



Hot Air Valves

VLF45...

- Single valve for use in the supply air line of heat generating equipment
- Valves used in connection with SKPx5... actuators open slowly and close rapidly
- 2-port valves of the normally closed type
- DN40...DN80
- Driven by electrohydraulic SKPx5... actuators or electromotoric SAX31... actuators
- The valves must be fitted with SKPx5.../SAX31... actuators
- Supplementary Data Sheets on actuators (see 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 SKP15...)
- Control valve with shutoff feature (in connection with SKP25..., SKP55... or SKP75...)

All types of VLF45... valves can be combined with any type of SKPx5... 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!

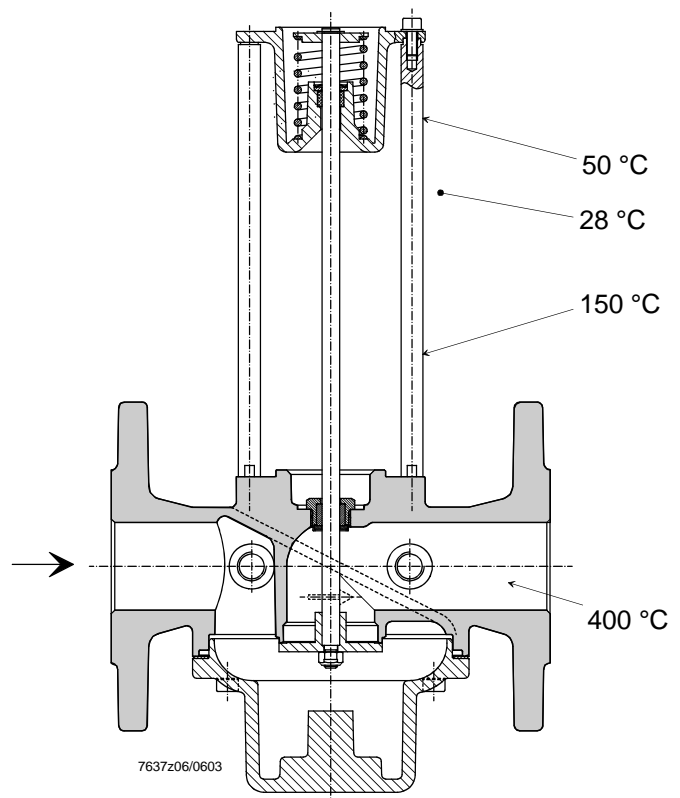
Any opening of the valve, replacement of parts or modifications to the original product is the user's responsibility and is done at his own risk.

- All activities (mounting, installation and service work, etc.) must be performed by qualified staff
- When combined with the SAX31... actuator, the valves **must not** be used for safety shutoff functions
- 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
- Medium temperatures ≥ 80 °C:
The spacers between valve body and spring housing act as heat dissipators and must 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 (see 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



Conformity to EEC directives

- Electromagnetic compatibility EMC (immunity) 2004/108/EC
- Directive for gas appliances 2009/142/EC
- Directive for pressure devices 97/23/EC



ISO 9001: 2008
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 valves may **only** be overhauled by Siemens AG Repair Centers

Disposal notes



Local and currently valid legislation must be observed.

Mechanical design

The valves can be combined with electrohydraulic SKPx5... actuators or electromotoric SAX31... actuators plus AGA60 adapter.

The valves are of the normally closed type only when used in connection with SKPx5... actuators.

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

Plug

Flat, non profiled 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
SKP15...	N7643	ON/OFF
SKP25...	N7643	ON/OFF with constant pressure control/zero pressure control
SKP25.7... with SQS37...	N7643	ON/OFF with pressure control and electric setpoint adjustment
SKP55...	N7643	ON/OFF differential pressure control, signal input → differential pressure
SKP75...	N7643	ON/OFF with ratio control, signal input → static pressure
SKL25... (only for air)	N7643	ON/OFF with constant pressure control, slow closing 4...6 seconds
SAX31... with AGA60	N4501	Modulating position control

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 m ³ /h		Number of connections ¹⁾ ²⁾		
			at $\Delta p = 1$ mbar at 20 °C	at 450 °C	Rp ¼		Rp ¼ Inlet side
			Inlet side	Outlet side			
DN40	VL45.404	1500	32	50	2	2	---
DN50	VL45.504	1500	48	75	2	2	---
DN65	VL45.654	700	77	120	1	1	2
DN80	VL45.804	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 SAX31... actuators

