

Lindab **VRA**

Volume flow regulator - rectangular



Volume flow regulator

VRA



Description - Compact

VRA is a rectangular VAV unit with combined regulating damper and airflow measurement in one unit, used for pressure independent volume air flow rate regulation.

VRA Compact is available with actuators for different communication platforms; Belimo MP, Modbus/BACnet or KNX. (For VRA Universal see details on next page).

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

- Pressure independent VAV regulation.
- Belimo MP, Modbus/BACnet or KNX.
- Integrated NFC interface, compatible with Belimo Assistant App (only MP).
- Tightness class ATC4 (formerly Class B) according to EN1751.

Order code

Product	VRA	aaa x bbb	ccc	dddd
Type	VRA			
Dimension	Min. : a x b = 200 x 100 mm Max. : a + b ≤ 2400 mm and a ≤ 1500 mm			
Motor type	MP, KNX, MOD			
Flange type	LS RJFP 20 (Standard All sizes) RJFP 30 When a or b > 800 RJFP 40 On request			

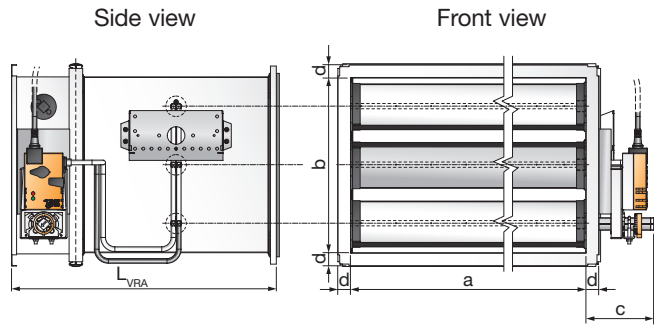
Example: VRA-500x200-MP-RJFP 20

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.

Dimensions



NB! Different flange types are available, see order code and dimension table below.

Dimension table

Flange type	d mm	L _{VRA} mm
LS	20	453
RJFP20	20	493
RJFP30	30	513
RJFP40	40	535

Motor type table

Type	Motor	c mm
MP	NMV-D3-MP	115
KNX	NMV-D3-KNX	115
MOD	NMV-D3-MOD	115

Tightness class

Blade area m ²	Tightness class
up to 0.6	2
From 0.6	3

Tightness for damper blades according to norm EN 1751, (leakage through closed blades).

Installation

VRA is prepared for insulation with 50 mm thick insulation material. VRA can only be installed with damper blades in a horizontal position.

Using LS-profile. Installation instruction, please go to Assembly instruction, Rectangular air duct systems, [LS-profile](#).

Using RJFP-profiles. Installation instruction, please go to Lindab rectangular duct systems, [RJFP-profile](#).

You can find general information about air duct systems, theory and calculations following this [link](#).

Belimo documentation

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

Type	Documentation
MP / MOD /KNX	Belimo Universal

Volume flow regulator

VRA



Description - Universal range

VRA is a rectangular VAV unit with combined regulating damper and airflow measurement in one unit, used for pressure independent volume air flow rate regulation. VRA 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 VRA Compact see details on previous page). To avoid clogging of the measuring cross, it is recommended to use VRA only in applications with clean air, meaning free of dust, particles and similar.

- Pressure independent VAV regulation.
- Belimo MP, Modbus, BACnet & analogue control 0(2)-10V.
- Integrated NFC interface, compliable with Belimo Assistant App.
- Tightness class ATC4 (formerly Class B) according to EN1751.

Order code

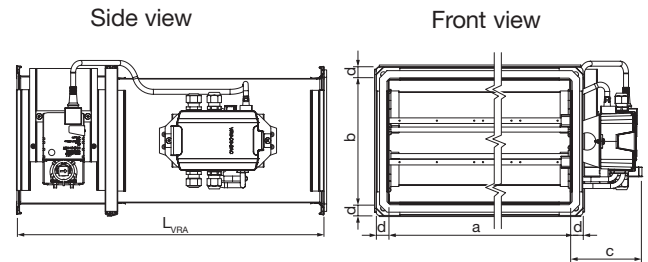
Product	VRA	aaa x bbb	ccc	ddd	eeee
Type	VRA				
Dimension	Min. : a x b = 300 x 100 mm Max. : a + b ≤ 2400 mm and a ≤ 1500 mm				
Motor type	UNI Universal rotary actuator SPR Spring return actuator FAS Fast running actuator				
Regulator	D D3 dynamic flow sensor M M1 membrane sensor				
Flange type	LS RJFP 20 (Standard All sizes) RJFP 30 When a or b > 800 RJFP 40 On request				

Example: VRA-500x200-UNI-D-RJFP 20

Factory settings

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

Dimensions



NB! Different flange types are available, see order code and dimension table below.

