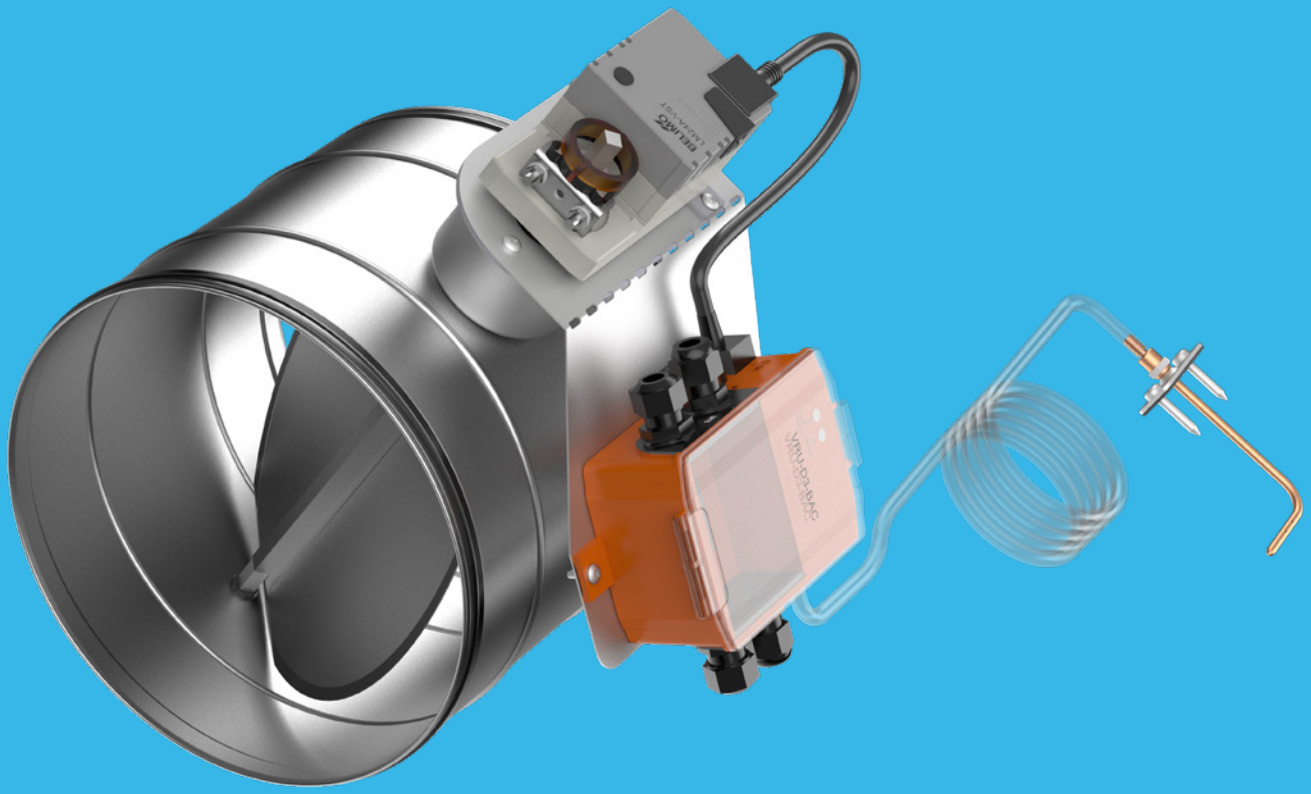


Lindab **PRU**

Pressure control damper - circular

Pressure control damper PRU

Description

PRU is a pressure control damper used for regulating static pressure in circular duct systems.

PRU is equipped with pressure regulator, rotary actuator and with 2 m hose and measuring probe (not included in MR version for room pressure control).
Pressure regulators comes with either flow sensor (D3) for clean air or membrane sensor (M1) for contaminated air. Furthermore the membrane sensor comes in a version specifically for room pressure control (M1R).

Actuators are available as standard universal (UNI), springreturn (SPR) or fast-running version (FAS).

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

- 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 Ø100-315 class ATC3 (formerly Class C) and Ø400-630 class ATC4 (formerly Class B) according to EN 1751.

