Alarm Transmission Equipment for alarm signals (ATE)

Requirements

Publisher: Gesamtverband der Deutschen Versicherungswirtschaft e.V. (GDV)
Publishing house: VdS Schadenverhütung GmbH

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Guidelines for alarm systems

Alarm Transmission Equipment for alarm signals (ATE)

Requirements

CONTENTS

1 General

1.1 Scope

These guidelines contain requirements for Alarm Transmission Equipment (ATE) for alarm and status signals/messages (e.g. fire signals/messages, intrusion signals/-messages and fault signals/messages). They shall be applied in conjunction with the "Guidelines for intruder alarm systems, general requirements and test methods", VdS 2227 and the "Rules for intruder alarm systems, environmental influences, requirements and test methods", VdS 2110. The "Rules for alarm systems, software controlled system components, requirements and test methods", VdS 2203, also apply for system components controlled by software.

ATE receive messages from Alarm Systems (AS), prepare them for transmission via transmission paths[1)] (e.g. Deutsche Telekom AG cable paths/networks) and serve as the interface to these transmission paths. They also relay the control commands given in the alarm receiving equipment (ARE)[2)] to the connected Alarm Systems (AS) (see figure 1.01). Figure 1.02 shows a schematically illustration of the whole Alarm Transmission System (ATS) including the different interfaces.

[1)] Guidelines for transmission paths in alarm transmission systems, VdS 2471

[2)] Guidelines for alarm receiving equipment (ARE), VdS 2466

ATE can be designed both as combined equipment for the transmission of different signals/messages (e.g. fire and intrusion signals/messages) and as individual units. Also, the equipment can have parallel and/or serial interfaces (see clause 9) or be a component of other equipment, e.g. Intruder alarm System (IAS)-CIE.

These guidelines are not applicable to parts that are components of the particular transmission path (e.g. network terminal sets - NTS, communications devices as user connection equipment, modems).

The test methods for ATE are described in the guidelines VdS 2464.

Note: ATE is a functional part of the Alarm Transmission System (ATS). Therefore it lies in the responsibility of the alarm receiving centre (e.g. Security company). This responsibility may be transferred to the operator or installer of the Alarm System (AS).

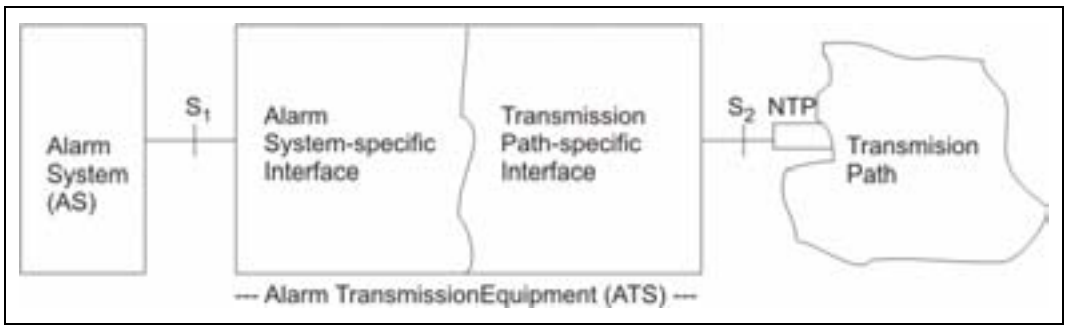

Figure 1.01

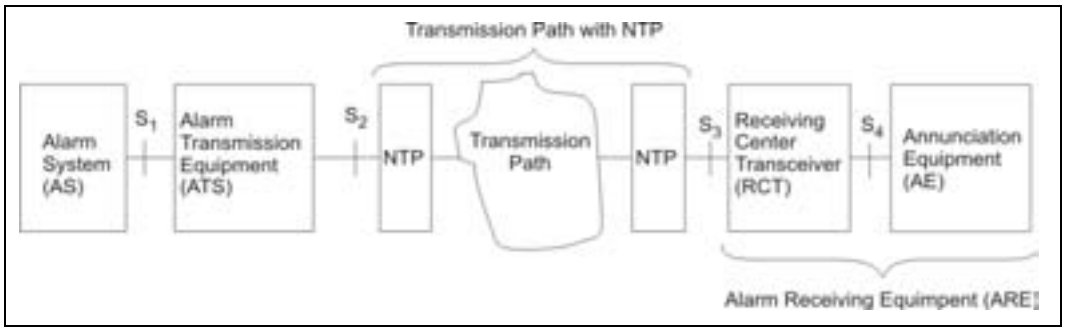

Figure 1.02

1.2 Validity

These guidelines are valid from 1 May 1995; they replace the provisional edition August 1994 edition.

The transition periods indicated there apply for clause 4.5.

2 Terms and definitions

For general terms and definitions refer to the “Rules for intruder alarm systems, general requirements and test methods“, VdS 2227, whereas for fire alarm systems the terms and definitions in DIN VDE 0833 Parts 1 and 2 and DIN 14 675 are applicable.

The following additional or deviating terms and definitions are applicable.

Alarm receiving equipment (ARE): Receiving equipment in alarm transmission systems which receives, acknowledges, processes and indicates signals/messages from alarm systems and transmits control signals to the Alarm transmission equipment (ATE). Alarm receiving equipment (ARE) consist at least of a Receiving centre transceiver (RCT) and an Annunciation equipment (AE).

Alarm transmission equipment for alarm signals (ATE): ATE pick up signals from alarm systems, prepare them for transmission via transmission paths and serve as an interface to these transmission paths. They also prepare the control commands issued in the alarm receiving equipment (ARE) and pass them on to the connected alarm system.

Note: Formerly known as: Transmission facility, Telephone dialling device, auto dialler

Alarm transmission system (ATS): Equipment and networks transferring information on the status of one or more alarm systems to one or more alarm receiving centres (ARC).

Alternative path: Transmission path used for the transmission of signals/messages when the primary transmission path is not available, for example because of faults or tampering.

Annunciation equipment (AE) of an alarm transmission system: Device which displays the signals/messages and information from the Receiving centre transceiver (RCT), stores them if required, and allows to send control commands to the Alarm transmission equipment (ATE).

Communications devices: Devices within transmission paths in alarm transmission systems which do not belong to networks. Communications devices include e. g. multiplexers, concentrators, processing nodes and service transition points. They may belong to the network operator, the operator of the alarm transmission system, the operator of the alarm system or third parties.

