integriert	Schnelllaufender Stellantrieb (bürstenloser Motor)	
<b>TMA</b>	RS, RE,	TCU-LON-II mit LonWorks-Schnittstelle		Integriert	Schnelllaufender Stellantrieb	
<b>TMB</b>	RS, RE,	TCU-LON-II mit LonWorks-Schnittstelle		Integriert	Schnelllaufender Stellantrieb (bürstenloser Motor)	
<b>TMA</b>	RE ,PC	TCU-LON-II mit LonWorks-Schnittstelle		Integriert	Schnelllaufender Stellantrieb	
<b>TMB</b>	RE ,PC	TCU-LON-II mit LonWorks-Schnittstelle		Integriert	Schnelllaufender Stellantrieb (bürstenloser Motor)	
<b>TMA</b>	RS, RE ,PC, FH	TCU-LON-II mit LonWorks-Schnittstelle		Integriert	Schnelllaufender Stellantrieb	
<b>TMB</b>	RS, RE ,PC, FH	TCU-LON-II mit LonWorks-Schnittstelle		Integriert	Schnelllaufender Stellantrieb (bürstenloser Motor)	
<b>XF3</b>	$\Delta p$			Integriert, 600 Pa	Federrücklaufantrieb	③
<b>BB3</b>	V			Separates Bauteil	Stellantrieb	②

① TROX, ② TROX/Belimo, ③ TROX/Gruner, ④ Sauter, ⑤ Siemens

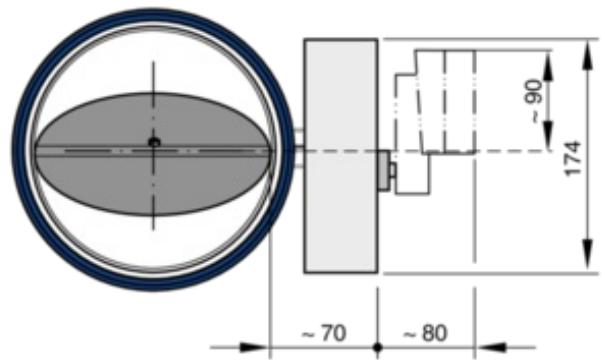
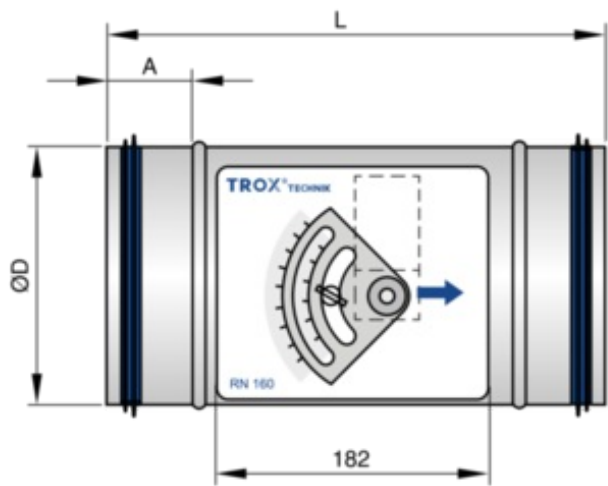
☒ Bestellschlüsseldetail, V Volumenstrom,  $\Delta p$  Differenzdruck

