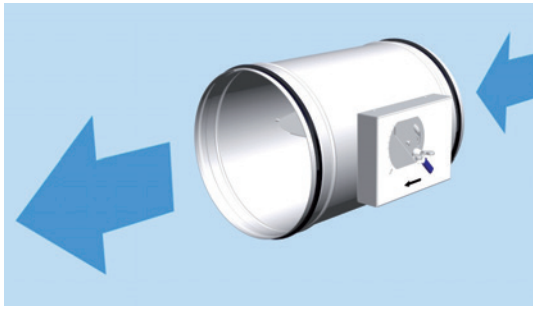
AIR TECH SYSTEMS

Technical Brochure

LTG Air Distribution

Constant flow rate controllers VRW



Mechanically self-operated, round

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Technical brochure • Constant flow rate controllers VRW, round

LTG Comfort Air

- Air-Water-Systems
- Air diffusers
- **Air Distribution**

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Notes

Dimensions stated in this brochure are in mm.

Dimensions stated in this brochure are subject to General Tolerances according to DIN ISO 2768-vL. Possible additional details are stated in the drawings.

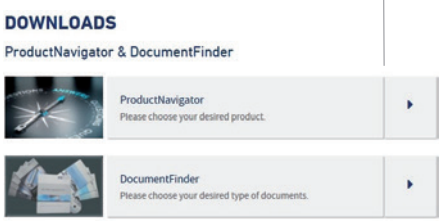
Straightness and twist tolerances according to DIN EN 12020-2.

The actual tender documents are available as a word document at your local distributor or at www.LTG.net.

LTG planning tools – we support you!

Visit the download area on our website www.LTG.net with helpful tools, such as dimensioning programs, streaming videos and product information!

Also available: Our product overviews about air diffusers, air-water systems and air distribution products.



Flow Rate Control Basics – Which Product for which Application?

Plant Types

ariable Flow Rate V

In Anlagen mit variablem Volumenstrom (VVS) arbeiten elektronische Volumenstromregler, die jeden Raum exakt mit der Luftmenge versorgen, die er benötigt – bedarfsgerecht und energieeffizient.

Constant Flow Rate

Units with constant flow rates (KVS) use flow rate controllers maintaining a constant flow rate mechanically self-operated. Working with no wiring or external power supply, they provide convenient and cost-saving solutions.

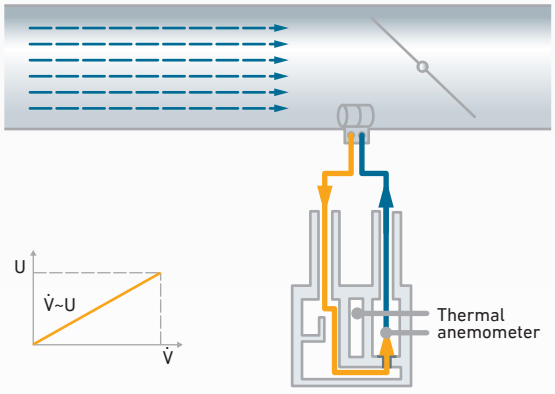
Measuring Methods

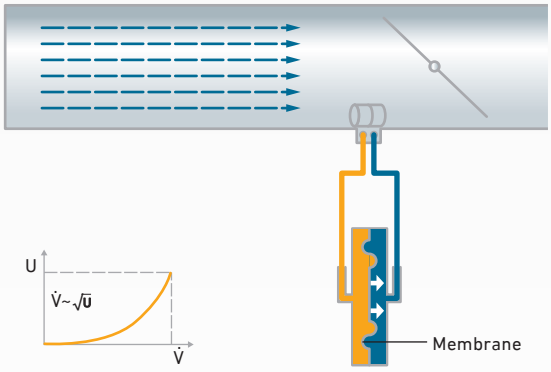
Dynamic Differential Pressure Management

Dynamic methods measure part of the air that is guided through the differential pressure transducer. Dynamic differential pressure measuring makes economical sense in plants where no dust and/or chemical pollution of the air is expected, potentially leading to the contamination of sensors (e. g. administration and office buildings, museums, etc.).

Static Differential Pressure Management

Static differential pressure measurement uses a diaphragm pressure transducer. With this method, no air is guided through the sensor, so no dust or chemical pollution by the air is possible and hence, may well be used in such environments.

