

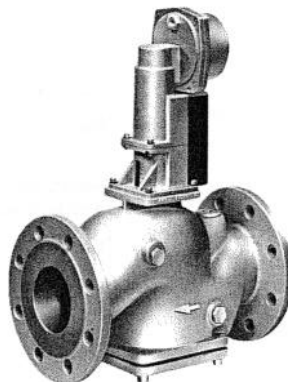
Valves for Biogases and Recycling Gases

VRF10... VRH10...

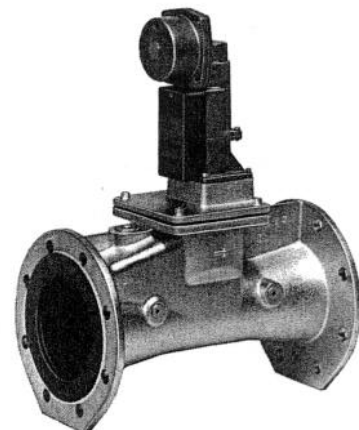
Supplementary Data Sheets: Refer to «Actuators»



Quality Assurance Services
FM739/1, QAS3284.5/108



VRF... with actuator type SKP20...



VRH... with actuator type SKP20...

Gas valves for installation in gas trains for use with slightly aggressive biogases or recycling gases.
Two-port valves of the normally closed type.
Suitable for use with electro-hydraulic actuators type SKP... or electric actuators type SQX...

Application

The gas valves of the VR... range have been designed for use with slightly aggressive gases, such as biogases, sewer gases and other recycling gases, as well as air. They are installed primarily in gas fired combustion plants.

The valves are used in connection with electro-hydraulic actuators (type SKP...) or electric actuators (type SQX...). They act as safety shut-off valves, gas pressure regulators, or air/gas ratio controllers; also refer to «Actuators».

The chemical composition and aggressiveness of biogases and recycling gases vary and depend on a number of factors.

The aggressiveness increases especially

- as the hydrogen-sulphide (H₂S) content increases, and
- as the humidity content of the gas changes, that is, when condensation occurs inside the valve body.

It is not possible to provide general information on the resistance of the VR... valves when used with recycling gases. The user must assess for himself whether the materials used with the VR... valves (refer to "Design Features/Materials") are suitable for the respective recycling gases.

For safety reasons, it is always recommended to

- install two valves in series
- install a gas valve proving unit
- visually check the valves at 6- to 12-month intervals

Summary of Types

DN (mm)	Type reference without stroke limitation		Permissible operating pressure mbar	Throughput of air in m ³ /h at Δp = 1 mbar	Number of test points	Number of ignition gas connections
	non-contoured	contoured				
40	—	VRF10.404	600	29.6	R1/4"	R3/4"
50	—	VRF10.504	600	48.8	4	—
65	—	VRF10.655	300	72.3	4	1
80	—	VRF10.805	300	85.4	4	1
Flap type valves: High flow types with flat disk						
80	VRH10.805	—	300	122.2	4	1
100	VRH10.905	—	300	197.3	4	1
125	VRH10.915	—	250 ¹⁾	281.0	4	1

1) With SKP... A series actuator, 300 mbar.

Accessories

- **Service replacement sets for VRF...-valves:** Consisting of stem, plug, filter and the necessary screws, washers and gaskets.

DN (mm)	Ordering number	DN (mm)	Ordering number
40	4 679 1556 0	65	on request
50	4 679 1496 0	80	on request

No service replacement sets are available for VRH... valves.

- **Strainers for VRH... -valves** complete with circlip, mesh size 1 mm

Strainer insert	For valve type VRH...	DN (mm)
AGA80	10.805	80
AGA90	10.905	100
AGA91	10.915	125

The strainer inserts can be fitted on both the gas inlet and gas outlet side of the valves.

Ordering

When ordering, please give the type reference.

Example: **VRF10.504**
(DN50 flanged valve for biogas)

The actuators must be ordered as separate items.