## DIMENSIONS AND WEIGHT

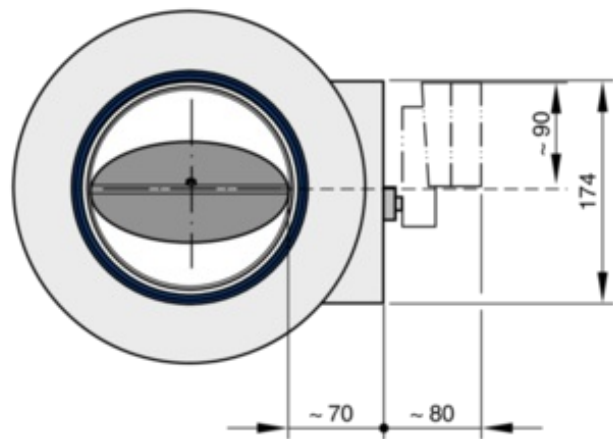
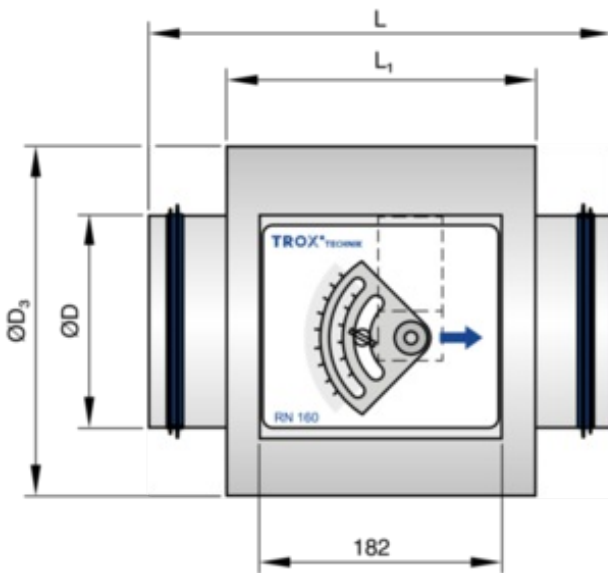
RN-S, nominal size 100, 125



