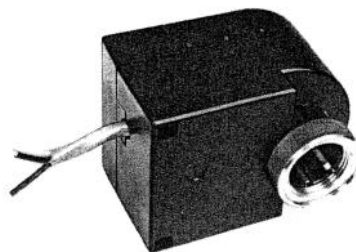


Gas Pressure Governor
with motorised setpoint adjuster

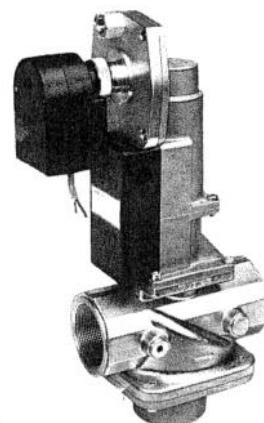
SKP27
SQS27



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



SQS27



SKP27/SQS27

Description

- Electro-hydraulically actuated gas pressure governor
- with motorised setpoint adjuster controlled by an electric 3-position controller
- with mechanical minimum and maximum pressure limitation
- with integrated safety shut-off function to BSI 5963
- with auxiliary switch and/or potentiometer (optional)

Combined gas pressure governor unit consisting of

- valve type VG...
- electro-hydraulic actuator type SKP27 with integrated gas pressure governor
- electro-mechanical motor type SQS27 for setpoint adjustment, with limit switch and/or potentiometer as an optional accessory

Application

Modulating or stepwise control of gas fired heat generating equipment that operates with sufficient excess air, such as

- natural draught burners
- stationary direct fired air heaters
- industrial furnaces
- For influencing the gas/air ratio in burners with fixed compound control, e.g. in connection with O₂ trim control

The combined valve provides the functions of

- gas pressure governor
- safety shut-off valve, and
- gas volume regulating unit (control valve or flap)

Suitable media

- Gases of gas families I, II and III
- Air

Maximum operating pressure 300 mbar – 1200 mbar (depending on size)

Setpoint setting range of outlet pressure 0,5...300 mbar

Design Features

The complete gas pressure governor consists of

valve

Refer to «Summary of Types» and

valve actuator with gas pressure governor, type SKP27.

The unit is of the same basic design as the SKP20 described in Data Sheet 7641, but featuring the following differences:

The governor of the SKP27

- is supplied with 2 setpoint springs
- permits mounting of the motorised setpoint adjuster

SQS27 motorised setpoint adjuster

Maintenance-free electric motor in plastic casing with connecting cable readily wired. The stroke is produced through the rotation of a threaded spindle which is driven back and forth by a synchronous motor with gear train. All gear wheels are made of plastic.

To provide position indication, the end of the threaded spindle protrudes through the casing. When the spindle is retracted, the setpoint is high, and vice versa. The motor can also be operated manually using an Allen key.

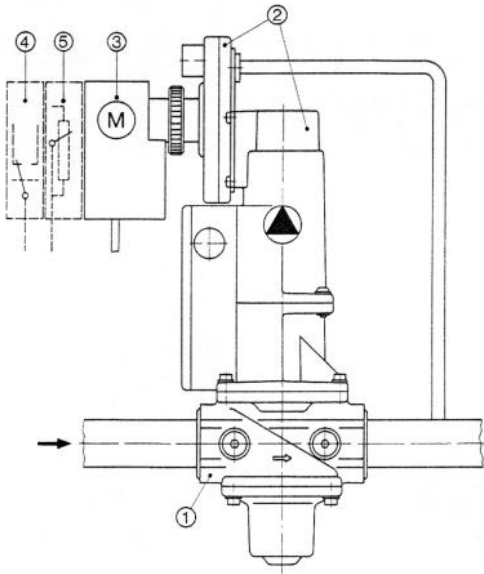
Accessories

The setpoint adjuster can be provided with a **limit switch** and/or a **potentiometer**. Both are supplied separately. The limit switch and the potentiometer are accommodated in a plastic casing suitable for the setpoint adjuster, with ready wired connecting cables.