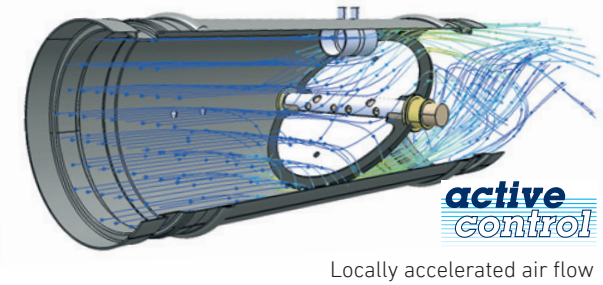




Both principles are applied in our products of VR... series: VR*active* (dynamic) and VR*active-s* (static).

LTG Map Control.
Differential pressure + Damper setting = Flow rate

Contrary to common measuring techniques, the differential pressure is not measured using an upstream element such as orifice plate or differential pressure sensor. Flow rate controllers VR.*active* measure the differential pressure directly in the damper blade area (stronger signal due to locally accelerated air flow).



Locally accelerated air flow at the measuring point

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View of unit

Application

Mechanically self-operated control of a constant air flow rate, i.e. without external power supply, pressure independent. Used in round air supply and discharge ducts in ventilation and air-conditioning systems.

Function

The aerodynamic forces acting on the damper blade are equalised using the control device after it has been set to the required value.

Mechanical flow rate controllers do not need any external energy sources; the required flow rate is easily set using a lever with indicator and scale.

An actuator is optionally available for remote adjustment of the required flow rate. The actuator operates in this case the lever that sets the target value.

Conditions for operation as authorised

- Max. air speed 12.7 m/s
- Max. pressure in the air duct 1000 Pa
- Air flow evenly spread over the entire casing cross-section
- No abrasive, adhesive or chemical constituents in the air
- Temperature in the air duct between
  0...70 °C (version with manual adjustment)
  0...50 °C (version with actuator)
- Surroundings without condensation, icing, ice formation, and without water even from sources other than rain as per EN 60 72133 Amendment A2

The flow rate controllers are protected against the effect of weather to climate classification class 3K5.

Design, constructional features

The flow rate controller consists of

- Casing
- Damper blade
- Control device with spring, vibration absorber, and cap with scale for setting the required values, scale accuracy approx. ± 5 %.

Standard

- Plug-in end pieces with lip seal
- Casing — Galvanized sheet steel (1 mm)
- Control device — Galvanized sheet steel
- Damper blade — Aluminium sheet
- Axle, sleeve, spring — Stainless steel, axle in a casing of stainless steel steel (resp. bronze)
- Sealing — Rubber
- Casing leakness — Class C acc. to DIN EN 1751
- Flow rate — 50...4500 m^3/h
- Max. air speed — 12.7 m/s
- Max. pressure in the air duct 1000 Pa
- Control accuracy — ± 10 % ... ± 20 % of set value

Accessories, special versions

- Stainless steel
- 50 mm thick insulating case of mineral wool as per DIN 4102, material class A2, non-combustible, density 25 kg/m^3
- Coated casing
- Plug-in end piece without lip seal
- Flanges on both sides
- Actuator
- Flexible silencer SDE-AO of aluminium
- Rigid silencer SDE-SO of galvanised sheet steel

