STEKON
air technology

VAV Terminal Units

SDR

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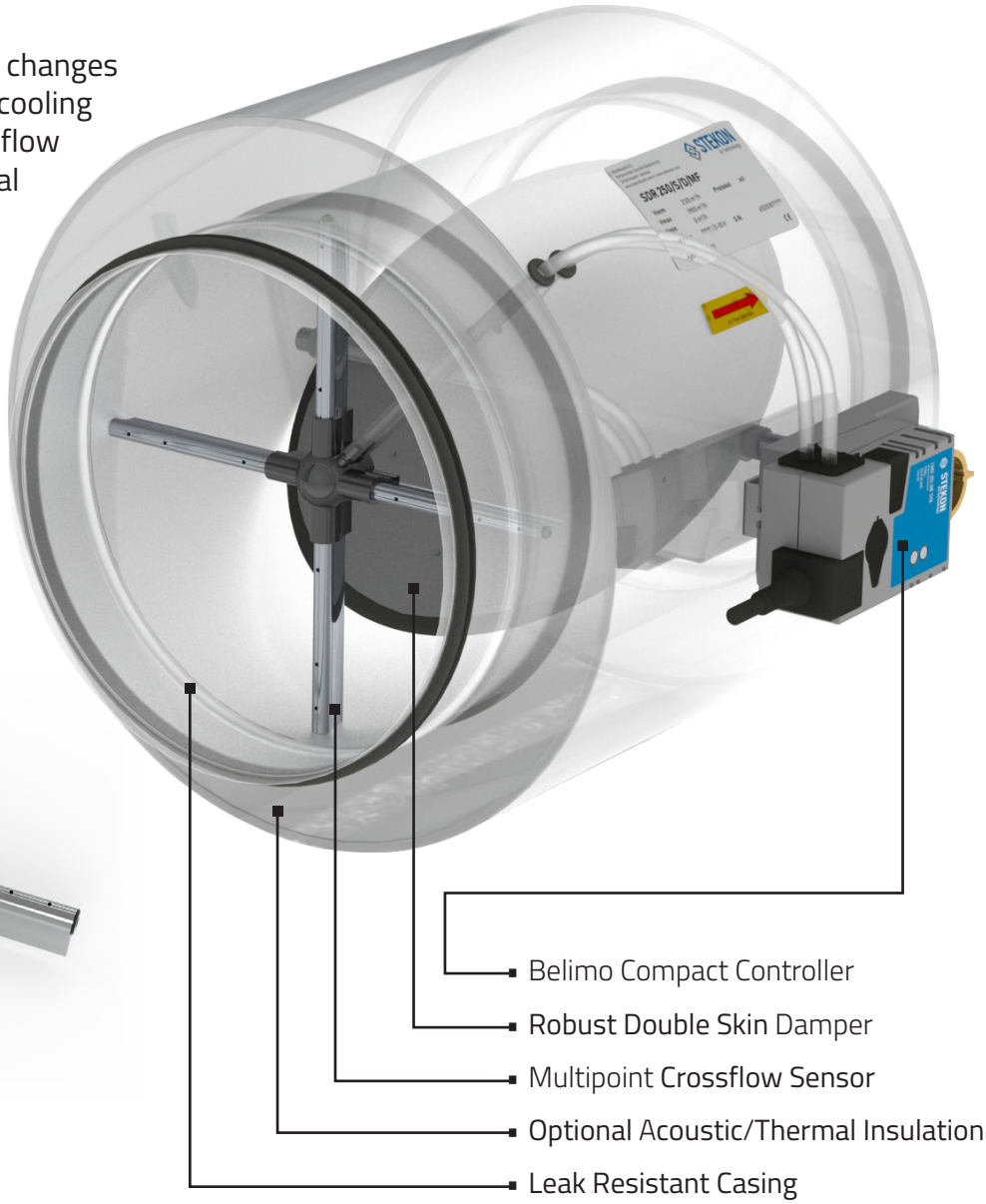
SDR

STEKON SDR; controls the volume of conditioned air into an occupied space in response to a thermostat or Building Management System control signal with minimal pressure drop and low sound levels. Thanks to its specially designed multipoint air flow sensor, terminal senses the air flow changes precisely and instantly and adjust the damper position independently of pressure.