Order code

Product	PRU	bbb	ccc	ddd	eee

Type
PRU

Dimension
Ød 100 - 630

Motor type
UNI Universal rotary actuator
SPR Spring return actuator
FAS Fast running actuator(Only MR regulator)

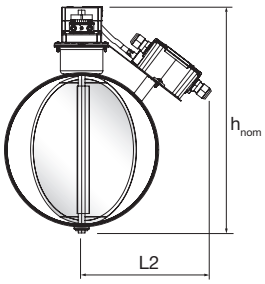
Regulator
D D3 dynamic flow sensor
M M1 membrane sensor
MR M1R membrane sensor for room

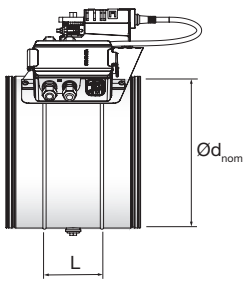
Pressure range
100, 200, 300, 500 pa (duct pressure type D + M)
25 pa (room pressure type MR)

Example: PRU - 250 - UNI - D - 100

Dimensions

UNI, SPR, FAS





Dimension table

$Ød_{nom}$ mm	L mm	L2 mm	h_{nom} mm	Weight Kg
100	182	172	223	1.9
125	182	183	248	2.0
160	182	195	283	2.2
200	182	205	323	2.5
250	222	213	373	3.0
315	222	219	438	3.7
400	262	223	523	4.1
500	262	226	623	6.3
630	262	228	753	8.1

h_{nom} and Weight is shown in the table for PRU-UNI.
SPR: h_{nom} + 20 mm. and weight + 1.5 kg
FAS: h_{nom} + 15 mm. and weight + 0.4 kg

Motor type table

Type	Regulator	Motor	
		Ø100 - Ø315	Ø400 - Ø630
UNI	VRU-D3-BAC	LM24A-VST	NM24A-VST
UNI-M	VRU-M1-BAC	LM24A-VST	NM24A-VST
UNI-MR*	VRU-M1R-BAC	LM24A-VST	NM24A-VST
SPR	VRU-D3-BAC	LF24A-VST	NF24A-VST
SPR-M	VRU-M1-BAC	LF24A-VST	NF24A-VST
SPR-MR*	VRU-M1R-BAC	LF24A-VST	NF24A-VST
FAS-MR*	VRU-M1R-BAC	LMQ24A-VST	NMQ24A-VST

*) Used without pressure measuring hose.

Belimo documentation

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

Type	Documentation
All	Belimo Universal

Pressure control damper PRU

Technical data

Duct pressure control range configurations

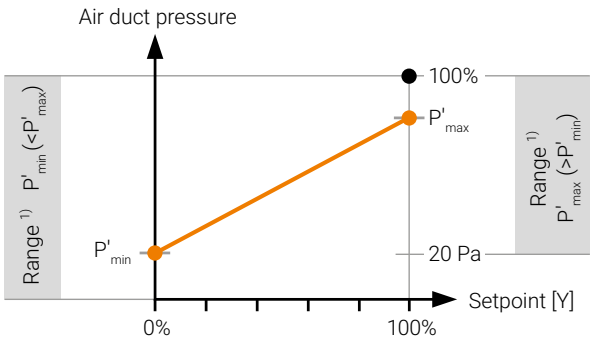
The setup is independent of sizes, but there are four different pressure range configurations (P_{nom}) to achieve different dead bands.

P_{nom}	Controller dead band	Lower regulation limit (from v.1.04-0001)	Lower regulation limit older versions
100 Pa	+/- 1 Pa	20 Pa	32 Pa
200 Pa	+/- 2 Pa	20 Pa	35 Pa
300 Pa	+/- 3 Pa	20 Pa	38 Pa
500 Pa	+/- 5 Pa	20 Pa	38 Pa

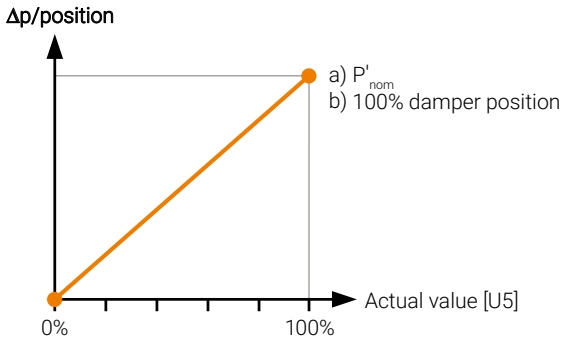
- From Lindab factory P_{max} is set equal to P_{nom}.
- P_{min} is set to 50 Pa for all configurations. If not providing a control signal, the pressure will then be controlled to 50 Pa.
- The controller dead band is from Lindab factory set for the most accurate possible regulation (+/- 1%).
- The controller sensitivity (regulation speed) is set to medium (5).
- In unstable systems, the controller settings can cause the motor to adjust excessively trying to keep the setpoint. Changing the controller dead band and controller sensitivity setting requires Belimo PC Tool.

