Vibration detectors

Requirements

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Guidelines for Intruder Alarm Systems

Vibration detectors

Requirements

Content

1 General

1.1 Scope

These guidelines contain requirements for **class A, B and C** Vibration detectors which are suitable for the surveillance of plains against penetration.

Vibration detectors may be arranged as electromechanical contacts (sensors) or as complete detector. In the case of vibration contacts processing of the signals received from the sensor is performed in the IAS-Control and Indicating Equipment (I-CIE) or a special processing unit.

They shall be applied in conjunction with the “Guidelines for intruder alarm systems, general requirements and test methods“; VdS 2227 and the “Guidelines for intruder alarm systems, protection against environmental influences, requirements and test methods“, VdS 2110. The “Rules for fire prevention and security technology, software, requirements and test methods“, VdS 2203, also apply for system components controlled by software.

The test methods for Vibration detectors are described in the guidelines VdS 2481 (at present draft).

1.2 Validity

These guidelines are valid from May 01, 2007; they replace the edition VdS 2480 01/97 (01).

2 Normative references

These guidelines contain dated and undated references to other publications. The normative references are cited at the appropriate places in the clauses, the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to these guidelines only when announced by a change of these guidelines. For undated references the latest edition of the publication referred will be applied.

- **DIN 41636** Sensitive switches for communication technology
- **DIN EN 60529** Degrees of protection provided by enclosures (IP-Code), corresponds with VDE 0470-1
- **DIN EN ISO 6988 : 1997-03** Metallic and other non-organic coatings - sulfur dioxide - test with general condensation of moisture
- **DIN VDE 0801** Principles for Computers in safety-related systems
- **EN 61000-4-2** Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques – Section 2: Electrostatic discharge immunity test – Basic EMC publication
- **EN 61000-4-3** Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques – Section 3: Radiated, radio-frequency, electromagnetic field immunity test

- **EN 61000-4-4** Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques, Section 4: Electrical fast transient/burst immunity test
- **EN 61000-4-5** Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques – Section 5: Surge immunity test
- **EN 61000-4-6** Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques – Section 6: Immunity to conducted disturbances, induced by radio-frequency fields
- **EN 60068-2-1** Environmental testing - Part 2: Tests, tests A: Cold;
- **EN 60068-2-2** Basic environmental testing procedures - Part 2: Tests; tests B: Dry heat
- **IEC 60068-2-3** Basic environmental testing procedures – Part 2: tests Ca: Damp heat, steady state
- **IEC 60068-2-6** Environmental testing - Part 2: Tests; test Fc: Vibration (sinusoidal)
- **IEC 60 068-2-27** Basic environmental testing - Part 2: Tests, tests Ea: shock
- **IEC 60 068-2-30** Environmental testing – Part 2: Tests, tests Db and guidance: Damp heat, cyclic
- **IEC 60068-2-75** Basic environmental testing - Part 2: Tests; test Eh: hammer tests
- **VdS 2110** Guidelines for intruder alarm systems, protection against environmental influences, requirements and test methods
- **VdS 2203** Rules for fire prevention and security technology, software, requirements and test methods
- **VdS 2227** Guidelines for intruder alarm systems, general requirements and test methods
- **VdS 2481** Guidelines for intruder alarm systems Vibration detectors, test methods (at present draft)

3 Terms and definitions

For general terms and definitions refer to the “Guidelines for intruder alarm systems, general requirements and test methods“, VdS 2227.

4 Classification

The **performance criteria** for different classes are defined in the „Guidelines for intruder alarm systems, general requirements and test methods“, VdS 2227.

The **environmental classes** are set in accordance with the “Guidelines for intruder alarm systems, protection against environmental influences, requirements and test methods“, VdS 2110.

5 Protection against environmental influences

5.1 Limits of application

Environmental influences shall not affect the function of Vibration detectors. Environmental influences can have various effects on operating characteristics, depending on the nature of the function applied. The manufacturer shall therefore specify the limits of the application (e.g. climate).

5.2 Climates

The function of Vibration detectors shall not be adversely affected by the thermal conditions described in table 5.01, appropriate to its environmental class.

