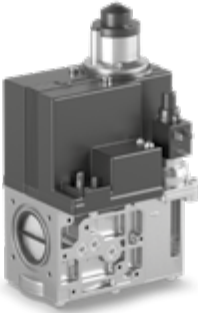


## VR400/VR800 Series Class "A" Servo Regulated Combination Valves

### OPERATING INSTRUCTIONS

· Edition 05.23 · 32-00285-01 · EN



### CONTENTS

1 Safety	1
2 Checking the usage	2
3 Installation	3
4 Wiring	4
5 Tightness test	4
6 Adjust valve	4
7 Adjust servo regulator	5
8 Maintenance	7
9 Troubleshooting	8
10 Accessories	8
11 Technical data	9
12 Designed lifetime	11
13 Certification	12
14 Logistics	12
15 Disposal	12

### 1 SAFETY

#### 1.1 Please read and keep in a safe place



Please read through these instructions carefully before installing or operating. Following the installation, pass the instructions on to the operator. This unit must be installed and commissioned in accordance with the regulations and standards in force. These instructions can also be found at [www.docuthek.com](http://www.docuthek.com).

#### 1.2 Explanation of symbols

**1, 2, 3, a, b, c** = Action

→ = Instruction

#### 1.3 Liability

We will not be held liable for damage resulting from non-observance of the instructions and non-compliant use.

#### 1.4 Safety instructions

Information that is relevant for safety is indicated in the instructions as follows:

#### **DANGER**

Indicates potentially fatal situations.

#### **WARNING**

Indicates possible danger to life and limb.

#### **CAUTION**

Indicates possible material damage.

All interventions may only be carried out by qualified gas technicians. Electrical interventions may only be carried out by qualified electricians.

#### 1.5 Conversion, spare parts

All technical changes are prohibited. Only use OEM spare parts.

## 2 CHECKING THE USAGE

The VR400 Series class "A" servo regulated combination valves are used for control and regulation of gaseous fuels in gas fired power burners, atmospheric gas boilers, melting furnaces, incinerators and other gas consuming appliances.

This function is only guaranteed when used within the specified limits – see page 9 (11 Technical data). Any other use is considered as non-compliant. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.

The combination gas valve is available in various pressure regulator types:

### Pressure regulator

VR..A.: Outlet pressure is held at a constant value regardless of fluctuations of inlet pressure. The outlet pressure can be adjusted to 3–37 mbar.

### Hi-Lo regulator

VR..P.: In addition to the servo pressure regulation the unit includes a high-low control. Within the ranges specified a high and a low outlet pressure can be mechanically adjusted and electrically selected.

### Integrated gas/air 1:1

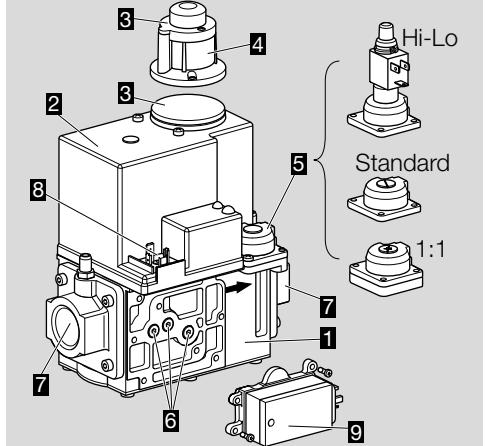
VR..V.: The 1:1 gas/air regulator equals the gas pressure to the supplied air pressure. In the working mode the gas pressure drops across the main burner injector is regulating and/or modulating equal to the air pressure drop across the air restriction.

VR..F.: The 1:1 gas/air regulator with an additional venturi mixing unit (VMU) and a fan, are used for modulating premixing units, such as gas burners, gas boilers, roof units, fresh air units and process applications. See instruction sheet VMU "Mixing unit for VR400VX/ VR800VX gas controls" (EN1C-0001) [www.docuthek.com](http://www.docuthek.com).

## 2.1 Type code

<b>VR</b>	Class "A" combination gas valve
<b>4</b>	Line voltage
<b>8</b>	Low voltage
<b>Nominal size valveseat (pipe size)</b>	
<b>15</b>	DN 15 (pipe size 1/2")
<b>20</b>	DN 20 (pipe size 3/4")
<b>25</b>	DN 25 (pipe size 1")
<b>32</b>	DN 32 (pipe size 1 1/4")
<b>34</b>	34 (pipe size 1 1/4")
<b>Type of pressure regulator</b>	
<b>A</b>	Pressure regulator
<b>F</b>	Integrated gas/air 1:1 with venturi mixing unit
<b>P</b>	Hi-Lo regulator
<b>V</b>	Integrated gas/air 1:1
<b>Characteristics second valve</b>	
<b>A</b>	Second valve fast opening, valves opened simultaneously
<b>B</b>	Characterized opening, valves opened simultaneously
<b>E</b>	Second valve fast opening, valves opened independently
<b>F</b>	Characterized opening, valves opened independently
<b>xxxx</b>	Specification number

## 2.2 Part designations



- 1 Main body
- 2 Cover
- 3 Cap
- 4 Characterized opening (slow opening)
- 5 Servo regulator valve:  
Pressure regulator or  
Hi-Lo regulator or  
Integrated gas/air 1:1
- 6 Pressure tap points
- 7 Inlet and outlet flange (Option)
- 8 Electrical connection  
(connector type: ISO 4400/DIN 43650 Form A)
- 9 Pressure switches (Option)

