Glass Break Detectors

Requirements

Publisher and Publishing house: VdS Schadenverhütung GmbH

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Rules for Intruder Alarm Systems

Glass Break Detectors

Requirements

CONTENTS

1 General

1.1 Scope

These rules contain minimum requirements for passive Glass Break Detectors (GBD) of **class B** and for active GBD of **class C** which are specified for monitoring silicate glazings; they can also be used in analogy for "Acoustic Glass Break Detectors".

These rules shall be applied in conjunction with the rules for Intruder Alarm Systems VdS 2227, “General requirements and test methods“ and the rules for Intruder Alarm Systems VdS 2110, “Protection against environmental influences; Requirements and test methods“. The rules for Alarm Systems VdS 2203, “Software controlled system components; Requirements and test methods“ also apply for system components controlled by software.

While **class B** GBD are only able to detect a single event (e.g. break of the glass) **class C** GBD in addition are able to detect any change of performance of the glazing and the fixing of the detector.

The test methods for GBD are described in VdS 2468.

1.2 Validity

These rules are valid from 01.04.2002; they replace the edition VdS 2332en : 1995 (01).

Note: This is a translation of the German rules; in case of discrepancies, the German version shall be binding.

2 Normative references

These rules 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 rules only when announced by a change of these rules. For undated references the latest edition of the publication referred will be applied.

- **DIN 41 636** Sensitive switches for communication technology
- **DIN 45 631** Procedure for calculating loudness level and loudness, procedure according to E. Zwicker
- **DIN EN 60 529** Degrees of protection provided by enclosures (IP-Code) – corresponds with VDE 0470 part 1
- **DIN EN ISO 6988** Metallic and other non-organic coatings – sulfur dioxide – test with general condensation of moisture
- **DIN IEC 65A/179/CDV : 1995** Functional safety – Safety-relevant systems – Part 1: General requirements – corresponds with VDE 0801 part 1 : 1995-12
- **EN 61 000-4-2 : 1995-03** Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 2: Electrostatic discharge immunity test – Basic EMC publication
- **EN 61 000-4-3 : 1996-09** Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 3: Radiated, radio-frequency, electromagnetic field immunity test

- **IEC 60 068-2-63 : 1991** Environmental testing; Part 2: Test methods, test Eg impact, spring hammer
- **EN 61 000-4-4 : 1995-03** Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 4: Electrical fast transient/burst immunity test
- **EN 61 000-4-5 : 1995-03** Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 5: Surge immunity test
- **EN 61 000-4-6 : 1996-07** Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 6: Immunity to conducted disturbances, induced by radio-frequency fields
- **IEC 60 068-2-1 : 1993-03** Environmental testing; Tests; Test A: Cold
- **IEC 60 068-2-2 : 1973-03** Environmental testing; Tests; Test B: Dry heat
- **IEC 60 068-2-3** Environmental testing; Part 2: Tests, Test Ca: Damp heat, steady state
- **IEC 60 068-2-6 : 1995-04** Environmental testing; Tests; Test Fc: Vibration (sinusoidal)
- **IEC 60 068-2-27 : 1993-03** Environmental testing; Tests; Test Ea: Shock
- **IEC 60 068-2-30** Environmental testing; Tests; Test Db and guidance: Damp heat, cyclic (12 + 12-hour cycle)
- **VdS 2110** Rules for Intruder Alarm Systems; Protection against environmental influences; Requirements and test methods
- **VdS 2203** Rules for Alarm Systems; Software controlled system components; Requirements and test methods
- **VdS 2227** Rules for Intruder Alarm Systems; General requirements and test methods
- **VdS 2468** Rules for Intruder Alarm Systems; Glass break detectors; Test methods

3 Terms and definitions

For general terms and definitions refer to the rules for Intruder Alarm Systems VdS 2227, "General requirements and test methods".

4 Classification

The **performance criteria** of different classes are defined in the rules for Intruder Alarm Systems VdS 2227, “General requirements and test methods“.

The **environmental classes** classification is made in accordance to the rules for Intruder Alarm Systems VdS 2110, “Protection against environmental influences; Requirements and test methods“.

5 Protection against environmental influences

5.1 Limits of application

GBD shall not be adversely affected in their function by environmental influences. Environmental influences can have various effects on operating characteristics, depending on the nature of the functional principle applied. The manufacturer shall therefore specify the limits of the application (e.g. climate).

