

INSTALLATION and OPERATING INSTRUCTIONS

UHV-LEAKVALVE ND 3

Stepper-motordriven

Valve F3CF1616-45

Valve F3CF3516-45

Valve F3VCR-45

Heating Cartridge HF3

Heater Controller HF3-S1

Controller F3-454



Version A

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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 controlability and can be baked, thanks to the used all-metal technology.

2. DESCRIPTION

2.1. Valve

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 on 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.

The Controller is a half 19" rack, 3HE (42TE), no additional components are necessary to operate the valve.

2.2. Controller

The front panel features a touch screen to control the valve. If you click on the nenion Logo at the top left corner, the help is being displayed. See there for the description of the software.

There is also the power button on the right side, a 3,5mm plug to host the nenion pen and below the screen a small hole. If you push the button behind the hole (with a paper clip or the like), the controller starts anew.

The back panel features different plugs:

MAINS SUPPLY Mains supply 110V / 230V, 50-60 Hz. A 2A - fuse is built-in.

INPUT/OUTPUT: 8-way plug. Configuration is described in 4.5.1.

VALVE Connection plug to the valve



ATTENTION: Do not unplug the valve before the mains supply has been switched off.

USB 2 USB Connectors to connect a mouse, keyboard or USB-Stick for an update.

REMOTE USB Remote USB Connection to control the valve from a remote Computer via USB. See help in the software for more information: Click on the nenion logo in the upper left corner.

ETHERNET Remote Ethernet Connection to control the valve from a remote Computer via Network. See help in the software for more information: Click on the nenion logo in the upper left corner.

The controller uses a raspberry pi. ssh is enabled and also file transfer via windows. The settings are:

Host name: nenion_leakvalv

User name: pi

Password: nenion2018

Help and software description is accessible via long press on the nenion icon directly on the controller.

3. TECHNICAL DATA

3.1. General

Pressure range		1×10^{-10} mbar to 10 bar
Leakrate:	Housing	$1 \cdot 10^{-10}$ mbar.l/s
	Valve plate	$1 \cdot 10^{-10}$ mbar.l/s
Differential pressure at the valve plate		10 bar in both directions

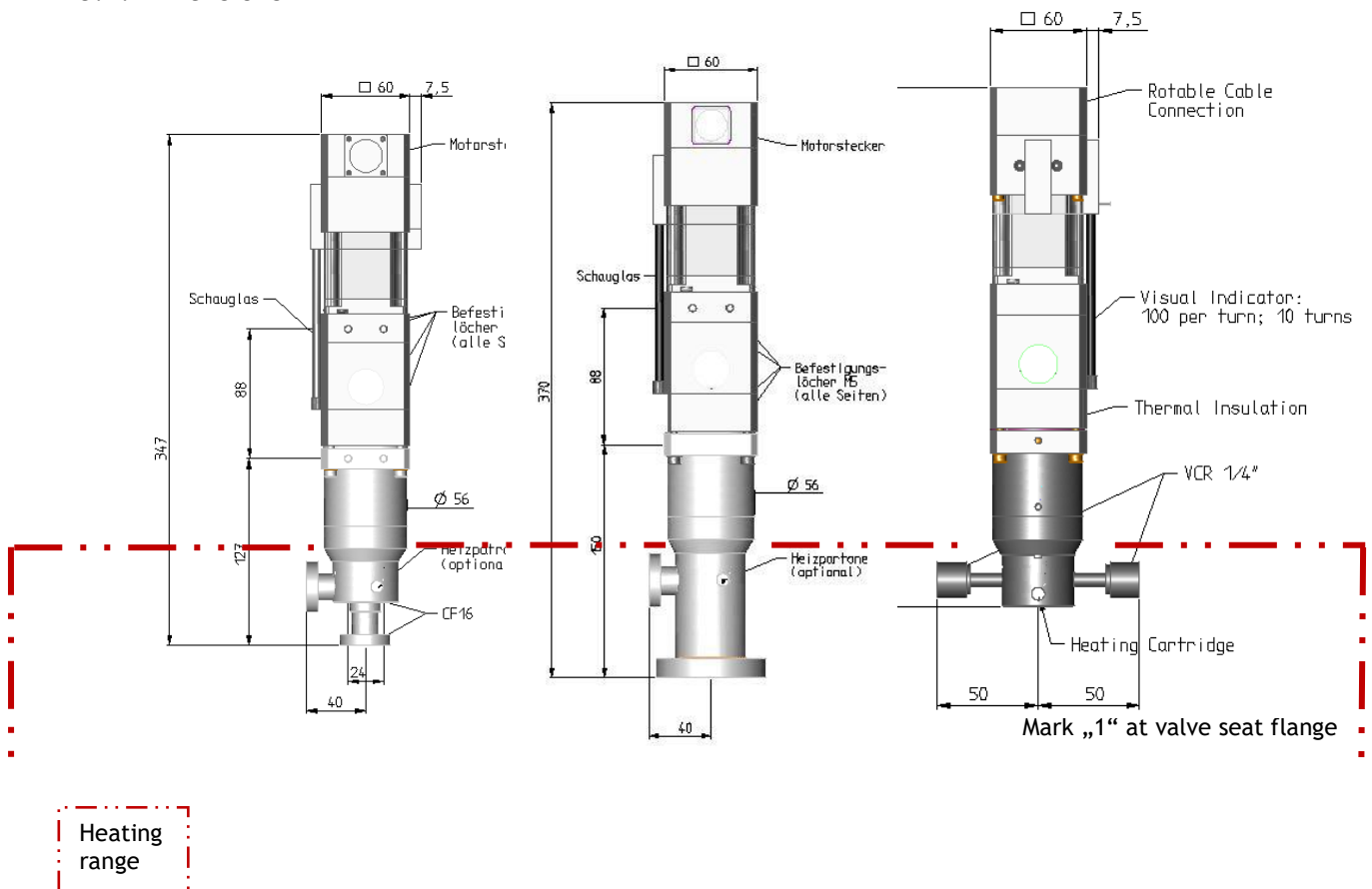
Adjustable leakrate:

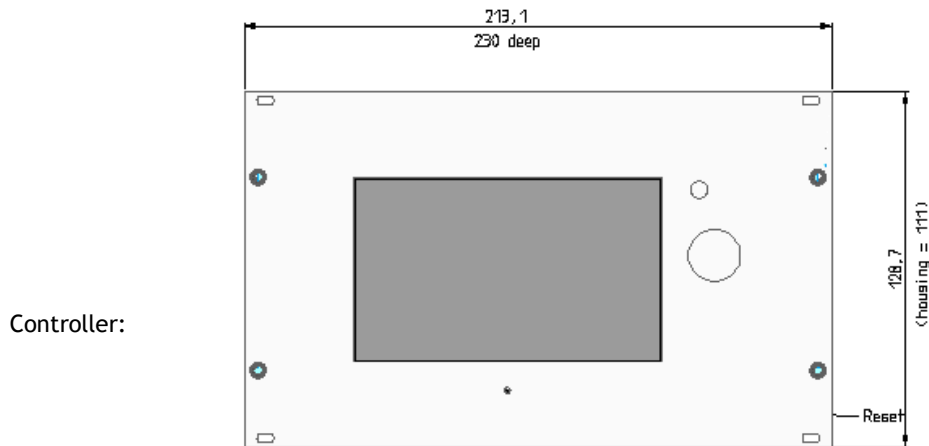
A throughput of 60 mbar.l/s is achieved in the open position. Close position: Due to physical reasons, the valve cannot control the range between 10^{-8} and 10^{-10} , if the valve is used in cold conditions. In that case, the valve is tight from turn 8 to 10. Control in this range is possible if the valve body is heated.

Mounting position Any. Valves with VCR-connectors have an "1" printed on the valve seat side.

Temperatures:	Housing	300°C. Motor may not be heated.
	Actuator	300°C (CAUTION: Heating range see page 5)
	Motor with gear and switches	50°C
Weight	CF-16/16 and VCR	4,5 kg
	CF-35/16	5 kg
Motor actuator:	Number of steps	1.000.000
	Lifetime until first service	100.000 cycles
Materials:	Housing	316L
	Diaphragm	316L gold plated
	Mechanism (not in touch with medium)	304, steel hardened and protected
	Parts between motor and valve	304, aluminium, steel hardened and protected
Deadvolume:	Main flange (down)	1,0 and 1,4 ccm (CF-16 and CF-35)
	Sideflange VCR ¼"	4,6 ccm
Actuation time:		14 seconds for the whole range.

