

Hiss&Fastighetslarm i Sverige AB (HFLAB)

# **EleVision Protocol Implementation Overview**

VERSION 1.1

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## Footnote (informative)

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The EleVision protocol architecture described in this document reflects the current design state of the system. Certain elements, including protocol message structures, configuration workflows, security mechanisms, and fallback behaviours, may be refined as part of the ongoing development and validation process. The final implemented version may therefore differ in detail from the version presented here, while maintaining compliance with the requirements of EN 81-28:2022.

The EleVision Protocol is developed by Hiss&Fastighetlarm i Sverige AB org.nr. 556601-6530. (HFLAB)

This document and its appendixes are HFLAB's property.

The protocol is free to use under the following conditions: This protocol specification and its appendixes are not to be modified. if the protocol are implemented in a product it shall be called "EleVision".

## Scope of the Document:

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This document specifies the communication architecture, protocol layers, operational processes, and fallback mechanisms used in the EleVision emergency communication system for passenger and goods passenger lifts. The scope of this document includes:

- a) the definition and functional description of all communication layers used for alarm transmission, two-way voice communication, multimedia transport, configuration, diagnostics, and supervision;
- b) the mapping of these communication layers to the requirements established in EN 81-28:2022, including alarm initiation, alarm signalling, identification, availability, voice communication, communication failure handling, and power-supply conditions;
- c) the specification of the EleVision SIA-DC09 Variant protocol used for both IP-based and SMS-based alarm signalling;
- d) the description of the SIP-based VoIP communication channel used to establish two-way voice communication between trapped passengers and the Alarm Receiving Centre (ARC);
- e) the definition of the proprietary TCP/SSL multimedia protocol used for still-image transmission, configuration data, diagnostics, and firmware management;
- f) the description of the fallback communication mechanism that ensures continuity of alarm signalling during IP communication outages;
- g) documentation and traceability requirements relevant for conformity assessment and certification of remote alarm equipment according to EN 81-28:2022.

This document does **not** specify mechanical, electrical, or installation requirements for lift systems, nor does it cover requirements unrelated to remote alarm communication (e.g., lift control logic, cabin emergency lighting, or user interface mechanical design). It also does not define the internal implementation details of external systems such as the ARC, SIP-PBX, or backend service infrastructure beyond their functional interfaces with the EleVision system.



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## Conventions and Definitions

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**ARC:** Alarm Receiving Centre.

**EleVision SIA-DC09 Variant:** Enhanced implementation of the SIA-DC09 protocol used in all alarm signalling layers.

**SIP-PBX:** Private Branch Exchange handling SIP-based VoIP calls.

**TLS:** Transport Layer Security used for encrypted communication.

**SMS Fallback:** Backup signalling mechanism using EleVision SIA-DC09 transported via SMS.

**Proprietary Multimedia Protocol:** Encrypted TCP/SSL protocol used for image, diagnostic, and configuration data.

## Revision history

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Version	Date	Issuer	Event
1.0 RC	2025-11-23	Janne Hiltunen	Created
1.1	2026-01-14	Lars Gustafsson	Release



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## Alarm Protocol Architecture – Compliance with EN 81-28:2022

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*(Including IP Alarm Signalling, SIP Voice Communication, Multimedia Transmission, and SMS Fallback)*

This document describes the communication architecture used in the EleVision system and its compliance with EN 81-28:2022 – Remote alarm systems for passenger and goods passenger lifts.

The system uses three distinct communication layers, each with a separate and clearly defined responsibility:

1. Primary alarm signalling: Genesis SIA-DC09 Variant (IP/TLS)
2. Two-way voice communication: SIP-based VoIP via SIP-PBX
3. Multimedia, still image transmission, and configuration: Proprietary TCP/SSL protocol
4. Backup signalling: SMS-based SIA-DC09 Variant

**The separation of these layers ensures that safety-critical functions are deterministic and independent of non-critical features.**

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### 1. EleVision SIA-DC09 Variant (IP/TLS) – Primary Alarm Signalling

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**This layer provides the mandatory alarm and supervision functions required by EN 81-28:2022.**

**Key characteristics:**

- Encrypted alarm signalling over TLS
- Reliable message delivery with acknowledgement and retransmission
- Heartbeat and automatic test messages at  $\leq 72$ -hour intervals
- Compliance with identification, end-of-alarm, reset control, and fault-reporting requirements
- Integrated backup power status reporting
- Automatic alarm initiation without further user action

**This is the primary method for sending emergency alarms from the lift to the alarm receiving centre (ARC).**

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## 2. SIP-Based VoIP (SIP-PBX Integration) – Two-Way Voice Communication

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**This layer is separate from both the alarm signalling layer and the proprietary multimedia layer.**

### 2.1 Purpose

**To establish mandatory two-way voice communication between trapped passengers and the ARC, as required by EN 81-28:2022 Clause 7.**

### 2.2 Communication Method

- The elevator device registers to a SIP-PBX as a SIP client.
- After an alarm is triggered (SIA-DC09 sent to ARC), the ARC establishes a standard SIP call to the device.
- No proprietary protocol is used for voice communication.
- The SIP audio path is entirely independent from the multimedia protocol.