Depending on environmental changes such as increased occupancy or cooling demand, VAV Unit adjusts air flow according to signals from a local or central control system, providing good air quality whilst avoiding excessive ventilation.

The SDR Round VAV Terminal Unit provides precise air flow adjustment by measuring the air flow rate across the entire cross section at the correct points and taking the average of all of them.

Log-linear rule for circular ducts



SDR | VAV Terminal Units

SDR (without insulation)

SDR/D (with insulation)

Application

The round flow rate control unit STEKON SDR is designed to control an initial pressure-independent constant or variable flow rate. Complete shut-off is also possible.

The casing is provided with plug-in end pieces with lip-seal gasket to fit lock-seam spiral wound air ducts according to DIN EN 1506. For sound and thermal insulation, a 50 mm mineral wool insulating shell with sheet steel jacket is available.

Measuring Principle

The specially designed multipoint sensor provides precise flow measurement even at low air velocities by increasing the difference measurement between total pressure and static pressure. Unlike conventional velocity pressure sensors, it eliminates the uniform entry condition requirements for accurate velocity measurement. Thanks to its aerodynamic profile structure, it provides advantages in pressure drop and noise. Multiple pressure ports are located according to ASHRAE reports and tests to maximize accuracy.

Advantages

- Exellent control accuracy +- %5
- Low leakage and long shaft cycle life due to the 100% closing capability of the dampers in 60 ° position
- Low air leakage rate of damper EN 1751 Class 4
- Overcomes the effects of poor inlet conditions by averaging and amplifying pressure signals
- Hygiene conforms to VDI6022

Construction, Materials

- Round Casing
- Casing, damper, axle, damper bearings galvanized steel
- Sealings of EPDM
- Measuring sensor, plastic and aluminium

SDR | VAV Terminal Units

Accessories, Special Versions

- 50mm insulating case for sound and heat insulation
- Duct type sound attenuators
- Compact controller compatible with MP Bus - LON - BACnet
- Electrical or Water reheater
- Powder coated casing
- Fast reacting actuator

Recommendation For Selection

- Air speed up to 7 m/s
- Damper pressure loss up to 500 Pa
- If airborne noise is critical, terminal units must have sound attenuators
- If casing radiated noise is critical, terminal units must have casing insulation
- Because of only acoustical considerations, after elbows, transitions and duct takeoffs 1D straight duct should be considered before the unit inlet

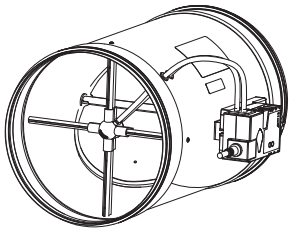
Application Ranges and Limits

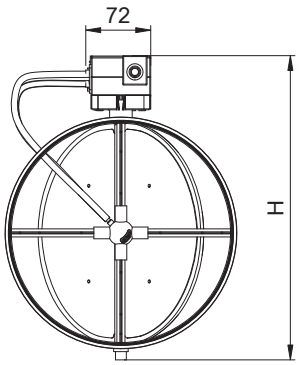
- Minimum air velocity 1,2 m/s
- Maximum air velocity 12 m/s
- Static over-pressure in the air duct up to 1000 Pa
- Leakage flow rate via shut damper blade Class 4 acc. to DIN EN 1751
- Leakage flow rate via casing Class A acc. to DIN EN 1751
- Operating temperature range 0 ...+50 °C at 5...95% RH, non-condensing
- Suitable for low-pollution air flows (e.g. ETA1, ETA2 acc. to DIN EN 13779)
- Suitable for non-corrosive, aggressive air, without solvents that may affect the EPDM damper sealing
- Suitable for horizontal and vertical installation
- Air flow direction sticker on the unit should be considered while installation

