Remote Alarm Systems
A new European Approach

Gerhard Thumm
Thyssen Aufzugswerke, Germany

Key words: Remote Alarm System, European Harmonized Standard, TELESERVICE

ABSTRACT

More people than we might be aware of are afraid of using a lift, as they imagine to be trapped in the lift car. The new European directive has addressed this item and is asking as a new general safety requirement for a so-called "two way communication system allowing permanent contact with a rescue service". The paper highlights the actual status of the European standardization work in this field and introduces a typical system of TELESERVICE not only handling the alarm situation of trapped people but allowing an overall remote service of a lift installation.

Part 1: European draft standard for remote alarm systems for passenger lifts and passenger goods lifts

Introduction

The idea of being trapped inside a lift for some time has given rise to discussions again and again for many years.

Besides the subject is as old as the passenger lift and already the first regulations, such as e.g. the police regulation for the installation and use of lifts of 17th March 1908 already covered this subject.

For example § 19 of the police regulations requires an alarm system:

"Every car shall be equipped with a signal device audible from outside of the well, which is placed in such a way that it can be operated by the passengers. A clear notice inside of the car indicating that the car is equipped with such a device shall be provided."

And § 32, in particular the chapter specifiying the use of lifts, covers the organizational requirements:

"Provided that the local police gave approval passenger lifts equipped with car and hall control are exempt from being accompanied by a lift operator and the latter can be substituted by a supervising, responsible, qualified lift warden, who shall always be present or easy to reach as long as the lift is in operation."

The observations below show that, strictly speaking, the considerations of our forefathers did not change at all. However, their ideas have been substituted and extended by the possibilities offered by contemporary communication technology.

European lift directive 95/16

This directive defining only fundamental safety requirements for lift installations in accordance with the guiding principle of the so-called new approach has been subject of endless discussions and articles.

It is not intended to repeat this discussion here. One of the major changes of this directive is that it provides for a communication device which permits trapped persons to contact an emergency call centre as fundamental safety requirement.

Therefore, the new European lift directive implemented in national law since 1st July 1999 after end of the transition period requires an operative a two-way means of communication for every new lift placed on the market in most European countries.

The emergency call device shall fulfil the following requirements according to the directive

4.5 Cars must be fitted with two-way means of communication allowing permanent contact with a rescue service.
4.9 The means of communication referred to in 4.8 must be designed and constructed so as to function even without the normal power supply. Their period of operation should be long enough to allow normal operation of the rescue procedure.

The general definitions above leave a large number of details unanswered.

This is why it is the common practice in these cases that the European commission authorizes the CEN (Comité Européen de Normalisation) to set up a harmonized standard. The function of such a harmonized standard is to define minimum requirements for the technical device. The example under consideration, the draft standard for remote alarm systems, also defines organizational requirements for such a system in the so-called informative part.

This part is of particular importance since already today lifts all over the world are equipped with an alarm button and a signal horn already today which gives an appropriate acoustic signal when operated and, in so doing, draws attention to the person trapped inside the car.

The real problem, however, begins with the procedure of passenger rescue.

Who considers himself responsible for taking action and initiating rescue measures when the signal sounds ? Is this a genuine emergency call or has somebody pressed the emergency call button by mistake ? Is this again the doing of playing children (or grown ups) ?

In Germany these tasks are performed by the lift warden who, at least in theory, is expected to be available 24 hours a day, 365 days a year in order to answer emergency calls and rescue trapped persons. But even the lift warden may be not available some day or is on holiday.

The German regulations cover the subject of passenger rescue to a much greater extent than other national regulations in Europe.

This European draft standard which has been submitted to the process of public inquiry is intended to eliminate existing uncertainties. The working group of CEN had to examine some questions more closely when defining the minimum requirements for a remote alarm system in order to ensure a safety level which is equivalent to the (theoretically permanently available) lift warden.

The draft which is subject of this paper has been one of the first European standards to be worked out on the basis of a risk analysis.

Fig. 1 shows the principal representation of an emergency call system.

