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## Rules for Intruder Alarm Systems

### Class A power supply units

#### Requirements

VdS 2195en : 2001-04 (04)

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# 1 General

## 1.1 Scope

These rules contain minimum requirements for power supply units (PSU) for use in class A intruder and hold-up alarm systems (IAS).

These rules shall be applied in conjunction with the "Rules for intruder alarm systems, general requirements and test methods"; VdS 2227 and the "Rules for intruder alarm systems, protection against environmental influences, requirements and test methods", VdS 2110. The "Rules for alarm systems, software controlled system components, supplementary requirements and test methods", VdS 2203, also apply for system components controlled by software.

*Note 1: The test methods for class A PSU are described in VdS 2197.*

*Note 2: The requirements for IAS class B and C PSU are described in VdS 2115.*

*Remark: The term „Power supply unit“ used in these rules also includes devices for the supply of power (e. g. primary cells including monitoring) which may be part of system elements (e. g. detectors).*

## 1.2 Validity

These rules are valid from 01.04.2001; they replace the edition VdS 2195 05/94 (03).

*Note: This is a translation of the German rules; if there are any 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.

- **CCITT V.31bis** Electrical characteristics for single-current interchange using optocouplers
- **DIN 45 631** Procedure for calculating loudness level and loudness
- **DIN EN 54-4** Fire detection and fire alarm systems – Part 4: Power supply Equipment
- **DIN EN 50 131-6** Alarm systems – Intrusion systems – Part 6: Power supplies – corresponds with VDE 0830 Part 2-6
- **DIN EN 60 529** Degree 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
- **DIN VDE 0833-1 : 1989** Alarm systems for fire, intrusion and hold-up, general requirements

- **DIN VDE 0833-3 : 1982** Alarm systems for fire, intrusion and hold-up, requirements for intrusion and hold-up alarm systems
- **EN 61 000-4-2** Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques – Section 2: Electrostatic discharge immunity test – Basic EMC publication
- **EN 61 000-4-3** Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques – Section 3: Radiated, radio-frequency, electromagnetic field immunity test
- **EN 61 000-4-4** Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques – Section 4: Electrical fast transient/burst immunity test
- **EN 61 000-4-5** Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques – Section 5: Surge immunity test
- **EN 61 000-4-6** Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques – Section 6: Immunity to conducted disturbances, induced by radio-frequency fields
- **EN 61 000-4-11** Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques – Section 11: Voltage dips, short interruptions and voltage variations immunity tests
- **IEC 60 068-2-1** Environmental testing; Part 2: Tests, Test A: Cold
- **IEC 60 068-2-2** Environmental testing; Part 2: 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** Environmental testing; Part 2: Tests, Test Fc: Vibration (sinusoidal)
- **IEC 60 068-2-27** Environmental testing; Part 2: Tests, Test Ea: Shock
- **IEC 60 068-2-63** Environmental testing; Part 2: Test methods, Test Eg: Impact, spring hammer
- VdS 2102 Maintenance-free batteries for alarm systems, requirements and test methods
- VdS 2110 Rules for intruder alarm systems, protection against environmental influences, requirements and test methods
- VdS 2115 Rules for intruder alarm systems, Power supply units, requirements
- VdS 2197 Rules for intruder alarm systems, class A power supply units, 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 2311 Rules for intruder alarm systems, planning and installation

### 3 Terms and definitions

For general terms and definitions refer to the "Rules for intruder alarm systems, general requirements and test methods", VdS 2227. In addition the following terms and definitions are valid:

**Power supply unit (PSU):** Technical realization of the power supply, which may be realized as a single device or as a part of a system component (e. g. module of an alarm control and indicating equipment).

**Power supply unit type I (mains supply and automatically rechargeable secondary battery):** Fault-jeopardized power source with almost unlimited capacity (e. g. public mains power supply) in connection with a not-fault-jeopardized power source with limited capacity, which is automatically regenerable.