Function diagram

Δp control: Y/bus (setpoint)



Feedback U5/bus (actual value)



1) Note: from firmware V 1.04-0001: 20 Pa
older firmware versions: 38 Pa

Control functions

- P^1_{min} Pressure level 1
- P^1_{max} Pressure level 2
- P^1_{min}...P^1_{max} Variable operation (STP)

- Local override (z1/z2) Motor stop, damper OPEN, P^1_{max} damper closed
- Control analogue 0... 10 V/2... 10 V, Modbus 1), BACnet 1), MP-Bus

1) Hybrid mode possible

Limitations for PRU regulator type D (Belimo VRU-D3-BAC)

- The Belimo VRU-D3-BAC can only be used for clean air / comfort application
- Max pressure hose length for PRU with Belimo VRU-D3-BAC is 20 m. If longer hose is needed, then use PRU with Belimo VRU-M1-BAC.

Pressure control damper PRU

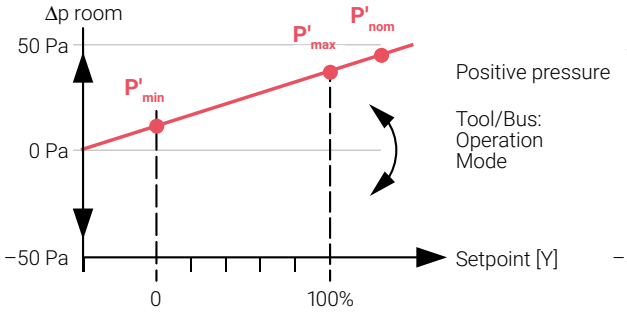
Room pressure control configuration

The PRU room pressure control is independent of sizes.

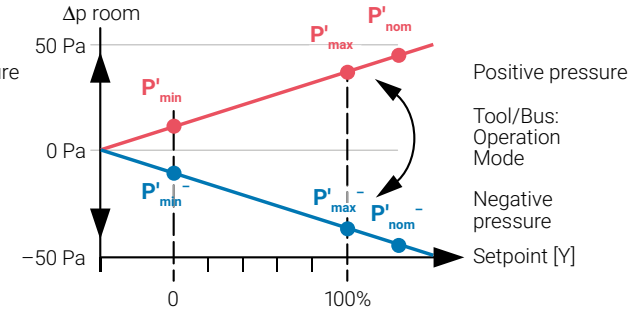
- From Lindab factory the application is supply air and overpressure, this can be changed via Belimo PC Tool or Belimo Assistant App.
- P_{max} set equal to P_{nom} = 25 Pa.
- P_{min} is set to 5 Pa. If not providing a control signal, the pressure will then be controlled to 5 Pa.
- The controller dead band is from Lindab factory set for the most accurate possible regulation (+/- 1%).
- The controller sensitivity (regulation speed) is set to high (10).
- In unstable systems, the controller settings can cause the motor to adjust excessively trying to keep the setpoint. Changing the controller dead band and controller sensitivity setting requires Belimo PC Tool.

Function diagram

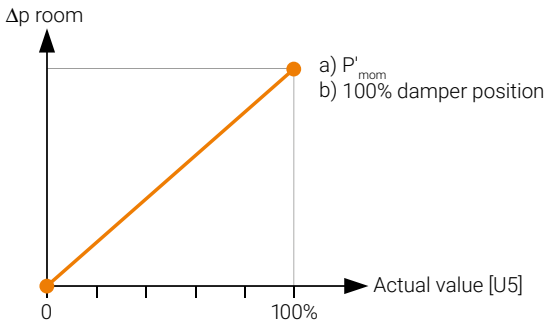
Positive room pressure



Changeover operation: positive/negative pressure



Feedback U5/bus (actual value)



For operation in the negative-pressure range, P_{nom} /P_{max} /P_{min} are mirrored in the negative range.

