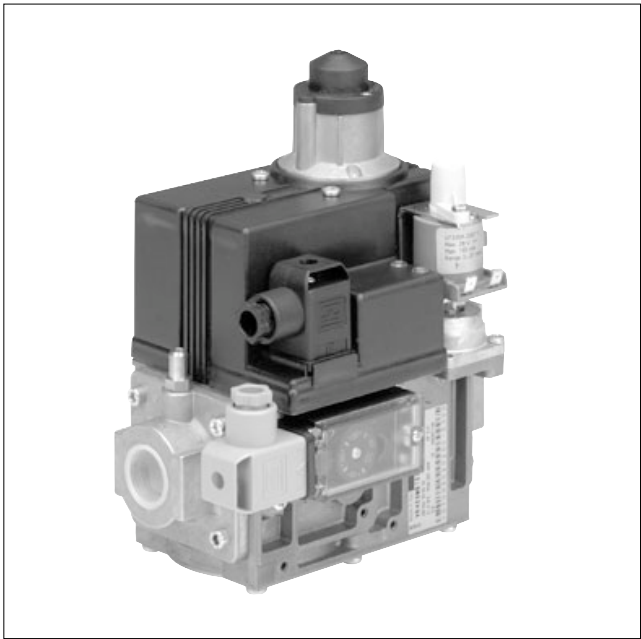


VR400/VR800 Series

CLASS „A“ SERVO REGULATED COMBINATION VALVES

PRODUCT HANDBOOK



APPLICATION

The VR400/VR800 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.

These servo regulated combination valves are available in five different versions:

- VR415/VR815 (pipe sizes 1/2")
- VR420/VR820 (pipe sizes 3/4")
- VR425/VR825 (pipe sizes 1")
- VR432/VR832 (pipe sizes 1¼")
- VR434/VR834 (pipe sizes 1½")

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DESCRIPTION

The VR400/VR800 series class „A“ servo regulated combination valves are suitable for the control of gaseous fuels in gas consuming appliances according to international standards.

The VR400/VR800 series meet the class A + A specification according EN 161.

The VR400/VR800 series have 1/2, „3/4“, 1" and 1¼" straight flanged pipe connection.

The VR400/VR800 series are standard equipped with two main valves V1 and V2.

Safety valve V1 is always fast opening/closing.

The second valve (V2) can be either fast (with flow regulation) or slow (= with flow regulation and adjustable opening). The pressure regulating valve is located between V1 and V2. The VR400/VR800 series are available for **D**irect **B**urner Ignition (**DBI**) and **I**ntermittent **P**ilot (**IP**) applications.

At both sides of the main body 4 flange connections are provided to mount either an:

- inlet pressure switch C60VR serie
 - interim pressure switch C60VR serie
 - Valve Proving System (VPS) + pressure switch.
- These accessories can be mounted on various positions of the main body of the VR400/VR800 series.

FEATURES

- **Class „A“ servo regulated combination valve for control of gaseous fuels in gas consuming appliances in accordance with international standards.**
- **Main body with two shut-off valves with single seat.**
- **Options for mounting flanged minimum and/or interim pressure switches.**
- **Valve Proving System (VPS).**
- **Closing time: < 1 second.**
- **Coils field replaceable.**
- **Coils suitable for permanent energization.**
- **Fine mesh screen (strainer) between inlet flange and main body.**
- **Various pressure tap points at main body available, when no additional valves or pressure switches are used.**
- **Second main valve, either with fast opening, or characterized opening mechanism (slow) with adjustable maximum flow rate and step pressure.**
- **Rectifier boards field replaceable.**
- **Plug connector according to DIN 43650.**
- **All adjustments are located on the top of the valve.**
- **Different pressure ranges.**
- **Suitable for electric modulation.**
- **Suitable for electric two stage regulator.**
- **Suitable for gas/air modulation.**
- **Connections for IP application.**

SPECIFICATION

The specifications described in this chapter are related to the main gas valve (see also Performance Characteristics on page 4.). The VR400/VR800 series must be used in combination with a burner programmer.

Models

VR415/VR815 (DN15)

VR420/VR820 (DN20)

VR425/VR825 (DN25)

VR432/VR832 (DN32)

VR434/VR834 (DN32)

Optional: adjustable opening characteristics, page 15.

For detailed regulator specifications of models with **suffix M**, **suffix F**, **suffix P** or **suffix V** see the appropriate Product Handbook.

VR4xxFy: EN1C-0001

VR4xxMy: EN2R-9009

VR4xxPy: EN2R-9010

VR4xxVy: EN2R-9017

Dimensions

See dimensional drawings and table on page 10-13.

Pipe sizes

Inlet and outlet straight flange connection: 1/2", 3/4", 1" and 1 1/4".

(all internal pipe thread according to ISO 7-1)

Capacity

See capacity curves on page 5-9

Minimum regulating capacity

VR415/VR815: 1 m³/hr.

VR420/VR820: 1 m³/hr.

VR425/VR825: 1.5 m³/hr.

VR432/VR832: 1.5 m³/hr.

VR434/VR834: 1.5 m³/hr.

Maximum operating pressure

VR400XX1000 series: 200 mbar

VR400XX4000 series: 360 mbar

VR400XX5000 series: 100 mbar

VR800XX series: 100 mbar

VR432/VR832 series: 100 mbar

VR434/VR834 series: 100 mbar

VR gas/air 1:1 series: 100 mbar

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

Connections (see fig. 16. and 17.)

- 1/8" pressure taps at inlet and outlet flanges. At the main body 8 flange connections are provided to mount either an:
- pressure switches (min. or max.)
- Valve Proving System (VPS).
- Two 1/8" connections for IP applications.

Torsion and bending stress

Pipe connections meet group 2 according to EN 161 requirements.

Valve Classification

Class A + A according EN 126/EN 161

Regulator Classification

Class C according EN 126/EN 88

Supply voltages

Line voltage: 230 Vac, 50/60 Hz

Other voltages on request.

Electrical equipment

DC current coils with combined rectifier inside the cover.

Electrical connections

Standard DIN plug connector according DIN 43650

Ambient temperature range

-15 ... 60 °C

Coil insulation solenoid valves

Insulation material according class F.

Enclosure

IP 40

Body material

Aluminium 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.

Closing spring

AISI 302 steel

Valve plunger

Coated Fe 360

Seals and gaskets

Hydrocarbon resistant NBR and Viton rubber types.

Flange kit

The kit consist of:

- 1 flange with sealing plug,
- 1 „O“-ring and 4 screws.
- 1 pressure tap nipple fitted

Table 1: Flange kits

O.S.Number	Size (PR)	Remarks
KTCOMB15	1/2"	with plug
KTCOMB20	3/4"	with plug
KTCOMB25	1"	with plug
KT432FG0	1 1/4"	with plug
KT434FG1 *) KT434FG2 *)	1 1/4"	with plug

*) These 2 flange kits bring gas inlet and outlet in line.

Table 2: Power consumption (W) VR400/VR800 series

Model	voltage	V1		V2	
		W	mA	W	mA
VRx15/VRx20	230	15,4	84	15,4	84
	110	14,6	170	14,6	170
	24	15	780	15	780
VRx25/VRx32	230	18,6	100	18,6	100
	110	22,1	250	22,1	250
	24	15,5	810	15,5	810
VRx34	230 *)	17,5	90	17,5	90
	230 **)	61	275	61	275

*) at normal operation

**) at start up

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 valve which reaches 50% of the adjustable outlet pressure within 0.5 sec. 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 ... 60°C) the adjusted opening time of 6 seconds measured at 80% of adjusted flow rate can vary ± 4 seconds.

Maximum allowable leakage

Each VR400 combination valve has been factory tested to meet the following leakage requirements:

- outerwall: 50 cm³/h at test pressure of 6 and 540 mbar.
- safety valve: 40 cm³/h at test pressure of 6 and 540 mbar.
- main valve : 40 cm³/h at test pressure of 6 and 540 mbar.

High pressure test

In the „OFF“ condition, the VR400 valve will withstand 1.5 bar (air) inlet pressure without damage.

Attempts to operate the VR400, while in this condition, will not cause damage.

Oscillation

For all versions except gas/air 1:1:

Maximum oscillation under all circumstances 0.5 mbar.

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.

Table 3: Total set point shift

Pressure range (mbar)	Tolerance
2 ... 37	6% of the set point value or 1 mbar whichever is the greatest
2 ... 20 *	6% of the set point value or 1 mbar whichever is the greatest
8 ... 50	6% of the set point value or 2,2 mbar whichever is the greatest

* 2 ... 20 mbar regulation not to be specified on valves with 360 mbar inlet pressure.

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.

Table 4: Design life

Model	Number of cycles
VR415/VR815	500.000
VR420/VR820	
VR425/VR825	
VR432/VR832	
VR434/VR834	

