

Lindab **VRU**

Volume flow regulator - circular



Volume flow regulator - circular VRU



Description - Compact

VRU is a circular VAV unit with combined regulating damper and airflow measurement in one unit, used for pressure independent volume air flow rate regulation. VRU Compact is available with actuators for different communication platforms; analogue MF, Belimo MP, Modbus/BACnet or KNX. (For VRU Universal see details on next page).

VRU is equipped with Lindab Safe for connection to the duct and is prepared for insulation up to 50 mm.

VRU can be installed in any position without adjustment required.

To avoid clogging of the measuring cross, it is recommended to use VRU only in applications with clean air, meaning free of dust, particles and similar.

- Pressure independent VAV regulation.
- Analogue MF, Belimo MP, Modbus/BACnet or KNX.
- Integrated NFC interface, compatible with Belimo Assistant App (only MP).
- Damper tightness class 4 according to EN 1751.
- Tightness class ATC 3 according to EN 1751 (formerly class C).
- Can be supplied with attenuation shield.

Note:

In Pascal systems VRU-MF is used and V_{max} and V_{min} settings has to be 100% and 0% respectively. Airflows are set in Regula Combi room controller.

Order code

Product	VRU	bbb	ccc	d
Type	VRU			
Dimension	Ød 100 - 630			
Motor type	MF, MP, MOD, KNX			
Attenuation shield	- Without attenuation shield D With attenuation shield			

Example: VRU - 250 - MF

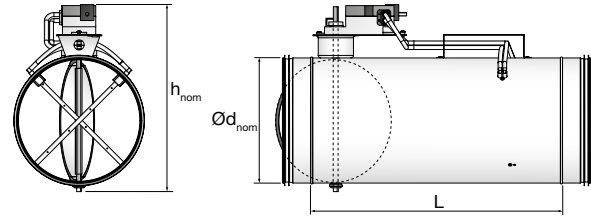
Factory settings

	Standard
Min. Air flow	0
Max. Air flow	V_{nom} (7 m/s)
Control signal	2 - 10 V
Feedback signal	Damper position *

* Valid for MP and MF.

Dimensions

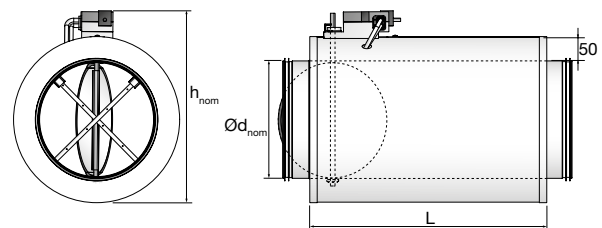
VRU (MF, MP, MOD, KNX)



Dimension table

Ød _{nom} mm	L mm	h _{nom}	Weight Kg
		MF / MP / MOD / KNX mm	
100	400	225	1.7
125	400	250	1.9
160	400	285	2.2
200	400	325	2.6
250	500	375	3.5
315	500	440	4.1
400	510	526	5.5
500	610	626	8.1
630	660	756	10.7

VRU (MF-D, MP-D, MOD-D, KNX-D)



Dimension table

Ød _{nom} mm	L mm	h _{nom}	Weight Kg
		MF-D/MP-D/MOD-D/KNX-D mm	
100	400	275	3.5
125	400	300	4.0
160	400	335	4.6
200	400	375	5.4
250	500	425	7.5
315	500	490	8.8
400	510	576	11.3
500	610	676	16.3
630	660	806	21.4

Motor type table

Type	Motor	
	Ød 100 - 315	Ød 400 - 630
MF	LMV-D3-MF-F	NMV-D3-MF-F
MP	LMV-D3-MP-F	NMV-D3-MP-F
MOD	LMV-D3-MOD-F	NMV-D3-MOD-F
KNX	LMV-D3-KNX-F	NMV-D3-KNX-F

Belimo documentation

For Belimo motor documentation, visit and read more on Belimo's homepage:

Type	Dokumentation
MF	LMV-D3-MF-F
MP/MOD/KNX	Compact VAV controllers

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Description - Universal

VRU is a circular VAV unit with combined regulating damper and airflow measurement in one unit, used for pressure independent volume flow regulation.

VRU Universal is equipped with regulator and rotary actuator.

Regulators comes with either flow sensor (D3) for clean air or membrane sensor (M1) for contaminated air.

Actuators are available as standard universal (UNI), spring-return (SPR) or fast-running version (FAS). (For VRU Compact see details on previous page).

VRU is equipped with Lindab Safe for connection to the duct and is prepared for insulation up to 50 mm.

VRU can be installed in any position without adjustment required.

To avoid clogging of the measuring cross, it is recommended to use VRU only in applications with clean air, meaning free of dust, particles and similar.