The setpoint adjuster, the limit switch and the potentiometer are designed to comply with protection standard IP40. If IP54 is required, all three units can be covered with a hood attached to the controller part of the valve actuator. See «Dimensions». This complies with protection standard IP54. The plastic hood has an aluminium baseplate.

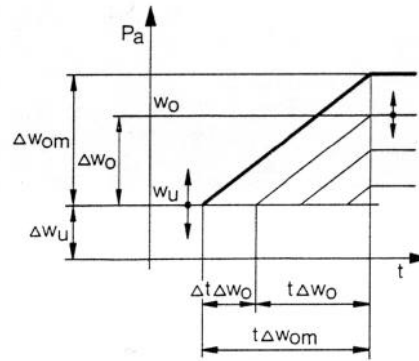
Function

Basic design



- 1 Valve
- 2 Electro-hydraulic actuator with integrated gas pressure governor
- 3 Motorised setpoint adjuster
- 4 Limit switch (accessory)
- 5 Potentiometer (accessory)

Function diagram



p_a	Outlet pressure
w_o	Maximum limitation of setpoint
w_u	Minimum limitation of setpoint
Δw_o	Upper setpoint setting range, adjustable
Δw_{om}	Maximum upper setpoint setting range
Δw_u	Lower setpoint limiting range, adjustable
t	Time
$t\Delta w_{om}$	Operating time with maximum setpoint setting range
$t\Delta w_o$	Operating time according to setpoint setting range

$$t\Delta w_o = \frac{\Delta w_o}{\Delta w_{om}} \cdot t\Delta w_{om}$$

Function

Gas pressure governor

The gas pressure governor maintains the gas pressure at the outlet side of the valve at a constant level, depending on the adjusted setpoint. When an appropriate electric signal is supplied to the motorised setpoint adjuster, the setpoint changes

- in proportion to the duration of the electric pulse
- rising or falling, depending on the direction of the signal

When the adjusted maximum or minimum setpoint is reached, the outlet pressure remains constant.

The time required to pass through the upper setpoint setting range Δw_o is the same for both directions. When the upper setpoint setting range Δw_o changes, the operating time $t\Delta w_o$ required to pass through it changes proportionally. At the minimum setpoint limitation w_u , the motorised setpoint adjuster runs idle during the period of time $\Delta t\Delta w_o$. This time span or part of it can therefore occur as dead time.

Limit switch type ASC...

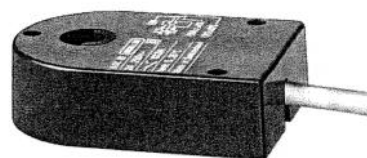
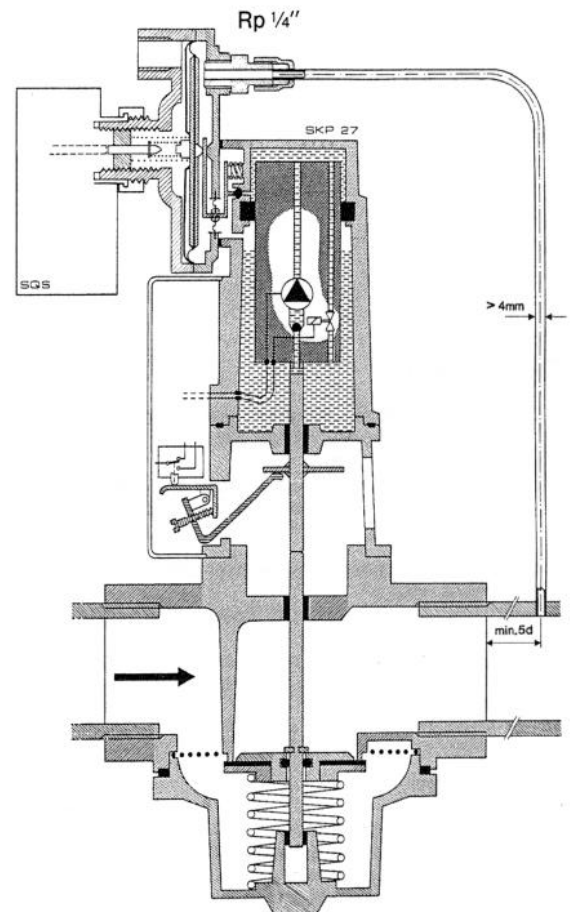
The changeover switch is actuated when the setpoint adjuster is fully retracted, i.e. the white adjuster spindle is at the height of mark 0.