Dedicated line: Physical or logical connection which, once set up or created, is constantly available for the transmission of signals/messages or for monitoring the connection.

Emergency redundancy: Performance of a fire alarm system (FAS) to be able to transmit a fire message even if the central processing unit (e.g. microprocessor) is faulty.

Interface S_1: Interface between the Alarm system (AS) and the Alarm transmission equipment (ATE).

Interface S_2: Interface between the alarm transmission equipment (ATE) and the network termination point or an available communications device.

Interface S_3: Interface between the network termination point and the Receiving centre transceiver (RCT) respectively Alarm receiving equipment (ARE).

Interface S_4: Interface between the Receiving centre transceiver (RCT) and the Annunciation equipment (AE).

Needs-based connection (dialup line): Physical or logical connection which has to be dialled-up prior to transmission of signals/messages or connection monitoring operations, and cleared again after the transmission or monitoring operation is complete.

Negative acknowledgement: Information from the alarm transmission equipment (ATE) to the alarm system to indicate that an alarm signal/message could not be passed across interface S_2.

Network: Networks transmit information from A to B without changing it; Network-specific information may be added to or left out of the transmission process.

Network termination point (NTP): Electrical (interface) and mechanical connection (e. g. socket) which the network provider makes available and which constitutes the end point of his area of responsibility.

Note: The network termination point may also contain electronic and/or energy supply equipment.

Network terminator (NT): Name for the network termination point of the German Telekom ISDN system.

Receiving centre transceiver (RCT): Receiving facility in alarm transmission systems which receives signals/messages from alarm systems, evaluates them, passes them to the Annunciation equipment (AE), stores them if necessary and passes on control signals to the Alarm transmission equipment (ATE).

Scanning connection: Physical or logical connection which is regularly available after set-up or dial-up for transmitting signals/messages or for monitoring the connection.

Sub-receiving centre transceiver (Sub-RCT): Processing unit for the concentration, handling, conversion and processing of signals/messages and control signals. The unit may also serve as a connection between two different networks. In the signal (alarm) direction (ATE ⇒ alarm receiving equipment - ARE), the sub-receiving centre transceiver (Sub-RCT) has an S_3 interface at the input and an S_2 interface at the output.

Test signal: Signal which does not contain any operational information (e. g. alarm signal) and which is used to test the transmission path and availability.

Transmission path: Logical connection between interfaces S_2 and S_3.

Transmission paths in Alarm Transmission Systems: Transmission paths suitable for the transmission of messages, signals and information (e.g. Deutsche Bundespost TELEKOM AG cable paths/networks)

3 Classification

The **performance criteria** for different classes are defined in the „Rules for intruder alarm systems, general requirements and test methods“, VdS 2227; for fire detection and fire alarm systems the requirements in DIN VDE 0833 Parts 1 and 2 and DIN 14 675 apply.

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

4 Protection against environmental influences

4.1 Limits of application

Environmental influences shall not affect the function of ATE. 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).

4.2 Climates

The function of ATE shall not be adversely affected by the thermal conditions described in table 4.01, 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 68-2-2	x		+40°C, 16 h	+55°C, 16 h
Cold (T3) as spec. in IEC 68-2-1	x		+5°C, 16 h	+5°C, 16 h
Damp heat, steady (T4) as spec. in IEC 68-2-3	x		+40 °C, 4 d, 93 % rel. humidity	

Table 4.01: Climates

4.3 Protection against corrosion

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

Test	Functional test	Endurance test	Degree of severity, abbreviated description of conditions	
			I	II
SO2-corrosion as spec. in DIN 50 018 (K3)		x	No test	0.2 l SO_2, 5 cycles

Table 4.02: Protection against corrosion

4.4 Mechanical influences

The function of ATE shall not be adversely affected by mechanical influences as described in table 4.03.

Test	Functional test	Endurance test	Degree of severity, abbreviated description of conditions	
			I	II
Shock (M1) as spec. in IEC 68-2-27	x		a = 100 - 20M, 6 x 3 shocks, duration 6 ms	
Impact (M2) as spec. in IEC 68-2-75	x		No test	a = 100 - 20M, 6 x 3 shocks, duration 6 ms
Vibration sinus (M3) as spec. in EN 60068-2-6	x		10-150 Hz, 0.1 g, 1 cycle	10-150 Hz, 0.1 g, 1 cycle
Vibration sinus (M3) as spec. in EN 60068-2-6		x	10-150 Hz, 0.5 g, 20 cycles	10-150 Hz, 1.0 g, 20 cycles

Table 4.03: Mechanical influences

4.5 Electromagnetic compatibility (EMC)

The function of ATE shall not be adversely affected by electromagnetic influences (EMC) as specified in table 4.04.

Test	**Functional test**	**Endurance test**	**Degree of severity, abbreviated description of conditions**	
			I	**II**
Electrostatic discharge of low energy (E1a) acc. to IEC 801-2 (1984) [1)]	x		8 kV	
Electrostatic discharge of low energy (E1b) acc. to IEC 801-2 (1991)	x		Contact discharge 6 kV, air discharge 8 kV	
Radiated, radio-frequency, electromagnetic field (E2) acc. to IEC 801-3	x		1 – 1000 MHz, 10 V/m 1 kHz pulse modulation	
Conducted electrical fast transient with low energy – burst - (E3a) acc. to IEC 801-4 [1)]	x		Mains 2 kV, other circuits 1 kV	
Conducted electrical fast transient with low energy (E3b) [1)]	x		Mains 2 kV, other circuits 1.2 kV	
Conducted slow surge with high energy - (E4a) acc. to IEC 801-5 [1)]	x		Mains class 4 diff. 0.5, 1, 2 kV and common 0.5, 1, 2 and 4 kV, other circuits class 3: line-to-line 0,5, 1 kV and line-to-ground 0.5, 1, 2 kV	
Conducted slow surge with high energy - (E4b) [1)]	x		Mains 1.2/3.4 kV, other circuits 300 V	
Electrostatic discharge of medium energy close to the equipment (E5b)	x		10 kV/2 µs	
Static magnetic fields (E6)	x		150 mT	

[1)] Test optionally possible until 31.12.1995, tests E1a, E3b and E4b are omitted starting 1.1.96.

Table 4.04: Electromagnetic compatibility (EMC)

5 Functional reliability

5.1 Provision of functions

5.1.1 Technical data

Technical data describing the system component 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 component.