5.2 Climates

GBD shall not be adversely affected in their function under the atmospheric conditions described in table 5.01, according 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 60 068-2-2	x		+40 °C, 16 h	+55 °C, 16 h	+70 °C, 16 h
Dry heat (T2) as spec. in IEC 60 068-2-2		x	No test	No Test	+70 °C, 21 d
Cold (T3) as spec. in IEC 60 068-2-1	x		+5 °C, 16 h	-10 °C, 16 h	-25 °C, 16 h
Damp heat, steady (T4) as spec. in IEC 60 068-2-3	x		+40 °C, 4 d 93 % rel. air humidity	+40 °C, 4 d 93 % rel. air humidity	No Test
Damp heat, steady (T5) as spec. in IEC 60 068-2-3		x	+40 °C, 21 d 93 % rel. air humidity	+40 °C, 21 d 93 % rel. air humidity	+40 °C, 21 d 93 % rel. air humidity
Damp heat, cyclic (T6) as spec. in IEC 60 068-2-30	x		No Test	+40 °C, 2 cycles	+55 °C, 2 cycles
Damp heat, cyclic (T7) as spec. in IEC 60 068-2-30		x	No Test	No Test	+55 °C, 6 cycles

Table 5.01: Climates

5.3 Protection against corrosion

GBD 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
SO2-Corrosion as spec. in EN ISO 6988 (K3)		x	No test	0.2 l SO_2, 5 cycles	2 l SO_2, 5 cycles
Corrosion by window cleaner (K4)		x	15 % alcohol 2 % ammonia 1 % alkylbenzol-sulfanat, 20 °C, 24 h as well as 15 % common salt, 5 % vinegar 1 % alkylbenzol-sulfanat, 20 °C, 24 h, per solvent 5 cycles	15 % alcohol 2 % ammonia 1 % alkylbenzol-sulfanat, 20 °C, 24 h as well as 15 % common salt, 5 % vinegar 1 % alkylbenzol-sulfanat, 20 °C, 24 h, per solvent 5 cycles	15 % alcohol 2 % ammonia 1 % alkylbenzol-sulfanat, 20 °C, 24 h as well as 15 % common salt, 5 % vinegar 1 % alkylbenzol-sulfanat, 20 °C, 24 h, per solvent 5 cycles

Table 5.02: Protection against corrosion

5.4 Mechanical influences

GBD shall not be adversely affected in their function by mechanical influences 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 60 068-2-27	x		$A(ms^{-2})$ = 1000 - (200 x M) 6 x 3 shocks, duration each 6 ms	$A(ms^{-2})$ = 1000 - (200 x M) 6 x 3 shocks, duration each 6 ms	$A(ms^{-2})$ = 1000 - (200 x M) 6 x 3 shocks, duration each 6 ms
Impact (M2) as spec. in IEC 60 068-2-75	x		0.5 J, 3 impacts per point	0.5 J, 3 impacts per point	0.5 J, 3 impacts per point
Vibration sinus (M3)as spec. in IEC 60 068-2-6	x		10-150 Hz, 0.2 g, 1 cycle	10-150 Hz, 0.5 g, 1 cycle	10-150 Hz, 0.5 g, 1 cycle
Vibration sinus (M4) as spec. in IEC 60 068-2-6		x	10-150 Hz, 0.5 g, 20 cycles	10-150 Hz, 1.0 g, 20 cycles	10-150 Hz, 1.0 g, 20 cycles

Table 5.03: Mechanical influences

5.5 Electromagnetic compatibility

GBD shall not be adversely affected in their function by electromagnetic influences 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 61 000-4-2	x		Each 10 times pos. and neg. contact discharge 2, 4 and 6 kV resp. air discharge 2, 4 and 8 kV	Each 10 times pos. and neg. contact discharge 2, 4 and 6 kV resp. air discharge 2, 4 and 8 kV	Each 10 times pos. and neg. contact discharge 2, 4 and 6 kV resp. air discharge 2, 4 and 8 kV
Radiated, radio-frequency, electromagnetic field (E2a) acc. to EN 61 000-4-3	x		80-2000 MHz, 10 V/m as well as 450-466 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	80-2000 MHz, 10 V/m as well as 450-466 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	80-2000 MHz, 10 V/m as well as 450-466 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 61 000-4-6	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	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	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 61 000-4-4	x		Each for a period of 1 min pos. and neg. 0.25, 0.5 and 1 kV	Each for a period of 1 min pos. and neg. 0.25, 0.5 and 1 kV	Each for a period of 1 min pos. and neg. 0.25, 0.5 and 1 kV
Conducted slow surge with high energy – (E4a) acc. to EN 61 000-4-5	x		5 times pos. and neg. cl. 3: line-to-line 0,5, 1 kV and line-to-ground 0.5, 1, 2 kV	5 times pos. and neg. cl. 3: line-to-line 0,5, 1 kV and line-to-ground 0.5, 1, 2 kV	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	150 mT	150 mT

Table 5.04: Electromagnetic compatibility

6 Functional reliability

6.1 Provision of functions

6.1.1 Technical data

Technical data shall be provided in the German or English language for GBD. This data shall include all information and parameters necessary for the operation of the GBD.

