LECKANZEIGETECHNIK

SGB

Vacuum leak detector

VL-HFw2

08/PTB no.:III B/S 1237

Documentation VL-HFw2

Art. No.: 605 002
Issue: 11/2004

SICHERUNGS**G**ERÄTE**B**AU GMBH
Hofstraße 10
57076 Siegen

LLOYDS REGISTER QUALITY ASSURANCE ISO9001

Contents of the documentation

1. Object

Leak detector with an alarm vacuum of > 410 mbar forming part of a leak detection system for double-walled pipes used for the transport of inflammable liquids.

2. Type

Vacuum leak detector type VL– HFw 2.

3. Field of application

3.1. Double-walled pipes

- Approved **Flexwell** safety pipes by Messrs. kabelmetal electro GmbH, D-3000 Hanover of types **FSR 16/30, FSR 30/48, FSR 39/60, FSR 48/71, FSR 60/83, FSR 83/120** and **FSR 127/175**
- **with an operating pressure in the inner pipe** not exceeding **4 bar**.

3.2. Material to be transported

All liquids of hazard class A III covered by the "Decree on inflammable liquids" (VbF), to which the components of the leak detection system are sufficiently resistant.

4. Functional description

4.1. Basic function

(1) In the case of double-walled pipes with an interstitial space which are fitted with a VL– HFw 2 leak detection system, any leakage in pipe walls, in the connection lines between the leak detector and the interstitial space and in the leak detector itself is automatically indicated, under all operational conditions, by a pressure rise, which activates an optical and audible alarm.

(2) The vacuum pump installed in the VL– HFw 2 leak detection system creates a vacuum in the interstitial space which is less than atmosphere pressure and the pressure inside the pipe by a fixed amount.

(3) On the pump side, the leak detector is connected with the interstitial space through the suction line (evacuation line) and the perpendicularly installed liquid trap. On the measuring side, the connection with the interstitial space is made through the measuring line (see drawing no. 1588).

(4) The vacuum generated by vacuum pump Rp is measured and controlled by pressure switch D, connected to the interstitial space through the measuring line lm.

When reaching the rated vacuum (trip pressure 'Pump Off'), microswitch M 2 in the pressure switch switches off the vacuum pump. In the event of a pressure rise, the vacuum pump is started by the same microswitch (trip pressure 'Pump On'). In normal operation, the vacuum varies between the two control limits with long rest periods and short running times for the vacuum pump, depending on the pressure tightness of the complete system.

(5) If due to **ingress of air** the pressure rises to the trip value 'Alarm On' in the interstitial space as a result of leakage in the walls of the interstitial space or in the components, pipes and fittings connected to the interstitial space, microswitch M 2 activates an alarm in pressure switch D, which comprises an optical alarm with a red signal lamp and an audible alarm through buzzer Su. The audible alarm may be switched off by switch TA which is fitted with a lead seal under normal operating conditions. Parallel to the buzzer installed in the leak detector, an additional external signal may be connected to the terminals on terminal strip $K_{N.}$

(6) When the pressure drops to the trip value 'Alarm Stop', e.g. during commissioning or functional checking, the alarm is cancelled by microswitch M 1 in pressure switch D.

(7) If leakage occurs and **liquid** gets into the interstitial space, the pressure will rise and the vacuum pump will be started by the pressure switch. When the liquid is evacuated and reaches the liquid trap in the suction line (evacuation line), the trap is closed against the interstitial space. No more liquid is extracted and no vacuum is generated. The pressure in the interstitial space will rise due to further liquid entering until the alarm is activated.

(8) Each time the alarm is activated, vacuum pump Rp will be automatically switched off.

(9) The leak detector is designed for en electrical supply of 220V, 50 Hz. After electrical connection a green signal lamp (pilot lamp) will light up.

(10) The factory-set trip values of the pressure switch for operation of the leak detector are given in table 1.

Table 1 - Trip values of the pressure switch

Pump 'Off' (mbar pressure)	500 - 540
Pump 'On' (mbar pressure)	440 - 480
Alarm 'On' (mbar pressure)	410 - 430
Alarm 'Off' (mbar pressure)	470 - 500
Ultimate point for alarm activation:	410 mbar

4.2. Additional information on the function

(1) In the case of an alarm, the feed pump in the product line is automatically stopped when the pump is connected to terminals 5, 6 and 7 of terminal strip K_{VBZ} (see drawing no. 1596) which are identified in the leak detector.

(2) Depending on the arrangement of the double-walled pipes, an **additional measuring device ZD** must be connected to the end opposite to the connection for the leak detector (see drawings no. 1591 to 1595). In case of a pressure rise in the interstitial space. This additional measuring device will electrically transmit the alarm to the alarm generator of the leak detector.

(3) The solenoid valves in the suction line (see drawing 1592 to 1595) are electrically connected to the leak detector (terminals 1, 2, 3 of terminal strip K_{VBZ}). When an alarm is activated, they close and protect the leak detector against excessive pressure.

(4) In order to ensure good, reliable functioning of the leak detection system in all operating conditions, the physical area of use of leak detector VL-HFw 2 should be limited to the defined maximum line length, depending on how the double-walled pipes are arranged.

The length limitations for the various types of pipes defined in the specification sheets no. FSR 6.03.01 to FSR 6.03.06 issued by Messrs. kabelmetal electro GmbH must be thoroughly adhered to.

5. Structure of the leak detector

The leak detector comprises vacuum pump Rp, the control systems including pressure switch D, the control elements including signalling equipment, the connections for the suction, measuring and exhaust lines as well as the equipment necessary for functional checking.

In the suction line between the leak detector and the interstitial space and in the exhaust line, a liquid trap (F1) is fitted below the leak detector.

The components required for proper functioning of the leak detector are quoted in the bill of material and in drawings no. 1596 to 1598.

6. Installation instructions

6.1. General information

(1) The double-walled pipe and leak detector VL-HFw 2 should only be installed by specialists according to § 19 l WHG who have submitted proof of their qualifications to TRbF 503 and to TRbF 180/280 no. 1.7.

(2) **The installation instructions by Messrs. kabelmetal electro GmbH for double-walled pipes of type FSR - specification sheets no. 6.03 and 6.03.01 to 6.03.06 must be followed.**

6.2. Installation of the leak detector

(1) The leak detector should be installed in a closed, dry room inaccessible to unauthorized persons. The leak detector must not be installed in potentially explosive locations. In order to protect the leak detector from excessive heat, it should not be installed near heat sources.

(2) The leak detector is designed for wall fastening. For fastening, dowels and screws may be used. In areas of heavy vibration, rubber-metal connections should be used for fastening. The distance between the interstitial space and the leak detector should be kept to a minimum.

(3) If the leak detector is situated outdoors or installed in a humid area as per VDE specification, it must be provided with a weather-proof box with a clear lid (DIN 40 050 IP 55). In this case, an additional external signal (horn) should be installed in a suitable location.

6.3. Electrical installation

The leak detector is designed for electrical supply of 220V ~ 50 Hz AC. It must be permanently connected. Plug-in or switch-type connections are not permitted. The detector must be effectively earthed.

The instructions of the local electric supply company and of VDE are to be observed.

It is possible to connect an additional external audible alarm signal to the terminals indicated on the leak detector. The power rating of this external signal should not exceed 50 VA.

If requested, the feed pump in the product line can be connected to terminals 5, 6 and 7 of terminal strip K_{VBZ} in the leak detector (see drawing no. 1596) , so that it is automatically disconnected in the event of an alarm.

6.4. Installation of the connecting pipework

(1) The pipework for connecting the leak detector and the interstitial space and the exhaust line must be made from commercially available copper pipes or corrosion-resistant steel pipes.

The pipes must have the following **dimensions** and **colour codes**:

Exhaust line:	ends marked with green rings	min. 6 x 1 mm
Measuring line:	ends marked with red rings	min. 6 x 1 mm
Suction line:	ends marked with white rings	min. 6 x 1 mm

The cross section areas of pipes must be maintained over their full length. Compression or kinking is not permitted.

(2) If the pipes are laid underground, protective conduits or plastic-coated copper pipes and cover blocks have to be used.

(3) Measuring and exhaust lines must be installed with a continuous drop of a minimum of 4%. If this is not possible, **condensate traps** which are accessible for maintenance purposes must be provided for at **each** low point.

(4) The exhaust line may terminate outdoors. Downstream of the leak detector, the pipe must include a liquid trap (F1).

(5) In the **exhaust line (suction line)** from the leak detector, a liquid trap (F1) must be installed downstream of the leak detector.

(6) For connecting the measuring, suction and exhaust lines to the leak detector, the marked sockets must be used. On the interstitial space, the branch(es) provided may be used for pressure-tight connection of the lines.

(7) When the **suction and measuring lines** are **both** connected to the interstitial space of the double-walled pipe using a measuring branch, the measuring line must reach up to the measuring branch. From the point of connection to the leak detector, it must be **laid horizontally over 50% of its total length**.

As an alternative, a **pressure tank (PN 6) with a minimum volume of 1.0 litre** may be provided (see drawing no. 1599).

The common **measuring branch must not be installed higher than 3.0 m above the lowest point of the interstitial space**.

If the above is not observed, proper functioning of the leak detector cannot be ensured (see also specification sheets no. FSR 6.03.01, 6.03.02 and 6.03.05 by Messrs. kabelmetal electro GmbH).

6.5. Additional installation instructions for leak detectors fastened to double-walled pipes installed outdoors

In the case of double-walled pipes installed outdoors, the following instructions must be observed in addition to the above subparagraphs 6.1 - 6.4:

(1) The lines between the interstitial space and the leak detector must be installed with a continuous slope of 4% minimum.

(2) The connection pipework must have a minimum internal diameter of 6 mm and a wall thickness of 1 mm (e.g. copper pipe 8 x 1 mm).

(3) Use suitable reducers for fastening the connection lines to sleeves and fittings.

6.6. Additional installation instructions for specific types of double-walled pipe

Based on basic drawings no. 1588 to 1595, Messrs. kabelmetal electro GmbH have prepared specification sheets for installation of the leak detector.

The information and conditions contained in these sheets must be carefully observed when installing the leak detector.

The installation instructions contained in subparagraphs 6.1 - 6.5 of the official approval are not affected by the above.

Flexwell safety pipes, types FSR 16/30 to FSR 127/175 and the vacuum leak detector type VL–HFw 2 can be installed as follows, with due attention to the related basic drawing and specification sheet:

Type of installation	**Basic drawing**	**Spec sheet no. FSR**
° Horizontal installation - single-train system	1588	6.03.01
° Horizontal installation - double-train system - closed circular pipeline	1589	6.03.03
° Horizontal installation - multiple-train system - closed circular pipeline	1590	6.03.04
° Horizontal installation - single-train system with additional measuring equipment	1591	6.03.02
° Vertical installation in buildings - single-train system with additional measuring equipment upstream	1592	6.03.05
° Vertical installation in buildings - double-train system with additional measuring equipment downstream	1594	6.03.06
° Vertical installation in buildings - multiple-train system with additional measuring equipment upstream	1593	6.03.06
° Vertical installation in buildings - multiple-train system with additional measuring equipment downstream	1595	not shown

When the installation is carried out in accordance with these instructions, the **length limitations** applicable to double-walled pipes must be observed.

7. Commissioning of the leak detection system

(1) When commissioning a leak detection system fastened to long pipe lengths or large pipe diameters or when several pipes must be monitored, it is recommended that the negative pressure is built up in the interstitial space using an auxiliary pump. For this purpose, the measuring and suction lines must be connected in a pressure-tight manner to the interstitial space. Immediately upstream of the leak detector, the suction line must be connected to the auxiliary pump, and the measuring line must be connected to a measuring device with a minimum accuracy of 1.6 and a scale end value of 600 mbar.

(2) The interstitial space and the connection lines are evacuated until a negative pressure of approx. 600 mbar is achieved.

(3) The negative pressure indicated by the measuring device should not drop in the next 30 minutes.

(4) After successful testing, the auxiliary pump and the measuring device are removed. The negative test pressure must be reduced to
the operating pressure (trip pressure 'Pump Off') as per table 1.

(5) After that, the measuring and the suction line are connected to the leak detector in a pressure-tight manner, using appropriate sockets and the leak detector is then connected to the mains supply. The green signal lamp (pilot lamp) will light up.

(6) If the red light (alarm) also lights up and an audible alarm is triggered with TA switch ("sound off") being activated, the negative pressure has been reduced too much and has reached the limit where an alarm is activated. In this case, flip switch KS for stopping the vacuum pump in the leak detector must be actuated.

(7) After stopping the leak detector vacuum pump in (the trip pressure 'Pump Off' having been reached), flip switch KS and alarm resetting switch TA for cancelling the alarm must be reset to their operating position.

(8) After that, a functional check of the leak detection system must be carried out in accordance with subparagraphs 8.3 and 8.4.

(9) After completion of all commissioning work including the functional test, flip switch KS and alarm resetting switch TA must be fitted with a lead seal.

8. Operating instructions

8.1. General instructions

(1) When the leak detection system has been properly installed in a pressure tight manner (double-walled pipe, connecting lines, leak detector), the leak detector will work within the control range. If there is a fall in negative pressure due to unavoidable slight leakage, the leak detector will build up pressure again until the rated value is reached.

(2) Frequent backfeed or even continuous running of the pump indicates a leakage that should be rectified without delay.

(3) If an **alarm** is triggered, significant leakage or a defect is indicated. The cause has to be established, and remedial action taken as quickly as possible.

(4) Note: The leak detector may only be opened in a potential free condition.

8.2. Maintenance

(1) Once a year, the leak detector VL– HFw 2 should be checked for operational safety by an expert from a specialist company or by the user's internal expert having submitted proof of his qualifications according to § 19 I Water Resources Law. The extent of the annual check is described in subparagraphs 8.3 and 8.4.

(2) It should be ascertained whether the provisions of paragraph 6 are still complied with.

8.3. Functional check of the leak detector and the leak detection system

The operational safety and the reliability of the VL-HFw 2 leak detector and of the leak detection system should be checked.

- each time they are recommissioned
- at intervals as specified in paragraph 8.2

and

- after each incident of trouble shooting.

The functional check shall be carried out using the three-way valve including test socket installed in the measuring line downstream of the leak detector and, as far as provided for by the installation instructions, using the test valve PD installed at the end of the double-walled pipe in combination with ventilation valve BV installed in the suction line downstream of the leak detector.

Ventilation of the interstitial space must be carried out **slowly**, in order to avoid measuring errors.

Thus, each functional check should include testing of the free passage through suction line, interstitial space and measuring line. The exhaust line must also be checked for free passage of fluid.

Independent of the type of installation, the functional check must **at least include the following as a minimum:**

(1) The leak detection system (interstitial space, connection lines and leak detector) must be checked for tightness by connecting a measuring device with a minimum accuracy of 1.6 and a scale end value of 600 mbar to the test sockets of test valves GD and PD. By setting the test valves to position 1, the negative pressure may be checked on the leak detector and at the end of the pipe. It should be at least

440 mbar

Except for slight inaccuracies, the reading should be identical on both measuring devices.

Please note: In the case of closed circular pipelines without test valve PD at the pipe end, the functional check shall be carried out using test valve GD on the leak detector.

(2) After setting test valve PD at the pipe end in its operating position, the pneumatic system is **slowly** ventilated such that the trip pressure of the pressure switch may be measured as a result of the pressure rise. The position of test valve GD (see item 1) remains unchanged.

(3) The optical and audible alarms of the leak detector must be checked for effectiveness. The alarm must be triggered upon reaching a vacuum of

410 mbar

(4) After testing of the alarm, the ventilation valve must be closed, and the leak detector vacuum pump must be started by actuating flip switch KS. The complete system can now be tested with increasing negative pressure (pressure drop) until the trip pressure 'Pump off' is reached.

After stopping the vacuum pump the pressure must not rise significantly within 30 minutes.

