



## Valves for Biogases and Recycling Gases

VRF10...

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- Valves (class A) for installation in gas trains
  - Safety shutoff valves in connection with actuators (conforming to EN 161)
  - Suited for use with gases of gas families I...III, air and slightly aggressive biogases and recycling gases
  - Valves in connection with actuators open slowly and close rapidly
  - 2-port valves with flange connection of the normally closed type
  - VRF10...: DN50...DN80
  - Driven by actuator type SKPx5 or SAX31
  - Supplementary Data Sheet on actuators (see Mechanical Design)

The VRF10 and this Data Sheet are intended for use by OEMs which integrate the valves in their products.

Functionally, the valves correspond to Siemens gas valves in accordance with EN 161.

They are also designed for use with slightly aggressive and dry gases

- Maximum 60 °C
- Gases to G262 like:  
Biogases, waste gases, digester gases, other recycling gases, process gases and air

The valves are designed for special use (processes) in industrial companies.

The valve is used as:

- Shutoff valve (in connection with SKP15)
- Control valve with shutoff function (in connection with SKP25, SKP55 or SKP75)  
SKPx5 with pressure regulation function (SKP25, SKP55 and SKP75) must be looked at in consultation with Siemens with regard to suitability for use with the relevant type of recycling gases.

The chemical composition and aggressiveness of each type of biogas or recycling gas is different, not constant and depends on various factors.

Aggressiveness of the gas augments especially

- as the hydrogen sulfide content H<sub>2</sub>S increases
- as the moisture content of the gas increases. Condensation in the valve is not permitted.

The user must decide after consultation with Siemens whether the valve materials are suited for the relevant type of recycling gas.

The composition of the gases and the concentration of the components may vary.

It is therefore impossible to give a guarantee for any information provided regarding life expectancy.

The suitability in principle is based on tests carried out on the gases to be used.

For safety reasons, we strongly recommend to

- install 2 valves in series
- install a valve proving device
- visually inspect the valves at 6- to 12-month intervals
- the used of SKPx5 with valve closure contact

All types of valves can be combined with any of these actuators.

## Warning notes

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**To avoid injury to persons, damage to property or the environment, the following warning notes must be observed!**

- Do not open, interfere with or modify the valves
- Any opening of the valve, replacement of parts or modifications to the original product is the user's responsibility and is done at his own risk
- All activities (mounting, installation and service work, etc.) must be performed by qualified staff. If this is not observed, there is a risk of loss of safety functions
- When used in connection with gases, the valves constitute part of the safety equipment
- In connection with SAX31 actuators, the valves must **not** be used as safety devices. No closing in accordance with EN 161 takes place
- Fall or shock can adversely affect the safety functions. Such valves must not be put into operation, even if they do not exhibit any damage
- Not suitable gases or gas components causes loss of the safety shutoff function
- It may not join contaminant / particles in the valve, because that could adversely affect the safety shutoff function
- Gases with concentrations >1% for H<sub>2</sub>S and NH<sub>3</sub> and condensation are not permitted. If not observed, there is a risk of impairment of safety functions

## Mounting notes

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- Ensure that the relevant national safety regulations are complied with
- The actuator can be mounted or replaced while the valve is under gas pressure
- Refer also following Mounting Instructions:

|                 |               |               |
|-----------------|---------------|---------------|
| AGA66           | M7643.2       | 74 319 0421 0 |
| VRF10 DN50...80 | M7636.1/M7633 | 4 319 2050 0  |
| VRF10           | M7633         | 4 319 2168 0  |

### Sealing/tightness

- Check to make certain that the bolts of the flanges are properly tightened and afterwards check to ensure that the valve is tight when all components are connected
- Check to ensure that the gaskets between the flanges and the valve must be fitted

### Mounting position

The permissible mounting positions of the used actuator must be observed, (refer to the relevant Data Sheet).

### Direction of flow

The direction of gas flow must be in accordance with the direction of the arrow on the valve body.

### Function

The inactive valve is closed and opens when the actuator opens.  
It is recommended to install a SKPx5.xxx1xx to report the CLOSED position of the valve.

