



# Braukmann V5001P Kombi-Auto

## Differential Pressure Control Valve

### APPLICATION

The V5001P Kombi-Auto differential pressure control valve is used to maintain automatically a hydronic balance in residential or commercial hydronic heating and cooling systems. It shall be installed in the return pipeline.

It is used in systems with variable volume flows, for example two-pipe heating systems, and creates a hydronic balance by keeping differential pressure over consumers at a constant preset level even under changing flow or pump pressure conditions, for example in part load states.

Hydronic balance is a significant requirement for efficient operation of a hydronic system. In an unbalanced system under- or oversupply of energy to individual circuits or heat exchangers can occur.

Apart from correct selection of radiator valves, regulation of individual circuits is necessary and in some countries required by national standards or regulations.

### SPECIAL FEATURES

- Automatic balancing of differential pressure
  - Highest energy saving potential due to efficient energy transfer and minimised pump speed
  - Lower noise emission on control valves
  - High authority over the control valves
  - Dividing systems into pressure independent zones
  - No complex calculation needed for selection
  - No balancing method needed for commissioning
- Wide range of application
  - Sizes DN15 up to DN50
  - Wide presetting ranges
  - Very high flow rates
- Easy commissioning
  - Presetting with visual  $\Delta p$ -scale in kPa
  - Presetting by hand without the need of tools
  - Presetting lead sealable
  - Removable insert for installation in tight spaces
  - Insulation shells included
- Maintenance friendly
  - Concealed shut-off function
  - Various measuring possibilities for problematic applications

### Valve Efficiency

|                             |     |   |   |   |      |
|-----------------------------|-----|---|---|---|------|
|                             | low |   |   |   | high |
| <b>Energy efficiency</b>    | ●   | ● | ● | ● | ●    |
| <b>Commissioning effort</b> | ●   | ● | ○ | ○ | ○    |
| <b>Calculation effort</b>   | ●   | ● | ● | ○ | ○    |

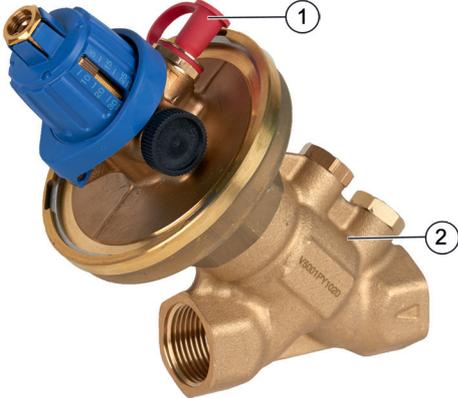


### TECHNICAL DATA

| Media                                   |   |
|---|---|
| Medium:                                 | Water or water-glycol mixture, quality to VDI 2035 (up to 50 % Glycol)  |
| pH-value:                               | 8 - 9.5   |
| Pressure values                         |   |
| Max. operating pressure:                | max. 16 bar (232 psi)   |
| Pump pressure:                          | min.: $\Delta p_c + 10 \text{ kPa g } Q_{\max L}$<br>min.: $\Delta p_c + 20 \text{ kPa g } Q_{\max H}$<br>max.: $6 \times \Delta p_c$ |
| Differential pressure presetting range: | 5 - 35 kPa or 30 - 60 kPa   |
| Operating temperatures                  |   |
| Max. operating temperature medium:      | -20 - 130 °C (-4 - 266 °F)*   |
| Connections/Sizes                       |   |
| Nominal size:                           | DN15 - DN50   |
| Specifications                          |   |
| Housing:                                | Dezincification-resistant brass   |
| Factory setting:                        | 5 kPa or 30 kPa   |
| Impulse tube:                           | 0.8 m   |
| Flow values:                            | see table on page Ordering Information  |
| Control characteristic:                 | see page Technical Characteristic   |