6.1.2 Mounting and installation instructions

Installation instructions written in the German language shall be provided for GBD. These instructions shall include a clear illustration of the assembly and installation procedures and a reference of the applications for which the GBD are suitable (including a statement of the sites of installation, kind of monitoring and class according to clause 4). In addition, information regarding adjustment (calibration) and maintenance is required.

Adjustments 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. GBD shall be safe in their function within these specified values. Variations in the voltage as specified in table 6.01 shall not adversely affect the function of GBD.

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

Table 6.01: Changes of operating voltage

6.1.4 Ripple of the operating voltage

As a minimum requirement GBD shall function safely with a voltage ripple of ≤ 1.0 V_{ss} if a nominal voltage of 12 V is specified. For 24 V nominal voltage the ripple value is ≤ 2.0 V_{ss}. For other nominal voltages the specifications of the manufacturer are definitive.

6.1.5 Reliability

The selection of components for GBD shall correspond to their use in the chosen environmental class.

6.1.6 Components

Only components using technology which has proved its reliability in various applications over a period of two years may be used. For components of unproved reliability other means of proof may be considered for evaluation on an individual basis.

All components shall be continuously operated within the limits specified by the manufacturer while taking into consideration the ambient temperature (including inherent warming) (see also DIN IEC 65A/179/CDV).

6.1.7 Relays

Relays shall be protected against the effects of dust at least to the degree of protection specified by DIN EN 60 529 (identically to with VDE 0470 part 1) – 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 DIN EN 60 529 (identically with VDE 0470 part 1) – IP 5x.

6.1.9 Access to assemblies and components

Parts of IAS shall be constructed to ensure easy access to assemblies and components as well as their replacement for installers. 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 the maintenance service personnel. Connection elements for connection to the IAS cabling shall be designed in a way that ensures safe operation and protection against corrosion.

It shall be possible to make adjustments comprehensible (e.g. by the provision of adequate graduation).

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 safe functioning of the GBD shall be specified by the manufacturer and shall not exceed 120 s.

6.2 Function monitoring

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

Security-relevant functions of **class C** GBD (e.g. signal processing and analysis, fixing on the monitored glazing) shall be monitored automatically as far as possible or other means shall be employed to ensure that any detector part failure will not reduce safe functioning (e.g. redundant detector).

Faults detected by the functional monitoring system shall be signalled as intrusion or fault.

Note: See clause 11.1.2.4 for the design of the interface.

6.3 Function testing

It shall be possible to test the function of GBD by the installer and maintenance service. The test functions shall allow recognition of the actual functions of the detector.

7 Operational security

7.1 Operation

Actions to be executed by the operator shall be simple. Indicators shall be designed in a clear and easy understanding manner.

7.2 Operating 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

GBD shall, if installed, be constructed at least to the degree of protection as specified by DIN EN 60 529 (identically with VDE 0470 part 1) – IP 3x. Parts of GBD which are mounted on glazings or directly to glazings shall, if installed, be constructed at least to the degree of protection as specified by DIN EN 60 529 (identically with VDE 0470 part 1) – IP 67.

7.4 Protection against access

Function relevant parts of GBD 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

GBD with parts which can be removed or opened shall be sealed such, that a removal or opening of these parts can be proved.

7.6 Error tolerance

GBD shall be constructed such that they cannot be adversely affected by incorrect operations executed by the operator of the IAS.

7.7 Setting of parameters

Facilities for the setting of the parameters of GBD shall be designed to allow parameter settings by the installer only with the actual consent of the user.

8 Tamper

8.1 Tamper protection

Housings of GBD shall be of adequate mechanical strength. The covers shall be mechanically stable in their fitting to the housing. Furthermore, it shall not be possible to see into the inside of the devices.

The indicating and operating elements shall be designed such that they do not weaken the stability of the casing and permit no 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 these devices by using tools. Unauthorized persons shall be prevented from changing the monitoring area of the GBD simply by turning or pulling it off using simple manual force.

Considerable reduction in the performance of the function (e.g. by attenuation of the glazing, copying of monitoring-criteria) of the detectors shall be prevented for **class C** GBD additionally; alternatively, they may be monitored according clause 8.2, last paragraph.

