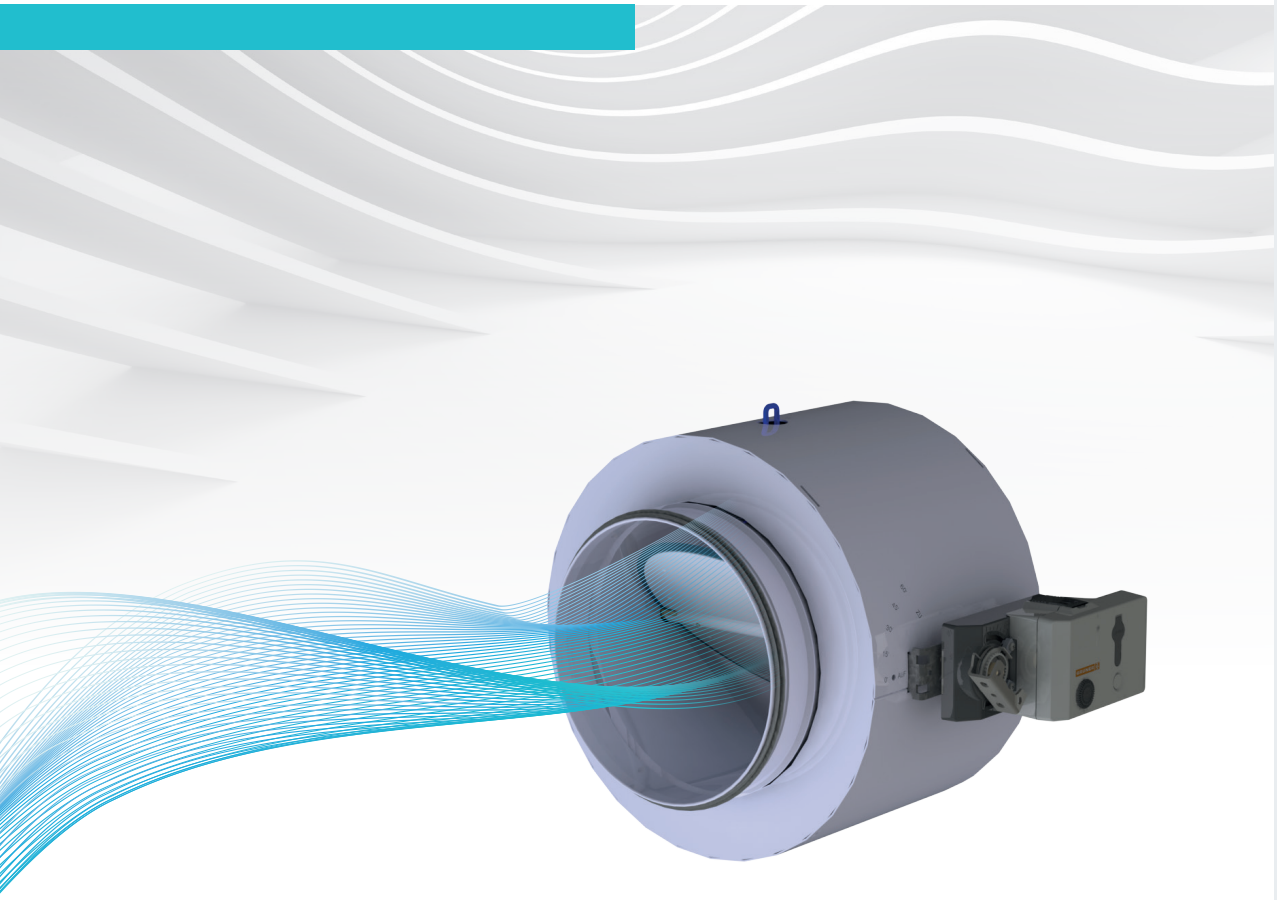
Let's realize
the potential of air
for a sustainable world

active control

AIR TECH SYSTEMS



Technical brochure

Pressure controller

DRE

The DRE pressure controller offers an efficient, precise and cost-effective solution for line pressure control in ventilation and air-conditioning systems.

It is ideal wherever a constant pressure is required in air pipes without the need for measurement of the air flow rate.

- **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 accord. to DIN EN 1751**
- **No flow path required**
- **Low pressure losses: Energy savings, quiet operation**
- **Precise line pressure control for stable operating conditions**
- **Measuring range: 0...500 Pa depending on version**
- **Conversion or programming to DREactive or VREactive is possible**
- **Compact design, retrofittable insulation shell**

Content

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Application range

The DRE pressure controller is used for line pressure control in air pipes within ventilation and air-conditioning systems.
It ensures that a constant and defined inlet pressure is maintained at downstream components such as air flow controllers, induction units or air diffusers.
This automatically balances the air circuits and achieves optimised pressure distribution throughout the entire system.

The measured pressure value can be used, taking the damper position into account, to control the fan speed (dead-point control), which leads to significant energy savings.
If required, the air circuit can be completely shut off.

Design

The DRE pressure controller consists of:

- A housing with a damper blade
- A control unit with a differential pressure sensor and actuator
- Optionally, an insulation shell for acoustic and thermal insulation

All components are pre-assembled and wired at the factory, enabling quick and easy installation.