**Power supply unit type II (mains supply and primary battery or automatically not-rechargeable secondary battery):** Fault-jeopardized power source with almost unlimited capacity (e. g. public mains power supply) in connection with a not-fault-jeopardized power source with limited capacity, which is not automatically regenerable.

**Power supply unit type III (primary battery or not automatically rechargeable secondary battery):** Not-fault-jeopardized power source with limited capacity, which is not automatically regenerable.

**Final voltage (cut-off voltage):** The specified voltage at which a discharge of a battery is considered finished and which typically shall not fall below.

**End-of-charge voltage:** The voltage of a battery during charging at a specified constant current when a battery has completely been charged.

**Alternative power source:** Battery capable of powering an alarm system for a pre-determined time period when the mains power supply is not available.

**Primary battery:** Galvanic cell, where chemical energy is converted into electrical energy. By this energy conversion the cell will be discharged; a primary battery is not rechargeable.

**Secondary battery:** (accumulator) Galvanic cell, where chemical energy is converted into electrical energy. During this energy conversion the cell will be discharged; a secondary battery is rechargeable.

**Warning signal:** Signal, that a given threshold exceeded or fell below.

*Note: Instead of the terms „fault-jeopardized power source“ and „not-fault-jeopardized power source“ which is used in the standard DIN VDE 0833 in these rules the terms „Electrical mains /mains supply“ and „battery“ is used.*

## 4 Classification

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

The **environmental classes** are set in accordance with the “Rules 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 PSU. 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 PSU shall not be adversely affected by the thermic 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
Dry heat (T1) as spec. in IEC 60 068-2-2	x		+40 °C, 16 h	+55 °C, 16 h
Cold (T3) as spec. in IEC 60 068-2-1	x		+5 °C, 16 h	-10 °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

**Table 5.01:** Climates

### 5.3 Protection against corrosion

PSU 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
SO <sub>2</sub> -corrosion (K3) as spec. in DIN EN ISO 6988		x	No test	2 l SO <sub>2</sub> 5 cycles

**Table 5.02: Protection against corrosion**

### 5.4 Mechanical influences

The function of PSU 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
Shock (M1) as spec. in IEC 60 068-2-27	x		$\hat{A} = 10 (100 - 20M) \text{ m/s}^2$ 6 x 3 shocks, duration 6 ms	$\hat{A} = 10 (100 - 20M) \text{ m/s}^2$ 6 x 3 shocks, duration 6 ms
Impact (M2) as spec. in IEC 60 068-2-63	x		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, 0,2 g, 1 cycle

**Table 5.03: Mechanical influences**

## 5.5 Electromagnetic compatibility (EMC)

The function of PSU shall not be adversely affected by electromagnetic influences as specified in table 5.04.

Test	Functional test	Endurance test	Degree of severity, abbreviated description of conditions	
			I	II
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 and air discharge 2, 4 and 8 kV	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 61 000-4-3			80 - 2000 MHz, 10 V/m as well as 415-466 and 890-960 MHz, 30 V/m modulation: AM 80 % (modulated with 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 415-466 and 890-960 MHz, 30 V/m modulation: AM 80 % (modulated with 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	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 – 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 lines 0.25, 0.5 and 1 kV	Each for a period of 1 min pos. and neg. mains 0.5, 1 and 2 kV, other lines 0.25, 0.5 and 1 kV
Conducted surge - (E4a) acc. To EN 61 000-4-5	x		Mains: 20 times pos. and neg. Kl. 4: line - line 0.5, 1, 2 kV Other lines: 5 times pos. and neg. Kl. 3: line – line 0.5, 1 kV and line – ground 0.5, 1, 2 kV	Mains: 20 times pos. and neg. Kl. 4: line - line 0.5, 1, 2 kV Other lines: 5 times pos. and neg. Kl. 3: line – line 0.5, 1 kV and line – ground 0.5, 1, 2 kV
Static magnetic fields (E6)	x		150 mT	150 mT