8.2 Tamper detection

The opening of GBD with removable parts or parts to be opened shall be detected and signalled (see clause 11.1.2.3) if, because of the opening, security relevant functions become accessible. The inside of the GBD and the monitoring of the opening shall be protected against access until the monitoring system has responded.

Only micro-“snap“-switches complying with DIN 41 636 or equivalent parts shall be used for cover contacts. 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 outside.

For **class C** GBD a considerable reduction in the performance of the function of the detector (e.g. by attenuation of the glazing, copying of monitoring-criteria) shall be detected and signalled (see clause 11.1.2.3) if this is not prevented as described in clause 8.1.

9 Construction

9.1 Stability

GBD shall be of adequate mechanical strength.

9.2 Stationary installation

GBD shall be designed to allow stationary installation.

9.3 Freedom of potential, isolation resistance

The casing and all parts of the casing for GBD 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

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

9.5 Strain relief

Connecting and terminal points of cables and leads shall be relieved of mechanical stress where such stress can be anticipated.

9.6 Fastening and calibration

GBD 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 detectors, the manufacturer shall provide the appropriate calibration auxiliaries.

9.7 Setting elements

The manufacturer shall supply the detection characteristics of the GBD for all extreme values of the setting elements. The functions and effects of setting elements shall be described if several setting elements are provided.

Where GBD have only one electrical setting element (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 requirements concerning the environmental behaviour in accordance with clause 5 shall be fulfilled for all possible settings; requirements towards the immunity to false alarms shall be met in all settings specified by the manufacturer for the relevant application.

9.8 Indicators

Any available indicators of the operational status of GBD (e.g. fault condition) shall be unambiguous to the operator of the IAS.

Optical indicators shall be clearly visible to the operator. Sounders for audible indicators shall have a minimum volume of 60 dB(A) – measured in accordance with DIN 45 631 – at a distance of 1 m from the sounder resp. from the housing where the sounder is located.

9.9 Mounting materials

Any special installation materials required for the installation of GBD (e.g. adhesive) shall be offered by the manufacturer.

9.10 Connecting cable

GBD consisting of one component only to be fixed on the glazing directly and supplied directly via the transmission paths with energy 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 0.6 mm^2, the cable shall not be longer than 10 m. The cross-section of the cores shall be at least 0.14 mm^2 per core and the length of the cable shall be at least 2 m.

When the GBD contains no part respectively connecting element (e.g. resistor), the connection cable shall be at least designed such that the cores (e.g. a "Primary Line") optically cannot be aligned (e.g. by using cores with the same colours).

Remark: For GBD connected direct via a detector-BUS to BUS-structured IAS a 4-core-connection-cable is not mandatory.

10 Function

GBD shall be designed to detect and signal an intrusion or intrusion attempt with a high probability as soon as possible.

10.1 Detection characteristics

According to the kind of monitoring specified by the manufacturer a GBD shall signal the openings as described in table 10.01 with a response probability as described in clause 10.2:

Monitoring for	**Opening**
passage	≥ (300 mm x 300 mm)
reaching through	≥ (40 mm x 40 mm)
reaching through with additional tools (e.g. wire hook)	≥ (15 mm x 15 mm)
Table 10.01: Detection characteristics	

10.2 Response probability

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

10.3 Insensitivity to unexpected unforced triggering

10.3.1 General

GBD shall be designed to ensure with a high probability that only a mechanical change of the monitored glazing and no other influences will result in an intrusion signal.

10.3.2 Mechanical influences

Mechanical influences on the monitored glazing, e.g. knocking, scratching, vibrating, throwing of sand/grit, shall not cause an intruder signal nor lead to a change of the performance criteria of the detector.

10.3.3 Weather related influences

Weather related influences on the supervised glazing like e.g. continuous rain, rain showers with and without sunshine afterwards, snow, hail and wind shall not cause an intruder signal nor lead to a change of the performance criteria of the detector.

10.3.4 Incidence of light

Visible light radiated on the detector (e.g. car headlamps, sunlight) from outside the monitoring area shall not cause an intrusion signal. Furtheron the influence of direct or indirect light shall not lead to a change of the performance criteria of the detector.

10.3.5 Sun light

The long-term influence of sunlight to the detector behind a normal glazing shall not lead to negative changes in the performance ratings of the GBD.

10.3.6 Light sources in the monitoring area

Light sources close to GBD (e.g. incandescent lamps, fluorescent lamps) shall not cause an intrusion signal nor lead to a change of the performance criteria of the detector.