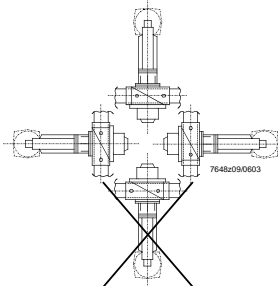


AGA60

- Consisting of 2 stem parts and a connecting flange

Technical data

General valve data	Perm. medium temperature	-15...+450 °C	flange
	- VLF45...		
	For temperatures below 60 °C, VG... valves can be used	(Data Sheet N7641)	
	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
Leakage rate	
- Internally at Δp 100 mbar	Max. 0.3 m ³ /h
- Externally at a medium pressure of 100 mbar	Max. 0.7 m ³ /h
Stroke	
- DN40	Approx. 16 mm
- DN50	Approx. 16 mm
- DN65	Approx. 16 mm
- DN80	Approx. 18 mm

Environmental conditions

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

Materials

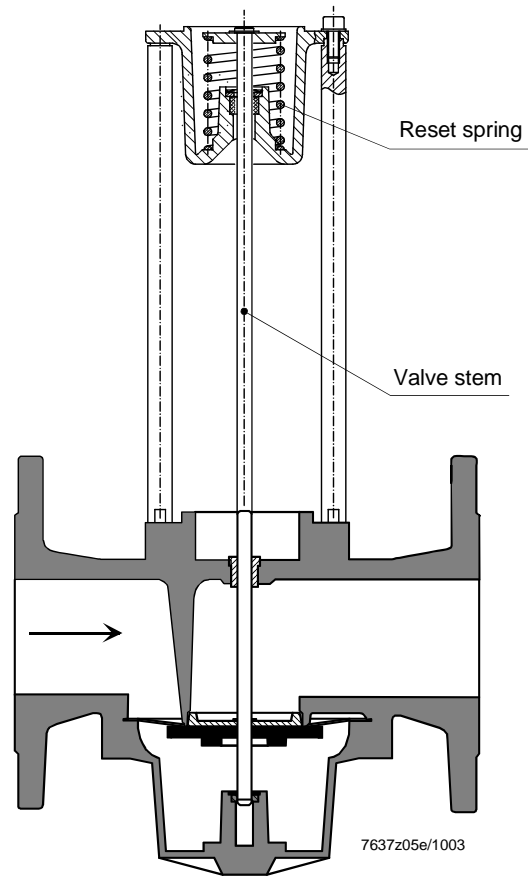
Valve components	VLF45...
Valve body + cover	GG20 cast iron
Plugs	Galvanized steel
Sealing compounds	Metallically tight
Stem	Stainless steel
Stem seal	Graphite bearing
Stem bushing	Stainless steel
Screws	Galvanized steel
Reset spring	Stainless spring steel
External spring housing	Aluminium sand-casting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

Function

VLF45...