CAPACITY CURVES AND RECOMMENDED WORKING AREA

Capacity curve servo regulated combination gas valves

Table 5: Capacity

1/2" DN15
6 m³/hr. air at Δp = 5 mbar

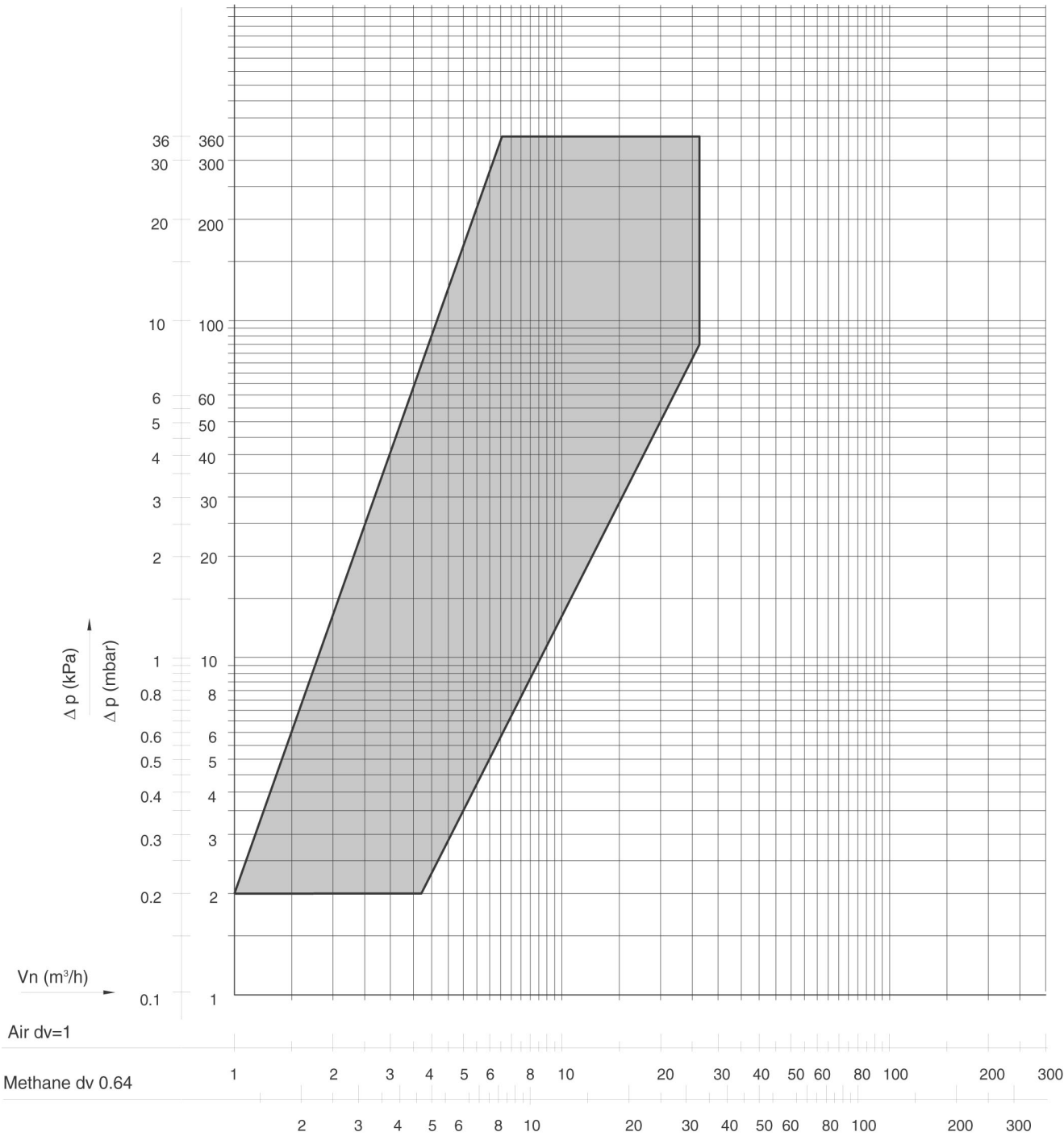


Fig. 1. Capacity curves for VR415/VR815 series (DN15)

CAPACITY CURVES AND RECOMMENDED WORKING AREA

Capacity curve servo regulated combination gas valves

Table 6: Capacity

3/4" DN20
9 m³/hr. air at Δp = 5 mbar

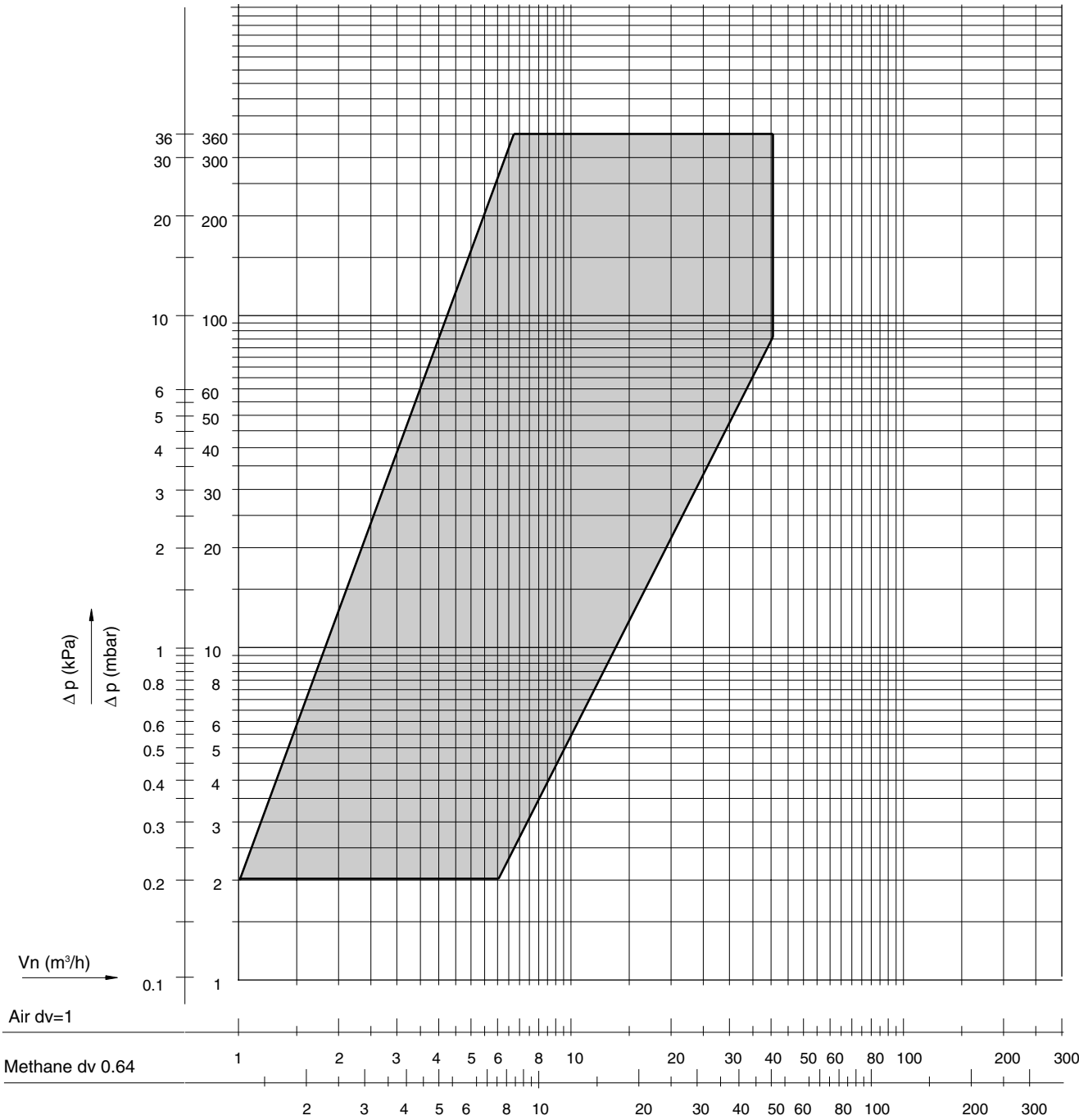


Fig. 2. Capacity curves for VR420/VR820 series (DN20)

CAPACITY CURVES AND RECOMMENDED WORKING AREA

Capacity curve servo regulated combination gas valves

Table 7: Capacity

1" DN25
13 m³/hr. air at Δp = 5 mbar

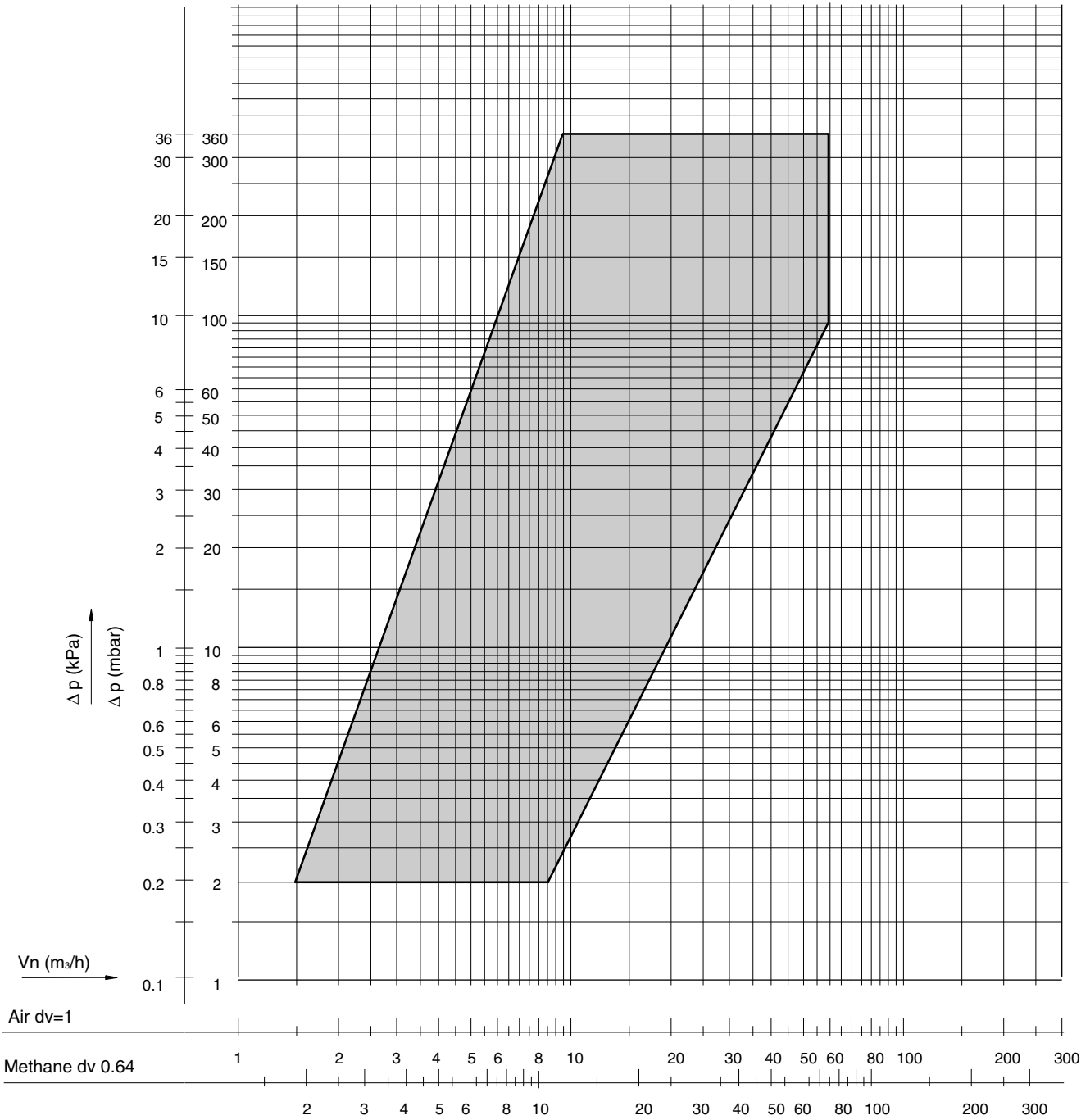


Fig. 3. Capacity curves for VR425/VR825 series (DN25)