(5) The tightness of the leak detector can be checked with test valve GD in position 1, with the measuring device connected, and with the connections of the suction and the measuring line short-circuited.

(6) The performance of the vacuum pump is checked with test valve PD in position 1. It must at least be 550 mbar.

During this test, the pressure switch must be ventilated through the test socket, and the measuring device must be connected to the closed ventilation valve.

If necessary, i.e. if the pressure switch is in the area in which an alarm is triggered, flip switch KS must be actuated to operate the vacuum pump.

(7) Position 3 of test valve GD is used for checking the tightness of the connection lines and of the connected interstitial space.

(8) The fittings and components required and specified for a system (liquid trap, solenoid valves, additional measuring device etc.) must be checked for correct, reliable operation.

(9) After completion of all checks, the test valve(s) must be placed in its / their operating position, the measuring device(s) must be removed, and a lead seal must be fitted to the alarm resetting switch TA in the 'On' position and to the flip switch KS in the 'Off' position.

(10) A report on the checks must be written.

8.4. Details on how to carry out the necessary functional checks for the various installation positions:

(1) **Horizontal installation - single-train system - basic drawing no. 1588, specification sheet no. FSR 6.03.01**

With the vacuum pump in the leak detector not running

- PD in position 3, read negative pressure, switch over to position 4 (operating position)

- GD in position 1, read negative pressure.

Except for slight inaccuracies of the measuring devices, both readings should be identical.

- Leave GD in position 1, bleed it through BV. Check trip pressures for 'Pump On' and alarm triggering.
- Shut BV, activate KS, check trip pressures up to 'Pump Off'
- GD in position 2 (operating position)

With the pump still not running fit lead seals to KS in the 'Off' position and TA in the 'On' position.

(2) **Horizontal installation - double-train system - circular pipeline - basic drawing no. 1589, specification sheet no. FSR 6.03.03**

With the vacuum pump in the leak detector not running

- GD in position 1, read negative pressure.
- Leave GD in position 1, bleed it through BV. Check trip pressures for 'Pump On' and alarm triggering.
- Shut BV, activate KS, check trip pressures for 'Pump Off'
- GD in position 2 (operating position)

With the pump still not running fit lead seals to KS in the 'Off' position and TA in the 'On' position.

(3) **Horizontal installation - multiple-train system - circular pipeline- basic drawing no. 1590, specification sheet no. FSR 6.03.04**

With the vacuum pump in the leak detector not running, proceed in the same way as described in (2).

(4) **Horizontal installation - single-train system - with additional measuring equipment - basic drawing no. 1591, specification sheet no. FSR 6.03.02**

With the vacuum pump in the leak detector not running

- Disconnect the system from the power supply
- Disconnect the electrical connection to the additional alarm device ZD in the leak detector
- Restore power to the system
- Measure PD in position 3, measure negative pressure, switch over to position 2 (operating position)
- GD in position 1, read negative pressure.

Except for slight inaccuracies of the measuring devices, both readings should be identical.

- Leave GD in position 1, bleed it through BV. Check trip pressures for 'Pump On' and alarm triggering.
- Shut BV, activate KS, check trip pressures for 'Pump Off', switch off KS, GD in position 2.
- Disconnect the system from the power supply.
- Reconnect the electrical connection to ZD in the leak detector
- Disconnect the black cable to the pressure switch of the leak detector
- Restore power to the system

- PD in position 1, bleed it through BV. Check negative pressure on the measuring device on PD while an alarm is triggered on ZD
- PD in position 2
- Shut BV, disconnect the system from the power supply
- Reconnect the black cable, restore power to the system
- Activate KS

With the pump still not running fit lead seals to KS in the 'Off' position and TA in the 'On' position.

(5) **Vertical installation in buildings - single-train system with additional measuring equipment upstream, basic drawing no. 1592, specification sheet no. FSR 6.03.05**

With the vacuum pump in the leak detector not running, proceed in the same way as described in (4).

(6) **Vertical installation in buildings - multiple-train system with additional measuring equipment - basic drawing no. 1593, specification sheet no. FSR 6.03.06**

(Leak detector installed downstream, additional alarm device installed upstream)

With the vacuum pump in the leak detector not running

- All PDs in position 2 (operating position)
- GD in position 1, measure negative pressure
- Leave GD in position 1 with the vacuum measuring device connected
- Disconnect the system from the power supply
- Disconnect the electrical connection to the additional alarm device ZD in the leak detector
- Restore power to the system
- Switch all PDs simultaneously to position 4
- Bleed the first pipe through the test socket, with the PD in this location being in position 3
- A fall in the negative pressure must be clearly visible on the measuring device on the GD (approx. 10mbar)
- Reset PD on the first pipe in position 4
- Proceed in the same manner for the second and all subsequent pipes, to check their continuity.

Please note: If the vacuum pump is activated during checking, wait until the pump is at a standstill again before carrying out another check.

- Leave all PDs in position 4, leave GD in position 1, bleed it through BV, check negative pressure with the pump in the 'On' position, check alarm triggering
- Shut BV, all PDs simultaneously in position 2 (operating position), activate KS, check trip pressure for 'Pump Off', deactivate KS, GD in position 2
- Disconnect the system from the power supply
- Reconnect the electrical connection to ZD in the leak detector
- Disconnect the violet cable on the pressure switch of the leak detector
- Restore power to the system

- With the first pipe PD in position 1, connect vacuum measuring device, open BV, check negative pressure on the measuring device fastened to the PD with the alarm of ZD triggered; reset PD on the first pipe to position 2, shut BV
- Activate KS with the pump still not running
- For checking the other pipes proceed in the same way
- Disconnect the system from the power supply
- Reconnect violet cable, restore power to the system

With the pump still not running fit lead seals to KS in the 'Off' position and TA in the 'On' position.

(7) **Vertical installation in buildings - double-train system with additional measuring equipment - basic drawing no. 1594, specification sheet no. FSR 6.03.06**

(Leak detector installed upstream, additional alarm device installed downstream)

With the vacuum pump in the leak detector not running

- Disconnect the system from the power supply
- Disconnect the electrical connection to the additional alarm device ZD in the leak detector
- Restore power to the system
- GD in position 1, measure negative pressure
- Leave GD in position 1 with the vacuum measuring device connected
- Bleed through BV, check trip pressures for pump 'On' and alarm triggering
- Shut BV, activate KS, check trip pressure for pump 'Off', deactivate KS, GD in position 2.
- Disconnect the system from the power supply
- Reconnect the electrical connection to ZD in the leak detector
- Disconnect the black cable on the pressure switch of the leak detector
- Restore power to the system
- With PD in position 1, connect the vacuum measuring device
- Open BV, check negative pressure on measuring device PD (position 1) with the alarm of ZD triggered
- With PD in position 2, shut BV, disconnect the system from the power supply
- Reconnect the black cable, restore power to the system
- Activate KS

With the pump still not running, fit lead seals to KS in the 'Off' position and TA in the 'On' position.

(8) **Vertical installation in buildings - multiple-train system with additional measuring equipment - basic drawing no. 1595, not shown on specification sheet FSR**

(Leak detector installed upstream, additional alarm device installed downstream)

With the vacuum pump in the leak detector not running

- Disconnect the system from the power supply
- Disconnect the electrical connection to ZD in the leak detector

- Restore power to the system
- With GD in position 1, measure negative pressure, keep measuring device connected
- Shut shut-off valves AV 1 and AV 2
- Open BV, check trip pressures for pump 'On' and alarm triggering on GD
- Shut BV, activate KS, check trip pressure for pump 'Off', deactivate KS, GD in position 2
- Disconnect the system from the power supply
- Reconnect the electrical connection to ZD in the leak detector
- Disconnect the black cable to the pressure switch of the leak detector
- Restore power to the system
- Connect the measuring device on PD to position 1, open AV 1, bleed through BV
- A fall in the negative pressure must be clearly visible on the measuring device on the PD (approx. 10mbar). Shut BV.
- Shut AV 1, open AV 2
- Bleed through BV, check negative pressure on measuring device PD with the alarm of ZD triggered
- Shut BV and fit lead seals to PD in position 2 and AV 1 and AV 2 in 'Open' position.
- Disconnect the system from the power supply, reconnect the black cable, restore power to the system
- Activate KS

With the pump still not running fit lead seals to KS in the 'Off' position and TA in the 'On' position.

Please note: The AV 1 and AV 2 shut-off valves must be fitted with lead seals in 'Open' position and shall **only be shut for test purposes**.

8.5. Activation of an alarm

(1) In case of an alarm, the red alarm lamp A lights up, and the audible signal Su sounds.

(2) Remove the lead seal from the alarm resetting switch TA, cancel the audible alarm and immediately contact the company which installed the system.

(3) An expert from the specialised company or the tank user's internal expert must establish the cause of the alarm, take remedial action and carry out a functional check as per paragraph 8.3 and 8.4.

Enclosure to test certificate
no. PTB no. III B/S 1237 dated Dec. 18, 1975
Federal Physical Technical Institution (PTB)
Seal / Signature

Appendix to approval
BAZ no. 08/PTB no. III B/S 1237
Central Office for
Safety Engineering
of North-Rhine Westphalia
dated Oct. 01, 1990

Hamburg, May 26, 1988
Technischer Überwachungsverein
Norddeutschland e.V.
Dept. for leak detectors
Signature

Sicherungsgerätebau
GmbH
5900 Siegen

Signature

Item	**Description**	**Material / Designation**	**Manufacturer**
A	Alarm lamp	Glow lamp 220 V	Pistor & Krönert
B	Pilot lamp	Glow lamp 220 V	Jautz, Rafi
TA	Alarm resetting switch	Flip switch 2-pole	Bär, Marquardt, Pistor & Krönert
D	Pressure switch (vacuum)	PU -H 4000/1	Sicherungsgerätebau GmbH
M_1	Alarm switch in D	Microswitch	Burgess, Marquardt,
M_2	Pump switch in D	Microswitch	Honeywell
Rp	Vacuum pump	Block A 15 7009	Piot & Tirouflet, Heidolph, ASF
Su	Buzzer	E 27772	Eichhoff-Werke
G	Housing	Plastic (GFR) min. wall thickness 2 mm	Sicherungsgerätebau GmbH
K	Terminal strips	Insulating material	Weichmüller, Wieland; WECO, Pistor & Krönert
F	Filter with RSp	Plastic (polystrol) Drawing no. 1564	Sicherungsgerätebau GmbH
BV PD, GD	Ventilation device Test valve	Brass "	Burger Industriewerke "
FL	Liquid trap	Brass, no. 68055	Oventrop
1s 1a 1m	Suction line Exhaust line Measuring line	Cu 6 x 1, white ring Cu 6 x 1, green ring Cu 6 x 1, red ring	commercially available " "
MV	Solenoid valves NW 2.2	Brass, ND 25 ATÜ	"
AV	Shut-off valve	standard	"
d_1	Auxiliary contactor	DIL 00L - 44	Klöckner-Moeller, commercially available
KS	Flip switch	2-pole	Marquardt, Bär
	Additional measuring device ZD		
D	Pressure switch (vacuum)	PU -H 4000/1	Sicherungsgerätebau GmbH
K	Terminal strip	Insulating material	Weidmüller, Wieland, WECO
G	Housing	Ci - D protective system P 44	Klöckner-Moeller,
M_3	Alarm switch in ZD	Microswitch	Burgess, Marquardt
Im	Measuring line	Cu 6 x 1, red ring	commercially available

Bill of materials for vacuum leak detector VL-HFw2

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Appendix to approval
BAZ no. 08/PTB no. III B/S 1237
Central Office for
Safety Engineering
of North-Rhine Westphalia
dated May 26, 1981
no. II.5.4-86042-Wi/Ma

Hamburg, Oct. 22, 1980
Technischer Überwachungsverein
Norddeutschland e.V.
Dept. for leak detectors
Signature

Sicherungsgerätebau
GmbH
5900 Siegen

Signature

SGB	59 Siegen-Weidenau	SGB
	Vacuum leak detector type VL-HFw 2 PTB no. III B/S ...	
Year of construction	Serial no.	220 V 50 Hz
Activation of an alarm:	Remove lead seal on the alarm resetting switch, cancel the audible alarm and contact the company which installed the system	
Maintenance:	Once a year, the leak detector shall be checked for operational safety by the maintenance engineer in charge.	

Nameplate

Appendix to approval
BAZ no. 08/PTB no. III B/S 1237
Central Office for
Safety Engineering
of North-Rhine Westphalia
dated May 26, 1981

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Signature

Legend for drawings no. 1588 - 1595

LA = Leak detector type VL-HFw 2

FL = Liquid trap - Oventrop 68055

MV = Solenoid valve

l_S = Suction line

L_a = Exhaust line

l_m = Measuring line

l_{min} = Horizontal length of the measuring line (at least 50% of the total line length)

ZD = Additional measuring device

FSR = Pipe

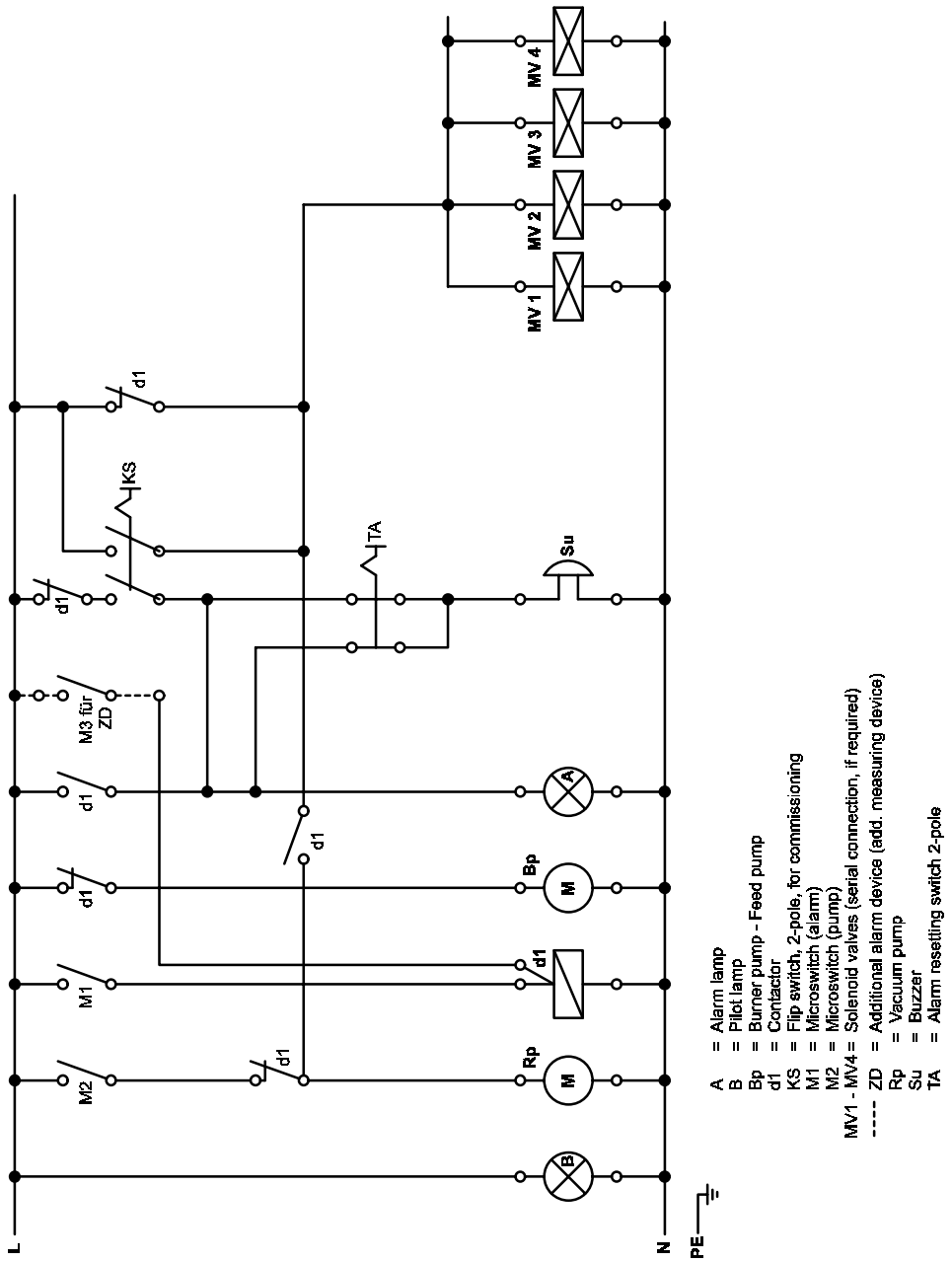
GD = Test valve on the leak detector

PD = Test valve in FSR or on ZD

AV = Shut-off valve

Appendix to approval
BAZ no. 08/PTB no. III B/S 1237
Central Office for
Safety Engineering
of North-Rhine Westphalia
dated May 26, 1981
no. II.5.4-86042-Wi/Ma

Enclosure to test certificate
no. PTB no. III B/S 1237 dated Dec. 18, 1975
Federal Physical Technical Institution (PTB)
Seal / Signature



Nr.	Änderung	Datum	Name
02		08.02.88	
01		30.05.80	

Toleranzen nach DIN 7168-m

Bearb. 12-05-1975

Gepr.