Standard connection: plug-in ends with lip seal in accordance with DIN EN 1506 / EN 13180
- Alternatively: flanges inaccordance with DIN 24154 R1 or clamping ring connection

Features

- Wide control range for differential pressures up to 1000 Pa
- Very low air leakage rate with the damper blade closed in accordance with DIN EN 1751 Class 4 (DN 100/125: Class 3 – meets the requirements of DIN 1946-4)
- Very low housing leakage in accordance with DIN EN 1751 Class C
- Low pressure loss, resulting in: energy savings and quiet system operation
- Short installation length – suitable for confined installation spaces
- High control accuracy and low sensitivity to flow conditions
- Pre-assembled and tested at the factory

Materials and finishes

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

Optional versions

- Powder-coated finish
- Damper blade and shaft made of stainless steel (V4A)
- All metal parts in the air stream made of stainless steel
- Aluminium gauge pressure transducer (for special versions)

Accessories and special versions

- Pressure tapping kit (item no. 673154) comprising:
  2 spigots with mounting accessories
  1 hose, Ø 5 mm x 7 mm (2 m long)
- Insulation shell for sound and thermal insulation
- Feedback potentiometer for detecting the damper position
- SDF-SM splitter silencer made from galvanised sheet steel
- Further special versions available on request

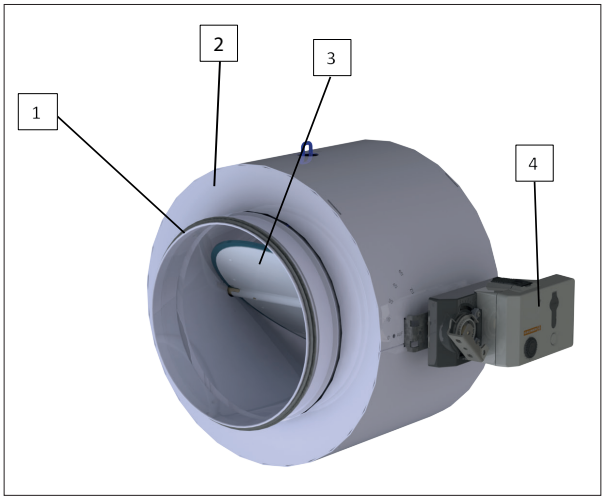
Function

How does the DRE work?

The static pressure in the air duct is detected via a pressure tap at the desired measuring point and measured by the differential pressure sensor.

The controller compares the actual pressure with the preset setpoint and controls the damper blade so that the setpoint is maintained as accurately as possible.

This control principle ensures stable pressure distribution throughout the duct network and contributes to efficient fan control.



1. Flange with lip seal
2. Housing / Insulation shell
3. Control damper
4. Actuator for control damper

Installation, positioning

The DRE pressure controller itself does not impose any specific requirements on the inlet flow path. However, when taking a pressure reading from the air duct, care must be taken to avoid flow separation or disturbances caused by obstracles; the pressure tap must therefore be fitted on site to a straight section of air duct at a sufficient distance from the nearest point of disturbance.

In duct or line pressure control, the pressure is measured relative to the ambient pressure, with one connection on the sensor left open ('+' for extract air, '-' for supply air) and the other connection linked to the measuring point. The pressure is controlled at the measuring point in the direction of air flow, downstream of the pressure controller in the supply air or upstream of the pressure controller in the extract air.

The pressure tapping point must be connected on site to the differential pressure sensor of the pressure controller using a pressure measurement hose.

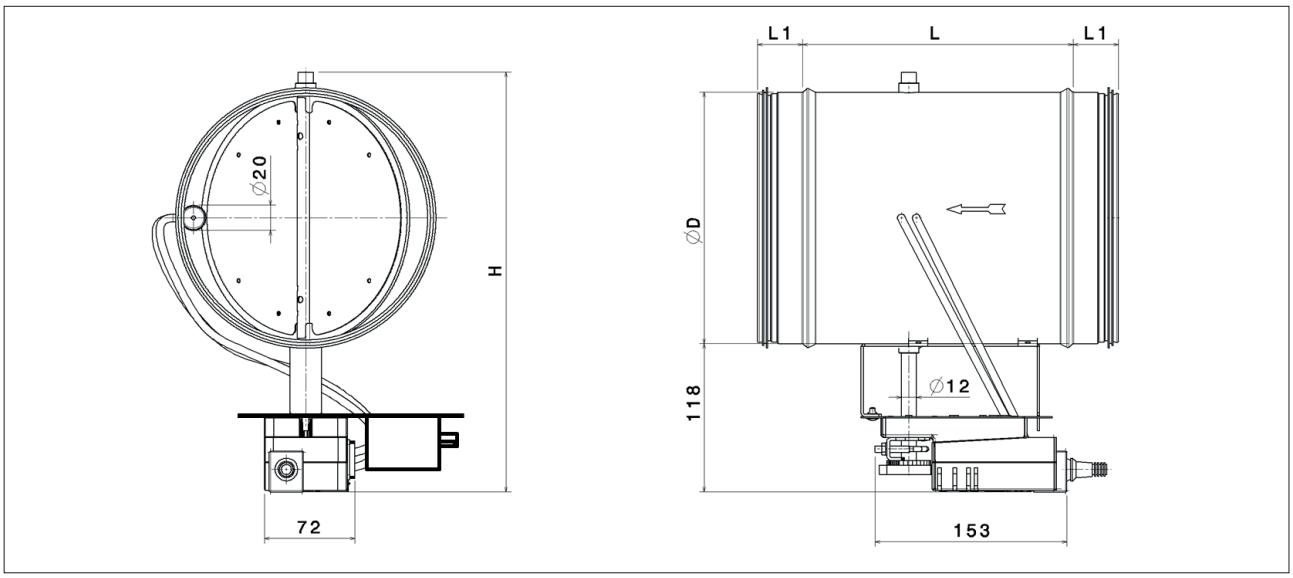
For the differential pressure sensor, appropriate corrections for height and hose length must be made.

