



## **Rules for Intruder Alarm Systems**

# **Stroke Plate Contacts and Locked State Monitoring Systems**

## **Part 1: Requirements**

## 1 General

### 1.1 Scope

These rules describe requirements for stroke plate contacts (SPC) and locked state monitoring systems (will be called SPC in the following) which will be used to monitor the locked state of e.g. entry doors of a protected area to reach an electrical guided set/unset procedure (called „elektrische Zwangsläufigkeit“) of the Intruder Alarm System (IAS).

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, supplementary Requirements and Test Methods“ also apply for system components controlled by software.

*Note: These rules also apply by analogy for monitoring the locked state of windows.*

The test methods for SPC are described in VdS 2315.

### 1.2 Validity

These guidelines are valid from September 01, 1996; they replace the edition VdS 2269 11/93 (03).

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

## 2 Terms and definitions

For general terms and definitions refer to the rules for Intruder Alarm Systems VdS 2227, „General Requirements and Test Methods“.

## 3 Classification

**Performance criteria** of SPC are not classified.

The **environmental classes** classification is made in accordance with the rules for Intruder Alarm Systems VdS 2110, „Protection against Environmental Influences, Requirements and Test Methods“.

## 4 Protection against environmental influences

### 4.1 Limits of application

SPC 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).

### 4.2 Climates

SPC shall not be adversely affected in their function under the atmospheric conditions as described in table 4.01 according to its environmental class.

Test	Function test	Endurance test	Degree of severity, abbreviated description of conditions			
			I	II	III	IV
Dry heat (T1) as spec. in IEC 68-2-2	x		+40°C, 16 h	+55°C, 16 h	+70°C, 16 h	+70°C, 16 h
Dry heat (T2) as spec. in IEC 68-2-2		x	////////////////////	////////////////////	////////////////////	+70°C, 21 d
Cold (T3) as spec. in IEC 68-2-1	x		+5°C, 16 h	-10°C, 16 h	-25°C, 16 h	-25°C, 16 h
Damp heat, steady (T4) as spec. in IEC 68-2-3	x		+40°C, 4 d 93% rel. air humidity	+40°C, 4 d 93% rel. air humidity	////////////////////	////////////////////
Damp heat, steady (T5) as spec. in IEC 68-2-3		x	////////////////////	////////////////////	+40°C, 21 d 93% rel. air humidity	+40°C, 21 d 93% rel. air humidity
Damp heat, cyclic (T6) as spec. in IEC 68-2-30	x		////////////////////	////////////////////	+55°C, 2 cycles	+55°C, 2 cycles
Damp heat, cyclic (T7) as spec. in IEC 68-2-30		x	////////////////////	////////////////////	+55°C, 6 cycles	+55°C, 6 cycles

**Table 4.01: Climates**

### 4.3 Protection against corrosion

SPC shall have adequate resistance to corrosion as specified in table 4.02.

Test	Function test	Endurance test	Degree of severity, abbreviated description of conditions			
			I	II	III	IV
SO <sub>2</sub> -Corrosion (K3) as specified in DIN EN ISO 6988		x	////////////////////	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

**Table 4.02: Protection against corrosion**

### 4.4 Mechanical influences

SPC shall not be adversely affected in their function by mechanical influences as described in table 4.03.

Test	Function test	Endurance test	Degree of severity, abbreviated description of conditions			
			I	II	III	IV
Shock (M1) as spec. in IEC 68-2-27	x		$a = k_1 - k_2 \cdot M$ , $k_1=100 \text{ m/s}^2$ , $k_2=20 \text{ m/kg s}^2$ , 6 x 3 shocks, duration 6 ms	$a = k_1 - k_2 \cdot M$ , $k_1=100 \text{ m/s}^2$ , $k_2=20 \text{ m/kg s}^2$ , 6 x 3 shocks, duration 6 ms	$a = k_1 - k_2 \cdot M$ , $k_1=100 \text{ m/s}^2$ , $k_2=20 \text{ m/kg s}^2$ , 6 x 3 shocks, duration 6 ms	$a = k_1 - k_2 \cdot M$ , $k_1=100 \text{ m/s}^2$ , $k_2=20 \text{ m/kg s}^2$ , 6 x 3 shocks, duration 6 ms
Impact (M2) as spec. in IEC 68-2-63	x		////////////////////	0,5 J, 3 impacts per point	0,5 J, 3 impacts per point	1 J, 3 impacts per point
Vibration sinus (M3) as spec. in IEC 68-2-6	x		10-150 Hz, 0,1 g, 1 cycle	10-150 Hz, 0,5 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 68-2-6		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	10-150 Hz, 1,0 g, 20 cycles

**Table 4.03:** Mechanical influences

#### 4.5 Electromagnetic compatibility

SPC shall not be adversely affected in their function by electromagnetic influences as specified in table 4.04.

