

MANUAL

UHV GAS DOSING VALVE ND 3 MANUALLY OPERATED

Valve	F3CF1616-01 and F3CF1616-012
Valve	F3CF3516-01 and F3CF3516-012
Valve	F3VCR-01 and F3VCR-012
Heating Cartridge	HF3
Heating Controller	HF3-S1

CONTENT

1. Application	4
2. Description	4
3. Technical Data	5
3.1. Dimensions:	7
4. Connection	8
4.1. Cleanliness	8
4.2. Mounting Position	8
4.3. Admissible Forces	8
4.4. Operation	9
5. Putting Into Operation	9
6. Maintenance	10
7. Service And Repairs	10
7.1. General	10
7.2. Dismanteling of the Actuator	11

7.3. Dismanteling of the Housing.....	12
8. Spare Parts.....	13
9. Warranty	14
10. Accessories	15
10.1. Heating Cartridge	15
10.2. Heating Controller	15
10.2.1. Connections	16
10.2.2. Programming.....	17
10.2.3. Display	19
10.2.4. Start Heating	20
10.2.5. End Heating	20
10.2.6. Error Messages	20
10.3. Vernier	21
11. Contact	22

1. APPLICATION

The UHV-Leakvalve is both a shut-off device and a control valve to control a gasflow. It covers a wide range of controllability and can be baked, thanks to the used all-metal technology.

2. DESCRIPTION

The housing and all parts in touch with the medium are made of stainless steel. The plate gasket and the bonnet gasket are one piece and made of stainless steel, gold plated.

The tightening between the valve rod and the inner volume is done through a diaphragm made of metal.

To ensure the big control range, the spindle works with a variable gear ratio, depending in which control range the valve actually is. The spindle presses a disk-spring package, and this presses the plate seal.

The actuator is a complete cartridge and cannot be taken apart. It is made of hardened parts and has a lifetime greasing.

3. TECHNICAL DATA

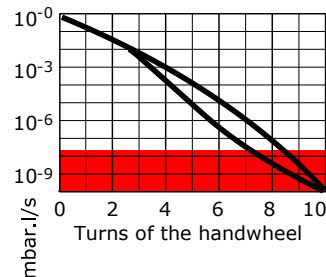
Pressure range 1 x 10⁻¹⁰ mbar to 10 bar

Leakrate: Housing 1.10⁻¹⁰ mbar.l/s

Valve plate 1.10⁻¹⁰ mbar.l/s

Differential pressure at the valve plate 10 bar in both directions

Leakrate: In the open position the throughput is 60 mbar.l/s.



In the range of turn 0 - 3, the diaphragm does not touch the valve seat, therefore there is no hysteresis. Due to physical reasons, the valve cannot control the range between 10⁻⁸ and 10⁻¹⁰, if the valve is used in cold conditions. In that case, the valve is tight from turn 8 to 10.

Mounting position
seat side.

any. Valves with VCR-connectors have an "1" printed on the valve

Temperatures:

Housing 300°C in control positions, 450°C in open position

Actuator 300°C (CAUTION: The handwheel must not be touched)

Weight

CF-16/16, VCR 1,3 kg

CF-35/16 2,0 kg

Handwheel: Number of turns

10

Lifetime until first service

100.000 cycles

Materials:

Housing 316L

Diaphragm 316L gold plated

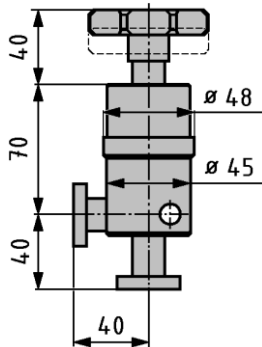
Mechanism (not in touch with medium) 304, steel hardened

Dead volume:

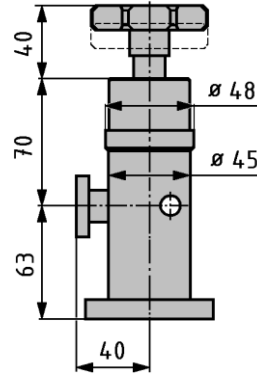
Main flange (down) 1,0 and 1,4 ccm (CF-16 and CF-35)

3.1. DIMENSIONS:

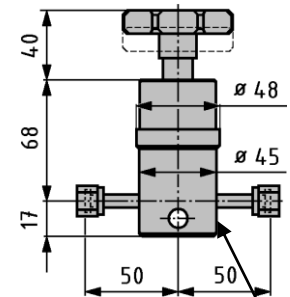
CF-16 rotatable on both sides:



CF-16 rotatable on the side and CF-35 rotatable downside:



VCR 3/4"



„1“ eingeschlagen auf der Ventilsitz-Seite

4. CONNECTION

4.1. CLEANLINESS

The valve may only be unpacked immediately before the valve is installed into the system. Sealing surfaces on the flanges, and also the valve interior may only be touched with clean gloves.

