

CEA 4015

Guidelines for the Triggering of Fire Extinguishing Systems Planning and Installation

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Insurance Europe Standard

CEA 4051
Guidelines for the Triggering of
Fire Extinguishing Systems
Planning and Installation

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This non-binding standard has been developed by prevention bodies, under the initiative of the insurers or their representatives grouped at European level in the Insurance Europe Prevention Forum.

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1 FOREWORD

1.1 General

These guidelines are particularly aimed at planners and installers of fire extinguishing systems and fire detection and fire alarm systems, as well as experts, builders, owners and operators.

1.2 Validity

The present guidelines come into force on 01.08.2023.

2 SCOPE OF APPLICATION

These guidelines apply to the triggering and control of automatically and manually actuated fixed gas and aerosol fire extinguishing systems (referred to throughout this document as fire extinguishing system). The scope of application covers control devices that are operated with

- electrical
- mechanical or
- pneumatic

energy or a combination of these energies.

These guidelines do not apply to spark extinguishing systems, powder extinguishing systems, explosion suppression and oxygen reduction systems.

Although predominantly aimed at assisting those involved in the release of fire extinguishing systems, these guidelines also provide information in situations, which could be used for the actuation of other fire protection measures.

3 NORMATIVE REFERENCES

These guidelines contain dated and undated references to other standards. These standards

are cited in the appropriate sections and the titles are listed hereinafter.

In case there is an undated reference in the binding text (reference to a document without giving the issue date and without indication of a section number, a table, a figure etc.), the reference refers to the latest issue of the document made reference to.

In case there is a dated reference in the binding text, the reference always refers to the issue of the document made reference to.

Amendments or additions to dated standards are only valid if they have been notified by amendment of these guidelines.

BS 7671

Requirements for Electrical Installations

EN 54

Automatic fire detection and fire alarm systems

EN 12094-1

Fixed firefighting systems – Components for gas extinguishing systems – Part 1: Requirements and test methods for electrical automatic control and delay devices

EN 12094-2

Fixed firefighting systems – Components for gas extinguishing systems – Part 2: Requirements and test methods for non-electrical automatic control and delay devices

EN 12094-3

Fixed firefighting systems – Components for gas extinguishing systems – Part 3: Requirements and test methods for manual triggering and stop devices

EN 15276-2

Fixed firefighting systems – Condensed aerosol extinguishing systems – Part 2: Design, installation and maintenance

EN 62305-1

Protection against lightning – Part 1: General principles

EN 61386-1

Conduit systems for cable management – Part 1: General requirements

ISO 3864-4

Graphical symbols – Safety colours and safety signs – Part 4: Colorimetric and photometric properties of safety sign materials

VdS 2095

VdS Guidelines for Automatic Fire Detection and Fire Alarm Systems – Planning and Installation

VdS 2833

VdS Guidelines for Alarm Systems – Protective Measures against Overvoltage for Alarm Systems (VdS-Richtlinien für Gefahrenmeldeanlagen – Schutzmaßnahmen gegen Überspannung für Gefahrenmeldeanlagen)

VdS 3189

VdS Guidelines for IR-Camera Equipment for Temperature Monitoring in Fire Protection – Planning and Installation (VdS-Richtlinien für IR-Kameraeinrichtungen zur Temperaturüberwachung im Brandschutz – Planung und Einbau)

4 DEFINITIONS AND ABBREVIATIONS

4.1 Definitions

For the application of this document, the terms in the respective VdS guidelines for planning and installation of the actuated fire extinguishing systems or fire detection and fire alarm systems apply and the following terms.

Alarm device

device, which emits an acoustic or optical alarm signal

Alarm valve station

module that includes an alarm valve, a stop valve both above and below the alarm valve, and all valves and accessories belonging to it

for controlling a water extinguishing system group

System isolating switch

key-operated or manual device with dual mode switch, which prevents the electrical triggering of aerosol generators. The intention here is to prevent the discharge of the extinguishing agent into the danger zone when the system-isolating switch is activated.

Triggering device

device for activating control devices and/or actuation devices

Actuation command

control signal from the control device to the actuation device

Actuation device

device for directly releasing the extinguishing agent

Automatic fire detector

fire detection element, in accordance with DIN EN 54, for automatic detection of physical and/or chemical fire characteristics

Selector valve

valve that feeds the extinguishing agent to the appropriate flooding zone

Disable device

Non-electrical device that prevents the discharge of the extinguishing agent

Fire detection device

device on a fire extinguishing system that detects fire, generates messages from this and transmits them

Fire detection elements

generic term that describes devices that respond to fire characteristics, such as smoke, heat, flames or others

Fire detection component

part of a fire extinguishing system, consisting of a fire detection device or fire detection and fire alarm system

Fire detection and fire alarm system

alarm system (AS) used by persons to directly call for help in case of fire risks and detect and signal fires at an early stage

Control and indicating equipment

device that collects information from the fire detection elements and generates signals from it

Installer

specialist firm that the competent authorities have approved for planning, installation and maintenance for each part of fire detection and fire alarm systems and/or fire extinguishing systems

Fire extinguishing system

installed system, consisting of fire detection and extinguishing element

Manual control device

device that can be directly or indirectly activated by persons to manually initiate functions in the electrical control device, e.g. subsequent flooding device or emergency stop device

Manual triggering device

device for manually actuating the fire extinguishing system

Extinguishing alarm

optical and acoustic signals emitted in the danger zone immediately before, during and after flooding

Fire extinguishing signal

signal to the control device to activate the control function

Flooding zone

area of a building or installation which is flooded on its own

Extinguishing element

part of a fire extinguishing system, consisting of a control, alerting and extinguishing device

Subsequent flooding device

device for releasing additional extinguishing agent once flooding has already taken place

Emergency abort device

appliance that prevents the electrical actuation of aerosol generators on a triggered fire extinguishing system within the pre-warning time

Purely manual mode

the electrical control device may be designed for switching from manual mode to automatic/manual mode and vice versa. During the purely manual mode, the electrical control device may only be triggered by signals from manual triggering devices.

