The Innovation Company

LTG Aktiengesellschaft

Flow Rate Controller Type VRD-W (short)

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VRD-W-E-TP-01 (12/09) 429-39

Components for Room Air Technology

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The Program for Room Air Technology

Components

Air diffusers for walls, floors and ceilings · LTG System clean® · linear diffusers Coandatrol® · ceiling air diffusers Coandavent® · displacement diffusers · LTG chilling fans cool wave® · induction units Klimavent® · fan coil units Raumluft · ceiling fan coil units Ventotel® · facade fan coil units · airflow control units · labair® system

Engineering services

Technical services for investors, architects, engineers and plant builders during design, construction and operation of buildings. Reliable and precise data relating to the ventilation of air conditioning system are given already before realization of the project, determined by measurements, calculations, building simulations and experiments.

Components for Process Air Technology

Japan

Toho Engineering Co. Ltd.
14-11, Shimizu 3-Chome, Kita Ku
Japan 462 Nagoya
☎ (052) 9 91-10 40, Fax (052) 9 14-98 22
E-Mail: main@tohoeng.com

The Program for Process Air Technology

Components

Axial-flow, centrifugal and tangential fans · Collector system for: coarse and fine particle filtration, separating and compacting, compressing and humidifying.

Engineering services

Technical services for construction engineers and plant designers during development and operation of assembly groups, machines and plants.

Flow Rate Controller VRD-W (short)

Application

The compact flow rate controller unit VRD-W works with auxiliary power and controls the flow rate independent of the initial pressure in two parallel air lines as follows: The flow rate is measured and controlled based on set values, either on the air inlet side (air inlet side controlled ventilation) or on the air outlet side (air outlet side controlled ventilation). The other non-measured air flow is controlled synchronously because of the rigid mechanical connection between the two dampers. This also ensures safe and complete shut-off.

To ensure steady indoor air pressure conditions in all controlled areas of one duct run it is recommended with air inlet side controlled ventilation to measure the inlet air flow in its entirety (e.g. MSE (round) or MSF (rectangular)) and to track the outlet air of the duct run by use of a flow rate controller. Cutting back the number of flow rate controllers may result in considerable savings with respect to investment and data points.

The units are factory-set for flow rates corresponding to velocity range of 1-10 m/s.

The casing is provided with plug-in ends to suit lock-seam ducts according to DIN 24145.

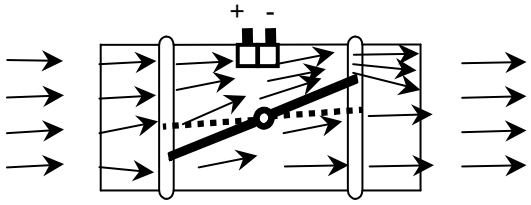
Measuring Principle

Contrary to conventional measuring techniques, the differential pressure is not measured through a conventional element such as an orifice plate. Instead, the differential pressure is measured by elements mounted in the damper blade area.

When the compact controller is powered , it synchronizes the blade at the open stop and throttles the damper to the 20° setting. In this way a ”jet effect” is achieved in the damper blade area which is concentrated with reduced flow rates and higher throttle settings. This results in increased air speeds at the measuring point even with lower duct air speeds allowing for relatively high and very precisely measurable differential pressures.

With this measuring principle, the highest control accuracy of all known systems is achieved even with very low air speeds.

Using this technique, flow rate control depends on two values, the differential pressure and the damper blade position.



Flow pattern inside the housing

Accessories and Special Versions

- Flexible sound absorber SDE-AO made of corrugated aluminum tube
- Rigid sound absorber SDE-SO, as above, with galvanized sheet steel jacket
- Lip seal gasket
- Flanges according to DIN 24154 R1

Advantages

- Cost-saving design and low wiring expenses due to one compact controller being used for both supply and return air
- Excellent control accuracy from +/- 5 % ($\dot{V}_{nom}$) to +/- 15 % ($\dot{V}_{min}$)
- Short installation length thanks to differential pressure measurement in the damper blade area. Thus, perfect for retrofitting and limited-space installation conditions.
- High control ratio of 1:10 (air speeds of 1 m/s to 10 m/s).
- Low minimum pressure loss, resulting in energy savings during operation and lower noise generation.
- Very low air leakage rate with the shut-off damper according to DIN EN 1751 Class 3.
- Good control accuracy even in case of unfavourable entry conditions, due to “jet effect”.

Flow Rate Controller Type VRD-W

You will find the actual ***Tender Documentation*** at the end of this document.
They are available in word format at your local dealership or at www.LTG-AG.de.

Flow Rate Controller VRD-W (short)

Design and Characteristics

The damper has an oval blade of galvanized sheet steel with an EPDM seal meeting DIN EN 1751 Class 3, for "near gas-tight" sealing of the closed blade.

The damper is positioned on a form-fitting, galvanized precision steel round shaft meeting DIN 1652 requirements.

