Control components for VAV terminal units
Compact, dynamic

With service interface and bus communication facility
Compact device for use with VAV terminal units
- Controller, differential pressure transducer, and actuator are fitted together in one casing
- Volume flow rates $\dot{V}_{\text{min}}$ and $\dot{V}_{\text{max}}$ are factory set as parameters
- Ideal for carrying out service from the switch cabinet or control panel
- Change of parameters using adjustment devices
- Suitable for constant and variable volume flows as well as for $\dot{V}_{\text{min}}$ - $\dot{V}_{\text{max}}$ switching
- Bus communication is possible due to the following interfaces: MP bus, LonWorks, Modbus RTU, KNX
### Control components for VAV terminal units

#### General information

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<th>Page</th>
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<tr>
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<td>CD - 19</td>
</tr>
</tbody>
</table>

#### Application

- Electronic volume flow controllers of Type Compact are compact, all-in-one control devices for VAV terminal units
- Dynamic differential pressure transducer, electronic controller, and actuator are fitted together in one casing
- Suitable for different control tasks depending on how the input for the setpoint value signal is used
- The output signals (voltage signals or data points) of the room temperature controller, central BMS, air quality controller or similar units control variably control the volume flow
- Switches or relays allow for local overrides (depending on controller variant)
- Volume flow rate actual value is available as a linear voltage signal or data point

- Controller parameters are factory set
- Standard filtration in comfort air conditioning systems allows for use of the controller in the supply air without additional dust protection. Since a partial volume flow is passed through the transducer in order to measure the volume flow rate, please note:
  - With heavy dust levels in the room, suitable extract air filters must be provided.
  - If the air is polluted with fluff or sticky particles or contains aggressive media, Compact controllers cannot be used

#### Description

- Sensor for dynamic differential pressure measurements
- Mechanical stops for limiting the damper blade positions
- Actuators with overload protection
- Release button to allow for manual operation
Control components for VAV terminal units

Function

**Functional description**
VAV terminal units control the volume flow in a closed loop, i.e. measurement – comparison – correction.
The volume flow rate is determined by measuring the differential pressure (effective pressure). For this purpose the VAV terminal unit is fitted with a differential pressure sensor.
The integral differential pressure transducer transforms the effective pressure into a voltage signal, which is then analysed by the microprocessor of the controller. The volume flow rate actual value is available as a data point or voltage signal. The factory setting is so that a 10 V DC voltage signal always corresponds to the nominal volume flow rate ($V_{\text{nom}}$).
The volume flow rate setpoint value comes from a higher-level controller (e.g. room temperature controller, air quality controller, central BMS), either as a voltage signal or as a data point, or from local switch contacts. Variable volume flow control results in a value between $V_{\text{min}}$ and $V_{\text{max}}$. It is possible to override the room temperature control, e.g. by a complete shut-off of the duct.
The controller compares the volume flow rate setpoint value to the actual value and controls the integral actuator accordingly.
Volume flow rate parameters and voltage ranges are factory stored in the controller. Changes on the customer's site can easily be carried out using an adjustment device, a notebook with service tool, or a bus interface.

**Volume flow control**
- The volume flow controller works independent of the duct pressure
- Differential pressure fluctuations do not result in permanent volume flow rate changes
- To prevent the control from becoming unstable, a dead band is allowed within which the damper blade does not move

**Principle of operation – Easy and Compact controllers**

![Diagram of VAV terminal unit components](image)

1. Differential pressure transducer
2. Actuator
3. Volume flow controller
4. Setpoint value signal
Control components for VAV terminal units

Variants

Compact, dynamic

Any attachments are to be defined with the order code of the VAV terminal unit.

