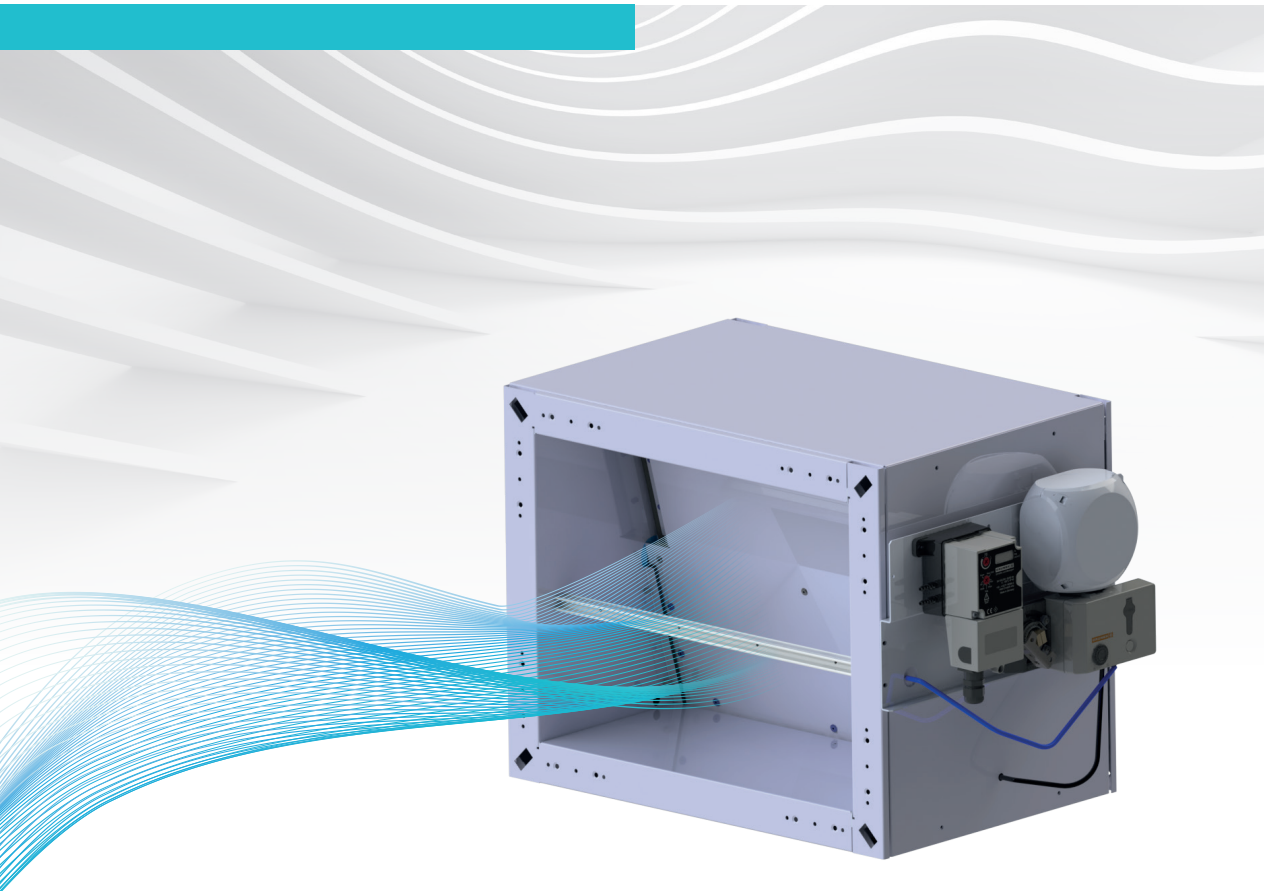


Let's realize  
the potential of air  
for a sustainable world

**active**  
control

**LTG**  
AIR TECH  
SYSTEMS



Technical brochure

## Pressure controller with air flow feedback

### DRFactive

The DRFactive is ideal for applications with limited space, low air velocities, high measurement accuracy requirements, and when pressure control and air flow measurement need to be combined in a single unit.

Differential pressure control up to 1000 Pa

Air leakage rate according to DIN EN 1751,  
class 4 (DN 100/125: class 3)

Housing tightness class C according to  
DIN EN 1751

Short installation lengths due to measurement  
at the damper blade

Low pressure losses: energy savings, quiet  
operation

Large measuring range: 1...10 m/s

Measuring accuracy:  $\pm 5\%$  ( $V_{nom}$ ) to  $\pm 15\%$  ( $V_{min}$ )

Retrofittable insulation shell

| Contents                                                                                              | Page |
|-------------------------------------------------------------------------------------------------------|------|
| Area of application, structure, mode of operation, features, materials/surfaces, options, accessories | 3    |
| Air flow ranges, minimum pressure differences, function                                               | 4    |
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## Application range

- DRFactive pressure controller for line pressure control in air pipes of ventilation and air conditioning systems
- Ensures equal inlet pressure at downstream components (e.g., air flow controllers, induction units, air diffusers)
- Measured value can be used for fan speed control (bad point control)
- Air flow measurement for recording and feedback of the air air flow. Feedback signal can be used for display or master-slave applications
- Optional: Full shut-off possible

## Design

- Housing with damper blade
- Control device with differential pressure sensor and actuator
- Air flow measuring device (gross pressure sensor, differential pressure sensor, transmitter)
- Factory-fitted hoses and wiring
- Housing with flanges and slotted holes, suitable for standard air duct connections
- Optional 40 mm mineral wool insulation shell with sheet steel jacket

## Function

### Pressure controller:

- Measures static pressure via pressure tap
- Compares measured value with setpoint
- Controls damper blade to achieve setpoint

### Air flow measurement

- Differential pressure method via cross-sectional constriction at the damper blade
- „Nozzle effect“ ensures high measurement accuracy even at low flow velocities
- Transducer calculates actual air flow value and outputs flow-linear signal

## Features

- Control range differential pressures up to 1000 Pa
- Very low air leakage rate (DIN EN 1751 class 4, size 200×100: class 3)
- Low housing leakage (DIN EN 1751 class C / ATC3)
- Low pressure loss: energy savings and quiet operation
- Gauge pressure measurement on the damper blade: short installation lengths and high measuring accuracy
- Large measuring range 1...10 m/s
- High measuring accuracy  $\pm 5\%$  ( $V_{nom}$ )

## Materials/surfaces

- Housing, damper blade, shaft: galvanized steel
- Damper bearing: POM plastic
- Seals: EPDM

## Options, accessories

- Powder-coated surfaces or stainless steel (V4A)
- Parts exposed to air flow optionally made of stainless steel (aluminum differential pressure transducer)
- Pressure tapping kit with connection spigot, hose, and accessories
- Insulation shell for sound and heat insulation
- Integrated air flow measuring device
- Feedback potentiometer for recording the damper position
- SDF-SM splitter silencer made of galvanized sheet steel
- Other special designs available on request

## Air flow ranges, minimum pressure differences

| Nominal width<br>B [mm] | Nominal height<br>H [mm] | At 1 m/s<br>$V_{min}$<br>[m³/h] | At 10 m/s<br>V<br>[m³/h] | $\Delta p_{min}$<br>[Pa] |
|-------------------------|--------------------------|---------------------------------|--------------------------|--------------------------|
| 200                     | 100                      | 72                              | 720                      | 80                       |
| 300                     |                          | 108                             | 1080                     | 70                       |
| 400                     |                          | 144                             | 1440                     | 60                       |
| 500                     |                          | 180                             | 1800                     | 60                       |
| 600                     |                          | 216                             | 2160                     | 60                       |
| 300                     | 150                      | 162                             | 1620                     | 40                       |
| 400                     |                          | 216                             | 2160                     |                          |
| 500                     |                          | 270                             | 2700                     |                          |
| 600                     |                          | 324                             | 3240                     |                          |
| 200                     | 200                      | 144                             | 1440                     | 40                       |
| 300                     |                          | 216                             | 2160                     |                          |
| 400                     |                          | 288                             | 2880                     |                          |
| 500                     |                          | 360                             | 3600                     |                          |
| 600                     |                          | 432                             | 4320                     |                          |
| 800                     |                          | 576                             | 5760                     |                          |

V – Air flow  
 $V_{min}$  – Minimum air flow = lower control limit  
 $V_{nom}$  – Nominal air flow  
 $\Delta p_{min}$  – Minimum pressure loss

| Nominal width<br>B [mm] | Nominal height<br>H [mm] | At 1 m/s<br>$V_{min}$<br>[m³/h] | At 10 m/s<br>V<br>[m³/h] | $\Delta p_{min}$<br>[Pa] |
|-------------------------|--------------------------|---------------------------------|--------------------------|--------------------------|
| 300                     | 250                      | 270                             | 2700                     | 30                       |
| 400                     |                          | 360                             | 3600                     |                          |
| 500                     |                          | 450                             | 4500                     |                          |
| 600                     |                          | 540                             | 5400                     |                          |
| 800                     |                          | 720                             | 7200                     |                          |
| 300                     | 300                      | 324                             | 3240                     | 30                       |
| 400                     |                          | 432                             | 4320                     |                          |
| 500                     |                          | 540                             | 5400                     |                          |
| 600                     |                          | 648                             | 6480                     |                          |
| 800                     |                          | 864                             | 8640                     |                          |
| 1000                    | 400                      | 1080                            | 10 800                   | 30                       |
| 400                     |                          | 576                             | 5760                     |                          |
| 500                     |                          | 720                             | 7200                     |                          |
| 600                     |                          | 864                             | 8640                     |                          |
| 800                     |                          | 1152                            | 11 520                   |                          |
| 1000                    |                          | 1440                            | 14 400                   |                          |
| 1200                    |                          |                                 | 17 280                   |                          |

## Function

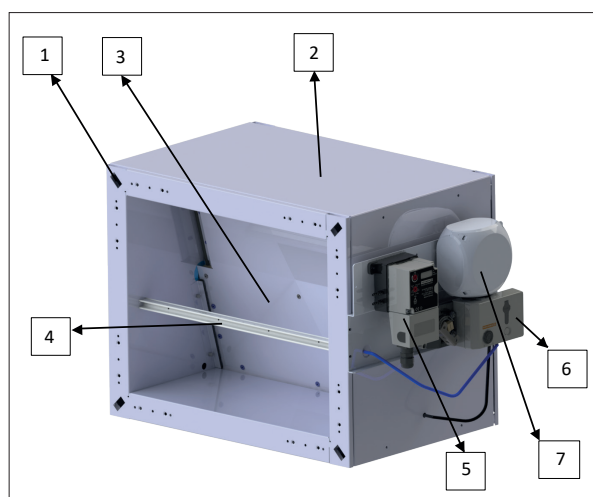
### How does the DRFactive work?

DRFactive makes it possible to regulate pressure and measure air flow precisely at the same time.

The advantage is that, with open extract air, the actual air flow can be measured and extracted almost identically.

Two electrical components are integrated for this purpose: one measures the air flow directly at the damper, while the other measures the pressure at a freely selectable point and controls the system accordingly.

This concept also saves several meters of ducting, which reduces both installation effort and costs.



