

Control equipment EMBL

Belimo's compact controller LMV/NMV-D3-MP is a complete unit comprising actuators and a dynamic differential pressure sensor for pressure-independent controls.

EMBL is also used as a differential pressure sensor for EMSF to measure the difference in pressure over the orifice plate.

AIRTREND Ltd
Predstavništvo u Beogradu
Kumanovska 14, 11000 Beograd
Tel: 011/3836886, 3085740
Faks: 011/3444113
e-mail: gobrid@eunet.rs
web: www.airtrend.rs

EMBL-aaa-2-cc-dd

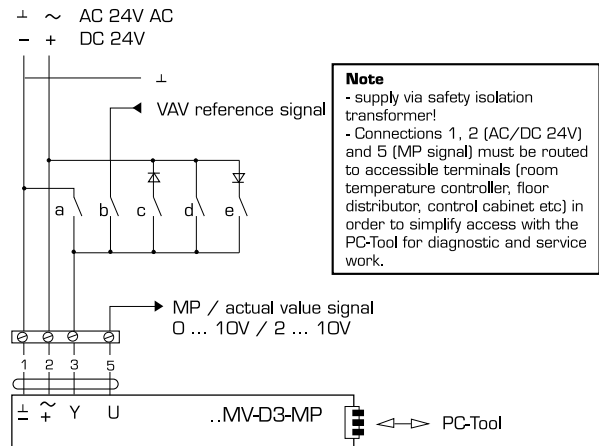
Belimo's compact controller LMV/NMV-D3-MP is a complete unit comprising actuators and a dynamic differential pressure sensor for pressure-independent controls.

By pressing the disconnection button on the side of the controller, the damper can be rotated manually and functions can be tested simply. Apart from the disconnection button, the controller has no operating controls. The controller is calibrated at the factory and is set to the specified min and max air flow settings. The set air flow settings can be changed, if necessary, with service tool EMBZ-05. The controller operating range is set to a standard value of 2 - 10 V on delivery. An operating range of 0 - 10 V can be provided on request. See also the technical data.

When the controller is controlled with a 2 - 10 V control signal, the resulting air flow varies in a linear fashion with the control signal. If slave control is needed, an actual value signal of 2 - 10 V can be obtained from the controller. The controller can also be force controlled via closing contacts (timer, presence sensor, etc.) to obtain the set min or max air flow. It is also possible to use the controller with a CAV function.



Connection diagram



Operating range/ Function		a	b	c*	d	e*
DC 2...10V	DC 0...10V					
Closed	q_{min}	↘	↘	↘	↘	↘
q_{min}		↘	↘	↘	↘	↘
Variable $q_{min} \dots q_{max}$		↘	↗	↘	↘	↘
Damper CLOSED		↘	↘	↘	↘	↘
q_{max}		↘	↘	↘	↗	↘
Damper OPEN		↘	↘	↘	↘	↗

* Not available with DC 24V supply

Technical data

Supply voltage	24 V AC $\pm 20\%$, 50/60Hz (SELV)
Power consumption	5 VA
Operating ranges	2 - 10 V DC
- 0.1 - 0.2 V	Damper closed
0.2 - 2 V	Min. air flow
2 - 10 V	Variable $q_{min} - q_{max}$
Actual value signal	2 - 10 V DC (standard)
Enclosure class	IP 42
Permitted ambient temperature operation	0 - 50 °C
storage	-20 - 80 °C
CE	89/336/EEC and 92/31/EEC

EMBZ-05

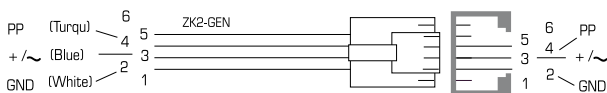
ZTH EU is a tool which can be used, if necessary, by adjustment and service personnel to change or read programmed- in values in compact controller EMBL-aaa-2-ccdd (LMV-D3). Since compact controller EMBL-aaa-2-cc-dd does not have any adjustment knobs, any changes must be made with EMBZ-05 (ZTH EU).

Parameters which can be set are max air flow, min air flow and operating range 0 - 10 V or 2 - 10 V. It is also possible to measure the actual measurement value signal via the tool.