\* for water glycol mixtures to VDI 2035 max. temperature 20 - 110°

## CONSTRUCTION

| Overview  | Components   | Materials   |
|---|--|---|
|  | <b>1</b> SafeCon™ pressure test valve at the membrane with colour marked dust cap  | Brass   |
|   | <b>2</b> Valve housing DN15 to DN50 with internal threads to DIN EN 10226-1 for threaded pipe and two G <sup>1</sup> / <sub>4</sub> " internal threads for installation of pressure test valves, equipped with blind stops | Dezincification-resistant brass and blind stops made of brass |
|   | <b>Not depicted components:</b>  |   |
|   | Valve insert with diaphragm assembly and impulse tube connection   | Brass and stainless steel                                     |
|   | Handwheel assembly with digital display of presetting value, locking ring and shut-off screw   | Brass and plastic   |
|   | Impulse tube with compression fittings and adapter for connection to V5001S Kombi-S shut-off valve in the supply   | Brass and copper  |
|   | Insulation shell with DN size  | -   |
| Installation and setup instructions   | -  |   |

## METHOD OF OPERATION

The V5001P Kombi-Auto is installed in the return pipeline. Based on required differential pressure at full load. The valve is preset to a certain value by turning handwheel or presetting lever clockwise (increase of differential pressure) or anticlockwise (decrease of differential pressure).

Required preset value can be determined by using tables further below, by using a sizing tool, by measuring or directly from design documentation. Required flow at full load is normally calculated in advance by a consultant or similar specialist and must be known for system balancing.

### Cautions during installation, commissioning, testing and maintenance

- 1) The membrane must have the equal pressure across both sides during pressure testing to prevent dislocation or damage to the membrane. It can be achieved by having the impulse tube connected between the flow valve and correctly installed membrane on the return valve
- 2) Kindly ensure that any isolation valves on the impulse tube or on flow and return pipework are open beforehand
- 3) At no time should the pressure on one side of the membrane be higher or lower than the other, please take special care about this when isolating the valves during installation, commissioning, testing or maintenance

Normal operation

- V5001PY: Max. allowable differential pressure:  $6 \times \Delta p_c$   
 $\Delta p_c$  = controlled differential pressure (e.g. 10 kPa)

### Valve Identification

Each valve is marked as follows:

- OS - Number
- DN size
- PN rating
- Flow arrows
- Serial number/date code

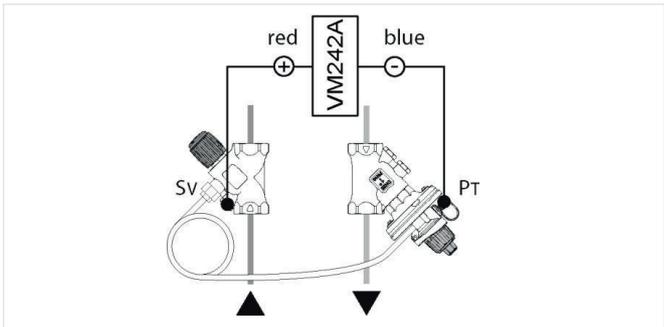
## INSTALLATION GUIDELINES

### Setup requirements

The Kombi-Auto is equipped with a SafeCon™ quick connect pressure test valve on the diaphragm housing and has two additional ports on the valve housing which can be retrofitted with SafeCon™ pressure test valves to allow measurements with a differential pressure measuring computer, for example VM242 BasicMes-2. The following measurements are possible:

**Installation Example**

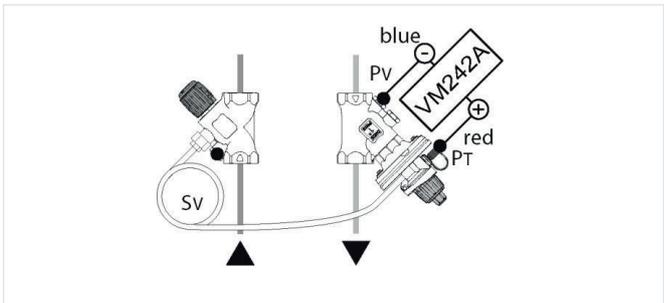
**Flow**



Requires a valve with defined kvs value with the pressure test ports in the supply, the pressure test ports must be designed across the valve seat for flow measurement e.g. Kombi-S with SafeCon pressure test connections.

