SIEMENS

7633

VRF...

VRH...

Valves for Biogases and Recycling Gases

VRF10... VRH10...

- **Single valves (class A) for installation in gas trains**
- **Safety shutoff valves in connection with SKP... 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 SKP... actuators open slowly and close rapidly**
- **2-port valves of the normally closed type**
- **DN40...DN80**
- **Driven by actuator type SKP..., SKL... or SQX...**
- **Supplementary Data Sheet on actuators (refer to «Use»)**

The VRF10... / VRH10..... and this Data Sheet are intended for use by OEMs which integrate the valves in their products.

CC1N7633en
28.09.2006

Use

The valves are designed for use with slightly aggressive and dry gases:
- Maximum 60 °C
- Gases of gas families I...III (conforming to G260 of DVGW)
- Biogases
- Waste gases
- Digester gases
- Other recycling gases
- Air

They are used primarily
- in gas-fired combustion plant
- in gas trains of combustion plant

The combination of valve and SKP... actuator provides the following functions:
- Shutoff valve (in connection with SKP1...)
- Gas pressure control valve with shutoff feature (in connection with SKP2..., SKP5… or SKP7…)

The chemical composition and aggressiveness of each type of biogas or recycling gas is different and depends on various factors.

Aggressiveness of the gas augments especially
- as the hydrogen sulfide content H_2S increases
- as the moisture content of the gas increases, if condensation occurs inside the valve

If the valves are used with gases other than those of gas families I...III, Siemens Building Technologies assumes no responsibility for the valve's durability and life expectancy. The user must decide for himself whether the valve materials are suited for the relevant type of recycling gas (for details, refer to «Mechanical design / Materials»).

For safety reasons, we strongly recommend to
- install 2 valves in series
- install a gas valve proving device
- visually inspect the valves at 6- to 12-month intervals

Warning notes

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

Do not open, interfere with or modify the valves except when installing the service replacement kit!

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.

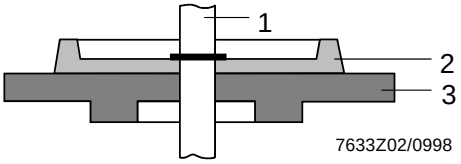
- All activities (mounting, installation and service work, etc.) must be performed by qualified staff
- When used in connection with gases, the valves constitute part of the safety equipment
- In connection with SQX... or SKL... actuators, the valves must **not** be used as safety devices
- Fall or shock can adversely affect the safety functions. Such valves must not be put into operation, even if they do not exhibit any damage

Engineering notes

Profile (only VRF...)

Owing to the profile of their flaps, the VRF… valves are especially suited for control functions.

Benefit:
Good control performance and hardly prone to hunting in low-fire operation.



Legend

1 Stem
2 Profile
3 Flap

Mounting notes

- Ensure that the relevant national safety regulations are complied with
- No special tools are required to assemble valve and actuator
- The actuator can be mounted or replaced while the valve is under pressure
- Refer also Mounting Instructions:
  M7636.1 (4 319 2050 0)
  M7633 (4 319 2168 0)

Sealings

- No sealing materials are required to assemble valve and SKP… actuator
- Check to ensure that the valve is tight when all components are connected
- Check to make certain that the bolts of the flanges are properly tightened
- Check to ensure that the gaskets between the flanges are fitted

Mounting position

The valve can be installed on the gas train in any position. The permissible mounting positions of the actuator must be observed, however (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. The pressure switch for lack of gas must always be fitted upstream of the gas valve when used in connection with the SKP1..., SKP2..., SKP5... or SKP7...

Function

Stem retracts → Valve open
Stem extends → Valve closes

Installation notes

Gas pressure

If the available gas pressure exceeds the valve's maximum permissible operating pressure, it must be lowered by an upstream pressure controller.

Commissioning notes

- In case of corrosive ambient conditions (e.g. when used near the sea), the valve body should be coated with protective lacquer

Standards and certificates

CE

Conformity to EEC directives

- Electromagnetic compatibility EMC (immunity)	89 / 336 / EEC
- Directive for gas appliances	90 / 396 / EEC
- Directive for pressure devices	97 / 23 / EEC

ISO 9001: 2000
Cert. 00739

ISO 14001: 2004
Cert. 38233

Service notes

- Each time a valve has been replaced, check to ensure that the valve operates correctly and that it is tight
- Siemens Building Technologies valves may only be overhauled by Siemens HVAC Repair Centers

Disposal notes

Local and currently valid legislation must be observed.

Mechanical design

VRF...

The valves are of the normally closed type with a flap.

Stem

The stem is guided on both sides of the flap, ensuring precise axial stroke and tight shutoff.

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.

Flap

The swing type flap of valve VRF... has a profile.

VRH...