## 3 INSTALLATION

### ⚠ CAUTION

Incorrect installation

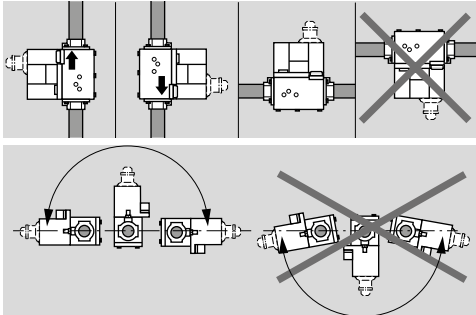
Please observe the following to ensure that the unit is not damaged during installation and operation:

- Sealing material and dirt, e.g. thread cuttings, must not be allowed to get into the valve housing.
- Dropping the device can cause permanent damage. In this event, replace the entire device and associated modules before use.
- Turn off gas supply before installation.
- Disconnect power supply to the valve actuator before beginning the installation to prevent electrical shock and damage to the equipment.
- Do not remove the seal over valve inlet and outlet, until ready to connect piping.
- The valve must be installed so that the arrow on the valve points in the direction of the gas flow (gas pressure helps to close the valve).
- Screws which are protected against unauthorised removal must not be loosened. This will invalidate the warranty!

### 3.1 Installation position

Solenoid actuator in the vertical upright position or tilted up to the horizontal, not upside down.

Gas valves with integrated gas/air 1:1: The factory settings are made in a horizontal installation position. A vertical installation may require readjustments.



The distance between the gas valve and the wall/ground, must be at least 30 cm.

- The valve can be mounted up to  $\pm 90$  degrees from this position without affecting the fuel/air metering at medium and high firing rates (3000 to 5000 rpm of the blower), but at lower firing rates (1000 rpm) the fuel might be reduced up to 10% when the valve is not mounted horizontal. To counter this, the low fire gas flow may be carefully field adjusted for non-horizontal mounting as described below.

### 3.2 Install valve

- 1 Take care that dirt does not enter the gas valve during handling.
- 2 Remove flanges from the valve (if factory mounted).

- 3 Use a sound taper fitting with thread according to ISO 7-1 or new, properly reamed pipe free from swarf.
- 4 Apply a moderate amount of good quality thread compound to the pipe for fitting only, leaving the two end threads bare, PTFE tape may be used as an alternative.
- 5 Screw the flanges onto the pipes.
- 6 Ensure that the inlet and outlet flanges are in line and separate from each other enough to allow the valve to be mounted between the flanges without damaging the "O"-ring.
- 7 Place the "O"-ring. If necessary grease it slightly to keep it in place.
- 8 Mount the gas valve between the flanges using the bolts for each flange.
- 9 Complete the electrical connections as instructed in the Electrical Connection section.
- 10 Complete the electrical connections as instructed in the wiring section.

### 3.3 Connections

There are 1/8" G pressure taps at the flanges.

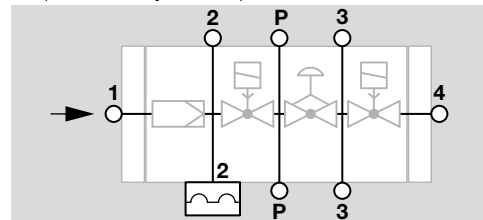
At the main body flange connections (1/8" G) are provided to mount either an:

- pressure switches (min. or max.)
- two connections for Intermittent Pilot (valves opened independently)

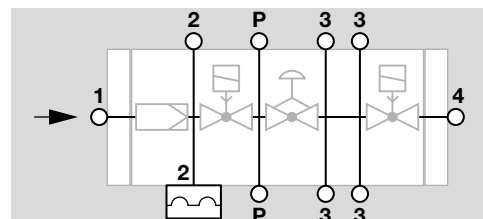
#### 3.3.1 Pressure tap points

The following pressures can be measured:

- 1 Inlet pressure
  - 2 Inlet pressure
  - 3 Interim pressure - unregulated (pressure between the two shut-off valves)
  - 4 Outlet pressure - regulated
- P Pilot gas pressure
- The corresponding numbers can be found on the sides of the valve. Pressure points 1 and 4 are located on top of the flanges.
- A pressure switch can be mounted to 2, P or 3. (C60VR: Only 2 and 3)

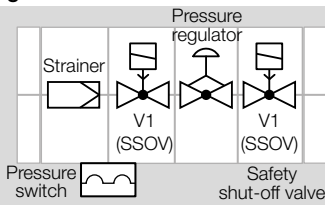


Pressure tap points for small body size models.



Pressure tap points for large body size model

### 3.3.2 Legend



## 4 WIRING

### ⚠ WARNING

Risk of injury!

Please observe the following to ensure that no damage occurs:

- Electric shocks can be fatal! Before working on possible live shocks components, ensure the unit is disconnected from the power supply.
- Switch off power supply before making electrical connections.
- All wiring must comply with local codes, ordinances and regulations.
- Use lead wire which can withstand 105°C ambient.

**1** Disconnect the system from the electrical power supply.

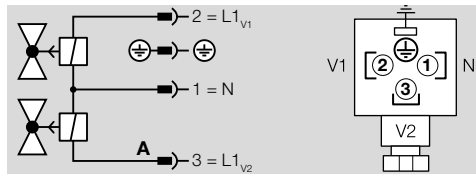
**2** Shut off the gas supply.