Dimension table

Flange type	d mm	L mm	c mm
LS	20	453	115
RJFP20	20	493	115
RJFP30	30	513	115
RJFP40	40	535	115

Motor type table

Type	Regulator	Motor
UNI	VRU-D3-BAC	NM24A-VST
UNI-M	VRU-M1-BAC	NM24A-VST
SPR	VRU-D3-BAC	NF24A-VST
SPR-M	VRU-M1-BAC	NF24A-VST
FAS	VRU-D3-BAC	NMQ-24A-VST
FAS-M	VRU-M1-BAC	NMQ-24A-VST

Tightness class: As VRA Compact (see page 2).
Installation: As VRA Compact (see page 2).

Belimo documentation

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

Type	Documentation
All	Belimo Universal

Volume flow regulator

VRA

Technical data

Volume flow measurement

The accuracy of volume 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.

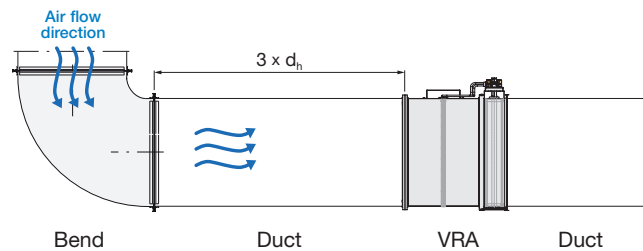
If these recommendations are not followed, it will cause an unstable flow measurement and therefore higher inaccuracy in the regulation of the required air flow.

Components	Recommended straight duct before unit
Bend	3 x d_h^*
Tee-piece	4 x d_h^*
Damper	6 x d_h^*
Rectangular attenuator (Extract)	1 x d_h^* (min. 500 mm)

d_h^* is the hydraulic diameter for a rectangular duct (and VRA), d_h can be calculated by using VRA dimension a and b:

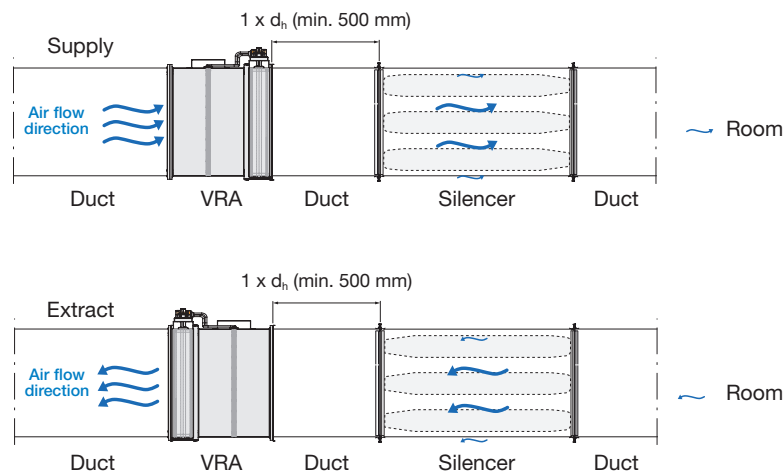
$$d_h^* = 2 \times a \times b / (a + b)$$

Examples:



Example above showing recommended straight duct distance between VRA and duct bend.

Minimum recommended distance between VRA and a rectangular attenuator:



Example above showing recommended straight duct distance between VRA and rectangular attenuator. (For supply air and extract air).

NB! Distance must as a minimum be ≥ 500 mm .

Volume flow regulator

VRA

Technical data

Settings

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

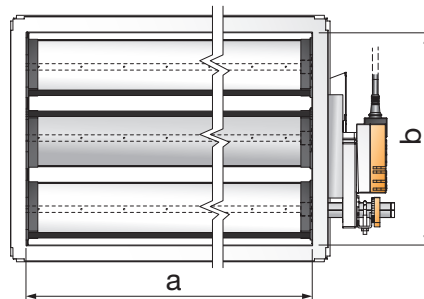
In special cases the VRA can be set to a higher V_{nom} , e.g. 10 m/s.

