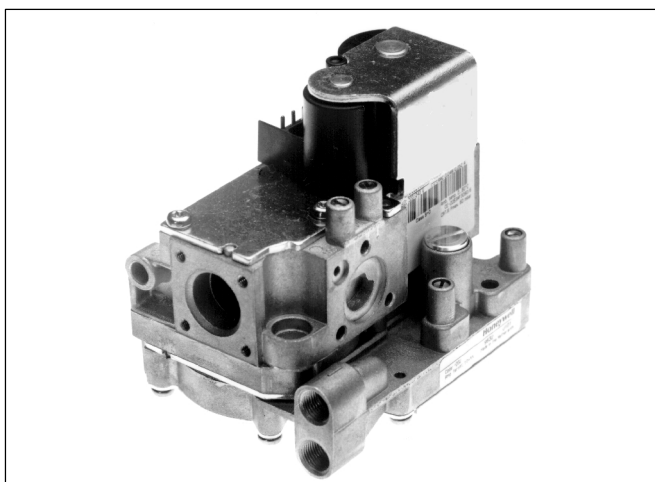


VK41..R/VK81..R series

GAS CONTROLS WITH INTEGRATED GAS/AIR MODULE FOR COMBINED VALVE AND IGNITION SYSTEM

INSTRUCTION SHEET



APPLICATION

The VK41..R/VK81..R series gas controls with integrated gas/air module have been developed for application in domestic appliances with premix or atmospheric burners and automatic ignition.

The gas/air module is designed to amplify and modulate the outlet gas pressure by means of a pneumatic link between the gas and air flow by using the air pressure difference.

For this system, the VK41..R series gas controls have been designed to have the S4565 series ignition control attached directly onto the valve.

The combined system then provides programmed safe light up, flame supervision and regulation of gas flow to the main burner of the appliance.

The VK41..R/VK81..R series are used in a system context in conjunction with fan control and a direct spark ignition (DBI) control.

The VK41..R/VK81..R series are approved in accordance with European standards.

DESCRIPTION

VK41..R/VK81..R combined gas controls perform all the functions required to safely regulate gas flow to the main burner of domestic central heating equipment, warm air furnaces, back boilers and water heaters.

VK41..R/VK81..R combined gas controls hold a first electric on/off direct operator for opening the safety valve of class A or class B according to EN161 and a second electric on/off servo operator of class B or class C to EN 161.

VK41..R/VK81..R combined gas controls comply with the additional requirement for class J valves according to EN 161.

The pressure regulator is in accordance with class B requirement of EN 88.

VK41..R/VK81..R combined gas controls can handle the three gas families, manufactured gas, natural gas and LP gas.

SPECIFICATIONS

Models

VK41.. series: line voltage, two automatic shut off valves for direct spark ignition (DBI) or hot surface ignition (HSI) applications.

VK81.. series: low voltage, two automatic shut off valves for direct spark ignition (DBI) or hot surface ignition (HSI) applications.

Suffix letter

R: fast opening, with integrated gas/air module

Pipe connection

Straight or elbow flanges.