Standardised interface for extinguishing systems

technical device for the standardised switching on of fire detection and fire alarm systems and fire extinguishing systems

Control device

device used to control and monitor the extinguishing element

Emergency stop device

manual control device which, when pressed during the pre-warning time, prevents flooding whilst it is being pressed

System

combination of approved components, which are checked to ensure they are compatible with each other and work together as intended

Monitored transmission path

external connection between system parts, which are used to transmit information or signals and which are monitored for intended availability. The transmission path may also be used for power supply purposes.

Delay device

automatic device that delays the actuation of the fire extinguishing system by a pre-determined time (pre-warning time) to ensure the evacuation of persons

Pre-warning time

time period between the start of the extinguishing alarm given to warn persons at risk and the discharge of the extinguishing agent

2-detector dependency type B

measure taken to prevent false alarms; entry into the fire alarm condition of the control and indicating equipment only happens once there is an alarm signal from two or more automatic fire detectors (“2-detector dependency” acc. to EN 54-2:1997/A1:2007-01).

4.2 Abbreviations

- FDAS: Fire detection and fire alarm system
- CIE: Control and indicating equipment
- EOL: End of Line/end of the transmission path
- ECD: electrical control device
- FES: Fire extinguishing system
- NECD: non-electrical control device
- SI: standardised interface for extinguishing systems

5 GENERAL REQUIREMENTS

5.1 Conditions specific to equipment

5.1.1 Product and system approval

All devices and components used in a fire detection and fire alarm system or fire extinguishing system shall be tested and approved to ensure they fit the respective purpose and work together as intended (product and system approval).

In the approval of the respective central system (fire control and indicating equipment and/or electrical control device), the maximum permitted number of flooding zones shall be specified.

5.1.2 Standard interface for extinguishing systems

Each approved fire detection and fire alarm system for triggering fire extinguishing systems as well as each approved fire extinguishing system used for actuation by means of fire detection and fire alarm systems features a *standard interface for extinguishing systems* according to Figure 5-1.

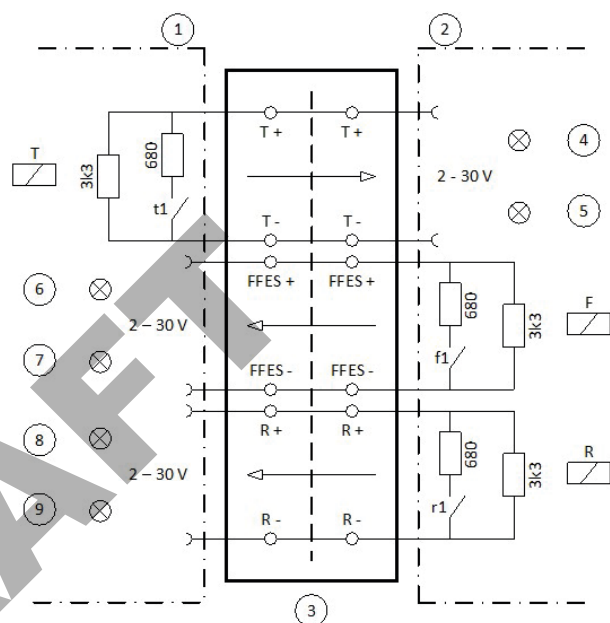


Figure 5-1 Standardised interface SI

Legend

1	Control and indicating equipment	6	Fault FES
2	Electrical control device	7	Line fault “fault FES”
3	Interface	8	Released FES
4	Triggering FES	9	Line fault „released FES“
5	Line fault „trigging FES“	T	Triggering FES
FFES	Fault FES	R	FES released

5.1.3 Connection and effective area

The requirements listed under Section 5.3.3 apply to all devices on the fire extinguishing system (fire detection and extinguishing element).

5.1.4 Cabling

National regulations may require fire rated cables, which need to maintain their circuit integrity during a fire for life safety and fire-fighting purposes.

Where this is not the case, these guidelines require fire rated cables on the critical signal path. (EN TS 54 Part 14; Clause 6.12.1.3)

Elements of the system not requiring fire rated cables would include:

- a) Wiring to electrical actuators
- b) Wiring to pressure switches
- c) Wiring to selector valves

5.2 Implementation

The technology, manufacture, planning and maintenance of fire extinguishing systems and their coordinated components including the devices necessary for fire detection/fire call represents a complex system solution, for which competence and responsibility cannot be separated as a rule.

Responsibility for the performance of the extinguishing system and fire detection and alarm systems may be with separate organisations. Where this is the case the responsibility of each organization should be clearly defined and documented as well as the organisation holding overall responsibility.

The individual elements of the mechanical and electrical installations shall be carried out by those skilled in those elements.

The control of the extinguishing system is part of the scope of the installer of the extinguishing system.

Note: For delegation of part performances/functions, see Section 5.3.4

5.3 General requirements for the control and actuation

Distinctions are made between mechanical, pneumatic, and electrical actuation and control systems as well as combinations of such technologies.

Note: Examples for the control and actuation of fire extinguishing systems are given in Annex A and Annex B.

The requirements of control devices are set out in the valid CEA guidelines for planning and installation in each case or shall be set out separately according to the respective application. Requirements from the European standards for electrical and non-electrical control devices shall be taken into account here.

5.3.1 Overvoltage protection

In electrical actuation and control systems used for fire extinguishing systems, the measures to protect against surges described in national requirements such as BS 7671 or VdS 2833 shall be observed.

5.3.2 Effect of faults

Electrical devices for controlling and actuating purposes shall be designed such that, in case of system failures on an ECD or CIE or faults (wire break, short circuit or faults with the same effect) for a monitored transmission path, no more than one flooding zone of the extinguishing system fails or at the most one unintentional release can occur in one flooding zone.

If an ECD and/or CIE is intended to be used to actuate several flooding zones, these shall be approved for the control and triggering of several flooding zones.

If the above-mentioned requirements are complied with, a maximum of 8 flooding zones may be actuated via a monitored transmission path.

Monitored transmission paths between the ECD and release elements, which are assigned to several flooding zones (e.g. actuation device on control container), shall be designed with redundancy (see Note 1 and 2).

