Valve monitoring system

VDK 200 A S02
H_2 version

8.12

DUNGS®
Combustion Controls

Technical description
The VDK 200 A S02 H_2 is a compact valve monitoring system according to EN 1643 for automatic shut-off valves:

- Equipment independent of residual pressure
- Test volume ≤ 1 l
- The complete test procedure is defined
- Short release time: approx. 10 s
- Tightness or leaks are displayed by an LED
- External fault display
- Suitable for TRD systems
- Electrical connection to screw terminals via PG* 11 cable gland (* = heavy-gauge conduit thread)

Fields of application
Valves according to EN 161 Class A.
The VDK 200 A S02 H_2 may be used with any valve whose tightness in counter-flow direction excludes by construction a leakage in flow direction. The VDK 200 A S02 H_2 is suitable for all DUNGS valves according to EN 161 Class A.
Suitable for hydrogen.

Approvals
EC type test approval as per EC Gas Appliance Directive:

VDK 200 A…	CE-0085 AQ 0808

EC type test approval as per EC Pressure Equipment Directive:

VDK 200 A…	CE0036

Approvals in other important gas consuming countries.

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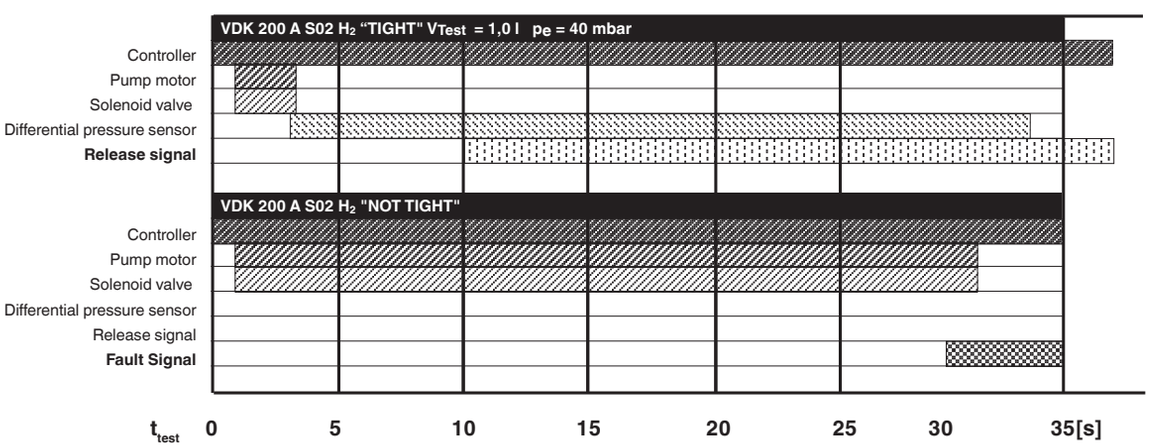
VDK 200 A S02 H_2	Valve proving system for automatic shut-off valves as per EN 161, Class A, in hydrogen systems.

Specifications

Operating pressure	max. 40 mbar (4 kPa)
Test volume	≤ 1 l
Pressure increase by motor pump	35 to 40 mbar
Nominal voltage (Permissible voltage range)	230 V AC (-15 %) to - 240 V (+6 %) For further voltages, refer to type overview
Frequency	50 Hz (For 60 Hz, refer to type overview)
Power requirements	During pumping time approx. 80 VA, in operation 20 VA
Back-up fuse (provided by customer)	10 A fast-blow fuse or 6.3 A slow-blow fuse
Fuse integrated into the hood, exchangeable	Microfuse T 6.3 L 250 V; IEC-127-2/III (DIN 41 662)
Switching current	Operating output Terminal 13: max. 4 A Refer to motor startup current! Interference output Terminal 14: max. 1 A
Degree of protection	IP 40
Ambient temperature	-10 °C to +60 °C
Release time	Approx. 10 s
Interference time	Approx. 32 ± 3
Sensitivity limit	100 dm^3 hydrogen/h
Switch-on duration of control	100 % ED
Max. number of test cycles	15/h. Wait for at least 2 minutes after carrying out more than 3 consecutive test cycles.
Installation position	vertical to horizontal, not upside down