The valve may only be installed in clean systems.

4.2. MOUNTING POSITION

These valves may be mounted in any position. . The valve with VCR-connections has an “1” printed on the valve seat side.

4.3. ADMISSIBLE FORCES

The valve must not be used to support other heavy components. Install bellows elements in the piping to ensure that no additional forces, either during bakeout or by heavy weights of other components of the installation, or by vibrations, can effect the valve.

4.4. OPERATION

The handwheel on the top can be removed i.e. for heating processes. For that purpose the screw (hexagon socket set screw M4), which is situated across the main axis on one finger-surface, must be loosened.

It is not possible to overturn the valve by closing, there is a fixed stop in the closed position. The valve is tight already before this stop is reached. A big torque against this stop increases the sealing force for a small amount. Doing that, the hysteresis for this one closure is then increased. If this happened by mistake, one full opening is enough to come to the initial situation, and the hysteresis and the well-known leakrates will be reached again.

5. PUTTING INTO OPERATION

After installing of the valve according to this manual it is ready to operate. The valve is shipped in closed position. To be sure about the tightness of the vacuum system, we recommend to check the whole valve and the flanges about their helium tightness.

6. MAINTENANCE

If the valve is used under clean conditions, it works maintenance-free during the lifetime stated in the technical data. If a valve will be sent back to the factory, it must be free from toxicant and noxious matters. Where applicable, it must undergo a decontamination prior to return. A certificate which confirms the harmless and safety must be added to the shipment.

7. SERVICE AND REPAIRS

7.1. GENERAL

During service works the following items must be observed:

- All works must be done under clean conditions.
- Sealing surfaces must be protected.
- Use only original spare parts.

7.2. DISMANTELING OF THE ACTUATOR

The actuator 01 is a single unit and can only be displaced in whole. Doing that it is recommended to put the valve first in the open position. Then the 2 M5 hexagon socket head cap screws can be loosed and removed. Then the actuator can be removed. See Figure 1 on page 13.

Then a package of disk springs is accessible, which can be newly greased. Use only temperature resistant greases. The stamp 03 can be removed together with the spring package. Then the diaphragm will be visible. On reassembling it must be considered that no dust or dirt or other particles are left on the diaphragm or on the stamp (on the front side where it touches the diaphragm), because this will infringe the tightness of the valve. Greases at this place are not necessary, but allowed (because this side of the diaphragm is not in touch with the medium).

ATTENTION: The package of disk springs is adjusted individual for each valve, and it must not be mixed, exchanged or otherwise modified.

7.3. DISMANTELING OF THE HOUSING

ATTENTION: From this step on, the medium touched inner parts will be uncovered. Depending on the used medium, it will be released to outside and it must be ensured that absolute no toxicant or noxious materials are left in the valve.

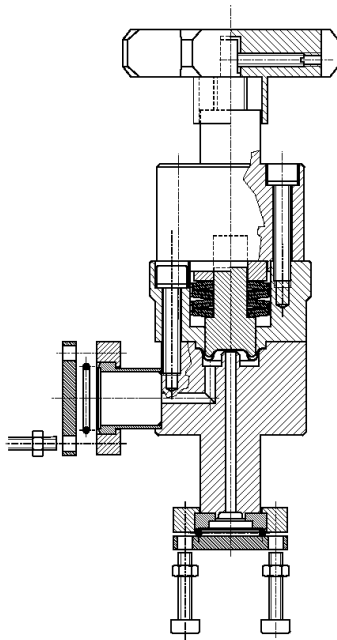
Loose and remove the four screws 04. Now the upper part of the housing, and then the diaphragm can be removed.

The diaphragm is used both as valve plate and as bonnet gasket.

Damages or scratches on the sealing surfaces requests new machining of the parts!

Before assembling, the parts must be cleaned carefully. In the vacuum-area no grease or oil must be used!