**Compact controllers for VAV terminal units**

<table>
<thead>
<tr>
<th>Order code detail</th>
<th>Part number</th>
<th>Type</th>
<th>Type of VAV terminal unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC0</td>
<td>A00000043143</td>
<td>LMV-D3L-MP-F</td>
<td>1</td>
</tr>
<tr>
<td>BC0</td>
<td>A00000043141</td>
<td>LMV-D3-MP-F</td>
<td>2</td>
</tr>
<tr>
<td>BC0</td>
<td>A00000043140</td>
<td>LMV-D3-MP</td>
<td>4, 6</td>
</tr>
<tr>
<td>BC0</td>
<td>A00000043142</td>
<td>NMV-D3-MP</td>
<td>3</td>
</tr>
<tr>
<td>BC0</td>
<td>A00000043140</td>
<td>2 × LMV-D3-MP</td>
<td>5</td>
</tr>
<tr>
<td>BL0</td>
<td>M466ES7</td>
<td>LMV-D3LON</td>
<td>2, 4</td>
</tr>
<tr>
<td>BL0</td>
<td>M466ES8</td>
<td>NMV-D3LON</td>
<td>3</td>
</tr>
<tr>
<td>LN0</td>
<td>M466EG7</td>
<td>GLB181.1E/3</td>
<td>2, 3, 4</td>
</tr>
<tr>
<td>LN0</td>
<td>M466EG7</td>
<td>2 × GLB181.1E/3</td>
<td>5</td>
</tr>
<tr>
<td>LK0</td>
<td>A00000043586</td>
<td>GLB181.1E/KN</td>
<td>2, 3, 4</td>
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<td>LK0</td>
<td>A00000043586</td>
<td>2 × GLB181.1E/KN</td>
<td>5</td>
</tr>
</tbody>
</table>

① LVC  
② TVR  
③ TVJ, TVT  
④ TZ-Silenzio, TA-Silenzio, TVZ, TVA  
⑤ TVM  
⑥ TVR, replacement part for LMV-D3-MP-F
Control components for VAV terminal units
MP bus/Analogue

Compact, dynamic

Application
- Electronic volume flow controller LMV-D3L-MP-F, LMV-D3-MP, LMV-D3-MP-F or NMV-D3-MP as Compact controller
- Variable air or constant air volume flow control
- The flow rate is measured using the dynamic measurement principle
- Voltage range for the actual and setpoint value signals 0 – 10 V DC or 2 – 10 V DC
- MP bus interface: Up to eight users can be addressed on an MP bus (LAN). This allows for the integration with higher-level systems (Lon-Works, EIB-Konex, Modbus RTU and BACnet); as an alternative, a DDC controller with MP bus interface can control the Compact controller.
- Controller with NFC technology, i.e. settings and operating values can be read out using a smartphone app

Construction
BC0
- LMV-D3L-MP-F for LVC
- LMV-D3-MP-F for TVR
- NMV-D3-MP for TVJ, TVT
- LMV-D3-MP for TZ-Silenzio, TA-Silenzio, TVZ, TVA
- 2 × LMV-D3-MP for TVM

Useful additions
- AT-VAV-B: Adjustment device

Signal voltage range
- 0: 0 – 10 V DC

Operating modes
E: Single and M: Master
- \( V_{\text{min}} \): minimum volume flow rate
- \( V_{\text{max}} \): maximum volume flow rate

S: Slave
- \( V_{\text{min}} \): 0 %
- \( V_{\text{max}} \): volume flow rate ratio to the master controller

F: Constant value
- \( V_{\text{min}} \): constant volume flow rate
- \( V_{\text{max}} \): 100 %

Parameters are factory set. The customer defines the required operating mode and the volume flow rates in the order code at the time of ordering.

Commissioning
- On-site adjusting is not required
- When installing the VAV terminal units it is important to assign each room the correct unit based on the ordered volume flow rates
- After successful installation and wiring the controller is ready for use on the analog interface
- If the MP bus interface is used, additional commissioning steps are required

BC0

1. VAV-Compact
2. Gear release button
3. Connections for differential pressure sensor
4. Service socket
5. Clamping device
6. Rotation stop
7. Indicator lights
8. Connecting cable

- 2: 2 – 10 V DC with shut-off function (< 0.1 V DC)
## Compact controller LMV-D3L-MP-F

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (AC)</td>
<td>24 V AC ± 20 %, 50/60 Hz</td>
</tr>
<tr>
<td>Supply voltage (DC)</td>
<td>24 V DC −10/+20 %</td>
</tr>
<tr>
<td>Power rating (AC)</td>
<td>3.5 VA max.</td>
</tr>
<tr>
<td>Power rating (DC)</td>
<td>2 W max.</td>
</tr>
<tr>
<td>Torque</td>
<td>5 Nm</td>
</tr>
<tr>
<td>Run time for 90°</td>
<td>120 – 150 s</td>
</tr>
<tr>
<td>Setpoint value signal input</td>
<td>0 – 10 V DC, R₂ &gt; 100 kΩ</td>
</tr>
<tr>
<td>Actual value signal output</td>
<td>0 – 10 V DC, 0.5 mA max.</td>
</tr>
<tr>
<td>IEC protection class</td>
<td>III (protective extra-low voltage)</td>
</tr>
<tr>
<td>Protection level</td>
<td>IP 54</td>
</tr>
<tr>
<td>EC conformity</td>
<td>EMC to 2014/30/EU, low voltage to 2014/35/EU</td>
</tr>
<tr>
<td>Weight</td>
<td>0.5 kg</td>
</tr>
</tbody>
</table>

