

Type RN-Ex



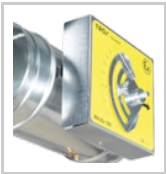
FOR THE PRECISE CONTROL OF CONSTANT VOLUME FLOWS IN POTENTIALLY EXPLOSIVE ATMOSPHERES (ATEX)

Circular, mechanical self-powered volume flow controllers for the control of supply air or extract air in constant air volume systems, approved and certified for potentially explosive atmospheres (ATEX)

- ATEX-compliant construction
- Approved for gases, mists, vapours and dusts in zones 1, 2, 21 and 22
- Volume flow rate can be set using an external scale, no tools required
- No on-site test measurements required for commissioning
- Suitable for airflow velocities of up to 12 m/s
- Any installation orientation
- 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 for the reduction of air-regenerated noise



APPLICATION

Application

- Circular EXCONTROL CAV controllers of Type RN-Ex for the precise supply air or extract air flow control in constant air volume systems
- For use in potentially explosive atmospheres (ATEX)
- Mechanical self-powered volume flow control without external power supply
- Simplified project handling with orders based on nominal size

Special features

- ATEX mark and certification
- ATEX equipment group II, approved for zones 1, 2, 21 and 22
- Volume flow rate can be set using an external scale; no tools required
- High volume flow rate control accuracy
- Any installation orientation
- Correct operation even under unfavourable upstream or downstream conditions (1.5 D straight section required upstream)

Classification

According to type examination certificate TUEV 05 ATEX 7159 X

- Zones 1 and 2 (atmosphere: gases): II 2 G c II T5 / T6
- Zones 21 and 22 (atmosphere: dusts): II 2 D c II T 80 °C

Nominal sizes

- 80, 100, 125, 160, 200, 250, 315, 400

DESCRIPTION

Variants

- RN-Ex: Volume flow controller
- RN-Ex-D: Volume flow controller with acoustic cladding
- Units with acoustic cladding and/or Type CA secondary silencers 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
- Connection for equipotential bonding
- Aerodynamic function testing of each unit on a special test rig prior to shipping

Accessories

- Lip seals on both ends (factory fitted)

Useful additions

- Secondary silencer Type CA

Construction features

- Circular casing
- Construction and materials comply with the EU directive for use in potentially explosive atmospheres (ATEX)
- Spigot suitable for circular ducts to EN 1506 or EN 13180
- Spigot with groove for lip seal (RN-P1/80 without groove)

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

- Directive 94/9/EC: Equipment and protective systems intended for use in potentially explosive atmospheres
- 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

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.

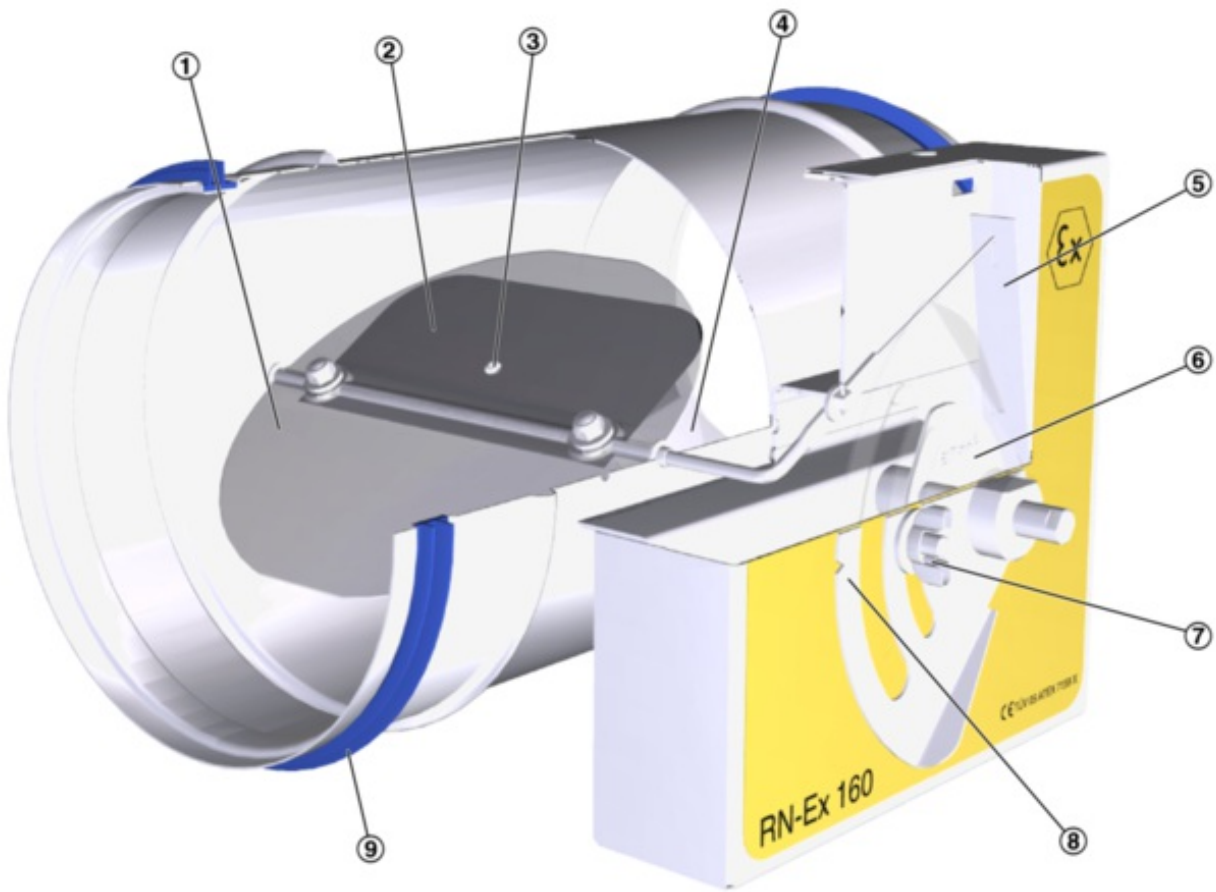
The aerodynamic forces of the airflow create a closing torque on the damper blade. The bellows extends and increases this force while at the same time acting as an oscillation damper. The closing force is countered by a leaf spring that unrolls over a cam plate. The shape of the cam plate is such that 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-Ex