Test	**Functional test**	**Endurance test**	**Degree of severity, abbreviated description of conditions**		
			I	II	III
Dry heat (T1) as spec. in IEC 60068-2-2	x		+40 °C, 16 h	+55 °C, 16 h	+70 °C, 16 h
Cold (T3) as spec. in IEC 60068-2-1	x		+5 °C, 16 h	-10 °C, 16 h	-25 °C, 16 h
Damp heat, steady (T4) as spec. in IEC 60068-2-3	x		+40 °C, 4 d, 93% rel. air humidity		No test
Damp heat, steady (T5) as spec. in IEC 60068-2-3		x	No test		+40 °C, 21 d 93 % rel. air humidity
Damp heat, cyclic (T6) as spec. in IEC 60068-2-30	x		No test		+55 °C, 2 cycles
Damp heat, cyclic (T7) as spec. in IEC 60068-2-30		x	No test		+55 °C, 6 cycles

Table 5.01: Climates

5.3 Protection against corrosion

Vibration detectors shall have adequate resistance to corrosion as specified in table 5.02.

Test	**Functional test**	**Endurance test**	**Degree of severity, abbreviated description of conditions**		
			I	II	III
SO_2-corrosion (K3) as spec. in DIN EN ISO 6988		X	No test	0.2 l SO_2, 5 cycles	2 l SO_2, 5 cycles
Corrosion by window cleanser (K4)		X	15 % alcohol, 2 % ammonia, 1 % alkylbenzolsulfanat, 20 °C, 24 h as well as 15 % common salt, 5 % vinegar, 1 % alkylbenzolsulfanat, 20 °C, 24 h, per solvent 5 cycles		

Table 5.02: Protection against corrosion

5.4 Mechanical influences

The function of Vibration detectors shall not be adversely affected by mechanical influences as described in table 5.03.

Test	**Functional test**	**Endurance test**	**Degree of severity, abbreviated description of conditions**		
			I	II	III
Shock (M1) as spec. in IEC 60068-2-27	x		$A(ms^{-2}) = 1000 - (200 \times M)$ 6 times 3 shocks, duration each 6 ms		
Impact (M2) as spec. in IEC 60068-2-75	x		0.5 J, 3 impacts per point		
Vibration sinus (M3) as spec. in IEC 60068-2-6 [1)]	x		10-150 Hz, 0.2 g, 1 cycle	10-150 Hz, 0.5 g, 1 cycle	
Vibration sinus (M4) as spec. in IEC 60068-2-6		x	10-150 Hz, 0.5 g, 20 cycles	10-150 Hz, 1.0 g, 20 cycles	

[1)] Influence may cause a signal/message – depending of the functional principle of the Vibration detector

Table 5.03: Mechanical influences

5.5 Electromagnetic compatibility (EMC)

The function of Vibration detectors shall not be adversely affected by electromagnetic influences (EMC) as specified in table 5.04.

Test	**Functional test**	**Endurance test**	**Degree of severity, abbreviated description of conditions**		
			I	II	III
Electrostatic discharge of low energy (E1b) acc. to EN 61000-4-2	x		Each 10 times pos. and neg. contact discharge 2, 4 and 6 kV and air discharge 2, 4 and 8 kV		
Radiated, radio-frequency electromagnetic field (E2a) acc. to EN 61000-4-3	x		80 – 2000 MHz, 10 V/m as well as 415-466 and 890-960 MHz, 30 V/m Modulation: AM 80 % (modulated with 1 kHz Sinus) for at least 3 s and in addition 3 times switching on/off of the carrier with 1 Hz and 1 kHz		
Conducted radio-frequency (E2b) acc. to EN 61000-4-6	x		150 kHz-100 MHz, 140 dBµV Modulation: AM 80 % (modulated with 1 kHz sinus) for at least 3 s and in addition 3 times switching on/off of the carrier with 1 Hz and 1 kHz		
Conducted electrical fast transient with low energy – burst - (E3a) acc. to EN 61000-4-4	x		Each for a period of 1 min pos. and neg. mains 0.5, 1 and 2 kV, other circuits 0.25, 0.5 and 1 kV		
Conducted slow surge with high energy - (E4a) acc. to EN 61000-4-5	x		Mains 20 times pos. and neg. cl. 4 diff. 0.5, 1, 2 kV Other circuits 5 times pos. and neg. cl. 3: line-to-line 0.5, 1 kV and line-to-ground 0.5, 1, 2 kV		
Static magnetic fields (E6)	x		150 mT		

Table 5.04: Electromagnetic compatibility (EMC)

6 Functional reliability

6.1 Provision of functions

6.1.1 Technical data

Technical data describing the system components shall be provided in the German language. This data shall include all information and parameters necessary for the correct and reliable operation of the system components.

