Installation VAV-Compact Retrofit-Set

NMV-D2-RE2-SET / NMV-D2-RE26-SET
VAV-Compact Retrofit-Set for utilisation of existing VAV devices made by various manufacturers.
• NMV-D2-RE2-SET for air velocity up to 12 m/s.
• NMV-D2-RE26-SET for air velocity up to 6 m/s.

Note
Suitable for round VAV boxes only.

General Information

Application
The VAV-Compact Retrofit-Set makes possible an efficient replacement of VAV and CAV devices made by various manufacturers. Each package contains all of the component parts required for making the conversion.

VAV Retrofit-Sets
Two versions of the Retrofit-Set are available.
The only difference concerns the parameterisation of the VAV-Compact controller.
• NMV-D2-RE2-SET is optimised for systems with a maximum air velocity of 12 m/s.
• NMV-D2-RE26-SET is optimised for systems with a maximum air velocity of 6 m/s.

Package contents

Installation instructions
These installation instructions describe the application of the VAV-Compact Retrofit-Set NMV-D2-RE6-SET. For a detailed description of the VAV controller, we draw your attention to the separate product documentation of the NMV-D2-MP, see www.belimo.eu ¦ Documentation ¦ Spatial and system applications.
Belimo Automation AG can at any time implement changes and improvements without prior notification. For the current edition of the operating instructions, see www.belimo.eu

Safety notes

• The device is not allowed to be used outside the specified field of application, especially not in aircraft or in any other airborne means of transport.
• It may only be installed by suitably trained personnel.
• Any legal regulations or regulations issued by authorities must be observed during assembly.
• The device may only be opened at the manufacturer’s site. It does not contain any parts that can be replaced or repaired by the user.
• The cable must not be removed from the device.
• When calculating the required torque, the specifications supplied by the damper manufacturers (cross section, design, installation site), and the air flow conditions must be observed.
• The device contains electrical and electronic components and is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.
Installation of the new pick-up device

Measuring value recording

The installation position and the inflow of the pick-up device are of decisive importance for measuring accuracy. If the measurement recording is positioned in an area of turbulence or if no sufficiently wide-ranging flow takes place, then measurement inaccuracies could occur under certain circumstances.

Placement

- **A** Measurement site
- **B** Maximum hose length 3 m per measurement line

Installation position

1. **D** = 100 ... 250
2. **D** = 280 ... 400

<table>
<thead>
<tr>
<th>D</th>
<th>B (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>220</td>
</tr>
<tr>
<td>315</td>
<td>247</td>
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<tr>
<td>355</td>
<td>279</td>
</tr>
<tr>
<td>400</td>
<td>314</td>
</tr>
</tbody>
</table>

Note

Two pick-up devices are required for VAV boxes from 280 to 400 mm. For this purpose use the ZPD-RE2-SET.
Installation of the new pick-up device (Continued)

**Preparations**

1. Shorten the pick-up device to the diameter of the VAV unit. The auxiliary template is located on the packaging of sets.

   ![Image of shortening the pick-up device]

   **Note**
   
The specified lengths must be maintained without fail in order to ensure that the desired measuring accuracy can be achieved.

2. Mount pick-up device seal

   ![Image of mounting the pick-up device seal]

3. Drill an opening in the duct; hole size: 36 mm Ø

   ![Image of drilling an opening in the duct]

**Installation**

1. Installation of the pick-up device in the duct

   **Caution:** Observe direction of arrow and of air

   ![Image of installing the pick-up device in the duct]

2. Mount pick-up device with accompanying screws

   ![Image of mounting the pick-up device with screws]
Installation of the new VAV controller

Spindle clamp installation

The VAV controller NMV-D2-RE2 is equipped with the base plate for form-fit mounting. The front mounting clip may not be used under any circumstances when the controller is used with clamp connection (Illustration 3). Damage to the VAV unit and/or the VAV controller would be the result.

Spindle clamp installation with short axes

Products no longer available
Adjusting angle of rotation limiter

Note
Incorrect settings can lead to damage to the damper blade and to a diminishment of the quality of the control.

The two mechanical end stops for angle of rotation limiting must be tailored to the conditions of the VAV unit and are therefore to be adjusted very carefully. The dismantled actuator is used as an orientation aid for placing the end stops.

Attaching hoses to the controller and pick-up device

1. Mount the two accompanying angle pieces to the connection nipples of the pick-up device.

2. Attach hoses to VAV controller with pick-up device
   Caution: Observe connection (±)

Note
Depending on the type of installation of the VAV controller, individual parts such as screws, form-fit insert or universal mounting brackets are not required and remain left over after completion of the installation.
Electrical connection of the new VAV controller

The VAV controller NMV-D2-RE2 is equipped with a 4-wire connecting cable. An electrical connection socket should be used for ensuring a permanent connection with the existing installation.

