BS EN 50136-2:2013

BSI Standards Publication

Alarm systems — Alarm transmission systems and equipment

Part 2: Requirements for Supervised Premises Transceiver (SPT)

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National foreword

This British Standard is the UK implementation of EN 50136-2:2013. It supersedes BS EN 50136-2-1:1998, BS EN 50136-2-2:1998, BS EN 50136-2-3:1998 and BS EN 50136-2-4:1998 which are withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GW/1/5, Transmission equipment and networks.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Foreword

This document (EN 50136-2:2013) has been prepared by CLC/TC 79 "Alarm systems".

The following dates are proposed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-08-12
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2016-08-12

This document supersedes EN 50136-2-1:1998+corr.Apr.1998+A1:2001, EN 50136-2-2:1998, EN 50136-2-3:1998 and EN 50136-2-4:1998.

EN 50136-2:2013 includes the following significant technical changes with respect to EN 50136-2-1:1998+corr.Apr.1998+A1:2001, EN 50136-2-2:1998, EN 50136-2-3:1998 and EN 50136-2-4:1998:

1) referenced based standards were updated to the latest versions;

2) definitions were updated;

3) requirements were aligned with new ATS categories of the revised system standard EN 50136-1;

4) test methods were added;

5) the scope was changed to reflect the amalgamation of EN 50136-2-2:1998, EN 50136-2-3:1998 and EN 50136-2-4:1998 and to achieve compatibility with application specific standards such as fire alarm transmission systems and social alarm transmission systems;

6) significant changes were made to the structure of the document to achieve general alarm transmission requirements for SPT. Application specific requirements were removed;

7) the title was corrected to match the scope of the document.

This revision was prepared to bring the procedures up-to-date with current technical developments, taking account of changes in the basic standards and the experience gained in the use of the standard.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This European Standard is part of a series. This series is intended to give the requirements applicable to alarm transmission systems in general.

EN 50136 consists of the following parts, under the general title *Alarm systems — Alarm transmission systems and equipment*:

– *Part 1: General requirements for alarm transmission systems*;

– *Part 2: Requirements for Supervised Premises Transceiver (SPT)*;

– *Part 3: Requirements for Receiving Centre Transceiver (RCT)*;

– *Part 4: Annunciation equipment used in alarm receiving centres* (Technical Specification);

– *Part 7: Application guidelines* (Technical Specification);

– *Part 9: Requirements for common protocol for alarm transmission using the Internet protocol* (Technical Specification).

1 Scope

This European Standard specifies the general equipment requirements for the performance, reliability, resilience, security and safety characteristics of supervised premises transceiver (SPT) installed in supervised premises and used in alarm transmission systems (ATS). A supervised premises transceiver can be a stand-alone device or an integrated part of an alarm system.

These requirements also apply to SPT's sharing means of interconnection, control, communication and power supplies with other applications.

The alarm transmission system requirements and classifications are defined within EN 50136-1. Different types of alarm systems may in addition to alarm messages also send other types of messages, e.g. fault messages and status messages. The term alarm is used in this broad sense throughout the document. Additional requirements for the connection of specific types of alarm systems are given in the relevant European Standards.

Because the SPT can be applied in different applications (e.g. I&HAS, fire and social alarm systems), requirements for the SPT, additional to those of this European Standard, may be specified in separate application specific documents.

This European Standard specifies the requirements specific to alarm transmission. Application specific requirements for the connection of the SPT to specific types of alarm systems are given in the EN 50131 (all parts) for I&HAS, and EN 54 (all parts) for fire. For other SPT applications, see the relevant National or European standards.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50130-4, *Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: Immunity requirements for components of fire, intruder, hold up, CCTV, access control and social alarm systems*

EN 50130-5, *Alarm systems — Part 5: Environmental test methods*

EN 50136-1:2012, *Alarm systems — Alarm transmission systems and equipment — Part 1: General requirements for alarm transmission systems*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 50136-1:2012 and the following apply.

3.1.1
alternative power source
power source capable of powering the SPT for a predetermined time when a prime power source is unavailable

3.1.2
indication
information (in audible, visual or any other form) about the state of the SPT, RCT and/or ATS

3.1.3
logical access
access to SPT data (e.g. configuration, status, software)

3.1.4
local access
access to the SPT from within the protected premises where physical access is required before logical access can be achieved

3.1.5
remote access
access to the SPT not requiring physical access

3.1.6
prime power source
power source used to support an SPT under normal operating conditions

3.2 Abbreviations

For the purposes of this document, the following abbreviations apply:

AE Annunciation Equipment

AS Alarm System

ATP Alarm Transmission Path

ATS Alarm Transmission System

CIE Control and Indicating Equipment

EMC Electromagnetic Compatibility

GND Ground

GPRS General Packet Radio Services

I&HAS Intruder and Hold-up Alarm Systems

NTP Network Time Protocol

RCT Receiving Centre Transceiver

SPT Supervised Premises Transceiver

4 General requirements

4.1 General

Where appropriate, equipment shall comply with local, national and European requirements and regulations for connection and transmission via public or private networks.

Requirements in this European Standard shall be considered as a minimum. As the SPT is used together with or integrated in associated alarm systems, the requirements of the specific applications or related standards shall apply.

Specific applications may require additional testing of the SPT. If such characteristics for a non-alarm application are provided and are submitted for testing, they shall be specified by the manufacturer at the time of testing.

4.2 SPT classification

This European Standard defines SPT requirements. For some specific characteristics also, a classification system or measuring scale is introduced. For the purpose of SPT classification, reference is made to the ATS categories in EN 50136-1. The SPT shall be labelled with each category or range of categories that it can be applied to.

