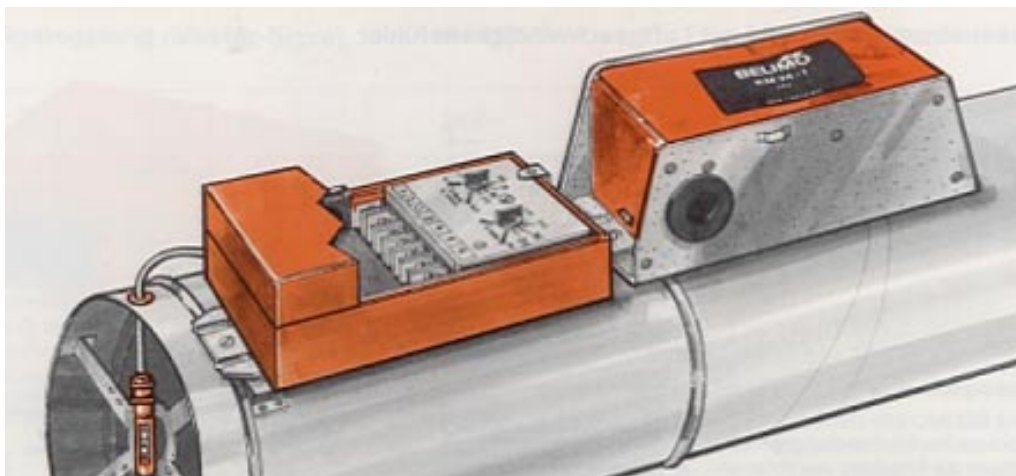




Exchange of Existing Controller Components

Model RETROFIT



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Introduction– what is RETROFIT?

Retrofit is a range of exchange components from SCHAKO for existing control components of a ventilation system controller type VRA-E with controller make BELIMO which have to be replaced or modernised and/or are no longer available from the component manufacturer. As part of the program, the sensor, volumetric flow controller or actuators have to be exchanged, but the volumetric flow controller housing with measurement cross and damper flap should be retained and continue to be used. The future in the building sector consists of 75% of reconstruction and modernisation and 25% of new construction. The end customers and users increasingly want to modernise existing systems without replacing the complete volumetric flow boxes. The part to be replaced could be, for example, a controller of type VR1 or VR2 with air velocity sensor or actuator type KM 24-V that are no longer available. RETROFIT projects are completed in close cooperation between SCHAKO, BELIMO and the CUSTOMER.

With RETROFIT, a clear distinction is made between the exchange of control components and new systems, it also being possible to exchange components of brands other than SCHAKO.

Thus, it is possible to select whether the existing measurement cross from SCHAKO is retained and continues to be used or whether it simply remains mounted in the duct network but is no longer used. In the second case, the measuring sensor type ZDMS is used, which is tuned to the dimensions of the relevant box. Since the exchange is easy to carry out, we recommend this procedure. This considerably reduces the commissioning time. The exchange can be carried out by SCHAKO service personnel (recommended) or on-site.

For parameterisation, the PC-Tool version 2.1 VAV-RETROFIT is available. An exchange for the out-of-date controller type VRD2-NMV24-D is also available.

VR1-NM24-V



ZDMS-100



Example of converting the volumetric flow controller type VRA-E-VR 1/VR2 to -NMV-D2M-RE... The following steps have to be carried out:

- 1.) Stock taking of the existing volumetric flow controller box
- 2.) Recording and testing the volumetric flow controller activation
- 3.) Dismounting the old volumetric flow controller
- 4.) Mounting the new differential pressure sensor (measuring rods) type ZDMS, optional
- 5.) Mounting the electric connector box
- 6.) Mounting + connecting the differential pressure hoses
- 7.) Mounting the new volumetric flow controller NMV-D2M-RE...
- 8.) Connection switch cabinet
- 9.) Commissioning

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Step 1: stock taking of the existing VAV box by SCHAKO service personnel or on-site

Recording the technical data of the VAV box in this table:

Firmen Name _____ Ort: _____ Name der Ansprechperson _____
 Telefon-Nummer _____ E-Mail _____ Objektname _____ Ort _____

Position od. Schema-Nr.	Zul od. Abl	Master/Slave oder Parallel	Ansteuerung 0(2)...10 V	Installierter		Achsart der Klappe		Achs-Länge	Dreh-Richtung wenn Klappe öffnet	Dimension VAV Box (in mm)					Momentane Einstellung					Boxen-Fabrikat, Namen	
				Regler	Antrieb	○	□			125	160	200	250	Spezial	V _{nenn} m ³ /h	V _{max} %	V _{max} m ³ /h	V _{min} %	V _{min} m ³ /h		
Beispiel A	Zul	Master	2...10V	VRD	KM24-F	○	8 x 8		rechts		X				724	75%		25%			
Beispiel B	Abl	Slave	2...10V	VRD	KM24	○	16		links	X					530	100%	530	0%	0		

- **Important:** record as many data as possible, in order to ensure that the function is retained after the conversion.
- Insert circular axis > 40 mm long, NMV-D2M-RE1
- Insert circular axis < 40 mm long, NMV-D2M-F-RE2. (When replacing KM24, reuse terminal block K1 or new K5)
- Use square axis 8x8 mm, NMV-D2M-F-RE2.

