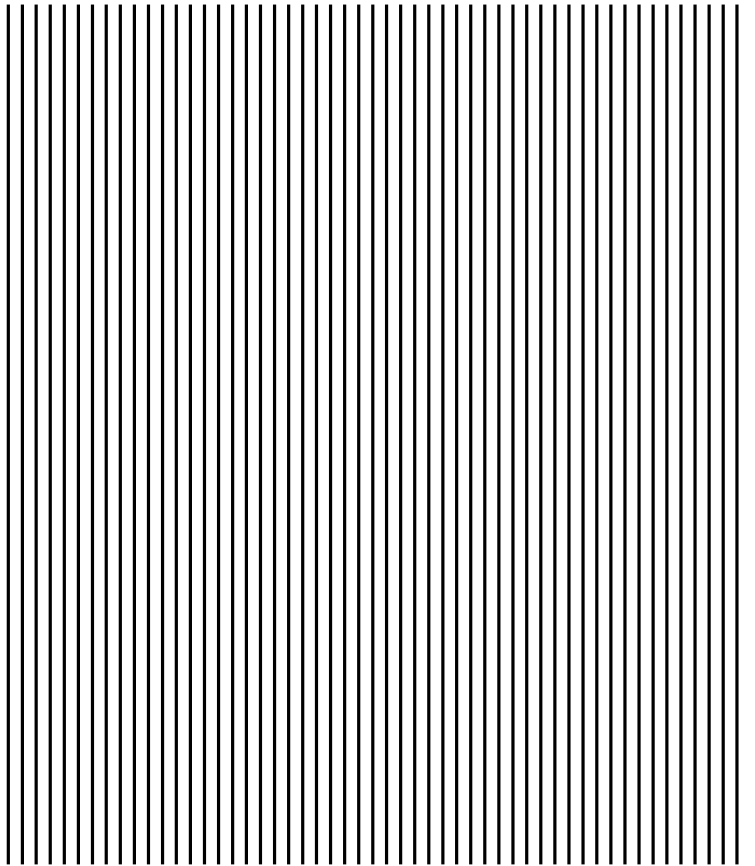




**VAV-STANDARD DAMPER UNIT
KOS-B · KOS-B-S**



ENG



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1. PRODUCT DESCRIPTION

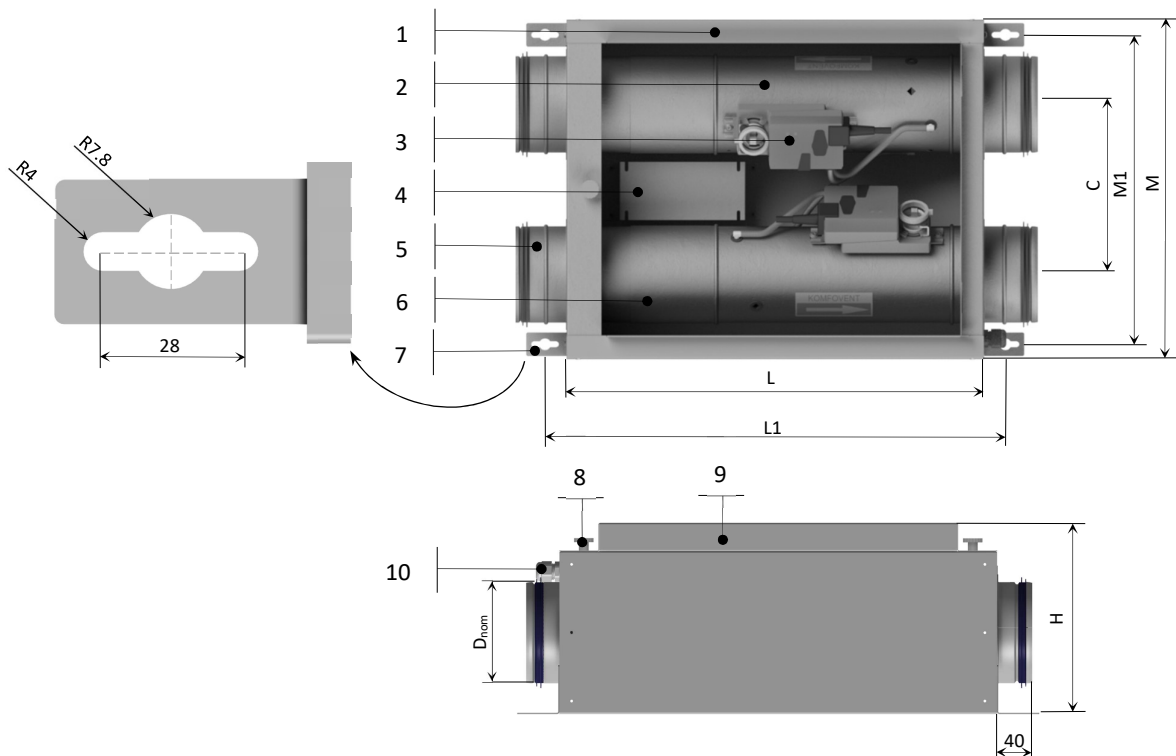


KOS-B and **KOS-B-S** are a compact two Variable Air Volume (VAV) damper unit designed for air flow regulation in areas with high demand for comfort and the variety of the required air volume and temperature range. It is mainly used in apartment and commercial buildings with central air preparation system.

KOS-B unit consists of one supply and one extract air VAV dampers, but **KOS-B-S** unit has already integrated silencer system.