Note 1: The transmission path between the ECD's triggering device and a release element, which is assigned to several flooding zones, may be designed without redundancy if the ECD is either

- *located in the same room as the release element or*
- *located with the release element in an adjacent, enclosed room, which is solely used for fire extinguishing and fire detection and fire alarm system technology, or*
- *located in an enclosed housing, which is used solely for fire extinguishing technology, with the release element in an adjacent room with limited access*

In the last two cases mentioned, the wiring in question shall be installed with specially protected lines, such as lines in electrical installation pipes according to EN 61386-1 in closed routing in at least heavy-duty design.

Note 2: If, for constructional reasons, the wiring of two cables with isolation and line termination cannot be installed in the connector of a release element that is assigned to several flooding zones, the installation of a junction box is permitted if it is ensured that

- *the junction box is permanently installed in the immediate vicinity of the release element (close to the control container, e.g. on the frame, etc.) and*
- *the line segment from the junction box to the release element (with the exception of the connector area) is permanently laid and*
- *the transmission path is monitored up to where the release element is connected.*

5.3.3 Connection and effective area of the control device

The connection and effective area of the control device includes all components and devices that perform primary and secondary functions for the fire extinguishing system.

5.3.3.1 Primary functions

Components and devices used to perform primary functions are, besides the activation, actuation and release components for the necessary control of the extinguishing element, in particular also alerting, monitoring, inspection (revision), manual triggering and disable devices as well as system isolating switches, emergency stop devices and/or emergency abort devices.

5.3.3.2 Secondary functions

The secondary functions include necessary control systems to take account of structural conditions, such as operating equipment, air-conditioning systems, room closures etc.

5.3.4 Functions of a fire extinguishing system, which can be delegated to a fire detection and fire alarm system

5.3.4.1 General

Functions of a fire extinguishing system are: Fire detection, fire call, extinguishing.

For delegable and non-delegable functions with activation via and without a standardised interface see Table 5-1.

GENERAL REQUIREMENTS.

	Function	CIE	ECD	NECD
Primary functions				
1.	Automatic fire call with fire extinguishing signal relating to flooding and detection area	present	not present	not present
2.	Fire call function of fire detection elements according to Section 7.1 c)	present	not present	not present
3.	Fire call function of fire detection elements according to Section 7.1 a) and b)	not present	not present	present
4.	Automatic fire call as a pre-alarm of the fire detection and fire alarm system with pilot command relating to detection area (see Section 6.2)	present	not present	not present
5.	Display of actuation, faults and other operating statuses of an extinguishing element, which are recorded by a monitoring function of the extinguishing element	delegable to CIE	present	present
6.	Non-automatic fire call (manual call point) with fire extinguishing signal relating to flooding and detection area	permitted when alarm valves are directly triggered	not present	not present
7.	Functions of the manual actuation and/or manual triggering device	permitted with combined CIE/ECD	not delegable to CIE	not delegable to CIE
8.	Acoustic alerting in the flooding zone by secured electrical/pneumatic alarm device	not permitted when activated via standardised interface	electrically not delegable to CIE	pneumatically present
9.	Delayed and/or undelayed triggering of actuation devices (valves)	not permitted when directly triggered by alarm valves; not permitted when activated via standardised interface	present	present
10.	Recording and indication of faults and other operating statuses of the fire extinguishing system	permitted with combined CIE/ECD	present	present
Secondary functions				
11.	All electrically implementable secondary functions	not permitted when activated via standardised interface	present	not present

Table 5-1 Function matrix

5.3.5 Transmission of signals

5.3.5.1 Transmission of the fire extinguishing signal from a fire detection and fire alarm system to the extinguishing element

If extinguishing is triggered by control and indicating equipment, a fault at, or resetting of, the control and indicating equipment shall not prevent the continued functioning of the extinguishing element via the control device.

5.3.5.2 Transmission of the actuation signal by the control device

If extinguishing is triggered by an electrical control device, a fault at, or resetting of, at the electrical control device shall not prevent the continued functioning of the extinguishing element if the electrical control device has already been triggered.

5.3.5.3 Transmission of other signals

The activation of “manual only mode” shall be indicated visually at a permanently manned location. This also applies to disablements and faults within the control and indicating equipment and electrical control device that may prevent an automatic triggering of the fire extinguishing system.

This shall be displayed, by at least one general indicator per fire extinguishing system, featuring a supplementary yellow general indicator or as an alphanumeric or digital display.

5.3.6 Disablement in case of functional tests

Functional testing on fire extinguishing systems shall be possible at any time. If equipment, which is controlled and normally shut-down by the fire extinguishing system, cannot be disabled during functional tests for operational reasons, the fire extinguishing systems shall be equipped with an operating device (preferable a key-operated switch) to disable

the automatic shut-down of equipment, e.g. IT systems or ventilation systems. The status of the operating device shall be indicated visually at a permanently manned location.

Only authorised persons shall be able to disable the shut-down function.

5.3.7 Indication of operating status of the fire extinguishing system

The following operating status of the fire extinguishing system shall be indicated visually and audible at a permanently manned location:

- triggering or actuation of the fire extinguishing system (implemented at least as one general indicator, colour red, per fire extinguishing system)
- fault on the fire extinguishing system/ monitoring system (implemented at least as one general indicator, colour yellow, per fire extinguishing system)
- pressing the emergency stop device in gas extinguishing systems, system isolating switch or emergency abort device in aerosol systems (implemented as a zone indicator, via separate yellow indicator or display)

The position of a non-electrical disable device on a fire extinguishing system shall be indicated optically at a permanently manned location. This shall be displayed, by at least one general indicator per fire extinguishing system, featuring a supplementary yellow general indicator or as an alphanumeric or digital display.

5.3.8 Ability to reset

A control device shall only be reset at the control device itself or using remote control devices designed with this functionality.

6 SPECIAL REQUIREMENTS FOR THE CONTROL AND TRIGGERING ON DIFFERENT FIRE EXTINGUISHING SYSTEMS

6.1 Automatic locking for multizone installations triggered by fire detection and fire alarm systems

Unless specified differently in the relevant guidelines and sets of rules, the following requirements apply:

On a multizone installation, once the first extinguishing zone has been triggered, the other extinguishing zones shall be locked.