## Compact controllers LMV-D3-MP and LMV-D3-MP-F

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (AC)</td>
<td>24 V AC ± 20 %, 50/60 Hz</td>
</tr>
<tr>
<td>Supply voltage (DC)</td>
<td>24 V DC −10/+20 %</td>
</tr>
<tr>
<td>Power rating (AC)</td>
<td>4 VA max.</td>
</tr>
<tr>
<td>Power rating (DC)</td>
<td>2 W max.</td>
</tr>
<tr>
<td>Torque</td>
<td>5 Nm</td>
</tr>
<tr>
<td>Run time for 90°</td>
<td>110 – 150 s</td>
</tr>
<tr>
<td>Setpoint value signal input</td>
<td>0 – 10 V DC, R₂ &gt; 100 kΩ</td>
</tr>
<tr>
<td>Actual value signal output</td>
<td>0 – 10 V DC, 0.5 mA max.</td>
</tr>
<tr>
<td>IEC protection class</td>
<td>III (protective extra-low voltage)</td>
</tr>
<tr>
<td>Protection level</td>
<td>IP 54</td>
</tr>
<tr>
<td>EC conformity</td>
<td>EMC to 2014/30/EU</td>
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<tr>
<td>Weight</td>
<td>0.5 kg</td>
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</table>
### Compact controller NMV-D3-MP

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (AC)</td>
<td>24 V AC ± 20 %, 50/60 Hz</td>
</tr>
<tr>
<td>Supply voltage (DC)</td>
<td>24 V DC −10/+20 %</td>
</tr>
<tr>
<td>Power rating (AC)</td>
<td>5 VA max.</td>
</tr>
<tr>
<td>Power rating (DC)</td>
<td>3 W max.</td>
</tr>
<tr>
<td>Torque</td>
<td>10 Nm</td>
</tr>
<tr>
<td>Run time for 90°</td>
<td>110 – 150 s</td>
</tr>
<tr>
<td>Setpoint value signal input</td>
<td>0 – 10 V DC, R&lt;sub&gt;a&lt;/sub&gt; &gt; 100 kΩ</td>
</tr>
<tr>
<td>Actual value signal output</td>
<td>0 – 10 V DC, 0.5 mA max.</td>
</tr>
<tr>
<td>IEC protection class</td>
<td>III (protective extra-low voltage)</td>
</tr>
<tr>
<td>Protection level</td>
<td>IP 54</td>
</tr>
<tr>
<td>EC conformity</td>
<td>EMC to 2014/30/EU</td>
</tr>
<tr>
<td>Weight</td>
<td>0.7 kg</td>
</tr>
</tbody>
</table>

**Volume flow rate setpoint value**

- **0 – 10 V DC**
  \[ V_{\text{Set}} = \frac{w}{10} (V_{\text{max}} - V_{\text{min}}) + V_{\text{min}} \]

**Volume flow rate actual value**

- **0 – 10 V DC**
  \[ V_{\text{Ist}} = \frac{U_5}{10} V_{\text{Nenn}} \]
Control components for VAV terminal units
MP bus/Analogue

Compact, dynamic

**BC0, Connecting cable core identification**

<table>
<thead>
<tr>
<th>BK</th>
<th>RD</th>
<th>WH</th>
<th>OG</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>⊥</td>
<td>~</td>
<td>w</td>
<td>US/MP</td>
</tr>
<tr>
<td>−</td>
<td>+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Compact: LMV-D3-MP, LMV-D3-MP-F, NMV-D3-MP, LMV-D3L-MP-F

1. ⊥, −: Ground, neutral
2. ~, +: Supply voltage
3. w: Setpoint value signal and override control
4. US/MP: Actual value signal and communication

