



# **Hold-up triggering devices**

## **Requirements**

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## VdS Guidelines for Intruder Alarm Systems

# Hold-up triggering devices

## Requirements

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# 1 General

## 1.1 Scope

These guidelines contain requirements for class A, B and C Hold-up Triggering Devices (HUTD) (including "radio-linked HUTD") used in Intruder and Hold-up Alarm Systems. These guidelines 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 "Guidelines for Fire Prevention and Security Technology, Software, Requirements and Test Methods", VdS 2203, also apply for system components controlled by software.

HUTD can be designed e.g. as device to be operated by foot or manually as bank note contact or control device (ancillary control equipment – ACE) with additional hold-up alarm part.

The test methods for HUTD are described in the guidelines VdS 2314 (currently in preparation).

## 1.2 Validity

These guidelines are valid from 01. December 2007; they replace the edition VdS 2271 : 1995-11 (03).

*Note: This is a translation of the German guidelines; if there are any discrepancies, the German version shall be binding.*

# 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 EN 60529** Degrees of protection provided by enclosures (IP-Code), corresponds with VDE 0470-1
- **DIN EN ISO 6988** Metallic and other non-organic coatings – sulfur dioxide – test with general condensation of moisture
- **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 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test
- **EN 61000-4-4** Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques, 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
- **IEC 60068-2-1** Environmental testing – Part 2: Tests; tests A: Cold;
- **IEC 60068-2-2** Basic environmental testing procedures – Part 2: Tests; tests B: Dry heat
- **IEC 60 068-2-3** Basic environmental testing procedures – Part 2: Tests; Test Ca: Damp heat, steady state
- **IEC 60068-2-6** Environmental testing – Part 2: Tests; test Fc: Vibration (sinusoidal)
- **IEC 60 068-2-14** Environmental testing – Part 2: Tests; Test N: Change of temperature
- **IEC 60 068-2-18** Environmental testing – Part 2: Tests; Test R and guidance: Water
- **IEC 60 068-2-27** Basic environmental testing – Part 2: Tests; tests Ea: shock
- **IEC 60 068-2-30** Environmental testing; Tests; Test Db and guidance: Damp heat, cyclic (12 + 12-hour cycle)
- **IEC 60 068-2-32** Basic environmental testing procedures – Part 2: Tests; test Ed: Free fall
- **IEC 60 068-2-75** Environmental testing; Part 2: Test methods; Test Eh: Hammer test
- **VdS 2110** Guidelines for intruder alarm systems, protection against environmental influences, requirements and test methods
- **VdS 2115** Guidelines for Alarm Systems, Power Supply Units, Requirements
- **VdS 2194** Guidelines for Intruder Alarm Systems, Control and Indicating Equipment (CIE) of Class A
- **VdS 2195** Guidelines for Intruder Alarm Systems, Power Supply Units of Class A, Requirements
- **VdS 2203** Guidelines for Fire Prevention and Security Technology, Software Controlled System Components, Requirements and Test Methods
- **VdS 2227** Guidelines for Intruder Alarm Systems, General Requirements and Test Methods
- **VdS 2252** Guidelines for Intruder Alarm Systems, Control and Indicating Equipment (CIE) of Classes B and C
- **VdS 2314** Guidelines for Intruder Alarm Systems, Hold-up Triggering Devices, Test Methods (currently in preparation)

### 3 Terms and definitions

For general terms and definitions refer to the “Guidelines for Intruder Alarm Systems, General Requirements and Test Methods“, VdS 2227. Additionally resp. deviating from these the following definitions are valid.

“**Radio-linked HUTD**“: HUTD, which are connected via non-exclusive interconnections (e.g. radio-link) with the IAS/HUAS. Radio-linked HUTD are differentiated into stationary installed design and non-stationary installed (portable) design.