This locking process is normally limited to preventing unintended subsequent flooding of other extinguishing zones, not, however, necessarily to additional controls in case of alarm. These may be necessary to limit fire and extinguishing damage.

This locking process must not prevent the triggering of zones that have to be flooded simultaneously with the first zone, however (i.e. that form a common flooding zone with the latter).

Locking shall take place via the electrical control device.

The locking process must not prevent the detection of fire and fire call for any flooding zone.

The locking process must not cause any fault signal.

The locking process must be shown as disablement of the actuation device for the corresponding flooding zone. Switching the actuation devices back on must only be possible once the electrical control device has been reset.

7 REQUIREMENTS OF THE FIRE DETECTION

7.1 Automatic fire detection

Fire detection in flooding zones can be done by

- fire detection and fire alarm systems or
- fire detection devices on a fire extinguishing system

Fire detection devices can contain the following different fire detection elements:

- a) Fire detection elements that act mechanically, e.g. fusible link sensors and thermal isolating links
- b) Fire detection elements that act pneumatically or hydraulically, e.g. sprinklers
- c) Fire detection elements that act electrically e.g. temperature sensing rods
- d) Fire detection elements according to the standards for automatic fire detectors, e.g. DIN EN 54

Fire detection and fire alarm systems can contain the different fire detection elements mentioned under c) and d) in the detection areas relevant to the fire extinguishing system.

All components must be included in the corresponding system approvals.

IR-camera devices according to VdS 3189 do not represent fire detection devices according to these guidelines.

7.2 Manual triggering devices

7.2.1 Selection

In electrical control devices, manual triggering devices and emergency stop devices according to DIN EN 12094-3 as well as manual control devices for initiating a subsequent flooding are to be used according to these guidelines.

7.2.2 Colours and labelling

Manual triggering devices are to be clearly labelled as such. They should also be differentiated in terms of colour from the red manual call point on a fire detection and fire alarm system (housing colour) in order to also make the function in question identifiable by the colour. In this respect, the following colours (definitions according to ISO 3864-4) and labels should be selected:

- a) For a manual triggering device
 Colour: Yellow (RAL 1003, RAL 1021, RAL EFFECT 290-6 or RAL EFFECT 270-5)
 Label: Manual triggering of fire extinguishing system
 e.g. manual triggering CO₂ extinguishing system
- b) For emergency stop devices,
 Colour: Blue (RAL 5005, RAL 5017 or RAL EFFECT 640-5)
 Label: Details of the extinguishing agent with designation –stop,
 e.g. CO₂-stop, high-expansion foam-stop
- c) For manual triggering devices for initiating subsequent flooding
 Colour: Green (RAL 6032 or RAL EFFECT 220-5)
 Label: Subsequent flooding, if need be with designation of the extinguishing agent,
 e.g. subsequent flooding CO₂

For executing the manual triggering devices, the requirements are described in the respective guidelines and regulations for planning and installation. Manual triggering devices do not replace the necessary manual call points on a fire detection and fire alarm system. These are to be arranged in addition where necessary.

7.3 Prevention of false releases

Besides the measures listed in the individual guidelines for planning and installation, to prevent false alarms and associated false releases, it may be advisable to make the

actuation of the fire extinguishing system independent not only of the signals from two fire detectors that detect the same fire characteristic (e.g. smoke), but also of two different fire characteristics (e.g. smoke and heat). It is to be noted in this case, however, that in the risk being monitored, both fire characteristics (smoke **and** heat) also occur due to the fire load present.

A graded protection system can be implemented here. An initial sensitive fire detector group ensures early fire detection by means of preliminary information (internal optical and acoustic indication e.g. at the permanently manned location – no extinguishing alarm) and can be used for the pilot control of operating equipment (e.g. shutting off fans, closing fire barriers). The fire extinguishing system is triggered, if applicable with the necessary extinguishing alarm and other safety devices, only in conjunction with a second signal (e.g. from a heat detector). Any preliminary information/pre-warning on site shall be clearly differentiated from the extinguishing alarm.

Due to an extinguishing process in an adjoining area it is possible e.g. due to the transfer of extinguishing agent, dust turbulence or the formation of water mist for false alarms to be provoked by automatic smoke detectors and false releases linked to these to be generated by automatic extinguishing systems. The transfer of triggering criteria can happen e.g. due to leaks from the room, due to non-closable openings, in case of automatic closing devices that do not work perfectly or work too late, ventilation and pressure relief devices. To avoid such false releases, the following measures may be useful:

- Sufficiently tight structural separation between the flooding zones
- Selection and linking of the fire detectors/ fire detection elements (see notes in 1st paragraph of this section)
- Locking of flooding zones in accordance with Section 6.1 (in case of independent fire

extinguishing systems, locking mechanisms analogous to Section 6.1 are only permitted if the spread of fire into the locked area can be ruled out.)

- If the fire extinguishing system has been triggered, before the fire detection and fire alarm system is reset, the rooms concerned shall be checked for possible extinguishing agent residue that affects the fire detection and fire alarm system and the detectors operated there shall be checked that they are ready to operate.

7.4 Installation of automatic fire detection elements and their triggering conditions

Smoke and flame detectors are to be switched in 2-detector dependency (type B). Over and above this, flame detectors should also be assigned to different angles of view.

Fire detection elements according to Section 7.1 a) to c), as well as heat detectors (part of the fire detection elements according to Section 7.1 d)) do not have to be executed in 2-detector dependency.

In order to increase the certainty of a fire extinguishing system being triggered, at least two fire detectors or fire detection elements should be planned. In case of 2-detector dependency (Type B), the monitoring area A of the signalling points (see guidelines for fire detection and fire alarm systems VdS 2095:2019-05, Section 6.2.7.2.2) is to be reduced if the detectors detect the same fire characteristic (e.g. smoke). When using detectors that each detect different fire characteristics (e.g. smoke detectors and heat detectors), the monitoring areas stipulated in VdS 2095 for each individual detector apply. This also results in a condensed detector arrangement.