Form-fitting is achieved through a milled surface in the controller area on the longitudinal side. This surface is in parallel to the damper and, in connection with an angle scale on the housing, simultaneously serves as a position indicator.

The shaft is maintenance-free and low-friction due to the use of copolymer bearing bushings (Hostaform C 9021).

Flow Rate Range and minimum Pressure Loss at 5 m/s

DN [mm]	Area [m^2]	V_{nenn} [m^3/h]	w_{nenn} [m/s]	Δp_{min*} [Pa]	V_{min} [m^3/h]	w_{min} [m/s]
100	0,008	270	10	37	27	1
125	0,012	428	10	36	43	1
160	0,020	706	10	35	71	1
200	0,031	1109	10	34	111	1

* at 5 m/s. At 10 m/s, the minimum pressure loss increases to four times the value for 5 m/s.

DN: nominal diameter

$V_{nom:}$ nominal flow rate

w_{nom} nominal air speed

Δp_{min} minimum pressure loss at nominal flow rate

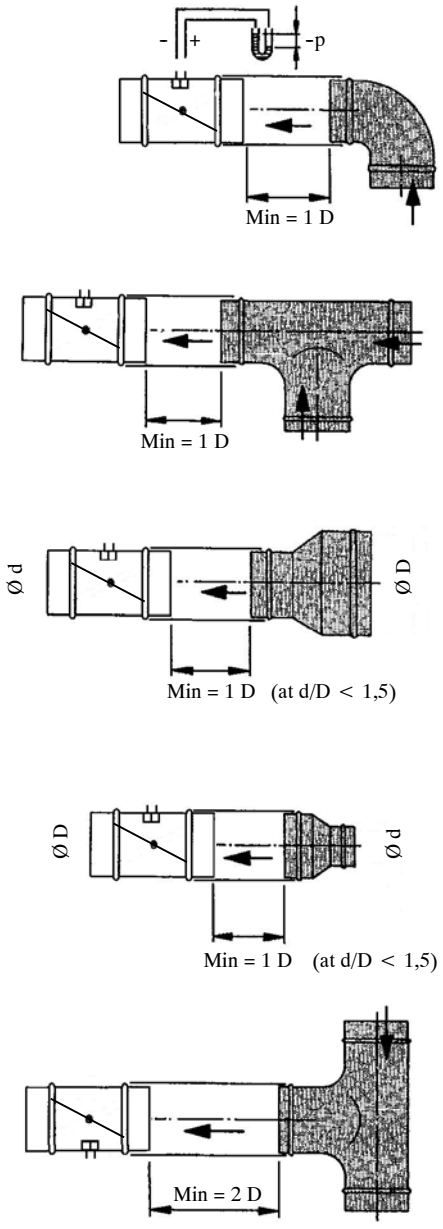
$V_{min:}$ minimum flow rate

w_{min} minimum air speed

Installation Conditions

A straight, undisturbed inflow distance of 1-3xD(mm) in front of the flow rate controller is required. There are, however, no restrictions regarding the outflow side.

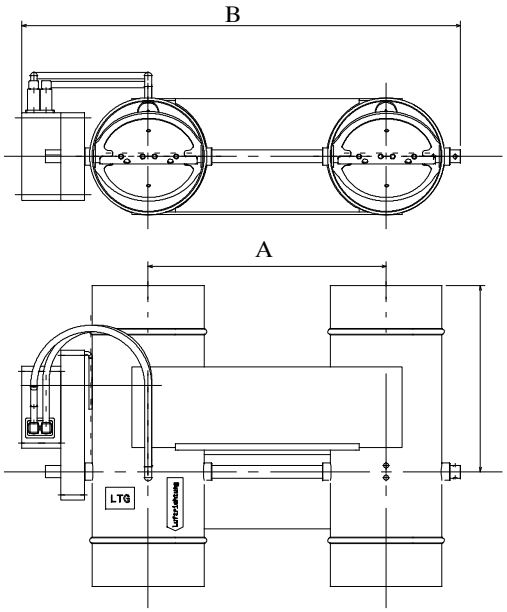
Please ensure indicated positioning of the measuring nipples with respect to the air flow. Avoid turbulent air flow and short radius bends or T-branches before the damper.

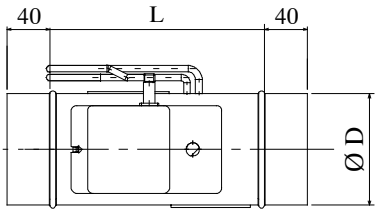


Min. = Minimum distance (measuring accuracy ± 5% regarding $V_{100\%}$). If a combination of fittings that is unfavorable with view to the air flow is unavoidable, the minimum distance is several times the given Min.