6.1.2 Installation instructions

Installation instructions written in German language shall be provided for system components. These instructions shall include a clear illustration of the assembly and installation procedures and information describing the applications for which the system components are suitable (including an indication of the class acc. to clause 4). Further on instructions are necessary for adjustment (setting) and maintenance. Any adjustment settings that are not allowed shall be indicated unambiguously.

6.1.3 Operating voltage behaviour

Nominal voltage, operating voltage range (at least nominal voltage U_N ± 25 %) and maximum permitted ripple of the operating voltage shall be specified by the manufacturer. Vibration detectors shall function correctly within these specified values. Variations in the voltage as specified in table 6.01 shall not adversely affect the function of Vibration detectors.

Test	**Functional test**	**Endurance test**	**Degree of severity, abbreviated description of conditions**		
			I	II	III
Operating voltage range system voltage (B1b)	x		UN ± 25 %		
Operating voltage surge system voltage (B2b)	x		10 cycles from UN +25 % to UN -25 % and back		

Table 6.01: Changes of operating voltage

6.1.4 Ripple of the operating voltage

As a minimum requirement Vibration detectors shall function correctly with a voltage ripple of ≤ 1.0 V_{SS} if a nominal voltage of 12 V is specified. For a nominal voltage of 24 V the ripple value is ≤ 2.0 V_{SS}. For other nominal voltages the specifications of the manufacturer shall apply.

6.1.5 Reliability

The selection of components for Vibration detectors shall be such that they are suitable for the selected environmental class.

6.1.6 Components

Only components using a technology that has proven to be reliable in various applications, with an unmodified specification over a period of 2 years, may be used. For components of unproven reliability, other means of demonstrating reliability may be considered on an individual basis.

All components shall be operated within the limits specified by the component manufacturer while taking into consideration the effect of ambient temperature (including inherent warming) (see also DIN VDE 0801).

6.1.7 Relays

Relays shall be protected against the effects of dust at least to the degree of protection specified by EN 60529 - IP 5x. Relay contacts shall be designed for at least 10,000 switching cycles at a corresponding connected load.

6.1.8 Switches

Switches shall be fitted with self-cleaning contacts or be enclosed in dust-protected casings complying at least with the degree of protection specified by EN 60529 - IP 5x.

6.1.9 Access to assemblies and components

System components of IAS shall be constructed to ensure that assemblies and components are easily accessible and a replacement is easily possible. Provisions shall be made to reduce handling errors to a minimum.

6.1.10 Connecting and adjustment elements

Connecting and adjustment elements shall be marked and shall be easily accessible to the installer and maintenance personnel. Connection elements for connection to the IAS shall be designed to ensure reliable operation and protection against corrosion.

Adjustments shall be comprehensible (e.g. by the provision of adequate graduation markings).

6.1.11 Operational readiness of the detector after application of the operation voltage

The time between the application of the operation voltage and the reliable operation of the Vibration detectors shall be specified by the manufacturer and shall not exceed 120 s.

6.2 Function monitoring

The failure of, or a fault in the central processing units (e.g. microprocessors) shall be signalled.

For **class C** detectors security relevant functions (e.g. signal processing and analysis, fixing on the monitored plane) shall be monitored automatically as far as possible or other means shall be employed to ensure that the failure of any part of the detector will not effect normal operation (e.g. redundant detector).

Faults detected by the functional monitoring system shall be signalled either as an intrusion signal or a fault signal (see also clause 11).

6.3 Function testing

It shall be possible to test the function of Vibration detectors by the installer and maintenance service. The test functions shall allow recognition of the actual functions of the detector. The manufacturer of the vibration detector shall make available respective test equipment.

7 Operational security

7.1 Operation

Actions to be executed by the operator shall be simple. Indicators shall be designed to be clear and easily understood.

7.2 Operation instructions

Operating instructions written in the German language shall be available to the operator of the IAS. The instructions shall include a clear illustration and description of all control and display elements of importance to the operator and shall incorporate clear instructions for all operating states of the installation.

7.3 Degree of protection

System elements of IAS shall, if installed, be constructed at least to the degree of protection as specified by EN 60529 - IP 3x. Parts of Vibration detectors which are mounted on glazing or directly to glazing shall be constructed at least to the degree of protection as specified by EN 60529 – IP 54.

