DOĞU
İKLİMLENDİRME | HVAC SYSTEMS

ACC

Variable Air Volume Terminal Box

FOUR SEASONS®

Venues Breathe with DOGU HVAC Systems!

DOGU HVAC founded in 1999, and ever since has been manufacturing energy and cost efficient products as Air Handling Units, Air Distribution & Management & Movement Systems [HVAC Components] and constantly enhancing to provide an integrated solution for well-being. DOGU HVAC's core business products which are subsumed under 4 major groups as Air Handling Units, Heat/Energy Recovery Units, Air Distribution & Management Products and Kitchen Ventilation Equipment are all produced under the compliance with EU standarts. Particularly AHU and HRU-ER units are entitled under the "FOUR SEASONS" brand name for domestic and foreign markets. DOGU HVAC's, headquarter in Izmir/Turkey, operates in a large-sized plant spread over 2 factories, in total area of 45.000 sqm in which 25.000 sqm indoor space that enables DOGU HVAC manufactures 180 various type of products. Additionally, DOGU HVAC has a powerful sales network with 4 sales offices located in İstanbul, Ankara, Antalya and Adana in Turkey as well as authorized dealers in many other countries for sales and after sales operations. DOGU HVAC has been exporting to more than 55 countries.

Thanks to our "Customer Satisfaction","Zero-Defect Policy" motto and reinforced by complete certified products, more than 250 employees. DOGU HVAC R&D center developed exclusive products, such as Double Skin Make-Up Kitchen Hood, Recirculated Laminar Airflow Unit, Single Piece Square Ceiling Diffuser and Ecology Units, for the first time have brought to the sector. DOGU HVAC R&D has the ability to make customized production which can meet the requirement of the customers by means of special software such as "ANSYS FLUENT". DOGU HVAC guaranteed its quality of management by having advantages of ISO 9001, ISO 14001, ISO 18001 certifications. Air Handling Units have EUROVENT, TUV Hygiene [in accordance with DIN1946-4, VDI 6022-1, DIN EN 13053 standarts], CE, TSEK, GOST-R certifications; Fire Dampers have EN 1366-2 and EN 13501-3 CE certifications; Smoke Control Dampers have EN 1366-10 and 12101-8 CE certifications; Kitchen Ventilation Products have TSEK, CE and GOST-R quality certifications.

- VAV terminal boxes for variable volume systems, for supply and extract air, in 7 nominal sizes 150 – 9.000 m^3/h flow range
- The boxes contain an averaging differential pressure sensor for air flow measurement, a control damper and an integral sound attenuator for reducing the air regenerated noise.
- The control damper blade with plastic seal when closed complies with the air tightness requirements of DIN EN 1751.
- There is a circular spigot connection on the fan (high pressure) end with a rectangular flange connection on the room (low pressure) end.

MATERIAL

- **Rubber seal**

  Circular duct connection equipped with integrated EPDM rubber seals. Duct connection gaskets are vulcanised to the casing.
- **Casing**

  Galvanized sheet steel

  Lined with mineral wool, perforated cover

  Abrasion-resistant up to a duct velocity of 20 m/s
- **Guide baffle**

  Galvanized sheet steel, perforated
- **Damper blade**

  Galvanized sheet steel
- **Measuring cross**

  Blades made of extruded aluminium profile

ACCESORY

- **Electrical Heater**

  Galvanized sheet steel, with stainless steel resistant
- **Acoustic cladding**

  Galvanized sheet steel, with mineral wool lining
- **Rubber lip seal**

  Special rubber
- **Additional silencer**

  Galvanized sheet steel with mineral wool lining and perforated cover

AIRFLOW CONTROL

The control of the flow rate takes place in a closed control circuit, i.e. measurement – comparison – control. A pressure transducer converts the pressure differential into an electrical signal, which is interpreted as the actual value by the controller. In most applications, the set point value comes from a room temperature controller. The controller compares the actual value with the set point value and from the difference between these two alters the control signal to the damper actuator.

Controllers include a dynamic differential pressure sensor with a low bypass airflow rate through the sensor element. Therefore, these controllers are not to be used in highly contaminated environments. Controllers EC and EE include Belimo's MP-bus connection.

Controller ED includes two potentiometers for minimum and maximum airflow setpoint adjustment (ranges: minimum = 0...80% and maximum = 30...100%).