Test	Function test	Endurance test	Degree of severity, abbreviated description of conditions			
			I	II	III	IV
Low energy static discharge (E1b) as spec. in IEC 1000-4-2 (1995)	x		Contact discharge 6 kV/ Air discharge 8 kV	Contact discharge 6 kV/ Air discharge 8 kV	Contact discharge 6 kV/ Air discharge 8 kV	Contact discharge 6 kV/ Air discharge 8 kV
Electromagnetic fields (radio frequency) (E2) as spec. in IEC 801-3	x		1-1000 MHz, 10 V/m, 1 kHz pulsed modulation	1-1000 MHz, 10 V/m, 1 kHz pulsed modulation	1-1000 MHz, 10 V/m, 1 kHz pulsed modulation	1-1000 MHz, 10 V/m, 1 kHz pulsed modulation
Line-conducted burst (E3a) as spec. in IEC 1000-4-4 (1995)	x		Mains 2 kV, other lines 1 kV	Mains 2 kV, other lines 1 kV	Mains 2 kV, other lines 1 kV	Mains 2 kV, other lines 1 kV
Line-conducted surge (E4a) as spec. in IEC 1000-4-5 (1995)	x		Mains Cl. 4 Diff.: 0,5; 1; 2 kV other lines Cl. 3: Diff.: 0,5; 1 kV and Common 0,5; 1; 2 kV	Mains Cl. 4 Diff.: 0,5; 1; 2 kV other lines Cl. 3: Diff.: 0,5; 1 kV and Common 0,5; 1; 2 kV	Mains Cl. 4 Diff.: 0,5; 1; 2 kV other lines Cl. 3: Diff.: 0,5; 1 kV and Common 0,5; 1; 2 kV	Mains Cl. 4 Diff.: 0,5; 1; 2 kV other lines Cl. 3: Diff.: 0,5; 1 kV and Common 0,5; 1; 2 kV
Static magnetic fields (E6)	x		150 mT	150 mT	150 mT	150 mT

**Table 4.04:** Electromagnetic compatibility

## 5 Functional reliability

### 5.1 Technical data

Technical data shall be provided in the German language for the parts of an IAS. This data shall include all information and parameters necessary for the safe operation of the system element.

### 5.2 Installation instructions

Installation instructions written in the German language shall be provided for the elements of an IAS. These instructions shall include a clear illustration of the assembly and installation procedures and a reference to the applications for which the parts are suitable (including a statement of the class according to clause 3). In addition, information regarding adjustment (calibration) and maintenance is required. Adjustments not allowed shall be indicated unambiguously.

### 5.3 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. SPC shall be safe in their function within these specified values. Variations in the voltage as specified in table 5.01 shall not adversely affect the function of SPC.

Test	Function test	Endurance test	Degree of severity, abbreviated description of conditions			
			I	II	III	IV
Operating voltage range system voltage (B1b)	x		$U_N \pm 25\%$ or system dependent	$U_N \pm 25\%$ or system dependent	$U_N \pm 25\%$ or system dependent	$U_N \pm 25\%$ or system dependent
Operating voltage step system voltage (B2b)	x		10 cycles from $U_N +25\%$ to $U_N -25\%$ and back or system dependent	10 cycles from $U_N +25\%$ to $U_N -25\%$ and back or system dependent	10 cycles from $U_N +25\%$ to $U_N -25\%$ and back or system dependent	10 cycles from $U_N +25\%$ to $U_N -25\%$ and back or system dependent

**Table 5.01:** Operating voltage behaviour

### 5.4 Ripple of the operating voltage

As a minimum requirement SPC shall function safely with a voltage ripple of  $\leq 1,0 V_{ss}$  if a nominal voltage of 12 V is specified. For 24 V nominal voltage the ripple value is  $\leq 2,0 V_{ss}$ . For other nominal voltages the specifications of the manufacturer are definitive.