If a Custom Category (category C) is defined then the requirements corresponding to Tables 1, 2 and 3 shall also be defined.

5 Functional requirements

5.1 General

The SPT shall be able to receive alarms from one or more ASs and transmit the alarm to one or more RCTs via one or more ATPs within the requirements of the appropriate ATS category.

5.2 Access levels

This European Standard specifies four levels of access that categorise the ability of users to gain logical access to the SPT functions.

Physical access requirements may be defined in the relevant application specific standards.

Access levels are defined as following:

- Level 1: access to functions, indications and notifications available to any individual without authentication;
- Level 2: access to information about the operational status of the SPT. Access level 2 may also allow access to basic functional tests and the management of other Access level 2 users;
- Level 3: maintenance and commissioning functions, access to affect the SPT configuration including the addition, removal or replacement of components and other operations that directly, or indirectly, may influence the functions of the SPT;
- Level 4: access to update the software and read-only functions.

Access to level 2, 3 and level 4 functions shall require authorisation with a key.

Access at level 3 should be authorised by a user with level 2 access. Access at level 4 should be authorised by a user with level 3 access. This may be achieved by a one time authorisation as part of a service level agreement.

Access at levels 2, 3 and 4 may be achieved providing authorisation, equivalent to 1 000 000 key differs is achieved.

Where it is possible to attempt to gain access more than 3 times in a 60-second period the SPT shall have the ability to delay repeated attempts. After the third attempt, each further attempt shall be prevented for a minimum of 90 s.

Where factory default keys are provided, it shall not be possible to complete the SPT commissioning without first, changing these keys e.g. during installation. It shall not be possible to read any key that provides authorisation for access at levels 2, 3 or 4.

5.3 Remote access

Remote access to the SPT shall meet at least the same information security requirements that are required for alarm transmission as defined in EN 50136-1 for the appropriate category.

5.4 Uploading and downloading of software and firmware

Where upload and download functions are provided, the upload and download of software to a SPT is only allowed to be performed by users with appropriate access level, as defined in 5.2.

The software to be replaced by a software download shall be stored. If there is a loss of connection or another transmission fault disrupts the download, the last fully functional software version shall be restored, and the SPT shall work as before the unsuccessful download.

EXAMPLE Procedure of a download: download software, check and validate the download, activate downloaded software.

5.5 Storage of parameters

Power cycle or a boot up sequence shall not result in the loss of any site specific data. The SPT shall return to normal operation.

5.6 ATS and ATP fault reporting to the AS

Where the SPT is required to report an ATS and/or ATP failure to the AS as per EN 50136-1:2012, Table 5, this shall take place within the reporting times shown in EN 50136-1:2012, Table 3.

For an ATS with more than one ATP, as long as service is not lost, a single path line fault may be held by the SPT for a period that is agreed between the interested parties until it is released to the AS.

Where an AS includes the ability to display the status of each ATP the SPT may be configured to pass individual ATP failures to the AS within the reporting times shown in EN 50136-1:2012, Table 3.

The manufacturer’s documentation should define the process for the reporting of ATS faults to the AS.

5.7 Interface to the AS

The connections to the AS shall be monitored in accordance with EN 50136-1.

The maximum time to detect and generate an interface failure shall meet the requirements of the associated application and shall not exceed the ATS reporting time of the appropriate category as specified in EN 50136-1:2012, Table 3.

To allow compatibility of equipment from different manufacturers, this European Standard specifies two electrical interfaces:

- parallel interface between AS and SPT, see A.1;
- serial interface between AS and SPT, see A.2.

This does not exclude the use of any other type of interface to the AS, provided that the specific requirements of this standard are met.

The manufacturer shall state in the associated documentation which type(s) of interface(s) to the AS are provided.

5.8 Monitoring of the transmission network interface(s) – Fault reporting

If required by the ATS category, the SPT shall be configured to detect the failure of a transmission network interface and generate an ATP fault to the AS.

The manufacturer's documentation shall describe the process for monitoring and reporting the network interface fault to the AS.

NOTE 1 The message generated by the SPT can indicate either an ATP fault or an interface fault.

Where required, transmission network interface faults shall be reported within the time specified in EN 50136-1:2012, Table 3.

For dual path category (Dx) ATSs, a fault on one of the transmission network interfaces shall be reported to the RCT over the remaining ATP within the time specified in EN 50136-1.

NOTE 2 An SPT network interface fault provides indication of a path fault.

Monitoring the state of a transmission network interface should not be used to monitor the state of an associated ATP.

NOTE 3 An ATP can be in a failed state whilst the associated network interface is in an operational state.

5.9 Power supply for the SPT

The SPT may be powered by the associated AS power supply (dedicated or shared) or by an integral SPT power supply.

Where an integral SPT power supply is used, it shall meet the requirements of the most demanding associated AS.

5.10 Event logging

A logging function for all categories of SPT except SP1 and DP1, shall be provided for the purposes of providing an audit trail and problem resolution.

Dependent upon the ATS category where the SPT is applied, the events specified in Table 1 shall be recorded in the SPT.

The means used to record the events shall be protected against the accidental or deliberate deletion or alteration of the contents.

The means of recording events shall be non-volatile and have a capacity complying with the requirements of Table 2. When the event recorder reaches maximum capacity, further events may cause the oldest events to be erased.

The log shall record, in addition to the event, the time and date at which the event occurred. The timing resolution shall be a minimum of 1 s and it shall be accurate to the coordinated universal time within +/- 5 s.

The SPT shall provide a means to adjust the date and time.

