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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Alarm and electronic security systems – Part 5-3: Alarm transmission systems – Requirements for receiving centre transceiver (RCT)

Systèmes d'alarme et de sécurité électroniques – Partie 5-3: Systèmes de transmission d'alarme – Exigences pour les transmetteurs du centre de réception (RCT)

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Systèmes d'alarme et de sécurité électroniques – Partie 5-3: Systèmes de transmission d'alarme – Exigences pour les transmetteurs du centre de réception (RCT)

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ALARM AND ELECTRONIC SECURITY SYSTEMS –

Part 5-3: Alarm transmission systems – Requirements for receiving centre transceiver (RCT)

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This international standard is based on EN 50136-3:2013.

The text of this standard is based on the following documents:

CDV	Report on voting
79/464/CDV	79/515/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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INTRODUCTION

The object of this part of IEC 60839 is to specify the general requirements for the performance, reliability, resilience and security of alarm transmission systems and to ensure their suitability for use with different types of alarm systems and annunciation equipment.

An alarm transmission system may use any type of transmission network.

When the ATS functions are integrated into an alarm system or annunciation equipment the requirements of this standard apply.

The intended users of this international standard include alarm transmission service providers, alarm receiving centre operators, fire departments, insurance companies, telecommunication network operators, internet service providers, equipment manufacturers, alarm companies, end users and others.

The IEC 60839-5 series consists of the following parts, under the general title *Alarm and electronic security systems*:

– Part 5-1: Alarm transmission systems – General requirements;
– Part 5-2: Alarm transmission systems – Requirements for supervised premises transceiver (SPT);
– Part 5-3: Alarm transmission systems – Requirements for receiving centre transceiver (RCT);
– Part 5-4[1]: (under evaluation);
– Part 5-5[1]: (under evaluation);
– Part 5-6[1]: (under evaluation);
– Part 5-7: (place holder).

[1] The former IEC 60839-5 series (1991) is being reviewed by an ad-hoc group set-up at the TC 79 meeting in Milano in October 2013. This ad-hoc group is in charge of evaluating the relevance / obsolescence of IEC 60839-5-4, IEC 60839-5-5 and IEC 60839-5-6 developed in 1991 and advise TC 79 on their future.

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ALARM AND ELECTRONIC SECURITY SYSTEMS –

Part 5-3: Alarm transmission systems – Requirements for receiving centre transceiver (RCT)

1 Scope

This part of IEC 60839 specifies the minimum equipment requirements for the performance, reliability, resilience, security and safety characteristics of the receiving centre transceiver (RCT) installed in an ARC and used in alarm transmission systems.

The alarm transmission system requirements and classifications are defined within IEC 60839-5-1. Different types of alarm systems may in addition to alarm messages also send other types of messages, e.g. fault messages and status messages. These messages are also considered to be alarm messages. The term alarm message is used in this broad sense throughout the document.

Where application specific standards exist, the RCT should comply with relevant standards called up by that application.

The RCT can be either an integrated element of any receiving/annunciation equipment, or a stand-alone device. In either case, the requirements of this international standard should apply.

The function of the RCT is to monitor the ATPs, receive alarm messages, forward alarm messages to one or more AEs and send acknowledgements to the SPTs.

This international standard specifies the minimum equipment requirements for the performance, reliability, resilience, security and safety characteristics of the receiving centre transceiver (RCT) installed in alarm receiving centres and to define parameters that are tested to ensure its compatibility with ATS categories.

Management of the transmission network is not in the scope of this international standard.

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.

IEC 60839-5-1:2014, *Alarm and electronic transmission systems – Part 5-1: Alarm transmission systems – General requirements*

IEC 62599-1, *Alarm systems – Part 1: Environmental test methods*

IEC 62599-2, *Alarm systems – Part 2: Electromagnetic compatibility – Immunity requirements for components of fire and security alarm systems*

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3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60839-5-1, as well as the following, apply.

3.1.1
remote access
access to the equipment from any location that is outside the protected premises in which the equipment is located

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
ARC	Alarm receiving centre
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 international requirements and regulations for connection and transmission via public or private networks.

Requirements in this international standard shall be considered as a minimum. As the RCT is used together with or integrated in receiving/annunciation equipment, the requirements of the specific applications or related standards shall apply.

