ACB

Circular Variable Air Volume Unit (VAV)





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DOĞU

ACB

GENERAL FEATURES

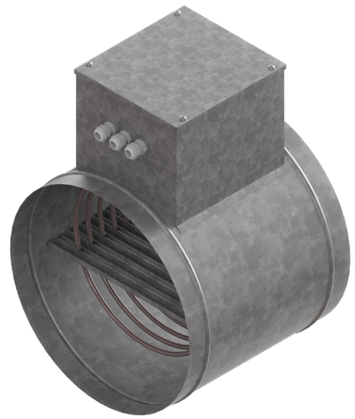
- The ACB Circular Variable Air Volume Unit (VAV) incorporates an averaging air velocity measuring probe, an airflow controller and an actuator.
  Airflow is controlled by adjusting the damper blade position.
- For airflow control in circular ductwork serving projects with specific comfort and hygiene requirements. Variable air volume (VAV) systems can reduce fan motor energy consumption by up to 50%.
- A room controller with an analogue signal (0-10 or 2-10 VDC) can vary the airflow between the minimum and maximum settings.
- Laboratory calibration is completed under simulated site conditions using 7 measuring stations with different diameters and nominal airflow rates.
- Casing air leakage complies with Class B to DIN EN 1751.
- Closed blade air leakage complies with Class 4 to DIN EN 1751.
- Duct connections incorporate airtight rubber seals.
- The ACB complies with the hygiene standards EN 1946/4 and VDI 6022.
- Suitable for use in supply and extract air systems.
- Pressure resistance up to 1000 Pa.
- Suitable for operation at an ambient temperature of 0-50°C.
- Ambient humidity up to 95% RH, non-condensing.
- Operating airflow range: 28 m³/h to 5372 m³/h.
- The compact ACB unit operates efficiently with low pressure loss thanks to its aerodynamic blade design.

MATERIALS

- Galvanised steel casing and blade
- Zinc-plated steel shaft
- Plastic bushes
- EPDM rubber duct seals
- Neoprene blade seals
- Aluminium measuring probe

ACCESSORIES

- **Acoustic insulation:** Optional 19 mm thick foamed rubber insulation is available to meet acoustic comfort requirements. The rubber insulation is clad in galvanised sheet steel.
- **ACQ - Electric Duct Heater:** Where additional supply air heating capacity is required, an electric duct heater can be fitted downstream of the ACB unit.
- **GSS - Circular Silencer:** An optional duct silencer is available to meet acoustic comfort requirements.



ACQ - Electric Duct Heater



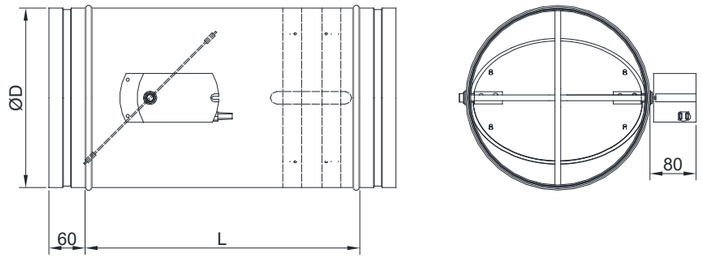
GSS - Circular Silencer

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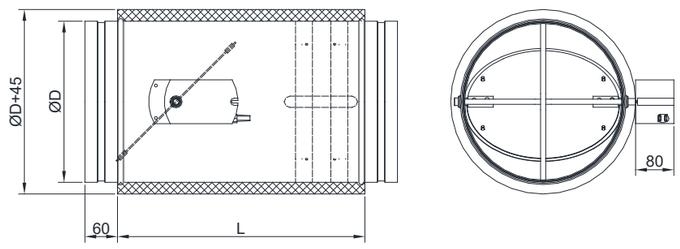
ACB

STANDARD DIMENSIONS

ACB UNINSULATED



ACB INSULATED



Diameter	L
Ø100	295
Ø125	275
Ø160	275
Ø200	320
Ø250	370
Ø315	435
Ø355	475
Ø400	520

Table 1: Quick selection

Vmax and Vmin must be specified when selecting the airflow range.

Measurement and control performance cannot be guaranteed if airflow falls below the Vmin value stated in the table.

If only Vmax is specified in the order, Vmin is set to the standard value stated in the catalogue.

If only Vmin is specified in the order, the stated airflow rate is assigned to Vmin and Vmax is set to 100%.

Airflow settings can be adjusted using tools suitable for the controller type, subject to the unit's factory calibration parameters.

The parameter settings of all control units are based on an air density of 1,2 kg/m³.