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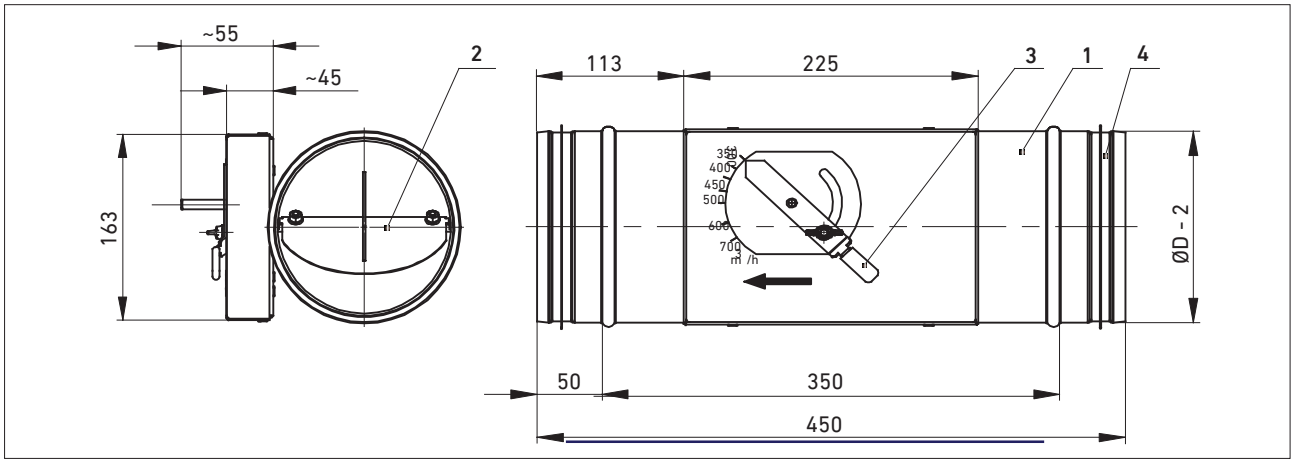
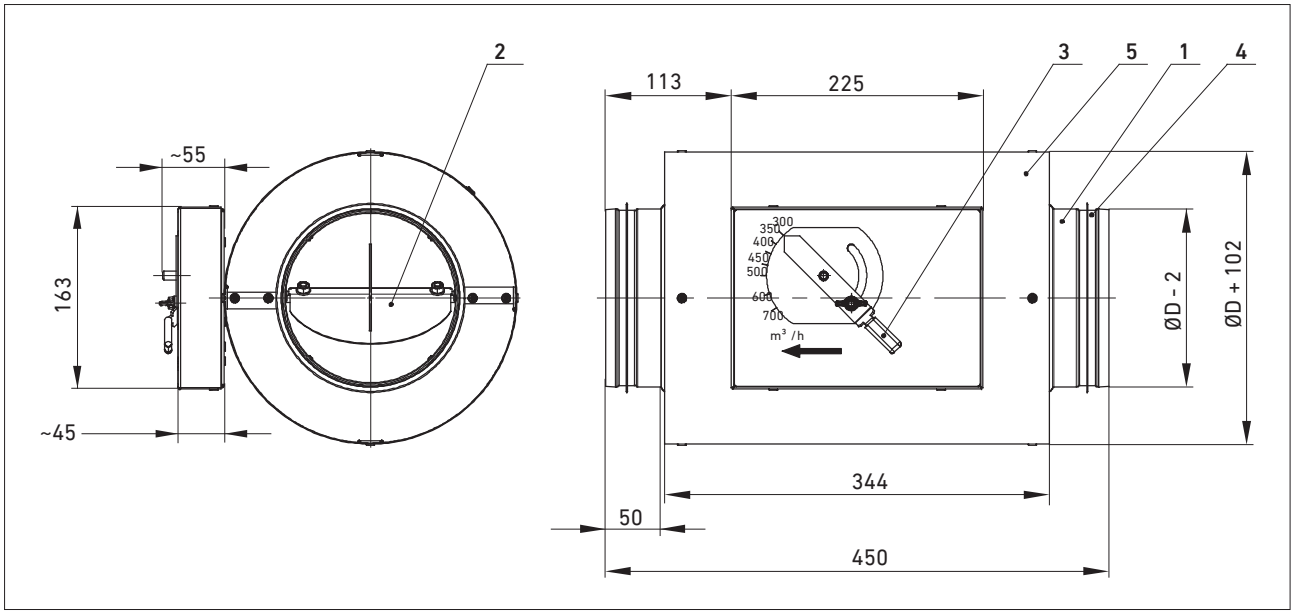
Dimensions, weight (version with manual adjustment)

Nominal size ØD [mm]	Weight [kg]	
	without insulating case	with insulating case
80	2.3	3.7
100	2.5	3.9
125	2.8	4.4
160	3.2	5.1
200	3.8	5.9
250	4.5	7.0
315	5.4	8.4
400	6.7	10.3