7.4 Protection against access

Function relevant parts of Vibration detectors as well as connecting elements and adjustment elements shall not be freely accessible; they shall be protected e.g. by covers.

7.5 Sealing capability

Classes B and C Vibration detectors with removable parts or parts which can be opened shall be designed to allow the attachment of a seal.

7.6 Error tolerance

Vibration detectors shall be constructed such that they cannot be adversely affected by incorrect operations executed by the operator.

8 Tamper

8.1 Tamper protection

Housings of Vibration detectors shall have adequate mechanical strength. The covers shall be mechanically stable in their fitting.

The indicating and operating elements of **classes B and C** detectors shall be designed such that they do not weaken the stability of the casing or permit access to the device. The fastening screws for assemblies shall not be visible externally once the device is properly fitted.

It shall only be possible to open **classes B and C** detectors using tools. Furthermore, it shall not be possible to see into the devices.

Provisions shall be made that prevent unauthorised persons from changing the monitoring area of **classes B and C** Vibration detectors simply by twisting or tearing them using low physical force.

Significant reduction of the proper function of **class C** detectors in the unset condition of the IAS (e.g. by attenuation of the glazing, the monitored window frame, copying of monitoring-criteria) shall be prevented; alternatively monitoring in accordance with clause 8.2 shall be provided.

8.2 Tamper detection

Opening of **classes B and C** Vibration detectors shall be detected and signalled if, because of it, security relevant functions become accessible. The inside of the detector and the monitoring of the opening shall be protected against access until the monitoring system has responded.

Only micro-“snap“-switches complying with DIN 41636 or equivalent parts shall be used for cover contacts of **classes B and C** Vibration detectors. The contact area of the contacts shall be gold-plated or of equivalent finish. Alternatively, reed contacts may be used as long as they cannot be influenced from the outside.

The minimum response time (holding time) of the opening monitoring system of **classes B and C** Vibration detectors shall be specified by the manufacturer if the device has an interface complying with clause 11.1.2.3.

A significant reduction in the functioning of **class C** detectors in the unset condition of the IAS (e.g. by attenuation of the glazing, copying of monitoring-criteria) shall be detected and signalled (see clause 11) if this reduction is not prevented as specified in clause 8.1, last paragraph.

9 Construction

9.1 Stability

Housings of Vibration detectors shall be of adequate mechanical strength. The covers shall be mechanically stable in their fitting.

9.2 Stationary installation

Vibration detectors shall be designed to facilitate stationary installation.

9.3 Freedom of potential, isolation resistance

The housing and all parts of the housing of Vibration detectors shall be free from electrical potential (with the exception of electrical protective measures). The isolation resistance shall be at least 10 MΩ.

9.4 Shielded cables

Vibration detectors shall be constructed so that the shielded cables can be joined together in a reliable manner.

9.5 Strain relief

Connecting and contact areas of cables and wires are to be relieved of mechanical strains if such strains can be anticipated.

9.6 Fastening and calibration

Vibration detectors shall be constructed to allow proper installation and calibration. Any special tools required shall be supplied by the manufacturer of the device.

Where the installer is required to calibrate the devices, the manufacturer shall provide the appropriate calibration devices.

9.7 Settings

The manufacturer shall supply the detection characteristics of the Vibration detector at all limiting values of adjustable parameters. The functions and effects of multiple adjustments shall be described if several adjustable features are provided.

Where Vibration detectors have only one electrical variable (e.g. sensitivity), a setting of “nil“ (i.e. no function) shall not be possible. Settings made shall be sufficiently traceable that a maximum deviation of 20 % may occur.

Note: The detector shall meet the requirements for the environmental performance in accordance with clause 5 at all possible settings of adjustable controls; requirements concerning immunity to false alarms shall be met at all settings specified by the manufacturer for the relevant application.

9.8 Indicators

Any existing indicators of the operational status of Vibration detectors (e.g. fault condition) shall be unambiguous to the operator of the IAS. Optical indicators shall be clearly visible to the operator.

9.9 Installation material

If special installation material is used for the installation of Vibration detectors (e.g. adhesive/glue) this material shall be made available by the manufacturer.