The risks and questions as well as the definitions agreed on in this context are explained below:

Question	Answer in European draft standard
1. How can alarms be precisely traced and identified by the emergency call centres?	Emergency calls shall always be transmitted completely and their receipt acknowledged by the emergency call centre. Identification shall be such that it does not lead to any misunderstandings, e. g. by transmitting the installation number. Transmitting one telephone number for several connected lifts is insufficient.
2. How can the emergency alarm trigger in the car be secured against damage (vandalism)?	Vandal-resistant design of alarm button or the (future) alarm sensor. For definition of the term „vandal-resistant" the wording of the draft being currently prepared by TC10/WG1/WT8 applies.
3. How much time can pass between triggering the emergency alarm and the response of the rescue organization?	Under normal conditions, the response time between triggering the emergency alarm and the personal response from the emergency call centre shall not exceed 5 minutes.
4. Can undue emergency alarms be suppressed to avoid overloaded emergency call centres? See comment 1	The emergency alarm system shall be capable of suppressing emergency calls provided that one of the following events is recognized: - the emergency alarm trigger is operated for less than a given time (max. 3 seconds), - in case of lifts with manually operated doors the car is within the unlocking zone, the car door is fully open and the landing door is at least ajar,

	- in case of lifts with automatically operated doors the car is within the unlocking zone and the door is fully open. - the car is moving.
5. How long shall the operation of the system be ensured after interruption of power supply?	Operation of the emergency alarm system shall be ensured for at least another hour. The auxiliary power supply may be part of the emergency alarm system or the lift installation or external generators may also be kept on standby. If the auxiliary power source is part of the emergency alarm system a device for monitoring the required power capacity for one hour shall be available, in order to recognize ageing batteries in good time.
6. How long can a failure of the emergency call system remain unnoticed? Which tests shall be made to recognize faulty operation ?	3 days at the most! This is why the connection between the emergency call system of the lift installation and the emergency call centre shall be established automatically at least every 3 days. In the course of the maintenance work a test alarm shall be triggered manually from inside the car and the personal response of the emergency call centre tested.
7. Can the emergency call centre establish voice contact to the car ?	Only in the case of an emergency call can the emergency call centre establish voice contact to the car. However, in all other cases it shall be technically prevented to do so. Therefore, listening in on conversations in the car is not possible.
Comment 1: Use of misuse suppression is not mandatory, but the system shall be technically able to do so.	

Part 2: Example of a remote alarm system

The above definitions of the draft standard can easily give the impression that implementing these requirements results in a costly technical solution. However, this is not true if the possibilities offered by microelectronics and software control are consistently used.

In the following an attempt is made to describe such as system using the example of TELESERVICE from Thyssen Aufzüge.

The subject remote attendance and part of the system - TELESERVICE, the emergency call transmission with voice contact - is nothing new at all for Thyssen Aufzüge. Since 1989 TELESERVICE has been used for connecting lift installations to service centres, which are on duty 24 hours. Meanwhile 18.000 lift installations have been connected via TELESERVICE. However until 1998 these systems were separate components which had to be installed in the lift installation. This is why a lot of connection lines between control and the TELESERVICE system were required (fig. 2).

Since the new European lift directive requires a two-way communication device for all new installations as fundamental safety requirement Thyssen Aufzüge reviewed the conception of the TELESERVICE system.

The development objective was to integrate the remote attendance system into the control step by step and, in so doing, using all synergistic effects possible.

All in all, it can be said that the hardware necessary in the control could be minimized for generation 6 of TELESERVICE. Instead of two only one 5 V and 12 V voltage supply are necessary, for example.

Almost no wiring is required.

A standard voice modem is used for establishing connection to the emergency call centre (fig. 3).

Fig. 4 shows the prototype of the component.

The new system of Thyssen Aufzüge fully complies with the requirements for an emergency call system according to the draft standard. The use of a modem, however, allowed for integrating additional functions, which are expected to be standard features for remote attendance systems in 2000.

They are presented in the table below in brief outlines:

Functions of TELESERVICE GEN.6

Function:		Comment:
- Remote alarm system	√	All required functions, e.g. misuse suppression, battery monitoring etc. are provided.
- Remote diagnosis from emergency call centres	√	Graphical representation of lift functions, remote parameterizing possible
- Transmission of qualified fault messages from the lift installation	√	Faster, more carefully directed trouble-shooting
- Transmission of warning messages in case of wearing components	√	Preventive maintenance possible
- Re-activation feature in case of breakdowns of lift system	√	Increases reliablity of lift installation
- Software download for all decentralized lift components	√	Updates possible, optimum stability of installation value

Summary

The new European draft standard for remote alarm systems is a first step on the right track. Stories of people trapped in lifts for a long time without being noticed shall belong to the past.