Type VRW/2/..././-/..., without insulating case



Type VRW/2/..././D/..., with insulating case



1 Casing 2 Damper blade 3 Lever 4 Lip seal 5 Insulating case

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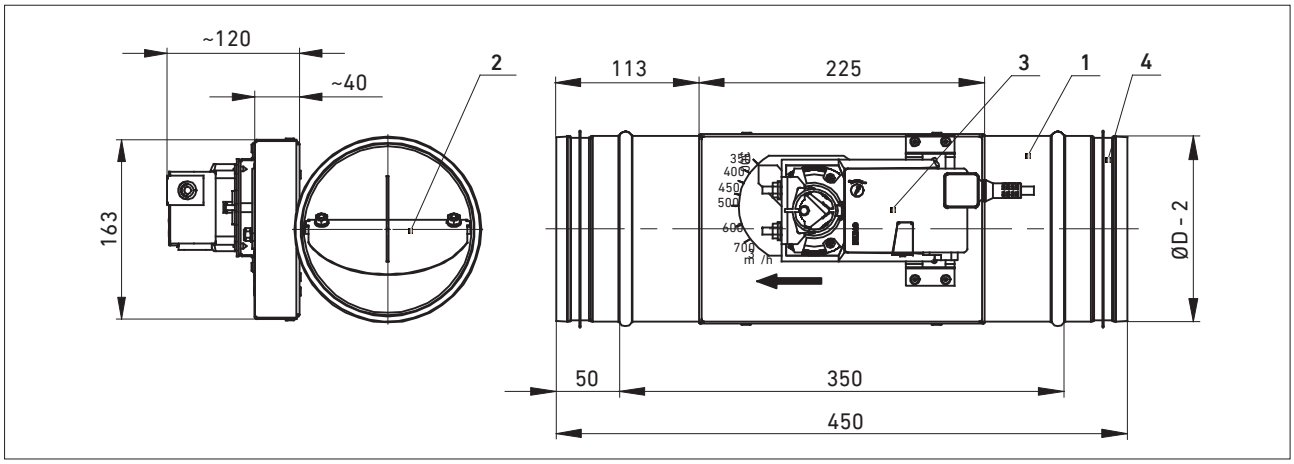
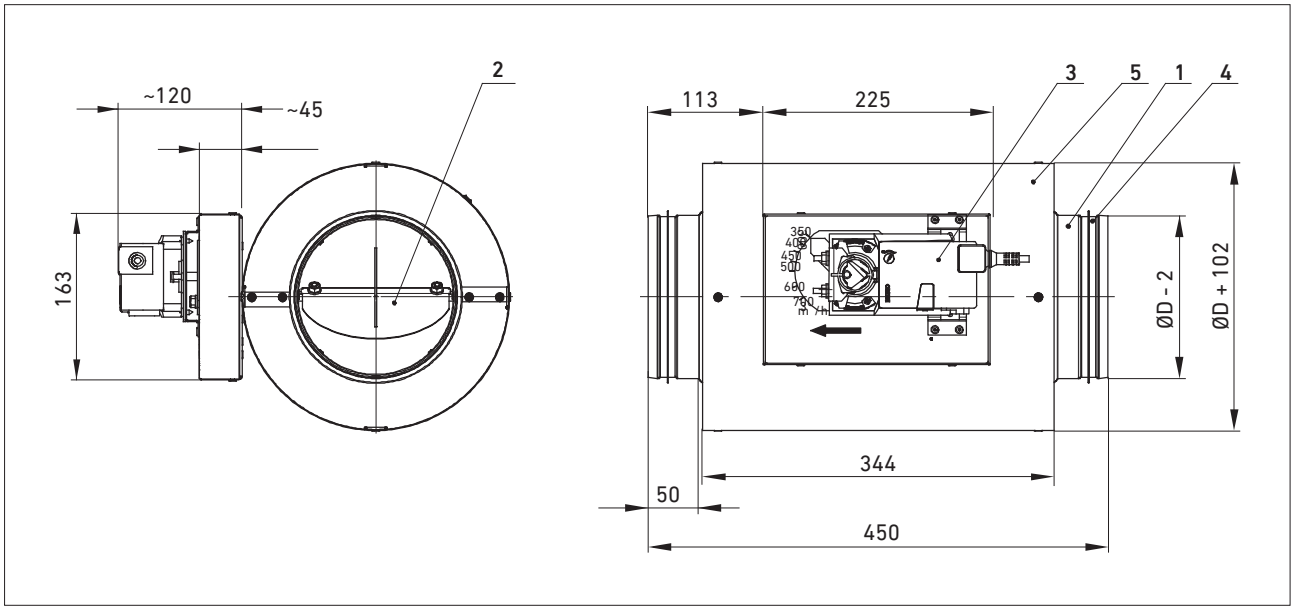
Dimensions, weight (with actuator)

Nominal size ØD [mm]	Weight [kg]		Actuator
	Without insulating case	With insulating case	
80	2.8	4.3	LM 24A
100	3.1	4.5	LM 24A
125	3.4	5.0	LM 24A
160	3.8	5.7	LM 24A
200	4.4	6.5	LM 24A
250	5.4	7.6	LM 24A
315	6.3	9.0	LM 24A
400	8.9	11.2	NM 24A

Type VRW/2/..././-/./.M24A/..., without insulating case



Type VRW/2/..././D/./.M24A/..., with insulating case



1 Casing 2 Damper blade 3 Actuator 4 Lip seal 5 Insulating case

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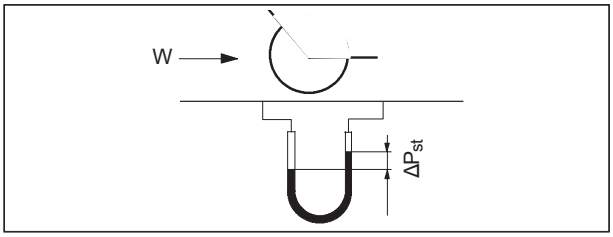
Technical data