Cable connection

The connection is made using the connecting cable mounted to the VAV-Compact device.

<table>
<thead>
<tr>
<th>No.</th>
<th>Designation</th>
<th>Wire colour</th>
<th>Function</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>–</td>
<td>black</td>
<td>– Supply AC/DC 24 V</td>
</tr>
<tr>
<td>2</td>
<td>+ –</td>
<td>red</td>
<td>+ – Supply AC/DC 24 V</td>
</tr>
<tr>
<td>3</td>
<td>+ ~</td>
<td>white</td>
<td>+ ~ Reference signal VAV/CAV</td>
</tr>
<tr>
<td>5</td>
<td>–</td>
<td>orange</td>
<td>– Actual value signal – MP-Bus connection</td>
</tr>
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</table>

Setting and first commissioning

Adjusting the volumetric flow

The adaptation of the VAV-Compact Retrofit-Set to the nominal width of the VAV/CAV unit is accomplished by shortening the pick-up device in accordance with the auxiliary template (see page 4). No further calibration of the controller to the system is required.

The adaptation of the volumetric flow to the system is accomplished with the setting of the two operating volumetric flow parameters \( V_{\text{min}} \) and \( V_{\text{max}} \).

The settings for \( V_{\text{min}} \) and \( V_{\text{max}} \) can be readily calculated with the aid of the table below and the associated formulas.

Table, formulas

<table>
<thead>
<tr>
<th>Diameter</th>
<th>VAV-Box</th>
<th>( V_{\text{nom}} ) [l/s]</th>
<th>( V_{\text{nom}} ) [m³/h]</th>
<th>( V_{\text{nom}} ) [l/s]</th>
<th>( V_{\text{nom}} ) [m³/h]</th>
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<td>6034</td>
<td>838</td>
<td>3017</td>
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Formulas

\[
V_{\text{max}} \text{ in } \% = \left( \frac{V_{\text{max}} [l/s, m^3/h]}{V_{\text{nom}} [l/s, m^3/h]} \right) \times 100
\]

\[
V_{\text{min}} \text{ in } \% = \left( \frac{V_{\text{min}} [l/s, m^3/h]}{V_{\text{nom}} [l/s, m^3/h]} \right) \times 100
\]

Example

Data

- VAV unit diameter: 180 mm
- \( V_{\text{nom}} \) from table: 1134 m³/h
- \( V_{\text{max}} \): 1000 m³/h
- \( V_{\text{min}} \): 230 m³/h

Calculation / result

\[
V_{\text{max}} = \frac{1000 \text{ m}^3/\text{h}}{1134 \text{ m}^3/\text{h}} \times 100 = 88 \%
\]

\[
V_{\text{min}} = \frac{230 \text{ m}^3/\text{h}}{1134 \text{ m}^3/\text{h}} \times 100 = 20 \%
\]
Setting and first commissioning (Continued)

Parameterisation

With ZTH-VAV manual operation device

Note
For a detailed description of these functions, we call attention to the separate documentation of the ZTH-VAV. Available at www.belimo.eu from your local Belimo representative.

The following settings are to be implemented for specific systems and applications:
- \( \bar{V}_{\text{min}} \) on the basis of the above calculation
- \( \bar{V}_{\text{max}} \) on the basis of the above calculation
- Mode of the control signal W \([2 \ldots 10 \text{ V} / 0 \ldots 10 \text{ V}]\)
- Direction of rotation of the actuator [CW/CCW] (clockwise / counter-clockwise)

Carry out adaption

An angle of rotation adaption is recommended at the time of initial commissioning. An angle of rotation adaption must however be carried out after the adjustment of the angle of rotation limitations.

Procedure:
- Switch on the 24 V supply
- Press the «Adaption» pressure switch (controller travels CLOSED … OPEN … setpoint position)

Note
For a detailed description of these functions, we call attention to the separate documentation of the ZTH-VAV. Available at www.belimo.eu from your local Belimo representative.

Functional check

A performance check is recommended after the installation of the VAV controller and the completion of the adaption.
- Set the VAV controller with the ZTH-VAV to maximum and then afterwards to minimum air volume \((\bar{V}_{\text{max}}/\bar{V}_{\text{min}})\).
- Check whether the required amounts of air have been attained.

Note
Additional optimisation possibilities can be achieved together with the single room controller CR 24. You will find information concerning this on the Belimo website www.belimo.com