Note: This position corresponds to low-fire after elapse of the operating time $\Delta t\Delta w_{om}$, i.e. after a possible dead time of $\Delta t\Delta w_o$ has elapsed. See function diagram.

Potentiometer ASZ...

The resistance is tapped from 2 output wires. Its value is proportional to the position of the adjuster spindle, and thus to the position of the setpoint adjuster. The resistance must be connected to a wiring combination appropriate to the change in the setpoint (increasing or decreasing).

Note: The nominal resistance range R_N relates to the maximum possible upper setpoint range. When the setpoint range is small, the resistance changes during the dead time $\Delta t\Delta w_o$, although the setpoint value remains constant. A proportionality between setpoint value and resistance occurs only in the upper setpoint range Δw_o . See function diagram.



ASC81
ASZ81.1

Summary of Types

Valves

Identical with the valves used with the SKP20. **All information given on the valves in Data Sheet 7641** such as

- available types of valves
- design features
- technical data
- dimensions and weights
- flow charts
- minimum flow required, and
- service replacement sets

is also valid when used together with the SKP27.

If the actuators are used with non LG valves, it must be ensured that a maximum stroke of 18 mm will not be exceeded. In every case, a mechanical stop must be provided.

Valve actuators

- without auxiliary switch **220 - 240 V SKP27.110C27**
- with auxiliary switch **100 - 110 V SKP27.111C27 SKP27.111C17**

Setpoint ranges in mbar
(see «Function»)
Tolerances $\pm 10\%$
 Δw_u Δw_o

Valve actuator supplied ex works with 0,5...4,0 0...18

Set value ranges other than the standard range can be obtained by changing the springs. Each SKP27 is supplied complete with a plastic bag containing 7 additional springs:

— For the upper setpoint setting range Δw_o :

Colour of spring	Dia. mm	Setpoint setting range mbar $\pm 15\%$
White	7,0	0...10
Black	7,0 mm	0...18
Red	7,5	0...45
Green	8,0	0...90

— For the lower setpoint setting range Δw_u :

Colour of spring	Dia. mm	Setpoint setting range mbar $\pm 15\%$
Black	12,0 mm	0,5...4,0
Green	12,5	2...15
Blue	13,0	10...30
Yellow	12,5	15...120
Red	12,5	100...250

All combinations between Δw_u and Δw_o are possible. Springs for Δw_u cannot be replaced by those for Δw_o and vice versa.

The max. permissible outlet pressure must not be exceeded (refer to «Technical Data»)

Motorised setpoint adjuster

220 V...240 V a.c., reversible, for modulating control, controllable by a 3-position controller, max. operating time $t\Delta w_{om}$ 75 s

220 - 240 V **SQS27.700A27** 100 - 110 V **SQS27.700A17**

Limit switch

For use with SQS27

ASC81

Potentiometer

For use with SQS27

ASZ81.1

Hood

for covering the set point adjuster, limit switch and potentiometer, for versions with protection standard IP54

AGA27

Ordering Specification

A complete gas pressure governor is comprised of valve, valve actuator and motorised setpoint adjuster. All items are to be ordered separately. The assembly is very straightforward and made by the user.