1.1 Design and dimensions of KOS-B and KOS-B-S units

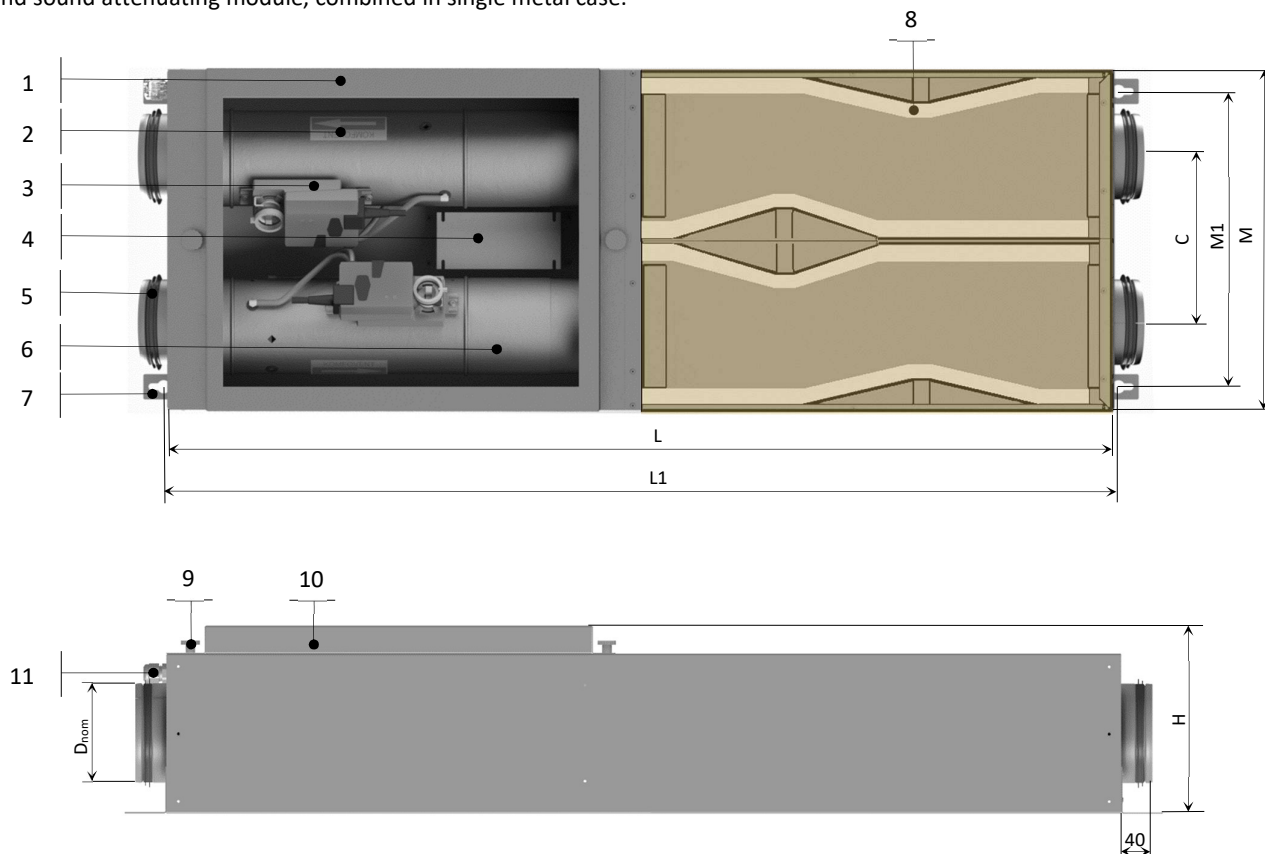
KOS-B is a compact-casing unit, combining two KOS-C VAV dampers and pre-equipped power supply device mounting bracket, combined in a single metal case.



1 – casing of the KOS-B unit; 2 – KOS-C-type VAV damper (2 pcs); 3 – actuator of the damper; 4 – power supply device mounting bracket; 5 – nipple connecting parts (4 pcs); 6 – connecting sleeve of the VAV dampers (2 pcs); 7 – installation bracket of the KOS-B unit; 8 – lid fastener (2 pcs); 9 – lid of the unit; 10 – omentum of the cable

Size	D _{nom} , mm	M ₁ , mm	M, mm	L ₁ , mm	L, mm	H, mm	C, mm
KOS-B-100	100	350	388	596	540	210	195
KOS-B-125	125	400	438	596	540	235	220
KOS-B-160	160	470	508	596	540	270	255

KOS-B-S is a compact-casing unit, combining two KOS-C VAV dampers, pre-equipped power supply device mounting bracket and sound attenuating module, combined in single metal case.

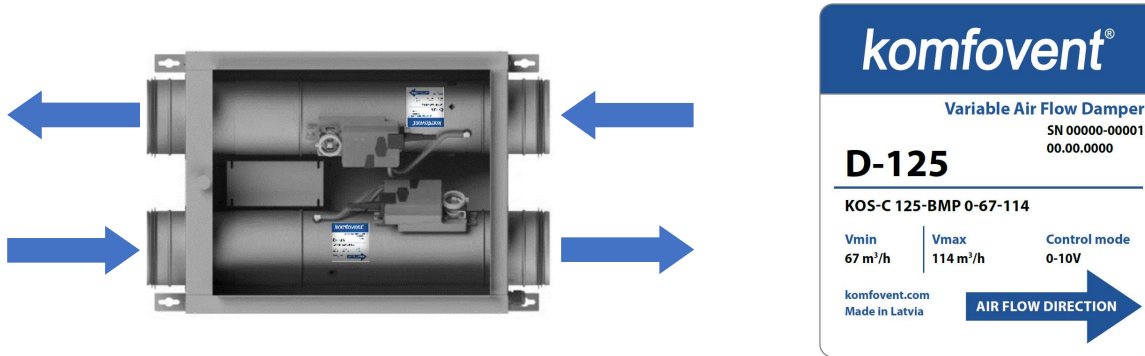


1 – casing of the KOS-B-S unit; 2 – KOS-C-type VAV damper (2 pcs); 3 – actuator of the damper; 4 – power supply device mounting bracket; 5 – nipple connecting parts (4 pcs); 6 – connecting sleeve of the VAV dampers (2 pcs); 7 – installation bracket of the KOS-B-S unit; 8 – sound attenuating material; 9 – lid fastener (2 pcs); 10 – lid of the unit; 11 – omentum of the cable