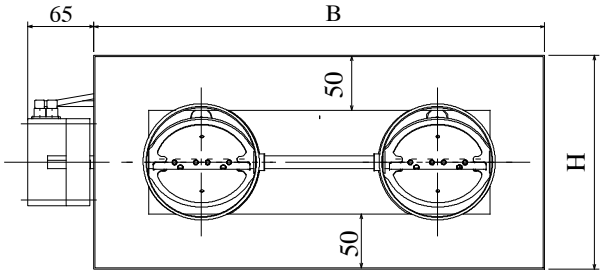
Flow Rate Controller VRD-W (short)

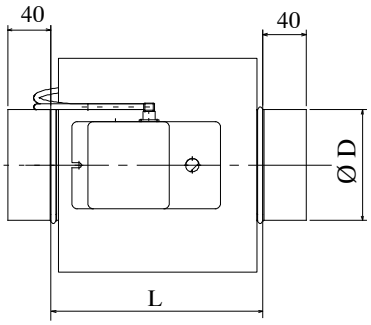
Dimensions and Weights

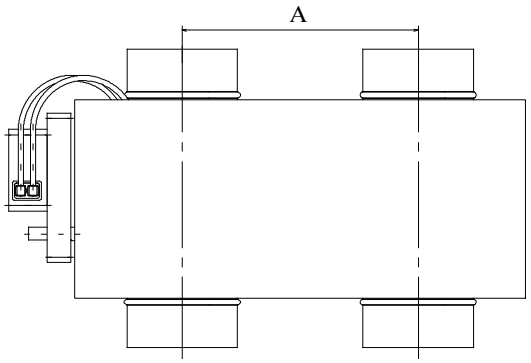




Version without insulating case







Version with insulating case

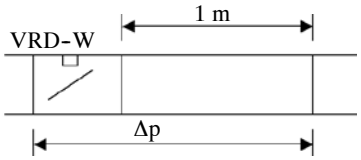
Nominal Diam. Ø D	A [mm]	Version without insulating case B [mm]	Version without insulating case L [mm]	Version with insulating case B [mm]	Version with insulating case H [mm]	Version with insulating case L [mm]	Damper angle [°]	Weight [kg] without insulating case	Weight [kg] with insulating case
100	220	420	195	420	199	195	60	3,2	7.5
125	245	475	195	470	224	195	60	4,0	10,0
160	280	550	215	540	259	215	60	4,6	11.5
200	320	630	215	620	298	215	60	5,8	14.5

Flow Rate Controller VRD-W (short)

*Acoustic Data, Airborne Sound Transmission**

Pressure loss **Δp = 100 Pa**

Direction of air flow ⇨



Δp is the pressure loss across the air flow controller including a 1 m pipe

Nominal size (dia)	Air speed [m/s]	Flow rate [m³/h]	L_W [dB]									
			f_m [Hz]								Weighted levels	
			63	125	250	500	1 K	2 K	4 K	8 K	L_W [dB]	**L_{WA} [dB(A)]**
100	1	27	33	32	36	42	43	32	23	26	47	**45**
	4	108	39	48	44	42	41	35	31	27	51	**45**
	7	189	41	50	45	46	45	42	38	33	54	**50**
	10	270	44	51	48	50	49	47	42	43	57	**54**
125	1	43	32	29	31	39	41	32	23	16	44	**42**
	4	172	46	48	42	44	44	38	32	23	53	**47**
	7	299	50	54	48	49	50	42	40	36	58	**53**
	10	428	50	55	50	53	54	46	43	37	60	**57**
160	1	71	43	37	39	42	42	30	23	26	48	**44**
	4	284	49	50	46	46	46	36	29	26	55	**48**
	7	494	55	57	53	53	52	44	40	36	61	**55**
	10	706	58	60	56	57	57	49	45	40	65	**60**
200	1	111	38	33	37	40	39	31	21	15	45	**42**
	4	444	50	46	44	43	43	39	31	22	53	**46**
	7	776	58	53	50	50	51	46	40	37	61	**54**
	10	1108	65	60	58	57	57	53	48	54	68	**61**

Chart: Airborne Sound Transmission

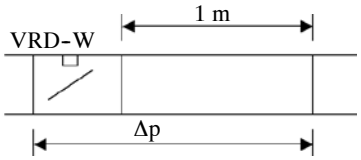
* Data given refers to the duct with installed compact controller.
For both ducts (inlet + outlet air) the following applies: LW total = LW from the chart + 3 dB, with assumed identical sound source levels, e.g. if the air speed and pressure loss in the inlet and outlet ducts are identical.

Flow Rate Controller VRD-W (short)