- 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.

| | |
|---------------------------------------|---|
| Nominal sizes | 80 – 400 mm |
| Volume flow rate range | 11 – 1400 l/s or 40 – 5040 m³/h |
| Volume flow rate control range | Approx. 25 to 100 % of the nominal volume flow rate |
| Scale accuracy | ± 4 % |
| Minimum differential pressure | 50 Pa (nominal size 80: 100 Pa) |
| Maximum differential pressure | 1000 Pa |
| Operating temperature | 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.

RN-Ex, 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 | 47 | 22 | 20 | 21 | <15 |
| 100 | 70 | 252 | 47 | 47 | 27 | 26 | 29 | <15 |
| | 90 | 324 | 50 | 50 | 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 |

① RN-Ex

② RN-Ex with secondary silencer CS/CF, insulation thickness 50 mm, length 500 mm

③ RN-Ex with secondary silencer CS/CF, insulation thickness 50 mm, length 1000 mm

④ RN-Ex with secondary silencer CS/CF, insulation thickness 50 mm, length 1500 mm

⑤ RN-Ex-D

SPECIFICATION TEXT

Circular volume flow controllers for constant air volume systems in potentially explosive atmospheres, 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 with leaf spring, and parts for equipotential bonding and for protection in potentially explosive atmospheres.

Volume flow controllers 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

- ATEX mark and certification
- ATEX equipment group II, approved for zones 1, 2, 21 and 22
- Volume flow rate can be set using an external scale; no tools required
- High volume flow rate control accuracy
- Any installation orientation
- Correct operation even under unfavourable upstream or downstream conditions (1.5 D straight section required upstream)

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 m³/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]
- Δp_{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-EX/80: no flange (FL), no matching flange (G2)
- RN-EX-A2/80: no lip seal (D2)

Order example: RN-Ex/160/D2

| | |
|--------------|------------------------|
| Nominal size | 160 |
| Material | Galvanised sheet steel |
| Accessories | Lip seals on both ends |

RN – Ex – D – P1 / 160 / D2

1 2 3 4 5

1 Type

RN-Ex Volume flow controller for potentially explosive atmospheres

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 Nominal size [mm]

80

100

125

160

200

250

315

400

5 Accessories

No entry: none

D2 Lip seals on both ends

PRODUKTBEZIEHUNGEN

Variants, Dimensions and weight

VARIANTS

RN-Ex

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

RN-Ex-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

Anbauteile: VARYCONTROL Regelkomponenten

| ☒ | Regelgröße | Schnittstelle | V_{\min} -/ V_{\max} - Verstellung | Differenzdruck- transmitter | Stellantrieb | Fabrikat |
|--------|------------|--|---|--------------------------------|--------------|----------|
| | | Easyregler | | Dynamisch | | |
| Easy | V | | | Integriert | Integriert | ① |
| | | Compactregler | | Dynamisch | | |
| BC0 | V | MP-Bus | | Integriert | Integriert | ② |
| BF0 | V | MP-Bus | | Integriert | Integriert | ② |
| BL0 | V | LonWorks | | Integriert | Integriert | ② |
| BM0 | V | Modbus | | Integriert | Integriert | ② |
| BM0-J6 | V | Modbus und steckerfertiger Anschlussleitung | | Integriert | Integriert | ② |
| XG0 | V | | | Integriert | Integriert | ③ |

| | | | | | | |
|------------|------------|-----------------|--|-------------------|--|---|
| XB0 | V | | | Integriert | Integriert | ③ |
| LN0 | V | | | Integriert | Integriert | ⑤ |
| LK0 | V | KNX | | | | ⑤ |
| LY0 | V | | | Integriert | Integriert | ⑤ |
| | | Compactregler | | Statisch | | |
| SA0 | V | | | Integriert | Integriert | ④ |
| SC0 | Δp | | | Integriert | Schnelllaufender Stellantrieb integriert | ④ |
| | | Universalregler | | Dynamisch | | |
| B11 | V | | | Integriert | Stellantrieb, Drehmoment für TVT | ② |
| B13 | V | | | Integriert | Stellantrieb | ② |
| B27 | V | | | Integriert | Stellantrieb | ② |
| B1B | V | | | Integriert | Federrücklaufantrieb | ② |
| XC3 | V | | | Integriert | Federrücklaufantrieb | ③ |
| | | Universalregler | | Statisch | | |
| BP1 | V | MP-Bus | | Separates Bauteil | Stellantrieb, Drehmoment für TVT | ② |
| BP3 | V | MP-Bus | | Separates Bauteil | Stellantrieb | ② |
| BPB | V | MP-Bus | | Separates Bauteil | Federrücklaufantrieb | ② |
| 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 | Δp | MP-Bus | | 100 Pa | Stellantrieb, Drehmoment für TVT | ② |
| BR3 | Δp | MP-Bus | | 100 Pa | Stellantrieb | ② |
| BRB | Δp | MP-Bus | | 100 Pa | Federrücklaufantrieb | ② |
| BRG | Δp | MP-Bus | | 100 Pa | Schnelllaufender Stellantrieb | ② |
| BS1 | Δp | MP-Bus | | 600 Pa | Stellantrieb, Drehmoment für TVT | ② |
| BS3 | Δp | MP-Bus | | 600 Pa | Stellantrieb | ② |
| BSB | Δp | MP-Bus | | 600 Pa | Federrücklaufantrieb | ② |
| BSG | Δp | MP-Bus | | 600 Pa | Schnelllaufender Stellantrieb | ② |
| BG1 | Δp | | | 100 Pa | Stellantrieb, Drehmoment für TVT | ② |
| BG3 | Δp | | | 100 Pa | Stellantrieb | ② |
| BGB | Δp | | | 100 Pa | Federrücklaufantrieb | ② |
| BH1 | Δp | | | 600 Pa | Stellantrieb, Drehmoment für TVT | ② |
| BH3 | Δp | | | 600 Pa | Stellantrieb | ② |
| BHB | Δp | | | 600 Pa | Federrücklaufantrieb | ② |
| XE1 | Δp | | | Integriert, 100 Pa | Stellantrieb | ③ |