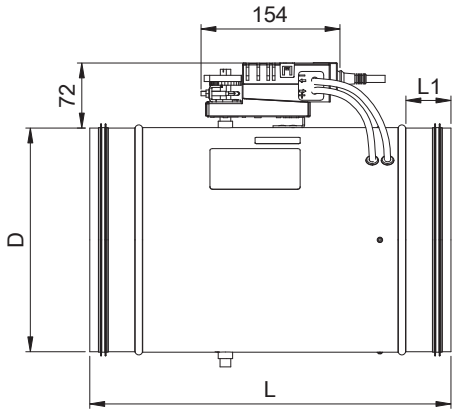
SIZE DN (mm)	1,2 m/s	7 m/s		12 m/s	
	V_{min} [m³/h]	V [m³/h]	ΔP_{min} [Pa]	V_{nom} [m³/h]	ΔP_{min} [Pa]
100	32	188	30	322	70
125	51	297	30	509	70
160	84	491	20	841	50
200	132	772	15	1323	40
250	208	1212	15	2077	25
315	331	1932	15	3312	25
400	536	3126	15	5358	25

Dimensions and Weights

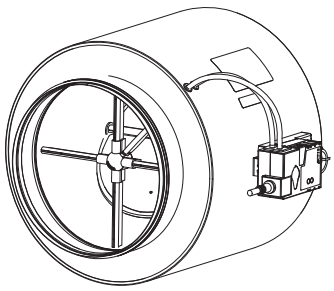
SDR (without insulation)

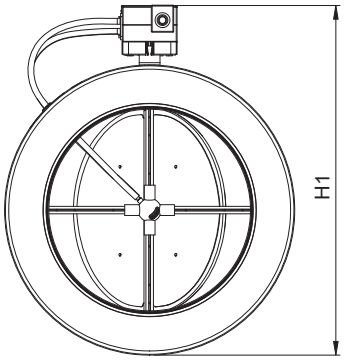


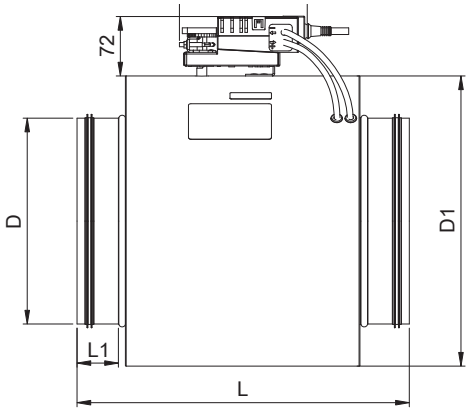




SDR/D (with insulation)







SIZE DN (mm)	L (mm)	L1 (mm)	D (mm)	D1 (mm)	H (mm)	H1 (mm)	Damper Angle (°)	Weights (kg)	
								w/ insulation	w/o insulation
100	400	50	99	199	179	271	60	3,1	1,6
125	400	50	124	224	204	296	60	4,1	2,0
160	400	50	159	259	239	331	60	5,3	2,6
200	400	50	199	299	279	371	60	6,3	3,1
250	400	50	249	349	329	421	60	7,8	4,2
315	500	50	314	414	394	486	60	11,3	5,8
400	570	50	399	499	479	571	60	14,6	8,2

Sound Pressure Values - Without Insulation (SDR)