Note: If explosive atmospheres can build up, appropriate measures shall be taken. For CO₂ extinguishing systems in particular, automatic detectors shall be designed in 2-detector dependency (type B) to prevent inadvertent

actuation of the CO₂ extinguishing system. The reason for such a design is the risk of electrostatic charging during CO₂ flooding, which could lead to ignition of a hazardous, explosive atmosphere.

If the automatic fire detection elements are switched off, an actuation of the fire extinguishing system via manual triggering devices shall be possible.

7.5 Manual triggering devices

Unless specified differently in the relevant guidelines and sets of rules, the following requirements apply:

Manual control devices, such as manual triggering devices, stop buttons, system isolating switches, emergency abort devices and manual triggering devices for initiating subsequent flooding shall be arranged so that the distance between the operating element (pushbutton) and the floor is 1400 (+ 200/- 300) mm. They shall be installed at easily visible points that are accessible at all times, close to emergency exits.

Manual triggering devices and manual control devices for initiating subsequent flooding are to be located outside the flooding zone.

In justified exceptional cases, manual triggering devices may also be located inside of the flooding zone.

7.6 Scope of monitoring

Electrical lines transmitting alarm and fault signals or signals for monitoring, system control and alerting (secured first alarm) shall be designed as monitored transmission paths.

The correct operating position of the following components shall be monitored:

- non-electrical control devices¹
- disable devices
- selector valves

¹ Does not include mechanical manual control devices fitted directly to the container valve

- switching devices for main/spare bank
- mechanical triggering devices using a wire cable with fusible link

8 STANDARDISED INTERFACE FOR EXTINGUISHING SYSTEMS

8.1 Implementation, planning and installation

8.1.1 Scope

The standardised interface (see Figure 5-1) is to be extended if needed (see example implementation in Annex C). The standardised activation is also to be complied with in case of the additional signals specified under Section 8.2.1.

8.1.2 Indications

The indications required for the interface can also be provided by a dedicated indicating device.

8.1.3 Interface connections

When using the standardised interface for extinguishing systems, the interface connections in the control and indicating equipment as well as in the electrical control device of the fire extinguishing system shall be provided. The interface connections shall be clearly marked (see Section 8.2).

8.1.4 Distributor housing

An interface distributor shall be installed by the installer of the extinguishing element between the control and indicating equipment and the electrical control device in the immediate vicinity of the electrical control device. The distributor housing shall be clearly marked and easily visible from outside. The distributor connections shall be made using separation terminals and, as specified in Section 8.2, also be clearly marked.

8.1.5 Joint agreement

The interface connections between the control and indicating equipment and electrical control devices shall be made with joint agreement between the two approved installers for the relevant system.

8.2 Designations

8.2.1 Connection points

The connection points on the standardised interface for actuating a fire extinguishing system in or on the control and indicating equipment are to be marked with *extinguishing system*. If several detection zones are planned to actuate several flooding zones, the corresponding detection/flooding zone shall be identifiable from the connection designations.

The connection points on the standardised interface in the electrical control device belonging to the extinguishing element and the distributor housing mentioned under Section 8.1.4 shall be marked with *fire detection and fire alarm system*. If several flooding zones are activated, the corresponding flooding zone shall also be identifiable from the connection designation (Annex C).

8.2.2 Transfer of signals, faults and additional information

The designations of the individual connection points specified in the following sections are to be provided.

8.2.2.1 Transfer of signals

Transfer of the fire extinguishing signal from the fire detection and fire alarm system to the electrical control device on the extinguishing system

T 1 + T = Fire extinguishing signal;
1 = no. of the flooding zone;
+ / - = polarity of the connection

T 1 -

For extinguishing systems with more than one flooding zone, the number changes, hence:

T 2 + Flooding zone 2

T 2 -

etc.

Transfer of a pre-alarm

P 1 + P = Pre-alarm;
1 = no. of the flooding zone

P 1 -

Transfer of a fault signal

(necessary when activating pre-action alarm valve stations type A1 in sprinkler systems)

FFDAS 4 + S = Fault signal;
FFDAS = (on the) Fire detection and fire alarm system;
4 = (in) Extinguishing zone 4

FFDAS 4 -

For extinguishing systems with a selective fault signal from more than one flooding zone, the number changes (see above); if a common (centralised) fault signal is transferred, this number is omitted.

Note: In case of a fault on the monitored transmission paths used to transfer the actuation command or the fault signal from the fire detection and fire alarm system to the electrical control device and when transferring a fault signal from the control and indicating equipment to the electrical

control device, the alarm valve station's function shall be switched from "pre-action" to "dry system" by the electrical control device. The fault signal from the fire detection and fire alarm system shall include all functional impairments for the fire extinguishing signal, e.g. group disablements, revision circuits etc.

Transfer of an additional signal

Transfer of the switched off signal of the automatic triggering. This signal is purely for information purposes and does not trigger any control in the extinguishing system's electrical control device.

Adis 1 + ZAb = Additional signal "Triggering disablement";
1 = no. of the flooding zone

Adis 1 -

8.2.2.2 Transfer of signals

Transfer of signals from the extinguishing system to the control and indicating equipment

Actuation of extinguishing system, i.e. feedback

R + A = Actuation;
L = (of the) Extinguishing system

R -

Transfer of fault signals

FFES + S = Fault;
ES = (on the) Extinguishing system

FFES -

or in case of differentiated transfer of fault signals from the individual flooding zones (if necessary; minimum requirement is the transfer of a general fault signal):

FFES 1 + F = Fault;
ES1 = (in) Extinguishing zone 1

FFES 1 -

FFES 2 + F = Fault;
ES2 = (in) Extinguishing zone 2

FFES 2 -

etc.

Additionally, desired transfer of fault signals

Fadd + F = Fault;

Z = Additional signal (e.g. leakage)

Fadd -

It may be necessary to further subdivide into different flooding zones.

In this case, the number of the flooding zone is to be specified at the 3rd position, hence:

Fadd 1 + F = Fault; Fadd 1 = Additional signal from extinguishing zone 1

Fadd 1 -

Additionally, desired transfer of alarm signals

It may be preferable to further subdivide into different flooding zones:

R 3 + A = Actuation; L3 = (of) flooding zone 3

R 3 -

Note 1: An example of how to possibly implement the interface to trigger a fire extinguishing system can be found in Annex C .