For VRA, 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, air velocities below 1 m/s corresponds to a measuring pressure of less than 1 Pa, which makes the flow regulation less accurate.

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

Size mm			Measuring limit = 1 m/s		(Standard) $V_{nom} = 7$ m/s		$V_{nom} = 10$ m/s	
a	x	b	m ³ /h	l/s	m ³ /h	l/s	m ³ /h	l/s
300		200	216	60	1512	420	2160	600
400		200	288	80	2016	560	2880	800
		300	432	120	3024	840	4320	1200
500		200	360	100	2520	700	3600	1000
		300	540	150	3780	1050	5400	1500
		400	720	200	5040	1400	7200	2000
		500	900	250	6300	1750	9000	2500
600		200	432	120	3024	840	4320	1200
		300	648	180	4536	1260	6480	1800
		400	864	240	6048	1680	8640	2400
		500	1080	300	7560	2100	10800	3000
800		200	576	160	4032	1120	5760	1600
		300	864	240	6048	1680	8640	2400
		400	1152	320	8064	2240	11520	3200
		500	1440	400	10080	2800	14400	4000
1000		300	1080	300	7560	2100	10800	3000
		400	1440	400	10080	2800	14400	4000
		500	1800	500	12600	3500	18000	5000
		600	2160	600	15120	4200	21600	6000



Front view of VRA and dimension a and b.