Technical Data

Subassemblies	A-type, conforming to EN 161 (exception: with SQX...) refer to «Application»
Types of gas	0°C...+60°C
Perm. medium temperature	
Perm. ambient temperature	-15°C...+60°C
Operation and storage	
Perm. mounting orientation	refer to «Mounting Guide»
Weight	refer to «Dimensions»
Operating pressure	refer to «Summary of Types»
Connecting flanges	PN16, to ISO 7005-2
Min. required flow rate	same as VG...-valves, refer to Data Sheets under «Actuators»

Actuators

The VR... valves can be used with the following types of actuators:

Type	Data Sheet	Function
SKP10	7641	ON/OFF
SKP20	7641	ON/OFF, with constant pressure regulation
SKP27 +SQS2	7644	ON/OFF, with pressure regulation and setpoint adjustment by electric signal
SKP50	7648	ON/OFF, with ratio control , signal input: differential pressure
SKP70	7651	ON/OFF, with ratio control , signal input: static pressure
SQX31 +AGA60	4551	Modulating three-position regulation (cannot be used as a safety shut-off valve!)

The valves are also suitable for use with actuators type SKL..., but the latter do not act as safety shut-off valves (closing time 4...6s) and are only permitted in connection with air or non-hazardous gases.

Valve and actuator are supplied separately. Assembly is straightforward because no special tools are required.

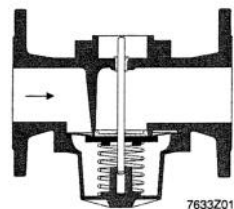
The actuator can be mounted or replaced while the valve is under gas pressure. Sealing material is not required.

Design Features

VRF... valves

The valves are of the normally closed one-way type and have a flat disk. Their stem is guided on both sides of the disk, thus ensuring precise alignment and stroke as well as tight shut-off. The closing force of the return spring is supported by the pressure of the gas. The VRF... valves are always supplied with a contoured disk and with no stroke limitation; refer to «Summary of Types». An interchangeable strainer made of stainless steel protects seat and disk as well as downstream controls against contamination.

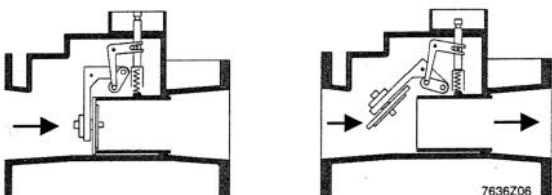
Function principle of VRF... valves



VRH... valves

The valves are of the normally closed one-way high flow types. The swing-type flap is flat (non-contoured). The high closing force of the return spring is supported by the pressure of the gas. A strainer is available as an accessory item. The valves are supplied without a strainer; also refer to «Planning Guide».

Function principle of VRH... valves



Fully closed

Fully open

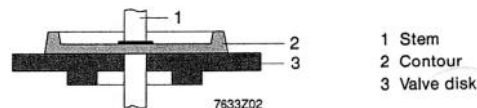
Materials	VRF... valves	VRH... valves
Valve component	Material	Material
Valve body and cover	Cast iron GG20	Cast iron GG20
Plug	Phosphated steel	Phosphated steel
Seal for plug	Novapress 200	Novapress 200
Sealing material	Viton	Viton
Stem	Machining steel SB X12 CrNi S18 8	Machining steel RS X12 CrMo S17
Stem seal	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 NiSn coated and painted	Spring steel NiSn coated and painted
Safety washer and lock washers	Spring steel NiSn coated	Spring steel NiSn coated
Lever	—	Phosphated or nitrated steel
Axles	—	Machining steel RS X12 CrMo S17
Contour of valve disk	PBT-polyester glass-ball reinforced	—
Strainer	Wire mesh St V2a	—

Planning, Mounting, Commissioning and Service Guide

Gas pressure: If the available gas pressure exceeds the valve's maximum permissible operating pressure, it must be reduced by an upstream gas pressure regulator.