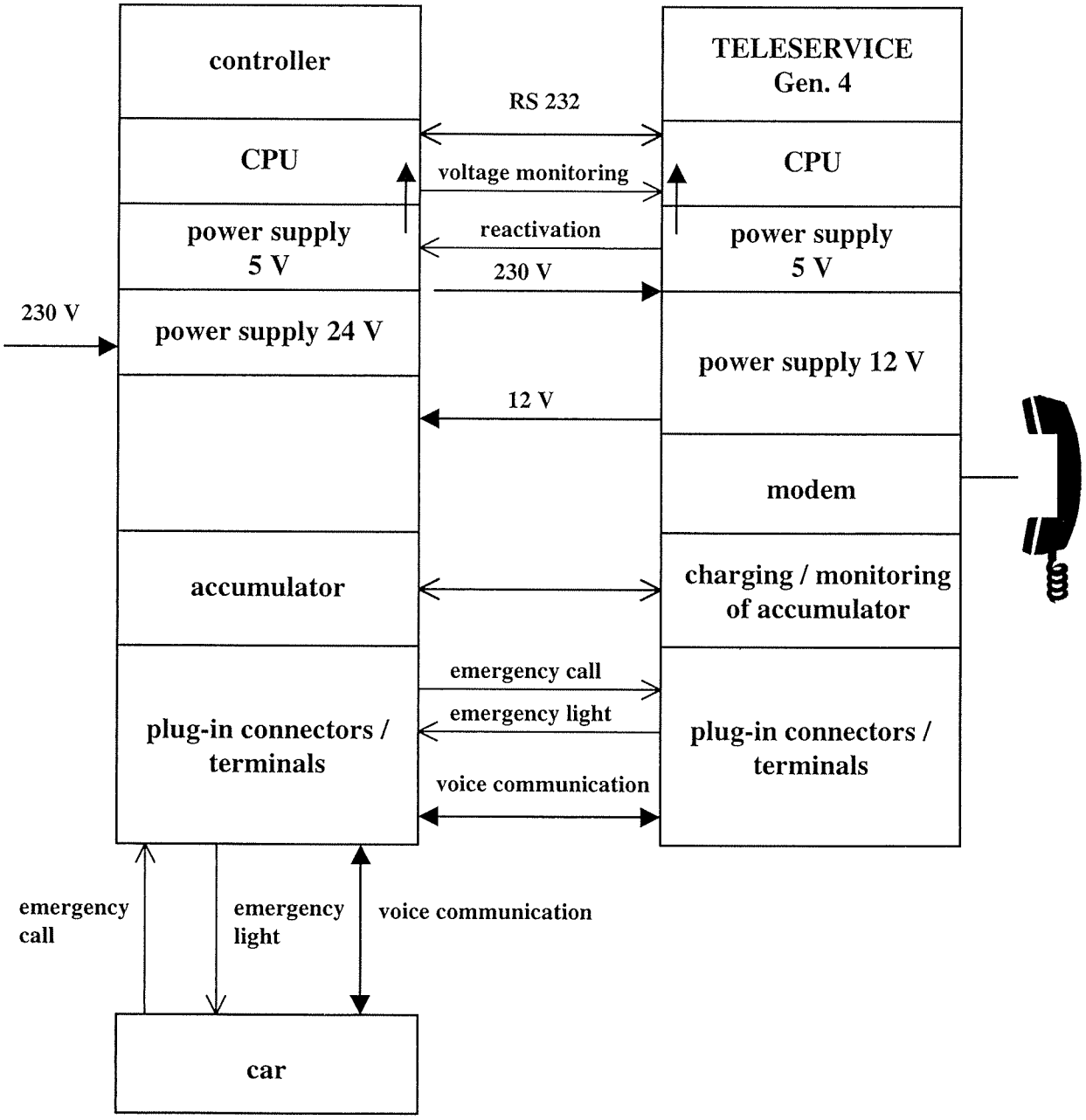
It is most desirable that such systems should not only be used for new lift installations, but existing installations also be upgraded step by step.

Advanced Teleservice systems can not only be used for transmitting emergency calls and establishing voice contact but they also contain a lot of additional functions which increase the reliablity and availability of lift installations.