Torsion and bending stress according to EN 126 group 2

Ambient temperature

0 ... 60 °C for combined valve and ignition control

0 ... 70 °C for stand alone valve

Dimensions

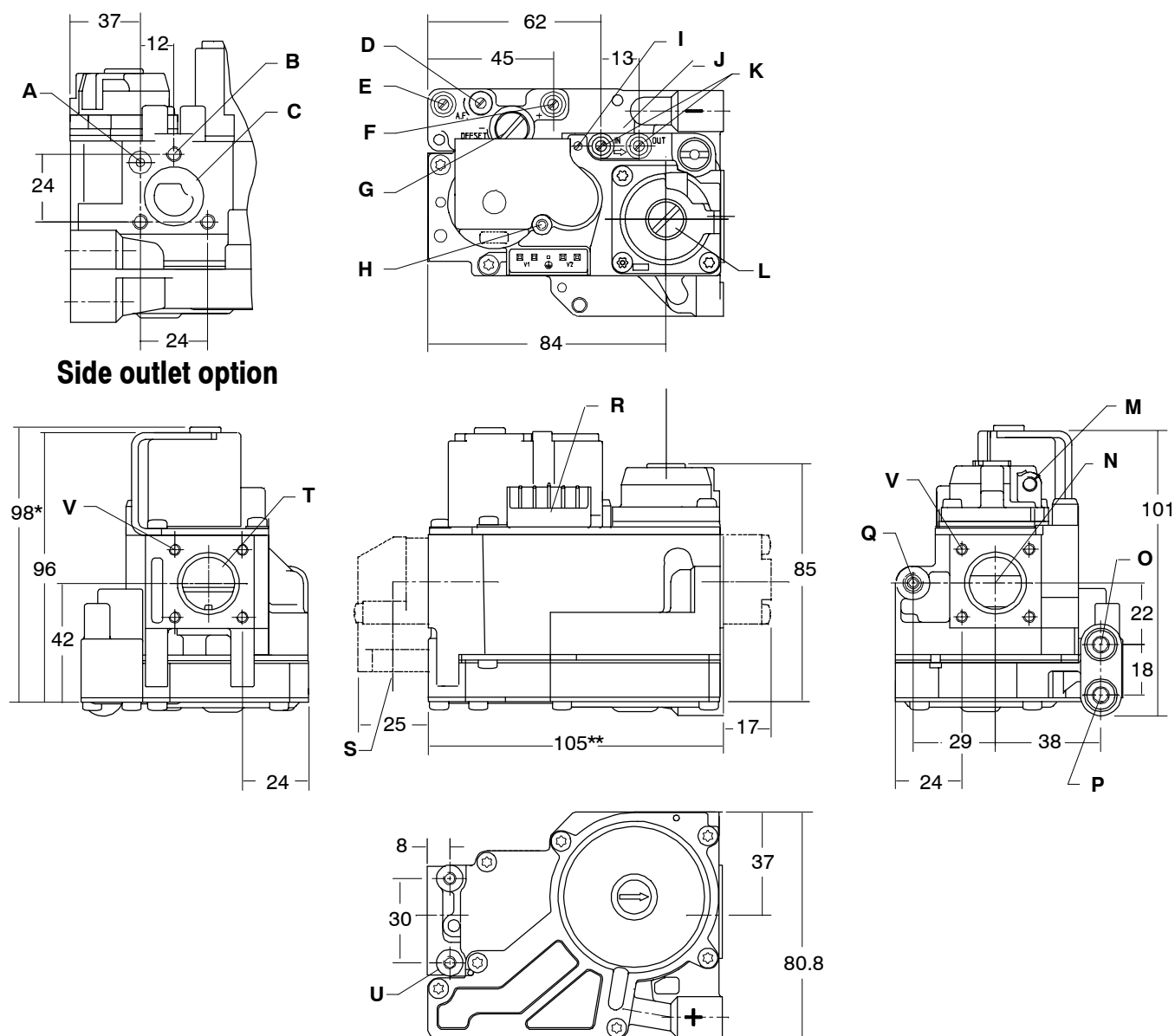
See fig. 1.

Pressure regulation function

Class B according to EN 88

Air pressure connections

M11 x 1



* For 220 V DBI only

** 115 mm for threaded body

- A - Side pilot outlet (optional) "O"-ring \varnothing 4.47 x \varnothing 1.78 mm
- B - M5 x 0.8 (3) 6 mm full thread
- C - "O"-ring \varnothing 15.55 x \varnothing 2.62 mm
- D - Ratio adjustment (optional)
- E - Pressure tap air pressure low 9 mm outer diameter
- F - Pressure tap air pressure High 9 mm outer diameter
- G - Offset offset adjustment screw
- H - Hole \varnothing 2.6 mm to connect ignition controller
- I - Minimum pressure adjustment (optional)
- J - Side outlet
- K - Pressure tap gas pressure (2) 9 mm outer diameter