Note 2: Faults that are not directly connected to the function of the fire extinguishing system shall not be transferred to the control and indicating equipment as a “Fire extinguishing system fault” (SL). Such faults, e.g. impairments to the extinguishing effect due to an unclosed room closure, are, when required, to be transferred to the control and indicating equipment as an additional signal (SZ).

9 SUPPLY WITH ELECTRICAL ENERGY

Dual power supply is required. One supply shall be electrical mains that is operated without interruption (main supply). The other supply shall be a battery (standby supply), which automatically takes over without interruption

if there is a mains failure. The energy sources shall be connected to the fire detection and electrical control device by fixed connections.

9.1 Electrical network

The power supply from the mains shall be rated such that the continuous operation of the system and the alarm devices is ensured. The power supply from the mains shall also be able to supply the charging current for the battery during the system’s normal operating state.

For the supply of power from the electrical networks, a dedicated electric circuit with its own isolating protective device, specially marked for the purpose shall be used. The possibility of the electric circuit for the system being interrupted by switching off other operating equipment shall be ruled out. A separate electric circuit from the building’s main distribution board is not necessary due to the integrated safety power supply.

Unless specified differently in the relevant guidelines and sets of rules, the following requirements apply:

The charging device shall be designed and set out so that:

- a) the battery can be automatically charged
- b) a battery that has been discharged down to its final voltage can be charged within 24 hours up to at least 80 % and within a further 48 hours up to 100 % of its rated capacity
- c) the charging characteristic is within the specifications given by the battery manufacturer for the ambient temperature range

9.2 Battery capacities

Unless specified differently in the relevant guidelines and sets of rules, the following requirements apply:

On systems with automatic fault signalling to a non-permanently manned location, the capacity of the battery is to be determined so that in case of a disrupted mains supply, the permanently unrestricted operation of the system is guaranteed for at least 72 hours. After 72 hours, the necessary alarm devices for the flooding zone with the biggest alarm current demand shall be able to be operated for at least a period of 30 minutes and the extinguishing system shall be able to be reliably actuated.

On systems with automatic fault signalling to a permanently manned location, as long as a suitable service for rectifying faults can be reached at all times, the capacity of the battery is to be determined so that in case of a disrupted mains supply, the permanently unrestricted operation of the system is guaranteed for at least 30 hours. After 30 hours, the necessary alarm devices for the flooding zone with the biggest alarm current demand shall be able to be operated for at least a period of 30 minutes and the extinguishing system shall be able to be reliably actuated.

On systems with automatic fault signalling to a permanently manned location with a suitable service for rectifying faults on standby at all times, the capacity of the battery is to be determined so that in case of a disrupted mains supply, the unrestricted operation of the system is guaranteed for at least 4 hours. After 4 hours, the necessary alarm devices for the flooding zone with the biggest alarm current demand shall be able to be operated for at least a period of 30 minutes and the extinguishing system shall be able to be reliably actuated. An external emergency generating unit for providing the power supply shall be available and able to be switched on without delay. The emergency generating unit shall be able to emit the power necessary to operate the system for a period of at least 30 hours.

9.3 Standby power supply

Unless specified differently in the relevant guidelines and sets of rules, the following requirements apply:

Only approved batteries conforming to EN 54 part 4, shall be used as standby supply.

Batteries shall be replaced at the latest every four years from the date of manufacture, unless otherwise stated in their certificate of approval.

Only batteries of the same type (same manufacturer, capacity, voltage, date of manufacture) may be used in parallel or in series.

More than two batteries shall only be connected in parallel to charging devices if the individual capacities are at least 36 Ah or the batteries are separately monitored and mutually decoupled. Altogether, however, only a maximum of three batteries shall be connected in parallel.

If batteries are connected in series, a maximum of two series connections shall be connected in parallel. Batteries may be connected in series up to a total number of maximum twelve cells. A series connection of more than twelve cells is permitted if an even voltage distribution is ensured by suitable measures.

10 LINE NETWORK

10.1 Overvoltage protection measures

The national requirements shall be complied with.

10.2 Circuit integrity maintenance

The fundamental requirements of circuit integrity maintenance are governed in the respective guidelines for the planning and

installation of fire detection and alarm and fire extinguishing systems.

Note: In principle, circuit integrity maintenance is only to be taken into account for the components of a fire detection and fire alarm system and/or fire extinguishing system that have to be functional for long enough in the event of a fire. Details about this are to be specified in the backup concepts for the respective systems.

11 COMMISSIONING AND HANDOVER

11.1 General

The installer of the extinguishing system is required to take the lead in the commissioning and handover process.

11.2 Commissioning

The fire detection and fire alarm system as well as the fire extinguishing system are to be put into operation according to the specifications of the respective guidelines for planning and installation. According to these, all the functions of the fire extinguishing system including the fire detection component relevant for the fire extinguishing system are to be inspected together by the installers before handover to the operator. An inspection document regarding the inspection is to be issued according to the sample form (see Annex D).

11.3 Handover

After correct operation of each part of the system has been confirmed by the installers involved, the system shall be handed over to operator. See also Section 5.2.3 (sample form of a certificate of approval see Annex D). If there is no confirmation from an installer, the fire extinguishing system shall not be put into operation by the operator.

12 MAINTENANCE

12.1 Responsibility

Maintenance work is necessary to ensure the proper operation of a fire extinguishing system. The national standards and provisions apply here, the guidelines for planning and installation of the respective fire extinguishing system as well as the national regulations for personal safety. Maintenance work is to be carried out by the certified installer for the relevant system. The timely and professional execution as well as the scope of this work shall be regulated (e.g. by a maintenance contract) between the responsible parties (e.g. operator, facility management organisation, installer).

If more than one installer is responsible, maintenance work shall be carried out jointly.

12.2 Arrangements for faults, damages and remediation

The installer shall start to remedy faults, damages and remediation within 24 hours of being requested. The work shall be performed in such a way that the period during which the function of appliances or system parts is interrupted is kept as short as possible. After concluding the work, a function test shall be carried out on the appliances and system parts whose function was impaired.