Example:

- Positive pressure: P_{min} 5 Pa / P_{max} 10 Pa, becomes
- Negative pressurev setting: P_{min} -5 Pa / P_{max} -10 Pa

Spring return direction for PRU-SPR

The damper motor is assembled, so the damper will close when power is cut/shut/switched off. If open damper is desired at power off, then damper must be opened with the attached hand crank and locked with the switch. Then demount motor, turn it around, demount and attach the clamp to opposite site and mount the damper to the shaft again. Be aware to mount when damper is either fully open or fully closed depending on the desired function. See Belimos installation instructions for LF… and NF… motors.

Pressure control damper PRU

Technical data

Application examples from Belimo VAV-Universal Brochure Duct pressure control example.

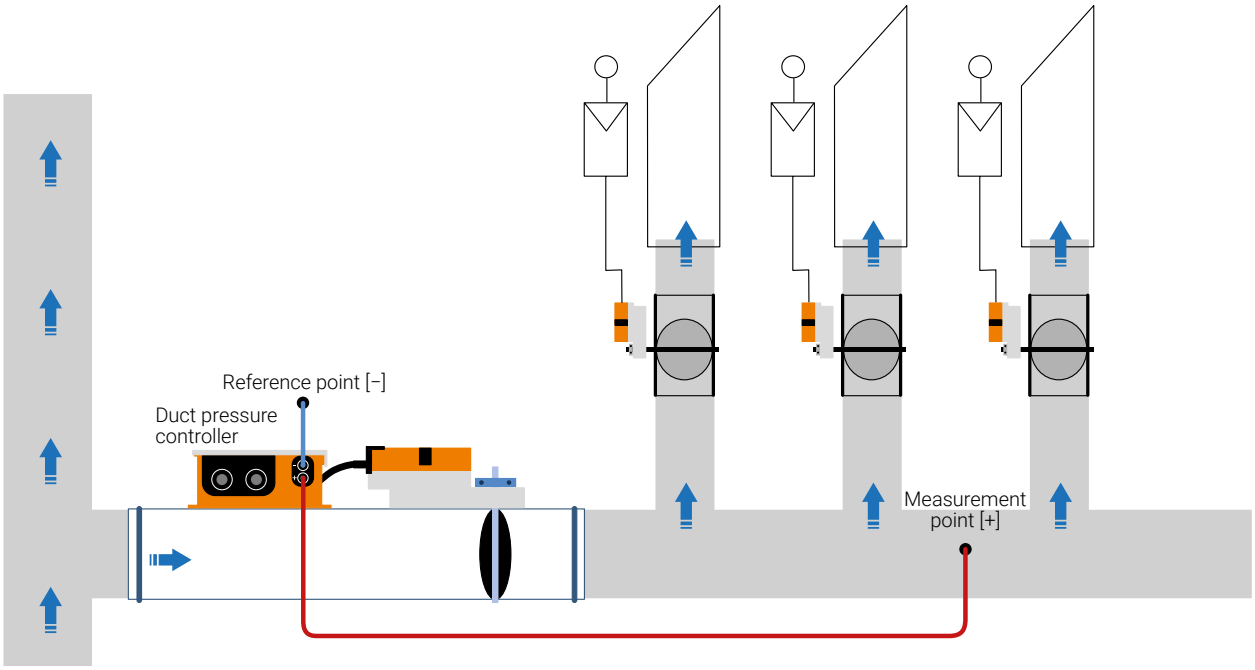


Illustration example

Room pressure control example

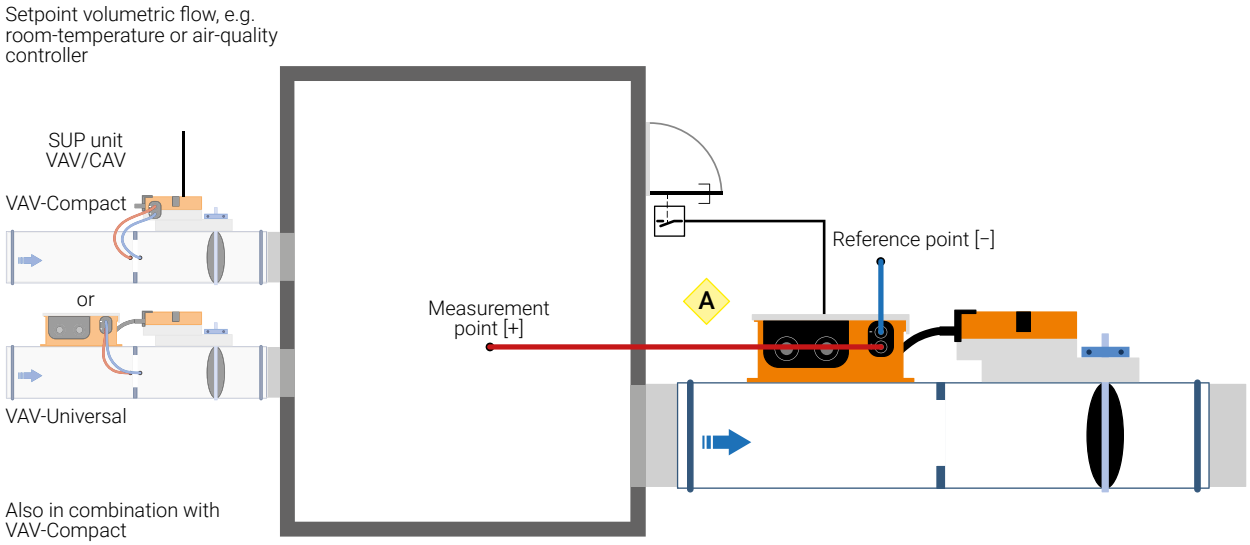


Illustration example

See more application possibilities:
[Belimo VAV-Universal Application Brochure]