**Table 5.04:** Electromagnetic compatibility

## **6 Functional reliability**

### **6.1 Provision of functions**

#### **6.1.1 Technical data**

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

#### **6.1.2 Installation instruction**

Installation instructions written in the German language shall be provided for PSU. These instructions shall include a clear illustration of the assembly and installation procedures and a reference of the applications for which the PSU is suitable (including a statement of the class according to clause 4). In addition, information regarding adjustment (calibration) and maintenance is required. Adjustments not allowed shall be indicated unambiguously, further the possibility of a delayed transmission of the signal "loss of mains power supply" and the effects to the calculation of the battery capacity acc. to clause 10.2.3.2 shall be indicated.

#### **6.1.3 Operating voltage behaviour**

Mains voltage, operating voltage range (at least mains voltage  $U_N + 10\%/-15\%$ ) and maximum permitted ripple of the operating voltage shall be specified by the manufacturer. PSU 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 PSU.

*Note: This requirements is not valid for PSU with power sources type III (see clause 10.1.1)*

Test	Functional test	Endurance test	Degree of severity, abbreviated description of conditions	
			I	II
Operating voltage changes mains supply (B1a)	x		$U_N + 10\% - U_N - 15\%$	$U_N + 10\% - U_N - 15\%$
Operating voltage range system-voltage (B1b)	x		$U_N \pm 15\%$ or system dependent	$U_N \pm 15\%$ or system dependent
Operating voltage dips of the mains supply (B2a) acc. to EN 61 000-4-11	x		For 0.5, 1, 5 and 10 periods the voltage shall be reduced by 60 % for 3 times, duration between the reductions $\geq 10$ s	For 0.5, 1, 5 and 10 periods the voltage shall be reduced by 60 % for 3 times, duration between the reductions $\geq 10$ s
			as well as for 0.5, 1, 5 and 10 periods the voltage shall be reduced by 100 % for 3 times, duration between the reductions $\geq 10$ s	as well as for 0.5, 1, 5 and 10 periods the voltage shall be reduced by 100 % for 3 times, duration between the reductions $\geq 10$ s
Operating voltage surge system voltage (B2b)	x		10 cycles from $U_N + 15\%$ to $U_N - 15\%$ and back, detectors $\pm 25\%$ or system dependent	10 cycles from $U_N + 15\%$ to $U_N - 15\%$ and back, detectors $\pm 25\%$ or system dependent

**Table 6.01:** Operating voltage behaviour

#### 6.1.4 Reliability

The selection of components for PSU shall be such that they are suitable for the selected environmental class. Primary batteries shall have a minimum availability of at least 99,95 %.

*Note: Requirements to the reliability of rechargeable batteries (so-called secondary batteries) are described in VdS 2102.*

#### 6.1.5 Components

Only components using technology which has proved its reliability in various applications over a period of two years shall be used. For components of unproved reliability other means of proof shall 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).

#### 6.1.6 Relays

Relays shall be protected against the effects of dust at least to the degree of protection specified by DIN EN 60 529 (identically with VDE 0470 Part 1) - IP 5x. Relay contacts shall be designed for at least 10.000 switching cycles at a corresponding connected load.

### **6.1.7 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.

### **6.1.8 Access to assemblies and components**

If PSU contain changeable parts they shall be constructed to ensure easy access to assemblies and components as well as their replacement. Provisions shall be made to reduce handling errors to a minimum.

### **6.1.9 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.

## **6.2 Function monitoring of the electronic**

The failure of, or a fault in the central processing units (e. g. microprocessors) of the PSU shall be signalled as a fault (e. g. in the assigned control and indicating 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 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**

Components of IAS if installed, shall be constructed at least to the degree of protection as specified by DIN EN 60 529 (identically with VDE 0470 Part 1) - IP 3x.

## **7.4 Protection against access**

Parts affecting the function of PSU as well as connecting elements and adjustment elements shall not be freely accessible; they shall be protected e. g. by covers.