1. Flat flange
2. Housing / insulation shell
3. Control damper
4. Measuring strip
5. Pressure controller
6. Air flow controller / actuator
7. Distribution box

## Installation, placement

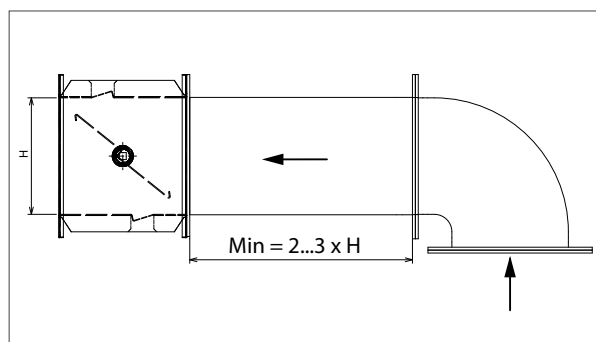
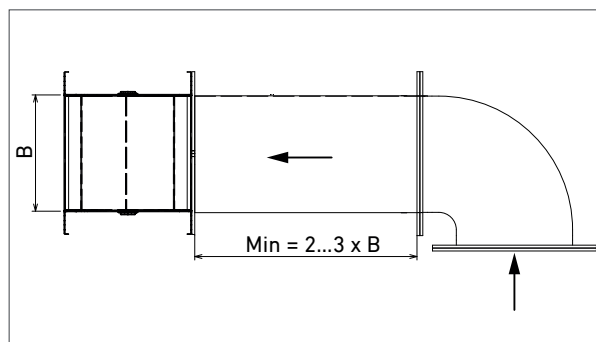
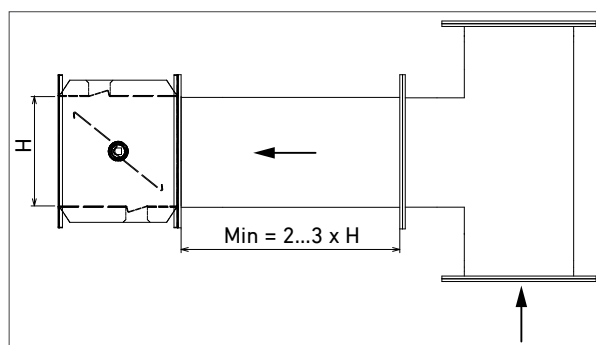
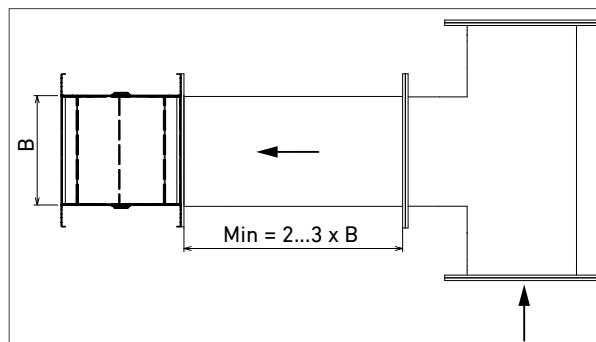
### Required straight inflow paths

The DRFactive must be installed taking into account the air direction arrow attached to the housing. A straight inflow path of at least two to three times the height (H) or width (B) of the air duct must be maintained in front of the unit, depending on whether possible flow disturbances are caused by the height or width of the air duct. When taking pressure readings in the air pipe, avoid separation or flow disturbances caused by obstacles. Therefore, the pressure tap must be installed on site on a straight air pipe with sufficient distance to the nearest disturbance point.

With duct or duct pressure control, the pressure is measured relative to the ambient pressure. One connection of the sensor remains open („+“ for extract air, „-“ for supply air), while the other connection is connected to the measuring point. The pressure at the measuring point is controlled in the direction of air flow behind the DRFactive in the supply air or in front of the DRFactive in the exhaust air. The pressure tapping point must be connected to the differential pressure sensor of the DRFactive on site using a pressure measuring hose.

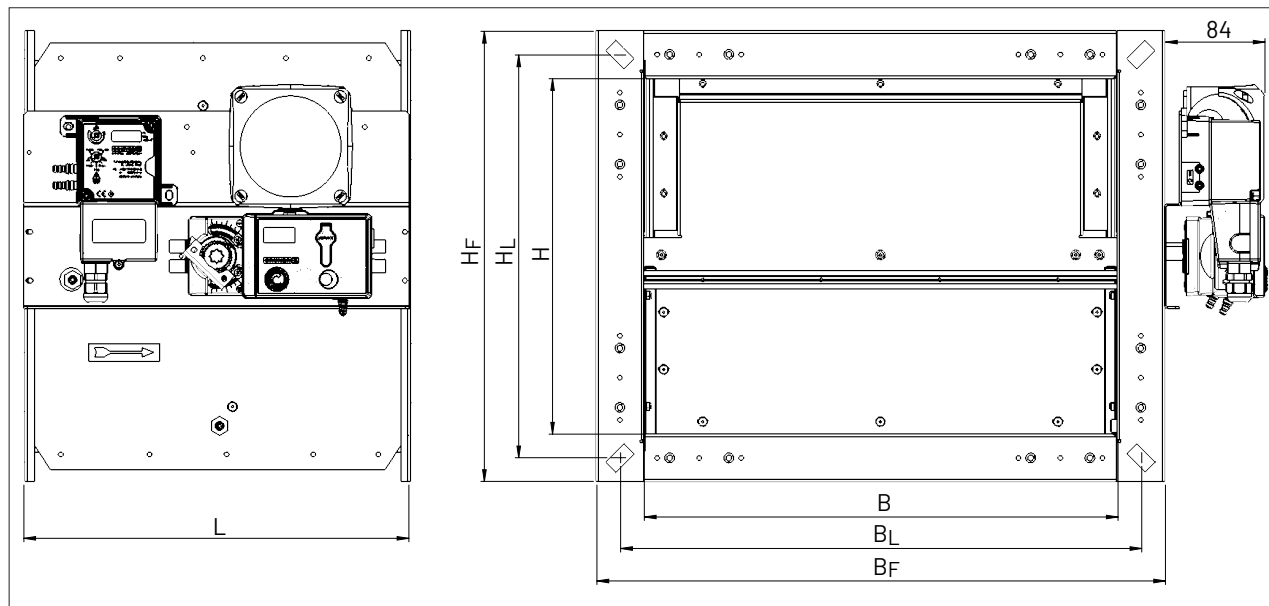
For the dynamic measuring principle of the differential pressure sensor, corresponding height and hose length corrections must be made. For the static measuring principle, the permissible installation position of the differential pressure sensor must be observed; if necessary, a zero point adjustment must be carried out.

### Minimum inflow paths for DRFactive

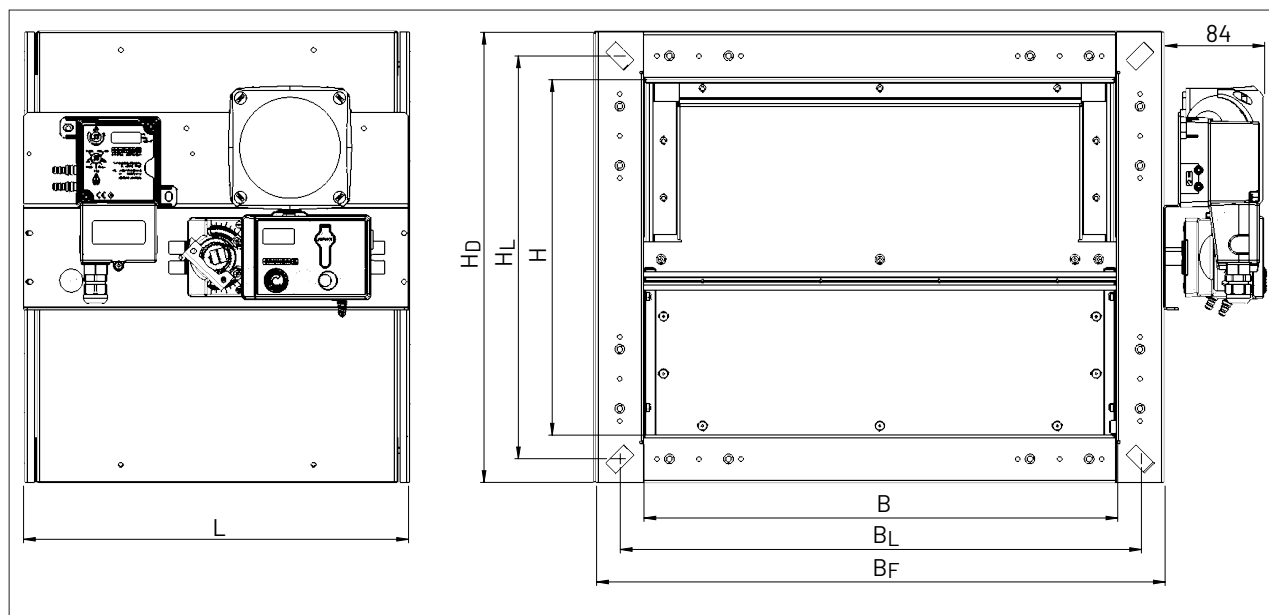


## Dimensions, weight

Type DRFactive/.../-/L/GUAC, without insulation shell



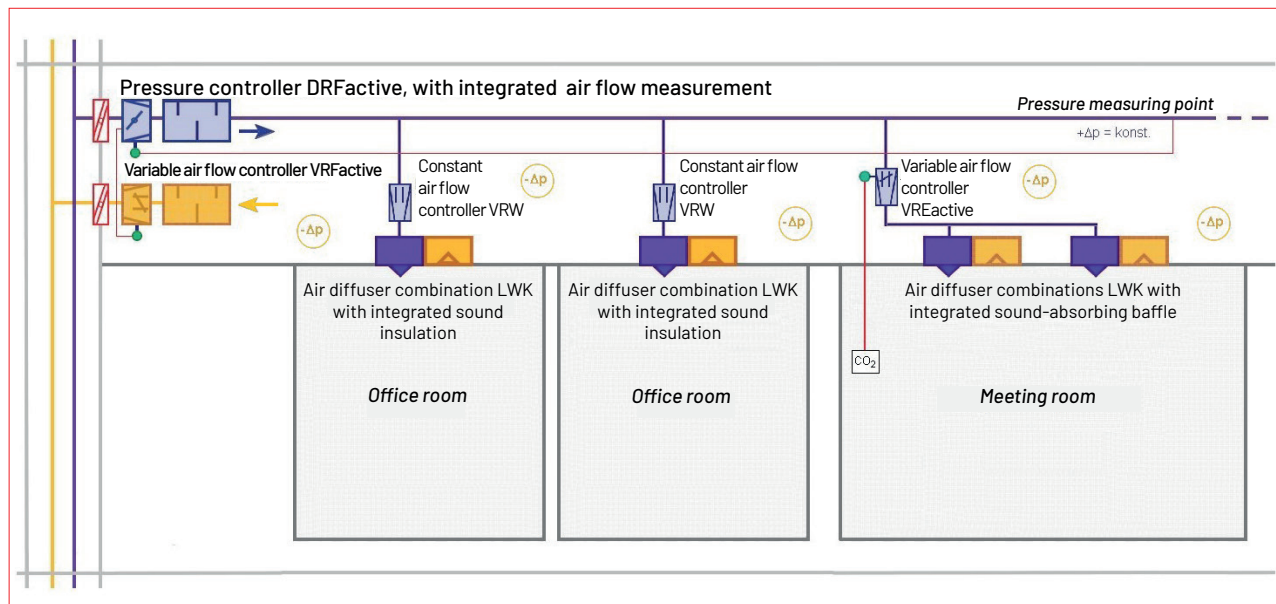
Type DRFactive/.../D/L/GUAC, with insulation shell