4.2 RCT classification

This international standard defines RCT requirements. For the purpose of RCT classification reference is made to the ATS categories in IEC 60839-5-1. The RCT documentation shall describe for which ATS categories the RCT complies with the requirements.

5 Functional requirements

5.1 General

The RCT shall provide communication between one or more AEs and one or more SPTs and monitor the interface(s) to one or more AEs.

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The RCT shall monitor the ATSs.

5.2 Access levels

This international standard specifies four levels of access that categorise the ability of users to access the RCT functions.

Access levels are defined as following:

- Level 1 access to indications;
- Level 2 access to the operational status and commissioning functions;
- Level 3 maintenance functions, access in order to affect the RCT configuration including site-specific data and other operations that directly, or indirectly, may adversely influence the functions of the RCT;
- Level 4 access to software updates and read-only parameters.

These access levels apply only for logical access (i.e. not physical access). Access to all functions shall require authorisation with a key.

Access levels 2, 3 and 4 shall use personalised accounts to achieve traceability.

A level 4 user shall be authorised by a user with level 3 access. This authorisation may be permanent or time limited.

Access at all levels shall require authorisation with a key. The key mechanism shall be able to provide at least 1 000 000 different keys.

Where it is possible to attempt to gain access more than 3 times in a 60-second period the RCT 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 RCT commissioning without first changing these keys during installation.

Remote access shall require a secure connection and meet the data security requirements of IEC 60839-5-1.

Automatic logout of remote access sessions shall be activated after a period of inactivity. The inactivity period shall be configurable.

Logical access to functions shall comply with Table 1.

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Table 1 – Access levels – Logical access to functions

Access Level	Level 1	Level 2	Level 3	Level 4
View RCT indications	P	P	P	P
Change RCT configuration	NP	NP	P	NP
View RCT configuration	NP	P	P	P
Commission/de-commission SPT	NP	P	P	NP
View RCT event/alarm log	NP	P	P	P
Change RCT software	NP	NP	NP	P
Change users and/or user rights	NP	NP	P	NP
Change and/or delete entries in the event log	NP	NP	NP	NP

Key

P = permitted

NP = not permitted

NOTE The requirement to restrict or permit access to a certain function does not imply that implementation of the function is required.

5.3 Uploading and downloading of software

The upload and download of software in/out of an RCT is only allowed at the appropriate access level as defined in 5.2.

5.4 Storage of parameters and data

A power cycle or a software restart shall not result in the loss of any configuration, log and secured alarm messages. The RCT shall return to normal operation automatically after such power cycle or software restart.

5.5 Monitoring and notification of failure of the ATP and ATS

For compliance to the relevant standards of the application, the RCT shall monitor the ATP and the ATS and report failures to the AE as defined in IEC 60839-5-1:2014, Table 4.

The documentation supplied by the manufacturer shall describe the notification signal.

5.6 Interface(s) to the AE(s)

The interface(s) to the AE(s) shall be monitored in accordance with IEC 60839-5-1. The reporting time of the connection failure shall be less than or equal to the reporting time of the ATS with the highest category or 60 s, whichever is shorter. In the event of an interface failure, a fault signal shall be generated, and an event logged.

The manufacturer shall state in its product documentation the specifications of the interface(s) to the AE and how the fault signal is presented and logged.

An alternative AE interface may be provided.

5.7 Fault signalling

The RCT shall have a means to signal faults when any of the following faults occur:

– AE interface failure;

– transmission network interface failure;

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– RCT system failure.

The manufacturer shall specify in the RCT documentation how these faults are signalled.

5.8 Event recording

For an RCT supporting and meeting any category of IEC 60839-5-1 other than SP1, SP2 and DP1, a logging function shall be provided for the purposes of providing an audit trail and problem resolution.

The events specified in Table 2 shall be recorded.

The event log may be stored outside of the RCT.

The means of recording events shall be non-volatile. The log entries shall be kept for no less than 3 years. The manufacturer shall specify in its documentation how this is achieved.

Events older than 3 years may be deleted.

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 RCT shall provide a means to synchronise the UTC date and time. The manufacturer shall specify in its documentation how time synchronisation with UTC is achieved.

The RCT may use local time-zones.