- Blue hose: connected to Kombi-Auto (PT)
- Red hose: connected to Kombi-S (SV)
- Use the  $k_{vs}$ -value of the valve in supply for flow calculation

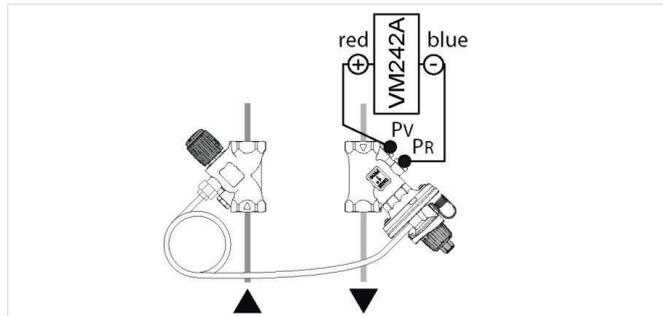
**$\Delta p$  loop**



Requires SafeCon™ pressure test valve on lower connection of Kombi-Auto valve housing

- Red hose: connected to lower SafeCon™ pressure test valve (PV)
- Blue hose: connected to Kombi Auto (PV)

**$\Delta$  valve**

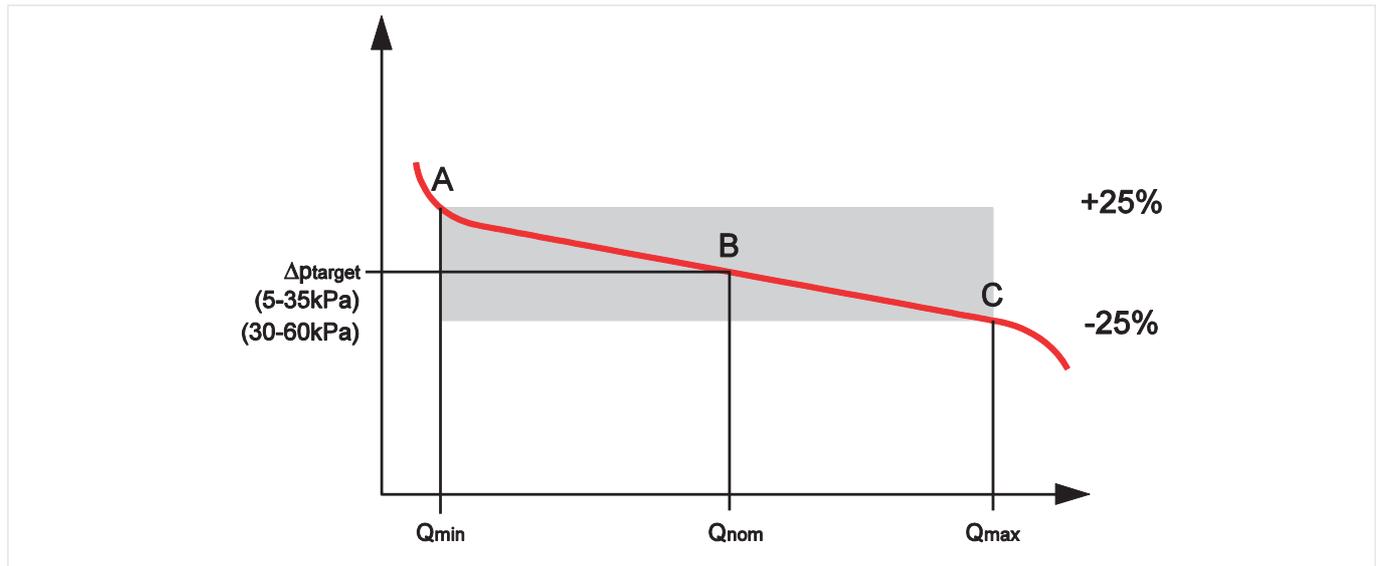


Requires SafeCon™ pressure test valves on both ports of Kombi-Auto

- Blue hose: connected to upper SafeCon™ pressure test valve (PR)
- Red hose: connected to lower SafeCon™ pressure test valve (PV)

SafeCon™ quick connect pressure test valves are available as accessory – see chapter ‘Accessories’ below. Depending on type of measurement desired they have to be fitted to the Kombi-Auto and/or Kombi-S respec. Kombi-2-Plus supply valve (if used). If no Kombi-S or kombi-2-Plus is used other means for pressure testing an impulse tube connection must be provide. The BasicMes-2 can directly connect to SafeCon™ pressure test valves for leakage free and quick measuring operations.