If the differential pressure sensor uses a static measuring principle, its permissible installation position must be observed. If necessary, a zero-point calibration must be carried out.

The DRE may only be installed with the damper axis in a horizontal position.

Dimensions, Weight

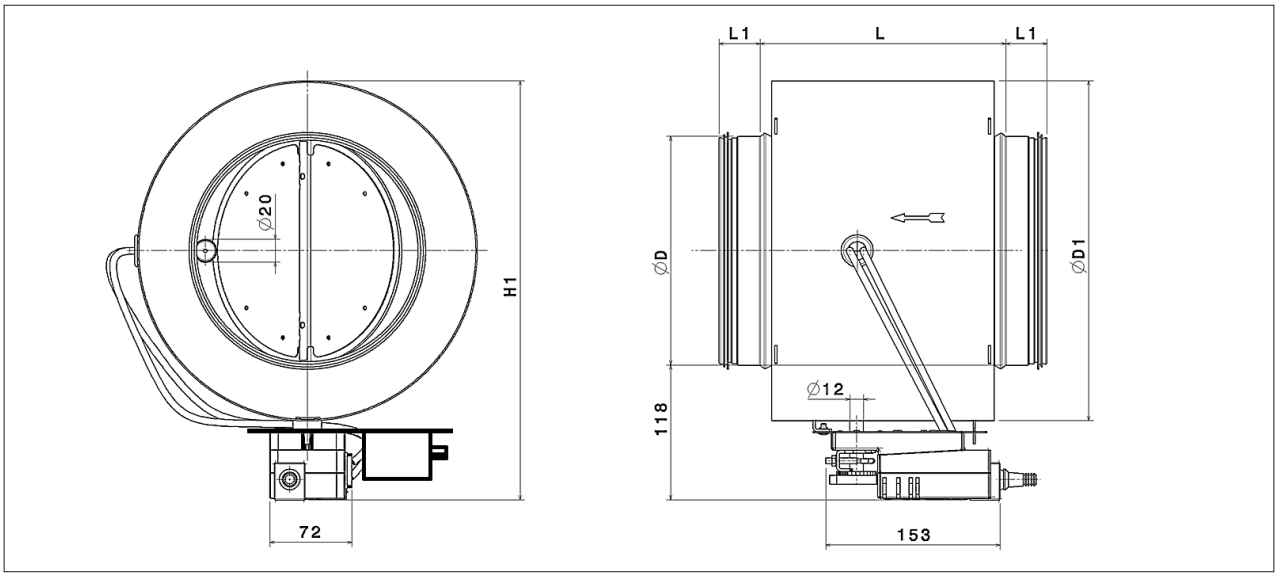
Type DRE/.../D/L/327-05-MB, without insulation shell



Nominal size DN	D [mm]	D1 [mm]	L [mm]	L1 [mm]	H [mm]	H1 [mm]	Damper angle [°]	Weight [kg] Type DRE without insulation shell	with insulation shell
100	100	200	195	36	233	268	60	1.8	3.2
125	125	225	195	36	258	293	60	2.1	3.7
160	160	260	215	36	293	328	60	2.4	4.4
200	200	300	215	36	333	368	60	2.9	5.2
250	250	350	260	54	383	413	60	3.6	6.8
315	315	415	260	54	448	483	60	4.7	8.5
400	400	500	315	72	533	568	60	6.4	12