Volume flow regulator

VRA

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. a x b mm	Pressure drop Pa	Velocity app. 1 m/s								Velocity app. 3 m/s								Velocity app. 6 m/s										
		Centre frequency Hz								L _{WA} dB(A)	Centre frequency Hz								L _{WA} dB(A)	Centre frequency Hz								L _{WA} dB(A)
		63	125	250	500	1k	2k	4k	8k		63	125	250	500	1k	2k	4k	8k		63	125	250	500	1k	2k	4k	8k	
300 x 200	500 200 100 50 20	Flow 60 l/s / 216 m ³ /h								57 53 49 45 40	Flow 180 l/s / 648 m ³ /h								63 58 54 49 43	Flow 360 l/s / 1296 m ³ /h								66 62 59 55 48
		57	57	54	53	52	49	47	44		63	63	60	59	58	55	53	50		66	66	63	62	61	58	56	53	
		53	53	50	49	48	45	43	40		58	58	55	54	53	50	48	45		62	62	59	58	57	54	52	49	
		49	49	46	45	44	41	39	36		54	54	51	50	49	46	44	41		59	59	56	55	54	51	49	46	
		45	45	42	41	40	37	35	32		49	49	46	45	44	41	39	36		55	55	52	51	50	47	45	42	
		40	40	37	36	35	32	30	27		43	43	40	39	38	35	33	30		48	48	45	44	43	40	38	35	
400 x 200	500 200 100 50 20	Flow 80 l/s / 288 m ³ /h								58 54 50 46 43	Flow 240 l/s / 864 m ³ /h								64 59 55 50 44	Flow 480 l/s / 1728 m ³ /h								67 63 60 56 52
		58	58	54	53	50	48	45	45		64	64	61	60	59	56	54	51		67	67	64	63	62	59	57	54	
		54	54	51	50	49	46	44	41		59	59	56	55	54	51	49	46		63	63	60	59	58	55	53	50	
		50	50	47	46	45	42	40	37		55	55	52	51	50	47	45	42		60	60	57	56	55	52	50	47	
		46	46	43	42	41	38	36	33		50	50	47	46	45	42	40	37		56	56	53	52	51	48	46	43	
		43	43	40	39	38	35	33	30		44	44	41	40	39	36	34	31		44	44	41	40	39	36	34	31	
400 x 300	500 200 100 50 20	Flow 120 l/s / 432 m ³ /h								60 56 52 48 43	Flow 360 l/s / 1296 m ³ /h								66 61 57 52 46	Flow 720 l/s / 2592 m ³ /h								69 65 62 58 51
		60	60	57	56	55	52	50	47		66	66	63	62	61	58	56	53		69	69	66	65	64	61	59	56	
		56	56	53	52	51	48	46	43		61	61	58	57	56	53	51	48		65	65	62	61	60	57	55	52	
		52	52	49	48	47	44	42	39		57	57	54	53	52	49	47	44		62	62	59	58	57	54	52	49	
		48	48	45	44	43	40	38	35		52	52	49	48	47	44	42	39		58	58	55	54	53	50	48	45	
		43	43	40	39	38	35	33	30		46	46	43	42	41	38	36	33		51	51	48	47	46	43	41	38	
500 x 200	500 200 100 50 20	Flow 100 l/s / 360 m ³ /h								59 55 51 47 42	Flow 300 l/s / 1080 m ³ /h								65 60 56 51 45	Flow 600 l/s / 2160 m ³ /h								68 64 61 57 50
		59	59	56	55	54	51	49	46		65	65	62	61	60	57	55	52		68	68	65	64	63	60	58	55	
		55	55	52	51	50	47	45	42		60	60	57	56	55	52	50	47		64	64	61	60	59	56	54	51	
		51	51	48	47	46	43	41	38		56	56	53	52	51	48	46	43		61	61	58	57	56	53	51	48	
		47	47	44	43	42	39	37	34		51	51	48	47	46	43	41	38		57	57	54	53	52	49	47	44	
		42	42	39	38	37	34	32	29		45	45	42	41	40	37	35	32		50	50	47	46	45	42	40	37	
500 x 300	500 200 100 50 20	Flow 150 l/s / 540 m ³ /h								61 57 53 49 44	Flow 450 l/s / 1620 m ³ /h								67 62 58 53 47	Flow 900 l/s / 3240 m ³ /h								70 66 63 59 53
		61	61	58	57	56	53	51	48		67	67	64	63	62	59	57	54		70	70	67	66	65	62	60	57	
		57	57	54	53	52	49	47	44		62	62	59	58	57	54	52	49		66	66	63	62	61	58	56	53	
		53	53	50	49	48	45	43	40		58	58	55	54	53	50	48	45		63	63	60	59	58	55	53	50	
		49	49	46	45	44	41	39	36		53	53	50	49	48	45	43	40		59	59	56	55	54	51	49	46	