8. SPARE PARTS



Actuator	15308
Diaphragm	15301
Housing CF 16/16	15421
Housing CF 35/16	15424
Housing VCR	15614

The diaphragm cannot be damaged by normal use. Only through improper using like crystal-growing of the used gases, other solid parts in the medium, or mechanical damage during a repair can damage the diaphragm.

Figure 1: Cut through a Leakvalve

9. WARRANTY

These valves are assembled under clean conditions. Each valve is tested for optimum performance and leak tightness. Installation into customers vacuum system must be done under clean conditions.

Installation and operating instructions must be adhered to according to this manual. Faulty installation, inappropriate operation or modifications of the valve will annul our warranty.

We guarantee a warranty period of 12 months from the date of arrival at the customer. In case of rightly claimed complaints or defects we replace or we repair the goods, according to our own deciding. Replacing of the goods requires always the return of the complained goods. There is no warranty for subsequent damages.

On demand, services or repairs will be carried-out through us. Goods sent back to the factory, irrespective of the reason (service, repair, replacement due to warranties) must be free from toxicant and noxious matters. Where applicable, it must undergo a decontamination prior to return. A certificate which confirms the harmless and safety must be added to the shipment.

10. ACCESSORIES

10.1. HEATING CARTRIDGE

A high performance heating cartridge $\varnothing 8 \times 35\text{mm}$ with an integrated thermoelement is used.

Power: 200W / 230VAC

Material: Incoloy 800

Max. temperature: 800°C

The heating cartridge fits in the boring $\varnothing 8\text{mm}$ on the housing, and must be secured slightly with the set screw. To avoid damage of the heating cartridge, this set screw must not be hard tightened.

The valve cannot reach the requested temperature (over 100°C), if the valve is not insulated. After installing of the valve and the heating cartridge we recommend to put an approximately 20mm thick insulating material over the whole installation. Only the handwheel can - if wanted - jut out. The handwheel can be removed to avoid high temperatures on it.

10.2. HEATING CONTROLLER

The Heating Controller from WATLOW is adjusted to the heating cartridge and the valve. The adjustable parameters like heating- and cooling ratio are pre-adjusted.

The operation is turned on when shipped. Press the turn key and then turn heating on with setting “off” to turn it off and “Auto” to turn it on. The temperature setpoint can then be adjusted with the arrow keys. Operating instructions are available from nenion.

10.2.1. CONNECTIONS

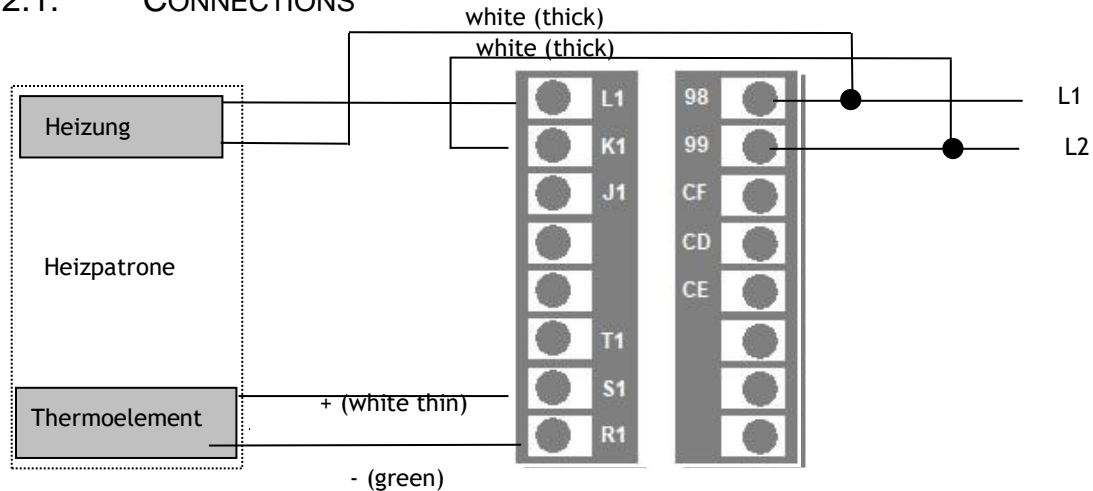


Figure 2: Connection of the Heating Controller

10.2.2. PROGRAMMING

We program all controllers, so that it is not necessary and not recommended to change the settings.