PERFORMANCE DATA

ACB - [Uninsulated] / ACB - [Insulated]				Air-regenerated noise Lp_A [dB(A)]				Casing-radiated noise LP_R [dB(A)]							
Nominal	Velocity	Airflow	Pressure loss	ACB - [Uninsulated] ACB - [Insulated]				ACB - [Uninsulated]				ACB - [Insulated]			
ØD	[m/s]	[m³/h]	[Pa]	100	200	400	800	100	200	400	800	100	200	400	800
				[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]
100	2	53	2	30	38	45	50	<15	20	28	32	<15	<15	<15	18
	4	106	10	34	40	47	52	<15	22	29	34	<15	<15	<15	21
	6	160	23	36	43	49	54	19	24	31	35	<15	<15	19	23
	8	213	41	39	45	51	57	21	27	33	38	<15	<15	22	27
	10	266	65	42	47	54	59	25	29	36	41	<15	18	24	30
125	2	86	2	30	38	45	50	<15	20	28	33	<15	<15	<15	20
	4	172	10	35	41	48	53	<15	23	31	36	<15	<15	18	23
	6	258	22	38	43	51	56	20	25	33	38	<15	<15	21	26
	8	344	39	41	46	53	58	24	28	35	41	<15	<15	24	29
	10	428	61	44	49	55	60	26	31	37	43	<15	19	26	31
160	2	141	2	28	40	46	52	<15	24	30	36	<15	<15	<15	20
	4	282	10	33	43	48	55	<15	26	32	38	<15	<15	17	23
	6	423	22	37	47	51	57	20	31	34	41	<15	21	22	28
	8	564	39	40	49	53	60	23	33	36	44	<15	18	24	31
	10	705	61	44	51	55	62	27	35	38	46	<15	20	26	33
200	2	222	2	29	38	44	54	<15	22	29	39	<15	<15	<15	26
	4	444	9	34	42	49	56	17	27	33	41	<15	<15	21	28
	6	666	19	38	45	51	58	22	30	36	43	<15	18	24	31
	8	888	35	41	48	54	61	25	33	38	45	<15	21	26	33
	10	1108	54	45	51	56	63	29	35	40	48	<15	23	29	35
250	2	348	2	28	37	46	52	<15	21	30	39	<15	<15	<15	26
	4	696	9	35	42	49	57	17	27	33	41	<15	<15	21	28
	6	1044	18	38	46	52	59	22	30	36	43	<15	18	24	31
	8	1392	33	41	49	54	61	25	33	38	45	<15	21	26	33
	10	1740	51	45	51	56	63	29	35	40	48	<15	23	29	35
	12	2086	53	48	53	58	64	32	36	42	48	22	28	33	39
315	2	554	2	29	37	46	52	<15	21	31	37	<15	<15	20	27
	4	1108	9	36	44	50	56	19	27	34	40	<15	19	25	31
	6	1662	17	40	47	54	59	24	31	37	43	<15	22	29	34
	8	2216	29	44	50	56	62	28	33	40	45	19	25	31	37
	10	2770	46	48	53	58	64	32	36	42	48	22	28	33	39
	12	3322	54	52	57	59	66	34	39	45	50	24	30	36	43
355	2	704	3	28	37	44	53	<15	23	31	40	<15	<15	20	29
	4	1408	14	36	45	49	56	21	30	35	43	<15	20	24	32
	6	2112	15	39	47	53	60	24	33	39	46	15	22	29	35
	8	2816	26	43	50	56	63	28	36	42	49	18	26	31	38
	10	3520	41	46	53	59	66	32	39	44	52	22	29	34	41
	12	4226	54	52	56	60	68	34	41	45	54	24	30	36	43
400	2	895	2	29	36	46	55	<15	22	34	41	<15	<15	22	31
	4	1790	10	37	44	50	57	22	30	36	43	<15	21	26	34
	6	2685	14	40	47	54	60	26	33	39	46	17	23	30	37
	8	3580	25	45	50	56	63	30	36	41	49	21	27	32	39
	10	4475	38	48	54	59	67	33	39	45	53	24	30	36	43
	12	5372	54	52	56	60	68	34	41	45	54	24	30	36	43

Table 2: Performance data

AIRFLOW CROSS-SECTIONAL AREA

Airflow area table	Type (Diameter [mm])							
	ACB- 100	ACB- 125	ACB- 160	ACB- 200	ACB- 250	ACB- 315	ACB- 355	ACB- 400
Airflow area [m²]	0,008	0,012	0,020	0,031	0,049	0,078	0,099	0,126