Dimensions, Weight

Type DRE/.../D/L/327-05-MB, with insulation shell

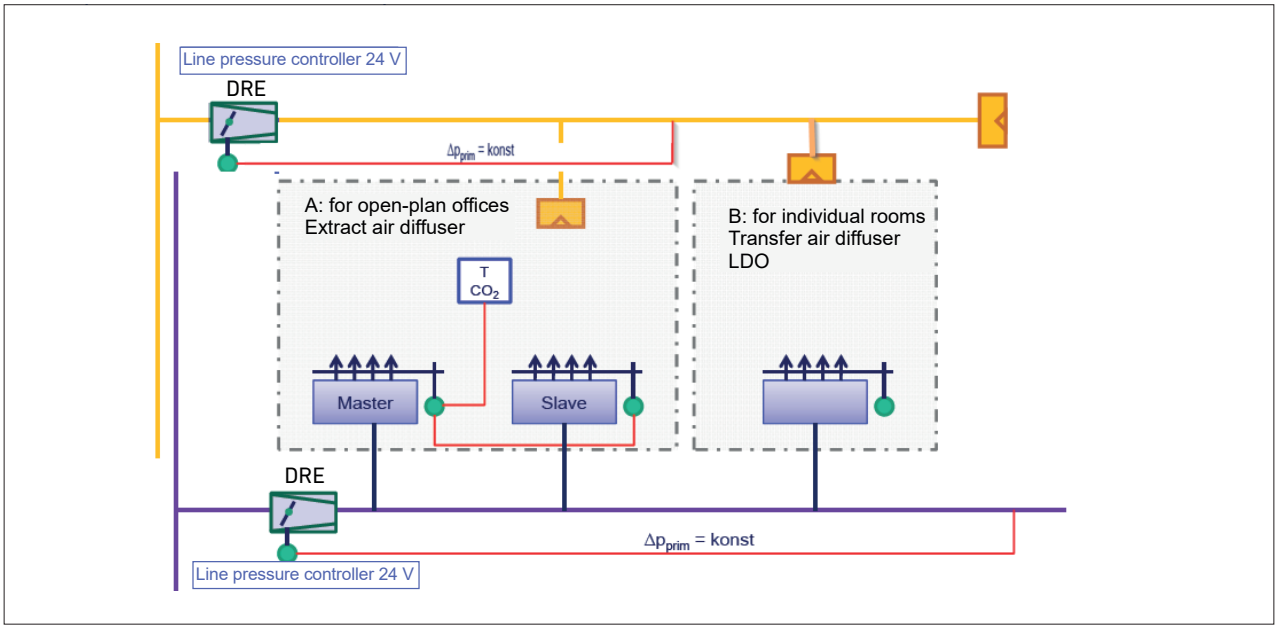


Nominal size DN	D [mm]	D1 [mm]	L [mm]	L1 [mm]	H [mm]	H1 [mm]	Damper angle [°]	Weight [kg] Type DRE without insulation shell	with insulation shell
100	100	200	195	36	233	268	60	1.8	3.2
125	125	225	195	36	258	293	60	2.1	3.7
160	160	260	215	36	293	328	60	2.4	4.4
200	200	300	215	36	333	368	60	2.9	5.2
250	250	350	260	54	383	413	60	3.6	6.8
315	315	415	260	54	448	483	60	4.7	8.5
400	400	500	315	72	533	568	60	6.4	12

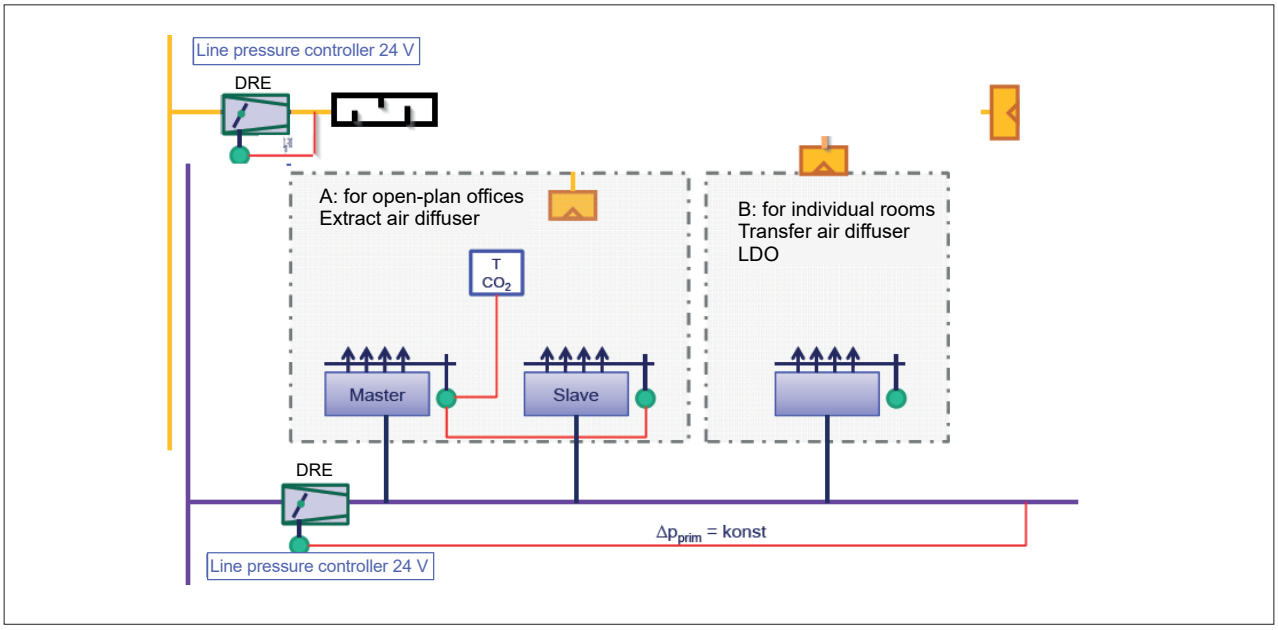
Ventilation systems with pressure controllers (examples)

The pressure setpoint must be designed in accordance with the downstream loads. A calculation of the air duct network is essential.

Ventilation systems with pressure controllers in the supply air and extract air circuits



Variant 1



Variant 2

Nomenclature, order code

DRE / 100 / S / D / L / G720

(1) (2) (3) (4) (5) (6) (7)

(1) **Series**	**DRE**	=	Pressure controller, round, short
(2) **Measuring principle**		=	dynamic (standard)
	-s	=	static
(3) **Size**	**100**	=	100
	125	=	125
	160	=	160
	200	=	200
	250	=	250
	315	=	315
	400	=	400
(4) **Design**	**S**	=	galvanised steel
	E	=	V4A stainless steel
	K	=	coated (damper blade, shaft and working pressure sensor made of stainless steel)
(5) **Insulation shell**	**-**	=	without
	D	=	with (outer casing made of galvanised steel)
(6) **Connection**	**-**	=	Plug-in end without lip seal
	L	=	Plug-in end with lip seal
	F	=	Flanges accord. to DIN 24154 R1
	B	=	Bord
(7) **Controller make/model**	**G710**	=	Gruner 327VMZ-024-05-MB (Modbus-compatible)
	G720	=	Gruner 327VMZ-024-05-BN (BACnet-compatible)