CAPACITY CURVES AND RECOMMENDED WORKING AREA

Capacity curve servo regulated combination gas valves

Table 8: Capacity

1 1/4" DN32 VR432
14,5 m³/hr. air at Δp = 5 mbar

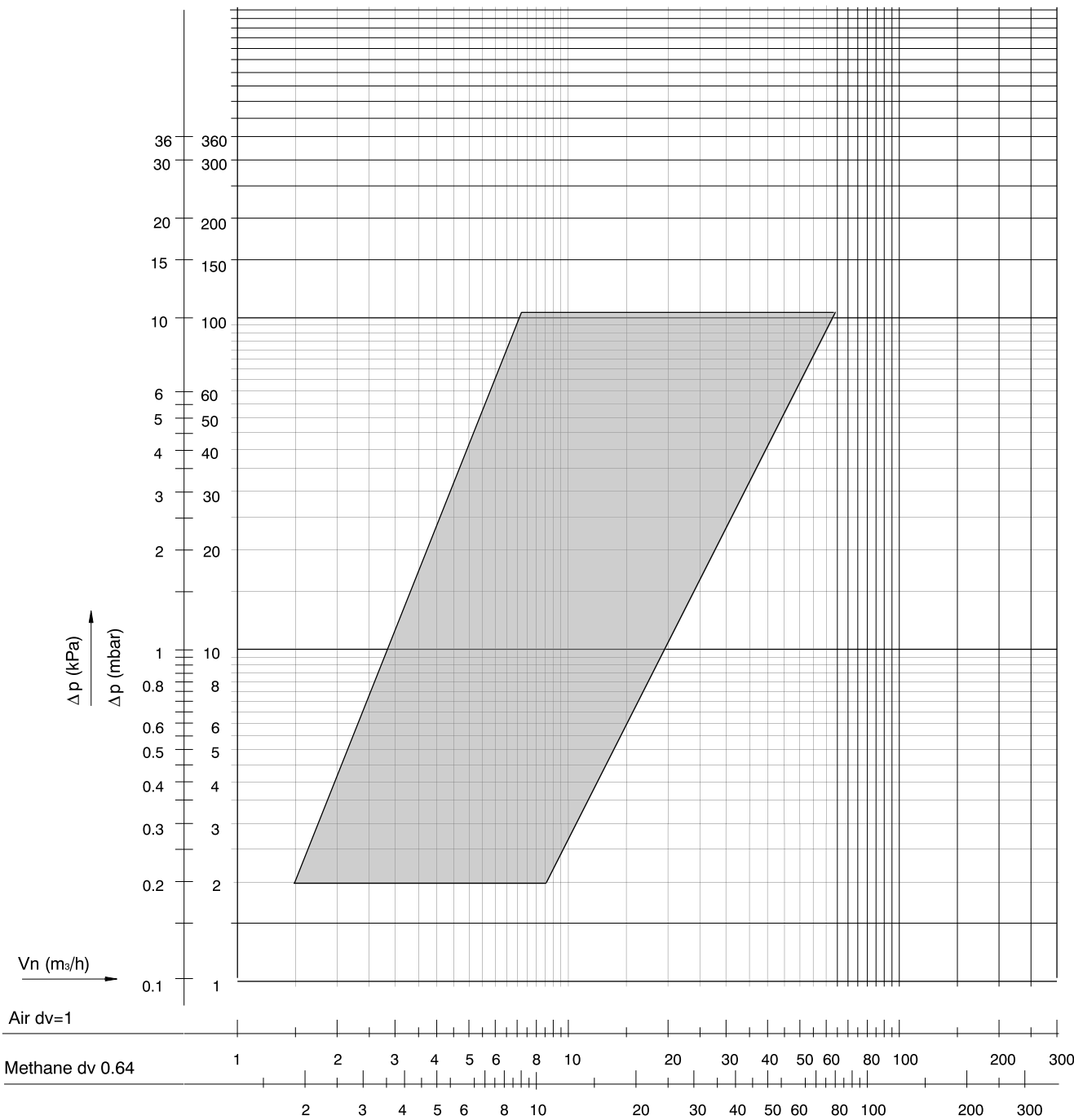


Fig. 4. Capacity curves for VR432/VR832 series (DN32)

CAPACITY CURVES AND RECOMMENDED WORKING AREA

Capacity curve servo regulated combination gas valves

Table 8a: Capacity

1 1/4" DN32 VR434
38 m³/hr. air at Δp = 20 mbar

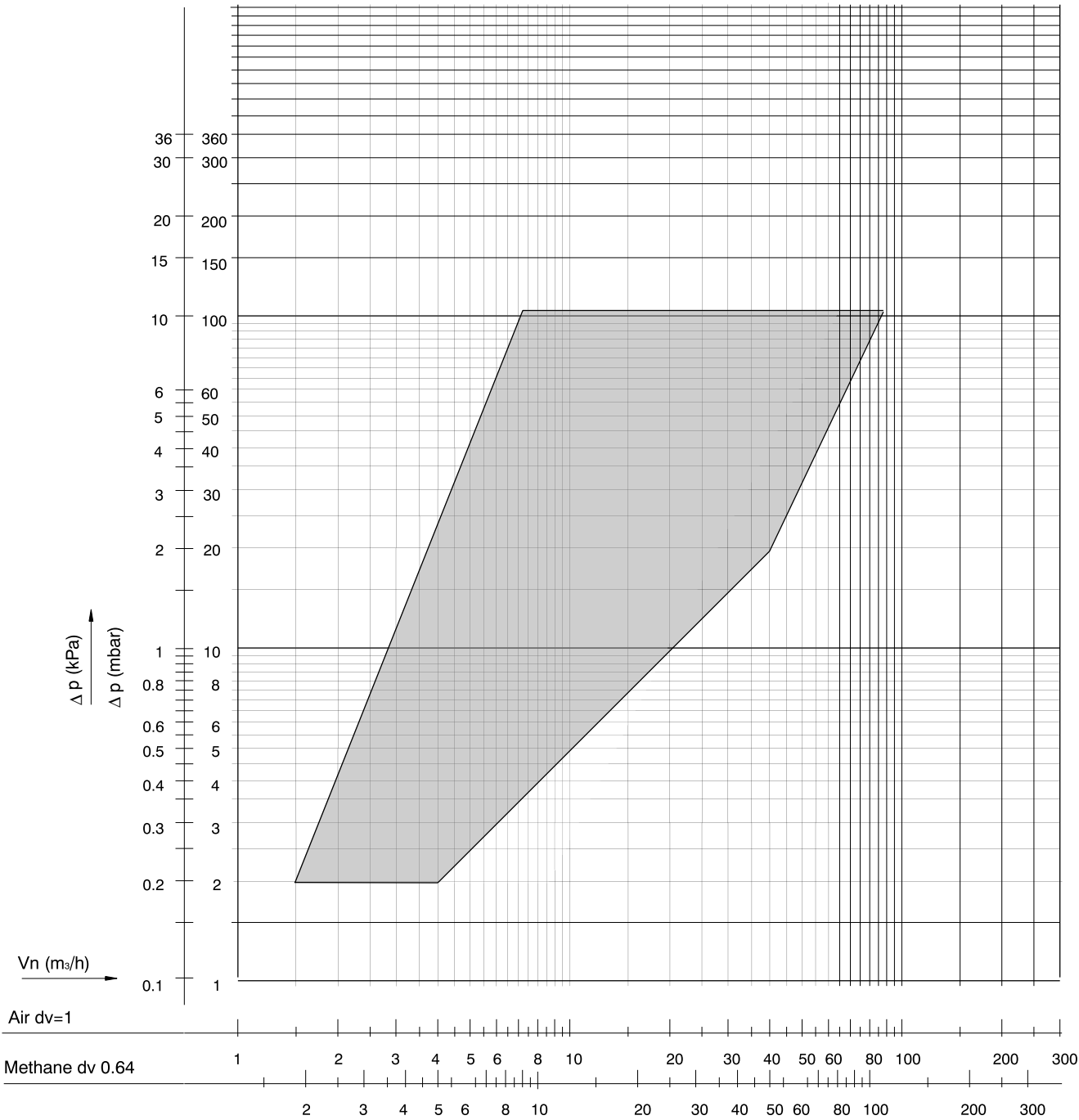


Fig. 4a. Capacity curves for VR434/VR834 series (DN32)

DIMENSIONAL DRAWINGS VR415/VR815 AND VR420/VR820

		Variable Dimensions			
	Kit flange	A	B	C	D
VR415/815 100/200 mbar EMC Class B	KTCOMB15	133.4 ±0.4	107.4 ±0.4	185 ±0.5	107 ±0.8
VR420/820 100/200 mbar EMC Class B	KTCOMB20	133.4 ±0.4	107.4 ±0.4	185 ±0.5	107 ±0.8
VR415 360 mbar EMC Class A	KTCOMB15	133.4 ±0.4	107.4 ±0.4	185 ±0.5	107 ±0.8
VR420 360 mbar EMC Class A	KTCOMB20	133.4 ±0.4	107.4 ±0.4	185 ±0.5	107 ±0.8
VR415 360 mbar EMC Class B	KTCOMB15	135.7 ±0.2	109.7 ±0.2	185 ±0.5	185.5 ±0.8
VR420 360 mbar EMC Class A	KTCOMB20	135.7 ±0.2	109.7 ±0.2	185 ±0.5	185.5 ±0.8