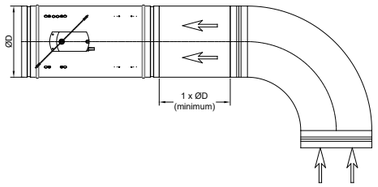
Table 3: Airflow cross-sectional area by size

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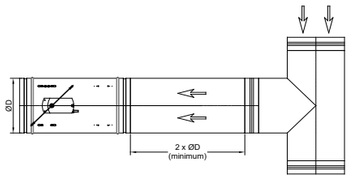
INSTALLATION

Install the ACB in the direction indicated by the airflow arrow. Observe the minimum straight duct lengths below to ensure correct operation of the differential pressure sensors. Duct fittings such as bends, branches, tees and reducers must conform to EN 13180.

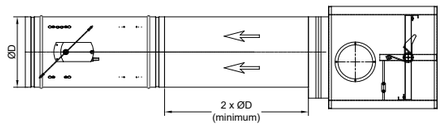
A. CONNECTION DOWNSTREAM OF A BEND



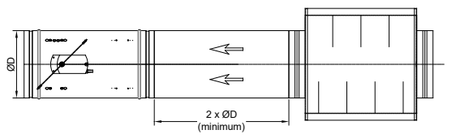
B. CONNECTION DOWNSTREAM OF A TEE



C. CONNECTION DOWNSTREAM OF A FIRE DAMPER



D. CONNECTION DOWNSTREAM OF A SILENCER



Duct fitting	Minimum straight duct length
Bend	1xØD
Other duct fittings (tees, reducers, etc.)	2xØD
Fire damper	2xØD
Silencer	2xØD

Table 4: Minimum straight duct lengths

VAV-COMPACT CONTROL UNITS

VAV control units are supplied as standard with actuators accepting analogue setpoint and feedback signals in DC 2 V...10 V or DC 0 V...10 V mode.
MP-Bus, Modbus, BACnet and LON communication options are available.
The units are factory-calibrated and configured to the required airflow rate and Vmin/Vmax settings using ZTH-EU and Belimo PC-Tool.

Belimo actuator code	Airflow measurement Analogue input	Airflow measurement via bus	Setting tools[3]	Wiring	Feedback signal type	Feedback variables[2]	Bus communication variables	Power supply	Operating temperature [°C]
LMV-D3-MP (5 Nm) NMV-D3-MP (10 Nm)	DC 0...10 V, DC 2...10 V	MP-BUS	ZTH-EU, PC TOOL, NFC(Android), MP-BUS	Open(1) Closed Vmin, Vmax	DC 0...10 V, DC 2...10 V, MP-BUS	Airflow, Damper position, Pressure	Read/write: Setpoint, Vmin, Vmax, Open, Closed Read: Actual airflow, Damper position, Actual pressure, Serial number, faults, Warning messages	AC 24 V, DC 24 V	0...+50°C
LMV-D3-MF (5 Nm)		-	ZTH-EU, PC TOOL		DC 0...10 V, DC 2...10 V		-		
LMV-D3-MOD (5 Nm) NMV-D3-MOD (10 Nm)		MODBUS, BACnet, MP-BUS	ZTH-EU, PC TOOL, MODBUS, MP-BUS		DC 0...10 V, DC 2...10 V, MODBUS, MP-BUS		Read/write: Setpoint, Vmin, Vmax, Open, Closed Read: Actual airflow, Damper position, Actual pressure, Serial number, faults, Warning messages		

Table 5: VAV control unit specifications

Note:
1) Available with AC 24 supply only.
2) The output is analogue; only one feedback variable can therefore be selected.
3) Setting tools are not supplied as accessories.

COMPACT SERIES (Integrated airflow measurement)				
Actuator model	**Torque**	**Operating speed**	**Control functions**	**Feedback signal type**
LMV-D3-MP	5 Nm	Slow	Airflow, position control	MP-Bus
NMV-D3-MP	10 Nm	Slow	Airflow, position control	MP-Bus
LMV-D3-MOD	5 Nm	Slow	Airflow, position control	MODBUS, BACnet, MP-Bus
NMV-D3-MOD	10 Nm	Slow	Airflow, position control	MODBUS, BACnet, MP-Bus
LMV-D3-MF	5 Nm	Slow	Airflow, position control	0-10V/2-10V

Table 6: Compact series specifications

Note: No external controller required - Integrated airflow sensor

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VAV-UNIVERSAL CONTROL UNITS

VRU series control units provide universal solutions for VAV applications requiring airflow, duct pressure and room pressure control. Modbus, BACnet and MP-Bus communication, together with compatibility with VST actuators, allow flexible control and straightforward integration into different systems.