Step 2: Recording and testing the volumetric flow controller activation and wiring

If the VAV box has a positive control, check whether it can be undone using the new VAV controller NMV-D2M-x-xx. This may make it necessary to make changes in the wiring of the activation of the VAV controller. Please refer to the documentation Volumetric Flow Controller VRA-E, Positive Control, or contact your SCHAKO representative.

Existing volumetric flow controller box:



- If there is a positive control in place with/without steady signal:
 - CLOSED / V_{max} / V_{min} / OPEN
- Operating range: 0 or 2 – 10V DC
- Number of wires of the activation cable

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Step 3: Dismounting the old volumetric flow controller

Dismounting the existing controller:



Dismounting the air velocity sensor:



- in the switch cabinet, disconnect supply / signal cable at the output terminals

Attention: Observe and note the connection sequence

- Disconnect supply / signal cable at the VAV controller

Attention: Observe and note the connection sequence

- Dismounting the air velocity sensor:
- Dismounting the controller
- Dismounting the actuator
- If terminal block K1 was used for mounting the KM24-x and the damper axis is < 40mm, K1 will be used again with the new controller NMV-D2M-F- RE1
- Insert circular axis > 40 mm long, NMV-D2M-RE1
- Insert circular axis < 40 mm long, NMV-D2M-F-RE2. (When replacing KM24-V, reuse terminal block K1 or new terminal block K5)
- Use square axis 8x8 mm, NMV-D2M-F-RE2.

Note:

VAV controllers for other axis types on request

Step 4: Mounting the new differential pressure sensor (measuring rods) type ZDMS, optional

Mounting the new differential pressure sensor:



Inserting the new differential pressure sensor:

- if the previously built-in air velocity sensor was one with immersion tube, the existing screw holes can be reused for fastening the differential pressure sensor type ZDMS.

Attention: Observe inflow direction

Attention: If the new measuring rod type ZDMS is not used, step 4 is omitted.

Step 5: Mounting the electric connector box

Mounting a new connector box



- the NMV-D2M-RE... is equipped with a connecting cable, this is why an electric connector box is required

Attention: Observe the connection sequence

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Step 6: Mounting + connecting the differential pressure hoses

Controller mounted with differential pressure hoses:



- Connecting the differential pressure sensor to the differential pressure hoses

Attention: red = (+); blue = (-)

Step 7: Mounting the new volumetric flow controller NMV-D2M-RE...

NMV-D2M-F-RE2 mounted with reused anti-twist device and terminal block K1:



- for the circular axis >40mm, the NMV-D2M-RE1 can be mounted directly on the damper axis
- for the circular axis < 40mm, the terminal block K1 must be removed from the KM24-V and reinserted in the NMV-D2M-F-RE2
- for the square axis 8x8 mm, the NMV-D2M-F-RE2 can be mounted directly on the damper axis

Connecting the differential pressure hoses to the NMV-D2M-RE...

Attention: Observe connection (+) / (-): 1st hose in air flow direction = (+)

Step 8: Connection switch cabinet

- the supply / signal cable must be reconnected to the terminals

Attention: Observe the connection sequence

Step 9: Commissioning

- will be carried out by SCHAKO service personnel after prior consultation
- when using an existing differential pressure sensor (measuring cross, orifice or the like), the controller NMV-D2M-RE... must be adapted to this sensor by parameterisation.

Attention, observe prerequisites: the connection work must be complete, the ventilation system must be running and a suitable reference sensor arrangement must be available, in order to allow the air velocity to be measured by means of an impeller or hot wire anemometer.

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RETROFIT: the complete range

RETROFIT controller

Terminal block: NMV-D2M-RE...



Positive locking: NMV-D2M-RE...



RETROFIT additional components

Static : VRP/VFP-100/300/600



All V-belt drives/spring return actuators



Room controller CR24-...