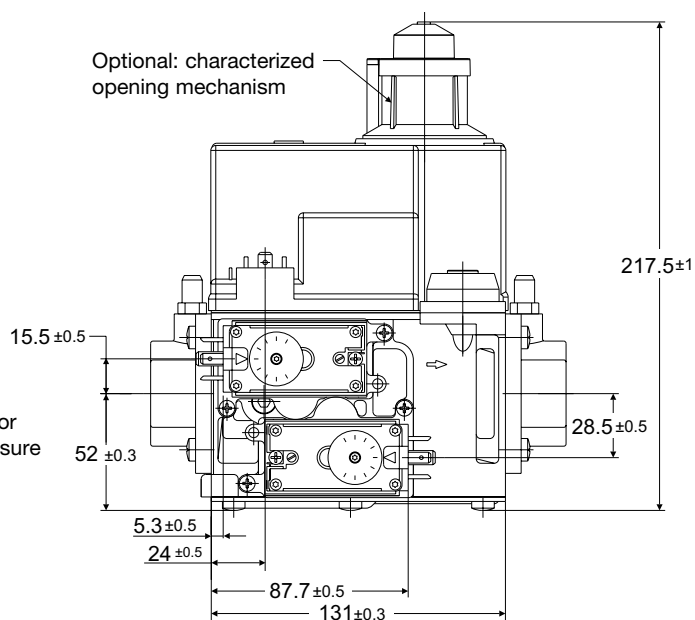
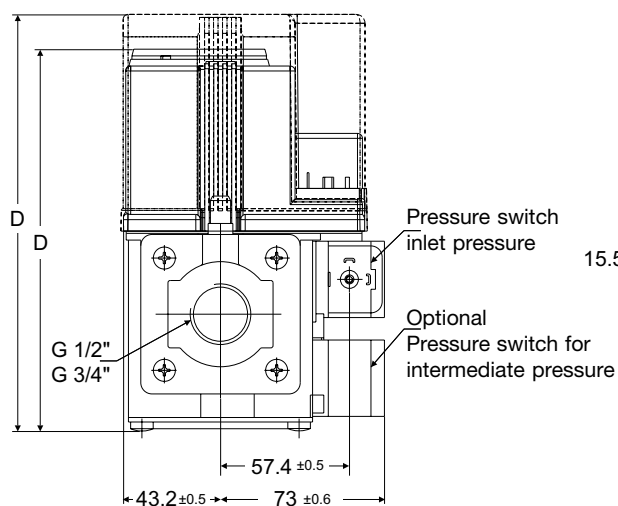
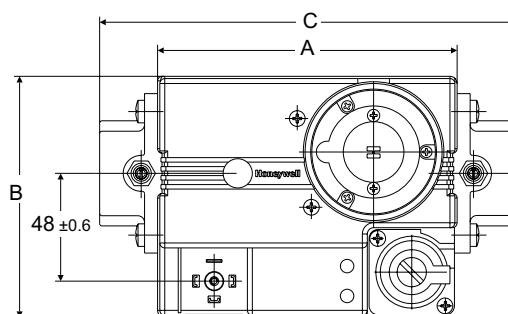
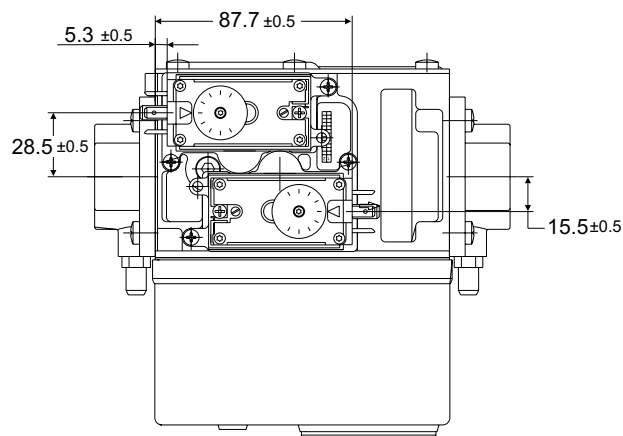
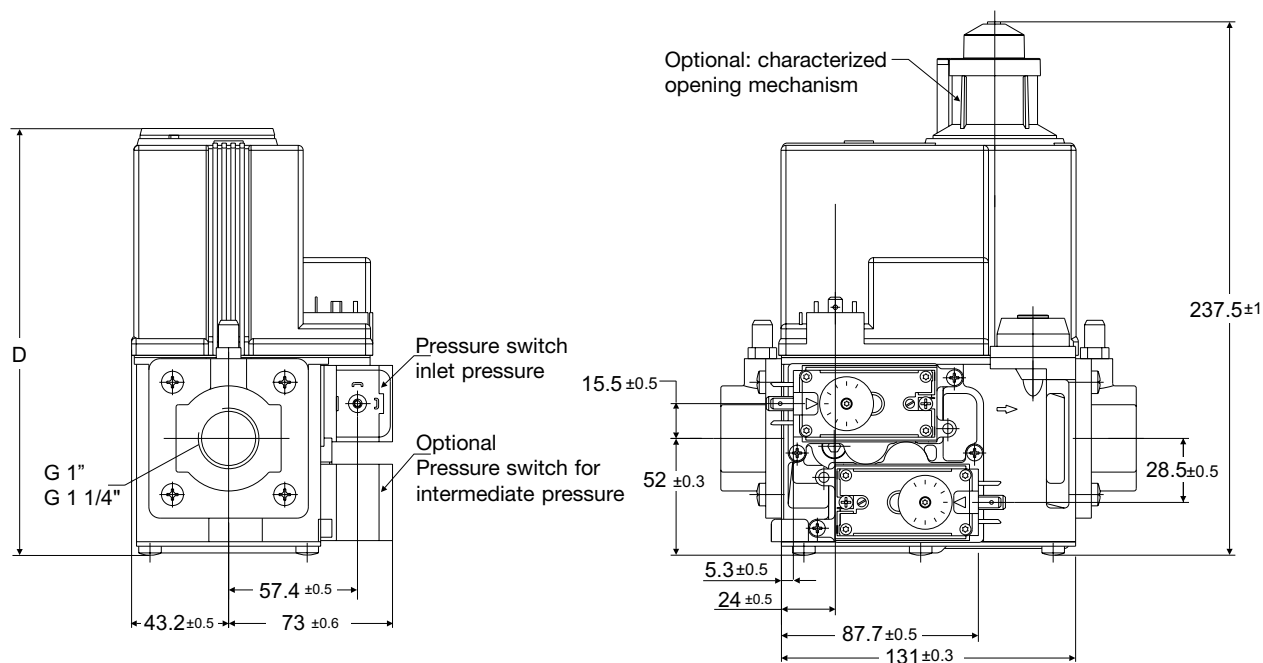
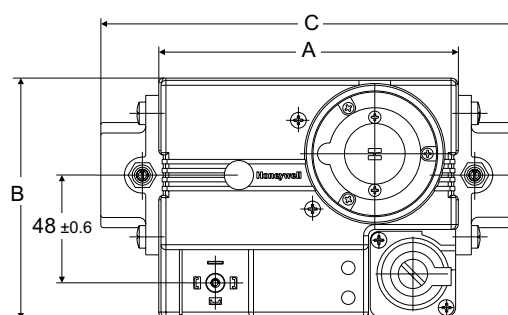
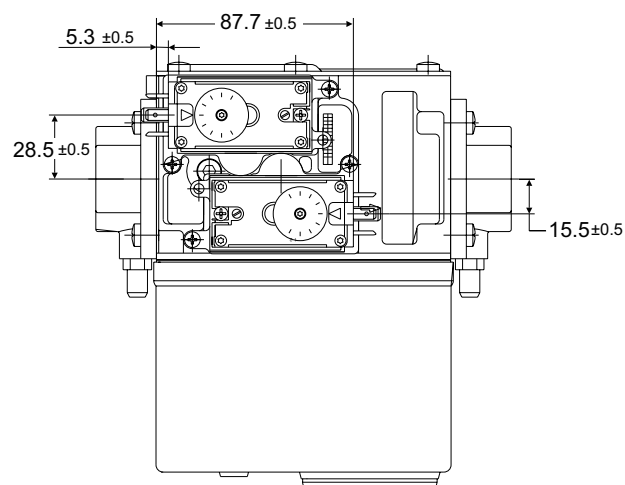


Fig. 5. Dimensional drawing VR415/VR815 (DN15) and VR420/VR820 series (DN20)

DIMENSIONAL DRAWINGS VR425/VR825/VR432/VR832 KTCOMB15/20/25

	Kit flange	Variable Dimensions			
		A	B	C	D
VR425/825 100/200 mbar EMC Class B	KTCOMB25	133.4 ±0.4	107.4 ±0.4	185 ±0.5	190 ±0.8
	KT432FG0	133.4 ±0.4	107.4 ±0.4	199 ±0.5	190 ±0.8
VR432/832 100/200 mbar EMC Class B	KTVR32	133.4 ±0.4	107.4 ±0.4	197 ±0.5	190 ±0.8
VR425 360 mbar EMC Class A	KTCOMB25	133.4 ±0.4	107.4 ±0.4	185 ±0.5	190 ±0.8
	KT432FG0	133.4 ±0.4	107.4 ±0.4	199 ±0.5	190 ±0.8
VR432 360 mbar EMC Class A	KTVR32	133.4 ±0.4	107.4 ±0.4	197 ±0.5	190 ±0.8
VR425 360 mbar EMC Class B	KTCOMB25	136 ±0.2	109.4 ±0.2	185 ±0.5	191.1 ±0.8
	KT432FG0	136 ±0.2	109.4 ±0.2	199 ±0.5	191.1 ±0.8
VR432 360 mbar EMC Class B	KTVR32	136 ±0.2	109.4 ±0.2	197 ±0.5	191.1 ±0.8

**Fig. 6. Dimensional drawing VR425/VR825 series (DN25) and VR432/VR832 series (DN32)**

DIMENSIONAL DRAWINGS VR434/VR834 WITH FLANGE KIT KT432FG0

	Kit flange	Variable Dimensions			
		A	B	C	D
VR434 100 mbar EMC Class B	KT432FG0	136 ±0.2	109.4 ±0.2	199 ±0.8	215.1 ±1.2
	KTVR32	136 ±0.2	109.4 ±0.2	197 ±0.8	215.1 ±1.2
VR434 100 mbar EMC Class A	KT432FG0	133.4 ±0.4	107.4 ±0.4	199 ±0.8	214 ±1.2
	KTVR32	133.4 ±0.4	107.4 ±0.4	197 ±0.8	214 ±1.2
VR434 360 mbar EMC Class B	KT432FG0	136 ±0.2	109.4 ±0.2	199 ±0.8	215.1 ±1.2
	KTVR32	136 ±0.2	109.4 ±0.2	197 ±0.8	215.1 ±1.2
VR434 360 mbar EMC Class A	KT432FG0	133.4 ±0.4	107.4 ±0.4	199 ±0.8	214 ±1.2
	KTVR32	133.4 ±0.4	107.4 ±0.4	197 ±0.8	214 ±1.2