Additional ordering information

	Please specify when ordering:	**If this information is not provided, the unit will be supplied with the following factory setting:**
DRE	- P_{min} [Pa] - P_{max} [Pa] - Mode 0...10 V or 2...10 V - Control: Analogue or Modbus	- P_{min} = 0 Pa - P_{max} = 500 Pa - Mode 0...10 V - Analogue control

Ordering example

DRE 100/S/D/L/G710, P_{min} = 150 Pa, P_{max} = 300 Pa, 2...10 V mode, Modbus control

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Technical data

Pressure controller series				DRE
	Controller component type			Gruner 327-VMZ
Electrical data	Power supply/rated voltage		24 V AC	X
			24 V DC	X
	Power consumption		[W]	3
	Connection	Type		Cable
		Cores	Number	6
			Cross-section [mm^2]	0.75
	Analogue	Inputs	Pressure setpoint	(0) 2...10 V DC / Ri > (100 kΩ) 50 kΩ (0) 4...20 mA / $R_{ext.}$ = 500 Ω
		Outputs	Actual pressure value	(0) 2...10 V DC, max. 0.5 mA
	Digital	Inputs	Pressure setpoint	X
		Outputs	Actual pressure value	X (Modbus RTU)
			Damper position	X (Modbus RTU)
Parameterisation	Pressure controller	on the unit	Function rotary switch	X
		via tool	Software	X
			Adjustment unit	X
		Parameter	Setpoints	X
			Control loop (P/I component)	X

Controller components

	Pressure controller series			DRE
	Controller component type			327-VMZ
Function/Operation	Pressure control	Setpoints	Stages	2
			variable	-
	Shut off the damper		Contact input	X
			Setpoint 0 Pa	X
	Actual value	display	Pressure	X
		report	Pressure	Analogue & Modbus RTU
			Damper position	Modbus RTU
Pressure sensor/ controller	Measuring range		[Pa]	0...500
	Measuring principle			Dynamic
	Altitude and hose length correction required			Yes
	Internal hose diameter		[mm]	4...5
Actuator	Torque		up to H = 250 mm [Nm]	5
			from H = 300 mm [Nm]	10
	Runtime		up to H = 250 mm [s/90°]	100
			from H = 300 mm [s/90°]	150
	Manual adjustment: Gear disengagement via push-button			X
Safety	Protection class		IP	54
	Ambient temperature			0...+50 °C
	Storage temperature			-20...+80 °C
	Ambient humidity			5...95 % r. F. non-condensing
	Environmental pollution degree		(EN 60730-1)	3

Airborne sound transmission without silencer

Nominal diameter	Air velocity [m/s]	Air flow rate [m³/h]	Δp_{tot} = 100 Pa										Δp_{tot} = 200 Pa									
			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)]
			L_W [dB/Okt]										L_W [dB/Okt]									
100	1	27	33	32	36	42	43	32	23	26	**45**	**37**	35	35	37	41	47	39	32	28	**48**	**41**
	4	108	39	48	44	42	41	35	31	27	**45**	**37**	42	51	50	48	50	46	47	42	**54**	**46**
	7	189	41	50	45	46	45	42	38	33	**50**	**42**	44	56	53	51	51	48	49	46	**57**	**49**
	10	272	44	51	48	50	49	47	42	43	**54**	**46**	47	58	56	55	54	53	49	52	**60**	**52**
125	1	43	32	29	31	39	41	32	23	16	**42**	**35**	37	29	33	41	49	44	37	29	**51**	**43**
	4	172	46	48	42	44	44	38	32	23	**47**	**39**	48	53	48	49	50	45	53	48	**57**	**49**
	7	299	50	54	48	49	50	42	40	36	**53**	**45**	52	61	54	54	55	49	53	51	**60**	**52**
	10	428	50	55	50	53	54	46	43	37	**57**	**49**	55	63	57	58	58	53	52	49	**62**	**54**
160	1	71	43	37	39	42	42	30	23	26	**44**	**37**	42	42	44	45	52	43	39	40	**53**	**46**
	4	284	49	50	46	46	46	36	29	26	**48**	**41**	52	54	53	52	53	46	39	34	**55**	**48**
	7	494	55	57	53	53	52	44	40	36	**55**	**48**	58	63	59	57	57	51	47	44	**61**	**53**
	10	706	58	60	56	57	57	49	45	40	**60**	**51**	62	66	63	61	61	55	51	49	**65**	**56**
200	1	111	38	33	37	40	39	31	21	15	**42**	**34**	41	37	41	46	49	45	36	28	**51**	**44**
	4	444	50	46	44	43	43	39	31	22	**46**	**39**	55	52	49	47	47	45	40	33	**52**	**44**
	7	776	58	53	50	50	51	46	40	37	**54**	**44**	62	59	57	54	54	51	47	48	**58**	**49**
	10	1108	65	60	58	57	57	53	48	54	**61**	**51**	66	63	61	58	58	56	51	56	**63**	**52**
250	1	174	38	39	42	43	39	33	28	26	**44**	**36**	39	42	45	50	50	46	38	31	**53**	**46**
	4	696	53	50	49	44	41	38	31	28	**47**	**38**	56	55	54	49	47	45	41	35	**53**	**44**
	7	1217	65	59	57	55	52	50	45	39	**58**	**46**	69	65	63	58	55	54	51	49	**62**	**50**
	10	1739	68	64	61	58	56	54	53	51	**62**	**49**	73	70	67	64	61	60	58	57	**68**	**55**
315	1	277	46	45	44	44	41	33	28	31	**45**	**38**	47	49	48	49	50	46	38	33	**53**	**45**
	4	1108	56	52	49	44	42	40	33	31	**48**	**37**	61	58	57	52	50	48	45	37	**56**	**45**
	7	1939	67	60	56	53	52	49	45	37	**57**	**43**	74	67	63	58	55	54	53	46	**62**	**48**
	10	2770	–	–	–	–	–	–	–	–	**–**	**–**	77	70	66	61	60	58	55	52	**66**	**51**
400	1	448	47	46	46	45	43	33	29	36	**47**	**39**	50	53	50	50	51	47	39	35	**54**	**46**
	4	1792	59	54	49	45	43	42	34	36	**50**	**36**	63	60	58	53	50	49	46	39	**57**	**44**
	7	3135	69	61	57	54	52	48	45	39	**57**	**41**	78	70	64	58	56	54	54	44	**63**	**47**
	10	4479	–	–	–	–	–	–	–	–	**–**	**–**	80	71	66	62	59	56	52	48	**65**	**48**