For specifications of versions of gases as per DVGW Worksheet G 260, refer to Datasheet 8.11

Program flowchart



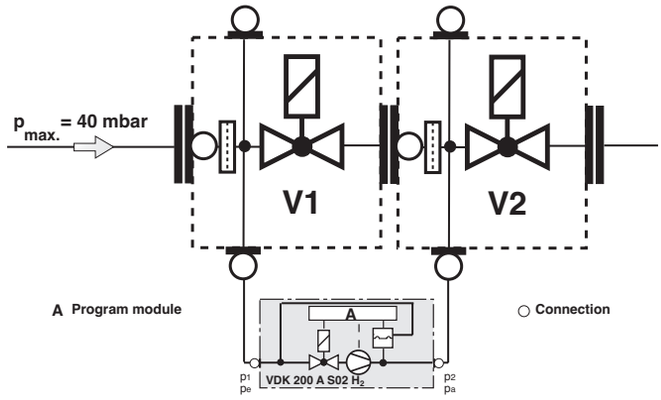
Functional description

The VDK 200 A S02 H_2 operates according to the pressure build-up principle.
The program module starts to function when heat is requested.
Test is performed depending on the burner functional procedure:

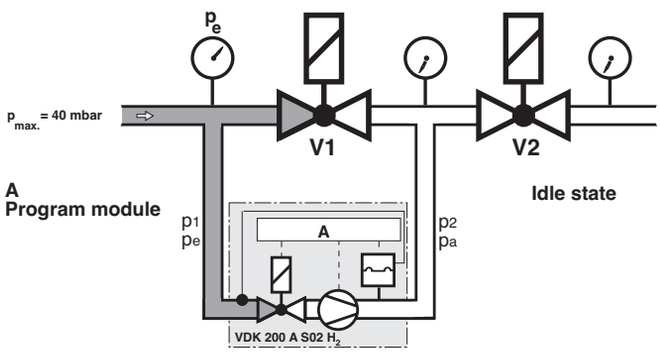
Test **prior to** burner start or
Test **during** pre-purge time or
Test **after** burner shut-down

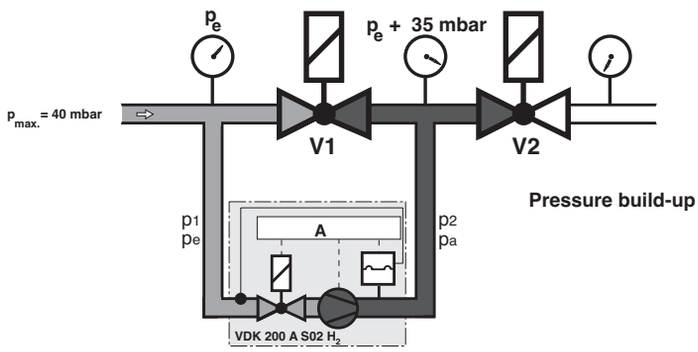
The VDK 200 A S02 H_2 performs a self-test during a switching sequence.