## Standards and certificates

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Note!

Only in conjunction with SKPx5, see Data Sheet N7643.



EAC Conformity mark (Eurasian Conformity mark)



ISO 9001:2008  
ISO 14001:2004  
OHSAS 18001:2007



China RoHS

Hazardous substances table:

<http://www.siemens.com/download?A6V10883536>

## Service notes

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- Each time a valve has been replaced, check to ensure that the valve operates correctly as well as the internal and external tightness
- Siemens valves may only be repaired by Siemens Repair Centers

## Life cycle

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The combination valve and actuator have a designed lifetime\* of 100,000 burner startup cycles which, under use of gases to EN 437 (or specification G260). This lifetime is based on the endurance tests specified in standard EN 161 and the table containing the relevant test documentation as published by the European Association of Component Manufacturers (Afecor) ([www.afecor.org](http://www.afecor.org)).

The designed lifetime is based on use of the valve and actuator according to the manufacturer's Data Sheet. After reaching the designed lifetime in terms of the number of burner startup cycles, or the respective time of usage, the valve and actuator are to be replaced by authorized personnel.

\* The designed lifetime is not the warranty time specified in the Terms of Delivery

The use of gases outside of EN 437 / G260, such as G262, may lead to a limited life cycle.

## Disposal notes

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Local and currently valid legislation must be observed.

## Mechanical design

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### VRF10

#### Strainer

A strainer made of stainless steel is fitted in the valve's inlet and protects the valve, the seat and flap as well as downstream devices against dirt.

#### Actuators

The valves can be combined with the following types of actuators:

- SKP15 (refer to Data Sheet N7643)
- Other actuators (SKP25, SKP55 and SKP75) following tests on gas suitability



Note!

Option for all SKPx5.xx1xx with valve closing contact to report the CLOSED position of the valve.

## Type summary (other types of valves on request)

| DN<br>(mm) | Article no.   | Type      | Perm. operating pressure<br>mbar | Air flow rate<br>m <sup>3</sup> /h at <sup>Δ</sup><br>Δp = 10 mbar | Number of test<br>points<br>Rp ¼ <sup>1)</sup> | Number of pilot gas<br>connections<br>G ¾ <sup>2)</sup> |
|------------|---------------|-----------|----------------------------------|--|--|---|
| 50         | BPZ:VRF10.504 | VRF10.504 | 600                              | 190  | 4  | ---   |
| 80         | BPZ:VRF10.804 | VRF10.804 | 600                              | 350  | 2  | 2   |

<sup>1)</sup> Both sides, inlet and outlet side

<sup>2)</sup> Inlet side, VRF10 with one connection on each side

## Ordering

When ordering, please give complete valve type reference.

Actuator and valve are supplied as single packs.

### Example:

1 VRF10.504 (flange single valve DN50 for biogas)

1 SKP15.001E2 (actuator OPEN / CLOSED) with valve closure contact

## Accessories



### Manual adjuster

**AGA61**

Article no.: **BPZ:AGA61**



### Adapter for actuators SAX31...

**AGA60**

Article no.: **BPZ:AGA60**

Consisting of 2 stem parts and one connecting flange



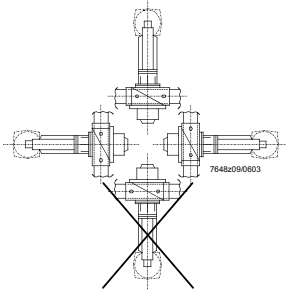
### Gasket kit to SKPx5

**AGA66**

Article no.: **BPZ:AGA66**

- Between actuator SKPx5 and valve VRF10
- For increasing of degree of protection from IP54 up to IP65
- Refer to Mounting Instruction M7643.2 (74 319 0421 0)