→ Before wiring, the fitter should ground himself.

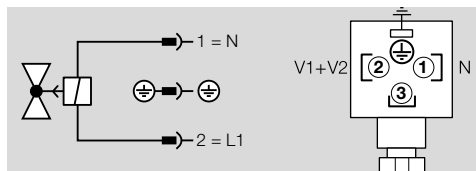
**3** Wire as shown on the connection diagram.

→ Three pin electrical plug connector according to ISO 4400/DIN 43650 (Form A).

### VR..X models with independent operated solenoid valves



### VR..X models with simultaneous operated solenoid valves



**4** After successful wiring, continue with page 4 (Tightness test on the pipe connections after installation or service is necessary.) and page 4 (6 Adjust valve).

## 5 TIGHTNESS TEST

Tightness test on the pipe connections after installation or service is necessary.

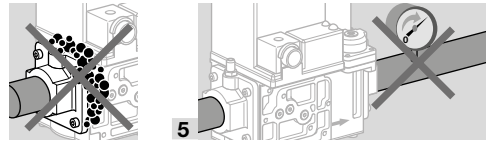
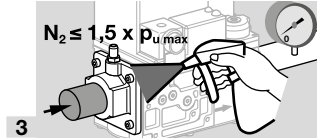
Use a high quality gas leak detection spray to spray the pipe connections and gaskets.

Start the appliance and check for bubbles as described below.

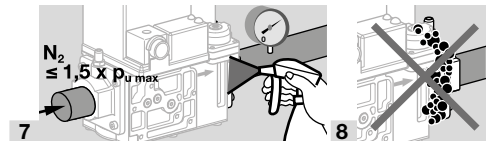
**1** Close the VR400/VR800 combination valve.

→ Both valves are closed.

**2** To be able to check the tightness, shut off the downstream pipeline close to the valve.



**6** Open the VR400/VR800 combination valve.



**9** Tightness OK: open the pipeline.

→ Unit leaking: Replace flat seal on flange. Then check for tightness once again.

→ Unit leaking: remove the unit and return it to the manufacturer.

## 6 ADJUST VALVE

→ The procedures described in this chapter are related to the adjustments on the main gas valve.

→ For adjustments on the other additional functionalities (e.g. pressure switch), refer to the included instruction sheet of the product in question in the package.

### ⚠ WARNING

Incorrect installation

Please observe the following to ensure that the unit is not damaged during adjustment and operation:

- Adjustments must be made by qualified personnel only.
- To ensure a safe closing of the valves, it is essential that voltage over the terminals of operators is reduced to 0 Volts.

**2nd valve = fast opening**

Flow rate can be adjusted.

**2nd valve = slow opening**

The following characteristics can be adjusted.

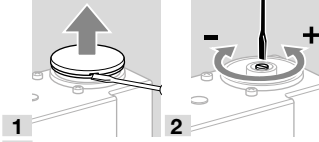
- Flow rate
- Step pressure
- Opening speed

## Important

→ To ensure a satisfactory setting of the valve the pressure drop over the valve should be at least 10% of the supply pressure or 2,5 mbar whichever ever is the greatest.

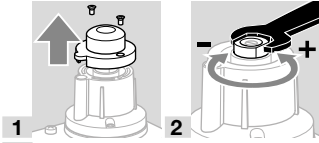
### 6.1 Adjust flow rate

#### 2nd valve = fast opening



- 1
- 3 Turn adjustment screw counter-clockwise to increase or clockwise to decrease the flow rate.
- 4 Replace cap on top of the coil.

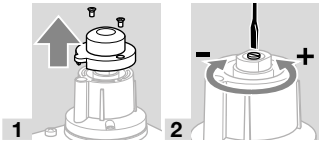
#### 2nd valve = slow opening



- 1
- 3 Turn wrench counter-clockwise to increase or clockwise to decrease the flow rate.
- 4 Replace cap on top of the coil.

### 6.2 Adjust step pressure

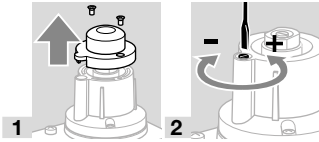
#### Step pressure adjustment



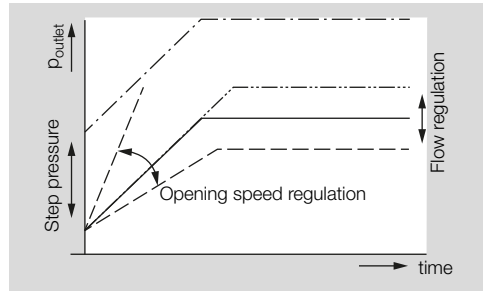
- 1
- 3 Turn screw driver counter-clockwise to increase or clockwise to decrease step pressure.
- 4 Replace cap on top of the coil.

### 6.3 Adjust opening speed

#### Opening speed adjustment



- 1
- 3 Turn screw driver counter-clockwise to increase the opening speed and therefore the time till full opening will decrease.
- 4 Turn screw driver clockwise to decrease the opening speed and therefore the time till full opening will increase.



Characterized opening

- 5 Replace cap on top of the coil.