## TECHNICAL CHARACTERISTICS



### Legend

- A –  $Q_{min}$  Minimum flow where valve starts to control (Lowest control point)
- B –  $Q_{nom}$  Value where set  $\Delta p$  is in middle of hysteresis (Optimal control point)
- C –  $Q_{max}$  Maximum flow before flow curve drops off (Highest control point)

### Flow Data

#### Standard Range for Kombi-Auto with $\Delta p$ range 5 - 35 kPa

| Preset $\Delta p$   | 5 kPa                      |           |           |                            |           | 10 kPa                     |           |           |                            |           | 15 kPa                     |           |           |                            |           |
|---------------------|----------------------------|-----------|-----------|----------------------------|-----------|----------------------------|-----------|-----------|----------------------------|-----------|----------------------------|-----------|-----------|----------------------------|-----------|
|                     | Flow $\Delta p_c + 10$ kPa |           |           | Flow $\Delta p_c + 20$ kPa |           | Flow $\Delta p_c + 10$ kPa |           |           | Flow $\Delta p_c + 20$ kPa |           | Flow $\Delta p_c + 10$ kPa |           |           | Flow $\Delta p_c + 20$ kPa |           |
| Pump pressure (l/h) | $Q_{min}$                  | $Q_{nom}$ | $Q_{max}$ | $Q_{nom}$                  | $Q_{max}$ | $Q_{min}$                  | $Q_{nom}$ | $Q_{max}$ | $Q_{nom}$                  | $Q_{max}$ | $Q_{min}$                  | $Q_{nom}$ | $Q_{max}$ | $Q_{nom}$                  | $Q_{max}$ |
| DN15                | 40                         | 550       | 1000      | 750                        | 1600      | 40                         | 550       | 1000      | 750                        | 1600      | 40                         | 570       | 1000      | 780                        | 1600      |
| DN20                | 60                         | 850       | 1500      | 1200                       | 2100      | 60                         | 870       | 1500      | 1250                       | 2150      | 60                         | 900       | 1700      | 1300                       | 2400      |
| DN25                | 100                        | 1000      | 1700      | 1400                       | 2500      | 100                        | 1000      | 1800      | 1400                       | 2650      | 100                        | 1100      | 1900      | 1450                       | 2800      |
| DN32                | 150                        | 1200      | 2500      | 1700                       | 3600      | 150                        | 1700      | 2900      | 2500                       | 4200      | 150                        | 2100      | 3500      | 3000                       | 5500      |
| DN40                | 200                        | 2500      | 4000      | 3900                       | 7500      | 200                        | 2600      | 4500      | 3900                       | 7700      | 200                        | 2700      | 5000      | 4000                       | 7900      |
| DN50                | 450                        | 3000      | 5000      | 5000                       | 10500     | 450                        | 3000      | 6000      | 5000                       | 11000     | 500                        | 3000      | 7000      | 5000                       | 13000     |

| Preset $\Delta p$   | 20 kPa                     |           |           |                            |           | 25 kPa                     |           |           |                            |           |
|---------------------|----------------------------|-----------|-----------|----------------------------|-----------|----------------------------|-----------|-----------|----------------------------|-----------|
|                     | Flow $\Delta p_c + 10$ kPa |           |           | Flow $\Delta p_c + 20$ kPa |           | Flow $\Delta p_c + 10$ kPa |           |           | Flow $\Delta p_c + 20$ kPa |           |
| Pump pressure (l/h) | $Q_{min}$                  | $Q_{nom}$ | $Q_{max}$ | $Q_{nom}$                  | $Q_{max}$ | $Q_{min}$                  | $Q_{nom}$ | $Q_{max}$ | $Q_{nom}$                  | $Q_{max}$ |
| DN15                | 40                         | 600       | 1100      | 800                        | 1600      | 40                         | 600       | 1100      | 800                        | 1600      |
| DN20                | 60                         | 900       | 1700      | 1300                       | 2450      | 60                         | 900       | 1750      | 1300                       | 2500      |
| DN25                | 100                        | 1100      | 2000      | 1470                       | 2850      | 100                        | 1200      | 2000      | 1500                       | 2900      |
| DN32                | 150                        | 2200      | 4000      | 3200                       | 5700      | 150                        | 2400      | 4100      | 3600                       | 5900      |
| DN40                | 200                        | 2800      | 5500      | 4000                       | 8250      | 200                        | 3000      | 5700      | 4300                       | 8500      |
| DN50                | 500                        | 4500      | 9000      | 6500                       | 14000     | 500                        | 5500      | 9500      | 8000                       | 15000     |