12.3 Modifications and extensions

Only an installer approved for the type of system involved shall carry out any modifications and extensions on the installed fire extinguishing systems. System parts required for this shall meet the guidelines applicable at the time.

12.4 Substantial modifications

Substantial modifications are:

- a) Modifications based on requirements of the fire extinguishing system resulting from the building permit, or change to the fire protection concept, which may lead to modifications to the fire extinguishing system, such as
 - 1) extension of the protection zone by one or more flooding zones
 - 2) dimensional changes of the protection zone
 - 3) change of risk in the protection zone
 - 4) change in the ventilation system
- b) System modification with change or replacement of the electrical control device, the performance features or function of the fire extinguishing system

A replacement of the control and indicating equipment with no change of function is not a substantial modification. For fire detection and fire alarm systems, the national requirements apply.

of extinguishing system are to be observed in this respect. A disablement of the electrical triggering on the fire detection and/or electrical control device, as well as switching over to manual mode are not sufficient because of the risk of false release e.g. by an operating error.

Measures are to be taken to keep the time of disablement and locking off as short as possible.

13 DISABLEMENT AND LOCK-OFF

In all case where a system or parts of a system are disabled or locked off, monitoring of the rooms in question shall be ensured until the system or the parts are switched back on or the disabling function is cleared. The locking off or disablements of the fire extinguishing system or of parts of the fire extinguishing system and/or the fire detection shall only be done by personnel authorised by the operator.

In the case of fire extinguishing systems, the extinguishing system shall be mechanically disabled **before** the start of any maintenance, repair or modification work on the fire protection equipment to prevent an unintended release of extinguishing agent. The corresponding regulations in the guidelines for planning and installation for the relevant type

ANNEX A (INFORMATIVE) EXAMPLES OF A GAS FIRE EXTINGUISHING SYSTEM ELECTRICALLY ACTUATED BY THE FIRE DETECTION AND FIRE ALARM SYSTEM

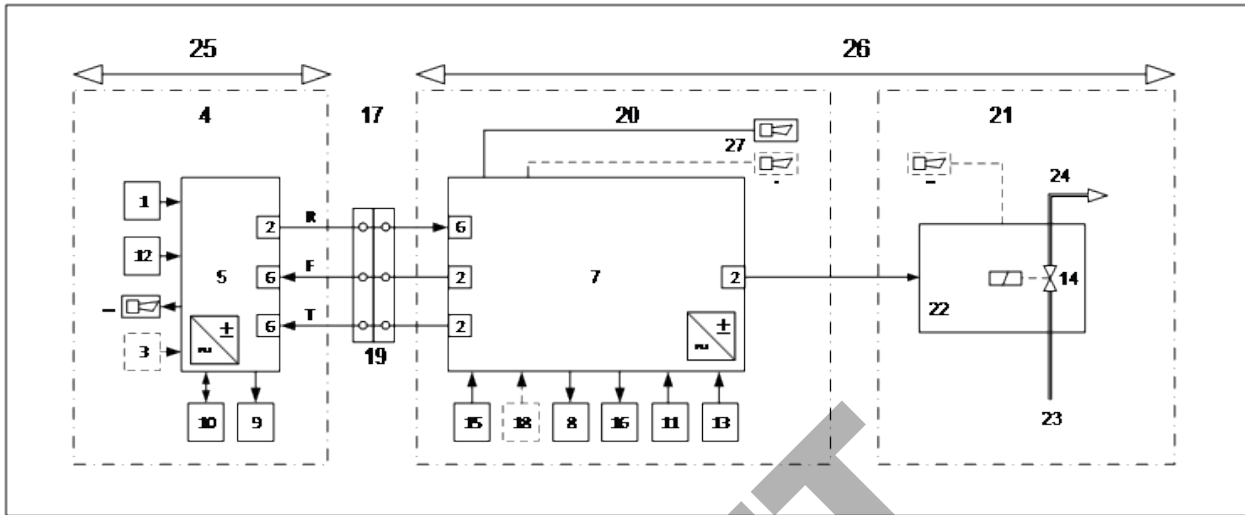


Figure A-1 Triggering with standardised interface

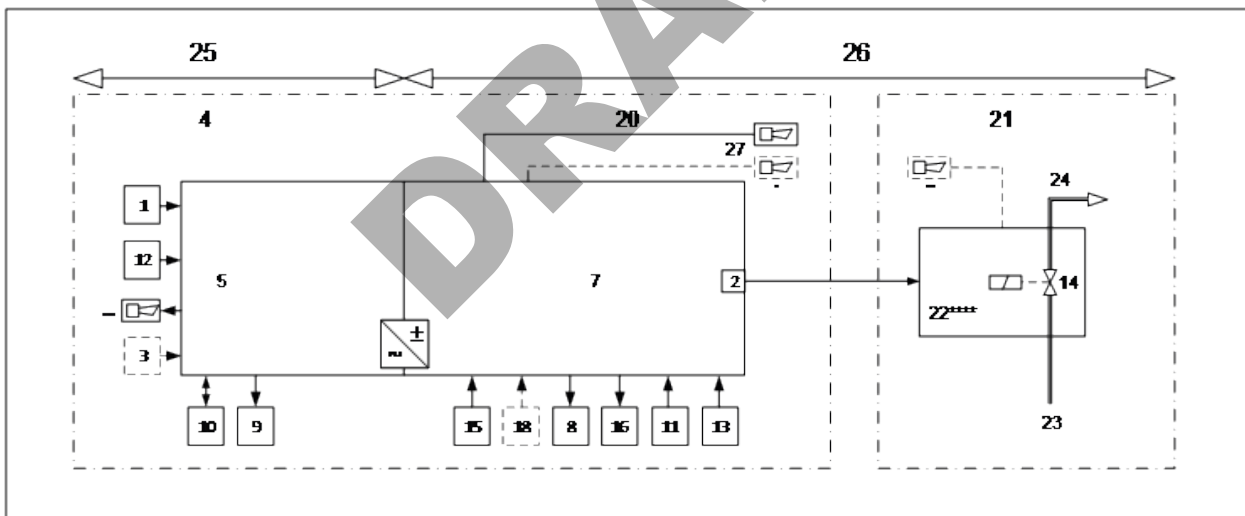


Figure A-2 Triggering without standardised interface
(joint control and indicating equipment/electrical control device)