Event optimisation is permitted, provided that all diverse events are recorded and that the first and the last repeated identical sequence of events in a 12 h period are recorded. Where this is done the number of repetitions need to be recorded.

When required by Table 1, the logging of access to the SPT shall include user identification.

The inclusion of requirements to record events in Table 1 does not imply a requirement to provide the associated function.

Table 1 — Event recording classification – Events to be recorded

#	Event	Events to be recorded									
		SP1	SP2	SP3	SP4	SP5	SP6	DP1	DP2	DP3	DP4
1	Alarm message from and to the AS	Op	M	M	M	M	M	Op	M	M	M
2	Positive alarm message acknowledgement from RCT	Op	M	M	M	M	M	Op	M	M	M
3	Negative alarm message acknowledgement or timeout on alarm message acknowledgement from RCT	Op	M	M	M	M	M	Op	M	M	M
4	SPT primary power source failure & restore	Op	M	M	M	M	M	Op	M	M	M
5	SPT alternative power source failure & restore [a]	Op	M	M	M	M	M	Op	M	M	M
6	AS to SPT interconnection failure & restore	Op	M	M	M	M	M	Op	M	M	M
7	ATP failure & restore	Op	M	M	M	M	M	Op	M	M	M
8	ATS failure & restore	Op	M	M	M	M	M	Op	M	M	M
9	SPT – transmission network interface failure & restore	Op	M	M	M	M	M	Op	M	M	M
10	Changes to the configuration of the SPT	Op	M	M	M	M	M	Op	M	M	M
11	Power-up or reset	Op	M	M	M	M	M	Op	M	M	M
12	Any change to software	Op	M	M	M	M	M	Op	M	M	M
13	Manual changes to the date and time	Op	M	M	M	M	M	Op	M	M	M
14	Access to the SPT at level 2, 3 or 4	Op	M	M	M	M	M	Op	M	M	M
Key Op = optional M = mandatory											
NOTE Logging requirements for primary and alternative power supply only apply if the SPT has its own integral power supply.											
[a] It is only required to report alternative power source failures if such alternative power source is required by the associated application standard.											

Where the SPT is an integrated part of an AS the log may be shared with the AS.

Table 2 — Event recording classification – Memory capacity & endurance

Capacity & endurance	SP1	SP2	SP3	SP4	SP5	SP6	DP1	DP2	DP3	DP4
SPT memory capacity Minimum number of events.	–	250	1 000	1 000	1 000	1 000	–	250	1 000	1 000
Minimum endurance of memory after SPT power failure in days.	–	30	30	30	30	30	–	30	30	30

Where the SPT is an integrated part of an AS the log may be shared provided that the memory capacity and endurance for SPT events meet the requirements of this table.

6 Operation

6.1 Modes of acknowledgement operation

6.1.1 General

Two modes of operation are permitted:

a) store-and-forward;

b) pass-through.

The manufacturer shall declare in the product documentation which of the two modes are supported.

6.1.2 Store-and-forward operation requirements

When an alarm is received from the AS, the SPT shall secure the alarm and provide acknowledgment of the correct receipt of the alarm to the AS.

If the store-and-forward operation is used, all alarm messages shall include a date and time stamp that is accurate to the resolution specified in 5.10.

Securing the alarm shall be achieved by storing the alarm in the SPT's non-volatile memory, this is to secure alarms during a power failure or other ATS failure; stored alarms shall be transmitted when the fault condition clears.

The secured message shall be transmitted from the SPT to the RCT.

The reception of an acknowledgement from the RCT shall not be forwarded to the AS, since the AS has already received an acknowledgement from the SPT.

NOTE The loss of an alarm message is regarded as a worse situation than sending a delayed message.

6.1.3 Pass-through operation requirements

When an alarm is received from the AS the SPT shall forward the alarm to the RCT.

The SPT shall not acknowledge the alarm to the AS before receiving an acknowledgement from the RCT. When the SPT receives an acknowledgement from the RCT, the acknowledgement shall be forwarded to the AS.

Pass-through operation may be used in systems where the application requires receipt of acknowledgement from the AE.

6.2 SPT alarms

The SPT shall be able to generate and transmit to the RCT the alarms specified in Table 3 for the appropriate category.

Table 3 — Alarms originated by the SPT and transmitted to the RCT

#	Alarms originated by the SPT and transmitted to the RCT										
#	**Alarms**	**SP1**	**SP2**	**SP3**	**SP4**	**SP5**	**SP6**	**DP1**	**DP2**	**DP3**	**DP4**
1	SPT prime power source failure & restore	Op	M	M	M	M	M	Op	M	M	M
2	SPT alternative power source failure & restore	Op	M	M	M	M	M	Op	M	M	M
3	AS to SPT interconnection failure & restore	Op	M	M	M	M	M	Op	M	M	M
4	Primary ATP failure & restore	Na	Na	Na	Na	Na	Na	Op	M	M	M
5	Secondary ATP failure & restore	Na	Na	Na	Na	Na	Na	Op	M	M	M

Key

Na = not applicable
Op = optional
M = mandatory

NOTE 1 The requirement to transmit SPT prime and/or alternative power source failures and restores only applies to SPTs that have a dedicated power supply. The maximum time to detect such power failures is defined in the associated application standard(s).

NOTE 2 The requirement to transmit ATP failures and restores only applies to dual path systems.

Where an SPT generates additional alarms to those defined in Table 3 these alarms should be described in the manufacturer's documentation.

6.3 Substitution security

The manufacturer shall provide their stated methodology used to achieve compliance with EN 50136-1:2012, 6.7.2.