## 7 ADJUST SERVO REGULATOR

### ⚠ WARNING

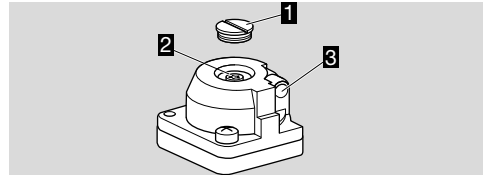
Incorrect adjustment

Please observe the following to ensure that the unit is not damaged during adjustment and operation:

- If the appliance manufacturer supplies checkout and/ or service and maintenance instructions carefully follow them. If these instructions are not provided, follow the procedure described below.

→ In some applications, adjustment screws are sealed as well, to avoid drift of factory calibration during transportation. These sealings can be broken when needed for readjustments, but only by trained and authorized technicians.

### 7.1 Adjust outlet pressure



- 1 Slotted cap
- 2 Adjustment screw
- 3 M5 pressure feedback connection
- 1 Disconnect pressure feedback connection (if applicable).
- 2 Energize both electric operators in order to have gas input to burner.
- 3 Check gas input to the appliance using a clocking gas meter or alternatively a pressure gauge connected to the outlet pressure tap.
- 4 Remove the slotted cap on the pressure regulator using a slotted screwdriver. This will expose the adjustment screw.
- 5 Slowly turn adjustment screw with the T40 screw driver until the burner pressure required is recorded on the pressure gauge. Turn adjustment screw clockwise to increase or counter-clockwise to decrease gas pressure to the burner.

**6** For non-regulating mode (LP gas) turn adjustment screw clockwise until it stops.

**7** Replace pressure regulator cap.

**8** Connect pressure feedback connection (if applicable).

### Checkout of adjustment

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

## 7.2 Adjust high-lo regulation

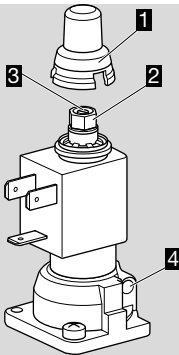
### ⚠ CAUTION

Incorrect adjustment

Please observe the following:

- Allow time for pressure to stabilize before making adjustments.
- It is recommended that the high-low regulator is operated a few time to ensure correct setting.
- It should be prevented, that high-low regulator is exposed to unnecessary forces because of wiring.

→ Good and reliable performance of high-low regulator is not only dependent on the high-low regulator itself, but also upon the reliability of the controller.



**1** Cap

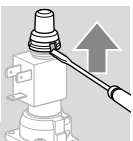
**2** Adjustment screw for max.pressure setting

**3** Adjustment screw for min.pressure setting

**4** M5 pressure feedback connection

→ Good and reliable performance of high-low regulator is not only dependent on the high-low regulator itself, but also upon the reliability of the controller.

**1** Before any adjustment can be made, cap has to be removed by putting a small screw driver in one of the slots and lifting the cap carefully while at the same time supporting it opposite to the screw driver.



**2**

### ⚠ WARNING

Incorrect adjustment

Please observe the following to ensure that the unit is not damaged during adjustment and operation:

- Maximum pressure setting must first be adjusted then minimum pressure setting can be adjusted.
- Any adjustment of maximum pressure setting influences minimum pressure setting.
- The outlet pressure setting should never be above the range specified.

Regulator output pressure range:

Pressure range (mbar)	Setting	
	low	high
4-37	4 - $P_{max}$ ( $P_{max} < P_{high}$ )	12-37

More settings, see page 10 (11.4.1 Performance hi-lo regulator).

### Adjustment of maximum pressure setting

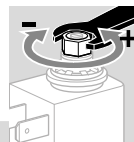
→ An 8 mm wrench is needed.

**3** Disconnect pressure feedback connection (if applicable)

**4** Connect a suitable pressure gauge to the pipe line or to the outlet pressure tap of the combination gas control concerned to measure burner pressure (measuring point must be as near to burner as possible).

**5** Energize high-low regulator, set combination gas control in operation and wait until an outlet pressure is recorded on the pressure gauge.

**6** Use a 8 mm wrench to turn adjustment screw for maximum pressure setting clockwise to increase or counter-clockwise to decrease pressure, until desired maximum burner pressure is obtained.



**7**

**8** Check maximum pressure setting after several times.

→ For further adjustment the cap needs to stay off.

**9** Now proceed with adjusting/checking the minimum pressure setting.

### Adjustment of minimum pressure setting

→ A 3,5 mm screw driver is needed.

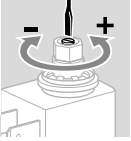
**10** Disconnect pressure feedback connection (if applicable).

**11** Connect a suitable pressure gauge to the pipe line or to the outlet pressure tap of the combination gas control concerned to measure burner pressure (measuring point must be as near to burner as possible).

**12** Disconnect electrical connection of high-low regulator coil.

**13** Set combination gas control in operation and wait until an outlet pressure is recorded on the pressure gauge.

**14** When minimum pressure setting needs adjustment, then use a 3,5 mm screw driver to turn adjustment screw for minimum pressure setting clockwise to increase or counter-clockwise to decrease pressure, until desired minimum burner pressure is obtained.



**15** Wire high-low regulator coil in circuit.  
**16** Wire high-low regulator coil in circuit.

**17** Check maximum pressure setting and re-adjust if necessary. Check minimum pressure setting again.

**18** When high and low pressure setting are correct, replace cap and connect pressure feedback connection (if applicable).