System attenuation according to VDI 2081

Nominal Sizes	Air Velocity (m/s)	Flow Rate (m³/h)	Airborne Noise			Radiated Noise		
			ΔP:100 Pa	ΔP:150 Pa	ΔP:250 Pa	ΔP:100 Pa	ΔP150 Pa	ΔP:250 Pa
			LpA (dBA)	LpA (dBA)	LpA (dBA)	LpA (dBA)	LpA (dBA)	LpA (dBA)
100	1,2	32	32	35	41	14	17	25
	4	107	37	40	45	19	23	30
	7	188	42	45	50	24	27	34
	12	322	48	52	61	31	33	38
125	1,2	51	32	35	42	17	21	29
	4	170	40	43	48	19	24	33
	7	297	45	48	53	23	28	36
	12	509	48	51	56	32	34	38
160	1,2	84	38	40	44	19	23	30
	4	280	43	45	49	22	26	33
	7	491	47	49	53	26	29	36
	12	841	51	54	59	32	35	41
200	1,2	132	35	38	44	18	22	29
	4	441	40	42	47	23	26	32
	7	772	44	46	50	27	30	35
	12	1323	50	52	55	33	35	39
250	1,2	208	36	40	46	22	25	30
	4	692	41	44	49	27	29	33
	7	1212	45	48	52	33	35	38
	12	2077	50	52	56	41	43	46
315	1,2	331	39	42	47	20	24	31
	4	1104	40	43	47	30	32	35
	7	1932	43	45	49	36	37	40
	12	3312	49	51	54	37	41	48
400	1,2	536	39	41	46	26	30	38
	4	1786	40	42	47	34	36	40
	7	3126	41	43	48	39	40	42
	12	5358	44	47	54	41	43	46

Sound Pressure Values - With Insulation (SDR/D)

System attenuation according to VDI 2081

Nominal Sizes	Air Velocity (m/s)	Flow Rate (m³/h)	Airborne Noise			Radiated Noise		
			ΔP:100 Pa	ΔP:150 Pa	ΔP:250 Pa	ΔP:100 Pa	ΔP150 Pa	ΔP:250 Pa
			LpA (dBA)	LpA (dBA)	LpA (dBA)	LpA (dBA)	LpA (dBA)	LpA (dBA)
100	1	32	32	35	41	8	10	15
	4	107	37	40	45	15	16	19
	7	188	42	45	50	20	22	25
	12	322	48	52	61	27	29	34
125	1	51	32	35	42	10	12	16
	4	170	40	43	48	13	16	20
	7	297	45	48	53	16	19	24
	12	509	48	51	56	20	23	29
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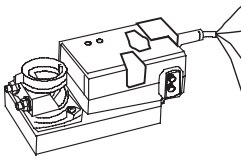
200	1	132	35	38	44	11	13	16
	4	441	40	42	47	13	15	18
	7	772	44	46	50	15	17	22
	12	1323	50	52	55	22	24	28
250	1	208	36	40	46	12	14	18
	4	692	41	44	49	15	17	20
	7	1212	45	48	52	18	20	25
	12	2077	50	52	56	26	28	34
315	1	331	39	42	47	12	14	20
	4	1104	40	43	47	15	18	22
	7	1932	43	45	49	20	22	26
	12	3312	49	51	54	30	31	34
400	1	536	39	41	46	16	18	21
	4	1786	40	42	47	19	20	23
	7	3126	41	43	48	22	23	26
	12	5358	44	47	54	29	30	33

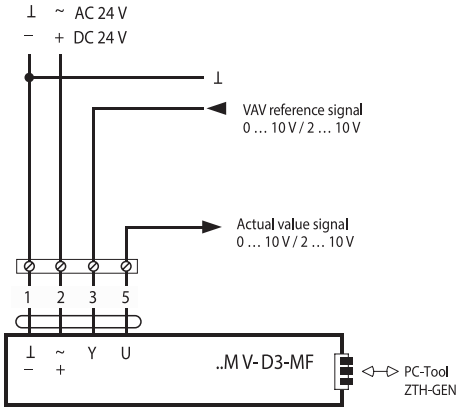
Compact Controller Connection Details



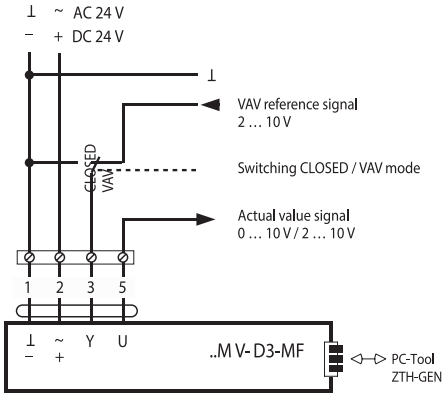
No.	Designation	Wire colour	Function
1	⊥ –	black	⊥ – } AC/DC 24 V supply
2	~ +	red	~ + } AC/DC 24 V supply
3	Y	white	Reference signal VAV/CAV
5	U	orange	– Actual v alue signal – Tool communication