## Dimensions, weight

| Nominal width<br>B | Nominal height<br>H<br>[mm] | Width<br>B <sub>F</sub><br>[mm] | Height<br>H <sub>F</sub><br>[mm] | Length<br>L<br>[mm] | Hole spacing<br>B <sub>L</sub><br>[mm] | Hole spacing<br>H <sub>L</sub><br>[mm] | Width<br>B <sub>D</sub><br>[mm] | Height<br>H <sub>D</sub><br>[mm] | Max. torque<br>[Nm] | Weight [kg]<br>Type DRFactive/.../GUAC<br>without   with<br>insulation shell |      |
|--------------------|-----------------------------|---------------------------------|----------------------------------|---------------------|----------------------------------------|----------------------------------------|---------------------------------|----------------------------------|---------------------|------------------------------------------------------------------------------|------|
|                    |                             |                                 |                                  |                     |                                        |                                        |                                 |                                  |                     |                                                                              |      |
| 200                | 100                         | 280                             | 180                              | 135                 | 240                                    | 140                                    | 282                             | 182                              | 5                   | 3.3                                                                          | 4.6  |
| 300                |                             | 380                             |                                  |                     | 340                                    |                                        | 382                             |                                  |                     | 4                                                                            | 5.8  |
| 400                |                             | 480                             |                                  |                     | 440                                    |                                        | 482                             |                                  |                     | 4.7                                                                          | 6.8  |
| 500                |                             | 580                             |                                  |                     | 540                                    |                                        | 582                             |                                  |                     | 5.4                                                                          | 7.8  |
| 600                |                             | 680                             |                                  |                     | 640                                    |                                        | 682                             |                                  |                     | 6.1                                                                          | 8.6  |
| 300                | 150                         | 380                             | 230                              | 170                 | 340                                    | 190                                    | 382                             | 232                              | 5                   | 4.7                                                                          | 6.8  |
| 400                |                             | 480                             |                                  |                     | 440                                    |                                        | 482                             |                                  |                     | 5.5                                                                          | 7.9  |
| 500                |                             | 580                             |                                  |                     | 540                                    |                                        | 582                             |                                  |                     | 6.3                                                                          | 9.1  |
| 600                |                             | 680                             |                                  |                     | 640                                    |                                        | 682                             |                                  |                     | 7.1                                                                          | 10.5 |
| 200                | 200                         | 280                             | 280                              | 220                 | 240                                    | 240                                    | 282                             | 282                              | 5                   | 4.6                                                                          | 7    |
| 300                |                             | 380                             |                                  |                     | 340                                    |                                        | 382                             |                                  |                     | 5.6                                                                          | 8.6  |
| 400                |                             | 480                             |                                  |                     | 440                                    |                                        | 482                             |                                  |                     | 6.6                                                                          | 9.8  |
| 500                |                             | 580                             |                                  |                     | 540                                    |                                        | 582                             |                                  |                     | 7.6                                                                          | 11.5 |
| 600                |                             | 680                             |                                  |                     | 640                                    |                                        | 682                             |                                  |                     | 8.6                                                                          | 12.7 |
| 800                |                             | 880                             |                                  |                     | 840                                    |                                        | 882                             |                                  |                     | 10.5                                                                         | 15.5 |
| 300                | 250                         | 380                             | 330                              | 270                 | 340                                    | 290                                    | 382                             | 332                              | 5                   | 6.6                                                                          | 11.6 |
| 400                |                             | 480                             |                                  |                     | 440                                    |                                        | 482                             |                                  |                     | 7.7                                                                          | 12.6 |
| 500                |                             | 580                             |                                  |                     | 540                                    |                                        | 582                             |                                  |                     | 8.8                                                                          | 15.7 |
| 600                |                             | 680                             |                                  |                     | 640                                    |                                        | 682                             |                                  |                     | 9.9                                                                          | 17.8 |
| 800                |                             | 880                             |                                  |                     | 840                                    |                                        | 882                             |                                  |                     | 11.9                                                                         | 22.1 |
| 300                | 300                         | 380                             | 380                              | 325                 | 340                                    | 340                                    | 382                             | 382                              | 10                  | 8.1                                                                          | 13.3 |
| 400                |                             | 480                             |                                  |                     | 440                                    |                                        | 482                             |                                  |                     | 9.5                                                                          | 15.8 |
| 500                |                             | 580                             |                                  |                     | 540                                    |                                        | 582                             |                                  |                     | 10.5                                                                         | 17.8 |
| 600                |                             | 680                             |                                  |                     | 640                                    |                                        | 682                             |                                  |                     | 13.1                                                                         | 20.3 |
| 800                |                             | 880                             |                                  |                     | 840                                    |                                        | 882                             |                                  |                     | 16                                                                           | 23.8 |
| 1000               |                             | 1080                            |                                  |                     | 1040                                   |                                        | 1082                            |                                  |                     | 19                                                                           | 27.8 |
| 400                | 400                         | 480                             | 480                              | 430                 | 440                                    | 440                                    | 482                             | 482                              | 10                  | 13                                                                           | 20.3 |
| 500                |                             | 580                             |                                  |                     | 540                                    |                                        | 582                             |                                  |                     | 14.8                                                                         | 22.8 |
| 600                |                             | 680                             |                                  |                     | 640                                    |                                        | 682                             |                                  |                     | 16.6                                                                         | 26.3 |
| 800                |                             | 880                             |                                  |                     | 840                                    |                                        | 882                             |                                  |                     | 20.2                                                                         | 30.8 |
| 1000               |                             | 1080                            |                                  |                     | 1040                                   |                                        | 1082                            |                                  |                     | 23.8                                                                         | 35.3 |
| 1200               |                             | 1280                            |                                  |                     | 1240                                   |                                        | 1282                            |                                  |                     | 27.4                                                                         | 40.3 |

## Ventilation systems with pressure controllers (example)



Application example DRFactive: Supply air pressure controller with additional air flow measurement for setpoint specification to extract air flow controller (e.g., if there is no extract air duct and overflow into the false ceiling in the hallway).

## Dimensioning

The pressure setpoint must be designed according to the downstream consumers. A calculation of the air duct network is mandatory.

## Nomenclature, order code

DRFactive /...x.../ S / D / GUAC

(1) (2) (3) (4) (5) (6)

|                                  |           |                                                                  |
|----------------------------------|-----------|------------------------------------------------------------------|
| (1) Series                       | DRFactive | = Rectangular pressure controller with air flow measuring device |
| (2) Measuring principle          |           | = Dynamic                                                        |
|                                  | s         | = Static                                                         |
| (3) Dimensions                   | ...x...   | = Nominal width B x nominal height H [mm] (see page 4)           |
| (4) Design                       | S         | = Steel, galvanized                                              |
|                                  | K         | = Coated                                                         |
| (5) Insulation shell             | D         | = With insulation shell                                          |
|                                  | -         | = Without insulation shell                                       |
| (6) Make/model control component | GUAC      | = 327VMZ-024-05-MB + GUAC-PM3-MB (up to nominal height 250 mm)   |
|                                  |           | = 327VMZ-024-10-MB + GUAC-PM3-MB (from nominal height 300 mm)    |

## Additional ordering information

|           | Please specify when ordering:                                                                                                                                                                                           | Without this information, the following factory settings will be delivered:                                                                                                   |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DRFactive | <ul style="list-style-type: none"> <li>- Air flow feedback signal: Mode 0...10 V or 2...10 V</li> <li>- <math>P_{\min}</math> [Pa]</li> <li>- <math>P_{\max}</math> [Pa]</li> <li>- Modbus or analog control</li> </ul> | <ul style="list-style-type: none"> <li>- Mode 0...10 V</li> <li>- <math>P_{\min} = 0</math> Pa</li> <li>- <math>P_{\max} = 300</math> Pa</li> <li>- Analog control</li> </ul> |

## Ordering example

DRFactive 600x200/S/D/GUAC,  $P_{\min} = 150$  Pa,  $P_{\max} = 300$  Pa, Mode 2...10 V, analog control

## Technical data

|                                    |        |              |
|------------------------------------|--------|--------------|
| Nominal size                       | [mm]   | see page 4   |
| Flow velocity measuring range      | [m/s]  | 1...10       |
| Measurement tolerance at $V_{nom}$ | [%]    | $\pm 5$      |
| Measurement tolerance at $V_{min}$ | [%]    | $\pm 15$     |
| Operating temperature              | °C     | 0...50       |
| Air flow range                     | [m³/h] | 272...17,280 |
| Measuring range                    | [Pa]   | 0...300      |

## Controller components

| Pressure controller series |                                  |                     | DRFactive                                                                                                                     |
|----------------------------|----------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Electrical data            | Controller component type        |                     | GUAC                                                                                                                          |
|                            | Power supply/<br>nominal voltage | 24 V AC             | X                                                                                                                             |
|                            |                                  | 24 V DC             | X                                                                                                                             |
|                            | Power consumption                |                     | 3.6                                                                                                                           |
|                            | Connection                       | Type                | Device connection terminals                                                                                                   |
|                            |                                  | Wires               | Number<br>6 + 4                                                                                                               |
|                            |                                  | Cross section [mm²] | 0.75                                                                                                                          |
|                            | Analog                           | Input               | Setpoint pressure<br>(0) 2...10 V DC / $R_i > (100 \text{ k}\Omega)$ 50 k $\Omega$<br>(0) 4...20 mA / $R_{ext.} = 500 \Omega$ |
|                            |                                  | Outputs             | Actual value pressure<br>(0) 2...10 V DC, max. 0.5 mA                                                                         |
|                            |                                  |                     | Actual value air flow<br>0 (2)...10 V DC,<br>max. 0.5 mA                                                                      |
|                            | Digital                          | Input               | Setpoint pressure<br>X                                                                                                        |
|                            |                                  | Outputs             | Actual value pressure<br>X (Modbus RTU)                                                                                       |
|                            |                                  |                     | Actual value air flow<br>X (Modbus RTU)                                                                                       |
|                            |                                  |                     | Damper position<br>X (Modbus RTU)                                                                                             |
| Parameterization           | Pressure controller              | on the unit         | Function rotary switch<br>X                                                                                                   |
|                            |                                  | via tool            | Software<br>X                                                                                                                 |
|                            |                                  |                     | Adjustment device<br>X                                                                                                        |
|                            |                                  | Parameters          | Setpoints<br>X                                                                                                                |
|                            |                                  |                     | Control loop (P/I component)<br>X                                                                                             |
|                            | Air flow transducer              | via tool            | Software<br>X                                                                                                                 |
|                            |                                  |                     | Adjustment device<br>X                                                                                                        |
|                            |                                  | Parameters          | Mode 0 / 2...10 V<br>X                                                                                                        |

## Controller components

| Pressure controller series     |                                                        |           |                           | DRFactive                        |
|--------------------------------|--------------------------------------------------------|-----------|---------------------------|----------------------------------|
|                                | COntroller component type                              |           |                           | GUAC                             |
| Function/Operation             | Pressure control                                       | Setpoints | Stages                    | 2                                |
|                                |                                                        |           | variable                  | -                                |
|                                | Shut off damper                                        |           | Contact input             | X                                |
|                                |                                                        |           | Setpoint 0 Pa             | X                                |
|                                | Actual value                                           | Display   | Pressure                  | X                                |
|                                |                                                        | Feedback  | Pressure                  | Analog & Modbus RTU              |
|                                |                                                        |           | Air flow                  | Analog & Modbus RTU              |
| Damper position                |                                                        |           | Modbus RTU                |                                  |
| Pressure sensor/<br>controller | Measuring range                                        |           | [ Pa]                     | 0...300                          |
|                                | Measuring principle                                    |           |                           | static                           |
|                                | Altitude and hose length correction required           |           |                           | no                               |
|                                | Hose inner diameter                                    |           | [ mm]                     | 4...5                            |
| Drive                          | Torque                                                 |           | up to H = 250 mm [ Nm]    | 5                                |
|                                |                                                        |           | from H = 300 mm [ Nm]     | 10                               |
|                                | Running time                                           |           | up to H = 250 mm [ s/90°] | 100                              |
|                                |                                                        |           | from H = 300 mm [ s/90°]  | 150                              |
|                                | Manual adjustment: Gear disengagement with push button |           |                           | X                                |
| Air flow transducer            | Measuring range                                        |           | [ m/s]                    | 1...10                           |
|                                | Measuring principle                                    |           |                           | dynamic                          |
|                                | Position dependency, zero point adjustment required    |           |                           | no                               |
|                                | Measurement deviation from setpoint                    |           | [ % v. V <sub>nom</sub> ] | ± 5                              |
|                                |                                                        |           | [ % v. V <sub>min</sub> ] | ± 15                             |
| Safety                         | Protection class                                       |           | IP                        | 54                               |
|                                | Ambient temperature                                    |           |                           | 0...+50 °C                       |
|                                | Storage temperature                                    |           |                           | -20...+80 °C                     |
|                                | Ambient humidity                                       |           |                           | 5...95 % r. F.<br>non-condensing |
|                                | Degree of contamination in the environment             |           | (EN 60730-1)              | 3                                |