### Checkout of adjustment

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

### 7.3 Adjust gas/air 1:1 regulation

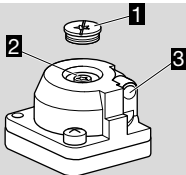
#### **⚠ WARNING**

Incorrect adjustment

High inlet pressures as used for gas G30 or G31, can cause oscillation. This is dependent on type of appliance. If oscillation occurs:

- The oscillation shall not exceed 10 % of the outlet pressure, with a stable air pressure signal.
- The oscillation has to be verified for the complete modulation band of the appliance.
- Please contact your Honeywell representative if the maximum of 10 % is exceeded.

The 1:1 gas/air regulator assembly has an air pressure connection and an offset adjustment screw. The 1:1 gas/air regulator equals the gas pressure to the supplied air pressure. With the offset adjustment screw it is possible to adjust the offset. (Offset =  $P_{\text{gas}} - P_{\text{air}}$ )



**1** Cap screw

**2** Offset adjustment screw

**3** M5 pressure feedback connection

**1** Remove cap screw with a torque bit (or slotted screwdriver) to expose offset adjustment screw.

**2** Check gas supply pressure to the appliance using a pressure gauge connected to the inlet pressure tap.  
**3** Start fan and check air flow.

**4** Energize both electric operators in order to have gas input to burner and ignite boiler.

**5** Adjust CO<sub>2</sub> % at the desired value at low output with offset adjustment screw. Turn offset adjustment screw clockwise to increase CO<sub>2</sub> %.

**6** Operate boiler on high output. (Only modulating applications).

**7** Replace cap screw and tighten pressure taps.

### Checkout of adjustment

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

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

### 7.3.1 Specify application parameters (gas/air 1:1)

Define maximum allowable deviation on  $\Delta P_{\text{gas}}$  at minimum  $\Delta P$  air in new appliance for reliability reasons.

The application parameters can effect the Offset Adjustment accuracy during cycling and life cycling of the control system.

These parameters are (in sequence of importance):

- Start pressure (the lower the better)
- Ambient temperature (the lower the better)

It is therefore advisable to verify the offset adjustment at service interval by CO<sub>2</sub> measurement or  $\Delta P_{\text{gas}}$  (burner orifice pressure drop) at minimum  $\Delta P_{\text{air}}$  (pressure drop over air restriction).

$\Delta P_{\text{gas}}$  measured on pressure tap of combination gas control (highest pressure) can deviate from real  $\Delta P$  (burner orifice pressure drop) due to gas turbulence and/or restrictions in the application. The deviation should be defined and documented. The measurement accuracy should be +/- 1 Pa.

## 8 MAINTENANCE

It is recommended to check the settings annually and readjust them if necessary.

## 9 TROUBLESHOOTING

### **⚠ WARNING**

Risk of injury!

Can cause severe injury, death or property damage.

- Use extreme caution when troubleshooting; line voltage is present.
- Do not replace the valve until all other sources of trouble are eliminated.

### **? Fault**

#### **!** Cause

- Remedy

### **? The valve does not open when the thermostat or controller calls for heat?**

#### **!** No voltage at the valve lead wires.

- Check for voltage at the valve lead wires or terminal block.

#### **!** If there is no voltage at the valve lead wires or terminal block.

- Make sure, that voltage is connected to the master switch.
- Make sure, that the master switch is closed and overload protection (circuit breaker, fuse, or similar device) has not opened the power line.

#### **!** There is still no voltage at the valve lead wires.

- If there is still no voltage at the valve leadwires or terminal block, make sure all appropriate contacts in the thermostat or controller, limits and flame safeguard control are closed. If one or more are open, determine the cause(s); correct the trouble and proceed.

#### **!** There is proper voltage at the valve but the valve still does not open.

- check for normal gas pressure.

#### **!** Is it not possible for the fault to be eliminated with the measures described above?

- Remove the unit and return it to the manufacturer for inspection.

### **? If the valve does not close when one or more of the appropriate contacts in the thermostat, controller, limits or flame safeguard control is open.**

#### **!** Is the valve connected in the correct circuit?

- Make sure the valve is wired in the correct circuit

#### **!** Valve is not wired correctly.

- Open the master switch to remove power from the valve. If the valve closes now, check the wiring for the valve and correct the wiring as necessary.

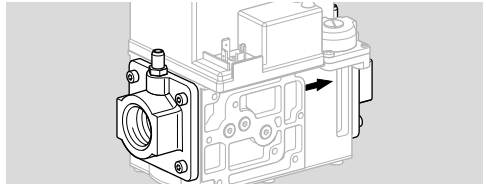
#### **!** Is there a short circuit?

- Check for a short in the electrical circuit and repair it as necessary.

## 10 ACCESSORIES

### 10.1 Flange kit

Inlet flanges and outlet flanges are available as accessories.



Scope of delivery:

- 1 flange with sealing plug,
- 1 "O"-ring and screws,
- 1 pressure tap nipple fitted

Flange kits

O.S. number	Size (Rp)	Remarks
KTCOMB15	1/2"	pressure tap 1/8"G
KTCOMB20	3/4"	pressure tap 1/8"G
KTCOMB25	1"	pressure tap 1/8"G
KTVR32	1 1/4"	pressure tap 1/8"G

### 10.2 Mixing unit VMU

VR..F.. (Integrated gas/air 1:1 with venturi mixing unit), see instruction sheet VMU "Mixing unit for VR400VX/ VR800VX gas controls" (EN1C-0001) [www.docuthek.com](http://www.docuthek.com).