VAV - Variable Operation - Vmin... Vmax

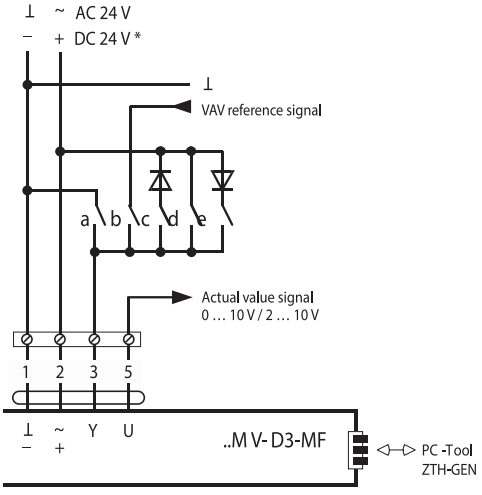
Example 1: VAV with analogue reference signal



Example 2: VAV with shut-off (CLOSE), 2 ... 10 V mode



CAV - Step Mode CLOSED / Vmin / Vmid / Vmax / OPEN



CAV function: Standard

Mode setting	–	0 … 10 V	0 … 10 V	0 … 10 V	0 … 10 V
	2 … 10 V	2 … 10 V	2 … 10 V	2 … 10 V	2 … 10 V
Signal	⊥ –	0 … 10 V 2 … 10 V	~	~ +	~
Function	3	3	3	3	3
Damper CLOSED	a) CLOSED		c) CLOSED *		
$\dot{M}_{min}$ ... $\dot{M}_{max}$		b) VAV			
CAV – $\dot{M}_{min}$	All open – $\dot{M}_{min}$ active **				
Damper OPEN					e) OPEN *
CAV – $\dot{M}_{max}$				d) $\dot{M}_{max}$	

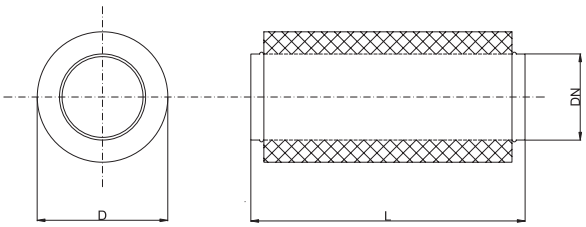
Legend

- Contact closed, function active
- Contact closed, function active, only in 2 ... 10 V mode
- Contact open

* Not available with DC 24 V supply
** the damper is closed when the 0.5 V shut-off level is used

Silencers

The outer surface of the **LR** round silencer is made of galvanized sheet metal, the inner surface is made of perforated galvanized sheet, the insulation material used between the two surfaces is rock wool with 50 mm thickness at 50 kg / m3 density and non-flammable according to DIN 4102 standard A2 class.



They are used to reduce airborne noise in air ducts. They are designed to use after the SDR round VAV units and are suitable for round air duct mounting.

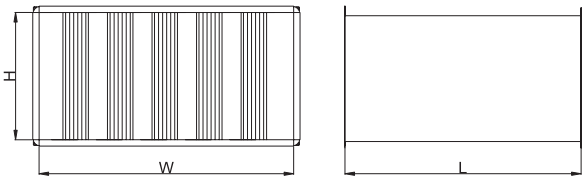
They can be manufactured in all RAL codes if required.