Nominal size ØD [mm]	Flow rate [m³/h]		Max. control error ± [%] *	Min. pressure difference Δp_{st} [Pa]
80	50	(min)	20	100
	100		15	100
	150		12	100
	200	(max)	10	120
100	80	(min)	15	50
	150		12	60
	250		10	80
	300	(max)	8	90
125	125	(min)	15	50
	200		12	60
	350		10	70
	500	(max)	8	90
160	200	(min)	15	50
	400		12	70
	700		10	80
	900	(max)	8	90

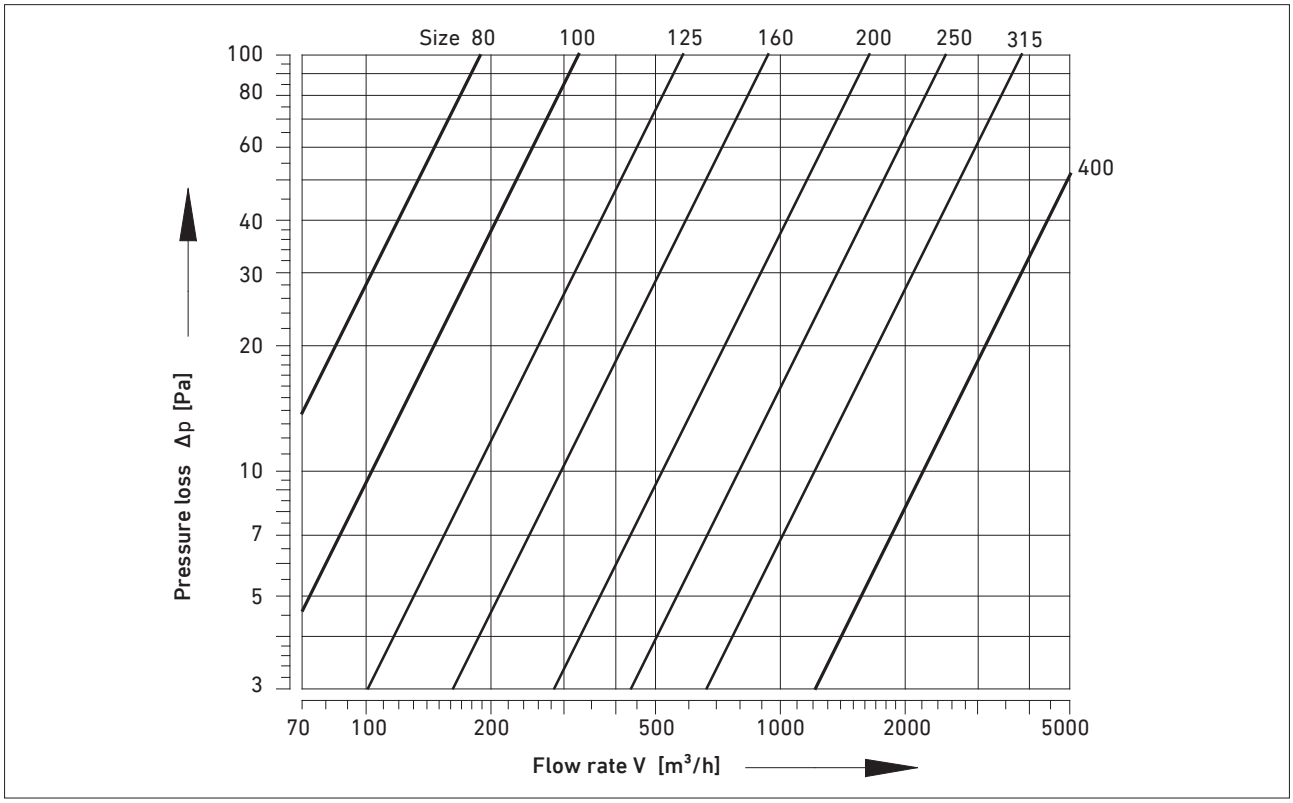
Nominal size ØD [mm]	Flow rate [m³/h]		Max. control error ± [%] *	Min. pressure difference Δp_{st} [Pa]
200	300	(min)	12	50
	500		10	60
	900		10	70
	1300	(max)	8	80
250	500	(min)	12	50
	800		10	70
	1200		10	80
	2000	(max)	8	90
315	850	(min)	12	50
	1200		10	70
	2000		10	80
	2800	(max)	10	90
400	1200	(min)	12	50
	2000		10	70
	3000		10	80
	4500	(max)	10	90

Pressure difference at the flow rate controller

* At pressure differences of ≤ 100 Pa or ≥ 500 Pa, greater divergences are possible.