6.4 Information security

The manufacturer shall provide their stated methodology used to achieve compliance with EN 50136-1:2012, 6.7.3.

7 Documentation

7.1 SPT documentation

Documentation relating to an SPT shall be concise, complete and unambiguous. The documentation shall be sufficient to ensure the correct installation, commissioning and maintenance of the SPT. Sufficient information shall be provided to ensure the integration of the SPT in an ATS.

Instructions relating to the operation of an SPT shall be designed to minimise the possibility of incorrect operation and be structured to reflect the access level of the user.

SPT documentation shall include at least the following:

– name of manufacturer or supplier;

– description of equipment;

– standard to which component claims compliance;

– ATS categories for which the SPT is suitable;

– environmental class for which the SPT is suitable;

– power requirements for the SPT;

– statement of compatibility with the supported type of AS interface(s);

– statement of compatibility with the supported RCT(s) types and/or protocols;

– description of the method of operation by which the SPT signals ATP failures to the AS;

– description of how monitoring of the transmission network interface is implemented;

– declaration of operation mode (store-and-forward and/or pass-through);

– methodology to achieve compliance with EN 50136-1:2012, 6.7.2;

– methodology to achieve compliance with EN 50136-1:2012, 6.7.3.

7.2 Marking and identification

The SPT shall be marked with the following:

– name of manufacturer;

– All ATS categories supported by the SPT;

– date of manufacture or batch number or serial number;

– environmental class for which the SPT is suitable.

The marking shall be legible, durable and unambiguous.

8 Housing and tamper protection – Tamper protection requirements

Where the SPT is housed separately from the AS, the requirements for tamper protection and housing of the SPT shall be the same as or higher than those of the associated AS.

9 Tests

9.1 General

The manufacturer shall provide a fully functional test setup. Other ATS components such as AS, network and the RCT may be provided as simulating equipment and/or network(s).

9.2 General requirements

9.2.1 Standard conditions for testing

Unless otherwise specified in a test procedure, the tests shall be carried out in the following standard atmospheric conditions:

– temperature: 15 °C – 35 °C;

– relative humidity: 25 % – 75 %;

– air pressure: 86 kPa – 106 kPa.

9.2.2 Mounting and orientation

Unless otherwise specified in a test procedure, the SPT shall be mounted in its usual orientation by the normal means of mounting indicated by the manufacturer. The equipment shall be in the condition of access level 1, except where otherwise required for functional testing.

9.2.3 Power supply

The SPT shall be powered from a power supply that meets the performance as specified by the manufacturer.

9.3 Reduced functional test

For the purpose of demonstrating that the SPT and any associated AS will operate correctly during or after given environmental conditions, it is required to trigger at least one alarm transmission on the AS and to verify the correct transmission of the transmitted alarm.

Relevant environmental tests are specified by the associated application standard and shall be in accordance with EN 50130-4 and EN 50130-5.

For operational tests, the SPT shall not generate alarms, tampers, faults or other signals or messages or change from one mode to another, when subjected to the specified range of environmental and EMC conditions and shall continue to function normally.

For endurance tests, the SPT shall pass the reduced functional tests after being subjected to the specified range of environmental conditions.

9.4 Functional tests

9.4.1 General

Specific applications may require additional testing of the SPT. If such characteristics are provided and are submitted for testing, they shall be specified by the manufacturer at the time of testing.

The purpose of the functional tests is to demonstrate that SPT performs its required functions.

For tests in 9.4.6, 9.4.7 and 9.4.8, at least one of these tests shall be performed as appropriate to the manufacturer’s statement required in 5.7.

If more than one single and/or dual path category is supported for testing only the most demanding supported single and/or dual path categories shall be tested.

Functional tests are summarised in Table 4.

Table 4 — Summary of functional tests

Subclause	Requirement to test	Test/validation objective	Validate or test
5.2	Access levels	Demonstrate that all access levels exist	Test (9.4.2)
5.5	Parameter storage	Demonstrate that storage is immune to power failure	Test (9.4.4)
5.4	Uploading and downloading of software and firmware	Demonstrate that the SPT will recover after an unsuccessful firmware upload/download	Test (9.4.3)
5.6	ATS and ATP fault reporting to the AS	Demonstrate function	Test (9.4.5)
5.7	Interface to AS (serial)	To demonstrate that any available interface shall comply with SPT manufacturer's documentation	Validate (9.4.6)
	Interface to AS (parallel)	To demonstrate that the SPT interface shall comply with Annex A	Test (9.4.7)
	Interface to AS (proprietary)	To demonstrate that any available interface shall comply with SPT manufacturer's documentation	Validate (9.4.8)
5.8	Monitoring of the transmission network interface	To demonstrate function	Test (9.4.9)
5.10	Protection of the log	To demonstrate compliance against manufacturer's documentation	Validate (9.4.11)
	Log capacity – Table 2	To demonstrate the capacity to store at least an equal quantity of events as illustrated in Table 2	Test (9.4.12)
	Clock resolution	To demonstrate that the clock remains accurate in line with 5.10	Test (9.4.13)
	Event logging– Table 1	To demonstrate compliance with Table 2	Test (9.4.10)
6.1.2	Store-and-forward (where applicable)	To demonstrate that the SPT secures alarm messages and meets the requirements of 6.1.2	Test (9.4.14)
6.1.3	Pass-through (where applicable)	To demonstrate that the SPT meets the requirements of 6.1.3	Test (9.4.15)
6.2	SPT alarms	To demonstrate that the SPT generates the required alarms	Test (9.4.16)
6.3	Substitution security	Verify the manufacturer declaration how substitution security is implemented and complies with the requirements of 6.3.	Validate (9.4.17)
6.4	Information security	Verify the manufacturer declaration how information security is implemented and complies with the requirements of 6.4	Validate (9.4.17)
7	Documentation	Verify the manufacturer documentation against the requirements of Clause 7.	Validate (9.4.18)

9.4.2 Access levels

9.4.2.1 Object of the test

The object of the test is to demonstrate the ability of the SPT to comply with 5.2 to provide up to 3 levels of access and verify the relevant access to the functions and controls.