## **7.5 Error tolerance**

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

## 7.6 Setting of parameters

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

## 7.7 Protected (fused) outputs

A fault (e. g. short circuit) in one load output shall not cause negative re-actions to loads which are connected to other outputs. This can be realized e. g. by a separate protection (fusing) of all available load outputs.

# 8 Tamper

## 8.1 Tamper protection

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

## 8.2 Tamper detection

No requirements.

# 9 Construction

## 9.1 Stability

PSU shall be of adequate mechanical strength.

## 9.2 Stationary installation

PSU shall be designed to facilitate static installation.

## 9.3 Freedom of potential, isolation resistance

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

For equi-potential bonding it shall be possible to connect a wire with a sectional view of 4 mm<sup>2</sup> to the PSU. Is the PSU a protection class I-type, a sectional view of 1,5 mm<sup>2</sup> is sufficient.

*Note: This requirement is not valid for PSU with power sources type III (see clause 10.1.1).*

#### **9.4 Shielded cables**

PSU 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 stresses can be anticipated.

#### **9.6 Fastening and calibration**

PSU shall be constructed to allow proper installation and – if necessary – calibration. Any special tools required shall be supplied by the manufacturer of the device.

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

#### **9.7 Indicators**

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

If coloured indicators are used the following colours shall be selected:

- GREEN = Operation
- YELLOW = Fault

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 signal emitter resp. housing.

#### **9.8 Installation of batteries**

Batteries shall be installed in housings only in such a way that in these housings – independent of the actual status of the PSU (e. g. when charging the batteries) no explosive gaseous may be accumulated.

*Note: Because batteries are part of the PSU resp. they are the only power source, also for these the requirements of these rules are valid.*

## 10 Function

### 10.1 General requirements

#### 10.1.1 Energy sources

Class A IAS may be powered in analogy to DIN EN 50131-6 by PSU with the following power sources:

Type I **Mains supply and automatically rechargeable secondary battery**

Type II **Mains supply and primary battery or automatically rechargeable secondary battery**

Type III **Primary battery or not automatically rechargeable secondary battery**

*Note: For system elements where a loss of function will cause a complete loss of the function of the IAS (e. g. control and indicating equipment, alarm transmission equipment), it is necessary to use at least two batteries (e. g. two primary batteries) as separated power sources.*

#### 10.1.2 Unrestricted operation

By the transition of the supply of the IAS from one power source to the other the function of the IAS shall not be influenced.

#### 10.1.3 Changes of load

Abrupt changes of the load shall not negatively influence the specified function of the PSU.

#### 10.1.4 Load output

For the supply of the IAS or parts of the IAS at least one load output shall be available. If DC is used the overlaid AC (ripple) shall at maximum load not be more than 2,5 % ( $U_{SS}$ ) of the nominal voltage ( $0,3 V_{SS}$  for nominal voltage 12 V,  $0,6 V_{SS}$  for nominal voltage 24 V).

*Note: This requirement is not valid for PSU with power sources type III (see clause 10.1.1).*

#### 10.1.5 Protection (fusing) of the load outputs

Load outputs shall be protected (fused) as such, that a short circuit of one output and the maximum complete current of all outputs shall not cause at total loss of function of the power supply.

#### 10.1.6 Batteries

Only such primary batteries specified by the manufacturer resp. VdS-approved secondary batteries shall be used in PSU.

### **10.1.7 Additional functions**

PSU may have additional functions and may supply other system elements than only the IAS (e. g. technical detectors, detectors for the early detection of fires) if it is ensured that also in the case of short circuit and interruption of these supplied system elements no negative retrospective effects to the power supply of the IAS are possible.

*Note: See also Rules for Intruder Alarm Systems, Planing and installation, VdS 2311.*

## **10.2 Power supply units type I**

### **10.2.1 General**

Two power sources are necessary for the power supply. One power source shall be an electrical net (mains) which operates without any interruption. The other shall be a system-own battery supply which is able to supply the system with power in case of a mains fault automatically and without any interruption and which is able to switch back to the mains if the mains are available again.