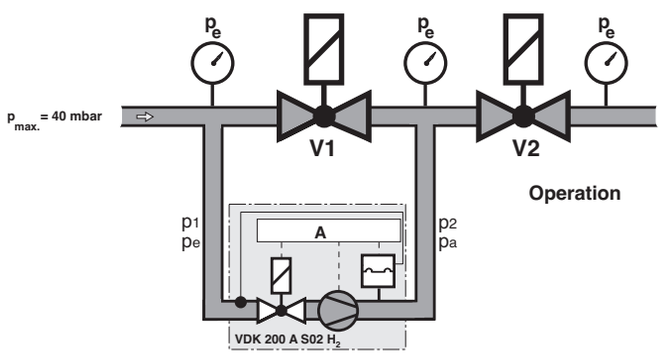
Function principle



Program flowchart





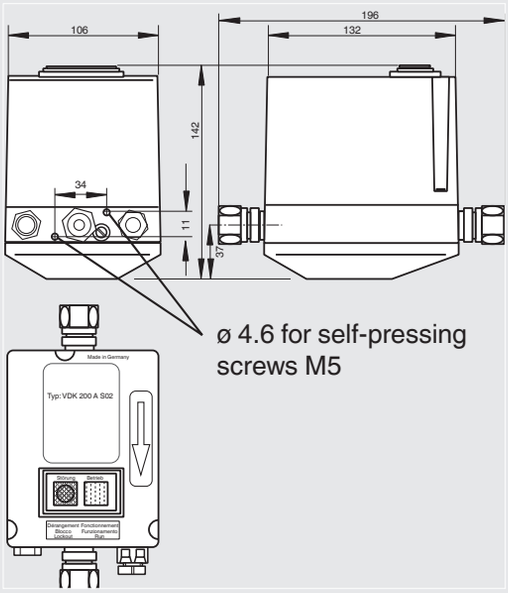


Idle state:
Valve V1 and valve V2 are closed.

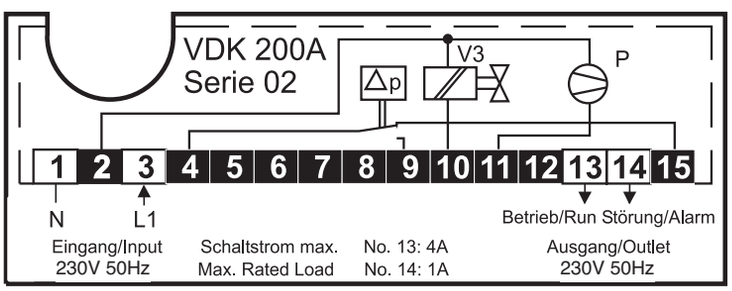
Pressure build-up:
The internal motor pump raises gas pressure in the test section by approx. 35 mbar compared to the pressure applied to the inlet section of valve V1.
During the test period (pump period) the integrated differential pressure switch monitors the test section for leaks. When the test pressure is reached, the motor pump switches off (end of test period). The release time (ca 10 s) is independent on test volume (max. 1l) and inlet pressure (max. 40mbar).
If the test section is leak-tight, the contact is released to the automatic burner control after (ca. 10 s) and the yellow LED comes on.
If the test section is leaky or if the pressure rise by +35 mbar is not reached during the test period (max. 5 s), the VDK 200 A S02 H_2 after 32 ± 3s switches to fault. The red signal lamp lights as long as the contact is released by the regulator or thermostat (heat request).
If there is a short power failure during the test or burner operation, the test is started again automatically.

Operation:
Valve V1 and valve V2 are opened, the internal valve of VDK 200 A S02 H_2 is closed.

Dimensions [mm]



Electrical connection
VDK 200 A S02 H_2
Connection to screw terminals via PG* 11 cable gland (* = heavy-gauge conduit thread).



⚠ Only use terminals 1, 3, 13 and 14. If you do not observe this instruction, it may result in personal injury or material damage.

Startup
1. Check test section for leaks (after assembly)
2. Start test by using temperature regulator and/or restart or by pressing the reset button on VDK 200 A S02 H_2.
3. **If the test section is tight**
   Depending on the length of the test section and the residual pressure applied, the pumping time can be up to 5 s.
   The enable signal for the automatic burner control is given after approx. 10 s - the yellow signal lamp lights up.
   If the test section is leaky
   If the test pressure is not reached: The motor pump switches off after 32 ± 3s and the red alarm LED comes on (fault signal terminal 14). There is no switch-through to the automatic burner control (operating signal terminal 13).

Functional check
By opening a screw plug p_2 (p_a) during the test period (pumping time), leakage can be simulated and a function check can take place.

Setting
The VDK 200 A S02 H_2 is set at the factory.
Setting the VDK 200 A S02 H_2 version is **not possible** on site.

Assembly
The VDK 200 A S02 must be connected to the DUNGS single valves (can be mounted on the right or the left) by means of two steel pipes (ø 12 mm).