### 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 Application limits

Environmental influences shall not affect the function of HUTD. 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 HUTD 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	IV
Dry heat (T1) as specified in IEC 60068-2-2	x		+40 °C, 16 h	+55 °C, 16 h	+70 °C, 16 h	+70 °C, 16 h <sup>1)</sup>
Dry heat (T2) as specified in IEC 60068-2-2		x	No test			+70 °C, 21 d <sup>1)</sup>
Cold (T3) as specified in IEC 60068-2-1	x		+5 °C, 16 h	-10 °C, 16 h	-25 °C, 16 h	
Damp heat, steady (T4) as specified in IEC 60068-2-3	x		+40 °C, 4 d, 93 % rel. air humidity		No test	
Damp heat, steady (T5) as specified in IEC 60068-2-3		x	+40 °C, 21 d, 93 % rel. air humidity			
Damp heat, cyclic (T6) as specified in IEC 60068-2-30	x		No test	+40 °C, 2 cycles	+55 °C, 2 cycles	
Damp heat, cyclic (T7) as specified in IEC 60068-2-30		x	No test		+55 °C, 6 cycles	
Temperature changes (T8) as specified in IEC 60068-2-14 <sup>2)</sup>	x		+5 °C/30 °C, 1 h, 4 cycles	-10 °C/30 °C, 1 h, 4 cycles	-25 °C/30 °C, 1 h, 4 cycles	
<sup>1)</sup> The test at 70°C shall cover the effect of warming by solar radiation. <sup>2)</sup> Test is only valid for portable system components (e.g. electronic key, "radio-linked HUTD").						
<b>Table 5.01: Climates</b>						

### 5.3 Corrosion protection

HUTD 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	IV
SO <sub>2</sub> -corrosion as spec. in DIN EN ISO 6988 (K3)		x	No test	0.2 l SO <sub>2</sub> , 5 cycles	2 l SO <sub>2</sub> , 5 cycles	2 l SO <sub>2</sub> , 20 cycles
Corrosion by window cleanser (K4) <sup>1)</sup>		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			
<sup>1)</sup> For system components in direct vicinity of glazing.						
<b>Table 5.02: Protection against corrosion</b>						



## 5.4 Mechanical influences

The function of HUTD 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	IV
Shock (M1) as specified in IEC 60068-2-27 <sup>1)</sup>	x		A(ms <sup>-2</sup> ) = 1000 - (200 x M), 6 x 3 shocks, duration each 6 ms			
Impact (M2) as specified in IEC 60068-2-75	x		0.5 J, 3 impacts per point (corresponds with EN 50 102 class IK 04)		1.0 J, 3 impacts per point (corresponds with EN 50 102 class IK 06)	
Strong impacts	x		100 g, impulses of 6 ms <sup>2)</sup>			
Vibration sinus (M3) as specified in IEC 60 068-2-6	x		10-150 Hz, 0.2 g, 1 cycle/axis	10-150 Hz, 0.5 g, 1 cycles/axis		
Vibration sinus (M4) as specified in IEC 60 068-2-6		x	10-150 Hz, 0.5 g, 20 cycles/axis	10-150 Hz, 1.0 g, 20 cycles/axis		
Free fall (M5) as specified in IEC 60068-2-32 <sup>3)</sup>	x		Free fall from 1.5 m height			
<p><math>\hat{A}</math> = peak acceleration, M = kilogramme value of the mass of the test specimen</p> <p><sup>1)</sup> Not applicable for portable system components (e.g. electronic key, "radio-linked HUTD")</p> <p><sup>2)</sup> Test is performed only for movable parts (e.g. doors) installed system components</p> <p><sup>3)</sup> Test is performed only for portable system components (e.g. electronic key, "radio-linked HUTD")</p>						
<b>Table 5.03: Mechanical influences</b>						

### 5.5 Electromagnetic compatibility (EMC)

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

Test	Func-tional test	Endu-rance 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		
Radiated, radio-frequency, electromagnetic field (E2a) acc. to EN 61 000-4-3	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 61 000-4-6	x		150 kHz-100 MHz, 140 dB $\mu$ V 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. 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 61 000-4-5	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)

### 5.6 Protection against water

Portable parts of HUDT (e. g. mobile HUDT) or parts which the manufacturer had specified as being waterproof, shall be sufficiently protected against ingress of water according to table 5.05.