UNIVERSAL VST SERIES (With VRU controller)						
Actuator family	**Torque**	**Speed**	**VRU-M1-BAC (Static)**	**VRU-M1R-BAC (Static + relay)**	**VRU-D3-BAC (Dynamic)**	**Feedback signal type**
LM24A-VST	5 Nm	Slow	Airflow, duct pressure	Room pressure	Airflow, duct pressure, position control	MODBUS, BACnet, MP-Bus
NM24A-VST	10 Nm	Slow	Airflow, duct pressure	Room pressure	Airflow, duct pressure, position control	MODBUS, BACnet, MP-Bus
LMQ24A-VST	5 Nm	Fast	Airflow, duct pressure	Room pressure	Airflow, duct pressure, position control	MODBUS, BACnet, MP-Bus
NMQ24A-VST	10 Nm	Fast	Airflow, duct pressure	Room pressure	Airflow, duct pressure, position control	MODBUS, BACnet, MP-Bus

Table 7: Universal series specifications

VAV-COMPACT CONTROL UNIT COMMISSIONING

S72: LMV-D3-MF



No.	Colour	Symbol	Function
1	Black	⊥–	AC/DC 24 V supply
2	Red	~+	
3	White	◂Y	VAV/CAV reference signal
5	Orange	▸U	-Airflow signal -Unit communication

S71: LMV-D3-MP & S70: NMV-03-MP



No.	Colour	Symbol	Function
1	Black	⊥–	AC/DC 24 V supply
2	Red	~+	
3	White	◂Y	VAV/CAV reference signal
5	Orange	▸U	-Airflow signal -Unit communication

S73: LMV-D3-MOD & S86: NMV-D3-MOD



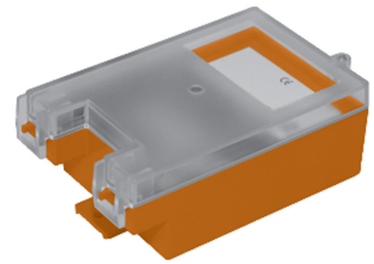
No.	Colour	Symbol	Function
1	Black	⊥–	AC/DC 24 V supply
2	Red	~+	
3			
5	Orange	◂MFT	MP connection
6	Pink	D-	BACnet / Modbus (RS485)
7	Grey	D+	

OPTIONAL ADAPTIVE VAV CONTROL SYSTEM

An optional configuration combines a fast-running VAV actuator, a static pressure sensor and a control platform. It provides adaptive room airflow control independently of duct pressure, with an opening/closing time of 2,5 seconds.

VRP-M Controller	
Nominal voltage	24 V AC, 50/60 Hz 24 V DC
Power supply	1,1 W (Without actuator, with VFP 300)
Reference signal w (terminal 3) Range: Vmin...Vmax	Input impedance > 200 k - DC 0...10 / 2...10 V or - 0...20 / 4...20 mA (With 500 resistance)
Actual value	0...10 / 2...10 DC, maximum 5 mA
Degree of protection	IP 42
Operating temperature	0...+50°C
EMC	CE 2004/108/EC
Ambient humidity	5...95% RH

Table 8: VRP-M controller specifications



VRP-M

VFP-300 Static Differential Pressure Transducer	
Supply connection	15 V DC (Compatible with VRP-M)
Measuring range	0...300 Pa
Output signal	0...10 V DC
Differential pressure connection	Internal diameter Ø4...6 mm
Protection class	III Safety extra-low voltage
Degree of protection	IP42
Operating temperature	0...+50°C
EMC	CE 2004/108/EC

Table 9: VFP-300 static differential pressure transducer specifications



VRP-300

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LMQ24A-SRV-ST Actuator	
Supply via VRP-M	24 V AC, 50/60 Hz 24 V DC
Power consumption	13W
Protection class	III (Safety extra-low voltage)
Torque	4 Nm
Running time	2,5 s / 90°
Degree of protection	IP54
Operating temperature	0...+50°C
EMC	CE 89/336/EEC
Ambient humidity	5...95% RH
Maintenance	Maintenance-free