*Acoustic Data, Airborne Sound Transmission**

Pressure loss **Δp = 100 Pa**

Direction of air flow ⇨



Δp is the pressure loss across the air flow controller including a 1 m pipe

Nominal size (dia)	Air speed [m/s]	Flow rate [m³/h]	L_W [dB]									
			f_m [Hz]								Weighted levels	
			63	125	250	500	1 K	2 K	4 K	8 K	L_W [dB]	**L_{WA} [dB(A)]**
100	1	27	35	35	37	41	47	39	32	28	49	**48**
	4	108	42	51	50	48	50	46	47	42	57	**54**
	7	189	44	56	53	51	51	48	49	46	60	**57**
	10	270	47	58	56	55	54	53	49	52	63	**60**
125	1	43	37	29	33	41	49	44	37	29	51	**51**
	4	172	48	53	48	49	50	45	53	48	59	**57**
	7	299	52	61	54	54	55	49	53	51	64	**60**
	10	428	55	63	57	58	58	53	52	49	66	**62**
160	1	71	42	42	44	45	52	43	39	40	54	**53**
	4	284	52	54	53	52	53	46	39	34	60	**55**
	7	494	58	63	59	57	57	51	47	44	67	**61**
	10	706	62	66	63	61	61	55	51	49	70	**65**
200	1	111	41	37	41	46	49	45	36	28	53	**51**
	4	444	55	52	49	47	47	45	40	33	58	**52**
	7	776	62	59	57	54	54	51	47	48	66	**58**
	10	1108	66	63	61	58	58	56	51	56	70	**63**

Chart: Airborne Sound Transmission

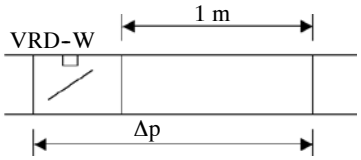
* Data given refers to the duct with installed compact controller.
For both ducts (inlet + outlet air) the following applies: LW total = LW from the chart + 3 dB, with assumed identical sound source levels, e.g. if the air speed and pressure loss in the inlet and outlet ducts are identical.

Flow Rate Controller VRD-W (short)

*Acoustic Data, Airborne Sound Transmission**

Pressure loss **Δp = 100 Pa**

Direction of air flow ⇨



Δp is the pressure loss across the air flow controller including a 1 m pipe

Nominal size (dia)	Air speed [m/s]	Flow rate [m³/h]	L_W [dB]									
			f_m [Hz]								Weighted levels	
			63	125	250	500	1 K	2 K	4 K	8 K	L_W [dB]	**L_{WA} [dB(A)]**
100	1	27	33	37	43	44	48	47	46	40	53	**53**
	4	108	44	53	54	54	58	58	53	48	63	**63**
	7	189	47	59	60	59	59	58	55	61	68	**66**
	10	270	51	64	64	63	61	60	56	54	70	**67**
125	1	43	32	31	36	44	53	58	54	46	61	**61**
	4	172	48	50	51	53	57	57	52	49	62	**62**
	7	299	55	60	63	60	61	60	55	54	69	**66**
	10	428	57	66	69	65	64	62	58	57	73	**69**
160	1	71	42	41	50	51	54	57	50	46	61	**60**
	4	284	57	56	60	61	61	58	55	53	68	**65**
	7	494	64	67	66	65	64	62	57	54	73	**69**
	10	706	67	71	70	68	66	64	59	58	76	**71**
200	1	111	43	41	43	49	56	60	55	47	63	**64**
	4	444	58	57	57	54	54	56	53	51	65	**61**
	7	776	67	66	64	60	59	59	56	60	72	**66**
	10	1108	71	70	68	64	62	61	58	57	76	**68**

Chart: Airborne Sound Transmission

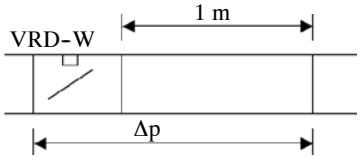
* Data given refers to the duct with installed compact controller.
For both ducts (inlet + outlet air) the following applies: LW total = LW from the chart + 3 dB, with assumed identical sound source levels, e.g. if the air speed and pressure loss in the inlet and outlet ducts are identical.

Flow Rate Controller VRD-W (short)

*Acoustic Data, Casing Sound Emission (for non-insulated casing)**

Pressure loss **Δp = 100 Pa**

Direction of air flow ⇨



Δp is the pressure loss across the air flow controller including a 1 m pipe

Nominal size (dia)	Air speed [m/s]	Flow rate [m³/h]	L_W [dB]									
			f_m [Hz]								Weighted levels	
			63	125	250	500	1 K	2 K	4 K	8 K	L_W [dB]	**L_{WA} [dB(A)]**
100	1	27	20	<	18	25	28	23	<	15	31	**30**
	4	108	26	24	26	25	26	27	19	16	34	**31**
	7	189	28	25	28	28	30	34	26	23	38	**37**
	10	270	32	27	31	33	34	39	31	33	42	**42**
125	1	43	18	<	<	21	24	23	<	<	28	**28**
	4	172	33	23	24	26	27	29	19	<	36	**33**
	7	299	37	29	29	31	33	33	27	25	41	**38**
	10	428	37	30	32	35	38	37	31	26	44	**42**
160	1	71	29	<	20	23	25	20	<	16	32	**27**
	4	284	35	24	27	27	29	26	16	16	37	**32**
	7	494	41	31	34	34	35	34	27	26	44	**39**
	10	706	44	34	37	38	40	39	32	30	47	**44**
200	1	111	28	<	22	25	23	17	<	<	31	**26**
	4	444	40	27	30	28	27	24	16	<	41	**31**
	7	776	48	34	36	35	35	31	26	28	49	**39**
	10	1108	55	41	44	42	41	39	34	45	56	**48**

< ≙ < 15 dB

Casing sound emission data given in the chart refers to the emitting jacket surface of a duct of galvanized sheet steel, total length 6 m, with the flow rate controller installed.