## Airborne sound transmission without silencer

| Nominal width B [mm] | Nominal height H [mm] | Flow velocity [m/s] | $\Delta p_{\text{total}} = 100 \text{ Pa}$ |     |     |     |    |    |    |    |                  |                  | $\Delta p_{\text{total}} = 200 \text{ Pa}$ |     |     |     |    |    |    |    |                  |                  | $\Delta p_{\text{total}} = 500 \text{ Pa}$ |     |     |     |    |    |    |    |                  |                  |
|----------------------|-----------------------|---------------------|--------------------------------------------|-----|-----|-----|----|----|----|----|------------------|------------------|--------------------------------------------|-----|-----|-----|----|----|----|----|------------------|------------------|--------------------------------------------|-----|-----|-----|----|----|----|----|------------------|------------------|
|                      |                       |                     | $f_m$ [Hz]                                 |     |     |     |    |    |    |    | Total            |                  | $f_m$ [Hz]                                 |     |     |     |    |    |    |    | Total            |                  | $f_m$ [Hz]                                 |     |     |     |    |    |    |    | Total            |                  |
|                      |                       |                     | 63                                         | 125 | 250 | 500 | 1K | 2K | 4K | 8K | $L_{WA}$ [dB(A)] | $L_{pA}$ [dB(A)] | 63                                         | 125 | 250 | 500 | 1K | 2K | 4K | 8K | $L_{WA}$ [dB(A)] | $L_{pA}$ [dB(A)] | 63                                         | 125 | 250 | 500 | 1K | 2K | 4K | 8K | $L_{WA}$ [dB(A)] | $L_{pA}$ [dB(A)] |
|                      |                       |                     | $L_W$ [dB/Okt]                             |     |     |     |    |    |    |    |                  |                  | $L_W$ [dB/Okt]                             |     |     |     |    |    |    |    |                  |                  | $L_W$ [dB/Okt]                             |     |     |     |    |    |    |    |                  |                  |
| 300                  | 100                   | 1                   | 31                                         | 31  | 40  | 43  | 40 | 33 | 31 | 29 | 44               | 37               | 36                                         | 34  | 42  | 47  | 46 | 42 | 38 | 37 | 50               | 42               | 39                                         | 46  | 45  | 49  | 51 | 50 | 48 | 47 | 56               | 48               |
|                      |                       | 2                   | 37                                         | 38  | 45  | 41  | 42 | 39 | 34 | 31 | 46               | 38               | 39                                         | 39  | 49  | 50  | 48 | 46 | 43 | 40 | 53               | 45               | 43                                         | 43  | 49  | 55  | 55 | 54 | 52 | 52 | 61               | 53               |
|                      |                       | 4                   | 41                                         | 45  | 46  | 42  | 43 | 40 | 38 | 33 | 47               | 40               | 42                                         | 45  | 51  | 49  | 49 | 49 | 46 | 42 | 55               | 47               | 44                                         | 45  | 53  | 57  | 60 | 56 | 56 | 54 | 64               | 56               |
|                      |                       | 7                   | 56                                         | 58  | 55  | 50  | 48 | 45 | 43 | 38 | 54               | 45               | 52                                         | 55  | 59  | 54  | 53 | 51 | 52 | 52 | 59               | 51               | 51                                         | 53  | 60  | 61  | 59 | 60 | 59 | 67 | 58               |                  |
|                      |                       | 10                  | 59                                         | 60  | 59  | 55  | 55 | 53 | 47 | 41 | 60               | 49               | 61                                         | 63  | 62  | 61  | 60 | 57 | 53 | 51 | 65               | 54               | 56                                         | 59  | 66  | 62  | 63 | 60 | 61 | 60 | 68               | 58               |
| 400                  | 150                   | 1                   | 42                                         | 43  | 46  | 48  | 45 | 43 | 36 | 38 | 50               | 42               | 47                                         | 46  | 50  | 52  | 51 | 50 | 44 | 42 | 56               | 48               | 48                                         | 49  | 55  | 59  | 58 | 58 | 60 | 56 | 65               | 58               |
|                      |                       | 2                   | 46                                         | 50  | 50  | 47  | 45 | 47 | 39 | 39 | 52               | 44               | 49                                         | 51  | 57  | 56  | 52 | 53 | 58 | 49 | 62               | 54               | 54                                         | 55  | 59  | 62  | 61 | 61 | 67 | 60 | 70               | 62               |
|                      |                       | 4                   | 54                                         | 56  | 54  | 51  | 49 | 48 | 43 | 40 | 55               | 45               | 57                                         | 61  | 63  | 58  | 54 | 54 | 59 | 52 | 63               | 54               | 62                                         | 63  | 67  | 70  | 63 | 61 | 63 | 68 | 72               | 63               |
|                      |                       | 7                   | 60                                         | 60  | 58  | 54  | 52 | 49 | 45 | 42 | 57               | 46               | 64                                         | 66  | 66  | 61  | 58 | 56 | 58 | 53 | 65               | 53               | 69                                         | 70  | 74  | 72  | 66 | 64 | 64 | 70 | 75               | 63               |
|                      |                       | 10                  | 65                                         | 64  | 62  | 58  | 57 | 52 | 48 | 45 | 61               | 48               | 72                                         | 70  | 69  | 64  | 61 | 58 | 56 | 54 | 67               | 53               | 74                                         | 76  | 78  | 75  | 68 | 66 | 66 | 72 | 77               | 64               |
| 600                  | 200                   | 1                   | 48                                         | 47  | 47  | 49  | 53 | 53 | 40 | 39 | 57               | 49               | 51                                         | 48  | 57  | 55  | 54 | 65 | 49 | 62 | 67               | 59               | 56                                         | 52  | 61  | 63  | 61 | 69 | 55 | 55 | 71               | 63               |
|                      |                       | 2                   | 55                                         | 47  | 51  | 54  | 53 | 57 | 46 | 41 | 60               | 50               | 61                                         | 50  | 57  | 56  | 56 | 60 | 52 | 63 | 64               | 54               | 60                                         | 51  | 59  | 65  | 63 | 67 | 68 | 59 | 72               | 63               |
|                      |                       | 4                   | 60                                         | 51  | 54  | 53  | 54 | 55 | 47 | 40 | 59               | 46               | 66                                         | 58  | 59  | 61  | 59 | 60 | 53 | 65 | 65               | 53               | 70                                         | 61  | 64  | 66  | 66 | 67 | 68 | 63 | 73               | 61               |
|                      |                       | 7                   | 61                                         | 60  | 58  | 56  | 54 | 55 | 48 | 44 | 60               | 45               | 70                                         | 62  | 61  | 63  | 60 | 61 | 54 | 67 | 67               | 53               | 78                                         | 71  | 71  | 71  | 71 | 69 | 69 | 66 | 76               | 62               |
|                      |                       | 10                  | 63                                         | 59  | 57  | 58  | 54 | 51 | 48 | 45 | 60               | 43               | 77                                         | 66  | 64  | 64  | 61 | 62 | 58 | 55 | 68               | 51               | 80                                         | 75  | 74  | 73  | 71 | 69 | 68 | 69 | 77               | 60               |
| 600                  | 250                   | 1                   | 49                                         | 48  | 51  | 50  | 55 | 53 | 40 | 39 | 58               | 50               | 52                                         | 50  | 57  | 56  | 56 | 65 | 49 | 45 | 67               | 59               | 57                                         | 53  | 62  | 64  | 62 | 69 | 58 | 56 | 72               | 64               |
|                      |                       | 2                   | 55                                         | 49  | 52  | 55  | 55 | 56 | 45 | 41 | 60               | 49               | 56                                         | 52  | 57  | 58  | 58 | 61 | 55 | 47 | 65               | 54               | 61                                         | 54  | 62  | 67  | 65 | 69 | 67 | 59 | 74               | 63               |
|                      |                       | 4                   | 59                                         | 52  | 54  | 55  | 55 | 55 | 47 | 44 | 60               | 46               | 64                                         | 59  | 61  | 63  | 61 | 60 | 57 | 52 | 66               | 53               | 70                                         | 63  | 65  | 67  | 68 | 69 | 68 | 62 | 75               | 61               |
|                      |                       | 7                   | 63                                         | 61  | 58  | 57  | 55 | 55 | 49 | 45 | 61               | 45               | 71                                         | 64  | 63  | 64  | 62 | 62 | 60 | 59 | 68               | 53               | 79                                         | 72  | 72  | 72  | 70 | 69 | 67 | 77 | 61               |                  |
|                      |                       | 10                  | 65                                         | 62  | 59  | 59  | 56 | 53 | 51 | 49 | 61               | 44               | 77                                         | 68  | 66  | 65  | 63 | 62 | 58 | 57 | 69               | 51               | 82                                         | 77  | 75  | 73  | 73 | 70 | 69 | 69 | 78               | 60               |
| 600                  | 300                   | 1                   | 51                                         | 48  | 52  | 52  | 57 | 53 | 40 | 39 | 49               | 51               | 53                                         | 51  | 58  | 57  | 59 | 65 | 50 | 45 | 67               | 58               | 58                                         | 55  | 63  | 66  | 64 | 70 | 60 | 57 | 73               | 64               |
|                      |                       | 2                   | 55                                         | 50  | 54  | 57  | 56 | 55 | 44 | 41 | 46               | 49               | 57                                         | 53  | 57  | 60  | 61 | 61 | 54 | 48 | 66               | 54               | 62                                         | 57  | 64  | 68  | 67 | 71 | 66 | 59 | 75               | 63               |
|                      |                       | 4                   | 58                                         | 53  | 57  | 57  | 56 | 55 | 47 | 47 | 45               | 46               | 65                                         | 60  | 62  | 64  | 62 | 61 | 56 | 51 | 67               | 52               | 70                                         | 64  | 65  | 68  | 71 | 71 | 68 | 62 | 76               | 61               |
|                      |                       | 7                   | 64                                         | 62  | 60  | 59  | 57 | 56 | 50 | 46 | 44               | 46               | 71                                         | 65  | 64  | 65  | 63 | 62 | 60 | 59 | 69               | 52               | 79                                         | 73  | 72  | 73  | 74 | 71 | 69 | 67 | 78               | 61               |
|                      |                       | 10                  | 68                                         | 65  | 61  | 60  | 57 | 54 | 53 | 52 | 63               | 44               | 77                                         | 70  | 67  | 67  | 64 | 63 | 59 | 58 | 70               | 51               | 83                                         | 78  | 75  | 74  | 74 | 71 | 70 | 69 | 79               | 60               |
| 800                  | 400                   | 1                   | 55                                         | 50  | 53  | 56  | 61 | 53 | 42 | 40 | 62               | 52               | 54                                         | 55  | 60  | 59  | 65 | 65 | 52 | 47 | 69               | 58               | 60                                         | 59  | 66  | 70  | 68 | 72 | 66 | 61 | 76               | 67               |
|                      |                       | 2                   | 57                                         | 53  | 59  | 60  | 59 | 55 | 43 | 42 | 63               | 49               | 60                                         | 57  | 59  | 65  | 67 | 64 | 53 | 49 | 70               | 56               | 65                                         | 63  | 69  | 72  | 72 | 77 | 64 | 60 | 80               | 68               |
|                      |                       | 4                   | 57                                         | 57  | 62  | 61  | 58 | 56 | 48 | 55 | 64               | 47               | 67                                         | 63  | 65  | 69  | 67 | 62 | 55 | 52 | 71               | 54               | 72                                         | 68  | 67  | 71  | 76 | 76 | 69 | 62 | 81               | 65               |
|                      |                       | 7                   | 67                                         | 65  | 64  | 63  | 61 | 59 | 54 | 49 | 66               | 46               | 73                                         | 69  | 67  | 68  | 67 | 65 | 61 | 60 | 72               | 52               | 82                                         | 76  | 74  | 76  | 78 | 74 | 70 | 69 | 81               | 65               |
|                      |                       | 10                  | 73                                         | 72  | 66  | 63  | 61 | 58 | 58 | 60 | 67               | 47               | 78                                         | 74  | 70  | 70  | 69 | 65 | 61 | 61 | 73               | 53               | 86                                         | 81  | 77  | 75  | 77 | 74 | 72 | 70 | 81               | 62               |

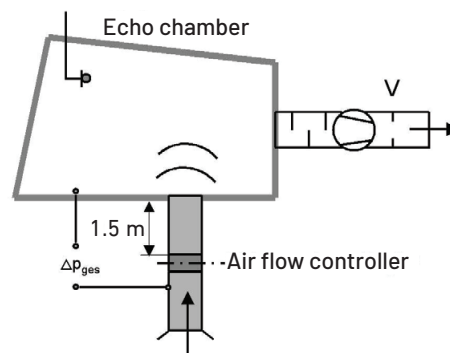
$\Delta p_{\text{total}}$  - Total pressure difference  
 $f_m$  - Center frequency of the octave bands  
 $L_W$  - Sound power level  
 $L_{WA}$  - Sound power level, A-weighted  
 $L_{pA}$  - Sound pressure level, A-weighted