9.4.2.2 Principle

The test consists of attempting to use the functions and the controls required by 5.2, operating the SPT at each access level and verifying that access is granted for permitted functions and is denied for non-permitted functions.

Table 5 — Test of access levels

Step	Test condition	Test procedure	Measurement	Pass criteria
1	*The uncommissioned SPT and any necessary equipment to allow the commissioning of the SPT.*	Commission the SPT and leave the default key unchanged.	Record if you are able to complete commissioning.	Commissioning shall not be completed.
2	*The SPT and any necessary equipment to allow the SPT to perform as required shall be installed and in a functional state.*	At access level 1, attempt to operate all the functions and controls as specified by the manufacturer for access level 1.	Record whether access is permitted.	Access is in accordance with 5.2.
3	As above	Repeat as step 1 for access level 2.	As above	As above
4	As above	Repeat as step 1 for access level 3.	As above Record if level 3 access is only possible if granted by a level 2 user.	As above
5	As above	Try to get access by using three times a wrong key in a 60 s timeframe.	Record whether access is denied.	No access is granted.
6	State after step.5	Wait 80s (+/- 5s) and retry with a valid key to get access.	Record whether access is denied.	No access is granted.
7	See manufacturers' proof of quality of the algorithm used to achieve remote access with a key of at least 1 000 000 differs.	Review document.	------	Algorithm can distinguish between 1 000 000 key differs.

9.4.3 Upload and download of software and firmware

9.4.3.1 Object of the test

The object of this test is to prove that upload and download of firmware of the SPT, if implemented, complies with the requirements of 5.4.

9.4.3.2 Principle

The test consists of attempting to update firmware of the SPT, operating the SPT at the appropriate access level and following the instructions in the SPT manual.

Table 6 — Test of upload and download of software and firmware

Step	Test condition	Test procedure	Measurement	Pass criteria
1	*The SPT and any necessary equipment to allow the SPT to perform as required shall be installed and in a functional state.*	At access level 1, attempt to apply a firmware update.	Record whether a firmware update is permitted.	A firmware update shall not be permitted.
2	As above	Repeat as above for access level 2.	As above	As above
3	As above	Repeat as above for access level 3.	As above	A firmware update shall be permitted.
4	As above	Repeat as above for access level 3. Disconnect from the network during the firmware update procedure.	Record whether the SPT fails to operate or restores normal operation.	The SPT shall operate normally after the attempt to download firmware.

9.4.4 Parameter storage

9.4.4.1 Object of the test

The object of the test is to demonstrate the ability of the SPT to comply with 5.5 to provide immunity of the storage of parameters against power failure or boot up sequence.

9.4.4.2 Principle

The test consists of changing at least 2 site specific parameters and read back these parameters after a power cycle (power loss / power recovery) and boot up sequence.

Table 7 — Test of parameter storage

Step	Test condition	Test procedure	Measurement	Pass criteria
1	*The SPT and any necessary equipment to allow the SPT to perform as required shall be installed and in a functional state.*	Change and save at least 2 site specific data according to the procedure in the manual.	Record whether the changes are stored.	----
2	As above	Power off the SPT.	----	----
3	SPT in power off state	Wait at least 10 s and power on the SPT again.	Record whether the SPT is in operational state.	SPT shall be in a functional state as before the power cycle.
4	Same as Step 1	Read the changed parameters according to the procedure in the manual.	Record the parameter values.	The parameter values shall be the same as before the power cycle.
5	As above	Reset the SPT according to the reset procedure in the manual.	Record the parameter values.	The parameter values shall be the same as before the reset procedure.

9.4.5 Test of ATS fault reporting to AS

9.4.5.1 Object of the test

The object of the test is to demonstrate the ability of the SPT to report an ATS fault to the AS to comply with 5.6.

9.4.5.2 Principle

The test consists of failing each ATP and the ATS to check the reporting of the ATS fault to the AS within the reporting times defined within EN 50136-1. This test shall be repeated for every ATS category that the SPT supports as defined by the manufacturer.

Table 8 — Reporting ATS failure from the SPT to the AS in a Dual path ATS

Step	Test condition	Test procedure	Measurement	Pass criteria
1	*The SPT and any equipment required to perform the required to test the system shall be in a functional state. The SPT shall be connected to the Primary ATP and the Alternative ATP.*	Check that each ATP is operating normally and that output to the AS is reporting ATP operational.	Record the operational status of the associated AS (or simulator).	No fault shall be displayed.
2	As after step 1.	Fail the primary ATP.	Record the operational status of the associated AS (or simulator).	No ATS fault shall be displayed. An ATP fault may be displayed.
3	As after step 2.	Fail the alternative ATP.	Record the time taken for the SPT to indicate the failure of the ATS. For this purpose an AS or measurement device may be used.	The ATS failure condition shall be displayed within the reporting times defined in EN 50136-1.
4	As after step 3.	Restore Primary ATP and Alternative ATP.	Record the status of the associated AS (or simulator).	No fault shall be displayed.