Pressure losses of flow rate controller with damper blade completely opened



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Airborne sound transmission

Nominal size ØD	Flow rate [m³/h]	Pressure difference Δp_{st} [Pa]																								
		100									250									500							
		Octave power level L_W [dB/Octave]								Sum sound power level L_{WA} A-weighted [dB(A)]	Octave power level L_W [dB/Octave]								Sum sound power level L_{WA} A-weighted [dB(A)]	Octave power level L_W [dB/Octave]								Sum sound power level L_{WA} A-weighted [dB(A)]
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
80	50	52	42	36	36	39	35	27	15	**42**	58	48	42	42	45	41	33	21	**48**	64	54	48	48	51	47	39	27	**54**
	100	58	49	45	42	43	39	32	21	**47**	64	55	51	48	49	45	38	27	**53**	70	61	57	54	55	51	44	33	**59**
	150	64	56	52	48	47	43	39	27	**52**	70	62	58	54	53	49	45	33	**58**	76	68	64	60	59	55	51	39	**64**
	200	70	62	58	53	50	46	43	32	**56**	76	68	64	59	56	52	49	38	**62**	82	74	70	65	62	58	55	44	**68**
100	80	53	43	37	37	40	36	28	16	**43**	59	49	43	43	46	42	34	22	**49**	65	55	49	49	52	48	40	28	**55**
	155	60	51	47	44	45	41	34	23	**49**	65	56	52	49	50	46	39	28	**54**	71	62	58	55	56	52	45	34	**60**
	225	66	58	54	50	49	45	41	29	**54**	73	65	61	56	55	52	48	36	**60**	78	70	66	62	61	57	53	41	**66**
	300	72	64	60	55	52	48	45	34	**58**	77	69	65	60	56	55	50	39	**63**	83	75	71	66	63	60	57	46	**69**
125	125	55	45	39	39	42	38	30	18	**45**	64	54	48	47	50	47	39	27	**53**	71	61	55	54	57	54	46	34	**60**
	250	63	54	50	47	48	44	37	26	**52**	69	60	56	53	54	50	43	32	**58**	76	67	63	60	61	57	50	39	**65**
	380	69	61	57	53	52	48	44	32	**57**	75	67	63	59	58	54	50	38	**63**	82	74	70	66	65	61	57	45	**70**
	500	74	66	62	57	55	50	47	36	**61**	81	73	69	64	61	58	55	44	**67**	87	79	75	70	67	63	60	49	**73**
160	200	58	48	42	42	45	41	33	21	**48**	66	56	50	50	53	49	41	29	**56**	72	62	56	56	59	55	47	35	**62**
	430	64	55	51	48	49	45	38	27	**53**	72	63	59	56	57	53	46	35	**61**	79	70	66	63	63	60	53	42	**67**
	650	69	61	57	53	52	48	44	32	**57**	77	69	65	61	60	56	52	40	**65**	83	75	71	67	66	62	58	46	**71**
	900	74	66	62	57	54	50	47	36	**60**	79	73	69	64	63	55	53	42	**68**	88	80	76	71	68	64	61	50	**74**
200	300	58	48	42	42	45	41	33	21	**48**	67	57	51	51	54	50	42	30	**57**	74	64	58	58	61	57	49	37	**64**
	630	65	56	52	49	50	46	39	28	**54**	72	63	59	56	57	53	46	35	**61**	79	70	66	63	64	60	53	42	**68**
	960	70	62	58	54	53	49	45	33	**58**	77	69	65	61	60	56	52	40	**65**	83	75	71	67	66	62	58	46	**71**
	1300	76	68	64	59	56	52	49	38	**62**	81	73	69	64	61	57	54	43	**67**	87	79	75	70	67	63	60	49	**73**
250	500	59	49	43	43	46	42	34	22	**49**	68	58	52	52	55	51	43	31	**58**	76	66	60	60	63	59	51	39	**66**
	1000	65	56	52	49	50	46	39	28	**54**	72	63	59	58	58	53	46	35	**62**	80	71	67	64	65	61	54	43	**69**
	1500	71	63	59	55	54	50	46	34	**59**	77	69	65	62	61	57	52	40	**66**	84	76	72	68	67	63	59	47	**72**
	2000	76	68	64	59	56	52	49	38	**62**	82	74	70	65	63	58	55	44	**69**	88	80	76	71	68	64	61	50	**74**
315	800	60	50	44	44	47	43	35	23	**50**	68	58	52	52	55	51	43	31	**58**	76	66	60	60	63	59	51	39	**66**
	1500	66	57	53	50	51	47	40	29	**55**	74	65	61	58	59	55	48	37	**63**	80	71	67	66	66	61	54	43	**70**
	2150	71	63	59	55	54	50	46	34	**59**	78	70	66	62	61	57	53	41	**66**	85	77	73	68	67	64	60	48	**72**
	2800	78	70	65	59	57	53	51	40	**63**	82	74	70	65	63	58	55	44	**69**	88	80	76	71	68	64	61	50	**74**
400	1200	67	58	54	51	52	48	41	30	**56**	73	64	58	58	60	57	50	37	**64**	79	70	65	66	68	62	53	42	**71**
	2300	70	62	58	54	55	51	45	33	**59**	75	67	63	61	62	58	50	38	**66**	83	74	70	68	69	65	58	47	**73**
	3400	73	65	60	57	58	53	49	36	**62**	77	69	66	63	65	59	51	41	**68**	86	76	73	70	71	66	59	48	**75**
	4500	76	68	64	60	59	55	51	39	**64**	81	74	70	66	65	61	56	44	**70**	88	81	77	73	72	68	64	51	**77**