| <b>Preset <math>\Delta p</math></b> | 30 kPa                     |                  |                  |                            |                  | 35 kPa                     |                  |                  |                            |                  |
|-------------------------------------|----------------------------|------------------|------------------|----------------------------|------------------|----------------------------|------------------|------------------|----------------------------|------------------|
| <b>Pump pressure (l/h)</b>          | Flow $\Delta p_c + 10$ kPa |                  |                  | Flow $\Delta p_c + 20$ kPa |                  | Flow $\Delta p_c + 10$ kPa |                  |                  | Flow $\Delta p_c + 20$ kPa |                  |
| <b>Flow</b>                         | Q <sub>min</sub>           | Q <sub>nom</sub> | Q <sub>max</sub> | Q <sub>nom</sub>           | Q <sub>max</sub> | Q <sub>min</sub>           | Q <sub>nom</sub> | Q <sub>max</sub> | Q <sub>nom</sub>           | Q <sub>max</sub> |
| DN15                                | 40                         | 600              | 1100             | 800                        | 1650             | 40                         | 650              | 1200             | 850                        | 1700             |
| DN20                                | 60                         | 900              | 1800             | 1300                       | 2550             | 60                         | 950              | 1850             | 1350                       | 2600             |
| DN25                                | 100                        | 1200             | 2100             | 1500                       | 2950             | 100                        | 1300             | 2100             | 1800                       | 3000             |
| DN32                                | 150                        | 2600             | 4300             | 3800                       | 6100             | 150                        | 2700             | 4500             | 4000                       | 6500             |
| DN40                                | 200                        | 3300             | 5800             | 4700                       | 8750             | 200                        | 3500             | 6000             | 5000                       | 9000             |
| DN50                                | 500                        | 7000             | 9500             | 9000                       | 16000            | 500                        | 8500             | 10000            | 9500                       | 17000            |

**Extended Range for Kombi-Auto with  $\Delta p$  range 30 - 60 kPa**

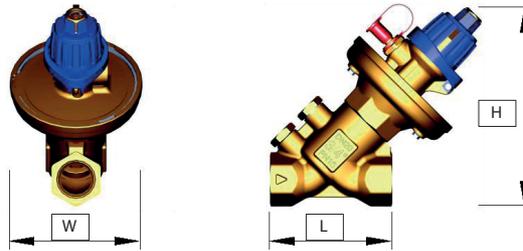
| <b>Preset <math>\Delta p</math></b> | 30 kPa                     |                  |                  | 35 kPa                     |                  |                  | 40 kPa                     |                  |                  | 45 kPa                     |                  |                  |
|-------------------------------------|----------------------------|------------------|------------------|----------------------------|------------------|------------------|----------------------------|------------------|------------------|----------------------------|------------------|------------------|
| <b>Pump pressure (l/h)</b>          | Flow $\Delta p_c + 20$ kPa |                  |                  | Flow $\Delta p_c + 20$ kPa |                  |                  | Flow $\Delta p_c + 20$ kPa |                  |                  | Flow $\Delta p_c + 20$ kPa |                  |                  |
| <b>Flow</b>                         | Q <sub>min</sub>           | Q <sub>nom</sub> | Q <sub>max</sub> | Q <sub>min</sub>           | Q <sub>nom</sub> | Q <sub>max</sub> | Q <sub>min</sub>           | Q <sub>nom</sub> | Q <sub>max</sub> | Q <sub>min</sub>           | Q <sub>nom</sub> | Q <sub>max</sub> |
| DN15                                | 50                         | 1000             | 1900             | 50                         | 1000             | 1900             | 50                         | 975              | 1900             | 75                         | 1000             | 1900             |
| DN20                                | 50                         | 1300             | 2600             | 50                         | 1350             | 2650             | 50                         | 1400             | 2700             | 75                         | 1450             | 2750             |
| DN25                                | 100                        | 1550             | 3000             | 100                        | 1600             | 3100             | 100                        | 1650             | 3200             | 100                        | 1675             | 3250             |
| DN32                                | 200                        | 3100             | 6000             | 200                        | 3350             | 6500             | 200                        | 3600             | 7000             | 200                        | 3850             | 7500             |
| DN40                                | 250                        | 5100             | 10000            | 250                        | 5375             | 10500            | 250                        | 5625             | 11000            | 250                        | 5875             | 11500            |
| DN50                                | 500                        | 6250             | 12000            | 500                        | 6750             | 13000            | 500                        | 7250             | 14000            | 500                        | 7750             | 15000            |