Table 9 – Reporting the ATS path failure from the SPT to the AS in a Single path ATS

Step	Test condition	Test procedure	Measurement	Pass criteria
1	*The SPT and any equipment required to test the system shall be in a functional state. The SPT shall be connected to a single path ATS.*	Check that the ATS is operating normally and that output to the AS is reporting ATS operational.	Record the operational status of the associated AS (or simulator) with the failure of the ATS.	No fault shall be displayed.
2		Fail ATS.	Record the time taken for the SPT to indicate the failure of the ATS. For this purpose an AS or measurement device may be used.	The ATS failure condition shall be displayed within the times defined in EN 50136-1:2012, Table 3.
3		Restore ATS.	Record the status of the associated AS (or simulator).	No fault shall be displayed.

9.4.6 Standardized serial interface to the AS

9.4.6.1 Object of the test

The object of this test is to prove that the serial interface to the AS, if implemented, complies with the requirements of 5.7.

9.4.6.2 Principle

The test consists of following the instructions in the SPT manual to install the SPT. Consequently, the monitoring and performance of this link is tested.

Table 10 — Test of standardized serial interface to the AS

Step	Test condition	Test procedure	Measurement	Pass criteria
1	*The SPT and any necessary equipment to allow the SPT to perform as required shall be installed and in a functional state.*	Connect SPT to AS via the serial interface as specified in the product documentation.	Record whether interconnecting SPT with AS is in line with documentation.	Interconnecting SPT and AS shall be according to documentation.
2	As above	Create event on AS.	Record the transmission time as per EN 50136-1.	The transmission time shall be within limits of the specified category.
3	As above	Disconnect serial interface.	Record the time until the disconnection is indicated on RCT to check maximum reporting time requirements as per EN 50136-1.	Indication shall be present on RCT within maximum reporting time of the specified category.

9.4.7 Standardized parallel interface to the AS

9.4.7.1 Object of the test

The object of the test is to demonstrate the ability of the SPT to comply with Annex A to provide a monitored connection to its associated AS via the standardized parallel interface if implemented.

9.4.7.2 Principle

The test consists of attempting to use the parallel Interface to its associated AS in accordance with Annex A. The test performs alarm transmission, interface failure and alarm acknowledge via the parallel interface to the AS.

Table 11 — Test of standardized parallel interface to the AS

Step	Test condition	Test procedure	Measurement	Pass criteria
1	*The SPT and an AS or an equivalent AS Interface simulator are connected via the parallel AS interface and are performing as required. The SPT is connected to a fully operational ATS.*	An alarm is triggered by the AS to every SPT parallel alarm Input as required by Annex A.	Record if a change of ± 40 % of the quiescent resistance value is recognized as an alarm and transmitted to the SPT network interface.	A change of more than ± 40 % from the quiescent resistance value is recognized as an alarm.
2	As above	An AS fault or other message is triggered by the AS to every SPT message/fault input as required by Annex A.	Record if a change from less than 100 Ω impedance to more than 500 kΩ impedance for longer than 200 ms is recognized as a change of state from normal to active state.	A change of impedance from less than 100 Ω to more than 500 kΩ is recognized as an change of state of the message/ fault input of the SPT.
3	As above	Make sure that the ATS is not available.	Monitor the state of the SPT fault output (A.1.3.3) to the AS.	The SPT fault output (A.1.3.3) shall change state within the reporting time of the appropriate category.
4	As above	Make sure that the ATS is not available and trigger an alarm input on the SPT.	Monitor the state of the alarm delivery failure (A.1.3.2) output to the AS.	The SPT alarm delivery failure output (A.1.3.2) shall change state after the maximum transmission time of the appropriate category.
5	As above	Activate both SPT outputs (A.1.3.2 and A.1.3.3) and connect a source of 20 mA to both individual outputs.	Record whether both SPT outputs (A.1.3.2 and A.1.3.3) can sink 20 mA in the case of an activated output to the AS.	Both SPT outputs to the AS can sink at least 20 mA.
6	As above	Tamper the interface to the AS by removing or shortening the interface connection of the SPT to the AS.	Record if an alarm message is generated.	Tamper of the SPT to AS connection is detected and reported to the RCT.

9.4.8 Proprietary interface to the AS

9.4.8.1 Object of the test

The object of this test is to prove that the proprietary interface to the AS, if implemented, complies with the requirements of 5.7.

9.4.8.2 Principle

The test consists of following the instructions in the SPT manual to install the SPT. Consequently, the monitoring and performance of this link is tested.

Table 12 — Test of proprietary interface to the AS

Step	Test condition	Test procedure	Measurement	Pass criteria
1	*The SPT and any necessary equipment to allow the SPT to perform as required shall be installed and in a functional state.*	Connect SPT to AS as specified in the product documentation.	Record whether interconnecting SPT with AS is in line with documentation.	Interconnecting SPT and AS shall be according to documentation.
2	As above	Create event on AS.	Record the transmission time as per EN 50136-1.	The transmission time shall be within limits of the specified category.
3	As above	Disconnect interface.	Record the time before this is indicated on RCT to check maximum reporting time requirements as per 5.7.	Indication shall be present on RCT within maximum reporting time of the appropriate category. The interface failure shall be detected and delivered within the maximum reporting time.

9.4.9 Monitoring of the transmission network interface

9.4.9.1 Object of the test

The object of this test is to prove that the SPT can detect the failure of each transmission network interface.

NOTE This can for example be Ethernet cable or network connection via GPRS.

9.4.9.2 Principle

The test consists of disconnect the SPT network interfaces from the network and monitoring if a fault is generated to the AS.