**BC0, Variable volume flow control and override control, voltage signal 0 – 10 V DC**

Switch functions:
- S1 Room temperature control
- S3 Maximum volume flow rate $V_{\text{max}}$
- S4 Damper blade CLOSED (only with supply voltage 24 V AC)
- S5 Damper blade OPEN (only with supply voltage 24 V AC)
- All OPEN: Minimum volume flow rate $V_{\text{min}}$

When combining several override controls the switches must be interlocked to prevent short-circuits.
Diode: e.g. 1N 4007

Compact: LMV-D3-MP, LMV-D3-MP-F, NMV-D3-MP, LMV-D3L-MP-F
Control components for VAV terminal units
MP bus/Analogue

Compact, dynamic

BC0, Variable volume flow control and override control, voltage signal 2 – 10 V DC

Switch functions
S1 Room temperature control
S2 Shut-off CLOSED
S3 Maximum volume flow rate $V_{\text{max}}$
S4 Damper blade CLOSED (only with supply voltage 24 V AC)
S5 Damper blade OPEN (only with supply voltage 24 V AC)
All OPEN: Minimum volume flow rate $V_{\text{min}}$

When combining several override controls the switches must be interlocked to prevent short-circuits.
Diode: e.g. 1N 4007

Compact: LMV-D3-MP, LMV-D3-MP-F, NMV-D3-MP, LMV-D3L-MP-F
Control components for VAV terminal units
MP bus/Analogue

Compact, dynamic

**BC0, Dual duct terminal units Type TVM**

Compact: LMV-D3-MP, LMV-D3-MP-F, NMV-D3-MP, LMV-D3L-MP-F
Control components for VAV terminal units
LonWorks

Application
- Electronic volume flow controller LMV-D3LON or NMV-D3LON as Compact controller
- Variable air or constant air volume flow control
- The flow rate is measured using the dynamic measurement principle
- Voltage range for the actual value signal
  2 – 10 V DC
- Volume flow controller with LonMark certification
- LonWorks interfaces for the transmission of standard network variables
- Functional profiles: Node-Object #0, Damper-Actuator-Object #8110, Open-Loop-Sensor-Object #1 and Thermostat-Object #8060
- The Thermostat-Object #8060 enables individual room control
- A plug-in for all LNS-based network integration tools (LNS version 3.3 and higher) is available for configuration

Construction
BL0
- LMV-D3LON for TVR, TZ-Silenzio, TA-Silenzio, TVZ, TVA
- NMV-D3LON for TVJ, TVT

Useful additions
- AT-VAV-B: Adjustment device

Signal voltage range
Actual value signal
- 2: 2 – 10 V DC

Commissioning
- A trained LonWorks systems integrator must carry out the integration into the overall system
### Compact controller LMV-D3LON

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (AC)</td>
<td>24 V AC ± 20 %, 50/60 Hz</td>
</tr>
<tr>
<td>Supply voltage (DC)</td>
<td>24 V DC –10/+20 %</td>
</tr>
<tr>
<td>Power rating (AC)</td>
<td>5.5 VA max.</td>
</tr>
<tr>
<td>Power rating (DC)</td>
<td>3 W max.</td>
</tr>
<tr>
<td>Torque</td>
<td>5 Nm</td>
</tr>
<tr>
<td>Run time for 90°</td>
<td>110 – 150 s</td>
</tr>
<tr>
<td>Communication</td>
<td>LonWorks-Transceiver FTT-10A, free topology, twisted pair</td>
</tr>
<tr>
<td>Actual value signal output</td>
<td>2 – 10 V DC, max. 0.5 mA</td>
</tr>
<tr>
<td>IEC protection class</td>
<td>III (protective extra-low voltage)</td>
</tr>
<tr>
<td>Protection level</td>
<td>IP 54</td>
</tr>
<tr>
<td>EC conformity</td>
<td>EMC to 2014/30/EU</td>
</tr>
<tr>
<td>Weight</td>
<td>0.5 kg</td>
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</tbody>
</table>