Type	Differential pressure sensor	Axle mount
NMV-D2M-RE1...	ZDMS	Terminal block
NMV-D2M-FRE2...	ZDMS	Positive locking
NMV-D2M-RE3...	- existing measuring cross	Terminal block
NMV-D2M-F-RE...	- existing measuring cross	Positive locking
NMV-D2M-RE4	- existing orifice gauge	Terminal block

Ex.: NMV-D2M-RE-125-ZDMS

Existing housing of nominal width 125 mm with new RETROFIT controller and new RETROFIT differential pressure sensor

Universal: VRD2-RE1...



Type	Differential pressure sensor	Replacement actuator for KM24
VRD2-RE1...-LM24-F	ZDMS	LM24-V

Ex.: VRD2-125-ZDMS-LM24-V

Existing housing of nominal width 125 mm with new RETROFIT controller, new RETROFIT differential pressure sensor and replacement actuator for existing type KM24

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Differential pressure sensor type ZDMS

(NMV-D2M-RE-)100-ZDMS



(NMV-D2M-RE-)125-ZDMS



(NMV-D2M-RE-)160-ZDMS



(NMV-D2M-RE-)200-ZDMS



(NMV-D2M-RE-)250-ZDMS



The differential pressure sensors (measuring rods) must be mounted by SCHAKO service personnel or on-site in accordance with the conversion instructions. Alternatively, it is also possible to reuse existing measuring crosses, measuring rods or orifice gauges.

For the **type VRA-R of larger nominal widths** and for **rectangular volumetric flow controllers VRA-Q**, two differential pressure sensors are mounted, one each from the right and from the left. For the VRA-Q, make sure that the ZDMS is used on the B side (width). The square controllers must always be calibrated on-site.

On request, differential pressure sensors made of the plastic PP are also available.

Commissioning

The commissioning should be carried out by SCHAKO service personnel, who use the Belimo PC-Tool equipped with a special RETROFIT software to program the required data into the controller. They include:

Nominal value V_{nom} [m³/h]

Standard value [--]

Operating volumetric flow V_{Min} [m³/h]

Operating volumetric flow V_{Max} [m³/h]

Operating mode 2 (0) - 10 [V DC]

Direction of rotation, torque



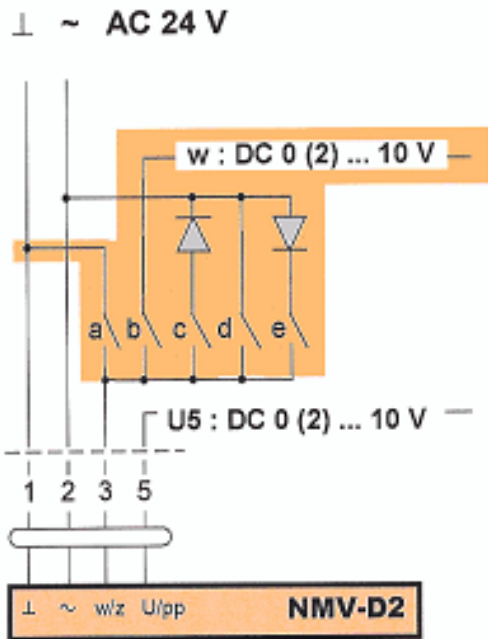
For MP bus controllers, it assigns the corresponding MP bus addresses.

Upon request, the entire conversion to RETROFIT (steps 1 to 9) can be carried out by SCHAKO and should only be carried out on their own by experienced ventilation engineers. If it is exactly known in which housing (nominal width) the controllers with differential pressure sensor are to be installed, the required data can already be programmed into the controllers at SCHAKO prior to delivery.

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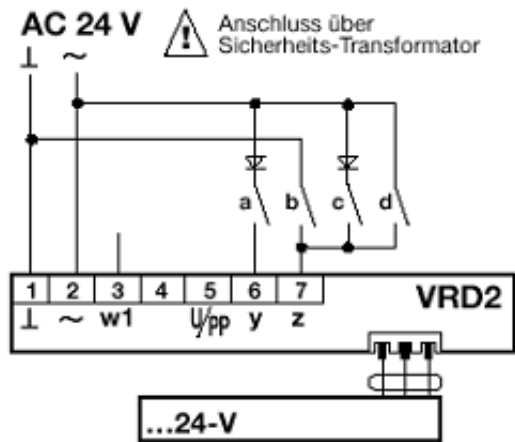
Connection diagram + positive contacts

NMV-D2M-RE...



mode / funktion	a	b	c	d	e
2...10 V 0...10 V					
zu \hat{V}_{MIN}					
\hat{V}_{MIN}					
$\hat{V}_{MIN} \dots \hat{V}_{MAX}$					
$\hat{V}_{Zwischenstufe}$					
\hat{V}_{MAX}					
auf					

VRD2-RE...



Funktion	a	b	c	d
Klappe «ZU»				
\hat{V}_{MIN}				
\hat{V}_{MAX}				
Klappe «AUF»				