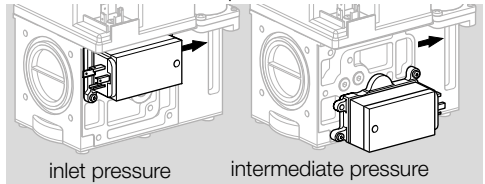
### 10.3 Valve connection plug

Electrical connections Standard DIN plug connector according DIN 43650 (Form A)

-CO020012 (black). Not included.

### 10.4 Pressure switch for gas C60VR4

The pressure switch for gas monitors the inlet pressure or the intermediate pressure.



Scope of delivery:

- 1 x pressure switch for gas,
- 2 x self-tapping retaining screws,
- 1 x sealing ring,
- 1 x protection cap.

#### 10.4.1 Pressure switch connection plug

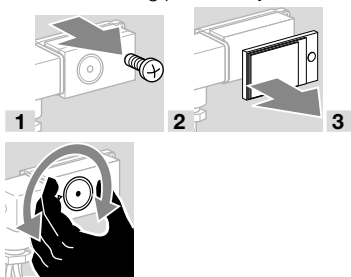
Electrical connections Standard DIN plug connector according DIN 43650 (Form A)

-CO020014 (gray). Not included.



#### 10.4.2 Adjust switching point

→ The switching point is adjustable via hand wheel.



Type	Adjusting range (adjusting tolerance = ± 15% of the scale value)		Mean switching differential at min. and max. setting	
	[mbar]	["WC]	[mbar]	["WC]
C60VR40017	2–17	0,8–6,8	0,7–1,7	0,3–0,8
C60VR40040	5–40	2–16	1–2	0,4–1
C60VR40110	30–110	12–44	3–8	0,8–3,2

→ Deviation from the switching point during testing pursuant to EN 1854 Gas pressure switches: ± 15%.

## 11 TECHNICAL DATA

The specifications described in this chapter are related to the main gas valve. The VR400/VR800 series must be used in combination with a burner programmer.

Models:

Type	Pipe sizes <sup>1)</sup>	
Small body size models		
VR415/VR815	DN 15	1/2"
VR420/VR820	DN 20	3/4"
VR425/VR825	DN 25	1"
VR432/VR832	DN 32	1 1/4"
Large body size models		
VR434	DN 32	1 1/4"

1) All internal pipe thread according to ISO 7-1

Minimum regulating capacity:

VR415/VR815: 1 m<sup>3</sup>/hr

VR420/VR820: 1 m<sup>3</sup>/hr

VR425/VR825: 1,5 m<sup>3</sup>/hr

VR432/VR832: 1,5 m<sup>3</sup>/hr

VR434: 1,5 m<sup>3</sup>/hr

Maximum operating pressure

All models: 100 mbar,

except: VR425/432/825/832AB/AF/PB/PF: 70 mbar (slow opening models DN25/DN32 with adjustable outlet pressure 3–37 mbar).

VR434 can be applied to a maximum of 100 mbar, but needs to be adjusted to nominal applied inlet pressure.

Torsion and bending stress

Pipe connections meet group 2 according to EN 13611 requirements.

Valve Classification:

Class A + A according EN 161

Regulator Classification:

Class C according EN 88-1

Supply voltages:

Line voltage: 230 V AC, 50/60 Hz

Low voltage: 24V AC, 50/60 Hz

Electrical equipment:

DC current coils with combined rectifier inside the cover.

Electrical connections:

Standard DIN plug connector according DIN 43650

Ambient temperature range:

-15 to +60°C (5 to +140 °F)

Storage temperature = transport temperature:

-20 to +40 °C (-4 to +104 °F).

Enclosure: IP 40

Body material: Aluminum alloy die cast

Strainer:

Fine mesh screen (diameter 0,34 mm), AISI 303

steel, serviceable after removing inlet flange screws.

Meets requirements for strainer according EN 161.

Power consumption:

Type	Voltage	V1		V2	
		W	mA	W	mA
VRx15/ VRx20	230	15,9	70	15,9	70
VRx15/ VRx20	24	15,2	640	15,2	640
VRx25/ VRx32	230	24,1	106	24,1	106
VRx25/ VRx32	24	30,9	1300	30,9	1300
VR434 <sup>1)</sup>	230	11	76	11	76
VR434 <sup>2)</sup>	230	49	220	49	220

1) At normal operation

2) At start up

#### 11.1 Tightening torque

Recommended tightening torques for the connection parts:

Screw type	Tightening torque
Throttle screw adjustment	max. 50 Ncm min. 4 Ncm
Flanges	max. 100 Ncm min. 0.5 Ncm
Pressure tap plug	max. 5 Nm min. 2 Nm
Pressure switch mounting	2.5 ± 1.5 Nm
Pressure switch cover	1.2 ± 0.2 Nm
Inlet/outlet flange screw	4.3 ± 0.4 Nm
Retarder cap	4.3 ± 0.4 Nm

## 11.2 Performance characteristics

Opening time:

Dead time maximum 1 second.

VR434: maximum dead time <0,5 second.

The first valve (V1) opens in less than 1 second.

The second valve (V2) can be either a fast opening, or slow opening valve with adjustable characteristic (VR..XB and VR..XF models).

Maximum allowable leakage:

Each VR400 combination valve has been factory tested to meet the following leakage requirements. Outerwall, safety valve and main valve = 40 cm<sup>3</sup>/h for up to DN 25 and 50 cm<sup>3</sup>/h for DN 32 at test pressure of 6 mbar and 1.5 x maximum operating pressure.