SGB

Werkstoff

Maßstab o.A.

Bezeichnung

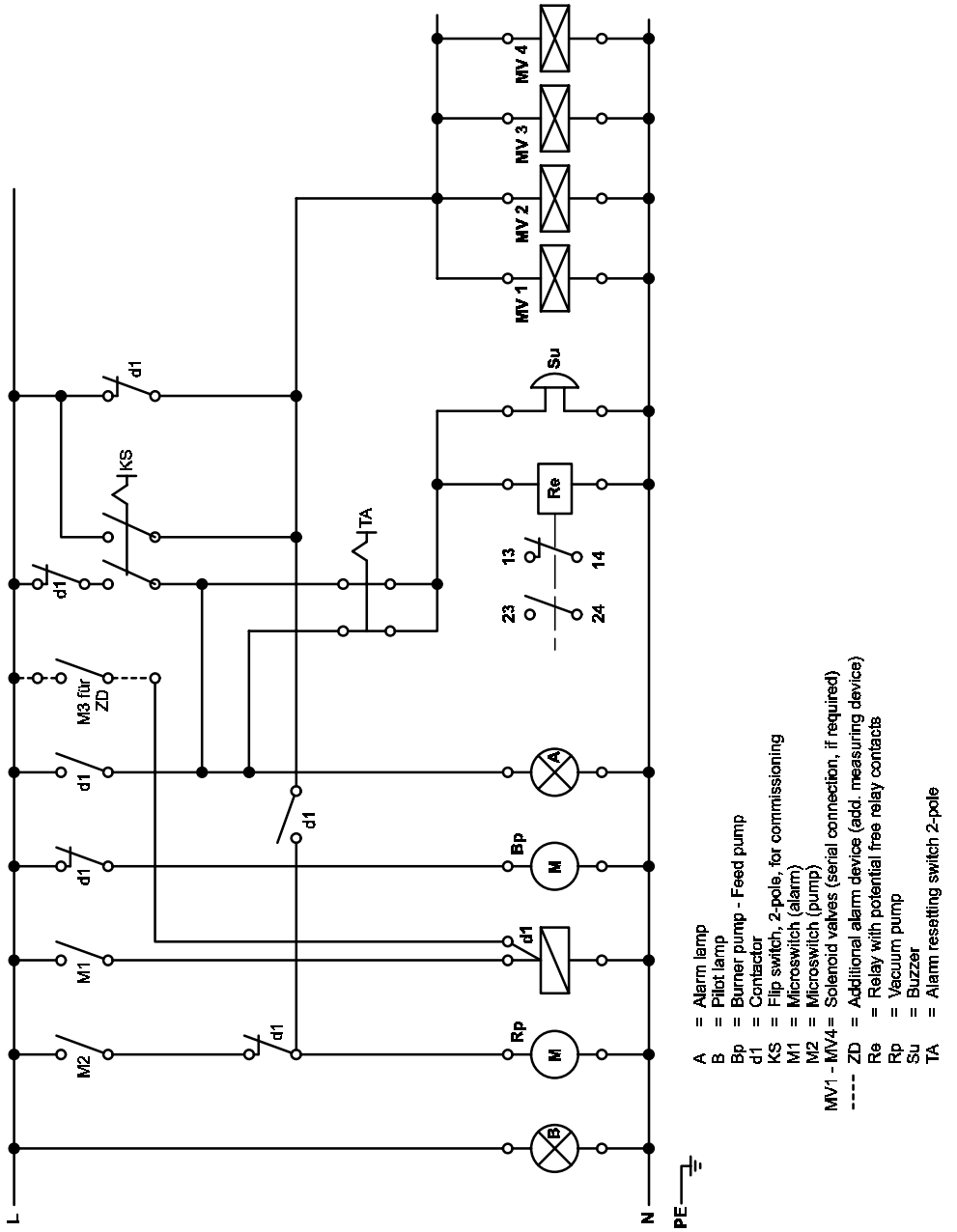
Wiring diagram

Zeichnungsnummer

1587

Blatt

Bl.



Nr.	Änderung	Datum	Name

Toleranzen nach DIN 7168-m

Bearb. 07-06-1993

Gepr.

SGB

Werkstoff | Maßstab o.A.

Bezeichnung

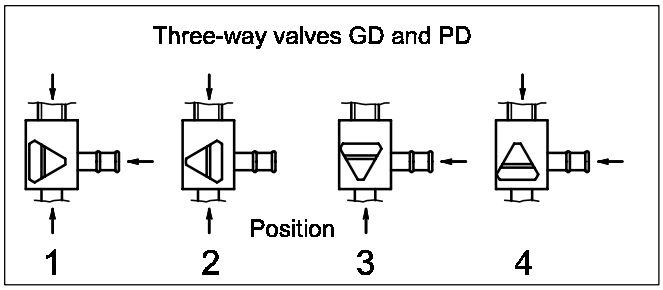
Wiring diagram

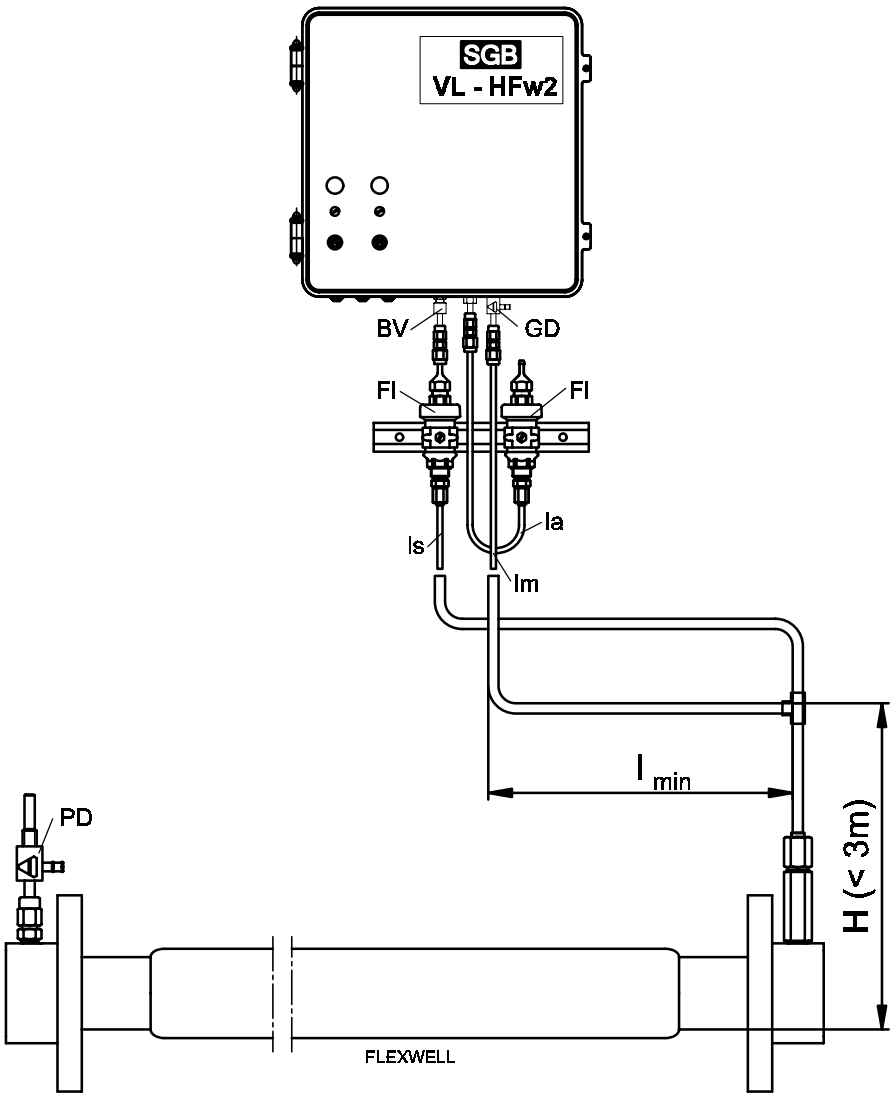
Zeichnungsnummer

1587a

Blatt

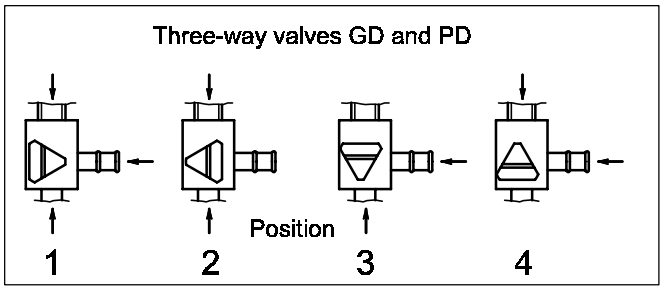
Bl.

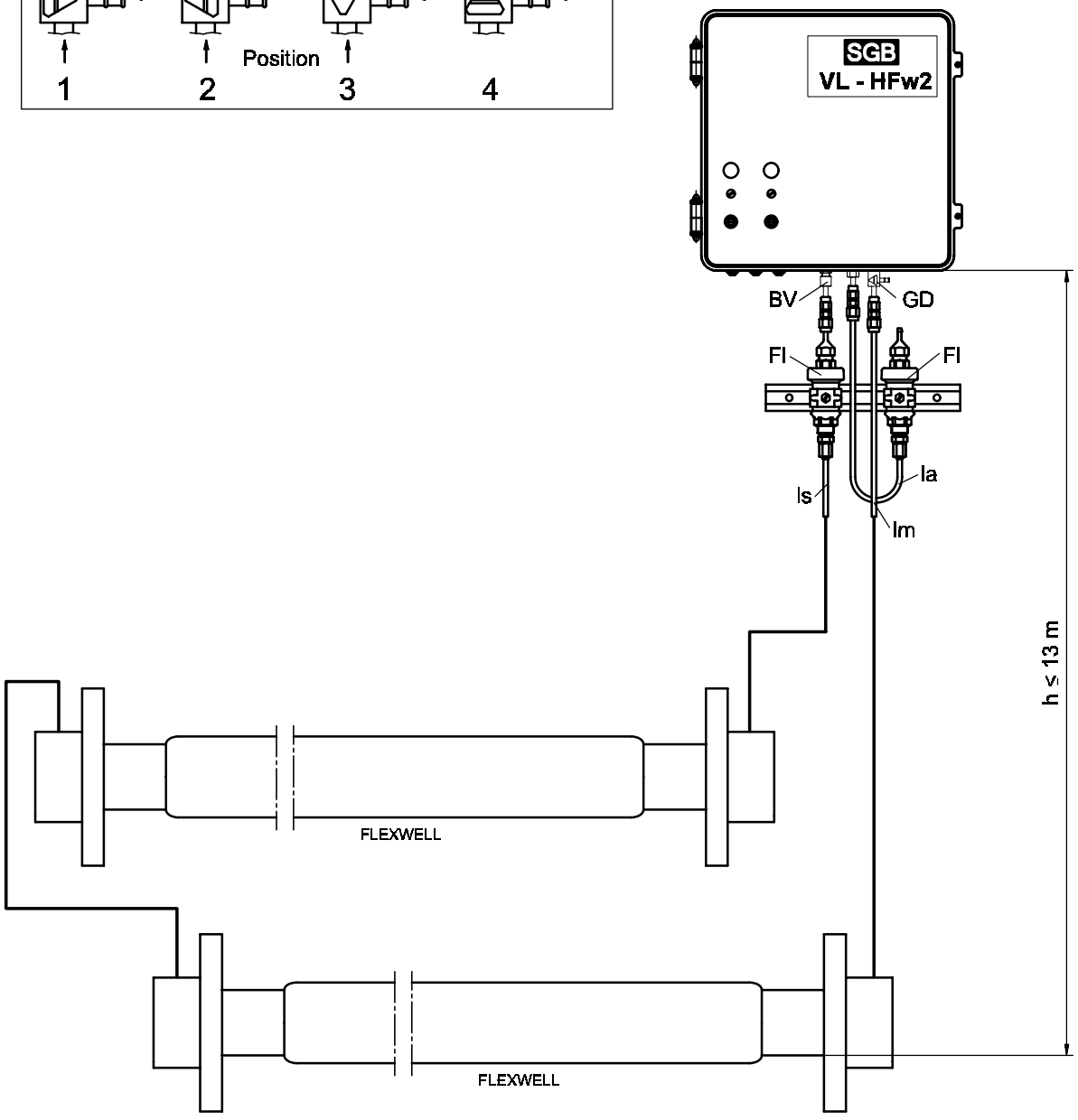




Installation in accordance with kabelmetal specification sheet 6.03.01

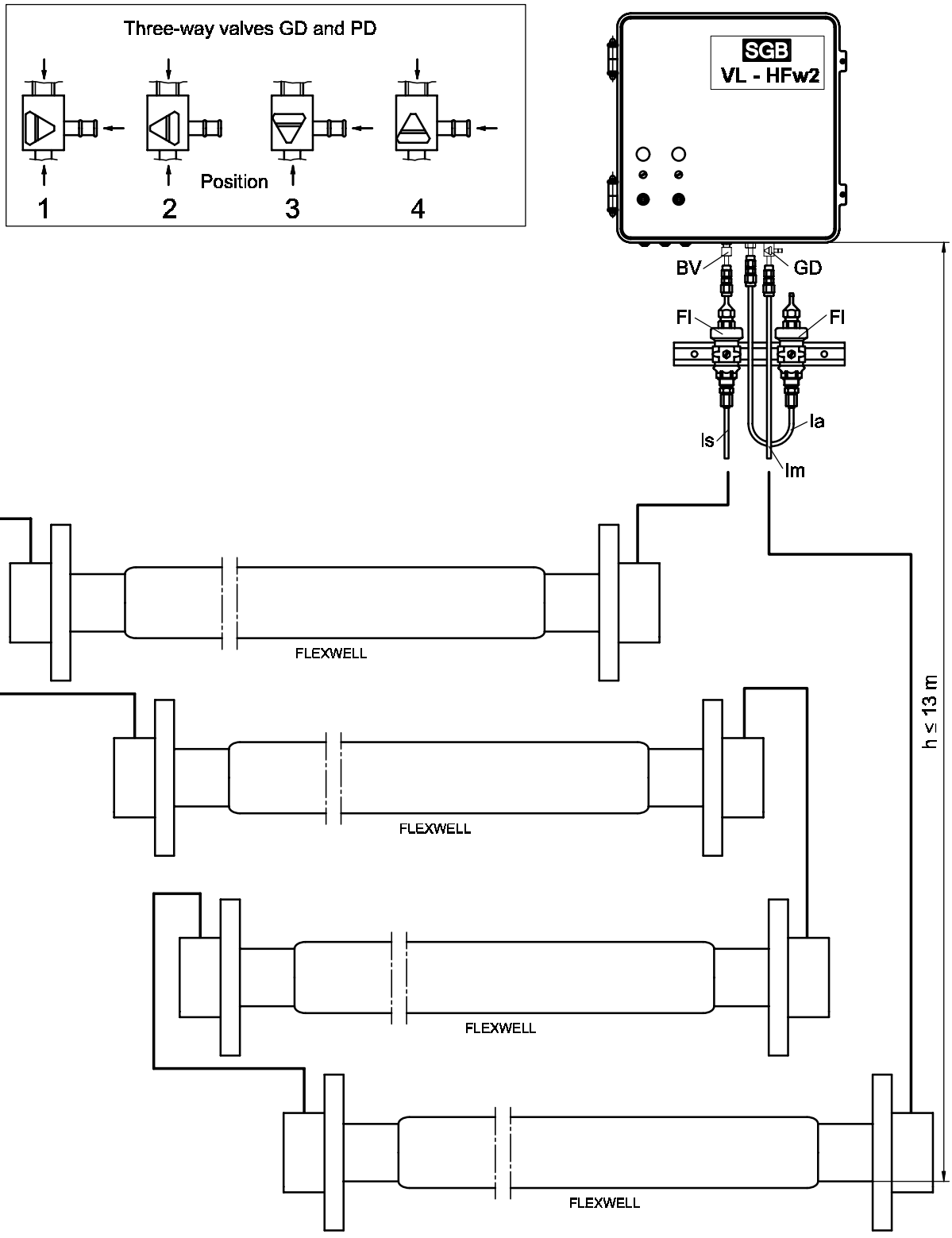
				Toleranzen nach DIN 7168-m	Werkstoff	Maßstab o.A.
					Bezeichnung	
				Bearb. 30-05-1980	Horizontal installation - single-train system	
				Gepr.		
				SGB	Zeichnungsnummer	Blatt
01		08-02-1988			1588	Bl.
Nr.	Änderung	Datum	Name			