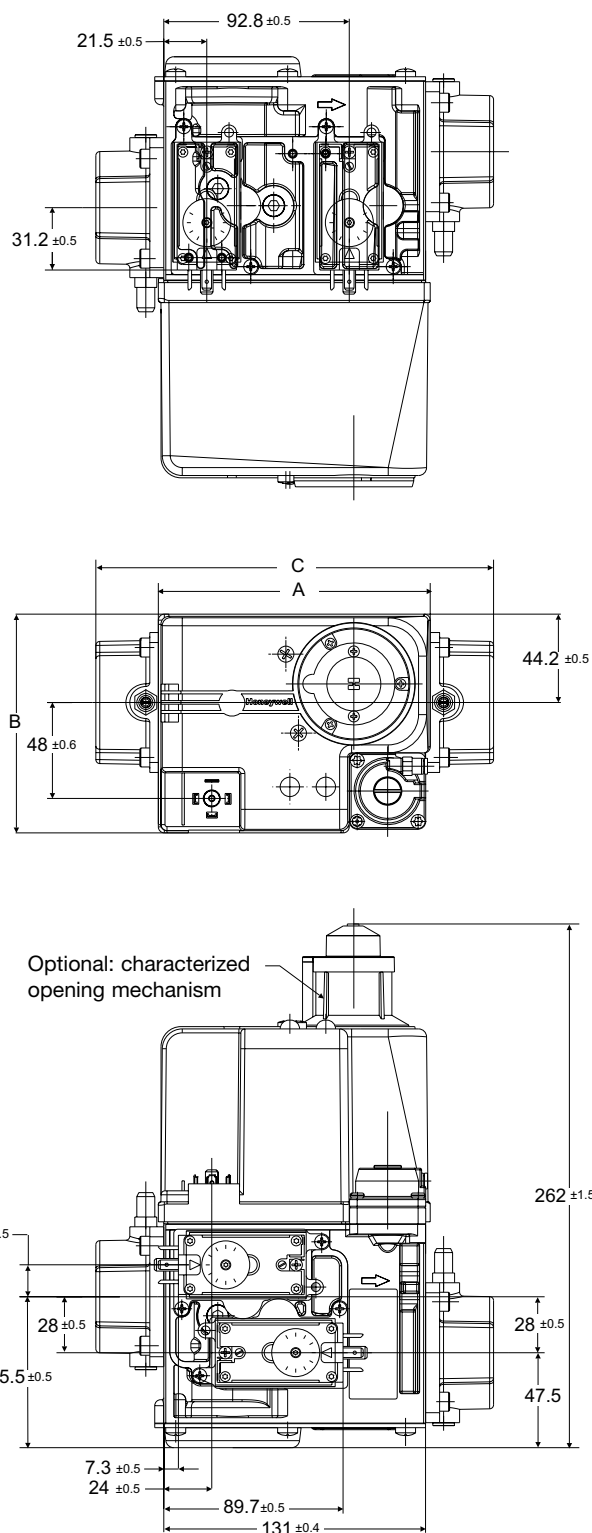


Fig. 6a. Dimensional drawing VR434/VR834 series (DN32)

DIMENSIONAL DRAWINGS VR434/VR834 WITH FLANGE KIT KT434FG1 + KT434FG2

		Variable Dimensions			
	Kit flange	A	B	C	D
VR434 100 mbar EMC Class B	KT434FG1+KT434FG2	136 ±0.2	109.4 ±0.2	215 ±0.8	215.1 ±1.2
VR434 100 mbar EMC Class A	KT434FG1+KT434FG2	133.4 ±0.4	107.4 ±0.4	215 ±0.8	214 ±1.2
VR434 360 mbar EMC Class B	KT434FG1+KT434FG2	136 ±0.2	109.4 ±0.2	215 ±0.8	215.1 ±1.2
VR434 360 mbar EMC Class A	KT434FG1+KT434FG2	133.4 ±0.4	107.4 ±0.4	215 ±0.8	214 ±1.2

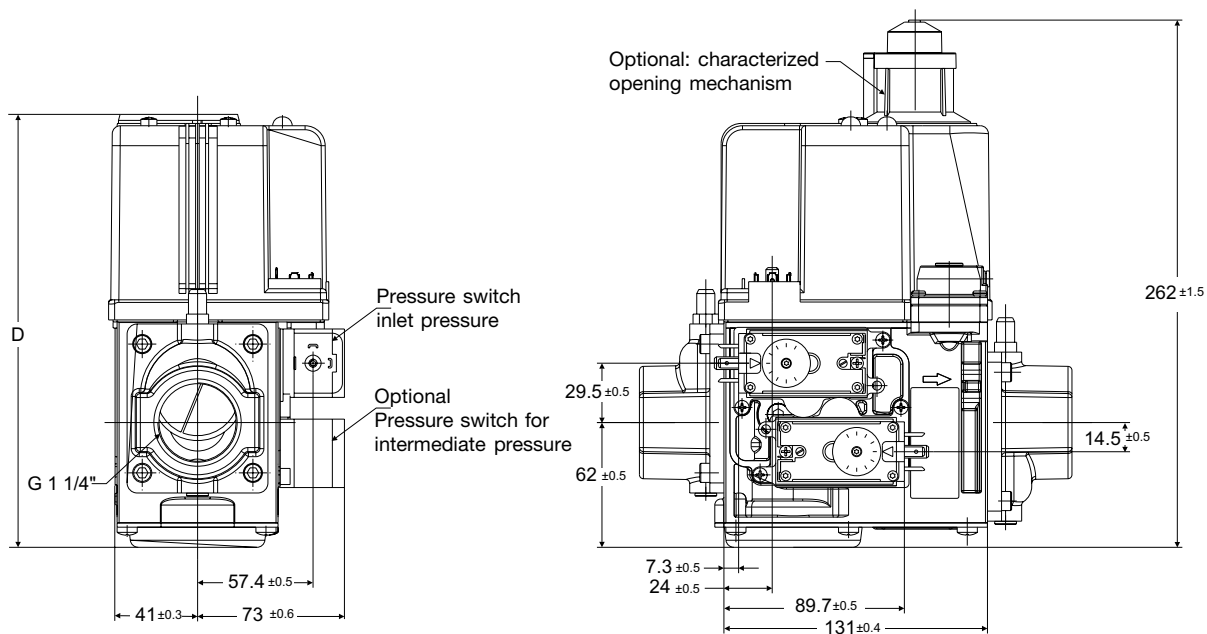
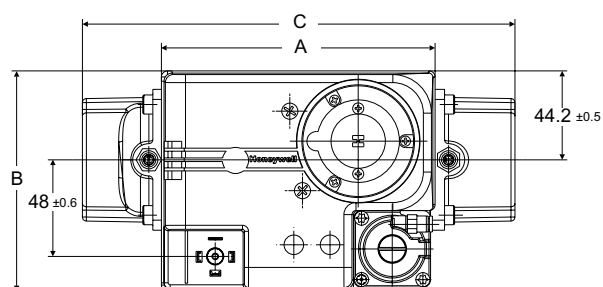
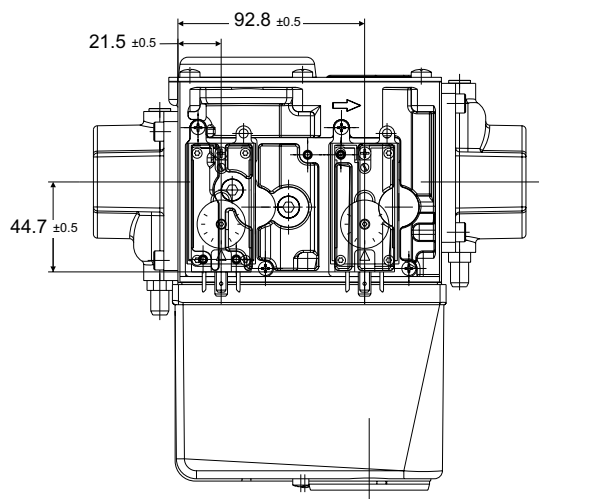


Fig. 7. Dimensional drawing VR434/VR834 series (DN32)

INSTALLATION

IMPORTANT

1. Read these instructions carefully. Failure to follow the instructions could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. The installation has to be carried out by qualified personnel only.
4. Carry out a thorough checkout when installation is completed.

! CAUTION

- 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).

Mounting position

The gas valve can be mounted plus or minus 90 degrees from the vertical.

Mounting location

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

Main gas connection

1. Take care that dirt does not enter the gas valve during handling
2. Remove the flanges from the valve.
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 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.

! WARNING !

Tightness test after installation

- Spray all pipe connections and gaskets with a good quality gas leak detection spray.
- 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 gas valve.

Electrical connection

! CAUTION

- 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.

Wiring

Follow the instructions supplied by the appliance manufacturer. Refer to Fig. 8. and Fig. 9.

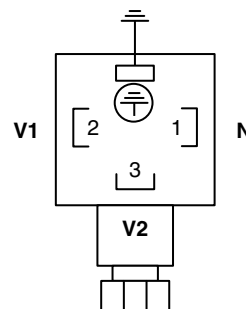


Fig. 8. Three pin electrical plug connector (according to ISO 4400) for IP applications.

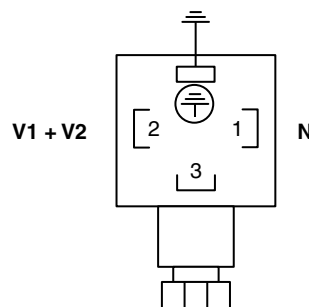


Fig. 9. Three pin electrical plug connector (according to ISO 4400) for DBI applications.

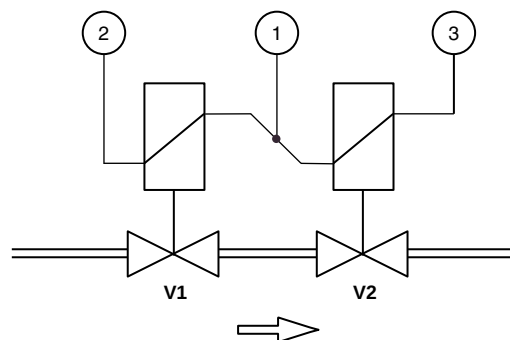


Fig. 10. Connection diagram VR400

ADJUSTMENTS AND FINAL CHECKOUT

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

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

The following characteristics can be adjusted:

- flow rate

Flow rate adjustment

1. Remove the cap from the cover.
2. Turn adjustment screw counter-clockwise to increase or clockwise to decrease the flow rate.