High pressure test:

In the "OFF" condition, the VR400 valve will withstand 1,5 bar (air) inlet pressure without damage.

Closing time (V1, V2):

Less than 1 second for all valves.

Maximum working frequency:

1 cycle per minute.

Duty cycle:

Coil suitable for permanent energization in cooperation with ignition controller.

Operational voltage range:

The combination gas valve will function satisfactory between 85% and 110% of the rated voltage.

## 11.3 Pressure regulator

Which reaches 50% of the adjustable outlet pressure within 0,5 seconds after start flow or a characterized opening valve which is adjustable from 1 up to 30 seconds, at rated capacity. The opening characteristic is factory set at approximately 6 seconds at the following conditions:

- measured at 80% of rated capacity
- 30 mbar supply pressure
- nominal voltage
- 20°C
- 2,5 mbar pressure drop
- no step pressure

Due to the influence of ambient temperature (-15 to +60°C) the adjusted opening time of 6 seconds measured at 80% of adjusted flow rate can vary ± 4 seconds.

Tap sensitivity of outlet pressure set point:

For all gases the maximum deviation may be 1 mbar.

Repeatability of outlet pressure set point:

For all gases the maximum deviation from set point is ± 0,3 mbar or + 3% of the set point value, whichever is the greatest.

### Total set point shift

Pressure range (mbar)	Tolerance
3-37	6% of the set point value or 1 mbar whichever is the greatest

## 11.4 Hi-lo regulator

Pressure feedback connection:

The high-low regulator with an M5 thread connection for pressure feedback.

Minimum regulation capacity:

0,31 m<sup>3</sup>/h

Maximum operating pressure:

The maximum pressure  $P_{max}$  indication on the housing of the combination gas control is the maximum pressure at which it functions safely.

However, the maximum operating pressure is limited by the pressure range of the high-low pressure regulator concerned: 50 mbar for pressure range 4-37.

Electrical connection:

The high-low coil is provided with an earth terminal.

The high-low coil is provided with quick connect terminals suitable for 6,3 mm.

Connector: DIN 43650 From B

Regulator output pressure range:

Pressure range (mbar)	Setting	
	low	high
4-37	4 - $P_{max}$ ( $P_{max} < P_{high}$ )	12-37

Electrical data:

Supply voltage	Color of coil	Current (mA)	Power consumption
220/240 V~, 50 Hz	black	17,4/19	3/3,2

### 11.4.1 Performance hi-lo regulator

Maximum allowable leakage:

Each hi-lo regulator has been factory tested to meet the following leakage requirements.

- outerwall: 24 cm<sup>3</sup>/h at test pressure of 150 mbar.
- seat leakage: 110 cm<sup>3</sup>/h at test pressure of 9 mbar.
- pressure feedback leakage: 650 cm<sup>3</sup>/h at test pressure of 8 mbar.

Total set point shift:

The total set point shift of the low and the high outlet pressure caused by repeatability, tapping (tapping impact 2 Ncm) and life cycle shall not exceed.

Pressure range (mbar)	Min. low setting (mbar)	Max high setting (mbar)
4-37	-2,5/+2,5	-4,0/+3,0

Repeatability:

Repeatability should be checked after five power interruptions, maximum deviation in outlet pressure may not exceed the values as indicated below.

Pressure range (mbar)	At min. set point (mbar)	At max. set point (mbar)
4-37	0,5	1

Tap test:

After tapping the control (tapping impact 2 Ncm max.) the deviation of the outlet pressure may be 1 mbar max.

## Hysteresis:

The deviation in the outlet pressure at minimum setting if hi-lo regulator is switched ON and OFF may not exceed: 0,5 mbar for 4–37 mbar range.

Shift on mechanical set point after live cycle:

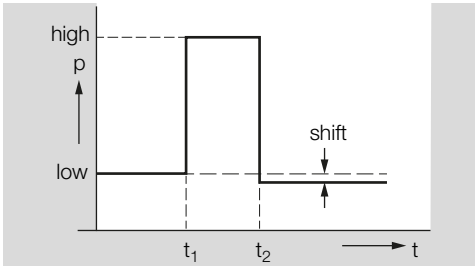
The set point shift after life cycle (with switching speed of maximum 40 cycles per minute at ambient temperature) without re-adjustment of the high or low setting may not exceed.

Pressure range (mbar)	At min. set point (mbar)	At max. set point (mbar)
4–37	+1,2/-0,8	+0,7/-1,8

Drift on mechanical set point during ambient temperature cycle:

The variation in outlet pressure caused by temperature changes in the ambient temperature between 0 and 70°C may be 1 mbar maximum.

Outlet pressure characteristic



Operable voltage range:

The hi-lo regulator will function satisfactory between 85% and 110% of the rated voltage.

Rated voltage	Operable Voltage
220/240 V, 50 Hz	187–264 V

Pressure feedback:

Within the limits of the capacity of the combination gas control, a pressure deviation on the pressure feedback connection must result in a outlet pressure deviation of the same value with an accuracy of p 5% of the adjusted outlet pressure or 0,4 mbar, whichever is the greatest.

## 11.5 Integrated gas/air 1:1

The 1:1 gas/air regulators are rated for the 2<sup>nd</sup> and the 3<sup>rd</sup> family gases ( G20, G25, G30 and G31).

Opening time:

Time till  $P_{\text{outlet}} \geq 100 \text{ Pa} = < 2 \text{ s}$  (Conditions:  $P_{\text{inlet}} = 3000 \text{ Pa}$ ).