Test	Func-tional test	Endu-rance test	Degree of severity, abbreviated description of conditions			
			I	II	III	IV
Water (F1a) according to IEC 60 068-2-18 <sup>1)</sup>	x		10 min 200 – 300 mm/h (corresponds with IPx2)			
Water (F1b) according to IEC 60 068-2-18 <sup>2)</sup>	x		30 min in 0,4 m depth (corresponds with IPx7)			

<sup>1)</sup> Test is performed only for portable system components (e.g. electronic key, "radio-linked HUDT")  
<sup>2)</sup> Test is performed only if the manufacturer has specified the portable system component as being waterproof.

**Table 5.05:** Protection against water

## 6 Functional reliability

### 6.1 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.

### 6.2 Installation instruction

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). Further on instructions are necessary for adjustment (setting) and maintenance. The mounting instruction shall point out that HUTD shall be installed such that a low-noise activation is possible (e. g. no amplifying of the triggering noise by the mounting surface).

### 6.3 Operating voltage behaviour

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

Test	Functional test	Endurance test	Degree of severity, abbreviated description of conditions		
			I	II	III
Operating voltage range system-voltage (B1b)	x		$U_N \pm 25\%$ or system dependent		
Operation voltage surge system-voltage (B2b)	x		10 cycles from $U_N +25\%$ to $U_N -25\%$ and back		
<sup>1)</sup> Test is not applicable for HUTD with power supply type III (primary battery with not automatically rechargeable secondary battery)					

**Table 6.01:** Operating voltage behaviour

### 6.4 Ripple of the operating voltage

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

### 6.5 Reliability

Components for HUTD shall be selected so that they are suitable for the selected environmental class.

### 6.6 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).

## **6.7 Relays**

Relays shall be protected against the effects of dust at least to the degree of protection specified by EN 60 529 – IP 5x. Relay contacts shall be designed for at least 10,000 switching cycles at a corresponding connected load.

## **6.8 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 60 529 – IP 5x.

## **6.9 Access to assemblies and components**

System components of IAS/HUAS 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.

## **6.10 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.

# **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 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**

System elements of IAS shall, if installed, be constructed at least to the degree of protection as specified by EN 60 529 – IP 3x.

## **7.4 Protection against access**

Function relevant parts of HUTD as well as connection and adjustment elements shall not be freely accessible. They shall be secured e. g. by covers.

## 7.5 Sealability

**Class B and C** HUTD shall be designed to allow the attachment of a seal.

## 7.6 Error tolerance

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

### 7.6.1 Unintended triggering

HUTD shall be designed such that unintended operation is excluded as far as possible (e.g. mechanically protected push-bottom switch) and intended operations still are possible inconspicuously.

### 7.6.2 Danger of confusion

HUTD shall be designed such that they cannot be mixed up with other electrical installations (e.g. light switches, calling facilities for elevators).

# 8 Tamper

## 8.1 Tamper protection

The indicating and operating elements of **classes B and C** HUTD 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. Furthermore, it shall not be possible to see into the devices.

It shall only be possible to open these devices by using tools.

## 8.2 Tamper detection

*Note: This requirement is not valid for non-stationary installed (portable) design ("radio-linked HUTD").*

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

Only micro-"snap"-switches complying with DIN 46 636 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 the outside.

The minimum response time (holding time) of the opening monitoring system shall be specified by the manufacturer.

## **9 Construction**

### **9.1 Stability**

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

### **9.2 Stationary installation**

HUTD shall be designed to facilitate stationary installation.

*Note: This requirement is not valid for non-stationary installed (portable) design ("radio-linked HUTD").*

### **9.3 Freedom of potential, isolation resistance**

The housing and all parts of the housing of HUTD shall be free from electrical potential (with the exception of electrical protective measures). The isolation resistance shall be at least 10 M $\Omega$ .

### **9.4 Shielded cables**

HUTD units 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 Installation and adjustment**

HUTD 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 Indicators**

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

### **9.8 Installation material**

If special installation material is used for the installation of devices this material shall be made available by the manufacturer.