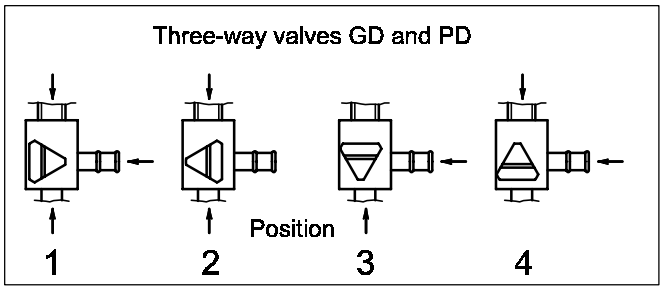
Installation in accordance with kabelmetal specification sheet 6.03.03

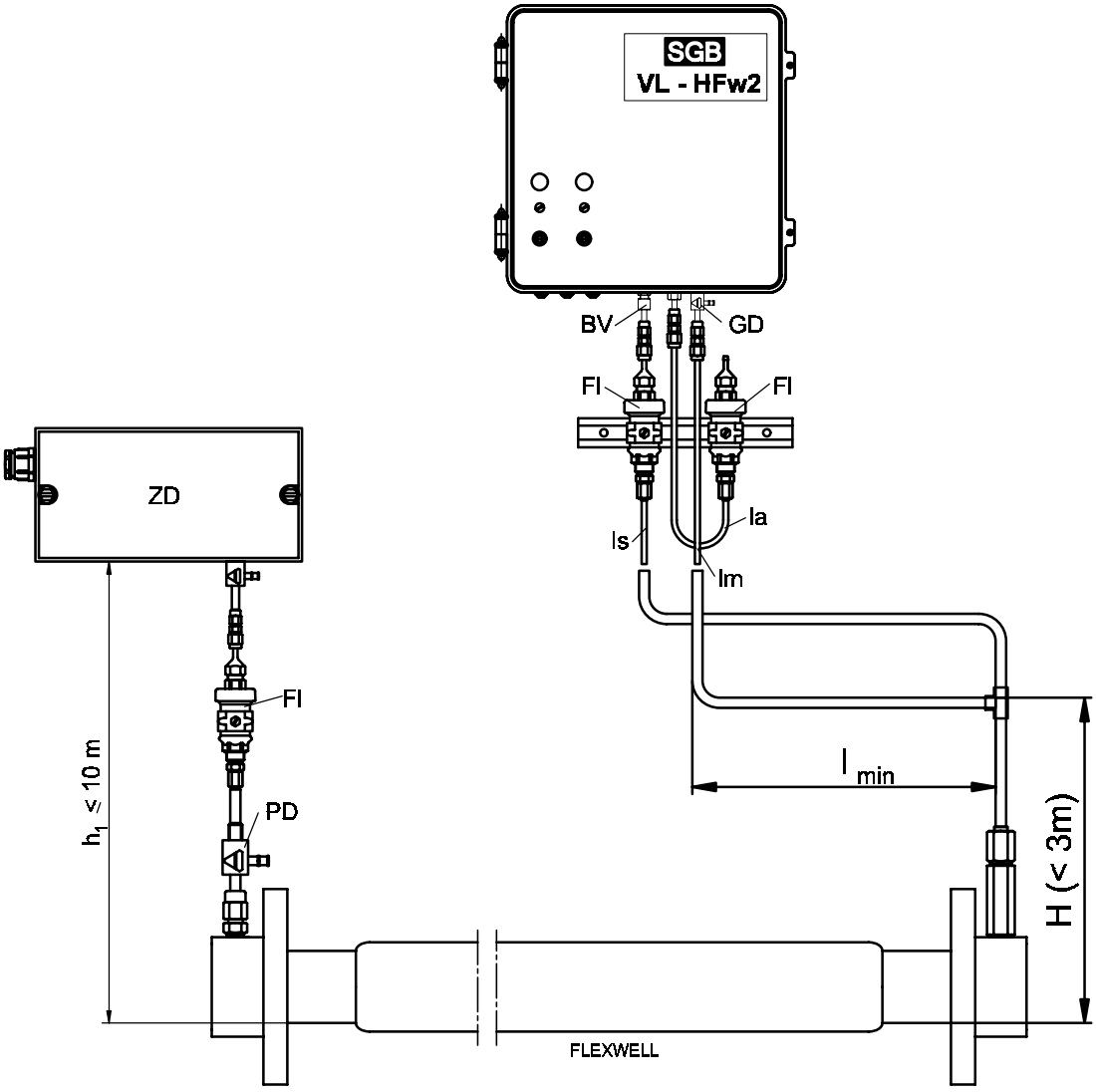
				Toleranzen nach DIN 7168-m		Werkstoff	Maßstab o.A.
						Bezeichnung	
				Bearb.	30-05-1980	Horizontal installation - double-train system	
				Gepr.			
				SGB		Zeichnungsnummer	Blatt
01		08-02-1988				1589	Bl.
Nr.	Änderung	Datum	Name				



Installation in accordance with kabelmetal specification sheet 6.03.04

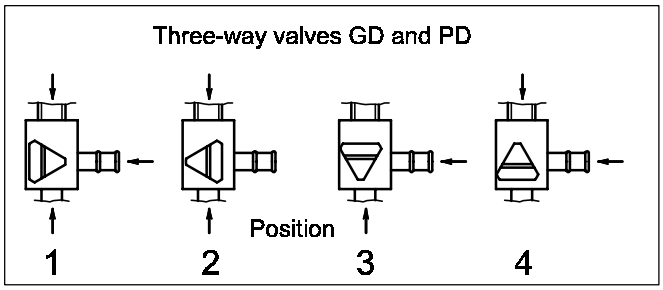
				Toleranzen nach DIN 7168-m		Werkstoff	Maßstab o.A.
						Bezeichnung	
				Bearb.	30-05-1980	Horizontal installation - Circular pipeline	
				Gepr.			
				SGB		Zeichnungsnummer	Blatt
						1590	
01		08-02-1988					Bl.
Nr.	Änderung	Datum	Name				

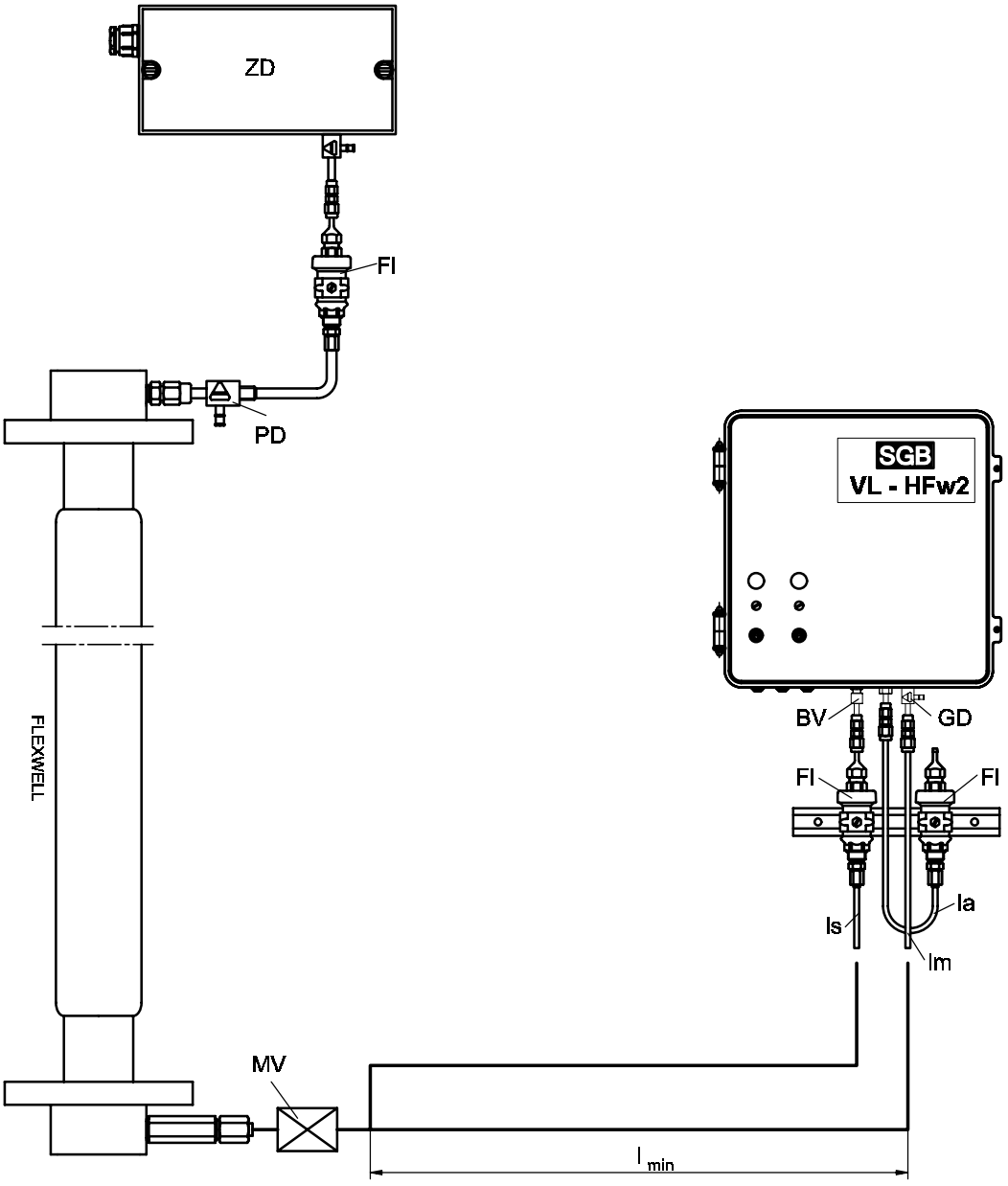




Installation in accordance with kabelmetal specification sheet 6.03.02

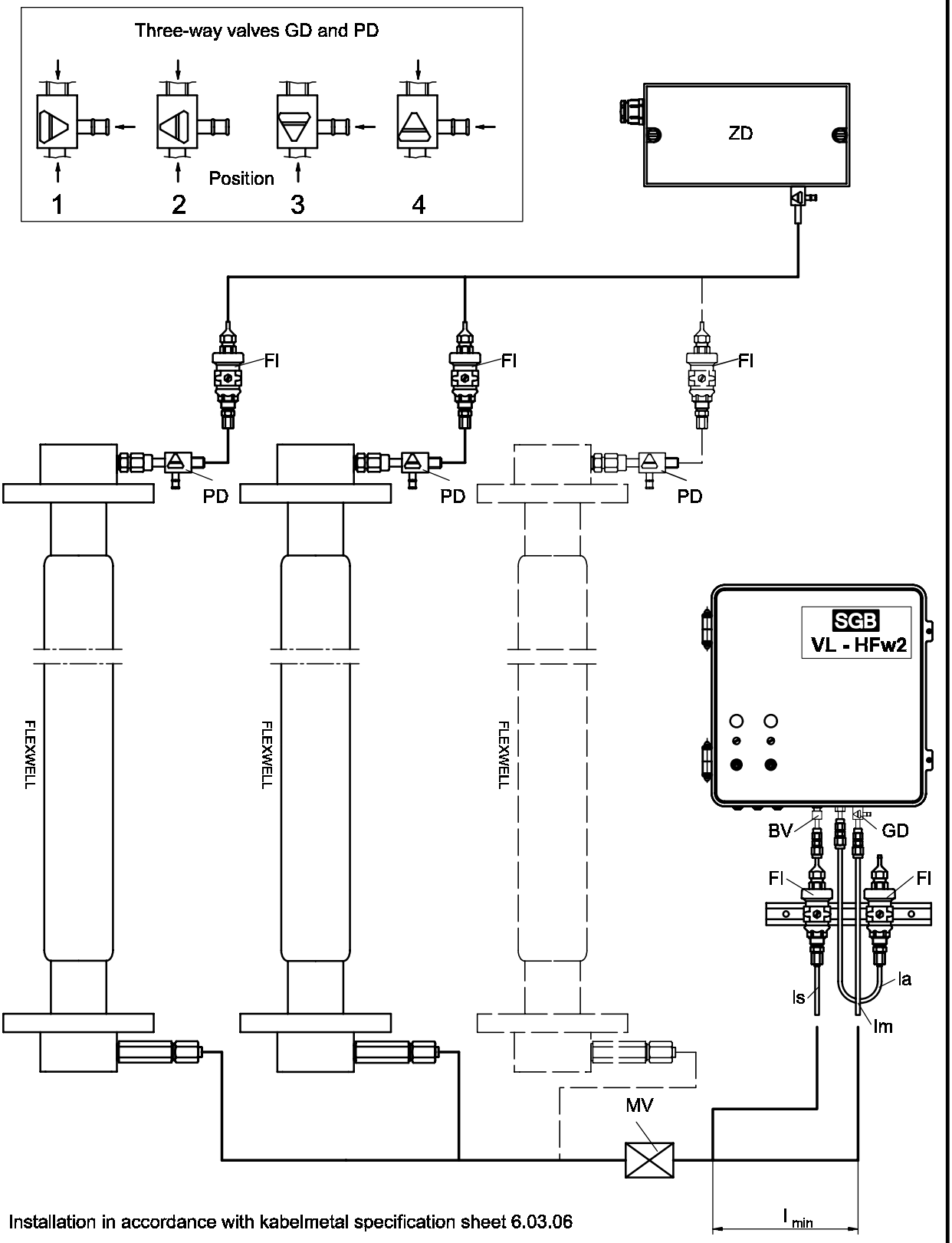
				Toleranzen nach DIN 7168-m	Werkstoff	Maßstab o.A.
					Bezeichnung	
				Bearb. 30-05-1980	Horizontal installation - single-train system w. additional alarm device	
				Gepr.		
				SGB	Zeichnungsnummer	Blatt
01		08-02-1988			1591	Bl.
Nr.	Änderung	Datum	Name			