| | | | | | | | | | | | | | | | | |
|-----|------------|------------------------|--|-------------------|----------------------------------|---|--|---|---|---|---|---|---|---|---|---|
| XC3 | V | | | Integriert | Federrücklaufantrieb | ③ | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | | Universalregler | | Statisch | | | | | | | | | | | | |
| BP1 | V | MP-Bus | | Separates Bauteil | Stellantrieb, Drehmoment für TVT | ② | | | | ● | | | | | | |
| BP3 | V | MP-Bus | | Separates Bauteil | Stellantrieb | ② | | ● | ● | | ● | ● | ● | ● | ● | ● |
| BPB | V | MP-Bus | | Separates Bauteil | Federrücklaufantrieb | ② | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 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 | Δp | MP-Bus | | 100 Pa | Stellantrieb, Drehmoment für TVT | ② | | | | ● | | | | | | |
| BR3 | Δp | MP-Bus | | 100 Pa | Stellantrieb | ② | | ● | ● | | ● | ● | ● | ● | ● | ● |
| BRB | Δp | MP-Bus | | 100 Pa | Federrücklaufantrieb | ② | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| BRG | Δp | MP-Bus | | 100 Pa | Schnelllaufender Stellantrieb | ② | | ● | | | ● | ● | ● | ● | ● | ● |

| | | | | | | | | | | | | | | | |
|-----|------------|--------|--|-----------------------|-------------------------------------|---|--|---|---|---|---|---|---|---|---|
| BS1 | Δp | MP-Bus | | 600 Pa | Stellantrieb, Drehmoment für TVT | ② | | | | ● | | | | | |
| BS3 | Δp | MP-Bus | | 600 Pa | Stellantrieb | ② | | ● | ● | | | | | | ● |
| BSB | Δp | MP-Bus | | 600 Pa | Federrücklaufantrieb | ② | | ● | ● | ● | | | | | |
| BSG | Δp | MP-Bus | | 600 Pa | Schnelllaufender Stellantrieb | ② | | ● | ● | ● | | | | | |
| BG1 | Δp | | | 100 Pa | Stellantrieb, Drehmoment für TVT | ② | | | | ● | | | | | |
| BG3 | Δp | | | 100 Pa | Stellantrieb | ② | | ● | ● | | ● | ● | ● | ● | ● |
| BGB | Δp | | | 100 Pa | Federrücklaufantrieb | ② | | ● | ● | ● | ● | ● | ● | ● | ● |
| BH1 | Δp | | | 600 Pa | Stellantrieb, Drehmoment für TVT | ② | | | | ● | | | | | |
| BH3 | Δp | | | 600 Pa | Stellantrieb | ② | | ● | ● | | | | | | |
| BHB | Δp | | | 600 Pa | Federrücklaufantrieb | ② | | ● | ● | ● | | | | | |
| XE1 | Δp | | | Integriert, 100 Pa | Stellantrieb | ③ | | ● | ● | ● | ● | ● | ● | ● | ● |
| XE3 | Δp | | | Integriert, 100 Pa | Federrücklaufantrieb | ③ | | ● | ● | ● | ● | ● | ● | ● | ● |
| XF1 | Δp | | | Integriert, 600 Pa | Stellantrieb | ③ | | ● | ● | ● | | | | | |
| XF3 | Δp | | | Integriert, 600 Pa | Federrücklaufantrieb | ③ | | ● | ● | ● | | | | | |