To enter into the operations-menu, press the arrow keys „up“ and „down“ together for min. 6 seconds. Green Display shows “Oper”.

To enter into the setup-menu, press the arrow keys „up“ and „down“ together for min. 6 seconds again. Green Display shows “Set”. If no key is pressed for a time of approx. 60 seconds, the setup-menu will be closed automatically. Go through the setup-menu with the arrow keys.

The green „turn“-key chooses the Setting.

The infinity-key will guide you back. Pressing it for 2 seconds will send you to the main menu.

Operating instructions are available from nenion. Choosing other settings than the following is not recommended and requires careful study of the operating instructions.

The different setup-menu-positions are:

 Analog Input (Submenu, Turn – Key to confirm)

 Factory Setting: tc Sensortype tc.

 Factory Setting: H. Thermoelement type. We use Type K, which is set as „H“.

The different operations-menu-positions are: These can be set in the setup-menu for all heating processes as well as in the operations menu for one.

LoopP Loop Control (Submenu, Turn – Key to confirm)

hR9 Loop control Heating: Setting on.of

CR9 Loop Control Cooling: Off

EEUn TruTune: Off

UFR User error: Off (Power will be set at 0%).

FRIL User error: Off (Power will be set at 0%).

rP Ramp: both.


rSc rP.Sc: hour. Time basis for Ramp (hour).

rct Ramp: 180. Ramp in °C (180°C/h).

LSP Min Temperature: 0.

hSP Max Temperature: 450.

9LbL Global Menu

 C – F: C. Celsius.

“Otp” Output Submenu

“heat” Output Heating.

“o.tb1” 20.0. Time Basis.

“o.hi” 100. Power Limit.

“o.Lo” 0. Power Limit.

10.2.3. DISPLAY

Upper 7-segments line red: Actual temperature in °C at the thermoelement.

Below 7-segments line green: Setpoint temperature in °C.

LED 1: Heating runs.

LED 2: Spare: Heat circuit 2.

LED 3: Spare: Heat circuit 3.

%: If this LED is on, the controller is in the manual-mode. Press “turn”-key twice and set Control to “Auto” with the Arrow Keys (Infinity Key leaves that menu.) to shut-up this LED and to put the controller in the automatic-mode.

Turn-key green: Go through the setup program.

Arrow key up: Go through the adjustments, upwards.

Arrow key down: Go through the adjustments, downwards.

Infinity-key: Press twice, to put the controller in the automatic mode. Press once to switch-off a possible alarm-LED.

10.2.4. START HEATING

Press arrow key up, until the requested temperature is in the green display. Heating starts after release. The LED 1 flashes, when the heating cartridge is under currency. Due to the adjusted ramp the LED 1 flashes not permanently, but every 10 seconds or so. The ramp is adjusted to 180°C/h.

10.2.5. END HEATING

Press arrow key down, until a temperature of i.e. 20°C is in the green display or press turn key and switch to "off". Cooling starts immediately after release.

10.2.6. ERROR MESSAGES

In the upper display appears 4 lines, in the below display appears is „Er X“.

Er.In Error in Wiring of Thermoelement: Wrong wiring or Shortcircuit. Also possibly wrong sensortype (see programming) or calibration error.

Er.Ab Thermoelement notifies a temperature under the allowed range (-200 – 450°C), or the controller has a mistake (analog/digital-conversion).

Er.CS Checksum error. Possibly the current was interrupted while the processor was under calculation.

To delate an error message: Switch-off the controller (cut the power input), and switch-on again.

If requested, a detailed manual from the manufacturer of the controller can be sent. This manual contains all different delivery versions and needs very exactly analyzing and adjustment.

10.3. VERNIER

A nonius on a valve can be used for individual reproducability of an adjustment. The fully open, as well as the fully closed position dont correspond with the “zero-position” of the handwheel.

The 10 lines on the housing are arranged for 180°, and each scale has s small number for identification: „1“ and „2“.

If a formerly adjusted and identified leak should be reproduced again by using the nonius, the movement must be leaded from the same side, this has to do with the hysteresis. It must be considered, that baking cycles, dirty gases or water layers on the surface can influence the results.

11. CONTACT



*Stefan Bösch
Sandstrasse 29
6890 Lustenau
ÖSTERREICH*

Tel.: +43 5577 826742

Email: office@nenion.at

Web: www.nenion.at