3.2. Dimensions





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. There are 4 mounting holes (M5) on each side to attach the valve to a frame. 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. These valves may be mounted in any position. There are 4 mounting holes (M5) on each side to attach the valve to a frame. 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 valve is actuated by a stepper motor and an electronic Controller.

4.5. Electric connection

The valve and its Controller is a ready adjusted system. No programming or additional installations are necessary. All plugs cannot be mixed up or cannot be plugged-in in the wrong way. If longer cables will be used, the shielding and insulation must be done without gaps.

 **ATTENTION:** Before connection and switch-on of the mains supply, the plug and cable of the motor must be connected carefully.

The cable of the heating cartridge is a short one. It may be made longer for some meters. Doing this, the both wires for the thermoelement (green and brown) must not be connected in the hot or warm area, because in that case the temperature would be displayed incorrect.

 **ATTENTION:** There is high voltage inside of the Controller. It must not be opened from unauthorized staff.

The plugs in detail:

MAINS SUPPLY 110V60Hz or 230V50Hz. Cable is part of the delivery. Fuse 2A is already installed.

VAVLE This plug is connected with the valve.

 **ATTENTION:** Don't plug or unplug the motor before the mains supply is switched off! The motor has a 24V supply with high currents, and injures, electric chocks or burns can occur.

4.5.1. Electric connection with 0 - 10V input

INPUT	1 = Input Signal 1 (0-10V)
	2 = GND for Input Signal 1
	3 = Input Signal 2 (0-10V)
	4 = GND for Input Signal 2
	5 = Input Signal 3 (0-10V)
	6 = GND for Input Signal 3
	7 = Output Signal 1 (0-5V)
	8 = GND for Output Signal 1

4.5.2. Connection with USB

REMOTE USB This port can be connected with a PC by using a common extension cable for standard USB Cable. For actuating of the Controller by a PC, a terminal program like “PuTTY” can be used.

The attributes for the used COM Interface are:

Bits per second:	115 200
Databits:	8
Parity:	None
Stopbits:	1
Float control:	None

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.

The Controller must be connected with the valve. The plug for the Input-signal may be connected or not. If not, the input-signal is 0V. In this case, the switch on the front can be switched from RS232/ANALOG to MANUAL. The mains supply cable (MAINS SUPPLY) must be connected, the corresponding switch (0/I) must be in the position 0. Now the mains supply switch can be switched on (I), if the cable to the motor is connected.

You can find a Program to control the valve via RS232 - Port on our Website www.andreas-mattil.de on the Download Center for free.

5.1. Initialization

The valve is shipped in closed position. An initializing procedure is not necessary, because the Controller keeps in its memory its last position before the mains supply was switched off.

You can Calibrate the valve within the settings Tab of the Software via the calibrate button. Calibration means to drive the valve into the close position and reach the limit switch.

6. AMBIENT CONDITIONS

Mains Voltage:	230V AC 50 Hz oder 110V AC 50 Hz
Mains Power consumption	150 VA
Fuse	2A
Output Voltage	24V DC
Output Current	2600 mA
Output Power	62,4 W

Ambient Working Temperature	-10° C (no icing allowed) bis 45° C
Relative Air Humidity	15% bis 85% (no condensation allowed)
Maximum working altitude	1000m; from 1000m - 2000m only 40° C ambient working temperature allowed
Weight of Controller	2,5 kg

7. 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. This certificate can be downloaded at: www.andreas-mattil.de

WARRANTY

These valves are assembled under clean conditions. Each valve is tested for optimum performance and leak tightness. Installation into customer's 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. Such a certificate can be downloaded from our homepage: www.andreas-mattil.de