- Belimo MP, Modbus, BACnet & analogue control 0(2)-10V.
- Integrated NFC interface, compatible with Belimo Assistant App.
- Damper tightness class 4 according to EN 1751.
- Tightness class ATC 3 according to EN 1751 (formerly class C).

Order code

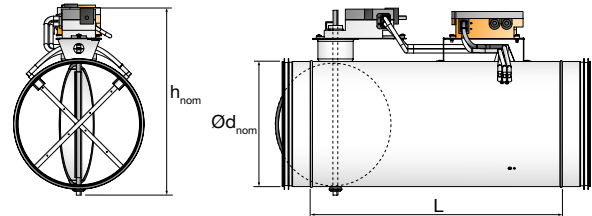
Product	VRU	bbb	ccc	d
Type	VRU			
Dimension	Ød 100 - 630			
Motor type	UNI Universal rotary actuator SPR Spring return actuator FAS Fast running actuator			
Regulator type	D D3 dynamic flow sensor M M1 membrane sensor			

Example: VRU - 250 - UNI - D

Factory settings

	Standard
Min. Air flow	0
Max. Air flow	V_{nom} (7 m/s)
Control signal	2 - 10 V
Feedback signal	Flow

Dimensions



Dimension table

Ød _{nom} mm	L mm	h _{nom}		Weight Kg
		UNI mm		
100	400	225		2.0
125	400	250		2.2
160	400	285		2.5
200	400	325		2.9
250	500	375		3.8
315	500	440		4.4
400	510	526		5.9
500	610	626		8.5
630	660	756		11.1

h_{nom} and Weight is shown in the table for VRU-UNI.

SPR: h_{nom} + 20 mm and weight + 1.5 kg

FAS: h_{nom} + 15 mm and weight + 0.4 kg

Motor type table

		Motor	
Type	Regulator	Ød 100-315	Ød 400-630
UNI	VRU-D3-BAC	LM24A-VST	NM24A-VST
UNI-M	VRU-M1-BAC	LM24A-VST	NM24A-VST
SPR	VRU-D3-BAC	LF24A-VST	NF24A-VST
SPR-M	VRU-M1-BAC	LF24A-VST	NF24A-VST
FAS	VRU-D3-BAC	LMQ24A-VST	NMQ-24A-VST
FAS-M	VRU-M1-BAC	LMQ24A-VST	NMQ-24A-VST

Belimo documentation

For Belimo motor documentation, visit and read more on Belimo's homepage:

Type	Documentation
All	Belimo Universal

Volume flow regulator - circular VRU

Technical data

Air flow measurement

The accuracy of air flow measurement depends on the flow conditions in front of the measuring cross. It is preferable to have a long straight duct section in front of the measuring point, according to the table below.

If these recommendations are not followed, it will cause an unstable flow measurement and therefore higher inaccuracy in the regulation of the required air flow.

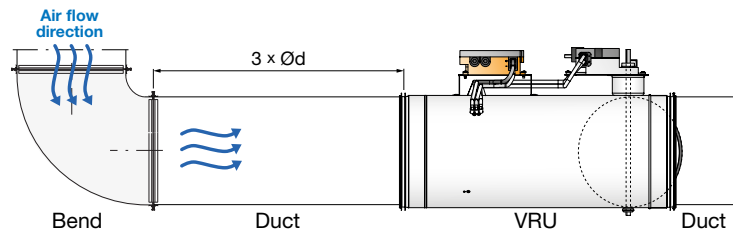
The accuracy of volume flow measurement also depends on whether the holes in the measuring cross are free of dust. The dust content in the individual application will determine the cleaning interval. For cleaning the measuring cross, see the [installation instructions](#).

Components	Recommended straight duct before unit
Bend	3 x Ød
Tee-piece	4 x Ød
Damper	6 x Ød

With recommended straight duct in front of the unit, the air flow accuracy will be according to the table below.

Duct velocity	Air flow accuracy
> 3 m/s	+/- 5%
1.2 - 3 m/s	+/- 10%
0.7 - 1.2 m/s	+/- 25%

Example:



Example above showing top view of recommended straight duct distance between duct bend and a VRU.

Settings

V_{nom} indicates the measuring range for the actuator. A standard VRU is calibrated to a V_{nom} of 7 m/s according to the table below.

In special cases the VRU can be set to a higher V_{nom} , e.g. 10 m/s.

For VRU, V_{max} and V_{min} indicate the limits for the actuators working range.

There is linearity between V_{min} to V_{max} and the input signal. V_{max} can be set in the range 20 - 100% of V_{nom} , V_{min} in the range of 0 - 100% of V_{nom} ($< V_{max}$); however, there is no regulation between 0.7 m/s and closed position.