When ordering, please give the type references:

E.g. gas pressure governor without auxiliary switch, with electrically adjustable setpoint, and with limit switch for motorised setpoint adjuster and hood for IP54:

- **SKP27.110C27**
- **SQS27.700A27**

- **Valve** (according to Data Sheet 7641)
- **ASC81**
- **AGA27**

Technical Data

Valves

Refer to «Summary of Types»

Valve actuator

Electro-hydraulic actuator
Operating voltage

220 V -15% ...240 V $+10\%$
100 V -15% ...110 V $+10\%$
50 Hz -6% ... 60 Hz $+6\%$
9...13,5 VA
100%

Frequency
Power consumption
On time

Switching capacity of auxiliary switch
Setting range of auxiliary switch
Opening time for full stroke

6(2) A, 250 V a.c.
4...96% of stroke
7...14 s, depending on nominal size

Closing time
Cable entry
Protection standard
Mounting position

< 1 s
2 knock-out holes for Pg11
IP54
optional, but always with **diaphragms in a vertical position and, with valves DN65 (2½") and larger, actuator never in a suspended position!**
Note: when governor is inclined 30 to 60° \angle , the dead time may increase to 1 s!

Permissible ambient temperature

0...+60°C (permitted down to -15°C , but opening times will increase)

Weight

1,65 kg including governor

Gas pressure governor (part of valve actuator)

Control group
Vent pipe

III to DIN 3392
not required for inlet pressures up to 100 mbar (to DIN)

Upper setpoint range Δw_o
Lower setpoint limiting range Δw_u

See «Summary of Types» under «Valve Actuators»
same as valves

Max. inlet pressure
Max. permissible outlet pressure
Permiss. test pressure
Permiss. negative pressure
Impulse pipe connection
Min. inner dia. of impulse pipe
Recommended minimum distance between impulse pipe connection and gas valve

300 mbar
1000 mbar
200 mbar
internally threaded Rp1/4"
6 mm
5 x nominal size of valve

Motorised setpoint adjuster

Operating voltage
(control voltage)

220 V -15% ...240 V $+10\%$
100 V -15% ...110 V $+10\%$
50 Hz -6% ... 60 Hz $+6\%$
1,3 VA

Frequency
Power consumption
Permissible ambient temperature
Protection standard
Insulation class
Max. running time $\Delta t\Delta w_{om}$
Connecting cable
Weight

-10°C ...+60°C
IP40 to DIN 40050 (see AGA27)
III to VDE 0631
refer to «Summary of Types»
1,5 m long
310 g

Limit switch

Operating voltage
Frequency
Rating
Permissible ambient temperature
Protection standard

24 V...250 V
50...60 Hz
10(3)A, 250 V
0...+35°C
IP40 (see AGA27)

Potentiometer

Nominal resistance calibration R_N
Accuracy of the limit positions
Max. load
Permissible ambient temperature
Protection standard

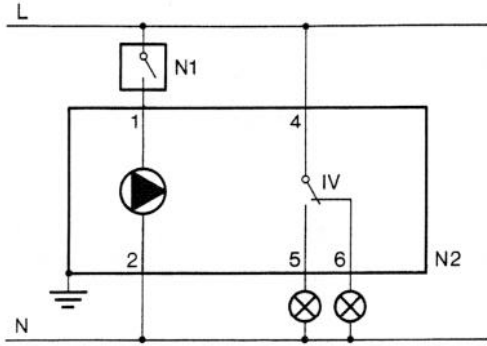
0...1000 Ohms
 $-0/+10$... $-10/+0$ Ohms
1,5 VA
 -15° ...+60°
IP40 (see AGA27)