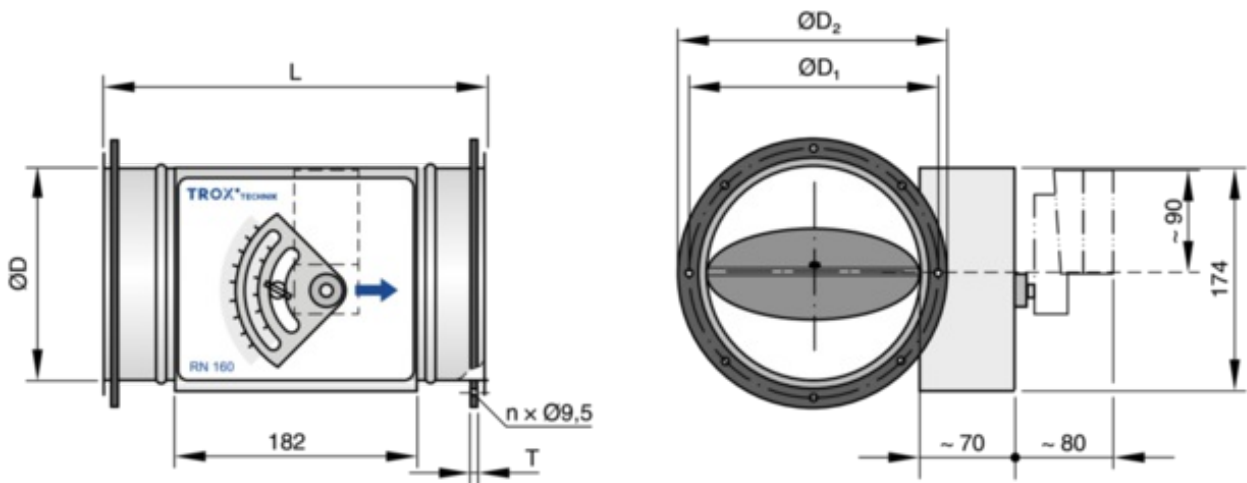
RN



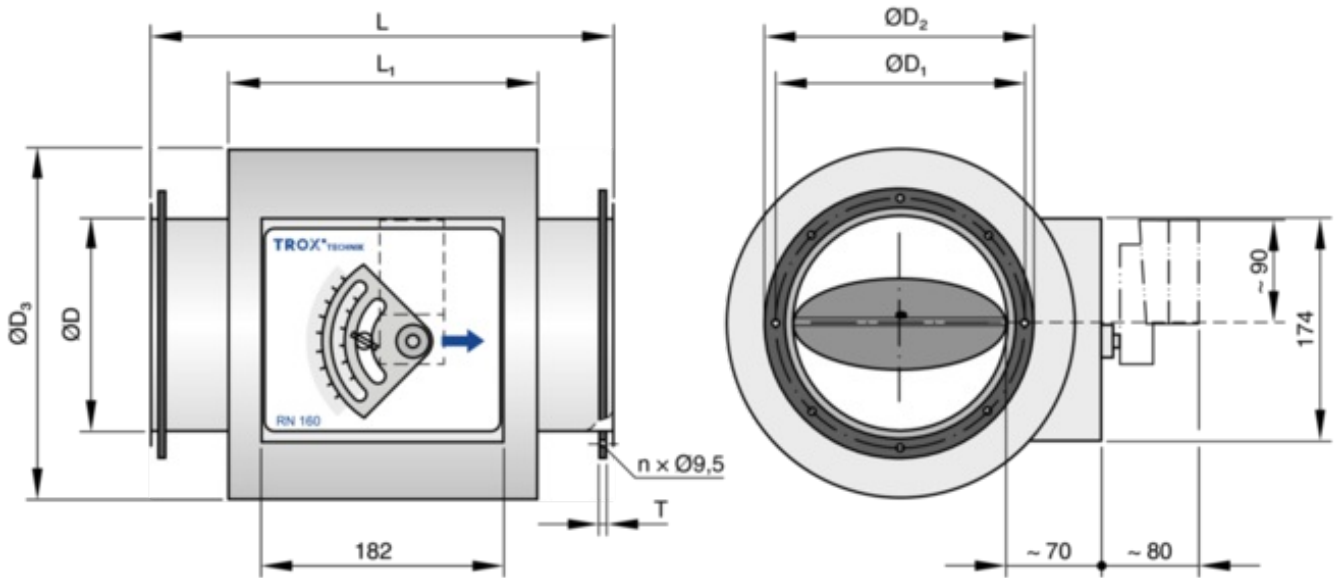
RN-D



RN-FL



RN-D-FL



### INSTALLATION DETAILS

#### Installation and commissioning

- Any installation orientation
- Volume flow rate can be set using an external scale; no tools required
- No repeat measurements or adjustments by an air conditioning engineer are necessary
- RN-D: For constructions with acoustic cladding, ducts on the room side should have cladding up to the acoustic cladding of the controller

#### Upstream conditions

The volume flow rate accuracy  $\Delta V$  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.

Free air intake only with a straight duct section of 1D upstream.

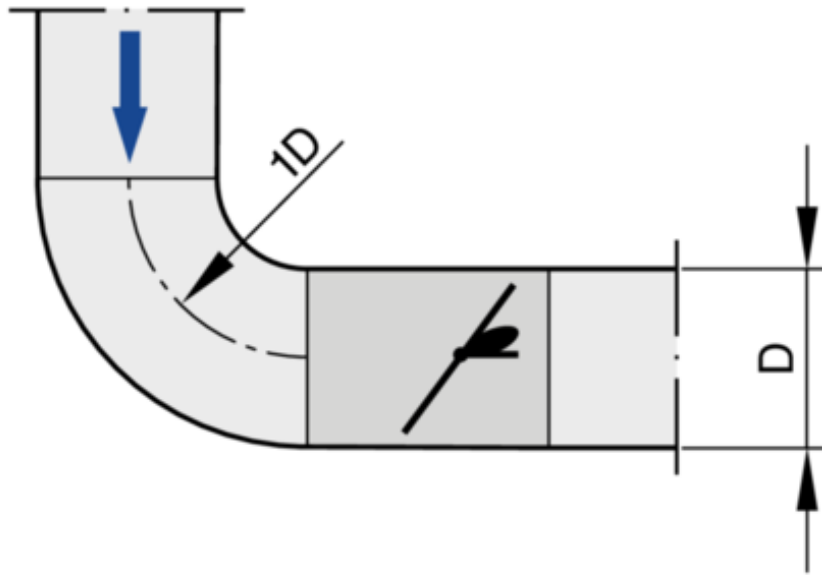
#### Space required for commissioning and maintenance

Sufficient space must be kept clear near any attachments to allow for commissioning and maintenance. It may be necessary to provide sufficiently sized inspection access openings.