## Technical data

|                          |   |   |
|--------------------------|---|---|
| General unit data        | Valve class in connection with actuator | A conforming to EN 161<br>(except with SAX31)   |
|                          | Group                                   | 2 (EN 161)  |
|                          | Perm. medium temperature                | 0...60 °C   |
|                          | Weight                                  | See Dimensions  |
|                          | Connecting flanges                      | PN16 to ISO 7005-2  |
|                          | Required flow rate                      | See Flow chart  |
|                          | Perm. mounting position                 |   |
|                          |   | See Mounting notes  |
|                          | Operating pressure                      | See Type summary  |
|                          | Types of gases                          | Suitable for<br>- gases of gas family 1, 2, 3 and air<br>- gases up to maximum 1 vol.% H <sub>2</sub> S, dry<br>- gases up to maximum 1 vol.% NH <sub>3</sub> , dry<br><br>Nonferrous (except in extremely small quantities bound in plastic components)<br><br>For more information see <i>Use</i> . |
| Strainer                 | Built-in, mesh size 0.9 mm              |   |
| Environmental conditions | <b>Storage</b>                          | DIN EN 60721-3-1  |
|                          | Climatic conditions                     | Class 1K3   |
|                          | Mechanical conditions                   | Class 1M2   |
|                          | Temperature range                       | -20...+60 °C  |
|                          | Humidity                                | <95% r.h.   |
|                          | <b>Transport</b>                        | DIN EN 60721-3-2  |
|                          | Climatic conditions                     | Class 2K2   |
|                          | Mechanical conditions                   | Class 2M2   |
|                          | Temperature range                       | -15...+60 °C  |
|                          | Humidity                                | <95% r.h.   |
|                          | <b>Operation</b>                        | DIN EN 60721-3-3  |
|                          | Climatic conditions                     | Class 3K5   |
|                          | Mechanical conditions                   | Class 3M2   |
|                          | Temperature range                       | -10...+60 °C  |
| Humidity                 | <95% r.h.                               |   |
| Installation altitude    | Max. 2,000 m above sea level            |   |

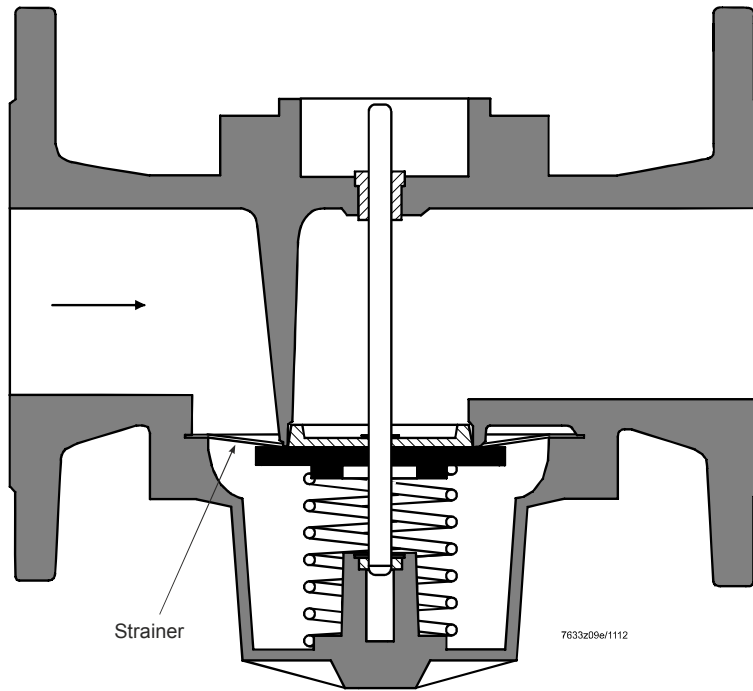


**Warning!**  
**Condensation is not permitted!**  
**If this is not observed, there is a risk of loss of safety functions.**