Mounting orientation: The gas valve's orientation on the gas train is optional. However, the actuator's permissible mounting positions must be observed; refer to the respective Data Sheets.

Contour: Due to the contour of their disks, the VRF... valves are especially suitable for regulating functions. Advantage: Good control characteristic and not prone to hunting in low flame operation.



Strainer: Valves type VRH... are always supplied with no strainer and must therefore be used in plants having a gas filter. A suitable strainer is available as an accessory item; refer to «Accessories».

Direction of flow: The direction of gas flow must agree with the direction of the arrow on the valve body.

Function: Stem retracts = valve opens
Stem extends = valve closes

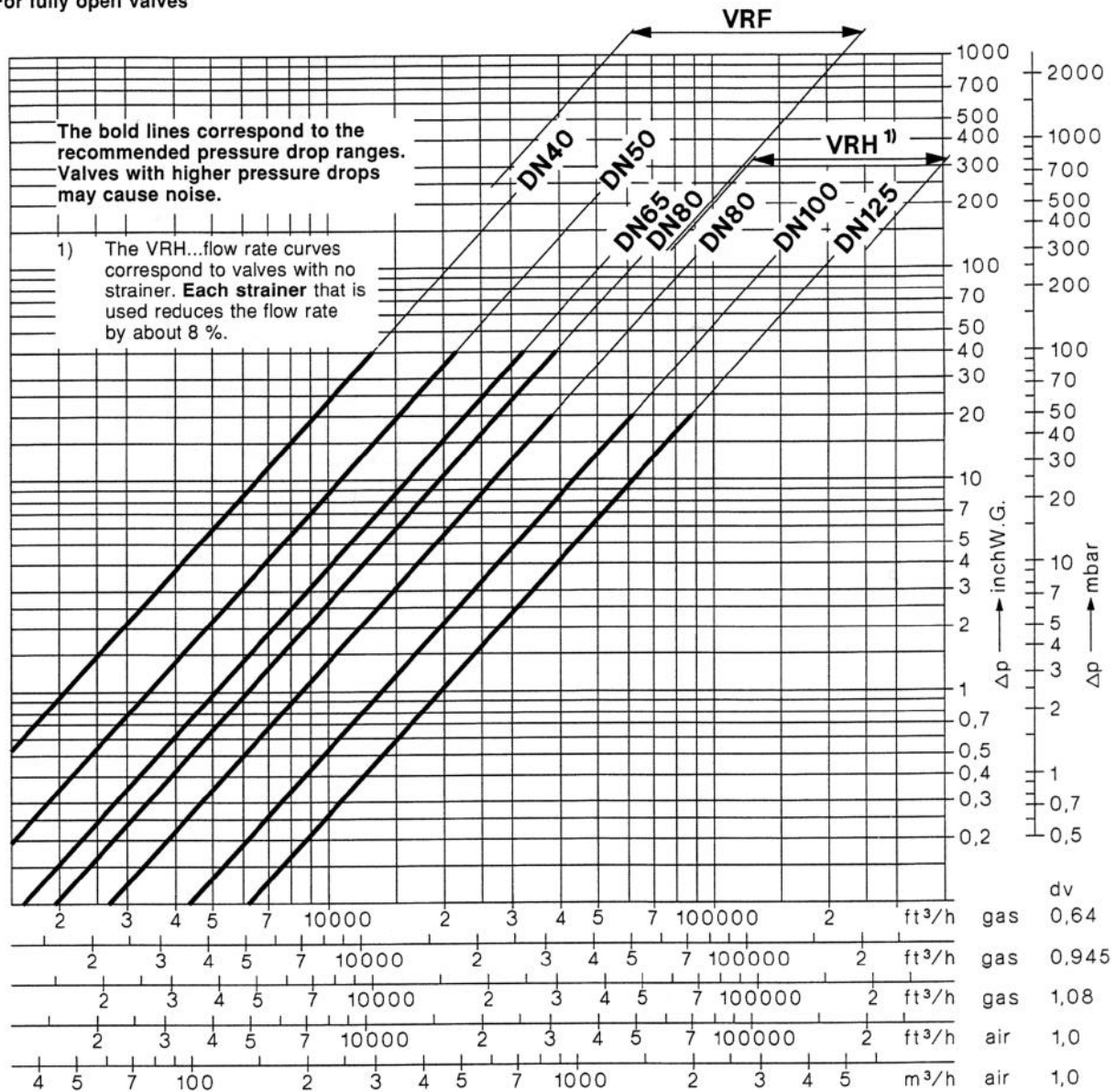
Service guide: For valves type VRF..., service replacement sets are available; refer to «Accessories». After each replacement, the function and the valve's internal and external tightness are to be checked.