		44	44	41	40	39	36	34	31		47	47	44	43	42	39	37	34		47	47	44	43	42	39	37	34	
500 x 400	500 200 100 50 20	Flow 200 l/s / 720 m ³ /h								62 58 54 50 45	Flow 600 l/s / 2160 m ³ /h								68 63 59 54 48	Flow 1200 l/s / 4320 m ³ /h								71 67 64 60 53
		62	62	59	58	57	54	52	49		68	68	65	64	63	60	58	55		71	71	68	67	66	63	61	58	
		58	58	55	54	53	50	48	45		63	63	60	59	58	55	53	50		67	67	64	63	62	59	57	54	
		54	54	51	50	49	46	44	41		59	59	56	55	54	51	49	46		64	64	61	60	59	56	54	51	
		50	50	47	46	45	42	40	37		54	54	51	50	49	46	44	41		60	60	57	56	55	52	50	47	
		45	45	42	41	40	37	35	32		48	48	45	44	43	40	38	35		53	53	50	49	48	45	43	40	
500 x 500	500 200 100 50 20	Flow 250 l/s / 900 m ³ /h								63 59 55 51 46	Flow 750 l/s / 2700 m ³ /h								69 64 60 56 49	Flow 1500 l/s / 5400 m ³ /h								72 68 65 61 54
		63	63	60	59	58	55	53	50		69	69	66	65	64	61	59	56		72	72	69	68	67	64	62	59	
		59	59	56	55	54	51	49	46		64	64	61	60	59	56	54	51		68	68	65	64	63	60	58	55	
		55	55	52	51	50	47	45	42		60	60	57	56	55	52	50	47		65	65	62	61	60	57	55	52	
		51	51	48	47	46	43	41	38		55	55	52	51	50	47	45	42		61	61	58	57	56	53	51	48	
		46	46	43	42	41	38	36	33		49	49	46	45	44	41	39	36		54	54	51	50	49	46	44	41	
600 x 200	500 200 100 50 20	Flow 120 l/s / 432 m ³ /h								60 56 52 48 43	Flow 360 l/s / 1296 m ³ /h								66 61 57 52 46	Flow 720 l/s / 2592 m ³ /h								69 65 62 58 51
		60	60	57	56	55	52	50	47		66	66	63	62	61	58	56	53		69	69	66	65	64	61	59	56	
		56	56	53	52	51	48	46	43		61	61	58	57	56	53	51	48		65	65	62	61	60	57	55	52	
		52	52	49	48	47	44	42	39		57	57	54	53	52	49	47	44		62	62	59	58	57	54	52	49	
		48	48	45	44	43	40	38	35		52	52	49	48	47	44	42	39		58	58	55	54	53	50	48	45	
		43	43	40	39	38	35	33	30		46	46	43	42	41	38	36	33		51	51	48	47	46	43	41	38	
600 x 300	500 200 100 50 20	Flow 180 l/s / 648 m ³ /h								61 57 53 49 44	Flow 540 l/s / 1944 m ³ /h								67 62 58 53 47	Flow 1080 l/s / 3888 m ³ /h								70 66 63 59 53
		61	61	58	57	56	53	51	48		67	67	64	63	62	59	57	54		70	70	67	66	65	62	60	57	
		57	57	54	53	52	49	47	44		63	63	60	59	58	55	53	50		67	67	64	63	62	59	57	54	
		53	53	50	49	48	45	43	40		59	59	56	55	54	51	49	46		64	64	61	60	59	56	54	51	
		49	49	46	45	44	41	39	36		54	54	51	50	49	46	44	41		60	60	57	56	55	52	50	47	
		44	44	41	40	39	36	34	31		48	48	45	44	43	40	38	35		53	53	50	49	48	45	43	40	
600 x 400	500 200 100 50 20	Flow 240 l/s / 864 m ³ /h								63 59 55 51 46	Flow 720 l/s / 2592 m ³ /h								69 64 60 56 49	Flow 1440 l/s / 5184 m ³ /h								72 68 65 61 54
		63	63	60	59	58	55	53	50		69	69	66	65	64	61	59	56		72	72	69	68	67	64	62	59	
		59	59	56	55	54	51	49	46		64	64	61	60	59	56	54	51		68	68	65	64	63	60	58	55	
		55	55	52	51	50	47	45	42		60	60	57	56	55	52	50	47		65	65	62	61	60	57	55	52	
		51	51	48	47	46	43	41	38		55	55	52	51	50	47	45	42		61	61	58	57	56	53	51	48	
		46	46	43	42	41	38	36	33		49	49	46	45	44	41	39	36		54	54	51	50	49	46	44	41	
600 x 500	500 200 100 50 20	Flow 300 l/s / 1080 m ³ /h								64 60 56 52 47	Flow 900 l/s / 3240 m ³ /h								70 65 61 57 50	Flow 1800 l/s / 6480 m ³ /h								73 69 66 62 55
		64	64	61	60	59	56	54	51		70	70	67	66	65	62	60	57		73	73	70	69	68	65	63	60	
		60	60	57	56	55	52	50	47		65	65	62	61	60	57	5											