Pressure control damper PRU

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$_1$	Pressure drop	Velocity app. 1 m/s								Velocity app. 3 m/s								Velocity app. 6 m/s							
		Centre frequency Hz								Centre frequency Hz								Centre frequency Hz							
	Pa	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		Flow 8 l/s 129 m^3/h								Flow 24 l/s 186 m^3/h								Flow 47 l/s 169 m^3/h							
	500	71	47	44	48	50	48	42	31	74	55	57	59	58	54	46	36	77	66	68	67	63	57	49	38
	200	65	44	42	45	45	42	37	28	68	55	55	55	52	46	40	31	70	66	66	61	55	48	40	32
	100	60	42	10	41	41	37	32	24	62	54	53	50	46	40	34	27	65	64	62	55	48	41	33	26
	50	55	40	38	37	35	32	27	21	57	51	49	45	39	33	28	22	61	60	57	49	42	35	27	21
	20	47	36	33	30	27	23	19	15	51	47	43	36	29	25	19	15	61	49	47	44	38	32	24	17
125		Flow 12 l/s 143 m^3/h								Flow 37 l/s 1133 m^3/h								Flow 74 l/s 1266 m^3/h							
	500	79	61	48	48	53	54	49	38	77	56	55	58	58	55	51	43	80	68	67	66	61	55	49	41
	200	70	50	43	45	47	47	44	35	71	56	54	54	51	46	42	36	73	67	65	59	52	44	36	31
	100	64	45	41	42	42	41	38	31	65	55	52	49	44	39	34	29	67	64	60	52	44	37	29	24
	50	58	41	38	38	37	34	32	27	59	52	48	42	36	30	25	21	63	58	54	47	40	34	26	20
	20	50	37	34	31	27	24	21	18	51	46	40	33	27	22	16	13	59	48	45	42	39	35	29	20
160		Flow 20 l/s 172 m^3/h								Flow 60 l/s 1216 m^3/h								Flow 121 l/s 1436 m^3/h							
	500	83	61	53	54	60	66	67	57	68	53	54	56	56	55	53	45	69	61	63	62	58	55	51	43
	200	68	50	47	49	51	53	52	44	60	50	51	50	47	45	42	36	65	60	61	58	53	48	42	34
	100	59	43	41	42	43	43	41	35	56	48	48	45	42	39	35	29	63	57	58	54	48	42	34	26
	50	51	38	36	35	34	33	31	27	53	46	45	41	36	33	28	23	60	5	52	49	43	36	27	20
	20	42	32	29	26	23	21	20	17	49	41	39	35	30	25	19	15	58	44	44	41	35	29	21	15
200		Flow 31 l/s 1112 m3/h								Flow 94 l/s 1338 m^3/h								Flow 188 l/s 677 m^3/h							
	500	72	54	53	59	63	63	57	44	63	54	57	58	59	57	52	41	72	65	64	61	58	58	56	47
	200	58	46	48	52	53	52	46	35	62	54	53	51	49	49	46	38	72	65	62	56	51	50	48	41
	100	53	43	44	45	46	44	39	30	62	53	51	46	43	43	41	35	68	63	59	51	45	42	39	32
	50	50	40	40	39	38	37	34	27	59	52	47	41	37	36	34	29	62	58	54	46	39	34	29	22
	20	47	37	34	31	28	28	26	22	53	46	41	34	28	25	23	19	54	49	46	40	33	27	20	13
250		Flow 49 l/s 1176 m^3/h								Flow 147 l/s 1529 m^3/h								Flow 295 l/s 11062 m^3/h							
	500	-	-	-	-	-	-	-	-	67	54	56	57	59	61	57	45	70	67	65	61	59	59	57	47