Due to resonance effects given frequency-related sound power level data may vary by +/- 6 dB max.

Chart: Casing sound emission

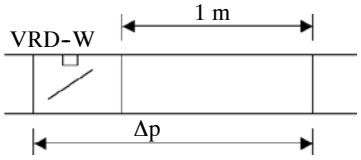
* Data given refers to the duct with installed compact controller.
For both ducts (inlet + outlet air) the following applies: LW total = LW from the chart + 3 dB, with assumed identical sound source levels, e.g. if the air speed and pressure loss in the inlet and outlet ducts are identical.

Flow Rate Controller VRD-W (short)

*Acoustic Data, Casing Sound Emission (for non-insulated casing)**

Pressure loss **Δp = 100 Pa**

Direction of air flow ⇨



Δp is the pressure loss across the air flow controller including a 1 m pipe

Nominal size (dia)	Air speed [m/s]	Flow rate [m³/h]	L_W [dB]									
			f_m [Hz]								Weighted levels	
			63	125	250	500	1 K	2 K	4 K	8 K	L_W [dB]	**L_{WA} [dB(A)]**
100	1	27	22	<	19	23	31	31	20	17	35	**35**
	4	108	30	26	33	31	34	37	36	31	42	**42**
	7	189	31	31	36	34	36	40	38	36	45	**45**
	10	270	34	33	38	37	39	44	38	42	49	**48**
125	1	43	23	<	<	23	33	35	25	17	38	**38**
	4	172	35	28	30	31	34	36	41	37	44	**44**
	7	299	39	36	36	36	38	40	41	40	48	**47**
	10	428	42	37	39	40	42	43	40	37	50	**48**
160	1	71	28	16	25	26	35	33	26	30	39	**38**
	4	284	38	28	34	33	36	36	26	24	43	**40**
	7	494	44	37	40	38	40	41	34	34	48	**45**
	10	706	48	40	44	42	44	45	38	39	52	**49**
200	1	111	31	17	27	30	33	30	22	19	38	**36**
	4	444	45	32	35	32	31	31	25	24	46	**37**
	7	776	52	40	43	39	37	37	33	39	53	**44**
	10	1108	56	44	47	43	42	41	36	47	58	**50**

< ≙ < 15 dB

Casing sound emission data given in the chart refers to the emitting jacket surface of a duct of galvanized sheet steel, total length 6 m, with the flow rate controller installed.

Due to resonance effects given frequency-related sound power level data may vary by +/- 6 dB max.

Chart: Casing sound emission

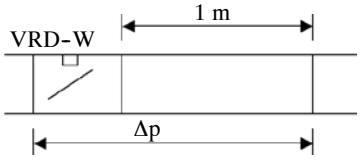
* Data given refers to the duct with installed compact controller.
For both ducts (inlet + outlet air) the following applies: LW total = LW from the chart + 3 dB, with assumed identical sound source levels, e.g. if the air speed and pressure loss in the inlet and outlet ducts are identical.

Flow Rate Controller VRD-W (short)

Acoustic Data, Casing Sound Emission (for non-insulated casing)*

Pressure loss **Δp = 100 Pa**

Direction of air flow ⇨



Δp is the pressure loss across the air flow controller including a 1 m pipe

Nominal size (dia)	Air speed [m/s]	Flow rate [m³/h]	L_W [dB]									
			f_m [Hz]								Weighted levels	
			63	125	250	500	1 K	2 K	4 K	8 K	L_W [dB]	**L_{WA} [dB(A)]**
100	1	27	21	<	26	26	33	39	35	29	41	**42**
	4	108	32	28	37	37	43	49	41	38	51	**52**
	7	189	34	34	43	41	44	50	43	51	55	**54**
	10	270	38	39	46	45	46	51	45	43	55	**55**
125	1	43	19	<	18	26	37	49	42	35	50	**51**
	4	172	35	25	33	35	41	48	40	38	50	**50**
	7	299	42	35	45	42	45	51	43	43	54	**54**
	10	428	44	41	51	47	48	53	46	46	57	**56**
160	1	71	28	<	31	32	37	47	37	36	48	**49**
	4	284	43	30	41	42	44	48	42	43	52	**52**
	7	494	50	41	47	46	47	52	44	44	56	**55**
	10	706	53	45	51	49	49	54	46	48	59	**57**
200	1	111	33	22	28	34	40	46	41	38	49	**49**
	4	444	48	38	42	38	38	41	39	42	51	**47**
	7	776	57	46	50	44	42	44	41	51	59	**53**
	10	1108	61	51	54	49	46	47	44	48	63	**54**

< ≙ < 15 dB

Casing sound emission data given in the chart refers to the emitting jacket surface of a duct of galvanized sheet steel, total length 6 m, with the flow rate controller installed.