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Sound emission (casing radiated noise)

Nominal size ØD	Flow rate [m³/h]	Sum sound power level L_{WA} A-weighted [dB(A)]					
		without insulating case			with insulating case		
		Pressure difference Δp_{st} [Pa]			Pressure difference Δp_{st} [Pa]		
		100	250	500	100	250	500
80	50	20	30	39	<15	<15	<15
	100	27	36	44	<15	<15	<15
	150	34	42	48	<15	15	20
	200	41	47	52	<15	17	22
100	80	22	32	39	<15	<15	<15
	155	30	38	45	<15	<15	15
	225	37	44	50	<15	19	22
	300	43	49	54	<15	20	25
125	125	24	34	42	<15	<15	15
	250	32	40	46	<15	15	20
	380	37	44	50	17	24	28
	500	41	47	53	21	28	30
160	200	36	43	49	<15	19	22
	430	40	47	53	18	26	30
	650	45	51	57	23	32	35
	900	48	54	60	25	31	37
200	300	36	44	50	15	20	22
	630	41	48	54	19	25	30
	960	46	52	57	26	34	38
	1300	50	55	60	29	36	40
250	500	36	46	53	15	23	27
	1000	41	50	57	20	28	33
	1500	46	53	59	28	36	42
	2000	49	56	61	31	39	44
315	800	38	47	53	16	22	27
	1500	44	52	57	22	28	34
	2150	49	56	61	29	35	41
	2800	53	59	64	33	38	45
400	1200	42	50	57	22	28	32
	2300	47	54	60	27	33	37
	3400	51	57	62	33	39	43
	4500	55	60	64	36	42	46

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Installation

The flow rate controllers must be mounted in consideration of and compliance with general rules of engineering, relevant regulations and mandatory construction supervision provisions.

Mounting consists of installation of the flow rate controller into the air piping system and, where applicable, electrical connection of the actuator.

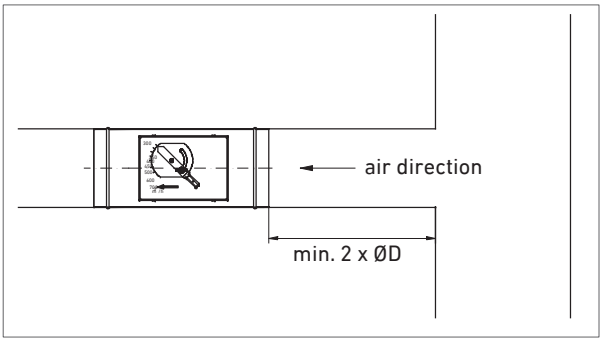
The flow rate controller can be installed with horizontal or vertical valve axis in vertically and horizontally routed air ducts.

During mounting, the flow direction must match the arrow on the casing.