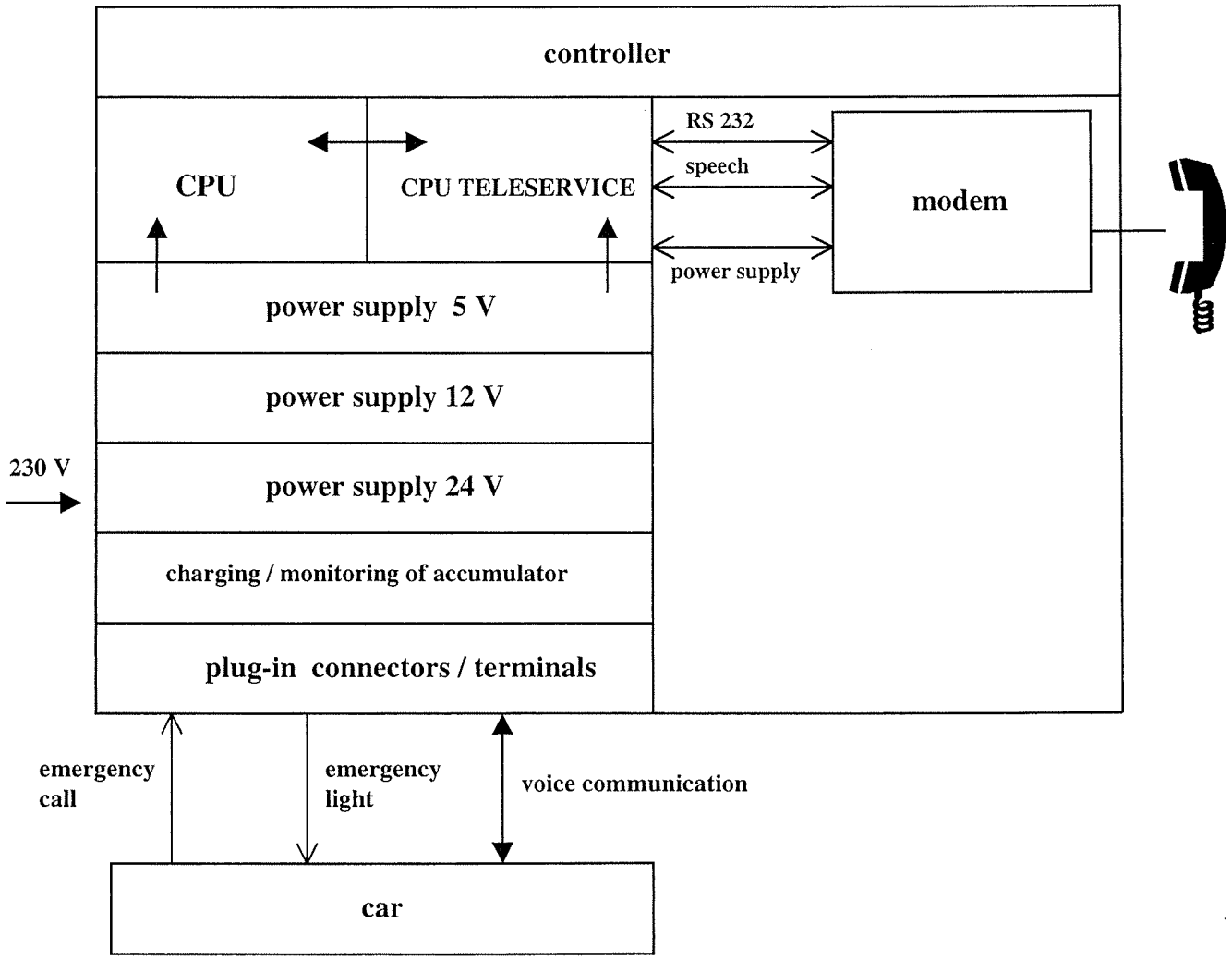
Lifts with integrated remote attendance systems will become more transparent here and offer the lift owner the possibility of calling up indicators informing about the quality and reliability of the lift.

These facilities will offer the service companies the chance of improving and extending their service business.

TELESERVICE Gen. 4 (Fig. 1)



TELESERVICE Gen. 6 (Fig. 3)



Integrated TELESERVICE Gen 6 (Fig. 4)