Connection diagram

Connection to	Cable type and order designation	
L/N/SMV-D3-MP	ZK2-GEN	White -1 GND
L/NMV-D3LON		Blue -2 ~ / +
L/NMV-D3M		3
NMV-D3, VRD3		Turqu -5 PP
VRD3, VRP-M	ZK2-GEN	White -1 GND
		Blue -2 ~ / +
		3
		Turqu -4 PP



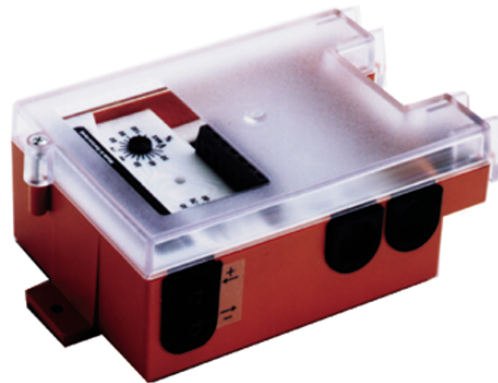
Technical data

Supply voltage	24 V AC ±20%, 50/60Hz (SELV)
Power consumption	1 W
Enclosure class	IP 42
Permitted ambient temperature operation	0 - 50 °C
storage	-20 - 80 °C
CE	89/336/EEC and 92/31/EEC

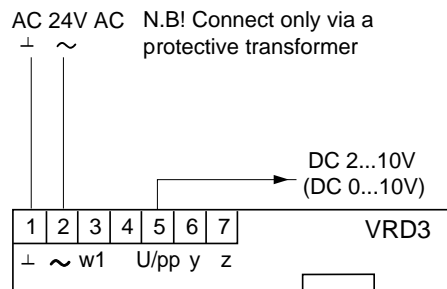
EMBL-aaa-9-00-00

EMBL is used as a differential pressure sensor for EMSF to measure the difference in pressure over the orifice plate. The electronics in VRD3 produce an output signal of 2 (0) - 10 V DC which is linear to the air flow.

The differential pressure sensor is calibrated on delivery for EMSF's nominal air flow. The system is used for monitoring purposes or for the slave control of an OPTIVENT equipped with EMBL-aaa-2-cc-dd.



Connection diagram

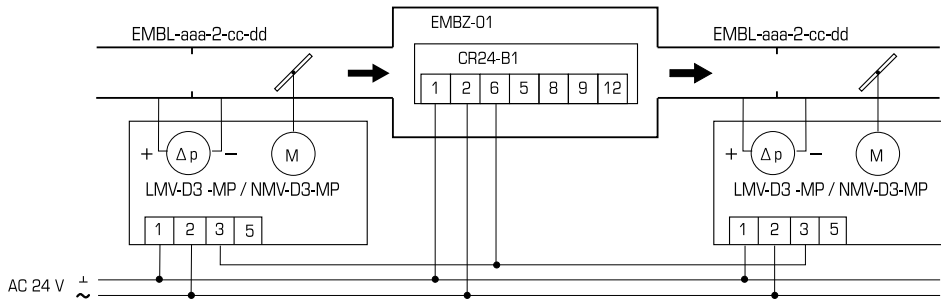


Technical data

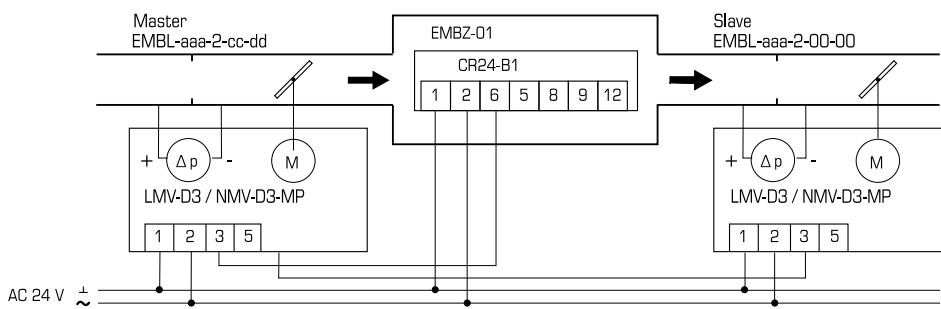
Supply voltage	24 V AC ±20 %, 50/60Hz (SELV)
Power consumption	3,0 VA
Actual value signal	2 - 10 V DC
Enclosure class	IP 42
Permitted ambient temperature operation	0 - 50 °C
storage	-20 - 80 °C
CE	89/336/EEC and 92/31/EEC
Power consumption	1.3 W