5.1.2 Installation instructions

Installation instructions written in German language shall be provided for system components. These instructions shall include a clear illustration of the assembly and installation procedures and information describing the applications for which the system component is suitable (including an indication of the class according to clause 3). Further on instructions are necessary for adjustment (setting) and maintenance. Also included shall be the information that the emergency call numbers of the police and fire brigade shall only be used with the permission of these services.

5.1.3 Operating voltage behaviour

Nominal voltage, operating voltage range (at least nominal voltage $U_N \pm 15\ \%$) and maximum permitted ripple of the operating voltage shall be specified by the manufacturer. ATE shall function correctly within these specified values. Variations in the voltage as specified in table 5.01 shall not adversely affect the function of ATE.

Test	**Functional test**	**Endurance test**	**Degree of severity, abbreviated description of conditions**	
			I	II
Operating voltage range system-voltage (B1b)	x		$U_N \pm 15\ \%$	
Operating voltage surge system voltage (B2b)	x		10 cycles from U_N +15 % to U_N –15 % and back	

Table 5.01: Operating voltage behaviour

5.1.4 Ripple of the operating voltage

As a minimum requirement ATE 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.

5.1.5 Reliability

Components for ATE shall be selected so that an MTBF-value of at least 45 000 h results.

5.1.6 Components

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

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

5.1.7 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.

5.1.8 Switches

Switches shall be fitted with self-cleaning contacts or be enclosed in dust-protected casings complying at least with the degree of protection specified by EN 60 529 - IP 5x.

5.1.9 Access to assemblies and components

ATE shall be constructed to ensure that assemblies and components are easy accessible for the installer and replacement is easily possible. Provisions shall be made to reduce handling errors to a minimum.

5.1.10 Connecting and adjustment elements

Connecting and adjustment elements shall be marked and easily accessible to the installer. For the operator access shall not be possible; the elements shall be secured e.g. by covers against unauthorised access.

5.1.11 Addresses of the alarm receiving equipment (ARE)

Addresses of the alarm receiving equipment (ARE) or Receiving centre transceiver (RCT) (e.g. telephone number) shall be safely stored in the ATE. Access to these addresses (numbers) and amendments shall only be available to authorized people (installer, maintenance personal) with the agreement of the user.

5.2 Function monitoring

Failure of or a fault in program-controlled processing units (e.g. microprocessors), preventing the receiving and/or correct processing and notification of signals/messages shall be acknowledged and indicated or signalled (see also clauses 9.4.1.5 and 9.5).

6 Operation safety

6.1 Degree of protection

ATE shall, if installed, be constructed at least to the degree of protection as specified by EN 60 529 - IP 3x.

6.2 Protection against access

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

6.3 Sealing capability

ATE shall be designed so that they can be sealed.

6.4 Error tolerance

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

6.5 Parameterisation of the equipment

Access to safety parameterisation of the ATE shall be possible only for an authorized person (e.g. installer) with the actual agreement of the user (e.g. by pushing a button, use of a single-use code). Also, a new release is required for each new parameterisation.

7 Tamper

The requirements of this clause apply only to ATE used for the transmission of intrusion and hold-up signals. If ATE for the transmission of intruder and hold-up signals/messages are part of a other device (e.g. an Intruder Alarm-CIE), the requirements for protection against tampering of this device apply if these are equivalent.

7.1 Tamper protection

Indication and operating elements shall be designed such that they do not weaken the stability of the housing or permit access into the device without leaving changes of form.

Housings shall not have stamped pre-determined breaking points except those at the mounting side. Hinges shall be provided with extricable bolts if accessible from the outside. Mounting screws of assemblies shall not be visible from the outside once mounted properly. Furthermore it shall not be possible to see inside of the housing in intended operation.

Attacks aiming to get inside of the ATE shall lead to a remaining form change. That means that opening shall be possible only with tools or after using a locking mechanism.

Tumbler locks or cylinder locks that have at least 5^4 possible variations or equivalent locks or devices (code lock) can be used.

7.2 Tamper detection

Opening of the ATE shall be detected and signalled if security relevant functions become accessible by the opening. The inside of the components and the monitoring of the opening shall be protected against access as long until the monitoring system has responded.

Only micro-“snap”-switches according to DIN 41636 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 response of the opening monitoring system shall be signalled to an Alarm Receiving Centre (ARC) and the output according to clause 9.3 shall be triggered.

8 Construction

If the ATE is part of a different device (e.g. an Intruder Alarm-CIE), the construction requirements of these devices shall apply as long as they are at least equivalent.

8.1 Stability

The ATE shall have a stable housing made of metal or material of equivalent stability. Covers shall be mounted mechanically stable, e.g. by screwing.

8.2 Stationary installation

ATE shall be designed that a stationary installation is possible.

8.3 Freedom of potential, isolation resistance

The housing and all parts of the housing of ATE shall be free from electrical potential (with the exception of electrical protective measures). The isolation resistance shall be at least 500 kΩ.

8.4 Shielded cables

ATE shall be constructed so that, in the event of shielded cables, the shields can be joined together in a reliable manner.

8.5 Strain relief

Where mechanical strain is to be expected at cable and line connection points, strain relief devices shall be provided.

8.6 Connections

It shall be possible to make reliable connections to the connected Alarm System (AS) and to the Network termination point (NTP) (for access to the interfaces, see clause 5.1.10).

8.7 Fastening and calibration

ATE shall be designed so that correct installation and adjustment is possible. If a special tool is used, it shall be made available by the equipment manufacturer.

8.8 Indicators

8.8.1 Design of visible indicators

All visible indicators shall be marked by different colours and - if their meaning is not clearly identifiable - by a respective inscription.

The following colours shall be selected:

- GREEN = Operation
- RED = Alarm signal, e.g. intrusion signal/message
- YELLOW = Fault

8.8.2 Concentrated displays

If concentrated displays are used (e.g. as display identifier according to clause 11.14), at least the following higher indicators (collective displays) shall be provided:

- Operation
- (collective) alarm
- (collective) fault

If concentrated displays are used alarm signals have priority to other signals/messages, e.g. "fault" and further information, e.g. "isolation". It shall be possible to recognize if more information is given than the concentrated display is able to indicate. It shall be possible to recall this information; such a recall shall not lead to a loss of information.