Size	D _{nom} , mm	M ₁ , mm	M, mm	L ₁ , mm	L, mm	H, mm	C, mm
KOS-B-S-100	100	350	388	1198	1142	210	193
KOS-B-S-125	125	400	438	1198	1142	235	220
KOS-B-S-160	160	470	508	1198	1142	270	251

1.2 Intake and Exhaust Air directions

For both **KOS-B** and **KOS-B-S** units intake and exhaust air directions should be as shown in the picture below in accordance to the label placed on the casing on each KOS-C VAV damper:



It is important to take into consideration project-based supply air side (supply air side RIGHT or supply air side LEFT) to achieve the compliance with design solution (*please refer to [Section 5](#) Ordering sample*).

2. CONTROLLING OF THE KOS-B UNIT

There are four possible main KOS-C VAV damper connection types: **Analogue connection** (LMV-D3-MF-F controller), **MP-Bus connection** (LMV-D3-MP controller), **Modbus / BACnet connection** (LMV-D3-MOD controller) and **KNX connection** (LMV-D3-KNX controller).

2.1 Analogue connection

For analogue connection it is possible to connect controller 0...10 V or 2...10 V to the VAV damper and control the air volume, depending on the given signal and set up.

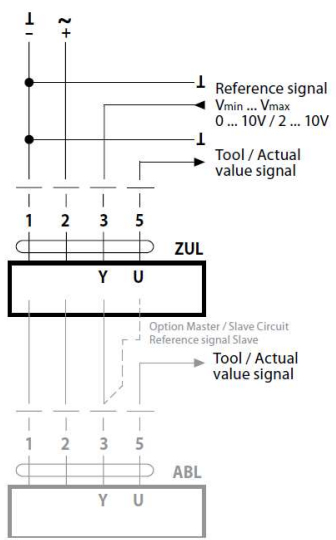
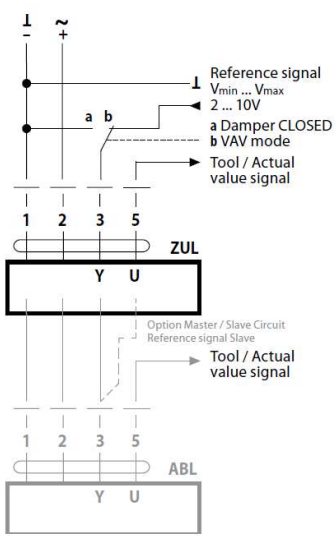
Actuator type	Torque, Nm	Power consumption, W	Rating, VA	Weight, g
LMV-D3-MF-F	5	2	3.5 (max. 8 A @ 5 ms)	500

Description	Wiring diagram 1: VAV, analogue reference signal	Wiring diagram 2: VAV with shut-off (CLOSED), 2 ... 10V mode												
<p>Damper is CLOSED via 0 ... 10 V reference signal (Mode 2 ... 10 V).</p> <p>Setting parameters: Mode 2 ... 10 V, Shut off level 0.1 V or 0.5 V. If the required switching threshold of 0.1 V cannot be attained, the value can be switched to 0.5 V with PC-Tool.</p> <table border="1"> <thead> <tr> <th>Function</th> <th>Standard 0.1V</th> <th>Shut-off level 0.5 V</th> </tr> </thead> <tbody> <tr> <td>Damper CLOSED</td> <td>< 0.1V</td> <td>< 0.5V</td> </tr> <tr> <td>V_{min}</td> <td>> 0.1 ... 2V</td> <td>> 0.5 ... 2V</td> </tr> <tr> <td>$V_{min} \dots V_{max}$</td> <td>2 ... 10 V</td> <td>2 ... 10 V</td> </tr> </tbody> </table> <p>In CAV applications shut-off level must not be set to 0.5 V, otherwise the open connection 3 is interpreted as damper CLOSED.</p>	Function	Standard 0.1V	Shut-off level 0.5 V	Damper CLOSED	< 0.1V	< 0.5V	V_{min}	> 0.1 ... 2V	> 0.5 ... 2V	$V_{min} \dots V_{max}$	2 ... 10 V	2 ... 10 V		
Function	Standard 0.1V	Shut-off level 0.5 V												
Damper CLOSED	< 0.1V	< 0.5V												
V_{min}	> 0.1 ... 2V	> 0.5 ... 2V												
$V_{min} \dots V_{max}$	2 ... 10 V	2 ... 10 V												

2.2 MP-bus connection

For MP-bus connection master/slave bus technology a defined number of slaves can be connected to a MP-Master unit.