Due to resonance effects given frequency-related sound power level data may vary by +/- 6 dB max.

Chart: Casing sound emission

* Data given refers to the duct with installed compact controller.
For both ducts (inlet + outlet air) the following applies: LW total = LW from the chart + 3 dB, with assumed identical sound source levels, e.g. if the air speed and pressure loss in the inlet and outlet ducts are identical.

Flow Rate Controller VRD-W (short)

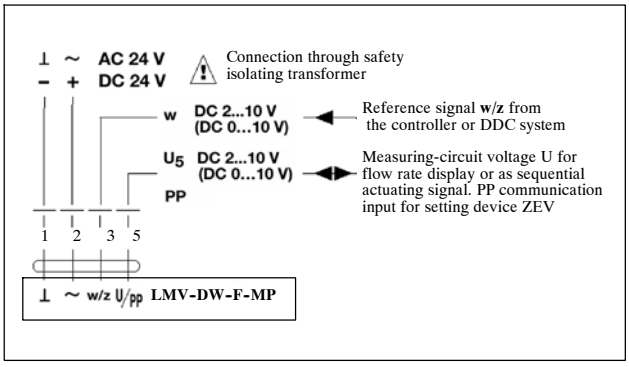
Flow Rate Controller VAV Compact LMV-DW-F-MP

Controller LMV-DW-F-MP

Pressure sensor, controller and actuator in one compact unit 5 Nm operating torque

Continuous control:
DC 2 ... 10 V, DC 0 ... 10 V

Forced controls:
«SHUT», $\dot{V}_{MIN}$, $\dot{V}_{ZS}$, $\dot{V}_{MAX}$, «OPEN»
communication capability (PP)



Wiring diagram for controller LMV-DW-F-MP

Application

The VAV Compact LMV-DW-F-MP is designed for an initial pressure independent control of VAV boxes.

It is activated through continuous signals of position transmitters, master controller or DDC systems. Through simple application of AC signals, various modes of operation may be realized in terms of forced controls.

Design

The LMV-DW-F-MP includes a dynamic differential pressure sensor and an electronic measuring and control unit with a microprocessor. The unit is based on the proven LM actuator.

Function and Setting

The gearbox may be released by pressing the button on the housing. While the button is pressed the damper may be operated by hand. Apart from the release button, the LMV-DW-F-MP has no further operating elements such as switches or set point potentiometers.
Programming of the operating range and of the operating parameters $\dot{V}_{MIN}$, $\dot{V}_{MAX}$ and $\dot{V}_{NOM}$ is performed using the PP setting device ZEV.

Advantages of the PP Communication:

- Possibility to check the actual value and remotely adjust parameters.
- Maloperations through unauthorized or unskilled persons are virtually prevented.

Techn. characteristics	**LMV-DW-F-MP**
Rated voltage	AC 24 V, 50/60 Hz, DC 24 V
Operating range	AC 19.2 ... 28.8 V, DC 21.6 ... 26.4 V
Power consumption	3 W
Dimensioning	5.5 VA
Reference variable w Input resistance	DC 0 ... 10 V (control between V_{MIN} and V_{MAX}) min. 50 kΩ
Mode control z	Forced control for «SHUT», V_{MIN}, V_{ZS}, V_{MAX}, «OPEN» specific switching with supply voltage
Working range (mode)	«2 ... 10 V» = DC 2 ... 10 V for V_{MIN} ... V_{MAX}
acc. to choice	«0 ... 10 V» = DC 0 ... 10 V for V_{MIN} ... V_{MAX}
Flow rate Actual value signal U5	DC 2 ... 10 V @ 0,6 mA (modo 2 ... 10) DC 0 ... 10 V @ 0,6 mA (modo 0 ... 10) Linear signals, corresponding to 0 ... 100 % V_{NOM}
Measuring range of sensor	2 ... ≈ 300 Pa (OEM-dependent)
Connection	1 m, 4 x 0.75 mm² cable
Direction of rotation	left/right selectable with ZEVO or PC (realized by OEM)
Class of protection	III (safety extra-low voltage)
Degree of protection	IP 42
Angle of rotation	max. 95°, adjustable mechanical stops
Torque	8 Nm min. with rated voltage
Position inidication	mechanical with pointer
Ambient temperature Storage temperature Humidity testing	0 ... + 50 °C - 20 ... + 80 °C according to EN 60335-1
EMC	CE complying with 89/336/EWG and 92/31/EWG
Sound power level	max. 35 dB(A)
Maintenance	maintenance-free
Weight	900 g

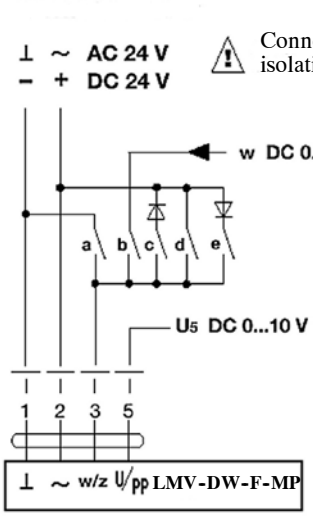
Electrical Accessories

ZEV	Setting device
SN1, SN2	Auxiliary switches

Flow Rate Controller VRD-W (short)