VRU nominal air flow (V_{nom}) and measuring limit

Size Ød mm	Measuring limit (0.7m/s)		(Standard) V_{nom} (7m/s)		V_{nom} (10m/s)	
	m ³ /h	l/s	m ³ /h	l/s	m ³ /h	l/s
100	20	6	198	55	283	79
125	31	9	309	86	442	123
160	51	14	506	141	723	201
200	79	22	791	220	1130	314
250	124	34	1236	343	1766	491
315	196	54	1963	545	2804	779
400	317	88	3165	879	4522	1256
500	495	138	4946	1374	7065	1963
630	785	218	7851	2181	11216	3116

Volume flow regulator - circular VRU

Technical data

Sound data

Below sound power levels for ducts (flow noise) with reference to ISO 5135 as a function of air flow and pressure difference.

Dim. Ød mm	Pressure drop Pa	Velocity app. 1 m/s								L _{WA} dB(A)	Velocity app. 3 m/s								L _{WA} dB(A)	Velocity app. 6 m/s								L _{WA} dB(A)
		Centre frequency Hz									Centre frequency Hz									Centre frequency Hz								
		63	125	250	500	1k	2k	4k	8k		63	125	250	500	1k	2k	4k	8k		63	125	250	500	1k	2k	4k	8k	
100	500	Flow 8 l/s / 29 m³/h								63	Flow 24 l/s / 86 m³/h								60	Flow 47 l/s / 169 m³/h								66
	200	69	45	43	46	48	46	40	29		72	54	55	57	56	51	44	34		75	64	66	65	61	55	47	37	
	100	64	43	41	44	44	41	35	27		67	54	54	54	51	46	39	31		70	65	65	61	55	48	41	32	
	50	60	41	40	41	40	37	31	24		63	53	53	50	46	40	34	27		66	65	63	57	49	43	35	28	
	20	55	40	38	37	35	32	27	21		58	52	50	46	40	35	29	23		63	62	59	52	44	37	29	23	
125	500	Flow 12 l/s / 43 m³/h								63	Flow 37 l/s / 133 m³/h								62	Flow 74 l/s / 266 m³/h								67
200	79	62	48	48	53	54	49	38	77		56	55	58	58	55	51	43	80		68	68	66	61	55	49	41		
100	70	51	43	45	48	48	44	36	71		56	55	55	51	47	43	36	74		69	66	60	52	45	37	31		
50	65	45	41	42	43	42	39	32	66		56	54	50	45	39	34	29	68		65	61	53	45	38	29	24		
20	59	42	39	39	38	36	33	27	60		53	49	43	37	31	25	21	64		59	55	48	42	37	28	21		
160	500	Flow 20 l/s / 72 m³/h								63	Flow 60 l/s / 216 m³/h								61	Flow 121 l/s / 436 m³/h								65
200	79	58	51	53	57	62	63	53	67		53	54	55	56	55	52	45	70		61	64	63	60	57	52	44		
100	67	49	45	47	50	51	50	43	61		51	51	50	48	46	43	37	67		62	63	60	55	50	44	36		
50	59	43	41	42	43	42	41	35	58		50	50	47	44	41	37	31	65		60	61	57	51	45	37	28		
20	52	39	37	36	35	34	32	27	55		48	48	44	39	35	31	25	63		55	56	52	46	39	29	21		
200	500	Flow 31 l/s / 112 m³/h								63	Flow 94 l/s / 338 m³/h								62	Flow 188 l/s / 677 m³/h								65
200	69	52	51	57	61	60	54	42	62		53	56	57	58	56	51	41	73		65	64	61	58	58	56	47		
100	58	45	47	50	52	50	44	34	62		54	53	51	50	49	47	38	73		67	64	57	52	51	49	42		
50	53	42	43	45	45	44	39	30	63		54	52	47	44	44	42	36	70		65	61	53	47	43	40	33		
20	50	40	40	40	39	37	34	27	61		53	49	43	38	37	36	31	62		59	56	48	41	35	29	21		
250	500	Flow 49 l/s / 176 m³/h								63	Flow 147 l/s / 529 m³/h								65	Flow 295 l/s / 1062 m³/h								67
200	-	-	-	-	-	-	-	-	67		54	56	57	59	61	57	45	71		68	66	62	60	60	58	48		
100	66	48	47	52	55	55	51	41	63		56	55	53	52	53	50	41	69		67	63	56	52	49	46	40		
50	60	44	45	47	49	50	46	36	60		56	52	47	45	44	42	36	64		61	55	50	44	39	34	30		
20	56	44	43	43	43	44	42	33	55		51	45	39	35	33	30	27	60		53	48	44	38	32	26	21		
315	500	Flow 78 l/s / 281 m³/h								63	Flow 234 l/s / 842 m³/h								66	Flow 468 l/s / 1685 m³/h								69
200	59	46	50	55	59	59	52	37	65		55	56	58	60	61	58	47	77		67	65	65	64	62	57	50		
100	54	42	44	46	49	50	46	35	63		53	51	51	50	49	46	39	74		64	59	57	54	49	43	39		
50	51	40	39	40	41	42	39	30	60		50	45	43	42	39	35	32	70		59	53	49	45	40	35	31		
20	47	37	34	32	32	32	30	24	55		45	38	35	32	29	25	23	65		54	48	43	39	34	29	24		
400	500	Flow 126 l/s / 454 m³/h								63	Flow 377 l/s / 1357 m³/h								71	Flow 754 l/s / 2714 m³/h								73
200	-	-	-	-	-	-	-	-	77		64	71	72	65	54	42	35	71		66	68	68	63	54	44	38		
100	78	57	69	73	69	60	46	32	63		55	57	56	50	42	33	29	65		59	59	58	54	47	38	33		
50	66	51	56	57	51	42	32	25	55		48	47	45	41	35	28	25	64		56	54	52	48	41	33	28		
20	54	42	43	41	36	29	22	19	50		42	39	37	33	28	22	20	64		53	50	47	42	35	28	22		
500	500	Flow 196 l/s / 706 m³/h								63	Flow 589 l/s / 2120 m³/h								67	Flow 1178 l/s / 4241 m³/h								69
200	-	-	-	-	-	-	-	-	55		53	57	61	63	61	53	40	68		64	65	67	66	61	51	37		
100	47	41	47	53	56	56	50	37	55		51	51	52	52	48	40	30	70		63	60	59	56	50	41	32		
50	43	38	40	43	44	43	38	28	54		48	46	45	43	39	32	24	71		61	56	53	49	44	37	31		
20	41	34	34	33	33	31	27	19	53		45	41	38	35	31	25	20	72		61	53	48	44	39	35	32		
630	500	Flow 312 l/s / 1123 m³/h								63	Flow 935 l/s / 3366 m³/h								71	Flow 1870 l/s / 6732 m³/h								73
200	-	-	-	-	-	-	-	-	61		57	62	67	68	63	53	41	64		62	68	71	70	63	52	40		
100	53	44	51	59	62	58	48	34	56		51	54	57	56	50	42	33	61		58	61	63	60	53	42	32		
50	49	41	43	46	47	43	36	27	52		47	49	50	48	42	34	27	60		55	56	56	53	46	36	27		
20	43	36	35	36	35	31	26	20	49		43	43	43	40	34	27	21	59		53	51	49	46	39	30	22		