**Function**

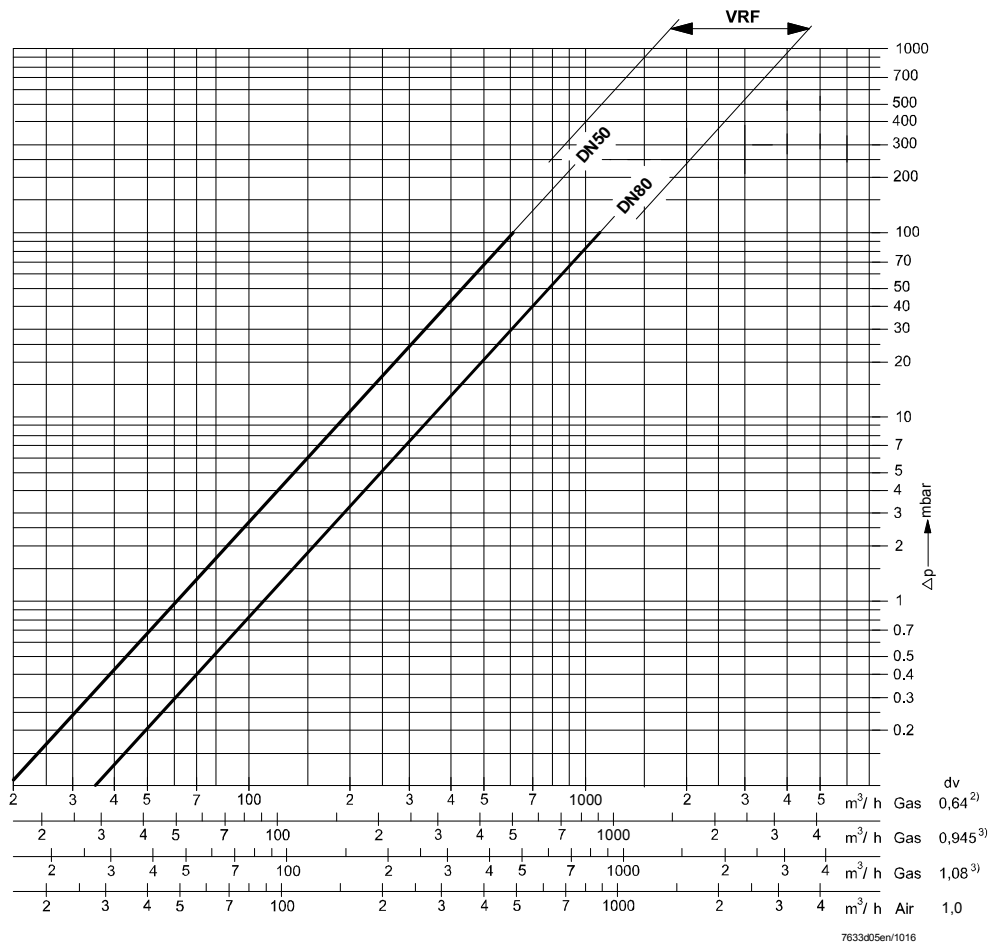
**VRF10**

Sectional view of VRF10 valve.



**Flow chart (only for fully open valves)**

**VRF10**



Legend

— Maximum flow (valve fully open)

**Flow chart** (only for fully open valves) (cont'd)

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Determination of pressure drop for gases with a density ratio **dv** other than that of the chart scales above:

Required variables      p(gas)      Gas density in kg/m<sup>3</sup>  
                                  V(gas)      Gas volume in m<sup>3</sup>/h

Procedure                      Calculate the gas density ratio [dv(gas)]:

$$dv(\text{gas}) = \frac{\text{Density (gas) in kg/m}^3}{1.22 \text{ kg/m}^3 \text{ (= density of air)}}$$

□□□□□□□□□□□□□□□□

Determine the air volume [V(air)] that produces the same pressure drop  $\Delta p$  as gas volume [dv(gas)]

$$V(\text{air}) = \frac{V(\text{gas) in m}^3/\text{h}}{\sqrt{dv(\text{gas})}}$$

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Determine the gas pressure drop  $\Delta p$  with the help of the flow chart, based on the calculated volume of air [V(air)] of the chart scale.