Strainer

A strainer type AGA... is available as an accessory item (refer to «Accessories»). The valves are supplied without the strainer (refer to «Engineering notes»). They are of the normally closed one-way high-flow type.

Flap

The swing type flap of valve VRH... has no profile.

Actuators

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

Type reference	Data Sheet	Function
SKP10...	N7641	ON / OFF
SKP11...	N7641	ON / OFF
SKP15...	N7643	ON / OFF
SKP20...	N7644	ON / OFF with constant pressure control / zero pressure control
SKP25...	N7643	ON / OFF with constant pressure control / zero pressure control
SKP25.7... with SQS37...	N7643	ON / OFF with pressure control, predefined setpoint adjustable via electrical signal
SKL25... (for air only)	N7643	ON / OFF with constant pressure control
SKP50...	N7648	ON / OFF with differential pressure control, signal input → differential pressure
SKP55...	N7643	ON / OFF with differential pressure control, signal input → differential pressure
SKP70...	N7651	ON / OFF with ratio control, signal input → static pressure
SKP75...	N7643	ON / OFF with fuel / air ratio control, signal input→ static pressure
SQX32... with AGA60	N4554	Modulating position control

Type summary (other types of valves on request)

DN (mm)	Type reference without stroke limitation		Perm. operating pressure mbar	Air flow rate m³/h at Δp = 1 mbar	Number of test points Rp ¼ [1])	Number of pilot gas connections G ¾ [2])
	Without profile	With profile				
40	---	VRF10.404	600	32.3	4	---
50	---	VRF10.504	600	47.4	4	---
65	---	VRF10.654	600	74	2	2
80	---	VRF10.804	600	85.4	2	2
Flap type valves: High-flow with swing type flap						
80	VRH10.805	---	300	128.4	4	1
100	VRH10.905	---	300	199.5	4	1
125	VRH10.915	---	300	277.6	4	1

[1]) On inlet and outlet side
[2]) On inlet side, VRF... with one connection on each side

Ordering

When ordering, please give complete type reference.

Actuators must be ordered as separate items.
Actuator and valve are supplied unassembled.

Example:
VRF10.504
Flanged valve DN50 for biogas

Accessories

Manual adjuster **AGA61**

Adapter for actuators SQX... **AGA60**

- Consisting of 2 stem parts and one connecting flange

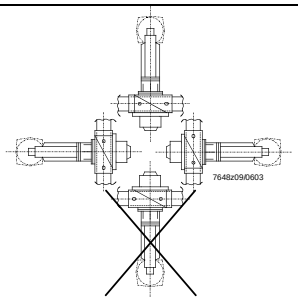
VRH... strainer

With circlip and 1 mm mesh size

Type reference of valve	Type reference of strainer
VRH10.805 / DN80	AGA80
VRH10.905 / DN100	AGA90
VRH10.915 / DN125	AGA91

The strainers can be fitted in the flange sections of the valves, either on the gas inlet or outlet side.

Technical data

General valve data	Valve class in connection with SKP...	A conforming to EN 161 (except with SQX... / SKL...)
	Group	2 (EN 161)
	Perm. medium temperature	0...60 °C
	Weight	refer to «Dimensions»
	Connecting flanges	PN16 to ISO 7005-2
	Required flow rate	refer to «Flow chart»
	Perm. mounting position	 refer to «Mounting notes»
	Operating pressure	refer to «Type summary»
	Types of gases	refer to «Use»
	Strainer (only for VRF...)	built-in, mesh size 0.9 mm

Environmental conditions	**Storage**	DIN EN 60721-3-1
	Climatic conditions	class 1K3
	Mechanical conditions	class 1M2
	Temperature range	-20...+60 °C
	Humidity	< 95 % r.h.
	Transport	DIN EN 60 721-3-2
	Climatic conditions	class 2K2
	Mechanical conditions	class 2M2
	Temperature range	-15...+60 °C
	Humidity	< 95 % r.h.
	Operation	DIN EN 60 721-3-3
	Climatic conditions	class 3K5
	Mechanical conditions	class 3M2
	Temperature range	-10...+60 °C
	Humidity	< 95 % r.h.