### 2.3 EN 81-28:2022 Compliance

- Automatic call setup without further user action
- Continuous, clear communication for the duration of the alarm
- Audio quality as required by the standard
- Echo control, gain control, and audio routing integrated in the device
- Communication availability monitored via DC-09 heartbeat and test alarms

**This approach ensures full compliance with EN 81-28 voice communication requirements.**

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## 3. Proprietary TCP/SSL Multimedia & Configuration Protocol

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**This protocol is used for high-bandwidth or extended functionality not covered by EN 81-28:2022.**

### 3.1 Purpose

- Transmission of still images from the lift cabin
- Device configuration and remote management
- Firmware updates
- Diagnostics and log retrieval

### 3.2 Still Image Transmission During Alarm

**The following operational flow applies:**



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### a) Initial Alarm Phase

**Immediately when the user presses the alarm button:**

1. The device sends a SIA-DC09 alarm event to the ARC.
2. In parallel (or within milliseconds), the device captures a still image from the cabin.
3. The still image is transmitted via the proprietary TCP/SSL channel to the ARC.
4. The ARC uses the image to quickly confirm whether a trapped person is present.

### b) End-of-Alarm Phase

**When the emergency call session is terminated by the ARC:**

1. The device captures a new still image.
2. The device sends an “end-of-alarm” DC-09 event.
3. The new still image is transmitted to document the reset condition.

**This behaviour is not required by EN 81-28 but greatly improves verification, documentation, and rescue process efficiency.**

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## 4. SMS-Based SIA-DC09 Variant – Backup Alarm Channel

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**To ensure full availability even during IP outages, EleVision implements a fallback transport using SMS.**

### 4.1 Purpose

- Maintain alarm signalling if IP communication fails
- Maintain test and supervision signalling
- Ensure alarms are still transmitted to the ARC
- Use the same DC-09 structure and shared secret for authentication

### 4.2 Features

- Uses the same event codes and authentication scheme as the IP-based DC-09
- Supports alarm, status, supervision, fault, and end-of-alarm events
- Supports essential remote commands
- Automatically activated when the device detects communication loss

**This fallback method supports the EN 81-28:2022 requirement for availability and reliability.**



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## 5. Mapping to EN 81-28:2022 Requirements

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<b>Requirement Area</b>	<b>EleVision Implementation</b>
<b>Alarm signalling</b>	EleVision SIA-DC09 Variant (IP/TLS) with ACK, retry, and metadata
<b>Two-way voice communication</b>	Independent SIP/VoIP signalling via SIP-PBX
<b>Alarm verification</b>	Still images transmitted immediately on alarm activation
<b>Reset condition verification</b>	Still image transmitted after alarm end
<b>Automatic test</b>	DC-09 heartbeat and periodic testing at $\leq 72$ -hour intervals Microphone and speaker test with status alarm.
<b>Backup communication</b>	SMS-based Sia DC-09 fallback
<b>Identification</b>	Included in all DC-09 messages (IP and SMS)
<b>Fault indication</b>	Reported through DC-09 and local HMI
<b>Backup power</b>	Fully monitored and reported
<b>ARC responsibilities</b>	Supported by both IP and SMS alarm channels
<b>Logging</b>	Full event logging and image storage

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### 6. Summary

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**The EleVision protocol architecture consists of four fully separated communication layers:**

1. SIA-DC09 Variant over IP/TLS (Primary Alarm Layer)
  - Fully EN 81-28:2022 compliant
  - Handles alarms, end-of-alarm, supervision, power faults
2. SIP-Based VoIP via SIP-PBX (Two-Way Voice Layer)
  - Independent path
  - Fully meets voice communication requirements of EN 81-28:2022
  - Not tied to multimedia or proprietary protocols
3. Proprietary TCP/SSL Protocol (Multimedia Layer)
  - Transmits still images during alarm start and alarm reset
  - Supports full device management, remote configuration , device logging etc.
4. SMS-Based DC-09 Variant (Fallback Layer)
  - Ensures availability during IP failures
  - Uses same protocol and authentication as primary path

This multi-layer architecture exceeds EN 81-28:2022 requirements and establishes a highly resilient, fully verifiable emergency communication system for elevator installations.

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