### Compact controller NMV-D3LON

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (AC)</td>
<td>24 V AC ± 20 %, 50/60 Hz</td>
</tr>
<tr>
<td>Supply voltage (DC)</td>
<td>24 V DC –10/+20 %</td>
</tr>
<tr>
<td>Power rating (AC)</td>
<td>6 VA max.</td>
</tr>
<tr>
<td>Power rating (DC)</td>
<td>3.5 W max.</td>
</tr>
<tr>
<td>Torque</td>
<td>10 Nm</td>
</tr>
<tr>
<td>Run time for 90°</td>
<td>110 – 150 s</td>
</tr>
<tr>
<td>Communication</td>
<td>LonWorks-Transceiver FTT-10A, free topology, twisted pair</td>
</tr>
<tr>
<td>Actual value signal output</td>
<td>2 – 10 V DC, max. 0.5 mA</td>
</tr>
<tr>
<td>IEC protection class</td>
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<tr>
<td>Protection level</td>
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</tr>
<tr>
<td>EC conformity</td>
<td>EMC to 2014/30/EU</td>
</tr>
<tr>
<td>Weight</td>
<td>0.7 kg</td>
</tr>
</tbody>
</table>
Control components for VAV terminal units
LonWorks

Compact, dynamic

BL0, BB*, Characteristic of the actual value signal

![Graph showing the characteristic of the actual value signal](image)

LMV-D3LON, VRP

Volume flow rate actual value

<table>
<thead>
<tr>
<th>2 – 10 V DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ V_{\text{act}} = \frac{U_5 - 2}{8} \cdot V_{\text{Nenn}} ]</td>
</tr>
</tbody>
</table>

BC0, BL0, BP*, B1*, BB*

BL0, Connecting cable core identification

<table>
<thead>
<tr>
<th>BK</th>
<th>RD</th>
<th>WH</th>
<th>OG</th>
<th>PK</th>
<th>GY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

1 ⊥, –: Ground, neutral
2 ~, +: Supply voltage
3 Y: Connection of external sensor or switch
5 MFT: Actual value signal and communication
6, 7 LON: LonWorks

Compact: LMV-D3LON, NMV-D3LON
BL0, Volume flow control

Compact: LMV-D3LON, NMV-D3LON
Control components for VAV terminal units
Analogue (Siemens)

Compact, dynamic

Application
– Electronic volume flow controller GLB181.1E/3 as Compact controller
– Variable air or constant air volume flow control
– The flow rate is measured according to the dynamic measurement principle
– Voltage range for the actual and setpoint value signals 0 – 10 V DC
– For room temperature controllers with output signal 0 – 10 V DC

Construction
LN0
– GLB181.1E/3 for TVR, TVJ, TVT, TZ-Silenzio, TA-Silenzio, TVZ, TVA
– 2 × GLB181.1E/3 for TVM

Useful additions
– AT-VAV-S: Adjustment device

Signal voltage range
– 0: 0 – 10 V DC

Operating modes
E: Single and M: Master
– \( V_{\text{min}} \): minimum volume flow rate
– \( V_{\text{max}} \): maximum volume flow rate
– \( V_{\text{max}} \): volume flow rate ratio to the master controller

Parameters are factory set. The customer defines the required operating mode and the volume flow rates in the order code at the time of ordering.

Commissioning
– On-site adjusting is not required
– When installing the VAV terminal units it is important to assign each room the correct unit based on the ordered volume flow rates
– After successful installation and wiring the controller is ready for use

LN0
① Rotation stop
② Blade shaft clamp
③ Position indicator
④ Service socket
⑤ Gear release button
⑥ Connections for differential pressure sensor
⑦ Connecting cable
Compact controller GLB181.1E/3

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (AC)</td>
<td>24 V AC ± 20 %, 50/60 Hz</td>
</tr>
<tr>
<td>Power rating (AC)</td>
<td>3 VA max.</td>
</tr>
<tr>
<td>Torque</td>
<td>10 Nm</td>
</tr>
<tr>
<td>Run time for 90°</td>
<td>125 – 150 s</td>
</tr>
<tr>
<td>Setpoint value signal input</td>
<td>0 – 10 V DC, $R_i &gt; 100$ kΩ</td>
</tr>
<tr>
<td>Actual value signal output</td>
<td>0 – 10 V DC, max. 1mA</td>
</tr>
<tr>
<td>IEC protection class</td>
<td>III (protective extra-low voltage)</td>
</tr>
<tr>
<td>Protection level</td>
<td>IP 54</td>
</tr>
<tr>
<td>EC conformity</td>
<td>EMC to 2014/30/EU</td>
</tr>
<tr>
<td>Weight</td>
<td>0.6 kg</td>
</tr>
</tbody>
</table>