8. ACCESSORIES

8.1. Heating cartridge

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

Power: 200W / 230VAC

Material: Incoloy 800

Max. temperature: 800° C

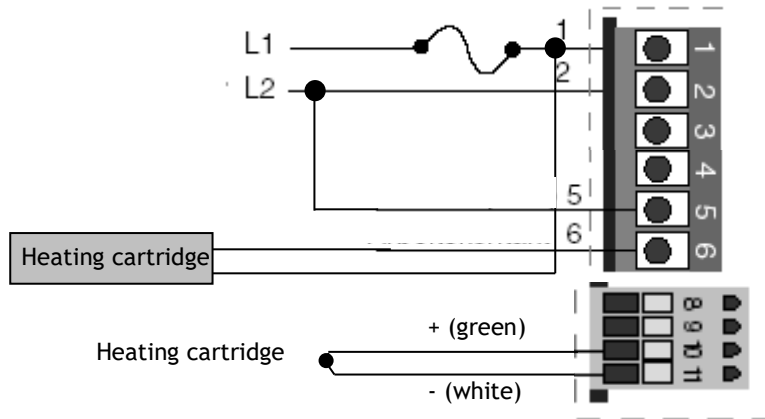
The heating cartridge fits in the boring $\varnothing 8$ mm on the housing, and must be secured slightly with the set screw. To avoid damage of the heating cartridge, this set screw must not be hard tightened. We propose to use a temperature resistant conductive paste.

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. These insulation must not go over the position Max, and should not be less than the position Min. See picture page 5.

8.2. Heater controller

The heater controller from WATLOW is adjusted to the heating cartridge and the valve. The adjustable parameters like heating- and cooling ratio are pre-adjusted in our works.

8.2.1. Connections of the Heater Controller



8.2.2. Programming of the Heater Controller

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

To enter into the setup-menu, press the arrow keys „up“ and „down“ together for min. 3 seconds. 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 green „turn“-key. Use Up and down Arrow to change the settings. The infinity-key will guide you back to the main screen.

The different setup-positions are:

Sen	Factory Setting: tc Sensortype tc.
Lin	Factory Setting: H. Thermoelement type. We use Type K, which is set as „H“.
C - F	Factory Setting: C. Celsius.
S.dec	Factory Setting: 0. Decimal Display for the temperature.
IS.En	Factory Setting: no. Infosense Setting.
SP.Lo	Factory Setting: 0. Minimum of temperature.
SP.hi	Factory Setting: 450. Maximum of temperature.
Ftr.E	Factory Setting: OFF. Filter setting.
Ot 1	Factory Setting: hEAt. Heating setting.
Ftb1	Factory Setting: 20.0. Time basis.
PL1	Factory Setting: 100. Power limit.
PSH1	Factory Setting: 100.0. Power limit.
PSL1	Factory Setting: 0. Power limit.
nLF1	Factory Setting: OFF. Linear Control.
Unit	Factory Setting: SI. SI-Units.
I.Err	Factory Setting: nLat. Input-Error-Latching.
FAIL	Factory Setting: bPLS.Input Error Failure Mode.

dsp	Factory Setting: nor. Display mode.
rP	Factory Setting: On. Ramp on.
rP.Sc	Factory Setting: hour. Time Basis for Ramp (hour).
rP.rtc	Factory Setting: 180. Ramp in °C (180°C/h).
LOC	Factory Setting: 0. All Settings can be adjusted.

If you want to have a deeper look into the Settings of the controller please refer to the WATLOW Manual on CD.

8.2.3. Display

Upper 7-segments line red:	Actual temperature in °C at the thermoelement.
Below 7-segments line green:	rP interchanges with a number: Initializing is running (for approx. 45 sec). Number: Adjusted 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 infinity-key twice 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. If this key is pressed in the standard menu, the advanced-menu starts. In this advanced-menu a fine tuning can be adjusted. We recommend to leave this menu.

8.2.4. Start heating

Press arrow key up, until the requested temperature is in the green display. Heating starts immediately 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. The ramp is adjusted to 180°C/h.

8.2.5. End heating

Press arrow key down, until a temperature of i.e. 20°C is in the green display. Cooling starts immediately after release. The LED 1 flashes from time to time, if the cooling-down would be faster than the adjusted ramp. The ramp is adjusted to 180°C/h. After reach of under 100°C (red display) the currency can be switched off.

9. Contact

If you have any questions regarding this or other products here is our contact information:



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