Conversion to other sizes is carried out at the same choke point from flow velocity and pressure loss using the  $\Delta L$  values in the following table. The values refer to the respective nominal height H.

$$L_{W \text{ Oct}} = L_W \text{ Table} + \Delta L \quad L_{WA} = L_{WA} \text{ Table} + \Delta L$$

## Airborne sound transmission without silencer

| Nominal width B<br>[mm] | Nominal height H<br>[mm] |     |     |     |     |     |
|-------------------------|--------------------------|-----|-----|-----|-----|-----|
|                         | 100                      | 150 | 200 | 250 | 300 | 400 |
| 200                     | -2                       |     | -5  |     |     |     |
| 300                     | 0                        | -1  | -3  | -3  | -3  |     |
| 400                     | 1                        | 0   | -2  | -2  | -2  | -3  |
| 500                     | 2                        | 1   | -1  | -1  | -1  | -2  |
| 600                     | 3                        | 2   | 0   | 0   | 0   | -1  |
| 800                     |                          |     | 1   | 1   | 1   | 0   |
| 1000                    |                          |     |     | 2   | 2   | 1   |
| 1200                    |                          |     |     |     | 3   | 2   |



## Airborne sound transmission with silencer

| Nominal width B [mm] | Nominal height H [mm] | Flow velocity [m/s] | $\Delta p_{\text{total}} = 100 \text{ Pa}$ |     |     |     |     |     |     |     |                  |                  | $\Delta p_{\text{total}} = 200 \text{ Pa}$ |     |     |     |     |     |     |     |                  |                  | $\Delta p_{\text{total}} = 500 \text{ Pa}$ |     |     |     |     |     |     |     |                  |                  |
|----------------------|-----------------------|---------------------|--------------------------------------------|-----|-----|-----|-----|-----|-----|-----|------------------|------------------|--------------------------------------------|-----|-----|-----|-----|-----|-----|-----|------------------|------------------|--------------------------------------------|-----|-----|-----|-----|-----|-----|-----|------------------|------------------|
|                      |                       |                     | $f_m$ [Hz]                                 |     |     |     |     |     |     |     | Total            |                  | $f_m$ [Hz]                                 |     |     |     |     |     |     |     | Total            |                  | $f_m$ [Hz]                                 |     |     |     |     |     |     |     | Total            |                  |
|                      |                       |                     | 63                                         | 125 | 250 | 500 | 1 K | 2 K | 4 K | 8 K | $L_{WA}$ [dB(A)] | $L_{pA}$ [dB(A)] | 63                                         | 125 | 250 | 500 | 1 K | 2 K | 4 K | 8 K | $L_{WA}$ [dB(A)] | $L_{pA}$ [dB(A)] | 63                                         | 125 | 250 | 500 | 1 K | 2 K | 4 K | 8 K | $L_{WA}$ [dB(A)] | $L_{pA}$ [dB(A)] |
|                      |                       |                     | $L_W$ [dB/Okt]                             |     |     |     |     |     |     |     |                  |                  | $L_W$ [dB/Okt]                             |     |     |     |     |     |     |     |                  |                  | $L_W$ [dB/Okt]                             |     |     |     |     |     |     |     |                  |                  |
| 300                  | 100                   | 1                   | 29                                         | 27  | 32  | 26  | 7   | 1   | 13  | 15  | 27               | 19               | 34                                         | 30  | 34  | 30  | 13  | 10  | 20  | 23  | 31               | 23               | 37                                         | 42  | 37  | 32  | 18  | 18  | 30  | 33  | 37               | 29               |
|                      |                       | 2                   | 35                                         | 34  | 37  | 24  | 9   | 7   | 16  | 17  | 30               | 22               | 37                                         | 35  | 41  | 33  | 15  | 14  | 25  | 26  | 36               | 28               | 41                                         | 39  | 41  | 38  | 22  | 22  | 34  | 38  | 41               | 33               |
|                      |                       | 4                   | 39                                         | 41  | 38  | 25  | 10  | 8   | 20  | 19  | 32               | 24               | 40                                         | 41  | 43  | 32  | 16  | 17  | 28  | 28  | 37               | 29               | 42                                         | 41  | 45  | 40  | 27  | 24  | 38  | 40  | 44               | 36               |
|                      |                       | 7                   | 54                                         | 54  | 47  | 33  | 15  | 13  | 25  | 24  | 42               | 32               | 50                                         | 51  | 51  | 37  | 20  | 19  | 34  | 38  | 45               | 36               | 49                                         | 49  | 52  | 43  | 28  | 27  | 42  | 45  | 49               | 40               |
|                      |                       | 10                  | 57                                         | 56  | 51  | 38  | 22  | 21  | 29  | 27  | 45               | 34               | 59                                         | 59  | 54  | 44  | 27  | 25  | 35  | 37  | 49               | 38               | 54                                         | 55  | 58  | 45  | 30  | 28  | 43  | 46  | 52               | 41               |
| 400                  | 150                   | 1                   | 40                                         | 39  | 38  | 31  | 12  | 11  | 18  | 24  | 33               | 25               | 45                                         | 42  | 42  | 35  | 18  | 18  | 26  | 28  | 37               | 29               | 46                                         | 45  | 47  | 42  | 25  | 26  | 42  | 42  | 47               | 39               |
|                      |                       | 2                   | 44                                         | 46  | 42  | 30  | 12  | 15  | 21  | 25  | 36               | 28               | 47                                         | 47  | 49  | 39  | 19  | 21  | 40  | 35  | 45               | 37               | 52                                         | 51  | 51  | 45  | 28  | 29  | 49  | 46  | 52               | 44               |
|                      |                       | 4                   | 52                                         | 52  | 46  | 34  | 16  | 16  | 25  | 26  | 41               | 30               | 55                                         | 57  | 55  | 41  | 21  | 22  | 41  | 38  | 49               | 39               | 60                                         | 59  | 59  | 53  | 30  | 29  | 45  | 54  | 57               | 47               |
|                      |                       | 7                   | 58                                         | 56  | 50  | 37  | 19  | 17  | 27  | 28  | 45               | 32               | 62                                         | 62  | 58  | 44  | 25  | 24  | 40  | 39  | 52               | 40               | 67                                         | 66  | 66  | 55  | 33  | 32  | 46  | 56  | 61               | 49               |
|                      |                       | 10                  | 63                                         | 60  | 54  | 41  | 24  | 20  | 30  | 31  | 49               | 34               | 70                                         | 66  | 61  | 47  | 28  | 26  | 38  | 40  | 55               | 41               | 72                                         | 72  | 70  | 58  | 35  | 34  | 48  | 58  | 64               | 50               |
| 600                  | 200                   | 1                   | 46                                         | 43  | 43  | 32  | 20  | 21  | 22  | 25  | 37               | 29               | 50                                         | 44  | 49  | 38  | 21  | 33  | 30  | 30  | 43               | 35               | 54                                         | 48  | 53  | 46  | 28  | 37  | 37  | 41  | 49               | 41               |
|                      |                       | 2                   | 53                                         | 43  | 42  | 37  | 20  | 25  | 28  | 27  | 39               | 29               | 53                                         | 46  | 49  | 39  | 23  | 28  | 38  | 33  | 44               | 34               | 58                                         | 47  | 51  | 48  | 30  | 35  | 50  | 45  | 53               | 43               |
|                      |                       | 4                   | 58                                         | 47  | 44  | 36  | 21  | 23  | 29  | 26  | 40               | 26               | 62                                         | 54  | 51  | 44  | 26  | 28  | 39  | 38  | 47               | 34               | 68                                         | 57  | 56  | 49  | 33  | 35  | 50  | 49  | 55               | 42               |
|                      |                       | 7                   | 59                                         | 56  | 49  | 39  | 21  | 23  | 30  | 30  | 45               | 29               | 68                                         | 58  | 53  | 46  | 27  | 29  | 42  | 44  | 51               | 35               | 76                                         | 67  | 63  | 54  | 38  | 37  | 51  | 52  | 60               | 44               |
|                      |                       | 10                  | 61                                         | 55  | 49  | 41  | 21  | 19  | 30  | 31  | 45               | 27               | 75                                         | 62  | 56  | 47  | 28  | 30  | 40  | 41  | 53               | 35               | 78                                         | 71  | 66  | 56  | 38  | 37  | 50  | 55  | 62               | 44               |
| 600                  | 250                   | 1                   | 47                                         | 44  | 43  | 33  | 22  | 21  | 22  | 25  | 37               | 29               | 50                                         | 46  | 49  | 39  | 23  | 33  | 31  | 31  | 43               | 35               | 55                                         | 49  | 54  | 47  | 29  | 37  | 40  | 42  | 50               | 42               |
|                      |                       | 2                   | 53                                         | 45  | 44  | 38  | 22  | 24  | 27  | 27  | 40               | 29               | 54                                         | 48  | 49  | 41  | 25  | 29  | 37  | 33  | 45               | 34               | 59                                         | 50  | 54  | 50  | 32  | 37  | 49  | 45  | 53               | 43               |
|                      |                       | 4                   | 57                                         | 48  | 46  | 38  | 22  | 23  | 29  | 30  | 41               | 27               | 62                                         | 55  | 53  | 46  | 28  | 28  | 39  | 38  | 49               | 35               | 68                                         | 59  | 57  | 50  | 35  | 37  | 50  | 48  | 55               | 41               |
|                      |                       | 7                   | 61                                         | 57  | 50  | 40  | 22  | 23  | 31  | 31  | 46               | 29               | 69                                         | 60  | 55  | 47  | 29  | 30  | 42  | 45  | 52               | 35               | 77                                         | 68  | 64  | 55  | 39  | 38  | 51  | 53  | 60               | 44               |
|                      |                       | 10                  | 63                                         | 58  | 51  | 42  | 23  | 21  | 33  | 35  | 47               | 28               | 75                                         | 64  | 58  | 48  | 30  | 30  | 40  | 43  | 55               | 35               | 80                                         | 73  | 67  | 56  | 40  | 38  | 51  | 55  | 63               | 44               |
| 600                  | 300                   | 1                   | 49                                         | 44  | 44  | 35  | 24  | 21  | 22  | 25  | 38               | 29               | 51                                         | 47  | 50  | 40  | 26  | 33  | 32  | 31  | 44               | 35               | 56                                         | 51  | 55  | 49  | 31  | 38  | 42  | 43  | 51               | 42               |
|                      |                       | 2                   | 53                                         | 46  | 46  | 40  | 23  | 23  | 26  | 27  | 41               | 29               | 55                                         | 49  | 49  | 43  | 28  | 29  | 36  | 34  | 45               | 33               | 60                                         | 53  | 56  | 51  | 34  | 39  | 48  | 45  | 54               | 42               |
|                      |                       | 4                   | 56                                         | 49  | 49  | 40  | 23  | 23  | 29  | 33  | 43               | 28               | 63                                         | 56  | 54  | 47  | 29  | 29  | 38  | 37  | 49               | 34               | 68                                         | 60  | 57  | 51  | 38  | 39  | 50  | 48  | 56               | 41               |
|                      |                       | 7                   | 62                                         | 58  | 52  | 42  | 24  | 24  | 32  | 32  | 47               | 30               | 69                                         | 61  | 56  | 48  | 30  | 30  | 42  | 45  | 53               | 35               | 77                                         | 69  | 64  | 56  | 41  | 39  | 51  | 53  | 61               | 43               |
|                      |                       | 10                  | 66                                         | 61  | 53  | 43  | 24  | 22  | 35  | 38  | 49               | 29               | 75                                         | 66  | 59  | 50  | 31  | 31  | 41  | 44  | 56               | 36               | 81                                         | 74  | 67  | 57  | 41  | 39  | 52  | 55  | 64               | 44               |
| 800                  | 400                   | 1                   | 53                                         | 46  | 45  | 39  | 28  | 21  | 24  | 26  | 40               | 30               | 52                                         | 51  | 52  | 42  | 32  | 33  | 34  | 33  | 46               | 35               | 58                                         | 55  | 58  | 53  | 35  | 40  | 48  | 47  | 55               | 44               |
|                      |                       | 2                   | 55                                         | 49  | 51  | 43  | 26  | 23  | 25  | 28  | 45               | 31               | 58                                         | 53  | 51  | 48  | 34  | 32  | 35  | 35  | 48               | 34               | 63                                         | 59  | 61  | 55  | 39  | 45  | 46  | 46  | 57               | 43               |
|                      |                       | 4                   | 55                                         | 53  | 54  | 44  | 25  | 24  | 30  | 41  | 48               | 31               | 65                                         | 59  | 57  | 52  | 34  | 30  | 37  | 38  | 53               | 36               | 70                                         | 64  | 59  | 54  | 43  | 44  | 51  | 48  | 58               | 41               |
|                      |                       | 7                   | 65                                         | 61  | 56  | 46  | 28  | 27  | 36  | 35  | 51               | 30               | 71                                         | 65  | 59  | 51  | 34  | 33  | 43  | 46  | 55               | 35               | 80                                         | 72  | 66  | 59  | 45  | 42  | 52  | 55  | 63               | 43               |
|                      |                       | 10                  | 71                                         | 68  | 58  | 46  | 28  | 26  | 40  | 46  | 55               | 33               | 76                                         | 70  | 62  | 53  | 36  | 33  | 43  | 47  | 59               | 37               | 84                                         | 77  | 69  | 58  | 44  | 42  | 54  | 56  | 66               | 44               |