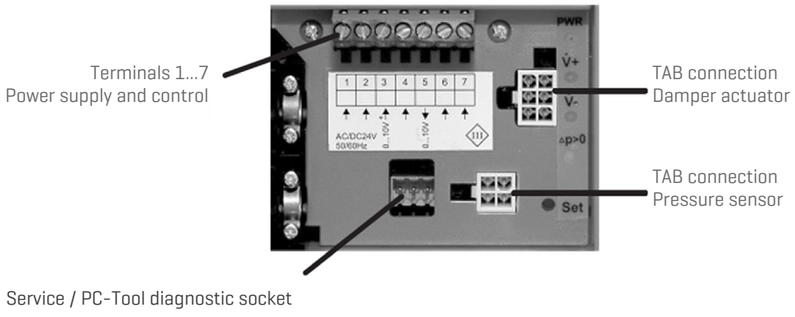
Table 10: LMQ24A-SRV-ST & LMQ24A-SRV-ST actuator specifications



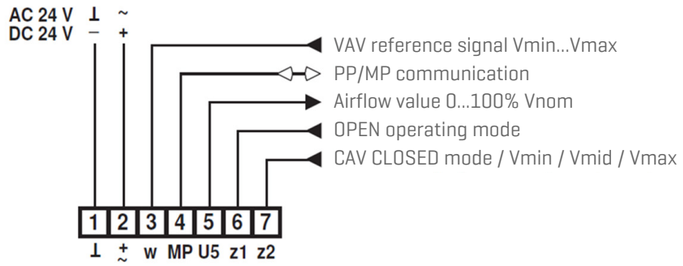
LMQ24A-SRV-ST
NMQ24A-SRV-ST

ADAPTIVE VAV CONTROL SYSTEM ELECTRICAL CONNECTION

FRONT PANEL



FRONT PANEL TERMINAL FUNCTIONS



PRODUCT ORDER CODES

Material
Galvanised steel
AISI 304 stainless steel
Diameter (W) [mm]
Refer to standard dimensions
Connection type
30 - 25 flanges
Insulation
Uninsulated
19 mm rubber
Airflow direction
Extract air
Supply air
Airflow control mode
Airflow control
Pressure control
Pressure control mode (1)
Duct pressure control
Room pressure control

Airflow data (2)
Min. airflow
Max. airflow
Pressure data (3)
Min. pressure
Max. pressure
Actuator
LMV-D3-MP
NMV-D3-MP
LMV-D3-MF
LMV-D3-MOD
NMV-D3-MOD
LMQ24A-VST
Controller
VRU-M1-BAC
VRU-M1R-BAC
VRU-D3-BAC
Control signal type
0-10 V
2-10 V

(1) Leave this field blank when airflow control is selected.
(2) Leave this field blank when pressure control is selected.
(3) Leave this field blank when airflow control is selected.

Example order description 1:
CIRCULAR VAV UNIT / GAL / Pressure control / Duct pressure / Supply air / Slip-in duct connection / Uninsulated / LMQ24A-VST - VRU - M1 BAC / 25 - 450 [Pa] / 2-10 V / Ø 250

Example order description 2:
CIRCULAR VAV UNIT / GAL / Airflow control / Supply air / Slip-in duct connection / Uninsulated / LMV-D3-MOD - 24V 5Nm / 1800 - 4500 [m3/h] / 2-10 V / Ø 400

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SUSTAINABILITY SOLUTIONS AT DOGU HVAC

3 GOOD HEALTH AND WELL-BEING

We offer supplementary health insurance to our employees to promote healthy living. We also plan health-focused initiatives such as smoking cessation programs.

7 AFFORDABLE AND CLEAN ENERGY

Our R&D center's 2,500 m² solar panels and 0.6 MW annual capacity solar energy systems reduce our carbon footprint. We generate our electricity, ensuring a reliable, sustainable, and accessible clean energy source.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

We minimize waste through lean production policies and emphasize recycling, simultaneously increasing efficiency in our production processes.

4 QUALITY EDUCATION

Through the DOGU HVAC CLUB project, we organize technical tours of our factory, participate in career events, and provide sponsorships to support the skill development of university and technical high school students.

8 DECENT WORK AND ECONOMIC GROWTH

Decent Work and Economic Growth: As an employer brand, our primary goal is to protect our employees' rights and create a workplace founded on equality and justice for all employees.

13 CLIMATE ACTION

We support environmental protection through our eco-friendly, sustainable, energy-efficient product lines and R&D efforts focused on reducing waste that could contribute to climate change.

5 GENDER EQUALITY

In 2024, we increased female employment in our administrative and production departments. This step aims to contribute to gender equality by offering a workplace with equal rights for all employees.

11 SUSTAINABLE CITIES AND COMMUNITIES

We enhance indoor air quality with environmentally friendly and energy-efficient products, ensuring adherence to European standards.

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

We value transparency and accountability, working with associations like ISKAV to prevent corruption and unfair competition, aligning with sectoral ethical values.









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