#### Space required

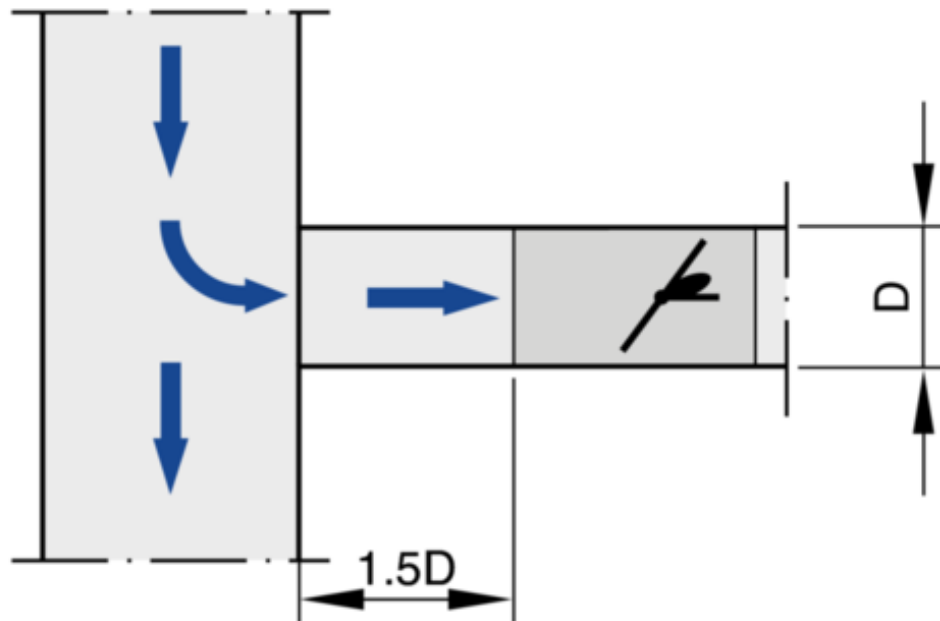
Attachments	①	②	③
	mm		
Without actuator	200	200	200
With actuator	200	320	300