Note:

- VRH... valves must be serviced by Landis & Gyr repair centres only.
- Replacement of the valve disk must always be undertaken by qualified personnel. Refer to «Service Guide».
- Die VRH... valves are always supplied with no strainer. They must be installed either with a gas filter upstream of the valve or with a strainer at the gas inlet.

Flow chart

For fully open valves



$$d_v = \text{density ratio to air at } +22^\circ\text{C} = \frac{\text{kg/m}^3 \text{ gas}}{1.22 \text{ kg/m}^3 \text{ (air)}}$$

When used in connection with actuators having an integral regulator, the nominal valve size - for control reasons - should not be chosen too large. This applies in particular to burners with small low flame rates and to burners where the change from high flame to low flame takes place in less than 5 s.

Determination of pressure drop for gases having a density ratio d_v other than those according to the scales 1, 2 and 3 above.

Required variables:

$$\rho_{(\text{gas})} = \text{density of gas in kg/m}^3$$

$$V_{(\text{gas})} = \text{volume of gas in m}^3/\text{h}$$

Procedure:

a) Calculation of gas density ratio $d_{v(\text{gas})}$.

$$d_{v(\text{gas})} = \frac{\rho_{(\text{gas})} \text{ in kg/m}^3}{1.22 \text{ kg/m}^3 (= \rho \text{ air})}$$

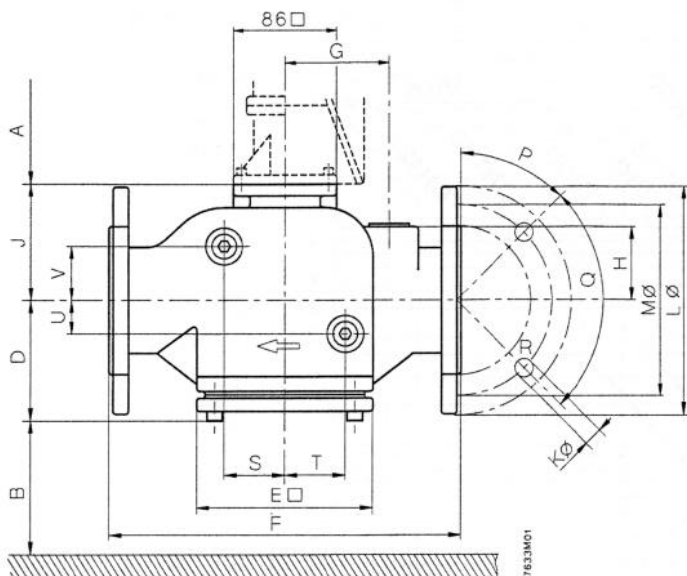
b) Determination of air volume $V_{(\text{air})}$, causing the same pressure loss Δp as $V_{(\text{gas})}$.

$$V_{(\text{air})} = \frac{V_{(\text{gas})} \text{ in m}^3/\text{h}}{\sqrt{\frac{1}{d_{v(\text{gas})}}}} = \text{m}^3/\text{h}$$