Functioning principle

Sectional view



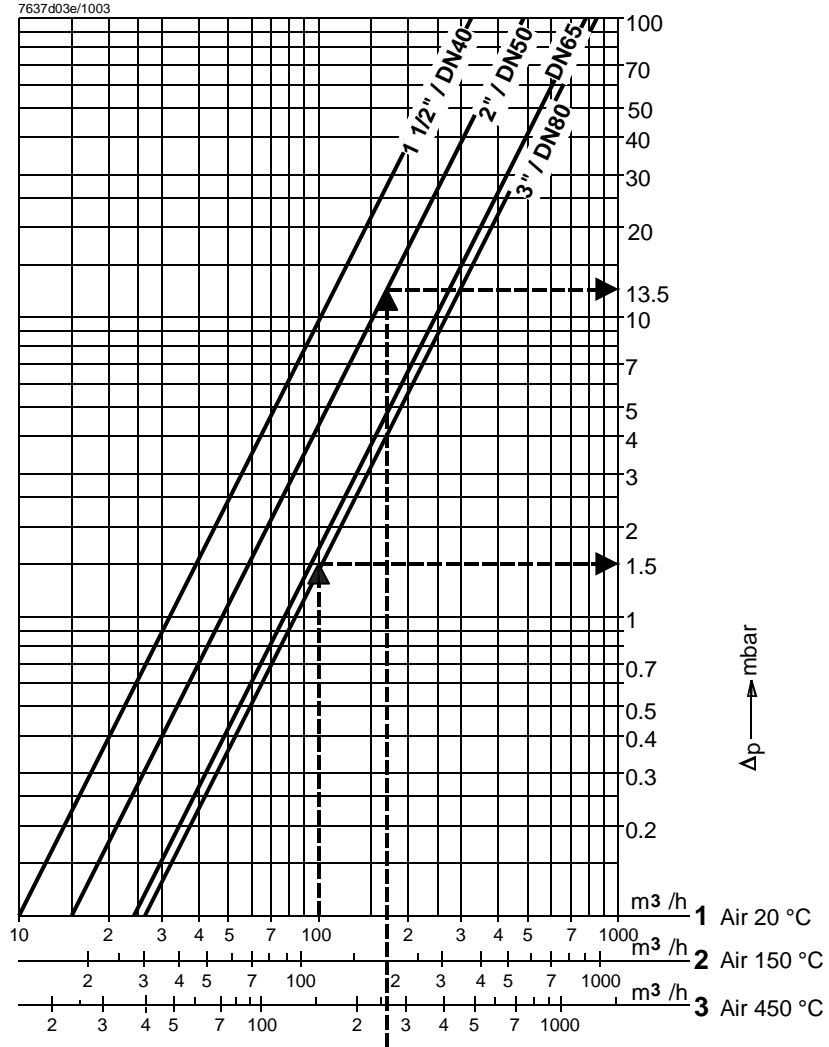
Application example

VLF45..., DN80 complete with SKP25... 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:

$$\dot{V}_H = FH \cdot \dot{V}_{20\text{ °C}} \quad \text{where} \quad FH = \frac{273 + TH}{293}$$

\dot{V}_H (m³/h) Hot combustion air volume at the respective hot air temperature

$\dot{V}_{20\text{ °C}}$ (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 Δp 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 m ³ / h
Air temperature (TH)	450 °C
Corresponding air volume \dot{V}_H at TH = 450 °C	
Air temperature: 2.5 x 100 m ³ /h	250 m ³ / h
From the flow chart with the help of the scale Air 450 °C :	
Δp for a DN50 valve:	13.5 mbar

2. Other hot air temperatures

Using the flow chart, determine the pressure drop $\Delta p_{20\text{ °C}}$ of the air volume at 20 °C.

Use the following formula and calculate the pressure drop Δp_H of the air volume at TH after it has been heated up to the hot air volume.

Formula:

$$\Delta p_H = \Delta p_{20\text{ °C}} \cdot \frac{273 + TH}{293}$$

Δp_H (mbar) Pressure drop at the hot air temperature

$\Delta p_{20\text{ °C}}$ (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:

$\Delta p_{20\text{ °C}} = 1.5\text{ mbar}$

Wanted:

Pressure drop at 300 °C to obtain the same mass flow rate as at 20 °C.

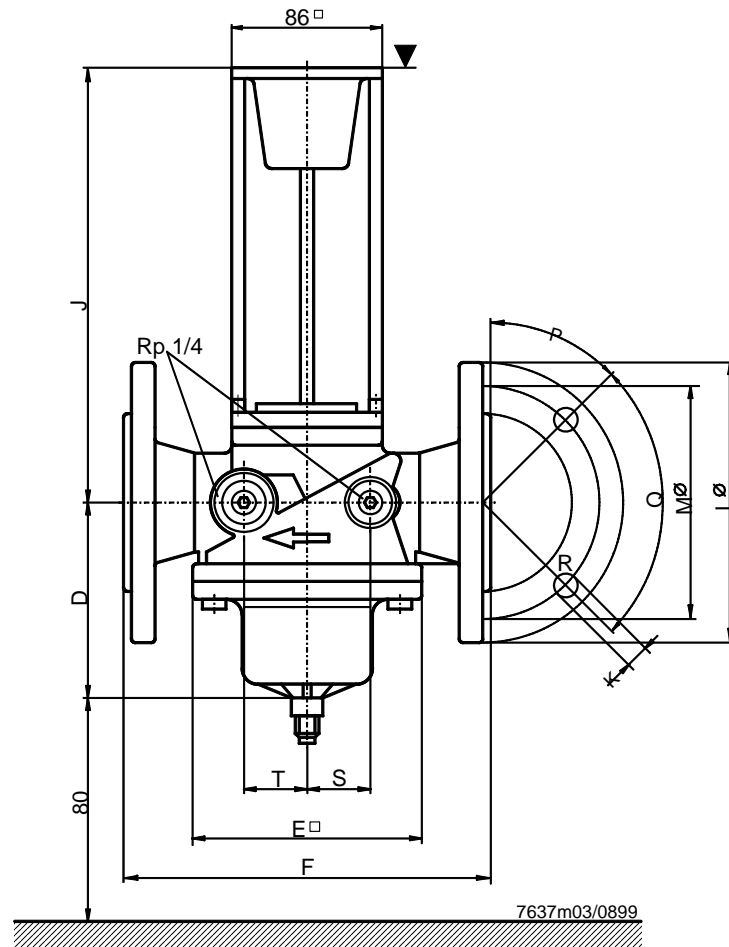
Solution:

$$\Delta p_H = 1.5\text{ mbar} \cdot \frac{273 + 300\text{ °C}}{293} = 2.9\text{ mbar}$$