⚠ **Condensation, formation of ice and ingress of water are not permitted!**

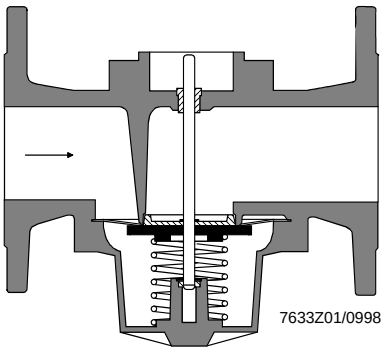
Materials

Valve components	VRF...	VRH...
Valve body and cover	GG20 cast iron	GG20 cast iron
Plugs	Phosphated steel	Phosphated steel
Plug seal	Novapress 200	Novapress 200
Sealing compound	Viton	Viton
Stem	Machining steel SB X12 CrNi S18 8	Machining steel RS X12 CrMo S17
Stem sealing	Viton	Viton
Stem bushing	Machining steel RS X12 CrMo S17	Machining steel RS X12 CrMo S17
Screws	Phosphated steel	Phosphated steel
Return spring	Spring steel Nimonic 90 NiCr20 Co18 Ti	Spring steel Nimonic 90 NiCr20 Co18 Ti
Safety disk and lockwashers	Coated spring steel NiSn	Coated spring steel NiSn
Levers	---	Phosphated or nitrated steel
Axles	---	Machining steel RS X12 CrMo S17
Valve flap profile	PBT polyester, glass-ball reinforced	---
Strainer	Wire mesh St V2a	---

Function

Functioning principle

Sectional view of VRF…valve

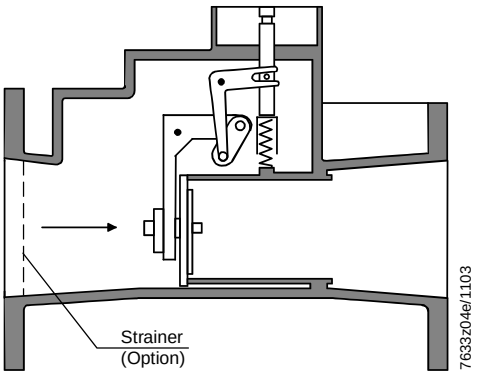


Application example

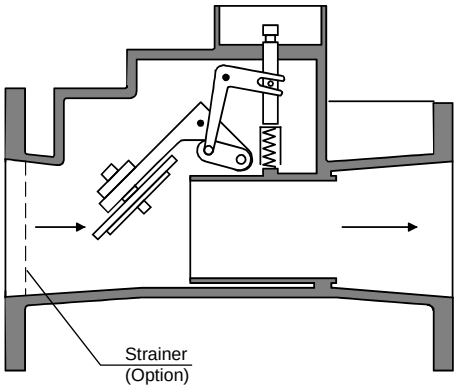
VRF... complete with SKP25... actuator

Functioning principle

Sectional view of VRH... valve



Fully closed



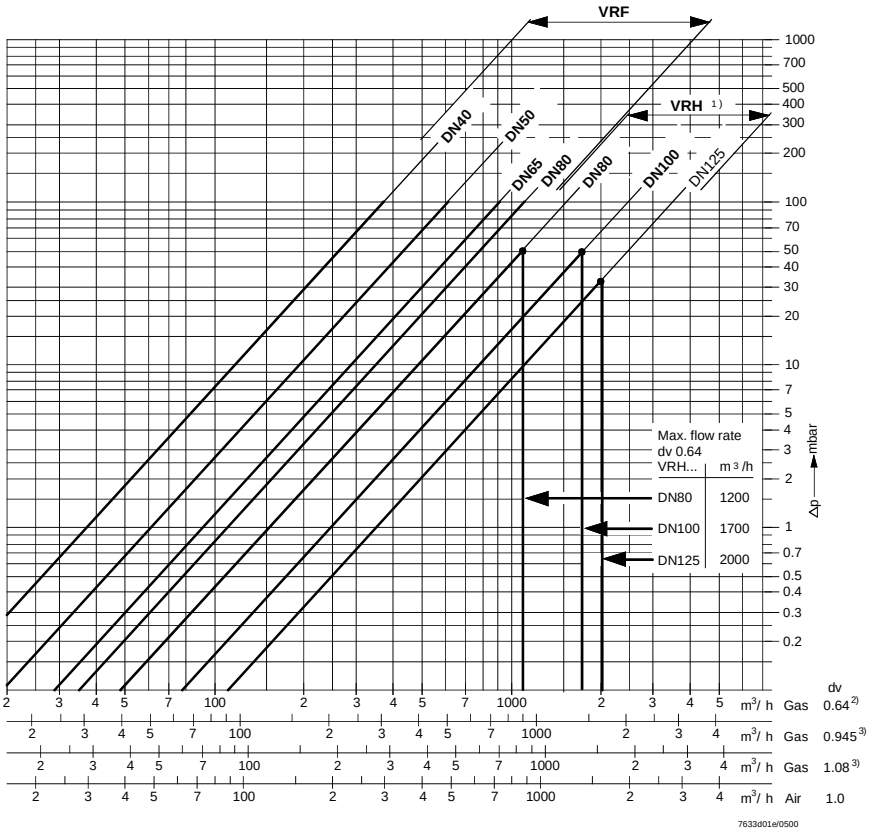
Fully open

Application example

VRH... complete with SKP25... actuator

Flow chart

Only for fully open valves



Legend ___ Maximum flow (valve fully open)