L= 500mm – 950mm

Attenuation values

SIZE DN (mm)	D (mm)	L Standard [mm]	Oktav Bands (Hz)							
			63	125	250	500	1000	2000	4000	8000
			Attenuation Values (dB)							
100	200	950	7	10	20	34	49	51	51	28
125	225	950	5	9	19	31	41	49	42	27
160	260	950	3	8	16	27	36	48	37	22
200	300	950	2	7	13	24	31	43	31	20
250	350	950	1	6	11	21	27	39	25	18
315	415	950	1	5	9	18	23	32	20	18
400	500	950	0	2	6	11	22	20	10	8

The casing of the **LS** rectangular silencer is manufactured from galvanized sheet between 0,8 mm and 1,5 mm according to its size. The splitters are made of galvanized sheet between 0,7 mm and 1 mm according to the silencer size. After that, ready flange and flange corner pieces are mounted.



The insulation material of the splitters is glass wool with 100 mm thick at 50 kg / m3 density and one side coated with glass cloth. The used glass wool is non-flammable according to DIN 4102 standard A2 class and is resistant against decay and moisture.

It is designed to use after the SDS rectangular VAV unit and is suitable for rectangular duct mounting.

Attenuation Values

Oktav Bands (Hz)	63	125	250	500	1000	2000	4000	8000
Attenuation Values (dB)	2	4	8	17	33	32	18	14

Values are given for 1000mm length. Valid for all sizes.

STEKON SDR - Technical Specification

Round flow rate controller designed to control constant or variable air flow rate.
Control range 1.2-12 m/s
The airflow range is 32x5358 m3/h, the control ratio is 10: 1
Minimum - maximum differential pressure range 5 - 1000 Pa
Plug-in installation system, plug-in end pieces to fit lock-seam air ducts acc. to DIN EN 1506 and EN 13180.
All measuring elements and compact controller are factory installed.
Display of damper setting and angle scale on the housing's outside.
Casing leakage acc. to DIN EN 1751 Class A
Damper tightness acc. to DIN EN 1751 Class 4
Operating temperature range is 0- + 50 ° C.
Voltage range for the control and measured signal 0...10 V DC.

Unit consisting of:

Galvanized sheet steel, plug-in duct connection on both sides with lip seal gasket.
Oval damper blade of galvanized sheet steel with EPDM sealing.
Galvanized steel damper axle
Differential pressure measurement probe manufactured from plastic and aluminum parts
Mounted and calibrated Belimo VAV compact D3 electronic flow control unit

Actuator, control

Belimo LMV-D3-MF-STK (dynamic measuring principle)

- Working range 0...10 V
- Working range 2...10 V

Sizes Ø : 100, 125, 160, 200, 250, 315, 400 mm

Accessories

S – Galvanized Sheet Steel T – Powder Coated Body
D – Optionally, 50 mm rockwool insulation, covered with 1 mm galvanized sheet metal, for sound and heat insulation.
ATT – Optionally, with suitable silencer
RHT – Optionally, with suitable electrical or water reheat

Motor/Control – Belimo LMV-D3-MF-STK (dynamic measuring principle)
Optionally MP – LON protocol

Ordering Code

SDR 100 / S / D / MF

(1) (2) (3) (4) (5)

(1)	Model	SDR	= Round VAV Unit
(2)	Size	100	= Ø100mm
		125	= Ø125mm
		160	= Ø160mm
		200	= Ø200mm
		250	= Ø250mm
		315	= Ø315mm
		400	= Ø400mm
(3)	Casing	S	= Galvanized Steel
		T	= Powder Coated
(4)	Insulation	D	= With
		_	= Without
(5)	Control Type	MF	= Standard
		MP	= MP-Bus
		LON	= LON

Additional ordering specifications

Vmin [m³/h] : Minimum air flow

Vmax [m³/h] : Maximum air flow

Mode : 0... 10V or 2... 10V

Ordering Example

SDR 250 / S / D / MF, Vmin : 500m³/h, Vmax: 1800m³/h, Mode 2... 10V

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