⚠ If an flue damper is installed in the boiler, it must be open at the beginning of the test.

⚠ In order to prevent functional and leakage problems, we recommend the use of solenoid valves as per EN 161 Class A.

⚠ The connection lines between the VDK 200 A S02 H_2 and the valves must be able to resist mechanical, chemical and thermal stress.

Using the VDK 200 A S02 H_2 at DUNGS individual solenoid valves .../5

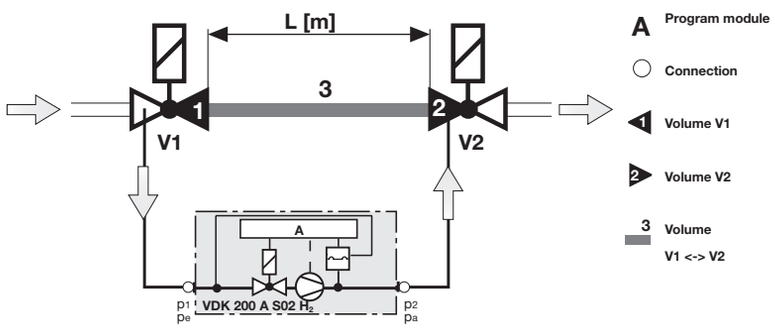
We recommend the use of the connection kit, Order No. 231 776, for mounting the VDK 200 A S02 H_2 on the valves Rp 1 1/2 to Rp 2.

Determining test volume V_{Test}

1. Determine outlet volume of V1.
   Refer to table for Rp 3/8 to Rp 2.
2. Determine inlet volume of V2.
   Refer to table for Rp 3/8 to Rp 2.
3. Determine volume of intermediate pipeline section 3.
   Refer to table for Rp 3/8 to Rp 2.
4. V_{Test} = Volume $_{Valve\ 1}$ + Volume $_{Intermediate\ pipeline\ section}$ + Volume $_{Valve\ 2}$

V_{Test} = **Valve volume** V1 outlet+ V2 inlet + **Volume of Pipeline**

Determining test volume V_{Test}



The max. test volume of 1 l must not be exceeded.

Test volume [l] = Volume V1 $_{outlet}$ + V2 $_{inlet}$ + Pipeline
Pipeline lengths between individual valves L [m]

Rp / DN	Valve-Volume [l] V1 $_{inlet}$ + V2 $_{outlet}$ Rp	0,5 m	1,0 m	1,5 m	2,0 m
		Rp	Rp	Rp	Rp
Rp 3/8	0,01 l	0,06 l	0,11 l	0,16 l	0,21 l
Rp 1/2	0,07 l	0,17 l	0,27 l	0,37 l	0,47 l
Rp 3/4 (DN 20)	0,12 l	0,27 l	0,42 l	0,57 l	0,72 l
Rp 1 (DN 25)	0,20 l	0,45 l	0,70 l	0,95 l	---
Rp 1 1/2	0,50 l	1,10	1,70 l		
Rp 2	0,90 l	1,90 l			

Strictly follow the instructions and guidelines for using hydrogen.

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VDK 200 A S02 H_2 type overview / accessories / order details		
Version		**Order No.**
VDK 200 A S02 H_2	230 VAC 50 Hz	214 445
VDK 200 A S02 H_2	120 VAC 60 Hz	222 747
Version for gases as per DVGW, Worksheet G 260		
VDK 200 A S02	230 VAC 50 Hz	211 222
VDK 200 A S02	110 VAC 50 Hz	211 224
VDK 200 A S02	240 VAC 50 Hz	211 229
VDK 200 A S02	120 VAC 60 Hz	211 927
For specifications, refer to Datasheet 8.11		
Accessories / spare parts		
Connection kit Rp 1 1/2 - Rp 2 DN 40 - DN 50		231 776
Connection kit DN 65 - DN 150		231 777
Equipment fuse element (5 pieces)		231 780

We reserve the right to make any changes in the interest of technical progress.

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