9.10 Connecting cable

One component only Vibration detectors to be fixed on the glazing directly may be supplied with a fixed connecting cable. The length of the cable shall be at least 2 m. If the cross-section of the cores is less than 0.28 mm^2 (diameter 0.6 mm), the cable shall not be longer than 6 m. The cross-section shall be at least 0.14 mm^2 per core and the length of the cable at least 2 m.

Class A

If the Vibration detector is not supplied with a part or end-of-line element (e.g. resistor), the cable shall be provided with four wires at least.

Classes B and C

If the Vibration detector is not supplied with a part or end-of-line element (e.g. resistor), the cable shall be provided with four wires at least and designed such that the wires cannot be visually assigned e.g. to a circuit (e.g. by using cores with the same colours).

10 Function

Vibration detectors shall be designed such that an intruder/intruder attempt of a monitored plain (area) is detected with a high feasibility.

10.1 Detection characteristics

Vibration detectors shall be designed such that as far as possible only a mechanical change of the monitored plane (e.g. opening) shall cause a signal.

According to the kind of monitoring specified by the manufacturer a Vibration detector shall signal the following openings with a response probability as described in clause 10.2:

- Monitoring for passage
  An opening of ≥ (300 mm x 300 mm)
- Monitoring for reaching through
  An opening of > (40 mm x 40 mm)
- Monitoring for reaching through with additional tools (e.g. wire hook)
  An opening of > (15 mm x 15 mm)

10.2 Response probability

The probability of a signal being transmitted during an attack to the monitored plane according to clause 10.1 shall be at least 90 %.

10.3 False alarm rejection

10.3.1 General

Vibration detectors shall be designed such that there is a high probability that they will not be triggered by effects other than mechanical changes of the monitored plane.

10.3.2 Mechanical influences

Mechanical influences to the monitored plane resp. monitored window frame, e.g. knocking, scratching, vibrating, throwing of sand/grit, shall not cause an intruder signal.

10.3.3 Weather related influences

Weather related influences to the monitored plane resp. monitored window frame, like continuous rain, rain showers with and without sunshine afterwards, snow, hail and wind shall not cause an intruder signal.

10.3.4 Incidence of light

Visible light radiated onto the Vibration detector (e.g. car headlamps, sunlight) shall not cause an intrusion signal.

10.3.5 Sunlight

The long-term influence of sunlight on the Vibration detector shall not lead to reduction in the performance of the detector.

Note: In respect of this influence also the installation material (e.g. adhesive/glue) shall be considered.

10.3.6 Light sources in the monitored area

Light sources close to the monitored area of the Vibration detector (e.g. incandescent lamps, fluorescent lamps) shall not cause an intrusion signal.

10.3.7 Air flow and air turbulences

Air flow and air turbulences in the monitored area of the Vibration detectors shall not cause an intrusion signal.

10.3.8 Sound sources

Sources of sound (e.g. telephones) which may occur in the vicinity of the Vibration detectors in practical use shall not cause an intrusion signal.

10.4 Overriding the detector by bypassing the monitoring method

Vibration detectors shall be designed such that they cannot be defeated by taking measures against undesired triggering.

10.5 Interference suppression

Interference suppression shall be implemented such that the response characteristic of the Vibration detector is not significantly affected as the interference suppression responds.

10.6 Triggering indication

Vibration detectors containing electronic components shall permit connection to the IAS in such a way that the operator is able to determine which detectors have triggered.

Once these detectors have triggered, it shall be ensured that the information concerning the triggering of the detectors is not modified in the unset state of the IAS.

If one component only Vibration detectors to be fixed on to the glazing directly and with an energy supply through the interconnection (circuit) are used it shall be possible to identify at least two detectors having triggered together. In the case of multi-triggering the first indication shall not be reset (switched off) automatically.

Note: See clause 9.8 for the indicator design.

It shall be possible for the operator to restore this information. Information not restored concerning detector triggering shall block a set procedure; alternatively, this information shall be deleted automatically during setting of the IAS.

10.7 State of the detector beyond the limits of the operating voltage

If the detector is outside the operating voltage range (loss of voltage) and if the specified performance is no longer fully available, an intrusion signal shall be issued for **classes B and C** detectors. In addition a fault signal may be issued.

*Note: This requirement is not valid for detectors with a **direct** energy supply through the interconnections.*

10.8 Renewed readiness of the system

The relevant values shall be given by the manufacturer.