Table 13 — Test of the transmission network interface monitoring

Step	Test condition	Test procedure	Measurement	Pass criteria
1	*The SPT and any necessary equipment to allow the SPT to perform as required shall be installed and in a functional state.*	Disconnect the network connection.	Monitor that a fault message is generated to the AS.	The fault shall be transmitted to AS within the reporting time of EN 50136-1:2012, Table 3.
2		Reconnect to the network.	Monitor that the fault to the AS is reset.	The fault reset shall be transmitted to AS within the reporting time of EN 50136-1:2012, Table 3.

9.4.10 Event logging

9.4.10.1 Object of the test

The object of this test is to demonstrate that events are recorded at the SPT as required in Table 1 according to category.

9.4.10.2 Principle

The test consists of generating events that are required in Table 1 according to category, then reviewing that they are recorded in the SPT event log.

Table 14 — Test of event logging

Step	Test condition	Test procedure	Measurement	Pass criteria
1	The SPT and any necessary equipment to allow the SPT to perform as required shall be installed and in a functional state.	Generate each implemented event listed in Table 1, according to category.	Check that all implemented events are recorded in the SPT event log according to category.	All implemented events shall be recorded in the SPT event log.

9.4.11 Protection of the log

9.4.11.1 Object of the test

The object of the test is to validate that the log is protected against accidental or deliberate deletion or alteration of log content.

9.4.11.2 Principle

The validation consists of verifying the stated manufacturer methodology to achieve compliance with 5.10 and confirming the log is protected against accidental or deliberate deletion or alteration.

9.4.12 Event log capacity and endurance

9.4.12.1 Object of the test

The object of the test is to demonstrate that the log contains the minimum of event records according to category and to demonstrate that the log endures the required duration according to classification.

9.4.12.2 Principle

The test consists of creating log event records and confirming that the quantity and retention of event records meet the requirements of 5.10.

Table 15 — Test of event log capacity

Step	Test condition	Test procedure	Measurement	Pass criteria
1	The SPT and any necessary equipment to allow the SPT to perform as required shall be installed and in a functional state.	Create log events in line with Table 2 according to category.	Check that all event records are logged.	All event records logged correctly.
2	As above	Create log events to exceed the minimum number of log events listed in Table 2 according to category.	Check that the most recent events are logged.	The most recent event records are logged correctly.
3	As above	Remove power from the equipment as listed in Table 2 according to category. Restore power.	Check that no event records are affected.	All event records still remain logged correctly.

9.4.13 Clock resolution

9.4.13.1 Object of the test

The object of this test is to prove that the accuracy of the timestamps as attached to events in the log complies with the requirements of 5.10.

9.4.13.2 Principle

The test consists of creating events, while verifying the timestamps against a reference time source.

The tests shall be done against a well-defined time reference. For this purpose, an NTP server on Stratum 2 level (generally available on the Internet) provides the required accuracy.

Table 16 — Test of clock resolution

Step	Test condition	Test procedure	Measurement	Pass criteria
1	The SPT and any necessary equipment to allow the SPT to perform as required shall be installed and in a functional state.	Create an event.	Record timestamp of event creation.	There shall be a log entry, with a minimum resolution of one second and a deviation in relation to the reference time of less than 5 s.
2	As after test nr. 1.	Wait for at least 72h. Create a second event.	Record timestamps of event creation (log against reference time source).	As above

9.4.14 Store-and-forward operation

9.4.14.1 Object of the test

The object of this test is to prove that the store-and-forward operation, if implemented, complies with the requirements of 6.1.2.

9.4.14.2 Principle

The test consists of triggering an alarm from the AS to the SPT and monitoring if an acknowledgement is transmitted from the SPT to the AS under various ATS conditions.

Table 17 — Test of store-and-forward operation

Step	Test condition	Test procedure	Measurement	Pass criteria
1	*General condition:* *The AS is connected to the SPT. The SPT is configured for store-and-forward operation.* The ATS is fully operational and configured for any ATS category.	Trigger an alarm transmission from AS to SPT.	Monitor if the alarm is received at the RCT and an acknowledgement signal is received at the SPT within the requirements of the appropriate ATS category.	The acknowledgement signal shall be transmitted to AS after successful reception of the alarm by the SPT.
2	General condition, and: The ATS is not connected; i.e. to make sure that no alarm transmission between SPT and RCT is possible.	As above	Monitor if an acknowledgement signal is sent from the SPT to the AS. Where a parallel interface is used this may be achieved by monitoring the 'failure to deliver an alarm' output according to A.1.3.2.	The SPT shall transmit an acknowledgement signal to the AS.
3	General condition, and: The ATS is fully operational and configured for any ATS category.	Trigger an alarm transmission from AS to SPT, and: Disconnect the ATS after the alarm is transmitted to the SPT. Make sure that the alarm is not received and/or acknowledged by the RCT.	Monitor if an acknowledgement signal is sent from the SPT to the AS. Where a parallel interface is used this may be achieved by monitoring the 'failure to deliver an alarm' output according to A.1.3.2.	The acknowledgement signal shall be transmitted to AS after successful reception of the alarm by the SPT.
4	As above	Power cycle the SPT according to the instruction in the documentation.	Monitor if the previously triggered alarm (test number 3) is received at the RCT and that no additional acknowledgement signal is received at the AS.	The SPT shall not transmit any spurious acknowledgement signal to the AS as a result of a previous unsuccessful alarm transmission attempt.

9.4.15 Pass-through operation

9.4.15.1 Object of the test

The object of this test is to prove that the pass-through operation, if implemented, complies with the requirements of 6.1.3.

9.4.15.2 Principle

The test consists of triggering an alarm from the AS to the SPT and monitoring if an acknowledgement is transmitted from the SPT to the AS under various ATS conditions.