**LN0, Characteristic of the setpoint value signal**

**LN0, Characteristic of the actual value signal**

**Volume flow rate setpoint value**

$$V_{set} = \frac{Y_C}{10} (V_{max} - V_{min}) + V_{min}$$

**Volume flow rate actual value**

$$V_{act} = \frac{U}{10} V_{\text{Nenn}}$$
**Control components for VAV terminal units**

**Analogue (Siemens)**

**Compact, dynamic**

---

**LN0, Connecting cable core identification**

![Diagram of LN0, Connecting cable core identification]

1 G: Supply voltage  
2 G0: Ground, neutral  
6 Y1: Override control  
7 Y2: Override control  
8 YC: Setpoint value signal and communication  
9 U: Actual value signal

Compact: GLB181.1E/3

---

**LN0, Variable volume flow control and override control**

![Diagram of LN0, Variable volume flow control and override control]

Switch functions  
S1 Damper blade OPEN  
S2 Damper blade CLOSED  
S1 and S2 Maximum volume flow rate \( V_{\text{max}} \)  
All OPEN: Room temperature control or minimum volume flow rate \( V_{\text{min}} \)

Compact: GLB181.1E/3
Control components for VAV terminal units
Analogue (Siemens)

Compact, dynamic

LN0, Control with external digital room temperature controllers (3P)

24 V AC

Digitaler Einzelraumregler

G G0

LN0, Dual duct terminal unit Type TVM

24 V AC

Raumtemperaturregler

G G0 y

Kaltregler Compact

G G0 Y1 Y2 YC U

Warmregler Compact

G G0 Y1 Y2 YC U

Betriebsart E, M, F

Folgeregler Compact

Betriebsart S

Compact: GLB181.1/E/3
Control components for VAV terminal units
KNX (Siemens)

Compact, dynamic

**Application**
- Electronic volume flow controller GLB181.1E/KN as Compact controller
- Variable air or constant air volume flow control
- The flow rate is measured according to the dynamic measurement principle
- KNX communication interface (S-mode and LTE-mode) and PL-link (peripheral equipment bus) with adjustable communication parameters
- Setpoint value defaults and overrides by means of data exchange with a higher-level system (Siemens Desigo, Siemens Synco 700 or S-mode compatible systems)
- Status values such as volume flow rate actual value and damper blade position are sent to the interface
- Use adjustment device or commissioning tool to configure the controller

**Construction**
LKO
- GLB181.1E/KN for TVR, TVJ, TVT, TZ-Silenzio, TA-Silenzio, TVZ, TVA
- 2 × GLB181.1E/KN for TVM

**Useful additions**
- AT-VAV-S: Adjustment device AST20

**Communication interface**
- KNX in S-mode and LTE-mode
- PL-link (peripheral equipment bus)

**Operating modes**
- Variable volume flow control: $V_{\text{min}} - V_{\text{max}}$
- Constant volume flow control: $V$

Parameters are factory set. The customer defines the required operating mode and the volume flow rates in the order code at the time of ordering.

**Commissioning**
- Use adjustment device or commissioning tool to configure the interface
- When installing the VAV terminal units it is important to assign each room the correct unit based on the ordered volume flow rates

**LK0**

① Rotation stop
② Blade shaft clamp
③ Position indicator
④ Indicator light
⑤ Push button
⑥ Service socket
⑦ Gear release button (side)
⑧ Connections for differential pressure sensor
⑨ Connecting cable
Control components for VAV terminal units

KNX (Siemens)

Compact, dynamic

**Compact controller GLB181.1E/KN**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (AC)</td>
<td>24 V AC ± 20 %, 50/60 Hz</td>
</tr>
<tr>
<td>Power rating (AC)</td>
<td>3 VA max</td>
</tr>
<tr>
<td>Torque</td>
<td>10 Nm</td>
</tr>
<tr>
<td>Run time for 90°</td>
<td>125 – 150 s</td>
</tr>
<tr>
<td>Communication</td>
<td>KNX, TP1-256 (el. insulated), bus current consumption 5 mA</td>
</tr>
<tr>
<td>IEC protection class</td>
<td>III (protective extra-low voltage)</td>
</tr>
<tr>
<td>Protection level</td>
<td>IP 54</td>
</tr>
<tr>
<td>EC conformity</td>
<td>EMC to 2014/30/EU</td>
</tr>
<tr>
<td>Weight</td>
<td>0.6 kg</td>
</tr>
</tbody>
</table>

