SIEMENS

7637

Hot Air Valves VLF45...

- **Single valve for use in the supply air line of heat generating equipment**
- **Valves used in connection with SKP... actuators open slowly and close rapidly**
- **2-port valves of the normally closed type**
- **DN40...DN80**
- **Driven by electrohydraulic SKP... actuators or electromotoric SQX32... / SQX62... actuators**
- **The valves must be fitted with SKP... / SQX... actuators**
- **Supplementary Data Sheets on actuators (refer to «Use»)**

The VLF45... and this Data Sheet are intended for use by OEMs which integrate the hot air valves in their products!

Use

The hot air valves are designed for use
- with air having a maximum temperature of 450 °C
- primarily as shutoff or control valves in the supply air line of industrial combustion plant with or without heat recovery systems

The valves provide the following functions:
- Shutoff valve (in connection with SKP1...)
- Control valve with shutoff feature (in connection with SKP2..., SKP5... or SKP7...)

All types of VLF45... valves can be combined with any type of SKP... actuator.

Warning notes

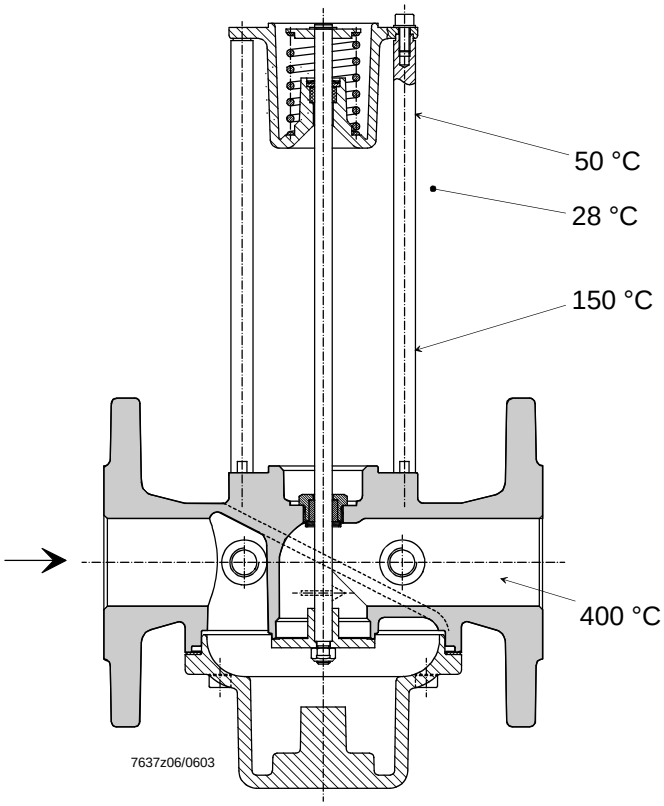
To avoid injury to persons, damage to property or the environment, the following warning notes should be observed!

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 combined with the SQX... actuator, the valves **may** not be used for safety shutoff functions
- Fall or shock can adversely affect the safety functions. Such valves may not be put into operation, even if they do not exhibit any damage
- Medium temperatures ≥ 80 °C:
  The spacers between valve body and spring housing act as heat dissipators and may not be insulated. With higher medium temperatures, fit a mesh or something similar to provide protection against physical contact and possible burns

Example:
The illustration shows the expected temperatures under the following conditions:
– Medium temperature 400 °C
– Ambient temperature 28 °C
– Valve body not insulated and mounted in the vertical position



Engineering notes

Protect the actuator against high temperatures resulting from radiation, for instance, to ensure the actuator's maximum permissible ambient temperatures will not be exceeded.

Mounting notes

- Ensure that the 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 system is under pressure

Sealings

- No sealing materials are required to assemble valve and 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 in the air train in any position. The permissible mounting positions of the associated actuator must be observed, however (refer to the relevant Data Sheet).

Direction of flow

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

Function

Stem retracts → valve opens
Stem extends → valve closes

Installation notes

Air pressure

If the air 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	93 / 23 EEC

ISO 9001: 2000
Cert. 00739

ISO 14001: 1996
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 valves may only be overhauled by Siemens HVAC Repair Centers

Disposal notes

Local and currently valid legislation must be observed.

Mechanical design

The valves can be combined with electrohydraulic SKP... actuators or electromotoric SQX32... / SQX62... actuators plus AGA60 adapter.

The valves are of the normally closed type only when used in connection with SKP... actuators.