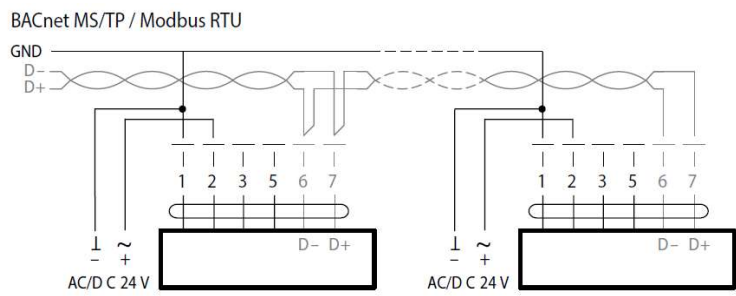
Actuator type	Torque, Nm	Power consumption, W	Rating, VA	Weight, g
LMV-D3-MP	5	2	3.5 (max. 8 A @ 5 ms)	500

Description	Wiring diagram 1: VAV, analogue reference signal	Wiring diagram 2: VAV with shut-off (CLOSED), 2 ... 10V mode												
<p>Damper is CLOSED via 0 ... 10 V reference signal (Mode 2 ... 10 V).</p> <p>Setting parameters: Mode 2 ... 10 V, Shut off level 0.1 V or 0.5 V. If the required switching threshold of 0.1 V cannot be attained, the value can be switched to 0.5 V with PC-Tool.</p> <table border="1" data-bbox="186 483 584 661"> <thead> <tr> <th>Function</th> <th>Standard 0.1V</th> <th>Shut-off level 0.5 V</th> </tr> </thead> <tbody> <tr> <td>Damper CLOSED</td> <td>< 0.1V</td> <td>< 0.5V</td> </tr> <tr> <td>V_{min}</td> <td>> 0.1 ... 2V</td> <td>> 0.5 ... 2V</td> </tr> <tr> <td>V_{min} ... V_{max}</td> <td>2 ... 10 V</td> <td>2 ... 10 V</td> </tr> </tbody> </table> <p>In CAV applications shut-off level must not be set to 0.5 V, otherwise the open connection 3 is interpreted as damper CLOSED.</p>	Function	Standard 0.1V	Shut-off level 0.5 V	Damper CLOSED	< 0.1V	< 0.5V	V _{min}	> 0.1 ... 2V	> 0.5 ... 2V	V _{min} ... V _{max}	2 ... 10 V	2 ... 10 V		
Function	Standard 0.1V	Shut-off level 0.5 V												
Damper CLOSED	< 0.1V	< 0.5V												
V _{min}	> 0.1 ... 2V	> 0.5 ... 2V												
V _{min} ... V _{max}	2 ... 10 V	2 ... 10 V												

2.3 Modbus connection

For Modbus connection, the Modbus protocol is used to establish master-slave / client-server communication between intelligent devices. Using Modbus, a master (e.g., automation station) and several slaves can be interconnected.

Actuator type	Torque, Nm	Power consumption, W	Rating, VA	Weight, g
LMV-D3-MOD	5	2	3.5 (max. 8 A @ 5 ms)	500



Cable colors:

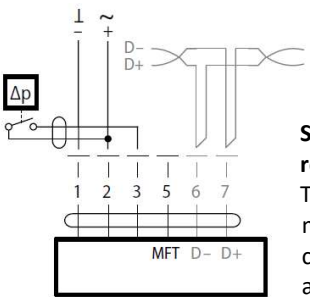
- 1 – black
- 2 – red
- 3 – white
- 5 – orange
- 6 – pink
- 7 – gray

Signal assignment Modbus:

C₁ = D- = A

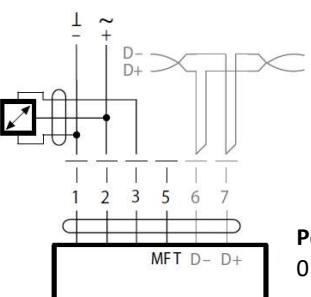
C₂ = D+ = B

Connection with switching contact, e.g., Δp-monitor

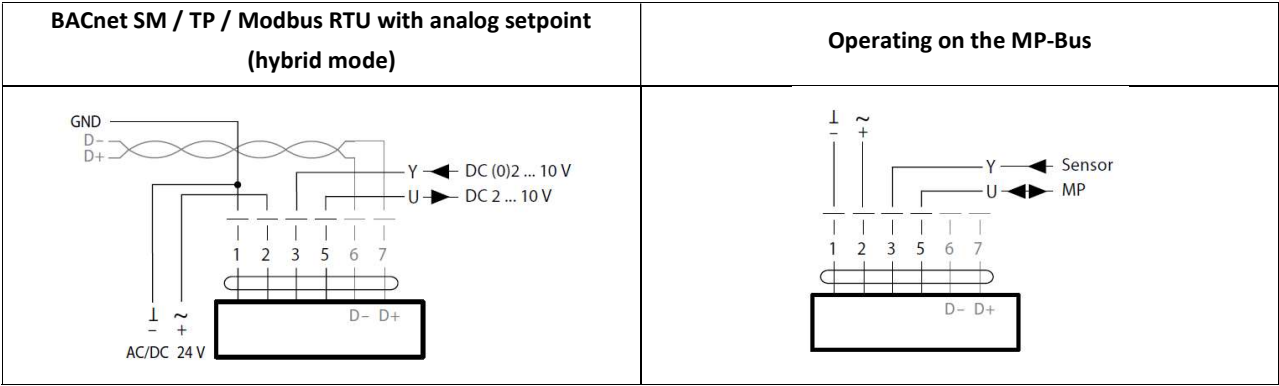


Switching contact requirements:
The switching contact must be able to switch a current of 16 mA at 24V accurately.