8.8.3 Reliability of visible indicators

Visible indicators shall be long-lasting; their life cycle shall at least be 30,000 h.

8.8.4 Recognisability of visible indicators

Visible collective indicators shall be recognisable unambiguously at a lightening between 100 – 2,000 lux with a distance of 1 m and radiating angle of $\pm$ 22.5° to the main view direction. The illuminance is measured perpendicular to the surface of the display equipment (according to DIN 5034 part 2, DIN 5035 part 2 and DIN 5035 part 7).

9 Interface to the Alarm System (AS) - (interface S_1)

If the ATE is an integral component of a Alarm System (AS) component (e.g. Alarm System (AS)-CIE, the requirements of interface S_1 are dispensed with. The functional requirements of the AE and the requirements for interface S_2 remain unaffected by this.

9.1 General

Interfaces to the Alarm System (AS)-CIE shall be designed so that correct functioning is ensured. The inputs and outputs shown in figure 9.01 are possible between the AE and the Alarm System (AS)-CIE.

9.2 Interface for the power supply

The ATE shall have connecting elements for the supply voltage.

9.3 Interface for the opening monitoring system according to clause 7.2

The interface shall satisfy the following conditions:

- potential-free
- closed in the non-alarm state, opening in the event of a signal/message
- response time corresponding to the response time of the tamper detection device

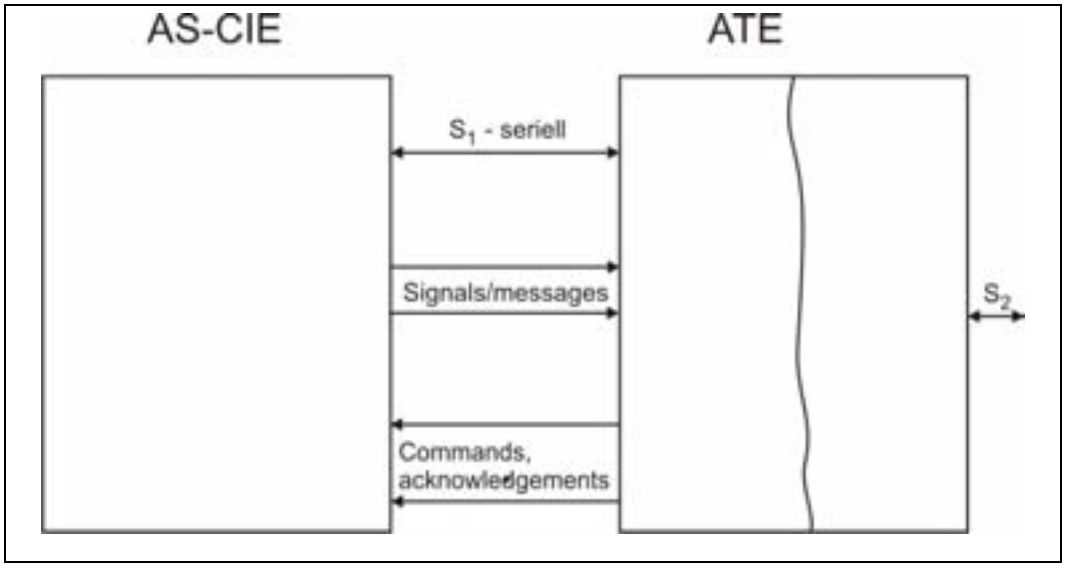

Figure 9.01

9.4 Parallel interface S_1

9.4.1 Parallel interface for use in intruder/hold up alarm systems (IAS/HUAS)

ATE with parallel interfaces for use in IAS/HUAS shall have at least the following inputs/outputs:

- 1x intruder/hold up signal/message (collected signal/message) according to clause 9.4.1.1;
- 1x hold-up signal/message according to clause 9.4.1.1;
- 1x IAS fault according to clause 9.4.1.2;
- 1x negative acknowledgement according to clause 9.4.1.4;
- 1x ATE fault according to clause 9.4.1.5.

An example for the design of a parallel interface S_1 in an IAS with different inputs and outputs is shown in figure 9.02.