10.9 Operating statuses

If the function of the Vibration detector is wholly or partially switched off (e.g. Transmitter switched off, or alarm relay switched off) in certain states of the IAS (e.g. in the unset state of the IAS), the control lines for such switching actions shall be monitored for interruption, or a “secure“ (fail-safe) condition (e.g. function in accordance with the designated function) shall be adopted in the event of an interruption. In the case of a dynamic control system, a signal indicating the operating status of the detector shall be issued or the switched-off condition shall be reversed automatically each time the IAS is set.

11 Interface to the Intruder/Hold-up Alarm System

Interfaces to other parts of the system, e.g. to the intruder alarm-Control and Indicating Equipment (CIE), shall be designed to ensure proper functioning. A combined test may be necessary depending on the design of the Vibration detector and the other parts.

All interfaces shall be specified in detail by the manufacturer. Alternatively, the interfaces described in clause 11.1 can be used.

Note: A detailed specification of the interfaces may only be omitted if all requirements of clause 11.1 are fulfilled.

11.1 Interface for conventional line technologies

The following requirements shall apply to the inputs and outputs for IAS with an external power supply of the Vibration detectors and a “conventional“ line termination technology (end-of-line resistor) according to clause 6.1.3.

11.1.1 Inputs

11.1.1.1 Operating voltage

If Vibration detectors have to be powered externally these shall be provided with supply voltage terminals.

11.1.1.2 Additional inputs

The relevant values shall be given by the manufacturer.

11.1.2 Outputs

11.1.2.1 Interface for intruder signals

The interface shall meet the following requirements:

- Potential-free output, load capability of at least 50 mA at 30 V DC, series resistance ≤ 47 Ω
- Closed in the non alarm state (low resistance), opening in the event of a signal (high resistance)
- Response time ≥ 1 s to ≤ 10 s
- **Class B and C**
  Facility for connecting a monitoring element (e.g. end-of-line resistor)

11.1.2.2 Additional electronic output for intrusion alarms (option)

This output shall be implemented as an open-collector output with the specifications according to tables 11.01 and 11.02.

	Non-alarm state	
	Minimum	Maximum
Output voltage	-	Depends on U_B
Output current	-	Depends on U_B
Stray current	-	$\leq 50\ \mu A$
Table 11.01: Output for intrusion alarm, non-alarm state		

	Alarm state	
	Minimum	Maximum
Output voltage at minimum output current	-	1.5 V
Output current	1 mA	-
Table 11.02: Output for intrusion alarm, alarm state		

11.1.2.3 Interface for tamper alarms according clause 8.2

Class A

No requirement

Classes B and C

The interface shall meet the following requirements:

- Potential-free output, load capability of at least 50 mA at 30 V DC, series resistance $\leq 47\ \Omega$
- Closed in the non alarm state (low resistance), opening in the event of a signal (high resistance)
- response time corresponding with the duration of the tamper detector response

11.1.2.4 Interface for fault signals (if given)

The interface shall meet the following requirements:

- design according to manufacturers specifications
- response duration at least 1 s, maximum according to the duration of the fault

11.1.2.5 Additional outputs

The relevant values shall be given by the manufacturer.

11.2 Interface for detectors which are connected directly to the interconnections for signals

The following interface conditions are valid for Vibration detectors and Vibration detectors designed as Vibration contacts which are connected directly to the interconnections for signals.

The detector in case of an intrusion signal shall influence (tune) the connected interconnection („Primary Line“) within 1 s in a way that the signal can be identified unambiguously by the Control and Indicating Equipment (CIE). The output of the detector shall not reset automatically.

For detectors designed as Vibration contacts the contact is a sensor and the processing is done in an I-CIE or an external processing unit. The interface shall therefore be designed such that a proper function in connection with the I-CIE or the external processing unit is guaranteed.

11.3 Interface for other connection technologies

The performance shall be specified by the manufacturer.

12 Options

Options shall have no adverse effect on the functions required for Vibration detectors. The performances of the options shall be specified by the manufacturer.

Changes

Compared with edition VdS 2480 : 1997-01 the following changes have been made:

- Addition of clause 2 (new) „Normative references“, change of the following numbering
- Revision of whole clause 5 „Protection against Environmental Influences“
- Update of clause 6.5 „Reliability“
- Update of clause 11.1.2.2 „Additional electronic output for intrusion alarms“
- Editorial changes