Bend



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

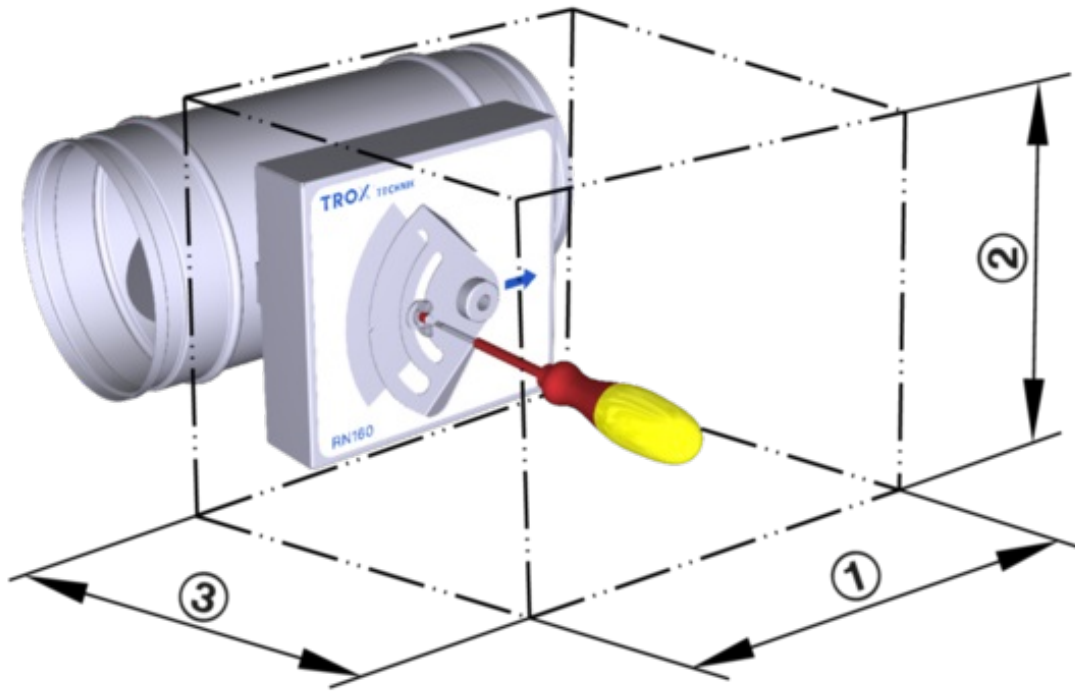
## Junction



A junction causes strong turbulence. The stated volume flow rate accuracy  $\Delta V$  can only be achieved with a straight duct section of at least  $1.5D$  upstream. Shorter upstream sections require a perforated plate in the branch and before the CAV controller. If there is no straight upstream section at all, the control will not be stable, even with a perforated plate.

Access for commissioning and maintenance





## BASIC INFORMATION AND NOMENCLATURE

### Principal dimensions

$\text{ØD}$  [mm]

Outside diameter of the spigot

$\text{ØD}_1$  [mm]

Pitch circle diameter of flanges

$\text{ØD}_2$  [mm]

Outside diameter of flanges

$\text{ØD}_4$  [mm]

Inside diameter of the screw holes of flanges

**L [mm]**

Length of unit including connecting spigot

**L<sub>1</sub> [mm]**

Length of casing or acoustic cladding

**B [mm]**

Duct width

**B<sub>1</sub> [mm]**

Screw hole pitch of flange (horizontal)

**B<sub>2</sub> [mm]**

Outside dimension of flange (width)

**B<sub>3</sub> [mm]**

Width of device

**H [mm]**

Duct height

**H<sub>1</sub> [mm]**

Screw hole pitch of flange (vertical)

**H<sub>2</sub> [mm]**

Outside dimension of flange (height)

**H<sub>3</sub> [mm]**

Unit height

**n [ ]**

Number of flange screw holes

**T [mm]**

Flange thickness

**m [kg]**

Unit weight including the minimum required attachments for manual adjustment

**Acoustic data** **$f_m$  [Hz]**

Octave band centre frequency

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

A-weighted sound pressure level of air-regenerated noise of the VAV terminal unit, system attenuation taken into account

 **$L_{PA1}$  [dB(A)]**

A-weighted sound pressure level of air-regenerated noise of the VAV terminal unit with secondary silencer, system attenuation taken into account

 **$L_{PA2}$  [dB(A)]**

A-weighted sound pressure level of case-regenerated noise of the VAV terminal unit, system attenuation taken into account

 **$L_{PA3}$  [dB(A)]**

A-weighted sound pressure level of case-regenerated noise of the VAV terminal unit with acoustic cladding, system attenuation taken into account

All sound pressure levels are based on 20  $\mu$ Pa.

**Volume flow rates** **$V_{nom}$  [m<sup>3</sup>/h] and [l/s]**

Nominal volume flow rate (100 %)

- The value depends on product type and nominal size
- Values are published on the internet and in technical leaflets, and stored in the Easy Product Finder design software.
- Upper limit of the setting range and maximum volume flow rate setpoint value for the CAV controller

**V [m<sup>3</sup>/h] and [l/s]**

Volume flow rate

## $\Delta V$ [ $\pm$ %]

Volume flow rate tolerance from setpoint value

## Differential pressure

### $\Delta p_{st}$ [Pa]

Static differential pressure

### $\Delta p_{st \min}$ [Pa]

Static differential pressure, minimum

- The static minimum differential pressure is equal to the pressure loss of the CAV controller when the damper blade is open, caused by flow resistance (bellows, crossbar)
- If the pressure on the CAV controller is too low, the setpoint volume flow rate may not be achieved, not even when the damper blade is open
- Important factor in designing the ductwork and in rating the fan including speed control
- Sufficient duct pressure must be ensured for all operating conditions and for all controllers, and the measurement point or points for speed control must have been selected accordingly to achieve this

## Construction

### Galvanised sheet steel

- Casing made of galvanised sheet steel
- Parts in contact with the airflow as described for the product type
- External parts, e.g. mounting brackets or covers, are usually made of galvanised sheet steel