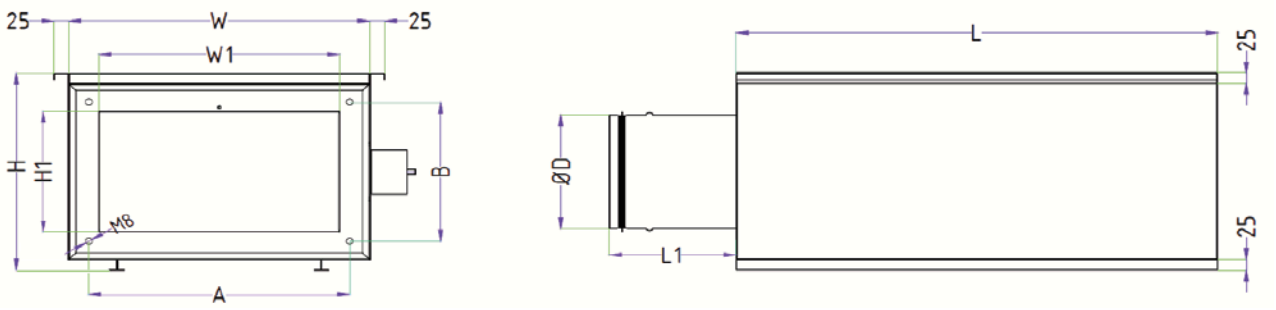
The adjustable airflow control range is presented in the table below. For airflow controllers the highest available minimum airflow rate equals the specified maximum airflow rate.

Minimum and maximum airflow rates are calculated as percentage of damper's nominal airflow.

For the ED controller, the highest minimum airflow rate is 80% of the specified maximum airflow rate.

Maximum airflow is calculated as percentage of nominal airflow and minimum airflow as percentage of maximum airflow.

DIMENSIONS



Dimensions (mm)							
Selection Diameter	**L**	**W**	**H**	**A**	**B**	**W_1**	**H_1**
125	1000	300	250	234	184	200	150
160	1000	410	250	344	184	310	150
200	1200	560	300	494	234	460	200
250	1200	700	300	634	234	600	200
315	1200	900	350	834	284	800	250
400	1200	1000	450	934	384	900	350

QUICK SELECTION

Table 1. Quick Selection

Flow Rate [m³/h]	**Velocity [m/s]**					
Product	**2**	**4**	**6**	**8**	**10**	**12**
ACC -125	86	171	257	342	428	513
ACC -160	141	282	423	564	705	847
ACC -200	222	443	665	886	1108	1329
ACC - 250	348	695	1043	1390	1738	2086
ACC - 315	554	1107	1661	2215	2769	3322
ACC - 400	895	1791	2686	3581	3376	5372
Pressure Drop	**20**	**25**	**30**	**40**	**60**	**80**

NOISE DATA

Table 2. Noise Data

			Flow Generated Noise [db(A)]				Case Radiated Noise [db(A)]			
Selection Diameter [mm]	**Air Velocity [m/s]**	**Air Flow Rate [m³/h]**	**100 [Pa]**	**200 [Pa]**	**400 [Pa]**	**800 [Pa]**	**100 [Pa]**	**200 [Pa]**	**400 [Pa]**	**800 [Pa]**
100	2	53	<15	<15	<15	<15	<15	<15	<15	21
	4	106	<15	<15	<15	20	<15	<15	19	24
	6	160	<15	19	22	27	<15	18	24	28
	8	213	<15	21	28	32	<15	20	27	32
	10	266	18	24	30	34	<15	23	29	35
125	2	84	<15	<15	<15	19	<15	<15	21	23
	4	168	<15	18	20	26	<15	<15	23	28
	6	252	17	22	25	32	<15	19	26	31
	8	336	19	25	31	35	<15	25	33	38
	10	421	21	26	33	37	20	24	31	36
160	2	139	<15	<15	22	23	<15	<15	22	27
	4	279	<15	<15	25	27	<15	18	26	31
	6	418	21	24	30	33	<15	21	28	33
	8	557	24	27	33	36	18	24	31	36
	10	697	24	30	34	39	21	27	33	38
200	2	219	<15	<15	23	29	<15	<15	22	29
	4	439	20	21	28	34	<15	20	27	34
	6	658	22	26	32	37	<15	24	29	37
	8	877	24	30	35	39	19	26	32	39
	10	97	26	32	38	43	23	29	34	41
250	2	345	<15	20	29	36	<15	<15	21	28
	4	690	21	28	34	40	<15	22	28	34
	6	34	25	31	39	44	18	25	32	37
	8	379	29	34	41	47	22	28	34	40
	10	724	32	38	43	48	25	31	36	42
315	2	550	<15	22	32	40	<15	<15	21	30
	4	1100	22	30	37	43	<15	23	27	35
	6	651	25	33	41	47	18	25	32	38
	8	2201	29	37	43	49	21	29	34	41
	10	2751	32	39	45	52	25	32	37	44
400	2	891	19	25	37	44	<15	<15	27	34
	4	782	26	33	41	48	<15	24	31	38
	6	2672	31	37	45	51	22	27	35	41
	8	3563	35	41	47	53	26	31	37	43
	10	4454	38	44	49	56	29	34	39	46