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

☒ Bestellschlüsseldetail, V Volumenstrom, Δp Differenzdruck

Anbauteile: VARYCONTROL Regelkomponenten

| ☒ | Regel- größe | Schnittstelle | V _{min} -/ V _{max} - 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 | |
| TMA | RS, RE, PC | TCU-LON-II mit LonWorks- Schnittstelle | | Integriert | Schnelllaufender Stellantrieb | |
| TMB | RS, RE, PC | TCU-LON-II mit LonWorks- Schnittstelle | | Integriert | Schnelllaufender Stellantrieb (bürstenloser Motor) | |
| TMA | RS, RE, | TCU-LON-II mit LonWorks- Schnittstelle | | Integriert | Schnelllaufender Stellantrieb | |
| TMB | RS, RE, | TCU-LON-II mit LonWorks- Schnittstelle | | Integriert | Schnelllaufender Stellantrieb (bürstenloser Motor) | |
| TMA | RE ,PC | TCU-LON-II mit LonWorks- Schnittstelle | | Integriert | Schnelllaufender Stellantrieb | |
| TMB | RE ,PC | TCU-LON-II mit LonWorks- Schnittstelle | | Integriert | Schnelllaufender Stellantrieb (bürstenloser Motor) | |
| TMA | RS, RE ,PC, FH | TCU-LON-II mit LonWorks- Schnittstelle | | Integriert | Schnelllaufender Stellantrieb | |
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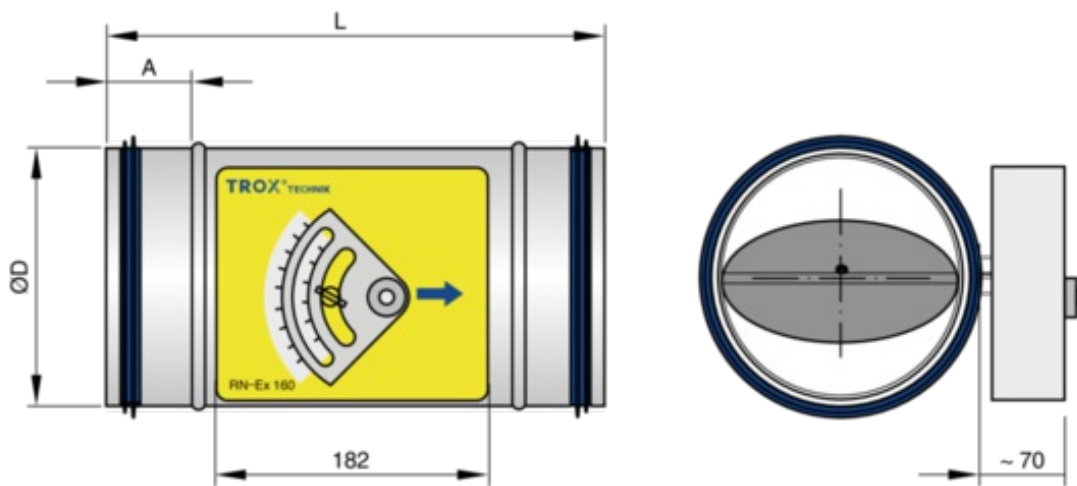
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| XF3 | Δp | | | Integriert, 600 Pa | Federrücklaufantrieb | ③ |
| BB3 | V | | | Separates Bauteil | Stellantrieb | ② |

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

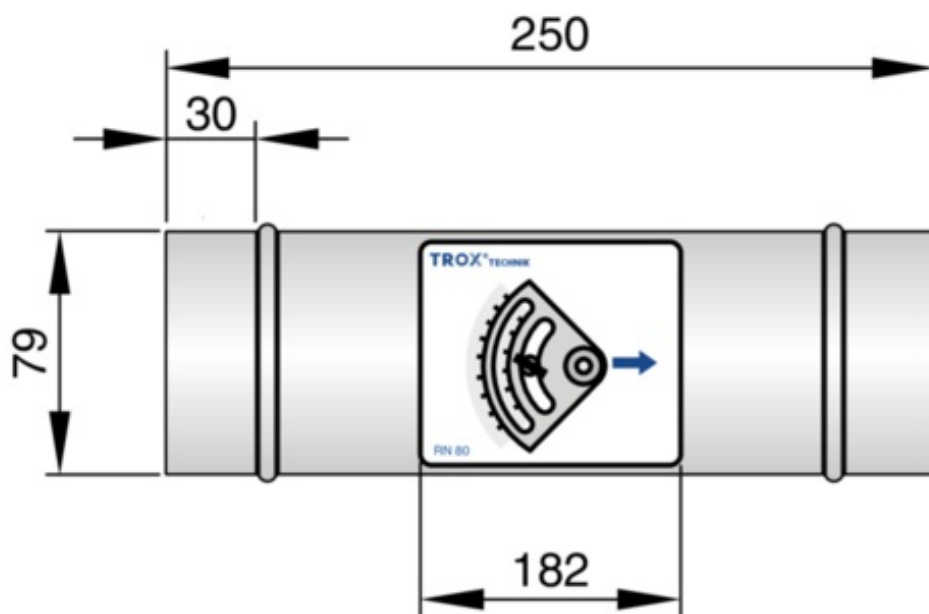
Bestellschlüsseldetail, V Volumenstrom, Δp Differenzdruck