### **10.2.2 Exclusion of repercussions**

Faults of the battery supply – with the exception of a short circuit of the connection leads of the battery – shall not jeopardize the IAS.

### **10.2.3 Mains power supply**

#### **10.2.3.1 Mains power supply voltage range**

The PSU shall be such that changes of the mains supply in a range of 230 V~ (+10 %/-15 %) do not interfere with the proper function of the IAS even if the mains are the only power supply (see also clause 6.1.3).

#### **10.2.3.2 Monitoring of the mains power supply**

The electrical existence of the mains power supply shall be monitored with sufficient means. A loss of the mains power supply shall be indicated visually and audibly or shall be available as a signal.

The loss of the mains power supply may be indicated with a delay. The delay shall be at maximum 60 min and – however - has to be taken into consideration during calculation of the battery capacity.

*Note: See clause 9.7 for the indicator design and clause 11.1.1 for the design of the fault signals.*

### **10.2.4 Alternative power supply (battery part)**

#### **10.2.4.1 Stand-by duration**

The battery (secondary battery) shall be able to guarantee the function of the IAS without any restriction for at least 12 h in the case of a mains fault.

#### **10.2.4.2 Charging facility**

For charging and maintenance of the charged state of the battery a regulated charging facility shall available. This shall be specified such that it is able to

recharge with  $I_{10}$  to its final voltage (cut-off voltage) a discharged battery within maximum 72 h to 80 % of its nominal capacity. The overlaid AC (ripple) shall not exceed 50 mVss/cell during full load for lead acid batteries (measured with connected batteries). For other types of batteries the values shall be specified in accordance with the specifications of the manufacturer.

Charging may be constant or periodical. A periodical charging shall be specified such that the charge of the battery/batteries does not drop more than 5 % during the charging pauses.

*Note:  $I_{10}$  = Nominal capacity of the battery  $\therefore$  10 h*

#### **10.2.4.3 Monitoring of the battery**

The electrical availability of the batteries shall be monitored with sufficient means. A fault of the battery supply shall be detected within 15 min and be available as a signal and – if necessary – visually and audibly indicated.

*Note: See clause 9.7 for the indicator design and clause 11.1.1 for the design of the fault signals.*

#### **10.2.4.4 Parallel connection of batteries**

Not more than two batteries may be connected parallel to the charging facility unless the batteries are de-coupled. Row connections of batteries are only allowed for batteries of the same type (same manufacturer, capacity, voltage, manufacturing date). If batteries are row-connected at maximum two row connections may be connected in parallel.

#### **10.2.4.5 Row connection of batteries**

Row connections of batteries are only allowed for batteries of the same type (same manufacturer, capacity, voltage, manufacturing date) up to a total number of 12 cells. A row connection of more cells is only allowed if suitable measures are taken for an equal assignment of the voltage.

### **10.3 Power supply units type II**

For type II PSU clauses 10.2.1 to 10.2.3.2 are valid and the following requirements.

#### **10.3.1 Alternative power supply (battery part)**

##### **10.3.1.1 Stand-by duration**

The battery (secondary battery) shall be able to guarantee the function of the IAS without any restriction for at least 24 h in the case of a mains fault.

##### **10.3.1.2 Monitoring of the battery**

The electrical existence of the batteries shall be monitored with sufficient means. A fault of the battery supply shall be detected within 15 min and be available as a signal and – if necessary – visually and audibly indicated. Further a fault has to be signalled when the capacity of the battery is only able to guarantee a standby-time of  $\leq 12$  h.

*Note: See clause 9.7 for the indicator design and clause 11.1.1 for the design of the fault signals.*

## **10.4 Power supply units type III**

### **10.4.1 General**

Batteries (e. g. primary batteries) may be used as the only power source for the power supply.

For system elements where a loss of function will cause a complete loss of the function of the IAS (e. g. control and indicating equipment, alarm transmission equipment), it is necessary to use at least two batteries (e. g. two separated primary batteries) as separated power sources.