Connection of active sensors, e.g., 0..10 V @ 0..50°C



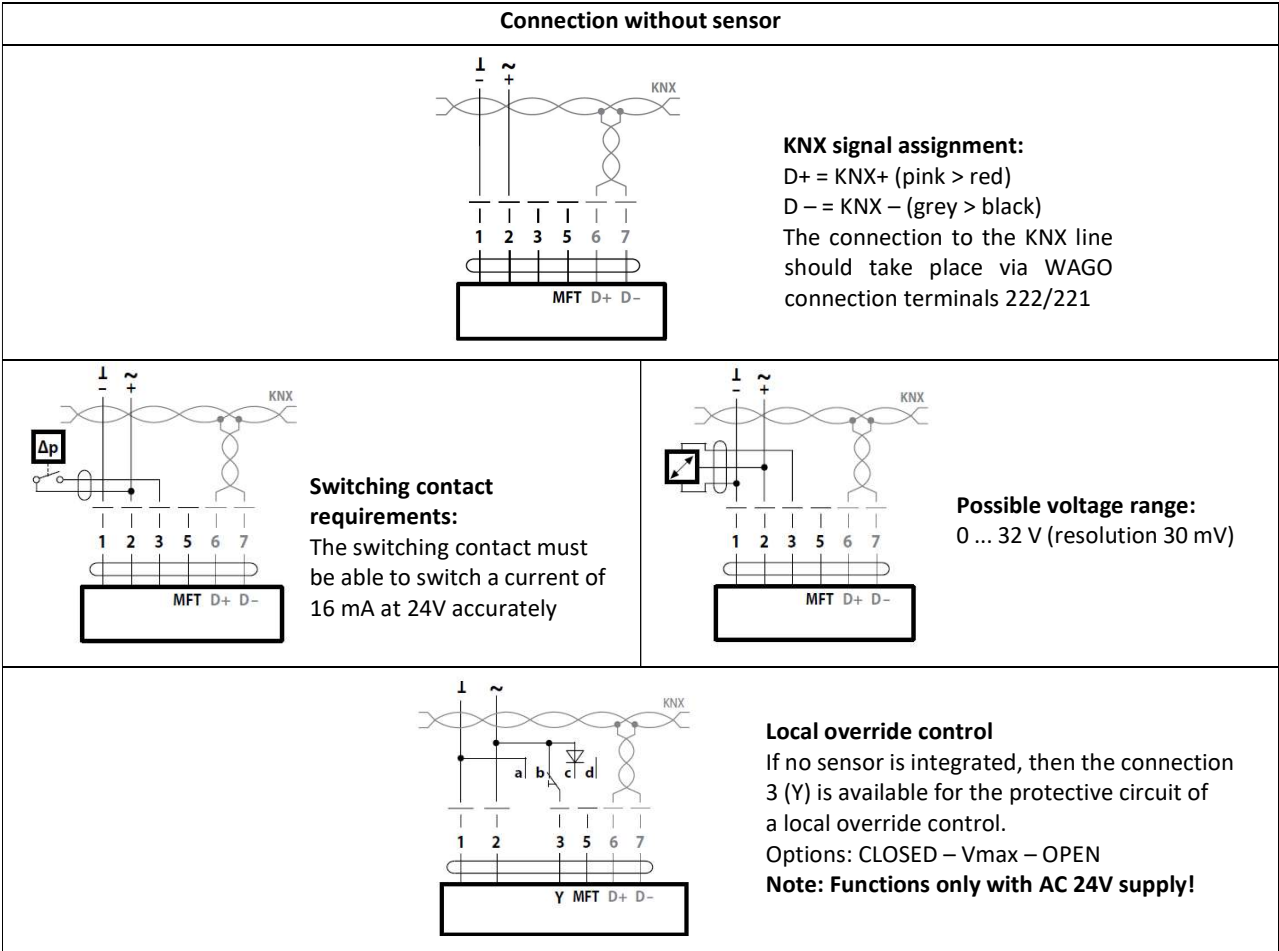
Possible voltage range:
0 ... 32 V (resolution 30 mV)



2.4 KNX connection

For KNX connection KNX devices are generally connected by a twisted pair bus and can be modified from a controller. Below is a connection scheme for KNX type actuators.

Actuator type	Torque, Nm	Power consumption, W	Rating, VA	Weight, g
LMV-D3-KNX	5	2	4 (max. 8 A @ 5 ms)	500



2.5 Power supply controller AEPS



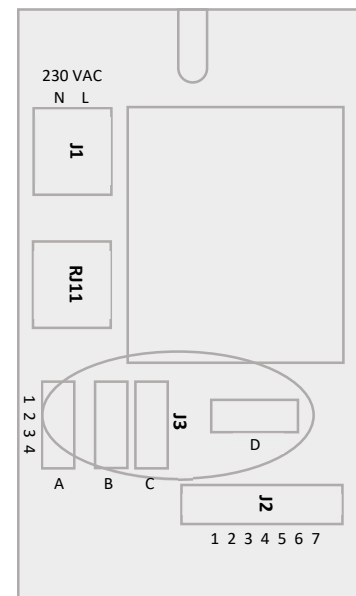
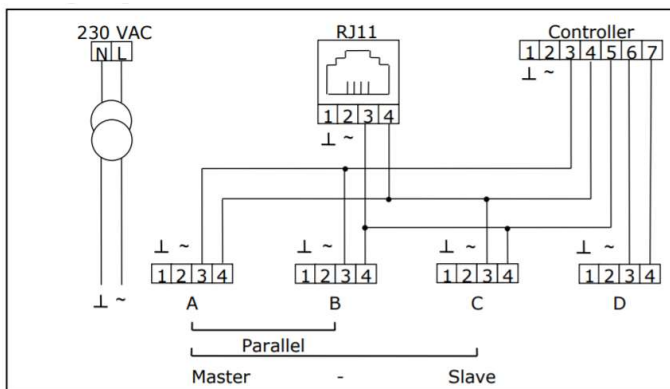
The Power Supply AEPS Controller can be built-in the KOS-B unit, providing 24 VAC power to actuators of the KOS-C VAV dampers, also room controllers or positioning devices.

Master-slave / parallel circuits can be done by simply plugging in the actuator plug to the appropriate connector. An RJ12-type plug allows connection of the actuators programming tool for configuration of programmable actuators.