DIMENSIONS AND WEIGHT

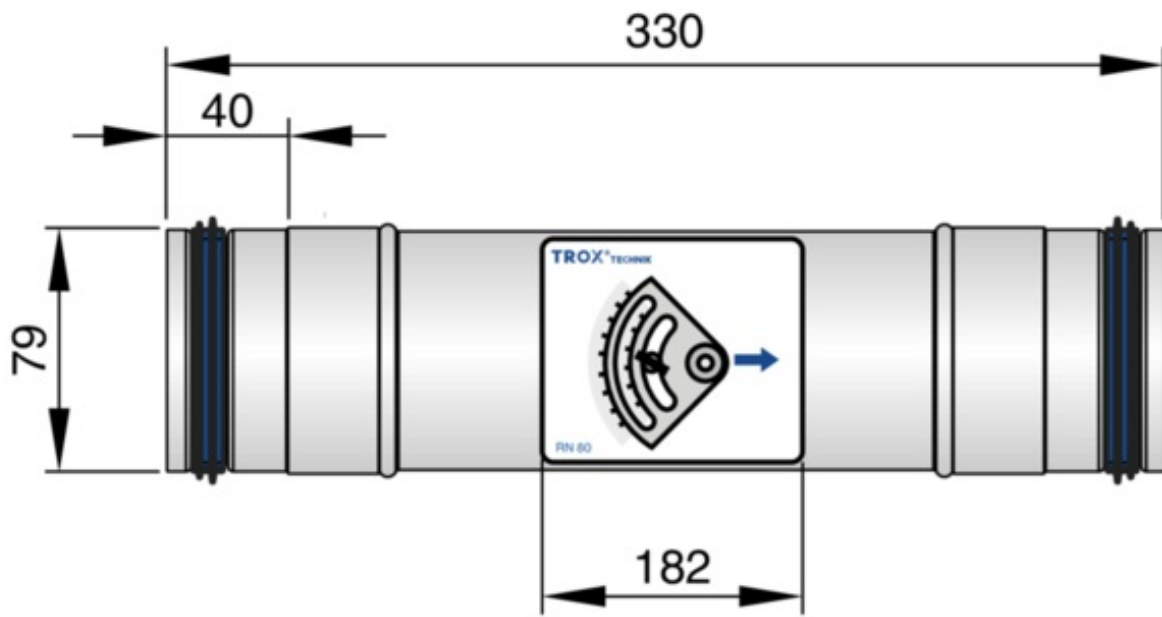
RN-Ex



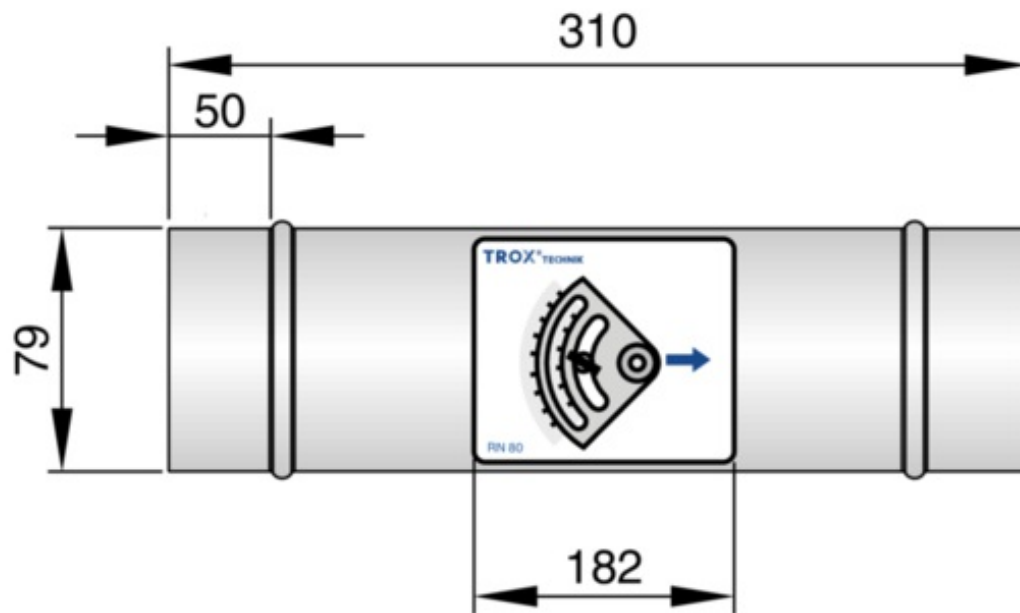
RN-Ex-P1/80



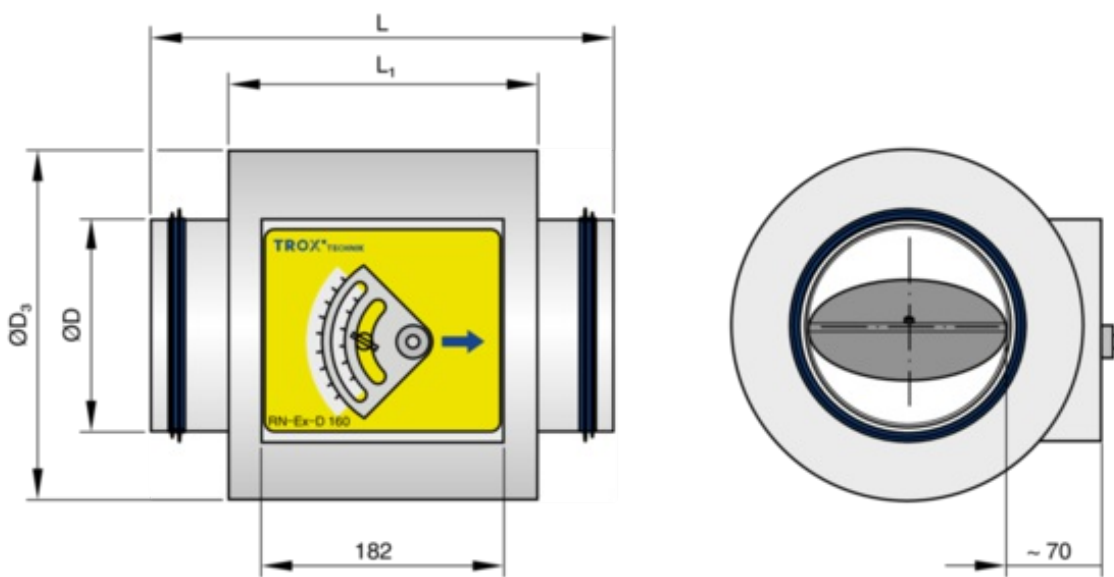
RN-Ex-P1/80/D2



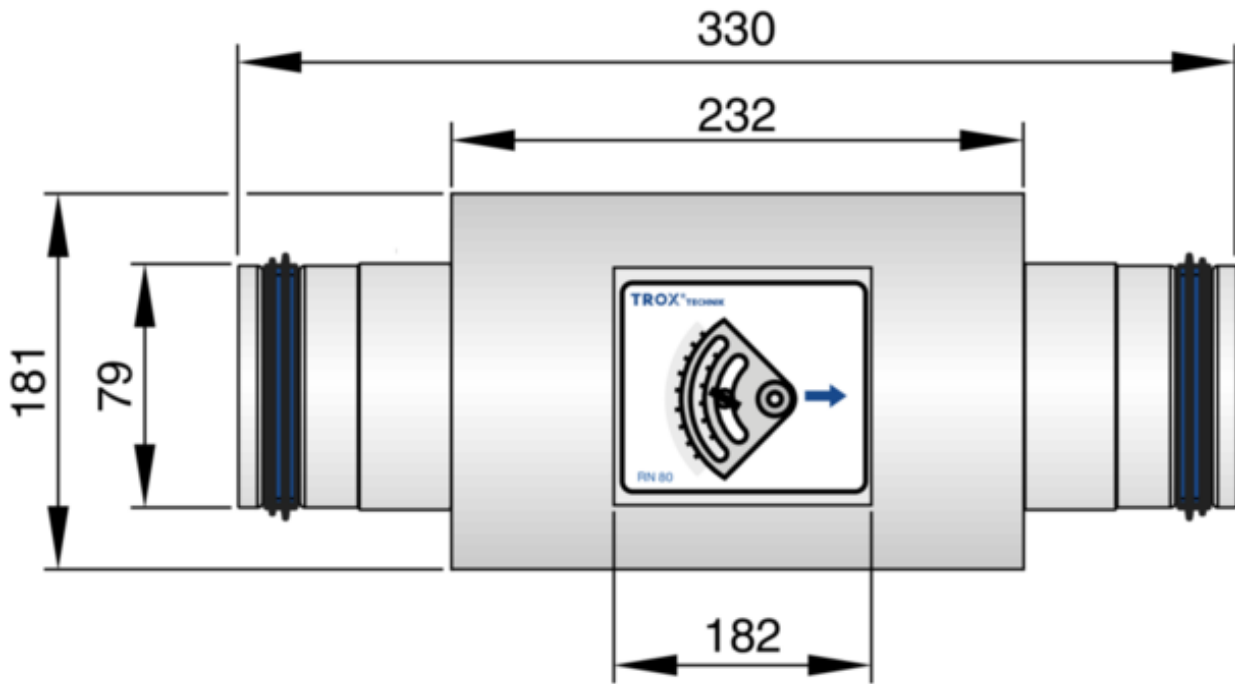
RN-Ex-A2/80



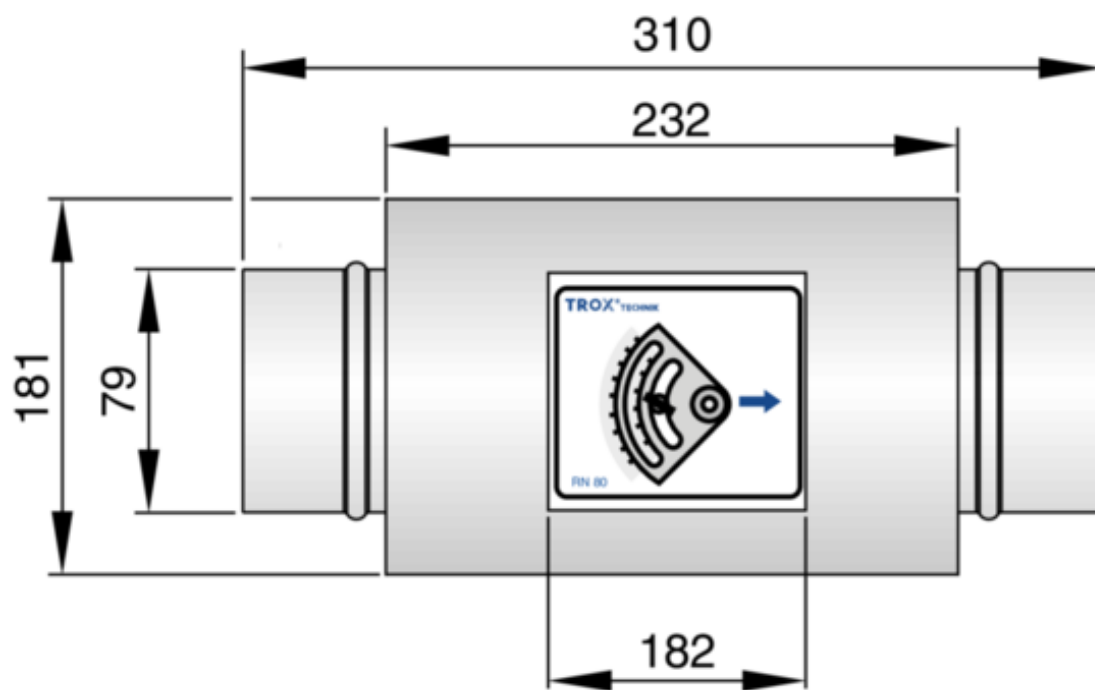
RN-Ex-DRN-Ex-D



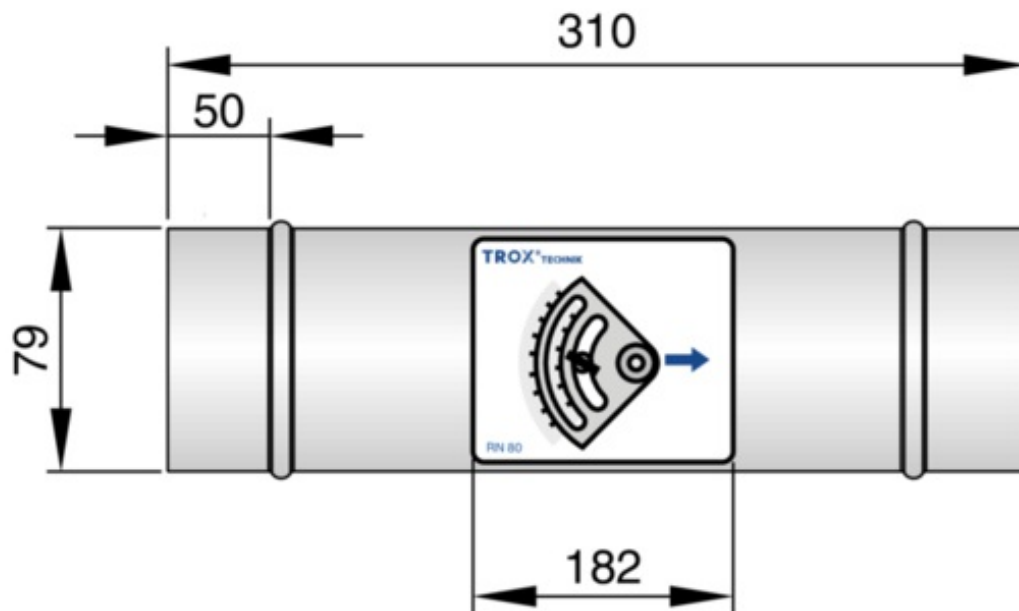
RN-Ex-D-P1/80/D2