Volume flow regulator - circular VRU

Belimo information

Find all information and download here: [Belimo](#)

Key features:

- Check and modify device setting parameters
- Display identification data: Device type, position, designation, serial number, bus address
- Addressing (MP-Bus, BACnet, Modbus, TCP/IP)
- "Setup": Guided parameter setup for your device
- "Copy/Paste Configuration": Replicate settings for the same device types
- "Live trend": Perform local override and live trending with the easysare function
- "Health": Monitor device operation KPIs. E.g. Power supply, Bus state, Sensor state, etc.
- "Reports": Retrieve digital reports of your device with the easy-share function. E.g. Calibration certificate, Commissioning report
- "Export Configuration": Create a logfile with the easy-share function -
- In-app language adjustment (EN/DE/FR/IT/ES/CN/RU)
- Platform-independent for Android, Apple iOS, and Windows



Smartphone/ Tablet



PC



- 1) LINK.10 is needed for Bluetooth and USB connection. It is recommended for more extended use and working with devices with a higher information density.
- 2) ZIP-BT-NFC is also possible.
- 3) ZTH EU/US/AP is also possible

Download and install

- [Link.10](#) - (Supports Bluetooth and USB to NFC and MP-Bus)
- [ZK1-GEN](#) (Connecting cable 5 m, A: RJ11 6/4 LINK.10, B: 6-pin for connection to service socket)
- [ZK2-GEN](#) (Connecting cable 5 m, A: RJ11 6/4 LINK.10, B: free wire end for connection to MP/PP terminal)



Most of us spend the majority of our time indoors. Indoor climate is crucial to how we feel, how productive we are and if we stay healthy.

We at Lindab have therefore made it our most important objective to contribute to an indoor climate that improves people's lives. We do this by developing energy-efficient ventilation solutions and durable building products. We also aim to contribute to a better climate for our planet by working in a way that is sustainable for both people and the environment.

[Lindab | For a better climate](#)