Dimensions

Dimensions in mm

VL45... DN40 and DN50



Dimensions (cont'd)

Dimensions in mm

VLF45... DN65/DN80

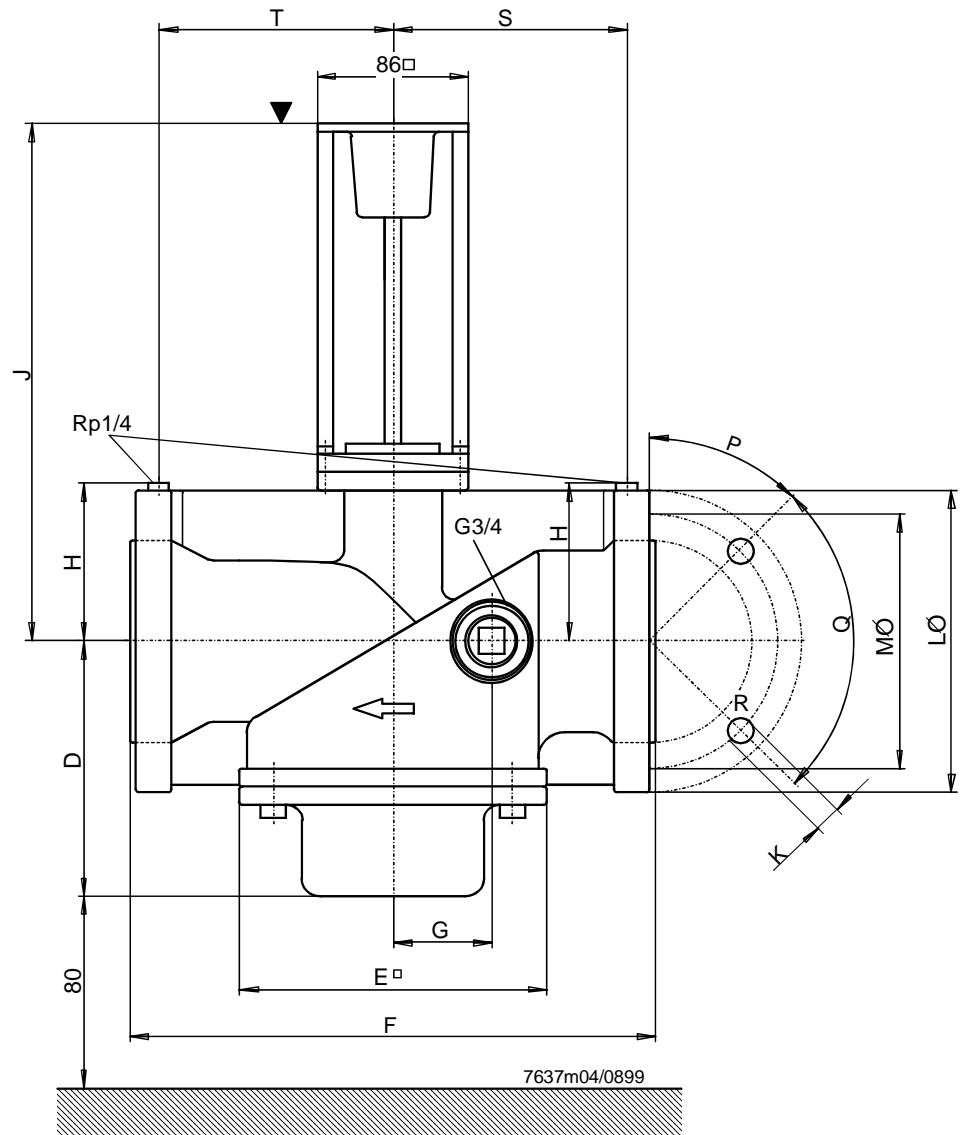


Table of dimensions

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 SKPx5.../SKLx5... actuator or AGA60 adapter