2nd valve (slow opening)

The following characteristics can be adjusted:

- flow rate
- step pressure

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 is the greatest.

Flow rate adjustment (see fig. 11. and fig. 12.)

1. Remove the cap from top of the coil by loosening both screws.
2. Place a wrench on the adjustment hexagon nut.
3. Turn wrench counter-clockwise to increase or clockwise to decrease the flow rate .
4. Replace cap on top of the coil.

Step pressure adjustment (see fig. 13.)

1. Remove the cap from top of the coil by loosening both screws.
2. Place a screw driver in the slot of adjustment screw which is situated in center of the valve.
3. Turn screw driver counter-clockwise to increase or clockwise to decrease step pressure.
4. Replace cap on top of the coil.

Opening speed adjustment (see fig. 14.)

Opening speed is factory set at customer settings, the adjustment screw is sealed.

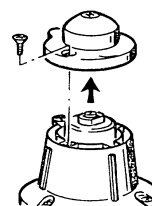


Fig. 11.

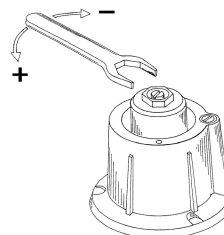


Fig. 12.

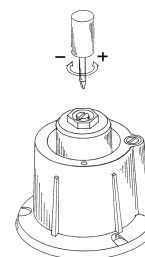


Fig. 13.

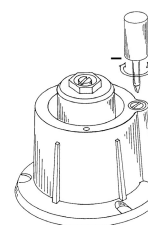


Fig. 14.

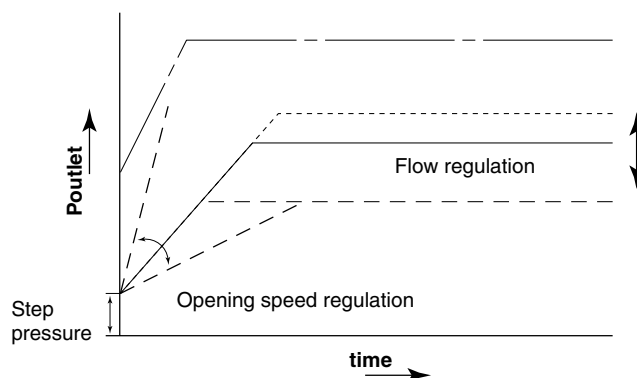


Fig. 15. Characterized opening.

Adjustment outlet pressure

- Disconnect pressure feedback connection (if applicable)
- Energize both electric operators in order to have gas input to burner
- Check gas input to the appliance using a clocking gas meter or alternatively a pressure gauge connected to the outlet pressure tap.
- Remove pressure regulator cap screw to expose pressure regulator adjustment screw.
- Slowly turn adjustment screw with a small 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.
- For non-regulating mode (LP gas) turn adjustment screw clockwise until it stops.
- Replace pressure regulator cap screw.
- Connect pressure feedback connection (if applicable).

Pressure tap points

The VR400/VR800 series has a number of connections points for measuring pressure, mounting a pressure switch, or IP applications.

The following pressures can be measured:

- P - pilot gas
- 1+2 - Inlet pressure
- 3 - Intermediate pressure
- 4 - Outlet pressure

The corresponding numbers can be found on the sides of the valve

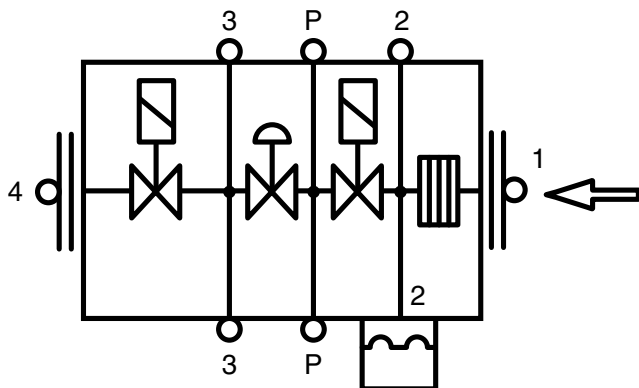


Fig. 16. Pressure tap points for VR415/VR420/VR425/VR432

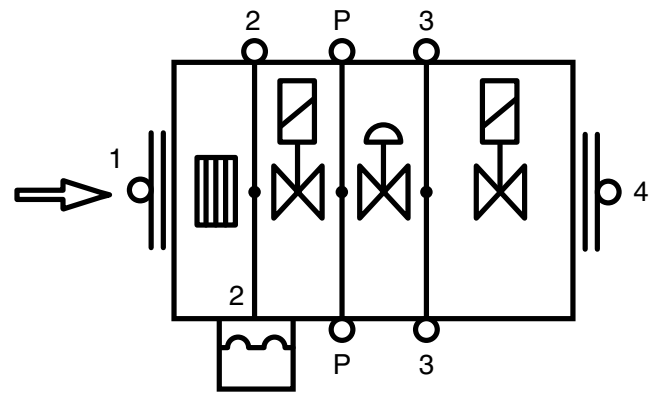


Fig. 17. Pressure tap points for all versions

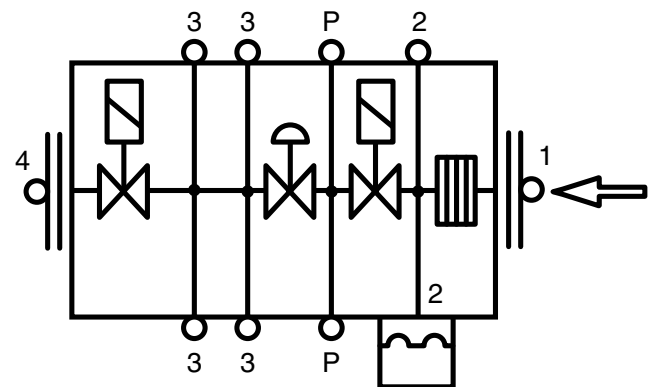


Fig. 17a. Pressure tap points for VR434 only

Final checkout of the installation

Set the appliance in operation after any adjustment and observe several complete cycles to ensure that all burner components function correctly.

CONSTRUCTION AND WORKING PRINCIPLES VR415/420/425/432

Servo pressure regulation working

The VR400/VR800 series servo regulated combination gas valves are 2 x class A fail safe shut-off valves. The valve is opened by energizing the direct ON/OFF operators. Each operator consists of a coil and a stop sleeve assy. Inside the stop sleeve assy is a plunger which is connected to a rubber valve and which is able to move up and down and thus opening or closing the valve.

The plunger is coated with an anti friction material.

Flow regulation is done by adjustable plunger stroke. A strainer made out of AISI303 is incorporated between inlet flange and main body. The valve closing spring are made of AISI302.

Seals and gaskets are manufactured out of hydrocarbon resistant NBR according to DIN 3535 and EN 291.

The VR400/VR800 series features the positive servo system, i.e. the regulating valve is held by spring pressure in the normal open position. The heart of the system is the servo pressure regulator which consists of a pressure relief valve integrated in a regulator diaphragm which is fitted above and controls the regulating valve.

When both operators are energized, inlet gas flows through the servo orifice into the servo system and into the regulator. This servo gas moves the regulating diaphragm upwards. As soon as the regulating valve has opened, the outlet pressure generated by the VR400/VR800 series will be sensed by the regulator diaphragm via the feedback channel.

When the force operated by the pressure is greater than that preset by the adjustment screw, the regulator valve opens relieving some of the working pressure. This reduces the force against the regulating valve spring allowing the regulating valve to close proportionately. Thus the regulating valve limits the outlet (or burner) pressure to the preset level.

As a result, outlet pressure is continuously maintained by comparing it to the preset pressure and adjusting the position of the regulating valve accordingly. This means that a constant outlet pressure is maintained regardless of inlet pressure variations. At shut down, the small volume of working gas in the regulator and in the diaphragm chamber is dumped into the main outlet chamber.

A reference pressure feedback connection further regulates the outlet pressure by compensating for differences in the air pressure in the combustion chamber and at the valve. If pressure regulation working is not needed, the regulator spring can be blocked by turning the adjustment screw down until it stops or the pressure regulation is removed. In these cases the full servo gas pressure opens the regulating valve as far as the pressure drop allows.

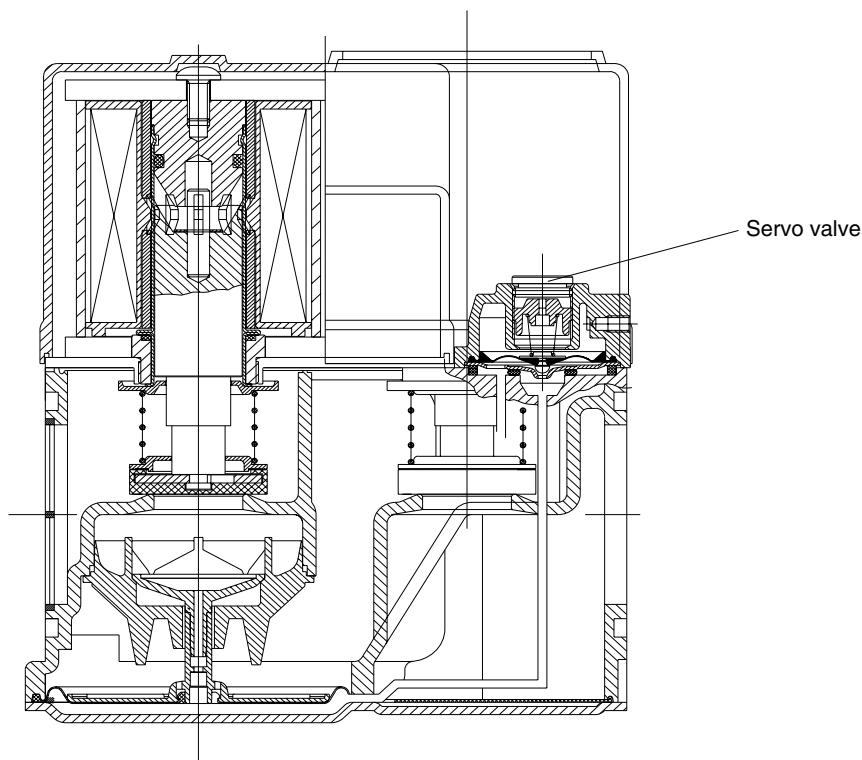


Fig. 18. Servo pressure regulator working VR415/420/425/432

CONSTRUCTION AND WORKING PRINCIPLES VR434

Servo pressure regulation working

The VR434/VR834 series servo regulated combination gas valves are 2 x class A fail safe shut-off valves. The valve is opened by energizing the direct ON/OFF operators. Each operator consists of a coil and a stop sleeve assy. Inside the stop sleeve assy is a plunger which is connected to a rubber valve and which is able to move up and down and thus opening or closing the valve.