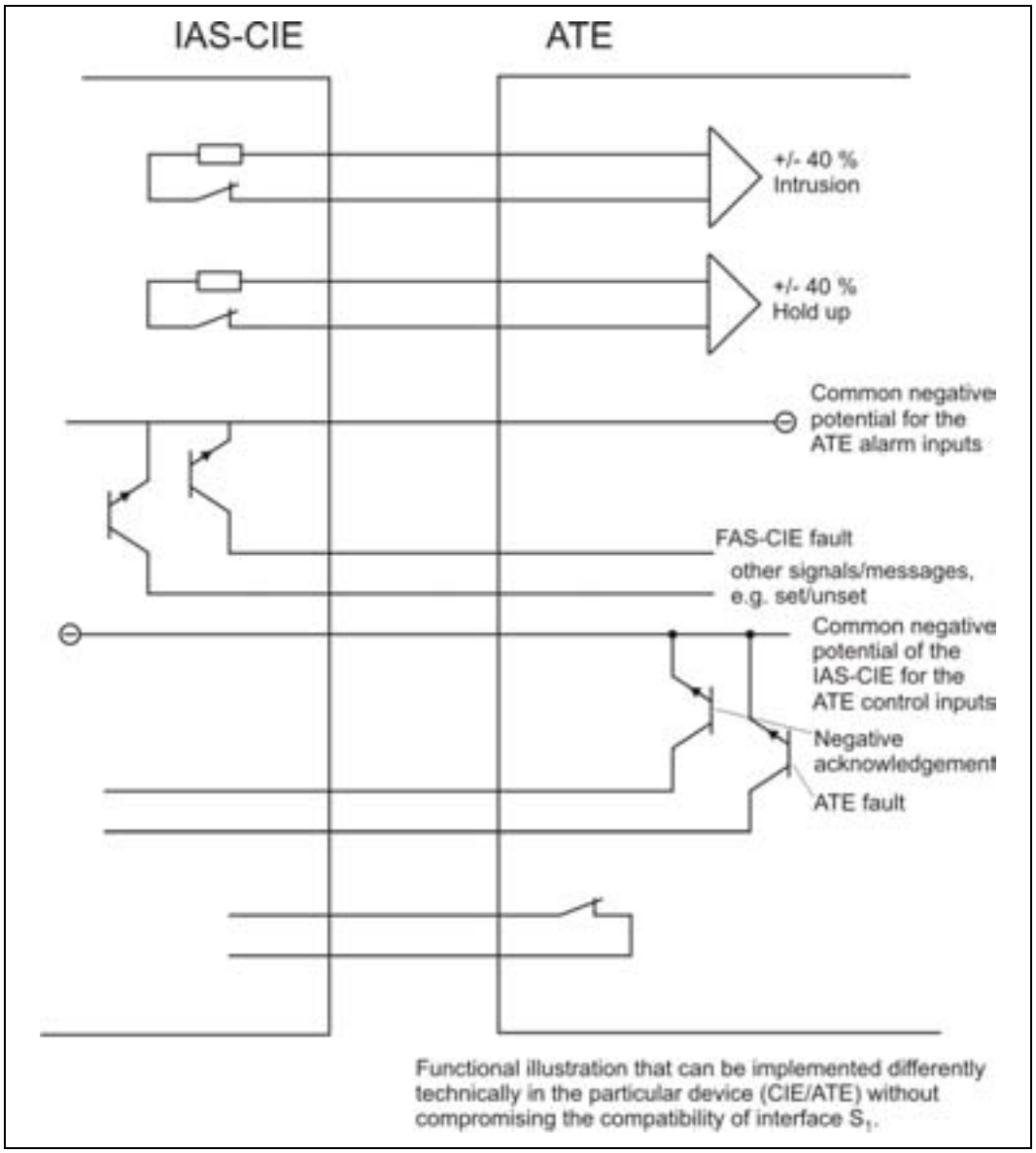

Figure 9.02

9.4.1.1 Intruder/hold up signals/messages

The output shall meet the following requirements:

- connectable to relay with potential-free contacts, that normally has a closed contact and in the event of a signal/message an open contact
- monitoring of the input from the ATE; changes in the monitoring criteria by 40% and more shall lead to a signal/message if they last longer than 200 ms.

9.4.1.2 IAS faults

The output shall meet the following requirements:

- short-circuited input (< 1 kΩ) shall lead to the normal state, open input (> 500 kΩ) to signal/message;
- a change in the criteria for > 200 ms shall be recognized

9.4.1.3 Other signals/messages (option with requirement) [1) 2)]

The output shall meet the following requirements:

- short-circuited input (< 1 kΩ) shall lead to the normal state, open input (> 500 kΩ) to signal/message;
- a change in the criteria for > 200 ms shall be recognized

9.4.1.4 Negative acknowledgement for intruder/hold up signals/messages

The output shall meet the following requirements [1)]:

- in the normal state, closed output (< 1 kΩ), in the absence of acknowledgment message from the RCT, open output (> 500 kΩ);
- triggering time > 1 s < 3 s

[1)] *These interfaces correspond to CCITT V.31bis; in this case, the relevant information sink (for signals/messages the ATE, for control commands the AS) supplies the required power. In this way, adequate isolation of potential can be ensured between the ATE and AS.*

[2)] *For signalling the status of the IAS, "IAS set" shall be transmitted with the input open (high-resistance), "IAS unset" with the input closed (low-resistance).*

9.4.1.5 ATE fault (intruder signals/messages area)

The output shall meet the following requirements:

- in the normal state, closed output (< 1 kΩ), in the event of a fault, open output (> 500 kΩ);
- setting according to the duration of the fault, but at least 1 s

9.4.1.6 Control outputs

The output shall meet the following requirements [1)]:

- in the normal state, open output (> 500 kΩ);
- in the event of control, closed output (< 1 kΩ);
- duration of triggering at least 1 s.

[1)] *These interfaces correspond to CCITT V.31bis; in this case, the relevant information sink (for signals/messages the ATE, for control commands the AS) supplies the required power. In this way, adequate isolation of potential can be ensured between the ATE and AS.*

9.4.2 Parallel interfaces for use in fire alarm systems (FAS)

TE with parallel interfaces for use in FAS shall have at least the following inputs/outputs:

- 1x fire signal/message including RCT acknowledgement and ATE fault according to clause 9.4.2.1;
- 1x FAS fault according to clause 9.4.2.2;
- 4x signals/messages according to clause 9.4.2.3 (use freely definable, e.g. location of fire, fire load);

- 1x input "Direct generation of a fire signal/message" according to clause 11.8, as long as the manual call point is not included directly in the ATE;
- 1x negative acknowledgement according to clause 9.4.2.4;
- 2x control outputs according to clause 9.4.1.6 (e.g. for key deposits).

An example for the design of a parallel interface S_1 for an FAS with different inputs and outputs is given in figure 9.03.