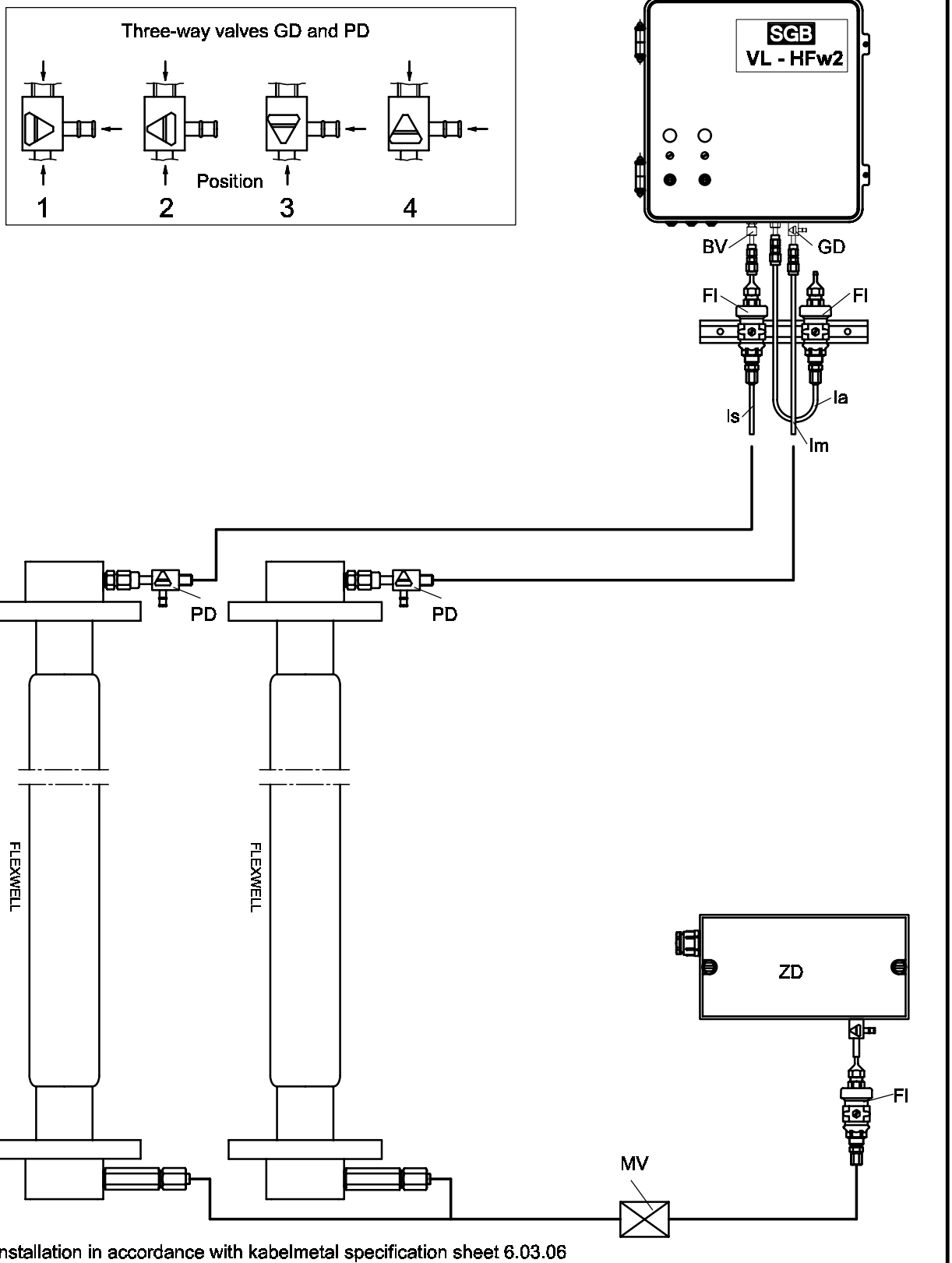
Installation in accordance with kabelmetal specification sheet 6.03.05

				Toleranzen nach DIN 7168-m		Werkstoff	Maßstab o.A.
						Bezeichnung Vertical installation in buildings - single-train system with additional alarm device	
				Bearb.	30-05-1980		
				Gepr.			
				SGB		Zeichnungsnummer 1592	Blatt Bl.
01		08-02-1988					
Nr.	Änderung	Datum	Name				



Installation in accordance with kabelmetal specification sheet 6.03.06

				Toleranzen nach DIN 7168-m		Werkstoff / Maßstab o.A.
				Bearb. 30-05-1980		Bezeichnung: Vertical installation in buildings - multiple-train system with additional alarm device
				Gepr.		
				SGB	Zeichnungsnummer 1593	Blatt Bl.
01		08-02-1988				
Nr.	Änderung	Datum	Name			



Installation in accordance with kabelmetal specification sheet 6.03.06

Nr.	Änderung	Datum	Name
01		08-02-1988	

Toleranzen nach DIN 7168-m

Bearb. 30-05-1980

Gepr.

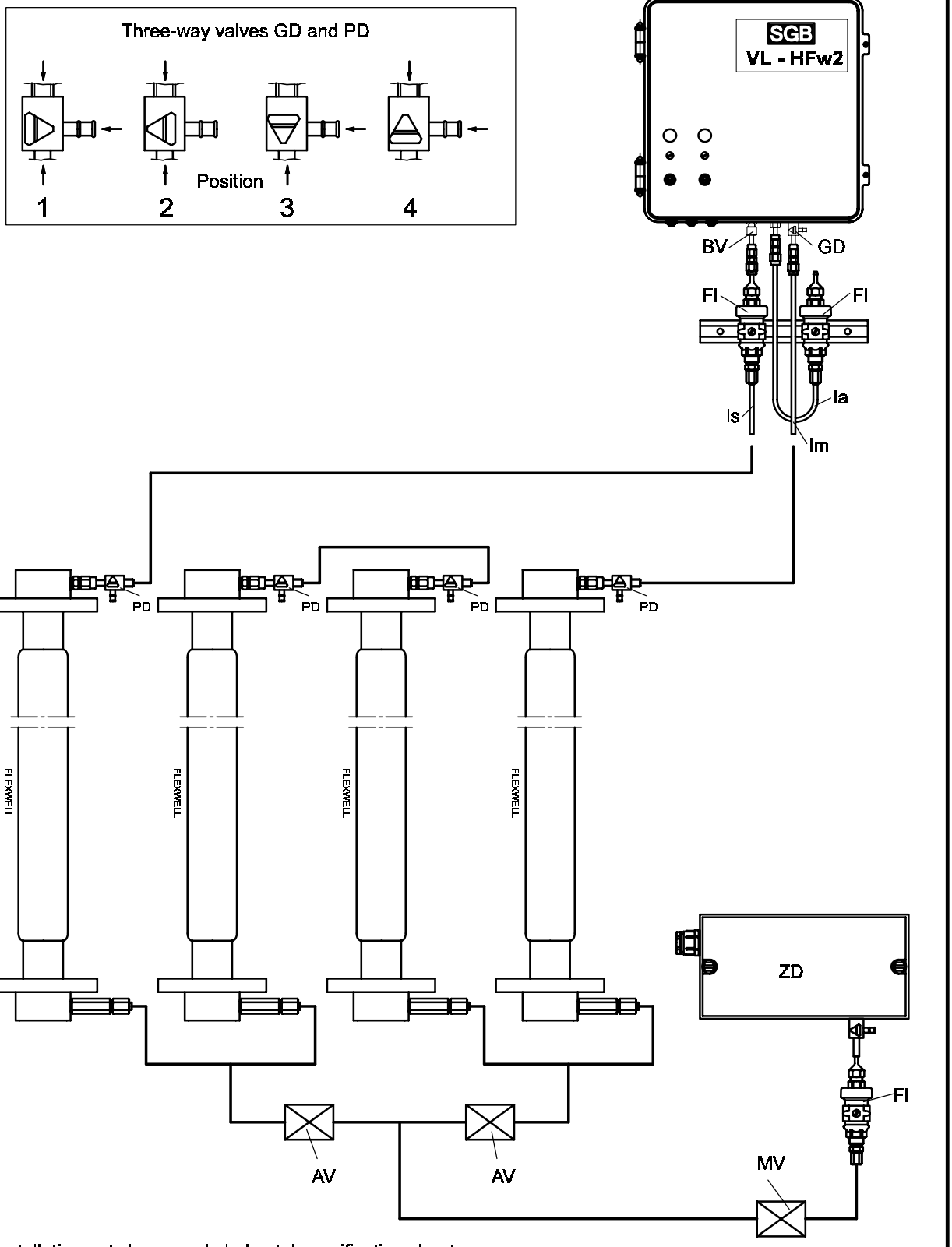
SGB

Werkstoff | Maßstab o.A.

Bezeichnung
Vertical installation in buildings - double-train system with additional alarm device

Zeichnungsnummer
1594

Blatt
Bl.



Installation not shown on kabelmetal specification sheet

Nr.	Änderung	Datum	Name
01		08-02-1988	

Toleranzen nach DIN 7168-m

Bearb. 30-05-1980

Gepr.

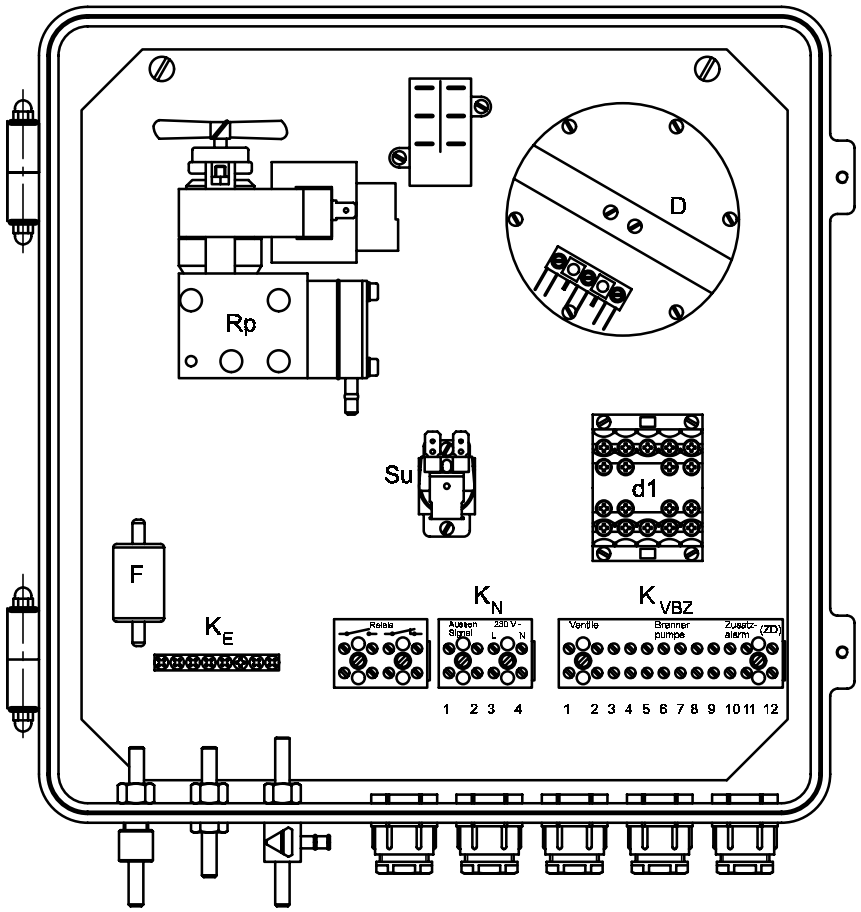
SGB

Werkstoff | Maßstab o.A.

Bezeichnung
Vertical installation in buildings - multiple-train system with additional alarm device

Zeichnungsnummer
1595

Blatt
Bl.



K_E	= Earthing terminal
K_N	= 1,2 external signal AS 3,4 220 Volt, R and MP
K_{VBZ}	= 1,2,3 valves 4 free (not assigned) 5,6,7 burner pump 8,9 free (not assigned) 10,11,12 additional alarm (ZD)

Nr.	Änderung	Datum	Name
02		08.02.88	
01		30.05.80	

Toleranzen nach DIN 7168-m

Bearb. 12-05-1975

Gepr.

SGB

Werkstoff | Maßstab o.A.

Bezeichnung

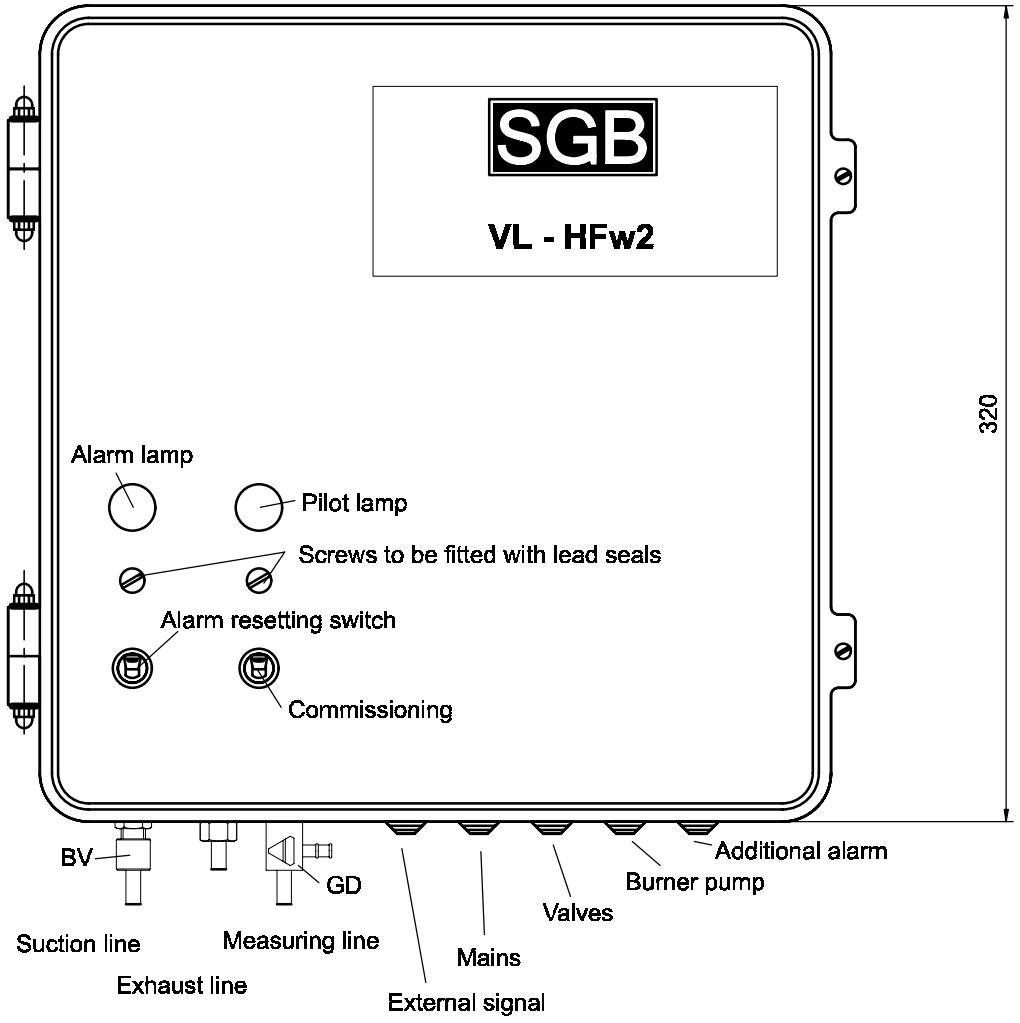
Inside view

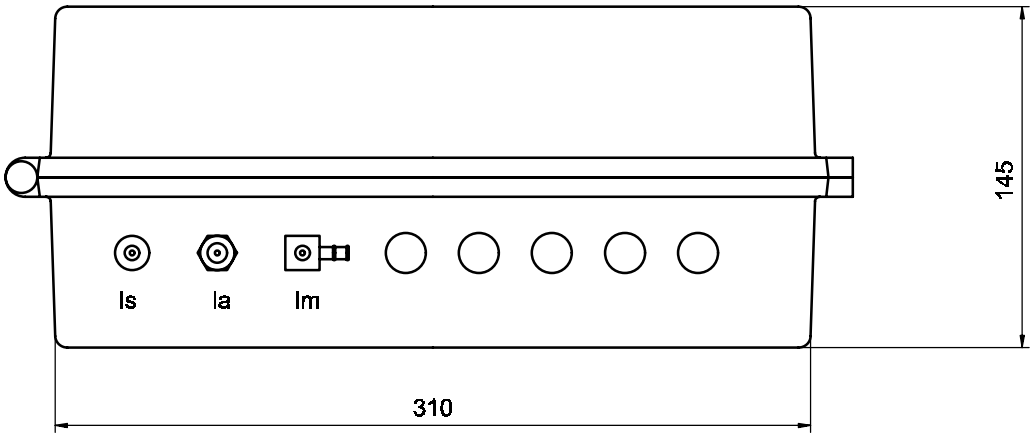
Zeichnungsnummer

1596

Blatt

Bl.