 $\Delta p_{\text{total}}$  - Total pressure difference

 $f_m$  - Center frequency of the octave bands

 $L_W$  - Sound power level

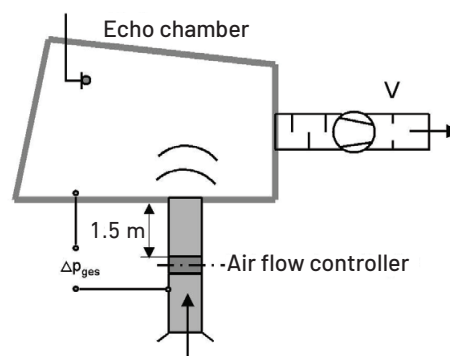
 $L_{WA}$  - Sound power level, A-weighted

 $L_{pA}$  - Sound pressure level, A-weighted

The values used for attenuation apply to an active silencer length of 1000 mm. Conversion to other sizes is carried out at the same throttling point from flow velocity and pressure loss using the  $\Delta L$  values in the following table. The values refer to the respective nominal height H.  $L_{W \text{ Oct}} = L_W \text{ Table} + \Delta L$      $L_{WA} = L_{WA \text{ Table}} + \Delta L$

## Airborne sound transmission without silencer

| Nominal width B<br>[mm] | Nominal height H<br>[mm] |     |     |     |     |     |
|-------------------------|--------------------------|-----|-----|-----|-----|-----|
|                         | 100                      | 150 | 200 | 250 | 300 | 400 |
| 200                     | -2                       |     | -5  |     |     |     |
| 300                     | 0                        | -1  | -3  | -3  | -3  |     |
| 400                     | 1                        | 0   | -2  | -2  | -2  | -3  |
| 500                     | 2                        | 1   | -1  | -1  | -1  | -2  |
| 600                     | 3                        | 2   | 0   | 0   | 0   | -1  |
| 800                     |                          |     | 1   | 1   | 1   | 0   |
| 1000                    |                          |     |     | 2   | 2   | 1   |
| 1200                    |                          |     |     |     | 3   | 2   |



## Structure-borne sound emission without insulation shell

| Nominal width B [mm] | Nominal height H [mm] | Flow velocity [m/s] | $\Delta p_{\text{total}} = 100 \text{ Pa}$ |     |     |     |     |     |     |     |                  |                  | $\Delta p_{\text{total}} = 200 \text{ Pa}$ |     |     |     |     |     |     |     |                  |                  | $\Delta p_{\text{total}} = 500 \text{ Pa}$ |     |     |     |     |     |     |     |                  |                  |
|----------------------|-----------------------|---------------------|--------------------------------------------|-----|-----|-----|-----|-----|-----|-----|------------------|------------------|--------------------------------------------|-----|-----|-----|-----|-----|-----|-----|------------------|------------------|--------------------------------------------|-----|-----|-----|-----|-----|-----|-----|------------------|------------------|
|                      |                       |                     | $f_m$ [Hz]                                 |     |     |     |     |     |     |     | Total            |                  | $f_m$ [Hz]                                 |     |     |     |     |     |     |     | Total            |                  | $f_m$ [Hz]                                 |     |     |     |     |     |     |     | Total            |                  |
|                      |                       |                     | 63                                         | 125 | 250 | 500 | 1 K | 2 K | 4 K | 8 K | $L_{WA}$ [dB(A)] | $L_{pA}$ [dB(A)] | 63                                         | 125 | 250 | 500 | 1 K | 2 K | 4 K | 8 K | $L_{WA}$ [dB(A)] | $L_{pA}$ [dB(A)] | 63                                         | 125 | 250 | 500 | 1 K | 2 K | 4 K | 8 K | $L_{WA}$ [dB(A)] | $L_{pA}$ [dB(A)] |
|                      |                       |                     | $L_W$ [dB/Okt]                             |     |     |     |     |     |     |     |                  |                  | $L_W$ [dB/Okt]                             |     |     |     |     |     |     |     |                  |                  | $L_W$ [dB/Okt]                             |     |     |     |     |     |     |     |                  |                  |
| 300                  | 100                   | 2                   | 46                                         | 45  | 44  | 32  | 33  | 28  | 24  | 24  | 39               | 30               | 48                                         | 46  | 48  | 41  | 39  | 36  | 33  | 33  | 45               | 36               | 52                                         | 51  | 48  | 46  | 46  | 44  | 42  | 45  | 52               | 43               |
|                      |                       | 4                   | 51                                         | 52  | 45  | 33  | 33  | 30  | 28  | 26  | 42               | 32               | 52                                         | 52  | 50  | 40  | 40  | 38  | 36  | 36  | 47               | 38               | 53                                         | 52  | 52  | 48  | 50  | 46  | 46  | 47  | 55               | 46               |
|                      |                       | 7                   | 65                                         | 65  | 54  | 41  | 39  | 35  | 33  | 31  | 52               | 43               | 61                                         | 62  | 57  | 45  | 44  | 41  | 42  | 45  | 53               | 44               | 60                                         | 60  | 59  | 51  | 52  | 49  | 50  | 52  | 58               | 50               |
|                      |                       | 10                  | 69                                         | 67  | 58  | 46  | 46  | 43  | 37  | 34  | 55               | 46               | 71                                         | 70  | 61  | 52  | 51  | 47  | 43  | 44  | 59               | 50               | 65                                         | 67  | 64  | 53  | 54  | 50  | 51  | 53  | 61               | 52               |
|                      |                       | 1                   | 47                                         | 46  | 42  | 38  | 35  | 32  | 26  | 31  | 41               | 32               | 52                                         | 49  | 46  | 42  | 41  | 40  | 34  | 35  | 47               | 38               | 53                                         | 53  | 50  | 49  | 48  | 47  | 50  | 49  | 56               | 47               |
| 400                  | 150                   | 2                   | 51                                         | 54  | 46  | 37  | 35  | 37  | 29  | 32  | 44               | 35               | 54                                         | 55  | 53  | 46  | 42  | 43  | 48  | 42  | 53               | 44               | 59                                         | 59  | 55  | 52  | 52  | 51  | 57  | 53  | 61               | 52               |
|                      |                       | 4                   | 59                                         | 60  | 50  | 41  | 39  | 37  | 33  | 33  | 48               | 39               | 62                                         | 65  | 59  | 48  | 45  | 44  | 49  | 45  | 56               | 47               | 67                                         | 66  | 63  | 59  | 53  | 51  | 53  | 61  | 64               | 55               |
|                      |                       | 7                   | 65                                         | 64  | 54  | 44  | 43  | 38  | 34  | 35  | 52               | 43               | 69                                         | 69  | 62  | 51  | 48  | 46  | 48  | 46  | 59               | 50               | 74                                         | 74  | 70  | 62  | 56  | 54  | 54  | 63  | 67               | 58               |
|                      |                       | 10                  | 70                                         | 68  | 58  | 48  | 47  | 42  | 38  | 38  | 56               | 47               | 77                                         | 73  | 65  | 54  | 51  | 48  | 46  | 47  | 62               | 53               | 79                                         | 79  | 74  | 65  | 59  | 56  | 56  | 65  | 71               | 62               |
|                      |                       | 1                   | 51                                         | 49  | 46  | 38  | 44  | 43  | 30  | 32  | 48               | 39               | 56                                         | 51  | 52  | 45  | 44  | 55  | 38  | 37  | 57               | 48               | 60                                         | 54  | 56  | 52  | 51  | 59  | 45  | 48  | 61               | 52               |
| 600                  | 200                   | 2                   | 59                                         | 50  | 46  | 43  | 44  | 47  | 36  | 34  | 50               | 42               | 59                                         | 52  | 52  | 45  | 46  | 50  | 46  | 40  | 54               | 45               | 64                                         | 54  | 55  | 55  | 53  | 56  | 57  | 52  | 63               | 53               |
|                      |                       | 4                   | 64                                         | 53  | 48  | 43  | 44  | 45  | 37  | 33  | 50               | 41               | 67                                         | 60  | 55  | 50  | 49  | 49  | 47  | 45  | 56               | 47               | 74                                         | 64  | 59  | 56  | 56  | 56  | 57  | 56  | 64               | 55               |
|                      |                       | 7                   | 65                                         | 63  | 52  | 45  | 44  | 44  | 38  | 37  | 52               | 43               | 74                                         | 65  | 57  | 52  | 51  | 50  | 50  | 51  | 59               | 50               | 82                                         | 73  | 67  | 61  | 61  | 59  | 58  | 59  | 68               | 59               |
|                      |                       | 10                  | 67                                         | 62  | 52  | 47  | 45  | 41  | 38  | 38  | 52               | 43               | 81                                         | 69  | 60  | 54  | 51  | 51  | 47  | 48  | 61               | 52               | 84                                         | 78  | 69  | 63  | 62  | 59  | 58  | 62  | 69               | 60               |
|                      |                       | 1                   | 52                                         | 49  | 46  | 40  | 46  | 43  | 30  | 32  | 49               | 40               | 55                                         | 51  | 52  | 45  | 47  | 55  | 39  | 38  | 57               | 48               | 60                                         | 55  | 57  | 54  | 53  | 59  | 48  | 50  | 62               | 53               |
| 600                  | 250                   | 2                   | 58                                         | 50  | 47  | 45  | 45  | 46  | 35  | 34  | 51               | 42               | 59                                         | 53  | 52  | 47  | 49  | 51  | 45  | 41  | 55               | 46               | 64                                         | 56  | 57  | 56  | 55  | 59  | 57  | 52  | 64               | 55               |
|                      |                       | 4                   | 62                                         | 54  | 50  | 45  | 45  | 45  | 37  | 37  | 51               | 42               | 67                                         | 61  | 56  | 52  | 51  | 50  | 47  | 45  | 57               | 48               | 73                                         | 65  | 60  | 57  | 59  | 59  | 58  | 55  | 65               | 56               |
|                      |                       | 7                   | 66                                         | 63  | 53  | 47  | 46  | 45  | 39  | 38  | 53               | 44               | 74                                         | 66  | 58  | 53  | 52  | 51  | 50  | 52  | 60               | 51               | 82                                         | 73  | 67  | 62  | 63  | 60  | 59  | 60  | 68               | 60               |
|                      |                       | 10                  | 68                                         | 64  | 54  | 48  | 46  | 43  | 41  | 42  | 54               | 45               | 80                                         | 70  | 61  | 55  | 53  | 52  | 48  | 50  | 61               | 52               | 85                                         | 78  | 70  | 63  | 63  | 60  | 59  | 62  | 70               | 61               |
|                      |                       | 1                   | 53                                         | 49  | 46  | 41  | 47  | 42  | 30  | 32  | 50               | 40               | 55                                         | 52  | 53  | 46  | 49  | 54  | 40  | 38  | 57               | 48               | 60                                         | 56  | 58  | 55  | 54  | 60  | 50  | 51  | 63               | 54               |
| 600                  | 300                   | 2                   | 58                                         | 51  | 49  | 46  | 46  | 45  | 34  | 34  | 42               | 42               | 60                                         | 54  | 52  | 49  | 51  | 51  | 44  | 41  | 56               | 47               | 65                                         | 58  | 59  | 57  | 57  | 61  | 56  | 52  | 65               | 56               |
|                      |                       | 4                   | 60                                         | 55  | 51  | 46  | 46  | 45  | 37  | 40  | 44               | 43               | 67                                         | 61  | 56  | 54  | 53  | 50  | 46  | 45  | 58               | 49               | 73                                         | 65  | 60  | 58  | 61  | 61  | 58  | 55  | 66               | 58               |
|                      |                       | 7                   | 66                                         | 63  | 55  | 48  | 47  | 46  | 40  | 39  | 45               | 45               | 73                                         | 67  | 59  | 54  | 54  | 52  | 50  | 52  | 60               | 51               | 82                                         | 74  | 67  | 62  | 64  | 61  | 59  | 60  | 69               | 60               |
|                      |                       | 10                  | 70                                         | 67  | 56  | 49  | 48  | 44  | 43  | 45  | 40               | 47               | 79                                         | 71  | 62  | 56  | 55  | 53  | 49  | 51  | 62               | 53               | 85                                         | 79  | 70  | 63  | 64  | 61  | 60  | 62  | 71               | 62               |
|                      |                       | 1                   | 55                                         | 50  | 47  | 45  | 51  | 43  | 32  | 33  | 53               | 44               | 54                                         | 54  | 54  | 48  | 56  | 55  | 42  | 40  | 59               | 51               | 60                                         | 58  | 60  | 69  | 58  | 61  | 56  | 54  | 68               | 59               |
| 800                  | 400                   | 2                   | 57                                         | 53  | 53  | 49  | 50  | 44  | 33  | 35  | 53               | 44               | 60                                         | 57  | 53  | 54  | 57  | 53  | 43  | 42  | 60               | 51               | 66                                         | 62  | 64  | 61  | 63  | 67  | 54  | 53  | 70               | 61               |
|                      |                       | 4                   | 57                                         | 57  | 56  | 50  | 49  | 46  | 38  | 48  | 55               | 46               | 67                                         | 63  | 59  | 58  | 57  | 52  | 45  | 45  | 61               | 52               | 72                                         | 67  | 62  | 60  | 66  | 66  | 59  | 55  | 71               | 62               |
|                      |                       | 7                   | 68                                         | 65  | 58  | 52  | 51  | 49  | 44  | 42  | 57               | 48               | 73                                         | 69  | 61  | 57  | 57  | 55  | 51  | 53  | 63               | 54               | 82                                         | 76  | 68  | 65  | 68  | 63  | 60  | 62  | 72               | 63               |
|                      |                       | 10                  | 73                                         | 72  | 61  | 52  | 51  | 48  | 48  | 53  | 60               | 52               | 78                                         | 74  | 65  | 59  | 59  | 55  | 51  | 54  | 65               | 56               | 86                                         | 81  | 71  | 64  | 67  | 64  | 62  | 63  | 73               | 64               |
|                      |                       | 1                   | 73                                         | 72  | 61  | 52  | 51  | 48  | 48  | 53  | 60               | 52               | 78                                         | 74  | 65  | 59  | 59  | 55  | 51  | 54  | 65               | 56               | 86                                         | 81  | 71  | 64  | 67  | 64  | 62  | 63  | 73               | 64               |