Wiring

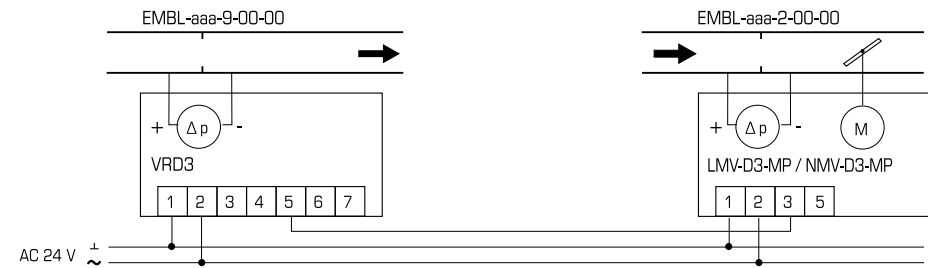
Parallel control of two flow variators



Master-Slave control of two flow variators

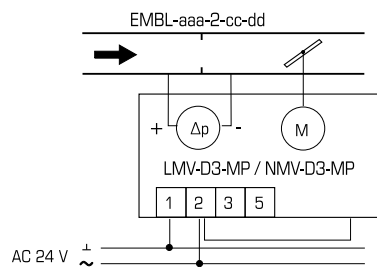


Control of a single flow variator from one flow sensor unit



CAV Constant air volume

With the same number on cc-dd (except 00-00) in the ordering code the controller is delivered as a CAV controller.



The controller will have q_{min} as the setpoint.

Nominal air flow and adjustable air flows

Size	q_{nom} , l/s	q_{max} , l/s	q_{min} , l/s
100	62	62 - 19	62 - 7
125	98	98 - 29	98 - 12
160	160	160 - 48	160 - 20
200	251	251 - 75	251 - 31
250	392	392 - 118	392 - 49
315	623	623 - 187	623 - 77
400	1005	1005 - 302	1005 - 125
500	1570	1570 - 471	1570 - 196
630	2493	2493 - 748	2493 - 311

q_{nom} = Nominal air flow, l/s

q_{max} = Max air flow setting = 100 - 30 % of q_{nom} , l/s

q_{min} = Min air flow setting = 100 - 8 % of q_{nom} , l/s

The lowest values in the table indicate the lowest recommended flow settings for good control accuracy.

If necessary, the device damper can be forced to the closed position.

NOTE! q_{min} can never be higher than q_{max} .

Scope of supply

The air flow controller and differential pressure sensor are supplied factory-assembled on a VAV unit ordered at the same time.

The controllers are function-tested and calibrated to max and min air flow setting.

Room temperature controllers and service tools are supplied separately.

Product code

Control equipment Belimo EMBL-aaa-b-cc-dd

Size (aaa)

100, 125, 160, 200, 250, 315, 400, 500, 630

Control application (b)

2=Compact controller:

LMV-D3 (aaa=100-315)

NMV-D3 (aaa=400-630)

9=Flow sensor VRD3¹⁾

Factory-set air flow settings²⁾:

Max air flow as a % of nominal air flow (cc)

Min air flow as a % of nominal air flow (dd)

¹⁾ For air flow sensor unit EMSF

Max and min air flow always specified as 00

²⁾ See the table "Nominal air flow and adjustable air flows". Max air flow 100% specified as 00.

For Master-Slave control, the max and min air flow settings for the slave controller are specified as 00. When the controller is to function as a constant flow controller, the max and min flow settings are specified with the same number.

Accessories

Room temperature controller
CR24-B1

EMBZ-01

Service tool ZTH EU

EMBZ-05

Transformer 230/24V 20VA³⁾

ETRA-20-01

Protective transformer mounted on the VAV unit for 24V supply to the air flow controller.

³⁾ Cannot be combined with EMSS or EMSD

Ordering example

VAV Flow variator, for supply air, with air flow controller type LMV-D3 adjusted for $q_{\max} = 90$ l/s and $q_{\min} = 40$ l/s

- VAV flow variator - EMOS-2-160-1-1
- Air flow controller - EMBL-160-2-60-25

VAV flow variator, for exhaust air, with air flow controller type LMV-D3 must function as a slave for the above example.

- VAV flow variator - EMOE-2-160-1-1
- Air flow controller EMBL-160-2-00-00

VAV unit with air flow controller type LMV-D3 must maintain the air flow at 96 l/s.

- VAV flow variator EMSS-2-160-1-1
- Air flow controller EMBL-160-2-60-60

Flow sensor unit with differential pressure sensor type VRD3 for a air flow range between 40-96 l/s

- VAV flow variator - EMSF-160-1 ⁴⁾
- Differential pressure sensor - EMBL-160-9-60-25

VAV flow variator for supply air with air flow controller type LMV-D3 set for $q_{\max} = 180$ l/s and $q_{\min} = 75$ l/s, must be equipped with transformer 230/24V.

- VAV flow variator - EMOS-2-160-1-1
- Air flow controller - EMBL-160-2-60-25
- Transformer - ETRA-20-01

⁴⁾ Details of ordering codes for flow controllers and flow sensor units can be found in the separate documentation section.