Operating Modes

With contact assembly

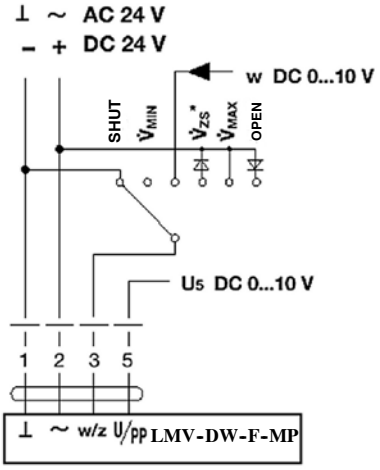


Work. range / Function DC 2 ...10 V	DC 0 ...10 V	a	b	c *	d	e *
SHUT	$\dot{V}_{MIN}$					
	$\dot{V}_{MIN}$					
variable	$\dot{V}_{MIN}$ ... $\dot{V}_{MAX}$					
** ZS (intermediate stage)						
	$\dot{V}_{MAX}$					
OPEN						

* only with AC 24 V

** $\dot{V}_{ZS} = 0.5 \cdot (\dot{V}_{MAX} - \dot{V}_{MIN}) + \dot{V}_{MIN}$

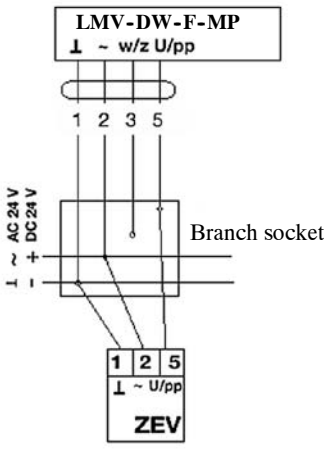
With rotary switch



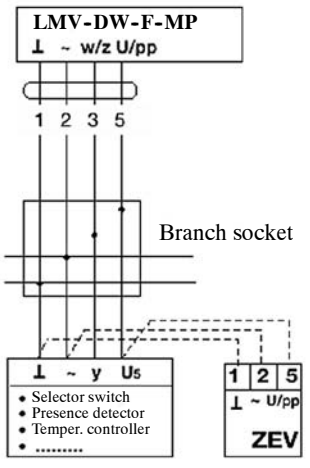
«SHUT», «OPEN» function: Flow rate control is inactive!

Examples for connecting the Control and Setting Device ZEV with the LMV-DW-F-MP

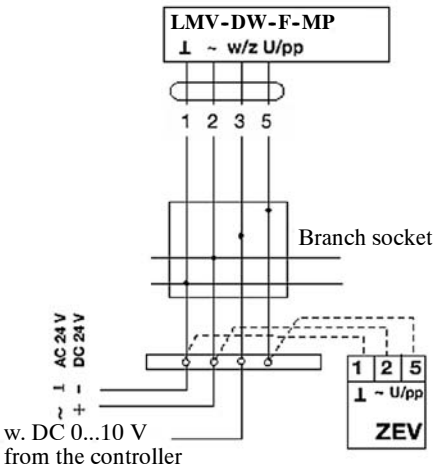
On site, at the controller connection



On site, at the master controller / control device



In the control cabinet



Flow Rate Controller VRD-W (short)

Operating Flow Rate $\dot{V}_{MIN}$ and $\dot{V}_{MAX}$

The flow rate controller's linear characteristic allows an easy setting of the operating flow rates on site through the use of two potentiometers on the setting device ZEV, a job that is performed in the factory (OEM), during installation or first use.

$\dot{V}_{MAX}$ represents the upper limit depending on the nominal flow rate.

$\dot{V}_{MIN}$ may be adjusted as a percentage of the set $\dot{V}_{MAX}$

The actual value output U_5 is not affected by the $\dot{V}_{MIN}$ and $\dot{V}_{MAX}$ settings.

Using the reference signals w/z, the flow rate setpoint may be adjusted continuously or in steps within the specified limits.

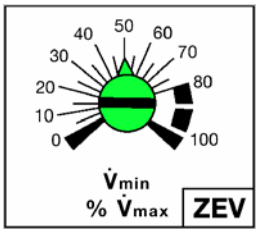
Operating Modes

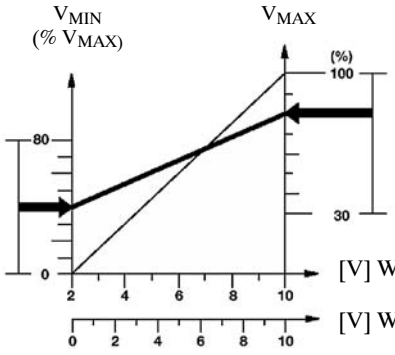
Multi-stage constant operation via forced controls:
Through simple forced control signals, the controller may be set to various operating stages according to requirement. As required, the controller will maintain constant the operating flow rate for $\dot{V}_{MIN}$, $\dot{V}_{MAX}$, or the average value thereof, will open or shut the damper depending on the control signal.