To optimise storage of events, where identical sequentially repeated events occur within any 12-h period, then only the first and last event need to be recorded. Where this is done then the number of identical events shall be recorded.

When required by the requirements of Table 2, the logging of access to the RCT shall include user identification.

Table 2 – Event recording classification – Events to be recorded

	Events to be recorded	
	Event	**User identification**
1	Alarm messages from ATS	n/a
2	AE interface(s) failure and restore	n/a
3	Transmission network Interface(s) failure and restore	n/a
4	Changes to the configuration of the RCT	M
5	Power-up or reset	M
6	Any change to software	M
7	Changes to the date and time	M
8	Access to the RCT	M
9	Changes to users and/of user rights	M

Key

n/a = not applicable

M = mandatory

NOTE Recording the user identification is only mandatory if the event is triggered by user intervention.

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5.9 Mode of operation (store-and-forward or pass-through)

5.9.1 General

Two modes of operation are permitted:

a) store-and-forward;

b) pass-through.

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

5.9.2 Store-and-forward operation requirements

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

If the store-and-forward operation is used, all alarm messages shall include the date and time stamp when the alarm was received by the SPT.

The RCT may also log the date and time stamp when the alarm was forwarded to the AE and/or when the acknowledgement was received from the AE.

Securing the alarm shall be achieved by storing the alarm in the RCT's non-volatile memory (data base), this is to secure acknowledged alarms whilst there is an AE interface failure or during a power failure. Stored alarms shall be transmitted when the fault condition clears.

The secured alarm shall be transmitted from the RCT to the AE(s).

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

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

5.9.3 Pass-through operation requirements

When an alarm is received from the SPT the RCT shall forward the alarm to the AE(s).

The RCT shall not acknowledge the alarm to the SPT before receiving an acknowledgement from at least one AE. When the RCT receives an acknowledgement from the AE(s) the acknowledgement shall be forwarded to the SPT.

5.10 Denial of service

The manufacturer of the RCT shall declare in its documentation how compliance with the requirements of IEC 60839-5-1:2014, 6.2.5, is achieved.

5.11 Information security

The manufacturer shall provide their stated methodology used to achieve compliance with IEC 60839-5-1:2014, 6.8.3, for both SPT communication and remote access.

5.12 Substitution security

The manufacturer shall provide their stated methodology used to achieve compliance with IEC 60839-5-1:2014, 6.8.2.

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5.13 RCT redundancy

If the RCT supports a dual path category ATS (DP1 to DP4) the RCT shall comply with the redundancy requirements of IEC 60839-5-1:2014, Table 1. The manufacturer shall specify and demonstrate how compliance is achieved.

5.14 Documentation

Documentation relating to an RCT shall be concise, complete and unambiguous. Sufficient information shall be provided to install, put into operation, operate and maintain an RCT.

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

Where there are user serviceable parts (e.g. fuses) their type and values shall be given.

The documentation shall include:

– the name of manufacturer or supplier,
– the description of equipment,
– the standard to which component claims compliance,
– the name or mark of the certification body,
– the maximum number of SPTs that can be connected for each category,
– the maximum number of AEs that can be connected,
– the maximum number of transmission network interfaces,
– the maximum number of alarms that can be processed per second,
– a list of supported ATS categories,
– the power requirements.

5.15 Marking/identification

The RCT shall be marked with the following:

– the name of manufacturer;
– the ATS categories for which the RCT is suitable.

The marking shall be legible, durable and unambiguous. If the RCT does not use dedicated hardware (i.e. the RCT is a software solution), the software shall be able to display the required markings/identifications.

6 Tests

6.1 General

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

6.2 Test conditions

6.2.1 Laboratory conditions and tolerance

Testing conditions shall be in accordance with IEC 62599-1 and IEC 62599-2, as follows:

1) temperature: 15 °C to 35 °C;
2) relative humidity: 25 % to 75 %;

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3) air pressure: 86 kPa to 106 kPa.

6.2.2 Mounting

The RCT shall be mounted in accordance with the manufacturer's installation instructions. Any additional equipment necessary to carry out the tests (e.g., simulation of the ATS and SPT) shall be supplied by the manufacturer in agreement with the test house.

6.2.3 Documentation

The product documentation (as required in 5.14) shall be provided with the RCT.