Practical experience shows that applications outside the range confined by the bold characteristics could produce significant noise

**Attention!**



- **When used in connection with burners having a small low-fire rate, the selected nominal valve size should not be too large (refer to Data Sheet on actuators).**
- **If the available gas pressure exceeds the maximum permissible operating pressure, lower it with a pressure controller fitted upstream of the valve.**
- **The pressure drop (lines of maximum flow) is based on a fully open valve.**



## Dimensions

Dimensions in mm

### VRF10

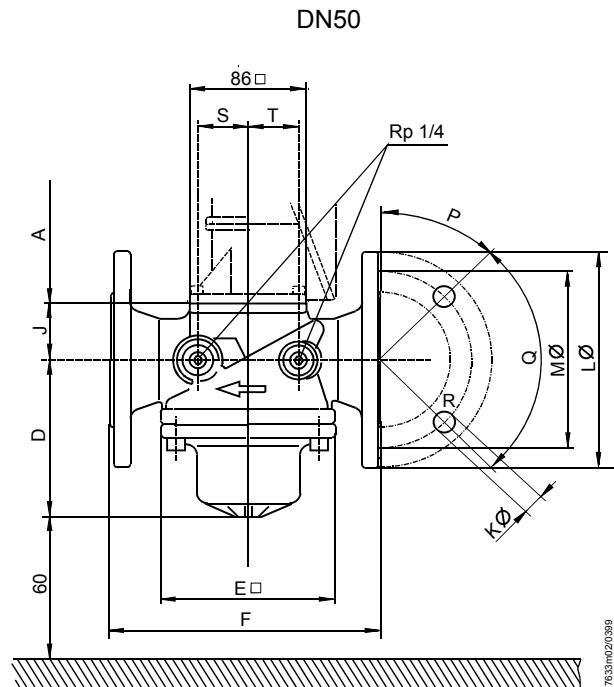
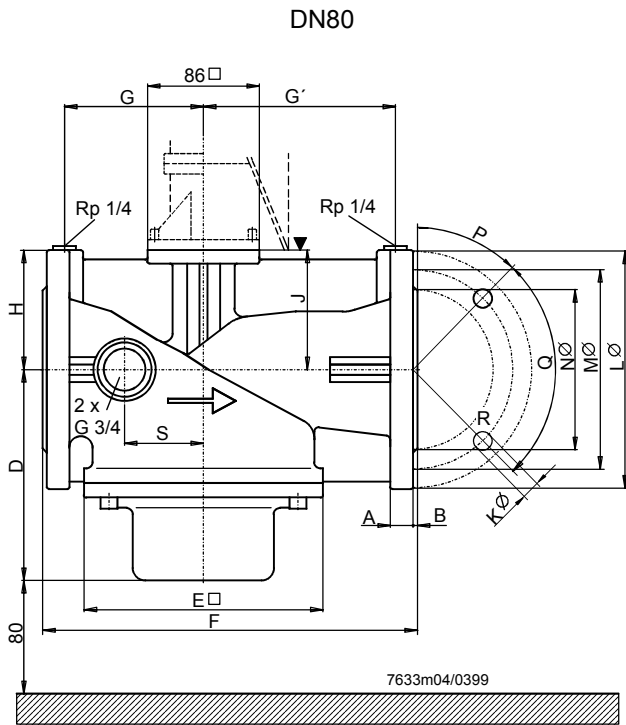


Table of dimensions

| Type      | DN 1) | A  | B   | D   | E   | F   | G   | G'  | H   | J   | K  | L   | M   | N   | P     | Q   | R | S  | T   | kg   |
|-----------|-------|----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-------|-----|---|----|-----|------|
| VRF10.504 | 50    | 13 | --- | 107 | 126 | 230 | --- | --- | --- | 50  | 19 | 165 | 125 | 102 | 45°   | 90° | 4 | 42 | 42  | 7.5  |
| VRF10.804 | 80    | 19 | 3   | 163 | 185 | 310 | 118 | 158 | 102 | 100 | 19 | 200 | 160 | 131 | 22.5° | 45° | 8 | 62 | --- | 17.9 |

- A From mounting surface for actuator (refer to Data Sheet of the relevant actuator)
- DN Nominal width, dimension connection of medium)
- R Number of boreholes in the flange