VAV COMPACT CONTROLLERS

VAV controllers are equipped as standard with actuators with analog setpoint and feedback signals in DC 2 V... 10 V or DC 0 V... 10 V mode.

MP-BUS, MODBUS and BACnet communication options are available in the control devices.

Control devices are calibrated and adjusted at the factory to the desired flow rate and Vmin Vmax value with ZTH-EU and Belimo PC Tool.

Table 3. VAV Controller Information Table

Order Code	Belimo Motor Code	Flow Volume Adjustment Analog input	Flow Volume Adjustment via BUS Com.	Controller Parameters Setup [3]	Hard Wired Override	Feedback Signal Type	Feedback Values [2]	BUS Communicated Variables	Power Supply	Operating Temperature [°C]
S71 S70	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] Close Vmin, Vmax	DC 0...10 V, DC 2...10 V, MP-BUS	Actual Volume, Damper Angle, Actual Pressure	**Read/Write:** Setpoint, Vmin, Vmax, Open, Close **Read:** Actual Volume, Damper Angle, Actual Pressure, Serial Number, Fault, Alarm Messages	AC 24 V, DC 24 V	0...+50 °C
S72	LMV-D3-MF (5 Nm)		—	ZTH-EU, PC TOOL		DC 0...10 V, DC 2...10 V		—		
S71 S86	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, Close **Read:** Actual Volume, Damper Angle, Actual Pressure, Serial Number, Fault, Alarm Messages		

Note:

1) Available on AC 24 supply only.

2) Output is analog. Therefore, only one feedback value can be selected.

3) Control units are not provided as accessories.

VAV COMPACT CONTROL DEVICE ELECTRIC CONNECTION

S72: LMV-D3-MF (STANDARD PRODUCTION)

No.	Designation	Wire Colour	Function
1	⊥-	Black	AC/DC 24 V Supply
2	~+	Red	
3	◂Y	White	Referance Signal VAV / CAV
5	▸U	Orange	-Actual Value Signal -Tool Communication

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

No.	Designation	Wire Colour	Function
1	⊥-	Black	AC/DC 24 V Supply
2	~+	Red	
3	◂Y	White	Referance Signal VAV / CAV
5	▸U	Orange	-Actual Value Signal -MP-Bus Connection

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

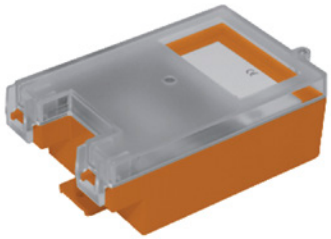
No.	Designation	Wire Colour	Function
1	⊥-	Black	AC/DC 24 V Supply
2	~+	Red	
3			
5	▸MFT	Orange	MP Connection
6	D-	Pink	BACnet / Modbus (RS485)
7	D+	Gray	

OPTIONAL ADAPTIVE VAV CONTROL SYSTEM

If desired, a product option is available with a fast response VAV servomotor, static pressure sensor and control platform. It provides the adaptive control of the ambient air flow by providing an on-off speed control independent of the duct pressure in 2.5 seconds.

Table 6. VRP-M Regulator Information Table

VRP-M Controller	
Nominal Voltage	24 V AC, 50/60 Hz 24 V DC
Power Supply	1,1 W (Without Servomotor, with VFP 300)
Reference Signal w (terminal 3) Range: Vmin...Vmax	Input Impedance > 200 kΩ - DC 0...10 / 2...10 V or - 0...20 / 4...20 mA (with 500 Ω 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% r.h



VRP-M

Table 7. VFP-300 Static Differential Pressure Transducer Information Table

VFP-300 Static Differential Pressure Sensor	
Supply Connection	15 V DC (Suitable with VRP-M)
Measuring Ranges	0...300 Pa
Output Signal	0...10 V DC
Connection for Pressure Losses	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