6.2.4 Power supply

Unless otherwise required, the RCT shall be powered by a power supply that meets the performance as specified by the manufacturer.

6.3 Functional tests

6.3.1 General

The purpose of the functional tests is to demonstrate that the RCT performs its required functions. The manufacturer shall provide a fully functional test setup. Other ATS components such as the AS, SPT, and network may be provided as simulating equipment and/or network(s).

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. The maximum reporting time requirement shall be tested for each individual supported category.

All network interfaces shall be tested.

All AE interfaces shall be tested.

Table 3 lists all required functional tests.

Table 3 – Summary of functional tests

Subclause reference	Requirement to test	Test/validation objective	Validate or test
5.1	Processing of alarm signals	Demonstrate the ability of the RCT to receive, process and forward a signal or message from the ATS.	Test (6.3.9)
5.2	Access levels	Demonstrate that all access levels exist.	Test (6.3.2)
5.3	Upload and download of software	Demonstrate that the RCT will recover after an unsuccessful software upload/download.	Test (6.3.3)
5.4	Storage of parameters and customer specific data	Demonstrate that the RCT will not lose any parameters or customer specific data after a reset or power cycle.	Test (6.3.4)
5.5	Notification of an ATS failure for a single path ATS	Demonstrate that the RCT signals an ATS failure to the AE as defined in IEC 60839-5-1:2014, Table 4.	Test (6.3.5)
5.5	Notification of an ATS failure for a dual path ATS	Demonstrate that the RCT signals an ATS failure to the AE as defined in IEC 60839-5-1:2014, Table 4.	Test (6.3.6)
5.6	Interface(s) to the AE(s)	Demonstrate that the interface(s) to the AE(s) are monitored.	Test (6.3.7)
5.7	Fault signalling	Demonstrate that faults are signalled according to the manufacturer RCT documentation.	Test (6.3.8)

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Subclause reference	Requirement to test	Test/validation objective	Validate or test
5.8	Event recording	Demonstrate that all mandatory events are recorded as required in Table 2.	Test (6.3.10)
5.8	Clock resolution and synchronisation	Demonstrate that the accuracy of the timestamps as attached to events in the log complies with the requirements of 5.9.	Test (6.3.11)
5.8	Endurance of the log	Verify that the manufacturer documentation specifies how 3-year endurance of log entries is achieved.	Validate (6.3.12)
5.8	Optimising methods of storage of events	(only if implemented) Demonstrate that event storage, by grouping the events as described in 5.9, is implemented and compliant with the requirements.	Test (6.3.13)
5.8	User identification of log entries	Demonstrate that user identification for log entries is logged according to the requirements of Table 2.	Test (6.3.14)
5.9	Mode of operation	Demonstrate that the implemented modes of operation comply with the requirements of 5.10.	Test (6.3.15)
5.10	Denial of service	Verify the manufacturer RCT documentation.	Validate (6.3.16)
5.11	Information security	Verify the manufacturer declaration of how information security is implemented and complies with the requirements of 5.11.	Validate (6.3.17)
5.12	Substitution security	Verify the manufacturer declaration of how substitution security is implemented and complies with the requirements of 5.12.	Validate (6.3.17)
5.13	RCT redundancy	Verify where an RCT can be used in a dual path ATS configuration. A failure of one RCT shall not compromise the ATS according to IEC 60839-5-1:2014, Table 1.	Test (6.3.18)
5.14	Documentation	Verify the manufacturer documentation against the requirements of 5.14.	Validate (6.3.19)
5.15	Marking/identification	Verify the marking and identification against the requirements of 5.15.	Validate

6.3.2 Access levels

6.3.2.1 Object of the test

To demonstrate the ability of the RCT to comply with 5.2 to provide up to 4 levels of access and verify the relevant access to the functions and controls.

6.3.2.2 Principle

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

Table 4 lists the required functional tests for access levels

Table 4 – Test of access levels

Step	Test condition	Test procedure	Measurement	Pass criteria
1	The RCT and any necessary equipment to allow the RCT to perform as required shall be installed and in a functional state.	At access level 1, attempt to operate all the functions and controls for access level 1.	Record whether access is permitted.	Access is in accordance with 5.3.
2	As above.	Repeat as step 1 for access level 2.	As above.	As above.

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