Features:

- 230 V power supply
- 24 VAC / 10VA nominal output voltage
- Master-Slave or parallel configuration of actuators
- Power indication LED
- RJ12 socket for configuration of actuators
- IP40 protection class
- Up to 3 VAV damper controllers are simultaneously connectable
- Suitable for wall mounting

Wiring diagram



Connection parameters

J1	Supply 230 V
Control unit / control signal	
1	= 24 VAC ⊥
2	= 24 VAC ~
J2	3 = 2...10 VDC control signal for drive A and B
	4 = Feedback signal from A as well as control signal for C
	5 = Feedback signal from B or C
	6 = Control signal from D
	7 = Feedback signal drive D
Actuators - drive, VAV controllers	
1	24 V ⊥
J3	2 24 V ~
	3 2...10 V control signal
	4 Feedback signal
RJ12	Programming device

Technical specification:

Power supply	Operating voltage	210...250 VAC, 50/60 Hz
	Maximum Power	10 VA
	Electrical connection	Terminal connectors, wire 2x 1...2.5 mm ²
Outputs	Nominal voltage	20...27 VAC
	Connections:	
	Drive and VAV-controllers	Plug 4 x 0.34...1.5 mm ²
	Control	Screw terminals: 7 x 0.34...2.5 mm ²
	Configuration	RJ11
Environment	Operation	To IEC 721-3-3
	Climatic conditions	Class 3K5
	Temperature	-10...+40 °C
	Humidity	<90% RH non-condensing
Standards	Conformity acc. to	
	2014/30/EU EMC	EN 61000-6-1
	2014/35/EU LVD	EN 61000-6-3
	Degree of protection	IP40 (EN 60529)
	Environment class	II (EN 60730-1)
	Safety class	II (IEC 60536)
	Overvoltage category	III (EN 60730-1)
General	Material	PC + APS plastics
	Dimensions (L x B x H)	160 x 75 x 50 mm
	Weight incl. package	550 g

2.6 Air quality sensors SQR/SCR



Room air quality sensor SCR monitors 3 different type sensing elements simultaneously – CO₂ (ppm), relative humidity (%RH), air temperature (°C). 2 analog outputs are available for reading measured air parameters. AO1 is always CO₂, while AO2 is user selectable - %RH or °C.

Room air quality sensor SCQ monitors 3 different type sensing elements simultaneously – VOC (%), relative humidity (%RH), air temperature (°C). 2 analog outputs are available for reading measured air parameters. AO1 is always CO₂, while AO2 is user selectable - %RH or °C.

Both sensor setting point for threshold can be adjusted using touch sensitive buttons or onboard potentiometer. PID (proportional–integral–derivative) algorithm can be used for VAV damper or other device control.

Features:

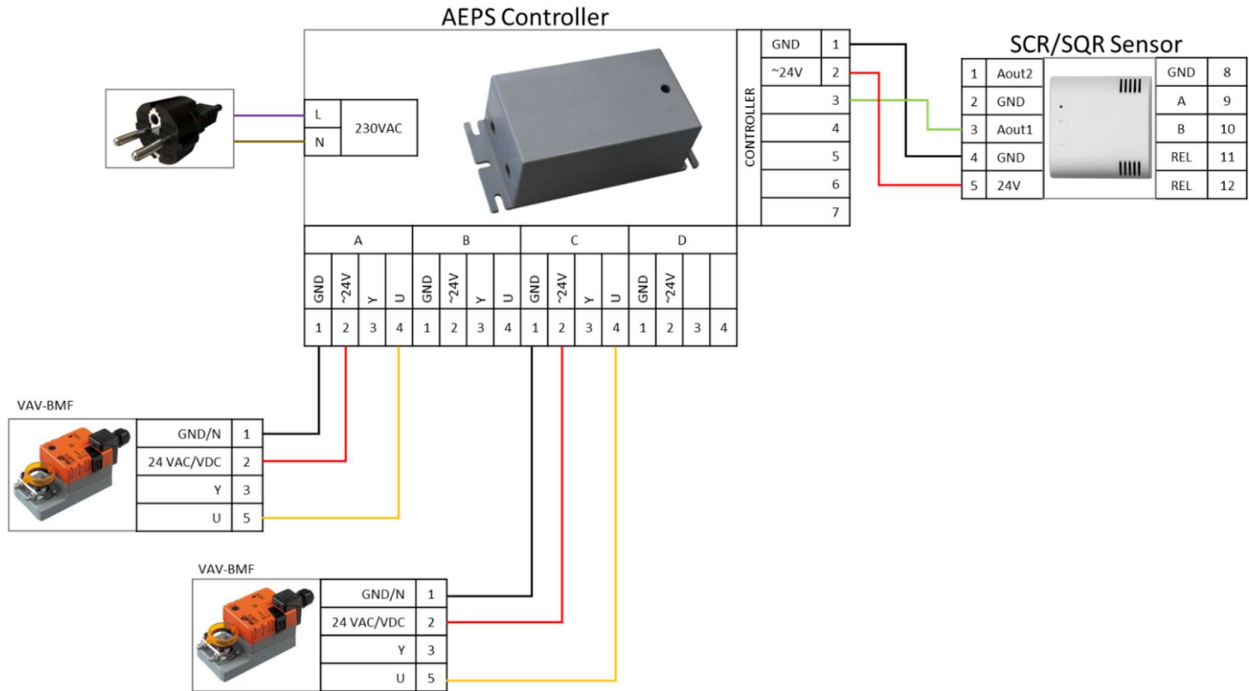
- 24 VAC / 24 VDC supply voltage
- SRC.3 sensor type options (CO₂, %RH or °C)
- SRQ.3 sensor type options (VOC, %RH or °C)
- 2 analog output options (0...10V / 4...20mA)
- Relay output for ON / OFF control
- RS-485 Modbus interface
- PID functionality for VAV damper control
- Compact design 80x80x26 mm
- High measurement accuracy (CO₂: ±6%, VOC: ±15%, %RH: ±3%, °C: ±1.0°C)