ANNEX A (INFORMATIVE)

Legend

1	Automatic fire detectors according to DIN EN 54 (or VdS system approval)	15	Subsequent flooding
2	Control device	16	Control operating equipment
3	Fire detection element	17	Standardised interface
4	FDAS according to EN 54	18	Stop device/ emergency stop button/ emergency stop function depending on extinguishing system
5	Control and indication equipment	19	Standardised interface with separator strip
6	Reserving device	20	Electrical control device
7	Electrical control device	21	Extinguishing element
8	Close-off system	22	Triggering device
9	Fire department display panel for FDAS (national requirement)	23	From storage container
10	Fire department control panel for FDAS (national requirement)	24	To flooding zone
11	Manual release device	25	Fire detection unit
12	Manual call point	26	Extinguishing unit
13	Mechanical lock-off device	27	Alarm devices
14	Solenoid valve		

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ANNEX B (BINDING) STANDARDISED INTERFACE FOR EXTINGUISHING, EXTENDED CONNECTION DIAGRAM

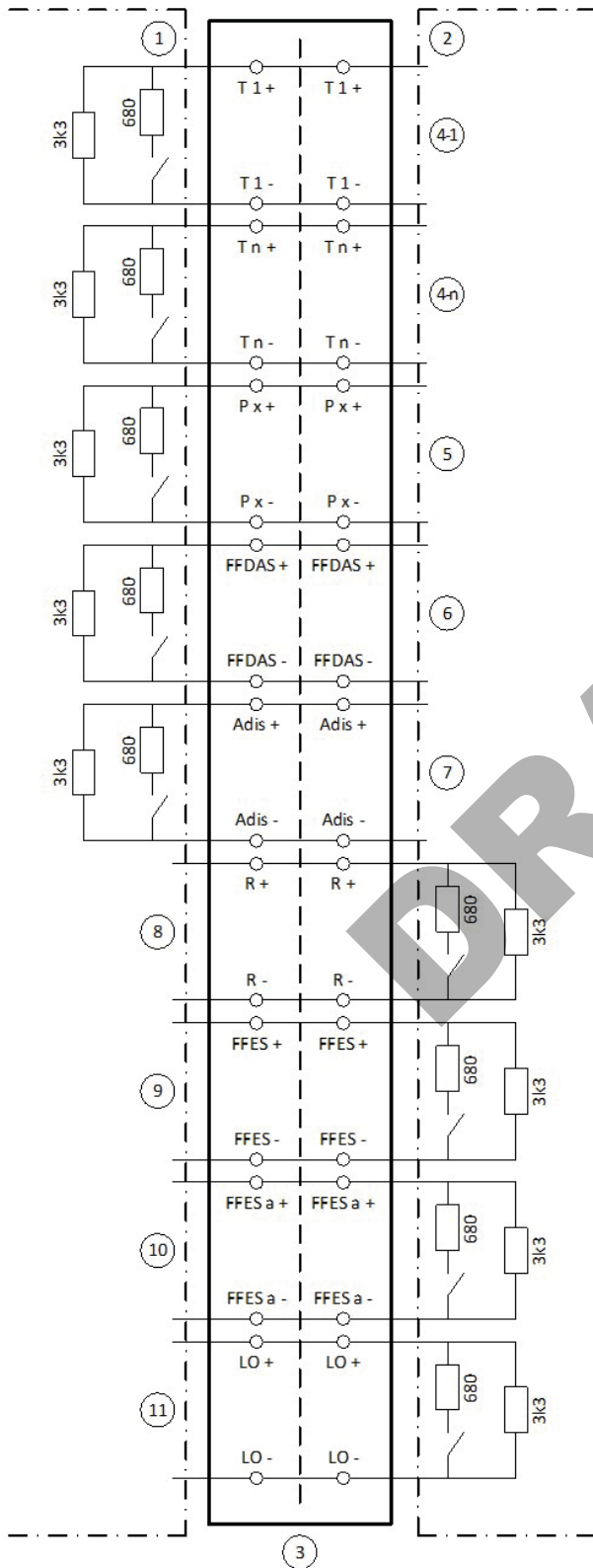


Figure B-1 Extended connection diagram standardised interface

ANNEX B (BINDING)

Legend

1	Control and indication equipment	6	Fault FES
2	Electrical control device	7	Additional message “ Deactivation of automatic triggering of flooding zone 1”.
3	Interface	8	Released FES
4	Triggering FEST -1 – Flooding zone 1 -n – Flooding zone n	9	Extinguishing unit fault Group signal
5	Pre-control alarm “Pre-alarm CIE area x”	10	Extinguishing unit fault (single message e.g. shrinkage)
		11	None electrical lock-off device (Gas extinguishing systems)
Abbreviation	Designation English		
Adis n	additional signal disablement in flooding zone / alarm valve n		
FES a	Fault signal additional signal e.g. “loss of extinguishant”		
FES n	Fault signal extinguishing system in flooding zone / alarm valve n		
FFDAS n	Fault signal fire detection and alarm system in flooding zone / alarm valve n		
LO	non-electrical disable device (lock-off device)		
P n	Pre-alarm flooding zone		

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ANNEX D (BINDING) CERTIFICATE OF APPROVAL OF THE TRIGGERING OF THE FIRE EXTINGUISHING SYSTEM – EXAMPLE

Certificate of approval for triggering of the fire extinguishing system in accordance with CEA 4015	
Project no.	
Construction project	
Postcode/town	
Areas	
The installer company of the extinguishing element	
approval no.	
Name of company	
Address	
represented by	
and the installer company of the fire alarm/fire detection component	
approval no.	
Name of company	
Address	
represented by	
have jointly completed the above mentioned fire extinguishing system, tested it, put it into operation and handed it over to the operator	
represented by	
The operator was told how it works and was instructed on how to operate it.	
Confirmation of the fire detection and fire alarm system installer	
Date	Stamp and signature
Confirmation of the fire extinguishing system installer	
Date	Stamp and signature
Confirmation of the operator	
Date	Stamp and signature

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