Valves with nominal sizes DN40...80 correspond to the standard sizes of single valves (conforming to EN 558).

Plug

Flat, nonprofiled valve plug, metal-to-metal seating.

Closing spring

The spring housing has Teflon bearings. The reset spring is located outside the medium in the spring housing. 4 spacers between valve and spring housing ensure a rigid connection.

Actuators

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

Type reference	Data Sheet	Function
SKP10...	7641	ON / OFF
SKP11...	7641	ON / OFF
SKP13...	7641	ON / OFF
SKP20...	7644	ON / OFF with constant pressure control / zero pressure control
SKP23...	7644	ON / OFF with constant pressure control
SKP27... with SQS27...	7644	ON / OFF with pressure control and electric setpoint adjustment
SKP50...	7648	ON / OFF differential pressure control, signal input → differential pressure
SKP70...	7651	ON / OFF with ratio control, signal input → static pressure
SKL90... (only for air)	7642	ON / OFF with constant pressure control, slow closing 4...6 s
SQX32... with AGA60	4554	Modulating position control
SQX62... with AGA60	4554	Positioning signals DC 0...10 V , 0...1000 Ω or DC 4...20 mA

Type summary (other types of actuators on request)

Valve size	Type reference for medium: (max.) with flanges to ISO 7005 450 °C	Operating pressure (inlet pressure) (max.) mbar	Air flow rate in m³/h at Δp = 1 mbar at		Number of connections [1] [2]		
					Rp ¼		Rp ¾
			20 °C	450 °C	Inlet side	Outlet side	Inlet side
1½"/DN40	VLF45.404	1500	32	50	2	2	---
2"/DN50	VLF45.504	1500	48	75	2	2	---
DN65	VLF45.654	700	77	120	1	1	2
3"/DN80	VLF45.804	700	82	129	1	1	2

[1]) Exclusively for medium inlet and outlet
[2]) If 2 connections, then 1 on each side

Ordering

When ordering, please give type reference.

Please order the actuators as separate items.
Valve and actuator are always supplied unassembled.

Example: VLF45.804
- Hot air valve
- Max. 450 °C
- DN80

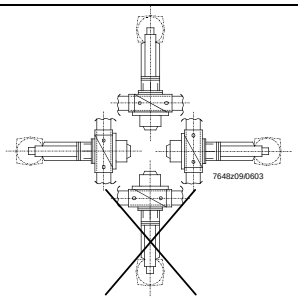
Accessories

Manual adjuster **AGA61**

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

- Consisting of 2 stem parts and a connecting flange

Technical data

General valve data	Perm. medium temperature	
	- VLF45...	-15...+450 °C flange
	For temperatures below 60 °C, VG... valves can be used	(Data Sheet 7641)
	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»
	Leakage rate	
	- Internally at Δp 100 mbar	max. 0.3 m³/h
	- Externally at a medium pressure of 100 mbar	max. 0.7 m³/h
	Stroke	
	- 1½“ / DN40	approx. 16 mm
	- 2“ / DN50	approx. 16 mm
	- DN65	approx. 16 mm
	- 3“ / DN80	approx. 18 mm
Environmental conditions	**Transport**	DIN EN 60 721-3-2
	Climatic conditions	class 2K2
	Mechanical conditions	class 2M2
	Temperature range	-20...+60 °C
	Humidity	< 95 % r.h.
	Operation	DIN EN 60 721-3-3
	Climatic conditions	class 3K5
	Mechanical conditions	class 3M2
	Temperature range	-20...+60 °C
	Humidity	< 95 % r.h.