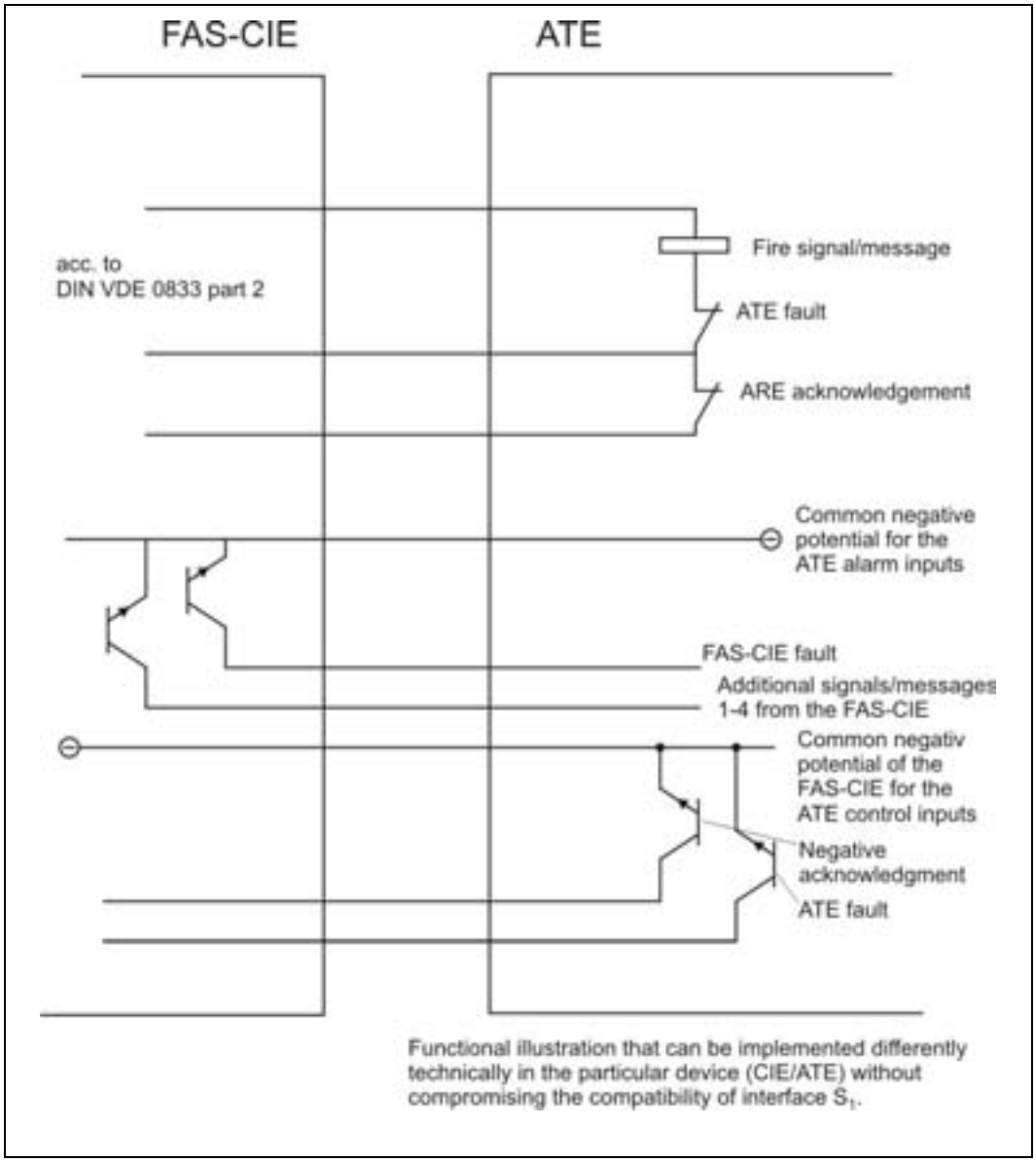

Figure 9.03

9.4.2.1 Fire signals/messages including acknowledgement and fault monitoring

The interface for fire signals/messages between the fire alarm system (FAS) and the ATE shall be monitored according to DIN VDE 0833 part 2 (July 1992 edition) from the FAS-CIE. The fault monitoring of the AE and, in the event of a fire signal/message, the acknowledgement of the RCT, is passed to the FAS via this interface.

9.4.2.2 FAS faults

The input shall meet the following conditions[1)]:

- short-circuit input (< 1 kΩ) shall lead to the normal state, open input (> 500 kΩ) to signal/message;
- a change in the criteria for > 200 ms shall be recognized.

9.4.2.3 Other signals/messages (option with requirement)

The inputs shall meet the following conditions[1)]:

- short-circuit input (≤ 1 kΩ) shall lead to the normal (idle) state, open input (≥ 500 kΩ) to message;
- a change in the criteria for > 200 ms shall be recognized

[1)] *These interfaces correspond to CCITT V.31bis; in this case, the relevant information sink (for signals/messages the ATE, for control commands the AS) supplies the required power. Thus adequate isolation of potential can be ensured between the ATE and AS.*

9.4.2.4 Negative acknowledgement for fire signals/messages

The output shall meet the following requirements:

The output shall meet the following conditions [1)]:

- in the normal state, closed output (≤ 1 kΩ), in the absence of acknowledgment message from the RCT, open output (≥ 500 kΩ);
- triggering ≥ 1 s ≤ 3 s

9.4.2.5 Control outputs

The output shall meet the following requirements [1)]:

- in the normal state, open output (≥ 500 kΩ)
- in the event of a control signal, closed output (≤ 1 kΩ);
- activation for at least 1 s.

[1)] *These interfaces correspond to CCITT V.31bis; in this case, the relevant information sink (for signals/messages the ATE, for control commands the AS) supplies the required power. Thus adequate isolation of potential can be ensured between the ATE and AS.*

9.5 Serial interface S_1

The serial interface S_1 consists of a series connection of two interfaces according to CCITT V.31bis. It operates under the conditions shown in figures 9.04 or 9.05. The transmission speed in this case is 1200 bit/s, the data is transmitted in the half duplex method.

The protocol and procedure are described in the guidelines for the transmission protocol for alarm messages, VdS 2465.