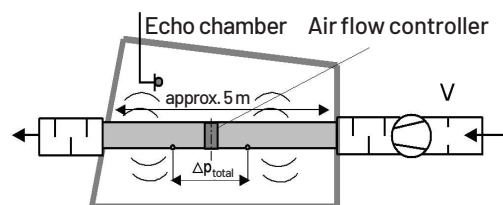
$\Delta p_{\text{total}}$  - Total pressure difference  
 $f_m$  - Center frequency of the octave bands  
 $L_W$  - Sound power level  
 $L_{WA}$  - Sound power level, A-weighted  
 $L_{pA}$  - Sound pressure level, A-weighted

Conversion to other sizes is carried out at the same choke point from flow velocity and pressure loss using the  $\Delta L$  values in the following table. The values refer to the respective nominal height H.  
 $L_W \text{ Oct} = L_W \text{ table} + \Delta L$        $L_{WA} = L_{WA} \text{ table} + \Delta L$

## Airborne sound transmission without silencer

| Nominal width B<br>[mm] | Nominal height H<br>[mm] |     |     |     |     |     |
|-------------------------|--------------------------|-----|-----|-----|-----|-----|
|                         | 100                      | 150 | 200 | 250 | 300 | 400 |
| 200                     | -2                       |     | -5  |     |     |     |
| 300                     | 0                        | -1  | -3  | -3  | -3  |     |
| 400                     | 1                        | 0   | -2  | -2  | -2  | -3  |
| 500                     | 2                        | 1   | -1  | -1  | -1  | -2  |
| 600                     | 3                        | 2   | 0   | 0   | 0   | -1  |
| 800                     |                          |     | 1   | 1   | 1   | 0   |
| 1000                    |                          |     |     | 2   | 2   | 1   |
| 1200                    |                          |     |     |     | 3   | 2   |

Controller and air duct without insulation shell



## Structure-borne sound emission with insulation shell

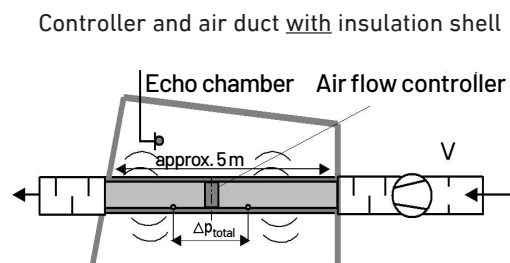
| Nominal width B [mm] | Nominal height H [mm] | Flow velocity [m/s] | $\Delta p_{\text{total}} = 100 \text{ Pa}$ |     |     |     |     |     |     |     |                  |                  | $\Delta p_{\text{total}} = 200 \text{ Pa}$ |     |     |     |     |     |     |     |                  |                  | $\Delta p_{\text{total}} = 500 \text{ Pa}$ |     |     |     |     |     |     |     |                  |                  |
|----------------------|-----------------------|---------------------|--------------------------------------------|-----|-----|-----|-----|-----|-----|-----|------------------|------------------|--------------------------------------------|-----|-----|-----|-----|-----|-----|-----|------------------|------------------|--------------------------------------------|-----|-----|-----|-----|-----|-----|-----|------------------|------------------|
|                      |                       |                     | $f_m$ [Hz]                                 |     |     |     |     |     |     |     | Total            |                  | $f_m$ [Hz]                                 |     |     |     |     |     |     |     | Total            |                  | $f_m$ [Hz]                                 |     |     |     |     |     |     |     | Total            |                  |
|                      |                       |                     | 63                                         | 125 | 250 | 500 | 1 K | 2 K | 4 K | 8 K | $L_{WA}$ [dB(A)] | $L_{pA}$ [dB(A)] | 63                                         | 125 | 250 | 500 | 1 K | 2 K | 4 K | 8 K | $L_{WA}$ [dB(A)] | $L_{pA}$ [dB(A)] | 63                                         | 125 | 250 | 500 | 1 K | 2 K | 4 K | 8 K | $L_{WA}$ [dB(A)] | $L_{pA}$ [dB(A)] |
|                      |                       |                     | $L_W$ [dB/Okt]                             |     |     |     |     |     |     |     |                  |                  | $L_W$ [dB/Okt]                             |     |     |     |     |     |     |     |                  |                  | $L_W$ [dB/Okt]                             |     |     |     |     |     |     |     |                  |                  |
| 300                  | 100                   | 1                   | 33                                         | 31  | 32  | 25  | 19  | 9   | 5   | 4   | 27               | 18               | 38                                         | 34  | 34  | 29  | 24  | 18  | 13  | 11  | 31               | 22               | 41                                         | 46  | 37  | 31  | 30  | 26  | 23  | 21  | 36               | 27               |
|                      |                       | 2                   | 39                                         | 38  | 37  | 23  | 21  | 15  | 9   | 5   | 30               | 22               | 41                                         | 39  | 41  | 31  | 27  | 22  | 18  | 14  | 35               | 26               | 45                                         | 43  | 41  | 37  | 34  | 30  | 27  | 26  | 40               | 31               |
|                      |                       | 4                   | 43                                         | 45  | 38  | 24  | 21  | 17  | 13  | 7   | 33               | 24               | 44                                         | 45  | 43  | 31  | 28  | 25  | 21  | 17  | 37               | 28               | 46                                         | 45  | 45  | 39  | 38  | 33  | 31  | 29  | 43               | 34               |
|                      |                       | 7                   | 58                                         | 58  | 47  | 32  | 27  | 21  | 18  | 12  | 44               | 35               | 54                                         | 55  | 50  | 36  | 32  | 27  | 26  | 26  | 45               | 35               | 53                                         | 53  | 52  | 42  | 39  | 35  | 35  | 33  | 47               | 38               |
|                      |                       | 10                  | 62                                         | 60  | 51  | 37  | 34  | 29  | 22  | 15  | 47               | 38               | 63                                         | 63  | 54  | 43  | 39  | 33  | 28  | 26  | 50               | 41               | 58                                         | 60  | 57  | 44  | 41  | 37  | 36  | 35  | 51               | 42               |
| 400                  | 150                   | 1                   | 40                                         | 39  | 35  | 29  | 23  | 19  | 11  | 12  | 31               | 22               | 45                                         | 42  | 39  | 33  | 29  | 26  | 19  | 16  | 36               | 27               | 45                                         | 46  | 43  | 40  | 36  | 34  | 35  | 30  | 43               | 34               |
|                      |                       | 2                   | 43                                         | 47  | 39  | 28  | 23  | 23  | 14  | 13  | 35               | 26               | 47                                         | 48  | 46  | 37  | 30  | 29  | 33  | 23  | 41               | 33               | 52                                         | 52  | 48  | 43  | 40  | 37  | 41  | 34  | 48               | 39               |
|                      |                       | 4                   | 51                                         | 52  | 43  | 32  | 27  | 24  | 18  | 14  | 39               | 30               | 55                                         | 58  | 52  | 38  | 32  | 30  | 34  | 26  | 47               | 38               | 60                                         | 59  | 56  | 50  | 41  | 38  | 38  | 42  | 52               | 43               |
|                      |                       | 7                   | 57                                         | 57  | 47  | 35  | 31  | 25  | 19  | 17  | 44               | 35               | 61                                         | 62  | 55  | 42  | 36  | 32  | 33  | 28  | 50               | 41               | 66                                         | 67  | 63  | 53  | 44  | 40  | 39  | 45  | 57               | 49               |
|                      |                       | 10                  | 63                                         | 60  | 51  | 38  | 35  | 28  | 23  | 19  | 48               | 38               | 69                                         | 66  | 58  | 44  | 39  | 34  | 31  | 28  | 54               | 45               | 72                                         | 72  | 67  | 56  | 47  | 42  | 41  | 46  | 61               | 53               |
| 600                  | 200                   | 1                   | 44                                         | 42  | 39  | 29  | 32  | 29  | 15  | 13  | 37               | 28               | 48                                         | 44  | 45  | 36  | 32  | 41  | 23  | 18  | 44               | 35               | 53                                         | 47  | 49  | 43  | 39  | 45  | 30  | 30  | 49               | 40               |
|                      |                       | 2                   | 51                                         | 43  | 39  | 34  | 32  | 33  | 20  | 15  | 39               | 30               | 52                                         | 45  | 45  | 36  | 34  | 36  | 31  | 21  | 42               | 33               | 56                                         | 47  | 48  | 46  | 41  | 43  | 42  | 33  | 49               | 41               |
|                      |                       | 4                   | 57                                         | 46  | 41  | 34  | 32  | 31  | 22  | 14  | 39               | 30               | 60                                         | 53  | 48  | 41  | 37  | 36  | 32  | 26  | 45               | 36               | 66                                         | 57  | 52  | 47  | 44  | 43  | 42  | 37  | 52               | 43               |
|                      |                       | 7                   | 58                                         | 56  | 45  | 36  | 32  | 31  | 22  | 19  | 43               | 34               | 66                                         | 58  | 50  | 43  | 39  | 37  | 35  | 33  | 48               | 39               | 74                                         | 66  | 60  | 52  | 49  | 45  | 43  | 40  | 57               | 48               |
|                      |                       | 10                  | 59                                         | 55  | 45  | 38  | 32  | 27  | 23  | 19  | 43               | 34               | 73                                         | 62  | 53  | 44  | 39  | 38  | 32  | 30  | 52               | 43               | 77                                         | 71  | 62  | 53  | 50  | 46  | 43  | 43  | 60               | 51               |
| 600                  | 250                   | 1                   | 45                                         | 42  | 39  | 31  | 33  | 29  | 15  | 14  | 37               | 28               | 48                                         | 44  | 45  | 36  | 35  | 41  | 24  | 19  | 44               | 35               | 53                                         | 48  | 50  | 45  | 41  | 45  | 33  | 31  | 50               | 40               |
|                      |                       | 2                   | 51                                         | 43  | 40  | 36  | 33  | 32  | 20  | 16  | 39               | 30               | 52                                         | 46  | 45  | 38  | 37  | 37  | 30  | 22  | 43               | 34               | 57                                         | 49  | 50  | 47  | 43  | 45  | 42  | 34  | 51               | 42               |
|                      |                       | 4                   | 55                                         | 47  | 43  | 35  | 33  | 31  | 22  | 18  | 40               | 31               | 60                                         | 54  | 49  | 43  | 39  | 36  | 32  | 26  | 46               | 37               | 66                                         | 57  | 53  | 48  | 47  | 45  | 43  | 37  | 53               | 44               |
|                      |                       | 7                   | 58                                         | 56  | 46  | 38  | 34  | 32  | 24  | 20  | 44               | 35               | 66                                         | 59  | 51  | 44  | 40  | 38  | 35  | 33  | 49               | 40               | 74                                         | 66  | 60  | 53  | 50  | 46  | 44  | 41  | 58               | 49               |
|                      |                       | 10                  | 61                                         | 57  | 47  | 39  | 34  | 29  | 25  | 23  | 45               | 36               | 73                                         | 63  | 54  | 46  | 41  | 39  | 33  | 31  | 52               | 43               | 77                                         | 71  | 63  | 54  | 51  | 47  | 44  | 44  | 60               | 51               |
| 600                  | 300                   | 1                   | 46                                         | 42  | 39  | 32  | 35  | 29  | 15  | 14  | 38               | 29               | 47                                         | 45  | 46  | 37  | 37  | 41  | 25  | 19  | 45               | 36               | 53                                         | 49  | 51  | 46  | 42  | 46  | 35  | 32  | 50               | 42               |
|                      |                       | 2                   | 50                                         | 44  | 42  | 37  | 34  | 31  | 19  | 15  | 40               | 31               | 52                                         | 47  | 45  | 40  | 39  | 38  | 29  | 22  | 44               | 35               | 57                                         | 51  | 52  | 48  | 45  | 48  | 40  | 33  | 53               | 44               |
|                      |                       | 4                   | 53                                         | 47  | 44  | 37  | 34  | 31  | 22  | 22  | 41               | 32               | 60                                         | 54  | 49  | 45  | 41  | 37  | 31  | 26  | 47               | 38               | 65                                         | 58  | 53  | 49  | 49  | 47  | 43  | 36  | 54               | 45               |
|                      |                       | 7                   | 59                                         | 56  | 48  | 39  | 35  | 32  | 25  | 21  | 45               | 36               | 66                                         | 59  | 52  | 45  | 42  | 39  | 35  | 33  | 50               | 41               | 74                                         | 67  | 60  | 53  | 52  | 47  | 44  | 41  | 58               | 49               |
|                      |                       | 10                  | 62                                         | 59  | 49  | 40  | 35  | 30  | 28  | 26  | 47               | 37               | 72                                         | 64  | 55  | 47  | 42  | 39  | 34  | 33  | 53               | 44               | 78                                         | 72  | 63  | 54  | 52  | 47  | 44  | 43  | 61               | 52               |
| 800                  | 400                   | 1                   | 48                                         | 43  | 40  | 36  | 39  | 29  | 16  | 14  | 41               | 32               | 47                                         | 47  | 47  | 39  | 43  | 41  | 27  | 21  | 47               | 38               | 53                                         | 51  | 53  | 50  | 46  | 48  | 41  | 35  | 53               | 44               |
|                      |                       | 2                   | 50                                         | 46  | 46  | 40  | 37  | 31  | 18  | 16  | 43               | 34               | 53                                         | 50  | 46  | 45  | 45  | 40  | 28  | 24  | 48               | 39               | 58                                         | 55  | 57  | 52  | 50  | 53  | 39  | 34  | 57               | 48               |
|                      |                       | 4                   | 50                                         | 50  | 49  | 41  | 37  | 32  | 23  | 30  | 44               | 35               | 59                                         | 56  | 52  | 49  | 45  | 39  | 30  | 26  | 50               | 42               | 65                                         | 60  | 55  | 51  | 54  | 52  | 44  | 36  | 58               | 49               |
|                      |                       | 7                   | 60                                         | 57  | 51  | 43  | 39  | 35  | 29  | 23  | 47               | 38               | 66                                         | 62  | 54  | 48  | 45  | 41  | 36  | 35  | 52               | 43               | 75                                         | 68  | 61  | 56  | 56  | 50  | 45  | 43  | 61               | 52               |
|                      |                       | 10                  | 66                                         | 65  | 54  | 43  | 39  | 34  | 32  | 34  | 52               | 43               | 71                                         | 67  | 58  | 50  | 47  | 41  | 36  | 36  | 55               | 47               | 79                                         | 74  | 64  | 55  | 55  | 50  | 46  | 44  | 62               | 54               |