Δp_{tot} - Total pressure difference
f_m - Octave midband frequency
L_W - Sound power level
L_{WA} - Sound power level, A-weighted
L_{pA} - Sound pressure level, A-weighted

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Structure-borne noise emission without insulation shell

Nominal diameter	Air velocity [m/s]	Air flow rate [m³/h]	Δp_{tot} = 100 Pa										Δp_{tot} = 200 Pa									
			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)]
			L_W [dB/Okt]										L_W [dB/Okt]									
100	1	27	20	<15	18	25	28	23	<15	15	**30**	**21**	22	<15	19	23	31	31	20	17	**35**	**26**
	4	108	26	24	26	25	26	27	19	16	**31**	**22**	30	26	33	31	34	37	36	31	**42**	**33**
	7	189	28	25	28	28	30	34	26	23	**37**	**28**	31	31	36	34	36	40	38	36	**45**	**36**
	10	272	32	27	31	33	34	39	31	33	**42**	**33**	34	33	38	37	39	44	38	42	**48**	**39**
125	1	43	18	<15	<15	21	24	23	<15	<15	**28**	**19**	23	<15	<15	23	33	35	25	17	**38**	**29**
	4	172	33	23	24	26	27	29	19	<15	**33**	**24**	35	28	30	31	34	36	41	37	**44**	**36**
	7	299	37	29	29	31	33	33	27	25	**38**	**29**	39	36	36	36	38	40	41	40	**47**	**38**
	10	428	37	30	32	35	38	37	31	26	**42**	**33**	42	37	39	40	42	43	40	37	**48**	**39**
160	1	71	29	<15	20	23	25	20	<15	16	**27**	**19**	28	16	25	26	35	33	26	30	**38**	**30**
	4	284	35	24	27	27	29	26	16	16	**32**	**23**	38	28	34	33	36	36	26	24	**40**	**32**
	7	494	41	31	34	34	35	34	27	26	**39**	**31**	44	37	40	38	40	41	34	34	**45**	**37**
	10	706	44	34	37	38	40	39	32	30	**44**	**35**	48	40	44	42	44	45	38	39	**49**	41
200	1	111	28	<15	22	25	23	17	<15	<15	**26**	**17**	31	17	27	30	33	30	22	19	**36**	**27**
	4	444	40	27	30	28	27	24	16	<15	**31**	**22**	45	32	35	32	31	31	25	24	**37**	**28**
	7	776	48	34	36	35	35	31	26	28	**39**	**30**	52	40	43	39	37	37	33	39	**44**	**35**
	10	1108	55	41	44	42	41	39	34	45	**48**	**39**	56	44	47	43	42	41	36	47	**50**	**41**
250	1	174	27	19	27	27	22	18	<15	16	**28**	**19**	28	22	30	34	33	31	23	21	**37**	**28**
	4	696	42	30	34	28	24	23	16	18	**31**	**22**	45	35	39	33	30	30	26	25	**37**	**28**
	7	1217	54	39	42	39	35	35	30	29	**42**	**33**	58	45	48	42	38	39	36	39	**47**	**38**
	10	1739	57	44	46	42	39	39	38	41	**47**	**38**	62	50	52	48	44	45	43	47	**53**	**44**
315	1	277	34	24	28	30	26	21	16	24	**31**	**22**	35	28	32	35	35	34	26	26	**39**	**31**
	4	1108	44	31	33	30	27	28	21	24	**34**	**25**	49	37	41	38	35	36	33	30	**42**	**33**
	7	1939	55	39	40	39	37	37	33	30	**43**	**34**	62	46	47	44	40	42	41	39	**49**	**40**
	10	2770	-	-	-	-	-	-	-	-	**-**	**-**	65	49	50	47	45	46	43	45	**52**	**44**
400	1	448	34	24	29	34	31	24	20	32	**36**	**27**	37	31	33	39	39	38	30	31	**43**	**35**
	4	1792	46	32	32	34	31	33	25	32	**38**	**29**	50	38	41	42	38	40	37	35	**46**	**37**
	7	3135	56	39	40	43	40	39	36	35	**46**	**37**	65	48	47	47	44	45	45	40	**52**	**43**
	10	4479	-	-	-	-	-	-	-	-	**-**	**-**	67	49	49	51	47	47	43	44	**54**	**45**

Δp_{tot} - Total pressure difference
f_m - Octave midband frequency
L_W - Sound power level
L_{WA} - Sound power level, A-weighted
L_{pA} - Sound pressure level, A-weighted

The values for structure-borne noise emission refer to the emitting outer surface of an air duct, including a built-in flow rate controller made of galvanised sheet steel, with a total length of 6 m.