VRP-300

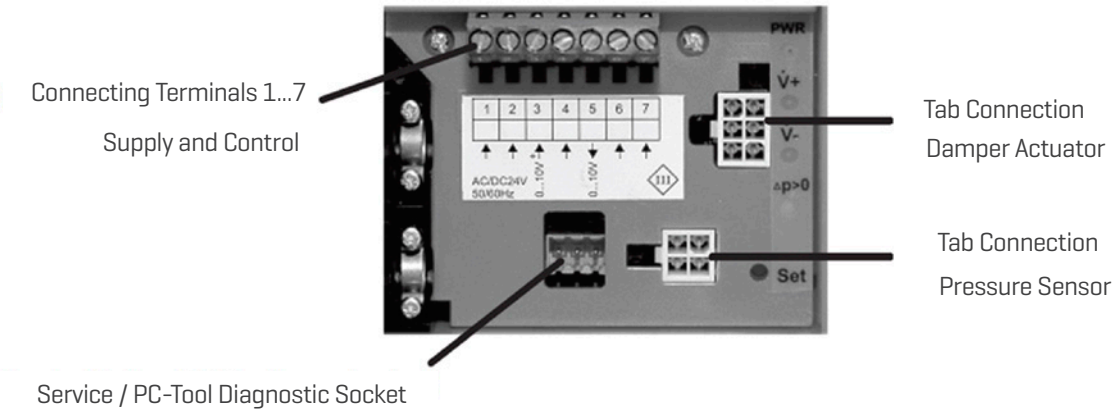
Table 8. LMQ24A-SRV-ST & LMQ24A-SRV-ST Servomotor Information Table

LMQ24A-SRV-ST Servomotor	
Supply with VRP-M	24 V AC, 50/60 Hz 24 V DC
Power Operating Consumption	13 W
Protection Class	III (Safety Extra-Low Voltage)
Torque	4 Nm
Speed	2,5 s / 90°
Degree of Protection	IP54
Operating Temperature	0...+50°C
EMC	CE 89/336/EEC
Ambient Humidity	5...95% r.h.
Maintenance	Maintenance Free

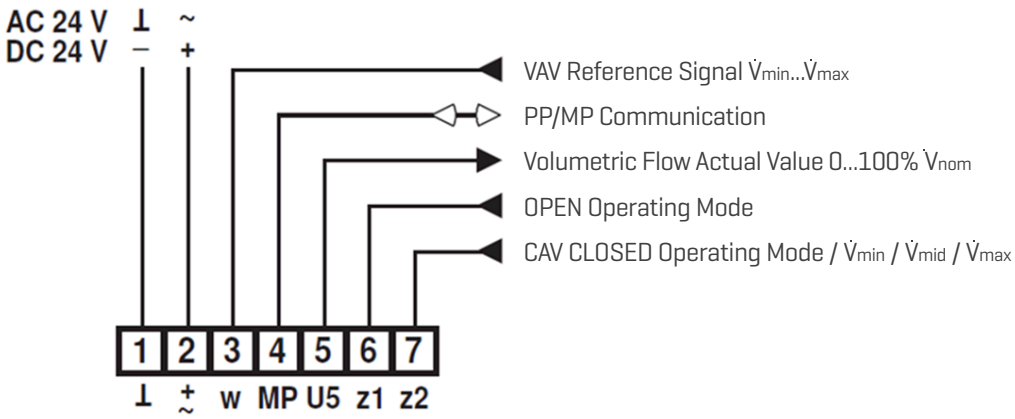
LMQ24A-SRV-ST
NMQ24A-SRV-ST

ADAPTIVE VAV CONTROL SYSTEM ELECTRIC CONNECTION

FRONT PANEL



FRONT PANEL CONNECTION TERMINALS FUNCTIONS



ORDER CODE

You can place your orders according to the following coding format.

ACC.GAL< A > . < B > . < C > . < D >

A	Flow Type	
	E	Exhaust
	U	Supply
B	**Controller**	
	S70	NMV-D3-MP
	S71	LMV-D3-MP
	S72	LMV-D3-MF
	S73	LMV-D3-MOD
	S74	LMV-D3-LON
	S86	NMV-D3-MOD
	S97	Adaptive VAV Control System
C	**Diameter (ØD) [mm]**	
	0125	125 mm
	0160	160 mm
	0200	200 mm
	0250	250 mm
	0315	315 mm
	0400	400 mm
D	**Length (L) [mm]**	
	0500	500 mm
	1000	1000 mm
	1200	1200 mm

Example; ACC.GAL.E.S71.0400.0500

NOTES


PLEASE HANDLE WITH CARE. DO NOT THROW


We make the difference with
180 different types of products.
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