RN-Ex-D-A2/80



RN-Ex-A2/80



Installation details, Basic information and nomenclature

INSTALLATION DETAILS

Installation and commissioning

- Connections for equipotential bonding: Suitable cables must be connected by others
- 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-Ex-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 ΔV 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.

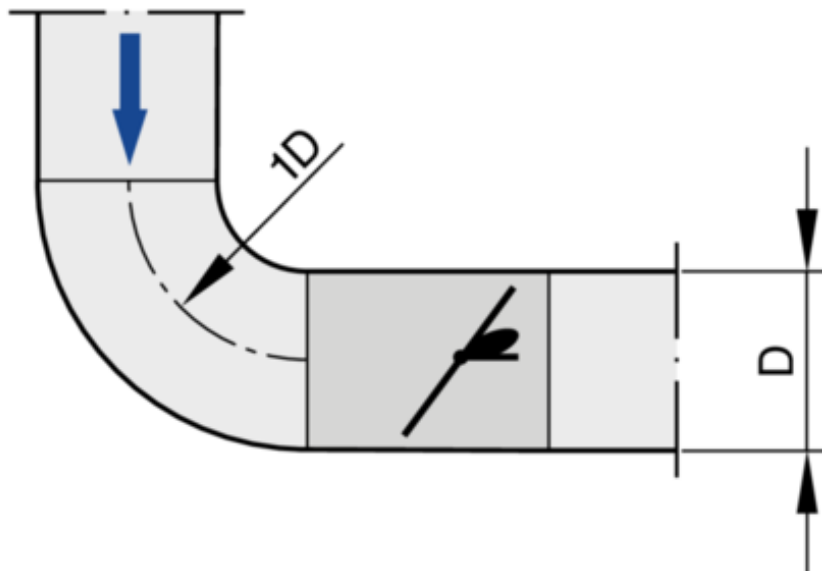
Space required for commissioning and maintenance

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 |

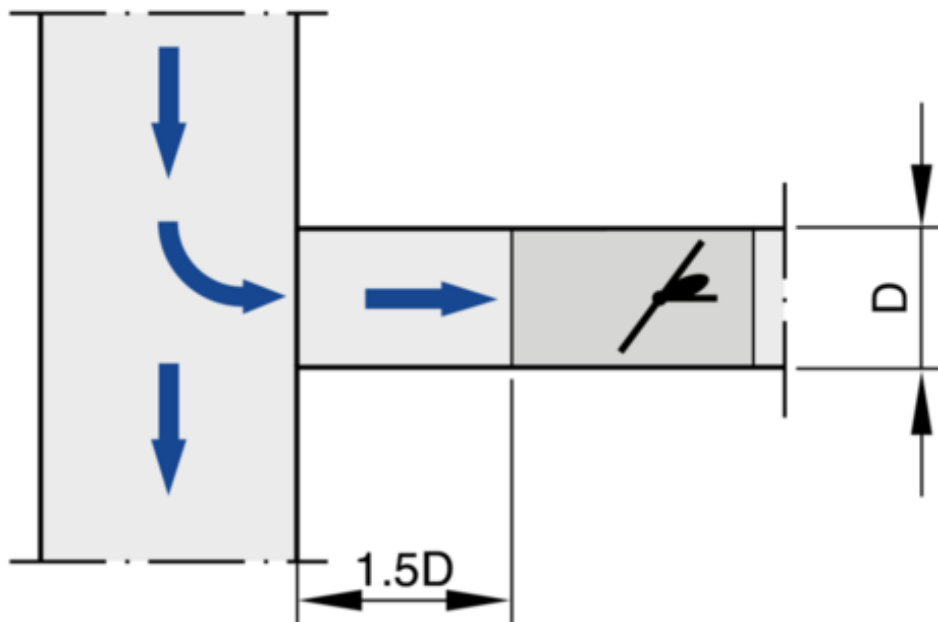
Bend



A bend with a curvature radius of at least 1D – without an additional straight duct section upstream of the CAV controller –