Pressure regulation function:

Class B according to EN 88.

Seat with throughput opening  $\phi 1 \text{ mm}$ .

Air pressure connection:

Servo pressure regulator has an M5 threaded hole to make connection between regulator and appliance.

Outlet pressure:

Outlet pressure is pressure drop across the main burner orifice.

Maximum inlet pressure:

100 mbar

Minimum regulation capacity:

1 m<sup>3</sup>/h air at  $\Delta p = 0,5 \text{ mbar}$  across main burner orifice at 30 mbar operating pressure maximum

Minimum operating gas pressure:

15 mbar

Maximum operating gas pressure:

The  $P_{\text{max}}$  100 mbar indication on the housing is the maximum inlet pressure at which the gas control functions safely.

Offset range:

-0,4 mbar to + 0,2 mbar (with coils sideways)

-0,24 mbar to + 0,36 mbar (with coils on top)

Maximum air pressure:

8 mbar without outlet gas pressure (before ignition)

40 mbar with outlet gas pressure present (after ignition)

Oscillation:

For all versions except gas/air 1:1: Maximum oscillation under all circumstances 0,5 mbar.

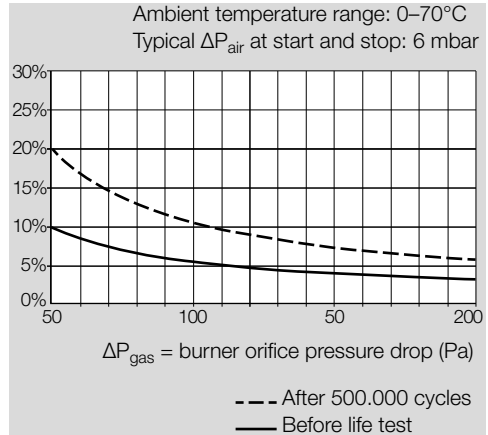
Accuracy:

$$\text{Typical accuracy} = \left( \frac{\Delta P_{\text{gas}} - \Delta P_{\text{air}}}{\Delta P_{\text{air}}} \right) \cdot 100 \%$$

$\Delta P_{\text{air}}$  = pressure drop over air restriction

$\Delta P_{\text{gas}}$  = burner orifice pressure drop

Accuracy includes tap sensitivity, repeatability, inlet pressure dependency, hysteresis and temperature influence and is shown below.



Typical accuracy

## 12 DESIGNED LIFETIME

Type	Number of cycles
VR415/VR815	500,000
VR420/VR820	500,000
VR425/VR825	500,000
VR432/VR832	500,000
VR434	500,000

## 13 CERTIFICATION

### 13.1 Certificate download

Certificates – see [www.docuthek.com](http://www.docuthek.com)

### 13.2 Declaration of conformity



We, the manufacturer, hereby declare that the product VR4xx/VRBxx with product ID No. CE-0063AT1198 complies with the requirements of the listed Directives and Standards.

Directives:

- 2014/35/EU – LVD
- 2014/30/EU – EMC
- 2011/65/EU – RoHS II
- 2015/863/EU – RoHS III

Regulation:

- (EU) 2016/426 – GAR

Standards:

- EN 88-1:2011+A1:2016
- EN 126:2012
- EN 60335-1 cl30:2016

The relevant product corresponds to the tested type sample.

The production is subject to the surveillance procedure pursuant to Regulation (EU) 2016/426 Annex III paragraph 3.

### 13.3 UKCA certified



Gas Appliances (Product Safety and Metrology etc. (Amendment etc.) (EU Exit) Regulations 2019)

BS EN 88-1:2011+A1:2016

BS EN 126:2012

### 13.4 REACH Regulation

The device contains substances of very high concern which are listed in the Candidate List of the European REACH Regulation No. 1907/2006. See Reach list HTS at [www.docuthek.com](http://www.docuthek.com).

### 13.5 China RoHS

Directive on the restriction of the use of hazardous substances (RoHS) in China. Scan of the Disclosure Table China RoHS2, see certificates at [www.docuthek.com](http://www.docuthek.com).

## 14 LOGISTICS

### Transport

Protect the unit from external forces (blows, shocks, vibration).

Transport temperature: see page 9 (11 Technical data).

Transport is subject to the ambient conditions described.

Report any transport damage on the unit or packaging without delay.

Check that the delivery is complete.

### Storage

Storage temperature: see page 9 (11 Technical data).

Storage is subject to the ambient conditions described.

Storage time: 6 months in the original packaging before using for the first time. If stored for longer than this, the overall service life will be reduced by the corresponding amount of extra storage time.

## 15 DISPOSAL

Devices with electronic components:

**WEEE Directive 2012/19/EU – Waste Electrical and Electronic Equipment Directive**



At the end of the product life (number of operating cycles reached), dispose of the packaging and product in a corresponding recycling centre. Do not dispose of the unit with the usual domestic refuse. Do not burn the product.

On request, old units may be returned carriage paid to the manufacturer in accordance with the relevant waste legislation requirements.

## FOR MORE INFORMATION

The Honeywell Thermal Solutions family of products includes Honeywell Combustion Safety, Eclipse, Exothermics, Hauck, Kromschroder and Maxon. To learn more about our products, visit [ThermalSolutions.honeywell.com](http://ThermalSolutions.honeywell.com) or contact your Honeywell Sales Engineer.

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