10.3.7 Air flow and air turbulences

Air flow and air turbulences (cased e.g. by heating/air condition systems) in the area of GBD shall not cause an intrusion signal nor lead to a change of the performance criteria of the detector.

10.3.8 Sound sources

Sources of sound (e.g. telephones) which may occur in the vicinity of the GBD in practical applications shall not cause an intrusion signal nor lead to a change of the performance criteria of the detector.

10.4 Defeating the detector by bypassing the monitoring area

GBD 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 GBD is not significantly affected when the interference suppression responds.

10.6 Triggering indication

GBD containing electronic components shall allow connection to the IAS such 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 falsified in the unset state of the IAS.

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

For GBD which consists of only one part to be fixed directly to the glazing and which are supplied with energy through the transmission path at least three detectors having triggered shall be identifiable.

Note : See clause 9.8 for the indicator design.

It shall be possible for the operator to delete this information. Undeleted information concerning detectors triggering shall be included in the “Zwangsläufigkeit” of the IAS during setting (shall block a set procedure); alternatively, this information shall be deleted automatically during setting of the IAS.

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

If the GBD is outside the operating voltage range (e.g. loss of voltage) and if the specified performance criteria are not longer fully available an alarm signal shall be emitted. A fault signal may be issued in addition.

10.8 Renewed readiness of the system

The relevant values shall be specified by the manufacturer.

10.9 Operation mode

If the function of the detector is wholly or partially switched off (e.g. sound source of an ultrasonic-motion-detector switched off, alarm relay switched off) in certain conditions 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“ condition (e.g. function in accordance with the designated function) shall be adapted 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 IAS/HAS

Interfaces to other parts of the system, e.g. to the Intruder Alarm Control and Indicating Equipment, shall be designed to ensure proper functioning. A combined test may be necessary depending on the design of the detector and the other parts of the system.

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 for the inputs and outputs of GBD with external power supply in accordance to clause 6.1.3 and a “conventional“ line technology (end-of-line resistor).

11.1.1 Inputs

11.1.1.1 Operating voltage

GBD shall have terminals for the supply voltage if necessary.

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 alarm signals

The interface shall meet the following requirements:

- potential-free output, loading capability at least 50 mA at 30 V DC, series resistance ≤ 47 Ω
- closed in the idle state (low resistance), opens in the event of a signal (high resistance)
- response time ≥ 1 s
- capability of connecting a monitoring element (e.g. end-of-line resistor)

11.1.2.2 Additional electronic output for intruder alarms (Option)

The additional electronic output shall be an open-collector output and shall be designed according to tables 11.03 and 11.04.

	Idle state	
	Minimum	**Maximum**
output voltage	-	Depends on U_B
output current	-	Depends on U_B
stray current	-	$\leq 50\ \mu A$
Table 11.03: Output for intruder signals, idle state		

	Signal	
	Minimum	**Maximum**
output voltage at minimum output current	-	1.5 V
output current	1 mA	-
Table 11.04: Output for intruder signals, alarm state		

11.1.2.3 Interface for tamper alarm according clause 8.2

The interface shall meet the following requirements:

- potential-free output, loading capability at least 50 mA at 30 V DC, series resistance $\leq 47\ \Omega$
- closed in the idle condition (low resistance), opens 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 provided)

The interface shall meet the following requirements:

- constructed in accordance with manufacturer's specification
- response duration ≥ 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 GBD which are connected directly to the transmission path for signals

In case of an intrusion signal the detector shall influence (tune) the connected transmission path ("Primary Line") within 1 s in a way that the signal can be identified unambiguously by the control and indicating equipment (CIE) aligned for monitoring and processing. The output of the detector shall not reset automatically.

11.3 Interfaces for other techniques

The performances shall be specified by the manufacturer.

12 Options

Options shall not have a negative effect on the functions required for GBD. The performances of the options shall be specified by the manufacturer.

Changes

Compared with edition VdS 2332 12/95 (01) the following changes have been made:

- Addition of clause 2 (new) “Normative references”
- Revision of clause 5 "Protection against Environmental Influences"
- In clause 6.1.2 "Mounting and installation instructions" in addition the statement of the possible kind of monitoring in the mounting and installation instructions is required
- Deletion of the required minimum “hold-time” in clause 8.2 “Tamper detection “
- Correction of clause 9.10 “Connection cable” relating to the classes of the detectors; the rules are only valid for class B and C GBD
- Clause 10.6 “Triggering indication” was revised relating to multi-triggering of GBD
- Editorial changes