### 5.5 Reliability

The selection of components for SPC shall provide a MTBF-value of at least 45.000 h for the SPC.

### 5.6 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 VDE 0801).

### **5.7 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.

### **5.8 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.

### **5.9 Access to assemblies and components**

If SPC enclose parts that need to be accessible these parts shall be constructed to ensure easy access to assemblies and components as well as their easy replacement. Provisions shall be made to reduce handling errors to a minimum.

### **5.10 Connecting and adjustment elements**

Connecting and adjustment elements shall be marked and shall be easily accessible to the installer and the maintenance service personnel. They shall not be accessible for the user, therefore they must be secured against unauthorized operation.

## **6 Operational security**

### **6.1 Operation**

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

### **6.2 Degree of protection**

System parts of an IAS shall, if installed, be constructed at least to the degree of protection as specified by EN 60 529 - IP 3x. SPC which have to withstand a higher grade of environmental influences, e.g. at external doors of buildings, shall be constructed including connecting cable to the degree of protection as specified by EN 60 529 - IP 54.

### **6.3 Error tolerance**

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

## **7 Tamper security**

There are no special means for the protection against sabotage required for SPC.

## **8 Construction**

### **8.1 Stability**

Housings of SPC shall be of adequate mechanical strength.

### **8.2 Stationary installation**

SPC shall be designed to allow stationary and operation secure installation.

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

The casing and all parts of the casing for SPC shall be free from electrical potential (with the exception of electrical protective measures). The isolation resistance shall be at least 500 k $\Omega$ .

### **8.4 Fastening and calibration**

SPC 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 SPC, the manufacturer shall provide the appropriate calibration auxiliaries.

### **8.5 Indicators**

Any available indicators of the operational status of SPC (e.g. fault condition) shall be unambiguous to the operator of the IAS. Optical indicators shall be clearly visible to the operator and have an average lifetime of at least 30.000 h. Audible indicators shall have a minimum volume of 60 dB(A) - measured in accordance with DIN 45 635 - at a distance of 1 m from the signal emitter.

### **8.6 Mounting materials**

#### **8.6.1 Supply of mounting materials**

The manufacturer shall deliver the material necessary for the mounting of SPC.

#### **8.6.2 Mounting materials for magnetic operating contacts**

If the SPC contain elements which are operated by magnetic force the material necessary for mounting shall be non-ferromagnetic. Furthermore appropriate distance elements (e.g. washers made of non-ferromagnetic material) shall be supplied when the function of the SPC can be negatively influenced.

### **8.7 Switching cycles**

SPC shall be designed to ensure at least 30.000 switching cycles for various contact current (10  $\mu$ A to 100 mA) (at connected resistance loads).

Transition resistance and switching hystereses shall be in the limits of the specifications of the manufacturer.

### **8.8 Long term behaviour**

SPC shall signal an operation with a high probability even if they have been in the idle state for a long time.

## **9 Function**

### **9.1 Switching forces**

SPC are allowed to response when the bolt is pushing against the switching mechanism with a force  $\geq 0,35$  N. By the force of  $\leq 0,3$  N the contact shall take its idle state.

*Note: Idle state means the contact is not operated by the bolt.*

### **9.2 Switching distance**

SPC shall be designed to ensure that only movements of the bolt  $\geq 1$  mm return the contact to its idle state.

## **10 Interface to IAS/Hold-Up Alarm System**

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 SPC and the other parts of the system.

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

*Note: Detailed specifications for the interfaces may only be omitted if all requirements of clause 10.1 are fulfilled.*

### **10.1 Interface for conventional line technologies**

The following requirements shall apply for the input and output of SPC with a „conventional“ line technology (end-of-line resistor).

#### **10.1.1 Inputs**

##### **10.1.1.1 Operating voltage**

SPC shall have terminals for the supply voltage if necessary.

##### **10.1.1.2 Additional inputs**

The relevant values shall be given by the manufacturer.

#### **10.1.2 Outputs**

##### **10.1.2.1 Interface for intruder alarms**

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 event of a signal (low resistance), opens in idle state (high resistance)
- response time according to the duration of the criteria triggering the signal

##### **10.1.2.2 Additional outputs**

The relevant values shall be given by the manufacturer.

## **11 Options**

Options shall not have a negative effect on the mandatory functions of SPC. The performances of the options shall be specified by the manufacturer.