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

Materials

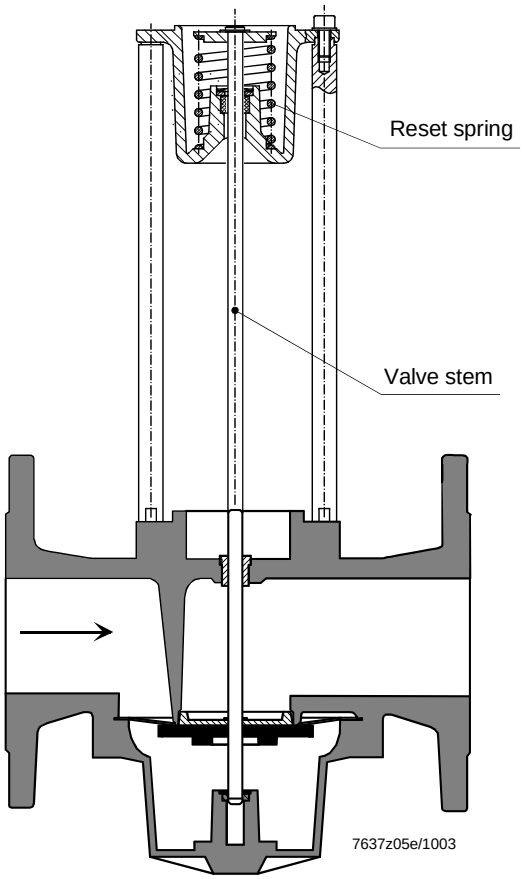
Valve components	VLF45...
Valve body + cover	GG20 cast iron
Plugs	Galvanized steel
Sealing compounds	Metallically tight
Stem	Stainless steel
Stem seal	Graphite bearing
Stem bushing	Stainless steel
Screws	Galvanized steel
Reset spring	Stainless spring steel
External spring housing	Aluminium sand-casting
Spacers	Stainless steel
Safety disk and spring washers	Coated spring steel NiSn
Valve plug	Stainless steel

Function

VLF45...

Functioning principle

Sectional view

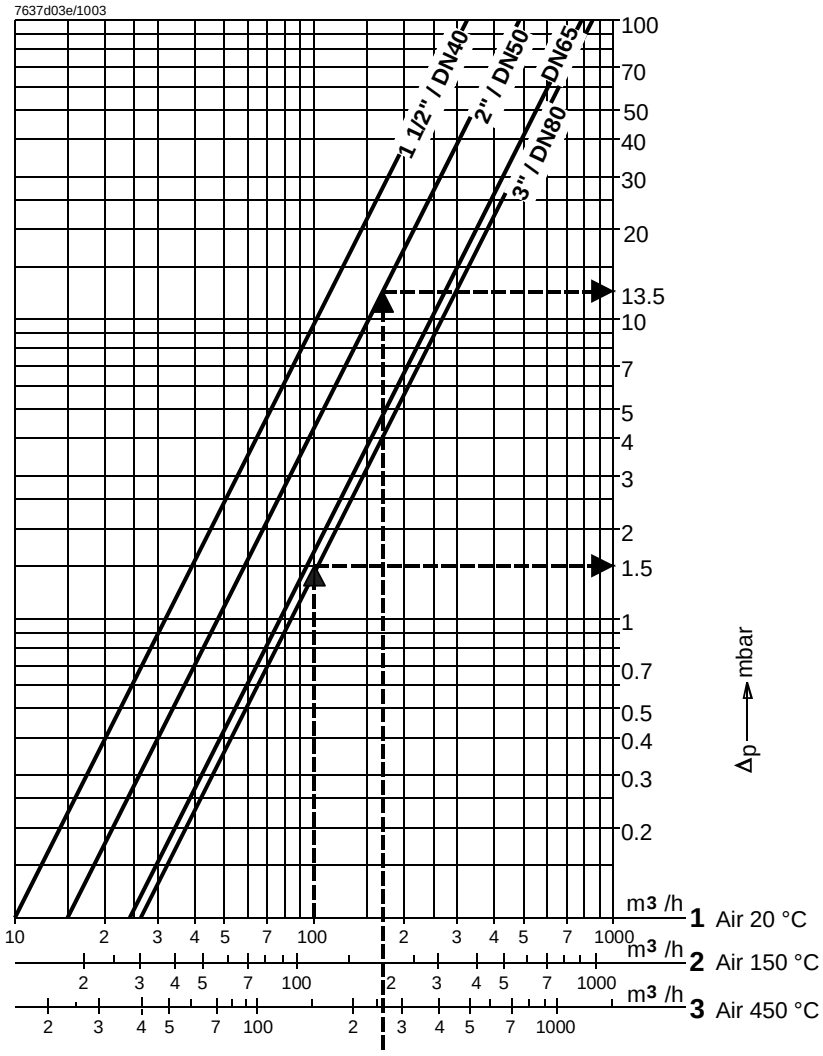


Application example

VLF45..., DN80 complete with SKL90... actuator

Flow chart

Only for fully open valves



Legend

—— Maximum flow (valve fully open)

Valve selection

1. Hot air temperatures of 450 °C

1.1 Determine the hot air volume $\dot{V}_H$ required to supply the burner with the same amount of oxygen that would be needed with air at 20 °C:

$\dot{V}_H = FH \bullet \dot{V}_{20\,°C}$ where $FH = \frac{273 + TH}{293}$

$\dot{V}_H$	(m³ / h)	Hot combustion air volume at the respective hot air temperature
$\dot{V}_{20\,°C}$	(m³ / h)	Combustion volume at 20 °C
TH	(°C)	Hot air temperature
FH	(-)	Factor according to the hot air temperature «TH»

For «TH»	is	«FH»
150 °C		1.5
450 °C		2.5

1.2 Determine pressure drop ∆p
with the help of the flow chart, based on the calculated $\dot{V}_H$ from the relevant hot air volume scale.

Example

Air volume required at 20 °C	100 m³ / h
Air temperature «TH»	450 °C
Corresponding air volume $\dot{V}_H$ at «TH» = **450 °C**	
Air temperature: 2.5 x 100 m³ / h	250 m³ / h
From the flow chart with the help of the scale «Air 450 °C»:	
∆p for a DN50 valve:	13.5 mbar

2. Other hot air temperatures

Using the flow chart, determine the pressure drop ∆p of the air volume at 20 °C. Use the following formula and calculate the pressure drop ∆pH of the air volume at «TH» after it has been heated up to the hot air volume.

Formula:

$\Delta pH = \Delta p\ 20\,°C \cdot \frac{273 + TH}{293}$

∆pH	(mbar)	Pressure drop at the hot air temperature
∆p 20 °C	(mbar)	Pressure drop at 20 °C, using the scale «Air 20 °C» of the flow chart
TH	(°C)	Hot air temperature

Example:

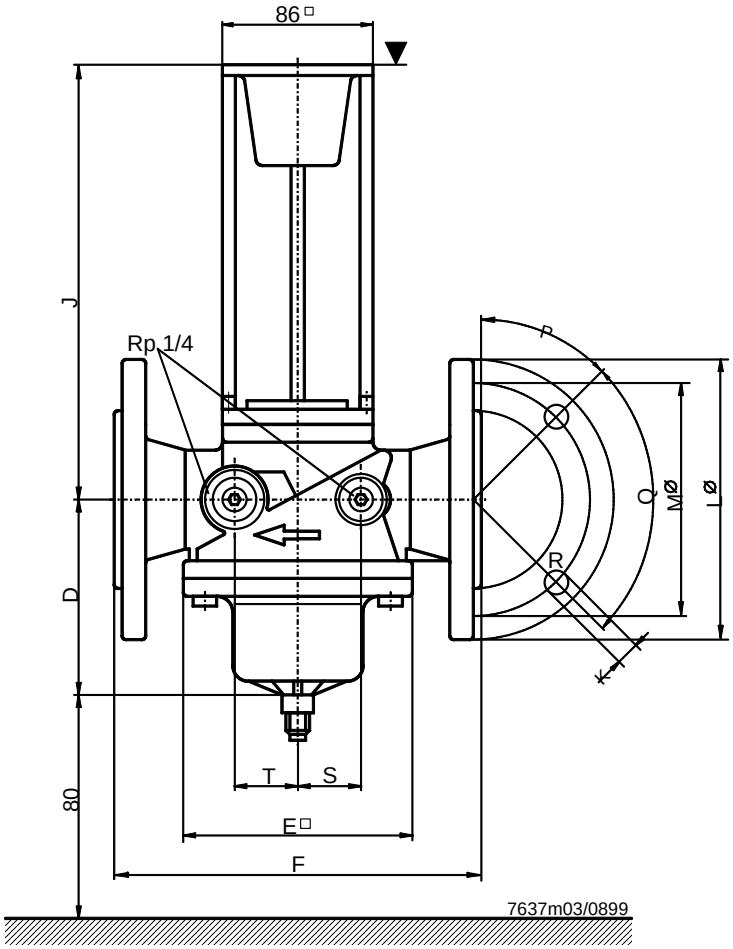
Valve DN80
Volumetric flow at 20 °C = 100 m³ / h
Determine from the flow chart:
∆p 20 °C = 1.5 mbar
Wanted:
Pressure drop at 300 °C to obtain the same mass flow rate as at 20 °C.
Solution:

$\Delta pH = 1.5\ mbar \cdot \frac{273 + 300\,°C}{293} =$ **2.9 mbar**

Dimensions

Dimensions in mm

VLF45... DN40 and DN50



Dimensions in mm

VLF45... DN65 / DN80

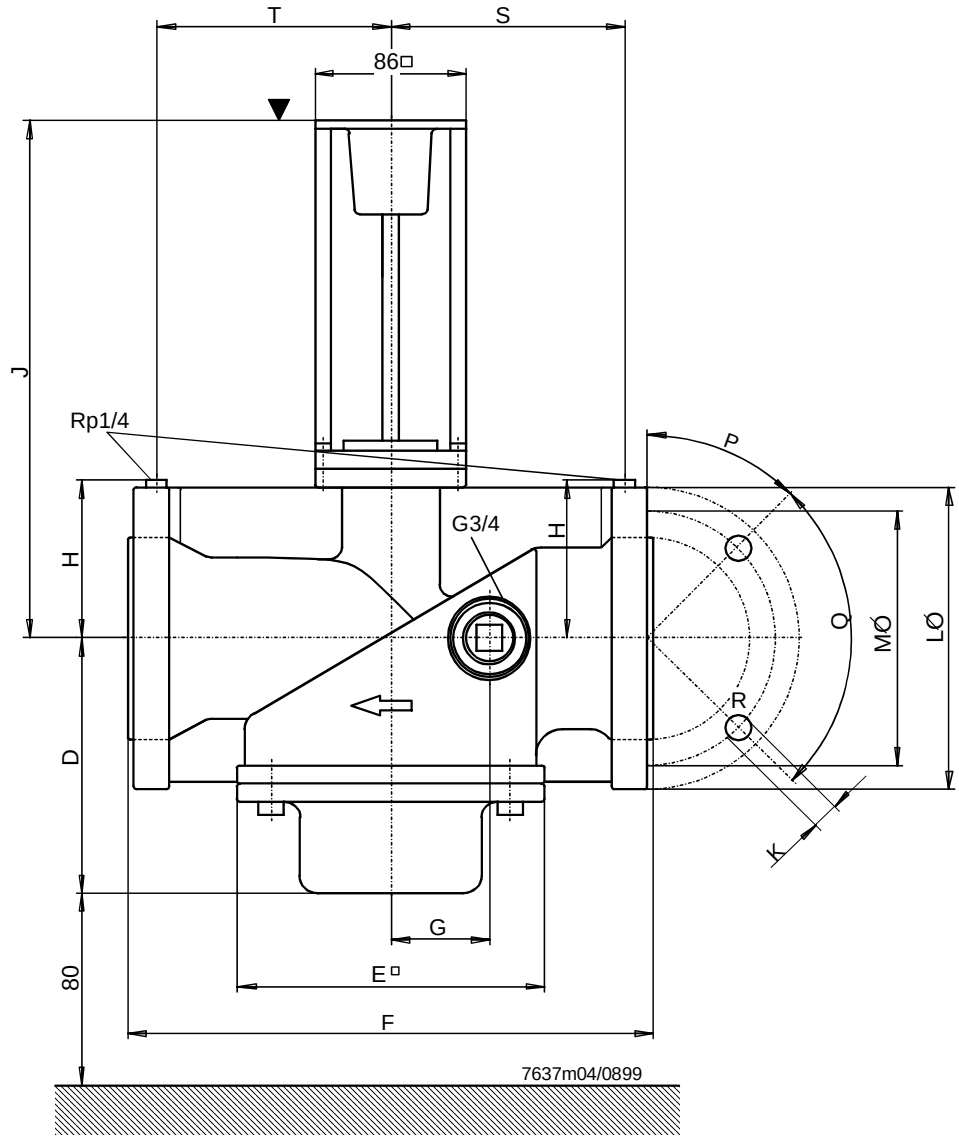


Table of dimensions

Type reference	DN	D	E❑	F	G	H	J	K	LØ	MØ	P	Q	R	S	SW	T	kg
VLF45...	40	102	126	200	---	---	244	19	150	110	45°	90°	4	36	---	36	6
	50	107	126	230	---	---	253	19	165	125	45°	90°	4	42	---	42	7.5
	65	163	185	290	62	95	295	19	185	145	45°	90°	4	108	---	148	20.5
	80	163	185	310	62	102	303	19	200	160	22.5°	45°	8	118	---	158	22

DN Nominal size, dimensions for connection of medium
R Number of boreholes
SW Width across flats
1) Flanges conforming to ISO 7005-2
▼ Mounting surface SKP... / SKL... actuator or AGA60 adapter