The plunger is coated with an anti friction material.

Flow regulation is done by adjustable plunger stroke. A strainer made out of AISI303 is incorporated between inlet flange and main body. The valve closing spring are made of AISI302.

Seals and gaskets are manufactured out of hydrocarbon resistant NBR according to DIN 3535 and EN 291.

The VR434/VR834 features a servo system. The regulating valve is positioned between the two shut-off valves. When both operators are energized, servo gas will start to flow through the system of the regulating diaphragm. From this chamber gas will flow via the inlet orifice (restriction) into the servo chamber. The pressure in the servo chamber is controlled by the pressure regulator. The balance between the pressure underneath the regulating diaphragm and the servo pressure determines the opening of the regulating valve

As soon as the regulating valve has opened, the outlet pressure generated by the VR400/VR800 series will be sensed by the regulator diaphragm via the feedback channel.

When the force operated by the pressure is greater than that preset by the adjustment screw, the regulator valve opens relieving some of the working pressure. This reduces the force against the regulating valve spring allowing the regulating valve to close proportionately. Thus the regulating valve limits the outlet (or burner) pressure to the preset level.

As a result, outlet pressure is continuously maintained by comparing it to the preset pressure and adjusting the position of the regulating valve accordingly. This means that a constant outlet pressure is maintained regardless of inlet pressure variations. At shut down, the small volume of working gas in the regulator and in the diaphragm chamber is dumped into the main outlet chamber.

A reference pressure feedback connection further regulates the outlet pressure by compensating for differences in the air pressure in the combustion chamber and at the valve. If pressure regulation working is not needed, the regulator spring can be blocked by turning the adjustment screw down until it stops or the pressure regulation is removed. In these cases the full servo gas pressure opens the regulating valve as far as the pressure drop allows.

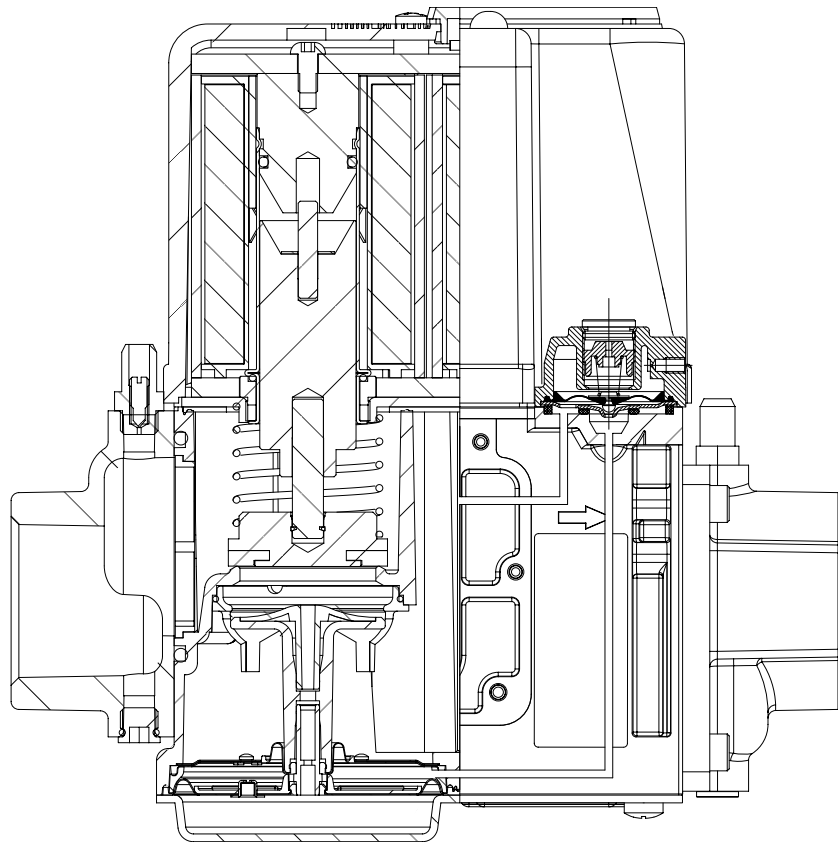


Fig. 18a. Servo pressure regulator working (VR434)

STANDARDS AND APPROVALS

Standards

The VR400/VR800 series servo regulated combination valves have been designed to meet the European Standard EN 126. The safety shut-off valve meets class „A“ requirements. According to bending stress the combination valve meets the highest requirements.

Regarding electric safety, the VR400/VR800 series can be used in appliances according to European Standard for a household electrical requirements EN 60335 series and industrial applications.

The VR400/VR800 series also meet all Electro Magnetic Compatibility standards for non-industrial and industrial appliances.

Approvals

The VR400/VR800 series servo regulated class „A“ combination valves conform with the following EC-directives:

- Gas Appliance Directive (90/396/EEC)
PIN: 0063AT1198
- Low Voltage Directive (73/23/EEC)
- Electro Magnetic Compatibility Directive (89/336/EEC)

The fact that the VR400/VR800 series are certified to European Standard EN 126 means that this series meets more stringent requirements than laid down in the essential requirements stated in the directives and therefore meets the requirements in all EC and EFTA countries.

Details can be found in the Approvals List.

The registration number specific for each O.S. number is mentioned on the label of the control.

ORDERING INFORMATION

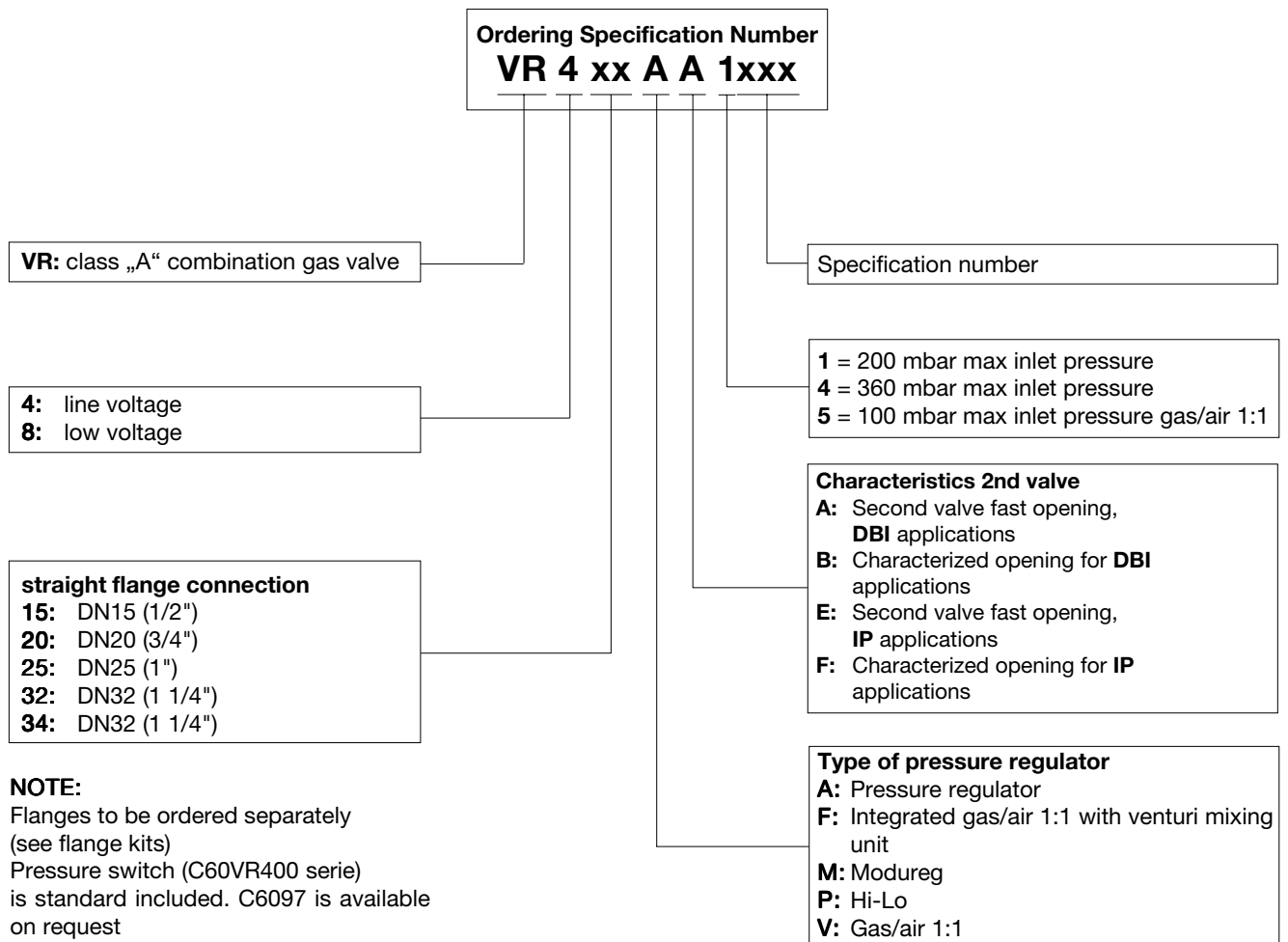


Fig. 19. Ordering information VR400/VR800 series combination valves

How to select your valve

Standard the VR400/VR800 series servo regulated combination valves are equipped with two main valves V1 and V2.
Safety valve V1 is always fast opening/closing.
The second valve (V2) can be either fast or slow (= with flow regulation and adjustable opening).