Commissioning Advice

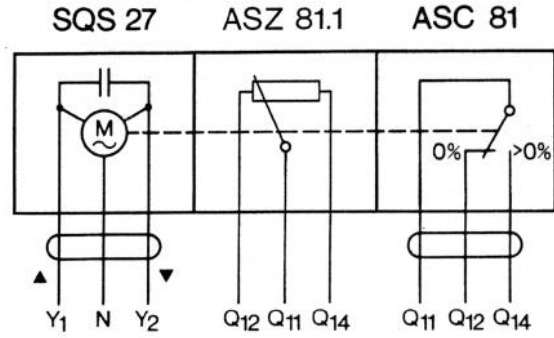
The position of the end of the spindle is an indication of the setpoint correction:

- Spindle fully extended (to the height of mark 0): setpoint at lower limit
- Spindle fully retracted (to the height of mark I): setpoint at upper limit

Wiring Diagram and Internal Diagram



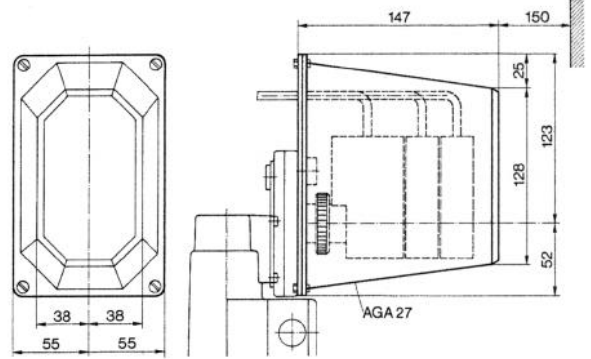
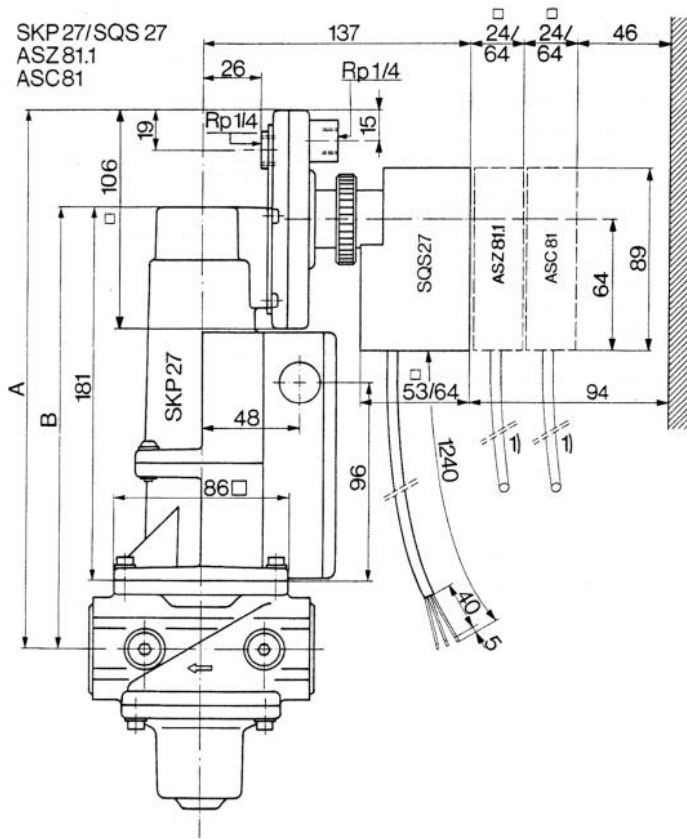
IV Adjustable, refer to «Technical Data» (only for versions with auxiliary switch, refer to «Summary of Types»)
 N1 Controller, switch, ...
 N2 SKP27
 N Neutral
 L Live



Voltage at
 Y₁ (brown) Setpoint increases
 Y₂ (black) Setpoint decreases
 N (blue) Neutral wire

ASZ81.1 and ASC81 are shown with voltage on Y₂, i.e. the end of the white spindle is at the height of mark 0.

Dimensions



¹⁾ Same cable as SQS27
 A, B see Data Sheet 7641