- L - Maximum pressure regulator (optional)
- M - M5 x 0.8 pressure feedback connection
- N - Outlet \varnothing 18 mm or $\frac{1}{2}$ " ISO 7-1 thread
- O - Air pressure connection low M11 x 1
- P - Air pressure connection high M11 x 1
- Q - M8 x 1 pilot outlet for 4 mm tubing
- R - Molex 1.1 square pin header
- S - Flange thread $\frac{3}{8}$ " or $\frac{1}{2}$ " ISO 7-1 thread
- T - Inlet \varnothing 18 mm or $\frac{1}{2}$ " ISO 7-1 thread
- U - Mounting hole M5 x (2) for tapping screws 3.9 DIN 7990
- V - M4 x 0.7 (4) 6.5 mm full thread

Fig. 1. Adjustment points and dimensions

Amplification factor (A) (see fig. 2.)

The amplification factor (A) is defined with the positive air signal connected to the gas/air module.

With a negative air signal the amplification factor is 1.0 lower (e.g. 2.5 ... 4 instead of 3.5 ... 5)

Formula:

$$\text{Amplification factor (A)} = \frac{P_{\text{outlet 2}} - P_{\text{outlet 1}}}{P_{\text{air high 2}} - P_{\text{air high 1}}}$$

Definitions:

Pressure drop across air restriction = $P_{\text{air high}} - P_{\text{ambient}}$

Pressure drop across gas injector = $P_{\text{outlet}} - P_{\text{ambient}}$

$P_{\text{air high}}$ = air pressure connected on the positive air side.

P_{ambient} = atmospheric pressure (mbar)

$P_{\text{air high 1}}$ = air pressure at which the offset is factory adjusted (depending on O.S. number).

$P_{\text{air high 2}} = P_{\text{air high 1}} + 1 \text{ mbar}$

$P_{\text{outlet 1}}$ = outlet pressure at $P_{\text{air high 1}}$

$P_{\text{outlet 2}}$ = outlet pressure at $P_{\text{air high 2}}$

Fixed amplification (depending on O.S. number)

As specified between 5 and 25 mbar/mbar

Adjustable amplification

The adjustable amplification factor can be adjusted until -30% from the nominal amplification factor.

The air pressure difference measured on the pressure taps of the module is reduced with the same factor as the amplification factor is reduced compared with the actual air pressure difference.

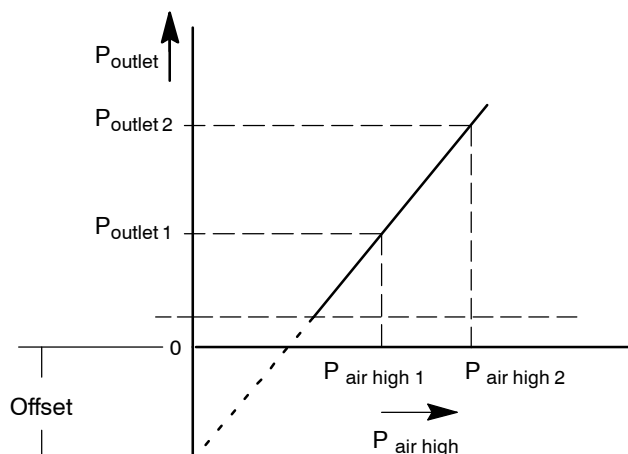


Fig. 2.

Table 1. Adjustable amplification factor

Amplification factor		Minimum outlet pressure (mbar)
Range	Nominal	
3.5 ... 5	5	1.5
7 ... 10	10	2.5
10.5 ... 15	15	3.5
17.5 ... 25	25	5.5

Outlet pressure (P_o)

Outlet pressure is pressure drop across the main burner orifice.

Air pressure difference

$P_{\text{air, high}} - P_{\text{air, low}}$

Offset

Offset = $P_o - P_{\text{air, high}} \times A$

Offset range

-0.5 x A ... 0.0 x A mbar (depending on O.S. number)

Outlet pressure range

(0.2 x A + 0.5) ... 50 mbar

The minimum outlet pressure (0.2 x A + 0.5) is corresponding with a typical accuracy of $\pm 10\%$ of outlet pressure.

(Depending on O.S. number)

Minimum outlet pressure range

See table 1.