Resonance effects may cause deviations of up to ± 6 dB in frequency-dependent sound power levels.

Airborne sound transmission with SDE-SO silencer, 900 mm long

Nominal diameter	Air velocity [m/s]	Air flow rate [m³/h]	Δp_{tot} = 100 Pa										Δp_{tot} = 200 Pa									
			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)]
			L_W [dB/Okt]										L_W [dB/Okt]									
100	1	27	29	22	21	<15	<15	<15	<15	<15	**16**	**<15**	31	25	22	<15	<15	<15	<15	<15	**17**	**<15**
	4	108	33	28	25	17	<15	<15	<15	<15	**20**	**<15**	35	33	28	18	<15	<15	<15	<15	**24**	**<15**
	7	189	36	34	29	19	<15	<15	<15	<15	**24**	**16**	39	40	34	22	<15	<15	<15	17	**30**	**20**
	10	272	40	40	32	23	19	<15	<15	15	**29**	**20**	43	47	40	27	20	<15	<15	24	**35**	**26**
125	1	43	28	20	17	<15	<15	<15	<15	<15	**<15**	**<15**	33	20	19	<15	<15	<15	<15	<15	**16**	**<15**
	4	172	34	29	23	17	<15	<15	<15	<15	**19**	**<15**	39	31	27	20	<15	<15	<15	<15	**24**	**<15**
	7	299	40	37	29	21	<15	<15	<15	<15	**27**	**17**	45	42	35	25	<15	<15	<15	18	**33**	**22**
	10	428	46	45	35	26	21	17	<15	<15	**33**	**24**	51	53	42	31	22	17	17	24	**40**	**30**
160	1	71	40	32	28	19	<15	<15	<15	<15	**23**	**<15**	39	37	33	22	17	<15	<15	28	**30**	**22**
	4	284	45	40	34	24	<15	<15	<15	19	**29**	**20**	46	45	39	27	20	<15	<15	31	**35**	**27**
	7	494	50	47	39	29	18	<15	<15	23	**35**	**26**	52	53	45	33	23	<15	17	34	**41**	**32**
	10	706	55	55	45	34	25	19	17	27	**42**	**31**	59	61	52	38	28	21	21	36	**48**	**37**
200	1	111	37	28	27	21	<15	<15	<15	<15	**22**	**<15**	40	32	31	27	17	<15	20	17	**28**	**21**
	4	444	46	37	34	27	<15	<15	<15	17	**29**	**21**	48	41	38	31	20	18	25	26	**34**	**26**
	7	776	55	46	41	32	20	16	23	30	**37**	**27**	57	49	44	35	23	21	30	35	**40**	**31**
	10	1108	64	55	48	38	28	24	32	43	**46**	**34**	65	58	51	39	28	26	35	45	**48**	**37**
250	1	174	36	36	33	26	<15	<15	15	18	**29**	**21**	37	39	36	33	24	25	25	23	**34**	**27**
	4	696	46	44	39	31	19	19	23	26	**37**	**26**	48	48	43	38	28	30	32	32	**41**	**32**
	7	1217	56	53	46	36	25	26	32	35	**45**	**30**	60	58	51	42	31	34	38	40	**47**	**36**
	10	1739	66	61	52	41	32	33	40	43	**50**	**36**	71	67	58	47	35	39	45	49	**56**	**42**
315	1	277	45	43	38	29	20	18	20	24	**33**	**25**	46	47	42	34	29	31	30	26	**39**	**31**
	4	1108	55	50	44	33	25	26	28	27	**40**	**28**	59	56	49	38	31	35	37	32	**46**	**35**
	7	1939	66	58	50	38	31	34	37	30	**47**	**32**	73	65	57	43	34	39	45	39	**54**	**39**
	10	2770	76	65	56	42	37	42	45	33	**57**	**38**	86	74	64	47	37	43	52	45	**61**	**46**
400	1	448	46	44	41	32	28	25	26	34	**38**	**30**	49	51	45	37	36	39	50	33	**49**	**44**
	4	1792	57	52	47	37	33	33	34	36	**44**	**30**	63	60	52	41	39	43	51	38	**53**	**40**
	7	3135	68	59	52	41	37	40	42	37	**50**	**34**	77	68	59	45	41	46	51	42	**58**	**41**
	10	4479	79	66	57	46	42	47	50	38	**59**	**39**	91	76	66	49	44	49	51	46	**62**	**46**

Δp_{tot} - Total pressure difference
f_m - Octave midband frequency
L_W - Sound power level
L_{WA} - Sound power level, A-weighted
L_{pA} - Sound pressure level, A-weighted