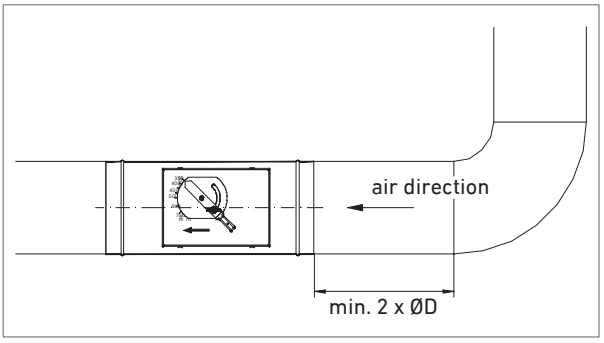
Mounting must not result in any deformations of the casing.

To ensure correct operation of the flow rate controller, the air flow must be spread evenly over the damper blade.

The spacing of shaped parts (bend, branch etc.) must be at least 2 x ØD.



Recommended distance to a branch



Recommended distance to a bend

Nomenclature, ordering code

VRW / 2 / 80 / S / D / L / – / ....-....

(1) (2) (3) (4) (5) (6) (7) (8)

(1)	**Series**	**VRW**	= constant flow rate controller, round
(2)	**Type**	**2**	= new standard from 2017
(3)	**Nominal size**	**80**	= 80
		100	= 100
		125	= 125
		160	= 160
		200	= 200
		250	= 250
		315	= 315
		400	= 400
(4)	**Design**	**S**	= galvanised steel
		E2	= stainless steel V2A
		E4	= stainless steel V4A
		K	= coated (casing only, polyester powder coating RAL 9010))
(5)	**Insulating case**	**–**	= without insulating case (standard)
		D	= with insulating case
(6)	**Connection**	**L**	= plug-in end pieces with lip seal (standard)
(7)	**Actuator**	**–**	= without actuator (standard)
		.M24A	= with actuator Belimo LM24A or NM24A, 24 V AC/DC, 2 target values
		.M24A-S	= with actuator Belimo LM24A-S or NM24A-S, 24 V AC/DC, 2 target values, position feedback
		.M24A-SR	= with actuator Belimo LM24A-SR or NM24A-SR, 24 V AC/DC, continuous activation of target values DC (0)2...10 V
		.M230A	= with actuator Belimo LM230A or NM230A, 230 V AC/DC, 2 target values
		.M230A-S	= with actuator Belimo LM230A-S or NM230A-S, 230 V AC/DC, 2 target values
(8)	**Setting range**	**....-....**	= Flow rate range [m^3/h]-[m^3/h]

© LTG Aktiengesellschaft, Grenzstrasse 7, 70435 Stuttgart , Germany
Tel. +49 711 8201-0, Fax +49 711 8201-720, info@LTG.net, www.LTG.net
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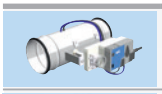
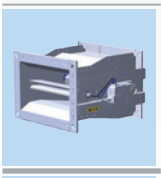
Product Overview • **LTG Air Distribution**

Flow rate controllers

Round

Variable		VRE*active*	LTG Map Control System *ActiveControl*; highest precision, short installation length
		VRD*active*	
		VRE	To combine with customized drives; VRE also available in PPs
		VRD	
Constant		VRW	Without external power supply, pollution-insentitive
		VRZ	

Square

Variable		VRF*active*	LTG Map Control System *ActiveControl*; highest precision, short installation length
		VRF*vent*	LTG control principle-*VenturiControl*; high pecision with low pressure loss, to combine with customized drives
Constant		VRX	Without external power supply, pollution-insentitive

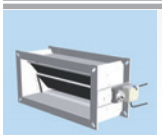
All variable controllers are available with dynamic or static measuring principle

Pressure controllers

Round

	DRE DRE*active*	To balance extreme pressure level differences; optionally with flow rate measuring

Square

	DRF DRF*active*	To balance extreme pressure level differences; optionally with flow rate measuring

Shut-off units

Round

	KLB	Ultra-tight shut-off damper
	ARE	Air-tight shut-off damper

Air-tight shut-off according to DIN EN 1751: Class 4

Square

	ARF	Air-tight shut-off damper

Engineering Services

LTG Engineering Services Comfort Air Technology

Portfolio

For our complete portfolio of air distribution products with suitable accessories see
www.ltg.de/en/products-services/ltg-comfort-air-technology/air-distribution/

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LTG Aktiengesellschaft
Grenzstraße 7
70435 Stuttgart
Germany
Tel.: +49 711 8201-0
Fax: +49 711 8201-720
info@LTG.net
www.LTG.net

LTG Incorporated
105 Corporate Drive, Suite E
Spartanburg, SC 29303
USA
Tel.: +1 864 599-6340
Fax: +1 864 599-6344
info@LTG-INC.net
www.LTG-INC.net

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