Maximum inlet pressure

60 mbar

Air pressure limitation

-10 ... +10 mbar

Minimum regulation capacity

0.31 m³/h air at 1.5 mbar outlet pressure

Maximum outlet pressure adjustment

The maximum outlet pressure adjustment is an optional feature and the adjusting is depending on O.S. number.

Maximum operating gas pressure

The P_{max} 60 mbar indication on the housing is the maximum inlet pressure at which the combination gas control functions safely.

Capacity

3.4 m³/h air at $\Delta p = 3 \text{ mbar}$

Curves are available on request.

Timing

Closing time: $\leq 1 \text{ s}$

Opening time: $\leq 1 \text{ s}$ from start of flow till outlet pressure is 1 mbar.

Mounting holes

Two mounting holes at the bottom for thread forming screws.

Valve classification

Type	Class	
	1 st valve	2 nd valve
VK4105 VK8105	Class B	Class J
VK4115 VK8115	Class B	Class C
VK4135 VK8135	Class A	Class J
VK4145 VK8145	Class A	Class C

Electrical data

Coil indication	Supply voltage
220/240 V RAC	220 V, 50 Hz using rectifier 240 V, 50 Hz using rectifier
24 V RAC	24 V, 50 Hz using rectifier

Electrical connection

For **stand alone AC** applications in **direct burner ignition** applications a plug with rectifier circuit (order number 45.900.441-) has to be used.

IMPORTANT

Warranty claims are not accepted if not the specified plug/rectifier circuit is used.

Current and power consumption

Nominal voltage	Current at nominal voltage (mA)		Power consumption at nominal voltage (W)	
	1 st operator	1 st + 2 nd operator	1 st operator	1 st + 2 nd operator
DBI system				
220 V, 50 Hz	--	48	--	9.4
240 V, 50 Hz	--	52	--	11.2
24 V, 50 Hz	--	420	--	9.0
IP system				
220 V, 50 Hz	46	24	9.1	4.8
240 V, 50 Hz	50	26	10.9	5.7
24 V, 50 Hz	343	159	8.2	3.8

INSTALLATION

IMPORTANT

Take care that installer is a trained experienced service man.

Turn off gas supply before starting installation.

Disconnect power supply to prevent electrical shock and/or equipment damage.

Do not remove seals over inlet and outlet until the device is ready to be installed.

If M5 air pressure connection is not to be used, it is recommended to push a dust cap (order nr. 45.900.426-001) into the hole.

Mounting position

The gas control can be mounted 0 to 90° in any direction from the upright position, i.e. from the position when coil is on top.

When mounted in 90° from the upright position a deviation of more than 3° can result in an unacceptable deviation of gas pressure.

At least one of the air connections must be made with a metal tube with an outside diameter of 6 mm.

To prevent blockage due to condensation, the positive air pressure connection should not be connected to combustion products.

To mount threaded pipe or flanges

- Take care that dirt cannot enter the gas control during handling.
- Use a sound taper fitting with thread according to ISO 7-1 or a piece of new, properly reamed pipe, free from swarf.

Enclosure

IP 40

Accessories

Hose socket for silicone tube with 5 mm inner diameter.

Order number 45.900.402-030

Compression fitting for metal tubing with 6 mm outer diameter

Order number 45.900.402-002

Rectifier

Order number 45.900.411-

- Do not thread or tighten the pipe or pipe fitting too far (see table below). Otherwise flange distortion could result.

Pipe size (inch)	Effective length of pipe thread (mm)
3/8	10
1/2	13

- Apply a moderate amount of good quality thread compound to the pipe or fitting only, leaving the two end threads bare. If permitted by local safety regulations, PTFE tape may be used as an alternative.
- Tighten the pipe to the gas control or flange.
- Install the flange to the gas control afterwards.
- Ensure the "O" ring is properly placed in the groove of the flange.
- Ensure the gas flows in the same direction as the arrow on the bottom of the gas control.

Air pressure connections

The air pressure difference must be connected to the two air pressure connections O (+) and P (-). See fig. 1.

Electrical connections

IMPORTANT

Disconnect power supply to prevent electrical shock and/or equipment damage.