	200	-	-	-	-	-	-	-	-	62	56	54	52	51	52	50	40	67	65	61	55	50	48	45	39
	100	60	44	45	47	48	49	46	36	59	55	51	46	43	43	41	34	62	59	53	47	42	38	33	29
	50	55	43	43	42	42	43	41	32	53	49	43	37	33	31	29	25	57	51	46	41	36	30	25	20
	20	48	40	37	33	31	31	30	24	44	37	31	25	20	17	14	13	57	44	41	36	32	27	21	15
315		Flow 78 l/s 1281 m^3/h								Flow 234 l/s 1842 m^3/h								Flow 468 l/s 11062 m^3/h							
	500	59	46	50	56	59	59	53	38	64	54	55	57	59	60	57	46	75	65	63	63	63	61	56	49
	200	53	42	43	46	48	49	45	34	62	52	49	49	49	48	45	38	72	62	57	55	53	49	43	39
	100	50	39	38	38	39	40	38	29	58	48	44	42	40	338	35	31	68	58	52	49	45	40	35	31
	50	46	35	32	31	30	30	29	23	53	43	37	34	31	28	25	23	64	53	47	42	38	33	28	24
	20	-	-	-	-	-	-	-	-	46	36	29	24	21	17	14	13	59	47	42	37	32	28	24	18
400		Flow 126 l/s 1454 m^3/h								Flow 377 l/s 11357 m^3/h								Flow 754 l/s 12714 m^3/h							
	500	-	-	-	-	-	-	-	-	76	64	71	72	65	54	42	34	70	65	67	67	62	53	43	38
	200	78	58	70	75	72	62	48	33	62	54	55	54	49	41	33	29	64	58	57	56	53	46	37	32
	100	66	51	56	57	51	42	32	25	54	47	46	44	40	33	27	24	62	55	52	50	46	40	32	27
	50	53	42	42	40	35	228	21	18	49	41	38	35	31	26	21	19	62	52	48	45	40	34	27	21
	20	-	-	-	-	-	-	-	-	44	34	29	25	21	17	13	11	61	49	43	38	33	27	21	15
500		Flow 196 l/s 1706 m3/h								Flow 589 l/s 12120 m^3/h								Flow 1178 l/s 14241 m^3/h							
	500	-	-	-	-	-	-	-	-	55	53	57	61	63	61	53	40	67	64	65	66	65	60	50	37
	200	47	41	47	53	56	56	50	37	55	50	51	52	51	48	40	29	69	62	59	58	55	50	41	32
	100	43	38	40	43	44	43	38	28	54	48	45	44	42	37	31	23	70	60	55	52	48	43	36	31
	50	40	34	33	33	32	30	26	19	53	44	40	37	34	30	24	19	71	59	52	47	42	38	34	31
	20									51	41	34	30	26	22	19	17	71	58	48	41	36	32	31	32
630		Flow 312 l/s 1123 m^3/h								Flow 935 l/s 13366 m^3/h								Flow 1870 l/s 16732 m^3/h							
	500	-	-	-	-	-	-	-	-	61	56	61	67	38	63	53	41	64	62	68	71	70	63	52	40
	200	53	44	51	59	62	58	47	34	55	51	54	56	55	50	41	32	61	57	61	62	60	53	42	32
	100	48	41	42	46	46	43	35	27	52	47	49	49	47	42	34	26	60	55	56	46	53	46	36	27
	50	43	36	35	35	34	31	25	20	49	43	43	42	40	34	27	21	59	52	51	50	46	40	31	23
	20	37	29	26	24	22	18	14	12	45	38	35	33	29	24	18	14	58	50	45	42	39	33	25	18

Pressure control damper PRU

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.

GET IT ON Google Play

Download on the 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 i Phones 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