| <b>Preset <math>\Delta p</math></b> | 50 kPa                     |                  |                  | 55 kPa                     |                  |                  | 60 kPa                     |                  |                  |
|-------------------------------------|----------------------------|------------------|------------------|----------------------------|------------------|------------------|----------------------------|------------------|------------------|
| <b>Pump pressure (l/h)</b>          | Flow $\Delta p_c + 20$ kPa |                  |                  | Flow $\Delta p_c + 20$ kPa |                  |                  | Flow $\Delta p_c + 20$ kPa |                  |                  |
| <b>Flow</b>                         | Q <sub>min</sub>           | Q <sub>nom</sub> | Q <sub>max</sub> | Q <sub>min</sub>           | Q <sub>nom</sub> | Q <sub>max</sub> | Q <sub>min</sub>           | Q <sub>nom</sub> | Q <sub>max</sub> |
| DN15                                | 100                        | 1000             | 1900             | 125                        | 1000             | 1900             | 150                        | 1000             | 1900             |
| DN20                                | 100                        | 1500             | 2800             | 125                        | 1550             | 2900             | 150                        | 1600             | 3000             |
| DN25                                | 100                        | 1700             | 3300             | 125                        | 1750             | 3400             | 150                        | 1825             | 3500             |
| DN32                                | 200                        | 4100             | 8000             | 200                        | 4600             | 9000             | 200                        | 5100             | 10000            |
| DN40                                | 250                        | 6125             | 12000            | 250                        | 6375             | 12500            | 250                        | 6625             | 13000            |
| DN50                                | 500                        | 8250             | 16000            | 500                        | 9000             | 17000            | 500                        | 9500             | 18000            |

Note: Pump pressure: max.  $6 \times \Delta p_c$   
 $\Delta p_c$ =controlled differential pressure (e.g. 10 kPa)

## DIMENSIONS

### Overview



| Parameter                               |      | Values |        |      |          |          |      |
|---|------|--------|--------|------|----------|----------|------|
| Connection sizes:                       | inch | 1/2"   | 3/4"   | 1"   | 1 1/4"   | 1 1/2"   | 2"   |
| Nominal sizes:                          | DN   | 15     | 20     | 25   | 32       | 40       | 50   |
| Thread:                                 | inch | Rp1/2" | Rp3/4" | Rp1" | Rp1 1/4" | Rp1 1/2" | Rp2" |
| Dimensions:<br>without insulation shell | L    | 140    | 140    | 143  | 188      | 194      | 206  |
|   | W    | 87     | 87     | 87   | 117      | 117      | 117  |
|   | H    | 129    | 136    | 140  | 190      | 195      | 208  |
| Dimensions:<br>with insulation shell    | L    | 170    | 167    | 173  | 225      | 231      | 243  |
|   | W    | 87     | 93     | 104  | 117      | 126      | 147  |
|   | H    | 155    | 163    | 168  | 218      | 227      | 243  |
| Weight:                                 | kg   | 1.1    | 1.2    | 1.4  | 3.0      | 3.3      | 4.0  |

Note: All dimensions in mm unless stated otherwise.

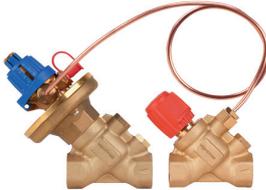
## ORDERING INFORMATION

The following tables contain all the information you need to make an order of an item of your choice. When ordering, please always state the type, the ordering or the part number.