Wiring must be in accordance with local regulations.

The appliance manufacturer's instructions should always be followed.

Before installing or replacing any control check that type number is correct for the application.

Ensure combustion chamber is free of gas before start up.

Conduct a thorough check out when installation is completed.

At the first start the ignition controller can be in lock out; depress reset button to free control.

Tightness test after installation

- Apply an approved liquid leak detector to all pipe connections.
- Start the appliance and check for bubbles. If a leak is found in a pipe connection, remake the joint. A gasket leak can usually be stopped by tightening the mounting screws. Otherwise, replace the gasket.
- Be careful not to clog bleed vent parts with liquid leak detector residue. Remember bleed vents will discharge air during gas valve opening or closing giving false indication of leakage.



CAUTION

Keep liquid leak detector away from electrical connections.

ADJUSTMENTS



WARNING

Adjustments must be made by qualified persons only. If the appliance manufacturer supplies checkout and/or service and maintenance instructions carefully follow them.

If such instructions are not provided then use the procedure outlined below.

Pressure tap

The combination gas control is provided with a pressure tap of 9 mm O.D. at inlet and outlet side.

The gas/air module is provided with pressure taps of 9 mm outer diameter to measure the high and the low air pressure. The air pressure difference measured on the pressure taps of the module is reduced with the same factor as the amplification factor is reduced compared with the actual air pressure difference.

When checking the pressure undo the screw a half turn and slip tube over nipple.

Ensure that screw is retightened after making test.



CAUTION

To ensure a safe closing of the valves, it is essential that voltage over the terminals of electric operators is reduced to 0 Volt.

Offset adjustment on CO₂ % (see fig. 1)

- Remove cap screw with a screw driver to expose offset adjustment screw.
- Check gas supply pressure to the appliance using a pressure gauge connected to the inlet pressure tap.
- Start fan and check air flow.
- Energize both electric operators in order to have gas input to burner and ignite boiler.

- Adjust CO₂ % at the desired value at low output with offset adjustment screw. Turn offset adjustment screw counter clockwise to increase CO₂ %.
- Replace cap screw and tighten pressure taps.

Offset adjustment on outlet pressure

- Remove cap screw with a screw driver to expose offset adjustment screw.
- Check gas supply pressure to the appliance using a pressure gauge connected to the inlet pressure tap.
- Control the fan to produce the air pressure difference stated by the boiler manufacturer.
- Energize both electric operators in order to have gas input to burner and ignite boiler. The main burner should ignite within 3 seconds.

IMPORTANT

Adjustments must be made in the final mounting position to avoid shift caused by weight of the diaphragm

- Because of amplification factor tolerance, it is advisable to adjust the offset at low outlet pressures. Turn offset adjustment screw counter clockwise to increase or clockwise to decrease outlet pressure.
- Replace cap screw and tighten pressure taps.

Maximum outlet pressure adjustment (depending on combination gas control) See fig. 1

The maximum outlet pressure is an optional feature, which can only be used in atmospheric burner applications.

The maximum outlet pressure adjustment is used to limit the load supplied to the main burner

- Remove cap screw with a screw driver to expose offset adjustment screw.
- Determine the value to which the maximum outlet pressure is to be set. Adjustments must be made when the main burner is burning and the fan is in the maximum air flow position.
- Turn the maximum outlet pressure adjustment screw slowly until the desired pressure is obtained. Turn adjustment screw clockwise to increase or counter clockwise to decrease outlet pressure.
- Replace cap screw and tighten pressure taps.

CHECKOUT

After any adjustment check pressure taps and gas connections with an approved leak detection fluid for gas leakage.

After any adjustment set appliance in operation and observe several complete cycles to ensure that all burner components function correctly.

MAINTENANCE AND SERVICE

Under normal circumstances no maintenance or service is required.



WARNING

Screws on the valve that have been sealed must never be removed.

Home and Building Control
Combustion Controls Center Europe
Honeywell BV
Phileas Foggstraat 7
7821 AJ Emmen
The Netherlands
Tel: +31 (-)591 695911
Fax: +31 (-)591 695200
<http://europe.hbc.honeywell.com>