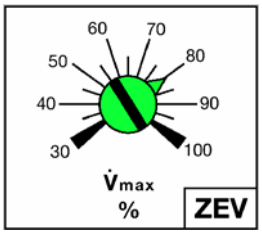
For technical reasons, forced control «SHUT» is only possible for the DC 2 ... 10 V working range or, in general, when setting $\dot{V}_{MIN}$ to 0%.

Continuous:
Using the reference signal w (DC 0 ... 10 V), the flow rate may be controlled within the $\dot{V}_{MIN}$ / $\dot{V}_{MAX}$ limits.
The effective working range DC 2 ... 10 V or DC 0 ... 10 V may be selected.
Forced control functions are active even when in the continuous mode and may be used in virtually any combination.

Operating elements for mode and parameter selection:
Except for the gearbox release button,
the LMV-DW-F-MP has no operating elements.
The installation specific operating parameters $\dot{V}_{MIN}$ and $\dot{V}_{MAX}$ and the working range are set via the PP communication interface U_5 using the setting device ZEV.





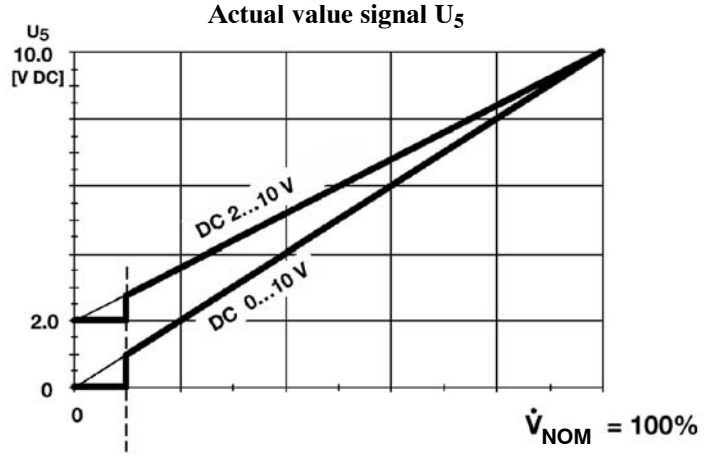


[V] Working range 2 ... 10 V

[V] Working range 0 ... 10 V

↑ The actuator will shut the damper by force if the setpoint for the minimum flow rate V_{MIN} has been set to 0% and the control signal complies with the V_{MIN} value.

Actual value signal U_5



Suppression of very small quantities according to differential pressure < ca. 2 [Pa]

Flow Rate Controller VRD-W (short)

Nomenclature

VRD-W ... / . / . / .. ...

Flow rate controller, round (short)

Size or diameter
- 100
- 125
- 160
- 200

Version
- S: steel, galvanized

Insulating case
- -: without
- D: with

Control type
- BI 670: Belimo LMV-DW-F-MP

Specification and Schedule of Prices

Flow Rate Controller VRD-W (short)

Edition 19.8.2008

Qty.	Description	Unit price in €	Total price in €
	Round twin flow rate controller for constant or variable flow rate controlling in high or low pressure installations, with two parallel control dampers. Thus, only 1 controller required for supply and return air, initial pressure independent. Minimum initial pressure at air speed 5 m/s: 23 Pa to 37 Pa, depending on size. Differential pressure range up to 800 Pa. Air speed 1 - 10 m/s. Plug-in installation system to fit lock-seam spiral wound ducts according to DIN 24145. All components are factory-wired and hose-connected. Display of damper setting and angle scale on the housing's outside. <u>Unit VRD-W consisting of:</u> Two very short parallel casings of galvanized sheet steel. Oval damper blades of galvanized sheet steel with EPDM sealing, low leakage meeting DIN EN 1751 Class 3 requirements. Form-fitting damper axle of galvanized precision steel according to DIN 1652. Low-friction, maintenance-free co-polymer damper bearing bushings (Hostaform C9021). Both damper blades are installed on the same continuous axis. Differential pressure measurement in the damper blade area on two cup-shaped elements. **Actuator/Control:** o Belimo LMV-DW-F-MP (dynamic measuring principle) **Model sizes/dimensions Ø x L:** o Ø 100 mm, installation length 195 mm o Ø 125 mm, installation length 195 mm o Ø 160 mm, installation length 215 mm o Ø 200 mm, installation length 215 mm **Manufacturer: LTG Aktiengesellschaft** **Series: Flow Rate Controller** **Type: VRD-W** **Accessories/special equipment** (optional, additional charge): o S = galvanized steel o D = insulating case (50 mm) with front cover o SDE = silencer o Plug-in end pieces with lip seal gasket		