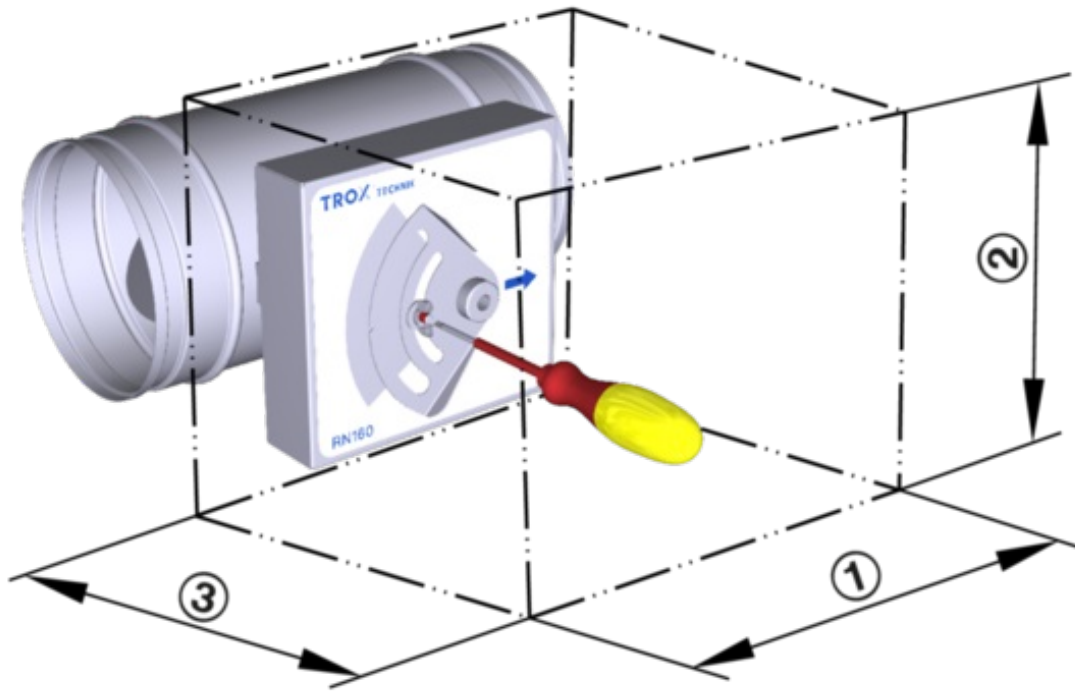
has only a negligible effect on the volume flow rate accuracy.

Junction



A junction causes strong turbulence. The stated volume flow rate accuracy ΔV 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

ØD [mm]

Outside diameter of the spigot

ØD_1 [mm]

Pitch circle diameter of flanges

ØD_2 [mm]

Outside diameter of flanges

ØD_4 [mm]

Inside diameter of the screw holes of flanges

L [mm]

Length of unit including connecting spigot

L₁ [mm]

Length of casing or acoustic cladding

B [mm]

Duct width

B₁ [mm]

Screw hole pitch of flange (horizontal)

B₂ [mm]

Outside dimension of flange (width)

B₃ [mm]

Width of device

H [mm]

Duct height

H₁ [mm]

Screw hole pitch of flange (vertical)

H₂ [mm]

Outside dimension of flange (height)

H₃ [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 μ Pa.

Volume flow rates

V_{nom} [m³/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 [m³/h] and [l/s]

Volume flow rate

ΔV [± %]

Volume flow rate tolerance from setpoint value

Differential pressure

Δp_{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)

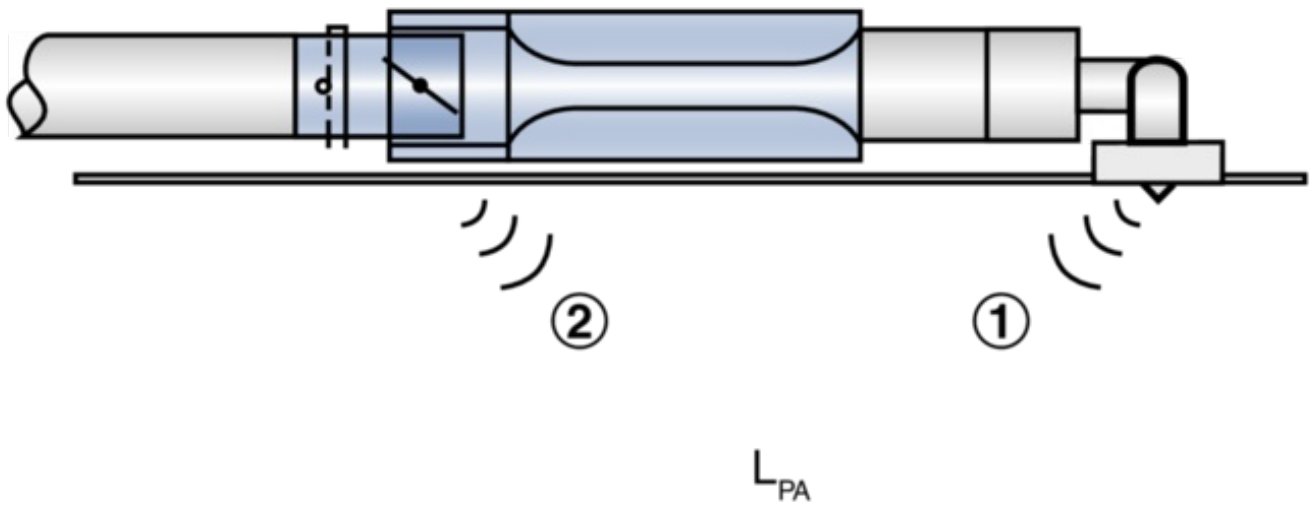
- Casing made of galvanised sheet steel, powder-coated RAL 7001, silver grey
- Parts in contact with the airflow are powder-coated or made of plastic
- Due to production, some parts that come into contact with the airflow may be stainless steel or aluminium, powder-coated
- External parts, e.g. mounting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