Nr.	Änderung	Datum	Name
02		08.02.88	
01		30.05.80	

Toleranzen nach DIN 7168-m

Bearb. 12-05-1975

Gepr.

SGB

Werkstoff | Maßstab o.A.

Bezeichnung

Outside view

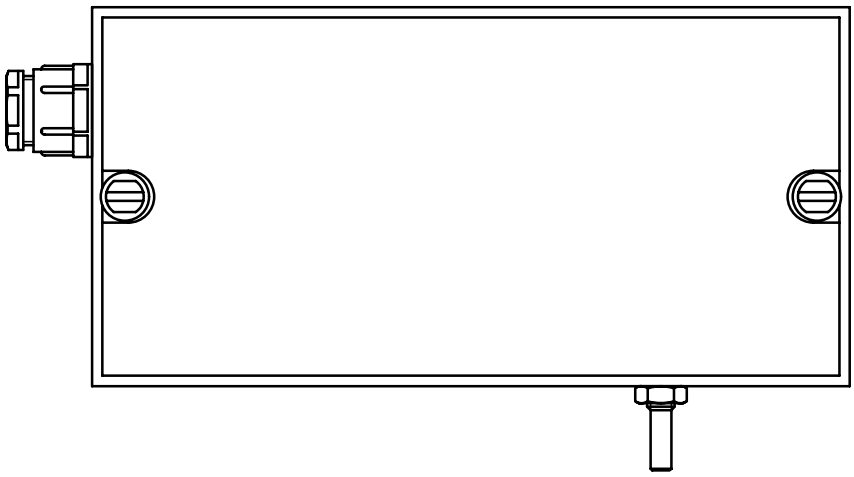
Zeichnungsnummer

1597

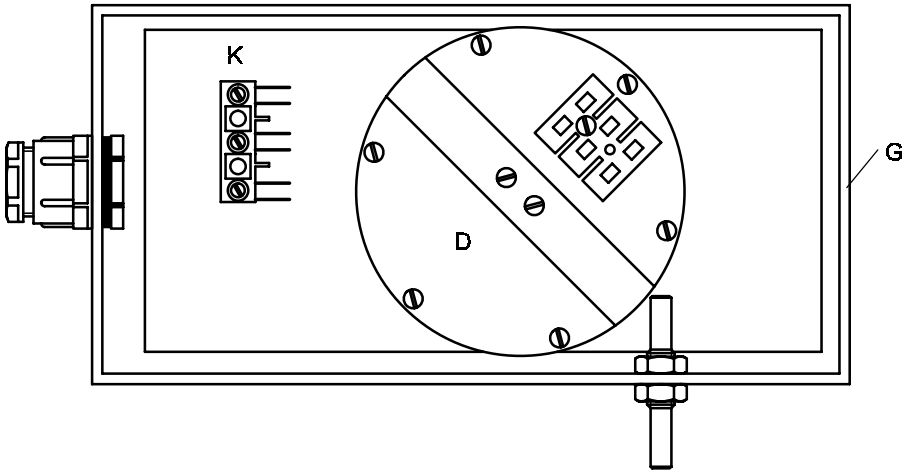
Blatt

Bl.

Outside view



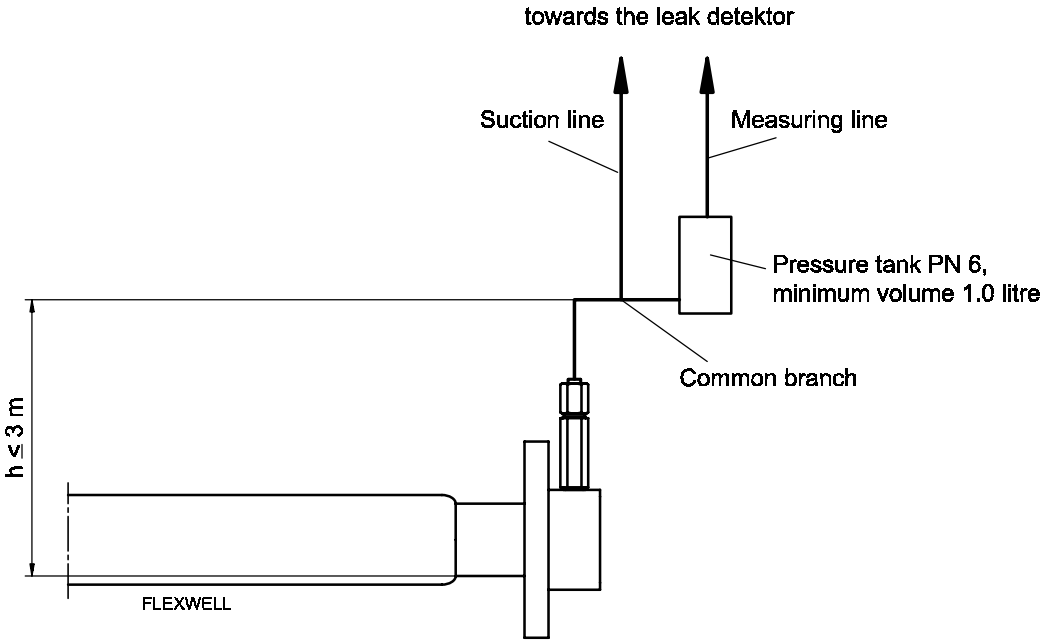
Inside view



D = Pressure switch (vacuum)
G = Housing
K = Terminal strip

				Toleranzen nach DIN 7168-m		Werkstoff	Maßstab o.A.
						Bezeichnung	
				Bearb.	12-05-1975	Additional measuring device ZD	
				Gepr.			
				SGB		Zeichnungsnummer	Blatt
02		08.02.88				1598	
01		30.05.80					Bl.
Nr.	Änderung	Datum	Name				

If horizontal laying of the measuring line (lmin) as specified in basic drawings no. 1588, 1591, 1592 and 1593 is not possible, a pressure tank (PN 6) with a minimum volume of 1.0 litre as shown on the following drawing may be provided as an alternative.



Nr.	Änderung	Datum	Name

Toleranzen nach DIN 7168-m

Bearb. 08-02-1988

Gepr.

SGB

Werkstoff | Maßstab o.A.

Bezeichnung

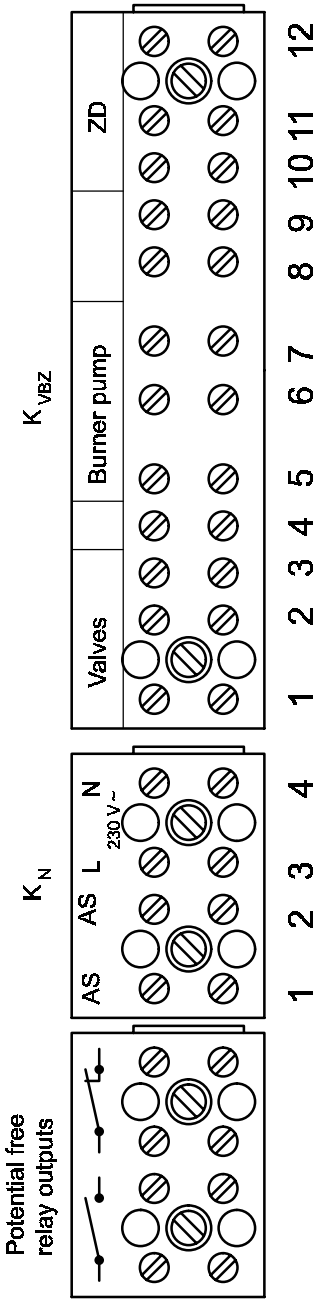
Pressure tank as replacement for horizontally laid measuring line

Zeichnungsnummer

1599

Blatt

Bl.



Nr.	Änderung	Datum	Name

Toleranzen nach DIN 7168-m

Bearb. 07-06-1993

Gepr.

SGB

Werkstoff | Maßstab o.A.

Bezeichnung

Terminal assignment

Zeichnungsnummer

1600

Blatt

Bl.

Supplement no. 5 to the approval issued on May 26, 1981

1. Object of supplement no. 5

- Extension of the field of application
- Extension of the range by addition of a pressure-resistant variant

2. Type

Vacuum leak detector type VL– HFw 2

Vacuum leak detector type VL– HFw 2 / 20

3. Field of application

3.1. Pipes (for both types of leak detector)

- FLEXWELL FILLING PIPES by BRUGG Rohrsysteme GmbH, Wunstorf, type FFL 80
- FLEXWELL SAFETY PIPES by BRUGG Rohrsysteme GmbH, Wunstorf, types FSR-16/30, FSR-30/48, FSR 39/60, FSR 48/71, FSR 60/83, FSR 83/120 and FSR 127/175
- STAMANT SAFETY PIPES by BRUGG Rohrsysteme GmbH, Wunstorf
- Officially approved double-walled pipes by BRUGG Rohrsysteme GmbH, Wunstorf which are provided with an interstitial space suitable for the connection of a vacuum leak detector.

3.2. Material to be transported

Inflammable liquids of hazard class A III to which the components of the leak detection system are resistant.

3.3. Restrictions / Extensions

VL-HFw2:
- max. delivery pressure in the inner pipe: 4 bar
- max. pressure in the inner pipe (rising pipes, in connection with ZD): 25 bar
- use of a ZD (depending on the method of installation)

VL-HFw2/20:
- max. delivery pressure in the inner pipe: 20 bar
- max. pressure in the inner pipe : 20 bar
- generally no ZD required

4. Connected power rating (VL-HFw2/20)

4.1. General

(1) Please refer to documentation for VL-HFw2.

(2) A short-term power interruption will trigger an alarm. Before restarting using the "Start" switch check to ensure that no leakage exists.

4.2. Solenoid valves and their connecting lines

(3) The solenoid valves (no. 44 and 94) must be suitable for 115 V/50 Hz, as they are connected in series in the leak detector.[1]

(4) The contacts of the solenoid valves must be provided with a suitable plug protected to IP 65 as a minimum.

(5) The connecting lines between the solenoid valve and the leak detector must be suitable for the application (e.g. environmental influences....). They must have a cross section of between 0.75 mm² and 2.5 mm².

(6) A blockage in the connecting line(s) will trigger an alarm.

4.3. Terminal assignment

1,2 External signal (230V in the event of an alarm)
3 Line conductor (phase)
4 Neutral conductor
7/8 Potential free contacts (opened in the event of an alarm or a power failure)
9/10 Potential free contacts (closed in the event of an alarm or a power failure)
11/12 Connection of solenoid valve 2/2-ways
13 Earthing for solenoid valve 2/2-ways
14/15 Connection of solenoid valve 3/2-ways
16 Earthing for solenoid valve 3/2-ways
17/18 Power supply for an auxiliary device (e.g. burner pump). In the event of an alarm or a power failure, this unit is switched off
19 Earthing for the above auxiliary device.

[1] They must all have virtually the same power consumption.

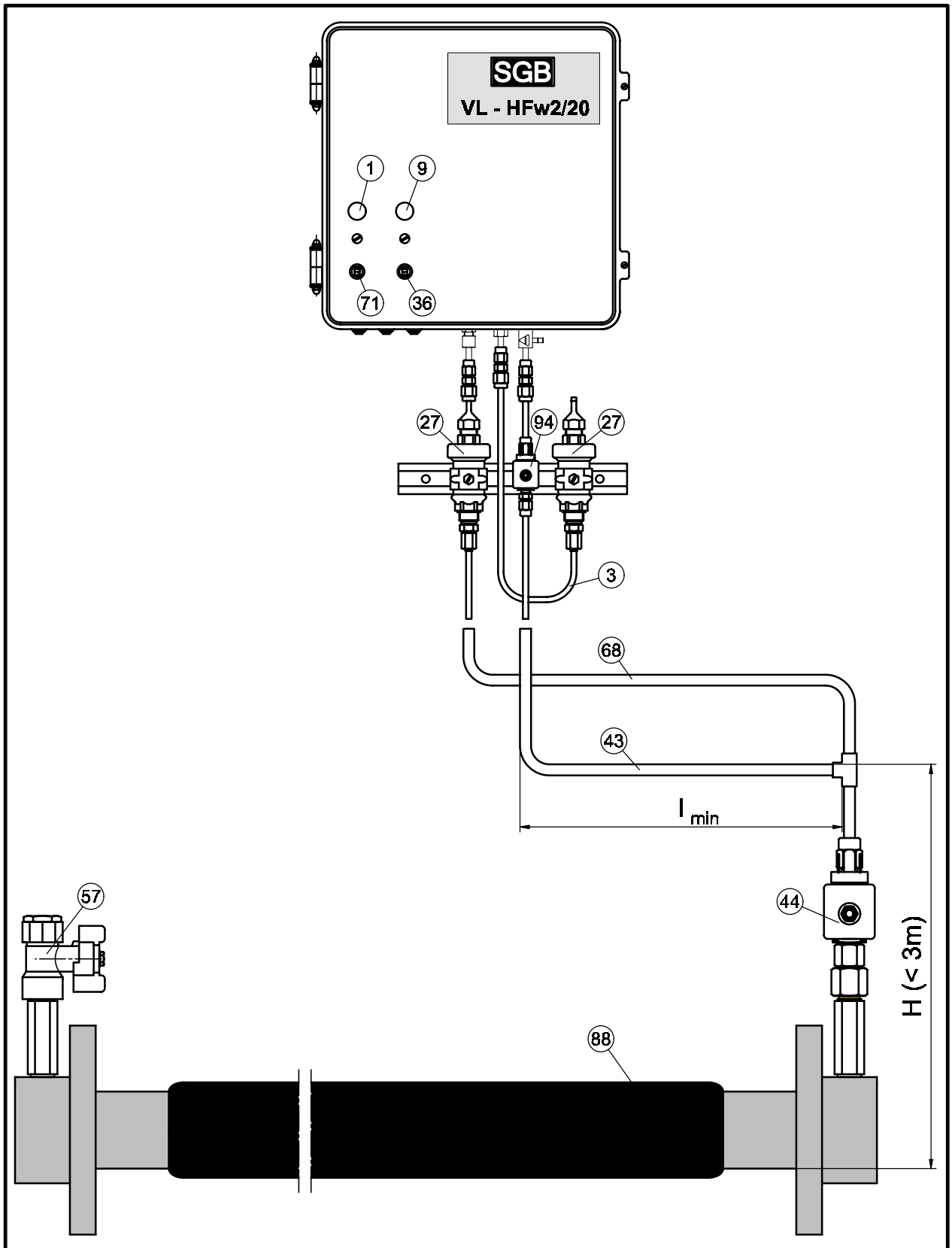
5. Abbreviations

1 Signal lamp "Alarm", red
3 Exhaust line
9 Signal lamp "Operation", green (white)
27 Liquid trap
36 Switch "Starting"
41 Alarm switch in D
42 Pump switch in D
43 Measuring line
44 Solenoid valve 2-2 ways
57 Check valve
59 Relay
59.1 Relay
59.2 Relay
59a Relay
60 Vacuum pump
68 Suction line
69 Buzzer
71 Switch "Audible alarm"
88 Double-walled pipe
94 Solenoid valve 3/2-ways

6. Other applicable documents

Installation example	M – 100 830
Wiring diagram	SL – 850 900

Enclosure to approval
08/PTB no. III B/S 1237
Institution for Protection of Health
and Safety Standards at Work
North-Rhine Westphalia
dated Nov. 03, 1999



Nr.	Änderung	Datum	Name

Toleranzen nach DIN 7168-m

Bearb.	28.06.1999	Hücking
Gepr.		