Volume flow regulator

VRA

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. a x b mm	Pressure drop Pa	Velocity app. 1 m/s								Velocity app. 3 m/s								Velocity app. 6 m/s										
		Centre frequency Hz								L _{WA} dB(A)	Centre frequency Hz								L _{WA} dB(A)	Centre frequency Hz								L _{WA} dB(A)
		63	125	250	500	1k	2k	4k	8k		63	125	250	500	1k	2k	4k	8k		63	125	250	500	1k	2k	4k	8k	
1000 x 300		Flow 300 l/s / 1080 m ³ /h								L _{WA}	Flow 900 l/s / 3240 m ³ /h								L _{WA}	Flow 1800 l/s / 6480 m ³ /h								L _{WA}
	500	64	64	61	60	59	56	54	51	64	70	70	67	66	65	62	60	57	70	73	73	70	69	68	65	63	60	73
	200	60	60	57	56	55	52	50	47	60	65	65	62	61	60	57	55	52	65	69	69	66	65	64	61	59	56	69
	100	56	56	53	52	51	48	46	43	56	61	61	58	57	56	53	51	48	61	66	66	63	62	61	58	56	53	66
	50	52	52	49	48	47	44	42	39	52	56	56	53	52	51	48	46	43	56	62	62	59	58	57	54	52	49	62
20	47	47	44	43	42	39	37	34	47	50	50	47	46	45	42	40	37	50	55	55	52	51	50	47	45	42	55	
1000 x 400		Flow 400 l/s / 1440 m ³ /h								L _{WA}	Flow 1200 l/s / 4320 m ³ /h								L _{WA}	Flow 2400 l/s / 6840 m ³ /h								L _{WA}
	500	65	65	62	61	60	57	55	52	65	71	71	68	67	66	63	61	58	71	74	74	71	70	69	66	64	61	74
	200	61	61	58	57	56	53	51	48	61	66	66	63	62	61	58	56	53	66	70	70	67	66	65	62	60	57	70
	100	57	57	54	53	52	49	47	44	57	62	62	59	58	57	54	52	49	62	67	67	64	63	62	59	57	54	67
	50	53	53	50	49	48	45	43	40	53	57	57	54	53	52	49	47	44	57	63	63	60	59	58	55	53	50	63
20	48	48	45	44	43	40	38	35	48	51	51	48	47	46	43	41	38	51	56	56	53	52	51	48	46	43	56	
1000 x 500		Flow 500 l/s / 1800 m ³ /h								L _{WA}	Flow 1500 l/s / 5400 m ³ /h								L _{WA}	Flow 3000 l/s / 10800 m ³ /h								L _{WA}
	500	66	66	63	62	61	58	56	53	66	72	72	69	68	67	64	62	59	72	75	75	72	71	70	67	65	62	75
	200	62	62	59	58	57	54	52	49	62	67	67	64	63	62	59	57	54	67	71	71	68	67	66	63	61	58	71
	100	58	58	55	54	53	50	48	45	58	63	63	60	59	58	55	53	50	63	68	68	65	64	63	60	58	55	68
	50	54	54	51	50	49	46	44	41	54	58	58	55	54	53	50	48	45	58	64	64	61	60	59	56	54	51	64
20	49	49	46	45	44	41	39	36	49	52	52	49	48	47	44	42	39	52	57	57	54	53	52	49	47	44	57	
1000 x 600		Flow 600 l/s / 2160 m ³ /h								L _{WA}	Flow 1800 l/s / 6480 m ³ /h								L _{WA}	Flow 3600 l/s / 12960 m ³ /h								L _{WA}
	500	67	67	64	63	62	59	57	54	67	73	73	70	69	68	65	63	60	73	76	76	73	72	71	68	66	63	76
	200	63	63	60	59	58	55	53	50	63	68	68	65	64	63	60	58	55	68	72	72	69	68	67	64	62	59	72
	100	59	59	56	55	54	51	49	46	59	64	64	61	60	59	56	54	51	64	69	69	66	65	64	61	59	56	69
	50	55	55	52	51	50	47	45	42	55	59	59	56	55	54	51	49	46	59	65	65	62	61	60	57	55	52	65
20	50	50	47	46	45	42	40	37	50	53	53	50	49	48	45	43	40	53	58	58	55	54	53	50	48	45	58	

Volume flow regulator

VRA

Technical data

Adjustment and simulation tool

- Graphical display of setpoint and actual values.
- Create and print trend evaluations.
- Useful tool for troubleshooting on the MP-Bus®.
- Access levels can be defined and managed via release code.
- Specialised software for OEMs to make efficient use of the tool in the production process.



ZTH EU Service Tool

- The handy ZTH EU Service Tool is connected directly to the actuator for parameterisation.
- Reliable and proven connection via the tool socket.
- Supply via actuator – always ready.
- MP-Bus® tester integrated (packet counter, signal level).
- ZIP level converter to USB for connecting the actuator with the PC Tool.



You can find further information about the possible connections of the ZTH EU Service Tool at Belimo.com.

Belimo Assistant App

- Belimo devices marked with the NFC logo can be parameterised using the Assistant App.
- Can be installed on all Android mobile phones and iPhones.
- Can be operated with ease using the smartphone's touch display.
- The actuator can be parameterised while de-energised.
- Updates are undertaken automatically via the Google Play or Apple App store.



ZIP-BT-NFC Bluetooth to NFC converter

- Allows for simple use of the Belimo Assistant App via Bluetooth with Android mobile phones and iPhones in order to parameterise NFC enabled devices.
- Safe to attach to the actuator thanks to countless micro suction cups attached to the bottom.





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