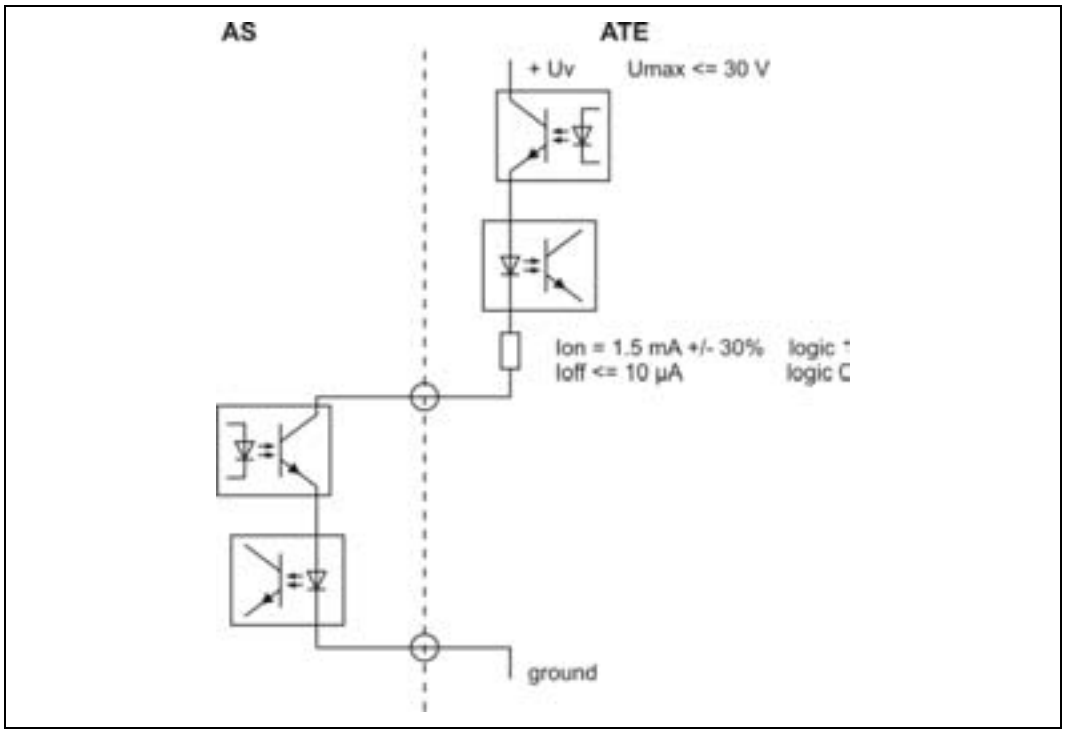

Figure 9.04

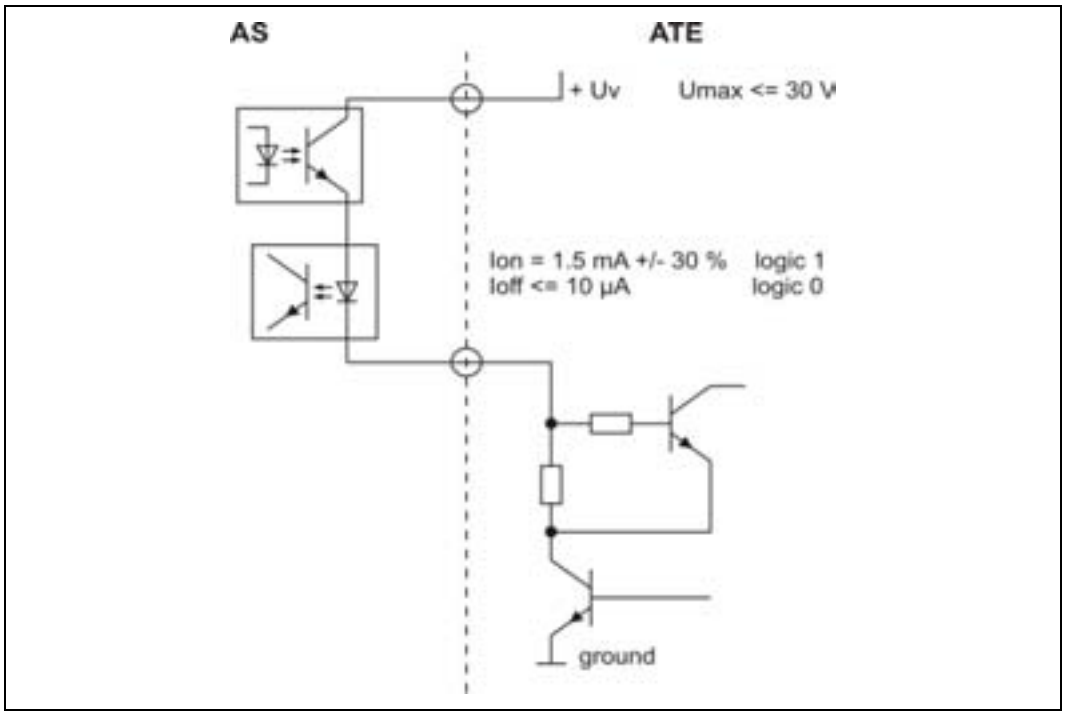

Figure 9.05

10 Interface to the transmission network (interface S_2)

Interface S_2 shall be designed so that correct routing of signals and control commands is ensured; no signals/messages or commands shall be lost or invalidated.

11 Functions

11.1 Basic function

ATE shall accept signals/messages from Alarm Systems (AS), prepare them for transmission to Alarm receiving equipment (ARE) via transmission paths and is used as an interface to these transmission paths. They also transmit the control commands given in the Alarm receiving equipment (ARE) to the connected Alarm Systems (AS).

11.2 Processing time

Signals/messages received via interface S_1 shall be notified at interface S_2 within 2 s at maximum. The time for establishing any connection (dial-up) possibly required shall be added to this time.

11.3 Monitoring of the transmission path

ATE shall be designed so that it meets the requirements contained in the guidelines for transmission paths in alarm transmission systems, VdS 2471. According to the features of the transmission path used, the ATE shall be capable of reacting to faults in the transmission path.

11.4 Different call (telephone) numbers

Depending on the transmission network, it may be necessary to have more than one call (telephone) number available when using Needs-based connection (dialup line) (see guidelines for transmission paths in alarm transmission systems, VdS 2471).

11.5 Alarm transmission via alternative paths

If transmission via an alternative path is required according to the guidelines for transmission paths in alarm transmission systems, VdS 2471, the ATE shall switch over to this alternative path automatically when a signal/message is given if transmission is not possible via the primary transmission path or it is not acknowledged within the specified time according to the guidelines for transmission paths in alarm transmission systems, VdS 2471.

11.6 Transmission protocol

For interfaces S_2 and S_2-serial, the protocol according to the guidelines for the transmission protocol for alarm messages VdS 2465 shall be used for the transmission. The guidelines for transmission paths in alarm transmission systems, VdS 2471, shall also be taken into account. All mandatory parts of the protocol shall be met (e.g. status check). Alternatively, an equivalent protocol specified by the manufacturer can be used.

11.7 Acknowledgement of signals/messages

Receiving equipment shall clearly acknowledge alarm signals/messages on receipt. If the interface S_1 has redundant inputs available, the acknowledgement shall be for both inputs (see also clause 11.10).

If the alarm signals/messages to the ARC are not received or only incompletely, the "negative acknowledgement" outputs shall be set according to clause 9.4.1.4 or 9.4.2.4 in the case of parallel interfaces within 240 s at the latest. According to clause 5 signals/messages are given via this serial interface.

11.8 Direct triggering of a fire signal/message

If the ATE has fire signal inputs, it shall also be possible to connect a manual call point according to clause 3.2.3 of DIN VDE 0833 part 2 (July 1992 edition) directly to the ATE. A fire signal/message shall be transmitted via this input directly to the receiving equipment; generation shall be acknowledged via the interface described in clause 9.4.2.1 to the connected FAS-CIE. Faults in this input shall not adversely be affecting the function of the ATE.

11.9 Loss of signal/message

Signals/messages shall not be lost except multiple signals/messages (see clause 11.11). If several signals/messages are waiting to be transmitted, alarm signals/messages shall have priority.

11.10 Emergency redundancy when transmitting fire signals/messages (option with requirements)

With emergency redundancy, the fire interfaces according to clause 9.4.2.1, if they exist, are always set also in the event of a signal/message with a serial interface. It then fulfils the function of an emergency-redundant group (collective) message.