Type of the Sensor	CO ₂	VOC	%RH	°C
SCR	+		+	+
SQR		+	+	+

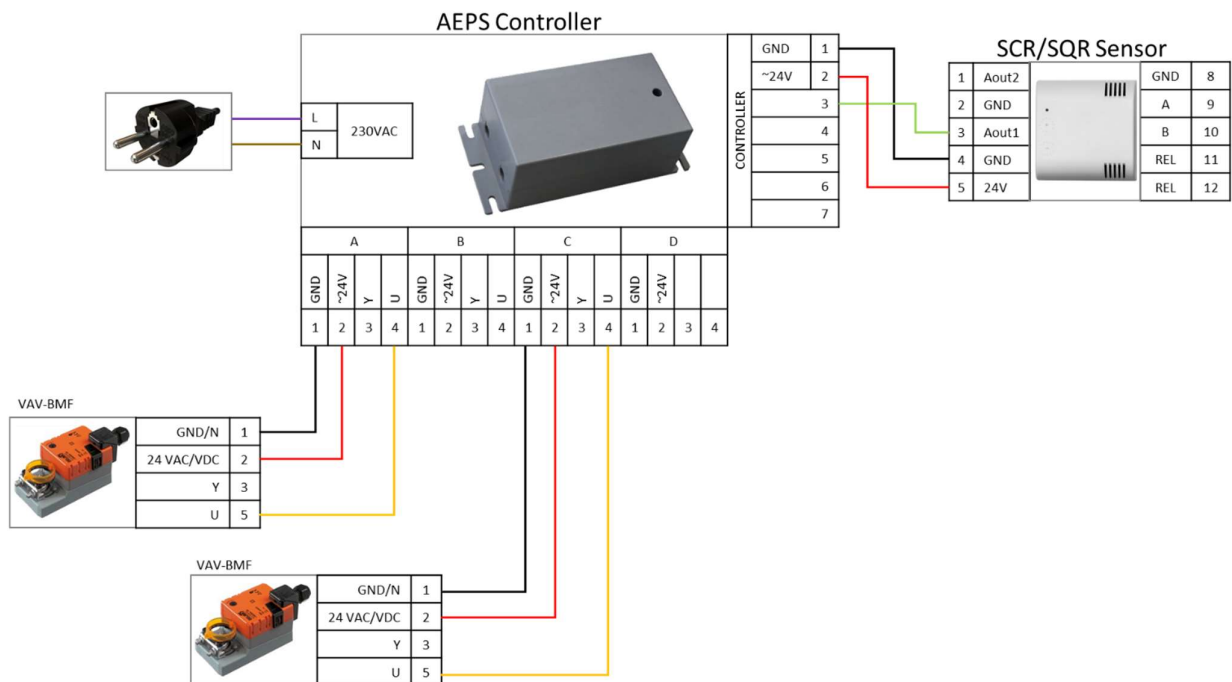
2.7 Application models for AEPS Power Supply Controller and SCR/SQR sensors

The most common examples of the application of the AEPS Power Supply Controller and SCR/SQR sensors are Master/Slave or Parallel communication models.

Master/Slave Connection

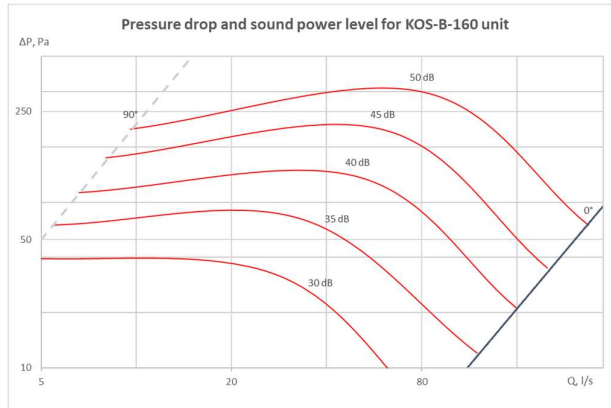
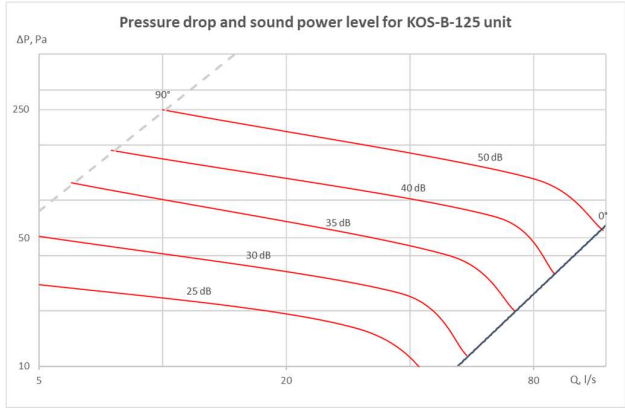
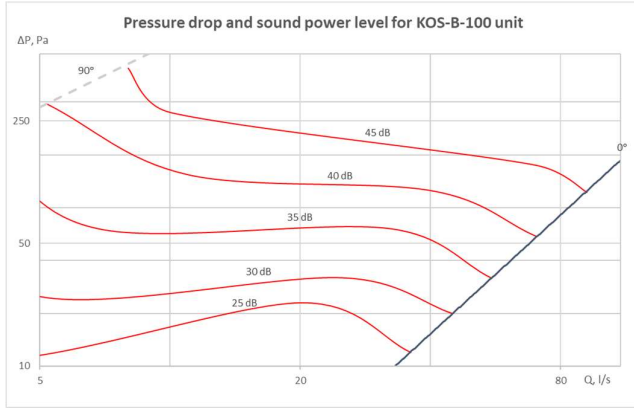