SGB

Werkstoff | Maßstab o.A.

Bezeichnung

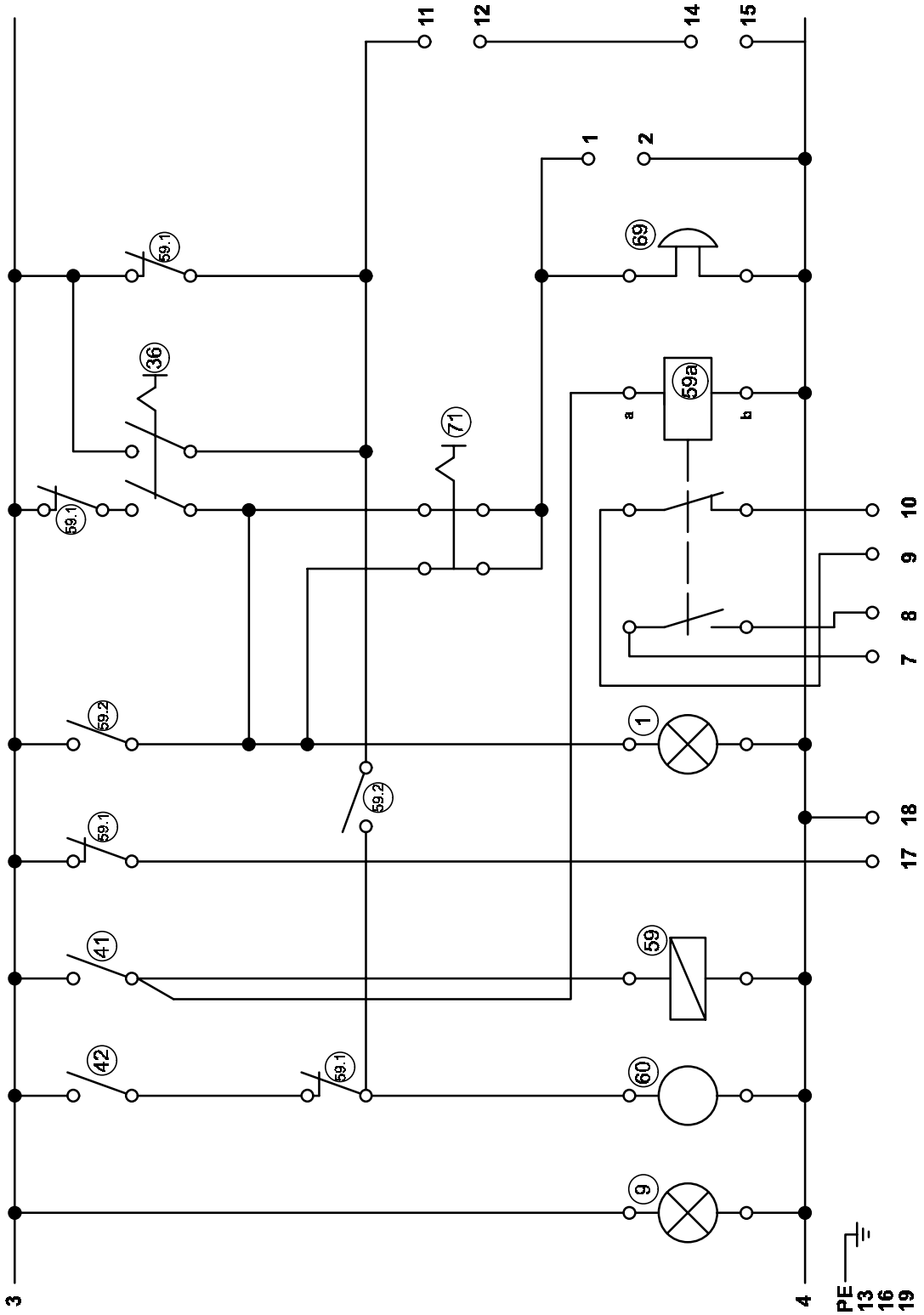
Installation example

Zeichnungsnummer

M - 100 830

Blatt

Bl.



Nr.	Änderung	Datum	Name

Bearb.	26.06.1999	Hücking
Gepr.		

SGB

Werkstoff	Maßstab
Bezeichnung	
Wiring diagram VL-HFw2/20	
with relay wired in rest current principle	
Zeichnungsnummer	Blatt
SL - 850 900	Bl.

Technical data
of
vacuum leak detector VL-HFw2

1. External electrical data

Connected power rating (without external signal)	230~ V - 50 Hz - 50 W
Switching contact load, terminals AS	230~ V - 50 Hz - 50 VA
Switching contact load, potential free contacts, max.	230~ V - 50 Hz - 8 A
Switching contact load, potential free contacts, min.	5 V / 5 mA
Switching contact load, burner pump, max.	230~ V - 50 Hz - 6 A
Switching contact load, burner pump, min.	6 V / 10 mA
Switching contact load, valves, max.	230~ V - 50 Hz - 6 A
Switching contact load, valves, min.	6 V / 10 mA
External fusing of leak detector	max. 10 A
Overvoltage category	2

2. Pneumatic data (leak detector tripping values)

Type	ALARM			PUMP	
	ON	delayed ON	OFF	ON	OFF
VL-HFw2	410 - 430	410	470 - 500	440 - 480	500 - 540

3. Pneumatic data (requirements concerning the measuring instrument for testing purposes)

Nominal size	min. 100
Degree of accuracy	min. 1.6
Scale end value	-1.0 bar and -600 mbar

Landesanstalt für Arbeitsschutz Nordrhein-Westfalen

(Central Office for Safety Engineering North-Rhine Westphalia)
Ulenbergstraße 127 – 131, 40225 Düsseldorf

Telephone: 0211/3101-0

-3.3-8229.2.8-Do Düsseldorf, Nov. 3, 1999

Supplement no. 4
to the
General Approval

By virtue of §7 of the '11th code of the legal provisions for the safety of devices' (code on the suitability of devices and protective systems for potentially explosive locations – code on protection against explosion – 11th GSGV)' in connection with §12 of the regulations on storage, canning and overland transportation of liquids, (code on inflammable liquids – VbF) dated Feb. 27, 1980 (Official Bulletin I, page 229) in its version published on March 23, 1994, the type approval

08/PTB no. III B/S 1237
dated May 26, 1981

granted to the company

Sicherungsgerätebau GmbH
57076 Siegen

is extended as follows:

I. The 'VL-HFw2' leak detector may also be used for leak detection on double-walled pipes subject to a maximum operating pressure of 20 bar in the inner pipe, as specified in subparagraph II of test certificate PTB no. III B/S 1237 dated December 18, 1975 and in subparagraph VI of supplement no. 1 to the above test certificate dated Feb. 04, 1981. For this purpose, the leak detector has the type designation 'VL-HFw2/20'.

II. 'VL-HFw2' and 'VL-HFw2/20' leak detectors may be used for leak detection on double-walled pipes of the following types:

a) Type 'FFL 80' and type 'STAMANT-SICHERHEITSROHR' by BRUGG Rohrsysteme GmbH, Wunsdorf

b) Double-walled pipes covered by a general approval by BRUGG Rohrsysteme GmbH, Wunsdorf, the interstitial spaces of which are suitable for a connection of HFw2' and 'VL-HFw2/20' leak detectors.

The present supplement to the type approval has been issued at the request of

Sicherungsgerätebau GmbH
Hofstraße 10
D-57076 Siegen

dated Oct. 18, 1999. It is based on test certificate PTB no. III B/S 1237 issued by the Federal Physical Technical Institution - supplement no. 5 dated Sept. 30, 1999 - and on the documents mentioned therein, which form an integral part of the general approval.

Note

In accordance with §7 of the 11th GSGV - code on protection against explosion -, devices and protective systems that comply with the provisions of this code in its version applicable on March 23, 1994 can be distributed until June 30, 2003.

Therefore, general approval 08/PTB no. IIIB/S 1237 including 4 supplements is valid until June 30, 2003.

Leak detectors distributed before this date may continue to be used.

Information on legal remedy

Objections to this notification can be registered up to one month after its issue. Such objections should be submitted in writing to the North-Rhine Westphalia State Institute for Occupational Safety and Health Ulenbergstraße 127 – 131, 40225 Düsseldorf.

If the a/m period of time has expired due to the negligence of one of your authorised representatives, such negligence will be considered as your own negligence.

By order

Signature

(Dr. Mildner)

Official seal
Central Office for Safety Engineering North-Rhine Westphalia

Central Office for Safety Engineering,
Radiation Protection and Nuclear Engineering Division of the Factory Inspectorate
of North-Rhine Westphalia
40225 Düsseldorf, Ulenbergstrasse 127 - 131
Telephone 0211 / 31 01-0

Supplement no. 3
to the
General Approval

II.1.3-8604-Do/We Düsseldorf, Sept. 28, 1993

Based on § 12 of the decree on plants for storage, transfer into containers and overland transportation of inflammable liquids, (code on inflammable liquids – VbF) dated Feb. 27, 1980 (Official Bulletin I, page 229) in its presently applicable version, the type approval

08/PTB no. III B/S 1237
dated May 26, 1981

granted to the company

Sicherungsgerätebau GmbH
57076 Siegen

for the manufacture of

leak detector type 'VL - HFw2'

is amended as follows:

The technical specification dated Feb. 08, 1988 is amended in accordance with paragraph XII of the PTB test certificate indicated below.

The present supplement is based on test certificate PTB no. III B/S 1237 issued by the Federal Physical Technical Institution - supplement no. 4 dated Aug. 05, 1993 - and on the documents mentioned therein, which form an integral part of the general approval.

Information on legal remedy

Objections to this notification can be registered up to one month after its issue. Such objections should be submitted in writing to the North-Rhine Westphalia State Institute for Occupational Safety and Health Ulenbergstraße 127 – 131, 40225 Düsseldorf.

If the a/m period of time has expired due to the negligence of one of your authorised representatives, such negligence will be considered as your own negligence.

By order

Signature

(R. Hahn)

Official seal
Central Office for Safety Engineering
North-Rhine Westphalia

**Central Office for Safety Engineering,
Radiation Protection and Nuclear Engineering Division of the Factory Inspectorate
of North-Rhine Westphalia
4000 Düsseldorf, Ulenbergstrasse 127 - 131
Telephone 0211 / 31 01-0**

II.1.3-8604-Do/He Düsseldorf, Oct. 01, 1990

Supplement no. 2
to the
General Approval

Based on § 12 of the decree on plants for storage, transfer into containers and overland transportation of inflammable liquids, (code on inflammable liquids – VbF) dated Feb. 27, 1980 (Official Bulletin I, page 229) in its presently applicable version, the type approval

08/PTB no. III B/S 1237
dated May 26, 1981

granted to the company

**Sicherungsgerätebau GmbH
57076 Siegen**

for the manufacture of

leak detector type 'VL - HFw2'

is amended as follows:

I. Replacement of the specification which has been the type approval category up to now through the technical specification dated Feb. 08, 1988.

II. Inclusion of drawing no. 1599 dated Feb. 08, 1988 relating to the alternative use of a pressure tank.

The present supplement is based on test certificate PTB no. III B/S 1237 issued by the Federal Physical Technical Institution - supplement no. 3 dated Aug. 30, 1990 - and on the documents mentioned therein, which form an integral part of the general approval.

Information on legal remedy

Objections to this notification can be registered up to one month after its issue. Such objections should be submitted in writing to the North-Rhine Westphalia State Institute for Occupational Safety and Health Ulenbergstraße 127 – 131, 40225 Düsseldorf.

If the a/m period of time has expired due to the negligence of one of your authorised representatives, such negligence will be considered as your own negligence.

By order

Signature

(R. Hahn)

Official seal
Central Office for Safety Engineering
North-Rhine Westphalia

Central Office for Safety Engineering,
Radiation Protection and Nuclear Engineering Division of the Factory Inspectorate
of North-Rhine Westphalia
4 Düsseldorf, Ulenbergstrasse 127 - 131
Telephone 0211 / 31 01-0

II.1.3-8604.2-Do/Me Düsseldorf, Feb. 19, 1986

Supplement no. 1
to the
General Approval

Based on § 12 of the decree on plants for storage, transfer into containers and overland transportation of inflammable liquids, (code on inflammable liquids – VbF) dated Feb. 27, 1980 (Official Bulletin I, page 229) in its presently applicable version, the type approval

08/PTB no. III B/S 1237
dated May 26, 1981

granted to the company

Sicherungsgerätebau GmbH
57076 Siegen

for the manufacture of

leak detector type 'VL - HFw2'

is amended as follows:

Subparagraph 3 of paragraph 2 'Description of the leak detection system' of the chapter 'Description and installation of vacuum leak detectors type VL-HFw2' which describes direct connection of a feed pump which is automatically stopped in the event of an alarm is deleted.

In future, a feed pump which is automatically stopped in the event of an alarm will only be connected to terminals 5, 6 and 7 as per drawing no. 1596 if the need arises.

The present supplement is based on test certificate PTB no. III B/S 1237 issued by the Federal Physical Technical Institution - supplement no. 2 dated Jan. 01, 1986 - and on the documents mentioned therein, which form an integral part of the general approval.

Information on legal remedy

Objections to this notification can be registered up to one month after its issue. Such objections should be submitted in writing to the North-Rhine Westphalia State Institute for Occupational Safety and Health Ulenbergstraße 127 – 131, 40225 Düsseldorf.

If the a/m period of time has expired due to the negligence of one of your authorised representatives, such negligence will be considered as your own negligence.

By order

Signature

(B. Ziegler)

Official seal
Central Office for Safety Engineering
North-Rhine Westphalia

**Central Office for Safety Engineering,
Radiation Protection and Nuclear Engineering Division of the Factory Inspectorate
of North-Rhine Westphalia
4 Düsseldorf, Gurlittstr. 53 A 127 - 131
Telephone 34 30 03 - 07**

II.5.1-8604.2-Wi/Ma Düsseldorf, May. 26, 1981

General Approval

of Leak Detector Type 'VL - HFw2'

Based on § 12 of the decree on plants for storage, transfer into containers and overland transportation of inflammable liquids, (code on inflammable liquids – VbF) dated Feb. 27, 1980 (Official Bulletin I, page 229) in its presently applicable version, the

leak detectors

manufactured by the company

**Sicherungsgerätebau GmbH
57076 Siegen**

are granted type approval under the registration number

08/PTB no.. III B/S 1237.

The test certificate PTB no. III B/S 1237 issued by the Federal Physical Technical Institution on Dec. 18, 1975 and Feb. 04, 1981 and the expertises of the Technical Control Board North Germany e.V. dated April 30, 1975 - 263 Bg/er - and Oct. 22, 1980 - 543-RK/Me - are integral parts of this general approval. The approval will cease to exist if it is not used for a period of three years, or if the systems are not manufactured for more than three years, or if the period of validity is not extended.