Table 18 — Test of pass-through operation

Step	Test condition	Test procedure	Measurement	Pass criteria
1	*General condition:* *The AS is connected to the SPT. The SPT is configured for pass-through operation.* The ATS is fully operational and configured for any ATS category.	Trigger an alarm transmission from AS to SPT.	Monitor if the alarm is received at the RCT and an acknowledgement signal is received at the SPT within the requirements of the appropriate ATS category.	The acknowledgement signal shall be transmitted to AS after successful reception of the alarm by the RCT.
2	General condition, and: The ATS is not connected; i.e. to make sure that no alarm transmission between SPT and RCT is possible.	As above	Monitor if an acknowledgement signal is sent from the SPT to the AS. Where a parallel interface is used this may be achieved by monitoring the 'failure to deliver an alarm' output according to A.1.3.2.	The SPT shall not transmit an acknowledgement signal to the AS. A negative acknowledgement signal from SPT to the AS is permitted.
3	General condition, and: The ATS is fully operational and configured for any ATS category.	Trigger an alarm transmission from AS to SPT, and: Disconnect the ATS after the alarm is transmitted to the SPT. Make sure that the alarm is not received and/or acknowledged by the RCT.	Monitor if an acknowledgement signal is sent from the SPT to the AS. Where a parallel interface is used this may be achieved by monitoring the 'failure to deliver an alarm' output according to A.1.3.2.	The SPT shall not transmit an acknowledgement signal to AS. A negative acknowledgement signal from SPT to the AS is permitted.
4	As after Step 3	Power cycle the SPT according to the instruction in the documentation and restore the ATS to normal operation.	Monitor if the previously triggered alarm (test number 3) is received by the RCT.	No alarm shall be received at the RCT. If the AS retransmits the previously triggered alarm (test number 3), the RCT shall receive this alarm and the SPT shall transmit an acknowledgement signal to the AS. Monitoring of the AS retransmission attempt is critical for the pass/fail verdict of this test.

9.4.16 SPT alarms

9.4.16.1 Object of the test

The object of this test is to demonstrate that all messages in Table 3 are generated and transmitted from the SPT to the RCT/AE for the appropriate category.

9.4.16.2 Principle

The test consists of generating all alarms that are required in Table 3 for the appropriate category, then reviewing that they are transmitted to the RCT/AE.

9.4.16.3 Test condition

The SPT and any necessary equipment to allow the SPT to perform as required shall be installed and in a functional state.

9.4.16.4 Test procedure

Generate each required alarm listed in Table 3, according to category.

9.4.16.5 Measurement

Check that all required alarms are generated and transmitted to the RCT/AE for the appropriate category.

9.4.16.6 Pass/fail criteria

All required alarms shall be generated by the SPT and transmitted from the SPT to the RCT/AE for the appropriate category.

9.4.17 Information and substitution security

The manufacturer shall describe in the SPT documentation the methods used for the protection against substitution of the SPT with identical equipment or simulation equipment to the requirements outlined in 6.3.

The manufacturer shall describe in the SPT documentation the methods used for the protection of the information transmitted by the ATS to prevent unauthorized reading and to unauthorized modification of the information transmitted to the requirements described in 6.4.

9.4.18 Documentation

To verify that all required documentation is provided, complete and correct.

Annex A
(normative)

Requirements of the interface between AS and SPT

A.1 Parallel interface between AS and SPT

A.1.1 General

Where the parallel interface is provided, it shall operate as described below. The parallel interface shall as a minimum provide one alarm input and two fault outputs.

A.1.2 Parallel SPT alarm inputs

Monitoring of the SPT inputs are done from the SPT itself; changes in the end of line resistance value by ± 40 % and more shall lead to a change of state if they last longer than 200 ms

A.1.3 Parallel SPT outputs

A.1.3.1 General

The output shall be either a potential free contact or an open collector. Where an open collector output is provided, the output shall be able to sink at least 20 mA.

A.1.3.2 Failure to deliver an alarm

This output shall comply with the following requirements:

– in the normal state: open output (> 500 kΩ);

– in the event of not receiving a positive acknowledgement within the maximum transmission time: closed output (< 100 Ω);

– triggering time greater than 200 ms.

A.1.3.3 ATS fault

This output shall comply with the following requirements:

– in the normal state (no faults): closed output (< 100 Ω);

– in the event of an ATS fault: open output (> 500 kΩ);

– in the event of a SPT failure: open output (> 500 kΩ);

– setting according to the duration of the fault, but at least 1 s.

A.2 Serial interface between AS and SPT

Interconnection between AS and SPT could be done using any serial interface and any signal transmission medium.

If a signal converter, router or any other active device or system is necessary to connect the AS to the SPT, this additional device or system shall be treated as a part of the AS or SPT, tested and certified accordingly.

The manufacturer shall specify the serial interface between SPT and AS referring to ISO OSI 7 Layer Model.

The interface specification shall cover at least following layers:

– physical;

– data link;

– application.

The serial protocol shall allow detection of any malfunction of the interconnection within the ATS reporting time required for appropriate SPT category.

Test results and documentation shall be provided by manufacturer stating compatibility with specific alarm systems and ATS category.

Application standards may specify more detailed and/or stringent requirements.

Bibliography

[1] EN 54 (all parts), *Fire detection and fire alarm systems*

[2] EN 50131 (all parts), *Alarm systems — Intrusion and hold-up systems*

[3] EN 50136-3, *Alarm systems — Alarm transmission systems and equipment — Part 3: Requirements for Receiving Centre Transceiver (RCT)*

[4] EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

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