At the main body flange connections (8) are provided to mount either pressure switches, a pilot valve, or a VPS + pressure switch.
These additional functionalities can be mounted on various positions of the main body of the VR400.

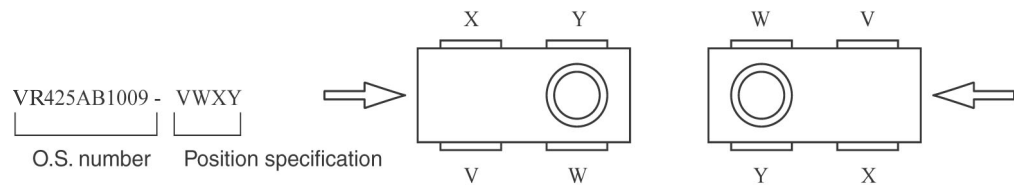


Table 1: VR400 series positions and additional functionalities chart

Type	Code	Positions			
		V	W	X	Y
C60VR40040 (5 ... 40 mbar)	1	●	●	●	●
C60VR40110 (30 ... 110 mbar)	2	●	●	●	●
C60VR40300 (100 ... 300 mbar)	3	●	●	●	●
A4021A + C60VR wired	4		●		●

Use the 4 digits behind the OS number to specify which option you need in which position.
Example:
With a 5 ... 40 mbar pressure switch on position V, the full O.S. number will be VR425AB1009-1000.
If you do not want any additional option the O.S. number will be VR425AB1009-0000

REPLACEMENTS

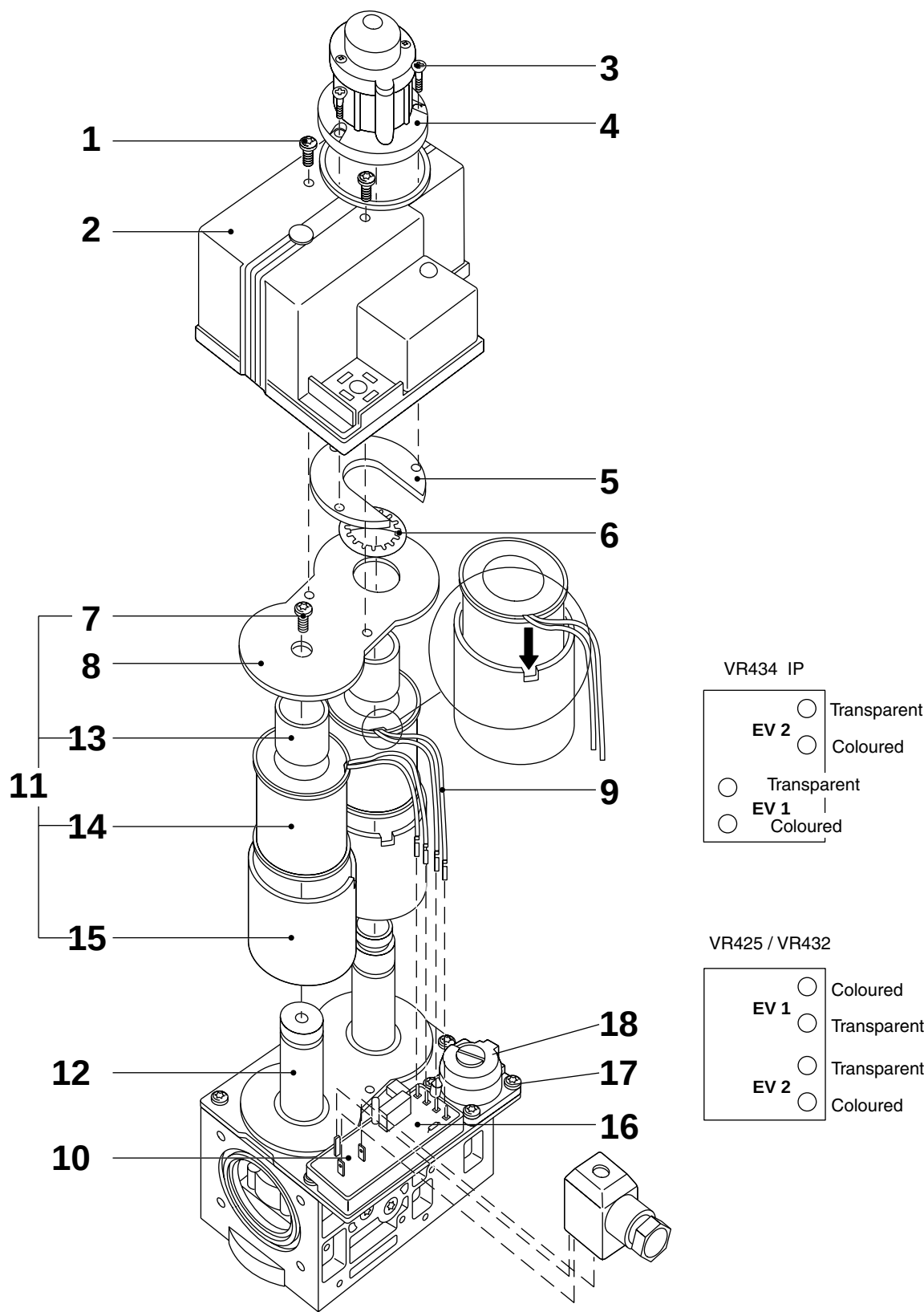


Fig. 20. Exploded view of the VR400/VR800 series

Replacement of coils (see fig. 20.)**⚠ WARNING****Disconnect power supply before**

1. Remove screws (1) on top of cover.
2. Lift cover (2).
3. Remove three screws (3) hydraulic unit (4).
4. Lift hydraulic unit (4).
5. Remove mounting bracket (5).
6. Remove blade spring (6).
7. Loosen and remove screw first operator (7).
8. Remove top plate (8).
9. Disconnect leads coils (9) from circuit board (10).
10. Lift coil assy (11) from operator (12).
11. Remove flux tube (13) from coil assy.
12. Remove coil (14) from tube (15).
13. Place new coil in tube with leads on top and in slot of the tube.
14. Replace flux tube into coil assy from top.
15. Place assy on operator with leads on top and in slot of operator.
16. Connect leads.
17. Replace top plate and fasten it with screw.
18. Replace blade spring.
19. Replace mounting bracket.
20. Replace cap or hydraulic unit and fasten it with screws.
21. Check if seal cover is mounted correctly and correct if needed.
22. Replace cover and fasten it with screws.

Remark: for fast opening versions, operations 3 and 4 are not applicable.

Replacement of rectifier board (see fig. 20.)**⚠ WARNING****Disconnect power supply before**

1. Remove screws (1) on top of cover.
2. Lift cover (2).
3. Disconnect leads coils (9) from circuit board (10).
4. remove screw (16) from printed circuit board.
5. Lift printed circuit board.
6. Place new printed circuit board.
7. Replace and fasten screw in printed circuit board.
8. Connect leads.
9. Check if seal cover is mounted correctly and correct if needed.
10. Replace cover and fasten screws.

Replacement of hydraulic slow open unit (see fig. 20.)**⚠ WARNING****Disconnect power supply before**

1. Remove screws (1) on top of cover.
2. Lift cover (2).
3. Remove three screws (3) from hydraulic unit (4).
4. Lift hydraulic unit (4).
5. Place new hydraulic unit and fasten it with screws.
6. Check if seal cover is mounted correctly and correct if needed.
7. Replace cover and fasten it with screws.

Replacement of pressure regulator (see fig. 20.)**⚠ WARNING****Disconnect power supply before**

1. Disconnect pressure feedback connection (if present).
2. Loosen and remove screws (17) from regulator (18).
3. Lift regulator (18).
4. Remove rubber gasket.
5. Place new gasket.
6. Place new regulator and fasten it with screws.
7. Reconnect pressure feedback connection.
8. Reconnect pressure and power supply.
9. Energize valve.
10. Check for leakage.

REPLACEMENT PARTS AND ACCESSORIES

IMPORTANT

When ordering replacement coils include the complete valve O.S. number, in order to provide the coil with proper product identification sticker.

WARNING

- Take care that only qualified persons carry out the installation of parts, accessories, and add on components.
- Follow the installation instructions included in the package.
- Check that the selected part, accessory or add on component is the correct one for the application in question.
- Replace the old gaskets with the new ones supplied in the package and check for leakage when the supply is switched on again.
- After installation and/or replacement has been completed, a gas leak test must be carried out.
- Also check the gas valve for satisfactory operation after fitting accessories.

Table 2: Coils for VR400/VR800 series

Model		Order number	rated Voltage (Vac)	200 mbar	Packing qty	100 mbar
DN15 DN20	V1	BBE20020	230	●	1	
		BBE20021	110	●	1	
		BBE20022	24	●	1	
	V2	BBE20020	230	●	1	
		BBE20021	110	●	1	
		BBE20022	24	●	1	
DN25	V1	BBE20025	230	●	1	
		BBE20026	110	●	1	
		BBE20027	24	●	1	
	V2	BBE20025	230	●	1	
		BBE20026	110	●	1	
		BBE20027	24	●	1	
DN32	V1	BBE20025	230		1	●
	V2	BBE20025	230		1	●
VR434	V1	BBE20034	230		1	●
	V2	BBE20034	230		1	●

Table 3: Rectifier boards for VR400/VR800 series

Model	Order number	rated Voltage (Vac)	Packing qty
IP application DN15 DN20 DN25 DN32	CSE20026	230	1
	CSE20026	110	1
	CSE20028	24	1
DBI application DN15 DN20 DN25 DN32	CSE20025	230	1
	CSE20025	110	1
	CSE20027	24	1
VR434 IP	CSE20030	230	1
VR434 DBI	CSE20029	230	1

Table 4: Slow open units

Model	Order number
DN20	GFO50001
DN25	
DN32	

Table 5: Regulators

Regulator type		Range	O.S. number
Standard regulator		2,5 ... 20	V53306E 1002
		3 ... 37	V5306E 1143
		10 ... 60	V5306E 1119
High - Low regulator 230V 50Hz		3 ... 20	V4336A2204
		4 ... 37	V4336A2212
		8 ... 50	V4336A2220
Modureg	165 mA	1,5 ... 20	V7335A2026
		3 ... 37	V7335A2067
		8 ...50	V7335A2034
	250 mA	1,5 ... 20	V7335A2000
		3 ... 37	V7335A2059
		8 ...50	V7335A2018