Parallel Connection

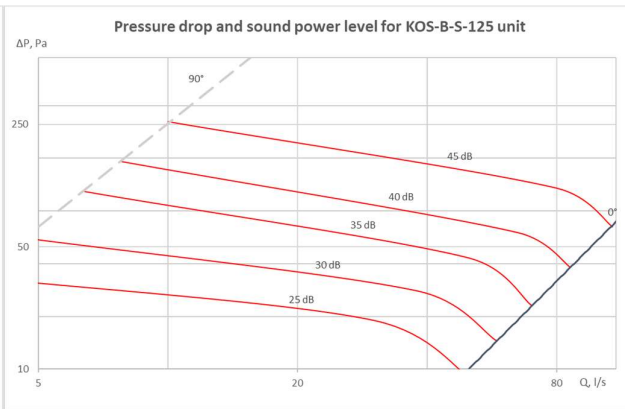
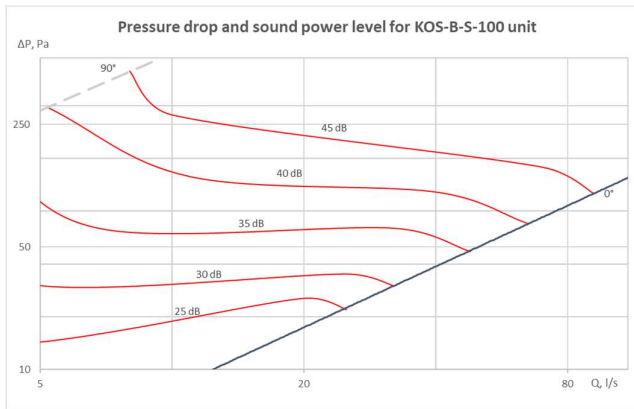


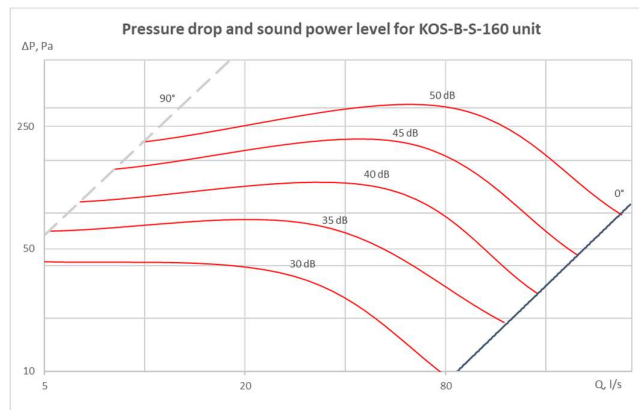
3. TECHNICAL DATA

3.1 Sound and pressure drop of the KOS-B unit



3.2 Sound and pressure drop for KOS-B-S unit





For sound attenuation corrections depending on the frequency, the correction unit factor should be applied:

Frequency, Hz	63	125	250	500	1000	2000	4000	8000
Correction factor, dB	0	-1.5	-3	-11.5	-19	-16.5	-11.5	-10.5

Mineral wool with sound attenuating and fire-resistance properties (A1 class) is used in KOS-B-S as an insulating material. The wool has long life span, is environmentally friendly, hygienic, hydrophobic and resistant to wood-destroying pests, rodents, and insect. Level of weighted sound absorption coefficient of the wool a_w is 0.7 (MH).

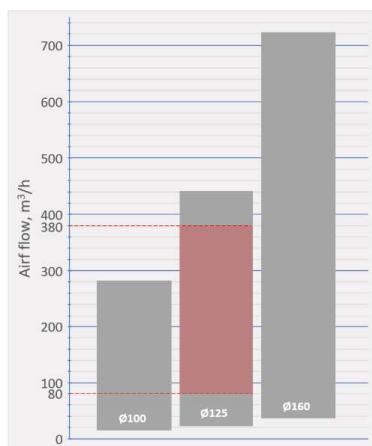
4. ORDERING SAMPLE

KOS-B - 160 - BMF - 0 - 100-300 - 0 - C - 1
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①	KOS-B - Variable Air Volume (VAV) damper unit w/o silencer module KOS-B-S - Variable Air Volume (VAV) damper unit with silencer module
②	Duct connection diameter: 100 mm / 125 mm / 160 mm Type of the actuator: BMF – analogue connection BMP – MP-bus communication BMD – Modbus communication BMDbn – BACnet communication BKX – KNX communication
④	Control signal: 0 – 0..10 V 2 – 2..10 V
⑤	Defined $V_{min} - V_{max}$ air flow values, m^3/h Supply air side:
⑥	0 – Supply air RIGHT / Extract air LEFT 1 – Supply air LEFT / Extract air RIGHT
⑦	Controller of the unit: No entry – w/o controller C – with AEPS-type controller
⑧	Finish of the material: No entry - galvanized steel VAV dampers and casing N – stainless steel VAV dampers and casing (AISI304 or AISI316 on request) P – galvanized steel VAV dampers, powder coated casing in RAL9010 (another tones on request)

4.1 Quick sizing

By using the graph below required VAV damper diameter for KOS-B unit (position ② in coding sample) can be determined easily:



How-to-use example:

Project-based minimal air flow volume is $80 m^3/hour$, maximum air flow volume – $380 m^3/hour$. Both values are marked on the Y axis and the guidelines are drawn until the two values can fit into single nearest airflow range, for this case it corresponds to $\varnothing 125 mm$.

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