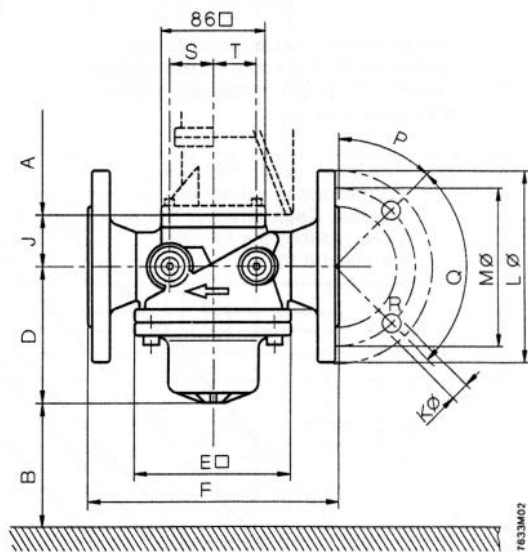
c) Determination of gas pressure drop Δp with the help of the flow chart, based on the calculated $V_{(\text{air})}$ of scale 4 for air.

Dimensions and Weights of the Valves without Actuators

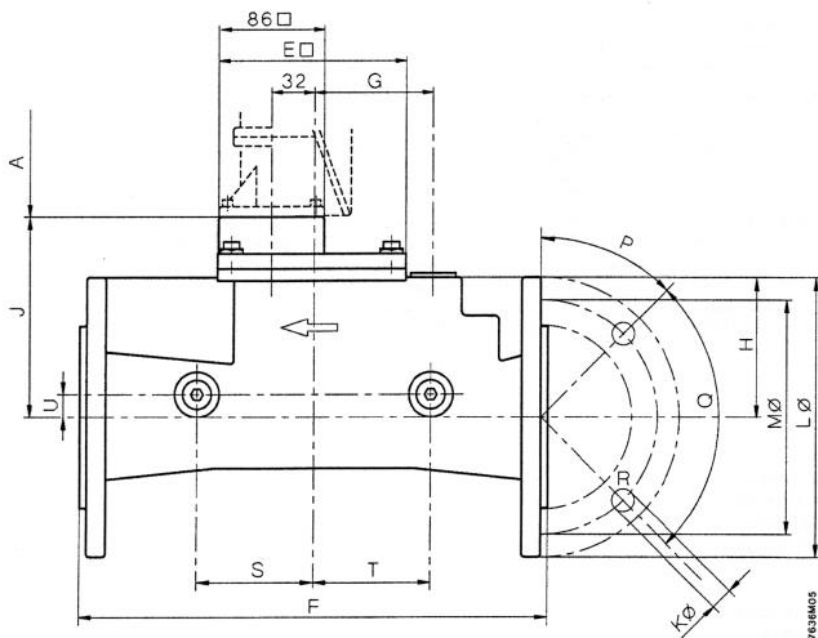
VRF DN65, DN80



VRF DN40, DN50



VRH...



Typ	DN ¹⁾	B	D	E	F	G	H	J	K	L	M	P	Q	R	S	T	U	V	kg
VRF...	40	60	102	126	200	—	—	41	19	150	110	45°	90°	4	36	36	—	—	6.0
	50	60	107	126	230	—	—	50	19	165	125	45°	90°	4	42	42	—	—	7.5
	65	80	92	146	290	90	60	101	18	185	145	45°	90°	4	50	50	25	46	15.3
	80	80	100	146	310	90	70	115	18	200	160	22.5°	45°	8	50	50	36	51	17.9
VRH...	80	—	—	160	310	102	100	159	18	200	160	22.5°	45°	8	95	95	20	—	16.3
	100	—	—	160	350	102	111	166	18	220	180	22.5°	45°	8	95	95	20	—	18.6
	125	—	—	160	400	102	116	174	18	250	210	22.5°	45°	8	95	95	20	—	23.4

A From flange for actuator.
Refer to respective Data Sheet
of actuator
DN Nominal valve size
R Number of holes

1) Flanges to ISO 7005-2