### **9.9 Definite status of switches**

Switching elements shall have a definite switch setting, e.g. "snap"-switches.

### **9.10 Low-noise triggering**

A low-noise triggering of HUTD shall be guaranteed.

### **9.11 Stability**

HUTD shall be designed for at least 1,000 operations.

## **10 Function**

### **10.1 Manual triggering**

A triggering of HUTD shall be possible only by manual operation (e.g. by operating manually or by foot, deliberate removal of bank note, choice of special figure input).

### **10.2 Triggering power**

Triggering of a manually operated (by hand) HUTD – with the exception of input devices for ACE with mental IM and bank note contacts – may be effected only after a force effect  $\geq 5$  N (e.g. pressure). If after triggering a force of  $\leq 3$  N effects, the contact of the device shall return to its idle state. For foot-operated devices the values  $\geq 20$  N /  $\leq 10$  N are valid.

### **10.3 Clear operation**

The operation shall be unambiguous for the operator/user (e.g. via a definite pressure point).

### **10.4 Triggering indication**

Triggering of each individual HUTD shall be recognisable such that in normal operation the robber shall not take note of the triggering. This identification may be restored only by the maintenance service of the IAS/HAS.

### **10.5 State of the device beyond the limits of the operating voltage**

The total loss of the operating voltage shall not result in an activation of the interface for hold-up signals/messages (see clause 11).

### **10.6 Anew triggering**

**Class B and C** HUTD shall be designed such that at least 10 s after the end of the triggering an anew triggering (alarm repetition) of the connected primary lines/connected zone is possible (with the exception of an anew triggering of bank note contacts).

### **10.7 Additional requirements for “radio-linked hold-up triggering devices”**

#### **10.7.1 General**

Radio-linked HUTD are divided into stationary installed design and non-stationary installed (portable) design. For both designs the connection to the IAS/HUAS is achieved by a non-exclusive transmission path (e.g. radio linked).

*Note: Portable “radio-linked HUTD” do not make up the required stationary installed HUTD. They therefore present **only an auxiliary**, especially because the detection triggering is technically not secured.*

### **10.7.2 Interconnection**

For “radio-linked HUTD” the requirements for interconnections of the respective class (see VdS 2252 Guidelines for Intruder Alarm Systems, Control and Indicating Equipment of Class B and C and VdS 2194 Guidelines for Intruder Alarm Systems, Control and Indicating Equipment of Class A) are valid.

*Note: As long as “radio-linked HUTD” of class C are not available, also HUTD of class B may be used in IAS/HUAS of class C.*

### **10.7.3 Stationary “Radio-linked HUTD”**

For stationary radio-linked HUTD no additional requirements are valid.

### **10.7.4 Non-stationary “Radio-linked HUTD”**

For non-stationary radio-linked HUTD the following additional requirements are valid.

#### **10.7.4.1 Measures against unintentional triggering**

Non-stationary radio-linked HUTD shall be designed such, that an inadvertent triggering by inappropriate transporting (e. g. in a bag with objects whereas one object could trigger the detector by pushing on the triggering button) is to be avoided as far as possible.

#### **10.7.4.2 Repetition of signalling**

After the manual triggering of the HUTD the signalling shall be repeated automatically for 3 min until it is received at the CIE.

*Note: This requirement was set up in order to compensate possible short-term transmission faults.*

Non-stationary radio-linked HUTD of class B shall receive acknowledgement of signalling of the IAS/HUAS-CIE after a triggering. This acknowledgement shall be indicated to the user of the radio-linked HUTD on request at the detector.

*Note: Radio-linked HUTD of class C are not available at present; see also clause 10.7.2.*

#### **10.7.4.3 Limitation of range**

In order to ease an aim-oriented intervention for security staff, the coverage between non-stationary radio-linked HUTD and its dedicated IAS/HUAS should be limited to detection areas. Exceedings are to be limited to a technically unavoidable value (e.g. by formation of cellular structures resp. by reducing the reception sensitivity at the radio-linked HUTD and/or reducing of emitting power at the satellite transmitter/receiver.