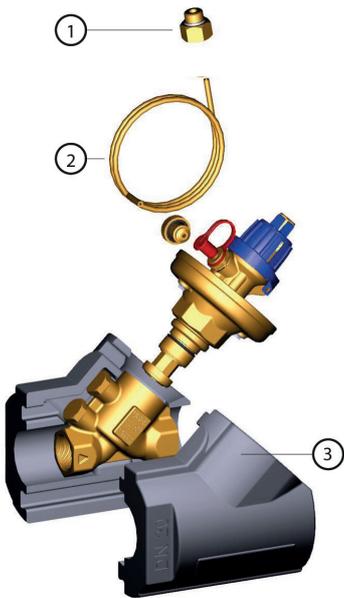
### Options

| Order text:  | DN:  | Thread:   | P Bereich:  | k <sub>VS</sub> -value (m <sup>3</sup> /h): | OS-No.:     |
|--|------|-----------|-------------|---|-------------|
| <b>V5001P<br/>Kombi-Auto with<br/>internal threads to<br/>DIN EN 10226-1<br/>(ISO 7)</b> | DN15 | Rp 1/2"   | 5 - 35 kPa  | 4.1   | V5001PY1015 |
|  | DN20 | Rp 3/4"   |             | 7.5   | V5001PY1020 |
|  | DN25 | Rp 1"     |             | 8.7   | V5001PY1025 |
|  | DN32 | Rp 1 1/4" |             | 17.6  | V5001PY1032 |
|  | DN40 | Rp 1 1/2" |             | 24.5  | V5001PY1040 |
|  | DN50 | Rp 2"     |             | 30.0  | V5001PY1050 |
|  | DN15 | Rp 1/2"   | 30 - 60 kPa | 4.1   | V5001PY2015 |
|  | DN20 | Rp 3/4"   |             | 7.5   | V5001PY2020 |
|  | DN25 | Rp 1"     |             | 8.7   | V5001PY2025 |
|  | DN32 | Rp 1 1/4" |             | 17.6  | V5001PY2032 |
|  | DN40 | Rp 1 1/2" |             | 24.5  | V5001PY2040 |
|  | DN50 | Rp 2"     |             | 30.0  | V5001PY2050 |

## Accessories

|   | Description  | Dimension          | Part No.    |
|---|--|--------------------|-------------|
|    | <b>VM242A BasicMes-2 handheld measuring computer</b><br>Note: To connect the VM241 BasicMes to SafeCon™ pressure test cocks please order measuring adapter VA3600C001 separately.  |                    |             |
|   | Computer is supplied with case and accessories   | for all sizes      | VM242A0101  |
|    | <b>VS5501 Shut-off valve for impulse tube</b>  |                    |             |
|   |  | for all sizes      | VS5501A008  |
|    | <b>VS2600 Spare set of 2 pressure test cocks G<sup>1</sup>/<sub>4</sub>"</b>   |                    |             |
|   | Set of SafeCon connections   | for all sizes      | VS2600C001  |
|   | <b>V5001SY Kombi-S Stop Valve</b><br>Partner valve for connection of included impulse tube and to extend measuring possibilities   |                    |             |
|   |  | DN15               | V5001SY2015 |
|   |  | DN20               | V5001SY2020 |
|   |  | DN25               | V5001SY2025 |
|   |  | DN32               | V5001SY2032 |
|   |  | DN40               | V5001SY2040 |
|   | DN50   | V5001SY2050        |             |
|  | <b>VA3401A Draining valve</b>  |                    |             |
|   |  | for all sizes      | VA3401A008  |
|  | <b>VA5001 Measuring adapter for low volume flow section</b><br>To increase the measuring signal at low flow rates<br>Note: For low flow rate measurement we recommend to use the VA5001A measuring adapter. It is to close the partner valve V5001SY... to a defined low flow measuring position B on the V5001S valve, please refer to the data sheet for the V5001S valve for further details. |                    |             |
|   |  | DN15 - DN25        | VA5001A001  |
|   |  | DN32 - DN50        | VA5001A002  |
|  | <b>VA5032A Draining adapter for SafeCon™ connections</b><br>Can be used to drain the water from a SafeCon connection provided on the balancing valve families as shown below   |                    |             |
|   |  | for all dimensions | VA5032A001  |

**Spare Parts**

| Overview  | Description  | Dimension  | Part No.   |
|---|--|------------|------------|
|  | <b>1 Replacement connector (5pcs.)</b>                 |            |            |
|   | Brass connector for the impulse tube with sealing ring |            | VS5001A005 |
|   | <b>2 Compression and impulse tube fitting</b>          |            |            |
|   | Copper pipe  | 4 x 1mm    | VS5001A006 |
|   | <b>3 Insulation shells</b>                             |            |            |
|   |  | DN15       | VA2510D015 |
|   | DN20   | VA2510D020 |            |
|   | DN25   | VA2510D025 |            |
|   | DN32   | VA2510D032 |            |
|   | DN40   | VA2510D040 |            |
|   | DN50   | VA2510D050 |            |



Manufactured for and on behalf of  
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 by its authorised representative  
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