### Powder-coated surface (P1)

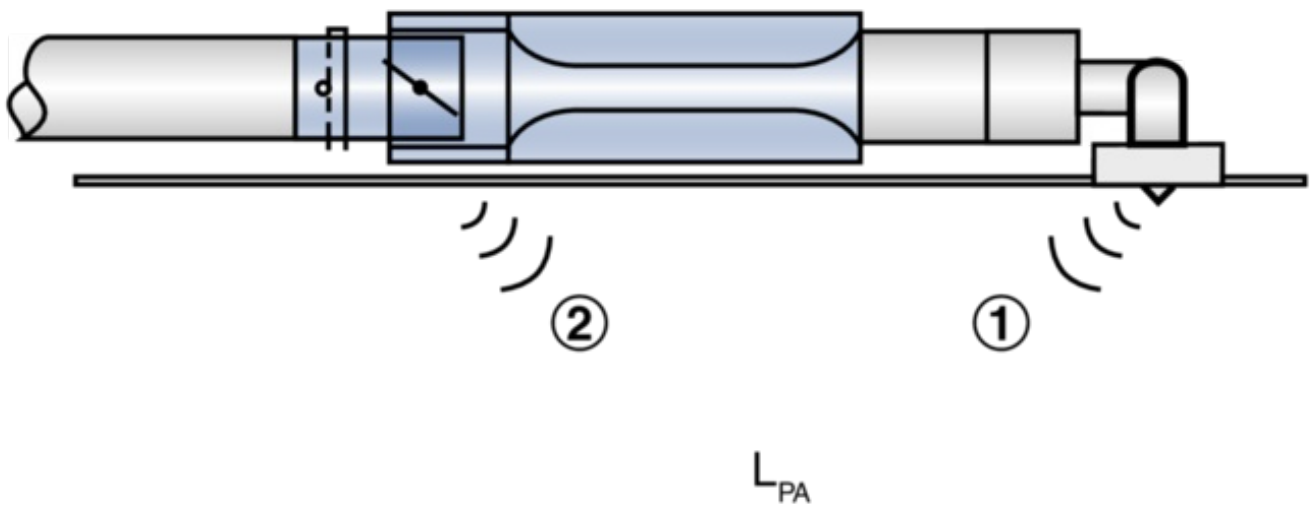
- Casing made of galvanised sheet steel, powder-coated RAL 7001, silver grey
- Parts in contact with the airflow are powder-coated or made of plastic
- Due to production, some parts that come into contact with the airflow may be stainless steel or aluminium, powder-coated
- External parts, e.g. mounting brackets or covers, are usually made of galvanised sheet steel

### Stainless steel (A2)

- Casing made of stainless steel 1.4201
- Parts in contact with the airflow are powder-coated or made of stainless steel

- External parts, e.g. mounting brackets or covers, are usually made of galvanised sheet steel

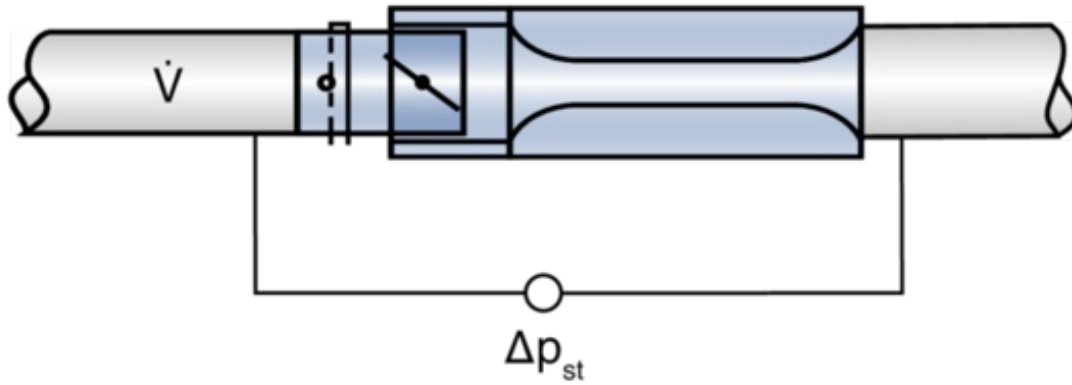
### Definition of noise



① Air-regenerated noise

② Case-radiated noise

### Static differential pressure



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