#### **10.7.4.4 Leaving the radio covering area**

When leaving and re-entry of the radio coverage area a HUTD which has not triggered shall not trigger nor shall this lead to a signalling (except status signals/messages).

The leaving of the radio covering area, however, shall be indicated as warning to the user and shall be stored in the IAS/HUAS-CIE automatically as warning with date and time.



*Note: Due to the special design of portable HUTD these shall not be included in the Zwangsläufigkeit of the IAS/HUAS; see respective Guidelines for Control and Indicating Equipment, VdS 2194 resp. VdS 2252.*

## **11 Interface to the Intruder/Hold-up Alarm System**

Interfaces to other parts of the system, e.g. to the intruder or hold-up 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 HUTD and the other parts.

All interfaces shall be specified in detail by the manufacturer. Alternatively, the interfaces described in clause 10.1 may be used. 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 technology**

The following requirements shall apply to the inputs and outputs for IAS with an external power supply of the HUTD and a "conventional" line termination technology (end-of-line resistor) according to clause 6.3.

#### **11.1.1 Inputs**

##### **11.1.1.1 Operating voltage**

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

##### **11.1.1.2 Other inputs**

The relevant values shall be given by the manufacturer.

#### **11.1.2 Outputs**

##### **11.1.2.1 Interface for Hold-up signals**

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  $\geq 1$  s to  $\leq 10$  s

##### **Class B and C**

- The contact shall close/the output shall become low resistance no later than 10 s after the end of the criterion triggering the alarm

##### **Class B and C**

- Facility for connecting a monitoring element (e.g. end-of-line resistor)

### 11.1.2.2 Additional electronic output for hold-up signals (option)

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

	Non-alarm state	
	Minimum	Maximum
Output voltage	-	Depends of $U_B$
Output current	-	Depends of $U_B$
Stray current	-	$\leq 50 \mu\text{A}$

**Table 11.01:** Output for hold-up signals; 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 hold-up signals; alarm state

### 11.1.2.3 Interface for tamper alarms according to clause 8.2

#### Class A

No requirements

#### Class B and C

The interface shall meet the following requirements:

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

*Note: Tamper may be signalled for HUTD also as "hold-up". In this case the times specified for the output of hold-up signals/messages are valid.*

#### 11.1.2.4 Other outputs

The relevant values shall be given by the manufacturer.

## 11.2 Interface for other technologies

The performance shall be specified by the manufacturer.

## 12 Power supply

The power supply necessary for the HUTD (if given) shall correspond at least with the requirements of the respective IAS class. Deviating to the requirements for power supply units of class B and C (VdS 2115) also power supply units as described in VdS 2195 (type III: primary battery or not automatically rechargeable secondary battery – jeopardises power source with limited capacity which is not automatically rechargeable) may be used in all non-stationary (portable) radio-linked HUTD.

The capacity of the power source is to be designed for at least 1,000 operations. At the non-stationary (portable) radio-linked HUTD it is durably to be indicated if an operation duration of  $\leq 30$  d is available (warning indication). This status is to be transmitted to the CIE and shall be indicated there as warning power supply.

*Note: Radio-linked HUTD, power supply of which fails in a time interval in which the HUTD are beyond the radio detection range of the IAS/HUAS, are not able to generate a warning signal. This fault source is encountered by a rotative change of batteries.*

Faults of the power supply of non-stationary (portable) radio-linked HUTD shall not lead to a hold-up/tamper signals or similar. However, they shall be transmitted to the IAS/IHUAS CIE and indicated and stored automatically there.

## 13 Options

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

## Changes

Compared with edition VdS 2271 : 1995-11 the following changes have been made:

- Addition of clause 2 (new) “Normative references”, Change of the subsequent enumeration
- Revision of whole clause 5 “Protection against Environmental Influences”
- Revision of clause 6.1.5 „Reliability“
- Actualising of clause 11.1.2.2 “Additional electronic output for Hold-up signals (option)”
- Amendment of requirements for so-called radio-linked HUTD
- Editorial changes