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Structure-borne noise emission with insulation shell

Nominal diameter	Air velocity [m/s]	Air flow rate [m³/h]	Δp_{tot} = 100 Pa										Δp_{tot} = 200 Pa									
			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)]
			L_W [dB/Okt]										L_W [dB/Okt]									
100	1	27	19	<15	18	19	19	<15	<15	<15	**21**	**<15**	21	<15	19	17	22	<15	<15	<15	**23**	**<15**
	4	108	25	24	26	19	17	<15	<15	<15	**22**	**<15**	29	26	33	25	25	16	16	<15	**29**	**20**
	7	189	27	25	28	22	21	<15	<15	<15	**25**	**16**	30	31	36	28	27	19	18	16	**32**	**23**
	10	272	31	27	31	27	25	18	<15	<15	**29**	**20**	33	33	38	31	30	23	18	22	**35**	**26**
125	1	43	17	<15	18	17	16	<15	<15	<15	**19**	**<15**	22	<15	<15	17	24	<15	<15	<15	**25**	**15**
	4	172	32	23	24	20	18	<15	<15	<15	**22**	**<15**	34	28	30	25	25	15	21	17	**29**	**20**
	7	299	36	29	29	25	24	<15	<15	<15	**28**	**18**	38	36	36	30	29	19	21	20	**34**	**25**
	10	428	36	30	32	29	29	16	<15	<15	**32**	**23**	41	37	39	34	33	22	20	17	**37**	**28**
160	1	71	28	<15	20	17	16	<15	<15	<15	**19**	**<15**	27	16	25	20	26	<15	<15	<15	**27**	**18**
	4	284	34	24	27	21	20	<15	<15	<15	**24**	**15**	37	28	34	27	27	<15	<15	<15	**30**	**21**
	7	494	40	31	34	28	26	<15	<15	<15	**30**	**21**	43	37	40	32	31	20	<15	<15	**35**	**27**
	10	706	43	34	37	32	31	18	<15	<15	**34**	**26**	47	40	44	36	35	24	18	17	**39**	**31**
200	1	111	25	<15	20	22	20	<15	<15	<15	**23**	**<15**	28	15	25	27	30	24	<15	<15	**32**	**23**
	4	444	37	25	28	25	24	18	<15	<15	**28**	**19**	42	30	33	29	28	25	<15	<15	**32**	**23**
	7	776	45	32	34	32	32	25	<15	<15	**35**	**26**	49	38	41	36	34	31	<15	18	**39**	**30**
	10	1108	52	39	42	39	38	33	<15	24	**42**	**33**	53	42	45	40	39	35	<15	26	**43**	**35**
250	1	174	24	17	25	24	19	<15	<15	<15	**24**	**15**	25	20	28	31	30	25	<15	<15	**33**	**24**
	4	696	39	28	32	25	21	17	<15	<15	**28**	**19**	42	33	37	30	27	24	<15	<15	**33**	**24**
	7	1217	51	37	40	36	32	29	<15	<15	**38**	**29**	55	43	46	39	35	33	<15	18	**42**	**33**
	10	1739	54	42	44	39	36	33	16	20	**42**	**33**	59	48	50	45	41	39	21	26	**47**	**38**
315	1	277	31	22	26	24	20	<15	<15	<15	**25**	**16**	32	26	30	29	29	<15	<15	<15	**33**	**22**
	4	1108	41	29	31	24	21	20	<15	<15	**28**	**19**	46	35	39	32	29	<15	<15	<15	**35**	**26**
	7	1939	52	37	38	33	31	29	<15	<15	**36**	**28**	59	44	45	38	34	17	17	17	**42**	**32**
	10	2770	–	–	–	–	–	–	–	–	**–**	**–**	62	47	48	41	39	19	19	23	**45**	**35**
400	1	448	31	22	27	24	21	<15	<15	<15	**25**	**16**	34	29	31	29	29	<15	<15	<15	**31**	**22**
	4	1792	43	30	30	24	21	24	<15	<15	**29**	**20**	47	36	39	32	28	<15	<15	<15	**34**	**25**
	7	3135	53	37	38	33	30	30	<15	<15	**37**	**28**	62	46	45	37	34	20	20	<15	**43**	**33**
	10	4479	–	–	–	–	–	–	–	–	**–**	**–**	64	47	47	41	37	18	18	19	**45**	**35**

Δp_{tot} - Total pressure difference
f_m - Octave midband frequency
L_W - Sound power level
L_{WA} - Sound power level, A-weighted
L_{pA} - Sound pressure level, A-weighted

The values for structure-borne noise emission refer to the emitting outer surface of an air duct, including a built-in flow rate controller made of galvanised sheet steel, with a total length of 6 m.

Resonance effects may cause deviations of up to ± 6 dB in frequency-dependent sound power levels.

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Product range LTG Air Distribution

Design	Type	Brief description, application
Variable air flow controllers (VAV) with electric variable-flow (VVS) drives		
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, Stahl	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
Constant air flow controllers, mechanically self-acting for constant air flow (KVS)		
round	VRW	Mechanically self-acting for constant air flow (KVS)
rectangular	VRX	Mechanically self-acting for constant air flow (KVS)
Pressure controllers		
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
Silencers		
round	SDE	Cross talk and circular silencer
rectangular	SDF	Splitter silencer
Highly airtight shut-off dampers		
round	KLB	Highly airtight shut-off dampers for laboratories, vessels

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