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/m³
V(gas) Gas volume in m³/h

Procedure

– Calculate the gas density ratio «dv (gas)»:

$$dv(Gas)\,\frac{Density\ (gas)\ in\ kg\ /\ m3}{1.22\ kg\ /\ m3\ (=density\ of\ air)}$$

– Determine the air volume «V(air)» that produces the same pressure drop «Δp» as «V(gas)»

$$V(air) = \frac{V(gas)\ in\ m3\ /\ h}{\sqrt{\frac{1}{dv(gas)}}} = m3\ /\ h$$

– Determine the gas pressure drop Δp» with the help of the flow chart, based on the calculated «V(air)» of the chart scale.
Applications within the area of the bold characteristics (max. 70 m/s) are within acceptable flow noise levels.

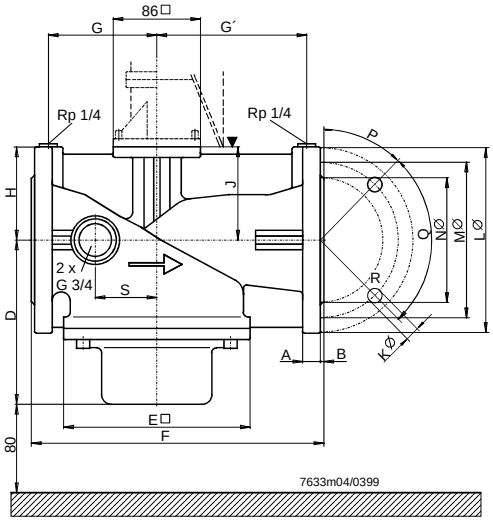
Note

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 SKP…). 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.

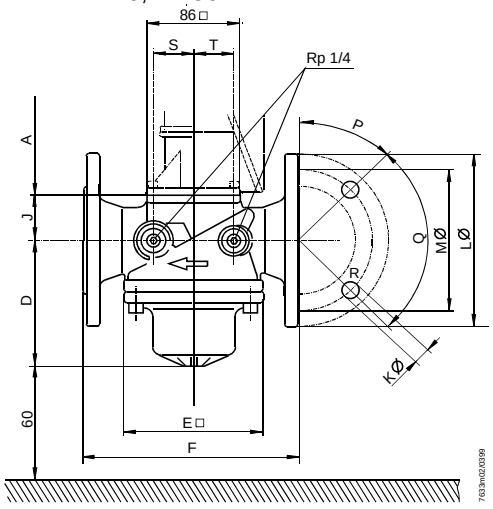
Dimensions

Dimensions in mm

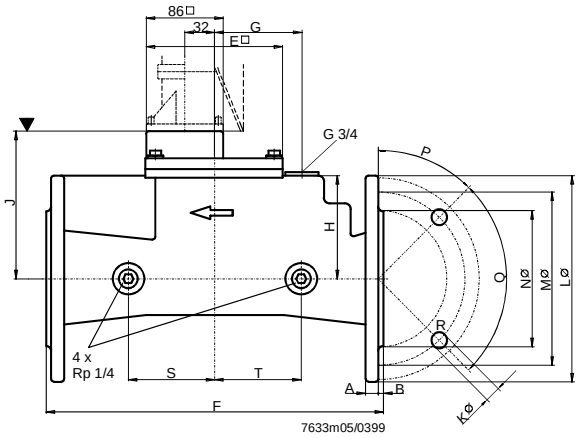
VRF... / DN65...DN80



VRF...DN40, DN50



VRH... / DN80...DN125



Mounting surface for actuator

Table of dimensions

Type	DN 1)	A	B	D	E□	F	G	G´	H	J	KØ	LØ	MØ	NØ	P	Q	R	S	T	kg
VRF...	40	13	---	102	126	200	---	---	---	41	19	150	110	88	45°	90°	4	36	36	6
	50	13	---	107	126	230	---	---	---	50	19	165	125	102	45°	90°	4	42	42	7.5
	65	16,5	3	163	185	290	108	148	95	92	19	185	145	120	45°	90°	4	62	---	15.3
	80	19	3	163	185	310	118	158	102	100	19	200	160	131	22.5°	45°	8	62	---	17,9
VRH...	80	15	3	---	160	310	102	---	105	159	19	200	160	131	22.5°	45°	8	95	95	16.3
	100	16	3	---	160	350	102	---	105	166	19	220	180	157	22.5°	45°	8	95	95	18.6
	125	17	3	---	160	400	102	---	121	174	19	250	210	187	22.5°	45°	8	95	95	23.4

A From mounting surface for actuator (refer to Data Sheet of the relevant actuator)
DN Nominal valve size (for connection of medium)
R Number of boreholes
1) Flanges to ISO 7005-2