### **10.4.2 Battery capacity (only/first power source)**

The battery (e. g. primary battery) shall be able to guarantee the function of the IAS without any restriction for at least 12 months. For calculation of the battery capacity the following events are expected:

- 4 external alarms per year with maximum possible duration of operation of the audible warning devices as well as 12 h operation time of the visual warning devices in parallel,
- 2 complete set/unset-procedures per day,
- 2 times triggering of the transmission device (transmission set/unset) per day,
- 2 times operating of the system (request for status of the zones) per day and
- 50 real movements per detector per day.

### **10.4.3 Alternative power supply for system elements were a loss could lead to a total loss of function of the IAS (e. g. control and indicating equipment, alarm transmission device)**

If the power source acc. to clause 10.4.2 is faulty a second power source shall automatically and without any interruption take over the supply of the system. This power source may be e. g. a primary battery which shall be able to guarantee the function of the IAS without any restriction for at least 24 h in the case of a loss of the first power source.

### **10.4.4 Monitoring of the battery**

The electrical existence of the batteries shall be monitored with sufficient means.

A fault of the battery supply (except a total loss) shall be detected within 15 min and be available as a signal and – if necessary – visually and audibly indicated. It shall be signalled if the capacity of the battery acc. to clause 10.4.2 only can guarantee a supply of the IAS of  $\leq 720$  h (warning signal) or  $\leq 640$  h (fault signal).

For the second power source for system elements acc. to clause 10.4.3, were a loss leads to a total loss of function of the IAS (e. g. control and indicating equipment, alarm transmission equipment) a fault shall be signalled when the supply is guaranteed only for  $\leq 12$  h.

*Note: See clause 9.7 for the indicator design and clause 11.1.1 for the design of the outputs.*

## 11 Interface to the IAS

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 PSU and the other parts.

### 11.1 Interface for conventional connection technology

The following requirements shall apply to the outputs of systems with a conventional connection technology.

#### 11.1.1 Interface for fault signals

The interface shall meet the following requirements:

- potential-free output (e. g. contact)
- a closed contact in normal condition ( $\leq 1 \text{ k}\Omega$ ), an opened contact in the event of a warning signal ( $\geq 500 \text{ k}\Omega$ )

*Note: Corresponds with interface CCITT V.31bis.*

- response duration according to the duration of the fault, but at least 1 s

#### 11.1.2 Interface for warning signals

The interface shall meet the following requirements:

- potential-free output (e. g. contact)
- a closed contact in normal condition ( $\leq 1 \text{ k}\Omega$ ), an opened contact in the event of a warning signal ( $\geq 500 \text{ k}\Omega$ )

*Note: Corresponds with interface CCITT V.31bis.*

- response duration according to the duration of the warning signal, but at least 1 s

### 11.2 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 PSU. The performances of the options shall be specified by the manufacturer.

## Changes

Compared with edition VdS 2195 05/94 (03) the following changes have been made:

- Amendment of the clause 2 (new) „Normative references“
- Addition of clause 3 „Terms and definitions“, addition of the three types of PSU
- Complete revision of clause 5 „Protection against environmental influences“
- Revision of table 6.01 „Operating voltage behaviour“
- Revision of clause 6.1.4 „Reliability“
- Addition of clauses 7.6 „Setting of parameters“ and 7.7 „Protected (fused) outputs“
- Addition of clause 9.3 „Freedom of potential, isolation resistance“ with a connector for the equi-potential bonding
- Addition of clause 10.1.7 „Additional functions“
- Changes of the values for the ripple of the charging voltage in clause 10.2.4.2
- Addition of clause 10.2.4.2 „Charging facility“ by „periodical charging“
- Amendment of the conditions for measuring the battery capacity for type II PSU in clause 10.4
- Reduction of the stand-by time of the second energy source and corrections for the fault detection in clause 10.4.4
- Editorial changes