By order

Signature

(Stegler)

Official seal
Central Office for Safety Engineering
North-Rhine Westphalia

Federal Physical Technical Institution (PTB)

Test certificate

PTB no. III B/S 1237

for leak detector type 'VL-HFw2'

I. General

Object:

A leak detector operating on the vacuum principle for the detection of leaks on double-walled pipes type 'FSR../..' made by Messrs. Kabel- und Metallwerke Gutehoffnungshütte AG, Hanover used for the transportation of inflammable liquids of hazard class A III. The leak detector generates a vacuum of between 0.46 and 0.52 bar in the interstitial space between the two walls and triggers an alarm in case of vacuum falls to 0.40 bar.

Manufacturer:

SGB Sicherungsgerätebau GmbH,
Hüttental-Weidenau

Type designation:

'VL-HFw 2'

Documents submitted for examination:

a) Descriptions and drawings as per appendix 1 of the test certificate, provided with the signature and the official seal of the Federal Physical Technical Institution

b) Report of the TUEV Norddeutschland e.V., Hamburg dated April 30, 1975 on a test of the operational safety of leak detector type 'VL-HFw 2'.

II. Assessment

On the basis of the documents submitted for examination and of the report prepared by the TUEV Norddeutschland e.V., Hamburg, the leak detector is assessed as follows:

As far as is presently known, there are no objections to the use of the leak detector type ''VL-HFw 2' for the detection of leakage on double-walled pipes type 'FSR../..' by Messrs. Kabel- und Metallwerke Gutehoffnungshütte AG, Hanover, if they are exclusively used for the transportation of inflammable liquids of hazard class AIII, and if the following conditions are complied with:

1. The leak detector shall only be connected to double-walled pipes type 'FSR 16/30', 'FSR 30/48', 'FSR 60/83' and 'FSR 83/120' by Messrs. Kabel- und Metallwerke Gutehoffnungshütte AG, Hanover which have been manufactured and installed in accordance with test certificate PTB no. III B/S 1236.
2. The leak detector shall only be used in enclosed spaces. It must not be used in potentially explosive locations.
3. The installation instructions described in the documents submitted for examination must be observed.

III. Individual testing

By testing individually each leak detector type 'VL-HFw2', the manufacturer shall ensure that

1. the design, function, components, materials and electrical circuits are in compliance with the documents submitted for examination and drawings as per appendix 1;
2. all components are made of faultless material;
3. the trip pressures stated in table 1 are complied with;
4. the device is provided with a legible and permanent inscription stating that it shall only be used for double-walled pipes type 'FSR 16/30', 'FSR 30/48', 'FSR 60/83' and 'FSR 83/120' by Messrs. Kabel- und Metallwerke Gutehoffnungshütte AG, Hanover.

IV. Special conditions

Every purchaser of a leak detector must be advised in writing of the installation instructions, the procedure for maintaining the operational safety and the limitations of use. He must be advised that the operational safety of the leak detector shall be checked at regular intervals and at least once a year.

Every purchaser of a leak detector shall be given a copy of this test certificate.

The manufacturer shall confirm due compliance with the a/m requirements by affixing the company sign, the type designation and the mark of approval in a clearly visible position.

Braunschweig, December 18, 1975

Federal Physical Technical Institution
Division III
by order:

Signature
C. H. Degener *Official seal*

Supplement no. 1

The following extensions, amendments and supplements are made:

V. Amendment of paragraph I 'General'

The descriptions and drawings as per appendix 1 of test certificate PTB no. III B/S 1237 dated Dec. 18, 1975 are replaced by the descriptions and drawings quoted in appendix 2 of the test certificate.

VI. Amendment of paragraph II 'Assessment' - subparagraph 1

The 'VL-HFw 2' leak detector may also be used for the detection of leakage on double-walled pipes type'FSR 39/60', 'FSR 48/71' and 'FSR 127/174' made by Messrs. Kabel- und Metallwerke Gutehoffnungshütte AG, Hanover.

VII. Amendment of paragraph II 'Individual testing' subparagraph 4,

The pipe types quoted in paragraph VI shall be added to the list contained in subparagraph 4.

VIII. Assessment of the amendments and supplements

As far as is presently known and based on supplement no. 1 of the TUEV Norddeutschland e.V., Hamburg dated Oct. 22, 1980 to the report on the tests carried out and based on the documents submitted for examination there are no objections to the amendments and supplements.

All other conditions of the test certificate are to be observed.

Braunschweig, Feb. 04, 1981

Federal Physical Technical Institution
Division III
by order:

Signature
C. H. Degener *Official seal*

Appendix to approval
BAZ no. 08/PTB no. III B/S 1237
Central Office for
Safety Engineering
of North-Rhine Westphalia
dated May 26, 1961

Appendix 2 - Test certificate PTB no. III B/S 1237 dated Dec. 18, 1975

Related documentation
provided with signature and official seal
of the Federal Physical Technical Institution (PTB)

Designation	Sheet Drg. no.	Date
Functional description, installation instructions, checking of the leak detector and of the complete system	1 - 13	May 30, 1980
Bill of materials	14 - 15	May 30, 1980
Nameplate	16	May 30, 1980
Abbreviations	17	May 30, 1980
Wiring diagram	1587	May 30, 1980
Installation - Basic drawing	1588	May 30, 1980
Installation - Basic drawing	1589	May 30, 1980
Installation - Basic drawing	1590	May 30, 1980
Installation - Basic drawing	1591	May 30, 1980
Installation - Basic drawing	1592	May 30, 1980
Installation - Basic drawing	1593	May 30, 1980
Installation - Basic drawing	1594	May 30, 1980
Installation - Basic drawing	1595	May 30, 1980
Inside view	1596	May 30, 1980
Outside view	1597	May 30, 1980
Additional measuring device ZD	1598	May 30, 1980

Supplement no. 2

The following extensions, amendments and supplements are made:

IX. Amendment

Subparagraph 3 of paragraph 2 'Description of the leak detection system' which describes direct connection of a feed pump which is automatically stopped in the event of an alarm is deleted.

In future, a feed pump which is automatically stopped in the event of an alarm will only be connected to terminals 5, 6 and 7 as per drawing no. 1596 if the need arises.

Related documentation

Supplement to the 'Description and installation for vacuum leak detectors type VL-HFw2', sheet 01 dated Oct. 21, 1985

provided with signature and official seal of the Federal Physical Technical Institution (PTB).

Assessment of the amendment

As far as is presently known and based on the statement of the TUEV Norddeutschland e.V. and on the documents submitted for examination there are no objections to the amendment.

All other conditions of the test certificate and of supplement no. 1 are to be observed.

Braunschweig, Jan. 20, 1986

Federal Physical Technical Institution
Division III
by order:

Signature
C. H. Degener *Official seal*

Appendix to approval
BAZ no. 08/PTB no. III B/S 1237
Central Office for
Safety Engineering
of North-Rhine Westphalia
dated Feb. 19, 1986

Supplement no. 3

X. Amendment of and supplement to paragraph I 'General'
Documents submitted for examination

The description pages 1 - 13 dated May 30, 1980 quoted in appendix 2 of supplement no. 1, paragraph V 1 is replaced by the description quoted in this appendix of the test certificate. Drawing no. 1599 dated Feb. 8, 1988 relating to the alternative use of a pressure tank will be included.

Documents submitted for examination

	Sheet Drg. no.	Date
Functional description, installation instructions, checking of the leak detector and of the complete system	1 - 19	Feb. 08, 1988
Drawing	1599	Feb. 08, 1988

provided with signature and official seal of the Federal Physical Technical Institution (PTB).

XI. Assessment of the amendment

As far as is presently known and based on the statement of the TUEV Norddeutschland e.V. and on the documents submitted for examination there are no objections to the amendment and supplement.

All other conditions of the test certificate and of supplement no. 1 are to be observed.

Braunschweig, Aug. 30, 1990

Federal Physical Technical Institution
Division III
by order:

Signature
Dr. H. Bothe *Official seal*

Appendix to approval
BAZ no. 08/PTB no. III B/S 1237
Central Office for
Safety Engineering
of North-Rhine Westphalia
dated Oct. 01, 1990

Supplement no. 4

X. Amendments of paragraph I 'General'
Documents submitted for examination

1. Paragraph 4.2 of the technical description dated Feb. 08, 1988 will be extended by subparagraph (5) with the following wording:

   The alarm signal can be additionally transmitted through a relay with potential free contacts (type E 3252, suitable versions).

Power rating:	220/250 V; 50 Hz
Max. contact load:	16 A; 250 V

2. Drawings no. 1587a dated June 07, 1993 and no. 1600 dated June 07, 1993 are added to the technical description.

Documents submitted for examination

	Sheet Drg. no.	Date
Wiring diagram, including relay with potential free contacts	1587a	June 07, 1993
Terminal designation	1600	June 07, 1993

provided with signature and official seal of the Federal Physical Technical Institution (PTB).

XI. Assessment of the amendment

As far as is presently known and based on the statement of the TUEV Norddeutschland e.V. and on the documents submitted for examination there are no objections to the amendments.

All other conditions of the test certificate and of supplement no. 1 are to be observed.

Braunschweig, Aug. 05, 1993

Federal Physical Technical Institution
Division III
by order:

Signature
Dr. H. Bothe *Official seal*

Appendix to approval
BAZ no. 08/PTB no. III B/S 1237
Central Office for
Safety Engineering
of North-Rhine Westphalia
dated Sept. 29, 1993

Supplement no. 5

XIV. Amendments of paragraph II 'Assessment'

The 'VL-HFw 2' leak detector may also be used for the detection of leakage on the double-walled pipes quoted in paragraph II of the test certificate and paragraph VI of supplement no. 1 with an operating pressure up to 20 bar in the inner pipe.

For this purpose, the leak detector is designated 'VL-HFw2/20'.

XV. Extension of the field of application

'VL-HFw 2' and 'VL-HFw2/20' leak detectors may also be used for the detection of leakage on the following double-walled pipes:

a) Type 'FFL 80' and type 'STAMANT-SICHERHEITSROHR' by BRUGG Rohrsysteme GmbH, Wunsdorf

b) Double-walled pipes covered by a general approval by BRUGG Rohrsysteme GmbH, Wunsdorf, the interstitial spaces of which are suitable for a connection of HFw2' and 'VL-HFw2/20' leak detectors.

Documents submitted for examination

Amendment to the technical description	3 sheets	June 30, 1999
Installation example	M-100830	June 28, 1999
Wiring diagram VL-HFw2/20	SL-850900	June 26, 1999

XI. Assessment of the amendment

As far as is presently known and based on the statement of the TUEV Norddeutschland e.V. and on the documents submitted for examination there are no objections to the amendment and extension.

All other conditions of the test certificate and of supplement no. 1 are to be observed.

Braunschweig, Sept. 30, 1999

Federal Physical Technical Institution
Division III
by order:

Signature
Dr. H. Bothe *Official seal*

Appendix to approval
BAZ no. 08/PTB no. III B/S 1237
Central Office for
Safety Engineering
of North-Rhine Westphalia
dated Nov. 03, 1999

Technischer Überwachungs-Verein
Norddeutschland e.V.

Tank and
Heating Systems
Division

TüV
Norddeutschland

113 BM SGB
113 BM 00582

Hamburg, Oct. 22, 1980
543-Rk/Me

Supplement no. 1

to the test report dated April 30, 1975 concerning
the operational safety of a leak detector

1. General

1.1	Manufacturer and applicant	:	Messrs. Sicherungsgerätebau GmbH, 5900 Siegen 21 Hofstr. 10 (Postfach 210439)
1.2	Test applied for by	:	the manufacturer, letter dated April 14, 1979 ref. I/Sch.
1.3	Type designation	:	VL - HFw 2
1.4	Existing approval		
1.4.1		:	Notification of the Minister for Work, Health and Social affairs of North-Rhine Westphalia dated Jan. 16, 1976, ref. III A 2 - 8603.4
1.4.2		:	Test certificate of the Federal Physical Technical Institution dated Dec. 18, 1975, ref. PTB no. III B/S 1237.
1.5	Mark of approval	:	-
1.6	Planned amendments	:	The amendments and supplements applied for do not concern the leak detector itself, which will remain unchanged, but rather the related installation methods and an extension of the field of application to new Flexwell pipes with different dimensions, namely 'FSR 39/60', 'FSR 48/71' and 'FSR 127/175'.

2. Documents submitted for examination : For the purpose of the application, the manufacturer has completely revised the installation plans and co-ordinated them with those by Messrs. Kabelmetall , and has added special testing instructions. The complete documents relating to the leak detector were submitted, including those to which no modifications were made.

3. Examination : The application documents have been checked for factual correctness and completeness, together with the documents relating to the Flexwell safety pipes concerned. There was no reason for new practical tests. However, the responsible for the examination attached great value to the preparation of precise instructions for carrying out the final functional check on site.

4. Results of the examination : As a result of the revision of the documents and inclusion of the additional pipe types, the installation plans have been substantially altered. The previous risk that in certain cases a leak could not be detected in the interstitial space of a double-walled pipe, because a solenoid valve was closed due to a defect, has been eliminated by the installation of an additional measuring device (ZD). In addition, the test instructions are assigned to the corresponding installation plans and structured in such a way as to ensure that the different steps and measurements to be taken for checking vacuum leak detectors in double-walled pipes may be carried out consecutively in an expert but relatively simple manner.

   The new test instructions will undoubtedly be helpful for fitters, technicians and experts when carrying out checks and acceptance tests.

5. Assessment : As far as is presently known there are no objections to the amendments and extensions applied for on the basis of the submitted documents.

Rüpcke
Expert
of the Technical Control Board
North Germany e.V.

Department for leak

Encl.
Application documents (placed in a file)

Appendix to approval
BAZ no. 08/PTB no. III B/S 1237
Central Office for
Safety Engineering
of North-Rhine Westphalia
dated May 26, 1981 II.5-1-8604.2 - Wi/Ma

CE Declaration of conformity

We hereby confirm that the

vacuum leak detector

VL-HFw2

complies with the protection requirements specified in the EC directive 89/336/EEC for harmonisation of the legal provisions applicable in the member states concerning electromagnetic compatibility (EMC), dated November 09, 1992 (§4, subparagraph 1).

This declaration applies to all leak detectors manufactured in accordance with the attached technical documents which are an integral part of this declaration.

For product assessment with respect to EMC, the following prescriptions were referred to:

- EN 50082 part 1: 1992
- EN 55014: 1993
- EN 60555-2: 1987
- EN 60555-3: 1987
- EN 60555-3/A1: 1991

This declaration is given on behalf of the manufacturing company

SGB

SICHERUNGS**G**ERÄTE**B**AU GMBH
Hofstraße 10
D - 57076 Siegen

by its managing director

Mr. Berg

D - 57076 Siegen, March 27, 1995

J. Berg, Managing Director

Warranty

Dear customer,

You have purchased a high-quality leak detector from our company.

All of our leak detectors undergo a 100% quality control examination.

The type plate with the serial number is only affixed after all test criteria have been complied with.

The **warranty period** for our leak detectors is **24 months**, beginning on the date of installation on site.

The maximum warranty period is 27 months from our date of sale.

Our warranty will be effective only if the customer submits to us the functional report or test report on initial putting into service, prepared by a recognised company specialised in water and water protection systems, including the serial number of the leak detector.

Our warranty shall not apply in the event of faulty or improper installation or improper operation, or if modifications or repairs are carried out without the manufacturer's consent.

In case of malfunction, please contact your local specialist company:

Stamp of the specialist company

Yours sincerely

Sicherungsgerätebau GmbH
Hofstraße 10 - D - 57076 Siegen
☎ +49 / 271 / 48964 - 0
Fax: +49 / 271 / 48964 - 6