$\Delta p_{\text{total}}$  - Total pressure difference  
 $f_m$  - Center frequency of the octave bands  
 $L_W$  - Sound power level  
 $L_{WA}$  - Sound power level, A-weighted  
 $L_{pA}$  - Sound pressure level, A-weighted

Conversion to other sizes is carried out at the same choke point from flow velocity and pressure loss using the  $\Delta L$  values in the following table. The values refer to the respective nominal height H.  
 $L_{W \text{ Oct}} = L_{W \text{ table}} + \Delta L$        $L_{WA} = L_{WA \text{ table}} + \Delta L$

## Airborne sound transmission without silencer

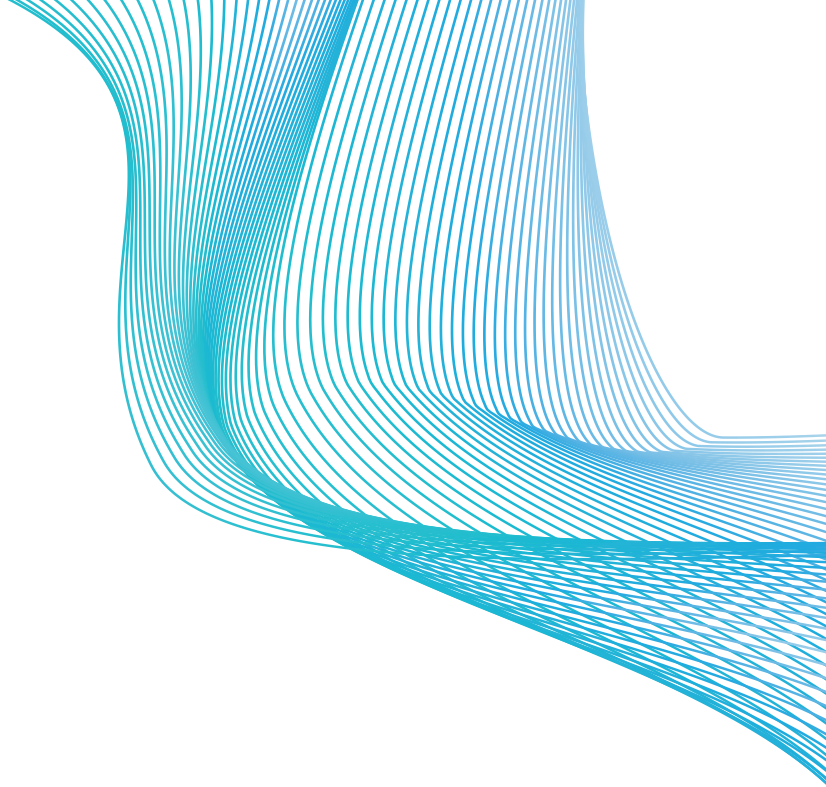
| Nominal width B<br>[mm] | Nominal height H<br>[mm] |     |     |     |     |     |
|-------------------------|--------------------------|-----|-----|-----|-----|-----|
|                         | 100                      | 150 | 200 | 250 | 300 | 400 |
| 200                     | -2                       |     | -5  |     |     |     |
| 300                     | 0                        | -1  | -3  | -3  | -3  |     |
| 400                     | 1                        | 0   | -2  | -2  | -2  | -3  |
| 500                     | 2                        | 1   | -1  | -1  | -1  | -2  |
| 600                     | 3                        | 2   | 0   | 0   | 0   | -1  |
| 800                     |                          |     | 1   | 1   | 1   | 0   |
| 1000                    |                          |     |     | 2   | 2   | 1   |
| 1200                    |                          |     |     |     | 3   | 2   |



## Product range LTG Air Distribution

| Design                                                                                     | Type       | Brief description, application                                                                                                                               |
|--------------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Variable air flow controllers (VAV) with electric variable-flow (VVS) drives</b>        |            |                                                                                                                                                              |
| round                                                                                      | VREactive  | Compact VAV controller for room air applications, map-based control                                                                                          |
|                                                                                            | VRDactive  | Compact VAV controller for room air applications, map-based control, double-pipe design                                                                      |
|                                                                                            | VRE, steel | For special requirements such as custom drives, static measurement, spring return or high-speed models                                                       |
|                                                                                            | VRE-PPs    | With a plastic housing for laboratories and pharmaceutical industries                                                                                        |
| rectangular                                                                                | VRFactive  | Compact VAV controller for room air applications, map-based control                                                                                          |
|                                                                                            | VRFvent    | For special requirements such as custom drives, static measurement, spring return or high-speed models                                                       |
|                                                                                            | VRF-PPs    | With a plastic housing for laboratories and pharmaceutical industries                                                                                        |
| <b>Constant air flow controllers, mechanically self-acting for constant air flow (KVS)</b> |            |                                                                                                                                                              |
| round                                                                                      | VRW        | Mechanically self-acting for constant air flow (KVS)                                                                                                         |
| rectangular                                                                                | VRX        | Mechanically self-acting for constant air flow (KVS)                                                                                                         |
| <b>Pressure controllers</b>                                                                |            |                                                                                                                                                              |
| round                                                                                      | DRE        | Duct pressure control without a flow path                                                                                                                    |
|                                                                                            | DREactive  | Duct pressure control with flow rate display/feedback                                                                                                        |
| rectangular                                                                                | DRF        | Duct pressure control without a flow path                                                                                                                    |
|                                                                                            | DRFactive  | Duct pressure control with flow rate display/feedback                                                                                                        |
|                                                                                            | DRFvent    | Duct pressure control with flow rate display/feedback for special requirements such as custom drives, static measurement, spring return or high-speed models |
| <b>Silencers</b>                                                                           |            |                                                                                                                                                              |
| round                                                                                      | SDE        | Cross talk and circular silencer                                                                                                                             |
| rectangular                                                                                | SDF        | Splitter silencer                                                                                                                                            |
| <b>Highly airtight shut-off dampers</b>                                                    |            |                                                                                                                                                              |
| round                                                                                      | KLB        | Highly airtight shut-off dampers for laboratories, vessels                                                                                                   |





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