Note: With emergency redundancy, it can happen that two messages from the same source are transmitted by the ATE.

11.11 Repetition of signals/messages

If the transmission of the signal/message is not correctly acknowledged (according to VdS 2471) at the application level (layer 7 of the OSI layer model), the transmission and, if necessary, its link connection (dial-up) shall be repeated as often as necessary until the specified time for negative acknowledgment is reached (see clause 11.7).

The redialling times shall be variably selectable depending on the network specification (see guidelines for the transmission paths in alarm transmission systems, VdS 2471).

Die Wahlwiederholungszeiten müssen je nach Netzspezifikation (siehe Richtlinien für Übertragungswege in Alarmübertragungsanlagen, VdS 2471) variabel wählbar sein.

11.12 Renewed readiness for transmission

ATE shall be capable of transmitting a further intruder/hold-up signal/message at latest 180 s after transmitting an initial intruder/hold-up signal/message.

Note: For FAS, the serial interface according to DIN VDE 0833 is only triggered once as indicated in clause 9.4.2. Clearing is according to DIN VDE 0833 part 2 (July 1992 edition) or via the serial interface as indicated in clause 9.5.

11.13 Limitation of multiple signalling

It shall be ensured that the receiving equipment (ARE) is not overloaded in the event of faults in the AS triggering the ATE or in interface S_1 (e.g. by reducing the transmission rate after multiple triggering).

Recommendation: In the case of $\geq$ 10 messages from the same call point per minute: Reduction of the signal transmission to one within 180 s.

11.14 Indication of triggering

Alarm signals/messages received by ATE shall be identifiable per ARC the signal/message were address to (i.e. the alarmed location shall be identifiable). If the event of a total power failure of the AE, this information shall be retained for at least 8 days. The indications shall not be visible for the user.

A restoring of these indications shall only be possible for an authorized person (e.g. maintenance service). Restoring is only possible from the ARE if this is recorded automatically in the ARE with time and date (see guidelines for alarm receiving equipment, VdS 2466).

11.15 Test messages

The ATE shall be capable of sending test messages automatically to the ARC provided for receiving alarm signals/messages. The intervals between the test messages depends on the transmission path and class of risks of the connected Alarm System (AS) (see guidelines for transmission paths in alarm transmission systems, VdS 2471).

Test messages shall not be transmitted via possibly existing alternative path as otherwise it will not be possible to detect any fault on the main transmission path.

Note: Test messages are not required for alternative paths.

11.16 Priority circuit

If other transmission services (e.g. telephone) can adversely affect the transmission of alarm signals/messages, it shall be possible to connect ATE to the particular transmission path in such a way that it has complete priority over other connected devices for the transmission of alarm signals/messages and, if necessary, has compulsory access to the transmission path (automatic isolation). Otherwise, exclusive access shall be provided to the transmission path.

11.17 Blockade release

ATE shall be designed so that it cannot be blocked via the transmission paths (inadvertently and/or deliberately). If this is not possible, ATE shall be capable of

automatically isolating an "engaged" transmission path (e.g. blockade release in analogue switched networks (PSTN)).

11.18 Changes of state in the network/area of the Network termination point (NTP)

Changes of state within the transmission paths (e.g. failure of a private automatic branch exchange –TC system) shall not adversely affect the safety function of the ATE.

11.19 ATE faults

The following faults shall be detected and shall lead to activating of the output according to clause 9.4.1.5 and/or clause 9.4.2.1:

- ATE not ready for operation;
- ATE power supply fault or failure;
- faults from the transmission network that are relevant for alarm signals/messages.

Note: The output can be included e.g. into the guided set/unset procedure ("Zwangsläufigkeit" of an Intruder alarm system (IAS).

If a serial interface according to clause 9.5 is used, the fault message is given – if technically possible in the event of a fault – via this interface.

If possible (see guidelines for transmission paths in alarm transmission systems, VdS 2471), ATE faults shall be signalled to all the relevant ARE.

11.20 Faults when establishing connections

If it is recognized when establishing a connection during a signal/message that it is not possible to transmit these signals/messages, the negative acknowledgement outputs according to clause 9.4.1.4 and clause 9.4.2.4 shall be set immediately in parallel interfaces (for reaction in the case of transmission of signals/messages via alternative, see clause 11.5). In the case of a serial interface according to clause 9.5, the message is given via this.

11.21 Control commands to the AS

Commands (interrogation, isolation) and remote parameterizing of the ATE shall only be accepted by the ATE if the connection from the ATE has been established. It is permitted to activate the ATE to establish such a connection from the ARE.

As an alternative to this release, passwords can be exchanged between the ATE and the ARE in which the number of all possible combinations is at least 10^6. The password shall be automatically changed after each command. Control and parameterizing is permitted if clear, non-manipulatable identification is possible through the ATE.

11.22 Isolation (switch-off) of the ATE

It shall not be possible to switch off fundamental security relevant functions and parts of the ATE from the Alarm receiving equipment (ARE).

11.23 Start-up (initiation)

When switching on the operation voltage, no undefined signals shall be transmitted via interface S_2. Further on, all the ATE outputs shall be in the normal (idle) state.

11.24 Status signals

The ATE shall be capable of transmitting a signal/message about its status. After start-up or a restart (e.g. restoring of a watchdog or manual restoring at the ATE), the status of the AE shall be transmitted automatically to the relevant ARE. This includes (if given):

- the state of the signal/message inputs of the parallel interface S_1;
- the signals/messages states generated in the ATE (e.g. power supply fault) and
- the state message of the serial interface S_1.

The status can be interrogated from an ARE.

11.25 Loss of the operating voltage

If the AE is supplied with power from the connected Alarm System (AS), an ATE power supply fault leading to an alarm being generated shall be detectable for the installer at the latest by the restoration of the supply at the AE.

12 Power supply

The ATE power can be provided from the connected alarm System (AS) or be powered by a power supply that shall meet the requirements of at least the power supply for the relevant alarm system.

If the ATE is connected to several alarm Systems (AS) with different power supply requirements, the more severe requirements shall apply in each case (e.g. stand-by time of the alternative power supply.

Note: Requirements for the power supply for communication devices (e.g. network termination sets) are described in the guidelines for transmission paths in alarm transmission systems, VdS 2471.

13 Options

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