**LK0**

Setpoint value setting
- The room or building automation system sends via a KNX bus a control signal
- The volume flow rate setpoint depends on the control signal and the saved parameters
- The control signal is sent as a percentage and leads to a volume flow rate setpoint between $V_{\text{min}}$ and $V_{\text{max}}$
- $V_{\text{min}} = 0$ and $V_{\text{max}} = V_{\text{nom}}$ the automation system can use the entire adjustment range of the VAV terminal unit

$V_{\text{min}} > 0$ and/or $V_{\text{max}} < V_{\text{nom}}$ results in a reduced variable volume flow range with higher resolution of the control signal
- If the control signal does not change, a constant volume flow rate is maintained

**Actual values**
- Volume flow rate actual value and damper blade position
## Control components for VAV terminal units
### KNX (Siemens)

**Compact, dynamic**

### KNX data points in S-mode

<table>
<thead>
<tr>
<th>Name in ETS tool</th>
<th>E: Input</th>
<th>Flags</th>
<th>Data point type</th>
<th>Value range:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A: Output</td>
<td>K</td>
<td>L</td>
<td>S</td>
</tr>
<tr>
<td>Fault information</td>
<td>A 1 0 0 1 0 219.001</td>
<td>_AlarmInfo</td>
<td>6 bytes</td>
<td>[0–255]=log no., [0–2]=alarm priority, [0–14]=application area, [0–4]=error class, [0–7]=attributes, [0–7]=fault state</td>
</tr>
<tr>
<td>Fault state</td>
<td>A 1 0 0 1 0 1.005</td>
<td>_Alarm</td>
<td>1 bit</td>
<td>0=normal, 1=fault</td>
</tr>
<tr>
<td>Fault transmission</td>
<td>E 1 0 1 0 1 1.003</td>
<td>_Enable</td>
<td>1 bit</td>
<td>0=disable, 1=enable</td>
</tr>
<tr>
<td>Default</td>
<td>E 1 0 1 0 1 5.001</td>
<td>_Scaling</td>
<td>1 bytes</td>
<td>%</td>
</tr>
<tr>
<td>Actual position</td>
<td>A 1 1 0 1 0 5.001</td>
<td>_Scaling</td>
<td>1 bytes</td>
<td>%</td>
</tr>
<tr>
<td>Volume flow rate actual value</td>
<td>A 1 1 0 1 0 8.010</td>
<td>_Percent_V</td>
<td>2 bytes</td>
<td>%</td>
</tr>
<tr>
<td>Volume flow rate actual value</td>
<td>A 1 1 0 1 0 14.077</td>
<td>_Value_Volume_Flux</td>
<td>4 bytes</td>
<td>m³/s</td>
</tr>
<tr>
<td>Fault clearance</td>
<td>A 1 1 0 1 0 1.002</td>
<td>_Bool</td>
<td>1 bit</td>
<td>0=no error, 1=error</td>
</tr>
<tr>
<td>Simulated default setting</td>
<td>A 1 1 0 1 0 1.002</td>
<td>_Bool</td>
<td>1 bit</td>
<td>0=no error, 1=error</td>
</tr>
</tbody>
</table>
Control components for VAV terminal units
KNX (Siemens)

Compact, dynamic

LK0, Characteristic of the setpoint value signal

\[
V_{set} = \frac{Y}{100} (V_{max} - V_{min}) + V_{min}
\]

Volume flow rate setpoint value

LK0

LK0, Characteristic of the actual value signal

\[
V_{act} = \frac{X}{100} V_{Nenn}
\]

Volume flow rate actual value

LK0

LK0, Connecting cable core identification

<table>
<thead>
<tr>
<th>RD</th>
<th>BK</th>
<th>RD</th>
<th>BK</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>G0</td>
<td>CE+</td>
<td>CE-</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Duct 1, supply voltage, black sheathed
1 G: Supply voltage
2 G0: Ground, neutral
Duct 2, Communication, green sheathed
1 CE+: PL-Link (KNX)
2 CE-: PL-Link (KNX)

Compact: GLB181.1E/KN
Control components for VAV terminal units

KNX (Siemens)

Compact, dynamic

LK0, Volume flow control

Compact: GLB181.1E/KN